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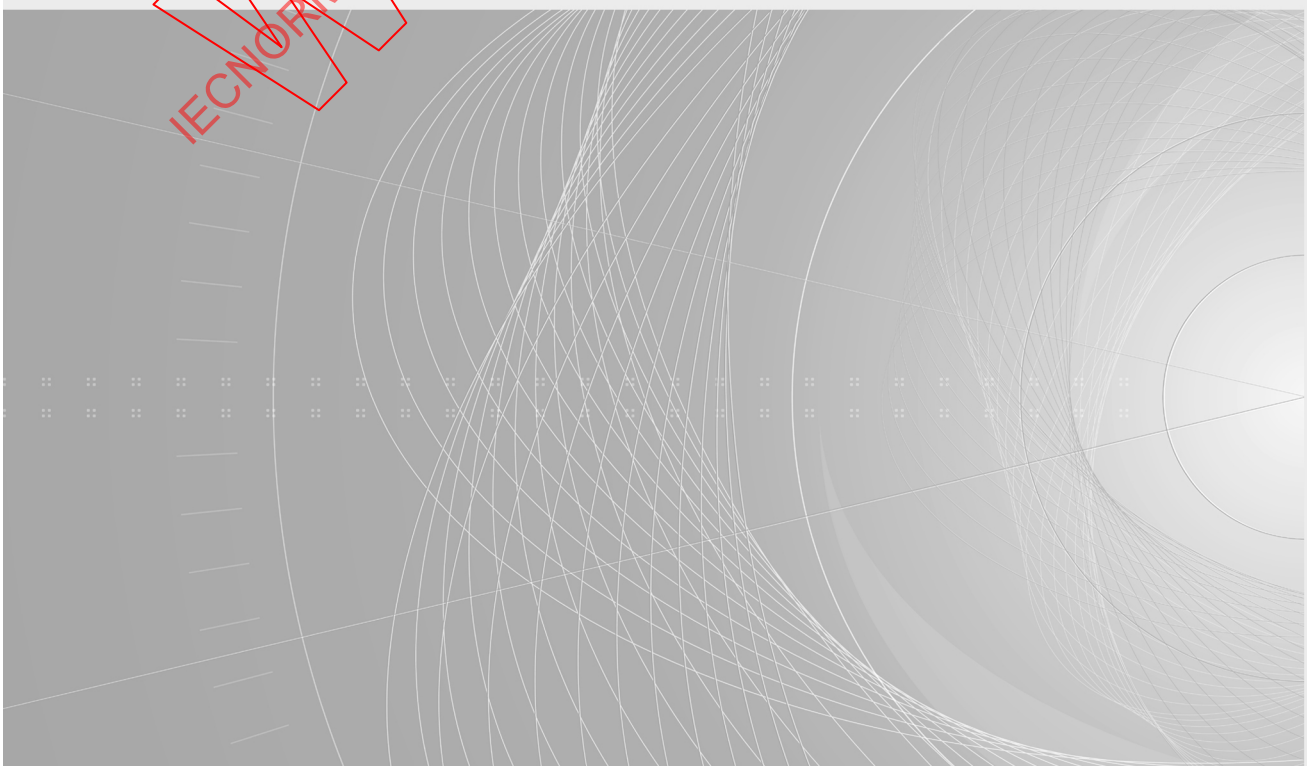
Edition 1.0 2007-08

INTERNATIONAL STANDARD

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



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

Part 2: DLNA media formats

FOREWORD

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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- withdrawn,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.

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 specifications, 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

3 Terms, definitions and acronyms

For the purposes of this document, the following terms, definitions and acronyms are applicable.

3.1 Terms and definitions

3.1.1
download controller
+DN+
one of the device capabilities defined by DLNA

3.1.2
printing controller
+PR1+, +PR2+
one of the device capabilities defined by DLNA

3.1.3
push uploader
+PU+
one of the device capabilities defined by DLNA

3.1.4
upload controller
+UP+
one of the device capabilities defined by DLNA

3.1.5
3rd generation partnership project
3GPP1
file format designed by this organization and used to encapsulate data.

3.1.6
audio code 3
AC-3
audio format standard popularly known as Dolby Digital* for delivering up to 5.1 audio channels developed by Dolby Laboratories

3.1.7
adaptive multi-rate
AMR
type of audio codec

3.1.8
extended adaptive multi-rate wideband
AMR-WB+
type of audio codec

3.1.9
AMR-WBplus
Same as AMR-WB+

3.1.10
association of radio industries and businesses
ARIB
one of the standard bodies for digital television broadcasting

3.1.11
adaptive transform acoustic coding 3 plus
ATRAC3plus
audio codec developed by Sony Corporation

3.1.12
advanced television systems committee
ATSC
one of the standard bodies for digital television broadcasting

3.1.13
audio with video
AV
any media content that contains both moving pictures and sound

3.1.14
advanced video codec
AVC
H.264 video codec

3.1.15
bit-sliced arithmetic coding
BSAC
type of audio codec

3.1.16
content directory service 1.0
CDS
UPnP service that provides network-based discovery of content. The content directory service specification is a standard UPnP DCP.

3.1.17
content receiver
endpoint that consumes content received via a network transfer from another endpoint

3.1.18
content source
endpoint that places content onto the network for transfer to another endpoint

3.1.19
decoder friendly alignment position
position in the bitstream defined for decoder friendly alignment; it is always a valid transport alignment position

3.1.20
device capability
set of device functions (at least 1) aggregated to support a system usage; it cannot stand alone and must be deployed in conjunction with an implementation of a valid DLNA device class. Since a device capability does not stand alone, it is not required to have components in

all layers of the DLNA architecture; it may have a one to one correspondence to a device function. It is a certifiable entity only when it is implemented as an addition to at least one device class

3.1.21
device category
group of device classes with the same environmental characteristics and sharing common system usages that are enabling home networking use case scenarios

NOTE Examples used within this standard are home network device (HND), mobile handheld device (MHD), and home infrastructure device (HID). While device classes are grouped within a device category, a single physical device may support device classes that fall into multiple device categories.

3.1.22
device class
class defined by a set of device functions. It specifies the features supported on a device regardless of its physical attributes. Examples used within this standard are digital media server (DMS) and digital media player (DMP). A single device may support multiple device classes. A DLNA device must support a least one device class and may support one or more device capabilities. A device class is the certifiable entity in DLNA

3.1.23
digital living network alliance
DLNA
organization that originally developed this standard

3.1.24
DLNA transport packet
term used to collectively refer to the three MPEG-2 transport stream packet formats defined by DLNA. These consist of a 188-byte ISO MPEG2 TS packet, a 192-byte packet consisting of a 188-byte ISO MPEG2 TS packet preceded by a 4-byte timestamp zero-value timestamp field, and a 192-byte packet consisting of a 188-byte ISO MPEG2 TS packet preceded by a 4-byte valid timestamp

3.1.25
digital media controller
DMC
one of the device classes defined by DLNA

3.1.26
digital media player
DMP
one of the device classes defined by DLNA

3.1.27
digital media printer
DMPr
one of the device classes defined by DLNA

3.1.28
digital media renderer
DMR
one of the device classes defined by DLNA

3.1.29
digital media server
DMS
one of the device classes defined by DLNA

3.1.30
digital video broadcast
DVB
one of the standard bodies for digital television broadcasting

3.1.31
digital versatile disc
DVD
high-capacity multimedia data storage medium

3.1.32
elementary stream
general term for a coded video, coded audio, or other coded bitstream.

3.1.33
exchangeable image file
EXIF
standardized format for exchanging images

3.1.34
format
family of encoding algorithm that share similar features or characteristics, for example, the MPEG-4 family of AV encoding algorithms, the MPEG-2 family of encoding algorithms, or the WMV family of encoding algorithms.

3.1.35
format profile
particular instantiation of a media format; given one family of encoding algorithms, a particular combination of algorithms and encoding parameters results in content items encoded with very specific features. For example, given the MPEG-4 media format, a media format profile results from the selection of AVC encoding at main profile and Level 3, AAC audio, and the MP4 file format

3.1.36
high-definition
HD
picture quality at HDTV level

3.1.37
high-definition television
HDTV
television system which provides a higher quality display, with a vertical resolution display from 720p to 1080i and higher and an aspect ratio (the width to height ratio of the screen) of 16:9, for a viewing experience similar to watching a movie

3.1.38
home network device
HND
one of the device categories defined by DLNA

3.1.39
ID3, ID3v2
general tagging format for audio that makes it possible to store meta data about the audio inside the audio file itself. It is a tag mainly targeted at files encoded with MPEG-1/2 layer I, MPEG-1/2 layer II, MPEG-1/2 layer III, and MPEG-2.5, but may work with other types of encoded audio or as a stand-alone format for audio meta data

3.1.40
information file
IFO
file containing information regarding a content item utilized in DVD content encoding and creation

3.1.41
JPEG file interchange format
JFIF
standardized file format for the exchange of images

3.1.42
joint photographic experts group
JPEG
coding standard for compression of still images (pictures).

3.1.43
low complexity
LC
used with AAC

3.1.44
linear pulse code modulation
LPCM
uncompressed audio encoding

3.1.45
MHD digital media controller
MDMC
one of the device classes defined by DLNA

3.1.46
MHD digital media downloader
MDMD
one of the device classes defined by DLNA

3.1.47
MHD digital media player
MDMP
one of the device classes defined by DLNA

3.1.48
MHD digital media server
MDMS
one of the device classes defined by DLNA

3.1.49
MHD digital media uploader
MDMU
one of the device classes defined by DLNA

3.1.50
media class
class by which multimedia objects can be classified according to their purpose in audio-only, audio and video, or images; these options constitute the 3 media classes defined in the DLNA guidelines

3.1.51
mobile handheld device
MHD
one of the device categories defined by DLNA

3.1.52
multimedia home platform
MHP
optional application interface used together with MPEG-2 transmissions

3.1.53
multipurpose Internet mail extension
MIME
standard system for identifying the type of data contained in a file. MIME is an Internet protocol that allows sending binary files across the Internet as attachments to email messages. This includes graphics, photos, sound, video files, and formatted text documents

3.1.54
media management
MM
one of the architecture components of DLNA

3.1.55
MPEG-1 audio layer 3
MP3
coding standard for compression of audio data

3.1.56
MPEG-4 file format
MP4
tool for storing MPEG-4 data in a file

3.1.57
media server 1.0 control point
MSCP
UPnP AV control point that issues actions to an MSD

3.1.58
multiple program transport stream
MPEG
contains two or more distinct programs which have been multiplexed into a single stream formatted to be a compliant MPEG transport stream

3.1.59
national television systems committee
NTSC
standard for broadcast and reception of analogue television signals

3.1.60
phase alternating line
PAL
standard for broadcast and reception of analogue television signals

3.1.61
personal computer
PC
general-purpose computer equipped with a microprocessor and designed to run commercial software (such as a word processor or World Wide Web browser) for an individual user

3.1.62
personal digital assistant
PDA
small electronic device used to store calendar information, contacs, etc.

3.1.63
profile parameter set
collection of compression, encoding, and encapsulation parameters that results in a valid object binary

NOTE Each media format profile defined in these guidelines is identified by its profile ID. Each profile is defined selecting a subset of compression parameters, encoding parameters, and file format (or encapsulation) parameters. The implementer chooses certain parameters to produce a content object binary.

3.1.64
quality of service
QoS
quality of service to provide guarantees on the ability of a network to deliver predictable results

3.1.65
quarter VGA
QVGA
display format used in digital cameras

3.1.66
render
function which reproduces the encoded content binary in a recognizable manner. The reproduction process may adjust the features of the content binary to the output characteristics of the device; for example, an A/V bitstream in high definition may be readjusted into SD resolution for display in standard definition TV

3.1.67
rendering endpoints
content receiver devices with the capability of rendering the content they receive. These devices could play the content at the time of the transfer, right after the transfer has finished, or at a later time after the transfer has finished

NOTE For the purposes of this standard, devices in the following device classes constitute the only known rendering endpoints: DMP, DMR, DMPr, MDMP, MDMD.

3.1.68
red green blue
RGB
colour composition scheme used by AV devices

3.1.69
real time transport protocol
RTP
media transport that provides end-to-end network transport functions for transmitting real-time data, such as AV and provides services such as payload type identification, sequence numbering, time-stamping, and delivery monitoring

3.1.70
standard definition
SD
picture quality at a SDTV level

3.1.71
standard definition television
SDTV
mode of operation of digital television that provides standard quality display, with a vertical resolution display less than 720p and an aspect ration of 4:3, resulting in a viewing experience similar or slightly better than today's analogue television

3.1.72
serving endpoints
content source devices with the capability of making content available to any client device in the home network. In order to make content available to other home devices, content source devices act as UPnP media servers

NOTE For the purposes of this standard, devices in the following device classes constitute the only known serving endpoints: DMS, MDMS. It should be noticed that an uploader device (MDMU) does not constitute a serving endpoint although it acts as a content source device.

3.1.73
service information (in DVB specifications)
SI
system information (in SCTE specifications)

3.1.74
single program transport stream
MPEG transport stream containing a single program

3.1.75
selection information table
SIT
service(s) and event(s) carried by a partial TS

3.1.76
source of an XHTML-Print document
term describing the DLNA entity that creates the XHTML-Print document for the purpose of printing. Devices that include a Printer Controller (+PR1+) can act as the source of XHTML-Print documents. An XHTML-Print document will be pulled by a DMPr from this source entity, or it will be pushed by this source entity to a DMPr.

3.1.77
system or systems
term referring to the encapsulation and multiplexing protocol that allows the delivery of audio, and audio/video streams in the context of media formats. This layer provides rules for identifying individual audio and video components, rules for synchronizing audio and video components, and others

3.1.78
tolerance
term when used as a noun or as a verb indicates that when a particular endpoint (serving or rendering or even an intermediate device) receive data packets, the endpoint must be tolerant of information that it may not understand. A tolerant behaviour implies that the endpoint must be capable of decoding, parsing, and gracefully ignoring information that is not understood

3.1.79
transport alignment position
position in the bitstream defined for transport alignment

3.1.80
transport stream
collection of multiplexed audio, video, and data packets organized in one or more programs (or services) in compliance with the MPEG-2 systems specifications

3.1.81
uploading endpoints
content source devices with the capability of uploading content to certain devices in the home network. In this case, these devices cannot serve to any potential client devices in the network. Instead they transfer content only to those devices capable of receiving uploads. A device that belongs to the MDMU device class, or a device that implements the +UP+ capability constitute uploading endpoints

3.1.82
universal plug and play
UPnP
organization that defines some of the foundation standards for DLNA

3.2 Acronyms

AAC	Advanced Audio Coding
ADTS	Audio Data Transport Stream
AOT	Audio Object Types
ASF1	Advanced System Format
BIFS	Binary Format for Scenes
BP	Baseline Profile
bps	bits per second
CAT	Conditional Access Table
CBR	Constant Bit Rate
CIF	Common Intermediate Format
CRC	Cyclic Redundancy Check
DCP	Device Control Protocol
DDC	Device Discovery and Control
DIDL	Digital Item Declaration Language
DIT	Discontinuity Information Table
DPB	Decoded Picture Buffer
DTS	Decoding Time Stamp
DVD-VR	DVD Video Recording
EDTV	Enhanced Definition Television
ES	Elementary Streams
EU	European Union
fps	frames per second
GOP	Group Of Pictures
HEAAC	High Efficiency Advanced Audio Coding
HighMAT1	High-Performance Media Access Technology
HTTP	HyperText Transfer Protocol
ID	Identifier
IP	Internet Protocol
IPR	Intellectual Property Rights
IRD	Integrated Receiver Decoder
ISMA	Internet Streaming Media Alliance
Kbps	Kilobits per second

KO	Korea
LFE	Low Frequency Effects” or “Low Frequency Enhancement
LRG	Large
LTP	Long Term Prediction
Mbps	Megabits per second
MF	Media Format
MPEG	Moving Picture Experts Group
MPTS	Multiple-Program Transport Streams
MULT5	Multiple channels, up to 5.1 channels
MULT7	Multiple channels, up to 7.1 channels
NA	North America
PAT	Program Association Table
PCR	Program Clock Reference
PDL	Page Description Language
PES	Packetized Elementary Streams
PMT	Program Map Table
PNG	Portable Network Graphics
PS	Program Stream
PSI	Program Specific Information
PSM	Program Stream Map
PTS	Presentation Time Stamp
QCIF	Quarter Common Intermediate Format"
RDI	Real-time Data Information
SBR	Spectral Band Replication
SCR	System Clock Reference
SCTE	Society of Cable Telecommunications Engineers
SM	Small
SPTS	Single Program Transport Stream
STB	Set-Top Box
STC	System Time Clock
TS	Transport Stream
TTS	Timestamped Transport Stream
URI	Uniform Resource Identifier
URN	Uniform Resource Name
UTF	Unicode Transformation Format
VBI	Vertical Blanking Interval
VBR	Variable Bit Rate
VGA	Video Graphics Array
VOB	Video Object
VOP	Video Object Plane
W3C	World Wide Web Consortium
WM	Windows Media
WMA	Windows Media Audio

WMV	Windows Media Video
WMV9	Windows Media Version 9 Series
XHTML	XML Hypertext Markup Language
XML	Extensible Markup Language

4 Guideline terminology and conventions

4.1 Guideline compliance classifiers

Reference [40] [1] provides a description of terminology conventions used in all IETF RFC documents. The terminology and conventions used by these guidelines are adapted from this reference. The details of each guideline will carry a compliance classifier from the following set.

[**M**]ust, Required, Must: This is the minimum set of requirements that will ensure interoperability and/or robust operation between devices. All devices are expected to comply with these requirements when expressed in unconditional form. A conditional requirement expressed in the form, "If X, then Y must be implemented", means that the requirement "Y" must be met when the conditional aspect "X" applies to a given implementation. In this case must has the same meaning as shall in ISO/IEC documents.

[**S**]hould, Recommended: Recommended items are optional items that are strongly recommended for inclusion in products. The difference between "recommended" items and "optional" items, below, is one of priority. When considering features for inclusion in a product, recommended items should be included first.

[**O**]ptional, May: Optional items are suggestions for features that will enhance the user experience or are offered as a less preferred choice relative to another recommended feature. If optional features are included, they should comply with the requirement to ensure interoperability with other implementations.

E[**X**]pressly forbidden: This term means that an item must not be incorporated in a product implementation.

4.2 Standard or specification usage classifiers

When specifying guideline details, it is often useful to reiterate or clarify certain aspects of a standard or specification that are often violated or misunderstood. Furthermore, there may be guideline requirements that intentionally contradict or restrict implementation of certain aspects of a standard or specification in order to ensure interoperability between digital home devices. The following classifiers are used in the guidelines to indicate the relationship of a specific guideline requirement to a source standard or specification.

[**A**]dding: A guideline requirement that adds to or supplements a standard or specification to enhance interoperability.

[**C**]larifying: A guideline requirement that addresses vague or ambiguous aspects of a standard or specification.

[**F**]ixing: A guideline requirement that intentionally supersedes and fixes aspects of a standard or specification that is incorrect and would otherwise provide a poor user experience or prevent device interoperability.

---

[1] Figures in square brackets refer to the Bibliography.

[**L**]imiting: A guideline requirement that narrows or specifies an exact behavior in areas where a standard or specification provides for greater degrees of latitude in implementation.

[**R**]epeating: A guideline requirement that repeats what is already in a standard or specification because of observed and repeated problems with implementations. Whenever a guideline requirement with this usage classifier seems to be in conflict with the actual standard, the standard prevails over the guideline requirement.

4.3 Guideline font usage conventions

The following font usage conventions are used within the guidelines to provide additional clarity:

- Links to reference citations are indicated as document number or [Bibliography number]. For example ISO/IEC 14496-3 AMD.1, ISO/IEC 13818-3 or [11].
- Special terms may be *italicized*. Sometimes a guideline requirement will define a term for use within that guideline and the term will be *italicized*.
- Profile identifiers are always capitalized and sometimes they are in bold, such as **MPEG_PS_NTSC**

4.4 Layout for guidelines

This subclause covers the guidelines that enable vendors to build interoperable products. Devices built to the DLNA home networked device interoperability guidelines will be able to manage, transfer, and play personal media over a home network.

These guidelines are in a section/subsection format as shown in Figure 1.

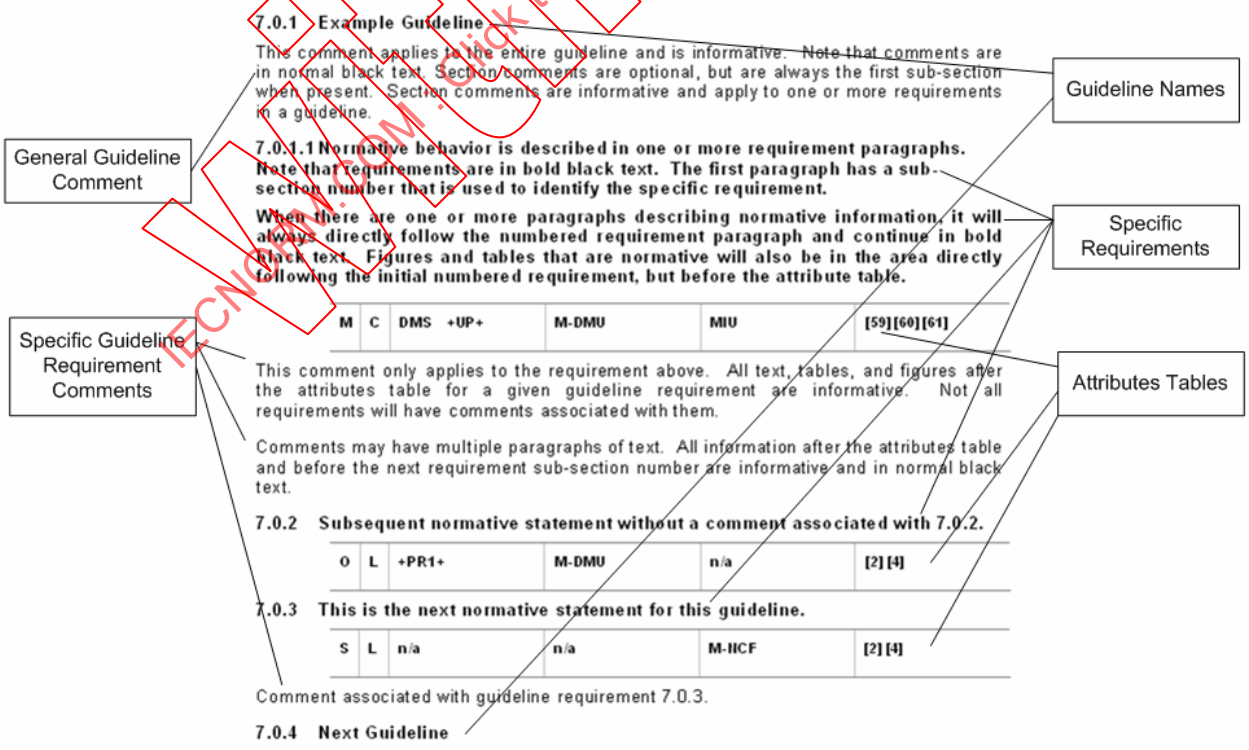

Figure 1 – Guideline layout and definitions

The following list describes the content of Figure 1.

a) Name: A unique label for the guideline. The label is preceded with a sequentially increasing number to allow easy lookup.

b) Requirements: The actual description of a guideline. A guideline is preceded with a sequentially increasing number to allow easy lookup. A given guideline may consist of several subrequirements that are also numbered.

c) Attribute table: A summary of the essential attributes of a requirement. The table is a single row with the following definitions for the columns:

   – compliance classifier: M/S/O (see 6.1 for the definition of guideline compliance classifiers);

   – the specification usage classifier: A/C/F/L/R: for the guideline (see 6.2 for the definition of specification usage classifiers);

   – HND device classes with device capabilities (see Table 2 and Table 3 for definitions). Device capabilities were originally defined within the context of the HND device category and are listed in the HND column of the attribute table. Device capabilities can also apply equally to the MHD device category but have been omitted from the MHD column in the attribute table to provide for better readability;

   – MHD device classes(see Table 4 for definitions);

   – HID device classes(see Table 5 for definitions);

   – ref #: Standards that are referenced by the guideline. Standards citations are by number and are defined in Clause 2.

   Guideline attribute columns that do not have a value have the designation "n/a" (not applicable). A visual map of possible values for the attribute tables is given in Figure 2.

d) Supplementary information about a guideline such as a justification for the guideline, the specific interoperability issue that is addressed, etc.

It should be noted that many guidelines do not explicitly list MIU since guidelines which apply to a device class also apply to the virtualized variants.

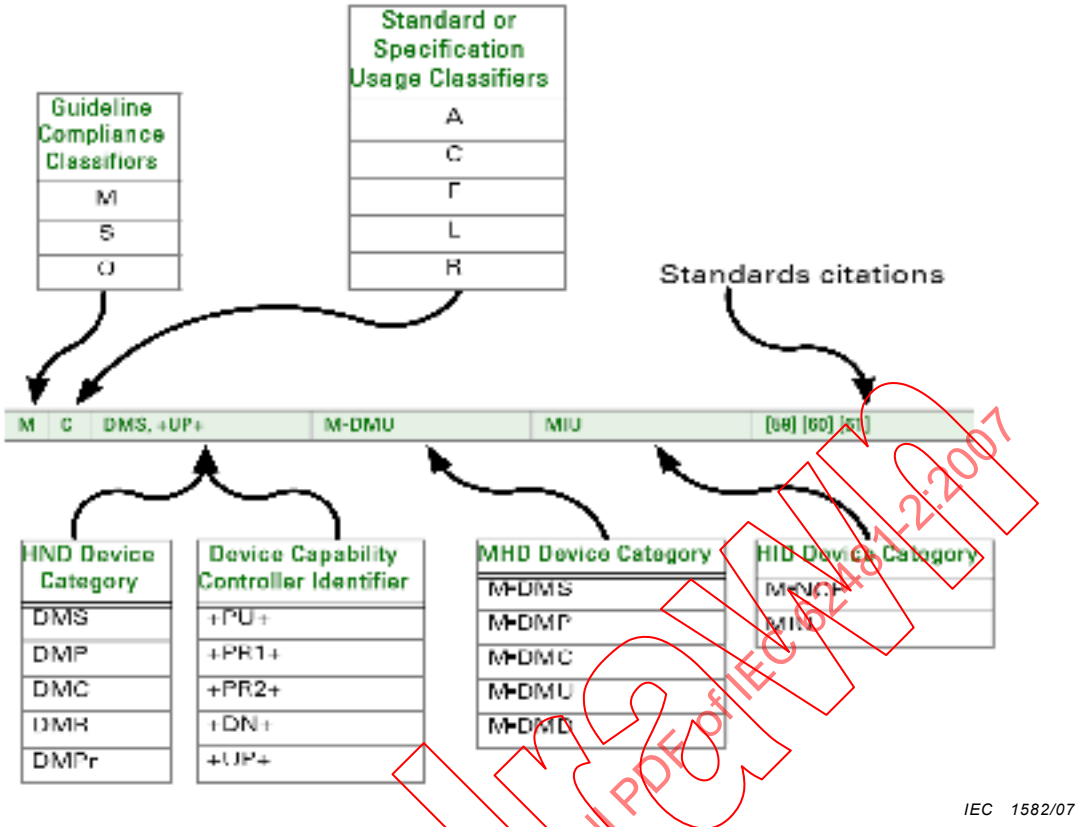

Figure 2 – Visual map of possible values for the attribute tables

Many of the guidelines in this standard define specific media format profiles. Each profile is composed of parameters like bit rate, sampling rate, resolution, etc. Each parameter admits one or more options recognized sometimes by textual description and other times by the use of a list of options signalled with the "➢" entry indicator. For example, a guideline entry may have sampling rates defined as follows:

- ➢ 44,1 kHz
- ➢ 48 kHz

In this example, these two values define two different encoding parameters. Servers choose to support one or both, but players have to support both.

5 Compendium of media format profiles

5.1 General

This clause provides a comprehensive list of all media format profiles defined for this version of the media format guidelines. The description includes the profile ID values as well as a brief summary of features and usage scenarios.

Content objects exchanged according to the DLNA home network device interoperability guidelines belong to one of the following media classes: image, audio, and AV. Each media class typically includes multiple formats, and each format can be instantiated according to multiple profiles. This standard defines the particular media format profiles based on strict selection of format parameters and features. Each media class typically includes multiple formats, and each format can be instantiated according to multiple media format profiles. This standard also contains media format profiles for media collections and printer XHTML documents. These profiles do not map into any of these media classes.

This clause contains a set of tables which contain a summary of the various media format profile definitions contained in this standard. Each table has the header shown below in Figure 3.

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Figure 3 – Profile summary table header

- **Profile ID**: Profiles are identified by an alphanumeric token that is known as the profile ID. This parameter is used by DLNA specifications and implementations whenever devices need to advertise or reference a content item of a particular profile. This clause provides a comprehensive list of all media format profiles, it describes their main features, and explains possible usage scenarios. Subsequent clauses of this standard describe the strict specifications that define each of the profiles.
- **Description**: A description of the profile ID.
- **MIME type**: The MIME type to be utilized along with the DLNA profile ID. It should be noted that the MIME types defined for each of the profiles are always case-insensitive.
- **Label**: A categorization label which helps identify related profile IDs.
- **Usage scenarios:** The rightmost column in the profile tables presented below describes existing and developing applicability scenarios for each of the DLNA media format profiles. The description in this column should be considered complementary information on each profile. It is not intended to be as an exhaustive list of all potential usage or applicability scenarios. In fact, many other usage scenarios may become applicable in the near future due to the emergence of new standards, new products, and new trends. In this column, the text in **bold** indicates applications or services whereas the text in *italics* indicates devices.

5.2 Categorization labels

The tables for DLNA media format profiles presented in this clause include a column called "label." Table 1 defines the meaning of these labels. Three audio labels, two image labels, and five video labels have been defined to provide guidance on the expected complexity level of each of the defined format profiles. The audio labels differentiate between single-channel, 2-channel and multi-channel scenarios. The video labels differentiate in terms of resolution; ranging from QCIF to high-definition (HD) scenarios. The image labels differentiate in terms of the purpose of usage. For a given audio or AV profile, the label indicates the most complex scenario. Readers should note that any given profile typically defines a range of scenarios, of which only the most complex is typically indicated by the label.

Table 1 – Categorization labels

Label name	Definition
mono	Single channel audio application scenarios (speech)
2 ch	2-channel audio application scenarios
multi	Multi-channel audio application scenarios
QCIF15	Low-resolution A/V application scenarios
CIF15	Medium-resolution A/V application scenarios with lower frame rates

CIF30	Medium-resolution A/V application scenarios
SD	Standard resolution A/V application scenarios
HD	High-resolution A/V application scenarios
picture	Image objects of different sizes used as content items
icon	Image objects of different sizes used only for icon or thumbnail representations

Table 2 – JPEG profiles

Profile ID	Description	MIME type	Label	Usage scenarios
JPEG_SM	Profile for image media class content of small resolution	image/jpeg	picture	A profile used by multiple types of devices (*cameras, cell phones, PCs)* to represent small images in compressed format
JPEG_MED	Profile for image media class content of medium resolution	image/jpeg	picture	A profile used by multiple types of devices (*cameras, cell phones, PCs*) to represent medium-size images in compressed format
JPEG_LRG	Profile for image media class content of high resolution	image/jpeg	picture	A profile used by multiple types of devices (*cameras, cell phones, PCs*) to represent large images in compressed format
JPEG_TN	Profile for image thumbnails	image/jpeg	icon	**An image profile for images in thumbnail resolutions used to provide a compact visual representation (a companion image) of other media objects (images, audio, AV), using JPEG encoding. This profile is used by multiple types of devices ()**
JPEG_SM_ICO	Profile for small icons	image/jpeg	icon	A profile used to represent small icons using JPEG image coding. This icon profile is used by multiple types of devices (*cameras, cell phones, PCs*) for UPnP device descriptions
JPEG_LRG_ICO	Profile for large icons	image/jpeg	icon	A profile used to represent large icons using JPEG image coding. This icon profile is used by multiple types of devices (*cameras, cell phones, PCs*) for UPnP device descriptions

Table 3 – Image class – PNG profiles

Profile ID	Description	MIME type	Label	Usage scenarios
PNG_TN	Profile for image thumbnails	image/png	icon	An image profile for images in thumbnail resolutions used to provide a compact visual representation (a companion image) of other media objects (images, audio, AV), using PNG encoding. This profile is used by multiple types of devices (*cameras, cell phones, PCs*)
PNG_SM_ICO	Profile for small icons	image/png	icon	A profile used to represent small icons using PNG image coding. This icon profile is used by multiple types of devices (*cameras, cell phones, PCs*) for UPnP device descriptions
PNG_LRG_ICO	Profile for large icons	image/png	icon	A profile used to represent large icons using PNG image coding. This icon profile is used by multiple types of devices (*cameras, cell phones, PCs*) for UPnP device descriptions
PNG_LRG	Profile for image class content of high resolution	image/png	picture	A profile used by multiple types of devices (*cameras, cell phones, PCs*) to represent large images in compressed format

Table 4 – Audio class – AC-3 profiles

Profile ID	Description	MIME type	Label	Usage scenarios
AC3	Profile for audio media class content	audio/vnd.dolby.dd-raw	2-ch multi	A profile used for audio content, including **multichannel audio content**. A related format profile is used in ***DVD-Audio*** for backward compatible multichannel audio content

5.3 Audio class – AMR profiles

Table 5 – Audio class – AMR profiles

Profile ID	Description	MIME type	Label	Usage scenarios
AMR_3GPP	Profile for audio media class content	audio/3gpp audio/mp4	mono	A profile utilized for audio capture and exchanging speech content in streaming and multimedia messaging **services in 3GPP**. This profile is supported by *Cellular Phones* and *PDAs*
AMR_WBplus	Profile for audio media class content	audio/3gpp	2-ch	This profile is used for **3GPP services**. This profile is supported by *Cellular Phones*. A related format profile is recommended in 3GPP and optional in DVB

5.4 Audio class – ATRAC3plus profiles

Table 6 – Audio class – ATRAC3plus profiles

Profile ID	Description	MIME type	Label	Usage scenarios
ATRAC3plus	Profile for audio media class content	audio/x-sony-oma	2-ch multi	This profile is supported by *Personal Audio Players, Multichannel Audio Systems*, and *PCs*

Table 7 – Audio class – LPCM profiles

Profile ID	Description	MIME type	Label	Usage scenarios
LPCM	Profile for audio media class content	audio/L16	2-ch	A profile used for creating recordings of **radio broadcasts** and **user-created audio content**. This profile is supported by *CD players, audio systems*, and *PCs* NOTE According to 8.4.3, the use of this MIME type requires additional parameters.

Table 8 – Audio class – MP3 profiles

Profile ID	Description	MIME type	Label	Usage scenarios
MP3	Profile for audio media class content	audio/mpeg	2-ch	A profile used for creating recordings of music and voice for storage on devices and for Internet transmission. This profile is supported by *Personal Audio Players, Cellular Phones*, and *PCs*
MP3X	Profile for MP3 audio media class content with extensions for lower sampling rates and bit rates.	audio/mpeg	2-ch	A profile used for creating recordings of **radio broadcasts** and **ripping CD audio content**, and **Internet radio broadcasting**. This profile is supported by *personal audio players, cellular phones*, and *PCs*

Table 9 – Audio class – MPEG-4 profiles

Profile ID	Description	MIME type	Label	Usage scenarios
AAC_ADTS	Profile for audio media class content	audio/vnd.dlna.adts	2-ch	A profile used for creating recordings of **radio broadcasts** and **user-created audio content** and for **digital radio broadcasting**. This profile is supported by *personal audio players, cellular phones*, and *PCs*. This Profile is used by ***ARIB radio***
AAC_ADTS_320	Profile for audio media class content	audio/vnd.dlna.adts	2-ch	A profile used for creating recordings of **radio broadcasts** and **user-created audio content** and for **digital radio broadcasting**. This profile is supported by *personal audio players, cellular phones*, and *PCs*
AAC_ISO	Profile for audio media class content	audio/mp4 audio/3gpp	2-ch	A profile used for creating recordings of **radio broadcasts** and **user-created audio content** and for **digital radio broadcasting**. This profile is supported by *personal audio players, cellular phones*, and *PCs*. A related format profile is used in ***iTunes*** and is required in ***ISMA***. A related format profile is optional in ***DVB*** and ***3GPP***
AAC_ISO_320	Profile for audio media class content	audio/mp4 audio/3gpp	2-ch	A profile used for creating recordings of **radio broadcasts** and **user-created audio content** and for **digital radio broadcasting**. This profile is supported by *personal audio players, cellular phones*, and *PCs*

Table 9 *(continued)*

Profile ID	Description	MIME type	Label	Usage scenarios
AAC_LTP_ISO	Profile for audio media class content. In the case of the AAC LTP profiles, both the ISO file formats and the ADTS format are supported by the same profile.	audio/mp4 audio/3gpp audio/vnd.dlna.adts	2-ch	A Profile used for creating recording of **radio broadcasts**, **the audio component of TV broadcast**, and **personal content**. This profile is supported by *cellular phones*. A related format profile is optional in 3GPP
AAC_LTP_MULT5_ISO	Profile for audio media class content with up to 5.1 channels	audio/mp4 audio/3gpp audio/vnd.dlna.adts	multi	A Profile used for creating recording of **radio broadcasts**, **the audio component of TV broadcast**, and **personal content**. This profile is supported by *personal audio players*, *cellular phones*, and *PCs*
AAC_LTP_MULT7_ISO	Profile for audio media class content with up to 7.1 channels	audio/mp4 audio/3gpp audio/vnd.dlna.adts	multi	A profile used for creating recording of **radio broadcasts**, **the audio component of TV broadcast**, and **personal content**. This profile is supported by *cellular phones*
AAC_MULT5_ADTS	Profile for audio media class content with up to 5.1 channels	audio/vnd.dlna.adts	multi	A profile used for creating recording of **radio broadcasts**, and **the audio component of TV broadcast**. This profile is supported by *personal audio players* and *PCs*
AAC_MULT5_ISO	Profile for audio media class content with up to 5.1 channels	audio/mp4 audio/3gpp	multi	A profile used for creating multichannel recordings of audio. It is incorporated by reference in DLNA AV profiles. A related format profile is expected to be required in ***ISMA***
HEAAC_L2_ADTS	Profile for audio media class content	audio/vnd.dlna.adts	2-ch	A profile used for creating recordings of **radio broadcasts** and **user-created audio content** and for **digital radio broadcasting**. This profile is supported by *personal audio players, cellular phones*, and *PCs*
HEAAC_L2_ISO	Profile for audio media class content	audio/mp4 audio/3gpp	2-ch	A profile used for creating recordings of **Radio Broadcasts** and **User Created Audio Content** and for **Digital Radio Broadcasting**. This Profile is *supported by Personal Audio Players, Cellular Phones*, and *PCs*
HEAAC_L3_ADTS	Profile for audio media class content	audio/vnd.dlna.adts	2-ch	A profile used for creating recordings of **radio broadcasts** and **user-created audio content** and for **digital radio broadcasting**. This profile is supported by *personal audio players, cellular phones,* and *PCs*
HEAAC_L3_ISO	Profile for audio media class content	audio/mp4 audio/3gpp	2-ch	A profile utilized in **digital radio broadcasting**. This profile is used in terrestrial and satellite broadcast digital radio. A related format profile is expected to be optional in ***3GPP***, ***ISMA***, and ***DVB***
HEAAC_MULT5_ADTS	Profile for audio media class content with up to 5.1 channels	audio/vnd.dlna.adts	multi	A profile utilized for creating **multichannel music tracks from AV content**. A related format profile is expected to be used in ***DVD-A***
HEAAC_MULT5_ISO	Profile for audio media class content with up to 5.1 channels	audio/mp4 audio/3gpp	multi	A profile utilized for creating **multichannel music tracks from AV content**. A related format profile is expected to be optional in ***3GPP***, ***ISMA***, and ***DVB***

Table 9 *(continued)*

Profile ID	Description	MIME type	Label	Usage scenarios
HEAAC_L2_ADTS_320	Profile for audio media class content	audio/vnd.dlna.adts	2-ch	A profile used for creating recordings of **radio broadcasts** and **user-created audio content** and for **digital radio broadcasting**. This profile is supported by *personal audio players, cellular phones*, and *PCs*
HEAAC_L2_ISO_320	Profile for audio media class content	audio/mp4 audio/3gpp	2-ch	A profile used for creating recordings of **radio broadcasts** and **user-created audio content** and for **digital radio broadcasting**. This profile is supported by *personal audio players, cellular phones*, and *PCs*
BSAC_ISO	Profile for audio media class content	audio/mp4 audio/3gpp	2-ch	A profile used for creating recording of **radio broadcasts**, **the audio component of TV broadcast**, and **personal content**. This profile is supported by *personal audio players, cellular phones* and *PCs*
BSAC_MULT5_ISO	Profile for audio media class content with up to 5.1 channels	audio/mp4 audio/3gpp	multi	A profile used for creating recording of **radio broadcasts**, **the audio component of TV broadcast**, and **personal content**. This profile is supported by *personal audio players, cellular phones*, and *PCs*

Table 10 – Audio class – WMA profiles

Profile ID	Description	MIME type	Label	Usage scenarios
WMABASE	WMA content (bit rates less than 193 Kbps)	audio/x-ms-wma	2-ch	A profile used for **user-created audio content**, **Internet music services**, and **Internet radio**. This profile is supported by *personal audio players* and *PCs*
WMAFULL	WMA content	audio/x-ms-wma	2-ch	A profile used for **user-created audio content**, **Internet music services**, and **Internet radio**. This profile is supported by *personal audio players* and *PCs*
WMAPRO	WMA professional version	audio/x-ms-wma	2-ch multi	A profile used by **user-created audio content**, and **Internet music services**. This profile is supported by *multichannel audio systems*, and *PCs*

Table 11 – AV Class – MPEG-1 profiles

Profile ID	Description	MIME type	Label	Usage scenarios
MPEG1	MPEG-1 video with 2 channel MPEG-1 Layer2 audio encapsulated in MPEG-1 system	video/mpeg	CIF30	A profile utilized to create recordings of **broadcast TV** and **personal content**. This profile is supported by *TVs, cellular phones, PDAs, portable video players*, and *PCs*

Table 12 – AV Class – MPEG-2 profiles

Profile ID	Description	MIME type	Label	Usage scenarios
MPEG_PS_NTSC	Profile for NTSC-formatted AV class media	video/mpeg	SD	A profile used to create recordings of **broadcast TV** and for **content storage in DVDs**. This profile is supported by *DVD players* and *PCs*
MPEG_PS_NTSC_XAC3	Profile for NTSC-formatted AV class media	video/mpeg	SD	A profile used to create recordings of **broadcast**. This profile is supported by *PCs*
MPEG_PS_PAL	Profile for PAL-formatted AV class media	video/mpeg	SD	A profile used to create recordings of **broadcast TV** and for **content storage in DVDs**. This profile is supported by *DVD players* and *PCs*
MPEG_PS_PAL_XAC3	Profile for PAL-formatted AV class media	video/mpeg	SD	A profile used to create recordings of **broadcast TV**. This profile is supported by *PCs*
MPEG_TS_SD_NA	North America region profile for standard definition AV class utilizing a DLNA transport packet with zero value timestamp	video/vnd.dlna.mpeg-tts	SD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_SD_NA_T	North America region profile for standard definition AV class utilizing a DLNA transport packet with a valid timestamp	video/vnd.dlna.mpeg-tts	SD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_SD_NA_ISO	North America region profile for standard definition AV class utilizing a DLNA transport packet without a timestamp field	video/mpeg	SD	A profile deived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_HD_NA	North America region profile for high-definition AV class utilizing a DLNA transport packet with zero value timestamp	video/vnd.dlna.mpeg-tts	HD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_HD_NA_T	North America region profile for high-definition AV class utilizing a DLNA transport packet with a valid timestamp	video/vnd.dlna.mpeg-tts	HD	A profile derived from **digital television broadcasting**, and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_HD_NA_ISO	North America region profile for high-definition AV class utilizing a DLNA transport packet without a timestamp field	video/mpeg	HD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_SD_EU	European region profile for standard definition AV class utilizing a DLNA transport packet with zero value timestamp	video/vnd.dlna.mpeg-tts	SD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **DVB (terrestrial, cable, and satellite)** systems. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*

