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OF TELEVISION, SOUND PROGRAMME AND OTHER
MULTIMEDIA SIGNALS

**IPCablecom2 residential SIP telephony:
embedded digital voice adapter (E-DVA)
specification**

Recommendation ITU-T J.460.2

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IPCablecom2 residential SIP telephony: embedded digital voice adapter (E-DVA) specification

Summary

Recommendation ITU-T J.460.2 defines the embedded Digital Voice Adaptor (E-DVA) requirements for the analog interface and for powering of the E-DVA. An embedded DVA is a DOCSIS cable modem (CM) integrated with an IPCablecom2 DVA. These requirements enable a sufficiently reliable service to meet assumed consumer expectations related to residential telephony.

Source

Recommendation ITU-T J.460.2 was approved on 13 June 2008 by ITU-T Study Group 9 (2005-2008) under Recommendation ITU-T A.8 procedure.

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CONTENTS

Page

1	Scope	1
2	References.....	1
2.1	Normative References	1
2.2	Informative References	2
2.3	Reference Acquisition	2
3	Terms and Definitions	2
4	Abbreviations, acronyms and conventions	3
4.1	Abbreviations and Acronyms	3
4.2	Conventions	4
5	Overview	4
5.1	IPCablecom2 Overview.....	4
5.2	Service Goals.....	4
5.3	IPCablecom2 Reference Architecture	5
5.4	Embedded Digital Voice Adaptor	5
6	E-DVA power requirements	5
6.1	Power Considerations.....	6
6.2	Typical E-DVA Traffic Model.....	6
6.3	Service Requirements Under AC Fail Conditions.....	6
6.4	Local Powering with Battery Backup.....	6
7	E-DVA analog port requirements.....	6
8	Client requirement	6
8.1	Provisioning.....	6
8.2	Security.....	7
8.3	NAT/Firewall Traversal	7
8.4	Codecs	7
8.5	Loopback Test Capability.....	8
9	E-DVA Monitoring requirements.....	9
9.1	eCM Monitoring.....	10
9.2	E-DVA Monitoring	10
9.3	Battery-Backup Monitoring.....	10
	Appendix I – Example of a power calculation.....	12
I.1	Loop Start Signaling.....	14
I.2	General Supervision	15
I.3	General Ringing.....	17
I.4	Voice Grade Analog Transmission	18
I.5	Out of Service Requirements.....	22
I.6	Message Waiting Indicator.....	24



Documents

Document Sharing Hub

Rec. ITU-T J.460.2 (06/2008)

iii

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Recommendation ITU-T J.460.2

IPCablecom2 residential SIP telephony: embedded digital voice adapter (E-DVA) specification

1 Scope

This Recommendation defines the embedded Digital Voice Adaptor (E-DVA) requirements for the analog interface and for powering of the E-DVA. An embedded DVA is a DOCSIS cable modem (CM) integrated with an IPCablecom2 DVA.

The purpose of this Recommendation is to define a set of requirements that will enable a sufficiently reliable service to meet assumed consumer expectations related to residential telephony. These assumed expectations include constant availability, including availability during power failure at the customer's premises, and access to emergency services (e.g., 121 or 911).

It is an important objective of this work that interoperability between IPCablecom 2.0 and 3GPP IMS is provided. IPCablecom 2.0 is based upon 3GPP IMS, but includes additional functionality necessary to meet the requirements of cable operators. Recognizing developing converged solutions for wireless, wireline, and cable, it is expected that further development of IPCablecom 2.0 will continue to monitor and contribute to IMS developments in 3GPP, with the aim of alignment of 3GPP IMS and IPCablecom 2.0.

NOTE – The structure and content of this Recommendation have been organized for ease of use by those familiar with the original source material; as such, the usual style of ITU-T recommendations has not been applied.

