

INTERNATIONAL STANDARD

**Digital living network alliance (DLNA) home networked device interoperability
guidelines –
Part 2: DLNA media formats**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE **XK**

CONTENTS

| | |
|---|-----|
| FOREWORD..... | 5 |
| 1 Scope..... | 7 |
| 2 Normative references | 7 |
| 3 Terms, definitions and acronyms | 9 |
| 3.1 Terms and definitions | 9 |
| 3.2 Acronyms | 17 |
| 4 Guideline terminology and conventions | 19 |
| 4.1 Guideline compliance classifiers..... | 19 |
| 4.2 Standard or specification usage classifiers | 19 |
| 4.3 Guideline font usage conventions..... | 20 |
| 4.4 Layout for guidelines | 20 |
| 5 Compendium of media format profiles..... | 22 |
| 5.1 General..... | 22 |
| 5.2 Categorization labels..... | 23 |
| 5.3 Audio class – AMR profiles..... | 25 |
| 5.4 Audio class – ATAC3plus profiles | 25 |
| 6 Media format interoperability model..... | 49 |
| 6.1 Media interoperability guidelines | 49 |
| 6.2 Overall interoperability | 49 |
| 6.3 Mandatory and optional profile guideline | 53 |
| 7 Image class media format profiles | 56 |
| 7.1 JPEG profiling guidelines | 56 |
| 7.2 PNG profiling guidelines..... | 59 |
| 8 Audio class media format profiles | 62 |
| 8.1 AC-3 profiling guidelines | 62 |
| 8.2 AMR profiling guideline..... | 63 |
| 8.3 ATAC3plus profiling guidelines | 65 |
| 8.4 LPCM profiling guidelines..... | 65 |
| 8.5 MP3 profiling guidelines | 67 |
| 8.6 MPEG-4 profiling guidelines | 69 |
| 8.7 WMA profiling guidelines | 92 |
| 9 AV media class format profiles | 94 |
| 9.1 General..... | 94 |
| 9.2 MPEG-1 profiling guidelines | 94 |
| 9.3 MPEG-2 profiling guidelines | 96 |
| 9.4 MPEG-4 Part 2 profiling guidelines..... | 129 |
| 9.5 MPEG-4 Part 10 (AVC) profiling guidelines..... | 157 |
| 9.6 WMV9 profiling guidelines | 210 |
| 10 Printing class media format profiles | 216 |
| 10.1 General..... | 216 |
| 10.2 Generic printing profiling guidelines, MF printing class – Profile parameter Sets – Profiles: All XHTML printing profiles | 217 |
| 10.3 XHTML profiling guidelines..... | 218 |
| 11 Media collection profile guidelines | 220 |

| | |
|---|-----|
| 11.1 DIDL-Lite playlist format | 220 |
| Annex A (informative) ASF recommended procedures | 225 |
| Annex B (normative) IFO file format field values within an IFO file | 229 |
| Bibliography..... | 235 |
| Figure 1 – Guideline layout and definitions | 20 |
| Figure 2 – Visual map of possible values for the attribute tables | 22 |
| Figure 3 – Profile summary table header..... | 23 |
| Table 1 – Categorization labels..... | 23 |
| Table 2 – JPEG profiles | 24 |
| Table 3 – Image class – PNG profiles | 25 |
| Table 4 – Audio class – AC-3 profiles | 25 |
| Table 5 – Audio class – AMR profiles..... | 25 |
| Table 6 – Audio class – ATRAC3plus profiles | 25 |
| Table 7 – Audio class – LPCM profiles..... | 26 |
| Table 8 – Audio class – MP3 profiles | 26 |
| Table 9 – Audio class – MPEG-4 profiles | 26 |
| Table 10 – Audio class – WMA profiles | 28 |
| Table 11 – AV class – MPEG-1 profiles | 28 |
| Table 12 – AV class – MPEG-2 profiles | 29 |
| Table 13 – AV class – MPEG-4 Part 2 profiles | 33 |
| Table 14 – AV class – MPEG-4 Part 2 (AVC) profiles | 38 |
| Table 15 – AV class – WMV9 profiles | 48 |
| Table 16 – Media collection profiles | 49 |
| Table 17 – Required media format profiles for the HND device category..... | 56 |
| Table 18 – MPEG-4 profile hierarchy | 70 |
| Table 19 – List of WMA profiles for the audio media class | 92 |
| Table 20 – MPEG-2 AV format resolutions..... | 100 |
| Table 21 – MPEG_TS_SD_NA, MPEG_TS_SD_NA_TDLNA_Part_2_Media_Formats_060621.doc | 111 |
| Table 22 – Video MPEG-2 AV encoding ParametersDLNA_Part_2_Media_Formats_060613.doc | 114 |
| Table 23 – MPEG_TS_SD_KO, MPEG_TS_SD_KO_T | 116 |
| Table 24 – MPEG_TS_HD_KO, MPEG_TS_HD_KO_T..... | 117 |
| Table 25 – MPEG-2 AV format resolutions | 125 |
| Table 26 – Summary of MPEG-4 Part 2 profiles for the AV media class | 129 |
| Table 27 – MPEGSP_L3 bit rates..... | 132 |
| Table 28 – MPEGSP_L3 resolutions | 132 |
| Table 29 – SP_L3_VGA resolutions | 133 |
| Table 30 – SP_L2 resolutions | 134 |
| Table 31 – SP_L0B video bit rate..... | 135 |

