

# FCC Part 15B




## Measurement and Test Report

For

**AsiaRF Co., Ltd.**

1F., No.2, Lane45, Shuiyuan Street., Yonghe City, Taipei County 234, Taiwan

**FCC ID: TKZAWUN2410**

<b>Report Concerns:</b> Original Report	<b>Equipment Type:</b> Wireless USB Dongle
<b>Model:</b>	<u>AWUN2410</u>
<b>Report No.:</b>	<u>STR11108100I-2</u>
<b>Test Date:</b>	<u>2011-10-18 to 2011-10-22</u>
<b>Issue Date:</b>	<u>2011-10-25</u>
<b>Tested By:</b>	<u>Jason Jiang / Engineer</u> 
<b>Reviewed By:</b>	<u>Lahm Peng / EMC Manager</u> 
<b>Approved &amp; Authorized By:</b>	<u>Jandy so / PSQ Manager</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) Tel.: +86-755-33663308 Fax.: +86-755-33663309 Website: www.semtest.com.cn

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: AsiaRF Co., Ltd.  
 Address of applicant: 1F., No.2, Lane45, Shuiyuan Street., Yonghe City, Taipei County 234, Taiwan

Manufacturer: AsiaRF Co., Ltd.  
 Address of manufacturer: 1F., No.2, Lane45, Shuiyuan Street., Yonghe City, Taipei County 234, Taiwan

#### General Description of E.U.T

Items	Description
EUT Description:	Wireless USB Dongle
Trade Name:	/
Model No.:	AWUN2410
Rated Voltage:	DC 5V
Rated Current:	500mA

*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 AsiaRF 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, Subpart B, and section 15.205, 15.107, and 15.109 rules.

**Maintenance of compliance** is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

### 1.3 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.

## 1.4 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.

- **CNAS Registration No.: L4062**

Shenzhen SEM.Test Electronics Service Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 3/F, Jinbao Commerce Building, Xin'an Fanshen Road, Bao'an District, Shenzhen, P.R.C (518101)

## 1.5 EUT Exercise Software

The EUT exercise program used during the testing was designed to exercise the system components.

## 1.6 Accessories Equipment List and Details

Description	Manufacturer	Model	Serial Number
Notebook	ASUS	X50R	74N0AS297138

## 1.7 EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
/	/	/	/

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## 2. SUMMARY OF TEST RESULTS

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<b>Description of Test</b>	<b>Result</b>
§15.107 (a) Conducted Emission	Compliant
§15.109(a) Radiated Emission	Compliant

### 3. §15.107 (a) CONDUCTED EMISSIONS

#### 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  $\pm 2.88$  dB.

#### 3.2 Test Equipment List and Details

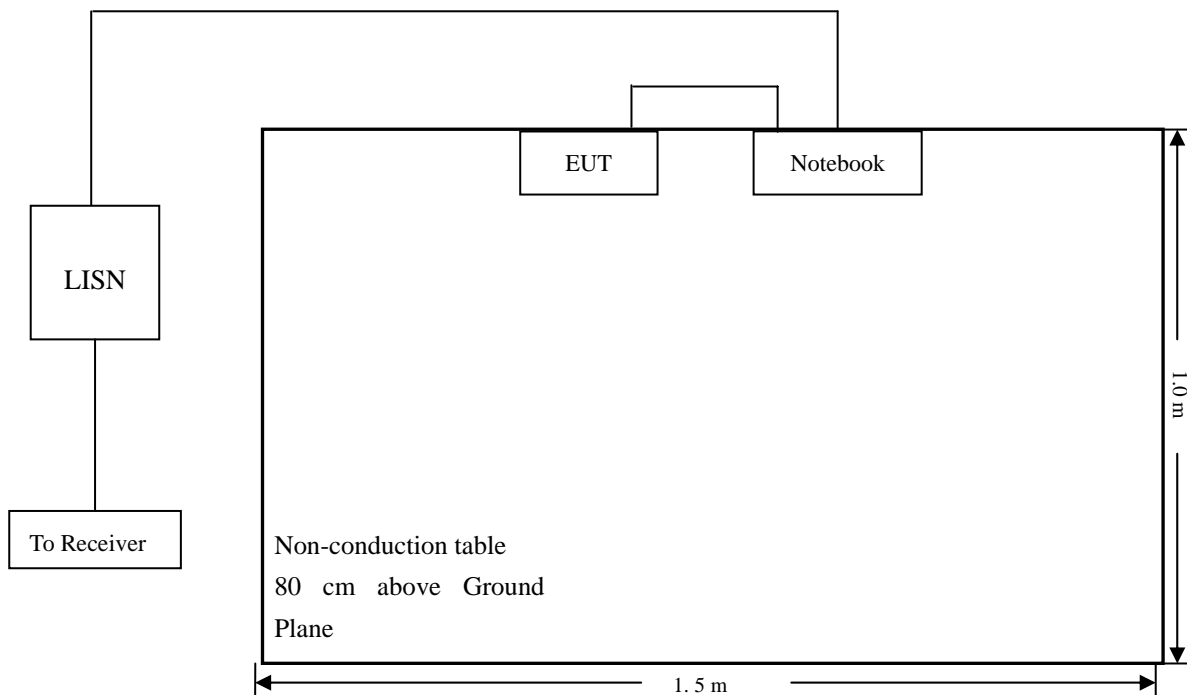
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2010-12-20	2011-12-19
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2010-12-20	2011-12-19
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2010-12-20	2011-12-19

**Statement of Traceability:** All calibrations have been performed per the NVLAP requirements traceable to the NIST.

#### 3.3 Test Procedure

Test is conducting under the description of 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.

#### 3.4 Basic Test Setup Block Diagram



### 3.5 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	52%
ATM Pressure:	1011 mbar

### 3.6 Summary of Test Results/Plots

According to the data in section 3.7, the EUT complied with the FCC Part 15.107 Conducted margin for a Class B device, with the *worst* margin reading of:

**-10.21 dB $\mu$ V at 0.318 MHz in the Line mode, Pk detector, 0.15-30MHz**

### 3.8 Conducted Emissions Test Data

**Plot of Conducted Emissions Test Data**

*Conducted Disturbance*

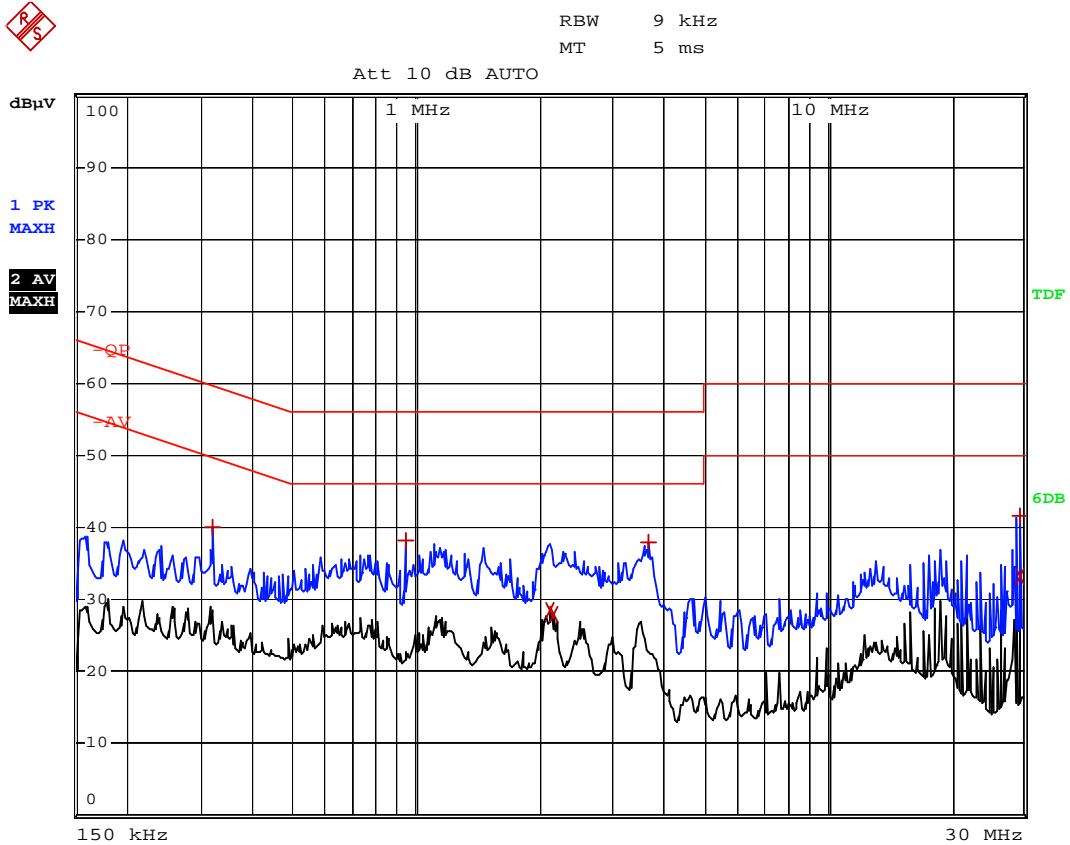
*EUT: Wirreless USB Dongle*

*M/N: AWUN2410*

*Operating Condition: Connect to PC*

*Test Specification: N*

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



EDIT PEAK LIST (Prescan Results)				
Trace1:		-QP		
Trace2:		-AV		
Trace3:		---		
TRACE		FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1	Max Peak	318 kHz	40.04	-19.71
1	Max Peak	946 kHz	38.19	-17.80
2	Average	2.118 MHz	28.48	-17.51
2	Average	2.166 MHz	27.91	-18.08
1	Max Peak	3.662 MHz	37.96	-18.03
1	Max Peak	29.466 MHz	41.47	-18.52
2	Average	29.466 MHz	33.26	-16.73



