FCC TEST REPORT

REPORT NO.:FCC0706010

MODEL NO.: MD8320

RECEIVED: Jun 04, 2007

TESTED: Jun 04, 2007 to Jun 14, 2007

APPLICANT: Nange Electronics Manufacturing (Zhongshan) Co., Ltd

ADDRESS: Dong Fu Road, Dong Feng Town, Zhong Shan City, Guangdong, China

ISSUED BY: SHENZHEN SETEK TECHNOLOGY CO., LTD.

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SHENZHEN SETEK TECHNOLOGY CO., LTD.

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Prepared for	:	Nange Electronics Manufacturing (Zhongshan) Co., Ltd
Address	:	Dong Fu Road, Dong Feng Town, Zhong Shan City, Guangdong, China
Product	:	Wireless optical mouse
Model No.	:	MD8320
Trademark	:	N/A
Test Standard	:	FCC Part 15 Paragraph 15.207 Paragraph 15.209 and Paragraph 15.227
Prepared by	:	SHENZHEN SETEK TECHNOLOGY CO., LTD.
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Report Number	:	FCC0706010
Date of Test	:	Jun 04, 2007 to Jun 14, 2007
Date of Report	:	Jun 14, 2007

The device described above is tested by SHENZHEN SETEK TECHNOLOGY CO., LTD. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. This report applies to above tested sample only and shall not be reproduced in part without written approval of SHENZHEN SETEK TECHNOLOGY CO., LTD.

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Description Page

The Report Description

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	:	Wireless optical mouse
Model Number	:	MD8320
Antenna Designation	:	A permanent fixed antenna, which is built-in, designed as an indispensable part of the EUT.
Power Supply	:	2.4V DC (2 pcs AAA batteries)
Operation Frequency	:	27.045MHz
Applicant	:	Nange Electronics Manufacturing (Zhongshan) Co., Ltd
Address	:	Dong Fu Road, Dong Feng Town, Zhong Shan City, Guangdong, China
Manufacturer	:	Nange Electronics Manufacturing (Zhongshan) Co., Ltd
Address	:	Dong Fu Road, Dong Feng Town, Zhong Shan City, Guangdong, China
Received	:	Jun 04, 2007
Date of Test	:	Jun 04, 2007 to Jun 14, 2007

1.2.Description of Support Device

PC	:	Manufacturer: DELL M/N: E157FPc S/N: 53SM12X CCC,FCC,VCCI,GS,S,CE
Monitor	:	Manufacturer: SAMSUNG M/N: 710MP [R]S S/N: MH17HVY500468F CCC,SA,UL
Mouse	:	Manufacturer: DELL M/N: M056UOA S/N: F1101WOS CE, VCCI,FCC,GS,UL
Keyboard	:	Manufacturer: DELL M/N: SK-8135 S/N: CN-0DJ340-71616683-01U6 VCCI,CE, FCC
Printer	:	Manufacturer: SAMSUNG M/N: ML-1610 S/N:BKAYB04125 CCC,CE,UL

1.3.Summary of test results

FCC Rules	Description Of Test	Result
Paragraph 15.207	Conducted Emission	N/A
Paragraph 15.227	Radiated Emission	Compliant
Paragraph 15.227	26 dB Bandwidth	Compliant

1.4.Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC – Registration No.: 966959

SHENZHEN SETEK TECHNOLOGY CO., LTD, the EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission.

