



ENERGY STAR® Program Requirements for Televisions

Partner Commitments

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Commitment

The following are the terms of the ENERGY STAR Partnership Agreement as it pertains to the manufacturing of ENERGY STAR qualified televisions (TVs). The ENERGY STAR Partner must adhere to the following program requirements:

- comply with current ENERGY STAR Eligibility Criteria, defining the performance criteria that must be met for use of the ENERGY STAR certification mark on TVs. EPA may, at its discretion, conduct tests on products that are referred to as ENERGY STAR qualified. These products may be obtained on the open market, or voluntarily supplied by Partner at EPA's request;
- comply with current ENERGY STAR Identity Guidelines, describing how the ENERGY STAR name and mark may be used. Partner is responsible for adhering to these guidelines and for ensuring that its authorized representatives, such as advertising agencies, dealers, and distributors, are also in compliance;
- qualify at least one ENERGY STAR labeled TV model within six months of activating the TV portion of the agreement. When Partner qualifies the product, it must meet the specification (e.g., Tier 1 or 2) in effect at that time;
- provide clear and consistent labeling of ENERGY STAR qualified TVs. The ENERGY STAR label must be clearly displayed on product packaging, in product literature (i.e., user manuals, spec sheets, etc.), and on the manufacturer's Internet site where information about ENERGY STAR qualified models is displayed. In addition, ENERGY STAR qualified TVs must be labeled according to one of the following three options: 1) permanent label on the top/front of the TV; 2) temporary label on the top/front of the TV; or, 3) use of an electronic label so that the ENERGY STAR certification mark appears on the TV's menu-screen for pre-set picture settings.
- provide to EPA, on an annual basis, an updated list of ENERGY STAR qualifying TV models. Once the Partner submits its first list of ENERGY STAR labeled TVs, the Partner will be listed as an ENERGY STAR Partner. Partner must provide annual updates in order to remain on the list of participating product manufacturers;
- provide to EPA, on an annual basis, unit shipment data or other market indicators to assist in determining the market penetration of ENERGY STAR. Specifically, Partner must submit the total number of ENERGY STAR qualified TVs shipped (in units by model) or an equivalent measurement as agreed to in advance by EPA and Partner. Partner is also encouraged to provide ENERGY STAR qualified unit shipment data segmented by meaningful product characteristics (e.g., capacity, size, speed, or other as relevant), total unit shipments for each model in its product line, and percent of total unit shipments that qualify as ENERGY STAR. The data for each calendar year should be submitted to EPA, preferably in electronic format, no later than the following March and may be provided directly from the Partner or through a third party. The data will be used by EPA only for program evaluation purposes and will be closely controlled. If requested under the Freedom of Information Act (FOIA), EPA will argue that the data is exempt. Any information used will be masked by EPA so as to protect the confidentiality of the Partner;
- notify EPA of a change in the designated responsible party or contacts for TVs within 30 days.

Performance for Special Distinction

In order to receive additional recognition and/or support from EPA for its efforts within the Partnership, the ENERGY STAR Partner may consider the following voluntary measures and should keep EPA informed on the progress of these efforts:

- consider energy efficiency improvements in company facilities and pursue the ENERGY STAR label for buildings;
- purchase ENERGY STAR qualified products. Revise the company purchasing or procurement specifications to include ENERGY STAR. Provide procurement officials' contact information to EPA for periodic updates and coordination. Circulate general ENERGY STAR qualified product information to employees for use when purchasing products for their homes;
- ensure the power management feature is enabled on all ENERGY STAR qualified monitors in use in company facilities, particularly upon installation and after service is performed;
- provide general information about the ENERGY STAR program to employees whose jobs are relevant to the development, marketing, sales, and service of current ENERGY STAR qualified product models;
- feature the ENERGY STAR mark(s) on Partner Web site and in other promotional materials. If information concerning ENERGY STAR is provided on the Partner Web site as specified by the ENERGY STAR Web Linking Policy (this document can be found in the Partner Resources section on the ENERGY STAR Web site at www.energystar.gov), EPA may provide links where appropriate to the Partner Web site;
- provide a simple plan to EPA outlining specific measures Partner plans to undertake beyond the program requirements listed above. By doing so, EPA may be able to coordinate, communicate, and/or promote Partner's activities, provide an EPA representative, or include news about the event in the ENERGY STAR newsletter, on the ENERGY STAR Web pages, etc. The plan may be as simple as providing a list of planned activities or planned milestones that Partner would like EPA to be aware of. For example, activities may include: (1) increase the availability of ENERGY STAR qualified products by converting the entire product line within two years to meet ENERGY STAR guidelines; (2) demonstrate the economic and environmental benefits of energy efficiency through special in-store displays twice a year; (3) provide information to users (via the Web site and user's manual) about energy-saving features and operating characteristics of ENERGY STAR qualified products, and (4) build awareness of the ENERGY STAR Partnership and brand identity by collaborating with EPA on one print advertorial and one live press event;
- provide quarterly, written updates to EPA as to the efforts undertaken by Partner to increase availability of ENERGY STAR qualified products, and to promote awareness of ENERGY STAR and its message.



