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ISO/IEC ISP 10609-10

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Information technology — International Standardized Profiles TB, TC, TD and TE — Connection-mode Transport Service over connection-mode Network Service —

Part 10:
LAN subnetwork-dependent, media-independent requirements

Technologies de l'information — Profils normalisés internationaux TB, TC, TD et TE — Service de transport en mode connexion sur service de réseau en mode connexion —

Partie 10: Prescriptions dépendantes du sous-réseau du RLE, indépendantes des supports

Reference number
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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) together form a system for worldwide standardization as a whole. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. In addition to developing International Standards, ISO/IEC JTC 1 has created a Special Group on Functional Standardization (ISO/IEC JTC 1/SGFS) for the processing of International Standardized Profiles.

An International Standardized Profile is an internationally agreed, harmonized document which identifies a standard or group of standards, together with options and parameters, necessary to accomplish a function or set of functions.

Draft International Standardized Profiles are circulated to national bodies for voting. Publication as an International Standardized Profile requires approval by at least 75% of the national bodies casting a vote.

S-liaison may be established with JTC 1/SGFS by specialized organizations involved in the work of functional standardization. This part of ISO/IEC ISP 10614 was prepared with the collaboration of the following S-liaisons:

- Asia-Oceania Workshop (AOW);
- European Workshop for Open Systems (EWOS);
- Open Systems Environment Implementors' Workshop (OIW).

ISO/IEC ISP 10609 consists of several parts, under the general title *Information technology - International Standardized Profiles TB, TC, TD and TE - Connection-mode Transport Service over connection-mode Network Service:*

- *Part 1: Subnetwork-type independent requirements for Group TB*
- *Part 2: Subnetwork-type independent requirements for Group TC*
- *Part 3: Subnetwork-type independent requirements for Group TD*
- *Part 4: Subnetwork-type independent requirements for Group TE*
- *Part 5: Definition of profiles TB1111/TB1121*
- *Part 6: Definition of profiles TC1111/TC1121*
- *Part 7: Definition of profiles TD1111/TD1121*
- *Part 8: Definition of profiles TE1111/TE1121*
- *Part 9: Subnetwork-type dependent requirements for Network Layer, Data Link Layer and Physical Layer concerning permanent access to a packet switched data network using virtual calls*

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- *Part 10: LAN subnetwork-dependent, media-independent requirements*
- *Part 11: CSMA/CD LAN subnetwork-dependent, media-dependent requirements*
- *Part 12: Definition of profile TC51, provision of the OSI connection-mode Transport Service using the OSI connection-mode Network Service in an End System attached to a CSMA/CD LAN*
- *Part 14: Definition of profile TC53, provision of the OSI connection-mode Transport Service using the OSI connection-mode Network Service in an End System attached to a Token Ring LAN*

This part of ISO/IEC ISP 10609 contains four annexes. Annexes A and B are normative, annexes C and D are informative.

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Introduction

This International Standardized Profile (ISP) is defined in accordance with the principles specified by ISO/IEC Technical Report 10000, "Information technology - Framework and taxonomy of International Standardized Profiles".

The context of Functional Standardization is one area in the overall field of Information Technology (IT) standardization activities, covering base standards, profiles, and registration mechanisms. A profile defines a combination of base standards that collectively perform a specific well-defined IT function. Profiles standardize the use of options and other variations in the base standards, and provide a base for the development of uniform, internationally recognized system tests.

ISPs are produced not simply to "legitimize" a particular choice of base standards and options, but to promote real system interoperability. One of the most important roles for an ISP is to serve as the basis for the development (by organizations other than ISO and IEC) of internationally recognized test methods. The development and widespread acceptance of tests based on this and other ISPs is crucial to the successful realization of this goal.

ISO/IEC ISP 10609 consists of several parts, of which this is part 10. Parts 1 to 4 of ISO/IEC ISP 10609 specify profile requirements that are subnetwork-independent, for each of the transport groups TB, TC, TD and TE, respectively. There are further parts which specify subnetwork-dependent and media-dependent requirements. In addition, for each individual profile there is a part of ISO/IEC ISP 10609 which identifies the specific requirements of that profile, making reference to appropriate material from the relevant subnetwork-independent and subnetwork-dependent parts.

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Information technology — International Standardized Profiles TB, TC, TD and TE — Connection-mode Transport Service over connection-mode Network Service —

Part 10:

LAN subnetwork-dependent, media-independent requirements

1 Scope

This International Standardized Profile is applicable to end systems concerned with operating in the Open Systems Interconnection (OSI) environment. It specifies a combination of OSI standards, which collectively provide the connection-mode Transport Service using the connection-mode Network Service.

This part of ISO/IEC ISP 10609 specifies subnetwork-type dependent requirements applicable to an end system attached to a local area network (LAN) subnetwork and using the ISO 8802-2 LLC type 2 protocol, irrespective of the LAN medium.

2 Normative references

The following documents contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC ISP 10609. At the time of publication, the editions indicated were valid. All documents are subject to revision, and parties to agreements based on this part of ISO/IEC ISP 10609 are warned against automatically applying any more recent editions of the documents listed below, since the nature of references made by ISPs to such documents is that they may be specific to a particular edition. Members of IEC and ISO maintain registers of currently valid International Standards and ISPs, and ITU-T maintains published editions of its current Recommendations.

ISO/IEC 8208 : 1990, *Information technology - Data communications - X.25 Packet Layer Protocol for Data Terminal Equipment*

ISO/IEC 8208 : 1990/Amd.3 : 1991, *Information technology - Data communications - X.25 Packet Layer Protocol for Data Terminal Equipment - Amendment 3: Conformance requirements*

ISO/IEC 8208 : 1990/Amd.3 : 1991/Cor.1 : 1993, *Information technology - Data communications - X.25 Packet Layer Protocol for Data Terminal Equipment - Amendment 3: Conformance requirements - TECHNICAL CORRIGENDUM 1*

ISO/IEC 8348 : 1993, *Information technology - Open Systems Interconnection - Network Service Definition*

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ISO 8802-2 : 1989, *Information processing systems - Local area networks - Part 2: Logical link control*

ISO 8802-2 : 1989/Amd.1 : - [1], *Information processing systems - Local area networks - Part 2: Logical link control - Amendment 1: Flow control techniques for bridged local area networks*

ISO 8802-2 : 1989/Amd.2 : - [1], *Information processing systems - Local area networks - Part 2: Logical link control - Amendment 2: Acknowledged connectionless-mode service and protocol - Type 3 operation*

ISO 8802-2 : 1989/Amd.3 : - [1], *Information processing systems - Local area networks - Part 2: Logical link control - Amendment 3: Conformance requirements*

ISO 8802-2 : 1989/Amd.4 : - [1], *Information processing systems - Local area networks - Part 2: Logical link control - Amendment 4: Editorial changes and technical corrections*

ISO 8802-2 : 1989/Amd.5 : - [1], *Information processing systems - Local area networks - Part 2: Logical link control - Amendment 5: Bridged LAN source routeing operation by end systems*

ISO/IEC 8878 : 1992, *Information technology - Telecommunications and information exchange between systems - Use of X.25 to provide the OSI Connection-mode Network Service*

ISO/IEC 8881 : 1989, *Information processing systems - Data communications - Use of the X.25 packet level protocol in local area networks*

ISO/IEC 8881 : 1989/Cor.1 : 1991, *Information processing systems - Data communications - Use of the X.25 packet level protocol in local area networks - TECHNICAL CORRIGENDUM 1*

NOTE - This Technical Corrigendum to ISO/IEC 8881 is to apply throughout in this part of ISO/IEC ISP 10614, wherever ISO/IEC 8881 itself is referenced.

ISO/IEC TR 10000-1 : 1992, *Information technology - Framework and taxonomy of International Standardized Profiles - Part 1: Framework*

ISO/IEC TR 10000-2 : 1992, *Information technology - Framework and taxonomy of International Standardized Profiles - Part 2: Taxonomy of OSI Profiles*

3 Definitions

The terms used in this part of ISO/IEC ISP 10609 are defined in the referenced base standards (see clause 2).

4 Abbreviations

Abbreviations used in this part of ISO/IEC ISP 10609 are defined in the referenced base standards (see clause 2).

1) To be published

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5 Requirements

5.1 Introduction

The requirements in this clause specify the subnetwork-type dependent, media-independent requirements for end system operation when the end system is attached to a local area network (LAN).

5.2 Static conformance requirements

5.2.1 Overall requirements

An implementation conforming to this part of ISO/IEC ISP 10609 shall:

a) meet the requirements for ISO/IEC 8878 in subclause 5.2.2 below;

b) meet the requirements for ISO/IEC 8208, as modified for operation over LLC type 2 in a LAN environment by ISO/IEC 8881, in subclause 5.2.3 below;

c) meet the requirements for ISO 8802-2 in subclause 5.2.4 below;

d) support all the features identified as requirements in the ISPICS requirements list in annex A.

5.2.2 ISO/IEC 8878

The implementation shall:

a) meet the requirements for the provision of the OSI Network Service as defined in ISO/IEC 8878 excluding: the Receipt Confirmation Service (clause 9), the Expedited Data Transfer Service (clause 10), and annex A;

b) be capable of using the source and destination OSI network addresses of any of the formats and values defined in ISO/IEC 8348.

