FCC Test Report

Applicant	:	AsiaRF Ltd.
Product	:	WiFi USB Dongle Versa3
Model No.	:	AWUHN2487
FCC ID	:	TKZAWUHN2487
Standards	:	FCC Part 15 Subpart B: 2013
		ANSI C63.4: 2009
Test Date	:	December 04, 2013

Reviewed By : Sunny Sun

(Engineer: Sunny Sun)

Approved By : Marlin Chen

(Manager: Marlin Chen)

Revision History

Report No.	Version	Description	Issue Date
1311RSU00203	Rev. 01	Initial report	2013-12-04
1311RSU00203	Rev. 02	Add FCC ID	2013-12-06

Test Summary

Normative References	Test Description	Test Result (Pass/Fail)
FCC Part 15 Subpart B: 2013 ANSI C63.4: 2009	Conducted Emission	Pass
FCC Part 15 Subpart B: 2013 ANSI C63.4: 2009	Radiated Emission	Pass

CONTENTS

Description Page

1. General Information

1.1. Applicant

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

1.2. Manufacturer

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

1.3. Feature of Product

Product Name	WiFi USB Dongle Versa3
Model No.	AWUHN2487
Frequency Range	802.11b/g/n(20MHz): 2412 ~ 2462 MHz 802.11n(40MHz): 2422 ~ 2452MHz
Channel Number	802.11b/g/n(20MHz): 11 802.11 n(40MHz): 7
Type of Modulation	802.11b: DSSS 802.11g/n: OFDM
Data Rate	802.11g: 6/9/12/18/24/36/48/54 Mbps 802.11b: 1/2/5.5/11 Mbps 802.11n: up to 135 Mbps
Channel Control	Auto
Antenna Gain	Reference to Antenna List

Antenna List

Antenna	Brand Name	Model No.	Peak Gain
Antenna	AsiaRF	A-2409D	5dBi
Omni Directional Antenna	AsiaRF	AG-24015	15dBi
Omni Directional Antenna	AsiaRF	AO-24008.1	8dBi

Note: This test report assessed AWUHN2487 with antenna A-2409D, AO-24015, AO-24008.1; and showed the worst data in the test report.

1.4. Testing Facility

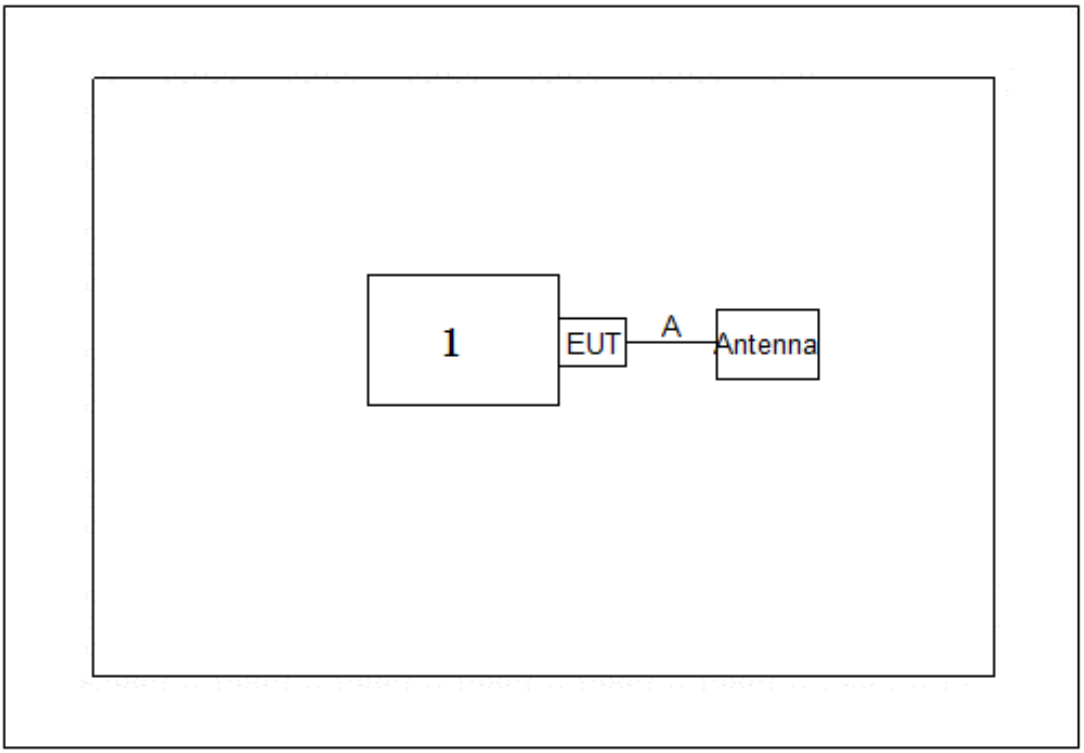
Test Site	MRT Technology (Suzhou) Co., Ltd
Test Site Location	D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
Registration No.	809388

