

# 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: WFL1108**

<b>Report Concerns:</b> Original Report	<b>Equipment Type:</b> PC Camera
<b>Model:</b>	<u>258-1108</u>
<b>Report No.:</b>	<u>STR08068123I</u>
<b>Test/Witness Engineer:</b>	<u>Susan Su</u>
<b>Test Date:</b>	<u>2008-07-07 to 2008-07-15</u>
<b>Issued Date:</b>	<u>2008-07-15</u>
<b>Prepared By:</b>	<b>SEM.Test Compliance Service Co., Ltd.</b> 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.C. (518101)
<b>Approved &amp; Authorized By:</b>	 _____ 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:	PC Camera
Trade Name:	eloam
Model No.:	258-1108
Rated Voltage:	USB 5V
Packaging Size:	4.5X4.5X.9.6 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
Lenovo	Display	LXM-L17AAB	4M0233274805856
TP-LINK	Modem	TM-EC5658V	KT99CTQC-508
Lenovo	Printer	3110	OD65133711480
Lenovo	Host	M2620V	N/A
Lenovo	Mouse	M028UOL	23-095827 077
Lenovo	Keyboard	LXB-CH0507	07G00501394D

### 1.8 EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
USB Cable	1.45	Shielded	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  $\pm 1.5$  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

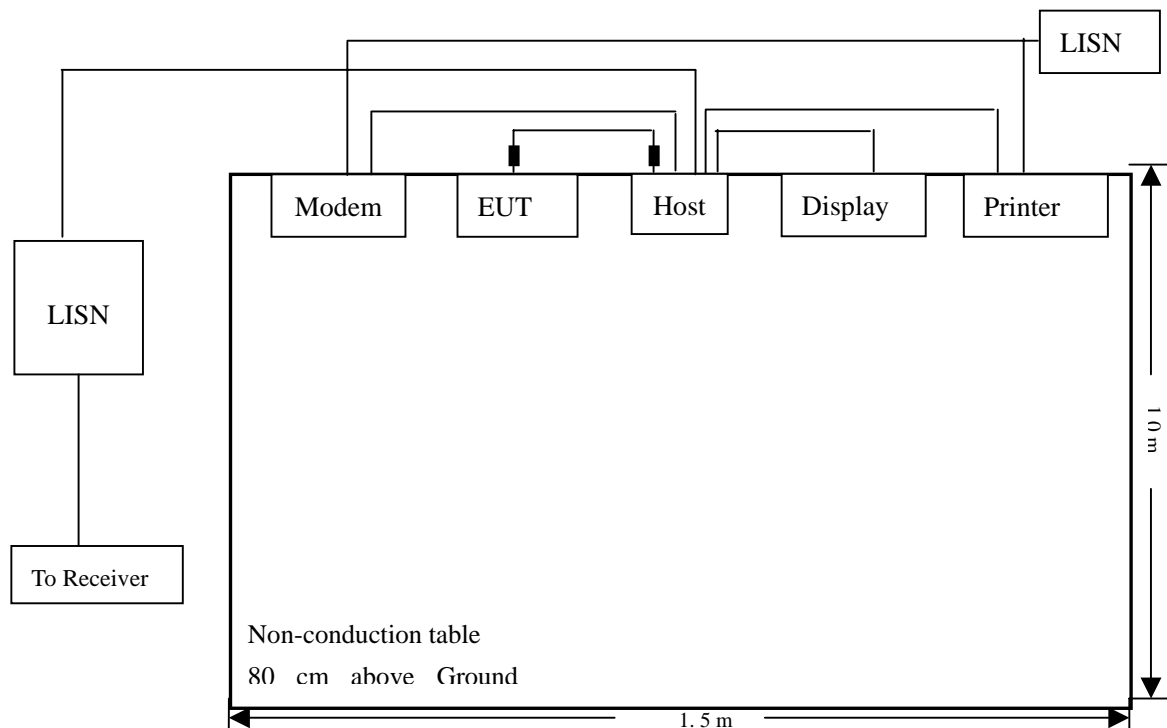
#### 3.3 Test Procedure

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:

