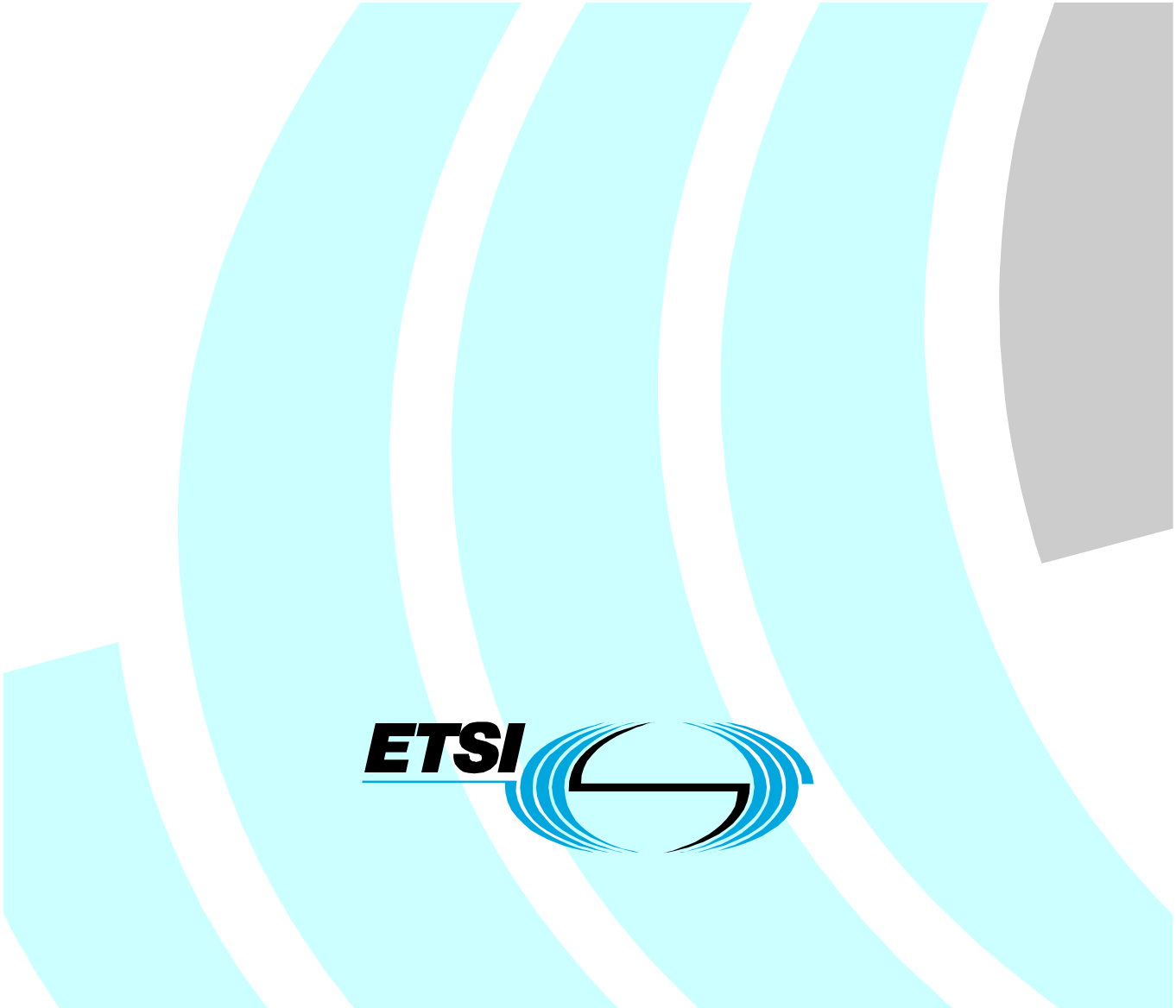
ETSI TS 102 318 V1.1.1 (2004-03)

Technical Specification

Access and terminals (AT);
Digital Broadband Access to the
Public Telecommunications Network;
IP Multimedia Time Critical Services;
Protocol Implementation Conformance Statement (PICS);
Internet Protocol Access Terminal - Line Control Signalling



Reference
DTS/AT-020020-26-02

Keywords
Access, broadband, cable, IP, multimedia, PSTN
IPCable, PICS, terminal, testing, VoIP

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Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Access and Terminals (AT).

Introduction

To evaluate conformance of a particular implementation, it is necessary to have a statement of which capabilities and options have been implemented for a telecommunication specification. Such a statement is called an Implementation Conformance Statement (ICS).

1 Scope

The present document provides the Protocol Implementation Conformance Statement (PICS) proforma for the Network-based Call Signalling, Dynamic Quality of Service, Provisioning and Security protocols together with the ETSI V5 mapping for the IPCablecom (packet-based multimedia communication) system defined in TS 101 909-4 [2], TS 101 909-5 [3], TS 101 909-6 [4], TS 101 909-7 [5], TS 101 909-8 [6], TS 101 909-9 [7], TS 101 909-11 [8], TS 101 909-23 [10], in compliance with the relevant requirements specified in those specifications and in accordance with the relevant guidance given in ISO/IEC 9646-7 [26].

The supplier of a protocol implementation which is claimed to conform to is required to complete a copy of the PICS proforma provided in annex A of the present document and is required to provide the information necessary to identify both the supplier and the implementation.

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 EG 201 188: "Public Switched Telephone Network (PSTN); Network Termination Point (NTP) analogue interface; Specification of physical and electrical characteristics at a 2-wire analogue presented NTP for short to medium length loop applications".

[2] ETSI TS 101 909-4 (V1.2.2): "Digital Broadband Cable Access to the Public Telecommunications Network; IP Multimedia Time Critical Services; Part 4: Network Call Signalling Protocol".

