



**Core Network and Interoperability Testing (INT);
Network Integration Testing between SIP and ISDN/PSTN
network signalling protocols;
Part 5: Test Suite Structure and Test Purposes (TSS&TP)
for Network Integration Tests between ISDN-ISDN and
ISDN-PSTN over SIP II NNI/SIP-I NNI**

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 Full standard:
<https://standards.iteh.ai/catalog/standards/srv/64594b86e-8a10e-420d-b974-8cd2ad196c3c/etsi-ts-186-001-5-v2.4.0-2020-09>

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Core Network and Interoperability Testing (INT).

The present document is part 5 of a multi-part deliverable covering Network Integration Testing between SIP and ISDN/PSTN network signalling protocols:

- Part 1: "Test Suite Structure and Test Purposes (TSS&TP) for SIP-ISDN";
- Part 2: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification";
- Part 3: "Test Suite Structure and Test Purposes (TSS&TP) for SIP-SIP";
- Part 4: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification";
- Part 5: "Test Suite Structure and Test Purposes (TSS&TP) for Network Integration Tests between ISDN-ISDN and ISDN-PSTN over SIP II NNI/SIP-I NNI".**

Modal verbs terminology

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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 of ISDN and non-ISDN (PSTN) over the national or international SIP-I and SIP II NNI networks. The TSS&TP specification covers the procedures described in Recommendation ITU-T Q.1912.5 [35] or ETSI EN 383 001 [36], ETSI TS 129 163 [40] and Recommendation ITU-T Q.699 [24] or ETSI EN 300 899-1 [37]. For SIP and SDP specific terminology, the reference is ETSI TS 124 229 [39].

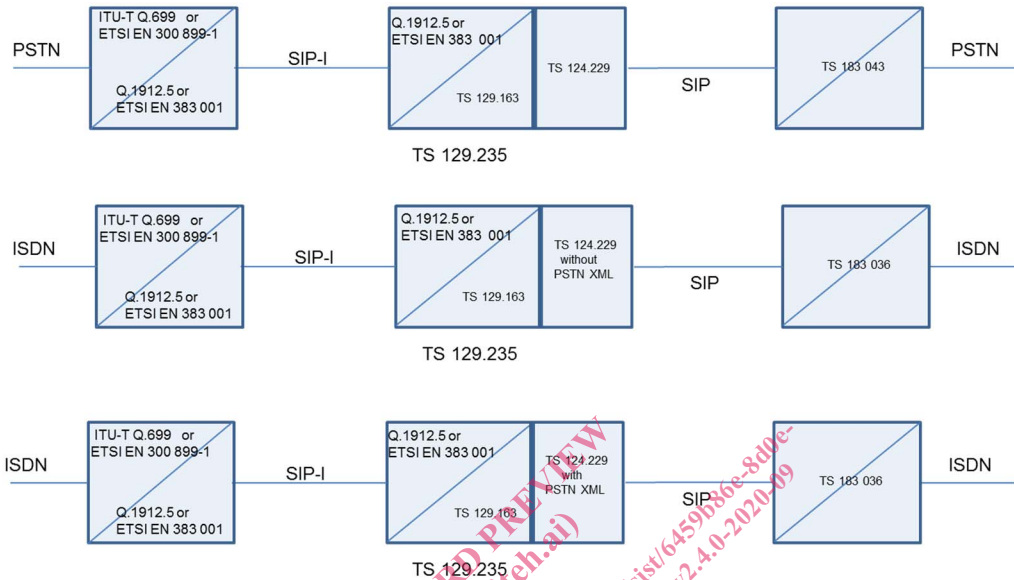


Figure 1: ISDN-ISDN and PSTN-PSTN inter-working testing architecture with SIP-I and ETSI TS 129 235 [43] based Interworking

