

# TEST REPORT

EUT Number: 49-355

Equipment Under Test: Computer

Trade Name: MISSION

Model: OPTIMA SERIES

Serial Number: T490707001

Customer: Mission Assembly Line Co.,Ltd.  
49 Naradhiwasraschanakarindha Rd, Silom Bangrak  
Bangkok 10500

Manufactured by: Mission Assembly Line Co.,Ltd.

Receipt Date: 13 July 2006

Date of Test: 6,18 September 2006

Issued Date of Report: 6 December 2006

Approved by



MR. Montri Pannarut

Operation Manager

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### SUMMARY OF TESTING

This product was tested and complied according to following specification standard:

FCC Part 15 Radio frequency devices

Test Item	Test Specification	Test Method	Result
Conducted Emission	FCC Part 15 Subpart B Section 15.107(a)	ANSI C63.4-2003	PASS
Radiated Disturbance	FCC Part 15 Subpart B Section 15.109(a)	ANSI C63.4-2003	PASS

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## 1. TEST PLAN AND DEVIATIONS FROM STANDARD

### 2.1 Test Plan

No.	Test Item	Input Voltage	Mode	Test Port	Test Specification
1	Conducted Emission	110 Vac 60 Hz	A	AC Main	FCC Part 15 Subpart B Section 15.107(a)
2	Radiated Disturbance	110 Vac 60 Hz	A	Enclosure	FCC Part 15 Subpart B Section 15.109(a)

### 2.2 Deviations from standard

-

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### 3 TEST CONDITIONS

#### 3.1 Operation Mode

A: Run Burn in Software (PC. Performance Test).

#### 3.2 Uncertainty Application

##### 3.2.1 Uncertainty application according to CISPR 16-4-2:2003 for Conducted Emission , Radiated Disturbance and Disturbance Power Testing.

Compliance or Non-Compliance with a disturbance limit was determined in the following manner

If  $U_{lab}$  is less than or equal to  $U_{cispr}$  in table 1, then:

- Compliance is deemed to occur if no measured disturbance exceeds the disturbance limit.
- Non-Compliance is deemed to occur if any measured disturbance exceeds the disturbance limit.

If  $U_{lab}$  is greater than  $U_{cispr}$  in table 1, then:

- Compliance is deemed to occur if no measured disturbance, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit.
- Non-Compliance is deemed to occur if any measured disturbance, increased by  $(U_{lab} - U_{cispr})$ , exceeds the disturbance limit.

Table 1 – Values of  $U_{cispr}$

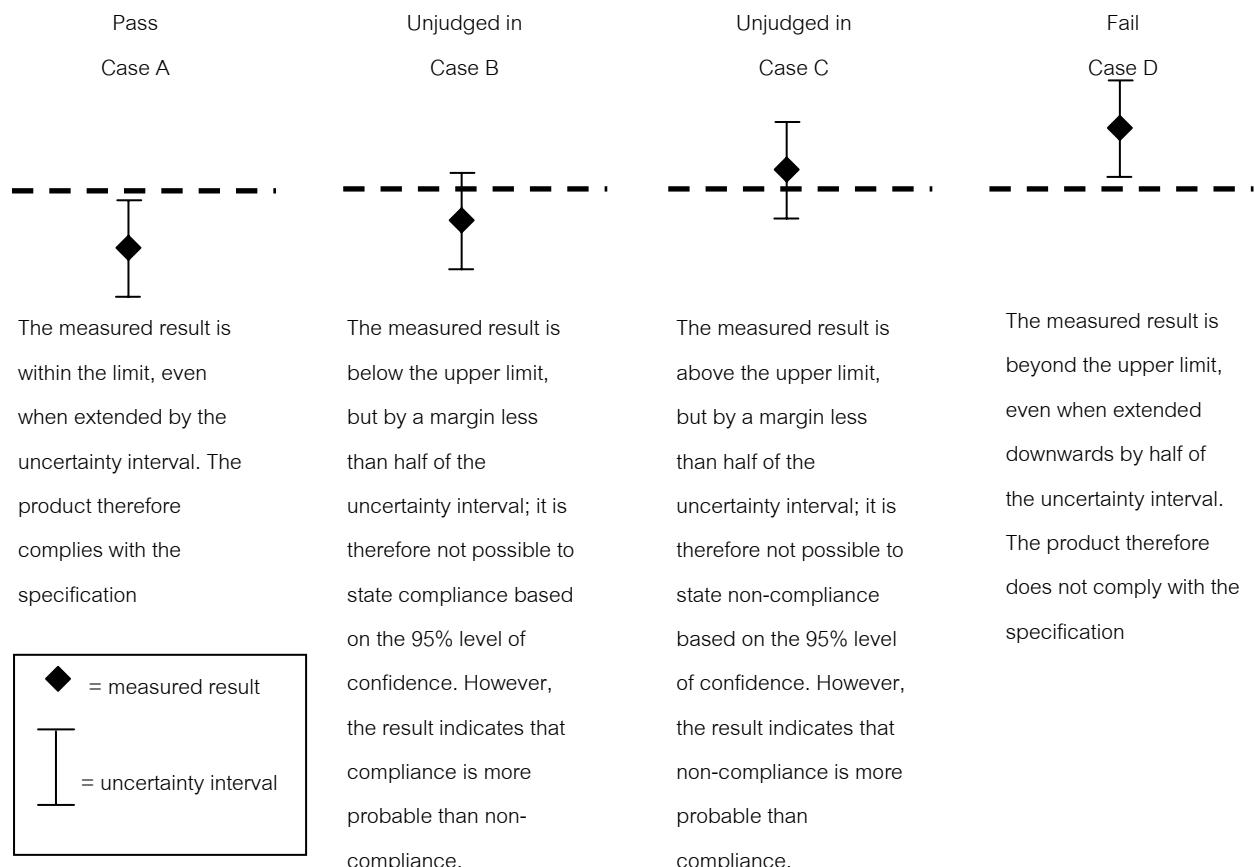
Abbreviation	Testing system	Frequency range	$U_{lab}$	$U_{cispr}$	$U_{lab} - U_{cispr}$
CE	Conducted Emission	9 kHz - 150 kHz	3.41	4.00	-0.59
CE	Conducted Emission	150 kHz - 30 MHz	2.98	3.60	-0.62
RE	Radiated Disturbance	30 MHz – 1000 MHz	4.53	5.20	-0.67
PE	Disturbance Power	30 MHz – 300 MHz	3.90	4.50	-0.60

