



SLOVENSKI STANDARD
SIST EN 301 145-1:2000
01-januar-2000

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Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Teleaction service; Part 1: Protocol specification

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ICS:

33.080	Digitalno omrežje z integriranimi storitvami (ISDN)	Integrated Services Digital Network (ISDN)
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SIST EN 301 145-1:2000 **en**

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EN 301 145-1 V1.1.4 (1999-03)

European Standard (Telecommunications series)

Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Telection service; Part 1: Protocol specification

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Reference

DEN/SPS-05106-1 (alo90ieo.PDF)

Keywords

bearer, DSS1, ISDN, protocol, service,
teleaction, teleservice

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Association à but non lucratif enregistrée à la
Sous-Prefecture de Grasse (06) N° 7803/88

<https://standards.etsi.fr/standards/standards/siret/06-7803-88-8814d0c3e029/sist-en-301-145-1-2000>

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Signalling Protocols and Switching (SPS).

The present document is part 1 of a multi-part EN covering the Digital Subscriber Signalling System No. one (DSS1) protocol specification for the Integrated Services Digital Network (ISDN) teleaction bearer service, as described below:

Part 1: "Protocol specification";

Part 2: "Protocol Implementation Conformance Statement (PICS) proforma specification".

In accordance with CCITT Recommendation I.130, the following three level structure is used to describe the bearer services as provided by European public telecommunications operators under the pan-European ISDN:

- Stage 1: is an overall service description, from the user's standpoint;
- Stage 2: identifies the functional capabilities and information flows needed to support the service described in stage 1; and
- Stage 3: defines the signalling system protocols and switching functions needed to implement the service described in stage 1.

The present document details the stage 3 aspects (signalling system protocols and switching functions) needed to support the teleaction bearer service. The stage 1 aspects are detailed in EN 301 131. The stage 2 aspects of the teleaction bearer service have not been specified.

National transposition dates

Date of adoption of this EN:	12 March 1999
Date of latest announcement of this EN (doa):	30 June 1999
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 December 1999
Date of withdrawal of any conflicting National Standard (dow):	31 December 1999

1 Scope

The present document specifies the stage three of the Teleaction bearer service for the pan-european Integrated Services Digital Network (ISDN) as provided by the European public telecommunication operators at the T reference point or coincident S and T reference point (as defined in CCITT Recommendation I.411 [1]). Stage three identifies the protocol procedures and switching functions needed to support a telecommunications service (see CCITT Recommendation I.130 [2]).

The present document also provides guidance on the network functionality required to implement the Teleaction service (see annex B). The functional capabilities and information flows of such network entities are described. In the absence of a stage 2 description this information has been included in the present document. This does not preclude its future publication as a separate stage 2 standard.

In addition, the present document specifies the protocol requirements at the T reference point where the service is provided to the user via a private ISDN.

The present document does not specify the additional requirements where the service is provided to the user via a telecommunications network that is not an ISDN, but does include interworking requirements of other networks with the public ISDN.

Teleaction is a service providing for reliable, low volume, data communication and allied processing to users. The Teleaction bearer service may be used for applications such as monitoring, indicating, controlling and verifying of remote events, operations, and measurements.

Charging principles are outside the scope of the present document.

Further parts of the present document specify the method of testing required to identify conformance to the present document.

The present document is applicable to equipment, supporting the Teleaction bearer service, to be attached at either side of a T reference point or coincident S or T reference point when used as an access to the public ISDN.

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2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- [1] CCITT Recommendation I.411 (1993): "ISDN user-network interfaces - Reference configurations".
- [2] CCITT Recommendation I.130 (1988): "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".
- [3] CCITT Recommendation I.112 (1993): "Vocabulary of terms for ISDNs".
- [4] CCITT Recommendation I.210 (1993): "Principles of telecommunication services supported by an ISDN and the means to describe them".

