



**ENERGY STAR® Program Requirements  
for Set-top Boxes  
DRAFT 2 – Version 2.0  
October 5, 2007**

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# ENERGY STAR<sup>®</sup> Program Requirements for Set-top Boxes

## Partner Commitments DRAFT 2 – Version 2.0 October 5, 2007

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### 58 **Commitment**

59 The following are the terms of the ENERGY STAR Partnership Agreement as it pertains to the  
60 manufacturing of ENERGY STAR qualified set-top boxes. The ENERGY STAR Partner must adhere to  
61 the following program requirements:  
62

- 63 • comply with current ENERGY STAR Eligibility Criteria, defining the performance criteria that must be  
64 met for use of the ENERGY STAR certification mark on set-top boxes and specifying the testing  
65 criteria for set-top boxes. EPA may, at its discretion, conduct tests on products that are referred to as  
66 ENERGY STAR qualified. These products may be obtained on the open market, or voluntarily  
67 supplied by Partner at EPA's request;  
68
- 69 • comply with current ENERGY STAR Identity Guidelines, describing how the ENERGY STAR marks  
70 and name may be used. Partner is responsible for adhering to these guidelines and for ensuring that  
71 its authorized representatives, such as advertising agencies, dealers, and distributors, are also in  
72 compliance;  
73
- 74 • qualify at least one ENERGY STAR set-top box model within 30 days of activating the set-top box  
75 portion of the agreement. When the manufacturing Partner qualifies the product, it must meet the  
76 specification (e.g., Version 2.0, Tier 1) in effect at that time;  
77
- 78 • provide clear and consistent labeling of ENERGY STAR qualified set-top boxes. For all qualified  
79 STBs sold at retail or to service providers participating as ENERGY STAR partners, the ENERGY  
80 STAR mark must be clearly displayed on the product or via electronic notification that meet the  
81 following requirements:  
82
  1. On the product via electronic notification that meets the following requirements:
    - 83 – The ENERGY STAR mark must appear in cyan, black, or white (as described in "The  
84 ENERGY STAR Identity Guidelines");
    - 85 – The ENERGY STAR mark must be at least 10% of the screen by area, may not be smaller  
86 than 76 pixels x 78 pixels, and must be legible;
    - 87 – The ENERGY STAR mark must appear for a duration not less than five seconds at power up  
88 and briefly upon power down; and
    - 89 – The ENERGY STAR mark must be displayed as part of the auto power down notification.  
90

91 Product guide and specification sheets for each qualified product must explain the conditions  
92 under which the model is able to earn the ENERGY STAR. Products whose ENERGY STAR  
93 qualification status could be undermined based on service provider interface with the product  
94 should not be labeled with the ENERGY STAR if they are sold to service providers that are not  
95 participants in the ENERGY STAR program.

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*Note: EPA welcomes suggestions from stakeholders on the feasibility of the preceding requirement for electronic labeling. This proposal is being offered as EPA understands that manufacturers do not necessarily have control over how their products are ultimately configured, and whether products that meet the ENERGY STAR criteria when shipped will still meet the criteria after being installed. In particular, EPA would like to understand how feasible it is to expect that manufacturing partners know if the service providers to whom they sell are ENERGY STAR partners at the time of product labeling.*

*EPA also continues to seek feedback on the feasibility of an electronic user interface that allows consumers to modify the energy settings on their qualified set-top box. This could be a Tier 2 requirement.*

2. In product literature (i.e., user manuals, spec sheets, etc.);
  3. On product packaging for products sold at retail; and
  4. On the manufacturer’s Internet site where information about ENERGY STAR qualified models is displayed;
- provide to EPA, on an annual basis, an updated list of ENERGY STAR qualified set-top box models. Once the Partner submits its first list of ENERGY STAR qualified set-top box models, the Partner will be listed on the ENERGY STAR Web site. 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 set-top boxes 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., type, presence of additional functions, 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. Any information used will be masked by EPA so as to protect the confidentiality of the Partner;

