

ANSI/CTA Standard

Set-top Box (STB) Power Measurement

ANSI/CTA-2043

(Formerly ANSI/CEA-2043)

August 2013



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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. It supersedes CEA-2013-A, *Digital STB Background Power Consumption*, and CEA-2022, *Digital STB Active Power Consumption Measurement*.

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CONTENTS

1 Scope..... 1

2 References 1

3 Compliance Notation 2

4 Definitions..... 2

5 Symbols and Abbreviations..... 4

6 Power Modes 4

7 Measurement Criteria 4

 7.1 General..... 4

 7.2 Measurement Accuracy 4

 7.3 Test room..... 5

 7.4 Test voltage 5

 7.5 Test Equipment 5

8 Test Procedures 6

 8.1 General..... 6

 8.2 ON Mode Test Procedures 8

 8.3 SLEEP Mode Test Procedures 9

 8.4 OFF Mode Test Procedure 10

 8.5 Power Mode Transition Test Procedures..... 10

9 Test Parameters Summary..... 12

Annex A (Informative) - Using CEA-2043 with ENERGY STAR STB Programs 13

Annex B (Informative) - CEA-2043 to IEC-62087 Parameter Map.....15

Annex C (Informative) - Measuring Power Consumption of Satellite STBs.....16

Annex D (Informative) – Concurrent Testing and Recommended Tests.....17

Annex E (Informative) – CEA-2043 Tester Information Template 19

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Set-top Box (STB) Power Measurement

1 Scope

This standard defines procedures for measuring Set-top Box power consumption. CEA-2043: *Set-top Box (STB) Power Measurement* standard supersedes CEA-2013-A: *Digital STB Background Power Consumption* and CEA-2022: *Digital STB Active Power Consumption Measurement* standards. CEA-2043 includes procedures for measuring power consumption for a broad variety of STB types and features, and therefore not all test procedures are applicable to all STBs. The entity specifying the use of CEA-2043 for STB power measurement is expected to select which procedures are required for the STB being tested and is expected to define predetermined testing parameters required by the test procedures chosen.

Several informative annexes are included:

- Annex A maps CEA-2043 measurement parameters to the US EPA ENERGY STAR® Program Requirements for Set-top Boxes,
- Annex B maps CEA-2043 measurement parameters to IEC 62087:2011 *Method of Measurement for the Power Consumption of Audio, Video, and Related Equipment*,
- Annex C provides a method for measuring Satellite STB power consumption when the satellite STB under test is also providing power to the satellite reception equipment (e.g. LNBs), and
- Annex D provides an example of a concurrent testing scenario and a recommended tests and testing parameters for common STB types.
- Annex E provides a Tester Information Template to assist in specifying the use of CEA-2043

2 References

2.1 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.

2.1.1 Informative Reference List

2.1.1.1 ENERGY STAR® Program Requirements for Set-top Boxes, Version 3.0

2.1.1.2 ENERGY STAR® Program Requirements for Set-top Boxes, Version 4.0

2.1.1.3 ANSI/SCTE 28 (2007) Host-POD Interface Standard

2.1.1.4 ANSI/SCTE 55-1 (2009) Digital Broadband Delivery System: Out of Band Transport Part 1: Mode A

2.1.1.5 ANSI/SCTE 55-2 (2008) Digital Broadband Delivery System: Out of Band Transport Part 2: Mode B

2.1.1.6 IEC 62301 Ed. 2.0 (2011) - Household electrical appliances – Measurement of standby power

2.1.1.7 IEC 62087:2011 Method of Measurement for the Power Consumption of Audio, Video, and Related Equipment

2.1.1.8 CSA C380-11 (2011) - Test procedure for the measurement of energy consumption of set-top boxes (STBs)

2.1.2 Informative Reference Acquisition

2.1.2.1 EPA ENERGY STAR® Specifications, 1200 Pennsylvania Ave, NW Washington, DC 20460 (http://www.energystar.gov/index.cfm?c=revisions.settop_box_spec)

2.1.2.2 ANSI/SCTE - Society of Cable Telecommunications Engineers, 140 Philips Road, Exton, PA 19341-1318, Phone: 800-542-5040, Fax: (610) 363-5898 (http://www.scte.org/standards/Standards_Home.aspx)

2.1.2.3 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

2.1.2.4 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

3 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 Definitions

4.1 Auto Power-Down (APD) — a STB feature that monitors parameters correlated with user activity or viewing. If the parameters collectively indicate that no user activity or viewing is occurring, the APD feature enables the STB to transition to SLEEP or OFF mode.

