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INTERNATIONAL STANDARD

colour inside

High Definition (HD) recording link guidelines

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

HIGH DEFINITION (HD) RECORDING LINK GUIDELINES

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

CDV	Report on voting
100/1470/CDV	100/1558/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

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INTRODUCTION

With the global introduction of High definition (HD) TV services, receivers, and consumer recording equipment, the need has arisen for a universal recording interface to connect receivers and recorders.

This International Standard presents a comprehensive proposal for this interface including content protection [2][3] [1]. The proposal – intended as a guideline – leverages existing standards IEC 62481-1, and [4] in the field, ensuring interoperability between receivers and recorders.

NOTE * HDMI (High-Definition Multimedia Interface)[2] is a digital interface for the connection between source device and monitor provided by HDMI Licensing, LLC.

Figure 1 – High definition reception and recording

The starting point for the proposal is an in-home configuration depicted in Figure 1. The assumption is that both the receiver (e.g. STB) as well as the recorder (e.g. BD-recorder) are connected to the display via an HDMI interface [4]. The proposed recording interface connects the recorder to the receiver and carries compressed signals only. Obviously, the receiver functionality can be integrated into the display.

The proposed interface recognises the fact that a large amount of content will be made available in the form of a Pay-TV and thus be protected via a Conditional Access (CA) system. The required CA functionality is assumed to be contained in the receiver.

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1 Figures in square brackets refer to the Bibliography.

2 HDMI is the trade name of a product supplied by HDMI Licensing, LLC. This information is given for the convenience of users of this document and does not consitute an endorsement by IEC of the product named.

HIGH DEFINITION (HD) RECORDING LINK GUIDELINES

1 Scope

This International Standard specifies the communication protocol between a TV receiver and a video recorder which are connected through a digital interface.

2 Normative references

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.

IEC 62481-1:2007, *Digital living network alliance (DLNA) home networked device interoperability guidelines – Part 1: Architecture and protocols*

IEC 62481-2, *Digital living network alliance (DLNA) home networked device interoperability guidelines – Part 2: DNLA media formats*

ETSI TR 101 211:2004, *Digital Video Broadcasting (DVB); Guidelines on Implementation and usage of Service Information (SI)-V1.6.1*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

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

3.1.1
content
video, audio or subtitles data which is intended to be delivered to and consumed by a user

3.1.2
content protection
control of access and usage of content through rules and rights

3.1.3
receiver
device with a digital broadcast reception capability which may have a storage for recording content, for example STB

3.1.4
recorder
device capable of recording digital content on to a storage medium (removable or non-removable or both), for example BD-recorder

3.2 Abbreviations

For the purposes of this document, the following abbreviations apply.

CDS Content Directory Service

CEC Consumer Electronics Control

CSV	Comma Separated Value
DIT	Discontinuity Information Table
DLNA	Digital Living Network Alliance
DMS	Digital Media Server
DTCP	Digital Transmission Content Protection
EPG	Electronic Program Guide
HDD	Hard Disk Drive
HDLNK	HD recording LiNK
HDMI	High Definition Multimedia Interface
HTTP	Hyper Text Transfer Protocol
IRD	Integrated Receiver Decoders
MPEG	Moving Picture Experts Group
OCM	Optional Content Management
PAT	Program Association Table
PMT	Program Map Table
PVR	Personal Video Recorder
RCV	Receiver
REC	Recorder
SIT	Selection Information Table
SPTS	Single Program Transport Stream
STB	Set Top Box
STC	System Time Clock
TS	Transport Stream
SI	Service Information
SOAP	Simple Object Access Protocol
SCPD	Service Controlled Protocol Description
UPnP	Universal Plug and Play
XML	eXtensible Markup Language

4 Use cases

Annex A shows the following use cases derived from the interconnection depicted in Figure 1.

a) Impulse recording (What You See Is What You Record – WYSIWYR)

b) Scheduled recording

c) Pause TV

d) Archiving

This standard addresses the following two use cases described in A.4.3 and Clause A.6, but not others described in Annex A.

In addition, it should be noted that this guideline implements the scheduled recording use case without reservation of the storage on the recorder side. Other use cases described in Annex A may be covered by the future publications.

5 System definition

5.1 Device model

HD Recording Link guidelines uses the device model described in DLNA (see Clause 5 in IEC 62481-1). This subclause maps the receiver and the recorder (target devices for the guidelines) to DLNA device model.

This guideline provides the requirements for the following devices:

a) **RCV** – receiver is a device that consists of one or more broadcasting tuner(s), an IP-based home network interface and may have storage for recording content. The storage functionality of the receiver is not covered by the guidelines;

b) **REC** – recorder is a device that consists of a storage for recording content (removable or non-removable or both) and an IP-based home network interface.

