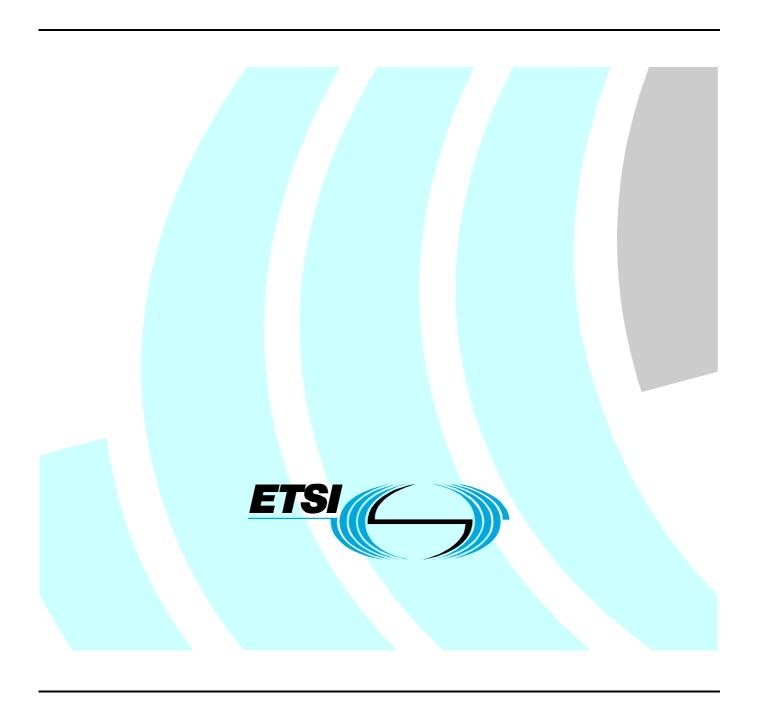# ETSI TS 101 909-1 V1.3.1 (2003-12)

Technical Specification

**Digital Broadband Cable Access to the
Public Telecommunications Network;
IP Multimedia Time Critical Services;
Part 1: General**

Reference

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Keywords

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Foreword

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

The present document is part 1 of a multi-part deliverable covering the Digital Broadband Cable Access to the Public Telecommunications Network; IP Multimedia Time Critical Services, as identified below:

Part 1: **"General";**

Part 2: "Architectural framework for the delivery of time critical services over cable Television networks using cable modems";

Part 3: "Audio Codec Requirements for the Provision of Bi-Directional Audio Service over Cable Television Networks using Cable Modems";

Part 4: "Network Call Signalling Protocol";

Part 5: "Dynamic Quality of Service for the Provision of Real Time Services over Cable Television Networks using Cable Modems";

Part 6: "Media Terminal Adapter (MTA) device provisioning";

Part 7: "Management Information Base (MIB) Framework";

Part 8: "Media Terminal Adapter (MTA) Management Information Base (MIB)";

Part 9: "Network Call Signalling (NCS) MIB Requirements";

Part 10: "Event Message Requirements for the Provision of Real Time Services over Cable Television Networks using Cable Modems";

Part 11: "Security";

Part 12: "Internet Signalling Transport Protocol (ISTP)";

Part 13: "Trunking Gateway Control Protocol";

 Sub-part 1: "H.248 option";

 Sub-part 2: "MGCP option";

Part 14: "Operation System Support";

Part 15: "Capability sets for delivery of service";

Part 16: "Signalling for Call Management Server";

Part 17: "Inter-domain Quality of Service";

Part 18: "Embedded Media Terminal Adapter (e-MTA) offering an interface to analogue terminals and Cable Modem";

Part 19: "IPCablecom Audio Server Protocol Specification";

Sub-part 1: "H.248 option";

Sub-part 2: "MGCP option";

Part 20: "Lawful Interception;

Sub-part 1: "E.164 Voice Telephony Services";

Sub-part 2: "Services not related to E.164 Voice Telephony";

Part 22: "Management Event Messages";

Part 23: "Internet Protocol Access Terminal - Line Control Signalling (IPAT - LCS)";

Part 24: "MTA Basic Access ISDN Interface";

