ENERGY STAR® Program Requirements for Televisions

Partner Commitments
DRAFT 1

Partner Commitments

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; and

- 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;

- join EPA's SmartWay Transport Partnership to improve the environmental performance of the company's shipping operations. SmartWay Transport works with freight carriers, shippers, and other stakeholders in the goods movement industry to reduce fuel consumption, greenhouse gases, and air pollution. For more information on SmartWay, visit www.epa.gov/smartway;

- join EPA's Climate Leaders Partnership to inventory and reduce greenhouse gas emissions. Through participation, companies create a credible record of their accomplishments and receive EPA recognition as corporate environmental leaders. For more information on Climate Leaders, visit www.epa.gov/climateleaders; and

- join EPA's Green Power partnership. EPA's Green Power Partnership encourages organizations to buy green power as a way to reduce the environmental impacts associated with traditional fossil fuel-based electricity use. The partnership includes a diverse set of organizations including Fortune

500 companies, small and medium businesses, government institutions as well as a growing number of colleges and universities, visit www.epa.gov/grnpower/.

ENERGY STAR® Program Requirements for Televisions

Eligibility Criteria (Version 3.1)
DRAFT 1

Following is the **DRAFT 1** product specification for ENERGY STAR qualified televisions (Version 3.1). A product must meet all of the identified criteria to be labeled as ENERGY STAR.

1) **Definitions**:

A. Television (TV): A commercially available electronic product designed primarily for the reception and display of audiovisual signals received from terrestrial, cable, satellite, Internet Protocol TV (IPTV), or other digital or analog signals. A TV consists of a tuner/receiver and a display encased in a single enclosure. 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 DVD or Blu-ray Disc player onto a CRT, LCD, plasma display, or other display device. This definition includes both analog and digital television monitors. Television monitors with computer capability (e.g., computer input port) may qualify for the ENERGY STAR under this specification as long as they are (1) marketed and sold to consumers primarily as televisions, and (2) incorporate Display Power Management Signaling (DPMS), a standard from the Video Electronics Standards Association (VESA) for managing the supply of power to a video monitor through a computer graphics card. 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.

C. Rear-Projection TV: A type of TV whose display device is a projector that focuses images onto a screen located inside the TV enclosure.

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, Blu-ray Disc player, Hard Disk Drive [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. The total power consumption of all components in the system is considered for purposes of ENERGY STAR qualification.

G. Analog: A television product which has an NTSC, PAL, or SECAM tuner, and may have analog video inputs (e.g., composite video, component video, S-video, RGB).

H. Digital: A television product which has 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 shall be considered digital products under this specification.

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.

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 (EPS): 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. Luminance: The photometric measure of the luminous intensity per unit area of light travelling in a given direction. Luminance describes the amount of light that passes through or is emitted from a particular area, and falls within a given solid angle. The standard unit for luminance is candela per square meter (cd/m^2).

> **Note**: The above definition for luminance is consistent with the definition provided in the Version 5.0 ENERGY STAR Displays specification. Stakeholders are encouraged to provide feedback on this definition.

N. 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.

O. Standby Mode: Where the product is connected to a mains power source, is not providing a primary function, and offers one or more of the following user-oriented or protective secondary functions which may persist for an indefinite time:
   a. To facilitate the activation of other modes (including activation or deactivation of On Mode) by remote switch (including remote control), internal sensor, or timer;
   b. To provide a continuous function, including information or status displays such as clocks, or sensor-based functions.

   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.

> **Note**: The above definition for Standby is consistent with the definition provided in latest Committee Draft for IEC 62031 Ed 2.0. EPA is aware that IEC 62301 is under revision with a forecasted publication date for Ed 2.0 of later this year. EPA will monitor developments and incorporate changes to its draft specification as appropriate.

P. Off Mode: Where the product is connected to a mains power source and is not providing any On Mode or Standby Mode functions, and where the mode may persist for an indefinite time.

Q. Download Acquisition Mode (DAM): Where the product is connected to a power source, produces neither sound nor a picture, and is actively 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.

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 that 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.

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 3.1 requirements is 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 publish an estimate of annual energy consumption (measured in kWh/year) for each ENERGY STAR qualified TV. This annual power consumption estimate will be based on a typical energy consumption (TEC) model which assumes a daily duty cycle of 5 hours in On mode and 19 hours in Standby Mode.

A. On Mode Power Consumption Criteria

1. To qualify as ENERGY STAR, a product must not exceed the maximum On Mode power consumption (P_{Max}) limit determined from the equations in Table 1, for all screen areas and native vertical resolutions. 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, calculated by multiplying the viewable image width by the viewable image height. Example power consumption limits for TV products of various screen sizes are provided below in Table 2.

