

INTERNATIONAL STANDARD



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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE **XH**

ICS 35.100.05; 35.110; 33.160

ISBN 978-2-8322-0937-0

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	20
INTRODUCTION.....	22
1 Scope.....	23
2 Normative references	23
3 Terms, definitions and abbreviated terms	30
3.1 Terms and definitions	30
3.2 Abbreviated terms	34
3.4 Conventions	46
4 Guideline terminology and conventions	46
4.1 Guideline compliance classifiers.....	46
4.2 Standard or specification usage classifiers	46
4.3 Guideline font usage conventions	47
4.4 Layout for guidelines	47
4.5 Interoperability Guidelines Usage	50
5 Compendium of Media Format Profiles	53
5.1 Overview	53
5.2 Categorization labels.....	54
5.3 Image Class: JPEG profiles.....	54
5.4 Image Class: PNG profiles	55
5.5 Audio Class: AC-3 profiles.....	55
5.6 Audio Class: AMR profiles	56
5.7 Audio Class: ATRAC3plus profiles.....	56
5.8 Audio Class: LPCM profiles	56
5.9 Audio Class: MP3 profiles	56
5.10 Audio Class: MPEG-4 profiles	57
5.11 Audio Class: WMA profiles	62
5.12 AV Class: MPEG-1 profiles.....	62
5.13 AV Class: MPEG-2 profiles.....	62
5.14 AV Class: MPEG-4 Part 2 profiles	72
5.15 AV Class: MPEG-4 Part 10 (AVC) profiles	80
5.16 AV Class: WMV9 profiles.....	105
5.17 Media collection profiles	106
5.18 Printer XHTML document profiles	106
5.19 Image Class: GIF profiles	107
5.20 Audio Class: DTS Digital Surround profiles.....	107
5.21 Audio Class: DTS-HD profiles.....	107
5.22 Audio Class: Enhanced AC-3 profiles	108
5.23 Audio Class: MLP profiles	108
5.24 Audio Class: MPEG-1/2 profiles	108
5.25 AV Class: VC-1 profiles	108
6 Media Format interoperability model.....	110
6.1 Media interoperability guidelines	110
6.1.1 General	110
6.1.2 MF mandatory media formats: support guidelines	110
6.1.3 MF optional media formats: support guidelines	111

6.1.4	MF optional media formats: content availability	112
6.1.5	MF optional media formats: user indications	112
6.1.6	MF media format overlap	113
6.1.7	MF Profile Parameter Sets.....	114
6.1.8	MF audio rendering guidelines.....	114
6.2	Mandatory and optional profile guidelines.....	115
6.2.1	MF mandatory image format profile for HND and MHD Device Categories.....	115
6.2.2	MF optional image format profile for HND and MHD Device Categories.....	115
6.2.3	MF mandatory audio format profile for the HND Device Category	115
6.2.4	MF optional audio format profile for the HND Device Category	115
6.2.5	MF mandatory audio format profiles for the MHD Device Category	115
6.2.6	MF optional audio format profiles for the MHD Device Category	115
6.2.7	MF mandatory AV format profiles for the HND Device Category.....	116
6.2.8	MF optional AV format profiles for the HND Device Category.....	116
6.2.9	MF mandatory AV format profiles for the MHD Device Category	116
6.2.10	MF optional AV format profiles for the MHD Device Category	116
6.2.11	MF optional Media Collection Profile for the HND and MHD Device Categories.....	116
6.2.12	MF mandatory print format profile for DMP _r Device Class	117
7	Image Class Media Format Profiles	118
7.1	JPEG profiling guidelines	118
7.1.1	JPEG SM format profile	118
7.1.2	JPEG MED format profile.....	119
7.1.3	JPEG LRG format profile	120
7.1.4	JPEG format profile	120
7.1.5	JPEG_RES_<H>_<V> format profile	120
7.1.6	Use of JPEG_RES_<H>_<V> in a <res> element	121
7.1.7	JPEG TN format profile.....	123
7.1.8	JPEG SM ICO format profile	123
7.1.9	JPEG LRG ICO format profile	124
7.1.10	JPEG format profile: MIME type definition	125
7.2	PNG profiling guidelines	125
7.2.1	PNG TN format profile	125
7.2.2	PNG SM ICO format profile.....	126
7.2.3	PNG LRG ICO format profile.....	127
7.2.4	PNG LRG format profile.....	127
7.2.5	PNG format profile: ancillary chunks.....	128
7.2.6	PNG format profile: MIME type definition	129
7.3	GIF profiling guidelines.....	129
7.3.1	GIF LRG format profile	129
7.3.2	GIF format profile: MIME type definition.....	130
8	Audio class media format profiles	130
8.1	AC-3 profiling guidelines	130
8.1.1	AC-3 audio format	130
8.1.2	AC-3 audio format: MIME type definition.....	131
8.2	AMR profiling guidelines.....	131
8.2.1	AMR audio format.....	131

8.2.2	AMR audio format: MIME type definition	132
8.2.3	AMR audio format.....	132
8.2.4	AMR audio format: systems portion profiling	133
8.2.5	AMR audio format: MIME type definition	134
8.3	ATRAC3plus profiling guidelines	134
8.3.1	ATRAC3plus audio format	134
8.3.2	ATRAC3plus audio format: MIME type definition	134
8.4	LPCM profiling guidelines	135
8.4.1	General	135
8.4.2	LPCM audio format.....	135
8.4.3	LPCM audio format: Transport Alignment Position	136
8.4.4	TLPCM audio format: MIME type definition	136
8.4.5	LPCM audio format: Rendering Endpoint capabilities.....	137
8.4.6	LPCM audio format: MPS signaling.....	137
8.4.7	LPCM audio format: low.....	137
8.4.8	LPCM audio format: MPS	138
8.5	MP3 profiling guidelines	139
8.5.1	MP3 audio format	139
8.5.2	MP3 audio format: ID3 tag tolerance.....	140
8.5.3	MP3 audio format: ID3 tag placement	140
8.5.4	MP3 audio format: MIME type definition.....	141
8.5.5	MP3 audio format	141
8.6	MPEG-4 profiling guidelines	142
8.6.1	General	142
8.6.2	AAC audio format: baseline (1).....	145
8.6.3	AAC audio format: exception (1).....	147
8.6.4	AAC audio format: exception (2).....	147
8.6.5	AAC audio format: content (1)	147
8.6.6	AAC audio format: baseline (2).....	148
8.6.7	AAC audio format: content (2)	149
8.6.8	AAC audio format: content (3)	149
8.6.9	AAC audio format: baseline (3).....	150
8.6.10	AAC audio format: content (4)	151
8.6.11	AAC audio format: content (5)	151
8.6.12	AAC audio format: exception (3).....	152
8.6.13	AAC audio format: Rendering Endpoint capabilities	152
8.6.14	AAC audio format: exception (4).....	152
8.6.15	AAC audio format: Rendering Endpoints capabilities.	153
8.6.16	AAC audio format: baseline (4).....	153
8.6.17	AAC audio format: content (6)	154
8.6.18	AAC audio format: content (7)	154
8.6.19	AAC audio format: baseline (5).....	155
8.6.20	AAC audio format: content (8)	156
8.6.21	AAC audio format: content (9)	156
8.6.22	AAC audio format: baseline (6).....	157
8.6.23	AAC audio format: content (10).....	158
8.6.24	AAC audio format: baseline (7).....	158
8.6.25	AAC audio format: content (11).....	159
8.6.26	AAC audio format: baseline (8).....	160

8.6.27 AAC audio format: content (12).....	161
8.6.28 AAC audio format: audio interchange formats	161
8.6.29 AAC audio format: audio interchange formats	162
8.6.30 AAC audio format: audio interchange formats	162
8.6.31 AAC audio format: audio interchange formats	163
8.6.32 AAC audio format: audio interchange formats	164
8.6.33 2 AAC audio format: audio interchange formats	164
8.6.34 AAC audio format: ADTS audio interchange formats	165
8.6.35 AAC audio format: MP4 audio interchange format.....	166
8.6.36 AAC audio format: MP4 audio interchange format.....	170
8.6.37 AAC audio format: 3GP audio interchange formats	170
8.6.38 AAC audio format: MIME type definition.....	170
8.6.39 AAC audio format: MIME type definition.....	171
8.6.40 AAC audio format: MIME type definition.....	171
8.6.41 AAC audio format: baseline (9).....	172
8.6.42 AAC audio format: BSAC_ISO encoding	173
8.6.43 AAC audio format: audio interchange formats	173
8.6.44 AAC audio format: MIME type definitions	173
8.6.45 AAC audio format: baseline	174
8.6.46 AAC audio format: baseline	174
8.6.47 AAC audio format: Rendering Endpoint capabilities	175
8.6.48 AAC audio format: baseline	176
8.6.49 AAC audio format: Rendering Endpoint capabilities	176
8.6.50 AAC audio format: baseline	177
8.6.51 AAC audio format: Rendering Endpoint capabilities	178
8.6.52 AAC audio format: baseline	178
8.6.53 AAC audio format: Rendering Endpoint capabilities	179
8.6.54 AAC audio format: baseline	180
8.6.55 AAC audio format: Rendering Endpoint capabilities	180
8.6.56 AAC audio format: baseline	181
8.6.57 AAC audio format: MPS signaling	182
8.6.58 AAC audio format: DAB audio super frame	182
8.6.59 AAC audio format: MIME type definition.....	183
8.6.60 AAC audio format: ADTS audio interchange formats	183
8.6.61 AAC audio format: baseline	183
8.6.62 Audio format: Rendering Endpoints capabilities	185
8.6.63 Audio format: baseline	185
8.6.64 Audio format: Rendering Endpoints capabilities	185
8.6.65 AAC audio format: audio interchange formats	186
8.6.66 Audio format: baseline	186
8.6.67 AAC audio format: Rendering Endpoints capabilities	187
8.6.68 AAC audio format: baseline	188
8.6.69 Audio format: Rendering Endpoints capabilities	189
8.6.70 ALS audio format: ALS_ISO profile	190
8.6.71 AAC audio format: ADTS audio interchange formats	191
8.6.72 ALS audio format: ALS_MULT5_ISO profile.....	191
8.6.73 ALS audio format: MIME type definition	192
8.6.74 AAC audio format: baseline(9).....	192
8.6.75 AAC format profile: baseline	193

