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## ***FCC TEST REPORT***

Under  
FCC 15 Subpart C, Paragraph 15.249: 2004


Prepared For :

### **Shenzhen SOAI Electronics & Technology Company Ltd.**

NO.58 Fuyuan St.1st Industrial Park of Fenghuang, Fuyong Town, Shenzhen, China

<b>FCC ID: VMEVO-103</b>
<b>EUT: Wireless Optical Mouse</b>
<b>Model: VO-103</b>

August 30, 2007

<b>Report Type:</b> Original Report
<b>Test Engineer:</b> <u>Jacky Huang</u>
<b>Test Date:</b> <u>August 29, 2007</u>
 <b>Review By:</b> _____ Apollo Liu / Manager

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## 1. General Information

### 1.1 Notes

The test results of this report relate exclusively to the test item specified in 1.5. The KMO Lab does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the KMO Lab.

### 1.2 Testing Laboratory

#### **SinTek Laboratory Co., Ltd.**

No.7, Xinshidai Industrial, Guantian Village, Shiyan Town, Bao'an District, Shenzhen, Guangdong China..

Tel: +86 755 27608353 Fax: +86 755 27608359

Site on File with the Federal Communications Commission – United States

Registration Number: 963441

### 1.3 Details of Applicant

**Name** : Shenzhen SOAI Electronics & Technology Company Ltd.  
**Address** : NO.58 Fuyuan St.1st Industrial Park of Fenghuang, Fuyong Town, Shenzhen, China  
**Contact** : N/A  
**Tel** : N/A  
**Fax** : N/A

### 1.4 Application Details

Date of Receipt of Application : August 16, 2007  
Date of Receipt of Test Item : August 29, 2007  
Date of Test : August 29~August 30, 2007

### 1.5 Test Item

Manufacturer : Same Applicant  
Trade Name : N/A  
Model No. : VO-103, VO-109, VO-216, VO-110, VO-201, VO-111, VO-200  
Description : Wireless Optical Mouse

### Additional Information

Frequency : 27.045MHz  
Number of Channels : 1  
Power Supply : DC3V  
Operation Distance : 1.8 Meter  
Resolution : N/A

### 1.6 Test Standards

FCC 15 Subpart C, Paragraph 15.249: 2004
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Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

## 2. Technical Test

### 2.1 Summary of Test Results

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.203	Antenna Requirement	PASS	Complies
FCC Part 15, Paragraph 15.207	Conducted Test	N/A	Owing to the DC operation of EUT, this test item is not performed.
FCC Part 15 Subpart C Paragraph 15.227 Limit	Field Strength of Fundamental	PASS	Complies.
FCC Part 15 , Paragraph 15.209	Radiated Test	PASS	Complies.
Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).	Band Edge Test	PASS	The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

## 3. EUT Modifications

No modification by SinTek Laboratory Co., Ltd.

## 4. Conducted Power Line Test

### 4.1 Test Equipment

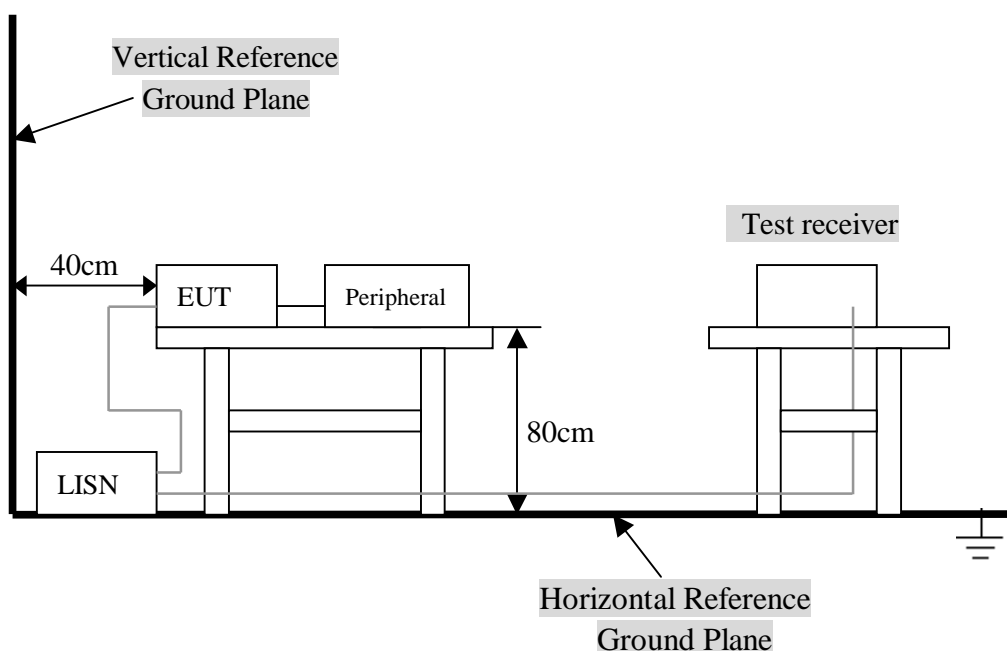
Please refer to Section 10 this report.

### 4.2 Test Procedure

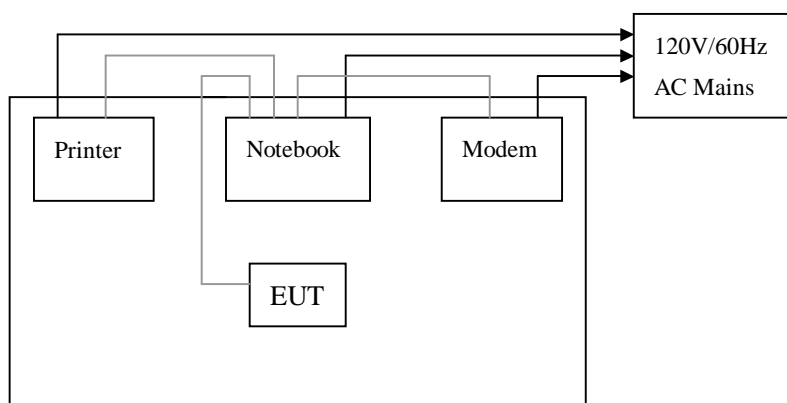
The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination.

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission., the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4:2003 on conducted measurement. Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

### 4.3 Test Setup



For the actual test configuration, Please refer to the related items – Photos of Testing.



#### 4. 4 Configuration of the EUT

The EUT was configured according to ANSI C63.4-2003. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

##### A. EUT

Device	Manufacturer	Model #	FCC ID
Wireless Optical Mouse	Shenzhen SOAI Electronics & Technology Company Ltd.	VO-103	

##### B. Internal Devices

Device	Manufacturer	Model #	FCC ID
N/A			

##### C. Peripherals

Device	Manufacturer	Model # Serial #	FCC ID/ DoC	Cable
Printer	HP	HP930C	DoC	1.5m unshielded power cord 1.2m unshielded data cable.
Modem	GVC	N/A	DoC	1.5m unshielded power cord 1.2m unshielded data cable.
Notebook	DELL	PP10L	DoC	1.5m unshielded power cord
PC	Dell	2400n	DoC	1.5m unshielded power cord

#### 4. 5 EUT Operating Condition

Operating condition is according to ANSI C63.4 - 2003.

- A. Setup the EUT and simulators as shown on follow.
- B. Enable RF signal and confirm EUT active.
- D. Modulate output capacity of EUT up to specification.



#### 4. 6 Conducted Power Line Emission Limits

FCC Part 15 Paragraph 15.207 (dBuV)		
Frequency Range (MHz)	Class A QP/AV	Class B QP/AV
0.15 – 0.5	79/66	66-56/56-46
0.5 – 5.0	73/60	56/46
5.0 - 30	73/60	60/50

**NOTE** : In the above table, the tighter limit applies at the band edges.

#### 4. 7 Conducted Power Line Test Result

Owing to the DC operation of EUT, this test item is not performed.

## 5. Radiated Emission Test

### 5.1 Test Equipment

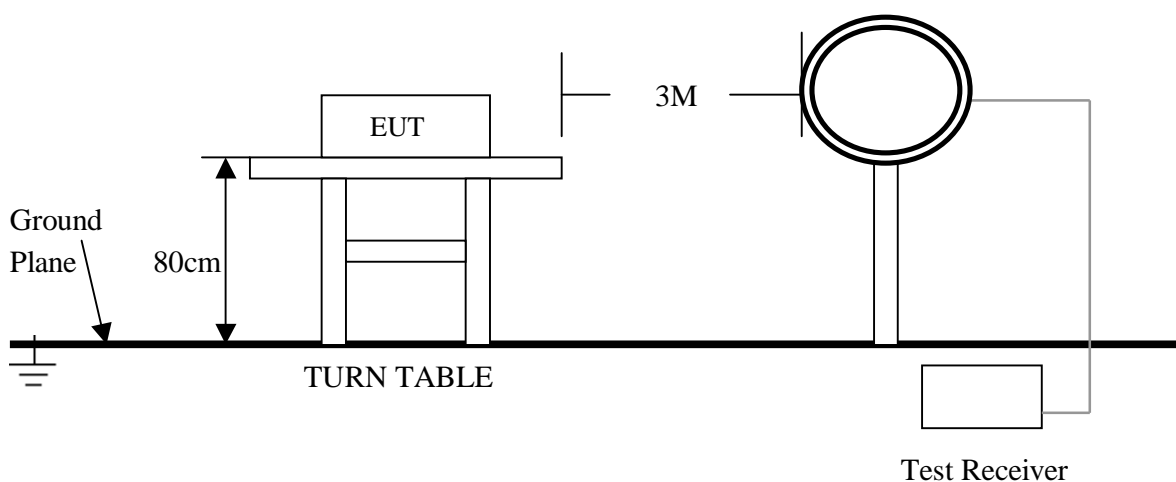
Please refer to Section 10 this report.

### 5.2 Test Procedure

1. The EUT was tested according to ANSI C63.4 - 2003.
2. The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-2003.
3. The frequency spectrum from 30 MHz to 1 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 KHz. All readings are above 1 GHz , peak values with a resolution bandwidth of 1 MHz . Measurements were made at 3 meters.
4. The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
5. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "QP" in the data table.
6. The antenna polarization: Vertical polarization and Horizontal polarization.

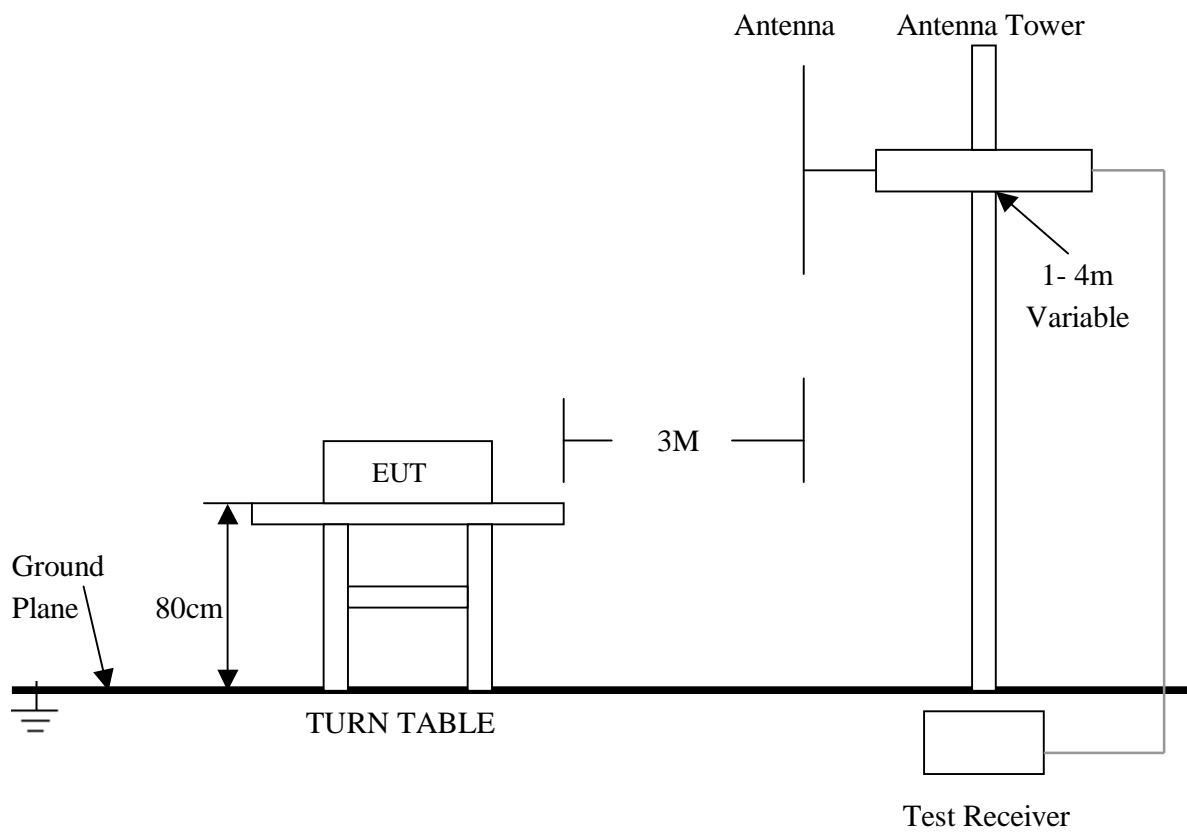
### 5.3 Radiated Test Setup

For Frequencies below 30 MHz



For the actual test configuration , please refer to the related items – Photos of Testing



**For Frequencies below 1 GHz**

**For the actual test configuration , please refer to the related items – Photos of Testing**

## 5. 4 Configuration of the EUT

Same as section 4.4 of this report

## 5. 5 EUT Operating Condition

Same as section 4.5 of this report.

## 5. 6 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below :

### A. FCC Part 15 Subpart C Paragraph 15.249(a) Limit

Fundamental Frequency (MHz)	Field Strength of Fundamental	
	uV/m	dBuV/m
26.96 – 27.28	10000	80.0

- Note:**
- (1) RF Voltage (dBuV) = 20 log RF Voltage (uV)
  - (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
  - (3) The emission limit in this paragraph is based on measurement instrumentation employing an average detector. Measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.

### B. Frequencies in restricted band are complied to limit on Paragraph 15.209.

Frequency (MHz)	Distance (m)	Field Strength (dBuV/m)
30 - 88	3	40.0
88 - 216	3	43.5
216 - 960	3	46.0
Above 960	3	54.0

- Note:**
- (1) RF Voltage (dBuV) = 20 log RF Voltage (uV)
  - (2) In the Above Table, the tighter limit applies at the band edges.
  - (3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

## 5. 7 Radiated Emission Test Result

### A. Fundamental Radiated Emission Data

Product : Wireless Optical Mouse      Test Mode : CH1  
 Test Item : Fundamental Radiated Emission Data      Temperature : 25 °C  
 Test Voltage : DC 3V (Power by Battery)      Humidity : 56%RH  
 Test Result : **PASS**

#### CH Low

Freq. (MHz)	Emission (dBuV/m)	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
27.045	46.37	HORIZ	80	-33.63
27.045	44.52	VERT	80	-35.48

- Note:**
- (1) All Readings are Peak value.
  - (2) Emission Level = Reading Level + Probe Factor + Cable Loss.
  - (3) The average measurement was not performed when the peak measured data under the limit of average detection.

### B. Harmonics Radiated Emission Data

Product : Wireless Optical Mouse      Test Mode : Tx & Rx  
 Test Item : General Radiated Emission Data      Temperature : 25 °C  
 Test Voltage : DC 3V (Power by Battery)      Humidity : 50%RH  
 Test Result : **PASS**

#### CH Low

Freq. (MHz)	Emission (dBuV/m)	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
81.135	27.09	HORIZ	40.0	-12.91
81.135	30.18	VERT	40.0	-9.82
108.180	28.44	HORZ	43.5	-15.06
108.180	32.11	VERT	43.5	-11.39
135.230	27.94	HORZ	43.5	-15.56
162.270	30.98	VERT	43.5	-12.52

- Note:**
- (1) All Reading Levels below 1GHz are Quasi-Peak, above are peak and average value.
  - (2) Emission Level = Reading Level + Probe Factor + Cable Loss.

6. Band Edge

6.1 Test Equipment

Please refer to Section 9 this report.

6.2 Test Procedure

Please refer to Section 5.2 this report.

6.3 Radiated Test Setup

Please refer to Section 5.3 this report.

6.4 Configuration of The EUT

Same as section 4 . 4 of this report

6.5 EUT Operating Condition

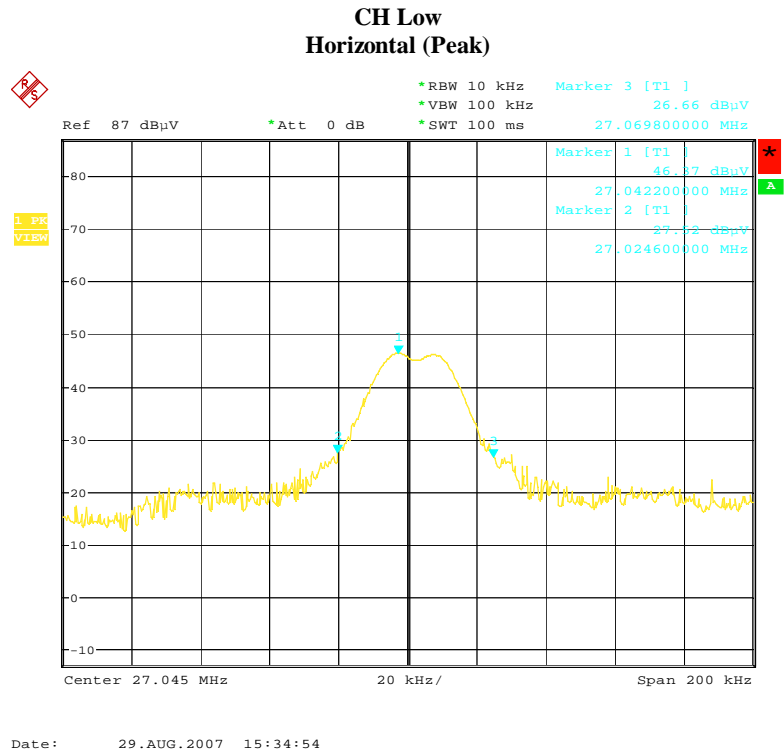
Same as section 4 . 5 of this report.

6.6 Band Edge Limit

Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

6.7 Band Edge Test Result

Product	: Wireless Optical Mouse	Test Mode	: CH1
Test Item	: Band Edge Data	Temperature	: 25 °C
Test Voltage	: DC 3V (Power by Battery)	Humidity	: 50% RH
Test Result	: PASS		



- Note:**
- (1) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.
  - (2) The average measurement was not performed when the peak measured data under the limit of average detection.

## 7. Antenna Requirement

### A. Regulation

FCC section 15.203, An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of Part 15C. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

### B. Result

The EUT no antenna connector for printed antenna. Therefore the EUT complies with Section 15.203 of the FCC rules.

## 8. Photos of Testing

### 8.1 EUT Test Photographs

Radiated emission test view



## 8. 2 EUT Detailed Photographs

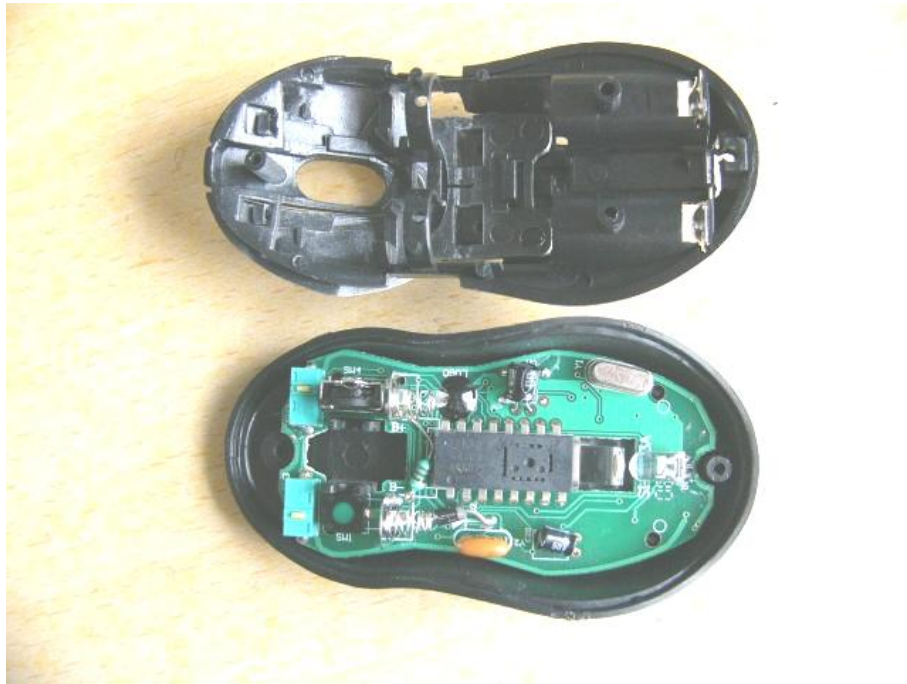
EUT top view



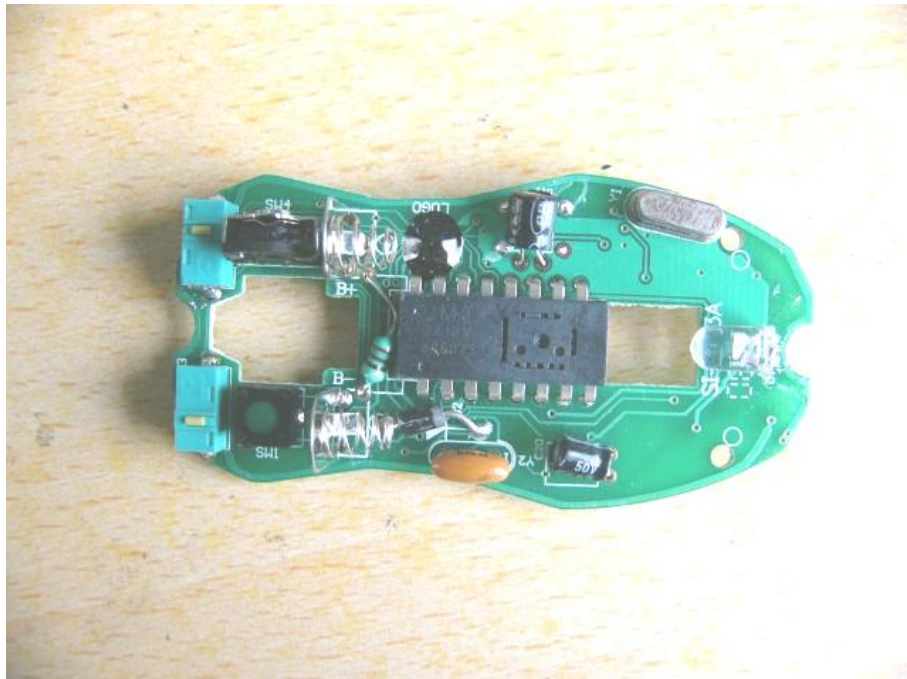
EUT bottom view



EUT inside whole view

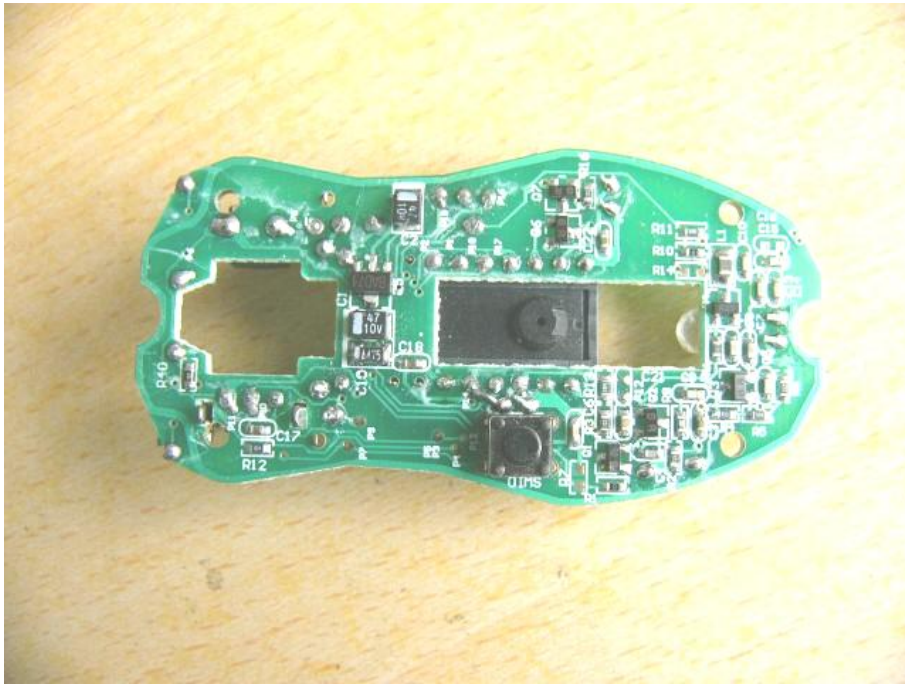


Main board component side





Main board solder side



## 9. FCC ID Label

**FCC ID: VMEVO-103**

**This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.**

The Label must not be a stick-on paper label. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

### Proposed Label Location on EUT

EUT Bottom View/Proposed FCC ID Label Location



## 10. Test Equipment

The following test equipments were used during the radiated & conducted emission test:

Equipment/ Facilities	Manufacturer	Model #	Serial No.	Date of Cal.	Due Date
Turntable	SinTek	N/A	N/A	NCR	NCR
Antenna Tower	SinTek	N/A	N/A	NCR	NCR
OATS	SinTek	N/A	N/A	Nov. 02, 2004	Nov. 02, 2007
EMI Test Receiver	Rohde & Schwarz	ESPI3	100180	Oct.18, 2006	Oct.18, 2007
Spectrum Analyzer	Rohde & Schwarz	FSP40	100273	Sep. 18, 2006	Sep. 18, 2007
Signal Generator	FLUKE	PM5418+Y/C	LO747012	Feb.10, 2007	Feb.10, 2008
Signal Generator	FLUKE	PM5418TX	LO738007	Feb.10, 2007	Feb.10, 2008
Loop Antenna	SCHWARZBECK	FMZB1516	113	Jan. 30, 2007	Jan. 30, 2008
Loop Antenna	Rohde & Schwarz	HFH2-Z2	872096/16	Jan. 30, 2007	Jan. 30, 2008
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	9161-4079	Sep.18, 2006	Sep.18, 2007
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	9161-4080	Sep.18, 2006	Sep.18, 2007
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-564	Sep.18, 2006	Sep.18, 2007
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-565	Sep.18, 2006	Sep.18, 2007
AMN	Rohde & Schwarz	ESH3-Z5	100196	Oct. 23, 2006	Oct. 23, 2007
AMN	Rohde & Schwarz	ESH3-Z5	100197	Oct. 23, 2006	Oct. 23, 2007
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	N/A	N/A	N/A
Absorbing Clamp	Rohde & Schwarz	MDS-21	N/A	Oct. 29, 2006	Oct. 29, 2007
KMO Shielded Room	KMO	KMO-001	N/A	N/A	N/A
Coaxial Cable with N-Connectors	SCHWARZBECK	AK9515H	95549	Sep.18, 2006	Sep.18, 2007
Power Meter	Rohde & Schwarz	NRVD	100041	Feb.10, 2007	Feb.10, 2008
Radio Communication Test Set	Rohde & Schwarz	CMS 54	846621/024	Feb.10, 2007	Feb.10, 2008
Modulation Analyzer	Hewlett-Packard	8901B	2303A00362	Feb.10, 2007	Feb.10, 2008
Communication Analyzer	Wavetek Stabilock	4032	N/A	Feb. 01, 2007	Feb.01, 2008
Storage Oscilloscope	Tektronix	TDS3052	N/A	Feb. 01, 2007	Feb.01, 2008
Attenuator	Schwarzbeck	20dB	N/A	Feb. 01, 2007	Feb.01, 2008
Attenuator	Rohde & Schwarz	10dB	N/A	Feb. 01, 2007	Feb.01, 2008
SOHO Telephone Switching System	IKE	2000-108C	N/A	Feb.10, 2007	Feb.10, 2008
Temperature Chamber	TABAI	PSL-4GTW	N/A	Feb.10, 2007	Feb.10, 2008