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INTERNATIONAL STANDARD

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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CONTENTS

FOREWORD.....	6
INTRODUCTION.....	8
1 Scope.....	10
2 Normative reference.....	11
3 Terms, definitions and abbreviations.....	11
3.1 Terms and definitions.....	11
3.2 Abbreviations.....	15
4 TCP/IP interface and requirements.....	15
4.1 Overview.....	15
4.2 Topology.....	16
4.3 UDP interface.....	19
4.4 Packet format of Home Network frame.....	19
4.4.1 General.....	19
4.4.2 Home Network transmission frame transfer.....	21
4.4.3 MAC/IP address resolution request/response.....	22
4.4.4 IP/MAC address resolution request/response.....	23
4.4.5 Hardware/MAC address resolution request/response.....	24
4.4.6 MAC address initialization request/response.....	25
4.4.7 MAC address server initialization response/MAC address allocation response.....	26
4.4.8 MAC address confirmation request/response.....	27
4.4.9 MAC address request to all nodes/response.....	28
4.4.10 MAC address server detection request/response, MAC address server notification.....	29
4.4.11 Network control message (destination invalid).....	30
4.4.12 Network control message (NMa overlap).....	31
4.5 Basic communication sequences.....	32
4.5.1 General.....	32
4.5.2 MAC/IP address resolution request/response (resolution of the NMa into the IP address).....	32
4.5.3 IP/MAC address resolution request/response (resolution of IP address into NMa).....	33
4.5.4 Hardware/MAC address resolution request/response.....	35
4.5.5 MAC address request/response to all nodes.....	36
4.5.6 Network control message (destination invalid).....	37
4.5.7 Special case pertaining to packets with invalid destination values.....	38
4.5.8 Network control message (NMa overlap).....	39
4.6 NMa acquisition booting sequence.....	40
4.6.1 Overview of NMa acquisition booting sequence.....	40
4.6.2 Overview of the processing after acquisition of IP Address.....	40
4.6.3 Booting node.....	41
4.6.4 MAC address server.....	45
4.6.5 Operating nodes.....	45
4.7 MAC address server.....	47
4.7.1 Requirement of MAC address server.....	47
4.7.2 Processing sequence for MAC address server booting.....	47

4.7.3	Processing by operating MAC address server.....	48
4.8	Time period parameters	50
4.9	Provision for updating data after NMa acquisition.....	51
5	TCP/IP and requirements	51
5.1	IP.....	51
5.1.1	Protocols to be used.....	51
5.1.2	IP Address.....	51
5.1.3	Multicast address	51
5.1.4	DHCP	51
5.1.5	Method for obtaining IP Address by manual setting, etc.....	52
5.1.6	Routing.....	52
5.2	UDP	52
5.2.1	Protocols to be used.....	52
5.2.2	Port Number	52
6	Lower-layer medium-specific interface and requirements.....	52
6.1	Interface and requirements on lower-layer medium.....	52
6.2	Software internal status transition	52
6.2.1	Overview	52
6.2.2	Stop status	54
6.2.3	Cold start status	54
6.2.4	Warm start status	55
6.2.5	Communication suspension status.....	55
6.2.6	Normal operation status.....	56
6.2.7	Error stop status.....	57
6.2.8	Temporary stop status	58
	Annex A (informative) Basic booting sequence	59
	Annex B (informative) Basic MAC address server booting sequence.....	66
	Annex C (normative) Requirements on IEEE 802.15.1	68
	Bibliography.....	74
	Figure 1 – Grouping of relationship between household appliances and audiovisual equipment, PCs and PC-related equipment.....	9
	Figure 2 – Examples of data communication between household appliance and audiovisual equipment, PCs and PC-related equipment	9
	Figure 3 – The composition of the Home Network layer and the specified portions.....	10
	Figure 4 – Encapsulation of Home Network frame.....	16
	Figure 5 – Example of a subnet using Layer 2 bridges	17
	Figure 6 – Example of a subnet connection using Home Network routers.....	17
	Figure 7 – Relationship between IP subnet and Home Network subnet	18
	Figure 8 – Home Network frame packet format	19
	Figure 9 – Notation for bits in the flag field.....	21
	Figure 10 – IEEE 802.15.1 Address described in bits.....	21
	Figure 11 – Basic MAC/IP address resolution sequence	33
	Figure 12 – Basic IP/MAC address resolution sequence	34

