



ENERGY STAR® Program Requirements Product Specification for Computers

Eligibility Criteria Draft 1, Version 7.0

Following is the **Draft 1, Version 7.0** ENERGY STAR Product Specification for Computers. A product shall meet all of the identified criteria if it is to earn the ENERGY STAR.

Note: In the Version 7.0 specification revision, the Environmental Protection Agency (EPA) is proposing to revise the eligibility criteria for notebook computers, slates and tablets, thin clients, internal power supplies, clarify the ENERGY STAR scope, and incorporate incentives for full network connectivity, which now encompasses features such as Microsoft's modern standby and Apple's power nap. EPA is also outlining the approach that it foresees for both the Version 7.0 specification and the Version 8.0 specification, which will focus on desktop computers. EPA believes this timeline reflects the comments made by stakeholders to allow additional time to consider levels for desktop and all-in-one computers. EPA welcomes feedback on this Draft 1 proposal; please send comments via email to computers@energystar.gov no later than August 3, 2017.

1 DEFINITIONS

A) Product Types:

- 1) Computer: A device which performs logical operations and processes data. For the purposes of this specification, computers include both stationary and portable units, including Desktop Computers, Integrated Desktop Computers, Notebook Computers, Small-Scale Servers, Thin Clients, and Workstations. Although computers are capable of using input devices and displays, such devices are not required to be included with the computer upon shipment. Computers are composed of, at a minimum:
 - a) A central processing unit (CPU) to perform operations. If no CPU is present, then the device must function as a client gateway to a server which acts as a computational CPU;
 - b) User input devices such as a keyboard, mouse, or touchpad; and
 - c) An Integrated Display screen and/or the ability to support an external display screen to output information.
- 2) Desktop Computer: A computer whose main unit is designed to be located in a permanent location, often on a desk or on the floor. Desktop computers are not designed for portability and are designed for use with an external display, keyboard, and mouse. Desktop computers are intended for a broad range of home and office applications, including point of sale applications.
 - a) Integrated Desktop Computer: A Desktop Computer in which the computing hardware and display are integrated into a single housing, and which is connected to ac mains power through a single cable. Integrated Desktop Computers come in one of two possible forms: (1) a system where the display and computer are physically combined into a single unit; or (2) a system packaged as a single system where the display is separate but is connected to the main chassis by a dc power cord and both the computer and display are powered from a single power supply. As a subset of Desktop Computers, Integrated Desktop Computers are typically designed to provide similar functionality as Desktop systems.
- 3) Notebook Computer: A computer designed specifically for portability and to be operated for extended periods of time both with and without a direct connection to an ac mains power source. Notebook Computers include an Integrated Display, a non-detachable, mechanical keyboard (using physical, moveable keys), and pointing device.

Note: Notebook computers are typically designed to provide similar functionality to Desktops, including operation of software similar in functionality as that used in Desktops. For purposes of this specification, Notebook Computers include models with touch-sensitive screens.

- a) Mobile Thin Client: A computer meeting the definition of a Thin Client, designed specifically for portability, and also meeting the definition of a Notebook Computer. These products are considered to be Notebook Computers for the purposes of this specification.
- b) Two-In-One Notebook: A computer which resembles a traditional Notebook Computer with a clam shell form factor, but has a detachable display which can act as an independent Slate/Tablet when disconnected. The keyboard and display portions of the product must be shipped as an integrated unit. Two-In-One Notebooks are considered Notebooks in the remainder of this specification and are therefore not referenced explicitly.
- 4) Slate/Tablet: A computing device designed for portability that meets all of the following criteria:
 - a) Includes an integrated display with a diagonal size greater than 6.5 inches and less than 17.4 inches;
 - b) Lacking an integrated, physical attached keyboard in its as-shipped configuration;
 - c) Includes and primarily relies on touchscreen input; (with optional keyboard);
 - d) Includes and primarily relies on a wireless network connection (e.g., Wi-Fi, 3G, etc.); and
 - e) Includes and is primarily powered by an internal battery (with connection to the mains for battery charging, not primary powering of the device).
- 5) Portable All-In-One Computer: A computing device designed for limited portability that meets all of the following criteria:
 - a) Includes an integrated display with a diagonal size greater than or equal to 17.4 inches;
 - b) Lacking keyboard integrated into the physical housing of the product in its as-shipped configuration;
 - c) Includes and primarily relies on touchscreen input; (with optional keyboard);
 - d) Includes wireless network connection (e.g. Wi-Fi, 3G, etc.); and
 - e) Includes an internal battery, but is primarily powered by connection to the ac mains.
- 6) E-Reader: A device designed for display and consumption of static images. The display is characterized by a low refresh rate and a display made of bistable materials where no energy is needed to maintain a visible image, only to alter the image.
- 7) Small-scale Server: A computer that typically uses desktop components in a desktop form factor, but is designed primarily to be a storage host for other computers. Small-scale Servers are designed to perform functions such as providing network infrastructure services (e.g., archiving) and hosting data/media. These products are not designed to process information for other systems or run web servers as a primary function. A Small-scale Server has the following characteristics:
 - a) Designed in a pedestal, tower, or other form factor similar to those of desktop computers such that all data processing, storage, and network interfacing is contained within one box/product;
 - b) Designed to operate 24 hours/day, 7 days/week, with minimal unscheduled downtime (on the order of hours/year);
 - c) Capable of operating in a simultaneous multi-user environment serving several users through networked client units; and
 - d) Designed for an industry accepted operating system for home or low-end server applications (e.g., Windows Home Server, Mac OS X Server, Linux, UNIX, Solaris).

