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| Definitions | Frame Buffer Width | One stakeholder commented that the term “Frame Buffer Width” is undefined. | EPA has included a footnote with an explanation of Frame Buffer Width in the Final Specification |
| Definitions | Full Network Connectivity | A stakeholder noted that the definition of Full Network Connectivity requires operation in Sleep Mode or another mode with equal or lower power. The stakeholder commented that this would require testing a product in both connected and unconnected Sleep Mode to determine if this condition was met.<br><br>Another stakeholder noted that according to the definition for Full Network Connectivity, it would not be possible for computers to offer connectivity unless their Long Idle or Connected Sleep Mode power is equal to or less than the power demand in Sleep Mode. | EPA has clarified this requirement by specifying that the power in an alternative low power mode can be less than or equal to 5 watts. |
| Definitions | Graphics Processing Unit | One stakeholder expressed concern that the statement "apart from the CPU" may be confused with the physical proximity of the GPU and suggested changing this language. | EPA has replaced "apart" with "separate" in the Final Specification. |
| Definitions | Idle State, Long Idle, and Short Idle | A stakeholder suggested altering the Idle State, Long Idle, and Short Idle definitions to reflect that the computer is not in any other low power modes in addition to Sleep Mode. | Since an Idle State can be the alternative low power mode for a system, Idle States should not be defined in opposition to low power modes. Therefore, EPA has maintained the pervious definition. |
| Definitions | Notebook Computer | A stakeholder requested that the Notebook definition reference a 'physical' keyboard and pointing device, as opposed to integrated, and further include touch-sensitive screens and "detachable and convertible configurations". | EPA has clarified the Notebook definition to refer to physical keyboards with moveable keys that cannot be detached from the screen. EPA will consider the inclusion of detachable and convertible configurations in the Version 6.1 specification development process. The inclusion of these products as well as slates/tablets should be subject to a more formal stakeholder process. |
| Definitions | Point-of-Sale Computer | A stakeholder recommended the addition of a Point of Sale (POS) product definition that included PC-based products. | POS products are included in the scope of the specification only if they meet the definitions of the other computer types. Therefore, no specific definition has been added to the Final Specification. |
| Definitions | Slate Computing Device | A stakeholder stated that excluding a definition for Slate/Tablet could cause confusion because these products may fall under the definition of Notebook Computer and also suggested limiting the term to "Slate". The stakeholder further requested a timeline for Version 6.1 if this definition if it not included in Version 6.0. | EPA intends some devices falling within the popular categories of "Slates" and "Tablets" within the Version 6.1 specification revision and will propose a definition at that point. That will allow stakeholders a chance to provide feedback on the scope of included products. Version 6.1 will start immediately after v6.0 is published, and the targeted Final date of v6.1 will be the effective date of v6.0, or earlier. |
| Definitions | Switchable Graphics | A stakeholder noted that some switchable graphics systems employ the integrated GPU at all times and switch on the discrete GPU when instructed and requested they be included through the following definition: "Functionality that allows discrete graphics to be disabled when not required in favor of an integrated graphics solution." | EPA has amended the definition of Switchable Graphics to include systems that keep their Integrated Graphics on at all times. |
| Definitions | Wake/Wake Event | One stakeholder requested that these definitions be revised to take into consideration all other low power modes that a computer may be woken from in addition to Sleep and Off Modes. | Since alternative low power modes still in a state of flux and are not clearly defined either in industry or in the specification at this time, EPA has continued to restrict Wake On LAN functionality to those systems that implement Sleep mode. When clearer definitions for alternative low power modes are available in future revisions, EPA will update these definitions as necessary. |
| Documentation | | A stakeholder stated that the requirements regarding power management documentation (Section 3.4 User Information Requirements) may limit manufacturers from providing information to consumers of non-ENERGY STAR computers, which could be at odds with other environmental initiatives. | The User Information requirements specify that documentation may be provided with non-ENERGY STAR certified computers as long as manufacturers provide information on how to identify an ENERGY STAR certified configuration. |

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| Full Network Connectivity Weightings | | A stakeholder expressed concern regarding the incentive for Full Network Connectivity because it would allow the product to be less efficient while still meeting the requirements. Although the functionality can reduce overall energy use in computers, without further research on actual use, the savings potential is uncertain, especially since computers are already required to enter Sleep Mode within 30 minutes. On the other hand, there is a risk of high qualification rates: 40% of Version 5.2 notebooks and 62% of desktops could meet the draft Version 6.0 TEC requirements if using the Full Capability mode weightings, with qualification rates even higher for 2012 models.<br><br>High qualification rates of 30--60% would persist even if the Sleep Mode power were to increase by 5 watts (e.g., to reflect the higher power needs of Full Network Connectivity). Therefore, the stakeholder suggested alternative use profiles for models with Full Network connectivity that feature a reduction in time assumed in Long Idle and Off Mode. | EPA does not expect a majority of computers to implement a proxy with Full Capability and therefore expects qualification rates to remain much lower than under that scenario. Therefore, EPA has maintained the previously proposed mode weightings in the Final Specification. |
