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Storitve in protokoli za napredna omrežja (SPAN) – Preskušanje integracije omrežja med IN, PLMN in ISDN – 1. del: Zgradba preskušalnega niza in namen preskušanja (TSS&TP)

Services and Protocols for Advanced Networks (SPAN); Network Integration Testing between IN, PLMN and ISDN; Part 1: Test Suite Structure and Test purposes (TSS&TP)

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33.080	Digitalno omrežje z integriranimi storitvami (ISDN)	Integrated Services Digital Network (ISDN)

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Technical Specification

Services and Protocols for Advanced Networks (SPAN); Network Integration Testing between IN, PLMN AND ISDN Part 1: Test Suite Structure and Test purposes (TSS&TP)

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Foreword

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

The present document is part 1 of a multi-part deliverable covering the Network Integration Testing between IN, PLMN and ISDN as identified below:

Part 1: "Test Suite Structure and Test Purposes (TSS&TP)";

Part 2: "Implementation Conformance Statement (ICS), partial Implementation eXtra Information for Testing (IXIT) proformas and Abstract Test Suite (ATS)".

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Introduction

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The present document contains the Test Suite Structure and Test Purposes (TSS&TP) for Network Integration Testing for the European ISDN and PLMN, covering the most used IN services and the interworking between the mobile and fix networks. All bearer services (and associated teleservices) and supplementary services are checked for interworking capability and compatibility, in the European ISDN and PLMN.

1 Scope

The present document specifies the Test Suite Structure and Test Purposes (TSS&TP) for Network Integration Testing (NIT) to verify the overall compatibility for the most used IN services based on the CS3 and the INAP/CAP/ISUP interworking between the mobile and fix networks.

Network Integration Testing will assure that the appropriate requested features pass between an ISDN subscriber and the mobile subscriber across the national or international ISUP (ISUP V2) interface and the IN interfaces CAP/INAP.

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 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] ETSI ETS 300 083: "Integrated Services Digital Network (ISDN); Circuit mode structured bearer service category usable for speech information transfer; Terminal requirements for end-to-end compatibility".
- [3] ETSI ETS 300 084: "Integrated Services Digital Network (ISDN); Circuit mode structured bearer service category usable for 3.1 kHz audio information transfer; Terminal requirements necessary for end-to-end compatibility".
- [4] ETSI 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".
- [5] ETSI ETS 300 080: "Integrated Services Digital Network (ISDN); ISDN lower layer protocols for telematic terminals".
- [6] ETSI 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".
- [7] ETSI 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".
- [8] ETSI EN 300 207-1: "Integrated Services Digital Network (ISDN); Diversion supplementary services; Digital Subscriber Signalling System No. One (DSS1); Part 1: Protocol specification".
- [9] ETSI ETS 300 289 (1994): "Business TeleCommunications (BTC); 64 kbit/s digital unrestricted leased line with octet integrity (D64U); Connection characteristics".
- [10] ISO/IEC 9646-1: "Information Technology-Open Systems Interconnection- Conformance testing methodology and framework, Part 1: General Concepts".
- [11] ETSI EN 300 940 (GSM 04.08): "Digital cellular telecommunications system (Phase 2+) (GSM); Mobile radio interface layer 3 specification".

- [12] ITU-T Recommendation Q.699: "Interworking between the digital Subscriber Signalling System Layer 3 protocol and the Signalling System No.7 ISDN User part".
- [13] ITU-T Recommendation Q.764: "Signalling System No. 7 - ISDN User Part signalling procedures".
- [14] ETSI TS 129 078: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Customized Applications for Mobile network Enhanced Logic (CAMEL) Phase 3; CAMEL Application Part (CAP) specification (3GPP TS 29.078 version 4.0.0 Release 4)".
- [15] ETSI EN 301 931-2 (V1.1.2): "Intelligent Network (IN); Intelligent Network Capability Set 3 (CS3); Intelligent Network Application Protocol (INAP); Protocol specification; Part 2: SCF-SSF interface".
- [16] ITU-T Recommendation Q.1601: "Signalling system No. 7 - Interaction between N-ISDN and INAP CS2".
- [17] 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".
- [18] ISO/IEC 8208: "Information technology - Data communications - X.25 Packet Layer Protocol for Data Terminal Equipment".
- [19] ETSI TS 101 285 (GSM 02.78): "Digital cellular telecommunications system (Phase 2+); Customized Applications for Mobile network Enhanced Logic (CAMEL); Service definition; Stage 1".
- [20] ETSI TS 101 044 (GSM 03.78): "Digital cellular telecommunications system (Phase 2+); Customized Applications for Mobile network Enhanced Logic (CAMEL); Stage 2".
- [21] ETSI TS 101 046 (GSM 09.78): "Digital cellular telecommunications system (Phase 2+); Customized Applications for Mobile network Enhanced Logic (CAMEL); CAMEL Application Part (CAP) specification".

