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V interfaces at the digital Local Exchange (LE); V5.2 interface for the support of Access Network (AN); Part 7: Test Suite Structure and Test Purposes (TSS&TP) specification for the data link layer

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Foreword

This final draft European Telecommunication Standard (ETS) has been produced by the Signalling Protocols and Switching (SPS) Technical Committee of the European Telecommunications Standards Institute (ETSI), and is now submitted for the Voting phase of the ETSI standards approval procedure.

This ETS is part 7 of a multi-part standard covering the V5.2 interface as described below:

Part 1: "V5.2 interface specification";

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

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".

Proposed transposition dates	
Date of latest announcement of this ETS (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

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1 Scope

This seventh part of ETS 300 347 contains the Test Suite Structure and Test Purposes (TSS&TP) for the Data Link Layer (DLL) of the V5.2 Interface.

The objective of this ETS is to provide conformance tests giving a high probability of inter-operability of the DLL of an Access Network (AN) and a Local Exchange (LE) infrastructure. This ETS covers only the procedures described in ETS 300 347-1 [3] which are based upon ETS 300 402-2 [1].

ISO/IEC 9646-1 [5] and ISO/IEC 9646-2 [6] are used as the basis for the test methodology.

For test definitions of protocol functions which are tested in V5.2 the same way as in V5.1, only reference is made to ETS 300 324-7 [2].

ETS 300 347-1 [3] defines the sublayers of the DLL, i.e. Link Access Protocol for V5 interface (LAPV5) Data Link sublayer (LAPV5-DL), LAPV5 Envelope Function sublayer (LAPV5-EF) and the mapping function (see ETS 300 347-1 [3], figure 6, which illustrates this approach). Regarding the conformance testing, these sublayer functions are not tested separately. The test purposes defined in clause 5 cover testing of the LAPV5-DL (control protocol only), LAPV5-EF and the mapping function. The AN frame relay function is tested in co-operation with a generic test of an Integrated Services Digital Network (ISDN) D-channel.

The limitation of the DLL test to the Control DL is based on the assumption that the Public Switched Telephone Network (PSTN) DL, the Protection DL, the Link control DL and the Bearer Channel Connection (BCC) DL implementations are identical with the Control DL implementation. This needs to be declared by the Implementation Under Test (IUT) supplier. Otherwise, the test purposes defined for the Control DL may be used for the other DLs as well.

2 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.

[1] ETS 300 402-2 (1995): "Integrated Services Digital Network (ISDN); User-network interface data link layer specification; Application of CCITT Recommendations Q.920/I.440 and Q.921/I.441".

[2] ETS 300 324-7 (1999): "V interfaces at the digital Local Exchange (LE); V5.1 interface for the support of Access Network (AN); Part 7: Test Suite Structure and Test Purposes (TSS&TP) specification for the data link layer".

[3] ETS 300 347-1 (1994) including amendment A1: "V interfaces at the digital Local Exchange (LE); V5.2 interface for the support of Access Network (AN); Part 1: V5.2 interface specification".

[4] ETS 300 347-2 (1994): "V interfaces at the digital Local Exchange (LE); V5.2 interface for the support of Access Network (AN); Part 2: Protocol Implementation Conformance Statement (PICS) proforma".

[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".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this ETS, the definitions given in ETS 300 324-7 [2] and ETS 300 347-1 [3] apply.

3.2 Abbreviations

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

AN	Access Network
ASP	Abstract Service Primitive
ATS	Abstract Test Suite
BCC	Bearer Channel Connection
DLL	Data Link Layer
ISDN	Integrated Services Digital Network
ISDN-BA	ISDN Basic Access
ISDN-PRA	ISDN Primary Rate Access
IUT	Implementation Under Test
LAPV5	Link Access Protocol for V5 interface
LAPV5-DL	LAPV5 Data Link sublayer
LAPV5-EF	LAPV5 Envelope Function sublayer
LE	Local Exchange
LT1	Lower Tester 1
PABX	Private Automatic Branch eXchange
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
PSTN	Public Switched Telephone Network
SAPI	Service Access Point Identifier
TEI	Terminal Endpoint Identifier
TP	Test Purpose
TSS	Test Suite Structure

4 Test Suite Structure (TSS)

4.1 Overview

The contents of this subclause are identical to ETS 300 324-7 [2], subclause 4.1.

