

Edition 2.0 2008-10

INTERNATIONAL STANDARD

Methods of measurement for the power consumption of audio, video and related equipment





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INTERNATIONAL STANDARD

Methods of measurement for the power consumption of audio, video and related equipment

INTERNATIONAL ELECTROTECHNICAL COMMISSION



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

METHODS OF MEASUREMENT FOR THE POWER CONSUMPTION OF AUDIO, VIDEO AND RELATED EQUIPMENT

FOREWORD

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International Standard IEC 62087 has been prepared by by technical area 1: Terminals for audio, video and data services and contents of IEC technical committee 100: Audio, video and multimedia systems and equipment.

This second edition cancels and replaces the first edition, published in 2002 and constitutes a technical revision.

The main changes with respect to the previous edition are listed below.

- Clause 2 is expanded to include references to video content to be used for On (average) mode measurements.
- Clause 3 is expanded to include additional definitions and abbreviations.
- Clause 4 is expanded to include On (average) mode for measuring average television power consumption.
- Clause 5 is modified to require reporting of the power supply voltage and frequency, and the ambient temperature. Clause 5 also includes updated requirements regarding the power measurement instrument.
- Subclause 6.7 is updated to indicate that is it maintained for backward compatibility.

- Clause 11 is newly added. It describes the methods for measuring On (average) mode television power.
- Annex B is newly added. It describes considerations for measuring On (average) mode television power.
- Annex C is newly added. It describes the video signals to be used for measuring On (average) mode television power.

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

CDV	Report on voting
100/1331/CDV	100/1424/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.

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.

INTRODUCTION

This standard specifies methods of measurement for the power consumption of television sets, video recording equipment, Set Top Boxes, audio equipment and multi-function equipment for consumer use.

This edition adds methods for measuring On (average) mode power consumption of television sets as defined in Clause 11. The power consumption of many televisions varies depending upon the video signal being displayed. Clause 11 includes three different video signals: static, dynamic broadcast-content, and Internet-content. For information about the three video signals and guidance on which signal(s) to use, see Annex C.

For additional considerations regarding average television power consumption, see Annex B.

METHODS OF MEASUREMENT FOR THE POWER CONSUMPTION OF AUDIO, VIDEO AND RELATED EQUIPMENT

1 Scope

This International Standard specifies methods of measurement for the power consumption of television sets, video recording equipment, Set Top Boxes (STBs), audio equipment and multi-function equipment for consumer use. Television sets include, but are not limited to, those with CRT, LCD, PDP or projection technologies.

Moreover the different modes of operation which are relevant for measuring power consumption are defined.

The methods of measurement are only applicable for equipment which can be connected to the mains.

The measuring conditions in this standard represent the normal use of the equipment and may differ from specific conditions, for example as specified in safety standards.

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 60107-1:1997, Methods of measurement on receivers for television broadcast transmissions – Part 1: General conditions – Measurements at radio and video frequencies

IEC 61938:1996, Audio, video and audiovisual systems – Interconnections and matching values – Preferred matching values of analogue signals

EN 50049-1, Domestic and Similar Electronic Equipment Interconnection Requirements: *Peritelevision Connector*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

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

3.1.1

additional functions

functions that are not required for the basic operation of the device

NOTE In the case of a television set, examples of additional functions include, but are not limited to, a VCR unit, a DVD unit, a HDD unit, a FM-radio unit, a memory card-reader unit, or an ambient lighting unit.

3.1.2

audio equipment

stand-alone equipment or a system of separable or non-separable components for one or more audio functions

3.1.3

conditional access module

a plug-in module that enables reception of program material or a service that is protected

3.1.4

gamma-corrected average picture level (APL')

the average luma (Y') level of the external video input signal applied to the television set. APL' is measured during the active scanning time integrated over a frame period; defined as a percentage of the range between reference black and reference white level

NOTE This is not a measure of the inverse gamma-corrected signal that might be available inside a television set and delivered to the display device. The external and internal video signals are shown in Figure 1.



Figure 1 – Gamma-corrected average picture level (APL')

3.1.5 luma (Y')

a gamma-corrected video signal that represents brightness

NOTE The external video signals that interface with a television are typically gamma-corrected.

3.1.6

multi-function equipment

combination of equipment with two or more functions in one unit

3.1.7

plug-in module

a device that plugs into the television set and provides additional functionality

3.1.8

point of deployment module

a conditional access module for digital cable signal reception

3.1.9

radio receiver

appliance for the reception of sound broadcast and similar services for terrestrial, cable and satellite transmissions of analogue or digital signals

3.1.10

set top box (STB)

appliance which performs a function which is not included in the main receiver such as the reception of digital signals or of satellite signals

3.1.11 special functions

functions that are related to, but not required for, the basic operation of the device

NOTE In the case of a television set, examples of special functions include, but are not limited to, special sound processing, power saving functions (e.g. automatic brightness control).

3.1.12

television set (TV)

appliance for the display and possible reception of television broadcast and similar services for terrestrial, cable, satellite and broadband network transmission of analogue and/or digital signals

NOTE A television set may include additional functions that are not required for its basic operation.

3.1.13

video recording equipment

appliance for the recording and reproduction of video and audio signals on a recording medium, for example a Video Cassette Recorder (VCR) or a Digital Versatile Disc (DVD) player or recorder

NOTE Appliances with only playback function are included as well.

3.2 Abbreviations

For the purposes of this International Standard, the following abbreviations apply.

,	Prime
AC/DC	Alternating Current/Direct Current
APL'	Gamma-Corrected Average Picture Level
BD	Blu-ray Disc ^{™ 1}
CRT	Cathode Ray Tube
DVD	Digital Versatile Disc
FM	Frequency Modulation
IF	Intermediate Frequency
HDD	Hard Disk Drive
LCD	Liquid Crystal Display
LNB	Low Noise Broadband unit
MPEG-2	Moving Picture Experts Group
PDP	Plasma Display Panel
PS	Power Supply unit
RF	Radio Frequency
rms	Root Mean Square
STB	Set Top Box
SW	Switch unit
TV	Television set
VCR	Video Cassette Recorder

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4 Specification of operating modes

