

**Explanation of the Act on the Rational Use of Energy
(Energy-Saving Act)**

— Client-side Computer Edition —

(FY 2022 Target Criteria)

Japan Electronics and Information Technology Industries Association

July 2019

Placement of This Document

This document contains explanations related to the client computers described in the 総合資源エネルギー調査会省エネルギー・新エネルギー分科会省エネルギー小委員会電子計算機及び磁気ディスク装置判断ワーキンググループ取りまとめ” (Summary of the Computer and Magnetic Disk Working Group of the Energy Conservation and New Energy Subcommittee of the General Resources and Energy Investigating Committee) from February 9, 2019, which is the basis of Notice 69 issued by the Ministry of Economy, Trade, and Industry on March 29, 2019.

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June 2019

Japan Electronics and Information Technology Industries Association
PC and Tablet Industry Committee
PC and Tablet Energy-Conservation Advisory Committee

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1. Scope of computers that are subject to the notice

As in the old regulations, both server-side and client-side computers are subject to this notice.

When we talk about computers in general, there is no clear definition of what constitutes one. In this case, the scope of computers includes digital central processing equipment (5211) and personal computers (5212) as defined under the Japan Standard Commodity Classification (revised in June 1990), which is the same as the scope of the target criteria for FY 2011.

However, the following computers are not subject to the notice:

(1) Computers with high throughput

- ① Computers that have multiple processing units, main storage devices, I/O controllers, or power supplies

As with the existing regulations, these evaluation criteria continue to exclude fault-tolerant computers that serve as the backbones of financial and social systems which require a high degree of reliability.

- ② Computers with at least 512 I/O signal paths that each have maximum data-transfer rate of 10 Gbps or more

Computers that are used to control I/O on a very large scale, such as a single server that connects the printers located at the many branches of a financial institution, have a limited purpose of use and are thus excluded from these criteria. The old criteria specifies that the maximum data-transfer rate must meet or exceed 100 Mbps, but this threshold is subject to change according to the technological advancements.

(2) Computers for which measurement and evaluation methods have not been established, making it difficult to determine target criteria

- ① Server computers with five or more CPU sockets
- ② Server computers equipped with CPUs other than x86, SPARC, or Power

Servers with CPUs other than those that can be tested with the methods in the

new criteria for server computers (x86, SPARC, or Power), such as mainframe servers, are excluded from these criteria.

(3) Computers with low overall power consumption

- ① Computers that have dedicated internal batteries and can be used without supplying electricity through a power cord

Since their total energy consumption is low due to the small amount of power they consume (just a few watts), these devices are excluded from the criteria. The old criteria specifies “computers that have dedicated internal batteries and can be used without electricity supplied through a power cord, and that are not equipped with magnetic-disk storage devices,” but the requirements have been updated to reflect the proliferation of solid-state drives. In addition to the computers specified under the Japan Standard Commodity Classification, the treatment of personal mobile devices such as tablets and personal mobile devices was discussed within the working group. Since the energy consumption of these devices is low, the decision was made to exclude them from these criteria.

Scope of regulations

1. Examples of personal computers (5212) that are in-scope

- Notebook computers
- Slate computers
- 2-in-1 computers
- Integrated desktop computers
- Discrete-type desktop computers
- Workstations
- Small general-purpose computers such as stick computers
- ...and other client PCs

2. Examples of computers that are out-of-scope

- ① Devices that fall under 5215 of the Japan Standard Commodity

Classification

- Thin clients
 - Point-of-sale terminals
 - E-book readers
 - Calculators
 - Game consoles
 - Handy terminals
 - Computers that are primarily developed and sold for embedding in switchboards, control panels, electrical appliances, automobiles, etc.
- ...and similar devices

*IoT devices and information appliances are not considered terminals and are thus excluded. However, if the usage of a device is expanded to include terminal functionality that corresponds to a client PC falling under the above-mentioned 5215, then it will be subject to the Energy-Saving Act.

② Used products that are resold

This is restricted to systems that have not been manufactured or imported. Here, “manufacturing” means making any modifications that affect a system’s classification or energy efficiency, such as ① changes to main memory capacity that exceed the previous maximum capacity, ② changes to the motherboard, ③ changes to the CPU, ④ changes to the power supply (AC adapter), ⑤ changes to the model name (the device nameplate), etc.

3. Computers to which the criteria does not apply

- Slate computers and 2-in-1 computers that have dedicated internal batteries which allow them to be used even when electricity is not supplied through a power cable; namely, slate computers, notebook computers and other client PCs that cannot operate without the presence of an internal battery. Whether the device can operate without an internal battery is determined by its design specifications and is unaffected by the ability or inability of the user to remove the internal battery.