4.2 Client — any device (e.g. STB, Thin-Client STB, Smart TV, Mobile Phone, Tablet, PC, etc.) that can receive content over a Home Network Interface.

4.3 Crest Factor — the ratio of the peak to the root-mean-square (rms) current.

4.4 Digital Video Recorder (DVR) — a STB feature that records television signals on a HDD or other non-volatile storage device. A DVR often includes features such as: Play, Record, Pause, Fast Forward (FF), and Fast Rewind (FR). STBs that support a Service Provider delivery network based “DVR” service are not considered DVR STBs for purposes of this standard. The presence of DVR functionality does not mean the device is defined to be an STB.

4.5 Display Device (DD) — a Display Device (e.g. TV, Computer Monitor, Portable TV, etc.) receives its content directly from an STB through a video interface (e.g. HDMI, Component, Composite, S-Video, etc.), not through a Home Network Interface, and renders it for viewing.

4.6 Harmonic — a component of order n of the Fourier series that describes the periodic current or voltage (where n is an integer greater than 1).

4.7 High Definition Test Stream (HD) — video content delivered to the STB by the content provider to produce a minimum output resolution of 1280×720 pixels in progressive scan mode at minimum frame rate of 59.94 fps (abbreviated 720p60) or a minimum output resolution of 1920×1080 pixels in interlaced scan mode at 29.97 fps (abbreviated 1080i30).

4.8 Home Network Interface (HNI) — the interface with external devices over a local area network (e.g. IEEE 802.11(Wi-Fi), MoCA, HPNA, IEEE 802.3, HomePlug AV).

4.9 Low Noise Block-downconverter (LNB) — a combination of low-noise amplifier, block-downconverter and intermediate frequencies amplifier. It takes the received microwave transmission, amplifies it, down-converts the block of frequencies down to a lower block of

intermediate frequencies where the signal can be amplified and fed to the indoor satellite TV STB using coaxial cable.

4.10 Outdoor Unit (ODU) — the satellite signal reception components including; a receiving dish, one or more LNBs, and imbedded or independent radio frequency (RF) switches, used to distribute a satellite Service Provider network to consumer Satellite STBs.

4.11 Point of Deployment (POD) module — a plug-in card that complies with the ANSI/SCTE 28 interface and is inserted into a digital-cable-ready device to enable the decryption of services and provide other network control functions.

4.12 Power Mode — a condition or state of a device that broadly characterizes its capabilities, power consumption, power indicator coding, and responsiveness to input.

4.13 Principal STB Function — functions necessary for selecting (e.g. EPG), receiving, decoding, decompressing, or delivering video content to a Display Device, DVR, or Client. Monitoring for user or network requests is not considered a Principal STB Function.

4.14 Service Provider — a business entity that provides video content, a delivery network, and associated installation and support services to subscribers with whom it has an ongoing contractual relationship.

4.15 Satellite STB — a STB that receives and decodes video content as delivered from a Service Provider satellite network.

4.16 Set-top Box (STB) — a device whose primary purpose or function is to receive video content which is then delivered to a Display Device, recording device, or Client.

4.17 Smart Card — a plug-in card that complies with ISO/IEC 7816-12 and is inserted into a satellite STB to enable the decryption of services and provide other network control functions.

4.18 Standard Definition Test Stream (SD) — video content delivered to the STB by the content provider to produce an output resolution of 640×480 pixels in interlaced scan mode at minimum frame rate of 29.97 fps (abbreviated 480i30).

4.19 Thin-Client STB — a STB that can receive content over a Home Network Interface from another STB, but is unable to interface directly to the Service Provider network.