



## Test Report

Product Name : Cordless Mouse  
Model No. : M-R0005  
FCC ID. : JNZMR0005

Applicant : Logitech Far East Ltd.

Address : #2 Creation Rd., 4, Science-Based Ind. Park,  
Hsinchu, Taiwan, R.O.C.

Date of Receipt : 2008/12/11  
Issued Date : 2008/12/25  
Report No. : 08C179-RFUSP03V01  
Version : V1.0

The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.

# Test Report Certification

Issued Date : 2008/12/25

Report No. : 08C179R-RFUSP03V01



Product Name : Cordless Mouse  
 Applicant : Logitech Far East Ltd.  
 Address : #2 Creation Rd., 4, Science-Based Ind. Park, Hsinchu,  
 Taiwan, R.O.C.  
 Manufacturer : Logitech Far East Ltd.  
 Model No. : M-R0005  
 FCC ID. : JNZMR0005  
 Rated Voltage : DC 1.5V (Power by Battery)  
 EUT Voltage : DC 1.5V (Power by Battery)  
 Trade Name : Logitech  
 Applicable Standard : FCC CFR Title 47 Part 15 Subpart C Section 15.227: 2007  
 Test Result : Complied

The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of Quietek Corporation.

Documented By : Demi Chang  
 ( Demi Chang / Engineering Adm. Specialist )

Tested By : Sheena Huang  
 ( Sheena Huang / Engineer )

Approved By : Roy Wang  
 ( Roy Wang / Manager )

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**1. General Information**

**1.1. EUT Description**

Product Name	Cordless Mouse
Trade Name	Logitech
Model No.	M-R0005
Frequency Range	27.045MHz~27.195MHz
Channel Number	2
Channel separation	150KHz
Channel Control	Manual
Type of Modulation	FSK
Antenna Type	Loop Antenna

Component	
Dongle	Logitech, C-UAY59

Working Frequency of Each Channel			
Channel	Frequency	Channel	Frequency
001	27.045MHz	002	27.195MHz

**Note:**

1. This device is a Cordless Mouse.
2. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.227.
3. Regards to the frequency band operation; the highest rate that was included the lowest and highest frequency of channel were selected to perform the test, and then shown on this report.

## 1.2. Operational Description

The EUT is a 27MHz Wireless Mouse intends to use in household and office PC system. The device adapts FSK modulation. The antenna Soldered on PCB Provides diversity function to improve the transmitting function.

**1.3. Test Mode**

QuieTek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Pre-Test Mode	
EMI	Mode 1 : Transmitter-27.045MHz Mode 2 : Transmitter-27.195MHz
Final Test Mode	
TX	Mode 1 : Transmitter-27.045MHz Mode 2 : Transmitter-27.195MHz

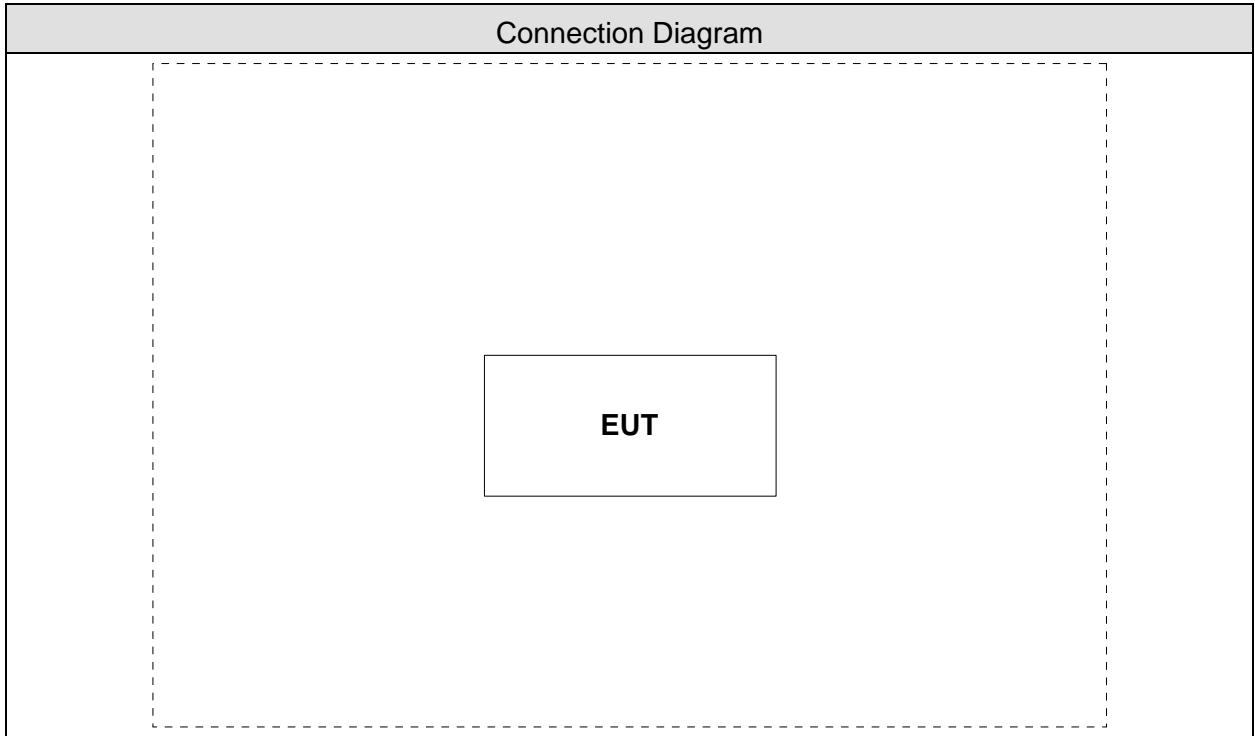
Emission		
Performed Item	Mode 1	Mode 2
Conducted Emission	NO	NO
Radiated Emission	Yes	Yes
Occupied Bandwidth	Yes	Yes

