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Foreword

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

Introduction

To permit the effective interchange of non-voice (telematic) information between two terminal equipments, connected together by means of an Integrated Services Digital Network (ISDN) bearer service connection, an end-to-end protocol for controlling the data transmission process needs to be agreed.

The basic reference model of Open System Interconnection (OSI), the OSI model, provides a framework in which such protocols can be agreed. The OSI model is an internationally standardized description of the activities and functions necessary to allow systems to interwork using telecommunications services. However other (non-OSI) methods are available and the ISDN circuit-mode 64 kbit/s unrestricted bearer services may be used in conjunction with any end-to-end protocols.

This ETR recommends, for use on the ISDN, a set of protocols based upon the structure defined by the lower 4 layers of the OSI model. It takes into account the longer transmission delays which are encountered on connections routed via satellite systems. The protocols reflect:

a) the importance of "open systems" as a means of achieving Europe-wide and World-wide information interchange; and

b) the position of ISDN as a means for providing Europe-wide and World-wide telecommunications services; and

c) the possibility that international connections will include a satellite link and the need for global applications which use the ISDN to operate efficiently over them.

However, the need to ensure compatibility with existing protocols has not been overlooked. Sufficient flexibility has been incorporated to allow communication with systems that are not necessarily OSI conformant and with those which conform to existing standards, such as ETS 300 080 [1].

Protocols to support the data link service, the network service and the transport service can be individually designed for each telematic application. However, there are benefits to be gained from using common protocols that generally satisfy the requirements of all the applications concerned. The objective of this ETR is to define a common protocol stack and to specify, as far as possible, a common protocol at each layer of the stack to support all future telematic applications with optional features to enable interoperation with existing applications. This will:

a) more readily allow data interchange between systems providing multiple services; and

b) limit the number of variants, enabling a standard implementation to be realized, thereby reducing costs (of both construction and testing).

This ETR describes a set of protocols, up to layer 4, which may be used by terminal equipment with telematic functions attached to the European ISDN. The protocols are based upon ITU-T Recommendation T.90 [28] and ETS 300 080 [1], Ed 1. Requirements previously contained in ENV 41112 (see annex D). are also included. To broaden the scope of this recommendation, giving it a more general ISDN application, the lower layer protocols are specified such that they can be used by any type of telematic terminal regardless of whether a transport service is specified for that application. In other words, the layer 2 and 3 requirements are for general application and are independent of the higher layer aspects of the protocol stack of each application. Furthermore, the type selection procedure for terminals at call set up allows applications using protocols that are not within the scope of this recommendation to be detected. Such protocols may be implemented in addition to those recommended in this ETR as part of a multifunction terminal.

For historic reasons the protocols to be implemented in existing facsimile group 4, file transfer and Syntax-based Videotex applications are defined in ETS 300 080 [1].

A TE implementing data link control procedures in accordance with ITU-T Recommendation X.75 (see annex D) as modified by Edition 1 of ETS 300 080 [1], does not conform to the requirements of this recommendation However, a TE implementing data link control procedures in accordance with this ETR will be able to interwork (but possibly less efficiently) with such terminal equipment.

The requirements recommended in this ETR are sufficiently general to be applicable to ITU telematic services, appropriate OSI-based applications and future multimedia applications. In addition procedures are defined to enable communication with group 3 facsimile terminals (G3C and G3F) operating in accordance with ITU-T Recommendations.

Some existing telematic applications do not include a transport layer (layer 4) in their protocol stack for end-to-end communication. In this case the next higher layer protocol for that application maps directly on to the layer 3 protocols. The protocol defined in subclause 4.8 of this recommendation is for those terminals that require an intermediate layer between the higher layers (5 to 7) and layer 3.

It is recognized that whilst many future developments are likely to be based upon the OSI model, some future applications (as some existing applications) will employ a minimal transport service and some (e.g. like, Videotex and Eurofile Transfer) might not define any kind of transport layer. Similarly, some existing (and possibly future) applications do not conform entirely to the requirements of the OSI model. All such applications should be able to operate over the ISDN and be capable of interchanging data with one another.

This implies the need for all multi-function TE to be capable of modifying their behaviour to conform to the requirements of each of the applications supported. To increase the probability of successful calls a single default protocol stack, with a single default set of parameters at each layer, is recommended for use on the B-channel.

Application specific variations to the recommended protocols, if necessary, are expected to be specified elsewhere.

This ETR contains a recommendation for the application of base standards to permit efficient interworking between a TE with telematic functions and the ISDN and between two TE telematic functions via an ISDN connection. Such a connection may be a wholly terrestrial connection or it may include a satellite system.

Options are defined which enable the system to select throughput parameters that permit efficient operation over most types of connection. The optimization of throughput for a particular application is outside the scope of this ETR.

Implementation of this recommendation requires reference to the appropriate base standards.

1 Scope

This ETSI Technical Report (ETR) contains a recommended method of extending the lower layer protocols specified in ETS 300 080 [1] to cover, in particular, new non-voice applications and to include requirements for efficient information transfer over long connections, typically when routed via a satellite system. The recommendation includes a set of protocols up to and including layer 4 of the Integrated Services Digital Network (ISDN) Protocol Reference Model (PRM) for use with Terminal Equipment (TE) with telematic functions (telematic terminals), attached to the pan-European ISDN. It contains a specification of the profile (including additional aspects not specified in the base standards to which the profile refers), the Requirements List (RL) and the profile specific Implementation Conformance Statement (ICS) for the profile. Together, clause 4 and annex A specify the complete requirements for the implementation of the profile.

The protocols recommended in this ETR do not constitute a normative requirement and are, therefore, published as an ETR.

This ETR defines a profile containing:

- lower layer protocols which may be used on the D-channel to establish an ISDN (public and/or private) circuit-mode connection between two terminal equipments incorporating telematic functions; and

- lower layer protocols which may be (subsequently) used on the B-channel for end-to-end communication between the telematic functions of the two terminal equipments, specified to support the provision of the Open System Interconnection (OSI) Connection-mode Network Service and to support the higher layer protocols of the full range of ISDN telematic applications.

The protocols recommended in this ETR may be applied to any TE that supports one or more telematic functions. Application specific requirements, where required for particular telematic functions, are expected to be covered elsewhere.

The migration of existing telematic applications or services (e.g. Group 4 facsimile, videotex, etc.) to the use of the protocols defined in this ETR would need certain additional requirements to be specified. Notes in the text identify where such additional requirements may be necessary. When implemented, the protocols recommended in this ETR should be applied to terminal equipment with telematic functions connected via an interface at the S reference point, at the T reference point, or at the coincident S and T reference point, as defined in ITU-T Recommendation I.411 [2]. These interfaces may be either the Basic Access or the Primary Rate Interface. The scope of this recommendation also includes interfaces of Private Telecommunication Network Exchanges (PTNX) at the T and Q reference points (as specified in ISO/IEC 11579-1 [27]) in so far as is necessary for the correct operation of calls between telematic terminals. The requirements for terminal equipment intended for attachment to non-ISDNs (e.g. PSTN, PDN) are covered elsewhere.

The scope of the protocols recommended in this ETR is limited to demand calls using the circuit-mode 64 kbit/s unrestricted digital information bearer service and to the Data Terminal Equipment (DTE)-to-DTE case of the network layer peer entities on the B-channel connection. The requirements included in this recommendation are based on ETSs, International Standards or ITU-T Recommendations. In particular, they are based on the requirements contained in ITU-T Recommendation T.90 [28] and, where appropriate, ITU-T Recommendation X.224 [29].

This recommendation follows the methodology specified in ISO/IEC TR 10000-1. It provides the RL and the profile specific ICS proforma in compliance with the relevant requirements, and in accordance with the relevant guidance, given in ISO/IEC 9646-7 [26] and ETS 300 406 (see annex D). Annex A contains the profile RL and annex B contains the profile specific ICS proforma. The supplier of an implementation that is claimed to conform to the requirements of this recommendation is required to complete a copy of the ICS proforma provided in annex B and is required to provide the information necessary to identify both the supplier and the implementation.

This recommendation does not identify all the standards to which TE intended for connection to the ISDN need to comply. In particular, this ETR does not identify standards related to safety and protection, and electromagnetic compatibility (EMC) for the physical interface(s) of the equipment. Neither does it identify regulatory requirements with which such equipment may be required to comply.

2 References

This ETR incorporates by dated or undated reference, provisions from other publications. These 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 ETR only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies. These references become normative in the event that the recommendations contained in this ETR are implemented.

[1] ETS 300 080 (1992): "Integrated Services Digital Network (ISDN); ISDN lower layer protocols for telematic terminals".

[2] ITU-T Recommendation I.411 (1988): "ISDN user-network interfaces - Reference configurations".

[3] ITU-T Recommendation T.70 (1988): "Network-independent basic transport service for the telematic services".

[4] ITU-T 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 circuits".

[5] ETS 300 011 (1992): "Integrated Services Digital Network (ISDN); Primary rate user-network interface, Layer 1 specification and test principles".

NOTE 1: Including Amendments 1 and 2.

[6] ETS 300 012 (1992): "Integrated Services Digital Network (ISDN); Basic user-network interface, Layer 1 specification and test principles".

NOTE 2: Including Amendments 1 and 2.

[7] ETS 300 172 (1993): "Private Telecommunication Network (PTN); Specification, functional models and information flows; Identification supplementary services; ECMA-ISSD" (ISO/IEC 11572 (1994) modified).

[8] ETS 300 192 (1992): "Private telecommunication network (PTN); Signalling protocol at the S-reference point; Circuit mode basic services ECMA-SSIG-BC".

[9] ETS 300 345 (1995): "Integrated Services Digital Network (ISDN); Interworking between public ISDNs and private ISDNs for the provision of telecommunications services; General aspects".

[10] prETS 300 402-1: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Data link layer; Part 1: General aspects" (ITU-T Recommendation Q.920 (1993) modified).

[11] prETS 300 402-2: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Data link layer; Part 2: General protocol specification. (ITU-T Recommendation Q.921 (1993) modified)".

[12] prETS 300 402-4: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Data link layer; Part 4: Protocol Implementation Conformance Statement (PICS)".

[13] prETS 300 403-1: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 1: Protocol specifications" (ITU-T Recommendation Q.931(1993) modified).

[14] prETS 300 403-2: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 2: Specifications and Description Language (SDL) diagrams".

[15] prETS 300 403-3: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 3: Protocol Implementation Conformance Statement (PICS)".

[16] ISO/IEC 4335 (1993): "Information technology - Telecommunications and information exchange between systems - High-level Data Link Control (HDLC) procedures - Elements of procedures" (5th edition).

[17] ISO/IEC 7776 (1994): "Information technology - Telecommunications and information exchange between systems - High-level data link control procedures - Description of the X.25 LAPB-compatible DTE data link procedures", 2nd edition.

[18] ISO/IEC 8072 (1986): "Information technology - Open Systems Interconnection - Transport Service definition".

[19] ISO/IEC 8073 (1992): "Information technology - Telecommunications and information exchange between systems - Open Systems Interconnection - Protocol for providing the connection-mode transport service".

NOTE 3: This reference includes ISO/IEC 8073, Technical Corrigendum 2 (1994), "Information technology - Telecommunications and information exchange between systems - Open Systems Interconnection - Protocol for providing the connection-mode transport service", 3rd edition.

[20] ISO/IEC 8208 (1995): "Information technology - Data communications - X.25 Packet Level Protocol for Data Terminal Equipment", 3rd edition.

[21] ISO/IEC 8348 (1993): "Information technology - Open Systems Interconnection - Network Service Definition".

[22] ISO/IEC 8878 (1992): "Information processing systems - Telecommunications and information exchange between systems - Use of X.25 to provide OSI connection-mode network service" (2nd edition).

[23] ISO/IEC 8885 (1993): "Information technology - Telecommunications and information exchange between systems - High-level data link control (HDLC) procedures - General purpose XID frame information field content and format" (3rd edition).

[24] ISO/IEC 9574 (1992): "Information technology - Provision of the OSI connection-mode network service by packet mode terminal equipment connected to an Integrated Services Digital Network (ISDN)" (2nd edition).

[25] ISO/IEC 9646-1 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".

[26] ISO/IEC 9646-7 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".

[27] ISO/IEC 11579-1 (1994): "Information technology - Private Integrated Services Network - Reference Configuration Part 1: Reference Configuration for PISN Exchanges (PINX)".

[28] ITU-T Recommendation T.90 (1994): "Characteristics and protocols for terminals for telematic services in ISDN".

[29] ITU-T Recommendation X.224 (1993): "Information technology – Open systems interconnection – Protocol for providing the OSI connection-mode transport service".

[30] ITU-T Recommendation I.333 (1988): "Terminal selection in ISDN".

[31] ITU-T Recommendation X.200: "Information technology – Open Systems Interconnection – Basic reference model: The basic model".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this ETR, the definitions in ISO/IEC 9646-1 [25] apply in addition to the following:

lower layer protocol: A protocol defined for use in one of layers 1 to 4 of the protocol reference model for ISDN.

Open System Interconnection (OSI): The concept of interconnecting systems in accordance with the architecture described in ITU-T Recommendation X.200 [31]

telematic function: A function, excluding telephony, for the exchange of information via telecommunication networks. Examples of existing telematic functions include facsimile, file transfer, message handling and videotex functions.

telematic terminal: A TE with one or more telematic functions.

NOTE 1: Where the term "telematic terminal" is used in this ETR, it may be interpreted to mean equally either "a terminal equipment with one or more telematic functions", or "an OSI reference end system as defined in Memorandum M-IT-02 (see annex D)".

NOTE 2: The shortened term "terminal" and the abbreviation "DTE" are also used in this ETR to improve clarity; in both cases they should be interpreted to mean "telematic terminal".

Terminal Equipment (TE): Equipment intended to be connected to a telecommunication network in order to send and/or receive information.

3.2 Abbreviations

For the purposes of this ETR, the following abbreviations are used:

BC	Bearer Capability
CC	Connection Confirm
CONS	COnnection-mode Network Service
CR	Connection Request
DCE	Data Circuit-terminating Equipment
DLS	Data Link Subfield
DM	Disconnected Mode
DR TPDU	Disconnect Request TPDU
DTE	Data Terminal Equipment
ER TPDU	Error TPDU
FI	Format Identifier
FIS	Format Identifier Subfield
FRMR	Frame Reject
FTAM	File Transfer and Access Management
G3C	Group 3 facsimile (ITU-T Recommendation T.30 annex C, digital mode)
G3F	Group 3 facsimile (ITU-T Recommendation T.4 annex F)
G3V	Group 3 facsimile (ITU-T Recommendation T.30 annex C, analogue mode)
G4	Group 4 facsimile

HDLC	High-level Data Link Control
HIC	Highest Incoming Channel
HLC	Higher Layer Compatibility
HOC	Highest Outgoing Channel
HTC	Highest Two-way channel
ICS	Implementation Conformance Statement
ISDN	Integrated Services Digital Network
ITSTC	CEN/CENELEC/ETSI Information Technology Steering Committee
IUT	Implementation Under Test
LAPD	Link Access Procedure on the D-channel
LI	Length Indicator
LIC	Lowest Incoming Channel
LLC	Lower Layer Compatibility
LLI	Logical Link Identifier
LOC	Lowest Outgoing Channel
LTC	Lowest Two-way Channel
MFE	Multiple Frame Establishment
NIC	Network Independent Clock
NCMS	Network Connection Management Subprotocol
NSAP	Network Service Access Point
OSI	Open Systems Interconnection
P/F	Poll/Final
PAD	Packet Assembler / Dis-assembler
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
PRM	Protocol Reference Model
PSPDN	Packet Switched Public Data Network
PSTN	Public Switched Telephone Network
PTN	Private Telecommunication Network
PTNX	Private Telecommunication Network eXchange
QOS	Quality Of Service
RL	Requirements List
SABM	Set Asynchronous Balanced Mode
SABME	Set Asynchronous Balanced Mode Extended
SDL	Specification and Description Language
SPI	Subsequent Protocol Identifier
TDSAI	Transit Delay Selection And Indication
TE	Terminal Equipment
TPDU	Transport Protocol Data Unit
TPI	Telematics Profile Identifier
TR	Technical Report
UA	Unnumbered Acknowledgement
UDS	User Data Subfield
XID	eXchange IDentification

4 Conformance requirements

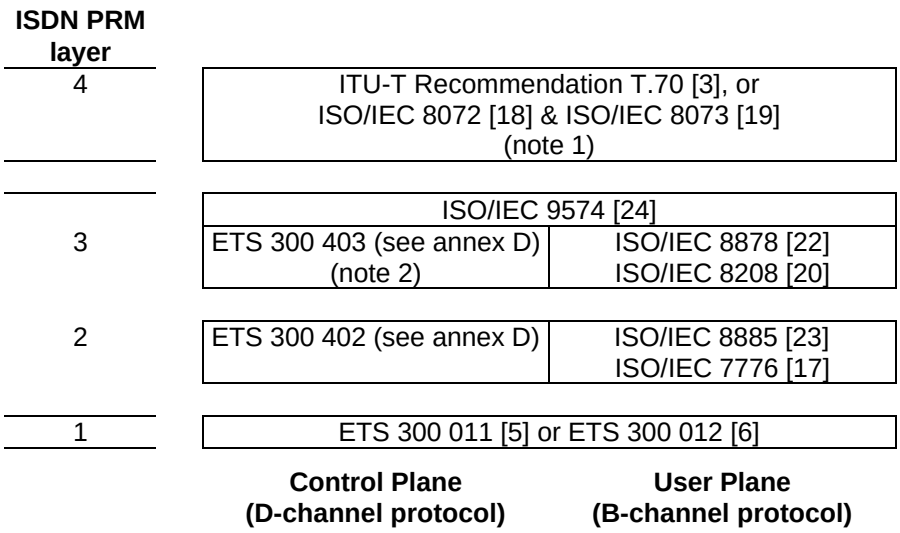
4.1 Protocol stack

4.1.1 Supported protocols

TE with telematic functions and attached to an ISDN (public or private) via an interface at the S reference point, the T reference point, or the coincident S and T reference point, should support the protocols defined by the Standards shown in figure 1.

Annex C to this ETR contains a description of the scenario to which this recommendation may be applied

NOTE: Existing types of telematic terminal, which comply with ETS 300 080 [1], may also be attached to an ISDN at these points.



NOTE 1: It is not essential that all telematic applications use the same transport layer (layer 4) protocols. (For example, Syntax-Based Videotex and Eurofile use no transport service.

NOTE 2: At the S reference point, the requirements of ETS 300 403 (see annex D) are modified; see subclause 4.5.1.

Figure 1: Protocol stack at the interface of ISDN TE with telematic functions

4.1.2 Relationship between protocols

Operations performed in the User Plane should be co-ordinated with operations performed in the Control Plane. The procedure should be as described below:

- If a B-channel connection has not previously been established, a calling TE should cause the ISDN D-channel signalling procedure for switched circuit-mode connections to be used to establish a B-channel connection. This should be carried out according to the requirements specified in subclause 4.5.

- If a B-channel connection already exists, or following establishment of the B-channel connection as specified above, the B-channel inband procedures should be carried out according to the requirements specified in subclauses 4.4 and 4.6.

- At the end of communication the call must be cleared. The B-channel data link should not be disconnected before the B-channel virtual call has been cleared. The B-channel should not be disconnected until the data link has been disconnected and the B-channel has returned to the idle channel state.

4.2 Physical interface (layer 1)

The physical interface of the TE should be an ISDN basic access implemented according to ETS 300 012 [6] or an ISDN Primary Rate Interface implemented according to ETS 300 011 [5].

4.3 Link layer (layer 2): D-channel

At layer 2, the data link procedures for the D-channel (Link Access Procedure on the D-channel (LAPD)) should be those specified in ETS 300 402-1 [10] and ETS 300 402-2 [11].

4.4 Link layer (layer 2): B-channel

4.4.1 Protocol to be used

Once a connection has been established between the calling TE and the called TE a High-level Data Link Control (HDLC) protocol should be operated on the B-channel. This protocol should be the protocol specified in ISO/IEC 7776 [17] modified by the requirements in subclause 4.4.6.

Prior to the establishment of the data link connection the following procedures should take place:

- achievement of octet alignment between the TEs, as specified in subclause 4.4.2; and

- optionally, terminal type selection and negotiation of the essential data link parameters, as specified in subclauses 4.4.3 and 4.4.4 respectively.

    NOTE: Provision for inband terminal type selection and negotiation of essential data link parameters is strongly recommended. It maximizes the probability of successful end-to-end communication between telematic terminals designed to different standards, and between telematic terminals connected to different networks.

4.4.2 Octet alignment

To ensure octet alignment between the terminals at each end of the connection, the procedure described in this subclause should be used for establishing end-to-end communication on the B-channel.

4.4.2.1 Idle channel state

A TE should close the receiver on the B-channel and transmit continuous "1" bits (idle channel state) on the B-channel until a B-channel connection to the remote TE has been established (i.e. until the circuit-switched ISDN call established by the network layer protocol on the D-channel (see subclause 4.5) has entered the Active state).

4.4.2.2 Active channel state - called terminal

After accepting a call (as described in subclause 4.5.2.4) a called terminal should open the receiver on the B-channel, and enter the active channel state by transmitting contiguous flags (interframe timefill, as defined in subclause 3.11.1 of ISO/IEC 7776 [17]).

4.4.2.3 Active channel state - calling terminal

When a B-channel connection has been established (i.e. after a CONNECT message has been received on the D-channel) a calling terminal should open the receiver on the B-channel and enter the active channel state by transmitting contiguous flags (interframe timefill, as defined in subclause 3.11.1 of ISO/IEC 7776 [17]).

4.4.2.4 Recognition of octet alignment

It is desirable that the calling terminal should not send any HDLC frames until at least 64 contiguous flags have been received on the B-channel.

The calling terminal may then send an eXchange IDentification (XID) frame (subclause 4.4.3) or initiate the setting up of the data link (subclause 4.4.6).

    NOTE: Recognition of at least 64 contiguous flags enables the terminal to distinguish between absence of flags and transmission errors. Contiguous flags are not available when interworking occurs with a network having restricted bearer capability. The absence of contiguous flags on the B-channel is not, therefore, necessarily an indication of a failure condition. Interworking with a network having restricted bearer capability is outside the scope of this ETR. In addition, by waiting for 64 flags before sending a frame, compatibility with facsimile "G3C" terminals will be achieved.

4.4.2.5 Return to idle channel state

A TE should return a B-channel to the idle channel state (see subclause 4.4.2.1) when the circuit-switched ISDN call established by the network layer protocol on the D-channel (see subclause 4.5) leaves the Active state (i.e. when call clearing commences).

A TE should also return a B-channel to the idle channel state (see subclause 4.4.2.1) if the receiver detects the idle channel condition (continuous "1" bits) for a period of time equivalent to timer T3 (see subclause 4.4.6.13).

4.4.3 Terminal type selection

4.4.3.1 General

Terminal type selection using an inband (on the B-channel) mechanism is an optional feature which may be carried out on a call-by-call basis.

If such a procedure is used, it should comply with the requirements of this subclause.

NOTE 1: The use of inband procedures may not be necessary if there is prior agreement between the calling and called parties on the terminal type and data link parameters. Such agreement may be achieved through outband negotiation (see subclause 4.5.2.3) or some other means which is outside the scope of this ETR. If used however, the inband negotiation overrides any prior agreement. The circumstances of when and if the inband procedure would be used are application dependant and are outside the scope of this ETR (inband terminal type selection, for example, is not supported by syntax based Videotex and Eurofile; it is optional in a facsimile group 4 terminal).