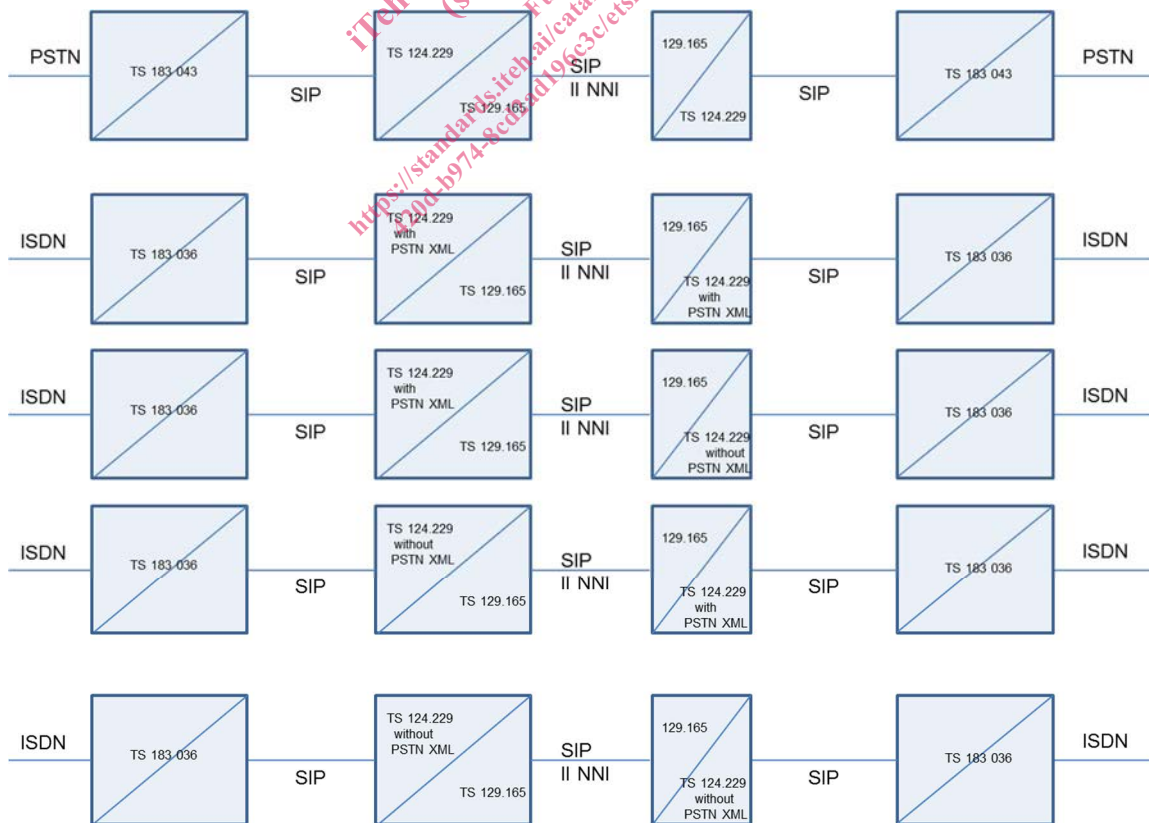


Figure 2: ISDN-ISDN and PSTN-PSTN inter-working testing architecture with SIP II NNI

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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The following referenced documents are necessary for the application of the present document.

- [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 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] ETSI 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".
- [4] ETSI 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".
- [5] ETSI 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".
- [6] ETSI 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".
- [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 300 061-1: "Integrated Services Digital Network (ISDN); Subaddressing (SUB) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".
- [9] ETSI 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".
- [10] ETSI 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".
- [11] ETSI 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".
- [12] ETSI EN 300 207-1: "Integrated Services Digital Network (ISDN); Diversion supplementary services; Digital Subscriber Signalling System No. One (DSS1); Part 1: Protocol specification".

- [13] ETSI 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".
- [14] ETSI 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".
- [15] ETSI 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".
- [16] ETSI 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".
- [17] ETSI 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".
- [18] ETSI 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]".
- [19] ETSI 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".
- [20] ETSI EN 300 195-1: "Integrated Services Digital Network (ISDN); Supplementary service interactions; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".
- [21] ETSI ETS 300 289: "Business Telecommunications (BTC); 64 kbit/s digital unrestricted leased line with octet integrity (D64U); Connection characteristics".
- [22] ETSI 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".
- [23] Recommendation ITU-T Q.737.1: "Stage 3 description for additional information transfer supplementary services using Signalling System No. 7:User-to-user signalling (UUS)".
- [24] Recommendation ITU-T Q.699: "Interworking between ISDN access and non-ISDN access over ISDN User Part of Signalling System No. 7".
- [25] Recommendation ITU-T Q.734.2: "Stage 3 description for multiparty supplementary services using Signalling System No. 7: Three-party service".
- [26] ETSI 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".
- [27] ETSI 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".
- [28] ETSI EN 300 357: "Integrated Services Digital Network (ISDN); Completion of Calls to Busy Subscriber (CCBS) supplementary service; Service description".
- [29] ETSI 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".
- [30] ETSI 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".