**1.4. Tested System Details**

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

N/A

**1.5. Configuration of tested System**



**1.6. EUT Exercise Software**

1	Setup the EUT as shown on 1.5.
2	Enable RF signal and confirm EUT active.
3	Modulate output capacity of EUT up to specification.

**1.7. Test Facility**

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual
Temperature (°C)	FCC Part 15 Subpart C Paragraph	15 - 35	24
Humidity (%RH)	15.209 and 15.227	25 - 75	59
Barometric pressure (mbar)	Radiated Emission (DSSS)	860 - 1060	950-1000
Temperature (°C)	FCC Part 15 Subpart C Paragraph	15 - 35	25
Humidity (%RH)	15.215	25 - 75	50
Barometric pressure (mbar)	Occupied Bandwidth (DSSS)	860 - 1060	950-1000

Site Description:

January 24, 2005 File on  
 Federal Communications Commission  
 Laboratory Division  
 7435 Oakland Mills Road  
 Columbia, MD 21046  
 Registration Number: 365520



Accredited by TAF  
 Accreditation Number: 1313  
 Effective through: December 27, 2010



Accredited by NVLAP  
 NVLAP Lab Code: 200347-0  
 Effective through: September 30, 2009



Site Name: Quietek Corporation  
 Site Address: No.75-1, Wang-Yeh Valley, Yung-Hsing,  
 Chiung-Lin, Hsin-Chu County,  
 Taiwan, R.O.C.  
 TEL : 886-3-592-8858 / FAX : 886-3-592-8859  
 E-Mail : [service@quietek.com](mailto:service@quietek.com)



## 2. Radiated Emission

### 2.1. Test Equipment

The following test equipment are used during the test:

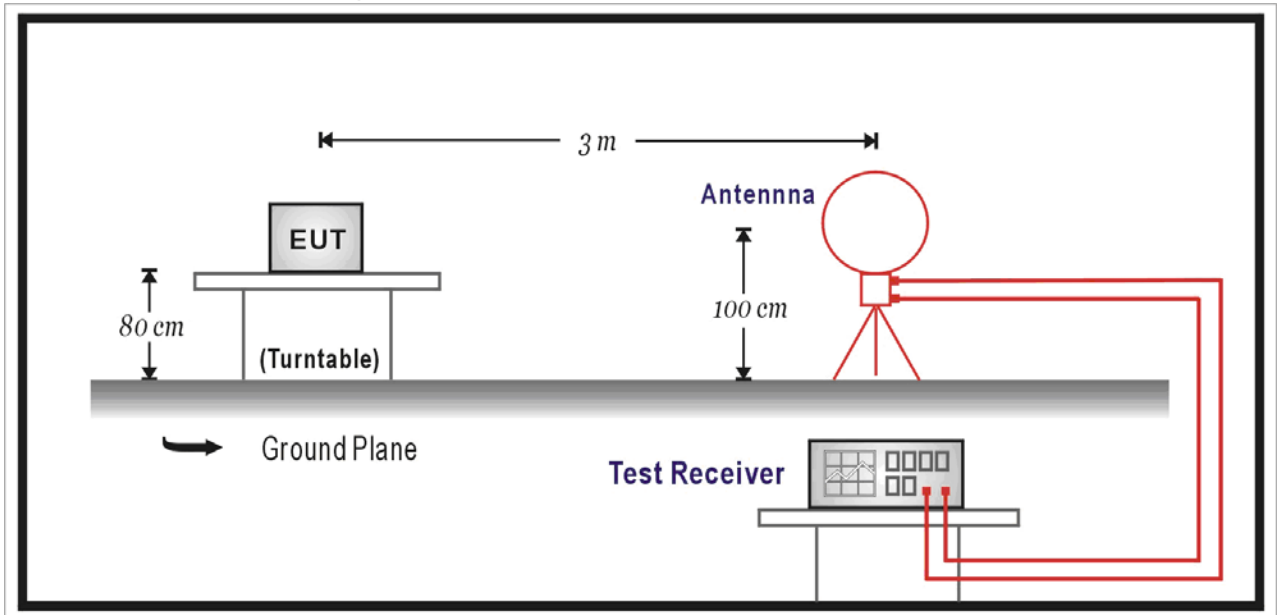
#### Radiated Emission / Site3

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Bilog Antenna	Schaffner Chase	CBL6112B	2673	2008/09/03
Horn Antenna	Electro Metrics	EM-6961	103325	2008/03/15
Pre-Amplifier	HP	8449B	3008A01123	2008/11/15
Pre-Amplifier	Quietek	AP-025C	003	N/A
Spectrum Analyzer	R & S	FSP40	100005	2008/08/25
Spectrum Analyzer	Advantest	R3162	91700283	2008/11/01
Test Receiver	R & S	ESCS 30	836858/022	2008/02/18