*Note: EPA received comments indicating that the preceding requirement to report shipments by model was too severe and unnecessary. To date, through five years of collecting data from manufacturers, EPA has consistently agreed to accept shipment data that is not broken down by model. While we do not anticipate the need to change this approach, we are inclined to leave the language, which is standard across all ENERGY STAR product categories. This language remains with the understanding that any change would be closely coordinated with partners to minimize burden.*

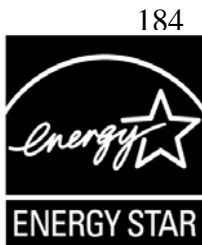
- notify EPA of a change in the designated responsible party or contacts for set-top boxes within 30 days.

**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 mark for buildings;

- 149 • purchase ENERGY STAR qualified products. Revise the company purchasing or procurement  
150 specifications to include ENERGY STAR. Provide procurement officials' contact information to EPA  
151 for periodic updates and coordination. Circulate general ENERGY STAR qualified product information  
152 to employees for use when purchasing products for their homes;  
153
- 154 • feature the ENERGY STAR mark(s) on Partner Web site and in other promotional materials. If  
155 information concerning ENERGY STAR is provided on the Partner Web site as specified by the  
156 ENERGY STAR Web Linking Policy (this document can be found in the Partner Resources section on  
157 the ENERGY STAR Web site at [www.energystar.gov](http://www.energystar.gov)), EPA may provide links where appropriate to  
158 the Partner Web site;  
159
- 160 • ensure the power management feature is enabled on all ENERGY STAR qualified monitors and  
161 computers in use in company facilities, particularly upon installation and after service is performed;  
162
- 163 • provide general information about the ENERGY STAR program to employees whose jobs are relevant  
164 to the development, marketing, sales, and service of current ENERGY STAR qualified product  
165 models;  
166
- 167 • provide a simple plan to EPA outlining specific measures Partner plans to undertake beyond the  
168 program requirements listed above. By doing so, EPA may be able to coordinate, communicate,  
169 and/or promote Partner's activities, provide an EPA representative, or include news about the event in  
170 the ENERGY STAR newsletter, on the ENERGY STAR Web pages, etc. The plan may be as simple  
171 as providing a list of planned activities or planned milestones that Partner would like EPA to be aware  
172 of. For example, activities may include: (1) increase the availability of ENERGY STAR qualified  
173 products by converting the entire product line within two years to meet ENERGY STAR guidelines; (2)  
174 demonstrate the economic and environmental benefits of energy efficiency through special in-store  
175 displays twice a year; (3) provide information to users (via the Web site and user's manual) about  
176 energy-saving features and operating characteristics of ENERGY STAR qualified products; and (4)  
177 build awareness of the ENERGY STAR Partnership and brand identity by collaborating with EPA on  
178 one print advertorial and one live press event;  
179
- 180 • provide quarterly, written updates to EPA as to the efforts undertaken by Partner to increase  
181 availability of ENERGY STAR qualified products, and to promote awareness of ENERGY STAR and  
182 its message.



## ENERGY STAR® Program Requirements for Set-top-Boxes

### Eligibility Criteria DRAFT 2 – Version 2.0 October 5, 2007

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193 **1) Definitions:** Below are the definitions of the relevant terms in this document.

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195

#### STB Types

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197 All STB types can come as stand-alone tuners or as part of a larger device with other tuners and/or  
198 secondary functions such as, but not limited to, DVR and DVD playback/recording.

199

200 A. Cable STB: A STB whose principal function is to receive television signals from a broadband,  
201 hybrid/[fiber] coaxial, community cable distribution system and deliver them to a consumer display  
202 and/or recording device. Source: CSA C380-06 modified.