Figure 13 – Basic Hardware/MAC address resolution sequence.....	35
Figure 14 – Basic “MAC address request/response to all nodes” sequence.....	37
Figure 15 – Basic “destination invalid” processing sequence.....	38
Figure 16 – Basic sequence for handling detected NMa overlap	39
Figure 17 – Flowchart for determining provisional NMa to be used.....	42
Figure 18 – Check for NMAs in use by other nodes	43
Figure 19 – Example of duplicated provisional NMa	44
Figure 20 – Format for UsedMAC.....	46
Figure 21 – Example of UsedMAC	46
Figure 22 – Internal software status transitions	53
Figure A.1 – A-MODE booting, NMAs not retained (with MAC address server)	60
Figure A.2 – SR-MODE booting, NMAs not retained (with MAC address server).....	61
Figure A.3 – A-MODE booting, NMAs not retained (without MAC address server)	62
Figure A.4 – SR-MODE booting, NMAs not retained (without MAC address server).....	63
Figure A.5 – A-MODE booting, NMAs retained (with MAC address server)	64
Figure A.6 – A-MODE booting, NMAs retained (without MAC address server)	65
Figure B.1 – Booting of a single MAC address server	66
Figure B.2 – Near-simultaneous booting of two or more MAC address servers.....	67
Figure C.1 – Layer structure	68
Figure C.2 – Basic form of subnet.....	69
Figure C.3 – Example of a subnet connection using Home Network routers	69
Figure C.4 – Example of an unacceptable subnet connection (scatternet).....	70
Figure C.5 – Example of a connection using a home network gateway.....	70
Figure C.6 – Example of a subnet using Layer 2 bridges.....	71
Figure C.7 – Examples of Home Network communication software implementation.....	72
Figure C.8 – Packet structure	73
Table 1 – Packet type numbers of the Home Network frame	20
Table 2 – Hardware type.....	20
Table 3 – Format for “Home Network transmission frame transfer” packets.....	22
Table 4 – Format for “MAC/IP address resolution request” packets	22
Table 5 – Format for “MAC/IP address resolution response” packets	23
Table 6 – Format for “IP/MAC address resolution request” packets	23
Table 7 – Format for “IP/MAC address resolution response” packets	24
Table 8 – Format for “hardware/MAC address resolution request” packets.....	24
Table 9 – Format for “hardware/MAC address resolution response” packets	25
Table 10 – Format for “MAC address initialization request” packets	26
Table 11 – Format for “MAC address initialization response” packets	26
Table 12 – Format for “MAC address server initialization response” packets.....	27
Table 13 – Format for “MAC address allocation response” packets	27
Table 14 – Format for “MAC address confirmation request” packets	28
Table 15 – Format for “MAC address confirmation response” packets.....	28
Table 16 – Format for “ MAC address request to all nodes” packets.....	28

Table 17 – Format for “MAC address response to all nodes” packets.....	29
Table 18 – Format for “MAC address server detection request” packets.....	29
Table 19 – Format for “MAC address server notification” packets.....	30
Table 20 – Format for “MAC address server detection response” packets	30
Table 21 – Format for “network control message (destination invalid)” packets	31
Table 22 – Format for “NMA overlap” network control message packets.....	31
Table 23 – Address Relation table	32
Table 24 – Booting modes	40
Table 25 – Sample for storing allocated NMAs	48
Table 26 – Time period parameters.....	50

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

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International Standard IEC 62457 has been prepared by technical area 9: Audio, video and multimedia applications for end-user network, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

The text of this standard is based on the following documents:

CDV	Report on voting
100/1197/CDV	100/1271/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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 countries¹).

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.

¹ CEBus, ECHONET, Konnex, LonTalk, others.

