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**Broadband Integrated Services Digital Network (B-ISDN);
Digital Subscriber Signalling System No. two (DSS2) protocol;
Quality of Service class and parameters indication
at call/connection establishment;
Part 5: Test Suite Structure and Test Purposes (TSS&TP)
specification for the network**



Reference

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B-ISDN, DSS2, network, quality, TSS&TP

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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 5 of a multi-part deliverable covering the Digital Subscriber Signalling System No. two (DSS2) protocol specification for the Broadband Integrated Services Digital Network (B-ISDN) to support Quality of Service class and parameters indication at call/connection establishment, as identified below:

- Part 1: "Protocol specification [ITU-T Recommendations Q.2965.1 (1999) and Q.2965.2 (1999), modified]";
- Part 2: "Protocol Implementation Conformance Statement (PICS) proforma specification [ITU-T Recommendations Q.2965.1B (2000) and Q.2965.2B (2000), modified]";
- Part 3: "Test Suite Structure and Test Purposes (TSS&TP) specification for the user";
- Part 4: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the user";
- Part 5: "Test Suite Structure and Test Purposes (TSS&TP) specification for the network";**
- Part 6: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification for the network".

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1 Scope

The present document specifies the network Test Suite Structure and Test Purposes (TSS&TP) for the T_B reference point or coincident S_B and T_B reference point (as defined in ITU-T Recommendation I.413 [5]) of implementations conforming to the standards for the Broadband Integrated Services Digital Network (B-ISDN) Digital Subscriber Signalling System No. two (DSS2) protocol specification for support of Quality of Service Class and parameters indication at call/connection establishment defined in EN 301 815-1 [1].

A further part of the present document specifies the Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma based on the present document.

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 301 815-1: "Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2) protocol; Quality of Service Class and parameters indication at call/connection establishment; Part 1: Protocol specification [ITU-T Recommendations Q.2965.1 (1999) and Q.2965.2 (1999), modified]".
- [2] ETSI EN 301 815-2: "Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2) protocol; Quality of Service class and parameters indication at call/connection establishment; Part 2: Protocol Implementation Conformance Statement (PICS) proforma specification [ITU-T Recommendations Q.2965.1B (2000) and Q.2965.2B (2000), modified]".
- [3] ISO/IEC 9646-1 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".
- [4] ISO/IEC 9646-2 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite specification".
- [5] ITU-T Recommendation I.413 (1993): "B-ISDN user-network interface".
- [6] ETSI ETS 300 406: "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".
- [7] ETSI EN 300 443-1: "Broadband Integrated Services Digital Network (B-ISDN); Digital Subscriber Signalling System No. two (DSS2) protocol; B-ISDN user-network interface layer 3 specification for basic call/bearer control; Part 1: Protocol specification [ITU-T Recommendation Q.2931 (1995), modified]".
- [8] ITU-T Recommendation Q.2965.1: "Digital Subscriber Signalling System No. 2 - Support of Quality of Service classes".
- [9] ITU-T Recommendation Q.2965.2: "Digital Subscriber Signalling System No. 2 - Signalling of individual Quality of Service parameters".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in EN 301 815-1 [1], EN 300 443-1 [7] and the following apply.

3.1.1 Definitions related to conformance testing

abstract test case: Refer to ISO/IEC 9646-1 [3].

Abstract Test Method (ATM): Refer to ISO/IEC 9646-1 [3].

Abstract Test Suite (ATS): Refer to ISO/IEC 9646-1 [3].

Implementation Under Test (IUT): Refer to ISO/IEC 9646-1 [3].

Lower Tester (LT): Refer to ISO/IEC 9646-1 [3].

Protocol Implementation Conformance Statement (PICS): Refer to ISO/IEC 9646-1 [3].

PICS proforma: Refer to ISO/IEC 9646-1 [3].

Protocol Implementation eXtra Information for Testing (PIXIT): Refer to ISO/IEC 9646-1 [3].

