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V interfaces at the digital Local Exchange (LE); V5.2 interface for the support of Access Network (AN); Part 4: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the network layer (AN side)

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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 4 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 fourth part of ETS 300 347 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 the V5.2 interface and parts of the system management of the Access Network (AN) side of a V5.2 interface.

The objective of this ETS is to provide an ATS containing conformance tests which give a high probability of inter-operability of an AN and a Local Exchange (LE) from different manufacturers over the V5.2 interface.

ISO/IEC 9646-1 [7] and ISO/IEC 9646-2 [8] 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 [9].

The ATS in annex A describes a set of Test Cases (TCs) which are based on the Test Purposes (TPs) specified in ETS 300 347-3 [6] (which is an extension of ETS 300 324-3 [2]). 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.

Annex C lists the informative references.

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 300 324-1 (1994) including amendment A1: "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] ETS 300 324-3 (1999): "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)".

[3] ETS 300 324-4 (1999): "V interfaces at the digital Local Exchange (LE); V5.1 interface for the support of Access Network (AN); Part 4: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the network layer (AN side)".

[4] 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".

[5] 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".

[6] ETS 300 347-3 (1999): "V interfaces at the digital Local Exchange (LE); V5.2 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)".

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

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

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

[10] 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".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this ETS, all definitions given in ETS 300 324-4 [3] apply.

3.2 Abbreviations

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

AN	Access Network
ASP	Abstract Service Primitive
ATM	Abstract Test Method
ATS	Abstract Test Suite
BCC	Bearer Channel Connection
BI	Invalid Behaviour
BO	Inopportune Behaviour
BV	Valid Behaviour
CA	CApability test
CTRL	Control
DLL	Data Link Layer
DSAP	Data link SAP
FE	Function Element
IE	Information Element
IEI	Information Element Identifier
ISDN	Integrated Services Digital Network
ISDN-BA	ISDN-Basic Access
IT	basic Interconnection Test
IUT	Implementation Under Test
L3addr	Layer 3 address
LC	Line Circuit
LT1	Lower Tester 1
MPH	Management Physical layer
NWK	Network Layer
PCO	Point of Control and Observation
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
REQ	Request
SAP	Service Access Point
SUT	System Under Test
TP	Test Purposes
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 V5.2 protocol for the AN components.

4.1 ATM

Principally, the remote test method is used for V5.2 AN NWK conformance testing. Certain V5.2 AN NWK TPs need also part of the service and national functions. Therefore, the embedded variant of the remote test method is applied.

The national dependant information is defined in the PIXIT.

4.2 NWK layer protocol testing

The V5.2 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.

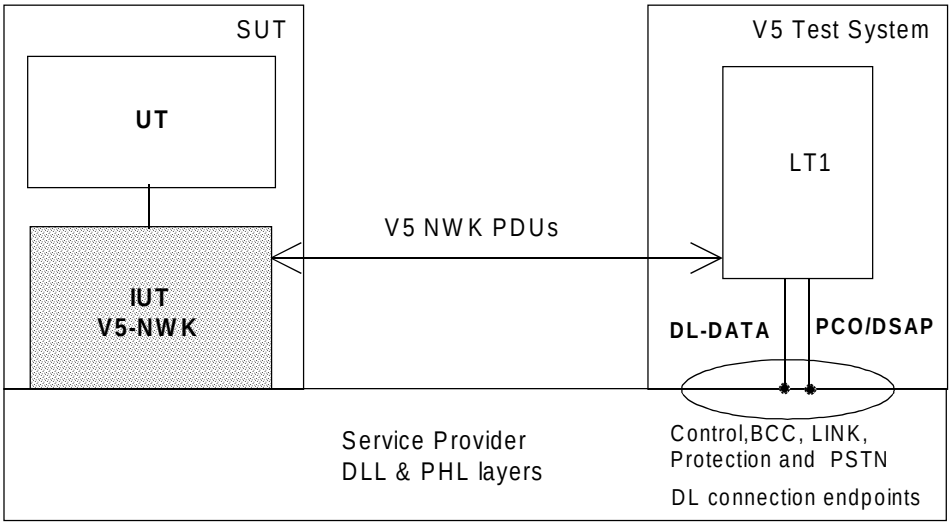

Figure 1: Remote single layer test method applied to the V5.2 NWK layer testing

LT1: A Lower Tester (LT1) is located in a remote V5.2 test system. It controls and observes the behaviours of the IUT.

DSAP: A unique Data link Service Access Point (DSAP) is defined at the V5.2 interface and commonly used for exchanging service data of the different network layer protocol functional entities.

PCO: The PCOs for NWK testing are located on the DSAP, PSAP, PSTN_ACCESS and PCM_ACCESS interfaces. All test events at the DSAP are specified in terms of Data Link Layer (DLL) Abstract Service Primitives (ASPs) and network layer PDUs. All test events at the PSAP are specified in terms of physical layer ASPs. All test events at PSTN_ACCESS and PCM_ACCESS are defined as ASPs.

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.

V5-NWK: To test the PSTN and ISDN protocols, a simulator shall be attached to relevant User Port (UP).

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 shares one data link connection.

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

Table 1: V5DLaddr

Protocol	PSTN	Control	BCC	Protection	Link Control
V5DLaddr	8176	8177	8178	8179	8180

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 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 ⇒ LINK⇒ PROTECTION⇒ PSTN⇒ BCC.
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.

5 Untestable test purposes

This clause gives a list of TPs which are not implemented in the ATS due to the chosen abstract test method or other restrictions.

5.1 Control protocol

Table 2 lists TPs which are not covered by the ATS due to unknown reaction of the IUT after testing the TPs.

