ENERGY STAR® Program Requirements for Single Voltage External Ac-Dc and Ac-Ac Power Supplies

Eligibility Criteria (Version 2.0)
Final Draft

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Below is the **Final Draft** product specification (Version 2.0) for ENERGY STAR qualified single voltage external ac-ac and ac-dc power supplies. A product must meet all of the identified criteria if it is to be qualified as ENERGY STAR by its manufacturer.

The goal of this ENERGY STAR external power supply specification is to recognize those models with an efficient ac-ac or ac-dc conversion process. This specification along with its complement, the specification for products with battery charging systems (BCSs), intends to comprehensively cover the full range of energy conversion products. Manufacturers shall carefully examine their product designs and compare them to the detailed definitions (Section 1) and qualifying product descriptions (Section 2) for an external power supply and battery charging system (visit http://www.energystar.gov/products) to determine the appropriate specification for ENERGY STAR qualification. Manufacturers may only qualify individual models under the one specification (i.e., external power supply OR battery charging system) that best reflects the power supply and product design.

1) **Definitions**: EPA has prepared detailed definitions of single voltage external ac-ac and ac-dc power supplies and other related terms as relevant to ENERGY STAR.

A. External Power Supply (EPS): For the purposes of this specification, an external power supply:

a) is designed to convert line voltage ac input into lower voltage ac or dc output;
b) is able to convert to only one output voltage at a time;
c) is sold with, or intended to be used with, a separate end-use product that constitutes the primary load;
d) is contained in a separate physical enclosure[1] from the end-use product;
e) is connected to the end-use product via a removable or hard-wired male/female electrical connection, cable, cord or other wiring;
f) does not have batteries or battery packs that physically attach directly (including those that are removable) to the power supply unit;
g) does not have a battery chemistry or type selector switch **AND** an indicator light or state of charge meter (e.g., a product with a type selector switch AND a state of charge meter is excluded from this specification; a product with only an indicator light is still covered by this specification); and
h) has nameplate output power less than or equal to 250 watts.

Note: EPA has recently been made aware of EPS models that convert line voltage AC into multiple USB (Universal Serial Bus) 5V outputs in parallel. These devices are being marketed for use with a growing number of small consumer electronic devices designed to charge through computer USB ports. To clarify, single voltage EPSs with multiple outputs of the same voltage are eligible for the ENERGY STAR provided that they meet the Version 2.0 specification when tested as indicated in the ENERGY STAR EPS Test Procedure. Information on testing single voltage EPSs with multiple output wires can be found in the ENERGY STAR Test Procedure on page 6, "5. Measurement Approach" under "a. Preparing UUT for Test."

One stakeholder recommended that EPA extend its EPS specification in the future to address EPSs with two or more output voltages. However, the EPS Test Method does not currently cover units with multiple output voltages and this would likely take some time to develop. EPA would welcome discussions regarding these products in the coming months, which could lead to a future revision of this specification, but does not want to delay finalizing Version 2.0.

[1] "Physical enclosure" refers to the housing of the products themselves, not their retail packaging.

B. Ac-Ac External Power Supply: An external ac-ac power supply is an EPS designed to convert line voltage ac input into lower voltage ac output.

C. Ac-Dc External Power Supply: An external ac-dc power supply is an EPS designed to convert line voltage ac input into lower voltage dc output.

D. Low Voltage External Power Supply: For the purposes of this specification, a low voltage model is an EPS with a nameplate output voltage of less than 6 volts and a nameplate output current greater than or equal to 550 milliamps.

E. Model: An external power supply model that is sold or marketed under a unique model number or marketing name. Any variation in the nameplate information (e.g., the rated input or output voltage, amperage, or wattage), circuitry, or output cord size is considered a unique model.

F. Active Mode: The condition in which the input of a power supply is connected to line voltage ac and the output is connected to an ac or a dc load drawing a fraction of the power supply's nameplate power output greater than zero.

G. No-Load Mode: The condition in which the input of a power supply is connected to an ac source consistent with the power supply's nameplate ac voltage, but the output is not connected to a product or any other load.

H. Power Factor (True): The true power factor is the ratio of the active, or real, power (P) consumed in watts to the apparent power (S), drawn in volt-amperes (VA).

$$PF = \frac{P}{S}$$

This definition of power factor includes the effect of both distortion and displacement.

