

FCC CERTIFICATION  
On Behalf of  
Eastern Times Technology Co., Ltd.

Wireless Optical Mouse  
Model No.: DS-2220(2220-A +2218-A)

**FCC ID: TUVDS2220-001TX**

Prepared for : Eastern Times Technology Co., Ltd.  
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Report Number : ATE20072353  
Date of Test : September 28, 2007  
Date of Report : October 08, 2007

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## Test Report Certification

Applicant : Eastern Times Technology Co., Ltd.  
Manufacturer : Eastern Times Technology Co., Ltd.  
EUT Description : Wireless Optical Mouse  
(A) MODEL NO.: DS-2220(2220-A +2218-A)  
(B) SERIAL NO.: N/A  
(C) POWER SUPPLY: 3.0V DC (“AAA” batteries 2×)

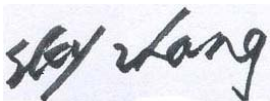
Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.227: 2006

The device described above is tested by ACCURATE TECHNOLOGY 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 Section 15.227 limits. The measurement results are contained in this test report and ACCURATE TECHNOLOGY CO. LTD is assumed full responsibility for the accuracy and completeness of these measurements. 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 ACCURATE TECHNOLOGY CO. LTD.

Date of Test : September 28, 2007

Prepared by :   
(Engineer)

Reviewer :   
(Quality Manager)

Approved & Authorized Signer :   
(Manager)

## 1. GENERAL INFORMATION

### 1.1. Description of Device (EUT)

EUT	:	Wireless Optical Mouse
Model Number	:	DS-2220(2220-A +2218-A)
Power Supply	:	3.0V DC (“AAA” batteries 2×)
Applicant Address	:	Eastern Times Technology Co., Ltd. Building 5, Penghua Industry Park, Heping Rd.(W), Longhua, Shenzhen, Guangdong, China
Manufacturer Address	:	Eastern Times Technology Co., Ltd. Building 5, Penghua Industry Park, Heping Rd.(W), Longhua, Shenzhen, Guangdong, China
Date of sample received	:	September 25, 2007
Date of Test	:	September 28, 2007

### 1.2. Description of Test Facility

EMC Lab	:	Listed by FCC The Registration Number is 274801  Listed by Industry Canada The Registration Number is IC4174  Accredited by China National Accreditation Committee for Laboratories The Certificate Registration Number is L0579
Name of Firm Site Location	:	Shenzhen Academy of Metrology & Quality Inspection Bldg. Metrology & Quality Inspection, Longzhu Road, Nanshan, Shenzhen, Guangdong, P.R. China

### 1.3. Measurement Uncertainty

Conducted emission expanded uncertainty	=	3.5dB, k=2
Radiated emission expanded uncertainty	=	4.5dB, k=2

## 2. MEASURING DEVICE AND TEST EQUIPMENT

**Table 1: List of Test and Measurement Equipment**

Kind of equipment	Manufacturer	Type	S/N	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	03.31.2008
EMI Test Receiver	Rohde&Schwarz	ESI26	838786/013	01.24.2008
Loop Antenna	Schwarzbeck	FMZB1516	113	01.24.2008
Bilog Antenna	Schwarzbeck	VULB9163	9163-194	03.31.2008
Bilog Antenna	Chase	CBL6112B	2591	01.24.2008
Horn Antenna	Rohde&Schwarz	HF906	100013	01.24.2008
Spectrum Analyzer	Anritsu	MS2651B	6200238856	03.31.2008
Pre-Amplifier	Agilent	8447D	2944A10619	03.31.2008

