



MSI
MICRO-STAR INTERNATIONAL

Link to the Future

CE TEST REPORT

According To

European Standard EN 55022:2006 Class B

EN61000-3-2:2000+A2:2005, 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,

EN61000-4-6:2004, EN61000-4-8:2001, EN61000-4-11:2004)

<i>EQUIPMENT :</i>	<i>VGA Card</i>
<i>MODEL NO :</i>	<i>MS-V160 , R4650-MD1G/R4650-MD512</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>2009/01/06</i>
<i>Date of Report :</i>	<i>2009/01/12</i>
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This test has been operated by

QuieTek Corporation.

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TABLE OF CONTENTS
 CE DECLARATION OF CONFORMITY TEST
 REPORT VERIFICATION

1. GENERAL DESCRIPTION.....1

2. TESTED SUPORT DEVICE LIST.....2

3. OPERATING CONDITION OF EUT.....3

4. CONDUCTED POWERLINE..... 4

4-1 TEST CONSTRUCTION.....4

4-2 TEST PROCEDURES..... 5

4-3 TEST RESULT OF AC POWERLINE CONDUCTED EMISSION.....6

5. TEST OF RADIATED EMISSION..... 8

5-1 TEST CONSTRUCTION.....8

5-2 TEST PROCEDURE..... 9

5-3 TEST RESULTS OF RADIATED EMISSION..... 10

5-4 PHOTOGRAPHS OF RADIATED EMISSION TEST COMFIGURATION..... 14

6. HARMONICS TEST16

6-1 STANDARD.....16

6-2 TEST PROCEDURE16

6-3 TEST EQUIPMENT SETTINGS.....16

6-4 TEST EQUIPMENT SETTING S.....16

6-5 CURRENT HARMONICS TEST17

6-5-1 TEST DATA OF CURRENT HARMONICS.....17

7. VOLTAGE FLUCTUATIONS TEST.....18

7-1 STANDARD.....18

7-2 TEST PROCEDURE18

7-3 TEST EQUIPMENT SETTINGS.....18

7-4 TEST RESULT OF VOLTAGE FLUCTUATION AND FLICKER TEST.....19

7-4-1 TEST DATA OF VOLTAGE AND FLICKER.....19

8. IMMUNITY TEST AGAINST ELECTROSTATIC DISCHARGE (ESD).....20

8-1 TEST CONSTRUCTIO N.....20

8-2 TEST LEVE L.....21

8-2-1 CONTACT DISCHARGE.....21

8-2-2 AIR DISCHARGE.....21

8-3 TEST RESULT OF AIR DISCHARGE.....22

8-4 TEST RESULT OF CONTACT DISCHARGE.....23

9. ATTACHMENT OF PHOTOGRAPH OF EUT.....	24
10.RADIO FREQUENCY ELECTROMAGNETIC FIELD IMMUNITY TEST (RS).....	25
10-1 TEST SETUP.....	25
10-2 TEST SEVERITY LEVELS.....	26
11. IMMUNITY TESTS AGAINST ELECTROSTATIC FAST TRANSIENT(EFT)	27
11-1 TEST SETUP	27
11-2 TEST SEVERITY LEVELS	28
12. SURGE IMMUNITY TEST.....	29
12-1 TEST RECORD	29
12-2 TETS LEVEL	30
12-3 OPERATING CONDITION	30
13.CONDUCTED DISTURBANCES INDUCED BY RADIO-FREQUENCY FIELD IMMUNITY TEST(CS.).....	31
13-1 TEST SETUP	31
13-2 OPERATING CONDITION	32
14.POWER FREQUENCY MAGNETIC FIELD IMMUNITY TESTS.....	33
14-1 TEST RECORD	33
14-2 TEST SETUP	34
14-3 OPERATING CONDITION	34
15.VOLTAGE DIPS AND VOLTAGE INTERRUPTIONS IMMUNITY TESTS.....	35
15-1 TEST RECORD OF VOLTAGE INTERRUPTION	35
15-2 TEST RECORD OF VOLTAGE DIPS	35
15-3 TEST CONDITIONS	36
15-4 OPERATING CONDITION	36



