JEITA Battery Run Time Measurement Method

(Ver. 2.0)

Revision History

Jun 20, 2001	JEITA battery run time measurement method (Ver. 1.0) was established.
Aug 1, 2001	Ver. 1.0 was executed.
Jan 20, 2014	JEITA battery run time measurement method was revised (Ver. 2.0).
Apr 1, 2014	Ver. 2.0 was executed.

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1. Preface

"JEITA battery run time measurement method (Ver. 1.0)" (hereinafter "JEITA-BAT1.0"), which was established in 2001 by Japan Electronics and Information Technology Industries Association (hereinafter "JEITA"), has been adopted by a number of notebook PC manufacturers up to date and it has played a certain role as a guideline for PC users to compare battery run times before purchasing notebook PCs.

Technological advances and use environment changes in the recent years, however, have changed the operating status of devices such as improved CPU and image processing performance, diversified functions and applications, and widespread use of wireless communication functionality. After its establishment 13 years ago, the JEITA-BAT1.0 is now upgraded to Ver. 2.0 with revised measurement conditions and other factors, based on the technological advances and environmental changes.

A review task group was set up within JEITA CE Section Personal Computer Operation Committee to discuss such revisions. The revised items and their details were defined mainly based on the following concepts:

➢ The measurement method targets battery-mounted personal computers.

➢ The measurement method is applied in the general operations that can be adopted to a variety of devices and compared between them, regardless of the device, OS type or version used.

➢ Its measurement conditions take into consideration the greater functionality of recent mobile devices and changes in their use environment.

➢ Like JEITA-BAT1.0, Version 2.0 can serve as a common guideline to allow the user to compare battery run times.

2. Names

The official names and their abbreviations are as follows:

Official Japanese name: JEITA バッテリ動作時間測定法（Ver. 2.0）

Abbreviated Japanese name: JEITA 測定法 2.0

Official English name: JEITA battery run time measurement method Ver. 2.0

Abbreviated English name: JEITA-BAT2.0

3. Scope of Application

It targets battery-mounted personal computers.

4. Measurement Method

4.1 Overview

Calculate the average of the run times under Measurement Methods a) and b), according to the conditions shown in Section 4.2. Then define the result as the battery run time based on this measurement method.

4.2 Measurement Conditions

1） **Sound volume:** The lowest (mute is also permitted)

2） **Screen brightness:** 150cd/m^2 or more

If the product does not reach a maximum brightness of 150cd/m^2, the maximum brightness of that product is used instead.

The brightness is defined when white is displayed on the screen.

White is achieved when all of R, G and B pixel data are set to the maximum values.

3） **Wireless LAN:** It is the state in which the device is connected to an access point.

Communication system, the availability of communication, radio wave environment and distance to the access point are not specified.

If the device does not have a wireless LAN function, this setting is not mandatory.

4） **Other wireless communication functions** (Bluetooth, 3G, etc.)**:** Can be turned off.

5） **Video replay software:** If video replay software is installed on the device, use that installed software. Otherwise, use the software that can be downloaded or purchased by the user.

6） **Display size of the replay screen:** Full screen.

Although power management settings, the treatment of other applications and background applications during measurement and the battery power remaining during transition to shut-down or hibernation are not specified, the user must be able to set their conditions in easy convenient manners such as OS, application and BIOS.

If the charging performance is restrained in the shipment state, the run time from fully-charged state can be measured. Such a condition, however, must be disclosed.

Although the storage location of a video file is not specified in this measurement method, such a location must also be disclosed.

5. Measurement and Run Time Calculation

5.1 Measurement Method a)

Load the video file specified in this measurement method in continuous play and measure the time from starting the battery operation to moving to shut-down or hibernation.

Condition: Apply all of the items in Section 4.2.

The specifications for the video to be played are as follows (the video file can be downloaded from the JEITA website http://home.jeita.or.jp/cgi-bin/page/detail.cgi?n=84&ca=14):

Video size	: 1920×1080 pixels
Video codec	: H.264/AVC
Video bit rate	: 10Mbps
Frame rate	: 29.97fps
Sound codec	: AAC
Sound bit rate	: 160kbps

5.2 Measurement Method b)

Leave the desktop screen displayed and measure the time from starting the battery operation to moving to shut-down or hibernation.