NOTE 2: The use of an inband selection mechanism can maximize the probability of successful end-to-end communication between telematic terminals designed to different standards, or between telematic terminals connected to different networks. The outband compatibility checking mechanism, using information elements of the D-channel layer 3 protocol as described in subclause 4.5.2, .may not be universally available and where it is available may not always be capable of unambiguously defining the telematic service required and the end-to-end protocol characteristics.

NOTE 3: The XID procedure specified in this subclause and in subclause 4.4.4 is a specific application of the general purpose XID procedure defined in ISO/IEC 8885 [23]. Based on the procedure described in annex F of ITU-T Recommendation T.90 [28], it permits inband terminal type selection and negotiation of the essential data link parameters between two telematic terminals.

NOTE 4: This procedure can only be used by applications for which terminal type codes have been allocated (see table 2 in subclause 4.4.5.3).

NOTE 5: This procedure supersedes procedures based on annex C of ITU-T Recommendation T.90 [28]. New designs of TE should not support the transmission of XID frames with a value of hexadecimal 82 in the Format Identifier Subfield (FIS). However, for backwards compatibility, new terminal designs may wish to support the recognition of received XID frames of this type. Requirements related to the recognition of such frames are contained in subclause 4.4.4.2.

Terminal type selection should be implemented using the XID command/response frame specified in ISO/IEC 4335 [16]. The format and content of the information field are described in subclause 4.4.5. The single-frame exchange negotiation procedure specified in clause 7 of ISO/IEC 8885 [23] should be used, as amended by the requirements of the following subclauses.

4.4.3.2 Procedure at calling terminal

Terminal type selection should be carried out after the physical B-channel connection has been established and octet alignment obtained, but before the initiation of data link set-up on the B-channel.

The calling terminal should send an XID command frame with the Poll/Final (P/F) bit of the control field set to "1". The User Data Subfield (UDS) should contain a Telematics Profile Identifier (TPI) block indicating the terminal type or types supported (see subclause 4.4.5.3).

4.4.3.3 Procedure at called terminal

A called terminal receiving an XID command frame, encoded as described in subclause 4.4.5, should acknowledge receipt of the frame. It does this by sending an XID response frame with the P/F bit of the control field set to "1". The UDS should contain a TPI block indicating a single terminal type. The terminal type indicated should be the first type, selected from the preference list sent by the calling terminal (see subclause 4.4.5.3), that the called terminal is able to support. Alternatively, the UDS may contain a list of terminal types that the called terminal can support.

A called terminal receiving an Set Asynchronous Balanced Mode (SABM) or Set Asynchronous Balanced Mode Extended (SABME) command frame whilst waiting for an XID command frame should assume that the calling terminal does not support XID command frame procedures. The called terminal then immediately continues with initiation of data link set-up; it should continue to behave as the called terminal, as described in subclause 4.4.6.

4.4.3.4 Selection by calling terminal

If only a single terminal type is indicated in the XID response frame, the calling terminal may accept this type or it may clear the call. If several terminal types are indicated in the XID response frame, the calling terminal may select one of the terminal types offered, or it may clear the call. In both cases, if the calling terminal decides to proceed with the call it sets up the data link according to subclause 4.4.6.

To maximize the probability of successful interworking, the defined terminal types (see table 2 in subclause 4.4.5.3) include terminal types that are not specifically within the scope of this recommendation e.g. facsimile group 3C. If the offered terminal type is outside the scope of this recommendation, and the calling terminal supports the required functionality, the calling terminal may still choose to proceed with the call. In this case, the subsequent procedures are outside the scope of this ETR.

NOTE: Some TE that can be called will not conform to the requirements of this recommendation.. Such TE may not recognize XID command frames of the type described in subclause 4.4.3.2, and might respond with a Disconnected Mode (DM) response frame with the P/F bit set to "1".

If the calling terminal receives a DM response frame, it should assume the called terminal has not recognized the XID frame. If, after a period of time equal to 3 times the value of timer T1, the calling terminal has received no response, the calling terminal should assume the called terminal has not recognized the XID frame. In either case the calling terminal should continue by setting up the data link according to subclause 4.4.6.

4.4.4 Negotiation of essential data link parameters

4.4.4.1 During terminal type selection

Negotiation of the essential data link parameters is optionally permitted if the application uses the terminal type selection procedure (subclause 4.4.3). Such negotiation should be undertaken using the same XID frame as is used for terminal type selection.

The XID frame transmitted by the calling terminal should indicate, by means of appropriate encoding in the Data Link Subfield (DLS), which modes of operation (subclause 4.4.6.2) the calling terminal supports. The XID frame should also indicate the maximum window size the calling terminal can support (subclause 4.4.6.16).

In accordance with ISO/IEC 8885 [23] the XID response frame sent by the called terminal determines the parameter values to be used by both terminals. It should indicate acceptance of extended (modulo 128) operation if this mode was offered by the calling terminal and is supported by the called terminal. Otherwise, the response should indicate acceptance of basic (modulo 8) operation. The value for the *k* parameter in the XID response frame should be equal to or less than the value of the equivalent *k* parameter in the XID command frame. The requirements specified in subclause 4.4.6.16 should be taken into account when setting the value of *k* in the response frame.

If the calling terminal receives a DM response frame, it should assume the called terminal has not recognized the XID frame. If, after a period of time equal to 3 times the value of timer T1, the calling terminal has received no response, the calling terminal should assume the called terminal has not recognized the XID frame. In either case the calling terminal should continue by setting up the data link according to subclause 4.4.6.

4.4.4.2 On receipt of XID frame with FIS = 82

A called terminal receiving an XID command frame in which the FIS is encoded with a value of hexadecimal 82 may respond with either a DM response frame or an XID response frame. In the latter case the requirements in the remainder of this subclause apply.

NOTE: This procedure is included to permit backwards compatibility with calling TE designed to the 1992 version of ITU-T Recommendation T.90 [28].

The format of the XID response frame should be similar to that described in subclause 4.4.5 below. The frame should contain a FIS, coded with value hexadecimal 82, and a Data Link Subfield (DLS), but no User Data Subfield (UDS).

In accordance with ISO/IEC 8885 [23] the XID response frame sent by the called terminal should determine the parameter values to be used by both terminals. It should indicate acceptance of extended (modulo 128) operation if this mode was offered by the calling terminal and is supported by the called terminal. Otherwise, the response should indicate acceptance of basic (modulo 8) operation. The value for the *k* parameter in the XID response frame should be equal to or less than the value of the equivalent *k* parameter in the XID command frame. The requirements specified in subclause 4.4.6.16 should be taken into account when setting the value of *k* in the response frame.

4.4.5 Content and format of the XID frame

Figure 2 shows the format of an XID frame for terminal type selection. The content and format of XID command and response frames should be as specified in ISO/IEC 8885 [23] with amendments as specified in this subclause.

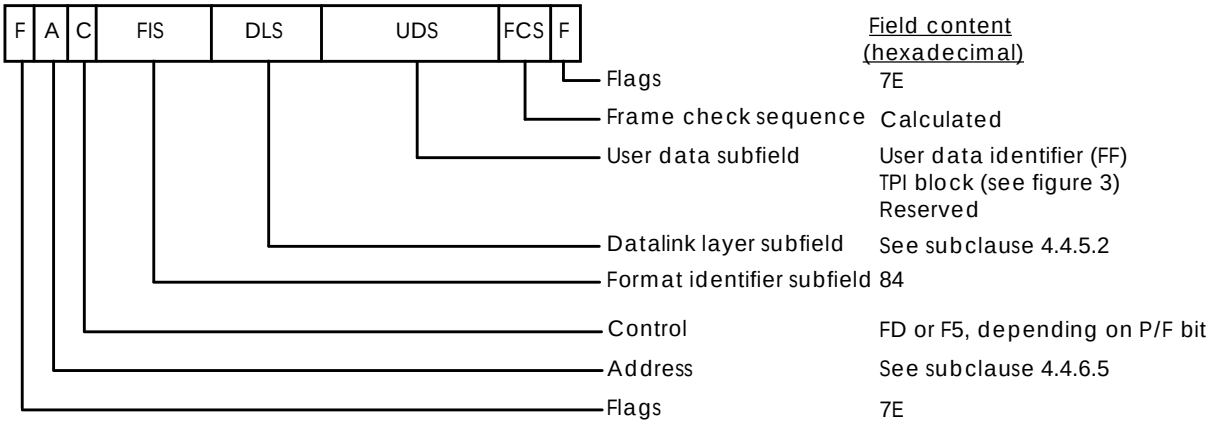


Figure 2: Format of XID frame for terminal type selection

4.4.5.1 Format Identifier Subfield (FIS)

The FIS should be encoded as: "telematic terminal negotiation" (hexadecimal value 84).

NOTE: See ISO/IEC TR 10178 (see annex D).

4.4.5.2 Data Link Subfield (DLS)

Only the DLS with Group Identifier equals "parameter negotiation" should be used (hexadecimal value 80).

Parameter field elements, selected from tables 1 and 3 of ISO/IEC 8885 [23] should be encoded as specified in table 1.

Table 1: DLS parameter field elements for negotiation of data link parameters

Name	Parameter identifier	Parameter field element	Value
HDLC optional functions	3	10A (modulo 8)	True
HDLC optional functions	3	10B (modulo 128)	True or False, according to the capability of the terminal (note 1)
Window size - transmit	7	Window size *k* - transmit	note 2
Window size - receive	8	Window size *k* - receive	note 2
NOTE 1: See subclause 4.4.6.2. NOTE 2: See subclause 4.4.6.16.			

Parameter field elements of the DLS not listed in table 1 should be set to the value zero by both calling and called terminals.

4.4.5.3 User Data Subfield (UDS)

The UDS consists of the user data identifier and a TPI block.

The user data identifier should be encoded with the hexadecimal value "FF".

The TPI block consists of a terminal identifier, a length indicator and one or more terminal type identifiers. The TPI block should be structured and encoded as shown in figure 3.

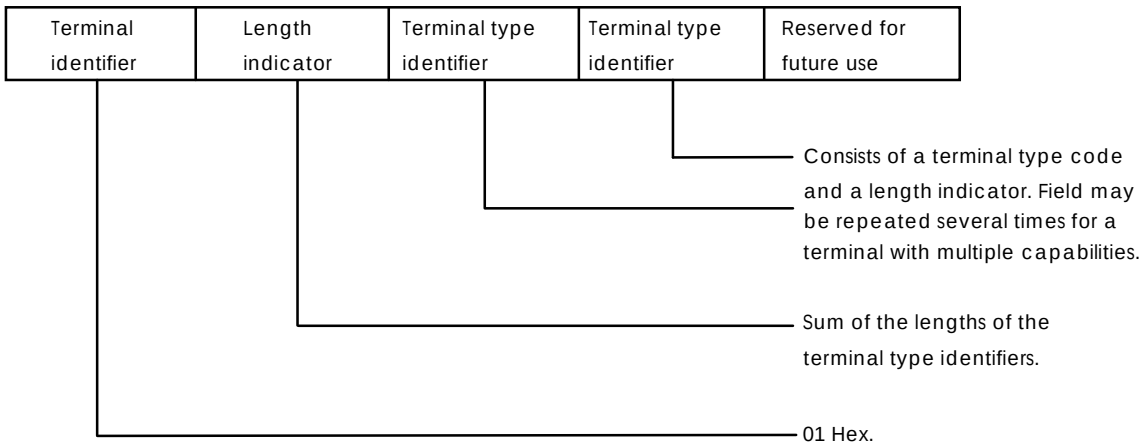


Figure 3: Structure of the Telematics Profile Identifier (TPI) block

Each terminal type identifier consists of 2 octets. The first octet should be the terminal type octet and should contain a value indicating the terminal type. The permitted values for terminal type are shown in table 2. The second octet (which is a length indicator for future expansion) should be set to zero.

Table 2: Permitted terminal types

Terminal type (note 1)	Hexadecimal coding
Facsimile G4 (G4)	11
Facsimile G3 ITU-T Recommendation T.30 annex C (G3C) (note 2) see annex D	12
Facsimile G3 ITU-T Recommendation T.4 annex F (G3F) see annex D	13
Facsimile G3 ITU-T Recommendation T.30 annex C (G3V) (note 2) see annex D	14
NOTE 1: At present, terminal type codes have only been allocated for various types of facsimile terminal. Other codes may be assigned in the future. NOTE 2: See subclause 4.4.3.4.	

Within the TPI block one or more terminal type identifiers may appear (as shown in figure 3) to signify a terminal meeting several standards (e.g. for facsimile transmission). Where several possibilities exist the terminal type identifiers should be in order of preference, the most preferable being transmitted first.

4.4.6 Data link procedures

The calling TE should implement the data link procedures for DTE/DTE operation specified in ISO/IEC 7776 [17] with modifications as specified in subclauses 4.4.6.1 to 4.4.6.16.

4.4.6.1 Mode of transmission

The requirements specified in subclauses 3.5, 3.7, 3.8, 3.9, 3.10, and 3.11 of ISO/IEC 7776 [17] should be met.

Only the synchronous mode of transmission should be supported.

4.4.6.2 Mode of operation

The requirements specified in clause 3 and subclauses 4.1 and 4.3 of ISO/IEC 7776 [17] should be met.

Basic (modulo 8) operation should be the standard (default) method of operation.

Extended (modulo 128) operation may also be supported.

NOTE: The use of basic (modulo 8) operation as the standard method of operation maximizes compatibility between many different types of terminal. However, it is strongly recommended that terminals should also support extended (modulo 128) operation to permit efficient communication over long connections e.g. via satellite. The use of extended (modulo 128) operation provides greater flexibility with regard to the choice of an optimum window size and packet size for a given application.

4.4.6.3 Frame reject response

The requirements specified in subclauses 4.3.9, 4.4.4, and 5.6.2 of ISO/IEC 7776 [17] should be met.

The sender of a Frame Reject Response (FRMR) should retransmit the FRMR if timer T1 expires and initiate the link resetting procedure if no action has been taken by the remote terminal after the FRMR has been sent N2 times.

4.4.6.4 Single link procedure

The requirements specified in clause 5 of ISO/IEC 7776 [17] should be met.

Only the single link procedure should be supported. Conformity to the multilink procedure defined in clause 6 of ISO/IEC 7776 [17] is not required.

4.4.6.5 Procedure for addressing

The requirements specified in subclause 5.1 of ISO/IEC 7776 [17] should be met.

DTE/DTE single link operation should be used with the addresses A and B being assigned dynamically on a call-by-call basis. The calling terminal should take address A and the called terminal should take address B.

4.4.6.6 Link set-up

The requirements specified in subclauses 4.3.5 and 5.3.1 of ISO/IEC 7776 [17] should be met.

The calling terminal should initiate link set-up. It should send an SABM command frame if basic (modulo 8) operation is to be used or an SABME command frame if extended (modulo 128) operation is to be used.

In establishing the link, the TE should take account of the outcome of the procedure for negotiating essential data link parameters (subclause 4.4.4), if it was used, or of any prior knowledge it may have about the capability of the called terminal.

When using extended (modulo 128) operation, if the calling terminal does not receive an Unnumbered Acknowledgement (UA) frame in response to the SABME command frame, after 2 attempts it should revert to basic (modulo 8) operation.

A calling terminal may receive a SABM or SABME frame (respectively) in response to a SABM or SABME it has previously sent i.e. a collision. In this case, the calling terminal should react as if it had received a UA frame.

4.4.6.7 Disconnected phase

The requirements specified in subclause 5.3.4 of ISO/IEC 7776 [17] should be met.

In the disconnected phase only the calling terminal should initiate set-up of the data link. i.e. it should not send an unsolicited DM response.

The terminal should ensure disconnection of the data link has occurred before disconnecting the B-channel.

The data link should be considered "disconnected" if continuous '1' state is detected for the period of timer T3.

4.4.6.8 Receiving an I-frame

The requirements specified in subclause 5.4.2 of ISO/IEC 7776 [17] should be met.

A terminal in the not-busy condition should respond to the receipt of a valid I-frame as quickly as possible, and within the time indicated by the value of timer T2.

4.4.6.9 Unsolicited UA in information transfer phase

The requirements specified in subclause 5.5 of ISO/IEC 7776 [17] should be met.

An unsolicited UA response received during the information transfer phase should be ignored. The terminal should react to any other unsolicited response with the F-bit set to "1", by resetting the link.

4.4.6.10 Procedure for link resetting

The requirements specified in subclause 5.6 of ISO/IEC 7776 [17] should be met.

After N2 attempts to reset the link without success the terminal should initiate higher layer recovery and enter the disconnected phase as described in subclause 5.3 of ISO/IEC 7776 [17].

4.4.6.11 Timer T1

The requirements specified in subclause 5.7.1.1 of ISO/IEC 7776 [17] should be met.

Timer T1 (retransmission timer) should be started at the end of the transmission of a frame. It is recommended that T1, should have a value in the range 2,5 seconds to 7 seconds.

NOTE: The choice of value for a particular implementation should allow sufficient margin of time for all the functions, including the round trip transmission delay over the longest connection, before T1 times out and recovery procedures are initiated whilst not holding up recovery by being unnecessarily long. The maximum frame size must also be taken into account.

4.4.6.12 Parameter T2

The requirements specified in subclause 5.7.1.2 of ISO/IEC 7776 [17] should be met.

The value of parameter T2 (acknowledgement delay) should be less than or equal to 1 second.

4.4.6.13 Timer T3

The requirements specified in subclause 5.7.1.3 of ISO/IEC 7776 [17] should be met.

Timer T3 (disconnected timer) should have a value between 30 seconds and 60 seconds.

4.4.6.14 Maximum number of transmissions N2

The requirements specified in subclause 5.7.2 of ISO/IEC 7776 [17] should be met.

The value of N2 should be set to a value equivalent to 60 seconds divided by the value of T1.

4.4.6.15 Maximum frame length N1

The requirements specified in subclause 5.7.3 of ISO/IEC 7776 [17] should be met.

Parameter N1 (maximum number of bits in an I-frame) should be such that the data link layer is capable of carrying the maximum packet size negotiated at the packet layer, plus the related packet layer and data link layer control information.

NOTE: Guidance on the derivation of N1 (DCE N1) can be found in Appendix II of ITU-T Recommendation X.25 [4].

4.4.6.16 Maximum number of outstanding I-frames *k*

The requirements specified in subclause 5.7.4 of ISO/IEC 7776 [17] should be met.

NOTE 1: The maximum number of outstanding I-frames - *k*, is commonly referred to as the "window size".

When basic (modulo 8) operation is used, the value for *k* should be 7.

A TE supporting extended (modulo 128) operation may support one or more window sizes in the range 1 to 127. If a variable window size is supported and terminal type selection (subclause 4.4.3) is used, a value in this range may be offered during the negotiation of the essential data link parameters (see subclause 4.4.4). The preferred value for *k* is 80.

NOTE 2: A value of 80 provides optimum throughput efficiency over a wide range of connections. With "larger" packet sizes (subclause 4.6.4.2), smaller values of *k* may be negotiated without significantly affecting throughput efficiency. This may allow better use of available memory within a TE.

4.5 Network layer (layer 3): D-channel

4.5.1 Protocol to be used

At layer 3, the user-network call control procedures on the D-channel, at interfaces at the coincident S and T reference point and at the T reference point, should be those specified in ETS 300 403-1 [13] and ETS 300 403-2 [14].

For interfaces at the S reference point, the user-network call control procedures specified in ETS 300 403-1 [13] and ETS 300 403-2 [14] with modifications as specified in ETS 300 192 [8] apply.

The requirements in the following subclauses are specified with reference to ETS 300 403-1 [13] and ETS 300 403-2 [14]. For the S reference point case the modifications contained in ETS 300 192 [8] should be applied.

NOTE 1: ETS 300 403-1 [13] supersedes ETS 300 102-1 (see annex D).

NOTE 2: ETS 300 403-2 [14] supersedes ETS 300 102-2 (see annex D).

NOTE 3: ETS 300 192 [8] makes normative reference to ETS 300 102-1 (see annex D). It will be revised to refer to ETS 300 403-1 [13]. The modifications to ETS 300 102-1 (see annex D) specified by ETS 300 192 [8] apply equally to ETS 300 403-1 [13].

4.5.2 Terminal selection

Terminal selection should be carried out according to the principles specified in ITU-T Recommendation I.333 [30]. The procedures defined in ETS 300 403-1 [13] apply. Subclauses 4.5.2.1 and 4.5.2.2 specify additional requirements to be met by TE with telematic functions.

NOTE 1: Implementors are advised to refer to ETR 018 and ETR 026 (see annex D) which contain additional information about terminal selection.

NOTE 2: Subclause 4.5.2 describes the preferred method. However, the information fields defined in ETS 300 403 may not always be transferred transparently across the network. An inband method for terminal type selection is also defined in order to maximize the probability of successful information interchange (see subclause 4.4.3).

4.5.2.1 Compatibility information provided by the calling terminal

A calling TE should always provide the full set of required information in the Bearer Capability (BC), Low Layer Compatibility (LLC), and High Layer Compatibility (HLC) information elements. This should be encoded as specified in ITU-T Recommendation Q.931 as modified by ETS 300 403-1 [13], supplemented by the requirements of this subclause.

4.5.2.1.1 BC information element

A calling terminal should include octets 1 to 4 in the BC information element. The service specific octets should be encoded as specified in table 3. Octets 5 to 7 should be omitted.

Table 3: Coding of BC information element

Octet	Information element field	Field value
3	Coding standard	ITU-T standardized coding
	Information transfer capability	Unrestricted digital information
4	Transfer mode	circuit-mode
	Information transfer rate	64 kbit/s

4.5.2.1.2 Low layer compatibility information element

A calling telematic terminal should include octets 1, 2, 3, 4, 6, and 7 in the LLC information element. Octets 6a, 6b, and 7a to 7c should be included to determine the B-channel layer 2 and layer 3 parameters to be used. The octets should be encoded as specified in table 4.

Outband negotiation of field values in octets 6a, 6b and 7 a to c, as specified in subclause 4.5.2.3, is an optional feature. Its implementation is strongly recommended. If the calling TE is capable of modifying these layer 2 and layer 3 parameters at the request of the called TE it should signify "outband negotiation possible" in octet 3a. In this case the values included may be selected from those specified in the appropriate subclause in 4.4 (for layer 2) and 4.6 (for layer 3).

As a minimum all TEs should implement the "Standard" values.

Table 4: Coding of LLC information element

Octet	Information element field	Field value
3	Coding standard	ITU-T standardized coding
	Information transfer capability	Unrestricted digital information
3a	Negotiation indicator	Optional: (note 1); The use of out-band negotiation is strongly recommended. Standard = Outband negotiation not possible
4	Transfer mode	Circuit-mode
	Information transfer rate	64 kbit/s
6	User information layer 2 protocol	ISO/IEC 7776 [17] DTE-DTE operation (note 2)
6a	Mode of operation	Optional: (subclause 4.4.6.2) Standard = Normal mode (notes 3 and 4)
6b	Window size (*k*)	Optional: (subclause 4.4.6.16) Standard = 7 (note 3)
7	User information layer 3 protocol	ISO/IEC 8208 [20] (note 2)
7a	Mode of operation	Optional:(subclause 4.6.4.3) Standard = Normal packet sequence numbering (notes 3 and 5)
7b	Default packet size (note 6)	Optional: (subclause 4.6.4.2 Standard = 128 (note 3)
7c	Packet window size	Optional.(subclause 4.6.4.3) Standard = 2 (note 3)

NOTE 1: The use of outband negotiation may be application dependent.

NOTE 2: Other encodings of octets 6 and 7 (chosen from those specified in ETS 300 403-1 [13]) may be used if this is appropriate for a specific application. However, this is outside the scope of this recommendation.