Mode	тv	Video recording equipment (e.g. VCR)	STB	Audio equipment
Disconnected	The appliance is disconnected from all external power sources	The appliance is disconnected from all external power sources	The appliance is disconnected from all external power sources	The appliance is disconnected from all external power sources
Off	The appliance is connected to a power source, produces neither sound nor picture and cannot be switched into any other mode with the remote control unit, an external or internal signal	The appliance is connected to a power source, does not perform any mechanical function (e.g. playing, recording) and cannot be switched into any other mode with the remote control unit, an external or internal signal	The appliance is connected to a power source, fulfils no function and cannot be switched into any other mode with the remote control unit, an external or internal signal	The appliance is connected to a power source, does neither produce sound nor performs any mechanical function (e.g. playing, recording) and cannot be switched into any other mode with the remote control unit, an external or internal signal
Standby- passive	The appliance is connected to a power source, produces neither sound nor picture but can be switched into another mode with the remote control unit or an internal signal	The appliance is connected to a power source, does not perform any mechanical function (e.g. playing, recording), does not produce video or audio output signals but can be switched into another mode with the remote control unit or an internal signal	The appliance is connected to a power source, does not fulfil the main function but can be switched into another mode with the remote control unit or an internal signal	The appliance is connected to a power source, produces neither sound nor performs any mechanical function (e.g. playing, recording) but can be switched into another mode with the remote control unit or an internal signal
Standby- active, low	and can additionally be switched into another mode with an external signal	and can additionally be switched into another mode with an external signal	and can additionally be switched into another mode with an external signal	and can additionally be switched into another mode with an external signal
Standby- active, high	and is exchanging/ receiving data with/from an external source	and is exchanging/ receiving data with/from an external source	and is exchanging/ receiving data with/from an external source	and is exchanging/ receiving data with/from an external source
On (play)	The appliance is connected to a power source and produces sound and picture. This mode is maintained for backward compatibility.	The appliance is connected to a power source and plays the tape or disc inside the appliance	The appliance is connected to a power source and fulfils its main function	The appliance is connected to a power source and is performing one or more of the following modes: produce sound, wake-up signal, or play a tape or disc

Table 1 – Operating mode



Not all equipment can be switched in each mode.

Video Cassette Recorders and STBs normally provide RF feed-through in standby and active modes; sometimes this feed-through is maintained in the off-mode.

The terms "internal" and "external" as used in this table refer to the appliance as it is delivered to the user.

5 General method of measurement

5.1 General measuring conditions

5.1.1 Power supply

Measurements shall be carried out using a power supply providing the nominal voltage and frequency of the region. The voltage and frequency used during the power measurement shall be described in the report.

The fluctuation of the voltage supplied during the tests shall not exceed ± 2 %. The frequency fluctuation and the harmonic components of the supplied power shall not exceed ± 2 % and 5 % respectively.

5.1.2 Environmental conditions

Ambient temperature 15 °C to 35 °C, preferably 20 °C, unless otherwise specified in this standard. The ambient temperature shall be described in the report.

5.1.3 Adjustment of controls

The controls not specifically mentioned in this standard shall be in the position adjusted by the manufacturer for shipment to the end user. These controls shall remain in this state for the duration of the test.

5.1.4 Input signals

For equipment for which the input signals are not explicitly described in this standard, the nominal signals as specified by the manufacturer shall be applied during the test. The input signals used shall be described in the report.

5.1.5 **Power measurement instrument**

The measurement shall be carried out directly by means of a wattmeter, a wattmeter with averaging function, or a watthour meter by dividing the reading by the measuring time. For television sets, in the case that the input video signal varies over time, a wattmeter without an averaging function shall not be used to carry out the measurement.

The sampling rate of the watthour meter or wattmeter with averaging function should be high enough to achieve an accurate measurement.

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The power measurement instrument used shall measure the real power consumed regardless of the power factor of the device under test.

Measurements of power of 0,5 W or greater shall be made with an uncertainty of less than or equal to 2 % at the 95 % confidence level. Measurements of power of less than 0,5 W shall be made with an uncertainty of less than or equal to 0,01 W at the 95 % confidence level. The power measurement instrument shall have a resolution of:

- 0,01 W or better for power measurements of 10 W or less;
- 0,1 W or better for power measurements of greater than 10 W up to 100 W;
- 1 W or better for power measurements of greater than 100 W.

For equipment connected to more than one phase, the power measurement instrument shall be equipped to measure total power of all phases connected.

NOTE 1 In the case of standby mode power measurement, it should be ascertained that the wattmeter or the watthour meter is suitable to measure the power consumption of power supplies working in a burst mode with a low duty cycle and the low power consumption levels in the standby modes.

NOTE 2 For digital power meters a sampling rate of at least 10 kHz is recommended. ("Sampling rate" in many specifications refers to how often the display is updated, and not the actual sampling frequency of the input waveform.) Most digital power meters are believed to meet this requirement. If it is not listed in the manufacturer's specifications, contact the manufacturer.

NOTE 3 For more information about the determination of uncertainty of measurement, refer to IEC 62301:2005, Annex D.

5.2 General measurement procedure

The following measurement procedure shall be used, unless otherwise specified in this standard.

Measure the power consumption of the appliance at a time not less than 15 minutes after it has been switched into the relevant operating mode.

If the power consumption in a certain operating mode has more than one stable level, the measuring time shall be of an appropriate duration to measure the correct average value.

Some appliances switch, after a time delay, from a standby mode to a mode with a lower (or zero) power consumption. The power consumption before and after the switching shall be determined.

For equipment with less functionality than described, for example playback tape equipment, only the relevant parts of the measuring conditions have to be considered.

The results shall be given in watts (W), with a number of relevant digits in accordance with the accuracy of the measurement.

NOTE If in the measuring conditions, the standby mode is mentioned without further specification, the standby modes as defined in Clause 4 are referred to.

6 Measuring conditions for television sets, excluding On (average) mode

6.1 Input signal

RF or baseband.

If an RF input is available, this shall be used.

6.2 RF input signal

At a level to provide a sufficiently noise-free or error-free picture.

6.3 Baseband input signal level

According to EN 50049-1.

6.4 Video test signal

Three vertical bar signal (see 3.2.1.3 of IEC 60107-1:1997).

6.5 Audio test signal(s)

Sine-wave signals at a frequency of 1 kHz, or if 1 kHz cannot be used, signals at the centre frequency of the transfer range, as specified by the manufacturer.

6.6 Loading of terminals

The loudspeaker terminals should be terminated with the minimum impedance as specified by the manufacturer.

6.7 On (play) mode

NOTE On (play) mode remains from the previous version (IEC 62087:2002, see Bibliography) for backward compatibility. For measuring television set power consumption, On (average) mode, defined in Clause 11, is recommended.