TEST REPORT VERIFICATION

Applicant : MICRO-STAR INT'L CO., LTD
Manufacturer : MICRO-STAR INT'L CO., LTD
EUT Description : VGA CARD
MODEL NO : MS-V160, R4650-MD1G/R4650-MD512
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 : Jan . 06 2009 ~ Jan . 12 2009

Prepared By : Cingky
Cingky Zhu

Test Engineer : Freedom
Freedom

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 : VGA CARD

Model No : MS-V160, R4650-MD1G / R4650-MD512



2. Tested Support Device List

Host PC Devices :

No	Equipment	Model	Serial	FCC/BSMI ID	Trade Name
1.	HDD	ST380815AS	N/A	CE,BSMI	Seagate
2.	Power Supply	DPS-250AB-9A	N/A	N/A	DELTA
3.	CPU	PENTIUM DUAL CORE-E2200-2.20	N/A	N/A	INTEL
4.	RAM	DDR2 667 512M*1	N/A	N/A	HYNIX
5.	MB	MS-7525	N/A	N/A	MSI

Peripherals Devices :

No	Equipment	Model	Serial	FCC/BSMI ID	Trade Name	Data Cable	Power Cord
1	Keyboard	KB-0133	B55940MGAP K00W	N/A	COMPAQ	N/A	N/A
2	Mouse	M-S69	N/A	N/A	HP	N/A	N/A
3	Monitor	CPD-G500	2737939	N/A	SONY	N/A	N/A
4	LCD Monitor	2408WFP	N/A	N/A	DELL	N/A	N/A
5	Printer	StyLus C63	FAPY093590	N/A	EPSON	N/A	Non-Shielded, 1.6m
6	Walkman	HS-TA164	N/A	N/A	AIWA	N/A	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

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.

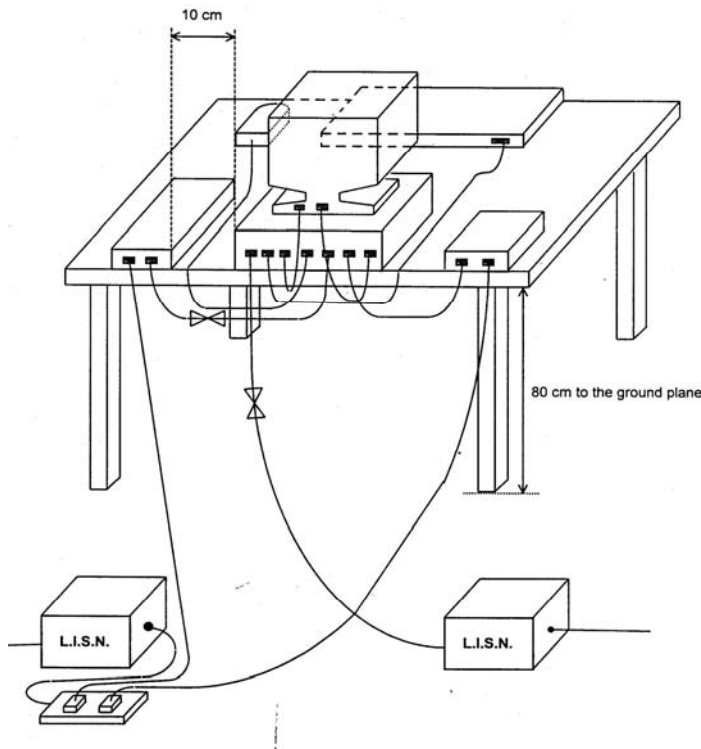
4-1 Test Construction

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,2008	
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