Table 12 *(continued)*

Profile ID	Description	MIME type	Label	Usage scenarios
MPEG_TS_SD_EU_T	European region profile for standard definition AV class utilizing a DLNA transport packet with a valid timestamp	video/vnd.dlna.mpeg-tts	SD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **DVB (terrestrial, cable, and satellite)** systems. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_SD_EU_ISO	European region profile for standard definition AV class utilizing a DLNA transport packet without a timestamp field	Video/mpeg	SD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **DVB (terrestrial, cable, and satellite)** systems. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_SD_KO	Korea region profile for standard definition AV utilizing a DLNA transport packet with zero value timestamp	video/vnd.dlna.mpeg-tts	SD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems with extensions for Korea. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_SD_KO_T	Korea region profile for standard definition AV class utilizing a DLNA transport packet with a valid timestamp	video/vnd.dlna.mpeg-tts	SD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems with extensions for Korea. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_SD_KO_ISO	Korea region profile for standard definition AV class utilizing a DLNA transport packet without a timestamp field	video/mpeg	SD	A profile derived from **digital television broadcasting**, and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems with extensions for Korea. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_HD_KO	Korea region profile for high-definition AV class utilizing a DLNA transport packet with zero value timestamp	video/vnd.dlna.mpeg-tts	HD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems with extensions for Korea. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_HD_KO_T	Korea region profile for high-definition AV class utilizing a DLNA transport packet with a valid timestamp	video/vnd.dlna.mpeg-tts	HD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems with extensions for Korea. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_HD_KO_ISO	Korea region profile for high-definition AV class utilizing a DLNA transport packet without a timestamp field	video/mpeg	HD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems with extensions for Korea. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_HD_KO_XAC3	Korea region profile for transcoded high-definition AV class media with a zero value timestamp	video/vnd.dlna.mpeg-tts	HD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems with extensions for Korea. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*

Table 12 *(continued)*

Profile ID	Description	MIME type	Label	Usage scenarios
MPEG_TS_HD_KO _XAC3_T	Korea region profile for transcoded high-definition AV class media with a valid timestamp	video/vnd.dlna.mpeg-tts	HD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems with extensions for Korea. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_HD_KO_XAC3_ISO	Korea region profile for transcoded high-definition AV class media without a timestamp field	video/mpeg	HD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems with extensions for Korea. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_HD_NA_XAC3	North America region profile for transcoded high-definition AV class media with a zero value timestamp	video/vnd.dlna.mpeg-tts	HD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_HD_NA _XAC3_T	North America region profile for transcoded high-definition AV class media with a valid timestamp	video/vnd.dlna.mpeg-tts	HD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_HD_NA_XAC3_ISO	North America region profile for transcoded high-definition AV class media without a timestamp field	video/mpeg	HD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_SD_KO_XAC3	Korea region profile for standard definition AV class media with a zero value timestamp	video/vnd.dlna.mpeg-tts	SD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems with extensions for Korea. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_SD_KO _XAC3_T	Korea region profile for standard definition AV class media with a valid timestamp	video/vnd.dlna.mpeg-tts	SD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems with extensions for Korea. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_SD_KO_XAC3_ISO	Korea region profile for standard definition AV class media without a timestamp field	video/mpeg	SD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems with extensions for Korea. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_SD_NA_XAC3	North America region profile for standard definition AV class media with a zero value timestamp	video/vnd.dlna.mpeg-tts	SD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*

Table 12 *(continued)*

Profile ID	Description	MIME type	Label	Usage scenarios
MPEG_TS_SD_NA _XAC3_T	North America region profile for standard definition AV class media with a valid timestamp	video/vnd.dlna.mpeg-tts	SD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_SD_NA_XAC3_ISO	North America region profile for standard definition AV class media without a timestamp field	video/mpeg	SD	A profile derived from **digital television broadcasting** and also used for **storing digital video streams**. This profile applies to **ATSC (terrestrial)** and **SCTE (cable)** systems. It is supported by *DTVs, STBs,* and *PCs with DTV tuner cards*
MPEG_TS_MP_LL_AAC	MPEG-2 main profile at low level with AAC LC audio encapsulated in MPEG-2 TS with zero value timestamp	video/vnd.dlna.mpeg-tts	CIF30	A profile used for **limited distribution of DTV broadcast content**. This profile may be supported by *cellular phones* and *PDAs*
MPEG_TS_MP_LL_AAC_T	MPEG-2 main profile at low level with AAC LC audio encapsulated in MPEG-2 TS with valid timestamp	video/vnd.dlna.mpeg-tts	CIF30	A profile used for **limited distribution of DTV broadcast content**. This profile may be supported by *cellular phones* and *PDAs*
MPEG_TS_MP_LL_AAC_ISO	MPEG-2 main profile at low level with AAC LC audio encapsulated in MPEG-2 TS without a timestamp field	video/mpeg	CIF30	A profile used for **limited distribution of DTV broadcast content**. This profile may be supported by *cellular phones* and *PDAs*
MPEG_ES_PAL	Profile signalling ES encapsulation for transport of MPEG_PS_PAL over RTP	video/mpeg	SD	A profile derived from content that exists as recordings of **broadcast TV** and from **content stored in DVDs**. This profile is supported by DVD players and *PCs*
MPEG_ES_NTSC	Profile signalling ES encapsulation for transport of MPEG_PS_NTSC over RTP	video/mpeg	SD	A profile derived from content that exists as recordings of **broadcast TV** and from **content stored in DVDs**. This profile is supported by DVD players and *PCs*
MPEG_ES_PAL_XAC3	Profile signalling ES encapsulation for transport of MPEG_PS_PAL_XAC3 over RTP	video/mpeg	SD	A profile derived from content that exists as recordings of **broadcast TV**. This profile is supported by *PCs*
MPEG_ES_NTSC_XAC3	Profile signalling ES encapsulation for transport of MPEG_PS_NTSC_XAC3 over RTP	video/mpeg	SD	A profile derived from content that exists as recordings of **broadcast TV**. This profile is supported by *PCs*

Table 13 – AV class – MPEG-4 Part 2 profiles

Profile ID	Description	MIME type	Label	Usage scenarios
MPEG4_P2_MP4_SP_AAC	MPEG-4 Part 2 simple profile with AAC LC audio, encapsulated in MP4	video/mp4	CIF30	A profile utilized to create recordings of **broadcast TV** and **personal content**. This profile is supported by *cellular phones*, *PDAs*, *portable video players*, and *PCs*. A subset of this profile is used by **ISMA** (Profile 0)
MPEG4_P2_MP4_SP_HEAAC	MPEG-4 Par t2 simple profile with HE AAC audio, encapsulated in MP4	video/mp4	CIF30	A profile utilized to create recordings of **broadcast TV** and **personal content**. This profile is supported by *cellular phones*, *PDAs*, *portable video players*, and *PCs*
MPEG4_P2_MP4_SP_ATRAC3plus	MPEG-4 Part 2 simple profile with ATRAC3plus audio, encapsulated in MP4	video/mp4	CIF30	A profile utilized to create recordings of **broadcast TV** and **personal content**. This profile is supported by *cellular phones*, *PDAs*, *portable video players*, and *PCs*
MPEG4_P2_MP4_SP_AAC_LTP	MPEG-4 Part 2 simple profile with AAC LTP audio encapsulated in MP4	video/mp4	CIF30	A profile utilized to create recordings of **personal content with a mobile recording device**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
MPEG4_P2_MP4_SP_L2_AAC	MPEG-4 Part 2 simple profile Level 2 with AAC audio encapsulated in MP4	video/mp4	CIF15	A profile utilized for **multimedia capture**. This profile may be supported by *cellular phones* and *PDAs*
MPEG4_P2_MP4_SP_L2_AMR	MPEG-4 Part 2 simple profile Level 2 with AMR audio encapsulated in MP4	video/mp4	CIF15	A profile utilized for **multimedia capture**. This profile may be supported by *cellular phones* and *PDAs*
MPEG4_P2_TS_SP_AAC	MPEG-4 Part 2 simple profile with AAC LC audio encapsulated in MPEG-2-TS with a zero TTS	video/vnd.dlna.mpeg-tts	CIF30	
MPEG4_P2_TS_SP_AAC_T	MPEG-4 Part 2 simple profile with AAC LC audio encapsulated in MPEG-2-TS with a valid TTS	video/vnd.dlna.mpeg-tts	CIF30	
MPEG4_P2_TS_SP_AAC_ISO	MPEG-4 Part 2 simple profile with AAC LC audio encapsulated in MPEG-2-TS without a timestamp field	video/mpeg	CIF30	
MPEG4_P2_TS_SP_MPEG1_L3	MPEG-4 Part 2 simple profile with MPEG-1 Layer 3 audio encapsulated in MPEG-2-TS with a zero TTS	video/vnd.dlna.mpeg-tts	CIF30	A profile utilized to **transcode existing video content into lower spatial resolutions**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
MPEG4_P2_TS_SP_MPEG1_L3_T	MPEG-4 Part 2 simple profile with MPEG-1 Layer 3 audio encapsulated in MPEG-2-TS with a valid TTS	video/vnd.dlna.mpeg-tts	CIF30	A profile utilized to **transcode existing video content into lower spatial resolutions**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
MPEG4_P2_TS_SP_MPEG1_L3_ISO	MPEG-4 Part2 simple profile with MPEG-1 Layer 3 audio encapsulated in MPEG-2-TS without a timestamp field	video/mpeg	CIF30	A profile utilized to **transcode existing video content into lower spatial resolutions**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*

Table 13 *(continued)*

Profile ID	Description	MIME type	Label	Usage scenarios
MPEG4_P2_TS_SP_AC3	MPEG-4 Part 2 simple profile with AC3 multi-channel audio encapsulated in MPEG-2-TS with a zero TTS.	video/vnd.dlna.mpeg-tts	CIF30	A profile utilized to **transcode existing video content into lower spatial resolutions**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
MPEG4_P2_TS_SP_AC3_T	MPEG-4 Part 2 simple profile with AC3 multi-channel audio encapsulated in MPEG-2-TS with a valid TTS	video/vnd.dlna.mpeg-tts	CIF30	A profile utilized to **transcode existing video content into lower spatial resolutions**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
MPEG4_P2_TS_SP_AC3_ISO	MPEG-4 Part2 simple profile with AC3 multi-channel audio encapsulated in MPEG-2-TS without a timestamp field	video/mpeg	CIF30	A profile utilized to **transcode existing video content into lower spatial resolutions**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
MPEG4_P2_TS_SP_MPEG2_L2	MPEG-4 Part 2 simple profile with MPEG-1/2 Layer1/2 multi-channel audio encapsulated in MPEG-2-TS with a zero TTS	video/vnd.dlna.mpeg-tts	CIF30	A profile utilized to **transcode existing video content into lower spatial resolutions**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
MPEG4_P2_TS_SP_MPEG2_L2_T	MPEG-4 Part 2 simple Profile with MPEG-1/2 Layer 1/2 multi-channel audio encapsulated in MPEG-2-TS with a valid TTS	video/vnd.dlna.mpeg-tts	CIF30	A profile utilized to **transcode existing video content into lower spatial resolutions**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
MPEG4_P2_TS_SP_MPEG2_L2_ISO	MPEG-4 Part 2 simple profile with MPEG-1/2 Layer 1/2 multi-channel audio encapsulated in MPEG-2-TS without a timestamp field	video/mpeg	CIF30	A profile utilized to **transcode existing video content into lower spatial resolutions**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
MPEG4_P2_ASF_SP_G726	MPEG-4 Part 2 simple profile with G.726 audio encapsulated in ASF	video/x-ms-asf	CIF30	A Profile utilized to create recordings of **broadcast TV** and **personal sontent**. This Profile is supported by *cellular phones*, *PDAs*, *portable video players*, and *PCs*
MPEG4_P2_MP4_SP_VGA_AAC	MPEG-4 Part 2 simple profile Level 3+ with AAC audio encapsulated in MP4	video/mp4	SD	A profile utilized for **multimedia capture**. This profile may be supported by *cellular phones* and *PDAs*
MPEG4_P2_MP4_SP_VGA_HEAAC	MPEG-4 Part 2 simple profile Level 3+ with HEAAC audio encapsulated in MP4	video/mp4	SD	A profile utilized for **multimedia capture**. This profile may be supported by *cellular phones* and *PDAs*
MPEG4_P2_MP4_ASP_AAC	MPEG-4 Part 2 advanced simple profile with AAC LC encapsulated in MP4.	video/mp4	SD	A profile utilized to create recordings of **broadcast TV** and **personal content**. This profile is supported by *cellular phones*, *PDAs*, *portable video players*, and *PCs*. A subset of this profile is used by ***ISMA*** (Profile 1)
MPEG4_P2_MP4_ASP_HEAAC	MPEG-4 Part 2 advanced simple profile with HE AAC audio encapsulated in MP4	video/mp4	SD	A profile utilized to create recordings of **broadcast TV** and **personal content**. This profile is supported by *TVs*, *cellular phones*, *PDAs*, *portable video players*, and *PCs*
MPEG4_P2_MP4_ASP_HEAAC_MULT5	MPEG-4 Part 2 advanced simple profile with HE AAC multi-channel audio encapsulated in MP4	video/mp4	SD	A profile utilized to create recording of **broadcast TV** and **personal content**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*

Table 13 *(continued)*

Profile ID	Description	MIME type	Label	Usage scenarios
MPEG4_P2_MP4_ASP_ATRAC3plus	MPEG-4 Part 2 advanced simple profile with ATRAC3plus audio encapsulated in MP4	video/mp4	SD	A profile utilized to create recordings of **broadcast TV** and **personal content**. This profile is supported by *TVs*, *cellular phones*, *PDAs*, *portable video players*, and *PCs*
MPEG4_P2_TS_ASP_AAC	MPEG-4 Part 2 advanced simple profile with AAC LC audio encapsulated in MPEG-2-TS with a zero TTS	video/vnd.dlna.mpeg-tts	SD	
MPEG4_P2_TS_ASP_AAC_T	MPEG-4 Part 2 advanced simple profile with AAC LC audio encapsulated in MPEG-2-TS with a valid TTS	video/vnd.dlna.mpeg-tts	SD	
MPEG4_P2_TS_ASP_AAC_ISO	MPEG-4 Part 2 advanced simple profile with AAC LC audio encapsulated in MPEG-2-TS without a timestamp field	video/mpeg	SD	
MPEG4_P2_TS_ASP_MPEG1_L3	MPEG-4 Part 2 advanced simple profile with MPEG-1 Layer3 audio encapsulated in MPEG-2-TS with a zero TTS	video/vnd.dlna.mpeg-tts	SD	
MPEG4_P2_TS_ASP_MPEG1_L3_T	MPEG-4 Part 2 advanced simple profile with MPEG-1 Layer3 audio encapsulated in MPEG-2-TS with a valid TTS	video/vnd.dlna.mpeg-tts	SD	
MPEG4_P2_TS_ASP_MPEG1_L3_ISO	MPEG-4 Part 2 advanced simple profile with MPEG-1 Layer3 audio encapsulated in MPEG-2-TS without a timestamp field	video/mpeg	SD	
MPEG4_P2_TS_ASP_AC3	MPEG-4 Part 2 advanced simple profile with AC3 multi-channel audio encapsulated in MPEG-2-TS with a zero TTS	video/vnd.dlna.mpeg-tts	SD	
MPEG4_P2_TS_ASP_AC3_T	MPEG-4 Part 2 advanced simple profile with AC3 multi-channel audio encapsulated in MPEG-2-TS with a valid TTS	video/vnd.dlna.mpeg-tts	SD	
MPEG4_P2_TS_ASP_AC3_ISO	MPEG-4 Part 2 advanced simple profile with AC3 multi-channel audio encapsulated in MPEG-2-TS without a timestamp field	video/mpeg	SD	

Table 13 *(continued)*

Profile ID	Description	MIME type	Label	Usage scenarios
MPEG4_P2_MP4_ASP_L5_SO_AAC	MPEG-4 Part 2 advanced simple profile up to Level 5 with only simple object with AAC LC audio encapsulated in MP4	video/mp4	SD	A profile utilized to create recordings of **broadcast TV** and **personal content**. This profile is supported by *cellular phones*, *PDAs*, *portable video players*, and *PCs*
MPEG4_P2_MP4_ASP_L5_SO_HEAAC	MPEG-4 Part 2 advanced simple profile up to Level 5 with only simple object with HE AAC audio encapsulated in MP4	video/mp4	SD	A profile utilized to create recordings of **broadcast TV** and **personal content**. This profile is supported by *cellular phones*, *PDAs*, *portable video players*, and *PCs*
MPEG4_P2_MP4_ASP_L5_SO_HEAAC_MULT5	MPEG-4 Part 2 advanced simple profile up to Level 5 with only simple object with HE AAC multi-channel audio encapsulated in MP4	video/mp4	SD	A profile utilized to create recording of **broadcast TV** and **personal content**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*
MPEG4_P2_ASF_ASP_L5_SO_G726	MPEG-4 Part 2 advanced simple profile up to Level 5 with only simple object with G.726 audio encapsulated in ASF	video/x-ms-asf	SD	A profile utilized to create recordings of **broadcast TV** and **personal content**. This profile is supported by *TVs*, *cellular phones*, *PDAs*, *portable video players*, and *PCs*
MPEG4_P2_MP4_ASP_L4_SO_AAC	MPEG-4 Part 2 advanced simple profile up to Level 4 with only simple object with AAC LC audio encapsulated in MP4	video/mp4	CIF30	A profile utilized to create recordings of **broadcast TV** and **personal content**. It is utilized to create recordings with a mobile recording device. This profile is supported by *TVs*, *cellular phones*, *PDAs*, *portable video players*, and *PCs*
MPEG4_P2_MP4_ASP_L4_SO_HEAAC	MPEG-4 Part 2 advanced simple profile up to Level 4 with only simple object with HE AAC audio encapsulated in MP4	video/mp4	CIF30	A profile utilized to create recordings of **broadcast TV** and **personal content**. This profile is supported by *TVs*, *cellular phones*, *PDAs*, *portable video players*, and *PCs*
MPEG4_P2_MP4_ASP_L4_SO_HEAAC_MULT5	MPEG-4 Part 2 advanced simple profile up to Level 4 with only simple object with HE AAC multi-channel audio encapsulated in MP4	video/mp4	CIF30	A profile utilized to create recording of **broadcast TV** and **personal content**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*
MPEG4_P2_ASF_ASP_L4_SO_G726	MPEG4 Part 2 advanced simple profile up to Level 4 with only simple object with G.726 audio encapsulated in ASF	video/x-ms-asf	CIF30	A profile utilized to create recordings of **broadcast TV** and **personal content**. This profile is supported by *TVs*, *cellular phones*, *PDAs*, *portable video players*, and *PCs*
MPEG4_H263_MP4_P0_L10_AAC	H263 profile 0 Level 10 with AAC LC audio encapsulated in MP4	video/3gpp	QCIF15	
MPEG4_H263_MP4_P0_L10_AAC_LTP	H263 profile 0 Level 10 with AAC LTP audio encapsulated in MP4	video/3gpp	QCIF15	A profile utilized to create recordings of **personal content with a mobile recording device**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
MPEG4_H263_3GPP_P0_L10_AMR_WBplus	H263 profile 0 Level 10 with AMR-WB+ audio encapsulated in **3GPP**	video/3gpp	QCIF15	This profile is used for **3GPP services**. This profile is supported by *cellular phones*

Table 13 *(continued)*

Profile ID	Description	MIME type	Label	Usage scenarios
MPEG4_P2_TS_CO_AC3	MPEG-4 Part 2 core profile with AC3 multi-channel audio encapsulated in MPEG-2-TS with a zero TTS	video/vnd.dlna.mpeg-tts	CIF30	This profile is utilized in **broadcast TV**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*. ***ARIB*** has adopted this profile for future digital TV broadcasting
MPEG4_P2_TS_CO_AC3_T	MPEG-4 Part 2 core profile with AC3 multi-channel audio encapsulated in MPEG-2-TS with a valid TTS	video/vnd.dlna.mpeg-tts	CIF30	This profile is utilized in **broadcast TV**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*. ***ARIB*** has adopted this profile for future digital TV broadcasting
MPEG4_P2_TS_CO_AC3_ISO	MPEG-4 Part 2 core profile with AC3 multi-channel audio encapsulated in MPEG-2-TS without a timestamp field	video/mpeg	CIF30	This profile is utilized in **broadcast TV**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*. ***ARIB*** has adopted this profile for future digital TV broadcasting
MPEG4_P2_TS_CO_MPEG2_L2	MPEG-4 Part 2 core profile with MPEG-1/2 Layer1/2 multi-channel audio encapsulated in MPEG-2 TS with a zero TTS	video/vnd.dlna.mpeg-tts	CIF30	This profile is utilized in **broadcast TV**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*. ***ARIB*** has adopted this profile for future digital TV broadcasting
MPEG4_P2_TS_CO_MPEG2_L2_T	MPEG-4 Part 2 core profile with MPEG-1/2 Layer1/2 multi-channel audio encapsulated in MPEG-2-TS with a valid TTS	video/vnd.dlna.mpeg-tts	CIF30	This profile is utilized in **broadcast TV**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*. ***ARIB*** has adopted this profile for future digital TV broadcasting
MPEG4_P2_TS_CO_MPEG2_L2_ISO	MPEG-4 Part 2 core profile with MPEG-1/2 Layer1/2 multi-channel audio encapsulated in MPEG-2-TS without a timestamp field.	video/mpeg	CIF30	This profile is utilized in **broadcast TV**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*. ***ARIB*** has adopted this profile for future digital TV broadcasting
MPEG4_P2_3GPP_SP_L0B_AAC	MPEG-4 Part 2 simple profile Level 0b with AAC audio encapsulated in 3GPP	video/3gpp video/mp4	QCIF15	A profile utilized for **multimedia streaming** and **messaging services in 3GPP**. This profile may be supported by *cellular phones* and *PDAs*
MPEG4_P2_3GPP_SP_L0B_AMR	MPEG-4 Part 2 simple profile Level 0b with AMR audio encapsulated in 3GPP	video/3gpp video/mp4	QCIF15	A profile utilized for **multimedia conversations**, **streaming**, and **messaging services in 3GPP**. This profile is supported by *cellular phones* and *PDAs*
MPEG4_H263_3GPP_P3_L10_AMR	MPEG-4 H.263 profile 3 Level 10 with AMR audio encapsulated in 3GPP	video/3gpp video/mp4	QCIF15	A profile utilized for **multimedia conversations**, **streaming**, and **messaging services in 3GPP**. This profile is supported by *cellular phones* and *PDAs*

Table 14 – AV Class – MPEG-4 Part 10 (AVC) profiles

Profile ID	Description	MIME type	Label	Usage scenarios
AVC_TS_MP_SD_AAC_MULT5	AVC wrapped in MPEG-2 TS main profile standard def with AAC audio with zero TTS	video/vnd.dlna.mpeg-tts	SD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*. This profile is used by **DVB IP-IRD Capability D**
AVC_TS_MP_SD_AAC_MULT5_T	AVC wrapped in MPEG-2 transport stream main profile standard def with AAC audio with valid TTS	video/vnd.dlna.mpeg-tts	SD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*. This profile is used by **DVB IP-IRD Capability D**
AVC_TS_MP_SD_AAC_MULT5_ISO	AVC wrapped in MPEG-2 transport stream main profile standard def with AAC audio without a timestamp field	video/mpeg	SD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*. This profile is used by **DVB IP-IRD Capability D**
AVC_TS_MP_SD_HEAAC_L2	AVC wrapped in MPEG-2 TS main profile standard def with HEAAC L2 audio with zero TTS	video/vnd.dlna.mpeg-tts	SD	This profile is used for **IP-based broadcast distribution**, and recordings of traditional **broadcast TV** and **personal content**. This profile is supported by *TVs* and *PCs*. This profile is used by **DVB IP-IRD Capability D**
AVC_TS_MP_SD_HEAAC_L2_T	AVC wrapped in MPEG-2 TS main profile standard def with HEAAC L2 audio with valid TTS	video/vnd.dlna.mpeg-tts	SD	This profile is used for **IP-based broadcast distribution**, and recordings of traditional **broadcast TV** and **personal content**. This profile is supported by *TVs* and *PCs*. This profile is used by **DVB IP-IRD Capability D**
AVC_TS_MP_SD_HEAAC_L2_ISO	AVC wrapped in MPEG-2 TS main profile standard def with HEAAC L2 audio without a timestamp field	video/mpeg	SD	This profile is used for **IP-based broadcast distribution**, and recordings of traditional **broadcast TV** and **personal content**. This profile is supported by *TVs* and *PCs*. This profile is used by **DVB IP-IRD Capability D**
AVC_TS_MP_SD_MPEG1_L3	AVC wrapped in MPEG-2 TS main profile standard def with MPEG-1 layer 3 audio with zero TTS	video/vnd.dlna.mpeg-tts	SD	
AVC_TS_MP_SD_MPEG1_L3_T	AVC wrapped in MPEG-2 TS main profile standard def with MPEG-1 layer 3 audio with valid TTS	video/vnd.dlna.mpeg-tts	SD	
AVC_TS_MP_SD_MPEG1_L3_ISO	AVC wrapped in MPEG-2 TS main profile standard def with MPEG-1 layer 3 audio without a timestamp field	video/mpeg	SD	
AVC_TS_MP_SD_AC3	AVC wrapped in MPEG-2 TS main profile standard def with AC3 audio with zero TTS	video/vnd.dlna.mpeg-tts	SD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*
AVC_TS_MP_SD_AC3_T	AVC wrapped in MPEG-2 TS main profile standard def with AC3 audio with valid TTS	video/vnd.dlna.mpeg-tts	SD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*
AVC_TS_MP_SD_AC3_ISO	AVC wrapped in MPEG-2 TS main profile standard def with AC3 audio without a timestamp field	video/mpeg	SD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*

Table 14 *(continued)*

Profile ID	Description	MIME type	Label	Usage scenarios
AVC_TS_MP_SD_AAC_LTP	AVC wrapped in MPEG-2 TS main profile standard def with AAC LTP audio with zero TTS	video/vnd.dlna.mpeg-tts	SD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs* and *PCs*
AVC_TS_MP_SD_AAC_LTP_T	AVC wrapped in MPEG-2 TS main profile standard def with AAC LTP audio with valid TTS	video/vnd.dlna.mpeg-tts	SD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs* and *PCs*
AVC_TS_MP_SD_AAC_LTP_ISO	AVC wrapped in MPEG-2 TS main profile standard def with AAC LTP audio without a Timestamp field	video/mpeg	SD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs* and *PCs*
AVC_TS_MP_SD_AAC_LTP_MULT5	AVC wrapped in MPEG-2 TS main profile standard def with AAC LTP audio with zero TTS	video/vnd.dlna.mpeg-tts	SD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*
AVC_TS_MP_SD_AAC_LTP_MULT5_T	AVC wrapped in MPEG-2 TS main profile standard def with AAC_LTP audio with valid TTS	video/vnd.dlna.mpeg-tts	SD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*
AVC_TS_MP_SD_AAC_LTP_MULT5_ISO	AVC wrapped in MPEG-2 TS main profile standard def with AAC_LTP audio without a timestamp field	video/mpeg	SD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*
AVC_TS_MP_SD_AAC_LTP_MULT7	AVC wrapped in MPEG-2 TS main profile standard def with AAC LTP audio with zero TTS	video/vnd.dlna.mpeg-tts	SD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*
AVC_TS_MP_SD_AAC_LTP_MULT7_T	AVC wrapped in MPEG-2 TS main profile standard def with AAC LTP audio with valid TTS	video/vnd.dlna.mpeg-tts	SD	This Profile is used for **DTV Broadcasting**. This Profile is supported by *TVs*, *Home Theatre Systems*, and *PCs*.
AVC_TS_MP_SD_AAC_LTP_MULT7_ISO	AVC wrapped in MPEG-2 TS main profile standard def with AAC LTP audio without a timestamp field	video/mpeg	SD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*
AVC_TS_MP_SD_BSAC	AVC wrapped in MPEG-2 TS main profile standard def with BSAC audio with zero TTS	video/vnd.dlna.mpeg-tts	SD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, *mobile handheld players*, and *PCs*
AVC_TS_MP_SD_BSAC_T	AVC wrapped in MPEG-2 TS main profile standard def with BSAC audio with valid TTS	video/vnd.dlna.mpeg-tts	SD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, *mobile handheld players*, and *PCs*
AVC_TS_MP_SD_BSAC_ISO	AVC wrapped in MPEG-2 TS main profile standard def with BSAC audio without a timestamp field	video/mpeg	SD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, *mobile handheld players*, and *PCs*
AVC_MP4_MP_SD_AAC_MULT5	AVC main profile standard def with AAC audio encapsulated in MP4	video/mp4	SD	This profile is used for **DTV broadcasting** and recordings of **broadcast TV** and **personal content**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*. It is expected to be supported in the future by ***ISMA***

Table 14 *(continued)*

Profile ID	Description	MIME type	Label	Usage scenarios
AVC_MP4_MP_SD_HEAAC_L2	AVC main profile standard def with HEAAC L2 audio encapsulated in MP4	video/mp4	SD	A profile utilized to create recording of **broadcast TV** and **personal content**. This profile is supported by *TVs* and *PCs*. It is expected to be supported in the future by ***ISMA***
AVC_MP4_MP_SD_MPEG1_L3	AVC main profile standard def with MPEG-1 L3 audio encapsulated in MP4	video/mp4	SD	
AVC_MP4_MP_SD_AC3	AVC main profile standard def with AC3 audio encapsulated in MP4	video/mp4	SD	
AVC_MP4_MP_SD_AAC_LTP	AVC main profile standard def with AAC_LTP audio encapsulated in MP4	video/mp4	SD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs* and *PCs*
AVC_MP4_MP_SD_AAC_LTP_MULT5	AVC main profile standard def with AAC LTP audio encapsulated in MP4	video/mp4	SD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*
AVC_MP4_MP_SD_AAC_LTP_MULT7	AVC main profile standard def with AAC LTP audio encapsulated in MP4	video/mp4	SD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*
AVC_MP4_MP_SD_ATRAC3plus	AVC main profile standard def with ATRAC3plus audio encapsulated in MP4	video/mp4	SD	A profile utilized to create recordings of **personal content**. This profile is supported by *portable video players*, *TVs*, *home theatre systems*, and *PCs*
AVC_MP4_BL_L3L_SD_AAC	AVC baseline profile SD/VGA with AAC audio encapsulated in MP4	video/mp4	SD	A profile utilized for **multimedia capture**. This profile may be supported by *cellular phones* and *PDAs*
AVC_MP4_BL_L3L_SD_HEAAC	AVC baseline profile SD/VGA with HEAAC audio encapsulated in MP4	video/mp4	SD	A profile utilized for **multimedia capture**. This profile may be supported by *cellular phones* and *PDAs*
AVC_MP4_BL_L3_SD_AAC	AVC baseline profile standard def with AAC audio encapsulated in MP4	video/mp4	SD	A profile utilized to create recording of **broadcast TV** and **personal content**. This profile is supported by *TVs* and *PCs*
AVC_MP4_MP_SD_BSAC	AVC baseline profile standard def with BSAC audio encapsulated in MP4	video/mp4	SD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, *mobile handheld players*, and *PCs*
AVC_TS_BL_CIF30_AAC_MULT5	AVC wrapped in MPEG-2 TS baseline profile CIF30 with AAC audio with zero TTS	video/vnd.dlna.mpeg-tts	CIF30	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *TVs*, *cellular phones*, *PDAs*, *portable video players*, and *PCs*. This profile is used by ***DVB IP-IRD Capability C***
AVC_TS_BL_CIF30_AAC_MULT5_T	AVC wrapped in MPEG-2 TS baseline profile CIF30 with AAC audio with valid TTS	video/vnd.dlna.mpeg-tts	CIF30	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *TVs*, *cellular phones*, *PDAs*, *portable video players*, and *PCs*. This profile is used by ***DVB IP-IRD Capability C***

Table 14 *(continued)*

Profile ID	Description	MIME type	Label	Usage scenarios
AVC_TS_BL_CIF30_AAC_MULT5_ISO	AVC wrapped in MPEG-2 TS baseline profile CIF30 with AAC audio without a timestamp field	video/mpeg	CIF30	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *TVs*, *cellular phones*, *PDAs*, *portable video players*, and *PCs*. This profile is used by ***DVB IP-IRD Capability C***
AVC_TS_BL_CIF30_HEAAC_L2	AVC wrapped in MPEG-2 TS baseline profile CIF30 with HEAAC audio with zero TTS	video/vnd.dlna.mpeg-tts	CIF30	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *TVs*, *cellular phones*, *PDAs*, *portable video players*, and *PCs*. This profile is used by ***DVB IP-IRD Capability C***
AVC_TS_BL_CIF30_HEAAC_L2_T	AVC wrapped in MPEG-2 TS baseline profile CIF30 with HEAAC audio with valid TTS	video/vnd.dlna.mpeg-tts	CIF30	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *TVs*, *cellular phones*, *PDAs*, *portable video players*, and *PCs*. This profile is used by ***DVB IP-IRD Capability C***
AVC_TS_BL_CIF30_HEAAC_L2_ISO	AVC wrapped in MPEG-2 TS baseline profile CIF30 with HEAAC audio without a timestamp field	video/mpeg	CIF30	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by ***TVs***, ***cellular phones***, ***PDAs***, ***portable video players***, and ***PCs***. This profile is used by ***DVB IP-IRD Capability C***
AVC_TS_BL_CIF30_MPEG1_L3	AVC wrapped in MPEG-2 TS baseline profile CIF30 with MPEG-1 layer 3 audio with zero TTS	video/vnd.dlna.mpeg-tts	CIF30	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *TVs*, *cellular phones*, *PDAs*, *portable video players*, and *PCs*
AVC_TS_BL_CIF30_MPEG1_L3_T	AVC wrapped in MPEG-2 TS baseline profile CIF30 with MPEG-1 layer 3 audio with valid TTS	video/vnd.dlna.mpeg-tts	CIF30	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *TVs*, *cellular phones*, *PDAs*, *portable video players*, and *PCs*
AVC_TS_BL_CIF30_MPEG1_L3_ISO	AVC wrapped in MPEG-2 TS baseline profile CIF30 with MPEG-1 layer 3 audio A/V without a timestamp field	video/mpeg	CIF30	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *TVs*, *cellular phones*, *PDAs*, *portable video players*, and *PCs*
AVC_TS_BL_CIF30_AC3	AVC wrapped in MPEG-2 TS baseline profile CIF30 with AC3 audio with zero TTS	video/vnd.dlna.mpeg-tts	CIF30	
AVC_TS_BL_CIF30_AC3_T	AVC wrapped in MPEG-2 TS baseline profile CIF30 with AC3 audio with valid TTS	video/vnd.dlna.mpeg-tts	CIF30	
AVC_TS_BL_CIF30_AC3_ISO	AVC wrapped in MPEG-2 TS baseline profile CIF30 with AC3 audio without a timestamp field	video/mpeg	CIF30	

Table 14 *(continued)*

Profile ID	Description	MIME type	Label	Usage scenarios
AVC_TS_BL_CIF30_AAC_LTP	AVC wrapped in MPEG-2 TS baseline profile CIF30 with AAC LTP audio with zero TTS	video/vnd.dlna.mpeg-tts	CIF30	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
AVC_TS_BL_CIF30_AAC_LTP_T	AVC wrapped in MPEG-2 TS baseline profile CIF30 with AAC LTP audio with valid TTS	video/vnd.dlna.mpeg-tts	CIF30	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
AVC_TS_BL_CIF30_AAC_LTP_ISO	AVC wrapped in MPEG-2 TS baseline profile CIF30 with AAC LTP audio without a timestamp field	video/mpeg	CIF30	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
AVC_TS_BL_CIF30_AAC_LTP_MULT5	AVC wrapped in MPEG-2 TS baseline profile CIF30 with AAC_LTP audio with zero TTS	video/vnd.dlna.mpeg-tts	CIF30	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
AVC_TS_BL_CIF30_AAC_LTP_MULT5_T	AVC wrapped in MPEG-2 TS baseline profile CIF30 with AAC_LTP audio with valid TTS	video/vnd.dlna.mpeg-tts	CIF30	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
AVC_TS_BL_CIF30_AAC_LTP_MULT5_ISO	AVC wrapped in MPEG-2 TS baseline profile CIF30 with AAC_LTP audio without a timestamp field	video/mpeg	CIF30	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
AVC_TS_BL_CIF30_AAC_940	AVC wrapped in MPEG-2 TS baseline profile CIF30 with AAC audio with zero TTS	video/vnd.dlna.mpeg-tts	CIF30	A profile utilized to create recordings of **broadcast TV** or **personal content** for mobile devices. This profile is supported by *TVs*, *digital video recorders*, *PCs*, *cellular phones*, *PDAs*, and *portable video players*
AVC_TS_BL_CIF30_AAC_940_T	AVC wrapped in MPEG-2 TS baseline profile CIF30 with AAC audio with valid TTS	video/vnd.dlna.mpeg-tts	CIF30	A profile utilized to create recordings of **broadcast TV** or **personal content** for mobile devices. This profile is supported by *TVs*, *digital video recorders*, *PCs*, *cellular phones*, *PDAs*, and *portable video players*
AVC_TS_BL_CIF30_AAC_940_ISO	AVC wrapped in MPEG-2 TS baseline profile CIF30 with AAC audio without a timestamp field	video/mpeg	CIF30	A profile utilized to create recordings of **broadcast TV** or **personal content** for mobile devices. This profile is supported by *TVs*, *digital video recorders*, *PCs*, *cellular phones*, *PDAs*, and *portable video players*
AVC_MP4_BL_CIF30_AAC_MULT5	AVC wrapped in MP4 baseline profile CIF30 with AAC audio	video/mp4	CIF30	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *TVs*, *PDAs*, *portable video players*, and *PCs*. It is expected to be supported in the future by ***ISMA***

Table 14 *(continued)*

Profile ID	Description	MIME type	Label	Usage scenarios
AVC_MP4_BL_CIF30_HEAAC_L2	AVC wrapped in MP4 baseline profile CIF30 with HEAAC audio	video/mp4	CIF30	A profile utilized to create recordings of **broadcast TV** and **personal content**. This profile is supported by *cellular phones*, *PDAs*, *portable video players*, and *PCs*
AVC_MP4_BL_CIF30_MPEG1_L3	AVC wrapped in MP4 baseline profile CIF30 with MPEG-1 layer3 audio	video/mp4	CIF30	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *TVs*, *cellular phones*, *PDAs*, *portable video players*, and *PCs*
AVC_MP4_BL_CIF30_AC3	AVC wrapped in MP4 baseline profile CIF30 with AC3 audio	video/mp4	CIF30	
AVC_MP4_BL_CIF30_AAC_LTP	AVC wrapped in MP4 baseline profile CIF30 with AAC LTP audio	video/mp4	CIF30	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
AVC_MP4_BL_CIF30_AAC_LTP_MULT5	AVC wrapped in MP4 baseline profile CIF30 with AAC LTP audio	video/mp4	CIF30	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
AVC_MP4_BL_L2_CIF 30_AAC	AVC wrapped in MP4 baseline profile CIF 30 with AAC audio	video/mp4	CIF30	A profile utilized to create recordings of **broadcast TV** and **personal content**. This profile is supported by *cellular phones*, *PDAs*, *portable video players*, and *PCs*
AVC_MP4_BL_CIF30_BSAC	AVC wrapped in MP4 baseline profile CIF30 with BSAC audio	video/mp4	CIF30	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *TVs*, *PDAs*, *portable video players*, and *PCs*
AVC_MP4_BL_CIF30_BSAC_MULT5	AVC wrapped in MP4 baseline profile CIF30 with BSAC audio	video/mp4	CIF30	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *TVs*, *PDAs*, *portable video players*, and *PCs*
AVC_MP4_BL_CIF30_AAC_912	AVC wrapped in MP4 baseline profile CIF30 with AAC audio	video/mp4	CIF30	A profile utilized to create recordings of **broadcast TV** or **personal content** for mobile devices. This profile is supported by *TVs*, *digital video recorders*, *PCs*, *cellular phones*, *PDAs*, and *portable video players*
AVC_MP4_BL_CIF15_HEAAC	AVC wrapped in MP4 baseline profile CIF15 with HEAAC audio	video/mp4	CIF15	A profile utilized for **multimedia streaming** and **messaging services in 3GPP**. This profile is supported by *cellular phones* and *PDAs*
AVC_MP4_BL_CIF15_AMR	AVC wrapped in MP4 baseline profile CIF15 with AMR audio	video/mp4	CIF15	A profile utilized for **multimedia streaming** and **messaging services in 3GPP**. This profile is supported by *cellular phones* and *PDAs*
AVC_TS_MP_HD_AAC_MULT5	AVC wrapped in MPEG-2 TS main profile HD with AAC audio with zero TTS	video/vnd.dlna.mpeg-tts	HD	A profile utilized to create recordings of **personal content** and for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, *cellular phones*, *portable video players*, and *PCs*. This profile is used by ***DVB IP-IRD Capability E***

Table 14 *(continued)*

Profile ID	Description	MIME type	Label	Usage scenarios
AVC_TS_MP_HD_AAC_MULT5_T	AVC wrapped in MPEG-2 TS main profile HD with AAC audio with valid TTS	video/vnd.dlna.mpeg-tts	HD	A profile utilized to create recordings of **personal content** and for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, *cellular phones*, *portable video players*, and *PCs*. This profile is used by ***DVB IP-IRD Capability E***
AVC_TS_MP_HD_AAC_MULT5_ISO	AVC wrapped in MPEG-2 TS main profile HD with AAC audio without a timestamp field	video/mpeg	HD	A profile utilized to create recordings of **personal content** and for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, *cellular phones*, *portable video players*, and *PCs*. This Profile is used by ***DVB IP-IRD Capability E***
AVC_TS_MP_HD_HEAAC_L2	AVC wrapped in MPEG-2 TS main profile HD with HEAAC audio with zero TTS	video/vnd.dlna.mpeg-tts	HD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs* and *PCs*. This profile is used by ***DVB IP-IRD Capability E***
AVC_TS_MP_HD_HEAAC_L2_T	AVC wrapped in MPEG-2 TS main profile HD with HEAAC audio with valid TTS	video/vnd.dlna.mpeg-tts	HD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs* and *PCs*. This profile is used by ***DVB IP-IRD Capability E***
AVC_TS_MP_HD_HEAAC_L2_ISO	AVC wrapped in MPEG-2 TS main profile HD with HEAAC audio without a timestamp field	video/mpeg	HD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs* and *PCs*. This profile is used by ***DVB IP-IRD Capability E***
AVC_TS_MP_HD_MPEG1_L3	AVC wrapped in MPEG-2 TS main profile HD with MPEG-1 layer 3 audio with zero TTS	video/vnd.dlna.mpeg-tts	HD	
AVC_TS_MP_HD_MPEG1_L3_T	AVC wrapped in MPEG-2 TS main profile HD with MPEG-1 layer 3 audio with valid TTS	video/vnd.dlna.mpeg-tts	HD	
AVC_TS_MP_HD_MPEG1_L3_ISO	AVC wrapped in MPEG-2 TS main profile HD with MPEG-1 layer 3 audio without a timestamp field	video/mpeg	HD	
AVC_TS_MP_HD_AC3	AVC wrapped in MPEG-2 TS main profile HD with AC3 audio with zero TTS	video/vnd.dlna.mpeg-tts	HD	The profile is expected to be supported in the future by **cable TV applications**
AVC_TS_MP_HD_AC3_T	AVC wrapped in MPEG-2 TS main profile HD with AC3 audio with valid TTS	video/vnd.dlna.mpeg-tts	HD	The profile is expected to be supported in the future by **cable TV applications**
AVC_TS_MP_HD_AC3_ISO	AVC wrapped in MPEG-2 TS main profile HD with AC3 audio without a timestamp field	video/mpeg	HD	The profile is expected to be supported in the future by **cable TV applications**
AVC_TS_MP_HD_AAC	AVC wrapped in MPEG-2 TS main profile HD with AAC audio with zero TTS	video/vnd.dlna.mpeg-tts	HD	A profile utilized to create recordings of **personal content with a mobile recording device**. This profile is supported by *cellular phones*, *PDAs*, *portable video players*, and *PCs*
AVC_TS_MP_HD_AAC_T	AVC wrapped in MPEG-2 TS main profile HD with AAC audio with valid TTS	video/vnd.dlna.mpeg-tts	HD	A profile utilized to create recordings of **personal content with a mobile recording device**. This profile is supported by *cellular phones*, *PDAs*, *portable video players*, and *PCs*

Table 14 *(continued)*

Profile ID	Description	MIME type	Label	Usage scenarios
AVC_TS_MP_HD_AAC_ISO	AVC wrapped in MPEG-2 TS main profile HD with AAC audio without a timestamp field	video/mpeg	HD	A profile utilized to create recordings of **personal content with a mobile recording device**. This profile is supported by *cellular phones*, *PDAs*, *portable video players*, and *PCs*
AVC_TS_MP_HD_AAC_LTP	AVC wrapped in MPEG-2 TS main profile HD with AAC LTP audio with zero TTS	video/vnd.dlna.mpeg-tts	HD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs* and *PCs*
AVC_TS_MP_HD_AAC_LTP_T	AVC wrapped in MPEG-2 TS main profile HD with AAC LTP audio with valid TTS	video/vnd.dlna.mpeg-tts	HD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs* and *PCs*
AVC_TS_MP_HD_AAC_LTP_ISO	AVC wrapped in MPEG-2 TS main profile HD with AAC LTP audio without a timestamp field	video/mpeg	HD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs* and *PCs*
AVC_TS_MP_HD_AAC_LTP_MULT5	AVC wrapped in MPEG-2 TS main profile HD with AAC LTP audio with zero TTS	video/vnd.dlna.mpeg-tts	HD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*
AVC_TS_MP_HD_AAC_LTP_MULT5_T	AVC wrapped in MPEG-2 TS main profile HD with AAC LTP audio with valid TTS	video/vnd.dlna.mpeg-tts	HD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*
AVC_TS_MP_HD_AAC_LTP_MULT5_ISO	AVC wrapped in MPEG-2 TS main profile HD with AAC LTP audio without a timestamp field	video/mpeg	HD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*
AVC_TS_MP_HD_AAC_LTP_MULT7	AVC wrapped in MPEG-2 TS main profile HD with AAC LTP audio with zero TTS	video/vnd.dlna.mpeg-tts	HD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*
AVC_TS_MP_HD_AAC_LTP_MULT7_T	AVC wrapped in MPEG-2 TS main profile HD with AAC LTP audio with valid TTS	video/vnd.dlna.mpeg-tts	HD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*
AVC_TS_MP_HD_AAC_LTP_MULT7_ISO	AVC wrapped in MPEG-2 TS main profile HD with AAC LTP audio without a timestamp field	video/mpeg	HD	This profile is used for **DTV broadcasting**. This profile is supported by *TVs*, *home theatre systems*, and *PCs*
AVC_TS_BL_CIF15_AAC	AVC wrapped in MPEG-2 TS baseline profile CIF15 with AAC audio with zero TTS	video/vnd.dlna.mpeg-tts	CIF15	A profile utilized to create recordings of **broadcast TV** or **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*. This profile is used by ***DVB IP-IRD Capability A***
AVC_TS_BL_CIF15_AAC_T	AVC wrapped in MPEG-2 TS baseline profile CIF15 with AAC audio with valid TTS	video/vnd.dlna.mpeg-tts	CIF15	A profile utilized to create recordings of **broadcast TV** or **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*. This profile is used by ***DVB IP-IRD Capability A***