Table 2: Untestable TPs

Test Purpose
TP1326S2008
TP1326S2009
TP1326S2010
TP1326S2011
TP1326S2012
TP1426SM_01
TP1426SM_02
TP1426SM_03

NOTE: Only V5.2 specific TPs are listed. See ETS 300 324-4 [3] also.

5.2 PSTN protocol

See ETS 300 324-4 [3].

5.3 Link control protocol

The following test purposes are not implemented in the ATS due to unknown reaction of the IUT after testing the TPs.

Table 3: Untestable TPs

Test Purpose
TP31__SM_01
TP32__SM_01
TP33_1S1_01
TP33_1SM_03
TP33_7S1002
TP33_7S1103
TP33_7S1112
TP33_7S1113
TP33_7S2001
(continued)

Table 3 (concluded): Untestable TPs

Test Purpose
TP33_7S2105
TP33_7S2125
TP33_7S2126
TP33_7S2204
TP33_7S2222
TP33_7SM_11
TP33_7SM_16
TP33_7SM_17
TP33_7SM_29

5.4 BCC Protocol

Table 4 lists TPs which are not covered by the ATS

Table 4: Untestable TPs

Test Purpose
TP41__SM_01
TP43__SM_21
TP44__S1_02
TP44__S1_03
TP44__S1_04
TP46__S1_01
TP46__S1_02

5.5 Protection protocol

The following test purposes are not implemented in the ATS

Table 5: Untestable TPs

Test Purpose
TP51__SM_01
TP53__SM_05
TP53__SM_06
TP53__SM_18
TP53__SM_20
TP56__S0_02
TP56__S1_04

6 Abstract test suite conventions

The ATS conventions are intended to give a better understanding of the ATS but they describe also the conventions made for the development of the ATS, thus for any later maintenance purposes or further development of the ATS the conventions described in this clause shall be considered.

The ATS conventions contain two clauses, the naming conventions and the implementation conventions. The naming conventions describe the structure of the naming of all ATS elements. The implementation conventions describe the functional structure of the ATS.

NOTE: To define the ATS, the guidelines given in ETS 300 406 and ETR 141 were considered.

6.1 Naming conventions

6.1.1 Declaration part

The ID names of the following definitions are written in lowercase:

- structured type definitions;
- ASP type definitions;
- PDU type definitions.

The ID names of the following definitions are written in uppercase:

- Test Suite Parameter Declarations;
- Test Case Selection Expression Definitions;
- Test Suite Constant Declarations;
- Test Case Variable Declarations.

ID names of PDUs and structured types commence with a protocol identifier to define which protocol they are belonging to. The following identifiers are used:

- control protocol: ctrl e.g. crtl_common_control_ack;

- PSTN signalling: pstn e.g. pstn_signal_ack.

ID names of PDUs and structured types which are used for invalid tests commence with "bi".

EXAMPLE 1: bi_com_ctrl_two_mety.

Complete names as defined in the specifications are used for ID names of declarations.

EXAMPLE 2: ctrl_control_function_element.

Test suite parameter ID names commence with TSP:

- PICS are identified by adding the letter "C": TSPC_. (e.g.: TSPC_PSTN);

- PIXIT are identified by adding the letter "X": TSPX_. (e.g.: TSPX_PORT_ADDRESS).

If the test suite parameter is representing a system parameter or value, only the parameter name is used.

EXAMPLE 3: MR (receive sequence number in signal message).

Test suite operations commence with TSO.

EXAMPLE 4: TSO_INTEGER_TO_OCTETSTRING.

Test suite constant ID names commence with TSC.

EXAMPLE 5: TSC_CFE_FE201_2_UNBL.

If the constant is representing a system parameter or value, only the parameter name is used.

EXAMPLE 6: N01.

ID names of Timers commence with T. The same names as in the specification are used.

EXAMPLE 7: T01.

6.1.2 Constraint part

Constraint names commence with uppercase. The remaining part of the ID name is written in lowercase.

ID names of elements concerning the same subject have equivalent names in the declaration and the constraint part:

- Declaration part: ctrl_control_function_element;

- Constraint part: Ctrl_control_function_element.

The name of the modified constraint describes the particularity of the modified constraint.

EXAMPLE: Ctrl_cc_mand_only (common control message which contains only the mandatory IEs).

If formal parameter lists are used, the variable names are written in lowercase. The variable name is the same as the name of the element it is representing.

6.1.3 Dynamic part

6.1.3.1 Test cases

The identifier of the TCs is constructed in the same way as for the TPs described in ETS 300 347-3 [6], subclause 5.1.1, with the exception that "TP" is replaced by "TC".

- TP identifier: TP1324S1106;
- TC identifier: TC1324S1106.

6.1.3.2 Test steps

In TCs, test steps as well as local trees are used. To allow an easy distinction, the following naming is applied:

- local tree: LTS_[local_tree_name];

- test step: STEP_[test-step_name].

6.1.3.3 General aspects

All verdict assignments are labelled. To allow an exact identification in which table the verdict was assigned, the following name convention is applied:

B	test Body
CS	Check State test steps
D	Default
E	Error handling test steps
PO	POstamble
PR	PReamble
S	test Step

Combinations of labels are also possible.

EXAMPLE: DPR --> label which is used in a default for preambles.

