Energy Related Products – Lot3 Test Report

RM Education * PC330 Tower System

Lab Ref: #Resea4977

Electrical and Electronic Household and Office Equipment
Measurement of Low Power Consumption *(as per BS EN50564: 2011)*

Desktop and notebook computers – Measurement of energy consumption *(as per relevant sections of IEC 62623)*

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Test	Tested By	Signature
Lowest Power state *(as per Commission Regulation 617/2013)*	John Sadler 14 October 2013	
Sleep Mode Power *(as per Commission Regulation 617/2013)*	John Sadler 14 October 2013	
Auto-Standby Mode Power *(as per Commission Regulation 617/2013)*	John Sadler 14 October 2013	
	Approved	**Signature**
	Anna Mancari 18 October 2013	

Contents

1.   Commission Regulation Synopsis

1.1. Synopsis of Commission Regulation (EU) No. 617/2013 [LOT3]

On July 17 2013, Commission Regulation (EU) No. 1275/2008 [LOT6] was amended to exclude IT and computer equipment.

This means, that following these amendments, and until July 2014:

- Equipment shall provide a **Lowest Power State** that does not exceed **0.5W**
- Equipment shall offer a **Power Management Function** that **automatically switches the computer into a lower power state** than sleep mode.

Note the removal of the where appropriate clause. The Lowest Power State must be provided although it does not have to be active.

After July 2014, there is a requirement for the following information to be made available, as part of the system documentation:

Product type and category: [Server, Desktop, Notebook etc]

a) Manufacturers name and address

b) Product model number

c) Year of manufacture

d) E_{TEC} value without external graphics card enabled

e) E_{TEC} value with external graphics card enabled

f) Idle state power demand

g) Sleep mode power demand

h) Sleep mode with WOL enabled

i) Off mode power demand

j) Off mode power demand with WOL

k) Internal power supply efficiency @ 10%, 20%, 50%, 100% of rated power

l) External power supply efficiency

m) Noise levels (the declared A-weighted sound power level)

n) Minimum number of loading cycles the batteries can withstand, for notebooks

o) The measurement methodology of (e) to (o)

p) Sequence of steps to achieve stable test condition

q) Description of how sleep and/or off mode were selected

r) Sequence of events required o reach the mode where equipment automatically reaches sleep and/or off mode

s) The duration of idle state prior to sleep mode

t) Time delay before computer reaches lower power demand than sleep mode

u) Time delay to display sleep mode

v) User information on the energy saving potential of power management

w) User information on how to enable the power management

x) Where there is an integrated display the mercury content in mg

y) Test parameters used for measurement

    a. Voltage and frequency

    b. Harmonic distortion of supply

    c. Information and documentation on the instrumentation set-up and circuits used for testing

1.1   Eco design Requirements:

Category A, B, C or D Equipment:

For this system the annual total energy consumption would be calculated from:

$E_{tec =}$ ((8,760 / 1000) * ((0.55*P_{off}) + (0.05*P_{sleep}) + (0.4*P_{idle})))

The desktop system would be categorized as Category D (E_{TEC} < 211)

2.   Introduction

This report presents the results of the low power consumption tests applied to a sample RM Education* PC330 Tower System. Lab Ref: #Resea4977 to the following standard:

- Electrical and Electronic Household and Office Equipment - Measurement of low power consumption *(as per Commission Regulation 617/2013)*

The testing was carried out by INTEL CORPORATION (UK) LTD at their Engineering test facilities located at

> Intel Corporation (UK) Ltd
> Pipers Way
> Swindon
> Wiltshire
> England
> SN3 1RJ

This report also details the configuration of the equipment under test, the test methods used and any relevant modifications where appropriate.

A summary of Action Items for hardware related issues are given below.

An Action Item (AI) means that the particular test is not meeting the relevant specification and could prevent correct operation of the named EUT.

Other items in this report may be marked as FYI. These are recommendations or observations that may be of interest to the system designer.

1.3. Summary

- The EUT *passes* the Lowest Power State Test at **0.16W.**
- The EUT *passes* the Power Management Test at **0.16W** which is less than the sleep mode power of **1.99W.**

1.4. FYI Items

- Please note, The System Under Test was set up as table 2.2 on page 12 prior to testing.