Table 14 *(continued)*

Profile ID	Description	MIME type	Label	Usage scenarios
AVC_TS_BL_CIF15_AAC_ISO	AVC wrapped in MPEG-2 TS baseline profile CIF15 with AAC audio without a timestamp field	video/mpeg	CIF15	A profile utilized to create recordings of **broadcast TV** or **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*. This profile is used by ***DVB IP-IRD Capability A***
AVC_TS_BL_CIF15_AAC_540	AVC wrapped in MPEG-2 TS baseline profile CIF15 with AAC audio with zero TTS	video/vnd.dlna.mpeg-tts	CIF15	A profile utilized to create recordings of **broadcast TV** or **personal content** for mobile devices. This profile is supported by *TVs*, *digital video recorders*, *PCs*, *cellular phones*, *PDAs*, and *portable video players*
AVC_TS_BL_CIF15_AAC_540_T	AVC wrapped in MPEG-2 TS baseline profile CIF15 with AAC audio with valid TTS	video/vnd.dlna.mpeg-tts	CIF15	A profile utilized to create recordings of **broadcast TV** or **personal content** for mobile devices. This profile is supported by *TVs*, *digital video recorders*, *PCs*, *cellular phones*, *PDAs*, and *portable video players*
AVC_TS_BL_CIF15_AAC_540_ISO	AVC wrapped in MPEG-2 TS baseline profile CIF15 with AAC audio without a timestamp field	video/mpeg	CIF15	A profile utilized to create recordings of **broadcast TV** or **personal content** for mobile devices. This profile is supported by *TVs*, *digital video recorders*, *PCs*, *cellular phones*, *PDAs*, and *portable video players*
AVC_TS_BL_CIF15_AAC_LTP	AVC wrapped in MPEG-2 TS baseline profile CIF15 with AAC LTP audio with zero TTS	video/vnd.dlna.mpeg-tts	CIF15	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
AVC_TS_BL_CIF15_AAC_LTP_T	AVC wrapped in MPEG-2 TS baseline profile CIF15 with AAC LTP audio with valid TTS	video/vnd.dlna.mpeg-tts	CIF15	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
AVC_TS_BL_CIF15_AAC_LTP_ISO	AVC wrapped in MPEG-2 TS baseline profile CIF15 with AAC LTP audio without a timestamp field	video/mpeg	CIF15	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
AVC_TS_BL_CIF15_BSAC	AVC wrapped in MPEG-2 TS baseline profile CIF15 with BSAC audio with zero TTS	video/vnd.dlna.mpeg-tts	CIF15	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *TVs*, *PDAs*, *portable video players*, and *PCs*
AVC_TS_BL_CIF15_BSAC_T	AVC wrapped in MPEG-2 TS baseline profile CIF15 with BSAC audio with valid TTS	video/vnd.dlna.mpeg-tts	CIF15	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *TVs*, *PDAs*, *portable video players*, and *PCs*
AVC_TS_BL_CIF15_BSAC_ISO	AVC wrapped in MPEG-2 TS baseline profile CIF15 with BSAC audio without a timestamp field	video/mpeg	CIF15	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *TVs*, *PDAs*, *portable video players*, and *PCs*

Table 14 *(continued)*

Profile ID	Description	MIME type	Label	Usage scenarios
AVC_MP4_BL_CIF15_AAC	AVC wrapped in MP4 baseline profile CIF15 with AAC audio	video/mp4	CIF15	A profile utilized to create recordings of **broadcast TV** or **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
AVC_MP4_BL_CIF15_AAC_520	AVC wrapped in MP4 baseline profile CIF15 with AAC LC audio	video/mp4	CIF15	A profile utilized for **broadcast services**, **mobile services** (for example, **3GPP services**) and **commercial A/V content services** and to create recordings of **personal content with a mobile recording device**. This profile is supported by all devices in the MHD category that implement the AV media class
AVC_MP4_BL_CIF15_AAC_LTP	AVC wrapped in MP4 baseline profile CIF15 with AAC LTP audio	video/mp4	CIF15	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
AVC_MP4_BL_CIF15_AAC_LTP_520	AVC wrapped in MP4 baseline profile CIF15 with AAC LTP audio	video/mp4	CIF15	A profile utilized for **3GPP services** and to create recordings of **personal content with a mobile recording device**. This profile is supported by *cellular phones*, *PDAs*, *portable video players*, and *PCs*
AVC_MP4_BL_CIF15_BSAC	AVC wrapped in MP4 baseline profile CIF 15 with BSAC audio	video/mp4	CIF15	A profile utilized to create recordings of **personal content with a mobile recording device** and for **DTV broadcasting**. This profile is supported by *TVs*, *PDAs*, *portable video players*, and *PCs*
AVC_MP4_BL_L12_CIF15_HEAAC	AVC wrapped in MP4 baseline profile CIF 15 with HEAAC L2 audio	video/mp4	CIF15	A profile utilized to create recordings of **broadcast TV** or **personal content with a mobile recording device**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
AVC_MP4_BL_L1B_QCIF15_HEAAC	AVC wrapped in MP4 baseline profile QCIF with HEAAC L2 audio	video/mp4	QCIF15	A profile utilized to create recordings of **broadcast TV** and **personal content with a mobile recording device**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
AVC_3GPP_BL_CIF30_AMR_WBplus	AVC wrapped in 3GPP baseline profile CIF30 with AMR-WB+ audio	video/3gpp	CIF30	A profile utilized for **3GPP services**. This profile is supported by *cellular phones*
AVC_3GPP_BL_CIF15_AMR_WBplus	AVC wrapped in 3GPP baseline profile CIF15 with AMR-WB+ audio	video/3gpp	CIF15	A profile utilized for **3GPP services**. This profile is supported by *cellular phones*
AVC_3GPP_BL_QCIF15_AAC	AVC wrapped in 3GPP baseline profile QCIF15 with AAC audio	video/3gpp	QCIF15	A profile utilized to create recordings of **broadcast TV** and **personal content with a mobile recording device**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
AVC_3GPP_BL_QCIF15_AAC_LTP	AVC wrapped in 3GPP baseline profile QCIF15 with AAC LTP audio	video/3gpp	QCIF15	A profile utilized to create recordings of **personal content with a mobile recording device**. This profile is supported by *cellular phones*, *PDAs*, and *portable video players*
AVC_3GPP_BL_QCIF15_HEAAC	AVC wrapped in 3GPP baseline profile QCIF15 with HEAAC Audio	video/3gpp video/mp4	QCIF15	A profile utilized for **multimedia streaming** and **messaging services in 3GPP**. This profile is supported by *cellular phones* and *PDAs*

Table 14 *(continued)*

Profile ID	Description	MIME Type	Label	Usage scenarios
AVC_3GPP_BL_QCIF15_AMR_WBplus	AVC wrapped in 3GPP baseline profile QCIF15 with AMR-WB+ audio	video/3gpp	QCIF15	This profile is used for **3GPP services**. This profile is supported by *cellular phones*
AVC_3GPP_BL_QCIF15_AMR	AVC wrapped in 3GPP baseline profile QCIF15 with AMR Audio	video/3gpp video/mp4	QCIF15	A profile utilized for **multimedia streaming** and **messaging services in 3GPP**. This profile is supported by *cellular phones* and *PDAs*

Table 15 – AV Class – WMV9 profiles

Profile ID	Description	MIME type	Label	Usage scenarios
WMVMED_BASE	Medium resolution video (main profile at medium level) with baseline WMA audio	video/x-ms-wmv	SD	A profile utilized for **IP and web-based video distribution** of content. This profile is supported by personal video players and *PCs*
WMVMED_FULL	Medium resolution video (main profile at medium level) with full WMA audio	video/x-ms-wmv	SD	A profile utilized for **IP and web-based video distribution** of content. This profile is supported by personal video players and *PCs*
WMVMED_PRO	Medium resolution video (main profile at medium level) with WMA professional audio	video/x-ms-wmv	SD	A Profile utilized for **IP and web-based video distribution** of content. This profile is supported by personal video players and *PCs*
WMVHIGH_FULL	High-resolution video (main profile at high level) with full WMA audio	video/x-ms-wmv	HD	A profile utilized for **IP and web-based video distribution** of content. This profile is supported by personal video players and *PCs*
WMVHIGH_PRO	High resolution video (main profile at high level) with WMA professional audio	video/x-ms-wmv	HD	A profile utilized for **IP and web-based video distribution** of content. This profile is supported by personal video players and *PCs*
WMVHM_BASE	HighMAT profile	video/x-ms-wmv	SD	A profile utilized for distribution of content using **optical media** and the HightMAT format. This profile is supported by optical disk devices, *portable video players*, and *PCs*
WMVSPLL_BASE	Low resolution video (simple profile at low level) with baseline WMA audio	video/x-ms-wmv	QCIF15	A profile used in the context of **Internet-based video** and ***small-screen devices***. This profile is supported in personal video players, *cellular phones*, *PDAs*, and *PCs*
WMVSPML_BASE	Low resolution video (simple profile at medium level) with baseline WMA audio	video/x-ms-wmv	CIF15	A profile used in the context of **Internet-based video** and ***small-screen devices***. This profile is supported in personal video players, *cellular phones*, *PDAs*, and *PCs*
WMVSPML_MP3	Low resolution video (simple profile at medium level) with MP3 audio	video/x-ms-wmv	CIF15	A profile used in the context of DLNA ***small-screen devices***. This profile is supported by *PCs* and will be supported by some DLNA mobile devices

Table 16 – Media collection profiles

Profile ID	Description	MIME type	Label	Usage scenarios
DIDL_S	Profile derived from DIDL-Lite to be used for describing media collections	text/xml	N/A	A profile used for exchanging information on a collection of media items. This profile may be supported by home networked devices
DIDL_V	Profile derived from DIDL-Lite to be used for describing media collections	text/xml	N/A	A profile used for exchanging information on a collection of media items. This profile may be supported by home networked devices

6 Media format interoperability model

6.1 Media interoperability guidelines

In order to provide a media interoperability model between various types of DLNA devices, DLNA media format profiles are classified into mandatory and optional. Media format profiles are mandatory or optional for a given device category. Subclause 6.2 defines conditions for overall interoperability, and 6.3 defines the specific set of media profiles that comprise the mandatory profiles.

Within one of the DLNA device categories, a rendering endpoint that supports a given media class has to support all mandatory media format profiling for that media class in the corresponding device category as defined in subsequent guidelines. However, such a device could implement additional partial profiling of another media class. Such a partial profiling can include just a subset of mandatory format profiles or just a subset of profile parameter sets. Such a device would not be able to claim support for that additional media class. For example, a DLNA rendering endpoint in the HND category that supports an audio media class has to implement all mandatory guidelines for LPCM, but could also provide support for rendering video profiled by an optional AV media class format profile (for example, MPEG_TS_SD_EU – profiled video).

6.2 Overall interoperability

6.2.1 MF mandatory media formats – Support requirements

6.2.1.1 Rendering endpoints of a DLNA device category that claim to support a particular DLNA media class must be capable of decoding and rendering all mandatory DLNA media format profiles for that media class and that DLNA device category.

M	C	DMP DMR DMPr	M-DMP M-DMD	n/a	[42]

Examples when this is not required:

- a rendering endpoint designed to support only the DLNA audio media class for the device category of home network devices (HND) is not required to support mandatory DLNA AV media format profiles;
- the same rendering endpoint is not required to support mandatory audio profiles for a different device category.

6.2.1.2 Serving endpoints of a DLNA device category that claim to support a particular DLNA media class must be capable of exposing and transferring at least one of the mandatory DLNA media format profiles for that media class and that DLNA device category.

M	C	DMS	M-DMS	n/a	[42]

A serving endpoint that cannot expose and transfer some content in any mandatory DLNA media format profile for its corresponding device category is not compliant with this requirement.

Examples of compliant serving endpoint implementations include

- a serving endpoint implementation on a PC belonging to the HND category that allows the user or application acting on the user's behalf to provide content in at least one of the mandatory DLNA media format profiles for the media classes the serving endpoint implementation claims to support in the HND category. The content can be exposed and transferred by the serving endpoint implementation to other DLNA devices;
- a serving endpoint device that allows the encoding of content to be user selectable in at least one of the mandatory DLNA media format profiles of the corresponding device category for the DLNA media classes it claims to support. A digital video recorder might by default support MPEG-4 encoding of captured video content, but either convert it to a mandatory DLNA AV media format profile for on-demand streaming to DLNA devices or else allow the user to change the content capture encoding to a mandatory DLNA AV media format profile. Such a device would also be compliant if the user can insert a memory card into it with content in a mandatory DLNA AV media format profile and the device then is able to expose and transfer it to other DLNA devices;
- a serving endpoint which is not capable of storing files in a mandatory format profile of its device category, but which can provide a transcoded version of some items originally stored in an optional profile, when the transcoded version is in the mandatory profile for its device category.

6.2.1.3 Uploading endpoints that belong to certain DLNA device category and which claim to support a particular DLNA media class must be capable of transferring at least one of the mandatory DLNA media format profiles for that media class and that DLNA device category

M	C	n/a	M-DMU	n/a	n/a

6.2.2 MF optional media formats – Support requirements

Content sources and content receivers that claim to support a particular DLNA media class may support any of the optional DLNA media format profiles for that DLNA device category and for that media class.

O	C	DMS DMP DMR DMPr +PU+ +UP+ +DN+	M-DMU M-DMS M-DMD	n/a	[42]

6.2.3 MF optional media formats – Content availability

If a serving endpoint exposes a content item encoded to an optional DLNA media format profile of the serving endpoint's device category in a CDS with the DLNA.ORG_PN parameter in res@protocolInfo, then the serving endpoint should also expose this content in a mandatory DLNA media format profile for the relevant media class of the serving endpoint's device category. It is recommended that all content available on serving endpoints be exposed if

possible in a mandatory DLNA media format profile of each of the serving endpoint's device categories regardless of its native format.

S	C	DMS	M-DMS	n/a	[42]

Since rendering endpoints such as a DMP are required to support content in mandatory media format profiles, it is recommended that all content available in optional media format profiles on serving endpoints also be made available and exposed in a mandatory media format profile. If a serving endpoint belongs to two different device categories (in this example, HND and MHD), it is recommended that all content available in optional DLNA media format profiles on such serving endpoints also be made available and exposed in the mandatory profiles for the two different device categories (HND and MHD) This may be achieved by a variety of means including storing copies of a content item in different formats or by conversion on demand for a content item.

6.2.4 MF optional media formats – User indications

6.2.4.1 For any content item in an optional DLNA media format profile, an indication must be given to the user of the following condition at the time content items are exposed to the user for selection.

If the selected rendering endpoint is not capable of rendering the content item, the form of this user indication is implementation dependent and can be user selectable.

Exception: A DMC (or MDMC) that selects content before selecting a target DMR is exempted from complying with this guideline.

M	C	DMP DMC	M-DMP M-DMD M-DMC	n/a	[42]

Optional media profiles are defined for each DLNA device category.

Examples of implementations that comply with this requirement include

- not displaying a content item that meets the condition to the user;
- graying out a content item that meets the condition and preventing its selection for playback by the user.

User selectable means that an implementation may allow users to turn this indication feature on or off, or an implementation may allow users to select among multiple indication alternatives. The actual methods for providing these options to users and the default values for these options are implementation dependent.

In the 3-box system usage, the DMC and MMDC provide an indication of the DMR's capabilities. In the 2-box pull and download system usages, the DMP, MDMP, and MDMD provide an indication of their capabilities respectively.

6.2.4.2 For any content item in a DLNA media format profile an indication should be given to the user of the following condition at the time content items are exposed to the user for selection.

If the content item is not available in a mandatory format for the HND device category, the form of this user indication is implementation dependent and can be user selectable.

S	C	DMP DMC,	M-DMP M-DMD M-DMC	n/a	[42]

Examples of implementations that comply with this requirement include

- not displaying a content item that meets the condition to the user;
- a textual statement for the user indicating a content item that meets the condition is not available in a mandatory DLNA format profile of the corresponding DLNA Device Category;
- a visual mark for the user such as a '–' or '*' displayed alongside a content item that meets the condition and explanatory text elsewhere (for example, a product manual or help file).

User selectable means that an implementation may allow users to turn this indication feature on or off, or an implementation may allow users to select among multiple indication alternatives. The actual methods for providing these options to users and the default values for these options are implementation dependent.

6.2.5 MF media format overlap

6.2.5.1 If a content binary is conformant to a mandatory media format profile of any device category, serving endpoints should expose the content binary in this mandatory media format profile.

S	A	DMS	M-DMS	n/a	n/a

It should be noted that serving endpoints can provide multiple <res> elements with different media format profile IDs.

If these two guidelines result in two or more separate media format profile IDs being recommended, each can be exposed as a separate <res> element.

6.2.5.2 If a content binary is conformant to multiple DLNA media format profiles, serving endpoints should expose the content binary in one or more of the media format profiles to provide a high level of interoperability.

A high level of interoperability may be achieved for example by choosing a profile with the most restrictive parameter set range(s), or by choosing to expose the content using all of the profiles to which the content binary conforms using multiple <res> elements.

S	A	DMS	M-DMS	n/a	n/a

6.2.6 MF profile parameter sets

6.2.6.1 Serving endpoints that expose content identified with a particular profile ID must use one of the permitted profile parameter sets of such profile ID

M	A	DMS	MDMS	MIU	n/a

This guideline defines the baseline rendering requirements for a DLNA rendering endpoint device for all media format profiles for which the device claims support.

6.2.6.2 Rendering endpoints that claim to decode content identified with a particular profile ID must be capable of rendering any of the defined profile parameter sets of such profile ID

M	A	DMP DMR DMPr	MDMP	n/a	n/a

Rendering endpoints may choose to render optional parameters.

Since rendering requires producing an output for all parameter sets of a profile, this implies that the rendering endpoint tolerate parameters defined for the profile.

6.2.6.3 Content sources that claim to provide content with a particular profile ID must be capable of providing one of the permitted profile parameter sets of such Profile ID

M	A	+PU+ +UP+ +PR1+	MDMU	MIU	n/a

6.2.6.4 Content receivers that claim to receive content identified with a particular profile ID must be capable of receiving any of the defined profile parameter sets of such profile ID

M	A	DMS +DN+	MDMD MDMS	n/a	n/a

It should be noted that DMS and MDMS which supports upload operation is a content receiver.

6.2.7 MF audio rendering requirements

Rendering endpoints that support DLNA media format profiles with multichannel, stereo, or mono audio parameter sets must be capable of rendering the audio bitstream by outputting all of the channels or converting all multichannel, stereo, or mono information into an implementation-dependent single-channel audio output at a minimum.

M	A	DMP DMR	MDMP MDMD	n/a	n/a

6.3 Mandatory and optional profile guidelines

6.3.1 MF mandatory image format profile for HND and MHD device categories

The mandatory media format profile applicable to the DLNA HND and MHD device categories for the image media class is:

- JPEG_SM

M	A	All HND	All MHD	n/a	n/a

6.3.2 MF optional image format profile for HND and MHD device categories

All image profiles other than the one listed in 6.3.1 are optional image format profiles for DLNA HND and MHD devices.

O	A	All HND	All MHD	n/a	n/a

6.3.3 MF mandatory audio format profile for the HND device category

The mandatory media format profile applicable to the DLNA HND device category for the audio media class is:

- LPCM

M	A	All HND	n/a	n/a	n/a

6.3.4 MF optional audio format profile for the HND device category

All audio profiles other than the one listed in 6.3.3 are optional audio format profiles for DLNA HND devices.

O	A	All HND	n/a	n/a	n/a

6.3.5 MF mandatory audio format profiles for the MHD device category

The mandatory media format profiles applicable to the DLNA MHD device category for the audio media class are:

- AAC_ISO_320
- MP3

M	A	n/a	All MHD	n/a	n/a

6.3.6 MF optional audio format profiles for the MHD device category

All audio profiles other than the ones listed in 6.3.5 are optional audio format profiles for DLNA MHD devices.

O	A	n/a	All MHD	n/a	n/a

6.3.7 MF mandatory AV format profiles for the HND device category

The mandatory media format profiles applicable to the HND device category for the AV media class must be those defined in Table 17.

M	A	All HND	n/a	n/a	n/a

Table 17 defines the required media format profiles for the HND device category according to region and device class.

The requirements in Table 17 are compliant with 6.2.1.1 and 6.2.1.2

6.3.8 MF optional AV format profiles for the HND device category

All AV profiles other than the ones required by 6.3.7 become optional AV format profiles for DLNA HND devices.

O	A	All HND	n/a	n/a	n/a

6.3.9 MF mandatory AV format profiles for the MHD device category

The mandatory media format profile applicable to the DLNA MHD device category for the AV media class is:

- AVC_MP4_BL_CIF15_AAC_520

M	A	n/a	All MHD	n/a	n/a

6.3.10 MF optional AV format profiles for the MHD device category

All AV profiles other than the one listed in 6.3.9 are optional AV format profiles for DLNA MHD devices.

O	A	n/a	All MHD	n/a	n/a

6.3.11 MF optional media collection profile for the HND and MHD device categories

Profile: DIDL_S, DIDL_V

The optional media collection profile ID values applicable to the DLNA HND and MHD device categories are:

- DIDL_S
- DIDL_V

Serving endpoints of any device category may be capable of exposing and transferring items identified with these profile ID values.

Uploading endpoint devices of any device category may be capable of transferring items identified with these profile ID values.

Rendering endpoints of any device category may be capable of decoding and processing items identified with these profile ID values.

O	A	All HND	All MHD	n/a	n/a

These optional profiles are used to signal a content item that actually constitutes a collection of media content items.

6.3.12 MF mandatory print format profile for DMPr device class

A printing device must be able to correctly print an XHTML document that conforms to the XHTML_Baseline profile, regardless of whether the RANGE header is supported by any of the images referenced in the XHTML document.

Correctly print means that images and layout used in the XHTML-Print document is rendered by the printing device, as defined in [43].

M	A	DMPr	n/a	n/a	n/a

This guideline requires a DMPr to print any XHTML layout that conforms to the XHTML_Baseline profile. The layout must be printed correctly even when the RANGE header is not supported.

Table 17 – Required media format profiles for the HND device category

Device Class	Japan	US	Korea	EU
DMS	MPEG_PS_NTSC	MPEG_PS_NTSC, or MPEG_TS_SD_NA, or MPEG_TS_SD_NA_T, or MPEG_TS_SD_NA_ISO	MPEG_PS_NTSC, or MPEG_TS_SD_KO, or MPEG_TS_SD_KO_T, or MPEG_TS_SD_KO_ISO	MPEG_PS_PAL, or MPEG_TS_SD_EU, or MPEG_TS_SD_EU_T,or MPEG_TS_SD_EU_ISO
DMP DMR	MPEG_PS_NTSC	MPEG_PS_NTSC, and MPEG_TS_SD_NA, and MPEG_TS_SD_NA_T, and MPEG_TS_SD_NA_ISO	MPEG_PS_NTSC and MPEG_TS_SD_KO, and MPEG_TS_SD_KO_T, and MPEG_TS_SD_KO_ISO	MPEG_PS_PAL, and MPEG_TS_SD_EU, and MPEG_TS_SD_EU_T, and MPEG_TS_SD_EU_ISO
Ad-ditional factors	1. Device vendors may choose to support one or more geographical regions for any device. 2. TS-based profiles will be defined for the Japan Region in the future			

7 Image class media format profiles

7.1 JPEG profiling guidelines

7.1.1 JPEG SM format profile, Profile: JPEG_SM

The DLNA JPEG_SM must comply with the following requirements.

File format:

- EXIF Ver.1.x or later
- JFIF 1.02

Image compression:

The *primary* image data compression (even in JFIF or EXIF 1.x file format) must be conformant to EXIF Ver.2.21 [18] with the following additional constraints;

Maximum resolution:

The resolution of the image must not exceed 640 pixels in the ImageWidth field and must not exceed 480 pixels in the ImageHeight field

Huffman table:

The typical Huffman table defined by JPEG standard

Colour space:

- sRGB
- Uncalibrated colour space.

M	L	n/a	n/a	n/a	ISO/IEC 10918-1 [17] [18] [19] [20]

The constraints to JPEG compression is equivalent to those of DCF.

Digital still camera creates image compliant to DCF [20].

The max resolution, 640 × 480 is selected for a resource-constrained rendering endpoint.

Dedicated photo players (for example, HDTV photo player) should decode higher-resolution images if a DMS provides DLNA JPEG_MED or DLNA JPEG_LRG – formatted images in addition to DLNA JPEG-640.

The serving endpoint is allowed to expose images file-formatted according to earlier versions of EXIF (i.e., EXIF 1.x), due to backward compatibility of those file formats. The compression aspects of such images are not covered by this relaxation rule.

7.1.2 JPEG MED format profile
Profile: JPEG_MED

7.1.2.1 The DLNA JPEG_MED media format must follow the requirement of 7.1.1 except for the following image resolution requirements.

Maximum resolution:

The resolution of the image must not exceed 1024 pixels in the ImageWidth field and must not exceed 768 pixels in the ImageHeight field.

M	L	n/a	n/a	n/a	ISO/IEC 10918-1 [17] [18] [19] [20]

7.1.3 JPEG LRG format profile
Profile: JPEG_LRG

The DLNA JPEG_LRG media format must follow the requirements of 7.1.1 except for the following image resolution requirements.

Maximum resolution:

The resolution of the image must not exceed 4096 pixels in the ImageWidth field and must not exceed 4096 pixels in the ImageHeight field.

M	L	n/a	n/a	n/a	ISO/IEC 10918-1 [17] [18] [19] [20]

7.1.4 JPEG format profile
Profiles:
JPEG_LRG,
JPEG_MED

If a serving endpoint exposes a content item in JPEG_LRG or JPEG_MED, the content item must be converted into the JPEG_SM profile and exposed as such to other devices in the home network.

M	A	DMS	MDMS	n/a	n/a

Vendors can choose any suitable decimation algorithm for the conversion of large and medium-sized images into small ones.

7.1.5 JPEG TN format profile
Profile: JPEG_TN

The DLNA JPEG_TN media format must follow the requirements of 7.1.1 baseline format except for the following requirements.

In an EXIF file a thumbnail image can be stored as a thumbnail component in addition to the *primary* image. However, in the JPEG_TN format profile, the thumbnail image must be stored as the *primary* image data of the file.

Maximum resolution:

The resolution of the image must not exceed 160 pixels in the ImageWidth field and must not exceed 160 pixels in the ImageHeight field

The DLNA JPEG_TN profile must be used only for a thumbnail representation of some content.

M	L	n/a	n/a	n/a	ISO/IEC 10918-1 [17] [18] [19] [20]

7.1.6 JPEG SM ICO format profile
Profile: JPEG_SM_ICO

The JPEG_SM_ICO media format profile must follow the requirements of 7.1.1 except for the following requirements.

Required resolution:

The resolution of the image must be 48 pixels in the ImageWidth field and must be 48 pixels in the ImageHeight field

It should also be noted that this media format profile is for use with 7.3.29 in IEC 62481-1 and other guidelines in the future that call for an icon image media format profile.

This ProfileID may not be assigned to a content item in CDS.

M	L	n/a	n/a	n/a	ISO/IEC 10918-1 [17] [18] [19] [20]

This media format profile is essentially the same as the JPEG_SM profile, except that it specifies a very small image size for use in scenarios involving small icons.

7.1.7 JPEG LRG ICO format profile
Profile: JPEG_LRG_ICO

The JPEG_LRG_ICO media format profile must follow the requirements of 7.1.1 except for the following requirements:

- required resolution:

The resolution of the image must be 120 pixels in the ImageWidth field and must be 120 pixels in the ImageHeight field

It should also be noted that this media format profile is for use with 7.3.29 in IEC 62481-1 and other guidelines in the future that call for an icon image media format profile.

This ProfileID may not be assigned to a content item in CDS.

M	L	n/a	n/a	n/a	ISO/IEC 10918-1 [17] [18] [19] [20]

This media format profile is essentially the same as the JPEG_SM profile, except that it specifies a smaller image size for use in scenarios involving large icons.

7.1.8 JPEG format profile – MIME type definition

Profiles:
JPEG_SM
JPEG_MED
JPEG_LRG
JPEG_TN

MIME type "image/jpeg" must be used for these media format profiles.

M	R	n/a	n/a	n/a	n/a

7.2 PNG profiling guidelines

7.2.1 PNG TN format profile

Profile: PNG_TN

The PNG_TN profile must follow the requirements of 7.2.2 except for the following requirements.

Maximum resolution:

The resolution of the image must not exceed 160 pixels in the width field and must not exceed 160 pixels in the height field

DLNA MF profileID "PNG_TN" must be used to identify content of this profile.

The PNG_TN media format profile must be used only for a thumbnail representation of some content.

M	L	n/a	n/a	n/a	ISO/IEC 15948 [21]

7.2.2 PNG SM_ICO format profile

Profile: PNG_SM_ICO

The PNG_SM_ICO profile must follow the requirements of [21] recommendations as well as the following restrictions and guidelines described in the entries below.

Maximum resolution:

The resolution of the image must be 48 pixels in the width field and must be 48 pixels in the height field

The MIME type for this image profile must be "image/png".

The image must use one of the following colour types, defined in 6.1 of ISO/IEC 15948.

- Greyscale (with or without tRNS chunks)
- Truecolor (with or without tRNS chunks)
- Indexed-color (with or without tRNS chunks)
- Greyscale with alpha

- Truecolor with alpha

The total number of bits (excluding alpha channel bits) needed to represent a colour must not exceed 24 bits, as described below.

- Greyscale: 8 or 16 bits
- Truecolor: 24 bits (triplet of 8 bit R/G/B samples)
- Indexed-color: 24 bits (palette entry is a triplet 8 bit R/G/B samples)
- Greyscale with alpha: 8 or 16 bits (with matching alpha channel depth)
- Truecolor with alpha: 24 bits (triplet of 8 bit R/G/B samples, alpha channel must be 8 bits)

The image must use "interlace method 0" (also known as the null method), as described in 8.2 of ISO/IEC 15948.

It should also be noted that this media format profile is for use with 7.3.29 in IEC 62481-1 and other guidelines in the future that call for an icon image media format profile.

This ProfileID may not be assigned to a content item in CDS.

M	L	n/a	n/a	n/a	ISO/IEC 15948 [21]

The W3C Recommendation of the PNG specification [21] is also an International Standard, ISO/IEC 15948:2003. The purpose of this media format profile is to define a subset of the PNG specification for UPnP device icons and image thumbnails. PNG's capability for lossless compression and transparency makes it ideal for extremely small image sizes.

Rendering endpoints for this media profile does not need to claim "absolute requirements" for PNG renderer according to 13.1 of [21]. PNG decoder implementations can be built specifically for this media format profile and not claim full compliance to the PNG specification. This guideline requirement allows for transparency.

This guideline requirement specifies the bit-depth individual sampling channels as well as the total bit depth for a colour.

Since the home network generally has higher bandwidth and lower latency than the Internet, "interlace method 1" (also known as Adam7) is less useful.

7.2.3 PNG_LRG_ICO format profile
Profile: PNG_LRG_ICO

The PNG_LRG_ICO profile must follow the requirements of 0 PNG_SM_ICO profile, except for the following requirements.

Maximum resolution:

The resolution of the image must be 120 pixels in the width field and must be 120 pixels in the height field.

It should also be noted that this media format profile is for use with 7.3.29 in IEC 62481-1 and other guidelines in the future that call for an icon image media format profile.

This ProfileID may not be assigned to a content item in CDS.

M	L	n/a	n/a	n/a	ISO/IEC 15948 [21]

7.2.4 PNG LRG format profile
Profile: PNG_LRG

PNG_LRG media format profile must follow media format profiling requirements of PNG_SM_ICO, except for the following distinctive profiling elements.

The resolution of the image must not exceed 4096 pixels in the width field and must not exceed 4096 pixels in the height field

Interlace 0 method only (interlaced images are not supported).

The following bit depths are supported by PNG_LRG (bit depths not supported by PNG_SM_ICO and PNG_LRG_ICO are in bold).

Greyscale:

- 1
- 2
- 4
- 8
- 16

Truecolor:

- 8 (24 bits total. Triplet of 8-bit R/G/B)

Indexed color:

- 1
- 2
- 4
- 8

Grayscale with alpha:

- 8
- 16

Truecolor with alpha:

- 8

The following chunks must be supported:

- IHDR
- PLTE
- IDAT
- IEND

M	A	n/a	n/a	n/a	ISO/IEC 15948 [21]

7.2.5 PNG format profile – Ancillary chunks
Profile: PNG_LRG

7.2.5.1 A bitstream conformant with this profile may include the following ancillary chunks:

- bKGD

- tRNS
- sRGB

O	A	n/a	n/a	n/a	ISO/IEC 15948 [21]

7.2.5.2 UPnP printer devices should be capable of decoding and rendering PNG_LRG content items that include the following ancillary chunks:

- bKGD
- tRNS
- sRGB

S	**A**	**DMPr**	**n/a**	**n/a**	**n/a**

7.2.6 PNG format profile – MIME type definition

Profiles:
PNG_LRG
PNG_TN

MIME type "image/png" must be used for these media format profiles.

M	R	n/a	n/a	n/a	n/a

8 Audio class media format profiles

8.1 AC-3 profiling guidelines

8.1.1 AC-3 audio format

Profile: AC3

The main characteristics of Dolby AC-3 audio stream are defined in [2].

Sampling rate:

- 32 kHz
- 44,1 kHz
- 48 kHz

Content audio channel modes:

A bitstream conformant to this media format profile may contain the following AC-3 formats:

- 1/0 (Mono)
- 2/0 (Stereo)
- 3/0 (Multichannel)
- 2/1 (Multichannel)
- 3/1 (Multichannel)

- 2/2 (Multichannel)
- 3/2 (Multichannel)

Changing audio channels among mono and stereo is allowed.

Bit rates (variable):

- 64 kbps – 640 kbps.

Payload format:

The payload format is raw bitstream.

M	L	n/a	n/a	n/a	[2]

8.1.2 AC-3 audio format – MIME type definition
Profile: AC3

MIME type "audio/vnd.dolby.dd-raw" must be used for this media format profile.

M	R	n/a	n/a	n/a	n/a

8.2 AMR profiling guidelines

8.2.1 AMR audio format
Profile: AMR_3GPP

This is a single channel multi-mode codec with encoding defined in [34]

Sampling Rate:

- 8 kHz

Bit Rates (CBR):

- 4,75 kbps
- 5,15 kbps
- 5,9 kbps
- 6,7 kbps
- 7,4 kbps
- 7,95 kbps
- 10,2 kbps
- 12,2 kbps

M	R	n/a	n/a	n/a	[34] [35]

The AMR speech codec is a mandatory codec in 3GPP cellular systems.

8.2.2 AMR audio format – MIME type definition
Profile: AMR_3GPP

MIME type "audio/3gpp" or "audio/mp4" must be used for this media format depending on the audio interchange format used.

MIME subtype of "AMR" must be used for this media format when stored as audio-only format as referenced in [36] and [37] and defined in [1].

M	R	n/a	n/a	n/a	[1] [36] [37]

8.2.3 AMR audio format
Profile: AMR_WBplus

The characteristics of AMR_WBplus audio stream are the same as specified in [33].

AMR_WBplus audio media format must abide by the following baseline characteristics:

audio encoding must be AMR_WBplus as defined in [33].

Sampling rates:

- 8 kHz
- 16 kHz
- 24 kHz
- 32 kHz
- 48 kHz

Bit rates (variable):

- 5,2 kbps – 48 kbps

Encoding types:

- Constant bit rate (CBR)
- Variable bit rate (VBR)

Content audio channel modes:

A bitstream conformant to this media format profile may contain the following formats:

- Mono (1)
- Stereo (2)

M	L	n/a	n/a	n/a	[1] [33]

8.2.4 AMR audio format – Systems portion profiling
Profile: AMR_WBplus

8.2.4.1 The AMR-WBplus audio elementary stream must be encapsulated in one of the following two 3GPP file formats that are specified in [1]:

- Progressive profile
- Basic profile

The following constraints must also be applied:

- All the provisions of 8.6.37 apply.

M	R	n/a	n/a	n/a	[1]

8.2.4.2 Between the basic and progressive profiles, the progressive profile should be used.

When the progressive profile is used then file brand "3gr6" should be used.

When the basic profile is used then file brand "3gp6" should be used.

S	R	n/a	n/a	n/a	[1]

8.2.5 AMR audio format – MIME type definition
Profile: AMR_WBplus

The MIME type "audio/3gpp" must be used for this media format profile.

M	R	n/a	n/a	n/a	n/a

8.3 ATRAC3plus profiling guidelines

8.3.1 ATRAC3plus audio format
Profile: ATRAC3plus

The audio file format and codec must conform to ATRAC3plus as defined in [3].

M	R	n/a	n/a	n/a	[3]

8.3.2 ATRAC3plus audio format – MIME type definition
Profile: ATRAC3plus

MIME type "audio/x-sony-oma" must be used for this media format profile.

MIME parameters and their usage rules for this mime type are defined in [3].

M	R	n/a	n/a	n/a	[3]

8.4 LPCM profiling guidelines

8.4.1 LPCM audio format
Profile: LPCM

This audio format specification must follow the profiling of [15], which defines the MIME encapsulation for the LPCM DLNA media format and uses the "L16" audio media format defined by [16]. "L16" denotes uncompressed audio data, using 16-bit signed representation in two's-complement notation and network byte order.

There are the following parameter constraints to "L16" as defined by DLNA.

Sampling rates:

- 44,1 kHz
- 48 kHz

Content audio channel modes:

A bitstream conformant with this media format profile may contain the following formats

- Mono (1)
- Stereo (2)

Quantization:

- 16 bit

M	L	n/a	n/a	n/a	[15] [16]

Sample rate and the number of channels parameters are provided in the MIME type header. The "channels" parameter is not required by [15].

The default channel ordering for 2 channel content is:

Channel 1: Left

Channel 2: Right

as indicated by [15]

8.4.2 LPCM audio format – Transport alignment position
Profile: LPCM

The transport alignment position for bitstreams conformant to this profile must be the sample boundary. For monaural streams this is a 16-bit sample, and for stereo streams this is a pair of 16-bit samples, one for each channel.

M	C	n/a	n/a	n/a	n/a

The channel order for stereo bitstreams is defined in 8.4.1.

8.4.3 LPCM audio format – MIME type definition
Profile: LPCM

MIME type "audio/L16" must be used for this media format profile.

The "channels" parameter should be included in MIME type header exposed by a serving endpoint.

If a serving endpoint does not include the "channels" parameter in a content description, the default value assumed by the rendering endpoint must be 1.

The "rate" parameter must be included in MIME type header exposed by the serving endpoint.

Reference [15] also defines some additional parameters to audio/L16, (i.e., emphasis, channel-order, etc). These parameters must not be used as MIME type parameters (i.e., they are illegal in DLNA).

M	R	n/a	n/a	n/a	n/a

Example MIME type for stereo LPCM content of 44,1 kHz sampling rate is:

audio/L16;rate=44100;channels=2

8.5 MP3 profiling guidelines

8.5.1 MP3 audio format
Profile: MP3

MP3 audio media format must abide by the following baseline characteristics:

Audio encoding must be MPEG-1 Layer 3 audio as defined in ISO/IEC 11172-3.

Content audio channel modes:

A bitstream conformant to this media format profiles may contain the following formats:

- Mono (1)
- Stereo (2)

Sampling rates:

- 32 kHz
- 44,1 kHz
- 48 kHz

Bit rates:

- 32 kbps
- 40 kbps
- 48 kbps
- 56 kbps
- 64 kbps
- 80 kbps
- 96 kbps
- 112 kbps
- 128 kbps
- 160 kbps
- 192 kbps
- 224 kbps
- 256 kbps
- 320 kbps

Encoding types:

- Constant bit rate (CBR)
- Variable bit rate (VBR)

M	L	n/a	n/a	n/a	ISO/IEC 11172-3

8.5.2 MP3 audio format – ID3 tag tolerance
Profile: MP3

A bitstream conformant with this profile may contain ID3 tags as defined in [4].

M	L	n/a	n/a	n/a	n/a

8.5.3 MP3 audio format – ID3 tag placement
Profile: MP3

If an MP3 file contains the ID3v2 tag [4], the tag with the ID3v2 header should be prepended to the MPEG-1 Layer3 audio bitstream ISO/IEC 11172-3. That is, the ID3v2 header is positioned at the beginning of MP3 file.

S	L	n/a	n/a	n/a	n/a

8.5.4 MP3 audio format – MIME type definition
Profile: MP3 MP3X

MIME type "audio/mpeg" must be used for these media format profiles.

M	R	n/a	n/a	n/a	n/a

8.5.5 MP3 audio format
Profile: MP3X

8.5.5.1 The MP3X audio format profile must conform to all aspects of the MP3 profile with the following extension of ISO/IEC 11172-3 to the lower sampling frequencies defined in ISO/IEC 13818-3.

The main characteristics of the MP3X audio format profile are as follows.

Audio encoding must match the provisions for one of the following MPEG audio formats:

- MPEG1 layer3
- MPEG2 layer3

Content audio channel modes:

A bitstream conformant to this media format profile may contain the following formats

- Mono (1)
- Stereo(2)

Sampling rates:

- 16 kHz
- 22,05 kHz
- 24 kHz
- 32 kHz
- 44,1 kHz

- 48 kHz

Bit rates:

- 8 kbps
- 16 kbps
- 24 kbps
- 32 kbps
- 40 kbps
- 48 kbps
- 56 kbps
- 64 kbps
- 80 kbps
- 96 kbps
- 112 kbps
- 128 kbps
- 160 kbps
- 192 kbps
- 224 kbps
- 256 kbps
- 320 kbps

Encoding types:

- Constant bit rate (CBR)
- Variable bit rate (VBR)

M	R	n/a	n/a	n/a	n/a

8.5.5.2 Rendering endpoints compliant with this DLNA media format profile must also render content indicating

- MP3 profile

M	R	n/a	n/a	n/a	n/a

8.6 MPEG-4 profiling guidelines

8.6.1 General

The DLNA-defined profiles of MPEG-4 are based on MPEG-4 AAC, MPEG-4 high efficiency AAC, MPEG-4 AAC-LTP and MPEG-4 BSAC. There are guidelines for both stereo and multi-channel audio and several supported file formats.

Many of the audio profiles incorporating AAC have a hierarchical relationship to each other. A DMP capable of rendering any of the multichannel AAC profiles is also capable of rendering the corresponding profiles with fewer channels. In addition, some profiles differ only in whether a bit rate restriction is imposed. A hierarchical relationship exists here, too, where a DMP capable of rendering a non-restricted bit-rate profile is also capable of rendering the corresponding profile without a bit-rate restriction. Furthermore, the "HEAAC" profiles and the "LTP" profiles are each a superset of a corresponding "AAC" profile because they all use the AAC-LC audio object. Finally, the "LTP" profiles include both the ISO-based file formats and the ADTS format, so these profiles are each a superset of both corresponding "AAC" profiles. The "BSAC" profiles do not include the ADTS format. Table 18 shows these relationships among MPEG-4-related audio profiles.

