

CE/EMC TEST REPORT

For

Acrox Technologies Co.,Ltd

2.4G Optical Mouse

Prepared for : Arox Technologies Co.,Ltd
Address : 4F., No.89, Minshan St., Neihu Dist., Taipei City 114,
Taiwan, R.O.C.

Prepared by : EST Technology Co., Ltd.
Address : San Tun Management Zone, Houjie District, Dongguan,
Guangdong, China

Tel: 86-769-83081888
Fax: 86-769-83081878

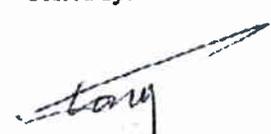
Report No. : ESTE-E1206011
Date of Report : June.11, 2012



TABLE OF CONTENTS

	Page
Test Report Declaration	
1. GENERAL PRODUCT INFORMATION.....	4
1.1. Product Function.....	4
1.2. Description of Device (EUT).....	4
1.3. Difference between Model Numbers	4
1.4. Independent Operation Modes	4
2. TEST STANDARDS AND SITES	5
2.1. Description of Standards and Results	5
2.2. Test Facilities.....	6
2.3. List of Test and Measurement Instruments	7
3. TEST SET-UP AND OPERATION MODES	8
3.1. Principle of Configuration Selection	8
3.2. Block Diagram of Test Set-up	8
3.3. Test Operation Mode and Test Software	8
3.4. Special Accessories and Auxiliary Equipment	8
3.5. Countermeasures to Achieve EMC Compliance.....	8
4. EMISSION TEST RESULTS	9
4.1. Radiated Emission Test.....	9
5. IMMUNITY TEST RESULT.....	15
5.1. Description of Performance Criteria:	15
5.2. Electrostatic Discharge Immunity Test.....	16
5.3. Radio Frequency Electromagnetic Field Immunity Test	18
6. PHOTOGRAPHS OF THE EUT.....	20

EST Technology Co., Ltd.

Applicant:	Acrox Technologies Co., Ltd.		
Address:	4F., No.89, Minshan St., Neihu Dist., Taipei City 114, Taiwan, R.O.C.		
Manufacturer:	Acrox Technologies Co., Ltd.		
Address:	4F., No.89, Minshan St., Neihu Dist., Taipei City 114, Taiwan, R.O.C.		
Factory:	Acrox Technologies Co., Ltd.		
Address:	Hsinmin Industria, Changan Town, Dongguan City, Guangdong, China		
E.U.T:	2.4G Optical Mouse		
Model Number:	G30		
Trade Name:	ACROX	Trade Name:	-----
Date of Receipt:	May.22.2012	Date of Test:	May.22.2012~June.11.2012
Test Specification:	EN 55022:2010 EN 61000-3-2:2006+A2:2009 EN 61000-3-3:2008 EN 55024:2010		
Test Result:	The equipment under test was found to be compliance with the requirements of the standards applied.		
	Date: June.11,12		
Prepared by:	Tested by:	Approved by:	
			
_____ Amy / Assistant	_____ Tony Tang / Engineer	_____ Iceman Hu / Manager	
Other Aspects:	None.		
<i>Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested</i>			
<i>This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd.</i>			

1. GENERAL PRODUCT INFORMATION

1.1. Product Function

Refer to Technical Construction Form and User Manual.

1.2. Description of Device (EUT)

Description	:	2.4G Optical Mouse
Model No.	:	G30
System Input Voltage	:	DC 3V
Operation frequency	:	2403~2480MHz

1.3. Difference between Model Numbers

None

1.4. Independent Operation Modes

The basic operation modes are:

1.4.1. On

2. TEST STANDARDS AND SITES

2.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION(EN 55022:2010)				
Description of Test Item	Standard	Limits		Results
Conducted disturbance at mains terminals	EN 55022:2010	Class B		N/A
		Minimum passing margin is ***dB at ***MHz		
Radiated disturbance	EN 55022:2010	Class B		PASS
		Minimum passing margin is 21.00dB at 4910MHz		
Harmonic current emissions	EN 61000-3-2:2006+A2:2009	Class A		N/A
Voltage fluctuations & flicker	EN 61000-3-3:2008	Section 5		N/A
IMMUNITY (EN 55024:2010)				
Description of Test Item	Basic Standard	Performance Criteria	Observation Criteria	Results
Electrostatic discharge (ESD)	IEC 61000-4-2:2008	B	A	PASS
Radio-frequency, Continuous radiated disturbance	IEC 61000-4-3:2010	A	A	PASS
Electrical fast transient (EFT)	IEC 61000-4-4:2004+A1:2010	B	B	N/A
Surge (Input a.c. power port)	IEC 61000-4-5:2005	B	A	N/A
Radio-frequency, Continuous conducted disturbance	IEC 61000-4-6:2008	A	A	N/A
Power frequency magnetic field	IEC 61000-4-8:2009	A	A	N/A
Voltage dips, >95% reduction	IEC 61000-4-11:2004	B	A	N/A
Voltage dips, 30% reduction		C	B	N/A
Voltage interruptions		C	B	N/A
N/A is an abbreviation for Not Applicable.				

