# FCC CERTIFICATION On Behalf of COMAT ELECTRONIC (SHENZHEN) CO., LTD

2.4G Wireless Mouse Model No.: CM9090G FCC ID: RTX-CM9090G

Prepared for : COMAT ELECTRONIC (SHENZHEN) CO., LTD

Address : NO.2 Lane 1, Xin`an 3rd 28 District Baoan Prepared by : ACCURATE TECHNOLOGY CO. LTD

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Report Number : ATE20121916

Date of Test : Aug. 17-Aug. 23, 2012

Date of Report : Aug. 23, 2012

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APPENDIX I (TEST CURVES)

7.1.

7.2.

# **Test Report Certification**

Applicant : COMAT ELECTRONIC (SHENZHEN) CO., LTD

Manufacturer : COMAT ELECTRONIC (SHENZHEN) CO., LTD

EUT Description : 2.4G Wireless Mouse

(A) MODEL NO.: CM9090G(B) Trade Name.: COMAT

(C) POWER SUPPLY: 3V DC ("AAA" batteries  $2\times$ )

Measurement Procedure Used:

#### FCC Rules and Regulations Part 15 Subpart C Section 15.249 ANSI C63.4: 2009

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 Section15.249 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:	Aug. 17-Aug. 23, 2012	
Prepared by :	Terry. Young	
	(Engineer)	
Approved & Authorized Signer :	Searle	
	(Manager)	

#### 1. GENERAL INFORMATION

#### 1.1.Description of Device (EUT)

EUT : 2.4G Wireless Mouse

Model Number : CM9090G

Power Supply : 3V DC ("AAA" batteries  $2 \times$ )

Operate Frequency : 2402-2479MHz

Applicant : COMAT ELECTRONIC (SHENZHEN) CO., LTD

Address : No.2 Lane 1, Xin'an 3rd 28 District Baoan

Manufacturer : COMAT ELECTRONIC (SHENZHEN) CO., LTD

Address : No.2 Lane 1, Xin'an 3rd 28 District Baoan

Date of sample received: Aug. 17, 2012

Date of Test : Aug.17-Aug. 23, 2012

# 1.2.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

# 1.3. 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	Туре	S/N	Calibrated date	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 7, 2012	Jan. 7, 2013
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 7, 2012	Jan. 7, 2013
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 7, 2012	Jan. 7, 2013
Pre-Amplifier	Rohde&Schwarz	CBLU118354 0-01	3791	Jan. 7, 2012	Jan. 7, 2013
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 7, 2012	Jan. 7, 2013
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 7, 2012	Jan. 7, 2013
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 7, 2012	Jan. 7, 2013
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 7, 2012	Jan. 7, 2013
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 7, 2012	Jan. 7, 2013
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 7, 2012	Jan. 7, 2013

# 3. SUMMARY OF TEST RESULTS

FCC Rules	<b>Description of Test</b>	Result
Section 15.207	Conducted Emission	N/A
Section 15.249(a)	Fundamental and Harmonics Radiated Emission	Compliant
Section 15.249(d)	Spurious Radiated Emission	Compliant
Section 15.249(d)	Band Edge	Compliant
Section 15.203	Antenna Requirement	Compliant

Remark: "N/A" means "Not applicable".

# 4. FUNDAMENTAL AND HARMONICS RADIATED EMISSION FOR SECTION 15.249(A)

# 4.1.Block Diagram of Test Setup

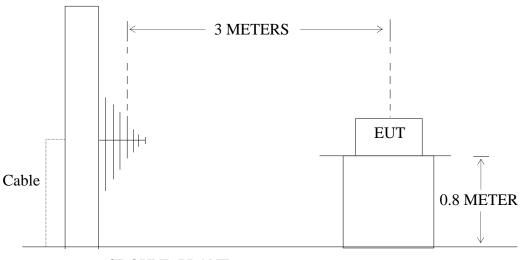
4.1.1.Block diagram of connection between the EUT and simulators

EUT

(EUT: 2.4G Wireless Mouse)

4.1.2.Semi-Anechoic Chamber Test Setup Diagram

#### ANTENNA ELEVATION VARIES FROM 1 TO 4 METERS



**GROUND PLANE** 

(EUT: 2.4G Wireless Mouse)

#### 4.2. The Emission Limit

4.2.1.For intentional radiators, According to section 15.249(a), Operation within the frequency band of 2.4 to 2.4835GHz, The fundamental field strength shall not exceed 94 dB $\mu$ V/m and the harmonics shall not exceed 54 dB $\mu$ V/m.

Fundamental	Field Strength of Fundamental	Field Strength of harmonics
Frequency	(millivolts/meter)	(microvolts/meter)
902-928MHz	50	500
2400-2483.5MHz	50	500
5725-5875MHz	50	500
24.0-24.25GHz	250	2500

4.2.2.According to section 15.249(e), as shown in section 15.35(b), the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

# 4.3. 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.

4.3.1. 2.4G Wireless Mouse (EUT)

Model Number : CM9090G

Serial Number : N/A

Manufacturer : COMAT ELECTRONIC (SHENZHEN) 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 modes measure it.. We are select 2402 MHz, 2439MHz and 2479MHz TX frequency to transmit.

#### 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. 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: 2009 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

The bandwidth of test receiver is set at 1000 kHz.