NOTE 3: This value should indicate the preferred mode of operation of the calling TE. Some applications may be able to negotiate another value as specified in 4.5.2.3. If outband negotiation is not possible then negotiation may be possible by using the inband procedures specified in subclauses 4.4.3 and 4.4.4.

NOTE 4: The term "normal mode of operation", used in ETS 300 403-1 [13], means the same as the term "basic (modulo 8) operation", as used in subclause 4.4.6 of this ETR.

NOTE 5: The term "normal packet sequence numbering", used in ETS 300 403-1 [13], means the same as the term "modulo 8 numbering", as used in subclause 4.6.4 of this ETR.

NOTE 6: The use of the term "default" by ETS 300 403-1 [13] is not the same as its use in ISO/IEC 8208 [20]. In this context it means the packet size to be assumed as the default for the current call until overridden e.g. by outband or inband negotiation procedures.

4.5.2.1.3 HLC information element

A calling telematic terminal should include octets 1 to 4 in the HLC information element. Other octets should be omitted.

The coding of octet 3 should be as specified in table 5.

Table 5: Coding of octet 3 of HLC information element

Information element field	Field value
Coding standard	ITU-T standardized coding, or National standard (note)
Interpretation	First high layer characteristics
Presentation method of protocol profile	High layer protocol profile
NOTE: The coding standard to be used is determined according to the function provided by the calling TE (see tables 6 and 7). The use of other values is not precluded if required in the future.	

The high layer characteristics identification octet, octet 4, should be encoded as shown in tables 6 and 7, depending on the function provided by the calling TE.

Table 6: ITU-T standardized coding of octet 4 of HLC information element

Field value (note 1)	Typically used by (note 2)
Facsimile group 3	Facsimile group 3, except G3F (note 3)
Facsimile group 4	Facsimile group 3F Facsimile group 4
Syntax-based Videotex	Terminal-to-Videotex access function, where a Videotex access function is a Videotex service centre, a Videotex access point or a Videotex host (note 4).
International Videotex interworking	Interworking between Videotex access functions.
FTAM application (ISO 8571)	FTAM over ISDN
OSI application	Other OSI applications having telematic functions (note 5)
NOTE 1: When field values in this column are used, octet 3 (Coding standard) of the HLC information element should be encoded as "ITU-T standardized coding". Other telematic applications are not excluded and other values may be added later.	
NOTE 2: This column gives examples of applications that typically use each of the possible encodings of the High layer characteristics identification octet in the HLC information element. It provides information concerning the relationship between the information encoded in the HLC information element and that encoded in the Subsequent Protocol Identifier (SPI) (see table 9).	
NOTE 3: The defined codings include applications other than those specifically within the scope of this ETR, to maximize the probability of successful inter-working. If such a terminal type is encountered during call establishment, the calling terminal may opt to clear the call and then try again using this mode of operation. In this case, the procedures to be followed after establishment of the data link are outside the scope of this ETR.	
NOTE 4: This use is different from that specified in ETS 300 403-1 [13].	
NOTE 5: Any further compatibility checking is outside the scope of this ETR.	

Table 7: ETSI Standard coding of octet 4 of HLC information element

Field value (note)	Typically used by
Eurofile	Eurofile transfer service
NOTE: When field values in this column are used, octet 3 (Coding standard) of the HLC information element should be encoded as "national standard".	

4.5.2.2 Compatibility checking by the called terminal

A called TE should carry out a compatibility check on calls offered by the network (incoming calls) according to the procedures specified in subclause 5.2.2 and annex B of ETS 300 403-1 [13], as modified by this subclause. An incoming call may be accepted, rejected, or ignored as a result of this check.

NOTE 1: Subclause 4.5.3 deals with the case where interworking between networks is involved

a) Compatibility checking with address information (annex B, subclause B.3.1):

- if an incoming SETUP message is offered with addressing information (either called party number or subaddress or both), this information should be checked against the corresponding addressing information assigned to the TE. In the case of a mismatch the TE should ignore the offered call. In the case of a match, further compatibility checking as specified in (b) should be carried out;

- if the TE has no addressing information assigned to it, then the addressing information presented in the incoming SETUP message should be ignored. The compatibility checking, as specified in (b) should be carried out.

b) Network to user compatibility checking (annex B, subclause B.3.2):

- the TE should check that the bearer service offered by the network in the BC information element matches the coding shown in table 3. If a mismatch is detected, the TE should reject the offered call using cause code 88 "incompatible destination". In the case of a match, further compatibility checking as specified in (c) should be carried out.

c) User to user compatibility checking (annex B, subclause B.3.3):

- two checks should be carried out as described in 1) and 2):

  1) LLC check

     * the called TE should check that the content of the LLC information element, if present, is compatible with the functions supported by the TE.

     * the TE should assume compatibility exists if the content of the LLC information element conforms to the coding shown in table 4. The TE may also assume that compatibility exists if the coding of the LLC information element contains any of the values shown in table 8.

Table 8: Alternative codings of LLC acceptable to called TE

Octet	Information element field	Field value
6	User information layer 2 protocol	ITU-T Recommendation X.25 [4] link layer ITU-T Recommendation X.75 Single Link Procedure
7	User information layer 3 protocol	ITU-T Recommendation X.25 [4] packet layer X.223/ISO 8878 CONS

     * if a Low layer compatibility information element is received with octet 7 encoded as "ITU-T Recommendation T.70 [3] minimum network layer", the called

terminal should assume compatibility exists provided it has the necessary functionality to support this operation. The subsequent procedures are outside the scope of this ETR.

NOTE 2: "ITU-T Recommendation T.70 [3] minimum network layer" operation is described in subclause 3.3.3 of ITU-T Recommendation T.70 [3].

* if the LLC information element is received with octets 6a, 6b, and/or 7a to 7c, missing, the called TE should assume Standard parameter values as specified in subclauses 4.4.4.2, 4.4.6.2, 4.4.6.16, and 4.6.4.3. A called TE should not treat the absence of these octets as a "non-mandatory information element content error".

NOTE 3: Subclause 4.5.2.3 specifies the procedure for negotiating different low layer parameters.

If a non-negotiable mismatch is detected during the LLC check the TE should reject the offered call using cause code 88 "incompatible destination".

2) HLC check

* the called TE should check the content of the HLC information element, if present. The called TE should accept calls with codings of the HLC information element given in tables 6 and 7, provided this coding is compatible with the function(s) supported by the TE. If a mismatch is detected during the HLC check, the TE should reject the offered call using cause code 88 "incompatible destination".

NOTE 4: A TE, meeting the requirements of this recommendation, and incompatible with the offered call will not ignore the call.

4.5.2.3 Low layer compatibility negotiation between users.

If the negotiation indicator (see table 4) is set to "outband negotiation possible" then one or more of the data link parameters or the packet flow control parameters indicated in octets 6a, 6b, 7a - c may be changed by the called TE. It does this by proposing the alternative values in the low layer compatibility information element of the CONNECT message. The alternative values proposed in octets 6b, 7b and 7c should be lower than those indicated by the calling TE but not lower than the Standard value specified in table 4.

NOTE 1: Information transfer parameters are not negotiable. The values in octets 3 and 4 returned by the called TE in the CONNECT message will be identical to the values in the low layer compatibility element sent in the SETUP message.

NOTE 2: Having indicated "outband negotiation possible" the calling TE is expected to be capable of modifying its behaviour to operate with the parameters proposed by the called TE but if it is unable to continue with the call it abandon it. The calling TE is required to, at least support the Standard conditions listed in table 4.

4.5.2.4 Call acceptance conditions

A called TE should be considered to be compatible with an offered call if it is a TE having an address that matches the offered address information and having functions matching the offered compatibility information.

Some applications may not have had codepoints assigned for them in the HLC information element (see tables 6 and 7). A called TE supporting such an application should not check the coding of the HLC information element offered in the SETUP message and should accept the call if the other parameters are compatible.

A compatible TE may either accept or reject an incoming call according to the procedures specified in subclause 5.2.5 of ETS 300 403-1 [13], as modified by this subclause.

NOTE 1: The reasons why a compatible terminal should reject or accept an incoming call are outside the scope of this ETR.

If a TE accepts an incoming call, the TE should initiate the appropriate link layer and network layer functions on the B-channel appropriate to its status as a called terminal (see subclauses 4.4 and 4.6 respectively).

NOTE 2: Higher layer functions are selected according to the inband protocol identification (see subclause 4.6.3.3).

A called TE should not send a CONNECT message to the network on the D-channel until the B-channel has entered the active channel state (see subclause 4.4.2.2).

If a compatible TE rejects an incoming call, it should indicate a cause from the following list:

a) Cause code 17: User busy (i.e. already involved in another call);

b) Cause code 47: Resources unavailable, unspecified;

c) Cause code 21: Call rejected (e.g. other local reasons apply).

4.5.3 Interworking with other networks

The procedures of subclause 4.5.2 assume no interworking occurs with a non-ISDN network, a private telecommunication network, or an ISDN that is not part of the European ISDN. This subclause contains additional requirements that should be applied in such cases.

4.5.3.1 Interworking with non-ISDNs

4.5.3.1.1 Outgoing calls

The actions to be taken by a calling TE following an unsuccessful call attempt where interworking is the reason for call rejection depend upon the functionality of the TE. For example, a facsimile terminal supporting both group 4 and group 3 operation may automatically re-attempt the call in a different mode. Such actions are outside the scope of this recommendation.

4.5.3.1.2 Incoming calls

A TE receiving an incoming SETUP message with a Progress indicator information element containing either of the values 1 "Call is not end-to-end ISDN" or 3 "Origination address is non-ISDN" should modify its compatibility checking (as specified in subclause 4.5.2.2). The TE should regard the check as successful if it is compatible with the included information (as a minimum this will be the BC information element).

A TE expecting information in addition to the BC information element in a full ISDN environment need not reject the call if such information is absent but a Progress indicator information element is included.

4.5.3.2 Interworking with private telecommunication networks

General aspects of interworking between ISDN and private telecommunication networks are specified in ETS 300 345 [9].

Interworking with private telecommunication networks that support the inter-exchange signalling protocol specified in ETS 300 172 [7] should be carried out according to the procedures specified in subclauses 8.9 and 8.10 of that ETS.

Interworking with other types of private network is outside the scope of this recommendation.

4.5.3.3 Interworking with a network having restricted bearer capability

In the case where a TE (either calling or called) detects that interworking is occurring with a network having restricted bearer capability the TE may use rate adaptation on the B-channel. The mechanisms and procedures for rate adaptation are outside the scope of this recommendation.

NOTE: Appendix V of ITU-T Recommendation T.90 [28] and clause 9 of ETR 018 (see annex D) contain one example of how such interworking may be achieved.

4.5.4 Use of ISDN supplementary services

The support of ISDN supplementary services by TE conforming to the requirements contained in this ETR, for use in conjunction with telematic applications, is outside the scope of this recommendation.

NOTE: Some supplementary services may not be suitable for use in conjunction with some or all telematic applications. Examples of such supplementary services are Call waiting, Terminal portability, and services involving 3 or more parties (e.g. Three party, Conference call - add-on, Call transfer).

4.6 Network layer (layer 3): B-channel

4.6.1 Protocol to be used

At layer 3, the protocol to be used on the B-channel should be the packet layer protocol specified in ISO/IEC 8208 [20]. This should be used in the DTE to DTE mode of operation, with modifications as specified in subclauses 4.6.2 to 4.6.11.

A calling TE should assume the role of DTE. A called TE should assume the role of Data Circuit-terminating Equipment (DCE).

4.6.2 Logical channels

The requirements specified in subclause 3.7 of ISO/IEC 8208 [20] should be met.

Only two-way logical channels should be supported.

Telematic terminals should support a single two-way logical channel (i.e. the logical channel identifiers Lowest Two-way Channel (LTC) and Highest Two-way Channel (HTC) should be set to 1, and the logical channel identifiers Lowest Incoming Channel (LIC), Highest Incoming Channel (HIC), Lowest Outgoing Channel (LOC) and Highest Outgoing Channel (HOC) should be set to zero).

NOTE: As an alternative the logical channel range or ranges to be used on a particular connection may be determined by prior knowledge. If more than one two-way logical channel is supported for instance, for a particular application or community of terminals, then both terminals involved in the communication must have prior knowledge of the number of logical channels to be supported, so that they may each set the value of HTC. How the TEs acquire this knowledge is outside the scope of this ETR.

4.6.3 Procedures for restart, virtual calls, data transfer, and reset

4.6.3.1 Procedures to be used

After the successful establishment of a B-channel data link connection (subclause 4.4), packets should be exchanged between the calling and called terminals in accordance with the procedures for restart, virtual call set-up and clearing, data and interrupt transfer, and reset, as specified in clauses 4 to 8 of ISO/IEC 8208 [20].

4.6.3.2 General packet format

The general format of packets should be as specified in clause 12 of ISO/IEC 8208 [20].

4.6.3.3 Format of CALL REQUEST/INCOMING CALL packets

The requirements specified in subclause 12.2.1 of ISO/IEC 8208 [20] should be met.

NOTE: See also ISO/IEC TR 9577 (see annex D).

The first octet of the Call user data field in the CALL REQUEST/INCOMING CALL packet should be the Subsequent Protocol Identifier (SPI). The SPI identifies the protocol to be carried in the User data field of DATA packets.

The SPI should be coded as shown in table 9.

Table 9: Encoding of Subsequent Protocol Identifier

Hexadecimal value (notes 1 and 2)	**Protocol to be used**	**Typically used by** (note 3)
01 (note 4)		Syntax-based Videotex, International Videotex interworking, Eurofile transfer,
02	ITU-T Recommendations T.70 [3]/X.224 [29] ISDN telematic transport service protocol	Facsimile group 3F Facsimile group 4
03	ISO/IEC 8073 [19] COTS protocol	FTAM over ISDN OSI applications (including telematic functions other than those shown in this table),

NOTE 1: The octet coding is in accordance with table 4 of ISO/IEC TR 9577 (see annex D).
NOTE 2: Other codepoints are either allocated for other uses or reserved.
NOTE 3: This column shows examples of applications that typically use each of the possible protocols that can be encoded in the SPI. It provides information concerning the relationship between the information encoded in the SPI and that encoded in the HLC information element (see tables 6 and 7).
NOTE 4: This value indicates the use of ITU-T Recommendation X.29 (see annex D).

A called TE receiving a CALL REQUEST/INCOMING CALL packet with an SPI containing an unrecognized code should reject the virtual call with the diagnostic, "Connection rejection - reason unspecified - permanent condition".

A called TE should clear the virtual call if a different protocol is identified by the SPI from that identified through the compatibility checking process on the D-channel (see tables 6 and 7, and subclause 4.5.2.2). The diagnostic, "Connection rejection - reason unspecified - permanent condition" should be used.

The remaining octets of the Call user data field in CALL REQUEST/INCOMING CALL packets should be ignored by the called TE.

If a CALL REQUEST/INCOMING CALL packet contains no Call user data field the called TE should act as if an SPI encoded with hexadecimal value 03 (i.e. ISO/IEC 8073 [19] COTS protocol) had been received.

4.6.4 Flow control parameters

The flow control parameters to be used are expected to be the same as those determined when setting up the ISDN connection. However, the procedure in this subclause overrides any prior agreement.

4.6.4.1 Flow control parameter negotiation

Flow control parameter negotiation should be implemented according to subclause 13.12 of ISO/IEC 8208 [20] and should be initiated by the calling terminal for every virtual call.

The values for packet size (subclause 4.6.4.2) and window size (subclause 4.6.4.3) negotiated by the use of this procedure should prevail over values derived from the LLC information element.

A called terminal receiving a request for parameter negotiation in the CALL REQUEST/INCOMING CALL packet should respond properly in the CALL ACCEPTED packet. If a called terminal receives a CALL REQUEST/INCOMING CALL packet that does not contain a request for parameter negotiation it should adopt the parameters specified in the previously received LLC information element (subclause 4.5.2.1). If this information is not available the called terminal should adopt standard default values for flow control as specified in subclauses 6.2 (packet size) and 7.1.2 (window size) of ISO/IEC 8208 [20].

4.6.4.2 Maximum length of user data field

The requirements specified in subclause 6.2 of ISO/IEC 8208 [20] should be met.

NOTE: The length of the user data field in DATA packets is commonly referred to as the "packet size".

Telematic terminals should be capable of supporting the standard default packet size of 128 octets. In addition, telematic terminals should be capable of handling DATA packets in which the maximum length of the user data field can be 256 octets, 512 octets, 1 024 octets, and 2 048 octets.

To ensure optimum throughput under most conditions, it is recommended that terminals should use a maximum user data field length of either 512 octets or 1 024 octets with modulo 128 packet numbering. However, some applications may be able to achieve efficient throughput over long connections by using a larger packet size (i.e. 2 048 octets) with modulo 8 numbering.

One of these lengths should be the length proposed by the calling terminal during flow control parameter negotiation (see subclause 4.6.4.1).

4.6.4.3 Window size and numbering of packets

The requirements specified in subclauses 7.1.1, 7.1.2 and 13.2 of ISO/IEC 8208 [20] should be met.

Packet numbering for packets at layer 3 should be aligned with the mode of operation at layer 2. i.e. modulo 8 numbering should be used if basic (modulo 8) operation is used at layer 2, and modulo 128 numbering should be used if extended (modulo 128) operation is used at layer 2.

The window size to be used should be proposed by the calling terminal during flow control parameter negotiation (see subclause 4.6.4.1). It should be greater than or equal to the window size (value of *k*) selected at layer 2 (see subclause 4.4.6.16).

The TE should be capable of supporting the standard default window size of 2.

A TE supporting extended (modulo 128) operation at layer 2 may support one or more layer 3 window sizes in the range 1 to 127. If a variable window size is supported, a value in this range may be proposed by the calling terminal during flow control parameter negotiation. The preferred window size is 80.

NOTE: A value of 80 provides optimum throughput efficiency over a wide range of connections. With "larger" packet sizes (subclause 4.6.4.2), a smaller window size may be negotiated without significantly affecting throughput efficiency. This may allow better use of available memory within a TE.

4.6.5 Delivery confirmation bit

The requirements specified in subclause 6.3 of ISO/IEC 8208 [20] should be met.

The D-bit should be set to "0" in all transmitted DATA packets.

A TE may ignore the D-bit in a received DATA packet. Alternatively it may treat the occurrence of the D-bit set to "1" in a received DATA packet as an error. If the terminal chooses to treat the D-bit set to "1" as an error, it should reset the logical channel indicating the cause "DTE originated" and the diagnostic "D-bit procedure not supported".

4.6.6 Complete packet sequence

The requirements specified in subclause 6.5 of ISO/IEC 8208 [20] should be met.

Protocol Data Units (PDU), for example, transport PDUs and other control blocks related to higher layers, should be transmitted in a complete packet sequence.

4.6.7 Qualifier bit

The requirements specified in subclause 6.6 of ISO/IEC 8208 [20] should be met.

A TE that does not use the Q-bit should set it to "0" in transmitted DATA packets and should ignore it in received DATA packets.

NOTE: Syntax based Videotex and Eurofile make use of the Q-bit set to 1.

4.6.8 Default throughput classes assignment

The requirements specified in subclauses 7.2 and 13.11 of ISO/IEC 8208 [20] should be met.

The default throughput class for both directions of transmission should be 64 kbit/s.

A lower bit rate throughput class may be negotiated (subclause 4.6.10.1) during call establishment. However, the rate adaptation method to be used is outside the scope of this ETR.

4.6.9 Error handling

The requirements specified in clause 11 of ISO/IEC 8208 [20] should be met.

A telematic terminal should recover from the detection of an erroneous DATA packet by either:

a) resetting the logical channel with the cause "DTE Originated" and the appropriate diagnostic; or

b) ignoring all subsequent DATA packets until the DATA packet concerned is correctly received.

Telematic terminals should not transmit REJECT packets. If a terminal receives a REJECT packet it should reset the logical channel with the cause "DTE originated" and the diagnostic "Unidentified packet".

4.6.10 Support of optional facilities of ISO/IEC 8208

The optional facilities of ISO/IEC 8208 [20] specified in this subclause should be implemented so that incoming calls are handled correctly i.e. to ensure interoperability when called by a terminal offering the OSI COnnection-mode Network Service (CONS).

As an option, a telematic terminal may support one or more of these facilities for outgoing calls.

A TE must also meet the requirements of subclause 4.7 of this recommendation in order to claim that it supports the OSI Connection-mode network service.

NOTE: Requirements are only specified for those optional facilities that are relevant to the DTE/DTE mode of operation.

4.6.10.1 Throughput class negotiation

The requirements specified in subclause 13.13 of ISO/IEC 8208 [20] should be met.

A terminal receiving a CALL REQUEST/INCOMING CALL packet requesting throughput class negotiation may ignore the request. In this case, the throughput class applying to the call should be that indicated in the CALL REQUEST/INCOMING CALL packet.

4.6.10.2 Fast select

The requirements specified in subclauses 13.16 and 13.17 of ISO/IEC 8208 [20] should be met.

A terminal receiving a CALL REQUEST/INCOMING CALL packet requesting fast select should not clear the call with the diagnostic "Fast select not subscribed", i.e. called terminals should support the fast select facility.

4.6.10.3 Transit delay selection and indication

The requirements specified in subclause 13.27 of ISO/IEC 8208 [20] should be met.

A terminal receiving a CALL REQUEST/INCOMING CALL packet containing a Transit Delay Selection And Indication (TDSAI) field should accept the value indicated. However, if the reply to be encoded in the cumulative transit delay sub-field of the end-to-end transit delay negotiation facility (subclause 4.6.10.5) is "unknown", the terminal may ignore the TDSAI field.

4.6.10.4 Minimum throughput class negotiation

The requirements specified in subclause 14.3 of ISO/IEC 8208 [20] should be met.

When responding to a CALL REQUEST/INCOMING CALL packet, requesting minimum throughput class negotiation, the called terminal need not send a minimum throughput class facility request in the CALL ACCEPTED packet. In this case, the throughput class applying to the call should be that indicated in the CALL REQUEST/INCOMING CALL packet.

4.6.10.5 End-to-end transit delay negotiation

The requirements specified in subclause 14.4 of ISO/IEC 8208 [20] should be met.

A terminal receiving a CALL REQUEST/INCOMING CALL packet containing a TDSAI field may ignore the field. In this case, the terminal should reply by encoding in the cumulative transit delay sub-field of the end-to-end transit delay negotiation facility as "unknown".

4.6.10.6 Expedited data negotiation

The requirements specified in subclause 14.7 of ISO/IEC 8208 [20] should be met.

If "non-use of expedited data" is agreed, the receipt of an INTERRUPT packet should be considered to be an error. The TE should reset the logical channel with the cause "DTE Originated" and the diagnostic "Unauthorized interrupt" (value = 44).

NOTE 1: Interrupt packets are used by syntax based Videotex.

NOTE 2: Facsimile applications which implement the optional facilities of ISO/IEC 8208 [20] operate under "non-use of expedited data".

4.6.11 Handling of unsupported optional facilities of ISO/IEC 8208

A terminal receiving an incoming REGISTRATION REQUEST packet invoking any facility other than those specified in subclause 4.6.4.1 or in subclause 4.6.10 should ignore the request. However, it is recommended that on receipt of an incoming REGISTRATION REQUEST packet, such a terminal responds with a REGISTRATION CONFIRMATION packet. This prevents any unnecessary delay from occurring before the calling terminal is able to send a CALL REQUEST packet.