Contrast and brightness are adjusted to obtain the luminance values as specified in 3.6.2 of IEC 60107-1:1997.

If the levels cannot be adjusted to the stated values, the actual values shall be described in the report.

If this setting is not practicable, a setting defined by the manufacturer shall be used. The actual setting shall be listed in the measuring report.

Volume control adjusted to obtain 50 mW at the loudspeaker terminals. In case of TVs with surround sound facility, only the front speaker terminals shall be loaded.

Television sets with wide screen display shall be measured in the wide screen mode.

6.8 Standby mode

Only those conditions apply which are relevant for the standby mode.

6.9 Off mode

Only those conditions apply which are relevant for the off mode.

7 Measuring conditions for video recording equipment

7.1 Input signal

RF or baseband.

If an RF input is available, this shall be used.

7.2 RF input signal

At a level to provide a sufficiently noise-free or error-free picture at play-back.

7.3 Baseband input signal level

According to EN 50049-1.

7.4 On mode

Record or playback mode with tape or disc specified by the manufacturer at standard speed.

7.5 Standby mode

Only those conditions apply which are relevant for the standby mode.

7.6 Off mode

Only those conditions apply which are relevant for the off mode.

8 STB

8.1 Measuring conditions for STB for digital cable transmissions or digital terrestrial broadcast transmissions

8.1.1 Input signal

RF.

8.1.2 RF input signal

At a level within the operating range of the receiver.

8.1.3 Video test signal

Three vertical bar signal (see 6.4).

8.1.4 Audio test signal(s)

1 kHz sine-wave signals.

8.1.5 On mode

Decoding one program with the video and audio test signals as described within the MPEG-2 transport stream or as received from a broadcast transmission.

8.1.6 Standby mode

Only those conditions apply which are relevant for the standby mode.

8.1.7 Off mode

Only those conditions apply which are relevant for the off mode.

8.2 STB for analogue and digital satellite broadcast

8.2.1 General

Satellite receivers may contain a dish positioner in order to receive signals from satellites at different orbital positions. However dish positioners are generally used for a very short period of time and are not considered to contribute significantly to the power consumption of satellite receivers. So here only the power consumption of the receiver itself and the connected low noise block converter(s) (LNBs) are considered.

8.2.2 Measuring conditions

8.2.2.1 Peripheral equipment

Tested with manufacturer supplied LNB at its highest consumption selection or if an LNB is not supplied then an LNB equivalent load of 150 mA is connected for the measurement.

8.2.2.2 Input signal

IF.

8.2.2.3 IF input signal

At a level within the operating range of the receiver.

8.2.2.4 Video test signal

Three vertical bar signal (see 6.4).

8.2.2.5 Audio test signal(s)

1 kHz sine-wave signals.

8.2.2.6 On mode (analogue STB)

Video and audio test signals as described.

8.2.2.7 On mode (digital STB)

Decoding one program with the described video and audio test signals within the MPEG-2 transport stream or as received from a broadcast transmission.

8.2.2.8 Standby mode

Only those conditions apply which are relevant for the standby mode.

8.2.2.9 Off mode

Only those conditions apply which are relevant for the off mode.

9 Audio equipment

9.1 General

Considered are audio products which are connected to the mains as shown in Figure 2.





Figure 2a – Separate components

Subunit		
Subunit	<u> </u>	AC/DC coupled
Main unit		— Mains
		IEC 848/02

Figure 2b – Systems (non separable components)



Figure 2c – Systems (separable components)

PS Power supply

SW Switch unit, operated by the standby control unit

Figure 2 – Possible configurations of audio equipment

9.2 Measuring conditions

9.2.1 Input signal

RF or baseband.

If a radio receiver is part of the equipment, the RF input shall be used.

9.2.2 RF input signal

At a level to provide a sufficiently noise free audio signal.

9.2.3 Auxiliary input signal

According to IEC 61938.

9.2.4 Reproduction of tape or disc

Pre-recorded signal.

9.2.5 Audio test signals

Sine-wave signals at a frequency of 1 kHz, or if 1 kHz cannot be used, signals at the centre frequency of the transfer range, as specified by the manufacturer shall be used.

9.2.6 Loading of terminals

All loudspeaker terminals should be terminated with the minimum impedance as specified by the manufacturer.

9.2.7 Output level

The volume control shall be adjusted to obtain 50 mW at the loudspeaker terminals. In the case of equipment with surround sound facility, only the front speaker terminals shall be loaded.

9.2.8 On modes to be considered

Separate components: to perform the main function.

Systems: with RF input if available and with playback of recorded material.

9.2.9 Standby mode

Only those conditions apply which are relevant for the standby mode.

9.2.10 Off mode

Only those conditions apply which are relevant for the off mode.

10 Multi-function equipment

10.1 General

In this clause, the measuring conditions of two types of multi-function equipment are described. In the case of a television set with additional functions, the On (average) mode shall be tested according to Clause 11.

Measuring conditions for other types of multi-function equipment can be defined accordingly. These conditions shall be described in the report.

Various operating modes for multi-function equipment can be distinguished, of which only the most relevant ones have to be measured.

10.2 Measuring conditions for TV-VCR combination

тν	VCR	
Standby-passive	Standby-passive	See Clauses 6 and 7
On (play)	Standby-passive	See Clauses 6 and 7
On (play)	On	See Clause 6. VCR in play mode reproducing the video and audio test signals as described in 6.4 and 6.5
Standby-passive	On	See Clauses 6 and 7
Standby-passive	Standby-active, low	See Clauses 6 and 7
Off	Off	See Clauses 6 and 7

10.3 TV-STB combinations

10.3.1 General

Television sets with built-in reception facilities for digital signals from cable systems and/or terrestrial broadcast are considered to be television sets and measured according to Clause 11 for the On (average) mode and according to Clause 6 for the modes indicated in 10.3.2.

10.3.2 Measuring conditions for TV-satellite receiver combination

TV	Satellite receiver	
Standby-passive	Standby-passive	See Clauses 6 and 8.2.2
On (play)	Standby-passive	See Clauses 6 and 8.2.2

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On (play)	On	See Clauses 6 and 8.2.2, the television set reproducing the video and audio signals from the satellite receiver
Standby-active, low	Standby-active, low	See Clauses 6 and 8.2.2
Off	Off	See Clauses 6 and 8 2 2

NOTE This subclause remains from the previous version (IEC 62087:2002, see Bibliography) for backward compatibility. For measuring television set power consumption, On (average) mode, defined in Clause 11, is recommended.

