



[6450-01-P]

**DEPARTMENT OF ENERGY**

**Office of Energy Efficiency and Renewable Energy**

**[Case Numbers EPS-001, EPS-002, EPS-003 and EPS-004]**

**Notice of Petition for Waiver of Apple, Inc., Microsoft Corporation, Poin2 Lab, and Hefei Bitland Information Technology Co., Ltd. from the Department of Energy External Power Supplies Test Procedure and Grant of Interim Waiver**

**AGENCY:** Office of Energy Efficiency and Renewable Energy, Department of Energy.

**ACTION:** Notice of petitions for waiver, granting of interim waiver, and request for public comment.

**SUMMARY:** This notice announces receipt of and publishes petitions for waivers from Apple, Inc. (“Apple”), Microsoft Corporation (“Microsoft”), Poin2 Lab (“Poin2”), and Hefei Bitland Information Technology Co., Ltd. (“Bitland”) (collectively, “the petitioners”) seeking an exemption from specific portions of the U.S. Department of Energy’s (“DOE’s”) test procedure for determining external power supply (“EPS”) energy efficiency. The waiver requests pertain to adaptive EPSs that support a particular International Electrotechnical Commission standard. Under the existing DOE test procedure, the average active mode efficiency of an adaptive EPS must be tested at both its lowest and highest achievable output voltages. The petitioners contend that since their products operate above 2 amps current at the lowest achievable output voltages under rare conditions and for only brief periods of time, the suggested alternative testing approach detailed in their waiver petition requests is needed to measure the active mode efficiency of their products in a representative manner. DOE is granting the petitioners with an interim waiver from the DOE EPS test procedure for the specified basic models of EPSs,

subject to use of the alternative test procedure as set forth in this document and is soliciting comments, data, and information concerning the petitions and the suggested alternate test procedure.

**DATES:** DOE will accept comments, data, and information with regard to the petition until **[INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]**.

**ADDRESSES:** You may submit comments, identified by Docket No. EERE-2017-BT-WAV-0043, by any of the following methods:

- *Federal eRulemaking Portal:* <http://www.regulations.gov>. Follow the instructions for submitting comments.
- *E-mail:* [AS\\_Waiver\\_Requests@ee.doe.gov](mailto:AS_Waiver_Requests@ee.doe.gov) Include the Docket No. EERE-2017-BT-WAV-0043 in the subject line of the message. Submit electronic comments in WordPerfect, Microsoft Word, PDF, or ASCII file format, and avoid the use of special characters or any form of encryption.
- *Postal Mail:* Mr. Bryan Berringer, U.S. Department of Energy, Building Technologies Office, Mailstop EE-5B, Petition for Waiver Docket No. EERE-2017-BT-WAV-0043, 1000 Independence Avenue, SW., Washington, DC 20585-0121. Telephone: (202) 586-0371. If possible, please submit all items on a compact disc (CD), in which case it is not necessary to include printed copies.
- *Hand Delivery/Courier:* Appliance and Equipment Standards Program, U.S. Department of Energy, Building Technologies Office, 950 L'Enfant Plaza, SW., 6<sup>th</sup> Floor, Washington, DC, 20024. Telephone: (202) 586-6636. If possible, please submit all items on a CD, in which case it is not necessary to include printed copies.

*Docket*: The docket, which includes *Federal Register* notices, comments, and other supporting documents/materials, is available for review at [www.regulations.gov](http://www.regulations.gov). All documents in the docket are listed in the [www.regulations.gov](http://www.regulations.gov) index. However, some documents listed in the index, such as those containing information that is exempt from public disclosure, may not be publicly available.

**FOR FURTHER INFORMATION CONTACT:** Mr. Jeremy Domm, U.S. Department of Energy, Building Technologies Office, Mailstop EE-5B, 1000 Independence Avenue, SW., Washington, DC 20585-0121. Telephone: (202) 586-9870. E-mail: [appliancestandardsquestions@ee.doe.gov](mailto:appliancestandardsquestions@ee.doe.gov).

Michael Kido, U.S. Department of Energy, Office of the General Counsel, Mail Stop GC-33, Forrestal Building, 1000 Independence Avenue, SW., Washington, DC 20585-0103. Telephone: (202) 586-8145. E-mail: [Michael.Kido@hq.doe.gov](mailto:Michael.Kido@hq.doe.gov)

**SUPPLEMENTARY INFORMATION:**

**I. Background and Authority**

Title III, Part B<sup>1</sup> of the Energy Policy and Conservation Act of 1975 (“EPCA”), Public Law 94-163 (42 U.S.C. 6291-6309, as codified) established the Energy Conservation Program for Consumer Products Other Than Automobiles, a program that includes the external power supplies (“EPSs”), which are the focus of this notice.<sup>2</sup> Part B includes definitions, test procedures, labeling provisions, energy conservation standards, and the authority to require information and reports from manufacturers. Further, Part B authorizes the Secretary of Energy to prescribe test procedures that are reasonably designed to produce results that measure energy efficiency, energy use, or estimated operating costs during a representative average-use cycle,

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<sup>1</sup> For editorial reasons, upon codification in the U.S. Code, Part B was redesignated as Part A.

<sup>2</sup> All references to EPCA in this document refer to the statute as amended through the Energy Efficiency Improvement Act of 2015 (“EEIA”), Public Law 114-11 (April 30, 2015).

and that are not unduly burdensome to conduct. (42 U.S.C. 6293(b)(3)) The test procedure for EPSs is contained in Title 10 of the Code of Federal Regulations (“CFR”) Part 430, Subpart B, Appendix Z, Uniform Test Method for Measuring the Energy Consumption of External Power Supplies.

DOE’s regulations set forth at 10 CFR 430.27 contain provisions that allow a person to seek a waiver from the test procedure requirements for a particular basic model of a type of covered consumer product when: (1) the petitioner’s basic model for which the petition for waiver was submitted contains one or more design characteristics that prevent testing according to the prescribed test procedure, or (2) the prescribed test procedures may evaluate the basic model in a manner so unrepresentative of its true energy consumption characteristics as to provide materially inaccurate comparative data. 10 CFR 430.27(a)(1). A petitioner must include in its petition any alternate test procedures known to the petitioner to evaluate the basic model in a manner representative of its energy consumption. 10 CFR 430.27(b)(1)(iii).

DOE may grant a waiver subject to conditions, including adherence to alternate test procedures. 10 CFR 430.27(f)(2). As soon as practicable after the granting of any waiver, DOE will publish in the *Federal Register* a notice of proposed rulemaking to amend its regulations so as to eliminate any need for the continuation of such waiver. As soon thereafter as practicable, DOE will publish in the *Federal Register* a final rule. 10 CFR 430.27(l).

The waiver process also allows DOE to grant an interim waiver from test procedure requirements to manufacturers that have petitioned DOE for a waiver of such prescribed test procedures if it appears likely that the petition for waiver will be granted and/or if DOE determines that it would be desirable for public policy reasons to grant immediate relief pending a determination on the petition for waiver. 10 CFR 430.27(e)(2). Within one year of issuance of an interim waiver, DOE will either: (i) publish in the *Federal Register* a

determination on the petition for waiver; or (ii) publish in the *Federal Register* a new or amended test procedure that addresses the issues presented in the waiver. 10 CFR 430.27(h)(1). When DOE amends the test procedure to address the issues presented in a waiver, the waiver will automatically terminate on the date on which use of that test procedure is required to demonstrate compliance. 10 CFR 430.27(h)(2).

## **II. Petition for Waiver of Test Procedure and Application for Interim Waiver**

On June 8, 2017 and June 22, 2017, the Information Technology Industry Council (“ITI”), on behalf of the petitioners, filed petitions for waivers from the DOE test procedure for EPSs under 10 CFR 430.27 for several basic models of adaptive EPSs that meet the provisions of the International Electrotechnical Commission’s “Universal serial bus interfaces for data and power - Part 1-2: Common components - USB Power Delivery” (“IEC 62680-1-2:2017”) specification.<sup>3</sup> All four waiver petitions were nearly identical in that they focused on each company’s respective basic models of adaptive EPSs that utilize the IEC 62680-1-2:2017 specification and provided the same rationale for why the waiver and the suggested alternative test method detailed in each petition is necessary. The IEC specification describes the particular architecture, protocols, power supply behavior, connectors, and cabling necessary for managing power delivery over a universal serial bus (“USB”) connection at power levels of up to 100 watts (“W”). The purpose behind this specification is to help provide a standardized approach for power supply and peripheral developers to ensure backward compatibility while retaining product design and marketing flexibility. See generally, IEC 62680-1-2:2017 (Abstract) (describing the standard’s general provisions and purpose).

