
Avdio, video in pripadajoča oprema - Ugotavljanje porabe energije - 3. del:
Televizijski sprejemnik

Audio, video, and related equipment - Determination of power consumption - Part 3:
Television sets

Audio-, Video- und verwandte Geräte - Messverfahren für die Leistungsaufnahme - Teil
3: Fernsehgeräte

Appareils audio, vidéo et matériel connexe - Détermination de la consommation de
puissance - Partie 3: Téléviseurs

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33.160.25	Televizijski sprejemniki	Television receivers

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100/4517/CDV

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OF INTEREST TO THE FOLLOWING COMMITTEES:	HORIZONTAL FUNCTION(S):
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TITLE:

Audio, video, and related equipment - Determination of power consumption - Part 3: Television sets

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CONTENTS

CONTENTS	1
FOREWORD	5
INTRODUCTION	8
1 Scope	9
2 Normative references	9
3 Terms, definitions, and abbreviated terms	9
3.1 Terms and definitions	9
3.1.1 TV function related terms and definitions	9
3.1.2 TV configuration related terms and definitions	12
3.1.3 Other terms and definitions	13
3.2 Abbreviated terms	13
4 Specification of operating modes and functions	15
5 Test equipment	15
5.1 General	15
5.2 Power source	16
5.3 Power measuring instrument	16
5.4 Imaging light measurement device (ILMD)	16
5.5 Spot photometer	16
5.6 Illuminance meter	16
5.7 Temperature sensor	16
5.8 Video signal provision equipment	16
5.9 ABC lamp	16
5.10 ABC lamp dimmer	16
5.11 Network-related equipment	17
5.11.1 Networking equipment	17
5.11.2 Smart speaker	17
5.11.3 Bluetooth soundbar	17
5.11.4 Smart phone or tablet used for wake-by-remote-control-app and wake-on-cast	17
5.12 Reflective card	18
5.13 Test table surface	18
6 Test clips	18
7 Ambient conditions	18
7.1 General	18
7.2 Test environment	18
7.3 Background ambient light	18
8 EUT and test equipment physical configuration	19
8.1 Coordinate system	19
8.2 Position of EUTs that are stand-compatible	20
8.3 Position of EUTs that are not stand-compatible	20
8.4 ABC lamp position	21
8.5 ABC lamp pitch and illuminance levels	23
8.6 Imaging light measurement device (ILMD) setup	24
8.7 Spot photometer setup	25
8.7.1 General	25

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8.7.2	Non-contact spot photometer	25
8.7.3	Contact spot photometer	25
8.8	Illuminance meter position, pointing and illuminance level control for ABC testing.....	25
8.8.1	General	25
8.8.2	Illuminance meter position and pointing — in front of the screen.....	26
8.8.3	Illuminance meter position and pointing — at the ABC sensor location	26
8.8.4	Illuminance meter position and pointing — side monitor meter	27
9	Test equipment functional configuration.....	27
9.1	General.....	27
9.2	Power source voltage and frequency	27
9.3	Power meter settings	28
9.4	Setting illuminance levels for ABC testing	28
9.5	Disabling the ABC feature with ABC lamp	29
10	EUT functional configuration.....	29
10.1	Main batteries	29
10.2	Plug-in module.....	29
10.3	Power on	29
10.4	EUT firmware update	29
10.5	EUT configuration	30
10.6	Input source selection	30
10.7	Satellite feature	31
10.8	Additional functions.....	31
10.9	Special functions	31
10.10	Video size, aspect ratio, and resolution	31
10.11	Sound level adjustments	31
10.12	Motion-based dynamic dimming	31
10.13	Networking.....	31
10.13.1	Network connections for active mode tests	31
10.13.2	Network connections for standby test	32
10.13.3	Network connections for networked standby test	32
10.13.4	Network connections for smart standby tests	33
10.13.5	Network connections for hands-free-wake tests	34
11	Test preparation	34
11.1	Determination of the screen area	34
11.2	Selection of test pattern	34
11.3	Identification of preset picture settings (PPSs).....	35
11.3.1	General	35
11.3.2	Determination of default SDR and HDR10 PPSs	35
11.3.3	Determination of the brightest SDR PPS while playing broadcast content	35
11.3.4	Determination of the brightest PPS while playing a test pattern	36
12	Test procedures	37
12.1	General.....	37
12.2	Active mode.....	37
12.2.1	General	37
12.2.2	Stabilisation procedure	38
12.2.3	Camera spectral mismatch correction factor (SMCF)	38
12.2.4	Power and luminance measurement procedure using dynamic video	38