11 Measuring conditions for television sets in On (average) mode

11.1 Video signals

The average power consumption of the television set shall be tested with either the static, dynamic broadcast-content, or Internet-content video signals, defined below. The type of signals used during the measurement shall be described in the report.

NOTE See Annex C for more information regarding video signals.

11.2 Input terminals

11.2.1 Input terminal selection

On (average) mode television set power consumption shall be measured with the audio and video test signals applied to one set of input terminals, and that set of input terminals shall be selected as the source for sound and picture generation by the television set. The selected input terminal(s) used during the measurement shall be described in the report.

NOTE See Clause B.2 for more information regarding input terminals.

11.2.2 Analogue terrestrial input terminal

In the case that the television set is being tested with an analogue terrestrial RF input signal, the signals used shall conform to IEC 60107-1:1997, 3.3, and shall have the input signal level set at -39 dB(mW) when terminated with a 75 Ω resistor or at a level to provide a perceptually noise free or error free picture.

NOTE -39 dB(mW) corresponds to 70 dB(μ V).

11.2.3 Cable television input terminal

In the case that the television set is being tested with a cable television RF input signal, the signals used shall conform to the cable television specifications for the region, and shall have the input signal level set at -49 dB(mW) when terminated with a 75 Ω resistor or at a level to provide a perceptually noise free or error free picture.

NOTE -49 dB(mW) corresponds to 60 dB(μ V).

11.2.4 Digital terrestrial input terminal

In the case that the television set is being tested with a digital terrestrial RF input signal, the signals used shall conform to the broadcast specifications for the region, and shall have the input signal level set at -49 dB(mW) with a termination of 75 Ω resistor or at a level to provide a perceptually noise free or error free picture.

11.2.5 Satellite input terminal

In the case that the television set is being tested with a satellite input, the input signal level shall be set at -49 dB(mW) with a termination of 75 Ω resistor or at a level to provide a perceptually noise free or error free picture.

11.2.6 Other input terminals

Signals provided to other inputs of the television set shall conform to the specifications for those inputs.

11.3 Audio test signal(s)

Sine-wave signals at a frequency of 1 kHz, or if 1 kHz cannot be used, signals at the centre frequency of the transfer range, as specified by the manufacturer. For digital inputs the level of the signal shall be 18 dB below full scale. For analogue inputs the signal shall be 20 dB below reference level or greater with a suggested signal level of 500 mV rms.

11.4 General measurement procedure for On (average) mode

11.4.1 Environmental conditions

For subclauses 11.6 and 11.7, the ambient temperature shall be 23 $^\circ\text{C}$ \pm 5 $^\circ\text{C}.$

NOTE In order to maximize compatibility with the power measurement method specified in the Energy Conservation Law in Japan, the temperature range for subclause 11.5 is defined in 5.1.2.

11.4.2 Stabilization

The measurements shall be performed after the television set has achieved a stable condition with respect to power consumption.

For subclause 11.5, the measurement shall be made before activation of an image retention prevention feature or any other state which cannot be disabled that interrupts the normal operation of the television set.

For subclauses 11.6 and 11.7, the measurements shall be made after the television set has been in the Off or Disconnected mode for a minimum of one hour immediately followed by a minimum of one hour in the On mode and shall be completed before a maximum of three hours in the On mode. The relevant video signal shall be displayed during the entire On mode duration. For television sets that are known to stabilize within one hour, these durations may be reduced if the resulting measurement can be shown to be within 2 % of the results that would otherwise be achieved using the durations described herein.

NOTE The stabilization procedure for subclause 11.5 is for use with static input signals, and is intended to maximize compatibility with the power measurement method specified in the Energy Conservation Law in Japan. The stabilization procedure for subclauses 11.6 and 11.7 is for use with dynamic input signals, and is intended to balance repeatability and cost.

11.4.3 Satellite feature

If the television set includes a satellite dish LNB power supply, it shall be turned off, if possible, during the measurement process.

11.4.4 Plug-in module

No plug-in module, such as a conditional access module or a point of deployment module, shall be connected to the television set during the measurement, unless the television set is shipped to the end customer already connected to an included plug-in module. In that case the plug-in module shall remain connected during the measurement.

11.4.5 Additional functions

Additional functions shall be turned off during the measurement process in the cases that those functions can be turned on and off by the end user.

11.4.6 Special functions

Special functions not mentioned in Clause 11 shall be in the position adjusted by the manufacturer for shipment to the end user.

11.4.7 Power saving functions

On (average) mode power consumption measurements shall be made with the Automatic Brightness Control power saving function, if such a function exists, made inactive. If the Automatic Brightness Control power saving function exists and cannot be made inactive, then the nominal measurements shall be performed with the light entering directly into the ambient light sensor at a level of 300 lux or greater.

A separate measurement may be made to determine the power savings related to an Automatic Brightness Control power saving function. (See 11.5.7, 11.6.3 and 11.7.3.) An additional measurement may be made to determine the power savings related to other power saving functions that were not enabled by default during the measurement of On (average) mode power consumption. (See 11.5.8, 11.6.4 and 11.7.4.)

NOTE See Clause B.3 for more information regarding power saving functions.

11.4.8 Picture level adjustments

The contrast and brightness of the television set and the backlight level, if it exists, shall be set as originally adjusted by the manufacturer to the end user. In the case that a setting mode must be chosen on initial activation, the "standard mode" or equivalent shall be chosen. In the case that no "standard mode" or equivalent exists, the first mode listed in the on-screen menus shall be selected. The mode used during the test shall be described in the report.

"Standard mode" is defined as "recommended by the manufacturer for normal home use."

NOTE See Clause B.4 for more information regarding picture level adjustments.

11.4.9 Video aspect ratio

The television set shall be set in a mode such that the active area of the video input signal fills the entire screen.

11.4.10 Video format

The frame rate of the video input signal should match the frame rate most commonly used in the region.

For inputs that are capable of receiving a high definition format signal, a high definition source should be used.

The resolution and frame rate of the input signal shall be described in the report.

NOTE In the US and Japan a 60 Hz frame rate is used; in Europe and Australia a 50 Hz frame rate is used.

11.4.11 Sound level adjustments

The volume control shall be adjusted to a level at which the sound output is audible.

NOTE One method of ensuring an audible sound level would be to set the volume control to obtain 50 mW at the speaker terminals.