2 References

2.1 Normative References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- | | |
|-------------------|--|
| [CODEC-MEDIA] | Recommendation ITU-T J.361 (2006), <i>IPCablecom2 Codec Media</i> . |
| [DOCSIS OSSIV2.0] | ANSI/SCTE 79-2 2002, <i>DOCS 2.0 Operations Support System Interface</i> . |
| [DOCSIS RFIv2.0] | Recommendation ITU-T J.122 (2002), <i>Second-generation transmission systems for interactive cable television services – IP cable modems</i> . |
| [eDOCSIS] | Recommendation ITU-T J.126 (2007), <i>Embedded Cable Modem device specification</i> . |
| [G.168] | Recommendation ITU-T G.168 (2004), <i>Digital network echo cancellers</i> . |
| [G.711] | Recommendation ITU-T G.711 (1988), <i>Pulse code modulation (PCM) of voice frequencies</i> . |
| [PKT 23.228] | Recommendation ITU-T J.366.3 (Draft), <i>IPCablecom2 IP Multimedia Subsystem Stage 2 (3GPP TS 23.228)</i> . |
| [PKT 24.229] | Recommendation ITU-T J.366.4 (Draft), <i>IPCablecom2 SIP and SDP Stage 3 (3GPP TS 24.229)</i> . |



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1

- [PKT 33.203] Recommendation ITU-T J.366.7 (Draft), *IPCablecom2 Access Security for IP-Based Services (3GPP TS 33.203)*.
- [RFC 4330] IETF RFC 4330, *Simple Network Time Protocol version 4 for IPv6, IPv4, and OSI*, January, 2006.
- [RSTF] Recommendation ITU-T J.460.1, *IPCablecom2 Residential SIP Telephony Feature Specification*.
- [SEC1.5] Recommendation ITU-T J.170, *IPCablecom security specification*.
- [RST E-UE Prov] Recommendation ITU-T J.460.4 (draft) – *IPCablecom2 RST E-UE Provisioning Specification*.

2.2 Informative References

This Recommendation uses the following informative references.

- [ARCH-FRM TR] Recommendation ITU-T J.360, *IPCablecom2 Architecture Framework*.
- [ID MMUSIC LOOPBACK] IETF Internet Draft, *An Extension to the Session Description Protocol (SDP) for Media Loopback*, draft-ietf-mmusic-media-loopback-04.txt, August 2006, work in progress.
- [ID SIP ANSWERMODE] IETF Internet Draft, *Requesting Answering Modes for the Session Initiation Protocol (SIP)*, draft-ietf-sip-answermode-01, April 2006, work in progress.
- [Key Smith] P. Key and D. Smith (editors). 1999. *The Internet & The Public Switched Telephone Network – A Troubled Marriage*. In *Teletraffic Engineering in a Competitive World*. Edinberg: Elsevier.
- [NFT TR] Recommendation ITU-T J.360, *IPCablecom2 Architecture Framework Appendix V NAT and Firewall Traversal*.
- [V.25] Recommendation ITU-T V.25 (1996), *Automatic answering equipment and general procedures for automatic calling equipment on the general switched telephone network including procedures for disabling of echo control devices for both manually and automatically established calls*.

2.3 Reference Acquisition

- IHS Standards Store, Internet: <http://global.ihs.com/>
- Internet Engineering Task Force (IETF), Internet: <http://www.ietf.org/>

NOTE – Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time.

The list of current Internet-Drafts can be accessed at <http://www.ietf.org/ietf/1id-abstracts.txt>.

3 Terms and Definitions

This Recommendation defines the following terms:

3.1 customer premises equipment: Usage of CPE within this Recommendation generically refers to the cable modem and E-DVA device that resides at the subscriber home, as well as any customer telephony equipment (telephones, answering machines, fax machines, etc.). Typically, CPE would refer to equipment that is beyond the service provider network interface, such as a

telephone or personal computer. However, since the cable modem and E-DVA represent the service provider network interface device at the subscriber home, it is commonly referred to as CPE.

