



ENERGY STAR®
Televisions
Draft 1 Specification Webinar
March 20, 2017

ENERGY STAR Products Labeling Program



Webinar Details

- Webinar slides and related materials will be available on the Television Product Development Web page:
 - www.energystar.gov/RevisedSpecs
 - Follow link to “Version 8.0 is in Development” under “Televisions”
- Audio provided via teleconference:
 - Call in:** +1 (877) 423-6338 (U.S.)
+1 (571) 281-2578 (International)
 - Code:** 773-366 #
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 - Please mute line unless speaking
 - Press *6 to mute and *6 to un-mute your line



Webinar Agenda

- Introductions
- Goals for Revision
- Draft 1 Specification
 - Scope
 - Alerting Changes in Power Consumption
 - Screen Brightness
 - Automatic Brightness Control (ABC)
 - Luminance Requirements
 - Additional Energy Saving Features
 - High Dynamic Range (HDR)
- Open Discussion
- Timeline and Conclusion



Introductions

Time	Topic
1:00–1:05	Introductions
1:05–1:15	Goals for Revision
1:15–3:15	Draft 1 Specification
1:15–1:30	Scope
1:30–1:45	Alerting Changes in Power Consumption
1:45–2:45	ABC Persistence and Screen Brightness
2:45–3:00	Additional Energy Saving Features
3:00–3:15	High Dynamic Range (HDR)
3:15–3:30	Timeline and Conclusion



Introductions

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Timeline to this point

Event	Date
<i>Version 8.0 Launch and Data Assembly</i>	<i>August 5, 2016</i>
<i>Version 8.0 Launch Webinar</i>	<i>October 3, 2016</i>
<i>Version 8.0 Launch Data and Comment Deadline</i>	<i>November 1, 2016</i>
<i>Version 8.0 Draft 1 Specification</i>	<i>March 10, 2017</i>
Version 8.0 Draft 1 Specification Webinar	March 20, 2016



Goals for Revision

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Goals for Version 8.0

1. Ensure energy savings and deliver a positive viewing experience for consumers.
2. Encourage the persistence of energy savings features, thus taking interim steps to ensure ENERGY STAR is recognizing efficient TVs based on real-world energy use.
3. Enable consumers to better understand the energy use of today's efficient televisions.
4. Better understand impact of more prominent features, such as HDR upscaling.



Proposed Priority Areas for Version 8.0

- More specifically, EPA has included the following in the Draft 1 Specification to achieve these goals:
 - Effectiveness and persistence of Automatic Brightness Control (ABC)
 - Alerting consumers to changes in power consumption in settings where ABC is not enabled
 - Prohibit certification of TVs unless energy saving features deliver comparable savings under various typical viewing environments
 - Testing and reporting for a better understanding of HDR
 - Expand scope to include ‘tuner-less’ TVs



Stakeholder Feedback from Launch

- Several stakeholders suggested considering power consumption in non-default Preset Picture Settings.
 - Stakeholders supported updating the standby power test method for Smart TVs to reflect that continuous connectivity yields greater power consumption. One also recommended measuring the resume time between when a TV is switched on and is fully ready to be used.
 - Two stakeholders supported eliminating or reducing the UHD adder, while another supported keeping the adder to at least 40%.
-
- While EPA has not proposed power requirements for additional picture settings, Version 8.0 Specification focuses on addressing the persistence of ABC in the Default Picture Setting and across multiple picture settings in order to ensure greater energy savings.
 - EPA intends to maintain the Version 7.0 On Mode levels in Version 8.0. Once the impact of the persistence of energy savings features on power consumption is better understood, EPA will evaluate the opportunity to revise criteria in a future revision.



Scope

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Scope Expansion

- Version 8.0 scope proposal to include a Home Theater Display (HTD)
- Proposed definition:

- 2) Home Theater Display (HTD): A product with diagonal viewable screen size greater than 25 inches, that is designed to produce dynamic video **that does not contain an internal TV tuner** encased within the product housing, that is primarily marketed for use in home theater applications, and that is capable of receiving dynamic visual content from wired or wireless sources including but not limited to:
- a) Display-specific data connections, such as HDMI, Component video, S-video, Composite video; and/or
 - b) Media storage devices such as a USB flash drive, a memory card, or a DVD; and/or
 - c) Network connections, usually using Internet Protocol, typically carried over Ethernet or Wi-Fi.