2. Test Configuration of Equipment Under Test

2.1. Test Mode

Final Test Mode	
Test Mode	Mode 1: Normal Operation

2.2. Configuration of Tested System

Connection Diagram


Cable Type		Cable Description
A	Coaxial Cable	Shielded, 0.5m

2.3. Accessories Description

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook	HP	HP 520	CND7480N5S	Non-Shielded, 1.8m

2.4. Tested Software

1	Setup the EUT and simulators as shown on above.
2	Turn on the power of all equipment.
3	Making EUT working on “Normal Operation” Mode.

3. Conducted Emission

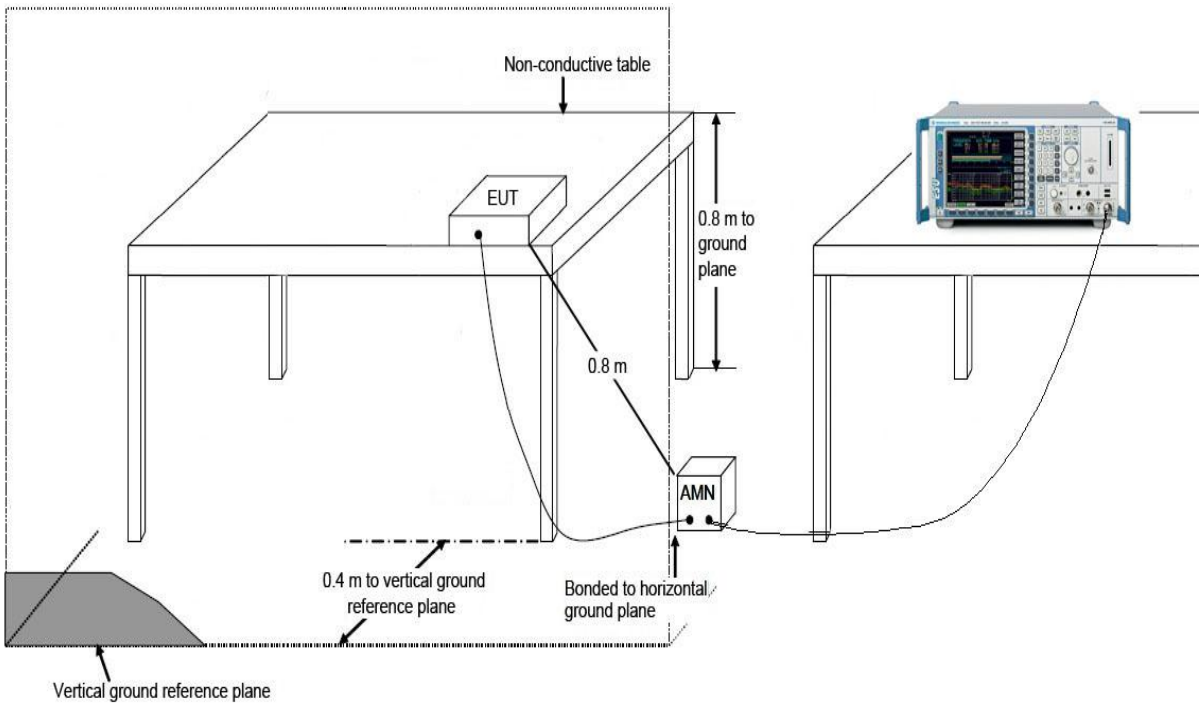
3.1. Limit of Conducted Emission

FCC Part 15 Subpart B Paragraph 15.107 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

3.2. Test Setup



3.3. Test Procedure

The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)

