

## **Version 1.1 ENERGY STAR<sup>®</sup> Imaging Equipment Specification – Data Summary**

### **Introduction**

In order to establish proposed Typical Electricity Consumption (TEC) and Operational Mode (OM) requirements for Tier 2 requirements in the Final Version 1.1 ENERGY STAR Imaging Equipment Specification (“Version 1.1”), the U.S. Environmental Protection Agency (EPA) used product data for models qualified as of July 2, 2008 under the current requirements in Version 1.0 ENERGY STAR Imaging Equipment Specification. The qualification percentages noted in the discussions below represent the percentage of ENERGY STAR models, out of all models currently available for sale in the United States.

In order to determine the models available in the current market, EPA recorded individual model information directly from manufacturers’ Web sites. Model information was obtained from Web sites of both partners and non-partners, accessed from May 29 to June 19. Any models listed on manufacturers’ Web sites as available for sale in the United States were counted. The list of product models found on Web sites was distributed to manufacturers on June 20 to: 1) confirm the accuracy and completeness of product listings and 2) provide updates as needed to the product information listed. Manufacturers’ were also invited to provide feedback on product information listed under other manufacturers.

Based on responses from 14 manufacturers, EPA updated products listings as determined from the Web site searches and added or removed products where applicable. EPA then cross-checked the products indicated as ENERGY STAR qualified on the updated product listings with product data from the ENERGY STAR database. Any incomplete product data was not included in the final analysis. The resulting product lists were the basis for which EPA used to determine the market share of ENERGY STAR qualifying products for Version 1.1.

EPA initially presented these market data analysis results in the Draft 2 Version 1.1 ENERGY STAR Imaging Equipment Specification, distributed on July 17, 2008. EPA received input from stakeholders on Draft 2 and on the following Draft Final document, distributed on August 28, 2008. When appropriate, the following data summary incorporates stakeholders’ comments from the previous two drafts.

Product models were grouped by product type, marking technology, size format, and color capability in order to classify by TEC or OM Table. Below are the data summary discussions for each category.

## TEC Discussion

The below table is a summary of the TEC data used in preparation of Version 1.1 after examining the datasets for completeness and accuracy.

	Market Info	ENERGY STAR Version 1.0		ENERGY STAR Version 1.1		
		Total Products	Qualified Products	% Qualified	Products <sup>1</sup>	% Qualified <sup>2</sup>
<b>TEC1</b>		283	151	53%	72	25%
<b>TEC2</b>		171	84	49%	41	24%
<b>TEC3</b>		357	177	50%	93	26%
<b>TEC4</b>		179	95	53%	48	27%
<b>TEC Total</b>		990	507	51%	254	26%

<sup>1</sup> The number of products that *would* qualify under the proposed Tier 2 levels.

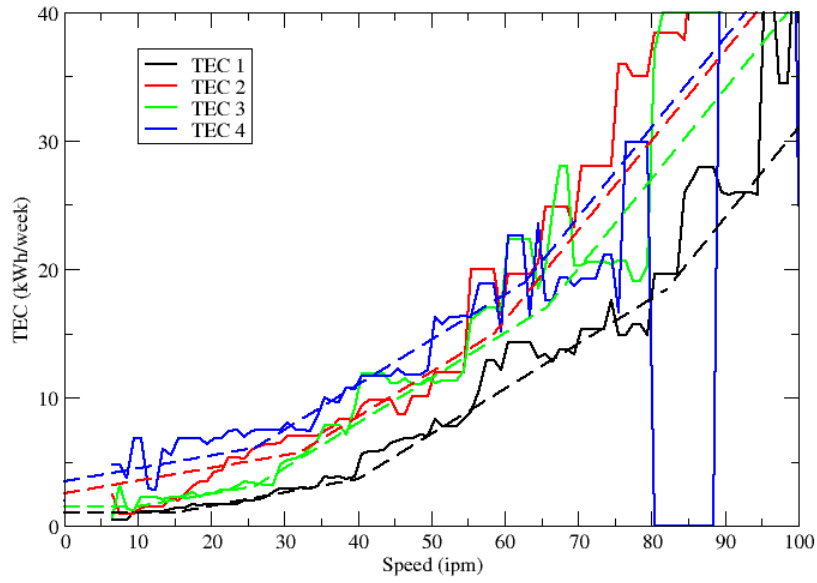
<sup>2</sup> The percent of total products that *would* qualify under the proposed Tier 2 levels.

In proposing the Version 1.1 levels, EPA took into account whether more than one manufacturer had qualified products.

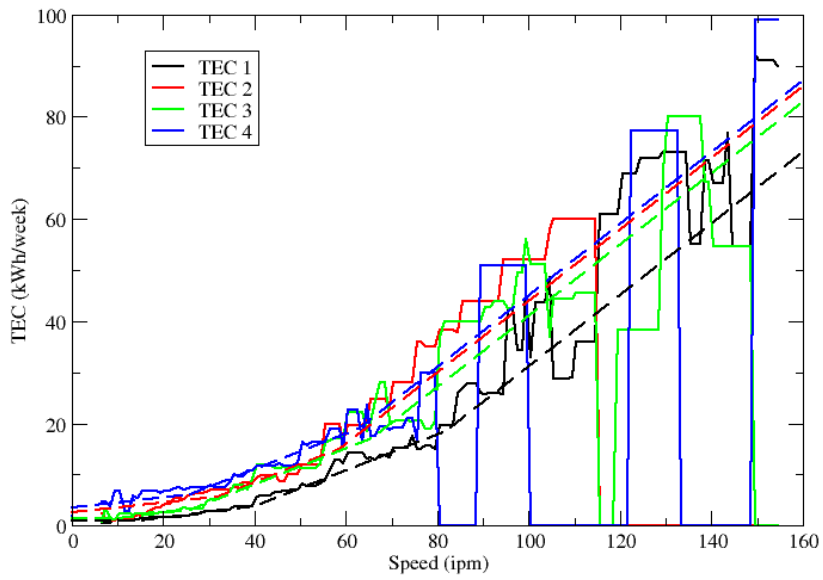
The approach to the analysis was to create a line of moving 25% levels for successive “windows” of 10 ipm. That is, the first window was 1-10 ipm, the second 2-11, third 3-12, etc. The 25% level was found for each window. Ideally, each window would have at least 25% of the models being compliant so that the actual values of the non-qualified models would never enter the analysis. While this is the case most of the time, it is not always. When non-qualified models were included in the analysis, since TEC values were not available for these models, EPA used Version 1.0 TEC limits in lieu of actual values. In addition, when no units at all were in the window, the value was set to zero. This method used to generate the trend lines in Version 1.1 was different than in Version 1.0 and provides a better reflection of the data. EPA believes this is a better intermediate step to drawing the actual linear spec lines.

