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# ETSI EN 300 324-3 V3.1.1 (2001-03)

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*European Standard (Telecommunications series)*

**V interfaces at the digital Local Exchange (LE);  
V5.1 interface for the support of Access Network (AN);  
Part 3: Test Suite Structure and Test Purposes (TSS&TP)  
specification for the network layer (AN side)**

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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 3 of a multi-part deliverable, covering the V5.1 interface at the digital Local Exchange (LE); 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
Date of latest announcement of this EN (doa):	30 June 2001
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



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# 1 Scope

The present document contains the Test Suite Structure (TSS) and Test Purposes (TPs) for the Network layer (NWK) and parts of the system management of the Access Network (AN) side of a V5.1 interface.

The objective of the present document is to provide conformance tests giving a high probability of inter-operability of an AN and a Local Exchange (LE) from different manufacturers over the V5.1 interface. The present document covers only the procedures described in EN 300 324-1 [1].

ISO/IEC 9646-1 [5] is used as the basis for the methodology of conformance testing.

Concerning the Public Switched Telephone Network (PSTN) protocol testing, only the procedures defined in EN 300 324-1 [1] are covered by the tests defined in the present document. An Implementation Under Test (IUT), however, will have implemented a national PSTN protocol part as well. This requires that the tester generates messages containing the national PSTN protocol specific optional Information Elements (IEs), otherwise the IUT would not act on messages according to the PSTN protocol procedure definition. However, this does not provide a comprehensive test of the national PSTN protocol mapping specification, which is outside the scope of the present document.

As the tests use PSTN messages containing optional IEs according to national specifications, the test result is only valid for the implemented national mapping of the V5.1 PSTN protocol.

The present document does not cover tests related to functions of the bearer channel. Those functions should be tested in conjunction with testing of the national PSTN protocol mapping specification.

The present document contains no requirements concerning NWK tests for Integrated Services Digital Network Basic Access (ISDN-BA).

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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] 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 interface 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 ETS 300 297 (1995): "Integrated Services Digital Network (ISDN); Access digital section for ISDN basic access".
- [4] ISO 7498-2: "Information processing systems - Open Systems Interconnection - Basic Reference Model - Part 2: Security Architecture".
- [5] ISO/IEC 9646-1: "Information Technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".

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## 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 (ATC):** refer to ISO/IEC 9646-1 [5]

**Abstract Test Suite (ATS):** refer to ISO/IEC 9646-1 [5]

**current provisioning variant:** identifier for the presently active data set

**data link layer:** refer to ISO 7498-2 [4]

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

**incorrect information element:** specified information element carrying information element types not defined in EN300 324-1 [1]

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

**invalid Protocol Data Unit:** pDU which contains 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 7498-2 [4]

**network termination:** equipment providing the network side at the ISDN user-network interface for the basic access

NOTE: This term is used in the present document to indicate network-terminating aspects of NT1 and NT2.

**new provisioning variant:** identifier for the data set which was announced to the IUT to become the next active data set through reprovisioning

**physical layer:** refer to ISO 7498-2 [4]

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

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

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

**System Under Test (SUT):** refer to ISO/IEC 9646-1 [5]

**Test Purpose (TP):** refer to ISO/IEC 9646-1 [5]

**unknown provisioning variant:** identifier for a non-available data set

**unspecified Information Element:** information element identifier 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
ATS	Abstract Test Suite
BI	Invalid Behaviour
BO	Inopportune Behaviour
BV	Valid Behaviour
CA	Capability
COM	Common control protocol
CTRL	Control
DSAP	Data link Service Access Point
FE	Function Element
FSM	Finite State Machine
ID	Identifier
IE	Information Element
ISDN	Integrated Services Digital Network
ISDN-BA	ISDN Basic Access
IT	Basic Interconnection
IUT	Implementation Under Test
L3addr	Layer 3 address
LE	Local Exchange
LT	Lower Tester
MDU	Management Data Unit
MPH	Management Physical Layer
NT	Network Termination
NWK	Network layer
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statements
PL	Permanent Line
PSTN	Public Switched Telephone Network
REST	Restart
REVV	Verify and Reprovisioning
SUT	System Under Test
TE	Terminal Equipment (ISDN or PSTN)
TI	Timer
TP	Test Purpose
TSS	Test Suite Structure
UNI	User Network Interface

## 4 Test Suite Structure (TSS)

### 4.1 TSS overview

Figure 1 shows the structure of the V5.1 AN side NWK test suite.

