



ENERGY STAR® Program Requirements Product Specification for Telephony

Final Test Method Rev. Nov-2013

1 OVERVIEW

The following test method shall be used for determining product compliance with requirements in the ENERGY STAR Eligibility Criteria for Telephony.

2 APPLICABILITY

ENERGY STAR test requirements are dependent upon the features of the product under evaluation. The following guidelines shall be used to determine the applicability of each section of this document:

- The test procedures in Section 6.2 shall be performed on all products.
- The test procedures in Section 6.3 shall be performed on all products that are capable of entering Off Mode.

Table 1. Test Procedure Applicability

Product Configuration	Test Procedure Section	
	6.2 Partial On Mode	6.3 Off Mode*
Corded Telephone	X	* Off Mode shall be tested when available.
Cordless Telephone	X	
Conference Telephone	X	
Additional Handset	X	
WiFi Telephone	X	

3 DEFINITIONS

Unless otherwise specified, all terms used in this document are consistent with the definitions contained in the ENERGY STAR Product Specification for Telephony.

4 TEST SETUP

4.1 Test Setup for All Products

- A) **Test Setup and Instrumentation:** Test setup and instrumentation for all portions of this method shall be in accordance with the requirements of International Electrotechnical Commission (IEC) 62301, Ed. 2.0, "Household Electrical Appliances – Measurement of Standby Power," Section 4, "General Conditions for Measurements" (IEC 62301, Ed. 2.0, 2011), unless otherwise noted in this document. In the event of conflicting requirements, the ENERGY STAR Test Method shall take precedence.

B) Input Power:

- 1) When testing with a Power over Ethernet (PoE) source, the UUT shall be connected to a Power Sourcing Equipment (PSE) voltage source of 53 ± 2 volts during testing. The PSE voltage source must be IEEE 802.3-2012 compliant.
 - a. Lower voltages required for detection and classification of Powered Devices (PD) may be used prior to testing.
- 2) When testing with power from ac mains, the UUT shall be connected to a voltage source appropriate for the intended market, as specified in Table 2.

Table 2: Input Power Requirements for Ac-Powered Products

Market	Voltage	Voltage Tolerance	Maximum Total Harmonic Distortion	Frequency	Frequency Tolerance
North America, Taiwan	115 V ac	+/- 1.0 %	2.0 %	60 Hz	+/- 1.0 %
Europe, Australia, New Zealand	230 V ac	+/- 1.0 %	2.0 %	50 Hz	+/- 1.0 %
Japan	100 V ac	+/- 1.0 %	2.0 %	50 Hz or 60 Hz	+/- 1.0 %

C) Ambient Temperature: Ambient temperature shall remain at $23^{\circ} \text{C} \pm 5^{\circ} \text{C}$, for the duration of the test.

D) Relative Humidity: Relative humidity shall remain between 10% and 80%, for the duration of the test.

E) Ac Power Meter: When measuring ac power, power meters shall possess the following attributes:

1) Crest Factor:

- a. An available current crest factor of 3 or more at its rated range value; and
- b. Lower bound on the current range of 10 mA or less.

2) Minimum Frequency Response: 3.0 kHz

3) Minimum Resolution:

- a. 0.01 W for measurement values less than 10 W;
- b. 0.1 W for measurement values from 10 W to 100 W; and
- c. 1.0 W for measurement values greater than 100 W.

4) Measurement Accuracy:

- a. Power measurements with a value greater than or equal to 0.5 W shall be made with an uncertainty of less than or equal to 2% at the 95% confidence level.
- b. Power measurements with a value of less than 0.5 W shall be made with an uncertainty of less than or equal to 0.01 W at the 95% confidence level.

F) PoE Power Meter: When measuring a PoE PD, power meters shall possess the following attributes:

- 1) Cable Compatibility: Capable of measuring Power over Ethernet connections directly from the Category 5 (enhanced) or 6 (CAT 5e/6) cable, regardless of the PoE method (PD operating modes) as specified by IEEE 802.3-2012.
- 2) Enables Ethernet link and packet traffic flow to the Unit Under Test (UUT) from a link partner at all network speeds at which the UUT is capable.
- 3) Acts as a PSE or allows another PSE to source power to the UUT.