5.2 System usage

The system usage describes the device interaction model between devices defined in this document in order to realise the use cases listed in Clause 4.

The usage covers the use cases addressed in Clause 4 of this document. The recording system usage has an upload controller device capability in the **RCV** to instruct the **REC** to accept the content for recording.

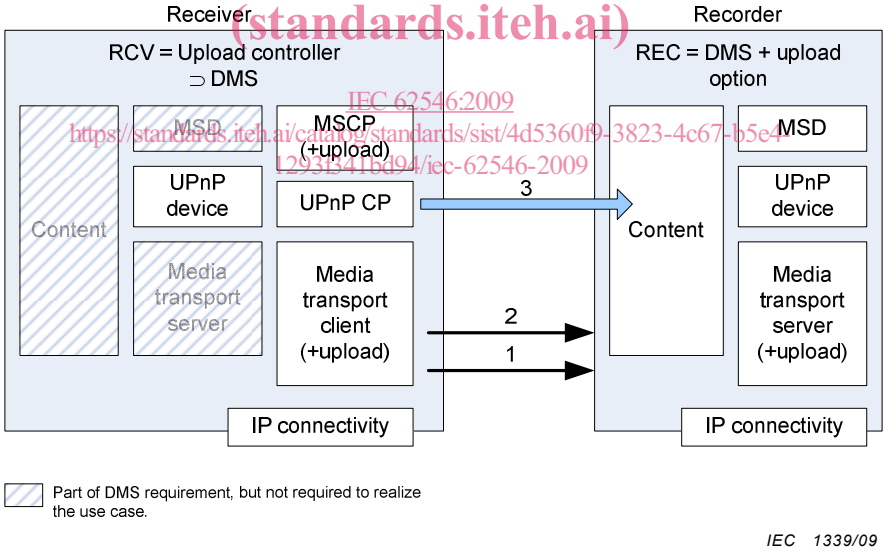

Figure 2 – Recording system usage interaction model

Figure 2 illustrates the device interaction model. The following steps are performed in the system usage:

invoke UPnP action to select the destination media (HDD, BD, etc.);

invoke UPnP action to create a CDS entry for the content to be recorded;

transport the content to the recorder.

It should be noted that the upload controller device capability is incorporated as part of a valid DLNA device. In preparation for the next steps of the guidelines it has been decided to host the upload controller device capability in a DMS. Therefore, the receiver requires adherence to the DMS device class although the functionality of the DMS is not required to implement the use cases realised by the current guidelines.

6 Guideline terminology and conventions

The HD Recording Link guidelines include references to XML [6][7] elements and attributes without the definition of formal HDLNK XML schema. This allows the HD Recording Link guidelines to define new XML elements and attributes in the future, without having to define a new namespace or schema definition. Table 1 lists the namespace values that are used by HD Recording Link guidelines and the context of their usage.

Table 1 – HDLNK namespace values

Namespace value	Usage context
urn:schemas-hdlnk-org:device-1-0	Used for XML elements and attributes defined by HD Recording Link guidelines for use in UPnP device description files.

7 Guideline requirements

7.1 Purpose

This clause covers the guidelines that enable vendors to build HD receivers and recorders that together, provide HD Recording Link functionality as defined in the current phase.

7.2 General

The **RCV** must fulfil all the guidelines for a DMS device class in IEC 62481-1 and upload controller device capability (+UP+) in IEC 62481-1. The **REC** must fulfil all guidelines for DMS device class in IEC 62481-1 and must accept upload operations from the **RCV** (see following subclause for details).

7.3 Networking and connectivity

The **RCV** and **REC** must support the following connectivity selection of IEC 62481-1.

- Ethernet conformant to all [NC Ethernet:] labeled requirements in the general capability requirements clause of networking and connectivity.

The **RCV** and **REC** may support the following connectivity selection of IEC 62481-1.

- 802.11 conformant to all [NC 802:11:] labeled requirements in the general capability requirements clause of networking and connectivity[3].

Any of the above selections can be supported via an add-on card, dongle, or equivalent.

7.4 Device discovery and control

The device discovery and control should be performed using UPnP device architecture as described in 7.3 of IEC 62481-1.

However, the HD Recording Link devices (**RCV** and **REC**) must incorporate the following changes to the device description documents.

a) The **RCV** and **REC** must employ the <hdlnk:X_HDLNKDOC> XML element inside the <device> element of the device description document to indicate adherence to a particular HDLNK guidelines parts.

b) The value of <hdlnk:X_HDLNKDOC> element is a string as defined below:

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[3] It is to be noted that the transmission of an HD signal may require more than 10 Mbps of network bandwidth.