


FCC PART 15.109
MEASUREMENT AND TEST REPORT
FOR

Shenzhen e-loam Technology Co., Ltd.

Building 168, Tongfucun Industry Park, Dalang, Longhua Town, Baoan District,

Shenzhen, Guangdong, China

FCC ID: WFLMD668

Report Concerns: Original Report	Equipment Type: Mouse
Model:	<u>MD668</u>
Report No.:	<u>STR08068124I</u>
Test/Witness Engineer:	<u>Susan Su</u>
Test Date:	<u>2008-06-23 to 2008-06-27</u>
Issue Date:	<u>2008-07-01</u>
Prepared By:	SEM.Test Compliance Service Co., Ltd. 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.C. (518101)
Approved & Authorized By:	 _____ Jandy So / PSQ Manager

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by SEM.Test Compliance Service Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Shenzhen e-loam Technology Co., Ltd.
Address of applicant: Building 168, Tongfucun Industry Park, Dalang, Longhua Town, Baoan District, Shenzhen, Guangdong, China

Manufacturer: Shenzhen e-loam Technology Co., Ltd.
Address of manufacturer: Building 168, Tongfucun Industry Park, Dalang, Longhua Town, Baoan District, Shenzhen, Guangdong, China

General Description of E.U.T

Items	Description
EUT Description:	Mouse
Trade Name:	eloam
Model No.:	MD668
Rated Voltage:	USB 5V
Packaging Size:	9.8X5.5X.3.0 cm
For more information refer to the circuit diagram form and the user's manual.	

The test data is gathered from a production sample, provided by the manufacturer.

1.2 Test Standards

The following report is prepared on behalf of the Shenzhen e-loam Technology Co., Ltd. in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15.107, and 15.109 rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which results in lowering the emission/immunity, should be checked to ensure compliance has been maintained.

1.3 Related Submittal(s)/Grant(s)

No Related Submittal(s).

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

The equipment under test (EUT) was configured to measure its highest possible susceptibility against the tested phenomena. The test modes were adapted accordingly in reference to the Operating Instructions.

1.5 Test Facility

The Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files which the Registration No.: **994117**. Measurement required was performed at laboratory of SEM. Test Compliance Service Co., Ltd. at 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.C

1.6 EUT Exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the system components. The test software, provided by the customer, is started while the EUT is on to simulate the normal work.

1.7 Accessories Equipment List and Details

Manufacturer	Description	Model	Serial Number
IBM	Notebook	R51e	LV14893
TP-LINK	Modem	TM-EC5658V	KT99CTQC-508
Lenovo	Printer	3110	OD65133711480

1.8 EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
USB Cable	1.25	Unshielded	With Core

2. SUMMARY OF TEST RESULTS

Description of Test	Result
§15.107 (a) Conducted Emission	Compliant
§15.109(a) Radiated Emission	Compliant

3. §15.107 (a)- CONDUCTED EMISSION

3.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 1.5 dB.