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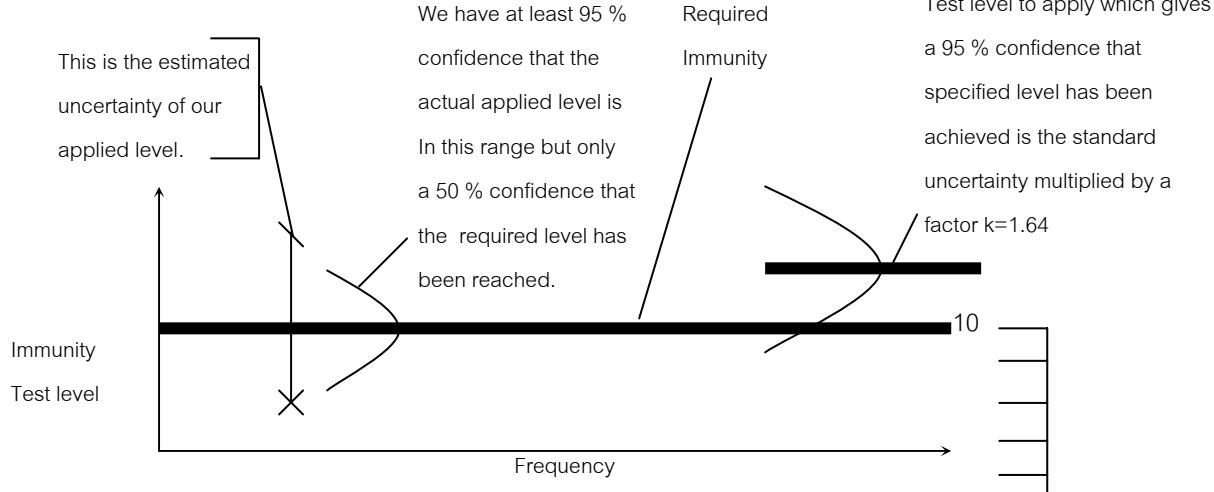
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### 3.2.2 Uncertainty Application according to LAB 34 Edition 1 ( Figure 1 ) for other testing system.



### 3.2.3 Uncertainty Application for immunity testing.

Uncertainty of each test systems are applied for compliance with related standard according to LAB 34 Edition 1 ( Figure 3 ).



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### 3.3 Equipment Classifications

Class B

### 3.4 Protection Classifications

-

### 3.5 Performance Criteria of Test Specification

-

### 3.6 EUT Function Monitoring

-

## 4 TEST SYSTEM CONFIGURATION

### 4.1 EUT Exercise Software

-

### 4.2 EUT Modifications

-

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## 5. EUT DESCRIPTION

## 5.1 EUT Specification

Input Voltage	110 Vac / 60 Hz
Input Current/Power	≤ 16 A
Clock/Oscillator	3.0 GHz

No.	Component Name	Specification
1	Processor	Intel P4 (630) 3.0 Ghz FSB 800 Mhz 90 nm. LGA775 2MB L2 Cache
2	Mainboard	PCChip P23G
3	Memory	DDR RAM 512 MB /PC4300
4	Hard Disk	IDE 80 GB/7200 SATA
5	Floppy Disk	Standard 3.5" 1.44 MB
6	VGA	Embedded UniChrome Pro Graphics with 64M share memory
7	MONITOR	LCD 17" H782F Resolution:1280x1024@75Hz,Pixel Pitch (mm):0.264,Number of Colors:16.2M, Active Area (mm):338x275
8	KEYBOARD	PS/2 Thai&Eng 107 Keys
9	MOUSE	Optical PS/2,USB
10	Optical Drive	CDRom Combo Samsung SH-M522 16x52x32x52
11	SOUND	Realtek ALC655 6-channel audio Codec
12	CASE	ATX
13	POWER SUPPLY	Linkworld LPK8-300W
14	LAN	VIA VT6103L 10/100Mbps Fast Ethernet PHY
15	Expansion Slot	1 x AGP 8X,3 x PCI Slot,1 x CNR slot
16	I/O Port	1 x PS/2 keyboard ,1 x PS/2 mouse, 1 x Parallel Port, 1 x Serial Port, 1 x VGA port, 4 x USB 2.0 Ports 1 x RJ 45 Port, 1 x Audio I/O (Line-in, Line-out and Mic-in)
17	OS Supported	Windows Xp SP2

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## 5.2 EUT Configuration

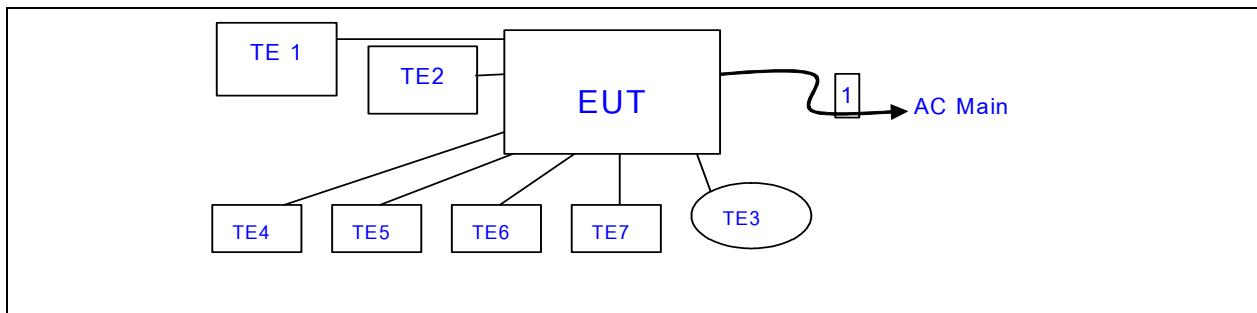


FIGURE 1 - EUT Configuration.

## 5.3 Peripherals Description

Diagram	Equipment name	Trade Name	Model	Serial Number
TE1	Printer	HP	C3980A	SGBB044748
TE2	Speaker	Modern Form	Model SK-881	4331160
TE3	Microphone	Qenius	-	-
TE4-TE7	Mouse	Microsoft	Mouse Optical 1.1A	-

## 5.4 Cables Description

Ref	Cable Type	Shield	Length (meters)	Ferrite	Connector	Connection Point 1	Connection Point 2
1	AC Power line	No	1.0	No	AC	EUT	AC Supply

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## 6 TEST SETUP AND RESULT

### 6.1 Test Item : Conducted Emission

#### 6.1.1 Test Setup

- Test Specification

See 1 and 2.1

- Test Equipment

Equipment Name	Manufacture	Model	S/N	Traceability	Cal date
EMI Test Receiver (Display Unit)	Rohde & Schwarz	ESCI	1166.5950.03	DKD	06-03-2006
LISN1	R&S	ESH2-Z5	831886/009	DKD	16-02-2006
LISN2	Koritsu	KNW-404	8-1502-1	NIMT	13-10-2000

- Customer's Equipment

Equipment Name	Manufacture	Model	S/N	Traceability	Cal date
-	-	-	-	-	-

- Test Uncertainty:  $\pm 2.98$  dB

- Test Location: TRM-001

- Test Environment

Temperature (°C)	23	Humidity (%)	47
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- Test Setup Description

The disturbance voltage at the main terminals and telecommunication ports testing measurements were performed with the EMI receiver to observe the emission characteristics and to identify the frequency of emission that had the highest amplitude related to the EUT configuration for the disturbance voltage testing.

The EUT was placed on the 80 cm height non-metallic table in the shielded room. The EUT was tested PC performance by Burn in software. The power line of the EUT was connected to the LISN, which was located in the shielded room. The EMI receiver in the control room measured the noise signals from the EUT. The testing method and the EUT setup were performed according to ANSI C63.4-2003. The EUT configuration for the disturbance voltage at the main terminals testing is shown in FIGURE 2 and 3, respectively.

