SLOVENSKI STANDARD

SIST ETS 300 402-2:1996

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Digitalno omrežje z integriranimi storitvami (ISDN) - Protokol digitalne naročniške signalizacije št. 1 (DSS1) - Podatkovna povezovalna plast - 2. del: Splošna specifikacija protokola (prilagojeno priporočilo ITU-T Q.921 (1993))

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]

Ta slovenski standard je istoveten z: **ETS 300 402-2 E1:1995-11**

ICS:

33.080	Digitalno omrežje z integriranimi storitvami (ISDN)	Integrated Services Digital Network (ISDN)
35.100.20	Podatkovni povezovalni sloj	Data link layer

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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]

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Signalling Protocols and Switching (SPS) Technical Committee of the European Telecommunications Standards Institute (ETSI).

This ETS is an updated version of ETS 300 125 Part 2. In addition, it was enhanced to cover service aspects of the data link layer protocol for inter-exchange signalling between Private Telecommunications Network eXchanges (PTNXs) in Private Telecommunication Networks (PTNs). Annex ZC identifies the technical differences between this ETS and ETS 300 125 Part 2.

This ETS is part 2 of a multi-part standard covering the Integrated Services Digital Network (ISDN) Digital Subscriber Signalling System No. one (DSS1) data link layer specification as described below:

Part 1: "General aspects [ITU-T Recommendation Q.920 (1993), modified]";

Part 2: "General protocol specification [ITU-T Recommendation Q.921 (1993), modified]";

Part 3: "Frame relay protocol specification";

Part 4: "Protocol Implementation Conformance Statement (PICS) proforma specification for the general protocol";

Part 5: "PICS proforma specification for the frame relay protocol";

Part 6: "Test Suite Structure and Test Purposes (TSS&TP) specification for the general protocol";

Part 7: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the general protocol".

Transposition dates	
Date of adoption of this ETS:	10 November 1995
Date of latest announcement of this ETS (doa):	28 February 1996
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	31 August 1996
Date of withdrawal of any conflicting National Standard (dow):	31 August 1996

Endorsement notice

The text of ITU-T Recommendation Q.921 (1993) was approved by ETSI as an ETS with agreed modifications as given below.

NOTE: New or modified text is indicated using sidebars. In addition, underlining and/or strike-out are used to highlight detailed modifications where necessary.

Page 1

Add the following four clauses (Scope, Normative references, Definitions, Abbreviations) at the start of the text:

Scope

This European Telecommunication Standard (ETS) describes in general terms the link access procedure of the Digital Subscriber Signalling System No. one (DSS1) protocol when used in the pan-European Integrated Services Digital Network (ISDN) as provided by European public telecommunications operators, or in a Private Telecommunication Network (PTN), at the T reference point or the S reference point or the coincident S and T reference point (as defined in ITU-T Recommendation I.411 [15]).

Annex ZA of this ETS describes in general terms the link access procedure for use in a symmetrical application between two Private Telecommunication Network eXchanges (PTNXs) at the Q reference point (see ETS 300 475-1 [14]).

Conformance to this ETS is met by conforming to the specific protocol standards for individual applications. Therefore, no separate method of testing is provided for this ETS.

The field of application of this ETS is determined by specific protocol standards for individual applications.

Normative references

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

[9] ETS 300 011 (1990): "Integrated Services Digital Network (ISDN); Primary rate user-network interface layer 1 specification and test principles".

[10] ETS 300 012 (1990): "Integrated Services Digital Network (ISDN); Basic user-network interface layer 1 specification and test principles".

[11] ETS 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]".

[12] ETS 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 specification [ITU-T Recommendation Q.931 (1993), modified]".

[13] ETS 300 415 (1995): "Private Telecommunication Network (PTN); Terms and definitions".

[14] ETS 300 475-1: "Private Telecommunication Network (PTN); Reference configuration; Part 1: Reference configuration for PTN eXchanges (PTNX) [ISO/IEC 11579-1 (1994), modified]".

[15] ITU-T Recommendation I.411 (1993): "ISDN user network interfaces - reference configurations".

