

# INTERNATIONAL STANDARD



**Digital living network alliance (DLNA) home networked device interoperability  
guidelines –  
Part 3: Link protection**

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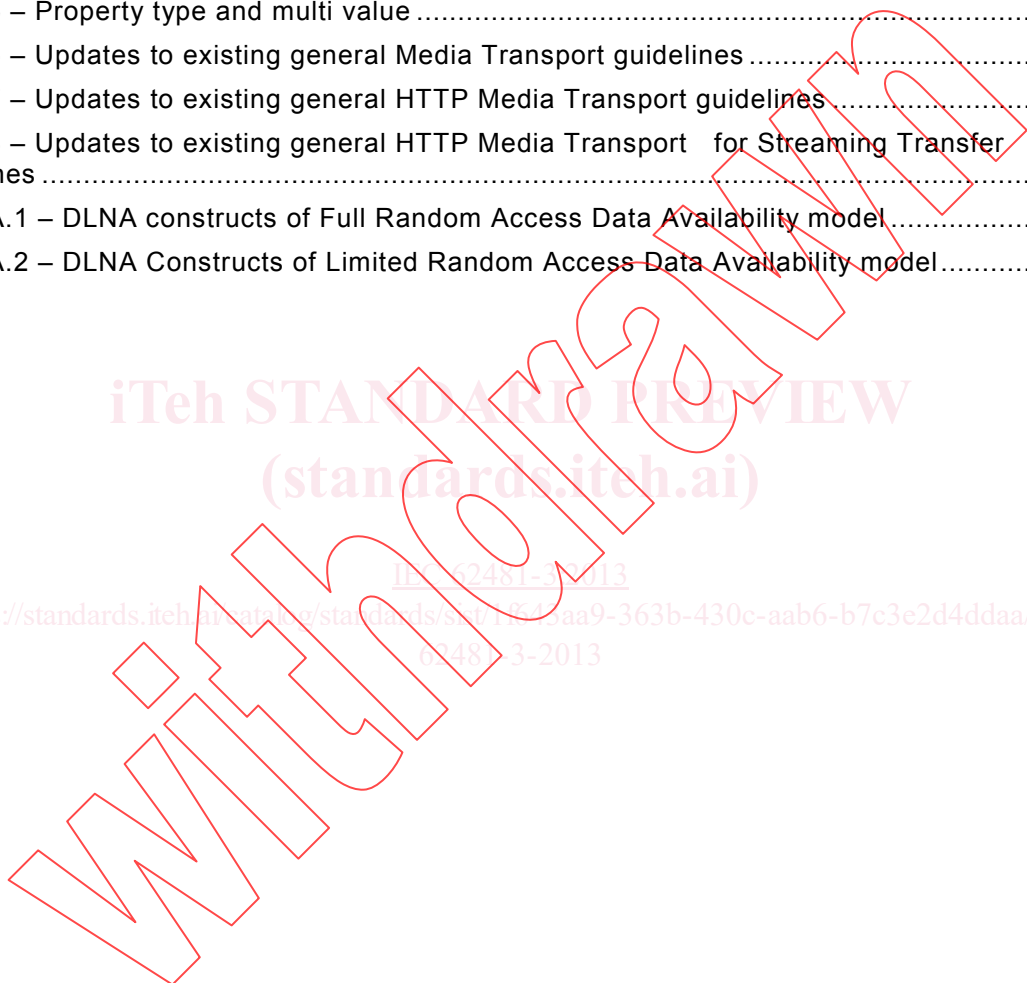
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**DIGITAL LIVING NETWORK ALLIANCE (DLNA) HOME  
NETWORKED DEVICE INTEROPERABILITY GUIDELINES –****Part 3: Link protection**

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International Standard IEC 62481-3 has been prepared technical area 9: Audio, video and multimedia applications for end-user network, by IEC technical committee 100: Audio, video and multimedia systems and equipment.

This second edition cancels and replaces the first edition published in 2010. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) includes variable play (trick mode) support;
- b) includes updates to resolve interoperability issues.

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

CDV	Report on voting
100/1994/CDV	100/2082/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.

A list of all parts of IEC 62481 series, published under the general title *Digital living network alliance (DLNA) home networked device interoperability guidelines*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability 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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- withdrawn,
- replaced by a revised edition, or
- amended.