6.1.4 ATS abbreviations

These abbreviations are used to shorten identifier names:

addr	address
act	activate
acc	access
ack	acknowledgement
alloc	allocation
cau	cause
cc	common control
cfe	control function element
cfi	control function identifier
chan	channel
com	common
cpl	complete
ctrl	control
dl	data link
enq	enquiry
est	establish
func	function
ind	indication
interf	interface
mand	mandatory
mety	message type
mod	modified
par	parameter

pc	port control
pd	protocol discriminator
perform	performance
prog	progress
pr	protection protocol
prot	protocol
prov	provisioned
repro	re-provisioning
req	request
rest	restart
rsp	response
up	user port
var	variant
verify	verifying
vid	variant & interface ID

6.2 Implementation conventions

6.2.1 Declaration part

The comment line of single element TTCN tables (e.g. test suite constants) is used to give a reference where the format and content of the element is described in the relevant protocol specifications. Any particularity of the element format or content is described in the comment line.

The comment line in the header of multi-element TTCN tables (e.g. ASPs) is used to reference to the protocol specification.

The detailed comments are used to describe any particularity of the table.

In the ASP and PDU declarations, the comments column is used to identify if an element is mandatory or optional.

m: mandatory;
o: optional.

In the ASP and PDU declarations the comments column is further used to give information about the element value, in particular if the element contains a fixed spare value.

In tables where structure types are used the information element and the relevant structured type have always the same name, that allows to have the same structure as in the protocol standards is used to document the relation between information elements in a table and their specific description in an other clause of the protocol standard.

6.2.2 Constraint part

The ASPs and PDUs are defined in a way that all relevant element are parameterized. That improves the transparency of the constraints in the dynamic part, as all values which are relevant for the test are always present.

Generally the base constraint contains all possible parameters and the relevant formal parameter list which goes with the base constraint. In case where a specific message IE is not used at all in the ATS, the base constraint will not contain such an IE. The base constraints of the PSTN protocol contain all mandatory IEs. The optional IEs are defined in one element of type OCTETSTRING. The actual value and format of the optional IE has to be defined in the PIXITs according to the PSTN specifications which is implemented in the IUT.

Modified constraints have the same parameter list as the base constraint. Not used elements of the parameter list are set to a default value "ANY" in the dynamic part. The number of base constraints is reduced to a minimum.

The comment line of a constraint contains always the reference to the used specifications. The detailed comments sector is used to describe any particularity of the table.

6.2.3 Dynamic part

Some TCs need a particular initialization of the IUT environment conditions to run the actual test, e.g. for testing re-provisioning procedures. Such message sequence can be quite complicated and long. In cases where a Local Test Step (LTS) facilitates the TC structure, the preamble and the condition setting are described in a LTS called **LTS_pre_step**. All LTS_pre_steps are described in the detailed comment part of the TTCN table.

Some TCs need after the actual test a particular re-initialization of the IUT, e.g. after re-provisioning. Such message sequence can be quite complicated and long. In cases where a Local Test Step (LTS) facilitates the TC structure, the postamble and the re-initialization are described in a LTS called **LTS_post_step**. All LTS_post_steps are described in the detailed comment part of the TTCN table.

All events which are defined as a conformance requirements by the TP, cause a preliminary verdict PASS if the requirement is met.

All invalid events are handled in the default tree. FAIL verdicts are only assigned in the default tree. The default tree contains the error handling procedure for the particular TC.

The preamble, the test body and the postamble have different defaults, what allows a specific verdict handling, e.g. only INCONC verdicts are assigned in the preamble.

Test steps do not contain a default. That allows to apply them with no restrictions regarding the error handling.

All verdict assignments are labelled. According to ISO/IEC 9646-3 [9], clause E.2, labels should be written to the conformance log. This allows to identify were the test failed. To allow an exact identification in which table the verdict was assigned, the naming convention as described in subclause 6.1.3.3 is applied.

The labels of the same type are numbered sequentially if they are in the same TC, test step or default.

TPs which only reference to an other TP, e.g. BV TPs which were already defined as CA TPs, are only implemented ones, thus the numbering of the TCs is not always continues.

TPs which are listed in the untestable TP list in clause 5, or which reference to an other TP, e.g. BV TPs which were already defined as CA TPs, are not considered in the ATS, thus these TC identifiers are missing in the ATS and the numbering of the TCs is not always continues.

NWK implementation:

1) the PDUs used in implicit send have the same name as the system management message which has to be sent to the IUT to provoke the requested event;

2) the ATS rebuilds the PSTN functions. Therefore the signal message sequence numbers M(S) and M(R) are implemented and used according to their function described in ETS 300 324-1 [1];

3) TCs of the */PORT/TRANS test group which have to be applied either to the PSTN user port or the ISDN-BA user port depending on the provisioned application in the IUT, use a common TC definition where the L3addr is parameterized (TCV_l3_addr). The L3_addr to be used during the execution is assigned in the test step STEP_Ctrl_pc_trans_init depending on the setting of the PICS which describe the provisioned data set. All of the TCs in the test groups */PORT/TRANS begin with the test step STEP_Ctrl_pc_trans_init.

6.2.4 Documentation

The comment line of the TC or test step header contains a reference to the relevant protocol specification.

The comment column of the dynamic behaviour part is used to number the test events which are relevant for the particular test or test operation.

Based on the numbering in the comment column all for the TC relevant events are described in the detailed comments part of each TTCN table.

Test procedures which cover a conformance requirement and lead to a preliminary or final verdict assignment are described as follows in the detailed comments part:

Expected event: a specific receive event is expected.

Expected behaviour: no event or a timer expiry is expected.

Expected status: the IUT is expected to be in a particular status.

Annex A (normative): Abstract test suite for NWK testing

This ATS has been produced using the Tree and Tabular Combined Notation (TTCN) according to ISO/IEC 9646-3 [9].

The ATS was developed on a separate TTCN software tool and therefore the TTCN tables are not completely referenced in the contents table. The ATS itself contains a test suite overview part which provides additional information and references.

