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*European Standard (Telecommunications series)*

**Integrated Services Digital Network (ISDN);  
Digital Subscriber Signalling System No. one (DSS1);  
Line Hunting (LH) supplementary service;  
Part 5: Test Suite Structure and Test Purposes (TSS&TP)  
specification for the network**

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**Reference**

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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 5 of a multi-part deliverable covering the Digital Subscriber Signalling System No. one (DSS1) specification for the Integrated Services Digital Network (ISDN); Line Hunting (LH) supplementary service, as identified below:

- Part 1: "Protocol specification";
- Part 2: "Protocol Implementation Conformance Statement (PICS) proforma specification";
- Part 3: "Test Suite Structure and Test Purposes (TSS&TP) specification for the user";
- Part 4: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the user";
- Part 5: "Test Suite Structure and Test Purposes (TSS&TP) specification for the network";**
- Part 6: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the network".

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# 1 Scope

The present document specifies the Test Suite Structure and Test Purposes (TSS&TP) for the Network side of the T reference point or coincident S and T reference point (as defined in ITU-T Recommendation I.411 [6]) of implementations conforming to the stage three standard for the Line Hunting (LH) service for the pan-European Integrated Services Digital Network (ISDN) by means of the Digital Subscriber Signalling System No. one (DSS1) protocol, EN 301 484-1 [1].

The present document is applicable to testing of network implementations claiming to conform to EN 301 484-1 [1].

A further part of the present document specifies the Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma based on the present document. Other parts specify the TSS&TP and the ATS and partial PIXIT proforma for the Network side of the T reference point or coincident S and T reference point of implementations conforming to EN 301 484-1 [1].

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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 and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

- [1] ETSI EN 301 484-1 (V1.1.1): "Integrated Services Digital Network (ISDN); Line Hunting (LH) supplementary service; Digital Subscriber Signalling System No. one (DSS1); Part 1: Protocol specification".
- [2] ETSI EN 301 484-2 (V1.1.1): "Integrated Services Digital Network (ISDN); Line Hunting (LH) supplementary service; Digital Subscriber Signalling System No. one (DSS1); Part 2: Protocol Implementation Conformance Statement (PICS) proforma specification".
- [3] ISO/IEC 9646-1: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".
- [4] ISO/IEC 9646-2: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite specification".
- [5] ETSI EN 300 196-1 (V1.3.2): "Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".
- [6] ITU-T Recommendation I.411 (1993): "ISDN user-network interfaces - Reference configurations".
- [7] ETSI ETS 300 406 (1995): "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".
- [8] ETSI EN 300 403-1: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 1: Protocol specification [ITU-T Recommendation Q.931 (1993), modified]".

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## 3 Definitions and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in EN 301 484-1 [1], EN 300 196-1 [5], ISO/IEC 9646-1 [3] and the following apply:

**network (S/T):** DSS1 protocol entity at the Network side of the user-network interface where a coincident S and T reference point applies

**network (T):** DSS1 protocol entity at the Network side of the user-network interface where a T reference point applies (User is the Private ISDN)

### 3.2 Abbreviations

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

ATM	Abstract Test Method
ATS	Abstract Test Suite
CR	Call Reference
CR1	CR one
DSS1	Digital Subscriber Signalling System No. one
ISDN	Integrated Services Digital Network
IUT	Implementation Under Test
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
LH	Line Hunting
THG	Temporary Hunt Group
TP	Test Purpose
TSS	Test Suite Structure

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## 4 Test Suite Structure

The test suite structure is specified in figure 1.

Error! Objects cannot be created from editing field codes.

NOTE: Numbers in brackets represent group numbers and are used in TP identifiers.

**Figure 1: Test suite structure**

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## 5 Test Purposes (TP)

### 5.1 Introduction

For each test requirement a TP is defined.

#### 5.1.1 TP naming convention

Tps are numbered, starting at 001, within each group. Groups are organized according to the TSS. Additional references are added to identify the actual test suite and whether it applies to the network or the user (see table 1).

**Table 1: TP identifier naming convention scheme**

Identifier: <ss>_<iut><group>_<nnn>			
<ss>	=	(supplementary) service:	e.g. "LH"
<iut>	=	type of IUT:	U            User N            Network
<group>	=	group	2 digit field representing group reference according to TSS
<nnn>	=	sequential number	(001-999)

### 5.1.2 Source of TP definition

The TPs are based on EN 301 484-1 [1].

### 5.1.3 TP structure

Each TP has been written in a manner which is consistent with all other TPs. The intention of this is to make the TPs more readable and checkable. A particular structure has been used and this is illustrated in table 2. This table should be read in conjunction with any TP, i.e. use a TP as an example to fully understand the table.

