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Harmonizacija telekomunikacij in internetnega protokola prek omrežij (TIPHON), 3. izdaja - Specifikacija tehnološke ustreznosti - Profil TIPHON za ITU-T H.248 - 2. del: Specifikacija zgradbe preskušalnega niza in namenov preskušanja (TSS&TP)

Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; Technology Compliance Specification; TIPHON profile for ITU-T H.248; Part 2: Test Suite Structure and Test Purposes (TSS&TP) specification

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Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; Technology Compliance Specification; TIPHON profile for IUT-T H.248; Part 2: Test Suite Structure and Test Purposes (TSS&TP) specification

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Foreword

This Technical Specification (TS) has been produced by ETSI Project Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON).

The present document is part 2 of a multi-part deliverable covering Conformance Testing for TIPHON Release 3; TIPHON profile for ITU-T Recommendation H.248.1 [3], as identified below:

Part 1: "Protocol Implementation Conformance Statement (PICS) proforma specification";

Part 2: "Test Suite Structure and Test Purposes (TSS&TP) specification";

Part 3: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification".

1 Scope

The present document specifies the Test Suite Structure and Test Purposes (TSS&TP) for the TIPHON mapping to H248 protocol as defined in TS 101 885 [1].

The objective of the present document is to provide conformance tests for TIPHON profile for ITU-T Recommendation H.248.1 equipment giving a greater probability of inter-operability between different manufacturer's TIPHON profile for ITU-T Recommendation H.248.1 equipments.

ISO standard for the methodology of conformance testing (ISO/IEC 9646-1 [4], ISO/IEC 9646-2 [5] and ISO/IEC 9646-3 [6]) as well as the ETSI rules for conformance testing (ETS 300 406 [7]) are used as basis for the test methodology.

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 TS 101 885 (V1.1.1): "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; Technology Mapping; Technology Mapping of TIPHON reference point N to H.248/MEGACO protocol".

[2] ETSI TS 101 889-1 (V1.1.1): "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; Technology Compliance Specification; TIPHON profile for ITU-T H.248; Part 1: Protocol Implementation Conformance Statement (PICS) proforma specification".

[3] ITU-T Recommendation H.248.1 (02/2002): "Gateway control protocol: Version 1".

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

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

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

[7] ETSI ETS 300 406: "Methods for Testing and Specification (MTS); Protocol and profile conformance testing specifications; Standardization methodology".

3 Definitions and abbreviations

3.1 Definitions

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

- terms defined in ITU-T Recommendation H.248.1 [3];
- terms defined in ISO/IEC 9646-1 [4], ISO/IEC 9646-2 [5] and ISO/IEC 9646-3 [6].

inopportune: specifies a test purpose covering a signalling procedure where an inopportune message (type of message not expected in the IUT current state) is sent to the IUT

syntactically invalid: specifies a test purpose covering a signalling procedure where a valid (expected in the current status of the IUT) but not correctly encoded (unknown or incorrect parameter values) message is sent to the IUT, which shall react correctly and eventually reject the message

Test Purpose: non-formal test description, mainly using text. This test description can be used as the basis for a formal test specification (e.g. Abstract Test Suite in TTCN)

NOTE: See ISO/IEC 9646-3 [6].

valid: specifies a test purpose covering a signalling procedure where all the messages sent to or received from the IUT are valid (expected in the current status of the IUT) and correctly encoded

3.2 Abbreviations

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

ATS	Abstract Test Suite
CID	Context Id
IUT	Implementation Under Test
MG	Media Gateway
MGC	Media Gateway Controller
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
PDU	Protocol Data Unit
TID	Termination Id
TP	Test Purpose
TSS	Test Suite Structure

4 Test Suite Structure (TSS)

Figure 1 shows the H.248.1 Test Suite Structure (TSS) including its subgroups defined for the conformance testing.

