



ENERGY STAR® Set-Top Boxes

Draft 1 Version 4.1 Specification

Stakeholder Meeting


March 29, 2013

U.S. Environmental Protection Agency
U.S. Department of Energy



 

Learn more at energystar.gov

Agenda (Eastern Daylight Time)




10 AM – 11 AM	Introduction
11 AM – 12:15 PM	Proposed V4.1 Energy Efficiency Levels
12:15 PM – 1 PM	<i>Break</i>
1 PM – 2 PM	Energy Efficiency Levels (Continued)
2 PM – 3 PM	Test Methods
3 PM – 3:30 PM	Manufacturer Partnership
3:30 PM – 4 PM	Closing Remarks


 

2

Introduction




10 AM – 11 AM	Introduction
11 AM – 12:15 PM	Proposed V4.1 Energy Efficiency Levels
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3:30 PM – 4 PM	Closing Remarks




3

Introduction



- EPA thanks all stakeholders for participating in the Version 4.1 specification revision
- EPA appreciates stakeholders' feedback on the Launch Letter and participation in today's meeting



4

Webinar Details



- Audio provided via conference call in:
 - **Call in:** +1.877.423.6338 (in the US)
+1.571.281.2578 (international)
 - **Code:** 456417
 - Please keep phone lines on mute unless speaking
 - Press *6 to mute and un-mute your line
- Webinar materials will be available online shortly
 - Go to: www.energystar.gov/revisedspecs
 - Click on: Set-Top Boxes



5

Introductions



- **Katharine Kaplan**
EPA Manager, ENERGY STAR Product Development
- **Jeremy Domm**
DOE
- **Matt Malinowski**
ICF International
- **Rachel Unger**
ICF International
- **Tom Bolioli**
Terra Novum
- **Mansi Thakkar**
Navigant



6

ENERGY STAR Program Overview



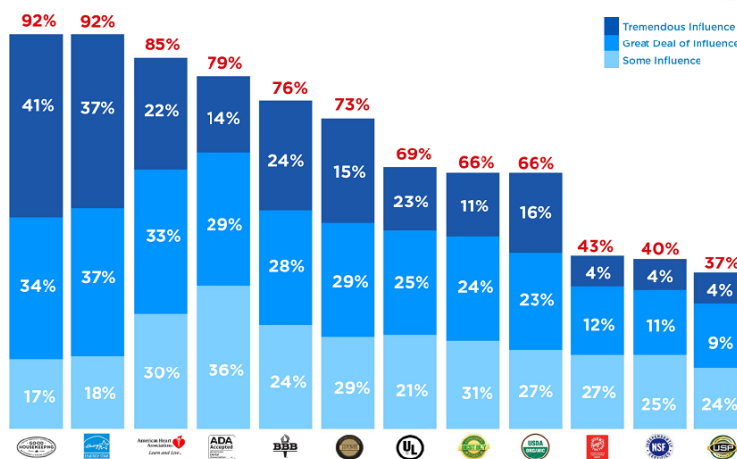
- ENERGY STAR is a public-private partnership program dedicated to helping individuals and businesses protect the environment through superior energy efficiency



- Program covers buildings, homes and products
- More than 60 ENERGY STAR product categories are available in over 40,000 retail storefronts in the US and Puerto Rico and are actively promoted by over 700 utilities programs
- The brand is internationally recognized and implemented