ENERGY STAR® Program Requirements for Televisions

Eligibility Criteria (Version 3.0)

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Below is the product specification for ENERGY STAR qualified TVs (Version 3.0). A product must meet all of the identified criteria to be labeled as ENERGY STAR by its manufacturer.

- 1) **Definitions:** Below is a brief description of TVs and other terms as relevant to ENERGY STAR.
 - A. **Television (TV):** A commercially available electronic product designed primarily for the display and reception of audiovisual 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.
 - B. **Television Monitor:** An electronic product intended to display a video signal from an *external tuner or other video source* such as a VCR or DVD player on a CRT, LCD, plasma display, or other display device. For purposes of this agreement, this definition includes analog and digital television monitors. Television monitors with computer capability (e.g., computer input port) may qualify as ENERGY STAR under this specification as long as they (i) are marketed and sold to consumers as focusing on television/video as the primary function, and (ii) incorporate Display Power Management Signaling (a standard from the VESA consortium for managing the supply of power of video monitors for computers through the graphics card) so that users may benefit from power management, allowing the product to automatically enter a low power mode after a certain period of inactivity, when it is being driven by a computer through a computer input port. Television monitors are considered to have computer monitor capability under this specification if any input on the product is intended by the manufacturer to be used as a computer input, and, as such, the product complies with the FCC's Class B Computer Peripheral requirements and is authorized under the FCC's Declaration of Conformity program.

Note: The above definition for a TV Monitor is broadly consistent with the definition in the Draft 2 Version 3.0 TV products specification, except for clarifying that the device must incorporate Display Power Management Signaling if it is being driven by a computer through a computer input. Per stakeholder request, EPA has not provided examples of computer input ports. Rather, as stakeholders suggested, EPA has aligned its definition to comply with the FCC's Class B Computer Peripheral requirements and is therefore authorized under the FCC's Declaration of Conformity program.
 - C. **Rear-Projection TV:** A type of TV in which the display device is a projector that focuses images onto a screen located within the housing of the TV.
 - D. **Direct-View TV:** A type of TV whose display device emits light either directly from the screen surface or transmits light from a source mounted directly behind the screen. Examples include CRT, LCD, and plasma display technologies.
 - E. **TV Combination Unit:** A system in which the TV and an additional device(s) (e.g., DVD player, HDD, VCR, etc.) are combined into a single unit and which meets all of the following criteria: the additional device(s) is included in the television casing; it is not possible to measure the power requirements of the two (or more) components separately without removal of the television casing; and the system is connected to the wall outlet through a single power cable.
 - F. **Component Television Unit:** A television system composed of two or more separate components (e.g., display device and tuner) marketed and sold as a television under one model or system designation. The system may have more than one power cord. For purposes of meeting ENERGY STAR criteria, the total power for the system is considered.

- G. **Analog:** For purposes of this agreement, analog units have an NTSC, PAL, or SECAM tuner and may have analog video inputs (e.g., composite video, component video, S-video, RGB).
- H. **Digital:** For purposes of this agreement, digital units include at least one digital tuner or at least one digital video input (e.g., HDMI). Products with an analog tuner and both analog and digital inputs should be considered digital units.
- I. **Native Vertical Resolution:** The physical pixel count for the vertical axis of the television. For example a television with a screen resolution of 1920 x 1080 would have a native vertical resolution of 1080.

Note: Per stakeholder request, EPA has changed all references to vertical resolution in this Draft Final specification to native vertical resolution for added clarity.