Figure 1 below shows the results of this analysis for models up to 100 ipm, along with the Version 1.1 proposed lines. Figure 2 shows the data up to 160 ipm. There are only six units in the dataset with a speed over 160 ipm.

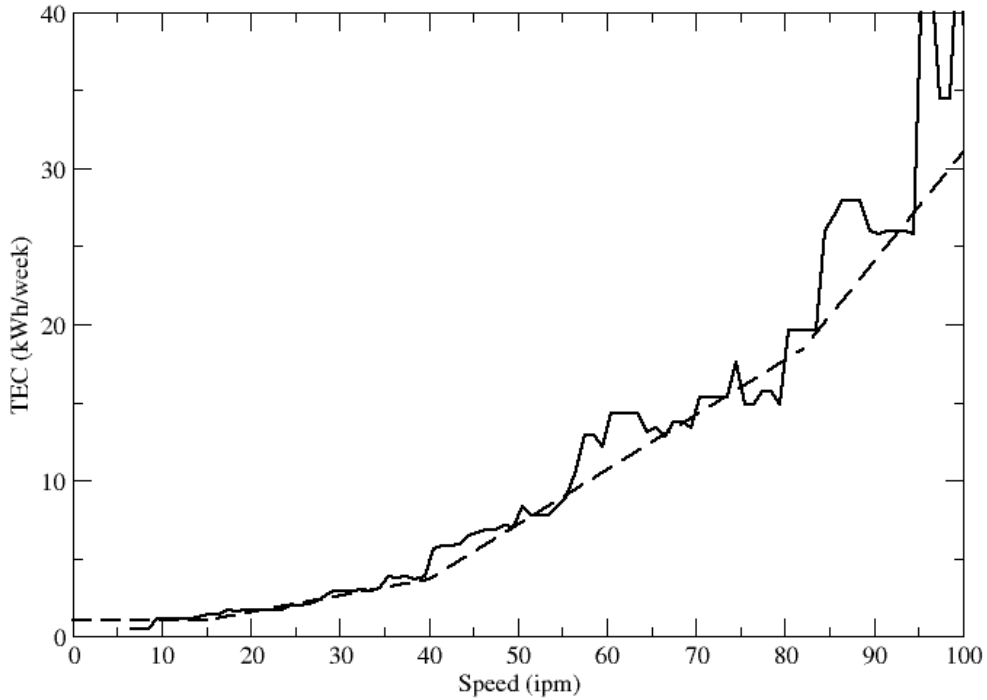
**Figure 1.**



**Figure 2.**



### TEC1



- Products: Copiers, Digital Duplicators, Fax Machines, Printers
- Size Format: Standard-size
- Marking Technology: DT, Mono DS, Mono EP, Mono Stencil, Mono TT, Mono High Performance IJ
- Total Products Available in US: 283

#### Version 1.0

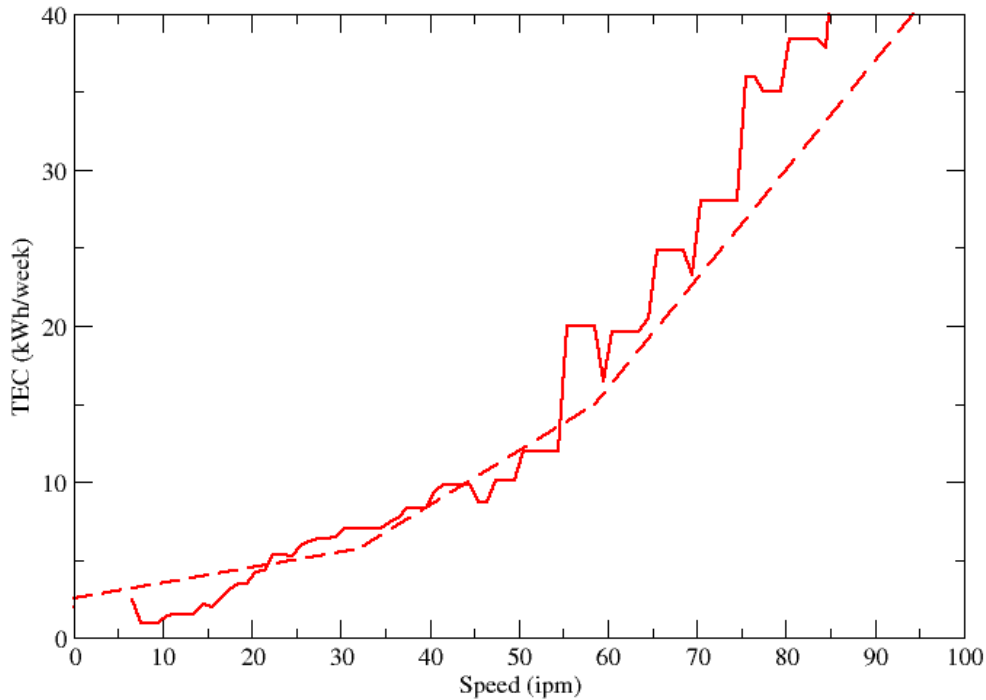
- ENERGY STAR qualified products: 151 (53% of available products)
- Number of manufacturers: 15

#### Version 1.1

Product Speed (ipm)	Maximum TEC (kWh/week)
$\leq 15$	<b>1.0 kWh</b>
$15 < ipm \leq 40$	<b><math>(0.10 \text{ kWh/ipm})x - 0.5 \text{ kWh}</math></b>
$40 < ipm \leq 82$	<b><math>(0.35 \text{ kWh/ipm})x - 10.3 \text{ kWh}</math></b>
$> 82$	<b><math>(0.70 \text{ kWh/ipm})x - 39.0 \text{ kWh}</math></b>

- ENERGY STAR qualified products: 72 (25% of available products)
- Manufacturers with qualifying products: 11
- TEC1 requirements (between 40 through 82 ipm) were slightly modified from Draft 2 to allow more models in this speed range to qualify.

