

APPLICATION FOR CERTIFICATION  
On Behalf of

SHARPER Innovations Ltd.

Mini Rechargeable Wireless Optical Mouse

Model Number: MW-701

Prepared for : SHARPER Innovations Ltd.  
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Report Number : ACS-F05198  
Date of Test : Jun.02~07, 2005  
Date of Report : Jun.23, 2005

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APPENDIX I           (3 pages)

# TEST REPORT DECLARATION

Applicant : SHARPER Innovations Ltd.  
 Manufacturer : SHARPER Electronic Factory  
 EUT Description : Mini Rechargeable Wireless Optical Mouse  
 (A) MODEL NO. : MW-701  
 (B) SERIAL NO. : F2005062301  
 (C) POWER SUPPLY : DC 3V

Test Procedure Used:  
 FCC Rules and Regulations Part 15 Subpart C Apr, 2004.

The device described above is tested by AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits both radiated and conducted emissions. The test results are contained in this test report and AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. is assumed full responsibility for the accuracy and completeness of these tests. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

This report must not be used by the applicant to claim product endorsement by NVLAP or any agency of the U.S. Government.

Date of Test : Jun.02~07, 2005

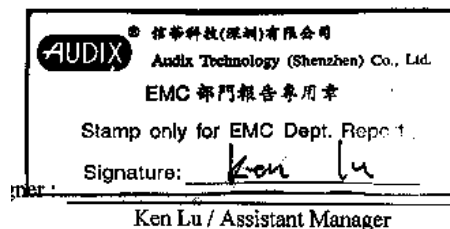
Prepared by :

Vammi Zeng  
 Vammi Zeng / Assistant

Lake Wang  
 Lake Wang / Supervisor

Reviewer :

Approved & Authorized Signer :



Name of the Representative of the Responsible Party : \_\_\_\_\_

Signature : \_\_\_\_\_

## 1. GENERAL INFORMATION

### 1.1. Description of Device (EUT)

|              |   |                                                                                                           |
|--------------|---|-----------------------------------------------------------------------------------------------------------|
| Description  | : | Mini Rechargeable Wireless Optical Mouse                                                                  |
| Model Number | : | MW-701                                                                                                    |
| Applicant    | : | SHARPER Innovations Ltd.<br>14/F., Block A, Chung Mei Centre, 15 Hing Yip<br>Street, Kwun Tong, Hong Kong |
| Manufacturer | : | SHARPER Electronic Factory<br>Daping District, Tangxia Town, Dongguan City,<br>Guangdong, China           |
| Date of Test | : | Jun.02~07, 2005                                                                                           |

## 1.2. Test Facility

### Site Description

- 3m Anechoic Chamber : Certificated by FCC, USA  
Registration Number: 90454  
Aug. 15, 2003
- 3m & 10m Anechoic Chamber : Certificated by FCC, USA  
Registration Number: 794232  
Mar. 15, 2004
- EMC Lab. : Certificated by DATech, German  
Registration Number: DAT-P-091/99-01  
Feb. 02, 2004
- Certificated by NVLAP, USA  
NVLAP Code: 200372-0  
Mar. 31, 2004
- Certificated by Nemko, Norway  
Aut. No.: ELA135  
April. 22, 2004
- Certificated by Industry Canada  
Registration Number: IC 5183  
Jul. 28, 2004
- Name of Firm : Audix Technology (Shenzhen) Co., Ltd.
- Site Location : No. 6, Ke Feng Rd., 52 Block,  
Shenzhen Science & Industrial Park,  
Nantou, Shenzhen, Guangdong, China

## 1.3. Measurement Uncertainty

| No. | Item                                    | Uncertainty | Remark      |
|-----|-----------------------------------------|-------------|-------------|
| 1.  | Uncertainty for Conducted Emission Test | 1.22dB      |             |
| 2.  | Uncertainty for Radiated Emission Test  | 3.14dB      | 3m Chamber  |
| 3.  | Uncertainty for Radiated Emission Test  | 3.18dB      | 10m Chamber |
| 4.  | Uncertainty for Power Clamp Test        | 1.38dB      |             |

## **2. POWER LINE CONDUCTED EMISSION TEST**

According to Paragraph (f) of FCC Part 15 section 15.107, Tests to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

