

EMC Test Report

Application No. : IP16110460

Applicant : Shenzhen Flytech(Hualet) Co., Ltd.

Equipment Under Test (EUT)

EUT Name : WIRED MOUSE

Model No. : HM-812

Serial No. : HM-817, HM-818, HM-987, HM-916, HM-820, HM-890, HM-702, HM-700,
, HM-814, HM-819B, HM-800

Brand Name : N/A

Receipt Date : 2016-11-18

Test Date : 2016-11-21 to 2016-11-24

Issue Date : 2016-11-25

Standards : EN55032: 2015
EN55024: 2010+A1 :2015

Conclusions : **PASS**

In the configuration tested, the EUT complied with the standards specified above
The EUT technically complies with the 2014/30/EU directive requirements

Test/Witness Engineer

Approved & Authorized



This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

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1. General Information

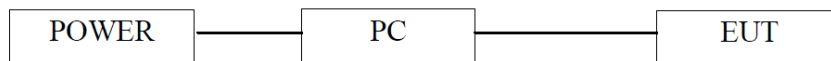
1.1. Client Information

Applicant	:	Shenzhen Flytech(Hualet) Co., Ltd.
Address	:	Floor 2nd,Building 3,Ximen Industrial Park,Liaokeng, ShiyanTown, Baoan District,Shenzhen City,P.R.China
Manufacturer	:	Shenzhen Flytech(Hualet) Co., Ltd.
Address	:	Floor 2nd,Building 3,Ximen Industrial Park,Liaokeng, ShiyanTown, Baoan District,Shenzhen City,P.R.China

1.2. General Description of EUT (Equipment Under Test)

EUT Name	:	WIRED MOUSE
Model No.	:	HM-812
Serial No.	:	HM-817, HM-818, HM-987, HM-916, HM-820, HM-890, HM-8XX, HM-7XX
Brand Name	:	N/A
Power Supply	:	DC12V
Remark: All above models are identical in schematic, structure and critical components except for only different appearance; therefore, we choose HM-812 for EMC test.		

1.3. Block Diagram Showing The Configuration of System Tested



1.4. Description of Support Units

Name	Model	S/N	Manufacturer	Used “√”
Printer	HP1505n	VNF3G06957	HP	√
Modem	RX304Xv2	----	ASUS	√
LCD Monitor	E170Sc	----	DELL	√
PC	OPTIPLEX380	----	DELL	√
Keyboard	L100	U01C	DELL	√
Mouse	M-UARDEL7	----	DELL	√
Mobile	E7	----	Nokia	√

1.5. Performance Criterion

Criterion 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.

Criterion 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.

Criterion 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.

1.6. Test Facility

The testing report were performed by the Shenzhen iPEN Testing Technology Co., Ltd., in their facilities located at 5/F Haoyunlai Building B, 2 Baomin Road Xixiang Street, Bao'an District, Shenzhen, China

2. TEST Results Summary

EMISSION		
Description of test items	Standards	Results
Conducted disturbance at mains terminals	EN 55032: 2015	N/A
Radiated Disturbance	EN 55032: 2015	Pass
Harmonic current emissions	EN 61000-3-2:2014	N/A
Voltage fluctuation and flicker	EN 61000-3-3:2013	N/A
IMMUNITY		
Description of test items	Standards	Results
Electrostatic Discharge (ESD)	EN 61000-4-2: 2009	Pass
Radio-frequency, Continuous radiated disturbance	EN 61000-4-3: 2006+A1:2008 +A2:2010	Pass
EFT/B Immunity	EN 61000-4-4: 2012	N/A
Surge Immunity	EN 61000-4-5: 2014	N/A
Conducted RF Immunity	EN 61000-4-6: 2014	N/A
Power frequency magnetic field	EN 61000-4-8: 2010	N/A
Voltage dips, >95% reduction	EN 61000-4-11: 2004	N/A
Voltage dips, 30% reduction		
Voltage interruptions		
Note: N/A is an abbreviation for Not Applicable.		

