Guidance for manufacturers

Background

The intent of publishing information about the power consumption of products is to provide customers with the capability to compare different models based on the energy performance of the product. In order for product energy efficiency information to be consistent, useful and appropriate for use in comparisons, appropriate uniform test standards must be used for testing and declaring the power consumption of products. The ENERGY STAR® Program Requirements test methods for Computing and Display products or IEC 62623 measurement of energy consumption of Notebooks and Desktops must be used for product power consumption information to be published. Additionally, the configurations of products being compared must be identical or very similar, in order for the power consumption data to be useful and truly comparable.

Within the Personal Computer product category, there is a wide range of types, forms, and configurations available to meet a correspondingly broad range of customers' needs, and a corresponding range in the power consumption of products across this broad range of models and possible configurations.

At one end of the spectrum, there are exceptionally high performance Desktop Workstations that offer very high performance and extensive configurability serving a wide range of customer uses including scientific, engineering, and medical, graphic/visual arts, financial/economic analysis/modeling, etc. In addition, similarly high performance Desktop Computers serving the audio-visual entertainment and gaming markets. While these products are very energy efficient in terms of the power they consume – particularly when evaluated in terms of the computing power/utility they provide to customers, they will typically consume more power than other types of computers with less computing capability.

At the other end of the spectrum, there are smaller portable computing products like Slates and Tablets that provide lower levels of computing power than when compared with a Desktop Workstation. Slates and Tablets are designed for mobility and extended battery life and to provide users with the capability to access and use the internet, download and use applications, communicate and share files with others, watch streaming audio/video content, etc. This class of computing products uses the least amount of power as a result of their size, capabilities, and design to maximize battery life as required by customers of this type of computing products.

In between high performance desktop computers/workstations and mobile computing product classes, there are a wide range of Desktop and Notebook computers, offering a wide range of performance and configurability.

In addition to a very broad range in the types of computing products available to customers, there is an extensive amount of configurability (customization) available within individual computer models/model

families. For example, within a typical model family of a computer, customers can select from several software operating systems (Windows, LINUX, Free DOS, Android), different processor chip sets/operating speeds, different capacity and speed hard disk or solid state drives, quantity/speed of installed memory **(**DIMM), type and speed of graphics processing solutions, size and type of internal display, types of optical media storage/player drives, external/internal power supplies, productivity software, accessories, etc.

Examples of the extensive configurability of computers includes different processor chip sets, quantity/speed of installed memory (DIMMs), graphics processing solutions, size and type of internal display, optical media storage/player drives, external/internal power supplies, and the operating system selected. This wide range in the configurability of computer provides customers with an equally wide range of functionality, performance, cost and also has an impact on the amount of power a given computer uses.

Personal Computers have and will continue to offer increasing levels of functionality and performance and also increasing levels of product energy efficiency as these products evolve over time.

When evaluating and particularly when comparing the energy efficiency of computers, it is important to ensure that very similar types and configurations are compared. One would not expect to find identical or similar power consumption characteristics, when comparing a Desktop Workstation with a portable Notebook computer, Slate or Tablet. The design of these products (including the system mother board, chipset, and configurable components) and performance will not be the same, and the power consumption characteristics will differ as well. Therefore it is essential to compare computers with the same form and very similar configurations, to be able to draw meaningful comparisons related to the energy efficiency/power consumption characteristics of these products.

There are several different operational states and metrics that are typically used by voluntary and mandatory energy efficiency schemes for evaluating the power consumption of personal computing products. These power consumption states include: Off, Sleep, Short Idle, and Long Idle states. Additionally, using power consumption test data of the computer in these states, it is possible to model or estimate the annual power consumption of the product in Kilo-Watt-Hours (KWh), using the ENERGY STAR Total Energy Consumption (TEC) formulas. Typically a majority profile providing duty cycle averages for each power state is assumed. The calculated results provide a typical annual power consumption value that can be used for comparing the power consumption of similar models/configurations of computers, estimate the annual power consumption in kWh of the product and associated cost (using local currency values and utility rate information). The ENERGY STAR TEC metric is preferred (versus use of individual power consumption values such as for the Off, Sleep, or Idle states) as TEC provides an estimate of annual power consumption in kWh, the ability to estimate annual operating cost, and compare very similarly configured products among manufacturers. Use of the TEC

metric allows designers of the computer system to refine the design and operating characteristics of the product, to achieve the lowest possible total power consumption of the computer. Newer generation computers are designed to dynamically manage the power consumption of the computer and power down to the ENERGY STAR Long Idle state, when computing resources required. With this approach, computers spend considerable less time in a Maximum Power, On, or "Short Idle" state, than computers of previous generations. And many of these same newer generating computers manage power consumption dynamically (entering the Long Idle State), and also include the traditional ENERGY STAR compliant power management capability that places an external display into a Low Power "Sleep Mode" within </= 15 minutes and the computer into a Low Power "Sleep Mode" within </= 30 minutes. The net result of these power limiting/management capabilities is less total power consumption, than previous generations of computers that did not include dynamic power management capability.

It is also important to note that computer monitors/displays are also being configured with more features and capability than traditional displays of the past. It is important when comparing the power consumption of two or more different display models to insure that they have the same configuration/features, when evaluating power consumption. Examples of additional functionality that can be added to computer monitors/displays include (but are not limited to): Integrated/external speakers, occupancy sensor/automatic brightness control circuitry, bridging capability (I.e. USB 1x, 2x, 3x, etc.) and networking capability (I.e. WiFi, Fast Ethernet, Gigabit Ethernet, etc.), Memory/Flash Memory, Smart Card Readers, USB Flash cameras/camera interfaces, PictBridge, and connectors enabling expanded use including VGA, DVI, HDMI, etc. Additionally it is important to insure that the display screen size and resolution are the same, when comparing two different models.

Guidance for customers:

[To be based on final reviewed version of the guidance for Manufacturers above]
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