203

204 B. Internet Protocol (IP) STB: A STB whose principal function is to receive television/video signals  
205 encapsulated in IP packets and deliver them to a consumer display and/or recording device.  
206 Source: CSA C380-06.

207

208 C. Satellite STB: A STB whose principal function is to receive television signals from satellites and  
209 deliver them to a consumer display and/or recording device. Source: CSA C380-06.

210

211 D. Terrestrial STB: Any STB whose principal function is to receive television signals over the air  
212 (OTA) and deliver them to a consumer display and/or recording device. Source: CSA C380-06.

213

214

215

#### Components

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217 E. CableCARD<sup>(TM)</sup>: A plug-in card that complies with the ANSI/SCTE 28 interface that is inserted  
218 into a Digital Cable Ready device to enable the decryption of premium services and provide other  
219 network control functions. Also known as a “Card” or a “Point of Deployment” (POD module).  
220 CableCARD<sup>(TM)</sup> is a registered trademark of CableLabs<sup>®</sup>. Source: CSA C380-06 modified.

221

222 F. Conditional Access: The encryption, decryption, and authorization techniques employed to protect  
223 content from unauthorized viewing. CableCARD, POD and Downloadable Conditional Access  
224 (DCAS) are examples of this technology.

225

226 G. Data Over Cable Service Interface Specification (DOCSIS): An international standard that defines  
227 the communications needed to transfer data over the cable infrastructure.

228

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230

#### Functionalities

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232 H. Base Functionality: For purposes of this specification, the primary functionality that defines the  
233 criteria that apply to a STB. The Base Functionality is one of the following: Cable, Satellite, IP, or  
234 Terrestrial. (See Section 3 below).

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- I. Additional Functionalities: Additional Functionalities consist of one or more of the following: Additional Tuners, DVR and/or DVD Players and Recorders, High Definition Resolution (Cable and Satellite STBs only), and Advanced Video Processing.

**Additional Functionalities**

- J. Additional Tuners: An additional tuner provides a second source of media content either from a physically separate A/V input or from the primary input (used concurrently); they need not be for the same source media type. Out-Of-Band tuners for DOCSIS and other similar types of technologies are not considered additional tuners for the purposes of this specification. For example, a device with additional tuners has the ability to tune into two or more separate streams of video simultaneously and place those on separate outputs (outputs being either physical outputs, recording mechanisms, or network based outputs).
- K. Advanced Video Processing: MPEG 4 encoding, transcoding and decoding.
- L. BluRay: A trademark for a competing version of high definition digital versatile disc that uses a smaller wavelength of light in order to embed more data on the disc. This is a direct competitor to HD-DVD and does not use actual DVD discs but discs of similar structure and type.
- M. Digital Versatile Disk (DVD): An optical disc storage media format that can be used for data storage, including movies, with high video and sound quality.
- N. Digital Video Recorder (DVR): A device that records video in a digital format to a rewritable disk drive or other non-volatile storage media local to the unit. The term covers DVR functions integrated in a STB; it does not include software for personal computers that enables video capture and playback to and from the computer's data storage nor does it include server based DVR capabilities.
- O. High Definition Resolution: Video with resolutions greater than 480i/p.
- P. Out-Of-Band Tuners: Tuners used to gain access to data channels outside of the audio/video source signal. These tend to be bi-directional in nature and allow the box to send diagnostic information back to the Service Provider as well as enabling Pay-Per-View content and other rich media interactive content.
- Q. Removable Media Player: A device, such as a DVD/HD or DVD/BluRay player, whose primary purpose is the decoding of digitized video signals on a DVD.
- R. Removable Media Player/Recorder: A device, such as a DVD/HD or DVD/BluRay recorder, whose primary purpose is the production or recording of digitized video/audio signals on a DVD.

