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Vmesniki V pri digitalnih krajevnih centralah (LE) – Vmesnik V5.1 za podporo dostopovnemu omrežju (AN) – 6. del: Abstraktni preskušalni niz (ATS) in delna dodatna informacija za preskušanje izvedbe protokola (PIXIT) – Proforma specifikacija za omrežno plast na strani krajevne centrale (LE)

V interfaces at the digital Local Exchange (LE); V5.1 interface for the support of Access Network (AN); Part 6: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the network layer (LE side)

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ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Services and Protocols for Advanced Networks (SPAN).

The present document is part 6 of a multi-part deliverable covering the V5.1 interface for the support of Access Network (AN) as described below:

Part 1: "V5.1 interface specification";

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

Part 3: "Test Suite Structure and Test Purposes (TSS&TP) specification for the network layer (AN side)";

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

Part 5: "Test Suite Structure and Test Purposes (TSS&TP) specification for the network layer (LE side)";

Part 6: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the network layer (LE side)";

Part 7: "Test Suite Structure and Test Purposes (TSS&TP) specification for the data link layer";

Part 8: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the data link layer";

Part 9: "Test specification for the physical layer".

National transposition dates	
Date of adoption of this EN:	16 March 2001
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Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 December 2001
Date of withdrawal of any conflicting National Standard (dow):	31 December 2001

1 Scope

This sixth part of EN 300 324 contains the Abstract Test Suite (ATS) as well as the Abstract Test Method (ATM) and the partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma for the Network layer (NWK) of a V5.1 interface and parts of the system management of the Local Exchange (LE) side of a V5.1 interface.

The objective of the present document is to provide an ATS containing conformance tests which give a high probability of inter-operability of an Access Network (AN) and a LE from different manufacturers over the V5.1 interface.

ISO/IEC 9646-1 [5] and ISO/IEC 9646-2 [6] are used as the basis for the test methodology. The ATS is defined using the Tree and Tabular Combined Notation (TTCN) according to ISO/IEC 9646-3 [7].

The ATS in annex A describes a set of Test Cases (TCs) which are based on the Test Purposes (TPs) specified in EN 300 324-5 [3]. The TCs provide the implementation of the TPs and can be converted into an executable test suite by using available TTCN translators and the corresponding tools.

Annex B provides the partial PIXIT proforma.

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] ETSI EN 300 324-1 (V2.1.1): "V interfaces at the digital Local Exchange (LE); V5.1 interface for the support of Access Network (AN); Part 1: V5.1 interface specification".

[2] ETSI EN 300 324-2: "V interfaces at the digital Local Exchange (LE); V5.1 interface for the support of Access Network (AN); Part 2: Protocol Implementation Conformance Statement (PICS) proforma specification".

[3] ETSI EN 300 324-5: "V interfaces at the digital Local Exchange (LE); V5.1 interface for the support of Access Network (AN); Part 5: Test Suite Structure and Test Purposes (TSS&TP) specification for the network layer (LE side)".

[4] ISO 7498: "Information Processing Systems - Open Systems Interconnection - Basic Reference Model".

[5] ISO/IEC 9646-1: "Information Technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".

[6] ISO/IEC 9646-2: "Information Technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract test suite specification".

[7] ISO/IEC 9646-3: "Information Technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 3: The Tree and Tabular Combined Notation (TTCN)".

[8] ISO/IEC 9646-5: "Information Technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 5: Requirements on test laboratories and clients for the conformance assessment process".

[9] ETSI ETS 300 406 (1995): "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

[10] ETSI ETR 141 (1994): "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; The Tree and Tabular Combined Notation (TTCN) style guide".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply, together with those given in EN 300 324-1 [1]:

abstract test case: refer to ISO/IEC 9646-1 [5]

NOTE: In the present document, the commonly used term TC is applied in the same way as ATC.

abstract test suite: refer to ISO/IEC 9646-1 [5]

current provisioning variant: ID for the presently active data set

data link layer: refer to ISO 7498 [4]

embedded variant: refer to ISO/IEC 9646-2 [6]

implementation under test: refer to ISO/IEC 9646-1 [5]

incorrect information element: specified information element carrying information element types not defined in EN 300 324-1 [1]

invalid PSTN information element: PSTN information element not according to national specific requirements

invalid protocol data unit: protocol Data Unit (PDU) which contains an incorrect message format

invalid PSTN message: PSTN message carrying information elements not according to national specific requirements

lower tester: refer to ISO/IEC 9646-1 [5]

network layer: refer to ISO 7498 [4]

new provisioning variant: ID for the data set which was announced to the IUT to become the next active data set through re-provisioning

physical layer: refer to ISO 7498 [4]

PICS proforma: refer to ISO/IEC 9646-1 [5]

PIXIT proforma: refer to ISO/IEC 9646-1 [5]

Point Of Control And Observation (PCO): refer to ISO/IEC 9646-1 [5]

Protocol Implementation Conformance Statement (PICS): refer to ISO/IEC 9646-1 [5]

Protocol Implementation eXtra Information For Testing (PIXIT): refer to ISO/IEC 9646-1 [5]

remote test method: refer to ISO/IEC 9646-2 [6]

specified information element: information element ID defined in EN 300 324-1 [1]

system under test: refer to ISO/IEC 9646-1 [5]

test purpose: refer to ISO/IEC 9646-1 [5]

unknown provisioning variant: ID for a non-available data set

unspecified information element: information element ID not defined in EN 300 324-1 [1]

valid information element: PSTN information element according to national specific requirements

valid PSTN message: PSTN message carrying information elements according to national specific requirements