- 8) Thin Client: An independently-powered computer that relies on a connection to remote computing resources (e.g., computer server, remote workstation) to obtain primary functionality. Main computing functions (e.g., program execution, data storage, interaction with other Internet resources) are provided by the remote computing resources. Thin Clients covered by this specification are (1) limited to devices with no rotational storage media integral to the computer and (2) designed for use in a permanent location (e.g. on a desk) and not for portability.
- a) Integrated Thin Client: A Thin Client in which computing hardware and display are connected to ac mains power through a single cable. Integrated Thin Client computers come in one of two possible forms: (1) a system where the display and computer are physically combined into a single unit; or (2) a system packaged as a single system where the display is separate but is connected to the main chassis by a dc power cord and both the computer and display are powered from a single power supply. As a subset of Thin Clients, Integrated Thin Clients are typically designed to provide similar functionality as Thin Client systems.
 - b) Ultra-thin Client: A computer with lesser local resources than a standard Thin Client that sends raw mouse and keyboard input to a remote computing resource and receives back raw video from the remote computing resource. Ultra-thin clients cannot interface with multiple devices simultaneously nor run windowed remote applications due to the lack of a user-discernible client operating system on the device (i.e., beneath firmware, user inaccessible).
- 9) Workstation: A high-performance, single-user computer typically used for graphics, CAD, software development, financial and scientific applications among other compute intensive tasks. Workstations covered by this specification (a) are marketed as a workstation; (b) provide mean time between failures (MTBF) of at least 15,000 hours (based on either Bellcore TR-NWT-000332, issue 6, 12/97 or field collected data); and (c) support error-correcting code (ECC) and/or buffered memory. In addition, a workstation meets three or more of the following criteria:
- a) Provide supplemental power support for high-end graphics (e.g., PCI-E 6-pin 12V supplemental power feed);
 - b) Wired for greater than x4 PCI-E on the motherboard in addition to the graphics slot(s) and/or PCI-X support;
 - c) Do not provide support for Uniform Memory Access (UMA) graphics;
 - d) Provide 5 or more PCI, PCI-E, or PCI-X slots;
 - e) Provide multi-processor support for 2 or more processors (shall support physically separate processor packages/sockets, i.e., requirement cannot be met with support for a single multi-core processor); and/or
 - f) Certification by 2 or more Independent Software Vendor (ISV) product certifications; these certifications can be in process, but shall be completed within 3 months of certification.
- 10) Rack-mounted Workstation: A workstation that is designed to be natively rack mounted as described in IEC 60297-3-101:2004. The rack-mounted workstation may be accessed locally by direct connection to the workstation and display or accessed remotely across a network by one or more users.

Note: EPA is proposing a new definition for rack-mounted workstation which aligns with the definition in the California Energy Commissions (CEC)'s Appliance Efficiency Rulemaking for Computers, Computer Monitors, and Signage Displays adopted on December 14, 2016. EPA also received comments regarding the workstation definition. After reviewing the definition within the CEC standards, EPA has retained the Version 6.1 definition. The Agency believes that the current definition better reflects the intended scope of these products under the ENERGY STAR program.

B) Product Category: A second-order classification or sub-type within a product type that is based on product features and installed components. Product categories are used in this specification to determine certification and test requirements.

C) Computer Components:

- 1) Graphics Processing Unit (GPU): An integrated circuit, separate from the CPU, designed to accelerate the rendering of either 2D and/or 3D content to displays. A GPU may be mated with a CPU, on the system board of the computer or elsewhere to offload display capabilities from the CPU.
- 2) Discrete Graphics (dGfx): A graphics processor (GPU) with a local memory controller interface and local graphics-specific memory. Discrete GPUs are not packaged on the same die or substrate as the CPU.

Note: EPA has received stakeholder feedback requesting that the dGfx definition be further clarified to ensure adequate division between traditional discrete graphics solutions and integrated graphics included on the CPU die. EPA welcomes stakeholder feedback on this proposed change.

3) Integrated Graphics (iGfx): A graphics solution that does not contain Discrete Graphics.

4) Display: A commercially-available product with a display screen and associated electronics, often encased in a single housing, that as its primary function displays visual information from (1) a computer, workstation or server via one or more inputs (e.g., VGA, DVI, HDMI, DisplayPort, IEEE 1394, USB), (2) external storage (e.g., USB flash drive, memory card), or (3) a network connection.

a) Enhanced-performance Integrated Display: An integrated Computer Display that has all of the following features and functionalities:

- (1) A contrast ratio of at least 60:1 at a horizontal viewing angle of at least 85°, with or without a screen cover glass;
- (2) A native resolution greater than or equal to 2.3 megapixels (MP); and
- (3) A color gamut of at least sRGB as defined by IEC 61966-2-1. Shifts in color space are allowable as long as 99% or more of defined sRGB colors are supported.

5) External Power Supply (EPS): Also referred to as External Power Adapter. An external power supply circuit that is used to convert household electric current into dc current or lower-voltage ac current to operate a consumer product.

6) Internal Power Supply (IPS): A component internal to the computer casing and designed to convert ac voltage from the mains to dc voltage(s) for the purpose of powering the computer components. For the purposes of this specification, an internal power supply shall be contained within the computer casing but be separate from the main computer board. The power supply shall connect to the mains through a single cable with no intermediate circuitry between the power supply and the mains power. In addition, all power connections from the power supply to the computer components, with the exception of a DC connection to a display in an Integrated Desktop Computer, shall be internal to the computer casing (i.e., no external cables running from the power supply to the computer or individual components). Internal dc-to-dc converters used to convert a single dc voltage from an external power supply into multiple voltages for use by the computer are not considered internal power supplies.

D) Operational Modes:

- 1) Active State: The power state in which the computer is carrying out useful work in response to a) prior or concurrent user input or b) prior or concurrent instruction over the network. Active State includes active processing, seeking data from storage, memory, or cache, including Idle State time while awaiting further user input and before entering low power modes.
- 2) Idle State: The power state in which the operating system and other software have completed loading, a user profile has been created, activity is limited to those basic applications that the system starts by default, and the computer is not in Sleep Mode. Idle State is composed of two sub-states: Short Idle and Long Idle.
 - a) Long Idle: The mode where the Computer has reached an Idle condition (i.e., 15 minutes after OS boot or after completing an active workload or after resuming from Sleep Mode) and the main Computer Display has entered a low-power state where screen contents cannot be observed (i.e., backlight has been turned off) but remains in the working mode (ACPI G0/S0). If power management features are enabled as-shipped in the scenario described in this definition, such features shall engage prior to evaluation of Long Idle (e.g., display is in a low power state, HDD may have spun-down), but the Computer is prevented from entering Sleep Mode. P_{LONG_IDLE} represents the average power measured when in the Long Idle Mode.
 - b) Short Idle: The mode where the Computer has reached an Idle condition (i.e., 5 minutes after OS boot or after completing an active workload or after resuming from Sleep Mode), the screen is on, and Long Idle power management features have not engaged (e.g. HDD is spinning and the Computer is prevented from entering sleep mode). P_{SHORT_IDLE} represents the average power measured when in the Short Idle mode.
- 3) Off Mode: The lowest power mode 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 systems where ACPI standards are applicable, Off Mode correlates to ACPI System Level S5 state.
- 4) Sleep Mode: A low power mode that the computer enters automatically after a period of inactivity or by manual selection. A computer with Sleep capability can quickly "wake" in response to network connections or user interface devices with a latency of less than or equal to 5 seconds from initiation of wake event to system becoming fully usable including rendering of display. For systems where ACPI standards are applicable, Sleep Mode most commonly correlates to ACPI System Level S3 (suspend to RAM) state.

E) Networking and Additional Capabilities:

- 1) Additional Internal Storage: Any and all internal hard disk drives (HDD) or solid state drives (SSD) installed beyond the first in a computer in its as shipped state. This definition does not include external drives.

