Stakeholder Comment Response Summary

Version 1.0 ENERGY STAR Uninterruptible Power Supply (UPS) Specification
Specification Framework

Num.	Topic	Subtopic	Comment Summary	EPA Response
1	Definitions	Battery	Replace all references to “battery” with “energy storage mechanism” to make definitions more widely applicable.	EPA intends to remove references to batteries or any other particular technology.
2	Definitions	Bypass Mode	Include Maintenance Bypass Mode in the list of operational states.	EPA intends to include bypass mode in the list of defined modes, as proposed in the framework document.
3	Definitions	Charging Mode	Include Charging Mode in the list of operational states. This mode occurs when the input power is connected, the load is or is not connected, and the energy storage mechanism has been depleted, requiring recharge. Although this is a real state, it is infrequent, and likely does not contribute significantly to the total energy consumption of the UPS.	EPA will consider including this mode in the list of definitions; however, due to its infrequency, EPA may not address it with proposed requirements.
4	Definitions	DC UPS	Modify the definitions of Normal and Stored-energy states to accommodate DC-output UPSs, as follows: "In normal mode, the load is supplied by the converter in a single AC-DC conversion" and "when there is a disruption in the utility power supply, the UPS enters stored energy mode of operation where the battery supports the load."	EPA intends to generalize the definitions to apply to DC-output UPSs, to allow their possible inclusion in the specification.
5	Definitions	Delta Conversion	Add to the double conversion definition: "Delta conversion is considered a form of double conversion with regard to this specification."	EPA intends to use definitions from the IEC 62040-3 standard, which does not define, "Delta Conversion." EPA is open to further comments on whether clarification to the definition is needed.
6	Definitions	Double Conversion	Change the first part of the definition to “A double conversion UPS device routes input power through a rectifier, then separately derives output power through an inverter. The DC link between the rectifier and inverter also supplies float current for the UPS batteries or flywheel.” The statement "Double Conversion UPSs are common in high-reliability applications" is subjective and should be removed.	EPA intends to use the definition provided by Test Method 62040-3 for consistency. Upon development of requirements, it is EPA's preference to consider a structure that promotes energy efficiency benefits independent of topology. This is in keeping with the ENERGY STAR program's technology-agnostic approach.

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7	Definitions	Eco Mode	Double Conversion in Eco mode should be defined and added as a Normal Operating State to accelerate market adoption of this high efficiency operating state. Alternatively, typical eco-modes are usually the equivalent of running the UPS in bypass. If the eco-mode can be shown to provide the same performance characteristics as full blown UPS operation, it can be considered to be a normal mode.	EPA is reviewing the inclusion of Eco-mode in the definitions. (For additional analysis, see further discussion of operational states.)
8	Definitions	Electrical Loads	Define “electrical loads” (the typical load for most UPS systems), this will allow adoption of tolerance standards like ITI (CBEMA) curve, creating a significant opportunity to optimize UPS energy efficiency.	EPA continues to investigate the use of the ITI (CBEMA) curve, but anticipates promoting consistent input and output characteristics for UPSs.
9	Definitions	Input Power	Mention that site generated power can be used interchangeably with utility power.	EPA will clarify that site-generated power can be used interchangeably with utility power.
10	Definitions	Line Interactive	Change "trickle current" to "float current" and remove reference to battery.	EPA is currently not using trickle current to define 'Line Interactive'. In general, however, EPA intends to remove topology definitions to maintain a technology-agnostic approach.
11	Definitions	Multiple Module	Define "Multiple Module UPS" for very large systems as the situation where the static or rotary components are separate assemblies paralleled through one system control, usually with separate switchgear.	EPA intends to cover a wide range of UPSs in its specifications and will construct its definitions sufficiently broadly to allow multiple-module UPSs to qualify.
12	Definitions	Normal State	Definition does not adequately capture the crucial power conditioning (as opposed to backup) function of three-phase UPS devices serving the larger (100 kW and above) end of the market.	The definition for normal state is derived from that in IEC standard 62040-3. EPA welcomes feedback on needed clarifications or augmentations to this definition for use in the ENERGY STAR program.
13	Definitions	Operational States	Recommend adding in DC output UPS conditions to the Normal and Stored state: * A. Normal: 4. DC Output UPS: In normal mode, the load is supplied by the converter in a single AC-DC conversion * B. Stored: 4. DC Output UPS: when there is a disruption in the utility power supply, the UPS enters stored energy mode of operation where the battery supports then load.	EPA intends to generalize the definitions to apply to DC-output UPSs, to allow their inclusion in the specification.
14	Definitions	Parallel Operation	Include parallel operation of UPS in system topology definitions, as many data centers will deploy multiple UPS modules operating in parallel configurations for reliability (N+1, N+N, etc.).	EPA will include and define parallel operation using the established definition stated in Section 3.1.30 of IEC 62040-3, Ed.2.0

