

ENERGY STAR Final Draft Specification for UPSs Comment Summary

Topic	Comment	EPA Response
Loading Profiles	One stakeholder indicated support for the more heavily loaded profile for UPSs intended for commercial use (VI and VFI) with output power less than or equal to 1.5 kW. Another stakeholder disagreed with the loading profile emphasizing that UPSs of this output power typically support a single important server and are therefore only loaded at less than <25%. Thus, the stakeholder suggested that EPA adopt the following weightings for VFI and VI UPSs with output power less than 1.5 kW: 25%(0.2) 50% (0.3) 75% (0.3) 100% (0.2).	EPA proposed the Final Draft loading profile for VI and VFI UPSs with output power less than or equal to 1.5 kW in the stakeholder memo released on February 3, 2012, and received a positive response at that time. Based on the absence of additional data on typical usage and general consensus around the previously-proposed usage profile, EPA has retained it in the Final Specification. Nevertheless, EPA continues to welcome feedback and usage data to help improve loading profiles in a future Version 2.0 of the specification.
Efficiency Requirements	A manufacturer and an industry group expressed support for the Final Draft efficiency requirements.	EPA appreciates stakeholders' input and has maintained the efficiency requirements in the Final specification.
Multi-mode UPS	A manufacturer and an industry group agreed with the Final Draft revision that only those Multiple-normal-mode models that require the benefit of their highest input dependency mode to qualify be required to ship with that mode enabled by default. However, one stakeholder noted that the language does not appropriately account for tri-mode (VFD, VI, VFI) UPSs. To address this issue, and avoid conflict with language elsewhere in the specification and test method, the stakeholder suggested changing the word "default" on line 228 of the specification to "lowest."	EPA has maintained the multiple-normal-mode requirements in the Final specification. Per stakeholder comment, EPA modified the language so that the efficiency requirement applies at "lowest input dependency mode provided by the UPS". This change will ensure that unless Multiple-normal-mode UPSs are shipped with their highest input dependency mode enabled by default (e.g., VFD), they will still need to qualify in their lowest input dependency mode (e.g., VFI), even if they have more than two normal modes.
Modular UPS	A manufacturer and industry group are in strong agreement with EPA's Final Draft proposal to allow manufacturers to specify the minimum and maximum configurations for testing Modular UPS Product Families since it will eliminate the impact of extreme configurations and encourage greater participation in the program.	EPA appreciates the input and has maintained the Modular UPS Product Family approach in the Final specification.
Metering	Two stakeholders expressed support for the Final Draft requirement that integral meters shall complete measurement system accuracy level of 5%. Another stakeholder noted that a 1% efficiency requirement allowance for UPSs meeting the metering and communications requirements may be acceptable provided that there are cost effective and defensible savings for purchasers. The stakeholder asked that EPA provide an updated savings analysis which includes the basis for the 1% efficiency incentive.	EPA has maintained the metering and communications requirements in the final specification. The intent of the metering incentive is to promote the measurement of PUE in data centers that currently do not possess such abilities and which lack sufficient resources to measure energy consumption closer to the IT load. The meters provide important information for the operators of these data centers, though EPA acknowledges that it is up to them to act on the provided information and save energy. Data center operators that can measure their PUE using these meters are eligible to apply to the ENERGY STAR Buildings program for possible recognition.
PPDS	Two stakeholders recommended that EPA pilot the PPDS comparison tool with certification bodies and manufacturers.	EPA will continue to work with stakeholders in the development of the PPDS and thanks stakeholders who have provided comments on the PPDS thus far. EPA plans to release and test the final PPDS and prototype of the comparison tool in the coming months.
Power Factor	One stakeholder agreed with the requirement proposed in the Draft Final specification that measured input power factor at 100 percent of the reference test load shall be at least 0.90 for all VFI and VI normal modes required for qualification.	EPA appreciates the feedback and has maintained the power factor requirement in the final specification, further clarifying that it applies only to Ac-output UPSs.