3.2 Test Equipment List and Details

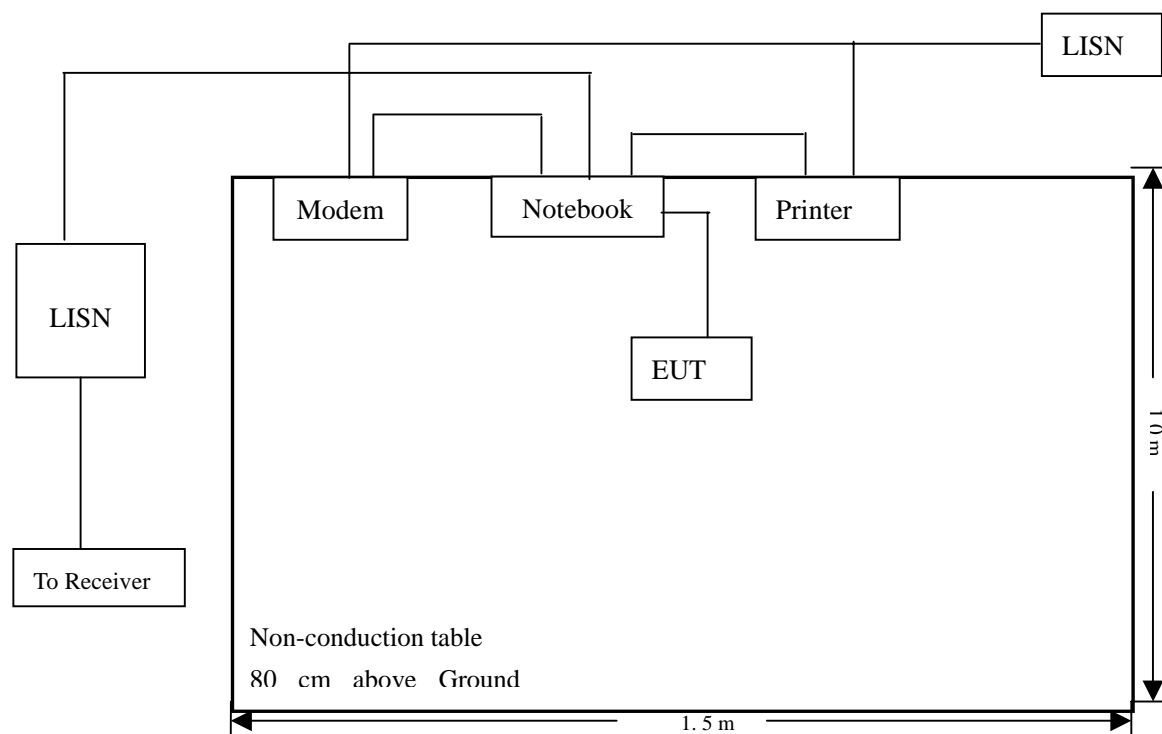
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESCS30	830245/009	2008-01-25	2009-01-24
AMN	Rohde & Schwarz	ESH2-Z5	100002	2008-01-25	2009-01-24
Limiter	Rohde & Schwarz	ESH3-Z2	357.8810.52	2008-01-25	2009-01-24
AMN	Rohde & Schwarz	ESH3-Z5	828304/014	2008-01-25	2009-01-24
Spectrum Analyzer	Aglient	E4402B-ESA	US41192821	2008-01-25	2009-01-24

3.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.107 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle. The spacing between the peripherals was 10 cm.

3.4 Basic Test Setup Block Diagram



3.5 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

3.6 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency 150 kHz
 Stop Frequency 30 MHz
 Sweep Speed Auto
 IF Bandwidth 10 kHz
 Quasi-Peak Adapter Bandwidth 9 kHz
 Quasi-Peak Adapter Mode Normal

3.7 Summary of Test Results/Plots

According to the data in section 3.8, the EUT complied with the FCC 15B Conducted margin for a Class B device, with the *worst* margin reading of:

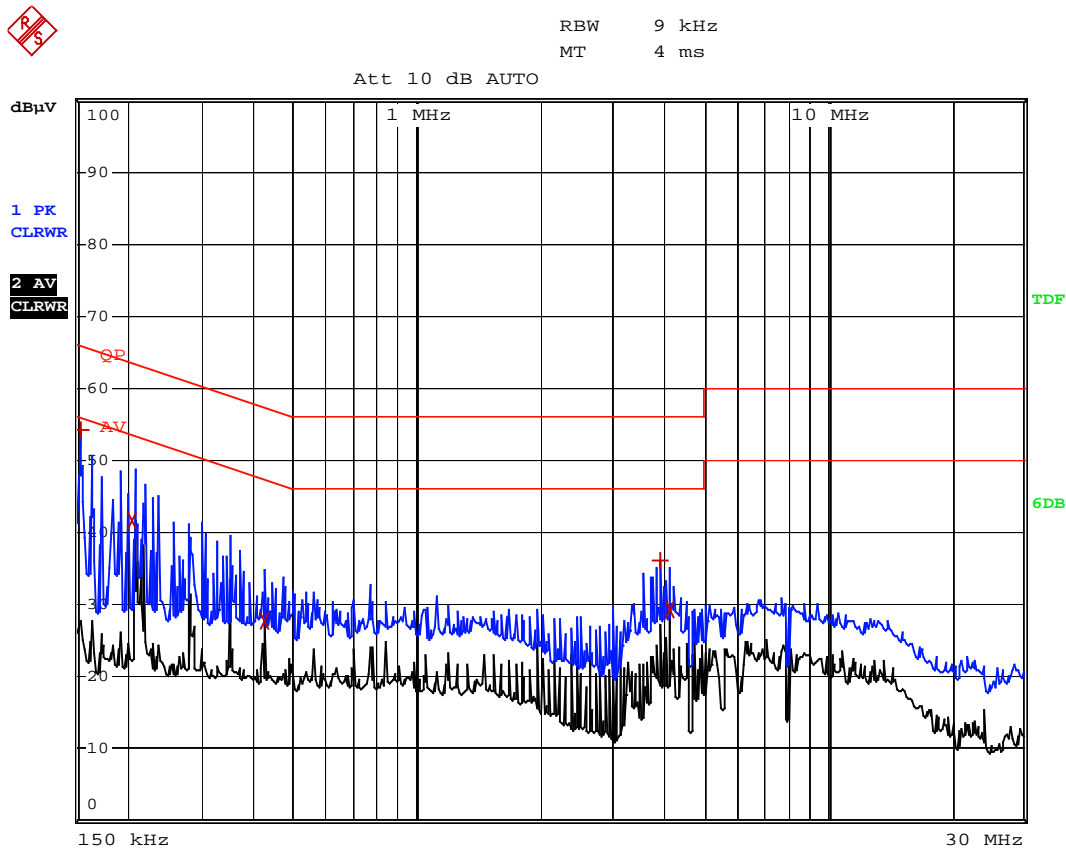
-11.12 dB μ V at 0.278 MHz in the Line mode, 0.15-30MHz