Note: In response to stakeholder feedback, EPA has clarified that the additional internal storage definition is only intended to cover additional internal storage installed in the product in its as-shipped state.

- 2) Energy Efficient Ethernet (EEE): A technology which enables reduced power consumption of Ethernet interfaces during times of low data throughput. Specified by IEEE 802.3az.

- 3) **Full Network Connectivity:** The ability of the computer to maintain network presence while in Sleep Mode or an alternative low power mode (LPM) with power demand of less than or equal to 2 watts and intelligently wake when further processing is required (including occasional processing required to maintain network presence). Presence of the computer, its network services and applications, is maintained even though the computer is in a LPM. From the vantage point of the network, a computer with full network connectivity that is in LPM is functionally equivalent to an idle computer with respect to common applications and usage models. Full network connectivity in LPM is not limited to a specific set of protocols but can cover applications installed after initial installation. Also referred to as “network proxy” functionality and as described in the *Ecma-393* standard.
 - a) **Network Proxy - Base Capability:** To maintain addresses and presence on the network while in LPM, the system handles IPv4 ARP and IPv6 NS/ND.
 - b) **Network Proxy - Full Capability:** While in LPM, the system supports Base Capability, Remote Wake, and Service Discovery/Name Services.
 - c) **Network Proxy - Remote Wake:** While in LPM, the system is capable of remotely waking upon request from outside the local network. Includes Base Capability.
 - d) **Network Proxy - Service Discovery/Name Services:** While in LPM, the system allows for advertising host services and network name. Includes Base Capability.

Note: EPA has received stakeholder feedback and confidential data regarding new networked connected very low power modes being collaboratively developed between multiple operating systems vendors and chipset manufacturers which will allow a constant network connection at power levels below 2 watts. Therefore, EPA is revising the definition of Full Network Connectivity to more closely align with these new very low power modes, and looks forward to the additional potential energy savings they will bring. EPA intends that products that implement any network connected low power mode which uses 2 watts or less and meets the Full Capability definition above will be subject to the Network Proxy – Full Capability mode weightings in Tables 6 and 7 in Section 3.5. EPA will also update the ENERGY STAR certified product list to highlight those products that incorporate these features and anticipates providing additional language on the ENERGY STAR website regarding the energy efficiency benefits this feature offers the end-user. EPA will continue to assess the development of this market and the effectiveness of these efforts in subsequent specifications.

- 4) **Network Interface:** The components (hardware and software) whose primary function is to make the computer capable of communicating over one or more network technologies. Examples of Network Interfaces are IEEE 802.3 (Ethernet) and IEEE 802.11 (Wi-Fi).
- 5) **Wake Event:** A user, scheduled, or external event or stimulus that causes the computer to transition from Sleep Mode or Off Mode to an active state of operation. Examples of wake events include, but are not limited to: movement of the mouse, keyboard activity, controller input, real-time clock event, or a button press on the chassis, and in the case of external events, stimulus conveyed via a remote control, network, modem, etc.
- 6) **Wake On LAN (WOL):** Functionality which allows a computer to transition from Sleep Mode or Off Mode to an Active State of operation when directed by a network Wake Event via Ethernet.
- 7) **Switchable Graphics:** Functionality that allows Discrete Graphics to be disabled when not required in favor of Integrated Graphics.

Note: This functionality allows lower power and lower capability integrated GPUs to render the display while on battery or when the output graphics are not overly complex while then allowing the more power consumptive but more capable discrete GPU to provide rendering capability when required.

Note: EPA has clarified in the note above that switching to the discrete GPU is intended to occur when the system requires the additional rendering capability, without the need for user interaction or demand to function correctly.

F) Marketing and Shipment Channels:

- 1) Enterprise Channels: Sales channels typically used by large and medium-sized business, government, educational, or other organizations to purchase computers for use in managed client/server environments.
- 2) Model Name: A marketing name that includes reference to the computer model number, product description, or other branding references.
- 3) Model Number: A unique marketing name or identification reference that applies to a specific hardware and software configuration (e.g., operating system, processor type, memory, GPU), and is either pre-defined or selected by a customer.

G) Product Family: A high-level description referring to a group of computers sharing one chassis/motherboard combination that often contains hundreds of possible hardware and software configurations. Product models within a family differ from each other according to one or more characteristics or features that either (1) have no impact on product performance with regard to ENERGY STAR certification criteria, or (2) are specified herein as acceptable variations within a product family. For Computers, acceptable variations within a product family include:

- 1) Color;
- 2) Housing; and
- 3) Electronic components other than the chassis/motherboard, such as the processor, memory, GPU, etc.

2 SCOPE

2.1 Included Products

2.1.1 Products that meet the definition of a Computer and one of the following Product Type definitions, as specified herein, are eligible for ENERGY STAR certification, with the exception of products listed in Section 2.2:

- i. Desktop Computers and Integrated Desktop Computers;
- ii. Notebook Computers;
- iii. Slates/Tablets;
- iv. Portable All-In-One Computers;
- v. Workstations; and
- vi. Thin Clients.

Note: EPA has received stakeholder feedback supporting the removal of small-scale servers from scope of Version 7.0 due to limited sales and no eligible products currently certified. Therefore, EPA is removing small-scale servers from scope in Version 7.0.

2.2 Excluded Products

2.2.1 Products that are covered under other ENERGY STAR product specifications are not eligible for certification under this specification. The list of specifications currently in effect can be found at www.energystar.gov/products.

2.2.2 The following products are not eligible for certification under this specification:

- i. Docking Stations;

- ii. Game Consoles;
- iii. E-Readers;
- iv. Handheld gaming devices, typically battery powered and intended for use with an integral display as the primary display;
- v. Mobile Thin Clients not meeting the definition of Notebook Computer;
- vi. Personal Digital Assistant devices (PDAs);
- vii. Point of Sale (POS) products that do not use internal components common to Notebook, Desktop, or Integrated Desktop Computers, including a processor, motherboard, and memory;
- viii. Slate/Tablet based POS products;
- ix. Handheld Computers which contain cellular voice capability;
- x. Ultra-thin Clients; and
- xi. Small-scale Servers.

Note: In addition to seeking feedback on inclusion of small scale servers, EPA solicited feedback on ultra-thin clients. After considering this feedback, EPA will continue to monitor this product category, but will continue to exclude them from the scope. Lastly, EPA solicited comment on interactive displays. After further consideration, EPA believes that this product would be covered under the ENERGY STAR Displays specification.

EPA also received feedback requesting clarification on whether Slate/Tablet based point of sale products are within scope. EPA has clarified that Slate/Tablet based POS devices are not intended for certification and has therefore explicitly removed them from scope.