3. Equipment Under Test (EUT)

3.1 EUT

Figure 2.1

RM Education* PC330 Tower System

3.2   EUT Configuration

Component	Qty	Manufacturer	Model	AA/Serial Number	Description	Location
System	1	RM*	PC 330 Tower	T093182301	µATX Mini Tower System	N/A
Chassis	1	Chenbro*	PC31176-H02*13246	Not Known	µATX Mini Tower Chassis	N/A
Power Supply	1	AcBel*	PCB029	PCB02913250000102A	iPower 85 400 ATX12V 350W Power Supply Unit.	Top rear of chassis
Motherboard	1	FUJITSU*	D3222-B1	42204493	µATX Desktop Motherboard with Intel® Q87 Chipset	N/A
Processor	1	Intel®	CM8064601464303	N/A	Intel® Core™ i7-4770 Processor (8M Cache, up to 3.90 GHz)	LGA1150 socket
Integrated Graphics	1	Intel®	Intel® HD Graphics 4600	N/A	N/A	N/A
SSD	1	Samsung*	SSD 840	S14GNEACC31555L	2.5" 840, 250 GB Solid State Drive	Side mounted bay
HDD	1	Toshiba*	DT01ACA1	83OH4JENS	3.5" 1000 GB, 7200 RPM Hard Disk Drive	Lower 3.5" bay
Optical Drive	2	TSSTcorp*	SH-224DB	R93E6YCD4071MZ R93E6YCD4071MY	Optical Media Drive CD/DVD Super Filemaster	5.25" bays
Memory	4	Elixir*	M2X8G64CB8HC5N-DG	7722123F/D815123E C11C123E/8B11123D	DIMM, DDR3, 8192 MB, 1600 MHz	DIMM A1/A3 DIMM B2/B4
Card Reader	1	Not known	Not known	130201724	Generic card reader for MS/MS Pro Duo, CFI/CFII/MD, SD/MMC/RS MMC, XD/Smart Media and ext. USB	Upper 3.5" Bay
Front-Panel Daughterboard	1	Not known	Not Known	Not known	Generic USB front panel with 2x USB2, 2x USB3, Audio in and Audio out	Front panel

Table 2.1

3.3   EUT Deviations and Comments

EUT was tested with one Intel® Core™ i7-4770 Processor (8M Cache, up to 3.90 GHz) with EKL* Processor Fan Heatsink. [DFR922512CM-010]

Other parts fitted in the chassis: One Top Motor* 80mm 12V Chassis Fan [DF128025SL-3] attached to the rear of the chassis.

BIOS Version: FUJITSU // American Megatrends Inc. * V4.6.5.4 R1.10.0

3.4   Software

The system was running Microsoft* Windows* 7 Professional 64bit
Video Resolution was 1920x1080.

The power options of Microsoft* Windows* 7 and BIOS* were set as below:

Setting	Lowest Power State	Sleep Mode	Power Management	Idle Mode
Display turn off	N/A	1 min	1 min	never
Sleep mode	N/A	1 min	1 min	never
Wireless adaptor Setting	N/A	N/A	N/A	N/A
Hard disk spin down	N/A	1 min	1 min	never
Hybrid sleep	off	on	on	off
Hibernate After	N/A	never	5 min	never
Allow wake timers	off	off	off	off
WOL from S5*	Off	Power on	Power on	Power on
Lot3	enabled	enabled	enabled	enabled
Wake on Link	off	on	on	On
Wake on magic packet	off	on	on	On
Wake on pattern	off	on	on	On
Wake on keyboard*	Disabled	Enabled	Enabled	Enabled

Table 2.2

4. Lowest Power State

4.1 Test Setup

The EUT (equipment under test) was powered from the Kikusui[*] stabilized AC power supply. This was connected to the U and I input of the Yokogawa[*]Precision Power Analyzer, using the low power connection method of BS EN 50564.

4.2 Test Equipment

Supplier	Description	Model/Part Number
Kikusui[*]	AC Power Supply	PCR 500M
Yokogawa[*]	Precision Power Analyzer	WT3000
Samsung[*]	Widescreen LCD Monitor	2032BW
NI[*]	GPIB[*] – USB Interface CCA	187965H-01L
Yokogawa[*]	Power Consumption Measuring Software	Version 3.11
NI[*]	Labview[*] Software	2011

Table 4.1

4.3 EUT

See table 2.1

4.4 Support Equipment Deviations

None

4.5 Test Method

The system power settings were as table 2.2. The unit was powered up into full operating mode. The system was then shut down under software control. Five minutes were allowed for stabilisation, samples were then read for ten minutes and averaged. Stability over the test period was determined by the Yokogawa software using linear regression. If stability was not established the Five minute period was restarted.