| Full Network Connectivity Weightings | Research | A stakeholder suggested further research on the use profiles for Full Network Connectivity for the next specification to understand the actual savings potential of this functionality. | EPA looks forward to working with stakeholders to validate the mode weightings against updated usage data in the near future. |
| Functional Adder Allowances | | A stakeholder had the following comments and suggestions for the Functional Adder Allowances:<br>• It is unclear why Integral Displays in Computers have different requirements than in the Version 6.0 Displays specification.<br>• The memory adder for Notebooks has doubled Since Version 5.2 while the efficiency of RAM modules has actually improved. Moreover, the memory allowance now applies to all Computers, rather than just above a base memory of 4GB.<br>• Similarly, the internal storage allowance for Desktop and Integrated desktop computers has increased since Version 5.2 as well despite market improvements.<br><br>This commenter believed that providing large adders for memory and storage will encourage manufacturers to qualify a configuration by adding in extra memory and/or storage devices. | The Integrated Display allowance differs from the requirement levels in the Version 6.0 ENERGY STAR specification due to lower display luminance in the Computers test method compared to the Displays test method.<br><br>The 4 GB base memory for application of the Memory adder was removed as part of the ITI proposal for computer categorization. However, similar to the changes in the Additional Internal Storage allowance, the effects of these changes on the TEC requirement are small and should have been reflected in the resulting base allowances. Moreover, when qualifying a product family, all configurations in the family (even ones without large adders) must meet the requirements. |
| Functional Adder Allowances | Integrated Display Adder | One stakeholder requested that EPA clarify if the Integrated Display adder can be applied more than once if a product has more than one display. | EPA has clarified that the Integrated Display adder can be applied for additional Integrated Displays. |
| Power in Long Idle State | | A stakeholder suggested that the term "Connected Sleep State" be changed to "Always-Connected State", while another asked for a definition to be provided for this term.<br><br>Another stakeholder asked if the requirements for using Long Idle in place of Sleep for products that do not support a Sleep Mode should also be included for Workstations. | As the names and capabilities of low-power non-Sleep states continue to evolve, EPA has not included a definition in the Final Specification, relying on their difference from the other defined states and modes. All such states/modes are referred to now as "alternative low power modes" throughout the specification.<br><br>EPA will only allow substitution of Long Idle for Sleep mode in Notebooks, Desktops, and Integrated Desktops, as alternative low power modes do not appear to be a candidate for use in workstations at this time. |

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| Power Management | | One stakeholder did not support the division of products into Consumer and Enterprise due to complexity. Instead, the stakeholder recommended that all products be required to meet the TEC limit and support either sleep or an alternative low power mode without the proposed 5 W limit. The stakeholder further forecast that models with Sleep Mode will remain dominant and noted that the TEC ENERGY STAR limits were calculated with a database of systems that used Sleep technology, not “always on” technology.<br><br>Another stakeholder commented that removing the Sleep Mode requirement would conflict with forthcoming EU Ecodesign regulations and requested its restoration, and requested that models with Sleep Mode continue to meet the requirements if Full Network Connectivity is disabled. Lastly, a third stakeholder suggested clarifying in Table 2 that only the Display Sleep Mode Requirement would apply to models without Sleep Mode. | EPA thanks stakeholders for their input on this issue. As of the writing of this comment, EPA has proposed recognizing alternative low power modes for notebooks and desktops (in place of Sleep) so long as those modes consume less than or equal to 5 W. EPA intends to make this requirement part of the Final Version 6.0 Computers specification, but is still in discussion with stakeholders.<br><br>EPA believes that new low power modes that serve as alternatives to Sleep or as improvements to Long Idle should be recognized and, when truly energy efficient, encouraged via inclusion in the ENERGY STAR Computers specification. Given the nebulous status of many of these new modes, EPA has proposed a very generic way of referencing them (simply as "alternative low power modes") and has proposed a generic modal limit of less than or equal to 5 W to ensure continued efficiency of products that implement them. As the modes are better defined and understood, they can be formally added to future revisions of the ENERGY STAR Computers specification and incorporated into the overall TEC calculations. |
