

ENERGY STAR V7.0 Computer Specification

Draft 1 – Comments from the European Commission

This document provides comments from the European Commission (EC) on the draft 1 of the ENERGY STAR v7.0 specification for computers.

Pass rates

We would like to emphasize the overall target of reaching a pass rate of 25 % at the time of setting the requirements. This is important in order that the specification will not be obsolete too soon after the effective date.

Portable All-In-One Computer Definition

The definition states that this type of computer is “*designed for limited portability*” and is also required to meet several other technical attributes. As “limited portability” is not defined there is a possibility that a product could meet all other technical requirements but also offer a period of portability that has e.g. similar length offered by Slate/Tablet products. In this circumstance, a product could not be considered a “Portable All-In-One”. The word “limited” should be removed.

Desktop Computer definition

We propose to add "touch display" in the list of user input devices" and "...possibly input information" to the sentence "An Integrated Display screen and/or the ability to support an external display screen to output."

Workstation Definition

The workstation definition could be viewed as outdated especially in terms of references to PCI slots. For example, “PCI-X” has been superseded by PCI-E. Most higher specification non-mobile desktop format computers would now be able to meet the PCI technical requirements. As such the definition should be refreshed. We suggest that a new definition is included which is based on the definition within the Californian Regulation. A small number of changes have been made to clarify technical issues in the Californian Regulation definition.

“Workstation” means a computer used for graphics, computer-aided design (CAD), software development, financial, or scientific applications, among other computation intensive tasks. A workstation covered by this specification must meet the following criteria:

(1) Product as shipped does not support altering frequency or voltage beyond the computer processing unit and GPU manufacturers' operating specifications;

(2) Has system hardware that supports error-correcting code (ECC) that detects and corrects errors with dedicated circuitry on and across the CPU, interconnect, and system memory; and

(3) Meets two or more of the following criteria:

(A) Supports one or more discrete GPU or discrete compute accelerators.

(B) Supports five or more PCI-express slots where each PCI lane has a bandwidth of 8 gigabytes per second (GB/s) or more.

(C) Provides multi-processor support for two or more physically separate processor packages or sockets. This requirement cannot be met with support for a single multi-core processor.

(D) Has qualified or is currently being reviewed for qualification by two or more independent software vendor (ISV) product certifications.

Discrete Graphics (dGfx) definition

We support the suggested change to the "discrete graphics (dGfx)" definition and this will ensure adequate division between discrete graphics solutions connected via PCI-e and integrated graphics included on the CPU die. Each type of graphics solution has different power demand requirements and saving capabilities and so should be treated separately.

Operational Mode definitions

The US EPA state that the "*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 Section 3.5*". We recognize that new power mode definitions will need to be included to reflect the desired changes.

Additional Internal Storage definition

The Californian Regulation on computer energy efficiency stipulates that additional storage is any storage device apart from "*the largest capacity non-volatile storage device present in the system*". This Californian approach would limit the ability to apply a large adder to a primary hard drive where a smaller SSD was also installed in a system. We support the Californian approach and so the definition of "Additional Internal Storage" should change to:

"Additional Internal Storage: Any and all internal hard disk drives (HDD) or solid state drives (SSD) installed beyond the largest capacity non-volatile storage device present in the system in its as shipped state. This definition does not include external drives".

Internal Power Supply (IPS) Requirements

The EC is supportive of including IPS efficiency requirements that match the 80Plus Gold efficiency requirements. We would like to point out that the 80Plus Gold efficiency requirements when measured at the EU voltage and frequency combination are different from those shown in Table 1 on page 9 of the draft specification document. The correct 80Plus Gold Level efficiency requirements for the EU are shown in Table 1. The ENERGY STAR v7.0 specification document should be altered to reflect this fact.

Table 1 – 80Plus Gold Efficiency Levels at EU voltage and Frequency (230v@50Hz)

Loading Condition (Percentage of Nameplate Output Current)	Minimum Efficiency	Minimum Power Factor
20%	0.9	–
50%	0.92	0.9
100%	0.89	–

The success of the ENERGY STAR programme has led to significant reductions in the idle power demands of computers. This efficiency increase has meant that that loading on IPS is often at significantly less than 20% during idle modes. Table 2 shows that average IPS loading for desktop and workstation computers in the EU ENERGY STAR database is under 10% in both short and long idle. Given that ENERGY STAR assumes that computers will spend considerable amounts of time in idle states, IPS efficiency at 10% loading should be considered in the ENERGY STAR v7.0 specification for computers.

Table 2 – IPS Loading Levels during Short and Long Idle

Products	Average Percentage IPS Loading	
	Short Idle	Long Idle
Desktop Computers	9.5%	8.9%
Integrated Desktop Computers	21.7%	16.1%
Workstations	8.6%	8.0%

A review of 80Plus registered “230V EU Internal” IPS shows that there is sufficient scope to set efficiency limits at the 10% loading level. Setting a 10% load efficiency at 84% would all 80Plus Gold IPS to pass the requirement.