- [31] ETSI ETS 300 648: "Public Switched Telephone Network (PSTN); Calling Line Identification Presentation (CLIP) supplementary service; Service description".
- [32] ETSI EN 300 659-1: "Access and Terminals (AT); Analogue access to the Public Switched Telephone Network (PSTN); Subscriber line protocol over the local loop for display (and related) services; Part 1: On-hook data transmission".
- [33] Recommendation ITU-T V.110: "Support by an ISDN of data terminal equipments with V-Series type interfaces".
- [34] Recommendation ITU-T 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)".
- [35] Recommendation ITU-T Q.1912.5 (2004): "Interworking between Session Initiation Protocol (SIP) and Bearer Independent Call Control Protocol or ISDN User Part".
- [36] ETSI EN 383 001 V1.1.1: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Interworking between Session Initiation Protocol (SIP) and Bearer Independent Call Control (BICC) Protocol or ISDN User Part (ISUP) [ITU-T Recommendation Q.1912.5, modified]".
- [37] ETSI EN 300 899-1 (V1.1.2): "Integrated Services Digital Network (ISDN); Signalling System No.7; Interworking between ISDN User Part (ISUP) version 2 and Digital Subscriber Signalling System No. one (DSS1); Part 1: Protocol specification [ITU-T Recommendation Q.699, modified]".
- [38] Recommendation ITU-T Q.931 (05/98): "ISDN user-network interface layer 3 specification for basic call control".
- [39] ETSI TS 124 229: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3 (3GPP TS 24.229 Release 10)".
- [40] ETSI TS 129 163: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks (3GPP TS 29.163 Release 10)".
- [41] ETSI TS 183 043: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); IMS-based PSTN/ISDN Emulation; Stage 3 specification".
- [42] ETSI TS 183 036: "Core Network and Interoperability Testing (INT); ISDN/SIP interworking; Protocol specification".
- [43] ETSI TS 129 235 (V10.3.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Interworking between SIP-I based circuit-switched core network and other networks (3GPP TS 29.235 version 10.3.0 Release 10)".
- [44] ETSI TS 124 654 (V12.0.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); LTE; Closed User Group (CUG) using IP Multimedia (IM) Core Network (CN) subsystem, Protocol Specification (3GPP TS 24.654 version 12.0.0 Release 12)".
- [45] ETSI TS 186 001-1 (V3.1.1) (2015-11): "Core Network and Interoperability Testing (INT); Network Integration Testing between SIP and ISDN/PSTN network signalling protocols; Part 1: Test Suite Structure and Test Purposes (TSS&TP) for SIP-ISDN".
- [46] ETSI EN 300 052-1 (V1.2.4) (1998-06): "Integrated Services Digital Network (ISDN); Multiple Subscriber Number (MSN) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] 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".
- [i.2] Recommendation ITU-T 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".
- [i.3] Recommendation ITU-T G.822 (1988): "Controlled slip rate objectives of an international digital connection".
- [i.4] Recommendation ITU-T O.152 (1992): "Error performance measuring equipment for bit rates of 64 kbit/s and N x 64 kbit/s".
- [i.5] Recommendation ITU-T I.112 (1993): "Vocabulary and terms for ISDNs".
- [i.6] Recommendation ITU-T I.210 (1993): "Principles of the telecommunication services supported by an ISDN and the means to describe them".
- [i.7] Recommendation ITU-T E.164 (2010): "The international public telecommunication numbering plan".
- [i.8] ISO/IEC 9646-1: "Information Technology -- Open Systems Interconnection -- Conformance testing methodology and framework -- Part 1: General Concepts".
- [i.9] Recommendation ITU-T H.221: "Frame structure for a 64 to 1920 kbit/s channel in audiovisual teleservices".
- [i.10] Recommendation ITU-T G.711: "Pulse code modulation (PCM) of voice frequencies".
- [i.11] Recommendation ITU-T F.721: "Videotelephony teleservice for ISDN".
- [i.12] Recommendation ITU-T F.182bis: "Guidelines for the support of the communication of documents using Group 3 facsimile between user terminals via public networks".
- [i.13] 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".
- [i.14] ISO/IEC 8208: "Information technology -- Data communications -- X.25 Packet Layer Protocol for Data Terminal Equipment".
- [i.15] ETSI 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".
- [i.16] Recommendation ITU-T H.242: "System for establishing communication between audiovisual terminals using digital channels up to 2 Mbit/s".

