

FCC PART 15.109
MEASUREMENT AND TEST REPORT
FOR

Guangzhou Aolong Electronic Technology Co., Ltd.

**No.2, Hualian Industry District, No.3 Economic Zone, Lianbian Village, Xinshi
Town, Baiyun District, Guangzhou, China**

FCC ID: UZMKB2362

Report Concerns: Original Report	Equipment Type: Computer Keyboard
Model: <u>2362</u>	
Report No.: <u>STR09028018I</u>	
Test/Witness Engineer: <u>Seven Song</u>	
Test Date: <u>2009-02-09 to 2009-02-11</u>	
Issue Date: <u>2009-02-14</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:	
<u>Jandy So / PSQ Manager</u>	

Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permission 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: Guangzhou Aolong Electronic Technology Co., Ltd.
Address of applicant: No.2, Hualian Industry District, No.3 Economic Zone,
Lianbian Village, Xinshi Town, Baiyun District, Guangzhou,
China

Manufacturer: Guangzhou Aolong Electronic Technology Co., Ltd.
Address of manufacturer: No.2, Hualian Industry District, No.3 Economic Zone,
Lianbian Village, Xinshi Town, Baiyun District, Guangzhou,
China

General Description of E.U.T

Items	Description
EUT Description:	Computer Keyboard
Trade Name:	Aisonic
Model No.:	2362
Adding Models:	2168 2169 2361 2368 2369 006M
Rated Voltage:	DC 5V
Rate Current:	250mA
Packaging Size:	13.0X8.8X1.5 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. Test is carried out with 2362 since the other models listed in this report are different appearance without circuit and electronic construction changed, declared by the manufacturer.

1.2 Test Standards

The following report is prepared on behalf of the Guangzhou Aolong Electronic 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

FCC – Registration No.: **994117**

SEM.Test Compliance Services Co., Ltd. EMC 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 our files and the Registration is 994117.

Industry Canada (IC) Registration No.: **7673A**

The 3m Semi-anechoic chamber of SEM.Test Compliance Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 7673A.

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. under the Windows XP terminal.

1.7 Accessories Equipment List and Details

Manufacturer	Description	Model	Serial Number
Lenovo	PC	T22	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	1.4	Unshielded	Without 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

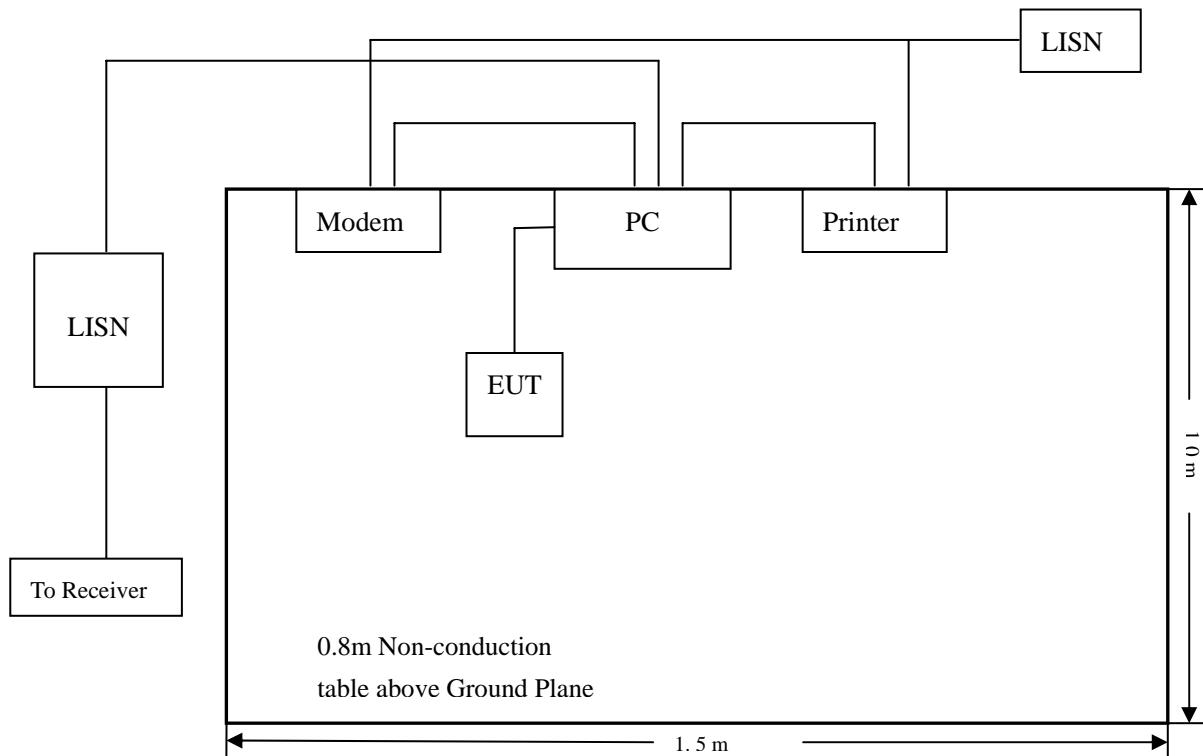
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2008-07-08	2009-07-07
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2008-07-08	2009-07-07
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2008-07-08	2009-07-07
AMN	Rohde & Schwarz	ESH3-Z5	828304/014	2008-07-08	2009-07-07

