FCC15.247 Test Report

Applicant	:	AsiaRF Ltd.
Product	:	WiFi USB Dongle Versa3
Model No.	:	AWUHN2487
FCC ID	:	TKZAWUHN2487
Standards	:	FCC CFR Title 47 Part 15 Subpart C: 2013
		ANSI C63.4: 2009
		ANSI C63.10: 2009
Test Date	:	November 07 ~ 26, 2013

Reviewed By : Sunny Sun

(Engineer: Sunny Sun)

Approved By : Marlinchen

(Manager: Marlin Chen)

The test results relate only to the samples tested.
The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.
The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date
1311RSU00201	Rev. 01	Initial report	11-27-2013
1311RSU00201	Rev. 02	Add calibration interval for equipment	12-04-2013

Test Summary

FCC Part Section(s)	Test Description	Test Result (Pass/Fail)	Reference
15.203 & 15.247(c)(1)(i)	Antenna Requirement	Pass	Section 3
15.207	Conducted Emission	Pass	Section 4
15.205 15.209	Radiated Emission	Pass	Section 5
15.247(d)	RF Antenna Conducted Spurious	Pass	Section 6
15.247(d)	Radiated Emission Band Edge	Pass	Section 7
15.215(c)	Operation Frequency Range of 20dB Bandwidth	Pass	Section 8
15.247(a)(2)	Occupied Bandwidth	Pass	Section 9
15.247(b)(3)	Power Output	Pass	Section 10
15.247(e)	Power Spectral Density	Pass	Section 11

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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.

Channel List for 802.11b/g/n(20MHz)

Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2412 MHz	02	2417 MHz	03	2422 MHz
04	2427 MHz	05	2432 MHz	06	2437 MHz
07	2442 MHz	08	2447 MHz	09	2452 MHz
10	2457 MHz	11	2462 MHz	N/A	N/A

Channel List for 802.11n(40MHz)

Channel	Frequency	Channel	Frequency	Channel	Frequency
03	2422 MHz	04	2427 MHz	05	2432 MHz
06	2437 MHz	07	2442 MHz	08	2447 MHz
09	2452 MHz	N/A	N/A	N/A	N/A

1.4. Testing Facility

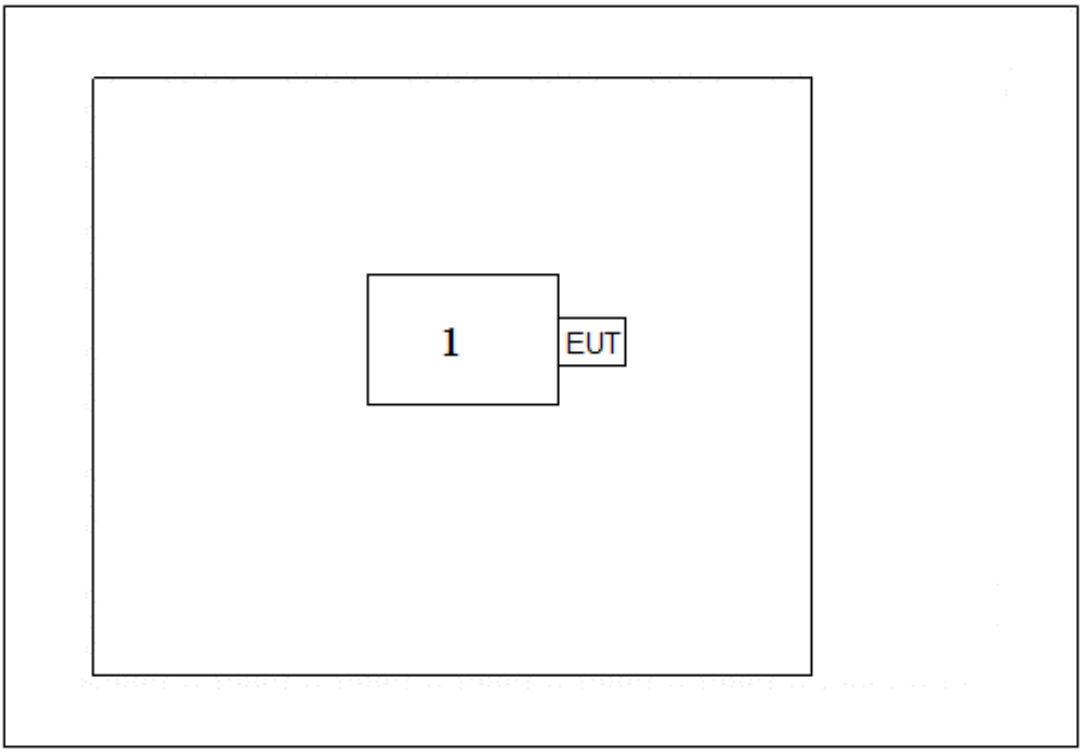
Test Site	MRT Technology (Suzhou) Co., Ltd
Test Site Location	D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
Registration No.	809388

2. Test Configuration of Equipment Under Test

2.1. Test Mode

Test Mode
Mode 1: Transmit by 802.11b
Mode 2: Transmit by 802.11g
Mode 3: Transmit by 802.11n(20MHz)
Mode 4: Transmit by 802.11n(40MHz)

2.2. Configuration of Tested System

Connection Diagram		
		
Signal Cable Type		Signal cable Description
N/A	N/A	N/A

2.3. Test System Details

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. Test Software

Turn on the power of all equipment, then run the RF test software “Ralink QA Tool” provided by applicant, and set the test mode and channel, then press OK to start continue transmit.

3. Antenna Requirement

3.1. Standard Applicable

According to FCC 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

3.2. Conclusion

This product has a detachable and unique antenna (SMA Reverse Connector), fulfill the requirement of this section.

4. Conducted Emission

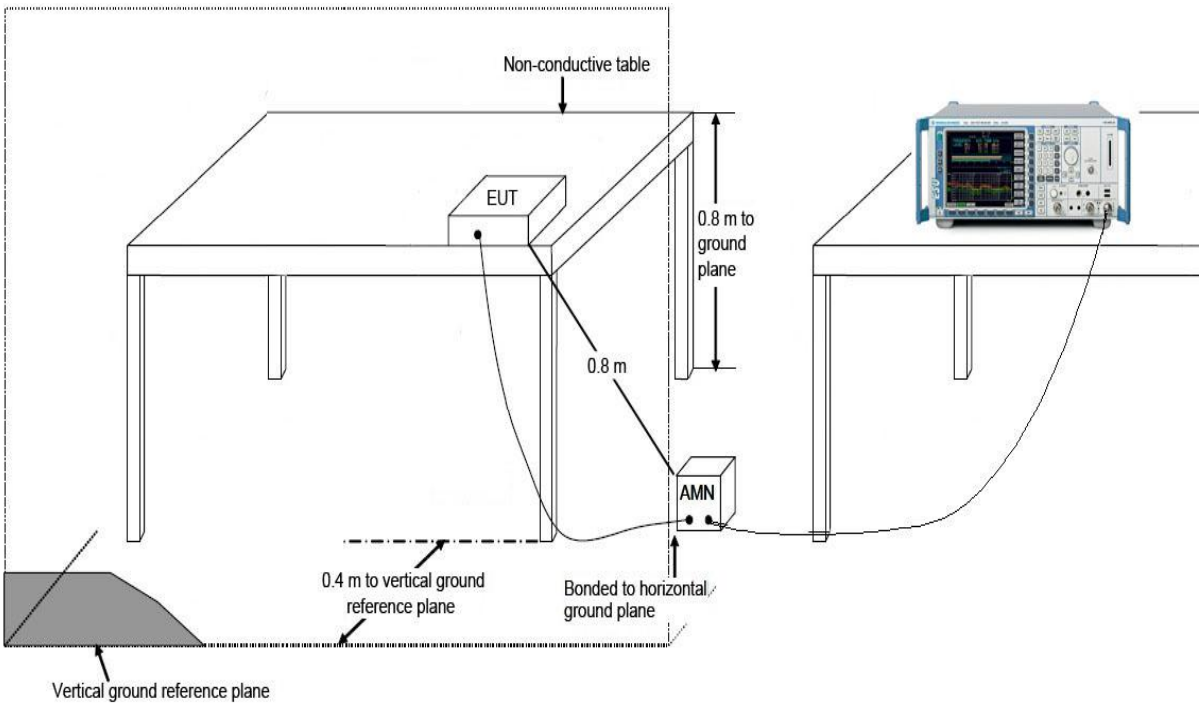
4.1. Limit of Conducted Emission

FCC Part 15 Subpart C Paragraph 15.207 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.

4.2. Test Setup



4.3. Test Procedure

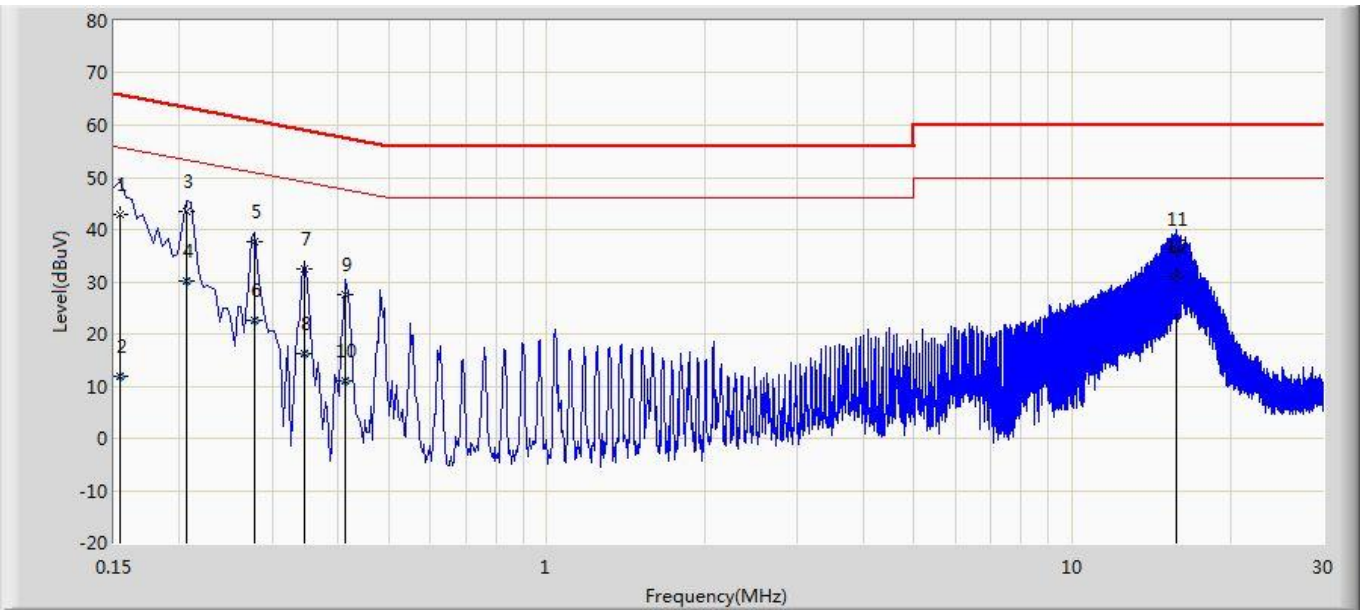
The EUT was setup according to ANSI C63.4, 2009 and tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear 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 9 kHz.

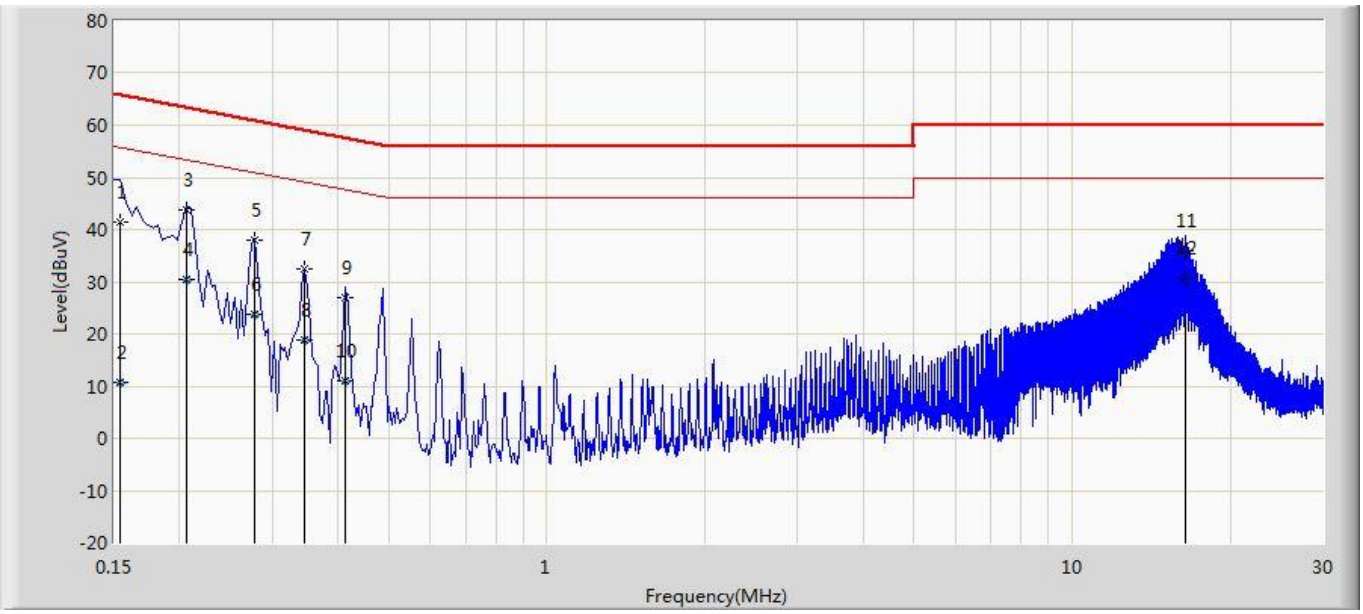
4.4. Test Result

Engineer: Roy	
Site: SR2	Time: 2013/11/19 - 20:38
Limit: FCC_Part15.207	Margin: 0
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: WiFi USB Dongle Ver	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	42.850	32.111	-22.931	65.781	10.740	QP
2			0.154	11.807	1.067	-43.974	55.781	10.740	AV
3			0.206	43.567	33.586	-19.798	63.365	9.981	QP
4			0.206	30.032	20.051	-23.333	53.365	9.981	AV
5			0.278	37.630	27.643	-23.245	60.875	9.986	QP
6			0.278	22.659	12.672	-28.217	50.875	9.986	AV
7			0.346	32.360	22.319	-26.698	59.058	10.041	QP
8			0.346	16.105	6.064	-32.953	49.058	10.041	AV
9			0.414	27.603	17.506	-29.965	57.568	10.097	QP
10			0.414	10.971	0.874	-36.597	47.568	10.097	AV
11			15.766	36.358	26.288	-23.642	60.000	10.070	QP
12		*	15.766	30.954	20.884	-19.046	50.000	10.070	AV

Engineer: Roy	
Site: SR2	Time: 2013/11/19 - 20:48
Limit: FCC_Part15.207	Margin: 0
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: WiFi USB Dongle Ver	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	41.436	30.720	-24.346	65.781	10.716	QP
2			0.154	10.635	-0.081	-45.146	55.781	10.716	AV
3			0.206	43.678	33.677	-19.687	63.365	10.001	QP
4			0.206	30.376	20.375	-22.989	53.365	10.001	AV
5			0.278	37.882	27.860	-22.993	60.875	10.022	QP
6			0.278	23.894	13.872	-26.981	50.875	10.022	AV
7			0.346	32.413	22.342	-26.645	59.058	10.071	QP
8			0.346	18.936	8.864	-30.122	49.058	10.071	AV
9			0.414	27.038	16.915	-30.529	57.568	10.123	QP
10			0.414	11.138	1.015	-36.429	47.568	10.123	AV
11			16.394	35.830	25.716	-24.170	60.000	10.114	QP
12		*	16.394	30.701	20.588	-19.299	50.000	10.114	AV

5. Radiated Emission

5.1. Limit

FCC Part 15 Subpart C Paragraph 15.209		
Frequency (MHz)	Distance (m)	Level (dBuV/m)
30 - 88	3	40
88 - 216	3	43.5
216 - 960	3	46
Above 960	3	54

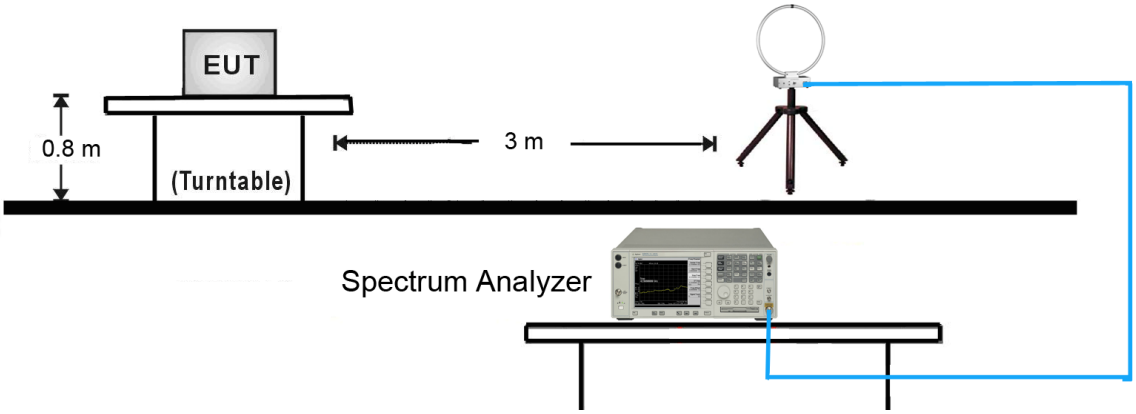
Note 1: The lower limit shall apply at the transition frequency.