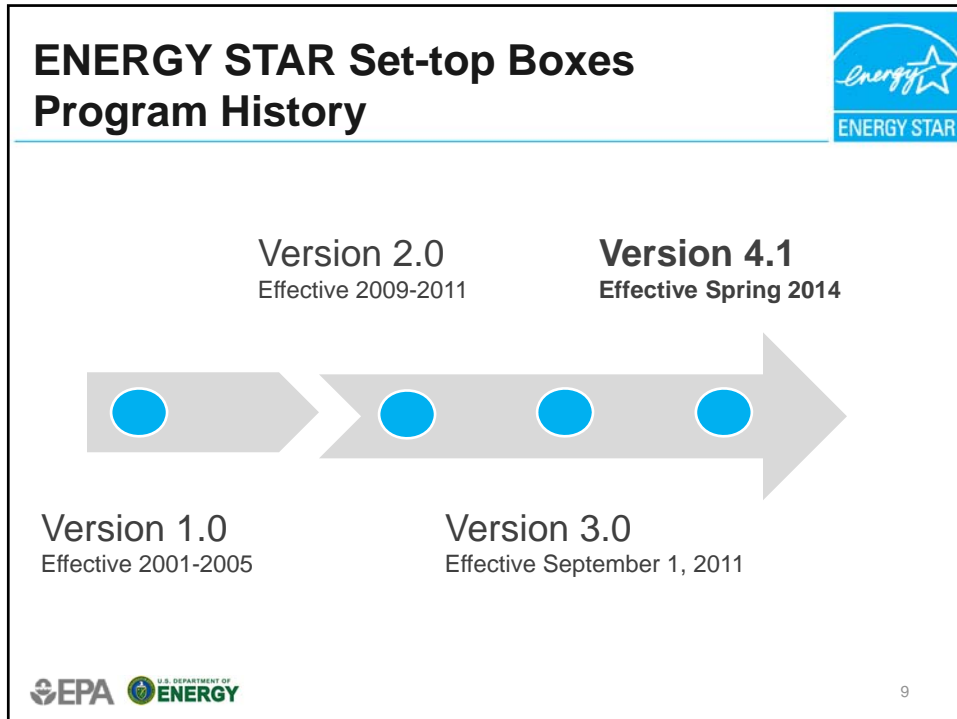


ENERGY STAR Influence




SOURCE: Fairfield Research, July 2011
 The ENERGY STAR mark ranks among the highest level of influence on product purchase among all consumer emblems, similar in ranking to the Good Housekeeping Seal.






Version 3.0 Summary



- Version 3.0 took effect on 9/1/11
- Key aspects of requirements:
 - Base allowances by tech type and allowances for key functionalities
 - TEC approach incentivizes APD to light sleep
 - Additional incentive for deep sleep
 - Multi-room incentive
 - Certified products approx 40% more efficient than conventional products
- 14 Manufacturer partners with 85 certified products
- 6 Service provider partners
- If every set-top box in the US met V3.0:
 - Energy cost savings would grow to about **\$1.8 billion/yr**
 - Annual GHG emissions reduced by the equivalent of emissions from about **2.3 million cars**
- Version 4.0 finalized simultaneously, but superseded by current Version 4.1 development effort



10

Goals of the Version 4.1 Specification Revision (Recap)



- Update Version 4.0 requirements to reflect market evolution—targeted revisions
- Continue to drive the greatest practical energy savings
- Harmonize with latest test procedures from the U.S. Department of Energy (DOE) and Consumer Electronics Association (CEA)



11

Goals of the Meeting




1. Discuss changes to the specification proposed for Version 4.1
2. Hear stakeholder comments on all aspects of the specification
3. Discuss timeline to finalization




12

Proposed V4.1 Energy Efficiency Levels




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13

Section Agenda



- Annual Energy Consumption calculation overview
- Optional Incentives
 - Deep Sleep Incentive
 - Client Only Incentive



14

Annual Energy Consumption



- Previous versions of the STB specification relied on a Typical Energy Consumption (TEC)
- The proposed DOE test procedure outputs an Annual Energy Consumption (AEC) metric:

$$AEC = 0.365 \times \left(\begin{array}{c} P_{WATCH} \times H_{WATCH} + \\ P_{MULTI_STREAM} \times H_{MULTI_STREAM} + \\ P_{SLEEP_MANUAL} \times H_{SLEEP_MANUAL} + \\ P_{SLEEP_APD} \times H_{SLEEP_APD} + \\ P_{OFF} \times H_{OFF} \end{array} \right)$$



Annual Energy Consumption (cont.)

$$AEC = 0.365 \times \left(\begin{array}{c} P_{WATCH} \times H_{WATCH} + \\ P_{MULTI_STREAM} \times H_{MULTI_STREAM} + \\ P_{SLEEP_MANUAL} \times H_{SLEEP_MANUAL} + \\ P_{SLEEP_APD} \times H_{SLEEP_APD} + \\ P_{OFF} \times H_{OFF} \end{array} \right)$$

APD by Default?	Multi-stream?	H_{WATCH}	H_{MULTI_STREAM}	H_{SLEEP_MANUAL}	H_{SLEEP_APD}	H_{OFF}
No	No	14	0	10	0	0
Yes	No	7	0	10	7	0
No	Yes	9	5	10	0	0
Yes	Yes	2	5	10	7	0