# 4.6. The Field Strength of Radiation Emission Measurement Results **PASS.**

Date of Test: Aug 22-23, 2012

EUT: 2.4G Wireless Mouse

Model No.: CM9090G

Temperature: 25°C

Humidity: 50%

Power Supply: 3V DC ("AAA" batteries 2×)

Test Mode: TX 2402MHz Test Engineer: LGWADE

#### **Fundamental Radiated Emissions**

Frequency	Reading(c	dBμV/m)	Factor(dB)	Result(c	lBμV/m)	Limit(dF	BμV/m)	Margi	in(dB)	Polarization
(MHz)	AV	PEAK	Corr.	AV	PEAK	AV	PEAK	AV	PEAK	
2402.000	95.87	99.77	-7.59	88.28	92.18	94	114	-5.72	-24.82	Vertical
2402.000	100.25	103.37	-7.59	92.80	95.78	94	114	-1.20	-18.22	Horizontal

#### **Harmonics and spurious Radiated Emissions**

Frequency	Reading(c	dBμV/m)	Factor(dB)	Result(c	lBμV/m)	Limit(dl	BμV/m)	Margi	in(dB)	Polarization
(MHz)	AV	PEAK	Corr.	AV	PEAK	AV	PEAK	AV	PEAK	
4804.000	47.95	52.11	-0.71	47.24	51.40	54	74	-6.76	-22.60	Vertical
4804.000	49.03	52.22	-0.71	48.32	51.51	54	74	-5.68	-22.49	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

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

Date of Test:Aug 22-23, 2012Temperature:25°CEUT:2.4G Wireless MouseHumidity:50%Model No.:CM9090GPower Supply:3V DC ("AAA" batteries 2×)Test Mode:TX 2439MHzTest Engineer:LGWADE

#### **Fundamental Radiated Emissions**

Frequency	Reading(c	dBμV/m)	Factor(dB)	Result(c	lBμV/m)	Limit(dF	BμV/m)	Margi	in(dB)	Polarization
(MHz)	AV	PEAK	Corr.	AV	PEAK	AV	PEAK	AV	PEAK	
2439.00	99.67	102.84	-7.42	92.25	95.42	94	114	-1.75	-18.58	Horizon
2439.00	95.78	98.94	-7.42	88.36	91.52	94	114	-5.645	-22.48	Vertical

#### **Harmonics and Spurious Radiated Emissions**

Frequency	Reading(c	dBμV/m)	Factor(dB)	Result(c	lBμV/m)	Limit(dI	BμV/m)	Margi	n(dB)	Polarization
(MHz)	AV	PEAK	Corr.	AV	PEAK	AV	PEAK	AV	PEAK	
4878.000	45.37	48.38	-0.23	45.14	48.15	54	74	-8.86	-20.10	Vertical
4878.000	52.97	55.91	-0.23	52.74	55.68	54	74	-1.26	-18.32	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:

 $Result = Reading + Corrected \ Factor$ 

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

Date of Test: Aug 22-23, 2012

EUT: 2.4G Wireless Mouse

Model No.: CM9090G

Temperature: 25°C

Humidity: 50%

Power Supply: 3V DC ("AAA" batteries 2×)

Test Mode: TX 2479MHz Test Engineer: LGWADE

#### **Fundamental Radiated Emissions**

Frequency	Reading(c	dBμV/m)	Factor(dB)	Result(c	lBμV/m)	Limit(dF	BμV/m)	Margi	n(dB)	Polarization
(MHz)	AV	PEAK	Corr.	AV	PEAK	AV	PEAK	AV	PEAK	
2479.000	99.35	102.30	-7.33	92.02	94.80	94	114	-5.55	-22.07	Horizon
2479.000	95.78	99.26	-7.33	46.26	78.25	94	114	-47.74	-35.75	Vertical

#### **Harmonics and Spurious Radiated Emissions**

Frequency	Reading(c	dBμV/m)	Factor(dB)	Result(c	lBμV/m)	Limit(dI	BμV/m)	Margi	n(dB)	Polarization
(MHz)	AV	PEAK	Corr.	AV	PEAK	AV	PEAK	AV	PEAK	
4958.00	47.70	50.93	0.24	47.94	51.17	54	74	-5.55	-22.07	Vertical
4958.00	51.08	54.92	0.24	51.32	54.92	54	74	-2.68	-29.48	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

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

# 5. SPURIOUS RADIATED EMISSION FOR SECTION 15.249(D)

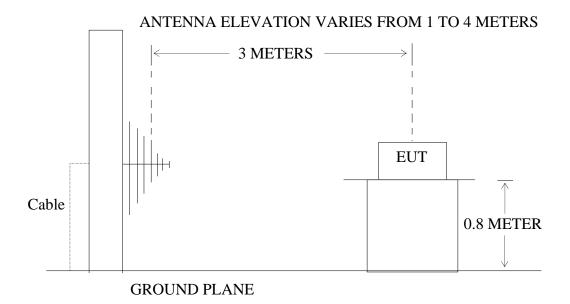
# 5.1.Block Diagram of Test Setup

5.1.1.Block diagram of connection between the EUT and simulators

EUT

(EUT: 2.4G Wireless Mouse)

5.1.2.Semi-Anechoic Chamber Test Setup Diagram



(EUT: 2.4G Wireless Mouse)

#### 5.2. The Emission Limit For Section 15.249(d)

5.2.1.Emission radiated outside of the specified frequency bands, except for harmonics, shall be comply with the general radiated emission limits in Section 15.209.

Radiation Emission Measurement Limits According to Section 15.209

<del></del>				
		Limit		
Frequency (MHz)	Field Strength of Quasi-peak Value (microvolts/m)	Field Strength of Quasi-peak Value (dBµV/m)	The final measurement in band 9-90kHz, 110-490kHz and above 1000MHz is	
30 - 88	100	40	performed with Average detector.	
88 - 216	150	43.5	Except those frequency bands mention above, the	
216 - 960	200	46	final measurement for frequencies below	
Above 960	500	54	1000MHz is performed with Quasi Peak detector.	

