

FCC CERTIFICATION
On Behalf of
Sedo Technology (HK) Limited

RF Wireless Optical Mouse
Model No.: SF-MW205

FCC ID: UUFSFMW205

Prepared for : Sedo Technology (HK) Limited
Address : Rm 1504B, 15/F., Fortress Tower, 250 King's Road, North
Point, Hong Kong

Prepared by : ACCURATE TECHNOLOGY CO. LTD
Address : F1, Bldg. A, Changyuan New Material Port, Keyuan Rd.
Science & Industry Park, Nanshan, Shenzhen, Guangdong
P.R. China

Tel: (0755) 26503290
Fax: (0755) 26503396

Report Number : ATE20062580
Date of Test : December 08, 2006
Date of Report : December 11, 2006

TABLE OF CONTENTS

Description	Page
Test Report Certification	
1. GENERAL INFORMATION	4
1.1. Description of Device (EUT).....	4
1.2. Description of Test Facility	4
1.3. Measurement Uncertainty	4
2. MEASURING DEVICE AND TEST EQUIPMENT	5
3. CONDUCTED EMISSION FOR FCC PART 15 SECTION 15.107(A).....	6
3.1. Block Diagram of Test Setup.....	6
3.2. The Emission Limit For Section 15.107(a)	6
3.3. EUT Configuration on Measurement	7
3.4. Operating Condition of EUT	7
3.5. Test Procedure	7
3.6. Power Line Conducted Emission Measurement Results	8
4. RADIATED EMISSION FOR FCC PART 15 SECTION 15.109(A).....	9
4.1. Block Diagram of Test Setup.....	9
4.2. The Field Strength of Radiation Emission Measurement Limits.....	9
4.3. Configuration of EUT on Measurement	10
4.4. Operating Condition of EUT	10
4.5. Test Procedure	10
4.6. The Field Strength of Radiation Emission Measurement Results	11
5. RADIATED EMISSION FOR FCC PART 15 SECTION 15.227(B).....	12
5.1. Block Diagram of Test Setup.....	12
5.2. The Field Strength of Radiation Emission Measurement Limits.....	12
5.3. Configuration of EUT on Measurement	13
5.4. Operating Condition of EUT	13
5.5. Test Procedure	13
5.6. The Field Strength of Radiation Emission Measurement Results	14
6. FUNDAMENTAL RADIATED EMISSION FOR FCC PART 15 SECTION 15.227(A).....	15
6.1. Block Diagram of Test Setup.....	15
6.2. The Emission Limit For Section 15.227(a)	15
6.3. EUT Configuration on Measurement	16
6.4. Operating Condition of EUT	16
6.5. Test Procedure	16
6.6. The Emission Measurement Result	17
7. BAND EDGES	18
7.1. The Requirement	18
7.2. EUT Configuration on Measurement	18
7.3. Operating Condition of EUT	18
7.4. Test Procedure	18
7.5. The Measurement Result	19
APPENDIX I (TEST CURVES) (7pages)	

Test Report Certification

Applicant : Sedo Technology (HK) Limited
 Manufacturer : Shenzhen Sunflower Technology Co., Ltd.
 EUT Description : RF Wireless Optical Mouse
 (A) MODEL NO.: SF-MW205
 (B) SERIAL NO.: N/A
 (C) POWER SUPPLY: 3.0V DC ("AAA" batteries 2×)

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.227, Section 15.107, Section 15.109: 2006

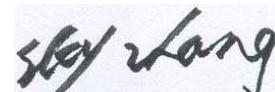
The device described above is tested by ACCURATE TECHNOLOGY CO. LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.227 Section 15.107, Section 15.109 limits. The measurement results are contained in 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 :

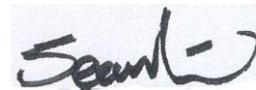
December 08, 2006

Prepared by :



(Engineer)

Reviewer :



(Quality Manager)

Approved & Authorized Signer :



(Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT : RF Wireless Optical Mouse
 Model Number : SF-MW205
 Power Supply : 3.0V DC (“AAA” batteries 2×) ,Can use USB cable to charge
 Applicant : Sedo Technology (HK) Limited
 Address : Rm 1504B, 15/F., Fortress Tower, 250 King's Road, North Point, Hong Kong
 Manufacturer : Shenzhen Sunflower Technology Co., Ltd.
 Address : The 2nd Floor, No.105 Lianda Industry Park, Shanglilang Village, Bulan Road, Buji Town, Longgang District, Shenzhen, Guangdong, P.R. China
 Date of sample received : December 06, 2006
 Date of Test : December 08, 2006

1.2. Description of Test Facility

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

1.3. Measurement Uncertainty

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

2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

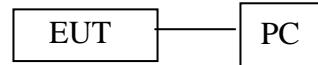
Kind of equipment	Manufacturer	Type	S/N	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	03.31.2007
EMI Test Receiver	Rohde&Schwarz	ESI26	838786/013	01.28.2007
Bilog Antenna	Schwarzbeck	VULB9163	9163-194	03.31.2007
Bilog Antenna	Chase	CBL6112B	2591	01.28.2007
Horn Antenna	Rohde&Schwarz	HF906	100013	01.28.2007
Spectrum Analyzer	Anritsu	MS2651B	6200238856	03.31.2007
Pre-Amplifier	Agilent	8447D	2944A10619	03.31.2007
L.I.S.N.	Rohde&Schwarz	ESH3-Z5	100305	03.31.2007
L.I.S.N.	Rohde&Schwarz	ESH3-Z5	100310	03.31.2007

3. CONDUCTED EMISSION FOR FCC PART 15 SECTION

15.107(A)