V 4.1

APD by Default?	Multi-stream?		H _{WATCH}	H _{MULTI_STREAM}	H _{SLEEP_MANUAL}	H _{SLEEP_APD}	
No	No		14	0	10	0	
Yes	No		7	0	10	7	
No	Yes		9	5	10	0	
Yes	Yes		2	5	10	7	

V 3.0

APD by Default?		APD Deep Sleep ?	T _{TV}		T _{SLEEP}	T _{APD}	T _{DEEP_SLEEP}
No		No	14		10	0	0
Yes		No	7		10	7	0
No		Yes	14		6	0	4
Yes		Yes	7		6	7	4

U.S. DEPARTMENT OF ENERGY 17

V 4.1

APD by Default?	Multi-stream?		H _{WATCH}	H _{MULTI_STREAM}	H _{SLEEP_MANUAL}	H _{SLEEP_APD}	
No	No		14	0	10	0	
Yes	No		7	0	10	7	
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V 3.0

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Yes		No	7		10	7	0
No		Yes	14		6	0	4
Yes		Yes	7		6	7	4

18

V 4.1


APD by Default?	Multi-stream?		H _{WATCH}	H _{MULTI_STREAM}	H _{SLEEP_MANUAL}	H _{SLEEP_APD}	
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Yes	No		7	0	10	7	
No	Yes		9	5	10	0	
Yes	Yes		2	5	10	7	

V 3.0

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Yes		No	7		10	7	0
No		Yes	14		6	0	4
Yes		Yes	7		6	7	4

19

AEC Requirement




- As in Version 3.0, the requirement consists of base and functionality allowances

$$(1 - Incentive_{DEEP_SLEEP} - Incentive_{CLIENT_ONLY}) \times AEC \leq AEC_{SPEC_MAX}$$

$$\leq AEC_{BASE_MAX} + \sum_1^n AEC_{ADDL_i}$$


Optional Incentives AEC Base Allowance Additional Functionality Allowances

- AEC is the only metric for representation



20

AEC Requirement



- As in Version 3.0, the requirement consists of base and functionality allowances

$$(1 - Incentive_{DEEP_SLEEP} - Incentive_{CLIENT_ONLY}) \times AEC \leq AEC_{SPEC_MAX}$$

$$\leq AEC_{BASE_MAX} + \sum_1^n AEC_{ADDL_i}$$



Optional
Incentives

AEC


Base
Allowance

Additional
Functionality
Allowances

- AEC is the only metric for representation





21

Deep Sleep Incentive



- Carried over from the previous version of the STB specification
- Recognizes devices capable of entering a lower power sleep state under appropriate conditions (i.e. nighttime, during limited network activity)
- To be in line with proposed DOE Sleep Mode definition, EPA revised Deep Sleep State definition:

*A power state characterized by reduced power consumption and **more than 30 seconds required** to return to full On Mode functionality.*



22

Deep Sleep Requirements



1. Measured power consumption in Sleep Mode or Deep Sleep State shall be less than or equal to 15% of the power in On Mode or 3 W; and
2. A means of manually activating Deep Sleep shall be accessible . . . within 2 seconds; or
3. Deep Sleep shall be enabled by default and initiated automatically via timer or other means;
4. An override function may be provided



23

Deep Sleep Considerations



- Requires a separate test if does not fall within definition of Sleep Mode:
 - More than 30 seconds to transition to On Mode
- Applies to both STBs and Displayless Video Gateways



24

Deep Sleep Incentive



V 3.0

APD by Default?	APD Deep Sleep ?	T_{TV}	T_{SLEEP}	T_{APD}	T_{DEEP_SLEEP}
No	No	14	10	0	0
Yes	No	7	10	7	0
No	Yes	14	6	0	4
Yes	Yes	7	6	7	4

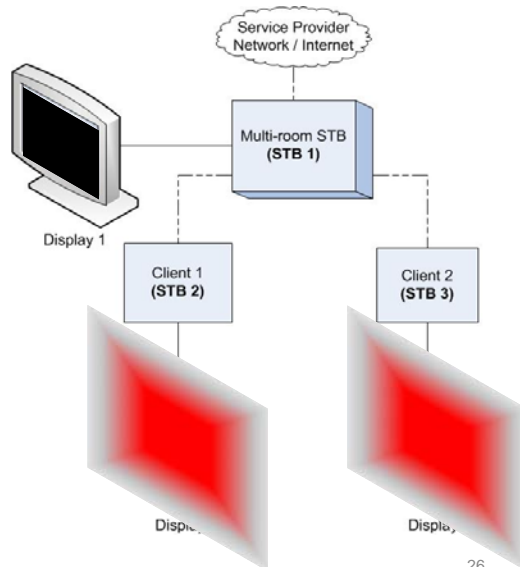
- Power levels in Deep Sleep multiplied by time spent results in a 17% incentive
- Applied prior to comparing AEC to requirement



