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Audio, video, and related equipment - Determination of power consumption - Part 2: Signals and media (TA 19)

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Appareils audio, vidéo et matériel connexe - Détermination de la consommation de puissance - Partie 2 : Signaux et supports (TA 19)

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OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
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TITLE:

Audio, video, and related equipment - Determination of power consumption - Part 2: Signals and media (TA 19)

PROPOSED STABILITY DATE: 2027

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**AUDIO, VIDEO, AND RELATED EQUIPMENT –
DETERMINATION OF POWER CONSUMPTION –**

Part 2: Signals and media

FOREWORD

- 101 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising
102 all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international
103 co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and
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133 International Standard IEC 62087-2 has been prepared by technical area 19: Environmental
134 and energy aspects for multimedia systems and equipment, of IEC technical committee 100:
135 Audio, video and multimedia systems and equipment.

136 This edition constitutes a technical revision.

137 This second edition of IEC 62087-2 includes the following significant technical changes with
138 respect to IEC 62087-2:2015:

- 139 - HDR and UHD video test signals have been added.
- 140 - Dynamic box and outline test signals have been added, replacing the static box and
141 outline test signals.
- 142 - All test signals are provided as media files for download from a specified IEC online
143 repository, which replaces previous DVD and Blu-ray media.

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

FDIS	Report on voting
100/xxx/FDIS	100/xxx/RVD

145
146 Full information on the voting for the approval of this standard can be found in the report on
147 voting indicated in the above table.

148 A list of all parts in the IEC 62087 series, published under the general title *Audio, video, and*
149 *related equipment – Determination of power consumption*, can be found on the IEC website.

150 This publication contains multiple test signals downloadable from a specified IEC online
151 repository, as indicated in the list of normative references. These files form an integral part of
152 this standard.

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

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

- 157 • reconfirmed,
- 158 • withdrawn,
- 159 • replaced by a revised edition, or
- 160 • amended.

161

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

163

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.

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166

INTRODUCTION

167 This document identifies test signals to be used to determine power consumption and related
168 characteristics specified in some other parts of the IEC 62087 series.

169 IEC 62087:2008¹ (second edition) added methods for measuring On (average) mode power
170 consumption of televisions, based on three video signal sets. These include static, dynamic
171 broadcast-content, and Internet-content signals.

172 IEC 62087:2011² (third edition) revised methods for measuring power consumption of set top
173 boxes. The signals and media were not changed in this third edition.

174 IEC 62087-2:2015³ (first edition) separates signals and media that are to be used for
175 determining power consumption and related characteristics into a dedicated part. The three
176 original video signal sets (static, dynamic broadcast-content, and Internet-content) are not
177 changed. This edition adds signals for the purpose of determining the peak luminance ratio that
178 is sometimes associated with television power consumption measurement programs.

179 This second edition of IEC 62087-2 adds HDR and UHD video test signals and dynamic box
180 and outline test signals for TV power consumption testing. All test signals are available from a
181 specified IEC online repository for download, replacing former physical media distribution.

182 IEC 62087 series currently consists of the following published parts:

183 – Part 1: General

184 – Part 2: Signals and media

185 – Part 3: Television sets

186 – Part 4: Video recording equipment

187 – Part 5: Set top boxes

188 – Part 6: Audio equipment

189 – Part 7: Computer monitors

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¹ IEC 62087:2008, *Methods of measurement for the power consumption of audio, video and related equipment*

² IEC 62087:2011, *Methods of measurement for the power consumption of audio, video and related equipment*

³ IEC 62087-2:2015, *Audio, video, and related equipment – Determination of power consumption, Part 2: Signals and media*

AUDIO, VIDEO, AND RELATED EQUIPMENT – DETERMINATION OF POWER CONSUMPTION –

Part 2: Signals and media

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200 1 Scope

201 This part of IEC 62087 specifies signals used in determination of the power consumption of
202 audio, video, and related equipment, such as television sets and computer monitors. It also
203 specifies signals for determining the peak luminance ratio that is sometimes associated with
204 television power consumption measurement programs. In addition, this part specifies
205 equipment, interfaces, and accuracy related to signal generation.

206 2 Normative references

207 The following documents are referred to in the text in such a way that some or all of their content
208 constitutes requirements of this document. For dated references, only the edition cited applies.
209 For undated references, the latest edition of the referenced document (including any
210 amendments) applies.

