



**MSI**  
MICRO-STAR INTERNATIONAL

*Link to the Future*

# CE TEST REPORT

## According To

European Standard EN 55022:1998+A1:2000 +A2:2003 Class B  
EN61000-3-2:2000, EN61000-3-3:1995+A1:2001 and  
EN55024:1998+A1:2001+A2:2003( EN61000-4-2:2001,  
EN61000-4-3:2002:+A1:2002, EN61000-4-4:2004, EN61000-4-5:2001,  
EN61000-4-6:2003+A1:2004, EN61000-4-8:2001, EN61000-4-11:2004)

<b>EQUIPMENT :</b>	<b>MOTHER BOARD</b>
<b>MODEL NO :</b>	<b>MS-7360 P35 Neo, G33 Neo</b>
<b>APPLICANT :</b>	<b>MICRO-STAR INT'L CO., LTD</b>
<b>ADDRESS :</b>	<b>NO.69,LI-DE ST,JUNG-HE CITY, TAIPEI HSIEN, TAIWAN</b>
<b>Date of Test :</b>	<b>2007/03/07</b>
<b>Date of Report :</b>	<b>2007/03/20</b>
<b>TEL :</b>	<b>886-2-3234-5599</b>
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*This test has been operated by*

***QuieTek Corporation.***

**ADDRESS: No.99 Hongye RD.Suzhou Industnal Park Loufeng Hi-Tech Development Zone.,Suzhou,China**

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# TEST REPORT VERIFICATION

Applicant : MICRO-STAR INT'L CO., LTD  
Manufacturer : MICRO-STAR INT'L CO., LTD  
EUT Description : Motherboard  
MODEL NO : MS-7360 P35 Neo, G33 Neo  
SERIAL NO : N/A  
POWER SUPPLY :AC 230V/50Hz

**Measurement Procedure Used:**

**EN 55022:1998+A1:2000+A2:2003 Class B**

**EN 55024 :1998+A1:2001+A2:2003**

The device described above was tested by MICRO-STAR INT'L CO., LTD . to determine the maximum emission levels emanating from the device and the severity levels of the device can stay and it's performance criterion. The measurement results are contained in this test report and MICRO-STAR INT'L CO., LTD. is assumed full responsibility for the accuracy and compliance with EN 55022 : 1998 + A 1 : 2000 + A 2 : 2003 CLASS B AND EN 55024 : 1998 + A 1 : 2001 + A 2 : 2003 official limits.

This report applies to above tested sample only and shall not be reproduced in part without written approve of MICRO-STAR INT'L CO., LTD

**Date Of Test :** Mar . 07 2007 ~ Mar . 20 2007

**Prepared By :** Free wang  
**Free wang**

**Test Engineer :** edison  
**Edison**

**Approve & Authorized Signer :** Jeremy Hsieh  
**Jeremy Hsieh**



## 1. General Description

### 1.1 Applicant

MICRO-STAR INT'L CO., LTD.

No. 69, Li-De St., Jung-He City, Taipei Hsien, Taiwan

### 1.2 Manufacturer

MICRO-STAR INT'L CO., LTD.

No. 69, Li-De St., Jung-He City, Taipei Hsien, Taiwan

### 1.3 Basic EUT Description

Equipment : Motherboard

Model No : MS-7360 P35 Neo, G33 Neo

## 2. Tested Support Device List

### Host PC Devices :

Component	
CPU	Intel / Pentium 3.2GHz
HDD	Maxtor / PATA 80GB
VGA Card	G33 Neo / Intel Bear lake (graphic integrated) P35 Neo / nvidia Geforce 6200 TC
DDR	DDRII 512MB*2 800 (A-Data)
PC Case Power Supply	Foxconn / feixue / X204 Manufacturer: Hunt Key M/N: HK350-55DP AC Input: 220V, 4.0A, 50Hz DC Output: +5V, 20A; +12V1, 10A; +12V2, 16A; +3.3V, 18A; -12V, 0.3A; +5Vsb, 2.0A; PG Cable Out: Non-Shielded, 1.8m with one ferrite core bonded Power Output: 300W, +5V&+3.3V, 145W

### Peripherals Devices :

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 21" CRT Monitor	IBM	6652-U3N	01	Non-Shielded, 1.8m
2 Modem	Aceex	DM-1414	0102027552	Non-Shielded, 1.8m
3 Printer	EPSON	B241A	7094256	Non-Shielded, 1.8m
4 PS/2 Keyboard	HP	SK-2506	C0008335811	Power by PC
5 PS/2 Mouse	IBM	M-SAU-IBM6	01	Power by PC
6 USB2.0 HDD	Terasys	F12-UF	A0100215-64v0002	Power by PC
7 USB2.0 HDD	Terasys	F12-UF	A0100215-64v0003	Power by PC
8 USB2.0 HDD	Terasys	F12-UF	A0100215-64b0004	Power by PC
9 USB2.0 HDD	Terasys	F12-UF	A0100215-64v0038	Power by PC
10 USB2.0 HDD	Terasys	F12-UF	A0100215-64v0035	Power by PC
11 Microphone & Earphone	SOMIC	CD-2688M.V	N/A	N/A
12 Microphone & Earphone	SOMIC	N/A	SM-302	N/A
13 Microphone & Earphone	SOMIC	SM-810	N/A	N/A
14 Notebook PC	ASUS	W5000	00043-635-502-422	Power by adaptor
15 TV	TCL	1475S	01000481106AG1855	Non-Shielded, 1.8m



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### 3. Operating Condition Of EUT

Two programs,EMITEST.EXE under WINXP, which generates a complete line of continuously repeating "H" character were used as the test software

- 3.1 Turn on the power of all equipment.
- 3.2 The PC reads the test program from the floppy disk drive and runs it.
- 3.3 The PC sends "H" messages to the monitor, and the monitor displays "H" patterns on the screen.
- 3.4 The PC sends "H" messages to the printer ,then the printer prints them on the paper.
- 3.5 The PC sends "H" messages to the modem.
- 3.6 The PC sends "H" messages to the internal Hard Disk ,and the Hard Disk reads and writes the messages .
- 3.7 Repeat the steps from 3-2 to 3-6

At the same time, the following programs were executed:

- Test Mode 1 executed " CD player" to play music.
- Test Mode 2 executed " DVD player" to play digital audio and video.
- Test Mode 3 executed " Copy.exe" to read data from EUT.
- Test Mode 4 executed " Easy CD creator" to write the data to the CD.

## 4. Conducted Powerline

Conducted Emissions were measured from 150 KHz to 30 MHz with a bandwidth of 9 KHz on the 230V AC power and return leads of the EUT according to the methods defined in European Standard EN-55022 Clause 9 .The EUT was placed on a nonmetallic stand in a shielded room 80 cm above the ground plane as show in figure 4-1.2.

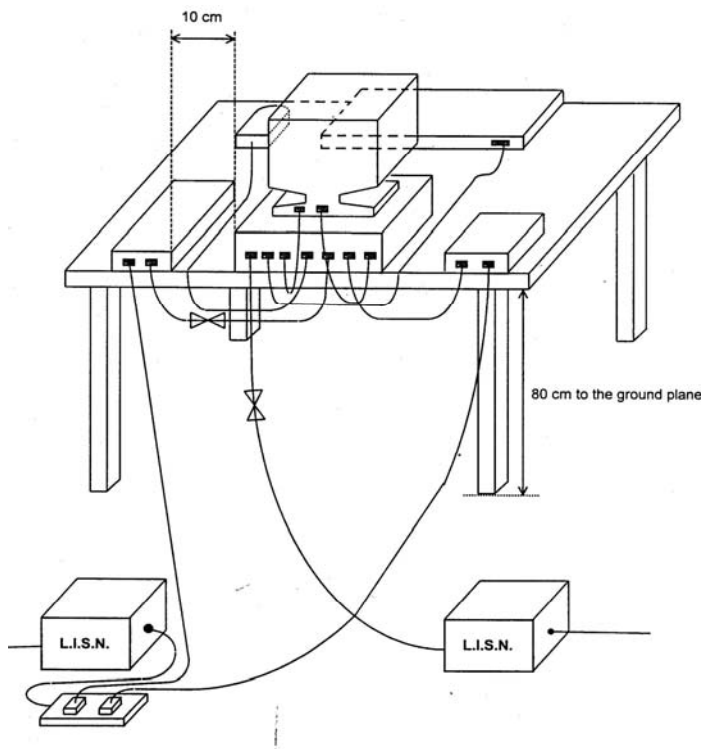
### 4-1 Test Construction

#### 4.1.1 Test Equipment List

The following test equipments are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No.	Cal.Date	Remark
1	Test Receiver	R & S	ESCS 30 / 100091	July.,2006	
2	L.I.S.N.	R & S	ESH3-Z5 / 100129	feb,2006	
3	L.I.S.N.	R & S	ESH3-Z5 / 100129	july,2006	
4	Pulse Limiter	R & S	ESH3-Z2 / 100092	sept,2005	
5	No.2 Shielded Room			N/A	

