

FCC TEST REPORT

Under
FCC 15 Subpart C, Paragraph 15.227

Prepared For:

MLK Industries (ShenZhen) Limited

Block A1, 1st Industries Park, 3rd Industries Zone,
Fenghuang, FuYong, BaoAn, Shenzhen

FCC ID: PP20101F0

EUT: Wireless Optical Mouse

Model: 0101F0

April 27, 2004

Report Type: Original Report

Test Engineer: Peter Lin

Test Date: April 20, 2004


Review By: _____
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

Ke Mei Ou Laboratory Co., Ltd.

7A, Jiexiangge, JiahuiXincheng, No.3027, Shennan Rd., Futian, Shenzhen, Guangdong, P.R.China.

Tel: +86 755 83642690 Fax: +86 755 83297077

Email: kmo@kmlab.com

Internet: www.kmlab.com

Site on File with the Federal Communications Commission – United States

Registration Number: 125782

For 3 & 10 meter OATS

Site Listed with Industry Canada of Ottawa, Canada

Registration Number: IC4986

For 3 & 10 meter OATS

1.3 Details of Applicant

Name : MLK Industries (ShenZhen) Limited
Address : Block A1, 1st Industries Park, 3rd Industres Zone, Fenghuang, FuYong, BaoAn, Shenzhen
Contact : Ke Chen Hua
Tel : + 86 755 27327598
Fax : + 86 755 27327498

1.4 Application Details

Date of Receipt of Application : April 14, 2004
Date of Receipt of Test Item : April 20, 2004
Date of Test : April 20~April 26, 2004

1.5 Test Item

Manufacturer : See Applicant
Brand Name : CREATIVE, MLK
Model No. : 0101F0, NWU90S
Description : Wireless Optical Mouse

Additional Information

Frequency : 27.045MHz
Number of Channels : Single Channel with 256 random ID,
Power Supply : Two AA Size Alkaline Batteries
Operation Distance : 1.8M (Typically under normal office environment)
Resolution : 800cpi

1. 6 Test Standards

FCC 15 Subpart C, Paragraph 15.227

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 15.207 | 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 | Minimum passing margin is -31.40 dB at 27.045 MHz Horizontal |
| FCC Part 15 , Paragraph 15.209 | Radiated Test | PASS | Meets Class B Limit Minimum passing margin is -15.2 dB at 358.560MHz Horizontal |
| 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 Ke Mei Ou Laboratory Co., Ltd.

4. Conducted Power Line Test

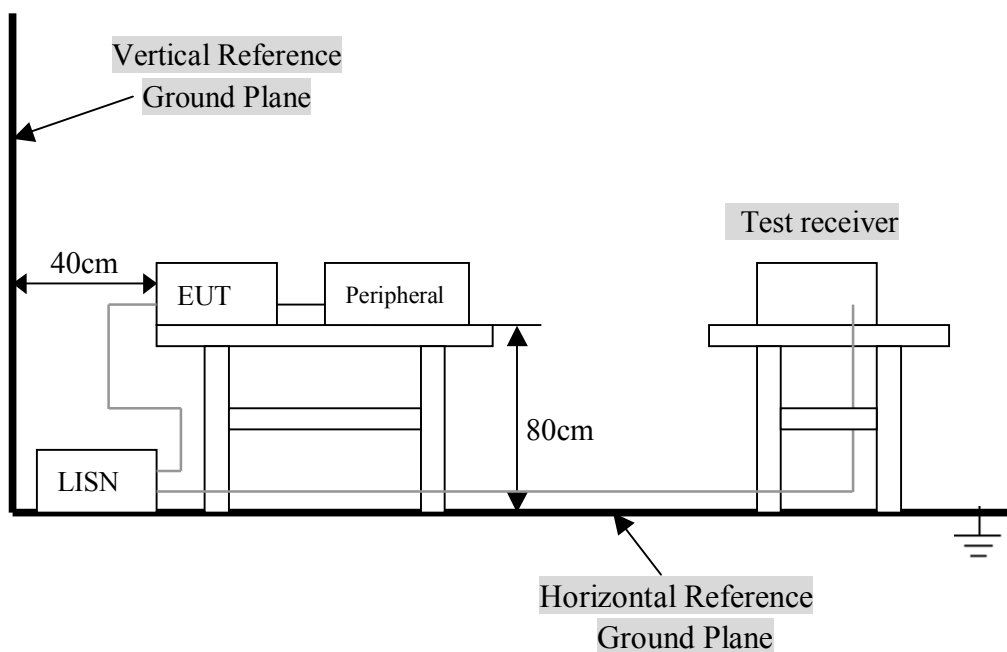
4.1 Test Equipment

Please refer to Section 9 this report.