25

Client Only Incentive

- Applies to Multi-room STBs that save energy while performing network functions only
 - Local display turned off



26

Client Only Testing



- Based on DOE test procedure
 - Simply an additional test using existing multi-stream setup
 - Test also confirms if UUT can be woken by client

Client Only Incentive



- Incentive is proportional to savings over multi-stream scenario with local display turned on, as measured per the DOE test method:

$$Incentive_{CLIENT_ONLY} = \frac{P_{MULTI_STREAM} - P_{CLIENT_ONLY}}{P_{MULTI_STREAM}}$$

- Applied prior to comparing AEC to requirement

Open Comment



At this time, EPA welcomes any comments from stakeholders.




Break




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Energy Efficiency Levels Continued




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31

Section Agenda




- Base Allowances:
 - New Over-the-top IP category
 - Lower Allowance for Thin Clients
- Additional Functionalities:
 - Multi-input, Multi-Output WiFi Home Network Interface
 - Multi-room




32


Base Allowances



Base Type	Version 3.0	Version 4.0
Cable	60	45
Satellite	70	50
Cable DTA	35	25
Internet Protocol (IP)	50	25
Terrestrial	22	18
Thin-client / Remote	35	20


33


Base Allowances




Base Type	Version 3.0	Version 4.0
Cable	60	45
Satellite	70	50
Cable DTA	35	25
Internet Protocol (IP)	50	25
Terrestrial	22	18
Thin-client / Remote	35	20

Stakeholder Comments:


- Higher allowance for IP
- Higher allowance for Cable DTA


34



Base Allowances



Base Type	Version 3.0	Version 4.0	Version 4.1
Cable	60	45	45
Satellite	70	50	50
Cable DTA	35	25	0
Service Provider IP	50	25	45
Over-the-top (OTT) IP			10
Terrestrial	22	18	18
Thin-client / Remote	35	20	10



35

- ## Base Allowances Summary
- 
- Over-the-top IP
 - Added category to split out the non-MVPD retail devices from the network-specific devices
 - 10 kWh AEC base allowance
 - Service Provider IP: Similar to Cable and Satellite
 - Cable DTA: No shipments in 2014
 - Thin-client/Remote:
 - Similarities with Retail IP STBs and ability to enter Deep Sleep
 - 10 kWh AEC base allowance
- 
- 36

Open Comment



At this time, EPA welcomes any comments from stakeholders.



Additional Functionality Allowances



Additional Functionality	Version 3.0	Version 4.0
Advanced Video Processing (AVP)	12	8
CableCARD	15	15
Digital Video Recorder (DVR)	45	36
DOCSIS®	20	15
High Definition (HD)	25	16
Home Network Interface (HNI)	10	8



Additional Functionality Allowances



Additional Functionality	Version 3.0	Version 4.0
Advanced Video Processing (AVP)	12	8
CableCARD	15	15
Digital Video Recorder (DVR)	45	36
DOCSIS®	20	15
High Definition (HD)	25	16
Home Network Interface (HNI)	10	8

Stakeholder Comments:

- More allowance for: AVP, DVR, HD, HNI



Additional Functionality Allowances



Additional Functionality	Version 3.0	Version 4.0	Version 4.1
Advanced Video Processing (AVP)	12	8	8
CableCARD	15	15	15
Digital Video Recorder (DVR)	45	36	36
DOCSIS®	20	15	15
High Definition (HD)	25	16	16
Home Network Interface (HNI)	10	8	8



Additional Functionality Allowances



- No changes to first half of allowances:
 - **HD:** Most STBs can already output video at HD/1080p resolution
 - **DVR:** No impact of higher-capacity hard drives on energy consumption
 - **AVP:** Additional power for transcoding will be handled through multi-room adder
 - **HNI:** Although changes in networking technology are reducing power of network links, EPA will be proposing an adder for Multi-input, Multi-output Wi-Fi




Additional Functionality Allowances (cont.)





Additional Functionality	Version 3.0	Version 4.0
Multi-room	40	30
Multi-stream – Cable/Satellite	16	8
Multi-stream – Terrestrial/IP	8	6
Removable Media Player	8	8
Removable Media Player / Recorder	10	10




Additional Functionality Allowances (cont.)





