SLOVENSKI STANDARD
SIST-TP ETSI/ETR 242 E1:2005

01-januar-2005

Signalizacijski protokoli in komutacija (SPS) – Standardizacija pri zagotavljanju odprtosti omrežij (ONP) za dostop do krajevne zanke

Signalling Protocols and Switching (SPS); Open Network Provision (ONP) standardization for access to the local loop

Ta slovenski standard je istoveten z: **ETR 242 Edition 1**

ICS:

33.040.30	Komutacijski in signalizacijski sistem	Switching and signalling systems

SIST-TP ETSI/ETR 242 E1:2005 **en**

ETSI
TECHNICAL
REPORT

ETR 242

November 1995

Source: ETSI TC-SPS

Reference: DTR/SPS-03037

ICS: 33.080

Key words: ONP, AN, LE, local loop, V interface, V5 interface

Signalling Protocols and Switching (SPS); Open Network Provision (ONP) standardization for access to the local loop

ETSI

European Telecommunications Standards Institute

ETSI Secretariat

Postal address: F-06921 Sophia Antipolis CEDEX - FRANCE
Office address: 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE
X.400: c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

Tel.: +33 92 94 42 00 - Fax: +33 93 65 47 16

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Foreword

This ETSI Technical Report (ETR) was produced by the Signalling Protocols and Switching Technical Committee of the European Telecommunications Standard Institute (ETSI).

This work was initiated in response to a Commission of the European Communities (CEC) mandate (BC-T-309) on ONP standardization for access to the local loop.

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1 Scope

This ETSI Technical Report (ETR) is the response to BC-T-309 [1] "Standardization Mandate Forwarded to CEN/CENELEC/ETSI in the Field of Information Technology and Telecommunications" entitled "ONP Standardization for Access to the Local Loop" issued by the Commission of the European Communities (CEC). The ETR has been prepared by an ETSI Task Group, set up by ETSI Technical Committee SPS (Signalling Protocols and Switching) which is responsible for the V5 interface specifications.

The first step of the mandated work is the development of this ETR covering:

a) the standardization requirements for interfaces between an Access Network (AN) and a core network taking into account the regulatory situation after 1998, where these interfaces could serve as a boundary of responsibility between an organization providing the local access network and an organization providing a telecommunication service;

b) an analysis of the V5 series interface specifications as a basis for these standards;

c) identification of additional specifications required to extend and to complement the above interface specifications, in particular in relation to the selection on a call-by-call, semi-permanent and permanent basis of core network or service provider;

d) an analysis of the Q3 specifications as a basis for the network management standards to complement the above interface specifications.

Clause 4 outlines the standardization requirements, in response to item a).

Clause 5 outlines the status of standardization work in both ETSI and ITU-T, concerned with V5 interfaces and related matters which are relevant to BC-T-309 [1].

Clause 6 provides an introduction to network architecture and modelling concepts, drawn from ITU-T Recommendations, which are essential to ONP consideration of access to the local loop.

Clause 7 provides an analysis of the V5 and related standards and identifies the extent to which they meet the needs of BC-T-309 [1] and the manner in which they do so. Clauses 7 and 8 address item b).

Clause 8 discusses the particular considerations which apply to leased lines.

Clause 9 discusses the management capabilities which are necessary to support the needs of BC-T-309 [1]. It covers item d).

Clause 10 identifies the additional standardization which is desirable in order to properly meet the needs of BC-T-309 [1]. It therefore covers item c).

Clause 11 summarizes the material in this ETR, so as to provide easy access to the main conclusions of the study.

Annex A discusses a supplementary approach to service provider access, which may be appropriate in some situations for Private Branch eXchange (PBX) users.

2 References

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

[1] CEC BC-T-309 (23-02-1994): "Standardization mandate forwarded to CEN/CENELEC/ETSI in the field of information technology: ONP standardization for access to the local loop".

[2] ETS 300 011: "Integrated Services Digital Network (ISDN); Primary rate user-network interface; Layer 1 specification and test principles" (based on ITU-T Recommendation I.431).

[3] ETS 300 012: "Integrated Services Digital Network (ISDN); Basic user-network interface; Layer 1 specification and test principles" (based on ITU-T Recommendation I.430).

[4] ETS 300 166 (1993): "Transmission and Multiplexing (TM); Physical and electrical characteristics of hierarchical digital interfaces for equipment using the 2 048 kbit/s-based plesiochronous or synchronous digital hierarchies" (based on CCITT Recommendation G.703).

[5] ETS 300 167 (1993): "Transmission and Multiplexing (TM); Functional characteristics of 2 048 kbit/s interfaces" (based on CCITT Recommendations G.704 and G.706).

[6] ETS 300 233: "Integrated Services Digital Network (ISDN); Access digital section for ISDN primary rate" (based on ITU-T Recommendation G.962).

[7] ETS 300 297: "Integrated Services Digital Network (ISDN); Access digital section for ISDN basic rate" (based on ITU-T Recommendation G.960).

[8] ETS 300 324-1: "Signalling Protocols and Switching (SPS), V interfaces at the digital Local Exchange (LE); V5.1 interface for the support of Access Network (AN); Part 1: V5.1 interface specification" (also ITU-T Recommendation G.964).

[9] ETS 300 347-1: "Signalling Protocols and Switching (SPS), V interfaces at the digital Local Exchange (LE); V5.2 interface for the support of Access Network (AN); Part 1: V5.2 interface specification" (also ITU-T Recommendation G.965).

[10] ETS 300 376-1 (1994): "Signalling Protocols and Switching (SPS); Q3 interface at the Access Network (AN) for configuration management of V5 interfaces and associated user ports; Part 1: Q3 interface specification" (also draft ITU-T Recommendation Q.57CM).