#### 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. 2.4G Wireless Mouse (EUT)

Model Number : CM9090G

Serial Number : N/A

Manufacturer : COMAT ELECTRONIC (SHENZHEN) 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 modes measure it. The transmit frequency are 2402-2479MHz. We are select 2402MHz, 2439MHz, and 2479MHz TX frequency to transmit.

#### 5.5.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 C63.4: 2009 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

The bandwidth of test receiver is set at 100 kHz in 30-1000MHz. and set at 1MHz in above 1000MHz.

The frequency range from 30MHz to 25000MHz is checked.

The final measurement in band 9-90 kHz, 110-490 kHz 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.

#### 5.6. The Emission Measurement Result

#### PASS.

Date of Test:	Aug 17, 2012	Temperature:	25°C
EUT:	2.4G Wireless Mouse	Humidity:	50%
Model No.:	CM9090G	Power Supply:	3V DC ("AAA" batteries $2\times$ )
Test Mode:	TX 2402MHz	Test Engineer:	LGWADE

Frequency	Reading	Factor(dB)	Result	Limit	Margin	Polarization
(MHz)	(dBµV/m)	Corr.	(dBµV/m)	(dBµV/m)	(dB)	
	QP		QP	QP	QP	
103.3353	14.29	13.94	28.23	43.50	-15.27	Vertical
358.4497	10.59	21.20	31.79	46.00	-14.21	Vertical
103.3353	11.79	13.94	25.73	43.50	-17.77	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:

 $Result = Reading + Corrected \ Factor$ 

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

Date of Test:Aug 17, 2012Temperature:25°CEUT:2.4G Wireless MouseHumidity:50%Model No.:CM9090GPower Supply:3V DC ("AAA" batteries 2×)Test Mode:TX 2439MHzTest Engineer:LGWADE

Frequency	Reading	Factor(dB)	Result	Limit	Margin	Polarization
(MHz)	(dBµV/m)	Corr.	(dBµV/m)	(dBµV/m)	(dB)	
	QP		QP	QP	QP	
103.3353	11.32	13.94	25.26	43.50	-18.24	Vertical
358.4497	9.36	21.20	30.56	46.00	-15.44	Vertical
103.3353	12.96	13.94	26.90	43.50	-16.60	Horizontal
358.4497	10.68	21.20	31.88	46.00	-14.12	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

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

Date of Test:Aug 17, 2012Temperature:25°CEUT:2.4G Wireless MouseHumidity:50%Model No.:CM9090GPower Supply:3V DC ("AAA" batteries 2×)Test Mode:TX 2479MHzTest Engineer:LGWADE

Frequency	Reading	Factor(dB)	Result	Limit	Margin	Polarization
(MHz)	(dBµV/m)	Corr.	(dBµV/m)	(dBµV/m)	(dB)	
	QP		QP	QP	QP	
103.3353	13.06	13.94	27.00	43.50	-16.50	Vertical
358.4497	10.28	21.20	31.48	46.00	-14.52	Vertical
103.3353	13.40	13.94	27.34	43.50	-16.16	Horizontal
358.4497	11.34	21.20	32.54	46.00	-13.46	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

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

#### 6. BAND EDGES

#### 6.1.The Requirement

6.1.1.Band Edge from 2400MHz to 2483.5MHz. Emission radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

# 6.2.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.

6.2.1. 2.4G Wireless Mouse (EUT)

Model Number : CM9090G

Serial Number : N/A

Manufacturer : COMAT ELECTRONIC (SHENZHEN) CO.,LTD

# 6.3. Operating Condition of EUT

- 6.3.1. Setup the EUT and simulator as shown as Section 4.1.
- 6.3.2. Turn on the power of all equipment.
- 6.3.3. Let the EUT work in TX modes measure it. The transmit frequency are 2402-2479MHz. We are select 2402MHz and 2479MHz TX frequency to transmit.

#### 6.4. Test Procedure

- 1. The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.
- 2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.
- 3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
- 4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

#### 6.5. The Measurement Result

#### Pass.

Date of Test:Aug 22, 2012Temperature:25°CEUT:2.4G Wireless MouseHumidity:50%Model No.:CM9090GPower Supply:3V DC ("AAA" batteries 2×)Test Mode:TX 2402MHzTest Engineer:LGWADE

Frequency	Reading(	dBμV/m)	Factor(dB)	Result(c	lBμV/m)	Limit(dI	BμV/m)	Margi	n(dB)	Polarization
(MHz)	AV	PEAK	Corr.	AV	PEAK	AV	PEAK	AV	PEAK	
2400.000	55.44	59.40	-7.46	47.98	51.94	54	74	-6.02	-22.06	Vertical
2400.000	60.02	64.05	-7.46	52.56	56.59	54	74	-1.44	-17.41	Horizontal
2390.179	45.55	48.83	-7.53	38.02	41.30	54	74	-15.98	-32.70	Vertical
2390.068	47.58	52.29	-7.53	40.32	44.76	54	74	-13.68	-29.24	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

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

3. The spectral diagrams in appendix I display the measurement of QP (up to 1G) and peak (above 1G) values.

Date of Test:	Aug 22, 2012	Temperature:	25°C
EUT:	2.4G Wireless Mouse	Humidity:	50%
Model No.:	CM9090G	Power Supply:	3V DC ("AAA" batteries 2×)
Test Mode:	TX 2479MHz	Test Engineer:	LGWADE

Frequency	Reading(	dBμV/m)	Factor(dB)	Result(c	lBμV/m)	Limit(dI	BμV/m)	Margi	n(dB)	Polarization
(MHz)	AV	PEAK	Corr.	AV	PEAK	AV	PEAK	AV	PEAK	
2483.500	42.83	46.00	-7.37	35.46	38.63	54	74	-18.54	-35.37	Vertical
2483.500	45.49	47.80	-7.37	38.12	40.43	54	74	-15.88	-33.57	Horizontal
2491.127	46.03	49.30	-7.38	38.65	41.92	54	74	-15.35	-32.08	Vertical
2491.167	48.72	51.54	-7.38	41.34	44.16	54	74	-12.66	-29.84	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