- [5] CCITT Recommendation X.25 (1996): "Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit".
- [6] ETS 300 011: "Integrated Services Digital Network (ISDN); Primary rate user-network interface; layer 1 specification and test principles".
- [7] ETS 300 012: "Integrated Services Digital Network (ISDN); Basic user-network interface; Layer 1 specification and test principles".
- [8] ETS 300 049: "Integrated Services Digital Network (ISDN); ISDN Packet Mode Bearer Service (PMBS) ISDN Virtual Call (VC) and Permanent Virtual Circuit (PVC) bearer services provided by the D-channel of the user access - basic and primary rate".
- [9] 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]".
- [10] ETS 300 402-2: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Data link layer; Part 2: General protocol specification [ITU-T Recommendation Q.921 (1993), modified]".
- [11] ETS 300 099: "Integrated Services Digital network (ISDN); Specification of the Packet Handler access point Interface (PHI)".
- [12] EN 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] EN 301 131: "Integrated Services Digital Network (ISDN); Teleaction teleservice; Service description".
- [14] CCITT Recommendation I.233 (1991): "Frame mode bearer services".
- [15] ITU-T Recommendation Q.72 (1993): "Stage 2 description for packet mode service".
- [16] ISO 8473-1: "Information technology - Protocol for providing the connectionless-mode network service: Protocol specification".
- [17] RFC 791: "Internet Protocol (IP)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following definitions apply:

Bd channel: 64 kbit/s timeslot over which multiple D channel connections are multiplexed using the procedures of ETS 300 099 [11], clause 9.

Bd bundle: collection of Bd channels.

Basic Network Provider (BNP): entity responsible for the installation and the maintenance of the network supporting the teleaction service.

bearer service: see CCITT Recommendation I.112 [3], subclause 2.2, definition 202.

End User (EU): entity to whom a teleaction application service is provided or who is affected by that application service.

End User Terminal (EUT): device (or location of a device) that, depending on the application (e.g. by monitoring of subdevices):

- on the basis of local conditions or by interrogation, generates information and presents this information for transmission by the network to a Service Provider (SP);
- receives information from a SP in order to affect local conditions;
- upon polling requests received from a Teleaction Management Function (TMF) executes the requested local actions (e.g. authorization, functionality checks, etc.) and sends appropriate responses to the TMF.

NOTE 1: Authorization and functionality checks are outside the scope of the present document.

EU access capability: telecommunication means used between an EUT and a TMF (e.g. ISDN bearer service, dedicated connection, etc.).

Integrated Services Digital Network (ISDN): see CCITT Recommendation I.112 [3] subclause 2.3 definition 308.

network: DSS1 protocol entity at the network side of the user network interface.

Service Provider (SP): entity which, by using one or more TMFs, provides a teleaction application service to one or more EUs.

NOTE 2: The SP may be the BNP, the TMFP, or another organization responsible for one or more SPTs.

Service Provider Terminal (SPT): device (or location of such a device) which, depending on the application:

- receives information from one or more EUTs for handling and processing in accordance with the application service offered by the SP;
- generates control messages and information requests and presents that information for transmission to one or more EUTs;
- monitors EUTs on the network, either by retrieving EUT status information stored in TMFs, and/or by receiving status information automatically from TMFs (e.g. alarms);
- receives polling requests from TMFs and sends appropriate responses to the TMF. Execution of local procedures such as authorization and functionality check is outside the scope of the present document;
- transfers to the TMF information to be broadcasted to the EUTs, if the broadcast functionality is supported by the TMF.

SPT access capability: telecommunication means used between a SPT and a TMF (e.g. ISDN bearer service, dedicated connection, etc.).

service; telecommunication service: see CCITT Recommendation I.112 [3] subclause 2.2 definition 201.

supplementary service: see CCITT Recommendation I.210 [4] subclause 2.4.

teleaction application: one specific end to end application offered by a service provider using the teleaction service.

teleaction service: teleaction service is the transport mechanism used by a teleaction application.

teleservice: see CCITT Recommendation I.112 [3], subclause 2.2, definition 203.

Teleaction Management Function (TMF): set of network functions added to either the public ISDN or assigned to a separate public, or private, network entity. The tasks of the TMF are:

- to ensure reliable communication paths between the EUTs and the SPT, i.e. to ensure available and secure access for the EUTs to the network and communication paths for the SPT in the ISDN, respectively;
- authorization of connected EUTs/SPTs;
- EUT/SPT functionality check;
- to address the appropriate EUT/SPT for transfer of information generated by SPT/EUT;
- as a TMFP option, to broadcast appropriate EUTs for transfer of information generated by a SPT.