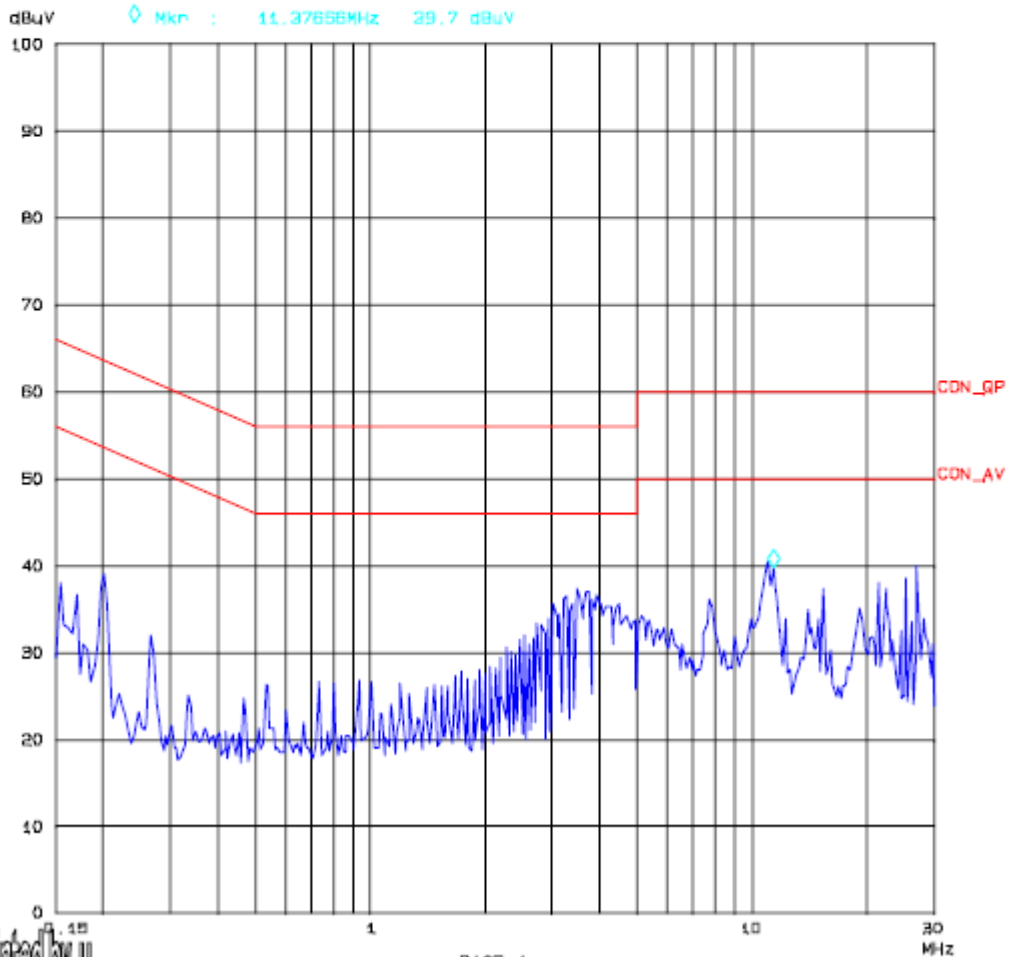
CISPR Class B

GUT: MS-V160 V1.0
 Manuf: MSI
 Op Cond: Conduction
 Operator: Neil
 Test Spec: L1
 Comment: WinEMC, Media player
 Bestec 125W ATX03300FSWB