PIXIT proforma: Refer to ISO/IEC 9646-1 [3].

Test Purpose (TP): Refer to ISO/IEC 9646-1 [3].

3.1.2 Definitions related to EN 301 815-1

network: DSS2 protocol entity at the Network side of the user-network interface where a T_B reference point or coincident S_B and T_B reference point applies

network (S_B/T_B): DSS2 protocol entity at the Network side of the user-network interface where a coincident S_B and T_B reference point applies

network (T_B): DSS2 protocol entity at the Network side of the user-network interface where a T_B reference point applies (user is the private ISDN)

3.2 Abbreviations

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

ATM	Abstract Test Method
ATS	Abstract Test Suite
B-ISDN	Broadband Integrated Services Digital Network
DSS2	Digital Subscriber Signalling System No. two
IUT	Implementation Under Test
N0	Null call/connection state
N10	Active call/connection state
N3	Outgoing Call Proceeding call/connection state
N6	Call Present call/connection state
N7	Call Received call/connection state
N9	Incoming Call Proceeding call/connection state
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing

QoS	Quality of Service
TP	Test Purpose
TSS	Test Suite Structure

4 Test Suite Structure (TSS)

- Support of Quality of Service classes (01)
- Signalling of individual Quality of Service parameters
 - End-to-end transit delay procedures (02)
 - Extended QoS parameters procedures (03)

5 Test Purposes (TP)

5.1 Introduction

For each test requirement a TP is defined.

5.1.1 TP naming convention

Ts are numbered, starting at 01, within each group. Groups are organized according to the TSS. Additional references are added to identify the actual test suite (see table 1).

Table 1: TP identifier naming convention scheme

Identifier: <suite_id>_<group>_<nnn>	
<suite_id> = service + type of IUT:	"QOSN" for Quality Of Service class and parameters indication, IUT = Network
<group> = group number:	two character field representing the group reference according to TSS
<nn> = sequential number:	(01-99)

5.1.2 Source of TP definition

The TPs are based on EN 301 815-1 [1].

5.1.3 Test strategy

As the base standard EN 301 815-1 [1] contains no explicit requirements for testing, the TPs were generated as a result of an analysis of the base standard and the PICS specification EN 301 815-2 [2].

The TPs are only based on conformance requirements related to the externally observable behaviour of the IUT and are limited to conceivable situations to which a real implementation is likely to be faced (ETS 300 406 [6]).

5.1.4 Test of call states

Many TPs include a reference to the IUT's final call state after the realization of the TP. In these cases the TP includes the requirement to ensure that the IUT has entered this particular final call state. Ensuring that the IUT is in a particular call state shall be realized by following the procedures described in clause 5.6.11 of EN 300 443-1 [7]. According to these procedures, the IUT on receipt of a STATUS ENQUIRY message, shall respond with a STATUS message indicating, in the fifth octet of the Call state information element, the current call state of the IUT. This exchange of messages is not mentioned explicitly in each TP but is considered to be implicit in the reference to the final call state. This way of phrasing the TPs has been used to avoid over-complicating the text and structure of the TPs and to improve the readability.

5.2 TPs for the Quality of Service Class and Parameters indication, network

All PICS items referred to in this clause are as specified in EN 301 815-2 [2] unless indicated otherwise by another numbered reference.

Unless specified:

- the messages indicated are valid and contain at least the mandatory information elements and possibly optional information elements;
- the information elements indicated are valid and contain at least the mandatory parameters and possibly optional parameters.

5.2.1 Support of Quality of Service classes (01)

Test purposes for EN 301 815-1 [1] (ITU-T Recommendation Q.2965.1 [8], modified).

QOSN_01_01

Ensure that the IUT in N0, to indicate the arrival of a call,

sends a SETUP message (Quality of Service parameter indicating identical forward and backward QoS classes, Broadband bearer capability, ATM traffic descriptor, Broadband bearer capability present, consistent set of parameters) and enters N6.