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<sup>3</sup> International Electrotechnical Commission Universal serial bus interfaces for data and power - Part 1-2: Common components - USB Power Delivery specification, <https://webstore.iec.ch/publication/26174/>

In the view of the petitioners, applying the DOE test procedure to the adaptive EPSs specified in their petitions would yield results that would be unrepresentative of the active-mode efficiency of those products. The DOE test procedure requires that the average active-mode efficiency for adaptive EPSs be measured by testing the unit twice – once at the highest achievable output voltage (“V”) and once at the lowest. The test procedure requires that active-mode efficiency be measured at four loading conditions relative to the nameplate output current of the EPS, See 10 CFR 430.23(bb) and 10 CFR Part 430, Subpart B, Appendix Z. The lowest achievable output voltage supported by the IEC 62680-1-2:2017 specification is 5V and the nameplate current at this voltage output is 3 amps (“A”), resulting in a power output of 15 W. The petitioners contend that while the IEC 62680-1-2:2017 specification requires the tested EPS to support this power output, the 15W at 5V condition will be rarely used and only for brief periods of time. Accordingly, the petitioners assert that the DOE test procedure’s measurement of efficiency at this power level is unrepresentative of the true energy consumption of these EPSs. Consequently, they seek a waiver from DOE to permit them to use an alternative test procedure to measure the energy efficiency of the specified adaptive EPSs that support the IEC 62680-1-2:2017 specification by testing these devices at the lowest voltage, 5V, and at an output power at 10W instead of 15W. In light of the similarities among these petitions, DOE is responding to them simultaneously in a single response.

Under the current test procedure, when testing an adaptive EPS at the lowest achievable output voltage, the measured average active mode efficiency is equal to the average efficiency when testing the EPS at 100%, 75%, 50%, and 25% of the nameplate output current of the EPS at that voltage. See 10 CFR 430 Appendix Z, sections 1.f and 4(a)(i)(E), and Table 1). Thus, for an adaptive EPS with a lowest output voltage of 5V and a nameplate output current of 3A (resulting in a 15W output at 100% of the nameplate output current), the average active mode

efficiency at the lowest output voltage would be equal to the average of the efficiencies when testing at 15W, 11.25W, 7.5W, and 3.75W. The petitioners suggested that these requirements be modified for their products when calculating the average active mode efficiency – namely, by using the average of four loading conditions representing the same respective percentages of an output current of 2A. Doing so would mean that the average active mode efficiency would equal the average of the efficiencies when testing at 10W, 7.5W, 5W, and 2.5W. The petitioners suggested taking the results from this alternative approach and comparing them against the DOE efficiency requirements at 10W. In their view, this approach is consistent with the current energy conservation standards for EPS, which scale based on the power output for which the EPS is tested.

The following table lists the basic model numbers for which each petitioner requests a waiver and interim waiver.

**Table 1: Basic Model Numbers submitted by each Petitioner for a waiver and interim waiver**

<b>Company</b>	<b>Basic Model Number</b>
Apple	A1718, A1719, A1540
Microsoft	AC-100
Poin2	A16-045N1A
Bitland	A045R053L

The petitioners assert that the test procedure for the lowest voltage level does not reflect actual use in the field. The IEC 62680-1-2:2017 specification requires USB-compliant products to support 15W at 5V. However, according to the petitioners, adaptive EPSs operating at 5 volts do not exceed 10W for almost all usage conditions. In their view, when charging a product that is sold or intended to be used with the EPS, the EPS charges at 5 volts only with a

dead battery or fully charged battery (and then at 0.5A or less). At other times when more power is needed, the EPS will use a higher voltage rail (greater than 5V). (A “voltage rail” refers to a single voltage provided by the relevant power supply unit through a dedicated circuit/wire used for that voltage.) The same holds true for other end-use products manufactured by the respective manufacturers. The petitioners further state and provide data demonstrating that when using an adaptive EPS that supports the IEC 62680-1-2:2017 specification to charge an end-use product of a manufacturer different from the one who manufactured the EPS, it is likely that the product would charge at less than 10W at 5V, or may even be capable of exploiting the ability of an adaptive EPS to provide higher voltages for faster charging. Accordingly, the petitioners argue that the current DOE test procedure, which requires that efficiency be measured above 10W at the lowest voltage condition, results in a measurement that is grossly unrepresentative of the actual energy consumption characteristics of the adaptive EPS being tested.

The petitioners also request an interim waiver from the existing DOE test procedure for immediate relief. As previously noted, an interim waiver may be granted if it appears likely that the petition for waiver will be granted, and/or if DOE determines that it would be desirable for public policy reasons to grant immediate relief pending a determination of the petition for waiver. See 10 CFR 430.27(e)(2).

DOE understands that absent an interim waiver, the basic models identified by the petitioners cannot be tested and rated for energy consumption on a basis representative of their true energy consumption characteristics. DOE has reviewed the suggested alternate procedure and concludes that it will allow for the accurate measurement of the energy use of these products, while alleviating the testing problems associated with petitioner’s implementation of EPS testing for their adaptive EPSs that support the IEC 62680-1-2:2017 specification.

Consequently, DOE has determined that the petition for waiver will likely be granted and has decided that it is desirable for public policy reasons to grant the petitioners immediate relief pending a determination on the petition for waiver.

### **III. Summary of Grant of Interim Waiver**

For the reasons stated above, DOE has informed the petitioners that it is granting the petitions for interim waiver from testing for the specified EPS basic models through separate correspondence to each petitioner, which includes an Order granting the petitions, subject to the certain specifications and conditions. The substance of the Interim Waiver Order is summarized below:

After careful consideration of all the material submitted by the petitioners in this matter, DOE grants an interim waiver regarding the specified basic models. Accordingly, it is ORDERED that:

(1) The petitioners must test and rate the EPSs of the following basic models as set forth in paragraph (2) below:

<b>Company</b>	<b>Basic Model Number</b>
Apple	A1718, A1719, A1540
Microsoft	AC-100
Poin2	A16-045N1A
Bitland	A045R053L

(2) The applicable method of test for the basic models listed in paragraph (1) is the test procedure for EPSs prescribed by DOE at 10 CFR Part 430, Subpart B, Appendix Z, except that under section 4(a)(i)(E) and Table 1 of Appendix Z, adaptive EPSs that meet the IEC 62680-1-2:2017 specification must be tested such that the 100% nameplate loading condition when

testing at the lowest achievable output voltage is 2A (which corresponds to an output power of 10 watts). The 75%, 50%, and 25% loading conditions shall be scaled accordingly and the nameplate output power of such an EPS, at the lowest output voltage, shall be equal to 10 watts.

(3) Representations. The petitioners are permitted to make representations about the energy use of the respective adaptive EPS for compliance, marketing, or other purposes only to the extent that such products have been tested in accordance with the provisions set forth above and such representations fairly disclose the results of such testing in accordance with 10 CFR 429.37.

(4) This interim waiver shall remain in effect consistent with the provisions of 10 CFR 430.27(h) and (l).

(5) This interim waiver is issued on the condition that the statements, representations, and documentary materials provided by the petitioner are valid. DOE may revoke or modify this waiver at any time if it determines the factual basis underlying the petition for waiver is incorrect, or the results from the alternate test procedure are unrepresentative of the basic model's true energy consumption characteristics.

(6) Granting of this interim waiver does not release the petitioners from the certification requirements set forth at 10 CFR part 429.

#### **IV. Alternate Test Procedure**

EPCA requires that manufacturers use DOE test procedures when making representations about the energy consumption and energy consumption costs of products and equipment covered by the statute. (42 U.S.C. 6293(c); 6314(d)) Consistent representations about the energy efficiency of covered products and equipment are important for consumers evaluating products when making purchasing decisions and for manufacturers to demonstrate compliance with applicable DOE energy conservation standards. Pursuant to its regulations

applicable to waivers and interim waivers from applicable test procedures at 10 CFR 430.27 and after considering public comments on the petition, DOE will announce its decision as to an alternate test procedure for the petitioners in a subsequent Decision and Order.

During the period of the interim waiver granted in this notice, the petitioners must test the basic models listed in Table 1 according to the test procedure for EPS prescribed by DOE at 10 CFR Part 430, Subpart B, Appendix Z, except that the 100% nameplate loading condition when testing at the lowest achievable output voltage must be 2A (which corresponds to an output power of 10W), and the 75%, 50%, and 25% loading conditions shall scale accordingly (i.e. 1.5A, 1A, and 0.5A, respectively). The nameplate output power of the EPS at the lowest output voltage shall be equal to 10W.

#### **V. Summary and Request for Comments**

This document announces DOE's receipt of the petitioners' petitions for waiver from the DOE test procedure for EPSs and announces DOE's decision to grant the petitioners with an interim waiver from the test procedure for the adaptive EPSs listed in Table 1 of this document. DOE is publishing the petitions from Apple, Microsoft, Poin2, and Bitland for waiver in their entirety, pursuant to 10 CFR 430.27(b)(1)(iv). The petitions contain no confidential information. The petitions include a suggested alternate test procedure to determine the energy consumption of these EPSs. The petitioners are required to use this alternate procedure, as specified in section IV of this notice, as a condition of the grant of interim waiver, and after considering public comments on the petition, DOE will publish in the *Federal Register* either a decision as to the continued use of this alternate procedure (or a modified version thereof) in a subsequent Decision and Order or a new or amended test procedure that addresses the issues presented in the waiver.