5.2.3 ISO/IEC 8208

5.2.3.1 General requirements

The implementation shall:

a) meet the static conformance requirements specified in clause 21 of ISO/IEC 8208/Amd.3;

b) implement the Virtual Call Service;

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c) implement the following capabilities identified in Table 37 of ISO/IEC 8208/Amd.3:

- Virtual Call setup; initiating an outgoing VC, with subsequent acceptance or rejection, or receiving an incoming VC and responding by acceptance, and receiving an incoming VC and responding by rejection;

  NOTE - An implementation may do one or the other or both.

- Aborting an outgoing VC attempt, by clearing;
- Clearing an established VC as initiator and as responder;
- Resetting a logical channel as responder;

d) implement the following options from subclause 21.1.2 of ISO/IEC 8208/Amd.3:

- support of transfer of user data in call setup packets, for both transmission and reception;
- support of DATA packet transfer;
- support of DATA packets with M-bit set to 1 for reception;
- transmit updated window rotation information;
- transmit RR packets;

e) be capable of accepting incoming VCs as fast select calls;

f) support the following optional facilities:

- Throughput Class Negotiation;
- Fast Select;
- Fast Select Acceptance;
- Transit Delay Selection and Indication;
- Calling Address Extension;
- Called Address Extension;
- Minimum Throughput Class Negotiation;
- End-to-End Transit Delay Negotiation;
- Expedited Data Negotiation;

g) meet the requirements on network addresses in subclause 5.2.3.2 below.

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5.2.3.2 Network addresses

A system conforming to this part of ISO/IEC ISP 10609 shall be capable of using source and destination OSI network addresses of any of the formats and values defined in ISO/IEC 8348.

The calling, called and responding NSAP addresses shall be conveyed in their entirety, using the preferred binary encoding, in the facility parameter field of the Called and Calling Address Extension Facility.

NOTE - If a conformant implementation receives an INCOMING CALL packet which does not conform to this specification, it is recommended that a CLEAR REQUEST packet is transmitted, using cause code 'DTE Originated' and either diagnostic code 235 or diagnostic code 232.

5.2.4 ISO 8802-2

The implementation shall:

a) support the functions required by ISO 8802-2 for the support of the Logical Link Control Type 2 protocol;

b) in order to achieve intercommunication, agree the values of N1 and the Ack Timer on a LAN-wide basis;

c) support an Ack Timer value of 5 ± 1 seconds, and it is recommended that the Ack Timer be configurable.

5.3 Dynamic conformance requirements

5.3.1 Overall requirements

An implementation conforming to this part of ISO/IEC ISP 10609 shall:

a) meet the requirements for ISO/IEC 8208 in the subclause 5.3.2 below;

b) meet the requirements for ISO 8802-2 in the subclause 5.3.3 below;

c) behave in accordance with the requirements of the ISPICS requirements list in annex A.

5.3.2 ISO/IEC 8208

5.3.2.1 General requirements

The implementation shall:

a) carry out the supported ISO/IEC 8208 functions in accordance with the procedures for the X.25 Packet Layer Protocol of ISO/IEC 8208, as modified for operation over LLC type 2 in a LAN environment by ISO/IEC 8881, sections 1 and 2;

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b) not make use of the procedures for the operation of ISO/IEC 8208 over LLC type 1 defined in ISO/IEC 8881, section 3, as they are prohibited by this International Standardized Profile;

NOTE - This does not apply to the use of the ISO/IEC 10030 routeing protocol which can make use of LLC type 1 in a LAN environment.

c) meet the requirements on expedited data in subclause 5.3.2.2 below;

d) meet the requirements on receipt confirmation in subclause 5.3.2.3 below;

e) support the method for determining the range of logical channels detailed in subclause 5.3.2.4 below.

The implementation may:

a) ignore the X.25 PLP called-DTE and calling-DTE addresses as this part of ISO/IEC ISP 10609 does not require their use.

5.3.2.2 Expedited data

The expedited data service is not supported.

The Expedited Data Negotiation (EDN) facility of ISO/IEC 8208 is used to negotiate non-use of expedited data service.

i) When a network layer entity receives an N-CONNECT request primitive from a Network Service user, the CALL REQUEST packet sent may contain the EDN facility set to 'no use of expedited data' or, alternatively, the EDN facility may be omitted which this implies 'no-use' of the facility;

ii) When a network layer entity receives an N-CONNECT response primitive from a Network Service user, the CALL ACCEPTED packet sent may contain the EDN facility set to 'no use of expedited data' or, alternatively, the EDN facility may be omitted which implies 'no-use' of the facility.

NOTES

1 If an implementation, operating according to this part of ISO/IEC ISP 10609, receives an INTERRUPT packet during the data transfer phase, it is recommended that the virtual call is cleared using the CLEAR REQUEST packet (and associated procedures defined in ISO/IEC 8208) using the cause code 'DTE Originated' and diagnostic code 44.

2 When operating certain other profiles, for instance to support X.29 terminal access, then the support of single octet INTERRUPT packets will be required.

5.3.2.3 Receipt confirmation

The receipt confirmation service is not supported.

Bit 7 of octet 1 (the D-bit) in the GFI of ISO/IEC 8208 call setup packets is used to negotiate the non-use of the receipt confirmation service.

i) CALL REQUEST packets sent by the DTE shall have the D-bit set to 0;

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ii) When a network layer entity receives an N-CONNECT response primitive, the receipt confirmation selection parameter shall be set to 'No use of Receipt Confirmation' and consequently bit 7 of the GFI in the CALL ACCEPTED packet is set to 0.

NOTE - If a conformant implementation receives a DATA packet with the D-bit set to 1, it is recommended that the virtual call is cleared using the CLEAR REQUEST packet (and associated procedures defined in ISO/IEC 8208) using the cause code 'DTE Originated' and either the diagnostic code 225 or diagnostic code 166.

5.3.2.4 Method for the determination of the range of logical channels

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

If a DTE is capable of initiating a REGISTRATION REQUEST packet, then the registration parameter fields shall be set as follows:

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

ii) No other optional user facilities shall be identified in the REGISTRATION REQUEST packet, and may be ignored by a responder if they are present;

If a DTE is capable of responding with a REGISTRATION CONFIRMATION packet, the maximum number of two-way logical channels allowed between the two DTEs shall be indicated in the HTC parameter field. The value in the HTC parameter field shall be less than or equal to the value requested in the HTC parameter field in the REGISTRATION REQUEST packet.

Registration of facilities normally applies in one direction only for the DTE/DTE case (i.e. registration of facilities is performed independently for each direction), but for the logical channel range negotiation it applies to both directions.

NOTE - A REGISTRATION REQUEST packet may be ignored by a responder. However, it is recommended that DTEs are capable of responding with a REGISTRATION CONFIRMATION packet even if they support only a single two-way logical channel. This will prevent unnecessary delays for the initiator in transmitting a CALL REQUEST packet. Such delays are determined by the initiator's values for timer T28 and retry counter R28.

5.3.3 ISO 8802-2

5.3.3.1 General requirements

The implementation shall:

a) carry out the supported ISO 8802-2 functions in accordance with the procedures specified in ISO 8802-2;

b) use the LLC actual address value of '111 1110'. Table 1 illustrates the coding of the DSAP and the SSAP address fields;

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Table 1 - LLC address values

	DSAP address field	SSAP address field
Field format	I/G D D D D D D D	C/R S S S S S S S
Value	0 1 1 1 1 1 1 0	C/R 1 1 1 1 1 1 0

c) if a value of k other than 7 is to be used, negotiate the value to be used by XID frames according to the procedures specified in subclause 5.3.3.2 below.

5.3.3.2 Use of XID

This part of ISO/IEC ISP 10609 does not require an implementation to transmit XID command frames, except for the negotiation of values of k other than 7.

NOTE - ISO 8802-2 requires that the receipt of an XID command frame is responded to with an XID response frame.

An implementation receiving an XID command frame addressed to the individual actual address value specified in subclause 5.3.3.1 (b) above is required to respond with an XID response frame using the individual actual address. The implementation shall act as follows:

i) Take note of the initiator's receive window size. If the default value is in use this would be 7. However, if the value is different the implementation shall not use a transmit window size greater than the value indicated in the received XID command. If a transmit window size is used which is greater than the receive window size, it can lead to LLC connection resets. There is no requirement to actually use the full window size indicated in the received XID command;

ii) The information field in the XID response should contain the responder's receive window size. The default window size (specified in ISO/IEC 8881) is 7;

iii) The initiator receiving the XID response shall note and act on the receive window size as indicated in (i) above.

An implementation receiving an XID command frame addressed to the null address shall respond with an XID response frame using the null address in both the DSAP and SSAP fields. The implementation shall act as follows:

i) The value of received window size shall be ignored;

ii) It is recommended that the information field in the XID response should contain the value of the LLC Types/Classes set to the value indicating 'Class II LLC', and the receive window size set to '000 0000'.

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NOTES -

1 The value for 'Class II LLC' is defined in ISO 8802-2 and is '11000'.
2 The receive window size in an XID frame associated with the null address has no meaning. Therefore, its value must be ignored. Whilst any value could be used for this field, the value '000 0000' is suggested.

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Annex A
(normative)

ISPICS requirements list

A.1 Introduction

ISO/IEC TR 10000-1 identifies three items to be included in an ISPICS requirements list. These are:

- general options of the profile;
- list of standards selected in the profile;
- constraints on the allowable answers in the PICS proforma of each such standard.