| | |
|--|-----|
| Table 32 – ASP_L5 bit rates | 136 |
| Table 33 – ASP_L5 resolutions | 136 |
| Table 34 – ASP_L4_SO bit rates | 139 |
| Table 35 – ASP_L4_SO resolutions | 139 |
| Table 36 – H263_P0_L10 resolutions..... | 141 |
| Table 37 – H263_P3_L10 resolutions..... | 142 |
| Table 38 – CO resolutions | 142 |
| Table 39 – MPEG2_TS maximum system bit rate..... | 151 |
| Table 40 – MPEG2_TS, MPEG2_TS_T, and MPEG2_TS_ISO bit rates..... | 152 |
| Table 41 – Maximum system bit rate..... | 153 |
| Table 42 – Summary of MPEG-4 Part 10 (AVC) profiles for the AV media class..... | 158 |
| Table 43 – Pixel aspect ratio for AVC_TS_BL_CIF15_AAC_xxx and AVC_TS_MP_SD_xxx profiles | 162 |
| Table 44 – MPEG-4 Part 10 AV format frame rate..... | 164 |
| Table 45 – MPEG-4 Part 10 AV format resolutions..... | 165 |
| Table 46 – Frame rate and number of pictures in a GOP structure | 170 |
| Table 47 – MPEG-4 Part 10 AV format resolutions..... | 171 |
| Table 48 – MPEG-4 Part 10 AV format resolutions..... | 173 |
| Table 49 – MPEG-4 Part 10 AV format resolutions..... | 177 |
| Table 50 – MPEG-4 Part 10 AV format resolutions..... | 181 |
| Table 51 – MPEG-4 Part 10 AV format resolutions..... | 183 |
| Table 52 – MPEG-4 Part 10 AV format resolutions..... | 185 |
| Table 53 – MPEG-4 Part 10 AV format resolutions..... | 187 |
| Table 54 – MPEG-4 Part 10 AV format resolutions..... | 187 |
| Table 55 – MPEG-4 Part 10 AV format resolutions..... | 190 |
| Table 56 – MPEG-4 Part 10 AV format resolutions..... | 193 |
| Table 57 – MPEG-4 Part 10 AV format resolutions..... | 195 |
| Table 58 – MPEG-4 Part 10 AV format resolutions..... | 196 |
| Table 59 – MPEG-4 Part 10 AV format resolutions..... | 197 |
| Table 60 – MPEG-4 Part 10 AV format resolutions..... | 199 |
| Table 61 – MPEG-4 Part 10 AV format resolutions..... | 200 |
| Table 62 – MPEG-4 Part 10 AV format resolutions..... | 204 |
| Table 63 – MPEG-4 Part 10 AV format resolutions..... | 204 |
| Table 64 – List of WMV9 profiles for the AV media class | 211 |
| Table B.1 – Fields within an IFO file supplied by serving endpoint | 229 |
| Table B.2 – IFO file fields treatment by rendering endpoints | 232 |

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**DIGITAL LIVING NETWORK ALLIANCE (DLNA) HOME NETWORKED
DEVICE INTEROPERABILITY GUIDELINES –**
Part 2: DLNA media formats

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as far as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62481-2 has been prepared by 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 |
|--------------|------------------|
| 100/1128/CDV | 100/1214/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 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.

A bilingual version of this publication may be issued at a later date.

Currently in preview, click buy full vers.

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

Part 2: DLNA media formats

1 Scope

This part of IEC 62481 specifies the DLNA media format profiles applicable to IEC 62481-1. Media format profiles are defined for each of the following media classes: audio, image, and AV. In addition, profile ID values that identify media collections and printer XHTML documents are also introduced.