DOE solicits comments from interested parties on all aspects of the petition, including the suggested alternate test procedure and calculation methodology. Pursuant to 10 CFR 430.27(d), any person submitting written comments to DOE must also send a copy of such comments to the petitioner. The contact information for the petitioners is: Ms. Alexandria McBride, Director of Environment and Sustainability, Information Technology Industry Council, 1101 K Street, NW Suite 610, Washington, DC 20005. All comment submissions must include the agency name and Docket No. EERE-2017-BT-WAV-0043 for this proceeding. Submit electronic comments in WordPerfect, Microsoft Word, Portable Document Format (“PDF”), or text (American Standard Code for Information Interchange (“ASCII”)) file format and avoid the use of special characters or any form of encryption. Wherever possible, include the electronic signature of the author. DOE does not accept telefacsimiles (faxes).

Pursuant to 10 CFR 1004.11, any person submitting information that he or she believes to be confidential and exempt by law from public disclosure should submit two copies to DOE: one copy of the document marked “confidential” with all of the information believed to be confidential included, and one copy of the document marked “non-confidential” with all of the information believed to be confidential deleted. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

Issued in Washington, DC, on July 11, 2017.

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Kathleen B. Hogan,  
Deputy Assistant Secretary for Energy Efficiency  
Energy Efficiency and Renewable Energy

BEFORE THE  
UNITED STATES DEPARTMENT OF ENERGY  
WASHINGTON, D.C. 20585

In the Matter of:

Energy Efficiency Program: Test Procedure for External Power Supplies

Docket No. EERE-2014-BT-TP-0043; RIN 1904-AD36

PETITION OF APPLE INC. FOR WAIVER AND APPLICATION FOR  
INTERIM WAIVER OF TEST PROCEDURE FOR EXTERNAL POWER SUPPLIES

Apple Inc. respectfully submits this Petition for Waiver and Application for Interim Waiver<sup>4</sup> as related to the Department of Energy's (DOE) test procedure for external power supplies (EPS)<sup>5</sup> as applied to certain adaptive EPSs.<sup>6</sup>

Apple Inc. is located at 1 Infinite Loop, Cupertino, CA 95014. Telephone number: (408) 996-1010.

Apple Inc. revolutionized personal technology with the introduction of the Macintosh in 1984. Today, Apple Inc. leads the world in innovation with iPhone, iPad, Mac, Apple Watch and Apple TV. Apple's four software platforms — iOS, macOS, watchOS and tvOS — provide seamless experiences across all Apple devices and empower people with breakthrough services including the App Store, Apple Music, Apple Pay and iCloud. Apple's more than 100,000 employees are dedicated to making the best products on earth, and to leaving the world better than we found it.

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<sup>4</sup> See 10 C.F.R. § 430.27 (waiver and interim waiver).

<sup>5</sup> *Id.* Part 430, Subpart B, Appendix Z.

<sup>6</sup> An adaptive EPS is an external power supply that can alter its output voltage during active-mode based on an established digital communication protocol with the end-use application without any user-generated action. 10 C.F.R. § 430.2.

The adaptive EPS basic models listed in Appendix I hereto meet the criteria for a waiver.<sup>7</sup> The current DOE test procedure evaluates the models in a manner that is that is grossly unrepresentative of their actual energy consumption characteristics in real-world usage. This circumstance has already been recognized by DOE, and it has indicated a willingness to review the situation. Apple Inc. urges that a waiver be granted that will provide for the alternate test procedure discussed herein, under which lowest voltage average efficiency would be measured at 10 watts (W). This is far more representative of the actual energy consumption characteristics of most such products in real-world usage than the 15W required by the current DOE test procedure. DOE “will grant a waiver from the test procedure requirements” in these circumstances.<sup>8</sup>

**I. BASIC MODELS FOR WHICH A WAIVER IS REQUESTED.**

The basic models for which a waiver is requested are the adaptive EPSs set forth in Appendix I hereto. They are manufactured by Apple Inc. and are distributed in commerce under the Apple brand name.

**II. NEED FOR THE REQUESTED WAIVER.**

Adaptive EPSs are highly beneficial products. They allow efficient charging with less resistive loss. They can be readily reused when devices are replaced; thus, there is less need to include EPSs in the box with a new device. This all is of significant benefit to the consumer – as well as to the environment, including reduced landfill, packaging, and transportation.

Under the current DOE test procedure, average active-mode efficiency for adaptive EPSs is to be measured by testing the unit twice – once at the highest achievable output voltage

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<sup>7</sup> *Id.* § 430.27(f)(2).

<sup>8</sup> *Id.*

and once at the lowest.<sup>9</sup> Testing is to be across four load points (100%, 75%, 50%, and 25%) for each of the highest and lowest voltage levels.<sup>10</sup> The average efficiency is deemed to be the arithmetic mean of the efficiency values calculated at the four load points.<sup>11</sup>

The lowest achievable output voltage supported by the basic models is 5 volts (V). They are designed to provide a maximum power of 15W when this voltage is selected. 15W is an element of the USB Power Delivery Specification,<sup>12</sup> which requires USB compliant products to support 15W at 5V. However, adaptive EPSs do not exceed 10W for almost all usage. 15W at 5V will only be used in rare use scenarios and only for brief periods of time. Therefore, the DOE test procedure's evaluation at this power level is unrepresentative of the true energy consumption of the basic models in real-world usage.

In that regard, where the adaptive EPS listed in Appendix I is used with an intended end use product (IEUP) manufactured by Apple Inc.,<sup>13</sup> the adaptive EPS is required to support 15W (5V 3A [amps]) as required by the USB Power Delivery Specification, but the IEUP product is designed never to consume this level of power. The IEUP charges at 5 volts only (i) with respect to a dead battery, 0.5A, i.e., 2.5W, for up to 120 seconds; or (ii) for end of charge (battery fully charged - trickle power at < 0.5A). At other times, particularly when power above 10W is needed, the IEUP commands the EPS to use a higher voltage rail, as this is more efficient. Therefore, evaluation of adaptive EPSs at the 15W power level when evaluating efficiency at the lowest voltage rail (5V) is grossly unrepresentative of the actual energy consumption characteristics of these models in real-world usage.

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<sup>9</sup> *Id.* Part 430, Subpart B, Appendix Z, § 4(a)(i)(E).

<sup>10</sup> *Id.* §§ 4(a)(i)(C), (E), (H).

<sup>11</sup> *Id.* § 4(a)(i)(H).

<sup>12</sup> IEC 62680-1-2:2017, Universal serial bus interfaces for data and power – Part 1-2: Common components – USB Power Delivery Specification. See <https://webstore.iec.ch/publication/26174>.

<sup>13</sup> An IEUP is a product that is sold or intended to be used with the unit under test (UUT) and constitutes the primary load for the UUT.

The same holds true of other end use products (OEUP)<sup>14</sup> manufactured by Apple Inc. that can be connected to basic models of adaptive EPSs listed in Appendix I hereto. When power above 10W is needed, any IEUP manufactured by Apple uses a higher voltage rail, as this is more efficient.

The situation is the same for basic models of adaptive EPSs listed in Appendix 1 to be used with OEUPs from another manufacturer. These OEUPs are highly likely to be mobile phones (smartphones or feature phones) or tablets.<sup>15</sup> As discussed herein, they are highly likely to charge at less than 10W at 5V, and to use a higher voltage rail when power above 10W is needed.

As shown in Table 1, mobile phones dominate the portable device market and are ubiquitous world-wide. The most likely OEUP to be charged from an adaptive EPS is a mobile phone. Note that all mobile phones are able to be charged from an adaptive EPS using an appropriate cable.

### **TABLE 1**

See the following website for figures of the “TABLE 1”:

<https://www.regulations.gov/docket?D=EERE-2017-BT-WAV-0043>

As shown in Table 2, smartphones dominate the U.S. market.

### **TABLE 2**

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<sup>14</sup> An OEUP is a product other than an IEUP that can be used with the UT and constitutes the primary load for the UUT.

<sup>15</sup> A smartphone is a mobile phone that performs many of the functions of a computer, typically having a touchscreen interface, Internet access, and an operating system capable of running downloaded applications. A feature phone is a mobile phone that is unable to run downloaded applications, and thus lacks the capabilities of a smartphone. A tablet is a small portable computer that accepts its input directly on a screen rather than via a keyboard or mouse, has Internet access, and an operating system capable of running downloaded applications.