- J. **Electronic Program Guide (EPG):** An interactive, onscreen menu of TV program information (e.g., time, date, description of TV programs, etc.) downloaded from an external source.
- K. **External Power Supply:** A component contained in a separate physical enclosure external to the television casing and designed to convert line voltage ac input from the mains to lower dc voltage(s) for the purpose of powering the television. An external power supply must connect to the television via a removable or hard-wired male/female electrical connection, cable, cord or other wiring.
- L. **Point of Deployment (POD) Module:** A conditional access module for digital cable signal reception.
- M. **Standby** The lowest power consumption state which cannot be switched off (influenced) by the user and that may persist for an indefinite time when the appliance is connected to the main electricity supply and used in accordance with the manufacturer's instructions. For purposes of this specification, Standby is defined as the time when the product is connected to a power source, produces neither sound nor picture, neither transmits nor receives program information and/or data (excluding data transmitted to change the unit's condition from Standby to On Mode), and is waiting to be switched to On Mode by a direct or indirect signal from the consumer, e.g., with the remote control.
- N. **Download Acquisition Mode (DAM):** The product is connected to a power source, produces neither sound nor a picture, and is downloading channel listing information according to a defined schedule for use by the electronic programming guide, monitoring for emergency messaging/communications and/or otherwise communicating through a network protocol. The power use in this mode is typically greater than the power requirement in Standby and less than that in On Mode.

Note: Per stakeholder request, EPA has modified the definition for DAM by removing the final sentence included in Draft 2, which stated that 'TVs without EPG functionality may not have a distinct Download Acquisition Mode.' Further, EPA has clarified that to be in DAM, the product does not necessarily have to be communicating with a networked device.

- O. **On Mode/Active Power:** The product is connected to a power source and produces sound and a picture. The power requirement in this mode is typically greater than the power requirement in Standby and Download Acquisition Modes.
 - P. **Disconnected:** The product is disconnected from all external power sources.
- 2) **Qualifying Products:** Any TV, TV Combination Unit, Television Monitor, or Component Television Unit that is marketed to the consumer as such (i.e., focusing on television as the primary function), which meets the respective product type definition in Section 1, and is capable of being powered from either a wall outlet or a battery unit that is sold with an external power supply is eligible to earn the ENERGY STAR. This specification does not cover monitors with computer capability (e.g., a computer input port, such as VGA) that are marketed and sold as 1) computer monitors or 2) dual function television and computer monitors. In addition, to qualify as ENERGY STAR under both tiers of this specification, TVs must not exceed power consumption of 1 watt in Standby. TVs which do not have a state meeting the definition of Standby (e.g., Public Alert CEA2009A certified models which offer 24/7/365 active features

to alert users) are not able to qualify for ENERGY STAR. Additionally, this lowest power consuming Standby state must be the default Standby state for the TV as shipped to consumers.

Note: Per stakeholder request, EPA has made minor clarifications to 2) **Qualifying Products** to clarify that computer monitors are not covered by this ENERGY STAR specification. EPA has also clarified that products must have a mode that meets the definition of Standby to qualify for ENERGY STAR.

- 3) **Energy-Efficiency Criteria:** Only those products listed in Section 2 that meet the following criteria may qualify as ENERGY STAR. The effective date for these Version 3.0 requirements are provided in Section 6 of this specification. To qualify TVs, TV Combination Units, Television Monitors, or Component Television Units as ENERGY STAR, they must be tested according to the protocol outlined in Section 4, Test Methodology.

EPA will make On Mode and Standby data available on the ENERGY STAR Web site for interested consumers. Additionally, EPA will also provide consumers with an estimate of each ENERGY STAR qualified TV's annual energy consumption through publication of a kWh/year number. This annual power consumption estimate will be based on a daily usage pattern of 5 hours in On Mode and 19 hours in Standby.

Note: Per the DAM proposal shared with stakeholders on November 16, 2007, EPA has decided to delay development and implementation of DAM requirements until Tier 2 of this Version 3.0 TV products specification. As such, references to DAM have been removed from the daily usage pattern that will be used to estimate a TV's annual energy consumption.

A. On Mode/Active Power

1. To qualify as ENERGY STAR, all TVs, TV Combination Units, Television Monitors, and Component Television Units must not exceed the maximum On Mode power consumption (P_{Max}) found from the equations in Table 1, based on the unit's native vertical resolution and visible screen area. The maximum On Mode power consumption is expressed in watts and rounded to the nearest whole number. In the following equations, A is the viewable screen area of the product, found by multiplying the display width by the display height. Equations are provided in standard units (inches²) as well as in the metric equivalent (cm²). As an example, maximum allowed power consumption for TV products of various screen sizes is provided below in Table 2.