Home Theater Display does not include Computer Monitors or Signage Displays (defined in the ENERGY STAR Product Specification for Displays).



Home Theater Display (HTD) Addition

HTDs support TV viewing through a direct connection to a set-top box or streaming from the Internet rather than via a tuner.

- EPA proposes this addition due to stakeholder feedback that numerous future products, including high-volume products, will be shipping without a tuner.
 - 10 CFR 430.2 TV definition excludes these products
 - ENERGY STAR has continued to align the TV definition and has added the HTD definition to include these products
- Version 8.0 would apply the same requirements to HTDs



Home Theater Display (HTD) Addition

- HTD Proposed Definition:
 - Includes tuner-less TV products with diagonal viewable screen size > 25 in.
 - Excludes Computer Monitors & Signage covered under the Displays Specification

Signage Display: An Electronic Display intended for multiple people to view in non-desk based environments, such as retail or department stores, restaurants, museums, hotels, outdoor venues, airports, conference rooms or classrooms. For the purposes of this specification, a Display shall be classified as a Signage Display if it meets two or more criteria listed below:

- (1) Diagonal screen size is greater than 30 inches;
- (2) Maximum Reported Luminance is greater than 400 candelas per square meter;
- (3) Pixel density is less than or equal to 5,000 pixels per square inch; or
- (4) Ships without a mounting stand.

EPA seeks feedback on whether the proposed definition clearly differentiates between HTDs and Signage Displays.



Alerting Changes in Power Consumption

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Alerting Consumers to Changes in Power Consumption

- To help consumers better understand the energy impacts of TVs/HTDs when selecting different picture settings and functions, EPA proposes to include a requirement that TVs/HTDs alert users of energy consumption increases when:
 - Selecting a Preset Picture Setting that does not have ABC enabled by default
 - More energy consumptive features are activated, such as HDR upscaling
- EPA also proposes to include a requirement that ABC Functionality remain enabled during manual adjustments to any of the TV/HTD's picture parameters to ensure that such adjustments do not automatically disable ABC.



ABC Persistence and Screen Brightness

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Automatic Brightness Control (ABC) Persistence

One stakeholder suggested maintaining the Version 7.0 method of ABC testing and stressed the importance of not requiring energy saving features, like ABC, to remain on in certain intentionally bright picture settings. Another stakeholder supported requiring persistence of ABC to receive credit for ABC. Finally, a suggested that EPA require persistence of ABC across all Preset Picture Settings.

- EPA seeks to ensure the persistence of ABC across as many Preset Picture Settings as possible, if the TV certifies with ABC enabled



Automatic Brightness Control (ABC) Persistence

In discussions with stakeholders, EPA learned that in certain TVs, Preset Picture Settings dedicated to displaying true HDR content (not upscaled content) appear only if the TV detects incoming true HDR content.

Also, in observing models available in the market and through discussions with stakeholders, EPA understands that manufacturers have varying numbers of picture settings. So a percentage requirement for # of picture settings allowed without ABC enabled may favor those with a greater # of total picture settings.

- As a result, EPA has proposed a specific number of Preset Picture Settings to have ABC enabled. Also, EPA noted that the total number of Preset Picture Settings should include only those displayed with regular, non-HDR content because the test clip contains only non-HDR content.



ABC Persistence: Requirements for Product Certification

- For TVs certifying with ABC enabled by default, EPA has proposed that for:

TVs with up to 4 Preset Picture Settings

Only one or no Preset Picture Settings without ABC enabled by default.

TVs with more than 4 Preset Picture Settings

No more than two Preset Picture without ABC enabled by default.

Any Retail Configurations that are offered will be excluded from the total number of Preset Picture Settings available, as EPA heard from stakeholders that these configurations are not intended for in-home use.



