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Docket Number:	16-AAER-02
Project Title:	Appliance Efficiency Rulemaking for Computers, Computer Monitors, and Signage Displays
TN #:	213553
Document Title:	2016 Appliance Efficiency Rulemaking, Recommendation: ITI CEC Battery Charger Regulation
Description:	Recommendation: ITI CEC Battery Charger Regulation for Rechargeable Battery Subsystems
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Organization:	Information Technology Industry Council
Submitter Role:	Public
Submission Date:	9/9/2016 9:23:22 AM
Docketed Date:	9/9/2016



Information Technology Industry Council

April 7, 2015

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Re: ITI Recommendation CEC Battery Charger Regulation

Introduction

In preparation for the scheduled January 1, 2017 expansion of scope of the CEC battery charger regulation to include non-consumer small battery chargers, ITI member companies impacted by the regulation have identified substantive concerns requiring immediate action and clarification by the CEC. On January 1, 2017, many non-consumer products that would qualify as battery chargers and battery charger systems under the scope of the regulation, but for which there is no appropriate test procedure in place, would no longer be able to be sold in the State of California. The products of concern are non-consumer products with battery charger and battery charger systems that include rechargeable batteries as defined by the regulation but do not support primary function of the product when the AC power is not present. This is not a niche problem impacting only a few isolated products, but would in effect bring the majority of servers, storage controllers and other products under the scope of the definition of a battery charger under the regulation.

The battery charger and battery charger systems in these products cannot be effectively isolated for testing, and there is currently no appropriate test procedure in place to test these products under the regulation. If these products cannot be tested to verify compliance, they cannot be sold in the state of California, which would have a significant and negative impact in California and other jurisdictions adopting and considering adoption of the CEC battery charger regulations moving forward. Given the lack of an appropriate test procedure for many non-consumer products covered under the scope of the regulation, ITI recommends that the CEC explicitly remove from scope the products of concern, specifically **rechargeable batteries and battery charger systems contained completely within a larger product that are not capable of providing normal operation of the parent product when AC mains power is removed.**

ITI provides the following comments in support of this recommendation.

Discussion

1. The Products of Concern are Currently Defined As Battery Chargers Under the Definition and Scope of the CEC Regulation

The regulation defines small battery chargers as any device that includes small rechargeable batteries with certain specific exceptions. Section 1602 defines battery chargers and battery charger systems covered under the scope of the regulation as follows (emphasis added):

Section 1602 Definitions, (w) Battery Charger Systems.

“Battery” or “battery pack” means an assembly of one or more rechargeable cells intended to provide electrical energy to a product, and may be in one of the following forms: (a) detachable battery: a battery that is contained in a separate enclosure from the product and is intended to be removed or disconnected from the product for recharging; or (b) integral battery: a battery that is contained within the product and is not removed from the product for charging purposes.

“Battery charger system (BCS)” means a battery charger coupled with its batteries or battery chargers coupled with their batteries, which together are referred to as battery charger systems. This term covers all rechargeable batteries or devices incorporating a rechargeable battery and the chargers used with them. Battery charger systems **include, but are not limited to:**

- (1) electronic devices with a battery that are normally charged from AC line voltage or DC input voltage through an internal or external power supply and a dedicated battery charger;
- (2) the battery and battery charger components of devices that are designed to run on battery power during part or all of their operations;
- (3) dedicated battery systems primarily designed for electrical or emergency backup; and
- (4) devices whose primary function is to charge batteries, along with the batteries they are designed to charge. These units include chargers for power tool batteries and chargers for automotive, AA, AAA, C, D, or 9 V rechargeable batteries, as well as chargers for batteries used in larger industrial motive equipment and à la carte chargers.

The charging circuitry of battery charger systems may or may not be located within the housing of the end-use device itself. In many cases, the battery may be charged with a dedicated external charger and power supply combination that is separate from the device that runs on power from the battery.