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15	Definitions	Passive Standby	“Passive standby” can also be used as the name of an operational state. Always make it clear when using the term “passive standby” whether it concerns the UPS system topology or the operational state.	EPA will clarify whether it is referring to system topology or operational state when using the term 'passive standby.'
16	Definitions	Rotary (Flywheel)	Change the title of this definition solely to “Flywheel” or "Kinetic energy" and delete the word “massive” from the first sentence due to negative connotations. Finally, note that energy from the flywheel can be transferred to the load either through an inverter (static UPS) or a generator (rotary UPS).	EPA will consider changing the definition of Flywheel to align with the definition in Section 3.1.10 of IEC 62040-3 Ed.2.0. In general, EPA intends to rely on technology-agnostic definitions.
17	Definitions	Static	Define "Static UPS" as using power electronics to convert between AC and DC for interacting with chemical batteries or flywheels.	EPA will consider addressing this comment through the definitions. In general, EPA intends to rely on technology-agnostic definitions.
18	Definitions	Stored Energy State	Change to: "The operating state in which the electric load is actively being supplied by the UPS due to a utility power disruption." Remove references to batteries as the energy source.	EPA will remove references to battery or other specific technology choices as possible.
19	Definitions	System Topology	Technology agnostic classifications allow specifications to stay current in the face of innovative techniques that raise the bar for efficiency. Remove topology-specific definitions and consider the performance classifications outlined in the CDV for IEC 62040-3.	EPA agrees with the comments and intends to rely on performance classifications rather than topology or technology definitions.
20	Definitions	UPS	Define “conditioning the power” and “maintain continuity of power” in UPS definition—these are the primary missions of the UPS.	The definition of "UPS" proposed in the specification framework already addresses both conditioning and maintaining the continuity of power.
21	Definitions	Utilization	"Utilization" is an open term, but could be defined as the higher of percentage output real power (W) or percentage output apparent power (VA) as a whole on a per-phase basis.	EPA requests clarification on the need to define utilization in the ENERGY STAR specification, for it is not defined in IEC standard 62040.

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22	Definitions		Rely solely on the established definitions of relevant terms contained in the Committee Draft for Vote (CDV) of IEC 62040-3, Ed.2.0: Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements, dated January 15, 2010. Alternatively, use Army Technical Manual 5-693 "Uninterruptible Power Supply System Selection, Installation, and Maintenance for Command, Control, Communications, Computer, Intelligence, Surveillance, and Reconnaissance (C4ISR) Facilities."	In general, EPA intends to rely on established definitions from IEC 62040-3, Ed.2.0
23	Efficiency Considerations	Air Conditioning Burden	Require separability of batteries, permitting placement of battery in the cooled data center and the power consuming electronics (more tolerant to temperature) outside in a utility room with free air cooling. One end-user expressed a desire not to air-condition the UPS at all, if possible.	EPA will take this and other best-practices suggestions into consideration and intends to incentivize methods of further improving the sustainability of UPSs.
24	Efficiency Considerations	Battery Environmental Impact	Version 1 of the specification should not take into account battery environmental impacts as they do not relate to energy efficiency. This issue is under consideration by other international organizations, and EPA should align with these efforts in due course (e.g., upon publication of IEC 62040-4). Alternatively, battery vendors should have established and validated processes for the manufacture of batteries. Batteries should be labeled with information on recycling programs. And/or technology that does not employ batteries should receive preferential treatment.	Although EPA understands that in many cases there exist frameworks for managing the impacts of the manufacture and use of lead-acid batteries, it will take this and other best-practices suggestions into consideration and is considering approaches to incentivize methods of further improving the sustainability of UPSs.
25	Efficiency Considerations	Clarity	Be clear about the process steps used to determine the performance cutoff levels intended to cover 25% of the UPS market.	The EPA will clarify how it determines the specification level during the specification development process and will welcome stakeholder input.
26	Efficiency Considerations	Datacenter Performance	An efficient UPS device does not necessarily yield an efficient distribution system, overall efficient data center and significant energy savings including: system over-sizing; building in excessive UPS or power distribution system redundancy; usage patterns; or other configuration strategies.	EPA intends to evaluate the role that ENERGY STAR UPS equipment specifications can play in the development of whole–datacenter efficiency metrics.