3.8 Conducted Emissions Test Data

LINE CONDUCTED EMISSIONS				FCC 15 CLASS B	
Frequency	Amplitude	Detector	Phase	Limit	Margin
MHz	dB μ V	QP/Ave/Pk	Line/Neutral	dB μ V	dB
0.278	39.74	Ave	Line	50.86	-11.12
0.154	54.26	Peak	Neutral	65.77	-11.51
0.206	41.70	Ave	Neutral	53.36	-11.66
0.206	50.91	Peak	Line	63.35	-12.44
0.422	34.46	Ave	Line	47.40	-12.94
4.126	29.19	Ave	Neutral	45.99	-16.80
4.130	28.99	Ave	Line	45.99	-17.00
0.422	38.90	Peak	Line	57.40	-18.50
3.918	36.28	Peak	Line	55.99	-19.71
0.422	27.63	Ave	Neutral	47.40	-19.77
3.914	36.21	Peak	Neutral	56.00	-19.79

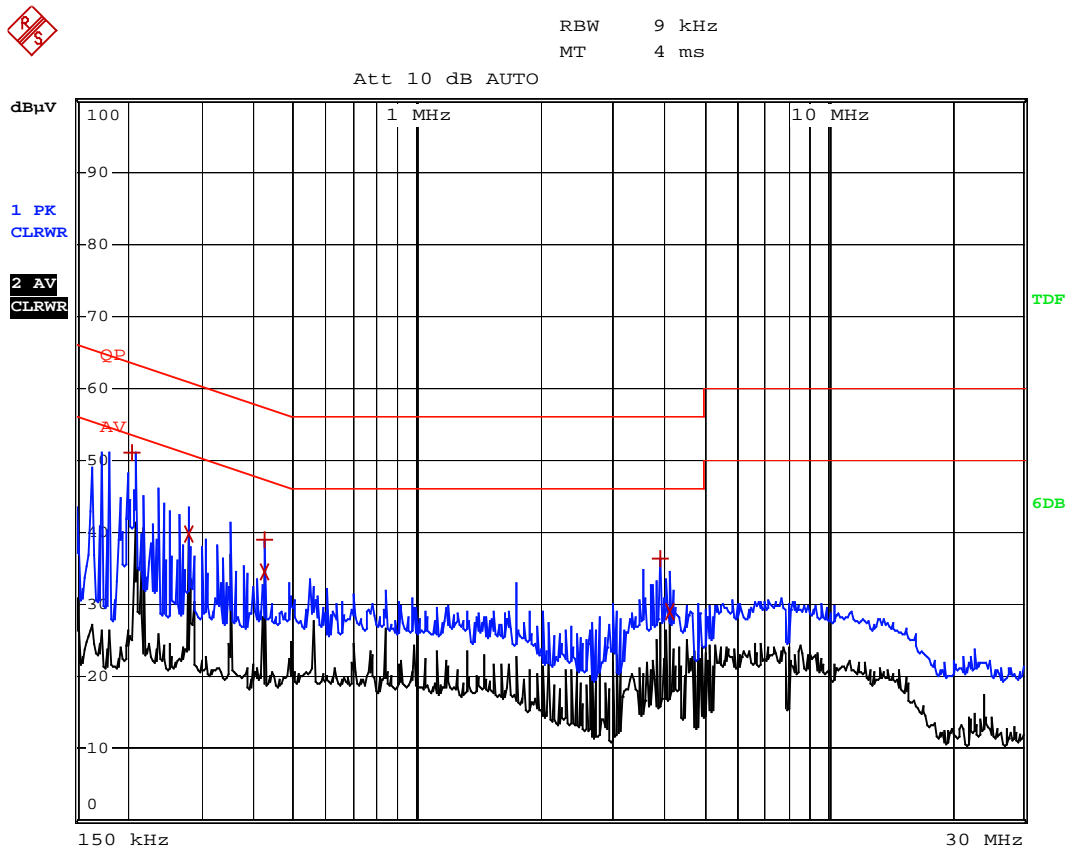
Plot of Conducted Emissions Test Data

Conducted Disturbance
EUT: Mouse
M/N: MD668
Operating Condition: Running with Program
Test Specification: N
Comment: AC 230V/50Hz connect to PC, USB 5V



Plot of Conducted Emissions Test Data

Conducted Disturbance
EUT: Mouse
M/N: MD668
Operating Condition: Running with Program
Test Specification: L