3.2 Abbreviations

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

AN	Access Network
ASP	Abstract Service Primitive
ATC	Abstract Test Case
ATM	Abstract Test Method
ATS	Abstract Test Suite
BI	Invalid Behaviour
BO	Inopportune Behaviour
BV	Valid Behaviour
CA	CApability test
CTRL	Control
DLL	Data Link Layer
DSAP	Data link Service Access Point
FE	Function Element
ID	Identifier
IE	Information Element
ISDN	Integrated Services Digital Network
ISDN-BA	ISDN-Basic Access
IT	basic Interconnection Test
IUT	Implementation Under Test
L3addr	Layer 3 address
LE	Local Exchange
LT1	Lower Tester 1
MPH	Management Physical layer
NWK	Network Layer
PCO	Point of Control and Observation
PDU	Protocol Data Unit
PHL	Physical Layer
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
PSTN	Public Switched Telephone Network
SAP	Service Access Point
SUT	System Under Test
TC	Test Case (abstract TC)
TI	Timer Expiry and Counter Mismatch
TP	Test Purpose
TSS	Test Suite Structure
TTCN	Tree and Tabular Combined Notation
UL	Upper Layer
UT	Upper Tester
V5DLaddr	V5 Data Link address

4 Abstract test method

This clause describes the Abstract Test Method (ATM) and the Point of Control and Observation (PCO) used to test the NWK of the V5.1 protocol for the LE components.

4.1 ATM

Principally, the remote test method is used for V5.1 LE NWK conformance testing. Certain V5.1 LE NWK TPs need also part of the service and national functions. Therefore, the embedded variant of the remote test method is applied.

The national dependent information is defined in the PIXIT.

4.2 NWK protocol testing

The V5.1 implementations do not offer a direct access to the upper service boundary. The remote test method was chosen because any co-ordination procedures can only be expressed in an informal way.

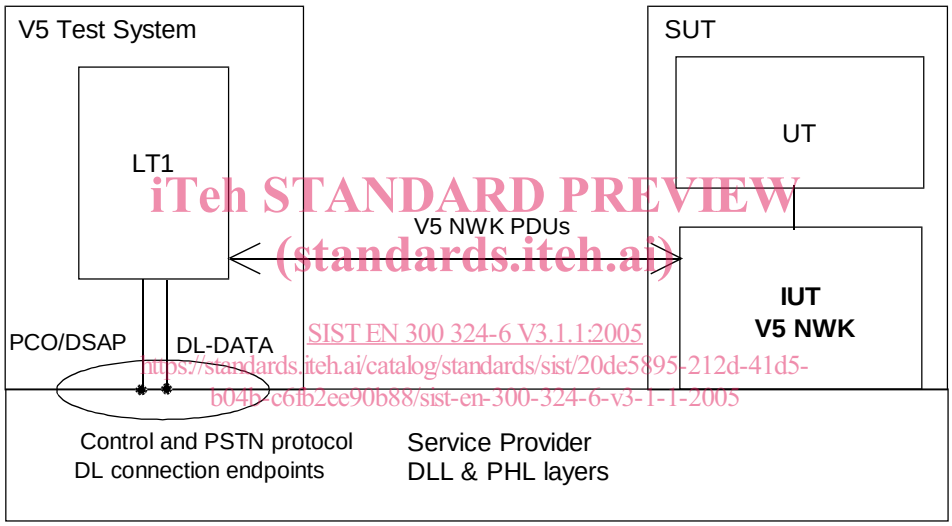

Figure 1: Remote test method applied to the V5.1 NWK testing

LT1: A Lower Tester (LT1) is located in a remote V5.1 test system. It controls and observes the behaviours of the IUT.

DSAP: A unique Data link Service Access Point (DSAP) is defined at the V5.1 interface and commonly used for exchanging service data of the different network layer protocol functional entities: PSTN, Control protocols.

PCO: The PCO for NWK testing is located on the DSAP. All test events at the PCO are specified in terms of data link Abstract Service Primitives (ASPs) and network layer PDUs.

UT: No explicit Upper Tester (UT) exists in the test system. However, the SUT needs to carry out some UL functions to achieve some effects of test co-ordination procedures. Designing ATS, the capability of the system management functions, such as controls of the IUT, its interactions with the Q interface may be taken into account. The controls of the IUT will be implied or informally expressed in the ATS, but no assumption shall be made regarding their feasibility or realization. Examples of such controls could be to provoke restarting IUT or blocking/unblocking procedures through Q interface.

4.3 Data link addresses

Within the DSAP, different V5DLaddr are used to identify each corresponding data link connection. Each network layer protocol functional entity can have only one data link connection, e.g. all PSTN signalling information share one data link connection.

Table 1 shows the allocated V5DLaddr used by the protocol function entities.

Table 1: V5DLaddr

Protocol	PSTN	Control
V5DLaddr	8 176	8 177

4.4 Execution of TCs

4.4.1 Handling of error indication

During the execution of the NWK ATS many error indications will be sent to the system management due to the invalid and the inopportune TCs. It is up to the IUT supplier to take the necessary precautions to avoid any impact on the test result.

4.4.2 TC execution sequence

The following test sequence shall be applied:

The TC containing the start-up procedure (TC11_SM_01) shall always be the first TC executed. Also in any case where the IUT has to be restarted this TC shall be first executed.

Protocol groups: CTRL ⇒ PSTN.
Test groups: IT ⇒ CA ⇒ TI ⇒ BV ⇒ BO ⇒ BI.

Interactions between the different test groups are not considered. It is up to the IUT supplier to take the necessary precautions to avoid any impact on the test result.

NOTE: This applies in particular to PORT CONTROL messages from ISDN ports while testing PSTN-related protocols and vice versa.