Summary and Response to Stakeholder Comments

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#Key	Comment Summary	Response
1	Line 89 should be reworded "... at both their the vendor specified maximum and minimum ..." to avoid conflict with the specification	DOE agrees with this clarification and has made the recommended modification in the Final Test Method.
2	Section 4.2.C should be reworded "Modular UPSs tested at their minimum and maximum non-redundant configurations shall be tested with redundant components (e.g., fans, controllers, etc.) of for the vacant module slots functioning according to the unit's as-shipped default behavior."	DOE agrees the original wording is redundant and has made the recommended modification in the Final Test Method.
3	Section 4.2.D should be reworded "Back-feeding the UPS source may be used in place of a test load during testing of UPS systems larger than 100 kW output, provided that an output power factor ≥ 0.99 is maintained at all times. " to be consistent with Section J.2.2.d of IEC 62040-3 Ed. 2.	DOE believes the suggested language is a clarification, as all loading for UPS testing is required to be resistive, and Section J.2.2.d of IEC 62040-3, Ed. 2.0 requires the power factor of the load to be 0.99 or greater. However, to ensure clarity and consistency, DOE has made the recommended modification in the Final Test Method.
4	Sections 4.2.E and 4.2.G.2 are potentially in conflict. To rectify this, we suggest that section 4.2.E be reworded "The UPS's firmware shall not be modified or adjusted to disable energy storage charging features such as energy storage self test and trickle charging . Note that some UPSs require that automatic battery tests be disabled to ensure that the UPS stays in normal mode during testing.	DOE agrees that this change will help prevent misunderstandings during testing and has made the recommended modification in the Final Test Method.
5	Section 4.2.G.1 should allow other documents besides the user manual to give guidance on battery disconnection during testing. We suggest the following changes to line 111 "... the user manual or other public documents does do not advise ..."	DOE agrees with the intent of this recommendation, and has modified Section 4.2.G.1 of the Final Test Method to read, "...the user manual or other public documents referenced in the PPDS do not advise..."
6	Line 128 should be clarified "... after the charge indicator fully charged indication is present."	DOE agrees with this clarification and has made the recommended modification in the Final Test Method.
7	Line 129 should be clarified "If there is no state of charge indicator ..."	DOE agrees with this clarification and has made the recommended modification in the Final Test Method.

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8	<p>Section 4.2.G.3.b should be reworded “For battery operated UPSs, if the UPS is shipped with a battery, that battery shall be used for testing. Otherwise, the manufacturer may select which battery is used for the test a battery for testing. , which Details regarding the selected battery shall be referenced included in the PPDS and documented in the test reporting template. These units will batteries are not be required to ship with the battery chosen for testing UPS.”</p>	<p>DOE agrees that this recommendation simplifies the language for selecting a battery and has made the recommended modification in the Final Test Method.</p>
9	<p>Section 5.B.1 strike “using a power meter” as it is incorrect and redundant.</p>	<p>DOE agrees this is redundant and has made the recommended modification in the Final Test Method.</p>
10	<p>Section 5.B.2 reword as follows for clarity and accuracy “Calculate the unit’s average input and output power in watts (W) over the 5 minute period using Equation 1.”</p>	<p>DOE agrees with this clarification and has made the recommended modification in the Final Test Method.</p>
11	<p>Section 5.B.3 reword as follows for clarity and accuracy “Calculate the unit’s efficiency over the 5 minute period using Equation 2.”</p>	<p>DOE agrees that “over the 5 minute period” is inaccurate because the test method states the measurement period must be “at least 5 minutes.” We have made the recommended modification in the Final Test Method.</p>
12	<p>Section 5.B.3 reword as follows for clarity and accuracy “Repeat steps 1 to 3 for another 5 minute measurement to get another efficiency calculation.”</p>	<p>DOE has removed “for another 5 minute measurement,” as recommended, and modified Section 5.B.5 of the Final Test Method to read, “Repeat steps 1 to 3 to calculate another efficiency value, Eff₂.”</p>
13	<p>Section 5.B.7 should have formulas and possibly an example.</p>	<p>DOE has added a formula to the Final Test Method to clarify the method for checking steady-state. DOE also notes this calculation is provided in the Ac-output UPS Measurements and Dc-output UPS Measurements worksheets of the Test Reporting Template, and recommends using these sheets to ensure values are calculated and recorded correctly.</p>
14	<p>Section 5.B.8 reword as follows for clarity and accuracy “If the absolute value of the difference between the efficiency calculations is greater than or equal to one percent of their average unit is not at steady-state, repeat steps 4 to 6 until the unit is considered to be at steady-state. Record the appropriate values in the test reporting template.</p>	<p>DOE agrees with this simplification and has made the recommended modification in the Final Test Method. DOE has also added a definition of steady-state to Section 5.B, which reads, “The UPS and load shall have been operated for a sufficient length of time to reach thermal stability...perform the following steady-state check, in which the difference between the two efficiency calculations shall be less than one percent .”</p>