### 3. RADIATED EMISSION FOR FCC PART 15 SECTION 15.227(B)

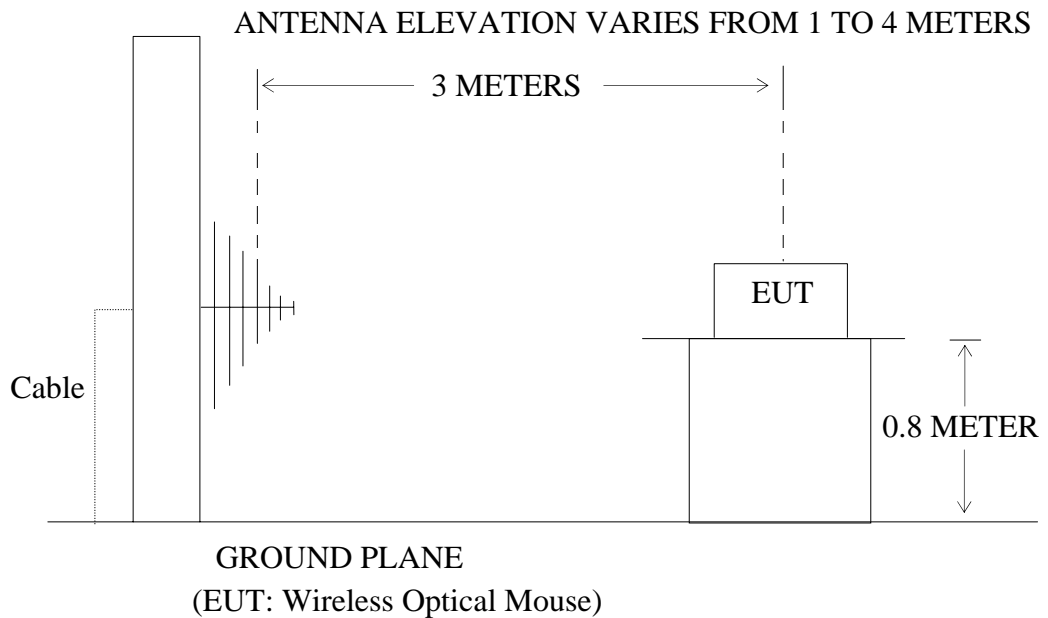
#### 3.1. Block Diagram of Test Setup

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



(EUT: Wireless Optical Mouse)

##### 3.1.2. Anechoic Chamber Test Setup Diagram



#### 3.2. The Field Strength of Radiation Emission Measurement Limits

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

Radiation Emission Measurement Limits According to Section 15.209(a)

Frequency (MHz)	Limit,		The final measurement in band 9-90kHz, 110-490kHz and above 1000MHz is performed with Average detector. Except those
	Field Strength of Quasi-peak Value (microvolts/m)	Field Strength of Quasi-peak Value (dBμV/m)	
30 - 88	100	40	
88 - 216	150	43.5	

216 - 960	200	46	frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.
Above 960	500	54	

### 3.3.Configuration of EUT 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.

#### 3.3.1. Wireless Optical Mouse (EUT)

Model Number : DS-2220(2220-A +2218-A)  
 Serial Number : N/A  
 Manufacturer : Eastern Times Technology Co., Ltd.

### 3.4.Operating Condition of EUT

3.4.1.Setup the EUT and simulator as shown as Section 3.1.

3.4.2.Turn on the power of all equipment.

3.4.3. Let the EUT work in TX modes and measure it.

### 3.5.Test Procedure

The 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. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C 63.4: 2003 on radiated emission measurement.

The bandwidth of test receiver (R&S ESCS30) is set at 120KHz in 30-1000MHz.

The frequency range from 30MHz to 1000MHz is checked.

The final measurement in band 9-90kHz, 110-490kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.

### 3.6. The Field Strength of Radiation Emission Measurement Results

#### PASS.

The frequency range 30MHz to 1000MHz is investigated.

Date of Test:	<u>September 28, 2007</u>	Temperature:	<u>25°C</u>
EUT:	<u>Wireless Optical Mouse</u>	Humidity:	<u>51%</u>
Model No.:	<u>DS-2220(2220-A +2218-A)</u>	Power Supply:	<u>3.0V DC (“AAA” battery)</u>
Test Mode:	<u>TX</u>	Test Engineer:	<u>Andy</u>

Polarization	Frequency (MHz)	Reading(dBμV/m)	Factor Corr.( dB)	Result(dBμV/m)	Limits(dBμV/m)	Margin(dBμV/m)
		QP		QP	QP	QP
Horizontal	81.140	23.8	8.9	32.7	40.0	7.3
Horizontal	108.187	18.1	7.0	25.1	43.5	18.4
Horizontal	135.220	23.2	5.5	28.7	43.5	14.8
Horizontal	162.262	27.6	6.8	34.4	43.5	9.1
Horizontal	189.310	22.9	9.0	31.9	43.5	11.6
Horizontal	216.361	20.7	9.7	30.4	46.0	15.6
Horizontal	351.565	14.6	13.9	28.5	46.0	17.5
Horizontal	378.605	13.7	14.6	28.3	46.0	17.7
Horizontal	405.658	12.8	15.2	28.0	46.0	18.0
Horizontal	459.757	14.8	16.2	31.0	46.0	15.0
Horizontal	486.812	12.2	16.7	28.9	46.0	17.1
Vertical	315.683	12.3	12.7	25.0	46.0	21.0
Vertical	385.007	14.3	14.9	29.2	46.0	16.8
Vertical	454.740	10.6	16.7	27.3	46.0	18.7