- Tablet devices(Portable terminal)

2. Evaluation criteria (items that manufacturers should use as the basis for making determinations)

(1) Target Year

FY 2022

For the next criteria period, the energy efficiency of client PCs will be expressed as annual energy consumption. From the reference year (FY 2015) to the year the new criteria were issued (FY 2019), there was virtually no decrease in the energy consumption of computers which have relatively high efficiency in the energy consumption , even when viewed in terms of the different generations of CPUs.

Realizing a decrease in energy consumption requires improvements in components other than the CPU, and the design and development of computers that incorporate these improvements takes approximately three years. Therefore, the target year is FY 2022, three years after FY 2019 when the regulations for the next period go into effect.

(2) Energy efficiency of client computers

The energy efficiency of a client computer uses the typical energy consumption or TEC, and is defined as the weighted average of the energy efficiency of four different modes—off mode, sleep mode, short idle mode, and long idle mode—as measured under the prescribed testing environment in accordance with JIS C 62623:2014, and can be expressed in units of kWh/year by the following formula:

$$TEC_{\text{estimated}} = (8760/1000) \times [P_{\text{off}} \times T_{\text{off}} + P_{\text{sleep}} \times T_{\text{sleep}} + P_{\text{idle}} \times T_{\text{idle}} + P_{\text{sidle}} \times (T_{\text{sidle}} + T_{\text{work}})]$$

$$\text{where } T_{\text{off}} + T_{\text{sleep}} + T_{\text{idle}} + T_{\text{sidle}} + T_{\text{work}} = 100\%.$$

T_{off}: Percentage of the year that the device is in off mode

T_{sleep}: Percentage of the year that the device is in sleep mode

- T_{idle} : Percentage of the year that the device is turned on and in long idle mode (screen display is off)
- T_{side} : Percentage of the year that the device is turned on and in short idle mode (screen display is on)
- T_{work} : Percentage of the year that the device is turned on and in active mode (screen display is on)
- P_{off} : Average energy consumption measured during a five-minute period while in off mode
- P_{sleep} : Average energy consumption measured during a five-minute period while in sleep mode
- P_{idle} : Average energy consumption measured during a five-minute period while in long idle mode
- P_{side} : Average energy consumption measured during a five-minute period while in short idle mode

The yearly percentages for each computer mode used in the above formula are the operational mode weightings (the percentage of the year that each mode is used) stipulated in JIS C 62623:2014 Supplement B and are calculated using the above formula (see Table 1).

JIS recommends the use of these mode weightings, which can also be found in ISO/IEC standards as well as the *Requirements for Computers Version 7.0* published by the international ENERGY STAR program.

Table 1 — Operational mode weightings used when calculating energy efficiency

	Desktop Computers	Notebook Computers
T_{off}	45%	25%
T_{sleep}	5%	35%
T_{idle}	15%	10%
T_{side}	35%	30%
T_{work}	0%	0%

Use the mode weightings in the Notebook Computers column of Table 1 for notebook computers (including slate and 2-in-1 PCs) and those in the Desktop Computers column for desktop computers (including integrated desktop PCs) to calculate energy efficiency with the provided formula.

JIS C 62623:2014 states that energy consumption should be measured for four modes: off mode, sleep mode, long idle mode, and short idle mode.

However, some products are equipped with a low-power mode instead of a sleep mode. Therefore, for this criteria, power is to be measured in the lowest-latency user-activated mode that is enabled by default for products that do not offer a sleep mode.

(1) Off mode

Off mode is the lowest power mode which cannot be switched off by the user and that may persist for an indefinite time when the unit under test (UUT) is connected to the main electricity supply and used in accordance with the manufacturer's instructions. In this state, the computer is supplied with only the minimum electricity required for shutdown, complete power off or power on.

(2) Sleep mode

Sleep mode is a low-power mode that the UUT enters automatically after a period of inactivity or by manual selection. In this state, the only electricity supplied is that required to power the main memory and to "wake" the computer back up.

When testing power consumption in sleep mode, the Wake-on-LAN feature can be disabled if desired.

(3) Short idle mode

Short idle mode is when the computer meets the following conditions:

- ① The UUT is in an idle state.
- ② The display has been powered on for at least 30 minutes to warm up and meets

the below brightness levels specified by JIS. It is noted that adjusting brightness levels in the operating system shall be done for displays configured to RGB values of 255, 255 and 255.

Integrated desktop computers: 150 cd/m² or higher

Notebook computers: 90 cd/m² or higher

Slate/tablet computers: 90 cd/m² or higher

- ③ The long idle power-management feature is not active.

(4) Long idle mode

Long idle mode is when the computer meets the following conditions:

- ① The UUT is in an idle state.
- ② The display is not powered but the UUT remains in an operational state.

