

Printer, Fax, Printer/Fax, and Mailing Machine Memorandum of Understanding — Version 3.0
between The United States Environmental Protection Agency
and

I. Common Agreements and Principles

- A. This is a voluntary agreement between _____ ("ENERGY STAR[®]"¹ Partner" or "Partner") and the United States Environmental Protection Agency (EPA), by which _____ joins the ENERGY STAR Program. The terms of this MOU shall apply to printers, facsimile (fax) machines, combination printer/fax machines, and mailing machines sold by Partner under its own brand name(s).
- B. ENERGY STAR Partner and EPA agree that the primary purpose of the ENERGY STAR Program is to promote the use of energy-efficient products by consumers, thereby potentially reducing combustion-related air pollution.
- C. ENERGY STAR Partner and EPA agree that the use of energy-efficient products reduces household and other end users' energy bills and increases profits and competitiveness for businesses.
- D. ENERGY STAR Partner and EPA agree that the ENERGY STAR Program may also improve or enhance a product's useful lifetime, customer satisfaction, and overall product quality.
- E. ENERGY STAR Partner and EPA agree that publicizing the ENERGY STAR Program is important to demonstrate the following: the concern of Partner for the environment, the vitality of the free enterprise system in reducing costs, and the capability of voluntary programs to achieve environmental goals.
- F. ENERGY STAR Partner and EPA agree that maintaining public confidence in the ENERGY STAR Program is critical to achieving the shared goals of Partner and EPA.
- G. ENERGY STAR Partner and EPA agree that the integrity of the ENERGY STAR Office Equipment Program and the ENERGY STAR logo depend on consumer recognition of the ENERGY STAR logo as a means of identifying products in a particular market that are more energy-efficient than conventional products. Therefore, ENERGY STAR Partner and EPA will work together to revise the technical specifications as necessary. ENERGY STAR Partner agrees that EPA can initiate a review of compliance guidelines at any time, if necessary.
- H. ENERGY STAR Partner and EPA agree that membership in the ENERGY STAR Program is essential to the cooperative effort to achieve the shared goals stated above.

¹ ENERGY STAR is a U.S. registered mark.

II. Definitions

- A. Printer: Imaging equipment, manufactured as a standard model, that serves as a hard copy output device, and is capable of receiving information from single-user or networked computers. In addition, the unit must be capable of being powered from a wall outlet. This definition is intended to cover products that are advertised and sold as printers including printers that can be upgraded to a multifunctional device (MFD)².
- B. Fax Machine: Imaging equipment, manufactured as a standard model, that serves as a hard copy output device whose primary function is sending and receiving information. Plain paper fax machines are covered under this MOU (e.g., ink jet/bubble jet, laser/LED, and thermal transfer). The unit must be capable of being powered from a wall outlet. This definition is intended to cover products that are advertised and sold as fax machines.
- C. Combination Printer/Fax Machine: Imaging equipment manufactured as a standard model that serves as both a fully-functional printer and fax machine, as defined in sections II.A and II.B above. This definition is intended to cover products that are marketed and sold as a combination printer/fax device.
- D. Mailing Machine: Imaging equipment that serves to print postage onto mail pieces. The unit must be capable of being powered from a wall outlet. This definition is intended to cover products that are advertised and sold as mailing machines.
- E. Print Speed: Pages per minute (ppm) measures the printing speed of a model. Print speed corresponds to the product's print speed as advertised by Partner. For Line Printers (e.g., dot matrix/impact printers), print speed is based on the method established in ISO 10561.

For wide format printers designed to handle primarily A2 or 17" x 22" paper or larger, the print speed is specified in terms of monochrome text output at the default resolution. The print speed measured as A2 or A0-sized prints per minute, shall be converted into A4-sized print speeds as follows: (a) One A2 print per minute is equivalent to four A4 prints per minute; (b) One A0 print per minute is equivalent to 16 A4 prints per minute.

For mailing machines, pages per minute (ppm) are considered equivalent to mail pieces per minute (mppm).

- F. Accessory: A piece of additional equipment that is not necessary for the standard operation of the base unit, but may be added before or after shipping in order to enhance or change printer performance. Examples of accessories include finishers, sorters, additional paper supply devices, and duplex units. An accessory may be sold separately under its own model number, or sold with a base unit as part of a printer.
- G. Active Mode: The condition (or mode) in which the product is producing hard copy output or receiving hard copy input. The power requirement in this mode is typically greater than the power requirement in standby mode.

