

CE TEST REPORT

According To

European Standard EN 55022:2006 Class B
EN61000-3-2:2006, EN61000-3-3:1995+A1:2001+A2:2005
EN55024:1998+A1:2001+A2:2003(EN61000-4-2:2001,
EN61000-4-3:2006, EN61000-4-4:2004, EN61000-4-5:2005,
EN61000-4-6:2006, EN61000-4-8:2001, EN61000-4-11:2004)

EQUIPMENT :	<i>Motherboard</i>
MODEL NO :	<i>MS-V177 V2.1 N260GTX-T2D896 N260GTX-T2D896-OC N275GTX TWIN FROZR N275GTX TWIN FROZR OC</i>
APPLICANT :	<i>MICRO-STAR INT'L CO., LTD</i>
ADDRESS :	<i>NO.69,LI-DE ST,JUNG-HE CITY, TAIPEI HSIEN, TAIWAN</i>
Date of Test :	<i>2009/04/18</i>
Date of Report :	<i>2009/04/25</i>
TEL :	<i>886-2-3234-5599</i>
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This test has been operated by

SPECTRUM RESEARCH & TESTING LAB., INC

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TEST REPORT VERIFICATION

Applicant : MICRO-STAR INT'L CO., LTD
Manufacturer : MICRO-STAR INT'L CO., LTD
EUT Description : VGA Card
MODEL NO : MS-V177 V2.1, N260GTX-T2D896
N260GTX-T2D896-OC
N275GTX TWIN FROZR
N275GTX TWIN FROZR OC
SERIAL NO : N/A
POWER SUPPLY : AC 230V/50Hz

Measurement Procedure Used:


EN 55022:2006 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 EN55022:2006 CLASS B AND EN55024 :1998+A1:2001+A2:2003 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 : Apr . 18 2009 ~ Apr . 24 2009

Prepared By : 

Cingky Zhu

Test Engineer : Bruce Tsai

Bruce tsai

Approve & Authorized Signer : 

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 : VGA Card

Model No : MS-V177 V1.0, N260GTX-T2D896
N260GTX-T2D896-OC
N275GTX TWIN FROZR
N275GTX TWIN FROZR OC

2. Tested Support Device List

Host Devices :

No	Equipment	Type	Model	Serial	FCC/BSMI ID	Trade Name
1.	HDD	80G/5200RPM	ST3102115A	794119476597	DoC	Seagate
2.	Power Supply	300W	Delta S2	N/A	DoC	Seasonic
4.	CPU	2.83GHz	Core2Quad Q9550	N/A	N/A	Intel
5.	RAM	2GB	DDR2 800	N/A	N/A	KingMax
6.	MB		MS-7521	N/A	DoC	MSI

Peripherals Devices :

No	Equipment	Model	Serial	FCC/BSMI ID	Trade Name	Data Cable	Power Cord
1.	PS/2 Mouse	M-S36	LZA138043	DZL211029	LOGITECH	Shielded, 1.8m	N/A
2.	PS/2 Keyboard	Y-SP29	SYU2503872 9	BSMI ID: 3902C736	LOGITECH	Shielded, 1.8m	N/A
3	Monitor	1900FP	N/A	DoC	DELL	shielded 1.8m with a core	Unshielded,1. 8m with a core
4	Monitor	2408WFP b	N/A	R43002	DELL	shielded 1.8m with a core	Unshielded,1. 8m with a core
5	Monitor	KLT-230	N/A	R41006	KOLIN	shielded 1.8m with a core	Unshielded,1. 8m with a core
6	Monitor	710TS	N/A	R33475	SAMSUNG	shielded 1.8m with a core	Unshielded,1. 8m with a core
7	Print	EPSONST YL USC20SX	EW4E126644	DoC	EPSON	shielded 1.8m	Unshielded,1. 8m



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

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.