See the following website for figures of the “TABLE 2”:

<https://www.regulations.gov/docket?D=EERE-2017-BT-WAV-0043>

Table 3 demonstrates that the vast majority of the shipments supporting mobile phones and tablets charge at 10W or less at 5V. For mobile phones and tablets sold in 2016: 97% of North American shipments and 97.4% of worldwide shipments charge below 10W at 5V. For charging at and above 10W at 5V the comparable numbers for smartphones and tablets sold in 2016 represented a mere 3% of North American shipments and 2.6% of worldwide shipments.<sup>16</sup> These figures include the 2016 introduction of smartphones that use USB Type-C as the phone’s charging interface. Some of these have the capability of charging at  $\geq 10W$  at 5V, but the proportion is not known so a conservative assumption is made (see below). Furthermore, some of these smartphones are capable of exploiting the ability of an adaptive EPS to provide higher voltages, and thus would be expected to use these higher voltages for faster charging and not charge at  $\geq 10W$  at 5V, but again the proportion is not known. (The proportion of USB Type-C smartphones that exploit the capabilities of adaptive EPSs might be expected to grow in the future.) In the figures above and in Table 3 the generous assumption is made that all such phones can charge at  $\geq 10W$  at 5V.

### TABLE 3

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<sup>16</sup> Laptops are not included in the market analysis. They usually do not charge from adaptive EPSs. Newly introduced laptops that can charge from adaptive EPSs typically only charge at 5V (i) with respect to a dead battery, 0.5A, i.e., 2.5W, for up to 120 seconds; or (ii) for end of charge (battery fully charged - trickle power at < 0.5A). Some non-IT products, such as some children’s toys, charge using default power (0.5A, 2.5W), while some use 1.5A, 7.5W.

See the following website for figures of the “TABLE 3”:

<https://www.regulations.gov/docket?D=EERE-2017-BT-WAV-0043>

Distortion caused by the test procedure when used to test the efficiency of adaptive EPSs at the lowest voltage level was highlighted during the test procedure rulemaking for EPSs.

It was stressed that the test procedure for the lowest voltage level does not reflect actual use in the field.<sup>17</sup> DOE was receptive and indicated that it could make changes when more information was known. “[I]n response to comments, in response to changing markets, in response to innovative technologies, we can always change the way we do things in the future.”<sup>18</sup> DOE also stated that it had not yet done any data collection on adaptive EPSs.<sup>19</sup>

DOE’s final test procedure rule<sup>20</sup> acknowledged that adaptive EPSs are a “new EPS technology,” are “unique among EPSs” and “were not considered when the current test procedure was first adopted.” Therefore, that test procedure “did not explicitly address the unique characteristics of these types of EPSs to ensure reproducible and repeatable results.”<sup>21</sup>

Recognizing the unrepresentative nature of the test procedure at the lowest voltage level, DOE also stated:

At higher output voltages, EPSs typically have greater efficiency due to a lower loss ratio of the fixed voltage drops in the conversion circuitry to the nominal output voltage.

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<sup>17</sup> DOE, Transcript, External Power Supply Test Procedure NOPR Meeting at 94-100 (Nov. 21, 2014).

<sup>18</sup> Transcript at 99 (Ashley Armstrong, DOE).

<sup>19</sup> *Id.* at 108 (Jeremy Domm, DOE).

<sup>20</sup> 80 Fed. Reg. 51424 (Aug. 25, 2015).

<sup>21</sup> *Id.* 51426, 51431-32.

These losses do not increase linearly with output voltage, so higher output voltages typically provide greater conversion efficiency.<sup>22</sup>

### **III. PROPOSED ALTERNATE TEST PROCEDURE**

Apple Inc. proposes the following alternate test procedure to evaluate the performance of the basic models listed in Appendix I hereto.

Apple Inc. shall be required to test the performance of the basic models listed in Appendix I according to the test procedures for adaptive EPSs in 10 C.F.R. Part 430, Subpart B, Appendix Z, except that it shall modify test measurements calculation for 5V (lowest voltage level [LV]):

- Measure at 4 points: 100%, 75%, 50%, & 25% of 10 W load points at 5V (LV).
  - Take the average.
- Compare results against DOE efficiency requirement at 10W.

The waiver should continue until DOE adopts an applicable amended test procedure.

### **IV. REQUEST FOR INTERIM WAIVER.**

Apple Inc. also requests an interim waiver for its testing and rating of the models in Appendix I. The petition for waiver is likely to be granted, as evidenced by its merits. Without waiver relief, Apple Inc. would be subject to requirements that clearly should not apply to its products identified herein. And without such relief, Apple Inc. will be obliged to market products that, while meeting the requirements of the current DOE test procedure, will not comply with the international USB Power Delivery Specification (IEC 62680-1-2:2017). This will put Apple Inc. at a competitive disadvantage and impact Apple Inc.'s reputation for

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<sup>22</sup> *Id.* 51432.

delivering standards compliant products. Apple Inc. would like to be compliant with the international USB Power Delivery Specification for the benefit of the USB adaptive charger ecosystem.

**V. LIST OF MANUFACTURERS**

A list of manufacturers of all other basic models distributed in commerce in the United States and known to Apple Inc. to incorporate design characteristic(s) similar to those found in the basic models that are the subject of the petition is set forth in Appendix II hereto.

\* \* \*

Apple Inc. requests expedited treatment of the Petition and Application. It is also willing to promptly provide any additional information DOE requires to act expeditiously.

**VI. CONCLUSION.**

DOE should grant Apple Inc. the requested waiver and interim waiver for the models listed in Appendix I hereto.

Respectfully submitted,

May 30, 2017

Carlos Ribas  
Director Power Systems Engineering

Apple Inc.

## APPENDIX I

The waiver and interim waiver requested herein should apply to testing and rating of the following basic models.

Model	Product Type	Nameplate Input Rating (AC)	Nameplate Output Rating (DC)
A1718	Adaptive Single Voltage External Power Supply	100-240V~, 50-60Hz, 1.5A	Highest output voltage: 20.3V, 3A (60.9W) Lowest output voltage: 5V, 3A (15W)
A1719	Adaptive Single Voltage External Power Supply	100-240V~, 50-60Hz, 1.5A	Highest output voltage: 20.3V, 4.3A (87W) Lowest output voltage: 5V, 3A (15W)
A1540	Adaptive Single Voltage External Power Supply	100-240V~, 50-60Hz, 0.75A	Highest output voltage: 14.5V, 2A (87W) Lowest output voltage: 5V, 3A (15W)

## APPENDIX II

The following are manufacturers of all other basic models distributed in commerce in the United States and known to Apple Inc. to incorporate design characteristics similar to those found in the basic models that are the subject of the petition for waiver.

Acbel  
Active-Semi, Inc.  
Bitland  
Chicony Power Technology  
Chrontel, Inc  
Dell  
HONOR ELECTRONIC CO.LTD  
Huntkey  
Ever Win International Corp.  
Griffin Technology LLC  
LG Electronics USA, Inc  
Liteon  
Lucent Trans Electronics Co.,  
Ltd. Mobileconn Technology  
Co., Ltd. Phihong Technology  
Co., Ltd.  
Poin2 Lab.  
Renesas Electronics Corp.  
Salcomp Plc  
Samsung  
STMicroelectronics  
Superior  
Communications Texas  
Instruments  
Ventev Mobile  
Weltrend Semiconductor  
Xentris Wireless

*Sources include: "USB Power Brick", USB Implementers Forum, Inc.*

*Accessed < <http://www.usb.org/kcompliance/view/CertifiedUSBPowerBricks.pdf>*

BEFORE THE  
UNITED STATES DEPARTMENT OF ENERGY  
WASHINGTON, D.C. 20585

In the Matter of:

Energy Efficiency Program: Test Procedure for External Power Supplies

Docket No. EERE-2014-BT-TP-0043; RIN 1904-AD36

PETITION OF MICROSOFT CORPORATION FOR WAIVER AND APPLICATION FOR  
INTERIM WAIVER OF TEST PROCEDURE FOR EXTERNAL POWER SUPPLIES

Microsoft Corporation (Microsoft) respectfully submits this Petition for Waiver and Application for Interim Waiver<sup>1</sup> as related to the Department of Energy's (DOE) test procedure for external power supplies (EPS)<sup>2</sup> as applied to certain adaptive EPSs.<sup>3</sup>

Microsoft is located at 1 Microsoft Way, Redmond, Washington 98052. Telephone: (425) 882-8080.

The adaptive EPS basic models listed in Appendix I hereto meet the criteria for a waiver.<sup>4</sup> The current DOE test procedure evaluates the models in a manner that is that is grossly unrepresentative of their actual energy consumption characteristics in real-world usage. This situation has already been recognized by DOE, and it has indicated a willingness to review the situation. Microsoft Corporation urges that a waiver be granted that will provide for the alternate test procedure discussed herein, under which lowest voltage average efficiency would be measured.

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<sup>1</sup> See 10 C.F.R. § 430.27 (waiver and interim waiver).

<sup>2</sup> *Id.* Part 430, Subpart B, Appendix Z.

<sup>3</sup> An adaptive EPS is an external power supply that can alter its output voltage during active-mode based on an established digital communication protocol with the end-use application without any user-generated action. 10 C.F.R. § 430.2.

<sup>4</sup> *Id.* § 430.27(f)(2).

at 10 watts (W). This is far more representative of actual energy consumption characteristics of the product in real-world usage than the 15W required by the current DOE test procedure. DOE “will grant a waiver from the test procedure requirements” in these circumstances.<sup>5</sup>

**I. BASIC MODELS FOR WHICH A WAIVER IS REQUESTED.**

The basic models for which a waiver is requested are the adaptive EPSs set forth in Appendix I hereto. They are distributed in commerce under the Microsoft brand name.

