

FCC TEST REPORT

FCC ID : TTNMOU-903

Applicant : **SHENZHEN MAXIN TECHNOLOGY DEVELOPMENT LIMITED**
Rm 1910-1912,China electronic Information Building, Xinwen Road,
shenzhen, China

Equipment Under Test (EUT) :

Product description : CORDLESS OPTICAL MOUSE

Model No. : MOU-903/MOU-904/MOU-906

Standards : FCC 15 Paragraph 15.205, Paragraph 15.209, Paragraph 15.227,
Paragraph 15.31, Paragraph 15.33, Paragraph 15.35.

Date of Test : November 21, 2005

Test Engineer : Tiger Su

Reviewed By : 

PERPARED BY:
Shenzhen Huatongwei International Inspection Co., Ltd

Keji S,12th,Road, Hi-tech Industrial Park, Shenzhen, Guangdong, China

FCC Registration Number: 662850

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3 Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (25MHz to 1GHz)	FCC PART 15: 2003	ANSI C63.4: 2003	Class B	PASS
Conducted Emission (150KHz to 30MHz)	FCC PART 15: 2003	ANSI C63.4: 2003	Class B	N/A

4 General Information

4.1 Client Information

Applicant: **SHENZHEN MAXIN TECHNOLOGY DEVELOPMENT LIMITED**
Address of Applicant: Rm 1910-1912,China electronic Information Building, Xinwen Road, shenzhen, China

4.2 General Description of E.U.T.

Product description: CORDLESS OPTICAL MOUSE
Model No.: MOU-903/MOU-904/MOU-906

4.3 Details of E.U.T.

Power Supply: Transmitter :3.0V DC Battery

4.4 Description of Support Units

The EUT has been tested as an independent device unit

4.5 Standards Applicable for Testing

The customer requested FCC tests for a CORDLESS OPTICAL MOUSE. The standards used were FCC 15 Paragraph 15.205, Paragraph 15.209, Paragraph 15.227, Paragraph 15.31, Paragraph 15.33, Paragraph 15.35.

4.6 Test Facility

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

- **FCC – Registration No.: 662850**

Shenzhen Huatongwei International Inspection Co., Ltd, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 662850, November 17, 2003.

4.7 Test Location

All Emissions tests were performed at:-Shenzhen Huatongwei International Inspection Co., Ltd. at Keji S,12th,Road, Hi-tech Industrial Park, Shenzhen, Guangdong, China.

5 Equipment Used during Test

Conducted Emission Test						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due date
1	Shielding Room	ETS	8 x 4 x 4 m ³	N0.2	N/A	N/A
2	LISN	Rohde & Schwarz	ESH2-Z5	100028	06-11-2005	05-11-2006
3	EMI Test Receiver	Rohde & Schwarz	ESCS30	100038	18-11-2005	17-11-2006
Radiated Emission Test						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due date
1	3m Semi- Anechoic Chamber	ETS	N/A	N/A	06-11-2005	05-11-2006
2	EMI Test Receiver	ROHDE & SCHWARZ	ESI 26	100009	06-11-2005	05-11-2006
3	EMI Test Receiver	ROHDE & SCHWARZ	ESCS30	100038	06-11-2005	05-11-2006
4	EMI Test Software	ROHDE & SCHWARZ	ES-K1	N/A	N/A	N/A
5	Bilog Type Antenna	ETS	2075	2346	06-11-2005	05-11-2006
6	Horn Antenna	ROHDE & SCHWARZ	HF906	1000029	06-11-2005	05-11-2006
7	Ultra-Broadband Antenna	ROHDE & SCHWARZ	HL562	100015	06-11-2005	05-11-2006
Common Used Equipment						
Item	Test Equipment	Manufacturer	Model No.	Series No.	Cal. Date	Due date
1	Temperature, Humidity & Barometer	OREGON SCIENTIFIC	BA-888	20001 to 20004	25-07-2005	25-07-2006
2	DMM	FLUKE	73	70681567 or 70671126	23-07-2005	23-07-2006

6 Conducted Emission Test

Product:	CORDLESS OPTICAL MOUSE
Test Requirement:	FCC Part15 Paragraph 15.207
Test Method:	Based on FCC Part15 Paragraph 15.207
Test Date:
Frequency Range:	150kHz to 30MHz
Class:	Class B
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth) Quasi-Peak & Average if maximised peak within 6dB of Average Limit