211 IEC 60107-1:1997, *Methods of measurement on receivers for television broadcast trans-*
212 *missions – Part 1: General conditions – Measurements at radio and video frequencies*

213 IEC 60268-1:1985, *Sound system equipment – Part 1: General*

214 IEC 60268-1:1985/AMD1:1988-01

215 IEC 60268-1:1985/AMD2:1988-06

216 IEC 60315-1:1988, *Methods of measurement on radio receivers for various classes of emission.*
217 *Part 1: General considerations and methods of measurement, including audio-frequency*
218 *measurements*

219 IEC 60315-3:1989+AMD1:1999 CSV, *Methods of measurement on radio receivers for various*
220 *classes of emission - Part 3: Receivers for amplitude-modulated sound-broadcasting emissions*

221 IEC 60315-4:1997, *Methods of measurement on radio receivers for various classes of emission*
222 *- Part 4: Receivers for frequency-modulated sound broadcasting emissions*

223 IEC 60958-1:2008, *Digital audio interface – Part 1: General*

224 IEC 60958-1:2008/AMD1:2014

225 IEC 60958-3:2006, *Digital audio interface – Part 3: Consumer applications*

226 IEC 60958-3:2006/AMD1:2009

227 IEC 61938:2013, *Multimedia systems – Guide to the recommended characteristics of*
228 *analogue interfaces to achieve interoperability*

229 IEC 62087-1:2015, *Audio, video, and related equipment – Determination of power*
230 *consumption – Part 1: General*

231 IEC online repository with signals and media for the IEC 62087 series at
232 <https://www.iec.ch/tc100/supportingdocuments>

233 IEC 62216:2009, *Digital terrestrial television receivers for the DVB-T system*

234 Recommendation ITU-R BT.2100-2: 2018, *Image parameter values for high dynamic range*
235 *television for use in production and international programme exchange*

236 **3 Terms, definitions, and abbreviations**

237 **3.1 Terms and definitions**

238 For the purposes of this document, the terms and definitions given in IEC 62087-1:2015 as well
239 as in the following apply.

240 ISO and IEC maintain terminological databases for use in standardization at the following
241 addresses:

- 242 • ISO Online browsing platform: available at <https://www.iso.org/obp>
- 243 • IEC Electropedia: available at <http://www.electropedia.org/>

244 **3.1.1**

245 **average picture level**

246 **APL**

247 average level of all the pixels of a single video signal frame or a group thereof in the linear
248 luminance domain

249 EXAMPLE Display equipment such as television sets or computer monitors that internally use linear encoding after
250 undoing the non-linearity of the input signal.

251 **3.1.2**

252 **backlit display**

253 display that generates light from a source behind the display panel

254 EXAMPLE Liquid-crystal display (LCD)

255 **3.1.3**

256 **component analogue video**

257 baseband analogue video interface that carries a standard or high definition colour video signal
258 over three signal lines

259 Note 1 to entry: See CTA-770.3-E R-2017.

260 **3.1.4**

261 **composite analogue video**

262 baseband analogue video interface that carries a standard definition colour video signal over a
263 single signal line

264 Note 1 to entry: See SMPTE ST 170M:2004 for the 59,94 Hz version and ITU-R BT.470-5 for the 50 Hz version.

265 **3.1.5**

266 **digital visual interface**

267 **DVI**

268 video interface that can carry analogue or digital uncompressed video

269 **3.1.6**

270 **DisplayPort**

271 digital display interface developed by the Video Electronics Standards Association

272 **3.1.7**

273 **emissive display**

274 display that generates light directly from each sub-pixel

275 EXAMPLE PDP or OLED displays

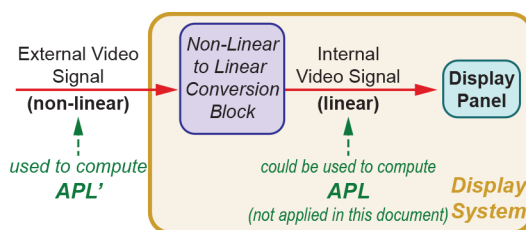
276 **3.1.8**
 277 **average picture level based on non-linear input signal**
 278 **APL'**

279 average level of all pixels of a single video signal frame or a group thereof in the non-linear
 280 luminance domain

281 EXAMPLE Display equipment such as television sets or computer monitor receive input signals that encode
 282 luminance or brightness in a non-linear way. Examples for such non-linear encoding are PQ (absolute luminance) or
 283 HLG (brightness) EOTFs (ITU-R BT.2100-2).