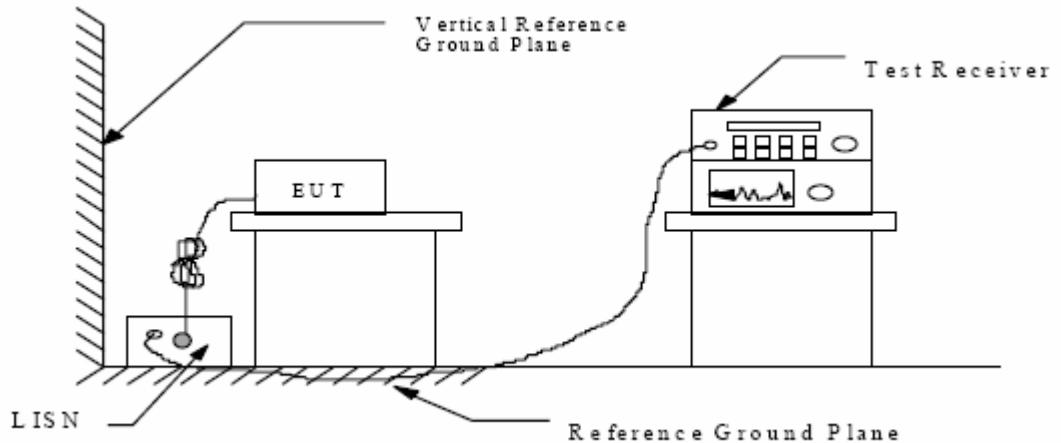
3.1. Block Diagram of Test Setup

3.1.1. Block diagram of connection between the EUT and simulators



(EUT: RF Wireless Optical Mouse)

3.1.2. Shielding Room Test Setup Diagram



(EUT: RF Wireless Optical Mouse)

3.2. The Emission Limit For Section 15.107(a)

3.2.1 Radiation Emission Measurement Limits According to Section 15.107(a)

Frequency (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 - 5	56	46
5 - 30	60	50

* Decreases with the logarithm of the frequency.

3.3.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.

3.3.1. RF Wireless Optical Mouse (EUT)

Model Number	:	SF-MW205
Serial Number	:	N/A
Manufacturer	:	Shenzhen Sunflower Technology Co., Ltd.

3.4.Operating Condition of EUT

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

3.4.2. Turn on the power of all equipment.

3.4.3. Let the EUT work in wired modes (use USB cable connect to PC) measure it.

3.5.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.

All the scanning waveforms are attached in Appendix I.

3.6. Power Line Conducted Emission Measurement Results

PASS.

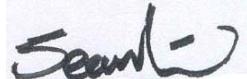
The frequency range from 150kHz to 30MHz is checked.

Date of Test:	<u>December 08, 2006</u>	Temperature:	<u>25°C</u>
EUT:	<u>RF Wireless Optical Mouse</u>	Humidity:	<u>55%</u>
Model No.:	<u>SF-MW205</u>	Power Supply:	<u>DC 5V power by PC usb port</u>
Test Mode:	<u>Connect to PC Charging</u>	Test Engineer:	<u>Andy</u>

Test Line	Frequency MHz	Emission Level(dB μ V)		Limits(dB μ V)		Margin(dB μ V)	
		QP	AV	QP	AV	QP	AV
Va	0.150	36.0	19.7	66.0	56.0	30.0	36.3
Va	0.185	40.0	38.7	64.3	54.3	24.3	15.6
Va	18.520	31.2	29.1	60.0	50.0	28.8	20.9
Vb	0.150	40.6	23.5	66.0	56.0	25.4	32.5
Vb	0.185	43.0	40.7	64.3	54.3	21.3	13.6
Vb	18.570	32.5	29.6	60.0	50.0	27.5	20.4

The spectral diagrams in appendix I display the measurement of un-weighted peak values.

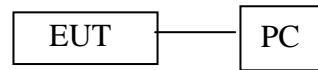
Reviewer :



4. RADIATED EMISSION FOR FCC PART 15 SECTION 15.109(A)

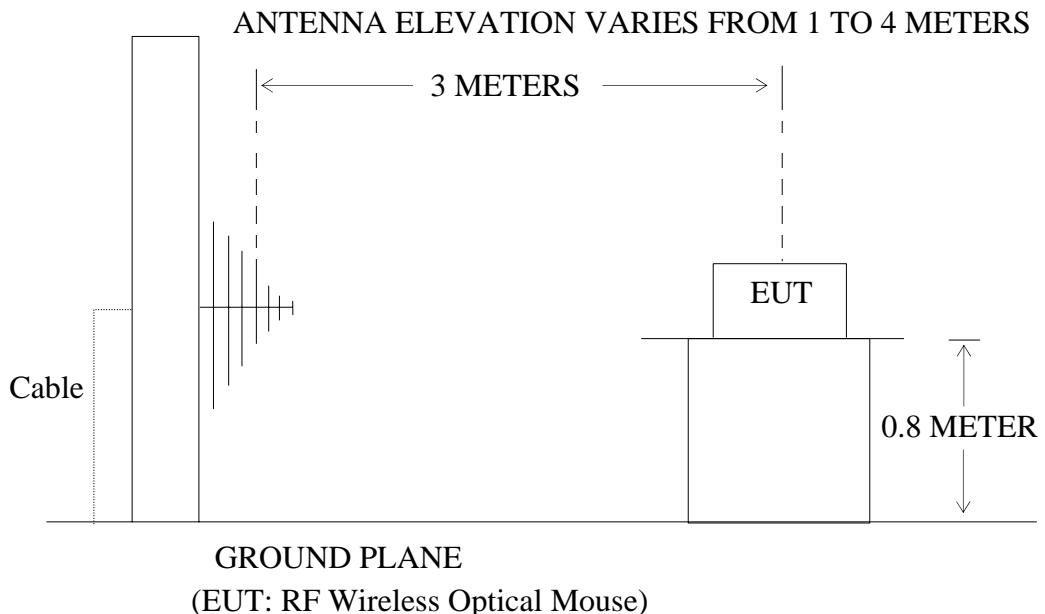
4.1. Block Diagram of Test Setup

4.1.1. Block diagram of connection between the EUT and simulators



(EUT: RF Wireless Optical Mouse)