Condition: Apply 1) to 4) in Section 4.2.

5.3 Run Time Calculation

The battery run time is calculated in the following formula using the run times achieved in Measurement Methods a) and b):

[Measurement Method a) + Measurement Method b)] / 2

6. Display and Information Disclosure

- The battery run time must be displayed by indicating that it complies with JEITA-BAT2.0.
- The display unit is [hours] and any amount smaller than the first decimal place must be disregarded.
- (approx.) can be added to values displayed (e.g. x.y hours (approx.)).

  E.g. Measurement Method a) = 3 hours 15 minutes

  Measurement Method b) = 8 hours 7 minutes

  (195 minutes + 487 minutes) / 2 ＝ 5.683 hours

  Thus, it should be displayed as 5.6 hours (or 5.6 hours (approx.)).

  Sample Display | Battery run time (JEITA 2.0)*1 | 5.6 hours |

  *1 Measured based on JEITA Battery Run Time Measurement Method (Ver. 2.0).

- Items whose information should be disclosed (e.g. it can be disclosed on websites, in catalogs, etc.)
  - ➢ Method to set the screen brightness to about 150cd/m^2 without using a brightness meter.
  - ➢ Video replay software used
  - ➢ Storage location of the video file
  - ➢ Details of setting changes from the shipment state to measurement state

7. Use of Trademarks and Patent Rights

The video file specified in this measurement method is protected under the copyright law and other

laws. It may be used only for the intended purpose of battery run time measurements. Before using the file, make sure to read the precautions provided in its download page.

Bluetooth is a registered trademark of Bluetooth SIG. Inc.

Any other system names, product names and service names are generally trademarks or registered trademarks of their respective development manufacturers. Symbols such as (TM) and (R) are not provided herein.

8.   Validity

JEITA-BAT2.0 shall be valid from April 1, 2014.

- End of Document -

[Commentary]

1. The Gist of Establishment and Revision of JEITA-BAT

Before this measurement method was established in 2001, the battery run times of notebook PCs could not be compared with one another, because each manufacturer had its own specified measurement standard.

For that reason, the establishment of a uniform measurement method was much anticipated. In response, JEITA-BAT1.0 was created as such a measurement method that unified major measurement standards for "screen brightness", "CPU load", "HDD load" and other factors.

As the use of personal computers became widespread among the general public and their functionality became more advanced with improved energy saving capabilities, many people started commenting on gaps between the conditions of this measurement method and the conditions of the actual usage. Due to the characteristics of general-purpose devices, however, their diversified applications made it difficult to identify each use situation. For that reason, Ver. 1.0 continued to be used merely for the purpose of unifying the measurement standards.

As, however, wireless communications are now widespread among the general public in addition to rapid advances in energy-saving technology and image processing performance in the recent years, a number of people have voiced the necessity of the measurement conditions that take into consideration such technological advances and use environment changes. As a result, JEITA-BAT has been updated to Ver. 2.0.

Through this revision, no change was made to the original purpose of unifying the measurement standards at the time of its initial establishment and a main focus was placed on a review of the measurement conditions.

2. Comparison of Measurement Conditions between New and Old Versions

Below are the key changes in the measurement conditions from Ver. 1.0 to Ver. 2.0.

Item	Ver. 2.0	Ver. 1.0	Note
Screen brightness	150cd/m^2 or more (When R, G and B are set to maximum values)	Measurement Method a): 20 cd/m^2 Measurement Method b):	

		Minimum brightness	
Wireless LAN	State in which the device is connected to an access point	—	
Other wireless functions*1	Can be turned off	—	*1Bluetooth、3G, etc.
Video replay software	Installed software	—	
Display size of the replay screen	Full screen	320×240 pixels	
Completion of measurement	Shut-down or hibernation (Forced termination due to flat battery is also permitted, if it can be set by the user.)	Forced termination due to flat battery is also permitted	
Battery charging method	—	Charged on the main unit	
Storage location of the video file	—	Hard disk	
Codec for the video file	H.264/AVC	MPEG1	

3. Details of Measurement Conditions and Measurement Method

　3.1 Measurement Conditions

　　1) As it is difficult to find a way to achieve a specific sound volume and any fluctuations must be avoided, Ver. 2.0 specifies that the volume be set to "The lowest (mute is also permitted)", which was also the case in Ver. 1.0.