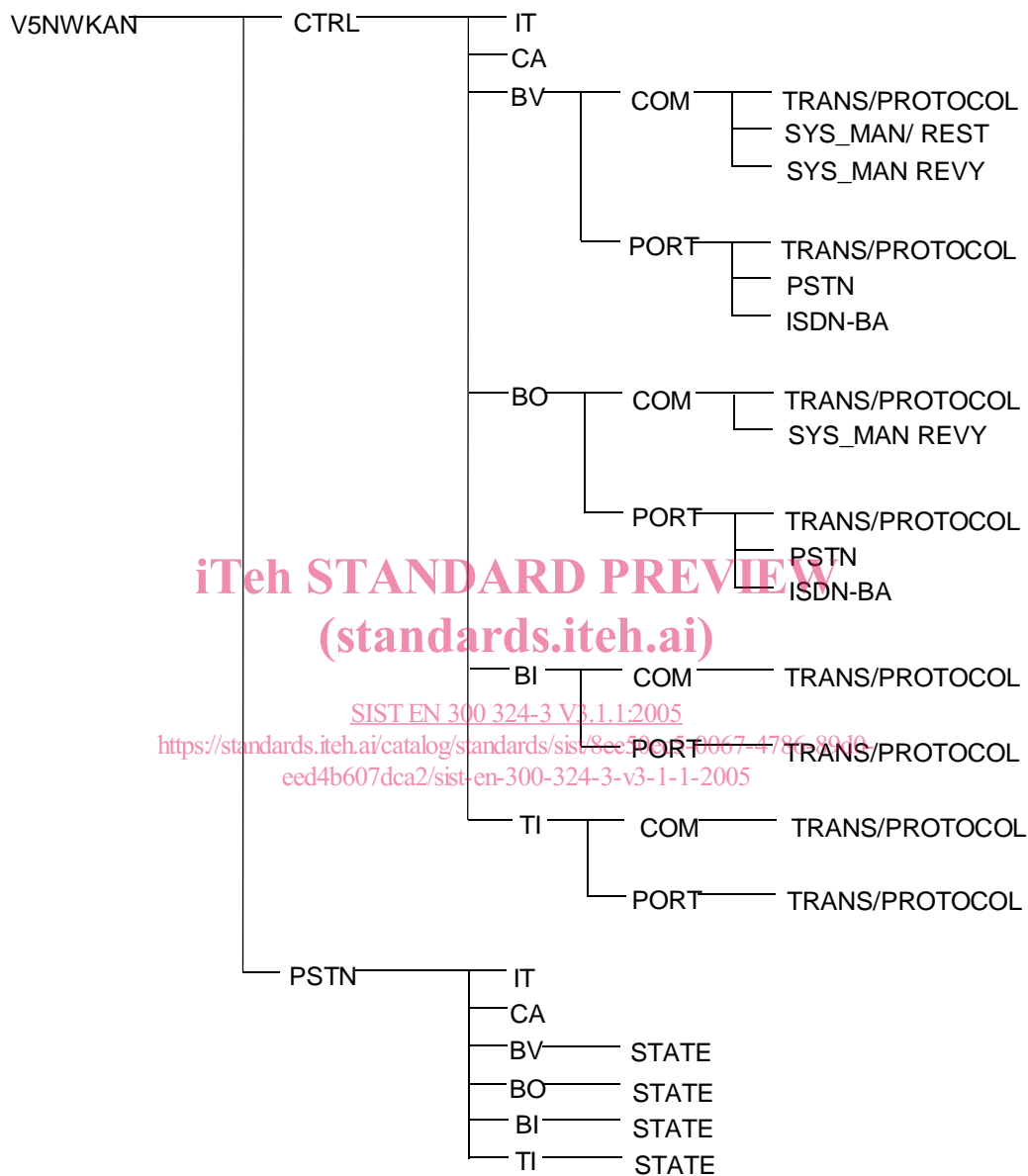


Figure 1: NWK AN TSS

## 4.2 Test groups

Figure 2 gives an overview of the various protocol entities of a V5.1 interface. Table 1 maps each protocol entity on tested protocol groups.