3 Definition of terms, symbols and abbreviations

3.1 Terms

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

Definitions related to conformance testing

Abstract Test Suite (ATS): Refer to ISO/IEC 9646-1 [i.8].

Implementation Conformance Statement (ICS) proforma: Refer to ISO/IEC 9646-1 [i.8].

Implementation eXtra Information for Testing (IXIT) proforma: Refer to ISO/IEC 9646-1 [i.8].

implementation under test: Refer to ISO/IEC 9646-1 [i.8].

ISDN number: number conforming to the numbering and structure specified in Recommendation ITU-T E.164 [i.7]

lower lester: Refer to ISO/IEC 9646-1 [i.8].

Point of Control and Observation: Refer to ISO/IEC 9646-1 [i.8].

Protocol Implementation Conformance Statement: Refer to ISO/IEC 9646-1 [i.8].

Protocol Implementation eXtra Information for Testing: Refer to ISO/IEC 9646-1 [i.8].

system under test: Refer to ISO/IEC 9646-1 [i.8].

Test Purpose: Refer to ISO/IEC 9646-1 [i.8].

Definitions related to ETSI EN 300 403-1 [1]

Integrated Services Digital Network (ISDN): See Recommendation ITU-T I.112 [i.5], clause 2.2, definition 308.

supplementary service: See Recommendation ITU-T I.210 [i.6], clause 2.4.

telecommunications service: See Recommendation ITU-T I.112 [i.5], clause 2.2, definition 201.

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)

Definitions related to test purpose descriptions

BC = Recommendation ITU-T V.110 [33]/Recommendation ITU-T X.30 [34]: Bearer capability information element with its information transfer capability set to "unrestricted digital information" and its user information layer 1 field set to "Recommendation ITU-T standardized rate adaptation Recommendation ITU-T V.110 [33]/Recommendation ITU-T X.30 [34]", including sync/async and user rate values

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 [i.9] 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 [i.9] 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 [i.10] and H.242 [i.16]"

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

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

eroded second: second with one or more bit errors

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

HLC = facsimile group 2/3: High Layer Compatibility information element with its high layer characteristics identification field set to "facsimile group 2/3 (Recommendation ITU-T F.182 [i.12])"

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 (Recommendation ITU-T F.721 [i.11])" and its extended audiovisual characteristics field set to "capability set of initial channel of Recommendation ITU-T H.221 [i.9]"

LLC = Recommendation ITU-T V.110 [33]/Recommendation ITU-T X.30 [34]: Low Layer compatibility information element with its user information layer 1 field indicating "Recommendation ITU-T standardized rate adaption Recommendation ITU-T V.110 [33]/Recommendation ITU-T X.30 [34]" and including sync/async and user rate values

LLC = telematic_term: Low Layer Compatibility information element with its user information layer 2 field indicating "ISO/IEC 7776 DTE-DTE [i.13] operation" and user information layer 3 field indicating "ISO/IEC 8208 [i.14]"

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 forwarded to the served user coded as "unknown"

octet slip: slip of one complete octet

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

PRBS = 2¹¹-1: pseudo random binary sequence according to Recommendation ITU-T O.152 [i.4] transmitted for two consecutive periods of 24 hours. If an unavailability period of more than one hour occurred during the measuring period, it has to be extended accordingly

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 1×10^{-3})

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

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"

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

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

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