4.1.2. Anechoic Chamber Test Setup Diagram



4.2. The Field Strength of Radiation Emission Measurement Limits

4.2.1. Radiation Emission Measurement Limits According to Section 15.109(a)

Frequency (MHz)	Limit,		The final measurement in band 9-90kHz, 110-490kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the
	Field Strength of Quasi-peak Value (microvolts/m)	Field Strength of Quasi-peak Value (dB μ V/m)	
30 - 88	100	40	
88 - 216	150	43.5	
216 - 960	200	46	

Above 960	500	54	final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.
-----------	-----	----	--

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. RF Wireless Optical Mouse (EUT)

Model Number : SF-MW205
 Serial Number : N/A
 Manufacturer : Shenzhen Sunflower Technology Co., Ltd.

4.4. Operating Condition of EUT

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

4.4.2. Turn on the power of all equipment.

4.4.3. Let the EUT work in Wired modes (use USB cable connect to PC) measure it.

4.5. Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. 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 FCC Part 15 Subpart C on radiated emission measurement.

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

4.6. The Field Strength of Radiation Emission Measurement Results

PASS.

The frequency range 30MHz to 1000MHz is investigated.

Date of Test:	December 08, 2006	Temperature:	25°C
EUT:	RF Wireless Optical Mouse	Humidity:	57%
Model No.:	SF-MW205	Power Supply:	5V DC power by PC usb port PC power: AC120V/60Hz
Test Mode:	Connect to PC Charging	Test Engineer:	Andy

Polarization	Frequency (MHz)	Reading(dB μ V/m) QP	Factor Corr.(dB)	Result(dB μ V/m) QP	Limits(dB μ V/m) QP	Margin(dB μ V/m) QP
Horizontal	135.730	29.7	5.8	35.5	43.5	8.0
Horizontal	484.930	24.4	16.6	41.0	46.0	5.0
Horizontal	660.500	20.9	19.4	40.3	46.0	5.7
Vertical	127.000	28.5	7.3	35.8	43.5	7.7
Vertical	483.960	23.2	17.2	40.4	46.0	5.6
Vertical	608.120	17.1	19.7	36.8	46.0	9.2

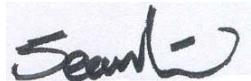
The spectral diagrams in appendix 1 display the measurement of un-weighted peak values.

The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

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

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

Reviewer :



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

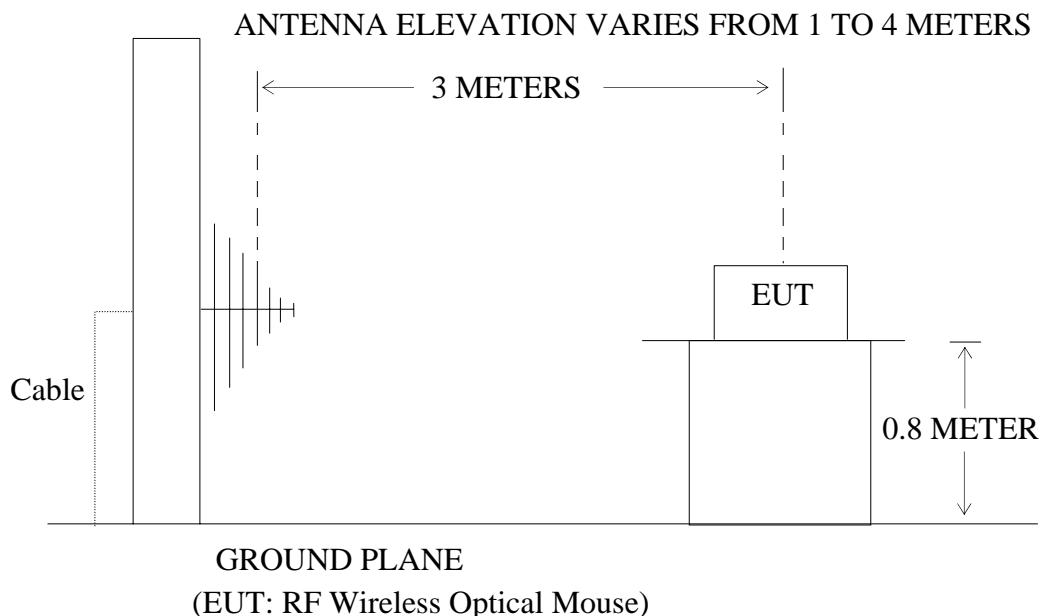
5.1. Block Diagram of Test Setup

5.1.1. Block diagram of connection between the EUT and simulators



(EUT: RF Wireless Optical Mouse)

5.1.2. Anechoic Chamber Test Setup Diagram



5.2. The Field Strength of Radiation Emission Measurement Limits

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

Radiation Emission Measurement Limits According to Section 15.209(a)

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

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

5.3.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.

5.3.1. RF Wireless Optical Mouse (EUT)

Model Number : SF-MW205
 Serial Number : N/A
 Manufacturer : Shenzhen Sunflower Technology Co., Ltd.

5.4.Operating Condition of EUT

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

5.4.2. Turn on the power of all equipment.

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

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 FCC Part 15 Subpart C on radiated emission measurement.