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	10dB LN OFF

Transducer No.	Start	Stop	Name
1	150k	30M	





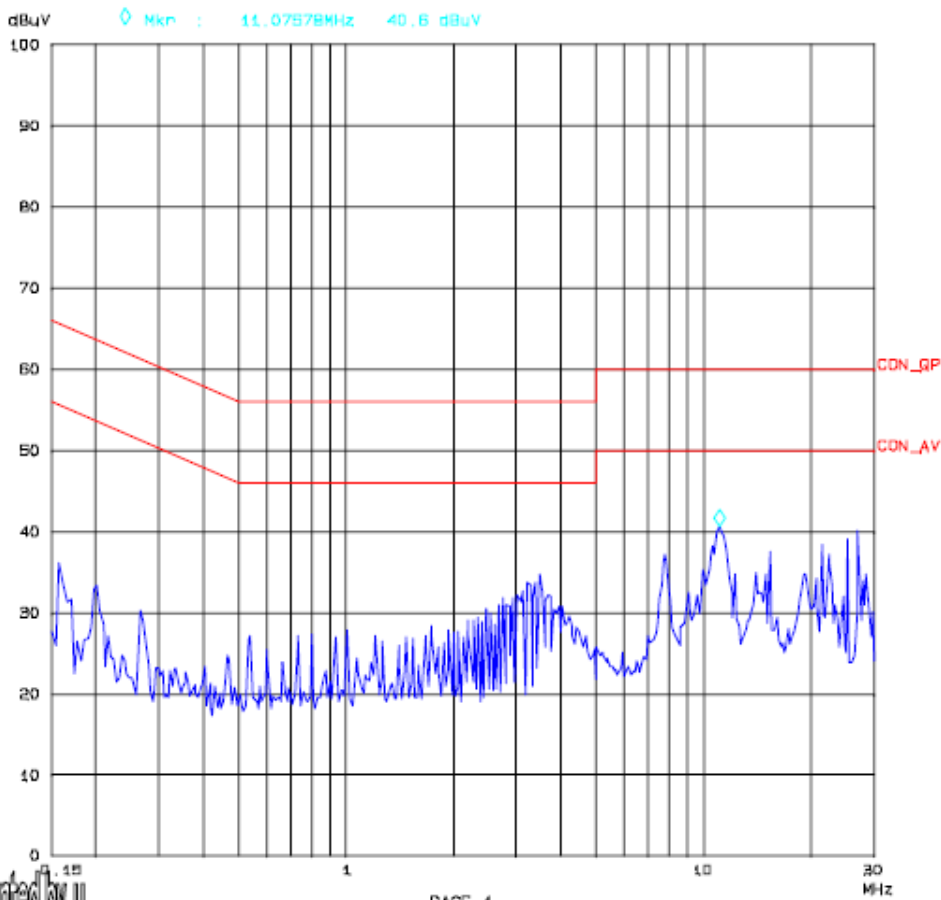
CISPR Class B

EUT: MS-V160 V1.0
 Manuf: MSI
 Op Cond: Conduction
 Operator: Neil
 Test Spec: N
 Comment: WinEMC, Media player
 Bestec 125W ATX03300FSWB

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	10dB LN	OFF

Transducer	No.	Start	Stop	Name
	1	150k	30M	



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Result

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

Test Engineer: Freedom

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.

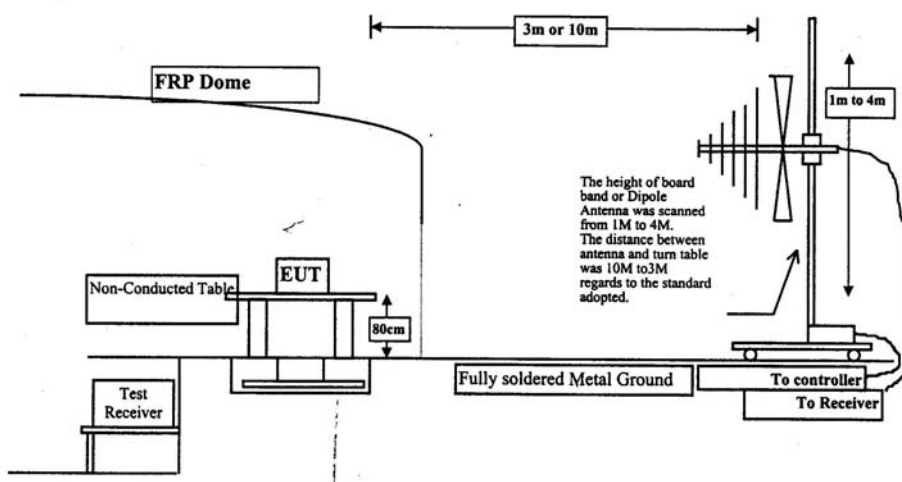
5-1. Test Construction

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

5.1.2 Test Setup





5-2 Test Procedures

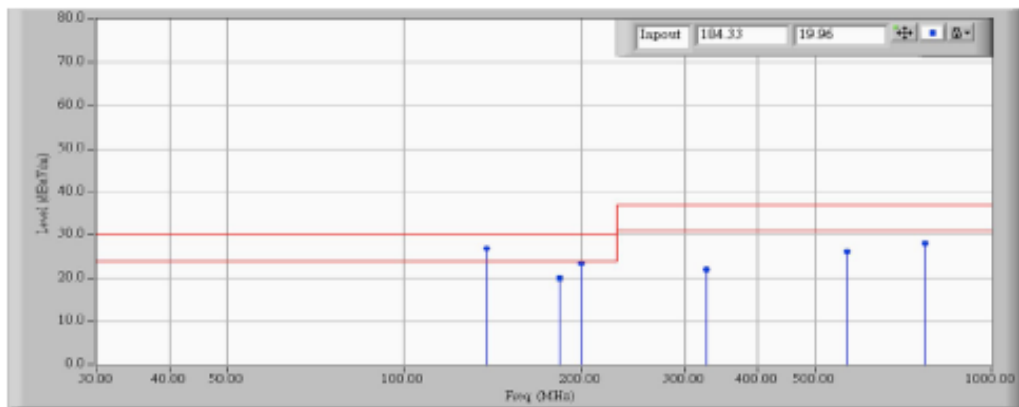
- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 10 meters from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- 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 Vertical Open Site TEST Mode: Intel 2.20G