3. Test Equipment Used

3.1. Test Equipment Used to Measure Conducted Emission

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
IP-EMC001	EMI Test Receiver	Rohde & Schwarz	ESCS30	Jan.06,2016	1 Year
IP -EMC002	AMN	Rohde & Schwarz	ESH3-Z5	Jan.06,2016	1 Year
IP -EMC003	ANN	SCHWARZBECK	NNBL 8226-2	Jan.06,2016	1 Year

3.2. Test Equipment Used to Measure Radiation Emissions

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
IP -EMC004	EMI Test Receiver	Rohde & Schwarz	ESI26	Jan.06,2016	1 Year
IP -EMC005	Bilog Antenna	Chase	CBL6112B	Jan.06,2016	1 Year
IP -EMC006	Positioning Controller	C&C	CC-C-1F	Jan.06,2016	1 Year
IP -EMC007	Spectrum Analyzer	Agilent	E4407B	Jan.06,2016	1 Year
IP -EMC008	Pre-amplifier	Agilent	8449B	Jan.06,2016	1 Year
IP -EMC009	Pre-amplifier	Agilent	8447D	Jan.06,2016	1 Year
IP -EMC010	Horn Antenna	ETS LINDGREN	3117	Jan.06,2016	1 Year

3.3. Test Equipment Used to Measure Harmonic Current/ Voltage Fluctuation and Flicker

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
IP -EMC011	Harmonic FlickerTest System	CI	5001ix-CT S-400	Jan.06,2016	1 Year

3.4. Test Equipment Used to Measure Electrostatic Discharge Immunity

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
IP -EMC012	ESD Tester	SCHNAFFNER	NSG435	Jan.06,2016	1 Year

3.5. Test Equipment Used to Measure Conducted Immunity

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
IP -EMC013	RF Generator	FRANKONIA	CIT-10/75	Jan.06,2016	1 Year
IP -EMC014	Attenuator	FRANKONIA	59-6-33	Jan.06,2016	1 Year
IP -EMC015	M-CDN	LUTHI	M2/M3	Jan.06,2016	1 Year
IP -EMC016	CDN	LUTHI	AF2	Jan.06,2016	1 Year
IP -EMC017	EM Injection Clamp	LUTHI	EM101	Jan.06,2016	1 Year

3.6 Test Equipment Used to Measure Radio Frequency Electromagnetic Fields Immunity

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
IP -EMC018	Signal Generator	Rohde & Schwarz	SMT03	Jan.06,2016	1 Year
IP -EMC019	Power Meter	Rohde & Schwarz	NRVD	Jan.06,2016	1 Year
IP -EMC020	Voltage Probe	Rohde & Schwarz	URV5-Z2	Jan.06,2016	1 Year
IP -EMC021	Voltage Probe	Rohde & Schwarz	URV5-Z2	Jan.06,2016	1 Year
IP -EMC022	Power Amplifier	AR	150W1000	Jan.06,2016	1 Year
IP -EMC023	Bilog Antenna	Chase	CBL6111C	Jan.06,2016	1 Year

3.7. Test Equipment Used to Measure Electrical Fast Transient/Burst Immunity

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
IP -EMC024	Simulator	EMTEST	UCS500M4	Jan.06,2016	1 Year
IP -EMC025	Auto-transformer	EMTEST	V4780S2	Jan.06,2016	1 Year

3.8. Test Equipment Used to Measure Surge Immunity

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
IP -EMC026	Simulator	EMTEST	UCS500M4	Jan.06,2016	1 Year
IP -EMC027	Coupling Clamp	EMTEST	HFK	Jan.06,2016	1 Year

3.9. Test Equipment Used to Measure Voltage Dips and Interruptions Immunity

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
IP -EMC028	Simulator	EMTEST	UCS500N5	Jan.06,2016	1 Year
IP -EMC029	Auto-transfo rmer	EMTEST	V4780S2	Jan.06,2016	1 Year