[11] ETS 300 377-1 (1994): "Signalling Protocols and Switching (SPS); Q3 interface at the Local Exchange (LE) for configuration management of V5 interfaces and associated customer profiles; Part 1: Q3 interface specification" (also draft ITU-T Recommendation Q.57CM).

[12] ETS 300 378-1 (1994): "Signalling Protocols and Switching (SPS); Q3 interface at the Access Network (AN) for fault and performance management of V5 interfaces and associated user ports; Part 1: Q3 interface specification" (also draft ITU-T Recommendation Q.57FPM).

[13] ETS 300 379-1 (1995): "Signalling Protocols and Switching (SPS); Q3 interface at the Local Exchange (LE) for fault and performance management of V5 interfaces and associated customer profiles; Part 1: Q3 interface specification" (also draft ITU-T Recommendation Q.57FPM).

[14] CCITT Recommendation G.703 (1991): "Physical/electrical interfaces of hierarchical digital interfaces" (see also ETS 300 166 [4]).

[15] CCITT Recommendation G.704 (1991): "Synchronous frame structures used at primary and secondary hierarchical levels" (see also ETS 300 167 [5]).

[16] CCITT Recommendation G.705 (1988): "Characteristics required to terminate digital links on a digital exchange".

[17] ITU-T Recommendation I.112 (1993): "Vocabulary of terms for ISDNs".

[18] CCITT Recommendation I.324 (1991): "ISDN network architecture".

[19] CCITT Recommendation I.340 (1988): "ISDN connection types".

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

[21] ITU-T Recommendation I.414 (1993): "Overview of Recommendations on layer 1 for ISDN and B-ISDN customer accesses".

[22] CCITT Recommendation I.511 (1988): "ISDN-to-ISDN layer 1 internetwork interface".

[23] CCITT Recommendation I.601 (1988): "General maintenance principles of ISDN subscriber access and subscriber installation".

[24] CCITT Recommendation M.3602 (1992): "Application of maintenance principles to ISDN subscriber installations".

[25] CCITT Recommendation M.3603 (1992): "Application of maintenance principles to ISDN basic rate access".

[26] CCITT Recommendation M.3604 (1992): "Application of maintenance principles to ISDN primary rate access".

[27] CCITT Recommendation Q.511 (1988): "Exchange interfaces towards other exchanges".

[28] ITU-T Recommendation Q.512 (1995): "Digital exchange interfaces for subscriber access".

[29] ITU-T Recommendation Q.521 (1993): "Digital exchange functions".

3 Definitions and abbreviations

3.1 Definitions

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

Access Network (AN): A system implemented between the Local Exchange (LE) and users, replacing part or the whole of the local line distribution network. The functions associated with the V5 interface(s) of an AN can be configured and operated flexibly via a management Q interface. An AN may consist of multiplexing, cross connect and transmission functions. The V5 interface standard is independent of the transmission media used inside the AN. An AN may support services which are outside the scope of the V5 standards.

Local Exchange (LE): An exchange on which user lines are terminated via an AN. The functions associated with the V5 interface(s) on a LE can be configured and operated flexibly via a management Q interface. An LE may also directly terminate user lines but these are outside the scope of the V5 standards.

V5 interface: A general term for the group of V interfaces for connection of ANs to the LE, i.e. V5.1 and V5.2 interface.

Q3 interface: A TMN interface between a Network Element (NE), such as an AN or LE, and the Operations System (OS) responsible for the management of that NE.

service provider: An organization which provides a telecommunications service. In this ETR, it refers particularly to the organization which provides a switched telephony and/or ISDN service (and therefore operates the local exchange) or a leased line service.

AN provider: An organization which operates an access network and therefore provides user access to one or more service providers.

transit network provider: An organization which provides a switched service, particularly long distance service, between other switched-service providers.

provisioned: A parameter is said to be provisioned if the Q interface has the capability to verify and change it. Such a parameter may have a default value and/or may be altered by a local interface.

user selection of switched-service provider (permanent): The case where selection of switched-service provider is by pre-arrangement between the user and the AN and service providers and is set up by management action.

user selection of switched-service provider (semi-permanent): The case where selection of switched-service provider is set up:

a) at times pre-arranged between the user and the AN and service providers, with switch-over by automatic management action, e.g. different service providers during the working day and at night, or

b) under user control via a user-network management interface.

user selection of switched-service provider (call-by-call): The case where selection of switched-service provider is part of the call set-up procedure.

transit network selection: The case where selection of transit network provider is part of the call set-up procedure.

user selection of leased-line service provider (permanent): The case where selection of leased-line service provider is by pre-arrangement between the user and the AN and service providers and is set up by management action.

semi-permanent leased line: A permanently established connection between two User-Network Interfaces (UNIs) routed through the switched digital network.

permanent leased line: A permanently established connection provided between two leased-line UNIs routed through the transmission network bypassing network nodes of the switched digital network. The UNIs may be analogue or digital. Permanent leased line services, provided by an access network, bypass the local exchange and have no effect on the V5 interface.

Permanent Line (PL): A permanently established connection provided between two ISDN UNIs routed through the transmission network bypassing network nodes of the switched digital network. The PL reduces the access capability at the UNI for switched services.

user access: The means by which a user is connected to a telecommunication network in order to use the service and/or facilities of that network.

access connection element (subscriber access): The equipment providing the concatenation of functional groups between and including the Exchange Termination (ET) and the Network Termination type 1 (NT1).

bearer channel: A 64 kbit/s time slot in the V5.1 or V5.2 interface allocated for a B-channel of an ISDN user port or a PCM encoded 64 kbit/s channel from a PSTN user port.

control: Control is concerned with status and control of user ports; V5.1 or V5.2 interface layer 1 and layer 2 establishment and other common procedures.