



**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)

<i>EQUIPMENT :</i>	<i>MOTHER BOARD</i>
<i>MODEL NO :</i>	<i>MS-7350 P6N SLI Platinum, P6N SLI ,P6N SLI-FI</i>
<i>APPLICANT :</i>	<i>MICRO-STAR INT'L CO., LTD</i>
<i>ADDRESS :</i>	<i>NO.69,LI-DE ST,JUNG-HE CITY, TAIPEI HSIEN, TAIWAN</i>
<i>Date of Test :</i>	<i>2007/01/19</i>
<i>Date of Report :</i>	<i>2007/01/26</i>
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*This test has been operated by*

*QuieTek Corporation.*

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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-7350 P6N SLI Platinum,  
 P6N SLI, P6N SLI-FI  
 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 :** Jan . 19 2007 ~ Jan . 26 2007

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

**Test Engineer :** Heat-Cheng  
**Heat Cheng**

**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-7350 P6N SLI Platinum,  
P6N SLI, P6N SLI-FI

## 2. Tested Support Device List

### Host PC Devices :

No	Equipment	Model	Serial	FCC/BSMI ID	Trade Name
1.	HDD	WD1600	N/A	DoC	WD
2.	Power Supply	SS-300FT	N/A	DoC	Seasonic
3.	CD/R	N/A	N/A	N/A	N/A
4.	CD/R	N/A	N/A	N/A	N/A
5.	Floppy Disk	N/A	N/A	N/A	N/A
6.	CPU	LGA775 3.06G	N/A	N/A	Intel
7.	RAM	MT4HTF3264AY-53EB1	N/A	N/A	Micron
8.	VGA Card	MS-V034	N/A	DoC	MSI
9.	LAN Card	N/A	N/A	DoC	MSI
10.	Sound Card	N/A	N/A	DoC	MSI

### Peripherals Devices :

No	Equipment	Model	Serial	FCC/BSMI ID	Trade Name	Data Cable	Power Cord
1.	PS/2 Mouse	M-SAU-IBM6	23-022663	DoC	IBM	Shielded, 1.5m	N/A
2.	PS/2 Keyboard	KB-0133	B55940FBUO E04B	DoC	COMPAQ	Shielded, 1.5m	N/A
3.	PRINTER	StyLus C63	FAPY094256	DoC	EPSON	shielded, 1.2m	Unshielded, 1.9m
4	MONITOR	G500	N/A	DoC	Sony	shielded, 1.2m	Unshielded, 1.8m
5	Microphone & Earphone	RSM-900	N/A	DoC	PCHOME	shielded, 1.2m	N/A
6	Walkman	RQ-L8LT	N/A	DoC	Panasonic	Unshielded, 1.8m	N/A
7.	USB 2.0 HDD	F12-UF	N/A	DoC	AACOM	Shielded, 1.5m	Power by PC
8	USB 2.0 HDD	F12-UF	N/A	DoC	AACOM	Shielded, 1.5m	Power by PC
9	USB 2.0 HDD	F12-UF	N/A	DoC	AACOM	Shielded, 1.5m	Power by PC
10	USB 2.0 HDD	F12-UF	N/A	DoC	AACOM	Shielded, 1.5m	Power by PC
11	USB 2.0 HDD	F12-UF	N/A	DoC	AACOM	Shielded, 1.5m	Power by PC
12	1394 HDD	F12-UF	N/A	DoC	AACOM	Shielded, 1.5m	Power by PC
13	USB 2.0 HDD	F12-UF	N/A	DoC	AACOM	Shielded, 1.5m	Power by PC
14	E-Sata HDD	ST30000XS	N/A	DoC	Seagate	Shielded, 1.5m	Unshielded, 1.8m
15	Speaker	IBM FRU PN 09N5395	N/A	DoC	IBM	N/A	N/A
16	Creative	S80130	N/A	DoC	Creative	N/A	N/A



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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.