Note: EPA has included a low voltage EPS definition to support the Active Mode requirements included in the Final Draft Version 2.0 specification. In addition, for clarity, an EPS model definition has been added.

2) **Qualifying Products**: In order to qualify as ENERGY STAR, an external power supply model must meet the definition in Section 1.A, as well as either the definition in 1.B or 1.C, and the specification requirements provided in Section 3, below.

3) **Energy-Efficiency Specifications for Qualifying Products**: Only those products in Section 2 that meet all of the following criteria for Active Mode, Power Factor, and No-Load Mode may qualify as ENERGY STAR.

Note: Below EPA provides its Final Draft proposed requirements for the Version 2.0 EPS specification. Based on EPA's dataset, 25% of the units would qualify as ENERGY STAR taking into account the Active Mode and No-Load Mode requirements. (Compliance with the power factor requirement was evaluated separately and is explained in the cover sheet to EPA's masked dataset.) At stakeholders' request, EPA also carefully analyzed small subsets of the data based on rated output power (i.e., < 1W, 1-5W, 5-10W, 10-20W, 20-30W, 30-40W, 40-50W, 50-100W, and >100W). EPA feels that the proposed Active and No-Load Mode specifications represent the top performers across the entire range, with significant compliance at all wattages; the lowest compliance rate being 15% for products between 30-40W, and the highest compliance rate being 37% for products below 1W.

Some stakeholders suggested that an ENERGY STAR Version 2.0 specification was not needed because of federal mandatory standards while others encouraged EPA to align ENERGY STAR requirements with these new standards. EPA's research has shown that there is still room for sufficient product differentiation for products currently available above this minimum standard, which justifies continuing a voluntary high efficiency label for EPSs.

A. Active Mode

To be eligible for ENERGY STAR qualification, an external power supply model must meet or exceed a minimum average efficiency for Active Mode, which varies based on the model's nameplate output power. Tables 1 and 2, below, outline the equations for determining minimum average efficiency, where P_{no} stands for nameplate output power and Ln refers to the natural logarithm. Table 1 addresses all standard EPSs, while Table 2 gives separate equations for a subset of low voltage EPSs that meet the appropriate definition in Section 1.D. All efficiency values shall be expressed in decimal form and rounded to the hundredths place.

Table 1: Energy-Efficiency Criteria for Ac-Ac and Ac-Dc External Power Supplies in Active Mode: Standard Models

Nameplate Output Power (P_{no})	Minimum Average Efficiency in Active Mode (expressed as a decimal) [2]
0 to ≤ 1 watt	≥ 0.495 * P_{no} + 0.143
> 1 to ≤ 49 watts	≥ [0.06 * Ln (P_{no})] + 0.638
> 49 watts	≥ 0.870

Table 2: Energy-Efficiency Criteria for Ac-Ac and Ac-Dc External Power Supplies in Active Mode: Low Voltage Models

Nameplate Output Power (P_{no})	Minimum Average Efficiency in Active Mode (expressed as a decimal) [2]
0 to ≤ 1 watt	≥ 0.497 * P_{no} + 0.071
> 1 to ≤ 49 watts	≥ [0.075 * Ln (P_{no})] + 0.569
> 49 watts	≥ 0.860

Note on EPA Dataset: EPA has developed proposed new Active Mode levels for the Version 2.0 specification from a dataset of 1,651 units measured in 2006 or 2007, including: currently qualified ENERGY STAR external power supplies; data shared with EPA from China's Standard Certification Center (CSC); and a small set of new models purchased at US retail stores and tested on behalf of EPA. Please note that the number of samples in the dataset was reduced from 1,834 for Draft 1 to 1,651 for this Final Draft. The number of models is reduced as, based on stakeholder requests, units capable of operating at multiple input voltages were analyzed based on measured efficiency at both 115 volts ***and*** 230 volts (i.e., test data at 115 volts and 230 volts was treated as two distinct units in the Draft 1 analysis and only as one unit in the Final Draft analysis) in order to be consistent with EPA's testing requirements in Section 4.C, below. This has generally resulted in a consideration of the dataset such that each model is only evaluated for compliance once.