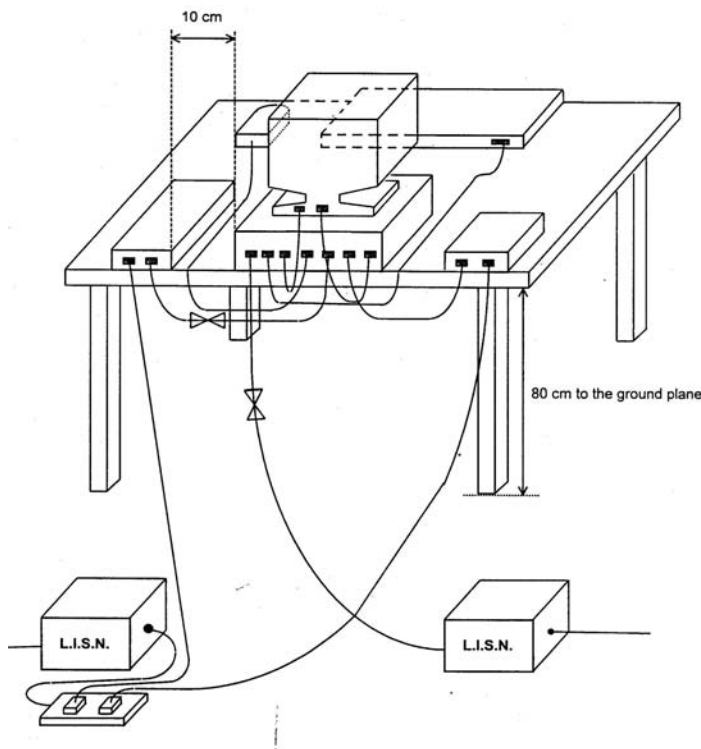
4-1 Test Construction

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,2008	
2	L.I.S.N.	R & S	ESH3-Z5 / 100129	Feb,2009	
3	L.I.S.N.	R & S	ESH3-Z5 / 100129	July,2008	
4	Pulse Limiter	R & S	ESH3-Z2 / 100092	Sep,2008	
5	No.2 Shielded Room				N/A

4.1.2 Test Setup





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

MICRO-STAR INT'L CO; LTD
CISPR 22 CLASS B

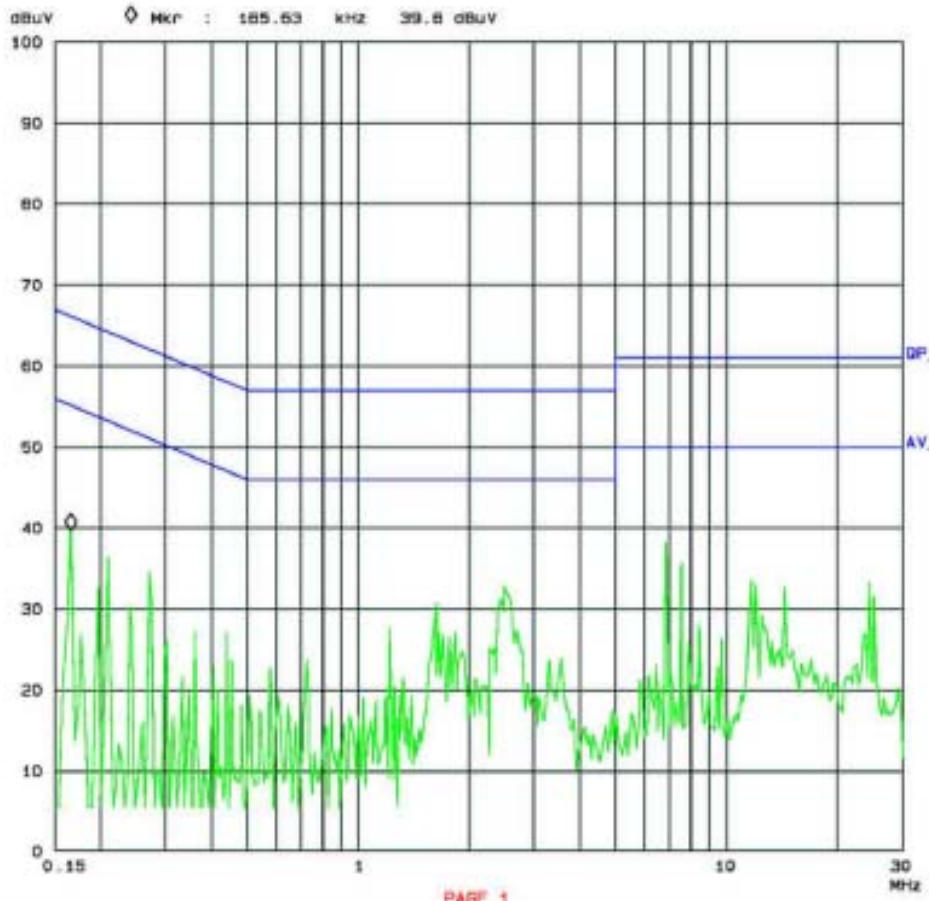
19. 04. 09 10: 03

EUT: HS_V177
Manuf: Delta_S2
Op Cond: 220V 60Hz
Operator: NEO
Test Spec: N

Overview Scan Settings (1 Range)