Table 18 – MPEG-4 profile hierarchy

		AAC_ISO	AAC_ISO_320	AAC_ADTS	AAC_ADTS_320	AAC_MULT5_ISO	AAC_MULT5_ADTS	HEAAC_L2_ISO	HEAAC_L2_ISO_32	HEAAC_L2_ADTS	HEAAC_L2_ADTS_3	HEAAC_L3_ISO	HEAAC_L3_ADTS	HEAAC_MULT5_ISO	HEAAC_MULT5_AD	AAC_LTP_ISO	AAC_LTP_MULT5_I	AAC_LTP_MULT7_I	BSAC_ISO	BSAC_MULT5_ISO
DMP renders this profile	AAC_ISO	X	X	X	X															
	AAC_ISO_320		X		X															
	AAC_ADTS			X	X															
	AAC_ADTS_320				X															
	AAC_MULT5_ISO	X	X	X	X	X	X													
	AAC_MULT5_ADTS			X	X		X													
	HEAAC_L2_ISO	X	X	X	X			X	X	X	X									
	HEAAC_L2_ISO_320		X		X				X		X									
	HEAAC_L2_ADTS			X	X					X	X									
	HEAAC_L2_ADTS_320				X						X									
	HEAAC_L3_ISO	X	X	X	X			X	X	X	X	X	X							
	HEAAC_L3_ADTS			X	X					X	X		X							
	HEAAC_MULT5_ISO	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
	HEAAC_MULT5_ADTS			X	X		X			X	X		X		X					
	AAC_LTP_ISO	X	X	X	X											X				
	AAC_LTP_MULT5_ISO	X	X	X	X	X	X									X	X			
	AAC_LTP_MULT7_ISO	X	X	X	X	X	X									X	X	X		
	BSAC_ISO																		X	
	BSAC_MULT5_ISO																		X	X

X = DMP is required to render content

Readers must consider this table informative and consider the guidelines below as the normative reference for the definition of these media format profiles.

8.6.2 AAC audio format Profiles: AAC_ADTS, AAC_ISO

The AAC audio media format must abide by the following baseline characteristics.

The audio encoding must match the provisions for one of these levels in the (MPEG-4) AAC profile as defined in ISO/IEC 14496-3. The appropriate parameter in the file format must be set to the profile and level:

- AAC Profile @ Level 1
- AAC Profile @ Level 2

Sampling rate:

- 8 kHz
- 11,025 kHz

- 12 kHz
- 16 kHz
- 22,05 kHz
- 24 kHz
- 32 kHz
- 44,1 kHz
- 48 kHz

Maximum bit rate (informative[2]):

- 576 kbps

Content audio channel modes:

A bitstream conformant to this media format profile may contain the following formats

- Mono (1)
- Stereo (2)

M	L	n/a	n/a	n/a	ISO/IEC 14496-3, A.1 ISO/IEC 14496-3

The MPEG-4 AAC profile specified in ISO/IEC 14496-3 includes only the AAC-LC audio object type.

NOTE A rendering endpoint meeting the requirements of the AAC_ISO or AAC_ADTS profiles is capable of a partial bandwidth decode of content using the MPEG-4 SBR coding tool if that content uses one of the implicit signaling modes in 1.6.5 of ISO/IEC 14496-3, Amendment 1, and uses the DLNA MF profileID "AAC_ISO" or "AAC_ADTS".

The number of channels may change during a content item.

8.6.3 AAC audio format
Profile: AAC_ISO_320

Bitstreams compliant with this profile must conform to all aspects of the AAC_ISO profile, except as noted here.

Maximum bit rate (normative):

- 320 kbps

M	L	n/a	n/a	n/a	n/a

In addition to all the provisions defined for AAC_ISO, this profile requires a maximum content bit rate of 320 kbps.

8.6.4 AAC audio format
Profile: AAC_ADTS_320

Bitstreams compliant with this profile must conform to all aspects of the AAC_ADTS profile, except as noted here.

---

[2] The maximum bit rate is defined by the following equation in ISO/IEC 14496-3: maximum bit rate = (6144 / 1024) * maximum sampling rate * number of channels.

Maximum bit rate (normative):

- 320 kbps

M	L	n/a	n/a	n/a	n/a

In addition to all the provisions defined for AAC_ADTS, this profile requires a maximum content bit rate of 320 kbps.

8.6.5 AAC audio format Profile: AAC_ISO_320

Rendering endpoints compliant with this DLNA media format profile must also render content indicating

- AAC_ADTS_320

profile.

M	A	DMP DMR	MDMD MDMP	n/a	n/a

8.6.6 AAC audio format Profiles: AAC_MULT5_ADTS, AAC_MULT5_ISO

The AAC audio media format must abide by the following baseline characteristics.

Audio encoding must match the provisions for this level in the (MPEG-4) AAC profile as defined in ISO/IEC 14496-3. The appropriate parameter in the file format must be set to the following profile and level.

AAC Profile @ Level 4

Sampling rate:

- 8 kHz
- 11,025 kHz
- 12 kHz
- 16 kHz
- 22,05 kHz
- 24 kHz
- 32 kHz
- 44,1 kHz
- 48 kHz

Maximum bit rate (informative[3]):

- 1440 kbps

Content audio channel modes:

A bitstream conformant to this media format profile may contain the following formats

3 The maximum bit rate is defined by the following equation in ISO/IEC 14496-3: maximum bit rate = (6144 / 1024) * maximum sampling rate * number of channels.

- Mono (1)
- Stereo (2)
- Multichannel (3)
- Multichannel (4)
- Multichannel (5)
- Multichannel (5.1)

M	L	n/a	n/a	n/a	ISO/IEC 14496-3, A.1 ISO/IEC 14496-3

The MPEG-4 AAC Profile specified in ISO/IEC 14496-3 includes only the AAC-LC audio object type.

NOTE Rendering endpoints meeting the requirements of the AAC_ISO or AAC_ADTS profiles are capable of a partial bandwidth decode of content using the MPEG-4 SBR coding tool if that content uses one of the implicit signalling modes in 1.6.5 of ISO/IEC 14496-3, Amendment 1, and uses the DLNA MF profileID "AAC_ISO" or "AAC_ADTS".

It should be noted that the MPEG-4 AAC profile specified in ISO/IEC 14496-3, Amendment 1, has no Level 3.

The number of channels may change during a content item.

8.6.7 AAC audio format Profile: AAC_MULT5_ADTS

Rendering endpoints compliant with this DLNA media format profile must also render content indicating

- AAC_ADTS
- AAC_ADTS_320

profiles.

M	L	DMP DMR	MDMP MDMD	n/a	n/a

8.6.8 AAC audio format Profile: AAC_MULT5_ISO

Rendering endpoints compliant with this DLNA media format profile must also render content indicating

- AAC_ADTS
- AAC_ADTS_320
- AAC_ISO
- AAC_ISO_320
- AAC_MULT5_ADTS

profiles.

M	L	DMP DMR	MDMP MDMD	n/a	n/a

8.6.9 AAC audio format Profiles: HEAAC_L2_ADTS, HEAAC_L2_ISO

HE-AAC audio media format must abide by the following baseline characteristics.

Audio encoding must match the provisions for this level in the (MPEG-4) high efficiency (HE) AAC profile as defined in ISO/IEC 14496-3, Amendment 1. The appropriate parameter in the file format must be set to the following profile and level.

HE-AAC Profile @ Level 2

AAC sampling rate (SBR present):

- 8 kHz
- 11.025 kHz
- 12 kHz
- 16 kHz
- 22,05 kHz
- 24 kHz

AAC sampling rate (SBR not present):

- 8 kHz
- 11.025 kHz
- 12 kHz
- 16 kHz
- 22,05 kHz
- 24 kHz
- 32 kHz
- 44,1 kHz
- 48 kHz

Maximum bit rate (informative[4]):

- 576 kbps

Content audio channel modes:

A bitstream conformant to this media format profile may contain the following formats

- Mono (1)
- Stereo (2)

M	L	n/a	n/a	n/a	ISO/IEC 14496-3, A.1 ISO/IEC 14496-3

4 The maximum bit rate is defined by the following equation in ISO/IEC 14496-3: maximum bit rate = (6144 / 1024) * maximum sampling rate * number of channels.

The MPEG-4 high efficiency (HE) AAC profile specified in ISO/IEC 14496-3, Amendment 1 includes the AAC LC and the SBR audio object types.

Note that the MPEG-4 HE-AAC Profile specified in ISO/IEC 14496-3, Amendment 1, has no Level 1.

The number of channels may change during a content item.

8.6.10 AAC audio format, Profile: HEAAC_L2_ADTS

Rendering endpoints compliant with this DLNA media format profile must also render content indicating profiles:

- AAC_ADTS
- AAC_ADTS_320
- HEAAC_L2_ADTS_320

M	L	DMP DMR	MDMP	n/a	n/a

8.6.11 AAC audio format, Profile: HEAAC_L2_ISO

Rendering endpoints compliant with this DLNA media format profile must also render content indicating profiles:

- AAC_ADTS
- AAC_ADTS_320
- AAC_ISO
- AAC_ISO_320
- HEAAC_L2_ADTS
- HEAAC_L2_ADTS_320
- HEAAC_L2_ISO_320

M	L	DMP	n/a	n/a	n/a

8.6.12 AAC audio format Profile: HEAAC_L2_ADTS_320

Bitstreams compliant with this profile must conform to all aspects of the HEAAC_L2_ADTS profile, except as noted here.

Maximum bit rate (normative):

- 320 kbps

M	R	n/a	n/a	n/a	n/a

8.6.13 AAC audio format – Rendering endpoints capability Profile: HEAAC_L2_ADTS_320

Rendering endpoints compliant with this DLNA media format profile must also render content indicating

- AAC_ADTS_320

profiles.

M	L	DMP DMR	MDMP	n/a	n/a

8.6.14 AAC audio format, Profile: HEAAC_L2_ISO_320

Bitstreams compliant with this profile must conform to all aspects of the HEAAC_L2_ISO profile except as noted here.

Maximum bit rate (normative):

- 320 kbps

M	R	n/a	n/a	n/a	n/a

8.6.15 AAC audio format – Rendering endpoints capabilities Profile: HEAAC_L2_ISO_320

Rendering endpoints compliant with this DLNA media format profile must also render content indicating

- AAC_ADTS_320
- AAC_ISO_320
- HEAAC_L2_ADTS_320

profiles.

M	L	DMP DMR	MDMP	n/a	n/a

8.6.16 AAC audio format Profiles: HEAAC_L3_ADTS, HEAAC_L3_ISO

Bitstreams compliant with the HE-AAC audio media format must abide by the following baseline characteristics.

Audio encoding must match the provisions for this level in the (MPEG-4) high efficiency (HE) AAC profile as defined in ISO/IEC 14496-3, Amendment 1. The appropriate parameter in the file format must be set to the profile and level:

- HE-AAC profile @ Level 3

AAC sampling rate (with and without SBR):

- 8 kHz
- 11,025 kHz
- 12 kHz
- 16 kHz
- 22,05 kHz
- 24 kHz
- 32 kHz
- 44,1 kHz
- 48 kHz

Maximum bit rate (informative[5]):

- 576 kbps

Content audio channel modes:

A bitstream conformant to this media format profile may contain the following formats

- Mono (1)
- Stereo (2)

M	L	n/a	n/a	n/a	ISO/IEC 14496-3, A.1 ISO/IEC 14496-3

NOTE The MPEG-4 high efficiency (HE) AAC profile specified in ISO/IEC 14496-3, Amendment 1, includes the AAC low complexity (LC) and the spectral band replication (SBR) audio object types.

The number of channels may change during a content item.

8.6.17 AAC audio format
Profile: HEAAC_L3_ADTS

Rendering endpoints compliant with this DLNA media format profile must also render content indicating

- AAC_ADTS
- AAC_ADTS_320
- HEAAC_L2_ADTS
- HEAAC_L2_ADTS_320

profiles.

M	L	DMP DMR	MDMP	n/a	n/a

5 The maximum bit rate is defined by the following equation in ISO/IEC 14496-3: maximum bit rate = (6144 / 1024) * maximum sampling rate * number of channels.

8.6.18 AAC audio format Profile: HEAAC_L3_ISO

Rendering endpoints compliant with this DLNA media format profile must also render content indicating

- AAC_ADTS
- AAC_ADTS_320
- AAC_ISO
- AAC_ISO_320
- HEAAC_L2_ADTS
- HEAAC_L2_ADTS_320
- HEAAC_L2_ISO
- HEAAC_L2_ISO_320
- HEAAC_L3_ADTS

profiles

M	**L**	**DMP DMR**	**MDMP**	**n/a**	**n/a**

8.6.19 AAC audio format Profiles: HEAAC_MULT5_ADTS, HEAAC_MULT5_ISO

Bitstreams compliant with the HE-AAC audio media format must abide by the following baseline characteristics.

Audio encoding must match the provisions for one of these levels in the (MPEG-4) high efficiency (HE) AAC profile as defined in ISO/IEC 14496-3, Amendment 1. The appropriate parameter in the file format must be set to the following profile and level:

- HE-AAC profile @ Level 4
- HE-AAC profile @ Level 5

AAC sampling rate (with and without SBR):

- 8 kHz
- 11,025 kHz
- 12 kHz
- 16 kHz
- 22,05 kHz
- 24 kHz
- 32 kHz
- 44,1 kHz
- 48 kHz

Maximum bit rate (informative[6]):

- 1440 kbps

6 The maximum bit rate is defined by the following equation in ISO/IEC 14496-3: maximum bit rate = (6144 / 1024) * maximum sampling rate * number of channels.

Content audio channel modes:

A bitstream conformant to this media format profile may contain the following formats

- Mono (1)
- Stereo (2)
- Multichannel (3)
- Multichannel (4)
- Multichannel (5)
- Multichannel (5.1)

M	L	n/a	n/a	n/a	ISO/IEC 14496-3, A 1 ISO/IEC 14496-3

The MPEG-4 high efficiency (HE) AAC profile specified in ISO/IEC 14496-3, Amendment 1, and ISO/IEC 14496-3, includes the AAC LC and the SBR audio object types.

The number of channels may change during a content item.

8.6.20 AAC audio format
Profile: HEAAC_MULT5_ADTS

Rendering endpoints compliant with this DLNA media format profile must also render content indicating

- AAC_ADTS
- AAC_ADTS_320
- AAC_MULT5_ADTS
- HEAAC_L2_ADTS
- HEAAC_L2_ADTS_320
- HEAAC_L3_ADTS

profiles.

M	L	DMP DMR	MDMP	n/a	n/a

8.6.21 AAC audio format
Profile: HEAAC_MULT5_ISO

Rendering endpoints compliant with this DLNA media format profile must also render content indicating

- AAC_ADTS
- AAC_ADTS_320
- AAC_ISO
- AAC_ISO_320
- AAC_MULT5_ADTS
- AAC_MULT5_ISO
- HEAAC_L2_ADTS
- HEAAC_L2_ADTS_320
- HEAAC_L2_ISO

- HEAAC_L2_ISO_320
- HEAAC_L3_ADTS
- HEAAC_L3_ISO
- HEAAC_MULT5_ADTS

profiles

M	L	DMP DMR	MDMP	n/a	n/a

8.6.22 AAC audio format Profile: AAC_LTP_ISO

Bitstreams compliant with the AAC audio media format must abide by the following baseline characteristics.

Audio encoding must match the provisions for one or both of these MPEG AOT as defined in ISO/IEC 14496-3.

- AAC LC
- AAC LTP

Audio encoding must not indicate any existing MPEG-4 AAC profile in ISO/IEC 14496-3.

Sampling rate:

- 8 kHz
- 11,025 kHz
- 12 kHz
- 16 kHz
- 22,05 kHz
- 24 kHz
- 32 kHz
- 44,1 kHz
- 48 kHz

Maximum bit rate (informative[7]):

- 576 kbps

Content audio channel modes:

A bitstream conformant to this media format profile may contain the following formats.

- Mono (1)
- Stereo (2)

M	L	n/a	n/a	n/a	ISO/IEC 14496-3

Content containing only AAC LC audio object types should be exposed by a proper AAC LC-based profile.

---

7 The maximum bit rate is defined by the following equation in ISO/IEC 14496-3: maximum bit rate = (6144 / 1024) * maximum sampling rate * number of channels.

The number of channels may change during a content item.

8.6.23 AAC audio format – Rendering Profile: AAC_LTP_ISO

Rendering endpoints compliant with this DLNA media format profile must also render content indicating

- AAC_ADTS
- AAC_ADTS_320
- AAC_ISO
- AAC_ISO_320

profiles.

M	L	DMP DMR	MDMP MDMD	n/a	n/a

8.6.24 AAC audio format Profile: AAC_LTP_MULT5_ISO

Bitstreams compliant with the AAC audio media format must abide by the following baseline characteristics.

Audio encoding must match the provisions for one or both of these MPEG AOT as defined in ISO/IEC 14496-3.

- AAC LC
- AAC LTP

Audio encoding must not indicate any existing MPEG-4 AAC profile in ISO/IEC 14496-3.

Sampling rate:

- 8 kHz
- 11,025 kHz
- 12 kHz
- 16 kHz
- 22,05 kHz
- 24 kHz
- 32 kHz
- 44,1 kHz
- 48 kHz
- 88,2 kHz
- 96 kHz

Maximum bit rate (informative[8]):

- 2880 kbps

Content audio channel modes:

A bitstream conformant to this media format profile may contain the following formats

8 The maximum bit rate is defined by the following equation in ISO/IEC 14496-3: maximum bit rate = (6144 / 1024) * maximum sampling rate * number of channels.

- Mono (1)
- Stereo (2)
- Multichannel (3)
- Multichannel (4)
- Multichannel (5)
- Multichannel (5.1)

M	L	n/a	n/a	n/a	ISO/IEC 14496-3

Content containing only AAC LC audio object types should be exposed by a proper AAC LC-based profile

The number of channels may change during a content item.

8.6.25 AAC audio format – Rendering Profile: AAC_LTP_MULT5_ISO

Rendering endpoints compliant with this DLNA media format profile must also render content indicating

- AAC_ADTS
- AAC_ADTS_320
- AAC_ISO
- AAC_ISO_320
- AAC_LTP_ISO
- AAC_MULT5 ADTS
- AAC_MULT5 ISO

profile

M	L	DMP DMR	MDMP MDMD	n/a	ISO/IEC 14496-3

8.6.26 AAC audio format Profile: AAC_LTP_MULT7_ISO

A bitstream compliant with the AAC audio media format must abide by the following baseline characteristics.

Audio encoding must match the provisions for one or both of these MPEG AOT as defined in ISO/IEC 14496-3.

- AAC LC
- AAC LTP

Audio encoding must not indicate any existing MPEG-4 AAC profile in ISO/IEC 14496-3.

Sampling rate:

- 8 kHz
- 11,025 kHz
- 12 kHz
- 16 kHz
- 22,05 kHz
- 24 kHz

- 32 kHz
- 44,1 kHz
- 48 kHz
- 88,2 kHz
- 96 kHz

Maximum bit rate (informative[9]):

- 4 032 kbps

Content audio channel modes:

A bitstream conformant to this media format profile may contain the following formats

- Mono (1)
- Stereo (2)
- Multichannel (3)
- Multichannel (4)
- Multichannel (5)
- Multichannel (7)
- Multichannel (5.1)
- Multichannel (7.1)

M	L	n/a	n/a	n/a	ISO/IEC 14496-3

Content containing only AAC LC audio object types should be exposed by a proper AAC LC-based profile

The number of channels may change during a content item.

8.6.27 AAC audio format – Rendering Profile: AAC_LTP_MULT7_ISO

Rendering endpoints compliant with this DLNA media format profile must also render content indicating

- AAC_ADTS
- AAC_ADTS_320
- AAC_ISO
- AAC_ISO_320
- AAC_LTP_ISO
- AAC_LTP_MULT5_ISO
- AAC_MULT5 ADTS
- AAC_MULT5 ISO

profiles.

---

9 The maximum bit rate is defined by the following equation in ISO/IEC 14496-3: maximum bit rate = (6144 / 1024) * maximum sampling rate * number of channels.

M	L	DMP DMR	MDMP MDMD	n/a	ISO/IEC 14496-3

8.6.28 AAC audio format – Audio interchange formats

Profiles:
AAC_ISO AAC_ISO_320,
AAC_MULT5_ISO,
HEAAC_L2_ISO,
HEAAC_L2_ISO_320,
HEAAC_L3_ISO,
HEAAC_MULT5_ISO

AAC audio format encoding must use one of the following audio interchange formats.

- MP4 file format
- 3GPP file format

M	R	n/a	n/a	n/a	ISO/IEC 14496-14 ISO/IEC 14496-12 [1]

8.6.29 AAC audio format – Audio interchange formats

Profiles:
AAC_ADTS,
AAC_ADTS_320,
AAC_MULT5_ADTS,
HEAAC_L2_ADTS,
HEAAC_L2_ADTS_320,
HEAAC_L3_ADTS,
HEAAC_MULT5_ADTS

AAC audio format encoding must use the following audio interchange format.

- ADTS

M	R	n/a	n/a	n/a	ISO/IEC 14496-3

8.6.30 AAC audio format – Audio interchange formats

Profiles:
AAC_LTP_ISO,
AAC_LTP_MULT5_ISO,
AAC_LTP_MULT7_ISO

AAC audio format encoding must use one of the following audio interchange formats.

- MP4 file format
- 3GPP file format
- ADTS

M	R	n/a	n/a	n/a	ISO/IEC 14496-3 ISO/IEC 14496-14 ISO/IEC 14496-12 [1]

8.6.31 AAC audio format – Audio interchange formats
Profiles:
AAC_ISO AAC_ISO_320,
AAC_LTP_ISO,
AAC_LTP_MULT5_ISO,
AAC_LTP_MULT7_ISO,
AAC_MULT5_ISO,
HEAAC_L2_ISO,
HEAAC_L2_ISO_32O,
HEAAC_L3_ISO,
HEAAC_MULT5_ISO

Rendering endpoints compliant with these AAC audio formats profiles must render the following audio interchange formats.

- MP4 file format
- 3GPP file format

M	R	DMP DMR	MDMP MDMD	n/a	ISO/IEC 14496-14 ISO/IEC 14496-12 [1]

8.6.32 AAC audio format – Audio interchange formats
Profiles:
AAC_ADTS,
AAC_ADTS_320,
AAC_ISO,
AAC_ISO_320,
AAC_LTP_ISO,
AAC_LTP_MULT5_ISO,
AAC_LTP_MULT7_ISO,
AAC_MULT5_ADTS,
AAC_MULT5_ISO,
HEAAC_L2_ADTS,
HEAAC_L2_ADTS_320,
HEAAC_L2_ISO,
HEAAC_L2_ISO_320,
HEAAC_L3_ADTS,
HEAAC_L3_ISO,
HEAAC_MULT5_ADTS,
HEAAC_MULT5_ISO

Rendering endpoints compliant with these AAC audio formats profiles must render the following audio interchange format.

- ADTS

M	R	DMP DMR	MDMP MDMD	n/a	ISO/IEC 14496-3

8.6.33 AAC audio format – Audio interchange formats
Profiles:
AAC_ADTS,
AAC_ADTS_320,
AAC_MULT5_ADTS,
HEAAC_L2_ADTS,
HEAAC_L2_ADTS_320,
HEAAC_L3_ADTS,
HEAAC_MULT5_ADTS

Rendering endpoints compliant with these AAC audio formats profiles should render the following audio interchange formats.

- MP4 file format
- 3GPP file format

S	R	DMP DMR	MDMP MDMD	n/a	ISO/IEC 14496-3 ISO/IEC 14496-14 ISO/IEC 14496-12 [1]

8.6.34 AAC audio format – ADTS audio interchange formats

Profiles:
AAC_ADTS,
AAC_ADTS_320,
AAC_LTP_ISO,
AAC_LTP_MULT5_ISO,
AAC_LTP_MULT7_ISO,
AAC_MULT5_ADTS,
HEAAC_L2_ADTS,
HEAAC_L2_ADTS_320,
HEAAC_L3_ADTS,
HEAAC_MULT5_ADTS

A bitstream compliant with the ADTS must selected as the audio interchange format, the following constraints on adts_fixed_header and adts_variable_header must be applied.

The constraints on adts_fixed_header are as follows:

ID:

- 0 (MPEG-4)

protection_absent:

- 0 (crc_check field is always present)

profile_ObjectType:

- 0x1

  (For AAC_ADTS profile,

  AAC_MULT5_ADTS profile,

  HEAAC_L2_ADTS profile,

  HEAAC_L2_ADTS_320 profile,

  HEAAC_L3_ADTS profile,

  HEAAC_MULT5_ADTS profile)

- 0x3

  (For AAC_LTP_ISO profile, AAC_LTP_MULT5_ISO profile, AAC_LTP_MULT7_ISO profile)

sampling_frequency_index:

- 0xb (8 kHz)
- 0xa (11,025 kHz)
- 0x9 (12 kHz)
- 0x8 (16 kHz)
- 0x7 (22,05 kHz)
- 0x6 (24 kHz)

- 0x5 (32 kHz)
- 0x4 (44,1 kHz)
- 0x3 (48 kHz)
- 0x2 (64 kHz)
- 0x1 (88,2kHz)
- 0x0 (96 kHz)

The constrains on adts_variable_header are as follows:

adts_buffer_fullness:

- 0x7FF (VBR)

number_of_raw_data_blocks_in_frame:

- 0 (One ADTS frame has only one raw_data_block)

M	L	n/a	n/a	n/a	ISO/IEC 14496-3 AMD.1 ISO/IEC 14496-3

8.6.35 AAC audio format – MP4 audio interchange format

Profiles:
AAC_ISO,
AAC_ISO_320,
AAC_LTP_ISO,
AAC_LTP_MULT5_ISO,
AAC_LTP_MULT7_ISO,
AAC_MULT5_ISO,
HEAAC_L2_ISO,
HEAAC_L2_ISO_320,
HEAAC_L3_ISO,
HEAAC_MULT5_ISO

8.6.35.1 MP4 system portion profile must match the provision about MPEG-4 Part 14 ISO/IEC 14496-14 with the constraints described below.

M	L	n/a	n/a	n/a	ISO/IEC 14496-14

The MP4 file format ISO/IEC 14496-14 is based on ISO file format ISO/IEC 14496-12.

8.6.35.2 One audio track must be present in the content item for default presentation of contents.

The default audio track must contain the audio elementary stream for this media format profile.

M	A	n/a	n/a	n/a	ISO/IEC 14496-12

An object descriptor box is optional for MP4 file.

Though the object descriptor box may contain an object descriptor or an initial object descriptor for MPEG-4 representation (generally, by BIFS track).

This guideline entry defines another way to identify an audio track for default representation (see 5.3 of ISO/IEC 14496-14).

The rendering endpoint must be able to render the default audio track.

M	A	DMP DMR	MDMP MDMD	n/a	ISO/IEC 14496-12

8.6.35.3 The default audio track must have the lowest track ID among the audio tracks stored in the content object.

M	A	n/a	n/a	n/a	ISO/IEC 14496-12

8.6.35.4 For the default audio track, "Track_enabled" must be set to the value of 1 in the "flags" field of the track header box of the track.

M	C	n/a	n/a	n/a	ISO/IEC 14496-12

8.6.35.5 Tracks other than the default audio track may be stored in the file.

It should be noted that other video or audio tracks may or may not be compliant to the elementary streams for the media format profile.

O	R	n/a	n/a	n/a	ISO/IEC 14496-12

Addition tracks may be BIFS track, optional audio tracks, text track, and hit track.

8.6.35.6 A bitstream conformant with these profiles may contain additional, optional tracks, other than the default video and audio tracks.

M	L	n/a	n/a	n/a	ISO/IEC 14496-12

8.6.35.7 A 'moov' box must be positioned after 'ttyp' and before the first 'mdat'. If a 'moof' box is present, each 'moof' box must be positioned before the corresponding 'mdat'

M	L	n/a	n/a	n/a	ISO/IEC 14496-12

For streaming, 'moov' is retrieved at first in consideration of streaming playback.

8.6.35.8 Within a track media data chunks within a media data box 'mdat' must be in decoding time order.

M	A	n/a	n/a	n/a	ISO/IEC 14496-12

8.6.35.9 Audio tracks must be organized as interleaved chunks. The duration of samples stored in a chunk must not exceed 1 s.

M	L	n/a	n/a	n/a	ISO/IEC 14496-12

A resource constrained system cannot process a big chunk.

8.6.35.10 If the size of 'moov' box becomes bigger than 1Mbytes, the MPEG-4 movie must be fragmented by using 'moof' box.

The size of 'moov' boxes must be equal to, or less than, 1Mbytes

The size of 'moof' boxes must be equal to, or less than, 300 kbytes

M	L	n/a	n/a	n/a	ISO/IEC 14496-12

A resource constrained system cannot process a big moov box in case of streaming.

The 300 Kbytes 'moof' box can store the sample table box corresponding to about 20 min AV stream if each video picture stored as a chunk.

It should be noted that a big 'moov' box may cause an initial delay in starting the rendering of the AV stream.

It should be noted that a small movie fragment may cause slow random access when the download file is played locally.

8.6.35.11 The sample size box ('stsz') must be used. The compact sample size box ('stz2') must not be used in MP4 files.

M	L	n/a	n/a	n/a	ISO/IEC 14496-12

8.6.35.12 Only a media data box (mdat) is allowed to have size 1. Only the last media data box (mdat) in the file is allowed to have size 0. Other boxes must not have size 1.

M	L	n/a	n/a	n/a	ISO/IEC 14496-12

8.6.36 AAC audio format – MP4 audio interchange format

Profiles:
AAC_ISO_320,
HEAAC_L2_ISO_320

The maximum system bit rate, which is defined as the maximum of cumulative bitrate of streams in media data, must be:

System bit rate:

- Up to 340 kbps

M	L	n/a	n/a	n/a	n/a

8.6.37 AAC audio format – 3GP audio interchange formats

Profiles:
AAC_ISO,
AAC_LTP_ISO,
AAC_LTP_MULT5_ISO,
AAC_LTP_MULT7_ISO,
AAC_MULT5_ISO,
HEAAC_L2_ISO,
HEAAC_L3_ISO,
HEAAC_MULT5_ISO

If the 3GPP file format is selected as the audio interchange format, the following constraints must be applied.

All the provisions of 8.6.35 AAC audio format – MP4 audio interchange format apply.

M	L	n/a	n/a	n/a	[1]

8.6.38 AAC audio format – MIME type definition

Profiles:
AAC_ADTS,
AAC_ADTS_320,
AAC_MULT5_ADTS,
HEAAC_L2_ADTS,
HEAAC_L2_ADTS_320,
HEAAC_L3_ADTS,
HEAAC_MULT5_ADTS

MIME type "audio/vnd.dlna.adts" must be used for these media format profiles.

M	R	n/a	n/a	n/a	ISO/IEC 14496-12

8.6.39 AAC audio format – MIME type definition

Profiles:
AAC_ISO,
AAC_ISO_320,
AAC_MULT5_ISO,
HEAAC_L2_ISO,
HEAAC_L2_ISO_320,
HEAAC_L3_ISO,
HEAAC_MULT5_ISO

MIME type "audio/mp4"or "audio/3gpp" must be used for these media format profiles, depending on the audio interchange format used.

M	R	n/a	n/a	n/a	ISO/IEC 14496-12 [1]

8.6.40 AAC audio format – MIME type definition

Profiles:
AAC_LTP_ISO,
AAC_LTP_MULT5_ISO,
AAC_LTP_MULT7_ISO

MIME type "audio/mp4", "audio/3gpp", or "audio/vnd.dlna.adts" must be used for these media format profiles, depending on the audio interchange format used.

M	R	n/a	n/a	n/a	ISO/IEC 14496-12 [1]

Unlike other AAC_ISO profiles, the AAC_LTP_ISO profiles include the ADTS file format.

8.6.41 AAC audio format

Profile: BSAC_ISO

BSAC audio media format must abide by the following baseline characteristics.

Audio encoding must match the provisions for ER-BSAC object as defined in ISO/IEC 14496-3. The appropriate parameter in the file format must be set as:

Sampling rate:

- 16 kHz
- 22,05 kHz
- 24 kHz
- 32 kHz
- 44,1 kHz
- 48 kHz

Maximum bit rate:

- 128 kbps

Content audio channel modes:

A bitstream conformant to this media format profile may contain the following formats

- Mono (1)
- Stereo (2)

M	L	n/a	n/a	n/a	ISO/IEC 14496-3

8.6.42 AAC audio format
Profile: BSAC_MULT5_ISO

Bitstreams comformant with this profile must conform to all aspects of the BSAC_ISO encoding features defined in AAC audio format, with the following additions:

Content audio channel modes:

A bitstream conformant to this media format profile may contain the following formats

- Multichannel (3)
- Multichannel (4)
- Multichannel (5)
- Multichannel (5.1)

M	L	n/a	n/a	n/a	n/a

8.6.43 AAC audio format – Audio interchange formats
Profiles:
BSAC_ISO,
BSAC_MULT5_ISO

BSAC audio format encoding must use one of the following audio interchange formats:

- MP4 file format
- 3GPP file format

M	R	n/a	n/a	n/a	ISO/IEC 14496-14 ISO/IEC 14496-12 [1]

MP4 or 3GPP is the file interchange format for BSAC streams.

8.6.44 AAC audio format – MIME type definitions
Profiles:
BSAC_ISO
BSAC_MULT5_ISO

MIME type "audio/mp4"or "audio/3gpp" must be used for these media format profiles, depending on the audio interchange format used.

M	R	n/a	n/a	n/a	ISO/IEC 14496-12 [1]

This entry defines a MIME type for this media format

8.7 WMA profiling guidelines

8.7.1 General

Table 19 summarizes the windows media audio (WMA) profiles and describes their relation with WMA specifications. Audio media class profile guidelines for WMA are listed in this subclause.

Table 19 – List of WMA profiles for the audio media class

Profile ID (DLNA.ORG_PN value)	Profile description	Relation to WMA specifications
WMABASE	Baseline profile	WMA with bit rates up to 192,999 bps
WMAFULL	Full profile	WMA with no bit rate constraints
WMAPRO	Professional profile	WMA professional version

8.7.2 WMA format Profiles: WMABASE, WMAFULL, WMAPRO

The WMA format must be profiled according to the audio guidelines defined in this subclause. Table 19 summarizes the features of the WMA profiles defined for DLNA.

M	C	n/a	n/a	n/a	[5]

WMA constitutes an audio profile within the DLNA framework.

8.7.3 WMA format – Baseline profile Profile: WMABASE

The WMA audio format must abide by the following characteristics:

The encoded audio matches the provisions for WMA defined in [5] with the following constraint.

Maximum bit rate of

- 192 999 bps

M	L	n/a	n/a	n/a	[5] [7]

The WMA baseline profile defines support for stereo signals with bit rates up to 193 kbps and sampling rates up to 48 kHz.

This profile also includes content available for HighMAT devices ISO/IEC 14496-1.

8.7.4 WMA format – Full profile Profile: WMAFULL

The WMA audio format must abide by the following characteristics.

The encoded audio matches the provisions for WMA defined in [5].

M	R	n/a	n/a	n/a	[5]

The WMA full profile defines support for stereo signals with bit rates up to 385 kbps, sampling rates of up to 48 kHz.

8.7.5 WMA format – Professional profile
Profile: WMAPRO

The WMA audio format must abide by the following characteristics.

The encoded audio matches the provisions for WMA Professional defined in [5].

M	R	n/a	n/a	n/a	[5]

The WMA professional profile defines support for up to 7.1 channels with bit rates up to 1,5 Mbps and sampling rates up to 96 kHz.

8.7.6 WMA format – Encapsulation file format for HTTP media transport
Profiles:
WMABASE
WMAFULL
WMAPRO

Endpoints capable of exchanging WMA audio format using the HTTP media transport must use the ASF encapsulation interchange format defined in [6].

M	R	DMS DMP DMR	MDMP	MDMS	[6]

ASF is the file interchange format for WMA streams when content is exchanged over the HTTP media transport.

8.7.7 WMA format – ASF operational procedures
Profiles:
WMABASE
WMAFULL
WMAPRO

Rendering endpoints that support ASF-encapsulated WMA audio format decoding over the HTTP media transport should follow the recommendations for ASF operational procedures described in [6].

S	C	DMP DMR	MDMP MDMD	n/a	[6]

Annex A describes seek operations with ASF files. It also describes buffering operations for the decoding of ASF files. These recommendations apply to the exchange of ASF encapsulated files using the HTTP media transport.

8.7.8 WMA format – Minimal implementation
Profiles:
WMABASE
WMAFULL
WMAPRO

A rendering endpoint that supports the WMA format must be capable of decoding the baseline profile (WMABASE) in addition to any other profile that it so chooses.

M	L	DMP DMR	MDMP M_DMD	n/a	[5]

This guideline defines the minimal implementation expected from DLNA players that support WMA.

8.7.9 WMA format – MIME type definition
Profiles:
WMABASE
WMAFULL
WMAPRO

MIME type "audio/x-ms-wma" must be used for these media format profiles.

M	R	n/a	n/a	n/a	[5]

9 AV media class format profiles

9.1 General

This clause specifies the set of format profiles applicable to the AV media class.

According to the requirements defined in Table 17, particular profiles of the MPEG-2 format become mandatory for HND devices depending on the applicable region. Table 17 currently defines four regions. Other regions may be incorporated in the future.

A number of the guidelines in this clause refer to the TV systems PAL and NTSC. These guidelines do not refer to the analogue part of the respective TV system, but only to the related relevant digital encoding characteristics like frame rates, frame resolutions, etc. For example,

a) "TV system PAL" in the DLNA context refers to 25 Hz video frame rate;

b) "TV system NTSC" in the DLNA context refers to 29,97 Hz video frame rate.

In addition to MPEG-2 profiles, this clause also defines profiles for MPEG-4 Part 2 (including profiles based on the H.263 version), MPEG-4 Part 10 (also known as AVC or H.264), and Windows media video version 9 (WMV9).

It should be noted that this clause defines four elementary stream profiles, namely MPEG_ES_PAL, MPEG_ES_NTSC, MPEG_ES_PAL_XAC3, MPEG_ES_NTSC_XAC3, which provide an alternate way for encapsulating AV stream content consistent with the traditional methods of RTP streaming. The four profiles define a set of additional media format profiles to signal the use of ES encapsulation. In this way, the MF profile mechanism can be re-used for RTP payload negotiation between serving and rendering endpoints.

9.2 MPEG-1 profiling guidelines

9.2.1 MPEG-1 AV format – System portion profiling
Profile: MPEG1

The MPEG1 AV format profile must conform to MPEG1 system defined in ISO/IEC 11172-1.

System bit rate:

- 1 411 200 bps (CBR)

Pack size:

- 2324

M	R	n/a	n/a	n/a	ISO/IEC 11172-1

VBR is not permitted for this media format profile.

The system bit rate 1 411 200 bps means that mux_rate is 3528 (= 2352 × 75/50).

If actual pack size is less than 2324, then zeros are filled to meet the required pack size as defined in ISO/IEC 11172-1.

9.2.2 MPEG-1 AV format – Video portion profiling
Profile: MPEG1

The MPEG1 AV format profile must conform to MPEG1 video defined in ISO/IEC 11172-2.

Main characteristics of MPEG1 video are as follows.

MPEG-1 AV format resolutions	
Resolution	**Frame rate**
352 x 288	25 Hz
352 x 240	29,97 Hz
352 x 240	23,976 Hz

Video bit rate:

- 1 151 929,1 bps (CBR)

M	L	n/a	n/a	n/a	[14] ISO/IEC 11172-2

This media format profile contains video formats for both NTSC and PAL TV systems.

9.2.3 MPEG-1 AV format – Audio portion profiling
Profile: MPEG1

The MPEG1 AV format profile must conform to MPEG1 audio defined in ISO/IEC 11172-3 with the following constrains.

The main characteristics of MPEG1 audio are as follows.

Layer:

- Layer 2

Sample frequency:

- 44,1 kHz

Audio channels:

- 2

Audio bit rate:

- 224 kbps (CBR)

M	L	n/a	n/a	n/a	ISO/IEC 11172-3

VBR and "free format" mode are not permitted..

9.2.4 MPEG-1 AV format – MIME type definition
Profile: MPEG1

MIME type "video/mpeg" must be used for this media format profile.

M	A	n/a	n/a	n/a	n/a

9.3 MPEG-2 profiling guidelines

9.3.1 General format system-level guidelines

9.3.1.1 MPEG-2 AV format – Program stream profiling

Profiles:
MPEG_PS_NTSC
MPEG_PS_PAL

9.3.1.1.1 The program streams (PS) must be profiled according to the video format-specific guideline requirements 9.2.2 through 9.2.14 and at least one of the following audio profile parameters: LPCM 9.3.2.4, AC-3 9.3.2.5, and MPEG audio layer 9.3.2.6.

M	L	n/a	n/a	n/a	ISO/IEC 13818-1 ISO/IEC 13818-2 ISO/IEC 13818-3 ISO/IEC 11172-3 [2]

9.3.1.1.2 Rendering endpoints must render the MPEG-2 PS profiled according to all video format-specific profile parameter sets listed in 9.2.2 through 9.2.14 and all audio portion profiles (i.e., LPCM, MPEG-1/2-Layer 2, and AC-3) specified in the entries 9.3.2.4 through 9.3.2.6.

The following are the exception rules.

TV system (NTSC / PAL):

Either NTSC or PAL may be supported.

AC-3:

Rendering endpoints must accept all content audio channel modes; however, only two output audio channel modes are mandatory for a rendering endpoint.

MPEG-2 L2 extension stream:

A bitstream conformant to these guidelines may contain multichannel audio information in the extension stream.

M	L	DMP DMR	MDMP MDMD	n/a	ISO/IEC 13818-1 ISO/IEC 13818-2 ISO/IEC 13818-3 ISO/IEC 11172-3 [2]

9.3.1.2 MMPEG-2 AV format – Program stream profiling

Profiles:
MPEG_PS_NTSC
MPEG_PS_PAL

The PS bitstream must consist of a sequence of MPEG-2 packs, as defined in ISO/IEC 13818-1, each of which may carry audio, video, or other data.

M	R	n/a	n/a	n/a	ISO/IEC 13818-1

9.3.1.3 MPEG-2 AV format – PS stream and substream IDs

Profiles:
MPEG_PS_NTSC
MPEG_PS_PAL

A bitstream compliant with these profiles must utilize the stream_id and sub_stream_id field to identify video and audio elementary streams as defined in this standard according to [22], and not in the program stream map (PSM) or directory structures of ISO/IEC 13818-1.

M	C	n/a	n/a	n/a	ISO/IEC 13818-1 [22]

9.3.1.4 MPEG-2 AV format – Program stream structure – Data packs

Profiles:
MPEG_PS_NTSC
MPEG_PS_PAL

A bitstream compliant with these profiles may have RDI and sub-picture packs in agreement to the provisions defined in [22].

O	C	n/a	n/a	n/a	[22]

This entry makes navigation and sub-picture packs optional. They will not be generated for example in cases of TS to PS conversions.

9.3.1.5 MPEG-2 AV format – Program stream structure – Private packs

Profiles:
MPEG_PS_NTSC
MPEG_PS_PAL

9.3.1.5.1 A bitstream compliant with these profiles may contain additional private packs recognized by the use of private stream_id and/or substream_id values.

O	C	n/a	n/a	n/a	ISO/IEC 13818-11 [22]

This entry clarifies that proprietary information may exist in the stream. It recommends the preferred MPEG-2 method to add private information without overloading stream_id values.

9.3.1.5.2 A bitstream compliant with these profiles should contain private packs that use the stream_id extensions defined in ISO/IEC 13818-11 to avoid potential conflicts with future usage of stream_id and substream_id fields.

S	C	n/a	n/a	n/a	ISO/IEC 13818-11 [22]

9.3.1.6 MPEG-2 AV format – Mandatory transport alignment element

Profiles:
MPEG_PS_NTSC
MPEG_PS_PAL

The transport alignment position for bitstreams conformant to these profiles must be the MPEG-2 pack boundary.

M	C	n/a	n/a	n/a	ISO/IEC 13818-1 [22] [32]

This entry clarifies the transport stream alignment of MPEG-2 program streams.

9.3.1.7 MPEG-2 AV format – Recommended decoder friendly alignment position

Profiles:
MPEG_PS_NTSC
MPEG_PS_PAL

The decoder friendly alignment element for bitstreams conformant with these profiles should be the MPEG-2 GOP boundary.

S	L	n/a	n/a	n/a	n/a

This entry clarifies the transport alignment of MPEG-2 program streams when a time seek is performed.

9.3.1.8 MMPEG-2 AV format – PS best effort source streams

Profiles:
MPEG_PS_NTSC
MPEG_PS_PAL

Elementary streams at the serving endpoint prior to transmission must conform to the constraints imposed by the buffer reference models defined in [22].

M	C	DMS	MDMS	n/a	[22]

The network may introduce jitter due to best effort traffic characteristics when sending packets across the network.

9.3.1.9 MPEG-2 AV format – PS best effort destination streams

Profiles:
MPEG_PS_NTSC
MPEG_PS_PAL

On arrival, rendering endpoints may reconstruct the original program multiplex typically using buffers that compensate for network jitter, delays, etc. The rate for the program multiplex must be obtained from the program_mux_rate field of a pack header. The reconstruction process is implementation-dependent.

M	C	DMP DMR	MDMP MDMD	n/a	[22]

This statement says that rendering endpoints will rely on the information from one particular field to reconstruct the program mux before decoding.

9.3.1.10 MPEG-2 AV format – MIME type definition

Profiles:
MPEG_PS_NTSC
MPEG_PS_PAL

MIME type "video/mpeg" must be used for these media format profiles.

M	A	n/a	n/a	n/a	

9.3.1.11 MPEG-2 AV format – Usage of profile IDs

Profiles
MPEG_PS_NTSC
MPEG_PS_PAL

The following profile ID values must be used for this media format.

- If the TV system is NTSC:
  DLNA profile=MPEG_PS_NTSC
- If the TV system is PAL:
  DLNA profile=MPEG_PS_PAL

M	A	n/a	n/a	n/a	

If the TV system supports both NTSC and PAL, it can be exposed using both MPEG_PS_NTSC and MPEG_PS_PAL DLNA profiles.