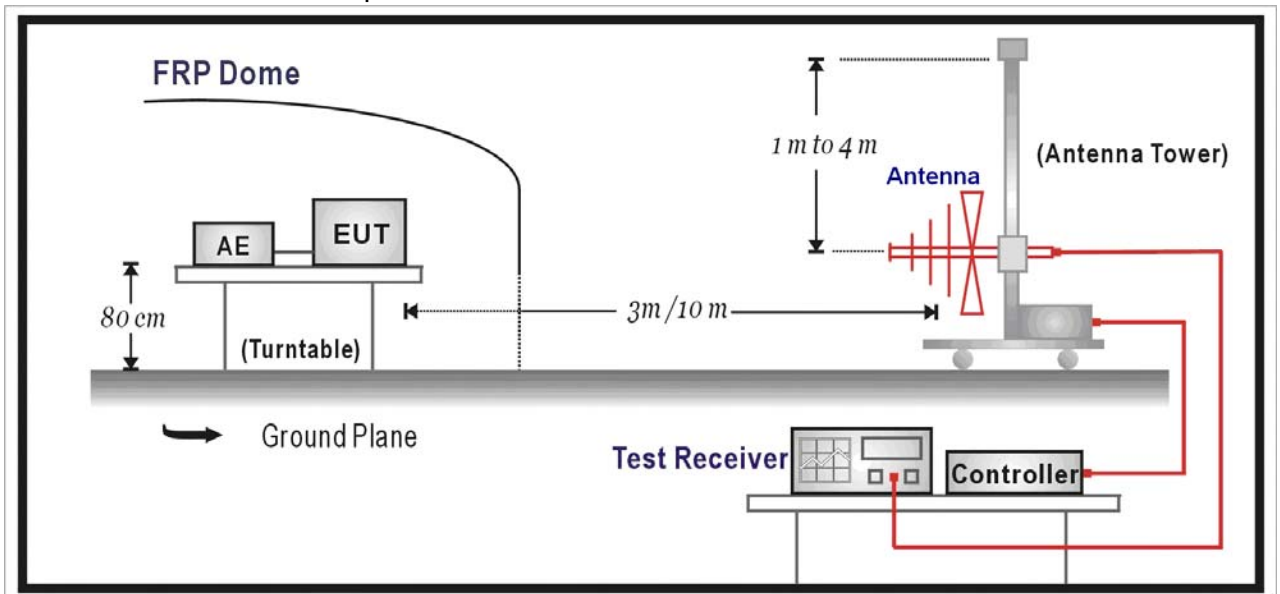
- Note: 1. All equipments that need to calibrate are with calibration period of 1 year.  
 2. "N/A" Ca1.Date is used to Pre-test, not final test.

2.2. Test Setup

For 9kHz-30MHz Test Setup



For 30MHz-1GHz Test Setup



2.3. Limits

➤ FCC Part 15 Subpart C Paragraph 15.227 Limit

FCC Part 15 Subpart C Paragraph 15.227 Limits		
Fundamental Frequency MHz	Field strength of fundamental	
	uV/m	dBuV/m
26.96-27.28	10000	80.0

Remarks :

1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
3. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. Measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.

➤ Frequencies in restricted band are complied to limits on Paragraph 15.209.

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits			
Frequency MHz	uV/m	dBuV/m	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	See Remark <sup>1</sup>	300
0.490-1.705	24000/F(kHz)	See Remark <sup>1</sup>	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Remarks : 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)

2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

## **2.4. Test Procedure**

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4 on radiated measurement.

On the field strength of fundamental and harmonics, the limits shown are based on measuring equipment employing a average detector function. As an alternative, compliance with the limits may be based on the use of measurement instrumentation with a CISPR quasi-peak detector.

On the field strength of spurious electric, on any frequency or frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a quasi-peak detector function and on any frequency or frequencies above 1000 MHz the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function.

When average radiated emission measurement are included emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

The bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

## **2.5. Test Specification**

According to EMC Standard: FCC Part 15 Subpart C Paragraph 15.209 and 15.227

## **2.6. Uncertainty**

The measurement uncertainty is evaluated as  $\pm 3.19$  dB.

## 2.7. Test Result

Product	Cordless Mouse		
Test Item	Radiated Emission		
Test Mode	Mode 1 : Transmitter-27.045MHz		
Date of Test	2008/12/23	Test Site	No.1 OATS