11.4.12 Accuracy of input signal levels

Analogue input signals provided by the signal generating device shall be accurate within 2 % of the full range of the video signal when terminated with a 75 Ω load. The accuracy of the

black and white levels shall be confirmed with the three bar signal of 11.5.5. The accuracy of the colour levels shall be confirmed with the full field colour bar signal of 11.5.4. The accuracy may be confirmed with an oscilloscope, waveform monitor, vector scope or other appropriate measurement device.

Digital input signal levels should be accurate within the resolution of the signal source equipment used.

NOTE In addition to the three bar and full field colour bar signals, the 60 Hz DVD and Blu-ray discs attached to the present standard include the SMPTE colour bar signal (SMPTE Engineering Guideline EG 1-1990) for the user's convenience.

11.5 On (average) mode testing using static video signals

11.5.1 Measurements using static video signals

This mode is used for measuring average TV power consumption using static test signals, which are widely available.

This subclause includes four video signals for use during the On (average) mode measurement in the static video signal case.

11.5.2 Black level video signal

In this case the entire part of the signal representing the active picture shall be black (0 %), as defined in IEC 60107-1:1997, 3.2.1.5.

11.5.3 White level video signal

In this case the entire part of the signal representing the active picture shall be white (100 %), as defined in IEC 60107-1: 1997, 3.2.1.5.

11.5.4 Full field colour bar video signal

In this case the active part of the signal shall be a full field colour bar signal. For 50 Hz systems, the (100/0/75/0) colour bar signal for PAL and SECAM receivers as defined in IEC 60107-1:1997, 3.2.1.2 shall be used. In the case of a 60 Hz system the top section of the (75/0/75/0) colour bar signal for NTSC defined in IEC 60107-1:1997, 3.2.1.2 shall be used and shall cover the full field of the display.

NOTE The 50 Hz signal has eight bars (including black), and the 60 Hz signal has seven bars (white, yellow, cyan, green, magenta, red and blue, in this order).

11.5.5 Three bar video signal

In this case the active picture area of the signal shall be three bars of white (100 %) over a black (0 %) background as defined in IEC 60107-1:1997, 3.2.1.3.

11.5.6 *P*_{o static}: On (average) mode power consumption using static signals

For the static video signal case the On-mode power consumption of the television shall be determined as follows:

$$P_{\rm o \ static} = ((P_{\rm b} + P_{\rm w})/2 + P_{\rm c} + P_{\rm t})/3$$

where

 $P_{o static}$ is the On (average) mode power consumption using static signals (W);

 $P_{\rm b}$ is the power measured using the black video signal (W);

 $P_{\rm W}$ is the power measured using the white video signal (W);

 $P_{\rm c}$ is the power measured using the full field colour bar video signal (W);

 $P_{\rm t}$ is the power measured using the three bar video signal (W).

11.5.7 P_{a1_static} : Power savings related to automatic brightness control, using static signals

For the static video signal case, the power savings related to an automatic brightness control function shall be determined as follows:

$$P_{a1_static} = P_c - P_{abc_static}$$

where

- *P*_{a1_static} is the power savings related to automatic brightness control, using static signals (W);
- $P_{\rm c}$ is the power measured using the full field colour bar video signal (W);
- *P*_{abc_static} is the power measured with automatic brightness control function in effect, using the full field colour bar video signal (W).

 $P_{\rm abc_static}$ is measured using the full field colour bar video signal, with the automatic brightness control function made active with 0 lux entering the ambient light sensor

11.5.8 *P*_{a2_static}: Power savings related to other power saving functions, using static signals

For the static video signal case, the savings related to other power saving functions not enabled by default shall be determined as follows:

$$P_{a2_static} = P_c - P_{other_static}$$

where

 P_{a2_static} is the power savings related to other power saving functions, using static signals (W);

*P*_c is the power measured using the full field colour bar video signal (W);

*P*_{other_static} is the power measured with other power saving functions made active, using the full field colour bar video signal (W).

11.6 On (average) mode testing using dynamic broadcast-content video signal

11.6.1 Measurements using dynamic broadcast-content video signal

The full duration of the dynamic broadcast-content video signal is used for measuring TV power consumption when the television is used for viewing typical broadcast TV content. The measurement shall be the average power consumed over ten consecutive minutes.

The dynamic broadcast-content video signal shall be used for stabilization and measurement and shall be generated from one of the video content sources available from IEC in a format compatible with the input under test. (See IEC 62087:2008 video content_DVD_50 through IEC 62087:2008 video content_BD.)² The duration of the video signal is ten minutes.

² These are attached to the present standard for the user's convenience.

NOTE The dynamic broadcast-content video signal varies over time and has a gamma-corrected average picture level (APL') that conforms to an APL' histogram having a mean of 34%. The contents were derived from statistics gathered from measurements of representative television programming in multiple countries as described in Clause C.3.

11.6.2 *P*_{o_broadcast}: On (average) mode power consumption using dynamic broadcastcontent video signal

The television average power consumption shall be measured using the dynamic broadcastcontent test signal to determine

*P*_{o_broadcast}: On (average) mode power consumption using dynamic broadcast-content video signal (W)

11.6.3 *P*_{a1_broadcast}: Power savings related to automatic brightness control, using dynamic broadcast-content video signal

For the dynamic broadcast-content video signal case, the power savings related to an automatic brightness control function shall be determined as follows:

where

P _{a1_broadcast}	is the power savings related to automatic brightness control, using dynamic broadcast-content video signal (W);
Po_broadcast	is the On (average) mode power consumption using dynamic broadcast-content video signal (W);
P _{abc_broadcast}	is the power measured with Automatic Brightness Control in effect, using dynamic broadcast-content video signal (W).

 $P_{abc_broadcast}$ is measured with the automatic brightness control function made active with 0 lux entering the ambient light sensor, using the dynamic broadcast-content video signal.

11.6.4 *P*_{a2_broadcast}: Power savings related to other power saving functions, using dynamic broadcast-content video signal

For the dynamic broadcast-content video signal case, the power savings related to other power saving functions not enabled by default shall be determined as follows:

where

P _{a2_broadcast}	are	the	power	savings	related	to	other	power	saving	functions,	using
_	dynamic broadcast-content video signal (W);										

- *P*_{o_broadcast} is the On (average) mode power consumption using dynamic broadcastcontent video signal (W);
- *P*_{other_broadcast} is the power measured with other power saving functions made active, using dynamic broadcast-content video signal (W).