8.6.76	AAC audio format profile: baseline.....	194
8.6.77	AAC audio format: Rendering Endpoint capabilities	194
8.6.78	AAC audio format maximum system bit rate.....	195
8.6.79	AAC audio format: baseline	195
8.6.80	AAC audio format: baseline	195
8.6.81	AAC audio format: MIME type definition: ADTS	196
8.6.82	AAC audio format: MIME type definition: ISO.....	196
8.6.83	AAC audio format: MIME type definition.....	196
8.6.84	AAC audio format: ADTS audio interchange formats.....	197
8.6.85	AAC audio format: MP4 audio interchange formats	197
8.6.86	AAC audio format: 3GPP audio interchange formats	197
8.7	WMA profiling guidelines	197
8.7.1	General	197
8.7.2	WMA format	198
8.7.3	WMA format: Baseline profile	198
8.7.4	WMA format: Full profile	199
8.7.5	WMA format: Professional profile.....	199
8.7.6	WMA format: encapsulation file format for HTTP Media Transport	199
8.7.7	WMA format: ASF operational procedures	200
8.7.8	WMA format: minimal implementation	200
8.7.9	WMA format: MIME type definition	200
8.8	DTS Digital Surround Profiling guidelines	201
8.8.1	DTS Digital Surround audio format	201
8.8.2	DTS Digital Surround audio format: MIME type definition.....	201
8.9	DTS-HD Profiling guidelines	202
8.9.1	DTS-HD High Resolution audio format.....	202
8.9.2	DTS-HD Master audio format.....	203
8.9.3	DTS-HD LBR audio format.....	203
8.9.4	DTS-HD audio format: MIME type definition.....	204
8.10	Enhanced AC-3 Profiling guidelines.....	205
8.10.1	Enhanced AC-3 audio format.....	205
8.10.2	Enhanced AC-3 audio format: MIME type definition	206
8.11	MLP Profiling guidelines	206
8.11.1	MLP audio format	206
8.11.2	MLP audio format: MIME type definition.....	207
8.12	MPEG-1/2 Profiling guidelines	207
8.12.1	MPEG-1/2 Layer 2 audio format.....	207
8.12.2	MPEG-1/2 Layer 2 audio format: MPS signaling	208
8.12.3	MPEG-1/2 Layer 2 audio format: MIME type definition	208
8.13	WMA Lossless Profiling guidelines	209
8.13.1	WMA Lossless: stereo profile	209
8.13.2	WMA Lossless: multichannel profile.....	209
8.13.3	WMA Lossless: MIME type definition	209
9	AV Media Class format profiles.....	210
9.1	General	210
9.2	MPEG-1 Profiling guidelines	210
9.2.1	MPEG-1 AV format: system portion profiling	210
9.2.2	MPEG-1 AV format: video portion profiling.....	211
9.2.3	MPEG-1 AV format: audio portion profiling	211

9.2.4	MPEG-1 AV format: MIME type definition	212
9.3	MPEG-2 Profiling guidelines	212
9.3.1	MPEG -2 profiles	212
9.3.2	General format system-level guidelines	214
9.3.3	Format compression-level guidelines	218
9.3.4	General format guidelines for Transport Stream: MPEG-2 AV Format: MPEG-2 MIME type definition	228
9.3.5	Common format specific guidelines	228
9.3.6	US region specific TS Profiling guidelines: MPEG_TS_SD_NA, MPEG_TS_SD_NA_T, MPEG_TS_HD_NA, and MPEG_TS_HD_NA_T Profiles	233
9.3.7	Korean region specific TS Profiling guidelines: MPEG_TS_SD_KO, MPEG_TS_SD_KO_T, MPEG_TS_HD_KO, and MPEG_TS_HD_KO_T profiles	240
9.3.8	DVB-European region specific TS Profiling guidelines MPEG_TS_SD_EU and MPEG_TS_SD_EU_T profiles	244
9.3.9	Subset of DLNA profiles that use MPEG-2 MP@LL, MPEG-2 TS encapsulation	253
9.3.10	AC-3 extension for AV format profiles	255
9.3.11	ES encapsulated MPEG-2 AV Stream for RTP	257
9.3.12	MPEG-2 AV format, system portion profile: PS_SD	259
9.3.13	MPEG-2 AV format, video portion profile: PS_SD	259
9.3.14	MPEG-2 AV format, system portion profile: PS_HD	260
9.3.15	MPEG-2 AV format, video portion profile: PS_HD	261
9.3.16	MPEG-2 AV format, audio portion profile: PS_SD_DTS, PS_HD_DTS	262
9.3.17	MPEG-2 AV format, audio portion profile: PS_HD_DTSHD_HRA	262
9.3.18	MPEG-2 AV format, audio portion profile: PS_HD_DTSHD_MA	263
9.3.19	MPEG-2 AV format, audio portion profile: PS_HD_DTSHD	263
9.3.20	MPEG-2 AV format, system portion profile: DIRECTV_SD	263
9.3.21	MPEG-2 AV format, system portion profile: SD_EU	264
9.3.22	MPEG-2 AV format, system portion profile: SD_JP	264
9.3.23	MPEG-2 AV format, system portion profile: HD_NA	264
9.3.24	MPEG-2 AV format, system portion profile: TS_HD_DTS	265
9.3.25	MPEG-2 AV Format, MPEG-2 Video Format: DIRECTV_SD	265
9.3.26	MPEG-2 AV format, MPEG-2 video format: SD_JP	266
9.3.27	MPEG-2 AV format, MPEG-2 video format: TS_HD_DTS	267
9.3.28	MPEG-2 AV format, audio portion profile: MPEG1_L2	267
9.3.29	MPEG-2 AV format, audio portion profile: MPEG1_L2	268
9.3.30	MPEG-2 AV format, audio portion profile: MPEG1_L2	269
9.3.31	MPEG-2 AV format, audio portion profile: AC3	269
9.3.32	MPEG-2 AV format, audio portion profile: AC3	270
9.3.33	MPEG-2 AV format, audio portion profile: TS_HD_DTS	270
9.3.34	MPEG-2 AV format, audio portion profile: TS_HD_DTSHD_HRA	270
9.3.35	MPEG-2 AV format, audio portion profile: TS_HD_DTSHD_MA	271
9.3.36	MPEG-2 AV format, MIME type definition: DIRECTV_SD	271
9.3.37	MPEG-2 AV format: system stream specification	271
9.3.38	MPEG-2 AV format: Transport Alignment Position	272
9.3.39	MPEG-2 AV format: video portion profiling	273
9.3.40	MPEG-2 AV format: MPEG-2 video format	273
9.3.41	MPEG-2 AV format: video format	274

9.3.42	MPEG-2 AV format: audio portion profiling: MPEG-1 L2.....	275
9.3.43	MPEG-2 AV format: audio portion profiling: AC-3.....	275
9.3.44	MPEG-2 AV format: MIME type definition	276
9.3.45	MPEG-2 AV format: system stream specification	277
9.3.46	MPEG-2 AV format: Transport Alignment Position	278
9.3.47	MPEG-2 AV format: video portion profiling.....	278
9.3.48	MPEG-2 AV format: video portion profiling.....	279
9.3.49	MPEG-2 AV format: video format	279
9.3.50	MPEG-2 AV format: audio portion profiling: MPEG-1 L2.....	279
9.3.51	MPEG-2 AV format: MIME type definition	280
9.3.52	MPEG-2 AV format: MIME type definition	280
9.3.53	MPEG-2 AV format: system stream specification	281
9.3.54	MPEG-2 AV format: Transport Alignment Position	281
9.3.55	MPEG-2 AV format: video portion profiling.....	282
9.3.56	MPEG-2 AV format: audio portion profiling: MPEG-2 AAC	283
9.3.57	MPEG-2 AV format: MIME type definition	284
9.3.58	MPEG-2 AV format: system portion profile: TS_HD_X	285
9.3.59	MPEG-2 AV format: Transport Alignment Position: TS_HD_X	286
9.3.60	MPEG-2 AV format: video portion profile: MPEG_TS_HD	286
9.3.61	MPEG-2 AV format: video format: MPEG_TS_HD_X_60	287
9.3.62	MPEG-2 AV format: video format: MPEG_TS_HD_X_50	287
9.3.63	MPEG-2 AV format: audio portion profile: L2	287
9.3.64	MPEG-2 AV format: MIME type definition: TS_T	288
9.3.65	MPEG-2 AV format: MIME type definition: TS_ISO	288
9.3.66	MPEG-2 AV format: system portion profile, DIRECTV_SD	289
9.3.67	MPEG-2 AV format: video portion profile, DIRECTV_SD	289
9.3.68	MPEG-2 AV format: audio portion profile, DIRECTV_SD_MPEG1_L2	291
9.3.69	MPEG-2 AV format: MIME type definition, DIRECTV_SD	292
9.3.70	MPEG-2 AV format: system portion profile, TS_NA	292
9.3.71	MPEG-2 AV format: video portion profile, TS_NA_ISO	294
9.3.72	MPEG-2 AV format: audio portion profile, TS_NA_ISO	295
9.3.73	MPEG-2 AV format: system portion profile, TS_SD_DTS, TS_HD_DTS	296
9.3.74	MPEG-2 AV format: video portion profile, TS_SD_DTS	297
9.3.75	MPEG-2 AV format: video portion profile, TS_HD_DTS	298
9.3.76	MPEG-2 AV format: audio portion profile, TS_DTS	298
9.3.77	MPEG-2 AV format: system portion profile, TS_SD_EU_DTS	299
9.3.78	MPEG-2 AV format: video portion profile, TS_SD_EU_DTS	299
9.3.79	MPEG-2 AV format: audio portion profile, TS_SD_EU_DTS	299
9.3.80	MPEG-2 AV format: MIME type definition, TS_ISO	300
9.4	MPEG-4 Part 2 profiling guidelines	300
9.4.1	General	300
9.4.2	MPEG-4 Part 2 video portion profiles	303
9.4.3	MPEG-4 Part2 audio portion profiles	317
9.4.4	MPEG-4 Part2 system portion profiles	325
9.4.5	MPEG-4 Part 2 AV ormat, video portion profile: H263_P0_L45	334
9.4.6	MPEG-4 Part 2 AV format, video portion profile: SP_L3_VGA_QHD	334
9.4.7	MPEG-4 Part 2 AV format, video portion profile: SP_L6	335
9.4.8	MPEG-4 Part 2 AV format, video portion profile: MP4_NDS	335