While the current dataset includes a large number of ENERGY STAR models, EPA does not feel that this biases the analysis because: 1) new US regulations and regulations in other countries, such as Australia, will exceed ENERGY STAR's Tier 1 levels (Version 1.1 specification) as early as July 2008, making ENERGY STAR models representative of the status quo and a good proxy for the US market in 2008; and 2) Beginning in June 2007 and most recently in late December 2007, EPA has repeatedly invited interested manufacturers to submit data for non-ENERGY STAR models for incorporation into the dataset.

[2] (a) "Ln" refers to the natural logarithm. The algebraic order of operations requires that the natural logarithm calculation be performed first and then multiplied by 0.06 (or 0.075 for low voltage models), with the resulting output added to 0.638 (or 0.569 for low voltage models). (b) An efficiency of 0.87 or 0.86 in decimal form corresponds to the more familiar value of 87% or 86% when expressed as a percentage.

Note on Active Mode Specification: In response to stakeholder feedback and based on further analysis, EPA has revised the Active Mode requirements in this Final Draft specification as follows:

- The proposed Final Draft requirements follow the same form as the Version 1.1 and Draft 1 Version 2.0 requirements, with a sloped line below 1 watt, a log function for mid-wattage units, and a flat line requirement above a certain wattage threshold. For the Final Draft Specification, based on stakeholder comments, the threshold for the flat line requirement has been raised back to 49 watts from the 36 watts threshold used in Draft 1. This change makes the criteria more consistent with the ENERGY STAR Version 1.1 specification and other international specifications;
- Separate requirements have been proposed for low voltage EPS models in recognition of design constraints that limit the efficiency of low voltage, high current products; and
- To account for stakeholder comments that the proposed Draft 1 requirements were too stringent for some products, adjustments have been made to the equations for EPS models at or below 49 watts output power to ensure more consistent qualification rates across various wattage ranges.

For Active Mode alone, 28% of the units in the dataset would meet the proposed Final Draft requirements. In addition, EPA also analyzed small subsets of the data based on the output power range (i.e., < 1W, 1-5W, 5-10W, 10-20W, 20-30W, 30-40W, 40-50W, 50-100W, and >100W). EPA feels that the proposed Active Mode specification allows for a reasonable compliance rate across the different wattage ranges, with the lowest compliance rate being 19% for products between 30-40W, and the highest compliance rate being 45% for products below 1W. Finally, for products between 25-42W, where some stakeholders expressed concerns about low compliance with the proposed Draft 1 levels, the Final Draft compliance rates are 35% for products between 20-30W, 19% for products between 30-40W, and 25% for products between 40-50W.

Examples to Illustrate the Active Mode Approach: Average Active Mode efficiency and ENERGY STAR qualification shall be determined as follows:

- Determine whether the product meets the definition for low voltage products by comparing the nameplate output voltage and nameplate output current to the definition found in Section 1.D.
- Calculate the model's single average Active Mode efficiency for each test voltage by testing at 100%, 75%, 50%, and 25% of rated current output and then computing the simple arithmetic average of these four values, as specified in the Test Method found in Section 4.
- Based on the model's nameplate output power, select the appropriate equation from Table 1 or 2 and calculate the minimum average efficiency.
- Compare the model's actual average efficiency to the minimum average efficiency required by ENERGY STAR. If actual average efficiency is greater than or equal to the minimum average efficiency, the model has satisfied ENERGY STAR's Active Mode requirement.

To provide an example using the criteria in Table 1 and Table 2, the minimum average efficiencies required of six sample power supplies are provided in Table 3 below. Power supplies 1 through 6 would meet the ENERGY STAR Active Mode requirement if they had average efficiencies greater than or equal to the corresponding values shown in the far right column. Therefore, if Power Supply 3 in Table 3 had an actual average efficiency of 80%, it would satisfy the Active Mode requirement because it surpassed the ENERGY STAR minimum average efficiency of 79%.

Table 3: Examples of Minimum Average Efficiency in Active Mode

Sample	Nameplate Output Power (P_{no})	Nameplate Output Voltage	Nameplate Output Current	Average Efficiency in Active Mode (expressed as a decimal)
PS 1	0.75 watts	1V	750 mA	0.497 * 0.75 + 0.071 = 0.4438 or 0.44
PS 2	0.75 watts	10V	75 mA	0.495 * 0.75 + 0.143 = 0.5143 or 0.51
PS 3	20 watts	5V	4000 mA	[0.075 * Ln (20)] + 0.569 = .7937 or 0.79
PS 4	20 watts	10V	2000 mA	[0.06 * Ln (20)] + 0.638 = 0.8177 or 0.82
PS 5	75 watts	5V	15000 mA	0.86
PS 6	75 watts	10V	750 mA	0.87

B. Power Factor Correction

In addition to the Active Mode efficiency requirements found above, all qualifying power supplies with greater than or equal to 100 watts *input* power must have a true power factor of 0.9 or greater at 100% of rated load.