### 3. RADIATED EMISSION TEST

#### 3.1. Test Equipment

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

##### 3.1.1. For Anechoic Chamber

| Item | Equipment      | Manufacturer    | Model No.  | Serial No.      | Last Cal.   | Cal. Interval |
|------|----------------|-----------------|------------|-----------------|-------------|---------------|
| 1.   | EMI Spectrum   | HP              | 85422E     | 3625A00181      | May 16, 05  | 1 Year        |
| 2.   | Test Receiver  | Rohde & Schwarz | ESVS20     | 830350/005      | May 16, 05  | 1 Year        |
| 3.   | Amplifier      | HP              | 8447D      | 2944A07794      | Mar.15, 05  | 1/2 Year      |
| 4.   | Bilog Antenna  | Schaffner       | CBL6111C   | 2598            | Jan. 12, 05 | 1 Year        |
| 5.   | PC             | N/A             | 586ATX3    | N/A             | N/A         | N/A           |
| 6.   | Printer        | HP              | Laserjet6P | SGCF019673      | N/A         | N/A           |
| 7.   | RF Cable       | MIYAZAKI        | 5D-2W      | 3# Chamber No.1 | Jan.30, 05  | 1/2 Year      |
| 8.   | RF Cable       | MIYAZAKI        | 5D-2W      | 3# Chamber No.2 | Jan.30, 05  | 1/2 Year      |
| 9.   | RF Cable       | FUJIKURA        | RG-55/U    | 3# Chamber No.3 | Jan.30, 05  | 1/2 Year      |
| 10.  | RF Cable       | FUJIKURA        | RG-55/U    | 3# Chamber No.4 | Jan.30, 05  | 1/2 Year      |
| 11.  | Coaxial Switch | Anritsu         | MP59B      | M73989          | May 25,05   | 1/2 Year      |

#### 3.2. Block Diagram of Test Setup

##### 3.2.1. Block diagram of connection between the EUT and simulators

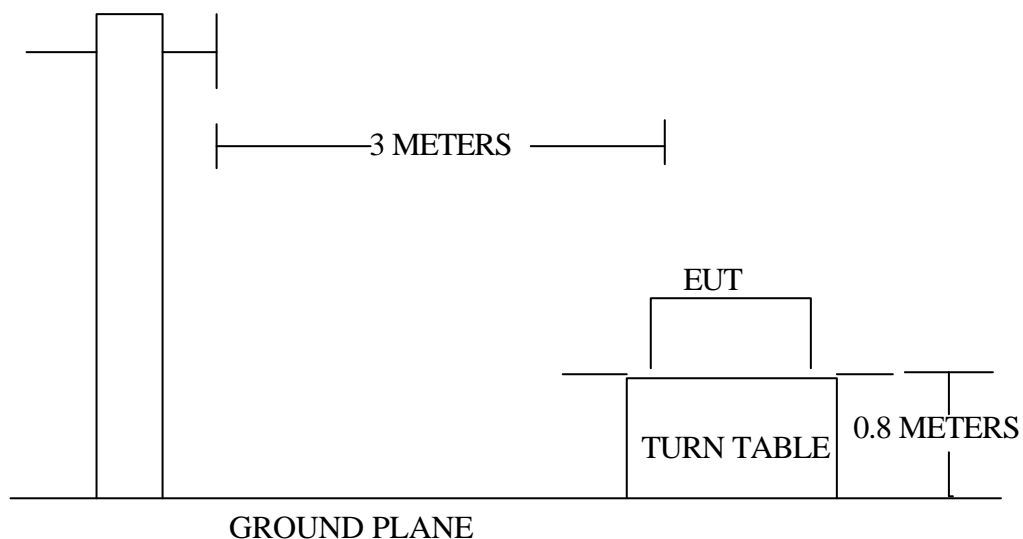


*(EUT: Mini Rechargeable Wireless Optical Mouse)*

## 3.2.2. In Anechoic Chamber

## ANTENNA TOWER

ANTENNA ELEVATION VARIES FROM 1 TO 4 METERS



## 3.3. Radiated Emission Limit: FCC 15.231

| FREQUENCY<br>MHz  | DISTANCE<br>Meters | FIELD STRENGTHS LIMIT                                                                               |                                   |
|-------------------|--------------------|-----------------------------------------------------------------------------------------------------|-----------------------------------|
|                   |                    | $\mu\text{V}/\text{m}$                                                                              | $\text{dB}(\mu\text{V})/\text{m}$ |
| 30 ~ 88           | 3                  | 100                                                                                                 | 40.0                              |
| 88 ~ 216          | 3                  | 150                                                                                                 | 43.5                              |
| 216 ~ 960         | 3                  | 200                                                                                                 | 46.0                              |
| 960 ~ 1000        | 3                  | 500                                                                                                 | 54.0                              |
| Local Oscillator: | 3                  | 80.00 $\text{dB}(\mu\text{V})/\text{m}$ (Peak)<br>60.00 $\text{dB}(\mu\text{V})/\text{m}$ (Average) |                                   |
| Harmonic :        |                    |                                                                                                     |                                   |

- Remark :
- (1) Emission level  $(\text{dB})\mu\text{V} = 20 \log \text{Emission level } \mu\text{V}/\text{m}$
  - (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.