**Operational Modes and Power States**

- S. On/Active: An operational state in which the STB is actively delivering one or more of its principal functions and some or all of its applicable secondary functions.
- T. Standby: A power state in which the device has greater power consumption, capability, and responsiveness than it does in the Off state, and has less (or similar) power consumption, capability, and responsiveness than it does in On state. For purposes of this specification, a Standby state initiated by a user (*Standby-Manual*) is distinguished from a Standby state that is initiated by an Auto Power down event (*Standby – Auto Power Down*).

291 U. Off: A state in which there is negligible or no power consumption.  
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293

### 294 **Miscellaneous**

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296 V. Auto Power Down: The capability to automatically switch from the On state to a Standby state  
297 after a period of time without user input, generally based on the amount of time the unit has  
298 remained "idle" from last active use (i.e., user input such as channel change, volume change,  
299 menu access, etc).  
300

301 W. Cable, Satellite, and Telecom Service Provider: An entity that provides video (and possibly other)  
302 content to these subscribers with whom it has an ongoing financial relationship. A service provider  
303 in the context of ENERGY STAR is one that distributes to end users STBs covered by this  
304 specification under an agreement such as a lease or rental arrangement.  
305

306 X. CSA: The Canadian Standards Association is a not-for-profit, membership-based association  
307 that works in Canada as well as globally to develop standards that affect areas such as public  
308 safety and health, quality of life, the environment, and trade.  
309

310 Y. C380-06: CSA's test procedure for the measurement of energy consumption of STBs. As of the  
311 publication of this Draft 2 specification, C380-06 is currently in draft format.  
312

313 Z. Digital Television Adapter (DTA): Receives terrestrial (over the air), digital signals and converts  
314 them to an analog output suitable for analog TVs. Does not provide digital signal output. For the  
315 purposes of this specification the DTA category does not include converters that work with satellite  
316 or cable digital signals, nor does it cover devices with multi-functionality such as DVD players with  
317 digital to analog conversion capability. Source: ENERGY STAR Digital-to-Analog Converter Box  
318 specification.  
319

320 DTAs are addressed under the Version 1.0 ENERGY STAR specification for Digital-to-Analog  
321 Converter Boxes, and are not included in this Set-top box specification.  
322

323 AA. Game Console: A stand-alone device whose primary use is to play video games. The primary  
324 input for game consoles are special hand held controllers rather than a mouse and keyboard used  
325 by conventional computers. Game consoles are also equipped with audio-visual outputs for use  
326 with televisions as the primary display, rather than an external monitor or integrated display.  
327 These devices typically do not use a conventional operating system, but often perform a variety of  
328 multimedia functions such as: DVD/CD playback, digital picture viewing, and digital music  
329 playback. Source: ENERGY STAR Version 4.0 Computers specification.  
330

331 Game consoles are addressed by the ENERGY STAR Version 4.0 Computers specification, and  
332 are not included in this Set-top Box specification.  
333

334 BB. TEC: Total Energy Consumption. TEC is an assessment tool used in this specification that  
335 provides flexibility to approach the issue of energy efficiency while retaining a comparable metric  
336 to assess performance. In this specification efficiency criteria are noted in terms of calculated  
337 energy use over a year for a typical user (kWh/yr) rather than power (Watts) for On and Standby  
338 states.  
339

340 CC. UUT: Unit Under Test (UUT) means the product being tested. Source: CSA C380-06 modified.  
341  
342

343 **2) Qualifying Products:** In order to qualify as ENERGY STAR under Tier 1 of this specification,  
344 STBs must meet the definition for these products in Section 1 and meet the technical requirements in  
345 Section 3. The following devices that fall within the definition of an STB, or provide functions similar to  
346 STBs, do not qualify under this Tier 1 specification. EPA envisions that the below excluded products list

347 will likely be modified for the Tier 2 phase of this specification:  
348

349 **Tier 1 Excluded Products:**

- 350 • Game Consoles (See definition above)
  - 351 • DTAs (See definition above)
  - 352 • IP set-top boxes sold or provided outside of a dedicated service or service contract.
- 353

354 *Note: EPA welcomes feedback on whether IP products distributed under other scenarios should*  
355 *be considered in Tier 2.*

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358 **3) Energy Efficiency and Power Management Criteria:** Only those products addressed by  
359 the Qualifying Products definition in Section 2 that meet the following criteria may qualify as ENERGY  
360 STAR products.