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

3. The spectral diagrams in appendix I display the measurement of QP (up to 1G) and peak (above 1G) values.

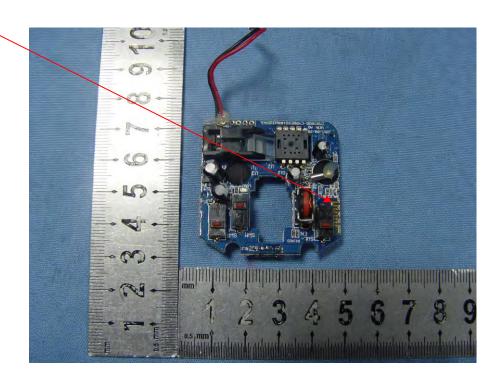
# 7. ANTENNA REQUIREMENT

# 7.1.The Requirement

7.1.1.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.

# 7.2. Antenna Construction

#### Antenna



# APPENDIX I (Test Curves)



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.: li #1

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 % EUT: 2.4G WIRELESS MOUSE

EUT: 2.4G WIRELESS MOUSE Mode: TRANSMITTING(2402MHz)

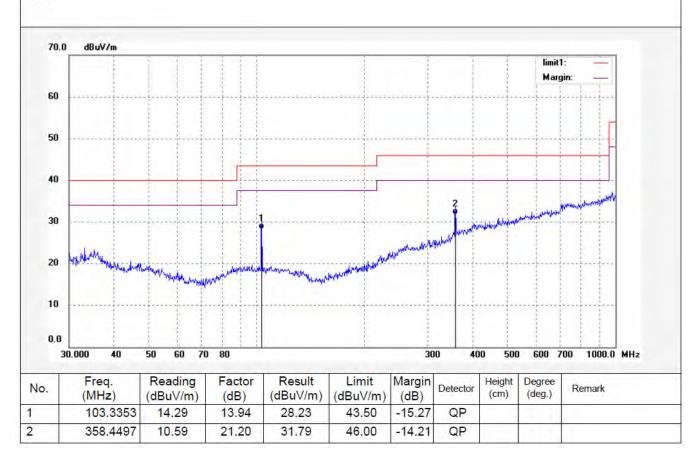
Model: CM9090G

Manufacturer: COMAT ELECTRONIC (SHENZHEN) CO.,LTD

Note:

Polarization: Vertical Power Source: DC 3V Date: 2012/08/17

Time: 14:57:56
Engineer Signature: LGWADE





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

Polarization:

Date: 2012/08/17

Time: 15:00:21

Distance: 3m

Power Source: DC 3V

Engineer Signature: LGWADE

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

Horizontal

Job No.: li #2

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

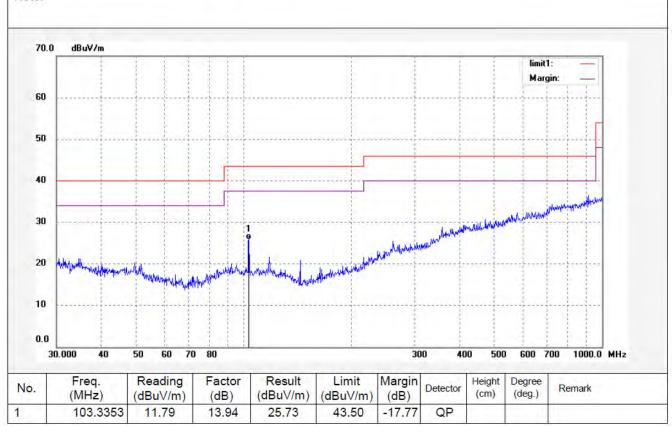
EUT: 2.4G WIRELESS MOUSE

Mode: TRANSMITTING(2402MHz)

Model: CM9090G

Manufacturer: COMAT ELECTRONIC (SHENZHEN) CO.,LTD

Note:





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.: li #3

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 % EUT: 2.4G WIRELESS MOUSE

Mode: TRANSMITTING(2402MHz)

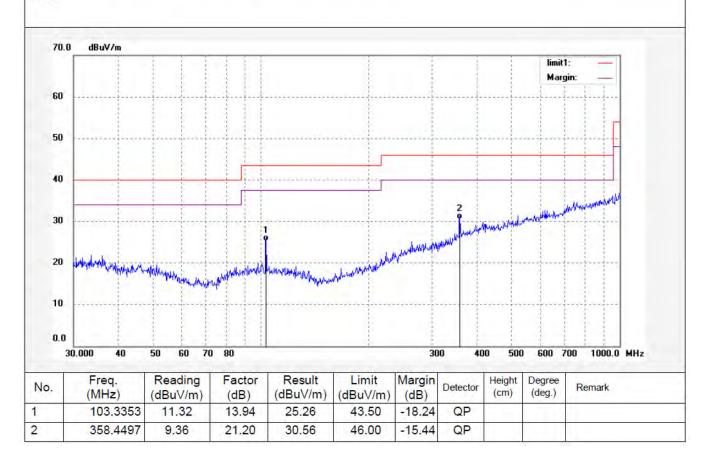
Model: CM9090G

Manufacturer: COMAT ELECTRONIC (SHENZHEN) CO.,LTD

Note:

Polarization: Vertical Power Source: DC 3V Date: 2012/08/17 Time: 15:03:01

Engineer Signature: LGWADE





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

Horizontal

Job No.: li #4

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 % EUT: 2.4G WIRELESS MOUSE Mode: TRANSMITTING(2439MHz)