Comment: AC 230V/50Hz connect to PC, USB 5V



4. §15.109(a)- RADIATED EMISSION

4.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any radiation emissions measurement is ± 3.0 dB.

4.2 Test Equipment List and Details

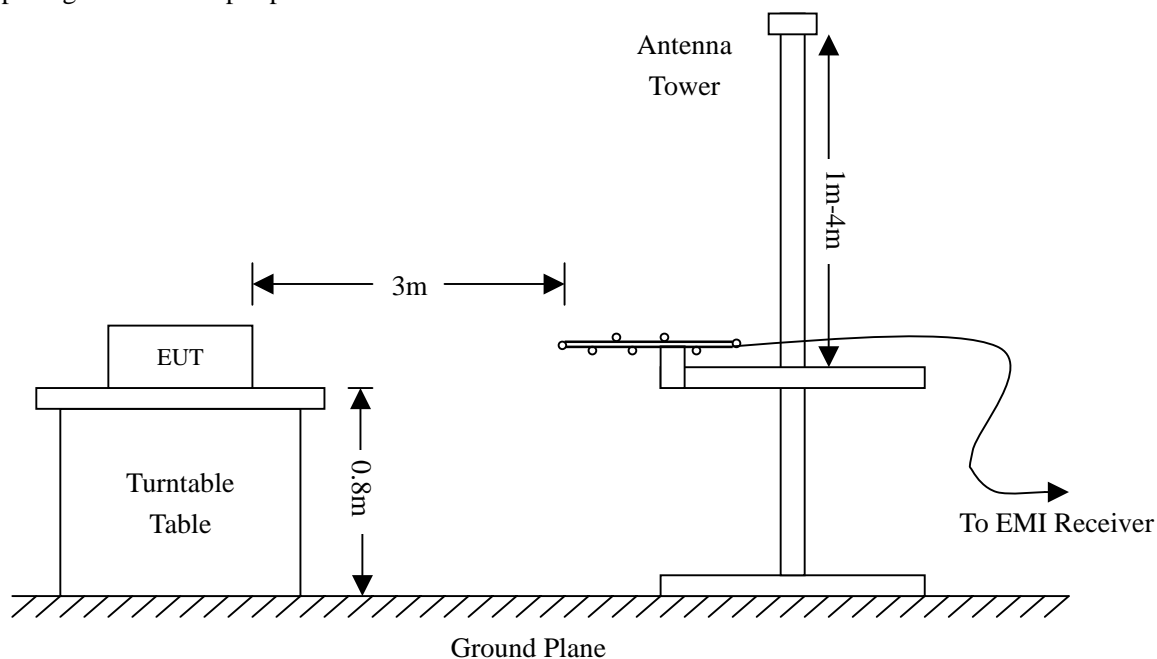
Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSEA20	DE25181	2008-01-25	2009-01-24
Positioning Controller	C&C	CC-C-1F	N/A	2008-01-25	2009-01-24
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2008-01-25	2009-01-24
Horn Antenna	SCHWARZBECK	BBHX 9120	9120-426	2008-01-25	2009-01-24
RF Switch	EM	EMSW18	SW060023	2008-01-25	2009-01-24
Amplifier	Agilent	8447F	3113A06717	2008-01-25	2009-01-24
Coaxial Cable	SCHWARZBECK	AK9513	9513-10	2008-01-25	2009-01-24
EMI Test Receiver	ROHDE&SCHWARZ	ESPI	25498514	2008-01-25	2009-01-24

4.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.205 and FCC Part 15.109 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.