Test Suite	Protocol group	Protocol subgroup	Test group
H248	Media Gateway (MG)	Procedures using Add command (AD)	BV - BI - BO
		Procedures using Modify command (MD)	BV - BI - BO
		Procedures using Subtract command (SU)	BV - BI - BO
		Procedures using Move command (MO)	BV - BI - BO
		Procedures using Audit Value command (AV)	BV - BI - BO
		Procedures using Audit Capabilities command (AC)	BV - BI - BO
		Procedures using Notify command (NO)	BV - BI - BO
		Procedures using Service Change command (SC)	BV - BI - BO
		Administration and Maintenance procedures (AM)	BV - BI - BO
		Transport related procedures (TR)	BV - BI - BO
		clause E.2 Base Root Package procedures	BV - BI - BO
		clause E.11 Network Package procedures	BV - BI - BO
		clause E.13 TDM Circuit Package procedures	BV - BI - BO
		TIPHON profile procedures for TIPHON N2 interface (TN2)	BV - BI - BO
		TIPHON profile procedures for TIPHON N3 interface (TN3)	BV - BI - BO
	Media Gateway Controller (MGC)	Procedures using Add command (AD)	BV - BI - BO
		Procedures using Modify command (MD)	BV - BI - BO
		Procedures using Subtract command (SU)	BV - BI - BO
		Procedures using Move command (MO)	BV - BI - BO
		Procedures using Audit Value command (AV)	BV - BI - BO
		Procedures using Audit Capabilities command (AC)	BV - BI - BO
		Procedures using Notify command (NO)	BV - BI - BO
		Procedures using Service Change command (SC)	BV - BI - BO
		Administration and Maintenance procedures (AM)	BV - BI - BO
		Transport related procedures (TR)	BV - BI - BO
		TIPHON profile procedures for TIPHON N2 interface (TN2)	BV - BI - BO
		TIPHON profile procedures for TIPHON N3 interface (TN3)	BV - BI - BO

Figure 1: TSS of TIPHON profile for H.248.1

The Test Suite is structured as a tree with a first level defined as H.248.1 representing the protocol group: "TIPHON profile for H.248.1".

4.1 Test groups

The test groups are organized in three levels. The first level creates two protocol groups representing the role of the IUT. The second level separates the selected role for the IUT in groups of procedures. The last level in each branch contains one or more of the standard ISO subgroups BV, BI, BO.

4.1.1 Protocol groups

The protocol groups identify the two roles of the IUT: Media Gateway (MG) and Media Gateway Controller (MGC) as defined in ITU-T Recommendation H.248.1 [3].

4.1.2 Media Gateway (MG)

The Media Gateway protocol group is divided in 15 groups of procedures. The first eight groups identify the procedures using different commands as defined in clause 7 of ITU-T Recommendation H.248.1 [3]. The ninth group of procedures identifies the Administration and Maintenance procedures (e.g.: cold start procedure and procedures against restart avalanche). The tenth group of procedures distinguishes the procedures related to transport of H.248.1 messages. Groups 11 to 13 distinguish the procedures for H.248.1 basic packages, group 14 and group 15 identify TIPHON profile specific procedures.

4.1.2.1 Media Gateway Controller (MGC)

The Media Gateway protocol group is divided in ten groups of procedures. The first eight groups identify the procedures using different commands as defined in clause 7. Of ITU-T Recommendation H.248.1 [3]. The ninth group of procedures identifies the Administration and Maintenance procedures (e.g.: Service changes procedures). The tenth group of procedures distinguishes the procedures related to transport of H.248.1 messages. Group 11 and group 12 identify TIPHON profile specific procedures.

4.1.3 Main test groups

The main test groups are the valid behaviour group, the invalid behaviour group and the inopportune behaviour group.

4.1.3.1 Valid Behaviour (BV) tests

This test sub group shall verify that the IUT reacts in conformity with the TS, after receipt or exchange of valid Protocol Data Units (PDUs). Valid PDUs means that the exchange of messages and the content of the exchanged messages are considered as valid.

4.1.3.2 Invalid Behaviour (BI) tests

This test sub group shall verify that the IUT reacts in conformity with the TS, after receipt of a syntactically invalid PDU.

4.1.3.3 Inopportune Behaviour (BO) tests

This test sub group shall verify that the IUT reacts in conformity with the TS, after receipt of a syntactically correct PDU not expected in the actual message exchange or state.

5 Test Purposes (TP)

5.1 Introduction

5.1.1 TP naming convention

Table 1: TP identifier naming convention scheme

Identifier: **TP/<iut>/<gp>/<type>-<nn>**

<iut>	=	type of IUT	MG	Media Gateway
			MGC	Media Gateway Controller
<gp>	=	group of procedures	AD	Procedures using Add command
			MD	Procedures using Modify command
			SU	Procedures using Subtract command
			MO	Procedures using Move command
			AV	Procedures using Audit Value command
			AC	Procedures using Audit Capabilities command
			NO	Procedures using Notify command
			SC	Procedures using Service Change command
			AM	Administration and Maintenance procedures
			TR	Transport related procedures
			E2	clause E.2 Base Root Packages procedures
			E11	clause E.11 Network Packages procedures
			E13	clause E.12 TDM Circuit Package procedures
			TN2	TIPHON profile procedures for N2 interface
			TN3	TIPHON profile procedures for N3 interface
<type>	=	type of testing	BV	Valid Behaviour Tests
			BI	Invalid Behaviour Tests
			BO	Inopportune Behaviour Tests
<nn>	=	sequential number	(01-99)	Test Purpose Number

5.1.2 TP structure

Each TP has been written in a manner, which is consistent with all other TPs. The intention of this is to make the TPs more readable and checkable. A particular structure has been used and this is illustrated in table 2. This table should be read in conjunction with any TP, i.e. use a TP as an example to fully understand the table.