Frequencies			Receiver Settings			
Start	Stop	Step	IF BW	Detector	M-Time	Atten Preamp
150k	30M	3.9k	9k	PK	0.10ms	0dB LN OFF

Final Measurement: x DP Transducer No. Start Stop Name
 Meas Time: 1 ms 1 9k 30M ESH3_Z2
 Subranges: 8
 Acc Margin: 20dB





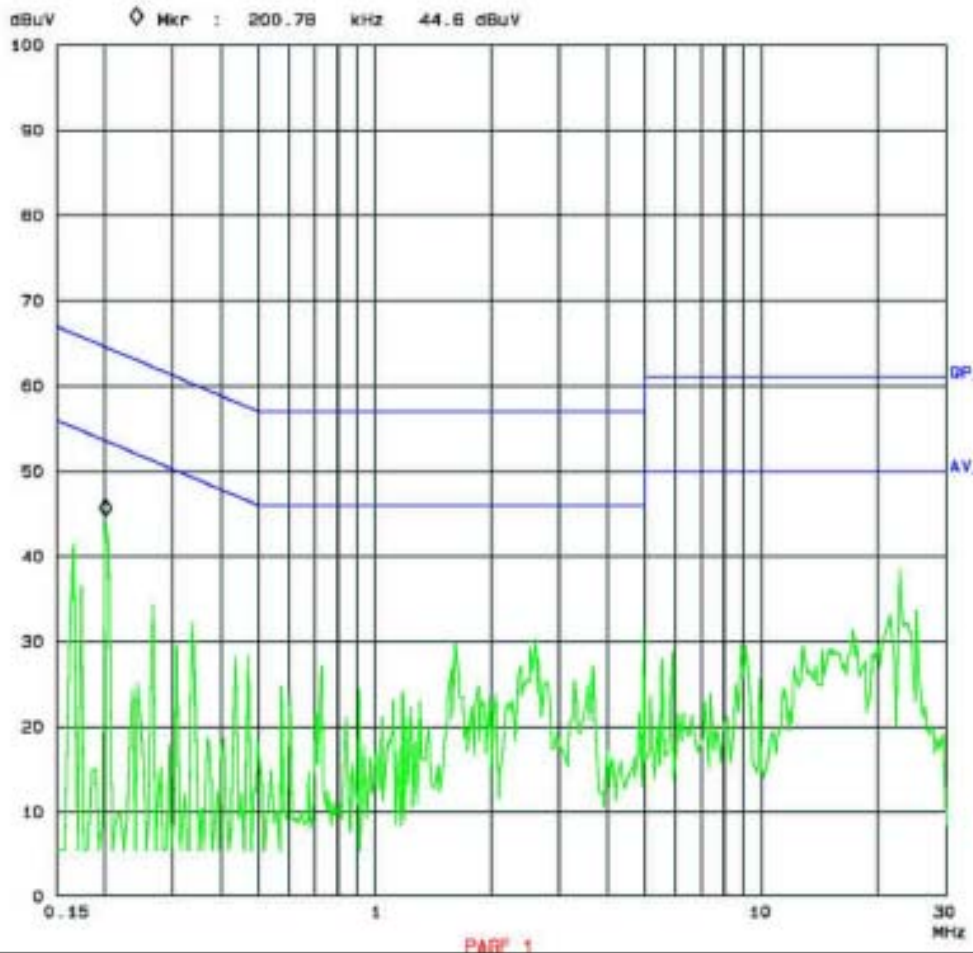
MICRO-STAR INT, L CO, LTD
CISPR 22 CLASS B

19. 04. 09 10: 05

EUT: MS_V177
Manuf: Delta_S2
Op Cond: 220V 60Hz
Operator: NEO
Test Spec: Lt

Overview Scan Settings (1 Range)			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	30M	3.9k	9k	PK	0.10ms	0dB	OFF

Final Measurement:	x QP	Transducer No.	Start	Stop	Name
	Mass Time: 1 ms	1	9k	30M	ES43_22
	Subranges: 8				
	Acc Margin: 20dB				



Result

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

Test Engineer : Bruce Tsai

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.