4.2 Test Procedure

The EUT was tested according to ANSI C63.4 - 2001. The frequency spectrum from 0.45 MHz to 30 MHz was investigated. The LISN used was 50 ohm / 50 uHenry as specified by section 5.1 OF ANSI C63.4 - 2001. cables and peripherals were moved to find the maximum emission levels for each frequency.

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 C63.4-2001. 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 | MLK Industries (ShenZhen) Limited | 0101F0 | PP20101F0 |

B. Internal Devices

| DEVICE | MANUFACTURER | MODEL # | FCCID / DoC |
|--------|--------------|---------|-------------|
| N/A | | | |
| | | | |
| | | | |
| | | | |
| | | | |

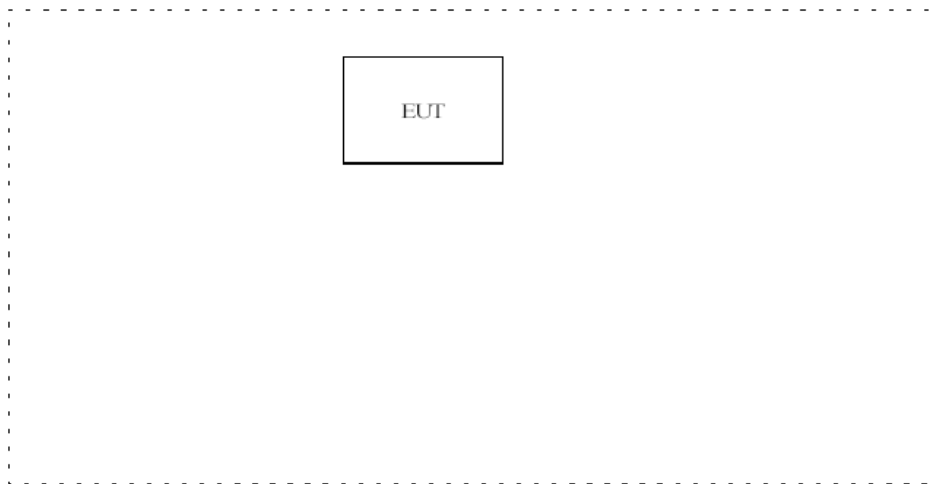
C. Peripherals

| DEVICE | MANUFAC-TURER | MODEL # SERIAL # | FCC ID/ DoC | CABLE |
|----------|---------------|---------------------|----------------|---|
| PRINTER | EPSON | P310B | Doc | 1.5m unshielded power cord 1.2m shielded data cable. |
| MODEM | DATATRONICS | 1200CK | E2050V1200CK | 1.5m unshielded power cord 1.2m shielded data cable. |
| NOTEBOOK | IBM | T23 | N/A | 1.5m unshielded power cord |

4. 5 EUT Operating Condition

Operating condition is according to ANSI C63.4 - 2001.

- 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.