4.2 Test groups

The contents of this subclause are identical to ETS 300 324-7 [2], subclause 4.2.

4.3 Test step structure

General dynamic behaviours are described in test steps which can be called from all test cases within the Abstract Test Suite (ATS):

state transitions	(refer to subclause 4.3.1);
preambles	(refer to subclause 4.3.2);
postambles	(refer to subclause 4.3.3);
status verification	(refer to subclause 4.3.4);
common test steps	(refer to subclause 4.3.5).

4.3.1 State transitions

Two groups of state transitions are defined:

V5 interface start-up: This group contains the test steps to initialize the V5 interface.

LAPV5-DL state transitions: This group contains test steps which describe state transitions of the LAPV5-DL implementation used in different preambles.

4.3.1.1 V5 interface start-up

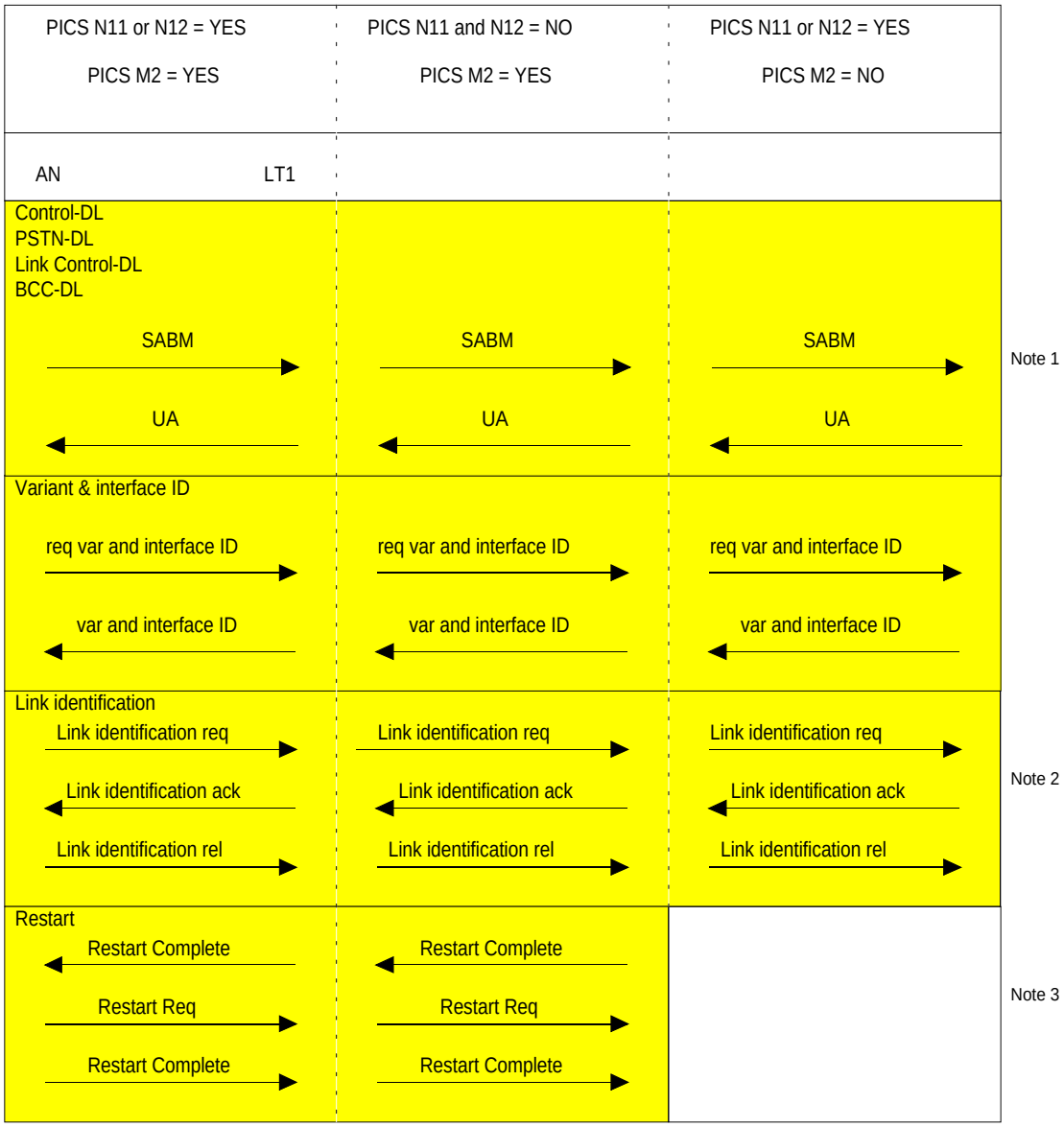
The start-up procedure of a V5.2 IUT (AN or LE) depends on the configuration which is provisioned (see subclause 5.1.6). The PICS items N11, N12, M2 and N9 (see ETS 300 347-2 [4], subclauses 6.5.1 and 6.6.1), further called TSPC_PSTN, TSPC_ISDNBA and TSPC_ISDNPRA, are used to define the implemented configuration of the IUT.