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

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

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

5.6. The Field Strength of Radiation Emission Measurement Results

PASS.

The frequency range 30MHz to 1000MHz is investigated.

Date of Test:	December 08, 2006	Temperature:	25°C
EUT:	RF Wireless Optical Mouse	Humidity:	57%
Model No.:	SF-MW205	Power Supply:	3.0V DC ("AAA"battery 2×)
Test Mode:	TX	Test Engineer:	Andy

Polarization	Frequency (MHz)	Reading(dB μ V/m) QP	Factor Corr.(dB)	Result(dB μ V/m) QP	Limits(dB μ V/m) QP	Margin(dB μ V/m) QP
Horizontal	81.020	21.9	8.9	30.8	40.0	9.2
Horizontal	324.550	19.7	13.2	32.9	46.0	13.1
Horizontal	351.090	19.2	13.9	33.1	46.0	12.9
Horizontal	378.250	22.4	14.6	37.0	46.0	9.0
Horizontal	405.600	21.5	15.2	36.7	46.0	9.3
Vertical	81.030	13.3	5.7	19.0	40.0	21.0
Vertical	324.590	13.6	13.7	27.3	46.0	18.7
Vertical	409.270	14.4	15.4	29.8	46.0	16.2

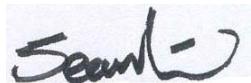
The spectral diagrams in appendix 1 display the measurement of un-weighted peak values.

1. Remark “-“ means that the emission level is too low to be measured.
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

Reviewer :



6. FUNDAMENTAL RADIATED EMISSION FOR FCC PART 15

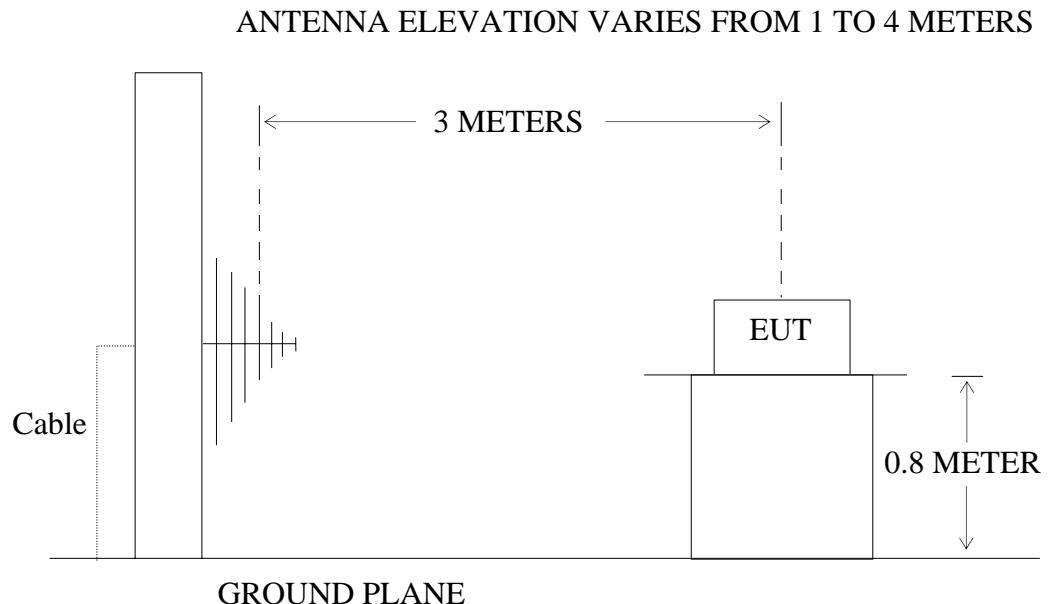
SECTION 15.227(A)

6.1. Block Diagram of Test Setup

6.1.1. Block diagram of connection between the EUT and simulators



6.1.2. Anechoic Chamber Test Setup Diagram



6.2. The Emission Limit For Section 15.227(a)

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

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. RF Wireless Optical Mouse (EUT)

Model Number : SF-MW205
 Serial Number : N/A
 Manufacturer : Shenzhen Sunflower Technology Co., Ltd.

6.4.Operating Condition of EUT

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

6.4.2. Turn on the power of all equipment.

6.4.3. Let the EUT work in TX mode (On) measure it.

6.5.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. calibrated Loop antenna is used as receiving antenna. In order to find the maximum emission levels, all of the interface cables must be manipulated according to FCC Part 15 on radiated emission measurement.

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

6.6.The Emission Measurement Result

PASS.

Date of Test:	December 08, 2006	Temperature:	25°C
EUT:	RF Wireless Optical Mouse	Humidity:	57%
Model No.:	SF-MW205	Power Supply:	3.0V DC ("AAA"battery 2×)
Test Mode:	TX	Test Engineer:	Andy

Fundamental Radiated Emissions

Test conditions		Fundamental Frequency		
		27.045MHz		
T _{nom} (25°C)	Unit	(dB μ V/m)/ (μ V/m)	(dB μ V/m)/(μ V/m)	
		PEAK	AV	
limit		47.1/226	42.9/140	
		100/100,000	80/10,000	
Note: Measurement was performed with modulated signal with average detector and peak detector.				

The spectral diagrams in appendix 1.

Reviewer :



7. BAND EDGES

7.1. The Requirement

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

7.2. 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.

7.2.1. RF Wireless Optical Mouse (EUT)

Model Number	:	SF-MW205
Serial Number	:	N/A
Manufacturer	:	Shenzhen Sunflower Technology Co., Ltd.