2.2. Test Facilities

EMC Lab : Certificated by CNAL, CHINA
Registration No.: L5288
Date of registration: October 28, 2011

 Certificated by FCC, USA
Registration No.: 989591
Date of registration: December 07, 2010

 Certificated by Industry Canada
Registration No.: 144350
Date of registration: December 16, 2010

 Certificated by VCCI, Japan
Registration No.: R-3663 & C-4103
Date of registration: July 25, 2011

 Certificated by TUV Rheinland, Germany
Registration No.: UA 50195514 0001
Date of registration: January 07, 2011

 Certificated by TUV/PS, Shenzhen
Registration No.: SCN1017
Date of registration: January 27, 2011

 Certificated by Intertek ETL SEMKO
Registration No.: 2011-RTL-L1-18
Date of registration: April 28, 2011

 Certificated by Nemko, Hong Kong
Registration No.: 175193
Date of registration: May 4, 2011

Name of Firm : EST Technology Co., Ltd.

Site Location : San Tun Management Zone, Houjie District, Dongguan,
Guangdong, China

2.3.List of Test and Measurement Instruments

2.3.1. For radiated emission test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESVS10	100004	May,30,12	1 Year
Spectrum Analyzer	Agilent	E4411B	MY50140697	May,30,12	1 Year
Bilog Antenna	Teseq	CBL 6111D	25872	Nov 08,11	1.5 Year
Signal Amplifier	Agilent	310N	187037	Aug.25,11	1 Year
Spectrum Analyzer	Agilent	E4446A	US44300459	May.08, 12	1 Year
Horn Antenna	EMCO	3115	9607-4877	May.08, 12	1.5 Year
Amplifier	Agilent	8449B	3008A02495	Nov.06, 11	1 Year
RF Cable	Hubersuhner	SUCOFLEX1 02	28620/2	May.08, 12	1 Year
RF Cable	Hubersuhner	SUCOFLEX1 02	271471/4	May.08, 12	1 Year
RF Cable	Hubersuhner	SUCOFLEX1 02	29086/2	May.08, 12	1 Year

2.3.2. For electrostatic discharge immunity test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
ESD Generator	HAEFELY	ONYX16	174153	June.02,12	1 Year

2.3.3. Radio Frequency Electromagnetic Field Immunity (R/S) Test(ITS)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Signal Generator	HP	8648A	3426A01263	Apr.10,12	1 Year
Amplifier	A&R	500A100	17034	Apr.10,12	1 Year
Amplifier	A&R	100W	17028	Apr.10,12	1 Year
Isotropic Field Monitor	A&R	FM2000	16829	Apr.10,12	1 Year
Isotropic Field Probe	A&R	FP2000	16755	Apr.10,12	1 Year
Biconic Antenna	EMCO	3108	9507-2534	Apr.10,12	1 Year
Log-periodic Antenna	A&R	AT1080	16812	Apr.10,12	1 Year

3. TEST SET-UP AND OPERATION MODES

3.1. Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

Immunity: The equipment under test (EUT) was configured to the representative operating mode and conditions.

3.2. Block Diagram of Test Set-up

System Diagram of Connections Between EUT and Simulators



(EUT : 2.4G Optical Mouse)

3.3. Test Operation Mode and Test Software

Refer to Test Setup in clause 4 & 5.

3.4. Special Accessories and Auxiliary Equipment

None.

3.5. Countermeasures to Achieve EMC Compliance

None.

4. EMISSION TEST RESULTS

4.1. Radiated Emission Test

RESULT : **Pass**
Test procedure : EN 55022:2006+A1:2007
Frequency range : 30~6000MHz
Test Site : 966 Chamber
Limits : EN 55022:2010