9.3.2 Format compression-level requirements

9.3.2.1 MPEG-2 AV format – System stream specification
Profiles:
MPEG_PS_NTSC
MPEG_PS_PAL

Main characteristics of MPEG-2 system stream are:

System:

Program stream

Number of video streams:

1 video stream only

Number of audio streams:

Up to 2 audio streams

System bit rate:

Up to 10,08 Mbps

Pack size:

Must be 2 048 bytes for each pack

Pack header:

Must match the provisions defined in Table 5.3.1-2 of [22]

Audio pack:

Audio pack structure must match the provisions in Figure 5.3.3-1 of [22].

Video pack:

Video pack structure must match the provisions in Figure 5.3.2-1 of [22].

System header:

Must match the provisions defined in Table 5.3.2-1 of [22].

Content length:

Must not exceed 1/90000 × 4294967295 second if the content has no corresponding IFO file.

M	A	n/a	n/a	n/a	ISO/IEC 13818-1 [22]

Stuffing up to 2048 bytes pack size must be done at the packet header or with padding packet.

232 – 1 = 4294967295

If the content has a corresponding IFO file, the content length limitation corresponds to that in the IFO file.

9.3.2.2 MPEG-2 AV Format – Optional system stream elements
Profiles:

MPEG_PS_NTSC
MPEG_PS_PAL

A bitstream conformant to these media format profiles may contain the follow characteristics

Program end code:

The program end code may be included at the end of stream.

O	A	n/a	n/a	n/a	n/a

9.3.2.3 MPEG-2 AV format – Video elementary stream specification

Profiles
MPEG_PS_NTSC
MPEG_PS_PAL

The video elementary stream must match the provisions for MPEG-2 video stream in 1.2, 5.1, 5.2.1, 5.3.2 and 5.5.1.2 of [22]. The main characteristics of MPEG-2 video stream are as follows.

Profile:

MP@ML

Stream ID in MPEG-2 system:

0xE0. (defined in Table 5.1-3 of [22]: stream_id).

Sequence_header:

Sequence_header followed by GOP_header must be set at the beginning of video data in video pack at the intervals between 0,4 s and 1,0 s. (defined in 5.2.1 Movie VOB in [22])

Video bit rate:

CBR: less than, or equal to, 9,80 Mbps

VBR: maximum bit rate less than, or equal to, 9,80 Mbps (defined in Table 5.5.1.2-1 of [22])

TV system:

NTSC or PAL with the following characteristics.

Table 20 – MPEG-2 AV format resolutions

	➢ NTSC	➢ PAL
Resolution	720x480 704x480 544x480 480x480 352x480 352x240	720x576 704x576 544x576 480x576 352x576 352x288
	The resolution may be changed during a single content streaming session. When this happens, and there is no associated IFO file, then the sequence_end_code must be set to the boundary of resolution change.	
Frame rate	29,97 Hz	25 Hz
Number of Pictures in GOP	36 display fields or less 18 frames or less (progressive)	30 display fields or less 15 frames or less (progressive)

(These constraints are defined in Table 5.5.1.2-1 of [22])

Display aspect ratio:

- 4:3
- 16:9

The aspect ratio may be changed. When this happens, and there is no associated IFO file, then the sequence_end_code must be set to the boundary of aspect ratio change (defined in 5.5.1.2 and Table C-2 of [22]).

"low_delay"

0b i.e. "low_delay" sequences are not permitted (defined in Table 5.5.1.2-1 of [22])

PTS, DTS in video packet:

PTS and DTS are mandatory in each video pack containing the first byte of the picture start code of any MPEG-2 I-picture encoded as a frame picture or any first MPEG-2 I-picture of a pair of two encoded field pictures.

PTS ISO/IEC 11172-2 and DTS ISO/IEC 11172-2 must be set to zero (defined in Table 5.3.2-2 of [22])

Video packet header:

Video packet header must match the provisions defined in Table 5.3.2-2 of [22]

M	A	n/a	n/a	n/a	ISO/IEC 13818-1 ISO/IEC 13818-2 [22]

For example, PTS ISO/IEC 11172-2 means the specific bit (i.e., MSB in this case) of the PTS field.

9.3.2.4 MPEG-2 AV format – Audio portion profiling – LPCM

Profiles:
MPEG_PS_NTSC
MPEG_PS_PAL

The LPCM audio stream must match the provisions for LPCM audio in 1.2, 5.1, 5.3.3 and 5.5.2.1 of [22]. The main characteristics of the LPCM audio stream are as follows.

Scheme to combine the LPCM elementary stream to MPEG-2 program stream:

LPCM audio bitstream is multiplexed as private_stream_1

Stream_id for main audio is 0xBD (indicating to the private_stream_1)

Sub_stream_id to distinguish the LPCM audio stream is 0b1010_000* (the first byte in data area of each packet is assigned as sub_stream_id).

0b1010_000*: * corresponds to audio stream number. *=0 for main language. *=1 corresponds to auxiliary language (defined in 5.1 of [22])

Sampling rate:

48 kHz (defined in Table 5.5.2.1-1 of [22])

Content audio channel modes:

A bitstream conformant to these media format profiles may contain the following formats

- Mono (1)
- Stereo (2)

- Dual monoaural (2) (these are defined in Table 5.5.2.1-2 of [22])

Quantization:

16 bits.(defined in Table 5.5.2.1-1 of [22].)

Audio bit rate:

1,536 Mbps per one stream (2 channels).

768 kbps per stream (mono)

Emphasis:

May be applied (zero point: 50 micro sec., Pole: 15 micro sec) (defined in Table 5.5.2.1-1 of [22].)

Channel assignment:

In the stereo presentation mode, the descriptions of channels, ACH0 and ACH1 correspond to the left channel (L-ch) and the right channel (R-ch), respectively (defined in F5.5.2.1 of [22]).

PTS in audio packet:

PTS must be described in every audio packet in which the first sample of audio frame is included.

PTS ISO/IEC 11172-2 must be set to ZERO (defined in Table 5.3.3-1 of [22]).

Packet header:

Packet header must match the provisions defined in Table 5.3.3-1 of [22].

M	C	n/a	n/a	n/a	[22]

9.3.2.5 MPEG-2 AV format – Audio portion profiling – AC-3

Profiles:
MPEG_PS_NTSC
MPEG_PS_PAL

AC-3 audio stream must match the provisions about AC-3 audio in 1.2, 5.1, 5.3.3 and 5.5.2.2 of [22]. The main characteristics of AC-3 audio stream are as follows.

Scheme to combine the AC-3 elementary stream to MPEG-2 program stream:

AC-3 Audio bitstream is multiplexed as private_stream_1

Stream_id for main audio is 0xBD (indicating the private_stream_1)

Sub_stream_id to distinguish the AC-3 audio stream is 0b1000_000* (the first byte in data area of each packet is assigned as sub_stream_id).

0b1000_000*: * corresponds to audio stream number. *=0 for main language. *=1 corresponds to auxiliary language (defined in 5.1 of [22]).

Sampling rate:

48 kHz (defined in Table 5.5.2.2-1 of [22]).

Content audio channel modes:

A bitstream conformant to these media format profiles may contain the following formats

- Mono (1)
- Dual monaural (1 + 1)
- Stereo (2/0)

- Multichannel (3/0)
- Multichannel (2/1)
- Multichannel (3/1)
- Multichannel (2/2)
- Multichannel (3/2)

Changing audio channels among mono, dual-mono and stereo is allowed (defined in Table 5.5.2.2-1 and Table C-4 of [22]).

Audio bit rate:

64 kbps – 448 kbps (defined in Table 5.5.2.2-1 of [22])

Emphasis:

Rendering endpoint may apply the emphasis if the emphasis flag is set.

Encode device should encode audio contents without emphasis.

PTS in audio packet:

PTS must be described in every audio packet in which the first sample of audio frame is included.

PTSISO/IEC 11172-2 must be set to zero (defined in Table 5.3.3-2 of [22]).

Packet header:

The packet header must match the provisions defined in Table 5.3.3-2 of [22].

M	C	n/a	n/a	n/a	[2] [22]

The content is converted from a content audio channel mode to an appropriate output audio channel mode by the AC-3 decoder.

9.3.2.6 MPEG-2 AV format – Audio portion profiling – MPEG-1 L2, MPEG-2 L2 Profiles: MPEG_PS_NTSC MPEG_PS_PAL

The MPEG-1 and MPEG-2 audio layer 2 stream must match the provisions about MPEG audio in 1.2, 5.1, 5.3.3 and 5.5.2.3 of [22]. The main characteristics of the MPEG audio layer 2 stream are as follows.

Stream ID in MPEG-2 system:

0b1100_000* for main audio stream

0b1101_000* for MEPG-2 extension audio stream

The bit identified by * corresponds to audio stream number with values: 0 (main language), or 1 (auxiliary language), as defined in Table 5.3.3-3 of [22].

Sampling rate:

48 kHz (defined in Table 5.5.2.3-1 of [22])

Protection:

CRC check always on (defined in Table 5.5.2.3-1 of [22]).

If bad (invalid) CRC is detected, DMP can mute the audio or deploy implementation-dependent error-concealment techniques.

Content audio channel modes:

A bitstream conformant to these media format profiles may contain the following formats

- Mono (1)
- Dual monoaural (1 + 1)
- Stereo (2)

Changing audio channels among mono, dual-mono and stereo is allowed, (defined in Table 5.5.2.3-1 and Table C-4 of [22]).

Audio bit rate:

- MPEG-1 Audio Layer 2
- 1 channel (mono):

from 64 kbps to 192 kbps

- 2 channel (stereo, dual mono)

from 64 kbps to 384 kbps

- MPEG-2 Audio Layer 2

Main stream:

- 1 channel (mono):

from 64 kbps to 192 kbps

- 2 channel (stereo, dual mono)

from 64 kbps to 384 kbps

Extension stream:

Up to 528 kbps

(defined in Table 5.5.2.3-1 of [22]).

Emphasis:

Always no emphasis. (defined in Table 5.5.2.3-1 of [22]).

Private bit:

0 (defined in Table 5.5.2.3-1of [22]).

Number of multilingual channels:

0 (defined in Table 5.5.2.3-1 of [22]).

mc_prediction_on:

0(use of prediction excluded) (defined in Table 5.5.2.3-1 of [22]).

Number of bits reserved for "dynamic_range_control" in ancillary data:

16 (defined in Table 5.5.2.3-1 of [22]).

PTS in audio packet:

PTS must be described in every audio packet in which the first sample of audio frame is included.

PTSISO/IEC 11172-2 must be set to zero (defined in Table 5.3.3-3 of [22]).

Audio packet header:

The packet header must match the provisions defined in Table 5.3.3-3 of [22]

M	C	n/a	n/a	n/a	ISO/IEC 13818-3 ISO/IEC 11172-3 [22]

9.3.2.7 MPEG2 AV format – IFO file format

Profiles:
MPEG_PS_NTSC
MPEG_PS_PAL

If the IFO file is used, then the format of an IFO file must conform to the DVD-VR IFO format except for the following provision.

Any given IFO file must include the information only for one piece of the corresponding to this IFO file DLNA PS-formatted content.

The maximum size of the IFO file must not exceed 512 kBytes

M	A	n/a	n/a	n/a	[22]

For media management-related guideline entry, see 7.4.1.46 in IEC 62481-1.

9.3.2.8 MPEG2 AV format – Field values in IFO file and their treatment

Profiles:
MPEG_PS_NTSC
MPEG_PS_PAL

9.3.2.8.1 An IFO file must conform to the field values specified in Table B.1.

M	A	n/a	n/a	n/a	[22]

NOTE "Correct value" in [22] means the value must be specified according to the DVD-VR specifications. "Ignorable" in Annex B means that the rendering endpoints do not care about the value in the field.

9.3.2.8.2 While interpreting the information in the IFO file, rendering endpoints must treat the fields according to Annex B. If the treatment in Table B.2 is "MUST check", then rendering endpoints must check the value and treat it according to what is specified in its comments column.

M	A	DMP DMR	MDMP	n/a	[22]

9.3.2.8.3 If the treatment in Annex B is "SHOULD use", then rendering endpoints should use the information specified in the field to handle the SCR/PTS discontinuous PS stream.

S	A	DMP DMR	MDMP	n/a	[22]

9.3.2.9 MPEG2 AV format – IFO file MIME type

Profiles:
MPEG_PS_NTSC
MPEG_PS_PAL

The following MIME-Type must be used in indicating the IFO file resource:

application/octet-stream.

M	A	DMS	n/a	n/a	[22]

9.3.3 General format guidelines for transport stream

MPEG-2 AV format – MPEG-2 MIME type definition
Profiles:
MPEG_TS_SD_NA,
MPEG_TS_SD_NA_T,
MPEG_TS_SD_NA_ISO,
MPEG_TS_HD_NA,
MPEG_TS_HD_NA_T,
MPEG_TS_HD_NA_ISO,
MPEG_TS_SD_EU,
MPEG_TS_SD_EU_T,
MPEG_TS_SD_EU_ISO,
MPEG_TS_SD_KO,
MPEG_TS_SD_KO_T,
MPEG_TS_SD_KO_ISO,
MPEG_TS_HD_KO,
MPEG_TS_HD_KO_T,
MPEG_TS_HD_KO_ISO

DLNA defines three MPEG TS packet formats as described below.

- 192-byte DLNA transport packet with a valid 4-byte timestamp field and a 188-byte MPEG transport stream packet
- 192-byte DLNA transport packet with zeros in a 4-byte timestamp field and a 188-byte MPEG transport stream packet
- 188-byte DLNA transport packet without a 4-byte timestamp field and a 188-byte MPEG transport stream packet

The MIME type "video/vnd.dlna.mpeg-tts" must be used for media format profiles which utilize a 192-byte DLNA transport packet format. The MIME type "video/mpeg" must be used for media format profiles which utilize the 188-byte DLNA transport packet format.

M	A	n/a	n/a	n/a	n/a

9.3.4 Common format specific requirements

9.3.4.1 MMPEG-2 AV format – System stream specification

Profiles
MPEG_TS_SD_NA,
MPEG_TS_SD_NA_T,
MPEG_TS_SD_NA_ISO,
MPEG_TS_HD_NA,
MPEG_TS_HD_NA_T,
MPEG_TS_HD_NA_ISO,
MPEG_TS_SD_EU,
MPEG_TS_SD_EU_T,
MPEG_TS_SD_EU_ISO,
MPEG_TS_SD_KO,
MPEG_TS_SD_KO_T,
MPEG_TS_SD_KO_ISO,
MPEG_TS_HD_KO,

MPEG_TS_HD_KO_T,
MPEG_TS_HD_KO_ISO

The main characteristics of MPEG-2 transport system stream are as follows.

System:

The system stream is full or partial single program transport stream (SPTS). It must contain only one program from the original broadcasted TS according to the PAT and PMT tables. A full SPTS must be fully compliant with ISO/IEC 13818-1 while a partial SPTS must be fully compliant with ISO/IEC 13818-1 except for requirements related to the T-STD model.

Number of programs:

1 as defined for a single program transport stream

Packet size:

188 bytes per transport packet

PSI information:

PAT and PMT are required in the multiplexed stream.

Additional PSI or PSIP information may exist in the multiplexed stream as defined in [ref].

Rendering endpoints must tolerate any additional information in the multiplexed stream.

The insertion intervals for PSI tables are implementation-dependent.

M	L	n/a	n/a	n/a	ISO/IEC 13818-2 ISO/IEC 13818-3 [9] ETSI TSR 101 154 V1.4.1 ISO/IEC 11172-3

A partial SPTS can be created from MPTS by removing packets corresponding to other programs or from another SPTS stream (by removing some components).

A full or partial SPTS can have multiple audio and video components in it.

The 188-byte transport stream packet specified in this guideline will be preceded by a 32-bit timestamp making a 192 byte DLNA transport packet, as described in [23] for media format profiles IDs which do not contain an "_ISO" suffix.

For a definition of "tolerance" see 3.140.

Rendering endpoints require PSI tables to initiate decoding. Therefore, it is recommended that PSI tables be inserted as early in the stream as possible. It should be noted that PSI tables may change or not be present in the stream.

9.3.4.2 MPEG-2 AV format – Rendering requirements

Profiles:
MPEG_TS_SD_NA,
MPEG_TS_SD_NA_T,
MPEG_TS_SD_NA_ISO,
MPEG_TS_HD_NA,
MPEG_TS_HD_NA_T,
MPEG_TS_HD_NA_ISO,
MPEG_TS_SD_EU,
MPEG_TS_SD_EU_T,

MPEG_DS_SD_EU_ISO,
MPEG_TS_SD_KO,
MPEG_TS_SD_KO_T,
MPEG_TS_SD_KO_ISO,
MPEG_TS_HD_KO,
MPEG_TS_HD_KO_T,
MPEG_TS_HD_KO_ISO

A rendering endpoint must tolerate but not necessarily render all audio, video and data components that belong to the (selected) program in a full or partial SPTS according to the PAT/PMT tables.

At a minimum, a rendering endpoint must render one elementary video stream and one corresponding elementary audio stream as present in TS.

M	A	DMP DMR	MDMP MDMD	n/a	ISO/IEC 13818-1 ISO/IEC 13818-2 ISO/IEC 13818-3 [9] ETSI TSR 101 154 V1.4.1 ISO/IEC 11172-3

AV device supporting AV media class content must support rendering of both, audio and video components.

For a definition of "tolerance", see 3.140.

9.3.4.3 MPEG-2 AV format – Video elementary stream specification

Profiles:
MPEG_TS_SD_NA,
MPEG_TS_SD_NA_T,
MPEG_TS_SD_NA_ISO,
MPEG_TS_SD_EU,
MPEG_TS_SD_EU_T,
MPEG_TS_SD_EU_ISO,
MPEG_TS_SD_KO,
MPEG_TS_SD_KO_T,
MPEG_TS_SD_KO_ISO

The main characteristics of MPEG-2 video stream are as follows.

Profile:

MP@ML

Chroma:

4:2:0

Video bit rate:

- CBR: equal to, or less than, 15 Mbps;
- VBR: maximum bit rate equal to, or less than, 15 Mbps.

M	L	n/a	n/a	n/a	ISO/IEC 13818-3 [9] ISO/IEC 13818-1 ISO/IEC 13818-2 ETSI TSR 101 154 V1.4.1

Some profiles may also utilize MP@HL MPEG-2 profile, as will be described in subsequent guideline entries.

9.3.4.4 MPEG-2 AV format – 192-byte timestamped TS packet format

Profiles:
MPEG_TS_SD_NA,
MPEG_TS_SD_NA_T,
MPEG_TS_HD_NA,
MPEG_TS_HD_NA_T,
MPEG_TS_SD_EU,
MPEG_TS_SD_EU_T,
MPEG_TS_SD_KO,
MPEG_TS_SD_KO_T,
MPEG_TS_HD_KO,
MPEG_TS_HD_KO_T

When a 192-byte DLNA transport packet is transmitted, each MPEG TS packet must be preceded by a 32-bit timestamp making a 192-byte packet (4-byte timestamp + 188 byte transport packet) as defined in [23]. The timestamp format is uimsbf (unsigned integer most significant bit first) as defined in ISO/IEC 13818-1.

This 32-bit field is a 27 MHz clock binary counter value to control the relative input timing to the decoder of the following transport packet. The 27 MHz clock is synchronized to the MPEG system clock but this counter value may not be equal to the STC counter value (i.e., they may have offset). A bitstream which is conformant with the profile IDs that do not have "_T" suffix must contain 0x00000000 in the timestamp field of the all packets in the stream. (Either all packets in the stream have valid timestamp or all packets have zero-valued timestamp.) If a rendering endpoint observes zero-valued timestamp in the first 2 packets of the stream, the rendering endpoint treats the timestamp as not available for the stream.

When timestamp is provided, the accuracy of the timestamp is recommended to be less than, or equal to, ± 500 ns.

Corresponding profile IDs have "_T" appended as part of their profile identifier (for example, MPEG_TS_SD_NA_T etc.) to indicate the content stream has valid timestamp values.

M	R	n/a	n/a	n/a	[23]

A conformant bitstream may not include a valid timestamp. TTS timestamp and PCR are different in the following aspects.

- PCR consists of 9-bit 27 MHz MPEG STC extension part and 33-bit 90 kHz base part. TTS timestamp is 32-bit binary 27 MHz counter.
- PCR may have discontinuity. TTS timestamp is continuous for the duration of the stream.
- PCR is present with an interval of 100 ms or less. TTS timestamp present in every TS packet.

9.3.4.5 MMPEG-2 AV format – Transport alignment position

Profiles:
MPEG_TS_SD_NA,
MPEG_TS_SD_NA_T,
MPEG_TS_SD_NA_ISO,
MPEG_TS_HD_NA,
MPEG_TS_HD_NA_T,
MPEG_TS_HD_NA_ISO,
MPEG_TS_SD_EU,
MPEG_TS_SD_EU_T,
MPEG_TS_SD_EU_ISO,
MPEG_TS_SD_KO,
MPEG_TS_SD_KO_T,
MPEG_TS_SD_KO_ISO,

MPEG_TS_HD_KO,
MPEG_TS_HD_KO_T,
MPEG_TS_HD_KO_ISO

The transport alignment position for bitstreams conformant to these profiles must be the DLNA transport packet boundary.

M	A	DMS	MDMS	n/a	n/a

9.3.5 US region specific TS profiling requirements MPEG_TS_SD_NA, MPEG_TS_SD_NA_T, MPEG_TS_HD_NA, and MPEG_TS_HD_NA_T profiles

9.3.5.1 MPEG-2 AV format – MPEG-2 AV stream

Profiles:
MPEG_TS_SD_NA,
MPEG_TS_SD_NA_T,
MPEG_TS_SD_NA_ISO

A bitstream conformant with these profiles must have the following system bit rate characteristics.

System bit rate:

- CBR or VBR up to 19,3927 Mbps

M	L	n/a	n/a	n/a	[9]

9.3.5.2 MPEG-2 AV format – MPEG-2 closed caption stream

Profiles:
MPEG_TS_SD_NA,
MPEG_TS_SD_NA_T,
MPEG_TS_SD_NA_ISO,
MPEG_TS_HD_NA,
MPEG_TS_HD_NA_T,
MPEG_TS_HD_NA_ISO

A bitstream conformant with these profiles may include closed caption streams with syntax, semantics, and usage rules defined in [9].

O	R	n/a	n/a	n/a	[9]

9.3.5.3 MPEG-2 AV format – MPEG-2 video format

Profiles:
MPEG_TS_SD_NA,
MPEG_TS_SD_NA_T,
MPEG_TS_SD_NA_ISO

Video encoding parameters:

Table 21 – MPEG_TS_SD_NA, MPEG_TS_SD_NA_TDLNA_Part_2_Media_Formats_060621.doc

Resolution	Aspect ratio	Field (interlaced) or frame (progressive) rate
720x480	16:9	29,97 P
720x480	16:9	59,94 I
720x480	4:3	29,97 P
720x480	4:3	59,94 I
704x480	16:9	59,94 I & 60 I
704x480	16:9	29,97 P & 30 P
704x480	16:9	23,976 P & 24 P
704x480	4:3	59,94 I & 60 I
704x480	4:3	29,97 P & 30 P
704x480	4:3	23,976 P & 24 P
640x480	4:3	59,94 I & 60 I
640x480	4:3	29,97 P & 30 P
640x480	4:3	23,976 P & 24 P
640x480	Square	59,94 I & 60 I
640x480	Square	29,97 P & 30 P
640x480	Square	23,976 P & 24 P
544x480	16:9	59,94 I
544x480	4:3	29,97 P
544x480	4:3	59,94 I
480x480	16:9	59,94 I
480x480	4:3	29,97 P
480x480	4:3	59,94 I
352x480	16:9	59,94 I
352x480	4:3	29,97 P
352x480	4:3	59,94 I

M	L	n/a	n/a	n/a	ISO/IEC 13818-1 ISO/IEC 13818-2 ISO/IEC 13818-3 [9] [24] [25]

60 i means interlaced sequence of 30 fps frame rate

9.3.5.4 MPEG-2 AV format – ATSC EDTV stream format

Profiles:
MPEG_TS_SD_NA,
MPEG_TS_SD_NA_T,
MPEG_TS_SD_NA_ISO

The main characteristics of the MPEG-2 video stream are as follows.

Profile:

MP@HL

Chroma:

4:2:0

Video bit rate:

- CBR: less than, or equal to, (19,3927 Mb/s minus the sum of audio, close caption data, other SI tables and TS overhead)
- VBR: maximum bit rate less than, or equal to, (19,3927 Mb/s minus the sum of audio, close caption data other SI tables and TS overhead)

M	L	n/a	n/a	n/a	ISO/IEC 13818-1 ISO/IEC 13818-2 ISO/IEC 13818-3 [9]

This is an additional profiling of MPEG_TS_SD_NA format profile that specifies different MPEG-2 profile (i.e., MP@HL).

9.3.5.5 MPEG-2 AV format – ATSC EDTV video format

Profiles:
MPEG_TS_SD_NA,
MPEG_TS_SD_NA_T,
MPEG_TS_SD_NA_ISO

Video encoding parameters:

Additional parameters for **MPEG_TS_SD_NA, MPEG_TS_SD_NA_T**

Resolution	Aspect ratio	Field (interlaced) or frame (progressive) rate
704x480	16:9	59,94 P & 60 P
704x480	4:3	59,94 P & 60 P
640x480	4:3	59,94 P & 60 P
640x480	Square	59,94 P & 60 P

M	L	n/a	n/a	n/a	ISO/IEC 13818-1 ISO/IEC 13818-2 ISO/IEC 13818-3 [9]

This is an additional profiling of MPEG_TS_SD_NA format profile that specifies different MPEG-2 profile (i.e. MP@HL) to support enhanced definition TV.

9.3.5.6 MPEG-2 AV format – Audio portion profiling – AC-3

Profiles:
MPEG_TS_SD_NA,
MPEG_TS_SD_NA_T,
MPEG_TS_SD_NA_ISO,
MPEG_TS_HD_NA,
MPEG_TS_HD_NA_T,
MPEG_TS_HD_NA_ISO

The main characteristics of the ATSC AC-3 audio stream are as follows.

Sampling rate:

48 kHz

Content audio channel modes:

A bitstream conformant to these media format profiles may contain the following AC-3 formats

- Mono (1/0)
- Stereo (2/0)
- Multi-channels (3/0)
- Multi-channels (2/1)
- Multi-channels (3/1)
- Multi-channels (2/2)
- Multi-channels (3/2)

A bitstream conformant to these media format profiles must be conformant with the requirements of [9].

Audio bit rate:

- Main audio service up to 448 kbps per one stream

The combined bit rate of a main service and an associated service which are intended to be decoded simultaneously must be up to 576 kbps.

M	R/L	n/a	n/a	n/a	[2] [9]

32 kHz and 44.1 kHz AC-3 audio sampling rates were removed from the ATSC A/53B Annex B normative standard.

576 kbps is the maximum ATSC AC-3 audio bit rate instead of 640 kbps per ATSC A/53B Annex B normative standard

9.3.5.7 MPEG-2 AV format – System stream

Profiles:
MPEG_TS_HD_NA,
MPEG_TS_HD_NA_T,
MPEG_TS_HD_NA_ISO

A bitstream conformant with these profiles must have the following system bit rate characteristics.

System bit rate:

- CBR or VBR up to 19,3927 Mbps

M	L	n/a	n/a	n/a	[9]

9.3.5.8 MPEG-2 AV format – Stream format

Profiles:
MPEG_TS_HD_NA,
MPEG_TS_HD_NA_T,
MPEG_TS_HD_NA_ISO

The main characteristics of the MPEG-2 video stream are as follows.

Profile:

MP@HL

Chroma:

4:2:0

Video bit rate:

- CBR: less than or equal to (19,3927 Mb/s minus the sum of audio, close caption data, other SI tables and TS overhead)
- VBR: maximum bit rate less than or equal to (19,3927 Mb/s minus the sum of audio, close caption data other SI tables and TS overhead)

M	L	n/a	n/a	n/a	ISO/IEC 13818-1 ISO/IEC 13818-2 ISO/IEC 13818-3 [9]

9.3.5.9 MPEG-2 AV format – Video format

Profiles:
MPEG_TS_HD_NA
MPEG_TS_HD_NA_T
MPEG_TS_HD_NA_ISO

Table 22 – Video MPEG-2 AV encoding ParametersDLNA_Part_2_Media_Formats_060613.doc

MPEG_TS_HD_NA, MPEG_TS_HD_NA_T MPEG_TS_HD_NA, MPEG_TS_HD_NA_T		
Resolution	**Aspect ratio**	**Field (interlaced) or frame (progressive) rate**
1920x1080	16:9	59,94 I & 60 I
1920x1080	16:9	29,97 P & 30 P
1920x1080	16:9	23,976 P & 24 P
1920x1080	Square	59,94 I & 60 I
1920x1080	Square	29,97 P & 30 P
1920x1080	Square	23,976 P & 24 P
1280x720	16:9	59,94 P & 60 P
1280x720	16:9	29,97 P & 30 P
1280x720	16:9	23,976 P & 24 P
1280x720	Square	59,94 P & 60 P
1280x720	Square	29,97 P & 30 P
1280x720	Square	23,976 P & 24 P
1440x1080	16:9	29,97 P & 30 P
1440x1080	16:9	23,976 P & 24 P
1440x1080	16:9	59,94 I & 60 I
1280x1080	16:9	29,97 P & 30 P
1280x1080	16:9	23,976 P & 24 P
1280x1080	16:9	59.94 I & 60 I

M	L	n/a	n/a	n/a	ISO/IEC 13818-1 ISO/IEC 13818-2 ISO/IEC 13818-3 [9] [24] [25]

9.3.6 Korean region specific TS profiling requirements: MPEG_TS_SD_KO, MPEG_TS_SD_KO_T, MPEG_TS_HD_KO, and MPEG_TS_HD_KO_T profiles

9.3.6.1 MPEG-2 AV format – MPEG-2 AV stream

Profiles:
MPEG_TS_SD_KO,
MPEG_TS_SD_KO_T,
MPEG_TS_SD_KO_ISO

A bitstream conformant with these profiles must have the following system bit rate characteristics.

System bit rate:

- CBR or VBR up to 19,3927 Mbps

M	L	n/a	n/a	n/a	[9]

9.3.6.2 MPEG-2 AV format – Closed caption

Profiles:
MPEG_TS_SD_KO,
MPEG_TS_SD_KO_T,
MPEG_TS_SD_KO_ISO,
MPEG_TS_HD_KO,
MPEG_TS_HD_KO_T,
MPEG_TS_HD_KO_ISO

A bitstream conformant with these profiles may include closed caption streams with syntax, semantics, and usage rules defined in [9].

M	R	n/a	n/a	n/a	[9]

9.3.6.3 MPEG-2 AV format – Audio portion profiling AC-3

Profiles:
MPEG_TS_SD_KO,
MPEG_TS_SD_KO_T,
MPEG_TS_SD_KO_ISO,
MPEG_TS_HD_KO,
MPEG_TS_HD_KO_T,
MPEG_TS_HD_KO_ISO

The main characteristics of the ATSC AC-3 audio stream are as follows.

Sampling rate:

48 kHz

Content audio channel modes:

Rendering endpoints must tolerate the following AC-3 formats

- Mono (1/0)
- Stereo (2/0)
- Multi-channels (3/0)
- Multi-channels (2/1)
- Multi-channels (3/1)
- Multi-channels (2/2)
- Multi-channels (3/2)

A bitstream conformant to these media format profiles must be conformant with the requirements of [9]

Audio bit rate:

Main audio service up to 448 kbps per one stream.

The combined bit rate of a main service and an associated service which are intended to be decoded simultaneously must be up to 576 kbps

M	L	n/a	n/a	n/a	[2] [9]

32 kHz and 44.1 kHz AC-3 audio sampling rates were removed from the ATSC A/53B Annex B normative standard.

576 kbps is the maximum ATSC AC-3 audio bit rate instead of 640 kbps per ATSC A/53B Annex B normative standard

9.3.6.4 MPEG-2 AV format – Video format

Profiles:
MPEG_TS_SD_KO,
MPEG_TS_SD_KO_T,
MPEG_TS_SD_KO_ISO

Video encoding parameters:

Table 23 – MPEG_TS_SD_KO, MPEG_TS_SD_KO_T

Resolution	Aspect ratio	Field (interlaced) or frame (progressive) rate
704x480	16:9	29,97 P & 30 P
704x480	16:9	23,976 P & 24 P
704x480	16:9	59,94 I & 60 I
704x480	4:3	29,97 P & 30 P
704x480	4:3	23,976 P & 24 P
704x480	4:3	59,94 I& 60 I
640x480	4:3	29,97 P & 30 P
640x480	4:3	23,976 P & 24 P
640x480	4:3	59,94 I & 60 I

M	L	n/a	n/a	n/a	ISO/IEC 13818-1 ISO/IEC 13818-2 ISO/IEC 13818-3 [9]

9.3.6.5 MPEG-2 AV format – Video stream specification

Profiles:
MPEG_TS_HD_KO,
MPEG_TS_HD_KO_T,
MPEG_TS_HD_KO_ISO

A bitstream conformant with these profiles must have the following system bit rate characteristics.

System bit rate:

- CBR or VBR up to 19,3927 Mbps

M	L	n/a	n/a	n/a	[9]

9.3.6.6 MPEG-2 AV format – Video stream format

Profiles:
MPEG_TS_HD_KO,
MPEG_TS_HD_KO_T,
MPEG_TS_HD_KO_ISO

The main characteristics of MPEG-2 video stream are as follows.

Profile:

MP@HL

Chroma:

4:2:0

Video bit rate:

- CBR: less than, or equal to, (19,3927 Mb/s minus the sum of audio, close caption data, other SI tables and TS overhead)
- VBR: maximum bit rate less than, or equal to, (19,3927 Mb/s minus the sum of audio, close caption data other SI tables and TS overhead)

M	L	n/a	n/a	n/a	ISO/IEC 13818-1 ISO/IEC 13818-2 ISO/IEC 13818-3 [9]

9.3.6.7 MPEG-2 AV format – Video format

Profiles:
MPEG_TS_HD_KO
MPEG_TS_HD_KO_T
MPEG_TS_HD_KO_ISO

9.3.6.7.1 Video encoding parameters

Table 24 – MPEG_TS_HD_KO, MPEG_TS_HD_KO_T

Resolution	Aspect ratio	Field (interlaced) or frame (progressive) rate
1920x1080	16:9	59,94 I & 60 I
1280x720	16:9	59,94 P & 60 P
704x480	16:9	59,94 P & 60 P
704x480	4:3	59,94 P & 60 P
640x480	4:3	59,94 P & 60 P

9.3.6.7.2

M	L	n/a	n/a	n/a	ISO/IEC 13818-1 ISO/IEC 13818-2 ISO/IEC 13818-3 [9]

9.3.7 DVB-European region specific TS profiling requirements MPEG_TS_SD_EU and MPEG_TS_SD_EU_T profiles

9.3.7.1 MPEG-2 AV format – Europe region – Compliance
Profiles:
MPEG_TS_SD_EU,
MPEG_TS_SD_EU_T,
MPEG_TS_SD_EU_ISO

A bitstream complaint with these profiles must comply with the following.

Subclause 4.1 in ETSI TSR 101 154 V1.4.1 defining the use of ISO/IEC 13818-1 for IRDs and bitstreams in DVB.

Subclause 5.1 in ETSI TSR 101 154 V1.4.1 defining the use of ISO/IEC 13818-2 for 25 Hz SDTV IRDs and bitstreams in DVB.

Clause 6 in ETSI TSR 101 154 V1.4.1 defining the use of ISO/IEC 13818-3 and ISO/IEC 11172-3 for IRDs and bitstreams in DVB.

All requirements for the MPEG_TS_SD_EU profile defined in this document that further specify, limit or otherwise modify the requirements for 25 Hz SDTV IRDs and bitstreams in DVB as defined in ETSI TSR 101 154 V1.4.1.

M	L	n/a	n/a	n/a	ISO/IEC 13818-1 ISO/IEC 13818-2 ISO/IEC 13818-3 ISO/IEC 11172-3 ETSI TSR 101 154 V1.4.1

30 Hz systems and HDTV are out of the scope of this guideline

9.3.7.2 MPEG-2 AV format – Subtitles for TS
Profiles:
MPEG_TS_SD_EU,
MPEG_TS_SD_EU_T,
MPEG_TS_SD_EU_ISO

9.3.7.2.1 A bitstream compliant with these profiles may contain DVB subtitles as specified in [27].

O	R	n/a	n/a	n/a	[27]

9.3.7.2.2 Rendering endpoints must tolerate but not necessarily render DVB subtitles as specified in [27].

M	R	DMP DMR	MDMP MDMD	n/a	[27]

9.3.7.2.3 A rendering endpoint should be *capable of rendering* DVB subtitles as specified in [27] if they are present.

S	A	DMP DMR	MDMP MDMD	n/a	[27]

If DVB subtitles are not used in the country in which the device is sold, this recommendation is not applicable.

9.3.7.3 MPEG-2 AV format – Teletext for TS
Profiles:
MPEG_TS_SD_EU,

MPEG_TS_SD_EU_T,
MPEG_TS_SD_EU_ISO

9.3.7.3.1 A bitstream compliant with these profiles may contain DVB teletext as specified in [29].

O	R	n/a	n/a	n/a	[29]

9.3.7.3.2 Rendering endpoints must tolerate but not necessarily render teletext as specified in [29].

M	R	DMP DMR	MDMP MDMD	n/a	[29]

9.3.7.4 MPEG-2 AV format – DVB SDTV systems
Profile
MPEG_TS_SD_E,
MPEG_TS_SD_EU_T,
MPEG_TS_SD_EU_ISO

9.3.7.4.1 The main characteristics of the MPEG-2 European DVB full transport stream are as follows

- TS format with PSI and SI tables as specified in 4.1 of ETSI TSR 101 154 V1.4.1 [26]. Other program-related data may be present according to [31].

M	R	n/a	n/a	n/a	ETSI TSR 101 154 V1.4.1 [26] [31]

The intent of this guideline is to ensure that TS complies with relevant DVB specifications.

9.3.7.4.2 A partial SPTS format is a TS with gaps of variable length between the TS packets. It must contain only one program from the original broadcast TS. A partial SPTS must carry at least the following PSI and SI tables as defined in ISO/IEC 13818-1, ETSI TSR 101 154 V1.4.1, and [26].

PAT and PMT:

SIT and the corresponding partial TS descriptor.

DIT whenever there is a discontinuity in the SI information.

M	F	n/a	n/a	n/a	ISO/IEC 13818-1 ETSI TSR 101 154 V1.4.1 [26] [31]

A full SPTS is fully compliant with ISO/IEC 13818-1.

A partial SPTS is fully compliant with ISO/IEC 13818-1 except for the T-STD buffer model.

9.3.7.4.3 A Rendering Endpoint may process a DIT as defined in [26] in a partial SPTS.

O	A	DMP DMR	MDMP MDMD	n/a	[26]

9.3.7.4.4 A bitstream compliant with these profiles is strongly recommended to contain a partial SPTS with all of the SI tables as defined in [26] that were part of the original broadcast TS as well as all audio, video and data components that belong to the (selected) program according to the PAT/PMT tables, and CAT, if need be. This includes components that contain DVB defined data that belong to that program such as teletext as defined in [29], other VBI data as defined in [28], object carrousels as defined in [30] [68], or MHP data as defined in [31].

S	A	n/a	n/a	n/a	[26] [28] [29] [30] [68] [31]

Even though content protection is outside the scope of this standard, it should be allowed to insert the CAT table to accommodate a DMP that is capable of decryption.

9.3.7.4.5 A rendering endpoint must tolerate all audio, video and data components that belong to the (selected) program in a full or partial SPTS according to the PAT/PMT tables.

This includes components that contain DVB defined data that belong to that program such as teletext as defined in [29], other VBI data as defined in [28], object carrousels as defined in [30] [68], or MHP data as defined in [31] and others.

M	A	DMP DMR	MDMP MDMD	n/a	[26] [28] [29] [30] [68] [31]

9.3.7.4.6 When the SI tables of a partial SPTS refer to programs that are not present in the partial SPTS or otherwise conflict with data in the SIT table of that partial SPTS, the rendering endpoint must ignore this SI data.

M	A	DMP DMR	MDMP MDMD	n/a	[26]

9.3.7.4.7 A rendering endpoint that is *capable of rendering* both audio and video must be able to render a full or partial SPTS containing a program with one video ES up to 15 Mb/s and one stereo (2/0) audio ES.

M	A	DMP DMR	MDMP MDMD	n/a	n/a

9.3.7.5 MPEG-2 AV format – Audio portion profiling – MPEG-1/2 audio
Profiles:
MPEG_TS_SD_EU,
MPEG_TS_SD_EU_T,
MPEG_TS_SD_EU_ISO

The main characteristics of the MPEG-2 TS format/European DVB profile for MPEG-1 or MPEG-2 audio streams, according to Clause 6 of ETSI TSR 101 154 V1.4.1 defining the use of ISO/IEC 13818-3 and ISO/IEC 11172-3.

Coding:

- MPEG-1 Layer 1
- MPEG-1 Layer 2

A bitstream compliant with these profiles may contain a joint stereo encoded audio stream.

No mc-prediction.

MPEG-1 backwards compatible multi-channel mode:

- MPEG-2 Layer 2 mc (multi-channel), dematrix procedure 0, 1 or 2

Content audio channel mode:

A bitstream conformant to these media format profiles may contain the following formats

- Mono (1/0)
- Dual Monaural (1/0+1/0)
- Stereo (2/0)
- Multichannel (2/2)
- Multichannel (2/1)
- Multichannel (3/2)
- Multichannel (3/1)
- Multichannel (3/0)
- Multichannel (3/0+2/0)
- Multichannel (2/0+2/0)
- Multichannel ([1/0+1/0])+2/0)
- Multichannel (1/0+2/0)

A bitstream compliant with these profiles may contain an extension stream and ancillary data fields of the audio stream

No multilingual channels in multi-channel mode

CRC check must be included

Sample rates:

- 32 kHz
- 44,1 kHz
- 48 kHz

Bit rates:

- Layer 1: from 32 to 448 kbps
- Layer 2: from 32 to 384 kbps

Extension stream (optional):

- From 0 to 682 kbps

No emphasis

M	R	n/a	n/a	n/a	ISO/IEC 13818-3 ISO/IEC 11172-3 ETSI TSR 101 154 V1.4.1

Serving endpoints must output one of the three basic content audio channel modes. The optional multi-channel modes use the ancillary data fields and optionally an extension stream, thereby preserving backwards compatibility to basic stereo decoders. Decoding of all multi-channel modes is optional.

9.3.7.6 MPEG-2 AV format – Audio portion profiling – MPEG-1/2 audio secondary sound services

Profiles:
MPEG_TS_SD_EU,

MPEG_TS_SD_EU_T,
MPEG_TS_SD_EU_ISO

9.3.7.6.1 A bitstream compliant with these profiles may contain the following additional sample rateYs for secondary sound services:

- 16 kHz
- 22,05 kHz
- 24 kHz

O	A	n/a	n/a	n/a	ETSI TSR 101 154 V1.4.1

European broadcasters expect DMPs to support this.

9.3.7.6.2 Rendering Endpoint must be able to play bitstreams which contain the following additional sample ratYes for secondary sound services:

- 16 kHz
- 22,05 kHz
- 24 kHz

M	A	DMP DMR	MDMP MDMD	n/a	

9.3.7.7 MPEG-2 AV format – Optional audio portion profiling – AC-3
Profiles:
MPEG_TS_SD_EU,
MPEG_TS_SD_EU_T,
MPEG_TS_SD_EU_ISO

9.3.7.7.1 The audio portion in the contents of an AV media class may be profiled according to the pptional audio portion profiling, AC-3, as indicated in 9.3.7.7.2 and 9.3.7.8.

O	A	n/a	n/a	n/a	n/a

9.3.7.7.2 The main characteristics of the MPEG-2 TS format/European DVB profile AC-3 audio stream (i.e., optional audio portion profiling) are as follows.

The coding and decoding of an AC-3 elementary stream is based upon ITU-R Recommendation BS.1196-11, ITU-R Recommendation BS.1196-E, Annex 2. However, Appendix 1 to Annex 2 of ITU-R Recommendation BS.1196-11 should be disregarded, as it is not applicable to the DVB system

Sample rates:

- 32 kHz
- 44,1 kHz
- 48 kHz

Content audio channel mode:

A bitstream conformant to these media format profiles may contain the following formats that optionally include a low-frequency-effects (LFE) channel

- Mono (1/0)

- Dual monoaural (1+1)
- Stereo (2/0)
- Multichannel (3/0)
- Multichannel (2/1)
- Multichannel (3/1)
- Multichannel (2/2)
- Multichannel (3/2)

Bit rates:

from 32 kbps to 640 kbps

AC-3 transmission in a full or partial SPTS according to Annex C of ETSI TSR 101 154 V1.4.1.

The AC-3 packetized elementary stream must conform to the requirements of a user private stream type 1, as described in ISO/IEC 13818-1.

AC-3 descriptor to distinguish the AC-3 audio stream is defined in ETSI TSR 101 154 V1.4.1 [26].