The first two items relate to the profile as a whole, and so are included only in those parts of ISO/IEC ISP 10609 which are specific to individual profiles. However, each part of ISO/IEC ISP 10609 contains the identification of those PICS proforma constraints which are within its scope.

ISO/IEC TR 10000-1 indicates that an ISPICS proforma may consist either of a simple list of constraints or of amended copies of the base standard PICS proforma. In this part of ISO/IEC ISP 10609 the former method is used.

A.2 Notation and conventions

A.2.1 Introduction

In many cases the constraints imposed by the IPRL are expressed in the form of symbols indicating the status, in the context of this part of ISO/IEC 10609, of those base standard PICS proforma items to which the constraints apply. The symbols used are defined in the following two subclauses.

A.2.2 Notation for static conformance

The following symbols are used to identify constraints on the capabilities to be supported by a conforming implementation:

a) Symbols directly specifying status

Symbol	Meaning
m	mandatory
o	optional
x	prohibited
-	not applicable
i	out of scope, not relevant to this profile

It should be noted that, in the context of received PDUs or fields or parameters of received PDUs, the capability to support them is the ability to interpret the significance of the PDU or field and act upon

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it in accordance with the dynamic conformance requirements of the protocol (which may in some cases mean generating an error report). PDUs or fields which are not supported are those whose receipt is ignored and have no impact on the protocol operation.

b) Other associated notation

Symbol	Meaning
c<n>	conditional (see below)
<item>:<status>	conditional (see below)

Symbols of the form c<n> are used when the status of an item is dependent on the support of other items. In this case, <n> is a number which refers to a definition at the end of the subclause in which it is used. That definition specifies the conditional status which may, for example, be in a form such as 'if ABC then m else x', which would indicate that the status is mandatory if the item in the PICS proforma with reference ABC is supported, and otherwise prohibited.

Symbols of the form <item>:<status> are used as an abbreviated way of expressing a condition wherein the status is as identified if the specified item is supported, and otherwise the status is not applicable. So, for example, 'ABC:m' would be equivalent to a conditional status 'if ABC then m else -'.

A.2.3 Notation for dynamic conformance

In some cases it is necessary to specify constraints not only on the capabilities which are implemented, but on whether they are used. When this is necessary the static conformance status symbol from subclause A.2.2 (a) above is followed by an additional symbol to create a two-character status definition. The second symbol specifies the dynamic constraints, and the meanings are as follows:

Symbol	Meaning
m	mandatory - the implementation is required to use the capability whenever applicable
o	optional - use of the capability is optional
x	prohibited - use of the capability is not permitted
-	not applicable
i	outside the scope of this profile

Thus, for example, a status of 'mm' would mean that it is mandatory to provide the capability indicated by the PICS proforma item and that it is also mandatory to use that capability wherever applicable.

Where only a single status character is used, it specifies the static requirement and indicates that no additional constraint is placed upon the dynamic use of the capability.

A.2.4 Identification of PICS proforma items

PICS proforma items are identified by using the subclause number followed by a solidus followed by the item reference of the relevant PICS proforma line. When identifying an item which is within the same subclause, the subclause number and solidus are not necessarily present.

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A.3 IPRL for ISO/IEC 8208

The relevant base standard PICS proforma is the PICS proforma given in annex C of ISO/IEC 8208/Amd.3. This part of ISO/IEC ISP 10609 imposes the following additional constraints:

C.5 General DTE Characteristics

Base Item	Description	Constraint
Vs	Virtual Call service	m
Ec/8	DTE/DCE (1988)	x
Ec/4	DTE/DCE (1984)	x
Ec/0	DTE/DCE (1980)	x

C.6.4.1 Call Setup

Base Item	Description	Constraint
S1c	Non-Fast-Select call request	i
S2a	Accept Fast-Select call	m
S2c	Accept Non-Fast-Select call	i

C.6.4.2 Call clearing

Base Item	Description	Constraint
C2a	Call clearing to abort outgoing VC	m
C2b	Call clearing to reject incoming VC	m
C2c	Originating clearing of established VC	m

C.6.5 Resetting of logical channels

Base Item	Description	Constraint
RSr	Resetting as responder	m

C.6.8.1 Sending data

Base Item	Description	Constraint
DS1	Sending DATA packets	m
DS2	Send-window rotation	m
DS5a	Sending Q=0 in DATA packets	m

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C.6.8.2 Receiving data

Base Item	Description	Constraint
DR1	Receiving DATA packets	m
DR2	Receive-window rotation	m
DR4b	Receive M=1 in DATA packets	m
DR5a	Receiving Q=0 in DATA packets	m

C.8.1.1 Facilities sent in CALL REQUEST packets

Base Item	Description	Constraint
FS2i	Throughput Class Negotiation	m
FS6a	Fast Select	m
FS12	Transit Delay Selection and Indication	m
FS20i	Facility Marker	m
FS21i	Calling Address Extension	m
FS22i	Called Address Extension	m
FS23i	Minimum Throughput Class Negotiation	m
FS24i	End-to-End Transit Delay Negotiation	m
FS25i	Expedited Data Negotiation	m

C.8.1.2 Facilities sent in CALL ACCEPT packets

Base Item	Description	Constraint
FS2r	Throughput Class Negotiation	m
FS20r	Facility Marker	m
FS22r	Called Address Extension	m
FS24r	End-to-End Transit Delay Negotiation	m
FS25r	Expedited Data Negotiation	m

C.8.1.3 Facilities sent in CLEAR REQUEST packets

Base Item	Description	Constraint
FS20d	Facility Marker	m
FS22d	Called Address Extension	m

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C.8.2.1 Facilities received in INCOMING CALL packets		
Base Item	Description	Constraint
FR2i	Throughput Class Negotiation	m
FR6a	Fast Select	m
FR12i	Transit Delay Selection and Indication	m
FR20i	Facility Marker	m
FR21	Calling Address Extension	m
FR22i	Called Address Extension	m
FR23	Minimum Throughput Class Negotiation	m
FR24i	End-to-End Transit Delay Negotiation	m
FR25i	Expedited Data Negotiation	m

C.8.2.2 Facilities received in CALL CONNECT packets		
Base Item	Description	Constraint
FR2r	Throughput Class Negotiation	m
FR12r	Transit Delay Selection and Indication	m
FR20r	Facility Marker	m
FR22r	Called Address Extension	m
FR24r	End-to-End Transit Delay Negotiation	m
FR25r	Expedited Data Negotiation	m

A.4 IPRL for ISO 8802-2

The relevant base standard PICS proforma is the PICS proforma given in annex B. This part of ISO/IEC ISP 10609 imposes the following additional constraints:

B.6.1 LLC type 1 - supported PDU types		
Base Item	Description	Constraint
UI/1	UI_CMD supported on transmission	i
UI/2	UI_CMD supported on receipt	i
XID/3	XID_CMD supported on transmission	c1
XID/6	XID_RSP supported on receipt	c1
TES/7	TEST_CMD supported on transmission	i

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B.6.2 LLC type 1 - supported parameters in PDUs on transmission		
Base Item	Description	Constraint
UIT/13	UI_CMD - P-bit=0	i
XDT/17	XID_CMD - P-bit=1	c2
XDT/18	XID_CMD - P-bit=0	c3
TST/26	TEST_CMD - P-bit=1	i
TST/27	TEST_CMD - P-bit=0	i

B.6.3 LLC type 1 - supported parameters in PDUs on receipt		
Base Item	Description	Constraint
UIR/35	UI_CMD - P-bit=0	i

B.7.5 LLC type 2 - protocol parameters		
Base Item	Description	Constraint
PPA/145	ACK_TIMER range	the value of 5±1 seconds shall be supported
PPA/155	Maximum value of k	the value 7 shall be supported

Definition of conditional status items:

c1 if a value of k other than 7 is supported then m else o
c2 if a value of k other than 7 is supported AND NOT XDT/17 then m else x
c3 if a value of k other than 7 is supported AND NOT XDT/18 then m else x

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Annex B[1]
(normative)

Assumed base standard PICS proforma for ISO 8802-2 Logical Link Control

B.1 Introduction

The supplier of a protocol implementation which is claimed to conform to ISO 8802-2:1989 and its amendments: Amd.1, Amd.2, Amd.4, and Amd.5, shall complete the following Protocol Implementation Conformance Statement (PICS) proforma.

A completed PICS proforma is the PICS for the implementation in question. The PICS is a statement of which capabilities and options of the protocol have been implemented. The PICS can have a number of uses, including use:

- by the protocol implementor, as a check-list to reduce the risk of failure to conform to the standard through oversight;
- by the supplier and acquirer - or potential acquirer - of the implementation, as a detailed indication of the capabilities of the implementation, stated relative to the common basis for understanding provided by the standard PICS proforma;
- by the user - or potential user - of the implementation, as a basis for initially checking the possibility of interworking with another implementation (note that, while interworking can never be guaranteed, failure to interwork can often be predicted from incompatible PICSs);
- by a protocol tester, as the basis for selecting appropriate tests against which to assess the claim for conformance of the implementation.

