



# TEST REPORT

EUT Number: 50-192

Equipment Under Test: Computer

Trade Name: MISSION

Model: OPTIMA SERIES

Serial Number: -

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

Manufactured by: Mission Assembly Line Co.,Ltd.

Receipt Date: 8 May 2007

Date of Test: 8-17 May 2007

Issued Date of Report: 25 May 2007

Approved by

A handwritten signature in blue ink, appearing to read 'Mr. Montri Pannarut', is placed over a horizontal line.

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  $U_{cispr}$

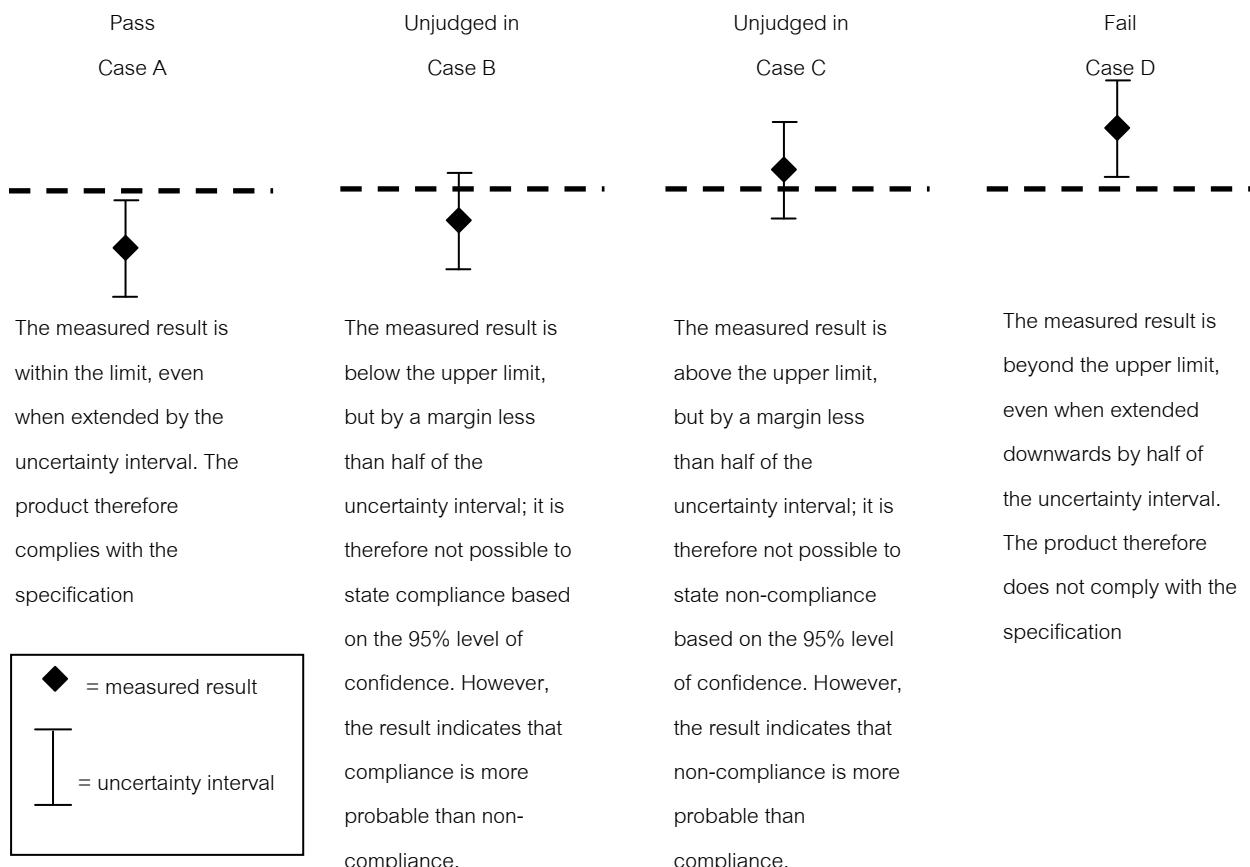
Abbreviation	Testing system	Frequency range	$U_{lab}$	$U_{cispr}$	$U_{lab} - U_{cispr}$
CE	Conducted Emission	9 kHz - 150 kHz	3.41	4.00	-0.59
CE	Conducted Emission	150 kHz - 30 MHz	2.98	3.60	-0.62
RE	Radiated Disturbance	30 MHz – 1000 MHz	4.53	5.20	-0.67
PE	Disturbance Power	30 MHz – 300 MHz	3.90	4.50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

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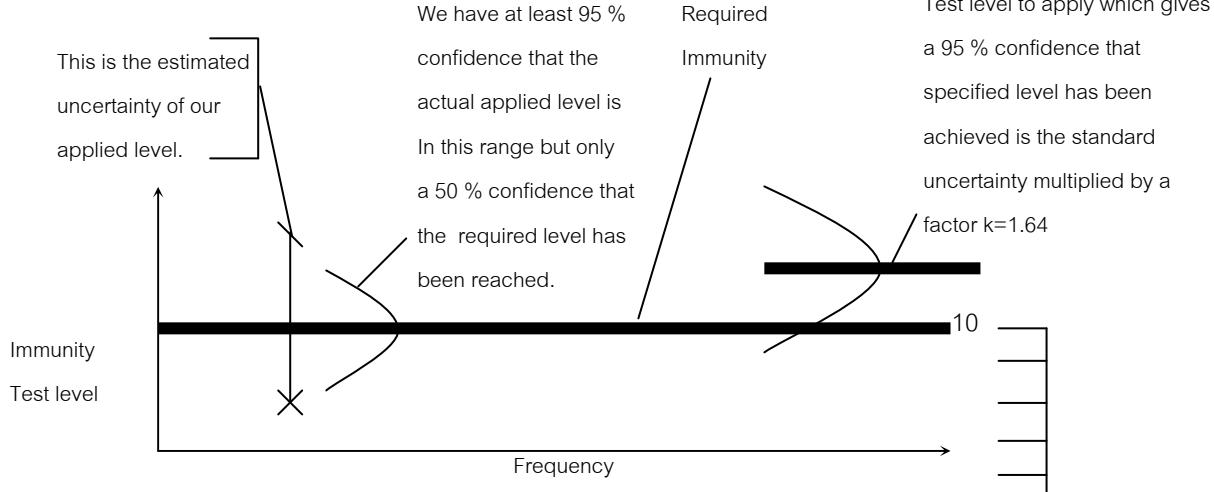
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### 3.2.2 Uncertainty Application according to LAB 34 Edition 1 ( Figure 1 ) for other testing system.