### 3.4.EUT Configuration on Test

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

#### 3.4.1.Mini Rechargeable Wireless Optical Mouse (EUT)

Model Number : MW-701  
Serial Number : F2005062301  
Manufacturer : SHARPER Electronic Factory

#### 3.4.2.Support Equipment : As Tested Supporting System Detail, in Section 1.2.

### 3.5.Operating Condition of EUT

#### 3.5.1.Setup the EUT as shown in Section 3.2..

#### 3.5.2.Let the EUT work in test mode (Running) and test it.

### 3.6.Test Procedure

According to paragraph of FCC Part15 Section 15.231.

EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. Power on the EUT and let it work normally, we use a keyboard test soft ware, let EUT working in test mode, then test it. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna are set on test.

The bandwidth of the EMI test receiver (R&S ESVS20) is set at 120KHz.

The frequency range from 30MHz to 1000MHz and above 1000MHz are checked.

The test mode (Running) is tested in Anechoic Chamber, and all the scanning waveforms are attached in Appendix I.

### 3.7. Radiated Emission Test Result

**PASS.**

The frequency range from 30MHz to 1000MHz is investigated.  
Please see the following pages.

|                |                                             |                 |                              |
|----------------|---------------------------------------------|-----------------|------------------------------|
| Date of Test : | Jun.07, 2005                                | Temperature :   | 24                           |
| EUT :          | Mini Rechargeable Wireless<br>Optical Mouse | Humidity :      | 56%                          |
| Model No. :    | MW-701                                      | Test Mode :     | Running                      |
| Test Engineer: | Thomax                                      | Test Standard : | FCC Part15C<br>15.227/15.209 |

| Frequency<br>MHz | Antenna<br>Factor<br>dB/m | Cable<br>Loss<br>dB | Meter Reading<br>Horizontal<br>dBμV | Emission Level<br>Horizontal<br>dBμV/m | Over<br>Limits<br>dB | Limits<br>dBμV/m |
|------------------|---------------------------|---------------------|-------------------------------------|----------------------------------------|----------------------|------------------|
| <b>30.000</b>    | <b>19.65</b>              | <b>1.10</b>         | <b>2.59</b>                         | <b>23.34</b>                           | <b>-16.67</b>        | <b>40.00</b>     |
| 114.390          | 11.55                     | 2.21                | 8.19                                | 21.95                                  | -21.55               | 43.50            |
| 195.870          | 9.29                      | 3.14                | 8.72                                | 21.16                                  | -22.34               | 43.50            |
| 231.760          | 10.96                     | 3.35                | 7.28                                | 21.58                                  | -24.42               | 46.00            |

Remark: 1. All readings are Peak values.

2. Emission Level = Antenna Factor + Cable Loss + Meter Reading

3. The worst emission was detected at 30.000MHz with corrected signal level of 23.34dBμV/m (Limit is 40.00dBμV/m) when the antenna was at horizontal polarization and at 1.1m high and the turn table was at 0°.

4. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Reviewer :

*Lake Wang*

|                |                                                 |                 |                                      |
|----------------|-------------------------------------------------|-----------------|--------------------------------------|
| Date of Test : | <u>Jun.07, 2005</u>                             | Temperature :   | <u>24</u>                            |
| EUT :          | <u>Mini Rechargeable Wireless Optical Mouse</u> | Humidity :      | <u>56%</u>                           |
| Model No. :    | <u>MW-701</u>                                   | Test Mode :     | <u>Running</u>                       |
| Test Engineer: | <u>Thomax</u>                                   | Test Standard : | <u>FCC Part15C<br/>15.227/15.209</u> |