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.

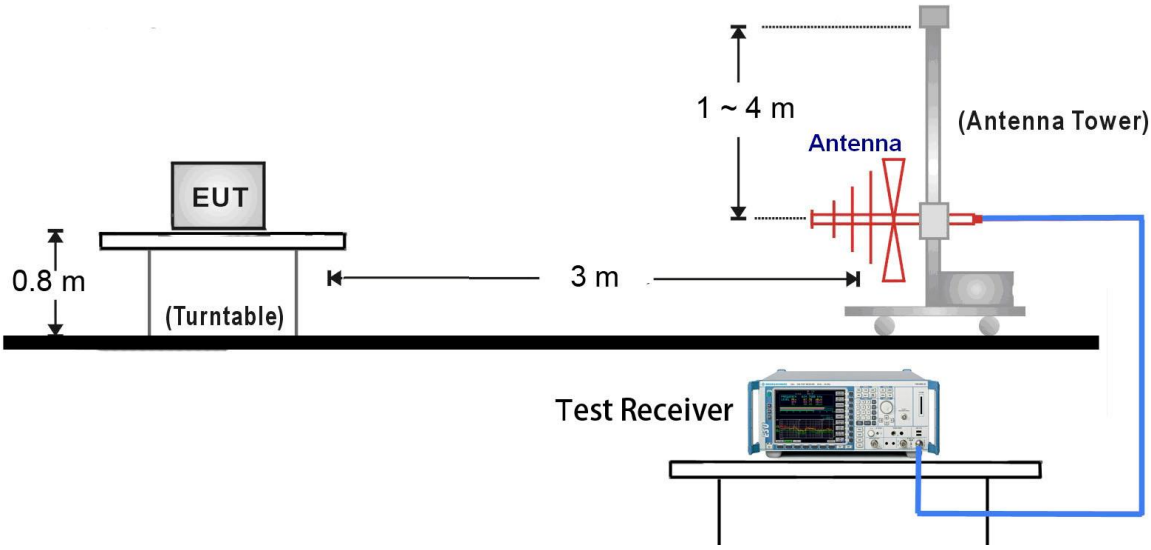
Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m)

5.2. Test Setup

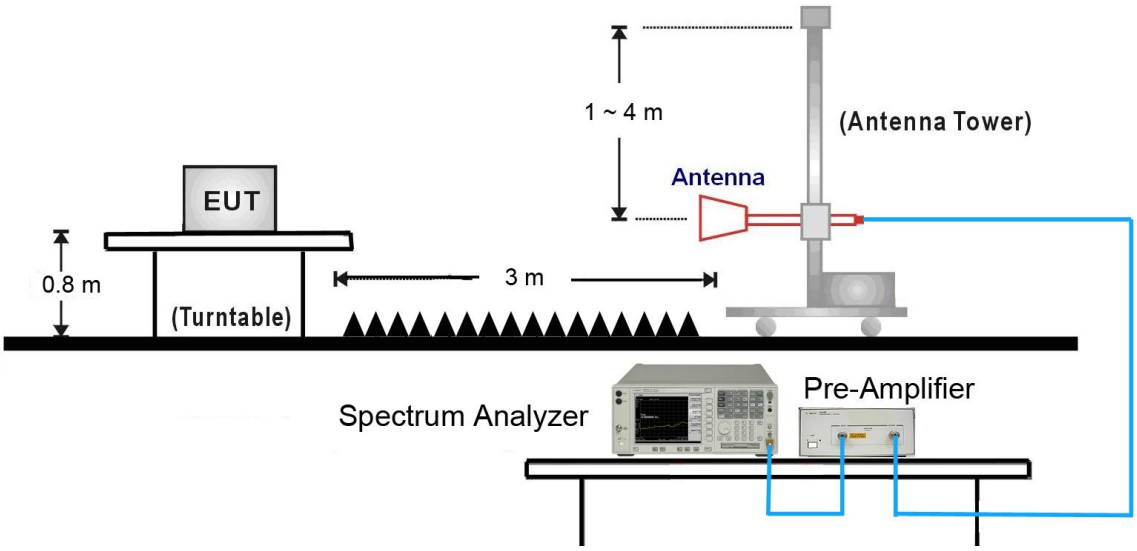
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:



5.3. Test Procedure

The EUT was setup according to ANSI C63.4, 2009 and tested according to KDB 558074 forcompliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 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 is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the Antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2009 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.The frequency range from 30MHz to 10th harmonic is checked.

Note: When doing emission measurement above 1GHz, the horn Antenna will be bended down a little (as horn Antenna has the narrow beamwidth) in order to keeping the Antenna in the “cone of radiation” of EUT. The 3dB beamwidth is 10~60 degrees for H-plane and 10~90 degrees for E-plane.

5.4. Test Result

All of the test result shown indicates the worst case, and spectrum analyzer parameters setting as shown below:
Peak detector: RBW = 1MHz, VBW = 3MHz, sweep time = 200ms;
Average detector: RBW = 1MHz, VBW = 10Hz, sweep time = auto.
Measure Level = Reading Level + Cable Loss + Antenna Factor - Preamplifier Gain

Mode1: Transmit by 802.11b for AWUHN2487 with antenna AG-24015

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	H	3278.2	36.4	3.3	39.7	54(Note3)	-14.3	PK
	V	3210.1	37.9	3.5	41.4	54(Note3)	-12.6	PK
	H	4824.6	46.2	6.4	52.6	54(Note3)	-1.4	PK
	V	4824.9	46.7	6.4	53.1	54(Note3)	-0.9	PK
	H	7236.0	33.2	13.8	47.0	54(Note3)	-7.0	PK
	V	7236.0	33.5	13.8	47.3	54(Note3)	-6.7	PK
	H	9648.0	34.2	15.5	49.7	54(Note3)	-4.3	PK
	V	9648.0	35.1	15.5	50.6	54(Note3)	-3.4	PK
6	H	3159.5	36.9	3.6	40.5	54(Note3)	-13.5	PK
	V	3110.0	38.9	3.5	42.4	54(Note3)	-11.6	PK
	H	4874.9	39.4	6.6	46.0	54(Note3)	-8.0	PK
	V	4874.9	42.5	6.6	49.1	54(Note3)	-4.9	PK
	H	7311.0	34.5	14.0	48.5	54(Note3)	-5.5	PK
	V	7311.0	35.1	14.0	49.1	54(Note3)	-4.9	PK
	H	9748.0	35.4	16.2	51.6	54(Note3)	-2.4	PK
	V	9748.0	35.2	16.2	51.4	54(Note3)	-2.6	PK
11	H	3278.4	41.5	3.3	44.8	54(Note3)	-9.2	PK
	V	3278.6	43.5	3.3	46.8	54(Note3)	-7.2	PK
	H	4924.9	42.6	6.7	49.3	54(Note3)	-4.7	PK
	V	4925.7	40.5	6.7	47.2	54(Note3)	-6.8	PK
	H	7386.0	35.4	14.1	49.5	54(Note3)	-4.5	PK
	V	7392.0	36.9	14.1	51.0	54(Note3)	-3.0	PK
	H	9848.0	35.5	16.4	51.9	54(Note3)	-2.1	PK
	V	9848.0	34.3	16.4	50.7	54(Note3)	-3.3	PK

Note: 1. Measure Level = Reading Level + Factor.

2. The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Mode2: Transmit by 802.11g for AWUHN2487 with antenna AG-24015

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	H	3109.5	36.8	3.5	40.3	54(Note3)	-13.7	PK
	V	3210.5	38.1	3.5	41.6	54(Note3)	-12.4	PK
	H	4824.9	44.5	6.4	50.9	54(Note3)	-3.1	PK
	V	4824.8	41.5	6.4	47.9	54(Note3)	-6.1	PK
	H	7236.0	34.5	13.8	48.3	54(Note3)	-5.7	PK
	V	7236.0	34.0	13.8	47.8	54(Note3)	-6.2	PK
	H	9648.0	34.8	15.5	50.3	54(Note3)	-3.7	PK
	V	9648.0	35.1	15.5	50.6	54(Note3)	-3.4	PK
6	H	3245.1	38.6	3.4	42.0	54(Note3)	-12.0	PK
	V	3023.5	35.4	3.4	38.8	54(Note3)	-15.2	PK
	H	4874.9	38.1	6.6	44.7	54(Note3)	-9.3	PK
	V	4874.9	38.1	6.6	44.7	54(Note3)	-9.3	PK
	H	7311.0	35.4	14.0	49.4	54(Note3)	-4.6	PK
	V	7311.0	34.1	14.0	48.1	54(Note3)	-5.9	PK
	H	9748.0	35.6	16.2	51.8	54(Note3)	-2.2	PK
	V	9748.0	35.7	16.2	51.9	54(Note3)	-2.1	PK
11	H	3227.8	36.5	3.5	40.0	54(Note3)	-14.0	PK
	V	3394.5	36.8	3.3	40.1	54(Note3)	-13.9	PK
	H	4924.8	39.4	6.7	46.1	54(Note3)	-7.9	PK
	V	4924.6	37.2	6.7	43.9	54(Note3)	-10.1	PK
	H	7386.0	35.1	14.1	49.2	54(Note3)	-4.8	PK
	V	7386.0	35.1	14.1	49.2	54(Note3)	-4.8	PK
	H	9848.0	35.3	16.4	51.7	54(Note3)	-2.3	PK
	V	9848.0	34.6	16.4	51.0	54(Note3)	-3.0	PK

Note: 1. Measure Level = Reading Level + Factor.

2. The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Mode3: Transmit by 802.11n (20MHz) for AWUHN2487 with antenna AG-24015

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	H	3210.5	36.9	3.5	40.4	54(Note3)	-13.6	PK
	V	3075.5	37.1	3.5	40.6	54(Note3)	-13.4	PK
	H	4824.5	46.5	6.4	52.9	54(Note3)	-1.1	PK
	V	4824.6	44.3	6.4	50.7	54(Note3)	-3.3	PK
	H	7236.0	34.6	13.8	48.4	54(Note3)	-5.6	PK
	V	7236.0	34.7	13.8	48.5	54(Note3)	-5.5	PK
	H	9648.0	35.1	15.5	50.6	54(Note3)	-3.4	PK
	V	9648.0	35.7	15.5	51.2	54(Note3)	-2.8	PK
6	H	3244.6	39.4	3.4	42.8	54(Note3)	-11.2	PK
	V	3381.5	35.6	3.2	38.8	54(Note3)	-15.2	PK
	H	4874.6	39.4	6.6	46.0	54(Note3)	-8.0	PK
	V	4874.4	38.4	6.6	45.0	54(Note3)	-9.0	PK
	H	7311.0	35.1	14.0	49.1	54(Note3)	-4.9	PK
	V	7311.0	35.4	14.0	49.4	54(Note3)	-4.6	PK
	H	9748.0	35.6	16.2	51.8	54(Note3)	-2.2	PK
	V	9748.0	36.5	16.2	52.7	54(Note3)	-1.3	PK
11	H	3551.5	37.2	4.1	41.3	54(Note3)	-12.7	PK
	V	3211.5	38.1	3.5	41.6	54(Note3)	-12.4	PK
	H	4924.8	36.6	6.7	43.3	54(Note3)	-10.7	PK
	V	4924.9	40.2	6.7	46.9	54(Note3)	-7.1	PK
	H	7386.0	35.1	14.1	49.2	54(Note3)	-4.8	PK
	V	7386.0	35.8	14.1	49.9	54(Note3)	-4.1	PK
	H	9848.0	36.1	16.4	52.5	54(Note3)	-1.5	PK
	V	9848.0	35.4	16.4	51.8	54(Note3)	-2.2	PK

Note: 1. Measure Level = Reading Level + Factor.

2. The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

Mode4: Transmit by 802.11n (40MHz) for AWUHN2487 with antenna AG-24015

CH	Antenna	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dB)	Measure Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
3	H	3193.0	38.4	3.6	42.0	54(Note3)	-12.0	PK
	V	3448.0	37.2	3.5	40.7	54(Note3)	-13.3	PK
	H	4842.0	40.5	6.5	47.0	54(Note3)	-7.0	PK
	V	4842.0	38.4	6.5	44.9	54(Note3)	-9.1	PK
	H	7266.0	35.6	13.9	49.5	54(Note3)	-4.5	PK
	V	7266.0	34.1	13.9	48.0	54(Note3)	-6.0	PK
	H	9688.0	35.4	15.6	51.0	54(Note3)	-3.0	PK
	V	9688.0	36.4	15.6	52.0	54(Note3)	-2.0	PK
6	H	3244.0	37.2	3.4	40.6	54(Note3)	-13.4	PK
	V	3244.0	38.1	3.4	41.5	54(Note3)	-12.5	PK
	H	4874.0	35.6	6.6	42.2	54(Note3)	-11.8	PK
	V	4874.0	36.4	6.6	43.0	54(Note3)	-11.0	PK
	H	7311.0	35.4	14.0	49.4	54(Note3)	-4.6	PK
	V	7311.0	33.5	14.0	47.5	54(Note3)	-6.5	PK
	H	9748.0	35.9	16.2	52.0	54(Note3)	-2.0	PK
	V	9748.0	36.1	16.2	52.3	54(Note3)	-1.7	PK
9	H	3210.0	38.1	3.5	41.6	54(Note3)	-12.4	PK
	V	3278.0	38.6	3.3	41.9	54(Note3)	-12.1	PK
	H	4904.0	37.2	6.7	43.9	54(Note3)	-10.1	PK
	V	4904.0	35.6	6.7	42.3	54(Note3)	-11.7	PK
	H	7356.0	35.7	14.0	49.7	54(Note3)	-4.3	PK
	V	7356.0	36.4	14.0	50.4	54(Note3)	-3.6	PK
	H	9808.0	35.4	16.4	51.8	54(Note3)	-2.2	PK
	V	9808.0	35.1	16.4	51.5	54(Note3)	-2.5	PK

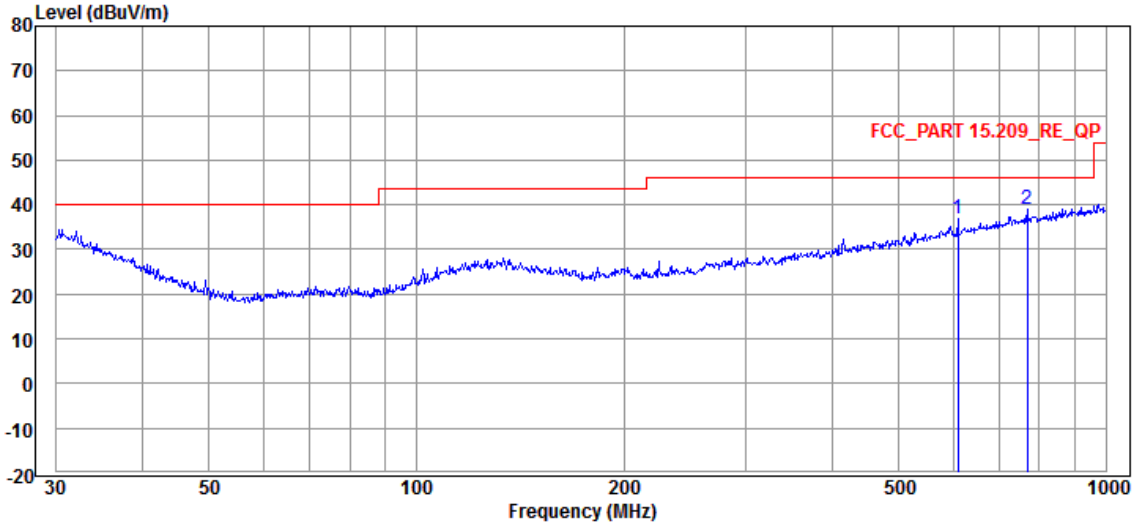
Note: 1. Measure Level = Reading Level + Factor.