3 CERTIFICATION CRITERIA

3.1 Significant Digits and Rounding

- 3.1.1 All calculations shall be carried out with directly measured (unrounded) values.
- 3.1.2 Unless otherwise specified in this specification, compliance with specification limits shall be evaluated using directly measured or calculated values without any benefit from rounding.
- 3.1.3 Directly measured or calculated values that are submitted for reporting on the ENERGY STAR website shall be rounded to the nearest significant digit as expressed in the corresponding specification limit.

3.2 General Requirements

- 3.2.1 Power supply test data and test reports from testing entities recognized by EPA to perform power supply testing shall be accepted for the purpose of certifying the ENERGY STAR product.
- 3.2.2 Internal Power Supply (IPS) Requirements: IPSs used in Computers eligible under this specification must meet the following requirements when tested using the *Generalized Internal Power Supply Efficiency Test Protocol, Rev. 6.6* (available at http://www.plugloadolutions.com/docs/collatrl/print/Generalized_Internal_Power_Supply_Efficiency_Test_Protocol_R6.6.pdf).
- i. IPS with maximum rated output power less than 75 watts shall meet minimum efficiency requirements as specified in Table 1.

- ii. IPS with maximum rated output power greater than or equal to 75 watts shall meet both minimum efficiency requirements and minimum power factor requirements, as specified in Table 1.

Table 1: Requirements for Internal Power Supplies

Loading Condition (Percentage of Nameplate Output Current)	Minimum Efficiency	Minimum Power Factor
20%	0.87	-
50%	0.90	-
100%	0.87	0.90

Note: Since the completion of Version 6.1, EPA has had multiple conversations with stakeholders to identify advancements in cost effective internal power supply efficiency. As a result, EPA is proposing 80Plus Gold equivalent internal power supply requirements in Version 7.0.

3.2.3 External Power Supply (EPS) Requirements: Single- and Multiple-voltage EPSs shall meet the Level V or higher performance requirements under the International Efficiency Marking Protocol when tested according to the Uniform Test Method for Measuring the Energy Consumption of External Power Supplies, Appendix Z to 10 CFR Part 430.

- i. Single-voltage EPSs shall include the Level VI or higher marking.
- ii. Multiple-voltage EPSs meeting Level VI or higher shall include the Level VI or higher marking.
- iii. Additional information on the Marking Protocol is available at <http://www.regulations.gov/#!documentDetail;D=EERE-2008-BT-STD-0005-0218>

Note: EPA notes that federal standards for external power supplies went into effect in 2016. EPA has harmonized with these requirements and has maintained this section in Draft 1 with the intention of serving ENERGY STAR partners in international markets.

3.3 Power Management Requirements

3.3.1 Products shall include power management features in their “as-shipped” condition as specified in Table 2, subject to the following conditions:

- i. For Thin Clients, the Wake-on-LAN (WOL) requirement shall apply for products designed to receive software updates from a centrally managed network while in Sleep Mode or in Off Mode. Thin Clients whose standard software upgrade framework does not require off-hours scheduling are exempt from the WOL requirement.
- ii. For Notebooks, WOL may be automatically disabled when the product is disconnected from ac mains power.
- iii. For all products with WOL, directed packet filters shall be enabled and set to an industry standard default configuration.
- iv. Products that do not support Sleep Mode by default are only subject to the Display Sleep Mode requirement.

Table 2: Power Management Requirements

Mode or Mode Transition	Requirement	Desktops	Integrated Desktops	Portable All-In-Ones	Notebooks	Slates/Tablets	Thin Clients	Workstations
System Sleep Modeⁱ	(1) Sleep Mode shall be set to activate after no more than 30 minutes of user inactivity. (2) The speed of any active 1 Gb/s Ethernet network links shall be reduced when transitioning to Sleep Mode or Off Mode.	Yes	Yes	Yes	Yes	N/A	Yes	Yes
Display Sleep Mode	(1) Display Sleep Mode shall be set to activate after no more than 15 minutes of user inactivity.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wake on LAN (WOL)ⁱ	(1) Computers with Ethernet capability shall provide users with an option to enable and disable WOL for Sleep Mode. (2) Computers with Ethernet capability that are shipped through enterprise channels shall either: (a) be shipped with WOL enabled by default for Sleep Mode, when the computer is operating on ac mains power; or (b) provide users with the ability to enable WOL that is accessible from both the client operating system user interface and over the network.	Yes	Yes	Yes	Yes	N/A	Yes	Yes
Wake Managementⁱ	(1) Computers with Ethernet capability that are shipped through enterprise channels shall: (a) be capable of both remote (via network) and scheduled (via real-time clock) wake events from Sleep Mode, and (b) provide clients with the ability to centrally manage (via vendor tools) any wake management settings that are configured through hardware settings if the manufacturer has control over such features.	Yes	Yes	Yes	Yes	N/A	Yes	Yes

ⁱ Where Sleep Mode is supported by the UUT by default and Sleep Mode power is used as part of the TEC equation for qualification.

3.4 User Information Requirements

- 3.4.1 Products shall be shipped with informational materials to notify customers of the following:
- i. A description of power management settings that have been enabled by default,
 - ii. A description of the timing settings for various power management features, and
 - iii. Instructions for properly waking the product from Sleep Mode.
- 3.4.2 Products shall be shipped with one or more of the following:
- i. A list of default power management settings.
 - ii. A note stating that default power management settings have been selected for compliance with ENERGY STAR (within 15 min of user inactivity for the display, within 30 min for the computer, if applicable per Table 2), and are recommended by the ENERGY STAR program for optimal energy savings.
 - iii. Information about ENERGY STAR and the benefits of power management, to be located at or near the beginning of the hard copy or electronic user manual, or in a package or box insert.
- 3.4.3 Provisions 3.4.1 and 3.4.2 may be met through use of either electronic or printed product documentation, provided it adheres to all of the following:
- i. Documentation is shipped with the product (e.g., in a printed manual or insert, on included optical media, in a file installed with the software load shipped to the customer) or available electronically on the manufacturer's website. In the latter case, instructions for accessing the information on the website shall be provided in the product package or on the Desktop or home screen; and
 - ii. Documentation is included either (a) only with ENERGY STAR certified Computers; or (b) as part of the standard documentation if and only if accompanied by EPA-approved customer guidance on how to identify if their computer configuration is ENERGY STAR certified.