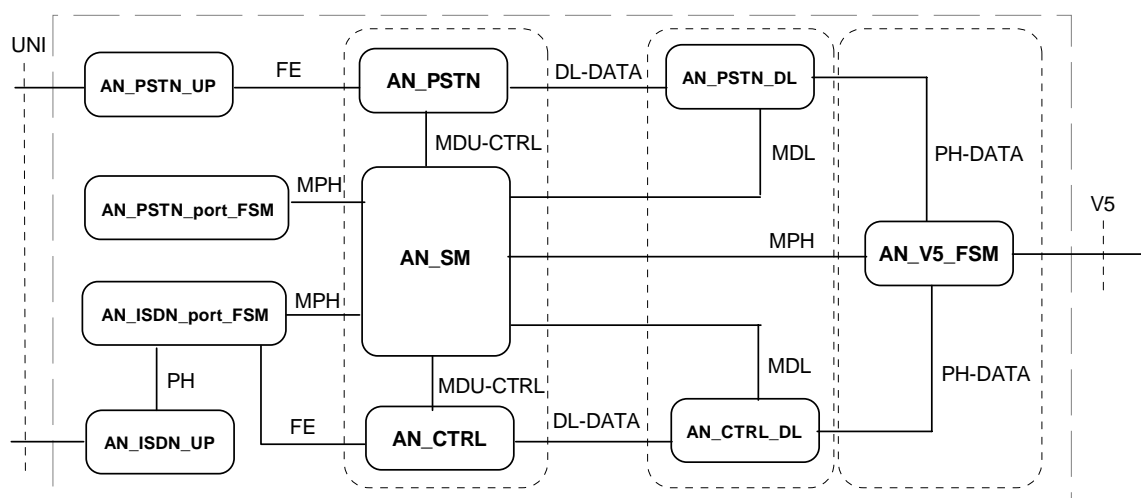


Figure 2: Network Layer AN - protocol entity overview

Table 1: Names used in figure 2 that correspond to EN 300 324-1 [1]

NWK protocol entities	Protocol entities defined in EN 300 324-1 [1]	Protocol group reference
AN_PSTN_UP	AN_PSTN_user_port	4.2.1.1
AN_PSTN_port_FSM	AN_PSTN_user_port_FSM	4.2.1.1
AN_ISDN_port_FSM	AN_ISDN_BA_user_port_FSM	4.2.1.1
AN_ISDN_UP	AN_ISDN_BA_user_port	4.2.1.1
AN_CTRL	AN_ISDN_PRA_user_port	4.2.1.1
AN_SYS	AN_control_protocol	4.2.1.1
AN_PSTN	AN_system_management	4.2.1.1
	AN_PSTN_protocol	4.2.1.2

### 4.2.1 Protocol groups

#### 4.2.1.1 Control protocol

All tests in the Control protocol (V5NWKAN/CTRL) test group are intended to verify as thoroughly as possible the various procedures of the AN\_control\_protocol entity. Depending on provisioning the following configurations are covered:

**AN\_system\_management:** the start-up, restart, re-provisioning and verification procedures of normal operation of the AN\_system\_management (V5NWKAN/CTRL/BV/COM/REST, V5NWKAN/ CTRL/BV/COM/REVV) and V5NWKAN/CTRL/BO/COM/REVV) are tested.

**AN\_control\_protocol:** the normal and exceptional procedures of the AN\_control\_protocol are verified in the test groups V5NWKAN/CTRL/BV/COM/TRANS, V5NWKAN/CTRL/BO/COM/TRANS, V5NWKAN/CTRL/TI/COM/TRANS, V5NWKAN/CTRL/BV/PORT/TRANS, V5NWKAN/CTRL/BO/ PORT/TRANS and V5NWKAN/CTRL/TI/PORT/TRANS. Contents of the AN\_control\_protocol values are not verified (e.g. the control function ID). The error handling procedures are verified in test groups V5NWKAN/CTRL/BI/COM/TRANS and V5NWKAN/CTRL/BI/PORT/TRANS.