Table 1: On Mode Power Level Requirements for TV Products

	Tier 2: Effective May 1, 2010		Tier 3: Effective May 1, 2012	
	Maximum On Mode Power Consumption (A expressed in square inches)	**Maximum On Mode Power Consumption (A expressed in square centimeters)**	**Maximum On Mode Power Consumption (A expressed in square inches)**	**Maximum On Mode Power Consumption (A expressed in square centimeters)**
All Screen Areas and Native Vertical Resolutions	$P_{Max} = 0.120*A + 25.0$	$P_{Max} = 0.019*A + 25.0$	$P_{Max} = 0.083*A + 18.34$	$P_{Max} = 0.013*A + 18.34$

For example, under Tier 2, the maximum power consumption allowance for a TV with a width of 36.6 inches and a height of 20.6 inches (screen area of 754.0 square inches) would be: 0.120 * (754.0) + 25.0 = 115.5 watts, or 116 watts when rounded to the nearest whole number. Additional examples are provided in Table 2.

Table 2: Tier 2 and 3 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)	Tier 2 Maximum On Mode Power in watts	Tier 3 Maximum On Mode Power in watts
20	16:9	17.4 x 9.8	170.5 (1,100)	45	32
32	16:9	27.9 x 15.7	438.0 (2,826)	78	55
42	16:9	36.6 x 20.6	754.0 (4,865)	115	81
50	16:9	43.6 x 24.5	1068.2 (6,892)	153	107
60	16:9	52.3 x 29.4	1537.6 (9,920)	210	146

Note: Consistent with ENERGY STAR program principles, EPA is seeking to establish Tier 2 and 3 TV On Mode power level requirements that qualify the top performing (in terms of efficiency) models on the market when the specification goes into effect, without sacrificing features or performance, and that are cost effective to purchasers. In order to accommodate consumer preferences in terms of size, ENERGY STAR performance requirements will continue to vary as a function of screen size so that consumers can identify the most efficient models within their size category of interest.

The proposed requirement for Tier 2 is based on a dataset of 495 models representative of what will be on the market in 2010. It combines 2010 product data received from manufacturers with data listed in the database of ENERGY STAR qualifying models, minus products indicated by partners not being available in 2010. (Products with no data reported at 115 volts were also removed). The proposed Tier 2 On Mode requirement represents approximately 25% of the overall dataset, with models across a range of size categories potentially qualifying (see attached data analysis).

Given the nature of the TV market and its rapid evolution, EPA is proposing to establish a Tier 3 requirement for On Mode power levels as part of this revision in an effort to ensure the relevancy of the ENERGY STAR label while minimizing the costs and burden associated with frequent revision processes. Based on advances in TV efficiency over the past year and an evaluation of our current data set, EPA believes that a 30% increase in efficiency compared to what is proposed for Tier 2 reasonably anticipates what will be available in 2012 (see attached data analysis). Specifically, a comparison of the dataset used to establish the Tier 1 specification and a dataset of 2009 TV models indicates an improvement in overall TV efficiency of about 30% over a one and a half year period. Further, a number of currently available models, albeit of smaller size, meet the proposed Tier 3 requirements with little or no price premium. Based on recent trends in the TV market, EPA views this as an indication that sufficient, cost effective efficiency gains will be achieved among larger TV categories to allow adequate selection of qualified models for consumers. EPA will, however, review Tier 3 requirements in advance of their effective date to ensure they remain appropriate.

2. TV Products with Automatic Brightness Control (ABC): 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, with an ambient light level of zero (0) lux measured at the face of the sensor.

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. (See Section 4.E.2, below, for further information on how to test TVs with Automatic Brightness Control to determine ENERGY STAR qualification.)

Note: For the Version 3.0 specification, EPA and stakeholders developed the calculation listed above for On Mode power consumption of products with the Automatic Brightness Control (ABC) feature as a way to reward models with this energy-saving feature. Stakeholders and EPA further agreed that they would track the use of this feature in the market and the appropriateness of this treatment for products available in 2010 when the Version 3.1 specification will go into effect. Stakeholders are encouraged to provide feedback on the prevalence of the ABC feature in products on the market and the continuous appropriateness of the On Mode power consumption calculation for products with the ABC feature.

3. TV Products Using an EPS: To qualify, the EPS must be ENERGY STAR qualified, or it must 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 EPS qualified product list can be found at www.energystar.gov/powersupplies.

