

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

Bluetooth Laser Mouse  
Model No.: DS-2398

FCC ID: TUVDS-2398J

Prepared for : Eastern Times Technology Co., Ltd.  
Address : Building D, Nan An Industry Park, Youganpu Village  
Fenggang Town, Dongguan City, Guangdong, China

Prepared by : ACCURATE TECHNOLOGY CO. LTD  
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Report Number : ATE20112435  
Date of Test : November 18-30, 2011  
Date of Report : December 6, 2011

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## Test Report Certification

Applicant : Eastern Times Technology Co., Ltd.  
Manufacturer : Eastern Times Technology Co., Ltd.  
EUT Description : Bluetooth Laser Mouse  
(A) MODEL NO.: DS-2398  
(B) SERIAL NO.: N/A  
(C) POWER SUPPLY: DC 3V(Li-ion battery 2x)

Measurement Procedure Used:

**FCC Rules and Regulations Part 15 Subpart C Section 15.247**  
**ANSI C63.4: 2003**

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 15.247 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 : November 18-30, 2011

Prepared by : Apple Lv  
(Engineer)

Approved & Authorized Signer : SeamL  
(Manager)

# 1. GENERAL INFORMATION

## 1.1. Description of Device (EUT)

EUT	:	Bluetooth Laser Mouse
Model Number	:	DS-2398
Frequency Band	:	2402MHz-2480MHz
Number of Channels	:	79
Antenna Gain	:	1.9dBi
Power Supply	:	DC 3V(AAA Ni-MH battery 2x)
Applicant	:	Eastern Times Technology Co., Ltd.
Address	:	Building D, Nan An Industry Park, Youganpu Village Fenggang Town, Dongguan City, Guangdong, China
Manufacturer	:	Eastern Times Technology Co., Ltd.
Address	:	Building D, Nan An Industry Park, Youganpu Village Fenggang Town, Dongguan City, Guangdong, China
Date of sample received	:	November 18, 2011
Date of Test	:	November 18-30, 2011

## 1.2. Accessory and Auxiliary Equipment

Notebook PC	:	Manufacturer: SONY M/N: PCG-663P S/N: 28123170 7202526
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### 1.3. Description of Test Facility

EMC Lab : Accredited by TUV Rheinland Shenzhen

Listed by FCC  
The Registration Number is 752051

Listed by Industry Canada  
The Registration Number is 5077A-2

Accredited by China National Accreditation Committee  
for Laboratories  
The Certificate Registration Number is L3193

Name of Firm : ACCURATE TECHNOLOGY CO. LTD

Site Location : F1, Bldg. A, Changyuan New Material Port, Keyuan Rd.  
Science & Industry Park, Nanshan, Shenzhen, Guangdong  
P.R. China

### 1.4. Measurement Uncertainty

Conducted Emission Expanded Uncertainty = 2.23dB, k=2

Radiated emission expanded uncertainty = 3.08dB, k=2  
(9kHz-30MHz)

Radiated emission expanded uncertainty = 4.42dB, k=2  
(30MHz-1000MHz)

Radiated emission expanded uncertainty = 4.06dB, k=2  
(Above 1GHz)

## 2. MEASURING DEVICE AND TEST EQUIPMENT

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

Kind of equipment	Manufacturer	Type	S/N	Calibrated date	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 16, 2011	Jan. 15, 2012
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 16, 2011	Jan. 15, 2012
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 16, 2011	Jan. 15, 2012
Pre-Amplifier	Rohde&Schwarz	CBLU118354 0-01	3791	Jan. 16, 2011	Jan. 15, 2012
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 16, 2011	Jan. 15, 2012
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 16, 2011	Jan. 15, 2012
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 16, 2011	Jan. 15, 2012
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 16, 2011	Jan. 15, 2012
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 16, 2011	Jan. 15, 2012
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 16, 2011	Jan. 15, 2012

### 3. OPERATION OF EUT DURING TESTING

#### 3.1.Operating Mode

The mode is used: Transmitting mode

Low Channel: 2402MHz

Middle Channel: 2441MHz

High Channel: 2480MHz

Hopping

Charging (Connect to PC)

#### 3.2.Configuration and peripherals

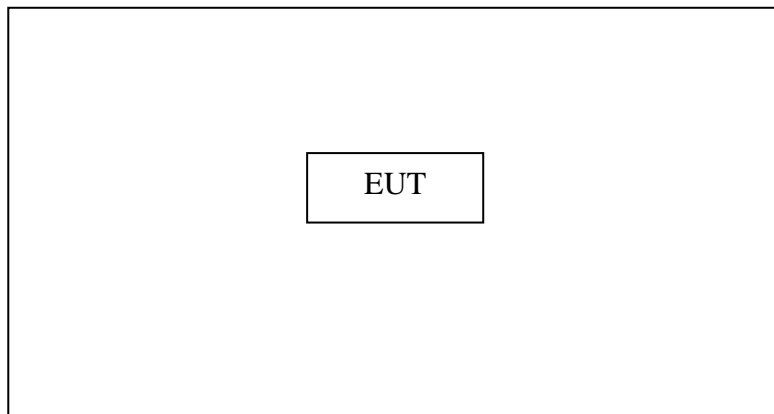


Figure 1 Setup: Transmitting mode

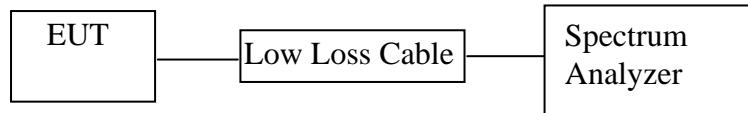


## 4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.247(a)(1)	20dB Bandwidth Test	Compliant
Section 15.247(a)(1)	Carrier Frequency Separation Test	Compliant
Section 15.247(a)(1)(iii)	Number Of Hopping Frequency Test	Compliant
Section 15.247(a)(1)(iii)	Dwell Time Test	Compliant
Section 15.247(b)(1)	Maximum Peak Output Power Test	Compliant
Section 15.247(d)	Band Edge Compliance Test	Compliant
Section 15.247(d) Section 15.209	Radiated Spurious Emission Test	Compliant
Section 15.247(d)	Conducted Spurious Emission Test	Compliant
Section 15.207	AC Power Line Conducted Emission Test	Compliant
Section 15.203	Antenna Requirement	Compliant

## 5. 20DB BANDWIDTH TEST

### 5.1. Block Diagram of Test Setup



(EUT: Bluetooth Laser Mouse)

### 5.2. The Requirement For Section 15.247(a)(1)

Section 15.247(a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

### 5.3. 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.

#### 5.3.1. Bluetooth Laser Mouse (EUT)

Model Number	:	DS-2398
Serial Number	:	N/A
Manufacturer	:	Eastern Times Technology Co., Ltd.

### 5.4. Operating Condition of EUT

5.4.1. Setup the EUT and simulator as shown as Section 5.1.

5.4.2. Turn on the power of all equipment.

5.4.3. Let the EUT work in TX(Hopping off) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, 2480MHz TX frequency to transmit.

## 5.5. Test Procedure

5.5.1. The transmitter output was connected to the spectrum analyzer through a low loss cable.

5.5.2. Set RBW of spectrum analyzer to 30kHz and VBW to 100kHz.

5.5.3. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

## 5.6. Test Result

**PASS.**

Date of Test:	November 22, 2011	Temperature:	25°C
EUT:	Bluetooth Laser Mouse	Humidity:	50%
Model No.:	DS-2398	Power Supply:	DC 3V
Test Mode:	TX	Test Engineer:	Kai

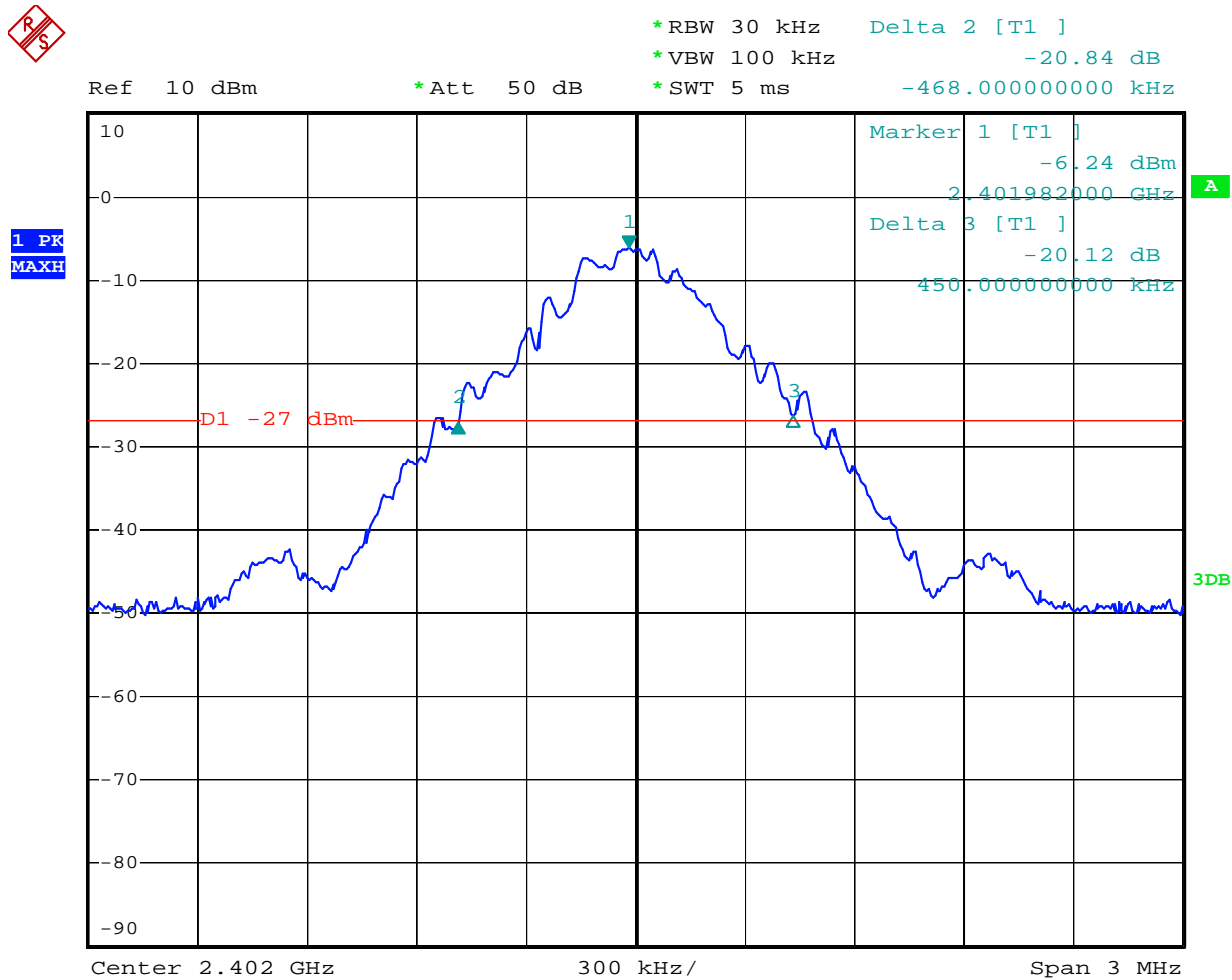
Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Limit (MHz)
Low	2402	0.918	N/A
Middle	2441	0.978	N/A
High	2480	0.978	N/A

Note: N/A: 1) The 20 dB bandwidth of the hopping channel is not limit.

2) The data of 20 dB bandwidth of the hopping channel is limit of carrier frequencies separated

The spectrum analyzer plots are attached as below.

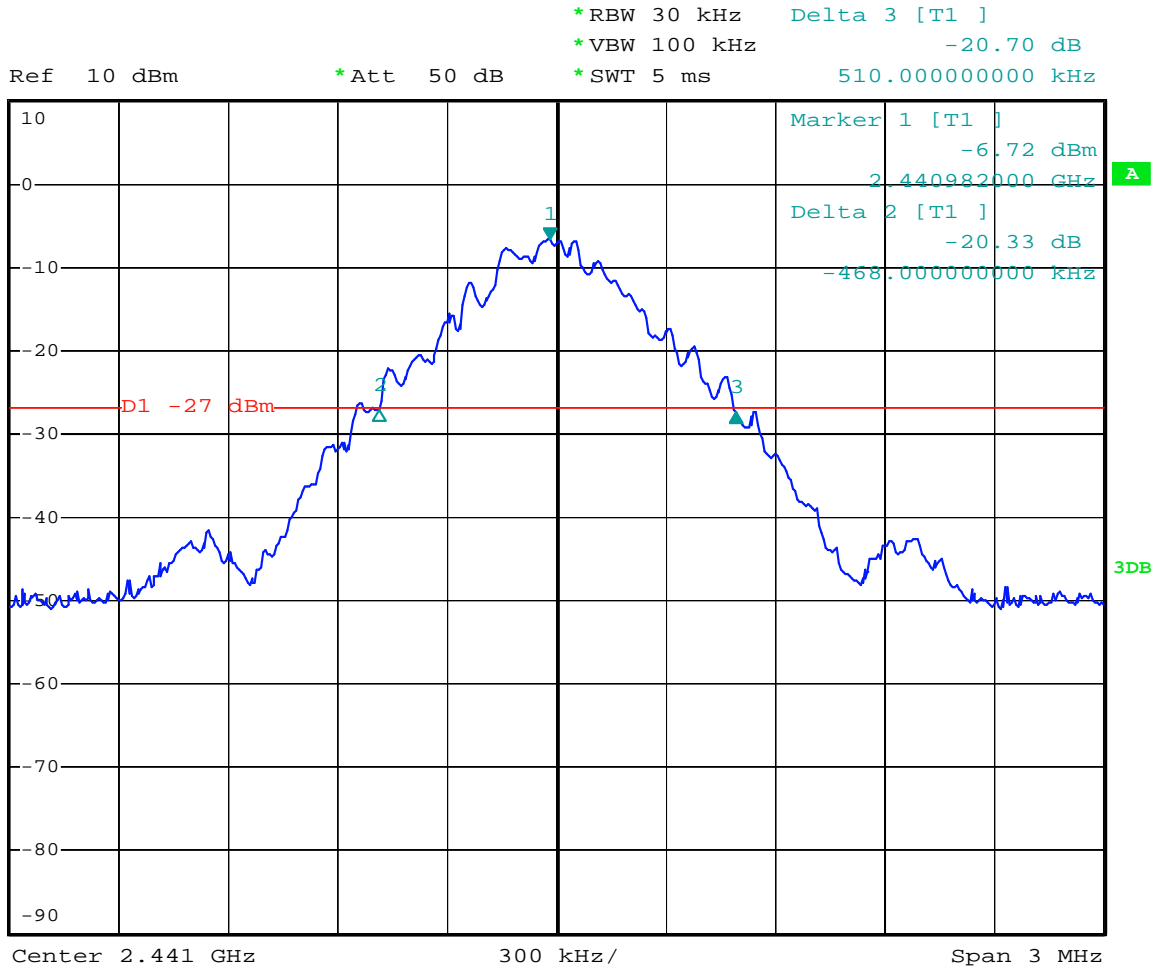
"Spectrum analyzer" is R/S



Date: 22.NOV.2011 17:47:40

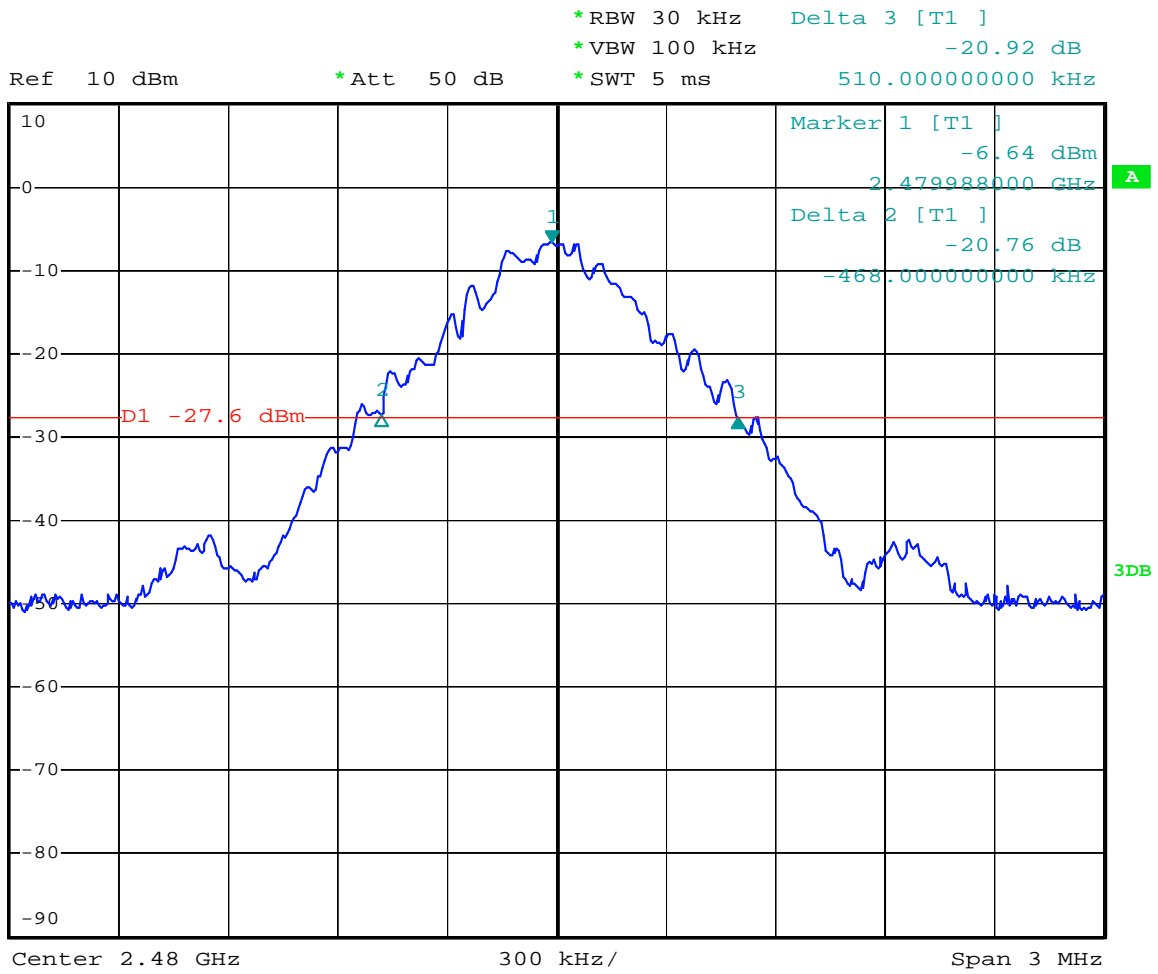


1 PK  
MAXH



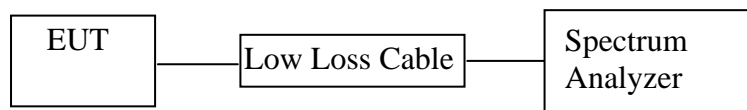


1 PK  
MAXH



## 6. CARRIER FREQUENCY SEPARATION TEST

### 6.1. Block Diagram of Test Setup



(EUT: Bluetooth Laser Mouse)

### 6.2. The Requirement For Section 15.247(a)(1)

Section 15.247(a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

### 6.3. 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.

#### 6.3.1. Bluetooth Laser Mouse (EUT)

Model Number : DS-2398  
 Serial Number : N/A  
 Manufacturer : Eastern Times Technology Co., Ltd.

### 6.4. Operating Condition of EUT

6.4.1. Setup the EUT and simulator as shown as Section 6.1.

6.4.2. Turn on the power of all equipment.

6.4.3. Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, 2480MHz TX frequency to transmit.

## 6.5. Test Procedure

6.5.1. The transmitter output was connected to the spectrum analyzer through a low loss cable.

6.5.2. Set RBW of spectrum analyzer to 100kHz and VBW to 300kHz. Adjust Span to 3 MHz.

6.5.3. Set the adjacent channel of the EUT maxhold another trace.

6.5.4. Measurement the channel separation

## 6.6. Test Result

**PASS.**

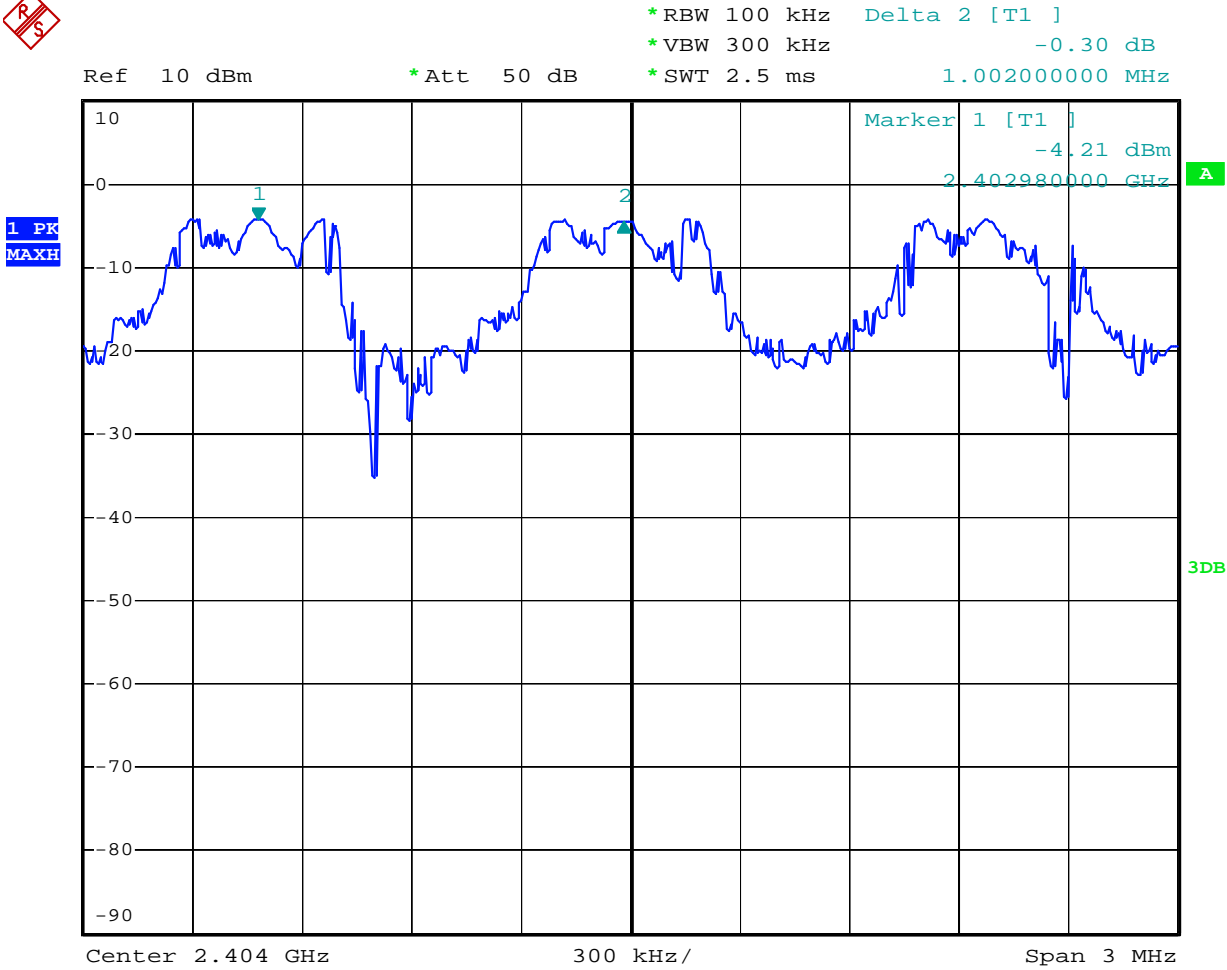
Date of Test:	November 22, 2011	Temperature:	25°C
EUT:	Bluetooth Laser Mouse	Humidity:	50%
Model No.:	DS-2398	Power Supply:	DC 3V
Test Mode:	Hopping	Test Engineer:	Kai

Channel	Channel Frequency (MHz)	Channel separation (MHz)	Limit
Low	2402	1.002	> the 20dB Bandwidth or 25kHz (whichever is greater)
Middle	2441	1.002	> the 20dB Bandwidth or 25kHz (whichever is greater)
High	2480	1.002	> the 20dB Bandwidth or 25kHz (whichever is greater)

The spectrum analyzer plots are attached as below.