² Note that once a printer base unit is upgraded to an MFD (for example, a photocopier unit is added), then the entire product must at minimum qualify according to the ENERGY STAR MFD MOU in order for the product to remain ENERGY STAR compliant.

- H. Standby Mode: The condition that exists when the product is not producing hard copy output or receiving hard copy input and is consuming less power than when producing such output or receiving such input. The transition from Standby Mode to Active Mode should cause no noticeable delay in the production of hard copy output.
- I. Sleep Mode: The condition that exists when the product is not producing hard copy output or receiving hard copy input and is consuming less power than when in a standby mode. In the transition from Sleep Mode to Active Mode, there may be some delay in the production of hard copy output, however there shall be no delay in the acceptance of information from a network or other input sources. The product enters this mode within a specified time period after the last hard copy output was produced.
- J. Default Time To Sleep Mode: The time period set by the Partner prior to shipping that determines when the product will enter the Sleep Mode. The default time shall be measured from the time that the last piece of hard copy output was produced.
- K. Duplexing: The process of producing text, an image, or a combination of text and image on both sides of a single sheet of paper.
- L. Standard Model: The term used to describe a product and its bundled features as marketed and sold by the Partner and as manufactured for its intended use.
- M. Wake Event: As used in this agreement, a "wake event" is defined as a user, programmed, or external event or stimulus that causes the unit to transition from its standby or Sleep Mode to its active mode of operation. A "wake event" as defined in this MOU does not include network related polling queries or "pings" that commonly occur in network environments.

III. Entry Into Force and Duration

- A. Both parties agree that any previously executed MOU between the parties on the subject of ENERGY STAR-compliant printers, fax machines, combination printer/fax machines, or mailing machines shall be terminated effective 31 October 2000.
- B. Both parties agree that the terms outlined in this MOU shall become effective on 1 November 2000. Partner may, at its discretion, choose to implement the specifications prior to this date.
- C. Both parties agree to the following schedule for phasing in the new specifications for the products contained in this MOU.
 - 1. Models that Partner "begins to ship" prior to 1 November 2000 may be qualified under Section IV.B of MOU Version 2.0. Once such models are qualified as ENERGY STAR-compliant, they may continue to bear the ENERGY STAR logo until the models are phased out of the market, and as long as the Partner continues its participation in the program and the product model continues to meet the specifications under which it was originally qualified (i.e., new specifications will not apply retroactively to previously qualified products).

2. Models that ENERGY STAR Partner "begins to ship" on or after 1 November 2000 must be qualified under the new specifications outlined in Section IV.E of this agreement. However, Partner may choose, at its discretion, to implement the new terms of this agreement prior to 1 November 2000.
- D. Both parties agree that Agreement Version 3.0 will remain in force until a new Agreement goes into effect. EPA expects that such an Agreement will become effective by May 2003. In order to continue participation in the Program, Partners will be required to sign that new Agreement on or before its effective date.

Both parties agree to the following timeline to develop the next Agreement:

Proposed Timeline for Developing the next Agreement

Timeline Targets	Action
Within six months of the Version 3.0 effective date.	EPA expects to begin formal review of power management issues. Prior to and during this time frame, industry should consider and submit proposals to interested parties.
Within one year of the Version 3.0 effective date.	EPA expects to convene Partner meeting(s) to discuss technological developments and proposals for new specifications. Interested parties will endeavor to reach agreement on the next Agreement.
By May 2003	EPA expects to implement the next Agreement.

- E. Both parties agree that this agreement can be terminated or discontinued by Partner or EPA at any time, and for any reason, with no penalty. However, both parties agree that termination for noncompliance would only occur in accordance with the procedures of Section VII below.

IV. ENERGY STAR Partner's Responsibilities

A. Reading and Understanding Logo Use Guidelines

ENERGY STAR Partner affirms that it has read, understands, and will abide by the Guidelines for Proper Use of the ENERGY STAR[®] Name and International Logo.

B. Appointment of Liaison

ENERGY STAR Partner agrees to appoint a responsible representative of the company as liaison with EPA for the ENERGY STAR Program for any of the following products: printers, fax machines, combination printer/fax machines, and mailing machines. Partner will notify EPA within one month of any change in liaison responsibility. **See Appointment of Liaisons. (Attachment A)**

C. Measuring and Testing Equipment

Power consumption shall be measured and tested from an AC source to the product. Partner must measure a representative sample of the configuration of all the models as they are shipped to the customer. **See Testing Conditions For ENERGY STAR[®] Measurement Of Printers And Fax Machines. (Attachment B)**

ENERGY STAR Partner agrees to perform tests according to the criteria specified in this

Section, as necessary, to determine which of its product models comply with the product specifications outlined in Section IV.E below.

