

ANSI/CTA Standard

Determination of Television Set Power Consumption

ANSI/CTA-2037-A

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July 2014

(with 2/2/2015 Correction)

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(Formulated under the cognizance of the CTA **R4 Video Systems Committee.**)

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FOREWORD

This standard was developed under the auspices of the Consumer Electronics Association (CEA) R4 Video Systems Committee.

On February 2, 2015 an error was discovered in the numbering of the sections in this standard. Subsection 6.3.4 (Plug-in module) was inadvertently numbered 6.4 in the version published in July 2014. This resulted in all subsequent subsections in section 6 having wrong numbers. The version that was balloted within the Video Systems Committee had the Plug-in module subsection numbered as 6.3.4. As this error was clearly introduced during the publication process CEA staff issued an updated edition on February 2, 2015 to correct the error.

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Determination of Television Set Power Consumption

1 Scope

This standard defines a method for measuring television set power consumption and related items. It is intended for television sets powered from an external source. Television sets with a non-removable main battery are excluded.

2 References

2.1 Normative References

The following standards contain provisions that, through reference in this text, constitute normative provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed here.

2.1.1 Normative Reference List

- IEC 62087:2011, Methods of measurement for the power consumption of audio, video and related equipment
- IEC 62301:2011, Household electrical appliances - Measurement of standby power

2.1.2 Normative Reference Acquisition

- IEC Standards:
 - Global Engineering Documents, World Headquarters, 15 Inverness Way East, Englewood, CO USA 80112-5776; Phone 800-854-7179; Fax 303-397-2740; Internet <http://global.ihs.com>; Email global@ihs.com
 - IEC Central Office, 3, rue de Varembe, PO Box 131, CH-1211 Geneva 20, Switzerland; Phone +41 22 919 02 11; Fax +41 22 919 03 00; Internet <http://www.iec.ch>; Email pubinfor@iec.ch

2.2 Informative References

The following standards contain provisions that, through reference in this text, constitute informative provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed here.

2.2.1 Informative Reference List

- CEA-770.3-E, High Definition TV Analog Component Video Interface
- CEA Home Illumination Technical Report, TR-1, July 2012
- CLASP Further Analysis of Background Lighting Levels during Television Viewing, March 2012
- ENERGY STAR® Program Requirements for Televisions, Eligibility Criteria
- HDMI Specification

- IEC 60933-5, Audio, video and audiovisual systems - Interconnections and matching values - Part 5: Y/C connector for video systems - Electrical matching values and description of the connector
- ITU-R BT.470-5, Conventional Television Systems
- SMPTE ST 170M:2004, For Television — Composite Analog Video Signal — NTSC for Studio Applications

2.2.2 Informative Reference Acquisition

- EPA ENERGY STAR® Specifications: <http://www.energystar.gov>
- CEA Specifications: <http://ce.org/Standards/Standard-Listings.aspx>
- CLASP Publications:
<http://www.clasponline.org/ResourcesTools/Resources/StandardsLabelingResourceLibrary>
- HDMI: <http://www.hdmi.org>; <http://en.wikipedia.org/wiki/HDMI>
- ITU-R: <http://www.itu.int/rec/R-REC-BT/en>
- SMPTE: <http://standards.smpte.org/>

3 Definitions

Automatic brightness control — Feature that senses ambient light conditions and changes display brightness accordingly, possibly reducing power consumption.

Auxiliary battery — Power storage device that is not capable of powering equipment such that the equipment can provide its primary functions.

Brightest selectable preset picture setting — This is the user-selectable, preset picture setting that produces the highest luminance picture in the home or default configuration. (See Figure 1.)

Category 5e — Twisted pair cable used for computer networks.

Component analog video — Baseband analog video interface that carries a standard or high definition color video signal over three signal lines. For reference, see CEA-770.3-D.

Composite analog video — Baseband analog video interface that carries a standard definition color video signal over a single signal line. For reference, see SMPTE 170M for the 59.94 Hz version and ITU-R BT.470-5 for the 50 Hz version.

Digital visual interface (DVI) — Video interface developed by the Digital Display Working Group that is capable of carrying analogue or digital uncompressed video.

Default configuration — Configuration for televisions without a forced menu. (See Figure 1.)

Default picture setting — Out-of-the-box picture setting for television sets in the home or default configuration. (See Figure 1.)

Forced menu — Configuration selection required of the user when a television set is turned on for the first time that forces the user to choose between the home configuration and the retail configuration. (See Figure 1.)

High definition multimedia interface (HDMI) — Audio-visual interface that is capable of carrying uncompressed video data, compressed or uncompressed digital audio data, and other information. For reference, see HDMI specification.