### 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	$\leq 16$ A
Clock/Oscillator	3.0 GHz

### 5.2 EUT Configuration

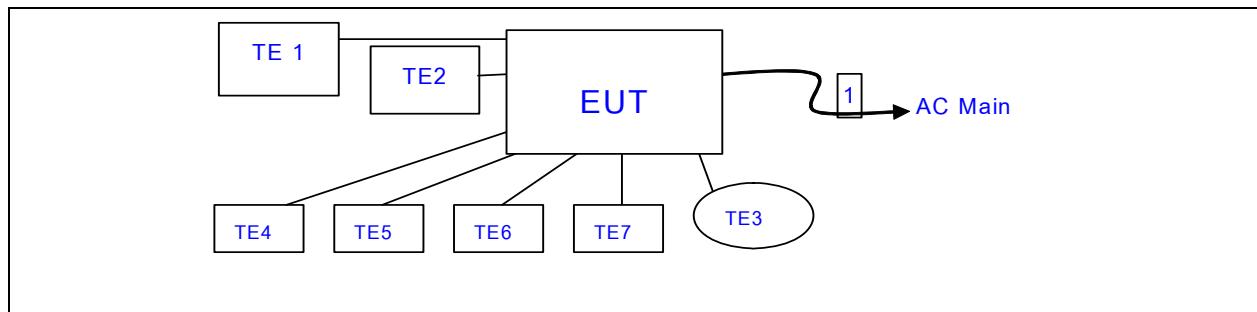


FIGURE 1 - EUT Configuration.

### 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	AFJ	LS16C	16010030095	DKD	11-10-2006

- Customer's Equipment

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

- Test Uncertainty:  $\pm 3.61$  dB

- Test Location: TRM-001

- Test Environment

Temperature (°C)	25	Humidity (%)	60
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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

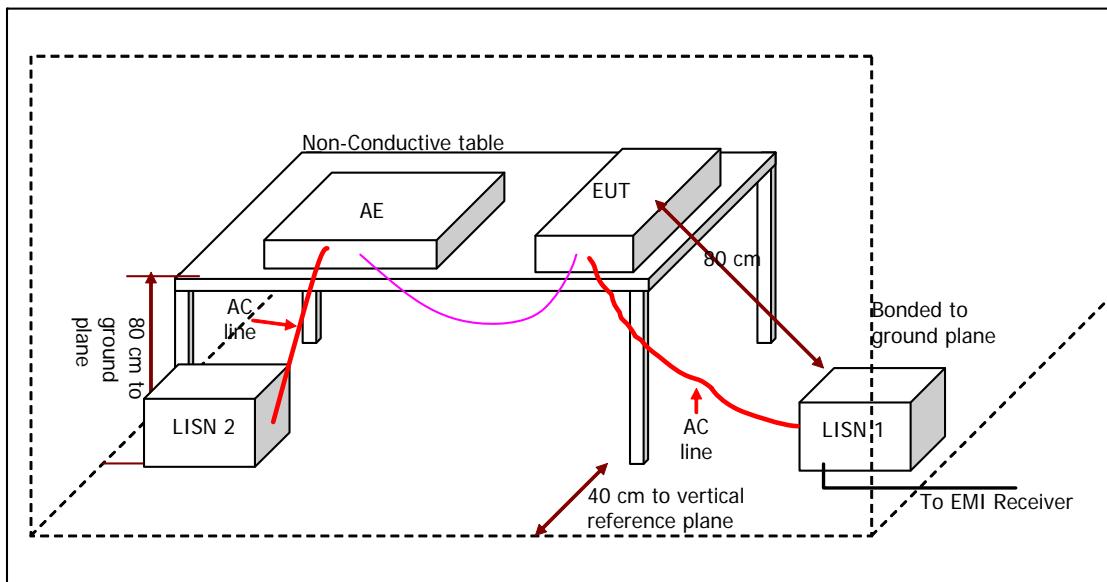


FIGURE 2 - The test setup diagram



FIGURE 3 - The test setup picture.

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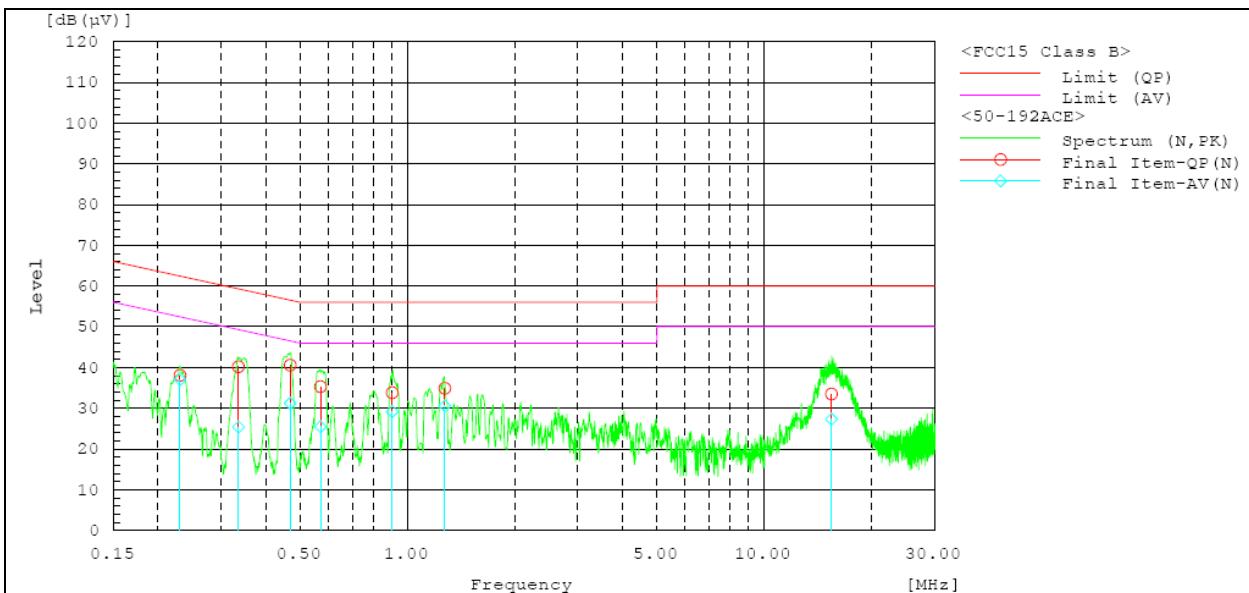
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## 6.1.2 Test Result