[3] ETSI TS 101 909-5 (V1.1.1): " Access and Terminals (AT); Digital Broadband Cable Access to the Public Telecommunications Network; IP Multimedia Time Critical Services; Part 5: Dynamic Quality of Service for the Provision of Real Time Services over Cable Television Networks using Cable Modems".

[4] ETSI TS 101 909-6 (V1.1.1): "Access and Terminals (AT); Digital Broadband Cable Access to the Public Telecommunications Network; IP Multimedia Time Critical Services; Part 6: Media Terminal Adapter (MTA) device provisioning".

[5] ETSI TS 101 909-7 (V1.1.1): "Access and Terminals (AT); Digital Broadband Cable Access to the Public Telecommunications Network; IP Multimedia Time Critical Services; Part 7: MIB Framework".

[6] ETSI TS 101 909-8 (V1.1.1): "Access and Terminals (AT); Digital Broadband Cable Access to the Public Telecommunications Network; IP Multimedia Time Critical Services; Part 8: Media Terminal Adapater (MTA) Management Information Base (MIB)".

[7] ETSI TS 101 909-9 (V1.1.1): "Access and Terminals (AT); Digital Broadband Cable Access to the Public Telecommunications Network; IP Multimedia Time Critical Services; Part 9: Network Call Signalling (NCS) MIB Requirements".

[8] ETSI TS 101 909-11 (V1.2.1): "Digital Broadband Cable Access to the Public Telecommunications Network; IP Multimedia Time Critical Services; Part 11: Security".

[9] ETSI TS 101 909-18 (V1.1.1): "Digital Broadband Cable Access to the Public Telecommunications Network; IP Multimedia Time Critical Services; Part 18: Embedded Media Terminal Adapter (E-MTA) offering Analogue Telephony Services for PSTN Terminals".

[10] ETSI TS 101 909-23 (V1.1.1): "Digital Broadband Cable Access to the Public Telecommunications Network; IP Multimedia Time Critical Services; Part 23: Internet Protocol Access Terminal - Line Control Signalling (IPAT - LCS)".

[11] ETSI ES 201 488: "Data-Over-Cable Service Interface Specifications; Radio Frequency Interface Specification".

[12] ETSI ES 200 800: "Digital Video Broadcasting (DVB); DVB interaction channel for Cable TV distribution systems (CATV)".

[13] ETSI EN 300 166: "Transmission and Multiplexing (TM); Physical and electrical characteristics of hierarchical digital interfaces for equipment using the 2 048 kbit/s - based plesiochronous or synchronous digital hierarchies".

[14] ETSI ES 201 235-2: "Access and Terminals (AT); Specification of Dual-Tone Multi-Frequency (DTMF) Transmitters and Receivers; Part 2: Transmitters".

[15] ETSI EN 300 347-1: "V interfaces at the digital Local Exchange (LE); V5.2 interface for the support of Access Network (AN); Part 1: V5.2 interface specification".

[16] 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".

[17] ETSI EN 300 659-2: "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 2: Off-hook data transmission".

[18] ETSI EN 300 659-3: "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 3: Data link message and parameter codings".

[19] IEEE 802.3: "Information Technology - Telecommunication & Information Exchange Between Systems - LAN/MAN - Specific Requirements - Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications".

[20] IETF RFC 1889: "RTP: A Transport Protocol for Real-Time Applications".

[21] IETF RFC 1890: "RTP Profile for Audio and Video Conferences with Minimal Control".

[22] IETF RFC 2131 (March 1997): "Dynamic Host Configuration Protocol".

[23] IETF RFC 2327 (April 1998): "SDP: Session Description Protocol".

[24] IETF RFC 2833: "RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals".

[25] ISO/IEC 9646-1 (1994): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".

[26] ISO/IEC 9646-7 (1995): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TS 101 909-4 [2], TS 101 909-5 [3], TS 101 909-6 [4], TS 101 909-7 [5], TS 101 909-8 [6], TS 101 909-9 [7], TS 101 909-11 [8], TS 101 909-23 [10], ISO/IEC 9646-1 [25], ISO/IEC 9646-7 [26] and the following apply:

ICS proforma: document, in the form of a questionnaire, which when completed for an implementation or system becomes a PICS

Implementation Conformance Statement (ICS): statement made by the supplier of an implementation or system claimed to conform to a given specification, stating which capabilities have been implemented

NOTE: The PICS can take several forms: protocol PICS, profile PICS, profile specific PICS, information object PICS, etc.

Protocol ICS (PICS): ICS for an implementation or system claimed to conform to a given protocol specification

3.2 Abbreviations

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

AN	Access Network
BCC	Basic Call Control
CM	Cable Modem
CMS	Call Management Server
CMTS	Cable Modem Termination System
COPS	Common Open Policy Service
DCR	Detailed Call Record
DF	Delivery Function
DQoS	Dynamic Quality of Service
DTMF	Dual Tone Multi Frequency
EMS	Event Message Server
E-MTA	Embedded MTA
GC	Gate Coordination
GCM	Gate Coordination Messaging
HMAC	Hashed Message Authentication Code
ICS	Implementation Conformance Statement
IKE	Internet Key Exchange
IPAT	Internet Protocol Access Terminal
IUT	Implementation Under Test
LCS	Line Control Signalling
LE	Local Exchange
MG	Media Gateway
MIB	Management Information Base
MTA	Multimedia Terminal Adapter
NCS	Network-based Call Signalling Protocol
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
PKINIT	Public Key INITial
PSTN	Public Switched Telephone Network
RGI	Remote-Gate-Info
RKS	Record Keeping Server
RTCP	Real-Time Transfer Control Protocol
RTP	Real Time Protocol
SCS	System Conformance Statement
SUT	System Under Test
UDP	User Data Protocol

4 Overview

IPCablecom is conceived as an integrated distributed system of cooperating elements with multi-layered multi-media protocols and end to end service support. Thus the structure of the IPCablecom technical specifications do not by nature lend themselves to defining the individual elements of the system as isolated components, which request that interfaces be clearly and independently identified for conformance testing purposes. Consequently, prior to performing any analysis of the complex signalling interactions that take place within the system, each of the physical and logical interfaces are identified as they apply to the IPAT.