2. The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

The worst case of Radiated Emission below 1GHz:

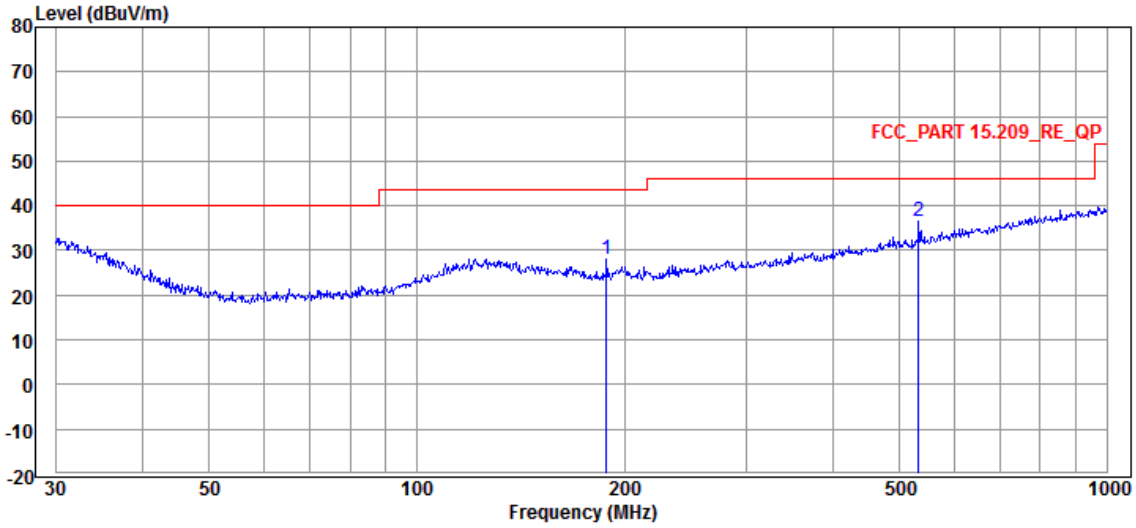
Tested by	Roy	Test Data	2013-11-21- 13:40:56
Site	AC1	Power	AC 120V/60Hz
Limit	FCC_PART 15.209_RE	Polarity	Horizontal
Antenna	VULB_9162	EUT	WiFi USB Dongle Versa3
Test Mode	Mode 1: Transmit at Channel 2412 by 802.11b with antenna AG-24015		



Freq (MHz)	Level (dBµV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
609.92	36.72	15.96	Peak	20.76	46.00	-9.28
768.75	38.91	15.80	Peak	23.11	46.00	-7.09

Remarks: C.F (Correction Factor) = Antenna Factor + Cable Loss - Preamp Gain

Tested by	Roy	Test Data	2013-11-21- 13:41:22
Site	AC1	Power	AC 120V/60Hz
Limit	FCC_PART 15.209_RE	Polarity	Vertical
Antenna	VULB_9162	EUT	WiFi USB Dongle Versa3
Test Mode	Mode 1: Transmit at Channel 2412 by 802.11b with antenna AG-24015		



Freq (MHz)	Level (dBµV/m)	Reading (dBuV)	Detector	C.F (dB)	Limit (dBuV/m)	Over Limit (dB)
188.41	28.18	15.93	Peak	12.25	43.50	-15.32
533.83	36.62	17.22	Peak	19.40	46.00	-9.38

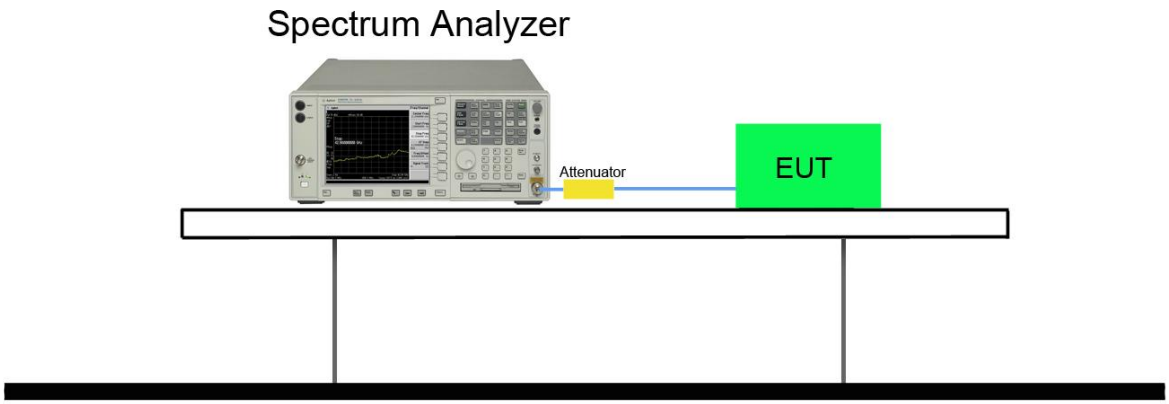
Remarks: C.F (Correction Factor) = Antenna Factor + Cable Loss - Preamp Gain

6. RF Antenna Conducted Spurious

6.1. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

6.2. Test Setup



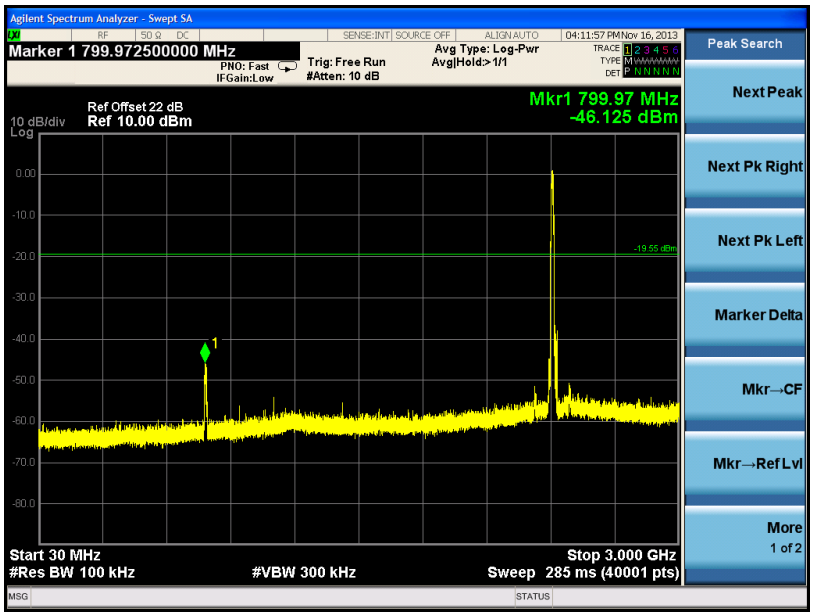
6.3. Test Procedure

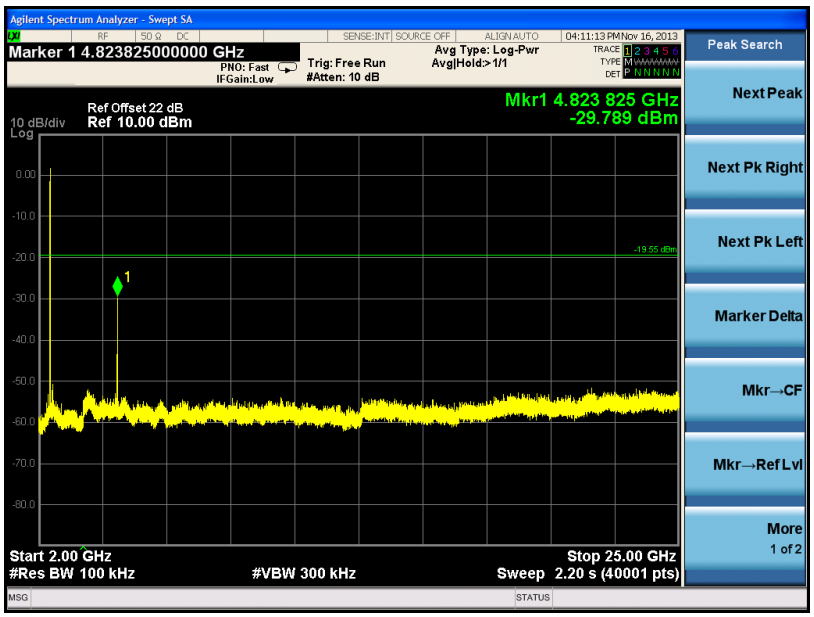
The EUT was tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.
Set RBW = 100 kHz, Set VBW > RBW, scan up through 10th harmonic.

6.4. Test Result

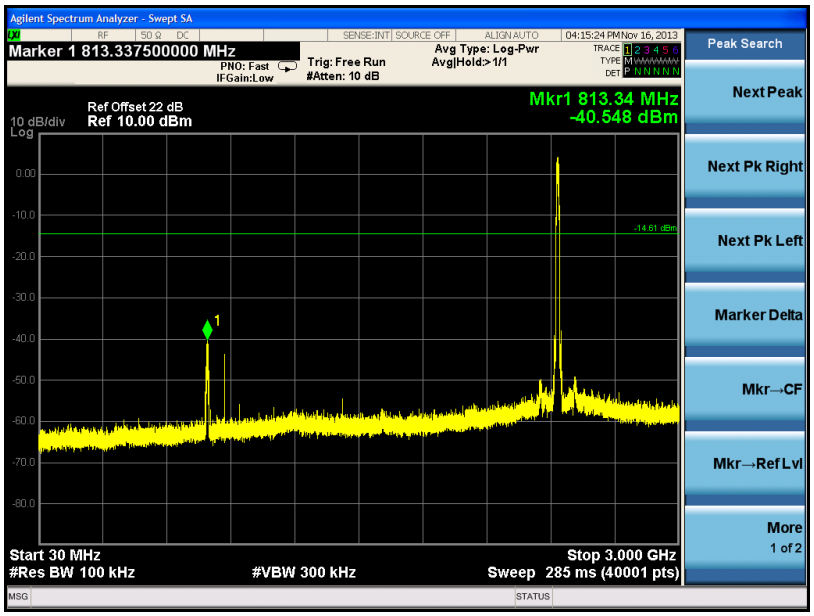
Product	:	WiFi USB Dongle Versa3
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	TR3
Test Mode	:	Mode 1: Transmit by 802.11b

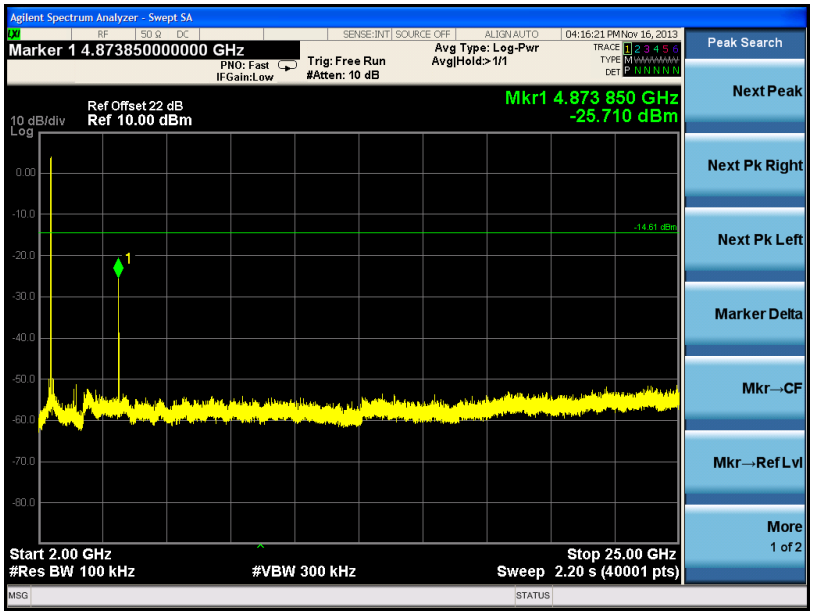
Channel 01 (2412MHz)



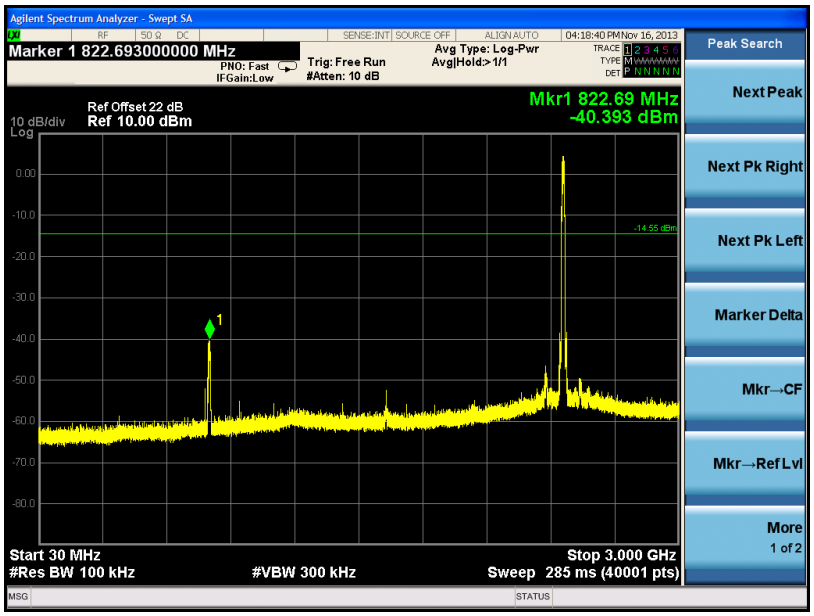


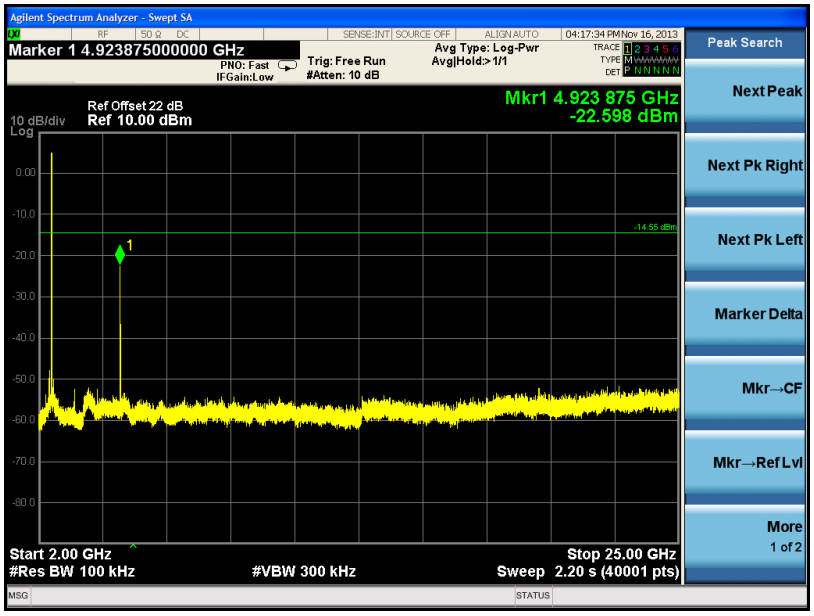
Channel 06 (2437MHz)





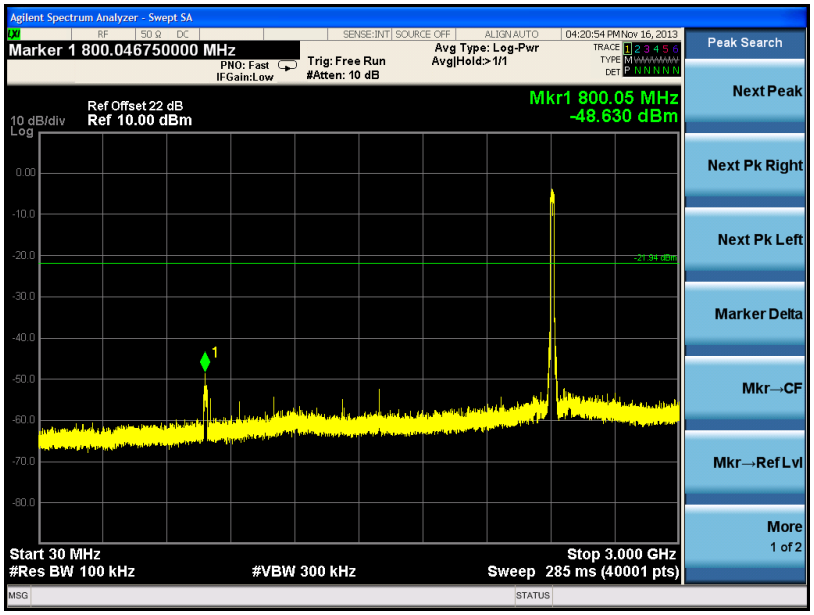
Channel 11 (2462MHz)

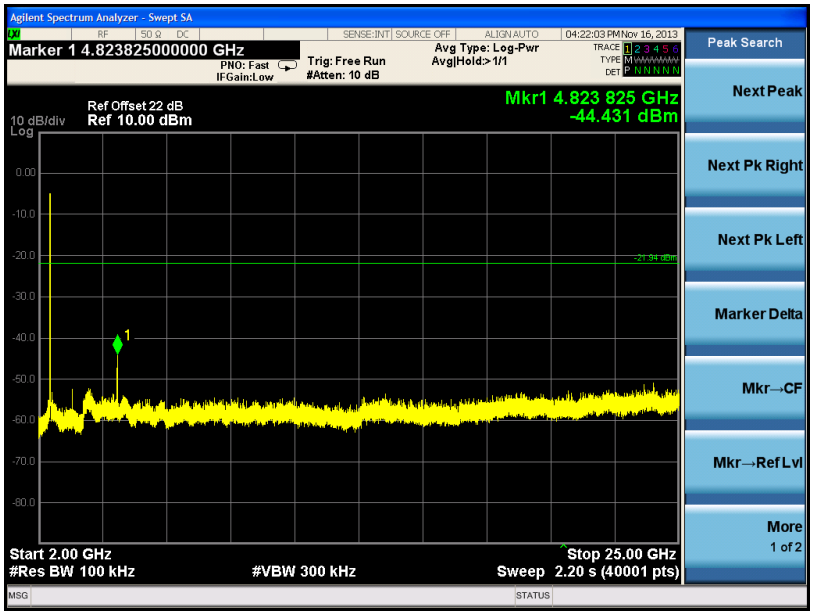




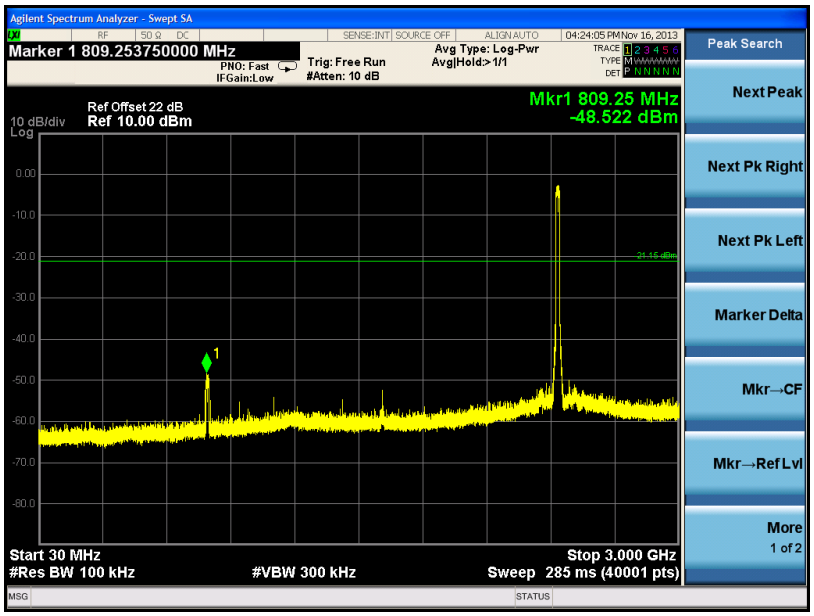
Product	:	WiFi USB Dongle Versa3
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	TR3
Test Mode	:	Mode 2: Transmit by 802.11g