A.1 The TTCN Graphical form (TTCN.GR)

The TTCN.GR representation of this ATS is contained in an Adobe Portable Document Format™ file (V52NAN05.PDF contained in archive 3474_e1.ZIP) which accompanies the present document.

A.2 The TTCN Machine Processable form (TTCN.MP)

The TTCN.MP representation corresponding to this ATS is contained in a text file (V52NAN05.MP contained in archive 3474_e1.ZIP) which accompanies the present document.

NOTE: According to ISO/IEC 9646-3 [9], in case of a conflict in interpretation of the operational semantics of TTCN.GR and TTCN.MP, the operational semantics of the TTCN.GR representation takes precedence.

Annex B (normative): Partial PIXIT proforma

Notwithstanding the provisions of the copyright clause related to the text of this ETS, ETSI grants that users of this ETS may freely reproduce the PIXIT proforma in this annex so that it can be used for its intended purposes and may further publish the completed PIXIT.

B.1 Introduction

The PIXIT proforma are based on ISO/IEC 9646-5 [10]. Any additional information needed can be found in this ETS.

B.2 PIXIT proforma

B.2.1 Identification summary

PIXIT Number:

.....

Test Laboratory Name:

.....

Date of Issue:

.....

Issued to:

.....

B.2.2 Abstract test suite summary

Protocol Specification: ETS 300 347-1

Protocol to be tested: V5.2, AN network layer

ATS Specification: ETS 300 347-3

Abstract Test Method: Remote test method, embedded variant

B.2.3 Test laboratory

Test Laboratory Identification:

.....

Test Laboratory Manager:

.....

Means of Testing:

.....

SAP Address:

.....

B.2.4 Client

Client Identification:

.....

Client Test manager:

.....

Test Facilities required:

.....

B.2.5 SUT

Name:

.....

Version:

.....

SCS Number:

.....

Machine configuration:

.....

Operating System Identification:

.....

IUT Identification:

.....

PICS Reference for IUT:

.....

Limitations of the SUT:

.....

Environmental Conditions:

.....

B.2.6 Protocol layer information

B.2.6.1 Protocol identification

Name: V5.2, network layer protocol for Control and PSTN

Version: .....

PICS References: ETS 300 347-2

B.2.6.2 IUT information

Table B.1: Addresses

Address name	Parameter type	Explanation and reference	Value
TSPX_CTRL_ISDNBA_PORT_ADDR	OCTETSTRING[11]	Port address of the ISDN-BA user port provisioned (ETS 300 324-1 [1], subclause 14.4.2.3).	
TSPX_CTRL_ISDNPRA_PORT_ADDR	OCTETSTRING[11]	Port address of the ISDN-BA user port provisioned (ETS 300 324-1 [1], subclause 14.4.2.3).	
TSPX_CTRL_PSTN_PORT_ADDR	OCTETSTRING[11]	Port address of the PSTN user port provisioned (ETS 300 324-1 [1], subclause 14.4.2.3).	
TSPX_CTRL_PSTN_PORT_ADDR_NOT_PROV	OCTETSTRING[11]	Port address of the PSTN user port which is not provisioned (ETS 300 324-1 [1], subclause 14.4.2.3).	
TSPX_V5DL_ADDR_BCC	OCTETSTRING[2]	V5DLaddr for the BCC protocol (see note) (ETS 300 324-1 [1], table 1).	default value: '1111 11?? 1110 010?'B
TSPX_V5DL_ADDR_CTRL	OCTETSTRING[2]	V5DLaddr for the Control protocol (see note) (ETS 300 347-1 [4], table 1).	default value: '1111 11?? 1110 001?'B
TSPX_V5DL_ADDR_LC	OCTETSTRING[2]	V5DLaddr for the Link control protocol (see note) (ETS 300 347-1 [4], table 1).	default value: '1111 11?? 1110 100?'B
TSPX_V5DL_ADDR_PR	OCTETSTRING[2]	V5DLaddr for the Protection protocol (see note) (ETS 300 347-1 [4], table 1).	default value: '1111 11?? 1110 011?'B
TSPX_V5DL_ADDR_PSTN	OCTETSTRING[2]	V5DLaddr for the PSTN protocol (see note) (ETS 300 347-1 [4], table 1).	default value: '1111 11?? 1110 000?'B
NOTE: The TSPX_V5DL_ADDR is used to address either the Control or the PSTN NWK entity. The TSPX V5DL_ADDR is part of the ASP send or received. Depending on the V5DLaddr format requested by the target implementation (LT1), the TSPX_V5DL_ADDR shall be coded according to ETS 300 324-1 [1], table 1.			