9.4.9	MPEG-4 Part 2 AV format, audio portion profile: AAC	336
9.4.10	MPEG-4 Part 2 AV format, audio portion profile: AAC_LTP	337
9.4.11	MPEG-4 Part 2 AV format, audio portion profile: HEAAC_L2	337
9.4.12	MPEG-4 Part 2 AV format, audio portion profile: HEAACv2_L2	337
9.4.13	MPEG-4 Part 2 AV format, audio portion profile: HEAACv2_L2	338
9.4.14	MPEG-4 Part 2 AV format, audio portion profile: AMR_WBplus	338
9.4.15	MPEG-4 Part 2 AV format, audio portion profile: NDSD	338
9.4.16	MPEG-4 Part 2 AV format, system portion profile: MP4	338
9.4.17	MPEG-4 Part 2 AV format, system portion profile: 3GPP	339
9.4.18	MPEG-4 Part 2 AV format, system portion profile: system bit rate	339
9.4.19	MPEG-4 Part 2 AV format, system portion profile: system bit rate	340
9.4.20	MPEG-4 Part 2 AV format, system portion profile: system bit rate	340
9.4.21	MPEG-4 Part 2: AV format, system portion profile: MP4_SP_VGA_res	340
9.4.22	MPEG-4 Part 2: AV format, system portion profile: MP4_SP_L6	341
9.4.23	MPEG-4 Part 2: AV format, system portion profile: MP4_NDSD	341
9.4.24	MPEG-4 Part 2 AV format, MIME type definition: MP4	342
9.4.25	MPEG-4 Part 2 AV format, MIME type definition: 3GPP	342
9.4.26	MPEG-4 Part 2 AV format: video portion profile: H263_P0_L45	343
9.4.27	MPEG-4 Part 2 AV format, video portion profile: H263_P0_L10	344
9.4.28	MPEG-4 Part 2 AV format, video portion profile: H263_P0_L45	344
9.4.29	MPEG-4 Part 2 AV format, audio portion profile: AMR	345
9.4.30	MPEG-4 Part 2 AV format, audio portion profile: AMR_WBplus	345
9.4.31	MPEG-4 Part 2 AV format, audio portion profile: 3GPP	345
9.4.32	MPEG-4 Part 2 AV format, system portion profile: system bit rates	345
9.4.33	MPEG-4 Part 2 AV format, system portion profile: system bit rates	346
9.4.34	MPEG-4 Part 2 AV format, system portion profile: MIME type definition	346
9.4.35	MPEG-4 Part 2 AV format, video portion profile: SP_L5	346
9.4.36	MPEG-4 Part 2 AV format, system portion profile	348
9.4.37	MPEG-4 Part 2 AV format, audio portion profile	348
9.4.38	MPEG-4 Part 2 AV format, MIME type definition	349
9.5	MPEG-4 Part 10 (AVC) profiling guidelines	349
9.5.1	General	349
9.5.2	Subset of DLNA profiles for AVC MP @ L3, SD resolutions, MPEG-2 TS encapsulation	358
9.5.3	Subset of DLNA profiles for AVC MP@L4, HD resolutions, and MPEG-2 TS encapsulation	364
9.5.4	Subset of DLNA profiles for AVC BP @ L3, SD resolutions, MP4 encapsulation	369
9.5.5	Subset of DLNA profiles for AVC BP @ L2 , CIF30 resolutions, MPEG-2 TS encapsulation	372
9.5.6	Subset of DLNA profiles for AVC BP @ L1.2, CIF 15 resolutions, MPEG-2 TS encapsulation	377
9.5.7	Subset of DLNA profiles for AVC BP@ L2, CIF30 resolutions, MP4 encapsulation	382
9.5.8	Subset of DLNA profiles for AVC BP@ L1.2, CIF15 resolutions, MPEG-2 TS encapsulation	388
9.5.9	Subset of DLNA profiles for AVC BP@ L1.2 , CIF15 resolutions, MP4 encapsulation	393

9.5.10	Subset of DLNA profiles forAVC BP@ L1b, QCIF15 resolutions, MP4 encapsulation	398
9.5.11	Subset of DLNA profiles for AVC MP@ L3, SD resolutions, MP4 encapsulation	400
9.5.12	Subset of DLNA profiles for AVC BP, QCIF15, CIF15, and CIF30 resolutions 3GPP encapsulation	405
9.5.13	Audio portion profiling for MPEG-4 Part 10 (AVC) profiles	409
9.5.14	MPEG-4 Part 10 AV format, system portion profile: PS_HD	417
9.5.15	MPEG-4 Part 10 AV format, video portion profile: PS_HD	417
9.5.16	MPEG-4 Part 10 AV format, audio portion profile: PS_HD_DTS	418
9.5.17	MPEG-4 Part 10 AV format, audio portion profile: PS_HD_DTSHD_HRA.....	419
9.5.18	MPEG-4 Part 10 AV format, audio portion profile: PS_HD_DTSHD_MA.....	419
9.5.19	MPEG-4 Part 10 AV format, audio portion profile: PS_HD_DTSHD	419
9.5.20	MPEG-4 Part 10 AV format, system portion profile: TS_MP_SD_EAC3.....	420
9.5.21	MPEG-4 Part 10 AV format, system portion profile: TS_HP_SD_MPEG1_L2	420
9.5.22	MPEG-4 Part 10 AV format, system portion profile: TS_HP_SD_AC3	421
9.5.23	MPEG-4 Part 10 AV format, system portion profile: TS_HP_SD_EAC3	421
9.5.24	MPEG-4 Part 10 AV format, system portion profile: TS_SD_EU	422
9.5.25	MPEG-4 Part 10 AV format, video portion profile: TS_HP_SD.....	422
9.5.26	MPEG-4 Part 10 AV format, video portion profile: TS_SD_EU.....	423
9.5.27	MPEG-4 Part 10 AV format, system portion profile: TS_MP_HD_EAC3.....	424
9.5.28	MPEG-4 Part 10 AV format, system portion profile: TS_HP_HD_MPEG1_L2	425
9.5.29	MPEG-4 Part 10 AV format, system portion profile: TS_HP_HD_AC3	425
9.5.30	MPEG-4 Part 10 AV format, system portion profile: TS_HP_HD_EAC3	426
9.5.31	MPEG-4 Part 10 AV format, system portion profile: TS_HD_EU	426
9.5.32	MPEG-4 Part 10 AV format, system portion profile: TS_JP	427
9.5.33	MPEG-4 Part 10 AV format, system portion profile: TS_HD_60, TS_HD_50, TS_HD_24.....	427
9.5.34	MPEG-4 Part 10 AV format, system portion profile: TS_HD_DTS.....	428
9.5.35	MPEG-4 Part 10 AV format, video portion profile: TS_MP_HD	428
9.5.36	MPEG-4 Part 10 AV format, video portion profile: TS_HP_HD	429
9.5.37	MPEG-4 Part 10 AV format, video portion profile: TS_HD_EU	430
9.5.38	MPEG-4 Part 10 AV format, video portion profile: TS_JP.....	431
9.5.39	MPEG-4 Part 10 AV format, video portion profile: TS_HD_60	432
9.5.40	MPEG-4 Part 10 AV format, video portion profile: TS_HD_50	433
9.5.41	MPEG-4 Part 10 AV format, video portion profile: TS_HD_24	434
9.5.42	MPEG-4 Part 10 AV format, video portion profile: TS_HD_DTS	435
9.5.43	MPEG-4 Part 10 AV format: Transport Alignment Element.....	436
9.5.44	MPEG-4 Part 10 AV format: Decoder Friendly Alignment Position	436
9.5.45	MPEG-4 Part 10 AV format, system portion profile: MP4_MP_HD_720p_AAC	437
9.5.46	MPEG-4 Part 10 AV format, system portion profile: MP4_MP_HD.....	437
9.5.47	MPEG-4 Part 10 AV format, system portion profile: MP4_HP_HD	438
9.5.48	MPEG-4 Part 10 AV format, system portion profile: MP4_NDHD.....	438