### TEC2



- Products: Copiers, Digital Duplicators, Fax Machines, Printers
- Size Format: Standard-size
- Marking Technology: Color DS, Color Stencil, Color TT, Color EP, SI, Color High Performance IJ
- Total Products Available in US: 171

#### Version 1.0

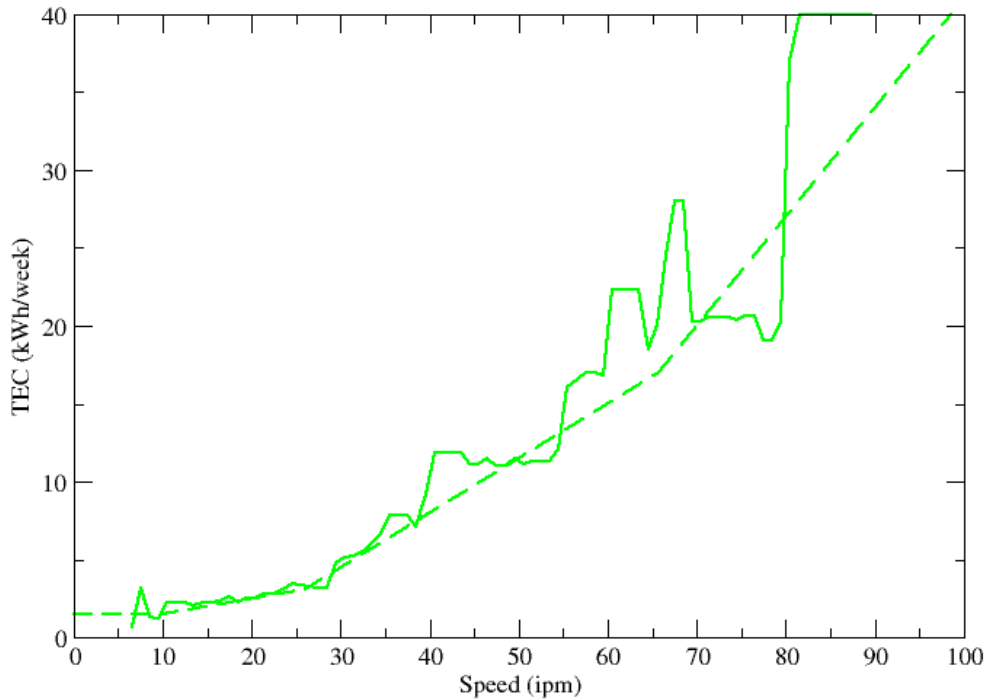
- ENERGY STAR qualified products: 84 (49% of available products)
- Number of manufacturers: 12

#### Version 1.1

Product Speed (ipm)	Maximum TEC (kWh/week)
$\leq 32$	$(0.10 \text{ kWh/ipm})x + 2.8 \text{ kWh}$
$32 < \text{ipm} \leq 58$	$(0.35 \text{ kWh/ipm})x - 5.2 \text{ kWh}$
$> 58$	$(0.70 \text{ kWh/ipm})x - 26.0 \text{ kWh}$

- ENERGY STAR qualified products: 41 (24% of available products)
- Manufacturers with qualifying products: 8

### TEC3



- Products: MFDs
- Size Format: Standard-size
- Marking Technology: DT, Mono DS, Mono EP, Mono TT
- Total Products Available in US: 357

#### Version 1.0

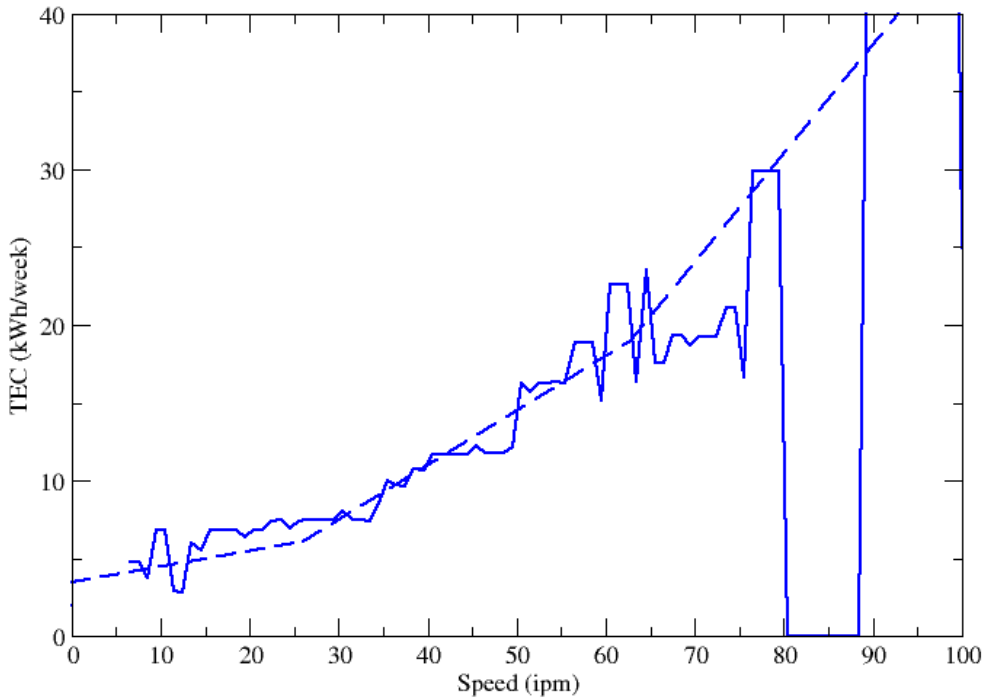
- ENERGY STAR qualified products: 177 (50% of available products)
- Number of manufacturers: 17

#### Version 1.1

Product Speed (ipm)	Maximum TEC (kWh/week)
$\leq 10$	<b>1.5 kWh</b>
$10 < ipm \leq 26$	<b><math>(0.10 \text{ kWh/ipm})x + 0.5 \text{ kWh}</math></b>
$26 < ipm \leq 68$	<b><math>(0.35 \text{ kWh/ipm})x - 6.0 \text{ kWh}</math></b>
$> 68$	<b><math>(0.70 \text{ kWh/ipm})x - 30.0 \text{ kWh}</math></b>

- ENERGY STAR qualified products: 93 (26% of available products)
- Manufacturers with qualifying products: 15

### TEC4



- Products: MFDs
- Size Format: Standard-size
- Marking Technology: Color DS, Color TT, Color EP, SI
- Total Products Available in US: 179