NOTE: The references listed in this ETS are a continuation of publications referenced in ITU-T Recommendation Q.921.

Definitions

For the purposes of this ETS, the following definitions apply, together with those given in the referenced publications:

Assignment Source Point (ASP): Layer management entity at the network side performing TEI management.

automatic TEI assignment: Layer management procedure between user side and network side (ASP) which associates within one interface a unique numeric value for a layer 2 terminal identity (TEI value) to a variable called TEI of a specific terminal equipment. The TEI, which is part of the DLCI, is selected by the ASP.

broadcast data link connection; broadcast connection: A connection with the capability to support more than two connection-endpoints (see [X.200 § 5.3.1.4] multi-endpoint-connection).

confirm (primitive): [X.210 § 3.2.7] A primitive issued by a service-provider to complete, at a particular service-access-point, some procedure previously invoked by a request at that service-access-point.

confirmed service: [X.210 § 3.2.12] A service which results in an explicit confirmation from the service-provider. There is not necessarily any relationship to a response from the peer service user.

connection: [X.200 § 5.3.1.2] An association established by the "service provider" layer between two or more "service user" entities for the transfer of data.

connection-endpoint: [X.200 § 5.3.1.3] A terminator at one end of a connection within a service-access-point.

Connection Endpoint Identifier (CEI): [X.200 § 5.4.1.5] An identifier of a connection-endpoint which can be used to identify the corresponding connection at a service-access-point.

Connection Endpoint Suffix (CES): [X.200 § 5.4.1.6] A part of a connection-endpoint-identifier which is unique within the scope of a service-access-point.

Connection Management Entity (CME): An entity for the purpose of management of resources that have impact on an individual data link connection.

D-channel: [I.412] The D-channel represents the portion of the information-carrying capacity of the ISDN user-network interface primarily intended to carry access signalling information. In addition, a D-channel may also be used to carry other information such as packet-switched data, teleaction information, etc.

data link connection: [X.212] An association established by a data link layer between two or more data link service users for the transfer of data, which provides explicit identification of a set of data link data transmissions and agreement concerning the data link transmission services to be provided for the set.

NOTE: This definition clarifies the definition given in CCITT Recommendation X.200.

Data Link Connection Identifier (DLCI): An address conveyed in a PDU which indicates the source and destination of an intended instance of communication at the data link layer.

function: [X.200 § 5.2.1.7] A part of the activity of entities.

indication (primitive): [X.210 § 3.2.5] A primitive issued by a service-provider either:

a) to invoke some procedure; or

b) to indicate that a procedure has been invoked by the service-user at the peer service-access-point.

interface-control-information: [X.200] Information transferred between a "service user" entity and a "service provider" entity to co-ordinate their joint operation.

interface-data: [X.200] Information transferred from a "service user" entity to a "service provider" entity for transmission to a correspondent "service user" entity over a connection, or conversely, information transferred from a "service provider" entity to a "service user" entity after being received over a connection from a correspondent "service user" entity.

Interface Data Unit (IDU): [X.200] The unit of information transferred across a service-access-point between a "service user" entity and a "service provider" entity in a single interaction. Each interface-data-unit contains interface-control-information and may also contain the whole or part of a service-data-unit.

Integrated Services Digital Network (ISDN): [I.112 § 2.3 definition 308] A network that provides or supports a range of different telecommunication services and provides digital connections between user-network interfaces.

layer: [X.200 § 5.2.1.2] A subdivision of the system architecture, constituted by subsystems of the same rank.

layer management: [X.200 § 8.1.6] Functions related to the management of the layer partly performed in the layer itself according to the protocol of the layer (activities such as activation and error control) and partly performed as a subset of systems management.

Layer Management Entity (LME): An entity for the purpose of management of resources that have layer-wide impact.

Link Access Procedure (LAP): Class of a procedure based on HDLC elements of procedures for use on the link layer.

(N)-entity: [X.200 § 5.2.1.11] An active element within a (N)-subsystem.

