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Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; Technology compliance specifications; Part 2: H.225.0 conformance test specifications; Test Suite Structure and Test Purposes (TSS&TP) specification for Terminal, Gatekeeper and Gateway

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Technical Specification

Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; Technology compliance specifications; Part 2: H.225.0 conformance test specifications; Test Suite Structure and Test Purposes (TSS&TP) specification for Terminal, Gatekeeper and Gateway

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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 the H225.0 protocol for Terminal, Gatekeeper and Gateway as identified below:

Part 1: "Revision/update of H.225.0 Protocol Implementation Conformance Statement (PICS) proforma specification for Terminal, Gatekeeper and Gateway";

Part 2: "H.225.0 conformance test specifications; Test Suite Structure and Test Purposes (TSS&TP) specification for Terminal, Gatekeeper and Gateway";

Part 3: "H.225.0 conformance test specifications; Abstract Test Suite (ATS) and PIXIT proforma specification for Terminal, Gatekeeper and Gateway".

1 Scope

The present document specifies the Test Suite Structure and Test Purposes (TSS&TP) for the H225.0 protocol for Terminal, Gatekeeper and Gateway.

The objective of the present document is to provide conformance tests that give a greater probability of inter-operability. The TSS&TP specification covers the procedures described in ITU-T Recommendation H.323 [2] and ITU-T Recommendation H.225.0 [3] as specified in TS 101 883 [1].

NOTE: The present document may not cover all requirements of the current version of TS 101 883 [1], as that mapping document has not yet reached a sufficiently stable state. Further versions of this TSS&TP specification will follow TS 101 883 [1] completely and cover all its requirements.

The ISO standard for the methodology of conformance testing (ISO/IEC 9646-1 [6], ISO/IEC 9646-2 [7] and ISO/IEC 9646-3 [8]) is 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 101 883: "Telecommunications and Internet protocol Harmonization Over Networks (TIPHON) Release 3; Technology Mapping; Implementation of TIPHON architecture using H.323".

[2] ITU-T Recommendation H.323 (2000): "Framework and wire-protocol for multiplexed call signalling transport".

[3] ITU-T Recommendation H.225.0 (2000): "Call signalling protocols and media stream packetization for packet-based multimedia communication systems".

[4] ETSI TS 101 804-1 (V1.1.1): "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; Release PICS; Revision/Update of H.225.0 PICS for Terminal, Gatekeeper and Gateway".

[5] ITU-T Recommendation Q.931: "ISDN user-network interface layer 3 specification for basic call control".

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

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

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

[9] ETSI TS 101 804-3: "Telecommunications and Internet Protocol Harmonization Over Networks (TIPHON) Release 3; Technology Compliance Specifications; Part 3: H.225.0 Conformance Test Specifications; Abstract Test Suite (ATS) and PIXIT proforma for Terminal, Gatekeeper and Gateway".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions defined in ITU-T Recommendation H.323 [2], ITU-T Recommendation H.225.0 [3], ISO/IEC 9646-1 [6], ISO/IEC 9646-2 [7] and ISO/IEC 9646-3 [8] and the following apply:

Basic Call Control (BCC): signalling protocol associated with the DSS1 - ISDN Basic Call control procedures of ITU-T recommendation Q.931

inopportune: 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: 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

NOTE: This test description can be used as the basis for a formal test specification (e.g. Abstract Test Suite in TTCN). See ISO/IEC 9646-2.

valid: 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:

ACF	Admission ConFirm
ADM	ADMission
APDU	Application Protocol Data Unit
ARJ	Admission ReJect
ARQ	Admission ReQuest
ATS	Abstract Test Suite
BCC	Basic Call Control
BCF	Bandwidth ConFirm
BRJ	Bandwidth ReJect
BRQ	Bandwidth ReQuest
DCF	Disengage ConFirm
DGK	Destination GateKeeper
DRJ	Disengage ReJect
DRQ	Disengage ReQuest
GCF	Gatekeeper ConFirm
GDR	Gatekeeper Discovery Request
GK	GateKeeper
GRJ	Gatekeeper ReJect
GRQ	Gatekeeper ReQuest
GW	GateWay
I	Inopportune
IUT	Implementation Under Test
LAN	Local Area Network
LCF	Location ConFirm
LRJ	Location ReJect
LRQ	Location ReQuest
MCU	Multipoint Control Unit
MSI	Manufacturer Specific Information
PDU	Protocol Data Unit
PER	Packed Encoding Rules

