



# ENERGY STAR<sup>®</sup> Program Requirements for Telephony

## Partner Commitments

### Commitment

The following are the terms of the ENERGY STAR Partnership Agreement as it pertains to the manufacturing of ENERGY STAR qualified telephony products. The ENERGY STAR Partner must adhere to the following program requirements:

- comply with current ENERGY STAR Eligibility Criteria, defining the performance criteria that must be met for use of the ENERGY STAR certification mark on telephony products and specifying the testing criteria for telephony products. EPA may, at its discretion, conduct tests on products that are referred to as ENERGY STAR qualified. These products may be obtained on the open market, or voluntarily supplied by Partner at EPA's request;
- comply with current ENERGY STAR Logo Use Guidelines, describing how the ENERGY STAR labels and name may be used. Partner is responsible for adhering to these guidelines and for ensuring that its authorized representatives, such as advertising agencies, dealers, and distributors, are also in compliance;
- qualify at least one ENERGY STAR labeled telephony model within one year of activating the telephony portion of the agreement. When Partner qualifies the product, it must meet the specification (e.g., Tier 1 or 2) in effect at that time;
- provide clear and consistent labeling of ENERGY STAR qualified telephony products. The ENERGY STAR label must be clearly displayed on the top/front of product, on product packaging, in product literature (i.e., user manuals, spec sheets, etc.), and on the manufacturer's Internet site where information about ENERGY STAR qualified telephony is displayed;
- provide to EPA, on an annual basis, an updated list of ENERGY STAR qualifying telephony models. Once the Partner submits its first list of ENERGY STAR labeled telephony models, the Partner will be listed as an ENERGY STAR Partner. Partner must provide annual updates in order to remain on the list of participating product manufacturers. Charter Partners — companies that join the program prior to its launch — will be added to the Partner List immediately, will be designated as Charter Partners in the List, and, like all other Partners, will have one year to submit a list of qualifying products;
- provide to EPA, on an annual basis, unit shipment data or other market indicators to assist in determining the market penetration of ENERGY STAR. Specifically, Partner must submit the total number of ENERGY STAR qualified telephony products shipped (in units by model) or an equivalent measurement as agreed to in advance by EPA and Partner. Partner is also encouraged to provide ENERGY STAR qualified unit shipment data segmented by meaningful product characteristics (e.g., capacity, size, speed, or other as relevant), total unit shipments for each model in its product line, and percent of total unit shipments that qualify as ENERGY STAR. The data for each calendar year should be submitted to EPA, preferably in electronic format, no later than the following March and may be provided directly from the Partner or through a third party. The data will be used by EPA only for program evaluation purposes and will be closely controlled. If requested under the Freedom of Information Act (FOIA), EPA will argue that the data is exempt. Any information used will be masked by EPA so as to protect the confidentiality of the Partner;
- notify EPA of a change in the designated responsible party or contacts for telephony products within 30 days.

## Performance for Special Distinction

In order to receive additional recognition and/or support from EPA for its efforts within the Partnership, the ENERGY STAR Partner may consider the following voluntary measures and should keep EPA informed on the progress of these efforts:

- consider energy efficiency improvements in company facilities and pursue the ENERGY STAR label for buildings;
- purchase ENERGY STAR labeled products. Revise the company purchasing or procurement specifications to include ENERGY STAR. Provide procurement officials' contact information to EPA for periodic updates and coordination. Circulate general ENERGY STAR labeled product information to employees for use when purchasing products for their homes;
- ensure the power management feature is enabled on all ENERGY STAR qualified monitors in use in company facilities, particularly upon installation and after service is performed;
- provide general information about the ENERGY STAR program to employees whose jobs are relevant to the development, marketing, sales, and service of current ENERGY STAR labeled product models;
- feature the ENERGY STAR label(s) on Partner Web site and in other promotional materials. If information concerning ENERGY STAR is provided on the Partner Web site as specified by the ENERGY STAR Web Linking Policy (this document can be found in the Partner Resources section on the ENERGY STAR Web site at [www.energystar.gov](http://www.energystar.gov)), EPA may provide links where appropriate to the Partner Web site;
- provide a simple plan to EPA outlining specific measures Partner plans to undertake beyond the program requirements listed above. By doing so, EPA may be able to coordinate, communicate, and/or promote Partner's activities, provide an EPA representative, or include news about the event in the ENERGY STAR newsletter, on the ENERGY STAR Web pages, etc. The plan may be as simple as providing a list of planned activities or planned milestones that Partner would like EPA to be aware of. For example, activities may include: (1) increase the availability of ENERGY STAR labeled products by converting the entire product line within two years to meet ENERGY STAR guidelines; (2) demonstrate the economic and environmental benefits of energy efficiency through special in-store displays twice a year; (3) provide information to users (via the Web site and user's manual) about energy-saving features and operating characteristics of ENERGY STAR qualified products, and (4) build awareness of the ENERGY STAR Partnership and brand identity by collaborating with EPA on one print advertorial and one live press event;
- provide quarterly, written updates to EPA as to the efforts undertaken by Partner to increase availability of ENERGY STAR qualified products, and to promote awareness of ENERGY STAR and its message.