Note: EPA believes it is important to retain a power factor level to help cut I-squared R losses in building distribution wiring. In addition, EPA believes it is important to retain a power factor level of 0.9 for high power devices to remain harmonized with the Computer V4.0 internal power supply requirement. In Section 3.B above, EPA provides one proposed option for the power factor requirement. Specifically, EPA has increased the cutoff for power factor correction to 100 watts of *input* power in response to stakeholder comments that the proposed Draft 1 power factor correction criteria were too difficult for many power supplies around the originally proposed 75 watt *output* power cutoff. With this new proposal, more than 80% of products in the dataset with 100 watts or more input power can meet the power factor criteria, with compliance dropping off under the 100 watts threshold.

In addition, EPA is continuing to evaluate the merits of a second proposed option. In this second option, qualifying EPSs would be required to have a true power factor of 0.9 or greater in *any measured condition* where input power is greater than or equal to 100 watts. For example, an EPS with a rated output power of 150 watts and a flat efficiency of 90% would have an input power of approximately 167 watts at full load and 125 watts at 75% load, but only 83 watts at 50% load. Thus, this unit would be required to achieve a power factor of 0.9 or greater at 100% load and 75% load, but not at 50% load or less to be labeled as ENERGY STAR. **Stakeholders are encouraged to provide feedback on both power factor options as described in this note.**

Based on comments from multiple stakeholders, EPA conducted research into eliminating the power factor requirement and replacing it with the IEC/EN 61000-3-2 specification, which limits harmonic currents. During EPA's research, the following issues were revealed:

- Both the IEC and EN versions of the 61000-3-2 specification for harmonic currents have levels based solely on greater than 220V input voltage, while the levels contained in the Japanese version of the standard (JIS C 61000-3-2) base their levels on 100V testing. Therefore, EPA's research found no applicable standard with corresponding levels based on testing at 115V as required by the ENERGY STAR Version 2.0 specification; and
- Although stakeholders indicated that the majority of manufacturers use active power factor correction to meet this harmonic current specification (and therefore units meeting this standard will ultimately have high power factor), it is also understood that certain designs that meet this standard can result in a power factor well below ENERGY STAR's proposed 0.9 level (e.g., 0.75 or lower).

Although EPA believes an approach for harmonizing with this standard could ultimately be developed, it would take additional research and testing, and EPA does not want this to delay finalizing the Final Draft specification. For these reasons, EPA has determined that harmonization with this standard would not be appropriate at this time, and furthermore would not meet EPA's continued goal of saving additional energy through increased power quality.

C. No-Load Mode

The third element of the ENERGY STAR specification is the No-Load power requirement, which specifies the maximum ac power that may be used by a qualifying ac-ac external power supply or ac-dc external power supply in the No-Load condition. Maximum power consumption levels for No-Load Mode are provided in Table 4, below.

Table 4: Energy Consumption Criteria for No-Load

Nameplate Output Power (P_{no})	Maximum Power in No-Load	
	Ac-Ac EPS	Ac-Dc EPS
0 to < 50 watts	≤ 0.5 watts	≤ 0.3 watts
≥ 50 to ≤ 250 watts	≤ 0.5 watts	≤ 0.5 watts

Note: EPA has not modified the proposed No-Load levels in this Final Draft specification. While a few stakeholders requested an increase in the maximum allowed power for ac-ac models, EPA did not implement this change because it would have made ENERGY STAR's voluntary levels less stringent than the new US mandatory standards for EPSs, which will take effect on July 1, 2008. For ac-ac EPSs in No-Load, the proposed Final Draft ENERGY STAR specification is identical to the 0.5 watt limit in the Energy Independence and Security Act of 2007.

For No-Load Mode alone, 84% of the units in the dataset would meet the proposed Final Draft requirements.