7.3. Operating Condition of EUT

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

7.3.2. Turn on the power of all equipment.

7.3.3. Let the EUT work in TX mode (On) measure it.

7.4. Test Procedure

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

7.5.The Measurement Result

The EUT does meet the FCC requirement.

The spectral diagrams in appendix 1.

APPENDIX I

(Test Curves)

CONDUCTION EMISSION STANDARD FCC PART15B

08. Dec 06 13:00

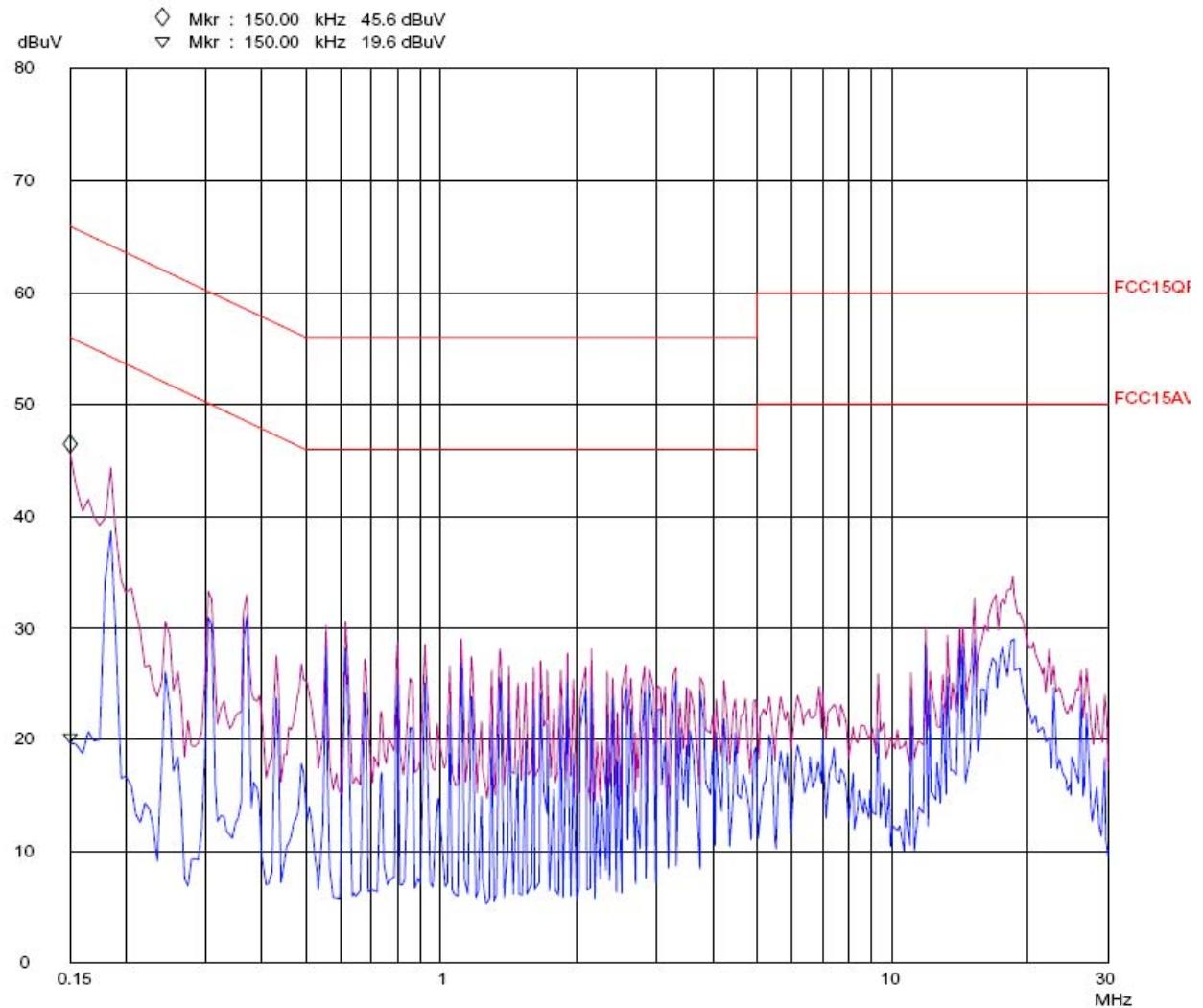
EUT: RF Wireless Optical Mouse m/n:SF-MW205
 Manuf: Sedo
 Op Cond: CONNECT TO PC
 Operator: Andy.tan
 Test Spec: Va 120V/60Hz
 Comment: Tem25°C Humi55%
 Sample no.:064255

Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	2M	5k	9k	PK+AV	10ms	AUTO	LN OFF
2M	10M	10k	9k	PK+AV	1ms	AUTO	LN OFF
10M	30M	25k	9k	PK+AV	1ms	AUTO	LN OFF