4.4 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency 30 MHz
 Stop Frequency 1000 MHz
 Sweep Speed Auto
 IF Bandwidth 10 kHz
 Quasi-Peak Adapter Bandwidth 120 kHz
 Quasi-Peak Adapter Mode Normal

4.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} - \text{Corr. Factor}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15B Limit}$$

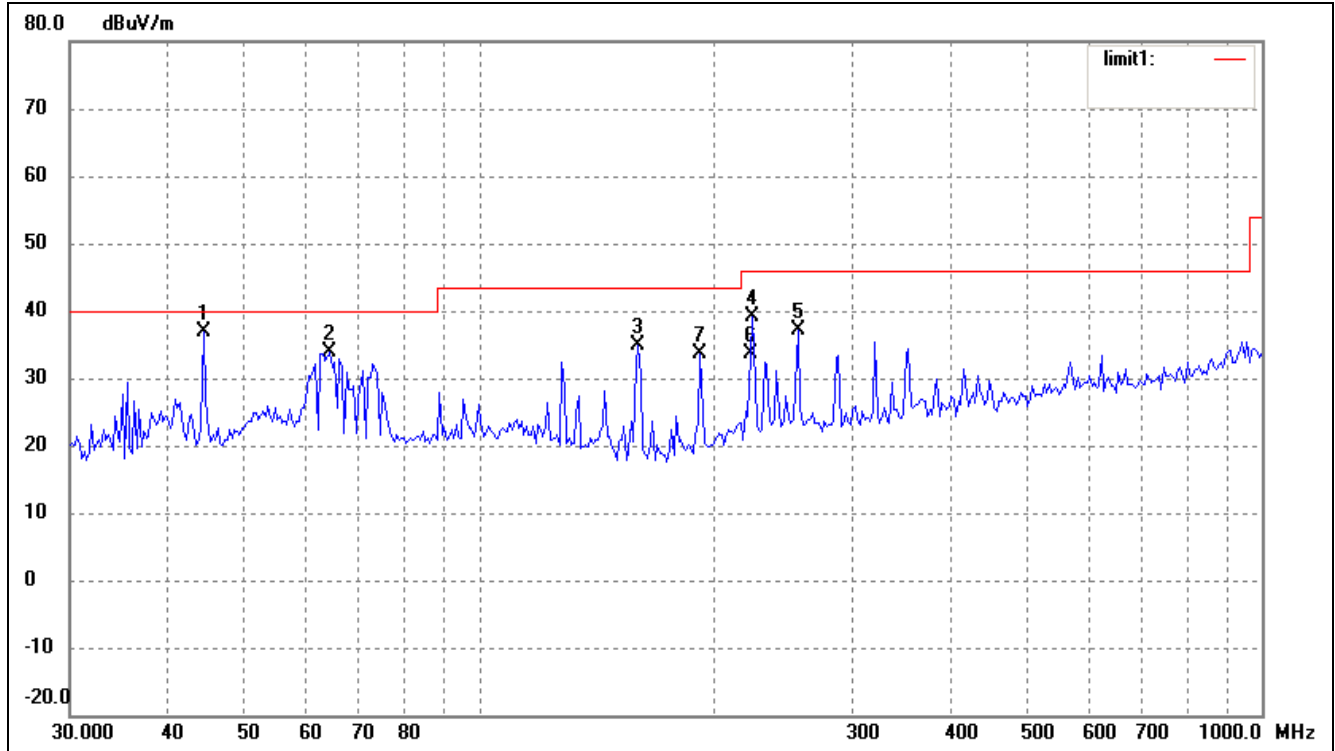
4.6 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