**II. NEED FOR THE REQUESTED WAIVER.**

Adaptive EPSs are highly beneficial products. They allow efficient charging with less resistive loss. They can be readily reused when devices are replaced; thus, there is less need to include EPSs in the box with a new device. This all is of significant benefit to the consumer – as well as to the environment, including reduced landfill, packaging, and transportation.

Under the current DOE test procedure, average active-mode efficiency for adaptive EPSs is to be measured by testing the unit twice – once at the highest achievable output voltage and once at the lowest.<sup>6</sup> Testing is to be across four load points (100%, 75%, 50%, and 25%) for each of the highest and lowest voltage levels.<sup>7</sup> The average efficiency is deemed to be the arithmetic mean of the efficiency values calculated at the four load points.<sup>8</sup>

The lowest achievable output voltage supported by the basic models is 5 volts (V). They are designed to provide a maximum power of 15W when this voltage is selected. 15W is an element of the USB Power Delivery Specification,<sup>9</sup> which requires the product to support 15W at 5V.

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<sup>5</sup> *Id.*

<sup>6</sup> *Id.* Part 430, Subpart B, Appendix Z, § 4(a)(i)(E).

<sup>7</sup> *Id.* §§ 4(a)(i)(C), (E), (H).

<sup>8</sup> *Id.* § 4(a)(i)(H).

<sup>9</sup> IEC 62680-1-2:2017, Universal serial bus interfaces for data and power – Part 1-2: Common components – USB Power Delivery Specification. See <https://webstore.iec.ch/publication/26174>.

However, adaptive EPSs do not exceed 10W for almost all usage. 15W at 5V will only be used in rare use scenarios and only for brief periods of time. Therefore, the DOE test procedure's evaluation at this power level is unrepresentative of the true energy consumption of the basic models in real-world usage.

In that regard, where the adaptive EPS listed in Appendix I is used with an intended end use product (IEUP),<sup>10</sup> the adaptive EPS is required to support 15W (5V 3A [amps]) due to the USB Power Delivery Specification, but the IEUP product very rarely consumes this level of power. The IEUP charges at 5 volts only (i) with respect to a dead battery, 0.5A, i.e., 2.5W, for up to 120 seconds; or (ii) for end of charge (battery fully charged - trickle power at < 0.5A). Therefore, evaluation of adaptive EPSs at the 15W power level is grossly unrepresentative of the actual energy consumption characteristics of these models in real-world usage.

The same holds true of other end use products (OEUP)<sup>11</sup> that can be connected to basic models of adaptive EPSs listed in Appendix I hereto.

The situation is the same for basic models of adaptive EPSs listed in Appendix 1 to be used with OEUPs from another manufacturer. These OEUPs are highly likely to be mobile phones (smartphones or feature phones) or tablets.<sup>12</sup> As discussed herein, they are highly likely to charge at less than 10W.

As shown in Table 1, mobile phones dominate the portable device market

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<sup>10</sup> An IEUP is a product that is sold or intended to be used with the unit under test (UUT) and constitutes the primary load for the UUT.

<sup>11</sup> An OEUP is a product other than an IEUP that can be used with the UT and constitutes the primary load for the UUT.

<sup>12</sup> A smartphone is a mobile phone that performs many of the functions of a computer, typically having a touchscreen interface, internet access, and an operating system capable of running downloaded applications. A feature phone is a mobile phone that is unable to run downloaded applications, and thus lacks the capabilities of a smartphone. A tablet is a small portable computer that accepts its input directly on a screen rather than via a keyboard or mouse, has internet access, and an operating system capable of running downloaded applications.

and are ubiquitous world-wide. The most likely OEUP to be charged from an adaptive EPS is a mobile phone. Note that all mobile phones are able to be charged from an adaptive EPS using an appropriate cable.

#### **TABLE 1**

See the following website for figures of the “TABLE 1”:

<https://www.regulations.gov/docket?D=EERE-2017-BT-WAV-0043>

As shown in Table 2, smartphones dominate the U.S. market.

#### **TABLE 2**

See the following website for figures of the “TABLE 2”:

<https://www.regulations.gov/docket?D=EERE-2017-BT-WAV-0043>

Table 3 demonstrates that the vast majority of the shipments supporting mobile phones and tablets charge at 10W or less at 5V. For mobile phones and tablets sold in 2016: 97% of North American shipments and 97.4% of worldwide shipments charge below 10W at 5V. For charging at and above 10W at 5V the comparable numbers for smartphones and tablets sold in 2016 represented a mere 3% of North American shipments and 2.6% of worldwide shipments.<sup>13</sup> These figures include the introduction in 2016 of smartphones that use USB Type-C as the phone’s charging interface. Some of these have the capability of charging at  $\geq 10W$  at 5V, but proportion is not known so a

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<sup>13</sup> Laptops are not included in the market analysis. They usually do not charge from adaptive EPSs. Newly introduced laptops that can charge from adaptive EPSs typically only charge at 5V (i) with respect to a dead battery, 0.5A, i.e., 2.5W, for up to 120 seconds; or (ii) for end of charge (battery fully charged - trickle power at  $< 0.5A$ ). Non-IT products such as children’s toys that charge usually charge using default power (0.5A, 2.5W); some use 1.5A, 7.5W.

conservative assumption is made (see below). Furthermore, some of these are capable of exploiting the ability of an adaptive EPS to provide higher voltages, and thus would be expected to use these higher voltages for faster charging and not charge at  $\geq 10\text{W}$  at  $5\text{V}$ , but again the proportion is not known. (The proportion of USB Type-C smartphones that exploit the capabilities of adaptive EPSs might grow in the future to some extent.) In the figures above and in Table 3 the generous assumption is made that all such phones can charge at  $\geq 10\text{W}$  at  $5\text{V}$ .

### TABLE 3

See the following website for figures of the “TABLE 3”:

<https://www.regulations.gov/docket?D=EERE-2017-BT-WAV-0043>

Distortion caused by the test procedure as applied for efficiency of adaptive EPSs at the lowest voltage level was highlighted during the test procedure rulemaking for EPSs.

It was stressed that the test procedure for the lowest voltage level does not reflect actual use in the field.<sup>14</sup> DOE was receptive and indicated that it could make changes when more information was known. “[I]n response to comments, in response to changing markets, in response to innovative technologies, we can always change the way we do things in the future.”<sup>15</sup> DOE also stated that it had not done any data collection on adaptive EPSs yet.<sup>16</sup>

DOE’s final test procedure rule<sup>17</sup> acknowledged that adaptive EPSs are a “new EPS technology,” are “unique among EPSs” and “were not considered when the current test

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<sup>14</sup> DOE, Transcript, External Power Supply Test Procedure NOPR Meeting at 94-100 (Nov. 21, 2014).

<sup>15</sup> Transcript at 99 (Ashley Armstrong, DOE).

<sup>16</sup> *Id.* at 108 (Jeremy Domm, DOE).

<sup>17</sup> 80 Fed. Reg. 51424 (Aug. 25, 2015).

procedure was first adopted.” Therefore, that test procedure “did not explicitly address the unique characteristics of these types of EPSs to ensure reproducible and repeatable results.”<sup>18</sup>

Virtually acknowledging the problem with the unrepresentative nature of the test procedure at the lowest voltage level, DOE also stated:

At higher output voltages, EPSs typically have greater efficiency due to a lower loss ratio of the fixed voltage drops in the conversion circuitry to the nominal output voltage. These losses do not increase linearly with output voltage, so higher output voltages typically provide greater conversion efficiency.<sup>19</sup>

### III. **PROPOSED ALTERNATE TEST PROCEDURE**

Microsoft Corporation proposes the following alternate test procedure to evaluate the performance of the basic models listed in Appendix I hereto.

A company subject to the waiver shall be required to test the performance of the basic models listed in Appendix I according to the test procedures for adaptive EPSs in 10 C.F.R. Part 430, Subpart B, Appendix Z, except that it shall modify test measurements calculation for 5V (lowest voltage level [LV]):

- Measure at 4 points: 100%, 75%, 50%, & 25% of 10 W load points at 5V (LV).
- Take the average.
- Compare results against DOE efficiency requirement at 10W.

The waiver should continue until DOE adopts an applicable amended test procedure.

### IV. **REQUEST FOR INTERIM WAIVER.**

Microsoft Corporation also requests an interim waiver for its testing and rating of the models in Appendix I. The petition for waiver is likely to be granted, as evidenced by its merits. Without waiver relief, the models would be subject to requirements that clearly should not

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<sup>18</sup> *Id.* 51426, 51431-32.

<sup>19</sup> *Id.* 51432.

apply to them. And without such relief, there will be economic hardship. Sales of adaptive EPSs will be inhibited, to the detriment of manufacturers, users and distributors of adaptive EPSs and the products that use adaptive EPSs.

