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Multimedia home networks - Home network communication protocol over IP for multimedia household appliances

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 62457

March 2008

ICS 33.040; 33.160.01

English version

Multimedia home networks - Home network communication protocol over IP for multimedia household appliances

(IEC 62457:2007)

Réseaux résidentiels multimédia - Protocole de communication de réseau résidentiel sur IP destiné aux appareils domestiques multimédia (CEI 62457:2007)

Multimedia-Heimnetzwerke - Heimnetzwerk-Kommunikationsprotokoll über IP für Multimedia-Haushaltsgeräte (IEC 62457:2007)

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 100/1197/CDV, future edition 1 of IEC 62457, prepared by technical area 9: Audio, video and multimedia applications for end-user network, of IEC TC 100, Audio, video and multimedia systems and equipment, was submitted to the IEC-CENELEC parallel Unique Acceptance Procedure and was approved by CENELEC as EN 62457 on 2008-02-01.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2008-11-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2011-02-01

Annex ZA has been added by CENELEC.

_____

Endorsement notice

The text of the International Standard IEC 62457:2007 was approved by CENELEC as a European Standard without any modification.

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEEE Std 802.15.1	2005	IEEE Standard for Information technology - Telecommunications and information exchange between systems - Local and metropolitan area networks - Specific requirements - Part 15.1: Wireless medium access control (MAC) and physical layer (PHY) specifications for wireless personal area networks (WPANs)	-	-

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INTRODUCTION

By enabling standalone-type household appliances (household appliances other than audiovisual equipment, PCs and PC-related equipment) such as white appliances (e.g. air conditioners, refrigerators), sensors, health, exercise and fitness equipment to connect to and work in conjunction with audiovisual equipment, PCs and/or PC-related equipment, it becomes possible to deliver multimedia application services, such as displaying a “washing completed” message of a washing machine on a TV screen or operating an air conditioner via a TV screen, that otherwise would not be possible (see Figure 1).

To achieve these services, a home network standard for networks of standalone-type household appliances and network standards for audiovisual equipment, PCs and PC-related equipment are needed. It is also necessary to establish a system that allows equipment belonging to a network to exchange data with other equipment of different types of networks. A commonly used approach to allow networks of different types to exchange data with each other is to use Gateways.

Because data transferred within, into and out of networks of standalone-type household appliances are control data, which are much smaller in volume than data similarly transferred for networks of audiovisual equipment, PCs and PC-related equipment, and because standalone-type household appliances have longer service lives than audiovisual equipment, PCs and PC-related equipment, home network standards for networks of standalone-type household appliances have been established separately from network standards for audiovisual equipment, PCs and PC-related equipment, and many different protocol standards have been in use for a long time in different countries[1)].

On the other hand, recent advances in device and software technology have made it possible to implement TCP/IP (which has been adopted worldwide for audiovisual equipment, PCs and PC-related equipment) in certain standalone-type household appliances, and so establishing a home network standard for networks of standalone-type household appliances in the form of a standard for layers above TCP/IP would allow data to be directly exchanged between household appliances and audiovisual equipment, PCs and PC-related equipment via TCP/IP (see Figure 2 example1, example2). In turn, this would allow the creation of multimedia application services that enable household appliances to work in conjunction with audiovisual equipment, PCs and PC-related equipment.

The advantages of applying this standard are:

- it can be applied to many types of Home Network standards.
- both Home Network nodes with TCP/IP Layer and without can coexist under the same Home Network middleware.
- Household appliances can communicate with audiovisual equipment, PCs and PC-related equipment, and vice versa, without requiring any gateway.
- Household appliances can handle text and audiovisual data.
- Audiovisual equipment, PCs and PC-related equipment can handle Household appliances data.
- Household appliances can freely select a suitable lower-layer medium from various lower-layer media below TCP/IP.

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1 CEBus, ECHONET, Konnex, LonTalk, others.