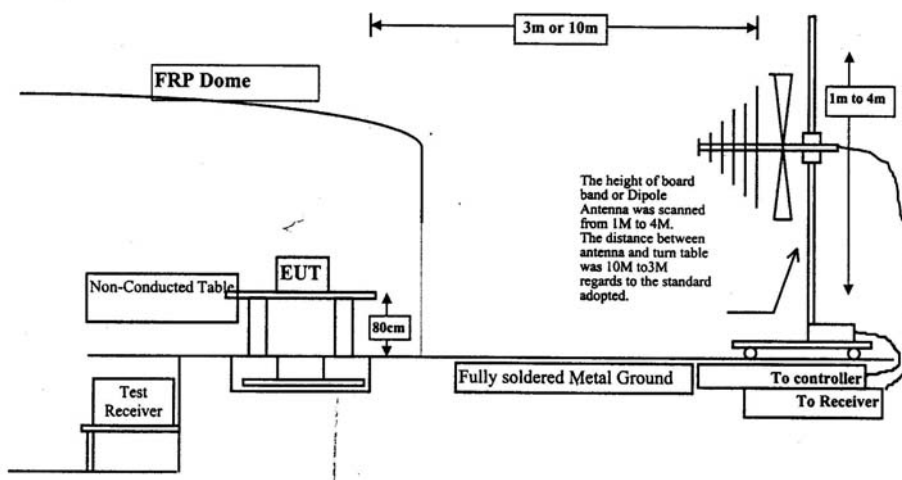
5-1. Test Construction

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	Mar, 2009	
2	Spectrum Analyzer	Advantest	R3162/ 00803480	Oct, 2008	
3	Pre -Amplifier	Advantest	BB525C/ 3307A01812	Jan, 2009	
4	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	Sep, 2008	

5.1.2 Test Setup





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 2.83GHz

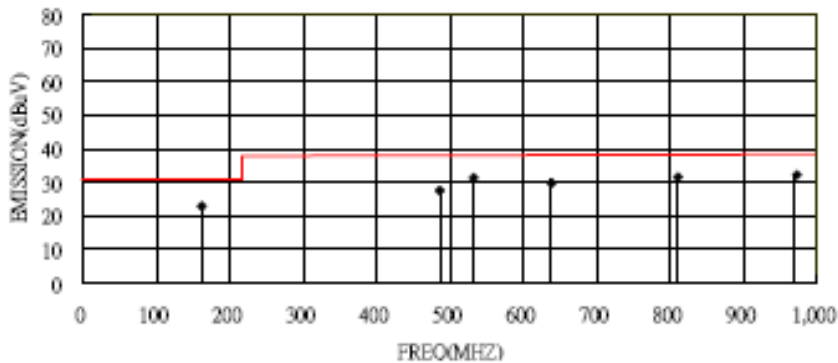
TEST RESULT OF RADIATED FIELD STRENGTH TEST

SRT No.: A09041410 REPORT No.: DATE : 2009.4.18
 EUT: VGA CARD MODEL: MS-V177 2.1 MODE D+D
 TEST STANDARD: CLASS B
 FREQUENCY RANG 30 - 1000 MHz , MEASURED DISTANCE : 10 M
 AC POWER SOURCE : AC V , Hz ANTENNA :
 DETECTOR FUNCTION : Q.P. 6 dB BANDWIDTH : 120 kHz
 TEST AT : OPEN SITE TEMPERATURE : 28°C HUMIDITY : 67 %RH
 SUPPORT UNIT : TEST PROGRAM :
 TEST BY : JASON APPROVED BY :

STANDARD AND ACCESSORIES USED OF TESTING			
Antenna	EQM-0019	Model : 3143	Serial No 9509-1141
RF Cable	EQM-0238+EQM-0166	Model : J400-25M-2NP	Serial No #163-25M
		Model : CABLE19	Serial No #8M