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## INTRODUCTION

Consumers are acquiring, viewing, and managing an increasing amount of digital media (photos, music, and video) on devices in the Consumer Electronics (CE), mobile, and Personal Computer (PC) domains. As such, they want to conveniently enjoy the content, regardless of the source, across different devices and locations in the home. The digital home vision integrates the Internet, mobile, and broadcast networks through a seamless, interoperable network, which will provide a unique opportunity for manufacturers and consumers alike. In order to achieve this interoperability, a common set of industry design guidelines is needed that allows vendors to participate in a growing marketplace, leading to more innovation, simplicity, and value for consumers. This standard serves that purpose and provides vendors with the information needed to build interoperable networked platforms and devices for the digital home.

This standard is organized to align with the overall structure of IEC 62481-1 and IEC 62481-2.

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# DIGITAL LIVING NETWORK ALLIANCE (DLNA) HOME NETWORKED DEVICE INTEROPERABILITY GUIDELINES –

## Part 3: Link protection

### 1 Scope

This part of IEC 62481 specifies the DLNA link protection guidelines, which are an extension of the DLNA guidelines. DLNA link protection is defined as the protection of a content stream between two devices on a DLNA network from illegitimate observation or interception using the protocols defined within this part of IEC 62481.

Content protection is an important mechanism for ensuring that commercial content is protected from piracy and illegitimate redistribution. Link Protection is a technique that enables distribution of protected commercial content on a home network, thus resulting in greater consumer flexibility while still preserving the rights of copyright holders and content providers.

The guidelines in this part of IEC 62481 reference existing technologies for Link Protection and provide mechanisms for interoperability between different implementations as well as integration with the DLNA architecture.

### 2 Normative references

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

IEC 62481-1:2013, *Digital Living Network Alliance (DLNA) home networked device interoperability guidelines – Part 1: Architecture and protocols*

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<http://www.dtcp.com/>

WMDRM-ND, *Windows Media DRM for Network Devices, Windows Media Technologies*  
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RTP Payload format for WMV and WMA, *RTP Payload Format for Windows Media Audio and Video*, Microsoft Corporation  
[http://download.microsoft.com/download/5/5/a/55a7b886-b742-4613-8ea8-d8b8b5c27bbc/RTP\\_PayloadFormat\\_for\\_WMAandWMV\\_v1.doc](http://download.microsoft.com/download/5/5/a/55a7b886-b742-4613-8ea8-d8b8b5c27bbc/RTP_PayloadFormat_for_WMAandWMV_v1.doc)

### **3 Terms, definitions and abbreviated terms**

#### **3.1 Terms and definitions**

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

### 3.1.1

**Cleartext**  
unencrypted content

Note 1 to entry: Within this standard, the content stream after decryption by the upstream content protection system and before encryption by the Link Protection System.

### 3.1.2

**Cleartext Byte Domain**  
specification of a byte position in the Cleartext content stream

Note 1 to entry: For a complete explanation of seek operations on link protected content, see Annex A.

### 3.1.3

**Cleartext Byte Seek Request Header**  
request that a certain position in the Cleartext byte stream be returned

Note 1 to entry: This term is used to signify any of these different transport layer request headers.

Note 2 to entry: When used in a guideline, Cleartext Byte Seek Request Header implies that the guideline applies to all uses of any of the request headers.

### 3.1.4

**Cleartext Byte Seek Response Header**  
response that declares the range of bytes returned in the Cleartext byte stream

Note 1 to entry: This term is used to signify any of these different transport layer response headers.

Note 2 to entry: When used in a guideline, this implies that the guideline applies to all uses of any of the request headers.

### 3.1.5

**Decoder Friendly Alignment Position**  
position in the bitstream defined for decoder friendly alignment

Note 1 to entry: A Decoder Friendly Alignment Position is always the start of a Media Format Alignment Element. Generally, the decoder can begin to process data without any other internal state information about the stream. The decoder can begin processing at that point and create a valid output rendering. This value is defined for the individual media format profiles that have Decoder Friendly Alignment Positions.

### 3.1.6

**DLNA Link Protection**  
protection, using DLNA protocol elements as defined in these guidelines, of a content stream between two devices on a DLNA network from illegitimate observation or interception

### 3.1.7

**Link Protection Alignment Element**  
unit of content carried within a link protected content stream

Note 1 to entry: This typically starts with a packet header that is defined by the Link Protection System and contains bytes of the link protected stream.

### 3.1.8

**Link Protection**  
protection of a content stream between two devices on a DLNA network from illegitimate observation or interception

### 3.1.9

**Link Protection System**  
specific collection of technologies with corresponding rules that enable secure content transfer between two endpoints

### 3.1.10

#### **Media Format Alignment Element**

unit of content carried within an unprotected content stream

Note 1 to entry: This typically starts at a Decoder Friendly Alignment Position for the given media format and contains an integral number of units of content as defined by the media format in use. This value is defined within the media format profile specification.