File# : MSI_MSX160 - Page: 5

Site : OATS1	Time : 2009/01/06
Limit : CISPR_B_10M_QP	Margin : 6
EUT : VGA CARD	Probe : Site1_CBL6112_10M_0811 - HORIZONTAL
Power : AC 230V/50Hz	Note : M/N:MS-V160 , D-SUB + HDMI 1920*1200/60Hz , BURNIN



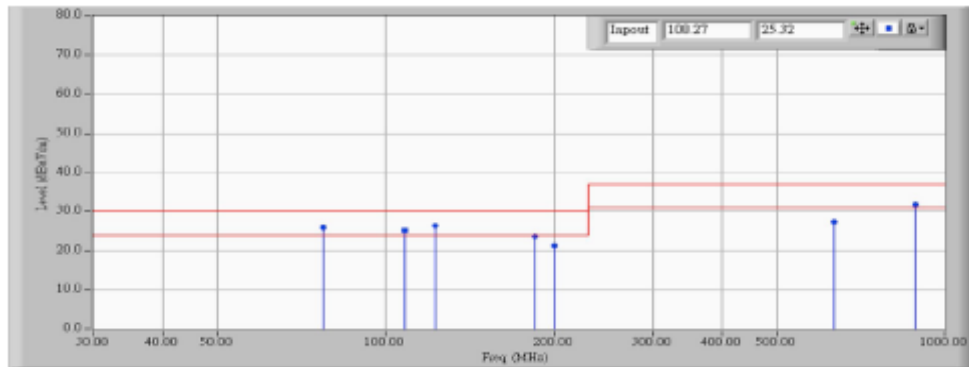
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	* 138.000	12.943	13.900	26.843	-3.157	30.000	QUASPEAK
2	184.330	10.560	9.400	19.960	-10.040	30.000	QUASPEAK
3	200.300	10.910	12.500	23.410	-6.590	30.000	QUASPEAK
4	327.340	16.787	5.200	21.987	-15.013	37.000	QUASPEAK
5	569.100	22.423	3.700	26.123	-10.877	37.000	QUASPEAK
6	770.150	24.400	3.800	28.200	-8.800	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

File# : MSI_MSX160 - Page: 4

Site : OATS1	Time : 2009/01/06
Limit : CISPR_B_10M_QP	Margin : 6
EUT : VGA CARD	Probe : Site1_CBL6112_10M_0811 - VERTICAL
Power : AC 230V/50Hz	Note : M/N:MS-V160 , D-SUB + HDMI 1920*1200/60Hz , BURNIN



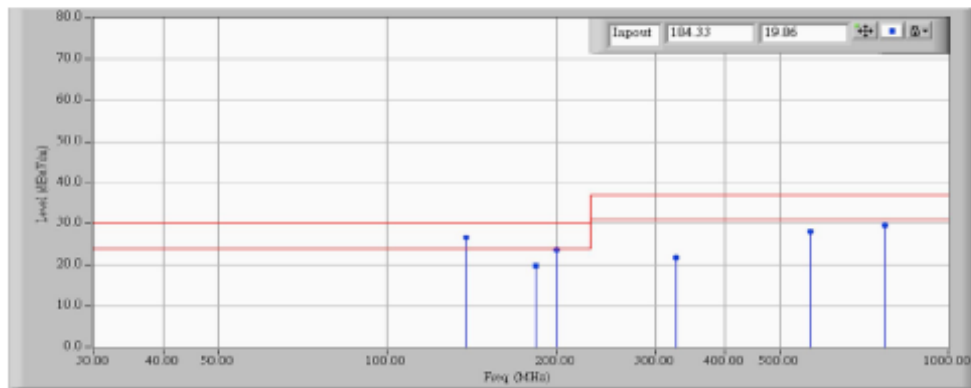
	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	77.480	7.704	18.200	25.904	-4.096	30.000	QUASPEAK
2	108.270	12.916	12.400	25.316	-4.684	30.000	QUASPEAK
3	* 122.890	13.511	13.000	26.511	-3.489	30.000	QUASPEAK
4	184.910	10.580	13.100	23.680	-6.320	30.000	QUASPEAK
5	200.320	10.910	10.400	21.310	-8.690	30.000	QUASPEAK
6	633.930	23.011	4.300	27.311	-9.689	37.000	QUASPEAK
7	884.750	25.419	6.300	31.719	-5.281	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