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## ● Test Picture

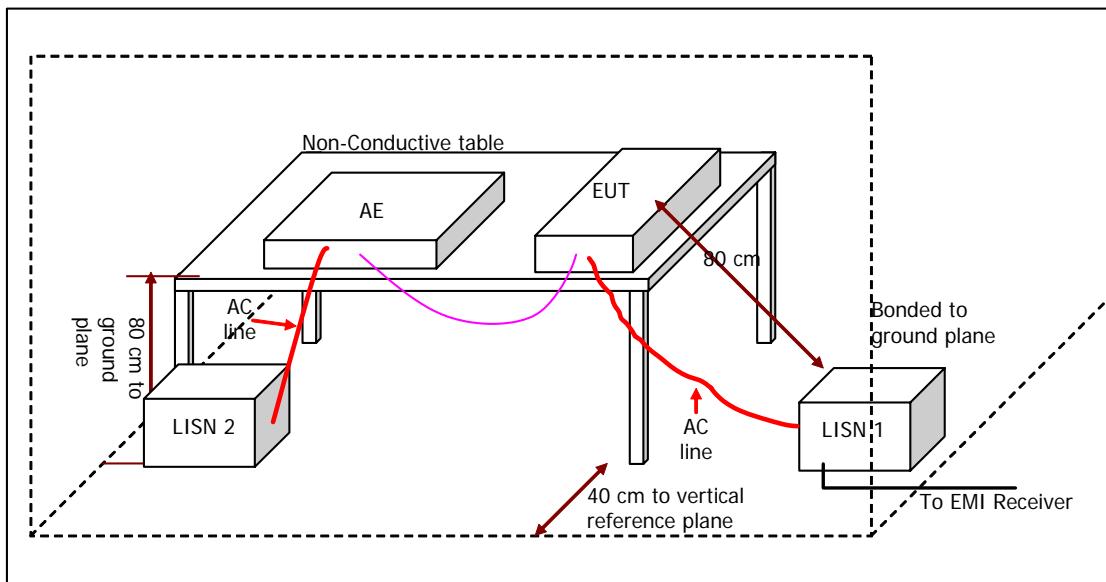


FIGURE 2 - The test setup diagram



FIGURE 3 - The test setup picture.

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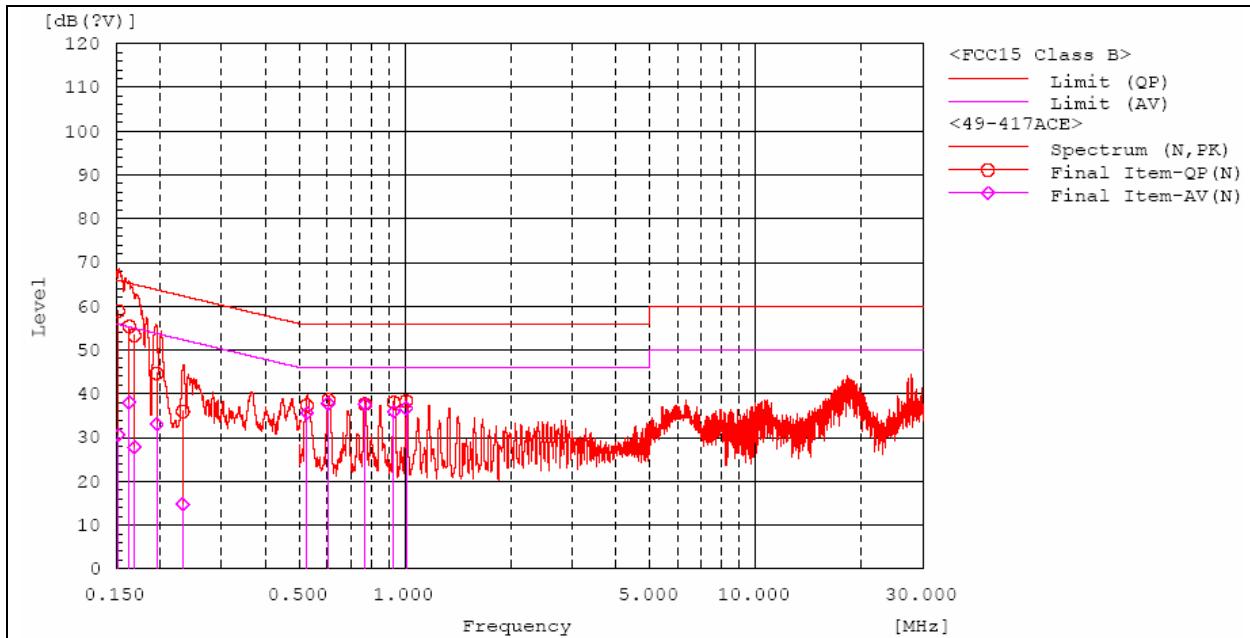
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## 6.1.2 Test Result

Measurement Port	AC Main	Operation Mode	A (See 3.1)
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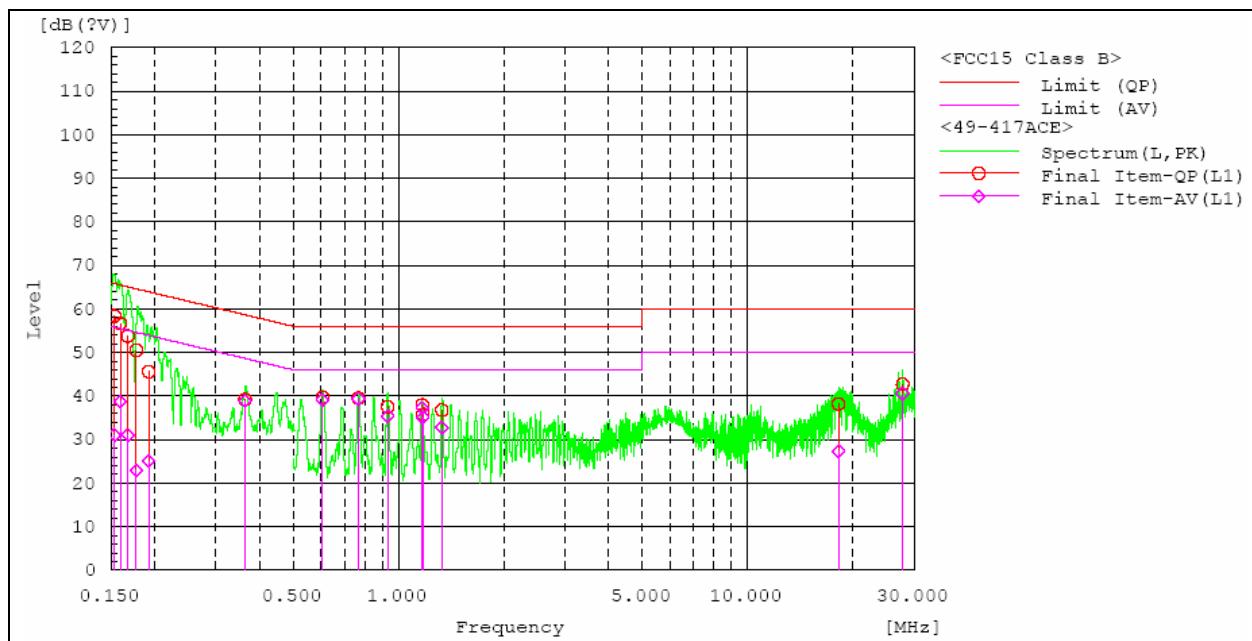
## Test Result for Neutron