4.6 Lowest Power State Test Results

Environmental Status

21.6˚C, 52% Humidity, 1001mB Barometric Pressure

Test Voltage V	Frequency Hz	Total Harmonic Distortion %	Average Power W	Apparent Power VI	Crest Factor (Range)
230.3 V	50.00	0.058	**0.16**	25.62	1.42 (1.34 – 1.49)

Table 4.2

Linear Regression: Stable

5. Sleep Mode Test Results

5.1   Test Setup

The EUT (equipment under test) was powered from the Kikusui[*] stabilized AC power supply. This was connected to the U and I input of the Yokogawa[*] Precision Power Analyzer, using the low power connection method of BS EN 50564.

5.2   Test Equipment

Supplier	Description	Model/Part Number
Kikusui[*]	AC Power Supply	PCR 500M
Yokogawa[*]	Precision Power Analyzer	WT3000
Samsung[*]	Widescreen LCD Monitor	2032BW
NI[*]	GPIB[*] – USB Interface CCA	187965H-01L
Yokogawa[*]	Power Consumption Measuring Software	Version 3.11
NI[*]	Labview[*] Software	2011

Table 4.4

5.3   EUT

See table 2.1

5.4   Support Equipment Deviations

None

5.5   Test Method

The system was powered up with power settings as in table 2.2. The system was allowed to go into sleep mode. Five minutes were allowed for stabilisation, samples were then read for ten minutes and averaged. Stability over the test period was determined by the Yokogawa software by linear regression. If stability was not established the Five minute period was restarted.

5.6   Sleep Mode (S3) Test Results:

Environmental Status
22.4˚C, 63% Humidity, 1003mB Barometric Pressure

Test Voltage V	Frequency Hz	Total Harmonic Distortion %	Average Power W	Apparent Power VI	Crest Factor (Range)
230.3	50.00	0.06	**1.99**	26.73	1.42 (1.34 - 1.49)

Table 4.5

Linear Regression: Stable

6. Auto-Stand By Test Results

6.1   Test Setup Auto-Stand by (S4) as per [Table 2.2]:

The EUT (equipment under test) was powered from the Kikusui* stabilized AC power supply. This was connected to the U and I input of the Yokogawa* Precision Power Analyzer, using the low power connection method of BS EN 50564.

6.2   Test Equipment

Supplier	Description	Model/Part Number
Kikusui*	AC Power Supply	PCR 500M
Yokogawa*	Precision Power Analyzer	WT3000
Samsung*	Widescreen LCD Monitor	2032BW
NI*	GPIB* – USB Interface CCA	187965H-01L
Yokogawa*	Power Consumption Measuring Software	Version 3.11
NI*	Labview* Software	2011

Table 4.1

6.3   EUT

See table 2.1

6.4   Support Equipment Deviations

None

6.5   Test Method

The system power settings were as table 2.2. The system was allowed to power down. Five minutes were allowed for stabilisation, samples were then read for ten minutes and averaged. Stability over the test period was determined by the Yokogawa software. If stability was not established the Five minute period was restarted.

6.6   Auto-Standby Test Results.

Environmental Status

21.6˚C, 52% Humidity, 1001mB Barometric Pressure

Test Voltage V	Frequency Hz	Total Harmonic Distortion %	Average Power W	Apparent Power VI	Crest Factor (Range)
230.3	50.00	0.058	**0.16**	25.47	1.42 (1.34 - 1.49)

Table 5.2

Linear Regression: Stable System **passes** the auto-standby test
No further testing was performed.

7.   LOT 3 Support Documentation and Reference Documents:

Commission Regulation (EU) No 617/2013

Electrical and Electronic Household and Office Equipment
Measurement of Low Power Consumption *(as per BS EN50564: 2011)*

IEC62623: Desktop and Notebooks Measurement of energy Consumption *(as per relevant sections of IEC 62623)*