9.5.49	MPEG-4 Part 10 AV format, system portion profile: MPS Transport and Signaling	439
9.5.50	MPEG-4 Part 10 AV format, video portion profile: MP4_BL_L12_CIF15.....	439
9.5.51	MPEG-4 Part 10 AV format, video portion profile: MP4_MP_HD_720p_AAC	440
9.5.52	MPEG-4 Part 10 AV format, video portion profile: MP4_MP_HD_1080i_AAC.....	441
9.5.53	MPEG-4 Part 10 AV format, video portion profile: MP4_MP_HD	442
9.5.54	MPEG-4 Part 10 AV format, video portion profile: MP4_HP_HD	442
9.5.55	MPEG-4 Part 10 AV format, video portion profile: MP4_NDHD	443
9.5.56	MPEG-4 Part 10 AV format, system portion profile: 3GPP_BL_L12_CIF15	443
9.5.57	MPEG-4 Part 10 AV format, video portion profile: 3GPP_BL_L12_CIF15	444
9.5.58	MPEG-4 Part 10 AV format, audio portion profile: MPEG-2 AAC	444
9.5.59	MPEG-4 Part 10 AV format, audio portion profile: AAC	444
9.5.60	MPEG-4 Part 10 AV format, audio portion profile: HEAAC_MULT5	445
9.5.61	MPEG-4 Part 10 AV format, audio portion profile: AAC_LTP.....	445
9.5.62	MPEG-4 Part 10 AV format, audio portion profile: AAC_MPS.....	445
9.5.63	MPEG-4 Part 10 AV format, audio portion profile: HEAAC_L2	445
9.5.64	MPEG-4 Part 10 AV format, audio portion profile: HEAAC_MPS	446
9.5.65	MPEG-4 Part 10 AV format, audio portion profile: HEAAC_L4	446
9.5.66	MPEG-4 Part 10 AV format, audio portion profile: HEAAC_MULT7	446
9.5.67	MPEG-4 Part 10 AV format, audio portion profile: HEAACv2_L2	446
9.5.68	MPEG-4 Part 10 AV format, audio portion profile: AC3	447
9.5.69	MPEG-4 Part 10 AV format, audio portion profile: AC3	448
9.5.70	MPEG-4 Part 10 AV format, audio portion profile: AC3	448
9.5.71	MPEG-4 Part 10 AV format, audio portion profile: AC3	448
9.5.72	MPEG-4 Part 10 AV format, audio portion profile: AMR_WBplus.....	449
9.5.73	MPEG-4 Part 10 AV format, audio portion profile: TS_HD_DTS	449
9.5.74	MPEG-4 Part 10 AV format, audio Portion Profile: TS_HD_DTSHD_HRA.....	449
9.5.75	MPEG-4 Part 10 AV Format, Audio Portion Profile: TS_HD_DTSHD_MA.....	450
9.5.76	MPEG-4 Part 10 AV format, audio portion profile: EAC3	450
9.5.77	MPEG-4 Part 10 AV format, audio portion profile: MPEG1_L2	451
9.5.78	MPEG-4 Part 10 AV format, audio portion profile: MPEG-1/2	451
9.5.79	MPEG-4 Part 10 AV format, video portion profiling: HP_HD_L4	452
9.5.80	MPEG-4 Part 10 AV format, video portion profiling: HP_SD_L3	454
9.5.81	MPEG-4 Part 10 AV format, audio portion profiling: HEAACv2_L4	455
9.5.82	MPEG-4 Part 10 AV format, MIME type definition	456
9.5.83	MPEG-4 Part 10 AV format, MIME type definition	457
9.5.84	MPEG-4 Part 10 AV format, MIME type definition	457
9.5.85	MPEG-4 Part 10 AV format, MIME type definition	457
9.5.86	MPEG-4 Part 10 AV Format, AVC_TS_HP_HD_HEAACv2_L4_T	457
9.5.87	MPEG-4 Part 10 AV format, AVC_TS_HP_HD_HEAACv2_L4_ISO	458
9.5.88	MPEG-4 Part 10 AV format, system portion profile	458
9.5.89	MPEG-4 Part 10 AV format, AVC_TS_HP_SD_HEAACv2_L4_T	458
9.5.90	MPEG-4 Part 10 AV format, AVC_TS_HP_SD_HEAACv2_L4_ISO.....	459
9.5.91	MPEG-4 Part 10 AV format, AVC_MP4_HP_SD_HEAACv2_L4.....	459

9.5.92	MPEG-4 Part 10 AV format, AVC_MP4_BL_CIF15_HEAACv2_L2.....	459
9.5.93	MPEG-4 Part 10 AV format, video portion profile	459
9.5.94	MPEG-4 Part 10 AV format, audio portion profile	460
9.5.95	MPEG-4 Part 10 AV format, AVC_MP4_BL_CIF30_HEAACv2_L2.....	460
9.5.96	MPEG-4 Part 10 AV format, video portion profile	461
9.5.97	MPEG-4 Part 10 AV format, AVC_3GPP_BL_CIF15_AMR_WBplus_res	461
9.5.98	MPEG-4 Part 10 AV format, AVC_3GPP_BL_CIF30_AMR_WBplus_res	462
9.5.99	MPEG-4 Part 10 AV format, video portion profiling	462
9.5.100	MPEG-4 Part 10 AV format, audio portion profiling: AMR.....	462
9.5.101	MPEG-4 Part 10 AV format, audio portion profiling: AMR_WBplus	463
9.5.102	MPEG-4 Part 10 AV format, system portion profile	463
9.5.103	MPEG-4 Part 10 AV format, system bit rate	463
9.5.104	MPEG-4 Part 10 AV format: MIME type definition	463
9.5.105	MPEG-4 Part 10 AV format: system portion profile: TS_HD_T	464
9.5.106	MPEG-4 Part 10 AV format: system portion profile: MP4_BL_L12_CIF15_HEAACv2_350.....	464
9.5.107	MPEG-4 Part 10 AV format: system portion profile: MP4_BL_CIF15_AAC_350.....	465
9.5.108	MPEG-4 Part 10 AV format: MP4_BL_CIF15_HEAAC_350	465
9.5.109	MPEG-4 Part 10 AV format: system portion profile: MP4_MP_SD_AAC_LC	466
9.5.110	MPEG-4 Part 10 AV format: system portion profile: MP4_BL_L31_HD	466
9.5.111	MPEG-4 Part 10 AV format: MP4_BL_L32_HD	466
9.5.112	MPEG-4 Part 10 AV format: video portion profile: BL_L12_CIF15	467
9.5.113	MPEG-4 Part 10 AV format: video portion profile: BL_CIF15.....	467
9.5.114	MPEG-4 Part 10 AV format: video portion profile: BL_CIF15.....	468
9.5.115	MPEG-4 Part 10 AV format: video portion profile: MP_SD	469
9.5.116	MPEG-4 Part 10 AV format: video portion profile: BL_L31_HD	469
9.5.117	MPEG-4 Part 10 AV format: video portion profile: BL_L32_HD	470
9.5.118	MPEG-4 Part 10 AV format: audio portion profile: AAC	470
9.5.119	MPEG-4 Part 10 AV format: audio portion profile: AAC_LC.....	470
9.5.120	MPEG-4 Part 10 AV format: audio portion profile: AAC_350	471
9.5.121	MPEG-4 Part 10 AV format: audio portion profile: HEAAC_350.....	471
9.5.122	MPEG-4 Part 10 AV format: audio portion profile: HEAACv2_350	471
9.5.123	MPEG-4 Part 10 AV format: audio portion profile: AC3_X	472
9.5.124	MPEG-4 Part 10 AV format: audio portion profile: LPCM	472
9.5.125	MPEG-4 Part 10 AV format: MIME type definition: TS_T.....	473
9.5.126	MPEG-4 Part 10 AV format: MIME type definition: MP4	474
9.5.127	MPEG-4 Part 10 AV format: system portion profile, TS_NA	474
9.5.128	MPEG-4 Part 10 AV format: video portion profile, TS_NA	476
9.5.129	MPEG-4 Part 10 AV format: audio portion profile, TS_NA.....	478
9.5.130	MPEG-4 Part 10 AV format: system portion profile, TS_EU_ISO.....	480
9.5.131	MPEG-4 Part 10 AV format: video portion profile, TS_EU_ISO	482
9.5.132	MPEG-4 Part 10 AV format: audio portion profile, TS_EU_ISO	484
9.5.133	MPEG-4 Part 10 AV format: system portion profile, TS_MP_SD_DTS(HD).....	484
9.5.134	MPEG-4 Part 10 AV format: video portion profile, TS_MP_SD_DTS(HD).....	485

