

FCC PART 15.225
EMI MEASUREMENT AND TEST REPORT

For

Power 7 Technology Corporation

2F, No. 176, Jian-Yi Road, Chung-Ho City, Taipei Hsien, Taiwan

FCC ID: TQNNFCENETMIC

June 7, 2006

This Report Concerns: ☒ Original Report	Equipment Type: Transmitter, eNetMouse
Test Engineer: Deny Xiong, Louise Lu and Charmi Peng <i>Deny Xiong Louise Lu Charmi Peng</i>	
Report No.: RSZ06041705	
Test Date: March 30-June 2, 2006	
Reviewed By: <i>[Signature]</i> Boni Baniqued	
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approval, or endorsement by NVLAP, NIST or any agency of the US Government.

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Power 7 Technology Corporation's* product, model number: *NFC* or the "EUT" as referred to in this report is a *eNetMouse*. The EUT is measured approximately 10.6 cm L x 5.7 cm W x 4.0 cm H. rated input voltage: DC 5V(from PC).

** The test data gathered are from production sample, serial number: 0604030, provided by the manufacturer, we received EUT on 2006-4-17.*

Objective

This Type approval report is prepared on behalf of *Power 7 Technology Corporation* in accordance with Part 2, Subpart J, and Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules, sec 15.203, 15.205, 15.207, 15.209 and 15.225.

Related Submittal(s)/Grant(s)

No Related Submittals.

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.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Lab Corp. (ShenZhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Lab Corp. (ShenZhen) to collect radiated and conducted emission measurement data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone, ShenZhen, Guangdong 518038, P.R.China.

Test site at Bay Area Compliance Lab Corp. (ShenZhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 04, 2004. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Lab Corp. (ShenZhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0). The current scope of accreditations can be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2007070.htm>

SYSTEM TEST CONFIGURATION

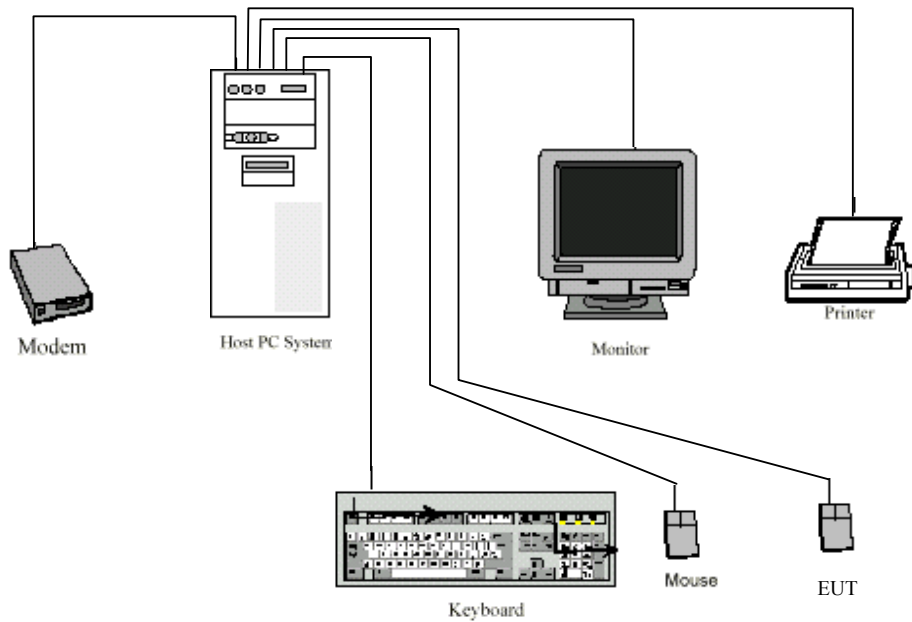
Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