3.10. Test Equipment Used to Measure Power Frequency magnetic field

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
IP -EMC030	Power Frequency Magnetic Field Generator	EMTEST	----	Jan.06,2016	1 Year

4. Radiated Emission Test

4.1. Test Standard and Limit

4.1.1. Test Standard

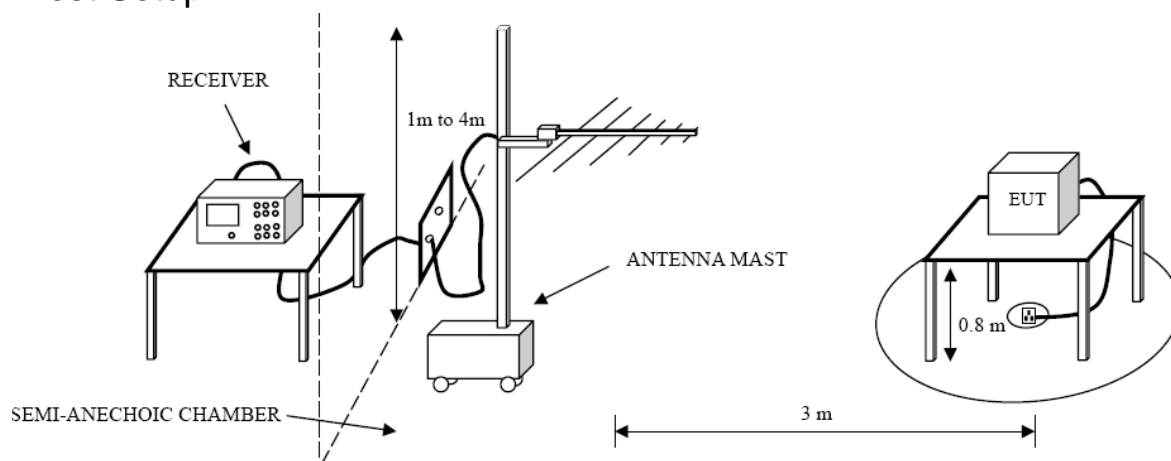
EN 55032: 2015

4.1.2. Test Limit

Radiated Disturbance Test Limit (Class B)

Frequency	Limit (dB μ V/m)
	Quasi-peak Level
30MHz~230MHz	40
230MHz~1000MHz	47
Remark: 1. The lower limit shall apply at the transition frequency. 2. The test distance is 3m.	

4.2. Test Setup



4.3. Test Procedure

The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m. The table was rotated 360 degrees to determine the position of the highest radiation.

The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

The initial step in collecting radiated emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range.

If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.