#### Version 1.0

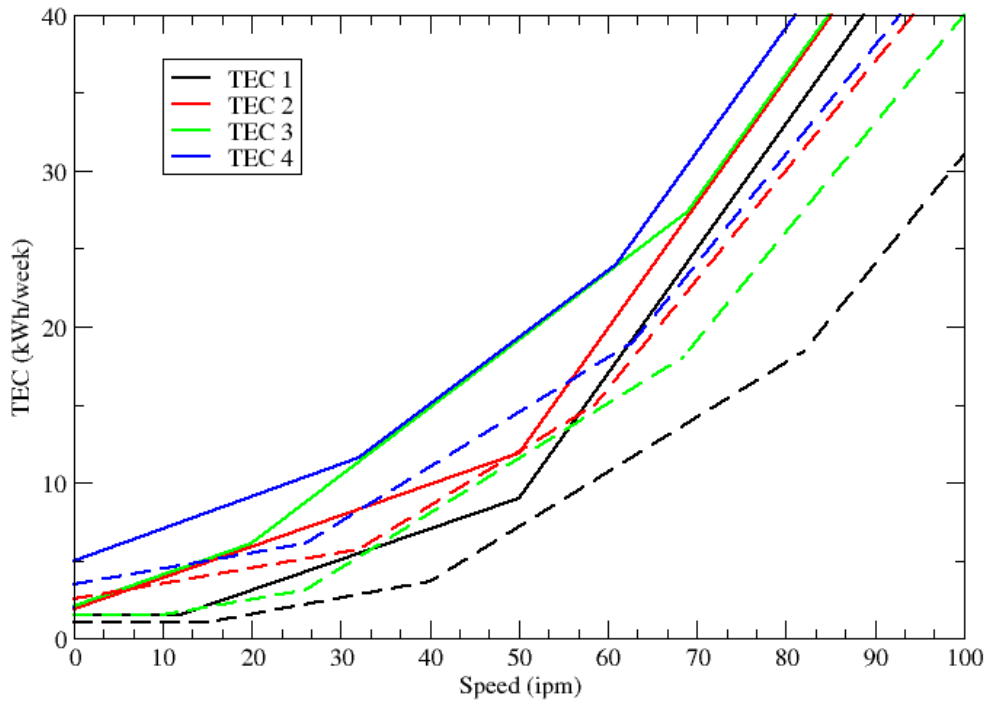
- ENERGY STAR qualified products: 95 (53% of available products)
- Number of manufacturers: 15

#### Version 1.1

Product Speed (ipm)	Maximum TEC (kWh/week)
$\leq 26$	$(0.10 \text{ kWh/ipm})x + 3.5 \text{ kWh}$
$26 < \text{ipm} \leq 62$	$(0.35 \text{ kWh/ipm})x - 3.0 \text{ kWh}$
$> 62$	$(0.70 \text{ kWh/ipm})x - 25.0 \text{ kWh}$

- ENERGY STAR qualified products: 48 (27% of available products)
- Manufacturers with qualifying products: 11

### Version 1.0 + 1.1 – All TEC



- All TEC levels displayed in graph
  - Version 1.0: solid lines
  - Version 1.1: dashed lines



## OM Discussion

The below table is a summary of the OM data used in the preparation of Version 1.1 after examining the datasets for completeness and accuracy. As with the TEC analysis, the qualification rates represent the percentage of ENERGY STAR qualified models, out of all models currently available in the U.S. market.

	Market Info	ENERGY STAR Version 1.0		ENERGY STAR Version 1.1	
	Total Products	Qualified Products	% Qualified	Products <sup>1</sup>	% Qualified <sup>2</sup>
<b>OM1</b>	18	6	33.3	3	16.7
<b>OM2</b>	148	66	44.6	38	25.7
<b>OM3</b>	77	48	62.3	20	26.0
<b>OM4</b>	55	15	27.3	15	27.3
<b>OM5</b>	162	9	5.6	9	5.6
<b>OM6</b>	39	17	43.6	10	25.6
<b>OM7</b>	239	74	31	60	25.1
<b>OM8</b>	27	16	59.3	9	33.3
<b>OM Total</b>	<b>765</b>	<b>251</b>	<b>32.8</b>	<b>164</b>	<b>21.4</b>

<sup>1</sup> The number of products that *would* qualify under the proposed Version 1.1 levels.

<sup>2</sup> The percent of total products that *would* qualify under the proposed Version 1.1 levels.

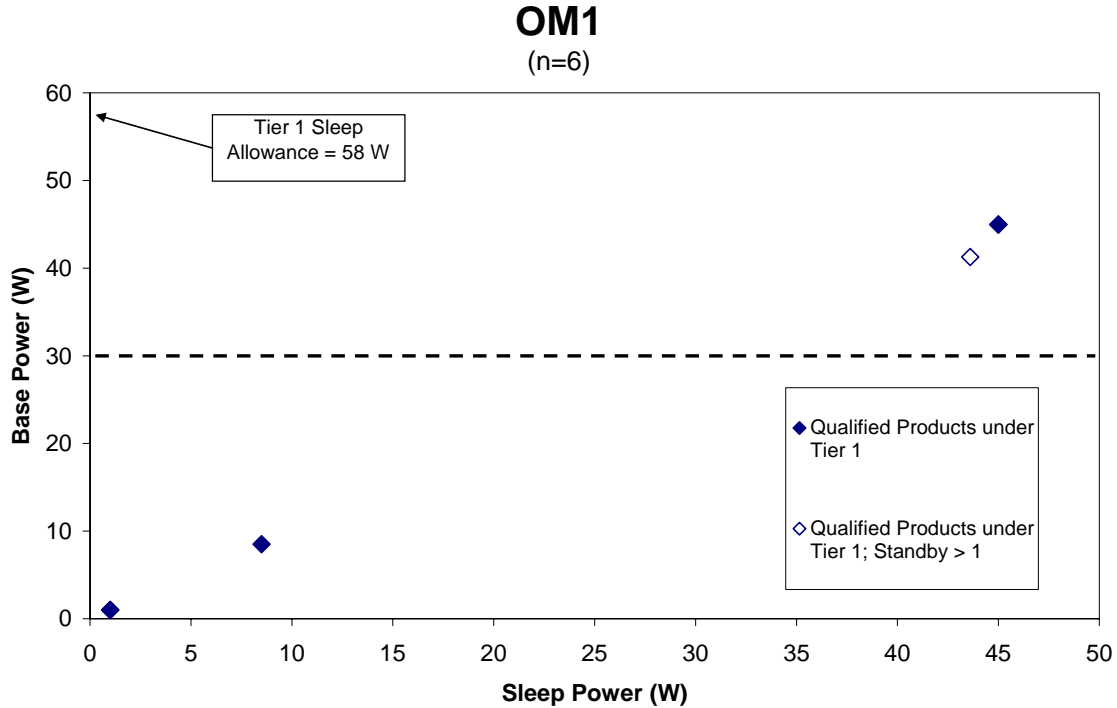
\* In Draft 2, this value was 100 total products. Based on stakeholder comments noting the possible inclusion of industrial products in this total, EPA reviewed the market information to remove these industrial products from the count of total products available.