Polarization: Horizontal

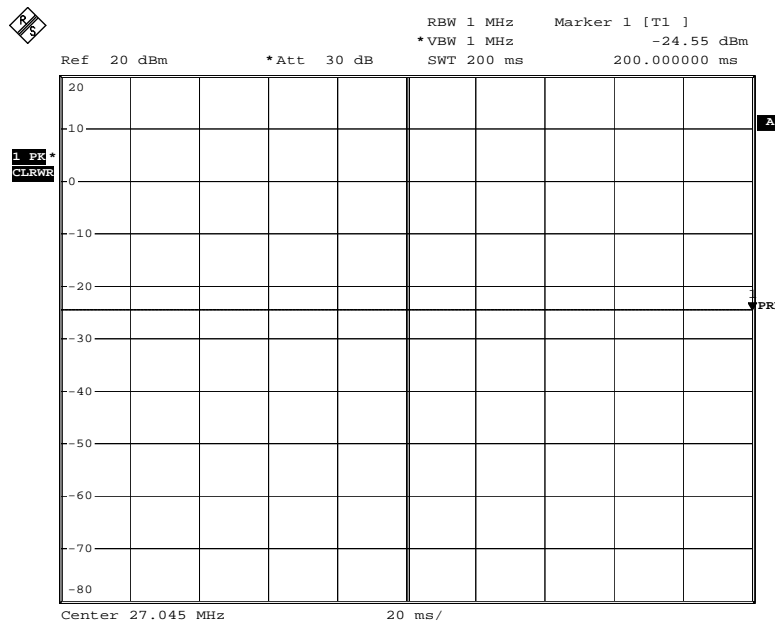
Direction	Frequency (MHz)	Correction Factor (dB)	Peak Reading Level (dBUV)	Peak Emission Level (dBUV/m)	Average Emission Level (dBUV/m)	Peak Limit (dBUV/m)	Average Limit (dBUV/m)
X	27.045	9.65	53.8	63.45	63.45	100	80
Y	27.045	9.65	63.4	73.05	73.05	100	80
Z	27.045	9.65	63.6	73.25	73.25	100	80

Polarization: Vertical

Direction	Frequency (MHz)	Correction Fact (dB)	Peak Reading Level (dBUV)	Peak Emission Level (dBUV/m)	Average Emission Level (dBUV/m)	Peak Limit (dBUV/m)	Average Limit (dBUV/m)
X	27.045	9.65	32.6	42.25	42.25	100	80
Y	27.045	9.65	55.8	65.45	65.45	100	80
Z	27.045	9.65	53.4	63.05	63.05	100	80

Note:

1. All Readings Levels are performed with peak and/or average measurements as necessary.
2. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
3. Average Emission level=Peak Emission level- 20Log(Duty Cycle),and the duty cycle is one as below.



Date: 18.DEC.2008 06:10:41

Product	Cordless Mouse		
Test Item	Radiated Emission		
Test Mode	Mode 2 : Transmitter-27.195MHz		
Date of Test	2008/12/23	Test Site	No.1 OATS

Polarization: Horizontal

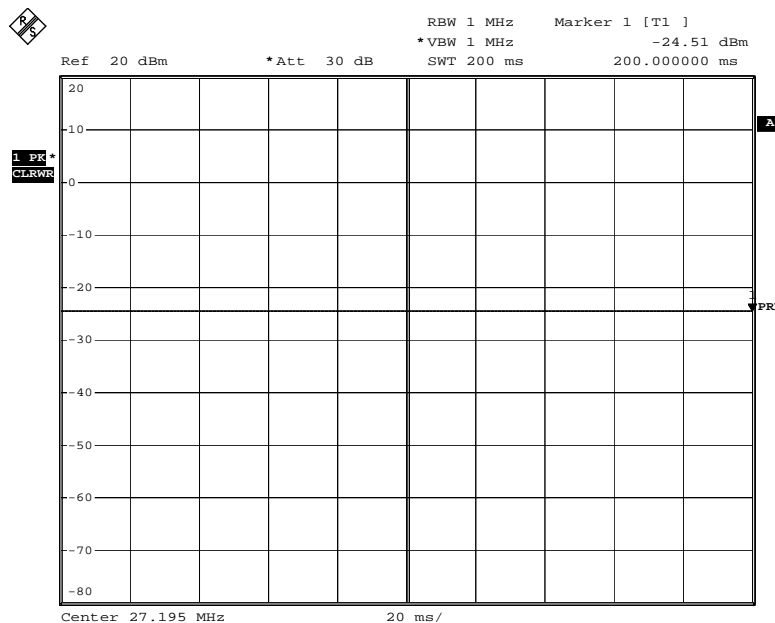
Direction	Frequency (MHz)	Correction Factor (dB)	Peak Reading Level (dBuV)	Peak Emission Level (dBuV/m)	Average Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)
X	27.195	9.65	53.9	63.55	63.55	100	80
Y	27.195	9.65	62.7	72.35	72.35	100	80
Z	27.195	9.65	61.3	70.95	70.95	100	80

Polarization: Vertical

Direction	Frequency (MHz)	Correction Fact (dB)	Peak Reading Level (dBuV)	Peak Emission Level (dBuV/m)	Average Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)
X	27.195	9.65	33.4	43.05	43.05	100	80
Y	27.195	9.65	55.7	65.35	65.35	100	80
Z	27.195	9.65	53.8	63.45	63.45	100	80

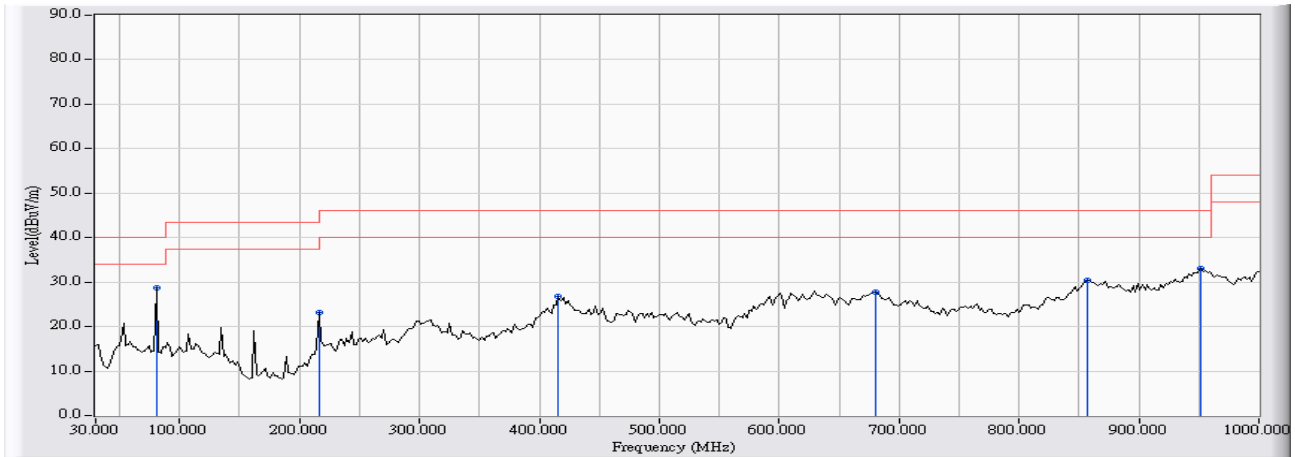
Note:

1. All Readings Levels are performed with peak and/or average measurements as necessary.
2. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
3. Average Emission level=Peak Emission level- 20Log(Duty Cycle),and the duty cycle is one as below.



Date: 18.DEC.2008 06:06:43

Site : Site 3	Time : 2009/01/08 - 10:33
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB3_FCC_30-1G(2008-9) - HORIZONTAL	Power : DC 1.5V
EUT : Cordless Mouse	Note : Mode 1 : Transmitter-27.045MHz

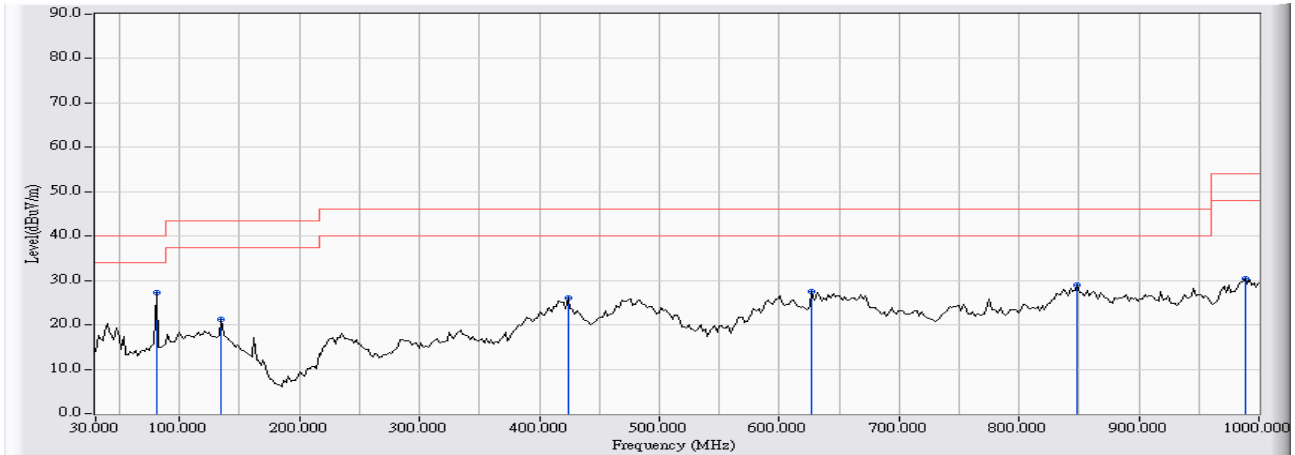


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	80.440	-15.429	44.258	28.829	-11.171	40.000	QUASPEAK
2		216.240	-13.691	36.859	23.169	-22.831	46.000	QUASPEAK
3		416.060	-3.958	30.745	26.787	-19.213	46.000	QUASPEAK
4		679.900	-1.847	29.690	27.843	-18.157	46.000	QUASPEAK
5		856.440	0.701	29.617	30.318	-15.682	46.000	QUASPEAK
6		951.500	3.054	29.948	33.002	-12.998	46.000	QUASPEAK

**Note:**

1. All Reading Levels are Quasi-Peak value.
2. “ \* ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : Site 3	Time : 2009/01/08 - 10:36
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB3_FCC_30-1G(2008-9) - VERTICAL	Power : DC 1.5V
EUT : Cordless Mouse	Note : Mode 1 : Transmitter-27.045MHz



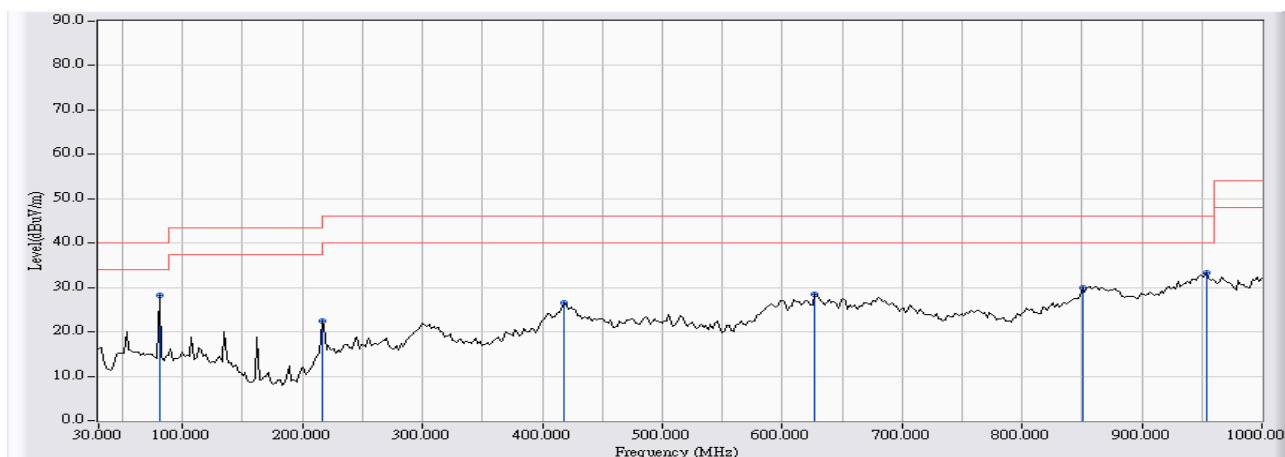
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	80.440	-13.898	41.204	27.306	-12.694	40.000	QUASPEAK
2		134.760	-11.155	32.280	21.125	-22.375	43.500	QUASPEAK
3		423.820	-4.680	30.661	25.981	-20.019	46.000	QUASPEAK
4		627.520	-3.787	31.242	27.456	-18.544	46.000	QUASPEAK
5		848.680	-1.638	30.669	29.031	-16.969	46.000	QUASPEAK
6		988.360	0.935	29.434	30.369	-23.631	54.000	QUASPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ \* ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.



Site : Site 3	Time : 2009/01/08 - 11:20
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB3_FCC_30-1G(2008-9) - HORIZONTAL	Power : DC 1.5V
EUT : Cordless Mouse	Note : Mode 2 : Transmitter-27.195MHz

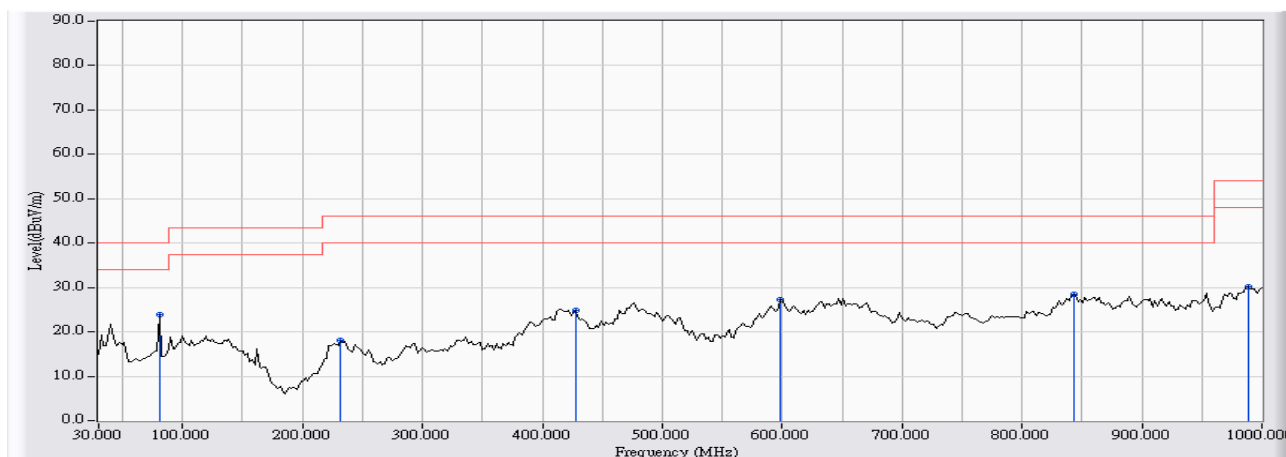


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	80.440	-15.429	43.705	28.276	-11.724	40.000	QUASPEAK
2		216.240	-13.691	36.116	22.426	-23.574	46.000	QUASPEAK
3		418.000	-3.868	30.432	26.564	-19.436	46.000	QUASPEAK
4		627.520	-2.158	30.707	28.549	-17.451	46.000	QUASPEAK
5		850.620	-0.486	30.385	29.899	-16.101	46.000	QUASPEAK
6		953.440	3.027	30.306	33.333	-12.667	46.000	QUASPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ \* ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : Site 3	Time : 2009/01/08 - 11:22
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB3_FCC_30-1G(2008-9) - VERTICAL	Power : DC 1.5V
EUT : Cordless Mouse	Note : Mode 2 : Transmitter-27.195MHz



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	80.440	-13.898	37.848	23.950	-16.050	40.000	QUASPEAK
2		231.760	-12.095	30.071	17.976	-28.024	46.000	QUASPEAK
3		427.700	-5.567	30.537	24.970	-21.030	46.000	QUASPEAK
4		598.420	-2.503	29.712	27.209	-18.791	46.000	QUASPEAK
5		842.860	-1.613	30.141	28.528	-17.472	46.000	QUASPEAK
6		988.360	0.935	29.237	30.172	-23.828	54.000	QUASPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ \* ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