The TS 101 909 specifications are not a series of individual standards that were just glued together to make a solution; they are a cohesive set of interwoven specifications that jointly evolved to enable the IPCablecom implementations to interwork as a cohesive end-to-end system. They are entirely based on cable operator needs and requirements. Any changes made to one part have to be done in concert with work being done in other parts. These must be closely coordinated to ensure the elements interface together properly.

For all of the clauses of a given specification, there is a history of evolution and reasoning behind the development of PacketCable™ and subsequently IPCablecom.The present document relates to the set of base standards as defined in the TS 101 909 series, there is no single base standard that covers the requirements of the IPAT in its entirety. Figure 1 illustrates the set of TS 101 909 series base standards that have been referred to in order to evaluate an IPAT protocol implementation, for the purpose of developing the present document.

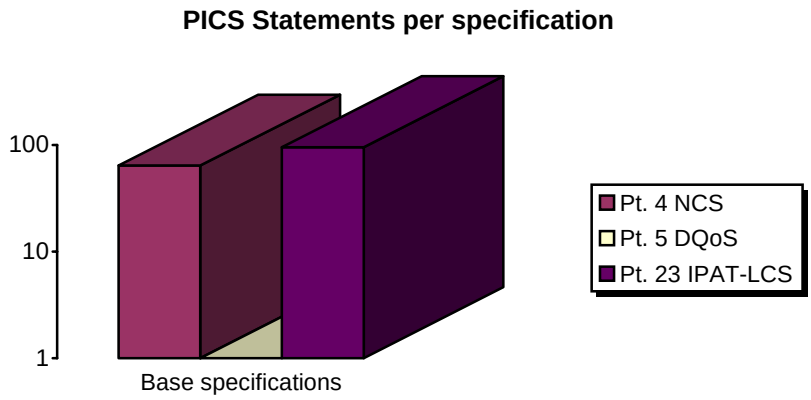

Figure 1: Base specifications relevant to the IPAT

5 Conformance to this PICS proforma specification

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

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

Annex A (normative): PICS proforma for ETSI TS 101 909 IPCablecom series specific to Internet Protocol Access Terminal

A.1 Guidance for completing the PICS proforma

A.1.1 Purposes and structure

The purpose of this PICS proforma is to provide a mechanism whereby a supplier of an implementation of the requirements defined in the ETSI IPCablecom [TS 101 909] series may provide information about the implementation in a standardized manner.

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

- guidance for completing the PICS proforma;
- identification of the implementation;
- identification of the protocol;
- global statement of conformance;
- V5 to NCS mapping implementation;
- network-based call signalling protocol implementation;
- dynamic quality of service implementation;
- multimedia terminal adapter provisioning implementation;
- management information base implementation;
- implementation of security mechanisms.

A.1.2 Abbreviations and conventions

The PICS proforma contained in this annex is comprised of information in tabular form in accordance with the guidelines presented in ISO/IEC 9646-7 [26].

Item column

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

Item description column

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

Status column

The following notations, defined in ISO/IEC 9646-7 [26], are used for the status column:

M	mandatory - the capability is required to be supported;
O	indicates an optional requirement in ETSI TS 101 909. However, only sending of the parameter/message is optional. When the parameter/message is received an ETSI IPCablecom compliant E-MTA shall act upon the parameter/message in accordance with the procedures as described in the main body of the present document;
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;
Ot.i	qualified optional - for mutually exclusive or selectable options from a set. "i" is an integer which identifies a unique group of related optional items in the table numbered t and the logic of their selection which is defined immediately following the table;
Ct.i	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 a unique conditional status in the table numbered t, expression which is defined immediately following the table.

Support column

The support column shall be filled in by the supplier of the implementation. The following common notations, defined in ISO/IEC 9646-7 [26], are used for the support column:

Y or y	supported by the implementation;
N or n	not supported by the implementation;
N/A, n/a or	no answer required (allowed only if the status is n/a, directly or after evaluation of a conditional status).

It is also possible to provide a comment to an answer in the space provided at the bottom of the table.

NOTE: As stated in ISO/IEC 9646-7 [26], support for a received PDU requires the ability to parse all valid parameters of that PDU. Supporting a PDU while having no ability to parse a valid parameter is non-conformant. Support for a parameter on a PDU means that the semantics of that parameter are supported.

Values allowed

Notes describe the content of the field, when only restricted values are supported, for sent message.

References to items

For each possible item answer (answer in the support column) within the PICS proforma a unique reference exists, used, for example, in the conditional expressions. It is defined as the table identifier, followed by a solidus character "/", followed by the item number in the table.

EXAMPLE: A.5/4 is the reference to the answer of item 4 in table 5 of annex A.

Prerequisite line

A prerequisite line takes the form: Prerequisite: < predicate >.

A prerequisite line after a clause or table title indicates that the whole clause or the whole table is not required to be completed if the predicate is FALSE.

A.1.3 Instructions for completing the PICS proforma

The supplier of the implementation shall complete the PICS proforma in each of the spaces provided. In particular, an explicit answer shall be entered, in each of the support or supported column boxes provided, using the notation described in clause A.1.2.

If necessary, the supplier may provide additional comments in space at the bottom of the tables, or separately on sheets of paper.

More detailed instructions are given at the beginning of the different clauses of the PICS proforma.