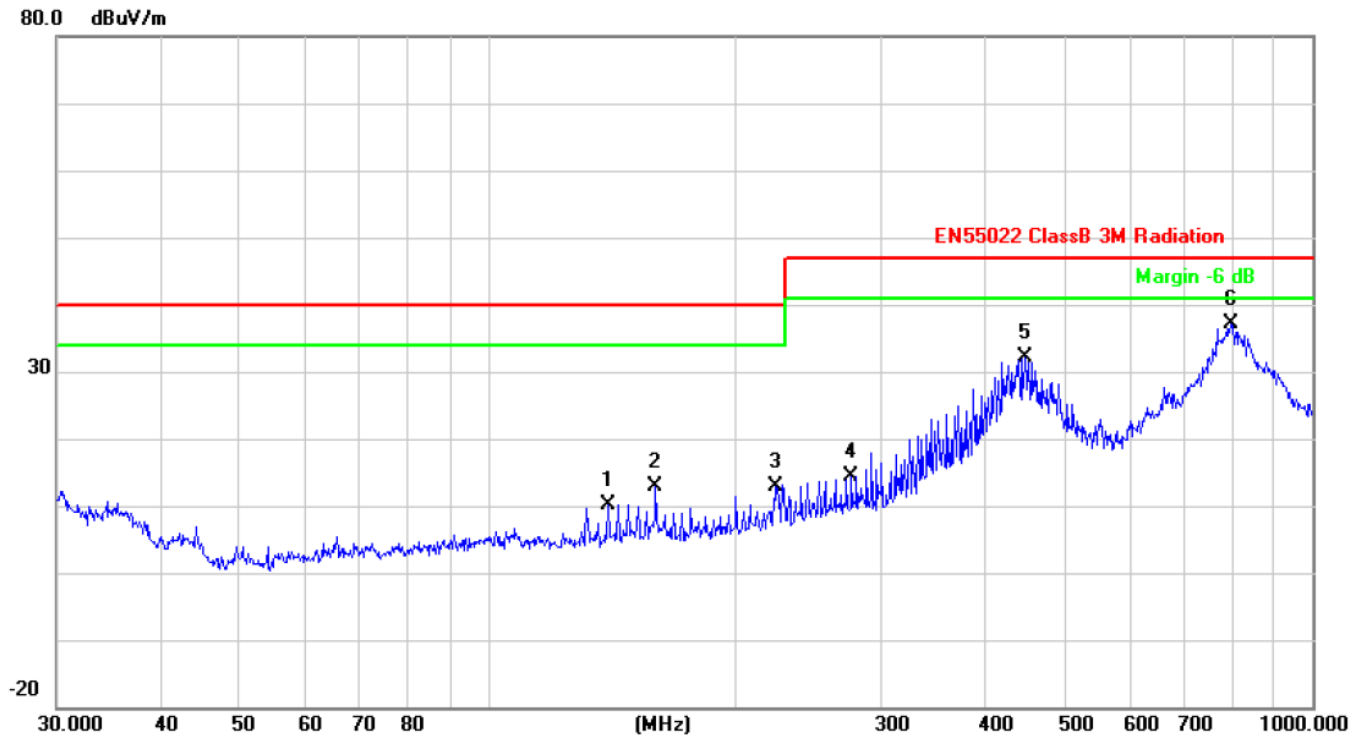
4.4. Test Condition

Temperature	:	25 °C
Relative Humidity	:	48 %
Pressure	:	1010 hPa
Test Power	:	DC 12V

4.5. Test Data

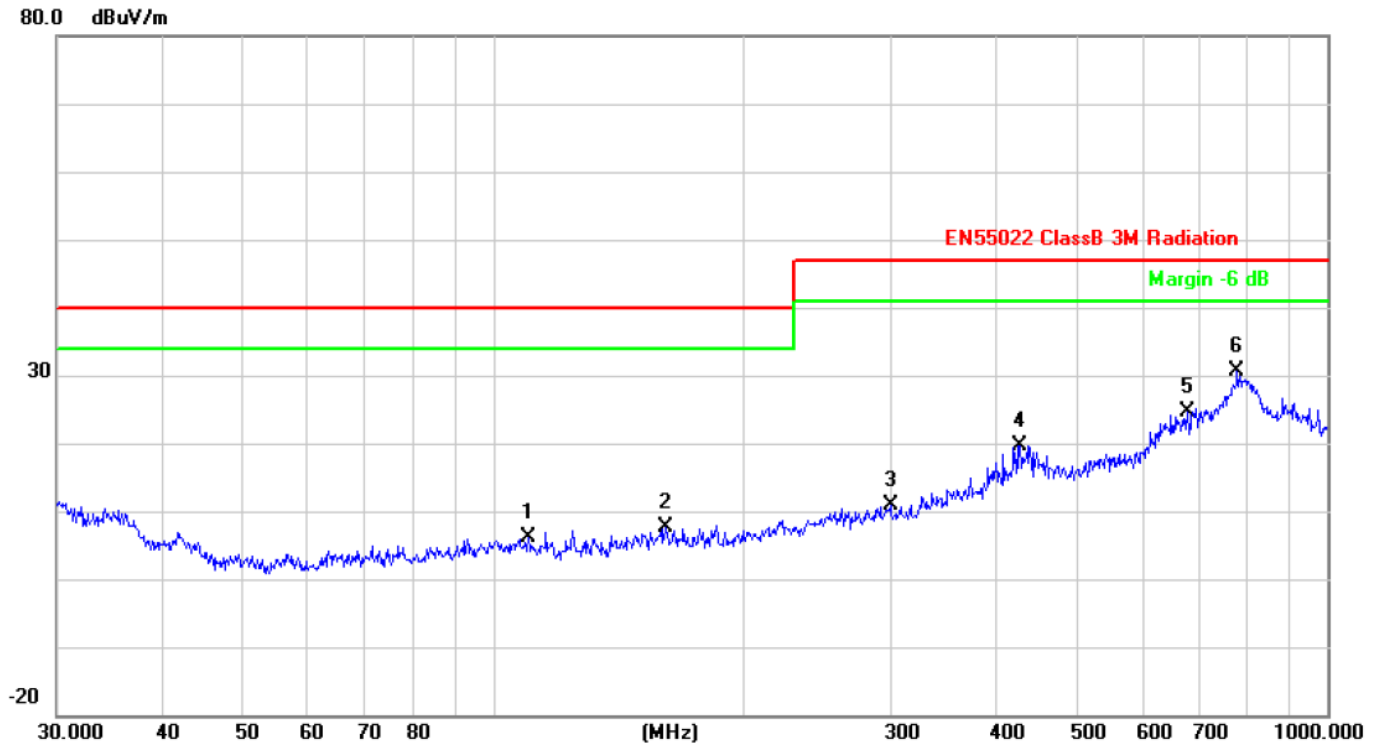
Please refer to the following pages.

Operating Condition: Discharging
Test Specification: Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	
1		139.8508	32.24	-21.99	10.25	40.00	-29.75	peak
2		159.7844	33.30	-20.52	12.78	40.00	-27.22	peak
3		223.7334	32.17	-19.36	12.81	40.00	-27.19	peak
4		276.1235	31.98	-17.55	14.43	47.00	-32.57	peak
5		447.9822	44.59	-12.49	32.10	47.00	-14.90	peak
6	*	796.1830	43.67	-6.54	37.13	47.00	-9.87	peak

Operating Condition: Discharging
Test Specification: Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		110.1816	27.97	-21.88	6.09	40.00	-33.91	peak
2		160.9089	28.19	-20.57	7.62	40.00	-32.38	peak
3		299.3158	27.90	-17.10	10.80	47.00	-36.20	peak
4		428.0193	32.53	-12.86	19.67	47.00	-27.33	peak
5		679.9600	32.00	-7.41	24.59	47.00	-22.41	peak
6	*	779.6068	37.21	-6.69	30.52	47.00	-16.48	peak

5. Electrostatic Discharge Immunity Test

5.1. Test Requirements

5.1.1. Test Standard

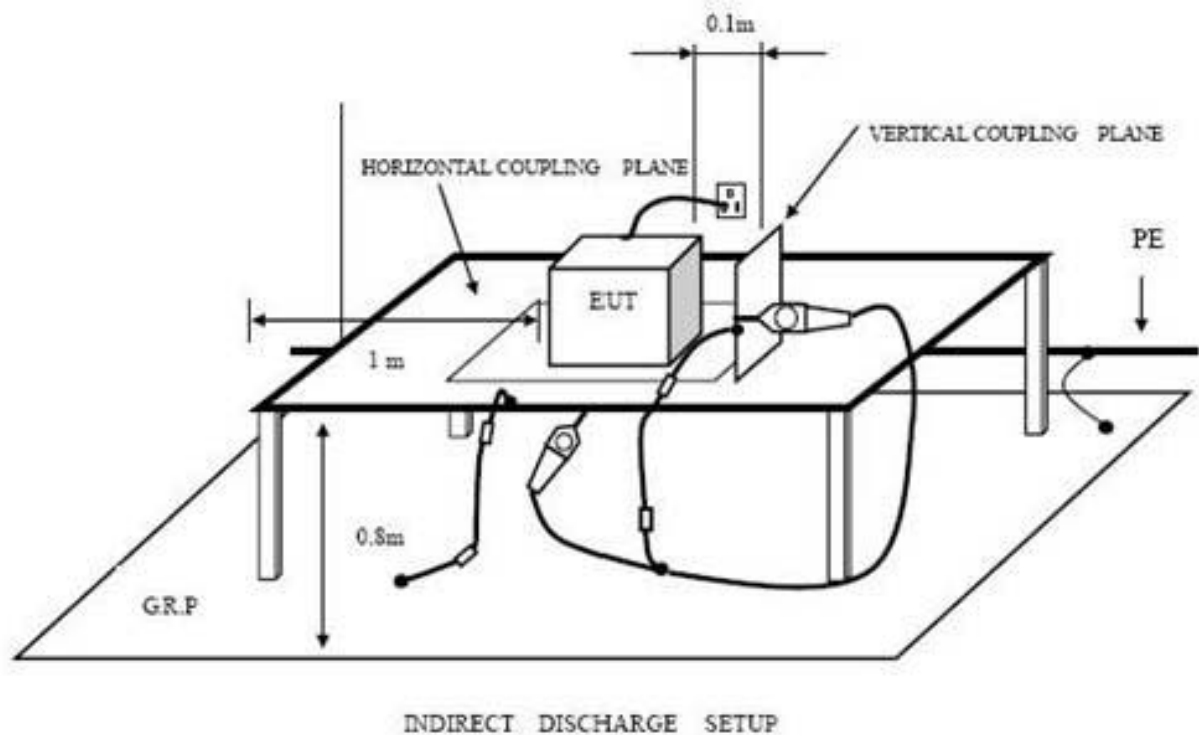
EN 55024:2010+A1:2015 (EN 61000-4-2:2009)

5.1.2. Test Level

Level	Test Voltage Contact Discharge (kV)	Test Voltage Air Discharge (kV)
1	±2	±2
2	±4	±4
3	±6	±8
4	±8	±15
X	Special	Special

5.1.3. Performance criterion: **B**

5.2. Test Setup



5.3. Test Procedure

5.3.1. Air Discharge:

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

5.3.2. Contact Discharge:

All the procedure shall be same as air discharge. Except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

5.3.3. Indirect discharge for horizontal coupling plane

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

5.3.4. Indirect discharge for vertical coupling plane

At least 10 single discharges (in the most sensitive polarity) shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

5.4. Test Data

Please refer to the following pages.

Electrostatic Discharge Test Result

EUT : WIRED MOUSE M/N : HM-812		
Temperature : 22°C Humidity : 50%		
Power supply : DC 12V Test Mode : Discharging		
Criterion: B		
Air Discharge: $\pm 8\text{kV}$ Contact Discharge: $\pm 4\text{kV}$		
For each point positive 10 times and negative 10 times discharge.		
Location	Kind A-Air Discharge C-Contact Discharge	Result
Nonconductive Enclosure	A	PASS
Slot of the EUT	A	PASS
Button	A	PASS
LED	A	PASS
Port	C	PASS
HCP	C	PASS
VCP of front	C	PASS
VCP of rear	C	PASS
VCP of left	C	PASS
VCP of right	C	PASS