Home configuration — Forced menu selection most likely to be chosen for home use. This configuration selection is generally named “home”, “standard”, or equivalent. (See Figure 1 and 4.2.2.)

Illuminance — Photometric measure of the total luminous flux incident on a surface, per unit area, expressed in lux.

Luminance — Photometric measure of the luminous intensity per unit area of light traveling in a given direction, expressed in units of candelas per square meter (cd/m^2).

Main battery — Power storage device capable of powering equipment such that the equipment can provide its primary functions.

Neutral density filter (ND filter) — Optical device that reduces the light intensity in the visible wavelength region.

Overall brightest preset picture setting — Either the retail picture setting or the brightest selectable preset picture setting, whichever produces the highest luminance picture. (See Figure 1.)

Partial On mode — A collection of power sub-modes, including Standby-passive, Standby-active, low, and Standby-active, high. (See 4.1.4 to 4.1.6.)

Quick start — Feature that, when enabled, presents sound and picture quickly when switching from Partial On mode to On mode.

Retail configuration — Forced menu selection most likely to be chosen for use in a retail environment. This configuration selection is generally recommended by the manufacturer for presentation in a public space when the television set is offered for sale and might be named “retail”, “store”, “shop”, or equivalent. (See Figure 1 and 4.2.3.)

Retail picture setting — Out-of-the-box picture setting for television sets with a forced menu in the retail configuration. (See Figure 1.)

S-video — Baseband analog video interface that carries a standard definition color video signal using two signal lines. For reference, see IEC 60933-5.

Selectable preset picture setting — TV picture setting that is selectable by a user from a set of manufacturer-defined picture settings. (See Figure 1.)

Television set (TV) — A commercially available electronic product designed primarily for the display and reception of audio-visual signals from terrestrial, cable, satellite, Internet Protocol TV (IPTV), or other transmission of analog and/or digital signals, consisting of a tuner/receiver and a display encased

in a single housing. The product usually relies upon a cathode-ray tube (CRT), liquid crystal display (LCD), plasma display, or other display device.

VGA port — 15-pin interface that is capable of carrying analog video.

3.1 Symbols and Abbreviations

ABC	Automatic Brightness Control
AP	Access Point
AV	Audio-Visual
BD	Blu-ray Disc™
CEA	Consumer Electronics Association
CLASP	Collaborative Labeling & Appliance Standards Program
CRT	Cathode Ray Tube
DAM	Download Acquisition Mode
DHCP	Dynamic Host Configuration Protocol
DVI	Digital Visual Interface
EMI	Electromagnetic Interference
EPA	Environmental Protection Agency
EPG	Electronic Program Guide
HDMI® ¹	High Definition Multimedia Interface
Hz	Hertz
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IP	Internet Protocol
IPTV	Internet Protocol TV
ITU	International Telecommunication Union
ITU-R	ITU Radiocommunication Sector
LAN	Local Area Network
LCD	Liquid Crystal Display
LMD	Luminance Measuring Device
LNB	Low Noise Block
NAT	Network Address Translation
ND	Neutral Density
NIST	National Institute of Standards and Technology
RF	Radio Frequency
SCR	Silicon-Controlled Rectifier
SMPTE	Society of Motion Picture and Television Engineers
TV	Television Set
US	United States
UUT	Unit Under Test
VGA	Video Graphics Array
VSB	Vestigial Sideband
WAN	Wide Area Network

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3.2 Compliance Notation

As used in this document “shall” and “must” denote mandatory provisions of the standard. “Should” denotes a provision that is recommended but not mandatory. “May” denotes a feature whose presence does not preclude compliance, and implementation of which is optional. “Optional” denotes items that may or may not be present in a compliant device.

4 Modes of Operation

4.1 Power modes

4.1.1 General

For all modes, main batteries, if any, shall be removed for the duration of the measurement procedure. (See 5.2.1.)

4.1.2 Disconnected:

The television set is disconnected or galvanically isolated from all external power sources and main batteries.

4.1.3 Off mode:

The television set is connected to an external power source and does not produce picture or sound and does not provide any other function that depends on an external power source. The television set cannot be switched into any other mode with the remote control unit, or an external or internal signal.

NOTE: Some power may be consumed if an EMC filter or other components exist on the source side of the power switch.

4.1.4 Standby-passive mode:

The television set is connected to an external power source and does not provide picture or sound. The television set can be switched into another mode with the remote control unit or an internal signal, but not with an external signal.