A.2 Identification of the implementation

Identification of the Implementation Under Test (IUT) and the system in which it resides (the System Under Test (SUT)) should be filled in so as to provide as much detail as possible regarding version numbers and configuration options.

The product supplier information and terminal information should both be filled in if they are different.

A person who can answer queries regarding information supplied in the PICS should be named as the contact person.

A.2.1 Date of the statement

.....

A.2.2 Implementation Under Test (IUT) identification

IUT name:

.....

.....

IUT version:

.....

A.2.3 System Under Test (SUT) identification

SUT name:

.....

.....

Hardware configuration:

.....

.....

.....

Operating system:

.....

A.2.4 Product supplier

Name:

.....

Address:

.....

.....

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....

.....

.....

A.2.5 PICS contact person

(A person to contact if there are any queries concerning the content of the PICS)

Name:

.....

Telephone number:

.....

Facsimile number:

.....

E-mail address:

.....

Additional information:

.....

.....

.....

A.3 PICS/System Conformance Statement (SCS)

Provide the relationship of the PICS with the SCS for the system.

A.4 Identification of the protocols to the interfaces on the IPAT

The PICS proforma applies to the following standards:

ETSI TS 101 909-4 (V1.2.2): "Digital Broadband Cable Access to the Public Telecommunications Network; IP Multimedia Time Critical Services; Part 4: Network Call Signalling Protocol".

ETSI TS 101 909-5 (V1.1.1): "Digital Broadband Cable Access to the Public Telecommunications Network; IP Multimedia Time Critical Services; Part 5: Dynamic Quality of Service for the Provision of Real Time Services over Cable Television Networks using Cable Modems".

ETSI TS 101 909-6 (V1.1.1): "Digital Broadband Cable Access to the Public Telecommunications Network; IP Multimedia Time Critical Services; Part 6: Media Terminal Adapter (MTA) Device Provisioning".

ETSI TS 101 909-7 (V1.1.1): "Digital Broadband Cable Access to the Public Telecommunications Network; IP Multimedia Time Critical Services; Part 7: MIB Framework".

ETSI TS 101 909-9 (V1.1.1): "Digital Broadband Cable Access to the Public Telecommunications Network; IP Multimedia Time Critical Services; Part 9: MIB Signalling".

ETSI TS 101 909-11 (V1.2.1): "Digital Broadband Cable Access to the Public Telecommunications Network; IP Multimedia Time Critical Services; Part 11: Security".

ETSI TS 101 909-23 (V1.1.1): "Digital Broadband Cable Access to the Public Telecommunications Network; IP Multimedia Time Critical Services; Part 23: Internet Protocol Access Terminal".

A.5 Global statement of conformance

Are all mandatory capabilities implemented? (Yes/No).

NOTE: Answering "No" to this question indicates non-conformance to the protocol specification. Non-supported mandatory capabilities are to be identified in the PICS, with an explanation of why the implementation is non-conforming, on pages attached to the PICS proforma.

A.6 General

Table A.1: General implementation by the IPAT

Item	Requirement	Reference	Status	Support
G_1	Is the IPAT capable of supporting a Media Gateway (MG) function, as defined by the NCS architecture TS 101 909-4 [2], to enable an upgrade from an LCS to NCS architecture?	4 [10]	O	
G_2	Does the IPAT implement the CMS Gate Controller functions to provide Dynamic Quality of Service (DQoS) functions?	5.2 [10]	M	
G_3	Does the IPAT implement IPCablecom security as defined in clause 6.8 [10]?	6.8 [10]	M	
G_4	Does the IPAT implement only those subscriber line call features as supported within the IPCablecom NCS architecture, as defined in TS 101 909-4, annex B [2]?	Annex B [2]	O	
Comments:				

Table A.2: Trunk management by the IPAT

Item	Requirement	Reference	Status	Support
G_5	Does the IPAT manage alarms associated to its end of the digital trunks?	5.2 [10]	M	
G_6	Does the IPAT manage the initialization process associated to its end of the digital trunks?	5.2 [10]	M	
G_7	Does the IPAT manage the maintenance of its end of the digital trunks?	5.2 [10]	M	
G_8	Does the IPAT manage its own provisioning information as needed to support inter-working (mapping between LCS and LE numbering, trunk identities, etc.)?	5.2 [10]	M	
Comments:				

A.7 Physical Interfaces

Table A.3: Physical Interfaces supported by the IPAT

Item	Requirement	Reference	Status	Support
PI_1	Does the IPAT support a V5.2 [13] physical interface between LE-to-IPAT ?	6.1 [10]	M	
PI_2	Do the electrical and physical characteristics of the V5.2 interface conform to the 2 048 kbit/s case in EN 300 166 [13]?	B.3 [2]	M	
PI_3	Does the IPAT implement IEEE 802.3 [19] as the physical interface between CMTS-to-IPAT?	6.1 [10]	M	
PI_4	Does the IPAT implement IEEE 802.3 [19] as the physical interface between IPAT-to-Network Servers?	6.1 [10]	M	
PI_5	Does the IPAT implement IEEE 802.3 [19] as the physical interface between IPAT-to-EMS?	6.1 [10]	M	
Comments:				