Note:

1. The spectral diagrams in appendix 1 display the measurement of peak values with corrected factors counted.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

$$\text{Result} = \text{Reading} + \text{Corrected Factor}$$

Where Corrected Factor = Antenna Factor + Cable Loss + High Pass Filter Loss – Amplifier Gain



# 4. FUNDAMENTAL RADIATED EMISSION FOR FCC PART 15

## SECTION 15.227(A)

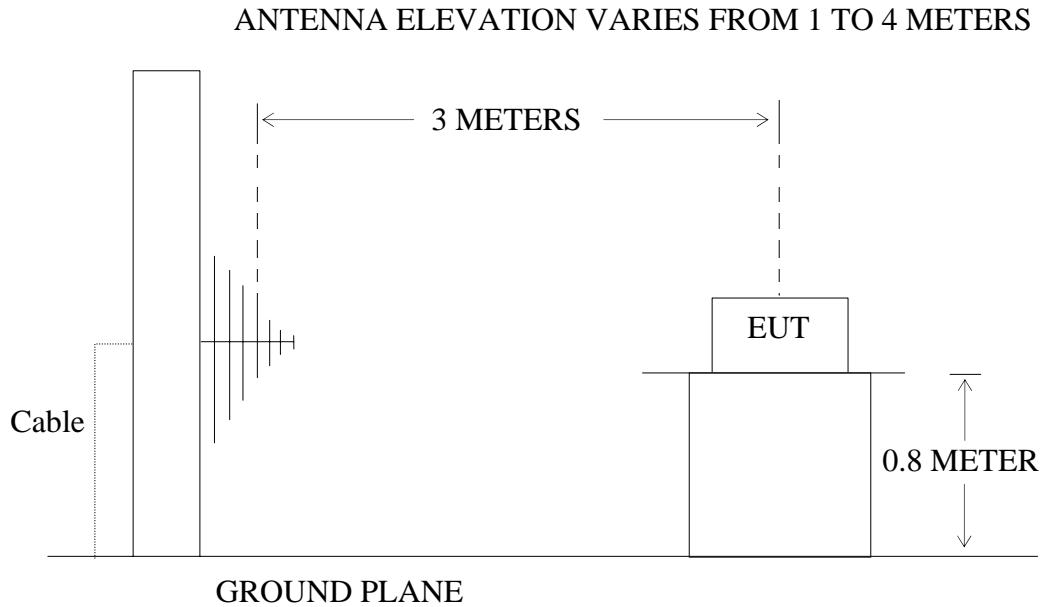
### 4.1. Block Diagram of Test Setup

4.1.1. Block diagram of connection between the EUT and simulators



(EUT: Wireless Optical Mouse)

4.1.2. Anechoic Chamber Test Setup Diagram



(EUT: Wireless Optical Mouse)

### 4.2. The Emission Limit For Section 15.227(a)

4.2.1 The field strength of any emission within this band shall not exceed 10,000microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emission apply.

### 4.3.EUT Configuration on Measurement

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

#### 4.3.1. Wireless Optical Mouse (EUT)

Model Number : DS-2220(2220-A +2218-A)  
Serial Number : N/A  
Manufacturer : Eastern Times Technology Co., Ltd.

### 4.4.Operating Condition of EUT

4.4.1.Setup the EUT and simulator as shown as Section 4.1.

4.4.2.Turn on the power of all equipment.

4.4.3.Let the EUT work in TX mode and measure it.

### 4.5.Test Procedure

The 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. calibrated Loop antenna is used as receiving antenna. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C 63.4: 2003 on radiated emission measurement.

The bandwidth of test receiver (R&S ESCS30) is set at 9KHz in 9kHz-30MHz

## 4.6. The Emission Measurement Result

**PASS.**

Date of Test:	<u>September 28, 2007</u>	Temperature:	<u>25°C</u>
EUT:	<u>Wireless Optical Mouse</u>	Humidity:	<u>51%</u>
Model No.:	<u>DS-2220(2220-A +2218-A)</u>	Power Supply:	<u>3.0V DC (“AAA” battery 2×)</u>
Test Mode:	<u>TX</u>	Test Engineer:	<u>Andy</u>

**Fundamental Radiated Emissions**

Test conditions		Fundamental Frequency	
		27.045MHz	
T <sub>nom</sub> (25°C)	Unit	(dBμV/m)/ ( μ V/m) PEAK	(dBμV/m)/( μ V/m) AV
			48.4/263
limit		100/100,000	80/10,000
Note: Measurement was performed with modulated signal with average detector and peak detector.			

