

FCC PART 15.109

MEASUREMENT AND TEST REPORT

FOR

SHENZHEN TENDA TECHNOLOGY CO., LTD.

3F, MOSO INDUSTRIAL BUILDING, NO.1031, LIMING ROAD XILI TOWN,

NANSHAN DISTRICT, Shenzhen, China.

FCC ID: V7TS108

Report Concerns: Original Report	Equipment Type: 8-Port 10/100Mbps Fast Ethernet Switch
Model:	<u>S108</u>
Report No.:	<u>STR09088011I</u>
Test/Witness Engineer:	<i>Seven Song</i>
Test Date:	<u>2009-08-03 to 2009-08-08</u>
Issue Date:	<u>2009-08-09</u>
Prepared By:	<p style="text-align: center;">SEM.Test Compliance Service Co., Ltd. 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.C. (518101)</p>
Approved & Authorized By:	<p style="text-align: center;"><i>Jandy So</i></p> <hr style="width: 20%; margin: auto;"/> <p style="text-align: center;">Jandy So / PSQ Manager</p>

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.

TABLE OF CONTENTS

1. GENERAL INFORMATION.....3

- 1.1 PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT).....3
- 1.2 TEST STANDARDS.....3
- 1.3 RELATED SUBMITTAL(S)/GRANT(S)3
- 1.4 TEST METHODOLOGY3
- 1.5 TEST FACILITY4
- 1.6 EUT EXERCISE SOFTWARE4
- 1.7 ACCESSORIES EQUIPMENT LIST AND DETAILS4
- 1.8 EUT CABLE LIST AND DETAILS4

2. SUMMARY OF TEST RESULTS5

3. §15.107 (A)- CONDUCTED EMISSION6

- 3.1 MEASUREMENT UNCERTAINTY6
- 3.2 TEST EQUIPMENT LIST AND DETAILS6
- 3.3 TEST PROCEDURE.....6
- 3.4 BASIC TEST SETUP BLOCK DIAGRAM.....6
- 3.5 ENVIRONMENTAL CONDITIONS7
- 3.6 TEST RECEIVER SETUP7
- 3.7 SUMMARY OF TEST RESULTS/PLOTS7
- 3.8 CONDUCTED EMISSIONS TEST DATA.....7

4. §15.109(A)- RADIATED EMISSION10

- 4.1 MEASUREMENT UNCERTAINTY10
- 4.2 TEST EQUIPMENT LIST AND DETAILS10
- 4.3 TEST PROCEDURE.....10
- 4.4 TEST RECEIVER SETUP11
- 4.5 CORRECTED AMPLITUDE & MARGIN CALCULATION.....11
- 4.6 ENVIRONMENTAL CONDITIONS11
- 4.7 SUMMARY OF TEST RESULTS/PLOTS11

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: SHENZHEN TENDA TECHNOLOGY CO., LTD.
 Address of applicant: 3F, MOSO INDUSTRIAL BUILDING, NO.1031, LIMING ROAD XILI TOWN, NANSHAN DISTRICT, Shenzhen, China.

Manufacturer: SHENZHEN TENDA TECHNOLOGY CO., LTD.
 Address of manufacturer: 3F, MOSO INDUSTRIAL BUILDING, NO.1031, LIMING ROAD XILI TOWN, NANSHAN DISTRICT, Shenzhen, China.

General Description of E.U.T

Items	Description
EUT Description:	8-Port 10/100Mbps Fast Ethernet Switch
Trade Name:	Tenda
Model No.:	S108
Rated Voltage:	AC 120V/60Hz Adapter: AC 9V
Rated Current:	0.6A
Rated Power:	5.4W
Packaging Size:	14.0X9.3X3.3 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 TENDA 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
IBM	Notebook	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
Power Cable	1.8	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