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



## Measurement Result

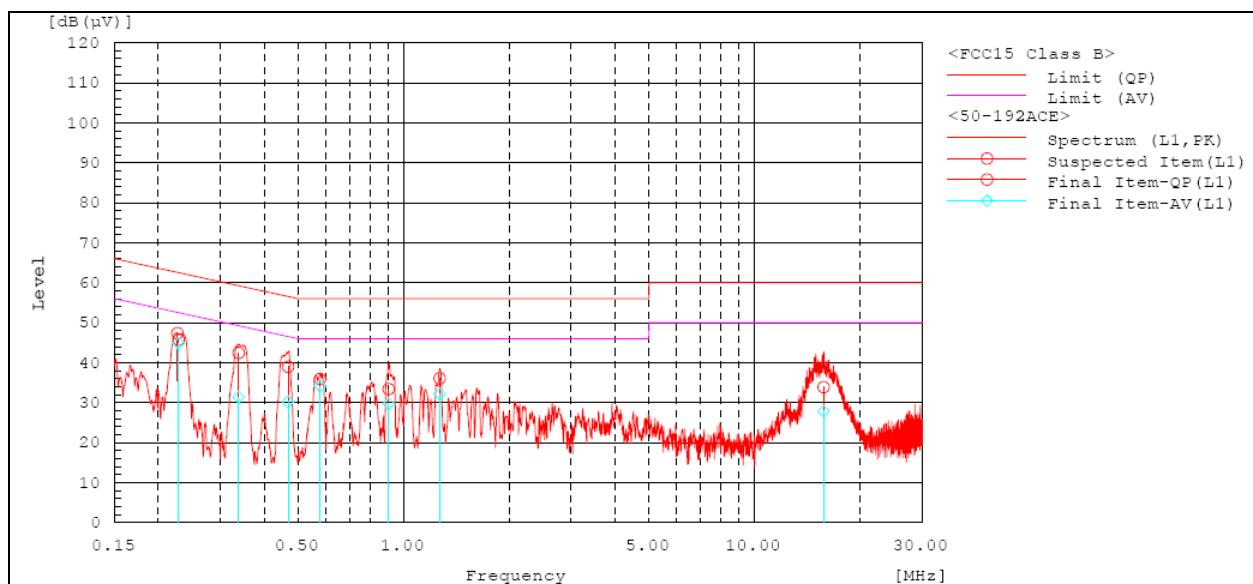
--- N Phase ---											
No.	Frequency [MHz]	Reading QP [dB(μV)]		Reading AV [dB(μV)]		c.f.	Result QP [dB]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]
		Reading QP [dB(μV)]	Reading AV [dB(μV)]	Result QP [dB]	Result AV [dB(μV)]						
1	0.23029	37.9	36.8	0.2	38.1	37.0	62.4	52.4	24.3	15.4	
2	0.33574	40.0	25.2	0.2	40.2	25.4	59.3	49.3	19.1	23.9	
3	0.46901	40.4	31.0	0.2	40.6	31.2	56.5	46.5	15.9	15.3	
4	0.57024	35.0	25.2	0.3	35.3	25.5	56.0	46.0	20.7	20.5	
5	0.90652	32.5	28.9	0.3	33.8	29.2	56.0	46.0	22.2	16.8	
6	1.27285	34.6	30.3	0.3	34.9	30.6	56.0	46.0	21.1	15.4	
7	15.44333	32.6	26.4	0.9	33.5	27.2	60.0	50.0	26.5	22.7	

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## Test Result for Line1



## Measurement Result

--- L1 Phase ---												
No.	Frequency	Reading		c.f	Result		Result		Limit		Margin	
		QP	AV		QP	AV	QP	AV	QP	AV	QP	AV
	[MHz]	[dB(μV)]	[dB(μV)]	[dB]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB]	[dB]
1	0.22826	45.5	44.6	0.2	45.7	44.8	62.5	52.5	16.8	7.7		
2	0.33861	42.3	31.2	0.2	42.5	31.4	59.2	49.2	16.7	17.8		
3	0.46843	38.8	30.0	0.2	39.0	30.2	56.5	46.5	17.5	16.3		
4	0.57736	35.6	23.8	0.3	35.9	34.1	56.0	46.0	20.1	11.9		
5	0.90612	33.1	29.4	0.3	33.4	29.7	56.0	46.0	22.6	16.3		
6	1.26629	35.8	31.9	0.3	36.1	32.2	56.0	46.0	19.9	13.8		
7	15.7425	32.9	26.9	1.0	33.9	27.9	60.0	50.0	26.1	22.1		

Tested by: MR. Marut Hnihilnae

**Result:** **Pass**

## 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	23-02-2007

- Customer's Equipment

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

- Test Uncertainty:  $\pm 4.78$  dB

- Test Location: TRM-002

- Test Environment

Temperature (°C)	23	Humidity (%)	56
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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

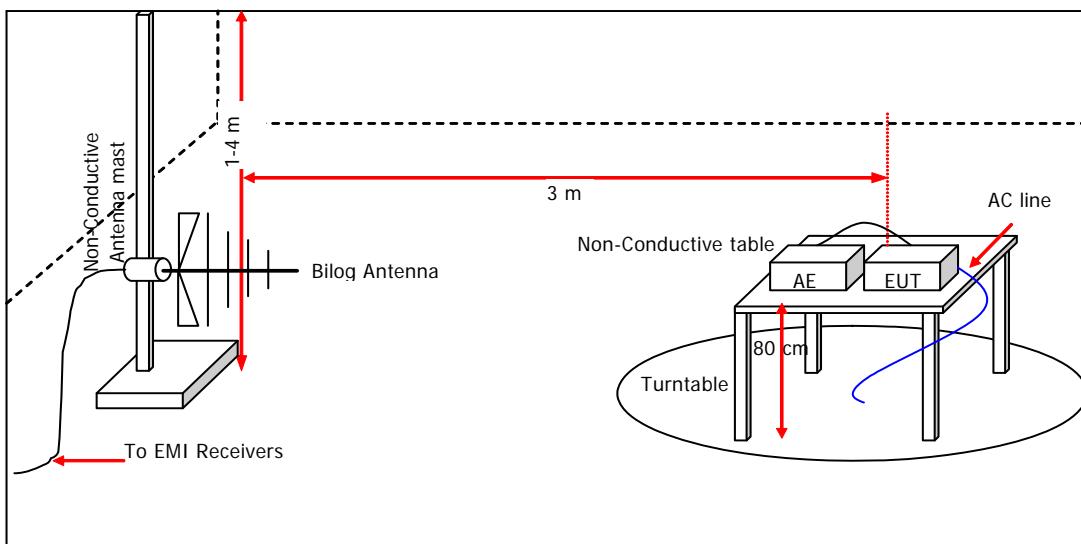


FIGURE 4 - The test setup diagram



FIGURE 5 - The test setup picture.