In proposing the new requirements for Sleep mode power, EPA took into account whether more than one manufacturer had qualified products. Based on stakeholder feedback on Draft 1, the base power calculated for each product in each OM category was examined against the products' speed and power-supply (PS) size to determine if a functional adder based on PS was necessary.

From the data analysis, EPA is proposing to include the functional adder associated with Sleep levels based on power supply output rating (PSOR) for imaging products which fall under OM Tables 2 and 6. When calculating the base power for all other OM Tables, the PSOR adder was excluded in the Version 1.1 specification. In some cases the proposed Sleep allowance ENERGY STAR are higher than Version 1.0 to account for elimination of Power-supply adder for these products. EPA examined each OM category based on power supply size and speed. If data showed all products with a large power supply or high speed products did not meet a proposed Sleep requirement within an OM category, EPA applied an adder based on power supply.

Due to more limited qualified product availability under Version 1.0, the Sleep allowances for some OM tables (OM4 and OM5) have effectively remained the same in Version 1.1 to ensure consumers have access to variety of qualified models.

Below are the graphs and summaries for each OM category. In the graphs below, Version 1.1 proposed Sleep mode power requirements are indicated by a dashed line.



## OM1

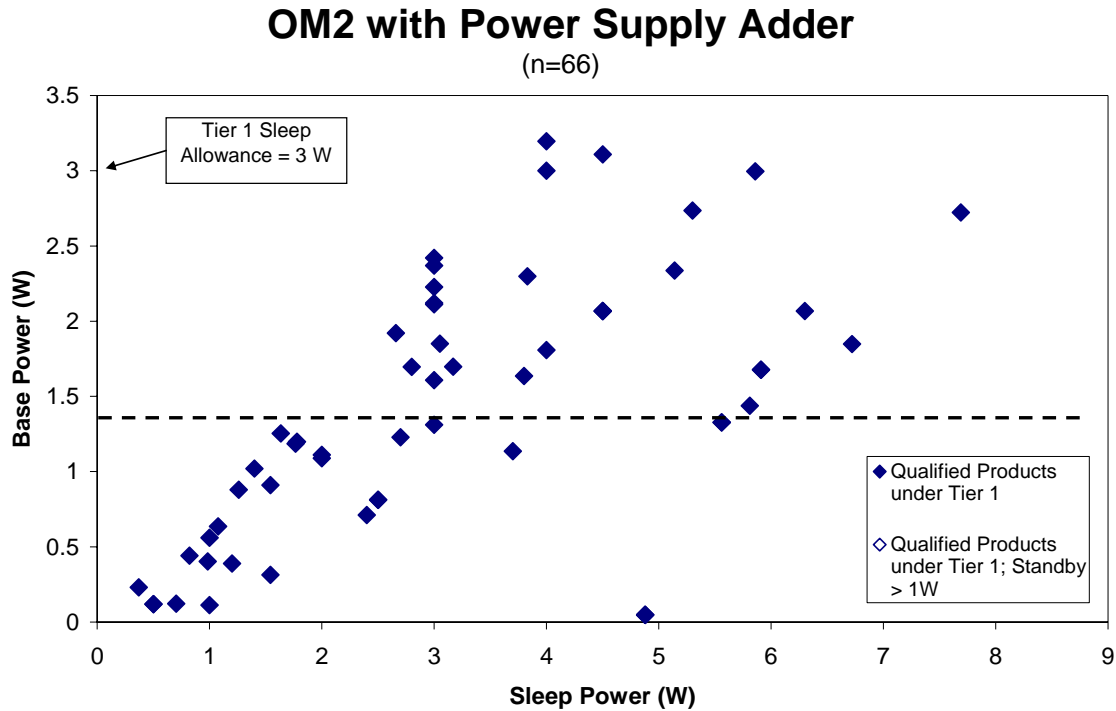
- Products: Copiers, MFDs
- Size Format: Large
- Marking Technology: Color DS, Color TT, DT, Mono DS, Mono EP, Mono TT, Color EP, SI
- Total Products Available in US: 18

### Version 1.0

- Sleep Allowance (W): 58
- ENERGY STAR qualified products: 6 (33.3% of available products)
- Number of manufacturers: 3
- All qualified products are EP

### Version 1.1

- Sleep allowance (W): 30
  - In Draft 2 the Sleep mode allowance for OM1 was set to similar level as OM8, 14 Watts (W), due to the fact that products in OM1 are basically built from a print-engine (including an optional DFE) plus a scanner. EPA intended to increase the OM1 Sleep allowance by some amount over the OM8 allowance of 14 W.
  - Based on stakeholders' input and data on an appropriate adder for the additional scanning function of OM1 products as compared to OM8, EPA proposed to set the Sleep allowance for OM1 to 30 W.
- ENERGY STAR qualifying products: 3 (16.7% of available products)
  - One product was disqualified based on a Standby power greater than 1.0 W.
- Manufacturers with qualifying products: 2



## OM2

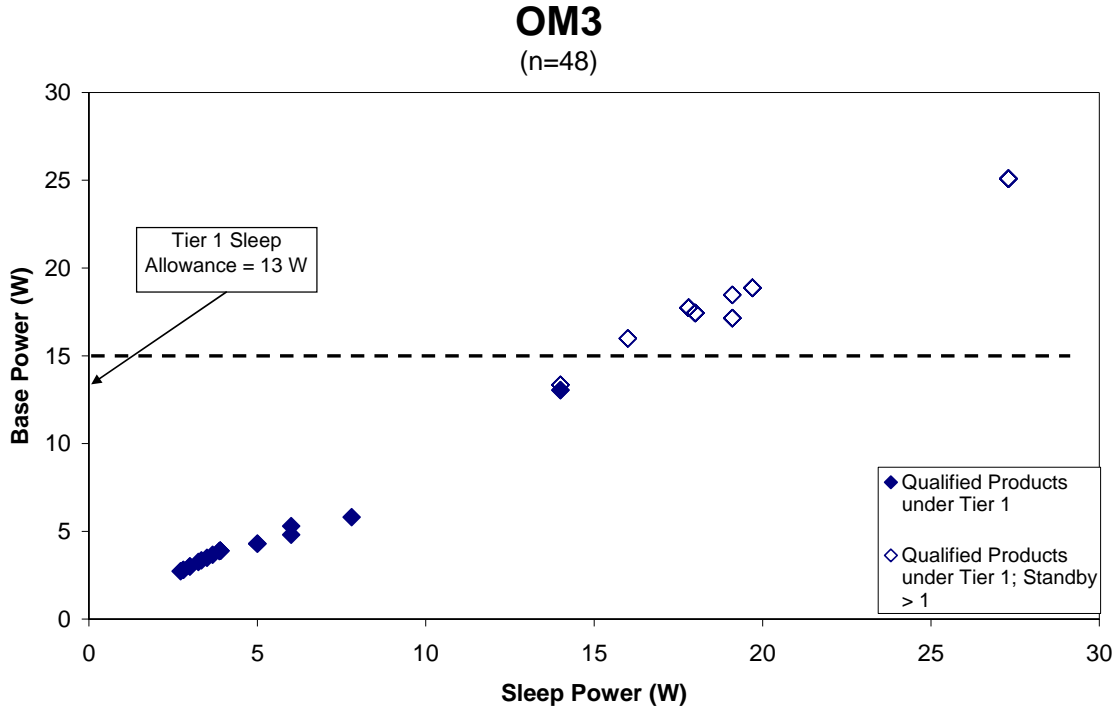
- Products: Fax Machines, MFDs, Printers
- Size Format: Standard
- Marking Technology: Color IJ, Mono IJ
- Total Products Available in US: 148