Table 1: On Mode Power Level Requirements for TV Products

Screen Area	Tier 1: Effective November 1, 2008		Tier 2: Effective September 1, 2010	
	Maximum On Mode Power Consumption (A expressed in inches ²)	Maximum On Mode Power Consumption (A expressed in cm ²)	Maximum On Mode Power Consumption (A expressed in inches ²)	Maximum On Mode Power Consumption (A expressed in cm ²)
Non-High Definition TVs (i.e. ≤ 480 Native Vertical Resolution)				
All Screen Areas	$P_{Max} = 0.120 \cdot A + 25$	$P_{Max} = 0.01860 \cdot A + 25$	TBD	TBD
High Definition and Full High Definition TVs (i.e. > 480 Native Vertical Resolution)				
$A < 680 \text{ inch}^2$ ($< 4,387 \text{ cm}^2$)	$P_{Max} = 0.200 \cdot A + 32$	$P_{Max} = 0.03100 \cdot A + 32$	TBD	TBD
$680 \text{ inch}^2 \leq A < 1068 \text{ inch}^2$ ($4,387 \text{ cm}^2 \leq A < 6,890 \text{ cm}^2$)	$P_{Max} = 0.240 \cdot A + 27$	$P_{Max} = 0.03720 \cdot A + 27$	TBD	TBD
$A \geq 1068 \text{ inch}^2$ ($\geq 6,890 \text{ cm}^2$)	$P_{Max} = 0.156 \cdot A + 151$	$P_{Max} = 0.02418 \cdot A + 151$	TBD	TBD

For example, under Tier 1, the maximum power consumption for a TV with 768 pixels of native vertical resolution, a width of 36.6 inches and a height of 20.6 inches (that has a screen area of 754.0 square inches) would be: $0.24(754.0) + 27 = 207.96$ or 208 watts when rounded to the nearest whole number. Examples of On Mode power requirements for other sample screen sizes are provided below in Table 2.

Table 2: Average Tier 1 On Mode Power Level Requirements for Example TV Screen Sizes

Viewable Diagonal Screen Size (Inches)	Aspect Ratio	Viewable Screen Size in Inches	Screen Area in Inches ² (cm ²)	Maximum On Mode Power in Watts	
				480 Lines of Native Vertical Resolution	768 or 1080 Lines of Native Vertical Resolution
20	16:9	17.4 x 9.8	170.5 (1,100)	45	66
32	16:9	27.9 x 15.7	438.0 (2,826)	78	120
42	16:9	36.6 x 20.6	754.0 (4,865)	115	208
50	16:9	43.6 x 24.5	1068.2 (6,892)	153	318
60	16:9	52.3 x 29.4	1537.6 (9,920)	210	391

Note: After the release of the Draft 2 Specification, some stakeholders asserted that the proposed levels could adversely affect consumer choice. In the interest of seeking broader input on a possible approach to addressing this concern, EPA released a modified On Mode proposal on November 26, 2007 that allowed for a greater variety of large screen products to qualify. While some stakeholders expressed support for the revised proposal. EPA received numerous sets of comments in opposition to the levels proposed on November 26 on the grounds that: they were too lenient, particularly for large screens; that qualification rates were uneven between different screen sizes; and that the corresponding savings were much lower than those projected from the proposed Draft 2 levels. In consideration of all comments received to date on the On Mode proposals from Draft 2 and November 26, EPA's Draft Final Specification includes proposed levels that reflect a more balanced qualification rate across different screen sizes and result in an overall qualification rate of 27.4% of models. Qualification rates based on major screen sizes can be found in the accompanying document with updated charts and tables. Based on this revised proposal, 71% of the manufacturers represented in EPA's data set have products that could currently meet the proposed ENERGY STAR On Mode requirements. In addition, and based on stakeholder comments, EPA has moved the screen size delineations from greater than 650 in² and 1,000 in² to greater than or equal to 680 in² and 1,068 in² respectively. This will help ensure that all products are evaluated under the correct criteria and helps ensure that the qualification rates are reasonably balanced across all screen sizes.

