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Digitalno omreģje z integriranimi storitvami (ISDN) ï Generiļ ni funkcijski protokol za podporo dopolnilnim storitvam ï Protokol digitalne naroļ niģke signalizacije ģt. 1 (DSS1) ï 1. del: Specifikacija protokola

Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification

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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 standard covering the Digital Subscriber Signalling System No. one (DSS1) protocol specification for the Integrated Services Digital Network (ISDN) generic functional protocol for the support of supplementary services, as described below:

Part 1: "Protocol specification";

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

Part 3: "Test Suite Structure and Test Purposes (TSS&TP) specification for the user";

Part 4: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the user";

Part 5: "TSS&TP specification for the network";

Part 6: "ATS and partial PIXIT proforma specification for the network".

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The present document is an extended and updated version of ETS 300 196-1 (1993) and its amendment A1 (1995).

National transposition dates	
Date of adoption of this EN:	3 April 1998
Date of latest announcement of this EN (doa):	31 July 1998
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 January 1999
Date of withdrawal of any conflicting National Standard (dow):	31 January 1999

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1 Scope

This first part of EN 300 196 specifies the functional protocol for the pan-European Integrated Services Digital Network (ISDN) as provided by European public telecommunications operators for the application to a range of supplementary services at the T reference point or coincident S and T reference point (as defined in ITU-T Recommendation I.411 [3]) by means of the Digital Subscriber Signalling System No. one (DSS1) protocol.

The functional protocol is based on the use of the Facility information element and the FACILITY message, as well as on other specific functional messages specified in subclause 11.1. The protocol is symmetrical, and is applicable to both the basic and primary rate access structures.

To be functional this protocol requires knowledge of supplementary services supported by the user equipment. This facilitates user equipment operation without human intervention by defining semantics for the protocol elements which user equipment can process on its own.

The procedures specified in the present document can be used for:

- activation and deactivation;
- invocation and operation;
- interrogation;
- status request; and
- status notification,

of supplementary services in association with existing calls or outside any existing call.

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In addition, the present document specifies the generic procedures for the channel reservation function performed by the network as it is applied by several supplementary services (e.g. call hold).

Furthermore, the functional signalling procedures that support the delivery of notifications at the user-network interface are covered.

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The application of the present document to individual supplementary services is outside the scope of the present document and is defined in those standards which specify the individual supplementary services.

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 supplementary services using the functional protocol, to be attached at either side of a T reference point or coincident S and T reference point when used as an access to the public ISDN.

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2 Normative references

References may be made to:

a) specific versions of publications (identified by date of publication, edition number, version number, etc.), in which case, subsequent revisions to the referenced document do not apply; or

b) all versions up to and including the identified version (identified by "up to and including" before the version identity); or

c) all versions subsequent to and including the identified version (identified by "onwards" following the version identity); or

d) publications without mention of a specific version, in which case 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] ITU-T Recommendation I.112 (1993): "Vocabulary of terms for ISDNs".

[2] ITU-T Recommendation I.210 (1993): "Principles of telecommunication services supported by an ISDN and the means used to describe them".

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

[4] CCITT Recommendation Q.9 (1988): "Vocabulary of switching and signalling terms".

[5] CCITT Recommendation X.208 (1988): "Specification of Abstract Syntax Notation One (ASN.1)".

[6] CCITT Recommendation X.209 (1988): "Specification of basic encoding rules for Abstract Syntax Notation One (ASN.1)".

[7] CCITT Recommendation X.219 (1988): "Remote operations: Model, notation and service definition".

[8] CCITT Recommendation X.229 (1988): "Remote operations: Protocol specification".

[9] ITU-T Recommendation Z.100: "Specification and Description Language (SDL)".

[10] ETS 300 052-1: "Integrated Services Digital Network (ISDN); Multiple Subscriber Number (MSN) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[11] ETS 300 061-1: "Integrated Services Digital Network (ISDN); Subaddressing (SUB) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[12] ETS 300 122-1: "Integrated Services Digital Network (ISDN); Generic keypad protocol for the support of supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[13] EN 300 267-1: "Integrated Services Digital Network (ISDN); Telephony 7 kHz, videotelephony audiographic conference and videoconference teleservices; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[14] 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".