## ENERGY STAR® Program Requirements for Telephony

### Eligibility Criteria

Below is the final product specification (Version 1.0) for ENERGY STAR qualified telephony. A product must meet all of the identified criteria if it is to be labeled as ENERGY STAR by its manufacturer.

- 1) **Definitions:** Below is a brief description of telephony products and their common operational modes as relevant to ENERGY STAR. The ENERGY STAR specification focuses on reducing energy consumption while the product is in the Standby Mode.
  - A. **Cordless Telephone:** A commercially available electronic product with a base station and a handset whose purpose is to convert sound into electrical impulses for transmission. Most of these devices require a wall pack for power, are plugged into an AC power outlet for 24 hours a day, and do not have a power switch to turn them off. To qualify, the base station of the cordless phone or its power supply must be designed to plug into a wall outlet and there must not be a physical connection between the portable handset and the phone jack.
  - B. **Answering Machine:** A commercially available electronic product—also known as a telephone answering device (TAD)—whose purpose is to provide analog or digital storage of outgoing and incoming telephone messages by connecting to the telephone line between the phone and the phone jack. Most of these devices require a wall pack for power and are plugged into an AC power outlet for 24 hours a day. To qualify, the answering machine or its power supply must be designed to plug into a wall outlet.
  - C. **Combination Cordless Telephone/Answering Machine:** A commercially available electronic product in which the cordless telephone and answering machine are combined into a single unit and which meets all of the following criteria: the answering machine is included in the base station of the cordless telephone; it is not possible to measure the power requirements of the two components separately without removal of the telephone casing; and the unit is connected to the wall outlet through a single power cable. Most of these devices require a wall pack for power, are plugged into an AC power outlet for 24 hours a day, and do not have a power switch to turn them off. To qualify, the combination unit or its power supply must be designed to plug into a wall outlet.
  - D. **Spread Spectrum Technology (SST):** There are two types of spread spectrum technology, direct sequence (e.g., digital spread spectrum or DSS) and frequency hoppers. Both types are available in some digital telephony products to provide enhanced transmission range, extendable portable numbers, and additional security. With this technology, the power requirement is typically greater than traditional analog models because the handsets and bases are always communicating with one another.
  - E. **Multi-Handset Model:** This cordless phone system requires only one base and phone jack and, as the name implies, can support multiple cordless handsets. Each handset added to the system comes with a battery and a charging base. Due to limited available data during the writing of this specification, multi-handset cordless telephones and combination units are not currently eligible for the ENERGY STAR label, but may be added in a future specification revision.
  - F. **Cellular Telephone:** A cellular telephone uses radio waves to connect to the cellular telephone carrier. Cellular telephones are not eligible to carry the ENERGY STAR label under this specification as they are not considered cordless telephones.

G. Cordless Telephone: Cordless telephones provide the same services as cordless telephones except that there is a physical connection between the handset and the jack, which limits the user's mobility while using the telephone. Cordless telephones may or may not require a wall pack for power. Cordless telephones and combination units are not covered by this cordless telephone specification and may not qualify as ENERGY STAR.

H. Wall Pack: A power supply commonly shipped with consumer electronic products that plugs into an AC power outlet on the wall.

I. Standby Mode: The product is connected to a power source and is inactive (i.e., the unit is not transmitting a conversation or recharging a low battery); in TAD the product is idle. In this mode, conventional units may consume energy to operate circuitry and to overcharge rechargeable batteries.

J. Active Mode: The product is connected to a power source and is transmitting telephone conversation, and/or playing/recording a message, and/or supplying current to a low battery to charge it. The power requirement in this mode is typically greater than the power requirement in Standby Mode.