“Not powered” means that the primary computer display (whether an integrated panel or an external display) has transitioned to a low-power state in which the contents of the screen cannot be viewed (for example, when the backlight is turned off and the screen is black).

- ③ The power-management feature is active if that is how it is configured by default, but it prevents the UUT from going into sleep mode.

About the energy efficiency

Measuring the power consumption in each mode:

- Obtain an average value for a five-minute interval, then round it to the nearest hundredth.

(3) Classification and target criteria

(3)-1 Classification

Currently, client computers are expected to handle a very diverse set of tasks. They are therefore categorized based on their form and performance characteristics such as CPU performance, screen size, and chassis volume to reflect the components that are representative of consumer needs.

① Classification by form

This criteria divides client PCs into two main categories—desktop computers and notebook computers—based on the differences in power consumption originating from their varied design philosophies and construction. In addition, desktop computers are further categorized as either integrated desktop computers, in which the main unit and display are combined or discrete-type desktop computers, which do not have a built-in display.

② Classification by CPU type

The theoretical performance of a CPU is proportional to its number of cores and clock frequency and can be expressed in terms of P-score (number of cores \times clock frequency in gigahertz).

Number of cores represents the number of physical CPU cores, and clock frequency represents the Max thermal design power(TDP) core frequency, not its Turbo-Boost frequency.

If the same target criteria is established for products within a category without regard to P-score, it becomes difficult for products with P-score of 8 or higher to meet this criteria; and if manufacturers can no longer ship products with P-score of 8 or higher, they may be unable to meet the diverse needs of consumers.

Therefore, regarding notebook computers and integrated desktop computers, products are divided into those with P-scores less than 8 and those with P-scores of 8 or higher.

③ Classification by screen size

Notebook computers with screen size smaller than 15 inches are designed for

portable use, while those with screen size of 15 inches or greater are primarily used in a single location, so their design emphasizes performance and expandability.

Specifically, some notebook models with screen sizes of 15 inches or greater feature strong performance provided by advanced CPUs and large memory capacity, and they may offer optical drives or numerous external ports. For these reasons, notebook computers with screen size of 15 inches or greater consume more power during maximum operation, which means that their power circuitry must be more elaborate; compared to notebook computers with screen size less than 15 inches, they experience greater power loss when idle. Since the difference in power consumption between notebook computers with screen size less than 15 inches and those with screen of 15 inches or greater cannot be compensated for using an adjustment value, they are divided into two separate categories. In addition, few products with P-score of 8 or higher were shipped during FY 2015, meaning that there wasn't enough test data for sufficient verification. Therefore, these products are not categorized according to their screen size.

About screen sizes

Screen size is determined by taking a diagonal measurement (in centimeters) of an LCD display's viewable screen area, dividing that value by 2.54, then rounding the result to the nearest whole number.

④ Classification by expandability

One of the characteristics of discrete-type desktop computers is that their performance can be expanded to match their intended use. The energy consumption and markets for such products vary according to their expandability. Since expanding performance involves increasing the number of components and is thus affected by factors such as motherboard size (form factor), internal power capacity, and fan size, it requires chassis with more room. Therefore, a computer's expandability and the volume of its chassis are related. The primary usage of discrete-type desktop computers with chassis volume of less than 5 L, 5 L to less than 20 L, 20 L to less than 35 L, and 35 L or greater is different, and each has technical and structural differences that affect energy consumption. For this reason,

traditional desktop computers are classified according to the volume of their chassis.

Chassis volumes and measurement methods

If the chassis volume for a computer is stated by the manufacturer, use that value. If no value has been specified by the manufacturer, determine the volume (cm³) calculated from the dimensions (height × width × depth (cm)) while excluding any stands, handles, or protruding areas of the discrete-type desktop computer's main body (without peripherals such as the keyboard, mouse, and display), divided by 1,000 (to express it in liters); then truncate any places after the decimal point.

(3)-2 Target criteria

Client computers are available in a dizzying array of internal component configurations (main memory, displays, internal storage, discrete GPUs, power supplies, etc.) that meet the diverse performance and feature sets sought by consumers. This means that setting the target criteria according to the TEC of products with only few components could make it technically difficult to achieve that TEC with products that come equipped with many components.

JIS C 62623:2014 states that an allowance value can be used to increase the TEC of a device by a certain amount when adding to or configuring the features of a computer product. Since the presence and specifications of main memory, displays (screen size and resolution), internal storage, discrete GPUs, and power supplies resulting from a product's form influence the TEC value, TEC allowance values that correspond to these factors are provided.

These allowance values are determined by selecting the top values within each category and are indicated in Table 2.