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

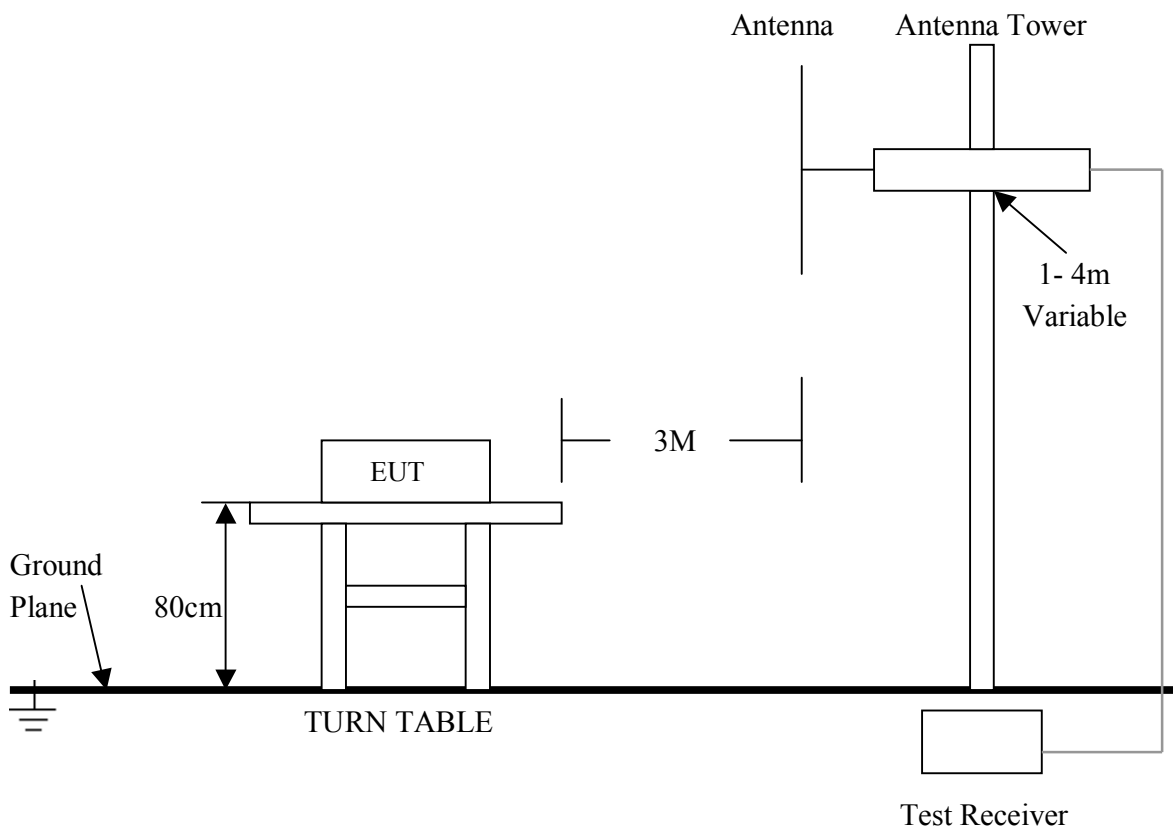
5.1 Test Equipment

Please refer to Section 9 this report.

5.2 Test Procedure

1. The EUT was tested according to ANSI C63.4 - 2001. The radiated test was performed at Ke Mei Ou Laboratory. This site is on file with the FCC laboratory division, Registration No. 125782.
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 C63.4-2001.
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 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 15.227 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

5. 7 Radiated Emission Test Result

A. Fundamental Radiated Emission Data

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

| Freq. (MHz) | Emission (dBuV/m) | HORIZ / VERT | Limits (dBuV/m) | Margin (dB) |
|-------------|-------------------|--------------|-----------------|-------------|
| 27.045 | 48.60 | HORIZ | 80 | -31.40 |
| 27.045 | 47.10 | VERT | 80 | -32.90 |

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. General Radiated Emission Data

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

| Freq. (MHz) | Emission (dBuV/m) | HORIZ / VERT | Limits (dBuV/m) | Margin (dB) |
|-------------|-------------------|--------------|-----------------|-------------|
| 152.720 | 27.8 | HORIZ | 43.5 | -15.7 |
| 124.560 | 25.5 | VERT | 43.5 | -18.0 |
| 358.560 | 30.8 | HORZ | 46.0 | -15.2 |
| 334.480 | 29.6 | VERT | 46.0 | -16.4 |
| 398.520 | 25.9 | HORZ | 46.0 | -20.1 |
| 427.680 | 28.1 | VERT | 46.0 | -17.9 |