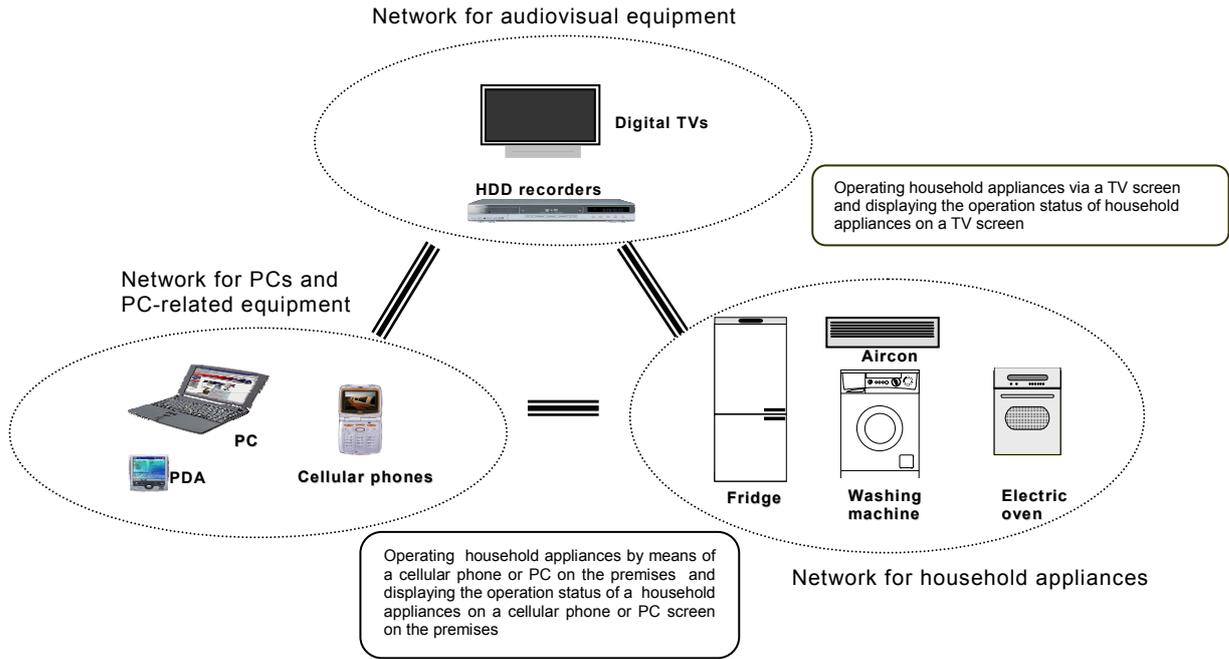


Figure 1 – Grouping of relationship between household appliances and audiovisual equipment, PCs and PC-related equipment