B.2 Abbreviations and special symbols

B.2.1 Status symbols

M	mandatory
O	optional
O.<*n*>	optional, but support of at least one of the group of options labelled by the same numeral <*n*> is required
X	prohibited

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<pred>: conditional item symbol, including predicate identification (see B.3.4), applicable to a particular item

<pred>:: conditional item symbol, including predicate identification (see B.3.4), applicable to a table or a group of tables

<item>: conditional symbol, status is dependent on the support marked for <item> (see B.3.4)

B.2.2 General abbreviations

N/A not applicable

PICS Protocol Implementation Conformance Statement

B.2.3 Item references

The following is a list of item references used in the PICS proforma:

Major capabilities:

CLS	Class of LLC supported
RDE	Route Determination Entity

LLC type 1:

UI	UI PDUs
XID	XID PDUs
TES	TEST PDUs
UIT	Parameters in transmitted UI PDUs
XDT	Parameters in transmitted XID PDUs
TST	Parameters in transmitted TEST PDUs
UIR	Parameters in received UI PDUs
XDR	Parameters in received XID PDUs
TSR	Parameters in received TEST PDUs
MIS	Miscellaneous protocol features

LLC type 2:

IP	I PDUs
IC	I_CMD PDUs
IR	I_RSP PDUs
RRC	RR_CMD PDUs
RRR	RR_RSP PDUs
RNC	RNR_CMD PDUs
RNR	RNR_RSP PDUs
RJC	REJ_CMD PDUs
RJR	REJ_RSP PDUs
SAC	SABME PDUs
DIC	DISC PDUs
UAR	UA PDUs

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DMR	DM PDUs
FRR	FRMR PDUs
PPT	Parameters in transmitted PDUs
PPR	Parameters in received PDUs
PRS	Protocol procedures
PPA	Protocol parameters
MIS	Miscellaneous protocol features

LLC type 3:

AnC	ACn command PDUs
A0C	AC0_CMD PDUs
A0R	AC0_RSP PDUs
A1C	AC1_CMD PDUs
A1R	AC1_RSP PDUs
A0T	Parameters in transmitted AC0 PDUs
A1T	Parameters in transmitted AC1 PDUs
A0R	Parameters in received AC0 PDUs
A1R	Parameters in received AC1 PDUs
PRS	Protocol procedures
PPA	Protocol parameters
MIS	Miscellaneous protocol features

B.3 Instructions for completing the PICS proforma

B.3.1 General structure of the PICS proforma

The first part of the PICS proforma - Implementation Identification and Protocol Summary - is to be completed as indicated with the information necessary to identify fully both the supplier and the implementation.

The main part of the PICS proforma is a fixed format questionnaire, divided into subclauses each containing a number of individual items. Answers to the questionnaire items are provided in the rightmost column, either by simply marking an answer to indicate a restricted choice (usually Yes or No) or by entering a value or a set or range of values.

NOTE - There are some items for which two or more choices from a set of possible answers can apply. All relevant choices are to be marked in these cases.

Each item is identified by an item reference in the first column; the second column contains the questions to be answered; and the third column contains the reference(s) to the material that specifies the item in the main body of ISO 8802-2:1989 and its amendments Amd.1, Amd.2, Amd.4, and Amd.5. The remaining columns record the status of the item - whether support is mandatory, optional, prohibited or conditional - and provide the space for the answers; see also B.3.4.

A supplier may also provide - or be required to provide - further information, categorized as either Additional Information or Exception Information. When present, each kind of further information is to be provided in a further subclause of items labelled A<*i*> or X<*i*>, respectively, for cross-referencing purposes, where <*i*> is an unambiguous identification for the item (e.g. a numeral). There are no other restrictions on its format or presentation.

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A completed PICS proforma, including any Additional Information and Exception Information, is the Protocol Implementation Conformance Statement for the implementation in question.

NOTE - Where an implementation is capable of being configured in more than one way, a single PICS may be able to describe all such configurations. However, the supplier has the choice of providing more than one PICS, each covering a subset of the implementation's configuration capabilities, in case that makes for easier and clearer presentation of the information.

B.3.2 Additional information

Items of Additional Information allow a supplier to provide further information intended to assist the interpretation of the PICS. It is not intended or expected that a large quantity of information will be supplied and a PICS can be considered complete without any such information. Examples of Additional Information might be an outline of the ways in which a (single) implementation can be set up to operate in a variety of environments and configurations, or a brief rationale - based perhaps upon specific application requirements - for the exclusion of features which, although optional, are commonly present in implementations of the ISO 8802-2:1989 protocol.

References to items of Additional Information may be entered next to any answer in the questionnaire, and may be included in items of Exception Information.

B.3.3 Exception information

It may occasionally happen that a supplier will wish to answer an item with mandatory or prohibited status (after any conditions have been applied) in a way that conflicts with the indicated requirement. No pre-printed answer will be found in the support column for this; instead, the supplier shall write the missing answer into the support column, together with an X<*i*> reference to an item of Exception Information, and shall provide the appropriate rationale in the Exception Information item itself.

An implementation for which an Exception Information item is required in this way does not conform to ISO 8802-2:1989 and its amendments Amd.1, Amd.2, Amd.4, and Amd.5.

NOTE - A possible reason for the situation described above is that a defect in ISO 8802-2:1989 and its amendments Amd.1, Amd.2, Amd.4, and Amd.5 has been reported, a correction for which is expected to change the requirement not met by the implementation.

B.3.4 Conditional status

B.3.4.1 Conditional items

The PICS proforma contains a number of conditional items. These are items for which the status - mandatory, optional or prohibited - that applies is dependent upon whether or not certain other items are supported, or upon the values supported for other items.

In many cases, whether or not the item applies at all is conditional in this way, as well as the status when the item does apply.

Where a group of items is subject to the same condition for applicability, a separate preliminary question about the condition appears at the head of the group, with an instruction to skip to a later point in the questionnaire

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if the "Not Applicable" answer is selected. Otherwise, individual conditional items are indicated by one or more conditional symbols (on separate lines) in the status column.

A conditional symbol is of the form "<pred>:<s>" where "<pred>" is a predicate as described in B.3.4.2 below, and "<s>" is one of the status symbols M, O, O.<*n*>, or X.

If the value of the predicate in any line of a conditional item is true (see B.3.4.2), then the conditional item is applicable, and its status is that indicated by the status symbol following the predicate; the answer column is to be marked in the usual way. If the value of a predicate is false, the Not Applicable (N/A) answer is to be marked in the relevant line. Each line in a multi-line conditional item should be marked: at most one line will require an answer other than N/A.

A conditional symbol of the form "<pred>::" where "<pred>" is a predicate as described in B.3.4.2 below, may precede a table or a group of tables in a clause or a subclause. If the value of the predicate is true, answers shall be marked in the table or group of tables. Otherwise, the table or group of tables shall be skipped.

B.3.4.2 Predicates

A predicate is one of the following:

a) an item-reference for an item in the PICS proforma: the value of the predicate is true if the item is marked as supported, and is false otherwise, or

b) a predicate name, for a predicate defined elsewhere in the PICS proforma (usually in the Major Capabilities section or at the end of the section containing the conditional item): see below, or

c) the logical negation symbol "¬" prefixed to an item-reference or predicate name: the value of the predicate is true if the value of the predicate formed by omitting the "¬" symbol is false, and vice versa.

The definition for a predicate name is one of the following:

i) an item-reference, evaluated as at (a) above, or

ii) a relation containing a comparison operator (=, >, etc.) with at least one of its operands being an item-reference for an item taking numerical values as its answer; the predicate is true if the relation holds when each item-reference is replaced by the value entered in the support column as answer to the item referred to, or

iii) a boolean expression constructed by combining simple predicates, as in (i) and (ii), using the boolean operators AND, OR and NOT, and parentheses, in the usual way; the value of such a predicate is true if the boolean expression evaluates to true when the simple predicates are interpreted as described above.

Each item whose reference is used in a predicate or predicate definition is indicated by an asterisk (*) in the Item column.

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B.3.5 Identification of requirements

The information in the PICS proforma does not supersede or augment the conformance requirements in the main body of ISO 8802-2:1989 and its amendments Amd.1, Amd.2, Amd.4, and Amd.5.

B.4 PICS proforma - Identification

B.4.1 Implementation identification

Supplier	
Contact point for queries about the PICS	
Implementation name(s) and version(s)	
Other information necessary for full identification, e.g. name(s) and version(s) of machines and/or operating system(s), system names	

NOTES -

1 Only the first three items are required for all implementations; other information may be completed as appropriate in meeting the requirement for full identification.

2 The terms Name and Version should be interpreted appropriately to correspond with a supplier's terminology, e.g. Type, Series, Model etc.