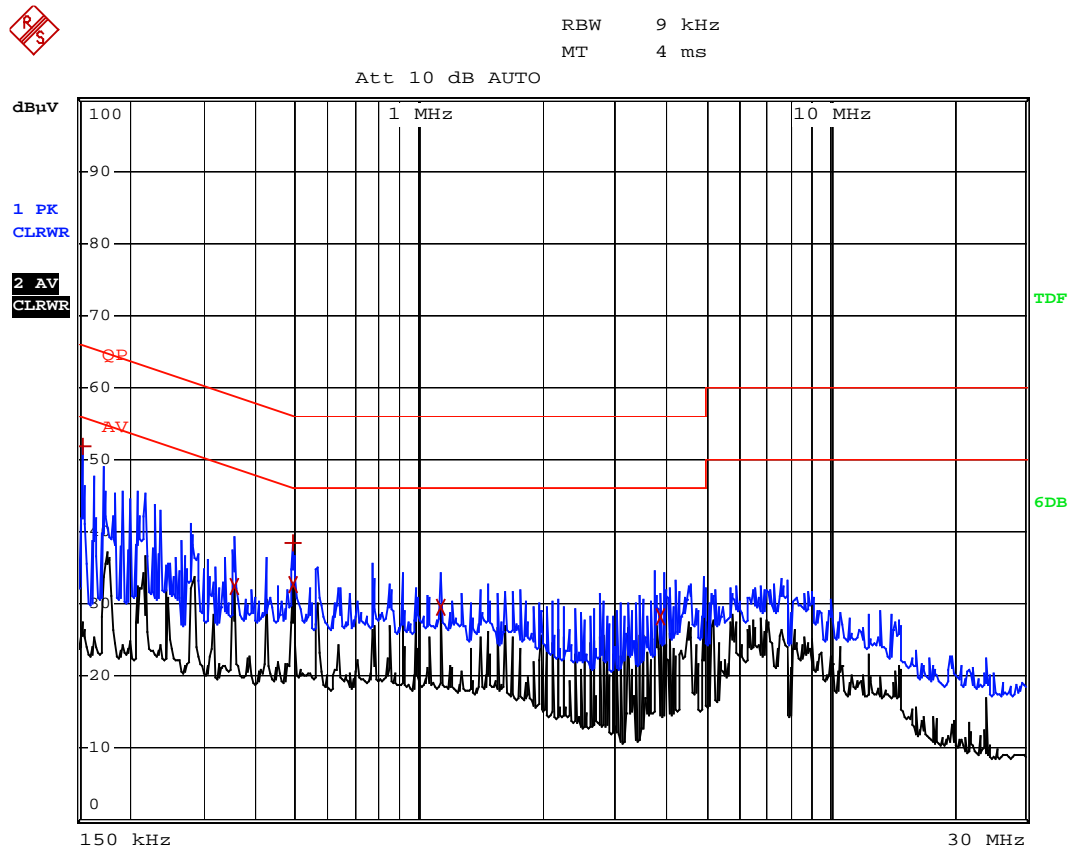
**-13.4 dB $\mu$ V at 0.494 MHz in the Neutral mode, 0.15-30MHz**

### 3.8 Conducted Emissions Test Data

LINE CONDUCTED EMISSIONS				FCC 15 CLASS B	
Frequency	Amplitude	Detector	Phase	Limit	Margin
MHz	dB $\mu$ V	QP/Ave/Pk	Line/Neutral	dB $\mu$ V	dB
0.494	32.73	Ave	Neutral	46.10	-13.4
0.154	51.78	Pk	Neutral	65.78	-14.0
0.150	51.37	Pk	Line	66.00	-14.6
0.166	49.76	Pk	Line	65.16	-15.4
0.354	32.50	Ave	Neutral	48.87	-16.4
1.130	29.62	Ave	Neutral	46.00	-16.4
0.214	46.10	Pk	Line	63.05	-16.9
0.186	47.19	Pk	Line	64.21	-17.0
0.158	48.06	Pk	Line	65.57	-17.5
0.494	38.45	Pk	Neutral	56.10	-17.7
3.886	28.26	Ave	Neutral	46.00	-17.7
0.202	44.04	Pk	Line	63.53	-19.5
0.494	31.64	Ave	Line	56.10	-24.5
4.594	30.70	Ave	Line	56.00	-25.3
0.210	37.82	Ave	Line	63.21	-25.4
0.282	35.25	Ave	Line	60.76	-25.5
0.354	32.07	Ave	Line	58.87	-26.8
0.174	37.77	Ave	Line	64.77	-27.0

