

# FCC Part 15B

## Measurement and Test Report

For

AsiaRF Co., Ltd.

3F., No.176, Yongzhen Road, Yonghe District, New Taipei City 234, Taiwan

**FCC ID: TKZAWUHN2405-2**

<b>Test Standards:</b>	<u>FCC Part 15 Subpart B</u>
<b>Product Description:</b>	<u>WiFi USB Dongle</u>
<b>Tested Model:</b>	<u>AWUHN2405-2</u>
<b>Report No.:</b>	<u>STR13048165I-2</u>
<b>Tested Date:</b>	<u>2013-05-21 to 2013-06-14</u>
<b>Issued Date:</b>	<u>2013-06-17</u>
<b>Tested By:</b>	<u>Seven Song / Engineer</u> <i>Seven Song</i>
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<b>Approved &amp; Authorized By:</b>	<u>Jandy so / PSQ Manager</u> <i>Jandyso</i>
<b>Prepared By:</b>	

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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

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### 1.1 Product Description for Equipment Under Test (EUT)

#### Client Information

Applicant: AisaRF Co., Ltd.  
 Address of applicant: 3F., No.176, Yongzhen Road, Yonghe Distict, New Taipei City 234, Taiwan  
 Manufacturer: AisaRF Co., Ltd.  
 Address of manufacturer: 3F., No.176, Yongzhen Road, Yonghe Distict, New Taipei City 234, Taiwan

General Description of EUT	
Product Name:	WiFi USB Dongle
Trade Name:	/
Model No.:	AWUHN2405-2
<i>Note: The test data is gathered from a production sample, provided by the manufacturer.</i>	

Technical Characteristics of EUT	
Rated Voltage:	USB DC 5V
Highest Internal Frequency:	40MHz
Classification of ITE:	B
Support Interface:	USB

## 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.

## 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 Setup and Operation Mode

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted according to the operation manual for use, more detailed description as follows:

Test Mode List:

Test Mode	Description	Remark
TM1	Operating	/

### Special Cable List and Details

Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
USB Cable	4.5	Unshielded	Without Ferrite

### Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
Note Book	SAMSUNG	R20	/

## 2. SUMMARY OF TEST RESULTS

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<b>FCC Rules</b>	<b>Description of Test Item</b>	<b>Result</b>
§ 15.107 (a)	Conducted Emissions	Compliant
§ 15.109 (a)	Radiated Emissions	Compliant

N/A: not applicable

### 3. 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.

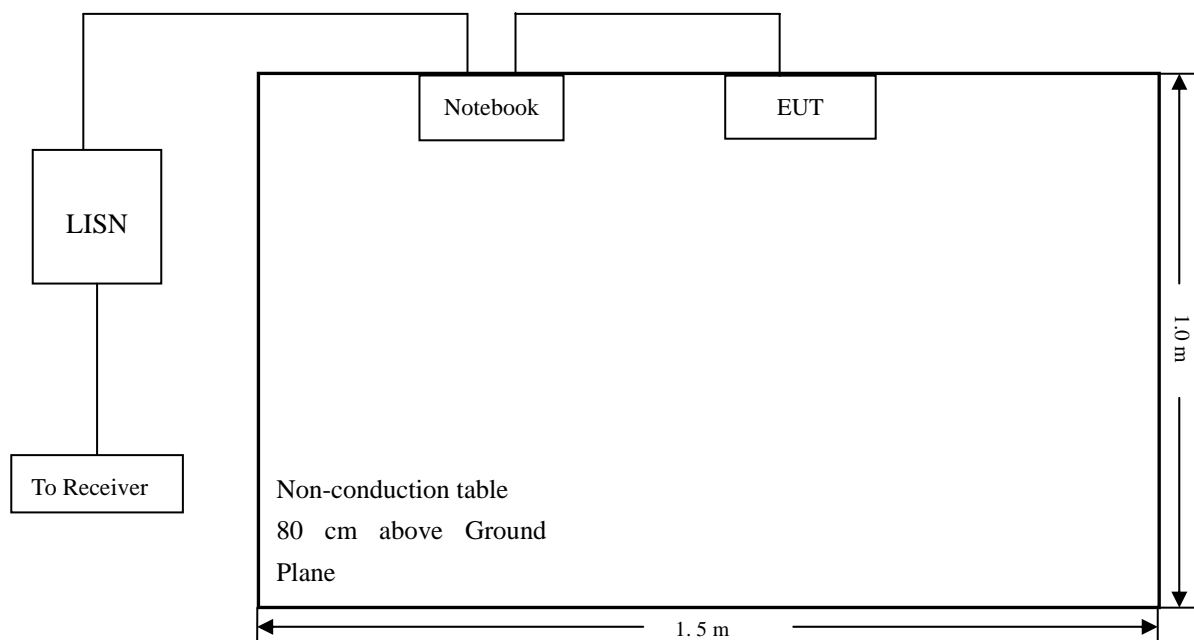
#### 3.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2013-05-07	2014-05-06
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2013-05-07	2014-05-06
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2013-05-07	2014-05-06