Part 25: "Conformance Testing (Test Suite Structure and Test Purposes, TSS&TP)";

Sub-part 1: "Embedded Multimedia Terminal Adapter";

Sub-part 2: "Internet Protocol Access Terminal - Line Control Signalling";

Sub-part 3: "Call Management Server";

Part 26: "Protocol Implementation Conformance Statement (PICS) proforma specification";

Sub-part 1: "Embedded Multimedia Terminal Adapter";

Sub-part 2: "Internet Protocol Access Terminal - Line Control Signalling";

Sub-part 3: "Call Management Server";

Part 28: "Standalone Media Terminal Adapter (S-MTA) offering an interface to analogue terminals and Cable Modem";

NOTE 1: The above list is complete at the date of publication of the present document. Additions may be proposed and will be added to the list in future versions.

NOTE 2: The choice of a multi-part format for this deliverable is to facilitate maintenance and future enhancements.

Introduction

The cable industry in Europe and across other regions have already deployed broadband cable television Hybrid Fibre Coax (HFC) data networks running Protocols like the ones specified in ES 201 488 [2] or ES 200 800 [3]. The Cable Industry is in the rapid stages of deploying IP Voice and other time critical multimedia services over these broadband cable television networks.
The cable industry has recognized the urgent need to develop ETSI Technical Specifications aimed at developing interoperable interface specifications and mechanisms for the delivery of end to end advanced real time IP multimedia time critical services over bi-directional broadband cable networks.

IPCablecom is a set of protocols and associated element functional requirements developed to deliver Quality of Service (QoS) enhanced secure IP multimedia time critical communications services using packetized data transmission technology to a consumer's home over the broadband cable television Hybrid Fibre/Coaxial (HFC) data network running the Cable Modem protocol. IPCablecom utilizes a network superstructure that overlays the two-way data-ready cable television network. While the initial service offerings in the IPCablecom product line are anticipated to be Packet Voice, the long-term project vision encompasses packet video and a large family of other packet-based services.

The cable industry is a global market and therefore the ETSI standards are developed to align to the extent possible with standards either already developed or under development in other regions. The ETSI Specifications are consistent to the extent possible with the CableLabs/PacketCable set of specifications as published by the SCTE. An agreement has been established between ETSI and SCTE in the US to ensure, where appropriate, that the release of PacketCable and IPCablecom set of specifications are aligned and to avoid unnecessary duplication. The set of IPCablecom ETSI specifications also refers to ITU-SG9 draft and published recommendations relating to IP Cable Communication.

The whole set of multi-part IPCablecom ETSI deliverables to which the present document belongs specify a Cable Communication Service for the delivery of IP Multimedia Time Critical Services over a HFC Broadband Cable Network to the consumers home cable telecom terminal.

1 Scope

The present set of documents specify IPCablecom, a set of protocols and associated element functional requirements. These have been developed to deliver Quality of Service (QoS), enhanced secure IP multimedia time critical communication services, using packetized data transmission technology to a consumer's home over a cable television Hybrid Fibre/Coaxial (HFC) data network.

NOTE 1: IPCablecom set of documents utilize a network superstructure that overlays the two-way data-ready cable television network, e.g. as specified within ES 201 488 [2] and ES 200 800 [3].

While the initial service offerings in the IPCablecom product line are anticipated to be Packet Voice and Packet Video, the long-term project vision encompasses a large family of packet-based services. This may require in the future, not only careful maintenance control, but also an extension of the present set of documents.

NOTE 2: The present set of documents aims for global acceptance and applicability. It is therefore developed in alignment with standards either already existing or under development in other regions and in International Telecommunications Union (ITU).

The present document is part 1 of the above mentioned series of ETSI deliverables and specifies general aspects of IPCablecom based on J.16x and J.17x ITU-T series of Recommendations.

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]   ITU-T Recommendation J.112: "Transmission systems for interactive cable television services".