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12.2.5	Luminance measurements procedure using a test pattern	39
12.2.6	Picture quality measurement procedures	40
12.3	Non-active mode	40
12.3.1	General	40
12.3.2	Standby mode test procedure	41
12.3.3	Networked standby mode test procedure	41
12.3.4	Other non-active mode with smart standby functions enabled test procedure	42
12.3.5	Other non-active mode with hands-free wake functions enabled test procedure	44
12.3.6	Off mode	45
12.3.7	Default test sequence	45
Annex A (informative)	Significance of methods	47
Annex B (informative)	Methods for ABC-enabled testing	49
B.1	Overview	49
B.2	Methods for relative ABC testing	50
B.2.1	Direct setting (manual)	50
B.2.2	Closed-loop automation	51
B.2.3	Open-loop calibrated lamp drive	51
B.3	Methods for absolute ABC testing	52
B.3.1	Analytical correction (single meter)	52
B.3.2	Empirical per-level calibration (single meter)	53
B.3.3	Dual illuminance meter, manual control	54
B.3.4	Dual illuminance meter, closed-loop automation	55
B.3.5	Open-loop calibrated lamp drive	56
Annex C (informative)	Worked example: determining δ for an example illuminance meter	57
C.1	Purpose	57
C.2	Geometric model	57
C.3	Dimensions for the example illuminance meter	58
C.4	Worked calculation	58
Annex D (normative)	Test report	60
Annex E (informative)	Example test report templates	63
Annex F (informative)	Optical performance of TV products and how it relates to power consumption and efficiency	64
Bibliography		66
Figure 1 – System boundary		15
Figure 2 – Position and attitude of test components		19
Figure 3 – Wall-mounted TV with built-in ABC sensor (dimensions in cm)		20
Figure 4 – Wall-mounted TV with external ABC sensor		21
Figure 5 – ABC lamp position (side view)		22
Figure 6 – ABC lamp position (3D view)		22
Figure 7 – ABC lamp position (back view)		23
Figure 8 – Example of illuminance meter orientation		25
Figure 9 – Default test sequence		46
Figure C.1 – Longitudinal offset between illuminance meter receptor and ABC sensor		57

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Figure F.1 – Colour gamut comparison	64
Figure F.2 – Contrast comparison	64
Figure F.3 – Viewing angle comparison	65
Table 1 – Required illuminance levels and illuminance meter pitch angles	24
Table 2 – Network connection hierarchy	33
Table B.1 – Summary of methods for relative ABC testing	49
Table B.2 – Summary of methods for absolute ABC testing	49
Table C.1 – Target meter readings for the example illuminance meter at $d =$ 2000 mm, $\theta = 45^\circ$	59

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

Audio, video, and related equipment - Determination of power consumption - Part 3: Television sets

FOREWORD

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IEC 62087-3 has been prepared by technical area 19: Environmental and energy aspects for multimedia systems and equipment, of IEC technical committee 100: Audio, video and multimedia systems and equipment. It is an International Standard.

The first edition of IEC 62087-3, together with IEC 62087-1, IEC 62087-2 and IEC 62087-4 to IEC 62087-6 canceled and replaced [IEC 62087:2011 \(third edition\) \[1\]](#) in its entirety.

IEC 62087-3:2015 (first edition) introduced:

- For TVs with an automatic brightness control feature that power may be measured at multiple specific illumination levels;
- A method for determining the ratio of peak luminance expected in the home versus the peak luminance expected in the retail environment.

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IEC 62087-3:2023 (second edition) included the following significant technical changes with respect to the previous edition:

- it introduced measuring procedures for the determination of power consumption in the active mode while viewing static metadata HDR video content;
- all tests for active mode power determination are performed with MDD disabled;
- only progressive video signals are used for testing;
- a dimmable LED lamp is used as a light source for illuminating the ABC sensor to achieve specific illuminance levels;
- a dynamic box and outline video signal is used for determining the ratio of peak luminance.