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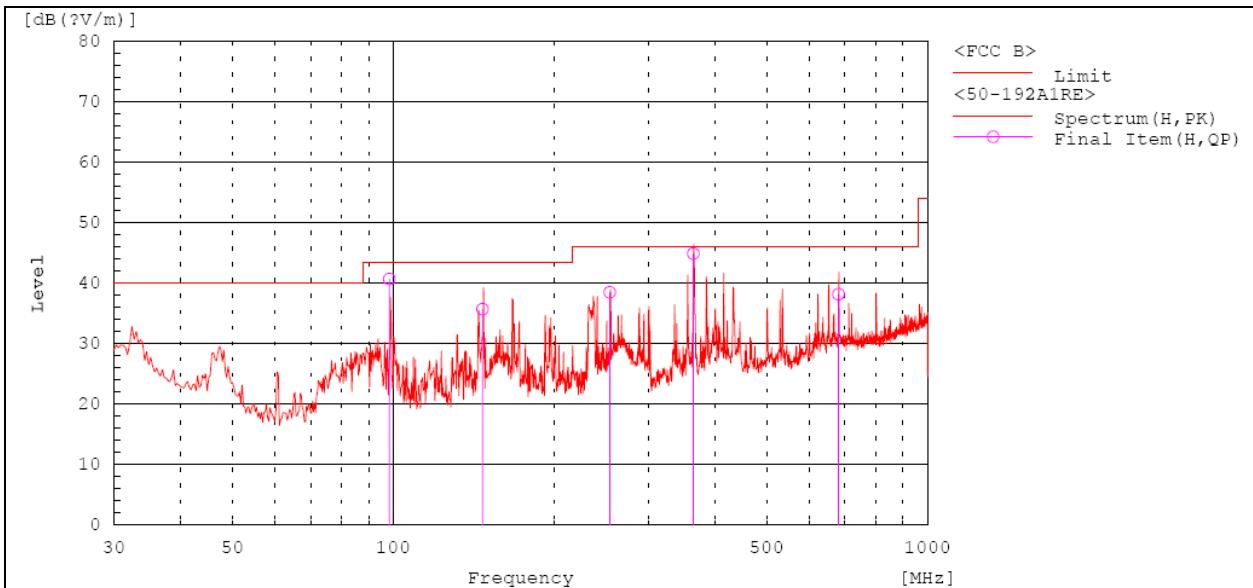
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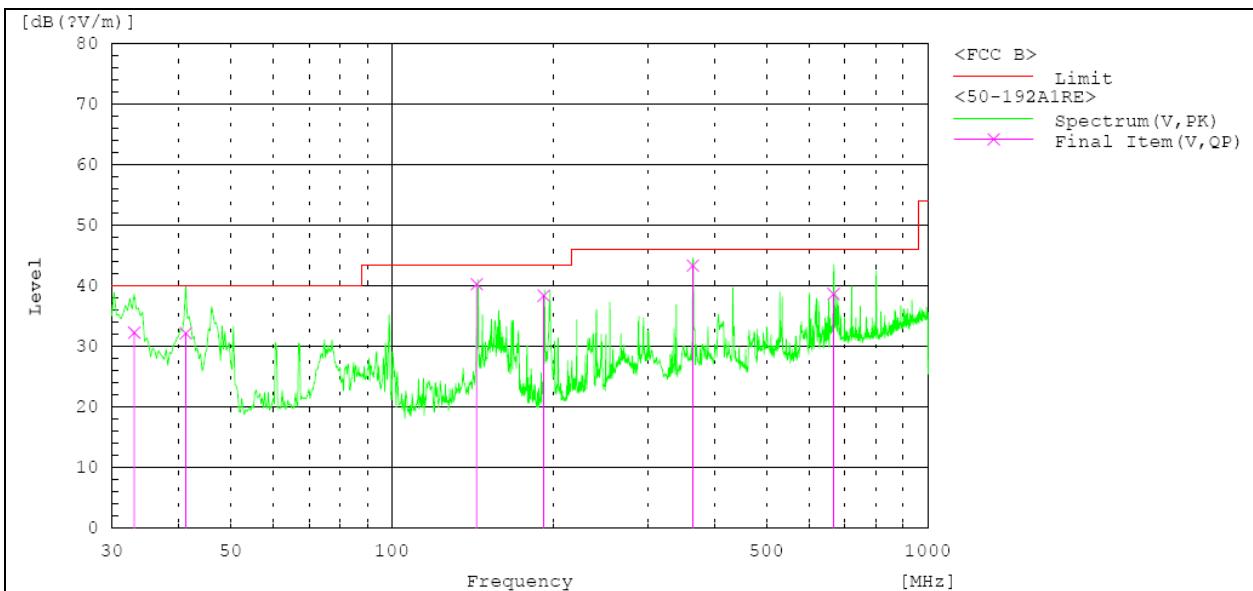
## 6.2.2 Test Result

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



## Test result for Horizontal polarization



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## Measurement Result

No.	Frequency (P)	Reading	c.f	Result		Limit	Margin	Height	Angle
				QP	QP				
1	33.032	V	30.7	1.6	32.3	40.0	7.7	100.0	0.0
2	41.211	V	35.4	-3.2	32.2	40.0	7.8	100.0	0.0
3	143.953	V	46.7	-6.4	40.3	43.5	3.2	100.0	264.0
4	191.964	V	46.3	-7.9	38.4	43.5	5.1	100.0	35.0
5	364.384	V	45.2	-1.8	43.4	46.0	2.6	100.0	0.0
6	666.761	V	35.1	3.6	38.7	46.0	7.3	100.0	0.0
7	98.266	H	50.5	-9.8	40.7	43.5	2.8	194.0	274.0
8	146.895	H	42.2	-6.5	35.7	43.5	7.8	163.0	96.0
9	254.220	H	43.0	-4.5	38.5	46.0	7.5	143.0	233.0
10	364.346	H	46.7	-1.8	44.9	46.0	1.1	100.0	41.0
11	681.422	H	34.3	3.9	38.2	46.0	7.8	101.0	0.0