#### 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(a) Conducted margin for a Class B device, with the *worst* margin reading of:

**-6.85 dB** at **4.818 MHz** in the **Line, Peak** detector, 0.15-30MHz

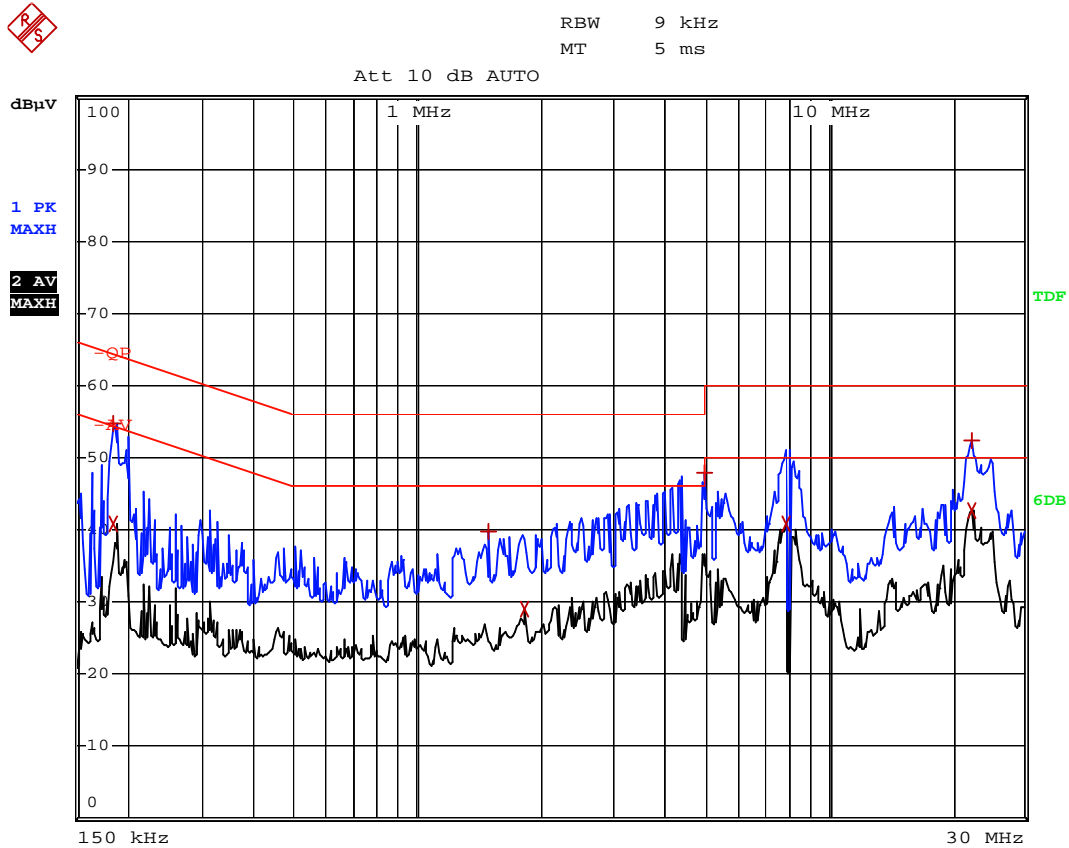