9.5.135MPEG-4 Part 10 AV format: system portion profile, TS_HP_HD_(L41)_DTS(HD).....	486
9.5.136MPEG-4 Part 10 AV format: video portion profile, TS_HP_HD_DTS(HD).....	487
9.5.137MPEG-4 Part 10 AV format: video portion profile, TS_HP_HD_L41_DTS	487
9.5.138MPEG-4 Part 10 AV format: audio portion profile, TS_DTS	488
9.5.139MPEG-4 Part 10 AV format: audio portion profile, TS_DTSHD	488
9.5.140MPEG-4 Part 10 AV format: system portion profile, TS_SD_EU_DTS	489
9.5.141MPEG-4 Part 10 AV format: video portion profile, TS_SD_EU_DTS	489
9.5.142MPEG-4 Part 10 AV format: audio portion profile, TS_SD_EU_DTS	489
9.5.143MPEG-4 Part 10 AV format: system portion profile, TS_HD_EU_DTS	490
9.5.144MPEG-4 Part 10 AV format: video portion profile, TS_HD_EU_DTS	490
9.5.145MPEG-4 Part 10 AV format: audio portion profile, TS_HD_EU_DTS	490
9.5.146MPEG-4 Part 10 AV format: system portion profile, TS_SHP_HD_EU	491
9.5.147MPEG-4 Part 10 AV format: video portion profile, TS_SHP_HD_EU	491
9.5.148MPEG-4 Part 10 AV format: audio portion profile, TS_SHP_HD_EU_AC3	492
9.5.149MPEG-4 Part 10 AV format: audio portion profile, TS_SHP_HD_EU_HEAACv2_L4	493
9.5.150MPEG-4 Part 10 AV format: MIME type definition, TS_T	493
9.5.151MPEG-4 Part 10 AV format: MIME type definition, TS_ISO	493
9.5.152MPEG-4 Part 10 AV format: system portion profile, MP4_EU	494
9.5.153MPEG-4 Part 10 AV format: video portion profile, MP4_EU	494
9.5.154MPEG-4 Part 10 AV format: audio portion profile, MP4_EU	495
9.5.155MPEG-4 Part 10 AV format: system portion profile, MP4_DTS, MP4_DTSHD	496
9.5.156MPEG-4 Part 10 AV format: video portion profile, MP4_BL_DTS, MP4_BL_DTSHD	497
9.5.157MPEG-4 Part 10 AV format: video portion profile, MP4_MP_DTS, MP4_MP_DTSHD	497
9.5.158MPEG-4 Part 10 AV format: video portion profile, MP4_HP_DTS, MP4_HP_DTSHD	498
9.5.159MPEG-4 Part 10 AV format: audio portion profile, MP4_DTS	498
9.5.160MPEG-4 Part 10 AV format: audio portion profile, MP4_DTSHD	499
9.5.161MPEG-4 Part 10 AV format: system portion profile, MP4_MP_SD_EAC3	499
9.5.162MPEG-4 Part 10 AV format: video portion profile, HP4_MP_SD_EAC3.....	500
9.5.163MPEG-4 Part 10 AV format: audio portion profile, MP4_MP_SD_EAC3	501
9.5.164MPEG-4 Part 10 AV format: system portion profile, MP4_HP_HD_EAC3	501
9.5.165MPEG-4 Part 10 AV format: video portion profile, HP4_HP_HD_EAC3.....	502
9.5.166MPEG-4 Part 10 AV format: audio portion profile, MP4_HP_HD_EAC3	503
9.5.167MPEG-4 Part 10 AV format: audio portion profile, MIME type definition, MP4	504
9.5.168MPEG-4 Part 10 AV format: system portion profile, MKV_MP_HD	505
9.5.169MPEG-4 Part 10 AV format: video portion profile, MKV_MP_HD	505
9.5.170MPEG-4 Part 10 AV format: system portion profile, MKV_HP_HD	506

9.5.171	MPEG-4 Part 10 AV format: video portion profile, MKV_HP_HD	506
9.5.172	MPEG-4 Part 10 AV format: audio portion profile, MKV_HD_ACC_MULT5	507
9.5.173	MPEG-4 Part 10 AV format: audio portion profile, MKV_HD_HEAAC_L4	507
9.5.174	MPEG-4 Part 10 AV format: audio portion profile, MKV_HD_AC3	508
9.5.175	MPEG-4 Part 10 AV format: audio portion profile, MKV_HD_MPEG1_L3	508
9.5.176	MPEG-4 Part 10 AV format: MIME type definition, MKV	509
9.6	WMV9 profiling guidelines	509
9.6.1	General	509
9.6.2	WMV AV format	510
9.6.3	WMV AV format: Medium Resolution Video with Baseline Audio	510
9.6.4	WMV AV format: Medium Resolution Video with Full Audio	510
9.6.5	WMV AV format: Medium Resolution Video with Professional Audio	511
9.6.6	WMV AV format: High Resolution Video with Full Audio	511
9.6.7	WMV AV format: High Resolution Video with Professional Audio	512
9.6.8	WMV AV format: HighMAT Profile	512
9.6.9	WMV AV format: Simple Profile at Medium Level with WMA	512
9.6.10	WMV AV format: Simple Profile at Medium Level with MP3	513
9.6.11	WMV AV format: Simple Profile at Low Level with WMA	513
9.6.12	WMV AV format: ASF encapsulation and multiplex format for HTTP transfer	514
9.6.13	WMV AV format: ASF operational procedures	514
9.6.14	WMV AV format: discovery of WMV version	515
9.6.15	WMV AV format: minimal implementation	515
9.6.16	WMV AV format: MIME type definition	516
9.7	VC-1 profiling guidelines	516
9.7.1	VC-1 AV format, system portion profile: PS_HD	516
9.7.2	VC-1 AV format, video portion profile: PS_HD	517
9.7.3	VC-1 AV format, audio portion profile: PS_HD_DTS	518
9.7.4	VC-1 AV format, audio portion profile: PS_HD_DTSHD_HRA	518
9.7.5	VC-1 AV format, audio portion profile: PS_HD_DTSHD_MA	518
9.7.6	VC-1 AV format, audio portion profile: PS_HD_DTSHD	519
9.7.7	VC-1 AV format, MIME type definition: PS_HD	519
9.7.8	VC-1 AV format, system portion profile: TS_AP	519
9.7.9	VC-1 AV format, system portion profile: TS_HD	520
9.7.10	VC-1 AV format, system portion profile: ASF_AP	521
9.7.11	VC-1 AV format: video portion profile: AP_L1	521
9.7.12	VC-1 AV format, video portion profile: TS_HD	522
9.7.13	VC-1 AV format: video portion profile: AP_L2	523
9.7.14	VC-1 AV format: audio portion profile: AC3	523
9.7.15	VC-1 AV format: audio portion profile: TS_HD_DTS	523
9.7.16	VC-1 AV format: audio portion profile: TS_HD_DTSHD_HRA	524
9.7.17	VC-1 AV format, audio portion profile: TS_HD_DTSHD_MA	524
9.7.18	VC-1 AV format: audio portion profile: WMA	525
9.7.19	VC-1 AV format, MIME type definition: TS, TS_T	525
9.7.20	VC-1 AV format, MIME type definition: TS_ISO	525
9.7.21	VC-1 AV format: system portion profile	526
9.7.22	VC-1 AV format: video portion profile: Adaptive AP_L2	526

9.7.23 VC-1 AV format: audio portion profile: WMA	527
9.7.24 VC-1 AV Format, MIME Type Definition: ASF	527
10 Printing Class Media Format Profiles	527
10.1 General	527
10.2 Generic Printing profiling guidelines MF Printing Class: profile parameter sets.....	528
10.2.1	528
10.2.2	528
10.2.3	528
10.2.4	529
10.2.5	529
10.2.6	529
10.3 XHTML profiling guidelines	529
10.3.1 XHTML format	529
10.3.2 XHTML format	532
10.3.3 XHTML format	532
10.3.4 XHTML format	537
11 Media Collection profile guidelines: DIDL-Lite Playlist format.....	538
11.1 DIDL_S Media Collection format profile	538
11.2 DIDL_V Media Collection format profile	539
11.3 Lifetime element for the image Class.....	542
11.3.1	542
11.3.2	542
11.3.3	542
11.3.4	542
Annex A (informative) ASF Recommended Procedures.....	543
Annex B (normative) IFO file format: field values	547
Figure 1 – Guideline layout and definitions	48
Figure 2 – Visual map of possible values for the attribute tables	49
Figure 3 – Profile summary Table header.....	53
Figure 4 – ITU-R Rec. BO.1516 SYSTEM B Transport Stream Packet with TTS support	289
Table 1 – Allowed Values for Change Indicator field in Attribute Table.....	50
Table 2 – DLNA Device Classes in the HND Device Category.....	51
Table 3 – DLNA Device Capabilities.....	51
Table 4 – DLNA Device Classes in the MHD Device Category	52
Table 5 – DLNA Device Classes in the HID Device Category	53
Table 6 – Categorization Labels.....	54
Table 7 – Image Class: JPEG profiles.....	54
Table 8 – Image Class: PNG profiles	55
Table 9 – Audio Class: AC-3 profiles.....	55
Table 10 – Audio Class: AMR profiles	56
Table 11 – Audio Class: ATRAC3plus profiles.....	56
Table 12 – Audio Class: LPCM profiles	56
Table 13 – Audio Class: MP3 profiles	57

Table 14 – Audio Class: MPEG-4 profiles	57
Table 15 – Audio Class: WMA profiles	62
Table 16 – AV Class: MPEG-1 profiles	62
Table 17 – AV Class: MPEG-2 profiles	63
Table 18 – AV Class: MPEG-4 Part 2 profiles	72
Table 19 – AV Class: MPEG-4 Part 10 (AVC) profiles	80
Table 20 – AV Class: WMV9 profiles	105
Table 21 – Media collection profiles	106
Table 22 – Printer XHTML document profiles	106
Table 23 – Image Class: GIF profiles	107
Table 24 – Audio Class: DTS Digital Surround profiles	107
Table 25 – Audio Class: DTS-HD profiles	107
Table 26 – Audio Class: Enhanced AC-3 profiles	108
Table 27 – Audio Class: MLP profiles	108
Table 28 – Audio Class: MPEG-1/2 profiles	108
Table 29 – AV Class: VC-1 profiles	108
Table 30 – Required Media Format Profiles for the HND Device Category	118
Table 31 – LPCM profile hierarchy	135
Table 32 – MPEG-4 audio profile hierarchy	143
Table 33 – MPEG-4 audio profile hierarchy	144
Table 34 – List of WMA profiles for the Audio Media Class	198
Table 35 – MPEG-1 AV format resolutions	211
Table 36 – Summary of MPEG-2 profiles for the AV Media Class	213
Table 37 – MPEG-2 AV format resolutions	221
Table 38 – MPEG_TS_SD_NA, MPEG_TS_SD_NA_T	234
Table 39 – Additional parameters for MPEG_TS_SD_NA, MPEG_TS_SD_NA_T	236
Table 40 – Video MPEG-2 AV encoding parameters	239
Table 41 – MPEG_TS_SD_KO, MPEG_TS_SD_KO_T	242
Table 42 – MPEG_TS_HD_KO, MPEG_TS_HD_KO_T	244
Table 43 – MPEG-2 AV format resolutions	253
Table 44 – MPEG-2 video encoding parameters (PS_SD)	260
Table 45 – MPEG-2 video encoding parameters (PS_HD)	261
Table 46 – MPEG-2 video encoding parameters (DIRECTV_SD)	266
Table 47 – MPEG-2 video encoding parameters (SD_JP)	266
Table 48 – MPEG-2 video encoding parameters (TS_HD_DTS)	267
Table 49 – MPEG_TS_SD_60_L2_T, MPEG_TS_SD_60_AC3_T	273
Table 50 – MPEG_TS_SD_50_L2_T, MPEG_TS_SD_50_AC3_T	274
Table 51 – MPEG_TS_HD_60_L2_T, MPEG_TS_HD_60_L2_ISO	279
Table 52 – MPEG_TS_HD_60_L2_T, MPEG_TS_HD_60_L2_ISO	279
Table 53 – MPEG_TS_JP_T	283
Table 54 – MPEG_TS_HD_60_L2_T, MPEG_TS_HD_X_60_L2_ISO	287
Table 55 – MPEG_TS_HD_X_50_L2_T, MPEG_TS_HD_X_50_L2_ISO	287
Table 56 – MPEG-2 video encoding parameters	290