### 3.1.11

#### **Network Byte Domain**

specification of a byte position in the content stream as it is carried on the network transport

Note 1 to entry: For content binaries that use a Link Protection System, this will include encryption and any headers or padding necessary for the Link Protection System.

### 3.1.12

#### **Time Domain**

specification of a position in the content stream in time units

### 3.1.13

#### **UPnP**

architecture for pervasive peer-to-peer network connectivity of devices of all form factors

Note 1 to entry: UPnP is designed to bring easy-to-use, flexible, standards-based connectivity to ad-hoc or unmanaged networks whether in the home, in a small business, public spaces, or attached to the Internet.

Note 2 to entry: UPnP is a distributed, open networking architecture that leverages TCP/IP and Web technologies to enable seamless proximity networking in addition to control and data transfer among networked devices in the home, office, and public spaces.

## 3.2 Symbols and abbreviated terms

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

### 3.2.1

#### **AKE**

Authentication and Key Exchange

step in a Link Protection System where the receiving device is authenticated and given the correct keys for the content

### 3.2.2

#### **ASF**

Advanced System Format

media format encapsulation for the transmission of content

### 3.2.3

#### **AV**

Audio with Video

media content that contains both moving pictures and sound

### 3.2.4

#### **AVT**

Audio Video Transport

UPnP service that provides network-based control for common transport operations such as play, stop, pause, next, previous, and seek

Note 1 to entry: The AVTransport service specification is a standard UPnP DCP.

### 3.2.5

#### **CMS**

ConnectionManager:1 Service

UPnP service that provides information about the supported transport protocols and media formats of a UPnP device

Note 1 to entry: The CMS specification is a standard UPnP DCP.

### **3.2.6**

#### **CSRC**

Contributing SouRCe  
as used for the RTP Media Transport

### **3.2.7**

#### **DLNA**

Digital Living Network Alliance  
organization that created this standard

### **3.2.8**

#### **DLNAQOS\_UP**

DLNA QoS User Priority  
DLNA-defined QoS label used to correlate an underlying IEEE 802.1Q user priority and WMM access category to a DLNA traffic type(s)

### **3.2.9**

#### **DTCP**

Digital Transmission Content Protection  
Link Protection System

### **3.2.10**

#### **DTCP-IP**

Digital Transmission Content Protection over IP networks  
DTCP as applied to IP based networks

### **3.2.11**

#### **GOP**

Group Of Pictures  
defined grouping of information in the MPEG 2 media format

### **3.2.12**

#### **HTTP**

Hyper Text Transfer Protocol  
protocol for transferring files across the Internet

Note 1 to entry: Requires an HTTP client program on one end, and an HTTP server program on the other end.

### **3.2.13**

#### **MIME**

Multipurpose Internet Mail Extension  
standard system for identifying the type of data contained in a file

Note 1 to entry: MIME is an internet protocol that allows sending binary files across the internet as attachments to e-mail messages. This includes graphics, photos, sound, video files, and formatted text documents.

### **3.2.14**

#### **MPEG-2**

Moving Picture Experts Group phase 2

### **3.2.15**

#### **NC-PS**

Network Connectivity – Power Saving  
power saving modes of operations as defined in IEC 62481-1

**3.2.16****PCP**

Protected Content Packet

packet format for DTCP-IP link protected content as defined in DTCP Volume 1 and DTCP Volume 1 Supplement E

**3.2.17****PS**

Program Stream

reference to an MPEG-2 AV stream format

**3.2.18****RTP**

Real Time Protocol

media transport that provides end-to-end network transport functions for transmitting real-time data, such as AV

Note 1 to entry: RTP provides services such as payload type identification, sequence numbering, time-stamping, and delivery monitoring.

**3.2.19****RTSP**

Real Time Streaming Protocol

protocol within the RTP protocol suite

**3.2.20****RTT**

Round Trip Time

time between sending a network packet to a remote host and the time that the response is received

**3.2.21****SDP**

Session Description Protocol

protocol within the RTP protocol suite

**3.2.22****SOAP**

Simple Object Access Protocol

XML based messaging protocol used to exchange service requests and responses over a network

**3.2.23****TS**

Transport Stream

MPEG-2 AV stream format

**3.2.24****UCDAM**

Uniform Client Data Availability Model

model for representing which bytes of a content binary are available on a server for seek operations

Note 1 to entry: See 7.4 of IEC 62481-1:2013 for a full definition.

**3.2.25****URI**

Uniform Resource Identifier

W3C's codification of the name and address syntax of present and future objects on the internet