### 3.7 Conducted Emissions Test Data



**Plot of Conducted Emissions Test Data**

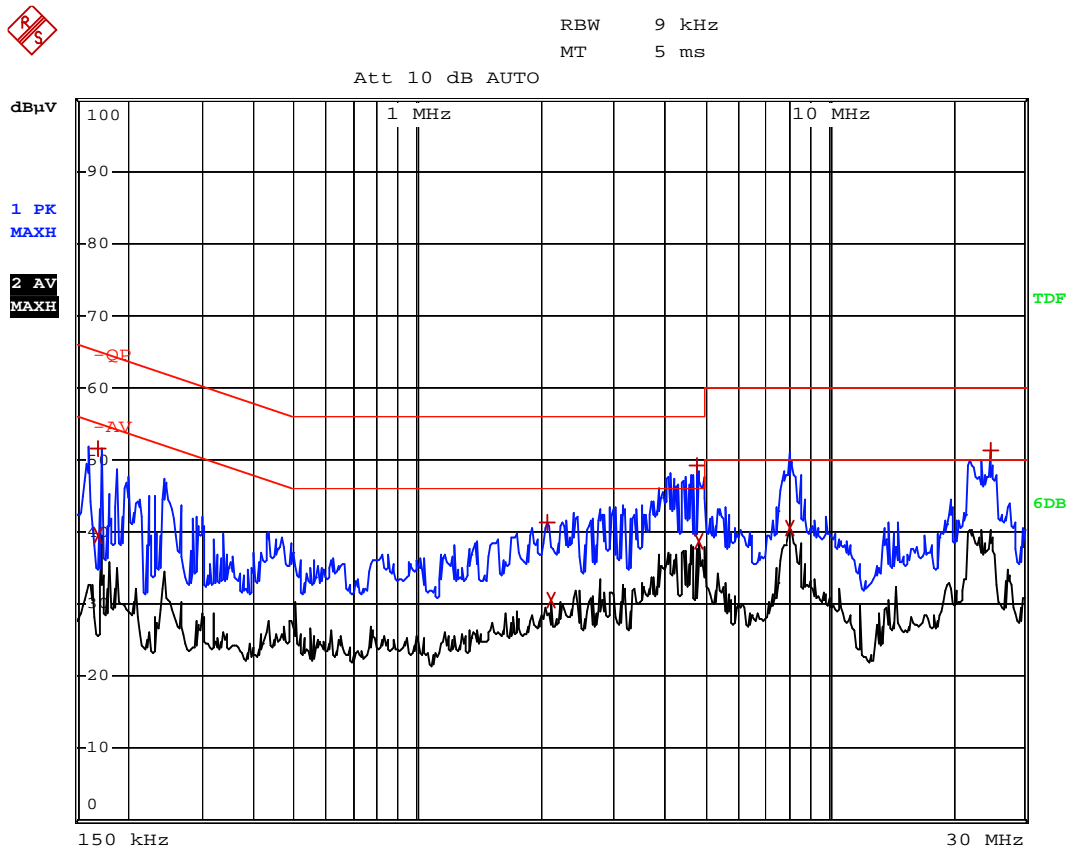
EUT: *WiFi USB Dongle*  
 Tested Model: *AWUHN2405-2*  
 Operating Condition: *TM1*  
 Comment: *AC 120V/60Hz, USB 5V*