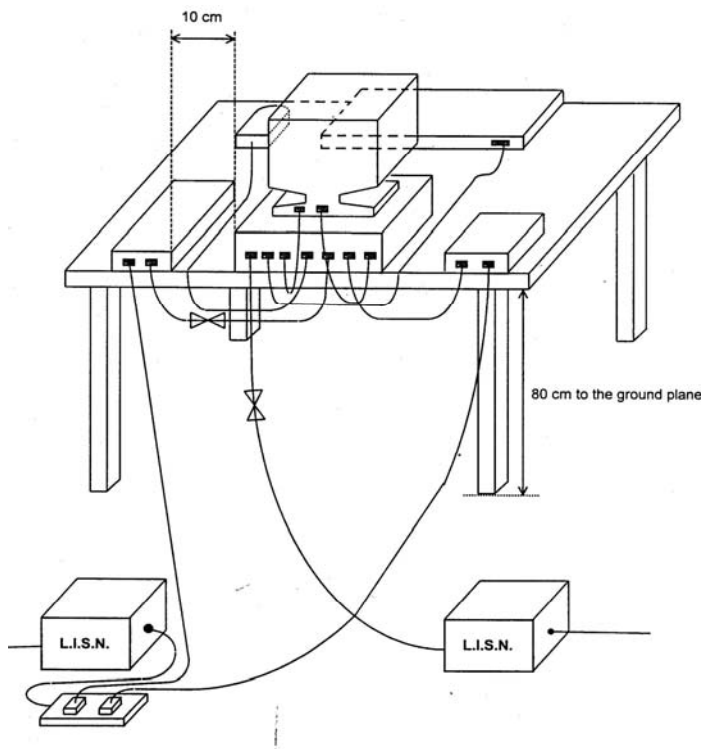
### 4-1 Test Construction

#### 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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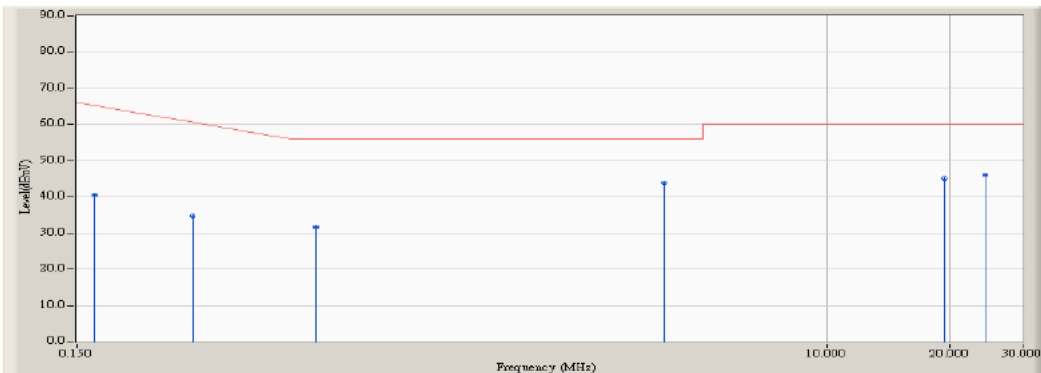
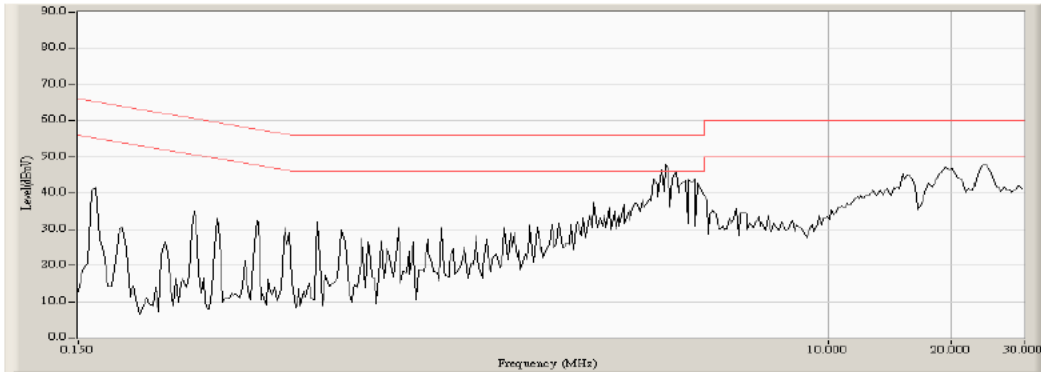
## 4-2 Test Procedures

- 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 :		Time : 2007/01/23 - 04:40
Site : SR-1		Margin : 10
Limit : CISPR_B_00M_QP		Probe : LISN-020(L) - Line1
EUT : MOTHERBOARD		Note : M/N MS-7350 ,MODE1
Power : AC 230V/50Hz		