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

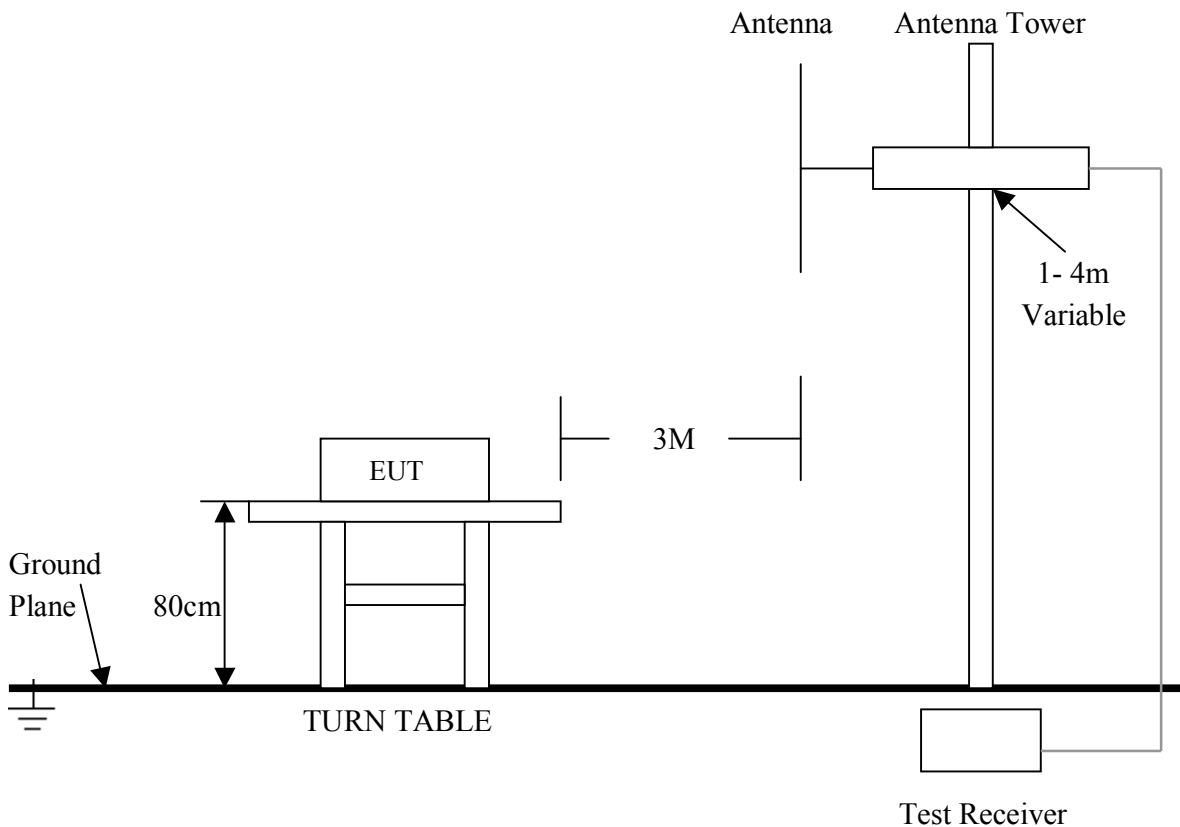
6.1 Test Equipment

Please refer to Section 9 this report.

6.2 Test Procedure

1. The EUT was tested according to ANSI C63.4 - 2001. The radiated test was performed at Ke Mei Ou Laboratory. This site is on file with the FCC laboratory division, Registration No. 125782.
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 C63.4-2001.
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 were varied from 1 m to 4 m high to find the maximum emission for each frequency.
5. The additional latch filter below 1GHz was used to measure the level of harmonics radiated emission during field strength of harmonics measurement. The bandwidth below 30MHz setting on the field strength meter is 10 kHz, above 1GHz are 1 MHz.
6. Maximizing procedure was performed on the 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.
7. The antenna polarization : Vertical polarization and horizontal polarization.

6.3 Radiated Test Setup



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

6. 4 Configuration of The EUT

Same as section 4 . 4 of this report

6. 5 EUT Operating Condition

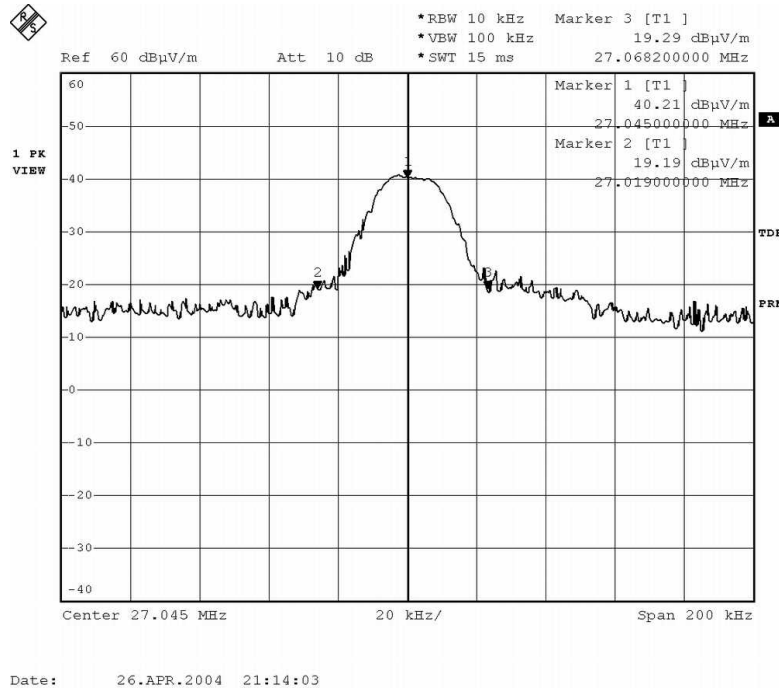
Same as section 4 . 5 of this report.