Table 3 – 80Plus Registered IPS and 10% Loading Efficiencies

80Plus Levels	Efficiency at 10% loading Levels				
	75th Per-centile	50th Per-centile	25th Per-centile	Max	Min
All	79.6%	81.6%	84.3%	93.9%	73.2%
Standard	78.3%	80.1%	81.5%	84.7%	73.2%
Bronze	80.9%	82.2%	83.8%	87.3%	77.4%
Silver	83.3%	84.6%	84.9%	86.2%	81.0%
Gold	85.9%	87.0%	88.2%	89.9%	84.2%
Platinum	88.5%	88.7%	89.0%	89.3%	88.2%
Titanium	93.9%	93.9%	93.9%	93.9%	93.9%

Table 4: Power Management Requirements

The text includes the requirement “(2) *The speed of any active 1 Gb/s Ethernet network links shall be reduced when transitioning to Sleep Mode or Off Mode*”. This wording should be changed to also cover Ethernet network connections with higher speeds. The text should read:

“(2) The speed of any active 1 Gb/s or faster Ethernet network links shall be reduced when transitioning to Sleep Mode or Off Mode”.

Power Management Requirements – Microsoft’s modern standby and Apple’s power nap modes

Whilst the consideration of new technologies, which may save considerable amounts of energy, is supported it is necessary to ensure that these technologies function as expected when computers are in use. We have seen many instances where mature power management functionalities do not function as expected in some computers. As such we would support further work to identify how the ENERGY STAR specification can help to ensure robust applications of these technologies during active computer usage.

We suggest that the ENERGY STAR v7.0 specification contains requirements on ensuring continued operational effectiveness of power management functionality during use. This could include a requirement that manufacturers report to the US EPA lists of any software packages that have known impacts on the power management functionality of their products during usage. These lists could then be published on the ENERGY STAR data-base providing an incentive for the software manufacturer to ensure their product is compatible with the named operating system and ENERGY STAR labelled product. We also suggest that

further consideration is given to both wake times and reliability of modern standby type technologies during specification development.

Table 6: Base TEC (TECBASE) Allowances for Desktops and Integrated Desktops

The US EPA states in the draft specification document that, “*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*”. ENERGY STAR typically attempts to develop specifications that reflect the performance of the most efficient 25% of products on the market. As such, not altering the ENERGY STAR requirements for desktops and integrated desktop computers from those laid down in the ENERGY STAR v6.0 specification (finalized in September 2013 and carried over into the ENERGY STAR v6.1 specification) appears to be in conflict of the general ENERGY STAR targeting the top 25% of most efficient products on the market. We believe that the TEC requirements can be brought down to reflect the top 25% of most efficient products on the market without needing to wait for major changes forthcoming for the ENERGY STAR v8.0 specification.

The US EPA decision not to amend the TEC requirements for desktops and integrated desktops within the ENERGY STAR v7.0 specification could have a number of unintended consequences including:

- Desktop and Integrated desktop computers will be able to meet the ENERGY STAR v7.0 specification more easily than other more efficient types of computer (e.g. notebook computers). This may result in many more desktops and integrated desktops listed in the ENERGY STAR database. This in turn could result in individuals and organisations purchasing desktops/integrated desktops over notebook computers either due to incorrect assumptions about energy efficiency levels or because it is easier to identify desktops/integrated desktops that meet the revised ENERGY STAR specifications.
- Other mandatory initiatives (e.g. Californian Regulation and the EU Ecodesign Regulation) may come into force during the life of the ENERGY STAR v7.0 specification. Some of the requirements in these mandatory measures may be more ambitious than those laid down in the ENERGY STAR v7.0 specification. This eventuality has several implications including loss of reputation to the ENERGY STAR scheme.

Table 7: Base TEC (TECBASE) Allowances for Notebooks

We are strongly supportive of reducing the number of notebook categories in order to simplify the specification and even further simplification would be desirable (in principle,

being agnostic of categories should be the ultimate goal). We are also supportive of reducing the base TEC but require access to the background evidence in order to form an opinion over the suitability of the actual TEC values.

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

On initial review, many of the adder allowances listed in Table 8 appear to warrant further review:

- It is suggested that dGfx adders are based on a formula approach (such as in the Californian Regulation and likely within the revised EU Ecodesign Regulation). A formula based approach limits stepped increases in adders between the different dGfx categories.
- The internal storage allowance for desktop and integrated desktop computers appears to be too large at 26kWh/year especially considering that a secondary drive may not be providing any functionality during testing. The Californian approach should be adopted and the allowances should be split out into different types of secondary storage device.
- The integrated display allowances for both integrated desktops and notebook computers appear to be too large. We suggest that the allowances are based on the deltas between short and long idle for computers in the ENERGY STAR database, whilst also considering other factors which contribute to the short/long idle delta (e.g. GPU power demand). We would appreciate the opportunity to review the background data that the US EPA has used to inform their decision making on these additional display allowances.

Allowance for Enhanced-performance Integrated Displays

We note that the US EPA has maintained the ENERGY STAR v6.1 EPD allowances within the draft ENERGY STAR v7.0 specification. We need access to the background evidence to understand how the US EPA arrived at the proposed EPD allowances. Previous analysis conducted by the EC suggested that the EPD allowances included in the ENERGY STAR v6.1 specification were too generous.

International Market Certification

The text states, “*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*”. We are aware of instances where some components in EU ENERGY STAR registered products (e.g. IPS) are only tested according to the US input voltage/frequency combination. In light of these instances, we suggest that the text is revised to:

“Products, and all applicable components, 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”.