#### 4.1.2 Test Setup







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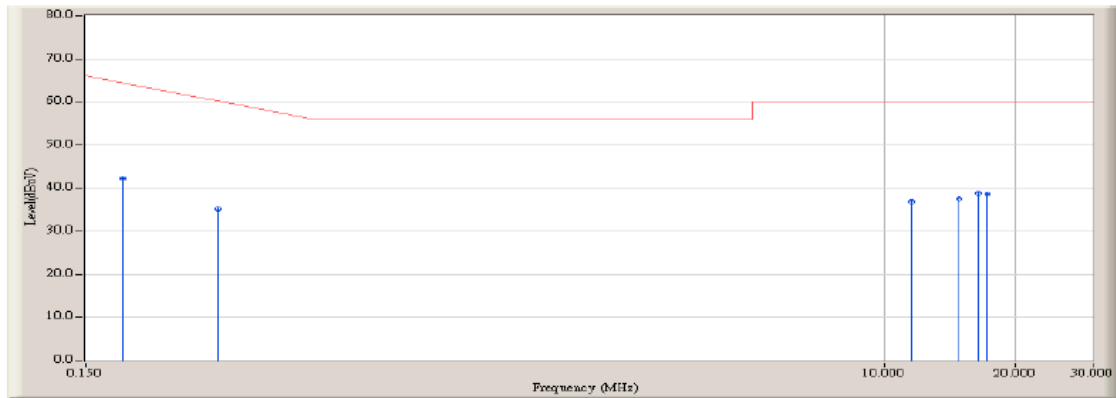
## 4-2 Test Procedures

- A. The EUT was placed on a desk 80 CM height from the metal ground plane and 40 cm from the conducting wall of the shielding room and it was kept at least 80 cm from any other grounded conducting surface.
- B. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- C. All the support units are connect to the other LISN.
- D. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- E. The CISPR states that 50 ohm ,50 microhenry LISN should be used.
- F. Both sides of AC line were checked for maximum conducted interference.
- G. The frequency range from 150 KHz to 30 MHz was searched.
- H. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- I. If the emission level of the EUT in peak mode was 6 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported , otherwise , the emission which do not have 6 dB margin will be retested one by one using the quasi-peak method and/or average methods and reported.



### 4-3 Test Results Of AC Powerline Conducted Emission

Engineer : Evan	
Site : SR-1	Time : 2007/03/07 - 21:39
Limit : FCC_Part15_B_00M_QP	Margin : 0
EUT : Motherboard	Probe : ENV216 - Line1
Power : AC 120V/60Hz	Note : Mode 3: VGA (1600*1200@85Hz)



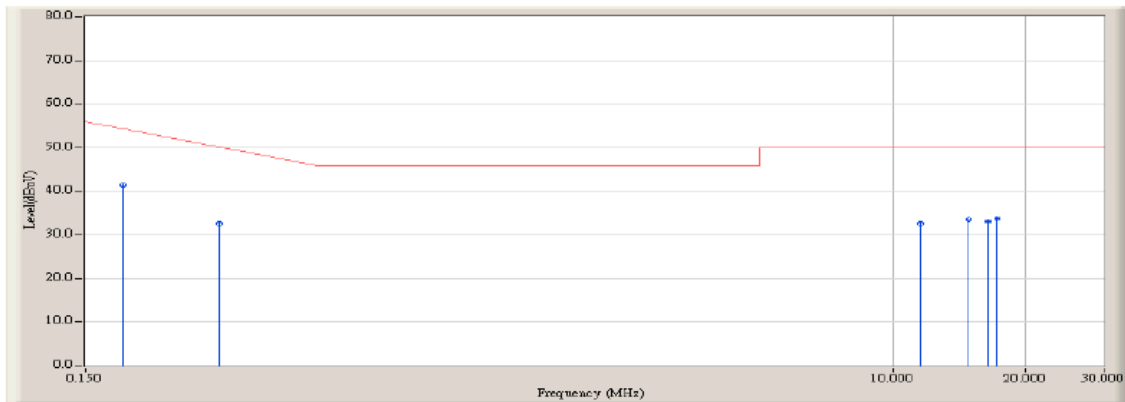
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	0.182	9.681	32.492	42.173	-22.913	65.086	QUASIPeAK
2	0.302	9.403	25.743	35.146	-26.511	61.657	QUASIPeAK
3	11.557	9.941	26.902	36.843	-23.157	60.000	QUASIPeAK
4	14.865	10.040	27.495	37.535	-22.465	60.000	QUASIPeAK
5	* 16.449	10.140	28.765	38.905	-21.095	60.000	QUASIPeAK
6	17.177	10.180	28.498	38.678	-21.322	60.000	QUASIPeAK

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor



Engineer : Evan	
Site : SR-1	Time : 2007/03/07 - 21:39
Limit : FCC_Part15_B_00M_AV	Margin : 0
EUT : Motherboard	Probe : ENV216 - Line1
Power : AC 120V/60Hz	Note : Mode 3: VGA (1600*1200@85Hz)



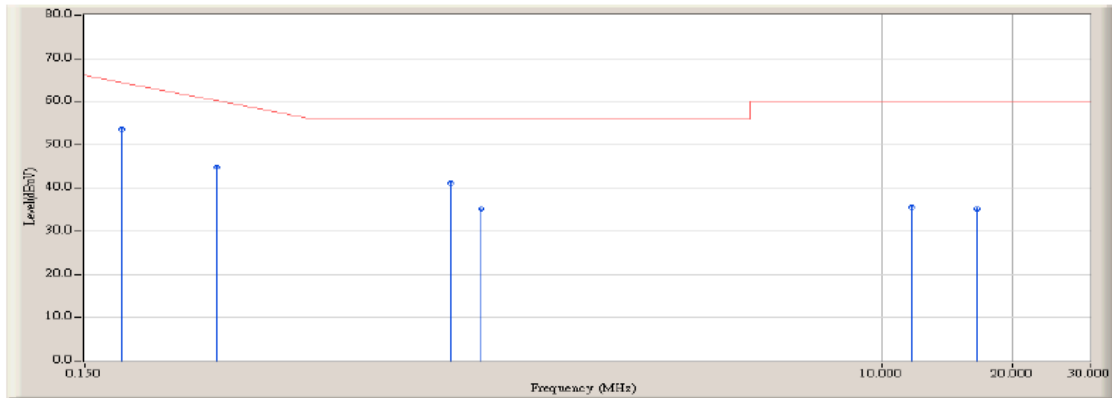
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV)	Margin (dB)	Limit (dBµV)	Detector Type
1	*	0.182	9.681	31.800	41.481	-13.605	55.086	AVERAGE
2		0.302	9.403	23.250	32.653	-19.004	51.657	AVERAGE
3		11.557	9.941	22.630	32.571	-17.429	50.000	AVERAGE
4		14.865	10.040	23.340	33.380	-16.620	50.000	AVERAGE
5		16.449	10.140	22.960	33.100	-16.900	50.000	AVERAGE
6		17.177	10.180	23.470	33.650	-16.350	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor



Engineer : Evan	
Site : SR-1	Time : 2007/03/07 - 21:46
Limit : FCC_Part15_B_00M_QP	Margin : 0
EUT : Motherboard	Probe : ENV216 - Line2
Power : AC 120V/60Hz	Note : Mode 3: VGA (1600*1200@85Hz)



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.182	9.515	44.200	53.715	-11.371	65.086	QUASIPeAK
2		0.302	9.523	35.200	44.723	-16.934	61.657	QUASIPeAK
3		1.030	9.740	31.400	41.140	-14.860	56.000	QUASIPeAK
4		1.214	9.750	25.400	35.150	-20.850	56.000	QUASIPeAK
5		11.730	10.050	25.500	35.550	-24.450	60.000	QUASIPeAK
6		16.554	10.140	25.100	35.240	-24.760	60.000	QUASIPeAK