Given that the Version 3.0 specification will address On Mode power consumption for the first time, EPA's revised Tier 1 On Mode criteria allows for an overall qualification rate that is just higher than the typical 25% (27.4%). EPA will work with stakeholders to develop Tier 2 criteria that will result in a 25% qualification rate and will take effect on September 1, 2010. In anticipation of the development of Tier 2, EPA will watch closely the evolution of both products and market conditions.. EPA also intends to work with stakeholders ahead of the Tier 1 effective date to develop and launch a marketing plan for the new Version 3.0 specification, so consumers are made aware of the savings associated with qualified TVs. Further, EPA intends to provide consumers with an estimate of each ENERGY STAR qualified TV's annual energy consumption through publication of a kWh/year number on the ENERGY STAR Web site. This annual power consumption estimate will be based on a daily usage pattern of 5 hours in On Mode and 19 hours in Standby.

EPA has also modified the notation used for average On Mode power consumption in this Draft Final specification to align with the notation used in IEC 62087, Ed. 2.0.

2. TV Products with Automatic Brightness Control: To account for the power savings achieved

through automatic brightness control, where the feature is activated by default when shipped to the end user, On Mode power consumption should be determined as follows:

$P_{a1_broadcast} = 0.55 * P_{o_broadcast} + 0.45 * P_{abc_broadcast}$, where $P_{a1_broadcast}$ is the average On Mode power consumption in watts and rounded to the nearest whole number, taking into consideration that the TV will be in low ambient light level conditions 45% of the time; $P_{o_broadcast}$ is the average On Mode power consumption in watts and rounded to the nearest whole number, and tested with a minimum ambient light level of 300 lux entering directly into the sensor; and $P_{abc_broadcast}$ is the average On Mode power consumption in watts and rounded to the nearest whole number, BUT when tested with an ambient light level of 0 lux entering directly into the sensor. (See Section 4.E.2, below, for further information on how to test TVs with Automatic Brightness Control to determine ENERGY STAR qualification.) When determining ENERGY STAR qualification, products which ship with automatic brightness control enabled should compare their On Mode power consumption ($P_{a1_broadcast}$), found using the equation above, to the maximum On Mode power consumption allowed (P_{Max}), determined using the equations in Table 1, above.

Note: Per stakeholder request, EPA reviewed Nielsen data to determine how much TV is typically watched at night domestically, and used that as a proxy for the amount of time TV is viewed in low ambient light settings. Based on Nielsen data for 2005, approximately 45% of TV viewing in the U.S. occurs during the evening and night. EPA has used this information to modify the equation for TVs with Automatic Brightness Control accordingly in the Draft Final specification. EPA has also modified the notation used for average On Mode power consumption when measured at both 0 lux and at 300 lux to align with the notation used in IEC 62087, Ed. 2.0.

3. **TV Products Using an External Power Supply:** To qualify, the external power supply must be ENERGY STAR qualified or meet the no-load and active mode efficiency levels provided in the ENERGY STAR Program Requirements for Single Voltage Ac-Ac and Ac-Dc External Power Supplies. The ENERGY STAR specification and qualified product list can be found at www.energystar.gov/powersupplies.

Note: Per the revised proposal for Download Acquisition Mode (DAM) distributed by EPA on November 16, 2007, EPA has deferred development and implementation of DAM requirements until Tier 2 of the Version 3.0 TV products specification. As such, the section referencing DAM requirements has been removed from this Draft Final document.

- B. **Standby:** To qualify as ENERGY STAR under both Tier 1 and Tier 2 of this specification, TVs, TV Combination Units, Television Monitors, and Component Television Units must not exceed power consumption of 1 watt in Standby. Additionally, this lowest power consuming Standby must be the default Standby for the TV as shipped to consumers. Measurements are to be taken without a POD module, if present on the product, installed.
- C. **User Information Requirement:** In order to ensure that consumers are properly informed of the benefits of keeping their TVs in the default modes as shipped, particularly for those models that incorporate additional features and functionality that, if employed, would result in increased energy use beyond that intended by the ENERGY STAR requirements for On and Standby, the manufacturer will include with each TV one of the following:
 - Information on ENERGY STAR and the benefits of keeping the TV at its factory default settings that meet ENERGY STAR criteria in either a hard copy or electronic copy of the user manual. Where necessary, manufacturers will also include language advising consumers that enabling certain features and functionality in their TV (e.g., instant-on) will increase its energy consumption, possibly beyond the limits required for ENERGY STAR qualification. This information should be near the front of the user manual; or,
 - A package or box insert on ENERGY STAR and the benefits of keeping the TV in its factory default modes. Where necessary, manufacturers will also include language advising consumers that enabling certain features and functionality in their TV (e.g., instant-on) will increase its energy consumption, possibly beyond the limits required for ENERGY STAR qualification.