A.8 V 5.2 Call Signalling Interfaces

Table A.4: V 5.2 Call signalling implementation by the IPAT

Item	Requirement	Reference	Status	Support
CS_1	Does the IPAT implement the call signalling interface Pkt-c8 (IPAT-LE)?	6.2 [10]	M	
CS_2	Does the IPAT convert NCS protocol call control signalling into digital line interface signalling (V5.2) required by the LE?	6.2 [10]	M	
CS_3	Does the IPAT implement the call signalling interface Pkt-c9 (LE-IPAT)?	6.2 [10]	M	
CS_4	Does the IPAT convert digital line interface signalling from the LE (V5.2) into the IPCablecom NCS protocol call control signalling?	6.2 [10]	M	
CS_5	Does the IPAT implement call signalling messages between the IPAT and LE via the V5.2 interface?	6.2 [10]	M	
CS_6	Does the IPAT implement In-Band DTMF Signalling towards the Local Exchange as specified in ES 201 235 [14]?	6.2 [10]	M	
CS_7	Does the IPAT implement Receipt of call progress tones and announcements from the Local Exchange as specified in EG 201 188 [1]?	6.2 [10]	M	
CS_8	Does the IPAT implement Receipt of display services protocols from the Local Exchange as specified in EN 300 659-1 [16]?	6.2 [10]	M	
CS_9	Does the IPAT implement the signalling functions of the V5.2 interface as specified in EN 300 347-1 [15] from the Local Exchange (LE)?	6.2 [10]	M	
CS_10	Does the IPAT support the Access Network (AN) functionality of the V5.2 interface for AN Data Link Layer Protocols?	6.2 [10]	M	
CS_11	Does the IPAT support the Access Network (AN) functionality of the V5.2 interface for the AN PSTN Protocol?	6.2 [10]	M	
CS_12	Does the IPAT support the Access Network (AN) functionality of the V5.2 interface for the AN BCC Protocol?	6.2 [10]	M	
CS_13	Does the IPAT support the Access Network (AN) functionality of the V5.2 interface for the AN Link Control Protocol?	6.2 [10]	M	
CS_14	Does the IPAT support the Access Network (AN) functionality of the V5.2 interface for the AN Control Protocol?	6.2 [10]	M	
CS_15	Does the IPAT support the Access Network (AN) functionality of the V5.2 interface for the AN Protection Protocol?	6.2 [10]	M	
CS_16	Does the IPAT support packetized PSTN media flows as both transmitted and managed using the RTP and RTCP protocols with QoS and security as defined in IPCablecom?	6.2 [10]	M	
Comments:				

A.9 Media Flow

Table A.5: RTP/RTCP signalling implementation by the IPAT

Item	Requirement	Reference	Status	Support
MF_1	Does the IPAT convert the outgoing RTP (voice) packets into digital circuit voice traffic, passing it over E1 digital trunks to the LE?	6.2 [10]	M	
MF_2	Does the IPAT convert incoming voice circuit traffic presented on E1 digital trunks from LE into RTP (voice) packet traffic?	6.2 [10]	M	
Comments:				

Table A.6: Media Flow

Item	Requirement	Reference	Status	Support
MF_3	Does the IPAT implement the IETF standard Real Time Transport Protocol (RFC 1889 [20]) as the means to transport all media streams in the network?	6.3 [10]	M	
MF_4	Does the IPAT implement the RTP profile for audio streams as defined in RFC 1890 [21]?	6.3 [10]	M	
MF_5	Does the IPAT implement the RTP profile for video streams as defined in RFC 1890 [21]?	6.3 [10]	M	
MF_6	Does the IPAT implement the Session Description Protocol (SDP), as given in RFC 2327 [23], to communicate the particular IP address and UDP port an RTP session is using?	6.3 [10]	M	
MF_7	Does the IPAT implement a Payload Header Suppression feature for abbreviating common headers so that RFC 2833 [24] event packets can be padded to match the length of the corresponding RTP voice packet?	6.3 [10]	M	
Comments:				

A.10 V5 Mapping

Table A.7: V5 Mapping implementation by the IPAT

Item	Requirement	Reference	Status	Support
V5_1	Does the IPAT translate PSTN V5.2 signalling messages into NCS messages as defined in the annex B of the NCS specification TS 101 909-4 [2]?	6.2.1 [10]	M	
V5_2	Does the IPAT handle the V5.2 control requirements as defined in EN 300 347-1 [15]?	6.2.2 [10]	M	
V5_3	Does the IPAT provide (via provisioning) an internal address translation table from the V5 User Port Identification Value to the associated IP/Line ID address of the CM/MTA that is associated with that line number?	6.10 [10]	M	
V5_4	Does the IPAT make the translation, as described in V_3.1, available through a provisioning system interface?	6.10 [10]	M	
V5_5	Does the IPAT Detailed Call Record (DCR) include the User Port Identification Value for each call processed by the IPAT?	6.10 [10]	M	
V5_6	Does the IPAT Detailed Call Record (DCR) include the IP/Line ID address values for each call processed by the IPAT?	6.10 [10]	M	
V5_7	Does the IPAT map the V5 "Establish" or "Signal" Message Types for "Cadence-ringing" to the NCS "SignalRequest"?	B.4.1 [2]	M	
V5_8	Does the IPAT map the The V5 "Establish" or "Signal" Message Type "Pulsed Signal" request to an NCS "SignalRequest"?	B.4.2 [2]	M	
V5_9	Does the IPAT include the timeout value if the product of pr*rep is less than 180 seconds?	B.4.2 [2]	O	
V5_10	Does the IPAT include the timeout value if the product of pr*rep is greater than 180 seconds?	B.4.2 [2]	M	
V5_11	Does the IPAT implement Line Treatment coding as given in table B.2 of TS 101 909-4 [2]?	B.4.2 [2]	M	
V5_12	Does the IPAT support mapping of V5 enumerated pulse type coding to NCS line treatment types as defined in the provisioning tables of annex B of TS 101 909-4 [2]?	B.4.2 [2]	M	
V5_13	Does the IPAT support mapping of V5 enumerated pulse duration coding to NCS line treatment durations in milliseconds as defined in the provisioning tables of annex B of TS 101 909-4 [2]?	B.4.2 [2] B.4.4 [2]	M	
V5_14	Does the IPAT support the NCS requested events for pulsed signals, by inclusion in the requested events (R) parameter?.	B.4.3 [2]	M	
V5_15	Does the IPAT support the NCS requested events (R) parameter **oc**?	B.4.3 [2]	M	
V5_16	Does the IPAT support the NCS requested events (R) parameter **of**?	B.4.3 [2]	M	
V5_17	Does the IPAT support requested events (R) parameter **pc**?	B.4.3 [2]	M	
V5_18	Does the IPAT implement the pulse completion event as defined in annex B of TS 101 909-4 [2]?	B.4.5 [2]	M	
Comments:				

