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Digitalno omrežje z integriranimi storitvami (ISDN) - Preskušanje integriranosti omrežja (NIT) - Preskušanje ISDN/PSTN od konca do konca - 1. del: Zgradba preskuševalnega niza in namen preskušanja (TSS&TP) - Specifikacija

Integrated Services Digital Network (ISDN) - Network Integration Testing (NIT) - ISDN/PSTN end-to-end testing - Part 1: Test Suite Structure and Test Purposes (TSS&TP) specification

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Integrated Services Digital Network (ISDN); Network Integration Testing (NIT); ISDN/PSTN end-to-end testing; Part 1: Test Suit Structure and Test Purposes (TSS&TP) specification

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Foreword

This ETSI Guide (EG) has been produced by ETSI Technical Committee Services and Protocols for Advanced Networks (SPAN).

The present document is part 1 of a multi-part EG covering Integrated Services Digital Network (ISDN); Network Integration Testing (NIT); ISDN/PSTN end-to-end testing, as identified below:

> **Part 1:   "Test Suite Structure and Test Purposes (TSS&TP) specification";**
>
> Part 2:   "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma for the network".

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Introduction

The present document contains the Test Suite Structure and Test Purposes (TSS&TP) list developed in the EURESCOM project P613 "Methodology and tools for ISDN Network Integration and Traffic Route Testing" for testing the international European ISDN, covering Network Integration Testing (NIT) between ISDN-ISDN, ISDN-PSTN and PSTN-ISDN networks. The objective is to verify the level of international end-to-end support of ISDN services. Both bearer services (and associated teleservices) and supplementary services are checked for interworking capability and compatibility, in the international European ISDN.

The European ISDN is made up by connecting the different national networks and End-to-end NIT covers all the testing activities necessary to assess the correct behaviour of the interconnected network from the point of view of access interfaces, network side.

Included are the test purposes developed in the preceding EURESCOM project P613 with additional test purposes for the basic call and supplementary services that are supported by the international ISUP versions 1 and 2, and test purposes for end-to-end performance to check B-channel stability and quality. The performance objectives take into consideration the definitions present in the relevant ITU-T Recommendations and adopt the 24 hours measurement period and target values used by ETSI for ONP 64 kbit/s leased line applications.

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 for the pan-European Integrated Services Digital Network (ISDN) as provided by European public telecommunications operators by means of the Digital Subscriber Signalling System No. one (DSS1) protocol, for Network Integration Testing (NIT) covering the end-to-end support of ISDN services.

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]   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]".

[2]   EN 300 267-1: "Integrated Services Digital Network (ISDN); Telephony 7 kHz, videotelephony, audiographic conference and videoconference teleservices; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[3]   ETS 300 080: "Integrated Services Digital Network (ISDN); ISDN lower layer protocols for telematic terminals".

[4]   ETS 300 103: "Integrated Services Digital Network (ISDN); Support of CCITT Recommendation X.21, X.21 bis and X.20 bis based Data Terminal Equipments (DTEs) by an ISDN Synchronous and asynchronous terminal adaptation functions".

[5]   EN 300 092-1: "Integrated Services Digital Network (ISDN); Calling Line Identification Presentation (CLIP) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[6]   EN 300 093-1: "Integrated Services Digital Network (ISDN); Calling Line Identification Restriction (CLIR) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[7]   EN 300 097-1: "Integrated Services Digital Network (ISDN); Connected Line Identification Presentation (COLP) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[8]   EN 300 098-1: "Integrated Services Digital Network (ISDN); Connected Line Identification Restriction (COLR) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[9]   EN 300 138-1: "Integrated Services Digital Network (ISDN); Closed User Group (CUG) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[10]   EN 300 061-1: "Integrated Services Digital Network (ISDN); Subaddressing (SUB) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[11]   EN 300 055-1: "Integrated Services Digital Network (ISDN); Terminal Portability (TP) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[12]   EN 300 286-1: "Integrated Services Digital Network (ISDN); User-to-User Signalling (UUS) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[13]   EN 300 185-1: "Integrated Services Digital Network (ISDN); Conference call, add-on (CONF) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[14]   EN 300 207-1: "Integrated Services Digital Network (ISDN); Diversion supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[15]   EN 300 210-1: "Integrated Services Digital Network (ISDN); Freephone (FPH) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[16]   EN 300 130-1: "Integrated Services Digital Network (ISDN); Malicious Call Identification (MCID) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[17]   EN 300 188-1: "Integrated Services Digital Network (ISDN); Three-Party (3PTY) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[18]   EN 300 141-1: "Integrated Services Digital Network (ISDN); Call Hold (HOLD) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[19]   EN 300 058-1: "Integrated Services Digital Network (ISDN); Call Waiting (CW) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[20]   EN 300 356-1: "Integrated Services Digital Network (ISDN); Signalling System No.7; ISDN User Part (ISUP) version 3 for the international interface; Part 1: Basic services [ITU-T Recommendations Q.761 to Q.764 (1997), modified]".