NOTE: ETS 300 347-2 [4] requires that at least one of the three PICS items N11, N12 and M2 be set.

PICS item description:

TSPC_PSTN (M2):	PSTN ports supported;
TSPC_ISDNBA (N11):	ISDN-BA user ports supported;
TSPC_ISDNPRA (N12):	ISDN-PRA user ports supported;
TSPC_V52_MULTIPLE_LINK (N9):	V5.2 single link (one 2 048 kbit/s digital link).

Depending on the setting of the PICS items, the start-up procedure is described in figure 1. It shows what happens on the V5.2 interface between the AN and Lower Tester 1 (LT1) during the start-up sequence.



NOTE 1: The start-up procedure is shown only for one Data Link. This DL start-up is mandatory for the Control-DL, the PSTN-DL, the Link Control-DL and the BCC-DL. The four Data Links can be started in any sequence. The PSTN-DL is only started up if a PSTN entity is provisioned.

NOTE 2: The Link identification procedure shall always be started from the IUT. If the IUT skips the Link identification procedure and starts immediately with the restart procedure it is assumed that the correct Link Ids are available within the IUT and the tester. For details on the Link identification procedure, refer to ETS 300 347-1 [3], subclause 16.2.4.3.5.

NOTE 3: LT1 shall wait for the receipt of restart complete from the IUT before sending restart complete.

Figure 1: Start-up flow diagram

4.3.1.2 LAPV5-DL state transitions

The contents of this subclause are identical to ETS 300 324-7 [2], subclause 4.3.1.2.

4.3.2 Preambles

The contents of this subclause are identical to ETS 300 324-7 [2], subclause 4.3.2.

4.3.3 Postambles

The contents of this subclause are identical to ETS 300 324-7 [2], subclause 4.3.3.

4.3.4 Status verifications

The contents of this subclause are identical to ETS 300 324-7 [2], subclause 4.3.4.

4.3.5 Common test steps

The contents of this subclause are identical to ETS 300 324-7 [2], subclause 4.3.5.

4.4 Defaults

The contents of this subclause are identical to ETS 300 324-7 [2], subclause 4.4.

4.5 Abstract Service Primitives (ASPs) and Protocol Data Units (PDUs)

The contents of this subclause are identical to ETS 300 324-7 [2], subclause 4.5.

4.6 Timers and counters of Abstract Test Suite (ATS)

The contents of this subclause are identical to ETS 300 324-7 [2], subclause 4.6.