3.5 Requirements for Desktop, Integrated Desktop, and Notebook Computers

- 3.5.1 Calculated Typical Energy Consumption (E_{TEC}) for Desktop, Integrated Desktop, and Notebook Computers per Equation 1 shall be less than or equal to the maximum TEC requirement (E_{TEC_MAX}) per Equation 2, subject to the following requirements:
- i. The Additional Internal Storage adder allowance ($TEC_{STORAGE}$) shall be applied if there are more than one internal storage devices present in the product, in which case it shall only be applied once.
 - ii. The Integrated Display adder allowance ($TEC_{INT_DISPLAY}$) applies only for Integrated Desktops and Notebooks and may be applied for each display. For Enhanced-performance Integrated Displays, the adder is calculated as presented in Table 8 and Equation 3.
 - iii. For a product to certify for the Full Network Connectivity mode weighting, the following criteria shall be satisfied:
 - Products shall meet a non-proprietary Full Network Connectivity standard such as ECMA 393 or another standard that has been approved by EPA as meeting the goals of ENERGY STAR.
 - Products shall have the applied level of functionality enabled and configured by default upon shipment. If Full Network Connectivity features are not enabled by default, the system shall be tested and reported with Conventional TEC weightings.
 - Products shall be capable of Sleep Mode or alternative low power modes with power less than or equal to 2 watts.

Note: Full Network Connectivity is a manufacturer-reported parameter. On Mac computers, “Wake for network access” enabled within the Energy Saver/Power Adapter Preferences signifies Base Capability or better. On Windows computers, “ARP Offload” or “NS Offload” or similar enabled within the Advanced Properties of the Network Interface Card (accessed through the Device Manager) signifies Base Capability or better. For systems with a dual Network Interface Card (NIC) configuration, only one NIC configuration needs to comply. The manufacturer can provide further guidance on how to confirm Proxy Support.

Note: ENERGY STAR recognizes that in order to accommodate additional full network connectivity with low power modes, such as Microsoft’s modern standby or Apple’s power nap, that additional clarification will be required beyond ECMA 393 and other similar standards. EPA is continuing to investigate what this language may entail and solicits stakeholder feedback to inform a Draft 2 proposal. In the interim, EPA has removed language to clarify that approval for a standard outside of ECMA 393 is not required on a per-product basis.

- iv. For Notebooks, Desktops, and Integrated Desktops that use an alternative low power mode in place of System Sleep Mode, power in Long Idle (P_{LONG_IDLE}) may be used in place of power in Sleep (P_{SLEEP}) in Equation 1 if the alternative low power mode is less than or equal to 10 watts. In such instances, $(P_{SLEEP} \times T_{SLEEP})$, is replaced by $(P_{LONG_IDLE} \times T_{SLEEP})$; Equation 1 remains otherwise unchanged.
- v. Notebooks, Desktops, and Integrated Desktops with switchable graphics may not apply the Discrete Graphics allowance, $TEC_{GRAPHICS}$, from Table 8 in Equation 2. However, for Desktop and Integrated Desktop systems providing Switchable Graphics and enabling it by default, an allowance equal to 50% of the G1 graphics allowance for the platform type (Desktop or Integrated Desktop) may be applied. The switchable graphics incentive only applies to automated switching that is enabled by default. This capability is manufacturer-declared.

Equation 1: TEC Calculation (E_{TEC}) for Desktop, Integrated Desktop, Thin Client and Notebook Computers

$$E_{TEC} = \frac{8760}{1000} \times (P_{OFF} \times T_{OFF} + P_{SLEEP} \times T_{SLEEP} + P_{LONG_IDLE} \times T_{LONG_IDLE} + P_{SHORT_IDLE} \times T_{SHORT_IDLE})$$

Where:

- P_{OFF} = Measured power consumption in Off Mode (W);
- P_{SLEEP} = Measured power consumption in Sleep Mode (W);
- P_{LONG_IDLE} = Measured power consumption in Long Idle Mode (W);
- P_{SHORT_IDLE} = Measured power consumption in Short Idle Mode (W); and
- T_{OFF} , T_{SLEEP} , T_{LONG_IDLE} , and T_{SHORT_IDLE} are mode weightings as specified in Table 3 (for Desktops, Integrated Desktops, and Thin Clients) or Table 4 (for Notebooks).

Table 3: Mode Weightings for Desktop, Thin Clients, and Integrated Desktop Computers

Mode Weighting	Conventional	Network Proxy - Full Capability
T _{OFF}	45%	20%
T _{SLEEP}	5%	45%
T _{LONG_IDLE}	15%	5%
T _{SHORT_IDLE}	35%	30%

Table 4: Mode Weightings for Notebook Computers

Mode Weighting	Conventional	Network Proxy - Full Capability
T _{OFF}	25%	25%
T _{SLEEP}	35%	45%
T _{LONG_IDLE}	10%	5%
T _{SHORT_IDLE}	30%	25%

Note: EPA investigated the existing certified product lists for computers and found that manufacturers have only been claiming conventional or full capability network proxy levels during certification. As a result, EPA is proposing to reduce Table 3 and Table 4 to the two relevant network proxy levels present in data set. EPA intends that Network Proxy – Full Capability will capture existing implementations of network proxy covered in Version 6.1, as well as new upcoming alternatives including but not limited to Microsoft’s modern standby and Apple’s power nap modes. EPA is interested in stakeholder feedback as to other means that ENERGY STAR can jump start the widespread adoption of this energy saving feature or similar features.

Equation 2: E_{TEC_MAX} Calculation for Desktop, Integrated Desktop, and Notebook Computers

$$E_{TEC_MAX} = (1 + ALLOWANCE_{PSU}) \times (TEC_{BASE} + TEC_{MEMORY} + TEC_{GRAPHICS} + TEC_{STORAGE} + TEC_{INT_DISPLAY} + TEC_{SWITCHABLE} + TEC_{EEE})$$

Where:

- ALLOWANCE_{PSU} is an allowance provided to power supplies that meet the optional more stringent efficiency levels specified in Table 5; power supplies that do not meet the requirements receive an allowance of 0;
- TEC_{BASE} is the Base allowance specified in Table 6 or Table 7; and,
- TEC_{GRAPHICS} is the discrete graphics allowance as specified in Table 8, with the exception of systems with integrated graphics, which do not receive an allowance, or Desktops and Integrated Desktops with switchable graphics enabled by default, which receive an allowance through TEC_{SWITCHABLE}; and
- TEC_{MEMORY}, TEC_{STORAGE}, TEC_{INT_DISPLAY}, TEC_{SWITCHABLE}, and TEC_{EEE} are adder allowances as specified in Table 8.