File# : MSI_MSX160 - Page: 6

Site : OATS1	Time : 2009/01/06
Limit : CISPR_B_10M_QP	Margin : 6
EUT : VGA CARD	Probe : Site1_CBL6112_10M_0811 - HORIZONTAL
Power : AC 230V/50Hz	Note : M/N:MS-V160 , D-SUB + DVI 1920*1200/60Hz , BURNIN



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBµV)	Measure Level (dBµV/m)	Margin (dB)	Limit (dBµV/m)	Detector Type
1	*	138.050	12.940	13.800	26.740	-3.260	30.000	QUASPEAK
2		184.330	10.580	9.300	19.880	-10.140	30.000	QUASPEAK
3		200.000	10.910	12.900	23.810	-6.190	30.000	QUASPEAK
4		327.330	16.788	4.900	21.688	-15.314	37.000	QUASPEAK
5		569.130	22.420	5.700	28.121	-8.879	37.000	QUASPEAK
6		770.150	24.400	5.100	29.500	-7.500	37.000	QUASPEAK

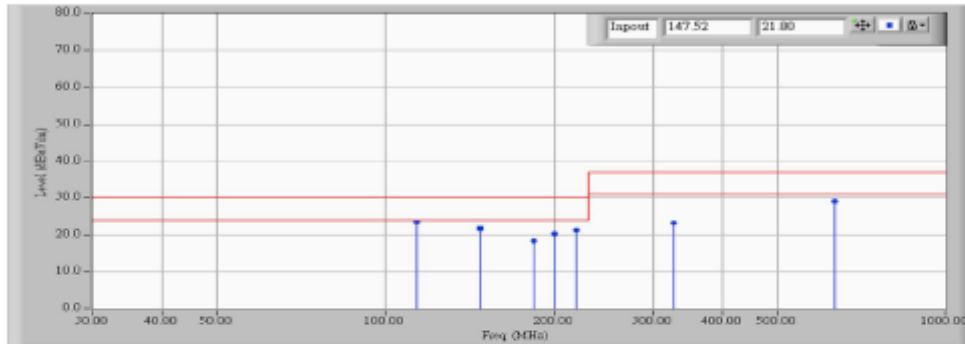
Note:

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



File# : MSI_MS160 - Page: 7

Site : OATS1	Time : 2009/01/06
Limit : CISPR_B_10M_QP	Margin : 6
EUT : VGA CARD	Probe : Site1_CBL6112_10M_0811 - VERTICAL
Power : AC 230V/50Hz	Note : M/N:MS-V160 , D-SUB + DVI 1920*1200/60Hz , BURNIN



	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	* 113.520	13.086	10.300	23.386	-6.634	30.000	QUASPEAK
2	147.520	12.185	9.600	21.785	-8.205	30.000	QUASPEAK
3	184.320	10.560	7.900	18.460	-11.540	30.000	QUASPEAK
4	200.000	10.910	9.300	20.210	-9.790	30.000	QUASPEAK
5	219.200	10.782	10.600	21.382	-8.618	30.000	QUASPEAK
6	327.340	16.787	6.400	23.187	-13.813	37.000	QUASPEAK
7	633.940	23.011	6.200	29.211	-7.789	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 : Freedom

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.

