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Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP) version 3 for the international interface; Part 36: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for supplementary services

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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 36 of a multi-part deliverable covering the ISDN User Part (ISUP) version 3 for the international interface, as identified below:

Part 1:   "Basic services [ITU-T Recommendations Q.761 to Q.764 (1999) modified]";

Part 2:   "ISDN supplementary service [ITU-T Recommendation Q.730 (1999) modified]";

Part 3:   "Calling Line Identification Presentation (CLIP) supplementary service [ITU-T Recommendation Q.731, clause 3 (1993) modified]";

Part 4:   "Calling Line Identification Restriction (CLIR) supplementary service [ITU-T Recommendation Q.731, clause 4 (1993) modified]";

Part 5:   "Connected Line Identification Presentation (COLP) supplementary service [ITU-T Recommendation Q.731, clause 5 (1993) modified]";

Part 6:   "Connected Line Identification Restriction (COLR) supplementary service [ITU-T Recommendation Q.731, clause 6 (1993) modified]";

Part 7:   "Terminal Portability (TP) supplementary service [ITU-T Recommendation Q.733, clause 4 (1993) modified]";

Part 8:   "User-to-User Signalling (UUS) supplementary service [ITU-T Recommendation Q.737, clause 1 (1997) modified]";

Part 9:   "Closed User Group (CUG) supplementary service [ITU-T Recommendation Q.735, clause 1 (1993) modified]";

Part 10:   "Subaddressing (SUB) supplementary service [ITU-T Recommendation Q.731, clause 8 (1992) modified]";

Part 11:   "Malicious Call Identification (MCID) supplementary service [ITU-T Recommendation Q.731, clause 7 (1997) modified]";

Part 12:   "Conference Call, add-on (CONF) supplementary service [ITU-T Recommendation Q.734, clause 1 (1993) and implementors guide (1998) modified]";

Part 14:   "Explicit Call Transfer (ECT) supplementary service [ITU-T Recommendation Q.732, clause 7 (1996) and implementors guide (1998) modified]";

Part 15:   "Diversion supplementary service [ITU-T Recommendation Q.732, clauses 2 to 5 (1999) modified]";

Part 16:   "Call Hold (HOLD) supplementary service [ITU-T Recommendation Q.733, clause 2 (1993) modified]";

Part 17:   "Call Waiting (CW) supplementary service [ITU-T Recommendation Q.733, clause 1 (1992) modified]";

Part 18:   "Completion of Calls to Busy Subscriber (CCBS) supplementary service [ITU-T Recommendation Q.733, clause 3 (1997) modified]";

Part 19:   "Three-Party (3PTY) supplementary service [ITU-T Recommendation Q.734, clause 2 (1996) and implementors guide (1998) modified]";

Part 20:   "Completion of Calls on No Reply (CCNR) supplementary service [ITU-T Recommendation Q.733, clause 5 (1999) modified]";

Part 21:   "Anonymous Call Rejection (ACR) supplementary service [ITU-T Recommendation Q.731, clause 4 (1993)]";

Part 31:   "Protocol Implementation Conformance Statement (PICS) proforma specification for basic services";

Part 32:   "Test Suite Structure and Test Purposes (TSS&TP) specification for basic services";

Part 33:   "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for basic services";

Part 34:   "Protocol Implementation Conformance Statement (PICS) proforma specification for supplementary services";

Part 35:   "Test Suite Structure and Test Purposes (TSS&TP) specification for supplementary services";

Part 36:   "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for supplementary services".

NOTE: Parts 13 and 22 to 30 have not been issued.

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Introduction

The present document contains the conformance test specification for ISUP '97 supplementary services. The present document presents an Abstract Test Suite (ATS), written in Tree And Tabular Combined Notation (TTCN). The main body of the present document presents the requirements regarding the chosen test method, conventions used within the ATS, the test suite structure and the Test Purposes. The annexes present the Protocol Implementation Conformance Statements (PICS), the Protocol Implementation eXtra Information for Testing (PIXIT), Protocol Conformance Test Report (PCTR) and the ATS for ISUP '97 supplementary services, the last one being available on electronic media.