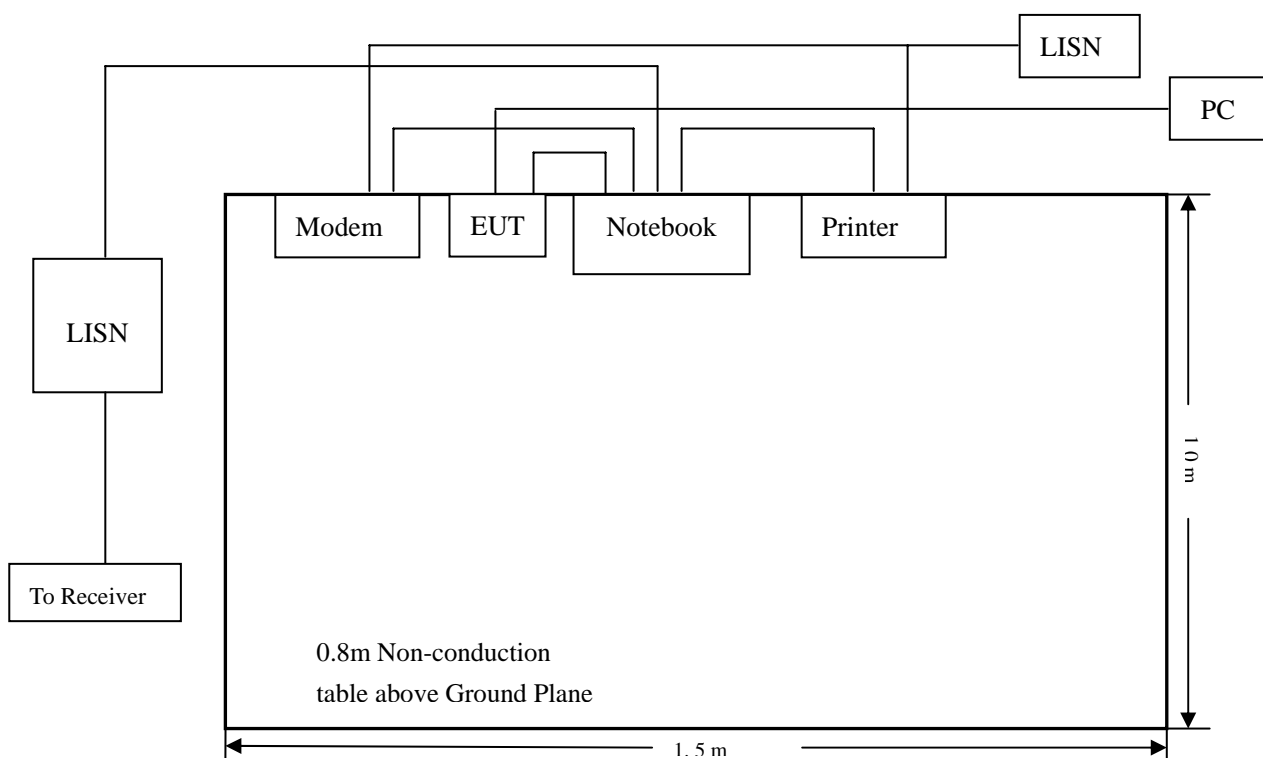
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2009-07-08	2010-07-07
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2009-07-08	2010-07-07
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2009-07-08	2010-07-07
AMN	Rohde & Schwarz	ESH3-Z5	828304/014	2009-07-08	2010-07-07

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:

-13.7 dBµV at 23.13 MHz in the Neutral 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	dBµV	QP/Ave/Pk	Line/Neutral	dBµV	dB
23.13	36.30	Ave	Neutral	50.00	-13.7
23.13	34.91	Ave	Line	50.00	-15.1
4.286	28.04	Ave	Line	46.00	-18.0
23.13	40.42	Pk	Neutral	60.00	-19.6
0.274	39.65	Pk	Line	61.00	-21.3
0.218	39.32	Pk	Neutral	62.89	-23.6
0.210	39.46	Pk	Line	63.21	-23.7
0.166	39.15	Pk	Neutral	65.16	-26.0