This third edition cancels and replaces the second edition published in 2023. This edition constitutes a technical revision and includes the following significant technical changes with respect to the previous edition:

- a method for simultaneously measuring both power and screen-average luminance while playing dynamic video content (e.g. broadcast content) to support effective luminance based energy efficiency metrics is introduced;
- equipment requirements are updated:
 - imaging light measurement device (ILMD) is introduced;
 - smart standby devices (i.e. smart phone, Bluetooth speaker, and smart speaker) are introduced;
 - spot photometer and illuminance meter accuracy requirements are increased;
 - power source and power meter reference updated in IEC 62301 (ED3), which includes improved measurement uncertainty specifications;
 - reflective card requirement is removed;
- MDD is left in default state during testing
- EUT initial configuration requirements are updated;
- smart standby and hands-free-wake tests are introduced;
- a new method for determining screen area is used (IEC/CD 62087-1:2024, clause 7);
- definitions are updated
- the document is reorganized
 - to enable use of common test procedures across two different approaches to representing television energy efficiency, one centred on measuring screen average luminance concurrent with power while playing broadcast content; the other centred on measuring screen centre luminance while displaying a test pattern and (not concurrently) power while playing broadcast content;
 - to separate tasks into the following buckets:
 - methods;
 - equipment;
 - test clips;
 - ambient conditions;
 - physical setup;
 - functional setup;
 - test preparation;
 - test procedures;
- picture quality measurement procedures are added;
- updates to test-pattern-based methods are provided, including:

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- additional dynamic box and outline video signals are provided to support more advanced methods for addressing power limiting when displaying test patterns;
- network configuration requirements for networked standby tests are simplified;

The text of this International Standard is based on the following documents:

Draft	Report on voting
100/xxxx/CDV	100/xxxx/RVC

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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

INTRODUCTION

This document describes common power and luminance measurement methods applicable to active mode and non-active mode power consumption of televisions.

Common approaches to representing television power consumption in active mode include:

- Approach A: determining the relationship between a) power while playing representative broadcast video and b) correlated screen average luminance, measured concurrently with power
- Approach B: determining the relationship between a) power while playing representative broadcast video and b) uncorrelated screen-centre luminance measured separately from power while playing a test pattern

This document provides the underlying procedures for each of these approaches.

This document also provides a method for assessing the performance of automatic brightness control functions. This method includes requirements for test equipment, equipment positioning, ambient light levels as a function of lamp angle and methods for setting these illuminance levels using an illuminance meter.

When testing in non-active mode, several tests are provided to assess the impact that functions like network standby, wake-on-cast, and hands-free wake have on non-active mode power consumption.

Each of the active mode and non-active mode test procedures defined in this document involves test parameters to be specified by the entity ordering the test. Where not specified, the parameters in 12.3.7 are provided.

Users of this document are reminded to consider the fact that TV set characteristics like screen luminance, resolution, contrast, color gamut, and viewing angle can have an impact on TV power consumption. To ensure that the obtained test results are credible and representative users should review their actual test method and consider the principles described in the IEC GUIDE 121:2023 'Securing credible environmentally relevant performance assessment methods in standards'.

The IEC 62087 series consists of the following planned or published parts:

- Part 1: General
- Part 2: Signals and media
- Part 3: Television sets
- Part 4: Video recording equipment
- Part 5: Set-top boxes
- Part 6: Audio equipment
- Part 7: Computer monitors
- Part 8: Small network equipment

1 Scope

This part of IEC 62087 specifies the determination of the power, luminance, and related characteristics of television sets as applicable to the determination of active mode and non-active mode power consumption. Television sets include, but are not limited to, those with self-emitting, backlit, or projection technologies.