--- N Phase ---												
No.	Frequency	Reading		Reading		c.f	Result		Result		Limit	
		QP	AV	QP	AV		QP	AV	QP	AV	QP	AV
		[MHz]	[dB (?V)]	[MHz]	[dB (?V)]	[dB]	[dB (2V)]	[dB (2V)]	[dB (2V)]	[dB (2V)]	[dB (?V)]	[dB]
1	0.15208	58.6	30.3	0.16381	55.0	0.3	58.9	30.6	65.9	55.9	7.0	25.3
2	0.16381	55.0	37.7	0.16941	53.0	0.3	55.3	38.0	65.3	55.3	10.0	17.3
3	0.16941	53.0	27.5	0.19621	44.4	0.3	53.3	27.8	65.0	55.0	11.7	27.2
4	0.19621	44.4	32.7	0.23279	35.7	0.3	44.7	33.0	63.8	53.8	19.1	20.8
5	0.23279	35.7	14.5	0.52551	37.0	0.3	36.0	14.8	62.3	52.3	26.3	37.5
6	0.52551	37.0	35.3	0.60492	38.3	0.3	37.3	35.6	56.0	46.0	18.7	10.4
7	0.60492	38.3	37.5	0.92988	37.6	0.3	38.6	37.8	56.0	46.0	17.4	8.2
8	0.92988	37.6	35.6	0.76921	37.3	0.4	38.0	36.0	56.0	46.0	18.0	10.0
9	0.76921	37.3	37.2	1.00898	37.9	0.3	37.6	37.5	56.0	46.0	18.4	8.5
10	1.00898	37.9	36.3			0.4	38.3	36.7	56.0	46.0	17.7	9.3

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## Test Result for Line1



--- L1 Phase ---												
No.	Frequency	Reading	Reading	c.f	Result	Result	Limit	Limit	Margin	Margin	QP	AV
		QP	AV		QP	AV	QP	AV	QP	AV		
	[MHz]	[dB(?)V]	[dB(?)V]	[dB]	[dB(?)V]	[dB(?)V]	[dB(?)V]	[dB(?)V]	[dB]	[dB]	[dB]	[dB]
1	0.15366	58.1	30.7	0.3	58.4	31.0	65.8	55.8	7.4	24.8		
2	0.15977	56.3	38.5	0.3	56.6	38.8	65.5	55.5	8.9	16.7		
3	0.16795	53.5	30.7	0.3	53.8	31.0	65.1	55.1	11.3	24.1		
4	0.17738	50.2	22.6	0.3	50.5	22.9	64.6	54.6	14.1	31.7		
5	0.19282	45.3	24.8	0.3	45.6	25.1	63.9	53.9	18.3	28.8		
6	0.36374	38.9	38.6	0.3	39.2	38.9	58.6	48.6	19.4	9.7		
7	0.60597	39.4	38.8	0.3	39.7	39.1	56.0	46.0	16.3	6.9		
8	0.76825	39.2	39.1	0.3	39.5	39.4	56.0	46.0	16.5	6.6		
9	0.93131	37.1	35.0	0.4	37.5	35.4	56.0	46.0	18.5	10.6		
10	1.17431	35.4	34.7	0.4	35.8	35.1	56.0	46.0	20.2	10.9		
11	1.17074	37.5	36.8	0.4	37.9	37.2	56.0	46.0	18.1	8.8		
12	1.33162	36.3	32.4	0.4	36.7	32.8	56.0	46.0	19.3	13.2		
13	27.80183	40.5	38.4	2.2	42.7	40.6	60.0	50.0	17.3	9.4		
14	18.21124	36.3	25.5	1.9	38.2	27.4	60.0	50.0	21.8	22.6		

Tested by: MR. Suriyan Srimat

**Result:** **Pass**

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## 6.2 Test Item : Radiated Disturbance

### 6.2.1 Test Setup

- Test Specification

See 1 and 2.1

- Test Equipment

Equipment Name	Manufacture	Model	S/N	Traceability	Cal date
EMI Test Receiver (Display Unit)	Rohde & Schwarz	ESMI	829179/008	UKAS	30-03-2006
EMI Test Receiver (Analyzer Unit)	Rohde & Schwarz	ESMI	829179/010	UKAS	30-03-2006
Bilog Antenna	Schaffner	CBL6141A	4146	UKAS	24-07-2006
Double Rigid Horn Antenna	EMCO	3115	96104996	NIST	24-12-2002

- Customer's Equipment

Equipment Name	Manufacture	Model	S/N	Traceability	Cal date
-	-	-	-	-	-

- Test Uncertainty:  $\pm 4.53$  dB

- Test Location: TRM-002

- Test Environment

Temperature (°C)	25	Humidity (%)	58
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- Test Setup Description

The radiated emission measurement was performed with EMI receiver to observe the emission characteristic and identify the frequency of emission that has the highest amplitude relative to limit by operating the EUT with a typical configuration. The EUT configuration, cable configurations of operation are determined for producing the maximum level of emissions.

The EUT was placed on the 80 cm height non-metallic table on 1 m radius turntable. The EUT was set on a real operation-mode, read-write disk, hard disk, memory, display on the screen and simulate the communication signal. The Burn-in software was used for control the functions of the EUT.

#### Frequencies below 1000MHz

The Bi-Log antenna (30 MHz – 2GHz) was used for received the noise of EUT and put on the antenna mast, which they were in side the semi-anechoic chamber. The testing method and the EUT setup were performed according to ANSI C63.4-2003. The EUT configuration setup is shown in figures 4 and 5, respectively.