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362 **A) Calculated TEC Criteria**

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364 The criterion for ENERGY STAR qualified STBs is a calculated TEC (in annual kWh). The criterion  
365 (herein called an “allowance”) is an allowance for Base Functionality, plus allowances for specific,  
366 additional functionalities present across a duty cycle. This duty cycle is further explained in Section 4.

367  
368 **B) Base Functionality Allowance**

369 The Base Function shall be established as detailed below.

- 370  
371 a. If the STB meets the definition of Cable STB above, regardless of whether the cable  
372 reception is considered the “principal function” by the manufacturer or service provider,  
373 and/or the STB is capable of receiving cable service after installation of a CableCARD™  
374 or other type of CA system, the Base Functionality is CABLE.
  - 375  
376 b. If the STB Base Function is not CABLE, and the STB meets the definition of Satellite STB  
377 above, regardless of whether the satellite reception is considered the “principal function”  
378 by the manufacturer or service provider, the Base Functionality is SATELLITE.
  - 379  
380 c. If the STB Base Function is not CABLE or SATELLITE, and the STB meets the definition  
381 of IP STB above, regardless of whether the IP reception is considered the “principal  
382 function” by the manufacturer or service provider, the Base Functionality is IP.
  - 383  
384 d. If the STB Base Function is not CABLE, SATELLITE, or IP, and the STB meets the  
385 definition of Terrestrial STB above, regardless of whether the terrestrial reception is  
386 considered the “principal function” by the manufacturer or service provider, the Base  
387 Functionality is TERRESTRIAL.
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392 **Table 1: Base Functionality Annual Energy Allowance**

Base Functionality	Tier 1 Annual Energy Allowance (kWh/year)	Tier 2 Annual Energy Allowance (kWh/year)
Cable	70	42
Satellite	88	44
IP	TBD	TBD
Terrestrial	27	22



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EPA relied heavily on power measurements reported in Roth, Kurt & Kurtis McKenney, TIAX, "Energy Consumption by Consumer Electronics in U.S Residences," January 2007 to establish allowances for Tier 1. The lower allowances in Tier 2 were derived by including an auto power down state of 3 Watts (1 Watt for OTA) that is maintained for seven hours per day. Results were compared against the data set provided by the NRDC of currently installed STBs. This also applies to Additional Functionalities as shown in Table 2.

EPA requests comments on the criteria shown here and appropriate levels for IP TV. EPA is especially interested in comments on the relative levels of Cable and Satellite STBs. EPA also requests comments on the Additional Functionalities Allowances specified in Section C below.

**C) Additional Functionalities Allowance**

The Additional Functionalities Allowance, if applicable, shall be determined using values from Table 2.

**Table 2: Additional Functions Annual Energy Allowance**

<b>Additional Functionalities</b>	<b>Tier 1 Annual Energy Allowance (kWh/year)</b>	<b>Tier 2 Annual Energy Allowance (kWh/year)</b>
Additional Tuners	53	8
Additional Tuners – OTA	14	8
Adv. Video Processing	18	7
DVR	83	32
High Definition*	35	12
Removable Media Player	12	6
Removable Media Player/Recorder	23	6

\* Credit for High Definition applies only to STBs with a Base Functionalities of Cable or Satellite.

**D) Calculating Device Allowances**

To calculate the ENERGY STAR allowance for a given device, take the sum of the base functionality allowance and all applicable additional functionalities allowances. (Note there may not be any additional functions in devices such as standard cable or satellite STBs) This sum is the calculated annual kWh limit, or TEC value. This sum equals the maximum amount of energy the box can use in a given year as calculated following the ENERGY STAR test procedure.