4) **Test Methodology**

The specifics for testing the energy efficiency of an external power supply model are outlined in a separate document titled "Test Method for Calculating the Energy Efficiency of Single-Voltage External Ac-Dc and Ac-Ac Power Supplies (August 11, 2004)," which is available on the ENERGY STAR Web site. The test results produced by this procedure shall be used to determine if a model qualifies as ENERGY STAR. In addition, below are five ENERGY STAR-specific testing requirements.

A. Safety Standards: ENERGY STAR qualified external power supplies shall comply with applicable safety standards from UL, CSA, and other global standards organizations. Relevant standards include, but are not limited to:

- *UL 1012, Standard for Power Units Other Than Class 2, Edition 7, April 29, 2005*
- *UL 1310, Standard for Class 2 Power Units, Edition 5, May 3, 2005*

It is the Partner's responsibility to ensure that its products meet applicable local safety standards based on where the product will be sold.

B. Number of Units Required for Test: Testing shall be conducted by the manufacturer or its authorized representative on three randomly chosen units of the same model. Manufacturers shall measure and maintain the Active Mode, Power Factor, and No-Load Mode values for all three units as well as the average values. To qualify as ENERGY STAR, all three units must meet the ENERGY STAR specification; only the average values will be displayed on ENERGY STAR's qualifying product list (see Section 4.E below).

C. Models Capable of Operating at Multiple Voltage/Frequency Combinations: For switchmode power supplies capable of operating at multiple voltages and frequencies, testing shall be conducted at both 115 volts @ 60 Hz and 230 volts @ 50 Hz, with the least efficient set of test values used to determine if products qualify for the Active Mode, Power Factor, and No-Load specifications.

Note: Some stakeholders indicated that qualification at 115 volts and 230 volts was too onerous and suggested alternative approaches, such as testing and qualification based on the region in which the EPS would be sold or separate energy-efficiency requirements at 115 volts and 230 volts. After careful consideration, EPA has retained the testing requirement at 115 volts and 230 volts for EPSs capable of operating at multiple voltages and frequencies. ENERGY STAR qualifying EPSs are sold into a global marketplace and are used in numerous countries by international travelers. By qualifying models under the least efficient set of test values, this approach ensures that models meet the ENERGY STAR performance levels in multiple markets and mitigates any potential variations in tested values across markets. Consistent with this approach, EPA analyzed its dataset such that qualification at 115 volts and 230 volts was required, where applicable. As noted earlier in this document, the compliance rate based on the proposed requirements in this Final Draft is in accordance with ENERGY STAR's desire to represent approximately the top 25% of models in terms of energy efficiency.

D. Multiple Tap or Switch Selectable Models: Manufacturers shall test a multiple tap or switch

selectable model at the highest and the lowest voltage outputs of the power supply. If the model meets or exceeds the ENERGY STAR requirements at both the highest and the lowest voltage outputs, then it qualifies as ENERGY STAR.

E. Submittal of Qualified Product Data to EPA: Partners are required to self-certify those product models that meet the ENERGY STAR guidelines and report information to EPA. ENERGY STAR qualifying product lists, including information about new models as well as notification of discontinued models, must be provided on a quarterly basis, or more frequently if desired by the manufacturer. If no new models are introduced during a particular quarter, manufacturer should notify EPA to ensure its partnership status is maintained.

All unique EPS models, as defined in Section 1.E, must be separately tested and reported for ENERGY STAR qualification. However, in some cases, a partner may have a base model number with several extensions to reflect various input pin and output connector configurations. If the only variation between the models is the physical connector configuration (provided that the nameplate information, circuit design, and output cord length and gauge are the same), partners may test one representative model and qualify it using a generic "XX" designation for the extension in the model number.

When qualifying EPSs as ENERGY STAR, partners also have the option of qualifying a family of EPSs that **all** meet the ENERGY STAR requirements, rather than individually submitting each model. For ENERGY STAR's purposes, an EPS model family is defined as **a group of switching-mode external power supplies that feature the same design (e.g., circuitry and components), transformer, and output wattage, but differ in rated output voltage.** To qualify a model family, partners must provide the efficiency data (average of three test units) for the highest and lowest output voltage members of the EPS model family that meet the ENERGY STAR specification. When submitting model families, manufacturers continue to be held accountable for any efficiency claims made about their external power supply products. In other words, even though data may not be submitted to ENERGY STAR on each model, manufacturers are still responsible for ensuring (and if challenged by another party, defending) each model's compliance with ENERGY STAR within the model family.