- 4) Minimum Resolution:
 - a. 0.01 W for measurement values less than 10 W;
 - b. 0.1 W for measurement values from 10 W to 100 W; and
 - c. 1.0 W for measurement values greater than 100 W.
- 5) Measurement Accuracy:
 - a. Power measurements shall have an accuracy of less than or equal to $\pm (2\% + 0.1 \text{ W})$.
- 6) Cable Length: A one meter CAT 5e/6 cable shall be used between the power meter and the UUT for all testing.

5 TEST CONDUCT

5.1 Test Conduct for All Products

- A) As-shipped Condition: The UUT shall be tested in its “as-shipped” condition including, but not limited to, display brightness settings, unless otherwise specified by this test method.
- B) Battery-powered Products: If the UUT contains rechargeable batteries, or can be integrated with another device that contains rechargeable batteries, all batteries shall be fully charged prior to the start of testing and shall remain in place for the duration of testing.
- C) Accessories: All UUTs shipped with accessories shall be tested with all accessories set up as specified in the manufacturer instructions.
- D) UUTs sold with Additional Handsets: UUTs sold with Additional Handsets as part of a multi-handset system shall be tested with two Additional Handsets connected and set up in their default configuration.
 - 1) Additional Handsets and the UUT shall be placed at least 1.2 meters above the floor. Additional Handsets shall be placed 3 ± 0.1 meters from the UUT with a direct line of sight between the Additional Handset and UUT.
 - 2) Additional Handsets set up for testing shall remain in Partial On Mode for the duration of testing.
 - 3) The model name and number of all Additional Handsets and accessories used during testing shall be reported.
- E) VoIP Server: Any standard configuration and/or equipment for creating a VoIP network is permitted. The UUT shall have a dial tone and be capable of receiving and making a phone call within the local VoIP network. A valid VoIP route to outside the local VoIP server is not required.
 - 1) The VoIP Server and all other network equipment shall be able to support the highest network speed at which the UUT is capable of operating.
- F) Energy Efficient Networking Protocols:
 - 1) If the UUT supports IEEE 802.3az protocol, all connected devices must support IEEE 802.3az.
 - 2) If the UUT supports Link Layer Discovery Protocol (LLDP)¹ for 802.3az, all connected devices must support LLDP for 802.3az.

¹ LLDP as defined in IEEE 802.1ab.

- G) Hybrid Telephones: Hybrid Telephones shall be tested as VoIP Telephones.
- H) PoE Telephones: All Telephones that can be powered using PoE shall be tested as PoE powered units.