QOSN_01_02

Ensure that the IUT in N0, on receipt of a SETUP message (Valid combination of traffic parameters, Quality of Service parameter present, requesting a QoS class that is supported),

sends a CALL PROCEEDING message and enters the N3.

QOSN_01_03

Ensure that the IUT in N0, on receipt of a SETUP message (Valid combination of traffic parameters, Quality of Service parameter present, requesting a QoS class that is not supported),

sends a RELEASE COMPLETE message (Cause value = 49) and remains in N0.

QOSN_01_04

Ensure that the IUT in N0, on receipt of a SETUP message (Invalid combination of traffic parameters and QoS class),

sends a RELEASE COMPLETE message (Cause value = 73) and remains in N0.

5.2.2 Signalling of individual Quality of Service parameters

Test purposes for EN 301 815-1 [1] (ITU-T Recommendation Q.2965.2 [9], modified).

5.2.2.1 End-to-end transit delay procedures (02)

QOSN_02_01

Ensure that the IUT in N0, to indicate the arrival of a call,

sends a SETUP message (end-to-end transit delay, Quality of Service parameter, ATM traffic descriptor, Broadband bearer capability present, consistent set of parameters) and enters N6.

QOSN_02_02

Ensure that the IUT in N9, having sent a SETUP message (end-to-end transit delay, Quality of Service parameter, ATM traffic descriptor, Broadband bearer capability present, consistent set of parameters), on receipt of a CONNECT message (end-to-end transit delay present),

sends a CONNECT ACKNOWLEDGE message and enters N10.

QOSN_02_03

Ensure that the IUT in N7, having sent a SETUP message (end-to-end transit delay, Quality of Service parameter, ATM traffic descriptor, Broadband bearer capability present, consistent set of parameters), on receipt of a CONNECT message (end-to-end transit delay present),

sends a CONNECT ACKNOWLEDGE message and enters N10.

QOSN_02_04

Ensure that the IUT in N9, having sent a SETUP message (end-to-end transit delay, Quality of Service parameter, ATM traffic descriptor, Broadband bearer capability present, consistent set of parameters), on receipt of a CONNECT message (end-to-end transit delay information element with maximum end-to-end transit delay subfield present), sends a CONNECT ACKNOWLEDGE message and enters N10.

QOSN_02_05

Ensure that the IUT in N7, having sent a SETUP message (end-to-end transit delay, Quality of Service parameter, ATM traffic descriptor, Broadband bearer capability present, consistent set of parameters), on receipt of a CONNECT message (end-to-end transit delay information element with maximum end-to-end transit delay subfield present), sends a CONNECT ACKNOWLEDGE message and enters N10.

QOSN_02_06

Ensure that the IUT in N0, on receipt of a SETUP message (end-to-end transit delay present, requesting a QOS class/maximum end-to-end transit delay combination that can be supported), sends a CALL PROCEEDING message and enters N3.

QOSN_02_07

Ensure that the IUT in N3, having received a SETUP message (end-to-end transit delay present), to indicate that the call has been accepted at the called user's side, sends a CONNECT message (end-to-end transit delay present, maximum end-to-end transit delay absent) and enters N10.

QOSN_02_08

Ensure that the IUT in N4, having received a SETUP message (end-to-end transit delay present), to indicate that the call has been accepted at the called user's side, sends a CONNECT message (end-to-end transit delay present, maximum end-to-end transit delay absent) and enters N10.

QOSN_02_09

Ensure that the IUT in N0, on receipt of a SETUP message (end-to-end transit delay present, invalid combination of transit delay, traffic parameters and QOS class), sends a RELEASE COMPLETE message (Cause value = 73) and remains in N0.

QOSN_02_10

Ensure that the IUT in N0, on receipt of a SETUP message (end-to-end transit delay present, maximum end-to-end transit delay absent, IE instruction field flag = IE instruction field not significant), optionally sends a STATUS message (Cause value = 100, call state value = 1) followed by a CALL PROCEEDING message and enters N3.