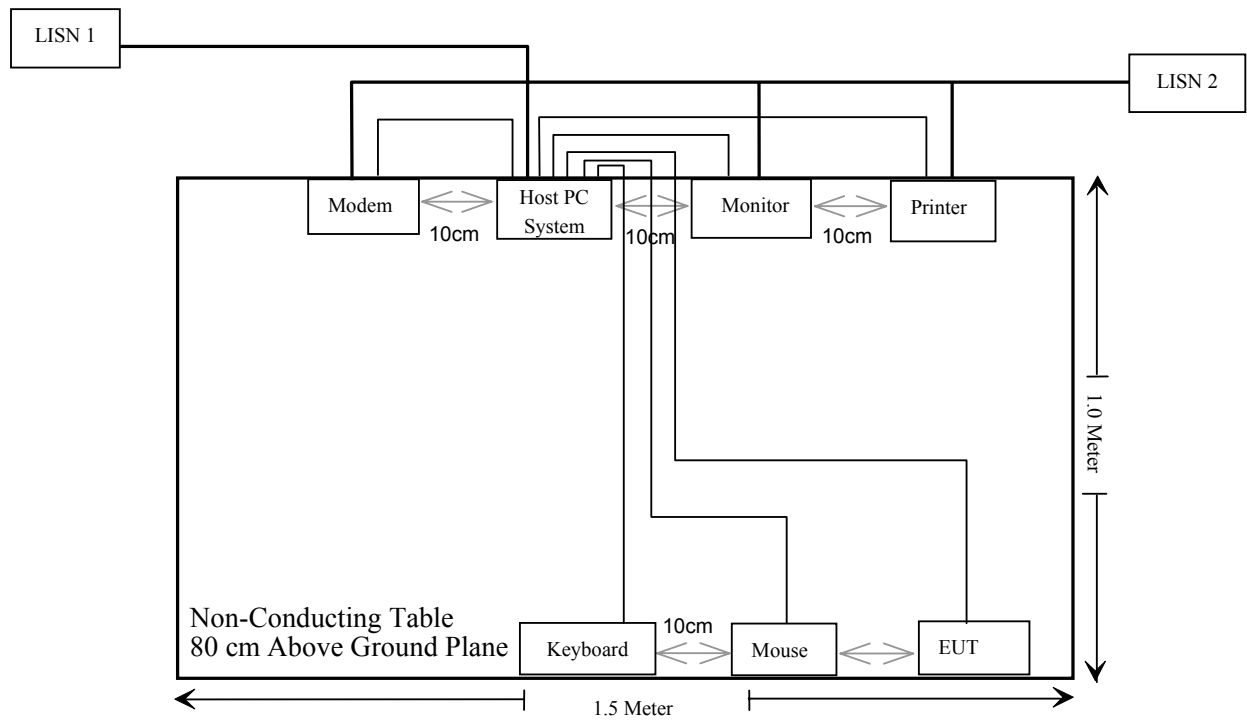
Equipment Modifications

Bay Area Compliance Lab Corp. (ShenZhen) has not done any modification on the EUT.

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.203	Antenna requirement	Compliant
§15.205	Restricted Band of operation	Compliant
§15.207	Conducted Emission	Compliant
§15.209	Radiated Emission Limit	Compliant
§15.225(a)	Field Strength	Compliant
§15.225(b)	Out of band emission	Compliant
§15.225(e)	Frequency Stability	Compliant

§15.203 - ANTENNA REQUIREMENT

Standard Applicable

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

The antenna was build on board, fulfill the requirement of this section.