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Engineer : Evan	
Site : SR-1	Time : 2007/03/07 - 21:46
Limit : FCC_Part15_B_00M_AV	Margin : 0
EUT : Motherboard	Probe : ENV216 - Line2
Power : AC 120V/60Hz	Note : Mode 3: VGA (1600*1200@85Hz)



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.182	9.515	43.100	52.615	-2.471	55.086	AVERAGE
2		0.302	9.523	35.100	44.623	-7.034	51.657	AVERAGE
3		1.030	9.740	27.300	37.040	-8.960	46.000	AVERAGE
4		1.214	9.750	19.700	29.450	-16.550	46.000	AVERAGE
5		11.730	10.050	19.200	29.250	-20.750	50.000	AVERAGE
6		16.554	10.140	17.400	27.540	-22.460	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor



Engineer : Evan	
Site : SR-1	Time : 2007/03/17 - 17:50
Limit : FCC_Part15_B_00M_QP	Margin : 0
EUT : Motherboard	Probe : ENV216 - Line1
Power : AC 120V/60Hz	Note : Mode 6: VGA (1600*1200@85Hz) + TV (800*600@60Hz)



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.182	9.681	44.000	53.681	-11.405	65.086	QUASIPeAK
2		0.302	9.403	34.300	43.703	-17.954	61.657	QUASIPeAK
3		0.362	9.472	31.500	40.972	-18.971	59.943	QUASIPeAK
4		0.786	9.674	23.500	33.174	-22.826	56.000	QUASIPeAK
5		1.090	9.645	30.100	39.745	-16.255	56.000	QUASIPeAK
6		15.714	10.080	26.700	36.780	-23.220	60.000	QUASIPeAK

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor



Engineer : Evan	
Site : SR-1	Time : 2007/03/17 - 17:50
Limit : FCC_Part15_B_00M_AV	Margin : 0
EUT : Motherboard	Probe : ENV216 - Line1
Power : AC 120V/60Hz	Note : Mode 6: VGA (1600*1200@85Hz) + TV (800*600@60Hz)



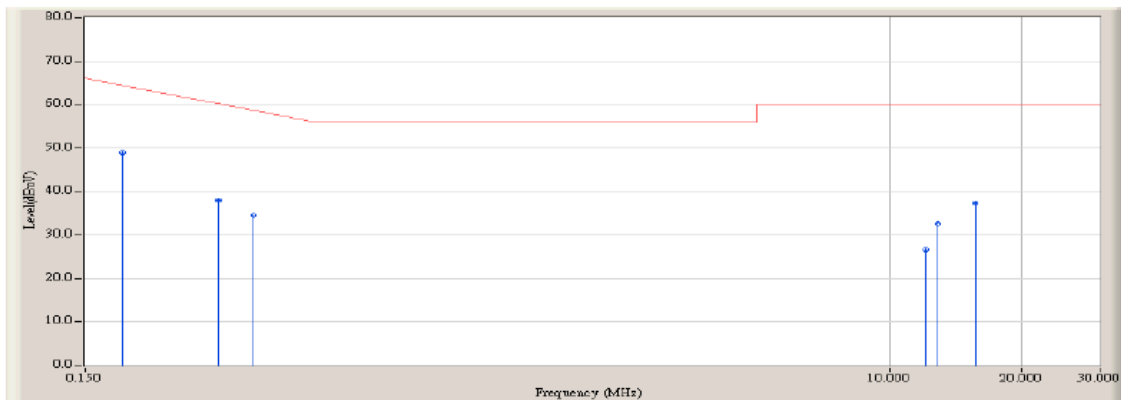
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.182	9.681	43.100	52.781	-2.305	55.086	AVERAGE
2		0.302	9.403	34.200	43.603	-8.054	51.657	AVERAGE
3		0.362	9.472	30.700	40.172	-9.771	49.943	AVERAGE
4		0.786	9.674	22.300	31.974	-14.026	46.000	AVERAGE
5		1.090	9.645	25.200	34.845	-11.155	46.000	AVERAGE
6		15.714	10.080	22.400	32.480	-17.520	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor



Engineer : Evan	
Site : SR-1	Time : 2007/03/17 - 17:56
Limit : FCC_Part15_B_00M_QP	Margin : 0
EUT : Motherboard	Probe : ENV216 - Line2
Power : AC 120V/60Hz	Note : Mode 6: VGA (1600*1200@85Hz) + TV (800*600@60Hz)



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.182	9.515	39.400	48.915	-16.171	65.086	QUASPEAK
2		0.302	9.523	28.500	38.023	-23.634	61.657	QUASPEAK
3		0.362	9.582	24.900	34.482	-25.461	59.943	QUASPEAK
4		12.114	10.060	16.500	26.560	-33.440	60.000	QUASPEAK
5		12.862	10.080	22.500	32.580	-27.420	60.000	QUASPEAK
6		15.710	10.150	27.200	37.350	-22.650	60.000	QUASPEAK

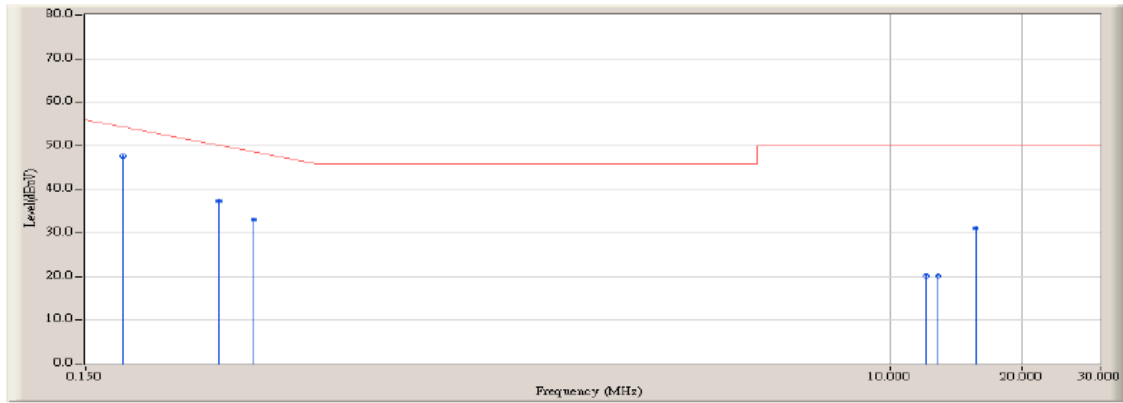
Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor





Engineer : Evan	
Site : SR-1	Time : 2007/03/17 - 17:56
Limit : FCC_Part15_B_00M_AV	Margin : 0
EUT : Motherboard	Probe : ENV216 - Line2
Power : AC 120V/60Hz	Note : Mode 6: VGA (1600*1200@85Hz) + TV (800*600@60Hz)



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.182	9.515	38.100	47.615	-7.471	55.086	AVERAGE
2		0.302	9.523	27.900	37.423	-14.234	51.657	AVERAGE
3		0.362	9.582	23.400	32.982	-16.961	49.943	AVERAGE
4		12.114	10.060	10.200	20.260	-29.740	50.000	AVERAGE
5		12.862	10.080	10.100	20.180	-29.820	50.000	AVERAGE
6		15.710	10.150	20.900	31.050	-18.950	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

### Result

The measured values of conducted emission test are below the limit.