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

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

3 Definitions and abbreviations

3.1 Definitions

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

access node: layer two termination device that terminates the network end of the ITU-T Recommendation J.112 connection

NOTE: It is technology specific. In ES 201 488 [2] and in ITU-T Recommendation J.112, annex A [1], it is called the INA while in ES 200 800 [3] and in ITU-T Recommendation J.112, annex B [1] it is the CMTS.

cable modem: layer two termination device that terminates the customer end of the J.112 connection

IPCablecom: ETSI deliverables including an architecture and a series of Specifications that enable the delivery of real time services (such as telephony) over the cable television networks using cable modems

3.2   Abbreviations

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

CMS   Call Management Server
CMTS   Cable Modem Termination System
DHCP   Dynamic Host Configuration Protocol
EWP   ETSI Work Program
HFC   Hybrid Fibre Coax
IP   Internet Protocol
IPAT   IP Access Terminal
ISTP   Internet Signalling Transport Protocol
LCS   Large Capacity Storage
MGCP   Media Gateway Control Protocol
MIB   Management Information Base
MTA   Multimedia Terminal Adapter
NCS   Network Call Signalling
OSS   Operational Support System
PICS   Protocol Implementation Conformance Statement
PSTN   Public Switched Telephone Network
QoS   Quality of Service
TFTP   Trivial File Transfer Protocol
TGCP   Trunking Gateway Control Protocol

4   Overview of the multi-part Technical Specification

The TS 101 909 series together present an IPCablecom network architecture for the provision of voice and multimedia IP services. The TS 101 909 series of standards represent a set of cohesive set of interwoven specifications that jointly evolved to present different phases of IPCablecom network developments. Changes made to one part of the series has to identify the consequence to other parts of the series to ensure the elements interface together properly.

4.1   Part 1: General

The present document.

4.2   Part 2: Architectural framework for the delivery of time critical services over cable Television networks using cable modems

Defines architecture framework for IPCablecom networks including all major system components and network interfaces necessary for delivery of IPCablecom services.

4.3   Part 3: Audio Codec Requirements for the Provision of Bi-Directional Audio Service over Cable Television Networks using Cable Modems

Defines the audio and video codecs necessary to provide the highest quality and the most resource-efficient service delivery to the customer. Also specifies the performance required in client devices to support future IPCablecom codecs. and describes suggested methodology for optimal network support for codecs.

4.4   Part 4: Network Call Signalling Protocol

Defines a profile of the Media Gateway Control Protocol (MGCP) for IPCablecom embedded clients, referred to as the Network Call Signalling (NCS) protocol. MGCP is a call signalling protocol for use in a centralized call control architecture, and assumes relatively simple client devices.

4.5   Part 5: Dynamic Quality of Service for the Provision of Real Time Services over Cable Television Networks using Cable Modems

Defines the QoS Architecture for the "Access" portion of the IPCablecom network, provided to requesting applications on a per-flow basis. The access portion of the network is defined to be between the Multimedia Terminal Adapter (MTA) and the Cable Modem Termination System (CMTS). The method of QoS allocation over the backbone is unspecified in the present document.

4.6   Part 6: Media Terminal Adapter (MTA) device provisioning

Defines the protocol mechanisms for provisioning of an IPCablecom embedded-MTA device by a single provisioning and network management provider.

4.7   Part 7: Management Information Base (MIB) Framework

Describes the framework in which IPCablecom MIBs (Management Information Base) are defined. It provides information on the management requirements of IPCablecom specified devices and functions, and how these requirements are supported in the MIB. It is intended to support and complement the actual MIB documents, which are issued separately.

4.8   Part 8: Media Terminal Adapter (MTA) Management Information Base (MIB)

Defines the MIB module which supplies the basic management objects for the MTA Device.

4.9   Part 9: Network Call Signalling (NCS) MIB Requirements

Defines the MIB module which supplies the basic management object for the NCS protocol.

4.10   Part 10: Event Message Requirements for the Provision of Real Time Services over Cable Television Networks using Cable Modems

Defines the concept of Event Messages used to collect usage for the purposes of billing within the IPCablecom architecture.

4.11   Part 11: Security

Defines the Security architecture, protocols, algorithms, associated functional requirements and any technological requirements that can provide for the security of the system for the IPCablecom network.

4.12 Part 12: Internet Signalling Transport Protocol (ISTP)

Defines the Internet Signalling Transport Protocol (ISTP) for IPCablecom PSTN Signalling Gateways. ISTP is a protocol that provides a signalling interconnection service between the IPCablecom network control elements (Call Management Server and Media Gateway Controller) and the PSTN C7 Signalling network through the C7 Signalling Gateway.