“Small battery charger system” means a battery charger system with a rated input power of 2 kW or less, and includes golf cart battery charger systems regardless of the output power.¹

The products of concern, because they include rechargeable batteries, would fall under the scope of the definition of a battery charger under the text of the regulation. Absent a specific exception, adding a battery (i.e. rechargeable battery) no matter how small the battery or how large the system, makes it a battery charger under this regulation. For example, adding a button cell rechargeable battery to a CRAY supercomputer would make it a battery charger under this regulation, and technically an alarm clock with a rechargeable battery used to keep the time during brown out/blackout periods would also fall under the definition. Many non-consumer products in the ICT sector have similar embedded batteries and are therefore defined as battery chargers under a plain reading of the text of the existing regulation. The conclusion is that the products of concern would fall under the scope of the program, even when the batteries are incapable of providing the primary “electrical energy to a product” for the product to operate in a normal fashion.

A clear definition of what it means “to provide electrical energy to a product” is critical to the CEC regulation as well as to other jurisdictions utilizing or adopting language from the CEC regulation moving forward. ITI believes the actual intent of this language to mean batteries supplying the energy to the main supply of a product and capable of providing normal operation of the main product, not just a subset element in the product. This understanding of intent is supported by both the lack of a test procedure to effectively isolate battery components as well as CEC and ECOVA not conducting an impact assessment of products with subset batteries in the original investigation for the rulemaking. To clarify the scope of the CEC rulemaking and avoid patchwork interpretation of this language in other jurisdictions, CEC will

¹ California Energy Commission, Appliance Efficiency Regulations, Battery Charger Systems and Self-Contained Lighting Controls Filed September 14, 2012 Title 20, Sections 1601-1608, available at: www.energy.ca.gov/2012publications/CEC-400-2012-011/CEC-400-2012-011-CMF.pdf

need to clarify the definition of a battery covered under the rulemaking by providing an exception for the products of concern.

2. The Products of Concern are Not Currently Included in the Exception List under the CEC Regulation

Section 1601 of the CEC regulation provides exceptions for products not covered under the scope of the definition as follows:

1601. (w) Battery charger systems, except those:

(1) used to charge a motor vehicle that is powered by an electric motor drawing current from rechargeable storage batteries, fuel cells, or other portable sources of electrical current, and which may include a nonelectrical source of power designed to charge batteries and components thereof. This exception does not apply to autoettes, electric personal assistive mobility devices, golf carts, or low speed vehicles, as those vehicles are defined in Division 1 of the California Vehicle Code;

(2) that are classified as Class II or Class III devices for human use under the Federal Food, Drug, and Cosmetic Act and require U.S. Food and Drug Administration listing and approval as a medical device;

(3) used to charge a battery or batteries in an illuminated exit sign, as defined in Section 1602(l);

(4) with input that is three phase of line-to-line 300 volts root mean square or more and is designed for a stationary power application;

(5) that are battery analyzers; or

(6) that are voltage independent or voltage and frequency independent uninterruptible power supplies as defined by International Electrotechnical Commission (IEC) 62040-3 ed.2.0.²

² California Energy Commission, Appliance Efficiency Regulations, Battery Charger Systems and Self-Contained Lighting Controls Filed September 14, 2012 Title 20, Sections 1601-1608, available at: www.energy.ca.gov/2012publications/CEC-400-2012-011/CEC-400-2012-011-CMF.pdf.

The products of concern do not qualify under any of the current exceptions. If a device is not listed in the exclusion list of 1601(w) and has a rechargeable battery with circuitry to recharge it in the system; then the device is a battery charger under the regulation. Input power below 2kW makes a device a small battery charger and above 2kW makes a device a large battery charger. No place in the regulation currently separates devices that can or cannot operate solely from the rechargeable batteries located in them.