**3. Occupied Bandwidth**

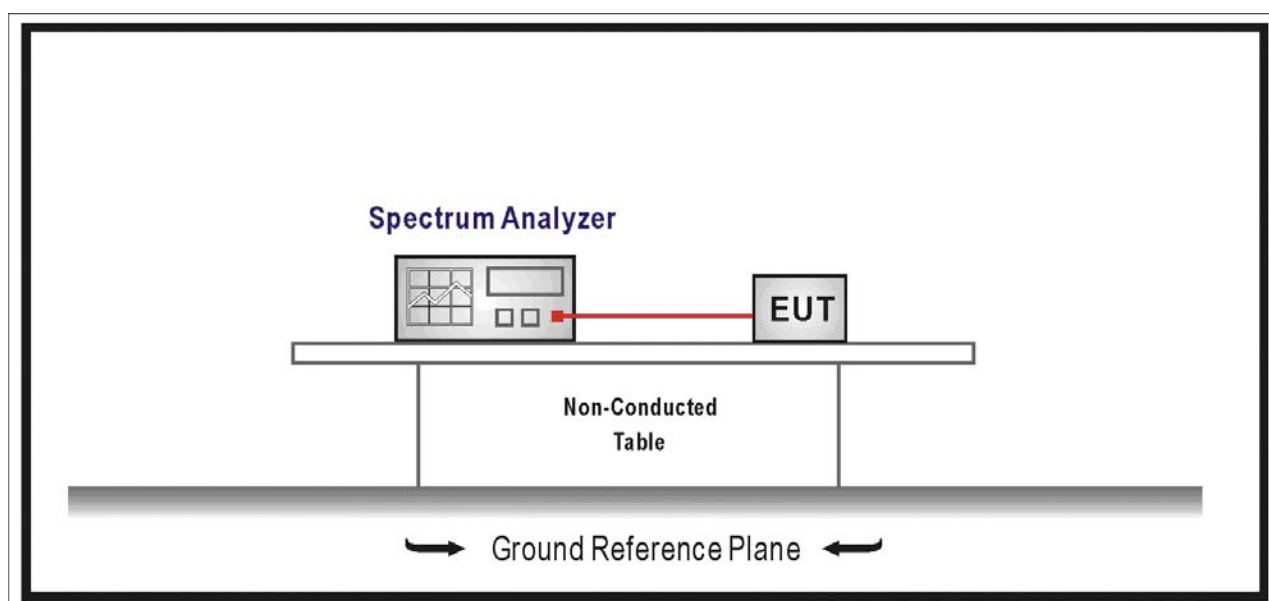
**3.1. Test Equipment**

The following test equipment are used during the test:

Item	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.
1	Spectrum Analyzer	R & S	FSP / 100561	Mar., 2008
2	No.1 OATS			Sep., 2008