(N)-subsystem: [X.200 § 5.2.1.1] An element in a hierarchical division of an open system which interacts directly only with elements in the next higher division or the next lower division of that open system.

network side: Location in relation to the user-network interface indicating that the context to which this term refers is at the network side of the user-network interface.

network side system management entity: An entity for the purpose of management communications at the network side of the user-network interface.

non-automatic TEI assignment: Layer management local interaction between layer management entity and data link layer entity at the user side which associates within one interface a numeric value for a layer 2 terminal identity (TEI value) to a variable called TEI of a specific terminal equipment. The TEI, which is part of the DLCI, is selected by the user.

persistent deactivation: The term "persistent layer 1 deactivation" defines condition which shall be satisfied before the data link layer assumes layer 1 deactivation and takes the actions according to the protocol specification. Persistency is achieved if:

a) the deactivation is an intended action within layer 1 caused by the functional block responsible for deactivation of the layer 1; or

b) layer 1 lost connectivity during a time interval, the value of which is outside the scope of this ETS, but which should be defined for each specific transmission facility.

point-to-point data link connection; point-to-point connection: A connection with two connection-endpoints.

Private Telecommunication Network (PTN); private network: [ETS 300 415 [13] subclause 4.3].

Private Telecommunication Network eXchange (PTNX): [ETS 300 415 [13] subclause 4.4].

protocol: [X.200 § 5.2.1.9] A set of rules and formats (semantic and syntactic) which determines the communication behaviour of entities in the performance of functions.

Protocol Data Unit (PDU): [X.200 § 5.6.1.3] A unit of data specified in a protocol and consisting of protocol-control-information and possibly user-data.

Protocol Control Information (PCI): [X.200 § 5.6.1.1] Information exchanged between entities using a connection (provided by the next lower layer), to co-ordinate their joint operation.

reference point: [I.411 § 2.3] Conceptual point dividing set of functions which form functional groups. In a specific access arrangement, a reference point may correspond to a physical interface between pieces of equipment, or there may not be any physical interface corresponding to the reference point. Physical interfaces which do not correspond to a reference point (e.g. transmission link interfaces) will not be the subject of ISDN user-network interface Recommendations.

request (primitive): [X.210 § 3.2.4] A primitive issued by a service-user to invoke some procedure.

response (primitive): [X.210 § 3.2.6] A primitive issued by a service-user to complete, at a particular service-access-point, some procedure previously invoked by an indication at that service-access-point.

service ("layer" service): [X.200 § 5.2.1.5] A capability of the providing layer and the layers beneath it, which is provided to "service user" entities at the boundary between the "service provider" layer and the "service user" layer.

Service Access Point (SAP): [X.200 § 5.2.1.8] The point at which services are provided by a "service provider" entity to a "service user" entity.

Service Data Unit (SDU): [X.200 § 5.6.1.4] An amount of interface-data whose identity is preserved from one end of a connection to the other.

service-primitive; primitive: [X.210 § 3.2.3] An abstract, implementation independent interaction between a service-user and the service-provider.

service-provider: [X.210 § 3.2.2] An abstract machine which models the behaviour of the totality of the entities providing the service, as viewed by the user.

service-user: [X.210 § 3.2.1] An abstract representation of the totality of those entities in a single system that make use of a service through a single access point.

system management: [X.200 § 8.1.4] Function in the Application Layer related to the management of various system resources and their status across all layers of the system architecture.

system management entity: [X.200 § 8.1.5] An entity for the purpose of systems-management communications.

Terminal Endpoint Identifier (TEI): Portion of a DLCI associated with one (point-to-point data link) or more than one (broadcast data link) terminal equipment.

unconfirmed service: [X.210 § 3.2.11] A service which does not result in an explicit confirmation from the service-provider.

user-data: [X.200 § 5.6.1.2] The data transferred between "service provider" entities on behalf of the "service user" entities for whom "service provider" entities are providing services.

user side: Location in relation to the user-network interface indicating that the context to which this term refers is at the user side of the user-network interface.

user side system management entity: An entity for the purpose of management communications at the user side of the user-network interface.