Plot of Conducted Emissions Test Data

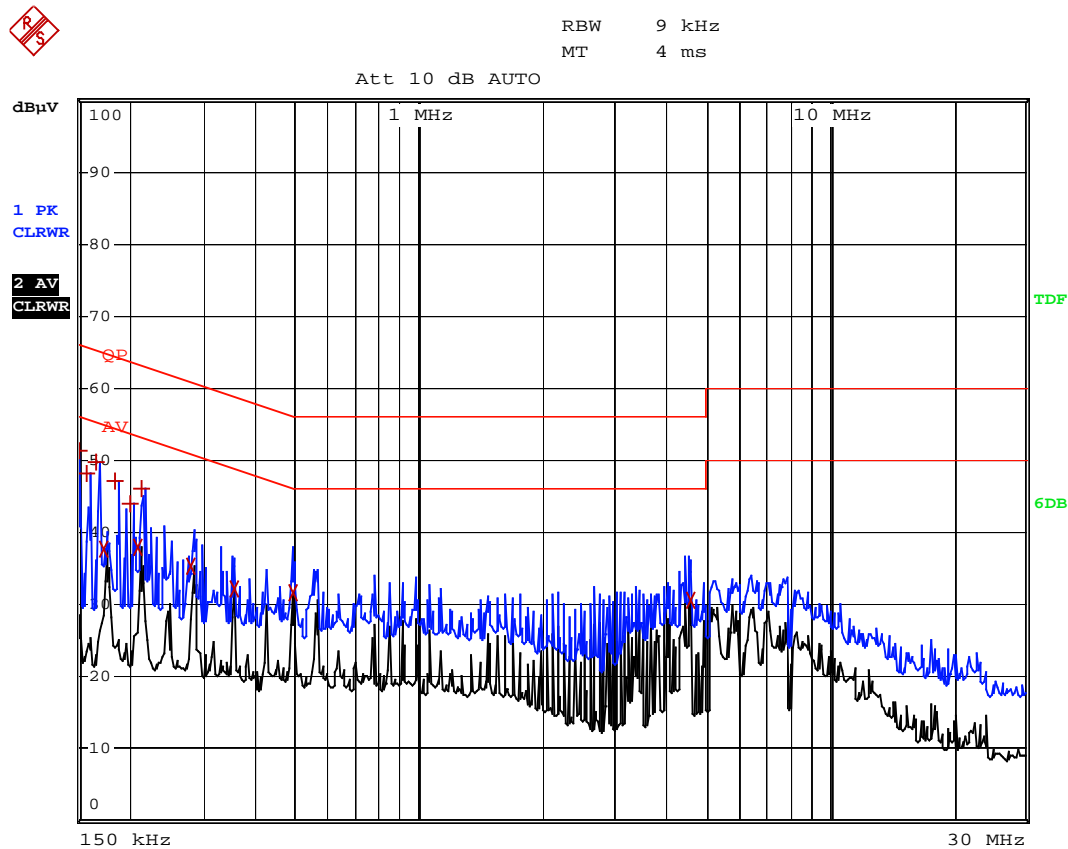
Conducted Disturbance  
EUT: PC Camera  
M/N: 258-1108  
Operating Condition: Running with Program  
Test Specification: N  
Comment: AC 120V/60Hz connect to PC, USB 5V





Plot of Conducted Emissions Test Data

Conducted Disturbance  
EUT: PC Camera  
M/N: 258-1108  
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  $\pm 3.0$  dB.

### 4.2 Test Equipment List and Details

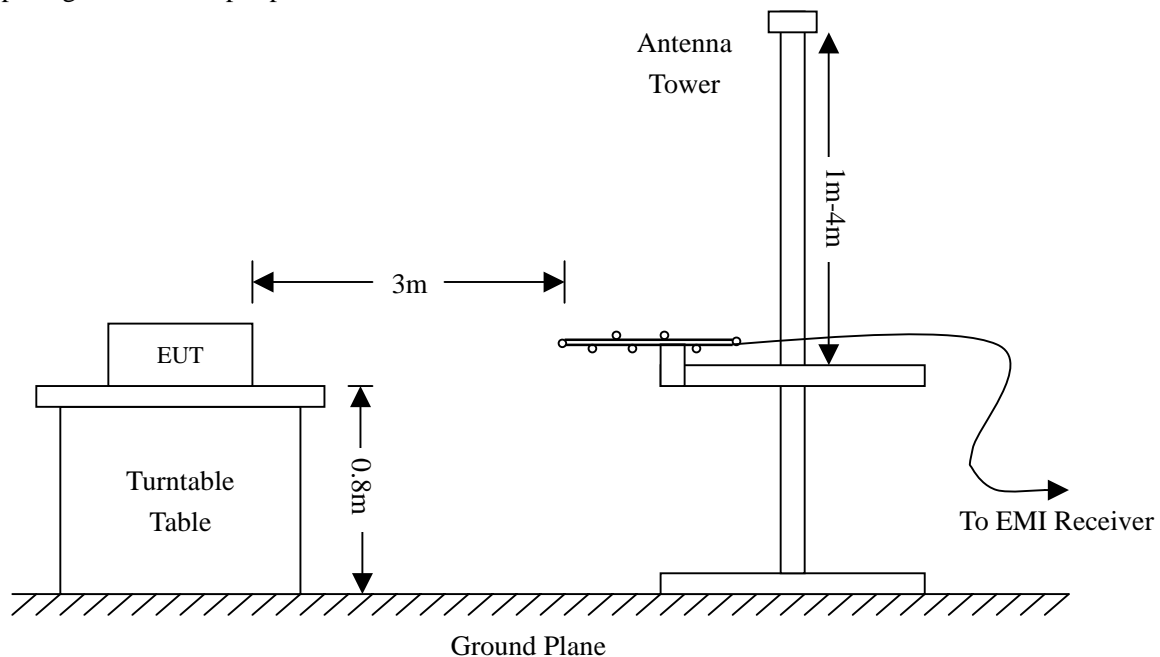
Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSEA20	DE25181	2008-01-25	2009-01-24
Positioning Controller	C&C	CC-C-1F	N/A	2008-01-25	2009-01-24
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2008-01-25	2009-01-24
Horn Antenna	SCHWARZBECK	BBHX 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 -6dB $\mu$ V means the emission is 6dB $\mu$ 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:

**-2.94 dB $\mu$ V at 569.9688 MHz in the Vertical polarization, 30 MHz to 1 GHz, 3Meters**

Plot of Radiation Emissions Test Data

Radiated Disturbance

EUT: PC Camera

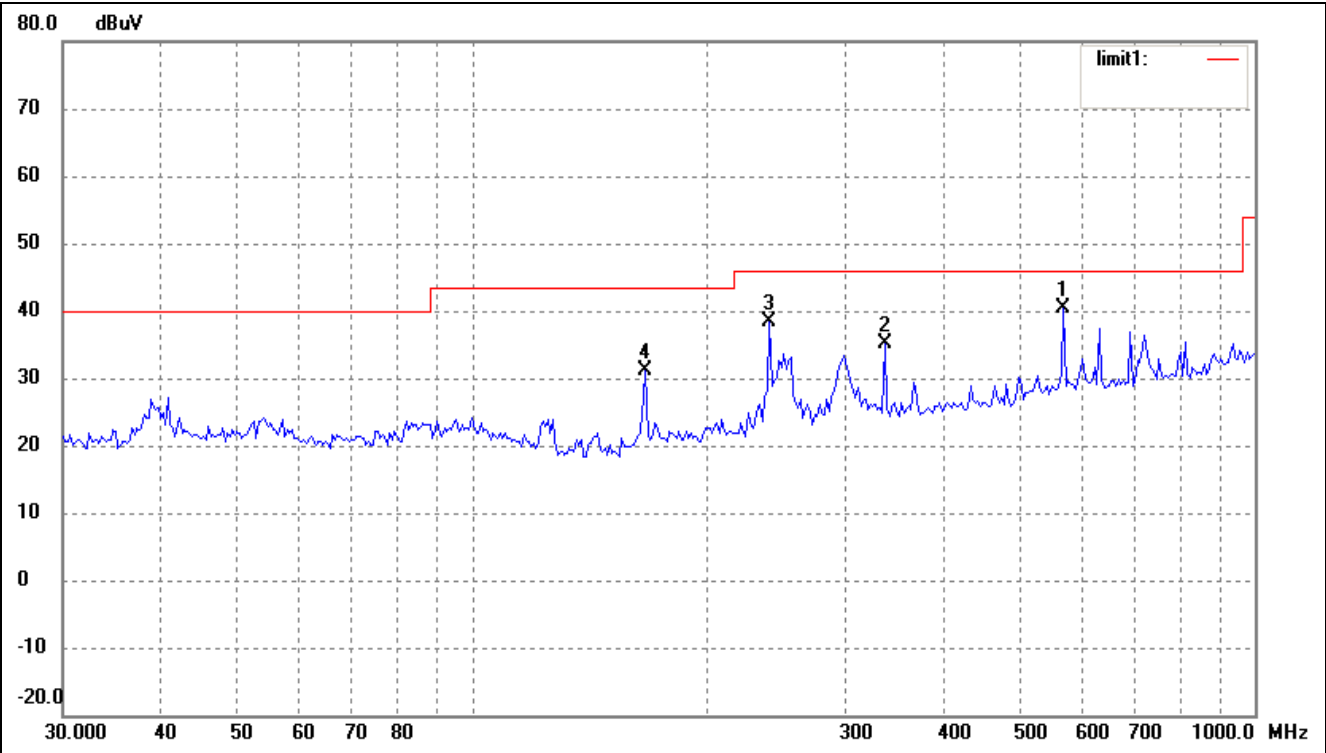
M/N: 258-1108

Operating Condition: Running with Program

Test Specification: Horizontal & Vertical

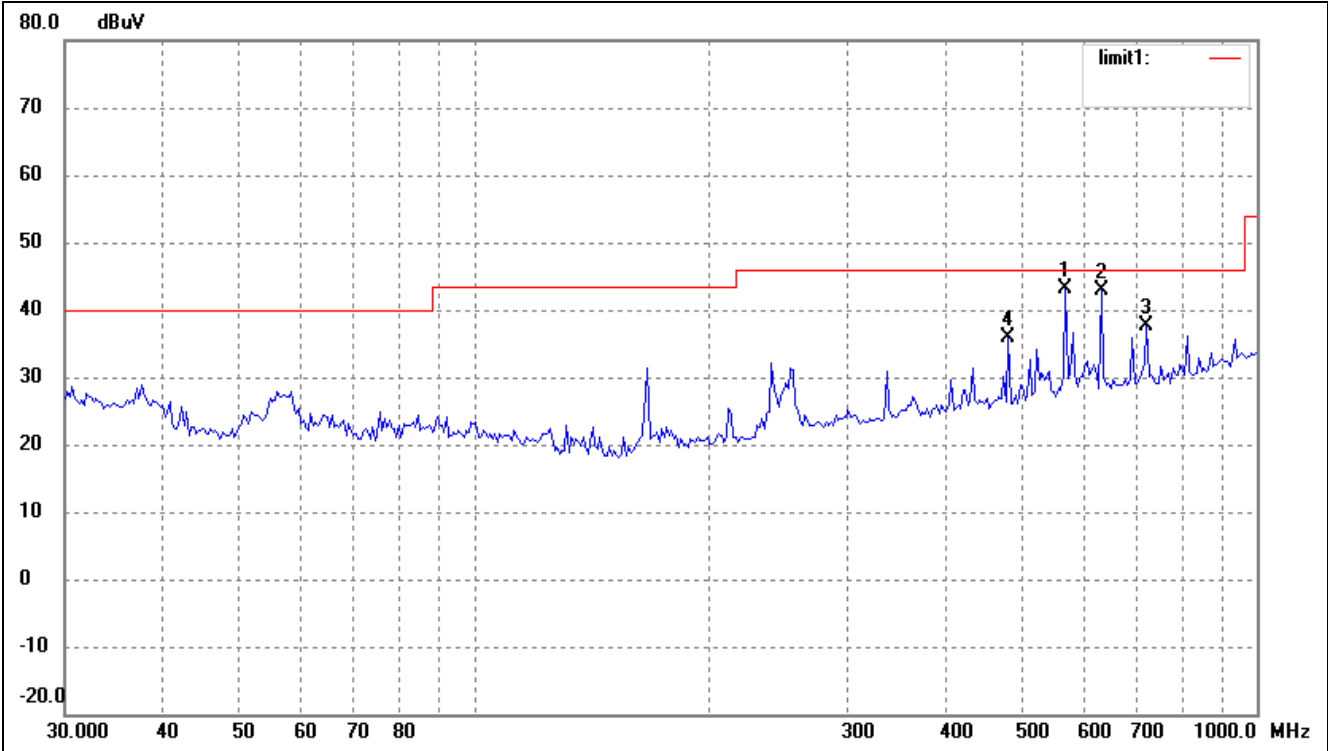
Comment: AC 120V/60Hz connect to PC, USB 5V

Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	( ° )	(cm)	
1	569.9688	26.84	13.64	40.48	46.00	-5.52	292	200	peak
2	336.4817	24.80	10.35	35.15	46.00	-10.85	67	100	peak
3	240.1442	29.83	8.43	38.26	46.00	-7.74	84	100	peak
4	166.6385	26.36	4.77	31.13	43.50	-12.37	24	100	peak

Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	( ° )	(cm)	
1	569.9688	29.42	13.64	43.06	46.00	-2.94	309	100	QP
2	633.3285	28.48	14.28	42.76	46.00	-3.24	67	100	QP
3	723.7930	22.96	14.74	37.70	46.00	-8.30	36	100	peak
4	481.5112	24.38	11.53	35.91	46.00	-10.09	54	100	peak