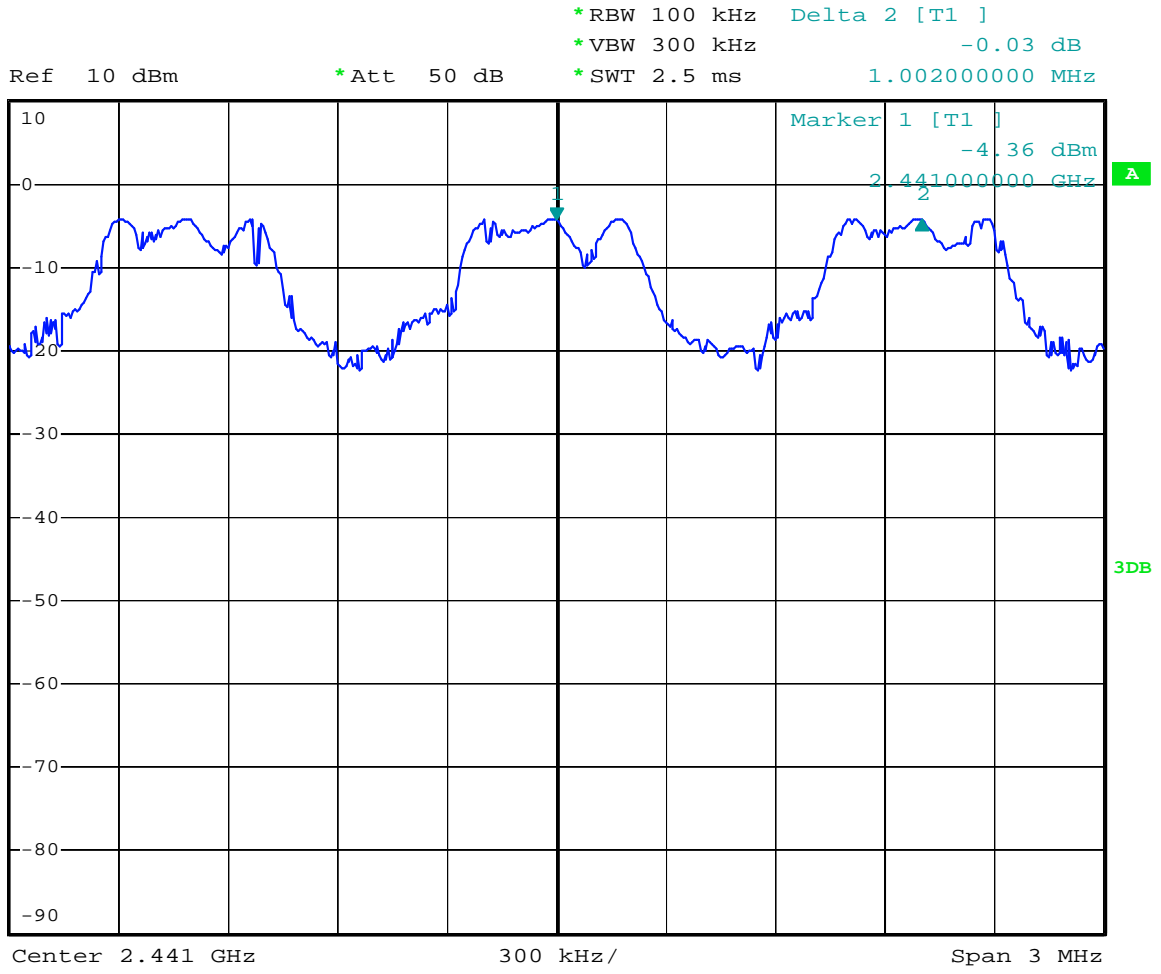


"Spectrum analyzer" is R/S



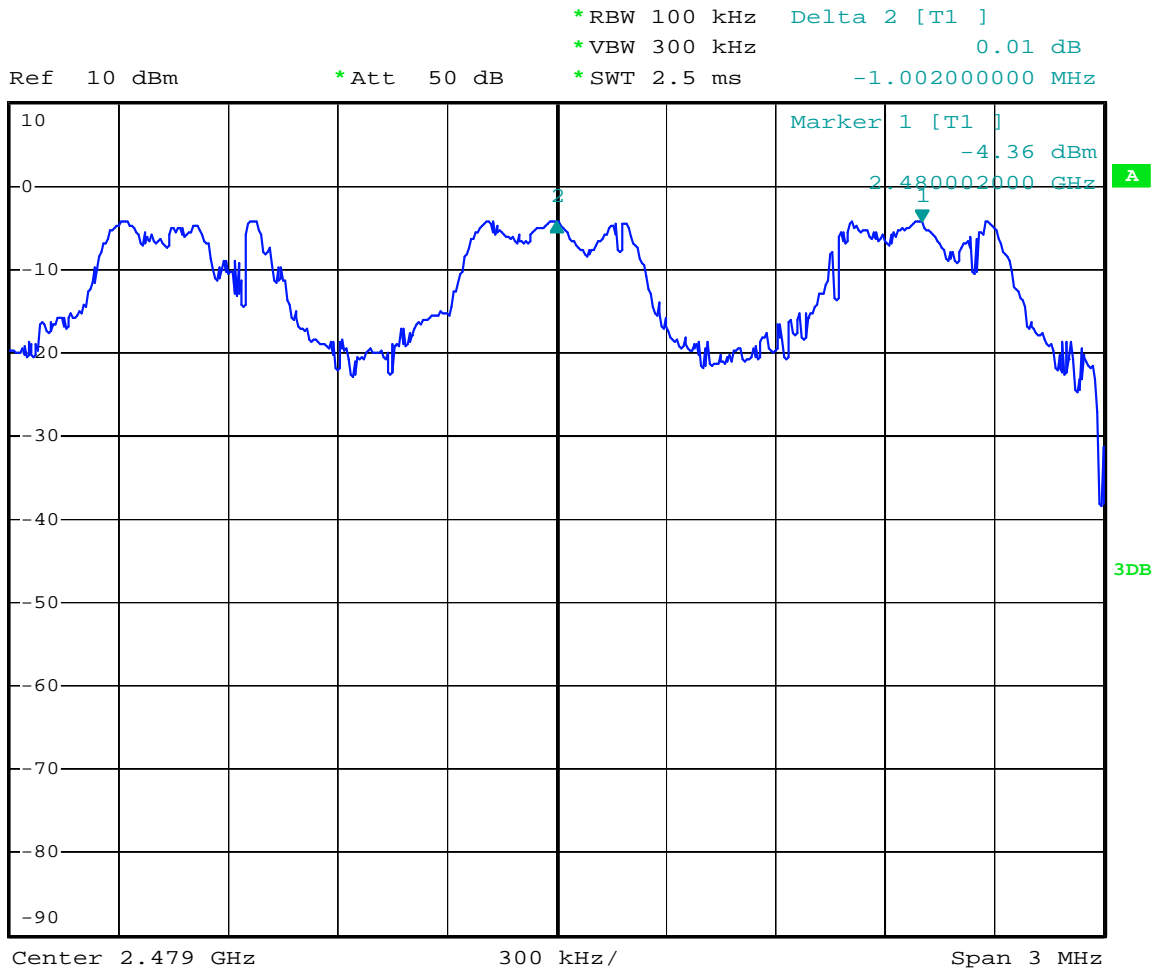


1 PK  
MAXH



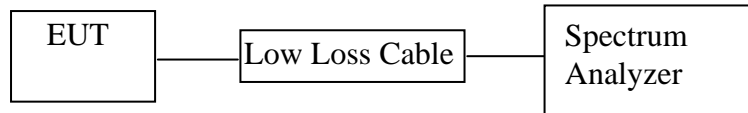


1 PK  
MAXH



## 7. NUMBER OF HOPPING FREQUENCY TEST

### 7.1. Block Diagram of Test Setup



(EUT: Bluetooth Laser Mouse)

### 7.2. The Requirement For Section 15.247(a)(1)(iii)

Section 15.247(a)(1)(iii): Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

### 7.3. 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.

#### 7.3.1. Bluetooth Laser Mouse (EUT)

Model Number	:	DS-2398
Serial Number	:	N/A
Manufacturer	:	Eastern Times Technology Co., Ltd.

### 7.4. Operating Condition of EUT

7.4.1. Setup the EUT and simulator as shown as Section 7.1.

7.4.2. Turn on the power of all equipment.

7.4.3. Let the EUT work in TX (Hopping on) modes measure it.

## 7.5. Test Procedure

7.5.1. The transmitter output was connected to the spectrum analyzer through a low loss cable.

7.5.2. Set the spectrum analyzer as Span=30MHz, RBW=300kHz, VBW=300kHz.

7.5.3. Max hold, view and count how many channel in the band.

## 7.6. Test Result

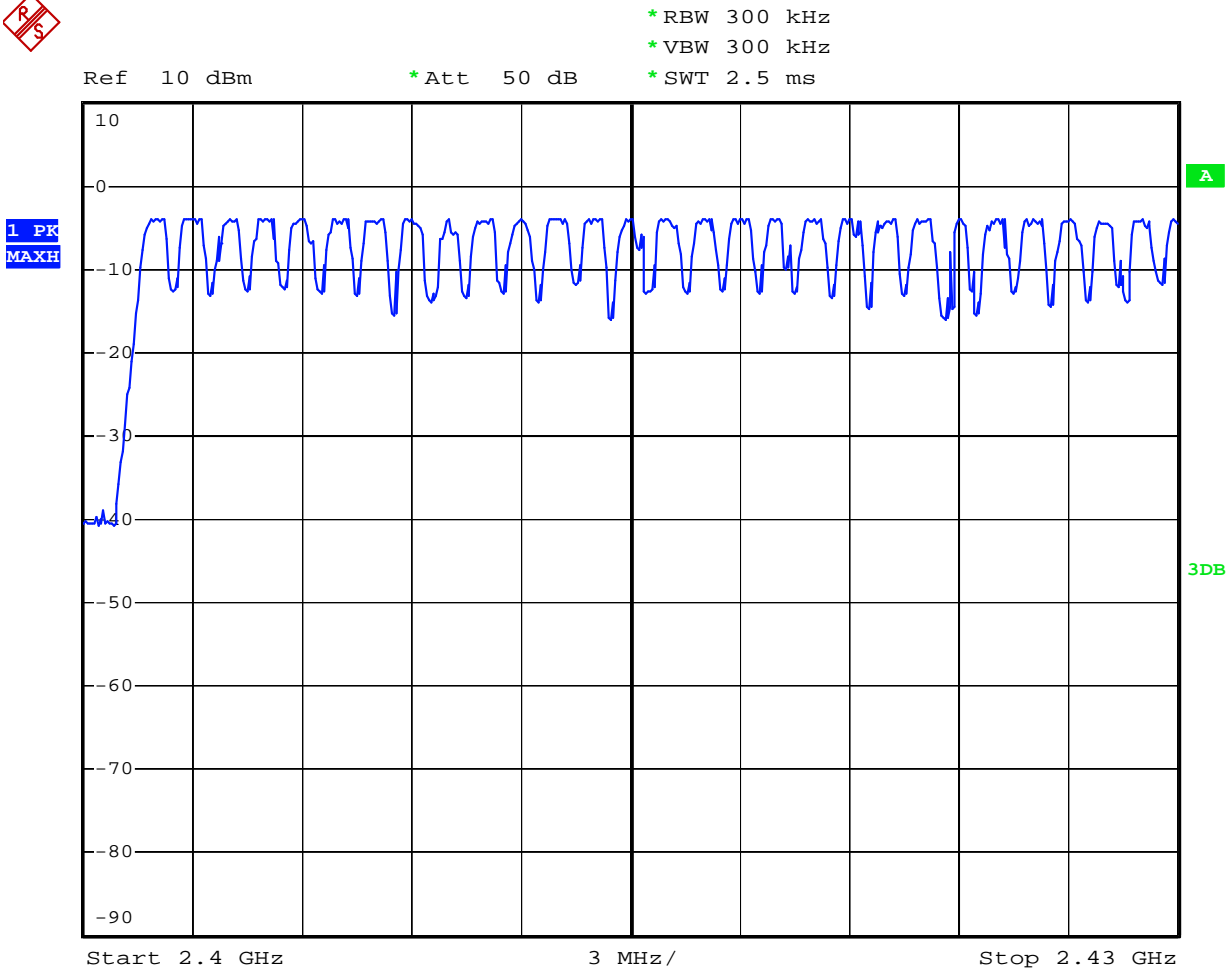
**PASS.**

Date of Test:	<u>November 22, 2011</u>	Temperature:	<u>25°C</u>
EUT:	<u>Bluetooth Laser Mouse</u>	Humidity:	<u>50%</u>
Model No.:	<u>DS-2398</u>	Power Supply:	<u>DC 3V</u>
Test Mode:	<u>Hopping</u>	Test Engineer:	<u>Kai</u>

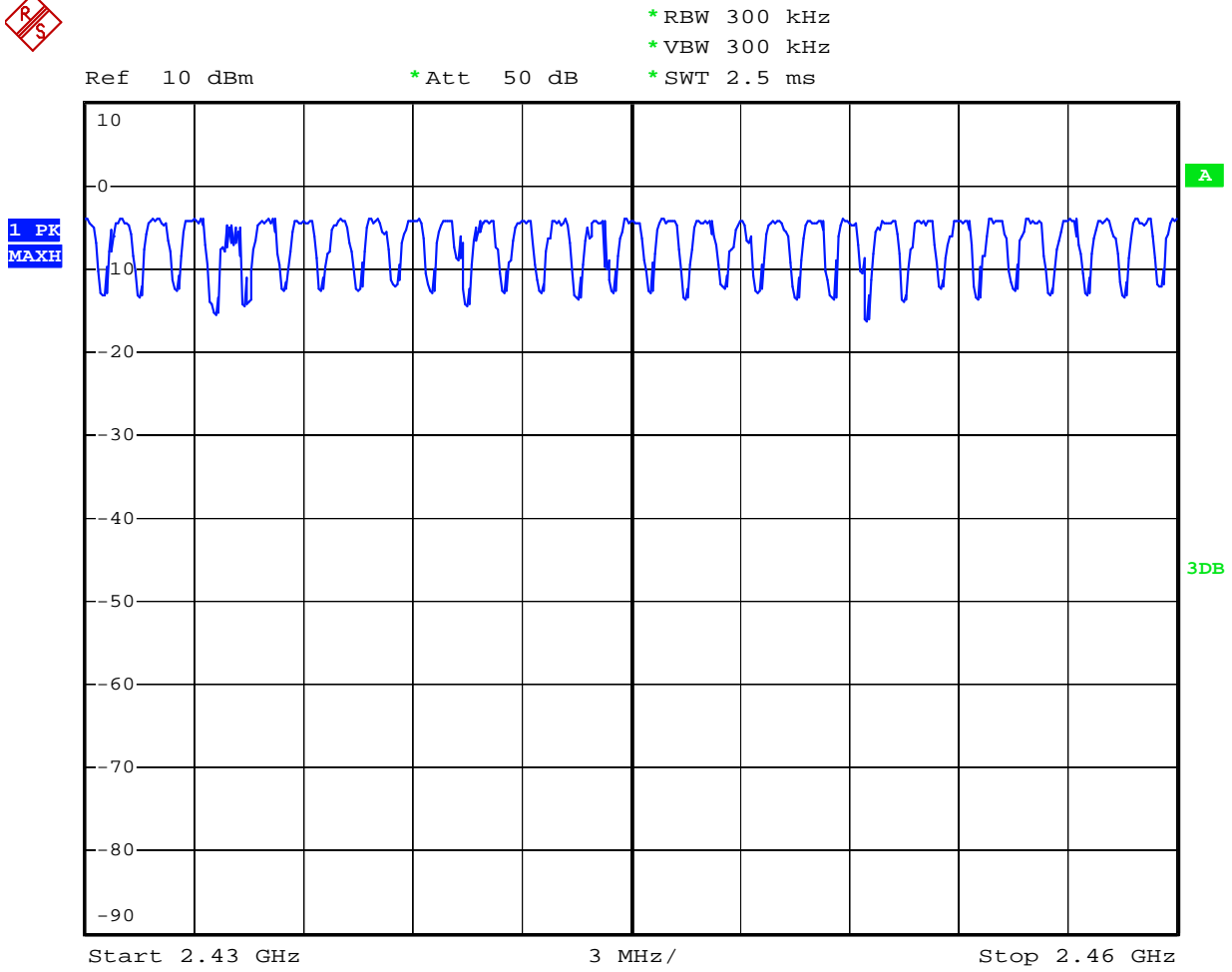
Total number of hopping channel	Measurement result (CH)	Limit (CH)
	79	>15

The spectrum analyzer plots are attached as below.

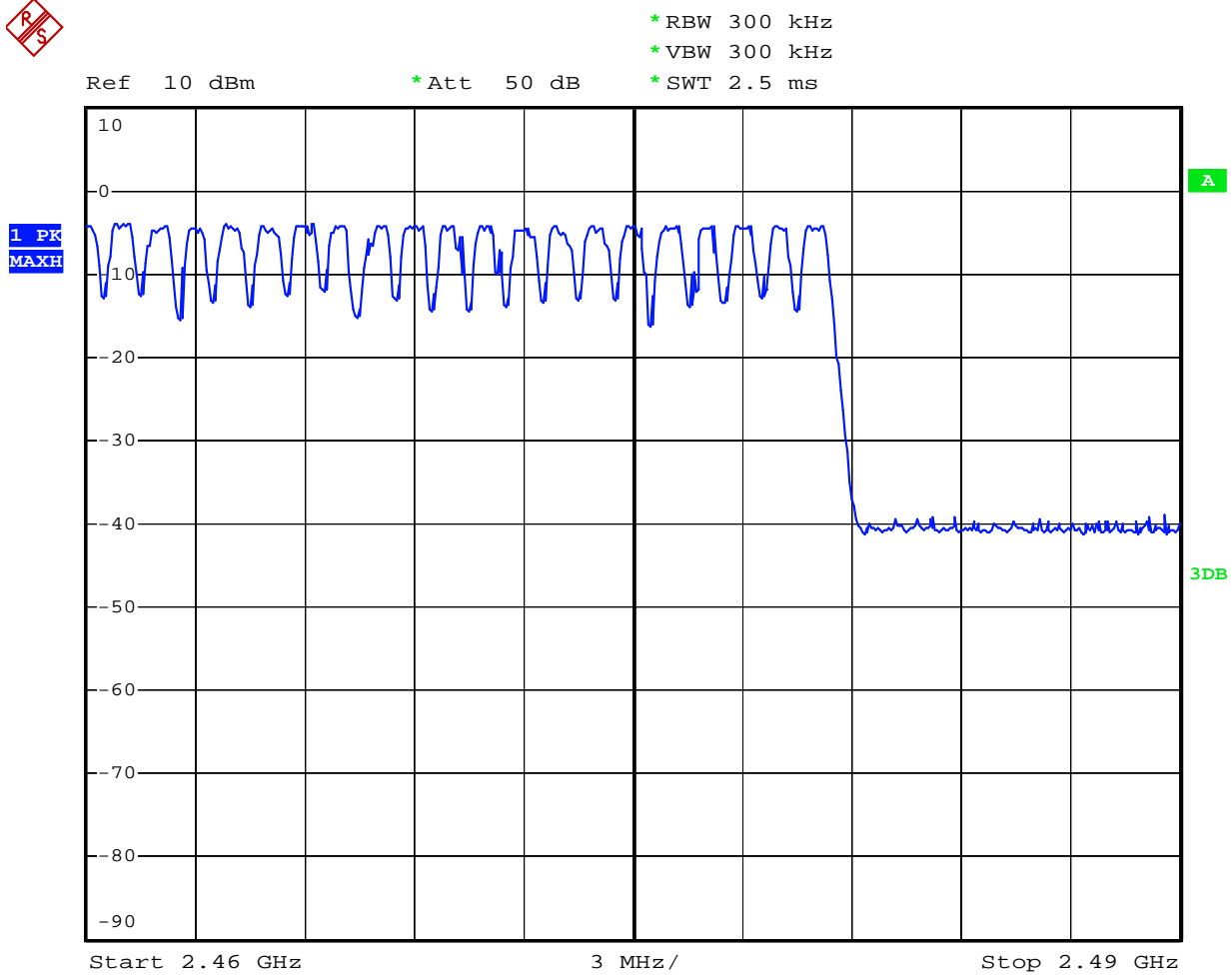
"Spectrum analyzer" is R/S



Date: 22.NOV.2011 18:35:14



Date: 22.NOV.2011 18:37:59

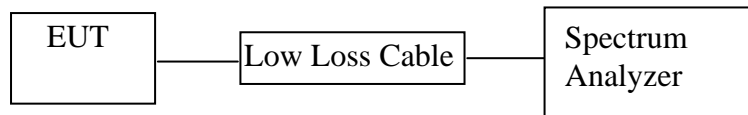


Date: 22.NOV.2011 18:40:33



## 8. DWELL TIME TEST

### 8.1. Block Diagram of Test Setup



(EUT: Bluetooth Laser Mouse)

### 8.2. The Requirement For Section 15.247(a)(1)(iii)

Section 15.247(a)(1)(iii): Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

### 8.3. 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.

#### 8.3.1. Bluetooth Laser Mouse (EUT)

Model Number	:	DS-2398
Serial Number	:	N/A
Manufacturer	:	Eastern Times Technology Co., Ltd.

### 8.4. Operating Condition of EUT

8.4.1. Setup the EUT and simulator as shown as Section 8.1.

8.4.2. Turn on the power of all equipment.

8.4.3. Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, 2480MHz TX frequency to transmit.

## 8.5. Test Procedure

8.5.1. The transmitter output was connected to the spectrum analyzer through a low loss cable.

8.5.2. Set center frequency of spectrum analyzer = operating frequency.

8.5.3. Set the spectrum analyzer as RBW=100kHz, VBW=300kHz, Span=0Hz, Adjust Sweep=31.6s.

8.5.4. Set the spectrum analyzer as RBW=1MHz, VBW=3MHz, Span=0Hz, Adjust Sweep=3ms. Get the pulse time.

8.5.5. Repeat above procedures until all frequency measured were complete.

## 8.6. Test Result

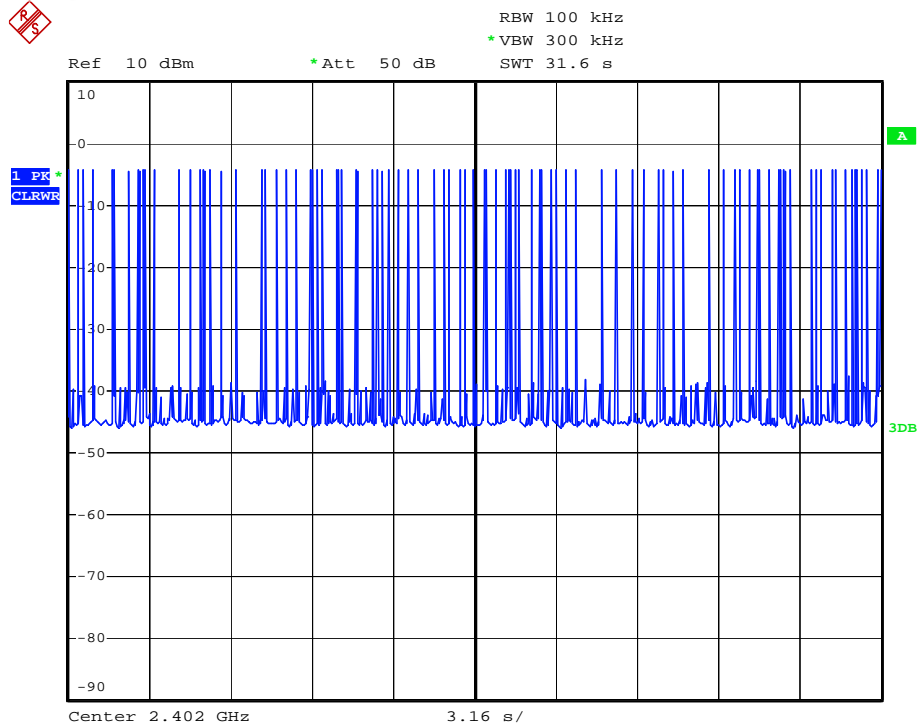
**PASS.**

Date of Test:	<u>November 22, 2011</u>	Temperature:	<u>25°C</u>
EUT:	<u>Bluetooth Laser Mouse</u>	Humidity:	<u>50%</u>
Model No.:	<u>DS-2398</u>	Power Supply:	<u>DC 3V</u>
Test Mode:	<u>Hopping</u>	Test Engineer:	<u>Kai</u>

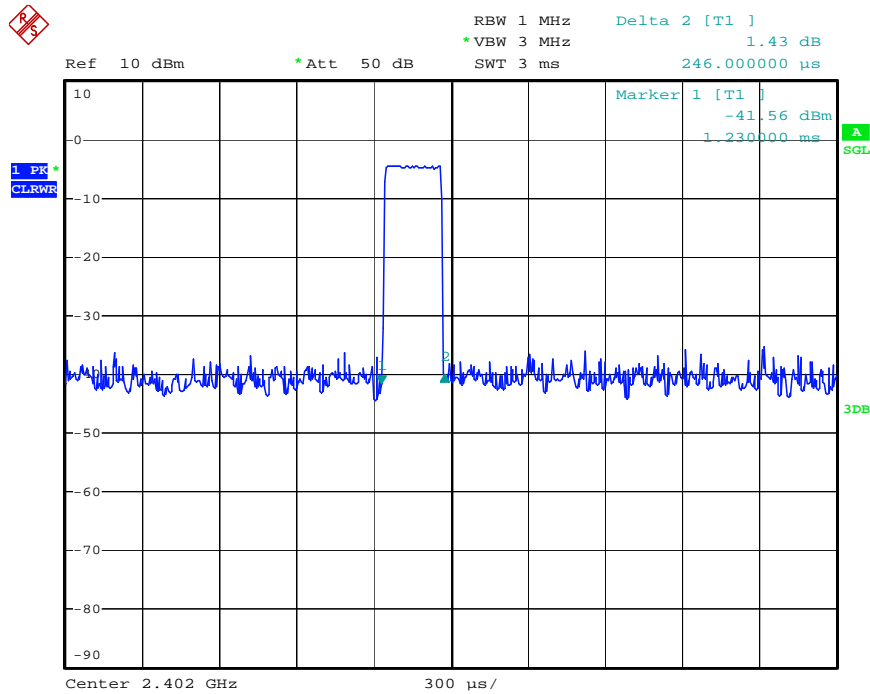
A period transmit time = $0.4 \times 79 = 31.6$					
Dwell time = pulse time $\times$ burst (in 31.6 sec.)					
Channel	Channel Frequency (MHz)	Pulse Time (ms)	Burst (in 31.6 sec.)	Dwell Time (ms)	Limit (ms)
Low	2402	0.246	96	23.616	400
Middle	2441	0.252	104	26.208	400
High	2480	0.270	91	24.570	400

The spectrum analyzer plots are attached as below.