**Plot of Conducted Emissions Test Data**

*Conducted Disturbance*

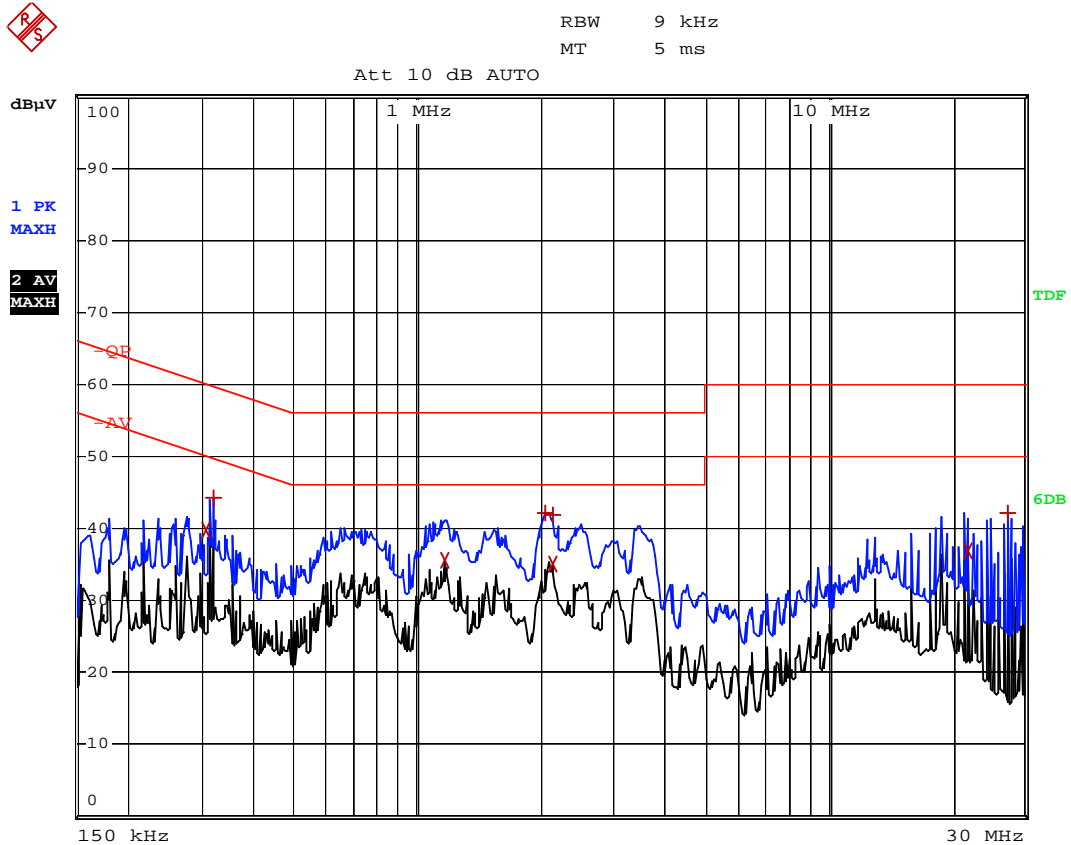
*EUT: Wirreless USB Dongle*

*M/N: AWUN2410*

*Operating Condition: Connect to PC*

*Test Specification: L*

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



EDIT PEAK LIST (Prescan Results)			
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
2 Average	310 kHz	39.75	-10.21
1 Max Peak	318 kHz	44.12	-15.63
2 Average	1.174 MHz	35.56	-10.43
1 Max Peak	2.058 MHz	42.16	-13.83
1 Max Peak	2.13 MHz	41.98	-14.02
2 Average	2.138 MHz	35.15	-10.84
2 Average	21.862 MHz	36.96	-13.04
1 Max Peak	27.174 MHz	42.07	-17.92