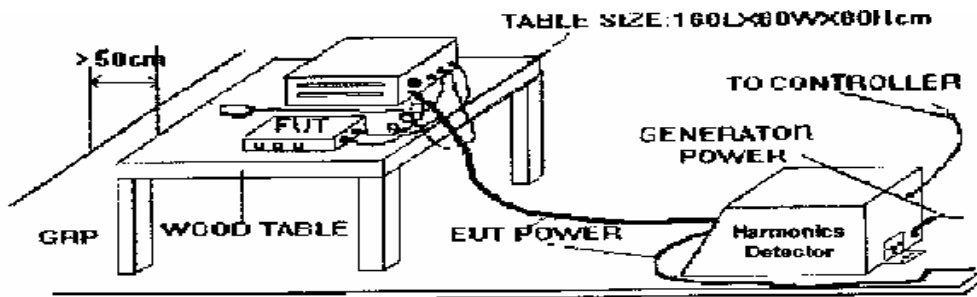
6.3 Test Equipment Settings

- 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, 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 : 01/06/2009
- 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	0.008	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: Freedom

7. Voltage Fluctuations Test

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

7.2 Test Procedure

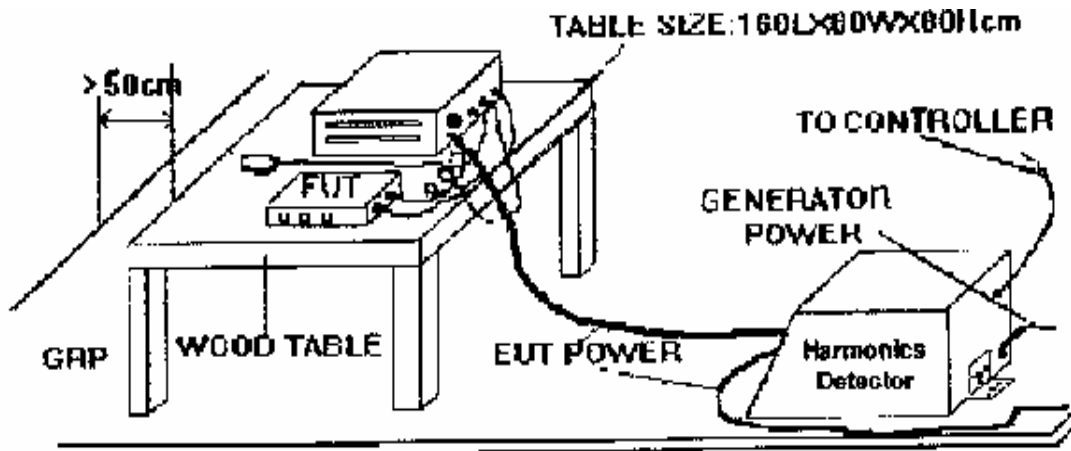
The equipment shall be tested under the conditions of Clause 5.

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, 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 : 01/06/2009
- 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

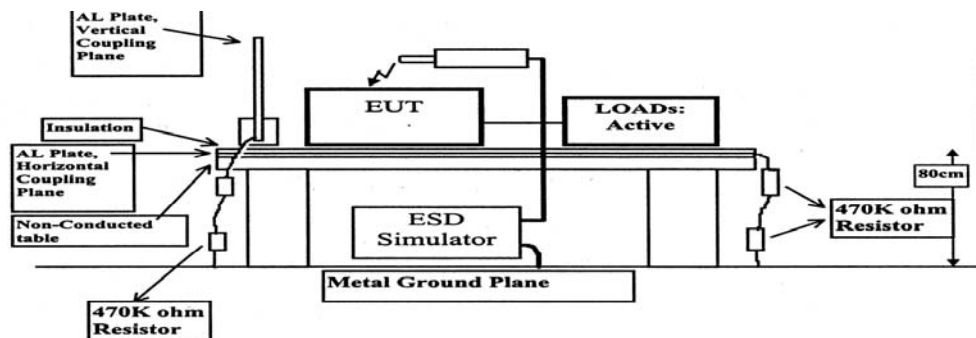
Test completed, Result :PASSED

Test Engineer : *Freedom*

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 : 01/06/2009
- 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 following 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: Freedom