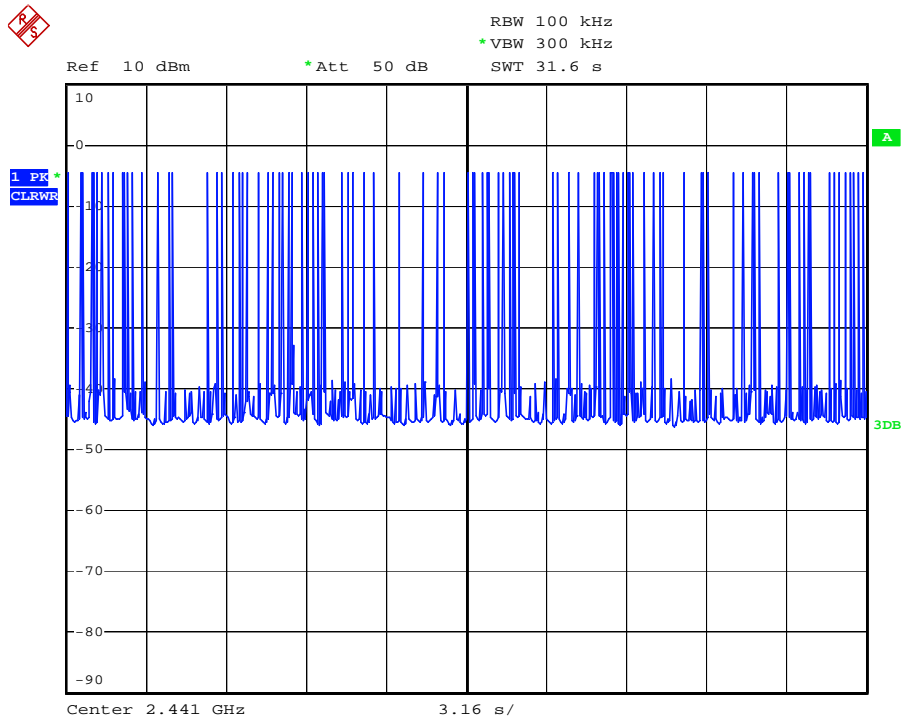
"Spectrum analyzer" is R/S



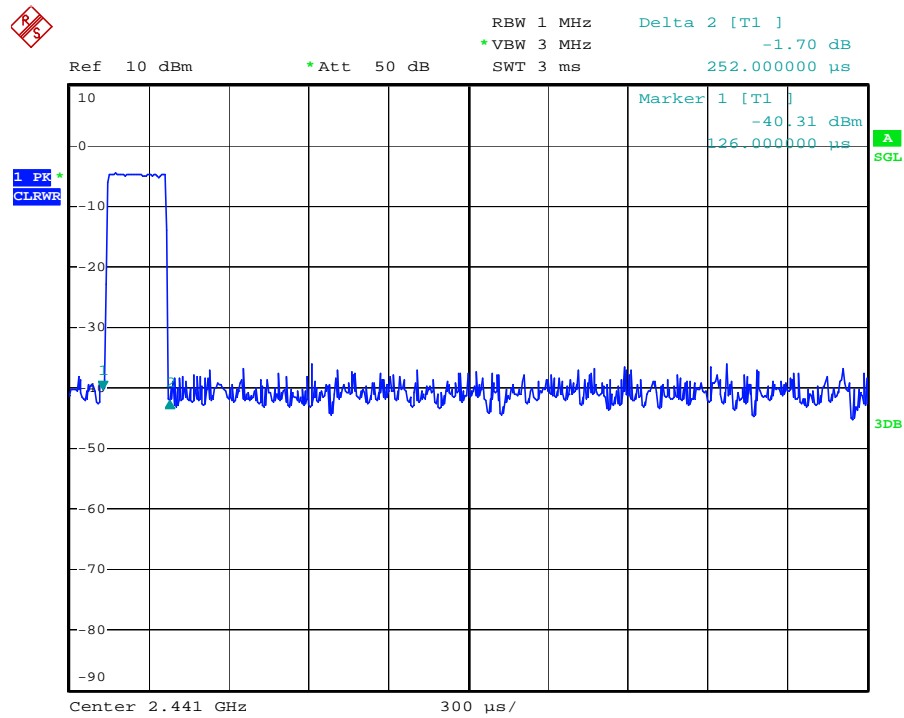
Date: 23.NOV.2011 09:56:39



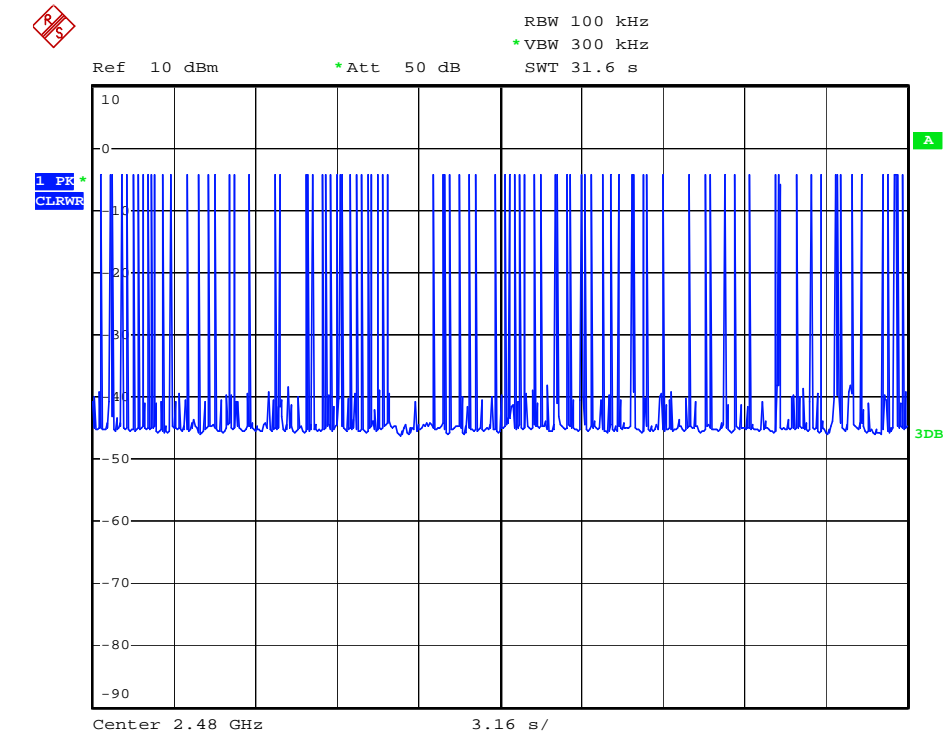
Date: 23.NOV.2011 10:01:12



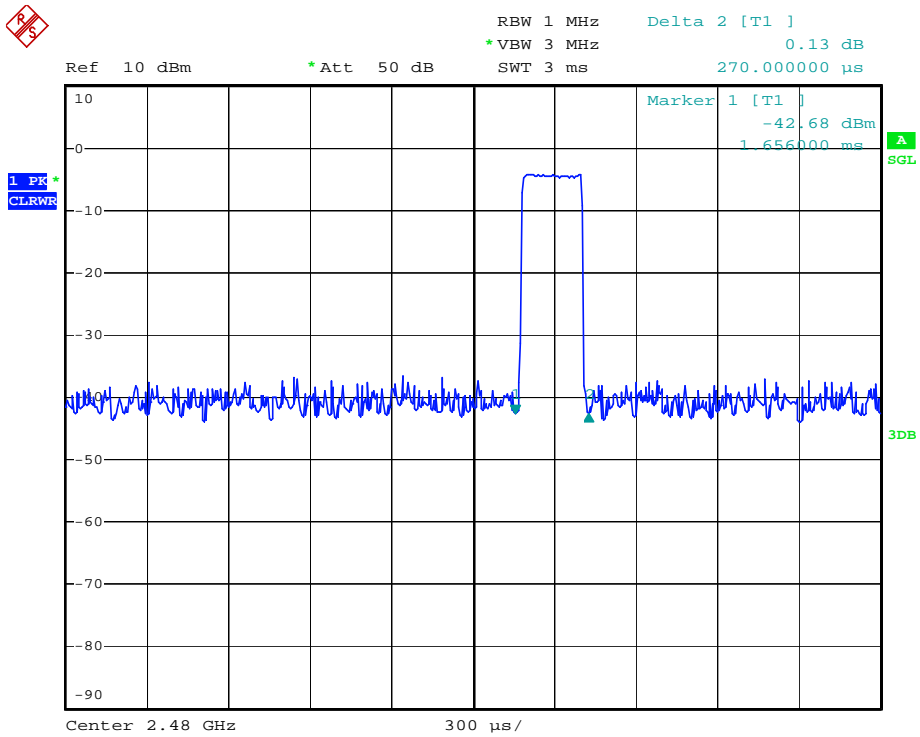
Date: 23.NOV.2011 10:06:58



Date: 23.NOV.2011 10:03:47



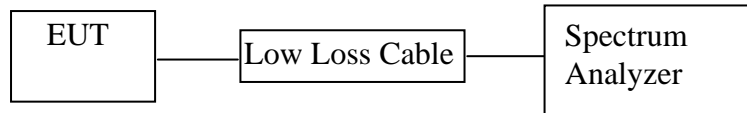
Date: 23.NOV.2011 10:08:15



Date: 23.NOV.2011 10:10:28

## 9. MAXIMUM PEAK OUTPUT POWER TEST

### 9.1. Block Diagram of Test Setup



(EUT: Bluetooth Laser Mouse)

### 9.2. The Requirement For Section 15.247(b)(1)

Section 15.247(b)(1): For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

### 9.3. 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.

#### 9.3.1. Bluetooth Laser Mouse (EUT)

Model Number	:	DS-2398
Serial Number	:	N/A
Manufacturer	:	Eastern Times Technology Co., Ltd.

### 9.4. Operating Condition of EUT

9.4.1. Setup the EUT and simulator as shown as Section 9.1.

9.4.2. Turn on the power of all equipment.

9.4.3. Let the EUT work in TX (Hopping off) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, 2480MHz TX frequency to transmit.

## 9.5. Test Procedure

9.5.1. The transmitter output was connected to the spectrum analyzer through a low loss cable.

9.5.2. Set RBW of spectrum analyzer to 1MHz and VBW to 3MHz.

9.5.3. Measurement the maximum peak output power.

## 9.6. Test Result

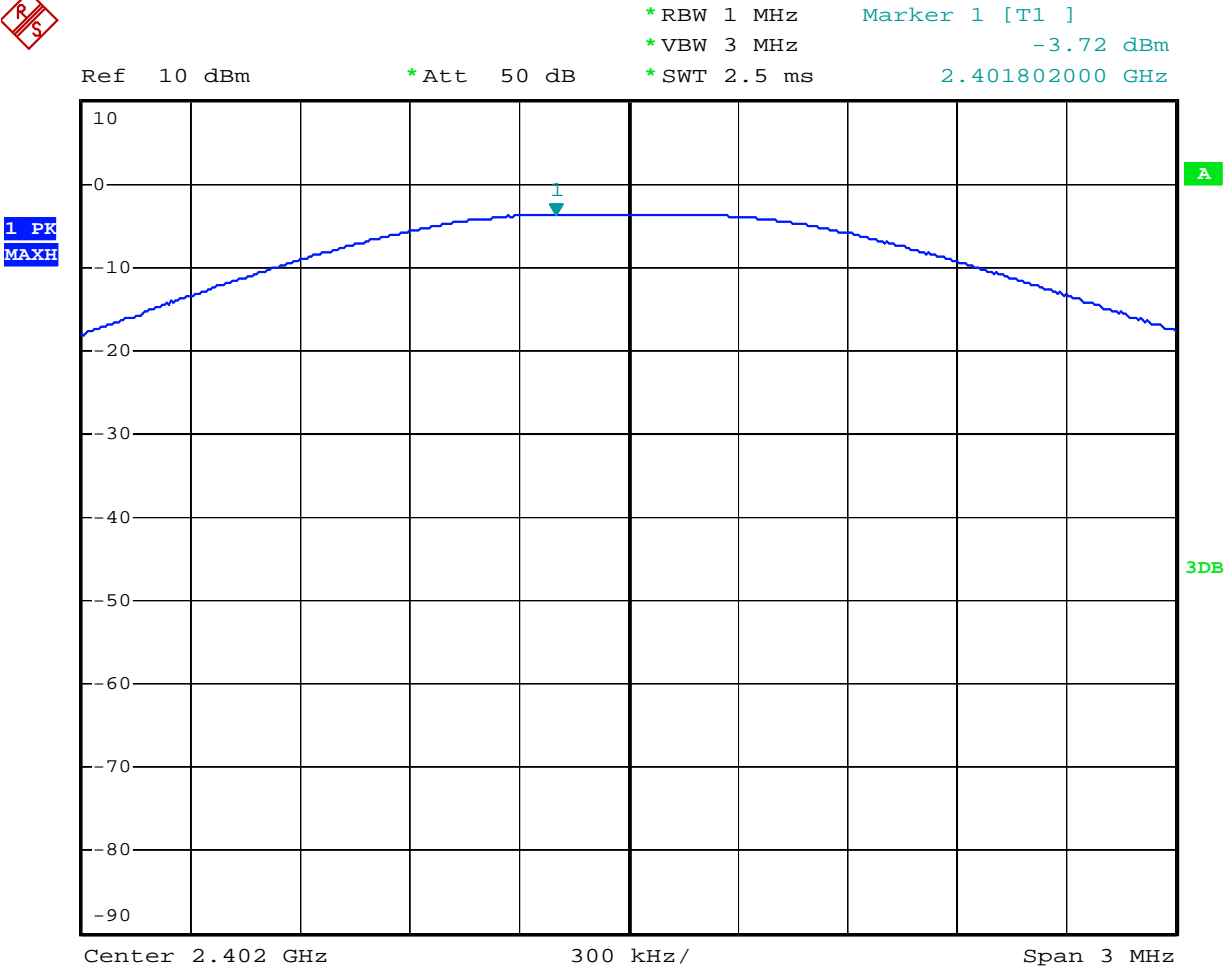
**PASS.**

Date of Test:	November 22, 2011	Temperature:	25°C
EUT:	Bluetooth Laser Mouse	Humidity:	50%
Model No.:	DS-2398	Power Supply:	DC 3V
Test Mode:	TX	Test Engineer:	Kai

Channel	Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power (mW)	Limits dBm / W
Low	2402	-3.72	0.425	30 dBm / 1 W
Middle	2441	-3.95	0.403	30 dBm / 1 W
High	2480	-4.04	0.394	30 dBm / 1 W

The spectrum analyzer plots are attached as below.

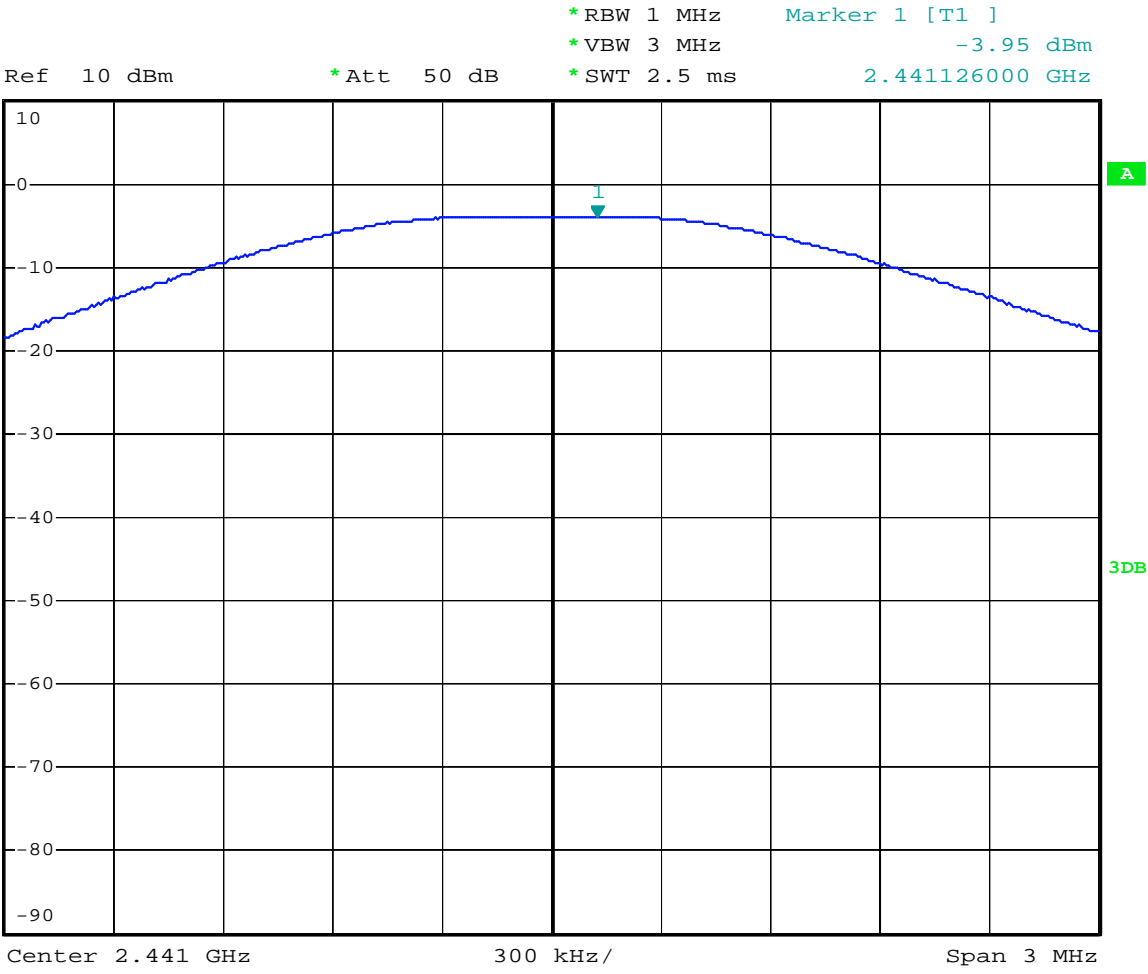
"Spectrum analyzer" is R/S





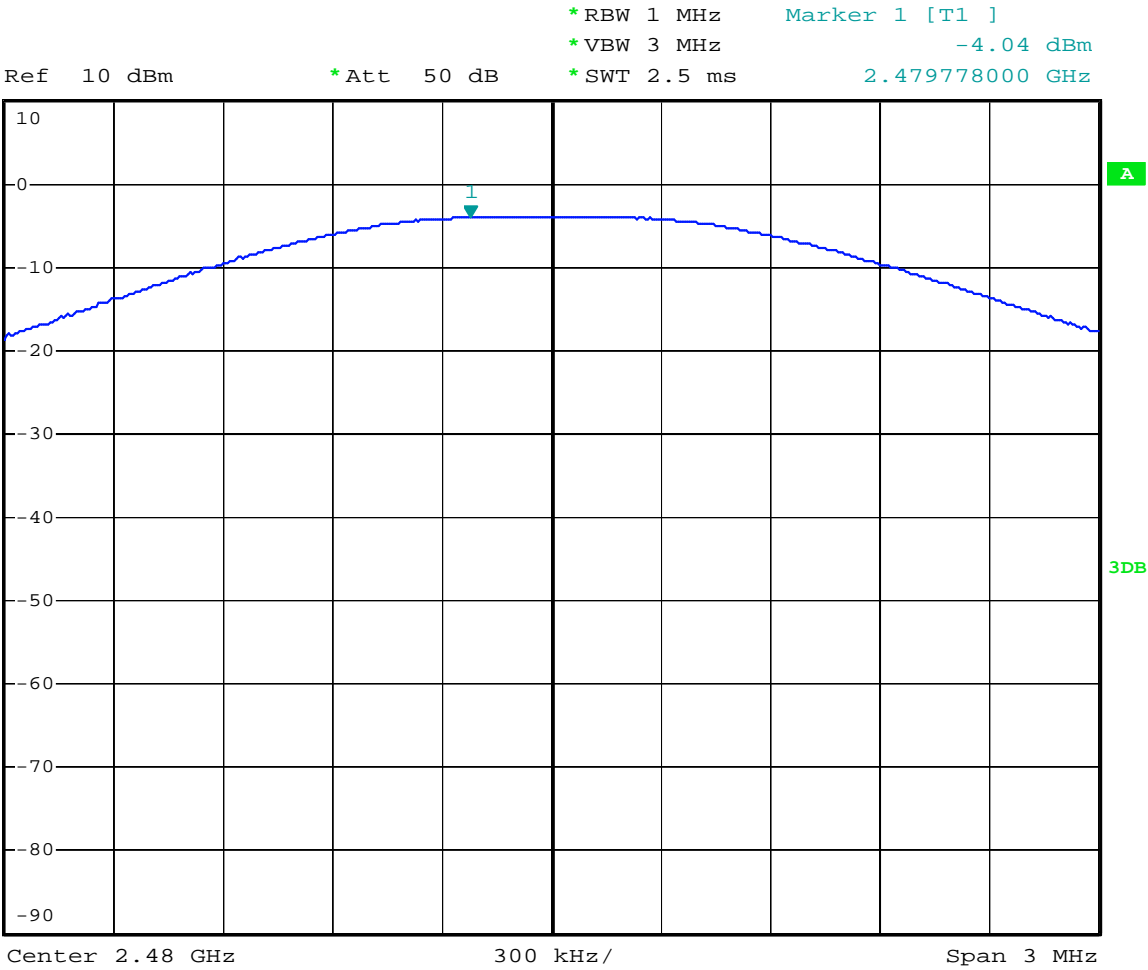


1 PK  
MAXH



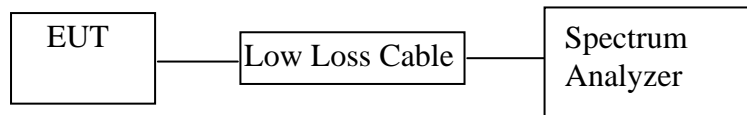


1 PK  
MAXH



## 10.BAND EDGE COMPLIANCE TEST

### 10.1.Block Diagram of Test Setup



(EUT: Bluetooth Laser Mouse)

### 10.2.The Requirement For Section 15.247(d)

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. 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).

### 10.3.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.

#### 10.3.1.Blutetooth Laser Mouse (EUT)

Model Number	:	DS-2398
Serial Number	:	N/A
Manufacturer	:	Eastern Times Technology Co., Ltd.

## 10.4. Operating Condition of EUT

10.4.1. Setup the EUT and simulator as shown as Section 10.1.

10.4.2. Turn on the power of all equipment.

10.4.3. Let the EUT work in TX (Hopping off, Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2480MHz TX frequency to transmit.

## 10.5. Test Procedure

Conducted Band Edge:

10.5.1. The transmitter output was connected to the spectrum analyzer via a low loss cable.

10.5.2. Set RBW of spectrum analyzer to 100kHz and VBW to 300kHz.

Radiate Band Edge:

10.5.3. The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.

10.5.4. The turntable was rotated for 360 degrees to determine the position of maximum emission level.

10.5.5. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.