[21]   EN 300 369-1: "Integrated Services Digital Network (ISDN); Explicit Call Transfer (ECT) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[22]   EN 300 195-1: "Integrated Services Digital Network (ISDN); Supplementary service interactions; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[23]   ETS 300 289: "Business TeleCommunications (BTC); 64 kbit/s digital unrestricted leased line with octet integrity (D64U); Connection characteristics".

[24]   ITU-T Recommendation G.821: "Error performance of an international digital connection operating at a bit rate below the primary rate and forming part of an integrated services digital network".

[25]   CCITT Recommendation G.822 (1988): "Controlled slip rate objectives of an international digital connection".

[26]   CCITT Recommendation O.152 (1988): "Error performance measuring equipment for 64 kbit/s paths".

[27]   CCITT Recommendation I.112 (1988): "Vocabulary and terms for ISDNs".

[28]   CCITT Recommendation I.210 (1988): "Principles of the telecommunication services supported by an ISDN and the means to describe them".

[29]   CCITT Recommendation E.164 (1988): "Numbering plan for the ISDN era".

[30]   ISO/IEC 9646-1: "Information Technology - OSI Conformance Testing Methodology and Framework - Part 1: General Concepts".

[31]   ITU-T Recommendation G.711: "Pulse code modulation (PCM) of voice frequencies".

[32]   ITU-T Recommendation H.221: "Frame structure for a 64 to 1920 kbit/s channel in audiovisual teleservices".

[33]   ITU-T Recommendation F.721: "Videotelephony teleservice for ISDN".

[34]   ITU-T Recommendation F.182: "Guidelines for the support of the communication of documents using Group 3 facsimile between user terminals via public networks".

[35]   ISO/IEC 7776: "Information technology - Telecommunications and information exchange between systems - High-level data link control procedures - Description of the X.25 LAPB-compatible DTE data link procedures".

[36]   ISO/IEC 8208: "Information technology - Data communications - X.25 Packet Layer Protocol for Data Terminal Equipment".

[37]   EG 201 018: "Integrated Services Digital Network (ISDN); Application of the Bearer Capability (BC), High Layer Compatibility (HLC) and Low Layer Compatibility (LLC) information elements by terminals supporting ISDN services".

[38]   ETS 300 097-1/A1: "Integrated Services Digital Network (ISDN); Connected Line Identification Presentation (COLP) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

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

[40]   ITU-T Recommendation Q.699: "Interworking between ISDN access and non-ISDN access over ISDN User Part of Signalling System No. 7".

[41]   ITU-T Recommendation Q.734.2: "Three-party service".

[42]   EN 300 196-1: "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".

[43]   EN 300 359-1: "Integrated Services Digital Network (ISDN); Completion of Calls to Busy Subscriber (CCBS) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[44]   EN 300 357: "Integrated Services Digital Network (ISDN); Completion of Calls to Busy Subscriber (CCBS) supplementary service; Service description".

[45]   EN 301 065-1: "Integrated Services Digital Network (ISDN); Completion of Calls on No Reply (CCNR) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[46]   EN 300 001: "Attachments to the Public Switched Telephone Network (PSTN); General technical requirements for equipment connected to an analogue subscriber interface in the PSTN".

[47]   ETS 300 648: "Public Switched Telephone Network (PSTN); Calling Line Identification Presentation (CLIP) supplementary service; Service description".

[48]   EN 300 659: "Public Switched Telephone Network (PSTN); Subscriber line protocol over the local loop for display (and related) services".

[49]   ITU-T Recommendation V.110: "Support by an ISDN of data terminal equipments with V-Series type interfaces".

[50]   ITU-T Recommendation X.30: "Support of X.21, X.21 bis and X.20 bis based Data Terminal Equipments (DTEs) by an Integrated Services Digital Network (ISDN)".