Additional Functionality	Version 3.0	Version 4.0	Stakeholder Comments: <ul style="list-style-type: none"> • More allowance for: <ul style="list-style-type: none"> ○ 3D ○ Multi-room
Multi-room	40	30	
Multi-stream – Cable/Satellite	16	8	
Multi-stream – Terrestrial/IP	8	6	
Removable Media Player	8	8	
Removable Media Player / Recorder	10	10	



43

Additional Functionality Allowances (cont.)



Additional Functionality	Version 3.0	Version 4.0	Version 4.1
MIMO WiFi HNI	–	–	$N_{2.4\text{ GHz}} + 2 \times N_{5\text{ GHz}}$
Multi-room	40	30	40
Multi-stream – Cable/Satellite	16	8	8
Multi-stream – Terrestrial/IP	8	6	6
Removable Media Player	8	8	0
Removable Media Player / Recorder	10	10	0



44

MIMO WiFi HNI



$$N_{2.4 \text{ GHz}} + 2 \times N_{5 \text{ GHz}},$$

- N is the number of spatial streams per frequency:

2x2:2 3x3:2 or 2x3:2 (IEEE notation)

Number of Spatial Streams

- All above examples have 2 streams per frequency
- Scales energy allowance with performance
- Adds to HNI or MR adder when UUT tested with WiFi enabled—not a standalone adder
- Based on Small Network Equipment data



Multi-room



- Version 4.0 Multi-room allowance was developed based on a limited number of prototype devices
- Client-server Multi-room devices are now available in the market
- Higher functionality than previously expected justifies higher energy allowance—40 kWh



Open Comment



At this time, EPA welcomes any comments from stakeholders.



Test Methods



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Section Agenda



- DOE Test Procedure
- CEA Test Procedure
- Client Only Incentive
- Displayless Video Gateway Testing
- Deep Sleep Incentive



New Referenced Test Methods



- EPA has replaced the reference to the 2011 ENERGY STAR Test Method with the **Proposed DOE Test Procedure for Set-top Boxes** published on January 23, 2013. 78 FR 5076.
- The V4.1 specification will be reviewed and updated to reference the finalized test procedure.

5076 Federal Register / Vol. 78, No. 14 / Wednesday, January 23, 2013 / Proposed Rules

DEPARTMENT OF ENERGY
ENERGY STAR PROGRAM
DOE Test Procedure for Set-top Boxes
78 FR 5076 (2013-01-23-01)

DOE Test Procedure for Set-top Boxes
78 FR 5076 (2013-01-23-01)

Summary: The U.S. Department of Energy (DOE) is proposing to update the DOE Test Procedure for Set-top Boxes (STB) to reflect the most current information available regarding the design and operation of STBs. The proposed update includes changes to the test procedure for STBs that are used for video-on-demand (VOD) services, as well as changes to the test procedure for STBs that are used for other services, such as pay-per-view (PPV) and interactive services. The proposed update also includes changes to the test procedure for STBs that are used for other services, such as pay-per-view (PPV) and interactive services. The proposed update also includes changes to the test procedure for STBs that are used for other services, such as pay-per-view (PPV) and interactive services.

Authority: 42 USC 6253; 10 CFR 431.207.

Comments: Interested parties should submit comments to the Office of Energy Efficiency and Renewable Energy, Department of Energy, Washington, DC 20585, by February 19, 2013. Comments should be submitted to the following email address: stb@ee.doe.gov.

For Further Information: For more information on the proposed update to the DOE Test Procedure for Set-top Boxes, please contact the Office of Energy Efficiency and Renewable Energy, Department of Energy, Washington, DC 20585, by telephone at (202) 586-5076 or by email at stb@ee.doe.gov.

Supplemental Notes: The proposed update to the DOE Test Procedure for Set-top Boxes is available at www.eere.doe.gov/stb.

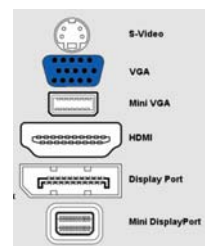


Scope of DOE Test Procedure



- EPA has adopted the DOE proposed definition for **Set-top Box**:

*A device combining hardware components with software programming designed for the primary purpose of receiving television and related services from terrestrial, cable, satellite, broadband, or local networks, **providing video output using at least one direct video connection.***



www.diyaudioandvideo.com

- Once finalized, this test procedure shall be the sole procedure for reporting the energy consumption (AEC) of STBs in the U.S.