　　2) As for wireless LAN, real file transfer was initially considered. However, depending on the communication method used, the radio wave environment during the measurement, the distance to the access point and other factors, the real file transfer is highly likely to generate significant variations in measurement values. Therefore, it is concluded that connecting to an access point is only the condition defined for wireless LAN in order to readdress the original purpose of providing run times under a uniform measurement method.

　　3) Regarding other wireless functions (i.e. wireless settings other than wireless LAN, such as Bluetooth and 3G), they "Can be turned off", because some

products may encounter problems such as their main functions failing to operate when other wireless functions are turned off.

4) In principle, preinstalled replay software should be used. If, however, the specified video cannot be played using the preinstalled software, it is allowed to use the one which can be downloaded or purchased by the user, just like when it is not installed. If multiple video replay software applications are already installed, you can use any of them during the measurement.

5) It is permitted to stop the background operation of the OS, stop or uninstall other applications in order to provide stable run times during the measurement. In that case, however, details of any change from the factory settings must be disclosed. As for power management settings and the treatment of applications, their conditions must be able to be set by the user in easy convenient manners and such conditions must be described clearly. The "easy convenient manners" refer to the manners that enable the above settings to be made using an application provided by a manufacturer or on the control panel of the OS. It excludes any special method (such as a debug program) that is not generally used in the normal use environment.

6) While Ver. 1.0 restricted the storage location of the video to HDD only, Ver. 2.0 does not specify such a location but only requires the location to be disclosed, taking into consideration advances in HDD energy-saving technology and the proliferation of SSD. The information to be disclosed can simply be a folder name on the desktop or in the video library folder.

3.2 Measurement Method

In addition to the above-mentioned video replay, a method integrating other applications such as web browsing and email transmission/reception was also considered initially. In conclusion, however, the existing measurement method has been followed as a method that can be used for a long term without being affected by various OSs or OS versions. Its specifics are as follows:

1) Initially, it was considered to define what percentage of remaining battery must trigger the device to move to "shut-down or hibernation". As, however, each device has a different battery capacity, it is determined that such uniform definition is meaningless. Therefore, it is concluded that no definition should be made and only the information about relevant conditions should be disclosed instead.

2) Regarding the frame rate of the video for measurement purposes, the application of "59.94fps" was initially considered. However, "29.97fps" is now chosen, taking into consideration the possibility that there may be dropping frames among models with low video processing performance.

3) The video for measurement purposes was created in cooperation with NHK Engineering System, using eight types of videos selected from those issued as "ITE/ARIB Hi-Vision Test Sequence 2nd Edition" by The Institute of Image Information and Television Engineers and the Association of Radio Industries and Businesses.

4. Switchover from Ver. 1.0 to Ver. 2.0

It is desirable to use data measured with Ver. 2.0 for new products that will start being sold on April 1, 2014 or later.

Although it is permitted to provide run times in both the new and old measurement methods for about one year in order to avoid any confusion on the market, it must be avoided to use any expression that would result in misleading presentation so as to protect consumers, such as using the values measured with Ver. 1.0 alone or emphasizing them.

It is desirable to indicate which measurement method was used to calculate each value so that the user can identify it clearly, taking the following into consideration:

➢ When Ver. 2.0 and Ver. 1.0 are displayed horizontally, Ver. 2.0 shall be placed on the left.

➢ When Ver. 2.0 and Ver. 1.0 are displayed together, the font size of Ver. 1.0 shall not be larger than that of Ver. 2.0.

Sample Display	Battery run time (JEITA 2.0*[1]/1.0*[2])	5.6 hours/7.0 hours

*[1] Measured based on JEITA Battery Run Time Measurement Method (Ver. 2.0).

*[2] Measured based on JEITA Battery Run Time Measurement Method (Ver. 1.0).

➢ When Ver. 2.0 and Ver. 1.0 are displayed vertically, Ver. 2.0 shall be placed on top.

Sample Display	Battery run time	JEITA 2.0*[1]	5.6 hours
		JEITA 1.0*[2]	7.0 hours

*[1] Measured based on JEITA Battery Run Time Measurement Method (Ver. 2.0).

*[2] Measured based on JEITA Battery Run Time Measurement Method (Ver. 1.0).

- End of Commentary -