## 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  $\pm 5.10$  dB.

### 4.2 Test Equipment List and Details

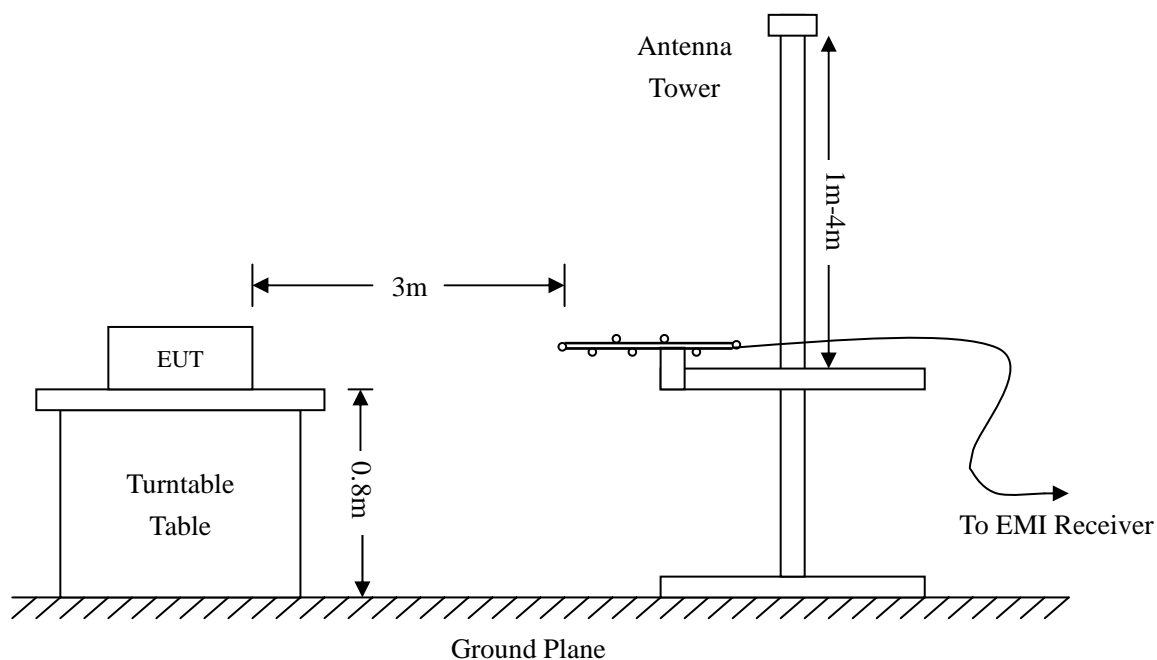
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2010-12-20	2011-12-19
EMI Test Receiver	R&S	ESVB	825471/005	2010-12-20	2011-12-19
Positioning Controller	C&C	CC-C-1F	N/A	2010-12-20	2011-12-19
RF Switch	EM	EMSW18	SW060023	2010-12-20	2011-12-19
Pre-amplifier	Agilent	8447F	3113A06717	2010-12-20	2011-12-19
Pre-amplifier	Compliance Direction	PAP-0118	24002	2010-12-20	2011-12-19
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2011-01-09	2012-01-08
Horn Antenna	ETS	3117	00086197	2011-01-09	2012-01-08

### 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 15.109 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 radiated emission test for above 1GHz, the test receiver was set with the following configurations:

For peak detector:

RBW = 1000kHz, VBW = 3000kHz, Sweep Time = Auto

For average detector:

RBW = 1000kHz, VBW = 10Hz, Sweep Time = Auto

#### 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:	23 °C
Relative Humidity:	55 %
ATM Pressure:	1011 mbar

#### 4.7 Summary of Test Results/Plots

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

**-6.77 dB $\mu$ V at 607.7866MHz in the Vertical polarization, 30 MHz to 1 GHz, 3Meters**

**Plot of Radiation Emissions Test Data**

*Radiated Disturbance*

*EUT: Wirreless USB Dongle*

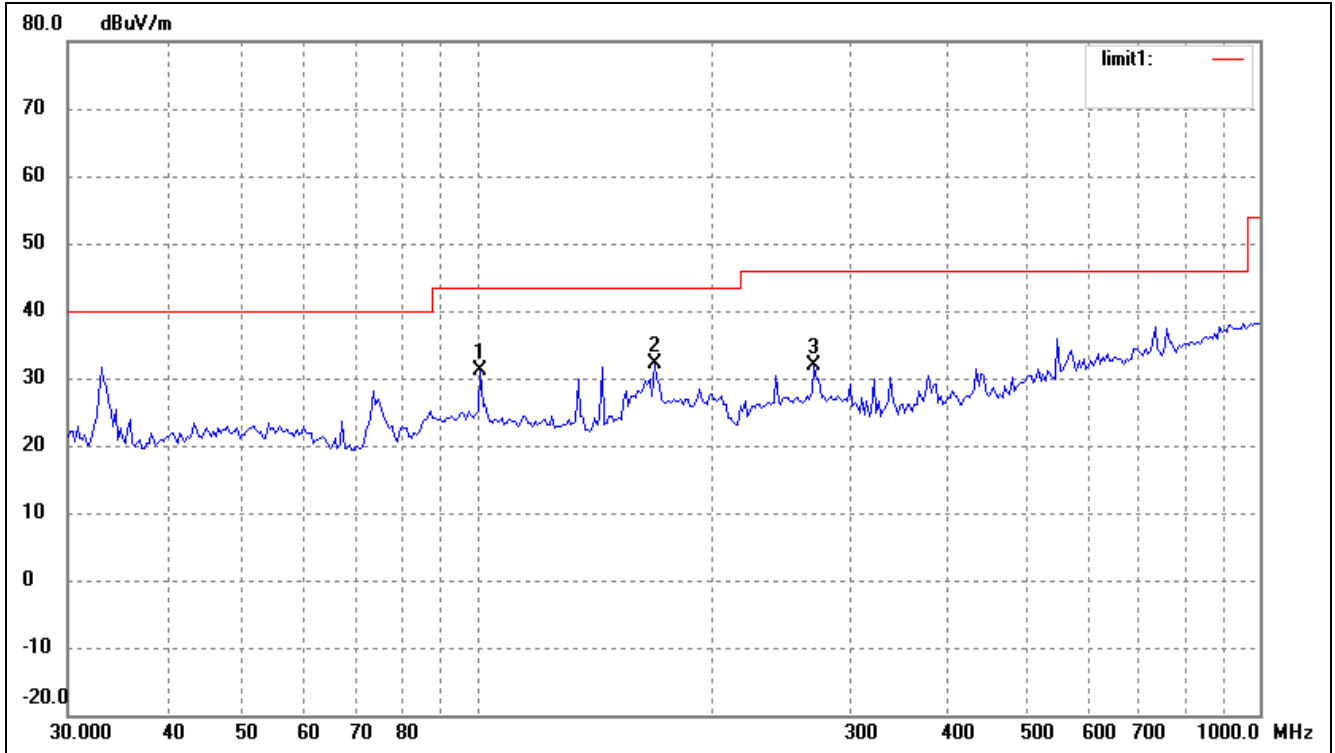
*M/N: AWUN2410*

*Operating Condition: Connect to PC*

*Test Specification: Horizontal & Vertical*

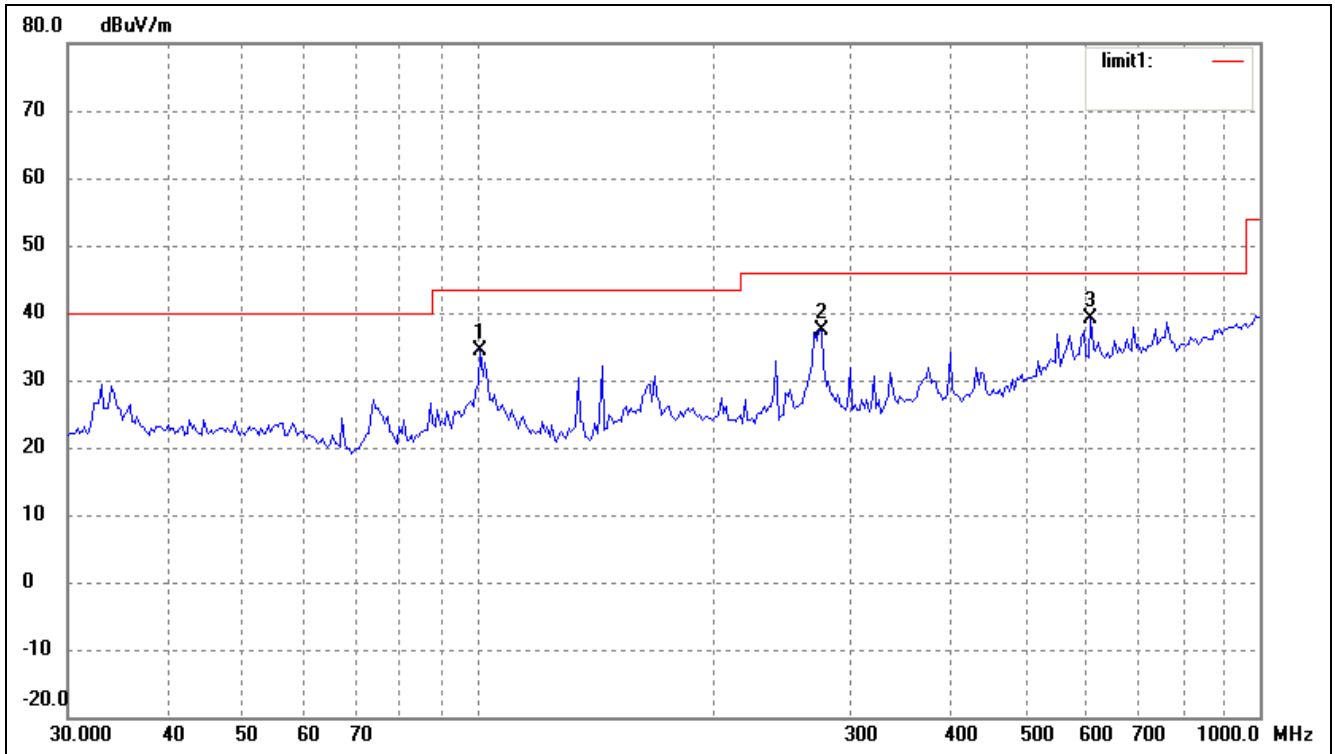
*Comment: AC 120V/60Hz connect to PC, USB 5V*

*Horizontal*



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ( ° )	Height (cm)	Remark
1	100.9338	22.90	8.34	31.24	43.50	-12.26	223	203	peak
2	168.4138	27.28	4.84	32.12	43.50	-11.38	360	200	peak
3	269.4284	22.55	9.22	31.77	46.00	-14.23	205	104	peak

Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	100.9338	26.06	8.34	34.40	43.50	-9.10	220	100	peak
2	275.1569	27.93	9.38	37.31	46.00	-8.69	360	400	peak
3	607.7866	22.50	16.73	39.23	46.00	-6.77	232	120	peak

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