284 Note 1 to entry: APL' is defined as a percentage of the range between reference black and reference white level.

285 Note 2 to entry: This is not a measure of the linear signal that might be available inside of some display equipment
 286 and delivered to the display device. The properties and their differences of the external and internal video signals
 287 are shown in Figure 1.



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289 **Figure 1 – Occurrence of linear and non-linear signal encodings in context of a typical**
 290 **display processing pipeline and how they can be used to compute APL and APL'**

291 **3.1.9**
 292 **hybrid log-gamma**
 293 **HLG**

294 one set of transfer functions offering a degree of backwards compatibility by more closely
 295 matching the previously established television transfer curves

296 Note 1 to entry: Sets of transfer functions related to HDR signals are specified in Rec. ITU-R BT.2100-2.

297 Note 2 to entry: HLG is used both as a description of a dedicated transfer function and as a video format name.

298 **3.1.10**
 299 **high dynamic range video**
 300 **HDR video**

301 capability of components in a video pipeline to capture, process, transport or display luminance
 302 levels and tone gradations that exceed capabilities of conventional SDR imaging pipelines
 303 components

304 EXAMPLE An HDR video signal typically uses a greater bit depth, luminance and colour volume than standard
 305 dynamic range (SDR) video. It also typically utilizes different tone curves such as perceptual quantizer (PQ) or hybrid
 306 log gamma (HLG) as specified in ITU-R BT.2100 instead of gamma, as used with SDR. When the HDR video signal
 307 is rendered on an HDR display, it is possible to see greater luminance ranges and wider colour gamut

308 Note 1 to entry: HDR video can provide an enhanced viewer experience and can more accurately reproduce scenes
 309 that include, within the same image, deep dark areas, and bright highlights, such as emissive light sources and
 310 reflections.

311 **3.1.11**
 312 **high definition**
 313 **HD**

314 spatial video resolution ranging from 1 280 × 720 to 1 920 × 1 080

315 **3.1.12**
 316 **ultra high definition**
 317 **UHD**
 318 **Ultra HD**
 319 spatial video resolution above 1 920 × 1 080

320 **3.1.13**
 321 **universal serial bus**
 322 **USB⁴**
 323 digital interface that can be used to connect storage media and peripherals to digital devices
 324 like computers and TVs

325 Note 1 to entry: See USB specification.

326 **3.1.14**
 327 **high definition multimedia interface**
 328 **HDMI⁵**
 329 audio-visual interface that is capable of carrying uncompressed video data, compressed or
 330 uncompressed digital audio data, and other information

331 Note 1 to entry: See HDMI specification.

332 **3.1.15**
 333 **luma**
 334 **Y'**
 335 gamma-corrected video signal that represents brightness

336 **1.1.1**
 337 **standard dynamic range video**
 338 **SDR video**
 339 capability of components in a video pipeline to capture, process, transport or display luminance
 340 levels and tone gradations that can be characterized by the dynamic range, colour rendering
 341 and tone gradation capabilities essentially compatible with cathode ray tube (CRT) displays

342 EXAMPLE BT.709/BT.1886 and IEC 62966-2-1 (sRGB)

343 **3.1.16**
 344 **S-video**
 345 baseband analogue video interface that carries a standard definition colour video signal using
 346 two signal lines

347 Note 1 to entry: See IEC 60933-5.

348 **3.2 Abbreviations**

349 ' Prime (noting that the signal is non-linear, for example APL')

350 AM amplitude modulation

351 AV audio-visual

⁴ USB Implementers Forum, Inc. takes the position that the terms "USB" and "Universal Serial Bus" are generic terms. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the product named. Equivalent products may be used if they can be shown to lead to the same results.

⁵ HDMI[®] and HDMI[®] High-Definition Multimedia Interface are registered trademarks of HDMI Licensing Administrator, Inc. This information is given for the convenience of users of this document and does not constitute an endorsement by IEC of the product named. Equivalent products may be used if they can be shown to lead to the same results.