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15	Section 5.C.1 reword as follows: “Test the UUT at the following reference test load conditions in the specified order: ”	DOE agrees with this clarification and has made the recommended modification in the Final Test Method.
16	Section 5.C.2 reword as follows: “The test shall be performed at each of the reference test loads by simultaneously accumulating measuring the unit’s total input and output energy in Wh over a 15 minute test period, then determining the unit’s average input and output powers for the period shall be calculated using Equation 1 and the unit’s efficiency shall be calculated using Equation 2. ”	DOE has modified Section 5.C.2 of the Final Test Method to read, “The test shall be performed at each of the reference test loads by simultaneously measuring the unit’s total input and output energy in Wh over a 15 minute test period. Calculate the unit’s average input power and output power for the period using Equation 1, and the unit’s efficiency using Equation 2.”
17	Section 5.C.3 reword as follows for clarity and accuracy “Measure and record all the applicable parameters listed in the test reporting template for each Ac-output/Dc-output UPS test performed, including the For Ac-output UPSs, also record the declared input dependency characteristic (AAA) in the tested modes, as specified in Section 5.3.4 of IEC standard 62040-3, Ed. 2.0.”	DOE has modified Section 5.C.3 of the Final Test Method to read, “For Ac-output UPSs, also record the input dependency characteristic (AAA, as declared in the PPDS) in the tested modes, as specified in Section 5.3.4 of IEC standard 62040-3, Ed. 2.0.”

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	<p>We don't support the inclusion of 415Y/240 V ac at 50 Hz in the test method</p> <p>Table 1 has multiple purposes: (1) to ensure that products only have to be tested at one voltage and frequency combination, (2) to ensure that all manufacturers test similar products at the same voltage and frequency combination and (3) to ensure that the voltage and frequency combination used for testing is the most relevant choice for the market in which the product is sold. Because most UPSs intended for sale in Europe can operate at 415Y/240 V ac and 50 Hz, but will most likely be used at 400Y/230V ac and 50 Hz, the inclusion of 415Y/240 V ac 50 Hz in Table 1 violates purpose (3) above. Additionally, it is likely that the European Union will require UPSs to be tested at 400Y/230V ac and 50 Hz, so the retention of 415Y/240 V ac 50 Hz in Table 1 could require separate and redundant testing for European ENERGY STAR. Note that if a UPS were capable only of operating at 415Y/240 V ac and 50 Hz, section 3.B.1 would still allow it to be qualified, even if this combination is not included in Table 1.</p>	<p>DOE originally added this value to account for the Australian markets. However, to ensure consistency with the European Union requirements, DOE has removed the 415Y/240 V ac at 50 Hz supply from Table 1 of the Final Test Method. DOE notes that UPSs in the Australian market can be tested using the 400Y/240 V ac at 50 Hz, or if the UPS supports only 415Y/240 V ac at 50 Hz, then Section 3.B.1 would allow the unit to be tested with this combination.</p>
18	<p>To be consistent with IEC 62040-3, the term "stabilization time" should be used in place of "rise time" and the value documented on the PPDS and the Test Reporting Template. <u>It should also be used in the Test Procedure.</u></p>	<p>DOE agrees with this clarification and has made the recommended modification in the Final Test Method and Test Reporting Template.</p>
19	<p>The manufacturer, model number, serial number and calibration due date for each piece of test equipment should be recorded on the Test Reporting Template (e.g. AC source, energy meter, load, current transducers, etc.).</p>	<p>DOE agrees with this recommendation and has added a Test Equipment Information tab to the Test Reporting Template, where manufacturer, model number, serial number, and calibration due date can be recorded for each piece of equipment.</p>

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20	As all UPSs must be tested in their lowest input dependency mode, this section should come first on the Test Reporting Template and performance values in this mode should appear first on the PPDS.”	DOE agrees with this recommendation and has placed the lowest input dependency section first in the Test Reporting Template.
21	ATIS-0600015.2009 CL. 5.4 says that if a dc power source is needed, the dc power source providing power to the equipment under test shall be capable of providing a minimum of 1.5 times the power rating of the equipment under test. Will this be required for ENERGY STAR testing or considered optional? The requirement in ATIS-0600015.04.2010 for power source of at least 2X the maximum input power rating of the rectifier has already been considered optional as per the note above.	DOE has modified Section 3.A.2 of the Final Test Method to note that Section 5.4 of ATIS-0600015.2009 which states, "DC power sources used to provide power to the equipment under test shall be capable of providing a minimum of 1.5 times the power rating of the equipment under test", is optional for ENERGY STAR testing.
22	<p>Recommend requiring a 2% max THD for ac-output UPSs. High-power sources may not be able to comply with this, but if no straightforward max value for THD is stated, testing may not be repeatable from one lab to the next.</p> <p>If a max THD requirement is implemented, recommend that for Ac-output UPSs, the THD should be measured with the UUT connected to the power source per the test methods for External Power Supplies. Otherwise, state clearly in the UPS specs that mains voltage THD measurements are not required for Ac-output UPSs.</p> <p>For Dc-output UPSs, DOE should specify whether the UUT should be connected to the power source for measurement of THD.</p>	DOE does not have data or information at this time on whether it is necessary to modify the THD requirements provided in Section 5.2.1 of IEC 62040-3, Ed. 2.0 and ATIS-0600015.04.2010. If the referenced standards do provide maximum THD requirements, they should be adhered to; however, DOE does not intend to add additional THD requirements or measurements beyond what is outlined in those standards.