10.5.6. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

RBW=1MHz, VBW=1MHz

10.5.7. The band edges was measured and recorded.

## 10.6. Test Result

**Pass****Conducted test**

Date of Test:	November 22, 2011	Temperature:	25°C
EUT:	Bluetooth Laser Mouse	Humidity:	50%
Model No.:	DS-2398	Power Supply:	DC 3V
Test Mode:	TX (Hopping off)	Test Engineer:	Kai

**Conducted test**

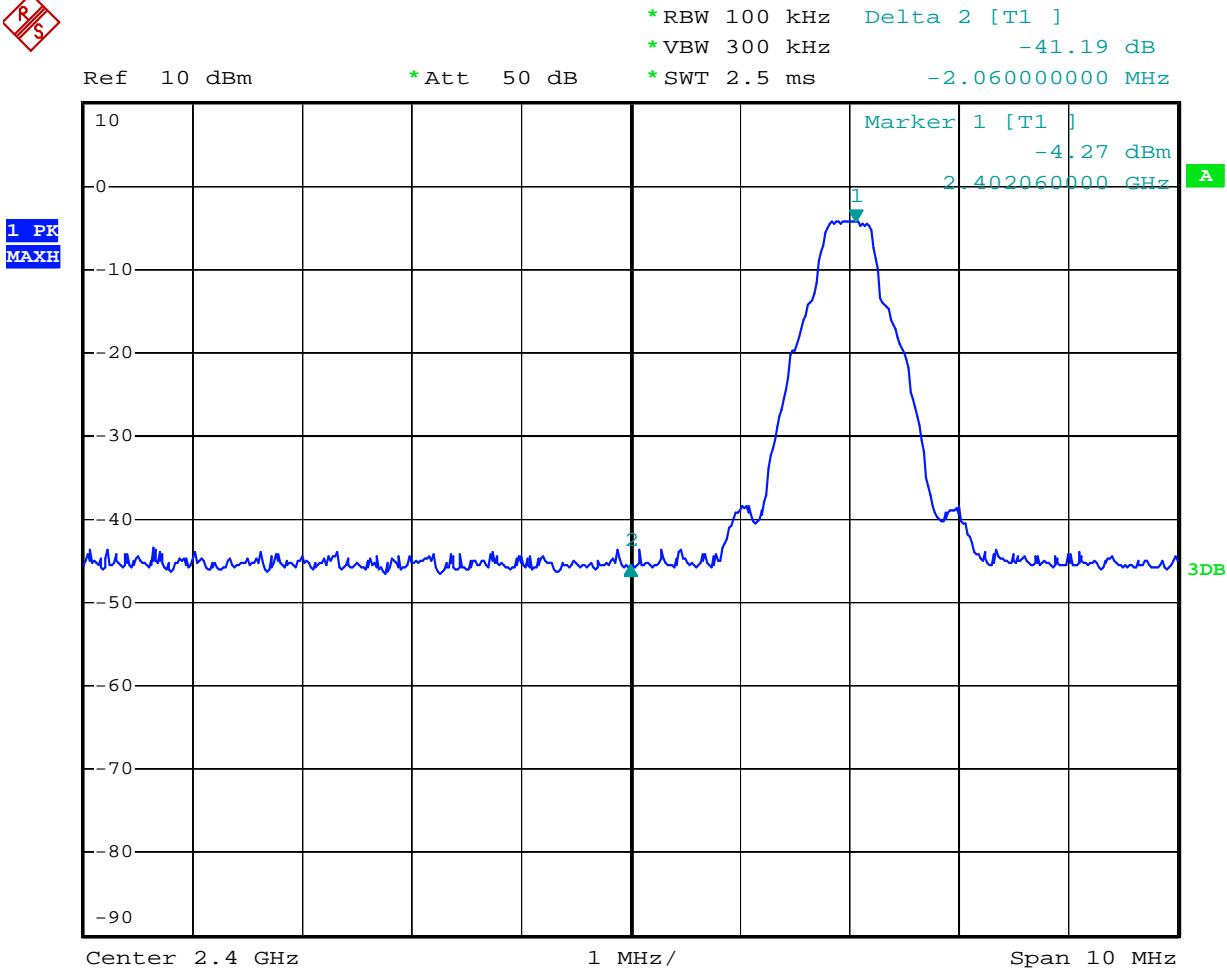
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2402	41.19	> 20dBc
2480	41.40	> 20dBc

Date of Test:	November 22, 2011	Temperature:	25°C
EUT:	Bluetooth Laser Mouse	Humidity:	50%
Model No.:	DS-2398	Power Supply:	DC 3V
Test Mode:	TX (Hopping on)	Test Engineer:	Kai

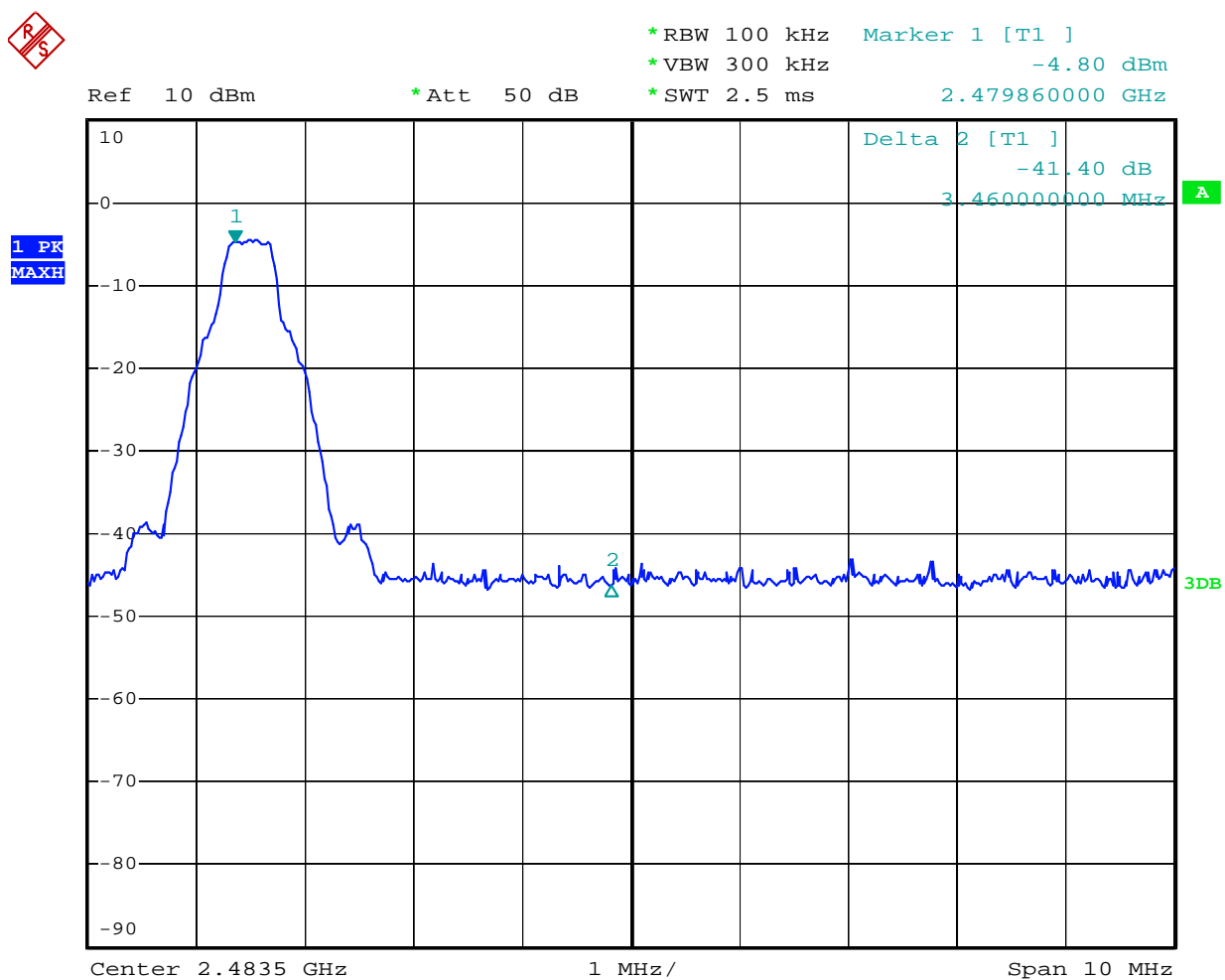
**Conducted test**

Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2402	41.16	> 20dBc
2480	40.94	> 20dBc

"Spectrum analyzer" is R/S



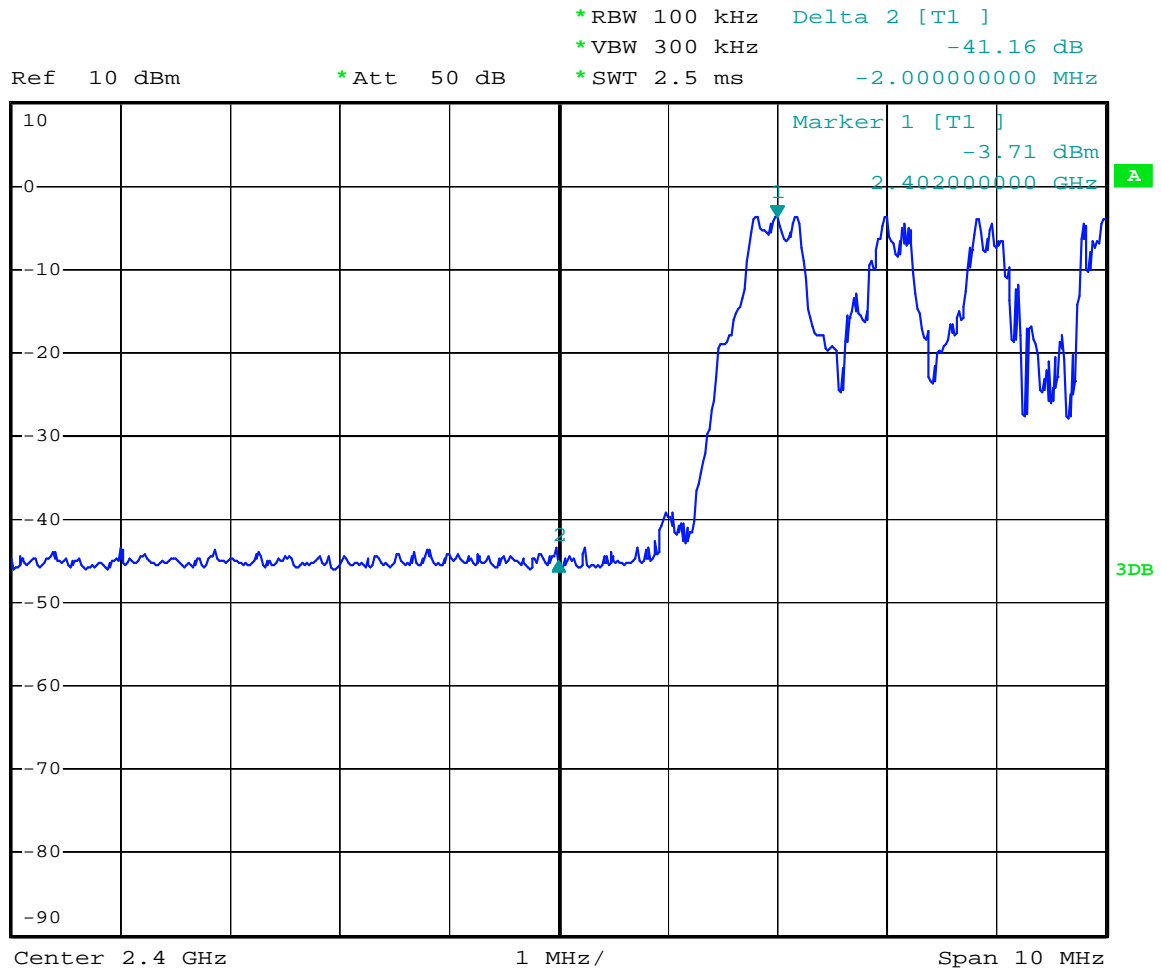
Date: 22.NOV.2011 18:12:29



Date: 22.NOV.2011 18:15:42

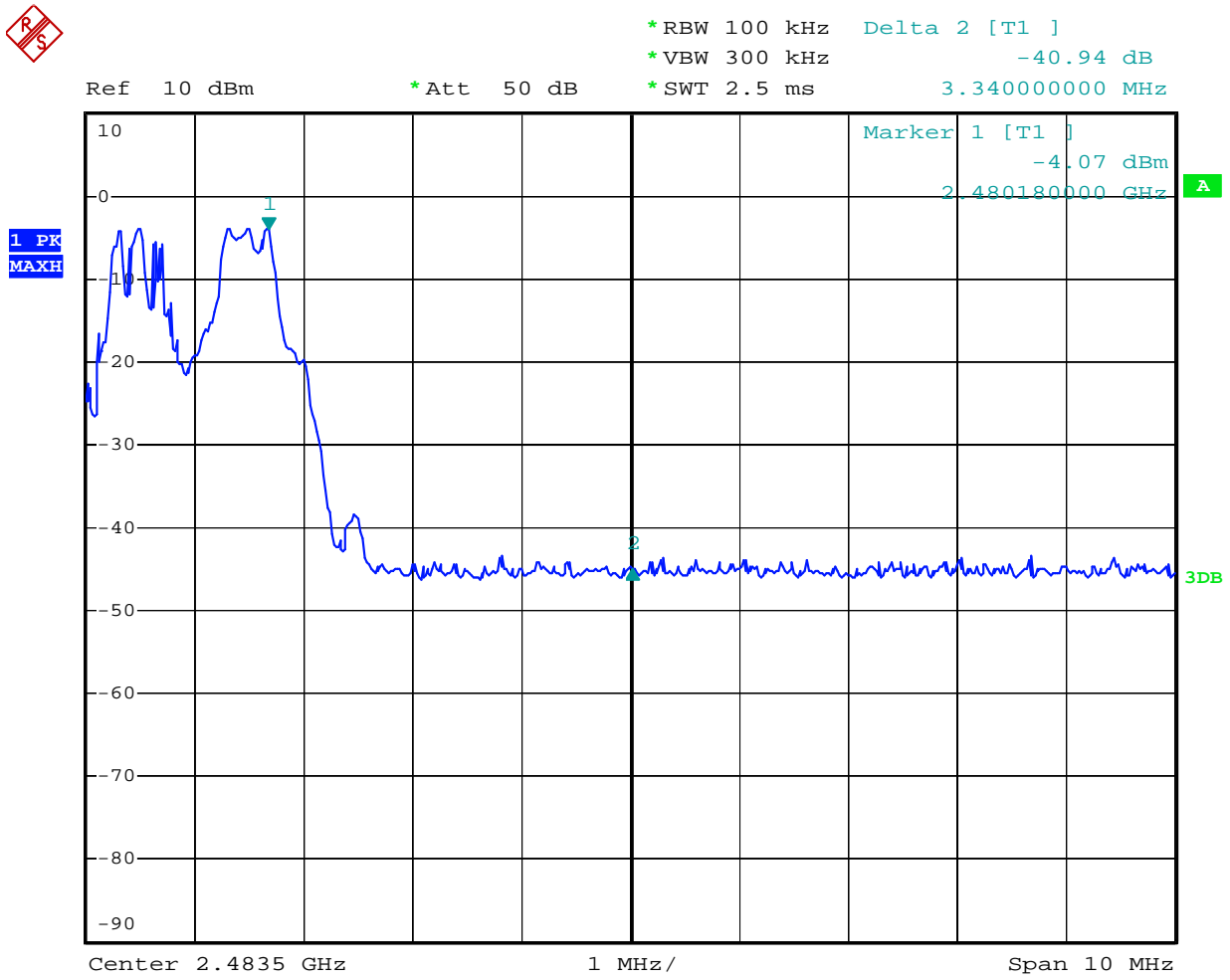


1 PK  
MAXH



Date: 22.NOV.2011 18:27:52





Date: 22.NOV.2011 18:30:50

**Radiated Band Edge Result**

Date of Test: November 22, 2011

Temperature: 25°C

EUT: Bluetooth Laser Mouse

Humidity: 50%

Model No.: DS-2398

Power Supply: DC 3V

Test Mode: TX (2402MHz)

Test Engineer: Kai

Frequency (MHz)	Reading(dBμV/m)		Factor(dB) Corr.	Result(dBμV/m)		Limit(dBμV/m)		Margin(dB)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
-	-	-	-	-	-	-	-	-	-	Vertical
-	-	-	-	-	-	-	-	-	-	Horizontal

Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.
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:

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

3. Display the measurement of peak values.

Date of Test: November 22, 2011

Temperature: 25°C

EUT: Bluetooth Laser Mouse

Humidity: 50%

Model No.: DS-2398

Power Supply: DC 3V

Test Mode: TX (2480MHz)

Test Engineer: Kai

Frequency (MHz)	Reading(dBμV/m)		Factor(dB) Corr.	Result(dBμV/m)		Limit(dBμV/m)		Margin(dB)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
-	-	-	-	-	-	-	-	-	-	Vertical
-	-	-	-	-	-	-	-	-	-	Horizontal

Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.
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:  
Result = Reading + Corrected Factor
3. Display the measurement of peak values.


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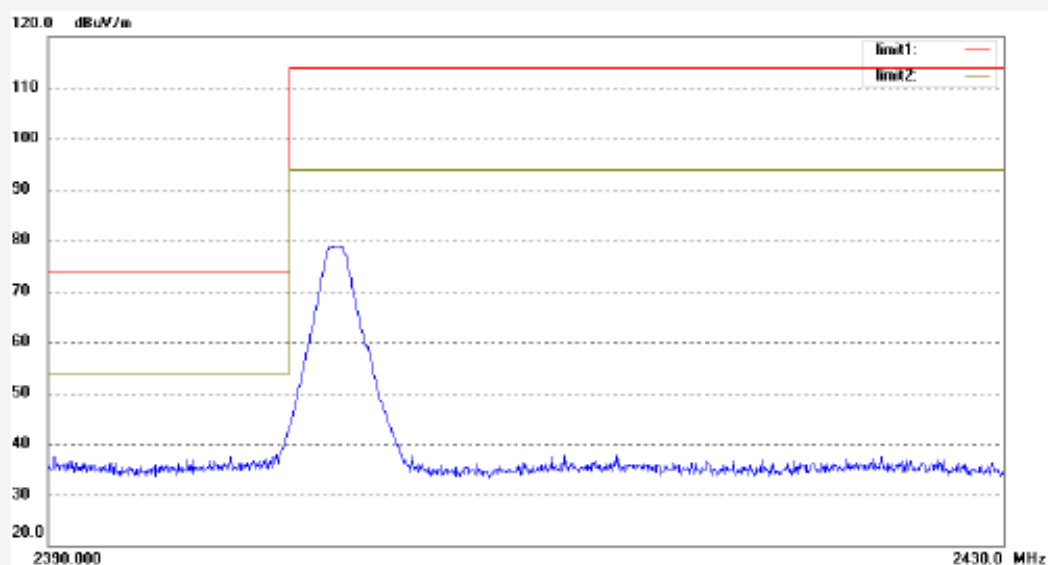
Site: 966 chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: Kai #1208	Polarization: Horizontal
Standard: FCC Part 15 PEAK 2.4G	Power Source: DC 3V
Test item: Radiation Test	Date: 2011/11/22
Temp.( C)/Hum.(%) 24 C / 48 %	Time: 14:12:52
EUT: Bluetooth Laser Mouse	Engineer Signature: Kai
Mode: TX 2402	Distance: 3m
Model: DS-2398	
Manufacturer: Eastern Times	

Note: Report No.:ATE20112435 Sample No.:1102394



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
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Site: 966 chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: Kai #1209

Standard: FCC Part 15 PEAK 2.4G

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 %

EUT: Bluetooth Laser Mouse

Mode: TX 2402

Model: DS-2398

Manufacturer: Eastern Times

Polarization: Vertical

Power Source: DC 3V

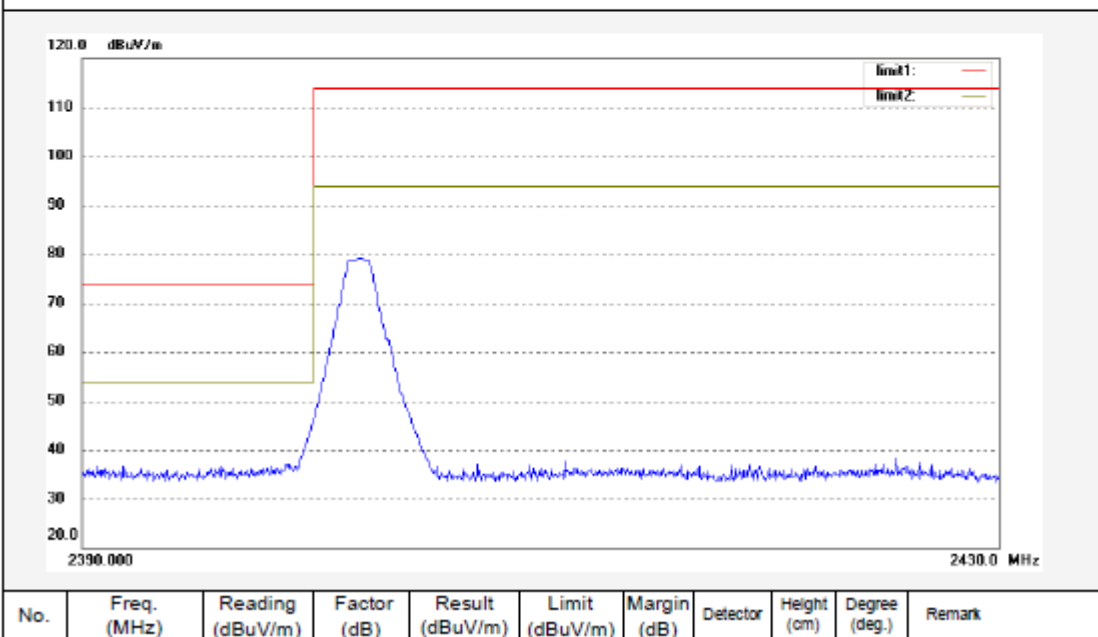
Date: 2011/11/22

Time: 14:14:18

Engineer Signature: Kai

Distance: 3m

Note: Report No.:ATE20112435 Sample No.:1102394




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Site: 966 chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: Kai #1211

Standard: FCC Part 15 PEAK 2.4G

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 %

EUT: Bluetooth Laser Mouse

Mode: TX 2480

Model: DS-2398

Manufacturer: Eastern Times

Polarization: Horizontal

Power Source: DC 3V

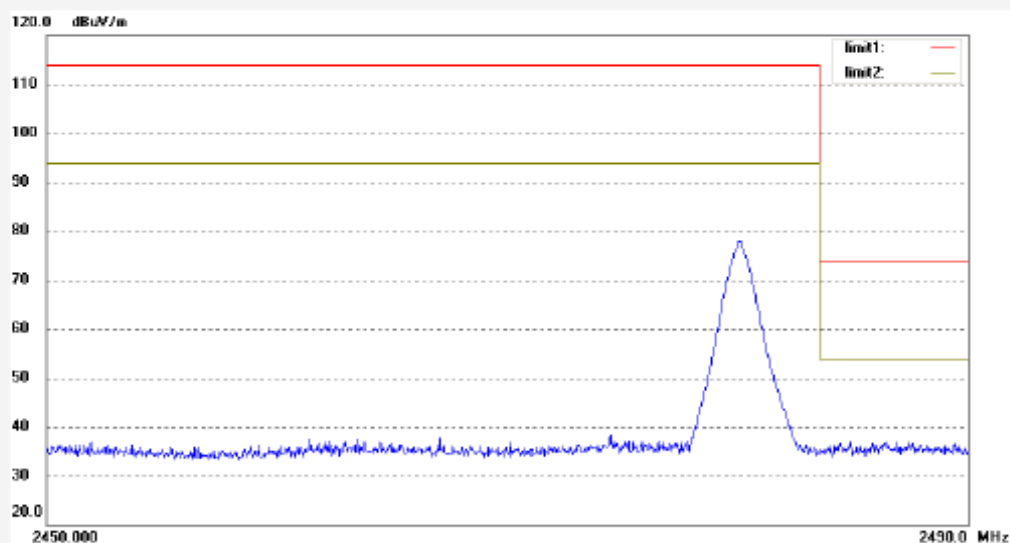
Date: 2011/11/22

Time: 14:23:04

Engineer Signature: Kai

Distance: 3m

Note: Report No.:ATE20112435 Sample No.:1102394



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
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 Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 966 chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: Kai #1210

Standard: FCC Part 15 PEAK 2.4G

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 %

EUT: Bluetooth Laser Mouse

Mode: TX 2480

Model: DS-2398

Manufacturer: Eastern Times

Polarization: Vertical

Power Source: DC 3V

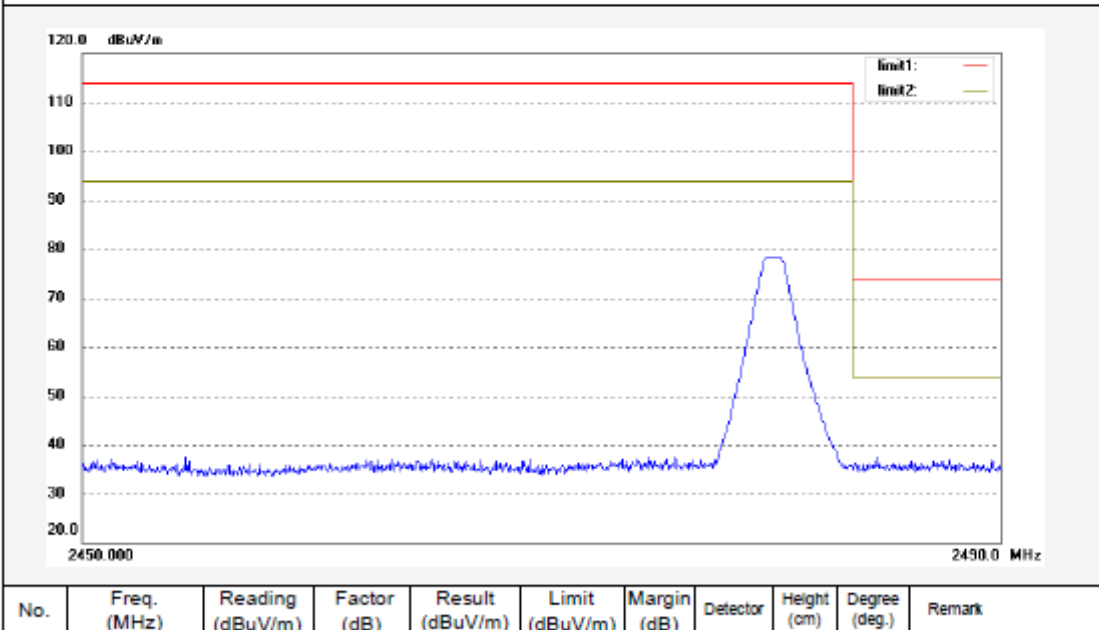
Date: 2011/11/22

Time: 14:17:40

Engineer Signature: Kai

Distance: 3m

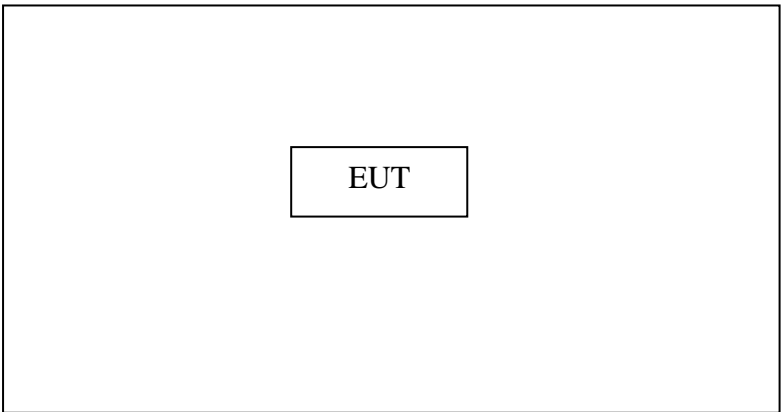
Note: Report No.:ATE20112435 Sample No.:1102394



# 11.RADIATED SPURIOUS EMISSION TEST

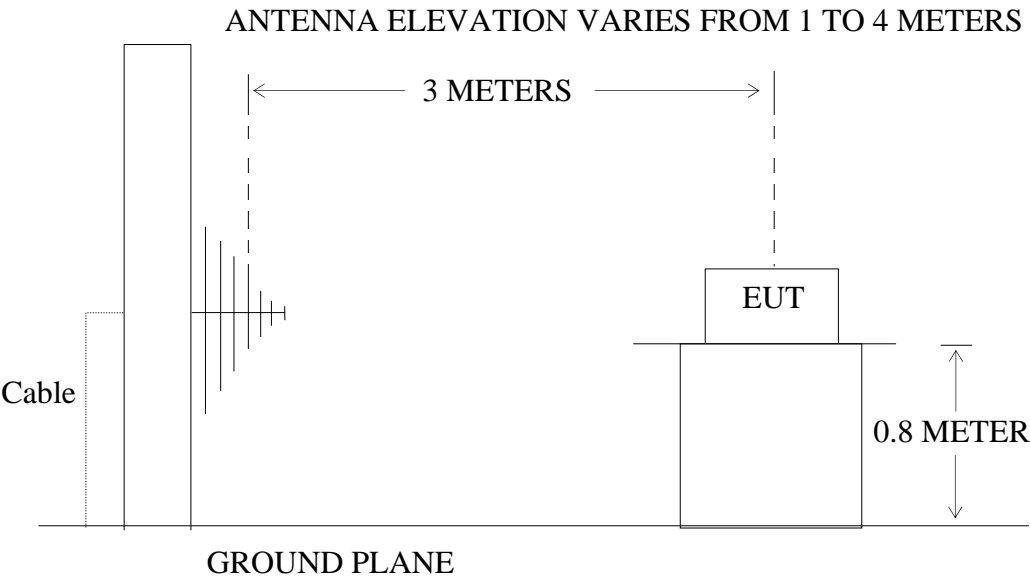
## 11.1.Block Diagram of Test Setup

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



(EUT: Bluetooth Laser Mouse)

### 11.1.2.Semi-Anechoic Chamber Test Setup Diagram



(EUT: Bluetooth Laser Mouse)



## 11.2.The Limit For Section 15.247(d)

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. 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).