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27	Efficiency Considerations	Levels	Depends on kVA capacity and loading of the UPS. In normal mode: * Passive Standby: 95~97% * Line Interactive: 92~94% * Double-conversion: 90–94% or 86–96% average efficiency * Double-conversion in eco-mode (can be used approximately 95–99% of the time): 97-99% efficiency	EPA wishes to thank the commenters for their submissions; EPA will take these into consideration when collecting and analyzing test data upon which the efficiency levels will be set.
28	Efficiency Considerations	Modularity	Since most of the power train will be similar whether or not a unit is installed in parallel, focus on the efficiency of individual UPS units or modules and do not attempt to create efficiency metrics for engineered/integrated systems; this will be simpler and leaves users free to select a configuration that is responsive to their requirements but built from more efficient components. Alternatively, since multi-module UPSs may have additional circuitry for control or filtering, and the system design has a large impact on efficiency, require manufacturers to qualify all configurations offered, or only the minimum and maximum configurations (product family approach). Finally, since modular UPSs depend on proprietary software to control the individual modules, eliminating proprietary software could improve their efficiency.	EPA intends to test modular units at their min and max configurations and compare those to a specification level expressed in terms of capacity. E.g. 1 MW modular unit would be tested at min (e.g., 200kW) and max and compared with non-modular units at 200kW and 1MW.
29	Efficiency Considerations	Overload	The ability to handle overload peaks should be expressed in some way in the overall review of an UPS. Overload handling allows a facility manager to use an EPS closer to 100% load where the efficiency is the best.	Manufacturers already typically specify overload operation on their datasheets (e.g., duration of time that a unit can operate at 150% of rated load) and overload capability testing is specified by IEC standard 62040-3. Because of the usefulness of this capability in increasing the utilization of the UPS, EPA intends to require overload reporting in the power and performance datasheet.

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30	Efficiency Considerations	Performance Degradation	The replacement cycles for UPS components such as capacitors and fans should be taken into consideration of the total cost of ownership and may further necessitate re-qualifications (approx. every 6 years) as operational efficiencies will be degraded over time if the UPS units are not properly maintained.	Although EPA expects that there are already service and warranty programs in place to address component degradation, it will nonetheless investigate ways to better educate end-users about the efficiency impacts of this degradation and promote the reliability of ENERGY STAR UPS products.
31	Efficiency Considerations	Physical Size	EPA should consider a UPS's Power-to-Weight ratio (kW output per kg of mass) and Power-to-Footprint ratio (kW output per sq meter of space used). Both of these will have an impact on the cost and efficiency of the resulting datacenter.	EPA does not intend to address physical size through an ENERGY STAR specification for UPSs. This could result in changing product functionality, which is inconsistent with program goals. Product size/functionality should be driven directly by customer demands, as customers will want smaller footprints. Also, EPA understands that size will tend to decrease with higher efficiency.
32	Efficiency Considerations	Reactive Loads	Reactive loads are not a well-understood factor in energy losses and should be noted in the UPS specification so that owners can understand how efficiencies are impacted.	EPA does not expect losses from non-linear loads to be significant due to the prevalence of power supplies with power factor correction (PFC). (This issue is also further discussed in the context of the test procedure).
33	Efficiency Considerations	Redundancy	Qualify UPS efficiency performance based on a built-to-rating system without redundancy (e.g., test a 500 kVA with 500 kVA worth of non-redundant modules). Trying to capture all the variations, will result in prohibitive testing, though the impact of redundancy would be valuable to know.	EPA continues to investigate the treatment of redundancy in UPSs.
34	Efficiency Considerations	Sizing	The need to respond to future needs and reliability through redundancy drives datacenters to have a 'shelf stock' of available capacity. This is fundamentally at tension with the concept of right-sizing; the best resolution is requiring high efficiency from 10% or 25% to 100% of load and letting the customer determine the size. Energy losses due to underutilized UPSs may be improved through enabling battery charging/maintenance with the output inverter turned off.	EPA agrees with promoting the ability of UPSs to charge batteries with output turned off. (This is addressed further in the discussion of standby/hibernate mode and the 0% loading condition.)