3.2 hybrid fibre coax: Access network architecture consisting of fibre-optic feeders from the head end to nodes, at which point a coaxial cable is used for the final distribution to the subscribers.

3.3 uninterruptible power supply: A power supply including a battery for backup power when AC input power fails.

4 Abbreviations, acronyms and conventions

4.1 Abbreviations and Acronyms

This Recommendation uses the following abbreviations:

A/D	Analog to Digital converter
CCS	One Hundred Call Seconds
CM	Cable Modem
CMS	Call Management Server
CMTS	Cable Modem Termination System
CPE	Customer Premises Equipment
CSCF	Call Session Control Function
D/A	Digital to Analog converter
DOCSIS®	Data-Over-Cable System Interface Specifications
DTMF	Dual Tone Multi Frequency
DVA	Digital Voice Adaptor
eCM	Embedded Cable Modem
eDOCSIS™	Embedded Data-Over-Cable System Interface Specification
E-DVA	Embedded Digital Voice Adaptor
FITL	Fibre In The Loop. A PSTN architecture consisting of a fibre-optic access network
HFC	Hybrid Fibre Coax
IP	Internet Protocol. A network layer protocol
LEC	Local Exchange Carrier
NAT	Network Address Translation
NCS	Network Call Signalling
OSSI	Operations Support System Interface
POTS	Plain Old Telephone Service
PSTN	Public Switched Telephone Network
RST	Residential SIP Telephony
RTCP	Real Time Control Protocol
RTCP XR	Real Time Control Protocol Extended Reports
SDP	Session Description Protocol

SIP	Session Initiation Protocol
STUN	Simple Traversal of User Datagram Protocol (UDP) Through Network Address Translators
UDP	User Datagram Protocol
UPS	Uninterruptible Power Supply

4.2 Conventions

Throughout this Recommendation, the words that are used to define the significance of particular requirements are capitalized. These words are:

"MUST"	This word means that the item is an absolute requirement of this Recommendation.
"MUST NOT"	This phrase means that the item is an absolute prohibition of this Recommendation.
"SHOULD"	This word means that there may exist valid reasons in particular circumstances to ignore this item, but the full implications should be understood and the case carefully weighed before choosing a different course.
"SHOULD NOT"	This phrase means that there may exist valid reasons in particular circumstances when the listed behaviour is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behaviour described with this label.
"MAY"	This word means that this item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because it enhances the product, for example; another vendor may omit the same item.

5 Overview

5.1 IPCablecom2 Overview

The IPCablecom2 project is aimed at defining interface Recommendations that can be used to develop interoperable equipment capable of providing packet-based voice, video, and other high-speed multimedia services over hybrid fibre coax (HFC) cable systems utilizing the Data-Over-Cable Interface Specification [DOCSIS RFIv2.0].

5.2 Service Goals

One application of the IPCablecom2 architecture is packet-based voice communications for cable system subscribers. The IPCablecom2 architecture as a whole enables voice communications, video, and data services based on bidirectional transfer of Internet Protocol (IP) traffic between the cable system headend and customer locations, over an all-coaxial or HFC cable network as shown in simplified form in Figure 1.

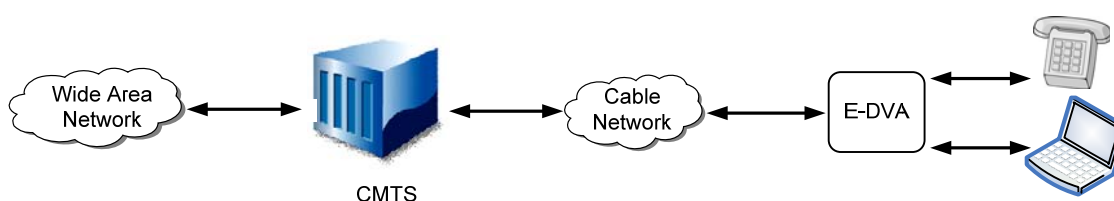


Figure 1 – Telephony Services Over the Data-Over-Cable System

The transmission path over the cable system is realized by a cable modem termination system (CMTS) and at each customer location by a cable modem (CM). The E-DVA includes an embedded cable modem and a Residential SIP Telephony (RST) client and analog ports for telephone devices. The E-DVA may include digital ports. The conversion between digital RST signaling and voice to analog telephone interfaces is accomplished within the E-DVA.

