



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-7388, 770T -C45</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>2007/12/31</i>
<i>Date of Report :</i>	<i>2008/01/07</i>
<i>TEL :</i>	<i>886-2-3234-5599</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-7388, 770T-C45
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 : Dec . 31 2007 ~ Jan . 07 2008

Prepared By : Cingky
Cingky Zhu

Test Engineer : Renee Ju
Rene Ju

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-7388, 770T-C45

**2. Tested Support Device List****Host PC Devices :**

No	Equipment	Model	Serial	FCC/BSMI ID	Trade Name
1.	SATA HDD	HD080HJ	N/A	N/A/D33027	Samsung
2.	Power Supply	ST-300WAP	N/A	DoC/D33108	Seventeam
3.	CPU	Athlon 64*2 Dual 2.6GHz	N/A	N/A	AMD
4.	RAM	DDR2 512MB*1	N/A	N/A	Swissbit
5.	VGA Card	MS-V093	N/A	N/A	MSI

Peripherals Devices :

No	Equipment	Model	Serial	FCC/BSMI ID	Trade Name	Data Cable	Power Cord
1.	PS/2 Mouse	M851	N/A	DoC	BTC	Shielded, 1.8m	N/A
2.	PS/2 Keyboard	KB-0316	N/A	DoC	BTC	Shielded, 1.8m	N/A
3.	TV Monitor	PG171S	N/A	DoC	SAMSUNG	P : 1.5m(US) D : 1.2m(S)	Shielded, 2.0m
4.	IPOD	A199	N/A	DoC	Apple	Shielded, 1.8m	N/A
5.	IPOD	A199	N/A	DoC	Apple	Shielded, 1.8m	N/A
6.	IPOD	A199	N/A	DoC	Apple	Shielded, 1.8m	N/A
7.	IPOD	A199	N/A	DoC	Apple	Shielded, 1.8m	N/A
8.	Walkman	HS-TA164	N/A	DoC	AIWA	N/A	N/A
9.	Modem	DM-1414	N/A	DoC	IBM	P : 1.5m(US) D : 1.2m(S)	N/A
10.	Ear&Mic	AXIS-301	N/A	DoC	Terasys	Shielded, 1.8m	N/A
11.	Ear&Mic	AXIS-301	N/A	DoC	Terasys	Shielded, 1.8m	N/A
12.	Ear&Mic	AXIS-301	N/A	DoC	Terasys	Shielded, 1.8m	N/A
13.	Ear&Mic	AXIS-301	N/A	DoC	Terasys	Shielded, 1.8m	N/A



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.

