

Australian/New Zealand Standard™

**Information technology equipment—
Energy performance of computers**

**Part 1: Methods of measurement of
energy performance**



AS/NZS 5813.1:2012

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee TE-001, Safety of Electronic Equipment. It was approved on behalf of the Council of Standards Australia on 21 June 2012 and on behalf of the Council of Standards New Zealand on 26 June 2012.

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Part 1: Methods of measurement of energy performance

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee TE-001, Safety of Electronic Equipment.

The objective of this Standard is to provide designers, manufacturers, importers, test laboratories, regulators and users of computers with a test method to assess the energy efficiency of this equipment.

This Standard was prepared in response to the publication of a plan for the regulation of computers under the Equipment Energy Efficiency Program (E3) in 2004. This Standard draws upon the test method specified in the International Electrotechnical Commission draft standard 62623-post CD Rev Nov 2 and ENERGY STAR® Program Requirements for Computers: Version 5.2 (ENERGY STAR® V5.2 Computer Specification) published by the United States' Environmental Protection Agency (EPA) in 2010. This Standard is based on but not equivalent to the test method specified in the draft standard 62623-post CD Rev Nov 2.

This series consists of two parts. These are:

AS/NZS

- 5813 Information technology equipment—Energy performance of computers
- 5813.1 Part 1: Methods of measurement of energy performance (this Standard)
- 5813.2 Part 2: Minimum energy performance standards (MEPS) for computers

Part 1 contains the test method for assessing the energy performance of computers.

Part 2 specifies minimum energy performance standard (MEPS) requirements. The MEPS requirements include typical energy consumption (TEC) calculations or maximum power allowances by operational mode for applicable computer types as defined in the ENERGY STAR® V5.2 Computer Specification. The MEPS requirements also include power management, power supply efficiency requirements and additional TEC allowances for additional components. Regulatory authorities have advised that it is intended to mandate Part 2 in regulations in Australia and New Zealand no earlier than 1 October 2012.

The term 'informative' is used to define the application of the appendix to which it applies. An informative appendix is only for information and guidance.

CONTENTS

	Page
SECTION 1 SCOPE AND GENERAL	
1.1 SCOPE.....	4
1.2 REFERENCED DOCUMENTS.....	4
1.3 DEFINITIONS—GENERAL.....	5
1.4 DEFINITIONS—COMPUTER TYPES.....	6
1.5 DEFINITIONS—COMPONENTS	7
1.6 DEFINITIONS—POWER MODES.....	8
1.7 DEFINITIONS—NETWORKING AND POWER MANAGEMENT.....	9
1.8 ABBREVIATIONS	10
SECTION 2 GENERAL CONDITIONS FOR MEASUREMENT	
2.1 GENERAL.....	11
2.2 POWER MEASUREMENTS.....	11
2.3 UNCERTAINTY, RESOLUTION AND ROUNDING.....	11
2.4 AMBIENT LIGHT METER SPECIFICATION.....	12
2.5 TEST ROOM.....	12
2.6 POWER SUPPLY.....	12
2.7 SUPPLY VOLTAGE WAVEFORM	12
SECTION 3 MEASUREMENT APPROACH	
3.1 EUT PREPARATION	13
3.2 TEST SETUP.....	14
3.3 TESTING PROCEDURE.....	15
SECTION 4 TEST REPORT	
4.1 GENERAL.....	17
4.2 MANDATORY INFORMATION	17
4.3 OPTIONAL INFORMATION	18
APPENDICES	
A ENERGY STAR SHORT AND LONG IDLE MODES	19

STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

Australian/New Zealand Standard**Information technology equipment—Energy performance of computers****Part 1: Methods of measurement of energy performance**

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies a standardized test method to measure the energy performance of computers for defined operational modes when connected to the mains electricity supply (nominally 230 V, 50 Hz a.c.).

Computers include both stationary and portable units, including desktop computers, integrated computers, notebook computers, tablet computers, thin clients and small-scale servers.

This Standard also specifies the following:

- (a) Computer types and associated components.
- (b) Operational modes which are relevant for measuring power consumption.
- (c) Terminology used in the test method.
- (d) Information required for test reports.

The scope includes computers supplied with operating systems that do not include the ability to activate computer and computer monitor sleep modes.