- 4) **Test Methodology:** Manufacturers are required to perform tests and self-certify those models that meet

the ENERGY STAR guidelines.

- In performing these tests, partner agrees to use the test procedures outlined in Table 3, below, with the clarifications outlined in Section 4.E.1.
- The test results must be reported to EPA.

Additional testing and reporting requirements are provided below.

A. Test Conditions:

Supply Voltage:	North America/Taiwan:	115 (± 1%) Volts AC, 60 Hz (± 1%)
	Europe/Australia/New Zealand:	230 (± 1%) Volts AC, 50 Hz (± 1%)
	Japan:	100 (± 1%) Volts AC, 50 Hz (± 1%)/60 Hz (± 1%)
<i>Note: For products rated for > 1.5 kW maximum power, the voltage range is ± 4%</i>		
Total Harmonic Distortion (THD) (Voltage):	< 2% THD (< 5% for products which are rated for > 1.5 kW maximum power)	
Ambient Temperature:	23°C ± 5°C	
Relative Humidity:	10 – 80 %	

(Reference IEC 62301 Ed 1.0: Household Electrical Appliances – Measurement of Standby Power, Sections 4.2, 4.3)

B. Models Capable of Operating at Multiple Voltage/Frequency Combinations: Manufacturers shall test their products based on the market(s) in which the models will be sold and promoted as ENERGY STAR qualified. For products that are sold as ENERGY STAR in multiple international markets and, therefore, rated at multiple input voltages, the manufacturer must test at and report the required power consumption or efficiency values at all relevant voltage/frequency combinations. For example, a manufacturer that is shipping the same model to the United States and Europe must measure, meet the specification, and report test values at both 115 Volts/60 Hz and 230 Volts/50 Hz in order to qualify the model as ENERGY STAR in both markets. If a model qualifies as ENERGY STAR at only one voltage/frequency combination (e.g., 115 Volts/60 Hz), then it may only be qualified and promoted as ENERGY STAR in those regions that support the tested voltage/frequency combination (e.g., North America and Taiwan).

C. Approved Meter: Approved meters will include the following attributes¹:

- An available current crest factor of 3 or more at its rated range value; and
- Lower bound on the current range of 10mA or less.

The power measurement instrument shall have a resolution of:

- 0.01 W or better for power measurements of 10 W or less;
- 0.1 W or better for power measurements of greater than 10 W up to 100 W; and
- 1 W or better for power measurements of greater than 100 W.

The following attributes in addition to those above are suggested:

- Frequency response of at least 3 kHz; and
- Calibration with a standard that is traceable to the U.S. National Institute of Standards and Technology (NIST).

¹ Characteristics of approved meters taken from IEC 62301 Ed 1.0: Household Electrical Appliances – Measurement of Standby Power

It is also desirable for measurement instruments to be able to average power accurately over any user selected time interval (this is usually done with an internal math calculation dividing accumulated energy by time within the meter, which is the most accurate approach). As an alternative, the measurement instrument would have to be capable of integrating energy over any user selected time interval with an energy resolution of less than or equal to 0.1 mWh and integrating time displayed with a resolution of 1 second or less.

- D. **Accuracy:** Measurements of power of 0.5 W or greater shall be made with an uncertainty of less than or equal to 2% at the 95% confidence level. Measurements of power of less than 0.5 W shall be made with an uncertainty of less than or equal to 0.01 W at the 95% confidence level.

All power figures should be in watts and rounded to the second decimal place. For loads greater than or equal to 10 W, three significant figures shall be reported.

E. **Test Procedures:**

Table 2: Test Procedures for Measuring Operational Modes

Specification Requirement	Test Protocol	Source
Standby	IEC 62301, Ed 1.0: Household Electrical Appliances – Measurement of Standby Power	www.iec.ch
On Mode	<i>Draft</i> IEC 62087, Ed 2.0: Methods of Measurement for the Power Consumption of Audio, Video and Related Equipment, Section 11, “Measuring conditions of television sets for On (average) mode.” ²	www.iec.ch

1. **Guidance on Implementation of IEC 62301:** Below, EPA provides specific guidance on using IEC 62301 for measuring TV Standby power. For purposes of determining ENERGY STAR qualification of a product, the below clarifications apply:
 - a. All Standby measurements shall be conducted and reported to EPA first at factory default conditions. Measurements are to be taken with the POD module, if available, not installed.
 - b. Manufacturers must make additional measurements as necessary, in addition to the Standby power consumption of the product at factory default settings, to report the highest observed power consumption of the product in Standby.