Annual Energy Allowance (kWh/year) = Base Functionality Allowance + Additional Functionalities Allowance

Examples:

- (A) Under Tier 1, the energy allowance for a high-definition, Cable STB with DVR to qualify for ENERGY STAR would be 188 kWh/y (70 kWh/y for the base function, 35 kWh/y for the high definition and 83 kWh/y for the DVR).
- (B) Under Tier 2, the energy allowance for the same product would drop to 86 kWh/y.

**E) STBs Using an External Power Supply:**

To qualify, the external power supply must be ENERGY STAR qualified or meet the no-load and active

430 mode efficiency levels provided in the ENERGY STAR Program Requirements for Single Voltage Ac-Ac  
431 and Ac-Dc External Power Supplies. The ENERGY STAR specification and qualified product list can be  
432 found at: [www.energystar.gov/powersupplies](http://www.energystar.gov/powersupplies).  
433

#### 434 **4) Testing Products for ENERGY STAR:**

##### 435 **A) Product Testing Set-up, Procedures, and Documentation:**

437 The test results produced by the ENERGY STAR test procedure (AKA; modified CSA 380-06) shall be  
438 used as the primary basis for determining ENERGY STAR qualification. Manufacturers are required to  
439 perform tests and self-certify those models that meet the ENERGY STAR requirements.  
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442 *Note: The specific instructions for testing the energy consumption of STBs under ENERGY STAR have*  
443 *been drawn heavily from C380-06. EPA plans to submit to CSA suggested modifications to C380-06 with*  
444 *the intent being to work towards harmonization, if possible. Depending on CSA's response to the*  
445 *suggested changes and the timing of the finalization of the standard, ENERGY STAR may reference*  
446 *C380-06 directly, or may reference its own test procedure (a modified version of C380).*

##### 447 **B) TEC Assessment**

448 In this specification, the power consumed in the On and Standby states will be multiplied by the number of  
449 hours a defined typical device spends in On and Standby (either through manual shutdown or shutdown  
450 from auto power down). The product of this will be a single energy value representing the energy usage of  
451 the device over the course of an entire year, when tested to the ENERGY STAR test procedure.  
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454 To determine if a STB meets the ENERGY STAR specification criteria (Annual Energy Allowance), the  
455 TEC of the STB shall be calculated as follows. If the TEC assessed for the product is less than the Annual  
456 Energy Allowance calculated from Section 3D, the product meets the criteria and has earned the  
457 ENERGY STAR.  
458  
459

##### 460 **C) Equation 1: Base Assessment**

461 *Applies To All Products*

462 Calculate the Base energy consumption by multiplying the measured power consumption as specified in  
463 this test procedure by the hours per day values in the equations below. If the UUT does not include the  
464 capability for auto power down, then use the first equation. If the product does include auto power down  
465 capability, then use the second equation.  
466  
467

468  $P_{TV}$ ,  $P_{Standby}$  and  $P_{Auto PD}$  are power levels in Watts as measured according to the ENERGY STAR test  
469 procedure.  
470

471 a) Annual energy (kWh/yr) for a product with no auto power down

$$472 \quad kWh_{Base} = 0.365 \times (14 \times P_{TV} + 10 \times P_{Standby})$$

473 b) Annual energy (kWh/yr) for a product with auto power down capability

$$474 \quad kWh_{Base} = 0.365 \times ((7 \times P_{TV}) + (10 \times P_{Standby}) + (7 \times P_{Auto PD}))$$

475 Examples:

476 (C) The UUT (HD DVR cable STB, Tier 1) does not have auto power down capability, and the  
477 measurement during the test procedure are as follows:  $P_{TV} = 24.0$  Watts and  $P_{Standby} = 18.0$  Watts. The  
478 annual energy consumption is then:  
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$$kWh_{Base} = 0.365 * ( 14 * 24.0 + 10 * 18.0) = 188.0 kWh/yr$$