This document is limited to television sets that can be connected to an external power source. Television sets that include a non-removable, main battery are not covered by this document. Television sets can include any number of auxiliary batteries.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 62087-1:2015, *Audio, video, and related equipment - Determination of power consumption - Part 1: General*

IEC 62087-2:2023, *Audio, video, and related equipment - Determination of power consumption - Part 2: Signals and media*

IEC 62301, *Household electrical appliances - Measurement of standby power*

IEC 62977-2-1:2021, *Electronic displays - Part 2-1: Measurements of optical characteristics - Fundamental measurements*

IEC 63474, *Electrical and electronic household and office equipment - Measurement of networked standby power consumption of edge equipment*

3 Terms, definitions, and abbreviated terms

For the purposes of this document, the terms and definitions given in IEC/CDV 62087-1 ED2:2026, IEC/CDV 62087-2 ED3:2026 and in the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

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

3.1 Terms and definitions

3.1.1 TV function related terms and definitions

3.1.1.1

television set

TV

equipment whose primary function is reception and display of analogue or digital video signals from terrestrial broadcast, cable, satellite and/or broadband sources

Note 1 to entry: A television set can include additional functions that are not required for its primary function.

3.1.1.2**backlit display**

display where light generated at the back of the display stack passes through multiple layers, including an LCD layer, before being emitted toward the viewer

3.1.1.3**emissive display**

display that generates light directly from each pixel or sub-pixel

EXAMPLE OLED displays

3.1.1.4**local dimming**

LD

<backlit display> feature that enhances contrast, enhances dynamic range, and reduces energy consumption by dynamically dimming the backlighting in lower-luminance areas of the displayed image

3.1.1.5**motion-based dynamic dimming**

MDD

feature that adjusts whole-screen luminance in response to the amount of change in screen brightness from frame-to-frame

3.1.1.6**dimming line**

numerical relationship between average power and screen-average luminance when playing a broadcast video test clip

Note 1 to entry: Dimming lines are typically represented as the linear or second-order polynomial trendline of a data series where average power is plotted against screen-average luminance at three or more LSS levels.

3.1.1.7**plug-in module**

device that plugs into television sets to provide additional functionality

3.1.1.8**conditional access**

encryption, decryption, and authorization techniques employed to protect content from unauthorized viewing

3.1.1.9**conditional access module**

plug-in module that enables conditional access

3.1.1.10**point of deployment module**

conditional access module for digital signal reception

3.1.1.11**quick-start**

function that reduces the television set's resume time from non-active mode to active mode

Note 1 to entry: Quick-start, sometimes referred to as fast-start, often enables smart standby functions (12.3.4).

Note 2 to entry: Quick-start can enable additional primary or secondary functions.

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3.1.1.12**smart standby function**

app/network-assisted function in which the television remains responsive to discovery and wake packets and/or maintains a persistent short-range wireless communication link, such that an external device can wake the television from non-active mode

EXAMPLE Smart standby functions include WbRA, WoC, WbS, and Bluetooth link maintenance .

3.1.1.13**wake-by-remote-control-app function**

WbRA

smart standby sub-function in which the television is reactivated by a manufacturer-provided or third-party remote-control application operating on a smart phone or tablet

3.1.1.14**wake-on-cast function**

WoC

smart standby function in which the television is reactivated by a casting request originating from a mobile device

3.1.1.15**wake-by-smart-speaker function**

WbS

smart standby function in which the television is reactivated by a command routed through an external smart-speaker device

EXAMPLE Voice command "Alexa, turn on the TV" or "Hey Google, play Netflix on the living room TV."

3.1.1.16**link maintenance**

asmart standby function which enables a television set when reactivated to seamlessly reconnect with a paired portable device without requiring the user to repeat the pairing process

3.1.1.17**hands-free wake function**

non-contact wake function in which the television can be reactivated solely by user-adjacent close proximity triggers

EXAMPLE	Example	hands-free	wake	functions	include:
(a)	voice	activation	via	built-in	microphones;
(b)	gesture	recognition	via	integrated	camera/sensor;
(c)	presence	detection		(camera/IR/ultrasonic);	or
(d)	mobile-device proximity via short-range wireless communication.				

3.1.1.18**gesture recognition function**

hands-free wake function in which the television is reactivated by recognition of a predefined user gesture, as detected by an integrated camera or other motion sensor

EXAMPLE Waving a hand in front of the screen or making a specific arm movement captured by an IR/optical sensor array.

3.1.1.19**presence detection function**

hands-free wake function in which the television is reactivated upon detection of a human presence within a defined range, using imaging (camera), infrared, ultrasonic, or other proximity-sensing technologies

EXAMPLE A person entering the room is detected by a passive infrared (PIR) or ultrasonic motion sensor integrated into the television.