Test Result: Pass

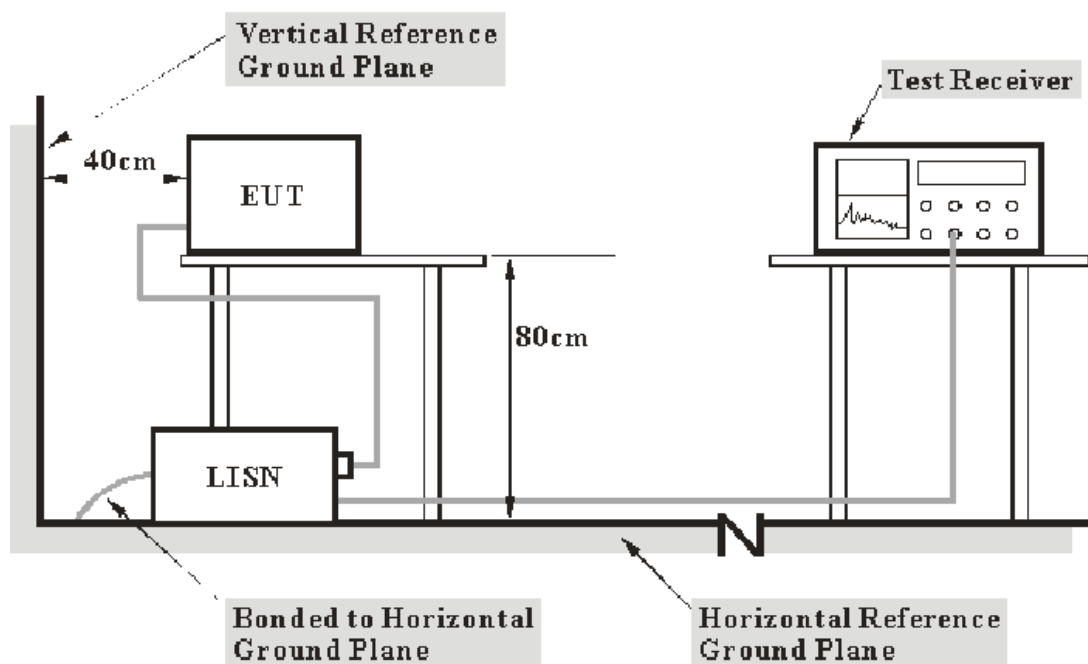
§15.207 - CONDUCTED EMISSION

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Lab Corp. (ShenZhen) is ± 2.4 dB.

EUT Setup



- Note:** 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.207.

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

The host PC was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

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

<i>Frequency Range</i>	<i>IF B/W</i>
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Com-Power	L.I.S.N.	LI-200	12005	N/A	N/A
Com-Power	L.I.S.N.	LI-200	12008	N/A	N/A
Rohde & Schwarz	EMI Test Receiver	ESCS30	100035	2005-8-17	2006-8-17
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2006-3-1	2007-3-1

* Com-Power's LISN were used as the supporting equipment.

* **Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

During the conducted emission test, the host PC was connected to the outlet of the first LISN, and all other support equipment power cords were connected to the outlet of the second LISN.

Maximizing procedure were performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, with the worst margin reading of:

-7.68 dB at 2.750 MHz in the Live conductor mode.

Test Data**Environmental Conditions**

Temperature:	27 °C
Relative Humidity:	58 %
ATM Pressure:	1000mbar

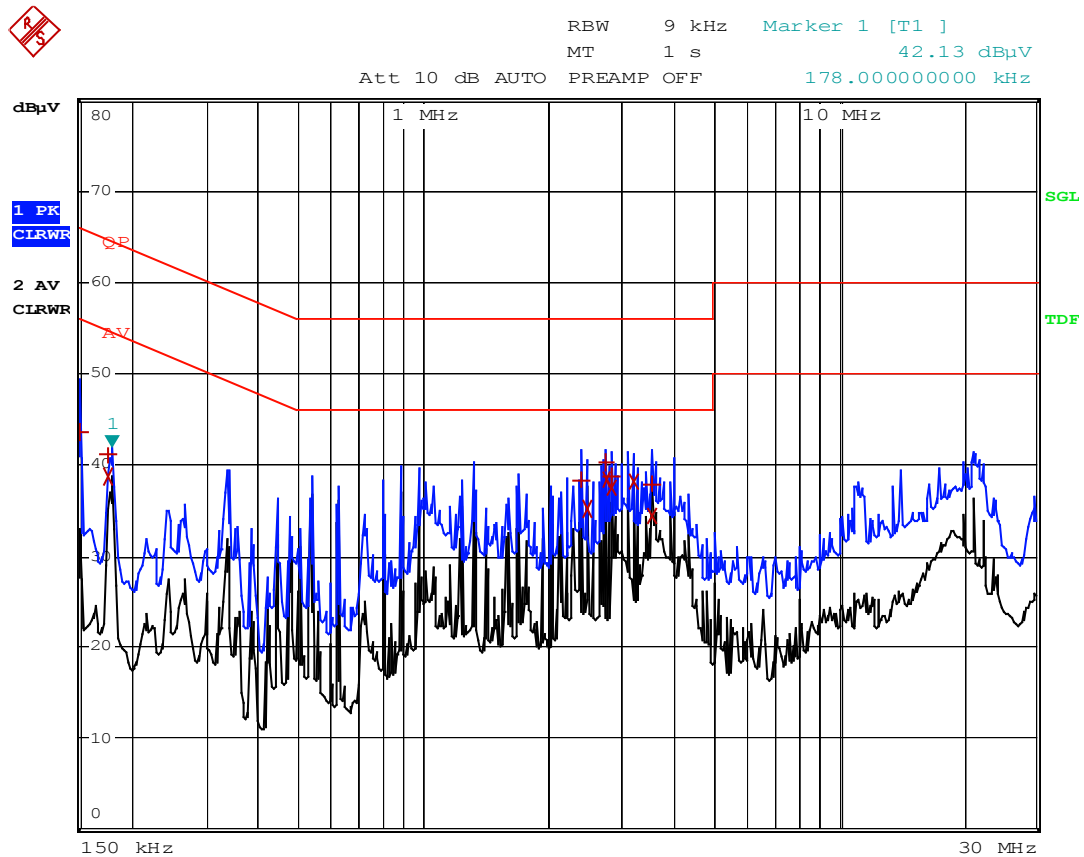
The testing was performed by Louise Lu on 2006-4-20.