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## Frequencies above 1000MHz

The Double Rigid Horn antenna (1GHz-18GHz) was used for received the noise at EUT and put on the antenna 1 m above ground plane (Cause of the antenna bandwidth is less than 30 degree, therefore the measurement above 1m don't necessary to test). They were in side the semi-anechoic chambers

## ● Test Picture

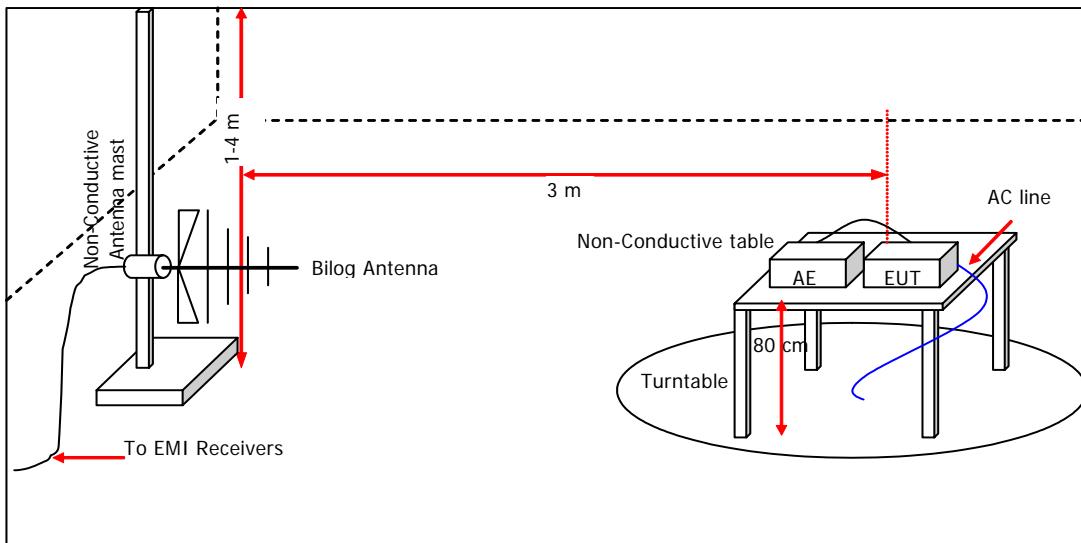


FIGURE 4 - The test setup diagram

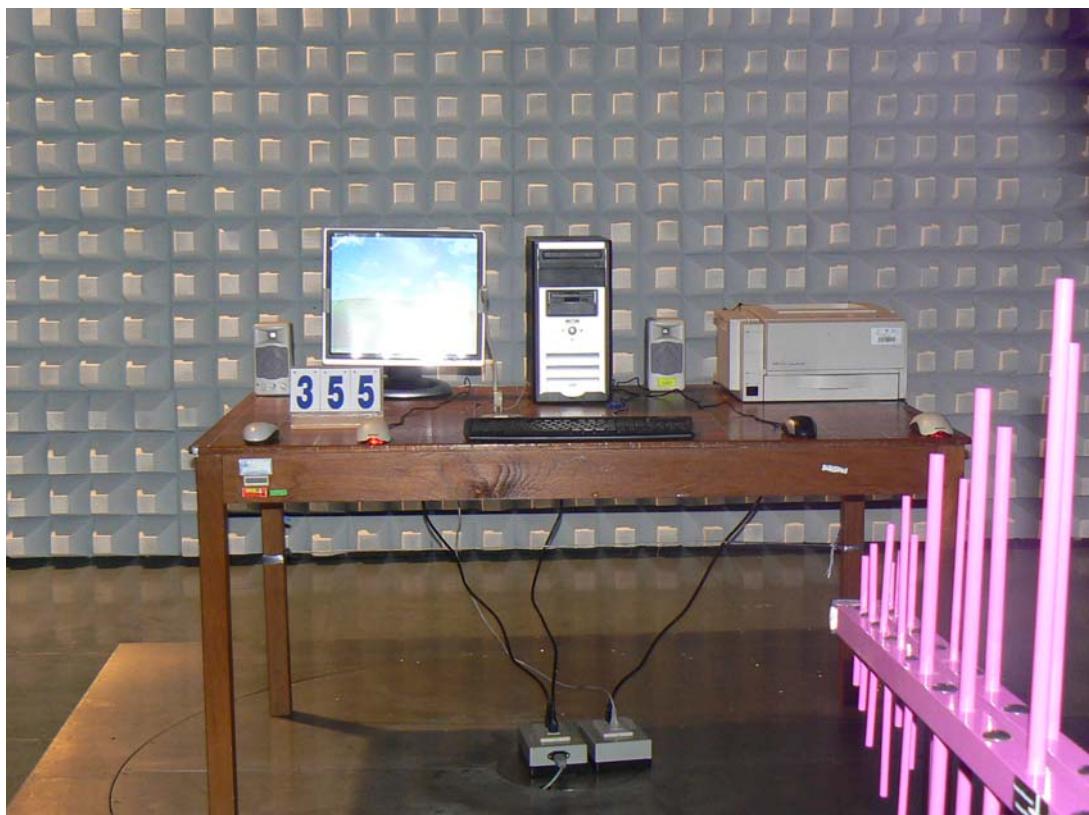


FIGURE 5 - The test setup picture.

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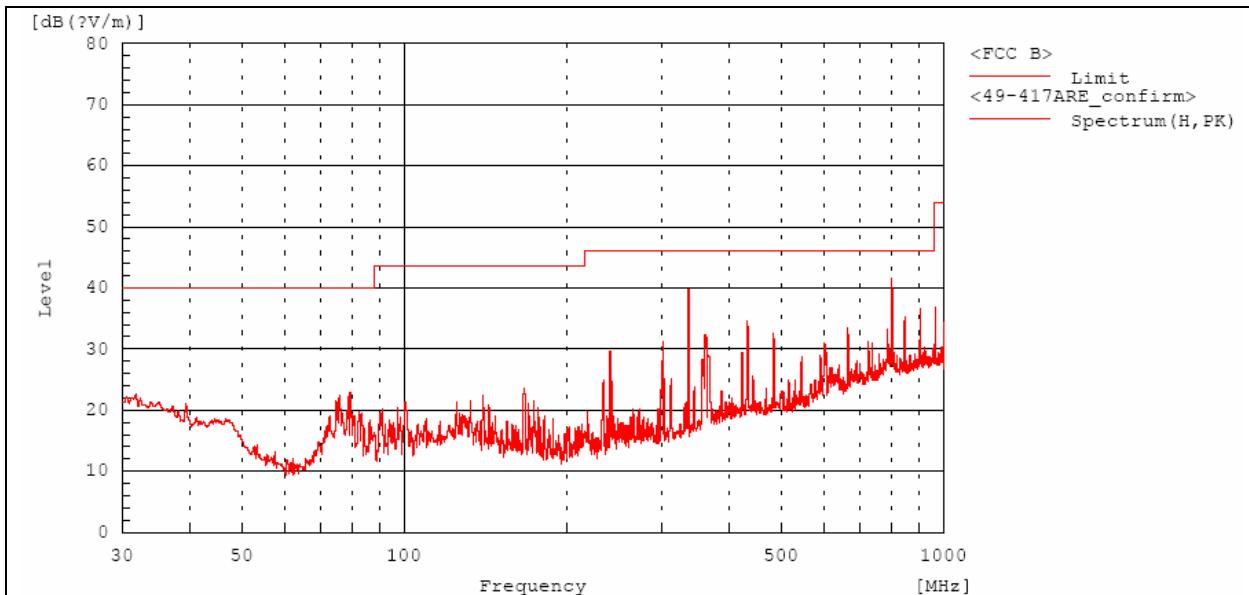
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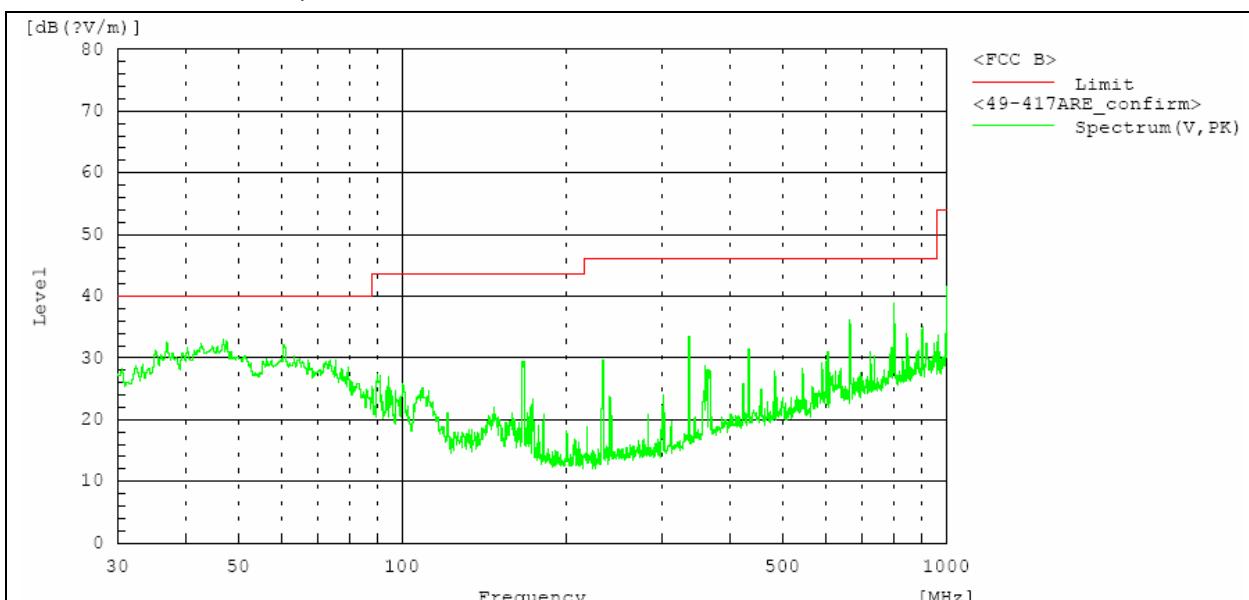
## 6.2.2 Test Result