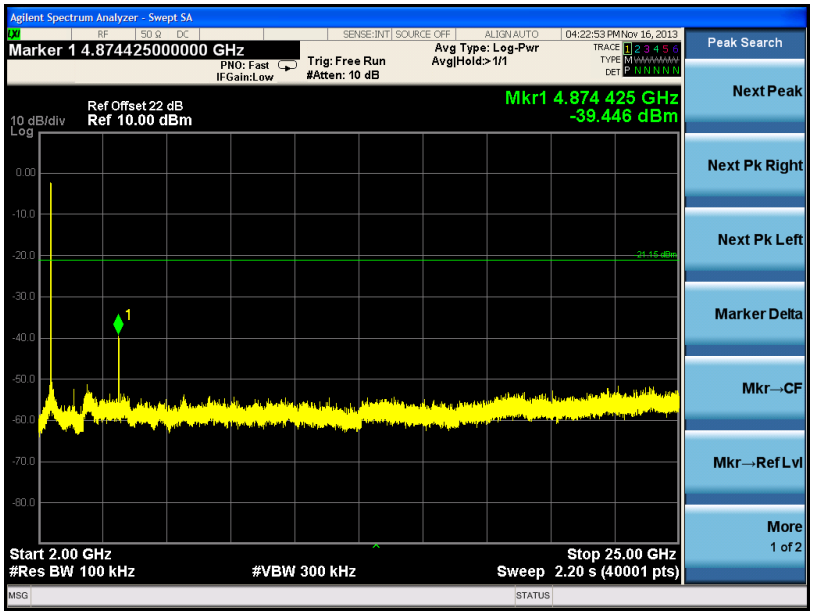
Channel 01 (2412MHz)



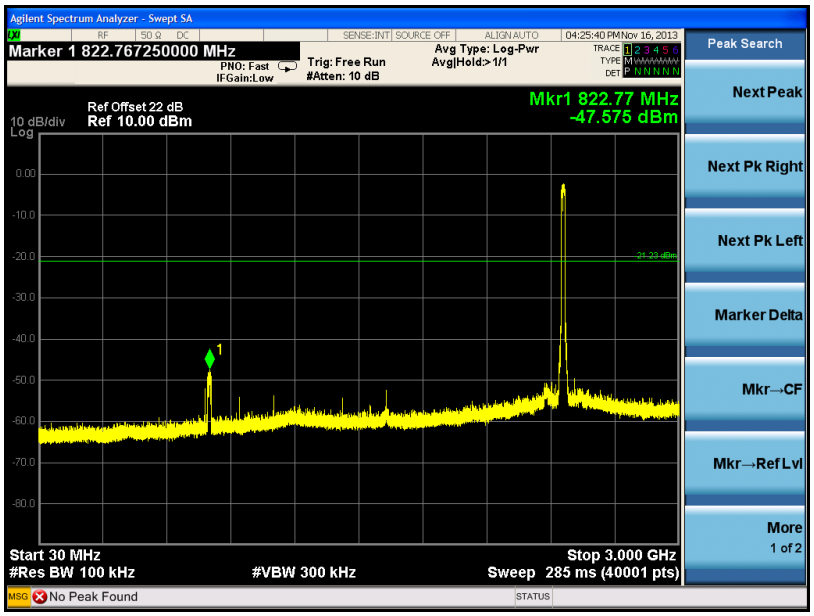


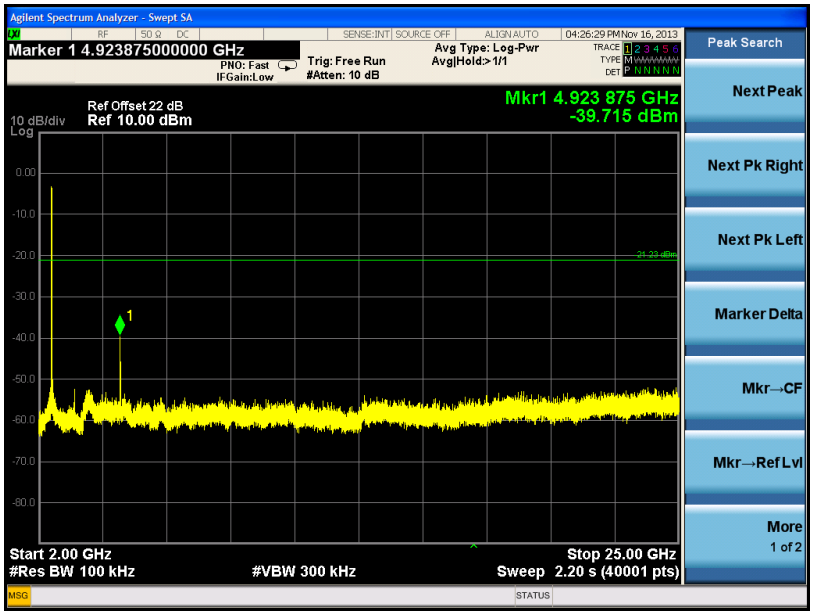
Channel 06 (2437MHz)





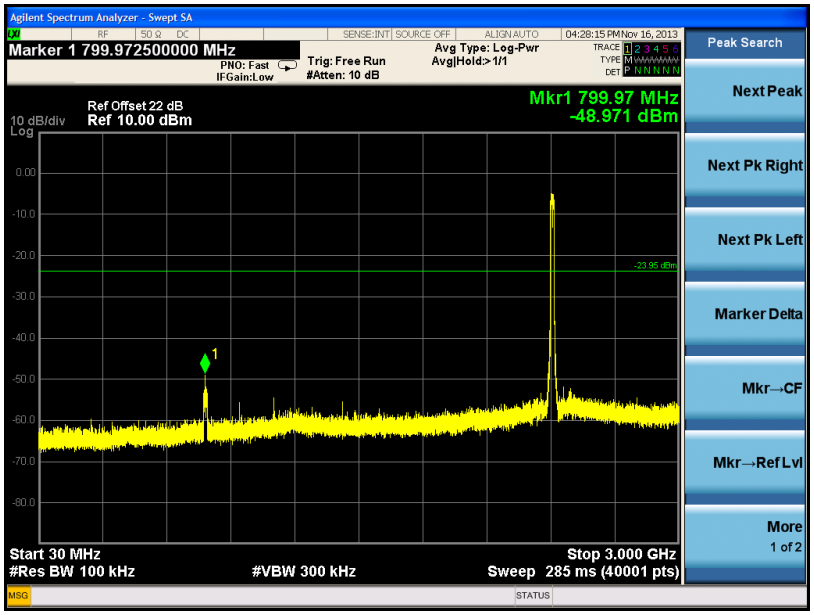
Channel 11 (2462MHz)

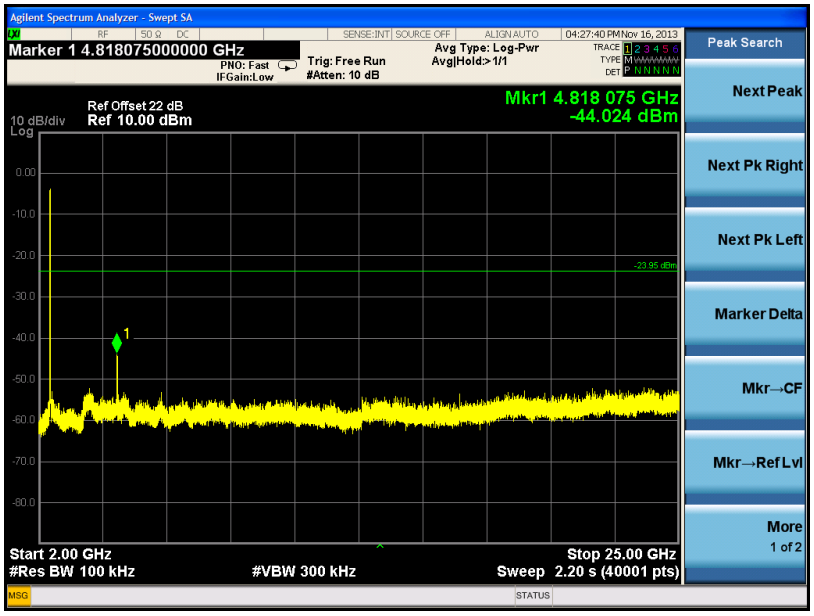




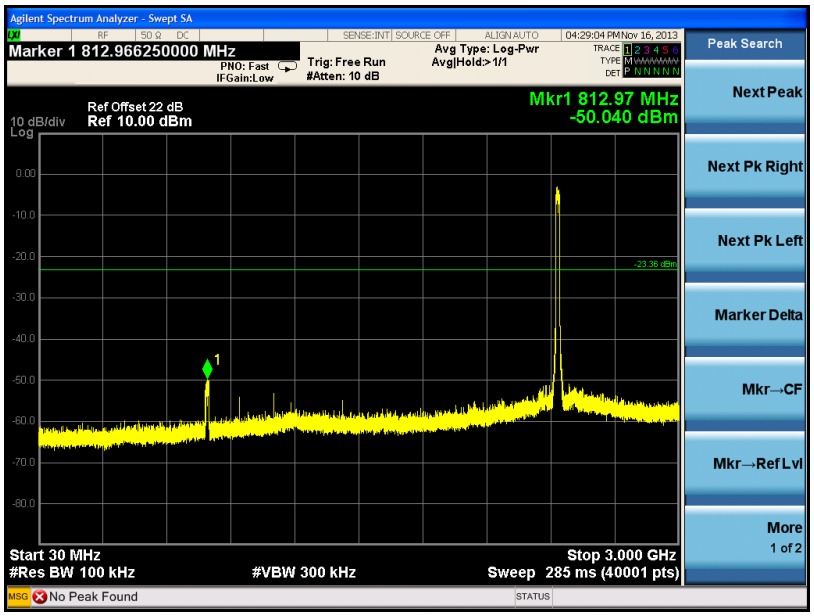
Product	:	WiFi USB Dongle Versa3
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	TR3
Test Mode	:	Mode 3: Transmit by 802.11n(20MHz)

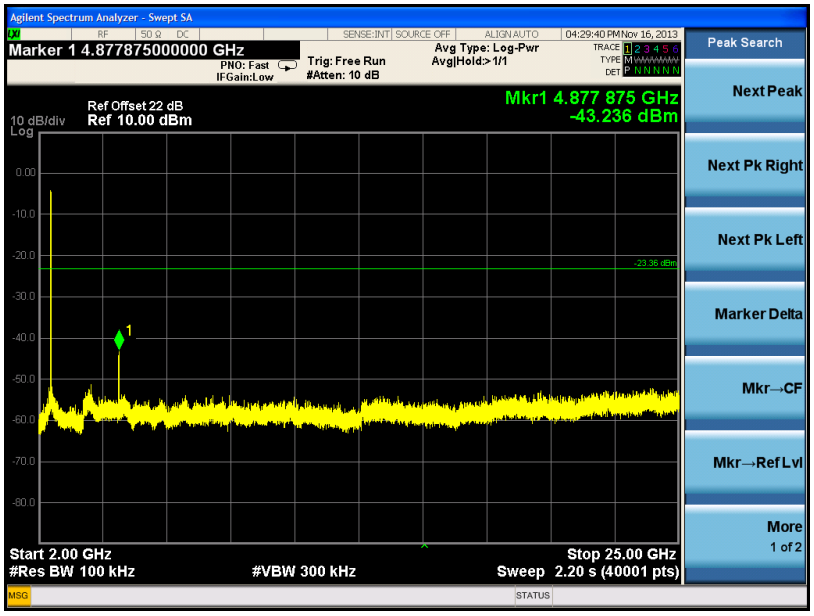
Channel 01 (2412MHz)



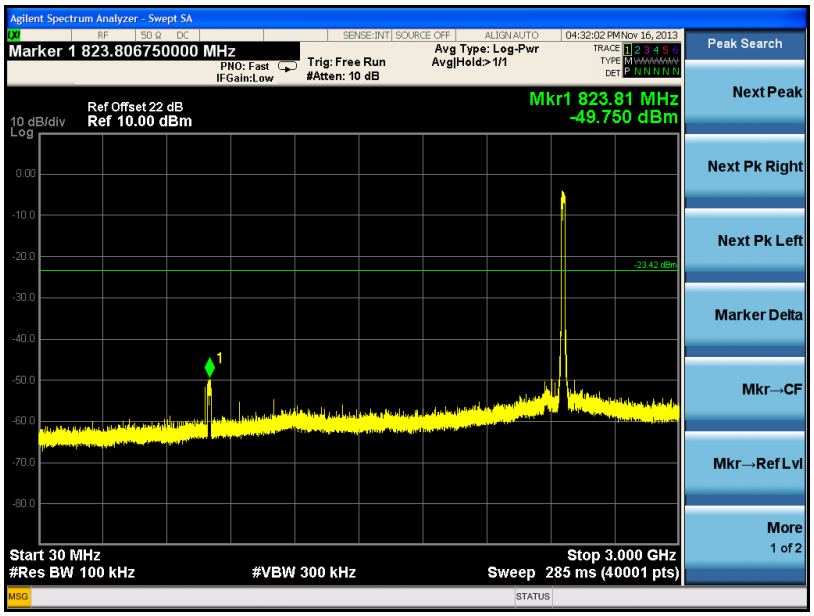


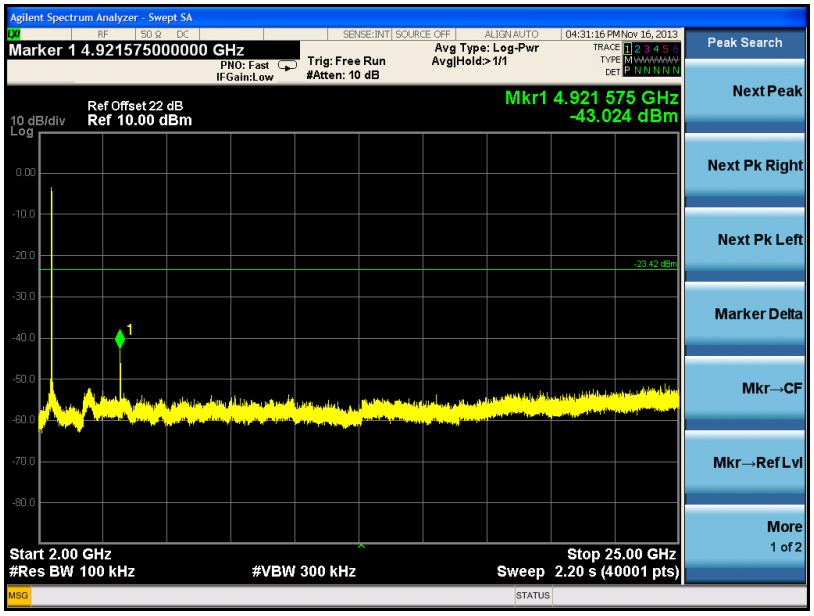
Channel 06 (2437MHz)





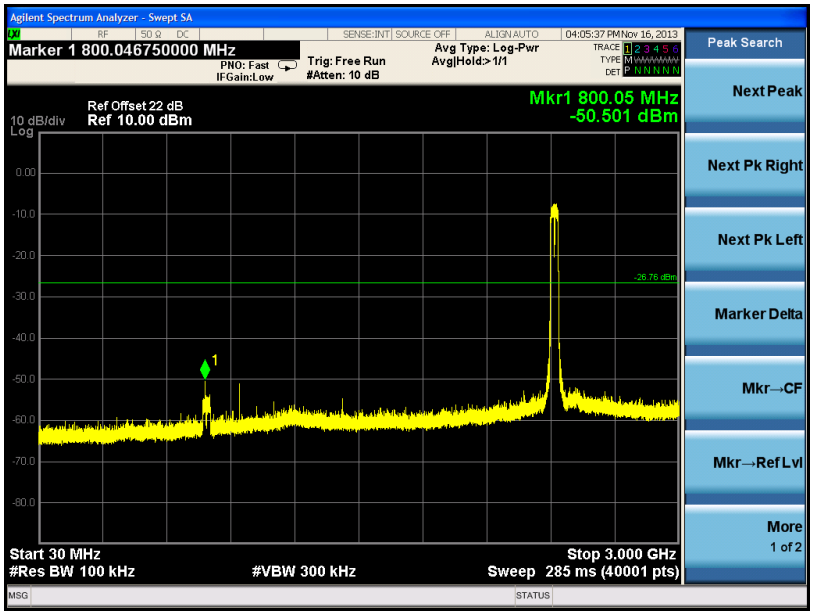
Channel 11 (2462MHz)