### Version 1.0

- Sleep allowance (W): 3
- ENERGY STAR qualified products: 66 (44.6% of available products)
  - 35 MFDs
  - 31 Printers
  - 0 Fax Machine
- Number of manufacturers: 7
- No monochrome products

### Version 1.1

- Sleep allowance (W): 1.4, with a functional adder based on power supply size
- ENERGY STAR qualified products: 38 (25.7% of available products)
  - 16 MFDs
  - 22 Printers
  - One product was disqualified based on a Standby power greater than 1.0 W
- Manufacturers with qualifying products: 5
- With the inclusion of the power supply adder, there were four products with slightly negative base powers; the existence of these four products is not indicative of a problem with the data analysis but may indicate a problem with the data entered.



### OM3

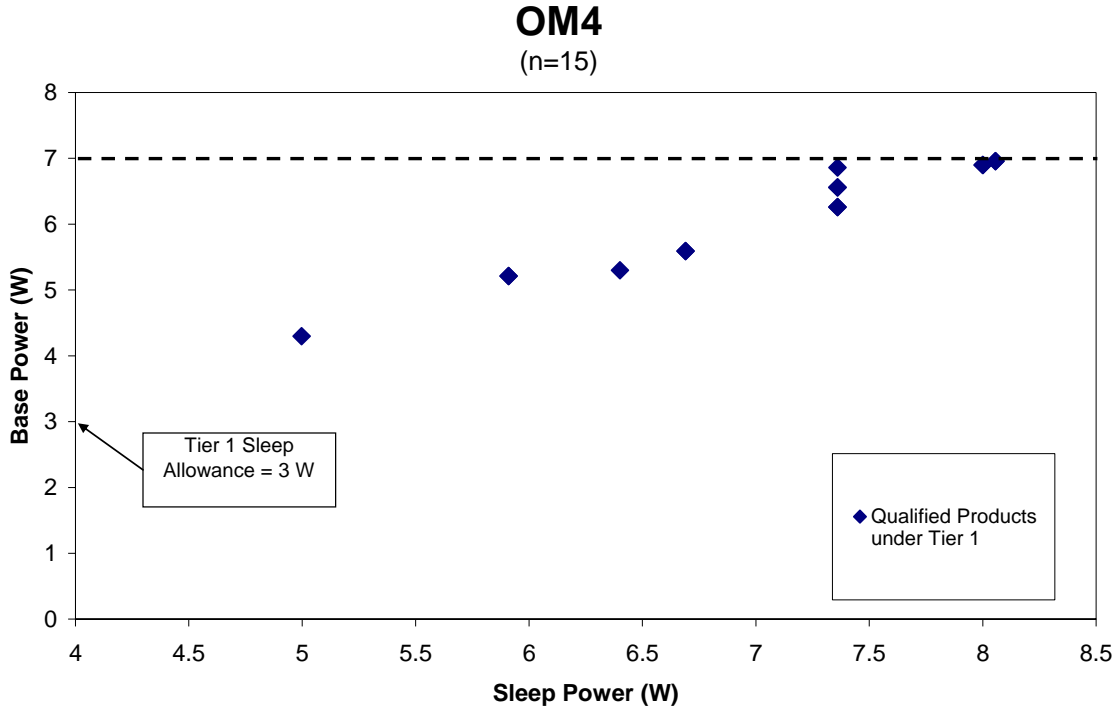
- Products: MFDs, Printers
- Size Format: Large Format
- Marking Technology: Color IJ, Mono IJ
- Total Products Available in US: 77
  - In Draft 2, this value was 100 total products. Based on stakeholder comments noting the possible inclusion of industrial products in this total, EPA reviewed the market information to remove these industrial products from the count of total products available.

#### Version 1.0

- Sleep allowance (W): 13
- ENERGY STAR qualified products: 48 (62.3% of available products)
- Number of manufacturers: 4
- All qualified products are color printers

#### Version 1.1

- Sleep allowance (W): 15
  - Tier 2 Sleep allowance higher than Tier 1 to account for elimination of Power supply adder for these products
- ENERGY STAR qualified products: 20 (26.0% of available products)
  - All products with a Standby of 1.0 W or less met the proposed Sleep allowance
- Manufacturers with qualifying products: 4