A.11 Dynamic Quality of Service

Table A.8: DQoS implementation by the IPAT

Item	Requirement	Reference	Status	Support
DQoS_1	Does the IPAT verify that the CMTS has correctly reported the completion of all calls?	6.6.3 [10]	M	
DQoS_2	Does the IPAT verify that QoS resources were released at the moment that the CMTS reported completion of all calls?	6.6.3 [10]	M	
DQoS_3	Does the IPAT support forcing the release of QoS resources as given in clause 6.6.3 [10]?	6.6.3 [10]	M	
DQoS_4	In the case of abnormal disconnect as given in clause 6.6.3 [10], does the IPAT support V 5.2 call release message notifications to the LE?	6.6.3 [10]	M	
DQoS_5	Does the IPAT establish DQoS Gates for every voice call by initiating DQoS *GATE-SET* message exchanges with the CMTS?	6.6.4.1 [10]	M	
DQoS_6	Does the IPAT send the GateID, signalled in NCS connection commands, to the MTA in subsequent resource reservation and committal message exchanges with the CMTS?	6.6.4.1 [10]	M	
DQoS_7	Does the IPAT protect against denial of service attacks as given in clause 6.6.4.1.7 [10]?	6.6.4.1.7 [10]	M	
DQoS_8	Does the IPAT signal the CMTS that Event Messages should not be generated for IPAT-initiated voice calls as given in clause 6.6.4.2 [10]?	6.6.4.2 [10]	M	
DQoS_9	Does the IPAT establish DQoS Gates for every voice call by initiating DQoS GATE-SET message exchanges with the CMTS as given in clause 6.6.4.2 [10]?	6.6.4.2 [10]	M	
DQoS_10	Does the IPAT-generated Gate-Specs object contain the MTA IP address in the appropriate positions for the upstream and downstream Gates, as given in clause 6.6.4.2 [10]?	6.6.4.2 [10]	M	
DQoS_11	Does the IPAT-generated Gate-Specs object contain the IPAT IP address in the appropriate positions for the upstream and downstream Gates, as given in clause 6.6.4.2 [10]?	6.6.4.2 [10]	M	
DQoS_12	Does the IPAT-generated Gate-Specs object contain the IPAT receive UDP port as the destination port of the upstream Gate, as given in clause 6.6.4.2 [10]?	6.6.4.2 [10]	M	
DQoS_13	Does the IPAT-generated Gate-Specs object set the MTA UDP Port to zero, in the appropriate positions for the upstream and downstream Gates, as given in clause 6.6.4.2 [10]?	6.6.4.2 [10]	M	
DQoS_14	Does the IPAT ensure that DQoS Gates it established have been properly closed by the CMTS for every voice call?	6.6.4.2 [10]	M	
DQoS_15	Does the IPAT ensure that it minimizes the possibility of deleting any Gates, as given in clause 6.6.4.2 [10]?	6.6.4.2 [10]	M	

Item	Requirement	Reference	Status	Support
DQoS_16	Does the IPAT generate (via provisioning) an internal address translation table to map the V5 User Port Identification Value to the associated IP/Line ID address of the CM/MTA associated with that line number?	6.10 [10]	M	
DQoS_17	Does the IPAT make the the internal translation table (see Q_16) accessible via a provisioning system interface?	6.10 [10]	M	
DQoS_18	Does the IPCablecom Access Network provide timely reporting to the LE of the loop state at the CM/MTA to enable accurate billing to be accomplished?	B.1 [10]	M	
DQoS_19	Does a trust relationship exist between GC/IPAT and CMTS with respect to admission and authorization?	5.4 [3]	M	
Comments:				

Table A.9: Implementation of DQoS Gate Co-ordination by the IPAT

Item	Requirement	Reference	Status	Support
DQoS_20	Does the IPAT implement the DQoS Gate Control interface as specified in TS 101 909-5 [3]?	6.6.4.2 [10]	M	
DQoS_21	Does the IPAT support DQoS Gate Control Messages as given in clause 6.9.3.1.1 [10]?	6.6.4.2 [10]	M	
DQoS_22	Does the IPAT support DQoS Gate Control Objects as given in clause 6.9.3.1.1 [10]?	6.6.4.2 [10]	M	
DQoS_23	Does the IPAT support the "without gate coordination option" as given in clause 6.6.3 [10]?	6.6.3 [10]	$O9_1$	
DQoS_24	Does the IPAT support the "with gate coordination option" as given in clause 6.6.3 [10]?	6.6.3 [10]	$O9_1$	
Comments: NOTE: $O9_1$: At least one of these options must be supported by the IPAT.				