Test Engineer : edison

## 5. Test Of Radiated Emission

Radiated emissions from 30 MHz to 1000 MHz were measured with a bandwidth of 120KHZ according to the methods defines in European Standard EN 55022, Clause 10. The EUT was placed on a nonmetallic stand in the open-field site, 0.8 meter above the ground plane, as shown in section 5.1.2. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

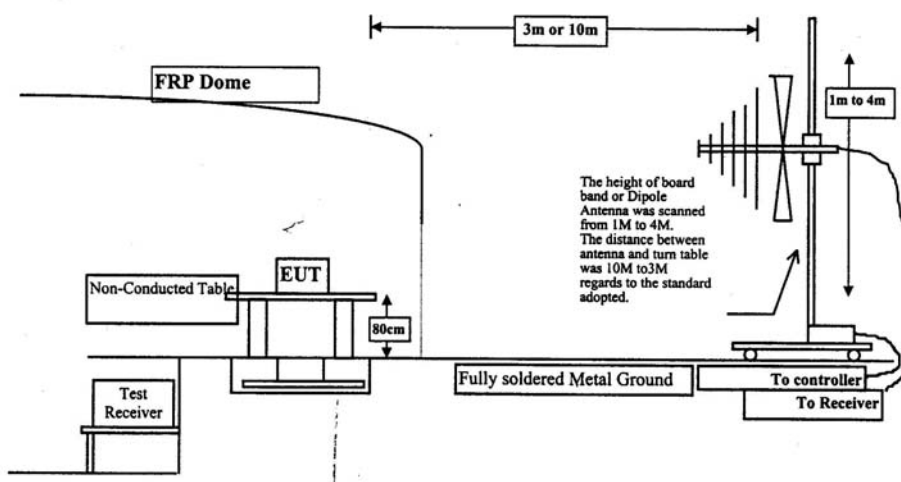
### 5-1. Test Construction

#### 5.1.1 Test Equipment List

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No.	Cal.Date	Remark
1	Test Receiver	R & S	ESVS 10 / 834468/003	March., 2006	
2	Spectrum Analyzer	Advantest	R3162/ 00803480	Oct, 2005	
3	Pre -Amplifier	Advantest	BB525C/ 3307A01812	Jan, 2006	
4	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	Sept., 2005	

#### 5.1.2 Test Setup





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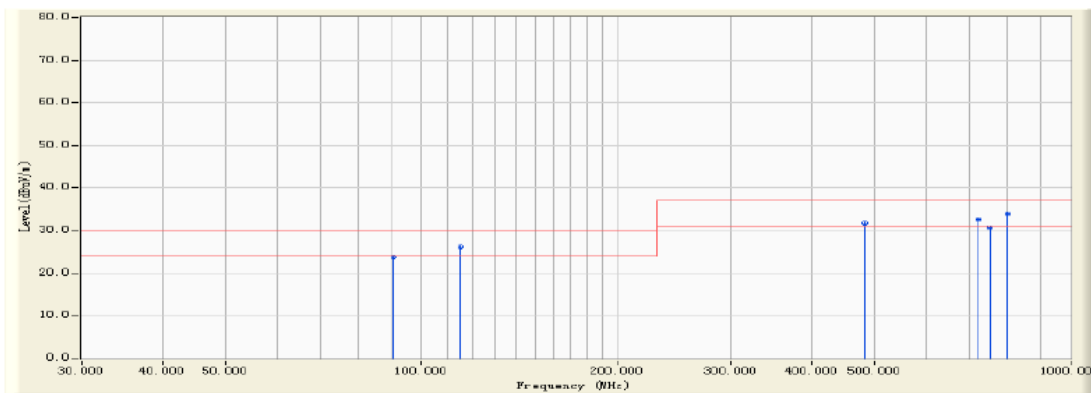
## 5-2 Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 10 meters from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower ( from 1 M to 4 M ) and turn table ( from 0 degree to 360 degrees ) to find the maximum reading.
- f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 6 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported , otherwise, the emissions which do not have 6 dB margin will be repeated one by one using the quasi-peak method and reported.



### 5-3 Test Results Of Radiated Emission Horizontal Open Site, 30MHz to 1000MHz TEST Mode: Intel Pentium 3.2GHz

Engineer : Evan	
Site : AC-1	Time : 2007/03/20 - 21:00
Limit : CISPR_22_B_10M_QP	Margin : 6
EUT : Motherboard	Probe : CBL6112B_2931(30-2000MHz) - HORIZONTAL
Power : AC 120V/60Hz	Note : Mode 6: VGA (1600*1200@85Hz) + TV (800*600@60Hz) (Close Case)



	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type	Ant Pos (cm)	Table Pos (deg)
1	90.625	-13.822	37.661	23.839	-6.161	30.000	QUASPEAK	357.000	254.000
2	114.875	-11.062	37.133	26.071	-3.929	30.000	QUASPEAK	298.000	163.000
3	481.050	-3.081	34.895	31.814	-5.186	37.000	QUASPEAK	372.000	15.000
4	721.125	0.400	32.175	32.575	-4.425	37.000	QUASPEAK	346.000	225.000
5	750.225	0.704	30.029	30.733	-6.267	37.000	QUASPEAK	150.000	263.000
6 *	801.150	0.949	32.892	33.841	-3.159	37.000	QUASPEAK	400.000	269.000

Note:

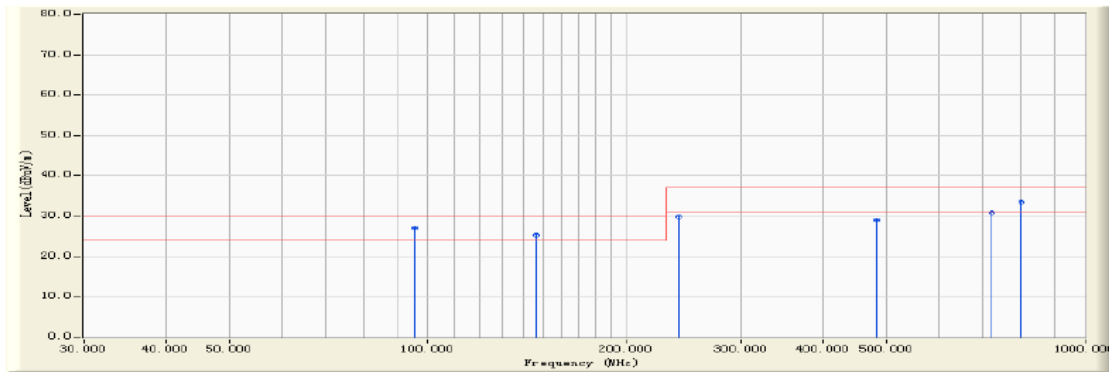
1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor



# Vertical Open Site, 30MHz to 1000MHz

## TEST Mode: Intel Pentium 3.2GHz

Engineer : Evan	
Site : AC-1	Time : 2007/03/20 - 21:01
Limit : CISPR_22_B_10M_QP	Margin : 6
EUT : Motherboard	Probe : CBL6112B_2933(30-2000MHz) - VERTICAL
Power : AC 120V/60Hz	Note : Mode 6: VGA (1600*1200@85Hz) + TV (800*600@60Hz) (Close Case)



	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type	Ant Pos (cm)	Table Pos (deg)
1	* 95.475	-11.802	38.729	26.927	-3.073	30.000	QUASIPeAK	108.000	340.000
2	146.400	-10.544	35.897	25.353	-4.647	30.000	QUASIPeAK	257.000	360.000
3	240.975	-9.421	39.140	29.719	-7.281	37.000	QUASIPeAK	202.000	315.000
4	481.050	-1.721	30.662	28.941	-8.059	37.000	QUASIPeAK	400.000	339.000
5	721.125	1.491	29.314	30.805	-6.195	37.000	QUASIPeAK	183.000	311.000
6	798.725	2.566	30.918	33.484	-3.516	37.000	QUASIPeAK	155.000	19.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

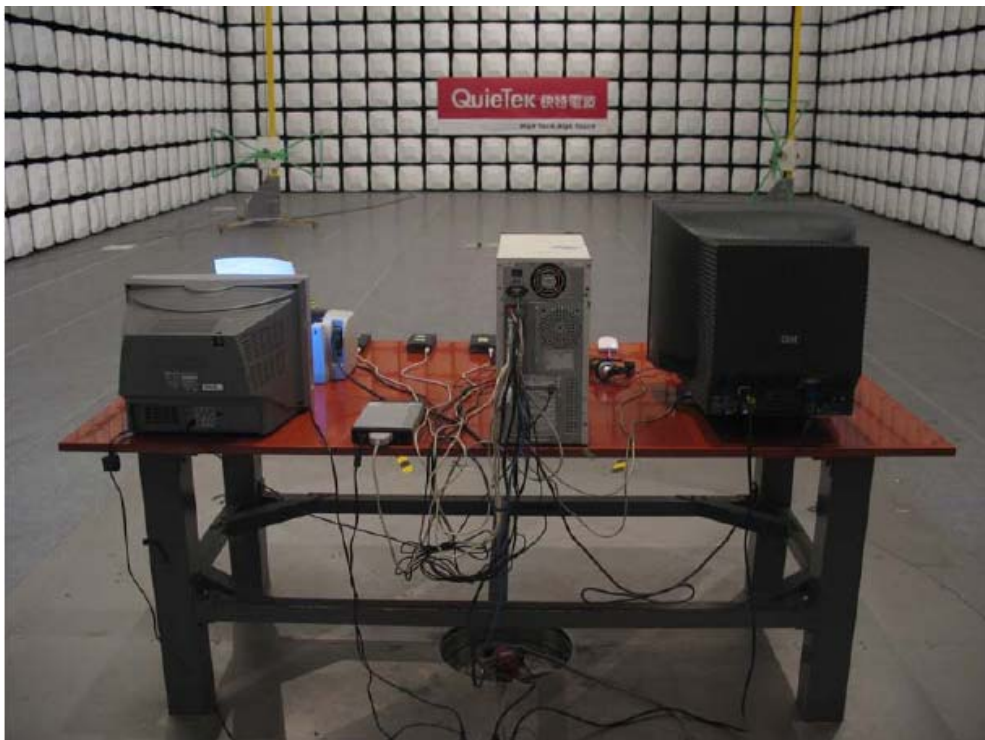
## Result

The measured values of radiated emission test are below the limit.