| Frequency     | Antenna      | Cable       | Meter Reading | Emission Level | Over          | Limits       |
|---------------|--------------|-------------|---------------|----------------|---------------|--------------|
|               | Factor       | Loss        | Vertical      | Vertical       | Limits        |              |
| MHz           | dB/m         | dB          | dBμV          | dBμV/m         | dB            | dBμV/m       |
| <b>31.940</b> | <b>13.71</b> | <b>0.98</b> | <b>3.80</b>   | <b>18.49</b>   | <b>-21.51</b> | <b>40.00</b> |
| 62.980        | 6.34         | 1.72        | 9.89          | 17.95          | -22.05        | 40.00        |
| 123.120       | 10.07        | 2.23        | 6.96          | 19.26          | -24.24        | 43.50        |
| 297.720       | 12.91        | 3.88        | 4.75          | 21.54          | -24.46        | 46.00        |

Remark: 1. All readings are Peak values.

2. Emission Level = Antenna Factor + Cable Loss + Meter Reading

3. The worst emission was detected at 31.940MHz with corrected signal level of 18.49dBμV/m (Limit is 40.00dBμV/m) when the antenna was at vertical polarization and at 1.3m high and the turn table was at 0°.

4. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Reviewer :

Lake Wang



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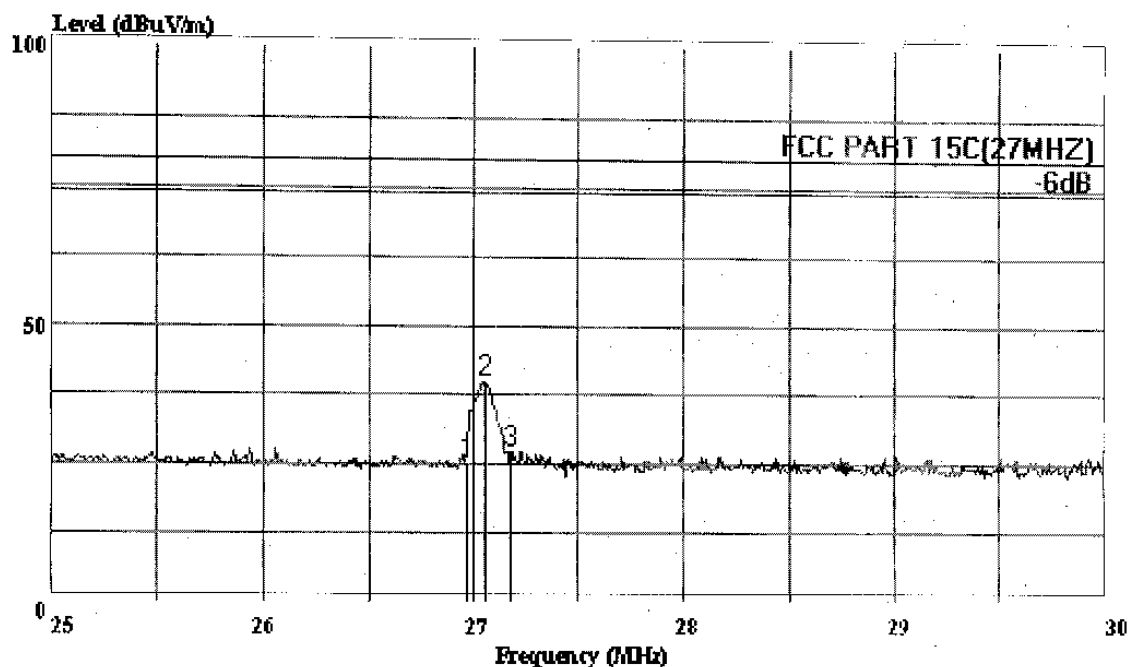
Shenzhen Science &amp; Ind. Park

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Fax: 0755-26632877

Data#: 16 File#: Sharper.EMI

Date: 2005-06-07 Time: 00:49:54



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (3# Chamber)

Trace:

Ref Trace:

Condition: FCC PART 15C(27MHZ) 3m 25-30MHZ HORIZONTAL

EUT : Mini Rechargeable Wireless

: Optical Mouse

M/N : MW-701

Power : DC 3V

Engineer : THOMAX

Test Mode: RUNNING

Memo : Temp:24'C Humi:56%

Page: 1

|   | Freq   | Level  | Over Limit | Limit Line | Read Level | Probe Factor | Cable Loss |
|---|--------|--------|------------|------------|------------|--------------|------------|
|   | MHz    | dBuV/m | dB         | dBuV/m     | dBuV       | dB           | dB         |
| 1 | 26.970 | 25.17  | -54.83     | 80.00      | 27.73      | 20.78        | 0.78       |
| 2 | 27.055 | 39.62  | -40.38     | 80.00      | 42.27      | 20.71        | 0.79       |
| 3 | 27.180 | 27.06  | -52.94     | 80.00      | 29.80      | 20.63        | 0.79       |