Note: EPA has added the above two paragraphs addressing model number extensions for physical connector configurations and EPS model family qualifications for ENERGY STAR. The requirements are consistent with past correspondence with partners on this topic, including the Guide to Using the Online Product Submittal System for External Power Supplies, which was prepared in November 2005.

5) **Effective Date for EPS Manufacturers**: The date that manufacturers may begin to promote products as ENERGY STAR under Version 2.0 will be defined as the *effective date* of the agreement. The ENERGY STAR single voltage external ac-ac and ac-dc power supplies (Version 2.0) effective date is November 1, 2008. Any previously executed agreement on the subject of ENERGY STAR qualified EPSs shall be terminated effective on October 31, 2008.

A. Product Qualification under Version 2.0: Prior to November 1, 2008, EPA will begin accepting product qualifications under Version 2.0 through the ENERGY STAR online product submittal system. All products, including models originally qualified under Version 1.1, with a date of manufacture on or after November 1, 2008 must meet the new Version 2.0 requirements in order to qualify as ENERGY STAR. The date of manufacture is specific to each unit and is the date (e.g., month and year) on which a unit is considered to be completely assembled.

Note: In this Final Draft, EPA has extended the Version 2.0 specification effective date to November 1, 2008. Given that EPA anticipates finalizing the specification in March, this November effective date allows industry approximately nine months transition time prior to the new specification taking effect. Further delays, as suggested by some stakeholders, are problematic given the new July 2008 US mandatory standards for EPSs, which render the current specification meaningless as a designator of top performing products. In addition, EPA conveyed in its original Version 1.0 specification its intent to implement a more stringent follow-on specification and in fact has already delayed the introduction of Version 2.0, which was originally slated for July 1, 2006.

EPA also has added new language in Section 5 above to clarify that the effective date is based on the EPS unit's date of manufacture.

6) **Effective Date for ENERGY STAR Product Specifications**

A. Computer and Imaging Equipment Specifications: To qualify as ENERGY STAR under the Computer Version 4.0 Tier 1 and Imaging Equipment Version 1.0 Tier 1 specifications, computers and imaging equipment with an EPS must meet the following requirements as provided in Tables 5 and 6. These requirements are identical to the EPS Version 1.1 specification, which was in effect upon completion and implementation of the Computer and Imaging Tier 1 specifications. **Computers qualified under the Version 4.0 Tier 2 specifications (effective July 2009) and Imaging Equipment qualified under the Version 1.0 Tier 2 specifications (effective April 2009) will need to meet the EPS Version 2.0 requirements. Refer to Section 3, Energy-Efficiency Specifications for Qualifying Products, of this document for the detailed Version 2.0 EPS requirements.**

- Computers and Imaging Equipment products that make use of an EPS must ensure that their EPS meets or exceeds a minimum average efficiency for Active Mode, which varies based on the model's nameplate output power. The following table outlines the equations for determining minimum average efficiency where P_{no} stands for nameplate output power and Ln refers to the natural logarithm. Efficiency shall be expressed in decimal form and rounded to the hundredths place.

Table 5: Version 1.1 Energy-Efficiency Criteria for Ac-Ac and Ac-Dc External Power Supplies in Active Mode

Nameplate Output Power (P_{no})	Minimum Average Efficiency in Active Mode (expressed as a decimal)
0 to ≤ 1 watt	≥ 0.49 * P_{no}
> 1 to ≤ 49 watts	≥ [0.09 * Ln (P_{no})] + 0.49
> 49 watts	≥ 0.84

- External Power Supplies must meet a No-Load power requirement, which specifies the maximum ac power that may be used by a qualifying external power supply in the No-Load condition. Maximum power consumption levels for No-Load Mode are provided in the table below.

Table 6: Version 1.1 Energy Consumption Criteria for No-Load

Nameplate Output Power (P_{no})	Maximum Power in No-Load
0 to < 10 watts	≤ 0.5 watts
≥ 10 to ≤ 250 watts	≤ 0.75 watts

B. Primarily Portable Products with Qualified EPSs: To qualify as ENERGY STAR, primarily portable products with EPSs that are not otherwise covered by the ENERGY STAR program (e.g., mobile phones, MP3 speaker systems, water filtration systems) must meet the EPS Version 2.0 specification as of July 1, 2008. Visit http://www.energystar.gov/index.cfm?c=ext_power_supplies_pd.CE_manufacturers for more information about this product category.