(D) The UUT (HD DVR cable STB, Tier 1) does have auto power down capability, and the measurements during the test procedure are similar to example A:  $P_{TV} = 26.0$  Watts,  $P_{Standby} = 20.0$  Watts and  $P_{AutoPD} = 20$  Watts. The annual energy consumption is then:

$$kWh_{Base} = 0.365 * ( 7 * 24.0 + 10 * 18.0 + 7 * 18.0) = 173 kWh/yr$$

*Note: EPA used an analysis of available Nielson data to develop the above user model. The above is based on the statistical probability that a user is watching TV at any given time (segregated into 1/2 hour segments) with assumptions regarding which segments viewers were most likely to be watching. This yielded three distinct viewing periods – morning, afternoon, and evening.*

*EPA understands that for most products, the power levels for  $P_{Standby}$  and  $P_{Auto PD}$  will be the same. However, it is important for EPA to provide the flexibility for cases where these levels differ; therefore, two equations have been provided in this specification.*

**D) Equation 2: Playback And Record Assessment**

The table and equation below illustrate how to calculate from the values measured in the test procedure the annual energy consumption for the added functionalities such as playback and record. These apply only to products with a DVR, Removable Media Playback, or Removable Media Playback with Record capabilities.

$P_{TV}$ ,  $P_{Playback}$  and  $P_{Record}$  are power levels in Watts as measured according to the ENERGY STAR test procedure.

$$kWh_{Play/Record} = 0.365 \times \sum_1^2 (P_{mode} - P_{TV}) \times H_{mode}$$

**Table 3: Duty Cycle**

	DVR (Hours/Day)	Removable Media Playback (Hours/Day)	Removable Media Playback w/ Record capability (Hours/Day)	Additional Tuner Usage
Mode				
Hours On-Playback ( $H_{Playback}$ )	2	2	2	1
Hours On-Record ( $H_{Record}$ )	3	0	1	2

Example:

(E) Consider the Cable STB with DVR product in example (C) above with a  $P_{TV}$  of 26.0 Watts. Following the test procedure, it is found that  $W_{Playback}$  is 30.0 Watts and  $W_{record}$  is 32.0 Watts

$$kWh_{Play/Record} = 0.365 * ((30.0 - 24.0) * 2 + (32.0 - 24.0) * 3) = 13.1 kWh/yr$$

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*Note: EPA arrived at the preceding Duty Cycle figures in Table 3 based on conversations with industry, recent press reports, Neilson data and best professional judgment*

Lastly, add the results from the base tuner, each test based additional functionality (i.e.; DVR, Removable Media Playback, etc), and then lastly add the allowances for all other additional functionalities (i.e.; HD, Adv. Video, etc;).

$$kWh_{Total} = \sum_1^n kWh_{Funcs}$$

If the STB includes a DVR, Removable Media Playback, or Removable Media Playback with Record capability, add the results of Equation 1 and Equation 2. If the STB does not include DVR, Removable Media Playback, or Removable Media Playback w/ Record capability the TEC is equal to Equation 1.

**Example:**

In the case of a STB with a DVR, Removable Media Playback, Removable Media Playback with Record capability, one would then take the example from letter C, add the result from letter E and get 188.0 + 13.1 for a total of 201.0 kWh for the year for this particular box. This product would not meet the ENERGY STAR requirements. If, however, the product had auto power down capability, one would take 173.0 from letter C and add 13.1 for a total of 186.1 kWh for the year and the product would qualify.

**E) Electronic Program Guide and System Update Requirements**

ENERGY STAR qualified STBs may exit Standby mode in order to scan for program and system information or private data (PSIP). In order to qualify for ENERGY STAR, STBs may exit the Standby mode for no longer than one hour in an eight hour period that the device would otherwise remain in Standby mode.