PHA	PHase A: call setup signalling procedures
PHE	PHase E: call termination signalling procedures
PICS	Protocol Implementation Conformance Statement
PIXIT	Protocol Implementation eXtra Information for Testing
RAS	Registration, Admission and Status
RCF	Register ConFirm
REG	REGistration
RIP	Request In Progress
RRJ	Register ReJect
RRQ	Register ReQuest
S	Syntactically invalid
STA	STAtus
TCP	Transmission Control Protocol
TE	TErminal
TP	Test Purpose
TSS	Test Suite Structure
TTCN	Testing and Test Control Notation
UCF	Unregistration ConFirm
UDP	User Datagram Protocol
URJ	Unregistration ReJect
URQ	Unregistration ReQuest
V	Valid

4 Architecture and Test Suite Structure (TSS)

4.1 Architecture

The items to be tested can be one of the following: Terminal, Gatekeeper, Gateway or Destination Gatekeeper. They are a part of a Packet Based Network using a LAN with TCP/IP (see figure 1).

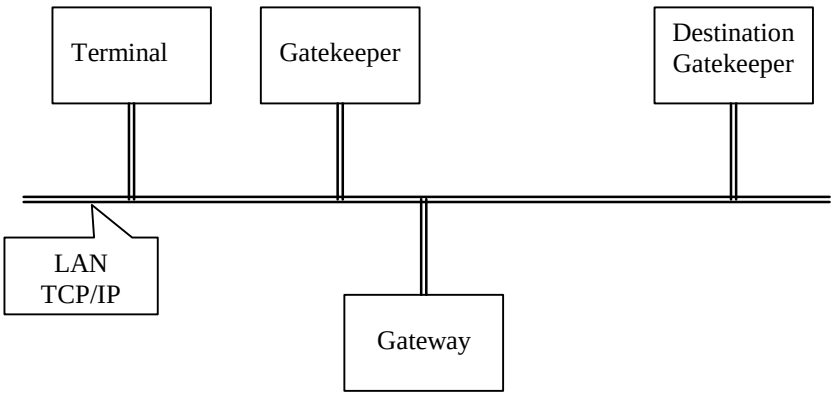

Figure 1: network architecture

The Implementation Under Test (IUT, see ISO/IEC 9646-1 [6]) for which this Test purpose specification applies consists of the H.225.0 terminal to gatekeeper signalling (RAS) and the H.225.0 call signalling (BCC) (see figure 2).

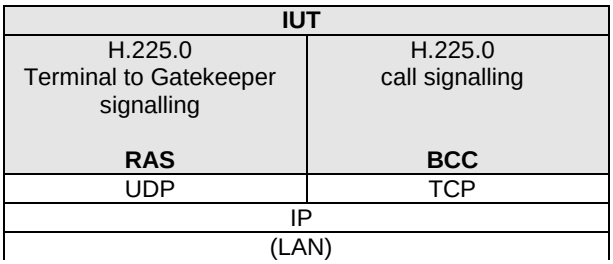

Figure 2: protocol architecture

4.2 Test Suite Structure (TSS)

The Test Suite Structure follows the network architecture and the protocol architecture. The first level is divided into 2 groups according to the protocol: RAS and BCC.

For the RAS protocol, each process is included in a corresponding sub-group: Gatekeeper Discovery Request (GDR), Registration (REG), Administration (ADM), LOC (Location), BND (Bandwidth), URG (Unregistration), DRG (Disengage) and Status (STA).

For BBC, 2 call phases are considered: phase A and phase E, each one forming a sub-group of BCC.