1.5.Measurement Uncertainty

Radiation Uncertainty	:	Ur = ±3.84dB
Conduction Uncertainty	:	Uc = ±2.72dB

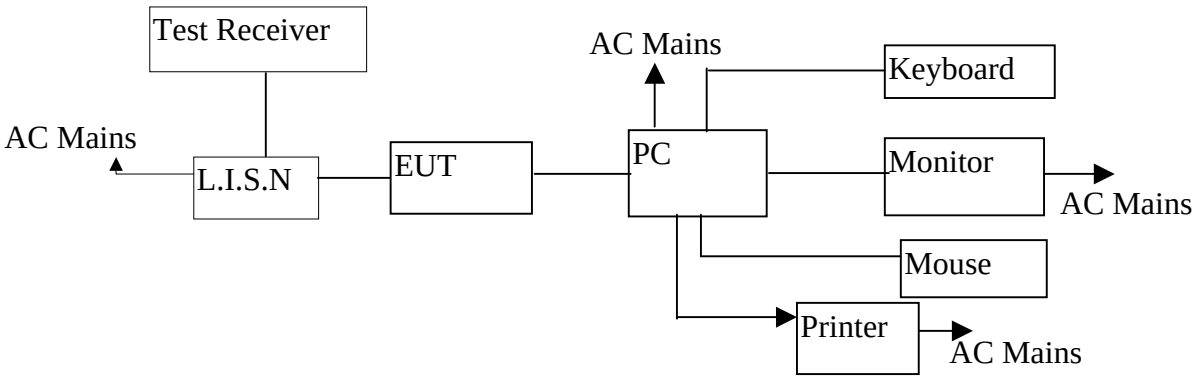
2. POWER LINE CONDUCTED MEASUREMENT

2.1.Test Equipment

The following test equipments are used during the power line conducted measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCS30	8289851018	May 29,2007	1 Year
2.	L.I.S.N.	Rohde & Schwarz	ESH2-Z5	834549/005	May 29,2007	1 Year
3.	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100006	May 29,2007	1 Year
4.	RF Cable	FUJIKURA	RG-55/U	LISN Cable	May 29,2007	1 Year

2.2.Block Diagram of Test Setup



2.3.Power Line Conducted Emission Measurement Limits(Class B)

Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

2.4.Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

EUT	:	Wireless optical mouse
Model Number	:	MD8320

2.5.Operating Condition of EUT

2.5.1.Setup the EUT and simulator as shown as Section 2.2.
2.5.2.Turn on the power of all equipment.
2.5.3.Let the EUT work in test mode (Normal) and measure it.

2.6.Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides 50ohm-coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4-2003 on Conducted Emission Measurement.

The bandwidth of test receiver (R & S ESCS30) is set at 9KHz.

The frequency range from 150KHz to 30 MHz is investigated.

2.7.Power Line Conducted Emission Measurement Results

N/A

Note: EUT powered by 2 pcs AAA batteries, this test item not applicant

3. RADIATED EMISSION MEASUREMENT

3.1.Test Equipment

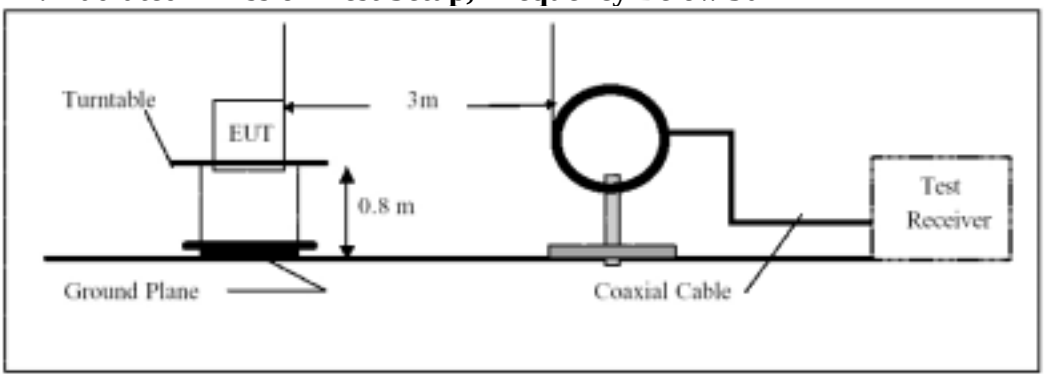
The following test equipments are used during the radiated emission measurement:

3.1.1.For Anechoic Chamber

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	ANRITSU	MS2661C	6200140915	May 29,2007	1 Year
2.	Test Receiver	Rohde & Schwarz	ESCS30	828985/018	May 29,2007	1 Year
3.	Bilog Antenna	Schwarzbeck	VULB9163	142	May 29,2007	1 Year
4.	Loop Antenna	EMCO	6502	00042960	Dec 11,2006	1 Year
5.	50 Coaxial Switch	Anritsu Corp	MP59B	6100237248	May 29,2007	1 Year
6.	Cable	Schwarzbeck	AK9513(1m)	CR RX2	May 29,2007	1 Year
7.	Cable	Schwarzbeck	AK9513(10m)	AC RX1	May 29,2007	1 Year
8.	Cable	Rosenberger	N/A(6m)	CR RX1	May 29,2007	1 Year
9.	Cable	Rosenberger	N/A(10m)	FP2RX2	May 29,2007	1 Year
9.	DC Power Filter	MPE	23872C	N/A	May 29,2007	1 Year
10.	Single Phase Power Line Filter	MPE	23332C	N/A	May 29,2007	1 Year
11.	3 Phase Power Line Filter	MPE	23333C	N/A	May 29,2007	1 Year
12.	Signal Generator	HP	8648A	3625U00573	May 29,2007	1 Year