Abbreviations

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

ACK	ACKnowledgement
Ai	Action indicator
ASP	Assignment Source Point
C/R	Command/Response field bit
CEI	Connection Endpoint Identifier
CES	Connection Endpoint Suffix
CME	Connection Management Entity
DISC	DISConnect
DL-	communication between layer 3 and Data Link layer
DLCI	Data Link Connection Identifier
DM	Disconnected Mode
EA	Extended Address field bit
ERR	ERRor
ET	Exchange Termination
FCS	Frame Check Sequence
FRMR	FRaMe Reject
HDLC	High-level Data Link Control procedures
I	Information
ID	IDentity
IDU	Interface Data Unit
ISDN	Integrated Services Digital Network
k	Maximum number of outstanding frames (window size)
L1	Layer 1
L2	Layer 2
L3	Layer 3
LAP	Link Access Procedure
LAPB	Link Access Procedure - Balanced
LAPD	Link Access Procedure on the D-channel
LME	Layer Management Entity
M	Modifier function bit
MDL-	communication between layer Management and Data Link layer
MPH-	communication between system Management and PHysical layer
NT2	Network Termination 2
OSI	Open System Interconnection
PCI	Protocol Control Information
PDU	Protocol Data Unit
P/F	Poll/Final bit
PI	Parameter Identifier
PH-	communication between data link layer and PHysical layer
PL	Parameter Length
PTN	Private Telecommunication Network
PTNX	Private Telecommunication Network eXchange
PV	Parameter Value
RC	Retransmission Counter
REC	RECeiver
REJ	REJect
Ri	Reference number
RNR	Receive Not Ready
RR	Receive Ready
RX	Receive
S	Supervisory
S	Supervisory function bit
SABME	Set Asynchronous Balanced Mode Extended
SAP	Service Access Point
SAPI	Service Access Point Identifier
SDL	Specification and Description Language
SDU	Service Data Unit
TE	Terminal Equipment
TEI	Terminal Endpoint Identifier

TX	Transmit
U	Unnumbered
UA	Unnumbered Acknowledgement
UI	Unnumbered Information
V(S)	Send state Variable
V(A)	Acknowledge state Variable
V(R)	Receive state Variable
N(S)	Send sequence Number
N(R)	Receive sequence Number
XID	eXchange IDentification

Throughout the text of ITU-T Recommendation Q.921

Replace references as shown in the following table.

Reference in ITU-T Recommendation Q.921	Modified reference
ITU-T Recommendation I.430 [5]	ETS 300 012 [10]
ITU-T Recommendation I.431 [6]	ETS 300 011 [9]
ITU-T Recommendation Q.920 [1]	ITU-T Recommendation Q.920 as modified by ETS 300 402-1 [11]
ITU-T Recommendation Q.931 [3]	ITU-T Recommendation Q.931 as modified by ETS 300 403-1 [12]

Page 5, clause 1, last paragraph

Delete the last paragraph referring to abstract test suites:

~~The abstract test suites for testing conformance to this Recommendation are contained in Recommendation Q.921 *bis* [4].~~

Page 1, subclause 2.3, second paragraph

Insert after the second paragraph referring to the support of a LAPB data link connection within the D-channel:

Networks conforming to this ETS do not support the LAPB data link connection within the D-channel.

Page 3, subclause 2.7, last two paragraphs

The last two paragraphs have the status of notes. As a consequence, replace the last two paragraphs by:

NOTE 1: As a typical implementation at the transmitter, the initial content of the register of the device computing the remainder of the division is preset to all 1s and is then modified by division by the generator polynomial (as described above) on the address, control and information fields; the ones complement of the resulting remainder is transmitted as the 16-bit FCS.

NOTE 2: As a typical implementation at the receiver, the initial content of the register of the device computing the remainder is preset to all 1s. The final remainder, after multiplication by x^{16} and then division (modulo 2) by the generator polynomial $x^{16} + x^{12} + x^5 + 1$ of the serial incoming protected bits and the FCS, will be 0001 1101 0000 1111 (x^{15} through x^0, respectively) in the absence of transmission errors.

