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Storitve in protokoli za napredna omrežja (SPAN) – Preskušanje integracije omrežja med GSM, faza 2+, ISDN in PSTN – 2. del: Abstraktni preskušalni niz (ATS) in delna dodatna informacija za preskušanje izvedbe protokola (PIXIT)

Services and Protocols for Advanced Networks (SPAN); Network Integration Testing between GSM Phase 2+, ISDN and PSTN; Part 2: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT)

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Technical Specification

Services and Protocols for Advanced Networks (SPAN); Network Integration Testing between GSM Phase 2+, ISDN and PSTN; Part 2: Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT)

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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 2 of a multi-part deliverable covering the Network integration testing between GSM Phase 2+, ISDN and PSTN, as identified below:

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

Part 2: "Abstract Test Suite (ATS), and partial Protocol Implementation eXtra Information for Testing (PIXIT)".

Introduction

The present document contains the Implementation Conformance Statement (ICS) and Implementation eXtra Information for Testing (IXIT) for Network Integration Testing for the European ISDN and PLMN, covering Network Integration Testing (NIT) between ISDN-GSM, PSTN-GSM, PLMN-ISDN, PLMN-PSTN and PLMN-PLMN networks. The objective is to verify the level of international or national end-to-end support of ISDN and PLMN (GSM) services. Both 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 Implementation Conformance Statement (ICS) and Implementation eXtra Information for Testing (IXIT) for Network Integration Testing for Network Integration Testing (NIT) to verify the overall compatibility of GSM, ISDN and non-ISDN (PSTN) over the national or international ISUP between networks. Network Integration Testing will assure that the appropriate requested features passes between an ISDN subscriber and the mobile subscriber across the national or international ISUP (ISUP V2) interface.

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.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

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

[3] ETSI ETS 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".

[4] ETSI ETS 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".

[5] ETSI ETS 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".

[6] ETSI ETS 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".

[7] ETSI ETS 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".

[8] ETSI ETS 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".

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

[10] ETSI ETS 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".

[11] ETSI ETS 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".

[12] ETSI ETS 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".

[13] ETSI ETS 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".

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

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

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

[17] ETSI TS 100 543: "Digital cellular telecommunications system (Phase 2+) (GSM); Call Forwarding (CF) supplementary services; Stage 2 (GSM 03.82)".

[18] ETSI EN 300 940: "Digital cellular telecommunications system (Phase 2+) (GSM); Mobile radio interface layer 3 specification (GSM 04.08)".

[19] ETSI EN 300 951: "Digital cellular telecommunications system (Phase 2+) (GSM); Line identification supplementary services; Stage 3 (GSM 04.81)".

[20] ETSI EN 300 952: "Digital cellular telecommunications system (Phase 2+) (GSM); Call Forwarding (CF) supplementary services; Stage 3 (GSM 04.82)".

[21] ETSI EN 300 953: "Digital cellular telecommunications system (Phase 2+) (GSM); Call Waiting (CW) and Call Hold (HOLD) supplementary services; Stage 3 (GSM 04.83)".

[22] ETSI TS 100 569 : "Digital cellular telecommunications system (Phase 2+) (GSM); Closed User Group (CUG) supplementary services; Stage 3 (GSM 04.85)".

[23] ETSI TS 100 956 : "Digital cellular telecommunications system (Phase 2+) (GSM); Call Barring (CB) supplementary services; Stage 3 (GSM 04.88)".

[24] ETSI TS 100 913: "Digital cellular telecommunications system (Phase 2+) (GSM); General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS) (GSM 07.01)".

[25] ETSI TS 100 976: "Digital cellular telecommunications system (Phase 2+) (GSM); General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN) (GSM 09.07)".

[26] ETSI TS 124 087 (V3.0.0): "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); User-to-User Signalling (UUS) Supplementary Service - Stage3 (3G TS 24.087 version 3.0.0 Release 1999)".

[27] ETSI ETS 300 559: "Digital cellular telecommunications system (Phase 2) (GSM);Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface (GSM 04.11)".

[28] ETSI ETS 300 646-1: "Integrated Services Digital Network (ISDN); Signalling System No.7; Digital cellular telecommunications system (Phase 2); Application of ISDN User Part (ISUP) version 2 for the ISDN-Public Land Mobile Network (PLMN) signalling interface; Part 1: Protocol specification (GSM 09.12 version 4.1.1)".