Table 2 — Target criteria for client computers (target energy efficiency)

Product Form		CPU Perf. (P-score)	Screen Size	Chassis Volume	Category	Formula for computing target energy efficiency (kWh/year)		
Notebook Computer		< 8	< 15"	—	10	$E = 5.21 + \text{TEC}_{\text{MEMORY}} + \text{TEC}_{\text{INT_DISPLAY}} + \text{TEC}_{\text{STORAGE}} + \text{TEC}_{\text{GRAPHIC}}$		
			≥ 15"	—	11	$E = 7.75 + \text{TEC}_{\text{MEMORY}} + \text{TEC}_{\text{INT_DISPLAY}} + \text{TEC}_{\text{STORAGE}} + \text{TEC}_{\text{GRAPHIC}}$		
		≥ 8	—	—	12	$E = 11.34 + \text{TEC}_{\text{MEMORY}} + \text{TEC}_{\text{INT_DISPLAY}} + \text{TEC}_{\text{STORAGE}} + \text{TEC}_{\text{GRAPHIC}}$		
Desktop Computer		Integrated		—	—	13	$E = 39.87 + \text{TEC}_{\text{MEMORY}} + \text{TEC}_{\text{INT_DISPLAY}} + \text{TEC}_{\text{STORAGE}} + \text{TEC}_{\text{GRAPHIC}}$	
		< 8	—			14	$E = 53.32 + \text{TEC}_{\text{MEMORY}} + \text{TEC}_{\text{INT_DISPLAY}} + \text{TEC}_{\text{STORAGE}} + \text{TEC}_{\text{GRAPHIC}}$	
		Discrete- type		—	—	< 5 L	15	$E = 29.59 + \text{TEC}_{\text{MEMORY}} + \text{TEC}_{\text{STORAGE}} + \text{TEC}_{\text{GRAPHIC}}$
				—	—	5 L to < 20 L	16	$E = 31.33 + \text{TEC}_{\text{MEMORY}} + \text{TEC}_{\text{STORAGE}} + \text{TEC}_{\text{GRAPHIC}} + \text{TEC}_{\text{POWER}}$
				—	—	20 L to < 35 L	17	$E = 28.45 + \text{TEC}_{\text{MEMORY}} + \text{TEC}_{\text{STORAGE}} + \text{TEC}_{\text{GRAPHIC}} + \text{TEC}_{\text{POWER}}$
				—	—	≥ 35 L	18	$E = 40.47 + \text{TEC}_{\text{MEMORY}} + \text{TEC}_{\text{STORAGE}} + \text{TEC}_{\text{GRAPHIC}} + \text{TEC}_{\text{POWER}}$

Note 1: E represents the following:

E : Target energy efficiency (kWh/year)

Note 2: The TEC adder allowance represent the following:

TEC_{MEMORY} : TEC adder allowance for main memory (kWh/year)

$TEC_{INT_DISPLAY}$: TEC adder allowance for the display (kWh/year)

$TEC_{STORAGE}$: TEC adder allowance for internal storage (kWh/year)

$TEC_{GRAPHIC}$: TEC adder allowance for the discrete GPU (kWh/year)

TEC_{POWER} : TEC adder allowance for the capacity of the internal power supply (kWh/year)

TEC adder allowance for each category are indicated in Table 3.

Table 3 — TEC adder allowance

(Units: kWh)

Category	TEC Adder Allowance							
	Main Memory	Display		Internal Storage			Discrete GPU	Power Capacity
		< 17.4"	≥ 17.4"	SSD	2.5" HDD	3.5" HDD		
10	Maximum memory capacity (GB) × 0.186	$(8.76 \times 0.30) \times (\text{screen area (cm}^2) \div 2.54^2 \times 0.0300 + \text{screen resolution (megapixels)} \times 0.244)$		0	2.510	—	4.198	—
11								—
12								—
13	Maximum memory capacity (GB) × 0.248	$(8.76 \times 0.35) \times (\text{screen area (cm}^2) \div 2.54^2 \times 0.0300 + \text{screen resolution (megapixels)} \times 0.244)$	$(8.76 \times 0.35) \times (\text{screen area (cm}^2) \div 2.54^2 \times 0.0393)$	0	3.140	20.380	$0.587 \times \text{frame-buffer bandwidth (GB/s)} + 30.463$ *Maximum of 130	—
14								—
15		—	—					
16		—	—					
17		—	—					
18		—	—					Rated input × 0.0543 (W)

Note 1: Maximum memory capacity is defined as the maximum memory that can be installed in the computer (excluding any cache memory) and is expressed in gigabytes.

Note 2: Screen area is defined as the product of the vertical and horizontal dimensions of the viewable screen area, expressed in square centimeters and rounded to the nearest tenth. The viewable screen area is the section of the liquid-crystal display that displays an image.

Note 3: Screen resolution is defined as the total number of pixels displayed on the screen and is expressed in megapixels.

Note 4: Internal storage is defined as the SSD, 2.5" HDD, or 3.5" HDD installed in the main body of the computer.