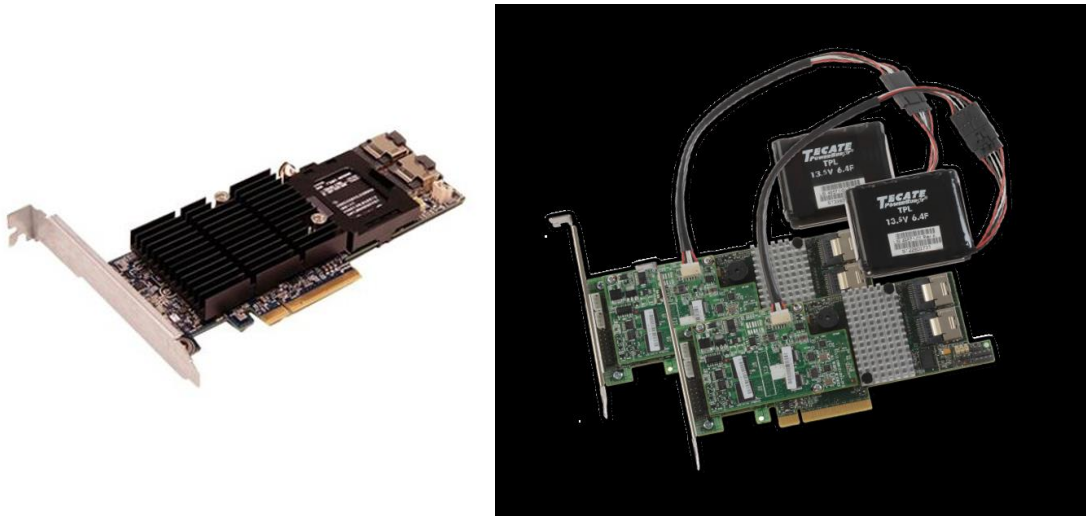
3. Embedded Batteries for the Products of Concern are Impossible to Isolate and Can Not be Tested under the Current Test Procedure.

Many products, especially in the non-consumer space, utilize embedded batteries to support portions of the system but are not used as an alternative supply to the end product. By nature, these embedded batteries are extremely difficult to isolate as they work in conjunction with the main supply, which is not battery powered. The current test procedure cannot be accurately applied to products requiring the isolation of an embedded battery in the system. As a result, these products would likely become illegal in California since the charging efficiency and maintenance mode cannot be assessed. Issues with testing small, integrated hold up batteries according to the existing test specification are as follows:

- a. Small rechargeable battery backup subsystems, whether on motherboard or on an add-in card, are generally connected to a power rail that is only active when the system is in the on and operating condition. The charger will not have power applied to it when the system is in a low power state. This would make it impossible to meet the maintenance energy requirements of the regulation.
- b. In many cases the power available at the card when the system is in a low power state is not adequate to power the battery subsystem. It may also be difficult or impossible to instrument the input to the charger and or the battery in order to make subsystem power measurements.
- c. Battery backed DRAM systems start draining the battery the moment power is removed from system by design. The battery is used to maintain power to the DRAM/memory controller and this state persists until power is restored or the battery is depleted. It is impossible to perform any off mode test with battery fully charged without modifying or potentially completely redesigning the system/cache card.

- d. Flash based NV cache systems use super capacitors or batteries to keep DRAM, Flash and controller powered until DRAM can be flushed to FLASH upon system power loss. Battery will drain for a short period when power is turned off then stop draining. Again a manufacturer cannot test off mode with the battery fully charged.

Examples of some battery backed DRAM cache cards:



4. The Products of Concern Do Not Fall Under the Definition of Battery Backup and UPS Systems under the Regulation.

Battery backup and UPS systems are defined in the regulation as follows (emphasis added):

Section 1602 Definitions, (w) Battery Charger Systems.

“Battery backup” or “uninterruptible power supply charger (UPS)” means a small battery charger system that is voltage and frequency dependent (VFD) and designed to provide power to an end use product in the event of a power outage, and includes a UPS as defined in IEC 62040-3 ed.2.0. The output of the VFD upon which the UPS is dependent changes in AC input voltage and

frequency and is not intended to provide additional corrective functions, such as those relating to the use of tapped transformers.

IEC 62040-3 ed 2.0 referenced in Section 1602 defines the scope as follows (emphasis added):

1 Scope

This International Standard applies to movable, stationary and fixed electronic uninterruptible power systems (UPS) that deliver single or three-phase fixed frequency a.c. output voltage not exceeding 1 000 V A.C. and that incorporate an energy storage system, generally connected through a d.c. link.