Table 5: Internal Power Supply Efficiency Allowance

Power Supply Type	Computer Type	Minimum Efficiency at Specified Proportion of Rated Output Current ⁱⁱ				Minimum Average Efficiency ⁱⁱⁱ	Allowance _{PSU}
		10%	20%	50%	100%		
IPS	Desktop	0.86	0.90	0.92	0.90	-	0.015
		0.90	0.92	0.94	0.92	-	0.03
	Integrated Desktop	0.86	0.90	0.92	0.90	-	0.015
		0.90	0.92	0.94	0.92	-	0.04

Note: In order to continue to recognize the industry leaders in internal power supplies, EPA is proposing to continue the internal power supply efficiency incentive in Version 7.0, but has raised the thresholds to 80Plus platinum and titanium equivalents given the increased internal power supply efficiency requirements referenced in Section 3.2 above.

Table 6: Base TEC (TEC_{BASE}) Allowances for Desktops and Integrated Desktops

Category Name	Graphics Capability ^{iv}	Desktop or Integrated Desktop	
		Performance Score, P ^v	Base Allowance
0	Any Graphics dGfx ≤ G7	$P \leq 3$	69.0
I1	Integrated or Switchable Graphics	$3 < P \leq 6$	112.0
I2		$6 < P \leq 7$	120.0
I3		$P > 7$	135.0
D1	Discrete Graphics dGfx ≤ G7	$3 < P \leq 9$	115.0
D2		$P > 9$	135.0

- ii EPSs shall meet the specified requirements when tested using the *Uniform Test Method for Measuring the Energy Consumption of External Power Supplies, Appendix Z to 10 CFR Part 430*. IPSs shall meet the specified requirements when tested using the *EPRI 306 Generalized Internal Power Supply Efficiency Test Protocol, Rev. 6.6*.
- iii Average efficiency is the arithmetic mean of efficiencies tested at 25%, 50%, 75%, and 100% of rated output current. EPSs shall meet the specified requirements when tested using the *Uniform Test Method for Measuring the Energy Consumption of External Power Supplies, Appendix Z to 10 CFR Part 430*.
- iv Discrete Graphics capability is categorized based on frame buffer bandwidth, as shown in Table 8.
- v $P = [\# \text{ of CPU cores}] \times [\text{CPU clock speed (GHz)}]$, where # of cores represents the number of physical CPU cores and CPU clock speed represents the Max TDP core frequency, not the turbo boost frequency.

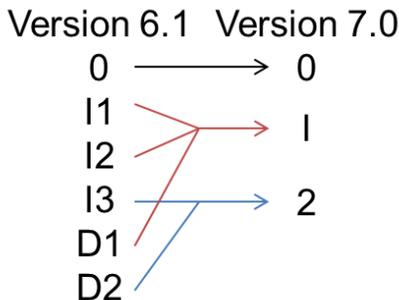
Note: As noted previously in this draft specification, EPA is not proposing any changes to the desktop and integrated desktop product categories in Version 7.0. Market penetration is at 40% as of the 2015 unit shipment data report and with the additional complexity of an updated metric, EPA understands that additional time is needed to complete this revision. Therefore, it is EPA's intention to address these products as part of the Version 8.0 specification revision, which will begin soon after the completion of the Version 7.0 effective date. EPA may solicit feedback on certain elements of the Version 8.0 specification in subsequent drafts of the Version 7.0 revision to allow stakeholders additional comment.

Table 7: Base TEC (TEC_{BASE}) Allowances for Notebooks

Category Name	Notebook	
	Performance Score, P^v	Base Allowance
0	$P \leq 2$	4.0
1	$2 < P \leq 9$	7.0
2	$P > 9$	11.0

Note: EPA is proposing revised energy efficiency requirements to create more product differentiation for notebooks. The ENERGY STAR criteria for notebooks last changed on September 10, 2014. Based on data collected through the Unit Shipment Data process, EPA believes that market penetration for notebook computers is 95%. The revised requirements ensure that the ENERGY STAR specification continues to highlight efficient notebooks, while ensuring a good selection of products. In addition, EPA has split the base TEC requirements for desktops and integrated desktops from notebooks to more easily capture the changes to the notebook portion of the specification.

EPA is maintaining the p-score category system for notebook computers in Version 7.0 as the overall approach continues to sufficiently bin together like products, both in energy consumption and functionality. However, EPA has consolidated several of the categories from Version 6.1 to address the reduced separation in measured energy between lower performance vs. higher performance products, as well as the discovery that differentiation based on graphics capability is no longer meaningful as a component of the base allowance. The resulting consolidation of notebook computer categories is shown below:



The revised notebook base allowances, when combined with the Functional adders in Table 8 below, result in top quartile pass rates for each performance category represented in Table 7. EPA estimates that the savings would range from 6 kWh/year for the new created 0 and 1 categories to 18 kWh/year for the 2 category.

Table 8: Functional Adder Allowances for Desktop, Integrated Desktop, Thin Client, and Notebook Computers

Function		Desktop	Integrated Desktop	Notebook
TEC_{MEMORY} (kWh)^{vi}			0.8	0.4
TEC_{GRAPHICS} (kWh)^{vii}	Graphics Category^{viii}	G1 (<i>FB_BW</i> ≤ 16)	36	16
		G2 (16 < <i>FB_BW</i> ≤ 32)	51	20
		G3 (32 < <i>FB_BW</i> ≤ 64)	64	25
		G4 (64 < <i>FB_BW</i> ≤ 96)	83	29
		G5 (96 < <i>FB_BW</i> ≤ 128)	105	35
		G6 (<i>FB_BW</i> > 128; Frame Buffer Data Width < 192 bits)	115	44
		G7 (<i>FB_BW</i> > 128; Frame Buffer Data Width ≥ 192 bits)	130	55
TEC_{SWITCHABLE} (kWh)^{ix}			0.5 × G1	N/A
TEC_{EEE} (kWh)^x			8.76 × 0.2 × (0.15 + 0.35)	N/A
TEC_{STORAGE} (kWh)^{xi}			26	2.6
TEC_{INT_DISPLAY} (kWh)^{xii}		N/A	8.76 × 0.35 × (1+EP) × (4×r + 0.05×A)	8.76 × 0.30 × (1+0.4×EP) × (0.43×r + 0.0263×A)

vi **TEC_{MEMORY} Adder:** Applies per GB installed in the system.

vii **TEC_{GRAPHICS} Adder:** Applies to only the first dGfx installed in the system, but not Switchable Graphics.

viii **FB_BW:** Is the display frame buffer bandwidth in gigabytes per second (GB/s). This is a manufacturer declared parameter and should be calculated as follows: (Data Rate [Mhz] × Frame Buffer Data Width [bits]) / (8 × 1000)

ix **TEC_{SWITCHABLE} Incentive:** Applies to automated switching that is enabled by default in Desktops and Integrated Desktops.

x **TEC_{EEE}:** Applies per IEEE 802.3az-compliant (Energy Efficient Ethernet) Gigabit Ethernet port.

xi **TEC_{STORAGE} Adder:** Applies once if system has more than one Additional Internal Storage element.

xii **TEC_{INT_DISPLAY} Adder:** EP is the Enhanced Performance Display allowance calculated per Equation 3; r is the Screen resolution in megapixels; and A is viewable screen area in square inches.