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35	Eligible Product Categories	DC UPS	Consider and discuss with the industry inclusion of DC output UPS and combined AC-DC output. These avoid losses in the UPS inverter and end-load rectifier, and can be used for servers, telecom, etc.	EPA expects to create a separate specification level for DC-output UPSs, as it would be beneficial for these products to be able to qualify for the ENERGY STAR to promote the system-wide savings enabled by this category.
36	Eligible Product Categories	Market Segment	Special categories, such as for medical or industrial, should not be considered for the Energy Star program at this time. These types are not relevant for data centers, small/home office and home entertainment, which are the current focus for the ENERGY STAR program.	EPA will be clear in specifying the power factor and voltage requirements for the UPS specification.
37	Eligible Product Categories	Output Power	Energy Star should include small UPS units (though there are greater opportunities for energy savings in the larger units).	EPA is planning on addressing small UPS units, including any that may fall under the scope of the U.S. Department of Energy battery charger rulemaking.
38	Eligible Product Categories	Output Voltage	ENERGY STAR program should include low-voltage AC output UPSs (i.e. 600 volts and below, static and rotary) only, provided that sufficient data is collected for each type.	EPA intends to limit its specifications to UPSs operating at typical voltages in use in a home office or data center, limited to 600 V.
39	Energy Savings Opportunities	Number of Phases	A majority of the Single-phase market is comprised of Passive Standby and Line Interactive topologies, which are fairly efficient, and the opportunity for significant improvement in Single-phase UPS energy efficiencies may be limited.	Despite the higher efficiency of passive standby and line-interactive topologies, which predominate the single-phase market, EPA nonetheless expects significant savings in this market segment and intends to include smaller consumer UPSs in the specification.
40	Energy Savings Opportunities	Output Power	Biggest opportunity for savings are above 100 kVA due to the vastly larger average size of those systems and rapid growth in market size. Also, customers in this space are interested in efficiency. Consumer products under 1.5 kVA may also provide opportunity for improvement due to customers' lack of familiarity with their standby losses, though there have been recent improvements in efficiency, so potential in this category would need to be reevaluated.	Despite the higher efficiency of passive standby and line-interactive topologies, which predominate at lower output powers, EPA nonetheless expects significant savings in this market segment and intends to include smaller consumer UPSs in the specification.

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41	Energy Savings Opportunities	Technologies	The variable losses will differ by UPS topology and include (though OEMS are moving away from input transformers): * filter, transformer, and interconnection losses for standby UPSs * filter, transformer, some inverter, and interconnection losses for line-interactive UPSs * rectifier, inverter, filter, and interconnection losses for double-conversion UPSs.	EPA thanks the commenters for identifying potential sources of loss in the UPS system.
42	Information Reporting	Power and Performance Datasheets	Power and performance datasheets should rely on data already collected per IEC 62040. Particular metrics to consider include: kVA, PF, kW, load flow, energy performance/efficiency, energy savings features, performance features active, thermal output, and life expectancy.	EPA intends to use the IEC 62040 datasheet as a template for ENERGY STAR power and performance datasheets, with any further relevant product characteristics or performance data added. EPA expects the performance datasheets to differ between consumer and datacenter products.
43	Information Reporting	Self-Certification	Do not permit self-certification. Use third-party testing agencies, especially when testing UPS protection performance.	EPA has adopted third-party certification requirements, effective January 1, 2011. This mechanism nonetheless allows for the use of a manufacturer's own laboratories enrolled in Certification Body supervised or witnessed manufacturer test lab programs. For more information, please see www.energystar.gov/testingandverification
44	Information Reporting	UPS Data Output Requirements	Measurement and communication capabilities vary based on UPS size and application, and there is no dominant protocol (typically customer-defined; this type of data is not necessary for UPS operation). For example, >100 kW UPSs, should be able to comply, but consumer and small business UPSs may not even collect such data. There are also possible issues with measurement accuracy, such that external instruments may be required. Because of these limitations, do not require such measurement and communication in version 1 of the specification. Possible data to report would include the operating state, and instantaneous and cumulative data on loading, efficiency, and output power tolerance.	EPA intends to require standardized monitoring and automated data reporting in in datacenter UPSs. Monitoring is already part of a growing trend of device monitoring and reporting. Many power distribution units (PDUs) and server power supplies already have this functionality so it is reasonable for EPA to require this best practice of ENERGY STAR UPSs.