The AC-3 elementary stream must be byte-aligned within the MPEG-2 full or partial SPTS. This means the initial 8 bits of an AC-3 frame must reside in a single byte, which is carried in the MPEG-2 full or partial SPTS.

M	R	n/a	n/a	n/a	ISO/IEC 13818-1 ITU-R Recommendation BS.1196-11 ETSI TSR 101 154 V1.4.1 [26]

9.3.7.8 MPEG-2 AV format – Audio portion profiling – AC-3 Annex C

Profiles:
MPEG_TS_SD_EU,
MPEG_TS_SD_EU_T,
MPEG_TS_SD_EU_ISO

A bitstream that conforms to these profiles must comply with Annex C of ETSI TSR 101 154 V1.4.1.

M	L	n/a	n/a	n/a	ETSI TSR 101 154 V1.4.1

ETSI TSR 101 154 V1.4.1 only recommends Annex C to support AC-3.

9.3.7.9 MPEG-2 AV format – Video portion profiling

Profiles:
MPEG_TS_SD_EU,
MPEG_TS_SD_EU_T,
MPEG_TS_SD_EU_ISO

The main characteristics of the MPEG-2 TS format/European DVB SDTV profile video stream are as follows.

A bitstream conformant to these profiles may contain the following full-screen resolutions:

- 720x576 50I
- 544x576 50I
- 480x576 50I
- 352x576 50I
- 352x288 50I

A serving endpoint may output other resolutions (lower than 720×576) for less than full-screen display. Rendering of these resolutions in full-screen format is optional for a DMP. If a DMP is not capable of rendering these resolutions in full-screen format, it must be able to render them on part of the screen.

A serving endpoint may output and a rendering endpoint must be capable of rendering the following aspect ratios:

- 4:3
- 16:9

A serving endpoint may output and a rendering endpoint must accept but not necessarily render the following aspect ratios:

- 2,21:1

Pan vectors as specified in ETSI TSR 101 154 V1.4.1 allow a 4:3 DMP to give a full-screen picture of 16:9 content.

It is recommended that the total bit rate of the set of components, associated PMT and PCR packets for a full or partial SPTS anticipated to be recorded by a consumer, should not exceed 9 Mbpsi.

M	R	n/a	n/a	n/a	ISO/IEC 13818-2 ETSI TSR 101 154 V1.4.1

50 I means 50 fields per second interlaced rate.

9.3.8 Subset of DLNA profiles that use MPEG-2 MP@LL, MPEG-2 TS encapsulation

9.3.8.1 MPEG-2 AV format – Video portion profiling

Profiles:
MPEG_TS_MP_LL_AAC,
MPEG_TS_MP_LL_AAC_T,
MPEG_TS_MP_LL_AAC_ISO

The main characteristics of the video stream are as follows.

Profile and level:

- MP@LL

Chroma:

- 4:2:0

Video bit rate:

- Less than 4 Mbps

Table 25 – MPEG-2 AV format resolutions

	Resolution	Pixel aspect ratio	Display aspect ratio	Maximum frame rate
CIF	352x288	12:11	4:3	30
	352x288	16:11	16:9	30

M	L	n/a	n/a	n/a	

9.3.8.2 MPEG-2 AV format – Audio portion profiling

Profiles:
MPEG_TS_MP_LL_AAC,
MPEG_TS_MP_LL_AAC_T,
MPEG_TS_MP_LL_AAC_ISO

The main characteristics of the audio portion must align with the AAC audio format as outlined in 8.6.2, except as noted here.

Maximum bit rate:

- 256 kbps

M	L	n/a	n/a	n/a	n/a

9.3.8.3 MPEG-2 AV format – MIME type definition

Profiles:
MPEG_TS_MP_LL_AAC
MPEG_TS_MP_LL_AAC_T
MPEG_TS_MP_LL_AAC_ISO

The MIME type of "video/vnd.dlna.mpeg-tts" must be used for the MPEG_TS_MP_LL_AAC and MPEG_TS_MP_LL_AAC_T media format profiles. The MIME type "video/mpeg" must be used for the MPEG_TS_MP_LL_AAC_ISO media format profile.

		n/a	n/a	n/a	n/a

9.3.8.4 MPEG-2 AV format – Systems portion profiling

Profiles:
MPEG_TS_MP_LL_AAC,
MPEG_TS_MP_LL_AAC_T,
MPEG_TS_MP_LL_AAC_ISO

The main characteristics of the MPEG-2 system stream are as follows.

System:

- MPEG-2 transport stream

Number of programs:

1 as defined for a single program transport stream

Packet size:

- 188 bytes per transport packet

System bit rate:

- Up to 5 Mbps (video up to 4 Mbps)

PSI information:

PAT and PMT are required in the multiplexed stream.

Additional PSI or PSIP information may exist in the multiplexed stream

A bitstream conformant with these guidelines may contain additional information in the multiplexed stream.

The insertion intervals for PSI tables are implementation-dependent.

		n/a	n/a	n/a	n/a

For a definition of "tolerance" refer to the terminology in Clause 4 of this standard.

9.3.9 AC-3 extension for AV format profiles

9.3.9.1 MPEG-2 AV format – Audio bit rate Profile: MPEG_PS_NTSC_XAC3

A bitstream that is conformant to this profile must conform to all aspects of the MPEG_PS_NTSC profile, except as noted here.

AC-3 audio bit rate:

- 64 kbps – 640 kbps.

M	L	n/a	n/a	n/a	[2]

See 7.7 of [8], especially, 7.7.16

9.3.9.2 MPEG-2 AV format – Audio bit rate Profile: MPEG_PS_PAL_XAC3

A bitstream that is conformant to this profile must conform to all aspects of the MPEG_PS_PAL profile, except as noted here.

AC-3 audio bit rate:

- 64 kbps – 640 kbps.

M	L	n/a	n/a	n/a	[2]

See 7.7 of [8], especially, 7.7.16

9.3.9.3 MPEG-2 AV format – Audio bit rate Profile: MPEG_TS_SD_NA_XAC3, MPEG_TS_SD_NA_XAC3_T, MPEG_TS_SD_NA_XAC3_ISO

A bitstream that is conformant to this profile must conform to all aspects of the MPEG_TS_SD_NA, MPEG_TS_SD_NA_T, and MPEG_TS_SD_NA_ISO profiles respectively, except as noted here.

AC-3 audio bit rate:

- Main audio service up to 640 kbps per one stream.

  The combined bit rate of a main service and an associated service which are intended to be decoded simultaneously is not constrained.

M	L	n/a	n/a	n/a	[2]

See 7.7 of [8], especially, 7.7.34

The constraint from ATSC A/53B, Annex B, on the combined bit rate is not used in this profile.

9.3.9.4 MPEG-2 AV format - Audio bit rate

Profiles:
MPEG_TS_HD_NA_XAC3
MPEG_TS_HD_NA_XAC3_T
MPEG_TS_HD_NA_XAC3_ISO

A bitstream that is conformant to this profile must conform to all aspects of the MPEG_TS_HD_NA, MPEG_TS_HD_NA_T, and MPEG_TS_HD_NA_ISO profiles respectively, except as noted here.

AC-3 audio bit rate

- Main audio service up to 640 kbps per one stream.

  The combined bit rate of a main service and an associated service which are intended to be decoded simultaneously is not constrained.

M	L	n/a	n/a	n/a	[2]

See 7.7 of [8], especially, 7.7.34

The constraint from ATSC A/53B, Appendix A, on the combined bit rate is not used in this profile.

9.3.9.5 MPEG-2 AV format – Audio bit rate

Profiles:
MPEG_TS_SD_KO_XAC3
MPEG_TS_SD_KO_XAC3_T
MPEG_TS_SD_KO_XAC3_ISO

A bitstream that is conformant to this profile must conform to all aspects of the MPEG_TS_SD_KO, MPEG_TS_SD_KO_T, and MPEG_TS_SD_KO_ISO profiles respectively, except as noted here.

AC-3 Audio bit rate:

- Main audio service up to 640 kbps per one stream.

  The combined bit rate of a main service and an associated service which are intended to be decoded simultaneously is not constrained.

M	L	n/a	n/a	n/a	[2]

See 7.7 of [8], especially, 7.7.42

The constraint from ATSC A/53B Annex B on the combined bit rate is not used in this profile.

9.3.9.6 MPEG-2 AV format – Audio bit rate

Profiles:
MPEG_TS_HD_KO_XAC3

MPEG_TS_HD_KO_XAC3_T
MPEG_TS_HD_KO_XAC3_ISO

A bitstream that is conformant to this profile must conform to all aspects of the MPEG_TS_HD_KO, MPEG_TS_HD_KO_T, and MPEG_TS_HD_KO_ISO profiles respectively, except as noted here.

AC-3 Audio bit rate:

- Main audio service up to 640 kbps per one stream.

  The combined bit rate of a main service and an associated service which are intended to be decoded simultaneously is not constrained.

M	L	n/a	n/a	n/a	[2]

See 7.7 of [8], especially, 7.7.42

The constraint from ATSC A/53B Annex B on the combined bit rate is not used in this profile.

9.3.10 ES encapsulated MPEG-2 AV stream for RTP

9.3.10.1 MPEG-2 AV format – General compliance
Profile: MPEG_ES_PAL

This profile is for elementary streams, and includes two elementary streams (i.e., video and audio). The MPEG_ES_PAL AV format profile must conform to all aspects of the MPEG_PS_PAL profile, except for those aspects referring to the system layer (i.e. the program stream multiplex itself).

M	R	n/a	n/a	n/a	[8]

Video and audio elementary streams are profiles as per MPEG_PS_PAL profile, but multiplex requirements omitted. RTP will encapsulate both elementary streams separately, without any system layer in between.

This profile is intended for RTP transport only.

9.3.10.2 MPEG-2 AV format – General compliance
Profile: MPEG_ES_NTS

This profile is for elementary streams and includes two elementary streams (i.e., video and audio). The MPEG_ES_NTSC AV format profile must conform to all aspects of the MPEG_PS_NTSC profile, except for those aspects referring to the system layer (i.e., the program stream multiplex itself).

M	R	n/a	n/a	n/a	[8]

Video and audio elementary streams are profiles as per MPEG_PS_NTSC profile, but multiplex requirements omitted. RTP will encapsulate both elementary streams separately, without any system layer in between.

This profile is intended for RTP transport only.

9.3.10.3 MPEG-2 AV format – General compliance
Profile: MPEG_ES_PAL_XAC3

This profile is for elementary streams and includes two elementary streams (i.e., video and audio). The MPEG_ES_PAL_XAC3 AV format profile must conform to all aspects of the MPEG_PS_PAL_XAC3 profile, except for those aspects referring to the system layer (i.e., the program stream multiplex itself).

M	R	n/a	n/a	n/a	n/a

Video and audio elementary streams are profiles as per MPEG_PS_PAL_XAC3 profile, but multiplex requirements omitted. RTP will encapsulate both elementary streams separately, without any system layer in between.

This profile is intended for RTP transport only.

9.3.10.4 MPEG-2 AV format – General compliance Profile: MPEG_ES_NTSC_XAC3

This profile is for elementary streams and includes two elementary streams (i.e., video and audio). The MPEG_ES_NTSC_XAC3 AV format profile must conform to all aspects of the MPEG_PS_NTSC_XAC3 profile, except for those aspects referring to the system layer (i.e., the program stream multiplex itself).

M	R	n/a	n/a	n/a	n/a

Video and audio elementary streams are profiles as per MPEG_PS_NTSC_XAC3 profile, but multiplex requirements omitted. RTP will encapsulate both elementary streams separately, without any system layer in between.

Intended for RTP transport only.

9.4 MPEG-4 Part 2 profiling guidelines

9.4.1 General

Table 26 gives an informative summary of MPEG-4 Part 2 profiles for the AV media class and see the subclauses after 9.4.2 for the definition of these media format profiles.

Table 26 – Summary of MPEG-4 Part 2 profiles for the AV media class

DLNA profile ID	Video portion profile										Audio portion profile											System portion profile					
	SP_L0B	SP_L2	SP_L3	SP_L3_VGA	ASP_L5	ASP_L5_SO	ASP_L4_SO	H263_P0_L10	H263_P3_L10	CO	AAC	HEAAC	HEAAC_MULT5	ATRAC3plus	AAC_LTP_STEREO	MPEG1_L3	MPEG2_L2	AC3	G726	AMR	AMR_WBplus	MP4	MPEG2_TS	MPEG2_TS_T	MPEG2_TS_ISO	ASF	3GPP
MPEG4_P2_3GPP_SP_L0B_AAC	X										X																X
MPEG4_P2_3GPP_SP_L0B_AMR	X																			X							X
MPEG4_P2_MP4_SP_L2_AAC		X									X											X					
MPEG4_P2_MP4_SP_L2_AMR		X																		X		X					
MPEG4_P2_MP4_SP_AAC			X								X											X					
MPEG4_P2_MP4_SP_HEAAC			X									X										X					
MPEG4_P2_MP4_SP_ATRAC3plus			X											X								X					
MPEG4_P2_MP4_SP_AAC_LTP			X												X							X					
MPEG4_P2_TS_SP_AAC			X								X												X				
MPEG4_P2_TS_SP_AAC_T			X								X													X			
MPEG4_P2_TS_SP_AAC_ISO			X								X														X		

DLNA profile ID	Video portion profile										Audio portion profile										System portion profile					
	SP_L0B	SP_L2	SP_L3	SP_L3_VGA	ASP_L5	ASP_L5_SO	ASP_L4_SO	H263_P0_L10	H263_P3_L10	CO	AAC	HEAAC	HEAAC_MULT5	ATRAC3plus	AAC_LTP_STEREO	MPEG1_L3	MPEG2_L2	AC3	G726	AMR	AMR_WBplus	MP4	MPEG2_TS	MPEG2_TS_T	MPEG2_TS_ISO	ASF	3GPP
MPEG4_P2_TS_SP_MPEG1_L3			X													X							X				
MPEG4_P2_TS_SP_MPEG1_L3_T			X													X								X			
MPEG4_P2_TS_SP_MPEG1_L3_ISO			X													X									X		
MPEG4_P2_TS_SP_MPEG2_L2			X														X						X				
MPEG4_P2_TS_SP_MPEG2_L2_T			X														X							X			
MPEG4_P2_TS_SP_MPEG2_L2_ISO			X														X								X		
MPEG4_P2_TS_SP_AC3			X															X					X				
MPEG4_P2_TS_SP_AC3_T			X															X						X			
MPEG4_P2_TS_SP_AC3_ISO			X															X							X		
MPEG4_P2_ASF_SP_G726			X																X							X	
MPEG4_P2_MP4_SP_VGA_AAC				X							X											X					
MPEG4_P2_MP4_SP_VGA_HEAAC				X								X										X					
MPEG4_P2_MP4_ASP_AAC					X						X											X					
MPEG4_P2_MP4_ASP_HEAAC					X							X										X					
MPEG4_P2_MP4_ASP_HEAAC_MULT5					X								X									X					
MPEG4_P2_MP4_ASP_ATRAC3plus					X									X								X					
MPEG4_P2_TS_ASP_AAC					X						X												X				
MPEG4_P2_TS_ASP_AAC_T					X						X													X			
MPEG4_P2_TS_ASP_AAC_ISO					X						X														X		
MPEG4_P2_TS_ASP_MPEG1_L3					X											X							X				
MPEG4_P2_TS_ASP_MPEG1_L3_T					X											X								X			
MPEG4_P2_TS_ASP_MPEG1_L3_ISO					X											X									X		
MPEG4_P2_TS_ASP_AC3					X													X					X				
MPEG4_P2_TS_ASP_AC3_T					X													X						X			
MPEG4_P2_TS_ASP_AC3_ISO					X													X							X		
MPEG4_P2_MP4_ASP_L5_SO_AAC						X					X											X					
MPEG4_P2_MP4_ASP_L5_SO_HEAAC						X						X										X					
MPEG4_P2_MP4_ASP_L5_SO_HEAAC_MULT5						X							X									X					
MPEG4_P2_ASF_ASP_L5_SO_G726						X													X							X	
MPEG4_P2_MP4_ASP_L4_SO_AAC							X				X											X					
MPEG4_P2_MP4_ASP_L4_SO_HEAAC							X					X										X					
MPEG4_P2_MP4_ASP_L4_SO_HEAAC_MULT5							X						X									X					
MPEG4_P2_ASF_ASP_L4_SO_G726							X												X							X	
MPEG4_H263_MP4 P0_L10_AAC								X			X											X					

DLNA profile ID	Video portion profile										Audio portion profile											System portion profile					
	SP_L0B	SP_L2	SP_L3	SP_L3_VGA	ASP_L5	ASP_L5_SO	ASP_L4_SO	H263_P0_L10	H263_P3_L10	CO	AAC	HEAAC	HEAAC_MULT5	ATRAC3plus	AAC_LTP_STEREO	MPEG1_L3	MPEG2_L2	AC3	G726	AMR	AMR_WBplus	MP4	MPEG2_TS	MPEG2_TS_T	MPEG2_TS_ISO	ASF	3GPP
MPEG4_H263_MP4 P0_L10_AAC_LTP								X							X							X					
MPEG4_H263_3GPP_P0_L10_AMR_WB plus								X													X						X
MPEG4_H263_3GPP_P3_L10_AMR									X											X							X
MPEG4_P2_TS_CO_AC3										X								X					X				
MPEG4_P2_TS_CO_AC3_T										X								X						X			
MPEG4_P2_TS_CO_AC3_ISO										X								X							X		
MPEG4_P2_TS_CO_MPEG2_L2										X							X						X				
MPEG4_P2_TS_CO_MPEG2_L2_T										X							X							X			
MPEG4_P2_TS_CO_MPEG2_L2_ISO										X							X										

9.4.2 MPEG-4 Part 2 video portion profiles

9.4.2.1 MPEG-4 Part 2 AV format, video portion profile: SP_L3

Profiles:
MPEG4_P2_ASF_SP_G726,
MPEG4_P2_MP4_SP_AAC,
MPEG4_P2_MP4_SP_ATRAC3plus,
MPEG4_P2_MP4_SP_HEAAC,
MPEG4_P2_MP4_SP_AAC_LTP,
MPEG4_P2_TS_SP_AAC,
MPEG4_P2_TS_SP_AAC_ISO,
MPEG4_P2_TS_SP_AAC_T,
MPEG4_P2_TS_SP_MPEG1_L3_T,
MPEG4_P2_TS_SP_MPEG1_L3,
MPEG4_P2_TS_SP_MPEG1_L3_ISO,
MPEG4_P2_TS_SP_MPEG2_L2_T,
MPEG4_P2_TS_SP_MPEG2_L2,
MPEG4_PS_TS_SP_MPEG2_L2_ISO,
MPEG4_P2_TS_SP_AC3,
MPEG4_P2_TS_SP_AC3_ISO,
MPEG4_P2_TS_SP_AC3_T

The main characteristics of SP_L3 video stream are as follows.

Profile and level:

- SP@ L0
- SP@ L0b
- SP@ L1
- SP@ L2
- SP@ L3

Chroma:

- 4:2:0

Video bit rate:

- CBR: less than, or equal to, the maximum bit rate of the following bit rates;
- VBR: the maximum bit rate less than, or equal to, the following bit rates.

Table 27 – MPEGSP_L3 Bit Rates

Bit rate	Profile and level
64 kbps	SP@L0
128 kbps	SP@L0b
64 kbps	SP@L1
128 kbps	SP@L2
384 kbps	SP@L3

Table 28 – MPEGSP_L3 resolutions

Type	Resolution	Pixel aspect ratio[10] (informative)	Display aspect ratio[11] (informative)
CIF, 625SIF	352x288	12:11	4:3
	352x288	16:11	16:9
525SIF	352x240	10:11	4:3
	352x240	40:33	16:9
QVGA 4:3	320x240	1:1	4:3
QVGA 16:9	320x180	1:1	16:9
1/7VGA 4:3	240x180	1:1	4:3
1/9VGA 4:3	208x160	1:1	4:3
QCIF,625QSIF	176x144	12:11	4:3
	176x144	16:11	16:9
525QSIF	176x120	10:11	4:3
	176x120	40:33	16:9
SQVGA 4:3	160x120	1:1	4:3
1/16 VGA 4:3	160x112	1:1	4:3
SQVGA 16:9	160x90	1:1	16:9
SQCIF	128x96	12:11	4:3
	128x96	16:11	16:9

Pixel aspect ratio:

- 1:1
- 12:11
- 10:11

[10] Pixel aspect ratio is informative and it indicates a typical aspect ratio for each resolution.

[11] Display aspect ratio of which a video stream is rendered is informative and it indicates display aspect ratio with a resolution and the typical aspect ratio for the resolution.

- 16:11
- 40:33

A bitstream compliant with these media format profiles may utilize any of these pixel aspect ratios regardless of resolutions.

The rendering endpoint may ignore pixel aspect ratio for rendering. The rendering endpoint can shrink, stretch and crop image to the display aspect ratio dependent on vendor implementations.

Frame rate:

The frame rate is less than, or equal to, 30 fps.

Both fixed frame rate and variable frame rate are allowed, i.e. fixed_vop_rate=1 or 0.

M	L	n/a	n/a	n/a	ISO/IEC 14496-2 ISO/IEC 14496-2 Amendment 2 ISO/IEC 14496-2 AMENDMENT 1

9.4.2.2 MPEG-4 Part 2 AV format – Video portion profile – SP_L3_VGA

Profiles:
MPEG4_P2_MP4_SP_VGA_AAC
MPEG4_P2_MP4_SP_VGA_HEAAC

The main characteristics of the video stream are as follows.

Profile and level:

- SP @ L0
- SP @ L0b
- SP @ L1
- SP @ L2
- SP @ L3

Chroma:

- 4:2:0

Video bit rate:

- The maximum video bit rate is 3 Mbps.

Table 29 – SP_L3_VGA resolutions

Resolution	Pixel aspect ratio	Display aspect ratio	Maximum frame rate
640x480	1:1	4:3	30
640x360	1:1	16:9	30

M	A	n/a	n/a	n/a	n/a

This profile extends upon the MPEG-4 simple profile tools at level 3 to provide VGA resolution. At this profile and level, the MPEG-4 standards define a maximum resolution of CIF. However, VGA is a *de facto* resolution at this profile and level.

9.4.2.3 MMPEG-4 Part 2 AV format – Video portion profile – SP_L2

Profiles:
MPEG4_P2_MP4_SP_L2_AAC
MPEG4_P2_MP4_SP_L2_AMR

The main characteristics of the video stream are as follows.

Profile and level:

- SP @ L0
- SP @ L0b
- SP @ L1
- SP @ L2

Chroma:

- 4:2:0

Video bit rate:

- The maximum video bit rate for L2 is 128 kbps.

Table 30 – SP_L2 resolutions

Type	Resolution	Pixel aspect ratio	Display aspect ratio	Maximum frame rate
CIF	352x288	12:11	4:3	15
	352x288	16:11	16:9	15
QVGA	320x240	1:1	4:3	15
	320x180	1:1	16:9	15
QCIF	176x144	12:11	4:3	30
	176x144	16:11	16:9	30
SQCIF	128x96	12:11	4:3	30
	128x96	16:11	16:9	30

M	L	n/a	n/a	n/a	n/a

9.4.2.4 MPEG-4 Part 2 AV format – Video portion profile – SP_L0B

Profiles:
MPEG4_P2_3GPP_SP_L0B_AAC
MPEG4_P2_3GPP_SP_L0B_AMR

The main characteristics of the video stream must be conformant to [36].

Profile and level:

- SP @ L0
- SP @ L0b

Chroma:

- 4:2:0

Video bit rate:

- Maximum bit rate for L0 is 64 kbps and for L0b is 128 kbps.

Table 31 – SP_L0B video bit rate

Type	Resolution	Pixel aspect ratio	Display aspect ratio	Maximum frame rate
QCIF	176x144	12:11	4:3	15
SQCIF	128x96	12:11	4:3	15

M	R	n/a	n/a	n/a	[36] [37]

This profile is predominantly used in 3GPP multimedia messaging, multimedia streaming, and multimedia conferencing applications.

9.4.2.5 MPEG-4 Part 2 AV format – Video portion profile – ASP_L5

Profiles:
MPEG4_P2_MP4_ASP_AAC,
MPEG4_P2_MP4_ASP_HEAAC,
MPEG4_P2_MP4_ASP_HEAAC_MULT5,
MPEG4_P2_MP4_ASP_ATRAC3plus,
MPEG4_P2_TS_ASP_AAC,
MPEG4_P2_TS_ASP_AAC_T,
MPEG4_P2_TS_ASP_AAC_ISO,
MPEG4_P2_TS_ASP_MPEG1_L3,
MPEG4_P2_TS_ASP_MPEG1_L3_T,
MPEG4_P2_TS_ASP_MPEG1_L3_ISO,
MPEG4_P2_TS_ASP_AC3,
MPEG4_P2_TS_ASP_AC3_T,
MPEG4_PS_TS_ASP_AC3_ISO

The main characteristics of the ASP_L5 video stream are as follows.

Profile and level:

- ASP@L0
- ASP@L1
- ASP@L2
- ASP@L3
- ASP@L3b
- ASP@L4
- ASP@L5

Chroma (informative):

- 4:2:0

Video bit rate (informative):

- CBR: less than, or equal to, the maximum bit rate of the following bit rates;
- VBR: the maximum bit rate less than, or equal to, the following bit rates.

Table 32 – ASP_L5 bit rates

Bit rate	Profile and level
128 kbps	ASP@L0
128 kbps	ASP@L1
384 kbps	ASP@L2
768 kbps	ASP@L3
1500 kbps	ASP@L3b
3000 kbps	ASP@L4
8000 kbps	ASP@L5

Table 33 – ASP_L5 resolutions

Type	Resolution	Pixel aspect ratio [12] (informative)	Display aspect ratio [13] (informative)
625 D1	720x576	12:11	4:3
	720x576	16:11	16:9
525 D1	720x480	10:11	4:3
	720x480	40:33	16:9
625 4SIF	704x576	12:11	4:3
	704x576	16:11	16:9
525 4SIF	704x480	10:11	4:3
	704x480	40:33	16:9
VGA	640x480	1:1	4:3
VGA 16:9	640x360	1:1	16:9
625 3/4D1	544x576	16:11	4:3
	544x576	64:33	16:9
525 3/4D1	544x480	44:33	4:3
	544x480	160:99	16:9
625 2/3D1	480x576	18:11	4:3
	480x576	24:11	16:9
525 2/3D1	480x480	15:11	4:3
	480x480	60:33	16:9
9/16VGA 4:3	480x360	1:1	4:3
9/16VGA 16:9	480x270	1:1	16:9
625 1/2D1	352x576	24:11	4:3

[12] Pixel aspect ratio is informative and it indicates a typical aspect ratio for each resolution

[13] Display aspect ratio of which a video stream is informative and it indicates display aspect ratio with a resolution and the typical aspect ratio for the resolution

Type	Resolution	Pixel aspect ratio[12] (informative)	Display aspect ratio[13] (informative)
	352x576	32:11	16:9
525 1/2D1	352x480	20:11	4:3
	352x480	80:33	16:9
CIF, 625SIF	352x288	12:11	4:3
	352x288	16:11	16:9
525SIF	352x240	10:11	4:3
	352x240	40:33	16:9
QVGA 4:3	320x240	1:1	4:3
QVGA 16:9	320x180	1:1	16:9
1/7VGA 4:3	240x180	1:1	4:3
1/9VGA 4:3	208x160	1:1	4:3
QCIF,625QSIF	176x144	12:11	4:3
	176x144	16:11	16:9
525QSIF	176x120	10:11	4:3
	176x120	40:33	16:9
SQVGA 4:3	160x120	1:1	4:3
1/16 VGA 4:3	160x112	1:1	4:3
SQVGA 16:9	160x90	1:1	16:9
SQCIF	128x96	12:11	4:3
	128x96	16:11	16:9

Pixel aspect ratio:

1:1
12:11
10:11
16:11
40:33
44:33
64:33
160:99
18:11
15:11
24:11
60:33
20:11
32:11
80:33

The serving endpoint may use any pixel aspect ratios regardless of resolutions.

The rendering endpoint may ignore pixel aspect ratio for rendering. The rendering endpoint can shrink, stretch and crop image to the display aspect ratio dependent on vendor implementations.

Frame rate:

The frame rate is less than, or equal to, 30 fps.

Both fixed frame rate and variable frame rate are allowed, i.e., fixed_vop_rate=1 or 0.

M	L	n/a	n/a	n/a	ISO/IEC 14496-2 ISO/IEC 14496-2, A.2 ISO/IEC 14496-2, A. 3

9.4.2.6 MPEG-4 Part 2 AV format – Video portion profile – ASP_L5_SO

Profiles:
MPEG4_P2_MP4_ASP_L5_SO_HEAAC_MULT5,
MPEG4_P2_MP4_ASP_L5_SO_AAC,
MPEG4_P2_MP4_ASP_L5_SO_HEAAC,
MPEG4_P2_ASF_ASP_L5_SO_G726

The main characteristics of the ASP_L5_SO video stream are the same as ASP_L5 with the following constraints.

Object type:

- Only simple object type must be used.

M	L	n/a	n/a	n/a	n/a

9.4.2.7 MPEG-4 Part 2 AV format – Video portion profile – ASP_L4_SO

Profiles:
MPEG4_P2_MP4_ASP_L4_SO_AAC
MPEG4_P2_MP4_ASP_L4_SO_HEAAC
MPEG4_P2_MP4_ASP_L4_SO_HEAAC_MULT5
MPEG4_P2_ASF_ASP_L4_SO_G726

The main characteristics of ASP_L4_SO video are as follows.

Profile and level:

- ASP@L0
- ASP@L1
- ASP@L2
- ASP@L3
- ASP@L3b
- ASP@L4

Object type:

Only simple object type must be used.

Chroma (informative):

- 4:2:0

Video bit rate (informative):

- CBR: less than, or equal to, the maximum bit rate of the following bit rates;
- VBR: the maximum bit rate less than, or equal to, the following bit rates.

Table 34 – ASP_L4_SO bit rates

Bit rate	Profile and level
128 kbps	ASP@L0
128 kbps	ASP@L1
384 kbps	ASP@L2
768 kbps	ASP@L3
1500 kbps	ASP@L3b
2000 kbps	ASP@L4

Table 35 – ASP_L4_SO resolutions

Type	Resolution	Pixel aspect ratio[14] (informative)	Display aspect ratio[15] (informative)
625 1/2D1	352x576	24:11	4:3
	352x576	32:11	16:9
525 1/2D1	352x480	20:11	4:3
	352x480	32:11	16:9
CIF, 625SIF	352x288	12:11	4:3
	352x288	16:11	16:9
525SIF	352x240	10:11	4:3
	352x240	40:33	16:9
QVGA 4:3	320x240	1:1	4:3
QVGA 16:9	320x180	1:1	16:9
1/7VGA 4:3	240x180	1:1	4:3
1/9VGA 4:3	208x160	1:1	4:3
QCIF,625QSIF	176x144	12:11	4:3
	176x144	16:11	16:9
525QSIF	176x120	10:11	4:3

[14] Pixel aspect ratio is informative and it indicates a typical aspect ratio for each resolution.

[15] Display aspect ratio of which a video stream is rendered is informative and it indicates display aspect ratio with a resolution and the typical aspect ratio for the resolution.

	176x120	40:33	16:9
SQVGA 4:3	160x120	1:1	4:3
1/16 VGA 4:3	160x112	1:1	4:3
SQVGA 16:9	160x90	1:1	16:9
SQCIF	128x96	12:11	4:3
	128x96	16:11	16:9

Pixel aspect ratio:

1:1
12:11
10:11
16:11
40:33
24:11
20:11
32:11
80:33

The serving endpoint may use any pixel aspect ratios regardless of resolutions.

The rendering endpoint may ignore pixel aspect ratio for rendering. The rendering endpoint can shrink, stretch and crop image to the display aspect ratio dependent on vendor implementations.

Frame rate:

The frame rate is less than, or equal to, 30 fps.

Both fixed frame rate and variable frame rate are allowed, i.e., fixed_vop_rate=1 or 0.

M	L	n/a	n/a	n/a	ISO/IEC 14496-2 ISO/IEC 14496-2, A.2 ISO/IEC 14496-2, A.3

9.4.2.8 MPEG-4 Part 2 AV format – Video portion profile – H263_P0_L10

Profiles:
MPEG4_H263_MP4_P0_L10_AAC
MPEG4_H263_MP4_P0_L10_AAC_LTP
MPEG4_H263_3GPP_P0_L10_AMR_WBplus

The main characteristics of the H263_P0_L10 video stream must be conformant to ITU-T Recommendation H.263.

Profile and level:

- H.263 profile 0 level 10 as defined in ITU-T Recommendation H.263, Annex X, must be supported.

  NOTE H.263 Profile 0 is a subset of MPEG-4 Visual Simple Profile, ISO/IEC 14496-2.

Chroma:

- 4:2:0

Video bit rate:

- CBR: less than, or equal to, the maximum bit rate 64 kbps;
- VBR: the maximum bit rate less than, or equal to, 64 kbps

Table 36 – H263_P0_L10 resolutions

Type	Resolution	Pixel aspect ratio[16] (informative)	Display aspect ratio[17] (informative)
QCIF,625QSIF	176x144	12:11	4:3
	176x144	16:11	16:9
SQCIF	128x96	12:11	4:3
	128x96	16:11	16:9

Pixel aspect ratio:

- 12:11
- 16:11

A bitstream conformant to these media format profiles may utilize any of these pixel aspect ratios regardless of resolutions.

The rendering endpoint may ignore the pixel aspect ratio for rendering. The rendering endpoint can shrink, stretch and crop image to the display aspect ratio dependent on vendor implementations.

Frame rate:

- The frame rate is less than, or equal to, 15 fps.

Both fixed frame rate and variable frame rate are allowed, i.e., fixed_vop_rate=1 or 0.

M	L	n/a	n/a	n/a	ISO/IEC 14496-2 ITU-T Recommendation H.263 ITU-T Recommendation H.263, Annex X

9.4.2.9 MPEG-4 Part 2 AV format – Video portion profile – H263_P3_L10 Profile: MPEG4_H263_3GPP_P3_L10_AMR

The main characteristics of the video stream must be conformant to ITU-T Recommendation H.263.

Profile and level:

- H.263 profile 3, level 10 as defined in ITU-T Recommendation H.263, Annex X, must be supported. H.263 Profile 3 is the interactive and streaming wireless profile and consists of the H.263 baseline profile and Annex I, J, K, and T ITU-T Recommendation H.263.

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[16] Pixel aspect ratio is informative and it indicates a typical aspect ratio for each resolution.

[17] Display aspect ratio of which video stream is rendered is informative and it indicates display aspect ratio with a resolution and the typical aspect ratio for the resolution.

Chroma:

- 4:2:0

Video bit rate:

- Less than, or equal to, 64 kbps

Table 37 – H263_P3_L10 resolutions

	Resolution	Pixel aspect ratio	Display aspect ratio	Maximum frame rate
QCIF	176x144	12:11	4:3	15
SQCIF	128x96	12:11	4:3	15

M	R	n/a	n/a	n/a	ITU-T Recommendation H.263 ITU-T Recommendation H.263, Annex X

9.4.2.10 MPEG-4 Part 2 AV format – Video portion profile – CO

Profiles:
MPEG4_P2_TS_CO_AC3,
MPEG4_P2_TS_CO_AC3_T,
MPEG2_P2_TS_CO_AC3_ISO,
MPEG4_P2_TS_CO_MPEG2_L2,
MPEG4_P2_TS_CO_MPEG2_L2_T,
MPEG4_P2_TS_CO_MPEG2_L2_ISO

The main characteristics of the CO video stream must be conformant to ISO/IEC 14496-2.

Profile and level:

- CO@L1
- CO@L2

Chroma:

- 4:2:0: video bit rate (informative);
- CBR: less than, or equal to, the maximum bit rate of the following bit rates.
- VBR: the maximum bit rate less than or equal to the following bit rates.

Bit rate profile and level:

- 384 kbps CO@L1
- 2000 kbps CO@L2

Table 38 – CO resolutions

	Resolution	Pixel aspect ratio[18] (informative)	Display aspect ratio[19] (informative)
CIF, 625SIF	352x288	12:11	4:3
	352x288	16:11	16:9
525SIF	352x240	10:11	4:3

[18] Pixel aspect ratio is informative and it indicates a typical aspect ratio for each resolution

[19] Display aspect ratio of which video stream is rendered is informative and it indicates display aspect ratio with a resolution and the typical aspect ratio for the resolution

	Resolution	Pixel aspect ratio[18] (informative)	Display aspect ratio[19] (informative)
	352x240	40:33	16:9
QVGA 4:3	320x240	1:1	4:3
QVGA 16:9	320x180	1:1	16:9
1/7VGA 4:3	240x180	1:1	4:3
1/9VGA 4:3	208x160	1:1	4:3
QCIF,625QSIF	176x144	12:11	4:3
	176x144	16:11	16:9
525QSIF	176x120	10:11	4:3
	176x120	40:33	16:9
SQVGA 4:3	160x120	1:1	4:3
1/16 VGA 4:3	160x112	1:1	4:3
SQVGA 16:9	160x90	1:1	16:9
SQCIF	128x96	12:11	4:3
	128x96	16:11	16:9

Pixel aspect ratio:

- 1:1
- 12:11
- 10:11
- 16:11
- 40:33

A bitstream conformant to these media format profiles may utilize use any of these pixel aspect ratios regardless of resolutions.

The rendering endpoint may ignore pixel aspect ratio for rendering. The rendering endpoint can shrink, stretch and crop image to the display aspect ratio depending on vendor implementations.

Frame rate:

- The frame rate is less than, or equal to, 30 fps.

  Both fixed frame rate and variable frame rate are allowed, i.e., fixed_vop_rate=1 or 0.

M	L	n/a	n/a	n/a	ISO/IEC 14496-2

9.4.3 MPEG-4 Part2 audio portion profiles

9.4.3.1 MPEG-4 Part 2 AV format – Rendering requirements for dual channel audio

Profiles:
MPEG4_P2_MP4_SP_AAC,
MPEG4_P2_MP4_SP_L2_AAC,
MPEG4_P2_MP4_SP_VGA_AAC,
MPEG4_P2_3GPP_SP_L0B_AAC,
MPEG4_P2_MP4_SP_HEAAC,
MPEG4_P2_MP4_SP_VGA_HEAAC,
MPEG4_P2_MP4_SP_AAC_LTP,
MPEG4_P2_TS_SP_AAC,
MPEG4_P2_TS_SP_AAC_T,
MPEG4_P2_TS_SP_AAC_ISO,
MPEG4_P2_TS_SP_MPEG1_L3,
MPEG4_P2_TS_SP_MPEG1_L3_T,
MPEG4_P2_TS_SP_MEPG1_L3_ISO,
MPEG4_P2_MP4_ASP_AAC,
MPEG4_P2_MP4_ASP_HEAAC,
MPEG4_P2_TS_ASP_AAC,
MPEG4_P2_TS_ASP_AAC_T,
MPEG4_P2_TS_ASP_AAC_ISO,
MPEG4_P2_TS_ASP_MPEG1_L3,
MPEG4_P2_TS_ASP_MPEG1_L3_T,
MPEG4_P2_TS_ASP_MPEG1_L3_ISO,
MPEG4_P2_MP4_ASP_L5_SO_AAC,
MPEG4_P2_MP4_ASP_L5_SO_HEAAC,
MPEG4_P2_MP4_ASP_L4_SO_AAC,
MPEG4_P2_MP4_ASP_L4_SO_HEAAC,
MPEG4_H263_MP4_P0_L10_AAC,
MPEG4_H263_MP4_P0_L10_AAC_LTP

A rendering endpoint that supports these profiles must be capable of either rendering all the channels or converting all dual channel information of a corresponding profile into an implementation-dependent single-channel audio output at a minimum.

A rendering endpoint must gracefully accept all dual channel bitstream information of a corresponding profile.

M	L	DMP DMR	MDMP MDMD	n/a	n/a

9.4.3.2 MPEG-4 Part 2 AV format – Rendering requirements for multichannel audio

Profiles:
MPEG4_P2_TS_SP_MPEG2_L2,
MPEG4_P2_TS_SP_MPEG2_L2_T,
MPEG4_P2_TS_SP_MPEG2_L2_ISO,
MPEG4_P2_MP4_ASP_HEAAC_MULT5,
MPEG4_P2_MP4_ASP_L5_SO_HEAAC_MULT5,
MPEG4_P2_MP4_ASP_L4_SO_HEAAC_MULT5,
MPEG4_P2_MP4_SP_ATRAC3plus,
MPEG4_P2_MP4_ASP_ATRAC3plus,
MPEG4_P2_TS_SP_AC3,
MPEG4_P2_TS_SP_AC3_T,
MPEG4_P2_TS_SP_AC3_ISO,
MPEG4_P2_TS_ASP_AC3,
MPEG4_P2_TS_ASP_AC3_T,
MPEG4_P2_TS_ASP_AC3_ISO,
MPEG4_P2_TS_CO_MPEG2_L2,
MPEG4_P2_TS_CO_MPEG2_L2_T,

MPEG4_P2_TS_CO_MPEG2_L2_ISO,
MPEG4_P2_TS_CO_AC3,
MPEG4_P2_TS_CO_AC3_T,
MPEG4_P2_TS_CO_AC3_ISO

A rendering endpoint that supports these profiles must be capable of either rendering all the channels or converting all multichannel information of a corresponding multichannel profile into an implementation-dependent single-channel audio output at a minimum.

A rendering endpoint must gracefully accept all multichannel bitstream information of a corresponding profile.

M	L	DMP DMR	MDMP MDMD	n/a	n/a

9.4.3.3 MPEG-4 Part 2 AV format – Audio portion profile – AAC

Profiles:
MPEG4_P2_MP4_SP_AAC,
MPEG4_P2_TS_SP_AAC,
MPEG4_P2_TS_SP_AAC_T,
MPEG4_P2_TS_SP_AAC_ISO,
MPEG4_P2_MP4_ASP_AAC,
MPEG4_P2_TS_ASP_AAC,
MPEG4_P2_TS_ASP_AAC_T,
MPEG4_P2_TS_ASP_AAC_ISO,
MPEG4_P2_MP4_ASP_L5_SO_AAC,
MPEG4_P2_MP4_ASP_L4_SO_AAC,
MPEG4_H263_MP4_P0_L10_AAC

A bitstream conformant with these profiles must conform to all aspects of the AAC audio format as specified in 8.6.2.

M	L	n/a	n/a	n/a	n/a

9.4.3.4 MPEG-4 Part 2 AV format – Audio portion profile – AAC

Profiles:
MPEG4_P2_MP4_SP_L2_AAC,
MPEG4_P2_3GPP_SP_L0B_AAC

The main characteristics of the audio portion must align with the AAC audio format as outlined in 8.6.2, except as noted here.

Maximum bit rate:

- 128 kbps

M	R	n/a	n/a	n/a	n/a

9.4.3.5 MPEG-4 Part 2 AV format – Audio portion profile – AAC

Profile: MPEG4_P2_MP4_SP_VGA_AAC

The main characteristics of the audio portion must align with the AAC audio format as outlined in 8.6.2, except as noted here.

Maximum bit rate:

- 256 kbps

M	R	n/a	n/a	n/a	n/a

9.4.3.6 MPEG-4 Part 2 AV format – Audio portion profile – HEAAC_L2

Profiles:
MPEG4_P2_MP4_SP_HEAAC,
MPEG4_P2_MP4_ASP_HEAAC,
MPEG4_P2_MP4_ASP_L5_SO_HEAAC,
MPEG4_P2_MP4_ASP_L4_SO_HEAAC

A bitstream conformant with these profiles must conform to all aspects of the HEAAC_L2 Audio Format as specified in 8.6.9.

M	L	n/a	n/a	n/a	n/a

9.4.3.7 MPEG-4 Part 2 AV format – Audio portion profile – HEAAC_L2

Profile: MPEG4_P2_MP4_SP_VGA_HEAAC

The main characteristics of the audio portion must align with the HEAAC_L2 audio format as outlined in 8.6.9, except as noted here.

Maximum bit rate:

- 256 kbps

M	R	n/a	n/a	n/a	n/a

9.4.3.8 MPEG-4 Part 2 AV format – Audio portion profile – HEAAC_MULT5

Profiles: MPEG4_P2_MP4_SP_HEAAC_MULT5,
MPEG4_P2_MP4_ASP_HEAAC_MULT5,
MPEG4_P2_MP4_ASP_L5_SO_HEAAC_MULT5,
MPEG4_P2_MP4_ASP_L4_SO_HEAAC_MULT5

A bitstream conformant with these profiles must conform to all aspects of the HEAAC_MULT5 audio format as specified in 8.6.19.

M	L	n/a	n/a	n/a	n/a

9.4.3.9 MPEG-4 Part 2 AV format – Audio portion profile – ATRAC3plus

Profiles:
MPEG4_P2_MP4_SP_ATRAC3plus,
MPEG4_P2_MP4_ASP_ATRAC3plus

The ATRAC3plus audio portion profile must conform to ATRAC3plus as defined in [3].

M	R	n/a	n/a	n/a	[3]

9.4.3.10 MPEG-4 Part 2 AV format – Audio portion profile – AAC_LTP

Profiles:
MPEG4_P2_MP4_SP_AAC_LTP,
MPEG4_H263_MP4_P0_L10_AAC_LTP

A bitstream conformant with these profiles must conform to all aspects of the AAC_LTP audio format as specified in 8.6.22.