Test Specification: *Neutral*



EDIT PEAK LIST (Prescan Results)			
Trace1:		-QP	
Trace2:		-AV	
Trace3:		---	
TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1 Max Peak	186 kHz	54.69	-9.51
2 Average	186 kHz	40.81	-13.39
1 Max Peak	1.486 MHz	39.73	-16.26
2 Average	1.822 MHz	29.04	-16.95
1 Max Peak	4.978 MHz	47.83	-8.16
2 Average	7.95 MHz	40.73	-9.26
1 Max Peak	22.25 MHz	52.28	-7.71
2 Average	22.266 MHz	42.67	-7.32

Test Specification: Line



EDIT PEAK LIST (Prescan Results)			
Trace1:	-QP		
Trace2:	-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
1 Max Peak	170 kHz	51.46	-13.50
2 Average	170 kHz	39.40	-15.55
1 Max Peak	2.074 MHz	41.29	-14.70
2 Average	2.11 MHz	30.46	-15.53
1 Max Peak	4.818 MHz	49.14	-6.85
2 Average	4.83 MHz	38.63	-7.36
2 Average	8.038 MHz	40.48	-9.51
1 Max Peak	24.75 MHz	51.25	-8.74

## 4. Radiated Emissions

### 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

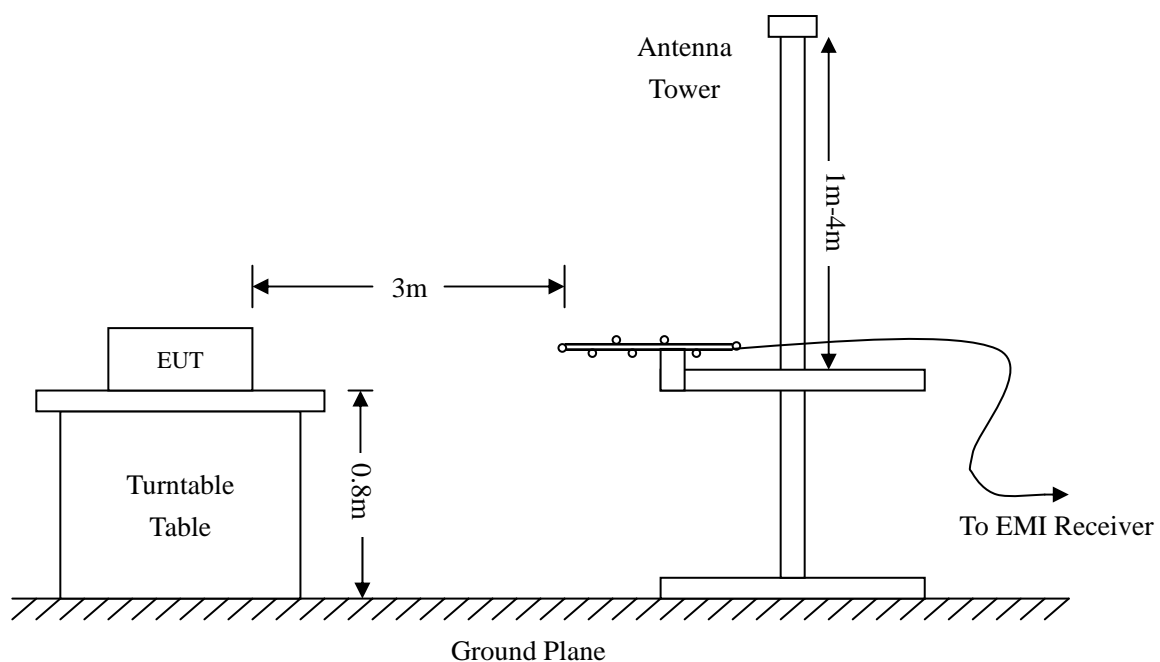
Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2013-05-07	2014-05-06
EMI Test Receiver	R&S	ESVB	825471/005	2013-05-07	2014-05-06
Pre-amplifier	Agilent	8447F	3113A06717	2013-05-07	2014-05-06
Pre-amplifier	Compliance Direction	PAP-0118	24002	2013-05-07	2014-05-06
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2013-04-20	2014-04-19
Horn Antenna	ETS	3117	00086197	2013-04-20	2014-04-19