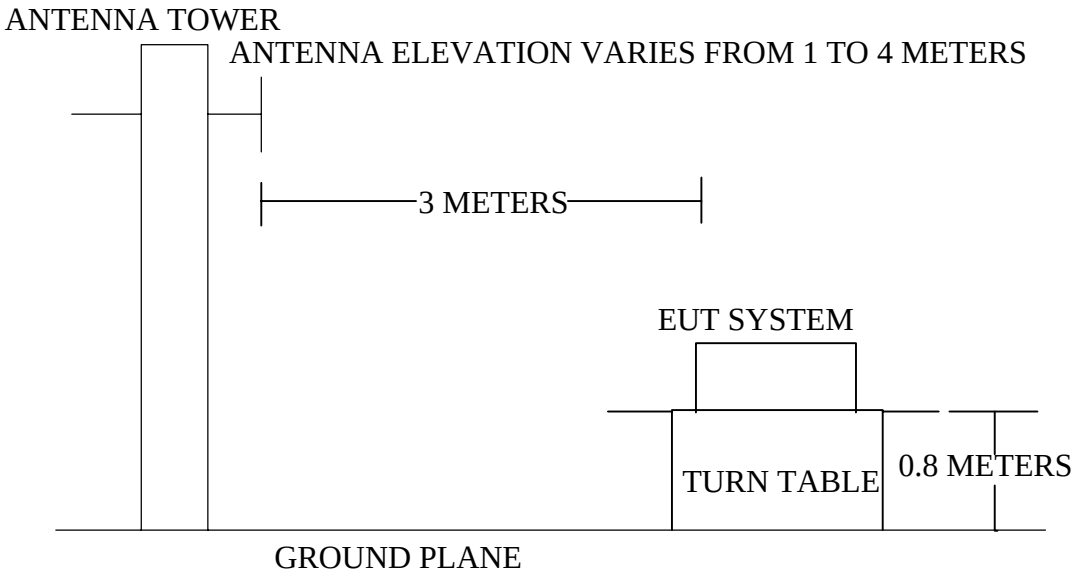
3.2.Block Diagram of Test Setup

A: Radiated Emission Test Setup, Frequency Below 30MHz



(EUT: Wireless optical mouse)

B: Radiated Emission Test Setup, Frequency 30M to 1000MHz



(EUT: Wireless optical mouse)

3.3.Radiated Emission Limit

A: FCC Part 15 Subpart C Paragraph 15.227 Limit

Fundamental Frequency (MHz)	Field Strength of Fundamental (3m)	
	uV/m	dBuV/m
26.96-27.28	10000	80

Note: 1. RF Field Strength (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.

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

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
1.705 ~ 30	30	30	69.54
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above960	3	500	54.0

Remark： (1) Emission level (dB)μV = 20 log Emission level μV/m
(2) The smaller limit shall apply at the cross point between two frequency bands.
(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

As shown in 15.35(b),for frequencies above 1000MHz,the field strength limits are based on average detector,however,the peak field strength of any emission shall not exceed the maximum permitted average limits,specified above by more than 20dB under any condition of modulation.

3.4.EUT Configuration on Measurement

The following equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

Wireless optical mouse (EUT)

Model Number : MD8320
Serial Number : N/A

3.5.Operating Condition of EUT

1. Setup the EUT as shown in Section 3.2.
2. Let the EUT work in test mode (Normal) and measure it.

3.6. Test Procedure

EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level.
Both horizontal and vertical polarization of the antenna is set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-2003 on radiated emission measurement.

The RBW of the EMI test receiver (R&S ESCS30) is set at 120KHz between 30MHz and 1000MHz, and the RBW is 9KHz between 0.15MHz and 30MHz.