## 5. BAND EDGES

### 5.1.The Requirement

5.1.1. The wanted emission within the band 26.96-27.28MHz.

### 5.2.EUT Configuration on Measurement

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

#### 5.2.1.Wireless Optical Mouse (EUT)

Model Number : DS-2220(2220-A +2218-A)  
Serial Number : N/A  
Manufacturer : Eastern Times Technology Co., Ltd.

### 5.3.Operating Condition of EUT

5.3.1.Setup the EUT and simulator as shown as Section 4.1.

5.3.2.Turn on the power of all equipment.

5.3.3.Let the EUT work in TX mode and measure it.

### 5.4.Test Procedure

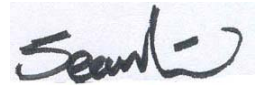
The transmitter output was fed into the spectrum analyzer and photo was taken. The vertical scale is set to 10dB per division; the horizontal scale is set to 32kHz per division. Star frequency are 26.96MHz, stop frequency are 27.28MHz .  
RBW are 3kHz, VBW are 10kHz, Sweep time are 50ms.

## 5.5.The Measurement Result

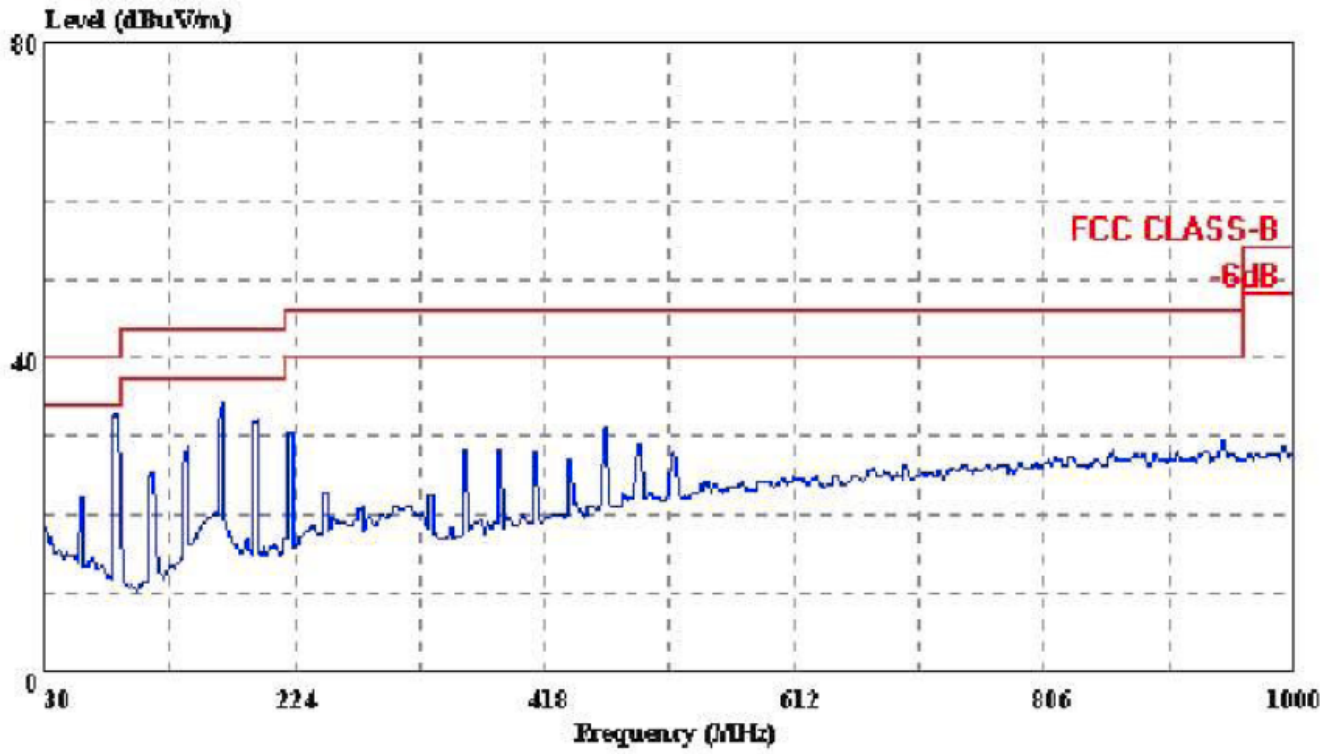
**The EUT does meet the requirement.**

The spectral diagrams in appendix 1.