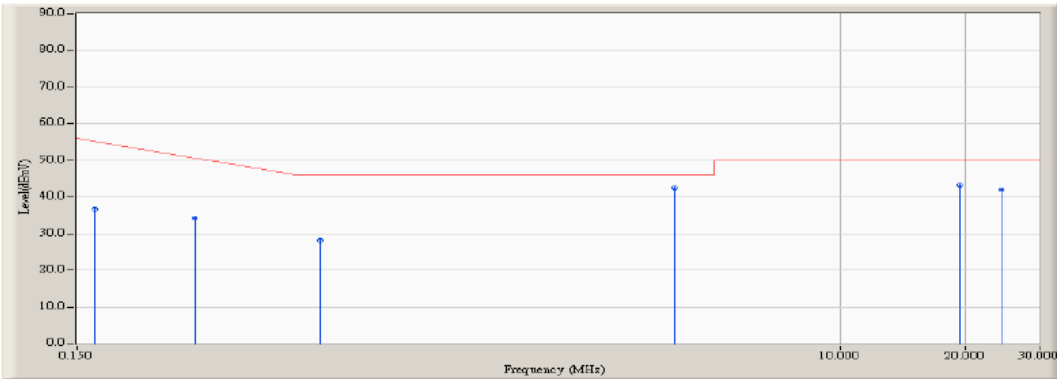
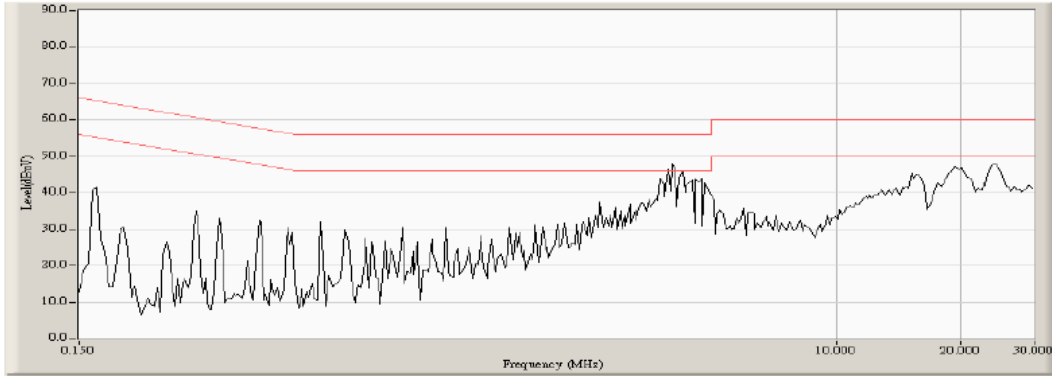
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	0.166	0.202	40.310	40.512	-25.031	65.543	QUASPEAK
2	0.287	0.214	34.420	34.634	-27.452	62.086	QUASPEAK
3	0.572	0.217	31.510	31.727	-24.273	56.000	QUASPEAK
4 *	4.013	0.353	43.500	43.853	-12.147	56.000	QUASPEAK
5	19.352	0.958	44.240	45.198	-14.802	60.000	QUASPEAK
6	24.346	1.105	44.920	46.025	-13.975	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 :	
Site : SR-1	Time : 2007/01/23 - 04:40
Limit : CISPR B_00M_AV	Margin : 10
EUT : MOTHERBOARD	Probe : LISN-020(L) - Line1
Power : AC 230V/50Hz	Note : M/N MS-7350 ,MODE1



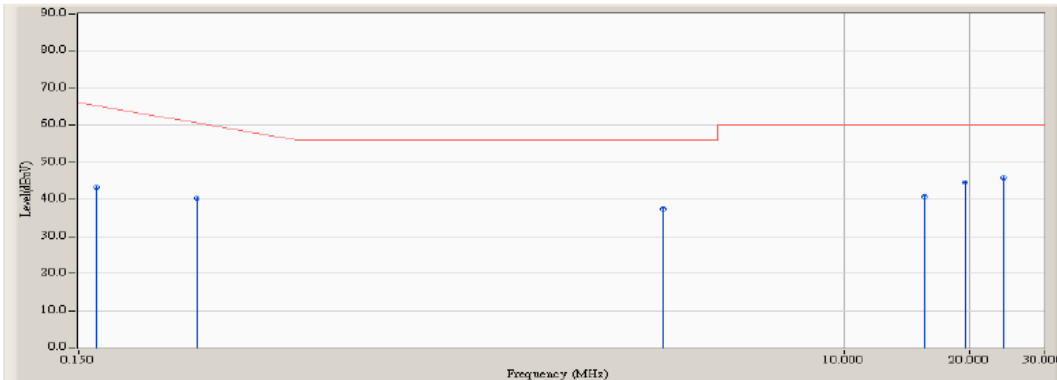
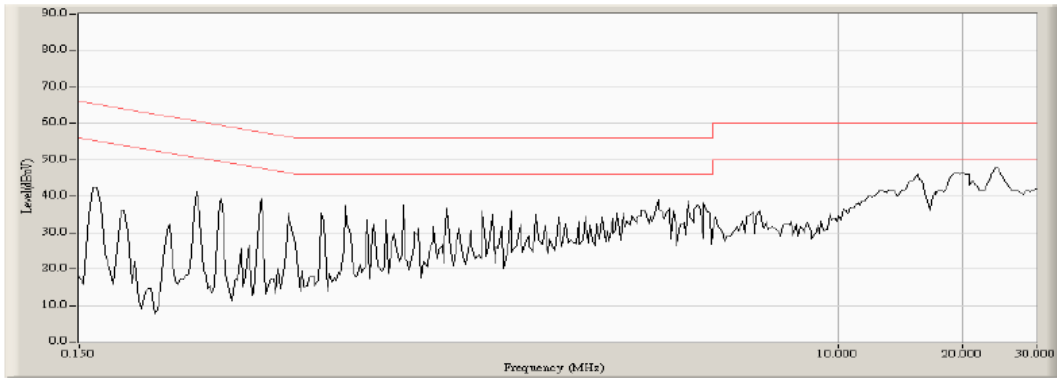
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	0.166	0.202	36.370	36.572	-18.971	55.543	AVERAGE
2	0.287	0.214	34.120	34.334	-17.752	52.086	AVERAGE
3	0.572	0.217	27.900	28.117	-17.883	46.000	AVERAGE
4	* 4.013	0.353	42.080	42.433	-3.567	46.000	AVERAGE
5	19.352	0.958	42.340	43.298	-6.702	50.000	AVERAGE
6	24.346	1.105	40.840	41.945	-8.055	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 :		Time : 2007/01/23 - 04:44
Site : SR-1		Margin : 10
Limit : CISPR_B_00M_QP		Probe : LISN-020(N) - Line2
EUT : MOTHERBOARD		Note : M/N MS-7350 ,MODE1
Power : AC 230V/50Hz		