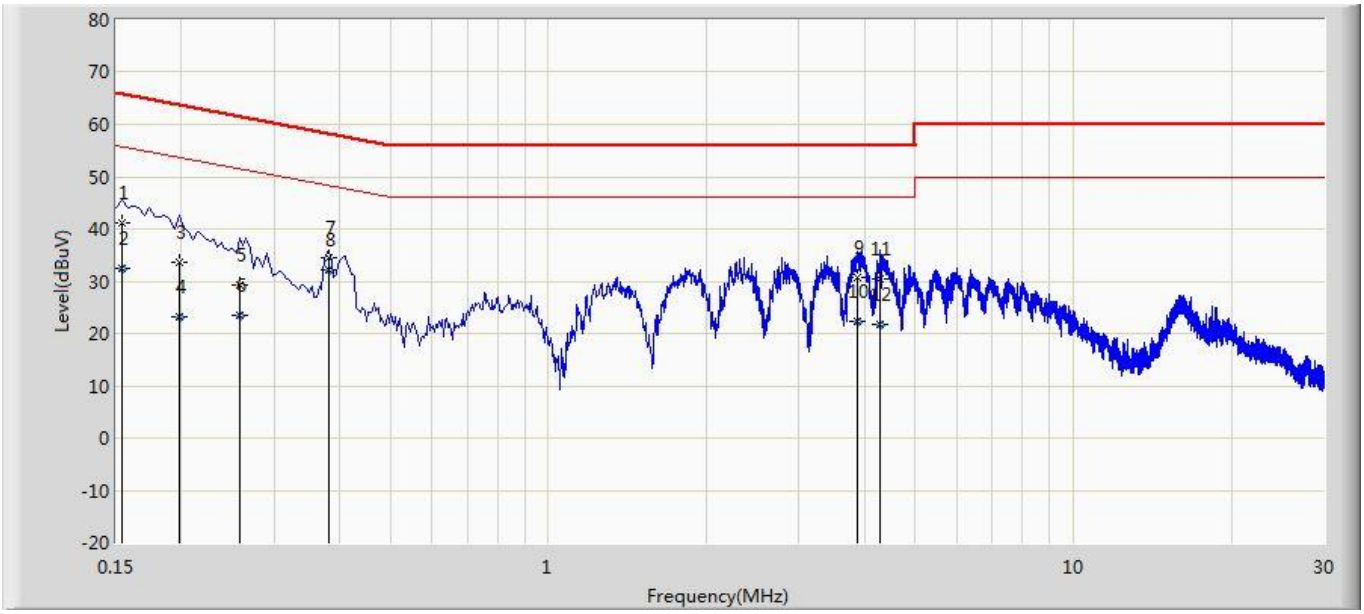
Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