Test Mode: Transmitting

LINE CONDUCTED EMISSIONS				FCC PART 15.207	
Frequency MHz	Amplitude dBμV	Detector QP/AV	Phase Live/Neutral	Limit dBμV	Margin dB
2.750	38.32	AV	Live	46.00	-7.68
3.194	38.19	AV	Live	46.00	-7.81
2.838	37.54	AV	Live	46.00	-8.46
2.482	35.10	AV	Live	46.00	-10.90
3.546	34.43	AV	Live	46.00	-11.57
0.886	34.07	AV	Neutral	46.00	-11.93
0.974	33.70	AV	Neutral	46.00	-12.30
0.178	41.29	AV	Neutral	54.58	-13.29
2.750	40.25	QP	Live	56.00	-15.75
0.178	38.70	AV	Live	54.58	-15.88
2.478	29.95	AV	Neutral	46.00	-16.05
0.334	32.48	AV	Neutral	49.35	-16.87
2.838	38.64	QP	Live	56.00	-17.36
2.394	38.30	QP	Live	56.00	-17.70
3.546	37.90	QP	Live	56.00	-18.10
0.266	32.56	AV	Neutral	51.24	-18.68
0.178	43.30	QP	Neutral	64.58	-21.28
0.334	37.99	QP	Neutral	59.35	-21.36
0.150	43.57	QP	Live	66.00	-22.43
0.178	40.95	QP	Live	64.58	-23.63
0.266	35.47	QP	Neutral	61.24	-25.77
0.386	30.20	QP	Neutral	58.15	-27.95
0.734	28.03	QP	Neutral	56.00	-27.97
12.342	27.42	QP	Neutral	60.00	-32.58