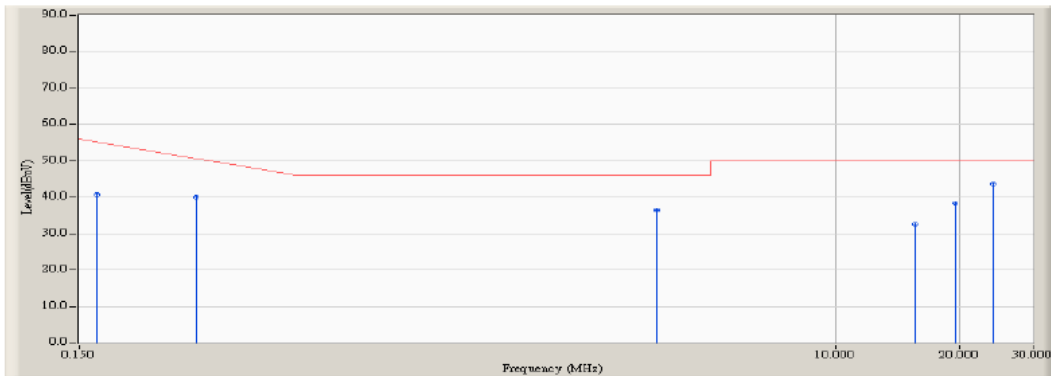
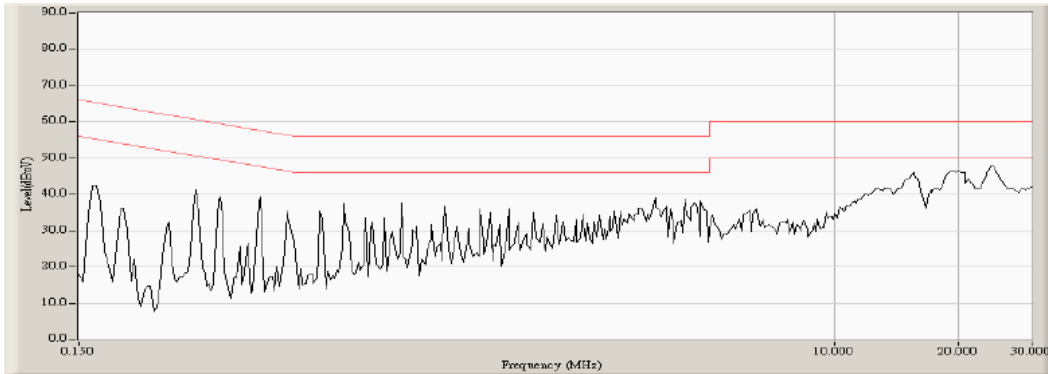
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV)	Margin (dB)	Limit (dBµV)	Detector Type
1	0.166	0.202	43.060	43.262	-22.281	65.543	QUASIPeAK
2	0.287	0.206	40.010	40.216	-21.870	62.086	QUASIPeAK
3	3.697	0.339	37.150	37.489	-18.511	56.000	QUASIPeAK
4	15.525	0.797	39.930	40.727	-19.273	60.000	QUASIPeAK
5	19.474	0.770	43.820	44.590	-15.410	60.000	QUASIPeAK
6 *	24.003	0.820	44.940	45.760	-14.240	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 :	
Site : SR-1	Time : 2007/01/23 - 04:44
Limit : CISPR_B_00M_AV	Margin : 10
EUT : MOTHERBOARD	Probe : LISN-020(N) - Line2
Power : AC 230V/50Hz	Note : M/N MS-7350 ,MODE1



	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	0.166	0.202	40.580	40.782	-14.761	55.543	AVERAGE
2	0.287	0.206	39.900	40.106	-11.980	52.086	AVERAGE
3	3.697	0.339	36.030	36.369	-9.631	46.000	AVERAGE
4	15.525	0.797	31.700	32.497	-17.503	50.000	AVERAGE
5	19.474	0.770	37.650	38.420	-11.580	50.000	AVERAGE
6	* 24.003	0.820	42.760	43.580	-6.420	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 : Heat-Cheng