Requirements to Certify with ABC Enabled by Default

- If the TV does not meet the requirements for ABC persistence across multiple Preset Picture Settings, the TV shall not be certified with ABC enabled. In such cases:
 - A second On Mode test will be performed, without ABC enabled according to Section 7.1.2 of Appendix H to Subpart B of 10 CFR 430, *On Mode Test for TVs without ABC Enabled by Default*
 - The resulting On Mode power shall be less than the sum of the maximum on mode power requirements and the high resolution allowance (as applicable):

$$P_{ON} \leq P_{ON_MAX} + P_{HR}$$

The proposed approach is intended to:

- Encourage persistence of quality implementations of ABC
- Allow flexibility in implementing ABC since implementing ABC may not be feasible or desirable in certain Preset Picture Settings



Luminance Requirements

- To ensure that the user experience with ABC is a good one and that TVs do not ship too dim, EPA has proposed two additional luminance requirements:

3.6 Luminance Requirements

3.6.1 For products with a luminance in the Brightest Selectable Preset Picture Setting (the greater value of $L_{\text{DEFAULT_RETAIL}}$ or $L_{\text{BRIGHTEST_HOME}}$) less than 350 cd/m^2 , luminance in the Default Picture Setting ($L_{\text{DEFAULT_HOME}}$) shall be greater than or equal to 65% of the luminance in the Brightest Selectable Preset Picture Setting.

3.6.2 For products with a luminance in the Brightest Selectable Preset Picture Setting greater than or equal to 350 cd/m^2 , luminance in the Default Picture Setting shall be greater than or equal to 228 cd/m^2 .

3.6.3 For products that certify to the On Mode requirements with ABC enabled by default, the average luminance at the illuminance conditions of 3, 12, 35, and 100 lux with ABC enabled shall be greater than or equal to 50% of the TV's luminance in the Brightest Selectable Preset Picture Setting.

3.6.4 For products that certify to the On Mode requirements with ABC enabled by default, the luminance at 3 lux in the Default Picture Setting, with ABC enabled, shall be greater than or equal to 150 cd/m^2 .

- These requirements seek to ensure that the luminance in the Default Picture Setting is acceptable to users so that the ENERGY STAR certified picture setting will persist in the home.



Luminance Requirements

- The Imaging Science Foundation (ISF) advocates that ABC should not dim the TV screen brightness below 150 nits in a dark room.
 - The ISF Expert dark room picture setting typically delivers a brightness of at least 150 nits.
 - ISF noted that unnaturally dim performance with ABC enabled is the most common complaint that ISF calibrators currently face when adjusting TV settings in the field.

In addition, several stakeholders expressed support for establishing minimum luminance levels for TVs that are certified with ABC enabled.

Luminance Testing

- EPA tested TVs with ABC enabled by default and measured the luminance and average power in a 3 lux illuminance condition. This was compared to the luminance of the picture setting optimized for viewing in a darkened room (e.g., Movie, Cinema, etc.).

	A2		A1		B2		E4		F1		C1		D1	
	Luminance (Nits)	Avg. Power (W)												
3 Lux Illuminance Condition	14.00	65.73	23.00	48.12	25.18	93.94	72.89	52.69	154.10	71.63	100.00	78.49	140.18	76.55
Darkened Room Picture Setting	N/A	133.51	199.27	121.73	146.65	136.20	N/A	76.81	N/A	103.14	N/A	121.31	N/A	119.58

- These results demonstrate that models with ABC enabled in default are often much dimmer and use much less power when tested at 3 lux than they do when tested in the 'darkened room picture setting'

Do circumstances exist where the screen luminance at 3 lux must be dimmer than the screen luminance for the picture setting intended for a darkened room?



Energy Saving Features

Time	Topic
1:00–1:05	Introductions
1:05–1:15	Goals for Revision
1:15–3:15	Draft 1 Specification
1:15–1:30	Scope
1:30–1:45	Alerting Changes in Power Consumption
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Energy Saving Features

- EPA has included language prohibiting certification of TVs if they have energy saving features enabled during testing with the IEC test clip that do not offer comparable savings when tested realistic viewing content
- EPA seeks to ensure that ENERGY STAR certified TVs deliver promised savings.

3.2.3 Energy Saving Features: A TV/HTD may not be certified with any detectable or undetectable energy saving feature (e.g., Motion Detection Dimming) enabled during testing unless that feature provides comparable energy savings during typical viewing experiences (i.e., the duration of a variety of popular programming) as to those realized when tested according to Appendix H to Subpart B of 10 CFR Part 430. This prohibition applies irrespective of whether the function's primary or intended purpose is energy savings.