Table B.2: Parameter values

Parameter Name	Parameter type	Reference	Parameter value
TSPX_BCC_MULTI_ SLOT_ALLOC	OCTETSTRING[8]	Multi Slot Map information element (ETS 300 347-1 [4], subclause 17.4.2.4).	
TSPX_BCC_REF_NUM	OCTETSTRING[2]	BCC Reference Number used to initialize a single BCC process, initiator LE (ETS 300 347-1 [4], subclause 17.4.1).	
TSPX_BCC_REF_NUM _AN	OCTETSTRING[2]	BCC Reference Number used to initialize a single BCC process, initiator AN (ETS 300 347-1 [4], subclause 17.4.1).	
TSPX_BCC_UP_ID_ ISDN_BA	OCTETSTRING[2]	ISDN-BA User Port Identification Value (last two octets of UP IE) (ETS 300 347-1 [4], subclause 17.4.2.1).	
TSPX_BCC_UP_ID_ ISDN_PRA	OCTETSTRING[2]	ISDN-PR User Port Identification Value (last two octets of UP IE) (ETS 300 347-1 [4], subclause 17.4.2.1).	
TSPX_BCC_UP_ID_ NOT_PROV	OCTETSTRING[2]	PSTN User Port Identification Value (last two octets of UP IE) which is not provisioned in the IUT (ETS 300 347-1 [4], subclause 17.4.2.1).	
TSPX_BCC_UP_ID_ ISDN_NOT_PROV	OCTETSTRING[2]	ISDN User Port Identification Value (last two octets of UP IE) which is not provisioned in the IUT (ETS 300 347-1 [4], subclause 17.4.2.1).	
TSPX_BCC_UP_ID_ PSTN	OCTETSTRING[2]	PSTN User Port Identification Value (last two octets of UP IE) (ETS 300 347-1 [4], subclause 17.4.2.1).	
TSPX_BCC_UP_ID_2	OCTETSTRING[2]	PSTN User Port Identification Value (last two octets of UP IE) of another PSTN port than assigned to TSPX_BCC_UP_ID_PSTN (ETS 300 347-1 [4], subclause 17.4.2.1).	
TSPX_BCC_UP_ID_ISD N_2	OCTETSTRING[2]	ISDN User Port Identification Value (last two octets of UP IE) of another PSTN port than assigned to TSPX_BCC_UP_ID_ISDN_BA or TSPX_BCC_UP_ID_ISDN_PRA (ETS 300 347-1 [4], subclause 17.4.2.1).	
TSPX_BCC_V5_LINK_ ID_PRIMARY	OCTETSTRING[1]	V5 2 048 kbit/s link identifier of the primary link (ETS 300 347-1 [4], subclause 17.4.2.3).	
TSPX_BCC_V5_LINK_ ID_2ND	OCTETSTRING[1]	V5 2 048 kbit/s link identifier of the secondary link (ETS 300 347-1 [4], subclause 17.4.2.3).	
TSPX_BCC_V5_LINK_ ID_NOT_PROV	OCTETSTRING[1]	V5 2 048 kbit/s link identifier of a V5.2 link which is not provisioned (ETS 300 347-1 [4], subclause 17.4.2.3).	

(continued)

Table B.2 (continued): Parameter values

Parameter Name	Parameter type	Reference	Parameter value
TSPX_BCC_V5_LINK_TS	BITSTRING[5]	V5 Time Slot Number (ETS 300 347-1 [4], subclause 17.4.2.3).	
TSPX_BCC_V5_LINK_TS_2	BITSTRING[5]	V5 Time Slot Number of a second V5 Time Slot which is different to TSPX_BCC_V5_LINK_TS (ETS 300 347-1 [4], subclause 17.4.2.3).	
TSPX_CTRL_INTERF_ID	OCTETSTRING[2]	Interface ID (ETS 300 324-1 [1]; subclause 14.4.2.5.7, figure 4)	
TSPX_CTRL_VAR	OCTETSTRING[10]	Presently active variant of the IUT (ETS 300 324-1 [1] figure 39, table 55).	
TSPX_CTRL_VAR_NEW	OCTETSTRING[10]	Variant announced to become next active variant of the IUT (ETS 300 324-1 [1] figure 39, table 55).	
TSPX_CTRL_VAR_NOT_PROV	OCTETSTRING[10]	Not available Variant in the IUT (not provisioned) (ETS 300 324-1 [1], figure 39, table 55).	
TSPX_LC_L3_ADDR_MAIN	OCTETSTRING[2]	Layer 3 address IE of the 2 Mbit/s link used for the link control protocol tests (ETS 300 324-1 [1], subclause 14.4.2.3).	
TSPX_LC_L3_ADDR_2ND_LINK	OCTETSTRING[2]	Layer 3 address IE of the second 2 Mbit/s link used for the link control protocol tests (ETS 300 324-1 [1], subclause 14.4.2.3).	
TSPX_LC_L3_ADDR_NOT_PROV	OCTETSTRING[2]	Layer 3 address IE of a not provisioned V5.2 2 Mbit/s link (ETS 300 324-1 [1], subclause 14.4.2.3).	
TSPX_PR_LOGICAL_C_CHANN_ID_CHANN1	OCTETSTRING[2]	Logical C-channel 1 ID information element (ETS 300 347-1 [4], subclause 18.5.1).	
TSPX_PR_LOGICAL_C_CHANN_ID_CHANN2	OCTETSTRING[2]	Logical C-channel 2 ID information element (ETS 300 347-1 [4], subclause 18.5.1).	
TSPX_PR_LOGICAL_C_CHANN_ID_CHANN3	OCTETSTRING[2]	Logical C-channel 3 ID information element (ETS 300 347-1 [4], subclause 18.5.1).	
TSPX_PR_LOGICAL_C_CHANN_ID_UNPROV	OCTETSTRING[2]	Logical C-channel ID information element with unprovisioned L3 address (ETS 300 347-1 [4], subclause 18.5.1).	
TSPX_PR_PHL_C_CHANN_ID_LINK_ID_1ST	OCTETSTRING[1]	Primary physical C-channel ID, V5 2 Mbit/s link ID in use (ETS 300 347-1 [4], subclause 18.5.3, figure 29).	

(continued)

Table B.2 (concluded): Parameter values

Parameter Name	Parameter type	Reference	Parameter value
TSPX_PR_PHL_C_ CHANN_ID_LINK_ID_ 2ND	OCTETSTRING[1]	Secondary physical C-channel ID, V5 2 Mbit/s link ID in use (ETS 300 347-1 [4], subclause 18.5.3, figure 29).	
TSPX_PR_PHL_C_ CHANN_ID_TS_15	BITSTRING[5]	Physical C-channel ID, V5 time slot number 15 (ETS 300 347-1 [4], subclause 18.5.3, figure 29).	
TSPX_PR_PHL_C_ CHANN_ID_TS_16	BITSTRING[5]	Physical C-channel ID, V5 time slot number 16 (ETS 300 347-1 [4], subclause 18.5.3, figure 29).	
TSPX_PR_PHL_C_ CHANN_ID_TS_31	BITSTRING[5]	Physical C-channel ID, V5 time slot number 31 (ETS 300 347-1 [4], subclause 18.5.3, figure 29).	