Note: Per the revised proposal for Download Acquisition Mode (DAM) distributed by EPA on November 16, 2007, EPA has deferred development and implementation of DAM requirements until Tier 2 of the Version 3.0 TV products specification. As such, the section referencing testing of products while in DAM has been removed from this Draft Final document.

2. **Guidance on Implementation of IEC 62087:** Below, EPA provides guidance on using IEC 62087, Ed. 2.0 for measuring TV On Mode power. For purposes of determining ENERGY STAR qualification of a product, the below exceptions and clarifications apply.
 - a. **Accuracy of Input Signal Levels:** *Section 11.4.12,* “Accuracy of input signal levels” reminds testers that video inputs used for testing should be within +/- 2% of reference white and black levels. *Section B.2 of Annex B,* “Considerations for On (average) mode television set

² IEC 62087, Ed 2.0 is still in draft form and under IEC committee review, as of the writing of this Draft 2 Version 3.0 specification. While significant changes to the relevant portions of the IEC document are not envisioned by its authors, EPA will review the final version, when available, to ensure that no material changes have been made to the applicable sections of the document. The Draft Final Version 3.0 specification specifically references the committee draft version of IEC 62087, Ed. 2.0.

power measurements” describes the importance of input signal accuracy in further detail. EPA would like to emphasize the importance of using accurate/calibrated video inputs during On Mode testing and encourages testers to use HDMI inputs wherever possible.

- b. Use of Broadcast Test Materials for Testing: To measure average On Mode power consumption, manufacturers should measure ‘ $P_{o_broadcast}$ ’ as described in *section 11.6.1*, “*On mode (average) testing with dynamic broadcast-content video signal.*”
- c. True Power Factor: Due to increased awareness of the importance of power quality on the part of EPA and electric utilities, manufacturers shall indicate the true power factor of their sets during On Mode measurement.
- d. Testing at Factory Default Settings: In measuring the On Mode power consumption of TVs, EPA is interested in capturing first and foremost the power consumption of products *as they are shipped from the factory*. TV models that do not make use of a forced menu at initial start up, and are shipped in a “retail” or equivalent mode, must be tested in that “retail” mode for ENERGY STAR qualification. Picture level adjustments that need to be made prior to testing On Mode power consumption should be made per *section 11.4.8*, “*Picture level adjustments,*” if applicable.

Section 11.4.8 reads: “The contrast and brightness of the television set and the backlight level, if it exists, shall be set as originally adjusted by the manufacturer to the end user. In the case that a setting mode must be chosen on initial activation, the “standard mode” or equivalent shall be chosen. In the case that no “standard mode” or equivalent exists, the first mode listed in the on-screen menus shall be selected. The mode used during the test shall be described in the report. “Standard mode” is defined as “recommended by the manufacturer for normal home use.””

For products shipped with a forced menu where the customer must select upon initial start up the mode in which the product will operate, *section 11.4.8* states that testing must be conducted in “standard mode.” To further consistent messaging to consumers about how to set their TVs for home use, the forced menu option should provide two choices: “home” or “retail.” EPA will consider alternative proposals regarding the words selected to describe these two modes on a case-by-case basis. If the user selects the “retail” setting, he/she will be prompted one additional time to confirm this choice. This additional prompt is only required the first time that the user turns on the TV and selects “retail.” A manufacturer may substitute the second prompt if “retail “ is selected with information on the start-up menu relaying that the “home” setting is the setting in which the product qualifies for ENERGY STAR.

Information relaying that the product qualifies for ENERGY STAR in the “home” setting and that this is the setting in which power savings will be achieved will be included with the product in its packaging and posted on the partner’s Web site, where information about the model is listed.

Note: Based on stakeholder request and per the revised proposal for the forced menu option distributed by EPA on November 16, 2007, EPA has clarified that for TVs with a forced menu at initial start up, users who select the “retail” setting will not be asked to confirm their choice every time they turn the TV on. EPA has also provided flexibility regarding the use of the words “home” and “retail,” per stakeholder request, and moved the requirements for TVs with a forced menu at initial start up to the body of the specification, as opposed to providing them in a note-box.