**F) Auto Power Down and Other Standby Event Requirements**

A STB for which the Partner claims the presence of Auto Power Down functionality or other automatically initiated standby capability for purposes of using equation 1b to calculate the total energy consumption in Section 4, the following requirements must be met:

1. The STB must be shipped from the manufacturer with the auto power down setting engaging at four hours or less of inactivity. It is acceptable for the current program to complete before switching to the Standby state. The energy-related settings shipped as the default by the manufacturer shall not be capable of being altered during the initial user set-up process and shall persist unless the user chooses at a later date to manually: a) disable the "automatic switching to Standby state" capability, or b) adjust the default time period from four hours or less to some other value.
2. The STB may exit an automatically-initiated Standby mode in order to scan for program and system information, scheduling information, or any other maintenance activity. If this occurs, the STB may exit the Standby mode for no longer than two hours in a twenty-four (24) hour period that the device would otherwise remain in Standby mode.

**G) Submittal of Qualified Product Data to EPA:**

575 Partners are required to report data on those models that meet the ENERGY STAR guidelines to EPA.  
576 The test results must be reported to EPA using the Set-top Box Version 2.0 Qualifying Product Information  
577 (QPI) Form or Online Product Submittal Tool (OPS).  
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580 **5) User Interface:** Although not mandatory, manufacturers are strongly recommended to design  
581 products in accordance with the Power Control User Interface Standard — IEEE 1621 (formally known as  
582 “Standard for User Interface Elements in Power Control of Electronic Devices Employed in  
583 Office/Consumer Environments”). Compliance with IEEE 1621 will make power controls more  
584 consistent and intuitive across all electronic devices. For more information on the standard, see  
585 <http://eetd.LBL.gov/Controls>.  
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588 **6) Effective Date:** The date that manufacturers may begin to qualify products as ENERGY STAR  
589 under this Version 2.0 specification will be defined as the *effective date* of the agreement. The ENERGY  
590 STAR specification for STBs (Version 2.0) Tier 1 is effective September 1, 2008. Tier 2 will become  
591 effective on January 1, 2010. Any previously executed agreement on the subject of ENERGY STAR  
592 qualified set-top boxes terminated effective February 2, 2005.  
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- 594 1. Qualifying and Marking products under the Tier 1 Version 2.0 specification: All products, including  
595 models originally qualified under Version 1.0, with a date of manufacture on or after September 1,  
596 2008, must meet the new (Version 2.0) requirements in order to qualify for ENERGY STAR. The  
597 date of manufacture is specific to each unit and is the date (e.g., month and year) on which a unit  
598 is considered to be completely assembled.  
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- 600 2. Qualifying and Marking products under the Tier 2 Version 2.0 specification: All products, including  
601 models originally qualified under Tier 1 Version 2.0, with a date of manufacture on or after January  
602 1, 2010, must meet the Tier 2 requirements in order to qualify for ENERGY STAR.  
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- 604 3. Elimination of Grandfathering: EPA will not allow grandfathering under this Version 2.0 ENERGY  
605 STAR specification. **ENERGY STAR qualification under previous Versions is not**  
606 **automatically granted for the life of the product model.** Therefore, any product sold,  
607 marketed, or identified by the manufacturing partner as ENERGY STAR must meet the current  
608 specification in effect at the time of manufacture of the product.  
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611 **7) Future Specification Revisions:** EPA reserves the right to revise the specification should  
612 technological and/or market changes affect its usefulness to consumers or industry or its impact on the  
613 environment. In keeping with current policy, revisions to the specification will be discussed with  
614 stakeholders. In the event of a specification revision, please note that ENERGY STAR qualification is not  
615 automatically granted for the life of a product model. To qualify as ENERGY STAR, a product model must  
616 meet the ENERGY STAR specification in effect on the model’s date of manufacture.  
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