**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: _____

9. Attachment A. Photograph Of EUT



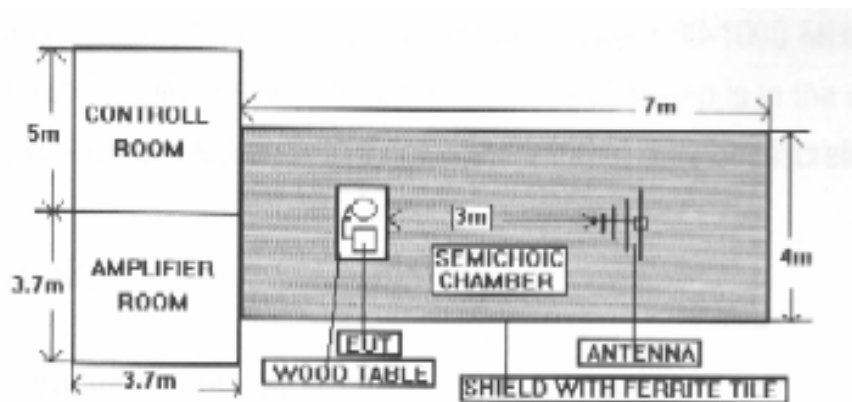
10. Radio Frequency Electromagnetic Field Immunity Test (RS)

- 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 : 01/06/2009
- 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,2008
5	Power Antenna	SCHWARZBECK	VULB 9166 / 1073	Jan,2008
6	Power Meter	BOONTON	4232A / 42201	Jan,2008
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: Freedom

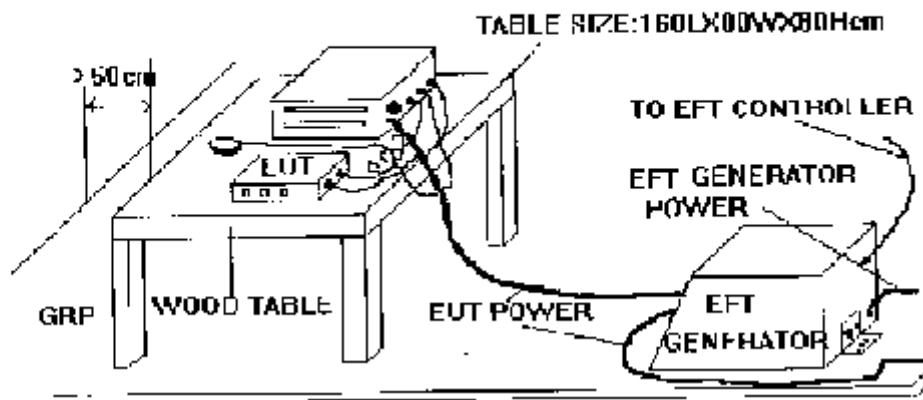
11. Immunity Tests Against Electrostatic Fast Transient (EFT)

- 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 : 01/06/2009
- 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: Freedom

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 : 01/06/2009
- 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: Freedom



13.1.1 Test Level

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

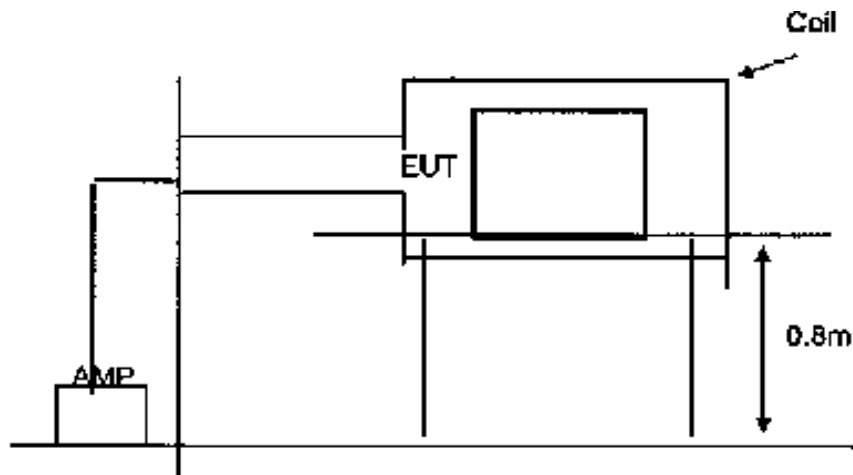
NOTE – X is an open class.
This level can be specified in the product specification.

13.2 Operating Condition

Full system

13.4 Final Testing Result : Pass

Test Engineer: Freedom

14.2 Test Setup**14.3 Operating Condition**

Full system

14.4 Final Testing Result : PassTest Engineer: Freedom



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: Freedom