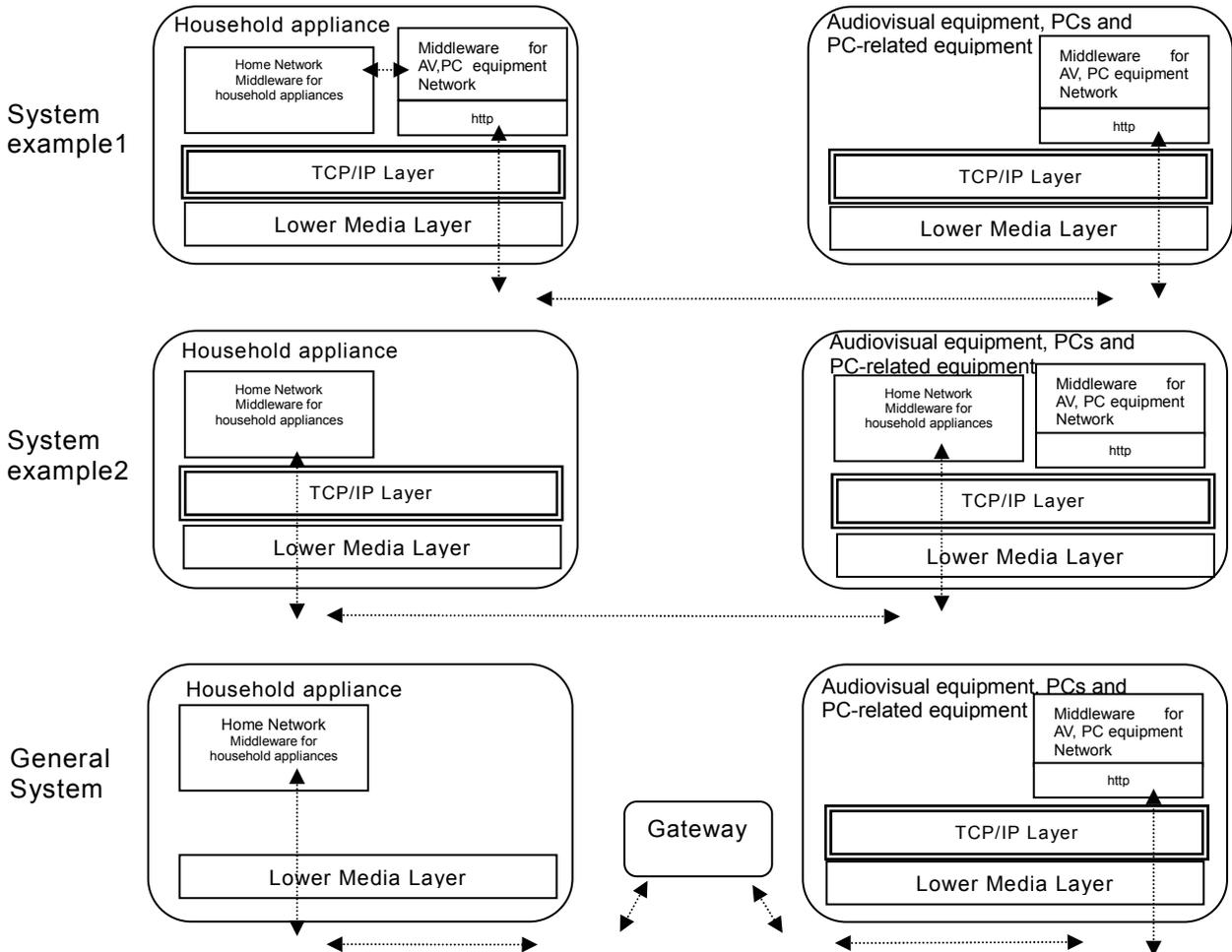
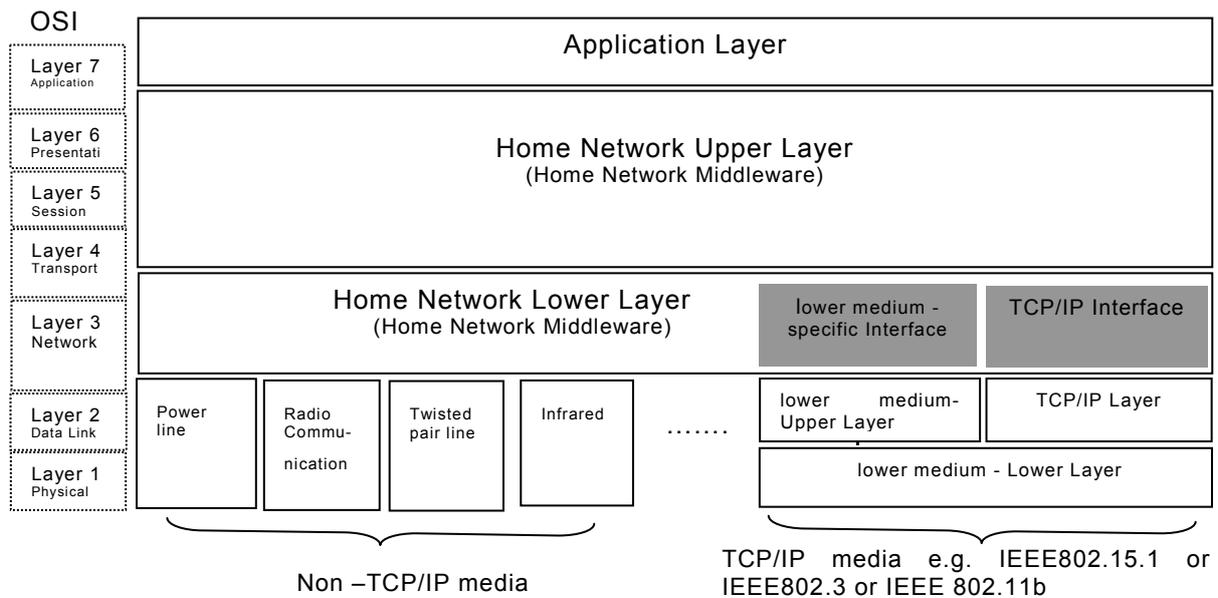


Figure 2 – Examples of data communication between household appliance and audiovisual equipment, PCs and PC-related equipment

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

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)*