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B.4.2 Protocol summary

Identification of protocol specification	ISO 8802-2:1989 ISO 8802-2:1989/Amd.1:19xx ISO 8802-2:1989/Amd.2:19xx ISO 8802-2:1989/Amd.4:19xx ISO 8802-2:1989/Amd.5:19xx
Identification of amendments and corrigenda to this PICS proforma which have been completed as part of this PICS	ISO 8802-2:1989 / Amd. : Corr. : Amd. : Corr. :
Have any exception items been required (see B.3.3)? Yes ☐ No ☐ (The answer Yes means that the implementation does not conform to ISO 8802-2:1989 and its amendments 1, 2 , 4, and 5)	

Date of statement	

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B.5 Major capabilities

Item	Protocol feature	References	Status	Support
* CLS1a	Is Class I LLC supported?	4.2	O.1	Yes ☐ No ☐
CLS1b	Are LLC Type 1 procedures supported?	4.2	CLS1a:M	N/A ☐ Yes ☐
* CLS2a	Is Class II LLC supported?	4.2	O.1	Yes ☐ No ☐
CLS2b	Are LLC Type 1 and Type 2 procedures supported?	4.2	CLS2a:M	N/A ☐ Yes ☐
* CLS3a	Is Class III LLC supported?	4.2	O.1	Yes ☐ No ☐
CLS3b	Are LLC Type 1 and Type 3 procedures supported?	4.2	CLS3a:M	N/A ☐ Yes ☐
* CLS4a	Is Class IV LLC supported?	4.2	O.1	Yes ☐ No ☐
CLS4b	Are LLC Type 1, Type 2 and Type 3 procedures supported?	4.2	CLS4a:M	N/A ☐ Yes ☐
* RDE	Is Route Determination supported?	10	O	Yes ☐ No ☐

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B.6 LLC Type 1 operation - Unacknowledged connectionless-mode

CLS1a OR CLS2a OR CLS3a OR CLS4a::

All tables in clause B.6 are to be completed if above predicate evaluates to true.

B.6.1 LLC Type 1 - Supported PDU types

Item	Protocol feature Supported PDU types	References	Status	Support	
UI/1	UI_CMD supported on transmission	6.1, 6.5.1	M	Yes ☐	
UI/2	UI_CMD supported on receipt	6.1, 6.5.2	M	Yes ☐	
* XID/3	XID_CMD supported on transmission	6.6	O	Yes ☐	No ☐
XID/4	XID_CMD supported on receipt	6.6	M	Yes ☐	
XID/5	XID_RSP supported on transmission	6.6	M	Yes ☐	
XID/6	XID_RSP supported on receipt	6.6	XID/3:M	N/A ☐ Yes ☐	
* TES/7	TEST_CMD supported on transmission	6.7	O	Yes ☐	No ☐
TES/8	TEST_CMD supported on receipt	6.7	M	Yes ☐	
TES/9	TEST_RSP supported on transmission	6.7	M	Yes ☐	
TES/10	TEST_RSP supported on receipt	6.7	TES/7:M	N/A ☐ Yes ☐	

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B.6.2 LLC Type 1 - Supported parameters in PDUs on transmission

Item	Protocol feature Supported parameters on transmission	References	Status	Support		
UIT/11	UI_CMD - DSAP address	6.2	M		Yes ☐	
UIT/12	UI_CMD - SSAP address	6.2	M		Yes ☐	
UIT/13	UI_CMD - P-bit = 0	6.3	M		Yes ☐	
UIT/14	UI_CMD - Information	3.3	O		Yes ☐	No ☐
XDT/15	XID_CMD - DSAP address	6.2, 6.6	XID/3:M	N/A ☐	Yes ☐	
XDT/16	XID_CMD - SSAP address	6.2, 6.6	XID/3:M	N/A ☐	Yes ☐	
XDT/17	XID_CMD - P-bit = 1	6.3	XID/3:O.2	N/A ☐	Yes ☐	No ☐
XDT/18	XID_CMD - P-bit = 0	6.3	XID/3:O.2	N/A ☐	Yes ☐	No ☐
XDT/19	XID_CMD - Information	5.4.1.1.2, 6.6	XID/3:M	N/A ☐	Yes ☐	
XDT/20	XID_RSP - DSAP address	6.2, 6.6	M		Yes ☐	
XDT/21	XID_RSP - SSAP address	6.2, 6.6	M		Yes ☐	
XDT/22	XID_RSP - F-bit = P-bit	6.3	M		Yes ☐	
XDT/23	XID_RSP - Information	5.4.1.2.1, 6.6	M		Yes ☐	
TST/24	TEST_CMD - DSAP address	6.2	TES/7:M	N/A ☐	Yes ☐	
TST/25	TEST_CMD - SSAP address	6.2	TES/7:M	N/A ☐	Yes ☐	
TST/26	TEST_CMD - P-bit = 1	6.3	TES/7:O.3	N/A ☐	Yes ☐	No ☐
TST/27	TEST_CMD - P-bit = 0	6.3	TES/7:O.3	N/A ☐	Yes ☐	No ☐
* TST/28	TEST_CMD - Information	5.4.1.1.3, 6.7	TES/7:O	N/A ☐	Yes ☐	No ☐
TST/29	TEST_RSP - DSAP address	6.2	M		Yes ☐	
TST/30	TEST_RSP - SSAP address	6.2	M		Yes ☐	
TST/31	TEST_RSP - F-bit = P-bit	6.3	M		Yes ☐	
TST/32	TEST_RSP - Information	5.4.1.2.2, 6.7	M		Yes ☐	

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B.6.3 LLC Type 1 - Supported parameters in PDUs on receipt

Item	Protocol feature Supported parameters on receipt	References	Status	Support
UIR/33	UI_CMD - DSAP address	6.2	M	Yes ☐
UIR/34	UI_CMD - SSAP address	6.2	M	Yes ☐
UIR/35	UI_CMD - P-bit = 0	6.3	M	Yes ☐
UIR/36	UI_CMD - Information	3.3	O	Yes ☐ No ☐
XDR/37	XID_CMD - DSAP address	6.2, 6.6	M	Yes ☐
XDR/38	XID_CMD - SSAP address	6.2, 6.6	M	Yes ☐
XDR/39	XID_CMD - P-bit = 1	6.3	M	Yes ☐
XDR/40	XID_CMD - P-bit = 0	6.3	M	Yes ☐
XDR/41	XID_CMD - Information	5.4.1.1.2, 6.6	M	Yes ☐
XDR/42	XID_RSP - DSAP address	6.2, 6.6	M	Yes ☐
XDR/43	XID_RSP - SSAP address	6.2, 6.6	M	Yes ☐
XDR/44	XID_RSP - F-bit = P-bit	6.3	M	Yes ☐
XDR/45	XID_RSP - Information	5.4.1.2.1, 6.6	M	Yes ☐
TSR/46	TEST_CMD - DSAP address	6.2	M	Yes ☐
TSR/47	TEST_CMD - SSAP address	6.2	M	Yes ☐
TSR/48	TEST_CMD - P-bit = 1	6.3	M	Yes ☐
TSR/49	TEST_CMD - P-bit = 0	6.3	M	Yes ☐
TSR/50	TEST_CMD - Information	5.4.1.1.3, 6.7	M	Yes ☐
TSR/51	TEST_RSP - DSAP address	6.2	M	Yes ☐
TSR/52	TEST_RSP - SSAP address	6.2	M	Yes ☐
TSR/53	TEST_RSP - F-bit = P-bit	6.3	M	Yes ☐
TSR/54	TEST_RSP - Information	5.4.1.2.2, 6.7	TST/28:M	N/A ☐ Yes ☐

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B.6.4 LLC Type 1 - Miscellaneous

Item	Protocol feature Miscellaneous	References	Status	Support
MIS/55	Do all transmitted PDUs contain an integral number of octets	3.3	M	Yes ☐
	If the following PDUs are received from the MAC sublayer, are they treated as invalid and ignored:			
MIS/56	- contains a non-integral number of octets	3.3.4	M	Yes ☐
MIS/57	- has a length less than 3 octets	3.3.4	M	Yes ☐
	Which of the following addresses are supported in the DSAP address field of UI PDUs			
MIS/58	- individual address	5.4.1.1.1	O.4	Yes ☐ No ☐
MIS/59	- group address	5.4.1.1.1	O.4	Yes ☐ No ☐
MIS/60	- global address	5.4.1.1.1	O.4	Yes ☐ No ☐
MIS/61	- null address	5.4.1.1.1	O.4	Yes ☐ No ☐
MIS/62	Is the address in the SSAP address field of a UI PDU the originator's individual address	5.4.1.1.1	M	Yes ☐
MIS/63	Are all UI PDUs transmitted as UI_CMD PDUs	6.5.1	M	Yes ☐
MIS/64	Are all UI_CMD PDUs transmitted with the P-bit = 0	6.5.1	M	Yes ☐
MIS/65	If a UI_RSP PDU is received, is the frame discarded	6.5.2	M	Yes ☐

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B.6.4 LLC Type 1 - Miscellaneous (continued)

Item	Protocol feature Miscellaneous	References	Status	Support		
	Which of the following addresses are supported in the DSAP address field of XID_CMD PDUs					
MIS/66	- individual address	5.4.1.1.2	XID/3:O.5	N/A ☐	Yes ☐	No ☐
MIS/67	- group address	5.4.1.1.2	XID/3:O.5	N/A ☐	Yes ☐	No ☐
MIS/68	- global address	5.4.1.1.2	XID/3:O.5	N/A ☐	Yes ☐	No ☐
MIS/69	- null address	5.4.1.1.2	XID/3:O.5	N/A ☐	Yes ☐	No ☐
	Which of the following addresses are supported in the SSAP address field of XID_CMD PDUs			N/A ☐		
MIS/70	- individual address	5.4.1.1.2	XID/3:O.6	N/A ☐	Yes ☐	No ☐
MIS/71	- null address	5.4.1.1.2	XID/3:O.6		Yes ☐	No ☐
	Which of the following addresses are supported in the DSAP address field of XID_RSP PDUs					
MIS/72	- individual address	5.4.1.2.1	M		Yes ☐	
MIS/73	- null address	5.4.1.2.1	M		Yes ☐	
	Which of the following addresses are supported in the SSAP address field of XID_RSP PDUs					
MIS/74	- individual address	5.4.1.2.1	M		Yes ☐	
MIS/75	- null address	5.4.1.2.1	M		Yes ☐	