6.1 Test Equipment

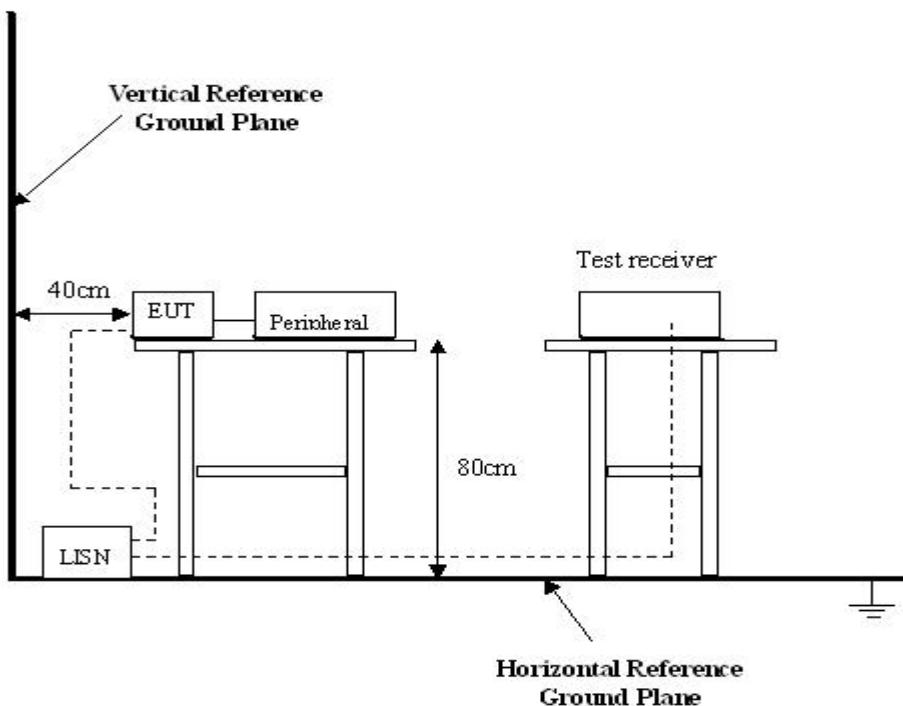
Please refer to Section 5 this report.

6.2 Test Procedure

1. The EUT was tested according to ANSI C63.4:2003. The frequency spectrum from 150kHz to 30MHz was investigated.
2. The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

6.3 Conducted Test Setup

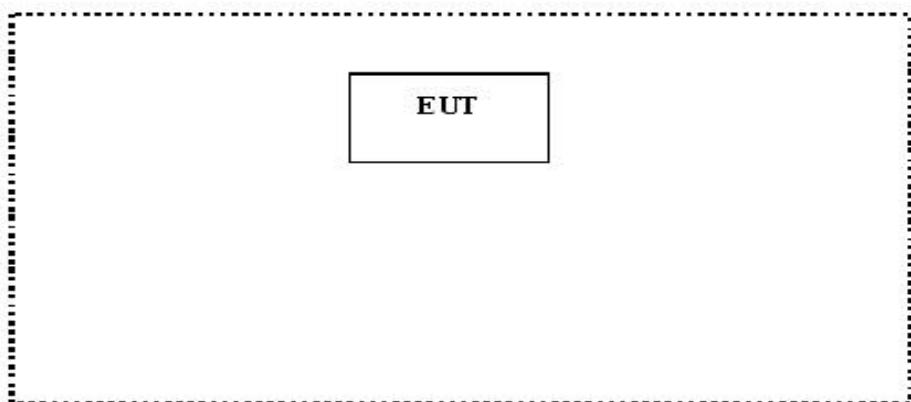
The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15 Paragraph 15.207 limits.



6.4 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.
- C. Modulate output capacity of EUT up to specification.



6.5 Conducted Emission Limits

66-56 dB μ V/m between 0.15MHz & 0.5MHz

56 dB μ V/m between 0.5MHz & 5MHz

60 dB μ V/m between 5MHz & 30MHz

Note: In the above limits, the tighter limit applies at the band edges.

6.6 Conducted Emission Test Result

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

7 Radiation Emission Test

Product:	CORDLESS OPTICAL MOUSE
Test Requirement:	FCC Part15 Paragraph 15.209, Paragraph 15.227
Test Method:	Based on FCC Part15 Paragraph 15.33
Test Date:	November 21, 2005
Frequency Range:	25MHz to 1GHz
Measurement Distance:	3m
Detector:	Peak for pre-scan (120kHz resolution bandwidth) Quasi-Peak if maximised peak within 6dB of limit

7.1 Test Equipment

Please refer to Section 5 this report.