1.2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

2706 Numerical values—Rounding and interpretation of limiting values

AS/NZS

5813 Information technology equipment—Energy performance of computers

5813.2 Part 2: Minimum energy performance standards (MEPS) for computers

62301 Household electrical appliances—Measurement of standby power (IEC 62301, Ed.1.0 (2005) MOD)

IEC

60050 International Electrotechnical Vocabulary

60050-300 Part 300: Electrical and electronic measurements and measuring instruments

IEEE

802 Information technology—Telecommunications and information exchange between systems—Local and metropolitan area networks—Specific requirements

802.3 Part 3: Carrier sense multiple access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications

IEEE

- 802.3az Part 3az: Carrier sense multiple access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications—Amendment 5: Media Access Control Parameters, Physical Layers and Management Parameters for Energy-Efficient Ethernet
- 802.11 Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications

1.3 DEFINITIONS—GENERAL

For the purpose of this Standard the definitions contained in IEC 60050-300 and the following definitions apply.

1.3.1 Ambient temperature

The temperature of the ambient air immediately surrounding the equipment under test (EUT).

1.3.2 As shipped

Configuration of the EUT in accordance with the instructions provided with the EUT.

1.3.3 Computer

A device which performs logical operations and processes data. Computers are composed of, at a minimum—

- (a) a central processing unit (CPU) to perform operations;
- (b) user input devices such as a keyboard, mouse, digitizer or game controller; and
- (c) An integrated display screen and/or the ability to support an external display screen to output information.

The term computer includes both stationary and portable units, including desktop computers, integrated desktop computers, notebook computers, tablet computers and small-scale servers. Although computers are capable of using input devices and displays, as noted in Items (b) and (c) above, computer systems do not need to include these devices on shipment to meet this definition.

1.3.4 Equipment under test (EUT)

Refers to the computer being tested.

NOTE: Also referred to as 'Product' in this Standard and sometimes referred to as UUTS (units under test) in other specifications.

1.3.5 Local area network (LAN)

Refers to two primary technologies used in computers: IEEE 802.3 Ethernet or Wired LAN, and IEEE 802.11 WiFi or Wireless LAN.

1.3.6 Manufacturer

An organization responsible for the design, development and production of a product in view of its being placed on the market, regardless of whether these operations are carried out by that organization itself or on its behalf.

1.3.7 Red green blue (RGB)

These colours represent the primary colours that make-up a pixel on a computer display.

NOTE: The RGB values represent the intensity settings of each colour of that pixel to specify an exact colour.

1.3.8 Total harmonic distortion (THD)

The ratio, expressed as a percent, of the r.m.s. value of an a.c. signal after the fundamental component is removed to the r.m.s. value of the fundamental component.

THD of voltage is defined as:

$$THD_V = \frac{\sqrt{V_2^2 + V_3^2 + V_4^2 + V_5^2 \dots + V_{13}^2}}{V_1} \quad \dots 1.3$$

where

V_1 = r.m.s. value of the fundamental of the voltage signal

V_{2-13} = r.m.s. values of the 2nd to 13th harmonics of the voltage signal respectively

A.C. signals have only odd number harmonics.

1.4 DEFINITIONS—COMPUTER TYPES

For the purpose of this Standard, the following computer type definitions apply.

1.4.1 Desktop computer

A desktop computer is a computer where the main unit is intended to be located in a permanent location, often on a desk or on the floor. Desktops are not designed for portability and utilize an external computer display, keyboard, and mouse. Desktop computers may also use touchscreen technology. Desktops are designed for a broad range of home and office applications.

1.4.2 Integrated computer or integrated desktop computer

An integrated desktop computer is a desktop computer where the computer and computer display are integrated into a single housing receiving its a.c. power through a single cable. Integrated desktop computers come in one of two possible forms:

- (a) a product where the computer display and computer are physically combined into a single unit; or
- (b) a product packaged as a single product where the computer display is separate but is connected to the main chassis by a d.c. power cord and both the computer and computer display are powered from a single power supply.

As a subset of desktop computers, integrated desktop computers are typically designed to provide similar functionality as desktop computers.

NOTE: An integrated desktop computer may also be referred to as an all-in-one computer.

1.4.3 Notebook and tablet computers

A notebook computer is a computer designed specifically for portability and to be operated for extended periods of time either with or without a direct connection to a mains power supply. Notebook computers include an integrated display and are capable of being powered by an integrated battery or other portable battery source. In addition, most notebooks use an external power supply and have an integrated keyboard and pointing device. Notebook computers are typically designed to provide similar functionality to desktops, including operation of software similar in functionality as that used in desktops. Docking stations are considered accessories and therefore, should not be considered as part of the EUT. Tablet computers, which use both a touch-sensitive screen and a physical keyboard, are considered notebook computers in this Standard. Netbook computers which are typically identified by a smaller screen size (constrained) and base memory size are also considered notebook computers in this Standard.