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:	25 °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

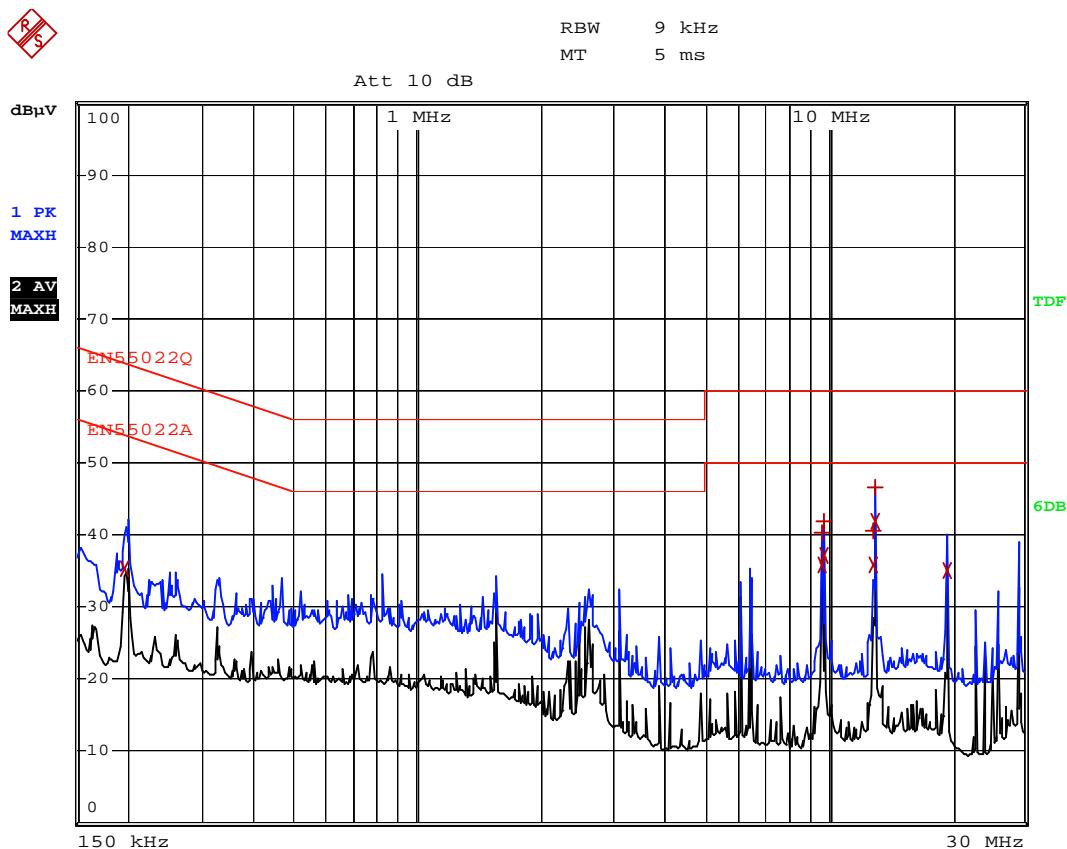
3.7 Summary of Test Results/Plots