Test Engineer : edison

**5.4 Photographs Of Radiated Emission Test Configuration**

**VGA (1600\*1200@85Hz) + TV (800\*600@60Hz) (Close Case)**



**VGA (1600\*1200@85Hz) (Close Case)**

## 6. Harmonics Test

6.1 Standard : EN 61000-3-2 :2000

### 6.2 Test Procedure

The measured values of the harmonics components of the input current, including line current and neutral current, shall be compared with the limits given in Clause 7 of EN 61000-3-2:2000.

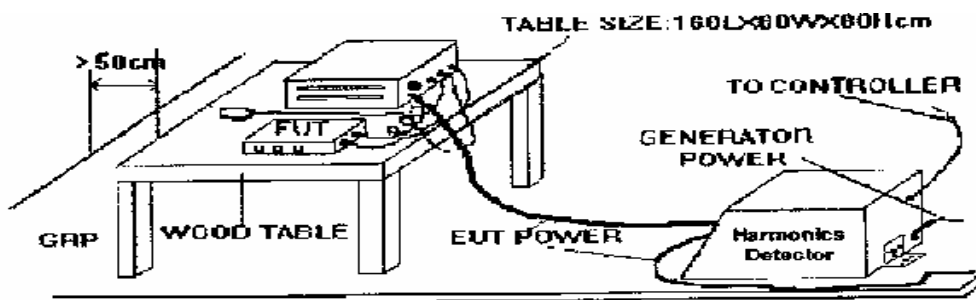
### 6.3 Test Equipment Settings

- Line Voltage : 230 V
- Line Frequency :50 Hz
- Device Class : D
- Current Measurement Range :High
- Measurement Delay : 10.0 seconds
- Test Duration :2.00 minutes
- Class determination Pre-test Duration : 10.00 seconds

#### 6.3.1 Test Equipment List

Item	Instrument	Manufacturer	Type No/Serial No.	Cal.Date
1	Power Harmonics Tester	SCHAFFNER	Proflin 2105-400 S/N: HK54148	July., 2006
2	Analyzer	SCHAFFNER	CCN 1000-1/X71887	July.,2006
3	No.2 Shielded Room			N/A

### 6.4 TEST SETUP





**6.5 Current Harmonics Test**

**6.5.1 Test Data Of Current Harmonics**

- Final Test Result : **Pass**
- Fundamental Current : 0.249A
- Real Power : 83W
- Power Factor : 0.762
- Percent in Envelope : 100.0%
- Temperature : 24°C
- Relative Humidity : 49% RH
- Test Date : 03/07/2007
- Environmental Conditions : 25deg. C, 55% RH, 1005hPa

**Current Test Result Summary (Run time)**

EUT: MOTHER BOARD      Tested by: MILLER  
 Test category: Class D Steady State (European limits)      Test Margin: 100

Comment: M/N:  
 Customer: MSI

Test Result: Pass      Source qualification: Normal

**Highest parameter values during test:**

V RMS (Volts): 229.71      I RMS (Amps): 0.472  
 I Peak (Amps): 2.443      Crest Factor: 5.228  
 I Fund (Amps): 0.389      Power Factor: 0.762  
 Power (Watts): 83

Harm#	Harmonics	Limit	% of Limit	Status
2	0.006			
3	0.275	0.280	97.99	Pass
4	0.006			
5	0.129	0.155	83.24	Pass
6	0.008			
7	0.040	0.081	49.83	Pass
8	0.006			
9	0.029	0.041	71.21	Pass
10	0.007			
11	0.010	0.028	33.62	Pass
12	0.007			
13	0.013	0.026	50.37	Pass
14	0.007			
15	0.009	0.022	38.11	Pass
16	0.006			
17	0.006	0.020	32.34	Pass
18	0.006			
19	0.010	0.017	60.01	Pass
20	0.007			
21	0.005	0.016	0.00	Pass
22	0.006			
23	0.010	0.014	71.87	Pass
24	0.006			
25	0.005	0.013	0.00	Pass
26	0.007			
27	0.009	0.012	70.63	Pass
28	0.006			
29	0.006	0.011	57.29	Pass
30	0.007			
31	0.007	0.010	66.47	Pass
32	0.007			
33	0.008	0.010	76.87	Pass
34	0.007			
35	0.006	0.009	64.38	Pass
36	0.006			
37	0.008	0.009	90.14	Pass
38	0.007			
39	0.006	0.008	73.82	Pass
40	0.007			

Test Engineer : edison

## 7. Voltage Fluctuations Test

7.1 Standard : EN 61000-3-3 :1995 +A1 :2001

### 7.2 Test Procedure

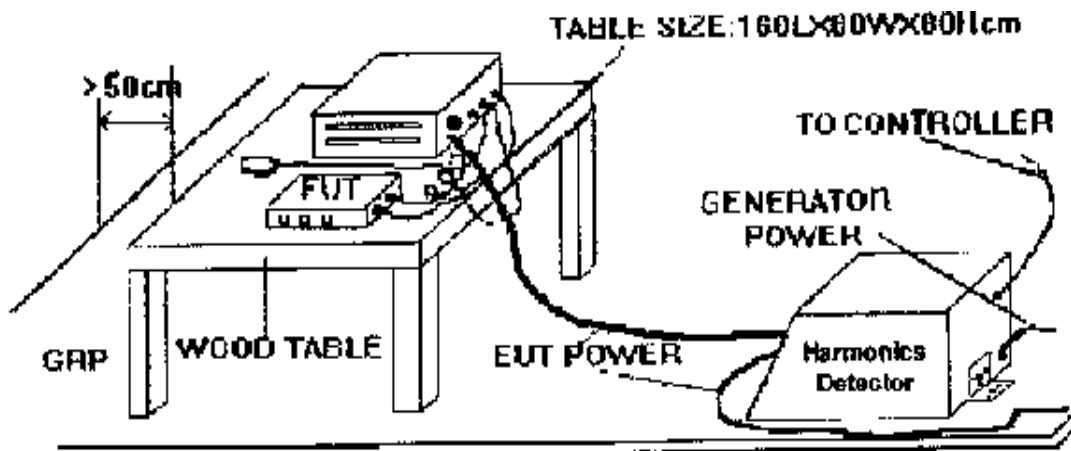
The equipment shall be tested under the conditions of Clause 5.

The total impedance of the test circuit, excluding the appliance under test, but including the internal impedance of the supply source, shall be equal to the reference impedance. The stability and tolerance of the reference impedance shall be adequate to ensure that the overall accuracy of  $\pm 8\%$  is achieved during the whole assessment procedure.