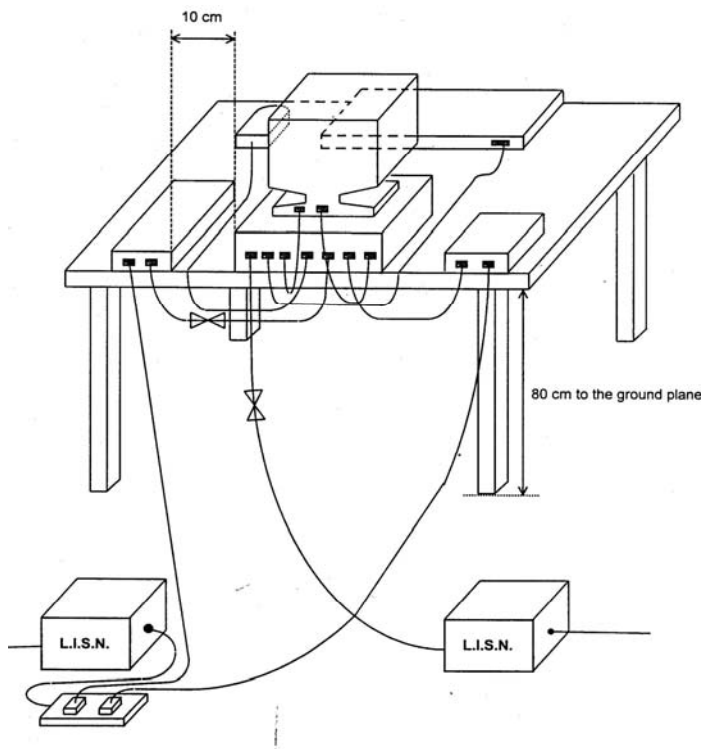
4-1 Test Construction

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





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

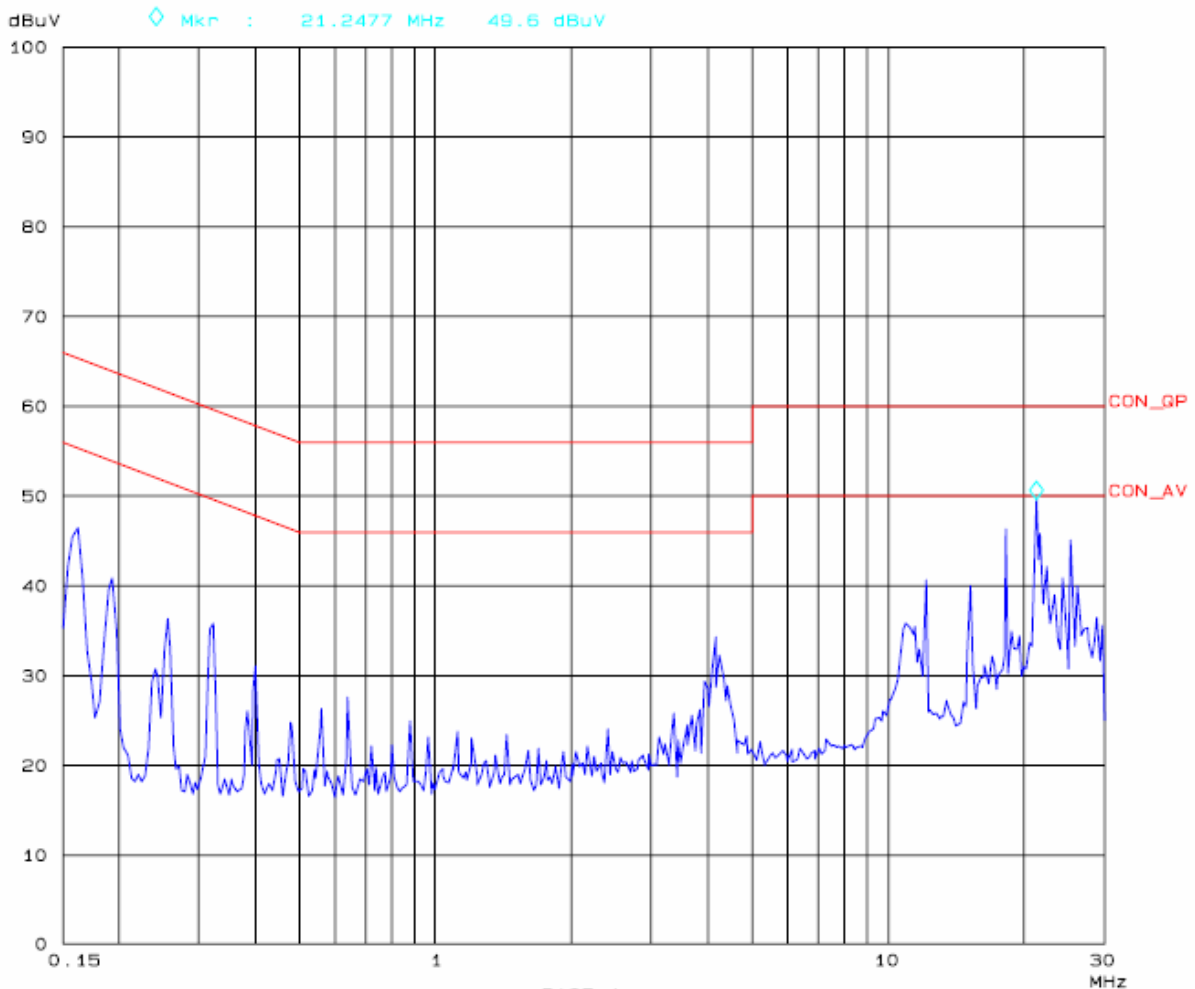
HICROSTAR INTERNATIONAL CO., LTD.
CISPR CLASS B

EUT: MS-7388 Version 1.0
Manuf: MSI
Op Cond: Conduction
Operator: Brian
Test Spec: L1
Comment: EMC/H, Media player
Seventeam 300W