51

Basic Model



- EPA has adopted DOE's definition of basic model and sampling plan for AEC representation
 - Basic Model: Basic model means all units of a given type of covered product (or class thereof) manufactured by one manufacturer, having the same primary energy source, and which have essentially identical electrical, physical, and functional (or hydraulic) characteristics that affect energy consumption, energy efficiency, water consumption, or water efficiency.*
 - Sampling Plan: Per 10 CFR Part 429.55



52

Open Comment



At this time, EPA welcomes any comments from stakeholders.

Displayless Video Gateway Definition



- EPA proposes expanding the scope to include devices without direct video connections

Displayless Video Gateway: A device that receives, encodes, and decodes video content which is then delivered to a recording device or Client, but not a Display Device, through quadrature amplitude modulation (QAM) or Multimedia over Coaxial Alliance (MoCA) video with a Digital Living Networking Alliance (DLNA) or similar security layer.

Gateway Trends



- Gateways may be designed to interact with other unmanaged CE devices (laptops, tablets, smartphones, game consoles)
 - Infrastructure transitioning from QAM system to a hybrid IP and QAM environment and ultimately to all-IP over the next several years
 - Gateways enable multi-room solutions and deployment of energy saving Thin Clients
- ↓
- Inclusion of gateways in the V4.1 specification provides greater flexibility to recognize new product designs



55

Displayless Video Gateway Classification



		Video Delivery to Display Device?		
		Yes	No	
			Video Delivery to Recording Device or Client Through QAM or MoCA?	
		Yes	No	
Direct Service Provider Source Input?	Yes	STB	Displayless Video Gateway	Small Network Equipment covered in separate ENERGY STAR Specification
	No	Thin Client/ Remote STB	Excluded from Scope	



56

Additional Test Procedures



- For measurements and scope not covered by DOE, EPA is proposing to reference draft CEA-2043 test procedures:
 - Displayless Video Gateways;
 - Client Only incentive; and
 - Deep Sleep State incentive



Network and Output Connections



- EPA has aligned the specified network and output connection precedence with the proposed DOE Test Procedure

Input/Network Connection (Protocol)
1. Coax (QAM/DOCSIS)
2. Coax (MoCa)
3. Coax (HPNA)
4. Coax (Satellite)
5. WiFi
6. Ethernet
7. HomePlug AV
8. Other

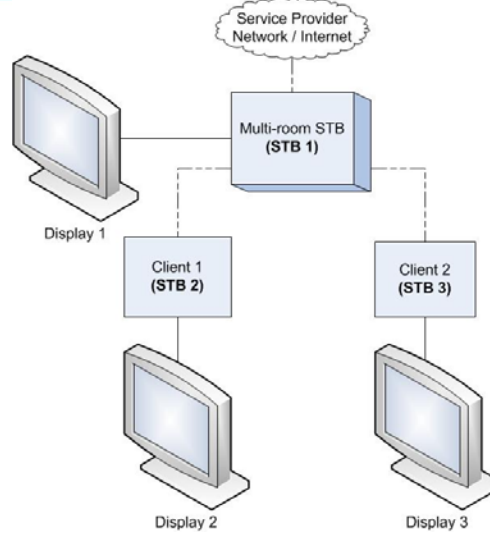
Output Connection (Protocol)
1. HDMI/DVI
2. Component
3. S-Video
4. Composite
5. Coax
6. Other



STB Set-Up for Client Only Incentive



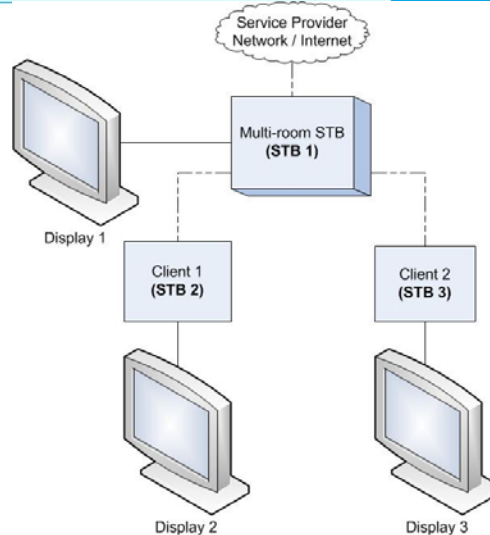
- EPA is proposing this scenario to assess the Multi-room STB's behavior and associated energy use when Clients are playing content on Display Devices while the Multi-room STB (UUT) is in Sleep.