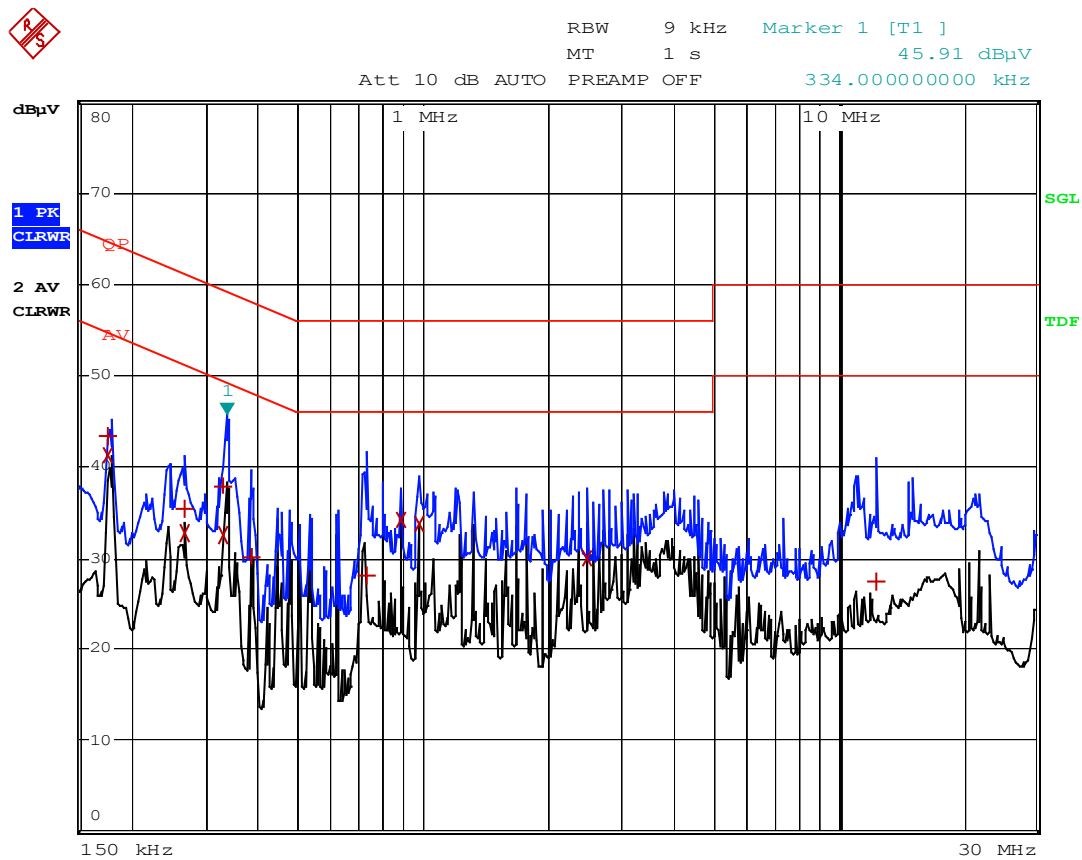
Plot(s) of Test Data

Plot(s) of Test Data is presented hereinafter as reference.



Power 7 eNetMouse M/N: NFC Running L

Date: 20.APR.2006 11:29:02



Power 7 eNetMouse M/N: NFC Running N

Date: 20.APR.2006 11:21:35

§15.205, §15.209, §15.225(a) - RADIATED EMISSIONS TEST

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Lab Corp. (ShenZhen) is ± 4.0 dB.

The fundamental data was recorded in average detection mode: set the VBW AVE on, then record the data.

EUT Setup

The radiated emission tests were performed in the 3-meter chamber A test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC Part Subpart C limits.

EMI Test Receiver Setup

According to FCC Rules, 47 CFR 15.33, the EUT emissions were investigated from 13.56 MHz to 1000 MHz.

During the radiated emission test, the EMI test Receiver was set with the following configurations:

<i>Frequency Range</i>	<i>RBW</i>	<i>Video B/W</i>
Below 30 MHz	10 kHz	30 kHz
30 – 1000 MHz	100 kHz	300 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447E	1937A01046	2005-8-17	2006-8-17
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2005-8-17	2006-8-17
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2005-4-28	2006-4-28
ETS	Passive Loop Antenna	6512	00029604	2005-4-26	2006-4-26

* **Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Corrected Amplitude & Margin Calculation

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

$$\text{Corr. Ampl.} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.209 & FCC 15.225, with the worst margin reading of:

30 MHz –1000 MHz: **-1.95 dB** at **531.96 MHz** in the **Vertical** polarization.
9 KHz-30 MHz: **-19.0 dB** at **13.49 MHz** in the polarization.

Test Data**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	53 %
ATM Pressure:	1010 mbar