QOSN_02_11

Ensure that the IUT in N0, on receipt of a SETUP message (end-to-end transit delay present, maximum end-to-end transit delay absent, IE instruction field flag = follow explicit instructions, IE action indicator = clear call), sends a RELEASE COMPLETE message (Cause value = 100) and remains in N0.

QOSN_02_12

Ensure that the IUT in N0, on receipt of a SETUP message (end-to-end transit delay present, maximum end-to-end transit delay absent, IE instruction field flag = follow explicit instructions, IE action indicator = discard message and report status), sends a STATUS message (Cause value = 100, call state value = 0) and remains in N0.

QOSN_02_13

Ensure that the IUT in N0, on receipt of a SETUP message (end-to-end transit delay present, maximum end-to-end transit delay absent, IE instruction field flag = follow explicit instructions, IE action indicator = discard message), sends no message and remains in N0.

QOSN_02_14

Ensure that the IUT in N0, on receipt of a SETUP message (end-to-end transit delay present, maximum end-to-end transit delay absent, IE instruction field flag = follow explicit instructions, IE action indicator = discard information element, proceed and report status), sends a STATUS message (Cause value = 100, call state value = 1) followed by a CALL PROCEEDING message and enters N3.

QOSN_02_15

Ensure that the IUT in N0, on receipt of a SETUP message (end-to-end transit delay present, maximum end-to-end transit delay absent, IE instruction field flag = follow explicit instructions, IE action indicator = discard information element and proceed),
sends a CALL PROCEEDING message and enters N3.

QOSN_02_16

Ensure that the IUT in N0, on receipt of a SETUP message (end-to-end transit delay present, maximum end-to-end transit delay absent, IE instruction field flag = follow explicit instructions, IE action indicator = reserved value),
sends a STATUS message (Cause value = 100, call state value = 1) followed by a CALL PROCEEDING message and enters N3.

QOSN_02_17

Ensure that the IUT in N0, on receipt of a SETUP message (end-to-end transit delay present, cumulative end-to-end transit delay absent, IE instruction field flag = IE instruction field not significant),
optionally sends a STATUS message (Cause value = 100, call state value = 1) followed by a CALL PROCEEDING message and enters N3.

QOSN_02_18

Ensure that the IUT in N0, on receipt of a SETUP message (end-to-end transit delay present, cumulative end-to-end transit delay absent, IE instruction field flag = follow explicit instructions, IE action indicator = clear call),
sends a RELEASE COMPLETE message (Cause value = 100) and remains in N0.

QOSN_02_19

Ensure that the IUT in N0, on receipt of a SETUP message (end-to-end transit delay present, cumulative end-to-end transit delay absent, IE instruction field flag = follow explicit instructions, IE action indicator = discard message and report status),
sends a STATUS message (Cause value = 100, call state value = 0) and remains in N0.

QOSN_02_20

Ensure that the IUT in N0, on receipt of a SETUP message (end-to-end transit delay present, cumulative end-to-end transit delay absent, IE instruction field flag = follow explicit instructions, IE action indicator = discard message),
sends no message and remains in N0.

QOSN_02_21

Ensure that the IUT in N0, on receipt of a SETUP message (end-to-end transit delay present, cumulative end-to-end transit delay absent, IE instruction field flag = follow explicit instructions, IE action indicator = discard information element, proceed and report status),
sends a STATUS message (Cause value = 100, call state value = 1) followed by a CALL PROCEEDING message and enters N3.

QOSN_02_22

Ensure that the IUT in N0, on receipt of a SETUP message (end-to-end transit delay present, cumulative end-to-end transit delay absent, IE instruction field flag = follow explicit instructions, IE action indicator = discard information element and proceed),
sends a CALL PROCEEDING message and enters N3.