**Table 2: Structure of a single TP**

TP part	Text	Example
<b>Header</b>	<Identifier> <i>tab</i> <clause number in base specification> <i>tab</i>	See table 1 <b>clause 0.0.0</b>
<b>Stimulus</b>	Ensure that the IUT in the <(supplementary) service state> <trigger> <i>see below for message structure</i> <i>or</i> <goal>	Wait LH Activation state receiving a XXXX message to request a ...
<b>Reaction</b>	<action> <i>If the action is sending</i> <i>see below for message structure</i> <next action>, <i>etc.</i> and enters <supplementary service state> <i>and/or</i> and remains in the same call state(s) <i>or</i> and enters call state <state> with CR<number(s)>	Sends, does, etc.
<b>Message structure</b>	<message type> message containing a a) <info element> information element with b) a <field name> encoded as <i>or</i> including <coding of the field> and <i>back to a or b</i>	SETUP, FACILITY, CONNECT, ...  Bearer capability, Facility, ...
<b>Selection</b>	Selection criteria reference	Support Line Hunting SS. PICS: R 1.1
NOTE 1: In order to use the same structure as for test group selection, the selection criteria is indicated at the bottom of the test purpose.		
NOTE 2: Unless specified the messages are valid and contain at least the mandatory information elements and possibly optional information elements, the information elements are valid and contain at least the mandatory parameters and possibly optional parameters.		
NOTE 3: Text in italics will not appear in TPs and text between <> is filled in for each TP and may differ from one TP to the next.		

## 5.1.4 Test strategy

As the base standard EN 301 484-1 [1] contained no explicit requirements for testing, the TPs were generated as a result of an analysis of the base standard and the PICS specification, EN 301 484-2 [2].

The TPs are only based on conformance requirements related to the externally observable behaviour of the IUT, and are limited to conceivable situations to which a real implementation is likely to be faced (ETS 300 406 [7]).

All the test purposes are mandatory unless they have selection criteria. Optional test purposes (with selection criteria) are applicable according to the configuration options of the IUT. The configuration option shall be covered by a PICS item.

## 5.2 Network TPs for LH

All PICS items referred to in this clause are as specified in EN 301 484-2 [2] unless indicated otherwise.

Unless specified otherwise:

- the components indicated are valid and contain at least the mandatory parameters and possibly optional parameters;
- all components are sent and received using the bearer-independent connectionless transport mechanism as described in clause 8.3.2.2 of EN 300 196-1 [5].

### 5.2.1 Network S/T

#### 5.2.1.1 Temporary Hunt Group (THG) withdrawal

**Selection:** IUT supports access withdrawal from hunt group. PICS: MC 7.

##### **LH\_N01\_001** clause 9.1.1.1

Ensure that the IUT in the LH Idle state and the access not being withdrawn, on receipt of a WithdrawLHG invoke component,

- sends a WithdrawLHG return result component and returns to the LH Idle state.

##### **LH\_N01\_002** clause 9.1.1.1

Ensure that the IUT in the LH Idle state and the access having been withdrawn, on receipt of a WithdrawLHG invoke component,

- sends a WithdrawLHG return result component and returns to the LH Idle state.

##### **LH\_N01\_003** clause 9.1.1.2

Ensure that the IUT in the LH Idle state and the access having not be defined as a member of any hunt group, on receipt of a WithdrawLHG invoke component,

- sends a WithdrawLHG return error component indicating "notSubscribed" and returns to the LH Idle state.

##### **LH\_N01\_004** clause 9.1.1.2

Ensure that the IUT in the LH Idle state and the hunt group withdrawal option having not be subscribed to with the value "available" for the access, on receipt of a WithdrawLHG invoke component,

- sends a WithdrawLHG return error component indicating "withdrawalNotSubscribed" and returns to the LH Idle state.

##### **LH\_N01\_005** clause 9.1.1.2

Ensure that the IUT in the LH Idle state and the hunt group withdrawal not being supported by the IUT, on receipt of a WithdrawLHG invoke component,

- sends a WithdrawLHG return error component indicating "withdrawalNotSupported" and returns to the LH Idle state.

##### **LH\_N01\_006** clause 9.1.1.2

Ensure that the IUT in the LH Idle state and the activation of the LH service is precluded by a supplementary service interaction procedure, on receipt of a WithdrawLHG invoke component,

- sends a WithdrawLHG return error component indicating "supplementaryServiceInteractionNotAllowed" and returns to the LH Idle state.



**LH\_N01\_007 clause 9.1.1.2**

Ensure that the IUT in the LH Idle state and the LH service not being available, on receipt of a WithdrawLHG invoke component,

- sends a WithdrawLHG return error component indicating "notAvailable" and returns to the LH Idle state.

**5.2.1.2 Cancellation of Temporary Hunt Group (THG) withdrawal**

**Selection:** IUT supports cancellation of access withdrawal. PICS: MC 8.

**LH\_N02\_001 clause 9.1.2.1**

Ensure that the IUT in the LH Idle state and the access being withdrawn from the hunt group, on receipt of a CancelWithdrawLHG invoke component,

- sends a CancelWithdrawLHG return result component and returns to the LH Idle state.

