ENERGY STAR®

ENERGY STAR
Computers Face to Face Meeting

June 18, 2019

Agenda for Today

9:30 – 9:45	Introductions
9:45 – 11:30	Discussion of Categorization, Base TEC, and Allowances
11:30 – 11:45	Break
11:45 – 12:15	Full Network Connectivity
12:15 – 12:30	Energy Efficient Ethernet
12:30 – 1:00	Lunch
1:00 – 1:30	Internal Power Supplies
1:30 – 2:30	Resume Time & Testing Implications
2:30 – 3:00	Test Method & Notebook Recertification
3:00 – 3:15	Version 8.0 Schedule
3:15 – 3:30	Closing Remarks
3:30 – 4:00	Parking Lot

Introductions

Ryan Fogle
U.S. Environmental Protection Agency

John Clinger
ICF

Where in the process are we?

- **Stakeholder Meetings:**
  - January 2018 – Discussed Internal Power Supplies in F2F.
  - March 2018 – Discussed Categorization in F2F
  - May 2018 – Call for data on non-certified products. Closed in February 2019 (from an original deadline of November 2018).
  - July 2018 – Follow Up Discussion with stakeholders.
  - December 2018 – Discussion Guide Released
  - April 2019 – Draft 1 Released
  - June 2019 – Face to Face Meeting

Discussion of Categorization, Base TEC, and Adders

Summary of Data Set Changes

- Generated on May 22, 2019
- Populated missing FB_BW data for D1 products
  - Used to more accurately calculate D1 graphics adders
- Use of ITI provided storage formula to estimate storage adders for products which sufficient storage data was not available
- Incorporated ITI corrections into ITI submitted data set (category clarifications)
- Inclusion of new ES products certified since the previous pull
- Inclusion of existing certified products which were previously missing data fields important for analysis that CBs provided prior to the latest pull

Criteria Levels - Desktops

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

Category Name	Graphics Capability[iii]	Desktop or Integrated Desktop	
		Performance Score, *P*[iv]	Base Allowance
0	Any Graphics	$P \leq 3$	6.0
I1	Integrated or Switchable Graphics	$3 < P \leq 8$	15.0
I2		$P > 8$	34.0
D1	Discrete Graphics	$3 < P \leq 9$	17.0
D2		$P > 9$	22.0

Proposed Draft 2 Desktop Pass Rates

Category Name	Graphics Capability	Desktop or Integrated Desktop
		Pass Rates
0	Any Graphics	40.0%
I1	Integrated or Switchable Graphics	25.0%
I2		25.9%
D1	Discrete Graphics	29.4%
D2		26.4%

Functional Adders

Table 9: Functional Adder Allowances for Desktop, Integrated Desktop, Thin Client, and Notebook Computers

Function		Desktop	Integrated Desktop	Notebook
TEC_{MEMORY} (kWh)[v]		2.4 + (0.294 × *GB*)		
$TEC_{GRAPHICS}$ (kWh)[vi],[vii]		58.6 × tanh(0.0038 × FB_BW – 0.137) + 26.8		29.3 × tanh(0.0038 × FB_BW – 0.137) + 13.4
$TEC_{SWITCHABLE}$ (kWh)[viii]		18		N/A
$TEC_{STORAGE}$ (kWh)[ix]	3.5" HDD	26		
	2.5" HDD	2.6		
	Hybrid HDD/SSD	1.0		
	SSD (including M.2 port solutions)	0.5		
$TEC_{INT\_DISPLAY}$ (kWh)[x]	*A* < 190	N/A	[(4.00 × r) + (0.172 × *A*) + 1.50] × (1 + *EP*)	8.76 × *0.30* × (1+*EP*) × (0.43×*r* + 0.0263×*A*)
	190 ≤ *A* < 210		[(4.00 × r) + (0.020 × *A*) + 30.4] × (1 + *EP*)	
	210 ≤ *A* < 315		[(4.00 × r) + (0.091 × *A*) + 15.4] × (1 + *EP*)	
	A ≥ 315		[(4.00 × r) + (0.182 × *A*) - 13.2] × (1 + *EP*)	
$TEC_{MOBILEWORKSTATION}$ (kWh)[xi]		N/A		4.0

Full Network Connectivity

Full Network Connectivity

- The Full Network Connectivity mode weighting was an incentive in V7.0 (and previously) to increase the adoption of sleep mode in products.
  - Incentives are provided by EPA to increase the adoption of a particular feature or otherwise move the market. A key element is that EPA must get something from the incentive.
- With the development of updated mode weightings, which indicate sleep mode is engaged much more so than previously believed, EPA did not see the need to incentivize additional mode weightings in Draft 1.
- EPA received feedback from stakeholders regarding maintaining the incentive, but based on the information presented, the Agency continues to believe that there is no justification for an incentive at this time.