Client Only Incentive Test



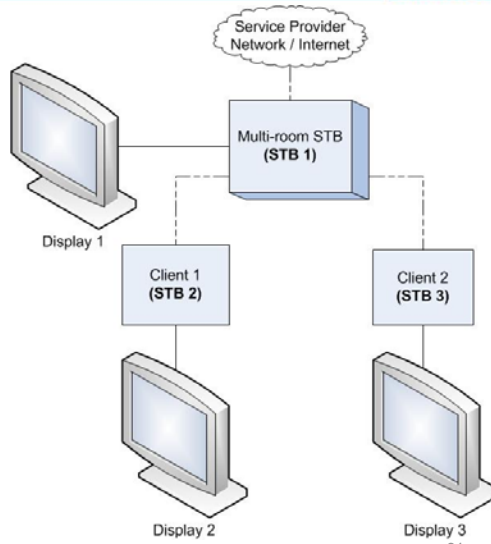
STB	Draft CEA-2043 Test	Result	Notes
STB 1 (UUT)	8.3 SLEEP	P CLIENT_ONLY	Multi-room STB not being used locally for viewing or recording
STB 2	8.2.2.3: ON (Play)	Not Measured	Thin Client in On Mode over a home network
STB 3	8.2.2.3: ON (Play)	Not Measured	Thin Client in On Mode over a home network



Client Only Incentive Test



STB	Draft CEA-2043 Test	Result	Notes
STB 1 (UUT)	8.3 SLEEP	P CLIENT_ONLY	Multi-room STB not being used locally for viewing or recording
STB 2	8.2.2.3: ON (Play)	Not Measured	Thin Client in On Mode over a home network
STB 3	8.2.2.3: ON (Play)	Not Measured	Thin Client in On Mode over a home network

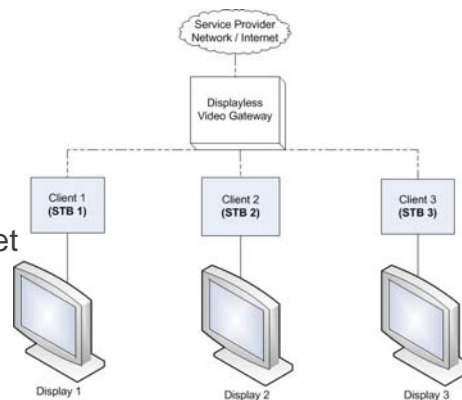


61

Displayless Video Gateway Set-Up




- Any PSTN telephone technology shall be connected
- Devices with Ethernet or MoCA based local networking technologies shall have either an Ethernet switch supporting the same Ethernet speed of the gateway device or a compatible MoCA bridge device




62


Displayless Video Gateway Measurements



- Two scenarios: All On and All Sleep
- The devices shall concurrently run all of the applicable draft CEA-2043 tests. Only UUT measured power is recorded.



63

Displayless Video Gateway Measurements



- All On Scenario:

Device	CEA-2043 Test	Result	Notes
Displayless Video Gateway (UUT)	8.2.2.1: ON (Watch)	P_{MULTL_STREAM}	All Clients in On Mode
STB 1	8.2.2.1: ON (Watch)	Not Measured	Watching TV on a Display Device connected to Thin Client/Remote STB over a home network
STB 2	8.2.2.1: ON (Watch)	Not Measured	Watching TV on a Display Device connected to Thin Client/Remote STB over a home network
STB 3	8.2.2.1: ON (Watch)	Not Measured	Watching TV on a Display Device connected to Thin Client/Remote STB over a home network


64

Displayless Video Gateway Measurements



- All Sleep Scenario:

Device	CEA-2043 Test	Result	Notes
Displayless Video Gateway (UUT)	8.3.4.1 SLEEP	P_{SLEEP}	All Clients in SLEEP mode
STB 1	8.3.4.1 SLEEP	Not Measured	Thin Client/Remote STB in SLEEP mode over a home network
STB 2	8.3.4.1 SLEEP	Not Measured	Thin Client/Remote STB in SLEEP mode over a home network
STB 3	8.3.4.1 SLEEP	Not Measured	Thin Client/Remote STB in SLEEP mode over a home network



Displayless Video Gateway AEC



- EPA proposes the following AEC calculation:

$$AEC = 0.365 \times \left(P_{MULTI_STREAM} \times H_{MULTI_STREAM} + P_{SLEEP_MANUAL} \times [H_{SLEEP_MANUAL} + H_{SLEEP_APD}] \right)$$

APD by Default?	H_{MULTI_STREAM}	H_{SLEEP_MANUAL}	H_{SLEEP_APD}
No	14	10	0
Yes	7	10	7



Open Comment



At this time, EPA welcomes any comments from stakeholders.