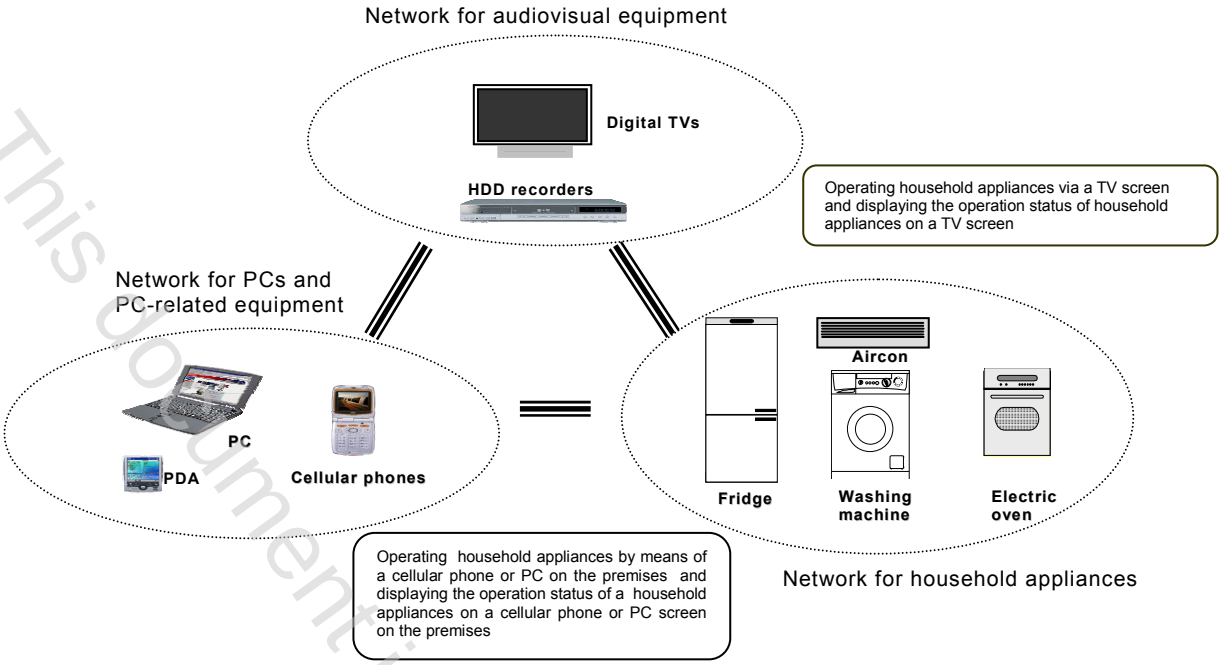

Figure 1 – Grouping of relationship between household appliances and audiovisual equipment, PCs and PC-related equipment