6 TEST PROCEDURES FOR ALL PRODUCTS

6.1 UUT Preparation

- A) Set up the UUT in accordance with the manufacturer instructions, except where these conflict with the requirements of this test method. If no instructions for use are available, then the as-shipped settings shall be used.
- B) PoE Powered Units:
 - 1) Connect the UUT to the PoE power meter and connect the PoE power meter to a port on a suitable Switch. A suitable Switch is defined as a Switch that:
 - a. Supports the maximum network speed of the UUT's network connection.
 - b. Supports all PoE modes that the Telephone can support, unless PoE power is supplied by the PoE power meter.
 - 2) Units that can utilize an alternate power source, as well as PoE, shall be tested using the PoE connection.
 - 3) Set up the Switch according to manufacturer instructions and connect it to the VoIP Server.
 - 4) Configure the VoIP Server and Telephone to prepare for making and receiving calls locally to the VoIP Server and the VoIP system the server implements.
 - a. Record the manufacturer and model number of the VoIP Server.
 - b. Set the network speed to the UUT's highest supported speed.
 - c. In the event that a VoIP Server setting does not have a default and is not specified in this test method, the setting shall be set according to the tester's discretion and recorded.
- C) Ac Powered Units:
 - 1) Set up the UUT in its standard configuration, utilizing any included EPSs, if applicable. Connect an approved power meter to an ac line set to the appropriate voltage and frequency as specified in Table 2.
 - 2) Plug the UUT into the measurement outlet on the power meter. No power strips or uninterruptible power supply (UPS) units shall be connected between the UUT and the meter.
 - 3) Connect the UUT to a suitable external telephone jack for Analog Telephones or a suitable VoIP Server for Hybrid and WiFi Telephones.
 - a. When testing Additional Handsets, the UUT shall be connected to a multi-handset Telephone system and be capable of making calls.
 - b. In the case that a working telephone line is not available, a Ringdown Simulator may be used as a replacement. Another Telephone must be connected to the Ringdown Simulator.
 - c. For WiFi Telephones, set up a WiFi network according to manufacturer instructions and connect the UUT to the WiFi network. The WiFi network shall be connected to a VoIP Server.
 - 4) The UUT shall be capable of making a call across either the Public Switched Telephone Network (PSTN), a Ringdown Simulator, or a VoIP network, for WiFi Telephones and Hybrid Telephones.

D) For VoIP and Hybrid Telephones with Data Switch Ports:

- 1) Connect a personal computer to the UUT Data Switch Port. Ensure that the computer is on and that this is the computer's only network connection. Ensure that the computer recognizes this connection.

6.2 Partial On Mode Measurement

A) For UUTs with Cordless Telephones, Additional Handsets, and WiFi Telephones:

- 1) Place the handset with a fully charged battery in the cradle at least 2 hours prior to the beginning of testing.
- 2) Ensure the UUT is in the Partial On Mode.
- 3) If the UUT can be placed in Call Origination Mode while the handset is in the cradle:
 - a. Place the UUT in Call Origination Mode for less than 1 minute.
 - b. Confirm the presence of a dial tone.
 - c. Return the UUT to Partial On Mode.
- 4) If the UUT cannot be placed in Call Origination Mode while the handset is in the cradle:
 - a. Remove the handset from the cradle.
 - b. Confirm the presence of a dial tone.
 - c. Place the handset back into the cradle, within one minute of removing it, and return the UUT to Partial On Mode.
 - d. Wait 10 minutes.
- 5) Measure and record the ac input voltage and frequency.
- 6) Set the meter to begin accumulating true power values at a rate greater than or equal to 1 reading per second. Accumulate power values for 2 hours and record the average (arithmetic mean) value.

B) For all other UUTs:

- 1) Ensure that the UUT is in the Partial On Mode.
- 2) Verify that there is a dial tone, then return the Telephone to the "on the hook" configuration.
- 3) Wait 10 minutes.
- 4) Measure and record the ac input voltage and frequency.
- 5) Set the meter to begin accumulating true power values at a rate greater than or equal to 1 reading per second. Accumulate power values for 10 minutes and record the average (arithmetic mean) value.

6.3 Off Mode Measurement

A) Perform the following test on any Telephone capable of entering Off Mode:

- 1) Place the UUT in Partial On Mode.
- 2) Place the UUT in Off Mode, as instructed in the product's user manual. All physical connections (e.g., data or power cabling) required for Partial On Mode must remain connected during Off Mode testing.
 - a. The method used to place the UUT in Off Mode shall be reported.
- 3) Wait 10 minutes.
- 4) Measure and record the ac input voltage and frequency.

- 5) Set the meter to begin accumulating true power values at a rate greater than or equal to 1 reading per second. Accumulate power values for 10 minutes and record the average (arithmetic mean) value.

7 REFERENCES

- A) IEC 62301:2011. Household Electrical Appliances – Measurement of Standby Power. Ed. 2.0.
- B) IEEE 802.3-2012. IEEE Standard for Ethernet.
- C) IEEE 802.11-2012. IEEE Standard for Information Technology --Telecommunications and information exchange between systems Local and metropolitan area networks--Specific requirements Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications.