



World Standardization Certification & Testing CO., LTD  
World Standardization Safety and EMC Testing Centre

## FCC Certification TEST REPORT

for

**2.4G wireless optical mouse**

**MODEL: SH-003, SH-601~SH-699**

**FCC ID:XYL-SH003R**

**Test Report Number: WSCT09100442E-1**

**Issued Date: January 4, 2010**

Issued for

**SUNICE INTERNATIONAL ELECTRONICS LIMITED**

**5/F, No.27, Gongye Road, Gonghe Industry, Xixiang Town,  
Bao'an District, Shenzhen, Guangdong, China**

Issued by:

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### Revision History

Rev.	Issue No.	Revisions	Effect Page	Revised By
00	WSCT09100442E-1	Initial Issue	ALL	Kallen Wang



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## 1 TEST RESULT CERTIFICATION

<b>Product:</b>	2.4G wireless optical mouse
<b>Model:</b>	SH-003, SH-601~SH-699
<b>Trade Mark:</b>	N/A
<b>Applicant:</b>	<b>SUNICE INTERNATIONAL ELECTRONICS LIMITED</b> 5/F, No.27, Gongye Road, Gonghe Industry, Xixiang Town, Bao'an District, Shenzhen, Guangdong, China
<b>Manufacturer:</b>	<b>SUNICE INTERNATIONAL ELECTRONICS LIMITED</b> 5/F, No.27, Gongye Road, Gonghe Industry, Xixiang Town, Bao'an District, Shenzhen, Guangdong, China
<b>Tested Date:</b>	October 17, 2009~ January 4, 2010
<b>Test Voltage:</b>	DC 5V(PC Input AC120V/60Hz)

### EMISSION

Standard	Item	Result	Remarks
FCC 47 CFR Part 15 Subpart B,	Conducted (Main Port)	PASS	Meet Class B limit
ANSI C63.4-2003	Radiated	PASS	Meet Class B limit

Note: 1. The test result judgment is decided by the limit of measurement standard  
2. The information of measurement uncertainty is available upon the customer's request.

### Deviation from Applicable Standard

None

The above equipment has been tested by World Standardization Certification & Testing Co., Ltd and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By: Eric Yang  
(Eric Yang)

Date: 2010/01/04

Check By: Kelly Wu  
(Kelly Wu)

Date: 2010/01/04

Approved By: Kallen Wang  
(Kallen Wang)

Date: 2010/01/04



Report reference No.:WSCT09100442E-1

Issued: January 4, 2010

Revised:None

## 2 EUT DESCRIPTION

<b>Product</b>	2.4G wireless optical mouse
<b>Trade Mark</b>	N/A
<b>Model</b>	SH-003, SH-601~SH-699
<b>Applicant</b>	SUNICE INTERNATIONAL ELECTRONICS LIMITED
<b>EUT Type</b>	<input checked="" type="checkbox"/> Engineering Sample. <input type="checkbox"/> Product Sample, <input type="checkbox"/> Mass Product Sample.
<b>Serial Number</b>	N/A
<b>EUT Power Rating</b>	DC 5V

## I/O PORT

I/O PORT TYPES	Q'TY	TESTED WITH
N/A	N/A	N/A

## Models difference

N/A

### 3 TEST METHODOLOGY

#### 3.1. DECISION OF FINAL TEST MODE

The EUT was tested together with the thereafter additional components, and a configuration, which produced the worst emission levels, was selected and recorded in this report.

The following test mode(s) were scanned during the preliminary test:

Pre-Test Mode		
Emission	Conducted Emission	Mode: Running PC System
	Radiated Emission	Mode: Running PC System

After the preliminary scan, the following test mode was found to produce the highest emission level.

The Worst Test Mode		
Emission	Conducted Emission	Mode: Running PC System
	Radiated Emission	Mode: Running PC System

Then, the EUT configuration and cable configuration of the above highest emission mode was chosen for all final test items.

#### 3.2. EUT SYSTEM OPERATION

1. Set up EUT with the relative support equipments.
2. Make sure the EUT worked normally during the test.

## 4 SETUP OF EQUIPMENT UNDER TEST

### 4.1. DESCRIPTION OF SUPPORT UNITS

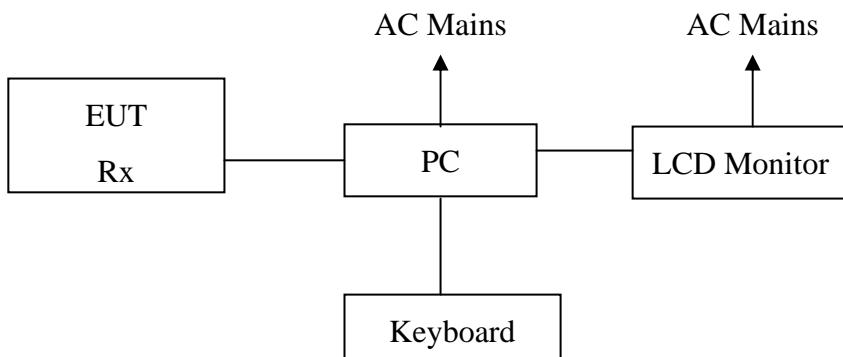
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Equipment	Model No.	Serial No.	FCC ID	Trade Name	Data Cable	Power Cord
1.	PC	DX2700	CNG714077P	N/A	HP	shielded 1.5m	Unshielded 1.8m
2.	LCD Monitor	L1706V	CON74535YZ	N/A	HP	Shielded 1.8m	Unshielded 1.8m
3.	Keyboard	SK-2800	435302-AA1	N/A	HP	Unshielded 1.5m	N/A

**Note:**

- 1) All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- 2) Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

### 4.2. CONFIGURATION OF SYSTEM UNDER TEST



(EUT:2.4G wireless optical mouse)

## 5 FACILITIES AND ACCREDITATIONS

### 5.1. FACILITIES

All measurement facilities used to collect the measurement data are located at **1-2/F, DaChong Science&Technology Building, No.28 of Tonggu Road,Nanshan District, ShenZhen.PRC**

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### 5.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

<b>USA</b>	<b>FCC</b> (The certificate registration number is 276008)
	<b>TIMCO</b> (The certificate registration number is Q2001)
<b>Japan</b>	<b>VCCI</b> (The certificate registration number is C-2912, R-2662)
<b>Canada</b>	<b>INDUSTRY CANADA</b> (The certificated registration number is 46405-7700)
<b>Germany</b>	<b>TUV</b> (The certificate registration number is UA50138086-0001,UA50138086-0002)
	<b>EMCC</b> (The certificated registration number is 080380)
<b>China</b>	<b>CNAS</b> (The certificated registration number is L3732)

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.wsct.org.cn>

### 5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency		Uncertainty
Conducted emissions	9kHz~30MHz		+/- 3.59dB
Radiated emissions	Horizontal	30MHz ~ 200MHz	+/- 4.77dB
		200MHz ~1000MHz	+/- 4.93dB
	Vertical	30MHz ~ 200MHz	+/- 5.04dB
		200MHz ~1000MHz	+/- 4.93dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

## 6 CONDUCTED EMISSION MEASUREMENT

### 6.1. LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

**NOTE:**

- (1) The lower limit shall apply at the transition frequencies.
- (2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
- (3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

### 6.2. TEST INSTRUMENTS

Conducted Emission Shielding Room Test Site 743				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	ROHDE&SCHWARZ	ESCI	100005	06/23/2010
LISN	AFJ	LS16	16010222119	04/02/2010
LISN	Meestec	AN3016	04/10040	04/02/2010

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to International system of unit (SI).  
2. N.C.R = No Calibration Request.

## 6.3.TEST PROCEDURES

### Procedure of Preliminary Test

The EUT and Support equipment, if needed, was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor standing equipment, it is placed on the ground plane, which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

All support equipment power received from a second LISN.

The EUT test program was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in Item 3.1 were scanned during the preliminary test.

After the preliminary scan, we found the test mode described in Item 3.1 producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

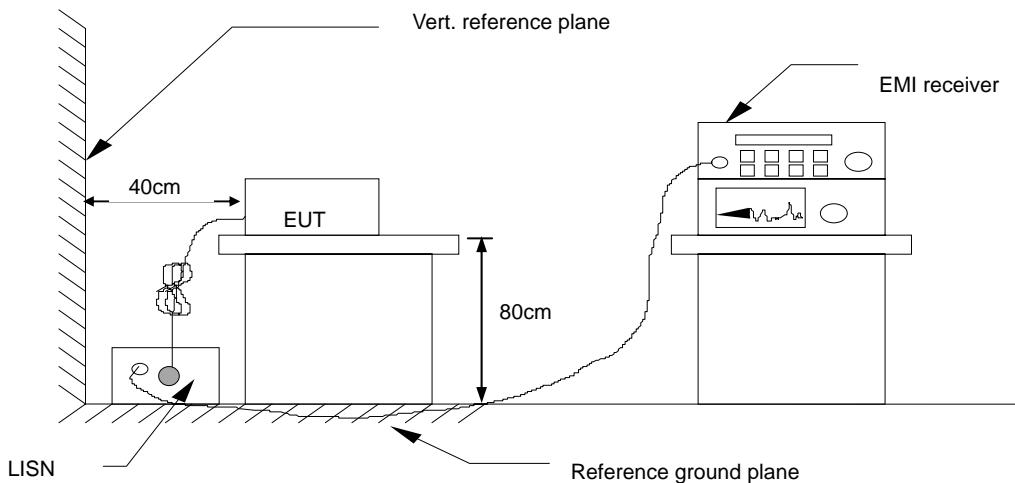
### Procedure of Final Test

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

## 6.4. TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

## 6.5. TEST RESULTS

<b>Model No.</b>	SH-003	<b>6dB Bandwidth</b>	10 KHz
<b>Environmental Conditions</b>	26°C, 60% RH	<b>Test Mode</b>	Running PC System
<b>Detector Function</b>	Peak / Quasi-peak/AV	<b>Test Result</b>	Pass
<b>Test By</b>	Eric Yang		

NOTE: 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

2. “---” denotes the emission level was or more than 2dB below the Average limit, so no re-check anymore.

Freq. = Emission frequency in MHz

Reading level(dBuV) = Receiver reading

Corr. Factor (dB) = Attenuator Factor+ Cable loss

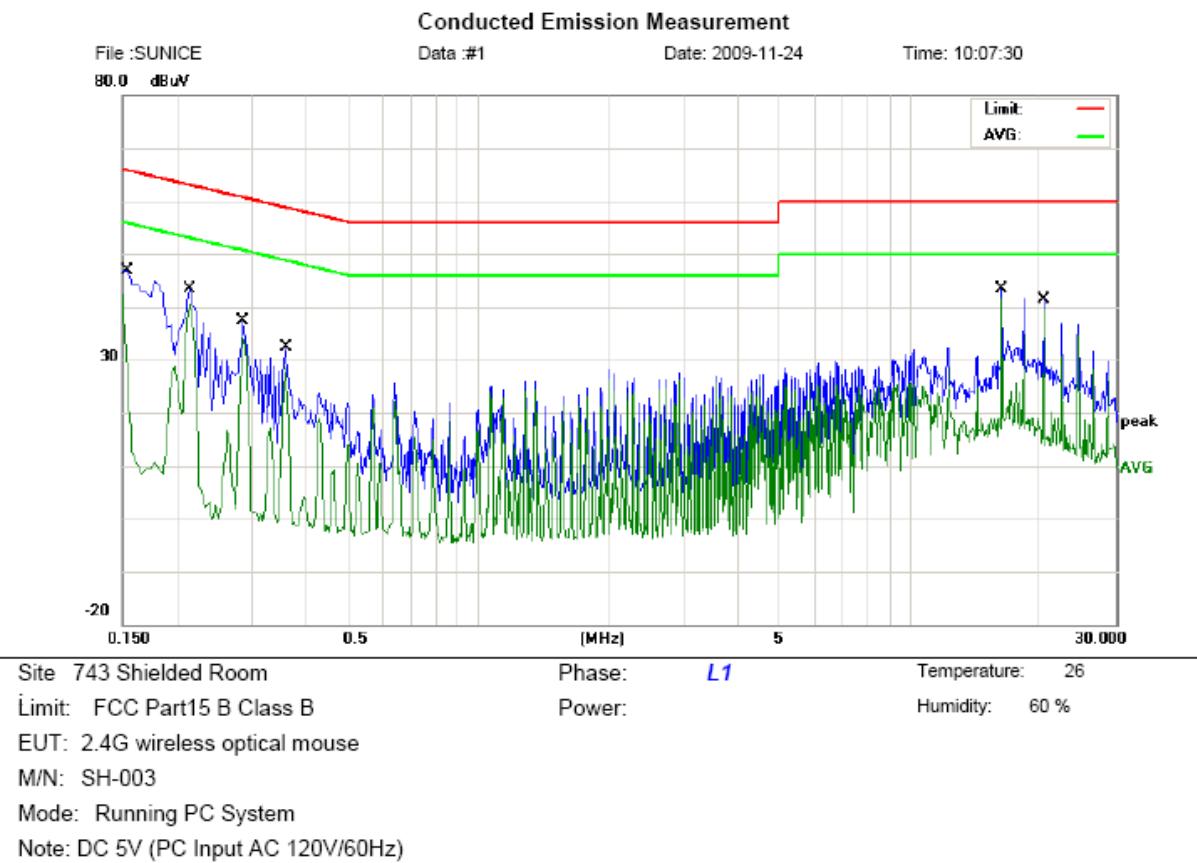
Level (dBuV) = Reading level(dBuV) + Corr. Factor (dB)

Limit (dBuV) = Limit stated in standard

Margin (dB) = Level (dBuV) – Limits (dBuV)

Q.P.=Quasi-Peak

Please refer to following diagram for individual



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1539	26.54	10.40	36.94	65.78	-28.84	QP	
2		0.1539	10.05	10.40	20.45	55.78	-35.33	AVG	
3		0.2140	30.62	10.43	41.05	63.04	-21.99	QP	
4		0.2140	30.00	10.43	40.43	53.04	-12.61	AVG	
5		0.2860	24.06	10.68	34.74	60.64	-25.90	QP	
6		0.2860	23.38	10.68	34.06	50.64	-16.58	AVG	
7		0.3580	18.53	10.68	29.21	58.77	-29.56	QP	
8		0.3580	17.16	10.68	27.84	48.77	-20.93	AVG	
9		16.3620	30.16	10.40	40.56	60.00	-19.44	QP	
10		16.3620	27.87	10.40	38.27	50.00	-11.73	AVG	
11		20.4500	30.38	10.32	40.70	60.00	-19.30	QP	
12	*	20.4500	29.04	10.32	39.36	50.00	-10.64	AVG	

\*:Maximum data    x:Over limit    !:over margin

(Reference Only)

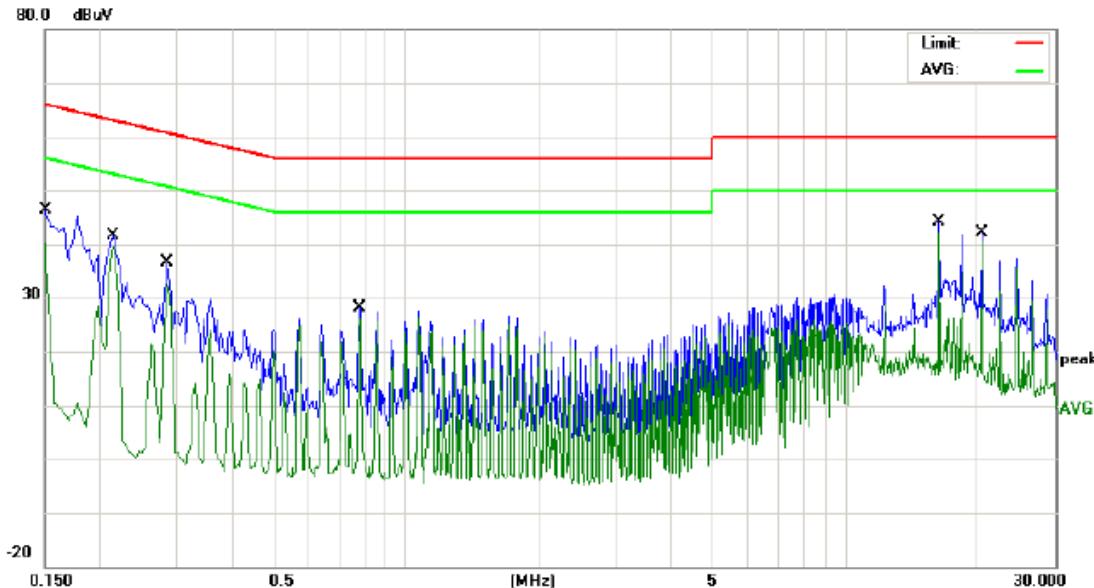
## Conducted Emission Measurement

File :SUNICE

Data :#2

Date: 2009-11-24

Time: 10:12:04



Site: 743 Shielded Room      Phase: **N**      Temperature: 26  
 Limit: FCC Part15 B Class B      Power:      Humidity: 60 %  
 EUT: 2.4G wireless optical mouse  
 M/N: SH-003  
 Mode: Running PC System  
 Note: DC 5V (PC Input AC 120V/60Hz)

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	Comment
		MHz	dBuV	dB	dBuV	dB	Detector	
1		0.1500	29.56	10.40	39.96	65.99	-26.03	QP
2		0.1500	29.35	10.40	39.75	55.99	-16.24	AVG
3		0.2140	29.60	10.43	40.03	63.04	-23.01	QP
4	*	0.2140	29.06	10.43	39.49	53.04	-13.55	AVG
5		0.2860	22.42	10.68	33.10	60.64	-27.54	QP
6		0.2860	21.47	10.68	32.15	50.64	-18.49	AVG
7		0.7820	16.81	10.45	27.26	56.00	-28.74	QP
8		0.7820	16.43	10.45	26.88	46.00	-19.12	AVG
9		16.3580	28.80	10.40	39.20	60.00	-20.80	QP
10		16.3580	25.36	10.40	35.76	50.00	-14.24	AVG
11		20.4460	26.86	10.32	37.18	60.00	-22.82	QP
12		20.4460	23.20	10.32	33.52	50.00	-16.48	AVG

\*:Maximum data    x:Over limit    !:over margin

(Reference Only)

## 7 RADIATED EMISSION MEASUREMENT

### 7.1. LIMITS OF RADIATED EMISSION MEASUREMENT

#### Maximum permissible level of Radiated Emission measured at 3 meter

FREQUENCY (MHz)	dBuV/m (At 3m)
	Class B
30~88	40.00
88~216	43.50
216~960	46.00
960~1000	54.00

NOTE: (1) The lower limit shall apply at the transition frequencies.

(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).

### 7.2. TEST INSTRUMENTS

Radiated Emission Test Site 966				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	ROHDE&SCHWARZ	ESCI	100005	06/23/2010
Pre Amplifier	H.P.	HP8447E	2945A02715	06/15/2010
Bilog Antenna	SUNOL Sciences	JB3	A021907	06/10/2010
Cable	TIME MICROWAVE	LMR-400	N-TYPE04	06/09/2010
System-Controller	CCS	N/A	N/A	N.C.R
Turn Table	CCS	N/A	N/A	N.C.R
Antenna Tower	CCS	N/A	N/A	N.C.R

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to International system of unit (SI).

2. N.C.R = No Calibration Request.

## 7.3. TEST PROCEDURES

### Procedure of Preliminary Test

The equipment was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane. When the EUT is a floor standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.

Support equipment, if needed, was placed as per ANSI C63.4.

All I/O cables were positioned to simulate typical usage as per ANSI C63.4.

Mains cables, telephone lines or other connections to auxiliary equipment located outside the test are shall drape to the floor, be fitted with ferrite clamps or ferrite tubes placed on the floor at the point where the cable reaches the floor and then routed to the place where they leave the turntable. No extension cords shall be used to mains receptacle.

The antenna was placed at 3 meter away from the EUT as stated in ANSI C63.4. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.

The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

The test mode(s) described in Item 3.1 were scanned during the preliminary test:

After the preliminary scan, we found the test mode described in Item 3.1 producing the highest emission level.

The EUT and worse cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for the final test.

When measuring emissions above 1GHz, the frequencies of maximum emission shall be determined by manually positioning the antenna close to the EUT and by moving the antenna over all sides of the EUT while observing a spectral display. It will be advantageous to have prior knowledge of the frequencies of emissions above 1GHz. If the EUT is a device with dimensions approximately equal to that of the measurement antenna beam width, the measurement antenna shall be aligned with the EUT.

## **Procedure of Final Test**

EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test.

The Analyzer / Receiver scanned from 30MHz to 1000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only Q.P. reading is presented.

For the measurement above 1GHz, use the cable, EUT arrangement, and mode of operation determined in the exploratory testing to produce the emission that has the highest amplitude relative to the limit.

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the antenna in the "cone of radiation" from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.

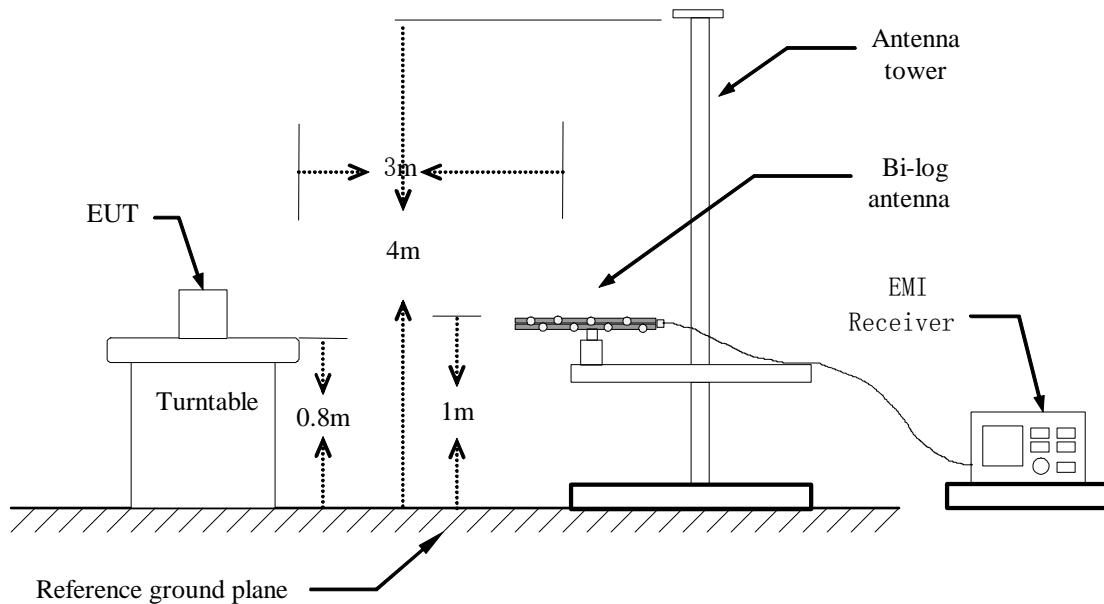
The antenna may have to be higher or lower than the EUT, depending on the EUT's size and mounting height, but the antenna should be restricted to a range of height of from 1m to 4m above the ground or reference ground plane.

If the transmission line for the measurement antenna restricts its range of height and polarization, the steps needed to ensure the correct measurement of the maximum emissions, shall be described in detail in the report of the measurements.

- 1) using the procedures above to measure with peak detector function, if the result comply with the average limit specified by the appropriate regulation, record the EUT arrangement, mode of operation, and cable positions used for final radiated emission measurement , this can be done with either diagrams or photographs.
- 2) Set the detector function of the measuring instrument to average mode, using the procedures above and remeasure only those emissions that complied with the peak limits but exceeded the average limits.

Recorded at least the six highest emissions.

## 7.4. TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

## 7.5. TEST RESULTS

<b>Model No.</b>	SH-003	<b>Test Mode</b>	Running PC System
<b>Environmental Conditions</b>	25°C, 61% RH	<b>6dB Bandwidth</b>	120 KHz
<b>Antenna Pole</b>	Vertical / Horizontal	<b>Antenna Distance</b>	3m
<b>Detector Function</b>	Peak / Quasi-peak	<b>Test Result</b>	Pass

Freq. = Emission frequency in MHz

Reading level (dBuV) = Receiver reading

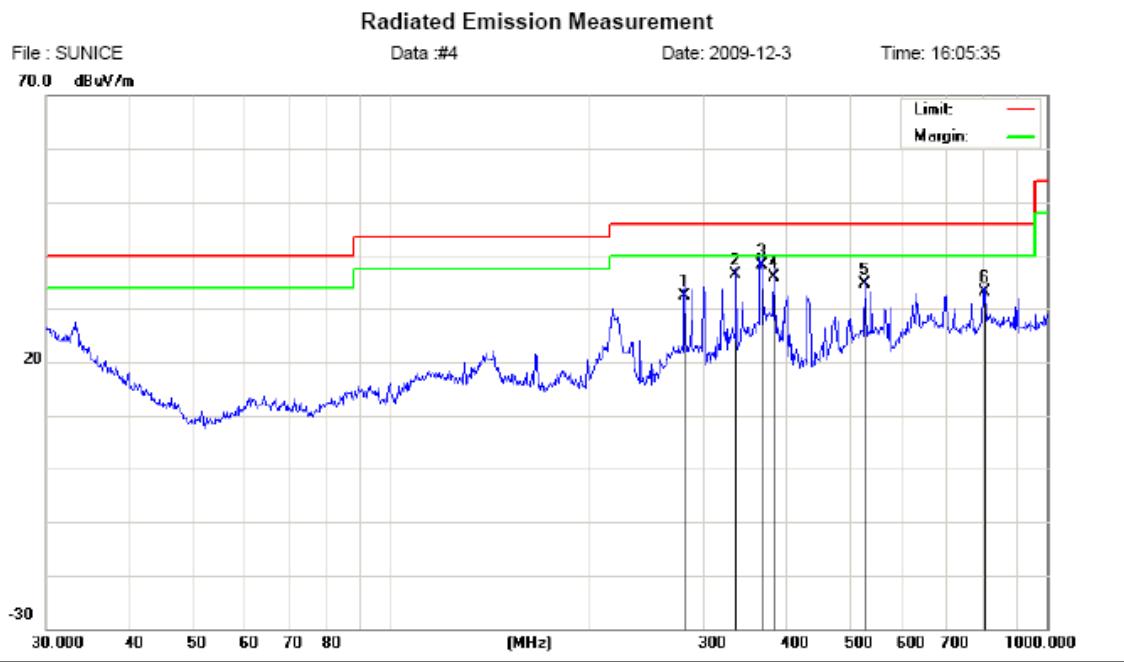
Corr. Factor (dB) = Antenna + Cable loss

Measurement (dBuV) = Reading level (dBuV) + Corr. Factor (dB)

Limit (dBuV) = Limit stated in standard

Margin (dB) = Measurement (dBuV) – Limits (dBuV)

Please refer to following diagram for individual



Site 966 Chamber

Polarization: **Horizontal**

Temperature: 25

Limit: FCC Part 15B ClassB\_RE 3M

Power:

Humidity: 61 %

EUT: 2.4G wireless optical mouse

Distance:

M/N: SH-003

Mode: Running PC System

Note: DC 5V (PC Input AC 120V/60Hz)

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
			Level	Factor	ment					Degree
		MHz	dBuV	dB	dBuV/m	dB	Detector	cm	degree	Comment
1		281.0075	35.41	-2.92	32.49	46.00	-13.51	QP		
2		336.0352	39.41	-3.00	36.41	46.00	-9.59	QP		
3	*	368.1116	40.85	-2.66	38.19	46.00	-7.81	QP		
4		383.9318	38.69	-2.90	35.79	46.00	-10.21	QP		
5		528.2458	32.87	1.65	34.52	46.00	-11.48	QP		
6		804.6028	28.46	4.73	33.19	46.00	-12.81	QP		

\*:Maximum data    x:Over limit    !:over margin

(Reference Only)

**Radiated Emission Measurement**

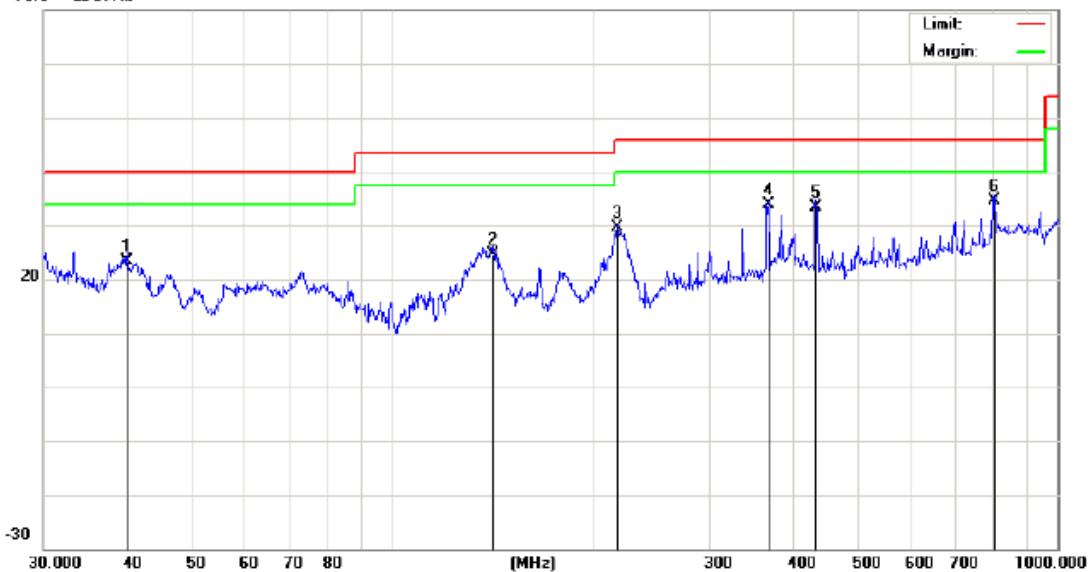
File : SUNICE

Data #3

Date: 2009-12-3

Time: 16:07:01

70.0 dBuV/m



Site 966 Chamber

 Polarization: **Vertical**

Temperature: 25

Limit: FCC Part 15B ClassB\_RE 3M

Power:

Humidity: 61 %

EUT: 2.4G wireless optical mouse

Distance:

M/N: SH-003

Mode: Running PC System

Note: DC 5V (PC Input AC 120V/60Hz)

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table		
			Level	Factor	ment						
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		39.9942	25.10	-1.73	23.37	40.00	-16.63	QP			
2		141.8262	30.16	-5.60	24.56	43.50	-18.94	QP			
3		218.3085	36.45	-6.74	29.71	46.00	-16.29	QP			
4		368.1116	34.85	-1.04	33.81	46.00	-12.19	QP			
5		434.0651	34.19	-0.76	33.43	46.00	-12.57	QP			
6	*	804.6028	28.86	5.89	34.75	46.00	-11.25	QP			

\*:Maximum data    x:Over limit    !:over margin

(Reference Only)