



May 16, 2019

To: Mr. Ryan Fogle, EPA Manager, ENERGY STAR® for IT and Data Center Products
From: Erica Logan, Information Technology Industry Council (ITI)

Re: ITI comments for ENERGY STAR Computers v8.0 Draft 1 specification and test method

On behalf of the preeminent companies in the information and communications technology (ICT) sector, the Information Technology Industry Council (ITI) appreciates the opportunity to provide comments for EPA's ENERGY STAR for Computers, v8 Draft 1 specification. As discussed, industry and EPA found missing data and errors in the dataset. Examples included missing power consumption, memory info, p-score data and screen area accidentally using the diagonal. Corrections were also identified for previously provided CEC datasets. Where uncertainty in the dataset limited our ability to execute quantitative analyses, industry provided qualitative assessments and noted the extensive quantitative work we will do in advance of the in-person meeting on June 18, 2019 in Washington DC. We look forward to on-going collaboration.

ITI Comments

1) Corrections to dataset and corresponding categorization

ITI appreciates EPA's willingness to work with us to correct the dataset used for creating newly proposed categories for Desktop/Integrated Desktop Personal Computer (PC) systems. Industry is waiting for a corrected dataset in order to conduct its own analysis of categorization criteria and determination of base TEC target recommendations with use of correct allowances (adders). We are unable to provide a complete industry assessment at this point, but we will be ready to address this topic at the June 18th in-person meeting in Washington DC. This is contingent upon availability of a 'clean dataset' by the mid-May timeframe. We would like to note that proposed Draft 1 base TEC targets are very challenging, and hope to see base TEC improvements in the corrected dataset.

2) Notebooks re-testing and re-certification for v8.0

EPA has proposed not to make any changes to notebooks for ENERGY STAR v8.0, and wait until V9.0 to apply the new mode weightings for notebook PCs. Industry agrees that EPA should not make changes to V8 which would negatively impact notebooks capable of qualifying for V7.1. Any re-testing of notebook PCs currently being certified to the V7.1 specification would be unnecessarily burdensome and must be avoided.

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In addition, we request clarification as to how notebooks already certified to ENERGY STAR v7.1 will be recertified for ENERGY STAR v8.0. If EPA believes that re-certification of notebooks cannot be avoided we would like to engage in additional discussions. As part of these discussions, we would propose that EPA consider resetting notebook base TEC targets based on the new mode weightings using the same dataset used for setting version 7.1 limits.

3) **Energy Efficient Ethernet (EEE)**

EPA is proposing two changes on Energy Efficiency Ethernet: 1) All products with one or more ethernet ports with a BW of 1 Gb/s to have EEE enabled in each of the ports in their as-shipped configuration 2) Removal of the EEE adder in equation 2 (E_{TEC_MAX}). Industry is skeptical about mandating one or more ethernet ports to be **EEE enabled as-shipped**, and would request EPA to share the survey it references in Draft 1 for making such a determination.

4) **Adders/Allowances**

Industry views adders to be part of the categorization and base TEC discussion. Industry plans to address specific response to Draft 1 adders and additional proposal on the adder approach in conjunction with analyses on categorization criteria, and base TEC targets using the corrected dataset. This will be part of our recommendation at the in-person meeting as discussed earlier. Regarding the point about additional storage adders, per earlier discussion with EPA, some conflicting language in the draft 1 created confusion on rules for additional storage adders. As discussed, EPA agreed to clarify the language to ensure the storage definition applies to the 2nd storage as opposed to the 3rd storage which would otherwise drive re-testing.

5) **Internal Power Supplies (IPSS)**

- a. **80+ gold proposal** - Industry preliminary analysis indicates the expected lifetime energy savings by changing from bronze to gold PSUs for desktop systems to be significantly smaller than the projected cost to the end user. ITI will provide a complete detailed description and analysis at the June 18th face-to-face meeting.
- b. IPS less than 75 watts shows an error in the document. Section (3.2)(3.2.2) para (i) and (ii) show typographical errors in two places. 'Error! Reference source not found' should be replaced with 'Table 1' in both places.

6) **Definitions**

- a. **Additional Storage Element:** Industry requests that the EPA clarify the definition of additional storage element. The draft says that the first drive would be the largest capacity storage device, but per our meeting with EPA, the intent was that the first drive should be the one with the operating system (OS) on it. For example, for systems that have both an SSD and HDD storage, the SSD will

likely have an OS on it so would be considered to be the first drive, and the HDD will be considered an additional drive for added applicability.