## Frequencies above 1GHz

## MEASUREMENT RESULT OF PEAK DETECTOR (Horizontal)

Frequency (GHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V)	Margin (dB)
1.02	30.82	53.9	23.08
1.06	37.41	53.9	16.49
1.18	38.43	53.9	15.47
1.21	37.47	53.9	16.43
1.24	36.18	53.9	17.72
1.33	36.53	53.9	17.37
1.39	30.39	53.9	23.51
1.45	31.31	53.9	22.59
1.6	39.8	53.9	14.1
1.74	27.32	53.9	26.58
1.86	40.74	53.9	13.16
2.13	29.62	53.9	24.28
2.43	30.19	53.9	23.71
2.49	37.16	53.9	16.74
2.7	29.62	53.9	24.28

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## MEASUREMENT RESULT OF PEAK DETECTOR (Vertical)

Frequency (GHz)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V)	Margin (dB)
1.48	33.62	53.9	20.28
1.42	36.98	53.9	16.92
1.24	33.37	53.9	20.53
1.21	37.68	53.9	16.22
1.06	41.2	53.9	12.7
1	34.77	53.9	19.13
1.2	32.79	53.9	21.11
1.33	35.1	53.9	18.8
1.6	40.04	53.9	13.86
1.66	38.76	53.9	15.14
1.86	39.26	53.9	14.64
1.69	30.78	53.9	23.12
2.13	29.74	53.9	24.16
2.18	29.04	53.9	24.86
2.49	32.6	53.9	21.3
2.71	31.03	53.9	22.87

## Note

- The frequencies above 1 GHz up to fifth harmonic of the internal clock were measured.
- The level of frequencies above 2.71 GHz 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