[15] 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".

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3 Definitions

The following definitions apply:

3.1 General definitions

all services: If for the control of supplementary services the parameter basic service is set to "all services", then all the basic services shall be affected that the user is subscribed to, and for which the supplementary service applies and is subscribed to, at the point in time that the request is received.

auxiliary state: A state as defined in subclause 7.1.2. An auxiliary state may exist for a call reference in parallel with the call state.

basic access: See CCITT Recommendation Q.9 [4], definition 1551.

basic service: A bearer service or teleservice. The terms "bearer service" and "teleservice" are defined in ITU-T Recommendation I.112 [1], definitions 202 and 203.

call control message: A message as defined in EN 300 403-1 [15], subclause 3.1, which on sending or receipt causes a change of the call state at either the network or the user. Call control messages also include the INFORMATION message and PROGRESS message.

call reference: (excluding dummy call reference) an identifier of a signalling transaction. The signalling transaction may either be bearer related, in which case the signalling transaction can be used to control that bearer, or bearer independent, in which case there is no bearer associated with that signalling transaction. Where there is only one bearer required for a call, then the call reference of the associated bearer-related signalling transaction may be used to identify the call.

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call state: A state as defined in EN 300 403-1 [15], subclause 2.1,for either the user or the network as appropriate. A call state may exist for each call reference value (and for each additional responding Connection Endpoint Identifier (CEI) in the incoming call states).

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call: See CCITT Recommendation Q.9 [4], definition 2201.

component: Data structure as defined in clause D.1.

connection: See CCITT Recommendation Q.9 [4], definition 0011. In the present document the use of this term is taken to include a bearer and its associated control signalling.

Data Link Connection Endpoint Identifier; Connection Endpoint Identifier (CEI): Identifier used by a layer 3 protocol entity to address its peer entity.

dummy call reference: A null value indicating that the message is not applicable to an identified signalling transaction. Other rules specify the association of DSS1 protocol entities.

functional protocol: A functional protocol consists of a sequence of functional information elements. A functional information element requires a degree of intelligent processing by a terminal in either generation or analysis.

initiator: An entity (user or network) requesting establishment of a signalling connection between an initiator and the responder.

Integrated Services Digital Network (ISDN): See ITU-T Recommendation I.112 [1], definition 308.

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

point-to-point configuration: See EN 300 403-1 [15]

point-to-multipoint configuration: See EN 300 403-1 [15]

primary rate access: See CCITT Recommendation Q.9 [4], definition 1552.

responder: The entity (user or network) responding to a request from an initiator on establishing a signalling connection.

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service; telecommunication service: See ITU-T Recommendation I.112 [1], definition 201.

signalling connection: An association of DSS1 protocol entities using the bearer-independent supplementary service procedure with the connection-oriented transport mechanism.

stimulus protocol: A stimulus protocol consists of a sequence of stimulus information elements. A stimulus information element is generated as a result of a single event at the user-network interface or contains a basic instruction from the network to be executed by the user.

supplementary service: See ITU-T Recommendation I.210 [2], subclause 2.4.

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

3.2 Remote operations definitions

The common information element category makes use of the following terms defined in CCITT Recommendation X.219 [7]:

- remote operation;
- operation;
- operation classes (class 1 to class 5);
- association (initiator; responder);
- invoking (application entity; invoker).

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invoke component: See subclause 8.2.2.1. Where reference is made to a "xxxx" invoke component, an invoke component is meant with its operation value set to the value of the operation "xxxx".

return result component: See subclause 8.2.2.2. Where reference is made to a "xxxx" return result component, a return result component is meant which is related to a "xxxx" invoke component.

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return error component: See subclause 8.2.2.3. Where reference is made to a "xxxx" return error component, a return error component is meant which is related to a "xxxx" invoke component.

reject component: See subclause 8.2.2.4.

3.3 Definition of procedures using the common information element approach

bearer-related transport mechanism: A procedure tied to the procedures for basic call control and tied to a connection in progress, active or in the clearing phase. The call reference used by the basic call control procedure is adopted by the bearer-related service invocations to correlate with the appropriate basic call control transaction.

bearer-independent transport mechanism: A procedure independent of the procedures for basic call control and not correlated to a connection.

connection-oriented transport mechanism: A mechanism requiring the establishment of a data link and a transport association between the service requesting entity and the service provider. It provides a facility to access common information element category operations where success and/or failure reporting is required. It provides a call reference within the transport association as a means to associate uniquely among the related transport messages.

connectionless transport mechanism: A mechanism where no transport association exists but a single transport message transfer is provided using the dummy call reference.