Table A.10: Implementation of DQoS Without Gate Co-ordination Option by the IPAT

Prerequisite: Support of the "without gate coordination option" [item DQoS_23]

Item	Requirement	Reference	Status	Support
DQoS_25	During abnormal situations as described in clause 6.6.3 [10], does the IPAT/GC close "open gates" to the CMTS?	6.6.3 [10]	M	
DQoS_26	Does the IPAT verify that Gates have been closed in all call release scenarios?	6.6.4.1.5 [10]	M	
DQoS_27	Does the IPAT delete the Gates that have not been properly closed?	6.6.4.1.5 [10]	M	
Comments:				

Table A.11: Implementation of DQoS With Gate Co-ordination Option by the IPAT

Prerequisite: Support of the "with gate coordination option" [item DQoS_24]

Item	Requirement	Reference	Status	Support
DQoS_28	During abnormal situations as described in clause 6.6.3 [10], does the IPAT/GC support requests for Gate information to the CMTS?	6.6.3 [10]	M	
DQoS_29	During abnormal situations as described in clause 6.6.3 [10], does the IPAT/GC support requests to the CMTS to close Gates?	6.6.3 [10]	M	
DQoS_30	Does the IPAT verify the reason for the Gates Closure, in abnormal cases, when the Gate has not been closed because of an explicit disconnect message from the LE (via V 5.2 interface)?	6.6.4.1.6 [10]	M	
DQoS_31	Does the IPAT notify the LE about call cut off (by sending V 5.2 AN_Fault message)?	6.6.4.1.6 [10]	M	
DQoS_32	Does the IPAT implement the Gate Coordination Messaging as given in clause 6.9.3.1.5 [10]?	6.6.4.2 [10]	M	
DQoS_33	Does the IPAT-generated Remote-Gate-Info object contain the IPAT/CMTS Proxy IP address as given in clause 6.6.4.2 [10]?	6.6.4.2 [10]	M	
DQoS_34	Does the IPAT-generated Remote-Gate-Info object contain the UDP port number as given in clause 6.6.4.2 [10]?	6.6.4.2 [10]	M	
DQoS_35	Does the IPAT provide message integrity using an application-layer (Radius) authenticator distributed by COPS?	6.8.3 [10]	M	
Comments:				

A.12 Security

Table A.12: Implementation of Security mechanisms

Item	Requirement	Reference	Status	Support
Sec_1	Is the IPAT Line Control Signalling (LCS) Security architecture implementation based on the IPCablecom Security Specification TS 101 909-11 [8]?	6.8 [10]	M	
Sec_2	Does the IPAT not implement the Record Keeping Server (RKS) and its interfaces to the CMS and CMTS?	6.8 [10]	M	
Sec_3	Does the IPAT not implement the Delivery Function (DF) and its interfaces to the MG, CMS, and CMTS?	6.8 [10]	M	
Sec_4	Does the IPAT not implement the Record Keeping Server (RKS) and its interfaces to the CMS and CMTS?	6.8 [10]	M	
Sec_5	Does the IPAT Gate Controller implement the COPS protocol to download QoS policy into the CMTS?	6.8.2.2 [10]	M	
Sec_6	Does the IPAT Gate Controller implement the Radius protocol to coordinate the QoS reservation?	6.8.2.2 [10]	M	
Sec_7	Does the IPAT encrypt RTP and RTCP signalling packets?	6.8.2.4 [10]	M	
Sec_8	Is bearer channel traffic passed directly between an MTA and the IPAT MG using RTP and RTCP secured as defined in ETSI Technical Specification TS 101 909-11 [8]?	6.8.2.5 [10]	M	
Sec_9	Does the IPAT respect the requirement to encrypt End-to-end RTP media packets between the E-MTA and IPAT?	6.8.3 [10]	M	
Sec_10	Does the IPAT use HMAC (Hashed Message Authentication Code) to provide message integrity?	6.8.3 [10]	M	
Sec_11	Does the IPAT use randomly generated keys?	6.8.3 [10]	M	
Sec_12	Does the IPAT exchange those randomly generated keys between the two endpoints inside the signalling messages via the IPAT CA?	6.8.3 [10]	M	
Sec_13	Does the IPAT encrypt RTCP messages using the same secret negotiated during the RTP key management?	6.8.3 [10]	M	
Sec_14	Does the IPAT implement NCS message integrity and privacy using IPSec?	6.8.3 [10]	M	
Sec_15	Does the IPAT respect the requirement to use Kerberos with PKINIT (public key initial authentication) extension for Key management?	6.8.3 [10]	M	
Sec_16	Is the IPAT implementation of the Gate Control protocol, between the IPAT GC and the CMTS, based upon COPS?	6.8.3 [10]	M	
Sec_17	Does the IPAT implement the Gate Control protocol message integrity and privacy using IPSec?	6.8.3 [10]	M	
Sec_18	Does the IPAT respect the requirement to use IKE with pre-shared key for Key management?	6.8.3 [10]	M	
Comments:				