B. Standby Mode Power Consumption Criteria: To qualify as ENERGY STAR under both Tier 2 and Tier 3 of this specification, qualified products must not consume more than one (1.0) watt while in Standby Mode. Additionally, this lowest power consuming Standby must be the default Standby for the TV as shipped to consumers.

C. User Information Requirements: 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.

D. Luminance:

> **Note**: EPA has a significant interest in ensuring that products are tested and qualified as ENERGY STAR in the mode in which they will ultimately be viewed in the home. Thus EPA is interested in taking steps with this specification to help prevent unsatisfactory viewing experiences driving consumers to choose a more consumptive mode than that in which their television was qualified as ENERGY STAR. One way to do so is to limit the difference between the luminance of the mode the TV is qualified in (the Home mode) and the selectable mode with the highest luminance (the Retail mode). This approach was proposed by EPA via a letter on February 9, 2009, and has also been adopted by ENERGY STAR partner countries in Europe and Australia. Another is to provide a set power allowance (based on screen size) beyond home mode power use for retail mode. This proposal was circulated by EPA on March 13, 2009. EPA has been asked to allow for discussion of at least one additional proposal at the upcoming EPA stakeholder meeting (all presentations from this meeting will be posted immediately after the meeting to www.energystar.gov). EPA is now seeking stakeholder feedback on how to achieve the above stated goal so as to ensure savings as well as create a level playing field.

E. Download Acquisition Mode (DAM): Qualified products may automatically exit Standby Mode according to a predefined schedule to: download channel listing information for use by an electronic programming guide, monitor for emergency messaging/communications, and/or otherwise communicate through a network protocol. The duration of any DAM event shall not be more than 15 minutes. Additionally, a product shall spend no more than two (2) hours of time in DAM in any continuous twenty-four (24) hour period.

> **Note**: As noted during the Tier 1 specification development process, EPA intends to set requirements for DAM in the Tier 2 process. The proposed requirement for DAM is consistent with the requirement described in Version 2.0 ENERGY STAR Set-top Boxes specification. Stakeholders are encouraged to provide feedback on this approach.

4) **Test Methodology**: Manufacturers are required to perform tests and self-certify that products 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.
- 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%)
		Note: For products rated for > 1.5 kW maximum power, the voltage range is ± 4%
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 several markets and rated for 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 attributes[1]:

- 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).

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.

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

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 3: Test Procedures for Measuring Operational Modes

Operational Mode	Test Protocol	Source
Standby Mode	IEC 62301, Ed 1.0: Household Electrical Appliances – Measurement of Standby Power.	www.iec.ch
On Mode	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."	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.

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 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 measuring 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.

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.

F. Dark Room Conditions: All luminance testing shall be performed in dark room conditions. Measurements should be taken perpendicular to the center of the display screen using a Light Measuring Device (LMD) with the display in Off Mode (Reference VESA FPDM Standard 2.0, Section 301-2F).

G. Light Measurement Protocols: When light measurements, such as luminance, need to be made, an LMD shall be used with the display located in dark room conditions. The LMD shall be used to take measurements at the center of and perpendicular to the display screen (Reference VESA FPDM Standard 2.0, Appendix A115). The screen surface area to be measured shall cover at least 500 pixels, unless this exceeds the equivalent of a rectangular area with sides of length equal to 10% of the visible screen height and width (in which case this latter limit applies). However, in no case may the illuminated area be smaller than the area the LMD is measuring (Reference VESA FPDM Standard 2.0, Section 301-2H).

> **Note**: The methodologies for measuring luminance above are consistent with those provided in the Version 5.0 ENERGY STAR Displays specification. Stakeholders are encouraged to provide feedback on these methodologies.

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 April 30, 2010.

A. Qualifying Products Under Tier 2 of the Version 3.1 Specification: Tier 2 of this Version 3.1 specification will commence on **May 1, 2010**. All products, including models originally qualified under Version 3.0, with a **date of manufacture** on or after **May 1, 2010** must meet the new Version 3.1 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 3 of the Version 3.1 Specification: The second phase of this specification, Tier 3, will commence on **May 1, 2012**. All products, including models originally qualified under Tier 2, with a **date of manufacture** on or after **May 1, 2012**, must meet the Tier 3 requirements in order to qualify for ENERGY STAR.

> **Note**: EPA anticipates finalizing the Version 3.1 ENERGY STAR TV products specification by August 2009. The proposed Tier 2 effective date of May 1, 2010, would allow industry the typical nine months transition time prior to the new specification taking effect. Additionally, EPA has included a proposed effective date of May 2012 for Tier 3 requirements under this Draft 1 specification.

C. Elimination of Grandfathering: EPA will not allow grandfathering under this Version 3.1 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.