About internal storage devices

Since HDDs require the operation of a rotor, they consume more energy than the solid-state memory of SSDs; and 3.5" HDDs consume more energy than 2.5" HDDs because they require more power to operate their rotors. For these reasons, the TEC adder allowance corresponds only to the presence of a single 2.5" or 3.5" HDD. Any adder allowance is not applied to storage devices consisting of solid-state memory, such as SSDs and eMMCs.

Note 5: Discrete GPUs (graphics processing units) are defined as image-data processors that are equipped with dedicated local memory. Discrete GPU performance is represented by the FB_BW (frame-buffer bandwidth) and is expressed in gigabytes per second (GB/s).

The frame-buffer bandwidth is the memory space used to temporarily store the image data displayed on the screen.

However, if the above formula results in a TEC adder allowance greater than 130, use 130 as the adder allowance.

About discrete GPUs

The adder allowance is not applied to GPUs that are integrated within the CPU, such as Intel HD Graphics or AMD Radeon Graphics. Also, the adder allowance is not applied to discrete GPUs that are switchable.

The followings are typical examples of form factors implementing discrete GPU and how the discrete GPU adder allowance is applied.

- (a) Desktop computer with discrete GPU graphics card without integrated GPU's support
 - Adder allowance: Yes
 - Adder allowance approach: See Table 3
 - Testing: Test with discrete graphics card (system not functional without discrete GPU)
- (b) Notebook/Desktop computer with removable discrete graphics card with integrated GPU's support
 - Adder allowance: No
 - Testing: Test without discrete graphics card
- (c) Desktop computer with non-removable discrete GPU on the mainboard or in the CPU package with integrated GPU's support
 - Adder allowance: switchable case: No, non-switchable case: Yes
 - Adder allowance approach: See Table 3
 - Testing: Test with discrete GPU
- (d) Notebook computer with non-removable discrete GPU on the mainboard or in the CPU package with integrated GPU's support
 - Adder allowance: switchable case: No, non-switchable case: Yes
 - Adder allowance approach: 4.198 kWh
 - Testing: Test with discrete GPU

Note 6: Power capacity is defined as the rated input of the internal power supply and is expressed in watts.

About power capacity

- The adder allowance is only applied to computers that have internal power supplies in their cases. It is not applied to AC adapters.

In addition, the rated power-conversion efficiency of a power supply (e.g. 80 Plus Gold) is not affected by the adder allowance; rather, the adder allowance is applied in accordance with the rated AC input of the unit (in watts).

- An example of calculating the rated AC input:

$$\text{rated AC input} = \text{rated output} \div \text{power efficiency}$$

(Example for 80PLUS Bronze)

Power efficiency of 82% at 100% load if rated output is 500 W

$$\text{rated AC input} = 500 / 0.82 = 609.8 \text{ W}$$

About the target criteria

An example of computing the target for a device with the below specifications:

Item	Notebook Computer Sample A		Specification	Notes
1	Screen Size		15.6"	
2	CPU	number of cores	2	P-score = $2 \times 2.7 = 5.4$
3		maxTDP	2.7 GHz	
4	Maximum Memory		16 GB	
5	Screen Area		664.5 cm ²	
6	Screen Resolution		1.049 MP	
7	HDD	2.5"	Yes	
8	Discrete GPU	Needed for	Not needed	If switchable,

		Display?		“Not needed”
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Determining Category:

From items 2 and 3, the P-score is 5.4, which is less than 8.

From item 1, the screen size is 15.6”, which is greater than 15”.

These factors, plus the fact that it is a notebook computer, tell us that the category of the device is 11 according to Table 2.

Target Criteria:

Table 2 indicates that the target criteria for category 11 is expressed by the following formula:

$$E = 7.75 + \text{TEC}_{\text{MEMORY}} + \text{TEC}_{\text{INT_DISPLAY}} + \text{TEC}_{\text{STORAGE}} + \text{TEC}_{\text{GRAPHIC}} \text{ (kWh/year)}$$

TEC adder allowance:

According to Table 3, the adder allowance for category 11 are determined using the following formulas:

$$\text{TEC}_{\text{MEMORY}} = \text{memory capacity (GB)} \times 0.186 = 16 \times 0.186 = 2.976$$

$$\begin{aligned} \text{TEC}_{\text{INT_DISPLAY}} &= (8.76 \times 0.30) \times (\text{screen area (cm}^2) \div 2.54^2 \times 0.0300 + \text{screen} \\ &\quad \text{resolution (MP)} \times 0.244) \\ &= (8.76 \times 0.30) \times (664.5 \div 2.54^2 \times 0.0300 + 1.049 \times 0.244) \\ &= (8.76 \times 0.30) \times (3.346) \\ &= 8.793 \end{aligned}$$

$$\text{TEC}_{\text{STORAGE}} = \text{for 2.5” HDD} = 2.51$$

The adder allowance is only for a single drive, even if multiple drives can be supported