#### OM4

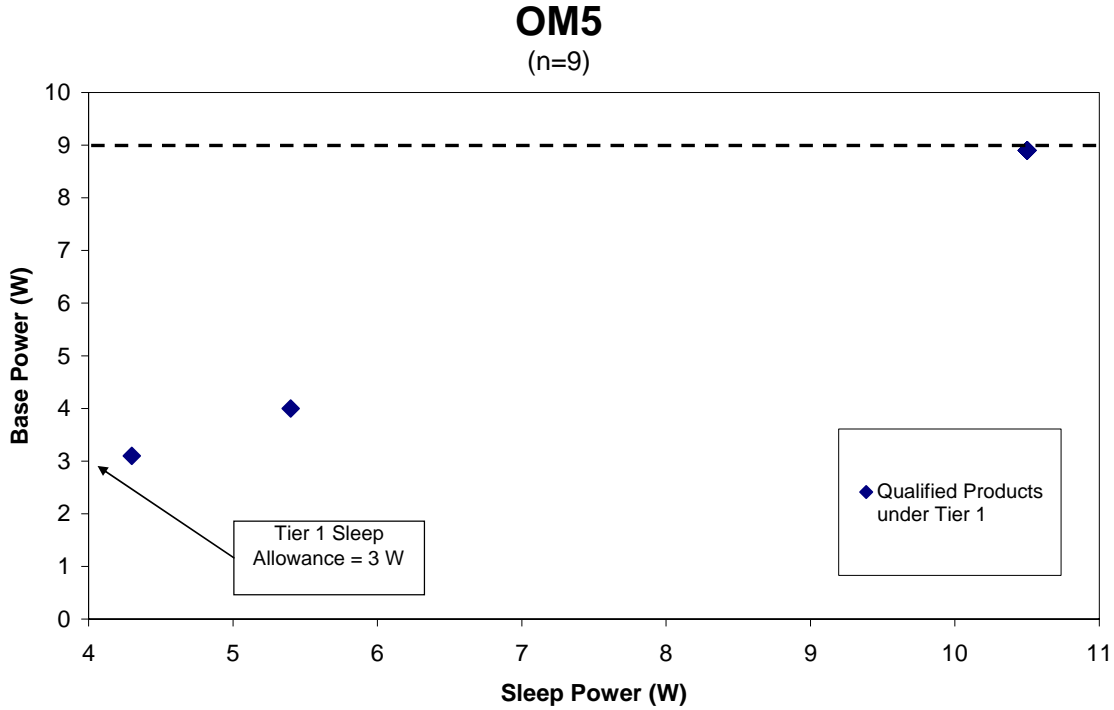
- Products: Mailing Machines
- Size Format: N/A
- Marking Technology: DT, Mono EP, Mono IJ, Mono TT
- Total Products Available in US: 55

#### Version 1.0

- Sleep Allowance (W): 3
- ENERGY STAR qualified products: 15 (27.3% of available products)
- Number of manufacturers: 2

#### Version 1.1

- Sleep Allowance (W): 7
  - Tier 2 Sleep allowance higher than Tier 1 to account for elimination of adder based on PS size – effectively remaining the same
  - Base power calculated for each product in OM4 was examined against the products' speed and PS size to determine if a secondary adder based on PS was necessary – the data did not suggest inclusion of a PS adder for these products
- ENERGY STAR qualified products: 15 (27.3% of available products) – no change
- Manufacturers with qualifying products: 2



### OM5

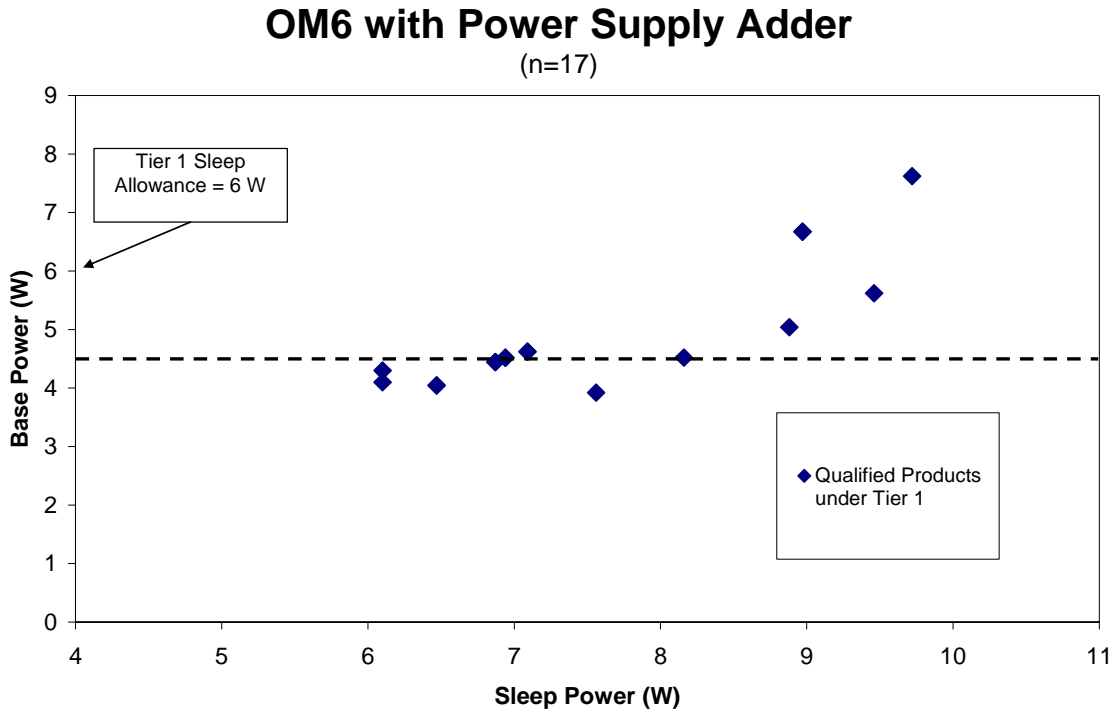
- Products: Printers
- Size Format: Small Format
- Marking Technology: Color DS, DT, Color IJ, Color Impact, Color TT, Mono DS, Mono EP, Mono IJ, Mono Impact, Mono TT, Color EP, SI
- Total Products Available in US: 162

#### Version 1.0

- Sleep allowance (W): 3
- ENERGY STAR qualified products: 9 (5.6% of available products)
- Number of manufacturers: 2

#### Version 1.1

- Sleep allowance (W): 9
  - Tier 2 Sleep allowance higher than Tier 1 to account for elimination of adder based on PS size – effectively remaining the same
- ENERGY STAR qualified products: 15 (5.6%) – no change
- Manufacturers with qualifying products: 2