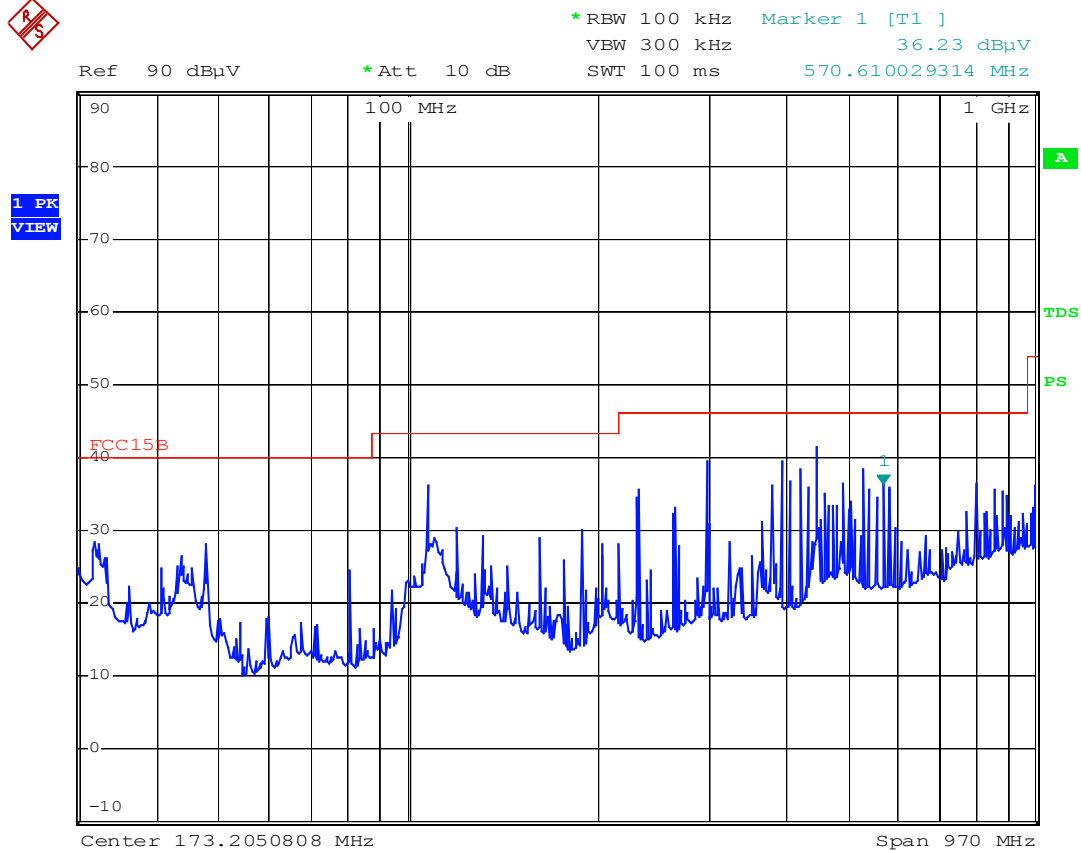
The testing was performed by Deny Xiong on 2006-3-30.

Test mode: Transmitting

INDICATED		TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC PART 15.209&15.225		
Frequency MHz	Meter Reading dBμV/m	Angle Degree	Height Meter	Polar H/ V	Antenna Loss dB	Cable Loss dB	Amplifier Gain dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB	Remark
30 MHz –1000 MHz											
531.96	49.68	45	1.2	V	18.60	3.03	27.26	44.1	46.00	-1.95*	PK
570.61	49.41	90	1.2	V	19.20	2.99	27.79	43.8	46.00	-2.19*	PK
47.99	36.40	45	1.0	V	10.80	0.44	27.01	37.7	40.00	-2.32*	PK
499.55	42.23	45	1.0	H	18.20	2.77	27.88	41.4	46.00	-4.60	PK
299.31	49.69	35	3.8	V	13.80	2.61	26.48	39.6	46.00	-6.38	PK
299.31	40.64	180	1.2	H	13.80	2.61	26.48	39.4	46.00	-6.60	PK
108.26	23.64	289	1.0	H	11.00	1.16	26.78	36.0	43.50	-7.46	PK
232.53	46.60	60	1.2	V	11.70	2.17	26.44	37.8	46.00	-8.19	PK
422.05	44.67	35	3.8	V	16.80	3.18	27.35	37.3	46.00	-8.70	PK
234.16	37.98	45	1.2	H	11.70	2.17	26.44	35.5	46.00	-10.48	PK
47.99	31.26	289	1.0	H	10.80	0.44	27.01	28.1	40.00	-11.91	PK
162.61	32.23	60	1.0	H	12.70	1.92	26.90	29.0	43.50	-14.46	PK
9 KHz-30 MHz											
13.49	34.50	60	1.0	/	32.3	1.5	26.8	41.5	60.5	-19.0	PK
13.35	32.50	180	1.2	/	32.3	1.5	26.8	39.5	60.5	-21.0	PK
13.77	30.83	45	1.2	/	32.3	1.5	26.8	37.8	60.5	-22.7	PK
13.64	33.33	60	1.0	/	32.3	1.5	26.8	40.3	70.5	-30.2	PK
13.43	33.17	90	1.0	/	32.3	1.5	26.8	40.2	70.5	-30.3	PK
13.70	32.00	45	1.2	/	32.3	1.5	26.8	39.0	70.5	-31.5	PK
13.56	51.33	60	1.2	/	32.3	1.5	26.8	58.3	104.0	-45.7	PK