Test Setup

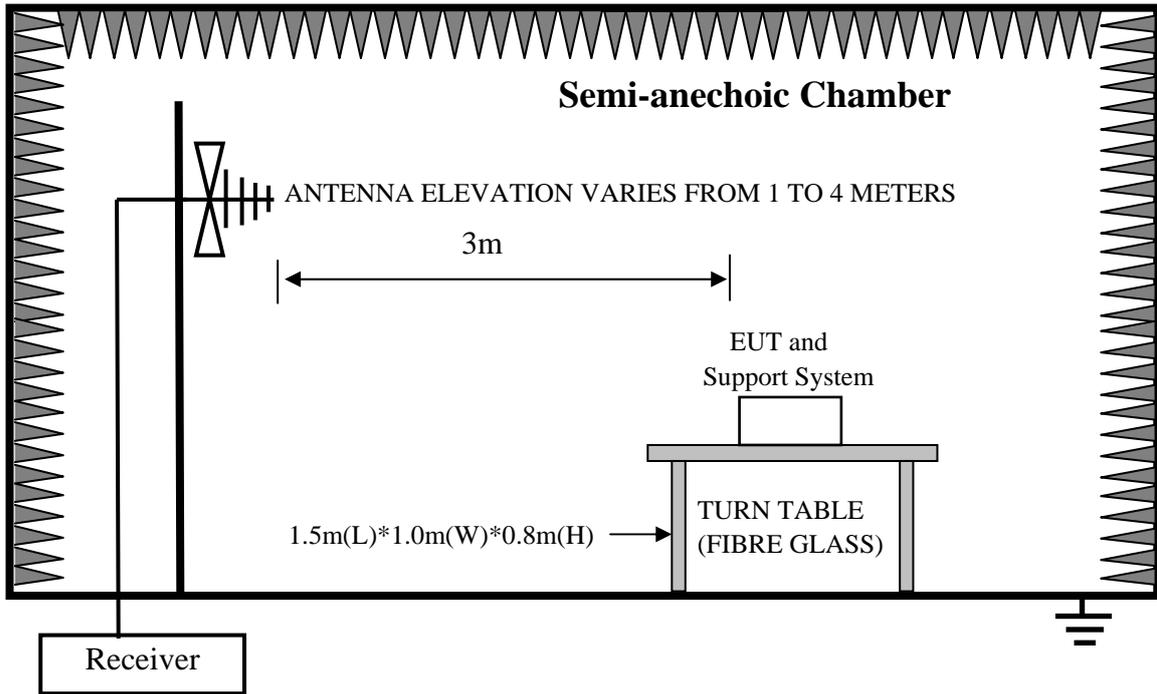
Date of test : June. 07, 2012
Model No. : G3O
Input Voltage : DC 5V
Operation Mode : On

The EUT was placed on a turn table which was 0.8 m above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

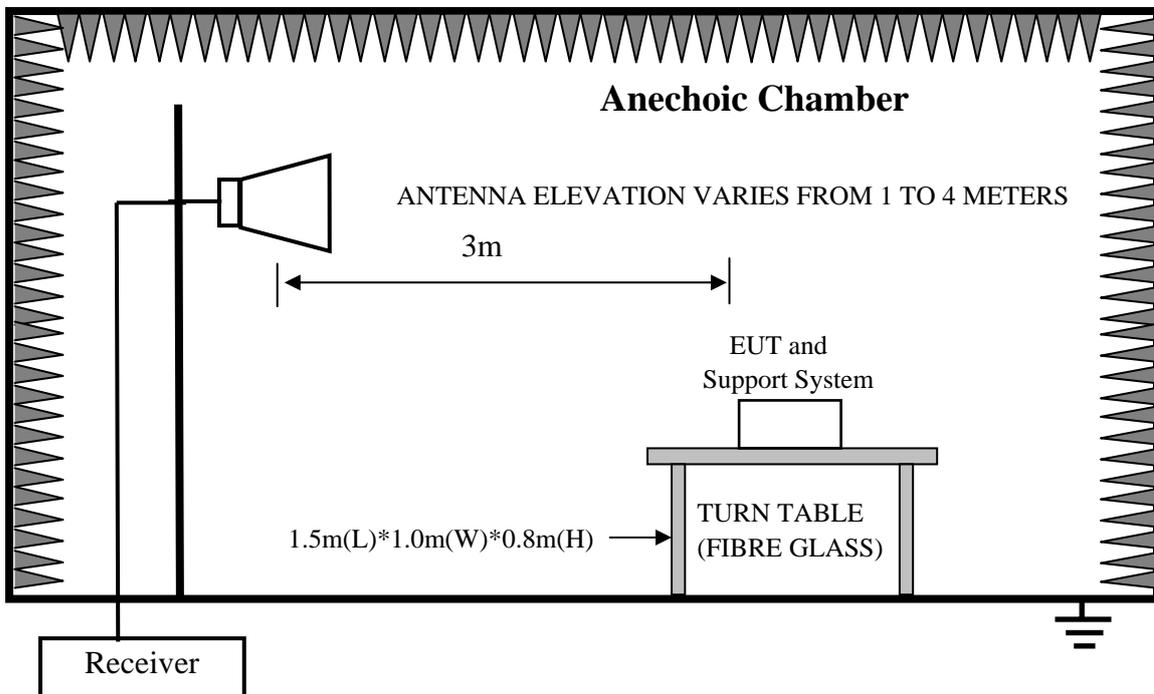
The EUT was tested in the Chamber Site. It was pre-scanned with a Peak detector from the spectrum, and all the final readings from the test receiver were measured with the Quasi-Peak detector.

The bandwidth setting on the test receiver was 120 kHz.