**V. LIST OF MANUFACTURERS**

A list of manufacturers of all other basic models distributed in commerce in the United States and known to Microsoft Corporation to incorporate design characteristic(s) similar to those found in the basic models that are the subject of the petition is set forth in Appendix II hereto.

\* \* \*

Microsoft Corporation requests expedited treatment of the Petition and Application. It is also willing to provide promptly any additional information the Department thinks it needs to act with expedition.

**VI. CONCLUSION.**

DOE should grant the requested waiver and interim waiver for the models listed in Appendix I hereto.

Respectfully  
submitted,

Ted Eckert  
Microsoft Corporation  
7 June, 2017

## APPENDIX I

The waiver and interim waiver requested herein should apply to testing and rating of the following basic models: AC-100

## APPENDIX II

The following are manufacturers of all other basic models distributed in commerce in the United States and known to Microsoft Corporation to incorporate design characteristics similar to those found in the basic models that are the subject of the petition for waiver:

Acbel  
Active-Semi,  
Inc. Apple, Inc  
Bitland  
Chicony Power Technology  
Chrontel, Inc  
Dell  
HONOR ELECTRONIC CO.LTD  
Huntkey  
Ever Win International  
Corp. Griffin Technology  
LLC  
LG Electronics USA, Inc  
Liteon  
Lucent Trans Electronics Co.,  
Ltd. Mobileconn Technology  
Co., Ltd. Pihong Technology  
Co., Ltd.  
Poin2 Lab.  
Renesas Electronics Corp.  
Salcomp Plc  
Samsung  
STMicroelectronics  
Superior  
Communications Texas  
Instruments  
Ventev Mobile  
Weltrend Semiconductor  
Xentris Wireless

*Sources include: "USB Power Brick", USB Implementers Forum, Inc.*

*Accessed < <http://www.usb.org/kcompliance/view/CertifiedUSBPowerBricks.pdf>*

THE  
UNITED STATES DEPARTMENT OF ENERGY  
WASHINGTON, D.C. 20585

In the Matter of:

Energy Efficiency Program: Test Procedure for External Power Supplies

Docket No. EERE-2014-BT-TP-0043; RIN 1904-AD36

**PETITION OF POIN2 LAB. FOR WAIVER AND APPLICATION FOR  
INTERIM WAIVER OF TEST PROCEDURE FOR EXTERNAL POWER SUPPLIES**

Poin2 Lab. respectfully submits this Petition for Waiver and Application for Interim Waiver<sup>1</sup> as related to the Department of Energy's (DOE) test procedure for external power supplies (EPS)<sup>2</sup> as applied to certain adaptive EPSs.<sup>3</sup>

Poin2 Lab. is located at 1404 Seoul Forest L-Tower, Seongdong-Gu, Seoul, 14789, South Korea. Telephone: (+82) 02-552-9012.

The adaptive EPS basic models listed in Appendix I hereto meet the criteria for a waiver.<sup>4</sup> The current DOE test procedure evaluates the models in a manner that is that is grossly unrepresentative of their actual energy consumption characteristics in real-world usage. This situation has already been recognized by DOE, and it has indicated a willingness to review the situation. Poin2 Lab. urges that a waiver be granted that will provide for the alternate test procedure discussed herein, under which lowest voltage average efficiency would be measured at 10 watts (W). This is far more representative of

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<sup>1</sup> See 10 C.F.R. § 430.27 (waiver and interim waiver).

<sup>2</sup> *Id.* Part 430, Subpart B, Appendix Z.

<sup>3</sup> An adaptive EPS is an external power supply that can alter its output voltage during active- mode based on an established digital communication protocol with the end-use application without any user-generated action. 10 C.F.R. § 430.2.

<sup>4</sup> *Id.* § 430.27(f)(2).

actual energy consumption characteristics of the product in real-world usage than the 15W required by the current DOE test procedure. DOE “will grant a waiver from the test procedure requirements” in these circumstances.<sup>5</sup>

**I. BASIC MODELS FOR WHICH A WAIVER IS REQUESTED.**

The basic models for which a waiver is requested are the adaptive EPSs set forth in Appendix I hereto. They are manufactured by Chicony Power Technology and are distributed in commerce under the Chicony brand name.

**II. NEED FOR THE REQUESTED WAIVER.**

Adaptive EPSs are highly beneficial products. They allow efficient charging with less resistive loss. They can be readily reused when devices are replaced; thus, there is less need to include EPSs in the box with a new device. This all is of significant benefit to the consumer – as well as to the environment, including reduced landfill, packaging, and transportation.

Under the current DOE test procedure, average active-mode efficiency for adaptive EPSs is to be measured by testing the unit twice – once at the highest achievable output voltage and once at the lowest.<sup>6</sup> Testing is to be across four load points (100%, 75%, 50%, and 25%) for each of the highest and lowest voltage levels.<sup>7</sup> The average efficiency is deemed to be the arithmetic mean of the efficiency values calculated at the four load points.<sup>8</sup>

The lowest achievable output voltage supported by the basic models is 5 volts (V). They are designed to provide a maximum power of 15W when this voltage is selected. 15W is an element

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<sup>5</sup> *Id.*

<sup>6</sup> *Id.* Part 430, Subpart B, Appendix Z, § 4(a)(i)(E).

<sup>7</sup> *Id.* §§ 4(a)(i)(C), (E), (H).

<sup>8</sup> *Id.* § 4(a)(i)(H).

of the USB Power Delivery Specification,<sup>9</sup> which requires the product to support 15W at 5V. However, adaptive EPSs do not exceed 10W for almost all usage. 15W at 5V will only be used in rare use scenarios and only for brief periods of time. Therefore, the DOE test procedure's evaluation at this power level is unrepresentative of the true energy consumption of the basic models in real-world usage.

In that regard, where the adaptive EPS listed in Appendix I is used with an intended end use product (IEUP) manufactured by Poin2 Lab.,<sup>10</sup> the adaptive EPS is required to support 15W (5V 3A [amps]) due to the USB Power Delivery Specification, but the IEUP product very rarely consumes this level of power. The IEUP charges at 5 volts only (i) with respect to a dead battery, 0.5A, i.e., 2.5W, for up to 120 seconds; or (ii) for end of charge (battery fully charged - trickle power at < 0.5A). Therefore, evaluation of adaptive EPSs at the 15W power level is grossly unrepresentative of the actual energy consumption characteristics of these models in real- world usage.

The same holds true of other end use products (OEUP)<sup>11</sup> manufactured by Poin2 Lab. that can be connected to basic models of adaptive EPSs listed in Appendix I hereto.

The situation is the same for basic models of adaptive EPSs listed in Appendix 1 to be used with OEUPs from another manufacturer. These OEUPs are highly likely to be mobile  
*[sic]*

As shown in Table 1, mobile phones dominate the portable device market and are ubiquitous world-wide. The most likely OEUP to be charged from an adaptive EPS is a

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<sup>9</sup> IEC 62680-1-2:2017, Universal serial bus interfaces for data and power – Part 1-2: Common components – USB Power Delivery Specification. See <https://webstore.iec.ch/publication/26174>.

<sup>10</sup> An IEUP is a product that is sold or intended to be used with the unit under test (UUT) and constitutes the primary load for the UUT.

<sup>11</sup> An OEUP is a product other than an IEUP that can be used with the UT and constitutes the primary load for the UUT.

mobile phone. Note that all mobile phones are able to be charged from an adaptive EPS using an appropriate cable.

### **TABLE 1**

See the following website for figures of the “TABLE 1”:

<https://www.regulations.gov/docket?D=EERE-2017-BT-WAV-0043>

As shown in Table 2, smartphones dominate the U.S. market.

### **TABLE 2**

See the following website for figures of the “TABLE 2”:

<https://www.regulations.gov/docket?D=EERE-2017-BT-WAV-0043>

Table 3 demonstrates that the vast majority of the shipments supporting mobile phones and tablets charge at 10W or less at 5V. For mobile phones and tablets sold in 2016: 97% of North American shipments and 97.4% of worldwide shipments charge below 10W at 5V. For charging at and above 10W at 5V the comparable numbers for smartphones and tablets sold in 2016 represented a mere 3% of North American shipments and 2.6% of worldwide shipments.<sup>12</sup> These figures include the introduction in 2016 of smartphones that use USB Type-C as the phone’s charging interface. Some of

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<sup>12</sup> Laptops are not included in the market analysis. They usually do not charge from adaptive EPSs. Newly introduced laptops that can charge from adaptive EPSs typically only charge at 5V (i) with respect to a dead battery, 0.5A, i.e., 2.5W, for up to 120 seconds; or (ii) for end of charge (battery fully charged - trickle power at < 0.5A). Non-IT products such as children’s toys that charge usually charge using default power (0.5A, 2.5W); some use 1.5A, 7.5W.

these have the capability of charging at  $\geq 10\text{W}$  at  $5\text{V}$ , but the proportion is not known so a conservative assumption is made (see below). Furthermore, some of these are capable of exploiting the ability of an adaptive EPS to provide higher voltages, and thus would be expected to use these higher voltages for faster charging and not charge at  $\geq 10\text{W}$  at  $5\text{V}$ , but again the proportion is not known. (The proportion of USB Type-C smartphones that exploit the capabilities of adaptive EPSs might grow in the future to some extent.) In the figures above and in Table 3 the generous assumption is made that all such phones can charge at  $\geq 10\text{W}$  at  $5\text{V}$ .