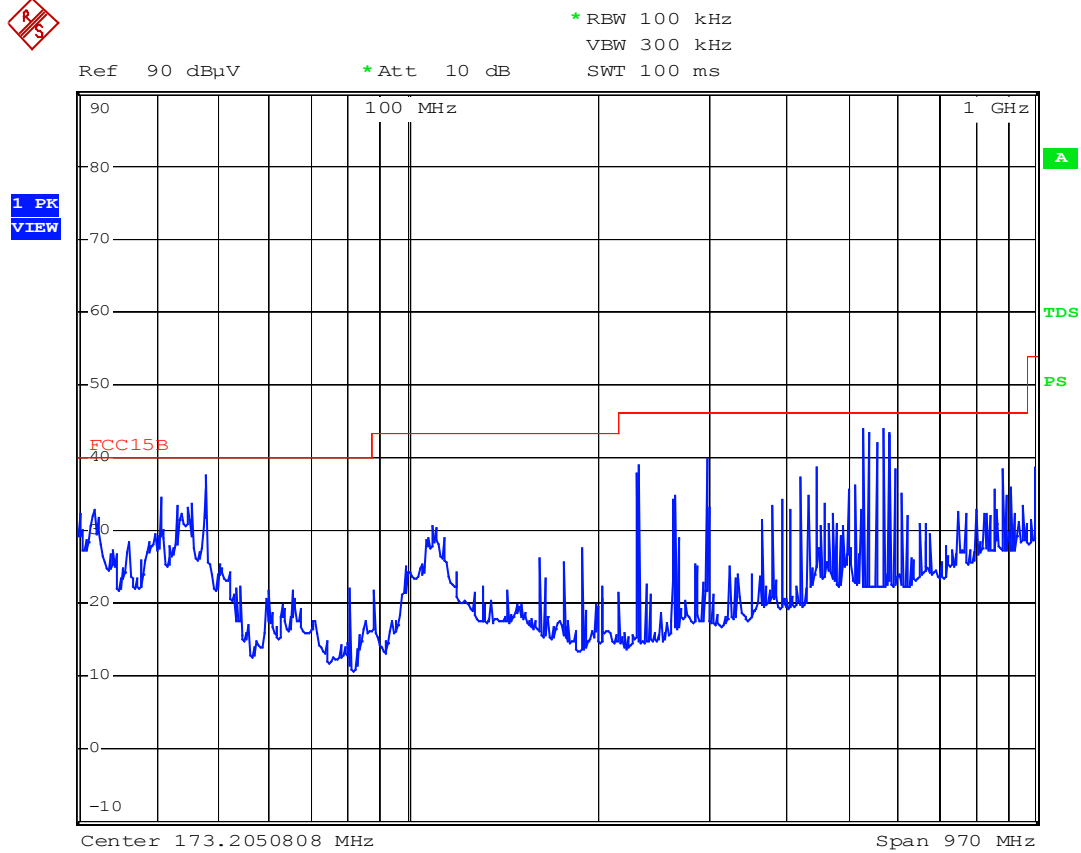
Plot(s) of Test Data

Plot(s) of Test Data is presented hereinafter as reference.



NFC MOUSE long Radiation Horizontal

Date: 30.MAR.2006 16:49:37



NFC MOUSE long Radiation Vertical

Date: 30.MAR.2006 16:41:00

§15.225(b) - Out of Band Emission**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2005-8-17	2006-8-17
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2005-8-17	2006-8-17
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2006-4-28	2007-4-28

* **Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Test Data**Environmental Conditions**