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3 Definitions

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

3.1 Definitions related to conformance testing

Abstract Test Case: Refer to ISO/IEC 9646-1 [38].

Abstract Test Suite: Refer to ISO/IEC 9646-1 [38].

Implementation Under Test: Refer to ISO/IEC 9646-1 [38].

Lower Tester: Refer to ISO/IEC 9646-1 [38].

Implementation Conformance Statement (ICS) proforma: Refer to ISO/IEC 9646-1 [38].

Implementation eXtra Information for Testing (IXIT) proforma: Refer to ISO/IEC 9646-1 [38].

Point of Control and Observation: Refer to ISO/IEC 9646-1 [38].

Protocol Implementation Conformance Statement: Refer to ISO/IEC 9646-1 [38].

Protocol Implementation eXtra Information for Testing: Refer to ISO/IEC 9646-1 [38].

System Under Test: Refer to ISO/IEC 9646-1 [38].

Test Purpose: Refer to ISO/IEC 9646-1 [38].

3.2 Definitions related to test purpose descriptions

BC=speech: a 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 A-law" [2]

BC=3,1 kHz audio: a 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 A-law" [3]

BC=UDI: a Bearer capability information element with its information transfer capability set to "unrestricted digital information" [1]

BC=UDI/TA: a 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 and H.242" [4]

BC= V110/X30: a Bearer capability information element with its information transfer capability set to "unrestricted digital information" and its user information layer 1 field set to "ITUstandardized rate adaption V.110/X.30", including sync/async and user rate values [1].

HLC=telephony: a High Layer compatibility information element with its high layer characteristics identification field set to "telephony" [28]

HLC=videotelephony_ic: a High Layer compatibility information element with its high layer characteristics identification field set to "videotelephony (Recommendation F.721)" and its extended audiovisual characteristics field set to "capability set of initial channel of Recommendation H.221" [4]

HLC = Facsimile G2/G3: a High Layer compatibility information element with its high layer characteristics identification field set to "facsimile group 2/3 (Recommendation F.182)" [1]

HLC=facsimile group 4: a High Layer compatibility information element with its high layer characteristics identification field set to "facsimile group 4 class 1" [1], [5]

HLC=telex: a High Layer compatibility information element with its high layer characteristics identification field set to "telex" [1]

LLC=telematic_term: a Low Layer compatibility information element with its user information layer 2 field indicating "ISO/IEC 7776 DTE-DTE operation" and user information layer 3 field indicating "ISO/IEC 8208" [1], [5]

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

LLC = V110/X30: a Low Layer compatibility information element with its user information layer 1 field indicating "ITUstandardized rate adaption V.110/X.30" and including sync/async and user rate values [6]

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

SI=NP: Screening Indicator coded as "Network provided" [1]

PI=PR: Presentation Indicator coded as "Presentation restricted" [1]

TON=international: Type of number coded as "international" [1]

TON=unknown: Type of number coded as "unknown" [1]

NPI=unknown: Numbering plan identification coded as "unknown" [1]

CUG default request: the calling user do not include in the outgoing SETUP message a explicit request for the CUG supplementary service [11]

UI length=32: the length of the User information field of the User-user information element is 35 octets

CF active: the call forwarding (U, B or NR) supplementary service is already activated with the address of user C [17]

GSM - Bearer service categories: all bearer service categories provide information transfer between R/S reference points and allow the use of sub-rate information streams which are rate adapted.

GSM-BC=UD: Unrestricted Digital Information (UD); Provides the transfer of unrestricted digital information.

GSM-BC= 3,1 kHz (External to the PLMN): Used to select a "3,1 kHz audio" interworking function at the MSC. This service category is used when interworking with the ISDN or PSTN "3,1 kHz audio" service and includes the capability to select a modem at the interworking function. "External to the PLMN" indicates that the "3,1 kHz audio" service is only used outside of the PLMN, in the ISDN/PSTN. The connection within the PLMN, user access point to the interworking function, is an unrestricted digital connection.

Alternate Speech/Data: Provides the capability to swap between speech and data during a call.