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4 Abbreviations

The following abbreviations apply:

ASN.1	Abstract Syntax Notation One
BER	Basic Encoding Rules
CEI	Connection Endpoint Identifier
DSS1	Digital Subscriber Signalling System No. one
ISDN	Integrated Services Digital Network
LSB	Least Significant Bit
MSB	Most Significant Bit
ROSE	Remote Operations Service Element
SDL	Specification and Description Language

5 Co-existence of generic protocols for the control of supplementary services

5.1 Support of various generic protocols

Networks may support more than one generic protocol for the control of supplementary services, e.g. the keypad protocol and the functional protocol. The support of multiple generic protocols is a network option. Users shall be informed by the service provider at subscription time of the supplementary services available, and of the generic protocols supported on their access.

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5.2 Co-existence of generic protocols

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As a general rule, the functional protocol shall be used unless the network specifies the use of a stimulus protocol for the control of certain supplementary services.

Networks may support one or more of the generic protocols; it is a network option as to whether one or more generic protocols are supported on a given access.

In general, the keypad protocol, as defined in ETS 300 122-1 [12], has only local significance while the functional protocol may have other than local significance.

For a given call instance, the protocol applied at a local interface may be different from the one applied at a remote user's interface. For example, one of the stimulus protocols may be used at the requesting user's interface, while a functional protocol may be applied at the remote user's interface.

5.3 Arrangements by which co-existence of protocols may be supported by a network

Some networks may support only one of the generic protocols per user access for the control of supplementary services. Other networks may choose to support a single generic protocol for the control of supplementary services, depending on the user-network interface type (e.g. keypad on the basic access, functional on the basic access and primary rate access). This has to be arranged at subscription time.

Networks supporting multiple generic protocols per access in the user-to-network direction will implicitly recognize the protocol option chosen by the user on the basis of the received message type or information element type.

Networks supporting multiple generic protocols per access in the network-to-user direction (i.e. at the remote-user interface) may choose to apply a particular protocol depending on the supplementary services involved.

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6 General principles applied for the functional control of supplementary services

6.1 Introduction

This clause specifies the general principles applied for the functional control of supplementary services at the user-network interface. The generic protocol utilizes functions and services provided by EN 300 403-1 [15] basic call control procedures and the functions of the data link layer as defined in ETS 300 402-2 [14].

6.2 Scope of the procedures

The procedures defined in clauses 7 to 10 specify the basic methodology for the control (e.g. invocation, notification, deactivation, etc.) of supplementary services. The procedures are independent of whether or not the user-network interface is at a basic or primary rate access.

6.3 Categories of procedures

Two categories of procedures are defined for the functional control of supplementary services. The first category, called the separate message approach, utilizes separate message types to indicate a desired function. The HOLD and RETRIEVE family of messages are used for this category. This approach is used when synchronization of resources between the user and the network is required.

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The second category, called the common information element approach, utilizes the Facility information element and applies only to supplementary services that do not require synchronization of resources between the user and the network.

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Both categories are specified in a symmetrical manner and can be signalled both in the network-to-user and the user-to-network directions.

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6.4 Supplementary service functions

The control of supplementary services by either the network or the user includes the following functions:

a) the control of supplementary services during the establishment of a call;

b) the control of supplementary services during the clearing of a call;

c) the control of bearer-related supplementary services during the Active call state of a call;

d) the control of supplementary services independent from an active call;

e) the control of multiple, different supplementary services within a single message;

f) the control of supplementary services related to different calls;

g) the provision of notifications.

The correlation of a bearer-related supplementary service and the call which it modifies is provided by use of the call reference (functions a), b), c), e), f) and g) listed above).

The correlation of bearer-independent supplementary service requests and their responses, is provided by the combination of the call reference of the message containing the Facility information element and the invoke identifier present within the Facility information element itself (refer to functions d), e) and g)).