Energy Saving Features

- 3 organizations tested a number of TVs containing a feature DOE termed Motion Detection Dimming (MDD), enabled by default
 - Test data demonstrated MDD does not consistently deliver energy savings
 - This data showed that savings with MDD enabled are greater using the IEC test clip than with the non-IEC test clips which reflected a range of content and typical viewing experiences

Energy Saving Features

- Test data results:

Testing Organization	TV Model	Realistic Clip Content	IEC Clip			Realistic Clip			Realistic Clip Compared to IEC		
			MDD Off Power (W)	MDD On Power (W)	MDD Savings (W)	MDD Off Power (W)	MDD On Power (W)	MDD Savings (W)	% Diff in non-MDD Power	% Diff in MDD Power	% Diff in MDD Savings
CLASP	CP26	STEP Test Clip	72.3	61.5	10.8	70.0	68.0	2.0	3%	-11%	81%
	CP27		141.7	131.6	10.1	134.1	135.9	-1.8	5%	-3%	118%
	CP28		236.0	130.0	106.0	240.0	191.0	49.0	-2%	-47%	54%
DOE	Brand X #1	Movies, News, Sports	70.5	52.7	17.8	70.2	55.6	14.6	0%	-6%	18%
	Brand X #3		103.3	91.1	12.2	103.9	97.8	6.1	-1%	-7%	50%
	Brand Y #4		60.7	42.6	18.1	60.7	55.3	5.4	0%	-30%	70%
NRDC	Brand A #1	Drama, News, Comedy, Sports, Commercials	124.9	99.7	25.2	124.2	125.0	-0.8	1%	-25%	103%
	Brand A #2		180.5	124.9	55.6	178.2	144.4	33.8	1%	-16%	39%
	Brand B		119.1	75.3	43.8	118.9	105.3	13.6	0%	-40%	69%
AVERAGE			123.2	89.9	33.3	122.2	108.7	13.5	1%	-21%	59%

- These data do not indicate comparable performance between testing with the IEC clip and testing with the typical viewing experiences.



Energy Saving Features

- Test data results:

Testing Organization	TV Model	Realistic Clip Content	IEC Clip			Realistic Clip			Realistic Clip Compared to IEC		
			MDD Off Power (W)	MDD On Power (W)	MDD Savings (W)	MDD Off Power (W)	MDD On Power (W)	MDD Savings (W)	% Diff in non MDD Power	% Diff in MDD Power	% Diff in MDD Savings
CLASP	CP26	STEP Test Clip	72.3	61.5	10.8	70.0	68.0	2.0	3%	-11%	81%
	CP27		141.7	131.6	10.1	134.1	135.9	-1.8	5%	-3%	118%
	CP28		236.0	130.0	106.0	240.0	191.0	49.0	-2%	-47%	54%
DOE	Brand X #1	Movies, News, Sports	70.5	52.7	17.8	70.2	55.6	14.6	0%	-6%	18%
	Brand X #3		103.3	91.1	12.2	103.9	97.8	6.1	-1%	-7%	50%
	Brand Y #4		60.7	42.6	18.1	60.7	55.3	5.4	0%	-30%	70%
NRDC	Brand A #1	Drama, News, Comedy, Sports, Commercials	124.9	99.7	25.2	124.2	125.0	-0.8	1%	-25%	103%
	Brand A #2		180.5	124.9	55.6	178.2	144.4	33.8	1%	-16%	39%
	Brand B		119.1	75.3	43.8	118.9	105.3	13.6	0%	-40%	69%
AVERAGE			123.2	89.9	33.3	122.2	108.7	13.5	1%	-21%	59%

- These data do not indicate comparable performance between testing with the IEC clip and testing with the typical viewing experiences.