#### 7.2.1 Test Equipment List

Item	Instrument	Manufacturer	Type No/Serial No.	Cal. Date
1	Power Harmonics Tester	SCHAFFNER	Proflin 2105-400 S/N: HK54148	July., 2006
2	Analyzer	SCHAFFNER	CCN 1000-1/X71887	July.,2006
3	No.2 Shielded Room			N/A

### 7.3 TEST SETUP





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**7.4 TEST RESULT OF VOLTAGE FLUCTUATION AND FLICKER TEST****7.4.1 TEST DATA OF VOLTAGE AND FLICKER**

- Final test Result : **Pass**
- Temperature : 24°C
- Relative Humidity : 49% RH
- Test Date : 03/07/2007
- Environmental Conditions : 25deg. C, 55% RH, 1005hPa

Urms = 228.9V                      Freq = 49.987                      Range :5A  
Irms =0.671A                      Ipk = 2.864A                      Cf =4.265  
P =68.60W                      Pap =153.7VA                      pf =0.446  
Test- Time :      1x 10min = 10min (100%)

LIN (Line Impedance Network) : Soft LIN 0.24Ohm +j 0.15Ohm N:0.16 Ohm + j 0.10Ohm

Limits :              Plt : 0.65              Pst : 1.00  
                            dmax : 4.00%      dc :3.30%  
                            dtLim :3.30%      dt>Lim : 500ms

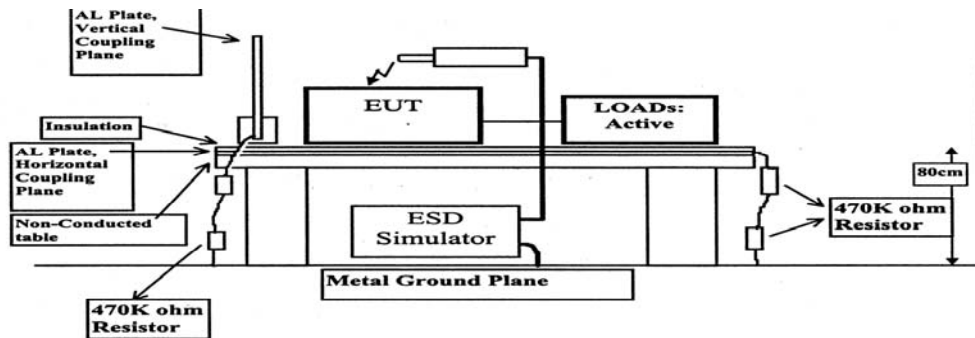
Test completed, Result :PASSED

Test Engineer : edison

## 8. Immunity Tests Against Electrostatic Discharge (ESD)

- FINAL TEST RESULT : PASS
- Passed Performance Criteria : B
- Basic Standard : EN 61000-4-2 :2001
- Generic Standard : EN 55024:1998+A1:2001+A2:2003
- Level : 2
- Frequency Range : 80-1000 MHz
- Field Strength : 3 V/m (Modulated 80%, AM)
- Temperature : 23°C
- Relative Humidity : 49 %
- Test Date : 03/07/2007
- Environmental Conditions : 25deg. C, 55% RH, 1005hPa

### 8.1.1 TEST SETUP



The test setup consists of the test generator, EUT and auxiliary instrumentation necessary to perform DIRECT and INDIRECT application of discharges to the EUT as applicable, in the follow manner:

- (a) CONTACT DISCHARGE to the conductive surfaces and to coupling plane.
- (b) AIR DISCHARGE at insulating surfaces.

The preferred test method is that of type tests performed in laboratories and the only accepted method of demonstrating conformance with this standard. The EUT was arranged as closely as possible to arrangement in final installed conditions.



8.1.2 Test Equipment List

Item	Instrument	Manufacturer	Type No/Serial No.	Cal. Date
1	ESD Simulator System	Noiseken	ESS-2000 S/N: 3010C03842	August., 2005
2	Horizontal Coupling Plane(HCP)	QuieTek	HCP AL50	N/A
3	Horizontal Coupling Plane(HCP)	QuieTek	VCP AL50	N/A
4	No.2 Shielded Room			N/A

8-2 Test Levels

8-2-1 Contact Discharge

Level	Test Voltage (KV) of Contact Voltage
1	±2
2	±4
3	±6
4	±8

8-2-2 Air Discharge

Level	Test Voltage (KV) of Air Voltage
1	±2
2	±4
3	±8
4	±15

**8-3 Test Result Of Air Discharge**

TEST POINT	VOLTAGE	TESTED NO	OBSERVATION	RESULT
CASE	±2/ ±4/ ±8KV	BY 10	NORMAL	<b>PASS</b>
SCREW	±2/ ±4/ ±8KV	BY 10	NORMAL	<b>PASS</b>
BRACKET	±2/ ±4/ ±8KV	BY 10	NORMAL	<b>PASS</b>
FAN	±2/ ±4/ ±8KV	BY 10	NORMAL	<b>PASS</b>
PRINTER PORT	±2/ ±4/ ±8KV	BY 10	NORMAL	<b>PASS</b>
COM 1 PORT	±2/ ±4/ ±8KV	BY 10	NORMAL	<b>PASS</b>
COM 2 PORT	±2/ ±4/ ±8KV	BY 10	NORMAL	<b>PASS</b>
LED	±2/ ±4/ ±8KV	BY 10	NORMAL	<b>PASS</b>
AC SOCKET	±2/ ±4/ ±8KV	BY 10	NORMAL	<b>PASS</b>
POWER SWITCH	±2/ ±4/ ±8KV	BY 10	NORMAL	<b>PASS</b>
RESET SWITCH	±2/ ±4/ ±8KV	BY 10	NORMAL	<b>PASS</b>
PS/2 KEYBOARD PORT	±2/ ±4/ ±8KV	BY 10	NORMAL	<b>PASS</b>
PS/2 MOUSE PORT	±2/ ±4/ ±8KV	BY 10	NORMAL	<b>PASS</b>
USB POT	±2/ ±4/ ±8KV	BY 10	NORMAL	<b>PASS</b>
F.D.D.	±2/ ±4/ ±8KV	BY 10	NORMAL	<b>PASS</b>
115/230 SWITCH	±2/ ±4/ ±8KV	BY 10	NORMAL	<b>PASS</b>

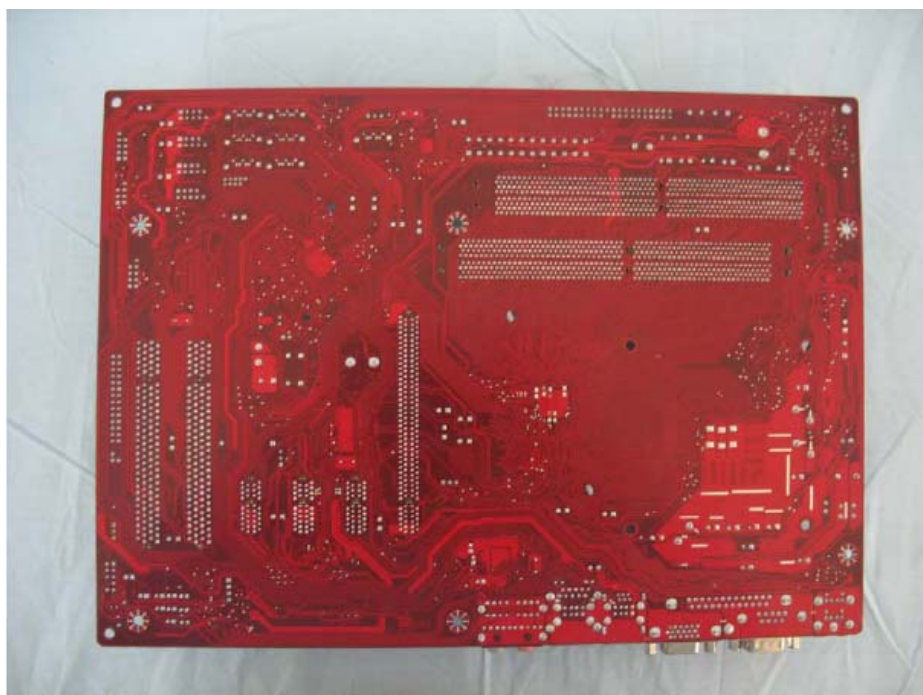
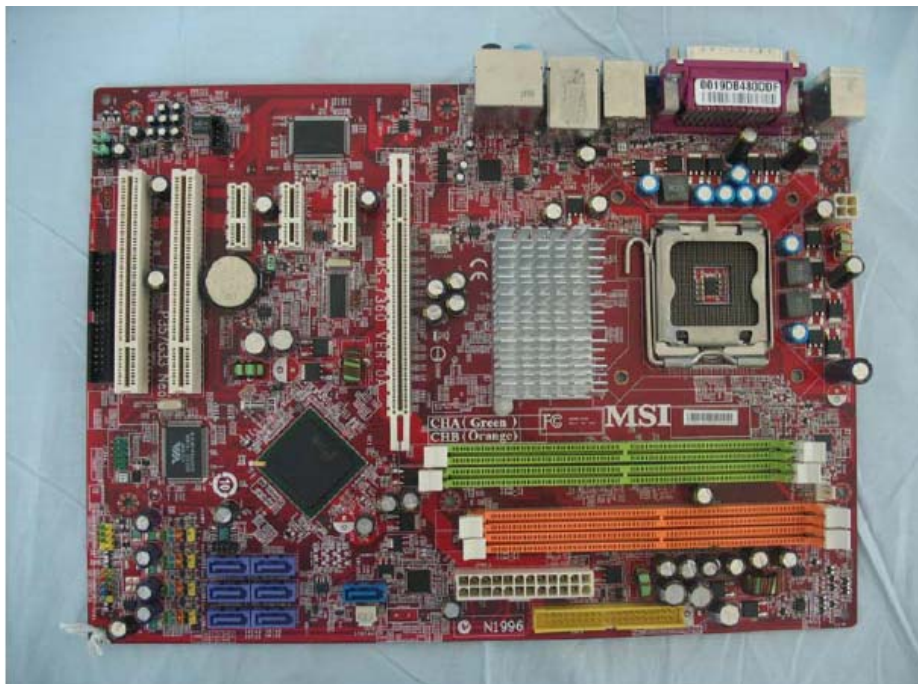
Test Engineer : edison