Teleaction Management Function Provider (TMFP): entity responsible for the installation and maintenance of one or more of the TMFs. A TMFP may be the same as the BNP.

user: DSS1 protocol entity at the user side of the user network interface.

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3.2 Abbreviations (standards.iteh.ai)

For the purposes of the present document, the following abbreviations apply:

	SIST EN 301 145-1:2000
BNP	Basic Network Provider
BRA	Basic Rate Access
BRF	Basic Routing Functional
CCAT	Call Control Agent for Teleaction
CEI	Connection Endpoint Identifier
CRF	Connection Related Function
CSPDN	Circuit Switched Public Data Network
DF	Database Functional
DLCI	Data Link Connection Identifier
DSS1	Digital Subscriber Signalling System No. one
EU	End User
EUT	End User Terminal
FH	Frame Handler
FRF	Frame Routing Function
ISDN	Integrated Services Digital Network
LAPD	Link Access Procedure for the D channel
LE	Local Exchange
LIC	Link Identification Code
NT1	Network Termination type 1
NT2	Network Termination type 2
OSI	Open System Interconnection
PFH	Private Frame Handler
PH	Packet Handler
PICS	Protocol Implementation Conformance Statement
PLL	Pre-allocated Logical Link
PMBS	Packet Mode Bearer Service
PRA	Primary Rate Access
PSPDN	Packet Switched Public Data Network
PSTN	Public Switched Telephone Network

PTN	Private Telecommunications Network
SAPI	Service Access Point Identifier
SP	Service Provider
SPT	Service Provider Terminal
TA	Terminal Adapter
TEI	Terminal Endpoint Identifier
TMF	Telection Management Function
TMFP	Telection Management Function Provider

4 Description

Telection is a service providing for reliable, low volume, data communication and allied processing to users. The Telection bearer service may be used for applications such as monitoring, indicating, controlling and verifying of remote events, operations, and measurements.

Telection is applicable to both basic rate and primary rate, access.

The service provides a datalink layer service over which, by means of a suitable convergence protocol, the OSI connectionless-mode network service may operate. An explicit indication (SAPI = 12) is used at the data link layer to identify a telection communication. This indication is used to filter the telection frames, from other frames which may co-exist on the interface e.g. call-control frames (SAPI = 0) and packet data frames (SAPI = 16). Once filtered, the frames can be directed towards a TMF. The method of filtering used by the network is outside the scope of the present document. The network uses a network-internal frame address structure (DLCI) to uniquely identify both SPTs, and EUTs, to the TMF. Routing of frames is based upon the Data Link Connection Identifier (DLCI).

A network may be comprised of multiple TMFs, and multiple SPs. Figure 1 illustrates some typical access scenarios that can exist in a network. The figure is not exhaustive, but illustrates a possible network implementation where there are multiple SPs. It is possible that within the TMF "cloud", multiple TMFs could exist.

