

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: V7TW311R

Report Concerns: Original Report	Equipment Type: Wireless-N Broadband Router
Model:	<u>W311R</u>
Report No.:	<u>STR09088013E-3</u>
Test/Witness Engineer:	<i>John shi</i>
Test Date:	<u>2009-08-04 to 2009-08-10</u>
Issue Date:	<u>2009-08-15</u>
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Approved & Authorized By:	<p><i>Jandy So</i></p> <hr style="width: 20%; margin: 0 auto;"/> <p>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.

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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.1301, LIMING ROAD XILI TOWN, NANSHAN DISTRICT, SHENZHEN, CHINA.

Manufacturer: SHENZHEN TENDA TECHNOLOGY CO., LTD.
 Address of manufacturer: 3F, MOSO INDUSTRIAL BUILDING, NO.1301, LIMING ROAD XILI TOWN, NANSHAN DISTRICT, SHENZHEN, CHINA.

General Description of E.U.T

Items	Description
EUT Description:	Wireless-N Broadband Router
Trade Name:	Tenda
Model No.:	W311R
Adding Model:	/
Rated Voltage:	DC 9V adapter
Packaging Size:	16.1x10.2x3.3 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

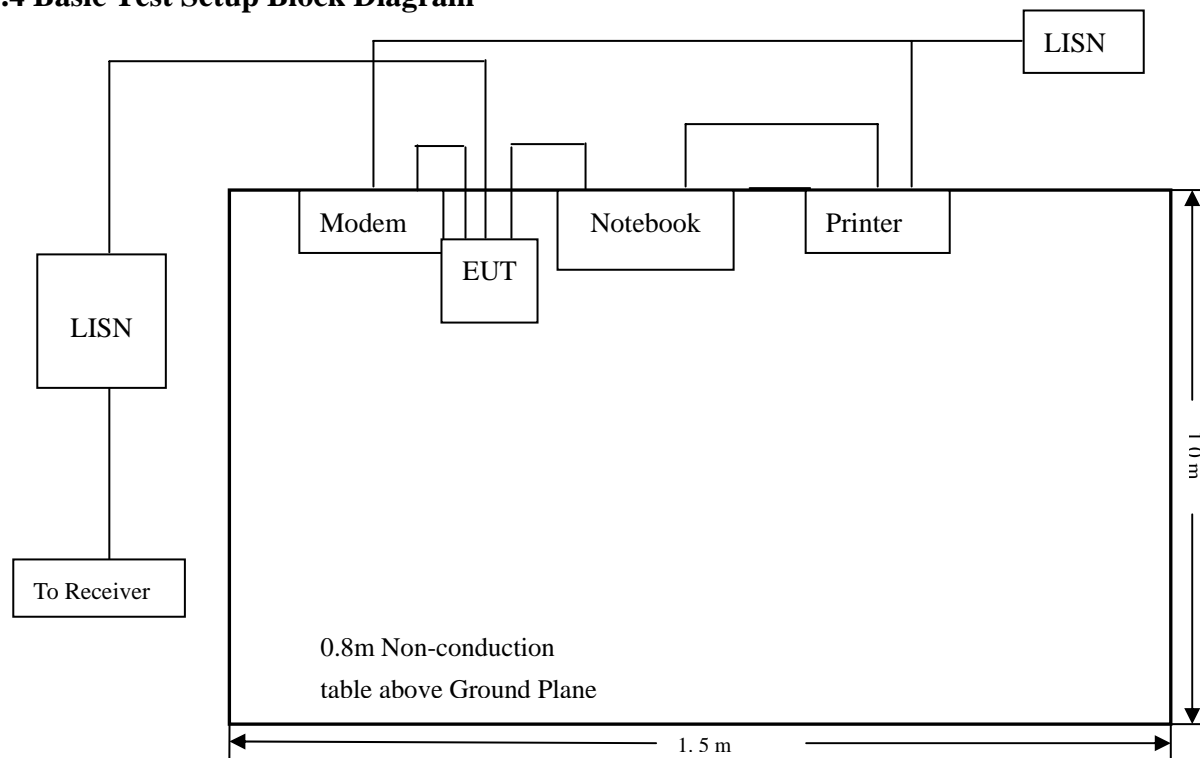
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2009-07-08	2010-07-07
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2009-07-08	2010-07-07
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2009-07-08	2010-07-07
AMN	Rohde & Schwarz	ESH3-Z5	828304/014	2009-07-08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

-13.35 dB μ V at 0.42MHz in the Line mode, Pk 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
0.42	44.10	Pk	Line	57.45	-13.35
0.33	45.96	Pk	Line	59.45	-13.49
0.25	46.07	Pk	Neutral	61.76	-15.69
0.39	41.66	Pk	Neutral	58.06	-16.40

Note: The Peak reading is less than the average limit, so the average is full fit the average limit and no record.