## 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.

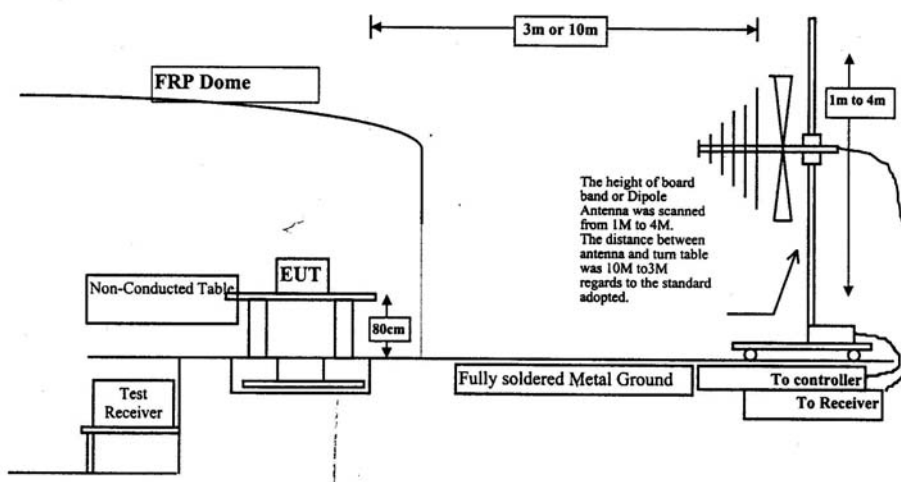
### 5-1. Test Construction

#### 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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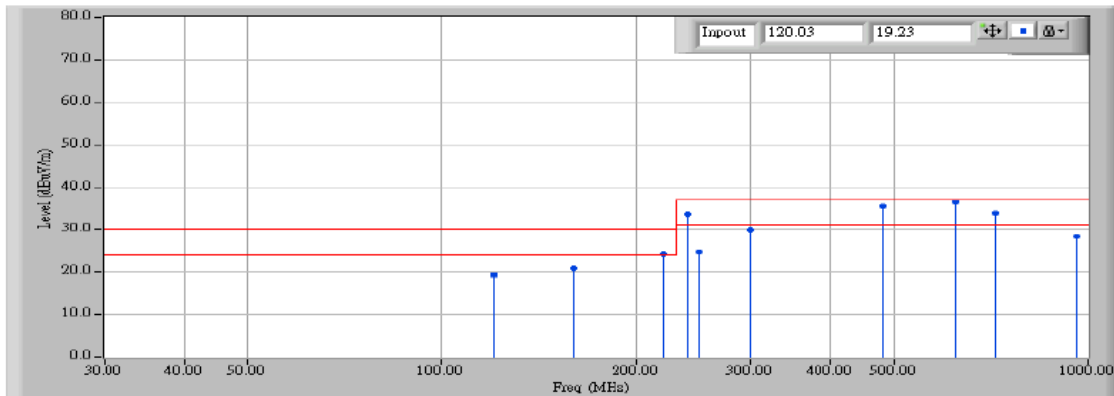
## 5-2 Test Procedures

- 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 LGA775 3.06GHz

Site : OATS-2	Time : 2007/01/19 - 11:42
Limit : CISPR_B_10M_QP	Margin : 6
EUT : Motherboard	Probe : LKANT_S2_2006_01 - HORIZONTAL
Power : AC 110V/60Hz	Note : M/N:MS-7350 , MODE:FULL SYSTEM



	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	120.031	14.866	4.360	19.226	-10.774	30.000	QUASIPeAK	0.000	0.000
2	160.005	12.799	8.080	20.879	-9.121	30.000	QUASIPeAK	0.000	0.000
3	220.000	13.712	10.400	24.111	-5.889	30.000	QUASIPeAK	0.000	0.000
4	240.000	15.210	18.300	33.510	-3.490	37.000	QUASIPeAK	0.000	0.000
5	250.000	15.948	8.780	24.728	-12.272	37.000	QUASIPeAK	0.000	0.000
6	300.000	17.151	12.770	29.921	-7.079	37.000	QUASIPeAK	0.000	0.000
7	480.121	21.510	13.900	35.411	-1.589	37.000	QUASIPeAK	0.000	0.000
8	* 624.998	23.740	12.660	36.400	-0.600	37.000	QUASIPeAK	0.000	0.000
9	720.000	24.803	8.900	33.703	-3.297	37.000	QUASIPeAK	0.000	0.000
10	960.244	28.350	0.100	28.450	-8.550	37.000	QUASIPeAK	0.000	0.000

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

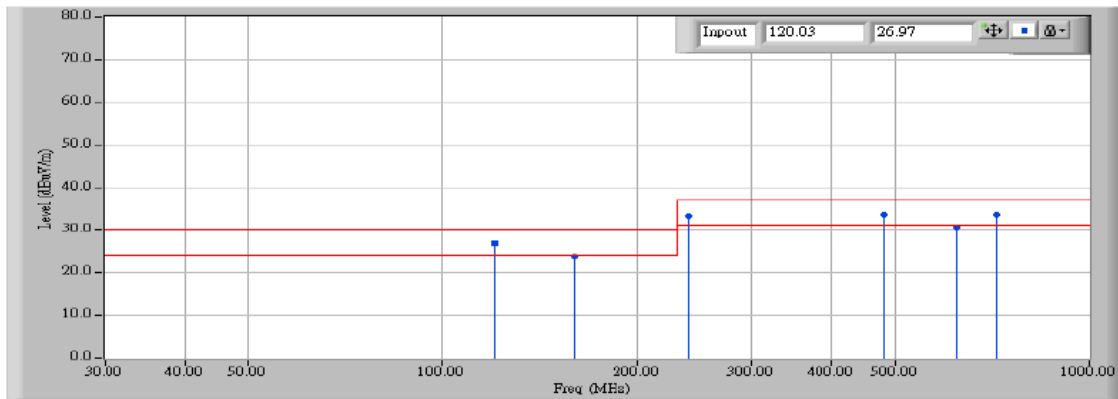




# Vertical Open Site, 30MHz to 1000MHz

TEST Mode: intel LGA775 3.06GHz

Site : OATS-2	Time : 2007/01/19 - 11:35
Limit : CISPR_B_10M_QP	Margin : 6
EUT : Motherboard	Probe : LKANT_S2_2006_01 - VERTICAL
Power : AC 110V/60Hz	Note : M/N:MS-7350 , MODE:FULL SYSTEM