A terminal receiving a CALL REQUEST/INCOMING CALL packet containing a facility field invoking any facility other than those specified in subclause 4.6.4.1 or in subclause 4.6.10 should treat it as an error, i.e. the terminal should send a CLEAR REQUEST packet with cause "DTE originated" and the diagnostic "Facility code not allowed".

4.7 Support of the OSI Connection-mode network service

4.7.1 General

Support by a TE, of the OSI CONS, as specified in ISO/IEC 8878 [22] clauses 0 to 12, is optional.

When supported, incoming calls with facilities fields used to support CONS missing should not be rejected so as to enable interoperation with terminals which do not conform with this clause.

NOTE: CONS is not supported by syntax based Videotex and Eurofile which do not, therefore, support Network Service Access Point (NSAP) (subclause 4.7.2.2).

Telematic terminals supporting the OSI CONS should, in addition to meeting the requirements of other clauses in this recommendation, also meet the requirements specified in subclause 4.7. In particular, the requirements of subclause 4.6, in conjunction with the requirements contained in subclause 4.7.3, represent the minimum requirements to be met in order to claim compliance with the requirements of the OSI CONS.

4.7.2 Additional D-channel requirements (network layer)

The D-channel network layer protocol procedures should satisfy the provisions of subclause 6.4 of ISO/IEC 9574 [24] subject to the specific requirements set out in subclauses 4.5 and 4.7.2 of this ETR.

4.7.2.1 Coding of LLC information element

TE supporting the OSI CONS should encode octet 7 (user information layer 3 protocol) of the LLC information element as "ISO/IEC 8878 [22] use of ISO/IEC 8208 [20] and ITU-T Recommendation X.25 [4] to provide the OSI CONS" (see subclause 4.5.2.1).

4.7.2.2 Conveyance of NSAP addresses

NOTE: See also subclause 4.7.3.1.

If an application needs to convey NSAP addresses during the establishment of a B-channel connection, these should be conveyed using the Subaddressing supplementary service i.e. NSAP address should be conveyed in the Subaddress information elements of relevant D-channel messages.

4.7.2.3 Non-use of User-to-User signalling supplementary service

A TE supporting the OSI CONS should not use the ISDN User-to-User signalling supplementary service for conveying network service user data.

4.7.2.4 Mapping of cause values to CONS reasons

Cause values contained within the cause information element of user-network call control messages should be mapped to the reason parameter of the CONS indication primitives as specified in table 10.

Table 10: Mapping of cause to CONS reasons

Cause	CONS reason
1: Unassigned or unallocated number 2: No route to specified transit network 3: No route to destination	Connection rejection - NSAP unreachable - permanent
34: No circuit/channel available	Connection rejection - NSAP unreachable - transient
22: Number changed 27: Destination out of service 28: Invalid number format (incomplete number) 29: Facility rejected 38: Network out of order 50: Requested facility not subscribed to 57: BC not authorized 58: BC not presently available 63: Service or option not available 65: Bearer service not implemented 66: Channel type not implemented 69: Requested facility not implemented 79: Service or option not implemented - unspecified 81: Invalid call reference value 82: Identified channel does not exist 88: Incompatible destination 91: Invalid transit network selection 95: Invalid message 96: Mandatory information element is missing 97: Message type non-existent or not implemented 98: Message not compatible with call state, or message type non-existent or not implemented	Connection rejection - reason unspecified - permanent
99: Information element non-existent or not implemented 100: Invalid information element contents 101: Message not compatible with call state 111: Protocol error - unspecified 127: Interworking - unspecified	Connection rejection - reason unspecified - permanent
6: Channel unacceptable 17: User busy 18: No user responding 19: User alerting, no answer 21: Call rejected 26: Non-selected user clearing 41: Temporary failure 42: Switching equipment congestion 44: Requested circuit or channel not available 47: Resources unavailable, unspecified	Connection rejection - reason unspecified - transient
16: Normal call clearing 31: Normal, unspecified	Disconnection - transient

4.7.3 Additional B-channel requirements (network layer)

The B-channel network layer protocol procedures should satisfy the conformance requirements of ISO/IEC 8878 [22] and the relevant provisions of subclause 6.4 of ISO/IEC 9574 [24] subject to the specific requirements set out in subclauses 4.6 and 4.7.3 of this recommendation.

NOTE: ISO/IEC 8878 [22] specifies the mapping of OSI CONS primitives and parameters to and from the elements of the packet layer protocol specified in ISO/IEC 8208 [20].

Those optional facilities (applicable to DTE to DTE mode of operation), from clauses 13 and 14 of ISO/IEC 8208 [20] whose fields, according to ISO/IEC 8878 [22] should be inserted in any CALL REQUEST packet to provide the OSI CONS, are indicated in subclause 4.7.3.2.

4.7.3.1 Conveyance of NSAP addresses

NOTE 1: NSAP addresses are encoded according to ISO/IEC 8348 [21].

NOTE 2: See also subclause 4.7.2.2.

NSAP addresses, if used, should be conveyed using the address extension facilities specified in subclauses 14.1 and 14.2 of ISO/IEC 8208 [20]. A TE should be capable of encoding and decoding the calling, called and responding NSAP addresses in the calling and called address extension fields of call set-up and call clearing packets. This should be done according to the mechanism specified in subclause 6.2.2 of ISO/IEC 8878 [22] for explicitly conveying the full NSAP address.

An incoming call should not necessarily be cleared due to a missing NSAP address; subclause 6.2.2.2.1 of ISO/IEC 8878 [22] specifies how this case can be dealt with.

4.7.3.2 Optional facilities of ISO/IEC 8208

The optional facilities of ISO/IEC 8208 [20] specified in this subclause should be implemented so that both outgoing and incoming calls are handled correctly i.e. so that the relevant facility fields are always inserted in the CALL REQUEST/INCOMING CALL packet sent by the calling terminal and always processed by the called terminal.

4.7.3.2.1 Throughput class negotiation

The requirements specified in subclause 13.13 of ISO/IEC 8208 [20] should be met.

4.7.3.2.2 Fast select

The requirements specified in subclause 13.16 of ISO/IEC 8208 [20] should be met.

A calling terminal should indicate "no restriction on response" in the CALL REQUEST/INCOMING CALL packet.

4.7.3.2.3 Transit delay selection and indication

The requirements specified in subclause 13.27 of ISO/IEC 8208 [20] should be met.

4.7.3.2.4 Minimum throughput class negotiation

The requirements specified in subclause 14.3 of ISO/IEC 8208 [20] should be met.

4.7.3.2.5 End-to-end transit delay negotiation

The requirements specified in subclause 14.4 of ISO/IEC 8208 [20] should be met.

4.7.3.2.6 Expedited data negotiation

The requirements specified in subclause 14.7 of ISO/IEC 8208 [20] should be met.

4.7.3.3 Interworking with calling terminals not supporting CONS

Where possible, a called terminal supporting the CONS should not reject an incoming call in which some of the facility fields, needed for the full support of CONS, are missing from the INCOMING CALL packet.

NOTE: This is to facilitate interoperability between terminals supporting the CONS and those that do not.

4.7.3.4 Throughput Quality Of Service (QOS) parameters

NOTE: See subclause 4.6.8.

A value of 64 kbit/s should always be used for all throughput Quality Of Service (QOS) parameters.

4.7.3.5 Transit delay QOS parameter

NOTE: Transit delay information is not presently available to a TE attached to an ISDN.

The value "unknown" should always be used for all transit delay QOS parameters.

4.8 Transport layer (layer 4)

4.8.1 General

Provision of a transport layer service in accordance with the requirements of subclause 4.8 of this recommendation is optional. Its use is application dependant and is outside the scope of this ETR.

Three options are permitted. These are:

- the ISDN telematic transport service;
- the OSI COnnection-mode Transport Service (COTS); and
- no defined transport service.

NOTE: No transport layer protocol is specified in syntax based Videotex and Eurofile. Telematic terminals may support any combination of options. The options supported at layer 4 determine the coding of the Subsequent Protocol Identifier (table 9) and subsequent protocol actions at layer 3.

If a terminal supports the ISDN telematic transport service, it should do so based on the requirements of ITU-T Recommendation T.70 [3], with modifications as specified in subclause 4.8.2.

If a terminal supports the OSI Connection-mode transport service, it should do so according to the requirements of ISO/IEC 8072 [18]. The transport layer protocol should be based on the requirements of ISO/IEC 8073 [19] with modifications as specified in subclause 4.8.3.

4.8.2 The ISDN telematic transport service

The layer 4 procedures to be used to provide the ISDN telematic transport service should be as specified in clause 5 of ITU-T Recommendation T.70 [3].

NOTE: Implementors are advised to also refer to annexes A and B of ITU-T Recommendation T.70 [3].

4.8.2.1 Supervisory timers

Supervision of the procedure should be implemented using timers as defined in table B-4 of ITU-T Recommendation T.70 [3]. The timers should each be set to a value of approximately 60 seconds.

4.8.2.2 Connection establishment - calling terminal: transport-selector

When establishing a transport connection a calling terminal should be capable of:

- transmitting a Called Transport-Selector field in a Connection Request (CR) Transport Protocol Data Unit (TPDU); and
- receiving a Called Transport-Selector field in the Connection Confirm (CC) TPDU.

The Transport-Selector field should be able to convey a transport selector of variable length, up to and including 32 octets, with any encoding format. When establishing a transport connection a calling terminal should be capable of:

- receiving a Calling Transport-Selector field in a CC TPDU; and

- when necessary, transmitting a Calling Transport-Selector field in a CR TPDU. The Calling Transport-Selector field should be able to convey each of the transport selectors implemented by the terminal.

4.8.2.3 Connection establishment - called terminal: transport-selector

When responding to a request for transport connection establishment a called terminal should be capable of:

- transmitting a Calling Transport-Selector field in a CC TPDU;

- receiving a Calling Transport-Selector field in a CR TPDU;

- receiving a Called Transport-Selector field in a CR TPDU; and

- when necessary, transmitting a Called Transport-Selector field, that should be able to convey each of the transport selectors implemented by the terminal, in a CC TPDU.

The Transport-Selector field should be able to convey a transport selector of variable length, up to and including 32 octets, with any encoding format.

4.8.2.4 Transport protocol Identification

NOTE: See also subclause 4.6.3.3 of this ETR.

The NS user data parameter of the N-CONNECT primitives as defined in table 2 of ITU-T Recommendation X.224 [29] should be used for transport protocol identification as follows:

- the sending terminal should operate the default protocol identification mechanism defined in annex B of ITU-T Recommendation X.224 [29]; and

- the receiving terminal should only accept TPDUs in which the protocol identifier is encoded with the hexadecimal value 02 as the protocol identification code.

4.8.3 Support of the OSI Connection-mode Transport Service

The layer 4 protocol to be used to provide the OSI COTS over ISDN circuit-mode connections should be the transport protocol specified in ISO/IEC 8073 [19] with additional requirements as specified in this subclause.

4.8.3.1 Expedited data transfer

The requirements specified in subclauses 5.1, 6.11 and 10.2.4.3 of ISO/IEC 8073 [19] should be met.

The expedited data option may be used unless non-use of explicit flow control has been selected. The default condition should be that non-use of the expedited data transfer option should be selected during connection establishment.

4.8.3.2 Classes and options

The requirements specified in subclause 5.4.1 of ISO/IEC 8073 [19] should be met.

A terminal should support protocol class 0. In addition, a terminal may also support protocol class 2.

Negotiation from class 2 to class 0 should be enabled by the use of the CR TPDU by the calling terminal and by the use of the CC TPDU by the called terminal.

The calling terminal should indicate "class 0" as the sole alternative in the alternative protocol classes parameter in all CR TPDUs that indicate a multiplexing class as the preferred class. The calling terminal should then adjust its operation according to the selected class in the CC TPDU.

The called terminal should indicate "class 0" as a response in the CC TPDU.

If there is already one or more transport connections assigned to the network connection (i.e. multiplexing being possible) then this negotiation procedure should not be implemented.

NOTE 1: ISDN provides network services according to "Type A", as defined by ISO/IEC 8072 [18].

NOTE 2: It is not forbidden for the TE to support other protocol classes, but their use is outside the scope of this ETR.

4.8.3.3 TPDU Numbering

The requirements specified in subclause 6.10 of ISO/IEC 8073 [19] should be met.

Data TPDU numbering should be used when the use of explicit flow control is selected (see subclause 4.8.3.4). The default arithmetic should be Modulo 8.

4.8.3.4 Explicit flow control

The requirements specified in subclauses 6.16 and 10.2.4 of ISO/IEC 8073 [19] should be met.

Negotiation during call establishment, of whether or not explicit flow control is to be used, is mandatory in class 2. In the event that the 2 ends cannot agree, explicit flow control should be used.

If non-use of explicit flow control is selected then the expedited data option (see subclause 4.8.3.1) cannot be selected.

4.8.3.5 Connection establishment - calling terminal: Transport-Selector

The requirements specified in subclauses 6.5.3 and 13.3.4 (a) of ISO/IEC 8073 [19] should be met.

When establishing a transport connection a calling terminal should be capable of:

- transmitting a Called Transport-Selector field in a CR TPDU; and

- receiving a Called Transport-Selector field in the CC TPDU.

The Transport-Selector field should be able to convey a transport selector of variable length, up to and including 32 octets, with any encoding format.

When establishing a transport connection a calling terminal should be capable of:

- receiving a Calling Transport-Selector field in a CC TPDU; and

- when necessary, transmitting a Calling Transport-Selector field in a CR TPDU.

The Calling Transport-Selector field should be able to convey each of the transport selectors implemented by the terminal.

4.8.3.6 Connection establishment - called terminal: transport-selector

The requirements specified in subclauses 6.5.3 and 13.3.4 (a) of ISO/IEC 8073 [19] should be met.

When responding to a request for transport connection establishment a called terminal should be capable of:

- transmitting a Calling Transport-Selector field in a CC TPDU;
- receiving a Calling Transport-Selector field in a CR TPDU;
- receiving a Called Transport-Selector field in a CR TPDU; and
- when necessary, transmitting a Called Transport-Selector field, that should be able to convey each of the transport selectors implemented by the terminal, in a CC TPDU.

The Transport-Selector field should be able to convey a transport selector of variable length, up to and including 32 octets, with any encoding format.

4.8.3.7 Supervisory timers (TS)

Supervision of the procedure should be implemented using the supervisory timers, TS1 and TS2 as defined in subclauses 6.5.4 and 6.7.1.5 respectively (see also subclause 6.22.1.3 of ISO/IEC 8073 [19]). The timers TS1 and TS2 should each be set to a value of approximately 60 seconds.

4.8.3.8 Length indicator value

The requirements specified in subclause 13.2.1 of ISO/IEC 8073 [19] should be met.

A data TPDU should be equal to or longer than the packet size at layer 3.

For interworking with a TE supporting only the ISDN telematic transport service:

- the Length Indicator (LI) field in the TPDU header should be restricted to 127; and
- extended Data Block (DT) TPDU numbering should not be used.

4.8.3.9 Transport protocol identification

NOTE: See also subclause 4.6.3.3 of this ETR.

A calling terminal may operate the Network Connection Management Subprotocol (NCMS) defined in annex B of ISO/IEC 8073 [19] to identify the protocol to be used on a given network connection.

Alternatively, the default transport protocol identification mechanism defined in annex B of ITU-T Recommendation X.224 [29] should be used.

A called terminal should accept calls with any of the values indicated in table 9 of this ETR.

4.8.3.10 Treatment of protocol errors

The requirements specified in subclause 6.22.1.3 of ISO/IEC 8073 [19] should be met.

On detection of an error in a received TPDU, an Error (ER)-TPDU should be sent containing the received octets of the invalid TPDU up to and including the octet where the error was detected.

NOTE: This extends the class 0 rule to class 2.

Annex A: Profile Requirements List

A.1 General

The requirements contained in this recommendation, if implemented, go beyond those of the base standards referred to by this ETR. These result in modifications to the requirements expressed in the Protocol Implementation Conformance Statement (PICS) proformas for the base standards. This annex specifies the modifications (the Requirements List - (RL)) that apply to the status of the items affected in each PICS proforma, with consequently modified requirements on the answers to be provided.

Throughout this annex the term ITU-T is used, since the CCITT no longer exists. However in some of the base standards the term CCITT may still be found.

The status notation used in this annex is that defined in ISO/IEC 9646-7 [26]. In summary, the meaning of the notations is as follows:

i	Irrelevant or out-of-scope - this capability is outside the scope of this profile and is not subject to conformance testing in this context.
m	Mandatory - the capability is required to be supported.
n/a	Not Applicable - in the given context, it is impossible to use the capability.
o	Optional - the capability may or may not be supported.
o.i	qualified optional - for mutually exclusive or selectable options from a set. "i" is an integer that identifies an unique group of related optional items and the logic of their selection, defined below the table.
x	eXcluded or prohibited - there is a requirement not to support this capability in this profile.

If the protocols recommended in this ETR are implemented, the RL in this annex should be used to restrict the permitted support answers in the corresponding PICS.

A.2 Relationship between RL and PICS proformas

In the context of the profile specification recommended in this ETR, PICS proformas of the base protocol standards contain tables in three categories. The three categories are:

- those proforma tables where this profile does not restrict the permitted support answers;
- those proforma tables where this profile restricts the permitted support answers; and
- proforma tables that are not relevant to this profile.

Each category is a subset of the proforma for a given base standard. In each of the clauses, the 3 subsets are identified for each base standard. The RL consists of the tables falling into the second category, with an indication of the modified items in that table.

A.3 Tables for the physical layer

The profile described by this ETR places no restrictions on the support answers requested by the PICS proformas contained in either ETS 300 011 [5] or ETS 300 012 [6].

A.4 Tables for the link layer: D-channel

The profile described by this ETR places no restrictions on the support answers requested by the PICS proforma contained in ETS 300 402-4 [12].

A.5 Tables for the link layer: B-channel

A.5.1 Requirements List for ISO/IEC 8885 [23]

Since no PICS proforma exists for ISO/IEC 8885 [23], no RL is necessary. The profile specific ICS in annex B covers the specific usage of ISO/IEC 8885 [23] according to the requirements of this ETR.

A.5.2 Requirements List for ISO/IEC 7776 [17]

Table A.1 identifies the tables of the PICS proforma in ISO/IEC 7776 [17] and indicates their relevance to the profile described by this ETR. Tables A.2 to A.5 specify the restrictions imposed by this profile on the permitted support answers.

Table A.1: ISO/IEC 7776 [17] PICS tables

Category of PICS table	Subclause number in ISO/IEC 7776 [17]	Name of PICS table
Profile does not restrict permitted support answers	A.6.2	Link disconnection and disconnected phase, link reset,
	A.6.3	collision resolution for U frames
	A.6.4	I-frame transmission/reception, frame rejection
		Frame formats
	A.6.6	System parameters
Profile restricts permitted support answers	A.5	Major capabilities
	A.6.1	Basic/extended operation, synchronous and start/stop transmission
	A.6.2	Link set-up
	A.6.5	Timers, etc.
Tables not relevant to this profile	A.7.1	Multilink procedures, ...
	A.7.2	Multilink system parameters

A.5.3 ISO/IEC 7776 [17] Major capabilities

Table A.2: Major capabilities

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 7776 [17] reference	Status	This ETR reference	Status
Lm	support the multilink procedure	6	o	4.4.6	i
Lc	support DTE/DCE operation	1, 5.1	m	4.4.6	i
Lt	support DTE/DTE operation	1, 5.1	o	4.4.6	m
Lta	assign addresses A/B as though for a DCE	1, 5.1	Lt:o	4.4.6.5	m

A.5.4 Basic/extended operation

Table A.3: Basic/extended operation

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 7776 [17] reference	Status	This ETR reference	Status
M8	Does the IUT support basic (modulo 8) operation	1, 3, 4.1.1	o.1	4.4.6	m
M128	Does the IUT support extended (modulo 128) operation	1, 3, 4.1.1	o.1	4.4.6	o
Tsy	Does the IUT support synchronous transmission	3.5.1	o.2	4.4.6	m
Tss	Does the IUT support start/stop transmission	3.5.2	o.2	4.4.6	x

A.5.5 Link set-up

Table A.4: Link set-up

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 7776 [17] reference	Status	This ETR reference	Status
LSR	Transmission of unsolicited DM response to request the remote DTE to initiate link set-up	4.3.8, 5.3.1, 5.5	o	4.4.6.7	c1
	Initiation of link reset:				
LRIa	- on receipt of FRMR	5.5, 5.6.1	o.3	4.4.6.3	m
LRIb	- on receipt of unsolicited UA	5.5, 5.6.1	o	4.4.6.9	x
LRIc	- on receipt of unsolicited F=1	5.5, 5.6.1	o	4.4.6.9	m
	Request for remote link reset, by transmission of DM response during information transfer phase:				
LRRa	- on receipt of FRMR	5.5, 5.6.1	o.3	4.4.6.3	x
LRRb	- on receipt of unsolicited UA	5.5, 5.6.1	o	4.4.6.9	x
LRRc	- on receipt of unsolicited F=1	5.5, 5.6.1	o	4.4.6.9	x
LRA	Acceptance of link reset attempts by the DCE/remote DTE	5.6.1	o.4	4.4.6.10	m
LRD	Denial of link reset attempts by the DCE/remote DTE	5.6.1	o.4	4.4.6.10	x
NOTE: c1 = IF IUT is a calling terminal THEN x ELSE o					

A.5.6 Timers, etc.

Table A.5: Timers, etc.

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 7776 [17] reference	Status	This ETR reference	Status
T3	Does the IUT support timer T3 procedures	5.7.1.3	o	4.4.6	m

A.6 Tables for the network layer: D-channel

A.6.1 Relationship between RL and PICS proformas

Table A.6 identifies the tables of the PICS proforma in ETS 300 403-3 [15] and indicates their relevance to the profile described by this ETR. Tables A.7 to A.14 specify the restrictions imposed by the profile recommended in this ETR on the permitted support answers.

Table A.6: ETS 300 403-3 PICS tables

Category of PICS table	Table number in ETS 300 403-3 [15]	Name of PICS tables
Profile does not restrict permitted support answers	A.2 A.5 A.6 A.7 to A.25 A.27 to A.45 A.47 to A.50 A.51 A.55 to A.60	Type of implementation Messages received by the user Messages transmitted by the user (tables of information elements in each message type) (tables of information elements in each message type) (tables of information elements in each message type) Timers in the user role (tables on structure of Number information elements)
Profile restricts permitted support answers	A.1 A.3 A.4 A.26 A.46 A.52 A.53 A.54	Roles Major capabilities of the user role Subsidiary capabilities of the user role Information elements in SETUP received by the user Information elements in SETUP transmitted by the user Bearer capability structure High layer compatibility structure Low layer compatibility structure
Tables not relevant to this profile	A.61 onwards	Tables applicable to the network role

A.6.2 Roles

Table A.7: Roles

BASE STANDARD FEATURES					PROFILE FEATURES	
Item	Role Does the implementation support	Conditions for status	Status	ETS 300 403-1 [13] reference	This ETR reference	Status
R 2.1	the user role		o.1		4.5.1	m
R 2.2	the network role		o.1		4.5.1	x
NOTE: o.1 - Support of one, and only one, of these options is required.						