- b. **Constant Network Connectivity:** Starting with ENERGY STAR Computers v7.0, EPA provided a second option for certifying products for Full Network Connectivity mode weightings. This option requires the product to maintain *constant network connectivity* with power consumption less than or equal to 2-watts in sleep mode or an Alternative Low Power Mode (ALPM). However, there was no definition for what may constitute ‘constant network connectivity’. Industry is proposing the following definition for consideration in ENERGY STAR Computers v8.0 specification:
- **Proposed Definition:** “Constant network connectivity means the system having wake capabilities that enable system OS or SW to facilitate communication and downloads from the network (for example, instant messaging, email, management and maintenance tasks, etc..”
- c. **Sleep mode:** Industry strongly believes that the sleep mode definition is outdated and needs to be updated. Industry looks forward to further discussion.

Sleep Mode: (Current Definition)

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.

The definition above has two key issues:

1. Resume time latency of less than or equal to 5 seconds: The original intent for this clause was to ensure that resume times were sufficiently short that users would not disable sleep states due to excessive resume time. That goal is largely met as evidenced by the new mode weighting published in Draft 1, where both enterprise and consumer notebooks and desktops/integrated desktops are spending less time in idle mode and more time in sleep mode, as compared to a previous PC duty cycle study. In short, power management enablement is no longer an issue and driving force for the above requirement. Should EPA insist on having a resume time latency, industry will address other sources of resume time variation, including computer form factor, key components and the type of external monitor being used for resume time testing, to prove that a one-size-fits-all approach is not workable here. Industry plans to share this data at the in-person meeting.

2. 'System becoming fully usable': This part of the definition is very vague especially when establishing the resume time test procedure. Industry proposes to remove this clause to simplify the definition.

Proposed Sleep Mode Definition: 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 from initiation of wake event to a readable display. For systems where ACPI standards are applicable, sleep mode most commonly correlates to ACPI system level S3 (suspend to RAM) state. The requirements apply to computers utilizing an alternative sleep mode.

d. Multi Screen Notebooks: Industry appreciates EPA action already taken to refine the notebook's definition to account for multi-screen notebook usage.

7) **Full network connectivity**

Industry has significant concerns with EPA's proposal for network proxy mode weighting. EPA is proposing not to award any mode weighting incentives for DT/AIO systems for V8.0. EPA's rationale is that due to lowering of the idle power and increase in sleep mode weighting (with new mode weightings study) there is no longer a need for such an incentive.

Industry's position is that % TEC reductions due to new mode weightings do not fully make up for network proxy allowances. While the idle mode residency dropped from 50% to 40% and sleep mode residency increased from 5% to 45% for desktops/integrated desktop computers, there is still room for incentives for systems that are spending significantly more time in sleep mode. Industry assessment shows that about 40% of DT/AIO systems spend 60% (14 hours plus per day) in sleep mode. While we don't have data to show what percentage of these systems actually meet the full networking proxy definition, even if 10% of overall DT/AIO systems meet the network proxy definition and spend 60%+ of time in sleep mode, there is still a justification for providing incentives for such systems. Industry's new proxy mode weighting modeling is based on 60% mode weighting in sleep for systems meeting the full capability definition.

Given the concern that the incentive mode weightings adds to the complexity in ENERGY STAR for desktops, industry has a new approach on full networking proxy allowances:

Proposal:

- Reduce DT/AIO V7.1 network proxy capability allowance by same % as the % TEC reduction due to conventional mode weightings changes going from v7.1 to v8.0 mode weightings
- Use only conventional mode weightings for measured TEC
- Replace proxy mode weightings with a simpler allowance approach in version 8.0 (similar to allowances for PSU efficiency). Allowances depend on meeting option 1 or option 2 requirements (option 1: meeting one or more of the four full networking connectivity proxy definitions; option 2: constant network connectivity and <2W)
- Add a new network connectivity allowance to be part of ETEC_MAX equation (similar to PSU efficiency allowance)
- For notebooks, keep the existing full network connectivity mode weightings that are found in V7.1 and in V8 draft 1. Alternatively, for better synergy across desktop and notebook systems, consider aligning notebooks to the new capability allowance approach like DT/AIO.