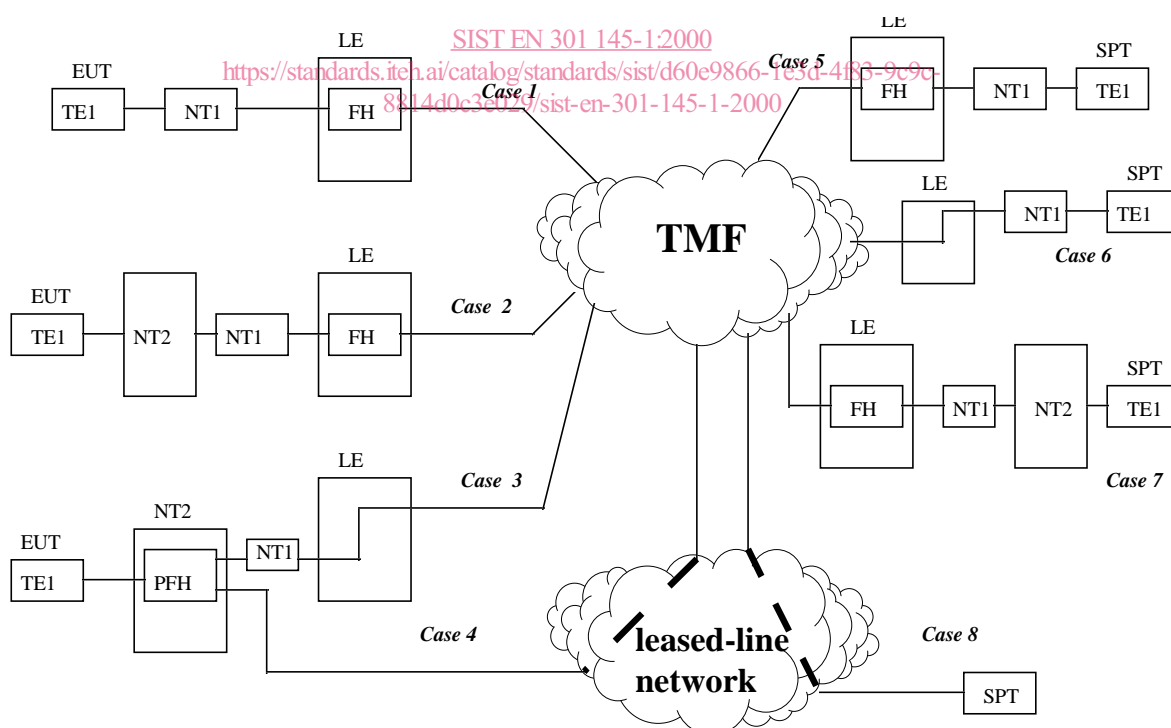


Figure 1: Telection access scenarios

The access scenarios presented are:

- Case 1: EUT connected to S/T reference point.
- Case 2: EUT connected to S reference point.
- Case 3: EUT connected to S reference point but with a Frame Handler (FH) within the private network. The PFH is connected by a semipermanent B channel to the TMF.
- Case 4: EUT connected to S reference point, with a FH within the private network, and the PFH connected to the TMF via a leased-line.
- Case 5: SPT connected to S/T reference point.
- Case 6: SPT connected to S/T reference point, but with semipermanent B channel connection to TMF.
- Case 7: SPT connected to S reference point (D or semipermanent B channel connections possible).
- Case 8: SPT connected via leased-line to the TMF.

NOTE 1: The TMF being implemented in the local exchange is not shown in figure 1, but is a possibility.

One EUT is logically associated with only one SPT.

NOTE 2: The context where an EUT communicates with several SPTs is outside the scope of the present document.

Of the three different methods of layer 2 activation defined in ETS 300 049 [8] (semipermanent, on demand fixed TEI (PLL), on demand variable TEI), only two are applicable to teleaction. Where either of these methods are used, the TEI value shall lie in the non-automatic range [0-63].

4.1 Semi-permanent access

For semi-permanent access, logical links between an EUT and a TMF, or between a SPT and a TMF, are allocated at subscription time. The network shall keep the access connection in the established state. Layer 2 addresses at the user-network interface are allocated at subscription time.

4.2 PLL access

For PLL access, D channel logical links between an EUT and a TMF, or between a SPT and a TMF, are permanently allocated on a subscription basis, but they can be activated and deactivated (SABME/DISC) on demand. The activation, or deactivation, of the link may be initiated by either endpoint. Layer 2 addresses at the user-network interface are allocated at subscription time.

5 Reference configuration and protocol architecture

5.1 Reference configuration

The teleaction bearer service consists of interaction between 3 essential entities: the EUT, the TMF and the SPT. As an abstraction of an actual instance of the service, these entities may be considered as part of functional planes. The EU plane and the SP plane can only communicate with each other by passing through the TMF plane. This is illustrated in figure 2.

The figure illustrates the possibility for multiple EUTs to communicate with individual SPTs, over a single connection to the TMF. The TMF is shown as being able to route the calls from EUTs to an SPT. Further, multiple SPTs may be contactable over the one link from the TMF.