It is envisioned that in the home network environment, devices will be capable of exchanging content items that originate from different sources. Content items will typically come encoded in different formats. The term "format" designates the compression and encoding tools utilized to generate the binary instance of a content item, which will be eventually exchanged over the home network using streaming or file transfer protocols. Examples of formats include MPEG-2, MPEG-4, WMV and others for video; or MP3, AAC, WMA and others for audio.

Formats alone, however, include as part of their specification, multiple parameters, features and tools which can be used in a myriad of combinations to generate content binaries. In this standard, the notion of a format profile is introduced to identify a particular suitable combination of format parameters which define a way for representing content binaries. A format like MPEG-2, for example, can have multiple profiles depending on selections for the companion audio, the system-layer multiplexing specifications, allowed frame resolutions, allowed aspect ratios, allowed bit rates, etc.

This standard provides a quasi-exhaustive list of broadly-used format profiles for image, audio, and AV formats. For each particular format profile, this standard defines a profile ID text token to be used during the DLNA media discovery and media transfer operations. The profile ID is exposed in a server's content directory service (CDS) to signal to potential networked players or renderers the existence of a content item with particular coding and compression features defined precisely by the item's profile ID. This standard also describes the uses of format profiles which define media collections and printer XHTML documents.

The number of potential combinations for suitable profiles becomes large rather quickly, as evidenced by the long profile lists observed in the different sections of this standard. Consequently, this standard introduces the notion of mandatory profiles, supported by all devices, as a means to provide baseline content interoperability in the home. Servers have to be capable of exposing and transferring mandatory profiles while players and renderers have to be capable of decoding and rendering the mandatory profiles. Unfortunately, mandatory format profiles cannot be defined universally to suit all scenarios. For this reason, the definition of mandatory profiles is made taking into account the geographical region and the target device category.

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

ISO/IEC 10918-1:1994, *Information technology – Digital compression and coding of continuous-tone still images: Requirements and guidelines*

ISO/IEC 11172-1:1993, *Information technology – Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s – Part 1: Systems*

ISO/IEC 11172-2:1993, *Information technology – Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s – Part 2: Video*

ISO/IEC 11172-3:1993, *Information technology – Coding of moving pictures and associated audio for digital storage media at up to about 1.5 Mbit/s – Part 3: Audio*

ISO/IEC 13818-1:2000, *Information technology – Generic coding of moving pictures and associated audio information: Systems*

ISO/IEC 13818-2:2000, *Information technology – Generic coding of moving pictures and associated audio information: Video*

ISO/IEC 13818-3:1998, *Information technology – Generic coding of moving pictures and associated audio information – Part 3: Audio*

ISO/IEC 13818-11:2004, *Information technology – Generic coding of moving pictures and associated audio information – Part 11: IPMP on MPEG-2 systems*

ISO/IEC 14496-1:2001, *Information technology – Coding of audio-visual objects – Part 1: Systems*

ISO/IEC 14496-2:2004, *Information technology – Coding of audio-visual objects – Part 2: Visual*

Amendment 1 (2004)

Amendment 2 (2005)

Amendment 3 (2007)

ISO/IEC 14496-3:2005, *Information technology – Coding of audio-visual objects – Part 3: Audio*

ISO/IEC 14496-10:2005, *Information technology – Coding of audio-visual objects – Part 10: Visual*

ISO/IEC 14496-12:2005, *Information technology – Coding of audio-visual objects – Part 12: ISO base media file format*

ISO/IEC 14496-14:2003, *Information technology – Coding of audio-visual objects – Part 14: MP4 file format*

ISO/IEC 14496-15:2004, *Information technology – Coding of audio-visual objects – Advanced Video Coding (AVC) file format*

ISO/IEC 15948:2004, *Information technology – Computer graphics and image processing – Portable Network Graphics (PNG): Functional specification*

ITU-R Recommendation BS.1196-11:2001, *Audio coding for digital terrestrial television broadcasting*

ITU-T Recommendation G.726:1990, *40, 32, 24,16 kbit/s Adaptive Differential Pulse Code Modulation (ADPCM)*

ITU-T Recommendation H.263:2005, *Video coding for low bit rate communication*

ITU-T Recommendation H.264:2005, *Advanced video coding for generic audiovisual services*

ETSI TSR 101 154 V1.4:2004, *Digital Video Broadcasting (DVB*) – Implementation Guidelines for the use of MPEG-2 Systems, Video and Audio Coding in Broadcasting Applications based on the MPEG-2 Transport Stream, European Telecommunications Standard Institute* http://webapp.etsi.org/action/PU/20050111/ts_101154v010601p.pdf