A.13 Network-based call signalling protocol

Table A.13: NCS Protocol

Item	Requirement	Reference	Status	Support
NCS_1	Does the IPAT implement the call signalling interface Pkt-c1 (MTA-IPAT)?	6.2 [10]	M	
NCS_2	Does the IPAT implement the call signalling interface Pkt-c10 (IPAT-MTA)?	6.2 [10]	M	
NCS_3	Does the IPAT implement the call signalling messages as defined in annex A and B of TS 101 909-4 [2]?	6.2 [10] Annex A [2] Annex B [2]	M	
NCS_4	Does the IPAT instruct the gateways to create connections between endpoints as given in clause 5 [2]?	5 [2]	M	
NCS_5	Does the IPAT instruct the gateways to detect certain events as given in clause 5 [2]?	5 [2]	M	
NCS_6	Does the IPAT implement the NCS protocol as defined in TS 101 909-4 [2]?	6.1 [2]	M	
NCS_7	Does the IPAT support text endpoint names of the form local-endpoint-name@domain-name?	6.1.1 [2]	M	
NCS_8	Does the IPAT support wildcarding in text endpoint names?	6.1.1 [2]	M	
NCS_9	Does the IPAT support character restriction in text endpoint names?	6.1.1 [2]	M	
NCS_10	Does the IPAT support slash naming in text endpoint names?	6.1.1 [2]	M	
NCS_11	Does the IPAT ensure that call identifiers are unique within the collection of call agents that control the same gateways?	6.1.2 [2]	M	
NCS_12	Does the IPAT support Connection identifiers with a maximum length of 32 characters?	6.1.3 [2]	M	
NCS_13	Does the IPAT respect the requirement to wait for a period >3 minutes between the end of a connection that used a Connection identifier and its use in a new connection for the same endpoint?	6.1.3 [2]	M	
NCS_14	Does the IPAT support loading of digit maps as per the NCS protocol [2]?	6.1.5 [2]	M	
NCS_15	Does IPAT support the NCS packet concept, providing unique package names as defined in the NCS specification [2]?	6.1.6 [2]	M	
NCS_16	Does IPAT support the NCS packet concept, providing unique name space for events as defined in the NCS specification [2]?	6.1.6 [2]	M	
NCS_17	Does IPAT support the NCS packet concept, providing unique name space for signals as defined in the NCS specification [2]?	6.1.6 [2]	M	
NCS_18	Does the IPAT support the IETF SDP protocol [23] to provide the gateways with the description of connection parameters?	6.2 [2]	M	
NCS_19	Does the IPAT keep track of the state of the endpoint?	6.4 [2]	M	
NCS_20	Does the IPAT keep track of the state of the endpoint during the restart procedure?	6.4 [2]	M	
NCS_21	Does the IPAT keep track of the state of the endpoint during the failover procedure?	6.4 [2]	M	
NCS_22	Does the IPAT support handover conflict resolution between separate call agents?	6.4.1 [2]	O	
NCS_23	Does the IPAT maintain a list of the responses sent to recent transactions?	6.4.1 [2]	M	
NCS_24	Does the IPAT maintain a list of the transactions that are currently being executed?	6.4.1 [2]	M	

Item	Requirement	Reference	Status	Support
NCS_25	Does the IPAT support retransmission as required in clause 6.4.2 [2]?	6.4.2 [2]	M	
NCS_26	Does the IPAT support detection of lost associations as required in clause 6.4.2 [2]?	6.4.2 [2]	M	
NCS_27	Does the IPAT handle race conditions to the MTA as required in clause 6.4.3 [2]?	6.4.3 [2]	M	
NCS_28	Does the IPAT respect the requirement to prove the response to a successful Notify message and the new NotificationRequest in the same datagram using the piggy-backing mechanism, as specified in the quarantine function of the MTA?	6.4.3.1 [2]	M	
NCS_29	Does the IPAT support the ordering of Commands to the MTA as per clause 6.4.3.4 [2]?	6.4.3.4 [2]	M	
NCS_30	Does the IPAT support the Treatment of Disorder as per clause 6.4.3.4 [2]?	6.4.3.4 [2]	M	
NCS_31	Does the IPAT implement the CreateConnection command transaction?	7 [2]	M	
NCS_32	Does the IPAT implement the ModifyConnection command transaction?	7 [2]	M	
NCS_33	Does the IPAT implement the DeleteConnection command transaction?	7 [2]	M	
NCS_34	Does the IPAT implement the NotificationRequest command transaction?	7 [2]	M	
NCS_35	Does the IPAT implement the Notify command transaction?	7 [2]	M	
NCS_36	Does the IPAT implement the AuditEndpoint command transaction?	7 [2]	M	
NCS_37	Does the IPAT implement the AuditConnection Notify command transaction?	7 [2]	M	
NCS_38	Does the IPAT implement the RestartInProgress command transaction?	7 [2]	M	
NCS_39	Does the IPAT implement the message syntax described in clause 5?	7 [2]	M	
NCS_40	Does the IPAT guarantee that transaction identifiers for commands sent to a given embedded client are unique for the maximum lifetime of the transactions within the collection of Call Agents that control that embedded client, and provide a synchronizing mechanism between multiple IPATs to support this?	7.2.1.2 [2]	M	
NCS_41	Does the IPAT support case insensitive names for endpoints, parameter names ,parameter values and connections?	7.2.1.3 [2] 7.2.2 [2]	M	
NCS_42	Does the IPAT support protocol version coding?	7.2.1.4 [2]	M	
NCS_43	Doet the IPAT support the mandatory provide mandatory parameters before optional ones?	7.2.2 [2]	M	
NCS_44	Does the IPAT support for commands the mandatory and optional parameter names and commands and the mapping as defined in the tables and the clauses TS 101 909-4 [2]?	7.2.2 [2]	M	
NCS_45	Does the IPAT support for responses the mandatory and optional parameter names and commands and the mapping as defined in the tables and the clauses TS 101 909-4 [2]?	7.3 [2]	M	
NCS_46	Does the IPAT support the CASE SENSITIVE session description is encoded in conformance with the session description protocol (SDP) RFC 2327 [23] as per clause 5.4	7.4 [2]	M	
NCS_47	Does the IPAT always explicitly state the MGCP port to use in NCS messages (and not rely on the default)?	7.5.1 [2]	O	

Item	Requirement	Reference	Status	Support
NCS_48	Does the IPAT support the MTA retransmission strategy as given in clause 5.5.2 [2]?	7.5.2 [2]	M	
NCS_49	Does the IPAT support piggybacking as defined in clause 7.6 [2]?	7.6 [2]	M	
NCS_50	Does the IPAT share the same transaction number space with all other IPATs and E-MTAs?	7.7 [2]	M	
NCS_51	Does the IPAT confirm completed transaction and NOT confirm provisional responses?	7.7 [2]	M	
NCS_52	Does the handle provisional responses from the MTA as per clause 7.8?	7.8 [2]	M	
Comments:				

History

Document history		
V1.1.1	March 2004	Publication