Measurement Port	Enclosure	Operation Mode	A (See 3.1)
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## Test result for vertical polarization



## Test result for Horizontal polarization



Note: This test result is more than 10 dB below the limit line, therefore QP and AV detectors were not performed.

Frequencies above 1GHz

## MEASUREMENT RESULT OF PEAK DETECTOR (Horizontal)

Frequency (GHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V)	Margin (dB)
1.108	33.33	53.9	20.57
1.285	34.17	53.9	19.73
1.458	34.5	53.9	19.4
2.147	32.67	53.9	21.23
2.327	34.67	53.9	19.23
2.512	35.33	53.9	18.57

## MEASUREMENT RESULT OF PEAK DETECTOR (Vertical)

Frequency (GHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V)	Margin (dB)
1.253	31.83	53.9	22.07
1.51	34.83	53.9	19.07
1.967	33.19	53.9	20.71
2.212	34.67	53.9	19.23
2.5	33.67	53.9	20.23
2.663	35.5	53.9	18.4
2.84	35.33	53.9	18.57

## Note

- The frequencies above 1 GHz up to fifth harmonic of the internal clock were measured.
- The level of frequencies above 2.84GHz are very small compared to the noise floor level then the signal cannot display.

**Result:** **Pass**

Tested by: MR. Suriyan Srimat

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## 7 APPENDIX

### FCC ID label location information

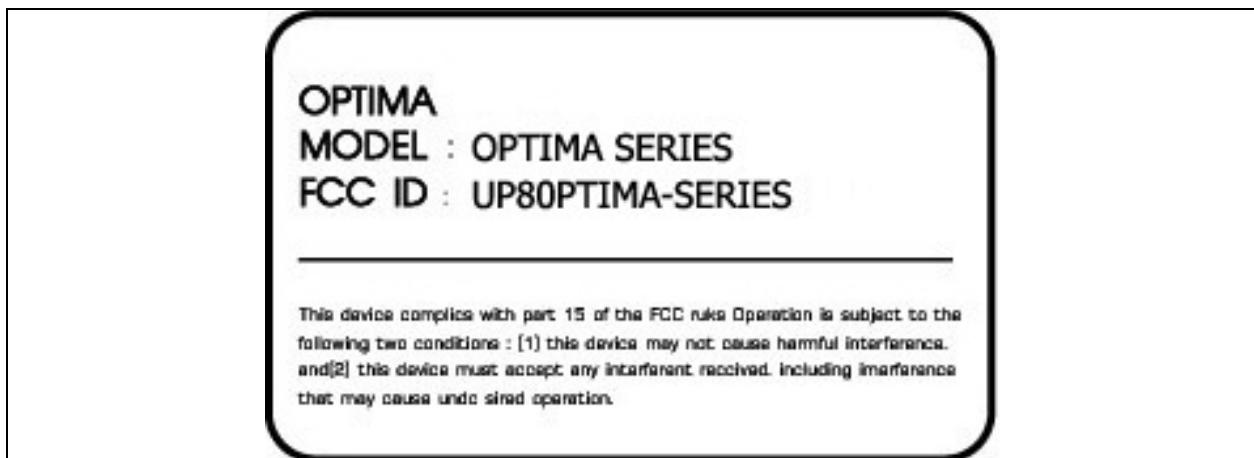


FIGURE 6 - FCC ID Label

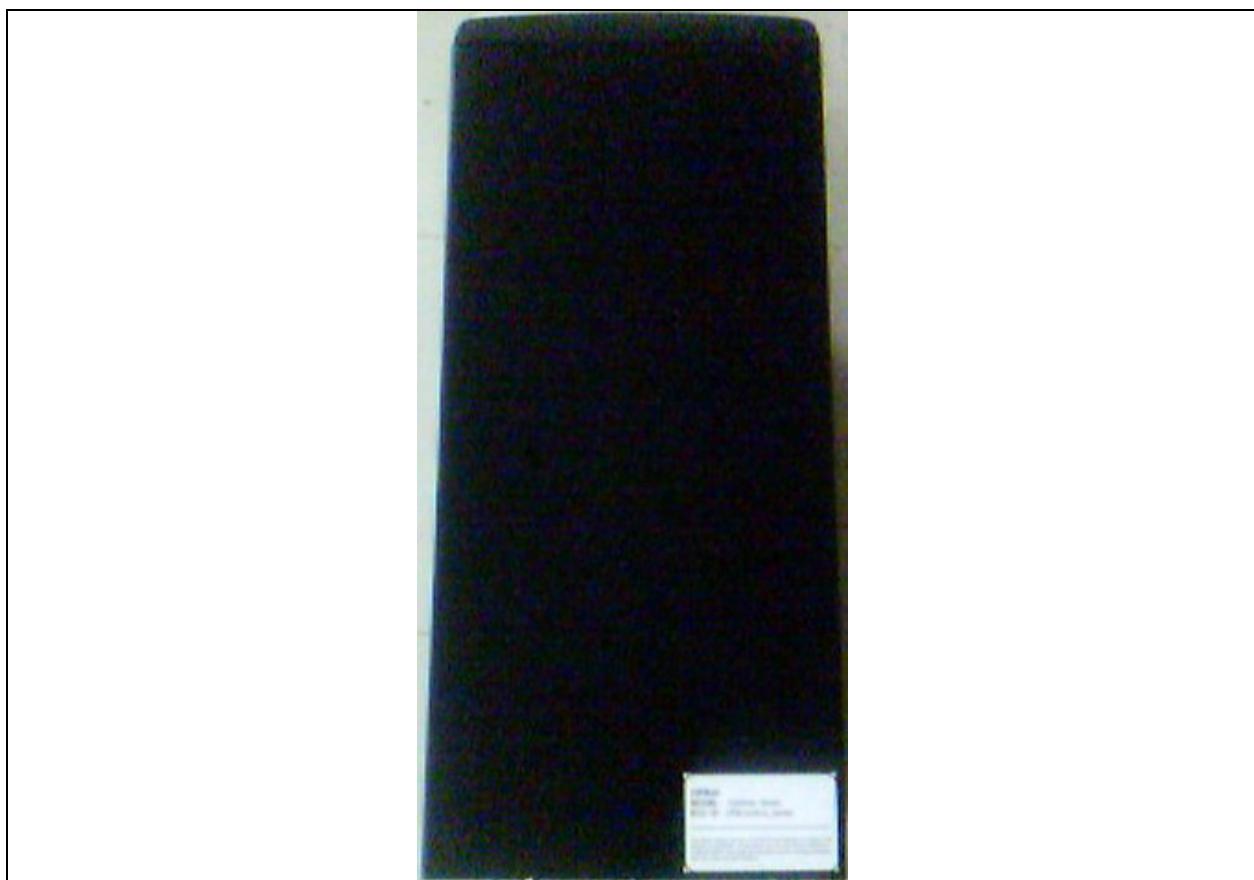


FIGURE 7 - FCC ID Label Located

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- Front



- Rear



- Left



- Right

FIGURE 8 – External Photographs (CPU Case)

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FIGURE 9 – External Photographs (Monitor)