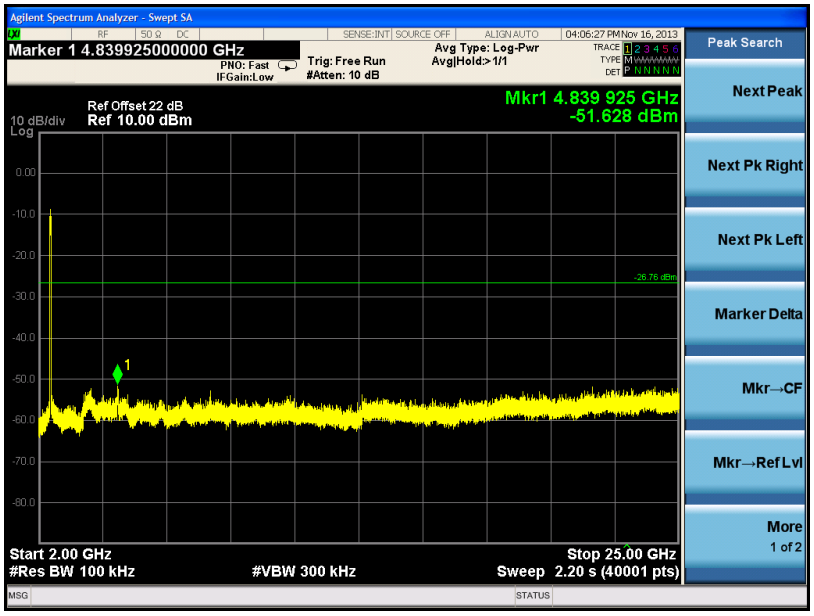




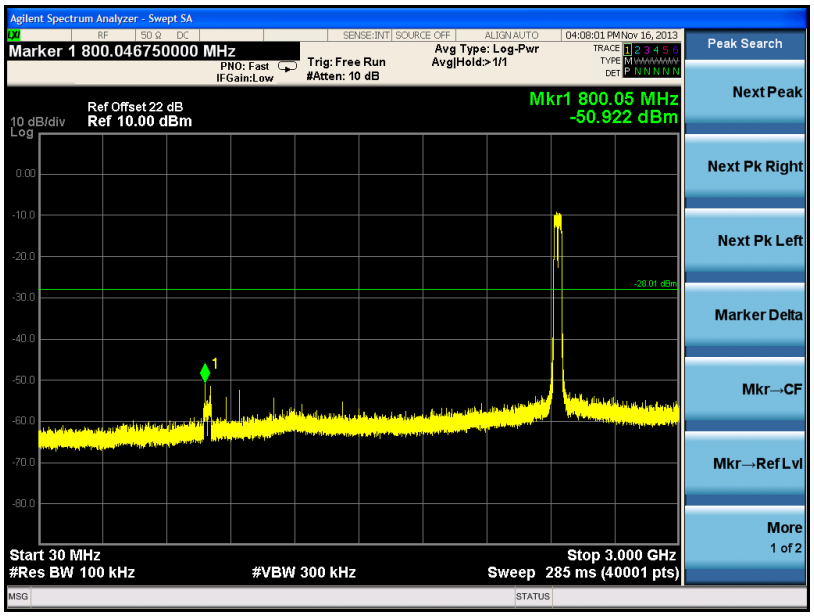
Product	:	WiFi USB Dongle Versa3
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	TR3
Test Mode	:	Mode 4: Transmit by 802.11n(40MHz)

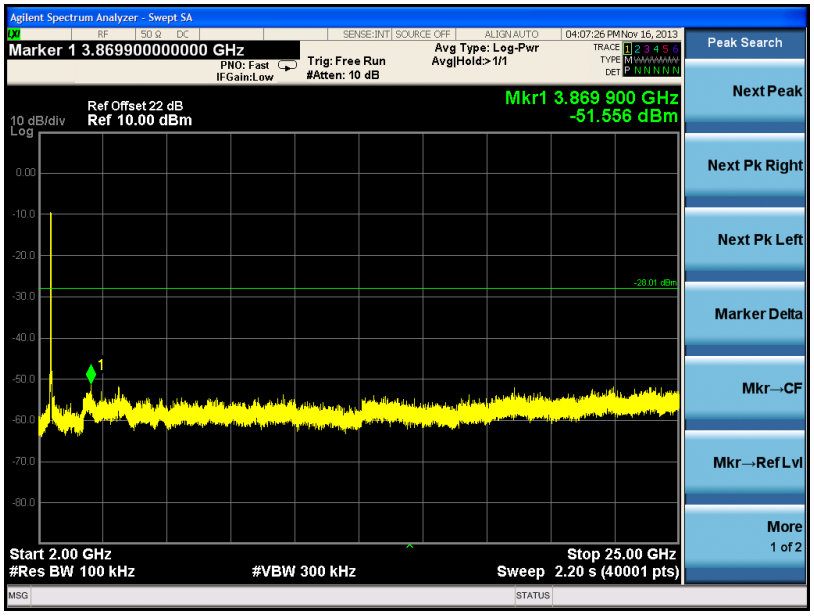
Channel 03 (2422MHz)



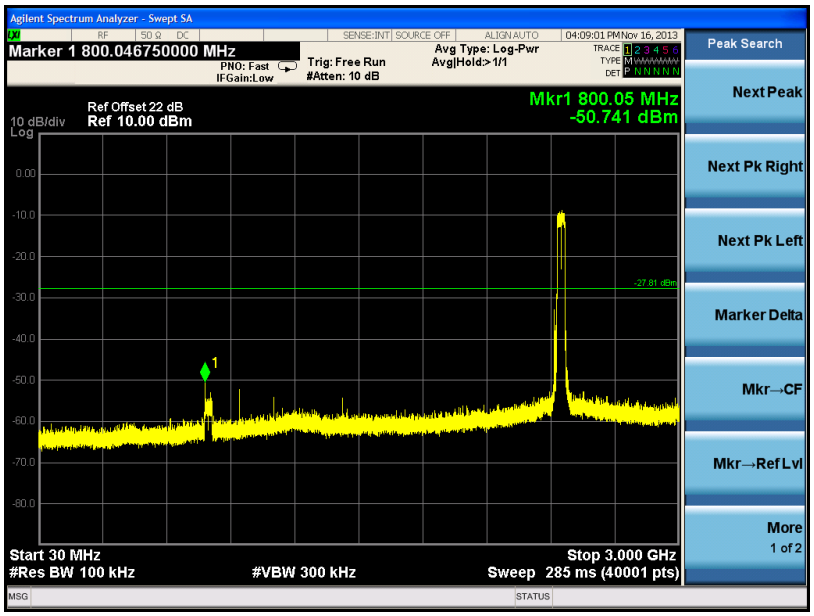


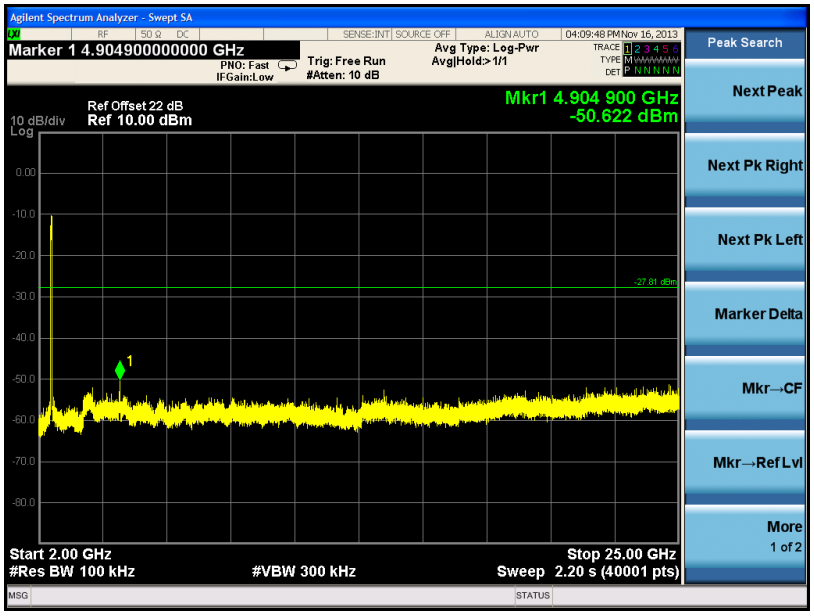
Channel 06 (2437MHz)





Channel 09 (2452MHz)



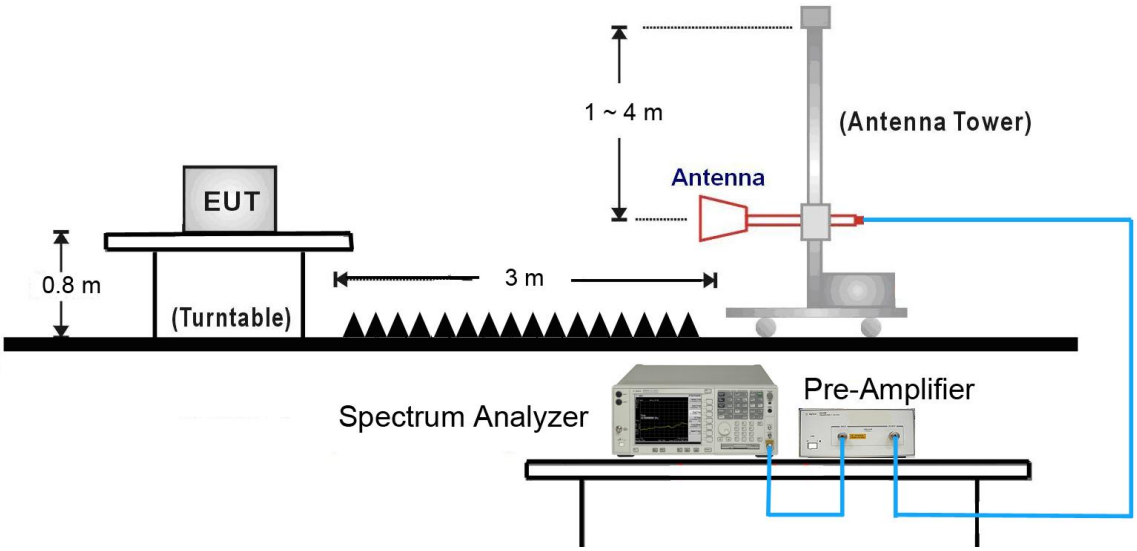


7. Radiated Emission Band Edge

7.1. Limit

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

7.2. Test Setup



7.3. Test Procedure

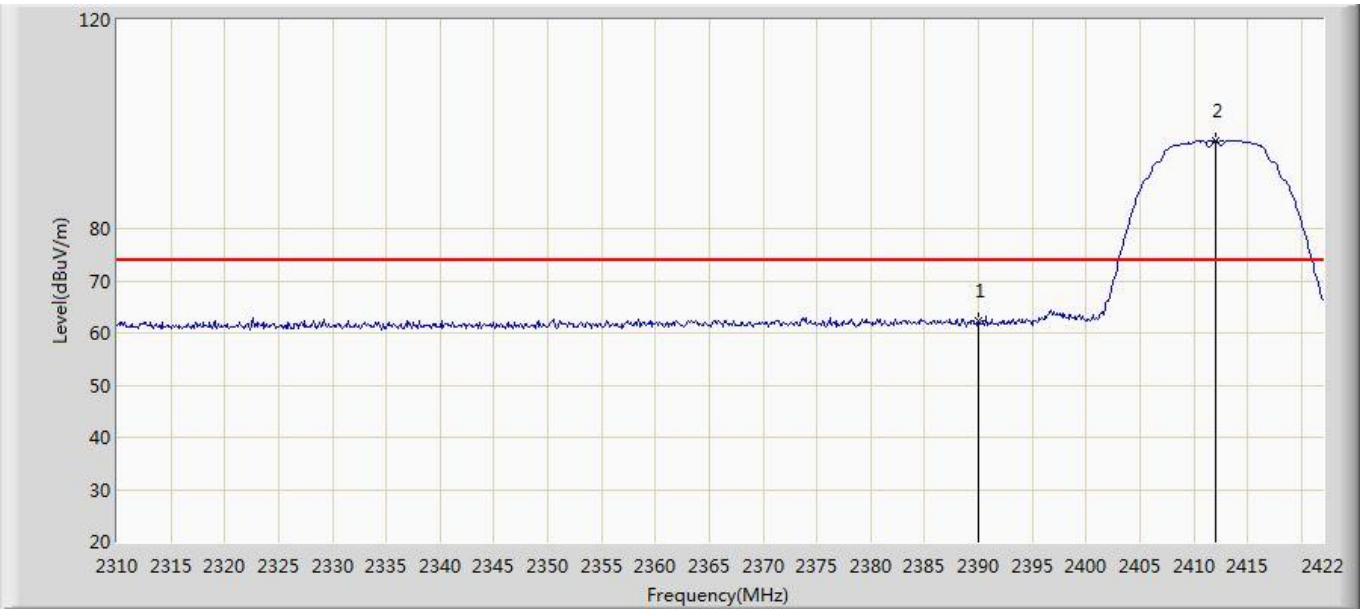
The EUT was setup according to ANSI C63.4, 2009 and tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 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 is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the Antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4: 2009 on radiated measurement.

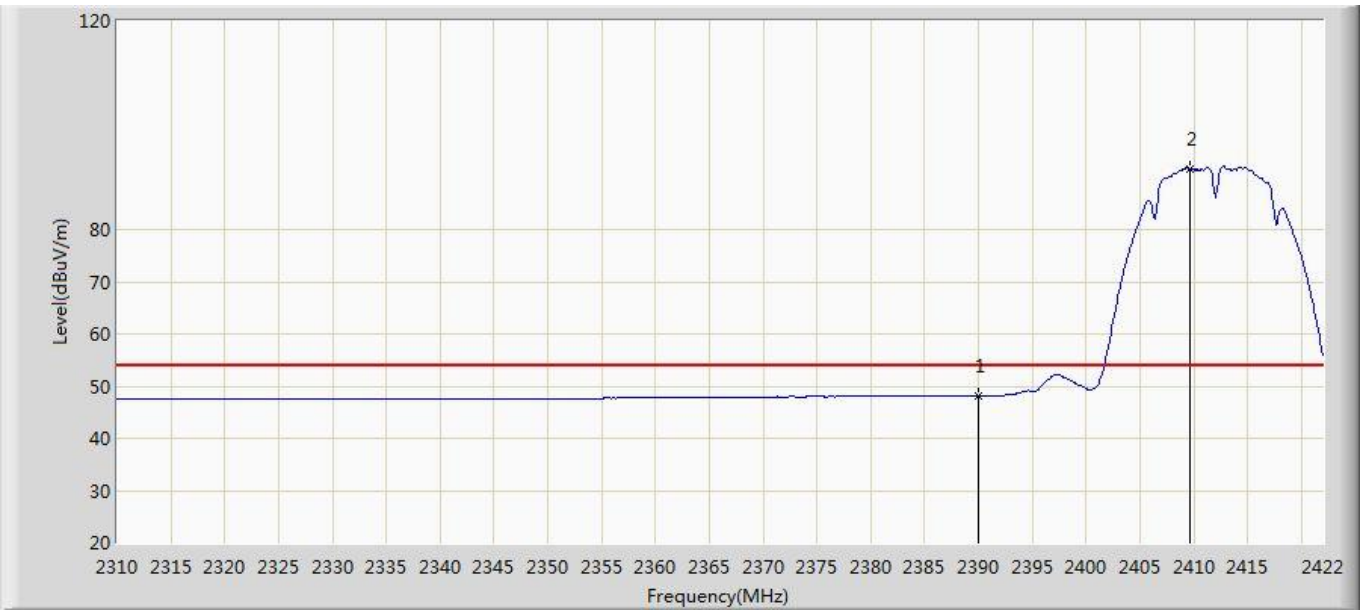
7.4. Test Result

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 11:59
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 1: Transmit at Channel 2412MHz by 802.11b (With Antenna AG-24015)	