QOSN_02_23

Ensure that the IUT in N0, on receipt of a SETUP message (end-to-end transit delay present, cumulative end-to-end transit delay absent, IE instruction field flag = follow explicit instructions, IE action indicator = reserved value),
sends a STATUS message (Cause value = 100, call state value = 1) followed by a CALL PROCEEDING message and enters N3.

5.2.2.2 Extended QoS parameters procedures (03)

Selection: T_B reference point supported. PICS: R 2.2

QOSN_03_01

Ensure that the IUT in N0, to indicate the arrival of a call,
sends a SETUP message (Extended Quality of Service parameter, end-to-end transit delay, Quality of Service parameter, ATM traffic descriptor, Broadband bearer capability present, consistent set of parameters) and enters N6.

QOSN_03_02

Ensure that the IUT in N9, having sent a SETUP message (Extended Quality of Service parameter, end-to-end transit delay, Quality of Service parameter, ATM traffic descriptor, Broadband bearer capability present, consistent set of parameters), on receipt of a CONNECT message (Extended Quality of Service parameter present), sends a CONNECT ACKNOWLEDGE message and enters N10.

QOSN_03_03

Ensure that the IUT in N7, having sent a SETUP message (Extended Quality of Service parameter, end-to-end transit delay, Quality of Service parameter, ATM traffic descriptor, Broadband bearer capability present, consistent set of parameters), on receipt of a CONNECT message (Extended Quality of Service parameter present), sends a CONNECT ACKNOWLEDGE message and enters N10.

QOSN_03_04

Ensure that the IUT in N0, on receipt of a SETUP message (Extended Quality of Service parameter, end-to-end transit delay present, requesting a QOS class/maximum end-to-end transit delay combination that can be supported), sends a CALL PROCEEDING message and enters N3.

QOSN_03_05

Ensure that the IUT in N3, having received a SETUP message (Extended Quality of Service parameter, end-to-end transit delay present, requesting a QOS class/maximum end-to-end transit delay combination that can be supported), to indicate that the call has been accepted at the called user's side, sends a CONNECT message (Extended Quality of Service parameter present) and enters N10.

QOSN_03_06

Ensure that the IUT in N4, having received a SETUP message (Extended Quality of Service parameter, end-to-end transit delay present, requesting a QOS class/maximum end-to-end transit delay combination that can be supported), to indicate that the call has been accepted at the called user's side, sends a CONNECT message (Extended Quality of Service parameter present) and enters N10.

QOSN_03_07

Ensure that the IUT in N0, on receipt of a SETUP message (Extended Quality of Service parameter present, requesting an unacceptable 2-point cell delay variation), sends a RELEASE COMPLETE message (Cause value = 49) and remains in N0.

QOSN_03_08

Ensure that the IUT in N0, on receipt of a SETUP message (Extended Quality of Service parameter present, invalid combination of transit delay, traffic parameters and individual QOS parameters), sends a RELEASE COMPLETE message (Cause value = 73) and remains in N0.

6 Compliance

An ATS which complies with this TSS&TP specification shall:

- a) consist of a set of test cases corresponding to the set or to a subset of the TPs specified in clause 5;
- b) use a TSS which is an appropriate subset of the whole of the TSS specified in clause 4;
- c) use the same naming conventions for the test groups and test cases;
- d) maintain the relationship specified in clause 5 between the test groups and TPs and the entries in the PICS proforma to be used for test case deselection;
- e) comply with ISO/IEC 9646-2 [4].

In the case of a) or b) above, a subset shall be used only where a particular Abstract Test Method (ATM) makes some TPs untestable. All testable TPs from clause 5 shall be included in a compliant ATS.

7 Requirements for a comprehensive testing service

As a minimum the remote test method, as specified in ISO/IEC 9646-2 [4], shall be used by any organization claiming to provide a comprehensive testing service for network equipment claiming conformance to EN 301 815-1 [1].

Annex A (informative): Bibliography

ISO/IEC 9646-3 (1998): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 3: The Tree and Tabular Combined Notation (TTCN)".

History

Document history			
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