7.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

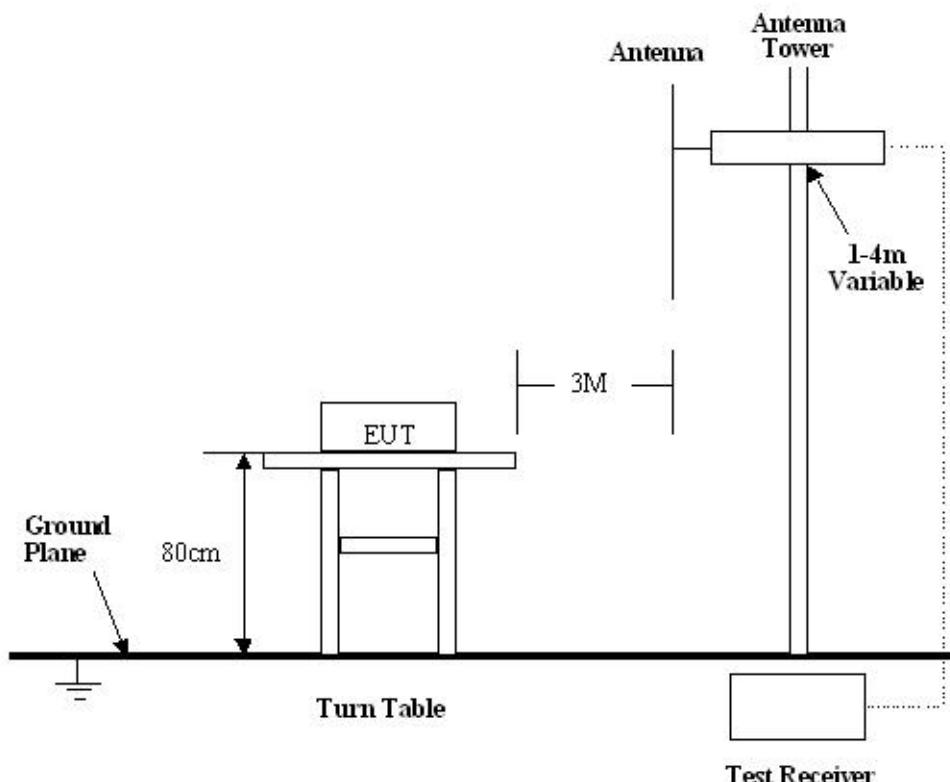
Based on ANSI C63.4:2003, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at SZHTW is +4.0 dB.

7.3 Test Procedure

1. For the radiated emissions test, since the EUT does not have a power source, there was no connection to AC outlets.
2. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combinations.
3. 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 μ V of specification limits), and are distinguished with a "Qp" in the data table.
4. The EUT was under normal mode during the final qualification test and the configuration was used to represent the worst case results.

7.4 Radiated Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15 Paragraph 15.209, Paragraph 15.227 limits.



7.5 Spectrum Analyzer Setup

According to FCC Part15 Paragraph 15.209, Paragraph 15.227 Rules, the system was tested to 1000 MHz.

Start Frequency	25 MHz
Stop Frequency	1000 MHz
Sweep Speed	Auto
IF Bandwidth	100 kHz
Video Bandwidth	1 MHz
Quasi-Peak Adapter Bandwidth	120 kHz
Quasi-Peak Adapter Mode	Normal
Resolution Bandwidth	1MHz

7.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of $-7\text{dB}\mu\text{V}$ means the emission is $7\text{dB}\mu\text{V}$ below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Class B Limit}$$

7.7 Summary of Test Results

According to the data in section 7.10, the EUT complied with the FCC Part15 Paragraph 15.209 and Paragraph 15.227 standards.

7.8 EUT Operating Condition

Same as section 6.4 of this report.

7.9 Radiated Emissions Limit

A. FCC Part 15 subpart C Paragraph 15.227 Limit

Fundamental Frequency(MHZ)	Field Strength of Fundamental
	dBuV/m
27.042	100

Note:(1) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

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.

7.10 Radiated Emissions Test Result

Formula of conversion factors: the field strength at 3m was established by adding The meter reading of the spectrum analyser (which is set to read in units of dBuV) To the antenna correction factor supplied by the antenna manufacturer. The antenna Correction factors are stated in terms of dB. The gain of the preselector was accounted For in the spectrum analyser meter reading.