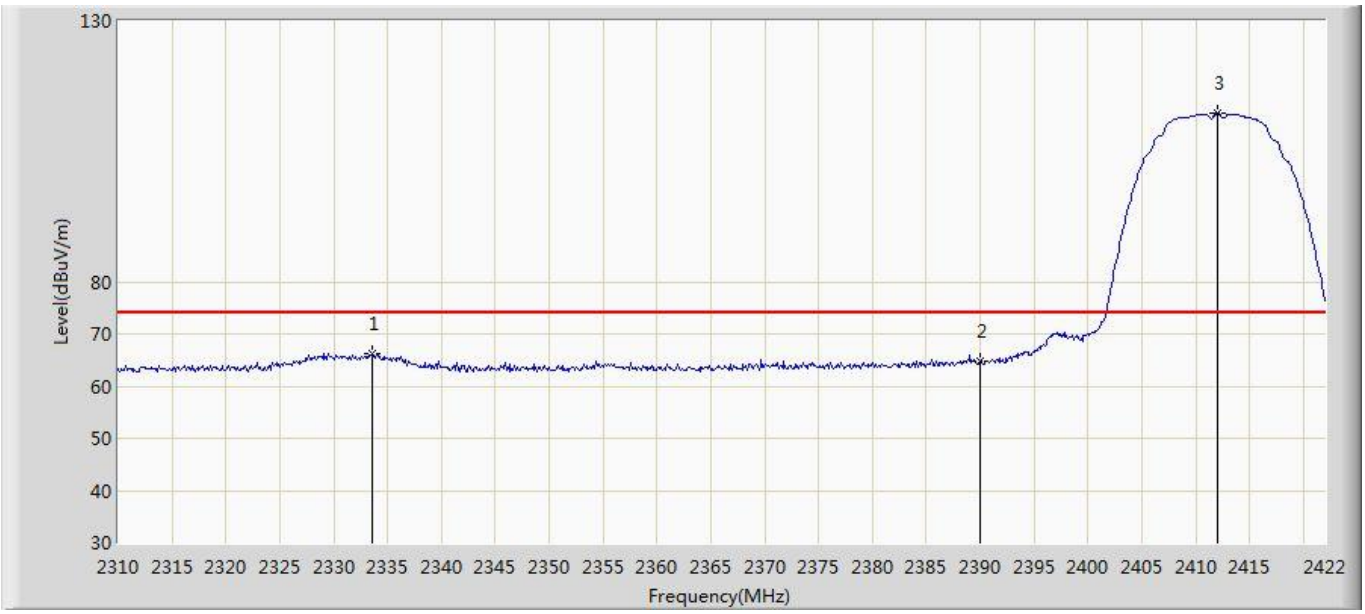
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	62.372	26.870	-11.628	74.000	35.502	PK
2		*	2412.032	96.902	61.349	N/A	N/A	35.554	PK

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 11:59
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 1: Transmit at Channel 2412MHz by 802.11b (With Antenna AG-24015)	



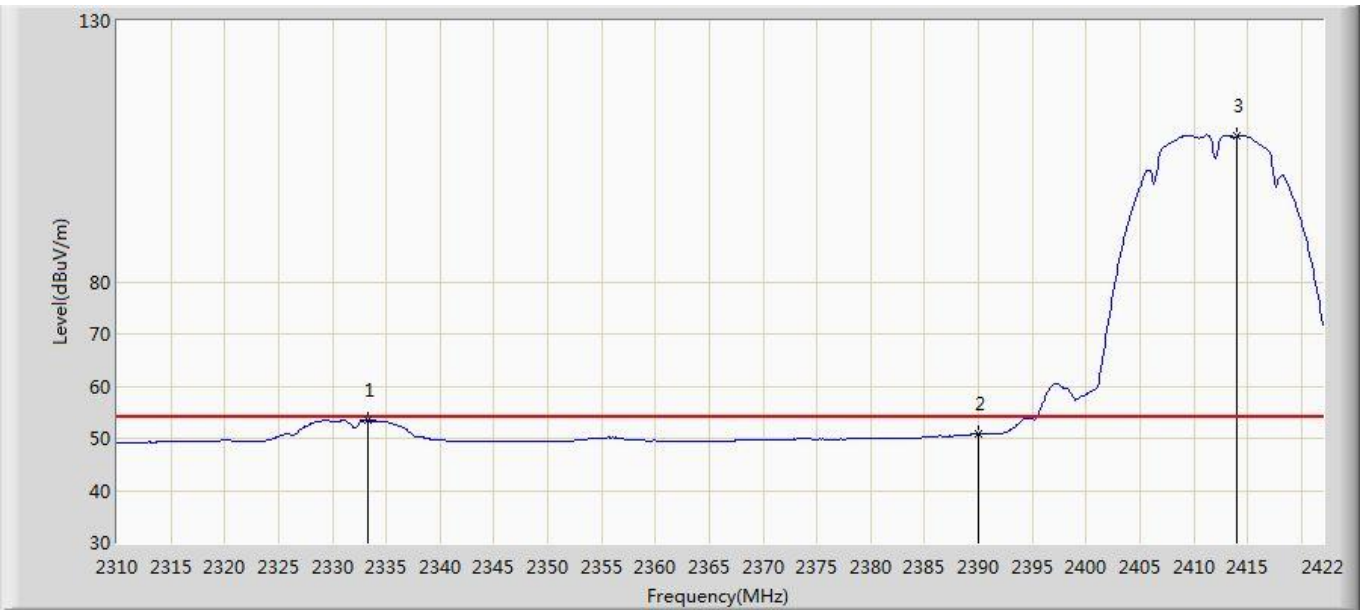
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	48.162	12.661	-5.838	54.000	35.502	AV
2		*	2409.680	91.717	56.170	N/A	N/A	35.548	AV

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 11:59
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 1: Transmit at Channel 2412MHz by 802.11b (With Antenna AG-24015)	



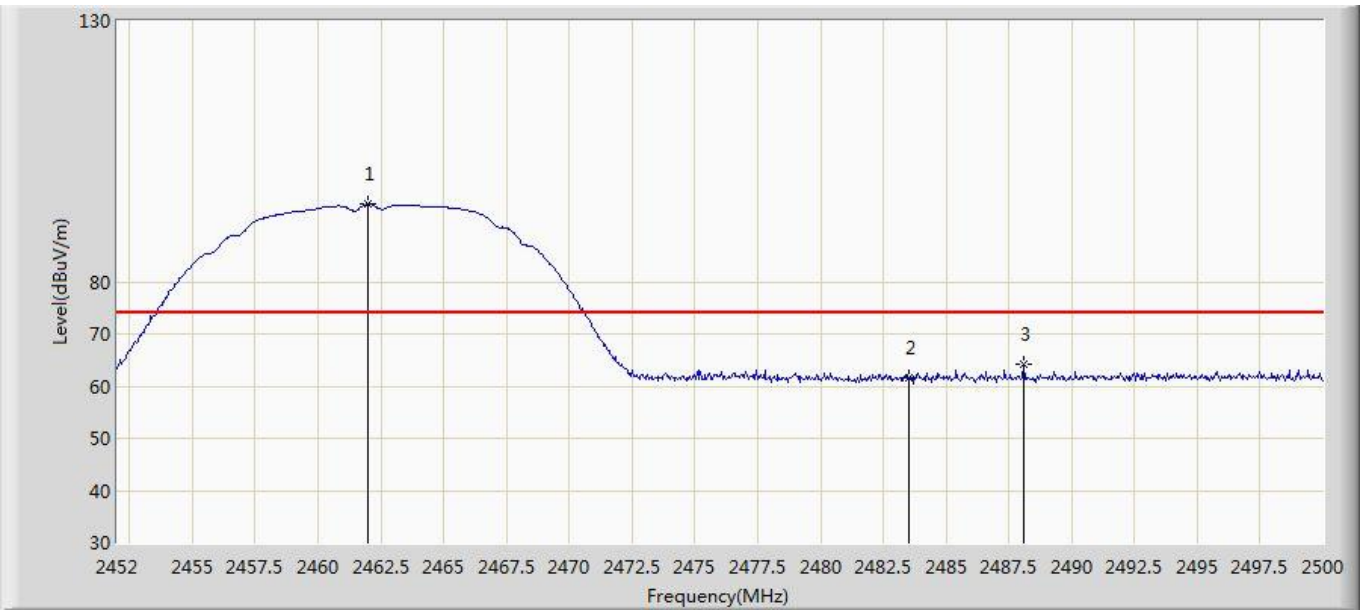
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2333.632	66.235	30.849	-7.765	74.000	35.386	PK
2			2390.000	64.899	29.398	-9.101	74.000	35.502	PK
3		*	2412.032	112.368	76.815	N/A	N/A	35.554	PK

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:00
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 1: Transmit at Channel 2412MHz by 802.11b (With Antenna AG-24015)	



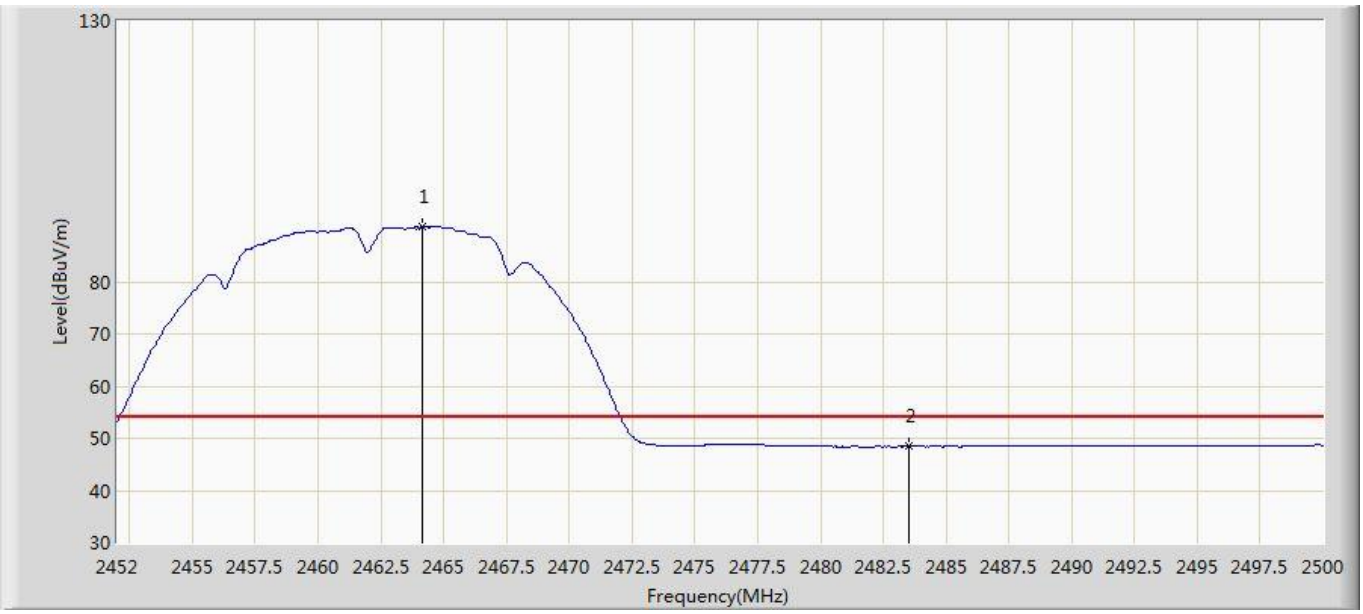
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2333.296	53.356	17.971	-0.644	54.000	35.386	AV
2			2390.000	50.867	15.366	-3.133	54.000	35.502	AV
3		*	2414.048	107.864	72.306	N/A	N/A	35.559	AV

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:00
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 1: Transmit at Channel 2462MHz by 802.11b (With Antenna AG-24015)	



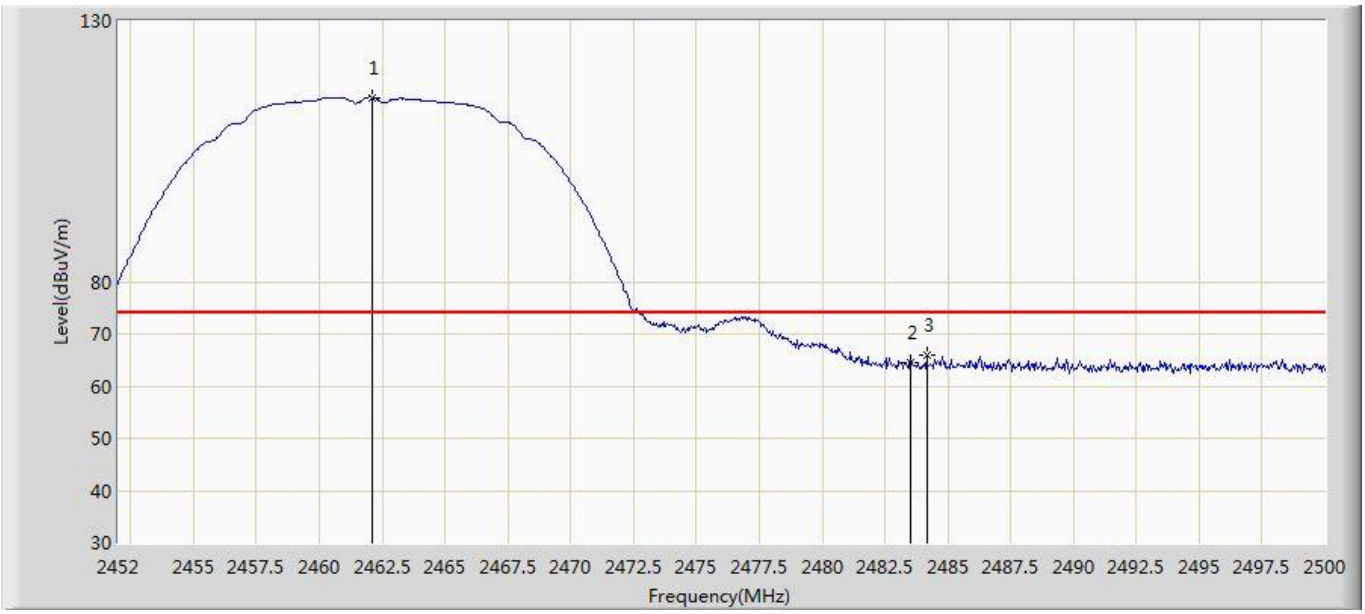
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2461.984	94.893	59.226	N/A	N/A	35.667	PK
2			2483.500	61.461	25.736	-12.539	74.000	35.725	PK
3			2488.096	64.088	28.353	-9.912	74.000	35.738	PK

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:00
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 1: Transmit at Channel 2462MHz by 802.11b (With Antenna AG-24015)	



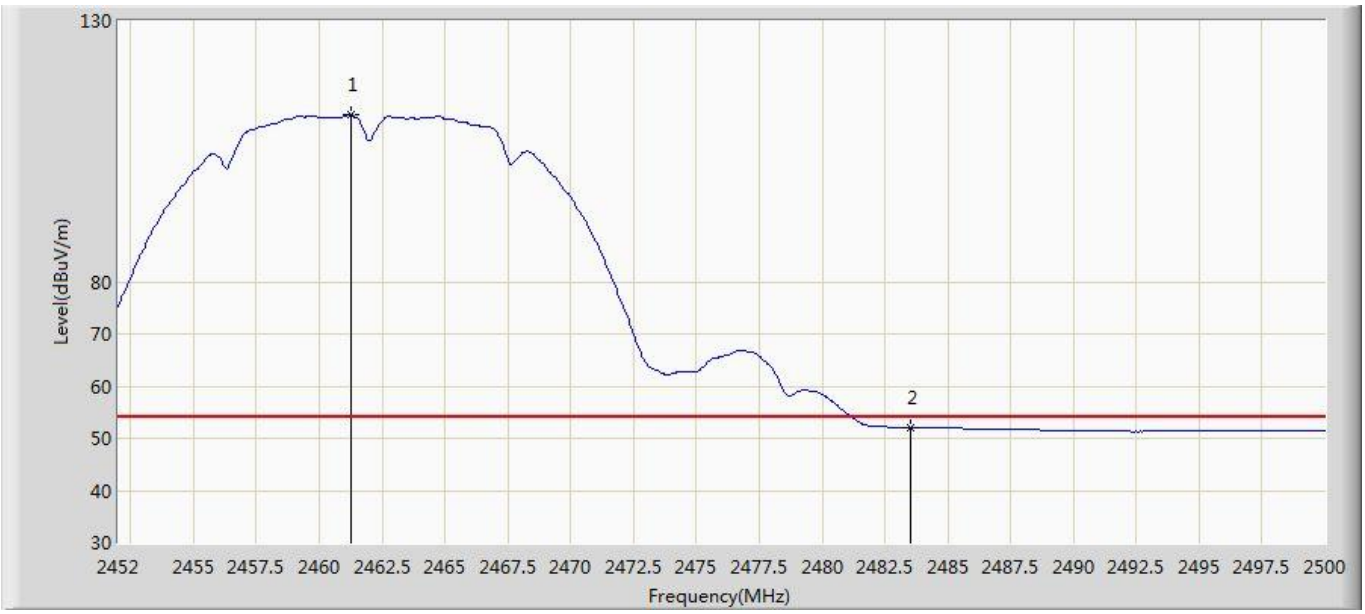
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2464.144	90.514	54.842	N/A	N/A	35.672	AV
2			2483.500	48.450	12.724	-5.550	54.000	35.725	AV

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:00
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 1: Transmit at Channel 2462MHz by 802.11b (With Antenna AG-24015)	