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

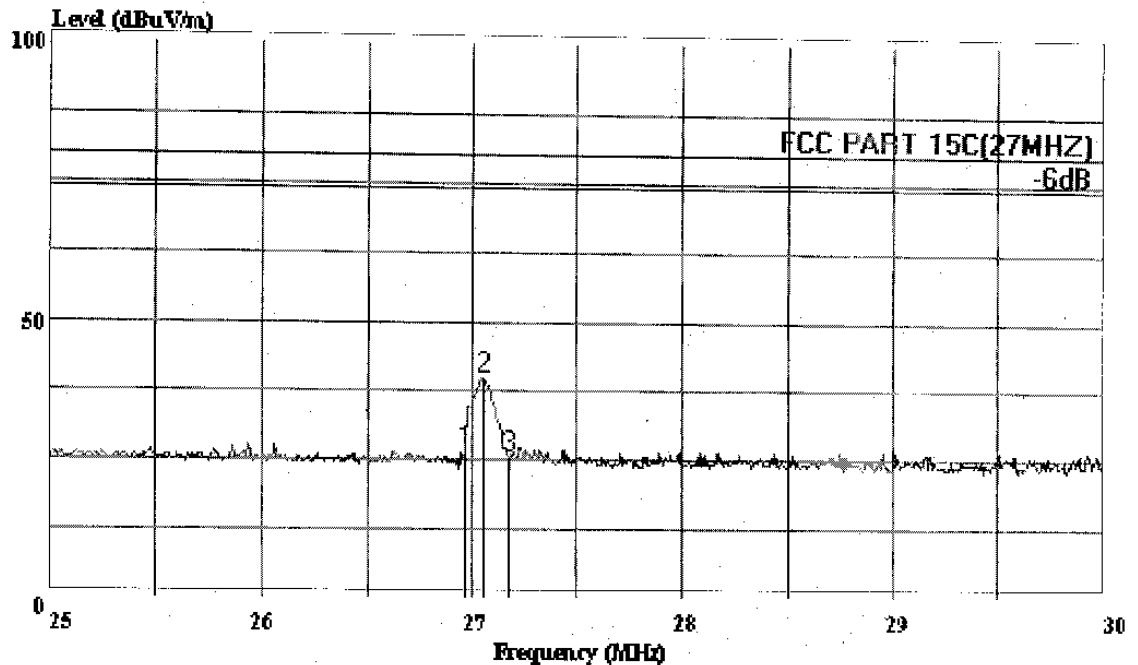
Shenzhen Science &amp; Ind. Park

Tel: 0755-26639495~7

Fax: 0755-26632877

Data#: 17 File#: Sharper.EMI

Date: 2005-06-07 Time: 00:50:59



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (3# Chamber)

Trace:

Ref Trace:

Condition: FCC PART 15C(27MHZ) 3m 25-30MHZ VERTICAL

EUT : Mini Rechargeable Wireless

: Optical Mouse

M/N : MW-701

Power : DC 3V

Engineer : THOMAX

Test Mode: RUNNING

Memo : Temp:24'C Humi:56%

Page: 1

|   | Freq   | Level  | Over Limit | Limit Line | Read Level | Probe Factor | Cable Loss |
|---|--------|--------|------------|------------|------------|--------------|------------|
|   | MHz    | dBuV/m | dB         | dBuV/m     | dBuV       | dB           | dB         |
| 1 | 26.965 | 26.45  | -53.55     | 80.00      | 29.33      | 20.47        | 0.78       |
| 2 | 27.050 | 39.69  | -40.31     | 80.00      | 42.61      | 20.44        | 0.79       |
| 3 | 27.175 | 25.72  | -54.28     | 80.00      | 28.71      | 20.39        | 0.79       |