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 | : Normal |
| Test Item | : Band Edge Data | Temperature | : 25 °C |
| Test Voltage | : DC 3V (Power by Battery) | Humidity | : 50%RH |
| Test Result | : PASS | | |

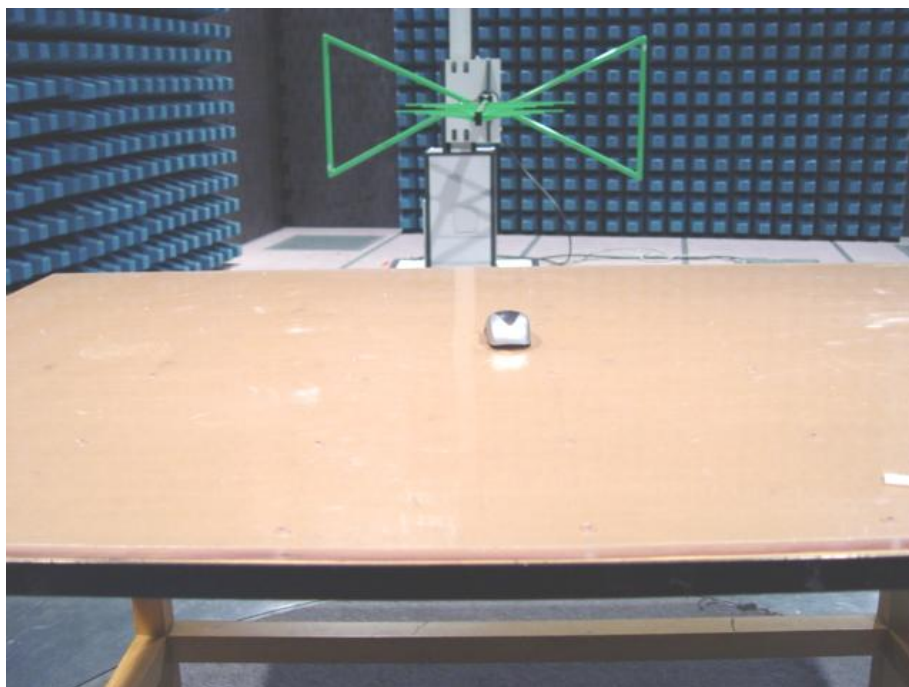


- Note:**
- (1) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.
 - (2) The average measurement was not performed when the peak measured data under the limit of average detection.