4.7 Summary of Test Results/Plots

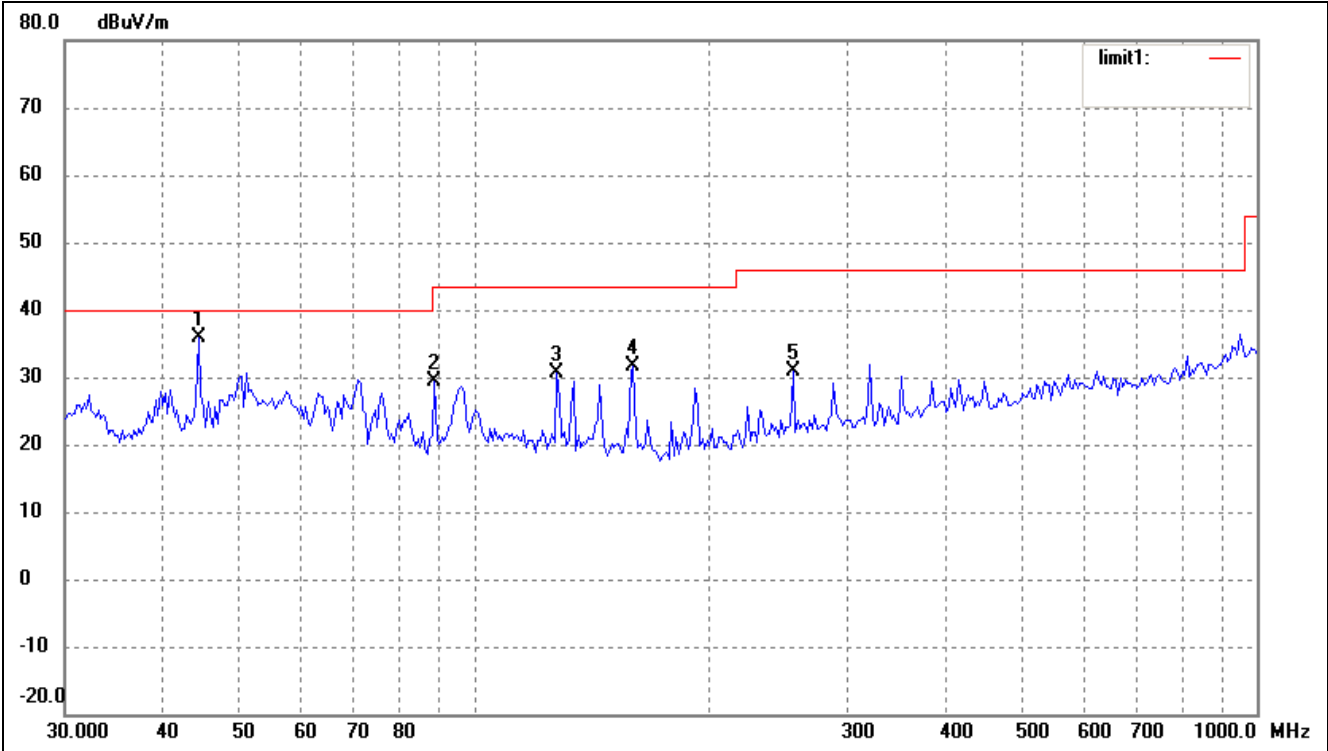
According to the data, the EUT complied with the FCC 15B Class B standards, and had the worst margin of:

-3.16 dBμV at 44.4657 MHz in the Horizontal polarization, 30 MHz to 1 GHz, 3Meters

Plot of Radiation Emissions Test Data*Radiated Disturbance**EUT: Mouse**M/N: MD668**Operating Condition: Running with Program**Test Specification: Horizontal & Vertical**Comment: AC 230V/50Hz connect to PC, USB 5V***Horizontal**

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	44.4657	28.62	8.22	36.84	40.00	-3.16	89	100	QP
2	64.5319	28.04	5.77	33.81	40.00	-6.19	97	200	peak
3	159.7586	30.45	4.53	34.98	43.50	-8.52	64	200	peak
4	223.8482	31.66	7.51	39.17	46.00	-6.83	358	100	peak
5	255.8226	28.22	8.84	37.06	46.00	-8.94	67	100	peak
6	222.2807	26.23	7.41	33.64	46.00	-12.36	84	100	peak
7	191.7841	27.01	6.54	33.55	43.50	-9.95	78	100	peak

Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(°)	(cm)	
1	44.4657	27.65	8.22	35.87	40.00	-4.13	93	200	QP
2	89.1579	22.66	6.80	29.46	43.50	-14.04	56	200	peak
3	127.5865	25.70	4.90	30.60	43.50	-12.90	64	100	peak
4	159.7586	27.20	4.53	31.73	43.50	-11.77	318	100	peak
5	255.8226	21.99	8.84	30.83	46.00	-15.17	48	100	peak