Partner is responsible for only applying the ENERGY STAR logo to products (or product systems) that meet the ENERGY STAR criteria. Partner shall self-certify those products that it determines are compliant. Partner may submit compliant product information to EPA on a voluntary basis using the product information form, if it wishes to have such products included in the ENERGY STAR Product Listing.

D. Number of Products Required

ENERGY STAR Partner agrees to market during the duration of this agreement one or more product models with power requirements that do not exceed the specifications outlined in Section IV.E below.

E. Product Qualification for the ENERGY STAR Logo

1. ENERGY STAR Partner agrees that only those products that are capable of entering a Sleep Mode after a period of inactivity or maintain a level of power consumption at or below the levels of power specified in Tables 1 through 10 (below), may qualify as ENERGY STAR compliant.
2. ENERGY STAR Partner agrees to set the product's default time to activate the Sleep Mode within the time specified in Tables 1 through 10 (below) from completion of the last job (e.g., from the time that the last piece of hard copy output was produced.). Partner also shall ship products with the default time for the Sleep Mode set to the levels specified in Tables 1 through 10 below.
3. ENERGY STAR Partner agrees to qualify products as they are intended to be used (Section II.L. above) by the end-user, particularly products intended to be connected to a network. ENERGY STAR Partner agrees that all products marketed, advertised, or sold as network-capable must meet the ENERGY STAR specifications (below) when configured as network-ready (i.e., with network functionality).
 - a) If the product is shipped with the capability to be on a network, it shall have the ability to enter a Sleep Mode while on the network.
 - b) If the product has the capability to be on a network, it shall retain in Sleep Mode its ability to respond to wake events directed or targeted to the product while on a network.
4. ENERGY STAR Partner agrees to qualify products according to the following specifications:

**Table 1: Tier 1
Standard Size Printers and Printer/Fax Combinations* (11/1/00 — 10/31/01)
(designed to accommodate primarily A3, A4, or 8.5" x 11" sized paper)**

Product Speed In Pages Per Minute (ppm)	Sleep Mode (Watts) ³	Default Time To Sleep Mode
0 < ppm ≤ 10	≤ 10 ⁴	≤ 5 minutes
10 < ppm ≤ 20	≤ 20 ⁴	≤ 15 minutes
20 < ppm ≤ 30	≤ 30	≤ 30 minutes
30 < ppm ≤ 44	≤ 40	≤ 60 minutes
44 < ppm	≤ 75	≤ 60 minutes

* Including monochrome electrophotography, monochrome thermal transfer, and monochrome and color ink jet.

**Table 2: Tier 1
Impact Printers designed to accommodate primarily A3 paper (11/1/00 — 10/31/01)**

Sleep Mode (Watts)	Default Time To Sleep Mode
≤ 30	≤ 30 minutes

**Table 3: Tier 1
Large/Wide-Format Printers (11/1/00 — 10/31/01)
(designed to accommodate primarily A2 or 17" x 22", or larger paper)**

Product Speed In Pages Per Minute (ppm)	Sleep Mode (Watts) ³	Default Time To Sleep Mode
0 < ppm ≤ 10	≤ 35	≤ 30 minutes
10 < ppm ≤ 40	≤ 65	≤ 30 minutes
40 < ppm	≤ 100	≤ 90 minutes

³ For printers that utilize a functionally integrated computer, whether contained within or outside of the printer cabinet, the power consumption of the computer does not have to be included when determining the sleep mode value of the printer unit. However, the integration of the computer must not interfere with the ability of the printer to enter or exit its Sleep Mode state. This provision is conditioned upon the manufacturer agreeing to provide potential customers with product literature that clearly states that the power consumed by the integrated computer is in addition to the power consumed by the printer unit, especially when the printer unit is in Sleep Mode.

⁴ For Tier 1, a one-time 5-Watt allowance is permitted for those products that are shipped “network ready” (i.e., inclusive of network functionality “out of the box”). For those products shipped as not “network ready”, the additional one-time 5-Watt allowance does not apply.