Plot of Conducted Emissions Test Data

Conducted Disturbance

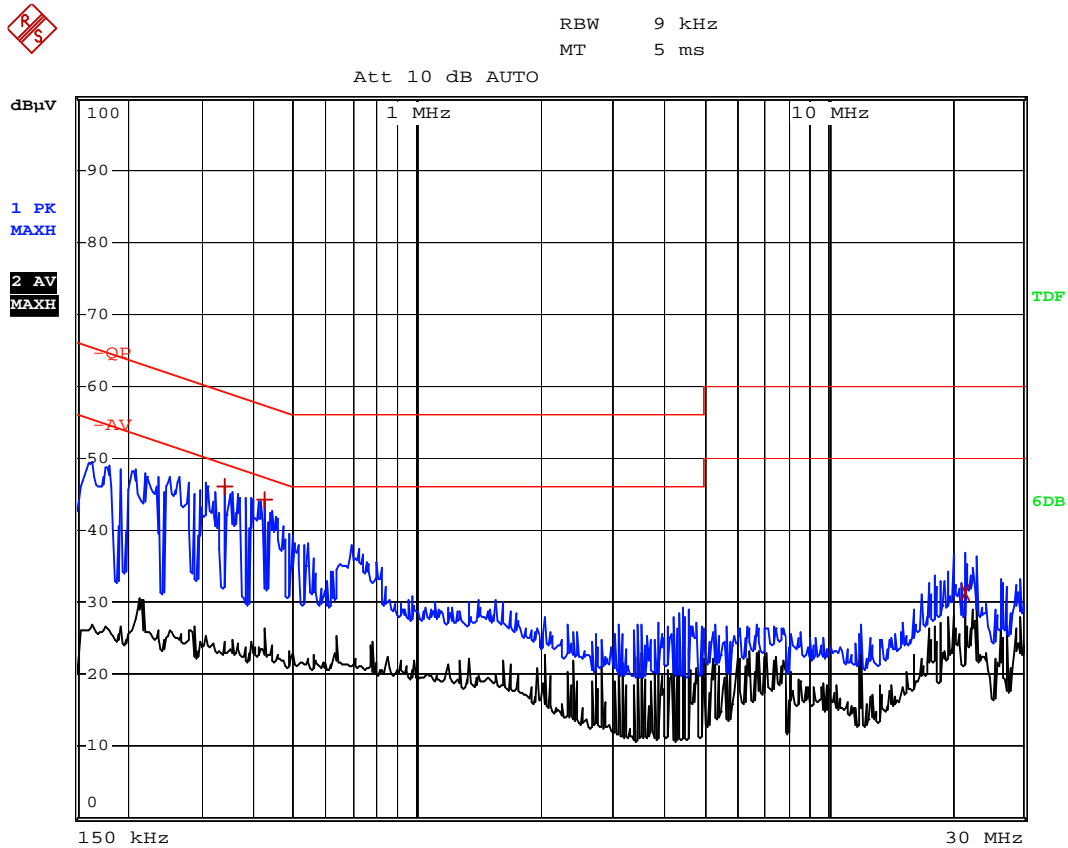
EUT: Wireless-N Broadband Router

M/N: W311R

Operating Condition: Linking

Test Specification: L

Comment: AC 120V/60Hz connect to PC



Date: 4.AUG.2009 10:44:44

Plot of Conducted Emissions Test Data

Conducted Disturbance

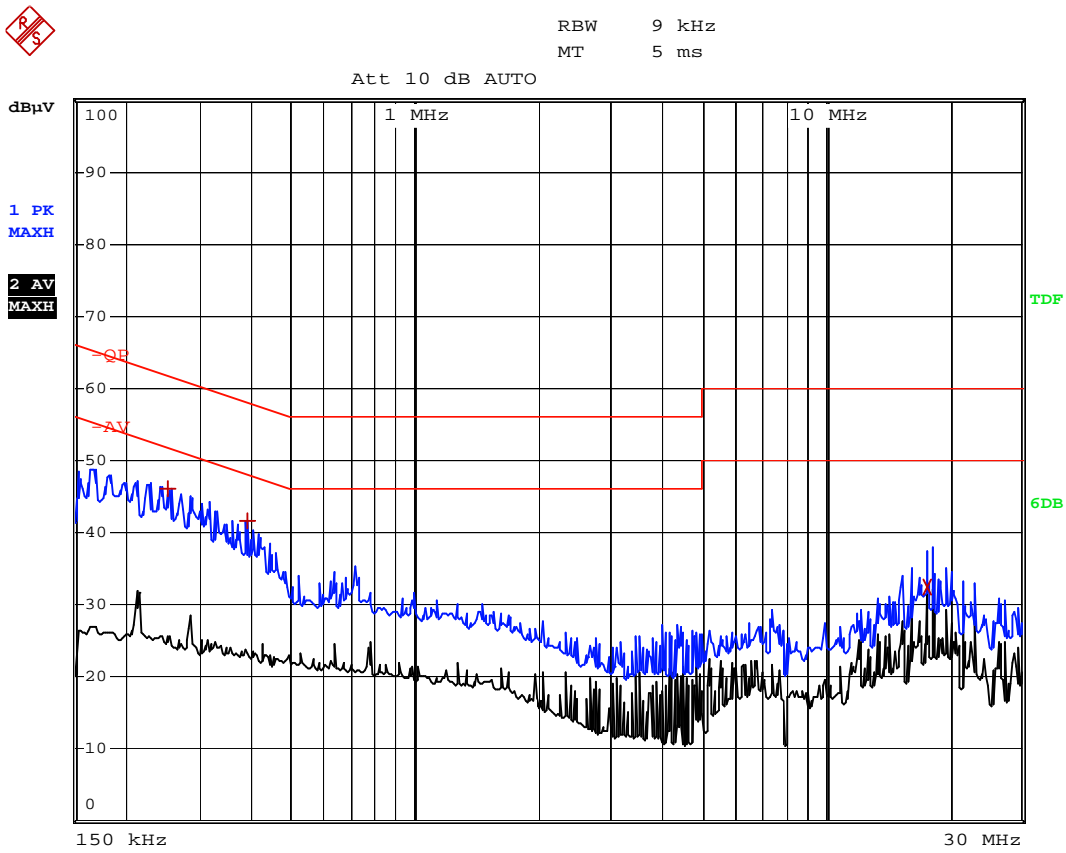
EUT: Wireless-N Broadband Router

M/N: W311R

Operating Condition: Linking

Test Specification: N

Comment: AC 120V/60Hz connect to PC