The result is that only AC input –AC output UPS systems are considered Backup/UPS under this regulation. Any battery backup application providing DC output does not qualify using the Backup Battery and UPS categorization and is therefore a standard battery charger. Absent an exception for these products, the test procedure would need to be changed to accommodate testing of a new class of product, and the CEC battery charger regulation would need to be changed in order to allow DC-based battery backup applications to be within scope of the backup batteries definitions and assuring appropriate performance requirements for these products.

Recommended Solution:

ITI recommends that the CEC remove from scope, battery systems that are not designed to provide normal operation of the product when AC mains power is not present. This can be accomplished by adding the following exclusion to Section 1601 (w).

Rechargeable batteries and battery charger systems contained completely within a larger product that are not capable of providing normal operation of the parent product when AC mains power is removed;

ADDITIONAL CONCERNS

ITI has also identified the following concerns related to the battery charger regulation, which will require additional action.

1. The Required DOE Test Procedure for Battery Chargers by Definition Currently Excludes Non-Consumer Appliances from the Scope of the Test Procedure.

The CEC regulation and the required DOE test method for small battery chargers define battery or battery pack, which is an essential element of a battery charger, as different things. According to CFR-2011-title10-vol3-part430-subpartB-appY; batteries and battery packs do not exist outside of consumer products.

CFR-2011-title10-vol3-part430-subpartB-appY defines a battery or battery pack as follows (emphasis added):

c. Battery or battery pack is an assembly of one or more rechargeable cells intended to provide electrical energy to a **consumer product**, and may be in one of the following forms: (a) detachable battery: a battery that is contained in a separate enclosure from the consumer product and is intended to be removed or disconnected from the consumer product for recharging; or (b) integral battery: a battery that is contained within the consumer product and is not removed from the consumer product for charging purposes.

CEC-400-2012-011-CMF³ defines small battery chargers as:

“Small battery charger system” means a battery charger system with a rated input power of 2 kW or less, and includes golf cart battery charger systems regardless of the output power.

“Battery” or “battery pack” means an assembly of one or more rechargeable cells intended to provide electrical energy to a product, and may be in one of the following forms: (a) detachable battery: a battery that is contained in a separate enclosure from

³ California Energy Commission, Appliance Efficiency Regulations, Battery Charger Systems and Self-Contained Lighting Controls Filed September 14, 2012 Title 20, Sections 1601-1608, available at: www.energy.ca.gov/2012publications/CEC-400-2012-011/CEC-400-2012-011-CMF.pdf

the product and is intended to be removed or disconnected from the product for recharging; or (b) integral battery: a battery that is contained within the product and is not removed from the product for charging purposes.

Based on the differences in definitions, inclusion of non-consumer products on Jan 1, 2017 would require manufacturers to test products according to a test procedure which excludes those products from its scope by definition. According to the test procedure definition commercial/enterprise products cannot have batteries or battery packs as they are defined to exist only in consumer products. To be accurate and reflective of the scope of the CEC rulemaking, the wording in the federal battery charger test procedure will need to be corrected to include non-consumer applications as part of the definitions of batteries and battery chargers.

2. ITI Recommends that the Battery Maintenance Procedure for Consumer Battery Chargers be Updated to the Delta Power Assessment Method Recommended by ITI on April 24, 2013 (originally submitted June 15, 2011) and Attached.

ITI has previously identified concerns with test methods for isolating consumer battery chargers with integrated rechargeable battery systems. For many highly integrated multi-function systems, isolation of the battery maintenance to other system functions are increasingly becoming more difficult. The current test procedures for maintenance mode inadvertently forces the inclusion of product maintenance functions, such as wireless connection, sensors, and such as part of the battery maintenance energy budget. To account for isolation concerns, ITI recommended the adoption of a delta power assessment method to explicitly isolate battery charging efficiency from energy expended in device management, safety controls, secondary functions such as back-up memory and other device functions. The initial recommendation is attached. We look forward to working with the CEC to clarify and improve the regulation.

Sincerely,

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