Energy Saving Features

- Test data results:

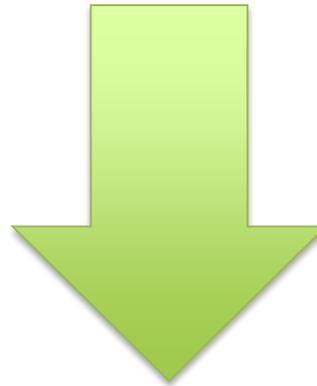
Testing Organization	TV Model	Realistic Clip Content	IEC Clip			Realistic Clip			Realistic Clip Compared to IEC		
			MDD Off Power (W)	MDD On Power (W)	MDD Savings (W)	MDD Off Power (W)	MDD On Power (W)	MDD Savings (W)	% Diff in non-MDD Power	% Diff in MDD Power	% Diff in MDD Savings
CLASP	CP26	STEP Test Clip	72.3	61.5	10.8	70.0	68.0	2.0	3%	-11%	81%
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	Brand Y #4		60.7	42.6	18.1	60.7	55.3	5.4	0%	-30%	70%
NRDC	Brand A #1	Drama, News, Comedy, Sports, Commercials	124.9	99.7	25.2	124.2	125.0	-0.8	1%	-25%	103%
	Brand A #2		180.5	124.9	55.6	178.2	144.4	33.8	1%	-16%	39%
	Brand B		119.1	75.3	43.8	118.9	105.3	13.6	0%	-40%	69%
AVERAGE			123.2	89.9	33.3	122.2	108.7	13.5	1%	-21%	59%

- These data do not indicate comparable performance between testing with the IEC clip and testing with the typical viewing experiences.



Energy Saving Features

- Test data underscores the need to demonstrate comparable energy savings between the IEC test clip and savings in other typical viewing situations:



- EPA is not allowing TV certification with energy saving features enabled unless the manufacturer is confident of comparable savings in typical viewing experiences



High Dynamic Range (HDR)

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1:00–1:05	Introductions
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1:30–1:45	Alerting Changes in Power Consumption
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High Dynamic Range (HDR) Upscaling

Two stakeholders were in favor of testing HDR content. One supported testing both native and upscaled HDR content.

- EPA understands that an increasing number of televisions are able to upscale SDR content to an HDR-like image, and that such a feature is poised to increase in popularity.
- EPA seeks to provide the public with a better understanding of the HDR-upscaling impacts on TVs/HTDs. As such, EPA proposes to measure the power use with HDR upscaling enabled as a separate test.
- EPA did not propose testing with native HDR content at this time due to lack of popularity of this content in the market, anticipating that HDR upscaling may currently have a wider uptake. EPA also encourages the development of an industry standard native HDR test clip.



Definition of HDR Upscaling

- EPA is proposing the below definition of HDR Upscaling in order to:
 - Test and characterize power consumption of this setting as it becomes a more prominent feature in TVs

High Dynamic Range (HDR) Upscaling: A user-selectable Special Function that extends the luminance of the brightest scene elements and apparent saturation of colors of standard-dynamic range content in a manner similar to those provided by HDR 10 or Dolby Vision encoding.

- In contrast to HDR picture settings, which require HDR encoded content.



Additional Required Test for HDR Upscaling

- For products with HDR upscaling, one additional test is required:
 - If HDR Upscaling is a Special Function selectable in the Default Picture Setting, it shall be enabled and the average power consumption reported
 - If the product has a separate picture setting with built-in HDR upscaling that is not in the Default or Brightest Selectable picture settings, the average power consumption AND the luminance in that picture setting shall be reported



Timeline and Conclusion

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Next Steps for Version 8.0

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<i>Launch and Data Assembly Released</i>	<i>August 5, 2016</i>
<i>Launch Webinar</i>	<i>October 3, 2016</i>
<i>Launch Data and Comment Deadline</i>	<i>November 1, 2016</i>
<i>Draft 1 Specification Released</i>	<i>March 10, 2017</i>
<i>Draft 1 Specification Webinar</i>	<i>March 20, 2016</i>
Draft 1 Stakeholder Comments Due	April 5, 2017
Final Draft Specification Release	May 2017
Specification Finalization	June 2017
Specification in Effect	March 2018



Comments

- Stakeholder comments and any additional data supporting the development of Version 8.0 are due on **Wednesday, April 5, 2017**. Please send all comments and data to:

Televisions@energystar.gov

- Unless marked as confidential, all comments will be posted to the TVs product development page at www.energystar.gov/products/spec/televisions_specification_version_8_0_pd
- Accessible through www.energystar.gov/RevisedSpecs and clicking on “Version 8.0 is in development” under “Televisions”



Thank you!

To be added to EPA's stakeholder listserve to receive specification updates, please email:

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