Freq/MHz	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dBuV)		Emission (dBuV/m)		Limit Line (dBuV/m)	Over Limit (dBuV/m)		AZ (e)	EL (m)
			H	V	H	V		H	V		
162.0650	2.24	9.32	11.4		23.0		30.0	-7.0		177	3.80
486.1290	4.05	16.07	7.5		27.6		37.0	-9.4		216	2.64
532.0430	4.28	16.52	10.6		31.4		37.0	-5.6		158	2.25
638.0219	4.72	18.77	6.4		29.9		37.0	-7.1		265	1.72
810.0547	5.38	21.96	4.3		31.6		37.0	-5.4		62	1.06
972.1642	5.98	23.29	3.0		32.3		37.0	-4.7		285	1.00

HORIZONTAL



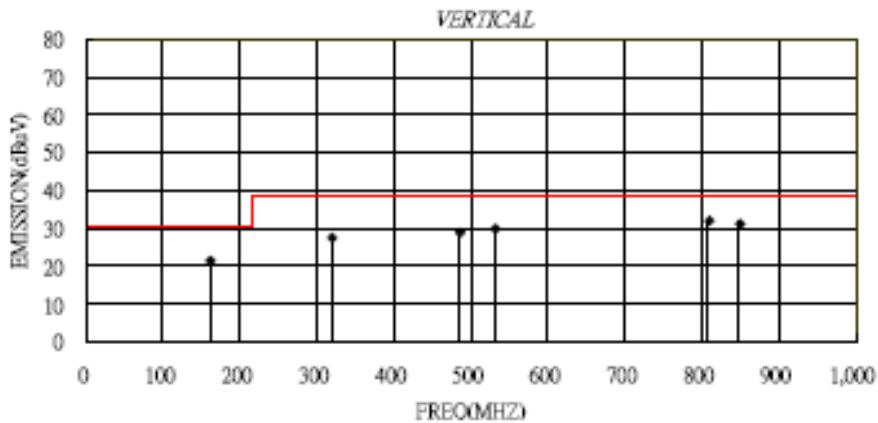


TEST RESULT OF RADIATED FIELD STRENGTH TEST

SRT No. : A09041410 REPORT No. : _____ DATE : 2009.4.18
 EUT : VGA CARD MODEL : MS-V177 2.1 MODE D+D
 TEST STANDARD : _____ CLASS B
 FREQUENCY RANG 30 - 1000 MHz , MEASURED DISTANCE : 10 M
 AC POWER SOURCE : AC _____ V , _____ Hz ANTENNA : _____
 DETECTOR FUNCTION : Q.P. 6 dB BANDWIDTH : 120 kHz
 TEST AT : OPEN SITE TEMPERATURE : 28°C HUMIDITY : 67 %RH
 SUPPORT UNIT : _____ TEST PROGRAM : _____
 TEST BY : JASON APPROVED BY : _____

STANDARD AND ACCESSORIES USED OF TESTING			
Antenna	EQM-0019	Model : 3143	Serial No 9509-1141
RF Cable	EQM-0238+EQM-0166	Model : J400-25M-2NP	Serial No #153-25M
		Model : CABLE19	Serial No #8M

Freq/MHz	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dBuV)		Emission (dBuV/m)		Limit Line (dBuV/m)	Over Limit (dBuV/m)		AZ (e)	EL (m)
			H	V	H	V		H	V		
152.0660	2.24	9.32		9.8		21.4	30.0		-8.6	241	1.16
320.1003	3.12	14.14		10.2		27.5	37.0		-9.5	106	1.35
486.1287	4.05	16.07		8.7		28.8	37.0		-8.2	73	1.74
532.0430	4.28	16.52		9.0		29.8	37.0		-7.2	56	2.20
610.0545	5.38	21.96		4.6		31.9	37.0		-5.1	317	3.37
850.0497	5.58	22.20		3.3		31.1	37.0		-5.9	129	3.49



Result

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

Test Engineer : Bruce Tsai

5.4 Photographs Of Radiated Emission Test Configuration



6. Harmonics Test

6.1 Standard : EN 61000-3-2 :2006

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 61000-3-2:2006.