Note: EPA is proposing the revised notebook functional adders in Table 8 to address advancements in efficiency, aligning with the CEC’s computer regulatory effort except in the case of the memory adder, where the CEC value was not sufficiently aggressive to differentiate products in Version 7.0. The combined proposed changes to the base and functional allowances for notebooks identify the top quartile of the notebook market in each performance category represented in Table 7 above. This quartile was identified utilizing the ENERGY STAR dataset, only including those products from 2015 onward. EPA also assessed the pass rate breakdown across each of the different categories and identified the top quartile of products for each sub-category. Although the dataset did not include non-certified products, EPA notes that the ENERGY STAR market penetration is 95% and therefore believes that the ENERGY STAR certified product list is an appropriate proxy for the entire market. Desktop and Integrated Desktop level are unchanged from Version 6.1.

Equation 3: Calculation of Allowance for Enhanced-performance Integrated Displays

$$EP = \begin{cases} 0, & \text{No Enhanced Performance Display} \\ 0.3, & \text{Enhanced Performance Display, } d < 27 \\ 0.75, & \text{Enhanced Performance Display, } d \geq 27 \end{cases}$$

Where:

- *d* is the diagonal of the screen, in inches;

3.6 Requirements for Slates/Tablets and Portable All-In-One Computers

- 3.6.1 Slates/Tablets and Portable All-In-One Computers shall follow **all** of the requirements for Notebook Computers in Section 3.5 above, including calculations of the following:
- i. Calculated Typical Energy Consumption (E_{TEC}), using Equation 1 with the Notebook Computer Mode Weightings from Table 4.
 - ii. Calculated Maximum Allowed Typical Energy Consumption (E_{TEC_MAX}), using Equation 2 with the appropriate base Notebook Computer allowance from Table 7, and applicable Notebook Computer functional adder allowances from Table 8.

Note: EPA has reviewed the data set and found only two examples of Portable All-In-One products certified as ENERGY STAR. Both products use far less energy than is allowed under the previous integrated desktop computer allowances. As such, EPA is proposing to treat Portable All-In-One Computers similarly to Slates/Tablets moving forward, as they essentially function as an oversized slate/tablet product. This approach aligns with the treatment of Portable All-In-One Computers in the European Commission’s Ecodesign regulation, where these products are subject to notebook computer requirements rather than integrated desktop requirements. EPA welcomes stakeholder feedback on this proposal.

3.7 Requirements for Workstations

- 3.7.1 Weighted power consumption (P_{TEC}) as calculated per Equation 4 shall be less than or equal to the maximum weighted power consumption requirement (P_{TEC_MAX}) as calculated per Equation 5.

Equation 4: P_{TEC} Calculation for Workstations

$$P_{TEC} = P_{OFF} \times T_{OFF} + P_{SLEEP} \times T_{SLEEP} + P_{LONG_IDLE} \times T_{LONG_IDLE} + P_{SHORT_IDLE} \times T_{SHORT_IDLE}$$

Where:

- P_{OFF} = Measured power consumption in Off Mode (W);
- P_{SLEEP} = Measured power consumption in Sleep Mode (W);
- P_{LONG_IDLE} = Measured power consumption in Long Idle Mode (W);
- P_{SHORT_IDLE} = Measured power consumption in Short Idle Mode (W); and
- T_{OFF} , T_{SLEEP} , T_{LONG_IDLE} , and T_{SHORT_IDLE} are mode weightings as specified in Table 9.

Table 9: Mode Weightings for Workstations

T_{OFF}	T_{SLEEP}	T_{LONG_IDLE}	T_{SHORT_IDLE}
35%	10%	15%	40%

Equation 5: P_{TEC_MAX} Calculation for Workstations

$$P_{TEC_MAX} = 0.28 \times (P_{MAX} + N_{HDD} \times 5) + 8.76 \times P_{EEE} \times (T_{SLEEP} + T_{LONG_IDLE} + T_{SHORT_IDLE})$$

Where:

- P_{MAX} = Measured maximum power consumption (W)
- N_{HDD} = Number of installed hard disk drives (HDD) or solid state drives (SSD)
- P_{EEE} is an EEE allowance of 0.2 W per IEEE 802.3az-compliant (Energy Efficient Ethernet) Gigabit Ethernet port.

3.7.2 Active State Benchmark: To be ENERGY STAR certified, a Workstation must be submitted for certification with the following information disclosed in full:

- i. Linpack benchmark test results, compiler optimizations, and total energy consumed over the duration of the test; and
- ii. SPECviewperf benchmark test results, configuration options, total duration of the test, and total energy consumed over the duration of the test.

3.7.3 Desktop Workstations: Products marketed as workstations may be ENERGY STAR certified under the Desktop requirements in Section 3.5 instead of the Workstation requirements in Section 3.6, at the Partner’s option. EPA will identify Workstations certified as Desktops as “Desktops” in all ENERGY STAR marketing materials, on certified product lists, etc.

Note: EPA noted that the market penetration of ENERGY STAR certified workstations is currently 10%. Therefore, EPA is not proposing any revisions to the workstation criteria as part of Version 7.0.

3.8 Requirements for Small-scale Servers

Note: As noted in Section 2.1, Small-scale Servers have been removed from the ENERGY STAR scope. As such EPA proposes to remove Section 3.8, Requirements for Small-scale Servers.

3.9 Requirements for Thin Clients

- 3.9.1 Calculated Typical Energy Consumption (E_{TEC}) per Equation 1 shall be less than or equal to the Maximum TEC Requirement (E_{TEC_MAX}), as calculated per Equation 6, subject to the following requirements.
- Allowances can only be applied if the corresponding adders are enabled by default.
 - Thin Clients can utilize the proxy weightings in Table 3 when calculating E_{TEC} .
 - For Thin Clients that lack a discrete System Sleep Mode, Long Idle State power (P_{LONG_IDLE}) may be used in place of Sleep Mode Power (P_{SLEEP}) in Equation 1 so long as the system meets the Thin Client TEC allowance. In such instances, $(P_{SLEEP} \times T_{SLEEP})$, is replaced by $(P_{LONG_IDLE} \times T_{SLEEP})$; Equation 1 remains otherwise unchanged.