## OM6

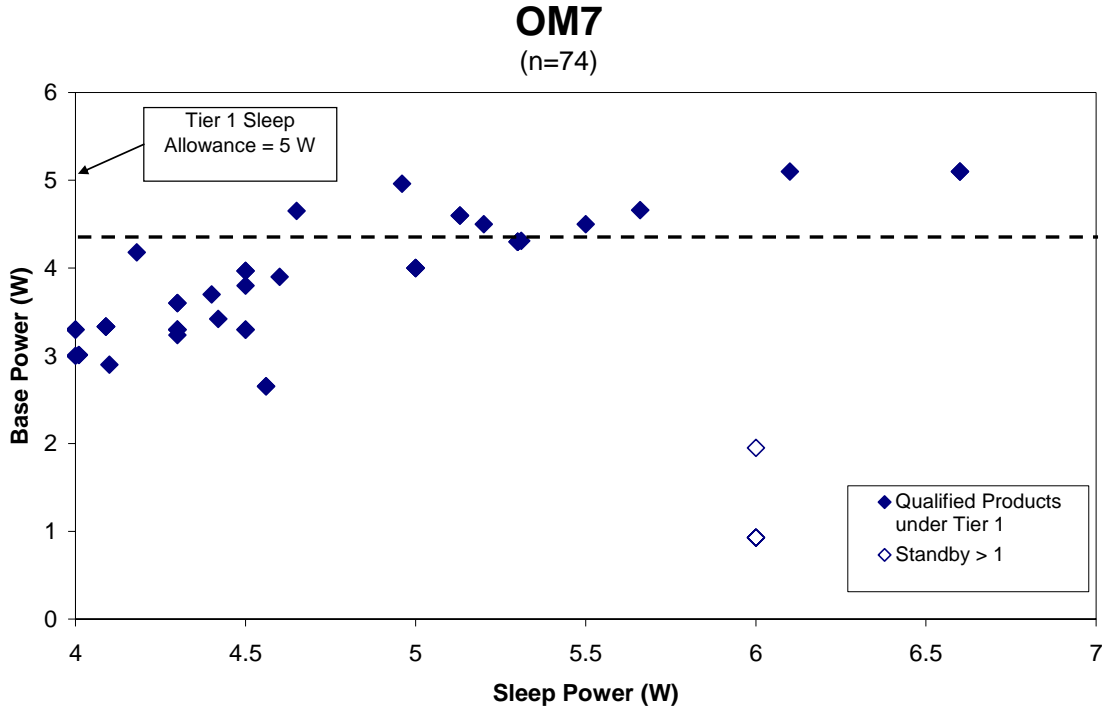
- Products: Printers
- Size Format: Standard
- Marking Technology: Color Impact, Mono Impact
- Total Products Available in US: 39

### Version 1.0

- Sleep allowance (W): 6
- ENERGY STAR qualified products: 17 (43.6% of available products)
- Number of manufacturers: 3

### Version 1.1

- Sleep allowance (W): 4.6, with a functional adder based on power supply size
- ENERGY STAR qualified products: 10 (25.6% of available products)
- Manufacturers with qualifying products: 3



**OM7**

- Products: Scanners
- Size Format: Large, Small, Standard
- Marking Technology: N/A
- Total Products Available in US: 239

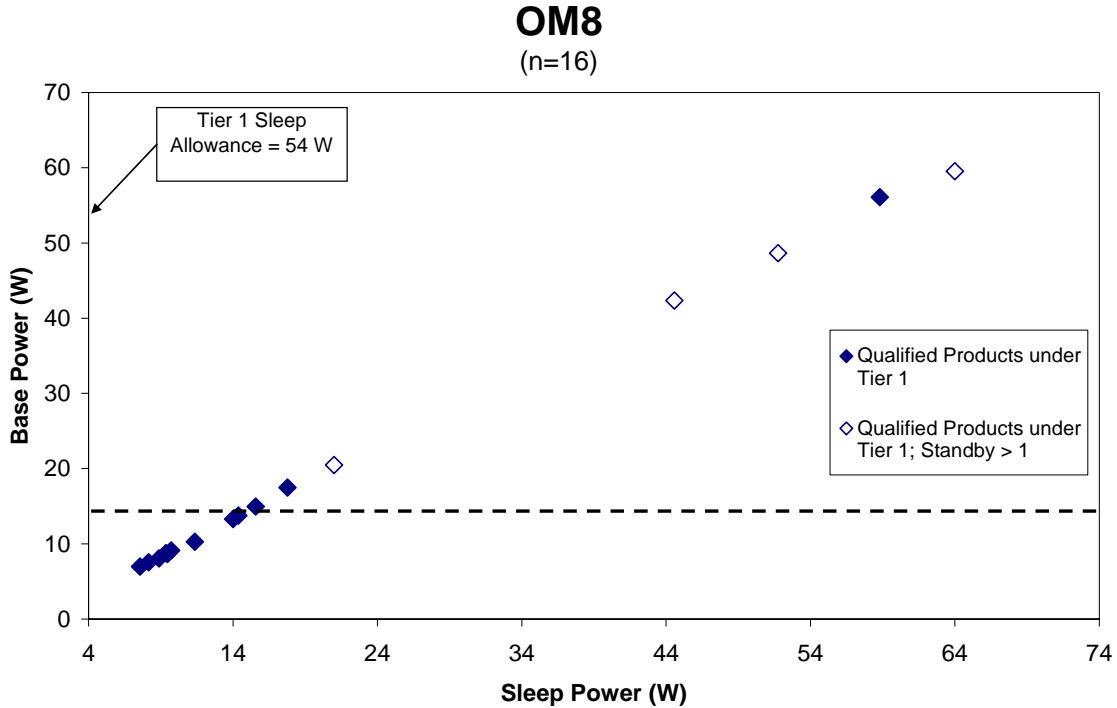
Version 1.0

- Sleep allowance (W): 5
- ENERGY STAR qualified products: 74 (31%)
- Number of manufacturers: 8

Version 1.1

- Sleep allowance (W): 4.3
  - This Sleep allowance was based on products with a reduction of the functional adder for scanners with Cold Cathode Fluorescent Lamps from 2.0 W to 0.5 W.
- ENERGY STAR qualified products: 61 (25.5%)
  - Three products meet the proposed Sleep allowance but do not meet the Standby requirement (1 W)
- Manufacturers with qualifying products: 7





**OM8**

- Products: Printers
- Size Format: Large
- Marking Technology: Color DS, Color Impact, Color TT, DT, Mono DS, Mono EP, Mono Impact, Mono TT, Color EP, SI
- Total Products Available in US: 27

Version 1.0

- Sleep allowance (W): 54
- ENERGY STAR qualified products: 16 (59.3%)
- Number of manufacturers: 4

Version 1.1

- Sleep allowance (W): 14
  - Only Impact printers meet proposed Sleep allowance. One EP product did not qualify under the Sleep allowance, and the other products which use non-Impact marking technologies did not meet the Standby requirement.
  - The proposed OM8 Sleep allowance in Draft 2 was used to set to OM1 requirements due to the fact that products in OM1 are basically built from a print-engine (including an optional DFE) plus a scanner. EPA increased the OM1 allowance by 16 W over the proposed OM8 allowance of 14 W.
- ENERGY STAR qualified products: 9 (33.3%)
  - Four products do not meet the Standby requirement (1 W)
  - Sleep allowance was set to represent more than 25% of available products in order to incorporate more than one manufacturer
- Manufacturers with qualifying products: 2