Energy Efficient Ethernet

Energy Efficiency Ethernet (EEE) Requirement

- EPA has observed that a vast majority of computer products, across all subtypes, are currently sold with Ethernet ports with a throughput capability of 1Gb/s or greater.
- All available data suggest that most if not all 1Gb/s or faster Ethernet ports used in electronics throughout ENERGY STAR program support EEE.
- As such, EPA is proposing that all Ethernet ports in a product with a throughput of 1Gb/s or higher must ship with EEE enabled.

Lunch

Internal Power Supplies

Internal Power Supply Requirement

- EPA received feedback regarding potential subpar efficiency at lower load operating levels (e.g. 5% load). Conflicting feedback stated that current requirements are sufficient and testing at low load would increase testing burden.

- As a compromise, EPA proposed the 80Plus Gold equivalent requirement introduced in Version 7 for products with greater than 500 watt nameplate rating be extended to all products with IPSs.

- EPA received further conflicting comments from stakeholders.
  - NRDC and CA IOUs requested that EPA include requirements at the 10% load level.
  - ITI disputed the cost effectiveness of gold levels and will provide follow up data.

Resume Time

Resume Time from Sleep

- During Version 7.1, EPA was approached by stakeholders to reconsider the resume time from sleep element in the sleep definition.
  - Particularly the 5 second resume time for desktops and workstations.
  - The U.S. Department of Energy worked with stakeholders to develop a test method, which was included in Draft 1.

Resume Time

- EPA received comments as part of Version 7.0 with requests to:
  - Remove the 5 second clause from the Sleep Mode definition.
  - Updates to the Resume Time Test Method

- In response, EPA is proposing:
  - Removing the 5 second requirement from the Sleep Mode definition.
  - Incorporating the following requirements into the General Requirements of the specification.
    - Notebook Computers: 5 seconds
    - Desktop Computers: 10 seconds
    - Workstations: 15 seconds
  - Testing will not be required, value will be self declared, with no verification testing.

Test Method Updates & Recertification

Jeremy Dommu, Department of Energy
Mansi Thakkar, Navigant Consulting

June 18, 2019

Test Method Topics

- Long Idle, Sleep, and Off Mode Tests
- Short Idle Test – Measuring Cyclical Behavior
- Recertification Requirements
- Display Requirements
- Open Q & A / Contact

Long Idle, Sleep, and Off Mode Tests

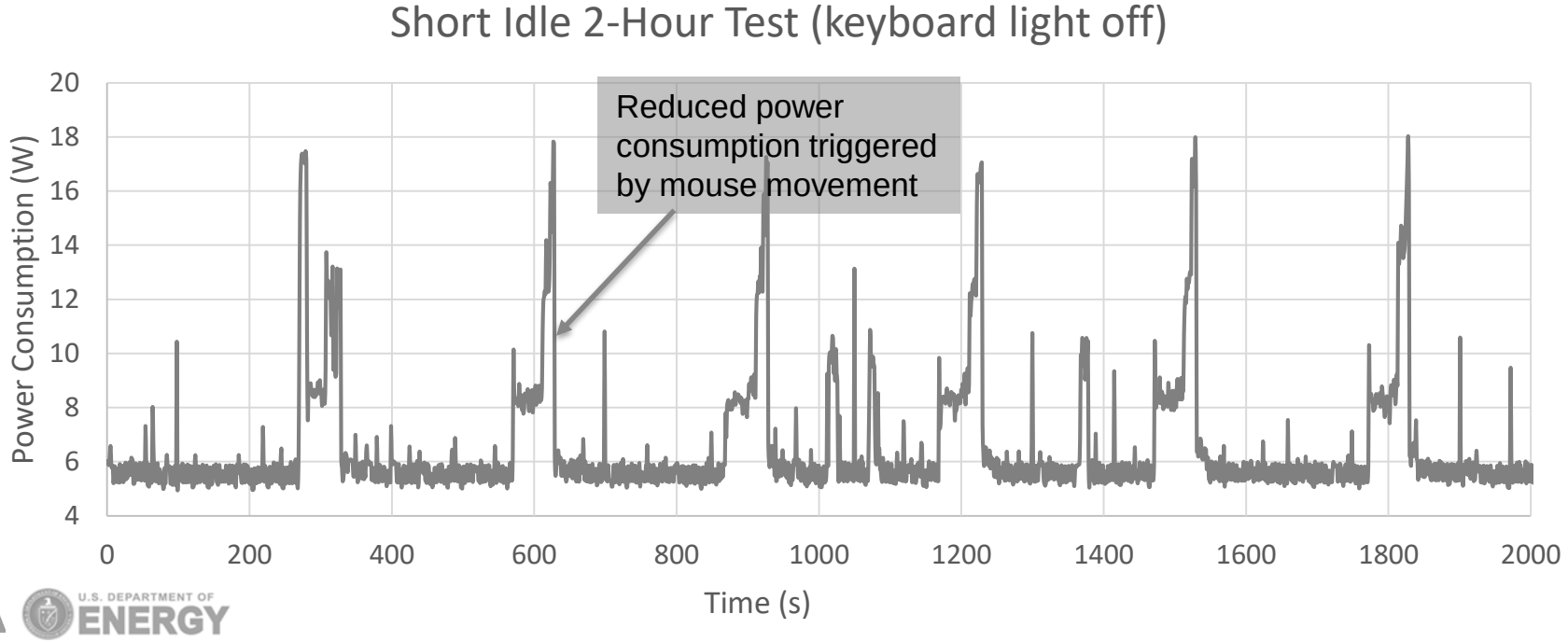
- In V. 7.1, DOE allowed a temporary solution to measure the average power consumption of units that exhibit cyclical behavior.
  - Because the Version 7 Program was already in effect, DOE did not want to make revisions that would impact test measurements of units already certified to V. 7.0.
  - V. 7.1 allowed the following temporary solutions:
    - *Permitted use of hardware or software to disable battery for testing.*
    - *Permitted running the 5-minute short idle test multiple times and reporting the average of all runs.*
    - *Permitted use of an extended measurement to capture one or more full cycles for the long idle, sleep, and off mode tests.*
- In V. 8.0 Draft 1, DOE is proposing as a requirement that if a unit exhibits cyclical behavior it must be tested with an extended measurement to capture one or more full cycle.
  - Thus, DOE has also removed the option to disable the battery via software.