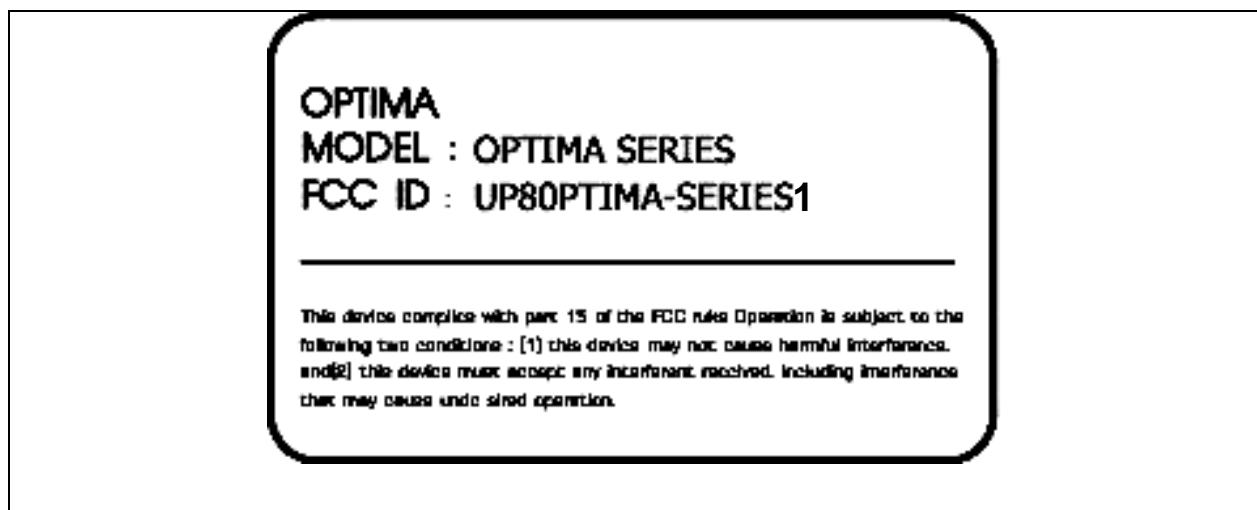


FIGURE 6 - FCC ID Label

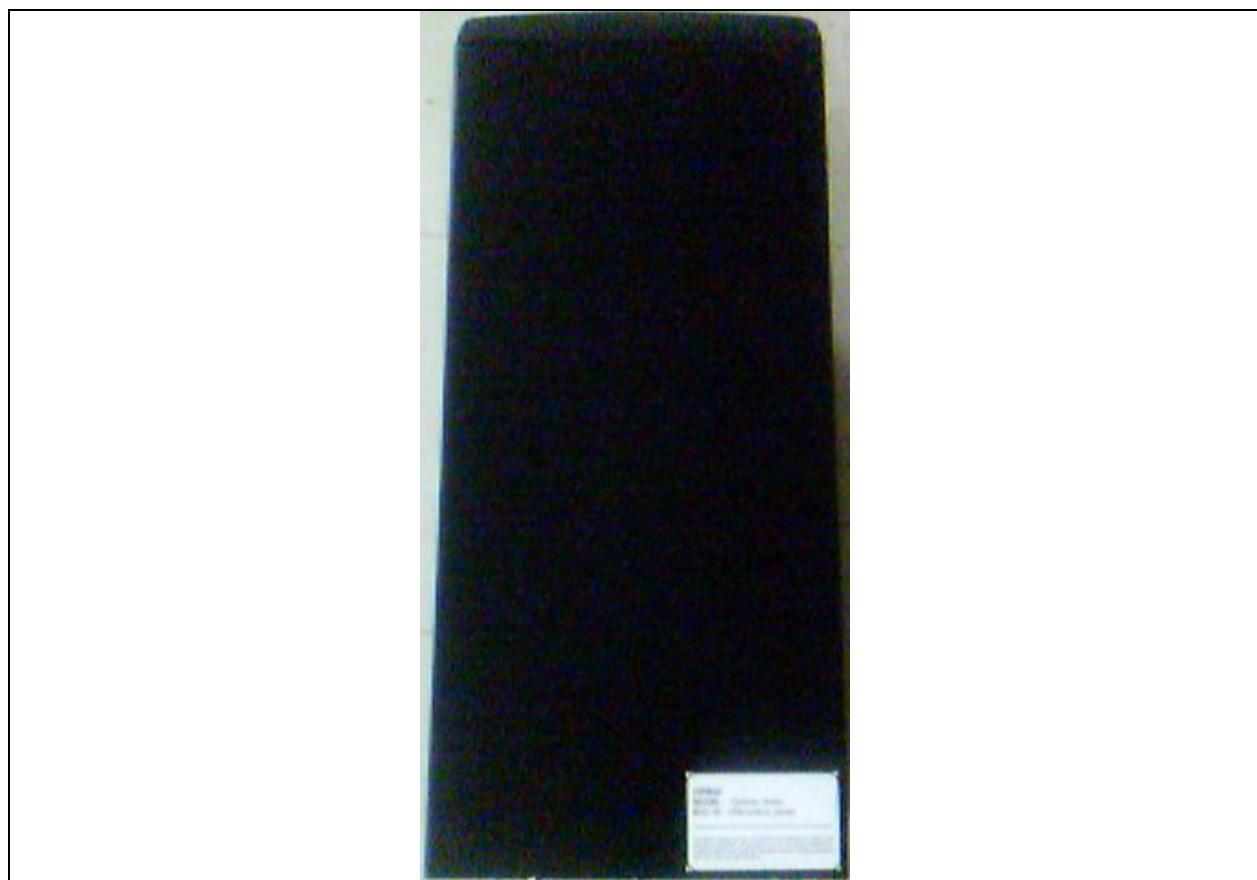


FIGURE 7 - FCC ID Label Located

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- Front



- Rear



- Left



- Right

FIGURE 8 – External Photographs (CPU Case)

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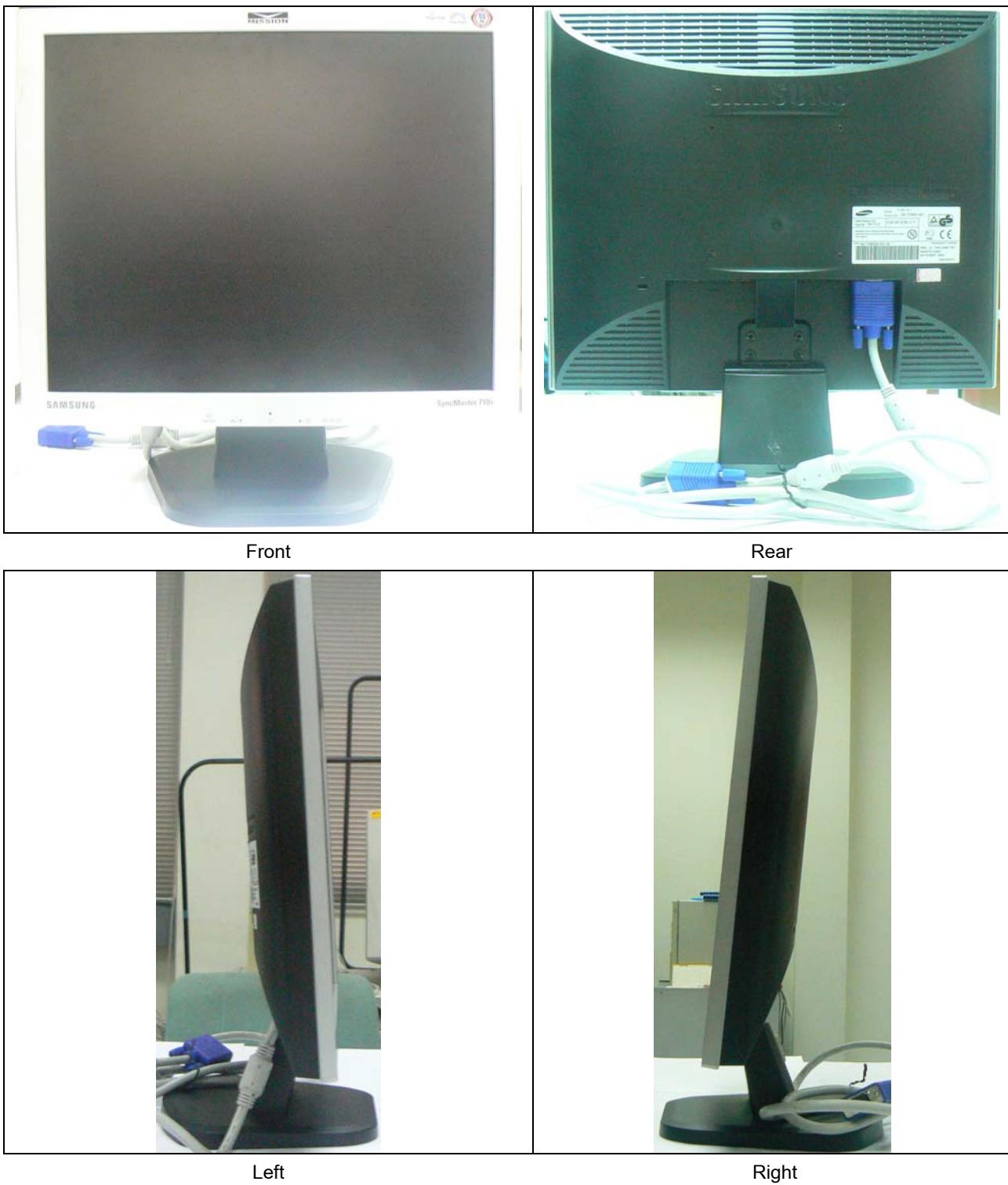


FIGURE 9 – External Photographs (Monitor)