A.6.3 Major capabilities of the user role

Table A.8: Major capabilities of the user role

BASE STANDARD FEATURES					PROFILE FEATURES	
Item	Role Does the implementation support	Conditions for status	Status	ETS 300 403-1 [13] reference	This ETR reference	Status
MCu 6	initiation of call rearrangement	R 6.1 R 6.2	o x	5.6	4.5.4	i
MCu 10.1	initiation of LLC negotiation (as a calling user)	MCu 1 NOT MCu 1	o n/a	annex J.3	4.5.2.1.2	o
MCu 10.2	processing of a LLC negotiation received in a SETUP (as a called user)	MCu 2 NOT MCu 2	o n/a	annex J.3	4.5.2.3	o
MCu 17	procedures for the control of circuit-mode multirate connections		o	8	1	x
MCu 21.1	initiation of BC selection (as a calling user)	MCu 1 NOT MCu 1	o n/a	5.10, 5.11.1	1	x
MCu 21.2	processing of incoming BC selection request (as a called user)	MCu 2 NOT MCu 2	o n/a	5.10, 5.11.2, 5.11.3	1	x
MCu 22.1	initiation of HLC selection (as a calling user)	MCu 1 NOT MCu 1	o n/a	5.10, 5.12.1	1	x
MCu 22.2	processing of incoming HLC selection request (as a called user)	MCu 2 NOT MCu 2	o n/a	5.10, 5.12.2, 5.12.3	1	x
MCu 23.2	status request procedures for services other than "existing services"	R 3.1 AND TIu 5 NOT R 3.1 OR NOT TIu 5	m n/a	5.13	1	i

A.6.4 Subsidiary capabilities of the user role

Table A.9: Subsidiary capabilities of the user role

BASE STANDARD FEATURES					PROFILE FEATURES	
Item	Role Does the implementation support	Conditions for status	Status	ETS 300 403-1 [13] reference	This ETR reference	Status
SCu 6	compatibility checking of the lower layers	MCu 2 AND R 3.1 MCu 2 AND NOT R 3.1 NOT MCu 2	m o n/a	5.2.2, annex B.3.3	4.5.2.2	m
SCu 8	compatibility checking of the higher layers	MCu 2 NOT MCu 2	o n/a	5.2.2, annex B.3.3	4.5.2.2	m
SCu 114.1	ignoring of incompatible incoming calls on a broadcast data link	R 7.2 NOT R 7.2	o.7 n/a	5.2.2	4.5.2.2	x
SCu 114.2	rejection of incompatible incoming calls on a broadcast data link	R 7.2 NOT R 7.2	o.7 n/a	5.2.2	4.5.2.2	m
NOTE: o.7 - Support of at least one of these options is required.						

A.6.5 Information elements in SETUP received by the user

Table A.10: Information elements in SETUP received by the user

BASE STANDARD FEATURES					PROFILE FEATURES	
Item	Role Does the implementation support	Conditions for status	Status	ETS 300 403-1 [13] reference	This ETR reference	Status
MRu 19-IE4	Called party number	MRu 19 NOT MRu 19	o n/a	3.1.14, 5.2.1, 5.2.2, 5.2.3, 5.2.4, annex B	4.5.2.2	m
MRu 19-IE5	Called party subaddress	MRu 19 NOT MRu 19	o n/a	3.1.14, annex B	4.5.2.2	m

A.6.6 Information elements in SETUP transmitted by the user

Table A.11: Information elements in SETUP transmitted by the user

BASE STANDARD FEATURES					PROFILE FEATURES	
Item	Role Does the implementation support	Conditions for status	Status	ETS 300 403-1 [13] reference	This ETR reference	Status
MTu 19-IE16	Low layer compatibility	MTu 19 AND MCu 10.1 MTu 19 AND NOT MCu 10.1 NOT MTu 19	m o n/a	3.1.14, annex I, annex J, annex B	4.5.2.1	m
MTu 19-IE14	High layer compatibility	MTu 19 AND MCu 22.1 MTu 19 AND NOT MCu 22.1 NOT MTu 19	m o n/a	3.1.14, 5.12.1, annex B	4.5.2.1	m

A.6.7 Bearer capability

Table A.12: Bearer capability structure

BASE STANDARD FEATURES					PROFILE FEATURES	
Item	Role Does the implementation support	Conditions for status	Status	ETS 300 403-1 [13] reference	This ETR reference	Status
ISu 1.2	Octet 3 bits 1 to 5, information transfer capability			4.5.5	1, 4.5.2.1.1	
	1. Speech		o			x
	2. Unrestricted digital		o			m
	4. 3,1 kHz audio		o			x
	5. Unrestricted digital information with tones/announcements		o			x
ISu 1.3	Octet 4 bits 6 and 7, transfer mode					
	1. Circuit		o			m
	2. Packet		o			x
ISu 1.4	Octet 4 bits 1 to 5, information transfer rate					
	1. 64 kbit/s		o			m
	6. Multirate		o			x
ISu 1.9	Octet 4.1 Rate multiplier		o			x
ISu 1.10	Octet 5 bits 1 to 5, user information layer 1 protocol		o			x
ISu 1.11	Octet 5a bit 7, synchronous/asynchronous		o			x
ISu 1.12	Octet 5a bit 6, negotiation indicator		o			x
ISu 1.13	Octet 5a bits 1 to 5, user rate		o			x
ISu 1.14	Octet 5b bits 6 and 7, intermediate rate		o			x
ISu 1.15	Octet 5b bit 5, Network Independent Clock (NIC) on transmission		o			x
ISu 1.16	Octet 5b bit 4, NIC on reception		o			x
ISu 1.17	Octet 5b bit 3, flow control on transmission		o			x
ISu 1.18	Octet 5b bit 2, flow control on reception		o			x
ISu 1.25	Octet 5c bits 6 and 7, number of stop bits		o			x
ISu 1.26	Octet 5c bits 4 and 5, number of data bits excluding parity		o			x
ISu 1.27	Octet 5c bits 1 to 3, parity information		o			x
ISu 1.28	Octet 5d bit 7, duplex mode		o			x
ISu 1.29	Octet 5d bits 1 to 6, modem type		o			x
ISu 1.30	Octet 6 bits 1 to 5, user information layer 2 protocol		o			x
ISu 1.31	Octet 7 bits 1 to 5, user information layer 3 protocol		o			x

A.6.8 High layer compatibility

Table A.13: High layer compatibility structure

BASE STANDARD FEATURES					PROFILE FEATURES	
Item	Role Does the implementation support	Conditions for status	Status	ETS 300 403-1 [13] reference	This ETR reference	Status
ISu 3.1	Octet 3 bits 6 and 7, coding standard		m	4.5.17	4.5.2.1.3	
	1. ITU-T (CCITT) standardized		o			ISu 3.2a:m ISu 3.2a:x
	2. ISO/IEC standard		o			x
	3. National standard		o			ISu 3.2b:m ISu 3.2b:x
	4. Network specific standard		o			x
ISu 3.2a	Octet 4 bits 1 to 7, high layer characteristics identification, ITU-T (CCITT) Recomendation standardized coding		m			
	1. Telephony		o			x
	2. Fax group 2/3 (F.182)		o			o.1
	3. Fax group 4 class 1 (F.184)		o			o.1
	4. Teletex, basic and mixed mode (F.230), Fax group 4, classes II & III (F.184)		o			x
	5. Teletex, basic and processable mode (F.220)		o			x
	6. Teletex basic mode (F.200)		o			x
	7. Syntax based Videotex (F.300, T.102)		o			o.1
	8. International Videotex interworking via gateways or interworking units (F.300, T.101)		o			o.1
	9. Telex (F.60)		o			x
	10. Message Handling Systems (X.400)		o			x
	11. OSI application (X.200)		o			o.1
	12. FTAM application (ISO/IEC 8571)		o			o.1
	13. Maintenance		o			x
	14. Management		o			x
ISu 3.2b	Octet 4 bits 1 to 7, high layer characteristics identification, National standard coding		m			
	1. Eurofile file transfer		o			o.1
ISu 3.3a	Octet 4 bits 1 to 7, extended high layer characteristics identification, ITU-T (CCITT) standardized coding		o			x
ISu 3.3b	Octet 4 bits 1 to 7, extended high layer characteristics identification, National standard coding		o			x

NOTE 1: o.1 - Any one or more of these may be supported.
NOTE 2: The features listed in table A.13 are those appearing in the current version of ETS 300 403-1 [13]. Some of these features have now been abandoned by ITU-T and will not appear in later revisions of the base standard.

A.6.9 Low layer compatibility

Table A.14: Low layer compatibility structure

BASE STANDARD FEATURES					PROFILE FEATURES	
Item	Role Does the implementation support...	Conditions for status	Status	ETS 300 403-1 [13] reference	This ETR reference	Status
ISu 4.1	Octet 3 bits 6 and 7, coding standard			4.5.19	4.5.2.1.2	
	1. ITU-T standardized		o			m
	2. ISO/IEC standard		o			x
	3. National standard		o			x
	4. Network specific standard		o			x
ISu 4.2	Octet 3 bits 1 to 5, information transfer capability					
	1. Speech		o			x
	2. Unrestricted digital		o			m
	3. Restricted digital		o			x
	4. 3,1 kHz audio		o			x
	5. 7 kHz audio		o			x
	6. Video		o			x
ISu 4.3	Octet 3a bit 7, negotiation indicator		o		4.5.2.3	m
	1. Outband negotiation not possible		o			o.1 (note 2)
	2. Outband negotiation possible		o			o
ISu 4.4	Octet 4 bits 6 and 7, transfer mode					
	1. Circuit		o			m
	2. Packet		o			x
ISu 4.5	Octet 4 bits 1 to 5, information transfer rate					
	1. 64 kbit/s		o			m
	2. 2 x 64 kbit/s		o			x
	3. 384 kbit/s		o			x
	4. 1536 kbit/s		o			x
	5. 1920 kbit/s		o			x
	6. Multirate		o			x
ISu 4.10	Octet 4.1 Rate multiplier		o			x
ISu 4.11	Octet 5 bits 1 to 5, user information layer 1 protocol		o			x
ISu 4.12	Octet 5a bit 7, synchronous/asynchronous		o			x
ISu 4.13	Octet 5a bit 6, negotiation indicator		o			x
ISu 4.14	Octet 5a bits 1 to 5, user rate		o			x
ISu 4.15	Octet 5b bits 6 and 7, intermediate rate		o			x
ISu 4.16	Octet 5b bit 5, NIC on transmission		o			x
ISu 4.17	Octet 5b bit 4, NIC on reception		o			x
ISu 4.18	Octet 5b bit 3, flow control on transmission		o			x
ISu 4.19	Octet 5b bit 2, flow control on reception		o			x
ISu 4.20	Octet 5b bit 7, header		o			x

(continued)

Table A.14 (continued): Low layer compatibility structure

BASE STANDARD FEATURES					PROFILE FEATURES	
Item	Role Does the implementation support...	Conditions for status	Status	ETS 300 403-1 [13] reference	This ETR reference	Status
ISu 4.21	Octet 5b bit 6, Multiple Frame Establishment (MFE) support in data link		o			x
ISu 4.22	Octet 5b bit 5, mode of operation		o			x
ISu 4.23	Octet 5b bit 4, Logical Link Identifier (LLI) negotiation		o			x
ISu 4.24	Octet 5b bit 3, assignor/assignee		o			x
ISu 4.25	Octet 5b bit 2, in-band/out-band negotiation		o			x
ISu 4.26	Octet 5c bits 6 and 7, number of stop bits		o			x
ISu 4.27	Octet 5c bits 4 and 5, number of data bits excluding parity		o			x
ISu 4.28	Octet 5c bits 1 to 3, parity information		o			x
ISu 4.29	Octet 5d bit 7, duplex mode		o			x
ISu 4.30	Octet 5d bits 1 to 6, modem type		o			x
ISu 4.31	Octet 6 bits 1 to 5, user information layer 2 protocol		o			
	1. Basic mode ISO 1745 (note 1)		o			x
	2. ITU-T Rec. Q.921 [11]		o			x
	3. ITU-T Rec. X.25 [4] link level		o			x
	4. ITU-T Rec. X.25 [4] multi-link		o			x
	5. Extended LAPB for half duplex (ITU-T Rec.T.71)(note 1)		o			x
	6. HDLC ARM (ISO 4335 [16])		o			x
	7. HDLC NRM (ISO 4335 [16])		o			x
	8. HDLC ABM (ISO 4335 [16])		o			x
	9. LAN LLC ISO 8802/2 (note 1)		o			x
	10. ITU-T Rec. X.75 [4] single link procedure		o			x
	11. ISO 7776 [17] DTE-DTE operation		o			m
ISu 4.31.1	Octet 6a, mode of operation	ISu 4.31 NOT ISu 4.31	o n/a			m
ISu 4.31.2	Octet 6b, window size (*k*)	ISu 4.31 NOT ISu 4.31	o n/a			m

(continued)

Table A.14 (concluded): Low layer compatibility structure

BASE STANDARD FEATURES					PROFILE FEATURES	
Item	Role Does the implementation upport...	Conditions for status	Status	ETS 300 403-1 [13] reference	This ETR reference	Status
ISu 4.32	Octet 7 bits 1 to 5, user information layer 3 protocol		o			
	1. ITU-T Rec. Q.931 (note 1)		o			x
	2. ITU-T Rec. X.25 [4] packet layer		o			x
	3. ISO 8208 [20] (ITU-T Rec X.25 for DTE)		o			m
	4. ISO 8348 [21] (OSI connection oriented service)		o			x
	5. ISO 8473 (OSI) (note 1) connectionless service)		o			x
	6. ITU-T Rec. T.70 [3] minimum network layer		o			x
ISu 4.32.1	Octet 7a, mode of operation	ISu 4.32	o			m
		NOT ISu 4.32	n/a			
ISu 4.32.2	Octet 7b, default packet size	ISu 4.32	o			m
		NOT ISu 4.32	n/a			
ISu 4.32.3	Octet 7c, packet window size	ISu 4.32	o			m
		NOT ISu 4.32	n/a			

NOTE 1: See annex D.
NOTE 2: o.1 mandatory if option 2 not provided.
NOTE 3: ITU-T Rec. means ITU-T Recommendation.

A.7 Tables for the network layer: B-channel

A.7.1 Requirements List for ISO/IEC 8208 [20]

Table A.15 identifies the tables of the PICS proforma in ISO/IEC 8208 [20], and indicates their relevance to the profile described by this ETR. Tables A.16 to A.37 specify the restrictions imposed by this profile on the permitted support answers.

Table A.15: ISO/IEC 8208 [20] PICS tables

Category of PICS table	Subclause number in ISO/IEC 8208 [20]	Name of PICS table
Profile does not restrict permitted support answers	C.6.1	Link layer interactions
	C.6.2	General packet formatting
	C.6.3	Packet layer functions independent of logical channels
	C.6.7	Interrupt transfer
	C.8.1	Facilities sent during call set-up and clearing
	C.8.2	Facilities received during call set-up and clearing
	C.9.1	Registration-facilities sent
	C.9.2	Registration-facilities received
Profile restricts permitted support answers	C.5	General DTE characteristics
	C.6.4.1	Call set-up
	C.6.4.2	Call clearing
	C.6.5	Resetting of logical channels
	C.6.6	Error procedures
	C.6.8.1	Sending data
	C.6.8.2	Receiving data
	C.6.8.3	Delivery confirmation
	C.7.1	Values of cause and diagnostic code fields
	C.8.1.1	Facilities sent in CALL REQUEST packets
	C.8.1.2	Facilities sent in CALL ACCEPT packets
	C.8.1.3	Facilities sent in CLEAR REQUEST packets
	C.8.2.1	Facilities received in INCOMING CALL packets
	C.8.2.2	Facilities received in CALL CONNECT packets
	C.8.2.3	Facilities received in CLEAR INDICATION packets
	C.8.2.4	Facilities received in CLEAR CONFIRMATION packets
	C.9.1.1	Registration-facilities sent in REGISTRATION REQUEST packets
	C.9.1.2	Registration-facilities sent in REGISTRATION CONFIRMATION packets
	C.9.2.1	Registration-facilities received in REGISTRATION CONFIRMATION packets
	C.9.2.2	Registration-facilities received in REGISTRATION REQUEST packets
	C.10.1	Values for flow control parameters and throughput class, Virtual Call service
	C.10.3	Timers, Retransmission Counts and logical channel ranges
Tables not relevant to this profile	C.7.2	Operation in an ITU-T Rec. X.25 [4] environment
	C.7.3	Operation in an ITU-T Rec. X.25 [4] network environment
	C.7.4	Transient states
	C.10.2	Values for flow control parameters and throughput class, Permanent Virtual Circuit service

NOTE: ITU-T Rec. means ITU-T Recommendation.

A.7.1.1 General DTE characteristics

Table A.16: General DTE characteristics

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
	Service supported:			4.6	
Vs	- Virtual Call		o.1		m
Vp	- Permanent Virtual Circuit		o.1		n/a
	What environments are supported	3, 3.2		4.6	
Ec/8	- DTE/DCE (1988)		o.2	4.6.1	i
Ec/4	- DTE/DCE (1984)		o.2	4.6.1	i
Ec/0	- DTE/DCE (1980)		o.2	4.6.1	i
Et/t	- DTE/DTE in fixed role as DTE		o.2	4.6.2, 4.6.1	x
Et/c	- DTE/DTE in fixed role as DCE		Vs:o.2	4.6.2, 4.6.1	x
Et/d	- DTE/DTE with dynamic role selection	4.5	Vs:o.2	4.6.1	m
	What packet sequence numbering is supported				
M8	- modulo 8	13.2, 12.1.1, table 3	o.3	4.6.4.3	m
M128	- modulo 128 (extended)	3.2, 12.1.1, table 3	o.3	4.6.4.3	o
	Is the reference number optional user facility supported				
RNa	- without reversion to use of logical channel ranges	13.28.2.1	Et:o Et:x	4.6.11	x
RNb	- with possible reversion of operating mode to use logical channel ranges	13.28.2.1	Et:o Et:x	4.6.11	x

A.7.1.2 Call set-up

Table A.17: Call set-up

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
	Are incoming virtual calls supported:	5.2.2, 5.2.5, table 33		4.6.3.1	
S2a	- Fast select, acceptance possible	5.2.3, 13.17	o	4.6.10.2	m
S2b	- Fast select, always cleared	13.17	o	4.6.10.2	x
S2c	- Non fast select, with acceptance possible	5.2.3	o	4.6.3.1	m
S2d	- Non fast select, always cleared	5.2.3	o	4.6.3.1	x
	Is D-bit negotiation supported:				
DN1	- for outgoing virtual calls	6.3	S1ac:o	4.6.5	x
DN2	- for incoming virtual calls	6.3	S2ac:o	4.6.5	x

A.7.1.3 Call clearing

Table A.18: Call clearing

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
	Is call clearing supported as:	5.5.4, table 33		4.6.3.1	
C1	- response to indication of clearing	5.5.2	o		m
C2a	- aborting an outgoing virtual call attempt	5.4, 5.5.1 5.5.3	S1:o		S1:m
C2c	- originating clearing of an established virtual call	5.5.1, 5.5.3	o		m
CP3b	send CLEAR REQUEST, basic format	12.2.3.1	Cbcxa:o.6		m
CP3e	send CLEAR REQUEST, extended format	12.2.3.1, 12.2.3.2	Cbcxa:o.6		m

A.7.1.4 Resetting of logical channels

Table A.19: Resetting of logical channels

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
	Is resetting supported:	8, 8.4, table 34	o	4.6.3.1	
RSi	- as initiator	8.1, 8.3	o		m
	send RESET REQUEST	12.5.1			
	receive RESET INDICATION/CONFIRM	12.5.2, 12.5.1			
RSr	- as responder	8.2	o		m
	receive RESET INDICATION	12.5.1			
	send RESET CONFIRMATION	12.5.2			

A.7.1.5 Error procedures

Table A.20: Error procedures

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
	Is the ERROR-C procedure:	5.2.1, 5.4, 8.1, table 33		4.6.3.1	
W1a	- clear the virtual call		o.7		m
W1b	- restart the packet layer		o.7		x
	Is the ERROR-R procedure for virtual calls:	6.3, 6.4, 6.8.1, 6.8.2, 7.1.3, 7.1.4, 8.2, 11.2.1, 13.4.1, tables 34-36		4.6.3.1	
W2sc	- restart the packet layer		o.8		x

A.7.1.6 Sending data

Table A.21: Sending data

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
DS1	Is sending of DATA packets supported:	6, 6.1, 6.2, 7.1.1, 7.1.2, 7.1.3, 12.3.1	o	4.6.3.1	m
DS2	- Send-window rotation on receiving updated P(R) values	7.1, 7.1.2, 7.1.3	o	4.6.3.1	m
DS5a	- Sending Q = 0 in DATA packets	6.6	o.10	4.6.7	Aq:o.2 Aq:m (note)
DS5b	- Sending Q = 1 in DATA packets	6.6	o.10	4.6.7	Aq:o.2 Aq:x (note)
DS6	- Responding to packet retransmission requests (received REJECT packets)	13.4.2, 12.8	ET:o	4.6.9	x
DS7a	- ERROR-R action on expiry	11.2.1(a)	o		x
DS8	- Discard of overlength flow control packets (instead of ERROR-R)	table 36 note 2	o		x
NOTE: Predicate Aq is defined in the profile specific ICS proforma, table B.10. o.2. At least one of these should be supported.					

A.7.1.7 Receiving data

Table A.22: Receiving data

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
DR1	Receiving DATA packets:	6, 6.1, 6.2, 7.1.1, 7.1.2, 7.1.3, 12.3.1	o	4.6.3.1	m
DR2	- Receive-window rotation on receiving updated P(R) values	7.1, 7.1.2, 7.1.3	o	4.6.3.1	m
DR3	- flow control by sending RECEIVE NOT READY and RECEIVE READY packets	7.1.5, 7.1.6, 12.4.1, 12.4.2	o		m
DR4b	- Receiving M=1 in DATA packets	6.4, 6.5, 6.6, 6.7	o	4.6.6	m
DR5a	- Receiving Q=0 in DATA packets	6.6	o.11	4.6.7	Aq:o.3 Aq:i
DR5b	- Receiving Q=1 in DATA packets	6.6	o.11	4.6.7	Aq:o.3 Aq:i
DR6	- Requesting packet retransmission by sending REJECT packets - Recovery from receipt of DATA packets containing invalid (PS), by:	13.4.1, 12.8	o	4.6.9	x
DR7a	- ERROR-R action	11.3(a)	o.12	4.6.9	o.4
DR7b	- requesting packet retransmission	11.3(b)	o.12	4.6.9	x
DR7c	- ignoring the packet and waiting for correct retransmission of the packet - Recovery from receipt of DATA packets with invalid User Data field, by:	11.3(c)	o.12	4.6.9	o.4
DR8a	- ERROR-R action	11.3(a)	o.13	4.6.9	o.5
DR8b	- requesting packet retransmission	11.3(b)	o.13	4.6.9	x
DR8c	- ignoring the packet and waiting for correct retransmission of the packet	11.3(c)	o.13	4.6.9	o.5
DR9	- Window status transmission timer procedure	11.2.2	o		x

NOTE: Predicate Aq is defined in the profile specific ICS proforma, table B.10.
o.3. At least one of these should be supported.
o.4. At least one of these should be supported.
o.5. At least one of these should be supported.