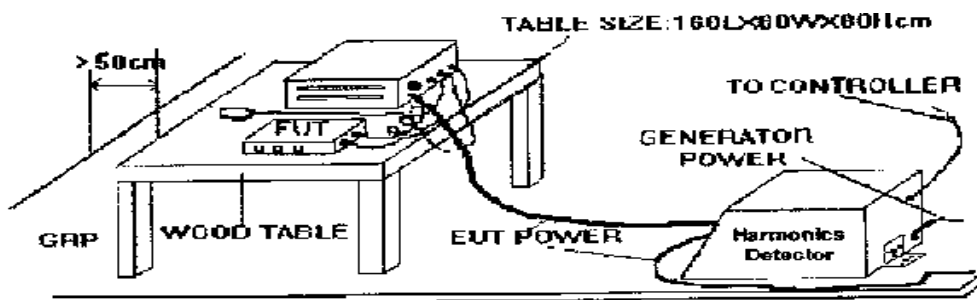
6.3 Test Equipment Settings

- 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, 2008
2	Analyzer	SCHAFFNER	CCN 1000-1/X71887	July,2008
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 : 04/18/2009
- 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	0.028	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 : Bruce Tsai

7. Voltage Fluctuations Test

7.1 Standard : EN 61000-3-3 :1995 +A1 :2001+A2:2005

7.2 Test Procedure

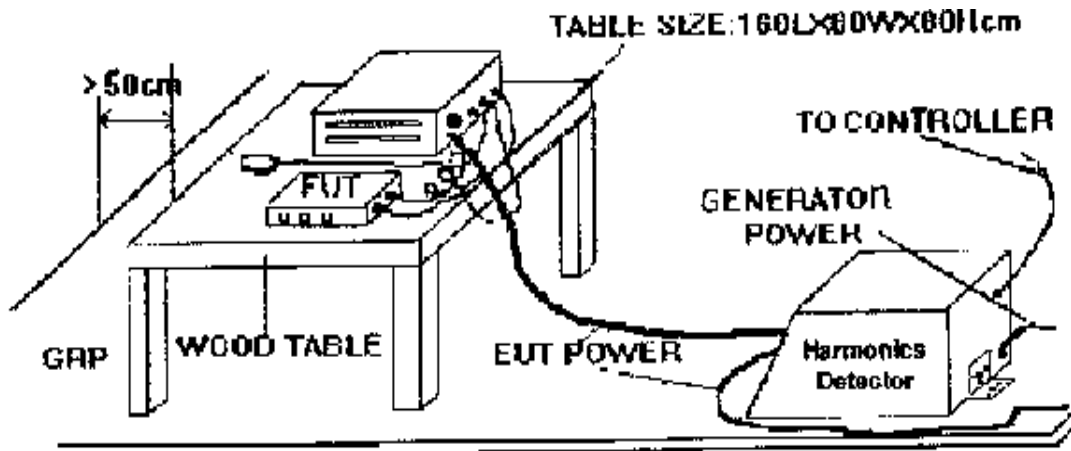
The equipment shall be tested under the conditions of Clause 5.

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, 2008
2	Analyzer	SCHAFFNER	CCN 1000-1/X71887	July,2008
3	No.2 Shielded Room			N/A

7.3 TEST SETUP





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 : 04/18/2009
- 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