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FIGURE 10 - Mouse



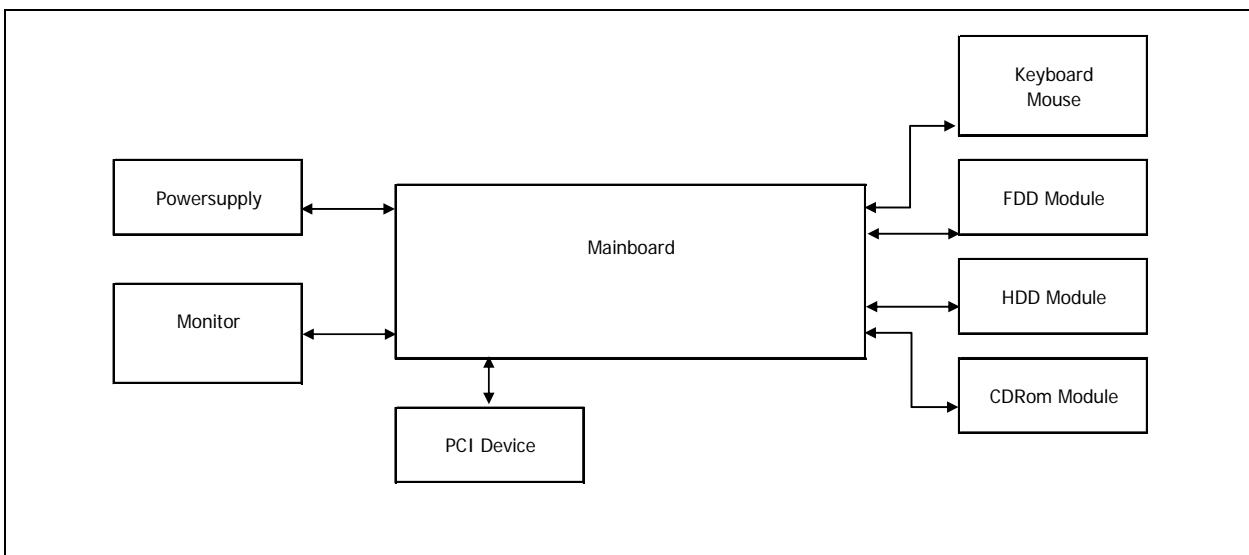
FIGURE 11 – Key board

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System Block Diagram



Mainboard Diagram

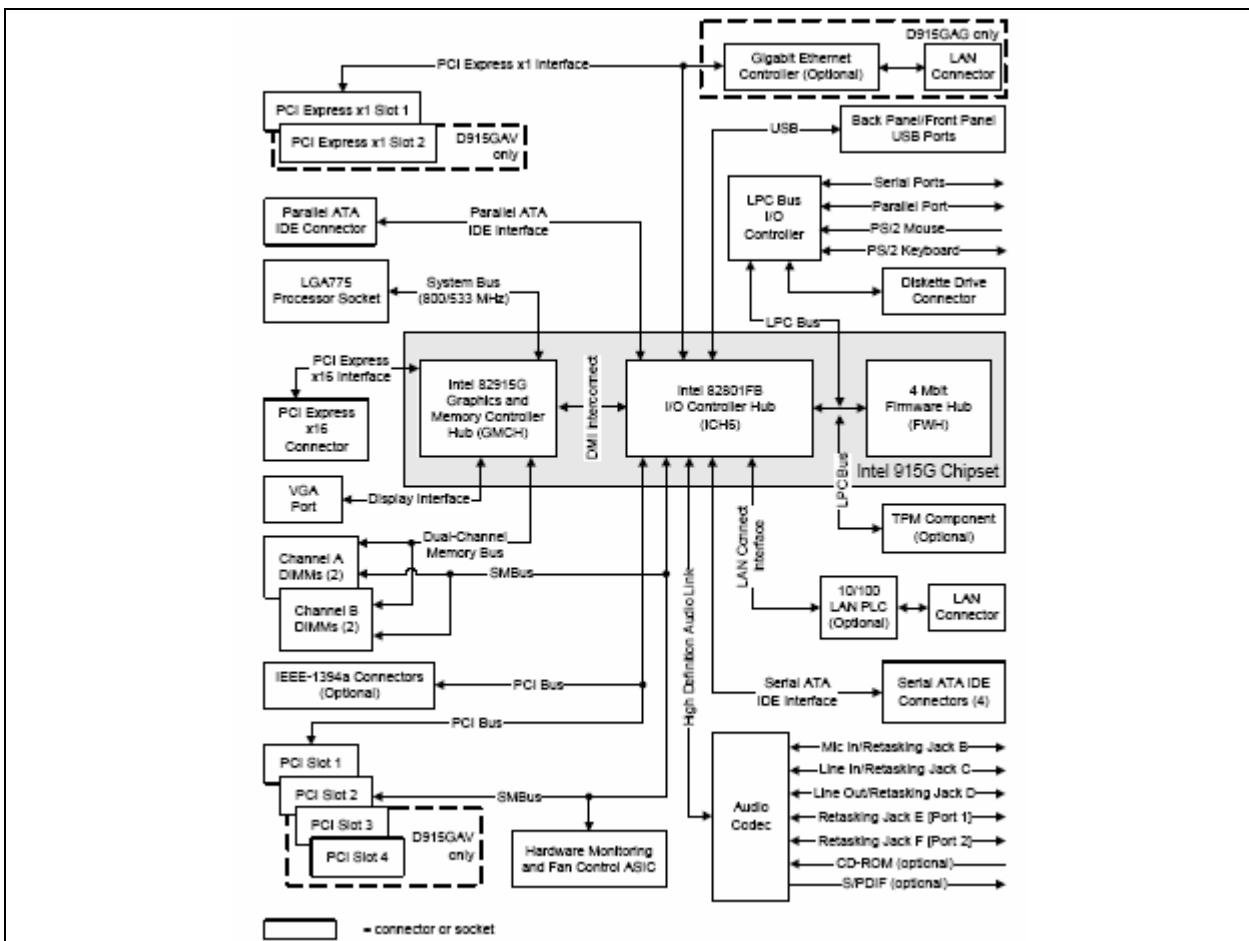


FIGURE 12 EUT Block Diagram

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FIGURE 13 – Internal Photographs (CPU case).