1、 In Semi-anechoic Chamber Test Setup Diagram for 30MHz~1000MHz



2、 In Anechoic Chamber Test Setup Diagram for 1-6GHz



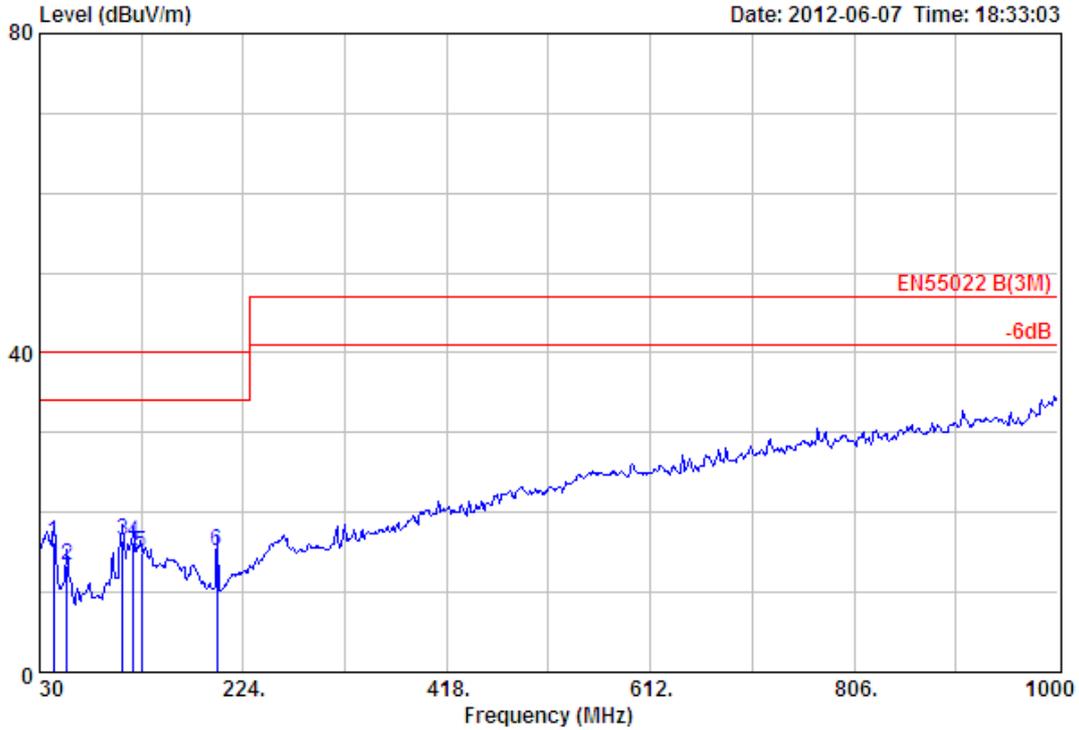
Note: Test uncertainty: $\pm 3.62\text{dB}$ at a level of confidence of 95%

Test Data
30MHz-1000MHz

EST Technology

San Tun Management Zone, Houjie Town,
Dongguan, Guangdong, China
Tel: +86-769-83081888
Fax: +86-769-83081878

Data: 212 File: \\Emc-966\test data\2012\W\WangHong.EMI (221) Date: 2012-06-07 Time: 18:33:03



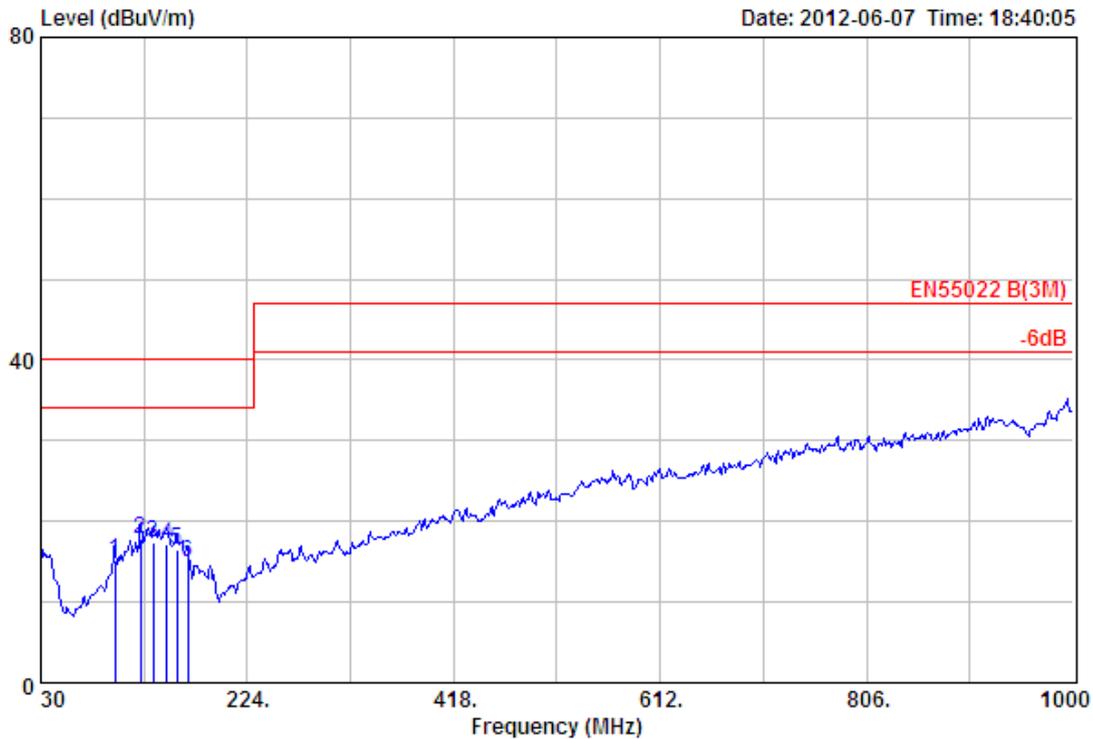
```

Site no       : 3m Chamber                Data no      :212
Dis. / Ant.   : 3m 27137                 Ant./Pol.   :VERTICAL
Limit        : EN55022 B(3M)
Env. / Ins.   : Temp:25.6';Humi:56%;Press:101.52kPa
Engineer     : Tony
EUT          : 2.4G Optical Mouse
Power        : DC 3V
M/N          : G30
Test Mode    : On
    
```