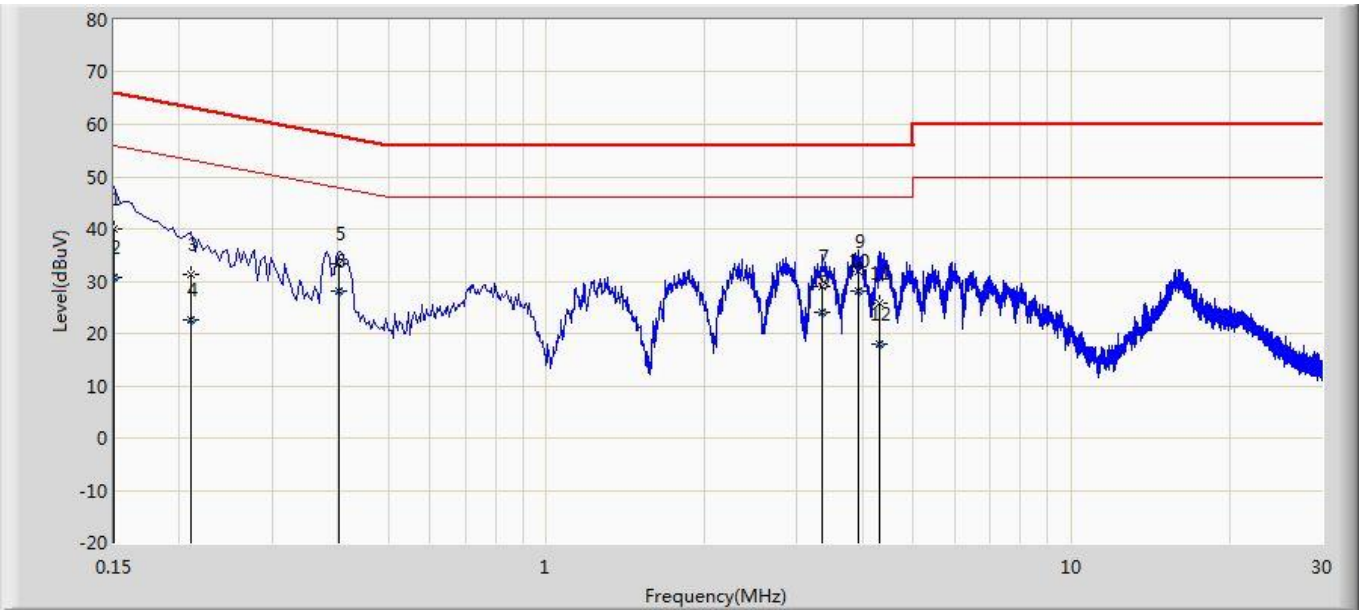
3.4. Test Result

Engineer: Roy	
Site: SR2	Time: 2013/12/04 - 09:50
Limit: FCC_Part15B Main_ClassB	Margin: 0
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: WiFi USB Dongle Versa3	Power: AC 120V/60Hz
Note: Mode 1	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor	Type
1			0.154	41.041	30.301	-24.740	65.781	10.740	QP
2			0.154	32.473	21.734	-23.308	55.781	10.740	AV
3			0.198	33.750	23.745	-29.944	63.694	10.005	QP
4			0.198	23.060	13.056	-30.634	53.694	10.005	AV
5			0.258	29.305	19.335	-32.191	61.496	9.970	QP
6			0.258	23.350	13.379	-28.146	51.496	9.970	AV
7			0.382	34.451	24.380	-23.785	58.236	10.071	QP
8		*	0.382	32.064	21.994	-16.171	48.236	10.071	AV
9			3.874	30.790	20.831	-25.210	56.000	9.959	QP
10			3.874	22.305	12.346	-23.695	46.000	9.959	AV
11			4.294	30.303	20.324	-25.697	56.000	9.979	QP
12			4.294	21.616	11.637	-24.384	46.000	9.979	AV

Engineer: Roy	
Site: SR2	Time: 2013/12/04 - 09:55
Limit: FCC_Part15B Main_ClassB	Margin: 0
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: WiFi USB Dongle Versa3	Power: AC 120V/60Hz
Note: Mode 1	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor	Type
1			0.150	39.943	28.801	-26.057	66.000	11.142	QP
2			0.150	30.666	19.524	-25.334	56.000	11.142	AV
3			0.210	31.430	21.435	-31.776	63.205	9.995	QP
4			0.210	22.556	12.561	-30.649	53.205	9.995	AV
5			0.402	33.330	23.216	-24.482	57.812	10.114	QP
6			0.402	28.120	18.007	-19.692	47.812	10.114	AV
7			3.354	28.851	18.949	-27.149	56.000	9.902	QP
8			3.354	24.086	14.184	-21.914	46.000	9.902	AV
9			3.922	31.904	21.938	-24.096	56.000	9.966	QP
10		*	3.922	28.047	18.081	-17.953	46.000	9.966	AV
11			4.298	25.832	15.845	-30.168	56.000	9.987	QP
12			4.298	17.946	7.959	-28.054	46.000	9.987	AV

4. Radiated Emission

4.1. Limit

FCC Part 15 Subpart B Paragraph 15.109		
Frequency (MHz)	Distance (m)	Level (dBuV/m)
30 - 88	3	40
88 - 216	3	43.5
216 - 960	3	46
Above 960	3	54

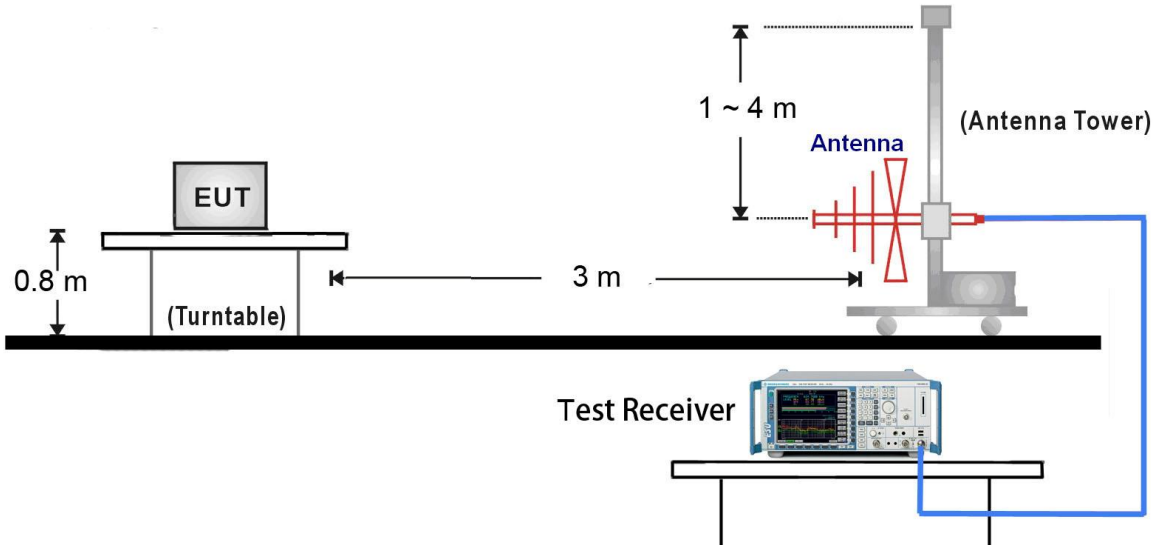
Note 1: The lower limit shall apply at the transition frequency.

Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

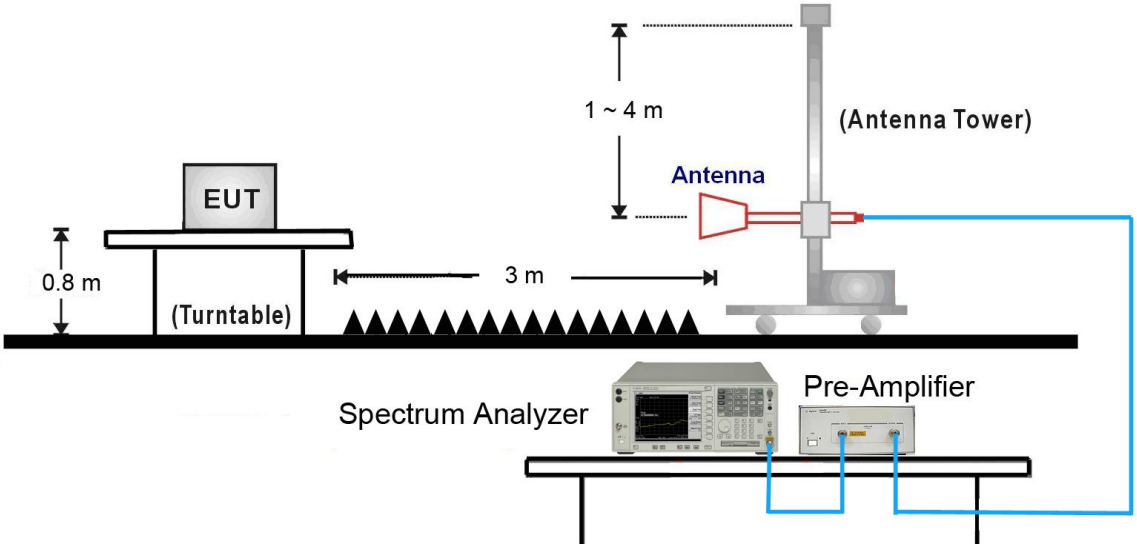
Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m)

4.2. Test Setup

<Radiated Emissions Frequency: 30 MHz to 1000 MHz>



<Radiated Emissions Frequency: 1000 MHz to 6000 MHz>



4.3. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Horizontal or vertical polarization of the antenna is set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated on radiated measurement.

For an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 - 108	1000
108 - 500	2000
500 - 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

On any frequency or frequencies below or equal to 1000 MHz, the radiated limits shown are based on measuring equipment employing a quasi-peak detector function and above 1000 MHz, the radiated limits shown are based measuring equipment employing an average detector function. When average radiated emission measurement are included emission measurement Above 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

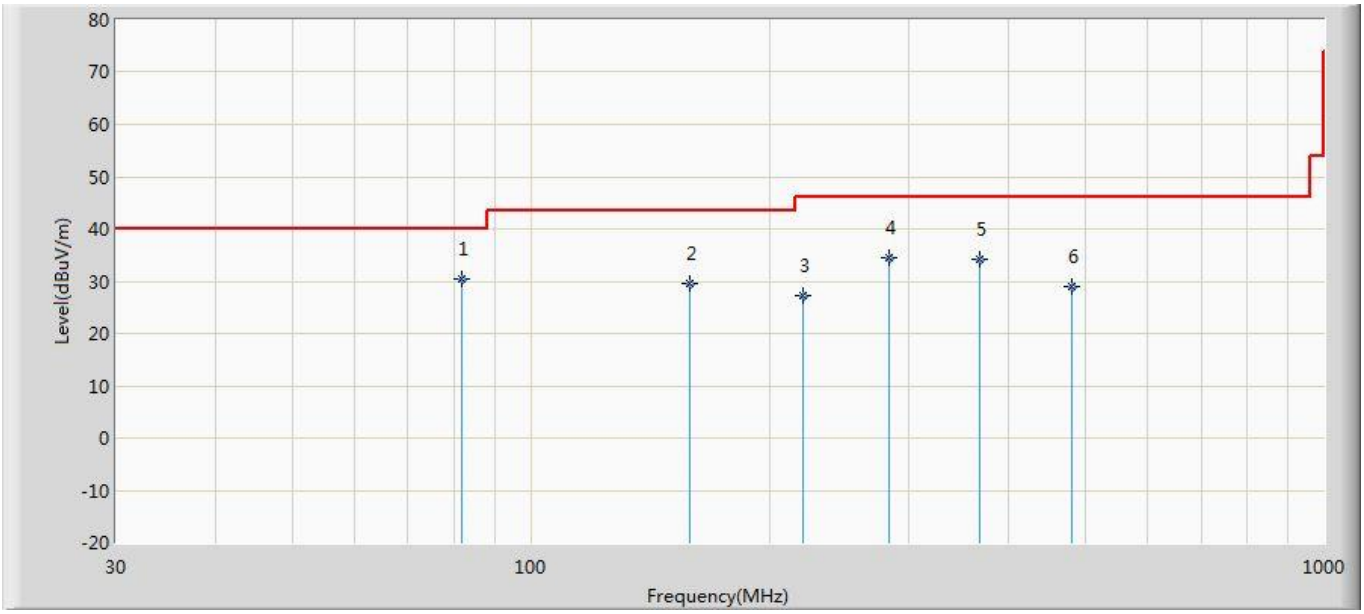
For class A, the measurement distance between the EUT and antenna is 10 meters for under 1GHz and above 1GHz.

For class B, the measurement distance between the EUT and antenna is 3 meters for under 1GHz and 3 meters for above 1GHz.

The bandwidth below 1GHz setting on the field strength meter (R&S Test Receiver ESR) is 120 kHz and above 1GHz is 1MHz.

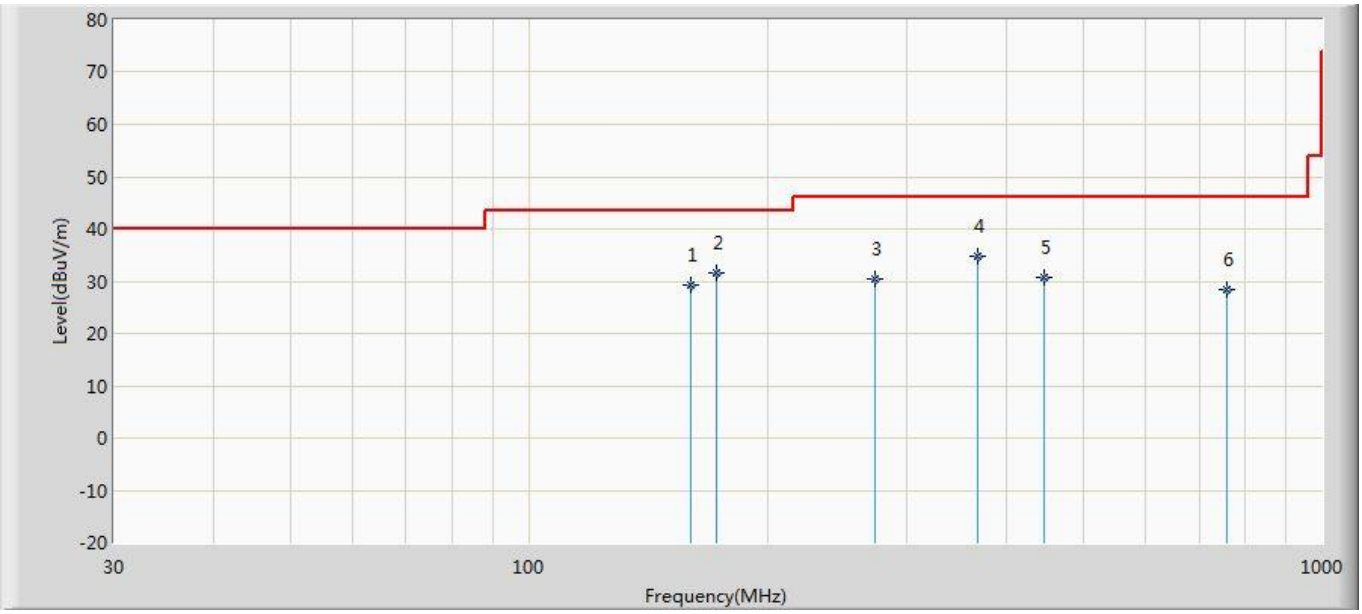
4.4. Test Result

Engineer: Roy	
Site: AC1	Time: 2013/12/04 - 09:44
Limit: FCC_Part15B RE_ClassB	Margin: 0
Probe: VULB9162_0.03-8GHz	Polarity: Horizontal
EUT: WiFi USB Dongle Versa3	Power: AC 120V/60Hz
Note: Mode 1:	



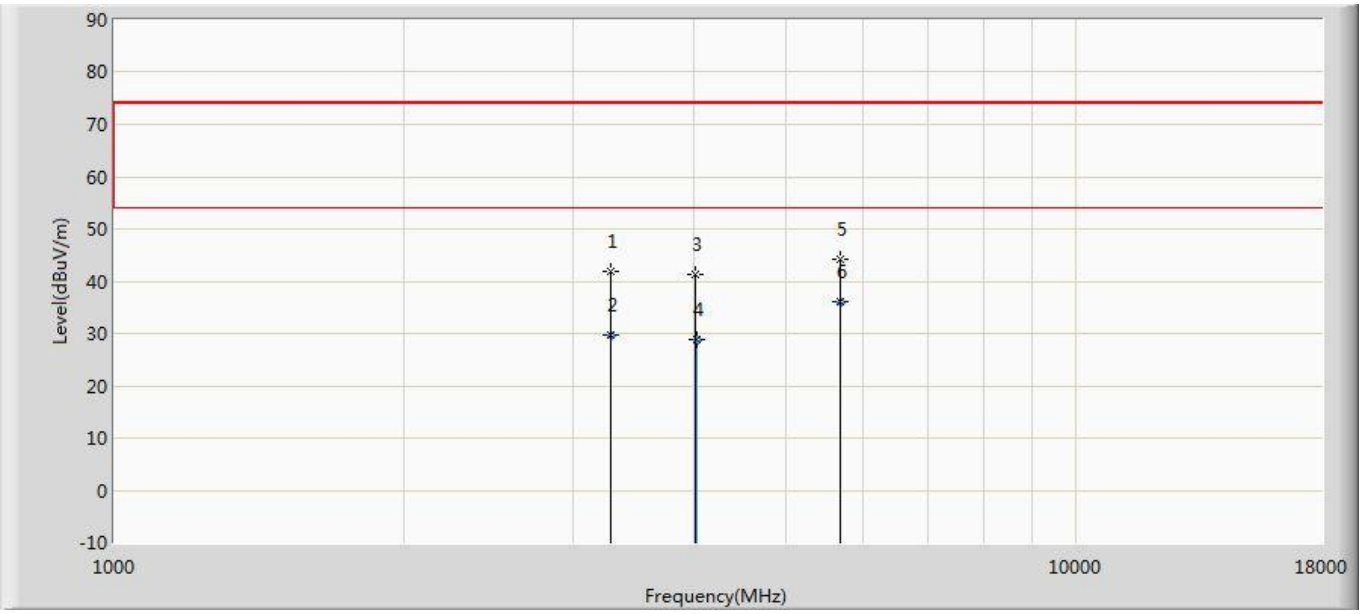
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	82.016	30.542	19.680	-9.458	40.000	10.862	QP
2			159.010	29.671	18.982	-13.829	43.500	10.689	QP
3			220.120	27.117	13.768	-18.883	46.000	13.349	QP
4			283.170	34.561	19.803	-11.439	46.000	14.758	QP
5			368.530	34.307	17.874	-11.693	46.000	16.433	QP
6			480.201	28.882	10.836	-17.118	46.000	18.046	QP

Engineer: Roy	
Site: AC1	Time: 2013/12/04 - 09:45
Limit: FCC_Part15B RE_ClassB	Margin: 0
Probe: VULB9162_0.03-8GHz	Polarity: Vertical
EUT: WiFi USB Dongle Versa3	Power: AC 120V/60Hz
Note: Mode 1:	