M	L	n/a	n/a	n/a	.n/a

9.4.3.11 MPEG-4 Part 2 AV format – Audio portion profile – MPEG1_L3

Profiles:
MPEG4_P2_TS_SP_MPEG1_L3,
MPEG4_P2_TS_SP_MPEG1_L3_T,
MPEG4_P2_TS_SP_MPEG1_L3_ISO,
MPEG4_P2_TS_ASP_MPEG1_L3,
MPEG4_P2_TS_ASP_MPEG1_L3_T,
MPEG4_P2_TS_ASP_MPEG1_L3_ISO

MPEG1_L3 audio portion profile must abide by the following baseline characteristics.

Audio encoding must be MPEG-1 Layer 3 audio as defined in ISO/IEC 11172-3.

Number of channels:

- 1 (if the content is mono)
- 2 (if the content is stereo)

Sampling rates:

- 32 kHz
- 44,1 kHz
- 48 kHz

Bit rates (Kbps):

32, 40, 48, 56, 64, 80, 96, 112, 128, 160 192, 224, 256, 320

Encoding types:

- Constant bit rate (CBR)
- Variable bit rate (VBR)

M	L	n/a	n/a	n/a	ISO/IEC 11172-3

9.4.3.12 MPEG-4 Part 2 AV format – Audio portion profile – MPEG2_L2

Profiles:
MPEG4_P2_TS_SP_MPEG2_L2,
MPEG4_P2_TS_SP_MPEG2_L2_T,
MPEG4_P2_TS_SP_MPEG2_L2_ISO,
MPEG4_P2_TS_ASP_MPEG2_L2,
MPEG4_P2_TS_ASP_MPEG2_L2_T,
MPEG4_P2_TS_ASP_MPEG2_L2_ISO,
MPEG4_P2_TS_CO_MPEG2_L2,
MPEG4_P2_TS_CO_MPEG2_L2_T,
MPEG4_P2_TS_CO_MPEG2_L2_ISO

9.4.3.12.1 The MPEG2_L2 audio portion profile must match the provisions about MPEG audio in ISO/IEC 11172-3 and ISO/IEC 13818-3.

The main characteristics of MPEG2_L2 audio stream are as follows.

Coding:

- MPEG-1 Layer 1
- MPEG-1 Layer 2

  A serving endpoint may output, and a rendering endpoint must be *capable of rendering* a joint stereo encoded audio stream.

No mc-prediction.

MPEG-1 backwards compatible multi-channel mode:

MPEG-2 Layer 2 mc (multi-channel), dematrix procedure 0, 1 or 2

A bitstream conformant with these media format profiles may contain the following.

Content audio channel modes:

A bitstream conformant with these media format profiles may contain the follow formats that may optionally include a low frequency enhancement (LFE) channel.

- Mono (1/0)
- Dual monaural (1/0+1/0)
- Stereo (2/0)
- Multichannel (2/2)
- Multichannel (2/1)
- Multichannel (3/2)
- Multichannel (3/1)
- Multichannel (3/0)
- Multichannel (3/0+2/0)
- Multichannel (2/0+2/0)
- Multichannel ([1/0+1/0]+2/0]
- Multichannel (1/0+2/0)

No multilingual channels in multi-channel mode

CRC check must be included

Sample rates:

- 32 kHz
- 44,1 kHz
- 48 kHz

Bit rates:

- Layer 1: from 32 to 448 kbps
- Layer 2: from 32 to 384 kbps

Extension stream (optional):

From 0 to 682 kbps

No emphasis

M	L	n/a	n/a	n/a	ISO/IEC 11172-3 ISO/IEC 13818-3

9.4.3.12.2 A bitstream compliant with these media format profiles may contain additional sample rates for secondary sound services.

- 16 kHz
- 22,05 kHz
- 24 kHz

O	A	n/a	n/a	n/a	ISO/IEC 13818-3

9.4.3.13 MPEG-4 Part 2 AV format – Audio portion profile – AC3

Profiles:
MPEG4_P2_TS_SP_AC3,
MPEG4_P2_TS_SP_AC3_T,
MPEG4_P2_TS_SP_AC3_ISO,
MPEG4_P2_TS_ASP_AC3,
MPEG4_P2_TS_ASP_AC3_T,
MPEG4_P2_TS_ASP_AC3_ISO,
MPEG4_P2_TS_CO_AC3,
MPEG4_P2_TS_CO_AC3_T,
MPEG4_P2_TS_CO_AC3_ISO

The main characteristics of Dolby AC-3 audio stream are defined in [9].

Sampling frequency:

32 kHz, 44,1 kHz, 48kHz

Content audio channel modes:

A bitstream conformant to these media format profiles may contain the following formats

- Mono (1/0)
- Stereo (2/0)
- Multichannel (3/0)
- Multichannel (2/1)
- Multichannel (3/1)
- Multichannel (2/2)
- Multichannel (3/2)

Changing audio channels among mono and stereo is allowed.

Audio bit rate:

- 32 kbps – 640 kbps.

M	L	n/a	n/a	n/a	[9]

Content is converted from a content audio channel mode to an appropriate output audio channel mode by the AC-3 decoder.

9.4.3.14 MPEG-4 Part 2 AV format – Audio portion profile – G726

Profiles:
MPEG4_P2_ASF_SP_G726,
MPEG4_P2_ASF_ASP_L5_SO_G726,
MPEG4_P2_ASF_ASP_L4_SO_G726

The main characteristics of G.726 audio portion profile are as follows.

Sampling frequency:

- 8 kHz

Number of channel:

- Mono (1)

Bit rate:

- 32 kbps

M	L	DMS DMP	n/a	n/a	ITU-T Recommendation G.726

9.4.3.15 MPEG-4 Part 2 AV format – Audio portion profile – AMR_Wbplus Profile: MPEG4_H263_3GPP_P0_L10_AMR_Wbplus

The main characteristics of the audio portion of this profile are similar to the AMR_Wbplus audio profile defined in the audio 0.

M	R	n/a	n/a	n/a	n/a

9.4.3.16 MPEG-4 Part 2 AV format – Audio portion profile – AMR Profiles: MPEG4_H263_3GPP_P3_L10_AMR, MPEG4_P2_MP4_SP_L2_AMR, MPEG4_P2_3GPP_SP_L0B_AMR

The main characteristics of the audio portion must align with the AMR_3GPP audio portion profile as outlined in 0.

M	R	n/a	n/a	n/a	n/a

9.4.4 MPEG-4 Part 2 system portion profiles

9.4.4.1 MPEG-4 Part 2 AV format – System portion profile – MPEG2-TS MPEG2-TS_T MPEG2-TS_ISO Profiles: MPEG4_P2_TS_SP_AAC, MPEG4_P2_TS_SP_AAC_T, MPEG4_P2_TS_SP_AAC_ISO, MPEG4_P2_TS_SP_MPEG1_L3, MPEG4_P2_TS_SP_MPEG1_L3_T, MPEG4_P2_TS_SP_MPEG1_L3_ISO, MPEG4_P2_TS_SP_AC3, MPEG4_P2_TS_SP_AC3_T, MPEG4_PS_TS_SP_AC3_ISO, MPEG4_P2_TS_SP_MPEG2_L2, MPEG4_P2_TS_SP_MPEG2_L2_T, MPEG4_P2_TS_SP_MPEG2_L2_ISO, MPEG4_P2_TS_ASP_AAC, MPEG4_P2_TS_ASP_AAC_T, MPEG4_P2_TS_ASP_AAC_ISO, MPEG4_P2_TS_ASP_MPEG1_L3, MPEG4_P2_TS_ASP_MPEG1_L3_T, MPEG4_P2_TS_ASP_MPEG1_L3_ISO, MPEG4_P2_TS_ASP_AC3, MPEG4_P2_TS_ASP_AC3_T, MPEG4_P2_TS_ASP_AC3_ISO, MPEG4_P2_TS_CO_AC3, MPEG4_P2_TS_CO_AC3_T, MPEG4_P2_TS_CO_AC3_ISO, MPEG4_P2_TS_CO_MPEG2_L2, MPEG4_P2_TS_CO_MPEG2_L2_T, MPEG4_P2_TS_CO_MPEG2_L2_ISO, MPEG4_P2_TS_CO_AC3,

MPEG4_P2_TS_CO_AC3 _T,
MPEG4_P2_TS_CO_AC3_ISO

9.4.4.1.1 The main characteristics of MPEG2 _TS system stream are

System:

- The system stream is full or partial single program transport stream (SPTS). It must contain only one program from the original broadcasted TS according to the PAT and PMT tables.

Number of programs:

- 1 as defined for a single program transport stream

Packet size:

- 188 bytes per transport packet

PSI information:

- PAT and PMT are required to be present in the stream. It must tolerate any other tables.
- PSI insertion interval should be implementation-dependent.

Maximum system bit rate (includes video, audio, etc.):

Table 39 – MPEG2 _TS maximum system bit rate

Bit rate	Video portion profile
600 kbps	SP_L3
10 000 kbps	ASP_L5
3000 kbps	CO

M	L	n/a	n/a	n/a	ISO/IEC 13818-1

9.4.4.1.2 The main characteristics of MPEG2_TS, MPEG2_TS_T, and MPEG2_TS_ISO system stream are

System:

- The system stream is full or partial single program transport stream (SPTS). It must contain only one program from the original broadcasted TS according to the PAT and PMT tables.

Number of programs:

1 as defined for a single program transport stream

Packet size:

- 188 bytes per transport packet

PSI information:

- PAT and PMT are required.
- PSI insertion interval should be implementation-dependent.

A compliant bitstream may include additional PSI information.

Maximum system bit rate (includes video, audio, etc.):

Table 40 – MPEG2_TS, MPEG2_TS_T, and MPEG2_TS_ISO bit rates

Bit rate	Video portion profile
600 kbps	SP_L3
10 000 kbps	ASP_L5
3000 kbps	CO

DLNA transport packets:

- A bitstream conformant to these media format profiles must contain DLNA transport packets as defined in 9.2.21 and 9.2.25.1

M	L	n/a	n/a	n/a	ISO/IEC 13818-1

A partial SPTS can be created from MPTS by removing packets corresponding to other programs, or from another SPTS stream (by removing some components).

A full or partial SPTS can have multiple audio and video components in it.

Full SPTS is fully compliant with ISO/IEC 13818-1.

Partial SPTS is fully compliant with ISO/IEC 13818-1 except for the T-STD buffer model.

9.4.4.1.3 A rendering endpoint must accept (tolerate) but not necessarily render all audio, video and data components that belong to the (selected) program in a full or partial SPTS according to the PAT/PMT tables.

At a minimum, a rendering endpoint must render one elementary video stream and one corresponding elementary audio stream as present in the TS.

M	A	DMP DMR	MDMP MDMD	n/a	ISO/IEC 13818-1

AV device supporting AV media class content, must support rendering of both, audio and video components.

9.4.4.1.4 1 VOP should be contained in 1 PES.

S	C	n/a	n/a	n/a	ISO/IEC 13818-1

9.4.4.1.5 Configuration information should be sent every 5 seconds or less.

S	L	n/a	n/a	n/a	ISO/IEC 13818-1

MPEG-4-Visual configuration information includes: visual object sequence header, visual object header, video object header, video object layer header.

9.4.4.1.6 VOP should be sent every 0,7 s or less

S	L	n/a	n/a	n/a	ISO/IEC 13818-1

This period comes from calculating 1001/vop_time_increment_resolution

9.4.4.2 MPEG-4 Part 2 AV format

Profiles:
MPEG4_P2_MP4_SP_AAC,
MPEG4_P2_MP4_SP_HEAAC,
MPEG4_P2_MP4_SP_ATRAC3plus,
MPEG4_P2_MP4_SP_AAC_LTP,
MPEG4_P2_MP4_ASP_AAC,
MPEG4_P2_MP4_ASP_HEAAC,
MPEG4_P2_MP4_ASP_HEAAC_MULT5,
MPEG4_P2_MP4_ASP_ATRAC3plus,
MPEG4_P2_MP4_ASP_L5_SO_AAC,
MPEG4_P2_MP4_ASP_L5_SO_HEAAC,
MPEG4_P2_MP4_ASP_L5_SO_HEAAC_MULT5,
MPEG4_P2_MP4_ASP_L4_SO_AAC,
MPEG4_P2_MP4_ASP_L4_SO_HEAAC,
MPEG4_P2_MP4_ASP_L4_SO_HEAAC_MULT5,
MPEG4_H263_MP4_P0_L10_AAC,
MPEG4_H263_MP4_P0_L10_AAC_LTP,
MPEG4_P2_MP4_SP_L2_AMR,
MPEG4_P2_MP4_SP_L2_AAC,
MPEG4_P2_MP4_SP_VGA_AAC,
MPEG4_P2_MP4_SP_VGA_HEAAC

The MP4 system portion profile must match the provisions of MPEG-4 Part 14 ISO/IEC 14496-14 with the constraints defined 9.3.29.

M	L	n/a	n/a	n/a	ISO/IEC 14496-14

9.4.4.3 MPEG-4 Part 2 AV format – Systems portion profile – Constraints on the MP4 file format

Profiles:
MPEG4_P2_MP4_SP_AAC
MPEG4_P2_MP4_SP_HEAAC
MPEG4_P2_MP4_SP_ATRAC3plus
MPEG4_P2_MP4_SP_AAC_LTP
MPEG4_P2_MP4_ASP_AAC
MPEG4_P2_MP4_ASP_HEAAC
MPEG4_P2_MP4_ASP_HEAAC_MULT5
MPEG4_P2_MP4_ASP_ATRAC3plus
MPEG4_P2_MP4_ASP_L5_SO_AAC
MPEG4_P2_MP4_ASP_L5_SO_HEAAC
MPEG4_P2_MP4_ASP_L5_SO_HEAAC_MULT5
MPEG4_P2_MP4_ASP_L4_SO_AAC
MPEG4_P2_MP4_ASP_L4_SO_HEAAC
MPEG4_P2_MP4_ASP_L4_SO_HEAAC_MULT5
MPEG4_H263_MP4_P0_L10_AAC
MPEG4_H263_MP4_P0_L10_AAC_LTP
MPEG4_P2_MP4_SP_L2_AMR
MPEG4_P2_MP4_SP_L2_AAC
MPEG4_P2_MP4_SP_VGA_AAC
MPEG4_P2_MP4_SP_VGA_HEAAC

An object descriptor box is optional for an MP4 file.

Though the object descriptor box may contain an object descriptor or an initial object descriptor for MPEG-4 representation (generally, by BIFS track), this guideline entry defines another way to identify video and audio track for default representation.

9.4.4.3.1 A bitstream conformant with these profiles must contain at least one video track and one audio track for the default presentation of contents.

The default video track must contain video elementary stream for this media format.

The default audio track must contain audio elementary stream for this media format profile.

M	L	n/a	n/a	n/a	ISO/IEC 14496-12

9.4.4.3.2 The rendering endpoint must be able to render the default video track and the default audio track.

M	A	DMP DMR	MDMP MDMD	n/a	ISO/IEC 14496-12

9.4.4.3.3 The default video track must have the lowest track ID among the video tracks contained in the content object.

The default audio track must have the lowest track ID among the audio tracks stored in the file.

M	A	n/a	n/a	n/a	ISO/IEC 14496-12

9.4.4.3.4 For the default video track and the default audio track "Track_enabled" must be set to the value of 1 in the "flags" field of the track header box of the track.

M	C	n/a	n/a	n/a	ISO/IEC 14496-12

See 5.3 of ISO/IEC 14496-14. "The track header flags track_in_movie and track_in_preview are not used in MP4 and must be set to the default value of 1 in all files."

9.4.4.3.5 Tracks other than the default video and audio tracks may be present in the content object.

It should be noted that other video or audio tracks may or may not be compliant to the elementary streams for the media format profile.

O	R	n/a	n/a	n/a	ISO/IEC 14496-12

Addition tracks may be BIFS track, optional audio tracks, text track, and hit track.

9.4.4.3.6 The rendering endpoint must be tolerant of additional tracks other than the default video and audio tracks.

M	L	DMP DMR	MDMP MDMD	n/a	ISO/IEC 14496-12

9.4.4.3.7 The 'moov' box must be positioned after the 'ftyp' box before the first 'mdat'. If a 'moof' box is present, it must be positioned before the corresponding 'mdat' box.

M	L	n/a	n/a	n/a	ISO/IEC 14496-12

For streaming, moov is retrieved at first in consideration of streaming playback.

9.4.4.3.8 Within a track, chunks must be in decoding time order within the media-data box 'mdat'.

M	A	n/a	n/a	n/a	ISO/IEC 14496-12

9.4.4.3.9 Video and audio tracks must be organized as interleaved chunks.

The duration of samples stored in a chunk must not exceed 1 s.

M	L	n/a	n/a	n/a	ISO/IEC 14496-12

The resource constrained system cannot process a big chunk.

9.4.4.3.10 If the size of 'moov' box becomes bigger than 1Mbytes, the MPEG-4 movie must be fragmented by using 'moof' box.

The size of 'moov' boxes must be equal to, or less than, 1 Mbyte.

The size of 'moof' boxes must be equal to, or less than, 300 kbytes

M	L	n/a	n/a	n/a	ISO/IEC 14496-12

The resource constrained system cannot process a big 'moov' box in case of streaming.

The 300 kbytes 'moof' box can store the sample table box corresponding to about 20 min AV stream if each video picture stored as a chunk.

It should be noted that a big 'moov' box may cause an initial delay to start rendering the AV stream.

It should be noted that a small movie fragment may cause slow random access when the downloaded file is playback locally.

9.4.4.3.11 For video, random accessible samples should be stored as the first sample of each 'traf'. In the case of gradual decoder refresh, a random accessible sample and the corresponding recovery point should be stored in the same movie fragment. In case of audio, samples having the closest presentation time for every video random accessible sample should be stored as the first sample of each 'traf'. Hence, the first samples of each media in the 'moof' have the approximately equal presentation times.

S	L	n/a	n/a	n/a	ISO/IEC 14496-12

9.4.4.3.12 The sample size box ('stsz') must be used. The compact sample size box ('stz2') must not be used.

M	L	n/a	n/a	n/a	ISO/IEC 14496-12

9.4.4.3.13 Only media data box (mdat) is allowed to have size 1. Only the last media data box (mdat) in the file is allowed to have size 0. Other boxes must not have size 1.

M	L	n/a	n/a	n/a	ISO/IEC 14496-12

Subclause 4.2 of ISO/IEC 14496-12 implies this requirement as follows: "size is an integer that specifies the number of bytes in this box, including all its fields and contained boxes; if size is 1 then the actual size is in the field largesize; if size is 0, then this box is the last one

in the file, and its contents extend to the end of the file (normally only used for a media data box)."

9.4.4.4 MPEG-4 Part 2 AV format – System portion profiling – System bit rates

Profiles:
MPEG4_P2_MP4_SP_AAC.
MPEG4_P2_MP4_SP_HEAAC,
MPEG4_P2_MP4_SP_ATRAC3plus,
MPEG4_P2_MP4_SP_AAC_LTP,
MPEG4_P2_MP4_ASP_AAC,
MPEG4_P2_MP4_ASP_HEAAC,
MPEG4_P2_MP4_ASP_HEAAC_MULT5,
MPEG4_P2_MP4_ASP_ATRAC3plus,
MPEG4_P2_MP4_ASP_L5_SO_AAC,
MPEG4_P2_MP4_ASP_L5_SO_HEAAC,
MPEG4_P2_MP4_ASP_L5_SO_HEAAC_MULT5,
MPEG4_P2_MP4_ASP_L4_SO_AAC,
MPEG4_P2_MP4_ASP_L4_SO_HEAAC,
MPEG4_P2_MP4_ASP_L4_SO_HEAAC_MULT5,
MPEG4_H263_MP4_P0_L10_AAC,
MPEG4_H263_MP4_P0_L10_AAC_LTP,
MPEG4_P2_MP4_SP_L2_AMR,
MPEG4_P2_MP4_SP_L2_AAC,
MPEG4_P2_MP4_SP_VGA_AAC,
MPEG4_P2_MP4_SP_VGA_HEAAC

The maximum system bite rate, which are defined as the maximum of cumulative bit rate of streams in media data, must be as follows. (They are constrained by the video portion profile which used in the media format profile.)

Maximum system bit rate:

Table 41 – Maximum system bit rate

Bit rate	Video portion profile
150 kbps	H263_P0_L10
300 kbps	SP_L2
600 kbps	SP_L3
4000 kbps	SP_L3_VGA
4000 kbps	ASP_L4_SO
10000 kbps	ASP_L5_SO
1000 kbps	ASP_L5

M	L	n/a	n/a	n/a	ISO/IEC 14496-12

9.4.4.5 MPEG-4 Part 2 AV format – System portion profile – ASF

Profiles:
MPEG4_P2_ASF_SP_G726,
MPEG4_P2_ASF_ASP_L5_SO_G726,
MPEG4_P2_ASF_ASP_L4_SO_G726

The ASF system portion profile must match the provisions about ASF defined in [6].

The main characteristics of ASF system portion profile are as follows.

Number of video streams:

- 1 video stream only

Number of audio streams:

- 1 audio stream only

M	L	n/a	n/a	n/a	[6]

9.4.4.6 MPEG-4 Part 2 AV format – System portion profile – 3GPP

Profile:
MPEG4_H263_3GPP_P0_L10_AMR_Wbplus
MPEG4_H263_3GPP_P3_L10_AMR
MPEG4_P2_3GPP_SP_L0B_AMR
MPEG4_P2_3GPP_SP_L0B_AAC

9.4.4.6.1 The video and audio elementary streams must be encapsulated into one of the following two 3GPP file formats as specified in [1].

- Progressive profile
- Basic profile

The following constraints must be also applied.

- All the provisions of 9.4.4.3 apply.

M	R	n/a	n/a	n/a	[1]

9.4.4.6.2 Between the basic and progressive profiles, the progressive profile should be used.

When the progressive profile is used then file brand "3gr6" should be used

When the basic profile is used then file brand "3gp6" should be used.

S	R	n/a	n/a	n/a	[1]

9.5 MPEG-4 Part 10 (AVC) profiling guidelines

9.5.1 General

Table 42 gives an informative summary of MPEG-4 Part 10 (AVC) profiles for the AV media class and see subclauses after 9.5.2 for the definition of these media format profiles.

Table 42 – Summary of MPEG-4 Part 10 (AVC) profiles for the AV media class

DLNA profile ID	Video portion profiling										Audio portion profiling											System portion profiling							
	MP_HD	MP_SD	BL_L3_SD	BL_L3L_SD	BL_CIF30	BL_L2_CIF30	BL_CIF15	BL_L12_CIF15	BL_L1B_QCIF	BL_QCIF15	AAC	AAC_MULT5	HEAAC_L2	MPEG1_L3	AC3	AAC_LTP	AAC_LTP_MULT5	AAC_LTP_MULT7	BSAC	BSAC_MULT5	ATRAC3plus	AMR	AMR_WBplus	MP4	3GPP	MPEG2-TS	MPEG2-TS_T	MPEG2-TS_ISO
AVC_TS_MP_HD_AAC_MULT5	x											x														x		
AVC_TS_MP_HD_AAC_MULT5_T	x											x															x	
AVC_TS_MP_HD_AAC_MULT5_ISO	x											x																x
AVC_TS_MP_HD_HEAAC_L2	x												x													x		
AVC_TS_MP_HD_HEAAC_L2_T	x												x														x	
AVC_TS_MP_HD_HEAAC_L2_ISO	x												x															x
AVC_TS_MP_HD_MPEG1_L3	x													x												x		
AVC_TS_MP_HD_MPEG1_L3_T	x													x													x	
AVC_TS_MP_HD_MPEG1_L3_ISO	x													x														x
AVC_TS_MP_HD_AC3	x														x											x		
AVC_TS_MP_HD_AC3_T	x														x												x	
AVC_TS_MP_HD_AC3_ISO	x														x													x
AVC_TS_MP_HD_AAC_LTP	x															x										x		
AVC_TS_MP_HD_AAC_LTP_T	x															x											x	
AVC_TS_MP_HD_AAC_LTP_ISO	x															x												x
AVC_TS_MP_HD_AAC_LTP_MULT5	x																x									x		
AVC_TS_MP_HD_AAC_LTP_MULT5_T	x																x										x	
AVC_TS_MP_HD_AAC_LTP_MULT5_ISO	x																x											x
AVC_TS_MP_HD_AAC_LTP_MULT7	x																	x								x		
AVC_TS_MP_HD_AAC_LTP_MULT7_T	x																	x									x	
AVC_TS_MP_HD_AAC_LTP_MULT7_ISO	x																	x										x
AVC_TS_MP_SD_AAC_MULT5		x										x														x		
AVC_TS_MP_SD_AAC_MULT5_T		x										x															x	

DLNA profile ID	Video portion profiling									Audio portion profiling											System portion profiling							
	MP_HD	MP_SD	BL_L3_SD	BL_L3L_SD	BL_CIF30	BL_L2_CIF30	BL_CIF15	BL_L12_CIF15	BL_L1B_QCIF	BL_QCIF15	AAC	AAC_MULT5	HEAAC_L2	MPEG1_L3	AC3	AAC_LTP	AAC_LTP_MULT5	AAC_LTP_MULT7	BSAC	BSAC_MULT5	ATRAC3plus	AMR	AMR_WBplus	MP4	3GPP	MPEG2-TS	MPEG2-TS_T	MPEG2-TS_ISO
AVC_TS_MP_SD_AAC_MULT5_ISO		x										x																x
AVC_TS_MP_SD_HEAAC_L2		x											x													x		
AVC_TS_MP_SD_HEAAC_L2_T		x											x														x	
AVC_TS_MP_SD_HEAAC_L2_ISO		x											x															x
AVC_TS_MP_SD_BSAC		x																	x							x		
AVC_TS_MP_SD_BSAC_T		x																	x								x	
AVC_TS_MP_SD_BSAC_ISO		x																	x									x
AVC_TS_MP_SD_MPEG1_L3		x												x												x		
AVC_TS_MP_SD_MPEG1_L3_T		x												x													x	
AVC_TS_MP_SD_MPEG1_L3_ISO		x												x														x
AVC_TS_MP_SD_AC3		x													x											x		
AVC_TS_MP_SD_AC3_T		x													x												x	
AVC_TS_MP_SD_AC3_ISO		x													x													x
AVC_TS_MP_SD_AAC_LTP		x														x										x		
AVC_TS_MP_SD_AAC_LTP_T		x														x											x	
AVC_TS_MP_SD_AAC_LTP_ISO		x														x												x
AVC_TS_MP_SD_AAC_LTP_MULT5		x															x									x		
AVC_TS_MP_SD_AAC_LTP_MULT5_T		x															x										x	
AVC_TS_MP_SD_AAC_LTP_MULT5_ISO		x															x											x
AVC_TS_MP_SD_AAC_LTP_MULT7		x																x								x		
AVC_TS_MP_SD_AAC_LTP_MULT7_T		x																x									x	
AVC_TS_MP_SD_AAC_LTP_MULT7_ISO		x																x										x
AVC_MP4_MP_SD_AAC_MULT5		x										x												x				
AVC_MP4_MP_SD_HEAAC_L2		x											x											x				
AVC_MP4_MP_SD_MPEG1_L3		x												x										x				

DLNA profile ID	Video portion profiling									Audio portion profiling										System portion profiling							
	MP_HD	MP_SD	BL_L3_SD	BL_L3L_SD	BL_CIF30	BL_L2_CIF30	BL_CIF15	BL_L12_CIF15	BL_L1B_QCIF	BL_QCIF15	AAC	AAC_MULT5	HEAAC_L2	MPEG1_L3	AC3	AAC_LTP	AAC_LTP_MULT5	AAC_LTP_MULT7	BSAC	BSAC_MULT5	ATRAC3plus	AMR	AMR_WBplus	MP4	3GPP	MPEG2-TS	MPEG2-TS_T	MPEG2-TS_ISO
AVC_MP4_MP_SD_AC3		x													x									x				
AVC_MP4_MP_SD_AAC_LTP		x														x								x				
AVC_MP4_MP_SD_AAC_LTP_MULT5		x															x							x				
AVC_MP4_MP_SD_AAC_LTP_MULT7		x																x						x				
AVC_MP4_MP_SD_ATRAC3plus		x																			x			x				
AVC_MP4_MP_SD_BSAC		x																	x					x				
AVC_MP4_BL_L3_SD_AAC			x								x													x				
AVC_MP4_BL_L3L_SD_AAC				x							x													x				
AVC_MP4_BL_L3L_SD_HEAAC				x									x											x				
AVC_TS_BL_CIF30_AAC_MULT5					x							x														x		
AVC_TS_BL_CIF30_AAC_MULT5_T					x							x															x	
AVC_TS_BL_CIF30_AAC_MULT5_ISO					x							x																x
AVC_TS_BL_CIF30_HEAAC_L2					x								x													x		
AVC_TS_BL_CIF30_HEAAC_L2_T					x								x														x	
AVC_TS_BL_CIF30_HEAAC_L2_ISO					x								x															x
AVC_TS_BL_CIF30_MPEG_L3					x									x												x		
AVC_TS_BL_CIF30_MPEG_L3_T					x									x													x	
AVC_TS_BL_CIF30_MPEG_L3_ISO					x									x														x
AVC_TS_BL_CIF30_AC3					x										x											x		
AVC_TS_BL_CIF30_AC3_T					x										x												x	
AVC_TS_BL_CIF30_AC3_ISO					x										x													x
AVC_TS_BL_CIF30_AAC_940					x						x															x		
AVC_TS_BL_CIF30_AAC_940_T					x						x																x	
AVC_TS_BL_CIF30_AAC_940_ISO					x						x																	x
AVC_TS_BL_CIF30_AAC_					x											x										x		

DLNA profile ID	Video portion profiling									Audio portion profiling										System portion profiling							
	MP_HD	MP_SD	BL_L3_SD	BL_L3L_SD	BL_CIF30	BL_L2_CIF30	BL_CIF15	BL_L12_CIF15	BL_L1B_QCIF	BL_QCIF15	AAC	AAC_MULT5	HEAAC_L2	MPEG1_L3	AC3	AAC_LTP	AAC_LTP_MULT5	AAC_LTP_MULT7	BSAC	BSAC_MULT5	ATRAC3plus	AMR	AMR_WBplus	MP4	3GPP	MPEG2-TS	MPEG2-TS_T	MPEG2-TS_ISO
LTP																												
AVC_TS_BL_CIF30_AAC_LTP_T					x											x											x	
AVC_TS_BL_CIF30_AAC_LTP_ISO					x											x												x
AVC_TS_BL_CIF30_AAC_LTP_MULT5					x												x								x			
AVC_TS_BL_CIF30_AAC_LTP_MULT5_T					x												x										x	
AVC_TS_BL_CIF30_AAC_LTP_MULT5_ISO					x												x											x
AVC_MP4_BL_L2_CIF30_AAC						x					x													x				
AVC_MP4_BL_CIF30_AAC_MULT5					x							x												x				
AVC_MP4_BL_CIF30_HEAAC_L2					x								x											x				
AVC_MP4_BL_CIF30_MPEG1_L3					x									x										x				
AVC_MP4_BL_CIF30_AC3					x										x									x				
AVC_MP4_BL_CIF30_AAC_LTP					x											x								x				
AVC_MP4_BL_CIF30_AAC_LTP_MULT5					x												x							x				
AVC_MP4_BL_CIF30_BSAC					x														x					x				
AVC_MP4_BL_CIF30_BSAC_MULT5					x															x				x				
AVC_TS_BL_CIF15_AAC							x				x															x		
AVC_TS_BL_CIF15_AAC_T							x				x																x	
AVC_TS_BL_CIF15_AAC_ISO							x				x																	x
AVC_TS_BL_CIF15_AAC_540							x				x															x		
AVC_TS_BL_CIF15_AAC_540_T							x				x																x	
AVC_TS_BL_CIF15_AAC_540_ISO							x				x																	x
AVC_TS_BL_CIF15_AAC_LTP							x									x										x		
AVC_TS_BL_CIF15_AAC_LTP_T							x									x											x	
AVC_TS_BL_CIF15_AAC_LTP_ISO							x									x												x
AVC_TS_BL_CIF15_BSAC							x												x							x		

DLNA profile ID	Video portion profiling									Audio portion profiling										System portion profiling							
	MP_HD	MP_SD	BL_L3_SD	BL_L3L_SD	BL_CIF30	BL_L2_CIF30	BL_CIF15	BL_L12_CIF15	BL_L1B_QCIF	BL_QCIF15	AAC	AAC_MULT5	HEAAC_L2	MPEG1_L3	AC3	AAC_LTP	AAC_LTP_MULT5	AAC_LTP_MULT7	BSAC	BSAC_MULT5	ATRAC3plus	AMR	AMR_WBplus	MP4	3GPP	MPEG2-TS	MPEG2-TS_T	MPEG2-TS_ISO
AVC_TS_BL_CIF15_BSAC_T							x												x								x	
AVC_TS_BL_CIF15_BSAC_ISO							x												x									x
AVC_MP4_BL_CIF15_AAC							x				x													x				
AVC_MP4_BL_CIF15_AAC_520							x				x													x				
AVC_MP4_BL_CIF15_AAC_LTP							x									x								x				
AVC_MP4_BL_CIF15_AAC_LTP_520							x									x								x				
AVC_MP4_BL_CIF15_HEAAC							x						x											x				
AVC_MP4_BL_L12_CIF15_HEAAC								x					x											x				
AVC_MP4_BL_CIF15_BSAC							x												x					x				
AVC_MP4_BL_CIF15_AMR							x															x		x				
AVC_MP4_BL_L1B_QCIF_HEAAC									x				x											x				
AVC_3GPP_BL_QCIF15_AAC										x	x														x			
AVC_3GPP_BL_QCIF15_AAC_LTP										x						x									x			
AVC_3GPP_BL_QCIF15_HEAAC										x			x												x			
AVC_3GPP_BL_QCIF15_AMR										x												x			x			
AVC_3GPP_BL_QCIF15_AMR_WBplus										x													x		x			
AVC_3GPP_BL_CIF15_AMR_WBplus							x																x		x			
AVC_3GPP_BL_CIF30_AMR_WBplus					x																		x		x			

Table 43 – Pixel aspect ratio for AVC_TS_BL_CIF15_AAC_xxx and AVC_TS_MP_SD_xxx profiles

0001	1:1 (Square)	3/4 SAR	2/3 SAR	1/2 SAR
0010	12:11 (625 for 4:3)	16:11	18:11	24:11
0011	10:11 (525 for 4:3)	44:33	15:11	20:11
0100	16:11 (625 for 16:9)	64:33	24:11	32:11
0101	40:33 (525 for 16:9)	160:99	60:33	80:33

9.5.2 Subset of DLNA profiles for AVC MP @ L3 – SD resolution –, MPEG-2 TS encapsulation

9.5.2.1 MPEG-4 Part 10 AV format – Systems portion profiling

AVC_TS_MP_SD_AAC_MULT5,
AVC_TS_MP_SD_AAC_MULT5_T,
AVC_TS_MP_SD_AAC_MULT5_ISO,
AVC_TS_MP_SD_HEAAC_L2,
AVC_TS_MP_SD_HEAAC_L2_T,
AVC_TS_MP_SD_HEAAC_L2_ISO,
AVC_TS_MP_SD_MPEG1_L3,
AVC_TS_MP_SD_MPEG1_L3_T,
AVC_TS_MP_SD_MPEG1_L3_ISO,
AVC_TS_MP_SD_AC3,
AVC_TS_MP_SD_AC3_T,
AVC_TS_MP_SD_AC3_ISO,
AVC_TS_MP_SD_AAC_LTP,
AVC_TS_MP_SD_AAC_LTP_T,
AVC_TS_MP_SD_AAC_LTP_ISO,,,
AVC_TS_MP_SD_AAC_LTP_MULT5,
AVC_TS_MP_SD_AAC_LTP_MULT5_T,
AVC_TS_MP_SD_AAC_LTP_MULT5_ISO,
AVC_TS_MP_SD_AAC_LTP_MULT7,
AVC_TS_MP_SD_AAC_LTP_MULT7_T,
AVC_TS_MP_SD_AAC_LTP_MULT7_ISO,
AVC_TS_MP_SD_BSAC,
AVC_TS_MP_SD_BSAC_T,
AVC_TS_MP_SD_BSAC_ISO

The main characteristics of video stream must be conformant to ISO/IEC 13818-1.

The main characteristics of MPEG-4 part 10 system stream are as follows.

System:

- MPEG-2 transport stream

Number of programs:

1 as defined for a single program transport stream

Packet size:

- 188 bytes per transport packet

System bit rate:

- Up to 12 Mbps (video up to 10 Mbps)

PSI information:

- PAT and PMT are required.
- PSI insertion interval should be implementation-dependent.

  Bitstreams conformant with these profiles may contain additional PSI information

M	A	n/a	n/a	n/a	ISO/IEC 13818-1

A full or partial SPTS can have multiple audio and video components in it.

9.5.2.2 MPEG-4 Part 10 AV format – Video portion profiling – GOP structure

Profiles:
AVC_TS_MP_SD_AAC_MULT5,

AVC_TS_MP_SD_AAC_MULT5_T,
AVC_TS_MP_SD_AAC_MULT5_ISO,
AVC_TS_MP_SD_HEAAC_L2,
AVC_TS_MP_SD_HEAAC_L2_T,
AVC_TS_MP_SD_HEAAC_L2_ISO,
AVC_TS_MP_SD_MPEG1_L3,
AVC_TS_MP_SD_MPEG1_L3_T,
AVC_TS_MP_SD_MPEG1_L3_ISO,
AVC_TS_MP_SD_AC3,
AVC_TS_MP_SD_AC3_T,
AVC_TS_MP_SD_AC3_ISO,
AVC_TS_MP_SD_AAC_LTP,
AVC_TS_MP_SD_AAC_LTP_T,
AVC_TS_MP_SD_AAC_LTP_ISO,
AVC_TS_MP_SD_AAC_LTP_MULT5,
AVC_TS_MP_SD_AAC_LTP_MULT5_T,
AVC_TS_MP_SD_AAC_LTP_MULT5_ISO,
AVC_TS_MP_SD_AAC_LTP_MULT7,
AVC_TS_MP_SD_AAC_LTP_MULT7_T,
AVC_TS_MP_SD_AAC_LTP_MULT7_ISO,
AVC_TS_MP_SD_BSAC,
AVC_TS_MP_SD_BSAC_T,
AVC_TS_MP_SD_BSAC_ISO

The frame rate and number of pictures in a GOP structure of bitstreams conformant to these profiles should be as follows.

Table 44 – MPEG-4 Part 10 AV format frame rate

	NTSC	**PAL**
Maximum frame rate of the content	30	25
Number of pictures in GOP	36 display fields or less (Interlaced)	30 display fields or less (interlaced)
	18 frames or less (progressive)	15 frames or less (progressive)

S	L	n/a	n/a	n/a	ITU-T Recommendation H.264 ISO/IEC 14496-10

9.5.2.3 MPEG-4 Part 10 AV format – Video portion profiling

Profiles:
AVC_TS_MP_SD_AAC_MULT5,
AVC_TS_MP_SD_AAC_MULT5_T,
AVC_TS_MP_SD_AAC_MULT5_ISO,
AVC_TS_MP_SD_HEAAC_L2,
AVC_TS_MP_SD_HEAAC_L2_T,
AVC_TS_MP_SD_HEAAC_L2_ISO,
AVC_TS_MP_SD_MPEG1_L3,
AVC_TS_MP_SD_MPEG1_L3_T,
AVC_TS_MP_SD_MPEG1_L3_ISO,
AVC_TS_MP_SD_AC3,
AVC_TS_MP_SD_AC3_T,
AVC_TS_MP_SD_AC3_ISO,

AVC_TS_MP_SD_AAC_LTP,
AVC_TS_MP_SD_AAC_LTP_T,
AVC_TS_MP_SD_AAC_LTP_ISO,
AVC_TS_MP_SD_AAC_LTP_MULT5,
AVC_TS_MP_SD_AAC_LTP_MULT5_T,
AVC_TS_MP_SD_AAC_LTP_MULT5_ISO,
AVC_TS_MP_SD_AAC_LTP_MULT7,
AVC_TS_MP_SD_AAC_LTP_MULT7_T,
AVC_TS_MP_SD_AAC_LTP_MULT7_ISO,
AVC_TS_MP_SD_BSAC,
AVC_TS_MP_SD_BSAC_T,
AVC_TS_MP_SD_BSAC_ISO

The main characteristics of video stream must be conformant to ITU-T Recommendation H.264 and ISO/IEC 14496-10.

The main characteristics of MPEG-4 part 10 video streams are as follows

Profile and level:

- ➢ MP at the following levels
- L1
- L1.1
- L1.2
- L1.3
- L2
- L2.1
- L2.2
- L3

Chroma:

- 4:2:0

Video bit rate:

- ➢ Main profile
- Constant bit rate equal to, or less than, 10 Mbps
- Variable-maximum bit rate equal to, or less than, 10 Mbps

TV system with the following characteristics:

- MPEG-4 Part 10 main profile

Table 45 – MPEG-4 Part 10 AV format resolutions

Type	Resolution	Pixel aspect ratio[20] (informative)	Display aspect ratio[21] (informative)
625 D1	720x576	12:11	4:3
	720x576	16:11	16:9
525 D1	720x480	10:11	4:3
	720x480	40:33	16:9
625 4SIF	704x576	12:11	4:3

[20] Pixel aspect ratio is informative and it indicates a typical aspect ratio for each resolution.

[21] Display aspect ratio of which a video stream is informative and it indicates display aspect ratio with a resolution and the typical aspect ratio for the resolution.

Type	Resolution	Pixel aspect ratio[20] (informative)	Display aspect ratio[21] (informative)
	704x576	16:11	16:9
525 4SIF	704x480	10:11	4:3
	704x480	40:33	16:9
VGA	640x480	1:1	4:3
VGA 16:9	640x360	1:1	16:9
625 3/4D1	544x576	16:11	4:3
	544x576	64:33	16:9
525 3/4D1	544x480	44:33	4:3
	544x480	160:99	16:9
625 2/3D1	480x576	18:11	4:3
	480x576	24:11	16:9
525 2/3D1	480x480	15:11	4:3
	480x480	60:33	16:9
9/16VGA 4:3	480x360	1:1	4:3
9/16VGA 16:9	480x270	1:1	16:9
625 1/2D1	352x576	24:11	4:3
	352x576	32:11	16:9
525 1/2D1	352x480	20:11	4:3
	352x480	80:33	16:9
CIF, 625SIF	352x288	12:11	4:3
	352x288	16:11	16:9
525SIF	352x240	10:11	4:3
	352x240	40:33	16:9
QVGA 4:3	320x240	1:1	4:3
QVGA 16:9	320x180	1:1	16:9
1/7VGA 4:3	240x180	1:1	4:3
1/9VGA 4:3	208x160	1:1	4:3
QCIF,625QSIF	176x144	12:11	4:3
	176x144	16:11	16:9
525QSIF	176x120	10:11	4:3
	176x120	40:33	16:9
SQVGA 4:3	160x120	1:1	4:3
1/16 VGA 4:3	160x112	1:1	4:3
SQVGA 16:9	160x90	1:1	16:9
SQCIF	128x96	12:11	4:3

Type	Resolution	Pixel aspect ratio[20] (informative)	Display aspect ratio[21] (informative)
	128x96	16:11	16:9

Pixel aspect ratio:

- 1:1
- 12:11
- 10:11
- 16:11
- 40:33
- 44:33
- 64:33
- 160:99
- 18:11
- 15:11
- 24:11
- 60:33
- 20:11
- 32:11
- 80:33

A bitstream conformant to these media format profiles may utilize any of these pixel aspect ratios regardless of resolutions.

The rendering endpoint may ignore pixel aspect ratio for rendering. The rendering endpoint can shrink, stretch and crop image to the display aspect ratio dependent on vendor implementations.

The resolution must not change in a video stream

The frame rate is less than, or equal to, 30 fps. Both fixed frame rate and variable frame rate are allowed.

M	L	n/a	n/a	n/a	ITU-T Recommendation H.264 | ISO/IEC 14496-10

The serving endpoint may stream with any of the pixel aspect ratio from Table 43.

The rendering endpoint must tolerate any of the pixel aspect ratio that it receives from DMS.

The accuracy of the aspect ratio rendering is up to the implementer.

The maximum frame rate is 30 fps and does not restrict the content frame rate to the input of rendering endpoint.

This means that the rendering endpoint must accept all frame rates equal to, or below, 30 fps. The manufacturers can decide how they process the frame rate conversion to output the required frame rate to the output device.

9.5.2.4 MPEG-4 Part 10 AV format – MIME type definition

Profiles:
AVC_TS_MP_SD_AAC_MULT5,
AVC_TS_MP_SD_AAC_MULT5_T,
AVC_TS_MP_SD_HEAAC_L2,
AVC_TS_MP_SD_HEAAC_L2_T,
AVC_TS_MP_SD_MPEG1_L3,
AVC_TS_MP_SD_MPEG1_L3_T,
AVC_TS_MP_SD_AC3,
AVC_TS_MP_SD_AC3_T,
AVC_TS_MP_SD_AAC_LTP,
AVC_TS_MP_SD_AAC_LTP_T,
AVC_TS_MP_SD_AAC_LTP_MULT5,
AVC_TS_MP_SD_AAC_LTP_MULT5_T,
AVC_TS_MP_SD_AAC_LTP_MULT7,
AVC_TS_MP_SD_AAC_LTP_MULT7_T,
AVC_TS_MP_SD_BSAC,
AVC_TS_MP_SD_BSAC_T

MIME type "video/vnd.dlna.mpeg-tts" must be used for these media format profiles.