Final Measurement: x QP / + AV
Meas Time: 1 s

Transducer No. Start Stop Name
1 9k 30M confac



CONDUCTION EMISSION STANDARD FCC PART15B

08. Dec 06 13:04

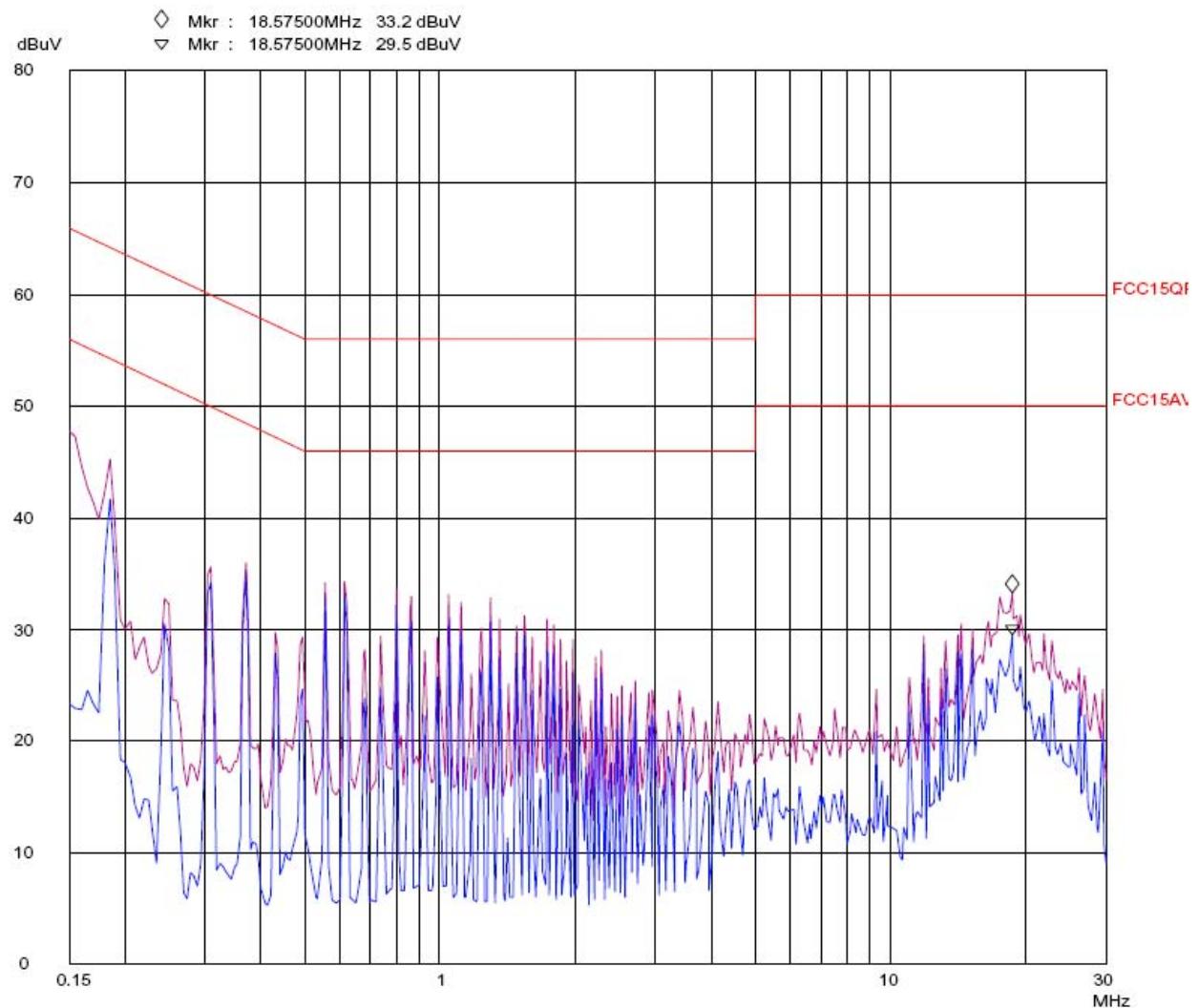
EUT: RF Wireless Optical Mouse m/n:SF-MW205
 Manuf: Sedo
 Op Cond: CONNECT TO PC
 Operator: Andy.tan
 Test Spec: Vb 120V/60Hz
 Comment: Tem25°C Humi55%
 Sample no.:064255

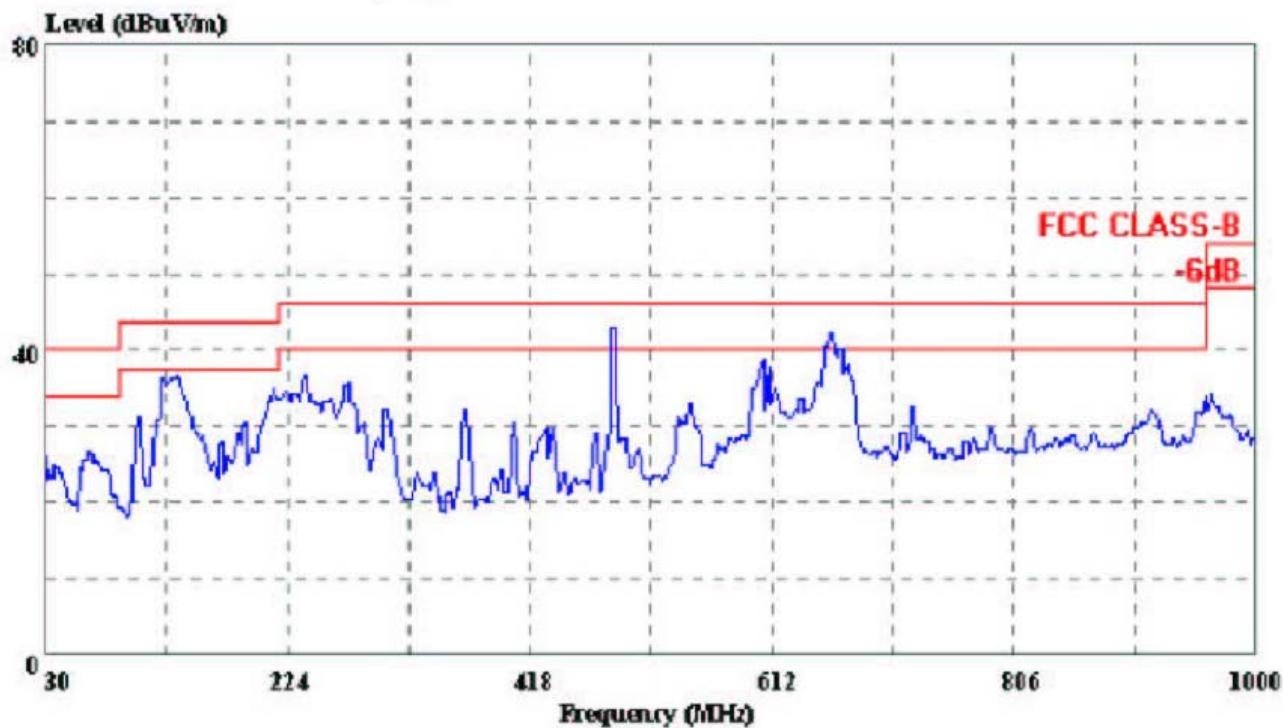
Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	2M	5k	9k	PK+AV	10ms	AUTO	LN OFF
2M	10M	10k	9k	PK+AV	1ms	AUTO	LN OFF
10M	30M	25k	9k	PK+AV	1ms	AUTO	LN OFF