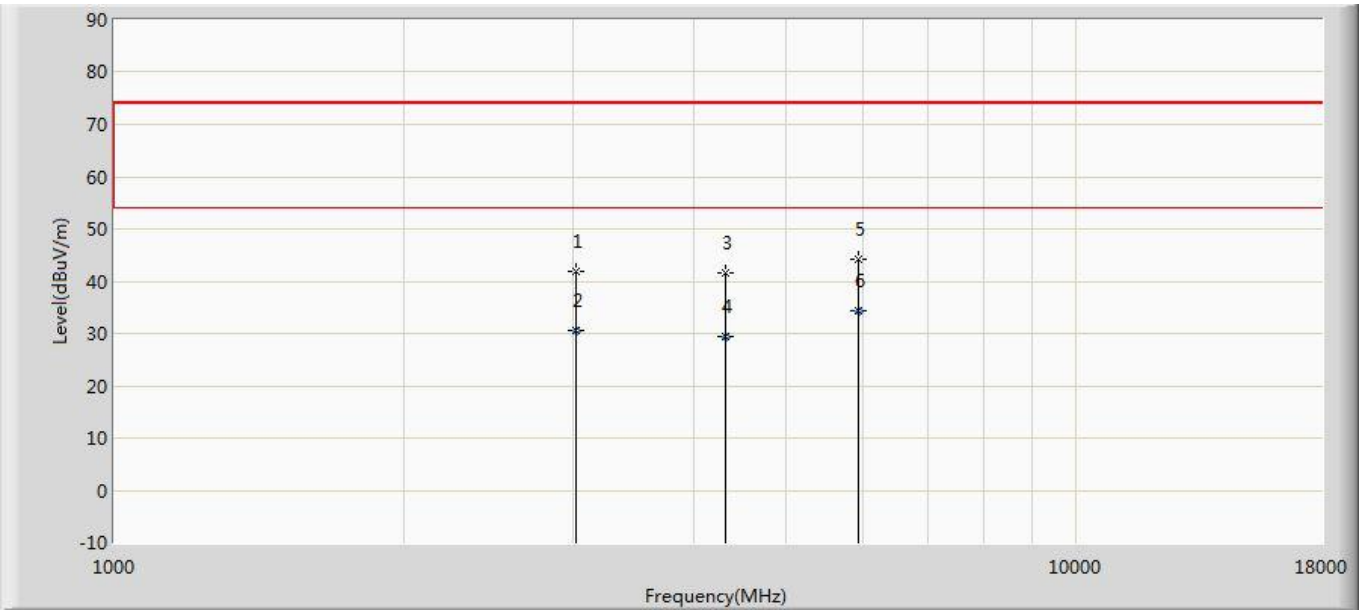
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			159.738	29.182	18.468	-14.318	43.500	10.714	QP
2			172.348	31.688	20.466	-11.812	43.500	11.222	QP
3			272.985	30.503	15.862	-15.497	46.000	14.641	QP
4		*	368.530	34.877	18.444	-11.123	46.000	16.433	QP
5			445.766	30.735	13.252	-15.265	46.000	17.483	QP
6			759.561	28.346	6.451	-17.654	46.000	21.895	QP

Engineer: Roy	
Site: AC1	Time: 2013/12/04 - 09:52
Limit: FCC_Part15B RE_ClassB	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: WiFi USB Dongle Versa3	Power: AC 120V/60Hz
Note: Mode 1:	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			3278.000	41.934	38.655	-32.066	74.000	3.279	PK
2			3278.045	29.819	26.540	-24.181	54.000	3.279	AV
3			4026.000	41.379	36.869	-32.621	74.000	4.510	PK
4			4026.140	28.822	24.312	-25.178	54.000	4.510	AV
5			5675.000	44.346	36.666	-29.654	74.000	7.680	PK
6		*	5675.240	36.030	28.350	-17.970	54.000	7.681	AV

Engineer: Roy	
Site: AC1	Time: 2013/12/04 - 09:52
Limit: FCC_Part15B RE_ClassB	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: WiFi USB Dongle Versa3	Power: AC 120V/60Hz
Note: Mode 1:	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			3023.000	41.786	38.385	-32.214	74.000	3.401	PK
2			3023.070	30.441	27.040	-23.559	54.000	3.401	AV
3			4315.000	41.614	36.289	-32.386	74.000	5.325	PK
4			4315.034	29.445	24.120	-24.555	54.000	5.325	AV
5			5930.000	44.186	35.896	-29.814	74.000	8.290	PK
6		*	5930.069	34.430	26.140	-19.570	54.000	8.290	AV

5. Measurement Uncertainty

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

Conducted Emission
The maximum measurement uncertainty is evaluated as: 9kHz~150kHz: 3.35dB 150kHz~30MHz: 2.91dB
Radiated disturbance
The maximum measurement uncertainty is defined as: 30MHz ~ 1GHz: 3.8dB 1GHz ~ 18GHz: 4.4dB

6. List of Measuring Instrument

Conducted Emission

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	101209	1 year	2014/07/17
Two-Line V-Network	R&S	ENV216	101683	1 year	2014/07/17
Two-Line V-Network	R&S	ENV216	101684	1 year	2014/07/17
Temperature/ Meter Humidity	Anymetre	TH101B	SR2-01	1 year	2014/08/15

Radiated Emission

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9038A	MY51210155	1 year	2014/08/15
Preamplifier	MRT	AP01G18	1310002	1 year	2014/10/08
TRILOG Antenna	Schwarzbeck	VULB9162	9162-047	2 years	2014/09/13
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1167	2 years	2014/09/13
Temperature/Humidity Meter	Anymetre	TH101B	AC1-01	1 year	2014/08/15

The End