Finally each group is divided in 3 subgroups:

- V containing the valid test purposes;
- I containing the inopportune test purposes;
- S containing the invalid test purposes.

Protocol	IUT type	Process/ Phase	Test type
RAS			
	Endpoint (TE)		
		GDR	
		REG	
		URG	
		RIP	
	Gatekeeper (GK)		
		GDR	
		REG	
		URG	
		RIP	
BCC			
	Endpoint (TE)		
		PHA	V - I - S
		PHE	V - I - S
	Gatekeeper (GK)		
		PHA	V - I - S
		PHE	V - I - S
	Destination Gatekeeper (DGK)		
		PHA	V - I - S
		PHE	V - I - S

5 Test Purposes (TP)

5.1 Introduction

5.1.1 TP naming convention

Table 1: TP identifier naming convention scheme

Identifier: **<iut>_<protocol>_<process>_<type>_<nnn>**			
<iut>	=	type of IUT	TE = terminal or endpoint
			GK, DGK
<protocol>			RAS or BCC
<process>			if RAS: GDR, REG, URG or RIP if BCC: PHA or PHE
<type>			V, I or S
<nn>	=	sequential number	(01-99)

5.1.2 State Definitions

5.1.2.1 State definition for BCC

For the BCC protocol, the call states of ITU-T Recommendation Q.931 [5] for the user side are followed.

5.1.3 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.225

TP part	Text	Example
Header	**<Identifier>** tab **<paragraph number in base ETS>**	**TE_RAS_GDR_I_01** (see table 1) **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,*	GRQ, RRQ, SETUP, FACILITY, CONNECT, ... RasAddress, callServices, … Bearer capability, Facility, ...
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.		

5.1.4 Test strategy

As the base standard ITU-T Recommendation H.225.0 [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 [9] (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.

5.2 TPs for H.225

All PICS items referred to in this clause are as specified in TS 101 804-1 [4].

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

5.2.1 RAS

5.2.1.1 Endpoint (TE)

5.2.1.1.1 Gatekeeper discovery request (GDR)

NOTE: When multicast or unicast is not specified, both modes are accepted for GRQ message.

Selection: IUT supports Discovery messages, PICS T_RM1

RAS_TE_GDR_V_01 clause 7.2.1 [2], clause 7.8 [3]
Ensure that the IUT having sent a valid GRQ message in unicast mode, with the gatekeeper Identifier set to a value other than NULL, on receipt of a GCF message,
considers to have completed the GKDiscovery procedure successfully.

RAS_TE_GDR_V_02 clause 7.2.1 [2], clause 7.8 [3]
Ensure that the IUT having sent a valid GRQ message in multicast mode to the well-known Discovery Multicast Address and gatekeeperIdentifier missing or set to NULL, on receipt of a GCF message,
considers to have completed its GKDiscovery procedure successfully.

RAS_TE_GDR_V_03 clause 7.2.1 [2], clause 7.8 [3]
Ensure that the IUT having sent a valid GRQ message in multicast mode to the well-known Discovery Multicast Address and with gatekeeperIdentifier missing or set to NULL, on receipt of multiple GCF message from different gatekeepers,
considers to have completed its GKDiscovery procedure successfully with one of them.

RAS_TE_GDR_V_04 clause 7.2.1 [2], clause 7.8 [3]
Ensure that the IUT having sent a valid GRQ message, on receipt of a GRJ message with a value in the rejectreason field,
does not consider to have completed its GKDiscovery procedure successfully.

RAS_TE_GDR_V_05 clause 7.2.1 [2], clause 7.8 [3], clause 7.19 [3]
Ensure that the IUT having sent a GRQ message, upon the first expiry of default timer for GRQ message,
sends the same GRQ message again.

RAS_TE_GDR_V_06 clause 7.2.1 [2], clause 7.8 [3], clause 7.19 [3]
Ensure that the IUT having sent a GRQ message for the second time, on receipt of GCF message before the expiry of timer for a GRQ message,
considers to have completed its GKDiscovery procedure successfully.