Reviewer :

A handwritten signature in black ink, appearing to read "Sean", is written over a light blue rectangular background. The signature is positioned to the right of the "Reviewer :" label and above a horizontal line.

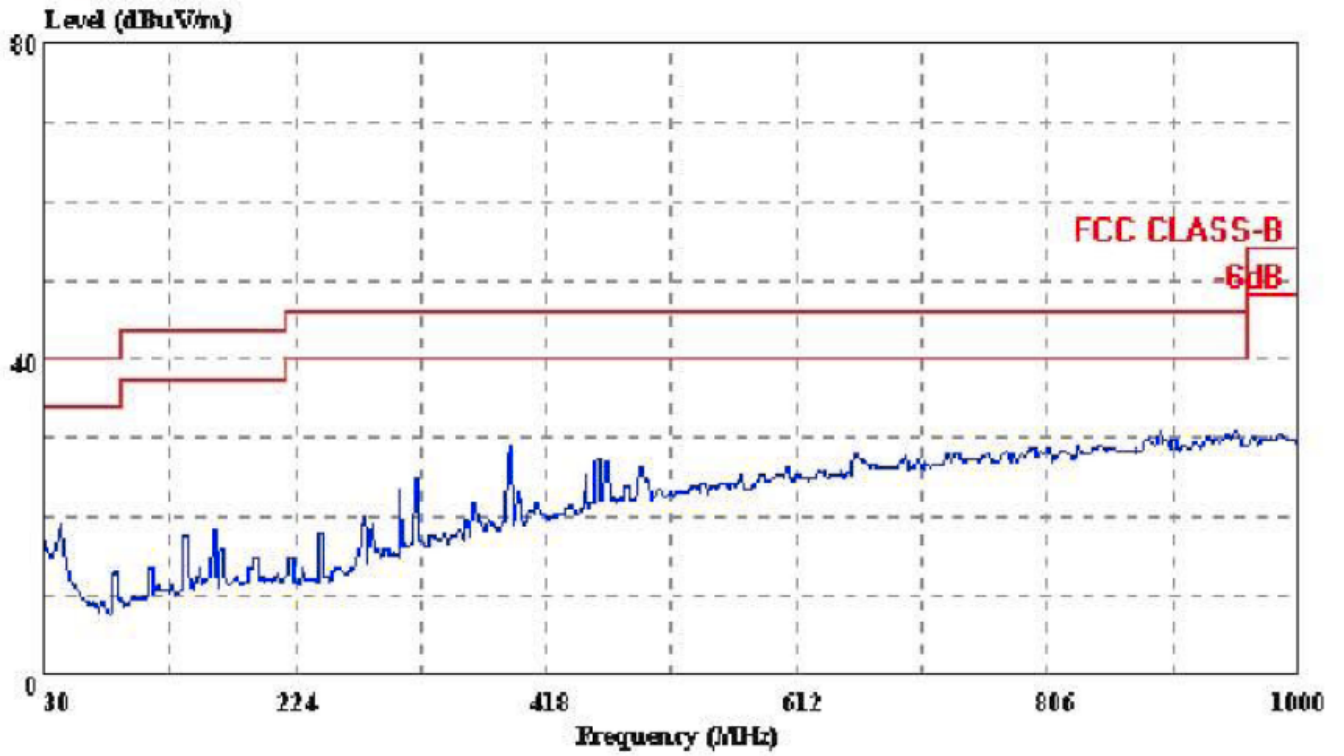
# APPENDIX I (Test Curves)



Trace:

Ref Trace:

Condition: FCC CLASS-B 3m ATC VULB9163(NEW) HORIZONTAL  
eut : Wireless Optical Mouse  
power : DC 3.0V  
memo : TX  
manuf : Eastern Times  
sample no.: 074405  
report no.:  
: M/N: DS-2220(2220-A+2218-A)



Trace:

Ref Trace:

Condition: FCC CLASS-B 3m ATC VULB9163 (NEW) VERTICAL  
eut : Wireless Optical Mouse  
power : DC 3.0V  
memo : TX  
manuf : Eastern Times  
sample no.: 074405  
report no.:  
: M/N: DS-2220 (2220-A+2218-A)





\*RBW 3 kHz  
\*VBW 10 kHz  
\*SWT 50 ms

Ref 87 dBμV \*Att 0 dB