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

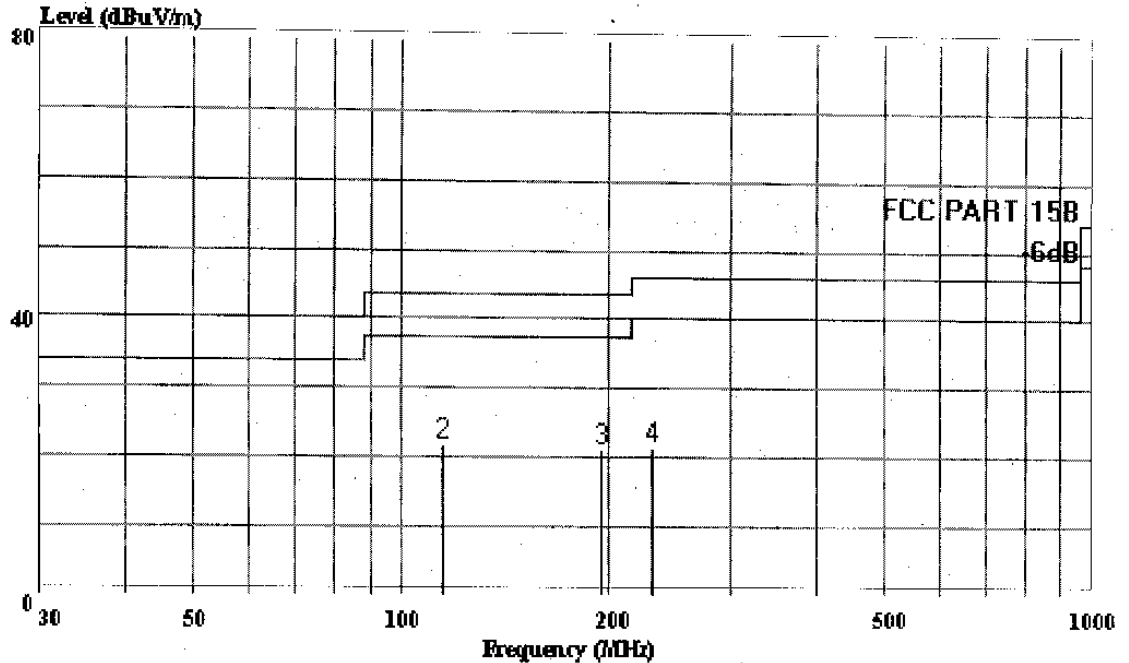
Shenzhen Science &amp; Ind. Park

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Fax: 0755-26632877

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Date: 2005-06-07 Time: 00:53:48



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (3# Chamber)

Trace:

Ref Trace:

Condition: FCC PART 15B 3m 2598FACTOR HORIZONTAL

EUT : Mini Rechargeable Wireless

: Optical Mouse

M/N : MW-701

Power : DC 3V

Engineer : THOMAX

Test Mode: RUNNING

Memo : Temp:24'C Humi:56%

: H:1.1m TablePos:0'

Page: 1

|   | Freq    | Level  | Over Limit | Limit Line | Read Level | Probe Factor | Cable Loss |
|---|---------|--------|------------|------------|------------|--------------|------------|
|   | MHz     | dBuV/m | dB         | dBuV/m     | dBuV       | dB           | dB         |
| 1 | 30.000  | 23.34  | -16.67     | 40.00      | 2.59       | 19.65        | 1.10       |
| 2 | 114.390 | 21.95  | -21.55     | 43.50      | 8.19       | 11.55        | 2.21       |
| 3 | 195.870 | 21.16  | -22.34     | 43.50      | 8.72       | 9.29         | 3.14       |
| 4 | 231.760 | 21.58  | -24.42     | 46.00      | 7.28       | 10.96        | 3.35       |