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	10dBLN	OFF

Transducer No.	Start	Stop	Name
1	150k	30M	



PAGE 1

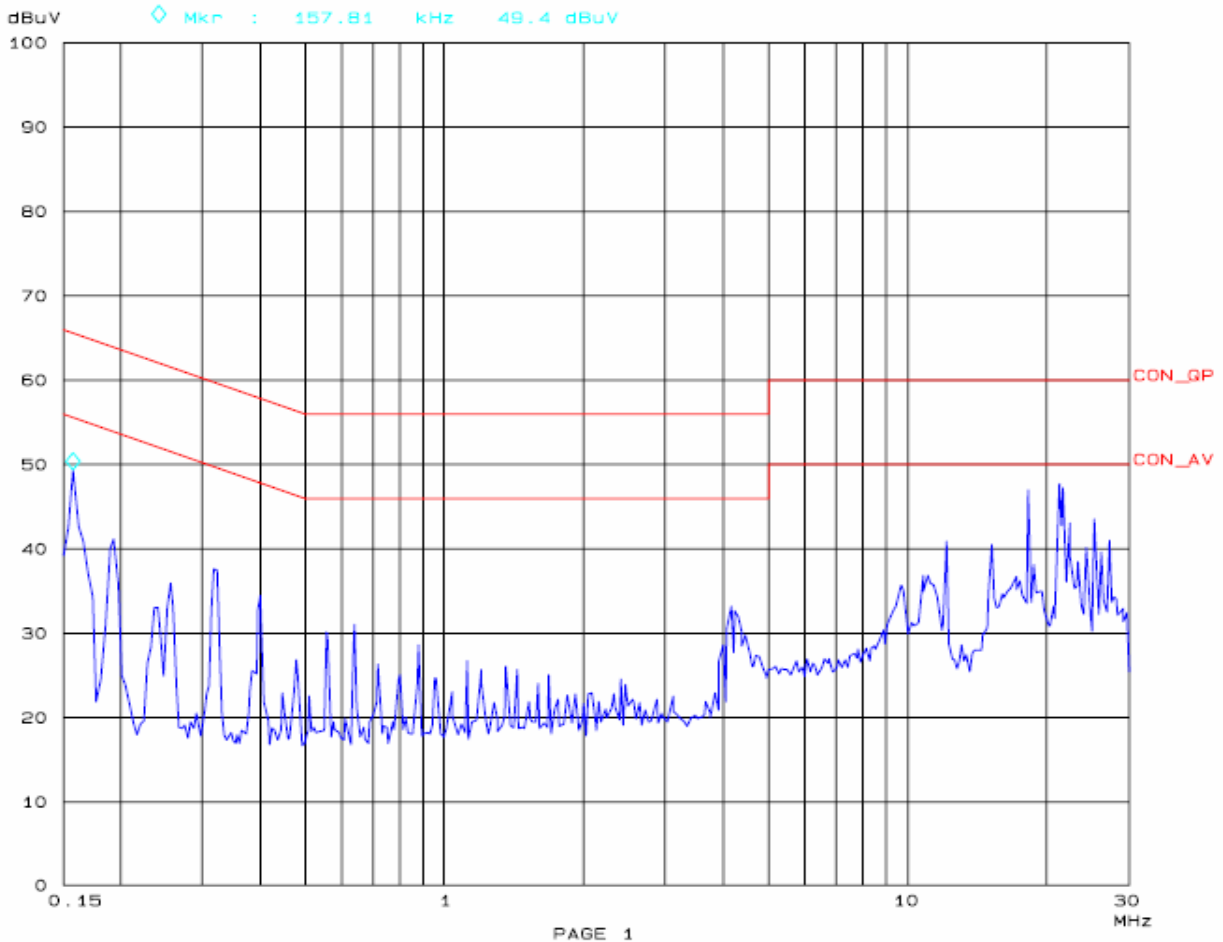


HICROSTAR INTERNATIONAL CO., LTD.
CISPR CLASS B

EUT: MS-7388 Version 1.0
Manuf: MSI
Op Cond: Conduction
Operator: Brian
Test Spec: N
Comment: EMC/H, Media player
Seventeam 300W

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	10dBLN	OFF	
		Transducer No.	No.	Start	Stop	Name		
		1	150k	30M				



PAGE 1

Result

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

Test Engineer : Brian Ju.

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.