	Freq. (MHz)	Ant Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	43.58	10.52	1.83	3.88	16.23	40.00	23.77	QP
2	56.19	5.21	2.07	6.06	13.34	40.00	26.66	QP
3	109.54	10.44	3.09	2.97	16.50	40.00	23.50	QP
4	119.24	11.11	3.22	1.95	16.28	40.00	23.72	QP
5	127.00	11.34	3.29	0.37	15.00	40.00	25.00	QP
6	198.78	7.71	4.17	3.21	15.09	40.00	24.91	QP



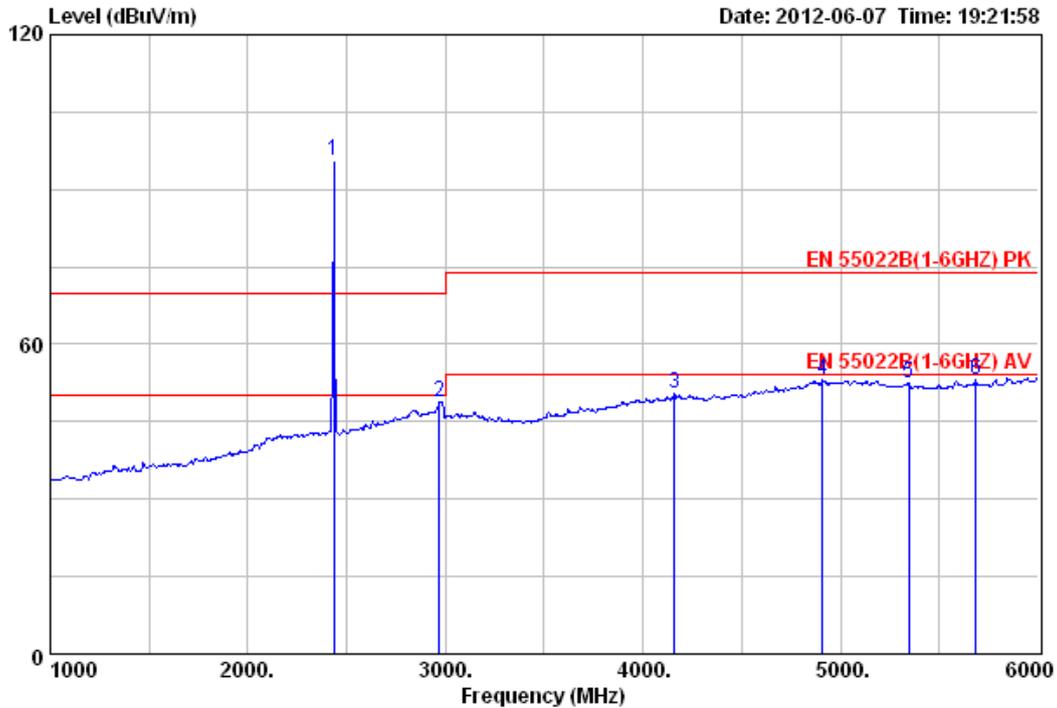
Data: 213 File: \\Emc-966\test data\2012\W\WangHong.EMI (221)



Site no : 3m Chamber Data no : 213
 Dis. / Ant. : 3m 27137 Ant./Pol.: HORIZONTAL
 Limit : EN55022 B(3M)
 Env. / Ins. : Temp: 25.6'; Humi: 56%; Press: 101.52kPa
 Engineer : Tony
 EUT : 2.4G Optical Mouse
 Power : DC 3V
 M/N : G30
 Test Mode : On