### 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 a Class B device. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15.109(a) Limit}$$

#### 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 15.109(a) rule, and had the worst margin of:

**-2.65 dB at 153.7385 MHz in the Horizontal polarization, 30 MHz to 1 GHz, 3Meters**

**Plot of Radiated Emissions Test Data**

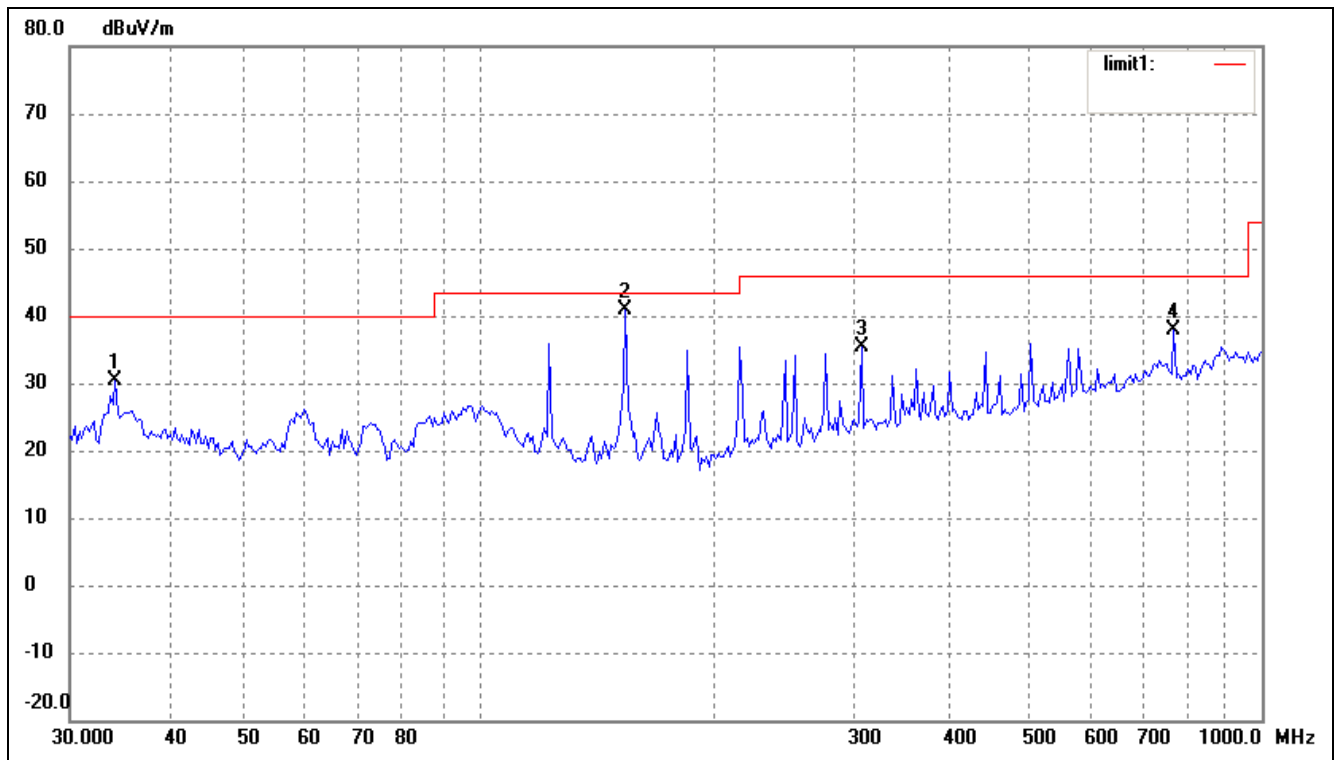
EUT: *WiFi USB Dongle*

Tested Model: *AWUHN2405-2*

Operating Condition: *TM1*

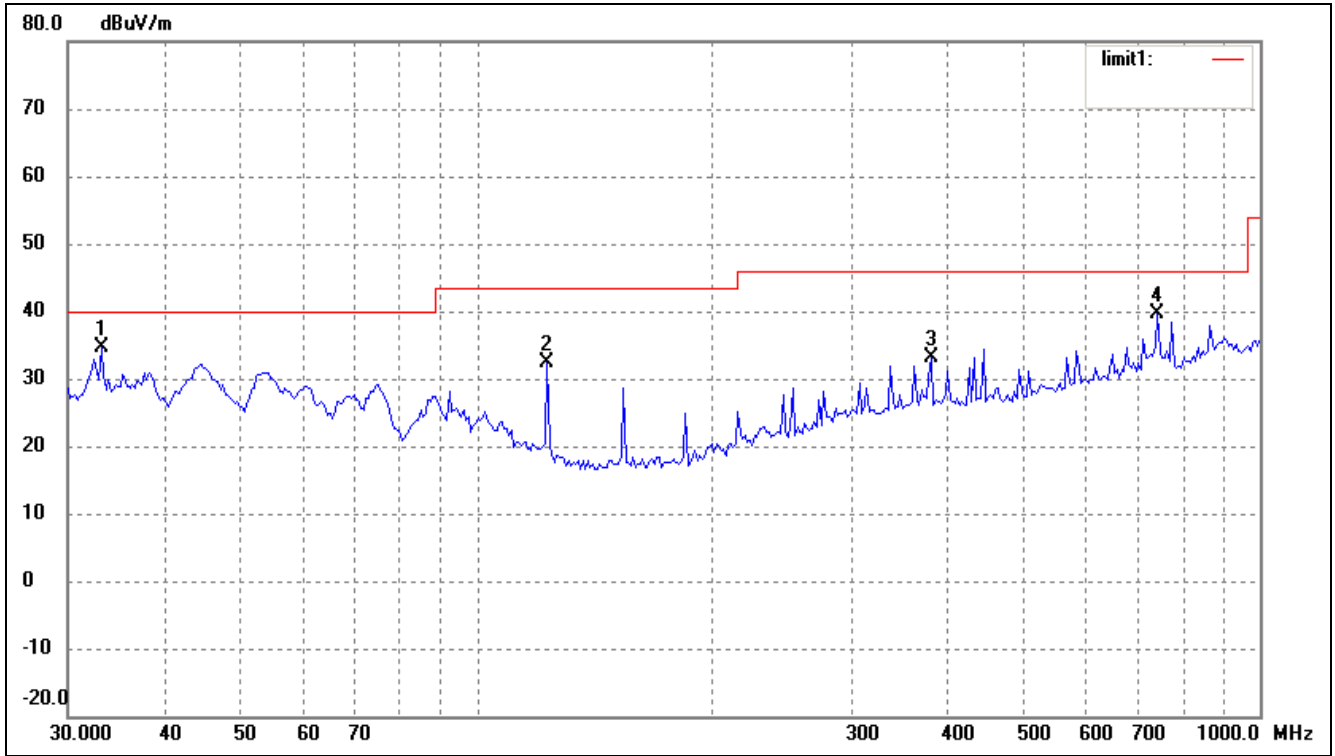
Comment: *Connect to PC*

Test Specification: *Horizontal*



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	34.2760	21.74	8.76	30.50	40.00	-9.50	162	100	peak
2	153.7385	37.26	3.59	40.85	43.50	-2.65	200	100	peak
3	307.8313	25.12	10.30	35.42	46.00	-10.58	200	100	peak
4	771.4486	21.42	16.37	37.79	46.00	-8.21	200	100	peak

Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (°)	Height (cm)	Remark
1	33.0950	26.01	8.56	34.57	40.00	-5.43	240	100	peak
2	122.8340	27.84	4.66	32.50	43.50	-11.00	187	100	peak
3	379.9141	22.58	10.62	33.20	46.00	-12.80	220	100	peak
4	739.6605	21.53	18.07	39.60	46.00	-6.40	220	100	peak