**8-4 Test Result Of Contact Discharge**

POLARITY	VOLTAGE	TESTED NO	OBSERVATION	RESULT
HORIZONTAL(FRONT)	±2/ ±4KV	BY 10	NORMAL	<b>PASS</b>
HORIZONTAL(REAR)	±2/ ±4KV	BY 10	NORMAL	<b>PASS</b>
HORIZONTAL(RIGHT)	±2/ ±4KV	BY 10	NORMAL	<b>PASS</b>
HORIZONTAL(LEFT)	±2/ ±4KV	BY 10	NORMAL	<b>PASS</b>
VERTICAL(FRONT)	±2/ ±4KV	BY 10	NORMAL	<b>PASS</b>
VERTICAL(REAR)	±2/ ±4KV	BY 10	NORMAL	<b>PASS</b>
VERTICAL(RIGHT)	±2/ ±4KV	BY 10	NORMAL	<b>PASS</b>
VERTICAL(LEFT)	±2/ ±4KV	BY 10	NORMAL	<b>PASS</b>
CASE	±2/ ±4KV	BY 10	NORMAL	<b>PASS</b>
SCREW	±2/ ±4KV	BY 10	NORMAL	<b>PASS</b>
BRACKET	±2/ ±4KV	BY 10	NORMAL	<b>PASS</b>
PRINTER PORT	±2/ ±4KV	BY 10	NORMAL	<b>PASS</b>
COM 1 PORT	±2/ ±4KV	BY 10	NORMAL	<b>PASS</b>
COM 2 PORT	±2/ ±4KV	BY 10	NORMAL	<b>PASS</b>
PS/2 KEYBOARD PORT	±2/ ±4KV	BY 10	NORMAL	<b>PASS</b>
PS/2 MOUSE PORT	±2/ ±4KV	BY 10	NORMAL	<b>PASS</b>
USB PORT	±2/ ±4KV	BY 10	NORMAL	<b>PASS</b>

Test Engineer : edison

**9. Attachment A. Photograph Of EUT**





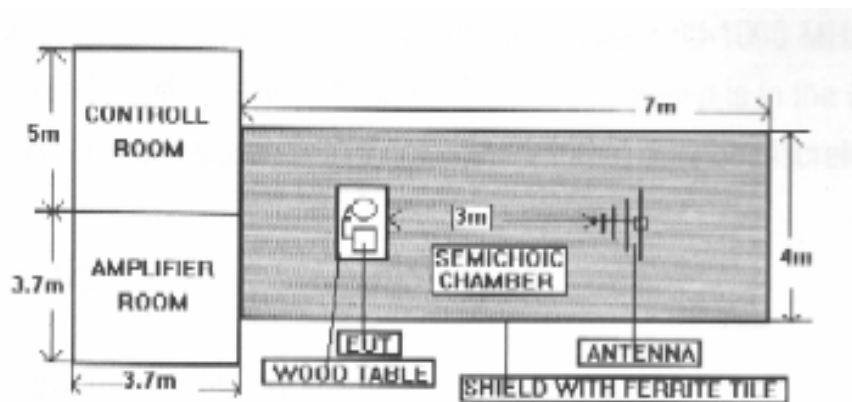
## 10. Radio Frequency Electromagnetic Field Immunity Test (RS)

- FINAL TEST RESULT : PASS
- Passed Performance Criteria : A
- Basic Standard : EN 61000-4-3 :2002:+A1:2002
- Generic Standard : EN 55024:1998 +A1:2001+A2:2003
- Level : 2
- Frequency Range : 80-1000 MHz
- Field Strength : 3 V/m (Modulated 80%, AM)
- Temperature : 23°C
- Relative Humidity : 49 %
- Test Date : 03/07/2007
- Environmental Conditions : 25deg. C, 55% RH, 1005hPa

### 10.1.1 Test Equipment List

Item	Instrument	Manufacturer	Type No/Serial No.	Cal. Date
1	Signal Generator	IFR	2023B / 202302/581	Oct.,2005
2	Power Amplifier	A & R	500A100AM3 /29369	N/A
3	Power Amplifier	SCHAFFNER	CBA9413B / 0006	N/A
4	Field Strength Sensor	SCHAFFNER	EMC 20 / Y-0028/ Z-0003	Feb.,2006
5	Power Antenna	SCHWARZBECK	VULB 9166 / 1073	Jan.,2006
6	Power Meter	BOONTON	4232A / 42201	Jan.,2006
7	No.2 EMC Fully Chamber			N/A

### 10.1.2 TEST SETUP





10.2 Test Severity Levels

Frequency Band :80-1000MHz

Level	Voltage field strength (V/m)	Result
1	1	N/A
2	3	Pass
3	10	N/A
X	Specified	N/A

Remark : "X" is an open class.

Test Engineer : edison

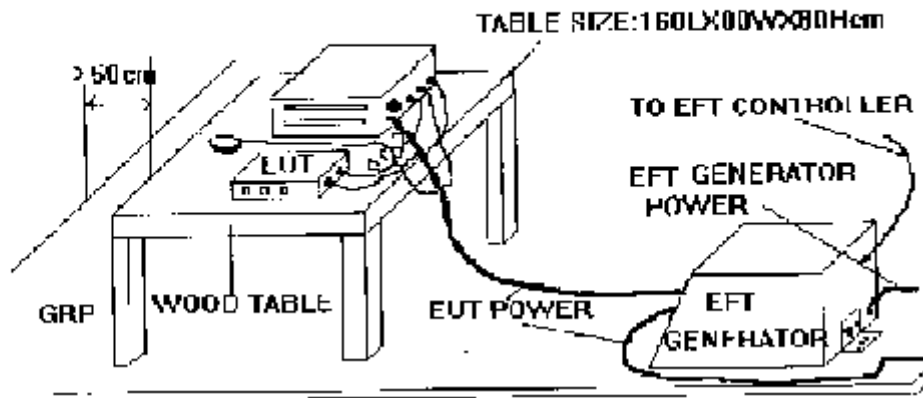
## 11. Immunity Tests Against Electrostatic Fast Transient (EFT)

- FINAL TEST RESULT : PASS
- Pass Performance Criteria : B
- Basic Standard : EN 61000-4-4:2004
- Generic Standard : EN 55024:1998+A1:2001+A2:2003
- Level : on Power Supply --2
- Tested voltage : on Power Supply --  $\pm 0.5/1.0$  KV
- Temperature : 24°C
- Relative Humidity : 49 %
- Test Date : 03/07/2007
- Environmental Conditions : 25deg. C, 55% RH, 1005hPa

### 11.1.1 Test Equipment List

Item	Instrument	Manufacturer	Type No/Serial No.	Cal. Date
1	Fast Transient/Burst Generator	Noiseken	FNS-AXIIA16 / 2010B01754	Dec., 2005
2	No.2 EMC Fully Chamber			N/A

### 11.1.2 Test setup





### 11.2 Test Severity Levels

The following test severity levels are recommended for the fast transient/burst test:

Open circuit output test voltage $\pm 10\%$			
Level	On Power Supply	On I/O signal, data and control line	RESULT
1	$\pm 0.5KV$	$\pm 0.25 KV$	<b>N/A</b>
2	$\pm 1.0KV$	$\pm 0.50 KV$	<b>PASS</b>
3	$\pm 2.0KV$	$\pm 1.00 KV$	<b>N/A</b>
4	$\pm 4.0 KV$	$\pm 2.00 KV$	<b>N/A</b>
X	Specified	Specified	<b>N/A</b>

Remark : "X" is an open level. The level is subject to negotiation between the user and the manufacturer or is specified by the manufacturer.