Final Measurement: x QP / + AV
Meas Time: 1 s

Transducer No. Start Stop Name
1 9k 30M confac

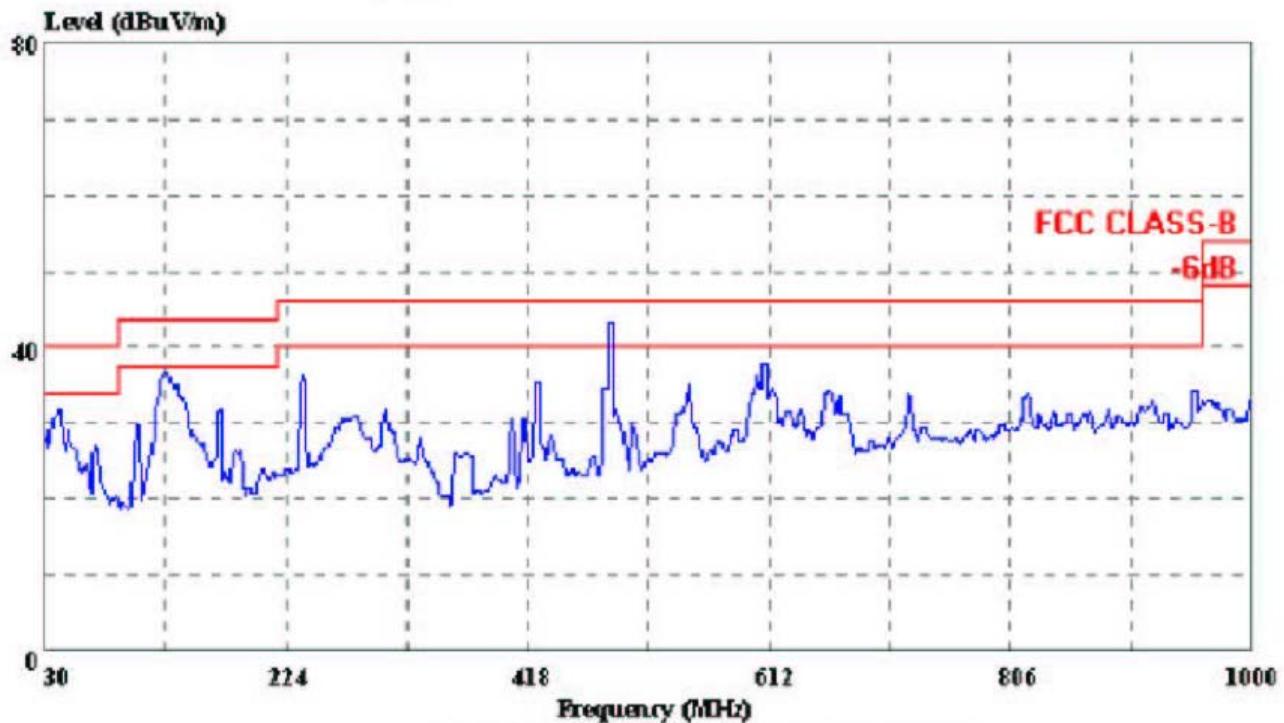




Trace:

Condition: FCC CLASS-B 3m ATC VULB9163 (NEW) HORIZONTAL
eut : RF Wireless Optical Mouse m/n:SF-MW205
power : USB 5.0V
memo : CONNECT TO PC
manuf : Sedo
sample no.: 064255