Example:

$$\text{Freq(MHz) Meter Reading +ACF=FS}$$

$$33 \quad 20\text{dBuV} + 10.36\text{dB} = 30.36\text{dBuV/m} @3\text{m}$$

A. Fundamental Radiated Emission Data for 27.042MHz

Test Item:	Fundamental Radiated Emission Data					
Test Voltage:	3.0VDC Battery					
Test Mode:	TX On					
Temperature:	24 °C					
Humidity:	52%RH					
Test Result:	PASS					

Frequency (MHz)	Antenna Polarization	Emission Level (dBuV/m)	FCC 15 Subpart C Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Turntable Angle (°)
27.042	Vertical	52.4	100.0	47.6	1.5	60
27.042	Horizontal	51.5	100.0	48.5	1.5	60

B. General Radiated Emission Data

Test Item: General Radiated Emission Data
Test Voltage: 3.0VDC Battery
Test Mode: TX On
Temperature: 24 °C
Humidity: 52%RH
Test Result: PASS

Frequency (MHz)	Antenna Polarization	Emission Level (dBuV/m)	FCC 15 Subpart C Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Turntable Angle (°)
217.192385	Vertical	25.6	46.0	20.4	1.2	277
296.593186	Vertical	29.8	46.0	16.2	1.2	214
351.302605	Vertical	29.1	46.0	16.9	1.2	225
568.657315	Vertical	32.1	46.0	13.9	1.5	223
271.192385	Horizontal	36.9	46.0	9.1	1.2	300
296.593186	Horizontal	41.5	46.0	4.5	1.2	268
351.302605	Horizontal	40.1	46.0	5.9	1.5	232
378.657315	Horizontal	40.2	46.0	5.8	1.2	232
406.012024	Horizontal	37.6	46.0	8.4	1.5	268
433.366733	Horizontal	41.0	46.0	5.0	1.2	300

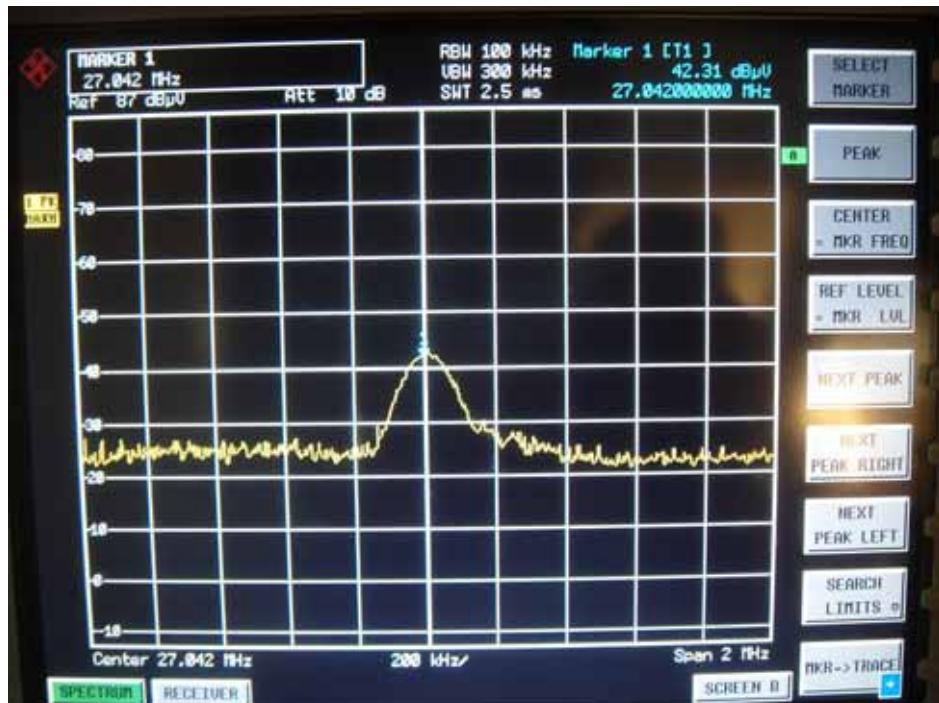
8 Occupied Bandwidth

Test Requirement:	FCC Part15 C
Test Method:	Based on FCC Part15 Paragraph 15.227
	Operation within the band 25.77-27.77MHz
Test Date:	November 21, 2005
Test mode:	TX On
Temperature:	24 °C
Humidity:	52%RH

8.1 Test Procedure

1. The field strength of any emissions which appear outside of the band shall not exceed the general radiated emission limits in section 15.209.
2. The useful radiated emission from the EUT was detected by the spectrum analyser with peak detector.