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FIGURE 10 - Mouse

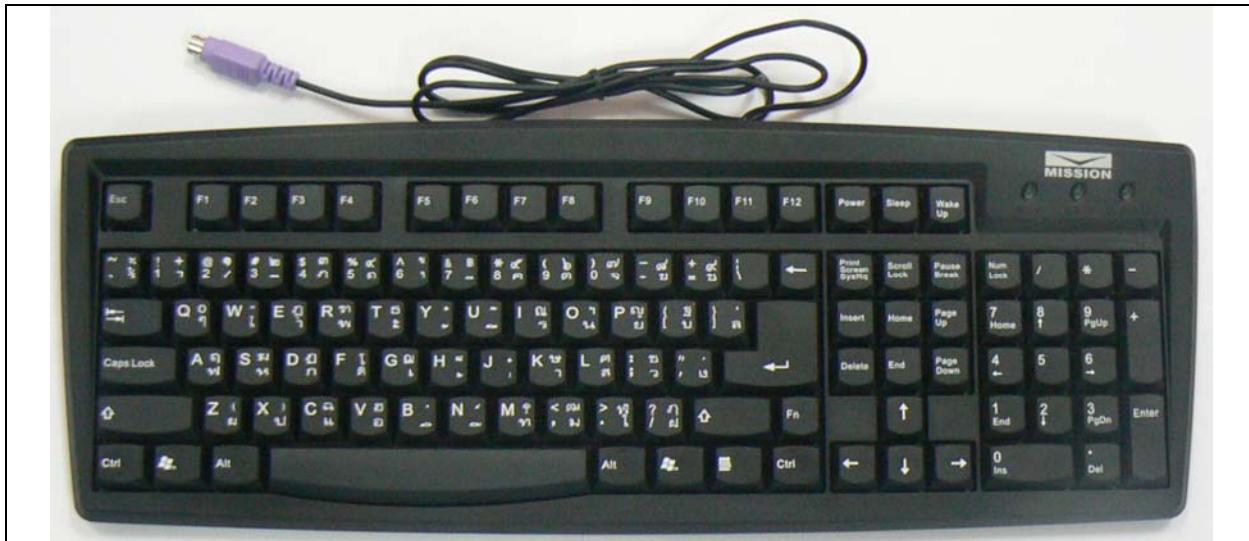


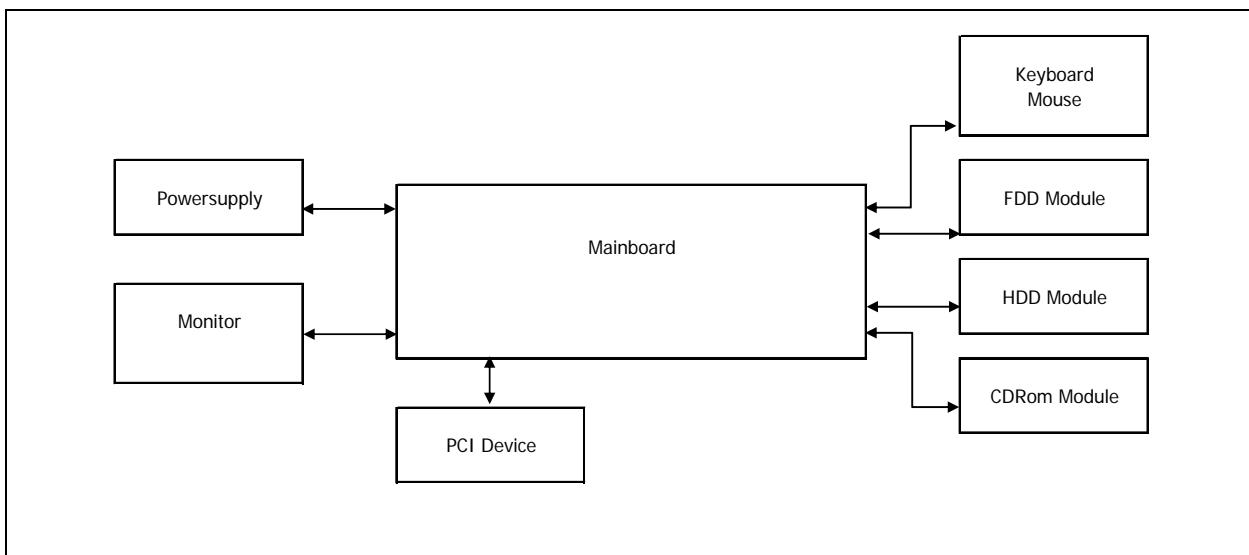
FIGURE 11 – Key board

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System Block Diagram



Mainboard Diagram

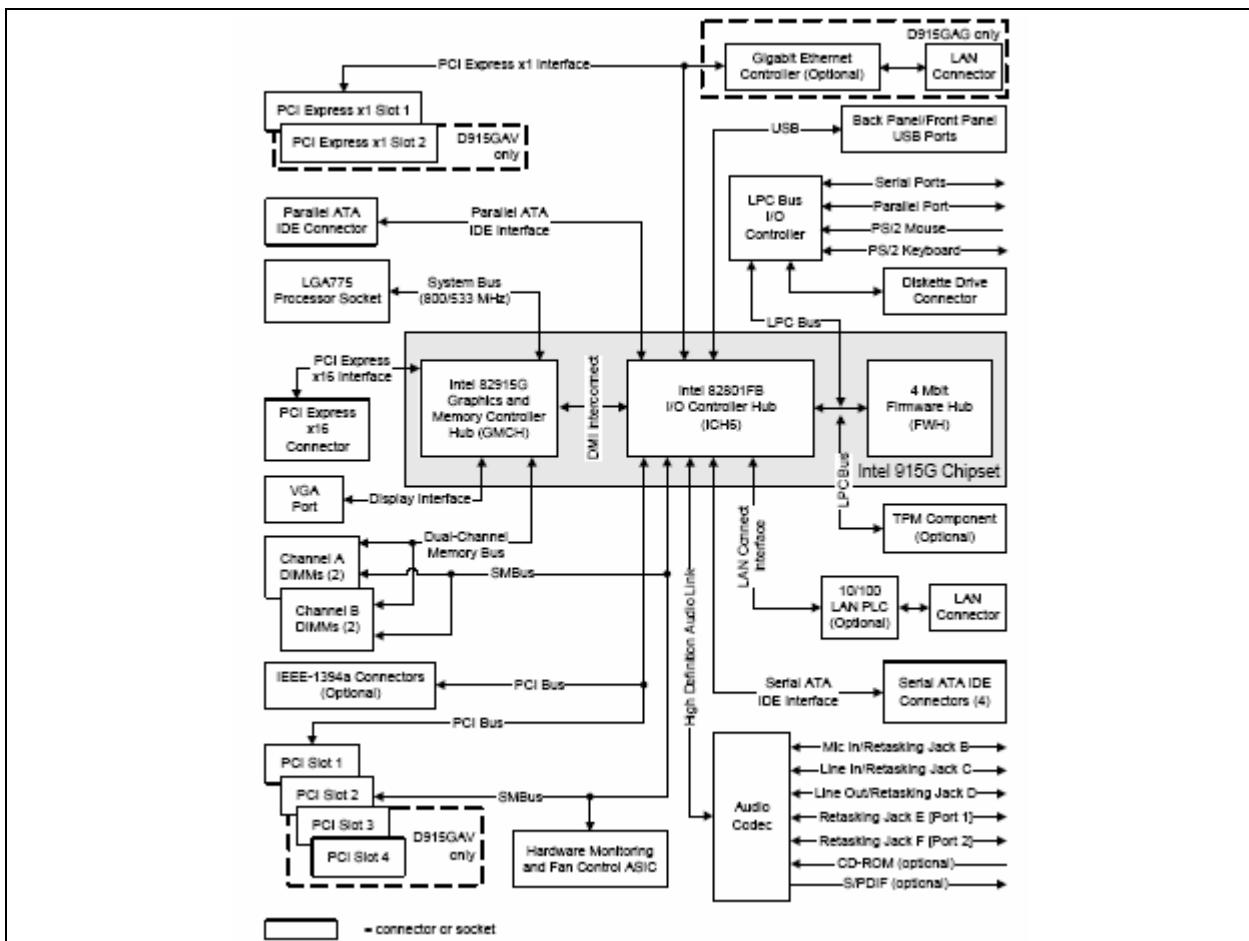


FIGURE 11 EUT Block Diagram

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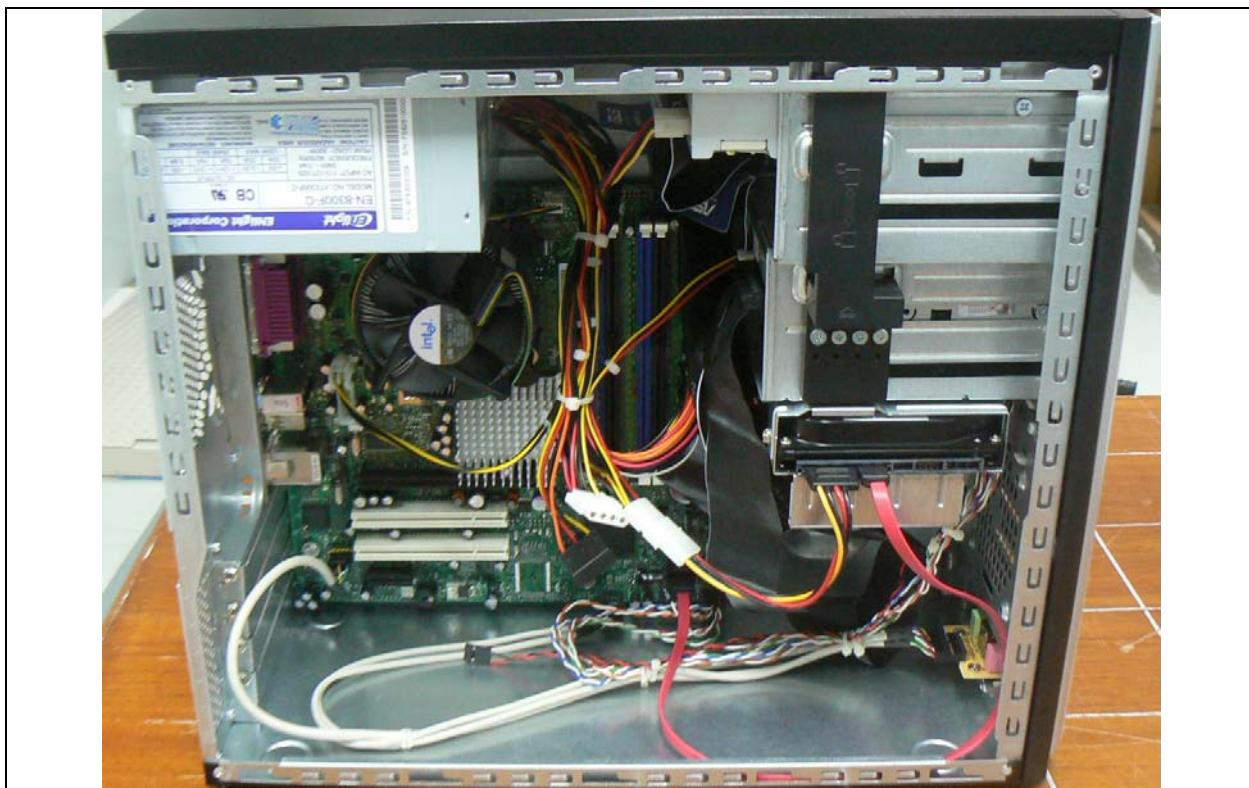


FIGURE 12 – Internal Photographs (CPU case).



FIGURE 13 – Power Supply

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FIGURE 14 – Main Board



FIGURE 15 – CPU

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FIGURE 16 Hard Disk

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FIGURE 17 – Memory (RAM)

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FIGURE 18 – Floppy Disk



FIGURE 19 – CD-Rom

----- End of Report -----

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