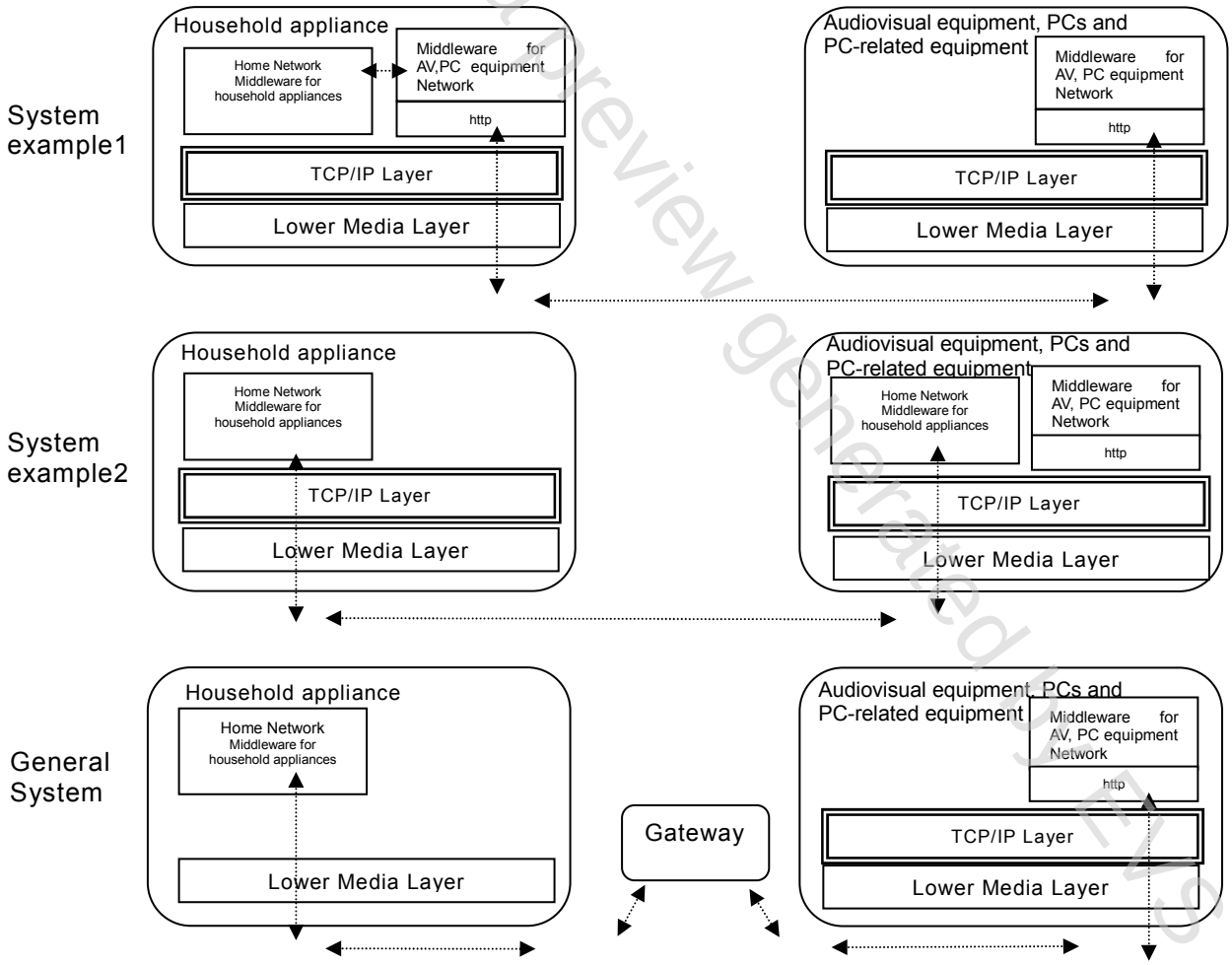

Figure 2 – Examples of data communication between household appliance and audiovisual equipment, PCs and PC-related equipment

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MULTIMEDIA HOME NETWORKS – HOME NETWORK COMMUNICATION PROTOCOL OVER IP FOR MULTIMEDIA HOUSEHOLD APPLIANCES

