

**Summary and Response to Draft 3 & Updated Final Draft Test Method Stakeholder Comments
Version 1.0 Final Draft ENERGY STAR Uninterruptible Power Supplies (UPS) Test Method**

#Key	Comment Summary	Response
1	Table 1 should allow 415Y/240 V Ac testing only at 60 Hz to cover the nascent application of 415Y/240 V Ac in North America. Outside of North America, these products should be tested at 400Y/230 V Ac at 50Hz, as this voltage and frequency combination is far more prevalent.	<p>After reviewing stakeholder comments 1 through 5 and the nominal voltages in question, DOE has made the following modifications to Table 1 in the Final Draft Test Method:</p> <ul style="list-style-type: none"> • Kept 415Y/240 V ac as proposed in the Updated Draft, at both 50 and 60 Hz; • Added 380Y/220 V ac 50 Hz as it is prevalent in many countries; • Added 200 V ac 60 Hz to accommodate the nominal voltage of Japan; • Added 120 V ac 60 Hz to accommodate the nominal voltage of North America. <p>To avoid issues that may result from the inclusion of both frequencies, language has been added to Section 3.B of the Final Draft Test Method, which allows the manufacturer to specify the frequency used for testing if two frequencies are allowed.</p>
2	The newly introduced 380Y/220 V Ac should be removed from Table 1 as nearly all products capable of running at this voltage will also be capable of running at 400Y/230 V Ac, and when this is the case they should be tested at that voltage due to its prevalence. If 380Y/220 V Ac is retained, it should be at only 50 Hz, as this is by far the most common frequency for this voltage.	<p>DOE has addressed this issue in the response to Comment #1.</p> <p>Furthermore, the highest compatible voltage precedence of Table 1 allows products capable of being used at both proposed voltages to test at 400Y/230 V ac. In addition, DOE believes that the language added to Section 3.B, as described in the response to Comment #1, will allow manufacturers to choose the frequency for 380Y/220 V ac given the differences among various countries.</p>
3	Table 1 should limit 230 V Ac to 50 Hz as it is very uncommon at 60 Hz.	DOE has addressed this comment in the response to Comment #1.
4	Table 1 should permit 200 V Ac 60 Hz for Japan.	DOE has addressed this comment in the response to Comment #1.

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5	Table 1 should permit 120 V Ac 60 Hz because it is the nominal voltage for USA and to avoid possible issues with the requirements of Section 3.C (small North American UPSs output 120 V Ac so supplying 115 V Ac could cause some products to correct the voltage, thereby lowering their efficiency).	DOE has addressed this comment in the response to Comment #1.
6	Section 4.2.F.2 should allow the use of vendor supplied end user software to disable alarms in addition to physical controls on the UPS.	DOE has modified Section 4.2.G.2 of the Final Draft Test Method to allow vendor-supplied end user software to disable alarms, which may result from disconnecting the energy storage system.
7	Please consider removing all references to Average Power in Section 5 and just calculate Average Efficiency as Output Energy divided by Input Energy over the same 5 or 15 minute period. Defining Average Efficiency should avoid conflict with other standard definitions of Efficiency based on instantaneous power ratios. If this change is not accepted, 5.B.2 needs to be expanded (or repeated) to measure both input power and output power.	Power is typically used to describe efficiency in the ENERGY STAR program. To ensure consistency with other ENERGY STAR programs, DOE has kept Equation 1 and Equation 2 as proposed in the Updated Draft. However, DOE has clarified in Section 5.B of the Final Draft Test Method that the input and output energy shall be measured simultaneously.
8	Section 3.C should only require that the output have the same nominal voltage and frequency as the input (i.e., it shouldn't mention waveform so as not to exclude non-sinusoidal output UPSs).	The reference to "voltage waveform" has been replaced with "voltage and frequency" in Section 3.C of the Final Draft Test Method.
9	Section 3.D should only mention output voltage (direct current doesn't have a waveform).	DOE has removed "waveform" from Section 3.D of the Final Draft Test Method.
10	Section 4.2.F.3 should more accurately match IEC 62040-3 Ed. 2 Annex J.2.2.b "transfer of energy to and from the energy storage system shall be prevented during the test."	If a unit is required to test with the energy storage system connected and operational, it may not be possible to completely prevent transfer of energy to and from the energy storage system, as specified in IEC 62040-3, Ed. 2.0. DOE has modified Section 4.2.G.3 of the Final Draft Test Method to read, "transfer of energy to and from the energy storage system shall be minimized during the test."
11	Section 5.D and foot note 5 should both explicitly mention input power factor as the criterion of interest.	DOE has modified Section 5.D to clarify that input power factor is the metric to be reported and measured.

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12	Add environmental conditions, operational/electrical conditions, and instrumentation requirements from Section J.2 of IEC 62040-3, Ed. 2.0 into the Final Draft Test Method, rather than referencing an external standard.	DOE understands that it is preferable to reference a single document during testing; however, because of the number of requirements, test conditions, and measurement procedures provided in IEC 62040-3, Ed. 2.0 and ATIS 0600015.2009, the Final Draft Method will continue to refer to these standards for test setup and instrumentation requirements.
13	Add environmental conditions, operational/electrical conditions, and instrumentation requirements from ATIS 0600015.2009 into Final Draft Test Method, rather than referencing an external standard.	DOE has addressed this comment in the response to Comment #12.
14	ATIS-0600015.04.2010 states that the power source used for testing must have a power rating of at least 2 times the input power rating of the rectifier. This will be difficult to meet for high power UPS. Will this be a requirement for ENERGY STAR UPS testing?	DOE has modified Section 3.2 of the Final Draft Test Method to clarify that the requirement which states the Unit Under Test (UUT) shall be evaluated with “a power source with a rating of at least 2X the maximum input power rating of the rectifier” is optional for ENERGY STAR testing.
15	Add requirement that Total Harmonic Distortion (THD) of Ac-output UPSs shall be less than or equal to two percent.	DOE does not have information at this time on whether a THD requirement is necessary. DOE may investigate including THD in the next test method revision.
16	State that THD is measured with UUT plugged into the power source during measurement, as opposed to the power source with no load.	DOE has addressed this comment in the response to Comment #15.
17	In Section 3.B, recommend modifying the language to state that the UUT shall be connected to the highest <u>rated</u> nominal voltage and <u>rated</u> frequency combination.	DOE has modified Section 3.B of the Final Draft Test Method to state that the UUT shall be connected to the first (highest) rated voltage and rated frequency combination.
18	In Section 5.C.1, specify that the loading levels are based on the percentage of <u>rated output power</u> .	DOE has modified Section 5.C.1 of the Final Draft Test Method to state that the loading levels are based on the percentage of rated output power.
19	In Section 5.C.2, make clear that 15 minute accumulated energy measurement is done at each reference test load.	DOE has modified Section 5.C.2 of the Final Draft Test Method to clarify that the 15 minute accumulated energy measurement is to be performed at each reference test load.