## 11.3.Restricted bands of operation

### 11.3.1.FCC Part 15.205 Restricted bands of operation

(a) Except as shown in paragraph (d) of this section, Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
<sup>1</sup> 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	( <sup>2</sup> )
13.36-13.41			

<sup>1</sup>Until February 1, 1999, this restricted band shall be 0.490-0.510

<sup>2</sup>Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emission appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, Compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

## 11.4.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.

### 11.4.1. Bluetooth Laser Mouse (EUT)

Model Number : DS-2398  
 Serial Number : N/A  
 Manufacturer : Eastern Times Technology Co., Ltd.

## 11.5. Operating Condition of EUT

11.5.1. Setup the EUT and simulator as shown as Section 11.1.

11.5.2. Turn on the power of all equipment.

11.5.3. Let the EUT work in TX (Hopping off) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, 2480MHz TX frequency to transmit.

## 11.6. 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 C63.4: 2003 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

The bandwidth of test receiver (R&S ESI26) is set at 120kHz in 30-1000MHz. and set at 1MHz in above 1000MHz.

The frequency range from 30MHz to 25000MHz 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.

The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

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

### PASS.

Date of Test:	November 22, 2011	Temperature:	25°C
EUT:	Bluetooth Laser Mouse	Humidity:	50%
Model No.:	DS-2398	Power Supply:	DC 3V
Test Mode:	TX (2402MHz)	Test Engineer:	Kai

#### For 30MHz-1000MHz

Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Frequency (MHz)	Reading (dBμV/m)	Factor Corr. (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
	QP		QP	QP	QP	
-	-	-	-	-	-	Vertical
-	-	-	-	-	-	Horizontal

#### For 1GHz-25GHz

Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Frequency (MHz)	Reading(dBμV/m)		Factor Corr. (dB)	Result(dBμV/m)		Limit(dBμV/m)		Margin(dBμV/m)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
2402.000	82.57	83.82	-7.45	75.12	76.37	-	-	-	-	Vertical
*4804.000	50.67	51.52	-0.30	50.37	51.22	54	74	-3.63	-22.78	Vertical
2402.000	82.39	83.56	-7.45	74.94	76.11	-	-	-	-	Horizontal
*4804.009	47.48	48.26	-0.30	47.18	47.96	54	74	-6.82	-26.04	Horizontal

**Note: 1. Emissions attenuated more than 20 dB below the permissible value are not reported.**

**2. \*: Denotes restricted band of operation.**

Date of Test: November 22, 2011

Temperature: 25°C

EUT: Bluetooth Laser Mouse

Humidity: 50%

Model No.: DS-2398

Power Supply: DC 3V

Test Mode: TX (2441MHz)

Test Engineer: Kai

**For 30MHz-1000MHz**

Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Frequency (MHz)	Reading (dBμV/m)	Factor Corr. (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
	QP		QP	QP	QP	
-	-	-	-	-	-	Vertical
-	-	-	-	-	-	Horizontal

**For 1GHz-25GHz**

Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Frequency (MHz)	Reading(dBμV/m)		Factor Corr. (dB)	Result(dBμV/m)		Limit(dBμV/m)		Margin(dBμV/m)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
2441.000	82.44	83.82	-7.35	75.09	76.47	-	-	-	-	Vertical
*4804.009	50.67	51.52	-0.30	50.37	51.22	54	74	-3.63	-22.78	Vertical
2441.000	82.67	83.50	-7.35	75.32	76.15	-	-	-	-	Horizontal
*4882.049	45.82	46.79	0.14	45.96	46.93	54	74	-8.04	-27.07	Horizontal

**Note: 1. Emissions attenuated more than 20 dB below the permissible value are not reported.****2. \*: Denotes restricted band of operation.**

Date of Test: November 22, 2011

Temperature: 25°C

EUT: Bluetooth Laser Mouse

Humidity: 50%

Model No.: DS-2398

Power Supply: DC 3V

Test Mode: TX (2480MHz)

Test Engineer: Kai

**For 30MHz-1000MHz**

Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Frequency (MHz)	Reading (dBμV/m)	Factor Corr. (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
	QP		QP	QP	QP	
-	-	-	-	-	-	Vertical
-	-	-	-	-	-	Horizontal

**For 1GHz-25GHz**

Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

Frequency (MHz)	Reading(dBμV/m)		Factor Corr. (dB)	Result(dBμV/m)		Limit(dBμV/m)		Margin(dBμV/m)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
2480.000	83.35	84.91	-7.37	75.98	77.54	-	-	-	-	Vertical
*4960.009	47.49	48.01	0.52	48.01	48.53	54	74	-5.99	-25.47	Vertical
2480.000	82.48	83.94	-7.37	75.11	76.57	-	-	-	-	Horizontal
*4960.009	45.66	46.17	0.52	46.18	46.69	54	74	-7.82	-27.31	Horizontal

**Note: 1. Emissions attenuated more than 20 dB below the permissible value are not reported.****2. \*: Denotes restricted band of operation.**


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Site: 966 chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: Kai #1191

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 %

EUT: Bluetooth Laser Mouse

Mode: TX 2402

Model: DS-2398

Manufacturer: Eastern Times

Polarization: Horizontal

Power Source: DC 3V

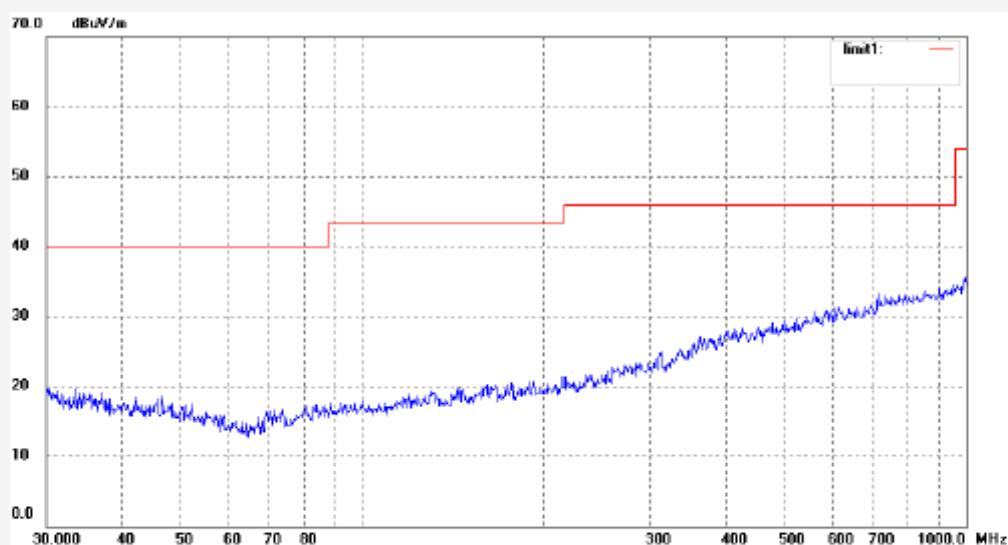
Date: 2011/11/22

Time: 12:39:18

Engineer Signature: Kai

Distance: 3m

Note: Report No.: ATE20112435 Sample No.: 1102394



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
-----	----------------	---------------------	----------------	--------------------	-------------------	----------------	----------	----------------	------------------	--------


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Site: 966 chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: Kai #1190

Polarization: Vertical

Standard: FCC Class B 3M Radiated

Power Source: DC 3V

Test item: Radiation Test

Date: 2011/11/22

Temp.( C)/Hum.(%) 24 C / 48 %

Time: 12:38:19

EUT: Bluetooth Laser Mouse

Engineer Signature: Kai

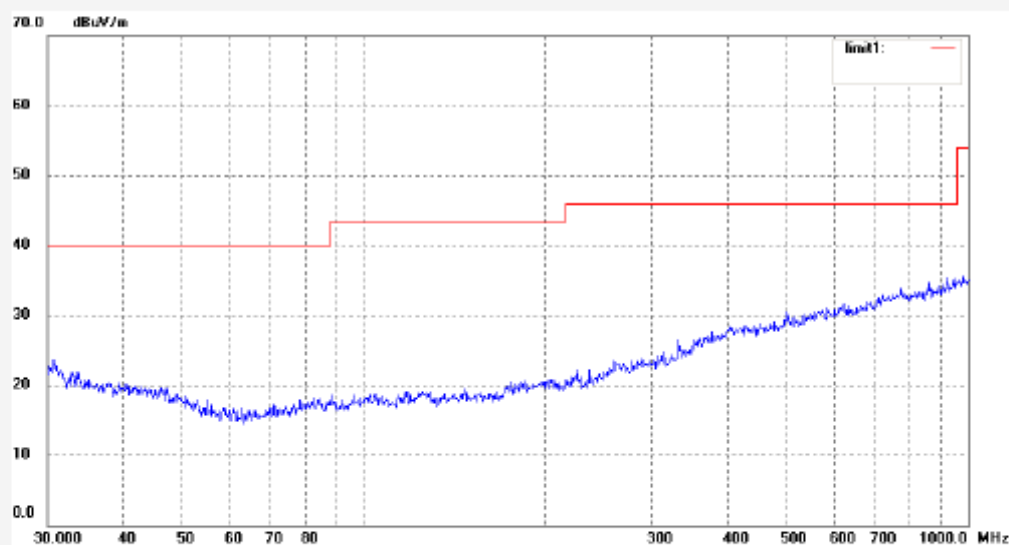
Mode: TX 2402

Distance: 3m

Model: DS-2398

Manufacturer: Eastern Times

Note: Report No.: ATE20112435 Sample No.: 1102394



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
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**ACCURATE TECHNOLOGY CO., LTD.**

 F1,Bldg,A,Changyuan New Material Port Keyuan Rd,  
 Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 968 chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: Kai #1196

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 %

EUT: Bluetooth Laser Mouse

Mode: TX 2402

Model: DS-2398

Manufacturer: Eastern Times

Polarization: Horizontal

Power Source: DC 3V

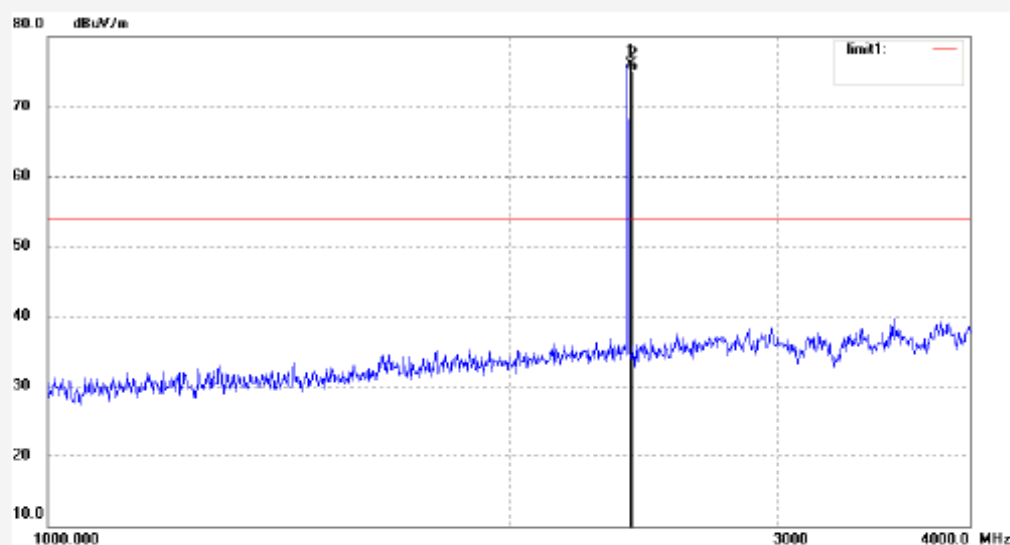
Date: 2011/11/22

Time: 12:47:44

Engineer Signature: Kai

Distance: 3m

Note: Report No.: ATE20112435 Sample No.: 1102394



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.000	83.56	-7.45	76.11	--	--	peak			
2	2402.000	82.39	-7.45	74.94	--	--	AVG			




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 Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 966 chamber

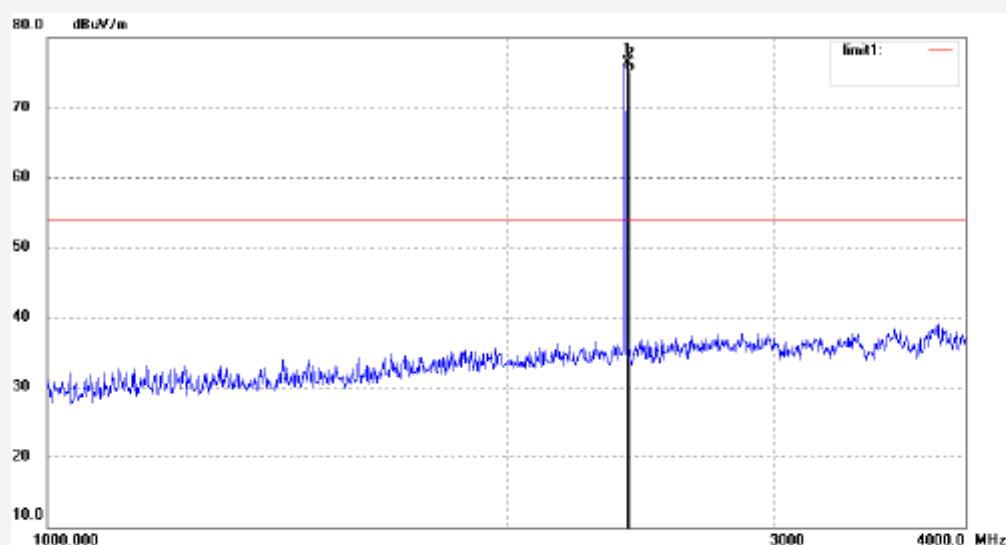
Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: Kai #1197  
 Standard: FCC Class B 3M Radiated  
 Test item: Radiation Test  
 Temp.( C)/Hum.(%) 24 C / 48 %  
 EUT: Bluetooth Laser Mouse  
 Mode: TX 2402  
 Model: DS-2398  
 Manufacturer: Eastern Times

Polarization: Vertical  
 Power Source: DC 3V  
 Date: 2011/11/22  
 Time: 12:49:32  
 Engineer Signature: Kai  
 Distance: 3m

Note: Report No.: ATE20112435 Sample No.: 1102394



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.000	83.82	-7.45	76.37	--	--	peak			
2	2402.000	82.57	-7.45	75.12	--	--	AVG			


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Site: 966 chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: Kai #1203

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 %

EUT: Bluetooth Laser Mouse

Mode: TX 2402

Model: DS-2398

Manufacturer: Eastern Times

Polarization: Horizontal

Power Source: DC 3V

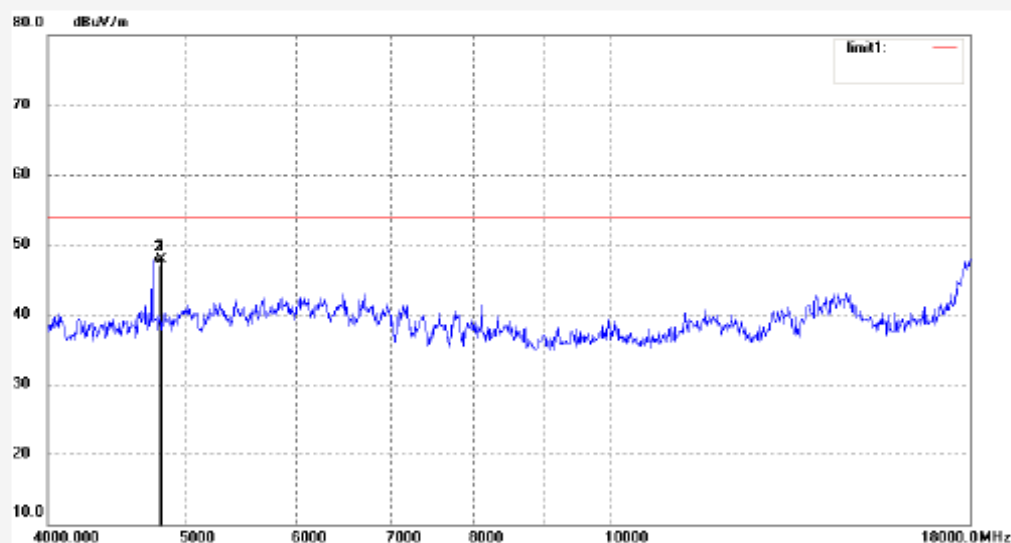
Date: 2011/11/22

Time: 13:54:18

Engineer Signature: Kai

Distance: 3m

Note: Report No.: ATE20112435 Sample No.: 1102394



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4804.009	48.26	-0.30	47.96	74.00	-26.04	peak			
2	4804.009	47.48	-0.30	47.18	54.00	-6.82	AVG			


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Site: 966 chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: Kai #1202

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 %

EUT: Bluetooth Laser Mouse

Mode: TX 2402

Model: DS-2398

Manufacturer: Eastern Times

Polarization: Vertical

Power Source: DC 3V

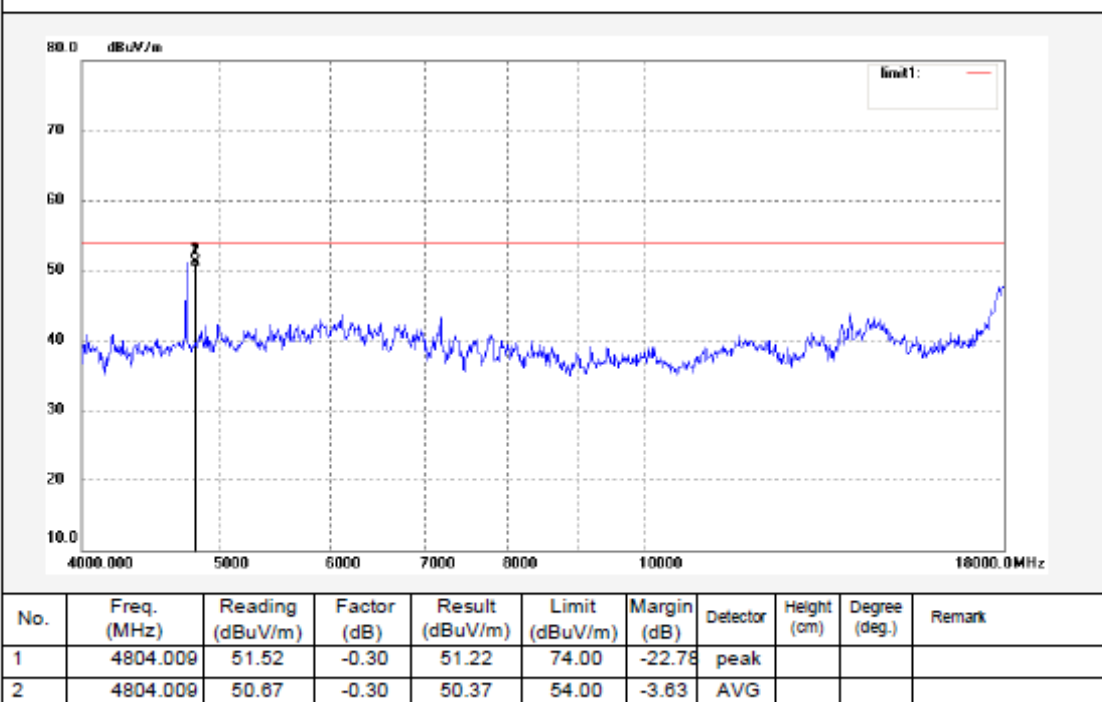
Date: 2011/11/22

Time: 13:51:13

Engineer Signature: Kai

Distance: 3m

Note: Report No.:ATE20112435 Sample No.:1102394





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Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 966 chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: Kai #1238

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 %

EUT: Bluetooth Laser Mouse

Mode: TX 2402MHz

Model: DS-2398

Manufacturer: Eastem Times

Polarization: Horizontal

Power Source: DC 3V

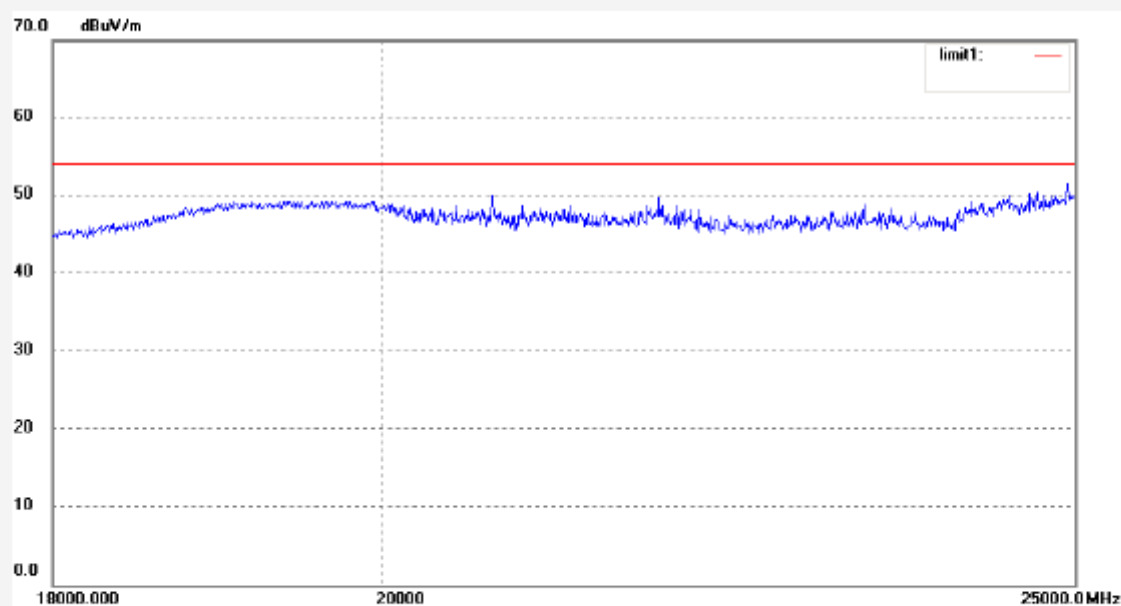
Date: 11/11/24/

Time: 5/47/15

Engineer Signature: Kai

Distance:

Note: Report No.: ATE20112435 Sample No.: 1102394



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
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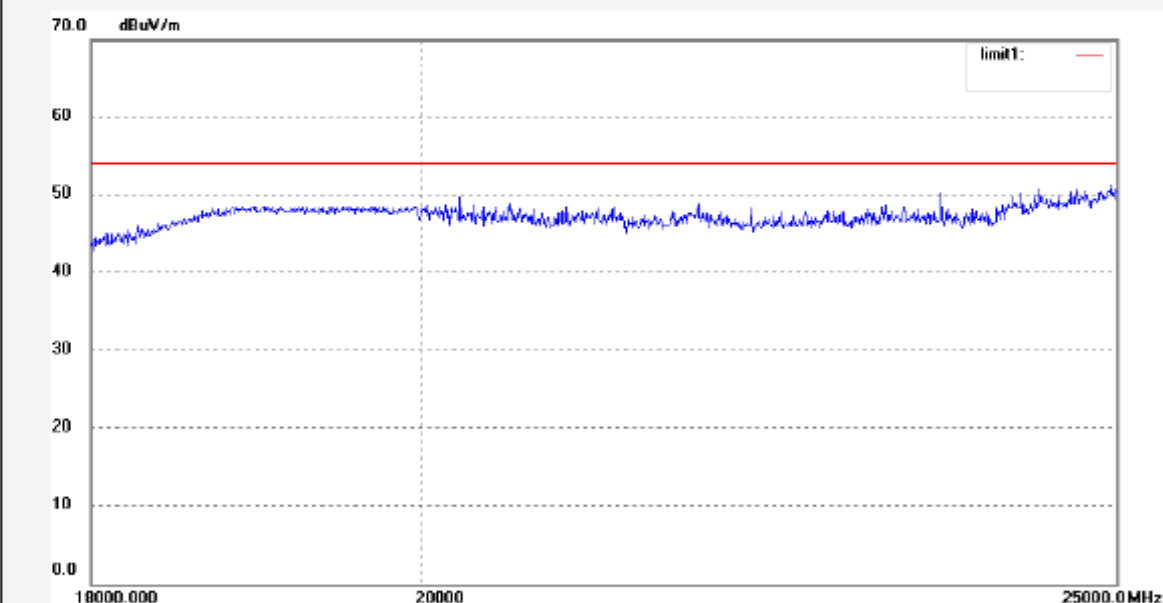
# **ACCURATE TECHNOLOGY CO., LTD.**

F1,Bldg,A,Changyuan New Material Port Keyuan Rd,  
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 966 chamber  
Tel:+86-0755-26503290  
Fax:+86-0755-26503396

Job No.: Kai #1239	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3V
Test item: Radiation Test	Date: 11/11/24/
Temp.( C)/Hum.(%) 24 C / 48 %	Time: 5/49/05
EUT: Bluetooth Laser Mouse	Engineer Signature: Kai
Mode: TX 2402MHz	Distance:
Model: DS-2398	
Manufacturer: Eastern Times	

Note: Report No.: ATE20112435 Sample No.: 1102394



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
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 Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 966 chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: Kai #1192

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 %

EUT: Bluetooth Laser Mouse

Mode: TX 2441

Model: DS-2398

Manufacturer: Eastern Times

Polarization: Horizontal

Power Source: DC 3V

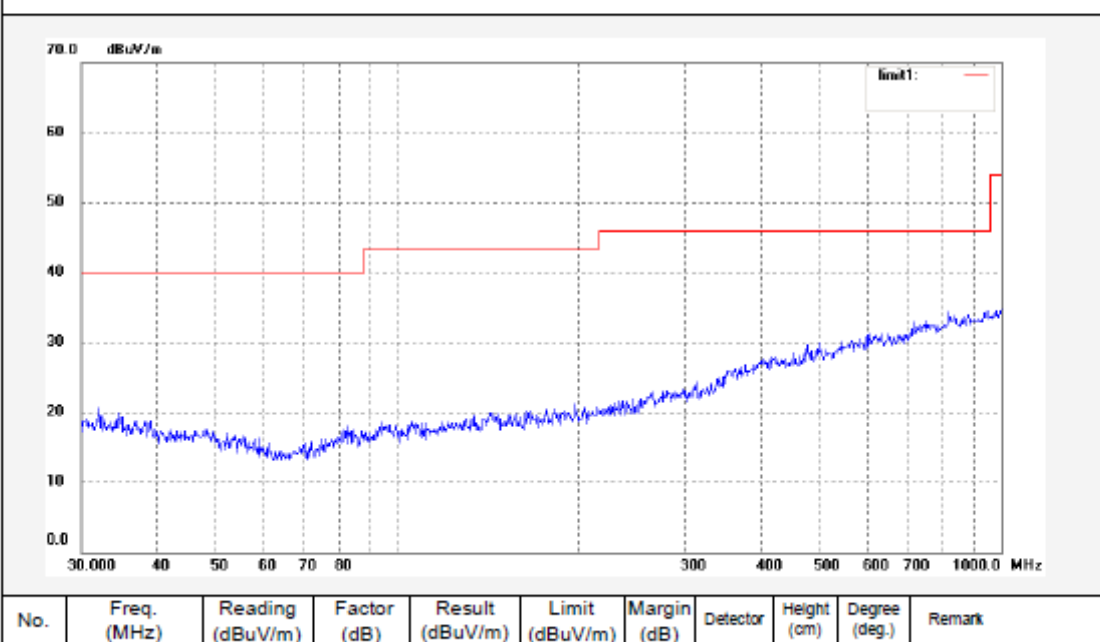
Date: 2011/11/22

Time: 12:40:08

Engineer Signature: Kai

Distance: 3m

Note: Report No.: ATE20112435 Sample No.: 1102394




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Site: 966 chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: Kai #1193

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 %

EUT: Bluetooth Laser Mouse

Mode: TX 2441

Model: DS-2398

Manufacturer: Eastern Times

Polarization: Vertical

Power Source: DC 3V

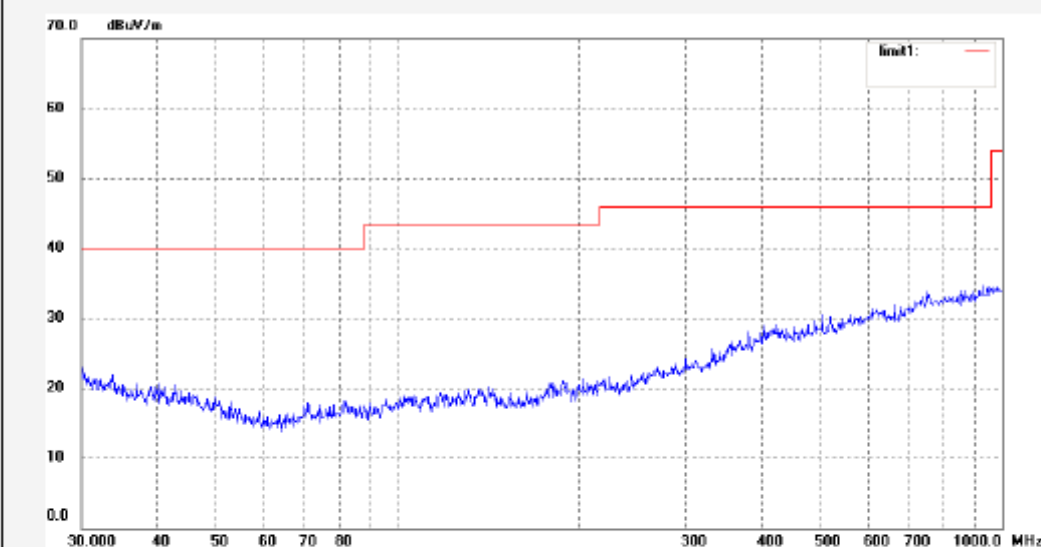
Date: 2011/11/22

Time: 12:41:26

Engineer Signature: Kai

Distance: 3m

Note: Report No.: ATE20112435 Sample No.: 1102394



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
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 Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 966 chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: Kai #1199

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 %

EUT: Bluetooth Laser Mouse

Mode: TX 2441

Model: DS-2398

Manufacturer: Eastern Times

Polarization: Horizontal

Power Source: DC 3V

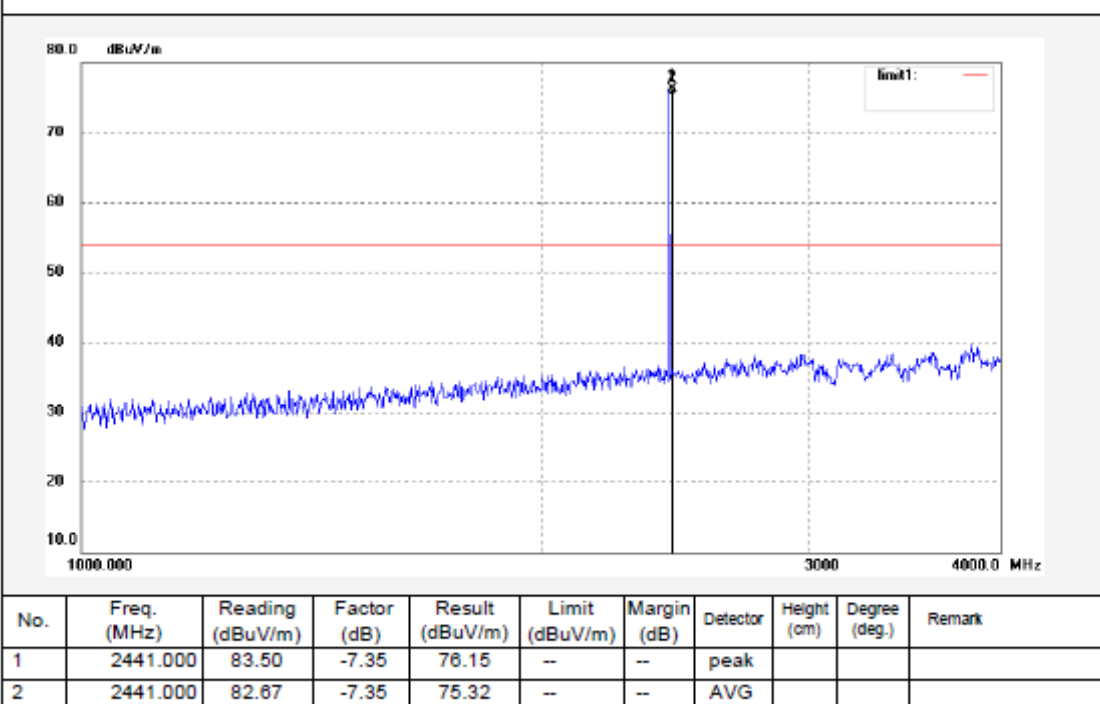
Date: 2011/11/22

Time: 12:58:33

Engineer Signature: Kai

Distance: 3m

Note: Report No.: ATE20112435 Sample No.: 1102394






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Site: 966 chamber

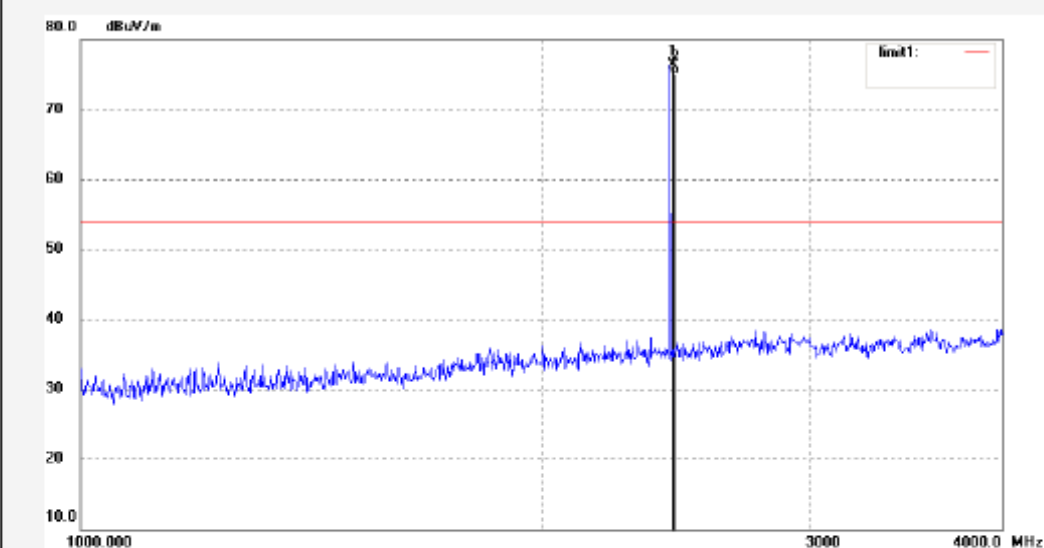
Tel:+86-0755-26503290

Fax:+86-0755-26503396

 Job No.: Kai #1198  
 Standard: FCC Class B 3M Radiated  
 Test item: Radiation Test  
 Temp.( C)/Hum.(%) 24 C / 48 %  
 EUT: Bluetooth Laser Mouse  
 Mode: TX 2441  
 Model: DS-2398  
 Manufacturer: Eastern Times

 Polarization: Vertical  
 Power Source: DC 3V  
 Date: 2011/11/22  
 Time: 12:56:15  
 Engineer Signature: Kai  
 Distance: 3m

Note: Report No.: ATE20112435 Sample No.: 1102394



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2441.000	83.82	-7.35	76.47	--	--	peak			
2	2441.000	82.44	-7.35	75.09	--	--	AVG			


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Site: 986 chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: Kai #1204

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 %

EUT: Bluetooth Laser Mouse

Mode: TX 2441

Model: DS-2398

Manufacturer: Eastern Times

Polarization: Horizontal

Power Source: DC 3V

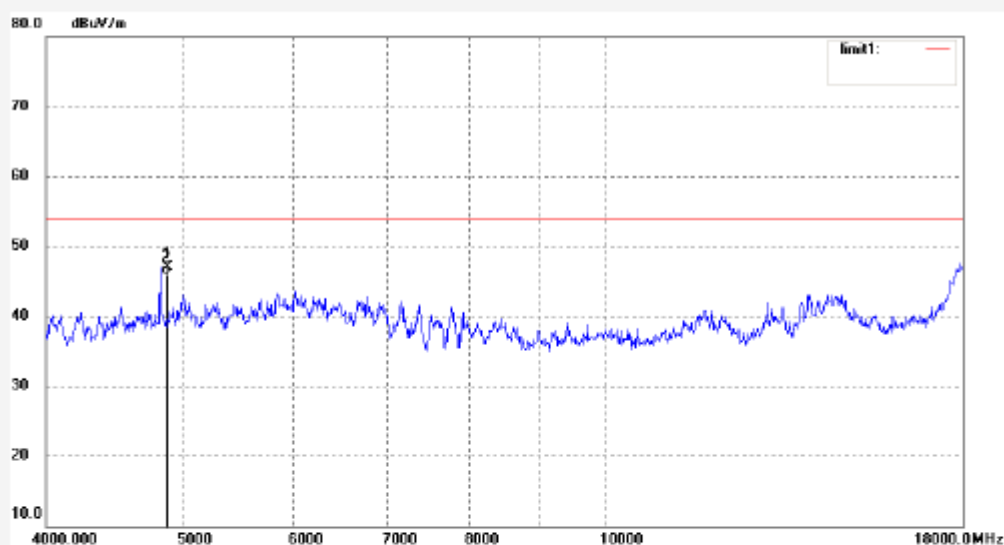
Date: 2011/11/22

Time: 13:57:46

Engineer Signature: Kai

Distance: 3m

Note: Report No.: ATE20112435 Sample No.: 1102394



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4882.049	46.79	0.14	46.93	74.00	-27.07	peak			
2	4882.049	45.82	0.14	45.96	54.00	-8.04	AVG			

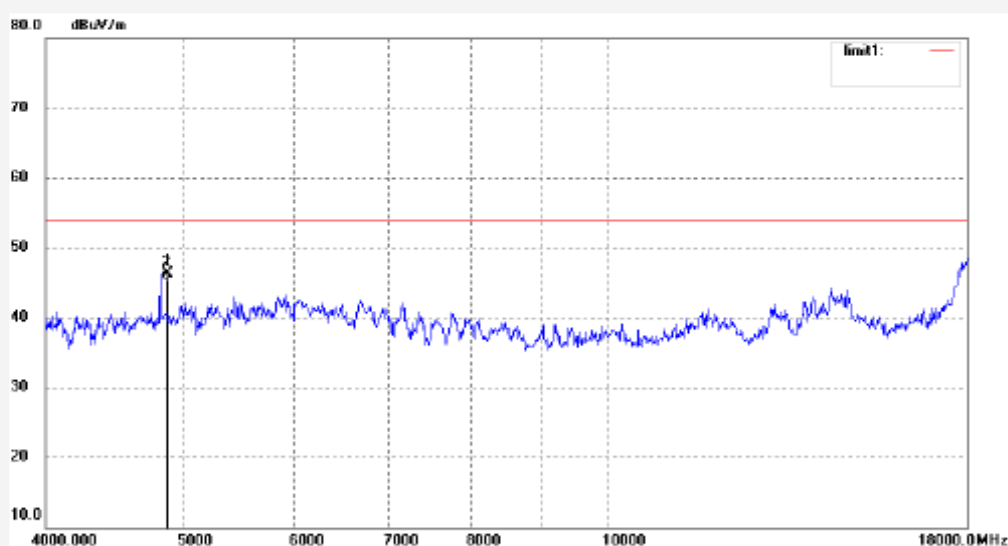

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 Science & Industry Park,Nanshan Shenzhen,P.R.China

 Site: 966 chamber  
 Tel:+86-0755-26503290  
 Fax:+86-0755-26503396

Job No.: Kai #1205	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3V
Test item: Radiation Test	Date: 2011/11/22
Temp.( C)/Hum.(%) 24 C / 48 %	Time: 14:00:52
EUT: Bluetooth Laser Mouse	Engineer Signature: Kai
Mode: TX 2441	Distance: 3m
Model: DS-2398	
Manufacturer: Eastern Times	

Note: Report No.:ATE20112435 Sample No.:1102394



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4882.049	46.25	0.14	46.39	74.00	-27.61	peak			
2	4882.049	45.37	0.14	45.51	54.00	-8.49	AVG			


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 Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 966 chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: Kai #1241

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 %

EUT: Bluetooth Laser Mouse

Mode: TX 2441MHz

Model: DS-2398

Manufacturer: Eastern Times

Polarization: Horizontal

Power Source: DC 3V

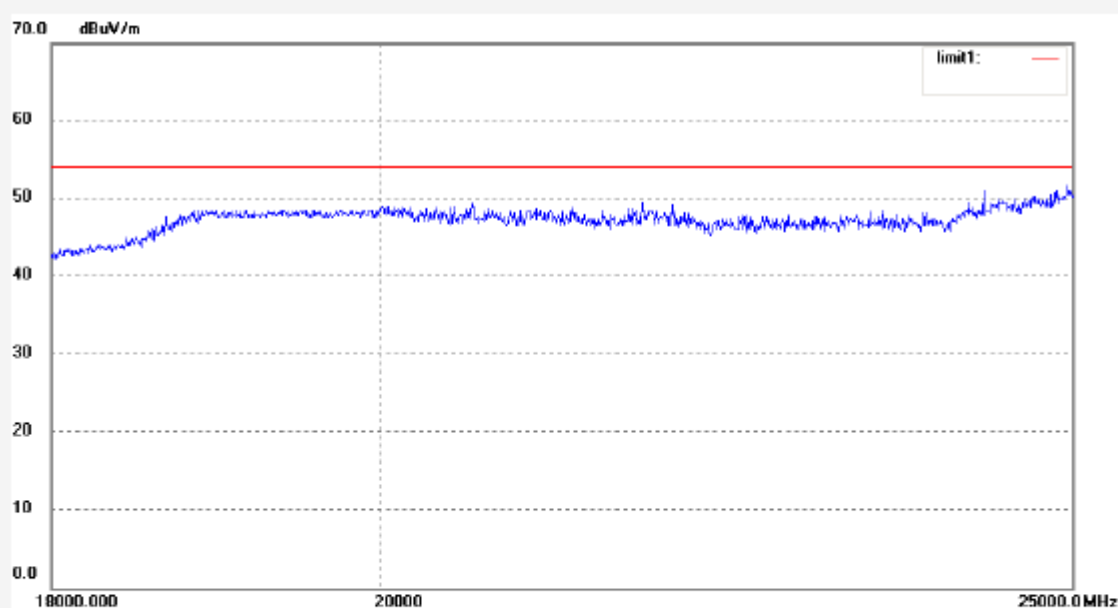
Date: 11/11/24/

Time: 5/53/01

Engineer Signature: Kai

Distance:

Note: Report No.:ATE20112435 Sample No.:1102394



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
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**ACCURATE TECHNOLOGY CO., LTD.**

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 Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 966 chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: Kai #1240

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 %

EUT: Bluetooth Laser Mouse

Mode: TX 2441MHz

Model: DS-2398

Manufacturer: Eastem Times

Polarization: Vertical

Power Source: DC 3V

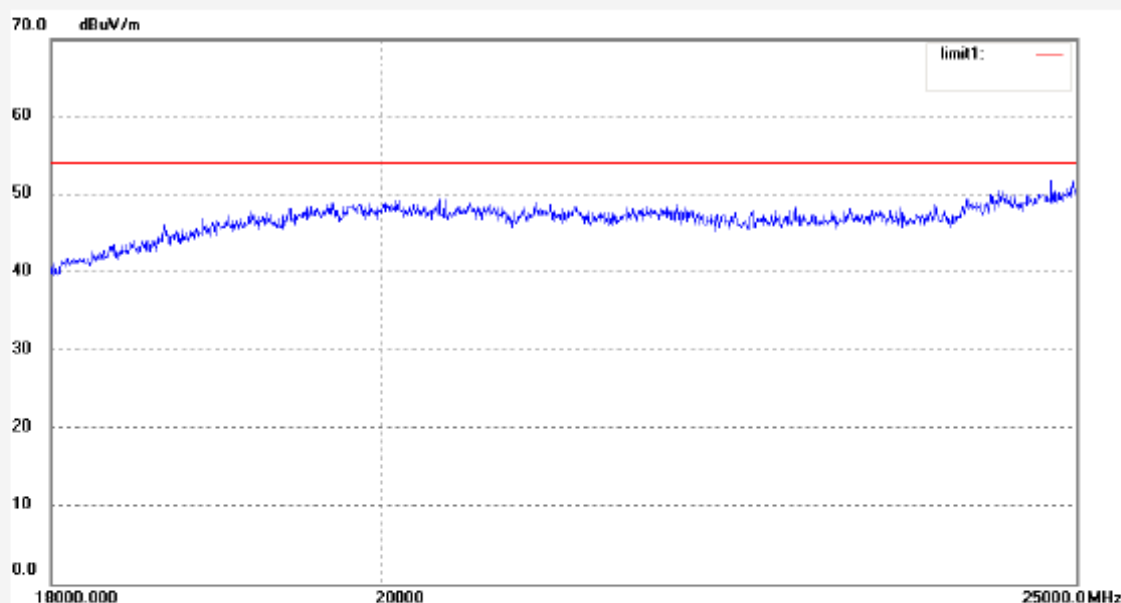
Date: 11/11/24/

Time: 5/51/02

Engineer Signature: Kai

Distance:

Note: Report No.: ATE20112435 Sample No.: 1102394



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
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Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 986 chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: Kai #1195

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 %

EUT: Bluetooth Laser Mouse

Mode: TX 2480

Model: DS-2398

Manufacturer: Eastern Times

Polarization: Horizontal

Power Source: DC 3V

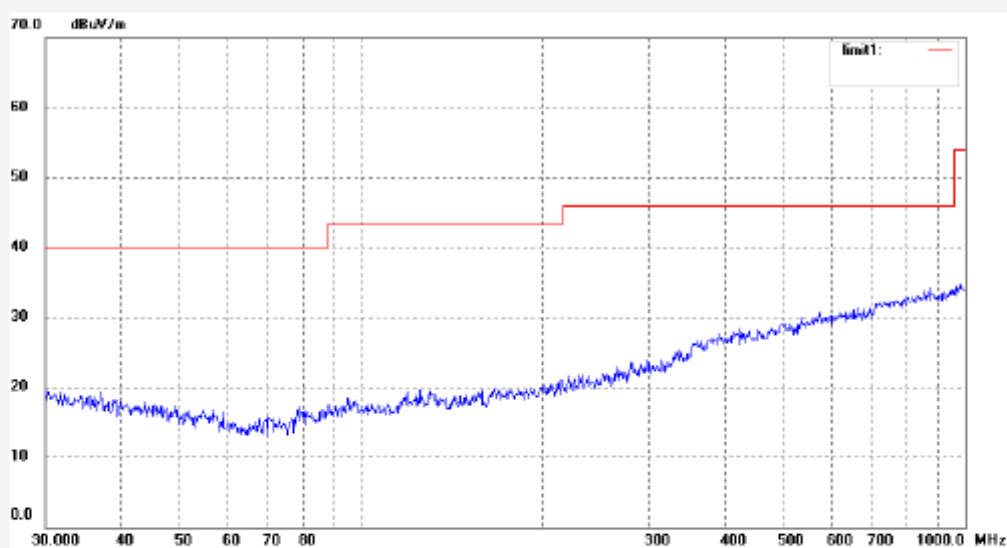
Date: 2011/11/22

Time: 12:43:29

Engineer Signature: Kai

Distance: 3m

Note: Report No.:ATE20112435 Sample No.:1102394



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
-----	----------------	---------------------	----------------	--------------------	-------------------	----------------	----------	----------------	------------------	--------


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 Science & Industry Park,Nanshan Shenzhen,P.R.China