**LH\_N02\_002 clause 9.1.2.1**

Ensure that the IUT in the LH Idle state and the access not being withdrawn from the hunt group, on receipt of a CancelWithdrawLHG invoke component,

- sends a CancelWithdrawLHG return result component and returns to the LH Idle state.

**LH\_N02\_003 clause 9.1.2.1**

Ensure that the IUT in the LH Idle state and the hunt group withdrawal option not being subscribed to with the value "available" for the access, on receipt of a CancelWithdrawLHG invoke component,

- sends a CancelWithdrawLHG return result component and returns to the LH Idle state.

**LH\_N02\_004 clause 9.1.2.1**

Ensure that the IUT in the LH Idle state and the hunt group withdrawal not being supported by the IUT, on receipt of a CancelWithdrawLHG invoke component,

- sends a CancelWithdrawLHG return result component and returns to the LH Idle state.

**LH\_N02\_005 clause 9.1.2.2**

Ensure that the IUT in the LH Idle state and the LH service not being available, on receipt of a CancelWithdrawLHG invoke component,

- sends a CancelWithdrawLHG return error component indicating "notAvailable" and returns to the LH Idle state.

**5.2.1.3 Interrogation**

**Selection:** IUT supports interrogation of Line Hunting. PICS: MC 9.

**LH\_N03\_001 clause 9.1.3.1**

Ensure that the IUT in the LH Idle state and the access being withdrawn from the hunt group, on receipt of a InterrogationLHG invoke component,

- sends a CancelWithdrawLHG return result component containing an IntResultLHG parameter with the value "withdrawn" and returns to the LH Idle state.

**LH\_N03\_002 clause 9.1.3.1**

Ensure that the IUT in the LH Idle state and the access not being withdrawn from the hunt group, on receipt of a InterrogationLHG invoke component,

- sends a CancelWithdrawLHG return result component containing an IntResultLHG parameter with the value "active" and returns to the LH Idle state.

**LH\_N03\_003 clause 9.1.3.2**

Ensure that the IUT in the LH Idle state and the access not being defined as a member of any hunt group, on receipt of a InterrogationLHG invoke component,

- sends an InterrogationLHG return error component indicating "notSubscribed" and returns to the LH Idle state.

**LH\_N03\_004 clause 9.1.3.2**

Ensure that the IUT in the LH Idle state and the LH service not being available, on receipt of a InterrogationLHG invoke component,

- sends an InterrogationLHG return error component indicating "notAvailable" and returns to the LH Idle state.

#### 5.2.1.4 Invocation

**Selection:** IUT supports invocation of Line Hunting. PICS: MC 10.

See EN 300 403-1 [8] for the signalling procedures related to the call control used in the following test purpose.

##### **LH\_N04\_001 clause 9.2.1**

Ensure that the IUT, on receipt of a valid SETUP message using the hunt group number (ISDN number),

- sends the corresponding SETUP message from the selected access of the hunt group and enters the N1 Call state on that selected access.

##### **LH\_N04\_002 clause 9.2.2**

Ensure that the IUT, on receipt of a valid SETUP message using the hunt group number (ISDN number), and no free access is available or all accesses have been withdrawn from the hunt group,

- proceeds the call according to EN 300 403-1 [8], sends a DISCONNECT message with the cause value #17 "user busy" and enters the N12 Call state.

#### 5.2.1.5 Notification

**Selection:** IUT supports the transmission of the withdrawnFromLHG invoke component. PICS: P14.

See EN 300 403-1 [8] for the signalling procedures related to the call control used in the following test purpose.

##### **LH\_N05\_001 clause 9.3**

Ensure that the IUT in the U0 Call state and the access being withdrawn from the hunt group, on receipt of a valid SETUP message,

- sends a SETUP ACKNOWLEDGE or a CALL PROCEEDING message including a Facility information element with a withdrawnFromLHG invoke component and enters respectively the N25 or N9 Call state.

### 5.2.2 Network (T)

Procedures for interworking with Private ISDNs are not applicable for the Line Hunting supplementary service.

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## 6 Compliance

An ATS which complies with this TSS&TP specification shall:

- a) consist of a set of test cases corresponding to the set or to a subset of the TPs specified in clause 5;
- b) use a TSS which is an appropriate subset of the whole of the TSS specified in clause 4;
- c) use the same naming conventions for the test groups and test cases;
- d) maintain the relationship specified in clause 5 between the test groups and TPs and the entries in the PICS proforma to be used for test case deselection;
- e) comply with ISO/IEC 9646-2 [4].

In the case of a) or b) above, a subset shall be used only where a particular Abstract Test Method (ATM) makes some TPs untestable. All testable TPs from clause 5 shall be included in a compliant ATS.

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## 7 Requirements for a comprehensive testing service

As a minimum the Remote test method, as specified in ISO/IEC 9646-2 [4], shall be used by any organization claiming to provide a comprehensive testing service for network equipment claiming conformance to EN 301 484-1 [1].

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## History

<b>Document history</b>			
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