	Freq. (MHz)	Ant Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	99.84	9.45	2.97	2.70	15.12	40.00	24.88	QP
2	124.09	11.31	3.28	3.29	17.88	40.00	22.12	QP
3	135.73	11.38	3.43	2.65	17.46	40.00	22.54	QP
4	148.34	11.00	3.60	2.65	17.25	40.00	22.75	QP
5	158.04	10.48	3.72	2.28	16.48	40.00	23.52	QP
6	167.74	9.43	3.82	1.59	14.84	40.00	25.16	QP

Data: 218 File: D:\test data\2012\W\WangHong.EMI (221)



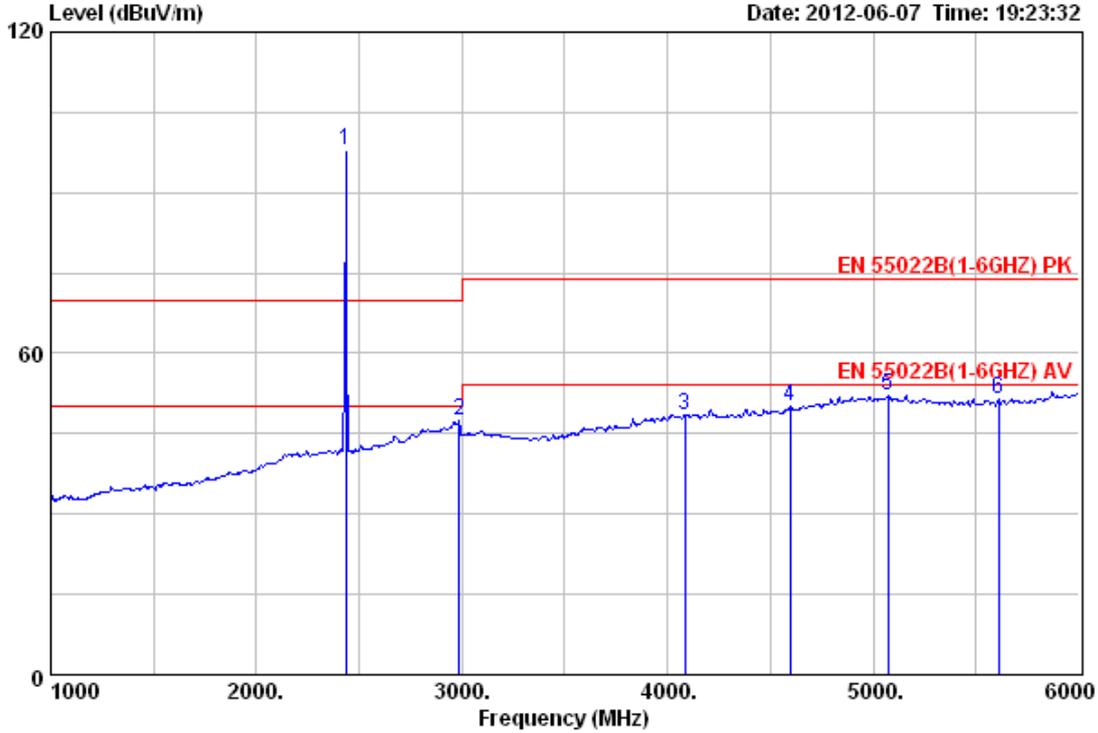
Site no. : 3m Chamber Data no. : 218
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL
 Limit : EN 55022B(1-6GHZ) PK
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : 2.4G Optical Mouse
 Power : DC 3V
 M/N : G30
 Test Mode : On

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Emission		Limits (dBuV/m)	Margin (dB)	Remark
					Reading (dBuV)	Level (dBuV/m)			
1	2435.00	27.60	6.66	34.12	95.38	95.52	70.00	-25.52	Peak
2	2970.00	28.16	8.90	33.60	45.29	48.75	70.00	21.25	Peak
3	4160.00	29.90	10.73	32.06	41.90	50.47	74.00	23.53	Peak
4	4910.00	31.42	12.22	31.93	41.29	53.00	74.00	21.00	Peak
5	5345.00	31.71	12.17	32.31	40.93	52.50	74.00	21.50	Peak
6	5685.00	32.17	12.04	32.60	41.50	53.11	74.00	20.89	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

Data: 219 File: D:\test data\2012\W\WangHong.EMI (221)

Date: 2012-06-07 Time: 19:23:32



Site no. : 3m Chamber Data no. : 219
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL
 Limit : EN 55022B(1-6GHZ) PK
 Env. / Ins. : Temp:25.6'; Humi:56%; Press:101.52kPa
 Engineer : Tony
 EUT : 2.4G Optical Mouse
 Power : DC 3V
 M/N : G30
 Test Mode : On

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Emission		Limits (dBuV/m)	Margin (dB)	Remark
					Reading (dBuV)	Level (dBuV/m)			
1	2435.00	27.60	6.66	34.12	97.83	97.97	70.00	-27.97	Peak
2	2985.00	28.19	8.97	33.58	43.74	47.32	70.00	22.68	Peak
3	4085.00	29.80	10.81	32.16	40.13	48.58	74.00	25.42	Peak
4	4595.00	30.80	10.79	31.66	40.12	50.05	74.00	23.95	Peak
5	5070.00	31.58	12.51	32.11	40.10	52.08	74.00	21.92	Peak
6	5610.00	32.05	12.02	32.67	40.19	51.59	74.00	22.41	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

5. IMMUNITY TEST RESULT

5.1. Description of Performance Criteria:

Performance criteria A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criteria B

After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.