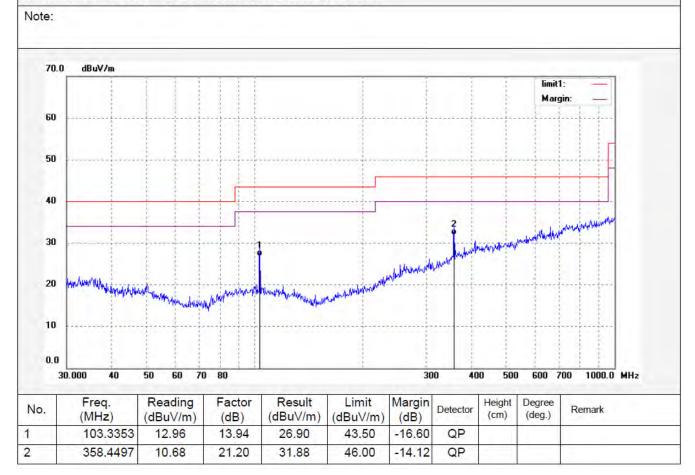
Manufacturer: COMAT ELECTRONIC (SHENZHEN) CO.,LTD

Model: CM9090G

Power Source: DC 3V Date: 2012/08/17 Time: 15:05:33 Engineer Signature: LGWADE

Distance: 3m

Polarization:





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.: li #5

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: 2.4G WIRELESS MOUSE Mode: TRANSMITTING(2479MHz)

Model: CM9090G

Manufacturer: COMAT ELECTRONIC (SHENZHEN) CO.,LTD

Note:

Polarization: Vertical Power Source: DC 3V Date: 2012/08/17 Time: 15:07:40

Engineer Signature: LGWADE

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	(1711 12)	(									



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.: li #6

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: 2.4G WIRELESS MOUSE Mode: TRANSMITTING(2479MHz)

Model: CM9090G

Manufacturer: COMAT ELECTRONIC (SHENZHEN) CO.,LTD

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Note:

Polarization: Horizontal Power Source: DC 3V Date: 2012/08/17 Time: 15:09:41

Engineer Signature: LGWADE

Distance: 3m

dBuV/m 70.0 limit1: Margin: 60 50 40 30 20 10

No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	(dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark	
1	103.3353	13.40	13.94	27.34	43.50	-16.16	QP				-
2	358.4497	11.34	21.20	32.54	46.00	-13.46	QP		7 4		

600 700

1000.0 MHz



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.: li #13

Standard: FCC 15C PK

Test item: Radiation Test
Temp.( C)/Hum.(%) 24 C / 48 %

EUT: 2.4G WIRELESS MOUSE Mode: TRANSMITTING(2402MHz)

Model: CM9090G

Manufacturer: COMAT ELECTRONIC (SHENZHEN) CO.,LTD

Note:

Polarization: Horizontal Power Source: DC 3V

Date: 12/08/22/ Time: 8/28/11

Engineer Signature: LGWADE

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18 8 -2.0	000.000 Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	3000 Result (dBuV/m)	5000 Limit (dBuV/m)	Margin (dB)	7000 8000 Detector	Height		
18 8 -2.0	Freq. (MHz) 2402.000	Reading (dBuV/m) 103.37	Factor (dB) -7.59	3000 Result (dBuV/m) 95.78	5000 Limit (dBuV/m) 114.00	Margin (dB)	7000 8000 Detector	Height		



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.: li #14 Standard: FCC 15C PK

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 %
EUT: 2.4G WIRELESS MOUSE
Mode: TRANSMITTING(2402MHz)

Model: CM9090G

Note:

Manufacturer: COMAT ELECTRONIC (SHENZHEN) CO.,LTD

Polarization: Vertical Power Source: DC 3V

Date: 12/08/22/ Time: 8/47/23

Engineer Signature: LGWADE

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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	99.77	-7.59	92.18	114.00	-24.82	peak	-		1 1 1 1 1	
2	2402.000	95.87	-7.59	88.28	94.00	-5.72	AVG		11 11		
3	4804.000	52.11	-0.71	51.40	74.00	-22.60	peak		11 - 11	12 -	10.0
4	4804.000	47.95	-0.71	47.24	54.00	-6.76	AVG		JF . 11		



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.: li #15

Standard: FCC 15C PK

Test item: Radiation Test

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

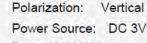
EUT: 2.4G WIRELESS MOUSE

Mode: TRANSMITTING(2439MHz)

Model: CM9090G

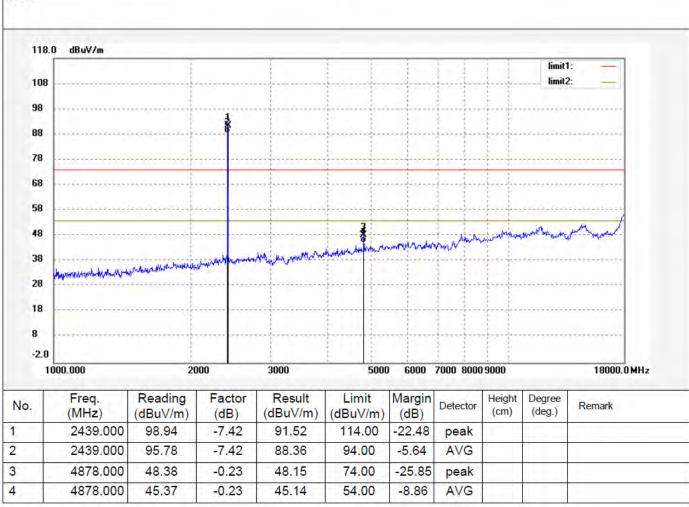
Manufacturer: COMAT ELECTRONIC (SHENZHEN) CO.,LTD