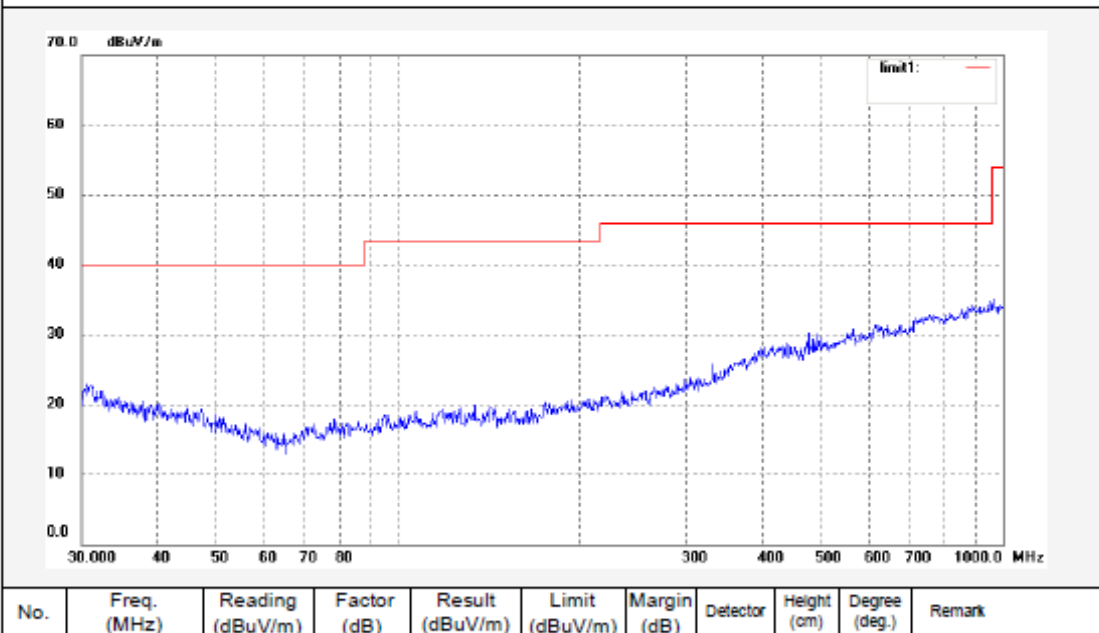
Site: 966 chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: Kai #1194	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3V
Test item: Radiation Test	Date: 2011/11/22
Temp.( C)/Hum.(%) 24 C / 48 %	Time: 12:42:33
EUT: Bluetooth Laser Mouse	Engineer Signature: Kai
Mode: TX 2480	Distance: 3m
Model: DS-2398	
Manufacturer: Eastern Times	

Note: Report No.: ATE20112435 Sample No.: 1102394




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Site: 986 chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503398

Job No.: Kai #1200

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 %

EUT: Bluetooth Laser Mouse

Mode: TX 2480

Model: DS-2398

Manufacturer: Eastern Times

Polarization: Horizontal

Power Source: DC 3V

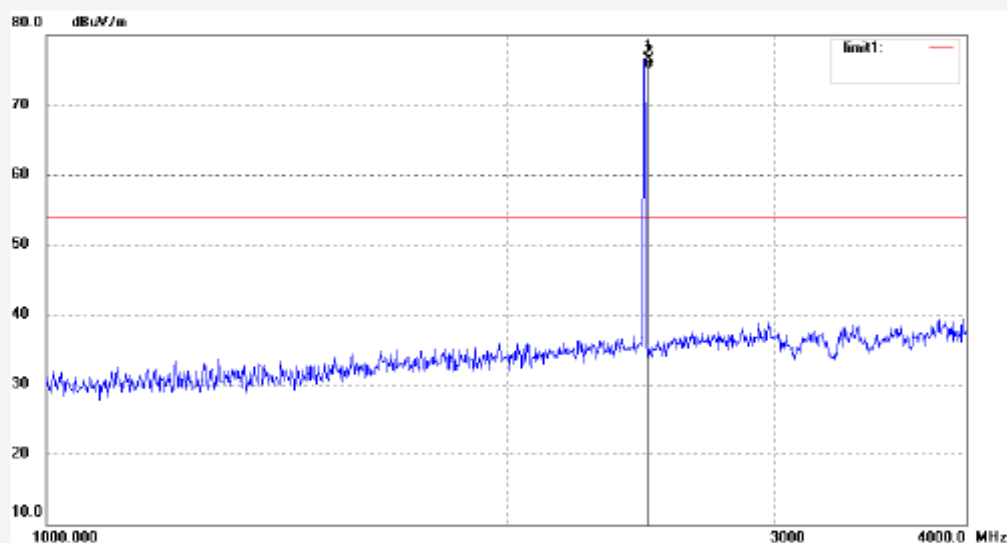
Date: 2011/11/22

Time: 13:03:03

Engineer Signature: Kai

Distance: 3m

Note: Report No.: ATE20112435 Sample No.: 1102394



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.000	83.94	-7.37	76.57	--	--	peak			
2	2480.000	82.48	-7.37	75.11	--	--	AVG			




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 Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 966 chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: Kai #1201

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 %

EUT: Bluetooth Laser Mouse

Mode: TX 2480

Model: DS-2398

Manufacturer: Eastern Times

Polarization: Vertical

Power Source: DC 3V

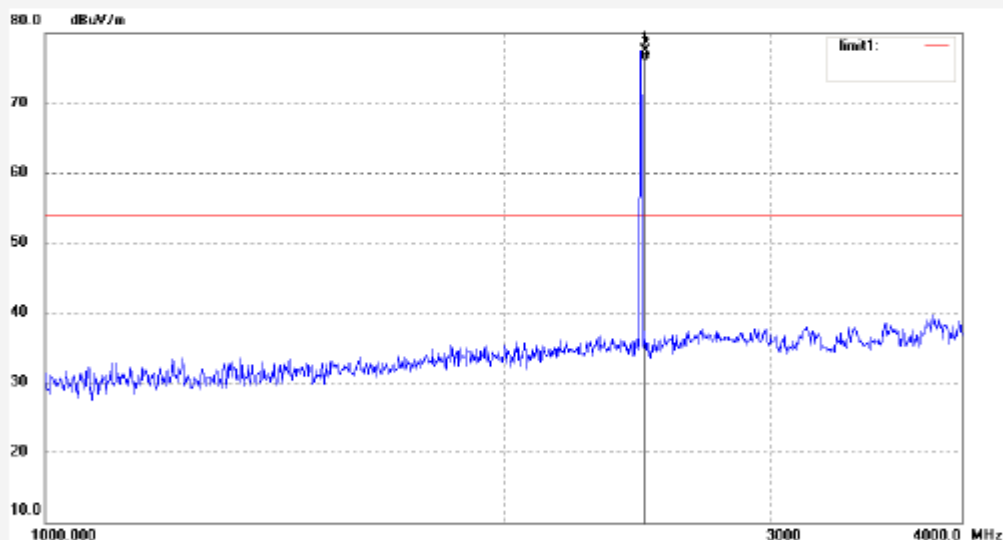
Date: 2011/11/22

Time: 13:05:08

Engineer Signature: Kai

Distance: 3m

Note: Report No.: ATE20112435 Sample No.: 1102394



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.000	84.91	-7.37	77.54	--	--	peak			
2	2480.000	83.35	-7.37	75.98	--	--	AVG			


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Site: 966 chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: Kai #1207

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 %

EUT: Bluetooth Laser Mouse

Mode: TX 2480

Model: DS-2398

Manufacturer: Eastern Times

Polarization: Horizontal

Power Source: DC 3V

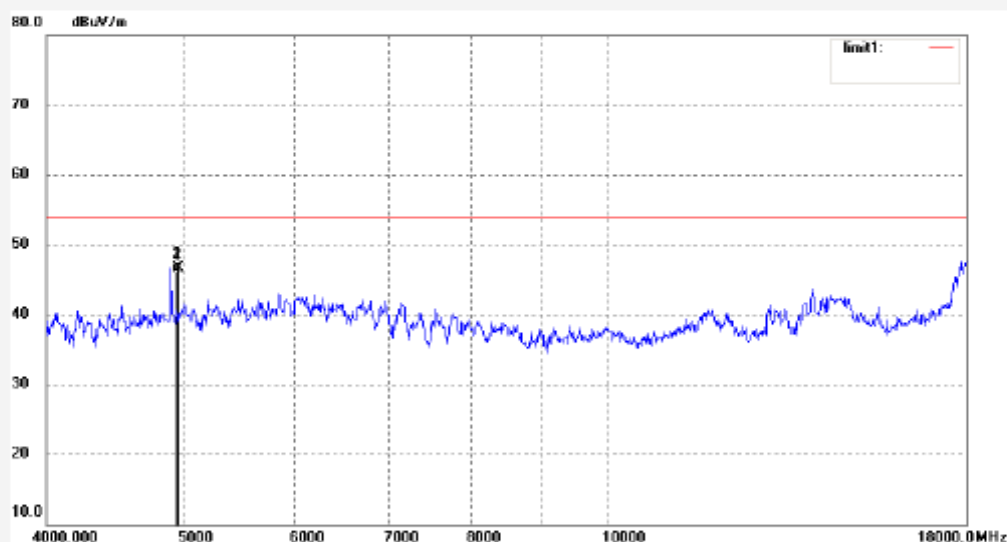
Date: 2011/11/22

Time: 14:05:39

Engineer Signature: Kai

Distance: 3m

Note: Report No.: ATE20112435 Sample No.: 1102394



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4980.009	46.17	0.52	46.69	74.00	-27.31	peak			
2	4980.009	45.66	0.52	46.18	54.00	-7.82	AVG			


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Site: 966 chamber

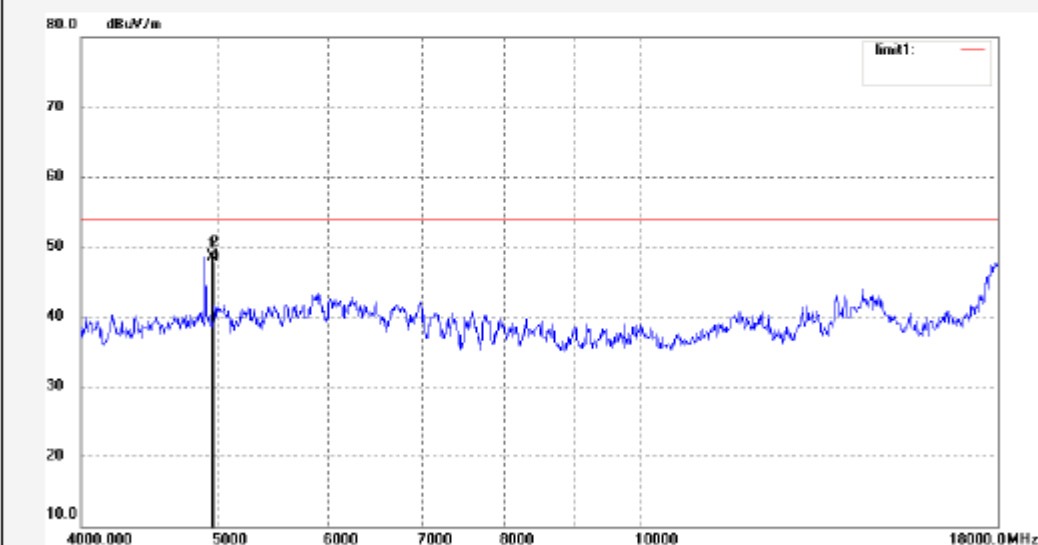
Tel:+86-0755-26503290

Fax:+86-0755-26503396

 Job No.: Kai #1208  
 Standard: FCC Class B 3M Radiated  
 Test item: Radiation Test  
 Temp.( C)/Hum.(%) 24 C / 48 %  
 EUT: Bluetooth Laser Mouse  
 Mode: TX 2480  
 Model: DS-2398  
 Manufacturer: Eastern Times

 Polarization: Vertical  
 Power Source: DC 3V  
 Date: 2011/11/22  
 Time: 14:03:03  
 Engineer Signature: Kai  
 Distance: 3m

Note: Report No.: ATE20112435 Sample No.: 1102394



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4980.009	48.01	0.52	48.53	74.00	-25.47	peak			
2	4980.009	47.49	0.52	48.01	54.00	-5.99	AVG			



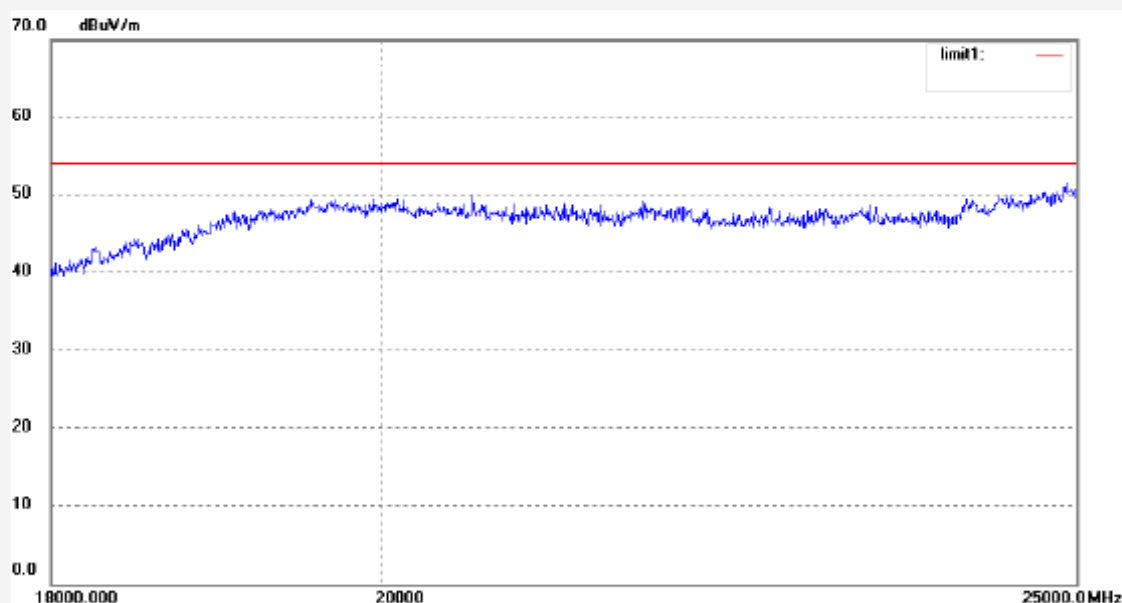
# **ACCURATE TECHNOLOGY CO., LTD.**

F1,Bldg,A,Changyuan New Material Port Keyuan Rd,  
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 966 chamber  
Tel:+86-0755-26503290  
Fax:+86-0755-26503396

Job No.: Kai #1242	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3V
Test item: Radiation Test	Date: 11/11/24/
Temp.( C)/Hum.(%) 24 C / 48 %	Time: 5/55/57
EUT: Bluetooth Laser Mouse	Engineer Signature: Kai
Mode: TX 2480MHz	Distance:
Model: DS-2398	
Manufacturer: Eastern Times	

Note: Report No.: ATE20112435 Sample No.: 1102394



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
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**ACCURATE TECHNOLOGY CO., LTD.**

F1,Bldg,A,Changyuan New Material Port Keyuan Rd,  
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 966 chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: Kai #1243

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 %

EUT: Bluetooth Laser Mouse

Mode: TX 2480MHz

Model: DS-2398

Manufacturer: Eastern Times

Polarization: Vertical

Power Source: DC 3V

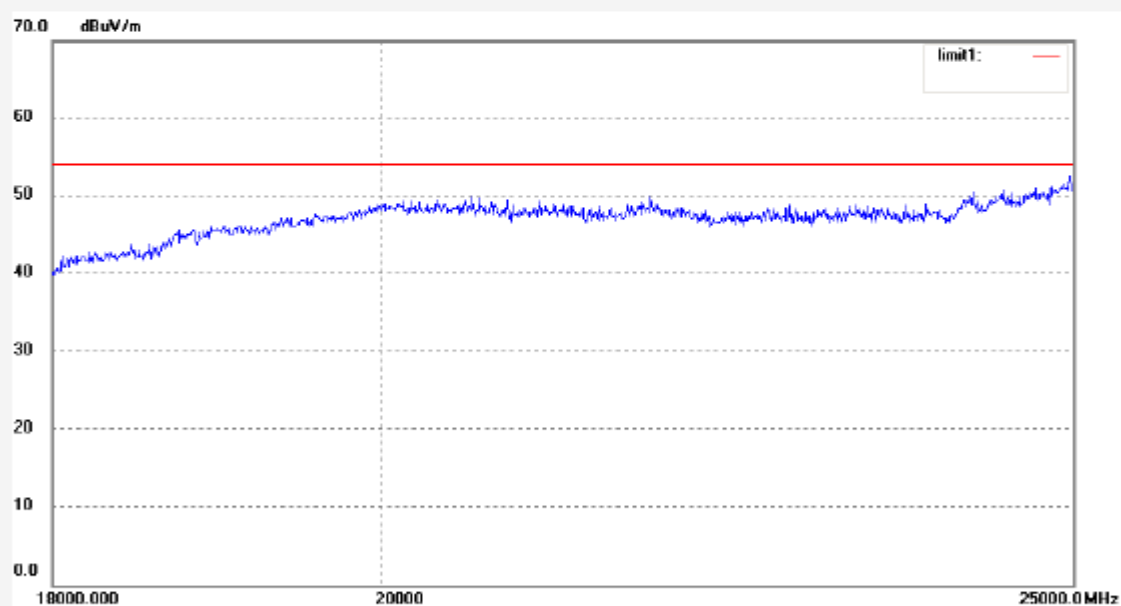
Date: 11/11/24/

Time: 5/57/43

Engineer Signature: Kai

Distance:

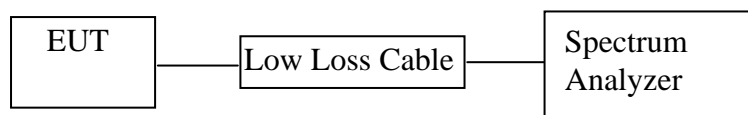
Note: Report No.:ATE20112435 Sample No.:1102394



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
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## 12.CONDUCTED SPURIOUS EMISSION COMPLIANCE TEST

### 12.1.Block Diagram of Test Setup



(EUT: Bluetooth Laser Mouse)

### 12.2.The Requirement For Section 15.247(d)

Section 15.247(d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. 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).

### 12.3.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.

#### 12.3.1.Blutetooth Laser Mouse (EUT)

Model Number	:	DS-2398
Serial Number	:	N/A
Manufacturer	:	Eastern Times Technology Co., Ltd.

## 12.4.Operating Condition of EUT

12.4.1.Setup the EUT and simulator as shown as Section 12.1.

12.4.2.Turn on the power of all equipment.

12.4.3.Let the EUT work in TX (Hopping off) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, 2480MHz TX frequency to transmit.

## 12.5.Test Procedure

12.5.1.The transmitter output was connected to the spectrum analyzer via a low loss cable.

12.5.2.Set RBW of spectrum analyzer to 100kHz and VBW to 300kHz.

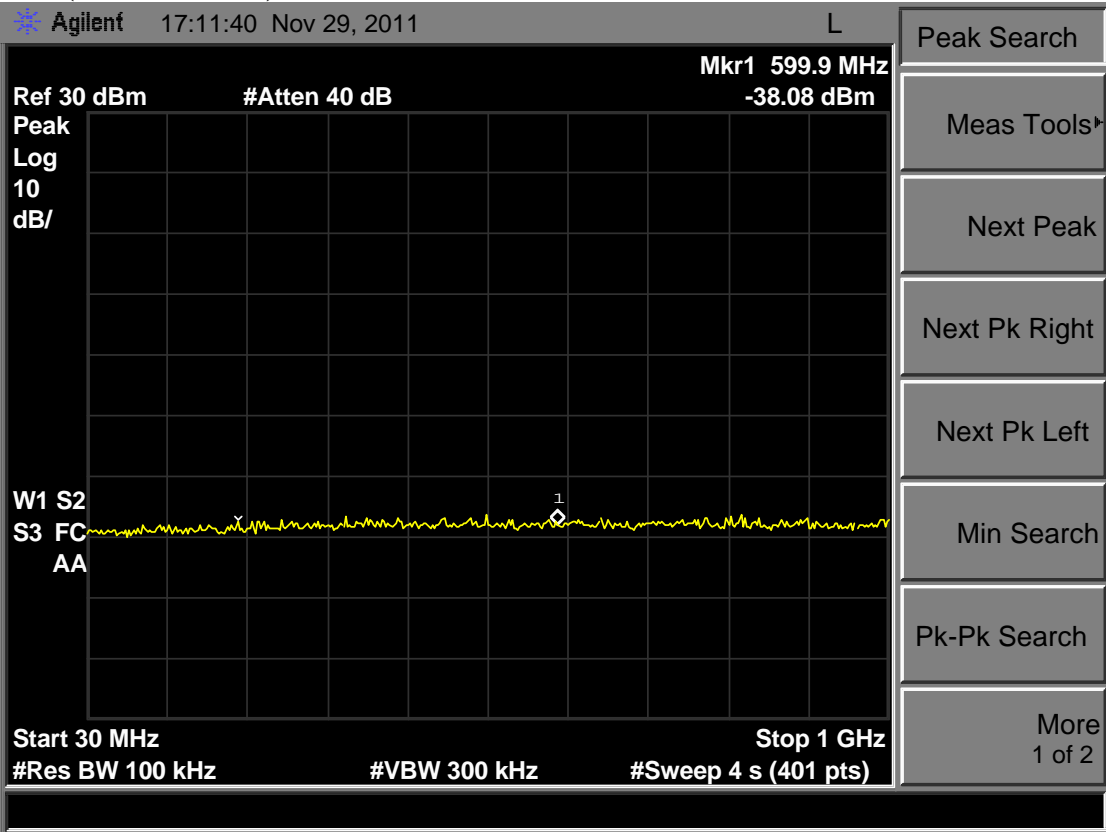
12.5.3.The Conducted Spurious Emission was measured and recorded.

## 12.6.Test Result

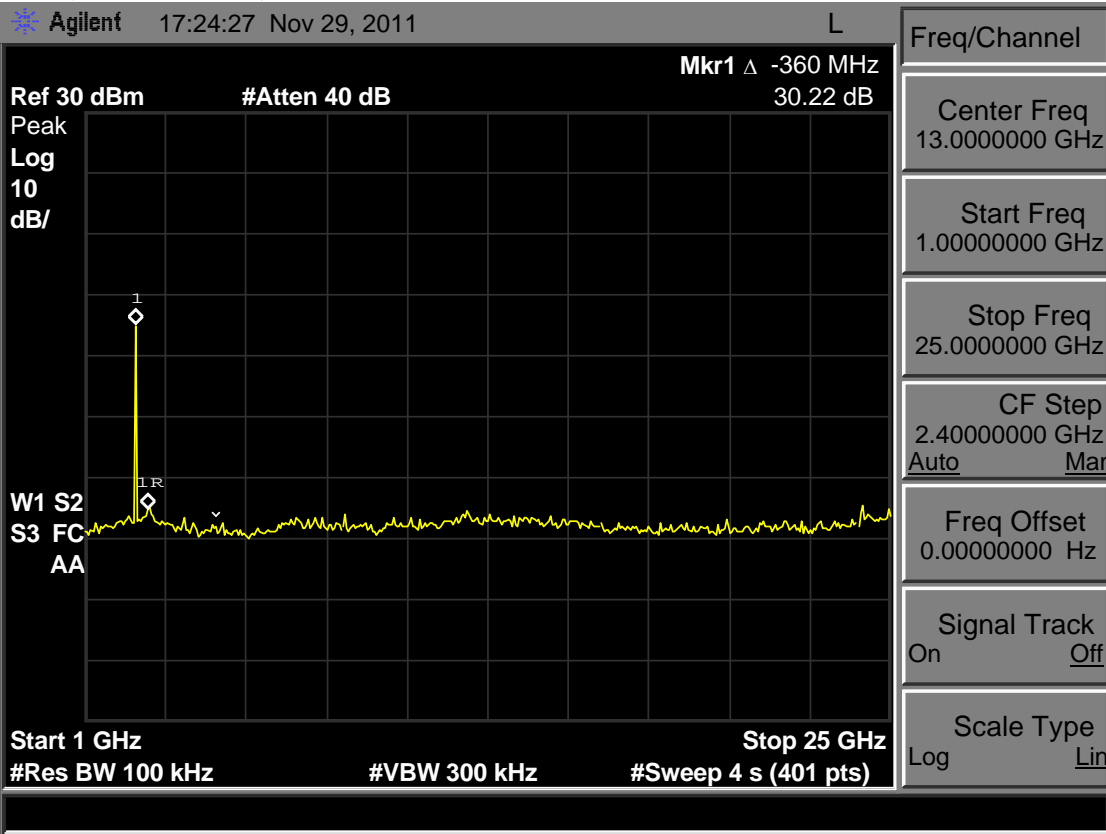
**Pass.**

The spectrum analyzer plots are attached as below.