M	R	n/a	n/a	n/a	n/a

9.5.2.5 MPEG-4 Part 10 AV format – MIME type definition

Profiles:
AVC_TS_MP_SD_AAC_MULT5_ISO,
AVC_TS_MP_SD_HEAAC_L2_ISO,
AVC_TS_MP_SD_MPEG1_L3_ISO,
AVC_TS_MP_SD_AC3_ISO,
AVC_TS_MP_SD_AAC_LTP_ISO,
AVC_TS_MP_SD_AAC_LTP_MULT5_ISO,
AVC_TS_MP_SD_AAC_LTP_MULT7_ISO,
AVC_TS_MP_SD_BSAC_ISO

MIME type "video/mpeg" must be used for these media format profiles.

M	R	n/a	n/a	n/a	n/a

9.5.3 Subset of DLNA profiles for AVC MP@L4, HD resolutions, and MPEG-2 TS encapsulation

9.5.3.1 MPEG-4 Part 10 AV format – Systems portion profiling

Profiles:
AVC_TS_MP_HD_AAC_MULT5,
AVC_TS_MP_HD_AAC_MULT5_T,
AVC_TS_MP_HD_AAC_MULT5_ISO,
AVC_TS_MP_HD_HEAAC_L2,
AVC_TS_MP_HD_HEAAC_L2_T,
AVC_TS_MP_HD_HEAAC_L2_ISO,
AVC_TS_MP_HD_MPEG1_L3,
AVC_TS_MP_HD_MPEG1_L3_T,
AVC_TS_MP_HD_MPEG1_L3_ISO,
AVC_TS_MP_HD_AC3,

AVC_TS_MP_HD_AC3_T,
AVC_TS_MP_HD_AC3_ISO,
AVC_TS_MP_HD_AAC_LTP,
AVC_TS_MP_HD_AAC_LTP_T,
AVC_TS_MP_HD_AAC_LTP_ISO,
AVC_TS_MP_HD_AAC_LTP_MULT5,
AVC_TS_MP_HD_AAC_LTP_MULT5_T,
AVC_TS_MP_HD_AAC_LTP_MULT5_ISO,
AVC_TS_MP_HD_AAC_LTP_MULT7,
AVC_TS_MP_HD_AAC_LTP_MULT7_T,
AVC_TS_MP_HD_AAC_LTP_MULT7_ISO

The main characteristics of video stream must be conformant to ISO/IEC 13818-1.

The main characteristics of MPEG-4 part 10 system stream are as follows.

System:

MPEG-2 transport stream

Number of programs:

1 as defined for a single program transport stream

Packet size:

188 bytes per transport packet

System bit rate:

Up to 25 Mbps (video up to 20 Mbps)

PSI information:

PAT and PMT are required. It must tolerate any other tables.

PSI insertion interval should be implementation-dependent.

M	A	n/a	n/a	n/a	ISO/IEC 13818-1

A full or partial SPTS can have multiple audio and video components in it.

9.5.3.2 MPEG-4 Part 10 AV Format – Video portion profiling – GOP Structure

Profiles:
AVC_TS_MP_HD_AAC_MULT5,
AVC_TS_MP_HD_AAC_MULT5_T,
AVC_TS_MP_HD_AAC_MULT5_ISO,
AVC_TS_MP_HD_HEAAC_L2,
AVC_TS_MP_HD_HEAAC_L2_T,
AVC_TS_MP_HD_HEAAC_L2_ISO,
AVC_TS_MP_HD_MPEG1_L3,
AVC_TS_MP_HD_MPEG1_L3_T,
AVC_TS_MP_HD_MPEG1_L3_ISO,
AVC_TS_MP_HD_AC3,
AVC_TS_MP_HD_AC3_T,
AVC_TS_MP_HD_AC3_ISO,
AVC_TS_MP_HD_AAC_LTP,
AVC_TS_MP_HD_AAC_LTP_T,
AVC_TS_MP_HD_AAC_LTP_ISO,
AVC_TS_MP_HD_AAC_LTP_MULT5,
AVC_TS_MP_HD_AAC_LTP_MULT5_T,
AVC_TS_MP_HD_AAC_LTP_MULT5_ISO,
AVC_TS_MP_HD_AAC_LTP_MULT7,
AVC_TS_MP_HD_AAC_LTP_MULT7_T,
AVC_TS_MP_HD_AAC_LTP_MULT7_ISO

The frame rate and number of pictures in a GOP structure of bitstreams conformant to these profiles should be as follows.

Table 46 – Frame rate and number of pictures in a GOP structure

	NTSC	PAL
Maximum frame rate of the content	30	25
Number of pictures in GOP	36 display fields or less (interlaced)	30 display fields or less (interlaced)
	18 frames or less (progressive)	15 frames or less (progressive)

S	L	n/a	n/a	n/a	ITU-T Recommendation H.264 | ISO/IEC 14496-10

9.5.3.3 MPEG-4 Part 10 AV format – Video portion profiling

Profiles:
AVC_TS_MP_HD_AAC_MULT5,
AVC_TS_MP_HD_AAC_MULT5_T,
AVC_TS_MP_HD_AAC_MULT5_ISO,
AVC_TS_MP_HD_HEAAC_L2,
AVC_TS_MP_HD_HEAAC_L2_T,
AVC_TS_MP_HD_HEAAC_L2_ISO,
AVC_TS_MP_HD_MPEG1_L3,
AVC_TS_MP_HD_MPEG1_L3_T,
AVC_TS_MP_HD_MPEG1_L3_ISO,
AVC_TS_MP_HD_AC3,
AVC_TS_MP_HD_AC3_T,
AVC_TS_MP_HD_AC3_ISO,
AVC_TS_MP_HD_AAC_LTP,
AVC_TS_MP_HD_AAC_LTP_T,

AVC_TS_MP_HD_AAC_LTP_ISO,
AVC_TS_MP_HD_AAC_LTP_MULT5,
AVC_TS_MP_HD_AAC_LTP_MULT5_T,
AVC_TS_MP_HD_AAC_LTP_MULT5_ISO,
AVC_TS_MP_HD_AAC_LTP_MULT7,
AVC_TS_MP_HD_AAC_LTP_MULT7_T,
AVC_TS_MP_HD_AAC_LTP_MULT7_ISO

The main characteristics of video stream must be conformant to ITU-T Recommendation H.264 and ISO/IEC 14496-10.

The main characteristics of MPEG-4 part 10 video streams are as follows.

Profile and level:

- ➢ MP at the following levels
- L4

Chroma:

- ➢ 4:2:0

Video bit rate:

- ➢ Main profile
- Constant bit rate equal to, or less than, 20 Mbps
- Variable-maximum bit rate equal to, or less than, 20 Mbps

MPEG-4 part 10 Main Profile L4

Table 47 – MPEG-4 Part 10 AV format resolutions

Resolution	Aspect ratio	Maximum frame rate
Up to 1920x1080	16:9	59.94i/60i
		29.97p/30p
		23.976p/24p
Up to 1280x720	16:9	59.94p/60p
		29.97p/30p
		23.976p/24p
Up to 1920x1152	16:9	50p
		50i
		25p

M	L	n/a	n/a	n/a	ITU-T Recommen-dation H.264 ISO/IEC 14496-10

9.5.3.4 MPEG-4 Part 10 AV format – MIME type definition
Profiles:
AVC_TS_MP_HD_AAC_MULT5,
AVC_TS_MP_HD_AAC_MULT5_T,

AVC_TS_MP_HD_HEAAC_L2,
AVC_TS_MP_HD_HEAAC_L2_T,
AVC_TS_MP_HD_MPEG1_L3,
AVC_TS_MP_HD_MPEG1_L3_T,
AVC_TS_MP_HD_AC3,
AVC_TS_MP_HD_AC3_T,
AVC_TS_MP_HD_AAC_LTP,
AVC_TS_MP_HD_AAC_LTP_T,
AVC_TS_MP_HD_AAC_LTP_MULT5,
AVC_TS_MP_HD_AAC_LTP_MULT5_T,
AVC_TS_MP_HD_AAC_LTP_MULT7,
AVC_TS_MP_HD_AAC_LTP_MULT7_T

MIME type "video/vnd.dlna.mpeg-tts" must be used for this subset of DLNA profiles.

M	A	n/a	n/a	n/a	n/a

9.5.3.5 MPEG-4 Part 10 AV format – MIME type definition

Profiles:
AVC_TS_MP_HD_AAC_MULT5_ISO,
AVC_TS_MP_HD_HEAAC_L2_ISO,
AVC_TS_MP_HD_MPEG1_L3_ISO,
AVC_TS_MP_HD_AC3_ISO,
AVC_TS_MP_HD_AAC_LTP_ISO,
AVC_TS_MP_HD_AAC_LTP_MULT5_ISO,
AVC_TS_MP_HD_AAC_LTP_MULT7_ISO

MIME type "video/mpeg" must be used for this subset of DLNA profiles.

M	A	n/a	n/a	n/a	n/a

9.5.4 Subset of DLNA profiles for AVC BP @ L3, SD resolutions, MP4 encapsulation

9.5.4.1 MPEG-4 Part 10 AV format – Systems portion profiling

Profiles:
AVC_MP4_BL_L3_SD_AAC,
AVC_MP4_BL_L3L_SD_AAC,
AVC_MP4_BL_L3L_SD_HEAAC

A bitstream conformant to these profiles must conform to the provisions defined by MPEG Part 14 ISO/IEC 14496-14 and Part 15 ISO/IEC 14496-15, and the additional constraints defined in 9.4.4.3.

M	A	n/a	n/a	n/a	ISO/IEC 14496-14 ISO/IEC 14496-15

9.5.4.2 MPEG-4 Part 10 AV format – Systems portion profiling – System bit rate

Profiles:
AVC_MP4_BL_L3_SD_AAC
AVC_MP4_BL_L3L_SD_AAC
AVC_MP4_BL_L3L_SD_HEAAC

A bitstream conformant to these profiles must meet the following requirements:

Maximum system bit rate:

- 5 Mbps

M	A	n/a	n/a	n/a	n/a

9.5.4.3 MPEG-4 Part 10 AV format – Video portion profiling Profile: AVC_MP4_BL_L3_SD_AAC

The main characteristics of video stream must be conformant to ITU-T Recommendation H.264 and ISO/IEC 14496-10.

The main characteristics of MPEG-4 part 10 video streams are as follows.

Profile:

Baseline profile

Level:

L3

Chroma:

4:2:0

Video bit rate:

- Constant bit rate equal to, or less than, 4 Mbps
- Variable-maximum bit rate equal to, or less than, 4 Mbps

Video resolution with the following characteristics:

Table 48 – MPEG-4 Part 10 AV format resolutions

	Resolution	Pixel aspect ratio[22] (informative)	Display aspect ratio[23] (informative)	Maximum frame rate
625 D1	720x576	12:11	4:3	25
	720x576	16:11	16:9	25
525 D1	720x480	10:11	4:3	29.97
	720x480	40:33	16:9	29.97
VGA	640x480	1:1	4:3	30
VGA 16:9	640x360	1:1	16:9	30

Pixel aspect ratio:

- 1:1
- 12:11
- 10:11
- 16:11
- 40:33
- 44:33
- 64:33
- 160:99
- 18:11
- 15:11

[22] Pixel aspect ratio is informative and it indicates a typical aspect ratio for each resolution.

[23] Display aspect ratio of which a video stream is informative and it indicates display aspect ratio with a resolution and the typical aspect ratio for the resolution.

- 24:11
- 60:33
- 20:11
- 32:11
- 80:33

A bitstream conformant to these media format profiles may utilize any of the pixel aspect ratios regardless of resolutions.

The rendering endpoint may ignore pixel aspect ratio for rendering. The rendering endpoint can shrink, stretch and crop image to the display aspect ratio dependent on vendor implementations.

The resolution must not change in a video stream.

Both fixed frame rate and variable frame rate are allowed when constrained_set1_flag = 1.

M	L	n/a	n/a	n/a	ITU-T Recommendation H.264 ISO/IEC 14496-10

This profile is progressive frames only.

9.5.4.4 MPEG-4 Part 10 AV format – Video portion profiling – Constraints for certain profiles

Profiles:
AVC_MP4_BL_L3L_SD_AAC,
AVC_MP4_BL_L3L_SD_HEAAC

The video portion profiling for these profiles must be as described in 9.5.4.3 with the following exceptions:

Profile and level:

- BP at level L3 and below

The Constraint Set1 flag value must be 1.

M	A	n/a	n/a	n/a	n/a

A **Constraint Set1 flag** of 1 indicates that the video stream may be decoded by a main profile decoder.

9.5.4.5 MPEG-4 Part 10 AV format – Video portion profiling – DPB buffer constraints for certain profiles

Profiles:
AVC_MP4_BL_L3L_SD_AAC,
AVC_MP4_BL_L3L_SD_HEAAC

The decoded picture buffer (DPB) size must be restricted to no more than three times (3x) the display resolution

M	L	n/a	n/a	n/a	n/a

This allows for one DPB and two reference frames, thus limiting the memory requirements of handheld devices.

9.5.4.6 MPEG-4 Part 10 AV format – MIME type definition

Profiles:
AVC_MP4_BL_L3_SD_AAC,

AVC_MP4_BL_L3L_SD_AAC,
AVC_MP4_BL_L3L_SD_HEAAC

MIME type "video/mp4" must be used for these media format profiles.

n/a	n/a	n/a	n/a		

9.5.5 Subset of DLNA profiles for AVC BP @ L2, CIF30 resolutions – MPEG-2 TS encapsulation

9.5.5.1 MPEG-4 Part 10 AV Format – System portion profiling

Profiles:
AVC_TS_BL_CIF30_AAC_MULT5,
AVC_TS_BL_CIF30_AAC_MULT5_T,
AVC_TS_BL_CIF30_AAC_MULT5_ISO,
AVC_TS_BL_CIF30_HEAAC_L2,
AVC_TS_BL_CIF30_HEAAC_L2_T,
AVC_TS_BL_CIF30_HEAAC_L2_ISO,
AVC_TS_BL_CIF30_AAC_LTP,
AVC_TS_BL_CIF30_AAC_LTP_T,
AVC_TS_BL_CIF30_AAC_LTP_ISO,
AVC_TS_BL_CIF30_AAC_LTP_MULT5,
AVC_TS_BL_CIF30_AAC_LTP_MULT5_T,
AVC_TS_BL_CIF30_AAC_LTP_MULT5_ISO

The main characteristics of video stream must be conformant to ISO/IEC 13818-1.

The main characteristics of MPEG-4 part 10 system stream are as follows.

System:

MPEG-2 transport stream

Number of programs:

1 as defined for a single program transport stream

Packet size:

188 bytes per transport packet

System bit rate:

Up to 3 Mbps

PSI information:

PAT and PMT are required. It must tolerate any other tables.

PSI insertion interval should be implementation-dependent.

M	A	n/a	n/a	n/a	n/a

A full or partial SPTS can have multiple audio and video components in it.

9.5.5.2 MPEG-4 Part 10 AV Format: System portion profiling,

Profiles:
AVC_TS_BL_CIF30_AAC_940,
AVC_TS_BL_CIF30_AAC_940_T,
AVC_TS_BL_CIF30_AAC_940_ISO

System stream specifications for these profiles must conform to 9.5.5.1, except as noted here:

Maximum system bit rate (normative):

- 940 kbps

M	A	n/a	n/a	n/a	n/a

9.5.5.3 MPEG-4 Part 10 AV format – Video portion profiling – Constraint Set1 Flag

Profiles:
AVC_TS_BL_CIF30_AAC_MULT5,
AVC_TS_BL_CIF30_AAC_MULT5_T,
AVC_TS_BL_CIF30_AAC_MULT5_ISO,
AVC_TS_BL_CIF30_HEAAC_L2,
AVC_TS_BL_CIF30_HEAAC_L2_T,
AVC_TS_BL_CIF30_HEAAC_L2_ISO,
AVC_TS_BL_CIF30_AAC_LTP,
AVC_TS_BL_CIF30_AAC_LTP_T,
AVC_TS_BL_CIF30_AAC_LTP_ISO,
AVC_TS_BL_CIF30_AAC_LTP_MULT5,
AVC_TS_BL_CIF30_AAC_LTP_MULT5_T,
AVC_TS_BL_CIF30_AAC_LTP_MULT5_ISO,
AVC_TS_BL_CIF30_AAC_940,
AVC_TS_BL_CIF30_AAC_940_T,
AVC_TS_BL_CIF30_AAC_940_ISO

A bitstream conformant to these profiles must meet the following requirements:

Constraint Set1 Flag:

1

M	A	n/a	n/a	n/a	n/a

The constraint_set1_flag is used to signal that even though the content conforms to baseline profile; it will also be decodable by a main profile decoder.

When this flag is set to 1, those encoding features that are allowed in Baseline profile but not in the

Main profile must not be used.

9.5.5.4 MPEG-4 Part 10 AV format – Video portion profiling

Profiles:
AVC_TS_BL_CIF30_AAC_MULT5,
AVC_TS_BL_CIF30_AAC_MULT5_T,
AVC_TS_BL_CIF30_AAC_MULT5_ISO,
AVC_TS_BL_CIF30_HEAAC_L2,
AVC_TS_BL_CIF30_HEAAC_L2_T,
AVC_TS_BL_CIF30_HEAAC_L2_ISO,
AVC_TS_BL_CIF30_AAC_LTP,
AVC_TS_BL_CIF30_AAC_LTP_T,
AVC_TS_BL_CIF30_AAC_LTP_ISO,
AVC_TS_BL_CIF30_AAC_LTP_MULT5,
AVC_TS_BL_CIF30_AAC_LTP_MULT5_T,
AVC_TS_BL_CIF30_AAC_LTP_MULT5_ISO,
AVC_TS_BL_CIF30_AAC_940,
AVC_TS_BL_CIF30_AAC_940_T,
AVC_TS_BL_CIF30_AAC_940_ISO

The main characteristics of video stream must be conformant to ITU-T Recommendation H.264 and ISO/IEC 14496-10.

The main characteristics of MPEG-4 part 10 video streams are as follows.

Profile and level:

- BP at the following levels
  - L2 and below

Chroma:

- 4:2:0

Video bit rate:

- Baseline profile
  - Constant bit rate equal to, or less than, 2 Mbps
  - Variable-maximum bit rate equal to, or less than, 2 Mbps

Table 49 – MPEG-4 Part 10 AV format resolutions

	Resolution	Pixel aspect ratio[24] (informative)	Display aspect ratio[25] (informative)	Maximum frame rate
CIF, 625SIF	352x288	12:11	4:3	15
	352x288	16:11	16:9	15
525SIF	352x240	10:11	4:3	18
	352x240	40:33	16:9	18
QVGA 4:3	320x240	1:1	4:3	20
QVGA 16:9	320x180	1:1	16:9	26
1/7VGA 4:3	240x180	1:1	4:3	30
1/7VGA 16:9	240x135	1:1	16:9	30

[24] Pixel aspect ratio is informative and it indicates a typical aspect ratio for each resolution.

[25] Display aspect ratio of which a video stream is informative and it indicates display aspect ratio with a resolution and the typical aspect ratio for the resolution.

1/9VGA 4:3	208x160	1:1	4:3	30
QCIF,625QSIF	176x144	12:11	4:3	30
	176x144	16:11	16:9	30
525QSIF	176x120	10:11	4:3	30
	176x120	40:33	16:9	30
SQVGA 4:3	160x120	1:1	4:3	30
1/16 VGA 4:3	160x112	1:1	4:3	30
SQVGA 16:9	160x90	1:1	16:9	30
SQCIF	128x96	12:11	4:3	30
	128x96	16:11	16:9	30

Pixel aspect ratio:

- 1:1
- 12:11
- 10:11
- 16:11
- 40:33
- 44:33
- 64:33
- 160:99
- 18:11
- 15:11
- 24:11
- 60:33
- 20:11
- 32:11
- 80:33

A bitstream conformant to these media format profiles may utilize any of the pixel aspect ratios regardless of resolutions.

The rendering endpoint may ignore pixel aspect ratio for rendering. The rendering endpoint can shrink, stretch and crop image to the display aspect ratio dependent on vendor implementations.

The resolution must not change in a video stream.

The frame rate is less than, or equal to, 30 fps.

Both fixed frame rate and variable frame rate are allowed.

M	L	n/a	n/a	n/a	ITU-T Recommendation H.264 ISO/IEC 14496-10

Progressive only, no interlace allowed.

The maximum allowed frame rate is 30 fps.

Serving endpoints may stream with any of the pixel aspect ratio from Table 49.

Rendering endpoints must tolerate any of the pixel aspect ratio that it receives from DMS.

The accuracy of aspect ratio rendering is up to the implementer.

9.5.5.5 MPEG-4 Part 10 AV format – MIME type definition

Profiles:
AVC_TS_BL_CIF30_AAC_MULT5,
AVC_TS_BL_CIF30_AAC_MULT5_T,
AVC_TS_BL_CIF30_HEAAC_L2,
AVC_TS_BL_CIF30_HEAAC_L2_T,
AVC_TS_BL_CIF30_AAC_LTP,
AVC_TS_BL_CIF30_AAC_LTP_T,
AVC_TS_BL_CIF30_AAC_LTP_MULT5,
AVC_TS_BL_CIF30_AAC_LTP_MULT5_T,
AVC_TS_BL_CIF30_AAC_940,
AVC_TS_BL_CIF30_AAC_940_T

MIME type "video/vnd.dlna.mpeg-tts" must be used for these media format profiles.

M	A	n/a	n/a	n/a	n/a

9.5.5.6 MPEG-4 Part 10 AV format – MIME type definition

Profile:
AVC_TS_BL_CIF30_AAC_MULT5_ISO,
AVC_TS_BL_CIF30_HEAAC_L2_ISO,
AVC_TS_BL_CIF30_AAC_LTP_ISO,
AVC_TS_BL_CIF30_AAC_LTP_MULT5_ISO,
AVC_TS_BL_CIF30_AAC_940_ISO

MIME type "video/mpeg" must be used for this media format profile.

M	A	n/a	n/a	n/a	n/a

9.5.6 Subset of DLNA profiles for AVC BP @ L1.2, CIF 15 resolutions, MPEG-2 TS encapsulation

9.5.6.1 MPEG-4 Part 10 AV format – Systems portion profiling

Profiles:
AVC_TS_BL_CIF15_AAC
AVC_TS_BL_CIF15_AAC_T
AVC_TS_BL_CIF15_AAC_ISO
AVC_TS_BL_CIF15_AAC_LTP
AVC_TS_BL_CIF15_AAC_LTP_T
AVC_TS_BL_CIF15_AAC_LTP_ISO
AVC_TS_BL_CIF15_BSAC
AVC_TS_BL_CIF15_BSAC_T
AVC_TS_BL_CIF15_BSAC_ISO

The main characteristics of video stream must be conformant to ISO/IEC 13818-1.

The main characteristics of MPEG-4 part 10 system stream are as follows.

System:

MPEG-2 transport stream

Number of programs:

1 as defined for a single program transport stream

Packet size:

188 bytes per transport packet

System bit rate:

Up to 600 kbps (video up to 384 kbps)

PSI information:

PAT and PMT are required. It must tolerate any other tables.

PSI insertion interval should be implementation-dependent.

Serving end point may choose to provide additional PSI information

M	A	n/a	n/a	n/a	ISO/IEC 13818-1

A full or partial SPTS can have multiple audio and video components in it.

9.5.6.2 MPEG-4 Part 10 AV format – Systems portion profiling

Profiles:
AVC_TS_BL_CIF15_AAC_540
AVC_TS_BL_CIF15_AAC_540_T
AVC_TS_BL_CIF15_AAC_540_ISO

System stream specifications for these profiles must conform to the previous guideline, except as noted here.

Maximum system bit rate (normative):

- 540 kbps

M	L	n/a	n/a	n/a	n/a

9.5.6.3 MPEG-4 Part 10 AV format – Video portion profiling – Constraint set1 flags

Profiles:
AVC_TS_BL_CIF15_AAC,
AVC_TS_BL_CIF15_AAC_T,
AVC_TS_BL_CIF15_AAC_ISO,
AVC_TS_BL_CIF15_AAC_LTP,
AVC_TS_BL_CIF15_AAC_LTP_T,
AVC_TS_BL_CIF15_AAC_LTP_ISO,
AVC_TS_BL_CIF15_BSAC,
AVC_TS_BL_CIF15_BSAC_T,
AVC_TS_BL_CIF15_BSAC_ISO,
AVC_TS_BL_CIF15_AAC_540,
AVC_TS_BL_CIF15_AAC_540_T,
AVC_TS_BL_CIF15_AAC_540_ISO

A bitstream conformant to these profiles must meet the following requirements.

Constraint Set1 Flag:

1

M	L	n/a	n/a	n/a	ITU-T Recommendation H.264 ISO/IEC 14496-10

The constraint_set1_flag is used to signal that even though the content conforms to baseline profile; it will also be decodable by a main profile decoder.

When this flag is set to 1, those encoding features that are allowed in baseline profile but not in the main profile must not be used.

9.5.6.4 MPEG-4 Part 10 AV format – Video portion profiling

Profiles:
AVC_TS_BL_CIF15_AAC
AVC_TS_BL_CIF15_AAC_T
AVC_TS_BL_CIF15_AAC_ISO
AVC_TS_BL_CIF15_AAC_LTP
AVC_TS_BL_CIF15_AAC_LTP_T
AVC_TS_BL_CIF15_AAC_LTP_ISO
AVC_TS_BL_CIF15_BSAC
AVC_TS_BL_CIF15_BSAC_T
AVC_TS_BL_CIF15_BSAC_ISO The main characteristics of video stream must be conformant to ITU-T Recommendation H.264 and ISO/IEC 14496-10

The main characteristics of MPEG-4 part 10 video streams are as follows:

Profile and level:

- BP at the following levels
  - L1.2 and below

Chroma:

- 4:2:0

Video bit rate:

- Baseline profile
  - Constant bit rate equal to, or less than, 384 kbps
  - Variable-maximum bit rate equal to, or less than, 384 kbps

Table 50 – MPEG-4 Part 10 AV format resolutions

	Resolution	Pixel aspect ratio[26] (informative)	Display aspect ratio[27] (informative)	Maximum frame rate
CIF, 625SIF	352x288	12:11	4:3	15
	352x288	16:11	16:9	15
525SIF	352x240	10:11	4:3	18
	352x240	40:33	16:9	18
QVGA 4:3	320x240	1:1	4:3	20
QVGA 16:9	320x180	1:1	16:9	26
1/7VGA 4:3	240x180	1:1	4:3	30
1/9VGA 4:3	208x160	1:1	4:3	30

[26] Pixel aspect ratio is informative and it indicates a typical aspect ratio for each resolution.

[27] Display aspect ratio of which a video stream is informative and it indicates display aspect ratio with a resolution and the typical aspect ratio for the resolution.

QCIF,625QSIF	176x144	12:11	4:3	30
	176x144	16:11	16:9	30
525QSIF	176x120	10:11	4:3	30
	176x120	40:33	16:9	30
SQVGA 4:3	160x120	1:1	4:3	30
1/16 VGA 4:3	160x112	1:1	4:3	30
SQVGA 16:9	160x90	1:1	16:9	30
SQCIF	128x96	12:11	4:3	30
	128x96	16:11	16:9	30

Pixel aspect ratio:

- 1:1
- 12:11
- 10:11
- 16:11
- 40:33
- 44:33
- 64:33
- 160:99
- 18:11
- 15:11
- 24:11
- 60:33
- 20:11
- 32:11
- 80:33

A bitstream conformant to these media format profiles may utilize any of these pixel aspect ratios regardless of resolutions.

The rendering endpoint may ignore pixel aspect ratio for rendering. The rendering endpoint can shrink, stretch and crop image to the display aspect ratio dependent on vendor implementations.

The resolution must not change in a video stream.

The frame rate is less than, or equal to, 30 fps.

Both fixed frame rate and variable frame rate are allowed.

M	L	n/a	n/a	n/a	ITU-T Recommendation H.264 ISO/IEC 14496-10

Progressive only, no interlace allowed.

The maximum allowed frame rate is 30 fps.

A serving endpoint may stream with any of the pixel aspect ratio from Table 50.

A rendering endpoint must tolerate any of the pixel aspect ratio that it receives from DMS.

The accuracy of aspect ratio rendering is up to the implementer.

9.5.6.5 MPEG-4 Part 10 AV format – Video portion profiling

Profiles:
AVC_TS_BL_CIF15_AAC_540,
AVC_TS_BL_CIF15_AAC_540_T,
AVC_TS_BL_CIF15_AAC_540_ISO

System stream specifications for these profiles must conform to 9.5.6.4, except as noted here.

Additional resolution:

Table 51 – MPEG-4 Part 10 AV format resolutions

	Resolution	Pixel aspect ratio	Display aspect ratio	Maximum frame rate
1/7VGA 16:9	240x135	1:1	16:9	30

M	L	n/a	n/a	n/a	n/a

9.5.6.6 MPEG-4 Part 10 AV format – MIME type definition

Profiles:
AVC_TS_BL_CIF15_AAC,
AVC_TS_BL_CIF15_AAC_T,
AVC_TS_BL_CIF15_AAC_LTP,
AVC_TS_BL_CIF15_AAC_LTP_T,
AVC_TS_BL_CIF15_BSAC,
AVC_TS_BL_CIF15_BSAC_T,
AVC_TS_BL_CIF15_AAC_540,
AVC_TS_BL_CIF15_AAC_540_T

MIME type "video/vnd.dlna.mpeg-tts" must be used for these media format profiles.

M	A	n/a	n/a	n/a	n/a

9.5.6.7 MPEG-4 Part 10 AV format – MIME type definition

Profiles:
AVC_TS_BL_CIF15_AAC_ISO
AVC_TS_BL_CIF15_AAC_LTP_ISO
AVC_TS_BL_CIF15_BSAC_ISO
AVC_TS_BL_CIF15_AAC_540_ISO

MIME type "video/mpeg" must be used for these media format profiles.

M	A	n/a	n/a	n/a	n/a

9.5.7 Subset of DLNA profiles for AVC BP@ L2, CIF30 resolutions, MP4 encapsulation

9.5.7.1 MPEG-4 Part 10 AV format – Systems portion profiling

Profile:
AVC_MP4_BL_L2_CIF30_AAC

AVC_MP4_BL_CIF30_AAC_MULT5
AVC_MP4_BL_CIF30_HEAAC_L2
AVC_MP4_BL_CIF30_MPEG1_L3
AVC_MP4_BL_CIF30_AC3
AVC_MP4_BL_CIF30_AAC_LTP
AVC_MP4_BL_CIF30_AAC_LTP_MULT5
AVC_MP4_BL_CIF30_BSAC
AVC_MP4_BL_CIF30_BSAC_MULT5
AVC_MP4_BL_CIF30_AAC_940

A bitstream that is conformant with these profiles must conform to the provisions defined by MPEG-4 ISO/IEC 14496-14 and ISO/IEC 14496-15, and the additional constraints defined in 9.4.4.3.

M	L	n/a	n/a	n/a	ISO/IEC 14496-14 ISO/IEC 14496-15

9.5.7.2 MPEG-4 Part 10 AV format – Systems portion profiling – System bit rate

Profiles:
AVC_MP4_BL_CIF30_AAC_MULT5
AVC_MP4_BL_CIF30_HEAAC_L2
AVC_MP4_BL_CIF30_MPEG1_L3
AVC_MP4_BL_CIF30_AC3
AVC_MP4_BL_CIF30_AAC_LTP
AVC_MP4_BL_CIF30_AAC_LTP_MULT5
AVC_MP4_BL_CIF30_BSAC
AVC_MP4_BL_CIF30_BSAC_MULT5

A bitstream conformant to these profiles must meet the following requirements:

Maximum system bit rate:

- 3 Mbps

M	A	n/a	n/a	n/a	n/a

9.5.7.3 MPEG-4 Part 10 AV format – Systems portion profiling – System bit rate

Profile: AVC_MP4_BL_CIF30_AAC_940

A bitstream conformant to this profile must meet the following requirements.

Maximum system bit rate:

- 940 kbps

M	A	n/a	n/a	n/a	n/a

9.5.7.4 MPEG-4 Part 10 AV format – System portion profiling – System bit rate

Profile: AVC_MP4_BL_L2_CIF30_AAC

A bitstream conformant to this profile must meet the following requirements:

Maximum system bit rate:

- 1,3 Mbps

M	A	n/a	n/a	n/a	n/a

9.5.7.5 MPEG-4 Part 10 AV format – Video portion profiling

Profiles:
AVC_MP4_BL_CIF30_AAC_MULT5
AVC_MP4_BL_CIF30_HEAAC_L2

AVC_MP4_BL_CIF30_MPEG1_L3
AVC_MP4_BL_CIF30_AC3
AVC_MP4_BL_CIF30_AAC_LTP
AVC_MP4_BL_CIF30_AAC_LTP_MULT5
AVC_MP4_BL_CIF30_BSAC
AVC_MP4_BL_CIF30_BSAC_MULT5

The main characteristics of video stream must be conformant to ITU-T Recommendation H.264 and ISO/IEC 14496-10.

The main characteristics of MPEG-4 Part 10 video streams are as follows.

Profile and level:

- BP at the following levels
- L2 and below

Chroma:

- 4:2:0

Video bit rate:

- Baseline profile
- Constant bit rate equal to, or less than, 2 Mbps
- Variable-maximum bit rate equal to, or less than, 2 Mbps

Table 52 – MPEG-4 Part 10 AV format resolutions

	Resolution	Pixel aspect ratio[28] (informative)	Display aspect ratio[29] (informative)
CIF, 625SIF	352x288	12:11	4:3
	352x288	16:11	16:9
525SIF	352x240	10:11	4:3
	352x240	40:33	16:9
QVGA 4:3	320x240	1:1	4:3
QVGA 16:9	320x180	1:1	16:9
1/7VGA 4:3	240x180	1:1	4:3
1/9VGA 4:3)	208x160	1:1	4:3
QCIF,625QSIF	176x144	12:11	4:3
	176x144	16:11	16:9
525QSIF	176x120	10:11	4:3
	176x120	40:33	16:9
SQVGA 4:3	160x120	1:1	4:3
1/16 VGA 4:3	160x112	1:1	4:3

[28] Pixel aspect ratio is informative and it indicates a typical aspect ratio for each resolution.

[29] Display aspect ratio of which a video stream is informative and it indicates display aspect ratio with a resolution and the typical aspect ratio for the resolution.

	Resolution	Pixel aspect ratio[28] (informative)	Display aspect ratio[29] (informative)
SQVGA 16:9	160x90	1:1	16:9
SQCIF	128x96	12:11	4:3
	128x96	16:11	16:9

Pixel aspect ratio:

- 1:1
- 12:11
- 10:11
- 16:11
- 40:33
- 44:33
- 64:33
- 160:99
- 18:11
- 15:11
- 24:11
- 60:33
- 20:11
- 32:11
- 80:33

A bitstream conformant with these media format profiles may utilize any of these pixel aspect ratios regardless of resolutions.

The rendering endpoint may ignore the pixel aspect ratio for rendering. The rendering endpoint can shrink, stretch and crop image to the display aspect ratio dependent on vendor implementations.

The resolution must not change in a video stream

The frame rate is less than, or equal to, 30 fps.

Both fixed frame rate and variable frame rate are allowed

M	L	n/a	n/a	n/a	ITU-T Recommendation H.264 ISO/IEC 14496-10

9.5.7.6 MPEG-4 Part 10 AV format – Video portion profiling – Constraint set1 flags

Profiles:
AVC_MP4_BL_CIF30_AAC_MULT5,
AVC_MP4_BL_CIF30_HEAAC_L2,
AVC_MP4_BL_CIF30_MPEG1_L3,
AVC_MP4_BL_CIF30_AC3,
AVC_MP4_BL_CIF30_AAC_LTP,
AVC_MP4_BL_CIF30_AAC_LTP_MULT5,
AVC_MP4_BL_CIF30_BSAC,

AVC_MP4_BL_CIF30_BSAC_MULT5,
AVC_MP4_BL_CIF30_AAC_940

A bitstream conformant to these profiles must meet the following requirements:

Constraint Set1 Flag:

1

M	L	n/a	n/a	n/a	ITU-T Recommrn-dation H.264 ISO/IEC 14496-10

The constraint_set1_flag is used to signal that even though the content conforms to baseline profile; it will also be decodable by a main profile decoder. When this flag is set to 1, those encoding features that are allowed in baseline profile but not main profile must not be used.

9.5.7.7 MPEG-4 Part 10 AV format – Video portion profiling Profile: AVC_MP4_BL_CIF30_AAC_940

A bitstream that conforms to this profile must conform to all aspects of the video portion definition of 9.4.34, except as noted here.

Video bit rate:

- Baseline profile
- Constant bit rate equal to, or less than, 768 kbps
- Variable-maximum bit rate equal to, or less than, 768 kbps

Additional resolution:

Table 53 – MPEG-4 Part 10 AV format resolutions

	Resolution	Pixel aspect ratio	Display aspect ratio	Maximum frame rate
1/7VGA 16:9	240x135	1:1	16:9	30

M	L	n/a	n/a	n/a	n/a

9.5.7.8 MPEG-4 Part 10 AV Format – Video portion profiling Profile: AVC_MP4_BL_L2_CIF30_AAC

A bitstream conformant with this profile must conform to all aspects of the video portion profile BL_CIF30 as specified in 9.5.7.5 except as noted here.

Level:

L2

Video bit rate:

- Constant bit rate equal to, or less than, 1 Mbps
- Variable-maximum bit rate equal to, or less than, 1 Mbps

Table 54 – MPEG-4 Part 10 AV format resolutions

	Resolution	Pixel aspect ratio[30] (informative)	Display aspect ratio[31] (informative)	Maximum frame rate
CIF, 625SIF	352x288	12:11	4:3	30
525SIF	352x240	10:11	4:3	30
QVGA4:3	320x240	1:1	4:3	30

constrained_set1_flag = 1

M	L	n/a	n/a	n/a	ITU-T Rec H.264 | ISO/IEC 14496-10

This profile is progressive frame only.

9.5.7.9 MPEG-4 Part 10 AV format – MIME type definition

Profile:
AVC_MP4_BL_L2_CIF30_AAC,
AVC_MP4_BL_CIF30_AAC_MULT5,
AVC_MP4_BL_CIF30_HEAAC_L2,
AVC_MP4_BL_CIF30_MPEG1_L3,
AVC_MP4_BL_CIF30_AC3,
AVC_MP4_BL_CIF30_AAC_LTP,
AVC_MP4_BL_CIF30_AAC_LTP_MULT5,
AVC_MP4_BL_CIF30_BSAC,
AVC_MP4_BL_CIF30_BSAC_MULT5,
AVC_MP4_BL_CIF30_AAC_940

MIME type "video/mp4" must be used for these media format profiles.

M	A	DMS DMP	n/a	n/a	n/a

9.5.8 Subset of DLNA profiles for AVC BP@ L1.2 – CIF15 resolutions – MPEG-2 TS encapsulation

9.5.8.1 MPEG-4 Part 10 AV format – Systems portion profiling

Profiles:
AVC_TS_BL_CIF15_AAC
AVC_TS_BL_CIF15_AAC_T
AVC_TS_BL_CIF15_AAC_ISO
AVC_TS_BL_CIF15_AAC_LTP
AVC_TS_BL_CIF15_AAC_LTP_T
AVC_TS_BL_CIF15_AAC_LTP_ISO

The main characteristics of video stream must be conformant to ISO/IEC 13818-1.

The main characteristics of MPEG-4 Part 10 system stream are as follows.

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[30] Pixel aspect ratio is informative and it indicates a typical aspect ratio for each resolution.

[31] Display aspect ratio of which a video stream is informative and it indicates display aspect ratio with a resolution and the typical aspect ratio for the resolution.

System:

MPEG-2 transport stream

Number of programs:

1 as defined for a single program transport stream

Packet size:

188 bytes per transport packet

System bit rate:

Up to 600 kbps (video up to 384 kbps)

PSI information:

PAT and PMT are required. It must tolerate any other table.

PSI insertion interval should be implementation-dependent.

The serving endpoint may choose to provide additional PSI information

M	A	n/a	n/a	n/a	ISO/IEC 13818-1

A full or partial SPTS can have multiple audio and video components in it.

9.5.8.2 MPEG-4 Part 10 AV format – Video portion profiling – Constraint set1 flags

Profiles:
AVC_TS_BL_CIF15_AAC
AVC_TS_BL_CIF15_AAC_T
AVC_TS_BL_CIF15_AAC_ISO
AVC_TS_BL_CIF15_AAC_LTP
AVC_TS_BL_CIF15_AAC_LTP_T
AVC_TS_BL_CIF15_AAC_LTP_ISO

A bitstream conformant to these profiles must meet the following requirements.

Constraint Set1 Flag:

1

M	L	1			ITU-T Recommendation H.264 ISO/IEC 14496-10

The constraint_set1_flag is used to signal that even though the content conforms to baseline profile; it will also be decodable by a main profile decoder.

When this flag is set to 1, those encoding features that are allowed in the baseline profile but not in the main profile must not be used.

9.5.8.3 MPEG-4 Part 10 AV Format – Video portion profiling

Profiles:
AVC_TS_BL_CIF15_AAC,
AVC_TS_BL_CIF15_AAC_T,
AVC_TS_BL_CIF15_AAC_T,
AVC_TS_BL_CIF15_AAC_LTP,
AVC_TS_BL_CIF15_AAC_LTP_T,
AVC_TS_BL_CIF15_AAC_LTP_ISO

The main characteristics of video stream must be conformant to ITU-T Recommendation H.264 and ISO/IEC 14496-10.

The main characteristics of MPEG-4 part 10 video streams are as follows.

Profile and level:

- BP at the following levels
- L1.2 and below

Chroma:

- 4:2:0

Video bit rate:

- Baseline profile
- Constant bit rate equal to, or less than, 384 kbps
- Variable-maximum bit rate equal to, or less than, 384 kbps

Table 55 – MPEG-4 Part 10 AV format resolutions

	Resolution	Pixel aspect ratio[32] (informative)	Display aspect ratio[33] (informative)	Maximum frame rate
CIF, 625SIF	352x288	12:11	4:3	15
	352x288	16:11	16:9	15
525SIF	352x240	10:11	4:3	18
	352x240	40:33	16:9	18
QVGA 4:3	320x240	1:1	4:3	20
QVGA 16:9	320x180	1:1	16:9	26
1/7VGA 4:3	240x180	1:1	4:3	30
1/9VGA 4:3	208x160	1:1	4:3	30
QCIF,625QSIF	176x144	12:11	4:3	30
	176x144	16:11	16:9	30
525QSIF	176x120	10:11	4:3	30
	176x120	40:33	16:9	30
SQVGA 4:3	160x120	1:1	4:3	30
1/16 VGA 4:3	160x112	1:1	4:3	30
SQVGA 16:9	160x90	1:1	16:9	30
SQCIF	128x96	12:11	4:3	30
	128x96	16:11	16:9	30

Pixel aspect ratio:

- 1:1
- 12:11
- 10:11

[32] Pixel aspect ratio is informative and it indicates a typical aspect ratio for each resolution.

[33] Display aspect ratio of which a video stream is informative and it indicates display aspect ratio with a resolution and the typical aspect ratio for the resolution.

- 16:11
- 40:33
- 44:33
- 64:33
- 160:99
- 18:11
- 15:11
- 24:11
- 60:33
- 20:11
- 32:11
- 80:33

The serving endpoint may use any pixel aspect ratios regardless of resolutions.

The rendering endpoint may ignore pixel aspect ratio for rendering. The rendering endpoint can shrink, stretch and crop image to the display aspect ratio dependent on vendor implementations.

The resolution must not change in a video stream

The frame rate is less than, or equal to, 30 fps.

Both fixed frame rate and variable frame rate are allowed

M	L	n/a	n/a	n/a	ITU-T Recommendation H.264 ISO/IEC 14496-10

Progressive only, no interlace allowed.

Maximum allowed frame rate is 30 fps.

A serving endpoint may stream with any of the pixel aspect ratio from Table 55.

A rendering endpoint must tolerate any of the pixel aspect ratio that it receives from DMS.

The accuracy of the aspect ratio rendering is up to the implementer.

9.5.8.4 MPEG-4 Part 10 AV format – MIME type definition

Profiles:
AVC_TS_BL_CIF15_AAC,
AVC_TS_BL_CIF15_AAC_T,
AVC_TS_BL_CIF15_AAC_LTP,
AVC_TS_BL_CIF15_AAC_LTP_T

MIME type "video/vnd.dlna.mpeg-tts" must be used for these media format profiles.

M	A	n/a	n/a	n/a	n/a

9.5.8.5 MPEG-4 Part 10 AV Format – MIME type definition

Profiles:
AVC_TS_BL_CIF15_AAC_ISO
AVC_TS_BL_CIF15_AAC_LTP_ISO

MIME type "video/mpeg" must be used for these media format profiles.