Note:



Date: 12/08/22/ Time: 8/53/44

Engineer Signature: LGWADE





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.: li #16

Standard: FCC 15C PK

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 %
EUT: 2.4G WIRELESS MOUSE
Mode: TRANSMITTING(2439MHz)

Model: CM9090G

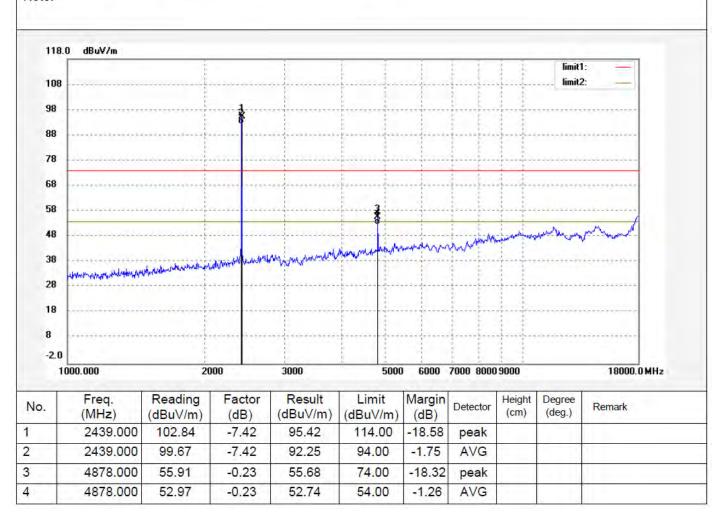
Manufacturer: COMAT ELECTRONIC (SHENZHEN) CO.,LTD

Note:

Polarization: Horizontal Power Source: DC 3V

Date: 12/08/22/ Time: 8/56/57

Engineer Signature: LGWADE





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.: li #17

Standard: FCC 15C PK

Test item: Radiation Test

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

EUT: 2.4G WIRELESS MOUSE

Mode: TRANSMITTING(2479MHz)

Model: CM9090G

Manufacturer: COMAT ELECTRONIC (SHENZHEN) CO.,LTD

Note:

Polarization: Horizontal Power Source: DC 3V

Date: 12/08/22/ Time: 8/59/32

Engineer Signature: LGWADE

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28 18 8 -2.0 1	000.000 Freq.	20 Reading	noo Factor	3000 Result	5000	0 6000 Margin	7000 8000	9000 Height	Degree	
28 18 8 -2.0 1	000.000 Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	3000 Result (dBuV/m)	5000 Limit (dBuV/m)	Margin (dB)	7000 8000 Detector	9000 Height	Degree	
28 18 8 -2.0	000.000 Freq. (MHz) 2479.000	Reading (dBuV/m) 102.13	Factor (dB) -7.33	3000 Result (dBuV/m) 94.80	5000 Limit (dBuV/m) 114.00	Margin (dB)	7000 8000 Detector peak	9000 Height	Degree	



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.: li #18

Standard: FCC 15C PK

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 % EUT: 2.4G WIRELESS MOUSE

Mode: TRANSMITTING(2479MHz)

Model: CM9090G

Manufacturer: COMAT ELECTRONIC (SHENZHEN) CO.,LTD

Note:

Polarization: Vertical Power Source: DC 3V

Date: 12/08/22/ Time: 9/04/39

Engineer Signature: LGWADE

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28 18 8.0	Freq. (MHz) 2479.000	Reading (dBuV/m) 99.26	Factor (dB) -7.33	3000 Result (dBuV/m) 91.93	Limit (dBuV/m) 114.0	Margin (dB) -22.07	7000 8000  Detector  peak	9000 Height	Degree	



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.: li#23

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 25 C / 50 % EUT; 2.4G Wireless Optical Mouse

Mode: TRANSMITTING(2402MHz)

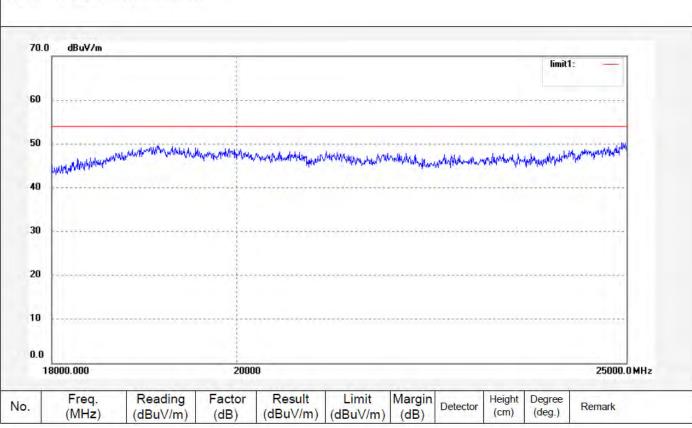
Model: CM9090G

Manufacturer: COMAT ELECTRONIC (SHENZHEN) CO.,LTD

Note: Report No.:ATE20121916

Polarization: Horizontal Power Source: DC3V Date: 2012/8/23

Time: 20:40:21
Engineer Signature: LGWADE





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.: li #24

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 25 C / 50 %

EUT: 2.4G Wireless Optical Mouse Mode: TRANSMITTING(2402MHz)