Table 57 – MPEG-2 video picture header user data	290
Table 58 – MPEG-2 video user data type	290
Table 59 – MPEG-2 video user data info	291
Table 60 – MPEG-2 AV format resolution	294
Table 61 – DTS registration descriptor syntax	297
Table 62 – DTS Format Identifier Values	297
Table 63 – Summary of MPEG-4 Part 2 profiles for the AV Media Class	300
Table 64 – Summary of MPEG-4 Part 2 profiles for the AV Media Class	302
Table 65 – MPEG SP_L3 bit rates	304
Table 66 – MPEG SP_L3 resolutions	304
Table 67 – SP_L3_VGA resolutions	306
Table 68 – SP_L2 resolutions	307
Table 69 – SP_L0B video bit rate	307
Table 70 – ASP_L5 bit rates	309
Table 71 – ASP_L5 resolutions	309
Table 72 – ASP_L4_SO bit rates	312
Table 73 – ASP_L4_SO resolutions	312
Table 74 – H263_P0_L10 resolutions	314
Table 75 – H263_P3_L10 resolutions	315
Table 76 – CO resolutions	316
Table 77 – MPEG2_TS maximum system bitrate	326
Table 78 – MPEG2_TS, MPEG2_TS_T, and MPEG2_TS_ISO bit rates	326
Table 79 – Maximum system bitrate	333
Table 80 – Additional MPEG-4 Part 2 AV format resolutions	335
Table 81 – Additional MPEG-4 Part 2 AV format resolutions	335
Table 82 – Informative summary of MPEG-4 Part 2 Profiles for the AV Media Class	343
Table 83 – Resolutions for video portion profile H263_P0_L45	344
Table 84 – MPEG4_P2_MP4_SP_L5_AAC	347
Table 85 – Resolutions for video portion profile SP_L5	347
Table 86 – MPEG4_P2_MP4_SP_L5_AAC bit rate	348
Table 87 – Summary of MPEG-4 Part 10 (AVC) profiles for the AV Media Class	349
Table 88 – Summary of additional MPEG-4 Part 10 (AVC) profiles for the AV Media Class – Part 1	353
Table 89 – Summary of additional MPEG-4 Part 10 (AVC) profiles for the AV Media Class – Part 2	355
Table 90 – Summary of additional MPEG-4 Part 10 (AVC) Profiles for the AV Media Class – Part 3	356
Table 91 – Summary of additional MPEG-4 Part 10 (AVC) profiles for the AV Media Class – Part 4	357
Table 92 – Pixel aspect ratio for AVC_TS_BL_CIF15_AAC_xxx and AVC_TS_MP_SD_xxx profiles	357
Table 93 – MPEG-4 Part 10 AV format frame rate	359
Table 94 – MPEG-4 Part 10 AV format resolutions	361
Table 95 – Frame rate and number of pictures in a GOP structure	366
Table 96 – MPEG-4 Part 10 AV format resolutions	367

Table 97 – MPEG-4 Part 10 AV format resolutions.....	370
Table 98 – MPEG-4 Part 10 AV format resolutions.....	375
Table 99 – MPEG-4 Part 10 AV format resolutions.....	380
Table 100 – MPEG-4 Part 10 AV format resolutions.....	381
Table 101 – MPEG-4 Part 10 AV format resolutions.....	385
Table 102 – MPEG-4 Part 10 AV format resolutions.....	387
Table 103 – MPEG-4 Part 10 AV format resolutions.....	388
Table 104 – MPEG-4 Part 10 AV format resolutions.....	391
Table 105 – MPEG-4 Part 10 AV format resolutions.....	395
Table 106 – MPEG-4 Part 10 AV format resolutions.....	396
Table 107 – MPEG-4 Part 10 AV format resolutions.....	397
Table 108 – MPEG-4 Part 10 AV format resolutions.....	399
Table 109 – MPEG-4 Part 10 AV format resolutions.....	402
Table 110 – MPEG-4 Part 10 AV format resolutions.....	403
Table 111 – MPEG-4 Part 10 AV format resolutions.....	408
Table 112 – MPEG-4 Part 10 AV format resolutions.....	408
Table 113 – MPEG-4 Part 10 AV format resolutions.....	418
Table 114 – MPEG-4 Part 10 AV format resolutions.....	424
Table 115 – MPEG-4 Part 10 AV format resolutions.....	429
Table 116 – MPEG-4 Part 10 AV format resolutions.....	431
Table 117 – MPEG-4 Part 10 AV format resolutions.....	432
Table 118 – MPEG-4 Part 10 AV format resolutions.....	433
Table 119 – MPEG-4 Part 10 AV format resolutions.....	434
Table 120 – MPEG-4 Part 10 AV format resolutions.....	435
Table 121 – MPEG-4 Part 10 AV format resolutions.....	436
Table 122 – MPEG-4 Part 10 AV format resolutions.....	440
Table 123 – MPEG-4 Part 10 AV format resolutions.....	441
Table 124 – Additional MPEG-4 Part 10 AV format resolutions	441
Table 125 – Informative summary of MPEG-4 Part 10 (AVC) profiles for the AV Media Class	452
Table 126 – Additional resolutions for AVC_MP4_BL_CIF15_HEAACv2_L2 and AVC_3GPP_BL_CIF15_AMR_WBplus_res.....	460
Table 127 – Additional resolutions for AVC_MP4_BL_CIF30_HEAACv2_L2 and AVC_3GPP_BL_CIF30_AMR_WBplus_res.....	461
Table 128 – Format resolutions.....	467
Table 129 – Format resolutions.....	468
Table 130 – Format resolutions.....	468
Table 131 – Resolutions	469
Table 132 – Additional resolutions	470
Table 133 – MPEG-4 Part 10 AV format resolution.....	477
Table 134 – ATSC/SCTE AVC SEI syntax for Closed Caption data	477
Table 135 – AVC Caption Transport Syntax following provider_code = 0x002F	478
Table 136 – MPEG-4 Part 10 AV format resolution.....	483
Table 137 – DTS registration descriptor syntax.....	485

Table 138 – DTS and DTS-HD format identifier values.....	485
Table 139 – DTS registration descriptor syntax.....	486
Table 140 – DTS and DTS-HD format identifier values.....	487
Table 141 – MPEG-4 Part 10 AV format resolution.....	492
Table 142 – MPEG-4 Part 10 AV format resolution.....	495
Table 143 – MPEG-4 Part 10 AV format resolutions.....	500
Table 144 – MPEG-4 Part 10 AV format resolutions.....	503
Table 145 – MPEG-4 Part 10 AV format resolution.....	506
Table 146 – MPEG-4 Part 10 AV format resolution.....	507
Table 147 – List of WMV9 profiles for the AV Media Class.....	509
Table 148 – VC-1 AV format resolutions	517
Table 149 – VC-1 AV format resolutions	522
Table B.1 – Fields within an IFO file Supplied by Serving Endpoint.....	547
Table B.2 – IFO file fields treatment by Rendering Endpoints.....	550

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 2: DLNA media formats

FOREWORD

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

International Standard IEC 62481-2 has been prepared technical area 9: Audio, video and multimedia applications for end-user network, by IEC technical committee 100: Audio, video and multimedia systems and equipment.

This second edition cancels and replaces the first edition published in 2007, and constitutes a technical revision.

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

- a) addition of new optional media format profiles for Audio and AV content;
- b) addition of mandatory media format profiles for the CVP-1 Device Profile;
- c) includes updates to resolve interoperability issues.

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

CDV	Report on voting
100/1993/CDV	100/2081/RVC

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

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

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

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

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

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

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

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 Media 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 Media Format Profiles depending on selections for the companion audio, the system-layer multiplexing specifications, allowed frame resolutions, allowed aspect ratios, allowed bit rates, etc.

The number of potential combinations for suitable Media Format Profiles increases rather quickly, as evidenced by the long profile lists observed in the different clauses and subclauses 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 shall be capable of exposing and transferring mandatory profiles while players and renderers shall be capable of decoding and rendering the mandatory profiles. Unfortunately, mandatory Media Format Profiles cannot be defined universally to suit all scenarios. For this reason, the definition of mandatory profiles has to be made taking into account the geographical region and the target device category. Clause 6 provides the definitions and requirements for using mandatory profiles.

All profiles not defined as mandatory become optional in the home. An implementer can choose whether to support optional profiles. When supported and used with DLNA's discovery and transfer methods, it shall follow the guideline provisions for encoding and exposing optional profiles.