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B.6.4 LLC Type 1 - Miscellaneous (continued)

Item	Protocol feature Miscellaneous	References	Status	Support/Value
	Which of the following addresses are supported in the DSAP address field of TEST_CMD PDUs			
MIS/76	- individual address	5.4.1.1.3	TES/7:O.7	N/A ☐ Yes ☐ No ☐
MIS/77	- group address	5.4.1.1.3	TES/7:O.7	N/A ☐ Yes ☐ No ☐
MIS/78	- global address	5.4.1.1.3	TES/7:O.7	N/A ☐ Yes ☐ No ☐
MIS/79	- null address	5.4.1.1.3	TES/7:O.7	N/A ☐ Yes ☐ No ☐
	Which of the following addresses are supported in the SSAP address field of TEST_CMD PDUs			
MIS/80	- individual address	5.4.1.1.3	TES/7:O.8	N/A ☐ Yes ☐ No ☐
MIS/81	- null address	5.4.1.1.3	TES/7:O.8	N/A ☐ Yes ☐ No ☐
	Which of the following addresses are supported in the DSAP address field of TEST_RSP PDUs			
MIS/82	- individual address	5.4.1.2.2	M	Yes ☐
MIS/83	- null address	5.4.1.2.2	M	Yes ☐
	Which of the following addresses are supported in the SSAP address field of TEST_RSP PDUs			
MIS/84	- individual address	5.4.1.2.2	M	Yes ☐
MIS/85	- null address	5.4.1.2.2	M	Yes ☐
* MIS/86	Is Duplicate Address Checking supported?	6.9.2	O	Yes ☐ No ☐
MIS/87	- Is the ACK_TIMER function supported	6.9.2	MIS/86:M	N/A ☐ Yes ☐
MIS/88	- ACK_TIMER range (secs)			Minimum Value = Maximum Value =
MIS/89	- Is the RETRY_COUNTER function supported	6.9.2	MIS/86:M	N/A ☐ Yes ☐
MIS/90	- RETRY_COUNTER range			Minimum Value = Maximum Value =
MIS/91	- Is the XID_R_COUNTER function supported	6.9.2	MIS/86:M	Yes ☐

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B.7 LLC Type 2 operation - Connection-mode

CLS2a OR CLS4a::

All tables in clause B.7 are to be completed if above predicate evaluates to true.

B.7.1 LLC Type 2 - Supported PDU types

Item	Protocol feature Supported PDU types	References	Status	Support		
* IP/92a	I PDU supported on transmission	7.4.2	O		Yes ☐	No ☐
* IC/92b	I_CMD supported on transmission	Table 7-1	IP/92a:O	N/A ☐	Yes ☐	No ☐
IC/93	I_CMD supported on receipt	Table 7-1	M		Yes ☐	
IR/94	I_RSP supported on transmission	Table 7-1	IP/92a:M	N/A ☐	Yes ☐	
IR/95	I_RSP supported on receipt	Table 7-1	M		Yes ☐	
RRC/96	RR_CMD supported on transmission	Table 7-1	M		Yes ☐	
RRC/97	RR_CMD supported on receipt	Table 7-1	M		Yes ☐	
RRR/98	RR_RSP supported on transmission	Table 7-1	M		Yes ☐	
RRR/99	RR_RSP supported on receipt	Table 7-1	M		Yes ☐	
RNC/100	RNR_CMD supported on transmission	Table 7-1	M		Yes ☐	
RNC/101	RNR_CMD supported on receipt	Table 7-1	M		Yes ☐	
RNR/102	RNR_RSP supported on transmission	Table 7-1	M		Yes ☐	
RNR/103	RNR_RSP supported on receipt	Table 7-1	M		Yes ☐	
* RJC/104	REJ_CMD supported on transmission	Table 7-1	O		Yes ☐	No ☐
RJC/105	REJ_CMD supported on receipt	Table 7-1	M		Yes ☐	
RJR/106	REJ_RSP supported on transmission	Table 7-1	M		Yes ☐	
RJR/107	REJ_RSP supported on receipt	Table 7-1	M		Yes ☐	
SAC/108	SABME_CMD supported on transmis-sion	Table 7-1	M		Yes ☐	
SAC/109	SABME_CMD supported on receipt	Table 7-1	M		Yes ☐	
DIC/110	DISC_CMD support on transmission	Table 7-1	M		Yes ☐	
DIC/111	DISC_CMD supported on receipt	Table 7-1	M		Yes ☐	
UAR/112	UA_RSP supported on transmission	Table 7-1	M		Yes ☐	
UAR/113	UA_RSP supported on receipt	Table 7-1	M		Yes ☐	
DMR/114	DM_RSP supported on transmission	Table 7-1	M		Yes ☐	
DMR/115	DM_RSP supported on receipt	Table 7-1	M		Yes ☐	
FRR/116	FRMR_RSP supported on transmission	Table 7-1	M		Yes ☐	
FRR/117	FRMR_RSP supported on receipt	Table 7-1	M		Yes ☐	

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B.7.2 LLC Type 2 - Supported parameters in PDUs

Item	Protocol feature Supported parameters on transmission	References	Status	Support
	Do the following PDUs contain a DSAP address, an SSAP address and a Control field as specified in the given referenced clauses			
PPT/118a	- I_CMD	3.2, 3.3, 5.4	IC/92b:M	N/A ☐ Yes ☐
PPT/118b	- I_RSP	3.2, 3.3, 5.4	IP/92a:M	N/A ☐ Yes ☐
PPT/119	- REJ_CMD	3.2, 3.3, 5.4	RJC/104:M	N/A ☐ Yes ☐
PPT/120	- RR_CMD, RR_RSP, RNR_CMD, RNR_RSP, REJ_RSP, SABME_CMD, DISC_CMD, UA_RSP, DM_RSP, FRMR_RSP	3.2, 3.3, 5.4	M	Yes ☐
	Do the following PDUs contain an information field			
PPT/121	- I_CMD, I_RSP, FRMR_RSP	3.2, 3.3, 5.4	M	Yes ☐
	Do the following PDUs contain an information field			
PPT/122	- REJ_CMD, RR_CMD, RR_RSP, RNR_CMD, RNR_RSP, REJ_RSP, SABME_CMD, DISC_CMD, UA_RSP, DM_RSP	3.2, 5.4	X	No ☐

Item	Protocol feature Supported parameters on receipt	References	Status	Support
	Is the receipt of a DSAP, an SSAP and a Control field supported for the following PDUs			
PPR/123	- I_CMD, I_RSP, RR_CMD, RR_RSP, RNR_CMD, RNR_RSP, REJ_CMD, REJ_RSP, SABME_CMD, DISC_CMD, UA_RSP, DM_RSP, FRMR_RSP	3.2, 3.3, 5.4	M	Yes ☐
	Is the receipt of an Information field supported for the following PDUs			
PPR/124	- I_CMD, I_RSP, FRMR_RSP *(Note: Response to receipt of a PDU with an Information field which is not permitted to have an Information field is covered under Frame Reject procedures)*	3.2, 3.3, 5.4	M	Yes ☐

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B.7.3 LLC Type 2 - Supported Procedures

Item	Protocol Feature Supported procedures	References	Status	Support
	Support of Connection Establishment			
PRS/125	- as initiator	7.4.1, 7.4.5	O	Yes ☐ No ☐
PRS/126	- as responder	7.4.1, 7.4.5	M	Yes ☐
	Support of Connection Release			
PRS/127	- as initiator (originating release)	7.4.3, 7.4.4, 7.4.5	O	Yes ☐ No ☐
PRS/128	- as initiator (rejecting connection establishment)	7.4.3, 7.4.4, 7.4.5	M	Yes ☐
PRS/129	- as responder	7.4.3, 7.4.4, 7.4.5	M	Yes ☐
	Support of Data Transfer			
PRS/130	- as originator	7.4.2, 7.5	O	Yes ☐ No ☐
PRS/131	- as responder	7.4.2, 7.5	M	Yes ☐
PRS/132	Is the Remote Busy procedure supported on receipt of an RNR PDU	7.5.7	M	Yes ☐
PRS/133	Is the Retransmission procedure supported on receipt of a REJ PDU	7.5.6	M	Yes ☐
PRS/134	Is the Reject procedure supported on receipt of an I PDU with an unexpected N(S)	7.4.2, 7.5	M	Yes ☐
PRS/135	Is the Local Busy procedure supported	7.5.8	M	Yes ☐
PRS/136	Is the Frame Reject procedure supported	5.4.2.3.5	M	Yes ☐
	Is the Reset procedure supported			
PRS/137	- as initiator	7.5, 7.6, 7.7	M	Yes ☐
PRS/138	- as responder	7.5, 7.6, 7.7	M	Yes ☐
* PRS/139	Is the LLC Flow Control procedure supported	ISO 8802-2:-1989,Amd.1	O	Yes ☐ No ☐

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B.7.4 LLC Type 2 - Miscellaneous