11.7 On (average) mode testing using Internet-content video signal

11.7.1 Measurements using Internet-content video signal

The full duration of the Internet-content video signal is used for measuring TV power consumption when the television is used for viewing Internet content. The measurement shall be the average power consumed over ten consecutive minutes.

The Internet-content video signal shall be used for stabilization and measurement and shall be generated from video content available from IEC in a format compatible with the input under test. (See Clause 2.) There are 100 images. The images shall be displayed at a rate of six seconds per image for a total duration of ten minutes.

The Internet-content video signal images should be scaled as necessary to cover the entire screen without cropping.

NOTE The Internet-content video signal varies over time and has a gamma-corrected average picture level (APL') that conforms to an APL' histogram described in Clause C.4. The contents were derived from statistics gathered as described in Clause C.4.

11.7.2 *P*_{o_internet}: On (average) mode power consumption using Internet-content video signal

The television average power consumption shall be measured with the Internet-content test signal to determine

 $P_{o_{internet}}$: On (average) mode power consumption using Internet-content video signal (W)

11.7.3 *P*_{a1_internet}: Power savings related to automatic brightness control, using Internet-content video signal

For the Internet-content video signal case, the power savings related to an automatic brightness control function shall be determined as follows:

$$P_{a1_internet} = P_{o_internet} - P_{abc_internet}$$

where

- *P*_{a1_internet} is the power savings related to automatic brightness control, using Internetcontent video signal (W);
- P_{o_internet} is the On (average) mode power consumption using Internet-content video signal (W);
- *P*_{abc_internet} is the power measured with automatic brightness control in effect, using Internet-content video signal (W).

 $P_{abc_{internet}}$ is measured with the automatic brightness control function made active, with 0 lux entering the ambient light sensor, using the Internet-content video signal.

11.7.4 *P*_{a2_internet}: Power savings related to other power saving functions, using Internet-content video signal

For the Internet-content video signal case, the savings related to other power saving functions not enabled by default shall be determined as follows:

P_{a2_internet} = P_{o_internet} - P_{other_internet}

where

- *P*_{a2_internet} is the power savings related to other power saving functions, using Internetcontent video signal (W);
- *P*_{o_internet} is the On (average) mode power consumption using Internet-content video signal (W);
- *P*_{other_internet} is the power measured with other power saving functions made active, using Internet-content video signal (W).

Annex A

(informative)

Verification procedure

A.1 General

Assesses compliance of a specific product with the declared value.

A.2 Verification procedure

To assess compliance of a specific product with the declared value, the *verification procedure* of Figure A.1 should be used.



Figure A.1 – Flowchart verification procedure

The verification procedure is a two step approach: the measured value of one appliance should not exceed the declared value by 15 %. If it does, two extra appliances are measured and the average value of the three measurements is calculated. This average value should not exceed the declared value by 10 %.

NOTE 1 The declared value can be the value of the specific standby energy consumption according to the manufacturer, or a criterion value.

NOTE 2 Measurements according to the test method for the product.

NOTE 3 The average value should be calculated as follows:

$$P_{sb,M} = 1/3 \sum_{i=1}^{3} P_{sb,mi}$$

where

 $P_{sb.mi}$ is the power consumption of measurement i;

 $P_{{}_{sh\,M}}$ is the average power consumption of three measurements.

Annex B

(informative)

Considerations for On (average) mode television set power measurements

B.1 General

This annex applies only to the measurement of television set On (average) mode power consumption.

B.2 Input terminals

Televisions often have many input terminals. Power consumption of the television might vary depending upon the input terminal selected as the video source. The most common input used by television owners might vary by region and over time.

Measuring the power consumed by the television for every input may be costly. One example of an input selection would be to specify that the input terminal selections with maximum and minimum power consumption be measured, and that these be averaged.

For baseband inputs a video disc player may be used. For RF inputs an appropriate encoder and modulator might also be required. Testing the RF inputs is not encouraged, due to the additional complexity and cost.

For best signal level accuracy a digital input should be used. This avoids problems with calibration of analogue signal generating equipment. In the case of analogue video signals, the accuracy of the video output device should be measured. If the device accuracy is not within ± 2 % of the full range, either it should be adjusted, or the signal should be routed through a processing amplifier that is capable of providing a calibrated output.

If, in a given region, a single input terminal type is the most commonly used, it may be sufficient to use only that input for the power measurement. Note that broadcast video might most commonly be viewed via one type of input, while Internet content might most commonly be viewed via a different type of input.

Policy makers are urged to balance accuracy with cost and to consider the most likely use scenarios in their region when determining which input terminals shall be selected during television set On (average) mode power consumption.

B.3 *P*_{os}: On (average) mode power consumption with power saving functions

B.3.1 Weighting of savings due to power saving functions

Many television sets include power saving functions such as automatic brightness control or other power saving functions that can be enabled with a user-controlled switch. The On (average) mode power consumption that considers power saving functions may be determined in the general case as follows:

$$P_{\rm os} = P_{\rm o} - P_{\rm a} \times A_{\rm a}$$

where

 P_{os} is the On (average) mode power consumption with power saving functions (W);

 P_{0} is the On (average) mode power consumption (W);

*P*_a is the power savings related to power saving functions (W);

A_a is the power saving functions weighting factor.

 A_a is a weighting that represents the ratio of the amount of time that the power saving functions are expected to be active relative to the amount of time that the television is expected to be in use. In the case of automatic brightness control, this value would consider the number of hours that the television would be viewed in dark conditions compared to total usage.

Specifically, the three equations for determining On (average) mode power consumption that consider power saving functions are as follows:

