

ENERGY STAR V7.0 Computer Specification

Draft 2 – Comments from the European Commission

This document provides comments from the European Commission (EC) on the draft 2 of the ENERGY STAR v7.0 specification for computers.

We provided extensive comments into the draft 1 specification. Whilst a small number of our suggested changes were made, most of the changes we requested have not been addressed. We are especially concerned that the US EPA is not reflecting the fact that voltage and frequency is different in the EU to the US. As ENERGY STAR is also an EC programme, the appropriate EU voltage and frequency combinations need to be included to make the specification relevant in the EU market.

We have reiterated several other points which we expect will be addressed in the final version of the ENERGY STAR specification.

Overall Pass Rates

We have assessed the pass rates associated with the draft ENERGY STAR v7 specifications for notebooks. The analysis is based on computers in the US ENERGY STAR database that have been tested at the EU voltage and frequency combination. The results shown below indicate that whilst the pass rate is acceptable when all products in the database are considered, it is not suitable when filtering for products that are on the market. Product models that were registered before 2016 (rarely available on the market today) are very unlikely to contain the same components now that they did pre-2016.

As newer components are likely to be more energy efficient this should be considered when developing the specification. It is shown that 47% of products registered with ENERGY STAR in 2017 are already compliant with the proposed ENERGY STAR v7 specification. We believe that this value is too high and that the specification should be made much more ambitious.

Category Name	ENERGY STAR Compliance Rates: Notebooks Tested @230v		
	All	Products Registered in 2016 & 2017	Products Registered in 2017
0	29.2%	46.4%	42.1%
1	21.0%	39.1%	45.7%
2	19.5%	35.8%	57.1%
All	22.1%	40.2%	47.1%

We have not accessed the pass rates for other products because they remain largely unchanged from the ENERGY STAR v6.1 specification. We would like to reiterate that we do not think it acceptable to issue a new ENERGY STAR specification for desktop computers that remains largely unchanged from the ENERGY STAR v6.1 specification. The desktop specification should be made more ambitious so that it reflects the top 25% most efficient products in the database.

Portable All-In-One Computer Definition

We appreciate that the EC recommendations on the Portable–All–In–One Definition were noted. We support the US EPA position of spending further time to, "adjust *the definition to include products that have longer battery lifetimes, while still including the existing products that feature "limited" portability*".

Workstation Definition

We appreciate that the workstation definition has been partially updated, however our recommended changes were not fully included, such as the CEC definition. The revised definition contains a technical error concerning the PCI–express requirement. The revised US EPA definition states:

"b) Supports four or more lanes of PCI–express, other than discrete GPU, connected to accessory expansion slots or ports where each lane has a bandwidth of 8 gigabits per second (Gb/s) or more".

Most personal computers will support 4 lanes of PCIe at 8 gigabits per second. Under the PCIe 3.0 specification the maximum bandwidth per lane is 984.6 MB/s (7.8s Gb/s). A PCIe slot will contain between 1 and 16 PCIe lanes. A typical workstation computer will have multiple PCIe x16 slots, each connected to 8 or 16 PCIe lanes. PCIe 4.0 will support per lane bandwidths of 1.97GB/s (15.76Gb/s). Each PCIe slot can be configured to support up to 16 lanes so a total throughput of 15.75 GB/s per slot under the PCIe 3.0 standard (increasing to 31.51 GB/s (252.08Gb/s) per 16 lane slot under PCIe 4.0).

We would suggest changing the definition to read:

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) do not support altering frequency or voltage beyond the CPU and GPU manufacturers as shipped operating specifications; and (c) have 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. In addition, workstations meet two or more of the following criteria:

- a) Support one or more discrete GPU or discrete compute accelerators*
- b) Support five or more PCI-express slots connected to accessory expansion slots or ports where each lane has a bandwidth of 8 gigabits per second (Gb/s) or more.*
- c) Provide 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); and/or*
- d) 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 product certification.*

Regarding item d) above, we suggest to require certification at the time of product registration, because it will too complex to check the ISV product certification afterwards and withdraw the ENERGY STAR certification if needed.