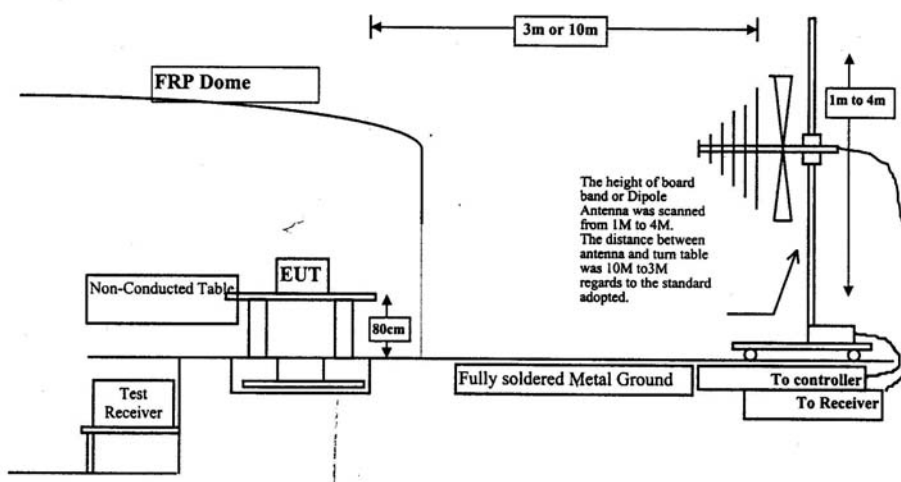
5-1. Test Construction

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





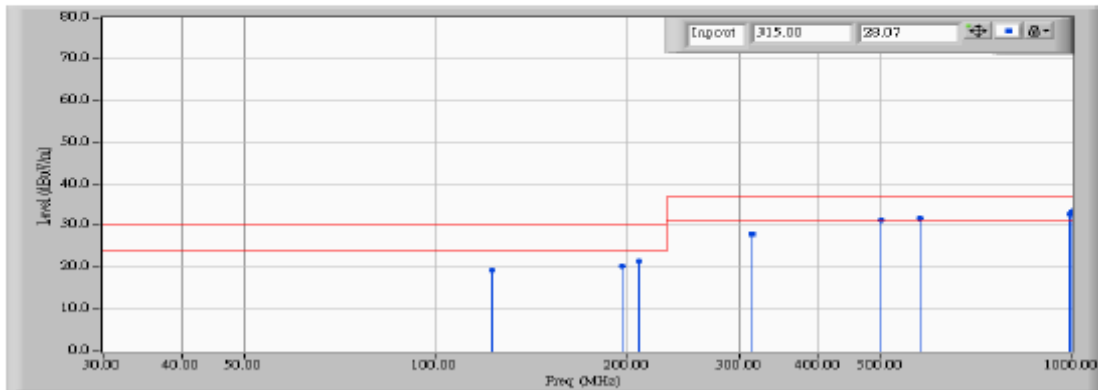
5-2 Test Procedures

- 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:AMD2.6GHz

Site : SITE_1	Time : 2008/01/15 - 17:41
Limit : CISPR_B_10M_QP	Margin : 6
EUT : MOTHERBOARD	Probe : CBL6112B-(2918) - HORIZONTAL
Power : AC 230V/50Hz	Note : M/N:MS-7388 , DVI 1024*768/60Hz



	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	122.880	13.940	5.300	19.239	-10.761	30.000	QUASPEAK
2	196.620	11.608	8.600	20.206	-9.794	30.000	QUASPEAK
3	208.910	11.605	10.000	21.605	-8.395	30.000	QUASPEAK
4	315.000	17.368	10.700	28.068	-8.932	37.000	QUASPEAK
5	500.000	22.412	8.800	31.212	-5.788	37.000	QUASPEAK
6	576.000	24.202	7.700	31.902	-5.098	37.000	QUASPEAK
7	* 990.010	28.860	4.000	32.860	-4.140	37.000	QUASPEAK
8	* 1000.000	28.918	4.600	33.518	-3.482	37.000	QUASPEAK

Note:

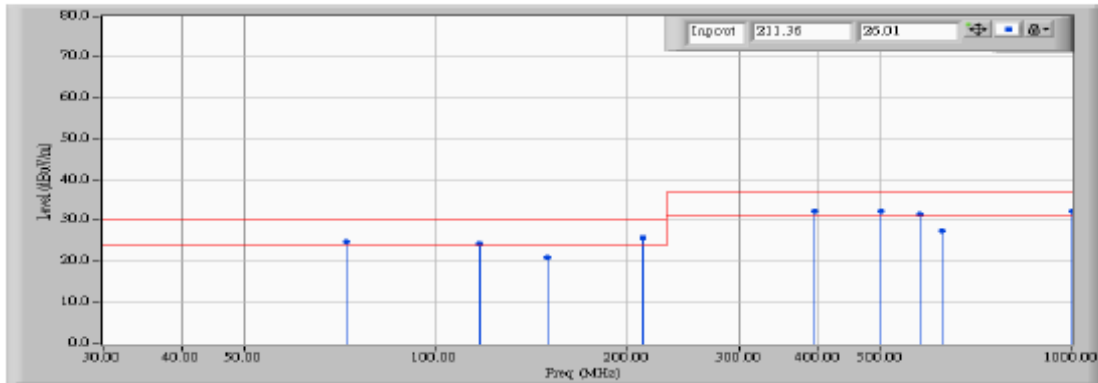
1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor



Vertical Open Site, 30MHz to 1000MHz

TEST Mode: AMD2.6GHz

Site : SITE_1	Time : 2008/01/15 - 17:22
Limit : CISPR_B_10M_QP	Margin : 6
EUT : MOTHERBOARD	Probe : CBL6112B-(2918) - VERTICAL
Power : AC 230V/50Hz	Note : M/N:MS-7388 , DVI 1024*768/60Hz



	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	72.600	7.331	17.700	25.032	-4.968	30.000	QUASPEAK
2	117.310	13.703	10.700	24.403	-5.597	30.000	QUASPEAK
3	150.000	12.700	8.300	21.000	-9.000	30.000	QUASPEAK
4 *	211.360	11.513	14.500	26.012	-3.988	30.000	QUASPEAK
5	393.750	20.125	12.200	32.325	-4.675	37.000	QUASPEAK
6	500.000	22.412	9.900	32.312	-4.688	37.000	QUASPEAK
7	576.000	24.202	7.300	31.502	-5.498	37.000	QUASPEAK
8	624.000	24.700	3.000	27.700	-9.300	37.000	QUASPEAK
9	1000.000	28.918	3.300	32.218	-4.782	37.000	QUASPEAK

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 : Renee Ju



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.

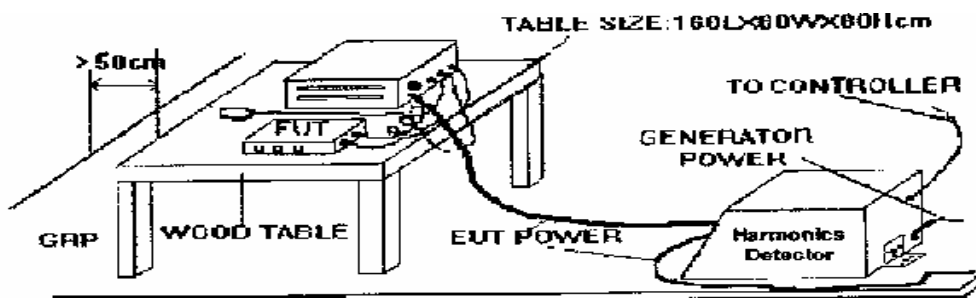
6.3 Test Equipment Settings

- 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



7. Voltage Fluctuations Test

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

7.2 Test Procedure

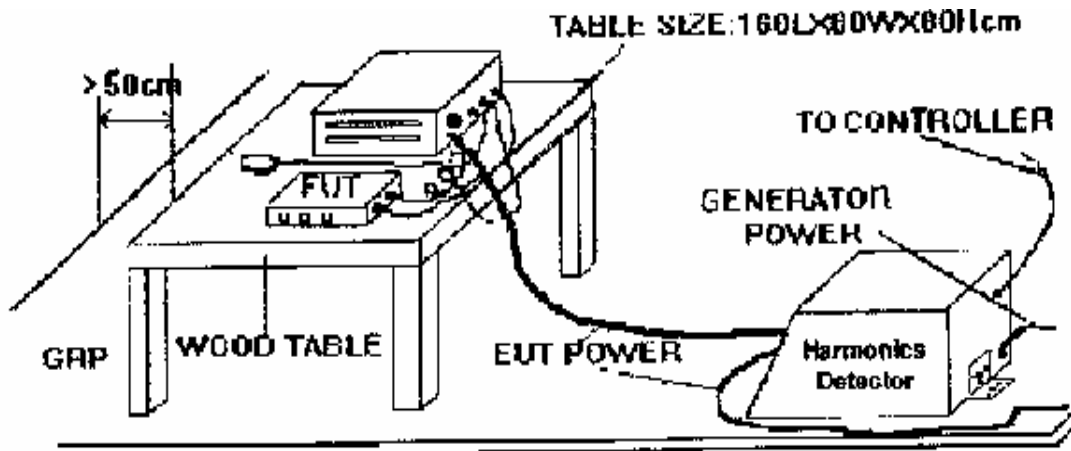
The equipment shall be tested under the conditions of Clause 5.