$$P_{os_{static}} = P_{o_{static}} - P_{a_{static}} \times A_{a}$$

 $P_{os_broadcast} = P_{o_broadcast} - P_{a_broadcast} \times A_{a}$

 $P_{os_{internet}} = P_{o_{internet}} - P_{a_{internet}} \times A_{a}$

where

$P_{os_broadcast}$ is the On (average) mode power consumption with power saving function using dynamic broadcast-content video signal (W); $P_{os_internet}$ is the On (average) mode power consumption with power saving function using Internet-content video signal (W); P_{o_static} is the On (average) mode power consumption using static signals (W); $P_{o_broadcast}$ is the On (average) mode power consumption using dynamic broadcast-cont video signal (W); $P_{o_broadcast}$ is the On (average) mode power consumption using dynamic broadcast-cont video signal (W); $P_{o_internet}$ is the On (average) mode power consumption using Internet-content video signal (W); P_{a_static} is the power savings related to power saving functions, using static sign (W); $P_{a_broadcast}$ is the power savings related to power saving functions, using dynamic broadcast-content video signal (W);
$P_{os_internet}$ is the On (average) mode power consumption with power saving function using Internet-content video signal (W); P_{o_static} is the On (average) mode power consumption using static signals (W); $P_{o_broadcast}$ is the On (average) mode power consumption using dynamic broadcast-cont video signal (W); $P_{o_internet}$ is the On (average) mode power consumption using Internet-content video signal (W); P_{a_static} is the On (average) mode power consumption using Internet-content video signal (W); P_{a_static} is the power savings related to power saving functions, using static sign (W); $P_{a_broadcast}$ is the power savings related to power saving functions, using dynamic broadcast-content video signal (W);
P_{o_static} is the On (average) mode power consumption using static signals (W); $P_{o_broadcast}$ is the On (average) mode power consumption using dynamic broadcast-cont video signal (W); $P_{o_internet}$ is the On (average) mode power consumption using Internet-content video signal (W); P_{a_static} is the power savings related to power saving functions, using static sign (W); $P_{a_broadcast}$ is the power savings related to power saving functions, using dynamic broadcast-content video signal (W);
$P_{o_broadcast}$ is the On (average) mode power consumption using dynamic broadcast-cont video signal (W); $P_{o_internet}$ is the On (average) mode power consumption using Internet-content video signal (W); P_{a_static} is the power savings related to power saving functions, using static sign (W); $P_{a_broadcast}$ is the power savings related to power saving functions, using dynamic broadcast-content video signal (W);
$P_{o_internet}$ is the On (average) mode power consumption using Internet-content vid signal (W); P_{a_static} is the power savings related to power saving functions, using static sign (W); $P_{a_broadcast}$ is the power savings related to power saving functions, using dyname broadcast-content video signal (W);
 P_{a_static} is the power savings related to power saving functions, using static sign (W); P_{a_broadcast} is the power savings related to power saving functions, using dyname broadcast-content video signal (W);
P _{a_broadcast} is the power savings related to power saving functions, using dynam broadcast-content video signal (W):
P _{a_internet} is the power savings related to power saving functions, using Internet-cont video signal (W);
A _a is the power saving functions weighting factor.

NOTE 1 In the case of Japan, $A_a = \frac{1}{4}$.

NOTE 2 A_a may be adjusted to consider if the power saving functions were enabled at the time of shipment from the manufacturer.

B.3.2 P_a : Power saved by the power saving functions

The power saved by the power saving functions (P_a) represents the savings from either the automatic brightness control or the savings from user-controlled power saving functions, whichever is larger. In general:

$$P_{a}$$
 (W) = maximum[P_{a1} , P_{a2}] (W)

where

*P*_a is the power savings related to power saving functions (W);

 P_{a1} is the power savings related to automatic brightness control (W);

 P_{a2} is the power savings related to other power saving functions (W).

Specifically, the three equations for determining the power saved by the power saving functions are as follows:

$$P_{a \text{ static}}(W) = \text{maximum}[P_{a1 \text{ static}}, P_{a2 \text{ static}}](W)$$

 $P_{a \text{ broadcast}}(W) = \text{maximum}[P_{a1 \text{ broadcast}}, P_{a2 \text{ broadcast}}](W)$

 $P_{a \text{ internet}}$ (W) = maximum[$P_{a1 \text{ internet}}$, $P_{a2 \text{ internet}}$] (W)

where

P_{a_static} is the power savings related to power saving functions, using static signals (W); is the power savings related to power saving functions, using dynamic P_{a broadcast} broadcast-content video signal (W); is the power savings related to power saving functions, using Internet-content P_{a internet} video signal (W); is the power savings related to automatic brightness control, using static P_{a1 static} signals (W); Power savings related to automatic brightness control, using dynamic P_{a1 broadcast} broadcast-content video signal (W); is the power savings related to automatic brightness control, using Internet-P_{a1 internet} content video si (W); ower savings related to other power saving functions, using static signals (W); P_{a2 static} is the power savings related to other power saving functions, using dynamic P_{a2 broadcast} broadcast-content video signal (W);

*P*_{a2_internet} is the power savings related to other power saving functions, using Internetcontent video signal (W).

B.4 Picture level adjustments

Manufacturers are recommended to allow the end user of the television set to easily restore the picture level adjustments used during average power consumption measurement. This setting, as defined in 11.4.8, is "as originally adjusted by the manufacturer to the end user". In the case that a setting mode must be chosen on initial activation, the setting is referred to as "standard mode" or equivalent. The terms "home mode" and "standard mode" are equivalent. Easy restoration of these settings simplifies testing of televisions that are not in out-of-the-box conditions.

Manufacturers are encouraged to configure the picture level adjustments used during average power consumption measurement to provide a comfortable viewing experience as intended for the normal home environment.

Annex C

(informative)

Description of On (average) mode video signals

C.1 General

The method for measuring the On (average) mode power consumption of television sets (see Clause 11) is based on the fact that television set power consumption varies depending on the APL' of the displayed images.

Three methods exist for measuring On (average) mode power consumption. These include using:

- Static video signals (see 11.5)
- Dynamic broadcast-content video signals (see 11.6), and
- Internet-content video signals (see 11.7).

Either the static video signals or the dynamic broadcast-content video signals are intended to be used when measuring power consumption of a television when displaying broadcast-type video content. The Internet-content video signal is intended to be used when measuring power consumption of a television when displaying web page-type content from the Internet.

There is also a method for measuring On (play) mode (see 6.7) using a single test signal (see 6.4). This method was described in the previous version of this standard, and is retained for backward compatibility.

C.2 Static video signals

The static video signal method was initially developed by JEITA in Japan. The power consumption of various Plasma and LCD televisions with broadcast signals were measured, and the ratios of the signals were chosen to best model the broadcast power consumption.

Measurement of power consumption based on the static video signals might be chosen for the simplicity of the test. This test can be performed directly by means of a wattmeter.

C.3 Dynamic broadcast-content video signals

The APL' of the dynamic broadcast-content video signal was chosen to best model actual APL' measured internationally. The project members measured at least 40 hours of typical broadcast content, including a variety of genres from a variety of broadcast stations in Australia, Japan, the Netherlands, the United Kingdom and the United States. The captured APL' curves were averaged to create a target APL' curve, known as the Master Histogram.

The mean of the APL' histogram is 34 %.

The project members acquired video content that was donated to the IEC by the content owners. A computer program was used to randomly select scenes that best matched the Master Histogram.