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

Part 2: DLNA media formats

1 Scope

This part of IEC 62481 describes DLNA Media Format Profiles applicable to the DLNA Device Classes defined in 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.

The Profile ID is exposed in a server's Content Directory Service (CDS) to signal 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.

2 Normative references

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

IEC 62481-1:2013, *Digital living network alliance (DLNA) home networked device interoperability guidelines – Part 1: Architecture and protocols*

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 – Part 1: Systems*

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

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

ISO/IEC 13818-7:2003, *Information technology – Generic coding of moving pictures and associated audio information – Part 7: Advanced Audio Coding (AAC)*

ISO/IEC 13818-7:2003/Amd 1:2004, *Information technology – Generic coding of moving pictures and associated audio information – Part 7: Advanced Audio Coding (AAC)*
Amendment 1: Embedding of bandwidth extension

ISO/IEC 13818-7:2005, *Information technology – Generic coding of moving pictures and associated audio information – Part 7: Advanced Audio Coding (AAC)*

ISO/IEC 13818-7:2006/Amd 1: 2007, *Information technology – Coding of Audio-Visual Objects – Part 7: Advanced Audio Coding (AAC)*
Amendment 1

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 14496-2:2001, *Information technology – Coding of audio-visual objects – Part 2: Visual*¹

ISO/IEC 14496-2:2001/Amd 2:2002, *Information Technology – Coding of audio-visual objects – Part 2: Visual, Amendment 2: Streaming video profile*

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

ISO/IEC 14496-2:2004/Amd 1, *Information Technology – Coding of Audio-Visual Objects – Part 2: Visual, AMENDMENT 1: Error resilient simple scalable profile*

ISO/IEC 14496-2:2004/Amd 2:2005, *Information Technology – Coding of audio-visual objects – Part 2: Visual, Amendment 2: "New Levels for Simple Profile"*

ISO/IEC 14496-2:2004/Amd 3 – *Coding of audio-visual objects – Part 2: Visual, Amendment 3: New levels and tools for MPEG-4 visual*

ISO/IEC 14496-2:2004/PDAM 4, *Information Technology – Coding of Audio-Visual Objects – Part 2: Visual, Amendment 4, Simple profile Level 6*

ISO/IEC 14496-3:2001, *Information technology – Coding of Audio-Visual Objects – Part 3: Audio*

ISO/IEC 14496-3:2001/Amd.1:2003, *Information technology – Coding of Audio-Visual Objects – Part 3: Audio, Amendment 1: Bandwidth extension*

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

ISO/IEC 14496-3:2005/Amd 2:2006, *Information technology – Coding of Audio-Visual Objects – Part 3: Audio, Amendment 2: Audio Lossless Coding (ALS), new audio profiles and BSAC extensions*

ISO/IEC 14496-3:2005/Amd 2:2006/Cor 2, *Information technology – Coding of Audio-Visual Objects – Part 3: Audio, Amendment 2, Technical Corrigendum 2*

ISO/IEC 14496-4, *Information technology – Coding of audio-visual objects – Part 4: Conformance testing*²

¹ In this standard referenced as MPEG 4, part 2.

ISO/IEC 14496-10:2003, *MPEG-4 Video, Information technology – Coding of audio-visual objects – Part 10: Advanced Video Coding*³

ISO/IEC 14496-12:2004, *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*⁴

ISO/IEC 14496-15:2004, *Information technology – Coding of Audio-Visual Objects – Part 15: AVC file format*

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

ISO/IEC 23003-1:2007, *Information technology – MPEG audio technologies – Part 1: MPEG Surround*

ISO/IEC 29341-3-12:2008, *Information technology – UPnP Device Architecture – Part 3-12: Audio Video Device Control Protocol – Content Directory Service*

ITU-R Rec BS.1196-11, *Audio coding for digital terrestrial television broadcasting, Annex 2 (Dolby* AC-3 Audio)*, International Telecommunication Union, April 2001

ITU-R Rec BO.1516, *Digital multiprogramme television systems for use by satellite operating in the 11/12 GHz frequency range, System B*, International Telecommunications Union, 2001

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

ITU-T Rec H.263 Annex X, *Profiles and levels definition*

ITU-T Rec G.726, *General Aspects of Digital Transmission Systems, Terminal Equipment – 40, 32, 24, 16 kbit/s Adaptive Differential Pulse Code Modulation (ADPCM)*, 1990

ETSI EN 300 468, *Specification for Service Information (SI) In DVB systems (SI)*, V1.5.1 (2003-05), Digital Video Broadcasting (DVB), European Telecommunications Standard Institute. http://pda.etsi.org/pda/home.asp?wki_id=U4j.cLPj9hPQUQUWcyK@f

ETSI EN 300 468, *Specification for Service Information (SI) In DVB systems (SI)*, Digital Video Broadcasting (DVB), v1.10.1, European Telecommunications Standard Institute (2009-07) (This is an update of ETSI EN 300 468)

ETSI EN 300 472, *Specification for conveying ITU-R System B Teletext in DVB bitstreams (DVB Teletext)*, V1.3.1 (2003-05), Digital Video Broadcasting (DVB), European Telecommunications Standard Institute
http://pda.etsi.org/pda/home.asp?wki_id=a0DKmDqQGxpwpsWuZ3v

ETSI EN 300 743, *Subtitling systems (DVB Subtitles)*, V1.2.1 (2002-10), Digital Video Broadcasting (DVB), European Telecommunications Standard Institute
http://pda.etsi.org/pda/home.asp?wki_id=l6LxE44yeylmqmq@b59E

² In this standard referenced as MPEG 4, part 4.

³ In this standard referenced as MPEG 4, part 10.

⁴ In this standard referenced as MPEG 4, part 14.

ETSI EN 300 743, *Subtitling systems*, Digital Video Broadcasting (DVB), v1.3.1, (2006-07) (This is an update of ETSI EN 300 743)

ETSI EN 301 192, *DVB Specification for Data broadcasting (DVB data broadcasting)*, V1.3.1 (2003-05), European Telecommunications Standard Institute
http://pda.etsi.org/pda/home.asp?wki_id=iSlfFH02bsMNRNRSwmkAp

ETSI EN 301 775, *Specification for the carriage of Vertical Blanking Information (VBI) data in DVB bitstreams (DVB VBI data)*, European Telecommunications Standard Institute, V1.2.1 (2003-05), Digital Video Broadcasting (DVB)
http://pda.etsi.org/pda/home.asp?wki_id=2760SgqWfSkIrrkocwSOy

ETSI ES 201 812, *Multimedia Home Platform (MHP) specification 1.0.3 (DVB-MHP)*, V1.1.1 (2003-12), Digital Video Broadcasting (DVB), European Telecommunications Standard Institute
http://pda.etsi.org/pda/home.asp?wki_id=Emytk-ljBPIJQQllzKtBe

ETSI TSR 101 154, *Implementation Guidelines for the use of MPEG-2 Systems, Video and Audio Coding in Broadcasting Applications based on the MPEG-2 Transport Stream*, V1.4.1 (2004-057), Digital Video Broadcasting (DVB*), European Telecommunications Standard Institute
http://webapp.etsi.org/action/PU/200501111/ts_101154v010601p.pdf

ETSI TS 101 154, *Implementation guidelines for the use of Video and Audio Coding in Broadcasting Applications based on the MPEG-2 Transport Stream*, Digital Video Broadcasting (DVB); v1.7.1 (2005-06) (This is an update of ETSI TSR 101 154)

ETSI TS 101 154, *Implementation guidelines for the use of Video and Audio Coding in Broadcasting Applications based on the MPEG-2 Transport Stream*, Digital Video Broadcasting (DVB), v1.9.1 (2009-09) (This is an update of ETSI TS 101 154)

ETSI TS 102 005, *Specification for the use of video and audio coding in DVB services delivered directly over IP*, Digital Video Broadcasting (DVB), Version 1.2.1, 2006-04

ETSI TS 102 114, *DTS Coherent Acoustics; Core and Extensions*, 2006

ETSI TS 102 366, *Digital Audio Compression (AC-3, Enhanced AC-3) Standard*, Version 1.1.1, 2005-02

ETSI TS 102 366, *Digital Audio Compression (AC-3, Enhanced AC-3) Standard*, v1.2.1 (2008-08) (This is an update of ETSI TS 102 366)

ETSI TS 102 563, *Transport of Advanced Audio Coding AAC) audio*, Digital Audio Broadcasting (DAB), Version 1.1.1, 2007-01

IETF RFC 1945, *Hypertext Transfer Protocol – HTTP/1.0*, T. Berners-Lee, MIT/LCS, R. Fielding, UC Irvine, H. Frystyk, May 1996.
<http://www.ietf.org/rfc/rfc1945.txt>

IETF RFC 2046, *Multipurpose Internet Mail Extensions (MIME) – Part Two: Media Types*, November 1996

IETF RFC 2616, *Hypertext Transfer Protocol HTTP/1.1*.
<ftp://ftp.isi.edu/in-notes/rfc2616.txt>

IETF RFC 3551, *RTP Profile for Audio and Video Conferences with Minimal Control*, H. Schulzrinne and S. Casner, July 2003
<http://www.ietf.org/rfc/rfc3551.txt>

IETF RFC 3555, *MIME Type Registration of RTP Payload Formats*, S. Casner, Packet Design, P. Hoschka, July 2003
<http://www.ietf.org/rfc/rfc3555.txt>

ANSI/SCTE 43:2005, *Digital Video Systems Characteristics Standard for Cable Television*, 2005

ANSI/SCTE 65:2008, *Service Information Delivered Out-Of-Band For Digital Cable Television*

ANSI/SCTE-128:2010, *AVC Video Systems and Transport Constraints for Cable Television*

ARIB STD B-1, Ver.2.0, *Digital Receiver for Digital Satellite Broadcasting Services using Communication Satellites*, Mar 14 2007