1　　Scope

The present document contains the validation (conformance) test specification for ISUP '97 supplementary services defined in ITU-T Recommendation Q.730 [1]. The present document presents an Abstract Test Suite (ATS) for ISUP '97 supplementary services, written in TTCN, see ISO/IEC 9646-5 [27]. The present document applies only to exchanges having implemented the ISUP '97 protocol specification. It is applicable for validation testing of all types of exchanges as defined in the ISUP '97 protocol specification. The present document does not deal with compatibility testing.

The main text part of the present document presents the requirements regarding the chosen test method, conventions used within the ATS, the Test Suite Structure and Test Purposes (TSS&TP) for ISUP'97 supplementary services.

The annexes present the Protocol Implementation Conformance Statements (PICS), the Protocol Implementation eXtra Information for Testing (PIXIT), Protocol Conformance Test Report (PCTR) and the ATS for ISUP '97 supplementary services, the last one being available on electronic media.

Annex A provides the Protocol Implementation Conformance Statement (PICS) proforma for the ISUP'97 supplementary services defined in compliance with the relevant requirements and in accordance with the guidance given in ISO/IEC 9646-7 [28]. This statement, of which capabilities and options of a telecommunication specification have been implemented, is necessary for evaluating the conformance of a particular implementation.

The supplier of an implementation that is claimed to conform to the ISUP'97 supplementary services reference specification ITU-T Recommendation Q.730 [1] is required to complete a copy of the PICS proforma provided in annex A.

Annex B provides the Protocol Implementation eXtra Information for Test (PIXIT) proforma, needed as a preparation for testing.

Annex C provides the Protocol Conformance Test Report (PCTR) proforma, used for evaluating the results of the testing campaign.

Annex D explains how to get hold of the actual ATS, which is delivered in electronic form only.

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.

[1]　　　　　　　ITU-T Recommendation Q.730: "ISDN user part supplementary services".

[2]　　　　　　　ITU-T Recommendation Q.731: "Stage 3 description for number identification supplementary services using Signalling System No. 7".

[3]　　　　　　　ITU-T Recommendation Q.731.3 (1993): "Calling line identification presentation (CLIP)".

[4]　　　　　　　ITU-T Recommendation Q.731.4 (1993): "Calling line identification restriction (CLIR)".

[5]　　　　　　　ITU-T Recommendation Q.731.5 (1993): "Connected line identification presentation (COLP)".

[6]　　　　　　　ITU-T Recommendation Q.731.6 (1993): "Connected line identification restriction (COLR)".

[7]　　　　　　　ITU-T Recommendation Q.731.7 (1997): "Malicious call identification (MCID)".

[8]　　　　　　　ITU-T Recommendation Q.731.8 (1992): "Sub-addressing (SUB)".

[9]　　　　　ITU-T Recommendation Q.732: "Stage 3 description for call offering supplementary services using Signalling System No. 7".

[10]　　　　ITU-T Recommendation Q.732.7: "Explicit Call Transfer".

[11]　　　　ITU-T Recommendation Q.733.2 (1993): "Call hold (HOLD)".

[12]　　　　ITU-T Recommendation Q.733.3 (1997): "Completion of calls to busy subscriber (CCBS)".

[13]　　　　ITU-T Recommendation Q.733.4 (1993): "Terminal portability (TP)".

[14]　　　　ITU-T Recommendation Q.733.5 (1999): "Completion of calls on no reply".

[15]　　　　ITU-T Recommendation Q.734.1 (1993): "Conference calling".

[16]　　　　ITU-T Recommendation Q.734.2 (1996): "Three-party service".

[17]　　　　ITU-T Recommendation Q.735.1(1993): "Closed user group (CUG)".