6. Radiated Electromagnetic Field Immunity Test

6.1. Test Requirements

6.1.1. Test Standard

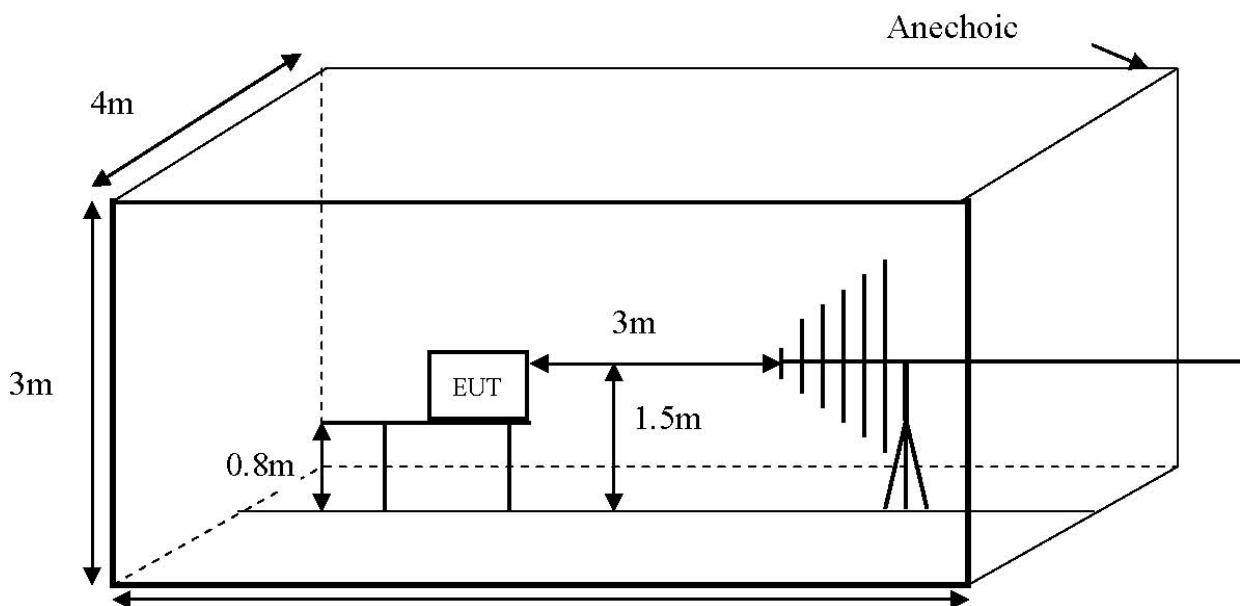
EN 55024:2010 (EN 61000-4-3:2006+A1:2008+A2:2010)

6.1.2. Test Level

Level	Field Strength V/m
1	1
2	3
3	10
X	Special

6.1.3. Performance criterion: A

6.2. Test Setup



6.3. Test Procedure

The EUT are placed on a table, which is 0.8 meter high above the ground. The EUT is set 3 meters away from the transmitting antenna, which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna is set on test. Each of the four sides of the EUT must be faced this transmitting antenna and measured individually.

In order to judge the EUT performance, a camera is used to monitor its screen.

All the scanning conditions are as following:

Condition of Test	Remark
Fielded strength	3V/m (Severity Level 2)
Radiated signal	Modulated
Scanning frequency	80-1000MHz
Sweep time of radiated	0.0015 Decade/s
Dwell time	1 Sec.

6.4. Test Data

Please refer to the following pages.

RF Field Strength Susceptibility Test Results

EUT : <u>WIRED MOUSE</u> M/N : <u>HM-812</u>				
Temperature : <u>22°C</u> Humidity : <u>50%</u>				
Power supply : <u>DC 12V</u> Test Mode : <u>Discharging</u>				
Criterion: A				
Modulation: Unmodulated				
Pulse: AM 1KHz 80%				
	Frequency Range 1		Frequency Range 2	
	80~1000MHz			
	Horizontal	Vertical	Horizontal	Vertical
Front	PASS	PASS	/	/
Right	PASS	PASS	/	/
Rear	PASS	PASS	/	/
Left	PASS	PASS	/	/
Remark:				

7. Photographs - Constructional Details

Photo 1 Appearance of EUT



Photo 2 Appearance of EUT



END OF REPORT