A.7.1.8 Delivery confirmation

Table A.23: Delivery confirmation

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
DC	Is Delivery Confirmation supported	6.3, 6.5, 6.7, 7.1.4	o	4.6.5	x

A.7.1.9 Values of cause and diagnostic code fields

Table A.24: Values of cause and diagnostic code fields

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
Y1d	- Cause = 128, private diagnostic codes	12.6.1.1, 12.6.1.2, tables 24-25	o.14		x
Y3a	In Clear Request packets send cause code = 0, specific codes	12.2.3.1.1, 12.2.3.1.2, tables 24-25	o.15		m
Y3d	- Cause = 128, private diagnostic codes	12.2.3.1.1, 12.2.3.1.2, tables 24-25	o.15		x
Y5d	- Cause = 128, private diagnostic codes	12.5.1.1, 12.5.1.2, tables 24-25	o.16		x

A.7.1.10 Facilities sent in CALL REQUEST packets

Table A.25: Facilities sent in CALL REQUEST packets

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
FS1pi	Flow control Parameter Negotiation, packet size	13.12, 15.2.2.1.1,	o	4.6.4.1	m
FS1wi	Flow control Parameter Negotiation, window size	13.12, 15.2.2.1.2	o	4.6.4.1	m
FS3b	Closed User Group Selection, basic format	13.14.6, 15.2.2.3.1	o	4.6.10, 4.6.11	x
FS3e	Closed User Group Selection, extended format	13.14.6, 15.2.2.3.2	o	4.6.10, 4.6.11	x
FS4b	Closed User Group With Outgoing Access Selection, basic format	13.4.7, 15.2.2.4.1	o	4.6.10, 4.6.11	x
FS4e	Closed User Group With Outgoing Access Selection, extended format	13.4.7, 15.2.2.4.2	o	4.6.10, 4.6.11	x
FS5	Bilateral Closed User Group Selection	13.15, 15.2.2.5	o	4.6.10, 4.6.11	x
FS6b	Reverse charging	13.18, 13.19, 15.2.2.6	o	4.6.10, 4.6.11	x
FS7i	Network User Identification	13.21, 13.21.3, 15.2.2.7	o	4.6.10, 4.6.11	x
FS8i	Charging information, requesting service	13.22, 15.2.2.8.1	o	4.6.10, 4.6.11	x
FS9b	RPOA selection, basic format	13.23, 13.23.2, 15.2.2.9.1	o	4.6.10, 4.6.11	x
FS9e	RPOA selection, extended format	13.23, 13.23.2, 15.2.2.9.2	o	4.6.10, 4.6.11	x
FS99i	Local non-ITU-T Rec. X.25 [4] facilities, following Facility Marker	15.1, table 16	o	4.6.10, 4.6.11	x
FS98i	Remote non-ITU-T Rec. X.25 [4] facilities, following Facility Marker	15.1, table 16	o	4.6.10, 4.6.11	x
FS20i	Facility Marker, ITU-T - specified DTE facilities	15.1	o	4.6.10	fsi:m fsi:i
FS21i	Calling Address Extension	14.1, 15.3.2.1	o	4.6.10, 4.6.11	x
FS22i	Called Address Extension	14.1, 15.3.2.2	o	4.6.10, 4.6.11	x
FS26i	Priority	14.5, 15.3.2.5	o	4.6.10, 4.6.11	x
FS27i	Protection	14.6, 15.3.2.6	o	4.6.10, 4.6.11	x

NOTE 1: Predicate definition: fsi = FS23i OR FS24i OR FS25i.
NOTE 2: ITU-T Rec. means ITU-T Recommendation.

A.7.1.11 Facilities sent in CALL ACCEPT packets

Table A.26: Facilities sent in CALL ACCEPT packets

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
FS1pr	Flow control Parameter Negotiation, packet size	13.12, 15.2.2.1.1,	o	4.6.4.1	m
FS1wr	Flow control Parameter Negotiation, window size	13.12, 15.2.2.1.2	o	4.6.4.1	m
FS7r	Network User Identification	13.21, 13.21.3, 15.2.2.7	o	4.6.10, 4.6.11	x
FS8r	Charging information, requesting service	13.22, 15.2.2.8.1	o	4.6.10, 4.6.11	x
FS10r	Called Line Address Modified Notification	13.26, 15.2.2.12	o	4.6.10, 4.6.11	x
FS99r	Local non - ITU-T Rec. X.25 [4] facilities, following Facility Marker	15.1, table 16	o	4.6.10, 4.6.11	x
FS98r	Remote non - ITU-T Rec. X.25 [4] facilities, following Facility Marker	15.1, table 16	o	4.6.10, 4.6.11	x
FS20r	Facility Marker, ITU-T - specified DTE facilities	15.1	o	4.6.10	m
FS22r	Called Address Extension	14.2, 15.3.2.2	o	4.6.10, 4.6.11	x
FS24r	End-to-End Transit Delay Negotiation	14.4, 15.3.2.4	o	4.6.10.5	m
FS25r	Expedited Data Negotiation	14.7, 15.3.2.7	o	4.6.10.6	m
FS26r	Priority	14.5, 15.3.2.5	o	4.6.10, 4.6.11	x
FS27r	Protection	14.6, 15.3.2.6	o	4.6.10, 4.6.11	x
NOTE: ITU-T Rec. means ITU-T Recommendation.					

A.7.1.12 Facilities sent in CLEAR REQUEST packets

Table A.27: Facilities sent in CLEAR REQUEST packets

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
FS10d	Called Line Address Modified Notification	13.26, 15.2.2.12	o	4.6.10, 4.6.11	x
FS13	Call Deflection Selection	13.25.2.2, 15.2.2.10	o	4.6.10, 4.6.11	x
FS99d	Local non - ITU-T Rec. X.25 [4] facilities, following Facility Marker	15.1, table 16	o	4.6.10, 4.6.11	x
FS98d	Remote non - ITU-T Rec. X.25 [4] facilities, following Facility Marker	15.1, table 16	o	4.6.10, 4.6.11	x
FS20d	Facility Marker, ITU-T - specified DTE facilities	15.1	o	4.6.10, 4.6.11	x
FS22d	Called Address Extension	14.2, 15.3.2.2	o	4.6.10, 4.6.11	x
FS21d	Calling Address Extension	14.1, 15.3.2.1	o		n/a
FS23d	Minimum Throughput Class Negotiation	14.3, 15.3.2.3	o		n/a
FS24d	End-to-End Transit Delay Negotiation	14.4, 15.3.2.4	o		n/a
FS25d	Expedited Data Negotiation	14.7, 15.3.2.7	o		n/a
FS26d	Priority	14.5, 15.3.2.5	o		n/a
FS27d	Protection	14.6, 15.3.2.6	o		n/a
NOTE: ITU-T Rec. means ITU-T Recommendation.					

A.7.1.13 Facilities received in INCOMING CALL packets

Table A.28: Facilities received in INCOMING CALL packets

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
FR1pi	Flow control Parameter Negotiation, packet size	13.12, 15.2.2.1.1	o	4.6.4.1	m
FR1wi	Flow control Parameter Negotiation, window size	13.12, 15.2.2.1.2	o	4.6.4.1	m
FR3b	Closed User Group Selection, basic format	13.14.6, 15.2.2.3.1	o	4.6.10, 4.6.11	x
FR3e	Closed User Group Selection, extended format	13.14.6, 15.2.2.3.2	o	4.6.10, 4.6.11	x
FR4b	Closed User Group With Outgoing Access Selection, basic format	13.4.7, 15.2.2.4.1	o	4.6.10, 4.6.11	x
FR4e	Closed User Group With Outgoing Access Selection, extended format	13.4.7, 15.2.2.4.2	o	4.6.10, 4.6.11	x
FR5	Bilateral Closed User Group Selection	13.15, 15.2.2.5	o	4.6.10, 4.6.11	x
FR6a	Fast Select	13.16, 13.17, 15.2.2.6,	o	4.6.10.2	m
FR6b	Reverse charging	13.18, 13.19, 15.2.2.6	o	4.6.10, 4.6.11	x
FR11	Call Redirection or Call Deflection Notification	13.25.3, 15.2.2.11	o	4.6.10, 4.6.11	x
FR12	Transit Delay Selection and Indication	13.27, 15.2.2.13,	o	4.6.10.3	m
FR99i	Local non-ITU-T Rec. X.25 [4] facilities, following Facility Marker	15.1, table 16	o	4.6.10, 4.6.11	x
FR20i	Facility Marker, ITU-T - specified DTE facilities	15.1	o	4.6.10	m
FR21	Calling Address Extension	14.1, 15.3.2.1	o	4.6.10, 4.6.11	x
FR22i	Called Address Extension	14.2, 15.3.2.2	o	4.6.10, 4.6.11	x
FR23	Minimum Throughput Class Negotiation	14.3, 15.3.2.3	o	4.6.10.4	m
FR24i	End-to-End Transit Delay Negotiation	14.4, 15.3.2.4	o	4.6.10.5	m
FR25i	Expedited Data Negotiation	14.7, 15.3.2.7	o	4.6.10.6	m
FR26i	Priority	14.5, 15.3.2.5	o	4.6.10, 4.6.11	x
FR27i	Protection	14.6, 15.3.2.6	o	4.6.10, 4.6.11	x
NOTE: ITU-T Rec. means ITU-T Recommendation.					

A.7.1.14 Facilities received in call connect packets

Table A.29: Facilities received in call connect packets

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
FR1pr	Flow control Parameter Negotiation, packet size	13.12, 15.2.2.1.1,	o	4.6.4.1	m
FR1wr	Flow control Parameter Negotiation, window size	13.12, 15.2.2.1.2	o	4.6.4.1	m
FR10r	Called Line Address Modified Notification	13.26, 15.2.2.12	o	4.6.10, 4.6.11	x
FR12r	Transit Delay Selection and Indication	13.27, 15.2.2.613,	o	4.6.10.3	m
FR99r	Local non - ITU-T Rec. X.25 [4] facilities, following Facility Marker	15.1, table 16	o	4.6.10, 4.6.11	x
FR20r	Facility Marker, ITU-T - specified DTE facilities	15.1	o	4.6.10	m
FR22r	Called Address Extension	14.2, 15.3.2.2	o	4.6.10, 4.6.11	x
FR24r	End-to-End Transit Delay Negotiation	14.4, 15.3.2.4	o	4.6.10.5	m
FR26r	Priority	14.5, 15.3.2.5	o	4.6.10, 4.6.11	x
FR27r	Protection	14.6, 15.3.2.6	o	4.6.10, 4.6.11	x
NOTE: ITU-T Rec. means ITU-T Recommendation					

A.7.1.15 Facilities received in clear indication packets

Table A.30: Facilities received in clear indication packets

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
FR8ad	Charging Information, monetary unit	13.22, 15.22.8.2	o	4.6.10, 4.6.11	x
FR8bd	Charging Information, segment count	13.22, 15.22.8.3	o	4.6.10, 4.6.11	x
FR8cd	Charging Information, call duration	13.22, 15.22.8.4	o	4.6.10, 4.6.11	x
FR10d	Called Line Address Modified Notification	13.26, 15.2.2.12	o	4.6.10, 4.6.11	x
FR99d	Local non - ITU-T Rec. X.25 [4] facilities, following Facility Marker	15.1, table 16	o	4.6.10, 4.6.11	x
FR20d	Facility Marker, ITU-T - specified DTE facilities	15.1	o		n/a
FR22d	Called Address Extension	14.2, 15.3.2.2	o	4.6.10, 4.6.11	x
NOTE: ITU-T Rec. means ITU-T Recommendation.					

A.7.1.16 Facilities received in CLEAR CONFIRMATION packets

Table A.31: Facilities received in CLEAR CONFIRMATION packets

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
FR8af	Charging Information, monetary unit	13.22, 15.22.8.2	o	4.6.10, 4.6.11	x
FR8bf	Charging Information, segment count	13.22, 15.22.8.3	o	4.6.10, 4.6.11	x
FR8cf	Charging Information, call duration	13.22, 15.22.8.4	o	4.6.10, 4.6.11	x

A.7.1.17 Registration-facilities sent in REGISTRATION REQUEST packets

Table A.32: Registration-facilities sent in REGISTRATION REQUEST packets

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
	Invocation indicated:	16.2.2.3			
GS3ia	- Incoming Calls Barred		o	4.6.11	x
GS3ib	- Outgoing Calls Barred		o	4.6.11	x
GS3ic	- Fast Select Acceptance		o	4.6.11	x
GS3id	- Reverse Charging Acceptance		o	4.6.11	x
GS3ig	- Charging Information per Interface		o	4.6.11	x
GS4i	Facilities That May Be Negotiated Only When All Logical Channels Used For Virtual Calls Are In State p1 Registration-Facility	16.2.2.4		4.6.11	x
	Invocation indicated:	16.2.2.4			
GS4ia	Extended Packet Sequence Numbering		o	4.6.11	x
GS4ib	- Packet Retransmission		o	4.6.11	x
GS5i	Non-standard Default Packet Sizes Registration-Facility	16.2.2.5	o	4.6.11	x
GS6i	Non-standard Default Window Sizes Registration-Facility	16.2.2.6	o	4.6.11	x
GS7i	Default Throughput Classes Assignment Registration-Facility	16.2.2.7, table 23	o	4.6.11	x
GS8i	Logical Channel Types Ranges Registration-Facility	16.2.2.8	o	4.6.11	x

A.7.1.18 Registration-facilities sent in registration confirmation packets

Table A.33: Registration-facilities sent in registration confirmation packets

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
	Availability indicated:	16.2.2.2			
GS2ra	- Extended Packet Sequence Numbering		o	4.6.11	x
GS2rb	- Packet Retransmission		o	4.6.11	x
GS2ri	- Default Throughput Classes Assignment Registration-Facility		o	4.6.11	x
GS2rj	- Non-standard Default Window Sizes Registration-Facility		o	4.6.11	x
GS2rk	- Non-standard Default Packet Sizes Registration-Facility		o	4.6.11	x
	Invocation indicated:	16.2.2.3			
GS3ra	- Incoming Calls Barred		o	4.6.11	x
GS3rb	- Outgoing Calls Barred		o	4.6.11	x
GS3rc	- Fast Select Acceptance		o	4.6.11	x
GS4r	Facilities That May Be Negotiated Only When All Logical Channels Used For Virtual Calls Are In State p1 Registration-Facility	16.2.2.4		4.6.11	x
	Invocation indicated:	16.2.2.4			
GS4ra	- Extended Packet Sequence Numbering		o	4.6.11	x
GS4rb	- Packet Retransmission		o	4.6.11	x
GS5r	Non-standard Default Packet Sizes Registration-Facility	16.2.2.5	o	4.6.11	x
GS6r	Non-standard Default Window Sizes Registration-Facility	16.2.2.6	o	4.6.11	x
GS7r	Default Throughput Classes Assignment Registration-Facility	16.2.2.7, table 23	o	4.6.11	x
GS8r	Logical Channel Types Ranges Registration-Facility	16.2.2.8	o	4.6.11	x

A.7.1.19 Registration-facilities received in registration confirmation packets

Table A.34: Registration-facilities received in registration confirmation packets

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
GR5i	Non-standard Default Packet Sizes Registration-Facility	16.2.2.5	GS5i:m	4.6.11	x
GR6i	Non-standard Default Window Sizes Registration-Facility	16.2.2.6	GS6i:m	4.6.11	x
GR7i	Default Throughput Classes Assignment Registration-Facility	16.2.2.7, table 23	GS7i:m	4.6.11	x
GR8i	Logical Channel Types Ranges Registration-Facility	16.2.2.8	GS8i:m	4.6.11	x

A.7.1.20 Registration-facilities received in registration request packets

Table A.35: Registration-facilities received in registration request packets

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
GR5r	Non-standard Default Packet Sizes Registration-Facility	16.2.2.5	o	4.6.11	x
GR6r	Non-standard Default Window Sizes Registration-Facility	16.2.2.6	o	4.6.11	x
GR7r	Default Throughput Classes Assignment Registration-Facility	16.2.2.7, table 23	o	4.6.11	x
GR8r	Logical Channel Types Ranges Registration-Facility	16.2.2.8	o	4.6.11	x

A.7.1.21 Values for flow control parameters, etc.

Table A.36: Values for flow control parameters, etc.

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status (note)
	What values are supported for:				
V1s	- Default packet sizes, sending (octets)	16.2.2.5		4.6.4.2	128
V1r	- Default packet sizes, receiving (octets)	16.2.2.5		4.6.4.2	128
V2s	- Default window sizes, sending (octets)	16.2.2.6		4.6.4.3	2
V2r	- Default window sizes, receiving (octets)	16.2.2.6		4.6.4.3	2
V3s	- Default throughput classes, sending (bits/second)	16.2.2.7, table 23		4.6.8	64 000
V3r	- Default throughput classes, receiving (bits/second)	16.2.2.7, table 23		4.6.8	64 000
V5	Can different default packet sizes be set for sending and receiving	13.9	o	4.6.4.2	n/a
V7	Can different default window sizes be set for sending and receiving	13.10	o	4.6.4.2	n/a
V8	Can different default throughput classes be set for sending and receiving	13.11	o	4.6.8	n/a
V9s	- packet sizes negotiable, sending (octets)	15.2.2.1.1		4.6.4.2	128, 256, 512, 1 024, 2 048
V9r	- packet sizes negotiable, receiving (octets)	15.2.2.1.1		4.6.4.2	128, 256, 512, 1 024, 2 048
NOTE: A numeric value(s) indicates the permitted support answer(s).					

A.7.1.22 Timers, Retransmission Counts and logical channel ranges

Table A.37: Timers, Retransmission Counts and logical channel ranges

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status (note)
	Logical Channel Range Parameters	16.2.2.8, fig. 1		4.6.2	
LC1	LIC	13.8			LCb:0
LC2	HIC	13.8			LCb:0
LC3	LTC				LCb:1
LC4	HTC				LCb:1
LC5	LOC	13.7			LCb:0
LC6	HOC	13.7			LCb:0
LC8	Maximum number of logical channels for Virtual Calls				LCb:1
NOTE: These numeric values indicate the permitted support answers for the default case. Predicate LCb is defined in the profile specific ICS proforma, table B.10.					

A.7.2 Requirements List for ISO/IEC 8878 [22]

Table A.38 identifies the tables of the PICS proforma in ISO/IEC 8878 [22] and indicates their relevance to the profile described by this ETR. Tables A.39 to A.44 specify the restrictions imposed by this profile on the permitted support answers.

Table A.38: ISO/IEC 8878 [22]PICS tables

Category of PICS table	Subclause number in ISO/IEC 8878 [22]	Name of PICS table
Profile does not restrict permitted support answers	D.6.6.2.4 D.6.6.2.3 D.6.6.2.6	Data packet with Q-bit set to 1 Zero-length M-bit Sequence Facilities missing in a CALL CONNECTED packet
Profile restricts permitted support answers	D.6.5 D.6.6.1 D.6.6.2.1 D.6.6.2.2 D.6.6.2.5	Major capabilities Network Address mapping Interrupt packet Data packet with D-bit set to 1 Facilities missing in an INCOMING CALL packet
Tables not relevant to this profile	D.6.7 D.6.8	Questions related to 1980 SNDCP Questions applicable for PVC SNDCP

A.7.2.1 Major capabilities

Table A.39: Major capabilities

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8878 [22] Reference	Status	This ETR Reference	Status
SY1	ITU-T Rec. X.25 [4]/PLP 1984 VC procedures	clauses 0 - 12	o.1	4.7.1	m
SY2	ITU-T Rec. X.25 [4]/PLP 1980 VC procedures	annex A	o.1	4.7.1	x
SY4	PVC SNDCP procedures	annex F	o	4.7.1	x
ED	The system supports Expedited Data transfer	6.2.4, 10	EDT:o	4.7.3.2.6	m
RC	The system supports Network Receive Confirmation	6.2.3, 8.2.3, 9	o	4.6.5	x
NOTE: ITUT-T Rec. means ITU-T Recommendation.					

A.7.2.2 Network Address mapping

Table A.40: Network Address mapping

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8878 [22] Reference	Status	This ETR Reference	Status
	Called Network Address:				
AFb	Can the system encode the address in the AF without the AEF or AEP	6.2.2.1.1	OC:o	4.7.3.1	m
AFe	Can the system decode the address in the AF without the AEF or AEP	6.2.2.2.1	IC:o	4.7.3.1	m
	Calling Network Address:				
AFa	Can the system encode the address in the AF without the AEF or AEP	6.2.2.1.1	OC:o	4.7.3.1	m
AFd	Can the system decode the address in the AF without the AEF or AEP	6.2.2.2.1	IC:o	4.7.3.1	m
	Responding Network Address:				
AFf	Can the system encode the address in the AF without the AEF or AEP	6.2.2.1.1	OC:o	4.7.3.1	m
AFc	Can the system decode the address in the AF without the AEF or AEP	6.2.2.2.1	IC:o	4.7.3.1	m

A.7.2.3 Interrupt packet

Table A.41: Interrupt packet

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8878 [22] Reference	Status	This ETR Reference	Status
MV1c	Other	12	o.6	4.6.10.6	m

A.7.2.4 Data packet with D-bit set to 1

Table A.42: Data packet with D-bit set to 1

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8878 [22] Reference	Status	This ETR Reference	Status
MV2c	Other	12	o.7	4.6.5	m

A.7.2.5 Facilities missing in an INCOMING CALL packet

Table A.43: Facilities missing in an INCOMING CALL packet

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8878 [22] Reference	Status	This ETR Reference	Status
MV5a	If an Incoming Call packet is received without the Fast Select facility, the system clears the NC and indicates a diagnostic code of 228 (or 224).	12	o.10	4.7.3.2.2, 4.7.3.3	x
MV6a	If an Incoming Call packet is received without the TCN facility, the system clears the NC and indicates a diagnostic code of 228 (or 224).	12	o.10	4.7.3.2.2, 4.7.3.3	x

A.7.2.6 Restrictions on ISO/IEC 8208 [20] requirements

Subclause D.7.1 of ISO/IEC 8878 [22] contains modifications to the permitted support answers for the PICS proforma in ISO/IEC 8208 [20] for TEs claiming compliance with the CONS. Table A.44 below is based on these modifications, and should be used in addition to the tables contained in subclauses A.7.1.1 to A.7.1.22 above.