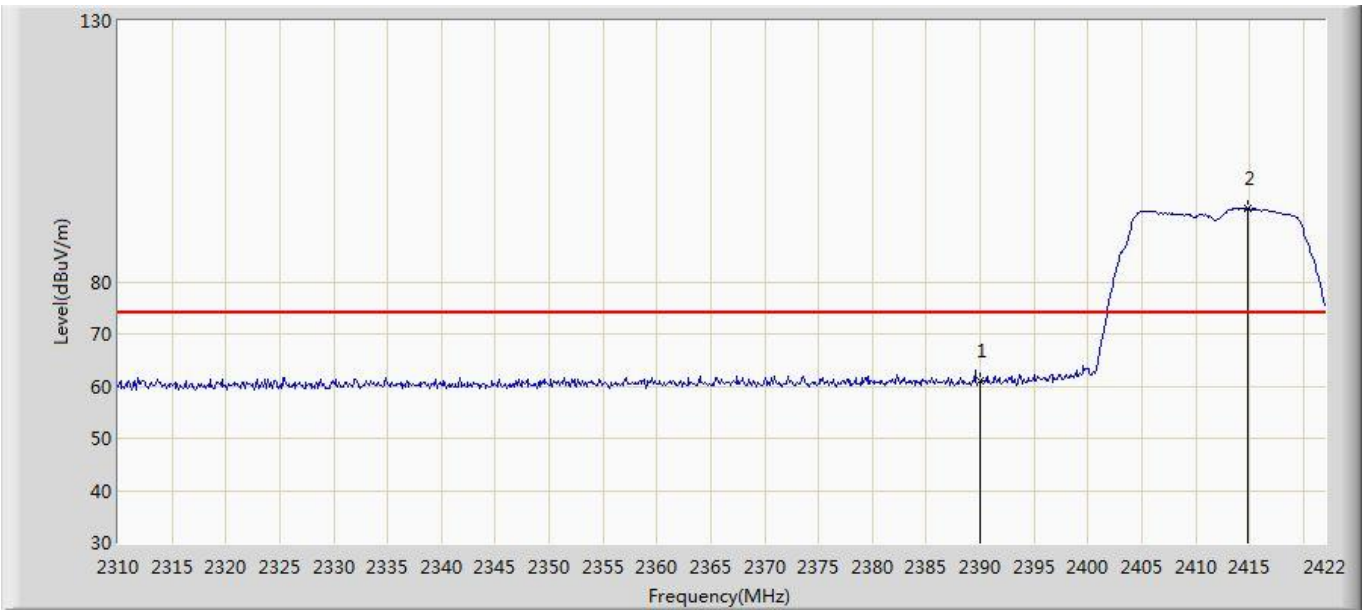
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2462.128	115.304	79.637	N/A	N/A	35.667	PK
2			2483.500	64.415	28.690	-9.585	74.000	35.725	PK
3			2484.160	65.875	30.148	-8.125	74.000	35.727	PK

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:00
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 1: Transmit at Channel 2462MHz by 802.11b (With Antenna AG-24015)	



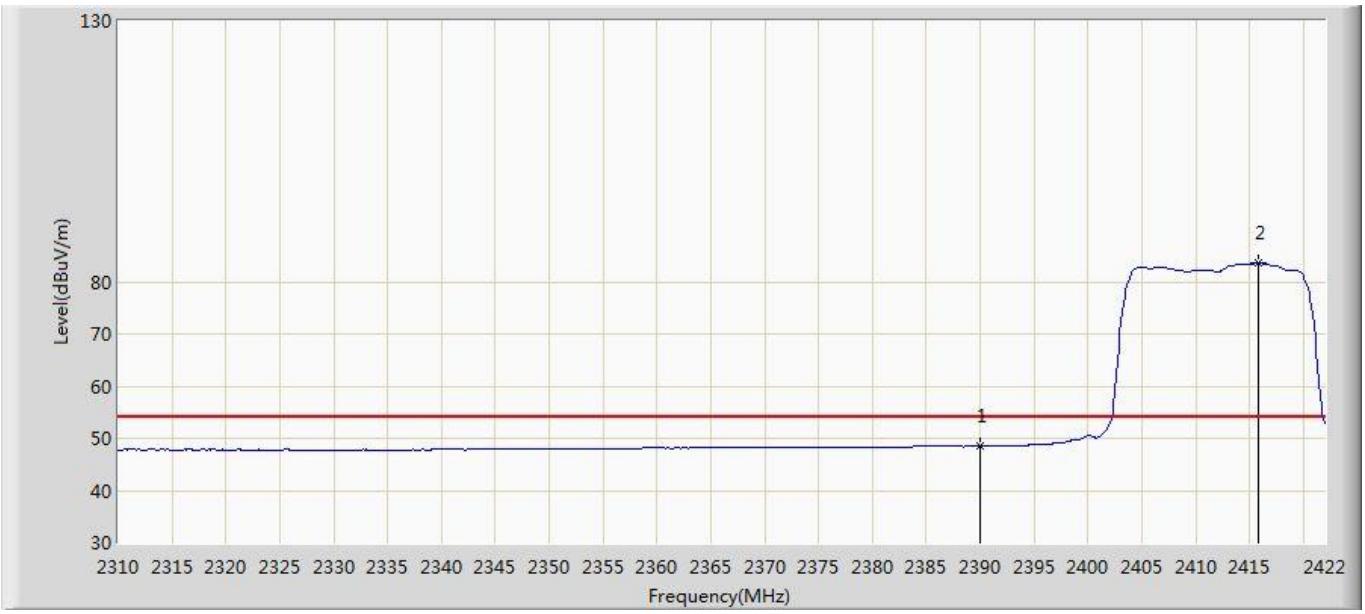
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2461.264	111.968	76.303	N/A	N/A	35.666	AV
2			2483.500	52.059	16.334	-1.941	54.000	35.725	AV

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:00
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 2: Transmit at Channel 2412MHz by 802.11g (With Antenna AG-24015)	



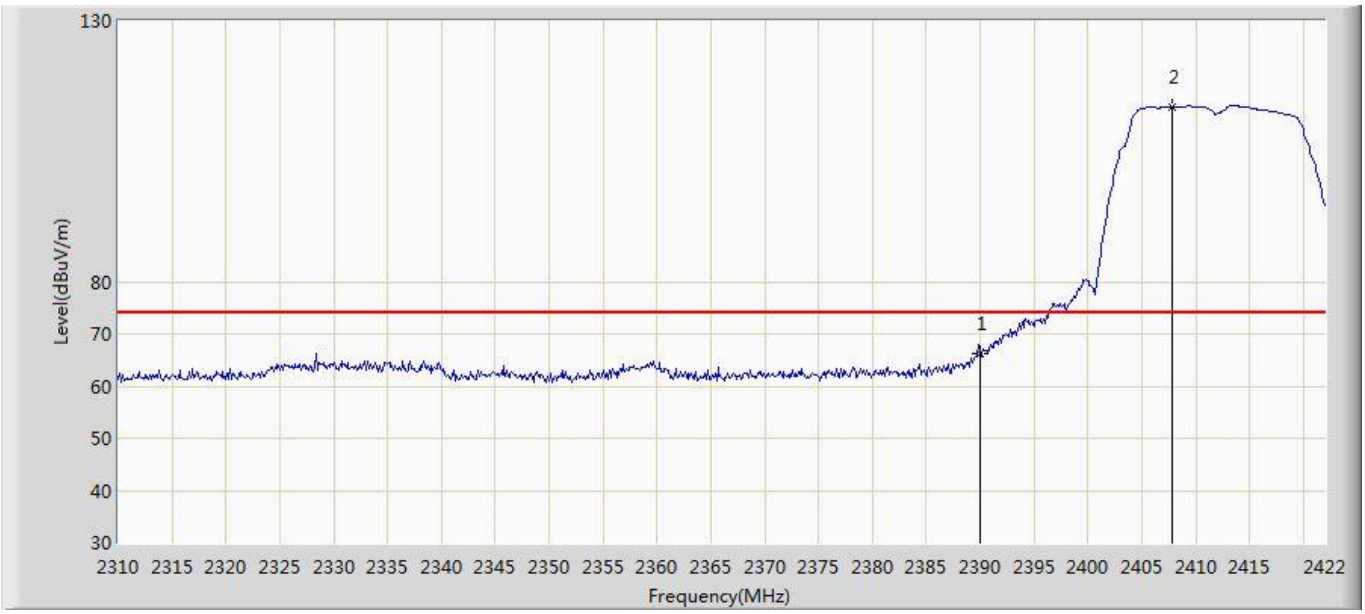
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	60.903	25.402	-13.097	74.000	35.502	PK
2		*	2414.832	94.102	58.542	N/A	N/A	35.560	PK

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:01
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 2: Transmit at Channel 2412MHz by 802.11g (With Antenna AG-24015)	



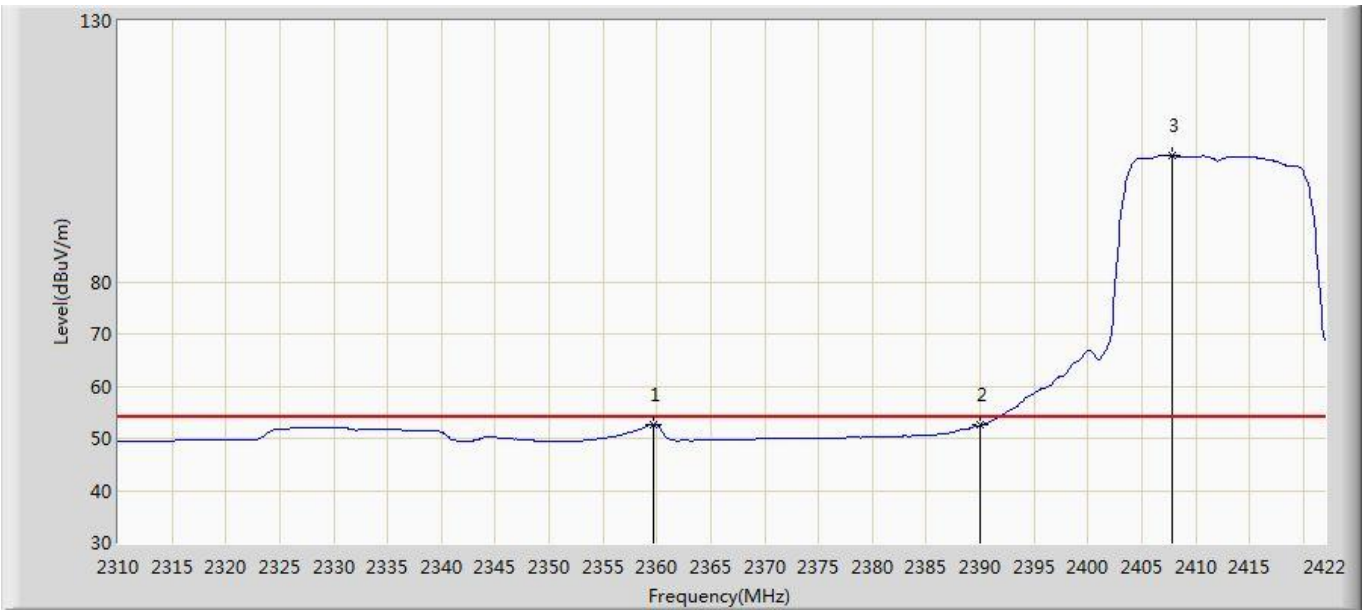
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	48.466	12.964	-5.534	54.000	35.502	AV
2		*	2415.840	83.498	47.936	N/A	N/A	35.563	AV

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:01
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 2: Transmit at Channel 2412MHz by 802.11g (With Antenna AG-24015)	



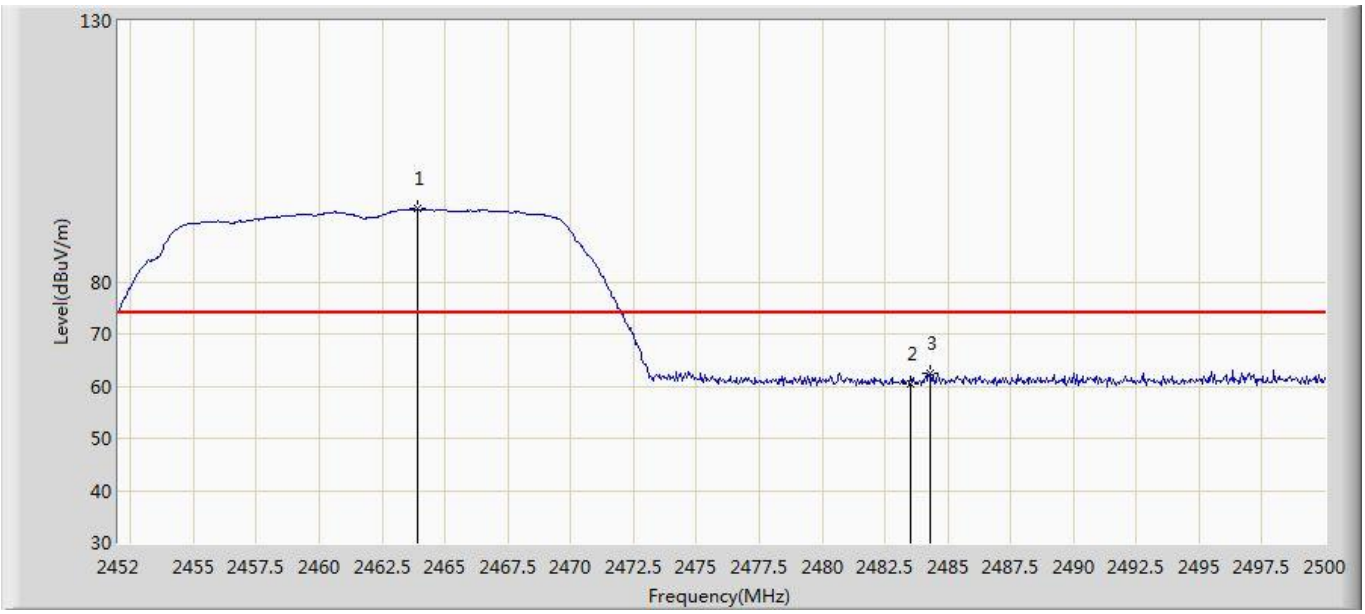
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	66.258	30.757	-7.742	74.000	35.502	PK
2		*	2407.888	113.594	78.051	N/A	N/A	35.543	PK

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:01
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 2: Transmit at Channel 2412MHz by 802.11g (With Antenna AG-24015)	



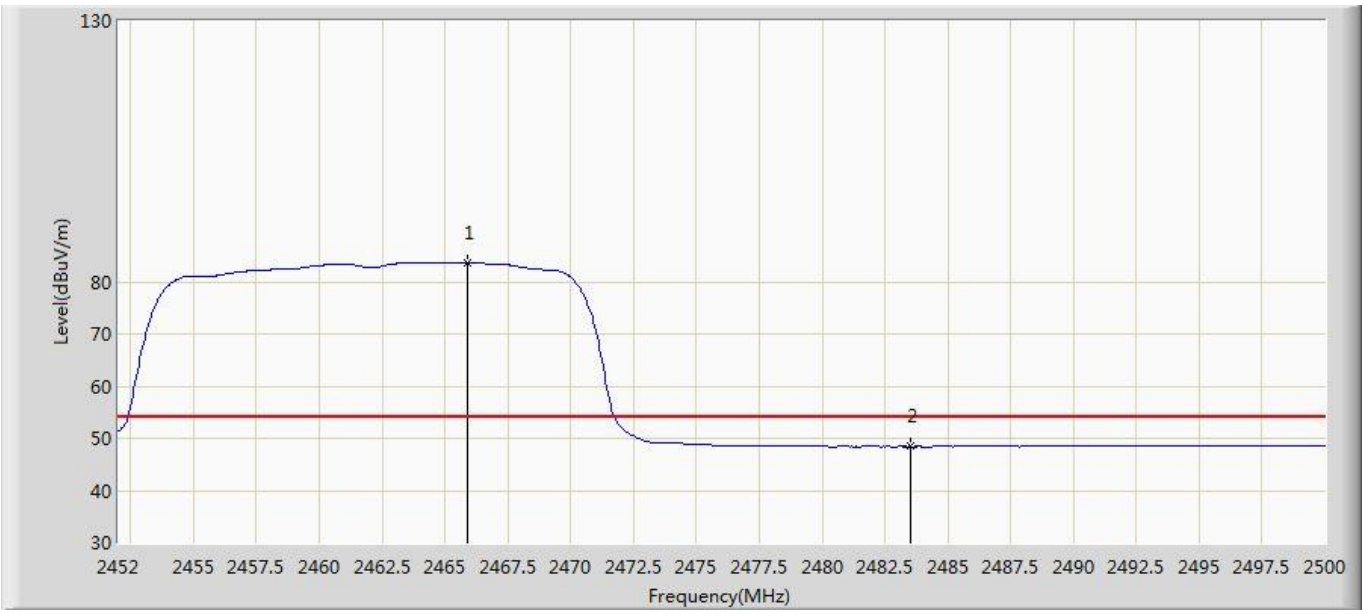
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2359.616	52.641	17.198	-1.359	54.000	35.443	AV
2			2390.000	52.532	17.031	-1.468	54.000	35.502	AV
3		*	2407.888	104.129	68.586	N/A	N/A	35.543	AV

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:01
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 2: Transmit at Channel 2462MHz by 802.11g (With Antenna AG-24015)	