[18]　　　　ITU-T Recommendation Q.737.1 (1997): "User-to-user signalling (UUS)".

[19]　　　　ITU-T Recommendation Q.761 (1997): "Signalling System No. 7 - ISDN User Part functional description".

[20]　　　　ITU-T Recommendation Q.762 (1997): "Signalling System No. 7 - ISDN User Part general functions of messages and signals".

[21]　　　　ITU-T Recommendation Q.763: "Signalling System No. 7 - ISDN User Part formats and codes".

[22]　　　　ITU-T Recommendation Q.764 (1997): "Signalling System No. 7 - ISDN User Part signalling procedures".

[23]　　　　ITU-T Recommendation Q.785.2: "ISUP'97 supplementary services – Test suite structure and test purposes (TSS & TP)".

[24]　　　　ISO/IEC 9646-1 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".

[25]　　　　ISO/IEC 9646-2 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite specification".

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

[27]　　　　ISO/IEC 9646-5 (1996): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 5: Requirements on test laboratories and clients for the conformance assessment process".

[28]　　　　ISO/IEC 9646-7 (1995): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".

[29]　　　　ITU-T Recommendation Q.788: "User-network-interface to user-network-interface compatibility test specifications for ISDN, non-ISDN and undetermined accesses interworking over international ISUP".

[30]　　　　ITU-T Recommendation E.164 (1997): "The international public telecommunication numbering plan".

[31]　　　　ITU-T Recommendation Q.701: "Functional description of the message transfer part (MTP) of Signalling System No. 7".

[32]　　　　ITU-T Recommendation Q.707: "Testing and maintenance".

[33]　　　　ITU-T Recommendation Q.733: "Stage 3 description for call completion supplementary services using Signalling System No. 7".

[34]   ITU-T Recommendation Q.737: "Stage 3 description for additional information transfer supplementary services using Signalling System No. 7".

[35]   ITU-T Recommendation Q.735: "Stage 3 description for community of interest supplementary services using Signalling System No. 7".

[36]   ITU-T Recommendation Q.734: "Stage 3 description for multiparty supplementary services using Signalling System No. 7".

3   Definitions and abbreviations

3.1   Definitions

For the purposes of the present document, the following terms and definitions apply:

- terms defined in ISDN User Part (ISUP) reference specification ITU-T Recommendation Q.730 [1];

- terms defined in ISO/IEC 9646-1 [24], ISO/IEC 9646-3 [26] and in ISO/IEC 9646-7 [28].

In particular, the following terms apply:

Abstract Test Case (ATC): complete and independent specification of the actions required to achieve a specific Test Purpose, defined at the level of abstraction of a particular Abstract Test Method, starting in a stable testing state and ending in a stable testing state (see ISO/IEC 9646-2, clause 3.3.3)

Abstract Test Method (ATM): description of how an IUT is to be tested, given at an appropriate level of abstraction to make the description independent of any particular realization of a Means of Testing, but with enough detail to enable abstract test cases to be specified for this method (see ISO/IEC 9646-2, clause 3.3.5)

Abstract Test Suite (ATS): test suite composed of abstract test cases (see ISO/IEC 9646-2, clause 3.3.6)

Implementation Under Test (IUT): implementation of one or more OSI protocols in an adjacent user/provider relationship, being part of a real open system which is to be studied by testing (see ISO/IEC 9646-2, clause 3.3.43)

ISDN number: number conforming to the numbering and structure specified in ITU-T Recommendation E.164

Means of Testing (MOT): combination of equipment and procedures that can perform the derivation, selection, parameterization and execution of test cases, in conformance with a reference standardized ATS, and can produce a conformance log (see ISO/IEC 9646-2, clause 3.3.54)

PICS proforma: document, in the form of a questionnaire, which when completed for an implementation or system becomes the PICS