"Spectrum analyzer" is [Agilent](#)  
TX 2402GHz (30MHz-1GHz)

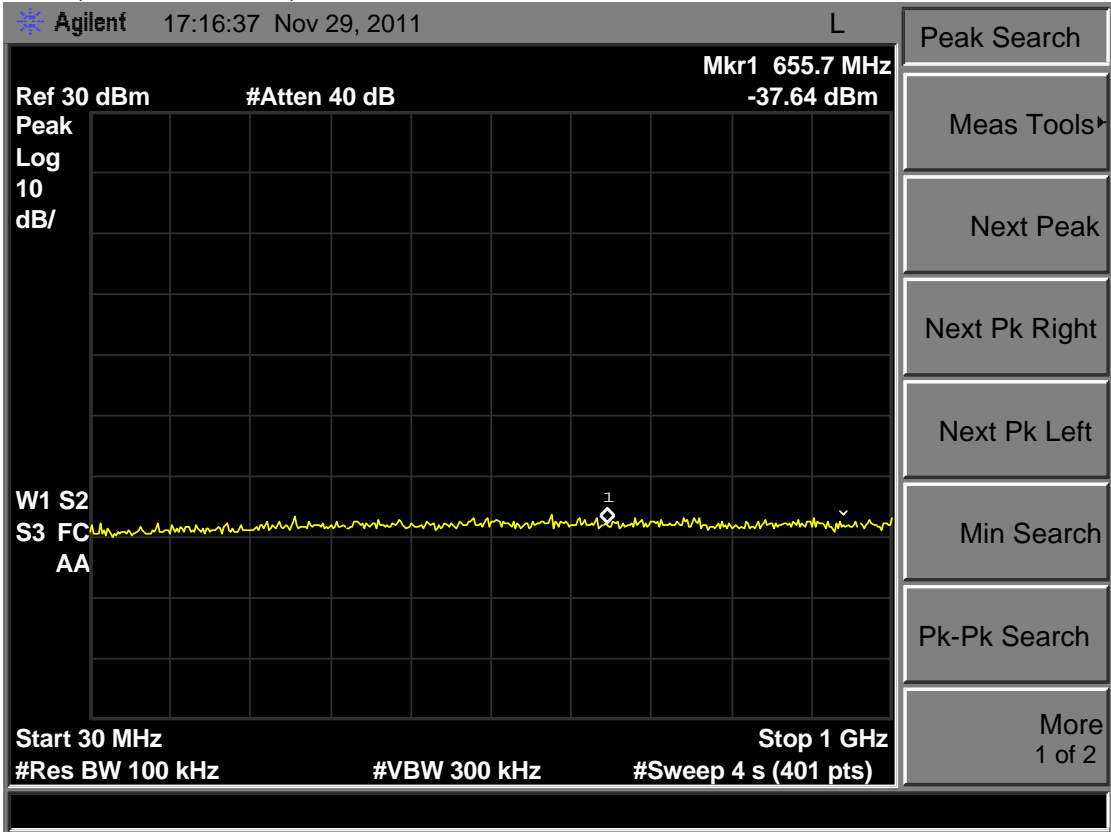


TX 2402GHz (1GHz-25GHz)

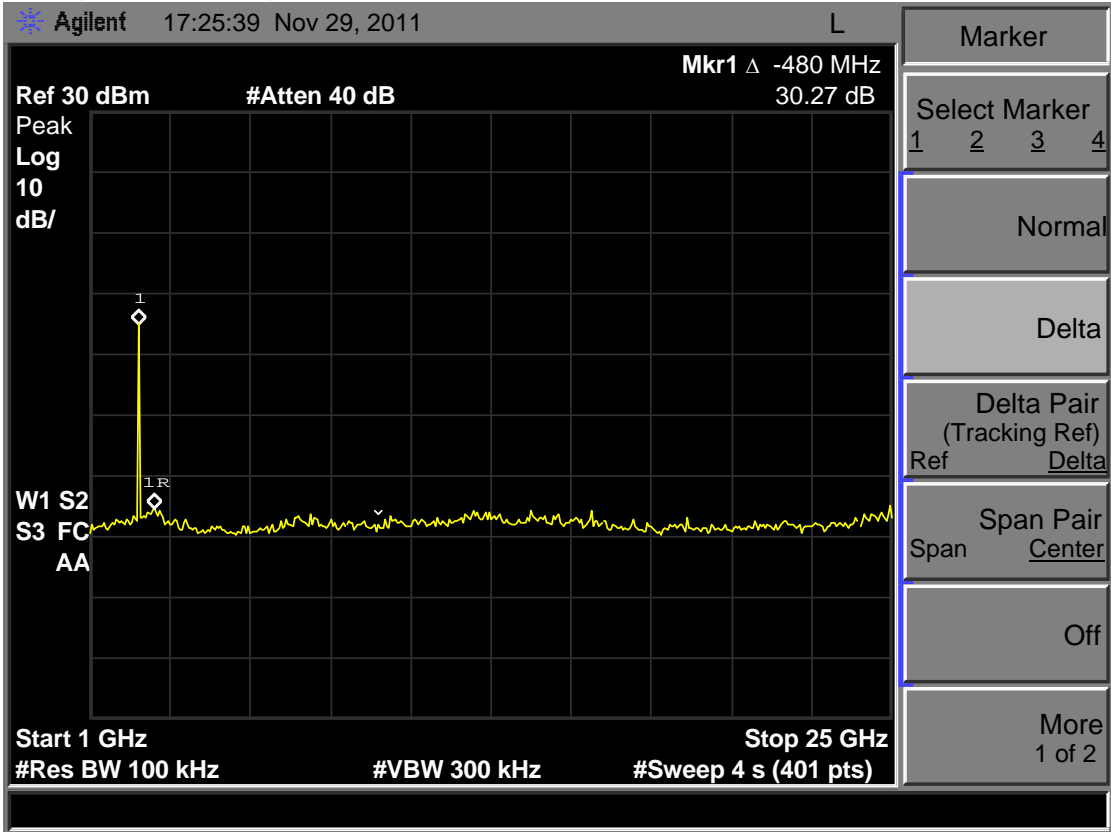




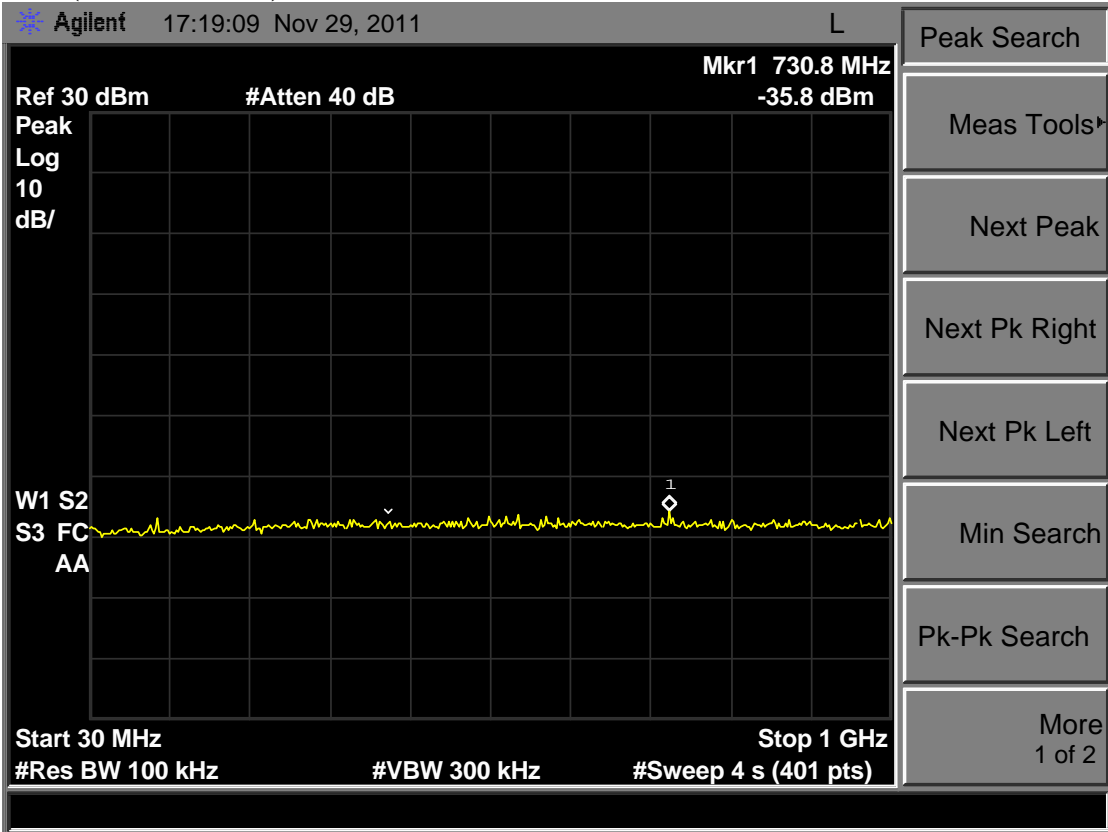
TX 2441GHz (30MHz-25GHz)



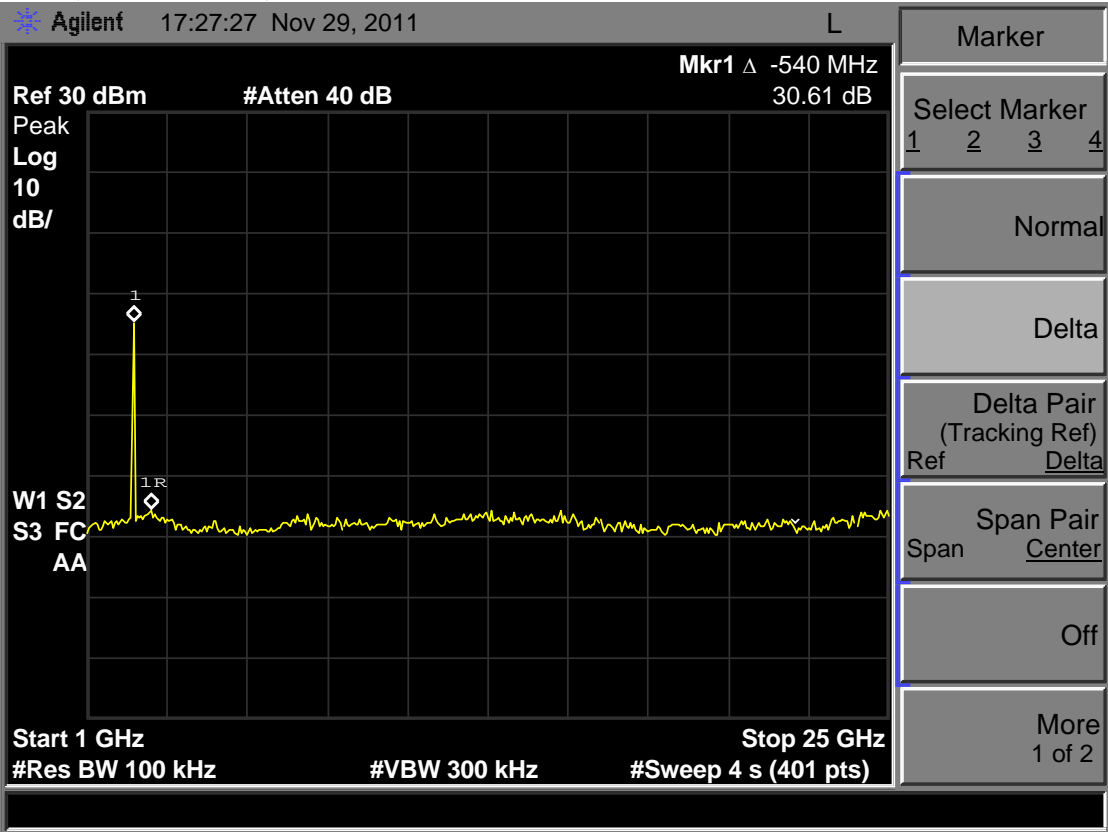
TX 2441GHz (1GHz-25GHz)



TX 2480GHz (30MHz-1GHz)



TX 2480GHz (1GHz-25GHz)

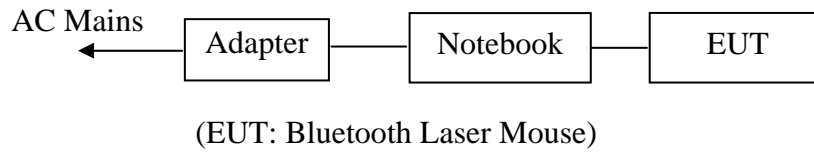


## 13.AC POWER LINE CONDUCTED EMISSION FOR FCC PART

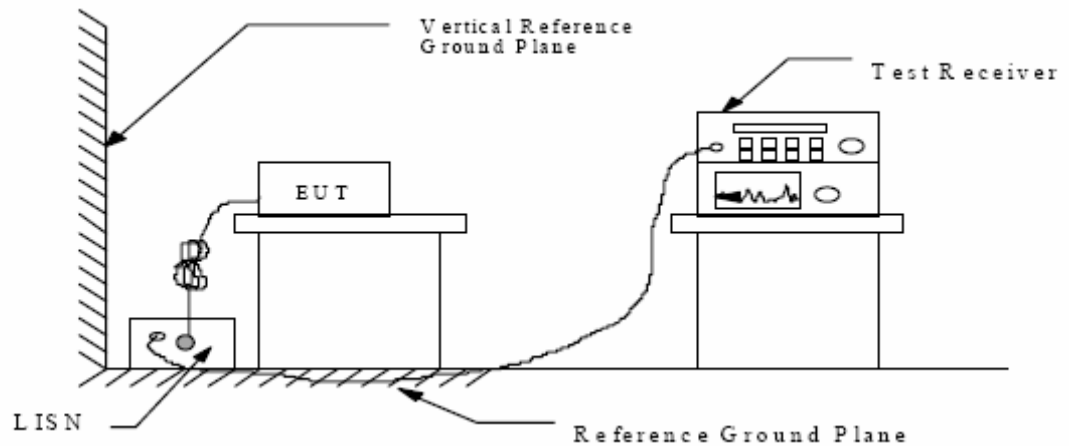
### 15 SECTION 15.207(A)

#### 13.1.Block Diagram of Test Setup

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



##### 13.1.2.Shielding Room Test Setup Diagram



(EUT: Bluetooth Laser Mouse)

#### 13.2.The Emission Limit

##### 13.2.1.Conducted Emission Measurement Limits According to Section 15.207(a)

Frequency (MHz)	Limit dB(μV)	
	Quasi-peak Level	Average Level
0.15 - 0.50	66.0 – 56.0 *	56.0 – 46.0 *
0.50 - 5.00	56.0	46.0
5.00 - 30.00	60.0	50.0

\* Decreases with the logarithm of the frequency.

### 13.3.Configuration of EUT on Measurement

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

#### 13.3.1. Bluetooth Laser Mouse (EUT)

Model Number	:	DS-2398
Serial Number	:	N/A
Manufacturer	:	Eastern Times Technology Co., Ltd.

### 13.4. Operating Condition of EUT

13.4.1. Setup the EUT and simulator as shown as Section 13.1.

13.4.2. Turn on the power of all equipment.

13.4.3. Let the EUT work in (Charging) mode measure it.

### 13.5. Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines 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 30MHz is checked.

### 13.6.Power Line Conducted Emission Measurement Results

#### PASS.

The frequency range from 150kHz to 30MHz is checked.

Date of Test:	<u>November 22, 2011</u>	Temperature:	<u>25°C</u>
EUT:	<u>Bluetooth Laser Mouse</u>	Humidity:	<u>50%</u>
Model No.:	<u>DS-2398</u>	Power Supply:	<u>AC 120V/ 60Hz</u>
Test Mode:	<u>Charging</u>	Test Engineer:	<u>Kai</u>

Frequency (MHz)	Result (dBμV)	Limit (dBμV)	Margin (dB)	Detector	Line
0.340018	36.80	59	22.2	QP	Neutral
0.406930	36.40	58	21.6	QP	
12.755974	48.30	60	11.7	QP	
11.730206	38.50	50	11.5	AV	
12.207951	44.70	50	5.3	AV	
13.222605	39.00	50	11.0	AV	
0.337314	36.80	59	22.2	QP	Live
0.406930	36.20	58	21.8	QP	
12.806998	43.60	60	16.4	QP	
12.404453	43.40	50	6.6	AV	
12.806998	38.00	50	12.0	AV	
13.013142	42.30	50	7.7	AV	

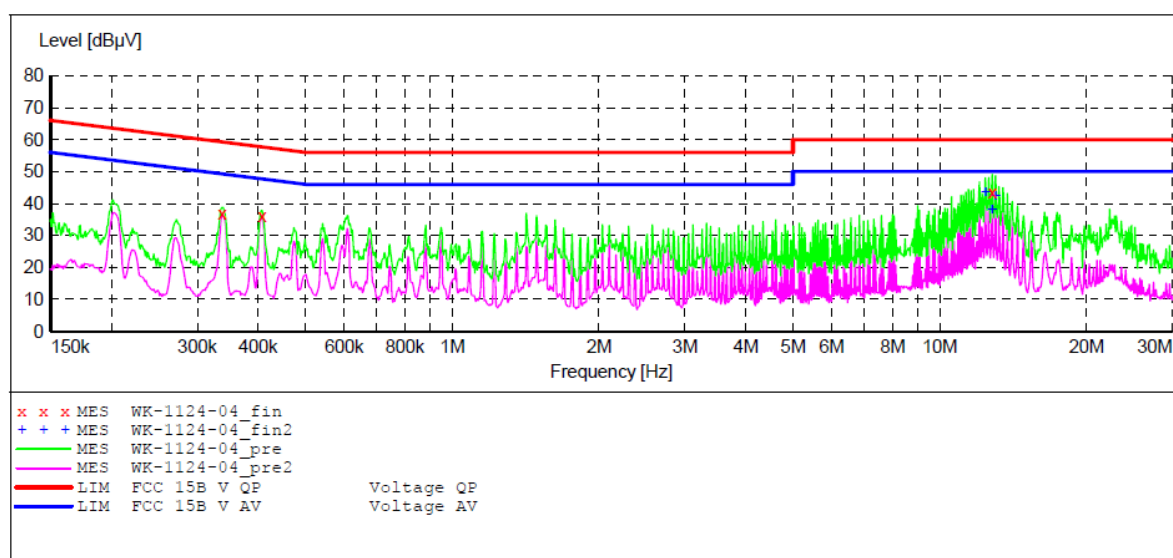
Emissions attenuated more than 20 dB below the permissible value are not reported.  
The spectral diagrams are attached as below.

**ACCURATE TECHNOLOGY CO., LTD****CONDUCTED EMISSION STANDARD FCC PART 15B**

EUT: Bluetooth Laser Mouse M/N:DS-2398  
 Manufacturer: Eastern Times  
 Operating Condition: Charging  
 Test Site: 1#Shielding Room  
 Operator: Kai  
 Test Specification: L 120V/60Hz  
 Comment: Mains port  
 Report No.: ATE20112435

**SCAN TABLE: "V 150K-30MHz fin"**

Short Description: SUB STD VTERM2 1.70  
 Start Stop Step Detector Meas. IF Transducer  
 Frequency Frequency Width Time Bandw.  
 150.0 kHz 30.0 MHz 0.8 % QuasiPeak 1.0 s 9 kHz NSLK8126 2008  
 Average

**MEASUREMENT RESULT: "WK-1124-04\_fin"**

11/24/2011 10:05AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.337314	36.80	11.7	59	22.2	QP	L1	GND
0.406930	36.20	11.8	58	21.8	QP	L1	GND
12.806998	43.60	11.2	60	16.4	QP	L1	GND

**MEASUREMENT RESULT: "WK-1124-04\_fin2"**

11/24/2011 10:05AM

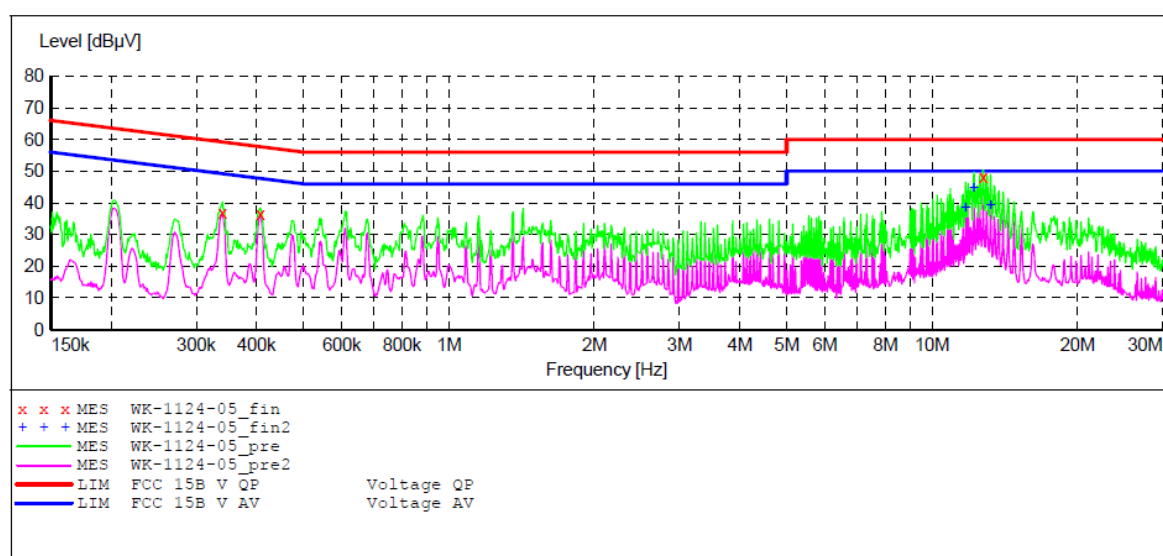
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
12.404453	43.40	11.2	50	6.6	AV	L1	GND
12.806998	38.00	11.2	50	12.0	AV	L1	GND
13.013142	42.30	11.2	50	7.7	AV	L1	GND

**ACCURATE TECHNOLOGY CO.,LTD****CONDUCTED EMISSION STANDARD FCC PART 15B**

EUT: Bluetooth Laser Mouse M/N:DS-2398  
 Manufacturer: Eastern Times  
 Operating Condition: Charging  
 Test Site: 1#Shielding Room  
 Operator: Kai  
 Test Specification: N 120V/60Hz  
 Comment: Mains port  
 Report No.:ATE20112435

**SCAN TABLE: "V 150K-30MHz fin"**

Short Description: SUB STD VTERM2 1.70  
 Start Stop Step Detector Meas. IF Transducer  
 Frequency Frequency Width Time Bandw.  
 150.0 kHz 30.0 MHz 0.8 % QuasiPeak 1.0 s 9 kHz NSLK8126 2008  
 Average

**MEASUREMENT RESULT: "WK-1124-05\_fin"**

11/24/2011 10:07AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.340018	36.80	11.7	59	22.2	QP	N	GND
0.406930	36.40	11.8	58	21.6	QP	N	GND
12.755974	48.30	11.2	60	11.7	QP	N	GND

**MEASUREMENT RESULT: "WK-1124-05\_fin2"**

11/24/2011 10:07AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
11.730206	38.50	11.2	50	11.5	AV	N	GND
12.207951	44.70	11.2	50	5.3	AV	N	GND
13.222605	39.00	11.2	50	11.0	AV	N	GND

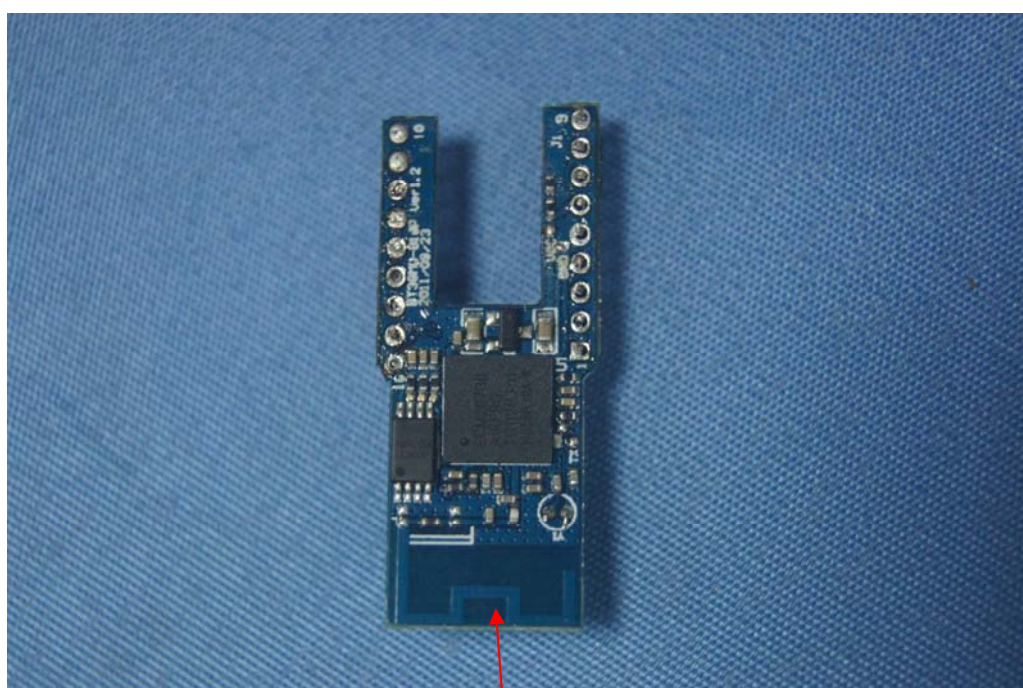
## 14.ANTENNA REQUIREMENT

### 14.1.The Requirement

According to Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

### 14.2.Antenna Construction

Antenna is formed by a copper trace on the PCB. Therefore, the equipment complies with the antenna requirement of Section 15.203.



Antenna