**Table 4: Tier 1
 Color Printers* (11/1/00 — 10/31/01)
 (designed to accommodate primarily A3, A4, or 8.5" x 11" sized paper)**

Product Speed In Pages Per Minute (ppm)	Sleep Mode (Watts) ³	Default Time To Sleep Mode
0 < ppm ≤ 10	≤ 35 ⁴	≤ 30 minutes
10 < ppm ≤ 20	≤ 45	≤ 60 minutes
20 < ppm	≤ 70	≤ 60 minutes

* Including color electrophotography and color thermal transfer.

**Table 5
 Stand Alone Fax Machines (11/1/00 — 10/31/02)
 (designed to accommodate primarily A4 or 8.5" x 11" sized paper)**

Product Speed In Pages Per Minute (ppm)	Sleep Mode (Watts)	Default Time To Sleep Mode
0 < ppm ≤ 10	≤ 10	≤ 5 minutes
10 < ppm	≤ 15	≤ 5 minutes

**Table 6
 Mailing Machines (11/1/00 — 10/31/02)**

Product Speed In Mail Pieces Per Minute (mppm)	Sleep Mode (Watts)	Default Time To Sleep Mode
0 < mppm ≤ 50 mppm	≤ 10	≤ 20 minutes
50 < mppm ≤ 100 mppm	≤ 30	≤ 30 minutes
100 < mppm ≤ 150 mppm	≤ 50	≤ 40 minutes
150 < mppm	≤ 85	≤ 60 minutes

**Table 7: Tier 2
 Standard Size Printers and Printer/Fax Combinations* (11/1/01 — 10/31/02)
 (designed to accommodate primarily A3, A4, or 8.5" x 11" sized paper)**

Product Speed In Pages Per Minute (ppm)	Sleep Mode (Watts)	Default Time To Sleep Mode
0 < ppm ≤ 10	≤ 10	≤ 5 minutes
10 < ppm ≤ 20	≤ 20	≤ 15 minutes
20 < ppm ≤ 30	≤ 30	≤ 30 minutes
30 < ppm ≤ 44	≤ 40	≤ 60 minutes
44 < ppm	≤ 75	≤ 60 minutes

* Including monochrome electrophotography, monochrome thermal transfer, and monochrome and color ink jet.

**Table 8: Tier 2
Impact Printers designed to accommodate primarily A3 paper (11/1/01 — 10/31/02)**

Sleep Mode (Watts)	Default Time To Sleep Mode
≤ 28	≤ 30 minutes

**Table 9: Tier 2
Large/Wide-Format Printers (11/1/01 — 10/31/02)
(designed to accommodate primarily A2 or 17" x 22", or larger paper)**

Product Speed In Pages Per Minute (ppm)	Sleep Mode (Watts)	Default Time To Sleep Mode
$0 < \text{ppm} \leq 10$	≤ 35	≤ 30 minutes
$10 < \text{ppm} \leq 40$	≤ 65	≤ 30 minutes
$40 < \text{ppm}$	≤ 100	≤ 90 minutes

**Table 10: Tier 2
Color Printers* (11/1/01 — 10/31/02)
(designed to accommodate primarily A3, A4, or 8.5" x 11" sized paper)**

Product Speed In Color Pages Per Minute (ppm)	Sleep Mode (Watts)	Default Time To Sleep Mode
$0 < \text{ppm} \leq 10$	≤ 35	≤ 30 minutes
$10 < \text{ppm} \leq 20$	≤ 45	≤ 60 minutes
$20 < \text{ppm}$	≤ 70	≤ 60 minutes

* Including color electrophotography and color thermal transfer.

5. Exceptions and Clarifications:

After shipping, the ENERGY STAR Partner or its designated service representative shall not alter the models covered by this MOU in any way that will affect the products' ability to meet the specifications outlined above. Four exceptions follow:

- a. Integrated Computer Systems: For a one-year period only, and for those products that incorporate an integrated computer, EPA proposes to not include the power consumption of the integrated computer when a product is qualified as ENERGY STAR-compliant. However, the manufacturer is required to explain to the end user that the power consumption of the printer does not include the power consumption of the integrated computer (i.e., the power consumption of the computer is in addition to the power consumption of the printer – including when the printer is in the Sleep Mode). This exception is limited to those situations where the manufacturer integrates a “stand-alone” computer and does not apply to printer controllers. (See footnote 3.)