Testing can be done with only one drive installed

$$\text{TEC}_{\text{GRAPHIC}} = \text{Not needed} = 0$$

If switchable, turn it off when testing

Thus:

$$\begin{aligned} E &= 7.75 + 2.976 + 8.793 + 2.510 + 0 \\ &= 22.029 \\ &= 22.0 \text{ kWh/year (rounded to the nearest tenth)} \end{aligned}$$

Similarly, target criteria for desktop computers (including integrated desktops) can be obtained by determining the category then finding the TEC adder allowance.

(4) Determining if the criteria are met

(4)-1 Using a weighted average to make a determination

Every manufacturer must ensure that the average (weighted by the number of units shipped in each category listed in Table 2) energy efficiency of the client computers it ships domestically in each fiscal year following the target year, as measured using the methods described in JIS C 62623:2014, does not exceed the weighted average of the target criteria (the energy efficiency calculated using the formulas in the table and rounded to the nearest tenth) for computers listed in the right-hand column of Table 2.

About making determinations using weighted averages

Below is an example of making a determination:

(Example) The following table lists the number of Category-Y units that Company X shipped to the domestic market in FY 2022, along with their criteria values and energy efficiencies:

Model	Energy Efficiency	Target Criteria	Shipped Units
Model A	15.2 kWh	14.8 kWh	30,000
Model B	16.7 kWh	18.5 kWh	50,000

Model C	17.5 kWh	18.5 kWh	10,000
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The weighted average of the energy efficiency of shipped Category-Y units is:

$$(15.2 \times 30,000 + 16.7 \times 50,000 + 17.5 \times 10,000) \div (30,000 + 50,000 + 10,000)$$

$$= 16.29 \rightarrow 16.3 \quad \text{rounded to the nearest tenth}$$

Weighted average of the target criteria for shipped Category-Y units:

$$(14.8 \times 30,000 + 18.5 \times 50,000 + 18.5 \times 10,000) \div (30,000 + 50,000 + 10,000)$$

$$= 17.27 \rightarrow 17.3 \quad \text{rounded to the nearest tenth}$$

Since the energy efficiency for Category Y is 16.3 kWh, which is less than the reference efficiency of 17.3 kWh, the weighted average for Company X's shipped units in that category has not exceeded the reference. Therefore, the company has met the requirements for Category Y.

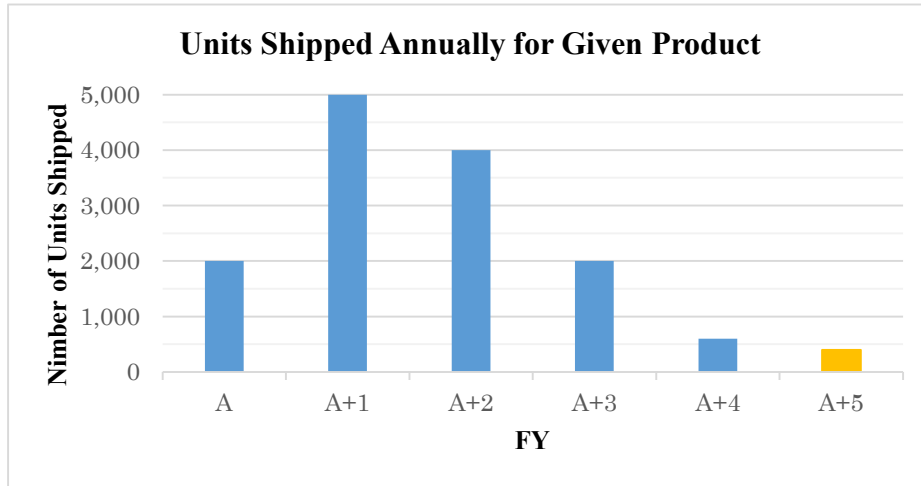
This determination must be made for each category, and Company X must meet the requirements for all categories that apply.

(4)-2 Products that are excluded when making a criteria determination

With information systems that cannot be easily updated, such as those involved in social infrastructure, models with identical specifications must be used for long periods of time. This means that the same device models must be provided and sold to organizations that operate these systems over the long term. When determining if the target criteria for the next period have been met, it is therefore important to exclude products whose sales have already peaked. For this reason, the criteria do not apply to models that have annual shipping numbers of 10% or less of the peak number of units shipped annually since the target year.

About products that are excluded from determinations

An example of how annual changes in the number of shipped units can result in the product being excluded:



If the number of units shipped annually for given model is described by the above graph,

The peak number of units shipped annually in the past was 5,000 units in Year [A+1].