Short Idle Test Requirements

V. 7.0	V. 7.1	V. 8.0 Draft 1
• Remove battery for all tests. If UUT cannot operate without battery, perform test with fully charged battery. • Disable display sleep settings. • Measure power consumption for 5 minutes after the UUT enters short idle mode.	• Same requirements as V. 7.0. • Additionally, software may be used to disable the battery during testing. • The 5-minute short idle test may be conducted multiple times. Report the average of all runs.	• If a UUT does not exhibit cyclical behavior, measure power consumption for 5 minutes (same as V. 7.0) • If the UUT exhibits cyclical behavior, perform an extended short idle test to capture one or more complete cycles. Ensure that the UUT is in short idle mode throughout testing through minimal user input. • Disabling battery via software is not permitted.

Short Idle Test – Measuring Cyclical Behavior

- In response to the proposal in V. 8.0 Draft 1, ITI commented that user interaction must be required every 5 minutes.
  - Investigative tests have shown user input may affect short idle power consumption:



Short Idle Test – Alternate Approaches

- Perform the 5-minute short idle test multiple times over a period of time that captures a complete cycle (e.g. 2 hours) and average the results from all measurements.
  - Pros: ensures that only short idle mode is captured during testing.
  - Cons: potential burden of testing.
- Allow disabling the battery via software.
  - Pros: does not increase test burden; may avoid recertification costs.
  - Cons: need to ensure any software that is used does not have unintended consequences.
- Perform an extended short idle test with user input every 10 minutes.
  - Pros: allows unit to spend more time in short idle mode.
  - Cons: still captures some instances when unit is in active state, but the impact of this may be negligible.

Short Idle Test – Stakeholder Feedback

- DOE requests feedback on the best path forward to capture short idle power consumption for units that exhibit cyclical behavior.

Retesting Requirements

- In V. 7.1 of the Computers Test Method, DOE allowed a temporary and optional solution to capture the power consumption of units that exhibit cyclical behavior.
- With V. 8.0 Draft 1, DOE is proposing to require an extended measurement in short idle, long idle, alternative low power mode, sleep mode, and off mode for any unit that exhibits cyclical behavior.
- Already certified units will not need to retest if their TEC remains the same or is better than the previously certified value.
- If the TEC of any unit increases under this proposal, retest of such a unit is required.

Display Requirements

- Display resolution and refresh rate:
  - Clear requirements do not exist for units that require an external display that is not shipped with the unit.
  - Proposal: Require testing with a display capable of the maximum resolution supported by the computer without exceeding 4k.

- Display connection priority:
  - Proposal: If the UUT and external monitor support multiple signal interfaces, the UUT shall be tested with the first available interface from the list below:
    i. Thunderbolt ii. DisplayPort iii. USB-C
    iv. HDMI v. DVI vi. VGA
  - This aligns with the requirements in the ENERGY STAR Displays Specification.

Display Requirements – Stakeholder Feedback

- DOE requests feedback on the display resolution and connection priority requirements for testing computers that require an external display and the display is not shipped with the unit.

Contact Information

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Recertification

- Roughly what percentage of notebooks previously tested and certified products are impacted by the cyclical testing change?
- Of those, what percentage of notebooks are expected to still be on the market by the effective date of Version 8?

Version 8.0 Schedule

Timeline

- Draft 2, V8.0 Specification – July 2019.
- Final Draft V8.0 Specification + Final Specification Release – Q3/Q4 2019
- V8.0 Specification Effective – July 2020

Parking Lot