5.3 **IPCablecom2 Reference Architecture**

For a description of the IPCablecom2 architecture and Functional Components, please refer to [ARCH-FRM TR].

5.4 **Embedded Digital Voice Adaptor**

A Digital Voice Adaptor (DVA) is an IPCablecom2 client device that contains a subscriber-side interface to the subscriber's CPE (e.g., telephone) and a network-side signaling interface to call control elements in the network (e.g., P-CSCF, S-CSCF, Application servers, etc.). A DVA provides codecs and all signaling and encapsulation functions required for media transport and call signaling.

DVAs reside at the customer side and are connected to other IPCablecom2 network elements via the HFC access network (DOCSIS). IPCablecom2 DVAs are required to support the SIP protocol as specified in IPCablecom2 Recommendation [RSTF].

IPCablecom2 only defines support for an embedded DVA (E-DVA). An E-DVA is a single hardware device that incorporates a DOCSIS 1.1 or higher CM as well as an IPCablecom2 DVA component. Figure 2 shows a representative functional diagram of an E-DVA. Additional E-DVA functionality is further defined in [ARCH-FRM TR]. For the purposes of this Recommendation, DVA is interpreted to be identical to E-DVA.

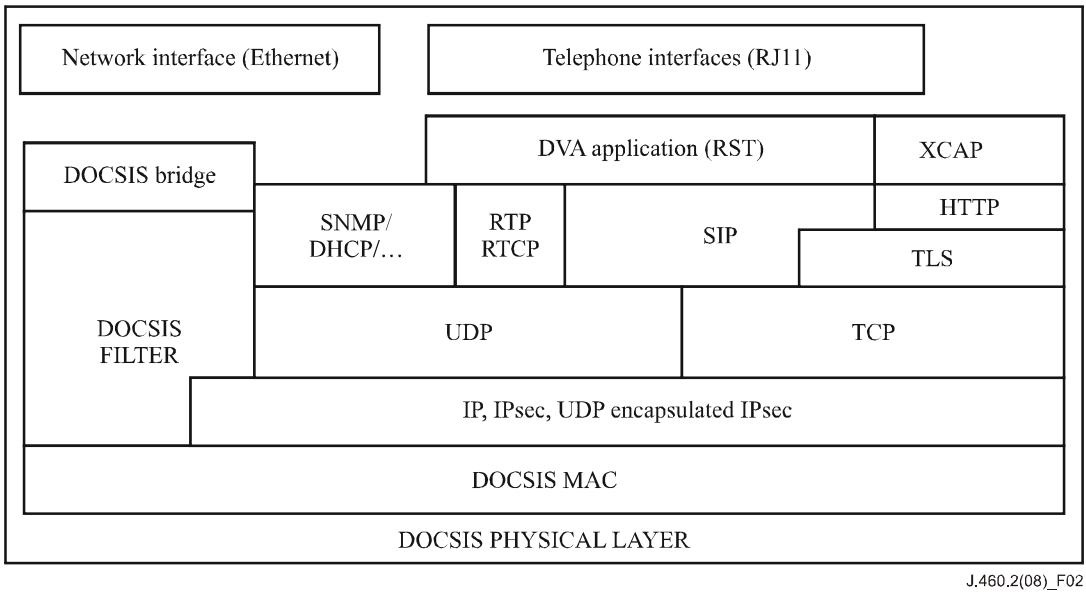


Figure 2 – E-DVA Protocols

6 **E-DVA power requirements**

This clause defines the power requirements of the E-DVA. This includes power consumption and presents associated traffic models recommended for power consumption calculations.