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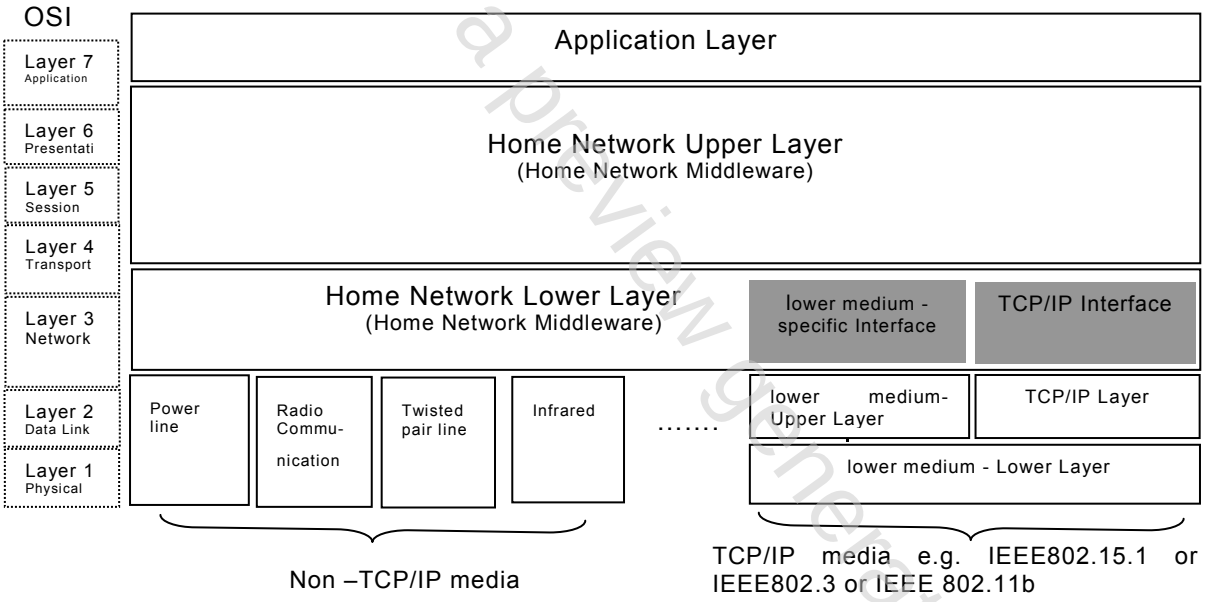
1 Scope

This International Standard specifies the requirements for the interface between the Home Network Lower Layer for a country's home network of standalone-type household appliances and the TCP/IP Layer for cases where it is intended to introduce a TCP/IP Layer to each of the nodes comprising such home network of standalone-type household appliances. The specified interface in the Home Network Lower Layer consists of 2 portions, the TCP/IP Interface and the lower medium-specific Interface. Figure 3 shows the composition of the Home Network Layer and the standardized portions. In Annex C, this standard specifies the requirements for the lower medium-specific Interface One of these layers shall be IEEE 802.15.1, short-distance radio standard additional layers can be added in the future).



NOTE 1 Grey coloured portions are standardized.

NOTE 2 TCP/IP Interface is the same even if the lower medium is different, however the lower medium-specific Interface is different.

NOTE 3 Home Network Lower Layer and Home Network Upper Layer are prepared for CEBus, ECHONET, Konnex, LonTalk, others respectively.

NOTE 4 Each OSI Layer is roughly mapped to each Home Network Layer.

Figure 3 – The composition of the Home Network layer and the specified portions

2 Normative reference

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEEE Std 802.15.1-2005, *IEEE Standard for Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 15.1: Wireless medium access control (MAC) and physical layer (PHY) specifications for wireless personal area networks (WPANs)*

3 Terms, definitions and abbreviations

For the purposes of this document, the following terms and definitions apply.

3.1 Terms and definitions

3.1.1
Bluetooth
wireless technology that is a worldwide specification for a small-form factor, low-cost radio solution providing links between mobile computers, mobile phones, other portable handheld devices, and connectivity to the Internet

NOTE The specification is developed, published and promoted by the Bluetooth Special Interest Group (SIG). Main specifications are adopted as IEEE Std 802.15.1. In this standard, Bluetooth means IEEE 802.15.1.

3.1.2
Bluetooth Network Encapsulation Protocol
BNEP
protocol specified in Bluetooth. IP packet is encapsulated according to this protocol

3.1.3
cold start
method for starting the Home Network node by starting initial setting processing while abandoning previous information related to network addresses

3.1.4
Group ad-hoc Networks
GN
Piconet which comprises a master and a slave as defined in IEEE 802.15.1 and which is not connected to any outside network or node

3.1.5
Hardware address
Ha
address based on a medium-specific addressing scheme

3.1.6
Home Network
generic name for various equipment-type Home Network standards mainly for household appliances

NOTE Specifically, it refers to CEBus, Konnex, ECHONET, LonTalk, etc.

3.1.7
Home Network device
a home device, home electric product, or building/store device, such as lighting, air conditioning, refrigeration, power equipment, ordinary home appliances, sensors, actuators, etc.

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