4.1.5 Standby-active, low mode:

The television set is connected to an external power source and does not provide picture or sound. The television set can be switched into another mode with the remote control unit or an internal signal and can additionally be switched into another mode with an external signal.

NOTE: When in Standby-active, low mode, a television might be able to be switched into the On mode, the Off mode, the Standby-passive, or the Standby-active, high mode.

4.1.6 Standby-active, high mode:

The television set is connected to an external power source and does not provide picture or sound. The television set can be switched into another mode with the remote control unit, an internal signal, or with an external signal. Additionally, the television set is exchanging/receiving data with/from an external source.

It is not possible to measure power consumption in this mode without knowledge of the internal design of the TV and/or related services. A possible method of measurement for this mode is included, informatively, in Annex D.

4.1.7 On mode:

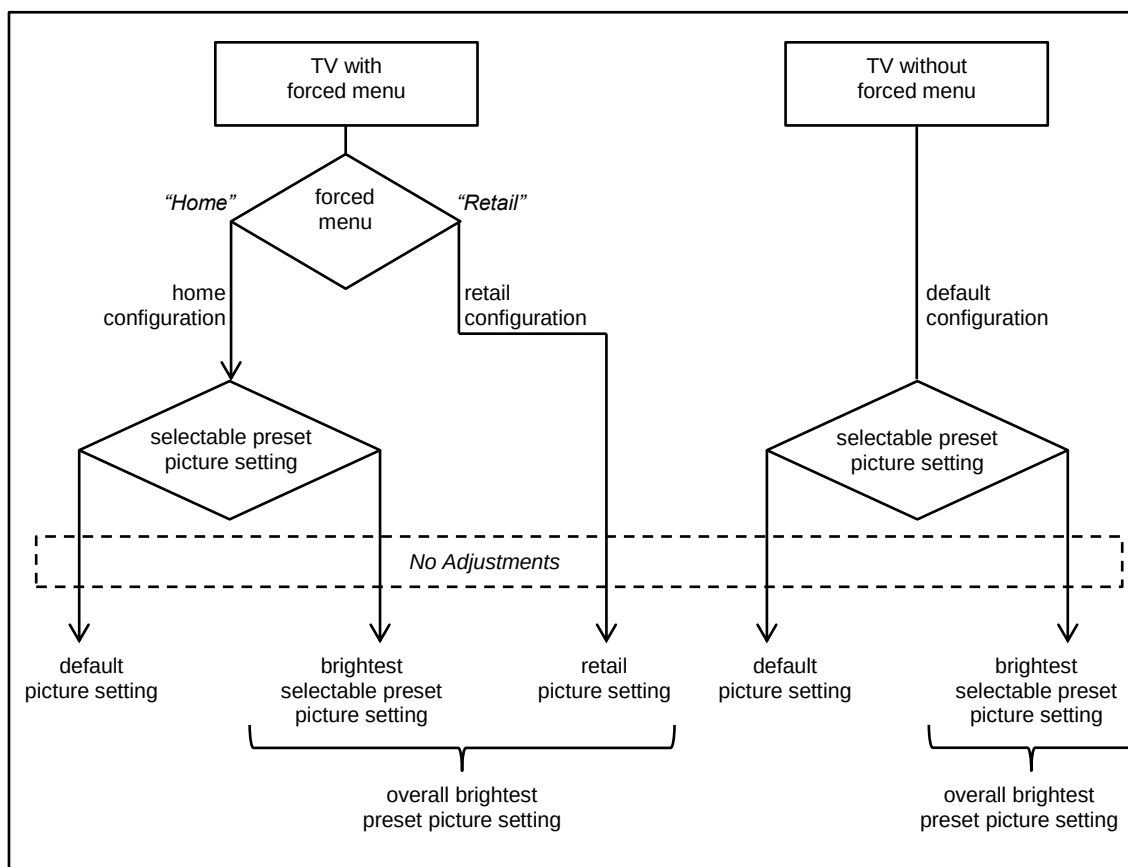
The television set is connected to an external power source and provides picture and, if possible, sound.

4.2 Configurations and picture settings

4.2.1 Conceptual framework

Figure 1 shows a conceptual framework of the various configurations and picture settings for television sets.

Figure 1 – Configurations and picture settings, conceptual framework



4.2.2 Selection of home configuration

When directed in this standard, the home configuration shall be selected from the forced menu by choosing the configuration that is recommended for normal home use and, if not clearly defined, it shall be selected by choosing the first configuration listed in the forced menu.

If the UUT has no forced menu, it shall remain in the default configuration.

NOTE: A factory reset might be required in order to enter the home configuration after the retail configuration has been previously selected.