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45	Operational States	Eco Mode	Although some commenters claim that Eco-modes tend to lower the performance characteristics of the UPS and increase risk to the load, others see benefit in this more energy-efficient mode. This may not be understood by some users, and not used by the majority. Therefore, commenters recommend either not permitting UPSs to qualify in Eco-mode (by requiring testing in the highest-performance mode) or ensuring that lower performance is taken into account and comparisons are made between similar modes of operation regardless what they are called.	EPA intends to classify products by output performance category and use separate requirements in each. This will allow customers to trade off efficiency against required performance.
46	Operational States	Hibernate/Off/ Standby State	Specify an Off/Hibernate/Standby Mode for larger UPS systems, intended to only maintain charge on the battery. The UPS is drawing power in this mode, but the inverter or other load-protection circuitry is not running. This mode could be engaged when the UPS is installed but not protecting any equipment. Promoting efficient operation in this mode would save energy over time. This mode already exists for many small UPSs (for home or small office use), but it may not be particularly efficient.	EPA intends to define a hibernate mode as recommended by commenters and require testing to evaluate the ability of UPSs to maintain the batteries (or other energy storage system as appropriate) without running the output circuitry.
47	Operational States	Normal State	It is estimated that UPSs spend 95%–99.9% of their time in Normal Mode; therefore, performance in this mode (either the highest-performance mode or all the relevant modes, if the UPS offers them) should be tested.	EPA intends to test UPSs primarily in Normal Mode.
48	Product Classification	Output Power	There need to be clear divisions between UPSs based on output rating (kVA or kW), especially between office and datacenter uses (~division at 10–20 kVA). A second major division may also occur at 100–200 kVA. Alternatively more detailed divisions include: <1.5 KVA, 1.5 to 5 kVA, 5 to 10 kVA, 10 to 20 kVA, 20 to 40 kVA, 40 to 100–200 kVA, 100–200 to 300 kVA, 300 to 1000 kVA, >1000 kVA. (IEC 62040-3 annex K has further divisions below 1.5 kVA)	EPA intends to use kVA capacity to classify UPSs, as proposed in the specification framework. Stakeholders have provided numerous points of division; however, EPA will further select categories based on the test data it receives.

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49	Product Classification	Performance	There exists no industry-accepted method to quantify power conditioning, but IEC 62040-3 classification is a good choice (draft standard update contains efficiency requirements based on input dependency and output voltage waveform; also used by EU Code of Conduct (2006)). Further consideration should be given to IEEE 519 (harmonic limits) and dynamic output performance relative to the ITI (CBEMA) voltage curve.	EPA agrees with using the output performance categories (VFD, VFI, VFI-S, etc.) specified in IEC 62040-3.
50	Product Classification		Product Classification Suggestions: * Engineered v. off-the-shelf * Cord-connected (pluggable) v. hardwired * Number of input and output phases (may result in complexity due to the number of combinations) * Form factor (rack v. tower) * Internal v. expandable battery * Performance (per IEC 62040-3 classification) * Output-power rating * Output voltage * Intended market segment (consumer, business, industrial, medical) Do not use topologies or technologies, which may evolve over time.	EPA will consider these suggestions in developing its set of categories for future data collection.
51	Test Procedure	Charging Mode	When testing the UPS in normal mode, either permit the disconnection of the battery charging system or ensure that the battery is fully charged.	EPA intends to allow the energy storage mechanism to be disconnected during test, to relieve the need to fully charge it, as specified in Annex J to version 2.0 of IEC 62040-3. This will permit the test to proceed without first waiting for the energy storage to charge. Nonetheless, EPA seeks further comment on typical maintenance loads, and their impact on overall UPS efficiency.