K. Disconnect: The product is disconnected from all external power sources.

- 2) **Qualifying Products**: For the purposes of ENERGY STAR, telephony products include analog and digital cordless telephones, answering machines, and combination cordless telephones/answering machines using a variety of frequencies ranges (e.g., 5.8Ghz, 2.4Ghz, 900Mhz, 46/49Mhz). Any cordless telephone, answering machine, or combination cordless telephone/answering machine that is marketed to the consumer as such and meets the product definition in Section 1 is eligible for the ENERGY STAR label. Please note that cellular and corded telephones may not carry the label. In addition, multi-handset cordless telephones and multi-handset combination units are not currently eligible for the ENERGY STAR label, but may be added in a future specification revision.
- 3) **Energy-Efficiency Specifications for Qualifying Products**: Only those products listed in Section 2 that meet the criteria below may qualify as ENERGY STAR.

**Table 1: Energy-Efficiency Criteria for ENERGY STAR Qualified Telephony**

Product Category	Tier 1	Tier 2
	January 1, 2002 – December 31, 2003	January 1, 2004
	<b>Standby Mode</b>	<b>Standby Mode</b>
<ul style="list-style-type: none"> <li>• Answering Machine*</li> <li>• Cordless Telephone*</li> </ul>	≤ 3.3 watts	≤ 1.0 watt
<ul style="list-style-type: none"> <li>• Answering Machine with SST*</li> <li>• Cordless Telephone with SST*</li> </ul>	≤ 3.6 watts	≤ 1.5 watts
<ul style="list-style-type: none"> <li>• Combination Cordless Telephone/Answering Machine*</li> </ul>	≤ 4.0 watts	≤ 1.0 watt
<ul style="list-style-type: none"> <li>• Combination Cordless Telephone/Answering Machine with SST*</li> </ul>	≤ 5.1 watts	≤ 2.0 watts

**\*Note:** Any power consumed by an external power supply must be included when metering the unit for

ENERGY STAR qualification.

- 4) **Power Measurement:** Manufacturers are required to perform tests and self-certify those product models that meet the ENERGY STAR guidelines. The power requirement shall be measured from the outlet or power supply to the product under test (PUT). The product manufacturer (i.e., ENERGY STAR Partner) shall measure the average true power (in watts) of the product. When performing measurements to self-certify a product model, the products under test must be in the condition (e.g., configuration and settings) shipped to the customer.
- 5) **Test Criteria:** To ensure consistency in measuring the power requirements for electronics products, this protocol should be followed. Outlined in Section A are the ambient test conditions that should be respected when performing power measurements. These conditions ensure that outside factors do not affect the test results and that the test results can be reproduced. Sections B and C describe the specifications for testing equipment and the test method, respectively. Section D reviews responsibilities, while Section E covers continuing verification.

A. Test Conditions

*General Criteria:*

<b>Total Harmonic Distortion (Voltage):</b>	< 3% THD
<b>Ambient Temperature:</b>	22°C ± 4°C

*Terminations:* External speaker terminals terminated per 3.6.2.2 (IEC 107-1)

*Market-Specific Criteria:*

<b>Market:</b>	<b>United States</b>	<b>Europe and Australia</b>	<b>Japan</b>
<b>Voltage:</b>	115 V RMS ± 3 V RMS	230 V RMS ± 10 V RMS	100 V RMS ± 5 V RMS & 200 V RMS ± 10 V RMS
<b>Frequency:</b>	60 Hz ± 3 Hz	50 Hz ± 3 Hz	50 Hz ± 3 Hz & 60 Hz ± 3 Hz

Note: Testing needs to be done only at a voltage and frequency in the above range. It is not necessary to test all combinations of high voltage/low frequency, high voltage/high frequency, etc.

- B. **Test Equipment:** Manufacturers should measure and report the true standby power<sup>1</sup> requirements of the product. Doing so necessitates the use of a true power watt meter. Because there are many watt meters from which to choose, manufacturers need to exercise care in selecting an appropriate model. The following items should be considered when procuring equipment and performing the test:
1. AC Power Source (with sufficient output current for the test unit such that it meets the requirement for AC line voltage, frequency stability, and THD).
  2. True Power Meter (with sufficient accuracy, resolution, crest factor rating, and bandwidth).
  3. Oscilloscope with Current Probe (to monitor AC line current waveform, amplitude, and frequency. Optional but recommended).
  4. True RMS Volt Meter (to verify voltage at the input of test unit. Optional if AC source output is sufficiently accurate).

<sup>1</sup> True power is defined as (volts)x(amps)x(power factor) and is typically reported as watts. Apparent power is defined as (volts)x(amps) and is usually expressed in terms of VA or volt-amps. The power factor for equipment with switching power supplies is always less than 1.0; therefore, true power is always less than apparent power.