Plot of Conducted Emissions Test Data

Conducted Disturbance

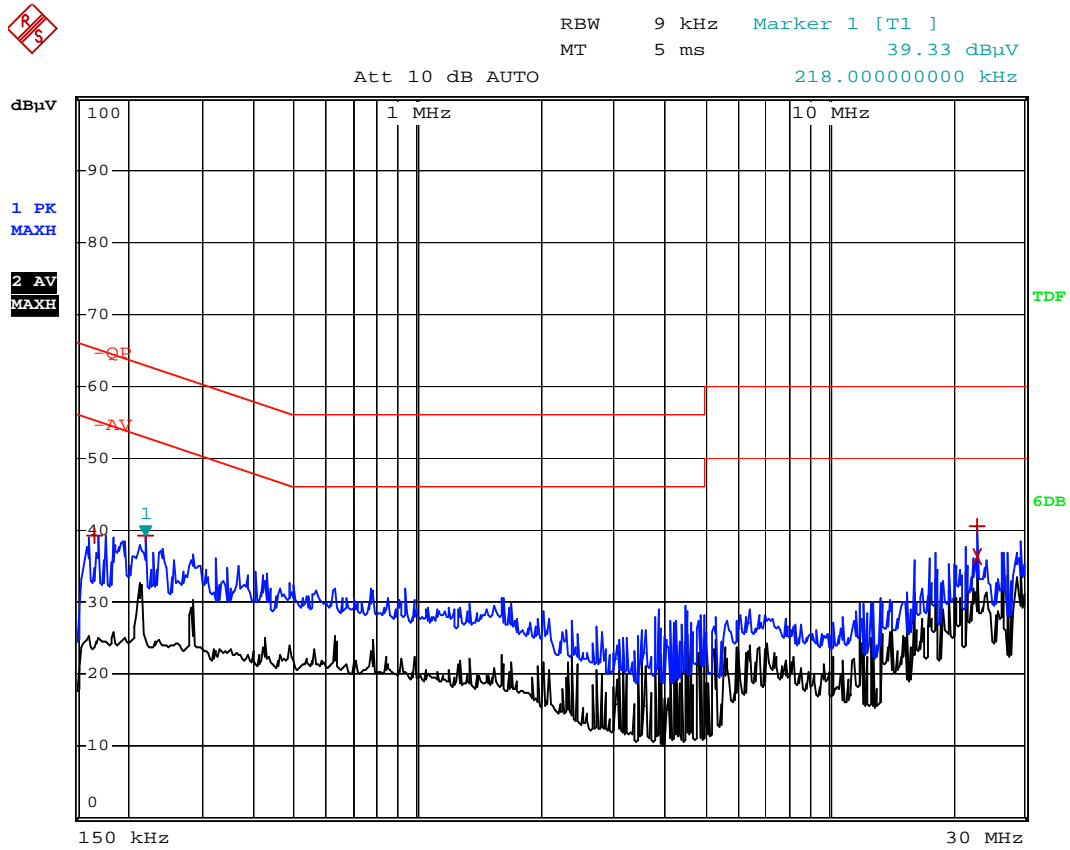
EUT: 8-Port 10/100Mbps Fast Ethernet Switch