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

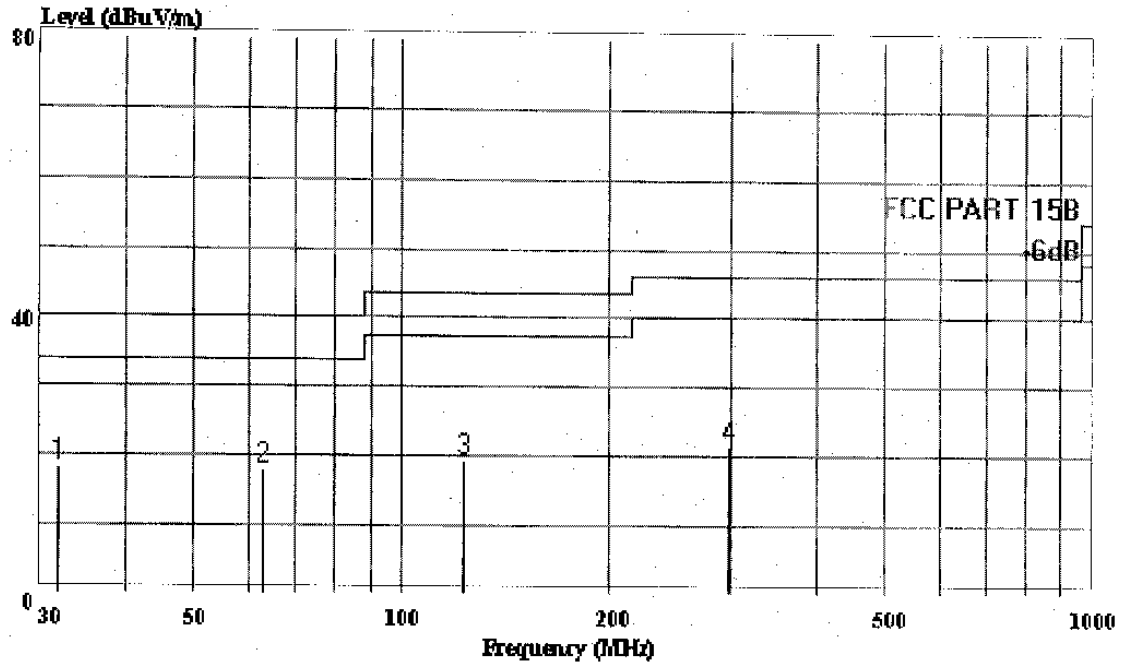
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Data#: 18 File#: Sharper.EMI

Date: 2005-06-07 Time: 00:53:26



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (3# Chamber)

Trace:

Ref Trace:

Condition: FCC PART 15B 3m 2598FACTOR VERTICAL

EUT : Mini Rechargeable Wireless

: Optical Mouse

M/N : MW-701

Power : DC 3V

Engineer : THOMAX

Test Mode: RUNNING

Memo : Temp:24'C Humi:56%

: H:1.3m TablePos:0'

Page: 1

|   | Freq    | Level  | Over Limit | Limit Line | Read Level | Probe Factor | Cable Loss |
|---|---------|--------|------------|------------|------------|--------------|------------|
|   | MHz     | dBuV/m | dB         | dBuV/m     | dBuV       | dB           | dB         |
| 1 | 31.940  | 18.49  | -21.51     | 40.00      | 3.80       | 13.71        | 0.98       |
| 2 | 62.980  | 17.95  | -22.05     | 40.00      | 9.89       | 6.34         | 1.72       |
| 3 | 123.120 | 19.26  | -24.24     | 43.50      | 6.96       | 10.07        | 2.23       |
| 4 | 297.720 | 21.54  | -24.46     | 46.00      | 4.75       | 12.91        | 3.88       |

#### **4. DEVIATION TO TEST SPECIFICATIONS**

[None.]