**AN\_PSTN\_user\_port:** the blocking, blocking request and co-ordinated unblocking procedures of the AN\_PSTN\_user\_port\_FSM are verified in the test group V5NWKAN/CTRL/BV/PORT/PSTN. The interworking of the AN\_PSTN\_user\_port\_FSM and the AN\_PSTN\_protocol entity is tested via the AN\_system\_management.

**AN\_ISDN-BA\_user\_port:** the blocking, blocking request, co-ordinated unblocking and activation/deactivation procedures of the AN\_ISDN-BA\_user\_port\_FSM are verified in the test group V5NWKAN/CTRL/BV/PORT/ISDNBA and V5NWKAN/CTRL/BO/PORT/ISDNBA.

#### 4.2.1.2 PSTN protocol

All tests in the PSTN protocol (V5NWKAN/PSTN) test group are intended to verify as thoroughly as possible the various procedures of the AN\_PSTN\_protocol entity.

The following PSTN procedures are covered:

- all path related normal operation procedures;
- significant path related exceptional procedures;
- the status enquiry procedure;
- the error handling procedures;
- the layer 3 error detection procedure;
- the port blocking procedure;
- the restart procedure.

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#### 4.2.2 Main test groups (standards.iteh.ai)

##### 4.2.2.1 Basic Interconnection (IT) tests

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The IT test subgroup contains a basic set of TPs which assures that there is a sufficient conformance for interconnection and that the chosen parameters are valid for the configuration.

##### 4.2.2.2 Capability (CA) tests

Capability testing provides a limited testing to ascertain the capabilities stated in the PICS can be observed.

##### 4.2.2.3 Valid Behaviour (BV) tests

Predefined state transitions are considered as valid. The test purpose in the valid behaviour test subgroup cover as far as reasonable the verification of the normal and exceptional procedures of the various FSMs.

A valid test is a test where the message sequence and the message contents is considered as valid (no error indication shall be indicated).

##### 4.2.2.4 Inopportune Behaviour (BO) tests

This test subgroup is intended to verify that the IUT is able to react properly in the case an inopportune protocol event occurring. Such an event is syntactically correct but occurs when it is not expected and an error indication is caused.

##### 4.2.2.5 Invalid Behaviour (BI) tests

This test subgroup is intended to verify that the IUT is able to react properly having received an invalid PDU. An invalid PDU is defined as a syntactically incorrect message and therefore an error indication is caused.

#### 4.2.2.6 Timer (TI) expiry and counter mismatch tests

Different timers and counters are defined to supervise the various state transitions. This test subgroup is intended to verify that the Finite State Machine (FSM) is reacting properly to an expiry of one of the timers or counter mismatch.

##### 4.2.2.6.1 Timer expiry and counters of the Control protocol

Refer to EN 300 324-1 [1], table 58.

T01	PORT CONTROL message sent
T02	COMMON CONTROL message sent

##### 4.2.2.6.2 Timer expiry and counters of the PSTN protocol

Refer to EN 300 324-1 [1], table 28.

T1	Subscriber seizure/Line information ESTABLISH sent
T2	Time out T1 or T2
T3	DISCONNECT sent
Tr	SIGNAL or PROTOCOL PARAMETER received
Tt	SIGNAL sent

Refer to EN 300 324-1 [1], clause 13.5.5.

S(S)	Sequence number to be sent/transmitted in next message
S(A)	Sequence number on the last acknowledged message
S(R)	Sequence number to be received in next message
M(S)	Sequence number of transmitted message
M(R)	Sequence number of next received message

##### 4.2.2.6.3 Timer expiry and counters of the AN system management

Refer to EN 300 324-1 [1], annex C, table C.1.

TR1	MDU-CTRL(restart request) to all PSTN protocol FSMs
TR2	MDU-CTRL(restart request) to or from CTRL protocol
TC1	MDL-RELEASE-INDICATION from CONTROL-DL
TC2	Expiry of TC1
TC3	MDL-RELEASE-INDICATION from PSTN-DL
TC8	Expiry of TC2
TC9	Cold restart of V5 interface
TV1	MDU-CTRL(request variant & interface ID) to CTRL protocol