Table B.3: Timer values

Timer name type	Reference	Timer range	Timer value
TSPX_TIMER_interface _startup	Time to wait the interface startup procedure to finish.	value: 10-60 [s]	
TSPX_TIMER_link_failur e	Time to wait for IUT to get to link failure state when link is disconnected.	value: 1-20 [s]	
TSPX_TIMER_T01_max	ETS 300 324-1, table 58	value: 1 200 [ms] T01 + T01 tolerance + test environment tolerance.	
TSPX_TIMER_T02_max	ETS 300 324-1, table 58	value: 1 200 [ms] T02 + T02 tolerance + test environment tolerance.	
TSPX_TIMER_T1_max	ETS 300 324-1, table 28	value: 1 200 [ms] T1 + T1 tolerance + test environment tolerance.	
TSPX_TIMER_T3_max	ETS 300 324-1, table 28	value: 2 400 [ms] T3 + T3 tolerance + test environment tolerance.	
TSPX_TIMER_T4_max	ETS 300 324-1, table 28	value: 2 400 [ms] T4 + T4 tolerance + test environment tolerance.	

(continued)

Table B.3 (concluded): Timer values

Timer name type	Reference	Timer range	Timer value
TSPX_TIMER_AC_short	Watch dog timer if immidiate ACtion is expected from the IUT.	value: 1 000 [ms]	
TSPX_TIMER_NOAC_short	Guard timer used if NO ACtion shall appear.Watch dog timer if immidiate ACtion is expected from the IUT.	value: 1 000 [ms]	
TSPX_TIMER_WAIT_SONV_BACK	Time to wait before Switch-Over to New Variant is invoked to get initial provisioning variant.		
TSPX_TIMER_AC_long	Watch dog timer if an ACtion from the IUT is expected after an undefined time period.		
TSPX_TIMER_WAIT_PROT_BACK	Time to wait before Protection Switch-Over is invoked to get initial C-channel configuration.		
TSPX_TIMER_Tbcc1_max	ETS 300 347-1, table 46	value: 500 - 1 800 [ms] Tbcc1 + Tbcc1 tolerance + test environment tolerance.	
TSPX_TIMER_Tbcc2_max	ETS 300 347-1, table 46	value: 2 000 - 2 400 [ms] Tbcc2 + Tbcc2 tolerance + test environment tolerance.	
TSPX_TIMER_Tbcc3_max	ETS 300 347-1, table 46	value: 2 000 - 2 400 [ms] Tbcc3 + Tbcc3 tolerance + test environment tolerance.	
TSPX_TIMER_Tbcc4_max	ETS 300 347-1, table 46	value: 500 - 1 800 [ms] Tbcc4 + Tbcc4 tolerance + test environment tolerance.	
TSPX_TIMER_LCT01_max	ETS 300 347-1, table 23	value: 1 000 - 1 200 [ms] LCTO1 + LCTO1 tolerance + test environment tolerance.	
TSPX_TIMER_TSO1_max	ETS 300 347-1, table 64	value: 1 500 - 1 800 [ms] TSO1 + TSO1 tolerance + test environment tolerance.	
TSPX_TIMER_TSO2_max	ETS 300 347-1, table 64	value: 1 500 - 1 800 [ms] TSO2 + TSO2 tolerance + test environment tolerance.	
TSPX_TIMER_TSO3_max	ETS 300 347-1, table 64	value: 1 500 - 1 800 [ms] TSO3 + TSO3 tolerance + test environment tolerance.	
TSPX_TIMER_T2_MAX	ETS 300 324-1, table 28	value: 5,5 - 36 [s] T2 + T2 tolerance + test environment tolerance.	
TSPX_TIMER_T2_MIN	ETS 300 324-1, table 28	value: 4,5 - 27 [s] T2 - T2 tolerance - test environment tolerance.	

Table B.4: Procedural information

Procedural name	Reference	Valid?
TSPX_EDITION_1	Is IUT implemented based on V5.1 specification, edition 1?	
TSPX_PSTN_LINE_INFORMATION	PSTN state Line information (AN4) is supported by the IUT.	
TSPX_PSTN_TERMINATING_CALL_PRIORITY	Terminating calls have priority (val: TRUE) (subclause 13.5.3.3). If the parameter is not set (val: FALSE), originating calls have priority.	
TSPX_2ND_LINK_DISCONNECT	Test case selection parameter for 2nd link disconnection.	
TSPX_PROT_OS_SO	Operator initiated protection switch-over is supported by the IUT, ETS 300 347-1, 18.6.4.	
NOTE: All parameters are of type BOOLEAN.		

Table B.5 requests the national specific optional PSTN data, which shall be coded according to the PSTN standard to which the PSTN application of the IUT shall conform.