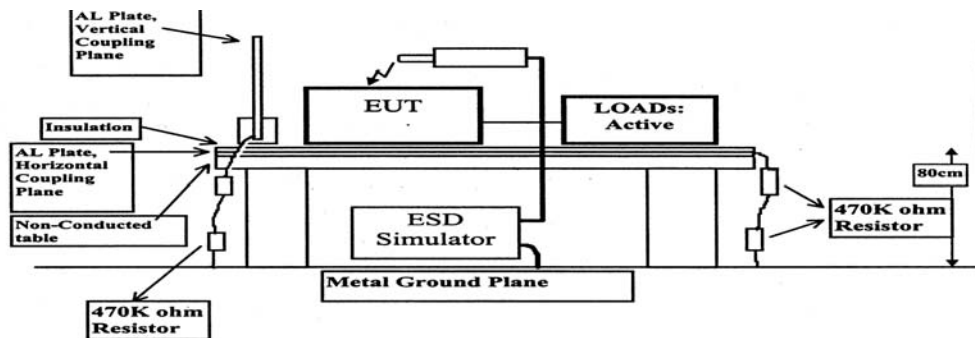
Test completed, Result :PASSED

Test Engineer : Bruce Tsai

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
- Temperature : 23°C
- Relative Humidity : 49 %
- Test Date : 04/18/2009
- 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	Aug, 2008
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	PASS
SCREW	±2/ ±4/ ±8KV	BY 10	NORMAL	PASS
BRACKET	±2/ ±4/ ±8KV	BY 10	NORMAL	PASS
FAN	±2/ ±4/ ±8KV	BY 10	NORMAL	PASS
PRINTER PORT	±2/ ±4/ ±8KV	BY 10	NORMAL	PASS
COM 1 PORT	±2/ ±4/ ±8KV	BY 10	NORMAL	PASS
COM 2 PORT	±2/ ±4/ ±8KV	BY 10	NORMAL	PASS
LED	±2/ ±4/ ±8KV	BY 10	NORMAL	PASS
AC SOCKET	±2/ ±4/ ±8KV	BY 10	NORMAL	PASS
POWER SWITCH	±2/ ±4/ ±8KV	BY 10	NORMAL	PASS
RESET SWITCH	±2/ ±4/ ±8KV	BY 10	NORMAL	PASS
PS/2 KEYBOARD PORT	±2/ ±4/ ±8KV	BY 10	NORMAL	PASS
PS/2 MOUSE PORT	±2/ ±4/ ±8KV	BY 10	NORMAL	PASS
USB POT	±2/ ±4/ ±8KV	BY 10	NORMAL	PASS
F.D.D.	±2/ ±4/ ±8KV	BY 10	NORMAL	PASS
115/230 SWITCH	±2/ ±4/ ±8KV	BY 10	NORMAL	PASS

Test Engineer : Bruce Tsai

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

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

Test Engineer : Bruce Tsai

9. Attachment A. Photograph Of EUT



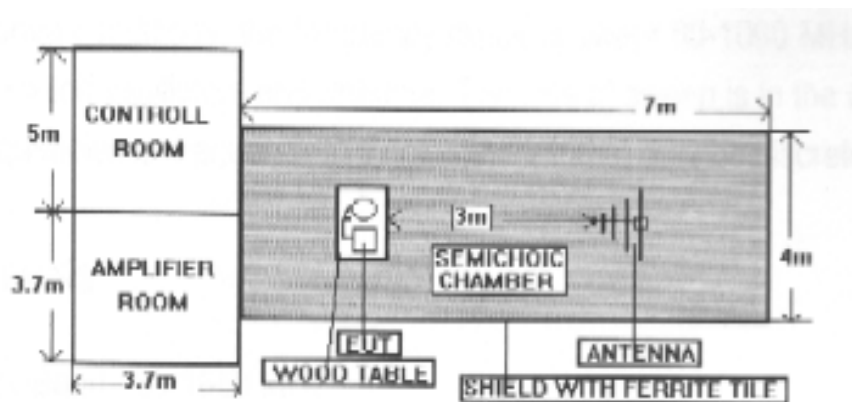
10. Radio Frequency Electromagnetic Field Immunity Test (RS)

- Final Test Result : PASS
- Passed Performance Criteria : A
- Basic Standard : EN 61000-4-3 :2006
- 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 : 04/18/2009
- 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,2008
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,2009
5	Power Antenna	SCHWARZBECK	VULB 9166 / 1073	Jan,2009
6	Power Meter	BOONTON	4232A / 42201	Jan,2009
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 : Brnce Tsai

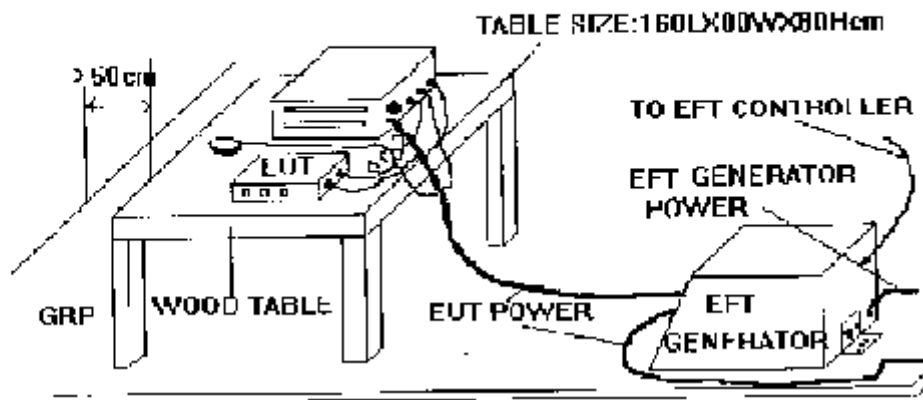
11. Immunity Tests Against Electrostatic Fast Transient (EFT)