	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	* 120.031	14.866	12.100	26.966	-3.034	30.000	QUASIPeAK	0.000	0.000
2	160.005	12.799	10.820	23.619	-6.381	30.000	QUASIPeAK	0.000	0.000
3	240.000	15.210	18.000	33.210	-3.790	37.000	QUASIPeAK	0.000	0.000
4	480.121	21.510	11.940	33.451	-3.549	37.000	QUASIPeAK	0.000	0.000
5	624.997	23.740	6.880	30.620	-6.380	37.000	QUASIPeAK	0.000	0.000
6	720.180	24.805	8.700	33.505	-3.495	37.000	QUASIPeAK	0.000	0.000

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 : Heat-Cheng

## 5.4 Photographs Of Radiated Emission Test Configuration



## 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.

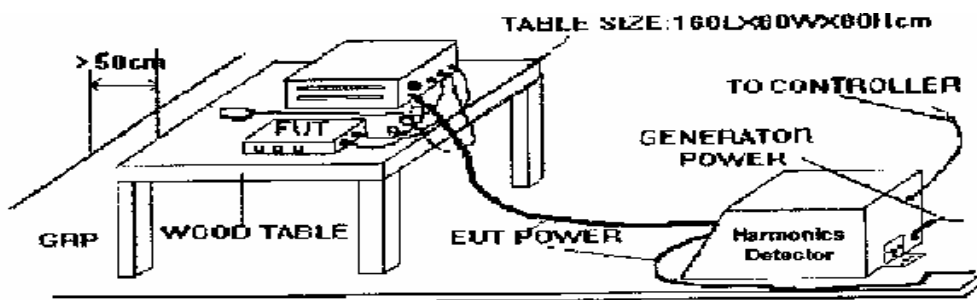
### 6.3 Test Equipment Settings

- 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 : 01/19/2007
- Environmental Conditions : 25deg. C, 55% RH, 1005hPa

Current Test Result Summary (Run time)

EUT: MOTHER BOARD  
 Test category: Class D Steady State (European limits)      Tested by: MILLER  
 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 : Heat-Cheng

## 7. Voltage Fluctuations Test

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

### 7.2 Test Procedure

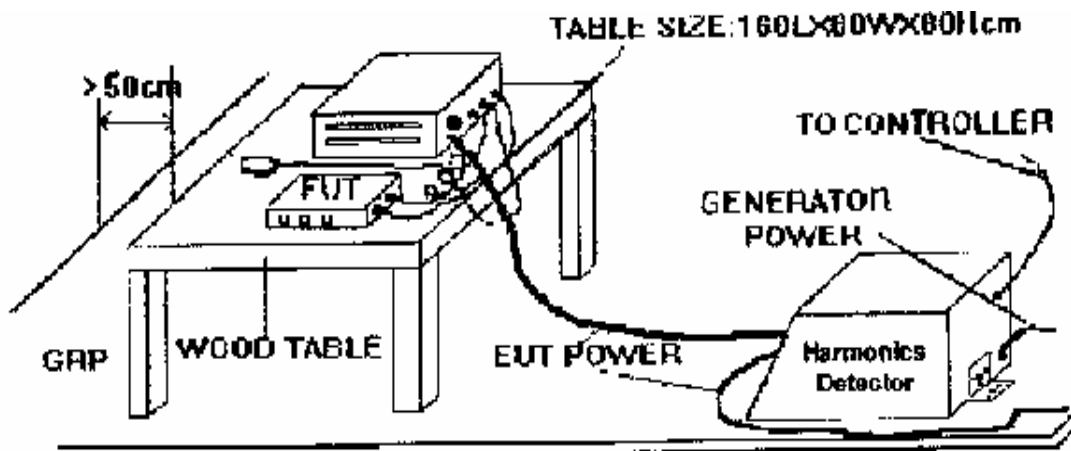
The equipment shall be tested under the conditions of Clause 5.