- b. Network Functionality: For a one-year period only, an additional one-time 5-Watt allowance for Network Functionality will be permitted for those products in the first two speed bands ($0 < \text{ppm} \leq 10$, and $10 < \text{ppm} \leq 20$) of Table 1 and the first speed band ($0 < \text{ppm} \leq 10$) of Table 4. This exception applies only to those products (in the above mentioned tables and speed segments) that are shipped “network ready” (i.e., inclusive of network card or functionality “out of the box”). For those products shipped as not “network ready”, the additional one-time 5-Watt allowance does not apply. (See footnote 4.)

- c. Default Times:
After shipping, the ENERGY STAR Partner, designated service representative, or customer may change the default times for the Sleep Mode, up to a factory-set maximum of 240 minutes. If a manufacturer chooses to design products with more than one power management mode, then the combined total of the default times shall not exceed 240 minutes.

- d. Disabling the Sleep Mode:
In an individual case where the Sleep Mode is causing a customer sizable inconvenience due to their particular usage patterns, the Partner, designated service representative, or customer may disable this Sleep Mode feature. If Partner chooses to design its product models to allow the customer to disable the Sleep Mode feature, then the disable option shall be accessed in a manner different from the time settings. (e.g., If a software menu provides Sleep Mode delay times of 15, 30, 60, 90, 120, and 240 minutes, then “disable” or “off” shall not be a choice in this menu. It shall be a hidden (or less obvious) choice or included in a different menu.)

6. Duplexing:

For all standard-size printers above 10 ppm in which a duplexing unit is installed, it is recommended that ENERGY STAR Partner educate its customers about using their printers with duplex set as the *default* printing mode. Education may consist of information about the appropriate printer driver and print menu setup in the product manuals, or by providing specific instructions about the printer driver when a duplexing unit is installed.

F. Customer Education:

1. Identification of Qualifying Products in the Marketplace

ENERGY STAR Partner must ensure that consumers have a quick and easy method of determining which of the Partner’s products are ENERGY STAR compliant. To achieve this goal, EPA recommends that the Partner place the ENERGY STAR logo on all qualified printers, fax machines, combination printer/fax machines, or mailing machines, their packaging, and product-related materials such as such as brochures, manuals, data sheets, and advertisements. EPA also recommends that Partner place the ENERGY STAR logo on all product-related materials published on the Partner's Web site.

2. Product Literature

Consumers must be able to identify and understand the energy-saving characteristics of the product models that Partner qualifies as ENERGY STAR compliant. Accordingly, Partner agrees to provide general information to users regarding the ENERGY STAR features of the qualifying products. EPA suggests including one or more of the following: a description of the ENERGY STAR Program, a discussion of the environmental and monetary benefits of the energy-savings characteristics of the product, and a description of the benefits of duplexing (e.g., reduced paper costs, decreased national energy consumption, and less paper in the waste stream). In addition, EPA recommends that Partner provide information about recommended types of recycled paper that can best be used in a particular printer, including the amount of post-consumer content in the paper.⁵ Partner may determine the best manner to disseminate this information to customers.

G. Employee Education

ENERGY STAR Partner agrees to make available general information about the ENERGY STAR Program to all of its employees whose jobs are relevant to the development, marketing, sales, and service of ENERGY STAR-compliant products. Partner may determine the best manner to provide this information to its employees.

H. Information Sharing

At EPA's request, Partner will attempt to locate customers that have purchased ENERGY STAR-compliant products and are willing to share information about performance and savings. In addition, Partner will attempt to identify employees who have contributed to the Partner's success in the ENERGY STAR Office Equipment Program. This customer- or employee-supplied information is to be without reference or endorsement of specific Partner, specific products, or other supply sources.

I. Endorsement

ENERGY STAR Partner agrees that it will not construe, claim, or imply that its participation in the Program constitutes EPA approval, acceptance, or endorsement of anything other than Partner's commitment to the Program. Partner understands that participation in the ENERGY STAR Program does not constitute EPA endorsement of ENERGY STAR Partner or its products. In addition, since EPA will not officially approve any individual test reports submitted by Partner, Partner may not include misleading statements in product literature or sales presentations that imply a product is approved or certified by EPA. For example, Partner shall not make claims such as "This printer is EPA-approved," "This printer is EPA-certified," or any similar statement intended to convey an EPA endorsement.

J. Voluntary Actions

ENERGY STAR Partner agrees that the activities it undertakes connected with this MOU are

⁵ As directed by Executive Order 12873, Part 5 – *Standards, Specifications, and Designation of Items*, §504.(a), the U.S. Government has specified a minimum of 30% post-consumer content (effective December 31, 1998) for all paper purchased for government use. Partner may wish to include information on this or other types of recycled paper.

not intended to provide services to the federal government and that Partner will not submit a claim for compensation to any federal agency.