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

[30] ETSI EN 300 954: "Digital cellular telecommunications system; Multi Party (MPTY) supplementary services; Stage 3 (GSM 04.84 version 5.0.1)".

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

[32] ISO/IEC 9646-4: "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 4: Test realization".

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

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

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

[36] ITU-T Recommendation H.242: "System for establishing communication between audiovisual terminals using digital channels up to 2 Mbit/s".

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

[38] 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)".

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

[40] 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".

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

3 Definitions

3.1 Definitions related to conformance testing

For the purposes of the present document, the terms and definitions given in ISO/IEC 9646-1 [14] apply:

Abstract Test Case (ATC): Refer to ISO/IEC 9646-1 [14].

Abstract Test Suite (ATS): Refer to ISO/IEC 9646-1 [14].

Implementation Conformance Statement (ICS) proforma: Refer to ISO/IEC 9646-1 [14].

Implementation eXtra Information for Testing (IXIT) proforma: Refer to ISO/IEC 9646-1 [14].

Implementation Under Test (IUT): Refer to ISO/IEC 9646-1 [14].

lower tester: Refer to ISO/IEC 9646-1 [14].

Point of Control and Observation: Refer to ISO/IEC 9646-1 [14].

Protocol Implementation Conformance Statement (PICS): Refer to ISO/IEC 9646-1 [14].

Protocol Implementation eXtra Information for Testing (PIXIT): Refer to ISO/IEC 9646-1 [14].

System Under Test (SUT): Refer to ISO/IEC 9646-1 [14].

Test Purpose: Refer to ISO/IEC 9646-1 [14].

3.2 Definitions related to test purpose descriptions

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

NOTE: Facsimile connections may be established to/from group 3 apparatus in the PSTN, ISDN or GSM PLMN.

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

NOTE 1: 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.

NOTE 2: 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.

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

NOTE: Facsimile connections may be established to and from group 3 apparatus in the PSTN, ISDN or GSM PLMN.

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 A-law"

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 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 "ITU-T Recommendations H.221 and H.242"

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

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

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

GSM-BC=3,1 kHz (External to the PLMN): Used to select a "3,1 kHz audio" interworking function at the MSC

NOTE: 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.

GSM-BC=Speech (TS 11): this service provides the transmission of speech information and audible signalling tones of the PSTN/ISDN

NOTE: 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.

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

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 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 the following categories:

- high layer attributes,
- low layer attributes (describing the Bearer capabilities which support the Teleservice),
- information transfer attributes,
- access attributes,
- general attributes.

HLC=Facsimile G2/G3: high layer compatibility information element with its high layer characteristics identification field set to "facsimile group 2/3 (ITU-T Recommendation F.182)"

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

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

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

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

LLC=telematic_term: 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"

LLC=V110/X30: 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

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

NPI=unknown: numbering plan identification coded as "unknown"

PI=PR: presentation indicator coded as "Presentation restricted"

SI=NP: screening indicator coded as "Network provided"

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

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

NOTE: 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.

TON=international: type of number coded as "international"

TON=unknown: type of number coded as "unknown"

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

3.3 Abbreviations

For the purpose of the present document the following abbreviations apply:

ATS	Abstract Test Suite
3PTY	Three-party conference
BC	Bearer capability information element
BS	Base Station
BSC	Base Station Controller
BSS	Base Station System
CAMEL	Customized Applications for Mobile Network Enhanced Logic
CD	Call Deflection
CDMA	Code Division Multiple Access
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
ECT	Explicit Call Transfer
FPH	FreePHone service
GSM	Global System for Mobile Communication
H/V-PLMN	Home/Visited PLMN
HLC	High Layer Compatibility information element
HPLMN	Home Public Land Mobile Network
IA	Incoming Access
ICB	Incoming Calls Barred within a CUG
IMSI	International Mobile Subscriber Identity
IN	Intelligent Network
INAP	Intelligent Network Application Part
IP	Internet Protocol
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
IUT	Implementation Under Test
LLC	Low Layer Compatibility information element
MAP	Mobile Application Part
MCID	Malicious Call Identification
MS	Mobile Station
MSC	Mobile Switching Center
MSISDN	Mobile Station ISDN number
MT	Mobile Terminal
MTP	Message Transfer Part
NIT	Network Integration Testing
OCB	Outgoing Calls Barred within a CUG
OSI	Open Systems Interconnection
PI	Presentation Indicator
PIXIT	Protocol Implementation eXtra Information for Testing
PLMN	Public Land Mobile Network
PSTN	Public Switched Telephone Network
SGSN	Serving GPRS Support Node
SI	Screening Indicator
SMS	Short Message Service
SUB	SUBaddressing
TCAP	Transaction Capabilities Application Part
TON	Type Of Number