### TABLE 3

See the following website for figures of the “TABLE 1”:

<https://www.regulations.gov/docket?D=EERE-2017-BT-WAV-0043>

Distortion caused by the test procedure as applied for efficiency of adaptive EPSs at the lowest voltage level was highlighted during the test procedure rulemaking for EPSs.

It was stressed that the test procedure for the lowest voltage level does not reflect actual use in the field.<sup>13</sup> DOE was receptive and indicated that it could make changes when more information was known. “[I]n response to comments, in response to changing markets, in response to innovative technologies, we can always change the way we do things in the future.”<sup>14</sup> DOE also stated that it had not done any data collection on adaptive EPSs yet.<sup>15</sup>

DOE’s final test procedure rule<sup>16</sup> acknowledged that adaptive EPSs are a “new EPS technology,” are “unique among EPSs” and “were not considered when the current test

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<sup>13</sup> DOE, Transcript, External Power Supply Test Procedure NOPR Meeting at 94-100 (Nov. 21, 2014).

<sup>14</sup> Transcript at 99 (Ashley Armstrong, DOE).

<sup>15</sup> *Id.* at 108 (Jeremy Domm, DOE).

<sup>16</sup> 80 Fed. Reg. 51424 (Aug. 25, 2015).

procedure was first adopted.” Therefore, that test procedure “did not explicitly address the unique characteristics of these types of EPSs to ensure reproducible and repeatable results.”<sup>17</sup>

Virtually acknowledging the problem with the unrepresentative nature of the test procedure at the lowest voltage level, DOE also stated:

At higher output voltages, EPSs typically have greater efficiency due to a lower loss ratio of the fixed voltage drops in the conversion circuitry to the nominal output voltage. These losses do not increase linearly with output voltage, so higher output voltages typically provide greater conversion efficiency.<sup>18</sup>

### **III. PROPOSED ALTERNATE TEST PROCEDURE**

Poin2 Lab. proposes the following alternate test procedure to evaluate the performance of the basic models listed in Appendix I hereto.

Poin2 Lab. shall be required to test the performance of the basic models listed in Appendix I according to the test procedures for adaptive EPSs in 10 C.F.R. Part 430, Subpart B, Appendix Z, except that it shall modify test measurements calculation for 5V (lowest voltage level [LV]):

- Measure at 4 points: 100%, 75%, 50%, & 25% of 10 W load points at 5V (LV).
- Take the average.
- Compare results against DOE efficiency requirement at 10W.

The waiver should continue until DOE adopts an applicable amended test procedure.

### **IV. REQUEST FOR INTERIM WAIVER.**

Poin2 Lab. also requests an interim waiver for its testing and rating of the models in Appendix I. The petition for waiver is likely to be granted, as evidenced by its merits. Without waiver relief, Poin2 Lab. would be subject to requirements that clearly

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<sup>17</sup> *Id.* 51426, 51431-32.

<sup>18</sup> *Id.* 51432.

should not apply to such products. And without such relief, Poin2 Lab. will suffer economic hardship. Sales of adaptive EPSs will be inhibited, to the detriment of Poin2 Lab. and to users and distributors of adaptive EPSs and the products that use adaptive EPSs.

v. **LIST OF MANUFACTURERS**

A list of manufacturers of all other basic models distributed in commerce in the United States and known to Poin2 Lab. to incorporate design characteristic(s) similar to those found in the basic models that are the subject of the petition is set forth in Appendix II hereto.

\* \* \*

Poin2 Lab. requests expedited treatment of the Petition and Application. It is also willing to provide any additional information the Department thinks it needs to act with expedition.

vi. **Conclusion**

DOE should grant Poin2 Lab the requested waiver and interim waiver for the models listed in Appendix I hereto.

Respectfully submitted,

Jeongseon Euh

June 7, 2017

## **APPENDIX I**

The waiver and interim waiver requested herein should apply to testing and rating of the following basic models: A16-045N1A

**APPENDI  
X II**

The following are manufacturers of all other basic models distributed in commerce in the United States and known to Poin2 Lab. to incorporate design characteristics similar to those found in the basic models that are the subject of the petition for waiver:

Acbel  
Active-Semi,  
Inc. Apple,  
Inc Bitland  
Chicony Power Technology  
Chrontel, Inc  
Dell  
HONOR ELECTRONIC CO.LTD  
Huntkey  
Ever Win International  
Corp. Griffin Technology  
LLC  
LG Electronics USA, Inc  
Liteon  
Lucent Trans Electronics Co.,  
Ltd. Mobileconn Technology  
Co., Ltd. Pihong Technology  
Co., Ltd.  
Renesas Electronics Corp.  
Salcomp Plc  
Samsung  
STMicroelectronics  
Superior  
Communications Texas  
Instruments  
Ventev Mobile  
Weltrend Semiconductor  
Xentris Wireless

*Sources include: "USB Power Brick", USB Implementers Forum, Inc.*

*Accessed < <http://www.usb.org/kcompliance/view/CertifiedUSBPowerBricks.pdf>*

BEFORE THE  
UNITED STATES DEPARTMENT OF ENERGY  
WASHINGTON, D.C. 20585

In the Matter of:

Energy Efficiency Program: Test Procedure for External Power Supplies

Docket No. EERE-2014-BT-TP-0043; RIN 1904-AD36

**PETITION OF HEFEI BITLAND INFORMATION TECHNOLOGY CO.,  
LTD. FOR WAIVER AND APPLICATION FOR  
INTERIM WAIVER OF TEST PROCEDURE FOR EXTERNAL POWER SUPPLIES**

Hefei Bitland Information Technology Co., Ltd. (Bitland) respectfully submits this Petition for Waiver and Application for Interim Waiver<sup>19</sup> as related to the Department of Energy's (DOE) test procedure for external power supplies (EPS)<sup>20</sup> as applied to certain adaptive EPSs.<sup>21</sup>

Bitland is located at No. 4088, Jinziu Road, National Hefei Economic & Technology Development Area, Hefei, Anhui, China. Telephone: 0755-6685.2000 ext. 81379.

The adaptive EPS basic models listed in Appendix I hereto meet the criteria for a waiver.<sup>22</sup> The current DOE test procedure evaluates the models in a manner that is that is grossly unrepresentative of their actual energy consumption characteristics in real-world usage. This situation has already been recognized by DOE, and it has indicated a willingness to review the situation. Bitland urges that a waiver be granted that will provide for the alternate test

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<sup>19</sup> See 10 C.F.R. § 430.27 (waiver and interim waiver).

<sup>20</sup> *Id.* Part 430, Subpart B, Appendix Z.

<sup>21</sup> An adaptive EPS is an external power supply that can alter its output voltage during active-mode based on an established digital communication protocol with the end-use application without any user-generated action. 10 C.F.R. § 430.2.

<sup>22</sup> *Id.* § 430.27(f)(2).

procedure discussed herein, under which lowest voltage average efficiency would be measured at 10 watts (W). This is far more representative of actual energy consumption characteristics of the product in real-world usage than the 15W required by the current DOE test procedure. DOE “will grant a waiver from the test procedure requirements” in these circumstances.<sup>23</sup>

**VII. BASIC MODELS FOR WHICH A WAIVER IS REQUESTED.**

The basic models for which a waiver is requested are the adaptive EPSs set forth in Appendix I hereto. They are manufactured by Chicony Power Technology and are distributed in commerce under the Chicony brand name.

**VIII. NEED FOR THE REQUESTED WAIVER.**

Adaptive EPSs are highly beneficial products. They allow efficient charging with less resistive loss. They can be readily reused when devices are replaced; thus, there is less need to include EPSs in the box with a new device. This all is of significant benefit to the consumer – as well as to the environment, including reduced landfill, packaging, and transportation.

Under the current DOE test procedure, average active-mode efficiency for adaptive EPSs is to be measured by testing the unit twice – once at the highest achievable output voltage and once at the lowest.<sup>24</sup> Testing is to be across four load points (100%, 75%, 50%, and 25%) for each of the highest and lowest voltage levels.<sup>25</sup> The average efficiency is deemed to be the arithmetic mean of the efficiency values calculated at the four load points.<sup>26</sup> The lowest achievable output voltage supported by the basic models is 5 volts (V). They are designed to provide a maximum power of 15W when this voltage is selected. 15W is an element of the USB Power Delivery Specification,<sup>27</sup> which requires the product to support

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<sup>23</sup> *Id.*

<sup>24</sup> *Id.* Part 430, Subpart B, Appendix Z, § 4(a)(i)(E).

<sup>25</sup> *Id.* §§ 4(a)(i)(C), (E), (H).