4.13 Part 13: Trunking Gateway Control Protocol

Defines a Trunking Gateway Control Protocol (TGCP) for use in a centralized call control architecture that assumes relatively simple endpoint devices. TGCP is designed to meet the protocol requirements for the Media Gateway Controller to Media Gateway interface defined in the IPCablecom architecture.

At present two alternative solutions may be found as given by sub-part 1 and 2 that describe two competing alternative protocol options, H.248 and TGCP (NCS based) respectively.

4.13.1 Sub-part 1: H.248 option

Specifies H.248 option.

4.13.2 Sub-part 2: MGCP option

Specifies TGCP (NCS based) option.

4.14 Part 14: Operation System Support

Defines terminology, architecture, operational processes, interfaces and data flows. It also introduces a range of operational processes that a European Cable Operator might employ to launch and manage IPCablecom products and services.

The main areas for OSS are fault management, performance management, security management, accounting management and configuration management.

> NOTE: Part 14 is not yet publicly available. The schedule for its production is given in the EWP.

4.15 Part 15: Capability sets for delivery of service

Defines Capability sets for delivery of service in the IPCablecom environment.

> NOTE: Part 15 is not yet publicly available. The schedule for its production is given in the EWP.

4.16 Part 16: Signalling for Call Management Server

Defines Signalling for Call Management Server in the IPCablecom environment.

> NOTE: Part 16 is not yet publicly available. The schedule for its production is given in the EWP.

4.17 Part 17: Inter-domain Quality of Service

Defines Inter-domain Quality of Service in the IPCablecom environment.

4.18　Part 18: Embedded Media Terminal Adapter (e-MTA) offering an interface to analogue terminals and Cable Modem

Defines Embedded media terminal adapter (MTA) offering analogue telephony services for PSTN terminals in the IPCablecom environment.

4.19　Part 19: IPCablecom Audio Server Protocol Specification

Defines Audio Server Protocols in the IPCablecom environment. At present, two alternative solutions may be found as given by sub-part 1 and 2 that describe two competing alternative protocol options, H.248 and MGCP respectively.

4.19.1　Sub-part 1: H.248 option

Specifies H.248 option.

4.19.2　Sub-part 2: MGCP option

Specifies MGCP option.

4.20　Part 20: Lawful Interception

Defines, within the IPCablecom environment, the Lawful Interception requirements.

Lawful Interception requirements described for the interception of voice services and non-voice services may be found as given by sub-part 1 and 2 respectively.

4.20.1　Sub-part 1: E.164 Voice Telephony Services

Defines, within the IPCablecom environment, the Lawful Interception requirements for voice services.

　　NOTE:　　Part 20 sub-part 1 is not yet publicly available. The schedule for its production is given in the EWP.

4.20.2　Sub-part 2: Services not related to E.164 Voice Telephony

Defines, within the IPCablecom environment, the Lawful Interception requirements for non-voice services.

　　NOTE 1:　The Lawful Interception requirements for non-voice services (i.e. IP data traffic) is an area only recently been submitted to major evolution and significant clarification is required at a global level before requirements can be specified for the IPCablecom environment.

　　NOTE 2:　Part 20 sub-part 2 is not yet publicly available. The schedule for its production is given in the EWP.

4.21　Void

4.22　Part 22: Management Event Messages

Defines Management Event Messages in the IPCablecom environment.

4.23　Part 23: Internet Protocol Access Terminal - Line Control Signalling (IPAT - LCS)

Defines the LCS architecture for an IPAT in the IPCablecom environment.

4.24 Part 24: MTA Basic Access ISDN Interface

Defines MTA Basic Access ISDN Interface to ISDN terminals in the IPCablecom environment.

NOTE: Part 24 is not yet publicly available. The schedule for its production is given in the EWP.

4.25 Part 25: Conformance Testing (Test Suite Structure and Test Purposes, TSS&TP)

This number is currently not taken up by a technical specification in the ETSI IPCablecom TS 101 909 series.