Analysis:

TEC Analysis: Desktop and NB Example						
		Short Idle	Long Idle	ModS	Sleep	Off
Desktop (W)		17	16	4	1.5	0.6
NB (W)		6.9	4.4	0.6	0.64	0.47
	Conventional	Base Capability	Remote Wake	Service Discovery/ Name Discovery	Full Capability	
DT -V7.1 TEC (option 1)	76.17	70.04	66.93	63.42	58.65	
DT - V7.1 TEC (option 2)					>2W (not Applicable)	
DT - V7.1 TEC Allowance _{CAP}	None	0.09	0.14	0.20	0.30	
NB -V7.1 TEC (option 1)	24.98	23.22	22.35	21.47	20.59	
NB - V7.1 TEC (option 2)					20.59	
NB - V7.1 TEC Allowance _{CAP}	None	0.08	0.12	0.16	0.21	
V8.0 TEC (option 1)	65.39					
V8.0 TEC (option 2)						
% TEC Red (V7->V8)	-0.14	(14% Reduction applies to above circled allowances)				
(Based on new mode weightings)						

Additional Analysis Use the straight 14% TEC reduction for conventional mode weighting going from V7 to V8, and apply the same reduction going from V7 to V8 allowances. Industry plans to validate this number (14%) with more data using the corrected EPA dataset. Average measured TEC reduction going from v7.1 to v8.0 mode

weightings using a partially corrected dataset is 13.69%, largely in alignment with the above assessment.

Capability Allowance Approach to Proxy Mode Weightings (Allowance_{CAP}):

Proposal: Reduce DT/AIO V8 capability allowance by same % as the % conventional TEC reduction due to mode weightings change					
V8 TEC Capability Allowance _{CAP (Desktops/AIO)}					
	Conventional	Base Capability	Remote Wake	Service Discovery/ Name Discovery	Full Capability
Option 1 allowance	0	0.08	0.12	0.17	0.26
Option 2 allowance	0	N/A	N/A	N/A	0.26

Proposal: Align Notebooks to capability allowance approach (based on v7.1 mode weightings)					
V7.1 TEC Capability Allowance _{CAP (Notebooks)}					
	Conventional	Base Capability	Remote Wake	Service Discovery/ Name Discovery	Full Capability
Option 1 allowance	0	0.08	0.12	0.16	0.21
Option 2 allowance	0	N/A	N/A	N/A	0.21

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

To further simplify propose a common approach for DT/AIO and Notebooks

Proposal: Align NBs and DT/AIO to a single allowance approach					
	Conventional	Base Capability	Remote Wake	Service Discovery/ Name Discovery	Full Capability
Option 1 allowance	0	0.08	0.12	0.16	0.20
Option 2 allowance	0	N/A	N/A	N/A	0.20

8) Short Idle Mode Testing:

Industry appreciates DOE adding a section in short idle testing to address systems that exhibit any cyclical behavior. Industry is proposing the following refinement to the DOE text for completeness.

Proposed Version 8.0 Text: Short Idle Mode Testing:

For Short Idle Mode Testing (Section 6.4), the UUT shall be allowed no more than five minutes from the point of ceased user input before measurements must be taken. Display sleep settings shall be disabled for Short Idle Mode Testing. If any other default

settings cause the UUT to exit Short Idle during the measurement time, extend the settings so that the UUT remains in short idle for the duration of the measurement.

If the UUT is demonstrating cyclical behavior during the short idle mode measurement, it is required to use an extended measurement capturing one or more full charging cycles per IEC 62301, section B.2.3. The extended test shall be conducted by keeping the unit in short idle through minimal user input such as moving the mouse or pressing a key that does not perform any action (e.g. shift, ctrl, tab, etc.) at a minimum of every 5 minutes. The UUT must remain in short idle during the entire time of the extended test. The short idle test can either be conducted one time or multiple times. If conducted multiple times, then the average of all runs should be reported.

Justification: For short idle testing, a continuous integration of power measurement for at least one full charge/discharge cycle in the charging algorithm will provide the most accurate average efficiency value and provide a means of charting the power data in a single continuous chart. By requiring user interaction every 5 minutes or less, the UUT will be kept in a representative short idle condition that aligns with the intent of the original 7.1 test method.

The proposed text above should address EPA's concerns that:

- A. If cyclical behavior is present, extended measurement must be conducted (for accuracy and repeatability); and
- B. Prevent short idle from transitioning to an artificially low power mode over an extended measurement period by requiring some minimal user interaction every 5 minutes or less.

Qualifying Products

Industry appreciates DOE mandating the longer test procedures for systems that exhibit cyclical behavior to account for full charging cycles. It's not clear, however, how such notebooks systems that were certified to v7.1 will be recertified for version 8.0. Industry believes that the new test should only apply to new models that have cyclical behavior, and that systems already certified to v7.1 should be grandfathered. In other words, systems that exhibit cyclical behavior and are already certified for v7.1 should get recertified for v8.0, but not be required to be retested, similar to other notebook recertifications. Industry looks forward to working with DOE and EPA on this issue.

Industry looks forward to discussing all of the aforementioned comments in greater detail.

Sincerely,