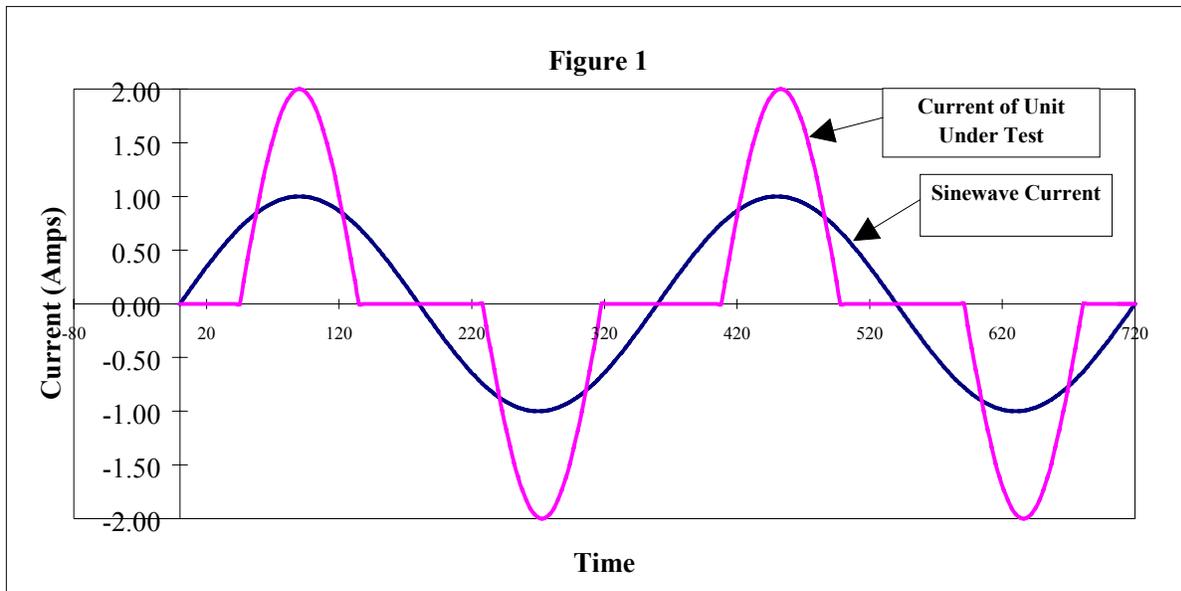
5. Frequency Counter (to verify frequency at the input of test unit. Optional if AC source output is sufficiently accurate).

**Crest Factor:** Electronics equipment may draw current that is not sinusoidal.<sup>2</sup> While virtually any watt meter can measure a standard current waveform, it is more difficult to select a watt meter when irregular current waveforms are involved.

It is critical that the watt meter selected be capable of reading the current drawn by the product without causing internal peak distortion (i.e., clipping off the top of the current wave). This requires a review of the meter's crest factor rating and the current ranges available on the meter. Better quality meters will have higher crest factor specifications and more choices of current ranges.

To determine the crest factor rating requirement of the meter and the proper current range settings, the peak current (amps) draw of the product under test in standby mode must first be measured. This can be accomplished using an oscilloscope with a current probe.

A current range on the meter must be selected that is sufficient to register the peak current. Specifically, the full-scale value of the selected current range multiplied by the crest factor of the meter (for current) must be at least 15 percent greater than the peak current reading from the oscilloscope to compensate for any measurement error. (Note: It is difficult to measure within 5 percent using an analog oscilloscope.) For example, if a watt meter has a crest factor of 4 and the current range is set on 3 amps, the meter can register current spikes of up to 12 amps. If measured peak current is only 6 amps, the meter would be satisfactory. If, however, the current range is set too high, the meter may lose accuracy in measuring non-peak current. Therefore, some delicate balancing is necessary. When choosing a meter, make sure that the crest factor is given for the current level that you desire.



<sup>2</sup> The crest factor of a current waveform is defined as the ratio of the peak current (amps) to the RMS current (amps). The crest factor for a sinusoidal 60 Hz current waveform is always 1.4. The crest factor for a current waveform associated with a product containing a switching power supply will always be greater than 1.4 (though typically no higher than 8).

*Frequency Response:* Another issue to consider when selecting a watt meter is the frequency response rating of the meter. Electronics equipment may cause harmonic waveforms that can lead to inaccuracies in the power measurements. For example, electronics equipment powered by switching power supplies typically produces odd harmonics up to the 21st. To ensure that the harmonics are properly addressed, ENERGY STAR recommends the use of a watt meter with frequency response of at least 3 kHz. This will account for harmonics up to the 50th, which is recommended by IEC 555.

*Resolution:* Manufacturers should choose a watt meter that can provide resolution of 0.1 watt or better.