ARIB TR B-14, Ver. 2.7, *Operational Guidelines For Digital Terrestrial Television Broadcasting*, March 14 2006

ARIB TR B-15, Ver. 3.6, *Operational Guidelines For Digital Satellite Broadcasting*, March 14 2006

ARIB STD B-21, Ver. 4.4, *Receiver for Digital Broadcasting*, Sept 29 2005

ARIB B 24, ARIB* STD-B24 Version 3.2, *Data Coding and Transmission Specification for Digital Broadcasting*, Association of Radio Industries and Businesses, November 15, 2001
http://www.arib.or.jp/english/html/overview/sb_e.html

ARIB STD B-32, Ver. 1.9, *Video Coding, Audio Coding and Multiplexing Specifications for Digital Broadcasting*, March 14 2006

ASF, *Advanced System Format (ASF) Specification which can be obtained from*
<http://www.microsoft.com/windows/windowsmedia/format/asfspec.aspx>

ATRAC3plus specification,
which can be obtained from ATRAC3 Licensing Program for DLNA, Sony, by contacting atrac_dlna@av.crl.sony.co.jp
<http://www.sony.net/Products/ATRAC3/tech/atrac3plus.html>

ATSC Standard A/6, *Program and System Information Protocol for Terrestrial Broadcast and Cable(PSIP)*

ATSC Standard A/52A, *Digital Audio Compression (AC-3*) Rev A*, Advanced Television Systems Committee, 20 Aug. 2001
<http://www.digitalpreservation.gov/formats/fdd/fdd000209.shtml>

ATSC A/53B Annex B, *ATSC Digital Television Standard: Part 1 – Digital Television System (A/53, Part 1:2007)*

ATSC Standard A/53, *Digital Television Standard*, 2007, 2009, 2010
(This is an update of the ATSC Standard A/53C:2004 ATSC Standard A/53C)

ATSC Standard A/53C:2004: *Digital Television Standard*, Revision C with Amendment 1, 21, May, 2004
<http://www.atsc.org>

BDA, *System Description Blu-ray Disc Rewritable Format Part 3, Audio Visual Basic Specifications (Version 3.01)*

BDA, *System Description Blu-ray Disc Rewritable Format Part 3, Audio Visual Basic Specifications (Version 2.11)*

BDA, *System Description Blu-ray Disc Read-Only Format Part 3 Audio Visual Basic Specifications (2005-03)*

CEA-849A, *Application Profiles for EIA*-775A compliant DTVs*, CEA. (DTV), Consumer Electronics Association, December 6, 2001
<http://www.ce.org/Standards/StandardsListing.aspx>

CompuServe Incorporated, *Graphics Interchange Format: Version 89a*, Columbus, OH, USA, 1990

CSS Print Profile, *W3C Candidate Recommendation*, World Wide Web Consortium (W3C), February 25, 2004. Available from
<http://www.w3.org/TR/css-print/>

CSS3 Paged Media Module, *CSS3 Paged Media Module*, H. Lie and J. Bigelow (editor), W3C February 25, 2004
<http://www.w3.org/TR/2004/CR-css3-page-20040225>

DTS 9302J85300, DTS document #9302J85300, *Implementation of DTS audio in MPEG-2 structures as defined in ISO/IEC 13818-1*

DTS 9302J81100, DTS document #9302J81100, *Implementation of DTS audio in media files based on ISO/IEC 14496*

DTS 9302F30400, DTS document #9302F30400, *DTS-HD Substream and Decoder Interface Description*

DVD Specifications, *for DVD-RAM/DVD-RW/DVD-R* for General Discs Part 3 Video Recording*, DVD Forum, Version 1.1, May 2001
<http://www.dvdfllc.co.jp/>

DVD Specifications, *DVD for High Definition Video: MLP Reference Information*, DVD Forum, Version 1.0, August 2005

DVD Forum DVD Specifications, *for High Definition Video, DTS-HD Reference Information (Version 1.0, 2005-08)*

DVD Forum DVD Specifications, *DVD Specifications for High Definition Video (Chapter 5, Version 1.0, 2005-08)*

DVD Forum DVD Specifications, *for Read Only Disc (Part 3: Video Specifications Ver1.1)*

HighMAT specifications,
which can be obtained through the HighMAT Licensing Program
<http://www.highmat.com/license/specifications.asp>

ID3 tag version 2.4.0 – *Main Structure*, M. Nilsson, November 1, 2000
<http://www.id3.org/id3v2.4.0-structure.txt>

JEITA CP-3451, *Exchangeable image file format for digital still cameras*: Exif Version 2.2, Standard of Japan Electronics and Information Technology Industries Association, April 2002.
<http://tsc.jeita.or.jp/avs/data/cp3451.pdf>

JEITA CP-3451-1, *Exchangeable image file format for digital still cameras*: Exif Version 2.21. (Amendment Ver2.2), Standard of Japan Electronics and Information Technology Industries Association, September 2003.
http://tsc.jeita.or.jp/avs/data/cp3451_1.pdf

JEITA CP-3461, *Design rule for Camera File system DCF*, Version 2.0, Standard of Japan Electronics and Information Technology Industries Association, September 2003
<http://tsc.jeita.or.jp/avs/data/cp3461.pdf>

JPEG File Interchange Format, Version 1.02, Eric Hamilton, C-Cube Microsystems, September 1, 1992
<http://www.w3.org/Graphics/JPEG/jfif3.pdf>

Matroska, *Matroska File Format specification*
<http://www.matroska.org/>

Nero Digital Format, *Nero Digital Format Specification v.2.0*, 2007

OMA (Open Mobile Alliance), *OMA Multimedia Messaging Service v1.3*

SCTE 54 2002, *Digital Video Service Multiplex and Transport System Standard for Cable Television*, Society of Cable Telecommunications Engineers Inc. (formerly DVS 241)
<http://www.scte.org/home.cfm>

SMPTE 421M-2006, *VC-1 Compressed Video Bitstream Format and Decoding Process*, 2006

SMPTE RP227-2006, *VC-1 Bitstream Transport Encodings*, 2006

WMA Specifications
which can be obtained through the Windows Media 9 Series License Program
<http://wmlicense.smdisp.net/licenserequest/>

WMV9 specifications, *Windows Media 9 Series License Program*,
<http://wmlicense.smdisp.net/licenserequest/>

W3C PNG, *Portable Network Graphics (PNG) Specification (Second Edition) Information technology – Computer graphics and image processing – Portable Network Graphics (PNG): Functional specification*, ISO/IEC 15948:2004, W3C, November 10, 2003
<http://www.w3.org/TR/2003/REC-PNG-20031110>

W3C XHTML-Print, *XHTML-Print*, W3C Recommendation, World Wide Web Consortium (W3C), January 20, 2004. Available from
<http://www.w3.org/TR/xhtml-print/>

XHTML-Print/CSS-Print Guidelines, *XHTML-Print/CSS Print Profile Guidelines for PrintEnhanced:1*, UPnP Forum, May 4, 2005.
http://www.upnp.org/standardizeddcps/documents/PrintEnhanced1_guideline_v1_050504.pdf

XHTML Photo Templates, *XHTML-Print Photo Templates for UPnP PrintEnhanced:1 v1.0*, UPnP Forum, May 4, 2005
http://www.upnp.org/standardizeddcps/documents/Phototemplates_v1_050504.pdf

XHTML-Print Test, *XHTML-Print Test Suite*, W3C Candidate Recommendation, World Wide Web Consortium (W3C), January 20, 2004
<http://www.w3.org/MarkUp/Test/xhtml-print/20040426>

3GPP TR 26.911, *Codecs for Circuit Switched Multimedia Telephony Service; Terminal Implementer's Guide*, Release 6 Version 6.0.0, 2004-09-30
<http://www.3gpp.org/ftp/Specs/html-info/26911.htm>

3GPP TS 26.244, *3GPP* file format (3GP)*, Release-6, 3GPP
<http://www.3gpp.org/ftp/Specs/html-info/26244.htm>

3GPP TS 26.090, *Adaptive Multi-Rate (AMR) Speech Codec, Transcoding functions*, Release 6 Version 6.0.0, 2005-01-06
<http://www.3gpp.org/ftp/Specs/html-info/26290.htm>

3GPP TS 26.101, *Adaptive Multi-Rate (AMR) Speech Codec Frame Structure*, Release 6 Version 6.0.0, 2004-09-30
<http://www.3gpp.org/ftp/Specs/html-info/26101.htm>

3GPP TS 26.140, *Multimedia Messaging Service (MMS); Media Formats and Codecs*, Release 6 Version 6.2.0, 2005-04-01
<http://www.3gpp.org/ftp/Specs/html-info/26140.htm>

3GPP TS 26.140, *Multimedia Messaging Service (MMS); Media Formats and Codecs*, Release 7

3GPP TS 26.234, *Transparent End-to-End Packet-Switched Streaming Service (PSS); Protocols and Codecs*, Release 6 Version 6.4.0, 2005-06-24
<http://www.3gpp.org/ftp/Specs/html-info/26234.htm>

3GPP TS 26.234, *Transparent end-to-end Packet-switched Streaming Service (PSS); Protocols and codecs*, Release 7

3GPP TS 26.244, *3GPP file format (3GP)*, Release 7

3GPP TS 26.290, *Extended AMR Wideband codec; Transcoding functions*, Release 6 Version 6.3.0, 2005-06-24
<http://www.3gpp.org/ftp/Specs/html-info/26290.htm>

3GPP TS 26.346, *Multimedia Broadcast/Multicast Service (MBMS); Protocols and codecs*, Release 6

3GPP TS 26.346, *Multimedia Broadcast/Multicast Service (MBMS); Protocols and codecs*, Release 7