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





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 : 12/31/2007
- 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

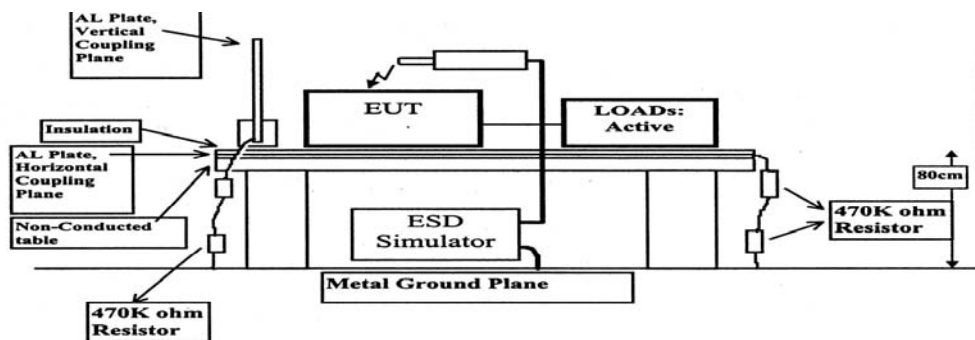
Test completed, Result :PASSED

Test Engineer : 

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 : 12/31/2007
- 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	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