3.7. Radiated Emission Measurement Results

PASS

A. Fundamental Radiated Emission Data

Test Item:	**Fundamental Radiated Emission Data**
Test Voltage:	2.4V DC BATTERY
Test Mode:	ON TX
Temperature:	24°C
Humidity:	61%RH
Test Result:	PASS

Frequency (MHz)	Antenna Polarization	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
27.045	Horizontal	54.26	80	25.74
27.045	Vertical	53.89	80	26.11

Note: (1) All Reading 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. General Radiated Emission Data

Please refer to following diagram
Note: No further spurious emissions found between 30 MHz and lowest internal generated or used frequency.

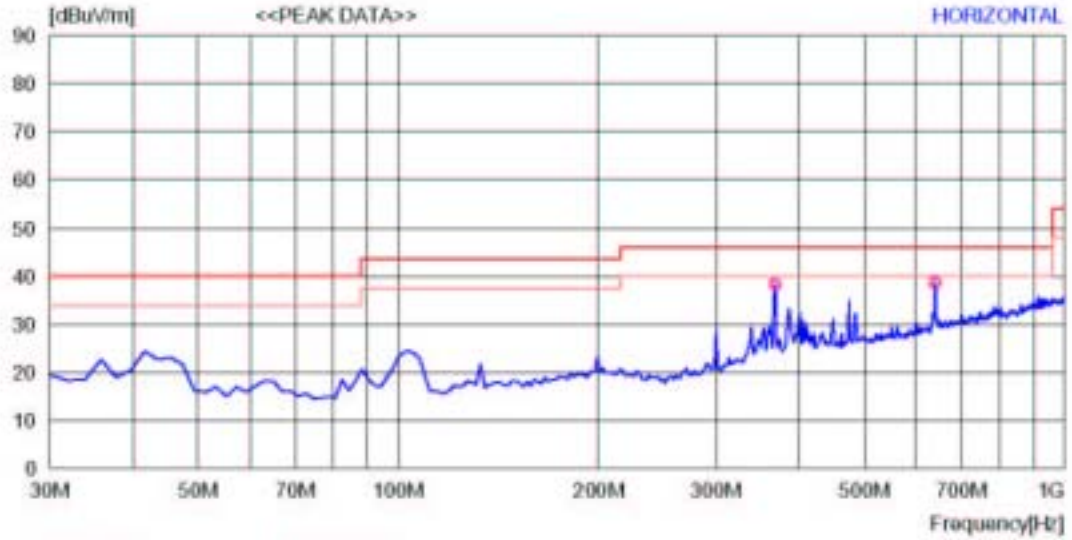
2007-06-07 18:51:31

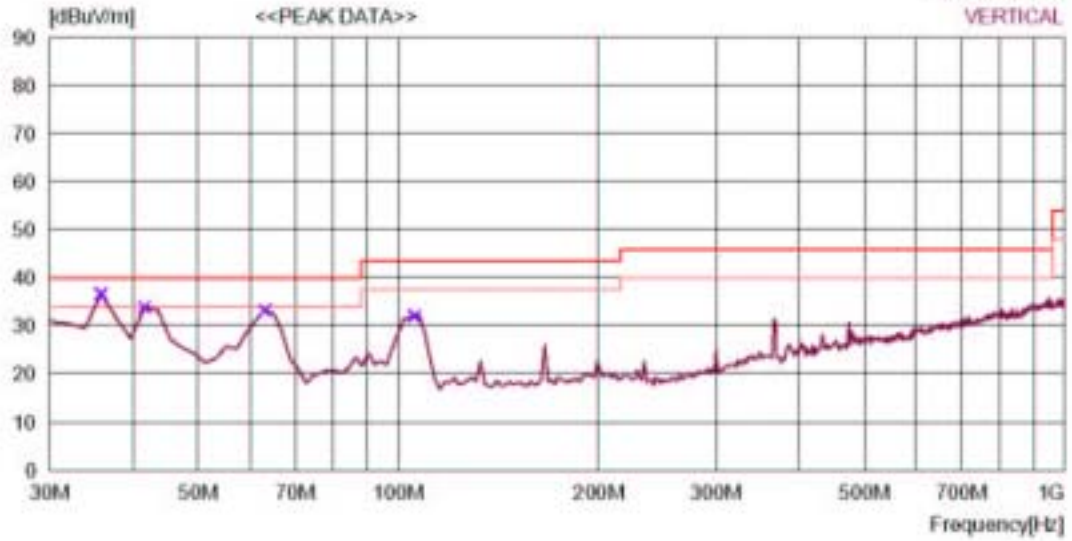
RADIATED EMISSION

Date : 2007-06-07 18:51:28

Trade Name	Nange	Document No	
Model Name	Wireless optical mouse(MD8320)	Power Supply	DC 2.4V
Serial No		Temp/Humi	24/61RH%
Test Condition	ON TX	Operator	Elly zhang
Memo			

LIMIT : FCC Part15 (3m)/USA
MARGIN: 6 dB





2007-06-07 18:51:31

RADIATED EMISSION

Date : 2007-06-07 18:51:28

Trade Name	:	Nange	Document No.	:	
Model Name	:	Wireless optical mouse(MD8320)	Power Supply	:	DC 2.4V
Serial No.	:		Temp/Humi	:	24/61RH%
Test Condition	:	ON TX	Operator	:	Elly zhang

Memo :

LIMIT : FCC Part15 (3m)/USA
MARGIN: 6 dB

No.	FREQ [MHz]	READING PEAK [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
---- Horizontal ----										
1	368.236	44.8	15.9	8.9	31.3	38.3	46	7.7	100	173
2	640.381	39.6	20.5	9.7	31.1	38.7	46	7.3	100	55
---- Vertical ----										
3	35.832	50.1	11.3	6.9	31.7	36.6	40	3.4	100	115
4	41.663	47.5	11.2	6.9	31.7	33.9	40	6.1	100	86
5	63.046	47.1	10.6	7.2	31.7	33.2	40	6.8	100	276
6	105.812	47.1	9.1	7.5	31.6	32.1	43.5	11.4	100	234

4. BAND EDGE

4.1.Measu rement Procedure

1. The EUT was placed on a turn table which is 0.8 m above ground plane.
2. Set EUT as normal operation
3. Set SPA Center Frequency = fundamental frequency, RBW, VBW= 3 KHz, Span =32 KHz.
4. Set SPA Max hold. Mark peak, - 26dB.

4.2.Test SETUP (Block Diagram of Configuration)

Same as 3.2 Radiated Emission Measurement.