7. Photos of Testing

7.1 EUT Test Photographs

Radiated emission test view



7.2 EUT Detailed Photographs

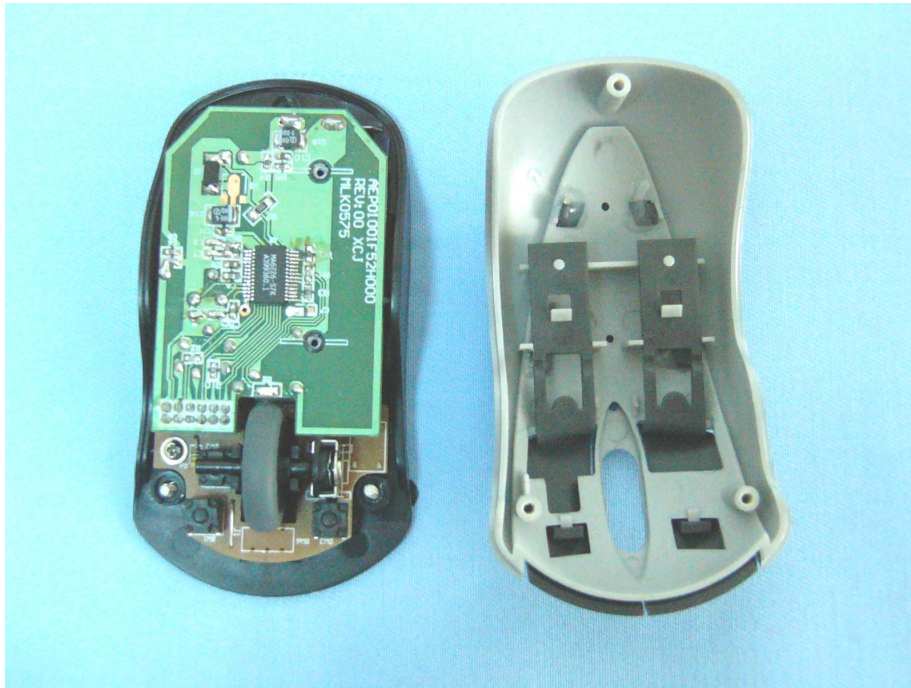
EUT top view



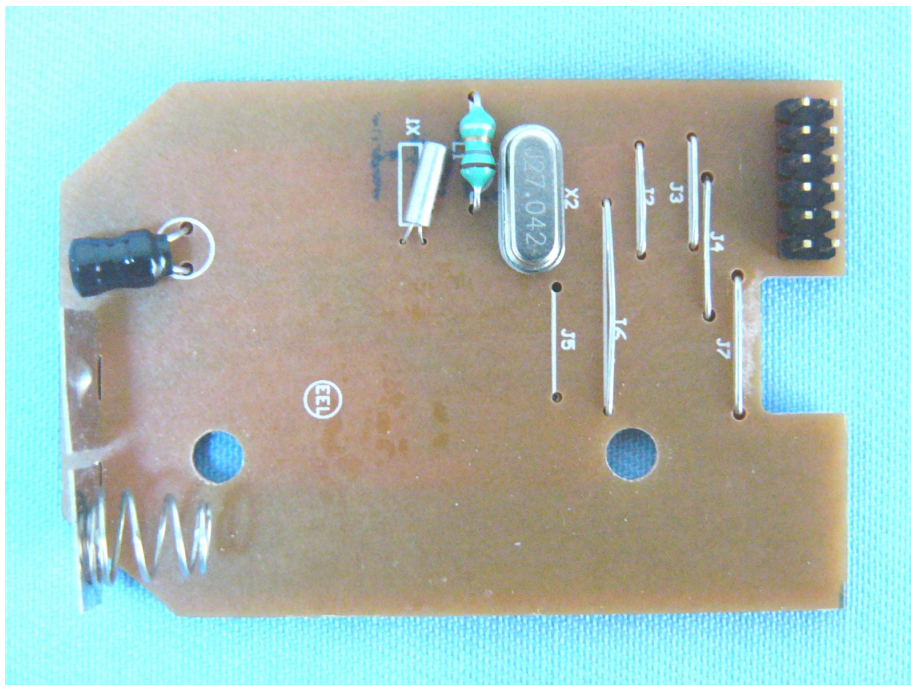
EUT bottom view

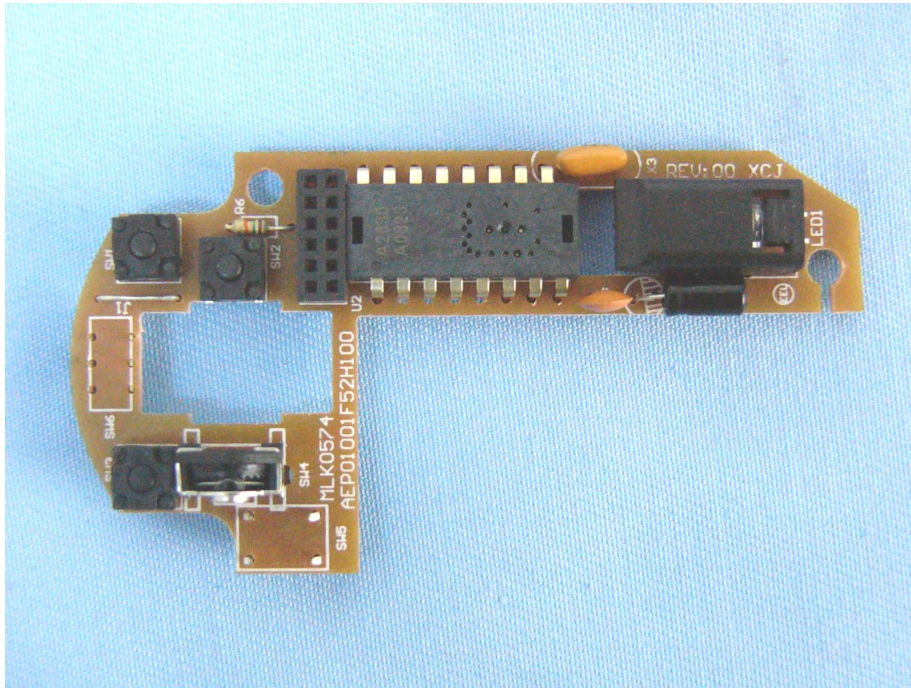


EUT inside whole view

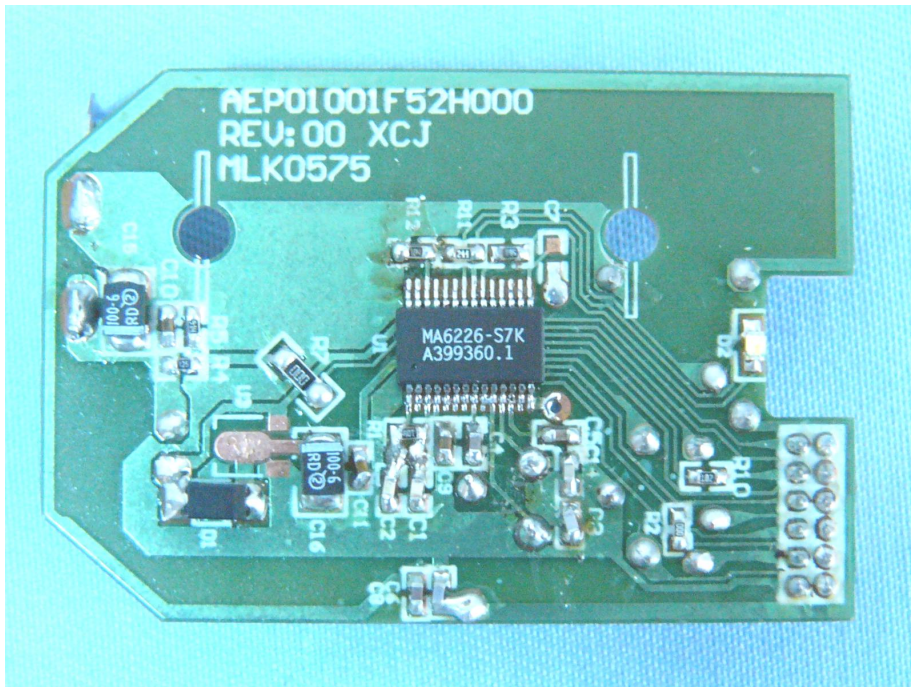


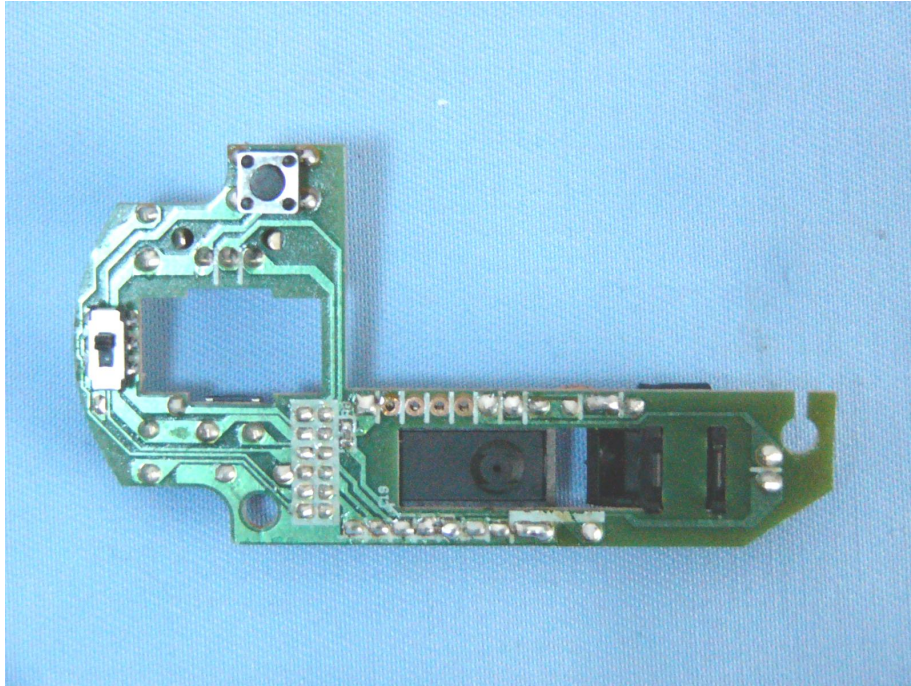
Main board component side





Main board solder side





8. FCC ID Label

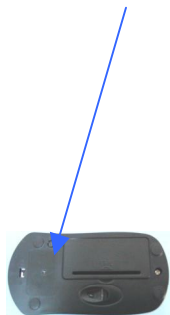
FCC ID: PP20101F0

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



9. 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 | KMO | KSZ001T | 200306 | NCR | NCR |
| Antenna Tower | KMO | KSZ002AT | 200307 | NCR | NCR |
| OATS | KMO | KSZSITE001 | N/A | July 06, 2003 | July 06, 2004 |
| EMI Test Receiver | Rohde & Schwarz | ESPI3 | 100180 | Oct.18, 2003 | Oct.18, 2004 |