V. EPA's Responsibilities

A. Appointment of Liaison

EPA agrees to designate a single liaison for the ENERGY STAR Program, and to notify Partner within one month of any change in liaison responsibilities. Please send the signed MOU and other correspondence to this person. **See Appointment of Liaisons. (Attachment A)**

B. Product Testing

EPA agrees to accept the certification by the Partner, whether it is self-determined or determined by an independent third party, that the Partner's qualifying product models satisfy the specifications set forth in this MOU. While this is a self-certifying process, EPA reserves the right to conduct tests on products bearing the ENERGY STAR logo from either the open market or other available sources. EPA may request Partner to voluntarily provide products to be tested by EPA.

C. Consumer Acceptance

EPA agrees to make an effort to encourage consumer acceptance of products introduced under this agreement and bearing the ENERGY STAR logo.

D. Public Recognition

EPA agrees to provide Partner with recognition for its public service in protecting the environment by performing analyses about the pollution prevented by corporate participants, and providing this and other program information to appropriate news media sources for publication.

E. Consumer Education

EPA agrees to promote energy-efficient products, and to inform consumers about the ENERGY STAR Program and the ENERGY STAR logo by writing articles and/or by cooperating with the news media by sharing information, where appropriate.

F. Public Service Advertisements

EPA agrees to work with Partners to coordinate the placement of advertisements to promote energy-efficient products, educate consumers about the ENERGY STAR Program and logo, and provide Partners with due recognition for their public service in protecting the environment.

VI. Use of the ENERGY STAR Logo and Name

A. Associating Logo with Qualifying Models

It is the responsibility of the Partner to associate EPA, the ENERGY STAR logo and name, and the ENERGY STAR Program only with those specific models that qualify under the terms and conditions of this MOU. **See Guidelines for Proper Use of the ENERGY STAR[®] Name and International Logo.**

B. ENERGY STAR Materials

EPA agrees to loan Partner, at no charge, materials from which Partner can reproduce the ENERGY STAR logo.

C. Referring to the ENERGY STAR Logo

When the ENERGY STAR logo is used, Partner agrees that the following statement shall accompany the Logo: "As an ENERGY STAR[®] Partner, has determined that this product meets the ENERGY STAR[®] guidelines for energy efficiency." When the ENERGY STAR logo is applied directly to the product or product packaging, Partner may place this statement in the user's manual. **See Guidelines for Proper Use of the ENERGY STAR[®] Name and International Logo.**

D. Registered Marks

ENERGY STAR Partner understands that the ENERGY STAR[®] name and the ENERGY STAR logo are registered marks of the United States Environmental Protection Agency, and are subject to the provisions of Title 15, Chapter 22, United States Code, the various state laws applicable to trademarks, and this Memorandum of Understanding. As such, the Partner shall note this registered status, as appropriate. This includes: (a) expressing the ENERGY STAR name in all capital letters (It is also appropriate to use a slightly larger point size for the first letter of each word, e.g., twelve point for the E and S, and ten point for the other letters.), and (b) including the registered symbol,[®], *each time* the ENERGY STAR name or logo appears in a brochure, poster, advertisement, or other document (i.e., ENERGY STAR[®]). The registered mark statement "ENERGY STAR is a U.S. registered mark" may also be used *in addition* to the registered symbol to indicate the registered status of the mark. **See Guidelines for Proper Use of the ENERGY STAR[®] Name and International Logo.**

E. Endorsement

Under no circumstances shall the ENERGY STAR name or logo be used in a manner that would imply EPA endorsement of the Partner, its products, or its services.

F. Altering Logo

ENERGY STAR Partner agrees not to alter the ENERGY STAR logo except in the ways described in the **Guidelines for Proper Use of the ENERGY STAR[®] Name and International Logo.**

G. Termination of Agreement

If either EPA or Partner terminates this Agreement, Partner will no longer be entitled to apply the ENERGY STAR logo to newly manufactured products, and will no longer make reference to the ENERGY STAR Program so as to construe continuing involvement in the program. Any products bearing the logo that have been shipped by the Partner prior to program termination, and are no longer in the Partner's possession (e.g., products on display or inventoried by retail stores or distributors), may continue to bear the logo.

VII. Conflict Resolution

A. Good Faith Principle

Each party agrees to assume good faith as a general principle for resolving conflicts under the ENERGY STAR Program.