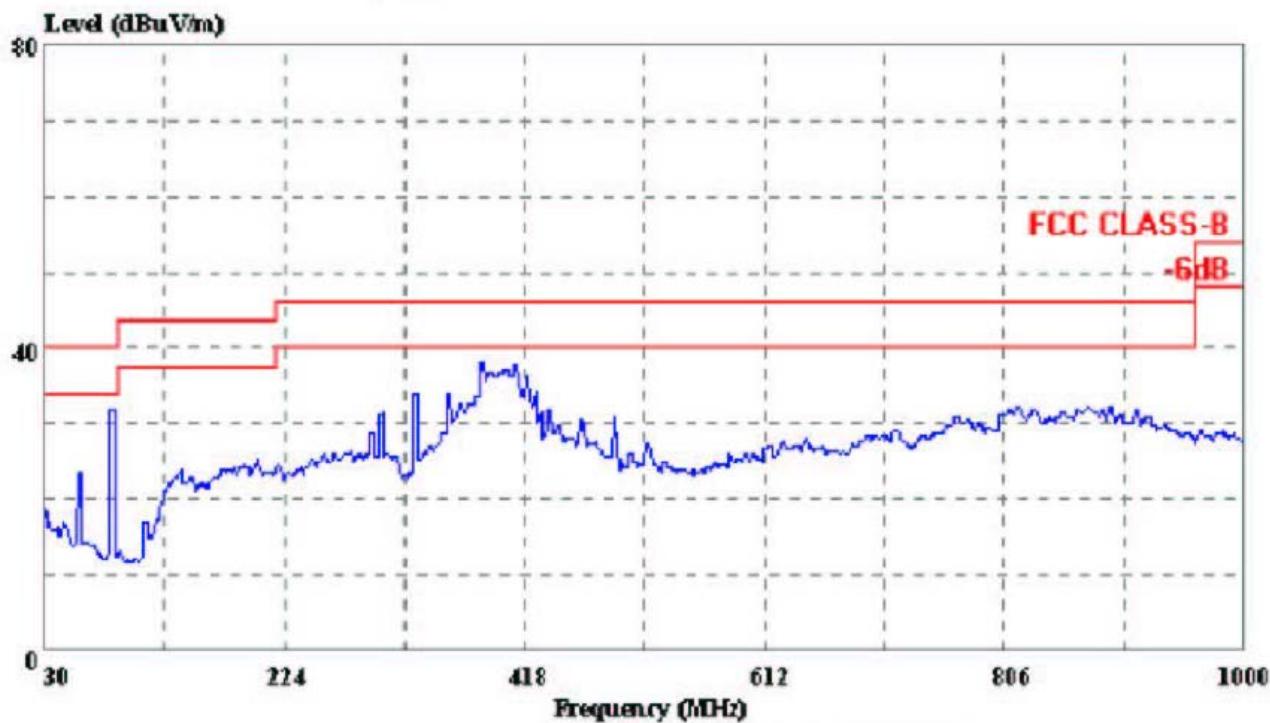
Ref Trace:



Trace:

Condition: FCC CLASS-B 3m ATC VULB9163 (NEW) VERTICAL
eut : RF Wireless Optical Mouse m/n:SF-MW205
power : USB 5.0V
memo : CONNECT TO PC
manuf : Sedo
sample no.: 064255

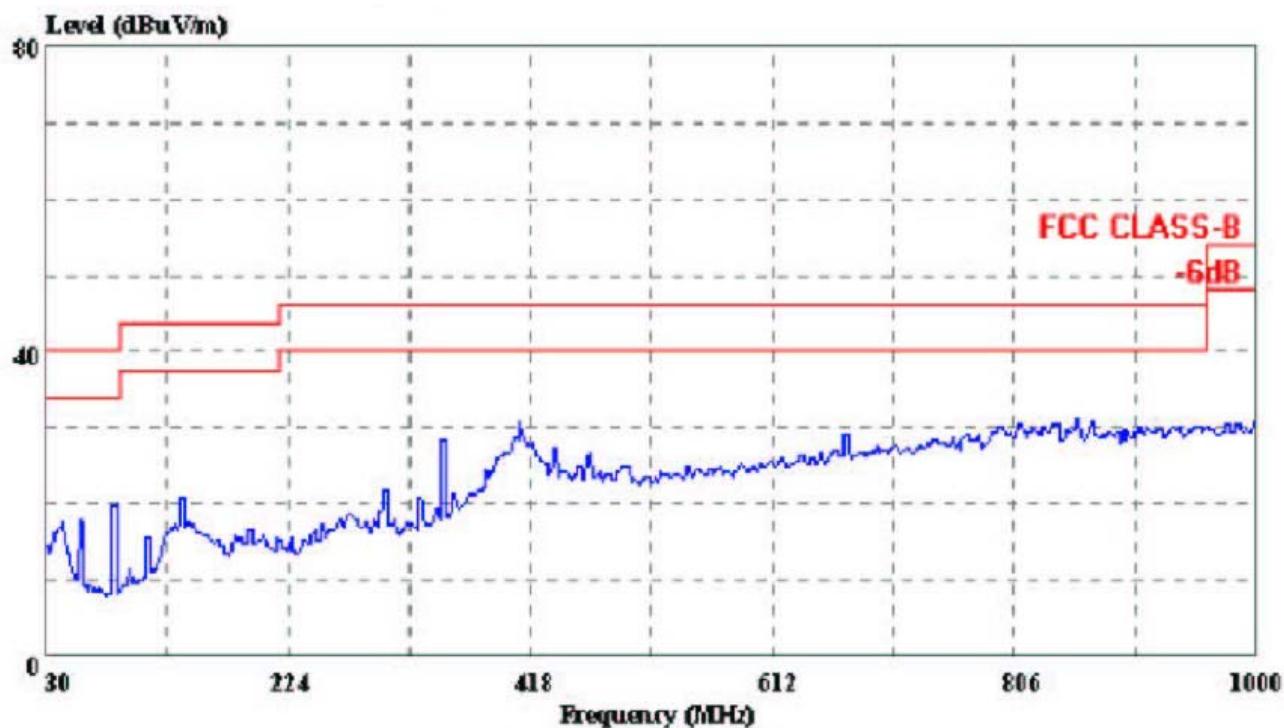
Ref Trace:



Trace:

Ref Trace:

Condition: FCC CLASS-B 3m ATC VULB9163 (NEW) HORIZONTAL
eut : RF Wireless Optical Mouse m/n:SF-MW205
power : DC 3.0V
memo : TX
manuf : Sedo
sample no.: 064255



Trace:

Ref Trace:

Condition: FCC CLASS-B 3m ATC VULB9163 (NEW) VERTICAL
eut : RF Wireless Optical Mouse m/n:SF-MW205
power : DC 3.0V
memo : TX
manuf : Sedo
sample no.: 064255