Test Engineer : edison

**12. Surge Immunity Test**

- FINAL TEST RESULT : PASS
- Pass Performance Criteria : B
- Basic Standard : EN 61000-4-5:2001
- Generic Standard : EN 55024:1998+A1:2001+A2:2003
- Input Voltage, Frequency : 230Vac, 50Hz
- Level : 3
- Tested voltage :  $\pm 1.0 / \pm 2KV$
- Temperature : 24°C
- Relative Humidity : 54 %
- Test Date : 03/07/2007
- Environmental Conditions : 25deg. C, 55% RH, 1005hPa

**12.1.1 Test Equipment List**

Item	Instrument	Manufacturer	Type No/Serial No.	Cal., Date
1	Surge Generator	SCHAFFNER	NSG 2050 S/N: 200124-031AR	Dec., 2005
2	No.2 EMC Fully Chamber			N/A

**12.1.2 Test Record**

Voltage (KV)	Test Location	Polarity	Phase Angle				Test Result
			0°	90°	180°	270°	
1KV	L-N	+	A	A	A	A	PASS
		-	A	A	A	A	PASS
2KV	L-PE	+	A	A	A	A	PASS
		-	A	A	A	A	PASS
	N-PE	+	A	A	A	A	PASS
		-	A	A	A	A	PASS

Remark : PE = DC Output GND



**12.2 Test Level**

Level	Open-circuit test voltage, $\pm 10\%$ , KV
1	0.5
2	1.0
3	2.0
4	4.0
X	Specified

NOTE – X is an open class.  
This level can be specified in the product specification.

**12.3 Operating Condition**

Full system

**12.4 Final Testing Result : Pass**

Test Engineer : edison



### 13. Conducted Disturbances Induced By Radio-Frequency Field Immunity Test (CS)

- FINAL TEST RESULT : PASS
- Pass Performance Criteria : A
- Basic Standard : EN 61000-4-6 :2003+A1:2004
- Generic Standard : EN 55024:1998+A1:2001+A2:2003
- Input Voltage, Frequency : AC 230V, 50Hz
- Level : 2
- Tested voltage : 3 V/rms (Modulated, 1KHz, 80%, AM)
- Frequency Range : 0.15MHz to 80MHz
- Temperature : 24°C
- Relative Humidity : 49 %
- Test Date : 03/07/2007
- Environmental Conditions : 25deg. C, 55% RH, 1005hPa

#### 13.1 Test Equipment

Item	Instrument	Manufacturer	Type No/Serial No.	Cal. Date
1	Signal Generator	FRANKONIA	CIT-10175/102C3D12	April, 2006
2	CDN 1	Schwarzbeck	CDNM3/A3003017	April, 2006
3	CDN 2	Schwarzbeck	RJ45/S / A3018002	April, 2006
4	50 ohm Terminator	RES-NET	RCX6BM	April, 2006
5	6dB Attenuator	BIRD	RFA250NFF10	April, 2006
6	EM Clamp	Schwarzbeck	KEMZ 801 / 15928	April, 2006
7	Power Amplifier	A & R	150A220 / 23076	N/A
8	Power Meter	HP	EPM-4418A / GB37482040	April, 2006
9	Power Sensor	Agilent	8482A / MY41091031	April, 2006
10	Directional Coupler	A & R	DC2600 / 23325	April, 2006
11	Fixed Pad	TRILITHIC	HFP-525-3/6-NF/NF/ N/A	N/A
12	No.2 Shielded room		N/A	



### 13.1.1 Test Level

Level	Voltage Level (EMF)
1	1 V
2	3 V
3	10 V
X	Specified

NOTE – X is an open class.  
This level can be specified in the product specification.

### 13.2 Operating Condition

Full system

### 13.4 Final Testing Result : Pass

Test Engineer :

edison



## 14. Power Frequency Magnetic Field Immunity Tests

- FINAL TEST RESULT : PASS
- Pass Performance Criteria : A
- Basic Standard : EN 61000-4-8 :1993+A1:2000
- Generic Standard : EN 55024:1998+A1:2001+A2:2003
- Input Voltage, Frequency : AC 230V, 50Hz
- Temperature : 24°C
- Relative Humidity : 54 %
- Test Date : 03/07/2007
- Environmental Conditions : 25deg. C, 55% RH, 1005hPa

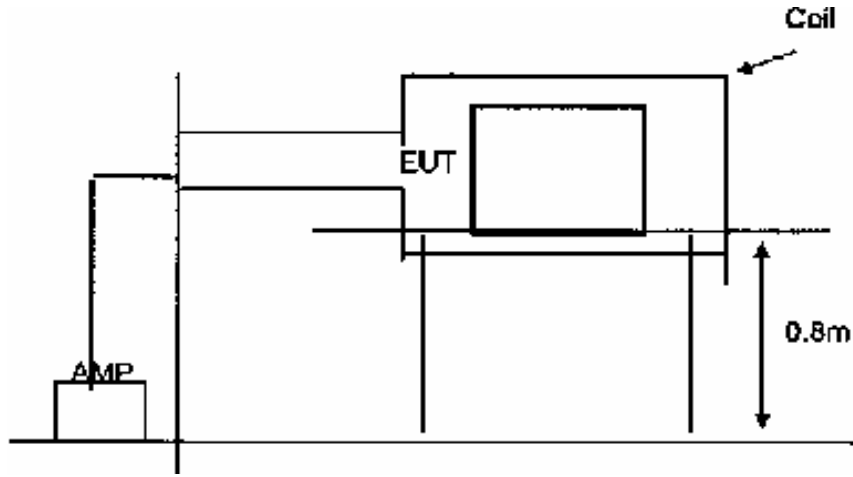
### 14.1 Test Record

Power Frequency Magnetic Field	Testing duration	Coil Orientation	Results	Remark
50Hz, 1A/m	1.0 Min	X-axis	Pass	Normal
50Hz, 1A/m	1.0 Min	Y-axis	Pass	Normal
50Hz, 1A/m	1.0 Min	Z-axis	Pass	Normal

#### 14.1.1 Test Equipment List

Item	Instrument	Manufacturer	Type No/Serial No.	Cal. Date
1	Power Line Magnetics	SCHAFFNER	PLINE1610 /080938-05	May, 2006
2	Gauss Meter	F.W.BELL	4090	May, 2006
3	Magnetic Field Coil	SCHAFFNER	INA702 /199749-020 IN	May, 2006
4	No.2 EMC Fully Chamber			N/A

**14.2 Test Setup**



**14.3 Operating Condition**

Full system

**14.4 Final Testing Result : Pass**

Test Engineer : edison



## 15. Voltage Dips And Voltage Interruptions Immunity Tests

- FINAL TEST RESULT : PASS
- Passed Performance Criteria : C for Voltage Interruption on >95% at 0.5 period, B for voltage Dip on >95% at 0.5 period & C for >30% at 25 period
- Basic Standard : EN 61000-4-11 :2004
- Generic Standard : EN 55024:1998+1:2001+A2:2003
- Input Voltage, Frequency : AC 230V, 50Hz
- Temperature : 24°C
- Relative Humidity : 54 %
- Test Date : 03/07/2007
- Environmental Conditions : 25deg. C, 55% RH, 1005hPa

### 15.1 Test Record Of Voltage Interruption

Voltage (V)	Phase Angle								% Reduction	Periods
	0°	45°	90°	135°	180°	225°	270°	315°		
230	C	C	C	C	C	C	C	C	>95%	250

#### 15.1.1 Test Equipment List

Item	Instrument	Manufacturer	Type No/Serial No.	Cal.Date
1	Voltage Dips Generator	SCHAFFNER	NSG 2050 200124-031AR	Dec., 2005
2	No.2 EMC Fully Chamber			N/A

### 15.2 Test Record Of Voltage Dips

Voltage (V)	Phase Angle								% Reduction	Periods(s)
	0°	45°	90°	135°	180°	225°	270°	315°		
230	A	A	A	A	A	A	A	A	30	25
230	A	A	A	A	A	A	A	A	>95%	0.5



**15.3 Test conditions**

- 1. Source voltage and frequency :230V / 50Mz , Single phase.
- 2. Test of interval : 10 sec.
- 3. Level and duration : Sequency of 3 dips / interrupts.
- 4. Voltage rise (and fall) time : 1~ 5  $\mu$  s.
- 5. Test severity :

Voltage dip and Interrupt reduction (%)	Test Duration (ms)
30	500
60	100
100	10
100	80
100	5000

**15.4 OPERATING CONDITION**

Full system

**15.4 Final Testing Result : Pass**

Test Engineer : edison