| Signal Generator | Rohde & Schwarz | SMT03 | 100059 | Feb.01, 2004 | Feb.01, 2005 |
| Signal Generator | FLUKE | PM5418TX | LO738007 | Feb 01, 2004 | Feb 01, 2005 |
| Biconical Antenna | Rohde & Schwarz | HK116 | EMC0502 | Dec. 14,2003 | Dec. 14,2004 |
| Bilog Antenna | Chase | CBL6111C | 2576 | Feb.01, 2004 | Feb.01, 2005 |
| Ultra Broadband Antenna | Rohde & Schwarz | HL 562 | 100110 | June.05, 2003 | June.05, 2004 |
| AMN | Rohde & Schwarz | ESH3-Z5 | 100196 | Oct. 23,2003 | Oct. 23, 2004 |
| AMN | Rohde & Schwarz | ESH3-Z5 | 100197 | Oct. 23,2003 | Oct. 23, 2004 |
| Pulse Limiter | Rohde & Schwarz | ESH3-Z2 | N/A | N/A | N/A |
| Absorbing Clamp | Rohde & Schwarz | MDS-21 | N/A | Oct. 29,2003 | Oct. 29,2004 |
| KMO Shielded Room | KMO | KMO-001 | N/A | N/A | N/A |
| EMI Test Receiver | Rohde & Schwarz | ESCS30 | 100003 | Feb. 27, 2004 | Feb.27, 2005 |