Model: CM9090G

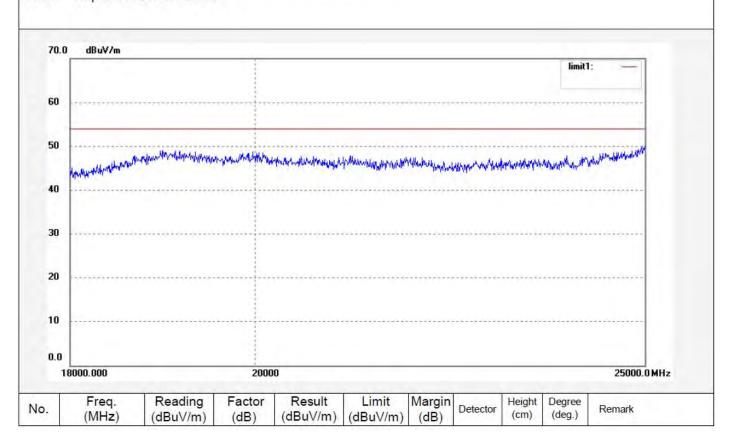
Manufacturer: COMAT ELECTRONIC (SHENZHEN) CO.,LTD

Note: Report No.:ATE20121916

Polarization: Vertical Power Source: DC3V Date: 2012/8/23

Date: 2012/8/23 Time: 20:42:32

Engineer Signature: LGWADE





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.: li #25

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 25 C / 50 %

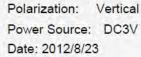
EUT: 2.4G Wireless Optical Mouse TRANSMITTING(2439MHz)

Mode:

Model: CM9090G

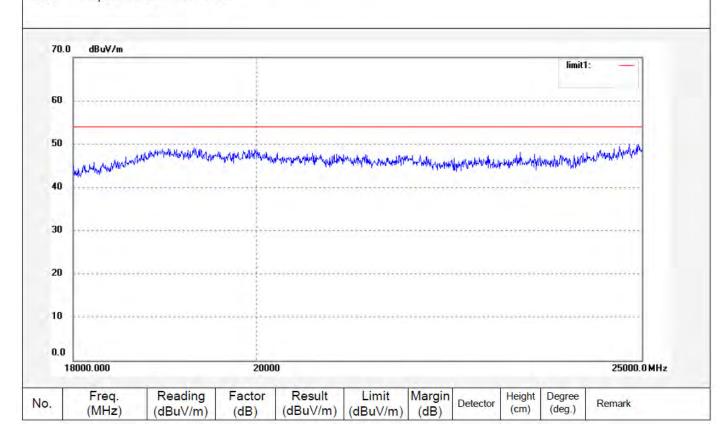
Manufacturer: COMAT ELECTRONIC (SHENZHEN) CO.,LTD

Note: Report No.:ATE20121916



Time: 20:45:17

Engineer Signature: LGWADE





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.: li #26

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

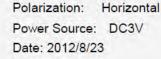
Temp.( C)/Hum.(%) 25 C / 50 % EUT: 2.4G Wireless Optical Mouse

Mode: TRANSMITTING(2439MHz)

Model: CM9090G

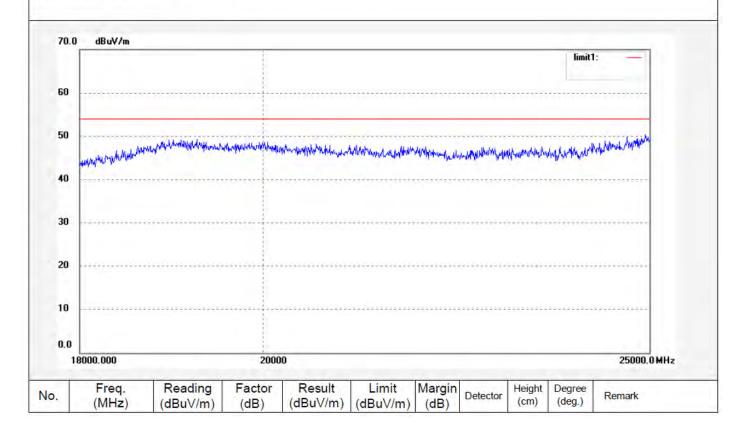
Manufacturer: COMAT ELECTRONIC (SHENZHEN) CO.,LTD

Note: Report No.:ATE20121916



Time: 20:49:26

Engineer Signature: LGWADE





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.: li #27

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 25 C / 50 % EUT: 2.4G Wireless Optical Mouse

Mode: TRANSMITTING(2479MHz)

Model: CM9090G

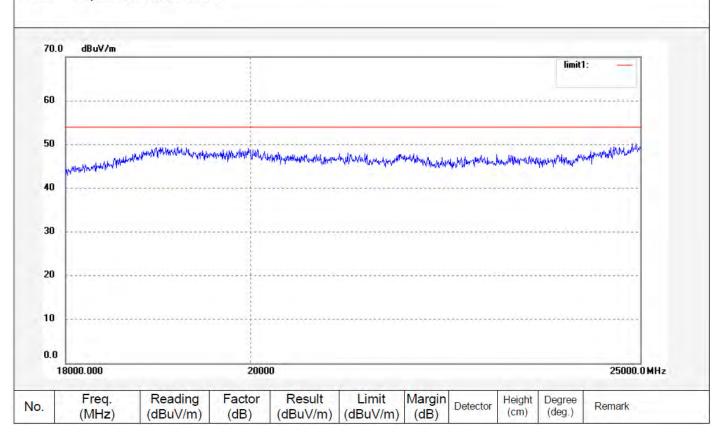
Manufacturer: COMAT ELECTRONIC (SHENZHEN) CO.,LTD

Note: Report No.:ATE20121916

Polarization: Horizontal Power Source: DC3V

Date: 2012/8/23 Time: 20:52:36

Engineer Signature: LGWADE





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.: li #28

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.( C)/Hum.(%) 25 C / 50 % EUT: 2.4G Wireless Optical Mouse

Mode: TRANSMITTING(2479MHz)