- 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 : 04/18/2009
- 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, 2008
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	$\pm 0.5KV$	$\pm 0.25 KV$	N/A
2	$\pm 1.0KV$	$\pm 0.50 KV$	PASS
3	$\pm 2.0KV$	$\pm 1.00 KV$	N/A
4	$\pm 4.0 KV$	$\pm 2.00 KV$	N/A
X	Specified	Specified	N/A

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: Bruce Tsai

12. Surge Immunity Test

- Final Test Result : PASS
- Pass Performance Criteria : B
- Basic Standard : EN 61000-4-5:2005
- 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 : 04/18/2009
- 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, 2008
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: Bruce Tsai



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 :2006
- 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 : 04/18/2009
- 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	Apr, 2009
2	CDN 1	Schwarzbeck	CDNM3/A3003017	Apr, 2009
3	CDN 2	Schwarzbeck	RJ45/S / A3018002	Apr, 2009
4	50 ohm Terminator	RES-NET	RCX6BM	Apr, 2009
5	6dB Attenuator	BIRD	RFA250NFF10	Apr, 2009
6	EM Clamp	Schwarzbeck	KEMZ 801 / 15928	Apr, 2009
7	Power Amplifier	A & R	150A220 / 23076	N/A
8	Power Meter	HP	EPM-4418A / GB37482040	Apr, 2009
9	Power Sensor	Agilent	8482A / MY41091031	Apr, 2009
10	Directional Coupler	A & R	DC2600 / 23325	Apr, 2009
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: Bruce Tsai



14. Power Frequency Magnetic Field Immunity Tests

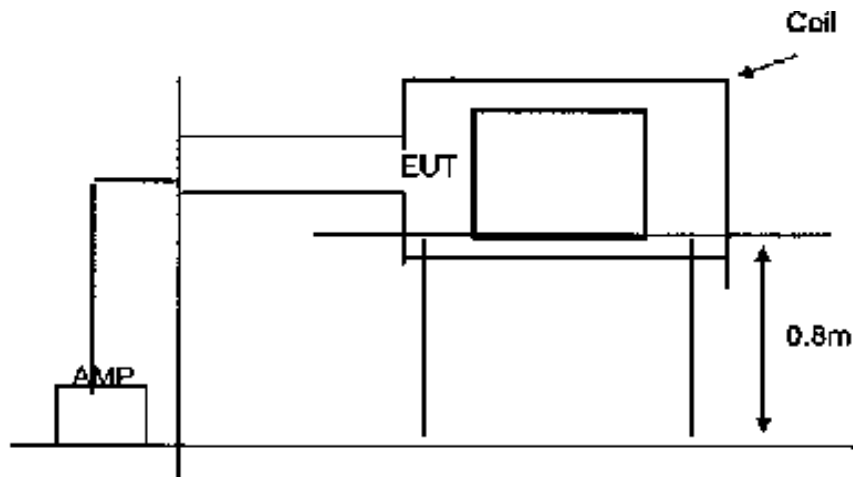
- FINAL TEST RESULT : PASS
- Pass Performance Criteria : A
- Basic Standard : EN 61000-4-8 :2001
- Generic Standard : EN 55024:1998+A1:2001+A2:2003
- Input Voltage, Frequency : AC 230V, 50Hz
- Temperature : 24°C
- Relative Humidity : 54 %
- Test Date : 04/18/2009
- Environmental Conditions : 25deg. C, 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, 2008
2	Gauss Meter	F.W.BELL	4090	May, 2008
3	Magnetic Field Coil	SCHAFFNER	INA702 /199749-020 IN	May, 2008
4	No.2 EMC Fully Chamber			N/A

14.2 Test Setup**14.3 Operating Condition**

Full system

14.4 Final Testing Result : PassTest Engineer: Bruce Tsai



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 : 04/18/2009
- 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, 2008
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 μ 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: Bruce Tsai