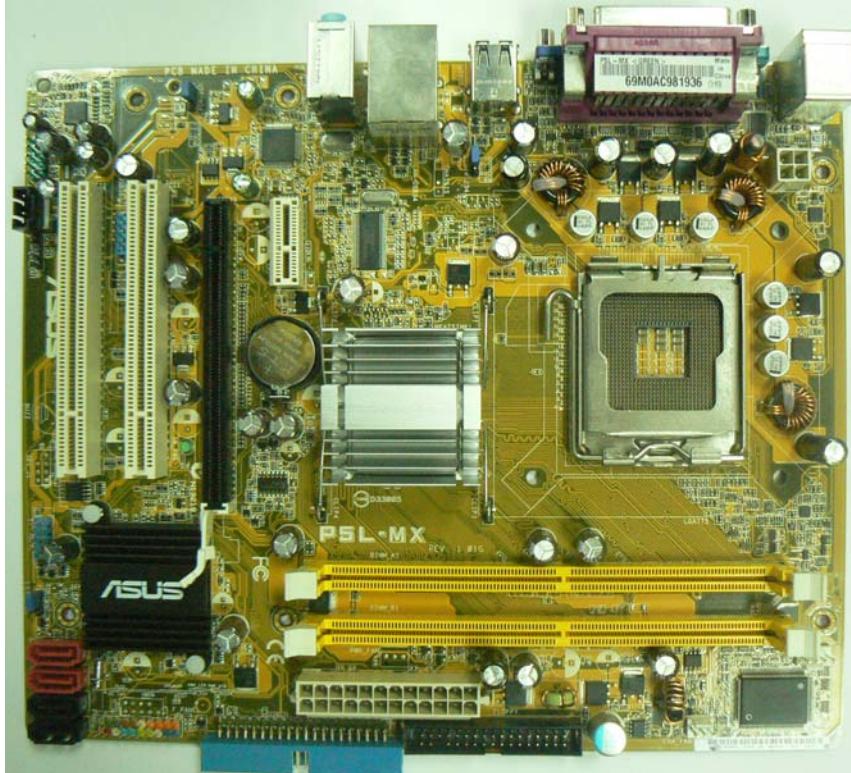


FIGURE 14 – Power Supply

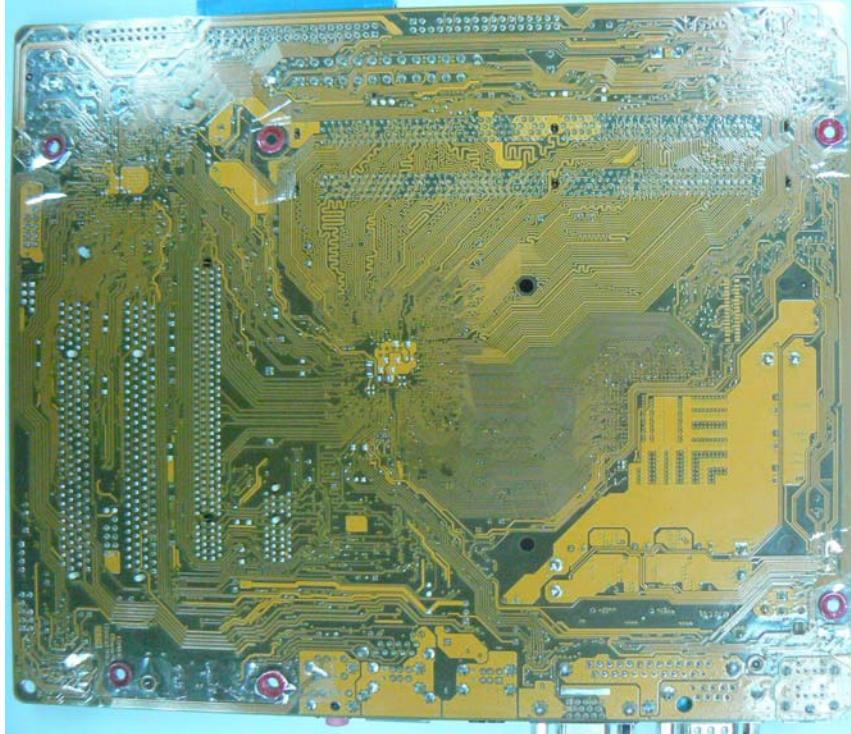
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Front



Rear

FIGURE 15 – Main Board

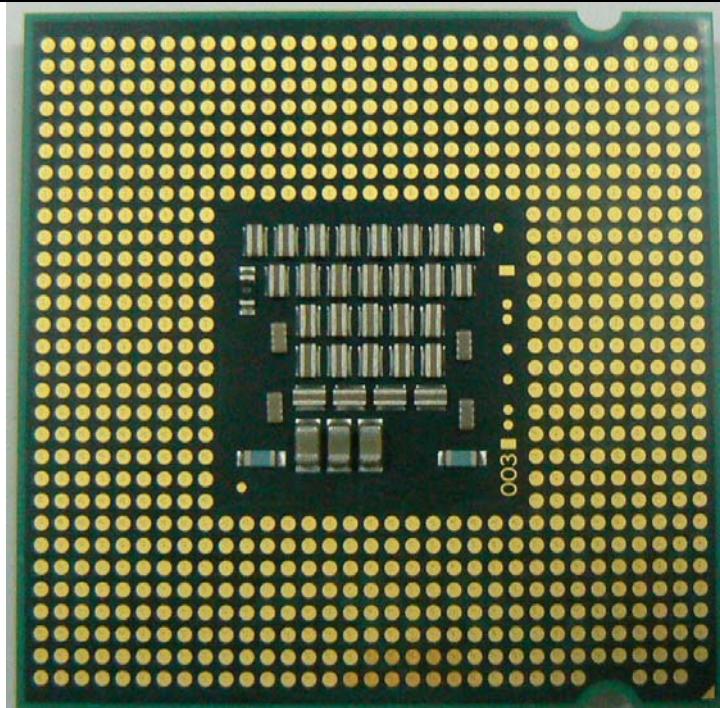
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Front



Rear

FIGURE 16 – CPU

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Front



Rear

FIGURE 17 Hard Disk

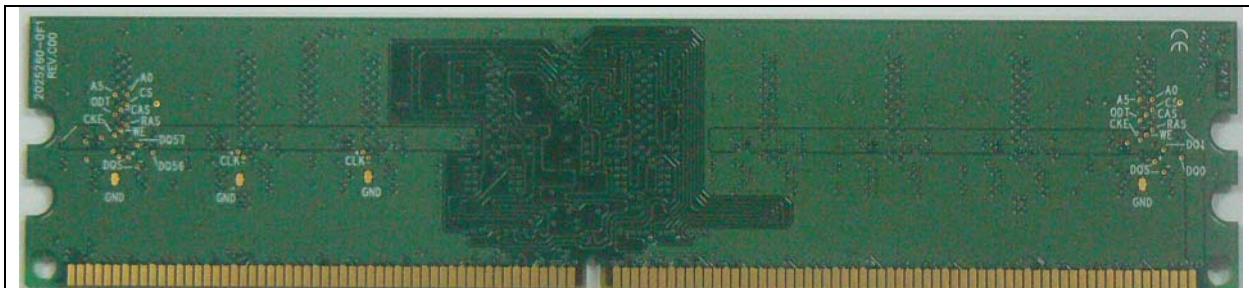
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Front



Rear

FIGURE 18 – Memory (RAM)



FIGURE 19 – CD-Rom

- End of Report

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