Table B.5: Optional information

PIXIT name	Related message	Reference to ETS 300 324-1 [1]	Specific requirements	Value
TSPX_PSTN_OPT_ INFO_EST	ESTABLISH	13.3.1, table 5	Optional part of ESTABLISH message received by LT1.	
TSPX_PSTN_OPT_ INFO_EST_SEND	ESTABLISH	13.3.1, table 5	Optional part of ESTABLISH message sent by LT1.	
TSPX_PSTN_OPT_ INFO_EST_4_ REP_OPT_IE	ESTABLISH	13.3.1, table 5 13.5.2.5 (error conditions) see also note	The optional part shall contain four repeated optional IEs which are valid for the IUT to be tested.	
TSPX_PSTN_OPT_ INFO_EST_IEI_4_ TIMES_REP	ESTABLISH	table 17	IEI of 4 times repeated IE in optional info: TSPX_PSTN_OPT_INFO_ EST_4_REPEATED_OPT_IE.	
TSPX_PSTN_OPT_ INFO_EST_ONE_ VALID_ONE_ INCORR_OPT_ IE	ESTABLISH	13.4.5, table 17 13.5.2.9 (error conditions) see also note	The optional part shall contain one valid and one incorrect optional IE.	
TSPX_PSTN_OPT_ INFO_EST_IEI_ INCORR_OPT_ IE	ESTABLISH	table 17	IEI of incorrect IE in optional info: TSPX_PSTN_OPT_INFO_ EST_ONE_VALID_ONE_ INCORRECT_OPT_IE.	
TSPX_PSTN_OPT_ INFO_EST_ONE_ VALID_ONE_ UNSPEC_ OPT_IE	ESTABLISH	13.4.5, table 17 13.5.2.7 (error conditions) see also note	The optional part shall contain one valid and one unspecified optional IE.	
TSPX_PSTN_OPT_ INFO_EST_IEI_ UNSPEC_ OPT_IE	ESTABLISH	table 17	IEI of unspecified IE in optional info: TSPX_PSTN_OPT_INFO_ EST_ONE_VALID_ONE_ UNSPECIFIED_OPT_IE.	
TSPX_PSTN_OPT_ INFO_EST_TWO_ DIFF_OPT_ IE	ESTABLISH	13.3.1, table 5 13.5.2.11 (error conditions) see also note	The optional part shall contain two different optional IEs.	
TSPX_PSTN_OPT_ INFO_EST_ACK	ESTABLISH_ACK	13.3.2, table 6		
TSPX_PSTN_OPT_ INFO_PROTOCOL_ PARAMETER	PROTOCOL_ PARAMETER	13.3.9, table 13	Optional information of a PROTOCOL_PARAMETER message.	
TSPX_PSTN_OPT_I NFO_DISC_S	DISCONNECT		Optional information of the DISCONNECT message which is sent from the LE to AN.	
TSPX_PSTN_EST_L INE_INFO	ESTABLISH		Optional information of the ESTABLISH message to be send by the LT1, length [1] that corresponds to the FE-line_information message sent to the NWK entity.	

(continued)

Table B.5 (concluded): Optional information

PIXIT name	Related message	Reference to ETS 300 324-1 [1]	Specific requirements	Value
TSPX_OPT_INFO_ SIGNAL_DIGIT1	SIGNAL	13.3.3, table 7	Optional information of a SIGNAL message which is sent from the AN to the LE and which represents the line signal of digit 1.	
TSPX_OPT_INFO_ SIGNAL_LE	SIGNAL	13.3.3, table 7	Optional information of a SIGNAL message which is send from the LE to the AN.	
NOTE: The PSTN messages which contain invalid optional information shall be coded according to the national PSTN specifications but the optional information shall be modified according to ETS 300 324-1 [1], subclause 13.5.2.				

Table B.6: Implicit send events

PIXIT name	Description	Selection
TSPX_IMPLICIT_ EVENT_CTRL	This PIXIT is used to select/deselect CTRL test cases which use implicit send events and thus need manual operations (no automatic execution).	
TSPX_IMPLICIT_ EVENT_PSTN	This PIXIT is used to select/deselect PSTN test cases which use implicit send events and thus need manual operations (no automatic execution).	
TSPX_IMPLICIT_ EVENT_LCP	This PIXIT is used to select/deselect LCP test cases which use implicit send events and thus need manual operations (no automatic execution).	
TSPX_IMPLICIT_ EVENT_BCC	This PIXIT is used to select/deselect BCC test cases which use implicit send events and thus need manual operations (no automatic execution).	
TSPX_IMPLICIT_ EVENT_PROT	This PIXIT is used to select/deselect PROT test cases which use implicit send events and thus need manual operations (no automatic execution).	
TSPX_IMPLICIT_ EVENT_PCM	This PIXIT is used to select/deselect use of implicit send events for PCM connect/disconnect and thus need manual operations (no automatic execution).	
NOTE: All parameters are of type BOOLEAN.		