Table A.44: Restrictions on ISO/IEC 8208 [20] requirements

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
	Are outgoing calls supported:				
S1a	- fast select, no restriction on response	5.2.4, 13.16	o	4.7.3.2.2	OC:m
SP1e	sends CALL REQUEST, extended format	12.2.1.1, 12.2.1.2	S1ab:o.4	4.7.3	OC:m
	Are incoming calls supported:				
S2a	- fast select, acceptance possible	5.2.3, 13.17	o	4.7.3.2.2	IC:m
S2b	- fast select, always cleared	13.17	o	4.7.3.2.2	IC:x
SP4b	send CALL ACCEPTED, basic format	12.2.2.1, 12.2.2.2	o	4.7.3	IC:m
SP4e	send CALL ACCEPTED, extended format	12.2.2.1, 12.2.2.2	S2axc:o.5 S2anc:o	4.7.3	IC:m
	Is D-bit negotiation supported:				
DN1	- for outgoing calls	6.3	S1ac:o	4.7.3	OC:m
DN2	- for incoming calls	6.3	S2ac:o	4.7.3	IC:m

(continued)

Table A.44 (continued): Restrictions on ISO/IEC 8208 [20] requirements

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
	Is call clearing supported, as:				
C1	- response to indication of clearing	5.5.2	o	4.7.3	m
C2a	- aborting an outgoing call attempt	5.4, 5.5.1, 5.5.3	S1:o	4.7.3	OC:m
C2c	- originating clearing of an established call	5.5.1, 5.5.3	o	4.7.3	m
CP3b	send CLEAR REQUEST, basic format	12.2.3.1	Cbcxa:o.6	4.7.3	m
CP3e	send CLEAR REQUEST, extended format	12.2.3.1, 12.2.3.2	Cbcxa:o.6	4.7.3	m
	Is resetting supported:				
RSi	- as initiator	8.1, 8.3	o	4.7.3	m
RSr	- as responder	8.2	o	4.7.3	m
	Are the following supported:				
DS1	Sending DATA packets	6, 6.1, 6.2, 7.1.1, 7.1.2, 7.1.3, 12.3.1	o	4.7.3	m
DS2	Send-window rotation on receiving updated P(R) values	7.1, 7.1.2, 7.1.3	o	4.7.3	m
DS4b	Sending DATA packets with M=1	6.4, 6.5, 6.7	o	4.7.3	m
DS5a	Sending Q=0 in DATA packets	6.6	o.10	4.7.3	m
DR1	Receiving DATA packets	6, 6.1, 6.2, 7.1.1, 7.1.2, 7.1.3, 12.3.1	o	4.7.3	m
DR2	Receive-window rotation by sending updated P(R) values	7.1, 7.1.2, 7.1.3	o	4.7.3	m
DR4b	Receiving M=1 in DATA packets	6.4, 6.5, 6.6, 6.7	o	4.7.3	m
DR5a	Receiving Q=0 in DATA packets	6.6	o.11	4.7.3	m
DC	Receiving D=1 in DATA packets	6.3, 6.5, 6.7, 7.1.4	o	4.7.3	RC:m
W1a	Error-C procedure - clear the virtual call	5.2.1, 5.4, 8.1, table 33	o.7	4.7.3	m
W1b	Error-C procedure - restart the packet layer	5.2.1, 5.4, 8.1, table 33	o.7	4.7.3	x
W2sc	Error-R procedure - restart the packet layer	6.3, 6.4, 6.8.1, 6.8.2, 7.1.3, 7.1.4, 8.2, 11.2.1, 13.4.1, tables 34-36	o.8	4.7.3	x
Y3a	In CLEAR REQUEST packets sent: - cause = 0, standard diagnostic codes, - specific codes	12.2.3.1.1, 12.2.3.1.2, tables 24 to 25	o.15	4.7.3	m
Is	Is sending interrupts supported	6.8, 6.8.1, 6.8.3, table 35	o	4.7.3	ED:m

(continued)

Table A.44 (continued): Restrictions on ISO/IEC 8208 [20] requirements

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
Ir	Is receiving interrupts supported	6.8, 6.8.2, 6.8.3, table 35	o	4.7.3	ED:m
	Facilities sent in CALL REQUEST packets				
FS2i	Throughput class negotiation	13.13, 15.2.2.2, table 18	o	4.7.3.2.1	OC:m
FS6a	Fast select	13.16, 15.2.2.6	o	4.7.3.2.2	OC:m
FS12	Transit delay selection and indication	13.27, 15.2.2.13	o	4.7.3.2.3	OC:m
FS20i	Facility marker for ITU-T - specified DTE facilities	15.1	o	4.7.3.2	OC:m
FS21i	Calling address extension	14.1, 15.3.2.1	o	4.7.3.1	OC:m
FS22i	Called address extension	14.1, 15.3.2.2	o	4.7.3.1	OC:m
FS23i	Minimum throughput class negotiation	14.3, 15.3.2.2	o	4.7.3.2.4	OC:m
FS24i	End-to-end transit delay negotiation	14.4, 15.3.2.4	o	4.7.3.2.5	OC:m
FS25i	Expedited data negotiation	14.7, 15.3.2.7	o	4.7.3.2.6	OC:ED:m
FS26i	Priority	14.5, 15.3.2.5	o	4.7.3	OC:m
	Facilities sent in CALL ACCEPTED packets				
FS20r	Facility marker for ITU-T - specified DTE facilities	15.1			IC:m
FS22r	Called address extension	14.2, 15.3.2.2	o	4.7.3.1	IC:m
FS24r	End-to-end transit delay negotiation	14.4, 15.3.2.4	o	4.7.3.2.5	IC:m
FS25r	Expedited data negotiation	14.7, 15.3.2.7	o	4.7.3.2.6	IC:ED::m
FS26r	Priority	14.5, 15.3.2.5	o	4.7.3	IC:m
	Facilities sent in CLEAR REQUEST packets				
FS20d	Facility marker for ITU-T - specified DTE facilities	15.1	o	4.7.3.2	IC:m
FS22d	Called address extension	14.2, 15.3.2.2	o	4.7.3.1	IC:m
	Facilities received in CALL CONNECTED packets				
FR2r	Throughput class negotiation	13.13, 15.2.2.2, table 18	o	4.7.3.2.1	OC:m
FR12r	Transit delay selection and indication	13.27, 15.2.2.13	o	4.7.3.2.3	OC:m
FR20r	Facility marker for ITU-T - specified DTE facilities	15.1	o	4.7.3.2	OC:m
FR22r	Called address extension	14.2, 15.3.2.2	o	4.7.3.1	OC:m
FR24r	End-to-end transit delay negotiation	14.4, 15.3.2.4	o	4.7.3.2.5	OC:m
FR25r	Expedited data negotiation	14.7, 15.3.2.7	o	4.7.3.2.6	OC:m
FR26r	Priority	14.5, 15.3.2.5	o	4.7.3	OC:m
	Facilities received in INCOMING CALL packets				

(continued)

Table A.44 (concluded): Restrictions on ISO/IEC 8208 [20] requirements

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8208 [20] Reference	Status	This ETR Reference	Status
FR2i	Throughput class negotiation	13.13, 15.2.2.2, table 18	o	4.7.3.2.1	IC:m
FR6a	Fast select	13.16, 13.17, 15.2.2.6	o	4.7.3.2.2	IC:m
FR12I	Transit delay selection and indication	13.27, 15.2.2.13	o	4.7.3.2.3	IC:m
FR20i	Facility marker for ITU-T - specified DTE facilities	15.1	o	4.7.3.2	IC:m
FR21	Calling address extension	14.1, 15.3.2.1	o	4.7.3.1	IC:m
FR22i	Called address extension	14.2, 15.3.2.2	o	4.7.3.1	IC:m
FR23	Minimum throughput class negotiation	14.3, 15.3.2.3	o	4.7.3.2.4	IC:m
FR24i	End-to-end transit delay negotiation	14.4, 15.3.2.4	o	4.7.3.2.5	IC:m
FR25i	Expedited data negotiation	14.7, 15.3.2.7	o	4.7.3.2.6	IC:m
FR26i	Priority	14.5, 15.3.2.5	o	4.7.3	IC:m
	Facilities sent in CALL ACCEPTED packets				
FS2r	Throughput class negotiation	13.13, 15.2.2.2, table 18	o	4.7.3.2.1	IC:m
	Facilities received in CLEAR INDICATION packets				
FR20d	Facility marker for ITU-T - specified DTE facilities	15.1	o	4.7.3.2	OC:m
FR22d	Called address extension	14.2, 15.3.2.2	o	4.7.3.1	OC:m
NOTE: OC = Outgoing Calls; IC = Incoming Calls					

A.8 Tables for the transport layer: B-channel

A.8.1 Requirements List for ITU-T Recommendation T.70 [3]

Since no PICS proforma exists for ITU-T Recommendation T.70 [3], no RL is necessary. The profile specific ICS in annex B covers the specific usage of ITU-T Recommendation T.70 [3] according to the requirements of this ETR.

A.8.2 Requirements List for ISO/IEC 8073 [19]

Table A.45 identifies the tables of the PICS proforma in ISO/IEC 8073 [19] and indicates their relevance to the profile described by this ETR. Tables A.46 to A.52 specify the restrictions imposed by this profile on the permitted support answers.

Table A.45: ISO/IEC 8073 [19] PICS tables

Category of PICS table	Subclause number in ISO/IEC 8073 [19]	Name of PICS table
Profile does not restrict permitted support answers	C.6.1 C.7 C.8 C.9.1 C.9.3 C.10 C.11.1 C.11.5 C.12.1 C.13 C.14 C.15	annex B - NCMS NCMS functions Initiator/responder capability for protocol classes 0 to 4 Supported functions for Class 0 Supported functions for Class 2 Supported TPDUs Supported parameters for NCMS - NCM TPDU Supported parameters for class 2 TPDUs Supported parameters for received TPDUs - NCM TPDU User data in issued TPDUs (relevant classes) User data in received TPDUs All tables in C.15, except C.15.1 and C.15.2
Profile restricts permitted support answers	C.6.2 C.11.2 C.11.3 C.15.1 C.15.2 C.16.1 C.17	Classes implemented Parameter values for CR TPDU Supported parameters for class 0 TPDUs Class negotiation - initiator Class negotiation - responder Action on receipt of a protocol error Timers and protocol parameters
Tables not relevant to this profile	C.9.2, C.9.4, C.9.5 C.11.4, C.11.6, C.11.7 C.12.2	Supported functions for other classes Supported parameters for other classes TPDUs in class 4

A.8.2.1 Classes implemented

Table A.46: Classes implemented

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Feature	ISO/IEC 8073 [19] Reference	Status	This ETR Reference	Status
C0	Class 0	14	ISO:o.1 CCT:m	4.8.3.2	m
C1	Class 1	14	C0:o	4.8.3.2	x
C2	Class 2	14	ISO:o.1 CCT:o	4.8.3.2	o
C3	Class 3	14	C2:o	4.8.3.2	x
C4	Class 4 operation over CONS	14	C2:o	4.8.3.2	x
C4L	Class 4 operation over CLNS	14	ISO:C2:o CCT:N/A	4.8.3.2	x

A.8.2.2 Parameter values for CR TPDU

Table A.47: Parameter values for CR TPDU

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Feature	ISO/IEC 8073 [19] Reference	Status	This ETR Reference	Status
ICR2	Is class 0 always offered as an alternative class	14.4	o CCT:M	4.8.3.2	m

A.8.2.3 Supported parameters for class 0 TPDUs

Table A.48: Supported parameters for class 0 TPDUs

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Feature	ISO/IEC 8073 [19] Reference	Status	This ETR Reference	Status
I0CR6	Called Transport-Selector	13.3.4 a)	o	4.8.3.5	m
I0CR7	Calling Transport-Selector	13.3.4 a)	o	4.8.3.5	m

A.8.2.4 Class negotiation - initiator

Table A.49: Class negotiation - initiator

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8073 [19] Reference	Allowed	This ETR Reference	Allowed
NAC2	Alternative class parameter if Class 2 is preferred class	6.5.4	None, 0, 2.	4.8.3.2	0

A.8.2.5 Class negotiation - responder

Table A.50: Class negotiation - responder

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Protocol feature	ISO/IEC 8073 [19] Reference	Allowed	This ETR Reference	Allowed
RC2a	Negotiation to alternative class in response to CR TPDU	6.5.4 Table 3	0, 2 or connection refused	4.8.3.2	0

A.8.2.6 Action on receipt of a protocol error

Table A.51: Action on receipt of a protocol error

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Feature	ISO/IEC 8073 [19] Reference	Allowed action	This ETR Reference	Allowed action
PE0	Treatment of protocol error	6.22.1.3	ER, NDISreq., NRSTreq. Discard (see note)	4.8.3.10	ER
PE2	Treatment of protocol error	6.22.1.3	ER, DR, NDISreq., NRSTreq. Discard (see note)	4.8.3.10	ER

A.8.2.7 Timers and protocol parameters

Table A.52: Timers and protocol parameters

BASE STANDARD FEATURES				PROFILE FEATURES	
Item	Feature	ISO/IEC 8073 [19] Reference	Status	This ETR Reference	Status
OT1	Support TS1 in Class 0	6.5.4	o	4.8.3.7	m
OT3	Support TS1 in Class 2	6.5.4	o	4.8.3.7	m
OT5	Support TS2 in Class 0	6.7.1.5 and 6.22.1.3	o	4.8.3.7	m
OT7	Support TS2 in Class 0	6.7.1.5 and 6.22.1.3	o	4.8.3.7	m

Annex B: Profile specific ICS proforma

B.1 General

This annex contains the profile specific Implementation Conformance Statement (ICS) proforma for the protocols in each of layers 1 to 4, for both the D-channel and the B-channel(s).

Throughout this annex the term ITU-T is used, since the CCITT no longer exists. However in some of the base standards the term CCITT may still be found.

The status notation used in this annex is that defined in ISO/IEC 9646-7 [26]. In summary, the meaning of the notations is as follows:

i	Irrelevant or out-of-scope - this capability is outside the scope of this profile and is not subject to conformance testing in this context.
m	Mandatory - the capability is required to be supported.
n/a	Not Applicable - in the given context, it is impossible to use the capability.
o	Optional - the capability may or may not be supported.
o.i	qualified optional - for mutually exclusive or selectable options from a set. "i" is an integer that identifies an unique group of related optional items and the logic of their selection, defined below the table.
x	eXcluded or prohibited - there is a requirement not to support this capability in this profile.

B.2 Copyright release for profile specific ICS proforma

Not withstanding the provisions of the copyright clause related to the text of this ETR, ETSI grants that users of this ETR may freely reproduce the profile specific ICS proforma in this annex (together with its supplements in annex C, if appropriate) so that they can be used for their intended purpose. Users may further publish the completed ICS.

B.3 Conformance

The supplier of a profile implementation that is claimed to conform to the requirements contained in this ETR is required to complete a copy of the profile specific ICS proforma provided in this annex and is required to provide the information necessary to identify both the supplier and the implementation.

Are all capabilities, whose status evaluates to "mandatory" in the profile specific ICS proforma in this annex, implemented in the Implementation Under Test (IUT)?

Answering "NO" to this question indicates non-conformance to the profile specification. Unsupported mandatory capabilities should be identified in the profile specific ICS, with an explanation of why the implementation is non-conformant.

In addition, the supplier is required to complete a copy of the PICS proformas provided in each of the protocol standards referred to by this ETR.

B.4 Identification

B.4.1 Identification of Implementation Under Test (IUT)

IMPLEMENTATION IDENTIFICATION:

Trade Name	Type	Version	Serial Number

CLIENT:

Company:

Contact Person:

Name: .....

..... Telephone: .....

Street & No.: ..... Facsimile: .....

Postal Code & City: ..... Telex: .....

Country .....

SUPPLIER (*if different from client*):

Company:

..... Telephone: .....

Street & No.: ..... Facsimile: .....

Postal Code & City: ..... Telex: .....

Country .....

RELATED SYSTEM CONFORMANCE STATEMENT (SCS):

Serial Number: **.....**

ADDITIONAL INFORMATION:

B.4.2 Identification of the profile

Identification of profile specification	This ETR	
Identification of amendments and corrigenda to this profile specific ICS proforma that have been completed as part of this profile specific ICS	This ETR Amd.:	Corr.:
	Amd.:	Corr.:
	Amd.:	Corr.:
Are all capabilities, whose status evaluates to "mandatory" in the profile specific ICS proforma, implemented in the IUT (see B.3)? (The answer "No" means that the implementation does not conform to This ETR)	Yes ☐	No ☐

Date of statement	

B.5 Profile specific ICS proforma structure and contents

B.5.1 General

The profile specific ICS proforma consists of tables to be filled in by the client. The tables are structured as indicated in ISO/IEC 9646-1 [25] and ISO/IEC 9646-7 [26]. They contain pre-printed guide text.

B.5.2 Pre-printed table contents

The pre-printed contents of the profile specific ICS tables provide the following:

- table/item identification;
- item names or short item descriptions;
- references to the Standards;
- status attributes specifying the status of the items; and
- support column to be filled in by the client.

B.5.3 The status column

The status notation in the "Status" column reflects the conformance requirements defined in the referenced subclause. The notation used is that defined in ISO/IEC 9646-7 [26]; a summary is provided in annex A (clause A.1) above.

B.5.4 Table and item identification

Each table in the profile specific ICS proforma is identified by a table number and name.

Each item in a table is provided with an item number in the left table column called "Item No.".

B.6 Guidance for completion of the profile specific ICS proforma

The profile specific ICS proforma is completed by providing answers in the "Support" column to the questions posed in the "Profile feature" column of each table. In most cases the client is only required to tick the appropriate "Yes" or "No" box. In a few cases, a "not applicable" (n/a) box needs to be ticked, or numeric values entered.

For each mandatory item that has not been implemented, the client should include a justification for not implementing it. This should be provided as a note added at the relevant profile specific ICS page.

B.7 Profile specific ICS tables

B.7.1 Supported protocols

Table B.1: Supported protocols

Item	Profile feature	Status	Reference	Support
L1bas	Does the IUT support basic access at layer 1?	o.1 (note 1)	4.1.1	Yes ☐ No ☐
L1prim	Does the IUT support primary rate interface at layer 1?	o.1 (note 1)	4.1.1	Yes ☐ No ☐
L2/LAPD	Does the IUT support LAPD procedures specified in ETS 300 402, parts 1 [10], 2 [11] and 4 [12] at layer 2 of the D-channel?	m	4.1.1	Yes ☐ No ☐
L2/7776	Does the IUT support ISO/IEC 7776 [17] protocol at layer 2 of the B-channel?	m	4.1.1	Yes ☐ No ☐
L2/XID	Does the IUT support XID procedures specified in ISO/IEC 8885 [23] at layer 2 of the B-channel?	o	4.1.1	Yes ☐ No ☐
L3/DSS1	Does the IUT support DSS1 procedures specified in ETS 300 403, parts 1 [13], 2 [14] and 3 [15] at layer 3 of the D-channel?	m	4.1.1	Yes ☐ No ☐
L3/X25	Does the IUT support ITU-T Rec. X.25 [4] PLP specified in ISO/IEC 8208 [20] at layer 3 of the B-channel?	m	4.1.1	Yes ☐ No ☐
L3/CONS	Does the IUT support OSI CONS with mapping to the elements of ITU-T Rec. X.25 [4] as specified in ISO/IEC 8878 [22]?	o	4.1.1	Yes ☐ No ☐
L4/T70	Does the IUT support the ISDN telematic transport service (ITU-T Recs. T.70 [3] and X.224 [29]) at layer 4?	o (note 2)	4.1.1	Yes ☐ No ☐
L4/8073	Does the IUT support the COTS (ISO/IEC 8073 [19] protocol) at layer 4?	o (note 2)	4.1.1	Yes ☐ No ☐
SYN	Does the IUT support co-ordinated operation of the procedures on the B-channel with those of the D-channel?	m	4.1.2	Yes ☐ No ☐
EES	Does the IUT support procedures for octet alignment of the B-channel?	m	4.4.2	Yes ☐ No ☐

NOTE 1: o.1 - support of one, and only one, of these options is required.
NOTE 2: The "implementation" (IUT) about which this profile specific ICS proforma asks questions corresponds to one configuration on top of ONE physical interface (i.e. one ISDN Basic access or one ISDN Primary rate access interface structure). If the TE supports more than one interface or configuration of that interface, then a profile specific ICS should be created for each type of interface (and for each configuration of each interface) provided by the TE.
NOTE 3: ITU-T Rec. means ITU-T Recommendation.

B.7.2 Profile specific ICS proforma for the physical layer

There are no profile specific requirements for the physical layer, thus, no profile specific ICS proforma is provided.

B.7.3 Profile specific ICS proforma for the link layer: D-channel

There are no profile specific requirements for the physical layer, thus, no profile specific ICS proforma is provided.

B.7.4 Profile specific ICS proforma for the link layer: B-channel

B.7.4.1 Terminal type selection

Table B.2: Terminal type selection

If the XID procedure (predicate L2/XID) is not supported, mark n/a: n/a ☐
Continue at table B.3.

Item	Profile feature	Status	Reference	Support
XD1a	Does the IUT encode XID frames according to the requirements of ISO/IEC 4335 [16]?	m	4.4.3.1	Yes ☐ No ☐
XD1b	Does the IUT implement the single-frame exchange negotiation procedure?	m	4.4.3.1	Yes ☐ No ☐
XD2a	Does the IUT support the calling terminal procedures for terminal type selection?	m	4.4.3.2 4.4.3.4	Yes ☐ No ☐
XD2b	Does the IUT encode the User Data Subfield with the terminal type identifiers it can support?	m	4.4.3.2, 4.4.5.3	Yes ☐ No ☐
XD3a	Does the IUT support the called terminal procedures for terminal type selection?	m	4.4.3.3	Yes ☐ No ☐
XD3b	Does the IUT encode the User Data Subfield with the terminal type identifiers it can support?	m	4.4.3.3, 4.4.5.3	Yes ☐ No ☐
XD4a	Does the IUT support the negotiation of essential data link parameters during terminal type selection?	m	4.4.4.1	Yes ☐ No ☐
XD4b	Does the IUT encode the Data Link Subfield with the layer 2 flow control parameters it can support?	m	4.4.4.1, 4.4.5.2	Yes ☐ No ☐

B.7.4.2 Receipt of XID frames with FIS = 82

Table B.3: Receipt of XID frames with FIS = 82

Item	Profile feature	Status	Reference	Support
XD3a	Does the IUT support the receipt of XID frames with FIS=82?	o	4.4.4.2	Yes ☐ No ☐
XD3b	Does the IUT encode the XID response frame with FIS=82 and the Data Link Subfield with the layer 2 flow control parameters it can support?	XD3a:m XD3a:n/a	4.4.4.2, 4.4.5.2	Yes ☐ No ☐ n/a ☐

B.7.4.3 Establishment of data link

Table B.4: Establishment of data link

Item	Profile feature	Status	Reference	Support
EDa	Does the IUT prohibit an unsolicited DM response from being sent when it is acting as a calling terminal?	m	4.4.6.7	Yes ☐ No ☐
EDb	Does the IUT ensure the data link connection is disconnected before disconnecting the D-channel?	m	4.4.6.7	Yes ☐ No ☐
EDc	Does the IUT consider the data link to be disconnected if it detects continuous '1' state for a period of time equal to timer T3?	m	4.4.6.7	Yes ☐ No ☐
EDd	Does the IUT support the commencement of timer period T1 at the end of the transmission of a frame?	m	4.4.6.11	Yes ☐ No ☐

B.7.4.4 System parameters

Table B.5: System parameters

Item	Profile feature	Status	Reference	Value
P1	What is the value of timer T1 (in the range 2,5 to 7s)?	m	4.4.6	
P2	What is the value of timer T2 (≤ 1s)?	m	4.4.6	
P3	What is the value of timer T3 (in the range 30 - 60s)?	m	4.4.6	
P4	What is the maximum number of re-attempts (N2, equal to 60/T1)?	m	4.4.6	
P5	What is the frame size (N1, sufficient to carry a complete layer 3 packet) in bits?	m	4.4.6	
P6	What is the value of window size k ?	M8:$1 \leq k \leq 7$ M128: $1 \leq k \leq 127$ (note)	4.4.6	
NOTE:	Predicates M8 and M128 refer to items in table A.3, and should not be confused with items in table A.16.			

B.7.5 Profile specific ICS proforma for the network layer: D-channel

B.7.5.1 Compatibility information provided by the calling terminal

Table B.6: Compatibility information provided by the calling terminal

Item	Profile feature	Status	Reference	Support
CCGT1	Does the terminal support encoding of the Bearer Capability information element?	m	4.5.2.1	Yes ☐ No ☐
CCGT2	Does the terminal support encoding of the Low layer compatibility information element?	m	4.5.2.1	Yes ☐ No ☐
CCGT3	Does the terminal support encoding of the High layer compatibility information element?	m	4.5.2.1	Yes ☐ No ☐

B.7.5.2 Compatibility checking by the called terminal

Table B.7: Compatibility checking by the called terminal

Item	Profile feature	Status	Reference	Support
CCDT1	Does the called terminal support compatibility checking of the addressing information?	m	4.5.2.2 a)	Yes ☐ No ☐
CCDT2	Does the called terminal support network to user compatibility checking?	m	4.5.2.2 b)	Yes ☐ No ☐
CCDT3	Does the called terminal support user to user compatibility checking based on the content of the Low layer compatibility (LLC) information element?	m	4.5.2.2 c) 1)	Yes ☐ No ☐
CCDT4	Does the called terminal support user to user compatibility checking based on the content of the High layer compatibility (HLC) information element?	m	4.5.2.2 c) 2)	Yes ☐ No ☐
CCDT5	Does the called terminal support outband negotiation?	o	4.5.2.3	Yes ☐ No ☐
CCDT6	Does the called terminal support the call acceptance conditions?	m	4.5.2.4	Yes ☐ No ☐

B.7.5.3 Interworking with other networks

Table B.8: Interworking with other networks

Item	Profile feature	Status	Reference	Support
IWa	Does the IUT support interworking with non-ISDNs for outgoing calls?	n/a	4.5.3.1.1	n/a
IWb	Does the IUT support interworking with non-ISDNs for incoming calls?	m	4.5.3.1.2	Yes ☐ No ☐
IWc	Does the IUT support interworking with private telecommunication networks (note)?	m	4.5.3.2	Yes ☐ No ☐
IWd	Does the IUT support interworking with a network having restricted bearer capability?	o	4.5.3.3	Yes ☐ No ☐
NOTE:	This question relates specifically to interworking with private telecommunication networks that use the inter-exchange signalling protocol specified in ETS 300 172 [7]. It does not cover interworking with private networks using other signalling protocols.			