<sup>26</sup> *Id.* § 4(a)(i)(H).

<sup>27</sup> IEC 62680-1-2:2017, Universal serial bus interfaces for data and power – Part 1-2: Common components –

15W at 5V. However, adaptive EPSs do not exceed 10W for almost all usage. 15W at 5V will only be used in rare use scenarios and only for brief periods of time. Therefore, the DOE test procedure's evaluation at this power level is unrepresentative of the true energy consumption of the basic models in real-world usage.

In that regard, where the adaptive EPS listed in Appendix I is used with an intended end use product (IEUP) manufactured by Bitland,<sup>28</sup> the adaptive EPS is required to support 15W (5V 3A [amps]) due to the USB Power Delivery Specification, but the IEUP product very rarely consumes this level of power. The IEUP charges at 5 volts only (i) with respect to a dead battery, 0.5A, i.e., 2.5W, for up to 120 seconds; or (ii) for end of charge (battery fully charged - trickle power at < 0.5A). Therefore, evaluation of adaptive EPSs at the 15W power level is grossly unrepresentative of the actual energy consumption characteristics of these models in real- world usage.

The same holds true of other end use products (OEUP)<sup>29</sup> manufactured by Bitland that can be connected to basic models of adaptive EPSs listed in Appendix I hereto.

The situation is the same for basic models of adaptive EPSs listed in Appendix 1 to be used with OEUPs from another manufacturer. These OEUPs are highly likely to be mobile

As shown in Table 1, mobile phones dominate the portable device market and are ubiquitous world-wide. The most likely OEUP to be charged from an adaptive EPS is a mobile phone. Note that all mobile phones are able to be charged from an adaptive EPS using an appropriate cable.

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USB Power Delivery Specification. See <https://webstore.iec.ch/publication/26174>.

<sup>28</sup> An IEUP is a product that is sold or intended to be used with the unit under test (UUT) and constitutes the primary load for the UUT.

<sup>29</sup> An OEUP is a product other than an IEUP that can be used with the UT and constitutes the primary load for the UUT.

## TABLE 1

See the following website for figures of the “TABLE 1”:

<https://www.regulations.gov/docket?D=EERE-2017-BT-WAV-0043>

As shown in Table 2, smartphones dominate the U.S. market.

## TABLE 2

See the following website for figures of the “TABLE 2”:

<https://www.regulations.gov/docket?D=EERE-2017-BT-WAV-0043>

Table 3 demonstrates that the vast majority of the shipments supporting mobile phones and tablets charge at 10W or less at 5V. For mobile phones and tablets sold in 2016: 97% of North American shipments and 97.4% of worldwide shipments charge below 10W at 5V. For charging at and above 10W at 5V the comparable numbers for smartphones and tablets sold in 2016 represented a mere 3% of North American shipments and 2.6% of worldwide shipments.<sup>30</sup> These figures include the introduction in 2016 of smartphones that use USB Type-C as the phone’s charging interface. Some of these have the capability of charging at  $\geq 10W$  at 5V, but the proportion is not known so a conservative assumption is made (see below). Furthermore, some of these are capable of exploiting the ability of an adaptive EPS to provide higher voltages, and thus would be

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<sup>30</sup> Laptops are not included in the market analysis. They usually do not charge from adaptive EPSs. Newly introduced laptops that can charge from adaptive EPSs typically only charge at 5V (i) with respect to a dead battery, 0.5A, i.e., 2.5W, for up to 120 seconds; or (ii) for end of charge (battery fully charged - trickle power at  $< 0.5A$ ). Non-IT products such as children’s toys that charge usually charge using default power (0.5A, 2.5W); some use 1.5A, 7.5

expected to use these higher voltages for faster charging and not charge at  $\geq 10\text{W}$  at 5V, but again the proportion is not known. (The proportion of USB Type-C smartphones that exploit the capabilities of adaptive EPSs might grow in the future to some extent.) In the figures above and in Table 3 the generous assumption is made that all such phones can charge at  $\geq 10\text{W}$  at 5V.

### TABLE 3

See the following website for figures of the “TABLE 1”:

<https://www.regulations.gov/docket?D=EERE-2017-BT-WAV-0043>

Distortion caused by the test procedure as applied for efficiency of adaptive EPSs at the lowest voltage level was highlighted during the test procedure rulemaking for EPSs.

It was stressed that the test procedure for the lowest voltage level does not reflect actual use in the field.<sup>31</sup> DOE was receptive and indicated that it could make changes when more information was known. “[I]n response to comments, in response to changing markets, in response to innovative technologies, we can always change the way we do things in the future.”<sup>32</sup> DOE also stated that it had not done any data collection on adaptive EPSs yet.<sup>33</sup>

DOE’s final test procedure rule<sup>34</sup> acknowledged that adaptive EPSs are a “new EPS technology,” are “unique among EPSs” and “were not considered when the current test procedure was first adopted.” Therefore, that test procedure “did not explicitly address the unique characteristics of these types of EPSs to ensure reproducible and repeatable results.”<sup>35</sup>

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<sup>31</sup> DOE, Transcript, External Power Supply Test Procedure NOPR Meeting at 94-100 (Nov. 21, 2014).

<sup>32</sup> Transcript at 99 (Ashley Armstrong, DOE).

<sup>33</sup> *Id.* at 108 (Jeremy Domm, DOE).

<sup>34</sup> 80 Fed. Reg. 51424 (Aug. 25, 2015).

<sup>35</sup> *Id.* 51426, 51431-32.

Virtually acknowledging the problem with the unrepresentative nature of the test procedure at the lowest voltage level, DOE also stated:

At higher output voltages, EPSs typically have greater efficiency due to a lower loss ratio of the fixed voltage drops in the conversion circuitry to the nominal output voltage. These losses do not increase linearly with output voltage, so higher output voltages typically provide greater conversion efficiency.<sup>36</sup>

**IX. PROPOSED ALTERNATE TEST PROCEDURE**

Bitland. proposes the following alternate test procedure to evaluate the performance of the basic models listed in Appendix I hereto.

Bitland shall be required to test the performance of the basic models listed in Appendix I according to the test procedures for adaptive EPSs in 10 C.F.R. Part 430, Subpart B, Appendix Z, except that it shall modify test measurements calculation for 5V (lowest voltage level [LV]):

- Measure at 4 points: 100%, 75%, 50%, & 25% of 10 W load points at 5V (LV).
- Take the average.
- Compare results against DOE efficiency requirement at 10W.

The waiver should continue until DOE adopts an applicable amended test procedure.

**X. REQUEST FOR INTERIM WAIVER.**

Bitland also requests an interim waiver for its testing and rating of the models in Appendix I. The petition for waiver is likely to be granted, as evidenced by its merits. Without waiver relief, Bitland would be subject to requirements that clearly should not apply to such products. And without such relief, Bitland will suffer economic hardship. Sales of adaptive EPSs will be inhibited, to the detriment of Bitland and to users and

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<sup>36</sup> *Id.* 51432.

distributors of adaptive EPSs and the products that use adaptive EPSs.

**XI. LIST OF MANUFACTURER**

A list of manufacturers of all other basic models distributed in commerce in the United States and known to Bitland to incorporate design characteristic(s) similar to those found in the basic models that are the subject of the petition is set forth in Appendix II hereto.

\* \* \*

Bitland requests expedited treatment of the Petition and Application. It is also willing to provide any additional information the Department thinks it needs to act with expedition.

**XII. Conclusion**

DOE should grant Bitland the requested waiver and interim waiver for the models listed in Appendix I hereto.

Respectfully submitted,

Robert Hsiao

June 22, 2017

## **APPENDIX I**

The waiver and interim waiver requested herein should apply to testing and rating of the following basic models: A045R053L provided by Chicony Power Technology.

## APPENDIX II

The following are manufacturers of all other basic models distributed in commerce in the United States and known to Bitland to incorporate design characteristics similar to those found in the basic models that are the subject of the petition for waiver:

Acbel  
Active-  
Semi, Inc.  
Apple, Inc  
Bitland  
Chicony Power  
Technology Chrontel, Inc  
Dell  
HONOR ELECTRONIC CO.LTD  
Huntkey  
Ever Win International  
Corp. Griffin Technology  
LLC  
LG Electronics USA, Inc  
Liteon  
Liteon  
Lucent Trans Electronics  
Co., Ltd. Mobileconn  
Technology Co., Ltd.  
Phihong Technology Co.,  
Ltd.  
Poin2 Lab.  
Renesas Electronics  
Corp. Salcomp Plc  
Samsung  
STMicroelectronics  
Superior  
Communications  
Texas Instruments  
Ventev Mobile  
Weltrend Semiconductor  
Xentris Wireless

*Sources include: "USB Power Brick", USB Implementers Forum, Inc.*

*Accessed < <http://www.usb.org/kcompliance/view/CertifiedUSBPowerBricks.pdf>*

[FR Doc. 2017-15134 Filed: 7/21/2017 8:45 am; Publication Date: 7/24/2017]