Equation 6: Calculation of E_{TEC_MAX} for Thin Clients

$$E_{TEC_MAX} = TEC_{BASE} + TEC_{GRAPHICS} + TEC_{WOL} + TEC_{INT_DISPLAY} + TEC_{EEE}$$

Where:

- TEC_{BASE} is the Base Allowance specified in Table ;
- $TEC_{GRAPHICS}$ is the Discrete Graphics allowance specified in Table 10 if applicable;
- TEC_{WOL} is the Wake-on-LAN allowance specified in Table if applicable;
- $TEC_{INT_DISPLAY}$ is the Integrated Display allowance for Integrated Desktops specified in Table 8 if applicable; and
- TEC_{EEE} is the Energy Efficiency Ethernet incentive for Desktops specified in Table 8 if applicable, per IEEE 802.3az-compliant (Energy Efficient Ethernet) Gigabit Ethernet port.

Table 10: Adder Allowances for Thin Clients

Adder	Allowance (kWh)
TEC_{BASE}	31
$TEC_{GRAPHICS}$	36
TEC_{WOL}	2

Note: After reviewing the current data set, EPA is proposing to revise the TEC_{BASE} allowance for Thin Clients to 31 kWh/year, as the existing base allowance from Version 6.1 appears to be far too generous for currently certified products. This revision identifies the top quartile of the thin client market. EPA utilized the ENERGY STAR certified product list to identify the top quartile of products, which included 62 products from 13 manufacturers. EPA does not have data on the size of the thin client market and solicits stakeholder feedback on data sources that could be utilized to identify the total number of models on the market.

Note: Products intended for sale in the US market are subject to minimum toxicity and recyclability requirements. Please see ENERGY STAR® Program Requirements for Computers: Partner Commitments for details.

4 TESTING

4.1 Test Methods

- 4.1.1 When testing Computer products, the test methods identified in Table 11 shall be used to determine ENERGY STAR certification.

Table 11: Test Methods for ENERGY STAR Certification

Product Type or Component	Test Method
All	ENERGY STAR Test Method for Computers, Rev. August-2014

4.2 Number of Units Required for Testing

- 4.2.1 Representative Models shall be selected for testing per the following requirements:
- i. For certification of an individual product configuration, the unique configuration that is intended to be marketed and labeled as ENERGY STAR is considered the Representative Model.
 - ii. For certification of a Product Family of all product types, with the exception of Workstations, product configurations that represent the worst-case power consumption for each product category within the family are considered Representative Models. When submitting Product Families, manufacturers continue to be held accountable for any efficiency claims made about their products, including those not tested or for which data were not reported.
 - iii. For systems that meet the definition for multiple categories (as defined in Section 1.B) depending on the specific configuration, manufacturers will have to submit the highest power configuration for each category under which they would like the system to be ENERGY STAR certified. For example, a system that could be configured as either a Category 0 or 1 Desktop, as defined in Table 6 would require submittal of the highest power configuration for both categories in order to be ENERGY STAR certified. If a product could be configured to meet all categories, it would then have to submit data for the highest power configuration in all categories.
 - iv. For certification of a Product Family of Workstations under the Workstation or Desktop product type, the product configuration that represents the worst-case power consumption with a single GPU within the family is considered the Representative Model.

Note: Workstations that meet ENERGY STAR requirements with a single graphics device may also have a configuration with more than one graphics device be ENERGY STAR certified, provided the additional hardware configuration is identical with the exception of the additional graphics device(s). The use of multiple graphics includes, but is not limited to, driving multiple displays and ganging for high performance, multi-GPU configurations (e.g. ATI Crossfire, NVIDIA SLI). In such cases, and until such time as SPECviewperf® supports multiple graphics threads, manufacturers may submit the test data for the workstation with the single graphics device for both configurations without retesting the system.

- 4.2.2 A single unit of each Representative Model shall be selected for testing.

- 4.2.3 All units/configurations for which a Partner is seeking ENERGY STAR certification, must meet the ENERGY STAR requirements. However, if a Partner wishes to certify configurations of a model for which non-ENERGY STAR certified alternative configurations exist, the Partner must assign the certified configurations an identifier in the model name/number that is unique to ENERGY STAR certified configurations. This identifier must be used consistently in association with the certified configurations in marketing/sales materials and on the ENERGY STAR list of certified products (e.g. model A1234 for baseline configurations and A1234-ES for ENERGY STAR certified configurations).

Note: There may be cases—as described in the paragraph above—where not all units/configurations will meet ENERGY STAR requirements. If so, the worst-case configuration for test will be the worst-case certified configuration, and not one of the presumably even higher-energy consuming non-certified configurations.

4.3 International Market Certification

- 4.3.1 Products shall be tested for certification at the relevant input voltage/frequency combination for each market in which they will be sold and promoted as ENERGY STAR.

4.4 Customer Software and Management Service Pre-Provisioning

- 4.4.1 If a manufacturing Partner is hired by a customer to load a custom image on an ENERGY STAR certified computer, the Partner shall take the following steps:
- i. Inform the customer that their product may not meet ENERGY STAR with the custom image. A sample notification letter is available on the ENERGY STAR Web site.
 - ii. Encourage the customer to test the product for ENERGY STAR compliance.
 - iii. Encourage the customer, should the product no longer meet ENERGY STAR, to make use of EPA's free technical assistance that can assist with Power Management performance, which can be found at www.energystar.gov/fedofficeenergy.

5 USER INTERFACE

- 5.1.1 Manufacturers are encouraged to design products in accordance with the user interface standard IEEE 1621: Standard for User Interface Elements in Power Control of Electronic Devices Employed in Office/Consumer Environments. For details, see <http://eetd.LBL.gov/Controls>.

6 EFFECTIVE DATE

- 6.1.1 Effective Date: The Version 7.0 ENERGY STAR Computers specification shall take effect **TBD**. To be ENERGY STAR certified, a product model shall meet the ENERGY STAR specification in effect on its date of manufacture. The date of manufacture is specific to each unit and is the date on which a unit is considered to be completely assembled.
- 6.1.2 Future Specification Revisions: EPA reserves the right to change this specification should technological and/or market changes affect its usefulness to consumers, industry, or the environment. In keeping with current policy, revisions to the specification are arrived at through stakeholder discussions. In the event of a specification revision, please note that the ENERGY STAR certification is not automatically granted for the life of a product model.

7 CONSIDERATIONS FOR FUTURE REVISIONS

7.1.1 TBD

Note: EPA received feedback regarding the timeline presented in the discussion document. EPA maintains its goal of completing the specification revision in 2017, but has reduced the scope of the Version 7.0 revision to those elements outlined in this Draft 1, Version 7.0 specification. Version 8.0 will focus on the desktop and integrated desktop categories and considering updates to the categorization methodology to account for changes in the market. EPA anticipates beginning the specification development process for Version 8.0 in earnest in 2018. EPA anticipates beginning discussions on desktops during Version 7.0 specification development to allow sufficient time to thoughtfully consider the change in categorization system.