- If either the speech or data portion of the call requires a full rate channel, a full rate channel shall be used for the duration of the call.
- The access interface at the mobile station for the data portion is assumed to be a standard data interface. Some means must be provided to select the speech/data capability.

Speech followed by Data: Provides a speech connection first and then at some time while the call is in progress, the user can switch to a data connection. The user cannot switch back to speech after the data portion. If either the speech or data portion of the call requires a full rate channel, a full rate channel shall be used from the start of the call. The network may then change to a half rate channel for the data portion.

GSM teleservices: Teleservices supported by a GSM PLMN are described by a number of attributes which are intended to be largely independent. They are grouped into three categories:

- High layer attributes.
- Low layer attributes (describing the Bearer capabilities which support the Teleservice).
- Information transfer attributes.
- Access attributes.
- General attributes.

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GSM-BC= Speech (TS 11): This service provides the transmission of speech information and audible signalling tones of the PSTN/ISDN. In the GSM PLMN and the fixed network processing technique appropriate for speech such as analogue transmission, echo cancellation and low bit rate voice encoding may be used.

Alternate speech and facsimile group 3 (TS 61): This Teleservice allows the connection of ITUgroup 3 fax apparatus (send and/or receive) to the mobile stations of a GSM PLMN. Facsimile connections may be established to/from group 3 apparatus in the PSTN, ISDN or GSM PLMN.

Automatic Facs. group 3 (TS 62): This teleservice allows connection of ITUgroup 3 fax apparatus to and from the mobile stations of a GSM PLMN. Facsimile connections may be established to and from group 3 apparatus in the PSTN, ISDN or GSM PLMN.

4 Abbreviations

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

3PTY	Three-ParTY conference
ATS	Abstract Test Suite
BC	Bearer Capability information element
BS	Base Station
BSC	Base Station Controller
BSS	Base Station Sub-system
BSS	Base Station System
CAMEL	Customized Applications for Mobile network Enhanced Logic
CD	Call Deflection
CFB	Call Forwarding Busy
CFNR	Call Forwarding No Response
CFNRc	Call Forwarding on mobile subscriber Not Reachable
CFNRy	Call Forwarding on No Reply

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
DFC	Disconnect Forward Connection
ECT	Explicit Call Transfer
FPH	FreePHone service
GMSC	Gateway MSC
GSM	Global System for Mobile communication
HLC	High Layer Compatibility information element
HLR	Home Location Register
HPLMN	Home Public Land Mobile Network
IN	Intelligent Network
INAP	Intelligent Network Application Part
IP	Internet Protocol
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
LAN	Locale Access Network
LLC	Low Layer Compatibility information element
MAP	Mobile Application Part
MCID	Malicious Call IDentification
MS	Mobile Station
MS	Mobile Subscriber
MSC	Mobile Switching Center
MT	Mobile Terminal
MT	Mobile Terminated
MTP	Message Transfer Part
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
PLMN	Public Land Mobile Network
PSTN	Public Switched Telephone Network
SCCP	Signaling Connection and Control Part
SCF	Service Control Function
SCP	Service Control Point
SGSN	Serving GPRS Support Node
SI	Screening Indicator
SMS	Short Message Service
SS	Supplementary Service
SSP	Service Switching Point
SUB	Subaddressing
TCAP	Transaction Capabilities Application Part
TON	Type Of Number
TP	Terminal Portability
TP	Test Plant
TSS	Test Suite Structure
TSS&TP	Test Suite Structure and Test Purposes
UD	Unrestricted Digital information
UMTS	Universal Mobile Telecommunications System
UUS	User-to-User Signalling
UUS1	UUS service 1
UUS2	UUS service 2
UUS3	UUS service 3
VLR	Visitor Location Register
VLR	Visitor Location Register

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VPLMN Visited Public Land Mobile Network

5 Numbering Scheme

Pos. 1: Network of the A-Subscriber
 Pos. 2: Network of the B-Subscriber
 Pos. 3: Network of the C-Subscriber
 Pos. 4: Network of the D-Subscriber
 Pos. 5: Network of the E-Subscriber

The following Network Codes apply:

_ : No such network used (used e.g. for C-Subscriber in successful A to B Calls)
 (underscore makes it easier to read the name)

P: PSTN
 I: ISDN
 G: GSM (w/ HCSCD & GPRS)

(Extensions will be added when needed)

Pos. 6 and 7: Bearer- or Teleservice involved

xx: defined per PIXIT value.