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

**3.2. Test Setup**



**3.3. Limits**

N/A

**3.4. Test Specification**

According to EMC Standard: FCC Part 15 Subpart C Paragraph 15.215

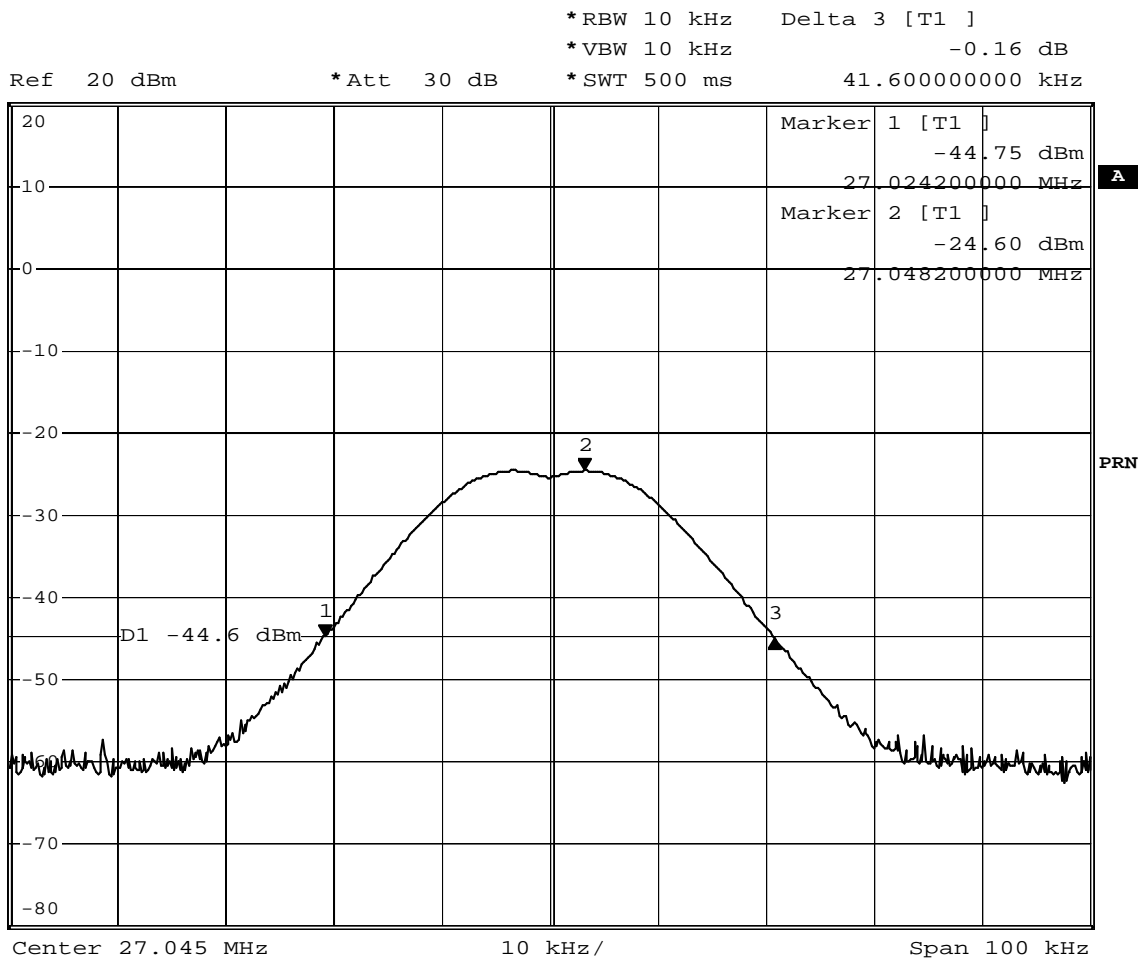
**3.5. Uncertainty**

The measurement uncertainty is defined as  $\pm 50\text{kHz}$

3.6. Test Result

Product	Cordless Mouse		
Test Item	Occupied Bandwidth		
Test Mode	Mode 1 : Transmitter-27.045MHz		
Date of Test	2008/12/18	Test Site	No.1 OATS

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)
1	27.045	41.6	--



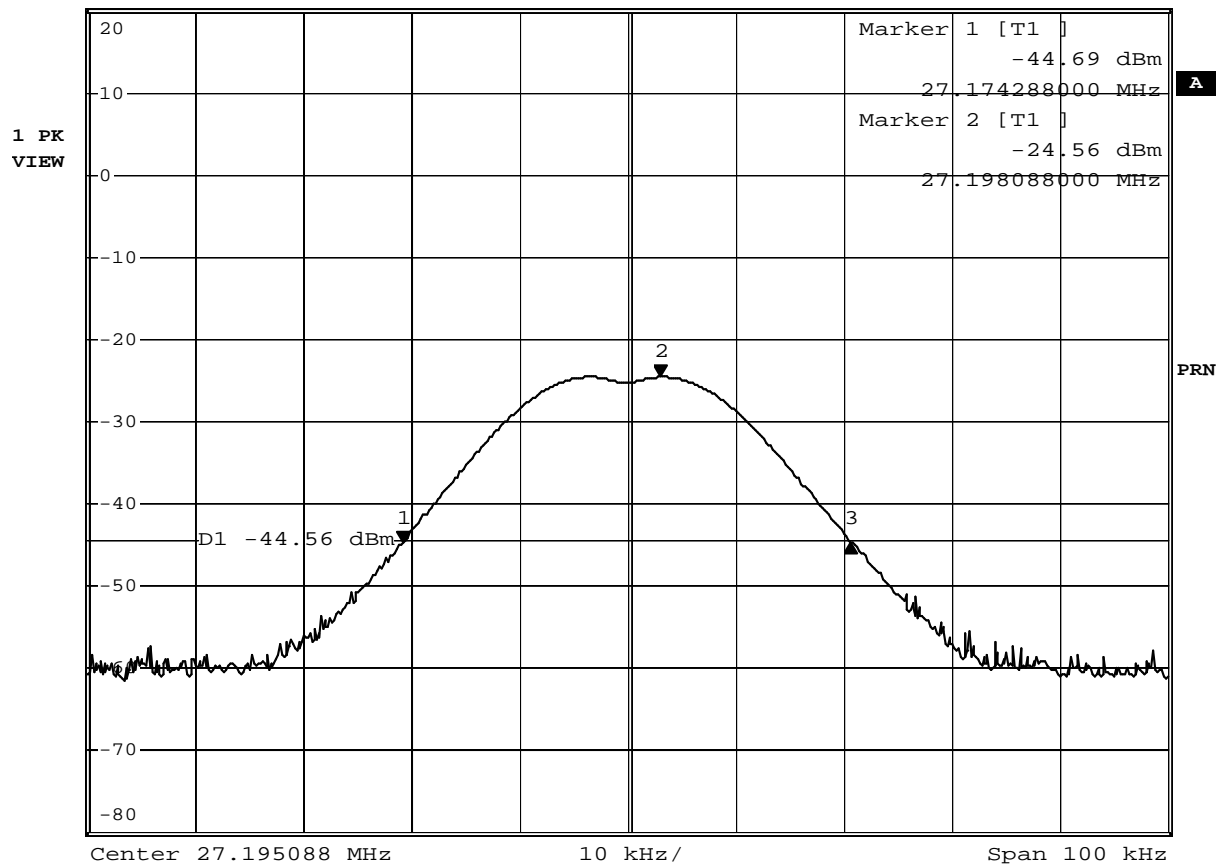
Date: 18.DEC.2008 05:05:03

Product	Cordless Mouse		
Test Item	Occupied Bandwidth		
Test Mode	Mode 2 : Transmitter-27.195MHz		
Date of Test	2008/12/18	Test Site	No.1 OATS

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)
2	27.195	41.4	--



\*RBW 10 kHz    Delta 3 [T1 ]  
 \*VBW 10 kHz    0.05 dB  
 Ref 20 dBm    \*Att 30 dB    \*SWT 500 ms    41.40000000 kHz



Date: 18.DEC.2008 04:58:08