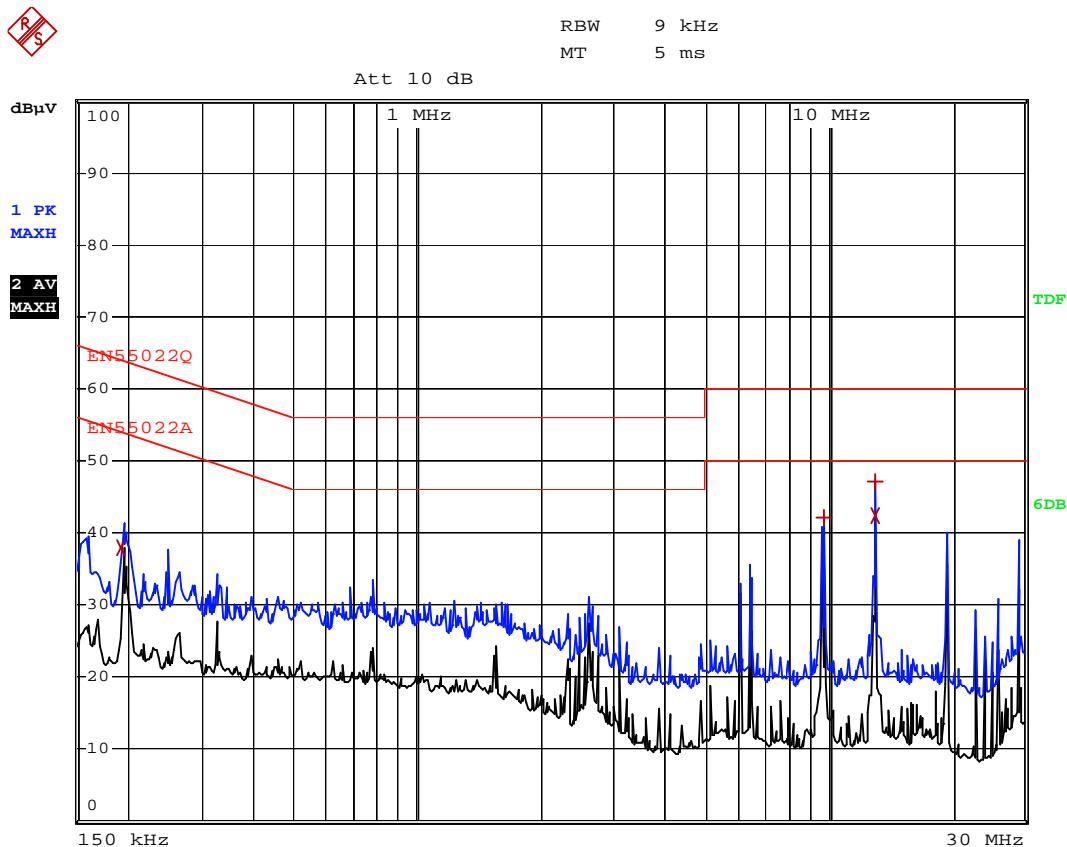
According to the data in section 3.8, the EUT complied with the FCC 15B Conducted margin for a Class B device, with the *worst* margin reading of:

-7.6 dB μ V at 12.97 MHz in the Line mode, Ave detector, 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
12.97	42.37	Ave	Line	50.00	-7.6
12.97	41.87	Ave	Neutral	50.00	-8.1
9.738	37.24	Ave	Neutral	50.00	-12.8
12.77	47.06	Pk	Line	60.00	-12.9
12.97	46.52	Pk	Neutral	60.00	-13.5
9.69	35.86	Ave	Neutral	50.00	-14.1
12.92	35.89	Ave	Neutral	50.00	-14.1
19.43	34.92	Ave	Neutral	50.00	-15.1
0.194	37.83	Ave	Line	53.86	-16.0
9.738	43.17	Pk	Line	60.00	-16.8
9.738	41.93	Pk	Neutral	60.00	-18.1
0.198	35.38	Ave	Neutral	53.69	-18.3
12.92	40.48	Pk	Neutral	60.00	-19.5
9.69	40.22	Pk	Neutral	60.00	-19.8

Plot of Conducted Emissions Test Data*Conducted Disturbance**EUT: Computer Keyboard**M/N: 2362**Operating Condition: Running with Program**Test Specification: N**Comment: AC 120V/60Hz connect to PC, USB 5V*

Plot of Conducted Emissions Test Data*Conducted Disturbance**EUT: Computer Keyboard**M/N: 2362**Operating Condition: Running with Program**Test Specification: L**Comment: AC 120V/60Hz 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

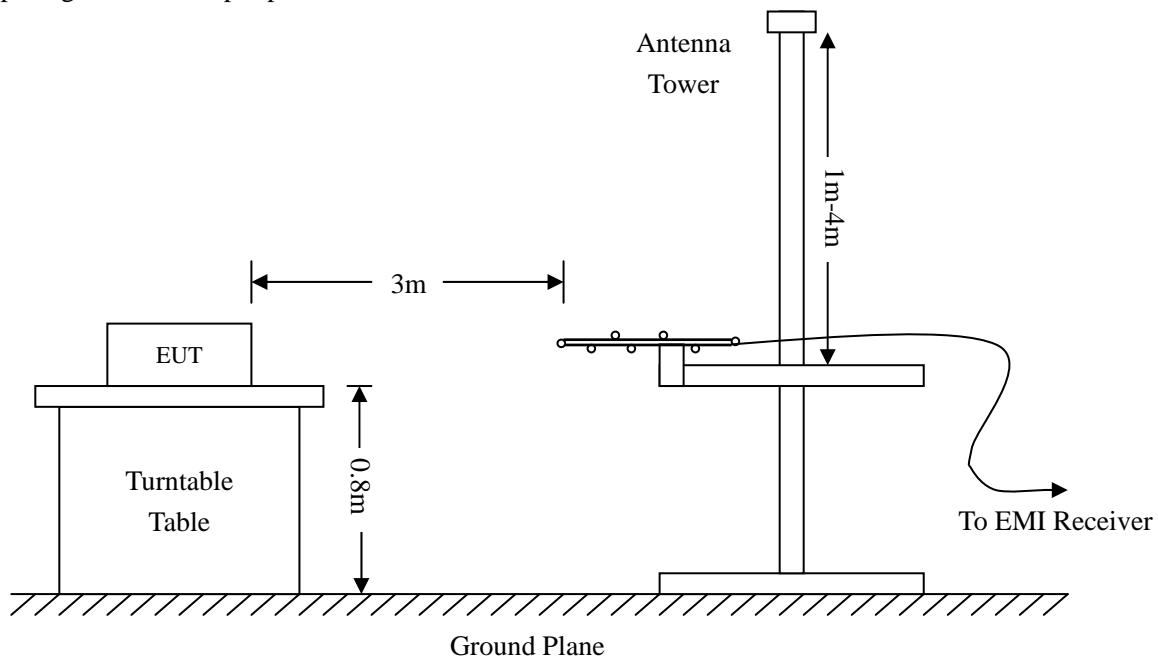
Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSEA20	DE25181	2008-07-08	2009-07-07
Positioning Controller	C&C	CC-C-1F	N/A	2008-07-08	2009-07-07
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2008-07-08	2009-07-07
Horn Antenna	SCHWARZBECK	BBHX 9120	9120-426	2008-07-08	2009-07-07
RF Switch	EM	EMSW18	SW060023	2008-07-08	2009-07-07
Amplifier	Agilent	8447F	3113A06717	2008-07-08	2009-07-07
Coaxial Cable	SCHWARZBECK	AK9513	9513-10	2008-07-08	2009-07-07
EMI Test Receiver	ROHDE&SCHWARZ	ESPI	25498514	2008-07-08	2009-07-07