- e. Testing of TVs with Automatic Brightness Control: If an automatic brightness control exists and is enabled by default, the TV should initially be tested in a room with a minimum ambient light level of 300 lux entering the sensor to obtain the ‘ $P_{o_broadcast}$ ’ measurement, as described in *section 11.4.7*, “*Power saving functions*” and in *section 11.6.1*. A second measurement should subsequently be taken with the TV tested in a room with an ambient light level of 0 lux entering the sensor to obtain the ‘ $P_{abc_broadcast}$ ’ measurement, as described in *section 11.4.7*, “*Power saving functions*” and in *section 11.6.2*. The average On Mode

power consumption for the TV will subsequently be determined using both 'P_{o_broadcast}' and 'P_{abc_broadcast}', as described in Section 3.A.2 of this document.

Note: The guidance provided in this Draft Final Version 3.0 TV products specification on implementation of *Draft* IEC 62087, Ed.2.0 is similar to the guidance provided in the Draft 2 specification. However, EPA has aligned references to specific portions of the *Draft* of IEC 62087, Ed. 2.0 with appropriate section numbers. Further, EPA has clarified that any picture level adjustments that need to be made prior to testing TVs to determine ENERGY STAR qualification should be made per *section 11.4.8, "Picture level adjustments,"* if applicable.

As of the writing of this Draft Final Version 3.0 specification, IEC 62087, Ed 2.0 is still in draft form and under IEC committee review. While significant changes to the relevant portions of the IEC document are not envisioned by its authors, EPA will continue to work closely with the IEC and monitor progress on the finalization of this test procedure. EPA will review the final version, when available, and if significant changes are made to the applicable sections of the document, EPA will engage in discussions with ENERGY STAR TV stakeholders prior to incorporating into the Version 3.0 ENERGY STAR TV products specification.

- 5) **Effective Date:** The date that manufacturers may begin to qualify products as ENERGY STAR will be defined as the *effective date* of the agreement. Any previously executed agreement on the subject of ENERGY STAR qualified TVs shall be terminated effective October 31, 2008.
 - A. **Qualifying Products Under Tier 1 of the Version 3.0 Specification:** Tier 1 of this Version 3.0 specification will commence on **November 1, 2008**. All products, including models originally qualified under Version 2.2, with a **date of manufacture** on or after **November 1, 2008** must meet the new Version 3.0 requirements in order to qualify for ENERGY STAR. The **date of manufacture** is specific to each unit and is the date (e.g., month and year) on which a unit is considered to be completely assembled.
 - B. **Qualifying Products Under Tier 2 of the Version 3.0 Specification:** The second phase of this specification, Tier 2, will commence on **September 1, 2010**. All products, including models originally qualified under Tier 1, with a **date of manufacture** on or after **September 1, 2010**, must meet the Tier 2 requirements in order to qualify for ENERGY STAR.

Note: Several stakeholders asked for a delayed effective date for the Version 3.0 TV products specification. EPA anticipates finalizing the Version 3.0 ENERGY STAR TV products specification in early February 2008. The proposed Tier 1 effective date of November 1, 2008, would allow industry the typical nine months transition time prior to the new specification taking effect. EPA is unable to accommodate any further delay because of the program integrity implications of not having an On Mode Specification in place prior to the next major sales season and the transition to digital. EPA intends that TBD Tier 2 requirements, to be developed in conjunction with stakeholders, will take effect on September 1, 2010.

- C. **Elimination of Grandfathering:** EPA will not allow grandfathering under this Version 3.0 ENERGY STAR specification. **ENERGY STAR qualification under previous versions is not automatically granted for the life of the product model.** Therefore, any product sold, marketed, or identified by the manufacturing partner as ENERGY STAR must meet the current specification in effect at the time of manufacture of the product
- 6) **Future Specification Revisions:** EPA reserves the right to revise the specification should technological and/or market changes affect its usefulness to consumers or industry or its impact on the environment. In keeping with current policy, revisions to the specification will be discussed with stakeholders. In the event of a specification revision, please note that ENERGY STAR qualification is not automatically granted for the life of a product model. To qualify as ENERGY STAR, a product model must meet the ENERGY STAR specification in effect on the model's date of manufacture.