Table 2: Structure of a single TP for H.248

TP part	Text	Example
Header	**<Identifier>** tab **<paragraph number in base ETS>**	 **clause 0.0.0**
Stimulus	Ensure that the IUT <state> <message already sent> <trigger> *see below for message structure* *or* <goal>	 in the idle state having sent a XXX message on receipt of a YYY message to request a ...
Reaction	<action> <conditions> if the action is sending see below for message structure <next action>, etc.	sends, does, etc. ...
Message structure	<message type> message containing a *a)* <message element> *b)* <information element> or <filed code> encoded as *or* including <coding of the field> and *back to a or b,*	 TerminalType, statusDetermination Number...
NOTE: Text in italics will not appear in TPs and text between <> is filled in for each TP and may differ from one TP to the next.		

5.1.3 Test strategy

As the base standard ITU-T Recommendation H.248.1 [3] contains no explicit requirements for testing, the TPs were generated as a result of an analysis of the base standard and the corresponding PICS proforma.

The TPs are only based on conformance requirements related to the externally observable behaviour of the IUT, over the TCP or UDP interface, and are limited to conceivable situations to which a real implementation is likely to be faced.

As indicated by the existence of the part 3 of this multi-part standard (see Foreword), the intention is to derive the test purposes to an abstract test suite in TTCN. Consequently the test purposes are written in a manner, which fit the TTCN methodology, and will consist of the textual documentation of the test cases.

All PICS items referred to in this clause are specified in TS 101 889-1 [2].

Unless specified otherwise, the messages indicated are valid and contain at least the mandatory parameters and possibly optional parameters.

5.1.4 Textual conventions within the Test Purposes

According to the ALL wildcard for TerminationIDs the following abbreviation conventions are used:

- ALL(p12) means a wildcard ALL which addresses only the physical Termination TID1 and TID2 as given in the initial conditions.
- ALL(e1234) means a wildcard ALL which addresses only the ephemeral Terminations TID1, TID2, TID3 and TID4 as given in the initial conditions.

The wildcard CHOOSE for the TerminationID can be used either for creating a complete new (ephemeral) Termination or to select/choose a physical Termination within a range of already existing physical TerminationIDs in the Null Context.

If wildcard combinations for the ContextID and TerminationID are used in the TPs that are not allowed from protocol point of view an Error Descriptor shall be returned. The Error Descriptor should have an appropriate error value (e.g. 401, protocol error).

5.1.5 TPs for Media Gateway (MG) Procedures using Add command (AD)

5.1.5.1 Valid behaviour test purposes (BV)

TP/MG/AD/BV-01	Reference: ITU-T Recommendation H.248.1 [3] clause 7.2.1 Selection criteria: Initial condition: any Ensure that the IUT, on receipt of a Transaction Request containing • Action request with o CID set to CHOOSE o ADD Command request with ▪ TID set to CHOOSE ▪ acceptable descriptors *(note: e.g. for creation of a RTP Termination)* sends a Transaction Reply containing • Action reply with o CID set to a specific value (assigned by the MG) o ADD Command reply with ▪ TID set to a specific value (assigned by the MG).
TP/MG/AD/BV-02	Reference: ITU-T Recommendation H.248.1 [3] clause 7.2.1 Selection criteria: Initial condition: a physical Termination, characterized by TID1, in the NULL Context, The physical Termination TID1 shall NOT be in serviceState "outOfService". Ensure that the IUT, on receipt of a Transaction Request containing • Action request with o CID set to CHOOSE o ADD Command request with ▪ TID set to TID1 ▪ acceptable descriptors sends a Transaction Reply containing • Action reply with o CID set to a specific value (assigned by the MG) o ADD Command reply with ▪ TID set to TID1.
TP/MG/AD/BV-03	Reference: ITU-T Recommendation H.248.1 [3] clause 7.2.1 Selection criteria: Initial condition: 2 physical Terminations, characterized by TID1 and TID2, each of them in the NULL Context. The physical Terminations TID1 and TID2 shall NOT be in serviceState "outOfService". Ensure that the IUT, on receipt of a Transaction Request containing • Action request with o CID set to CHOOSE o ADD Command request with ▪ TID set to ALL(p12) ▪ acceptable descriptors sends a Transaction Reply containing • Action reply with o CID set to a specific value (assigned by the MG) o ADD Command reply with ▪ TID set to TID1 o ADD Command ▪ TID set to TID2.