Page 5, subclause 2.9, item b)

Replace item b) and add a note:

b) has fewer than six octets between flags of frames that contain sequence numbers (see note) and fewer than five octets between flags of frames that do not contain sequence numbers, or

NOTE: The order of checking the content of the control field, and frame formats for compliance with the specification, are an implementation matter. Therefore, a S-format with two octet address field and modulo 8 sequence number format can be identified to be an invalid frame according to subclause 2.9 item b), or to be an undefined control field according to subclause 3.6.1. Either of these two verdicts is in compliance with this ETS.

Page 9, table 2/Q.921

Replace table 2/Q.921 by:

SAPI value	Related layer or layer management entity
0	Call control procedures
1-11	Reserved for future standardization
12	Connectionless network applications
13-15	Reserved for future standardization
16	Packet communication conforming to X.25 level 3 procedures
17-31	Reserved for future standardization
32-62	Not available for Q.921
63	Layer 2 management procedures

Page 10, table 5/Q.921, note

Replace the note in table 5/Q.921 by:

NOTE: According to subclause 5.4.2.2, European networks do not support automatic negotiation of data link layer parameter values, thus XID is associated with an application not supported. Consequently, the XID frame shall be discarded and no action shall be taken as a result of that frame, according to subclause 3.6.1.

Page 11, subclause 3.6.7, second paragraph

Add after the second paragraph:

The optional procedure for the retransmission of an REJ response frame is not used by networks conforming to this ETS.

Subclause 4.1.1, table 6/Q.921

Replace table 6/Q.921 by:

Generic name	Type				Parameters		Parameter data contents (note 1)
	Request	Indication	Response	Confirm	Priority indicator	Parameter data	
L3 <---> L2							
DL-ESTABLISH	u + n	u + n	-	u + n	-	-	-
DL-RELEASE	u + n	u + n	-	u + n	-	-	-
DL-DATA	u + n	u + n	-	-	-	X	Layer 3 PDU (peer-to-peer message)
DL-UNIT DATA	u + n	u + n	-	-	-	X	Layer 3 PDU (peer-to-peer message)
M <---> L2							
MDL-ASSIGN	u + n	u	-	-	-	X	TEI value, CES (note 2)
MDL-REMOVE	u + n	-	-	-	-	X	TEI value, CES
MDL-ERROR	-	u + n	u	-	-	X	Reason for error message
MDL-UNIT DATA	u + n	u + n	-	-	-	X	Layer management PDU (peer-to-peer message)
L2 <---> L1							
PH-DATA	u + n	u + n	-	-	X (note 3)	X	Data link layer PDU (peer-to-peer frame)
PH-ACTIVATE	u + n	u + n	-	-	- (note 4)	-	-
PH-DEACTIVATE	-	u + n	-	-	-	-	-
M <---> L1							
MPH-ACTIVATE (note 5)	-	u + n	-	-	-	-	-
MPH-DEACTIVATE (note 5)	n	u + n	-	-	-	-	-
MPH-INFORMATION	-	u (note 6)	-	-	-	X	Connected/disconnected

L3 <---> L2 := Layer 3/data link layer boundary
L2 <---> L1 := Data link layer/physical layer boundary
M <---> L2 := Management entity/data link layer boundary
M <---> L1 := Management entity/physical layer boundary
u := Exists at user side
n := Exists at network side
u + n := Exists at both user and network side
X := Exists
- := Does not exist

NOTE 1: Although not shown below, the CES is implicitly associated with each L3-L2 primitive, indicating the applicable connection endpoint.
NOTE 2: TEI value is included only in the MDL-ASSIGN.request.
NOTE 3: The parameter "Priority indicator" only relates to the request type.
NOTE 4: The PH-ACTIVATE.indication primitive is also used as confirm.
NOTE 5: The MPH-ACTIVATE and MPH-DEACTIVATE primitive are confined to the usage defined in annex G/Appendix III. Other uses are outside the scope of this ETS.
NOTE 6: Only applies to the basic access.

Page 16, subclause 4.1.1.9

Delete subclause 4.1.1.9. The MDL-XID primitives are not applicable to networks conforming to this ETS.