3   Definitions

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

3.1   Definitions related to conformance testing

Abstract Test Suite: refer to ISO/IEC 9646-1 [30]

Implementation Under Test: refer to ISO/IEC 9646-1 [30]

Lower Tester: refer to ISO/IEC 9646-1 [30]

Implementation Conformance Statement (ICS) proforma: refer to ISO/IEC 9646-1 [30]

Implementation eXtra Information for Testing (IXIT) proforma: refer to ISO/IEC 9646-1 [30]

Point of Control and Observation: refer to ISO/IEC 9646-1 [30]

Protocol Implementation Conformance Statement: refer to ISO/IEC 9646-1 [30]

Protocol Implementation eXtra Information for Testing: refer to ISO/IEC 9646-1 [30]

System Under Test: refer to ISO/IEC 9646-1 [30]

Test Purpose: refer to ISO/IEC 9646-1 [30]

3.2   Definitions related to EN 300 403-1

User: DSS1 protocol entity at the User side of the user-network interface where a T reference point or coincident S and T reference point applies

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

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

Integrated Services Digital Network (ISDN): see CCITT Recommendation I.112 [27], subclause 2.2 definition 308

Service: telecommunications service: see CCITT Recommendation I.112 [27], subclause 2.2 definition 201

Supplementary service: see CCITT Recommendation I.210 [28], subclause 2.4

ISDN number: number conforming to the numbering and structure specified in CCITT Recommendation E.164 [29]

3.3   Definitions related to test purpose descriptions

BC = speech: bearer capability information element with its information transfer capability field set to "speech" and its user information layer one protocol field set to "G.711 [31] A-law"

BC = 3,1 kHz audio: bearer capability information element with its information transfer capability field set to "3,1 kHz Audio" and its user information layer one protocol field set to "G.711 [31] A-law"

BC = UDI: bearer capability information element with its information transfer capability set to "unrestricted digital information"

BC = UDI/TA: bearer capability information element with its information transfer capability set to "unrestricted digital information with tones/announcements" and its user information layer one protocol field set to "Recommendations H.221 [32] and H.242"

BC = ITU-T Recommendation V.110 [49] / ITU-T Recommendation X.30 [50]: a Bearer capability information element with its information transfer capability set to "unrestricted digital information" and its user information layer 1 field set to "CCITT standardized rate adaption ITU-T Recommendation V.110 [49] / ITU-T Recommendation X.30 [50]", including sync/async and user rate values

HLC = telephony: High Layer compatibility information element with its high layer characteristics identification field set to "telephony"

HLC = videotelephony_ic: High Layer compatibility information element with its high layer characteristics identification field set to "videotelephony (ITU-T Recommendation F.721 [33])" and its extended audiovisual characteristics field set to "capability set of initial channel of ITU-T Recommendation H.221 [32]"

HLC = facsimile group 2/3: High Layer compatibility information element with its high layer characteristics identification field set to "facsimile group 2/3 (ITU-T Recommendation F.182 [34])"

HLC = facsimile group 4: High Layer compatibility information element with its high layer characteristics identification field set to "facsimile group 4 class 1"

HLC = telex: High Layer compatibility information element with its high layer characteristics identification field set to "telex"

LLC = telematic_term: Low Layer compatibility information element with its user information layer 2 field indicating "ISO/IEC 7776 DTE-DTE [35] operation" and user information layer 3 field indicating "ISO/IEC 8208 [36]"

LLC = voice band data via modem: Low Layer compatibility information element with its user information layer 1 field indicating a "modem type" coding

LLC = ITU-T Recommendation V.110 [49] / ITU-T Recommendation X.30 [50]: a Low Layer compatibility information element with its user information layer 1 field indicating "CCITT standardized rate adaption ITU-T Recommendation V.110 [49] / ITU-T Recommendation X.30 [50]" and including sync/async and user rate values

telephony 7 kHz fallback not allowed SETUP message: SETUP message containing a single BC = UDI/TA and a HLC = telephony

videotelephony fallback not allowed SETUP message: SETUP message containing a single BC = UDI/TA and a single HLC = videotelephony_ic

SI = UPVP: Screening Indicator forwarded to the served user coded as "User-provided, verified and passed"

SI = NP: Screening Indicator forwarded to the served user coded as "Network provided"

PI = PR: Presentation Indicator forwarded to the served user coded as "Presentation restricted"

TON = international: type of number forwarded to the served user coded as "international"

TON = unknown: type of number forwarded to the served user coded as "unknown"

NPI = unknown: numbering plan identification forwarded to the served user coded as "unknown"

CUG default request: calling user does not include in the outgoing SETUP message an explicit request for the CUG supplementary service

UI length = 32: length of the User information field of the User-user information element is 32 octets

CF active: call forwarding (U, B or NR) supplementary service is already activated with the address of user C