PIXIT proforma: document, in the form of a questionnaire, which when completed for the IUT becomes the PIXIT

point of control and observation: point within a testing environment where the occurrence of test events is to be controlled and observed, as defined in an Abstract Test Method (see ISO/IEC 9646-2, clause 3.3.64)

pre-test condition: setting or state in the IUT which cannot be achieved by providing stimulus from the test environment

Protocol Implementation Conformance Statement (PICS): statement made by the supplier of a protocol claimed to conform to a given specification, stating which capabilities have been implemented (see ISO/IEC 9646-2, clauses 3.3.39 and 3.3.80)

Protocol Implementation eXtra Information for Testing (PIXIT): statement made by a supplier or implementor of an IUT (protocol) which contains or references all of the information related to the IUT and its testing environment, which will enable the test laboratory to run an appropriate test suite against the IUT (see ISO/IEC 9646-2, clauses 3.3.41 and 3.3.81)

System Under Test (SUT): real open system in which the IUT resides (see ISO/IEC 9646-2, clause 3.3.103)

user: access protocol entity at the User side of the user-network interface where a T reference point or coincident S and T reference point applies

3.2   Abbreviations

The ISUP message acronyms can be found in table 2 of ITU-T Recommendation Q.762 [20].

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

3PTY	Three Party service
addCgPN	additional Calling Party Number
addConNb	additional Connected Number
AdSg	Address Signals
APRI	Address Presentation Restricted Indicator
ASE	Application Service Entity
ASP	Abstract Service Primitive
ATC	Abstract Test Case
ATM	Abstract Test Method
ATP	Access Transport Parameter
ATS	Abstract Test Suite
BCI	Backward Call Indicators
CC	Country Code
CCBS	Completion of Calls to Busy Subscriber
CCBSpar	CCBS parameter
CD	Call Deflection
CDInf	Call Diversion Information
CDIV	Call DIVersion
CDmo	Call Diversion may occur
CdPSI	Called Party's Status Indicator
CFB	Call Forwarding Busy
CFNR	Call Forwarding No Reply
CFU	Call Forwarding Unconditional
CgPN	Calling Party Number
CHInf	Call History Information
CIC	Circuit Identification Code
CLI	Calling Line Identity
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
CntrlE	Controlling Exchange
COL	Connected Line Identity
COLP	Connected Line Identification Presentation
COLR	Connected Line Identification Restriction
CONF	Conference call, add-on
ConNb	Connected Number
CTNb	Call Transfer Number
CTRef	Call Transfer Reference
CUG	Closed User Group
CUGIC	CUG Interlock Code
CW	Call Waiting
DDI	Direct Dialling-In
DLE	Destination Local Exchange
DSS1	Digital Subscriber System No. 1
ECT	Explicit Call Transfer
FCI	Forward Call Indicators
GenNb	Generic Number
GenNot	Generic Notification
HOLD	Call Hold
IA	Incoming Access
ICB	Incoming Calls Barred

ICS	Implementation Conformance Statement
IncIE	Incoming International Exchange
IntermE	Intermediate Exchange
IPI	ISUP Preference Indicator
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
ITE	International Transit Exchange
IUT	Implementation Under Test
IWorkE	Interworking Exchange
LAPD	Link Access Protocol for the D-channel
LOPInd	LOop Prevention Indicators
LT	Lower Tester
MCID	Malicious Call Identification
MOT	Means Of Testing
MSN	Multiple Subscriber Number
MTC	Main Test Component
MTP	Message Transfer Part
NNI	Network-Network Interface
NoInd	No Indication
NSO	Notification Subscription Option
NTE	National Transit Exchange
OA	Outgoing Access
OBCI	Optional Backward Call Indicators
OFCI	Optional Forward Call Indicators
OriCdNb	Original Called Number
PCO	Point of Control and Observation
PCTR	Protocol Conformance Test Report
PDC	Propagation Delay Counter
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
PSTN	Public Switched Telephone Network
OLE	Originating Local Exchange
OutIE	Outgoing International Exchange
RgInd	Redirecting Indicator
RgNb	Redirecting Number
RnCnt	Redirection Counter
RnInf	Redirection Information
RnNb	Redirection Number
RnNbRes	Redirection Number Restriction
RnReas	Redirection Reason
SCCP	Signalling Connection Control Part
ScrI	Screening Indicator
SCS	System Conformance Statement
ServAct	Service Activation
SP	Signalling Point
SUB	Sub-addressing
SUT	System Under Test
TCAP	Transaction Capabilities Application Part
TCP	Test Coordination Procedures
TP	Terminal Portability
TP	Test Purpose (context dependent)
TSS	Test Suite Structure
TSS&TP	Test Suite Structure and Test Purposes
TTCN	Tree and Tabular Combined Notation
UNI	User-Network interface
USI	User Service Information
USIp	User Service Information prime
UUInd	User-to-User Indicators
UUInf	User-to-User Information
UUS	User-to-User Signalling
UUS1	User-to-User Signalling service 1