| Power Management | Sleep Mode | A stakeholder noted that power management requirements may not be applicable under alternative low power modes. Therefore, users should be informed if power management settings have been disabled due to alternative low power modes and instructed how to re-enable them. | Full Network Connectivity refers to a suite of capabilities present when a system enters Sleep Mode or (with language currently being inserted into v6.0 Final) an alternative low power mode consuming less than or equal to 5 W. Power management requirements for Sleep Mode are as listed in Table 2. Power management requirements for alternative modes are restricted to Display Sleep Mode, as the remainder of the power management requirements apply specifically to capabilities developed for ACPI S3 Sleep Mode.<br><br>Regarding user information, manufacturers are provided several options for providing information to users. Per section 3.4.2, if the power management settings are not present due to alternative low power modes, option (i) would apply and manufacturers would have to provide a list of the default power management settings. |
| TEC Requirements | | A stakeholder noted that the Desktop I3 and D2 categories have the same base allowance although the Desktop D2 category has a higher performance score. They suggested that the base allowance for Desktop I3 be reduced or if warranted, extra allowance be given in the GPU adder for the Desktop D2 category. | Although the performance score of D2 Desktops may be higher than that of I3 Desktops, the base allowance for the I3 must also accommodate graphics energy consumption, which can be covered by the Discrete Graphics Adders or the Switchable Graphics Incentive in the case of D2. |
| TEC Requirements | Power Supply Efficiency Incentive | A stakeholder supported the inclusion of the incentive for internal power supplies that are more efficient than the minimum 80 PLUS Bronze requirement because it will create demand for more efficient internal power supplies in real-world usage conditions. However, the stakeholder recommended increasing the 10% load requirement to 82% to reflect current average performance in the market and yield greater savings.<br><br>Another stakeholder noted that there is no incentive for desktop computers that are supplied with more efficient external power supplies. | Due to the lack of opportunity for discussion at this late stage and the potential for excluding otherwise-efficient 80 PLUS Silver power supplies, EPA has not made any changes to the efficiency criteria for receiving power supply efficiency incentive. However, EPA has revised the incentives table to include Desktops with external power supplies with the same incentive level as Desktops with internal power supplies. |

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| TEC Requirements | Switchable Graphics | A stakeholder noted the substantial energy savings that could be gained from switchable graphics, but expressed concern that the current draft provides a disincentive since manufacturers can claim a full discrete graphics adder by disabling the switchable graphics but only a small incentive in the case of Desktops and Integrated Desktops and no incentive in the case of notebooks if they do enable it.<br><br>The stakeholder therefore suggested that EPA increase the incentive to a full G1 adder for Desktops and Integrated Desktops and not allow Notebooks capable of switchable graphics to claim a discrete graphics adder. Instead, these Notebooks should be required to have switchable graphics enabled by default in Short Idle State to qualify for ENERGY STAR.<br><br>This stakeholder recommended that triggers for graphics switching be verified to prevent a loophole from manufacturers configuring products to switch based on AC/DC status as well as graphics intensity. They also stated that forcing notebooks to switch to integrated graphics during testing removes the incentive to improve discrete graphics energy use, which could discourage low-power discrete graphics. As a result, they requested testing with the discrete GPU switched on and off in future specifications. | Although the incentive for Switchable Graphics is smaller than the allowances for Discrete Graphics Adders, those can only be applied when the Discrete Graphics is enabled (and therefore using energy). Therefore, on balance, the Switchable Graphics incentive continues to provide a benefit.<br><br>EPA will consider further proposals to testing Switchable Graphics in a future specification revision. |
| Scope | Included Products | One stakeholder requested that POS products based on Desktop/Integrated Computer designs and standard Desktop/Integrated Computer operating systems be added to the scope. Another stakeholder requested that mention of Tablets either be removed from the scope or a definition for Tablets be re-added. | The Included Products section is based on the five computer types (Desktop, Notebook, etc.) which each have separate definitions and requirements. As POS systems do not have an agreed-upon definition or requirements, EPA has instead kept the current exclusion of non-PC products in the Final Draft. |
| Scope | Excluded Products | A stakeholder suggested adding Docking Stations to the Excluded Products section. | Although docking stations do not meet the computers specification, EPA has added them to the list of excluded products for clarity. |
| Thin Clients | Adder Allowances | A stakeholder requested that the TEC base allowance be changed to 60 kWh (in Table 11) as previously agreed. | EPA has changed the TEC base allowance for Thin Client. |
| Workstations | $P_{MAX}$ | A stakeholder noted that $P_{MAX}$ for Workstations is measured three times in the test procedure and asked which measurement should be used in the $P_{TEC\_MAX}$ formula. Furthermore, the stakeholder questioned the appropriateness of referring to both $P_{TEC}$ and $P_{TEC\_MAX}$ as "TEC" because they are power, not energy, values. | DOE has clarified that $P_{MAX}$ is the average of the three measured values.<br><br>Also, although the workstation performance and requirements are power values, both include modal assumptions, and therefore EPA has retained the TEC designation in their symbols. |