During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criteria C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a backup, shall not be lost.

5.2. Electrostatic Discharge Immunity Test

RESULT	: Pass
Test procedure	: EN 55024:2010
Basic standard	: IEC 61000-4-2:2008
Test specification	: +/-4.0kV(Contact discharge) +/-8.0kV(Air discharge)
Number of discharges	: ≥ 10 (Air discharge for single polarity discharge) ≥ 25 (Contact discharge for single polarity discharge)
Polarity	: Positive/Negative
Performance criterion	: B

Test Setup

Date of test	: June. 08, 2012
Model No.	: G30
Input Voltage	: DC 5V
Operation Mode	: On
Temperature	: 24.8°C
Humidity	: 56%
Pressure	: 101.50kPa

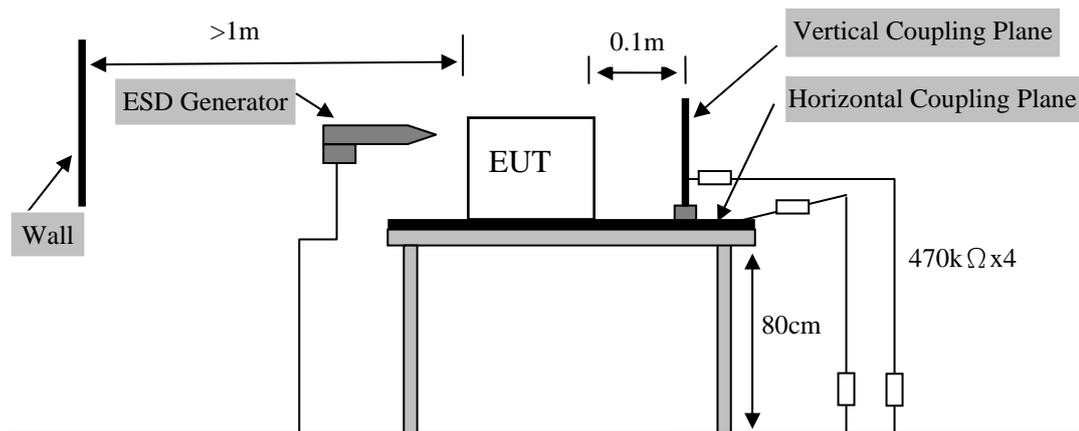


Table 1: Electrostatic Discharge Immunity Test Result

Discharge Location		Type of discharge	Result
Slots	4 points	Air	Pass
Buttom	4 points	Air	Pass
Switch	1 point	Air	Pass
HCP	4 points	Contact	Pass
VCP	4 points	Contact	Pass

*Remark: 1. There was no change compared with initial operation during the test.
 2. Discharge should be considered on Contact and Air and Horizontal Coupling Plane (HCP) and Vertical Coupling Plane (VCP).*

5.3. Radio Frequency Electromagnetic Field Immunity Test

RESULT : **Pass**
Test procedure : EN 55024:2010
Basic standard : IEC 61000-4-3:2010
Performance criterion : A
Test site : ITS

Test Setup

Date of test : Jun. 08, 2012
Model No. : G3O
Input Voltage : DC 5V
Operation Mode : On
Temperature : 24.8°C
Humidity : 56%
Pressure : 101.50kPa

The EUT and its simulators were placed on a turn table which was 0.8 meter above the ground. The EUT was set 3 m away from the transmitting antenna which was mounted on an antenna tower. Both horizontal and vertical polarization of the antenna were set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually.

In order to judge the EUT performance, a CCD camera was used to monitor EUT screen.

All the scanning conditions were as follows:

Condition of Test	Remarks
1. Field Strength	3 V/m (Severity Level 2)
2. Radiated Signal	Modulated
3. Scanning Frequency	80 - 1000 MHz
4. Sweeping time of radiated	0.0015 decade/s
5. Dwell Time	3 Sec.