Discrete Graphics (dGfx) definition

We do not support the suggested change to the “discrete graphics (dGfx)” definition. We have no evidence that system-on-chip (SoC) based graphics processing units (GPUs) draw as much power as PCIe slot based discrete graphics cards. It is our understanding that OEMs have different options open to them to significantly reduce the idle power demand associated with SoC based GPUs. We are concerned that major changes can be made to definitions without data being presented to all stakeholders detailing why the change is required. We suggest that data is submitted into the ENERGY STAR v7.0 development process proving why SoC based GPUs require the discrete GPU adders.

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 Ta-

bles 6 and 7 Section 3.5". We recognize that new power mode definitions will need to be included to reflect the desired changes. Furthermore, we suggest to write "...less than 2 Watts.." instead of the current formulation, because 2 Watts without decimals could be 2.3 Watts.

Additional Internal Storage definition

We suggested that the US EPA adopt the definition for "additional storage" found in the draft Californian Regulation on computer energy efficiency. We appreciate that this change has been made in draft 2. However, the definition seems not to cover hybrids, which we believe it should. The first part of the definition may be: "Additional internal, non-removable storage...."

Internal Power Supply (IPS) Requirements

We suggested several changes for the IPS requirements, most of which have not been adopted. We recognise that the US EPA has added IPS efficiency requirements that match the 80Plus Gold efficiency requirements but only for power supplies rated above 500W. We support that compromise approach. We believe though there is an error in Table 1, where minimum power factor is stated for 100%, because the 80Plus Bronze requirement is for 50 %.

We would like to reiterate that the 80Plus Gold efficiency requirements when measured at the EU voltage and frequency combination are different from those shown in Table 2 on page 9 of the draft specification document. Given that the EC partner with the US EPA on the development of ENERGY STAR specifications it is expected that EU voltage and frequency combinations are catered for in the specifications. 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 External Power Supply requirements have been written in a manner that accommodates for different voltage and frequency combinations outside of the USA. The same approach should be taken for the IPS requirements if the US EPA are not able to reflect different voltage and frequency combinations in the table. A general reference to the 80Plus Gold level would resolve this issue for ENERGY STAR partners outside of the USA.

We are also concerned that our recommendations on including IPS efficiency requirements at 10% loading have not been adopted. We previously stated that the success of the ENERGY STAR programme has led to significant reductions in the idle power demands of computers. We further explained that this efficiency increase has meant that that loading on IPS is often at significantly less than 20% during idle modes. In addition, we provided evidence, shown in Table 2, identifying how the average IPS loading for desktop and workstation computers in the EU ENERGY STAR database is under 10% in both short and long idle.

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%

We also shared the results of a review of 80Plus registered “230V EU Internal” IPS, detailed in Table 2, which showed 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%

We firmly believe that the ENERGY STAR v7.0 specification for personal computers should include IPS efficiency requirements at 10% loading. We base our decision on the following:

- The ENERGY STAR specification assumes that computers will spend considerable amounts of time in idle states
- There is available data to show that average idle loading is below 10% in ENERGY STAR registered desktop and workstation computers
- The established test procedure supports testing at 10% loading
- The Internal Power Supply Efficiency Allowance (Table 6) includes measurement at 10% loading
- There are sufficient products on the market that could meet a reasonable requirement on 10% loading efficiency

Table 3: Power Management Requirements

We appreciate that our comment relating to the speed of active 1Gb/s or faster Ethernet network links was addressed.

Power Management Requirements

We are dissatisfied that our comments on ensuring continued effectiveness in ENERGY STAR registered products has not been addressed.

We previously noted that we have seen many instances where mature power management functionalities do not function as expected in some computers. We suggested that the ENERGY STAR v7.0 specification contains requirements on ensuring continued operational effectiveness of power management functionality during use.

We provided an example of how a requirement could be included that required manufacturers to report to the US EPA lists of any software packages that have known impacts on the power management functionality of their products during usage. We suggested that lists could then be published on the ENERGY STAR database 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 suggested that further consideration is given to both wake times and reliability of modern standby type technologies during the specification development.

Allowance for Enhanced-performance Integrated Displays

We previously commented about the US EPA decision to maintain the ENERGY STAR v6.1 EPD allowances within the draft ENERGY STAR v7.0 specification. We stated that we needed access to the background evidence to understand how the US EPA arrived at the proposed EPD allowances. We have not received this background data in a format that is easily interpreted. 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

We previously commented on the text which reads, "*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 pointed out that 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 suggested that the text was 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".

This suggested change has not been addressed. This is however important to address for use of ENERGY STAR in countries with voltage/frequency different from what used in the US.