67

Deep Sleep State Test



- Deep Sleep State meeting the definition of Sleep Mode shall be tested per DOE test procedure
- For Deep Sleep States that require more than 30 seconds to transition to On Mode, EPA has proposed an additional test procedure
 - Setup per CEA-2043;
 - Number of connected devices unspecified as long as all in Sleep Mode;
 - All other test conditions from DOE test procedure
- This measurement applies only to the Deep Sleep State incentive



68

Open Comment



At this time, EPA welcomes any comments from stakeholders.



Manufacturer Partnership



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Manufacturer Partner Commitments: Toxicity and Recyclability



- ENERGY STAR: differentiating products based on energy efficiency only
- In developing these requirements, EPA seeks to avoid associating the ENERGY STAR label with poor quality or otherwise undesirable products
- Many ENERGY STAR product specifications (e.g. lighting) incorporate non-energy requirements. Reflects longstanding practice of ensuring that ENERGY STAR products deliver on consumer expectation for quality



71

Manufacturer Partner Commitments: Toxicity and Recyclability



In making CE purchase decisions, factors such as price (95%) and product features (88%) are most vital in purchase decision making.

Surprisingly, environmental factors, including energy consumption (85%) and the ability to recycle a device (70%) were highly rated on the decision tree (above elements such as brand and size) – a possible indication that these considerations are weighing more heavily on consumers' minds.

- Source: Consumer Electronics Association, "Powering Intelligent Electricity Use," 2011



72

Manufacturer Partner Commitments: Toxicity and Recyclability



- Non-energy requirements are exempt from third party certification process
- Non-energy requirements are not intended for international adoption
- When products are sold in countries other than the U.S., they are not subject to proposed non-energy requirements



Standard CE/IT Toxicity and Recyclability Language



- Product material requirements as defined in restriction of hazardous substances (RoHS) regulations, as generally accepted. This includes exemptions in force at the date of product manufacture, where the maximum concentration values tolerated by weight in homogeneous materials are: lead (0.1%), mercury (0.1%), cadmium (0.01%), hexavalent chromium (0.1%), polybrominated biphenyls (PBB) (0.1%), or polybrominated diphenyl ethers (PBDE) (0.1%). Batteries are exempt.
- The generally accepted attributes of a recyclable product at the date of product manufacture: where products shall be designed for ease of disassembly and recyclability where external enclosures, sub-enclosures, chassis and electronic subassemblies are easily removable with commonly available tools, by hand, or by a recycler's automated processes.



Open Comment



At this time, EPA welcomes any comments from stakeholders.



Closing Remarks



10 AM – 11 AM	Introduction
11 AM – 12:15 PM	Proposed V4.1 Energy Efficiency Levels
12:15 PM – 1 PM	<i>Break</i>
1 PM – 2 PM	Energy Efficiency Levels (Continued)
2 PM – 3 PM	Test Methods
3 PM – 3:30 PM	Manufacturer Partnership
3:30 PM – 4 PM	Closing Remarks



Written Comments



- In addition to making verbal comments during today's meeting, stakeholders are strongly encouraged to submit written comments and data
- Please send all comments to: stbs@energystar.gov

Comment Deadline
Monday, April 15, 2013



Anticipated V4.1 Specification Development Timeline



Milestone	Anticipated Date
Final Draft	June 2013
Final Specification	Summer 2013
Effective Date	Spring 2014



Open Comment



- EPA would now like to open up the line for any additional comments from stakeholders



79

Contact Information



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80

References and Resources



- ENERGY STAR STB specification development:
Go to www.energystar.gov/RevisedSpecs
and Click on “Set-top Boxes”
- U.S. Department of Energy Set-top Box Rulemaking:
http://www1.eere.energy.gov/buildings/appliance_standard/residential/set_top_boxes.html
- CEA-2043, Set-top Box Power Measurement
http://standards.cea.org/apps/group_public/project/details.php?project_id=51



Thank you!



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