UUS2   User-to-User Signalling service 2
UUS3   User-to-User Signalling service 3

4   Void

5   Implementation under test and test methods

5.1   Identification of the system and implementation under test

The System Under Test (SUT) is an exchange. The Implementation Under Test (IUT) is the ISUP '97 implementation in this exchange, mainly the part responsible for the supplementary services functionality, as shown in figure 1.
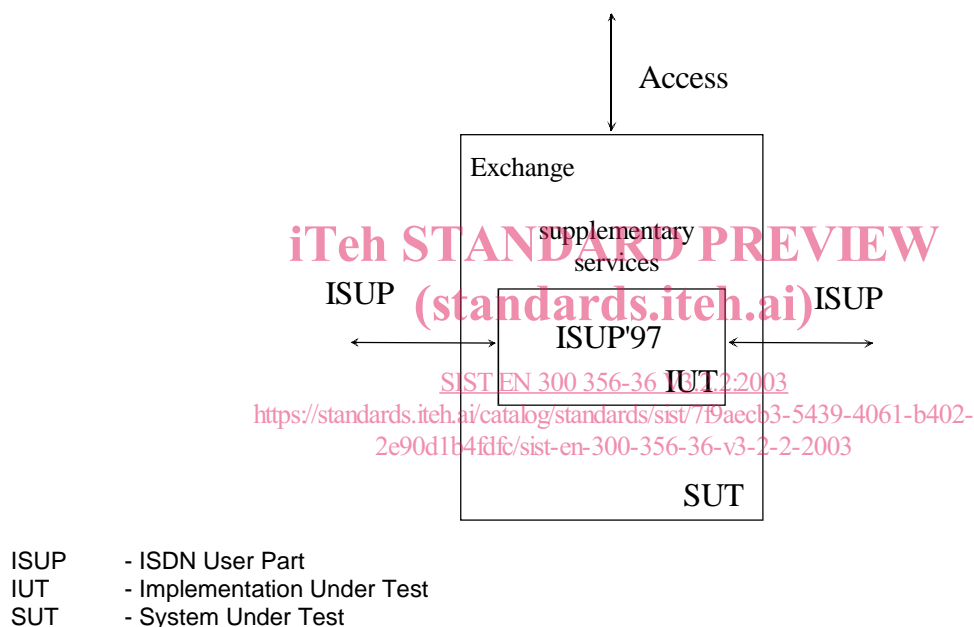

ISUP   - ISDN User Part
IUT   - Implementation Under Test
SUT   - System Under Test

Figure 1

The ISUP signalling protocol can be observed on the SS No.7 link on the Network-Network Interface (NNI). The effects of signalling procedures of the ISDN User Part can be observed on the circuits controlled by the ISUP on the NNI.

The ISUP implementation will in some exchanges have to interwork with the Access signalling system on the User-Network Interface (UNI) and involve call handling in order to establish end-to-end connections.

From the ISUP reference standard several types of exchanges (or roles) can be identified as presented in figure 2.