Figure C.1 shows the APL' histograms of the Test Disc and the Master video. The data is shown in Clause C.5.



Dynamic broadcast-content video signal APL'

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C.4 Internet-content video signals

The APL' of the Internet-content video signal was chosen to best model actual the APL' of popular web pages.

The project members acquired screen shots of web-pages from US Government websites, including that of EPA Energy Star, because according to United States Code Title 17, Section 105, "copyright protection is not provided for any work produced by the United States Government". The Test Images were chosen to best match the APL' of the most popular 100 web-pages as determined during development of the standard.

The project members chose Test Images that it believes to be inoffensive. However, in order to ensure 100 % acceptability across all cultures internationally, some images were scrambled. Tests have confirmed that the scrambling has an inconsequential effect on the power consumed.

Current statistics show that the number of hours that television sets are used to view Internet content vs. broadcast content is very low. The relative weighting of power results measured using Internet-content compared to dynamic broadcast-content should reflect the expected usage in the region where any such weighting is being developed.

Figure C.2 shows the APL' histograms of the Top-100 web-pages and Test Images, with a mean APL' of 81 %. In this figure, the solid line shows that the APL' histogram approximates an inverse chi-square distribution.



Figure C.2 – Internet-content video signal APL'

C.5 Dynamic broadcast-content data

Table C.1 shows the frequency of frames in the Test Video and the Master in 1 % APL' bins. The percentage of Master frames in each bin is also shown. The scenes in the Test Video were chosen to best match the Master Histogram.

APL'	Test video	Master	Master
bin %	frequency	frequency	%
0,5	18	51,0	0,28
1,5	15	27,9	0,16
2,5	47	31,0	0,17
3,5	46	42,9	0,24
4,5	71	56,3	0,31
5,5	98	69,3	0,39
6,5	105	81,3	0,45
7,5	107	102,6	0,57
8,5	98	122,6	0,68
9,5	137	144,8	0,81
10,5	159	173,4	0,96
11,5	199	193,7	1,08
12,5	180	220,0	1,22
13,5	225	233,8	1,30
14,5	275	270,7	1,51
15,5	276	294,3	1,64

Table C.1 – Dynamic broadcast-content data

APL'	Test video	Master	Master
bin %	frequency	frequency	%
16,5	338	322,1	1,79
17,5	352	340,2	1,89
18,5	382	365,9	2,03
19,5	383	389,3	2,16
20,5	384	402,9	2,24
21,5	413	410,8	2,28
22,5	400	415,6	2,31
23,5	447	441,8	2,46
24,5	443	439,7	2,44
25,5	462	450,3	2,50
26,5	449	445,4	2,48
27,5	485	451,4	2,51
28,5	421	463,7	2,58
29,5	453	471,1	2,62
30,5	458	453,3	2,52
31,5	468	464,0	2,58
32,5	452	462,1	2,57
33,5	450	460,2	2,56
34,5	426	460,4	2,56
35,5	406	431,0	2,40
36,5	430	424,8	2,36
37,5	432	403,9	2,25
38,5	394	394,2	2,19
39,5	371	375,5	2,09
40,5	372	359,7	2,00
41,5	362	352,5	1,96
42,5	370	345,1	1,92
43,5	319	315,9	1,76
44,5	328	294,4	1,64
45,5	283	280,6	1,56
46,5	244	274,7	1,53
47,5	291	262,6	1,46
48,5	262	247,9	1,38
49,5	231	231,3	1,29
50,5	214	209,7	1,17
51,5	202	209,2	1,16
52,5	219	182,8	1,02
53,5	201	185,9	1,03
54,5	212	200,9	1,12
55,5	151	156,9	0,87
56,5	94	143,6	0,80
57,5	109	128,8	0,72
58,5	102	113,7	0,63

APL'	Test video	Master	Master
bin %	frequency	frequency	%
59,5	118	108,1	0,60
60,5	114	100,0	0,56
61,5	96	86,1	0,48
62,5	103	81,5	0,45
63,5	104	73,2	0,41
64,5	87	75,0	0,42
65,5	37	70,0	0,39
66,5	48	58,6	0,33
67,5	63	54,0	0,30
68,5	48	51,0	0,28
69,5	37	46,6	0,26
70,5	43	39,8	0,22
71,5	22	38,2	0,21
72,5	14	35,2	0,20
73,5	16	30,5	0,17
74,5	15	27,6	0,15
75,5	21	26,6	0,15
76,5	19	22,7	0,13
77,5	11	23,9	0,13
78,5	14	20,9	0,12
79,5	10	17,5	0,10
80,5	12	14,6	0,08
81,5	23	14,4	0,08
82,5	23	14,0	0,08
83,5	35	11,7	0,06
84,5	16	9,9	0,06
85,5	25	10,6	0,06
86,5	17	9,1	0,05
87,5	31	8,9	0,05
88,5	15	8,4	0,05
89,5	1	8,0	0,04
90,5	2	5,9	0,03
91,5	2	5,3	0,03
92,5	1	5,5	0,03
93,5	1	4,5	0,03
94,5	3	3,4	0,02
95,5	3	2,4	0,01
96,5	1	1,6	0,01
97,5	2	1,9	0,01
98,5	0	1,9	0,01
99,5	8	1,7	0,01
NOTE Fre	equency is the numbe	er of frames per 1% AP	L' bin

C.6 Internet-content data

Table C.2 shows the frequency of the Test Images and the "Top 100" images in 5 % APL' bins. The scenes in the Test Images were chosen to best match the "Top 100" Histogram.

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APL'	Top 100 Test Image			
bin	frequency	frequency		
%				
2,5	0	0		
7,5	0	0		
12,5	1	1		
17,5	0	0		
22,5	0	0		
27,5	1	1		
32,5	0	0		
37,5	1	1		
42,5	2	2		
47,5	1	1		
52,5	1	1		
57,5	1	1		
62,5	3	3		
67,5	2	2		
72,5	5	7		
77,5	14	10		
82,5	16	18		
87,5	26	26		
92,5	22	23		
97,5	4	3		
NOTE Frequency is the number of frames per 5 % APL' bin.				

Table C.2 – Internet-content data

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IEC 62087:2008, video content_BD, Video content for IEC 62087:2008 on Blu-ray™ Disc⁵

³ This is attached to the present standard for the user's convenience.

⁴ This is attached to the present standard for the user's convenience.

⁵ This is attached to the present standard for the user's convenience.

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