10% or less of that number would be 500 units or less, which occurred in Year [A+5]. So for that year, a device with these specifications would be excluded when determining if the criteria have been met.

The criteria would apply to the product through Year [A+4], since the annual sales in those years exceeded 10% of the peak.

Note that the labeling mandated by the Energy-Saving Act must always be complied with regardless of the number of units shipped.

(5) Testing methods

When testing, follow the protocol established in JIS C 62623:2014 (Desktop and notebook computers - Measurement of energy consumption). However, the Unit Under Test (UUT) should be configured as follows.

(5)-1 Configuring the UUT

JIS C 62623:2014 states that the UUT should include all of the hardware accessories and software that ship with it (configured to their default settings) and that it should be set up according to the instructions provided with the product unless otherwise explicitly specified in the protocols of JIS C 62623:2014.

But personal computers in the market today are available in a plethora of different combinations of components, memory capacities, and accessory devices, so testing them all and comparing them to target criteria would be difficult.

Therefore, the UUT should be configured as follows.

- Perform the test using the maximum configuration, but exclude any I/O controllers, communication controllers, magnetic disks, or other devices that can be removed from the computer without hindering its basic functionality.
- If the computer has an expandable number of CPUs, perform the test using the minimum number of processors.

Configuring the UUT

- Use the maximum configuration of main memory and cache memory with the minimum number of CPUs.

In other words, the test must be performed using the maximum amount of memory that can be installed in the computer. This installed memory capacity is also used to compute the TEC adder allowance.

If, for example, the computer is capable of using two CPUs but can still operate with just one CPU, then it is okay to test it with one CPU installed; and if that

computer supports different types of CPUs, the test should be conducted using the CPU with the highest energy consumption.

- When measuring the energy efficiency of a client computer as described in (2) above, feel free to exclude any internal or external options that are easily removable and are not required to fulfill the operating conditions.

In other words, external displays, printers, internal SSDs or HDDs, optical drives, I/O adapter cards, and similar devices can be removed before testing.

- Discrete GPUs are included within the scope of testing illustrated in Figure 3, with the exception of switchable discrete GPUs that can seamlessly transition between integrated chipset graphics and a powerful external graphics engine.

(5)-2 Testing environment

(1) Testing conditions: Per the following conditions stipulated in section 5.4 of JIS C 62623:2014

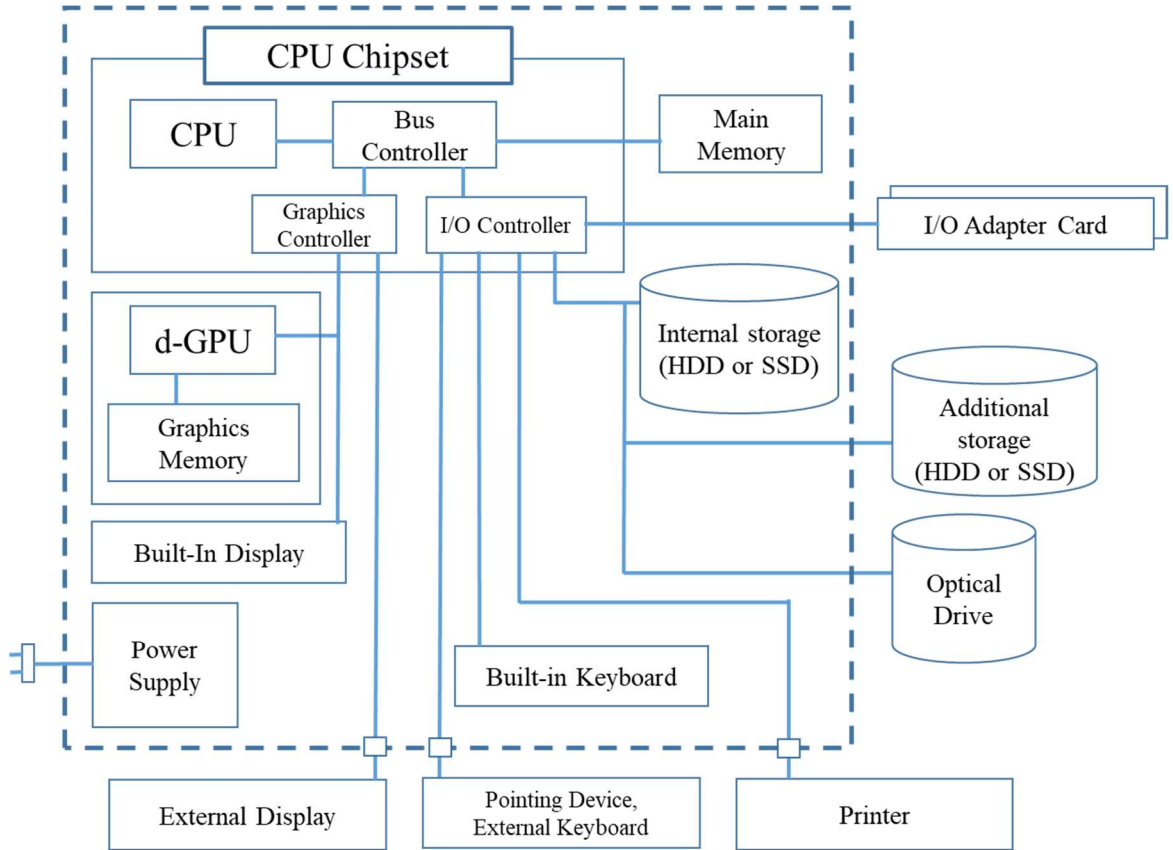
- Ambient Temperature 23 °C ± 5 °C
- Voltage 100 VAC ± 1%
- Power Frequency 50 Hz or 60 Hz ± 1%