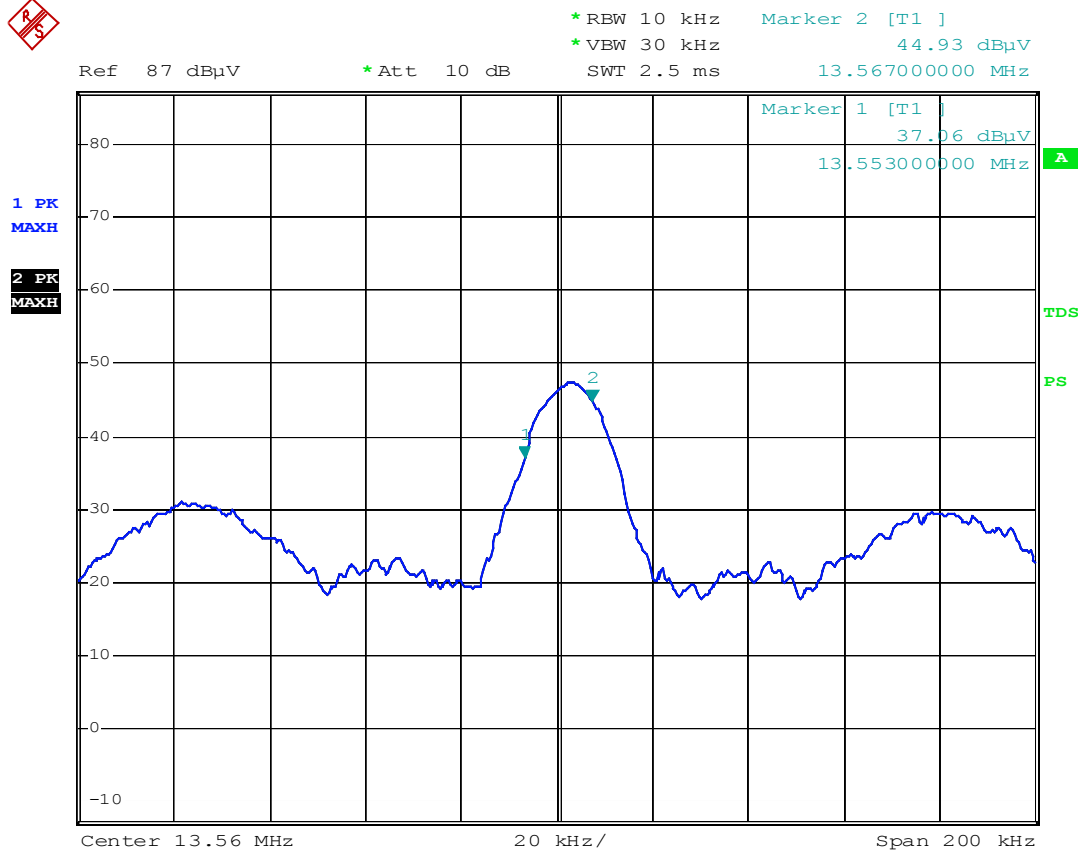
Temperature:	25 °C
Relative Humidity:	53 %
ATM Pressure:	1010 mbar

The testing was performed by Deny Xiong on 2006-6-2.

The result has been complied with the 15.225(b), see the following plot:

Frequency MHz	Emission dBμV/m	Limit dBμV/m	Margin dB
13.553	37.06	70.47	-33.41
13.567	44.93	70.47	-25.54

Test Result: Pass



eNetMouse out of band3

Date: 2.JUN.2006 13:44:42

§15.225(e)- FREQUENCY STABILITY

Applicable Standard

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to $+50$ degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde&Schwarz	EMI Test Receiver	ESCI	100035	2005-8-17	2006-8-17

* **Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a f Spectrum Analyzer via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the Spectrum Analyzer.

Frequency Stability vs. Voltage: An external variable DC power supply Source. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the end point. The output frequency was recorded for each voltage.

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	1005mbar

The testing was performed by Charmi Peng on 2006-4-28.

Test Result: Pass

Test Mode: Transmitting

Reference Frequency: 13.557802MHz, Limit: 100 ppm			
Environment Temperature (°C)	Power Supplied (Vdc)	Frequency Measure with Time Elapsed	
		MCF (MHz)	PPM Error
50	120	13.557822	1.475
40	120	13.557820	1.328
30	120	13.557818	1.180
20	120	13.557802	0.000
10	120	13.557791	-0.811
0	120	13.557772	-2.213
-10	120	13.557743	-4.352
-20	120	13.557720	-6.048

Frequency Stability Versus Input Voltage

Reference Frequency: 13.557802 MHz, Limit: 100 ppm		
Power Supplied (Vdc)	Frequency Measure with Time Elapsed	
	Frequency (MHz)	PPM Error
102	13.557795	-0.516
138	13.557803	0.074