Date: 4.AUG.2009 10:43:32

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

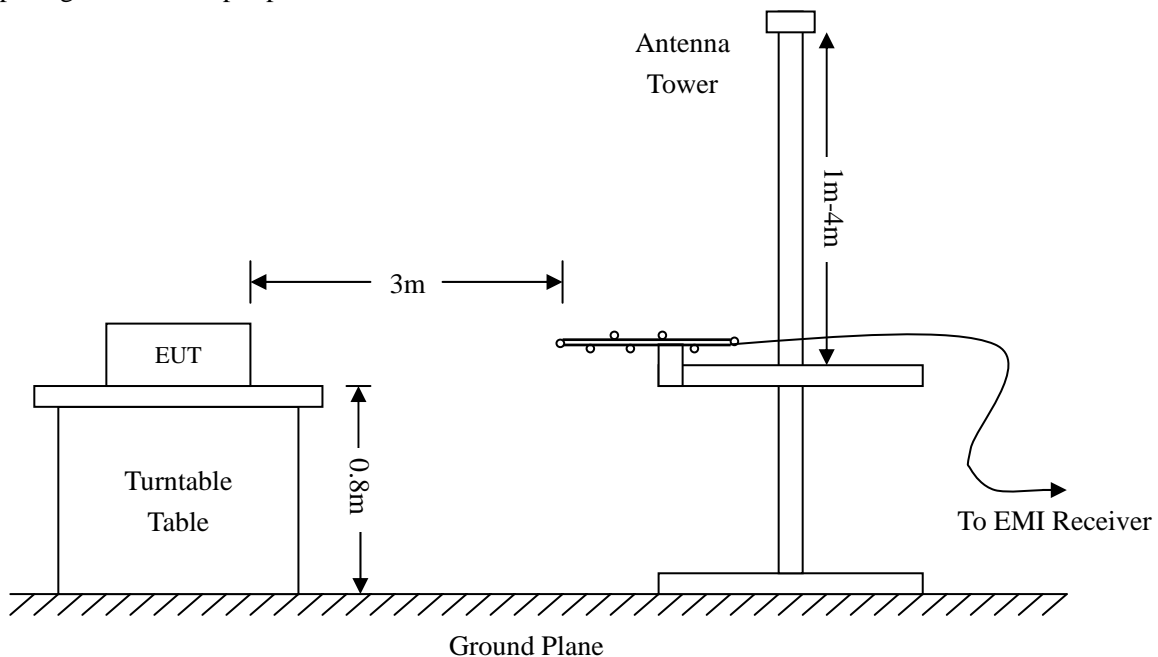
Manufacturer	Description	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	ROHDE&SCHWARZ	FSEA20	DE25181	2009-07-08	2010-07-07
Positioning Controller	C&C	CC-C-1F	N/A	2009-07-08	2010-07-07
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2009-07-08	2010-07-07
Horn Antenna	SCHWARZBECK	BBHX 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:

-1.33 dBμV at 899.9577MHz in the Horizontal polarization, 30 MHz to 1 GHz, 3Meters

Plot of Radiation Emissions Test Data

Radiated Disturbance

EUT: Wireless-N Broadband Router

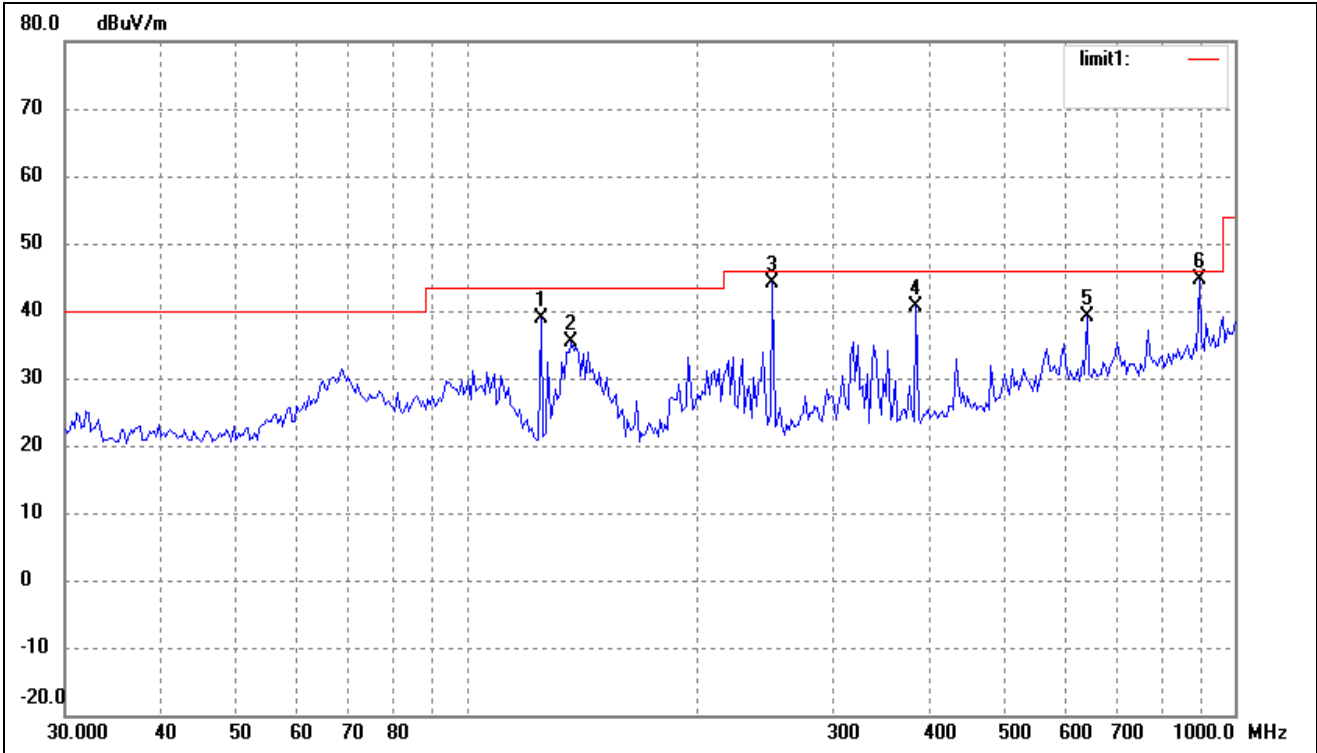
M/N: W311R

Operating Condition: Linking

Test Specification: Horizontal & Vertical

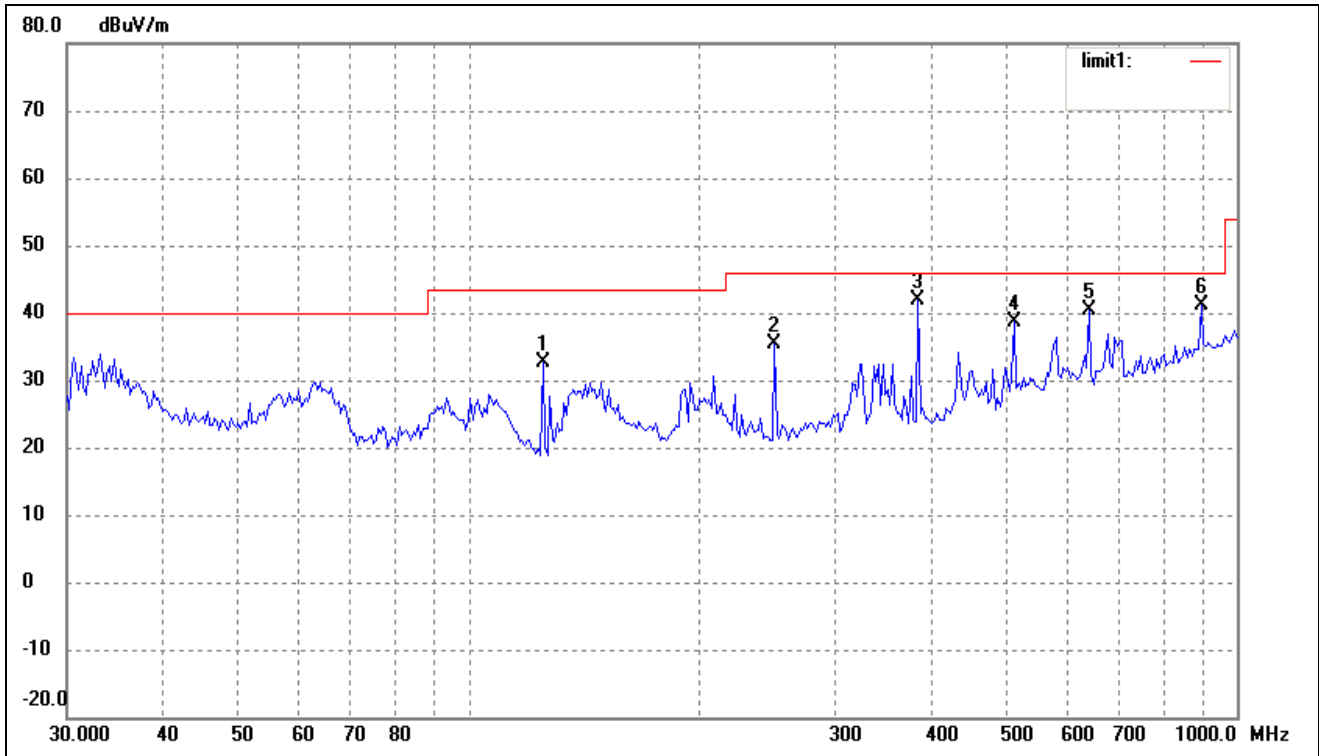
Comment: AC 120V/60Hz connect to PC

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	34.37	4.57	38.94	43.50	-4.56	160	100	peak
2	136.8747	31.89	3.42	35.31	43.50	-8.19	36	100	peak
3	250.4859	36.35	7.69	44.04	46.00	-1.96	12	100	peak
4	384.5447	30.72	9.96	40.68	46.00	-5.32	2	100	peak
5	642.2923	23.78	15.31	39.09	46.00	-6.91	360	100	peak
6	899.9577	25.87	18.80	44.67	46.00	-1.33	110	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	124.9249	27.95	4.57	32.52	43.50	-10.98	2	100	peak
2	250.4859	27.76	7.69	35.45	46.00	-10.55	30	200	peak
3	384.5447	31.80	9.96	41.76	46.00	-4.24	100	100	peak
4	512.9478	25.42	13.20	38.62	46.00	-7.38	200	200	peak
5	642.2923	25.09	15.31	40.40	46.00	-5.60	325	100	peak
6	899.9577	22.24	18.80	41.04	46.00	-4.96	360	100	peak

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