TP	Terminal portability
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
VPLMN	Visited Public Land Mobile Network

4 Conformance to this ICS and IXIT proformas specification

If it claims to conform to the present document, the actual ICS proforma to be filled in by a supplier shall be technically equivalent to the text of the ICS proforma given in annex A, and shall preserve the numbering/naming and ordering of the proforma items.

An ICS, which conforms to the present document, shall be a conforming ICS proforma completed in accordance with the guidance for completion given in clause A.1.

A test realizer, producing a executable test suite for this ATS specification is required, as specified in ISO/IEC 9646-7 [33], to produce an augmented partial IXIT proforma conformant with the text of the partial IXIT proforma given in annex B.

An augmented partial IXIT proforma which conforms to this partial IXIT proforma specification shall, as a minimum, have contents which are technically equivalent to annex B. The augmented partial IXIT proforma may contain additional questions that need to be answered in order to prepare the Means Of Testing (MOT) for a particular IUT. The test laboratory may further augment the augmented partial IXIT proforma to produce a IXIT proforma conformant with this partial IXIT proforma specification.

A IXIT proforma which conforms to this partial IXIT proforma specification shall, as a minimum, have contents which are technically equivalent to annex B. The IXIT proforma may contain additional questions that need to be answered in order to prepare the test laboratory for a particular IUT.

5 ATS Conformance

The test realizer, producing a Means Of Testing (MOT) and Executable Test Suite (ExTS) for this Abstract Test Suite (ATS) specification, shall comply with the requirements of ISO/IEC 9646-4 [32]. In particular, these concern the realization of an Executable Test Suite (ExTS) based on each ATS. The test realizer shall provide a statement of conformance of the MOT to this ATS specification.

An ExTS which conforms to this ATS specification shall contain test groups and test cases which are technically equivalent to those contained in the ATS in annex C. All sequences of test events comprising an abstract test case shall be capable of being realized in the executable test case. Any further checking which the test system might be capable of performing is outside the scope of this ATS specification and shall not contribute to the verdict assignment for each test case.

A test laboratory which claims to conform to this ATS specification shall use a MOT which conforms to this ATS.

Annex A (normative): End-to-end ICS proforma

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

A.1 Guidance for completing the ICS proforma

A.1.1 Purposes and structure

The purpose of this ICS proforma is to provide a mechanism whereby a supplier of an implementation of the requirements defined by ETSI, may provide information about the implementation in a standardized manner.

The proforma is subdivided into clauses for the following categories of information:

- guidance for completing the proformas;
- identification of the implementation;
- global statement of conformance.

A.1.2 Abbreviations and conventions

The ICS proforma contained in annex A is comprised of information in tabular form in accordance with the guidelines presented in ISO/IEC 9646-7 [33].

Item column:

- The item column contains a number which identifies the item in the table.

Item description column:

- The item description column describes in free text each respective item (e.g. parameters, timers, etc.). It implicitly means "is <item description> supported by the implementation?".

Status column:

- The following notations, defined in ISO/IEC 9646-7 [33], are used for the status column:

m	mandatory - the capability is required to be supported.
o	optional - the capability may be supported or not.
n/a	not applicable - in the given context, it is impossible to use the capability.
x	prohibited (excluded) - there is a requirement not to use this capability in the given context.
o.i	qualified optional - for mutually exclusive or selectable options from a set. "i" is an integer which identifies an unique group of related optional items and the logic of their selection which is defined immediately following the table.
ci	conditional - the requirement on the capability ("m", "o", "x" or "n/a") depends on the support of other optional or conditional items. "i" is an integer identifying an unique conditional status expression which is defined immediately following the table.