C. Other Electronic Product Specifications: EPA is committed to advancing power supply efficiency in all products as quickly as is reasonable. For Telephony, the EPSs are a central part of this specification and thus must meet Version 2.0 as of its effective date, as outlined in Section 5, above. For Monitors, Televisions, Set-top Boxes, and Audio/DVD, updated specifications will specifically require that any EPSs meet the Version 2.0 requirements. Manufacturers should refer to the latest electronic product category specification for relevant effective dates.

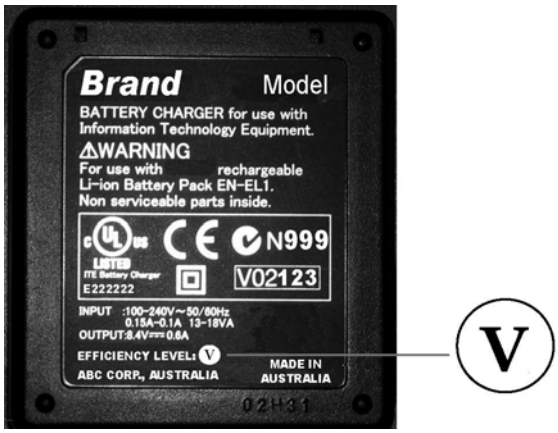
Note: As requested by stakeholders, EPA has added a new Section 6: Effective Date for ENERGY STAR Product Specifications to this Final Draft EPS specification. This additional language is provided to clearly and formally outline EPA's intentions with regards to EPS requirements to both EPS manufacturers and their end-use product customers.

7) **Future Specification Revisions**: EPA reserves the right to change the specification should technological and/or market changes affect its usefulness to consumers, industry, or the environment. In keeping with current policy, revisions to the specification are arrived at through stakeholder discussions. In the event of a specification revision, please note that ENERGY STAR qualification is not automatically granted for the life of a product model. To qualify as ENERGY STAR, a product model must meet the ENERGY STAR specification in effect on the model's date of manufacture. The date of manufacture is specific to each unit and is the date on which a unit is considered to be completely assembled.

8) **International Efficiency Marking Protocol**: ENERGY STAR partners shall follow the international efficiency marking protocol to indicate the energy performance of their ENERGY STAR qualified power supplies. (See Figure 1 for an illustration of the international efficiency mark.) In addition, the efficiency level, as denoted by a Roman numeral under the protocol, shall be reported to EPA as part of the qualified product data submission process. Further information about the endorsers of the marking protocol and its intent is available at www.energystar.gov/powersupplies.

ENERGY STAR partners shall clearly and permanently mark (e.g., imprint, label, etc.) the nameplate of their qualifying external power supplies with the appropriate Roman numeral (I – VI) that corresponds to specific minimum Active and No-Load efficiency levels. (See www.energystar.gov/powersupplies and click on "International Efficiency Marking Protocol" for energy performance requirements at each Roman numeral.) Partners shall determine the appropriate Roman numeral by: 1) comparing the unit's Active and No-Load test data (when tested in accordance with the ENERGY STAR Test Method and at each relevant test voltage and frequency value) with the performance requirements at each level of the Roman numeral scale; and 2) choosing the highest Roman numeral where the power supply meets the Active and No-Load requirements.

Figure 1: Illustration of International Efficiency Mark



When applied by a manufacturer, the mark shall conform to the following characteristics:

Format: Roman numeral: I, II, III, IV, V, or VI.

Font: Times Roman preferred (or other plain serif fonts).

Size: Legible and indelible.

Color: Text to contrast with the nameplate background.

Placement: On the power supply nameplate; however, the exact location is at the discretion of the manufacturer. The text “Efficiency Level” shown above is optional.

Example: Any external power supply meeting the performance requirements for level V and above would qualify as ENERGY STAR (Version 2.0). Power supplies with performance levels of I - IV would not qualify under the Version 2.0 Specification.

Note: The international community has reserved level V of the international efficiency marking protocol for ENERGY STAR’s Version 2.0 specification. Once the Version 2.0 specification is finalized, the protocol will be amended with the new requirements for level V and only EPSs with level V efficiency levels will qualify as ENERGY STAR. In addition, EPA plans to include updated information about the marking protocol on its ENERGY STAR Web site, once the Version 2.0 specification is finalized.