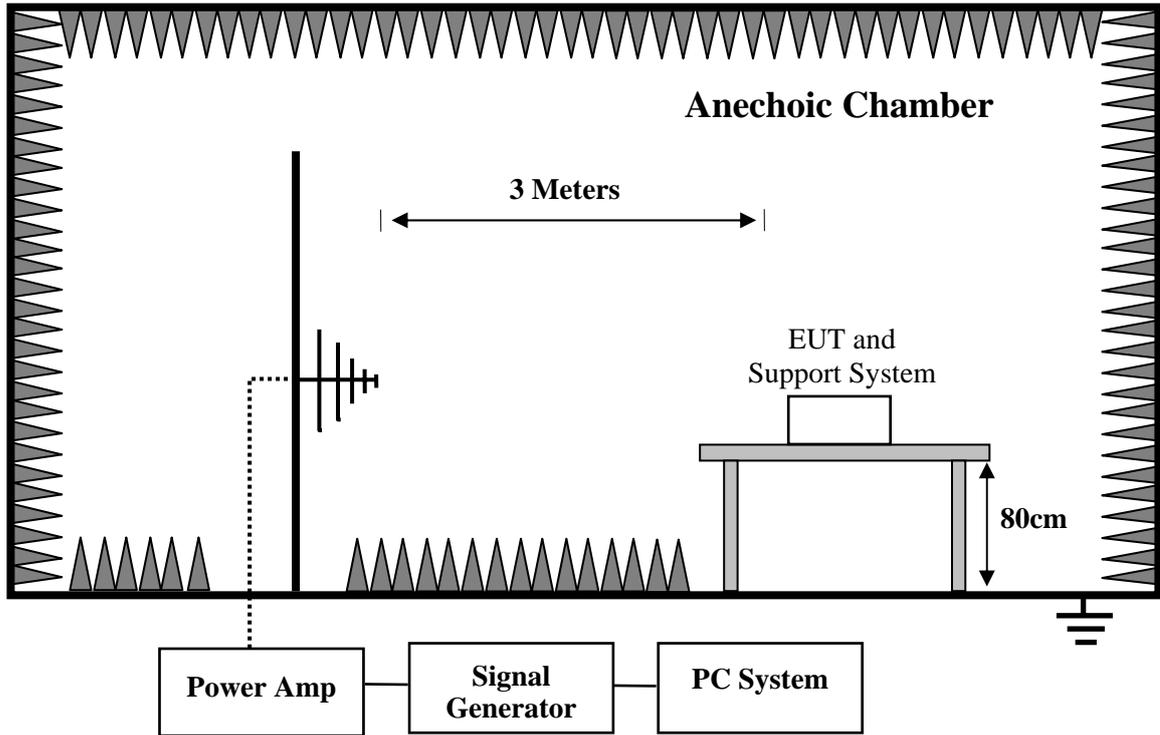


Table 2: Radio Frequency Electromagnetic Field Immunity Test Result

Position	Modulated signal	Test level	Step	Result
Front	AM 80% 1kHz	3 V/m	1%	Pass
Right				Pass
Rear				Pass
Left				Pass

Remark: There was no change compared with initial operation during the test.

6. PHOTOGRAPHS OF THE EUT

Figure 1
General Appearance of the EUT



Figure 2
General Appearance of the EUT



Figure 3
Inside View of the EUT

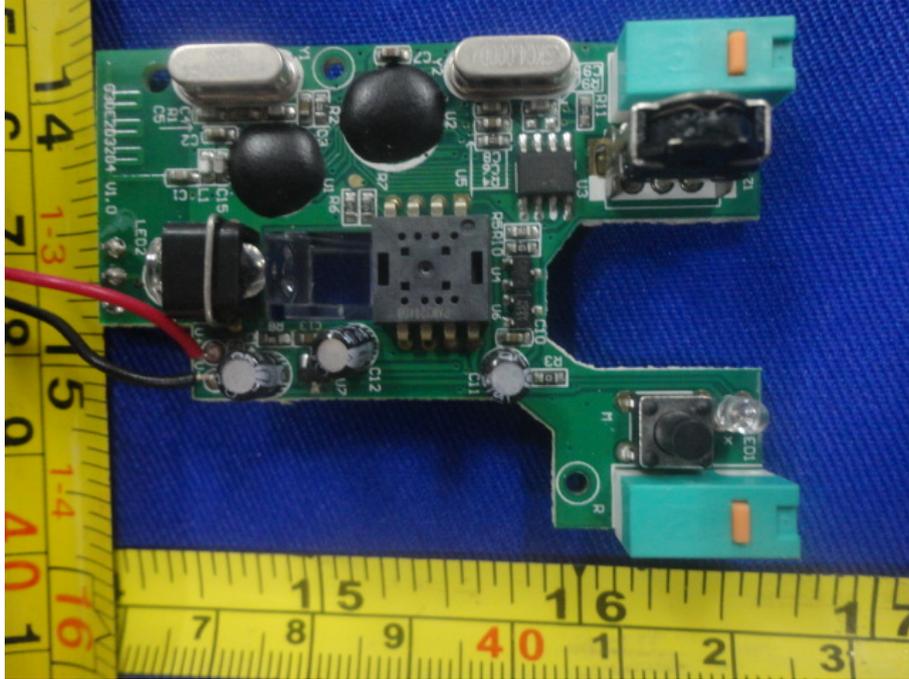


Figure 4
Inside View of the EUT