B. Notification of Problems

Both parties agree to notify each other informally if any problems or issues arise and to work together to provide maximum public confidence in the program.

C. Procedure for Addressing Non-Compliant Products

1. If EPA receives information that one or more products certified by Partner as ENERGY STAR-compliant may not meet all of the terms of this MOU, then EPA will immediately notify Partner and attempt to address and resolve the problem informally.
2. If these informal discussions do not produce a mutually agreeable resolution, EPA shall notify Partner in writing that Partner shall be terminated from the ENERGY STAR Program unless it undertakes the specific corrective actions sought by EPA. Partner agrees to reply to EPA in writing within 20 business days of receiving EPA's letter. At that time, Partner shall agree to do one of the following: (a) undertake in a timely and effective manner, the corrective actions sought by EPA; or (b) voluntarily terminate this agreement. If Partner does not respond to EPA's letter within 20 business days, or responds but does not agree to either (a) or (b), then this agreement is terminated.

D. Notification in Writing

If ENERGY STAR Partner believes that EPA is not meeting all of its commitments, Partner agrees to notify EPA formally in writing. EPA agrees to respond in writing within 20 business days of receiving ENERGY STAR Partner's letter. At that time, EPA will do one of the following: (a) undertake the corrective actions sought by Partner, or (b) explain why such corrective actions cannot be undertaken.

VIII. Freedom of Information Act and Confidential Business Information

Both parties understand that information provided by Partner to EPA will be treated pursuant to EPA's public information regulations under 40 Code of Federal Regulations, Part Two.

* * * * *

*Revisions to this Agreement will not be accepted
This Agreement becomes effective 1 November 2000*

The undersigned hereby execute this Memorandum of Understanding on behalf of their parties. The signer of this agreement affirms that he/she has the authority to commit Partner to participation in the ENERGY STAR Office Equipment Program.

For the U.S. Environmental Protection Agency (EPA):

Signature: _____ Date: _____

Name: Kathleen Hogan

Title: Director, Climate Protection Partnerships Division

For

Signature: _____ Date: _____

Name: _____

Title: _____

ATTACHMENT A

Please complete and return with the signed Memorandum of Understanding.

EPA Contact:

Mailing Address:

Craig Hershberg
Manager, ENERGY STAR Office Equipment
US EPA
Ariel Rios Bldg.
1200 Pennsylvania Ave., NW
(Mail Code 6202 J)
Washington, DC 20460

Overnight Delivery Address:

Craig Hershberg
Manager, ENERGY STAR Office Equipment
US EPA
1310 L Street, NW
Washington, DC 20005
(202) 343-9120

Partner's Contacts:

Primary Contact (to receive all program administrative materials):

Name:
Title:
Address:
City, State, ZIP:
Telephone Number:
Fax Number:
E-mail Address:
Location of US Headquarters (if applicable):

Marketing/PR Contact (to receive marketing and communications materials):

Name:
Title:
Address:
City, State, ZIP:
Telephone Number:
Fax Number:
E-mail Address:

Customer Service Contact (to be given to the public for further information on products):

Telephone number:
Fax Number:
Web Site:

ATTACHMENT B

TEST CONDITIONS FOR ENERGY STAR® COMPLIANCE MEASUREMENT FOR PRINTERS AND FAX MACHINES

In order to eliminate confusion and ensure consistency, the following protocol should be followed when measuring power for printers and fax machines under the ENERGY STAR Office Equipment Program.

Outlined below are the ambient test conditions that should be established when performing the power measurement. These are necessary in order to ensure that outside factors do not affect the test results, and that test results can be reproduced later. A description of the specifications for testing equipment, as well as a discussion of testing issues, follow on the succeeding pages.

I. TEST CONDITIONS

Line Impedance:	< 0.25 ohm
Total Harmonic Distortion: (Voltage)	< 5%
Input AC Voltage: ¹	115 VAC RMS +/- 5V RMS
Input AC Frequency: ⁴	60 Hz +/- 3 Hz
Ambient Temperature:	25 deg. C +/- 3 deg. C

II. TEST METHOD

Printer and fax machine manufacturers should measure and report the **average** power consumption of their printer and fax machine products when in the Sleep Mode. This should be done by evaluating the printer or fax machine over a time period sufficiently long to include typical variations or surges in power (e.g., any cycling of the fuser). The recommended approach is to utilize a watt-hour meter, and measure the energy consumption in the Sleep Mode of the printer or fax machine over 1 hour. This will allow manufacturers to capture any variations in power usage that occur during the Sleep Mode. Dividing the measured energy consumption by the time period over which it is measured will produce average Watts. While this approach will provide the most accurate results, it is not essential to follow this for printers and fax machines whose idle-mode power consumption does not vary (e.g., dot matrix printers, inkjet type printers and fax machines, and laser printers and fax machines where the fuser is turned off during idle mode). For printers and fax machines with constant idle-mode power consumption, manufacturers may choose to utilize a high quality watt meter and take several measurements of instantaneous power.