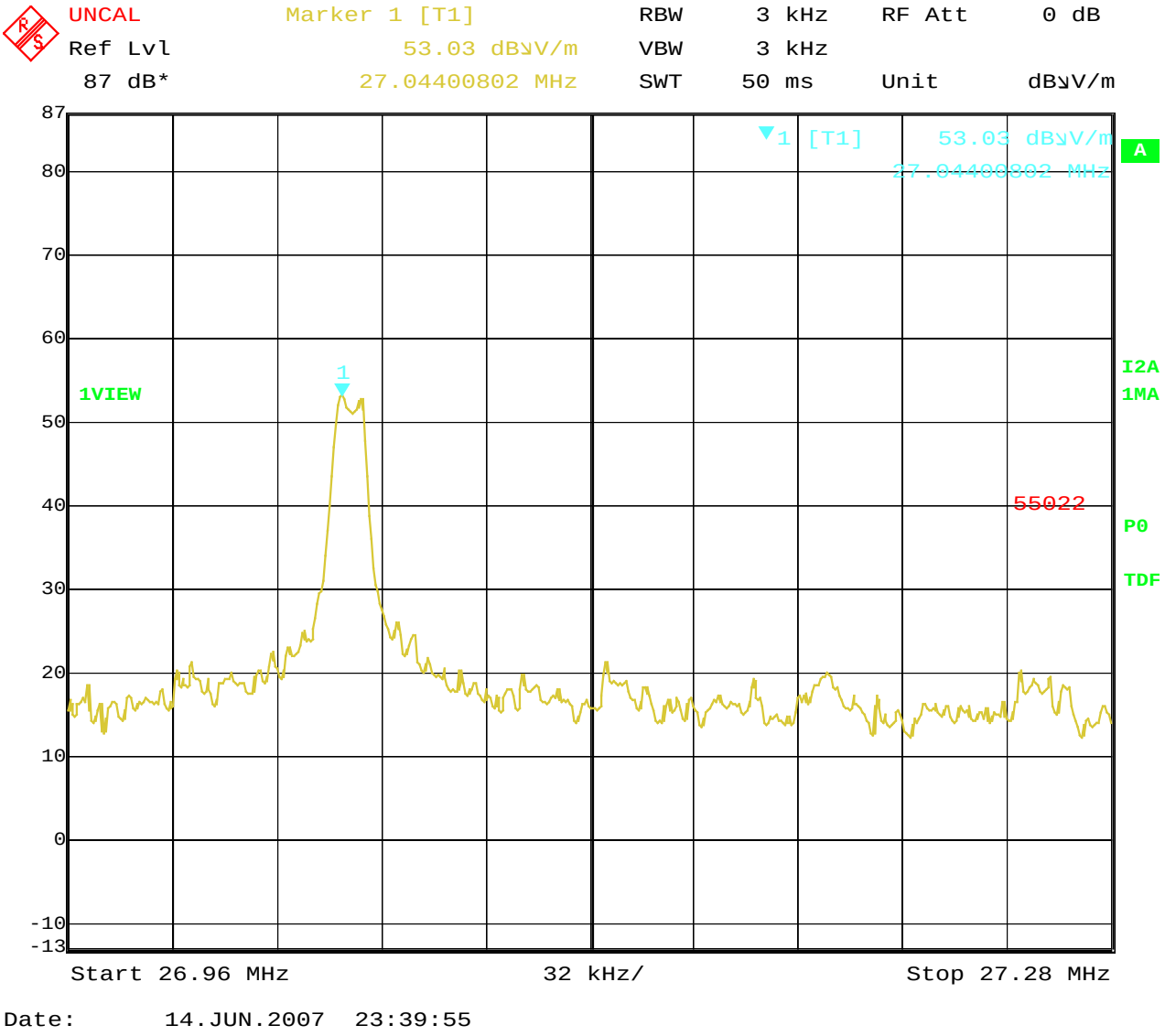
4.3.Band Edge Limit

The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

4.4.Band Edge Test Result

Test Item:	**Fundamental Radiated Emission Data**
Test Voltage:	2.4V DC BATTERY
Test Mode:	ON TX
Temperature:	24^{o}C
Humidity:	61%RH
Test Result:	PASS

Refer to attached data chart.