Item	Protocol feature Miscellaneous	References	Status	Support
MIS/140	Do all transmitted PDUs contain an integral number of octets If the following PDUs are received from the MAC sublayer, are they treated as invalid and ignored:	3.3	M	Yes ☐
MIS/141	- contains a non-integral number of octets	3.3.4	M	Yes ☐
MIS/142	- has a length less than 3 octets (in the case of a one octet control field)	3.3.4	M	Yes ☐
MIS/143	- has a length less than 4 octets (in the case of a two octet control field)	3.3.4	M	Yes ☐

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B.7.5 LLC Type 2 - Protocol parameters

Item	Protocol feature Protocol parameters	References	Status	Support/Value
PPA/144 PPA/145	Is the ACK_TIMER function implemented - ACK_TIMER range	7.8.1.1	M	Yes ☐ Minimum Value = Maximum Value =
PPA/146 PPA/147	Is the P_TIMER function implemented - P_TIMER range	7.8.1.2	M	Yes ☐ Minimum Value = Maximum Value =
PPA/148 PPA/149	Is the REJ_TIMER function implemented - REJ_TIMER range	7.8.1.3	M	Yes ☐ Minimum Value = Maximum Value =
PPA/150 PPA/151	Is the BUSY_TIMER function implemented - BUSY_TIMER range	7.8.1.4	M	Yes ☐ Minimum Value = Maximum Value =
PPA/152 PPA/153	Is the N2 (Maximum Number of Transmissions) function implemented - Number of Transmissions	7.8.2	M	Yes ☐ Minimum Value = Maximum Value =
PPA/154 PPA/155	Is the k (Transmit Window Size) function implemented - Maximum value of k	7.8.4	M	Yes ☐ Value =
PPA/156 PPA/157a	Is the LLC flow control function implemented - K step range	ISO 8802-2:-1989, Amd.1	PRS/139:M	N/A ☐ Yes ☐ Minimum Value = Maximum Value =
PPA/157b PPA/157c	Is the RW (Receive Window Size) function implemented - Maximum value of RW	7.8.6	M	Yes ☐ Value =

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B.8 LLC Type 3 operation - Acknowledged connectionless-mode

CLS3a OR CLS4a::

All tables in clause B.8 are to be completed if above predicate evaluates to true.

B.8.1 LLC Type 3 - Supported PDU Types

Item	Protocol feature Supported PDU types	References	Status	Support		
* AnC/158a	Are ACn commands transmitted	8.5.1	O		Yes ☐	No ☐
A0C/158b	AC0_CMD supported on transmission	8.5.1	AnC/158a:M	N/A ☐	Yes ☐	
A0C/159	AC0_CMD supported on receipt	8.5.2	M		Yes ☐	
A0R/160	AC0_RSP supported on transmission	8.5.3	M		Yes ☐	
A0R/161	AC0_RSP supported on receipt	8.5.4	AnC/158a:M	N/A ☐	Yes ☐	
A1C/162	AC1_CMD supported on transmission	8.5.1	AnC/158a:M	N/A ☐	Yes ☐	
A1C/163	AC1_CMD supported on receipt	8.5.2	M		Yes ☐	
A1R/164	AC1_RSP supported on transmission	8.5.3	M		Yes ☐	
A1R/165	AC1_RSP supported on receipt	8.5.4	AnC/158a:M	N/A ☐	Yes ☐	

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B.8.2 LLC Type 3 - Supported parameters in PDUs on transmission

Item	Protocol feature Supported parameters on transmission	References	Status	Support		
A0T/166	AC0_CMD - DSAP address	8.2	AnC/158a:M	N/A ☐	Yes ☐	
A0T/167	AC0_CMD - SSAP address	8.2	AnC/158a:M	N/A ☐	Yes ☐	
	AC0_CMD -					
A0T/168	- P-bit = 1 and non-null Information field	8.3	AnC/158a:O.9	N/A ☐	Yes ☐	No ☐
A0T/169	- P-bit = 1 and null Information field	8.3	AnC/158a:O.9	N/A ☐	Yes ☐	No ☐
	AC0_CMD -					
A0T/170	- P-bit = 0 and non-null Information field	8.3	AnC/158a:O.9	N/A ☐	Yes ☐	No ☐
A0T/171	- P-bit = 0 and null Information field	8.3	AnC/158a:O.9	N/A ☐	Yes ☐	No ☐
A1T/172	AC1_CMD - DSAP address	8.2	AnC/158a:M	N/A ☐	Yes ☐	
A1T/173	AC1_CMD - SSAP address	8.2	AnC/158a:M	N/A ☐	Yes ☐	
	AC1_CMD -					
A1T/174	- P-bit = 1 and non-null Information field	8.3	AnC/158a:O.10	N/A ☐	Yes ☐	No ☐
A1T/175	- P-bit = 1 and null Information field	8.3	AnC/158a:O.10	N/A ☐	Yes ☐	No ☐
	AC1_CMD -					
A1T/176	- P-bit = 0 and non-null Information field	8.3	AnC/158a:O.10	N/A ☐	Yes ☐	No ☐
A1T/177	- P-bit = 0 and null Information field	8.3	AnC/158a:O.10	N/A ☐	Yes ☐	No ☐
A0T/178	AC0_RSP - DSAP address	8.2	M		Yes ☐	
A0T/179	AC0_RSP - SSAP address	8.2	M		Yes ☐	
	AC0_RSP - F-bit = P-bit (= 1)					
A0T/180	- with Status Subfield and non-null LSDU Subfield	8.3	O		Yes ☐	No ☐
A0T/181	- with Status Subfield and null LSDU Subfield	8.3	M		Yes ☐	
	AC0_RSP - F-bit = P-bit (= 0)					
A0T/182	- with Status Subfield and non-null LSDU Subfield	8.3	X			No ☐
A0T/183	- with Status Subfield and null LSDU Subfield	8.3	M		Yes ☐	

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B.8.2 LLC Type 3 - Supported parameters in PDUs on transmission (continued)

Item	Protocol feature Supported parameters on transmission	References	Status	Support	
A1T/184	AC1_RSP - DSAP address	8.2	M	Yes ☐	
A1T/185	AC1_RSP - SSAP address	8.2	M	Yes ☐	
	AC1_RSP - F-bit = P-bit (= 1)				
A1T/186	- with Status Subfield and non-null LSDU Subfield	8.3	O	Yes ☐	No ☐
A1T/187	- with Status Subfield and null LSDU Subfield	8.3	M	Yes ☐	
	AC1_RSP - F-bit = P-bit (= 0)				
A1T/188	- with Status Subfield and non-null LSDU Subfield	8.3	X		No ☐
A1T/189	- with Status Subfield and null LSDU Subfield	8.3	M	Yes ☐	

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B.8.3 LLC Type 3 - Supported parameters in PDUs on receipt

Item	Protocol feature Supported parameters on receipt	References	Status	Support
A0R/190	AC0_CMD - DSAP address	8.1, 8.2	M	Yes ☐
A0R/191	AC0_CMD - SSAP address	8.1, 8.2	M	Yes ☐
	AC0_CMD -			
A0R/192	- P-bit = 1 and non-null Information field	8.1, 8.3	M	Yes ☐
A0R/193	- P-bit = 1 and null Information field	8.1, 8.3	M	Yes ☐
	AC0_CMD -			
A0R/194	- P-bit = 0 and non-null Information field	8.1, 8.3	M	Yes ☐
A0R/195	- P-bit = 0 and null Information field	8.1, 8.3	M	Yes ☐
A1R/196	AC1_CMD - DSAP address	8.1, 8.2	M	Yes ☐
A1R/197	AC1_CMD - SSAP address	8.1, 8.2	M	Yes ☐
	AC1_CMD -			
A1R/198	- P-bit = 1 and non-null Information field	8.1, 8.3	M	Yes ☐
A1R/199	- P-bit = 1 and null Information field	8.1, 8.3	M	Yes ☐
	AC1_CMD -			
A1R/200	- P-bit = 0 and non-null Information field	8.1, 8.3	M	Yes ☐
A1R/201	- P-bit = 0 and null Information field	8.1, 8.3	M	Yes ☐

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B.8.3 LLC Type 3 - Supported parameters in PDUs on receipt (continued)

Item	Protocol feature Supported parameters on receipt	References	Status	Support
A0R/202	AC0_RSP - DSAP address	8.1, 8.2	M	Yes ☐
A0R/203	AC0_RSP - SSAP address	8.1, 8.2	M	Yes ☐
	AC0_RSP - F-bit = P-bit (= 1)			
A0R/204	- with Status Subfield and non-null LSDU Subfield	8.1, 8.3	M	Yes ☐
A0R/205	- with Status Subfield and null LSDU Subfield	8.1, 8.3	M	Yes ☐
	AC0_RSP - F-bit = P-bit (= 0)			
A0R/206	- with Status Subfield and non-null LSDU Subfield	8.1, 8.3, 8.7.2	M	Yes ☐
A0R/207	- with Status Subfield and null LSDU Subfield	8.1, 8.3	M	Yes ☐
A1R/208	AC1_RSP - DSAP address	8.1, 8.2	M	Yes ☐
A1R/209	AC1_RSP - SSAP address	8.1, 8.2	M	Yes ☐
	AC1_RSP - F-bit = P-bit (= 1)			
A1R/210	- with Status Subfield and non-null LSDU Subfield	8.1, 8.3	M	Yes ☐
A1R/211	- with Status Subfield and null LSDU Subfield	8.1, 8.3	M	Yes ☐
	AC1_RSP - F-bit = P-bit (= 0)			
A1R/212	- with Status Subfield and non-null LSDU Subfield	8.1, 8.3, 8.7.2	M	Yes ☐
A1R/213	- with Status Subfield and null LSDU Subfield	8.1, 8.3	M	Yes ☐