*Accuracy:* Catalogues and specification sheets for watt meters typically provide information on the accuracy of power readings that can be achieved at different range settings. If the power measurement is very close to the energy-efficiency guideline specified in these Program Requirements (Eligibility Criteria), a test procedure with greater accuracy will be necessary. For example, if the ENERGY STAR specification is 1.0 watt or less *and* the resulting accuracy of the watt meter at the test settings is  $\pm 0.1$  watts, then a power measurement of less than 0.9 watts will ensure that the product qualifies for ENERGY STAR.

*Calibration:* To maintain their accuracy, watt meters should be calibrated every year with a standard that is traceable to the US National Bureau of Standards (NBS).

C. Test Method: Following are the test steps for measuring the true power requirements of the product under test (PUT) in standby mode.

1. Power the PUT. When rechargeable batteries are involved, the PUT must be fully charged (allow up to 24 hours). The PUT must be in an on-hook state. Cordless phones and combination units must have the handset on the cradle.
2. Power on all test equipment and properly adjust operation range. Connect the test equipment and PUT.
3. Check that the PUT is connected to an external phone jack before and during testing. This is done to ensure that the product is tested in a manner consistent with the way the consumer will use it.
4. Check that the PUT has all settings equal to the factory default settings (i.e., unit must be in the condition shipped to the customer).
5. Verify that the PUT is in standby mode (not disconnect mode).
6. Either verify that the wall outlet power is within specifications or adjust the AC power source output as described in Section A (e.g., 115Vrms  $\pm$  3Vrms, 60Hz  $\pm$  3Hz).
7. Set the power meter current range. The selected full scale value multiplied by the crest factor rating ( $I_{\text{peak}}/I_{\text{rms}}$ ) of the meter must be greater than the peak current reading from the oscilloscope.
8. After the PUT reaches operating temperature and the readings on the power meter stabilize, (times may vary depending on product) take the true power reading in watts from the power meter.
9. Record the test conditions and test data. The measurement time shall be sufficiently long to measure the correct average value to within a +10% - 0% error, up to 24 hours but no less than 2 hours. If the device has different standby modes that can be manually selected, the measurement should be taken with the device in the most power consumptive mode. If the

modes are cycled through automatically, the measurement time should be long enough to obtain a true average that includes all modes.

- D. **Responsibilities:** ENERGY STAR's test criteria are not mandatory, but they will be distributed to outside parties such as buyers and the press. Following the test criteria and producing accurate test results will assist manufacturers in qualifying and labeling products as ENERGY STAR. Companies may determine the appropriate level of stringency and accuracy for their own testing based on their specific products.
- E. **Continuing Verification:** This testing procedure (protocol) describes the method by which a single unit may be tested and qualify as an ENERGY STAR labeled product. An ongoing testing process is highly recommended to ensure that products from different production runs qualify for ENERGY STAR. A model may qualify as ENERGY STAR if testing indicates that 95 percent of the units sold under this model name/number will meet the specifications contained in these Program Requirements (Eligibility Criteria).

- 6) **Effective Date:** The date that manufacturers may begin to qualify products as ENERGY STAR will be defined as the *effective date* of the agreement. The first phase of this specification, Tier 1, shall commence on January 1, 2002 and conclude on December 31, 2003. The second phase of this specification, Tier 2, shall commence on January 1, 2004.

All products shipped from the factory or factories after January 1, 2002 and through December 31, 2003 must meet Tier 1 requirements in order to bear the ENERGY STAR label. All products shipped on or after January 1, 2004 must meet Tier 2 requirements in order to bear the ENERGY STAR label. However, where an individual product model is qualified by the Partner as ENERGY STAR under Tier 1, the model, packaging, or other product-related materials may continue to bear the ENERGY STAR label until the model is phased out of the market or until January 1, 2005 (one year after the Tier 2 specification takes effect), based on whichever comes first.

- 7) **Future Specification Revisions:** ENERGY STAR reserves the right to change the specification should technological and/or market changes affect its usefulness to consumers, industry, or the environment. In keeping with current policy, revisions to the specification are arrived at through industry discussions.

NOTE: In April 2003 (nine months prior to the Tier 2 effective date), ENERGY STAR will begin a review of the Tier 2 specification (i.e., 1 watt or less). During this evaluation process, ENERGY STAR will assess the market in terms of energy efficiency and new technology. Prior to and during this time frame, industry will have an opportunity to share its data, submit proposals, and voice any concerns. ENERGY STAR will strive to ensure that the Tier 2 specification recognizes the most energy-efficient models and rewards those manufacturers who have made efforts to further improve efficiency.