B.7.5.4 Use of ISDN supplementary services

Table B.9: Use of ISDN supplementary services

Item	Profile feature	Status	Reference	Support
SSa	Does the IUT support the use of ISDN supplementary services in conjunction with telematic applications?	n/a	4.5.4	n/a

B.7.6 Profile specific ICS proforma for the network layer: B-channel

Table B.10: Logical channels

Item	Profile feature	Reference	Status	Support
LCa	Does the IUT support a single two-way logical channel?	4.6.2	m	Yes ☐ No ☐
LCb	Does the IUT support 2 or more two-way logical channels?	4.6.2	o	Yes ☐ No ☐
LCc	Does the IUT set the parameter LTC to the value of 1?	4.6.2	m	Yes ☐ No ☐
LCd	Does the IUT set the parameter HTC to the value of 1?	4.6.2	LCb:n/a LCb:m	n/a ☐ Yes ☐ No ☐
SPIa	Does the IUT support Subsequent Protocol Identifiers (SPI) as the 1st octet of the Call user data field of CALL REQUEST/INCOMING CALL packets?	4.6.3.3	m	Yes ☐ No ☐
FCN	Does the IUT support flow control parameter negotiation for every virtual call?	4.6.4.1	m	Yes ☐ No ☐
PSa	Is the IUT capable of handling packet sizes of 256, 512, 1 024, and 2 048 octets?	4.6.4.2	o	Yes ☐ No ☐
PSb	During flow control parameter negotiation, does the IUT propose a value for packet size of 512 octets?	4.6.4.2	o.2	Yes ☐ No ☐
PSc	During flow control parameter negotiation, does the IUT propose a value for packet size of 1 024 octets?	4.6.4.2	o.2	Yes ☐ No ☐
WS	During flow control parameter negotiation, does the IUT propose a value of 80 for window size?	4.6.4.3	o	Yes ☐ No ☐
PDUc	Does the IUT transmit PDUs in a complete packet sequence?	4.6.6	m	Yes ☐ No ☐
Aq	Does the IUT support the use of the Qualifier bit (Q-bit)?	4.6.7	o	Yes ☐ No ☐
ERRa	On receipt of a REGISTRATION REQUEST packet invoking an unsupported optional facility, does the IUT respond with a REGISTRATION CONFIRMATION packet?	4.6.11	o	Yes ☐ No ☐
ERRb	Does the IUT treat the receipt of a CALL REQUEST/INCOMING CALL packet invoking an unsupported optional facility, as an error?	4.6.11	m	Yes ☐ No ☐
NOTE:	o.2 - Only one of the options may be supported.			

B.7.7 Profile specific ICS proforma for the CONS

If the layer 3 CONS (predicate L3/CONS) is not supported, mark n/a: n/a ☐
Continue at table B.13.

Table B.11: Additional D-channel requirements for the CONS

Item	Profile feature	Reference	Status	Support
Dadd1	Does the IUT support the additional D-channel protocol requirements specified in ISO/IEC 9574 [24], modified by this ETR?	4.5, 4.7.2 (note 1)	m	Yes ☐ No ☐
Dadd2	When operating as a CONS compliant terminal, does the IUT support encoding of the LLC information element as "ISO/IEC 8878 [22] use of ISO/IEC 8208 [20] and ITU-T Rec. X.25 [4] to provide the OSI CONS"?	4.7.2.1	m	Yes ☐ No ☐
Dadd3	Does the IUT support use of the Subaddressing supplementary service to convey NSAP addresses during call establishment?	4.7.2.2	c1:m c1:n/a (note 2)	Yes ☐ No ☐ n/a ☐
Dadd4	Does the IUT support use of the User-to-User signalling supplementary service for conveying network service user data?	4.7.2.3	x	Yes ☐ No ☐
Dadd5	Does the IUT support mapping of cause values to the reason parameter of the CONS indication primitive?	4.7.2.4, table 10	m	Yes ☐ No ☐

NOTE 1: See also subclause 6.4 in ISO/IEC 9574 [24].
NOTE 2: c1 - Application needs to convey NSAP addresses during the establishment of the B-channel connection.
NOTE 3: ITU-T Rec. means ITU-T Recommendation.

Table B.12: Additional B-channel requirements for the CONS

Item	Profile feature	Reference	Status	Support
Badd1	Does the IUT support the additional B-channel protocol requirements specified in ISO/IEC 9574 [24], modified by this ETR?	4.5, 4.7.2 (note)	m	Yes ☐ No ☐
Badd2	Does the IUT support additional fields in CALL REQUEST packets, corresponding to those optional facilities of ISO/IEC 8208 [20] required to provide the CONS?	4.7.3, 4.7.3.2	m	Yes ☐ No ☐
Badd3	Does the IUT support encoding of called, calling and responding addresses as specified in ISO/IEC 8878 [22] for conveying the full NSAP address?	4.7.3.1	m	Yes ☐ No ☐
Badd4	Does the IUT support interworking with calling terminals not supporting CONS?	4.7.3.3	m	Yes ☐ No ☐
Badd5	Does the IUT support use of a value of 64 kbit/s for the Throughput QOS parameter?	4.7.3.4	m	Yes ☐ No ☐
Badd6	Does the IUT support use of the value "unspecified" for the Transit delay QOS parameter?	4.7.3.5	m	Yes ☐ No ☐

NOTE: See also subclause 6.4 in ISO/IEC 9574 [24].

B.7.8 Profile specific ICS proforma for the transport layer

B.7.8.1 Profile specific ICS proforma for the ISDN telematic transport service

This profile specific ICS proforma for the ISDN telematic transport service covers the specific usage of ITU-T Recommendation T.70 [3] according to the requirements in subclause 4.8.2 of this ETR.

If the ISDN telematic transport service (predicate L4/T70) is not supported, mark n/a: n/a ☐
Continue at table B.19.

Table B.13: Major capabilities

Item	Profile feature	Reference in ITU-T Rec. T.70 [3]	Reference in This ETR	Status	Support
1	Does the IUT support transport connection establishment and termination; see B.14/1, B.14/2 and B.14/3?	5.1.4.1 a)	4.8.2	m	Yes ☐ No ☐
2	Does the IUT support transport connection identification; see B.14/1, B.14/2 and B.14/3?	5.1.4.1 a)	4.8.2	m	Yes ☐ No ☐
3	Does the IUT support data transfer; see B.14/4?	5.3	4.8.2	m	Yes ☐ No ☐
4	Does the IUT support data delimitation; see B.14/4?	5.1.4.1 b)	4.8.2	m	Yes ☐ No ☐
5	Does the IUT support segmentation and reassembling; see B.14/4?	5.1.4.1 b)	4.8.2	m	(note)
6	Does the IUT support detection/indication of procedural errors; see B.14/5 and B.17?	5.1.4.1 c)	4.8.2	m	Yes ☐ No ☐
7	Does the IUT support recovery from network reset?	A.1.2.3	4.8.2	m	Yes ☐ No ☐
8	Does the IUT support recovery from network disconnection?	A.1.2.4	4.8.2	m	Yes ☐ No ☐
9	Does the IUT support extended addressing; see B.14/1, B.14/2 and B.16?	5.1.4.1 a), 5.2.6	4.8.2	o	Yes ☐ No ☐
10	Does the IUT support protocol identification by annex B of ITU-T Recommendation X.224 [29]?		4.8.2.4	m	Yes ☐ No ☐
NOTE: State the TSDU maximum size for reassembling.					

Table B.14: Transport data protocol units

Item	Profile feature	Reference in ITU-T Rec. T.70 [3]	Reference in This ETR	Status	Support
1	Does the IUT support TCR?	5.2.2	4.8.2.2, 4.8.2.3	m	Yes ☐ No ☐
2	Does the IUT support TCA?	5.2.3	4.8.2	m	Yes ☐ No ☐
3	Does the IUT support TCC?	5.2.4	4.8.2.2, 4.8.2.3	o	Yes ☐ No ☐
4	Does the IUT support TDT?	5.3	4.8.2	m	Yes ☐ No ☐
5	Does the IUT support TBR?	5.4	4.8.2	m	Yes ☐ No ☐

Table B.15: Transport data block size negotiation

Item	Profile feature	Reference in ITU-T Rec. T.70 [3]	Reference in This ETR	Status	Support
1	Does the IUT support receipt of request in TCR for use of optional TDT block length?	5.3.2.2, 5.5.5.3	4.8.2		Yes ☐ No ☐
2	Does the IUT support request in TCR for use of an optional, not supported TDT block length is not TBR responded?	5.2.3.2	4.8.2		Yes ☐ No ☐
3	Does the IUT support TDT length of 128 octets (Standard length)?	5.3.2	4.8.2	m	Yes ☐ No ☐
4	Does the IUT support TDT length of 256 octets?	5.3.2	4.8.2	o	Yes ☐ No ☐
5	Does the IUT support TDT length of 512 octets?	5.3.2	4.8.2	o	Yes ☐ No ☐
6	Does the IUT support TDT length of 1 024 octets?	5.3.2	4.8.2	o	Yes ☐ No ☐
7	Does the IUT support TDT length of 2 048 octets?	5.3.2	4.8.2	o	Yes ☐ No ☐
8	Does the IUT support sending request in TCR for use of optional TDU block length?	5.5.4.3	4.8.2	o	Yes ☐ No ☐
9	Does the IUT support sending request in TCA for a shorter allowable TDT block?	5.2.3.2	4.8.2	o	Yes ☐ No ☐
10	Does the IUT support accepting use of optional TDT size by returning size value in TCA response?	5.2.3.2	4.8.2	o	Yes ☐ No ☐
11	Does the IUT support rejecting use of optional TDT size by TCA response without TDT block size parameter?	5.2.3.2	4.8.2	o	Yes ☐ No ☐

Table B.16: Extended addressing

Item	Profile feature	Reference in ITU-T Rec. T.70 [3]	Reference in This ETR	Status	Support
1	Does the IUT support TCA response on receipt of TCR with/without extended addressing?	5.2.6	4.8.2	c2	Yes ☐ No ☐
2	Does the IUT support reaction on receipt of TCR with/without extended addressing?	5.2.6	4.8.2	c2	Yes ☐ No ☐
3	Does the IUT support routing in a multi-terminal configuration?	5.2.6	4.8.2	o	Yes ☐ No ☐
NOTE: c2 - Mandatory if extended addressing is supported.					

Table B.17: Procedures and reactions on protocol errors

Item	Profile feature	Reference in ITU-T Rec. T.70 [3]	Reference in This ETR	Status	Support
1	Does the IUT support when calling: Notifying in TBR if TCR is received?	5.2.5	4.8.2	m	Yes ☐ No ☐
2	Does the IUT support neglect of incorrect extended addressing?	5.2.6.3	4.8.2	m	Yes ☐ No ☐
3	Does the IUT support no reject of TDT/TSDU with end mark 0 and size less than maximum?	5.3.2.2	4.8.2	m	Yes ☐ No ☐
4	Does the IUT support accepting TDT/TSDU with end mark 1 and no user information?	5.3.3.1	4.8.2	m	Yes ☐ No ☐
5	Does the IUT support sending TBR to report receipt of invalid/not implemented block (except in states 0.3/1.1 (calling) and 0.2 (called))?	5.4	4.8.2	m	Yes ☐ No ☐
6	Does the IUT support ignoring invalid/not implemented parameters/values in received TCR during transport connection establishment?	5.4	4.8.2	m	Yes ☐ No ☐
7	Does the IUT support valid or invalid TBR is not answered by sending TBR?	5.4	4.8.2	m	Yes ☐ No ☐
8	Does the IUT support indication of clearing cause in TCC?	5.5.6.1	4.8.2	m	Yes ☐ No ☐
9	Does the IUT support provision of additional clearing information in TCC?	5.5.6.2	4.8.2	o	Yes ☐ No ☐
10	Does the IUT support indication of reject cause in TBR?	5.5.7.1	4.8.2	m	Yes ☐ No ☐
11	Does the IUT support return of rejected block in TBR?	5.5.7.1	4.8.2	m	Yes ☐ No ☐
12	Does the IUT support indication of only the first procedural/parameter error in TBR?	5.5.7.2	4.8.2	m	Yes ☐ No ☐
13	Does the IUT support network disconnection request if timeout occurs in states 0.3/1.1 (calling) or 0.2/0.3 (called)?	Fig:A.14	4.8.2	m	Yes ☐ No ☐
14	Does the IUT support network disconnect request if invalid/not implemented block is received in states 0.2 (called) or 1.1 (calling)?	Fig:A.14	4.8.2	m	Yes ☐ No ☐
15	Does the IUT support discard of any received block in state 0.3?	Fig:A.14/A.15	4.8.2	m	Yes ☐ No ☐
16	Does the IUT support use of T_EXCEPTION indication?	A.1.1.3	4.8.2	o	Yes ☐ No ☐
17	Does the IUT support request of network disconnection if TBR is received in state 2.1 and T_EXCEPTION indication is not supported?	Fig.A.15	4.8.2	c3	Yes ☐ No ☐
18	Does the IUT support on receipt of TCC: Re-sending TCR(s)?	5.2.4.1	4.8.2	o	(1)

NOTE: c3 - Mandatory if item T5/16 is not supported.

Table B.18: Timers

Item	Profile feature	Reference in T.70	Reference in This ETR	Status	Support
1	Does the IUT support timer state 0.2 (called side) with value approx. 60 s?	table B.4, item E11 and table B.5	4.8.2.1	m	Yes ☐ No ☐
2	Does the IUT support timer state 0.3 (calling/called side) with value approx. 60 s?	table B.4, item E11 and table B.5	4.8.2.1	m	Yes ☐ No ☐
3	Does the IUT support timer state 1.1 (calling side) with value approx. 60 s?	table B.4, item E11 and table B.5	4.8.2.1	m	Yes ☐ No ☐

B.7.8.2 Profile specific ICS proforma for the COTS

If the layer 4 COTS (predicate L4/8073) is not supported, mark n/a: n/a ☐
The tables in this subclause are then not applicable.

Table B.19: Layer 4 protocol - Base standard/Recommendation conformance

Item	Profile feature	Reference	Status	Support
PID1	Does the IUT support protocol identification by annex B of ISO/IEC 8073 [19]?	4.8.3.9	o.2	Yes ☐ No ☐
PID2	Does the IUT support protocol identification by annex B of ITU-T Recommendation X.224 [29]?	4.8.3.9	o.2	Yes ☐ No ☐
NOTE:	o.2 - Support of one, and only one, of these options is required.			

Table B.20: Timers

Item	Profile feature	Reference	Status	Support
OT1	(class 0) Is the value of timer TS1 = 60 s approx.	4.8.3.7	m	Yes ☐ No ☐
OT3	(class 2) Is the value of timer TS1 = 60 s approx.	4.8.3.7	m	Yes ☐ No ☐
OT5	(class 0) Is the value of timer TS2 = 60 s approx.	4.8.3.7	m	Yes ☐ No ☐
OT7	(class 2) Is the value of timer TS2 = 60 s approx.	4.8.3.7	m	Yes ☐ No ☐

Table B.21: Error handling

Item	Profile feature	Reference	Status	Support
PE0	Does the IUT support treatment of protocol errors; ER-TPDU sent (Class 0)?	4.8.3.10	m	Yes ☐ No ☐
PE2	Does the IUT support treatment of protocol errors; ER-TPDU sent (Class 2)?	4.8.3.10	m	Yes ☐ No ☐

Annex C: Applicability of this ETR

This annex contains a description of the scenario to which the requirements of this ETR apply. This is illustrated in figure C.1.

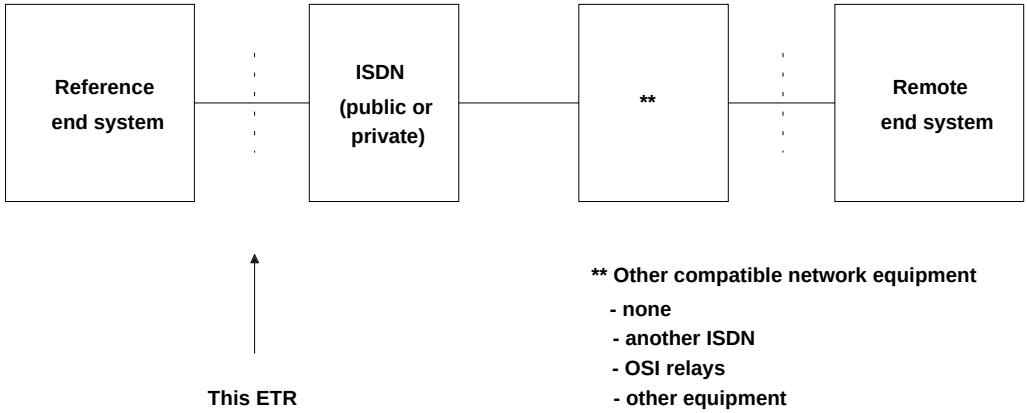


Figure C.1: Applicability of this ETR

The "reference end system" or "calling TE" is a system (or TE) to which the requirements of this ETR apply. The "remote end system" or "called TE" is another system (or TE) to which the reference end system attempts to establish communication. A reference end system may also be a system or TE to which communication is established from a remote end system. In this respect a reference end system performs the functions of a called TE. The reference end system may or may not be operating in an OSI environment.

The reference end system communicates with the remote end system through an Integrated Services Digital Network (ISDN). The reference end system is directly attached to the ISDN at an S reference point, at a T reference point, or at a coincident S and T reference point. The remote end system may or may not conform to the requirements of this recommendation. It may be using a different access method on an ISDN or another subnetwork technology.

Communication between the reference end system and remote end system is via a single or multiple ISDN(s), or via combination of ISDN(s) and single or multiple intermediate systems.

In this scenario, the ISDN provides a circuit-mode 64 kbit/s unrestricted bearer service between the reference end system and the compatible end system or an intermediate system. The D-channel is used to carry signalling relating to the establishment and control of the B-channel connections. The B-channel connections carry the user information. The end systems communicate with one another via one or more virtual calls (ITU-T Recommendation X.25 [4] DTE to DTE operation) on the B-channel.

The requirements in clause 4 of this recommendation are described in a way that assumes that the remote end system conforms to the recommendations in this ETR and that the complete facilities of the D-channel signalling system are available. In a practical situation, this may not always be the case; appropriate requirements are included in the recommendation to cater for this.

Memorandum M-IT-02 on the taxonomy of profiles for systems operating in an OSI environment, contains further information on the relationship between reference end systems and remote end systems. In particular, it provides information on how the profile described in this ETR fits into the overall framework of profiles for interworking in an OSI environment. The profile described in this ETR matches profiles T/C4211 and T/D4211 described in ITSTC Memorandum M-IT-02 (see annex D). These profiles specify a combination of standards (the same combination as specified in subclause 4.1 of this ETR) that provide a Connection-mode Transport Service (classes 0 and 2 for T/C4211 and class 0 for T/D4211). However this ETR goes further than this.

Annex D: Bibliography

The following documents provide useful additional information:

- ITU-T Recommendation X.29 (1988): "Procedures for the exchange of control information and user data between a Packet Assembly/Disassembly facility (PAD) and a packet mode DTE or another PAD".

- ITU-T Recommendation X.75 (1984): "Packet-switched signalling system between public networks providing data transmission services".

- ENV 41112 (1991): "Information Systems Interconnection - ISDN - Provision of the OSI connection-mode transport service over the OSI connection-mode network service by using an ISDN circuit-mode 64 kbit/s unrestricted bearer service - Demand case".

- ETR 018 (1994): "Integrated Services Digital Network (ISDN); Application of the Bearer Capability (BC) -, High Layer Compatibility (HLC) - and Low Layer Compatibility (LLC) - information elements by terminals supporting ISDN services".

- ETR 026 (1992): "Network Aspects (NA); Terminal selection principles for priority I and II services of MoU-ISDN, applicable in multi-terminal environments at customer premises".

- ETR 076: "Integrated Services Digital Network (ISDN); Standards guide" (In particular section A.5).

- ETS 300 102-1 (1990): "Integrated Services Digital Network (ISDN); User-network interface layer 3, Specifications for basic call control".

- ETS 300 102-2 (1990): "Integrated Services Digital Network (ISDN); User-network interface layer 3, Specifications for basic call control, Specification Description Language (SDL) diagrams".

- ISO 7498 (1984): "Information processing systems - Open Systems Interconnection - Basic Reference Model".

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- ITU-T Recommendation T.30 (1994): "Terminal equipments and protocols for telematic services - Procedures for document facsimile transmission in the general switched telephone network".

- CEN / CENELEC / ETSI Information Technology Steering Committee (ITSTC) Memorandum M-IT-02 (1991): "Taxonomy of profiles and directory of functional standards for interworking in an OSI environment to be adopted by CEN/CENELEC/ETSI ITSTC" Issue 5.

- ITU-T Recommendation X.31: "Support of packet mode terminal equipment by an ISDN".

- ETS 300 402, Parts 1 to 7 (1995): "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Data link layer".

- ETS 300 403, Parts 1 to 7 (1995): "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control".

- ETS 300 406 (1995): "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

- ETS 300 079 (1991): "Integrated Services Digital Network (ISDN); Syntax-based videotex End-to-end protocols, circuit mode DTE-DTE".

- ETS 300 087 (1994): "Integrated Services Digital Network (ISDN); Facsimile group 4 class 1 on the ISDN Functional specification of the equipment".

- ETS 300 112 (1994): "Integrated Services Digital Network (ISDN); Facsimile group 4 class 1 equipment on the ISDN End-to-end protocols".

- ETS 300 218 (1993): "Integrated Services Digital Network (ISDN); Syntax-based videotex lower layer protocols for ISDN packet mode (ITU-T Recommendation X.31 Case A and Case B)".

- ETS 300 262 (1993): "Integrated Services Digital Network (ISDN); Syntax-based Videotex teleservice Service description".

- ETS 300 383 (1995): "Integrated Services Digital Network (ISDN); File transfer over the ISDN EUROFILE transfer profile".

- ETS 300 388 (1995): "Integrated Services Digital Network (ISDN); File Transfer Access & Management (FTAM) over ISDN based on simple file transfer profile".

- ETS 300 409 (1995): "Integrated Services Digital Network (ISDN); Eurofile transfer teleservice; Service description".

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- CCITT Recommendation T.71 (1998): "Link access protocol balanced (LAPB) extended for half-duplex physical level facility".

- ITU-T Recommendation Q.921 (1993): "ISDN user-network interface – Data link layer specification".

- ITU-T Recommendation Q.931 (1993): "ISDN user-network interface layer 3 specification for basic call control".

History

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