Table B.6A: Implicit send event procedures

Implicit event	Description	Procedural information
<IUT ! ctrl_com_ctrl> Ctrl_cc_no_interf_id(TSC_CFI_ SWITCH_OVER_TO_NEW_VAR, TSPX_CTRL_VAR_NEW, ANY_1 , ANY_3	How can the sending of an COMMON CONTROL message (cfi: switch over to new variant) by the IUT be invoked?	
<IUT ! ctrl_com_ctrl> Ctrl_cc_no_interf_id(TSC_CFI_ REST_REQ, SPX_CTRL_VAR, ANY_1, ANY_3)	How can the sending of an COMMON CONTROL message (cfi: restart request) by the IUT be invoked?	
<IUT ! ctrl_com_ctrl> Ctrl_cc_mand_only(TSC_CFI_REQ_ VID, ANY_1, ANY_1, ANY_3)	How can the sending of an COMMON CONTROL message (cfi: request variant & interface ID) by the IUT be invoked?	
<IUT ! ctrl_port_ctrl> Ctrl_pc_isdnba(TSC_CFE_FE102_ ACT_INIT)	How can the sending of an PORT CONTROL message (cfi: FE2, access activation initiated by user) by the IUT (ISDN-BA entity) be invoked?	
<IUT ! ctrl_port_ctrl> Ctrl_pc_isdnba(TCV_l3_addr, TSC_CFE_FE203_4_BL)	How can the sending of an PORT CONTROL message (cfe: block command) by the IUT (ISDN-BA entity) be invoked?	
<IUT ! ctrl_port_ctrl> Ctrl_pc_isdnba(TSC_CFE_FE205_ BL_REQ)	How can the sending of an PORT CONTROL message (cfe: block request) by the IUT (ISDN-BA entity) be invoked?	
<IUT ! ctrl_port_ctrl> Ctrl_pc_isdnba(TSC_CFE_FE201_ 2_UNBL)	How can the sending of an PORT CONTROL message (cfi: unblock request/ack) by the IUT (ISDN-BA entity) be invoked?	
<IUT ! ctrl_port_ctrl> Ctrl_pc_pstn(TCV_l3_addr,TSC_ CFE_FE203_4_BL)	How can the sending of an PORT CONTROL message (cfe: block command) by the IUT (PSTN entity) be invoked?	
<IUT ! ctrl_port_ctrl> Ctrl_pc_pstn(TSC_CFE_FE205_BL_ REQ)	How can the sending of an PORT CONTROL message (cfe: block request) by the IUT (PSTN entity) be invoked?	
<IUT ! ctrl_port_ctrl> Ctrl_pc_pstn(TSC_CFE_FE201_2_ UNBL)	How can the sending of an PORT CONTROL message (cfi: unblock request/ack) by the IUT (PSTN entity) be invoked?	
<IUT ! lc_link_ctrl> Lc_lc(TSPX_LC_L3_ADDR_MAIN, TSC_LCF_FE301_2_UNBL)	How can the sending of an LINK CONTROL message (lcf: FE301/2, link_unblock ack/req) by the IUT be invoked?	
<IUT ! lc_link_ctrl> Lc_lc(TSPX_LC_L3_ADDR_2ND_ LINK,TSC_LCF_FE303_4_BL)	How can the sending of an LINK CONTROL message (lcf: FE303/4, link_block_cmd) by the IUT be invoked?	
<IUT ! lc_link_ctrl> Lc_lc(TSPX_LC_L3_ADDR_2ND_ LINK,TSC_LCF_FE305_DFBL)	How can the sending of an LINK CONTROL message (lcf: FE305, deferred_link_block req) by the IUT be invoked?	

(continued)

Table B.6A (concluded): Implicit send event procedures

Implicit event	Description	Procedural information
<IUT ! lc_link_ctrl> Lc_lc(TSPX_LC_L3_ADDR_2ND_ LINK,TSC_LCF_FE306_NDFBL)	How can the sending of an LINK CONTROL message (lcf: FE306, non_deferred_link_block_req) by the IUT be invoked?	
<IUT ! lc_link_ctrl> Lc_lc(TSPX_LC_L3_ADDR_2ND_ LINK,TSC_LCF_ID_REQ)	How can the sending of an LINK CONTROL message (lcf: FE-IDReq) by the IUT be invoked?	
<IUT ! pstn_est> Pstn_est	How can the sending of an PSTN ESTABLISH message by the IUT be invoked? (sending of a FE-subscriber_seizure message to the NWK entity).	
<IUT ! pstn_signal> Pstn_signal(S_R, TSPX_PSTN_OPT_INFO_SIGNAL_ DIGIT1)	How can the sending of an PSTN SIGNAL message (digit 1) by the IUT be invoked? (sending of a FE-line_signal message (digit 1) message to the NWK entity).	
<IUT ! mdu_ctrl_data_set_available>	How can the IUT internal status "data set available" be invoked?	
<IUT ! mdu_system_start_up>	How can a system start-up procedure in the IUT be invoked as described in ETS 300 324-1 [1], annex C, item 17?	
<IUT ! mph_ar_isdn>	How can the IUT internal event "MPH_AR, activate access from AN" be invoked? (New state AN3.1).	
<IUT ! te_off_hook_pstn>	How can the IUT internal event "sending of a FE-subscriber_seizure message" be invoked?	
<IUT ! te_on_hook_pstn>	How can the IUT internal event "sending of a FE-subscriber_release message message" be invoked?	
<IUT ! v52_2nd_link_interruption>	How can the IUT internal event "persistent link failure condition" be invoked? (interruption (disconnect/connect) the second V5.2 link).	
<IUT ! v52_2nd_link_disconnect>	How can the IUT internal event "persistent link failure condition" be invoked? (disconnecting the second V5.2 link).	
<IUT ! v52_2nd_link_connect>	How can the IUT internal event "disappearance of the persistent link failure condition" be invoked? (connecting the second V5.2 link).	
NOTE: *Procedural information* part shall provide the necessary information required to provoke the *Implicit event* described in *Description* part of this table.		

Table B.7: PICS information

PIXIT name	PICS item	Valid ?
TSPC_ISDNBA	ETS 300 347-2, M1	
TSPC_PSTN	ETS 300 347-2, M2	
TSPC_PL_CAPABILITY	ETS 300 347-2, M7	
TSPC_VERIFY_REPRO	ETS 300 347-2, P5.2	
TSPC_PSTN_PROTOCOL_PARAMETER	ETS 300 347-2, U1.9	
TSPC_REPRO_SYNC	ETS 300 347-2, P5.3	
TSPC_ISDNPRA	ETS 300 347-2, N12	
TSPC_MULTI_SLOT_CONNECTION	ETS 300 347-2, N8	
TSPC_V52_MULTIPLE_LINK	ETS 300 347-2, N9	
TSPC_V52_UBA_SUPPORTED	ETS 300 347-2, R5.2	
NOTE All parameters are of type BOOLEAN.		

Annex C (informative): Bibliography

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

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

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