# **APPENDIX I**



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

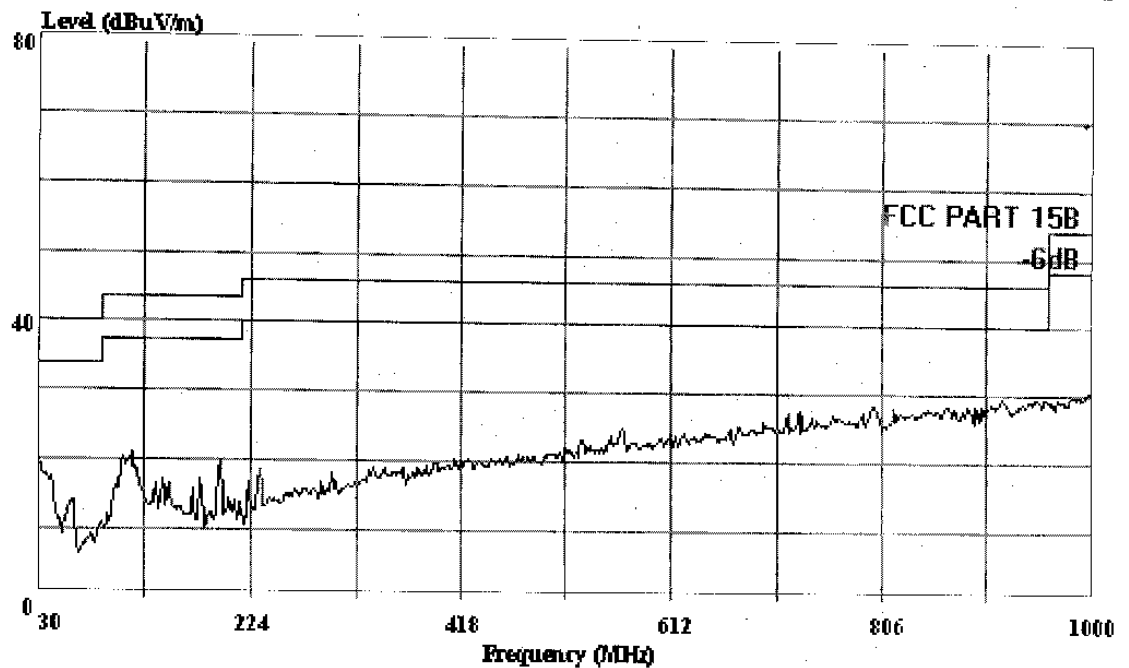
Shenzhen Science &amp; Ind. Park

Tel: 0755-26639495~7

Fax: 0755-26632877

Data#: 13 File#: Sharper.EMI

Date: 2005-06-02 Time: 11:07:41



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (3# Chamber)

Trace:

Ref Trace:

Condition: FCC PART 15B 3m 2598FACTOR HORIZONTAL

EUT : Mini Rechargeable Wireless

: Optical Mouse

M/N : MW-701

Power : DC 3V

Engineer : THOMAX

Test Mode: RUNNING

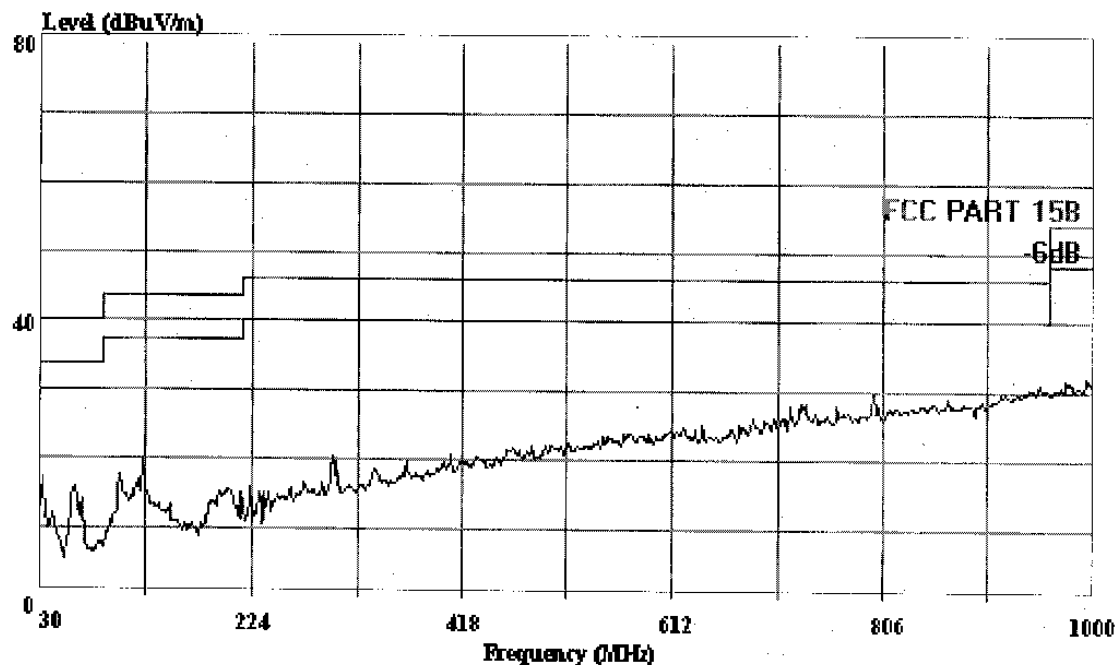
Memo : Temp:24'C Humi:56%



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

Shenzhen Science & Ind. Park  
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Fax: 0755-26632877

Data#: 12 File#: Sharper.EMI Date: 2005-06-02 Time: 11:05:48



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (3# Chamber)

Trace:

Ref Trace:

Condition: FCC PART 15B 3m 2598FACTOR VERTICAL  
EUT : Mini Rechargeable Wireless  
: Optical Mouse  
M/N : MW-701  
Power : DC 3V  
Engineer : THOMAX  
Test Mode: RUNNTNG  
Memo : Temp:24'C Humi:56%