5 Test Purposes (TP)

5.1 Introduction

Clause 5 contains the TPs for V5.2 DLL testing. This subclause describes the test strategy of the TPs, the test environment for which the TPs apply and the V5.2 procedures for which no TPs are defined.

5.1.1 TP naming convention

The contents of this subclause are identical to ETS 300 324-7 [2], subclause 5.1.1.

5.1.2 Source of test purpose definition

The contents of this subclause are identical to ETS 300 324-7 [2], subclause 5.1.2.

5.1.3 Test strategy

The contents of this subclause are identical to ETS 300 324-7 [2], subclause 5.1.3.

5.1.4 Procedures for which no TPs are defined

The contents of this subclause are identical to ETS 300 324-7 [2], subclause 5.1.1, except for item a) which is replaced as follows:

a) only the Control DL is tested. The limitation of the DLL tests to the Control DL is based on the assumption that the PSTN DL, the Protection Protocol DL, the Link Control DL and the BCC DL implementations are identical with the Control DL implementation. This shall be declared by the IUT supplier in a PIXIT. Otherwise, the TPs defined for the Control DL can be used for the other DLs as well;

Item f) is an addition to the contents of ETS 300 324-7 [2], subclause 4.3.1.2:

f) it is assumed that the LAPV5-EF requirements are the same for an ISDN-BA user port as for an ISDN-PRA user port, thus only one of the two configuration will be tested.

5.1.5 Initial state

If the DLL is released between each test, the IUT may have to be re-initialized. If the IUT detects a data link failure (see ETS 300 347-1 [3], annex C, item 17) the start-up procedure (see subclause 4.3.1.1) brings the IUT into the initial state. The initial state for V5 DLL testing is state 7.0 "multiple frame established". At the start and end of a test, the IUT shall always be brought into state 7.0.

5.1.6 Data configuration for AN and LE testing

To test the DLL entity of the AN as well as of the LE a particular IUT data configuration shall be applied to avoid complicated test case layout. Depending on the services supported by the IUT, three IUT data configurations are considered:

- ISDN-BA user ports or ISDN-PRA user ports supported (see ETS 300 347-2 [4], PICS items N11 and N12);

- PSTN ports supported (see ETS 300 347-2 [4], PICS item M2);

- ISDN-BA/-PRA user ports and PSTN ports supported.

Port provisioning:

a) if ISDN-BA applications are provisioned, one ISDN-BA user port shall be provisioned in such a way that the ISDN-BA user port entity will not enter the operational state after system start-up. The ISDN-BA port shall be provisioned for a non-automatic ISDN-BA terminal for point-to-point connection over a single data link (fixed TEI);

b) only if no ISDN-BA application is provisonable, a ISDN-PRA application shall be provisioned. The ISDN-PRA user port shall be provisioned in such a way that the ISDN-PRA user port entity will not enter the operational state after system start-up;

c) if PSTN applications are provisioned, only the PSTN application but no PSTN port shall be provisioned.

V5.2 link provisioning:

- only one 2 048 kbit/s link shall be provisioned (see ETS 300 347-2 [4], PICS item N9 = NO).

Additional requirements:

a) if a ISDN-BA user port is provisioned, for AN testing an non-automatic ISDN-BA terminal (SAPI = 0, TEI = 0) shall be connected to the ISDN-BA user port;

b) if a ISDN-PRA user port is provisioned, an ISDN Private Automatic Branch eXchange (PABX) shall be connected to the ISDN-PRA user port.

In case of other configurations being provisioned, the start-up procedures has to be adapted. It is possible that events occur which are not considered in this ETS.

5.2 LAPV5-EF

The contents of this subclause are identical to ETS 300 324-7 [2], subclause 5.2.

5.3 LAPV5-DL

The contents of this subclause are identical to ETS 300 324-7 [2], subclause 5.3.

Annex A (informative): Bibliography

- ETS 300 406: "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

History

Document history			
February 1996	First Edition		
February 1996	Public Enquiry	PE 9815:	1997-12-12 to 1998-04-10
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