4.25.1 Sub-part 1: Embedded Multimedia Terminal Adapter

This number is currently not taken up by a technical specification in the ETSI IPCablecom TS 101 909 series.

4.25.2 Sub-part 2: Internet Protocol Access Terminal - Line Control Signalling

This number is currently not taken up by a technical specification in the ETSI IPCablecom TS 101 909 series.

4.25.3 Sub-part 3: Call Management Server

This number is currently not taken up by a technical specification in the ETSI IPCablecom TS 101 909 series.

4.26 Part 26: PICS Proforma for Conformance Test Suites

This number is currently not taken up by a technical specification in the ETSI IPCablecom TS 101 909 series.

4.26.1 Sub-part 1: Embedded Multimedia Terminal Adapter

Defines Embedded Multimedia Terminal Adapter.

4.26.2 Sub-part 2: Internet Protocol Access Terminal - Line Control Signalling

This number is currently not taken up by a technical specification in the ETSI IPCablecom TS 101 909 series.

4.26.3 Sub-part 3: Call Management Server

This number is currently not taken up by a technical specification in the ETSI IPCablecom TS 101 909 series.

4.27 Void

4.28 Part 28: Standalone Media Terminal Adapter (S-MTA) offering an interface to analogue terminals and Cable Modem

Defines a Standalone Multimedia Terminal Adapter (S-MTA) offering analogue telephony services for PSTN terminals in the IPCablecom environment.

Annex A (informative):
Bibliography

- IETF RFC 2132 (1997): "DHCP Options and BOOTP Vendor Extensions".

- IETF RFC 1700 (1994): "Assigned Numbers".

- IETF RFC 1350 (1992): "The TFTP Protocol (Revision 2)".

- ITU-T Recommendation J.83 (1997): "Digital multi-programme systems for television, sound and data services for cable distribution".

- ETSI TS 101 909-2: "Access and Terminals (AT); Digital Broadband Cable Access to the Public Telecommunications Network; IP Multimedia Time Critical Services; Part 2: Architectural framework for the delivery of time critical services over cable Television networks using cable modems".

- IETF RFC 2131: "Dynamic Host Configuration Protocol".

List of ITU-T Recommendations referring to IPCablecom:

- ITU-T Recommendation J.160: "Architectural framework for the delivery of time-critical services over cable television networks using cable modems".

- ITU-T Recommendation J.161: "Audio codec requirements for the provision of bidirectional audio service over cable television networks using cable modems".

- ITU-T Recommendation J.162: "Network call signalling protocol for the delivery of time critical services over cable television networks using cable modems".

- ITU-T Recommendation J.163: "Dynamic quality of service for the provision of real time services over cable television networks using cable modems".

- ITU-T Recommendation J.164: "Event message requirements for the support of real-time services over cable television networks using cable modems".

- ITU-T Recommendation J.165: "IPCablecom Internet Signalling Transport Protocol (ISTP)".

- ITU-T Recommendation J.166: "IPCablecom Management Information Base (MIB) framework".

- ITU-T Recommendation J.167: "Media Terminal Adapter (MTA) device provisioning requirements for the delivery of real time services over cable television networks using cable modems".

- ITU-T Recommendation J.168: "IPCablecom media terminal adapter (MTA) MIB requirements".

- ITU-T Recommendation J.169: "IPCablecom network call signalling (NCS) MIB requirements".

- ITU-T Recommendation J.170: "IPCablecom security specification".

- ITU-T Recommendation J.171: "IPcablecom trunking gateway control protocol (TGCP)".

- ITU-T Recommendation J.172: "IPCablecom management event mechanism".

- ITU-T Recommendation J.173: "IPCablecom embedded MTA primary line support".

- ITU-T Recommendation J.174: "IPCablecom interdomain quality of service".

- ITU-T Recommendation J.175: "Audio server protocol".

- ITU-T Recommendation J.176: "IPCablecom management event mechanism MIB".

- ITU-T Recommendation J.177: "IPCablecom CMS subscriber provisioning specification".

- ITU-T Recommendation J.178: "IPCablecom CMS to CMS signalling".

History

Document history		
V1.1.1	June 2001	Publication
V1.2.2	April 2002	Publication
V1.3.1	December 2003	Publication