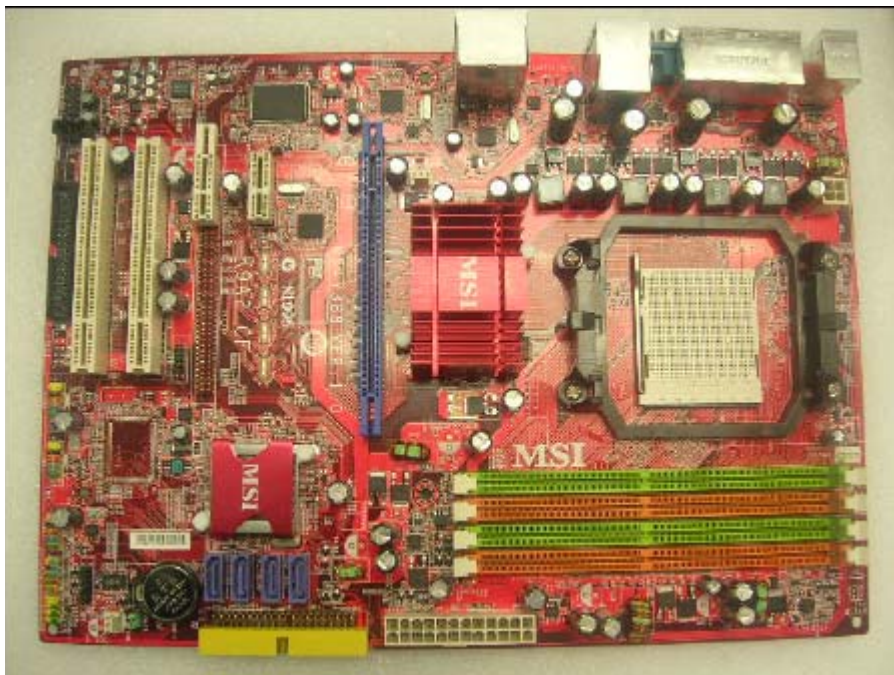
Test Engineer : Renee Ju

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 : Renee Ju

9. Attachment A. Photograph Of EUT



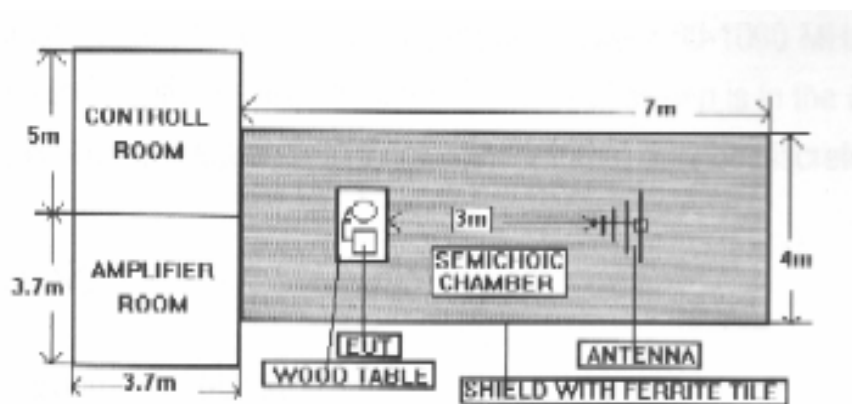
10. Radio Frequency Electromagnetic Field Immunity Test (RS)

- 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 : 12/31/2007
- 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 : Renee Ju

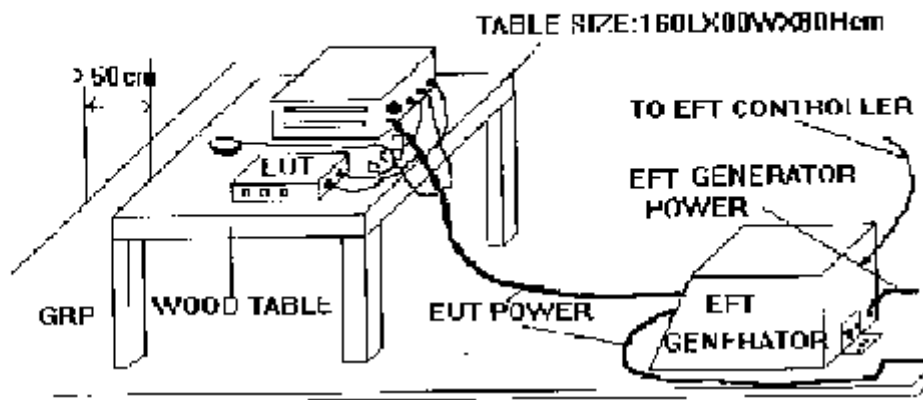
11. Immunity Tests Against Electrostatic Fast Transient (EFT)

- 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 : 12/31/2007
- 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	$\pm 0.5KV$	$\pm 0.25 KV$	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 : Renee Ju

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 : 12/31/2007
- 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 : Renee Ju.



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 : 12/31/2007
- 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 : Renee Ju.



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 : 12/31/2007
- Environmental Conditions : 25deg. C, 55% RH, 1005hPa

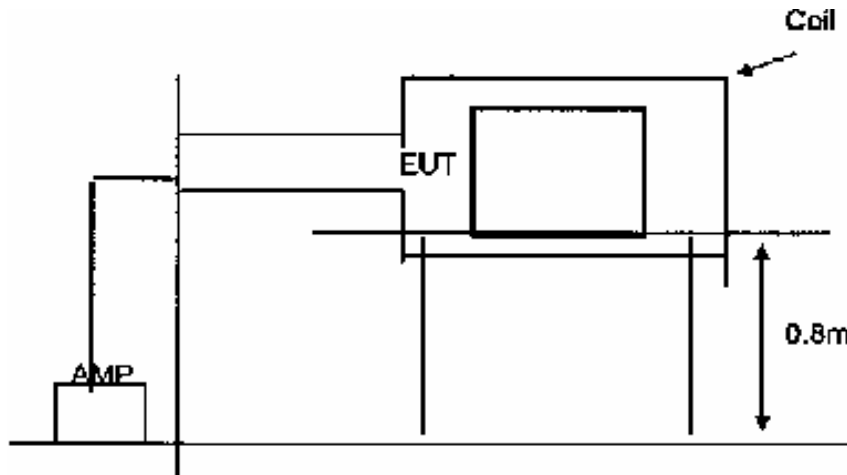
14.1 Test Record

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 : Renee Ju.



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 : 12/31/2007
- 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 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 : Renee Ju.