Unavailability period: period of time beginning at the first of 10 consecutive severely eroded seconds and ending immediately before the first following period of 10 consecutive seconds none of which are severely eroded

Eroded second: second with one or more bit errors

Severely eroded second: second where at least 0,1% of the bits are eroded (corresponds to a one-second interval with a bit-error ratio worse than $1x10^{-3}$)

Slip: one or more extra or missing consecutive unit intervals in the bit stream

Octet slip: slip of one complete octet

Eroded Seconds Ratio: ratio of eroded seconds over all seconds within a specified measuring period, where neither are counted during unavailability periods

Severely Eroded Seconds: ratio of severely eroded seconds over all seconds within a specified measuring period, where neither are counted during unavailability periods

PRBS = 2^{11}**-1:** pseudo random binary sequence according to O.152 [26] transmitted for two consecutive periods of 24 hours. If an unavailability period of more than one hour occurred during the measuring period, it shall be extended accordingly

4   Abbreviations

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

ATS	Abstract Test Suite
BC	Bearer capability information element
CD	Call deflection
CFB	Call forwarding busy
CFNR	Call forwarding no response
CFU	Call forwarding unconditional
CLIP	Calling line identification presentation
CLIR	Calling line identification restriction
COLP	Connected line identification presentation
COLR	Connected line identification restriction
CONF	Conference (add-on)
CUG	Closed user group
CW	Call waiting
ECT	Explicit call transfer
ESR	Eroded Seconds Ratio
FPH	Freephone service
FTAM	File Transfer Access & Management
HLC	High layer compatibility information element
LLC	Low layer compatibility information element
MCID	Malicious call identification
NIT	Network Integration Testing
ONP	Open Network Provision
OSI	Open Systems Interconnection
PI	Presentation indicator
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
P104	EURESCOM P104 ATS v1.2
SESR	Severely Eroded Seconds
SI	Screening indicator
TON	Type of number
TC	Test Case
TP	Terminal portability
TSS	Test Suite Structure
TSS&TP	Test Suite Structure and Test Purposes
UDI	Unrestricted digital information
UDI-TA	Unrestricted digital information with tones/announcements
SUB	Subaddressing
UUS	User-to-user signalling
UUS1	UUS service 1

UUS2	UUS service 2
UUS3	UUS service 3
3PTY	Three-party conference

5   Test Suite Structure (TSS)

5.1   ISDN-ISDN

ISDN-ISDN	Basic_Call (1)	Successful (1)	Speech	1101xx
			UDI	1102xx
			Audio	1103xx
			UDI-TA	1104xx
		Unsuccessful (2)	Speech	1201xx
			UDI	1202xx
			Audio	1203xx
			UDI-TA	1204xx
	Supplementary Services (2)		CLIP	2101xx
			CLIR	2102xx
			COLP	2103xx
			COLR	2104xx
			CUG	2105xx
			SUB	2106xx
			TP	2107xx
			UUS	2108xx
			CONF	2109xx
			CFU	2111xx
			CFB	2112xx
			CFNR	2113xx
			CD	2114xx
			FPH	2115xx
			MCID	2116xx
			3PTY	2117xx
			HOLD	2118xx
			CW	2119xx
			ECT	2120xx
			CCBS	2121xx
			CCNR	2122xx
			Comb	2123xx
			DDI	2124xx
	B-channel (3)	(0)	Speech	3001xx
			UDI	3002xx
			Audio	3003xx
			UDI-TA	3004xx

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5.2   ISDN-PSTN

ISDN-PSTN	Basic_Call (4)	Successful (1)	Speech	4101xx
			Audio	4102xx
			UDI -TA	4103xx
		Unsuccessful (2)	Speech	4201xx
			UDI	4202xx
			Audio	4203xx
			UDI -TA	4204xx
	Supplementary Services (5)		CLIP	5101xx
			CLIR	5102xx
			COLP	5103xx
			COLR	5104xx
			CUG	5105xx
			CFU	5106xx
			CFB	5107xx
			CFNR	5108xx
			UUS1	5109xx
			CCBS	5110xx
			CCNR	5111xx
			ECT	5112xx

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5.3   PSTN-ISDN   (standards.iteh.ai)

PSTN-ISDN	Basic_Call (6)	Successful (1)		6101xx
		Unsuccessful (2)		6201xx
	Supplementary Services (7)		CLIP	7101xx
			CLIR	7102xx
			CFU	7103xx
			CFB	7104xx
			CFNR	7105xx
			MCID	7106xx
			CUG	7107xx
			CCBS	7108xx
			CCNR	7109xx
			DDI	7110xx
			ECT	7111xx