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 -6dB μ V means the emission is 6dB μ V below the maximum limit for Class B. The equation for margin calculation is as follows:

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

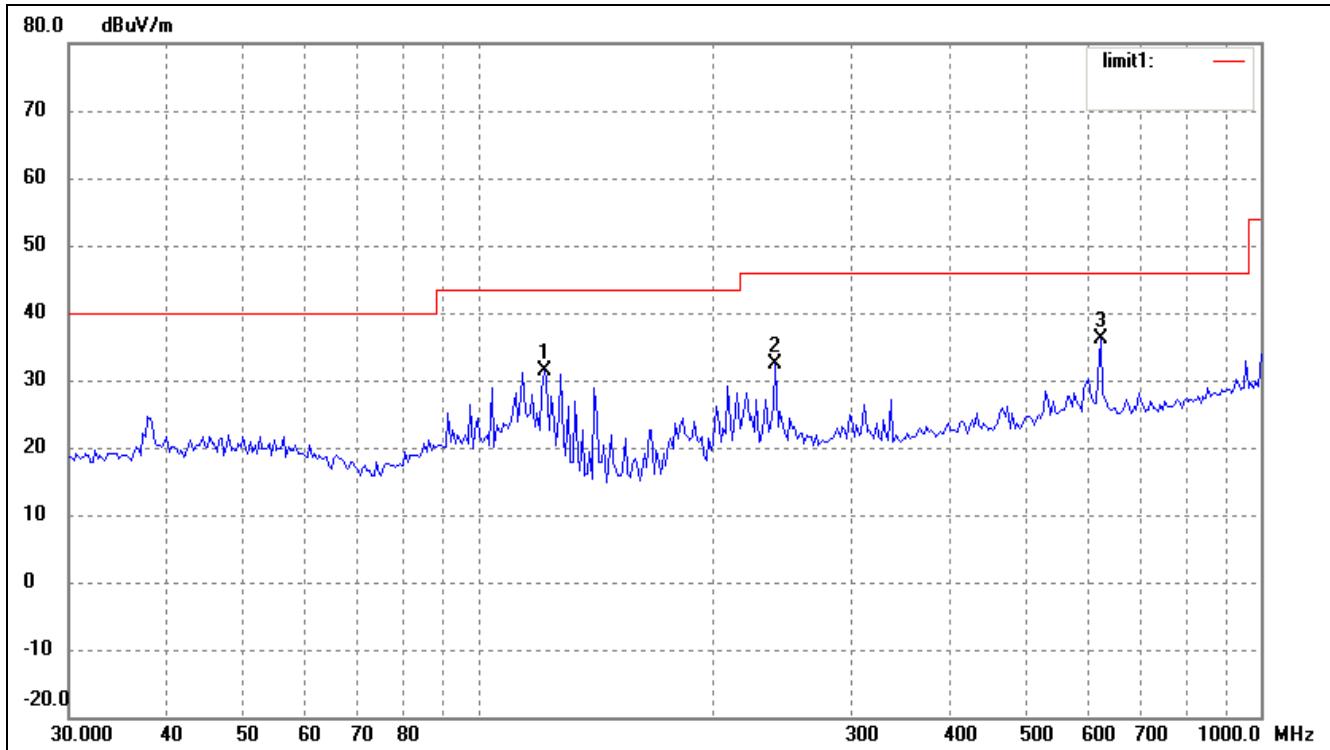
4.6 Environmental Conditions

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

4.7 Summary of Test Results/Plots

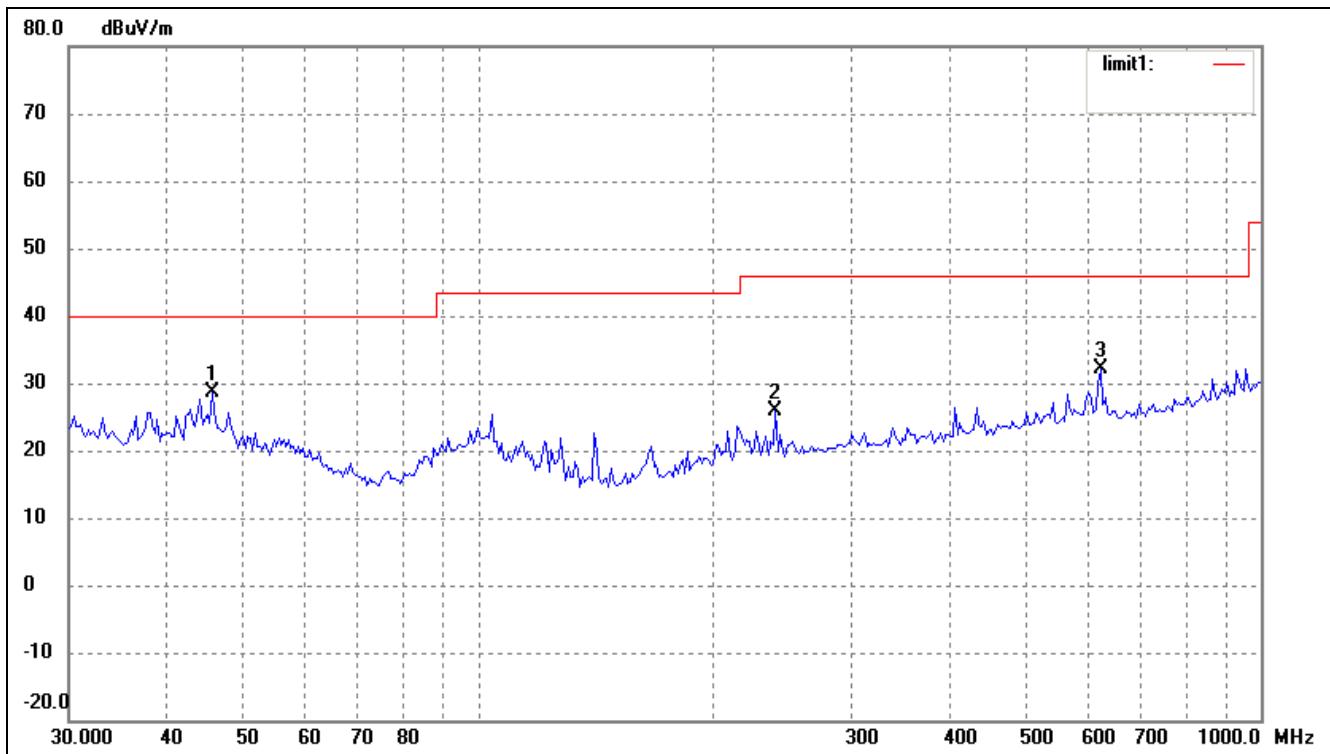
According to the data, the EUT complied with the FCC 15B Class B standards, and had the worst margin of:

-9.96 dB μ V at 624.4897 MHz in the Horizontal polarization, 30 MHz to 1 GHz, 3Meters

Plot of Radiation Emissions Test Data*Radiated Disturbance**EUT: Computer Keyboard**M/N: 2362**Operating Condition: Running with Program**Test Specification: Horizontal & Vertical**Comment: AC 120V/60Hz 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	121.4623	26.42	5.06	31.48	43.50	-12.02	121	100	peak
2	240.1442	24.93	7.44	32.37	46.00	-13.63	100	100	peak
3	624.4897	23.48	12.56	36.04	46.00	-9.96	248	200	peak

Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	45.7333	20.60	7.95	28.55	40.00	-11.45	231	100	peak
2	240.1442	18.37	7.44	25.81	46.00	-20.19	100	200	peak
3	624.4897	19.51	12.56	32.07	46.00	-13.93	22	200	peak

***** END OF REPORT *****