(2) Testing Configuration: Per Figure 1 — Standard test configuration in section 5.2 of JIS C 62623:2014. However, refer to sections (2) (Energy efficiency of client computers) and (5)-1 (Configuring the UUT) above for detailed settings to use when testing (configuring devices with switchable discrete GPUs, brightness settings, etc.).

(3) Testing Protocol: Per section 5.3 of JIS C 62623:2014.

(4) Other: Refer to section (2) above for the formula to use when calculating typical energy consumption.

Figure 3 — Device configuration



Note: Areas within the dotted line subject to testing
The presence of a d-GPU or graphics memory will depend on the product's specifications.

⋮ ⋮ ⋮ ⋮ ⋮ ⋮ ⋮ ⋮ ⋮ ⋮ ⋮

3. Labeling

(1) Label information

Manufacturers must indicate the following information about a computer's energy efficiency:

- a) Product name or model name
- b) Classification
- c) Energy efficiency
- d) Manufacturer name
- e) Note that the listed "Energy efficiency" is the Typical Energy Consumption as tested using the methods described in JIS C 62623:2014.

(2) Compliance

- a) Energy efficiency must be expressed using the values listed in the lower column of Attachment 4 of the Order for Enforcement of the Act on the Rational Use of Energy (Ministry of International Trade and Industry Order No. 74, 1979), rounded to the nearest tenth.
- b) The labeling items listed in (1) must be included in catalogs containing performance-related descriptions as well as in the materials provided by manufacturers when attempting to sell the device, and they must be written in a visible location using a method that will not fade easily.

(3) Grace period

The old regulatory requirements regarding labeling were abolished when this criteria went into effect (on April 1, 2019); but since revising measurements and replacing catalogs in accordance with this criteria will take time, the old labeling can still be used until March 31, 2020.

(4) Other

- In order to popularize energy-efficient computers, manufacturers must quickly introduce “energy-efficient labels” and make an effort to provide users with the information they need to select computers that are energy-efficient.

JIS C 9901, the standard related to energy-efficient labels, is scheduled to be revised in October 2019.

- Manufacturers must work to promote an understanding of the new energy-efficient labeling among users. Also, inform users of the labeling changes so they are not confused by the new labeling.
- When implementing energy-efficient labels, manufacturers must design them in a non-confusing way so that users can easily understand them.

About labeling

Because labeling exists for the purposes of providing consumers with information they can use to make purchasing decisions, catalogs that include descriptions of a product’s performance as well as other materials containing such information that are presented by the manufacturer or another party when a product is being selected are subject to this regulation.

For example, the labeling items must be included in the commonly mass-produced catalogs that contain descriptions of memory capacity and other performance characteristics and are used by consumers when making purchasing decisions, as well as in the performance-related materials provided by manufacturers for use in selling office computers and other products to individual consumers.

If these latter materials are provided to the consumer along with a catalog as part of a single package, however, the labeling contained in the catalog is considered to also be the labeling for the other materials. Image catalogs that do not contain performance descriptions, catalogs that serve to introduce a system, and materials that are used by consumers after making a selection are not subject to these requirements. In addition, the regulations state that the label information must be listed in a visible location using a method that is not easily erased so that the above

purposes are achieved.

Reference Document: "総合エネルギー調査会省エネルギー・新エネルギー分
科会省エネルギー小委員会 電子計算機及び磁気ディスク装置判断基準ワー
キンググループ取りまとめ" (Summary of the Computer and Magnetic Disk
Working Group of the Energy Conservation and New Energy Subcommittee of the
General Resources and Energy Investigating Committee) from March 2019

https://www.meti.go.jp/shingikai/enecho/shoene_shinene/sho_energy/denshi_keisanki/pdf/report_01_01.pdf