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B.8.4 LLC Type 3 - Supported procedures

Item	Protocol feature Supported procedures	References	Status	Support/Value
PRS/214	Is the procedure for Sequence Number Resynchronisation supported	8.4, 8.4.1	AnC/158a:O	N/A ☐ Yes ☐ No ☐
PRS/215a	Is the procedure for Destruction of a Transmit Sequence State Variable V(SI) supported	8.4, 8.4.2	AnC/158a:O	N/A ☐ Yes ☐ No ☐
PRS/215b	Is the procedure for Destruction of a Receive Sequence State Variable V(RI) and Reception Status State Variable V(RB) supported	8.4, 8.4.3	O	Yes ☐ No ☐
	Are the procedures for Information Transfer supported			
PRS/216	- For the general MAC capabilities case	8.5, 8.5.1, 8.5.2.1, 8.5.3, 8.5.4.1	O.11	Yes ☐ No ☐
PRS/217	- For the certain special MAC capabilities case	8.5, 8.5.1, 8.5.2.2, 8.5.3, 8.5.4.2	O.11	Yes ☐ No ☐

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B.8.5 LLC Type 3 - Miscellaneous

Item	Protocol feature Miscellaneous	References	Status	Support	
MIS/218	Do all transmitted PDUs contain an integral number of octets	3.3	M	Yes ☐	
	If the following PDUs are received from the MAC sublayer, are they treated as invalid and ignored:				
MIS/219	- contains a non-integral number of octets	3.3.4	M	Yes ☐	
MIS/220	- has a length less than 3 octets	3.3.4	M	Yes ☐	
	Note: The reception of an AC0_RSP or AC1_RSP with bit 8 of the Control Field equal to V(SI) is covered in items PRS/216 and PRS/217				
	Which of the following addresses are supported in the DSAP address field of AC0_CMD and AC1_CMD PDUs				
MIS/221	- individual address	5.4.3.1	O.12	Yes ☐	No ☐
MIS/222	- group address	5.4.3.1	O.12	Yes ☐	No ☐
MIS/223	- global address	5.4.3.1	O.12	Yes ☐	No ☐
MIS/224	Is the address in the SSAP address field of AC0_CMD and AC1_CMD PDUs the originator's individual address	5.4.3.1	M	Yes ☐	
	Is the address in the DSAP address field of AC0_RSP and AC1_RSP PDUs				
MIS/225	- the individual address of the corresponding AC0_CMD or AC1_CMD originator	5.4.3.2	M	Yes ☐	
	Is the address in the SSAP address field of AC0_RSP and AC1_RSP PDUs				
MIS/226	- the individual address of the AC0_RSP or AC1_RSP transmitter	5.4.3.2	M	Yes ☐	

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B.8.6 LLC Type 3 - Protocol parameters

Item	Protocol Feature Protocol Parameters	References	Status	Support/Value
PPA/227 * PPA/228	Is the N4 (Maximum Number of Transmissions) function implemented - Maximum Number of Transmissions	8.6.1	M	Yes ☐ Value =
PPA/229 PPA/230	Is the T1 (ACK_TIMER) function implemented - ACK_TIMER range	8.6.4	If PPA/228 > 1:M	N/A ☐ Yes ☐ Minimum Value = Maximum Value =
PPA/231 PPA/232	Is the T2 (RCV_LIFE_TIMER) function implemented - RCV_LIFE_TIMER range	8.6.5	M	Yes ☐ Minimum Value = Maximum Value =
PPA/233 PPA/234	Is the T3 (TX_LIFE_TIMER) function implemented - TX_LIFE_TIMER range	8.6.6	M	Yes ☐ Minimum Value = Maximum Value =

B.9 Route Determination Entity

RDE::

All tables in clause B.9 are to be completed if above predicate evaluates to true.

NOTE - Use of the Route Determination Entity facility is not required by this profile. The assumed base standard PICS proforma tables associated with the Route Determination Entity facility have been omitted from this part of ISO/IEC ISP 10614.

B.9.1 General Characteristics

Refer to Table A.20 in ISO 8802-2:1989/DAM5.

B.9.2 Procedures, PDU types and Formats

Refer to Table A.21 in ISO 8802-2:1989/DAM5.

B.9.3 Parameter and Parameter Values

Refer to Table A.22 in ISO 8802-2:1989/DAM5.

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Annex C
(informative)

Recommendations

C.1 Introduction

The information in this annex is tutorial in nature. It does not constitute a normative part of this part of ISO/IEC ISP 10609. In the absence of specific applications making alternative behaviour appropriate, it is recommended that the features described in this annex are implemented.

C.2 ISO/IEC 8208 recommendations

1 To allow for improved performance it is recommended that the following optional facilities are supported:

- non-standard default packet sizes;
- non-standard default window sizes;

and support of the following non-standard default parameter values is provided:

- all non-standard default packet sizes (maximum user data field length) from 32 octets to 1024 octets;
- all non-standard default window sizes from 1 to 7.

The non-standard default values shall be agreed on a LAN-wide basis.

2 Dynamic role selection is recommended to overcome any potential problems of administration of fixed role end systems.

3 Where dynamic routeing is required then the use of the ISO/IEC 10030 routeing exchange protocol is recommended.

C.3 ISO 8802-2 recommendations

1 The recommended parameter values are depicted in table C.1. It is recommended that the implementation supports a value of N1 as indicated in table C.1, that is 1031 octets. The support of larger sizes may be possible with certain LAN technologies. The support of these larger sizes is not addressed in this part of ISO/IEC ISP 10609. If specified, these larger sizes will be contained in the parts of ISO/IEC ISP 10609 that contain the requirements for particular LAN technologies.

NOTE - 1031 octets can be conveyed as a MAC service data unit by all ISO/IEC 8802 LANs. Where there is a need for LAN interconnection, the maximum size of 1031 octets for N1 can enable a MAC transparent bridging relay (profiles RD5n.5n) to be used regardless of the technologies being interconnected.

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Table C.1 - LLC parameter values

Parameter	Value
Maximum number of octets in an I PDU (N1)	1031(1)
Minimum number of octets in a PDU (N3)	4
Maximum number of outstanding I PDUs (k)	7
Maximum number of transmissions (N2)	10(2)

NOTES -

1 See the main text regarding support of other sizes of N1.

2 Parameter N2, although titled 'Number of transmissions' for consistency with ISO 8802-2, is actually defined as the number of retransmissions. Thus the above value could lead to a PDU being transmitted a total of 11 times.

2 The recommended timer values are depicted in table C.2. It is recommended that all the timers are configurable. These timer values are based on empirical evidence from the operation of a bridged LAN environment. In the case of a single isolated LAN smaller timer values may be appropriate.

Table C.2 - LLC timer values

Timer name	Value (seconds)
Busy-state	30
Reject	10
P-bit	5

3 It is recommended that where the end system is to operate in an environment with MAC level bridging that the flow control technique below should be applied. It should be noted that all end systems using LLC type 2 which are connected to such LAN configuration should apply the technique. This is the only way to maintain fairness.

The end system applies the following procedure to each LLC connection it supports:

i) Each time congestion is detected, the congestion recovery period starts: the working window size is set to one and the I-PDU whose sequence number equals the N(R) of the last PDU correctly received is retransmitted;

ii) During the congestion recovery period the LLC type 2 procedures ensure that the maximum number of outstanding I-PDUs does not exceed the working window size;

iii) When the number of previously unacknowledged I-PDUs successfully transmitted and acknowledged reaches the value of the working window size, the working window size is incremented by one. The congestion recovery period terminates when the working window size reaches the k value defined in ISO 8802-2, clause 7.4;

iv) An I-PDU is considered as lost by its sending LLC entity on one of the following conditions:

1. The transmitter receives a REJECT PDU, which indicates that the receiver detected the loss of an I-PDU, or

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2. The following sequence of events occurs:

   a. the transmitter ACK TIMER expires and the Retry Count is lower than the N2 value,

   b. the transmitter sends an RR command PDU with the Poll bit set to one,

   c. the transmitter receives an I-PDU or S-format PDU in which the Final bit is set to one but in which the value of N(R) is not equal to the value held by the transmitter's V(S) when the RR command PDU with the Poll bit set to one was sent;

v) The operation of this algorithm is interrupted by any condition causing LLC connection component to enter a Resetting or Disconnect state.

NOTE 1 This method applies to the parabolic increase mechanism covered by ISO 8802-2/Amd.1.

Additionally, a LAN station can refuse to establish new LLC connections and/or decide to release LLC connections that it supports.

NOTE 2 An appropriate sizing of a bridged LAN environment can considerably reduce the congestion problem occurring in MAC relay equipment. The sizing of a real world configuration of bridged LANs should be carefully estimated in order to limit the occurrence of congestion problems within the MAC sub-layer.

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Annex D
(informative)

Bibliography

D.1 Informative references

The following International Standard is referenced in notes and in informative annex C to this part of ISO/IEC ISP 10609:

ISO/IEC 10030 : 1990, *Information technology - Telecommunications and information exchange between systems - End System Routeing Information Exchange Protocol for use in conjunction with ISO 8878*

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