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52	Test Procedure	Input Voltage	Products that can operate at multiple voltages and frequencies should be tested at only the typical combinations (minimizing burden while still providing the necessary data). Alternatively, a more complete list would involve the following mid-range voltage and frequency combinations: 120V-60Hz, 208V-60Hz, 230V-50Hz, 208/120V-60Hz, 400/230V-50Hz, 415/240V-60Hz, 480/277V-60Hz, 600/346V-60Hz.	EPA intends to test datacenter UPSs at 480/277V-60Hz or 400/230 three-phase input voltage. Consumer UPSs will be tested at 115V-60 Hz or 240V-50Hz, consistent with other consumer electronic products. Nonetheless, EPA continues to seek comment on the best input voltages for testing.
53	Test Procedure	Loading Points	EPA should base loading points on usage data: designers expect facility managers to load UPSs to 75%-80% (35%-40% for 2N redundant configurations). Nonetheless, in practice, loading conditions vary widely (one survey of datacenters found loading between 9% to 100% of rated power capacity). Low loading conditions may be due to staged growth of the IT load. In addition, UPSs may spend significant time in an idle mode (whether a small UPS connected to a powered-down workstation or a large UPS prior to commissioning). Therefore, adopt a widely distributed set of loading points (such as the IEC 62040-3 points: 25%, 50%, 75%, 100% of rated output power in kW), and supplement with additional testing below between 0% and 40%, either points at 0% and 10% or at 5% or 10% increments. UPSs spend significant portions of time in this loading region, where the efficiency is most variable. Finally, do not require too many loading points as testing is burdensome: testing one unit may require 2 weeks (including assembly and disassembly), with 4 hours per loading point to achieve thermal stability.	EPA intends to measure efficiency at a distributed set of loading points based on IEC 62040 (25%, 50%, 75%, and 100% of full load), as well as additional stakeholder suggestions: 0% for hibernate/standby/battery maintenance only and 10% for low load/redundant configurations.

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54	Test Procedure	Output Voltage	Test procedure should apply to UPSs with output voltage higher than 1000 V. Also (from Input Voltage Comments): Products that can operate at multiple voltages and frequencies should be tested at only the typical combinations (minimizing burden while still providing the necessary data). Alternatively, a more complete list would involve the following mid-range voltage and frequency combinations: 120V-60Hz, 208V-60Hz, 230V-50Hz, 208/120V-60Hz, 400/230V-50Hz, 415/240V-60Hz, 480/277V-60Hz, 600/346V-60Hz.	For higher-capacity UPSs, EPA intends to exclude testing at output voltage above that typically used in datacenters. Instead, EPA will focus on testing at the following output voltages which permit higher-voltage operation downstream of the UPS: 480/277V-60Hz, 415/240V-60Hz, 40V/215V-50Hz For consumer UPSs, EPA intends to test at 115V-60Hz, 240V-50Hz, etc., as required for other consumer products. EPA continues to seek comment on the best input voltages for testing.
55	Test Procedure	Power Factor	Test procedure should measure input power factor.	EPA intends to require power factor testing at 100% of rated linear load—i.e., at the UPS's kW rating.
56	Test Procedure	Reactive Loads	Reactive, solid-state loads may cause power quality issues for utilities, and an ENERGY STAR test method should address this. However, complex loading conditions may be difficult to verify and obtain consistent results.	Due to the widespread popularity of power supplies with power factor correction (PFC), EPA intends to require the use of linear loads when testing UPS efficiency.
57	Test Procedure		Align ENERGY STAR test procedure with IEC standard 62040-3: Uninterruptible power systems (UPS) -- Part 3: Method of specifying the performance and test requirements. In addition, CENELEC is developing an annex (A11) to the IEC standard.	EPA intends to base its test procedure on the draft version 2.0 of IEC 62040-3, in particular the efficiency test procedure in Annex J.
58	Value Added Retailers (VARs)		Value Added Retailers (VARs) are an important part of the sales and distribution of UPSs, especially to small- and medium-sized customers in business and government. They may make system modifications (e.g., integration of UPS modules with a control system and switchgear), but do not modify the individual UPS modules. Therefore, while they may impact the system efficiency, they do not impact the efficiency of the UPS.	EPA intends to precisely specify the test conditions and then work with VARs to educate the end-user that modifying the configuration of a UPS during install may bring it out of compliance with the ENERGY STAR specification.