The graph as below.



9 Photographs of Testing set up

9.1 Radiation Emission Test View For 30MHz-1000MHz



10 Photographs - Constructional Details

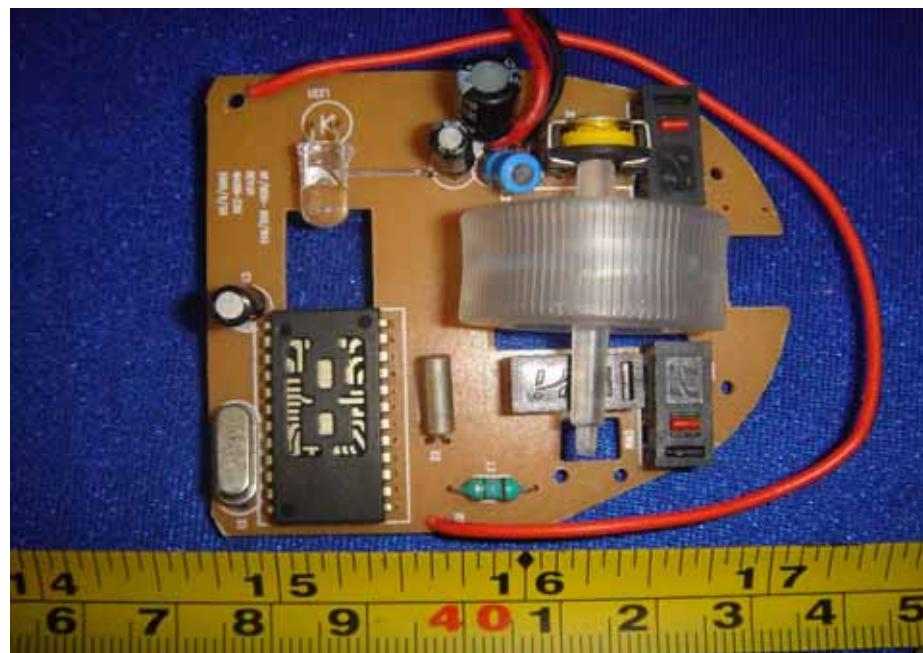
10.1 EUT - Front View



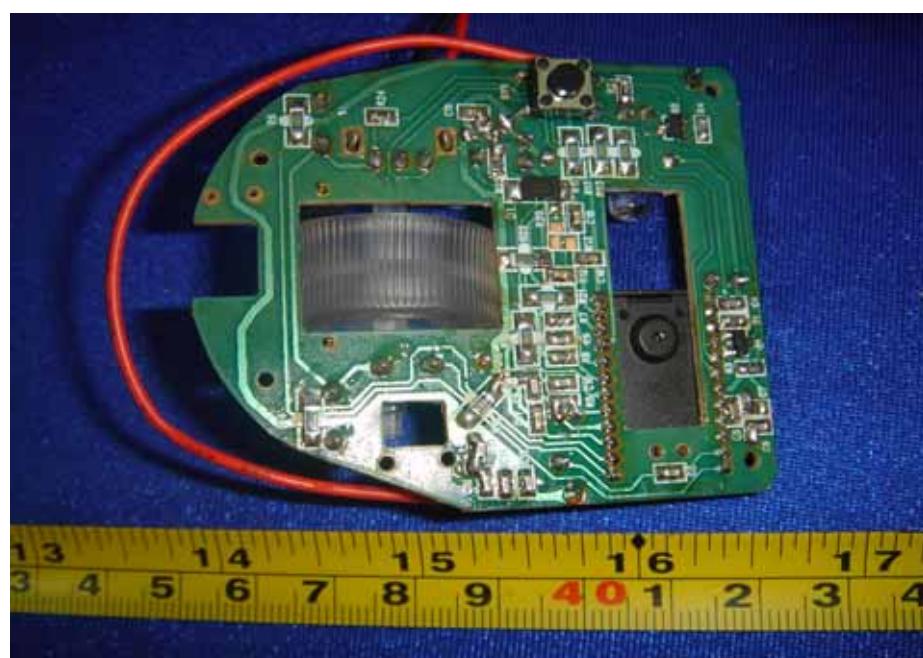
10.2 EUT - Back View



10.3 PCB – Component View



10.4 PCB – Solder View



11 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 accept 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.

Proposed Label Location on EUT

EUT Bottom View/proposed FCC Mark Location