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 : 01/19/2007
- 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

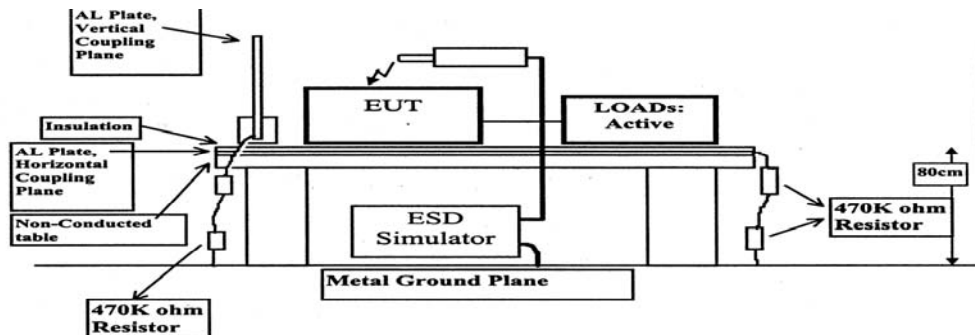
Test completed, Result :PASSED

Test Engineer : Heat-Cheng

## 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 : 01/19/2007
- 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 : Heat-Cheng

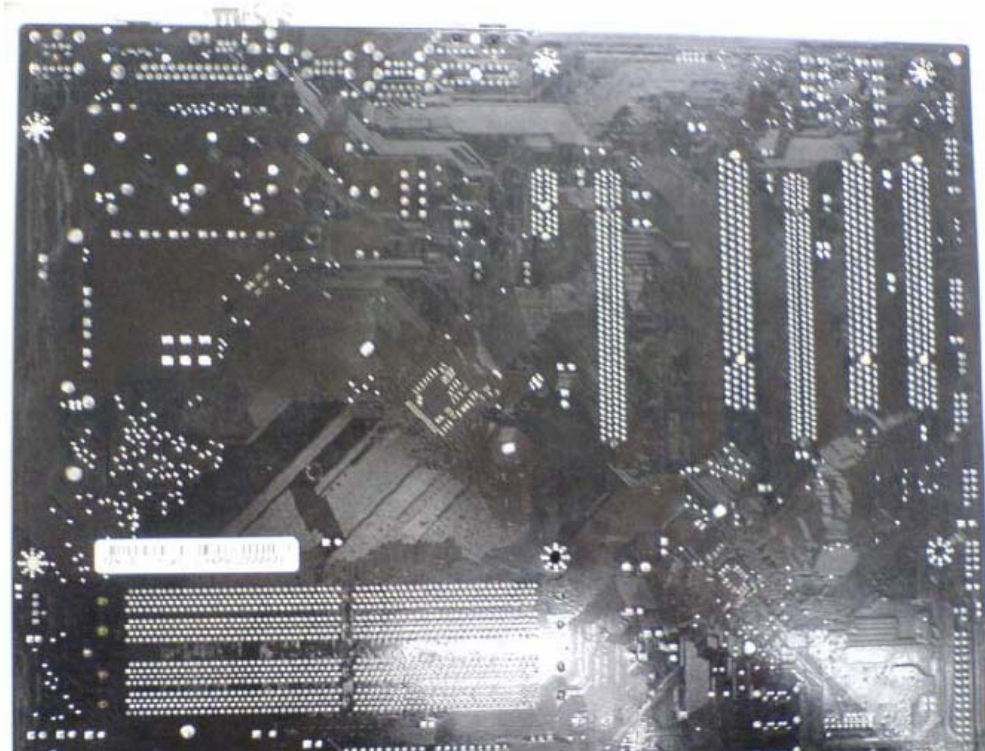
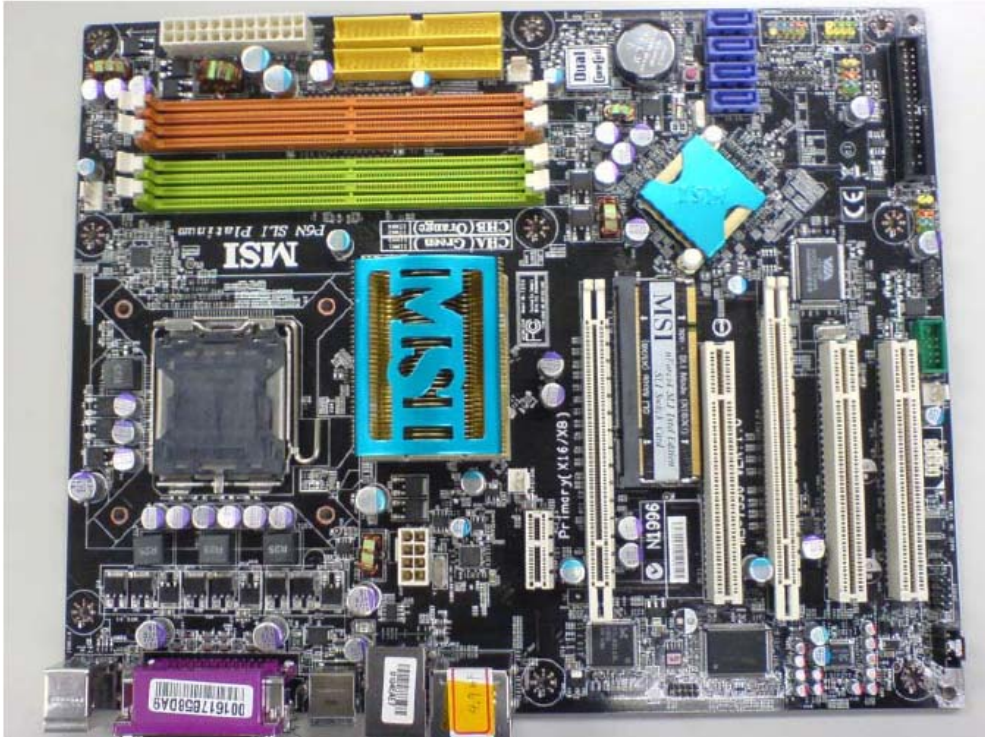
**8-4 Test Result Of Contact Discharge**