M/N: S108

Operating Condition: Running with Program

Test Specification: N

Comment: AC 120V/60Hz Adapter AC 9V



Plot of Conducted Emissions Test Data

Conducted Disturbance

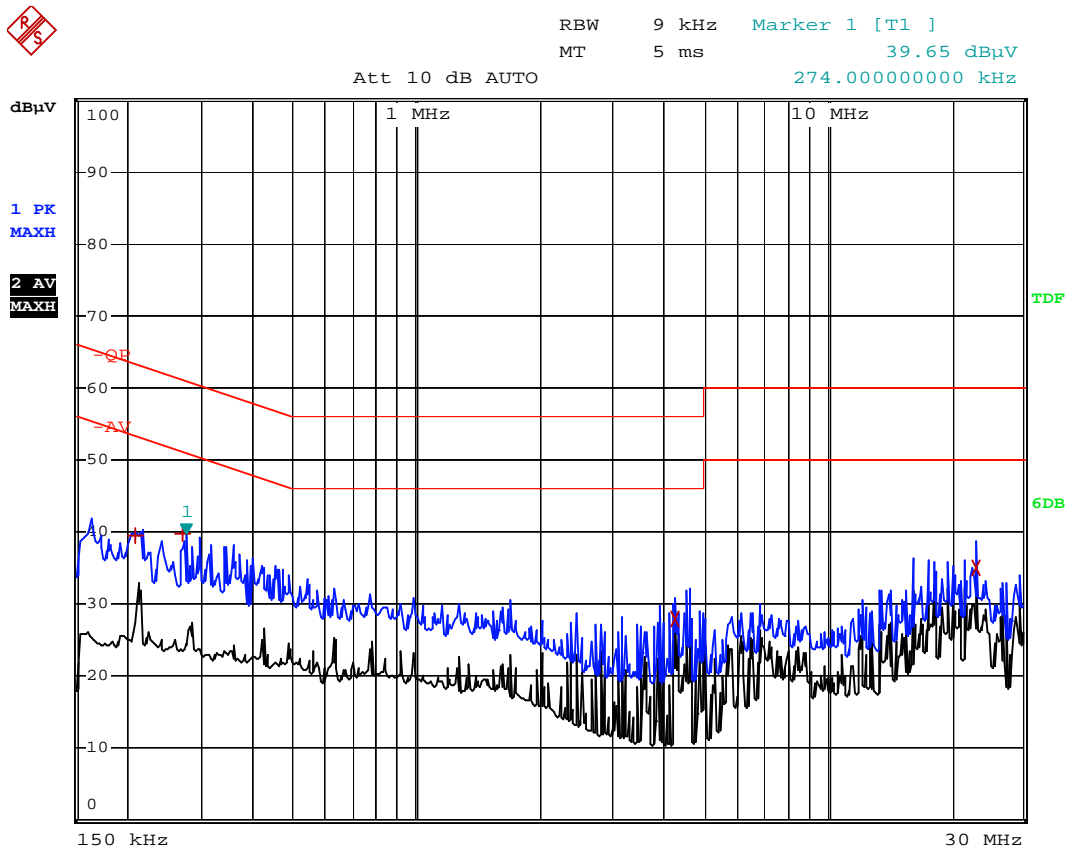
EUT: 8-Port 10/100Mbps Fast Ethernet Switch

M/N: S108

Operating Condition: Running with Program

Test Specification: L

Comment: AC 120V/60Hz Adapter AC 9V



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

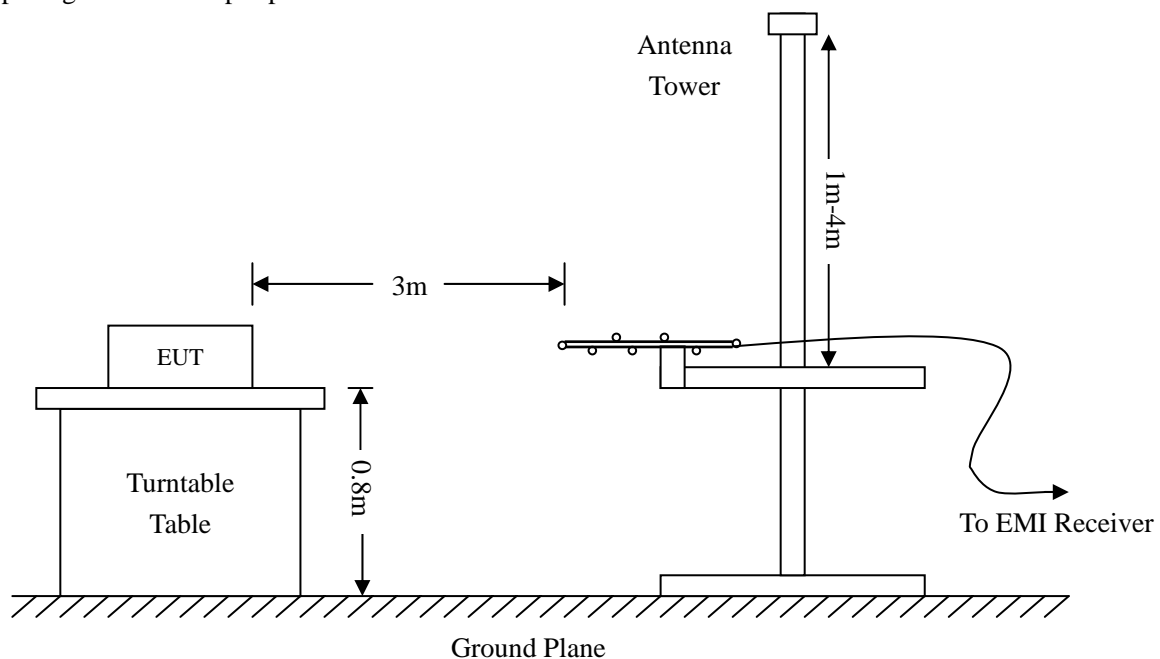
Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSEA20	DE25181	2009-07-08	2010-07-07
Positioning Controller	C&C	CC-C-1F	N/A	2009-07-08	2010-07-07
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2009-07-08	2010-07-07
Horn Antenna	SCHWARZBECK	BBHX 9120	9120-426	2009-07-08	2010-07-07
RF Switch	EM	EMSW18	SW060023	2009-07-08	2010-07-07
Amplifier	Agilent	8447F	3113A06717	2009-07-08	2010-07-07
Coaxial Cable	SCHWARZBECK	AK9513	9513-10	2009-07-08	2010-07-07
EMI Test Receiver	ROHDE&SCHWARZ	ESPI	25498514	2009-07-08	2010-07-07