¹ If products will be sold in Europe or Asia, testing should also be performed at the appropriate machine-rated voltage and frequency. For example, products destined for European markets might be tested at 230 V and 50 Hz. The logo should not be displayed on products shipped to Europe or Asia if the equipment does not meet the power requirements of the Program at the local voltage and current conditions.

III. TESTING EQUIPMENT

The goal is to accurately measure the TRUE power consumption² of the printer or fax machine. This necessitates the use of a **True RMS** Watt Meter or Watt-Hour Meter. There are many watt meters and watt-hour meters to choose from, but manufacturers will need to exercise care in selecting an appropriate model. The following factors should be considered when purchasing a meter and setting up the actual test.

Crest Factor

A previous version of EPA's testing procedure included a requirement that manufacturers utilize a meter with a crest factor greater than eight. As many Partners pointed out, this is not a useful or relevant requirement. The following paragraphs are meant to discuss the issues relating to crest factor and to clarify the intent of the initial statement. Unfortunately, EPA cannot provide a specific equipment requirement because testing is as much art as it is science. Manufacturers and testers will have to exercise judgement, and draw on people well versed in testing issues, to select an appropriate meter.

It is important to understand that electronic equipment such as printers and fax machines typically draw current in a waveform different from typical sinusoidal current.³ While virtually any meter can measure a standard current waveform, it is more difficult to select a meter when irregular current waveforms are involved.

It is critical that the meter selected be capable of reading the current drawn by the printer or fax machine 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,⁴ and of the current ranges available on the meter. Better meters will have higher crest factors, and more choices of current ranges. When preparing the test, the first step should be to determine the peak current (amps) associated with the printer or fax machine being measured. This can be accomplished using an oscilloscope. A current range must be selected that will enable the meter to register the peak current. Specifically, the full scale value of the current range selected multiplied by the crest factor of the meter (for current) must be greater than the peak current reading from the oscilloscope. For example, if a 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 the measured peak current is only 6 amps, the meter would be satisfactory. However, if the current range is set too high in order to register peak current, then it may lose accuracy in measuring the non-peak current. Therefore, some delicate

² 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, so true power is always less than apparent power.

³ The crest factor for a sinusoidal 60 Hz current waveform is always 1.4. The crest factor for a current waveform associated with equipment containing a switching power supply will always be greater than 1.4 (though typically no higher than eight). The crest factor of a current waveform is defined as the ratio of the peak current (amps) to the RMS current (amps).

⁴ The crest factor of a watt meter is often provided for both current and voltage. For current it is the ratio of the peak current to the RMS current in a specific current range. When only one crest factor is given, it is usually for current. An average True RMS Watt meter has a crest factor in the range of 2:1 to 6:1.

balancing is necessary. Again, with more current range choices and higher crest factors you will get better results.

Frequency Response

Another issue to consider when selecting a watt meter is the frequency response rating of the meter. Electronic equipment that contains switching power supplies causes harmonics (odd harmonics typically up to the 21st). These harmonics must be accounted for in power measurement, or the Wattage consumption will be inaccurate. Accordingly, EPA recommends that manufacturers purchase meters that have a frequency response of at least 3 kHz. This will account for harmonics up to the 50th, and is recommended by IEC 555.

Resolution

When testing printers and fax machines whose power consumption is close to the ENERGY STAR requirements, manufacturers will probably want a meter than can provide resolution of 0.1 W.

Accuracy

Another feature to consider is the resulting accuracy you will be able to achieve. 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 you are measuring a product that is very close to the various watt ceilings noted in Tables 1 through 8, you will need to set up a test that will provide greater accuracy. For example, if the resulting accuracy for your watt-meter at the test settings is ± 0.5 W, then with a measured power consumption of ≤ 29.5 W you can be fairly sure that your printer or fax machine is compliant.

Calibration

Meters should be calibrated every year to maintain their accuracy.