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 : Heat-Cheng



9. Attachment A. Photograph Of EUT



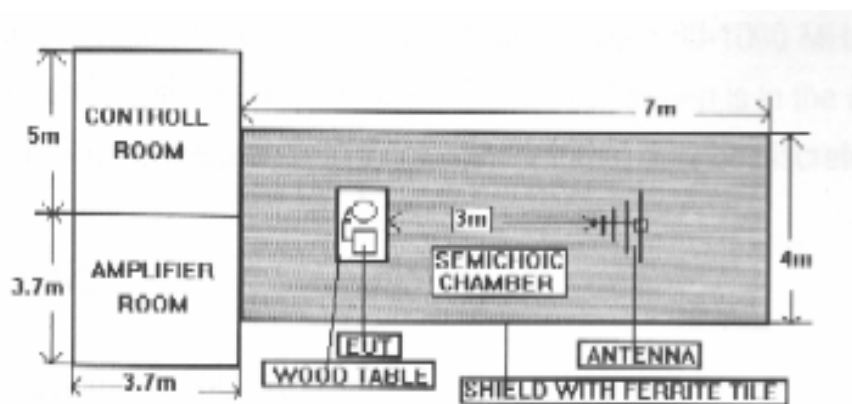
## 10. Radio Frequency Electromagnetic Field Immunity Test (RS)

- 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 : 01/19/2007
- 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 : Heat-Cheng

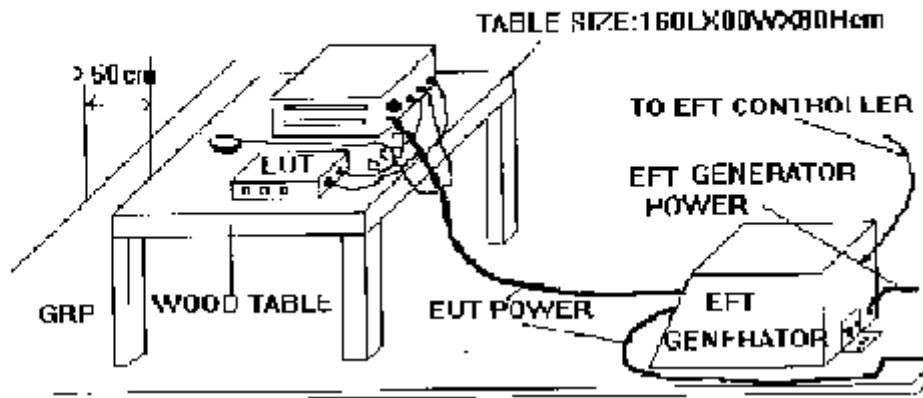
## 11. Immunity Tests Against Electrostatic Fast Transient (EFT)

- 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 : 01/19/2007
- 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 : Heat-Cheng

**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 : 01/19/2007
- 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 : Heat-Cheng



### 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 : 01/19/2007
- 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 : Heat-Cheng

## 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 : 01/19/2007
- Environmental Conditions : 25deg. C, 55% RH, 1005hPa

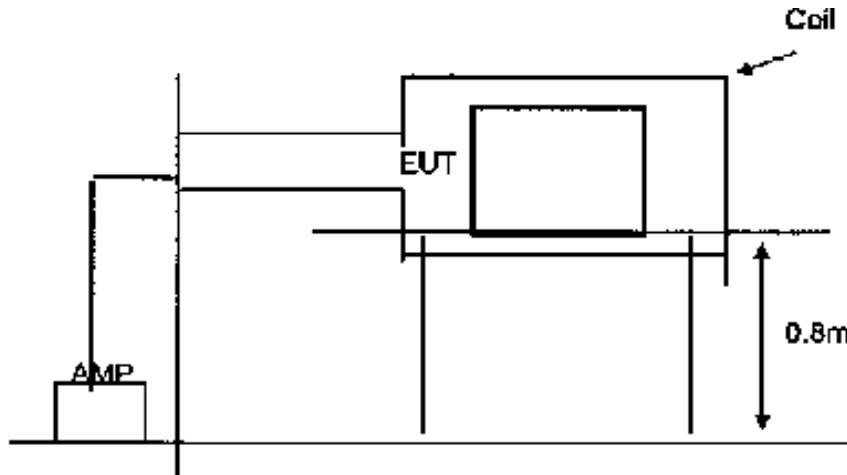
### 14.1 Test Record

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 : Heat-Cheng



## 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 : 01/19/2007
- 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 : Heat-Cheng