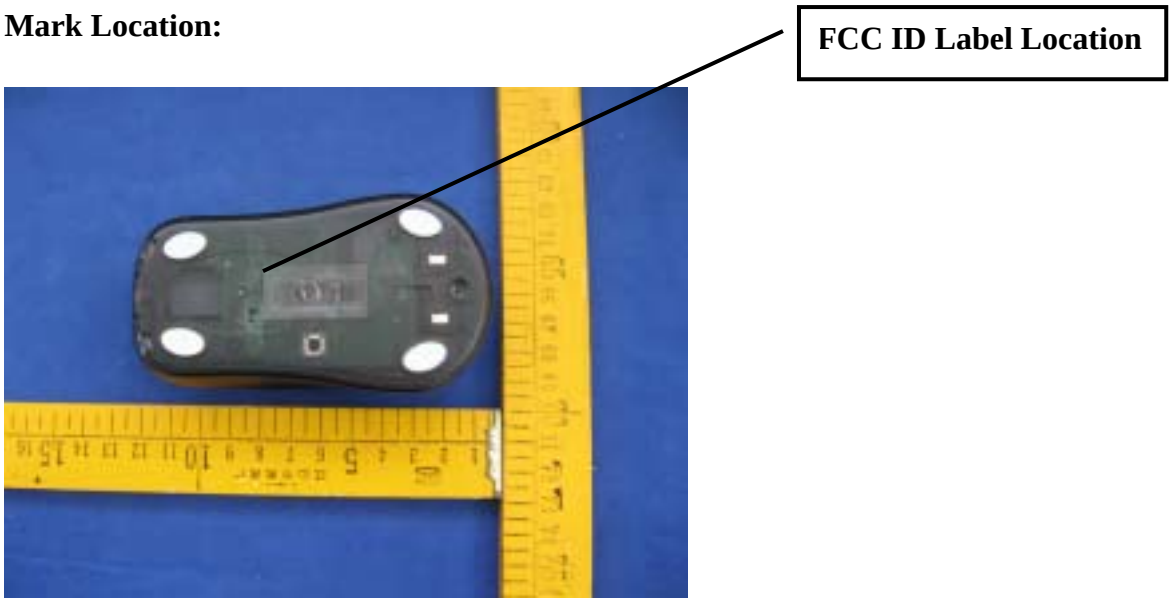

UNCAL
Marker 1 [T1]
RBW 3 kHz
RF Att 0 dB
Ref Lvl
53.03 dBµV/m
VBW 3 kHz
87 dB*
27.04400802 MHz
SWT 50 ms
Unit dBµV/m
1 [T1] 53.03 dBµV/m
27.04400802 MHz
A
87
80
70
60
50
40
30
20
10
0
-10
-13
1VIEW
1
I2A
1MA
55022
P0
TDF
Start 26.96 MHz
32 kHz/
Stop 27.28 MHz
Date: 14.JUN.2007 23:39:55

5. FCC ID LABEL

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 accpt any interference received, including interference that may cause undesired operation.

The Label must not be a stick-on paper. 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.

Mark Location:

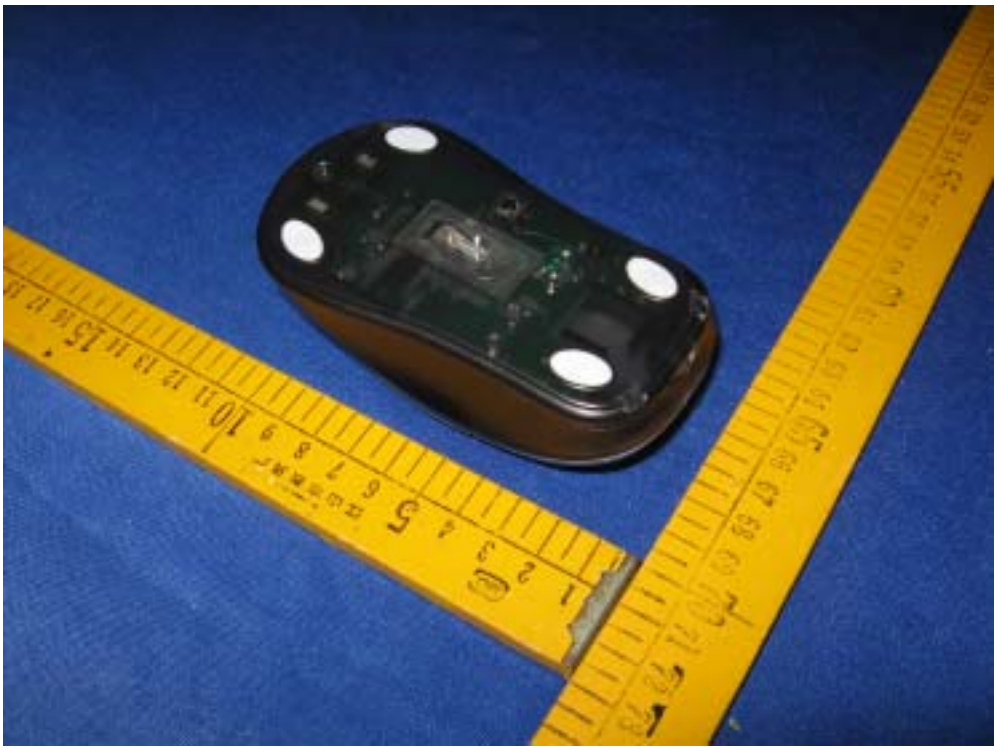


6. PHOTOGRAPH

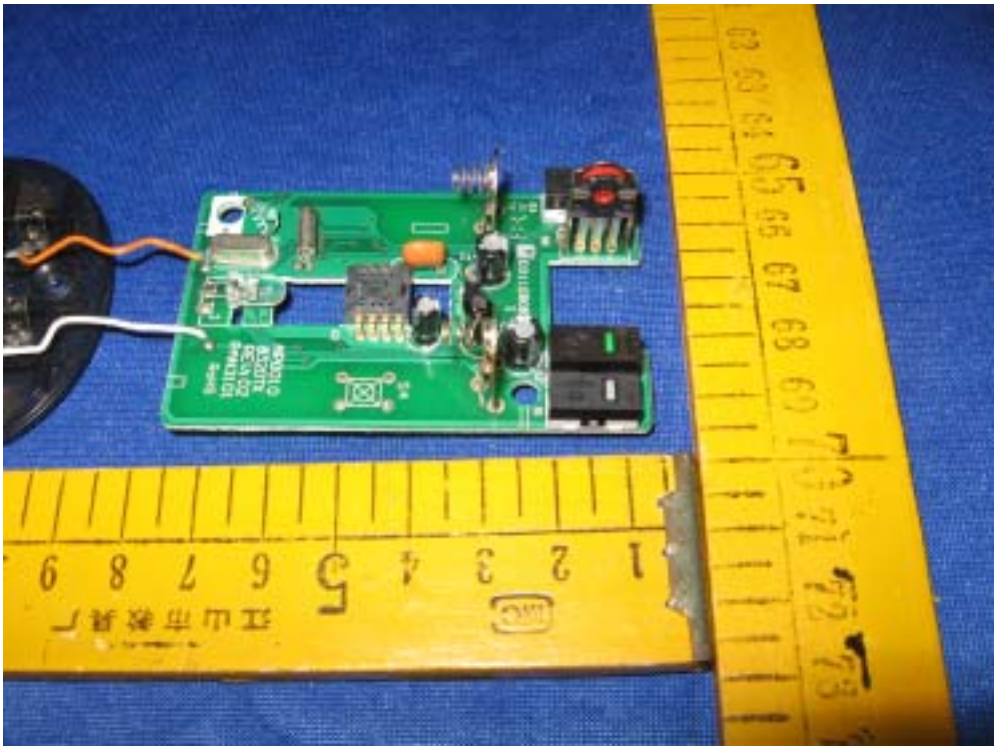
6.1.Photo of Radiated Measurement

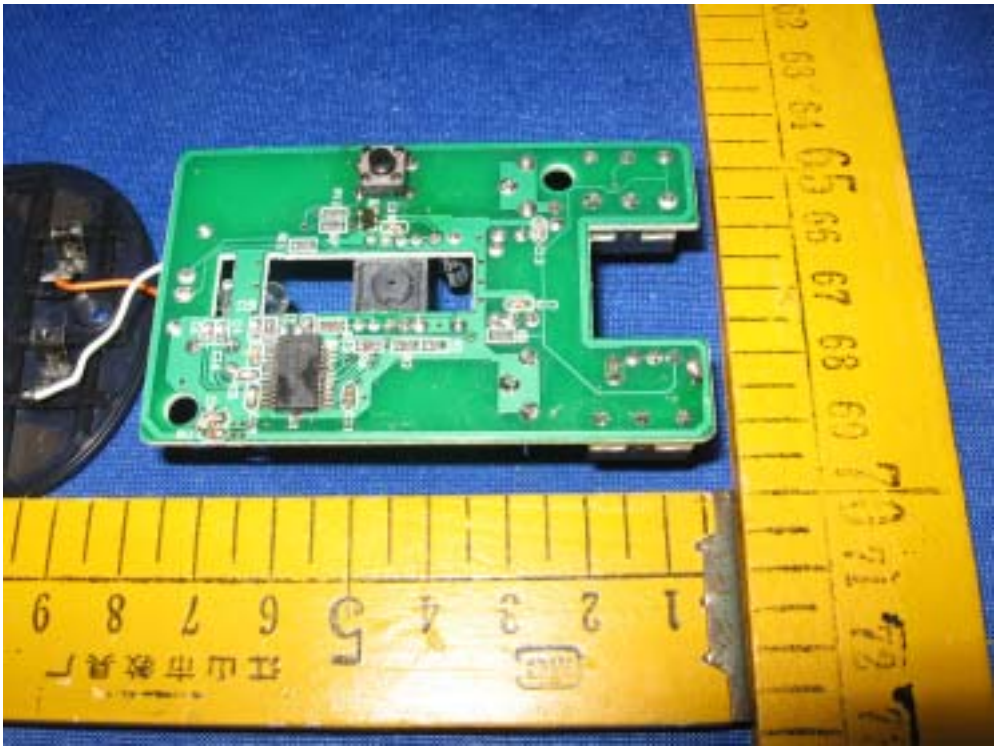
APPENDIX I
(Photos of EUT)

Outside View



Interior View





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