Model: CM9090G

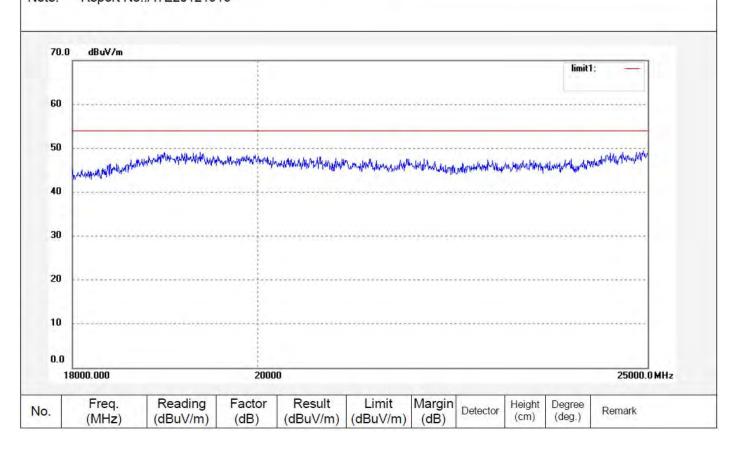
Manufacturer: COMAT ELECTRONIC (SHENZHEN) CO.,LTD

Note: Report No.:ATE20121916

Polarization: Vertical Power Source: DC3V

Date: 2012/8/23 Time: 20:58:26

Engineer Signature: LGWADE





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.: li #21

Standard: FCC 15C PK

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 % EUT: 2.4G WIRELESS MOUSE

Mode: TRANSMITTING(2402MHz)

Model: CM9090G

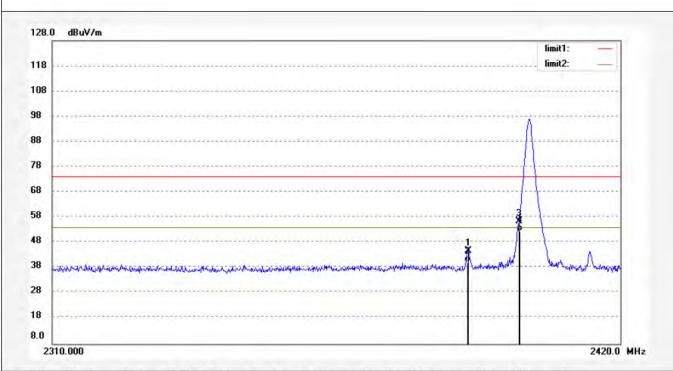
Manufacturer: COMAT ELECTRONIC (SHENZHEN) CO.,LTD

Note:

Polarization: Horizontal Power Source: DC 3V

Date: 12/08/22/ Time: 9/13/34

Engineer Signature: LGWADE



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark	
1	2390.068	52.29	-7.53	44.76	74.00	-29.24	peak	- 1			
2	2390.068	47.85	-7.53	40.32	54.00	-13.68	AVG				
3	2400.000	64.05	-7.46	56.59	74.00	-17.41	peak				
4	2400.000	60.02	-7.46	52.56	54.00	-1.44	AVG				



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.: li #22

Standard: FCC 15C PK

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 % EUT: 2.4G WIRELESS MOUSE Mode: TRANSMITTING(2402MHz)

Model:

Manufacturer: COMAT ELECTRONIC (SHENZHEN) CO.,LTD

CM9090G

Note:

Polarization: Vertical Power Source: DC 3V

Date: 12/08/22/ Time: 9/17/19

Engineer Signature: LGWADE

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20	neert miredoor again about	ecropolyporodeophocological	halinenia ini say tara ka	-f-decked hander being decked by	ah water parthagain	paper of the second of the sec	man de la company	inc. andrew. wh	Jus.	Marin America	
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38 28 18 8.0 23	***************************************	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)		MHz
38 28 18 3.0 23	810.000 Freq.	Reading	Factor	Result	Limit	Margin	Detector		Degree	2400.0]	MHz
28 18 8.0	910.000 Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)			Degree	2400.0]	MHz



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.: li #20

Standard: FCC 15C PK

Test item: Radiation Test

Temp.( C)/Hum.(%) 24 C / 48 % EUT: 2.4G WIRELESS MOUSE

Mode: TRANSMITTING(2479MHz)
Model: CM9090G

Manufacturer: COMAT ELECTRONIC (SHENZHEN) CO.,LTD

Note:

Polarization: Horizontal Power Source: DC 3V

Date: 12/08/22/ Time: 9/11/38

Engineer Signature: LGWADE

		limit1:	
118		limit2:	
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88			
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No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	47.80	-7.37	40.43	74.00	-33.57	peak		11.1	11.0
2	2483.500	45.49	-7.37	38.12	54.00	-15.88	AVG			
3	2491.167	51.54	-7.38	44.16	74.00	-29.84	peak			
4	2491.167	48.72	-7.38	41.34	54.00	-12.66	AVG			

#### 2481MHz Transmitting Restricted Band Spurious:



# 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.: li #19

Standard: FCC 15C PK

Test item: Radiation Test

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

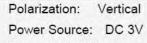
EUT: 2.4G WIRELESS MOUSE

Mode: TRANSMITTING(2479MHz)

Model: CM9090G

Manufacturer: COMAT ELECTRONIC (SHENZHEN) CO.,LTD

Note:



Date: 12/08/22/ Time: 9/09/26

Engineer Signature: LGWADE

		limit1:	-
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No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark	
1	2483.500	46.00	-7.37	38.63	74.00	-35.37	peak				
2	2483.500	42.83	-7.37	35.46	54.00	-18.54	AVG				
3	2491.127	49.30	-7.38	41.92	74.00	-32.08	peak				
4	2491.127	46.03	-7.38	38.65	54.00	-15.35	AVG				