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 -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:

-3.94 dBμV at 43.8452MHz in the Vertical polarization, 30 MHz to 1 GHz, 3Meters

Plot of Radiation Emissions Test Data

Radiated Disturbance

EUT: 8-Port 10/100Mbps Fast Ethernet Switch

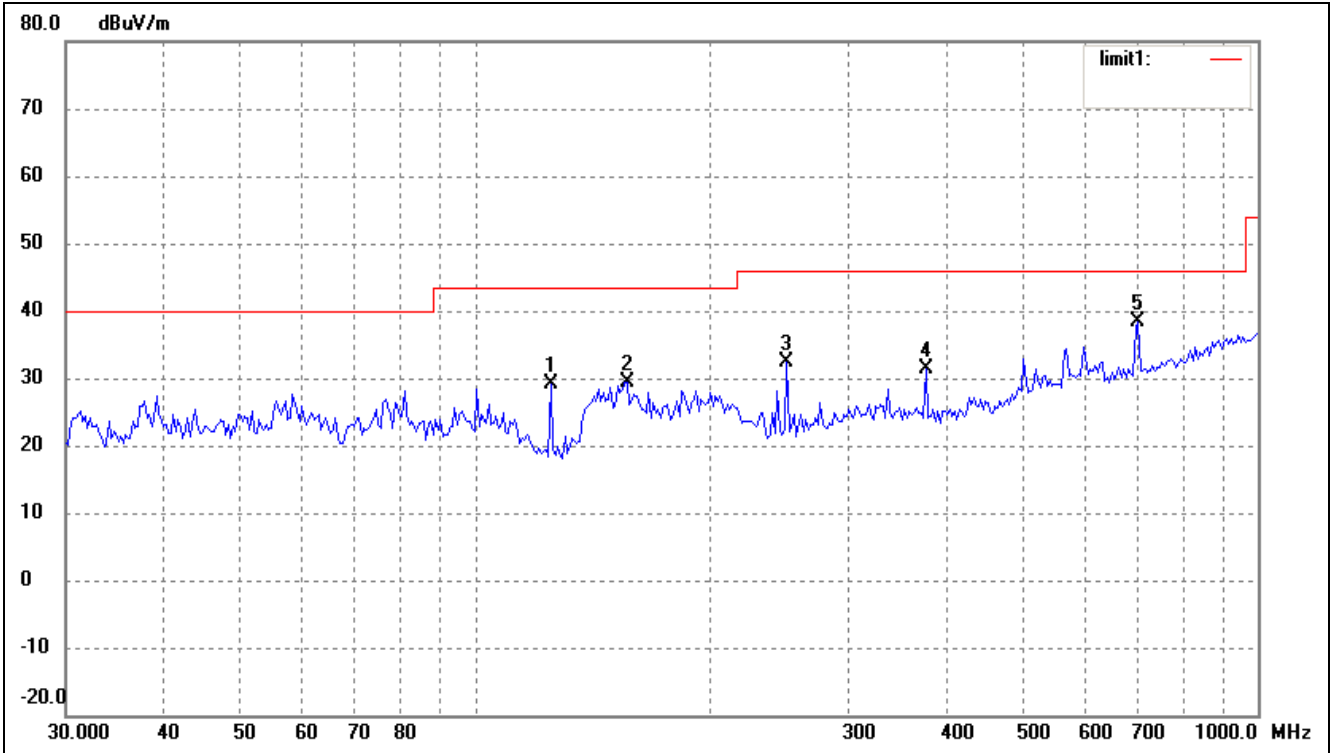
M/N: S108

Operating Condition: Running with Program

Test Specification: Horizontal & Vertical

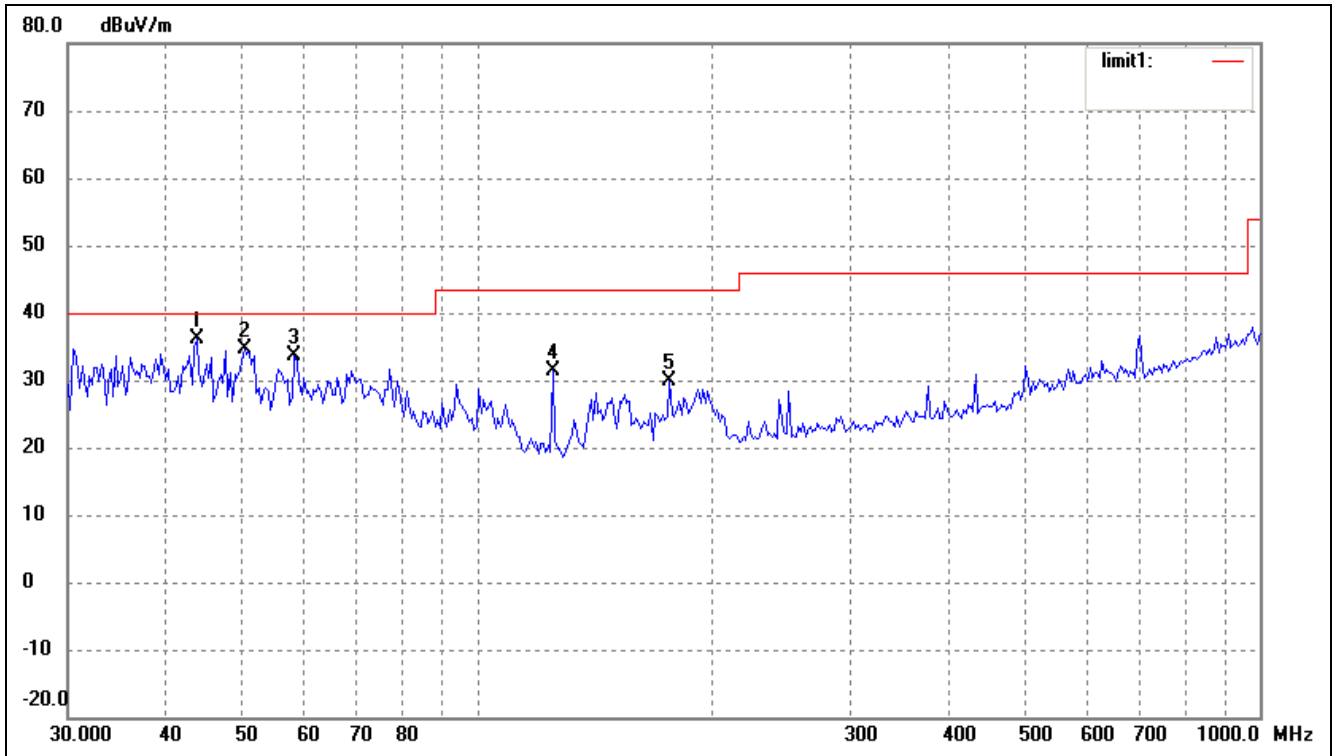
Comment: AC 120V/60Hz Adapter AC 9V

Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	124.9249	24.54	4.57	29.11	43.50	-14.39	332	100	peak
2	156.4259	25.76	3.59	29.35	43.50	-14.15	172	200	peak
3	250.4859	24.77	7.69	32.46	46.00	-13.54	36	200	peak
4	376.5228	21.41	9.87	31.28	46.00	-14.72	351	100	peak
5	703.7314	22.59	15.76	38.35	46.00	-7.65	209	100	peak

Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	43.8452	28.08	7.98	36.06	40.00	-3.94	102	100	QP
2	50.4614	26.95	7.67	34.62	40.00	-5.38	69	110	QP
3	58.4855	26.35	7.27	33.62	40.00	-6.38	221	100	peak
4	124.9249	26.72	4.57	31.29	43.50	-12.21	125	100	peak
5	176.2748	25.42	4.51	29.93	43.50	-13.57	44	100	peak

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