NOTE: This may be appropriate for Test Purposes (provided the Test Purpose states for which Bearer- and/or Tele Services it should be tested). It is however NOT appropriate for Test Cases since it would be detrimental to Test Automation:

- SP: Speech;
- AU: 3,1 kHz Audio;
- UD: UDI;
- FX: Facsimile G3;
- HA: HSCSD - 3,1 kHz audio;
- HU: HSCSD - UDI.

Pos. 8 and 9:

_ : No Supplementary Services Involved / Successful
 _U: No Supplementary Services Involved / Unsuccessful
 SS: Supplementary Services Involved
 SI: Supplementary Services interaction
 SN: Nonsymmetrical Supplementary Services Involved
 ST: Supplementary Services transparent

IN SERVICES

Number translation services:

N_: No Supplementary Services Involved / Basic Call Successful/Number translation services
 NU: No Supplementary Services Involved / Basic Call Unsuccessful/Number translation services
 NS: Supplementary Services Involved / Number translation services
 NI: Supplementary Services interaction / Number translation services
 NN: Nonsymmetrical Supplementary Services Involved / Number translation services
 NT: Supplementary Services transparent to IN / Number translation services

Services with user interactive dialogue:

I_: No Supplementary Services Involved / Basic Call Successful/Services with user interactive dialogue
 IU: No Supplementary Services Involved / Basic Call Unsuccessful/ Services with user interactive dialogue
 IS: Supplementary Services Involved / Services with user interactive dialogue
 II: Supplementary Services interaction / Services with user interactive dialogue

IN: Nonsymmetrical Supplementary Services Involved / Services with user interactive dialogue
 IT: Supplementary Services transparent to IN / Services with user interactive dialogue

Other services:

O_: No Supplementary Services Involved / Basic Call Successful/ Other services
 OU: No Supplementary Services Involved / Basic Call Unsuccessful/ Other services
 OS: Supplementary Services Involved / Other services
 OI: Supplementary Services interaction / Other services
 ON: Non symmetrical Supplementary Services Involved / Other services
 OT: Supplementary Services not impact by IN / Other services

Pos. 10 to 20: YYYY Name of individual Test Group (if needed) If supplementary services are involved the following codes are used.

Services	Name of individual test group
3PTY	3PTY
Call Barring services	CBS
Call Barring services outgoing	CBSO
CCBS	CCBS
CD	CD
CFB	CFB
CFNR	CFNR
CFU	CFU
CLIP	CLIP
CLIR	CLIR
COLP	COLP
COLR	COLR
CONF	CONF
CUG	CUG
CW	CW
ECT	ECT
HOLD	HOLD
MCID	MCID
MPTY	MPTY
SUB	SUB
TP	TP
UUS1	UUS1
UUS1 implicit	UUS1i
UUS1 explicit	UUS1e

Pos. Last two positions: XX Number of individual Test Purpose.

5.1 Examples

Basic Call:

Speech					IG __ SPN __ xx					
1	2	3	4	5	6	7	8	9	10	11
I	G	_	_	_	S	P	N	_	x	x

Supplementary Services:

CLIP					IG __ xxSSCLIP xx									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
I	G	_	_	_	X	X	N	S	C	L	I	P	x	x

6 Test Suite Structure (TSS)

6.1 Support of IN services in the mobile network Mobile - Mobile

6.1.1 Number translation services

Number translation Services	C – Plane / U–Plane Basic_Call	Successful	
			GG __xxN__xx
		Unsuccessful	GG __xxNUxx

6.1.2 Services with user interactive dialogue

Interactive dialogue	C – Plane / U–Plane Basic_Call	Successful	Speech	GG __SP I__xx
		Unsuccessful	Speech	GG __SP IUxx

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6.1.3 Supplementary services

Supplementary Services

Control – Plane

Services impact by IN

CLIP	GG __xx NS CLIP xx
CLIR	GG __xx NS CLIR xx
COLP	GG __xx NS COLP xx
CFxx	GG __xx NS CFxx
CFU	GG __xx NS CFUxx
CFB	GG __xx NS CFB xx
CFNR	GG __xx NS CFNR xx
CCBS	GG __xx NS CCBS xx

6.2 Number translation services between mobile and fixed networks

6.2.1 Number translation services between mobile and fixed networks

Number Translation Services ISDN/GSM	Control – Plane Basic_Call	Successful	IG __xxN__xx
		Unsuccessful	IG __xxNUxx