| AMN | Rohde & Schwarz | ESH3-Z5 | 100002 | Feb. 01, 2004 | Feb.01, 2005 |
| LISN | Kyoritsu | KNW-407 | 8-1441-8 | Feb. 23, 2003 | Feb.23, 2004 |
| EMI Test Receiver | Rohde & Schwarz | ESI26 | 838786/013 | Feb. 01, 2004 | Feb.01, 2005 |
| Bilog Antenna | Chase | CBL6112B | 2591 | Feb. 01, 2004 | Feb.01, 2005 |
| Horn Antenna | Rohde & Schwarz | HF906 | 100014 | Feb. 01, 2004 | Feb.01, 2005 |
| Power Meter | Rohde & Schwarz | NRVD | 100041 | Feb. 01, 2004 | Feb.01, 2005 |
| Radio Communication Test Set | IFR | 2955B | 100015 | Feb 01, 2004 | Feb 01, 2005 |
| Multifunction Synthesizer | Hewlett-Packard | 8904A | 100016 | Feb 01, 2004 | Feb 01, 2005 |
| Temperature Chamber | TABAI | PSL-4GTW | N/A | Feb 06,2004 | Feb 06, 2005 |
| 3m Semi-Anechoic Chamber | Albatross Projects | 9mX6mX6m | N/A | Feb. 01, 2004 | Feb.01, 2005 |