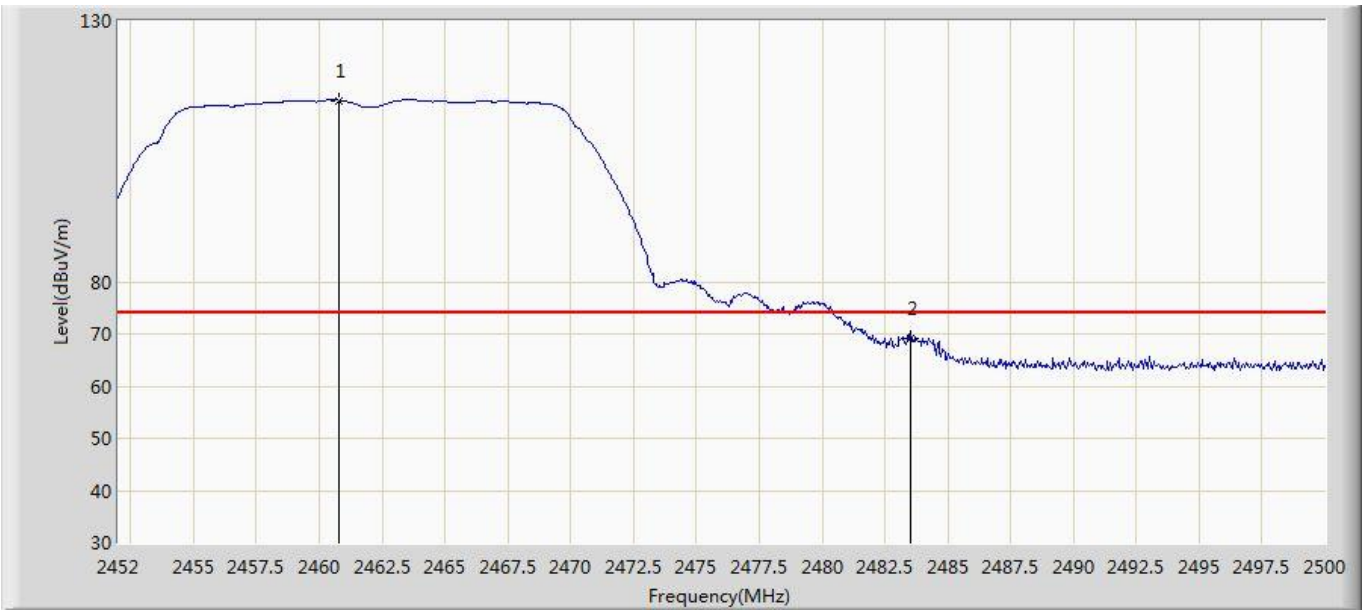
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2463.904	93.916	58.244	N/A	N/A	35.672	PK
2			2483.500	60.448	24.723	-13.552	74.000	35.725	PK
3			2484.304	62.364	26.638	-11.636	74.000	35.728	PK

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:01
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 2: Transmit at Channel 2462MHz by 802.11g (With Antenna AG-24015)	



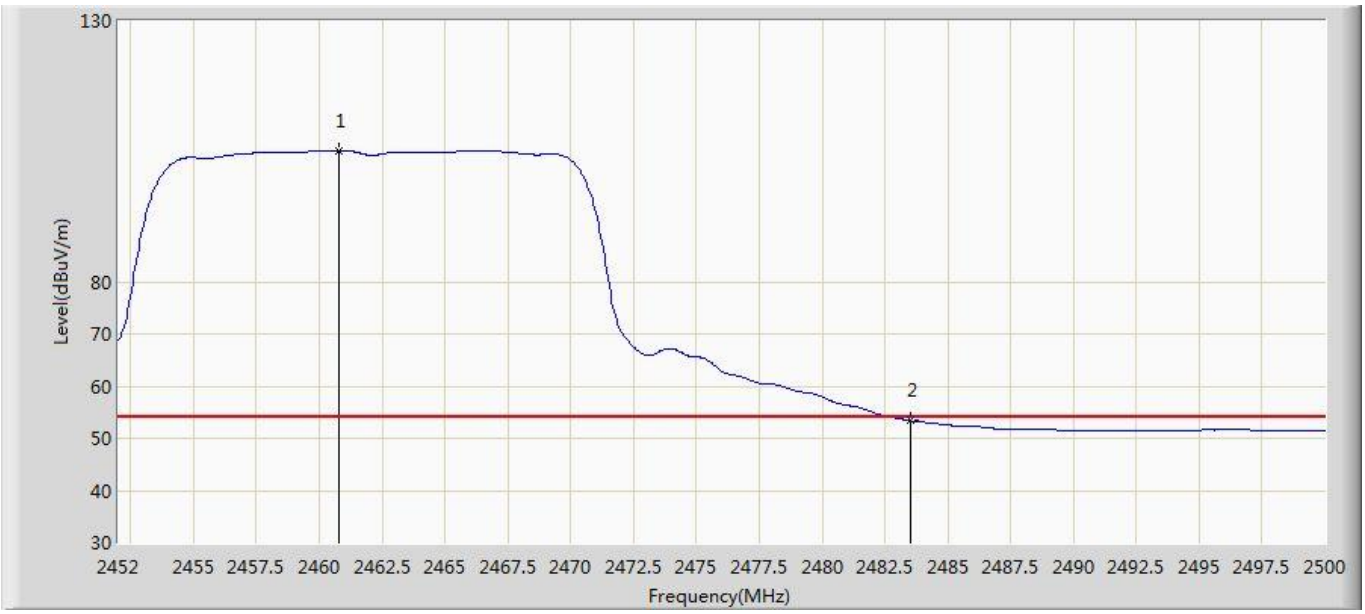
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2465.872	83.616	47.939	N/A	N/A	35.677	AV
2			2483.500	48.406	12.680	-5.594	54.000	35.725	AV

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:01
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 2: Transmit at Channel 2462MHz by 802.11g (With Antenna AG-24015)	



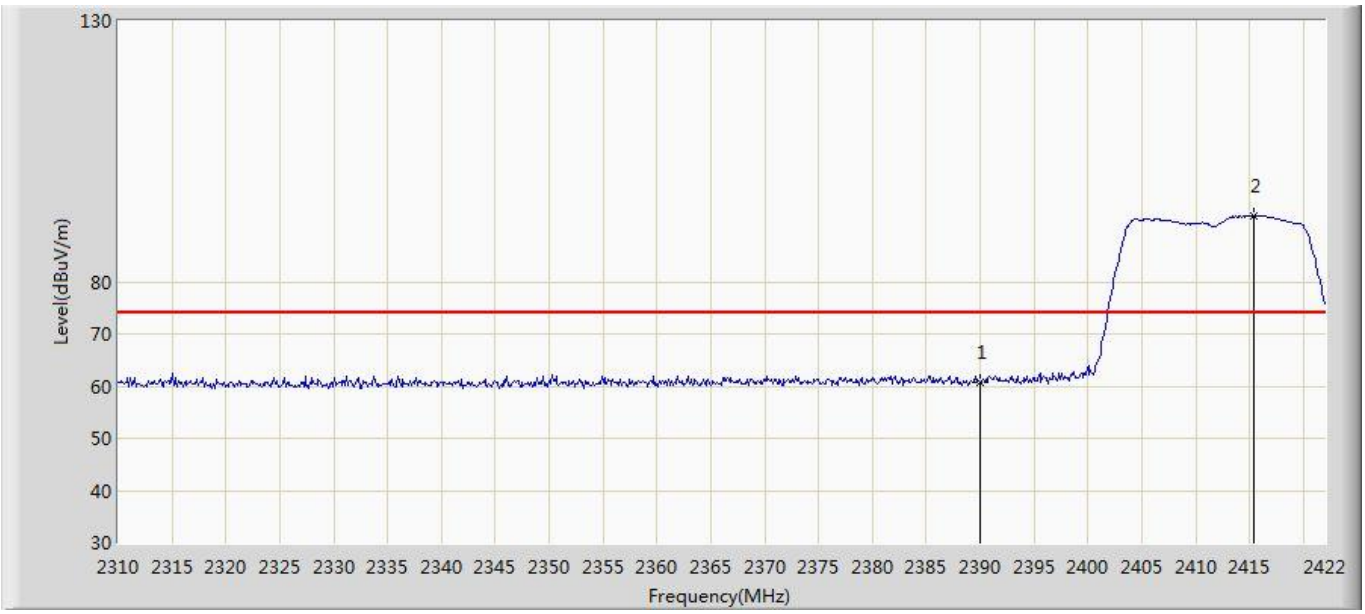
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2460.784	114.745	79.081	N/A	N/A	35.664	PK
2			2483.500	69.214	33.489	-4.786	74.000	35.725	PK

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:02
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 2: Transmit at Channel 2462MHz by 802.11g (With Antenna AG-24015)	



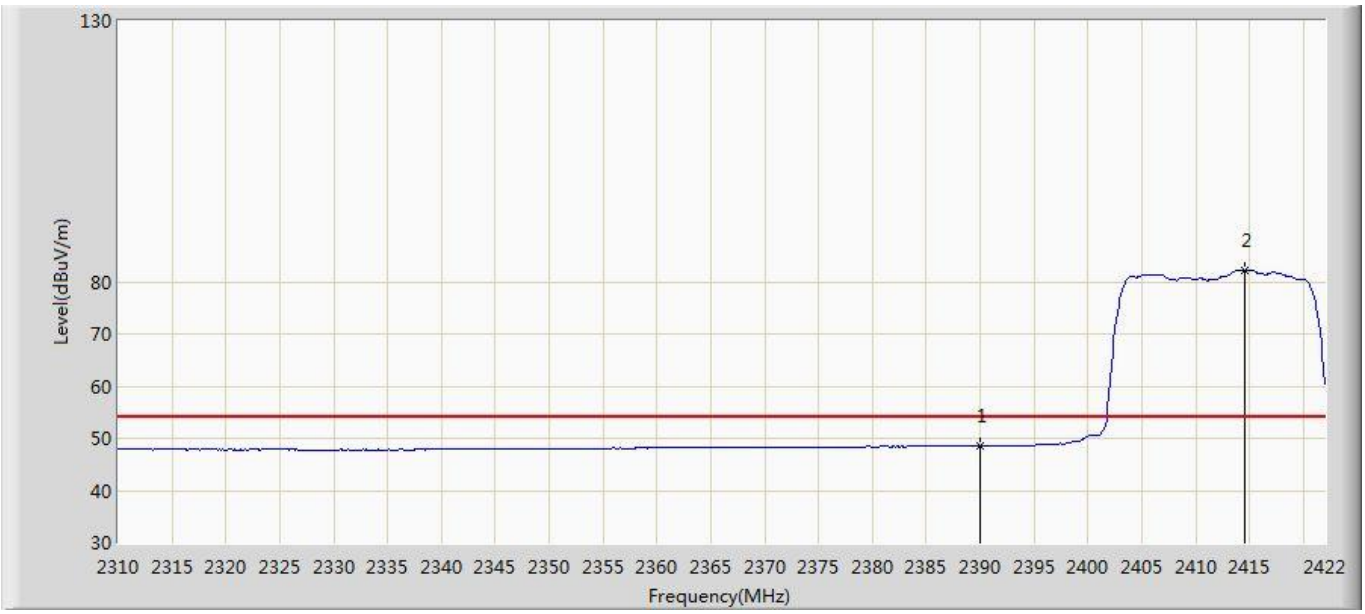
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2460.784	105.157	69.493	N/A	N/A	35.664	AV
2			2483.500	53.360	17.635	-0.640	54.000	35.725	AV

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:02
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 3: Transmit at Channel 2412MHz by 802.11n(20MHz) (With Antenna AG-24015)	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	60.861	25.359	-13.139	74.000	35.502	PK
2		*	2415.392	92.533	56.972	N/A	N/A	35.562	PK

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:02
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 3: Transmit at Channel 2412MHz by 802.11n(20MHz) (With Antenna AG-24015)	

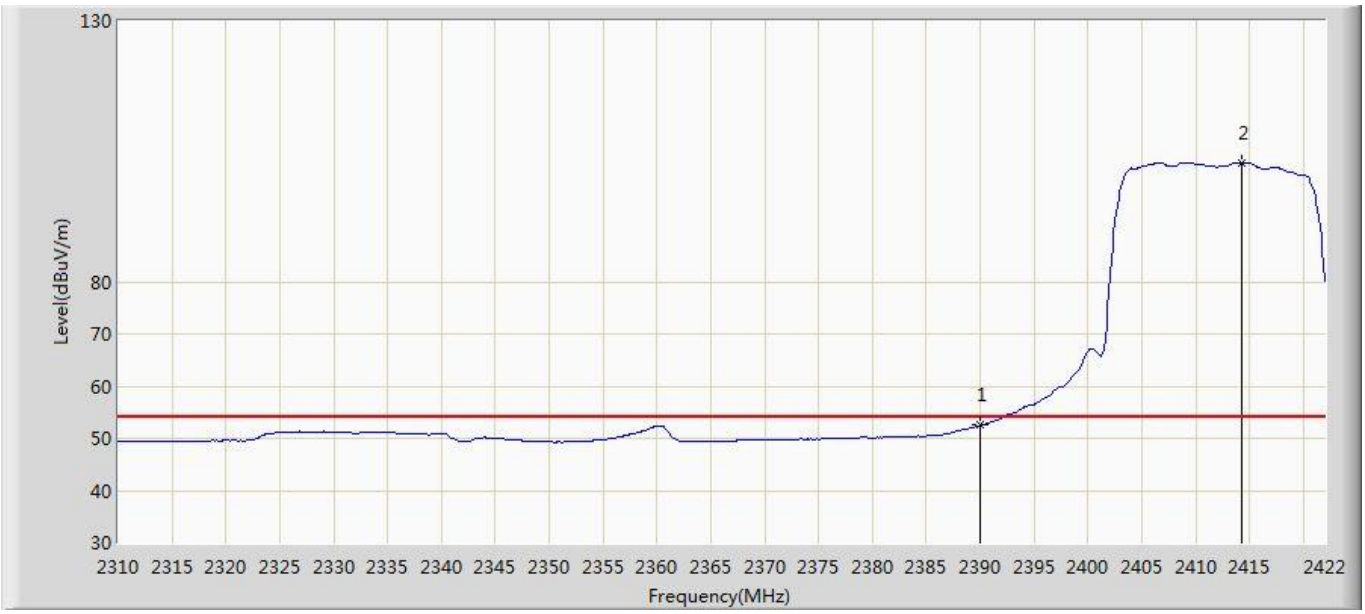


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	48.525	13.023	-5.475	54.000	35.502	AV
2		*	2414.496	82.216	46.657	N/A	N/A	35.560	AV

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:02
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 3: Transmit at Channel 2412MHz by 802.11n(20MHz) (With Antenna AG-24015)	

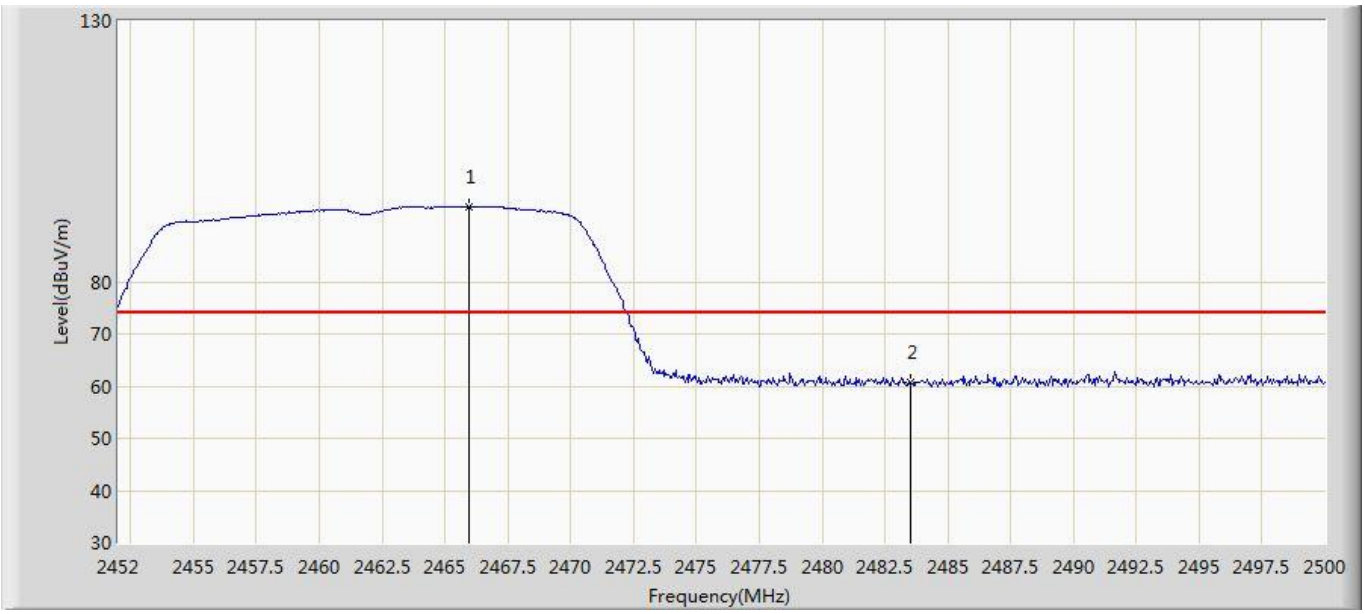
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	69.610	34.109	-4.390	74.000	35.502	PK
2		*	2408.560	112.493	76.948	N/A	N/A	35.545	PK

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:02
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 3: Transmit at Channel 2412MHz by 802.11n(20MHz) (With Antenna AG-24015)	



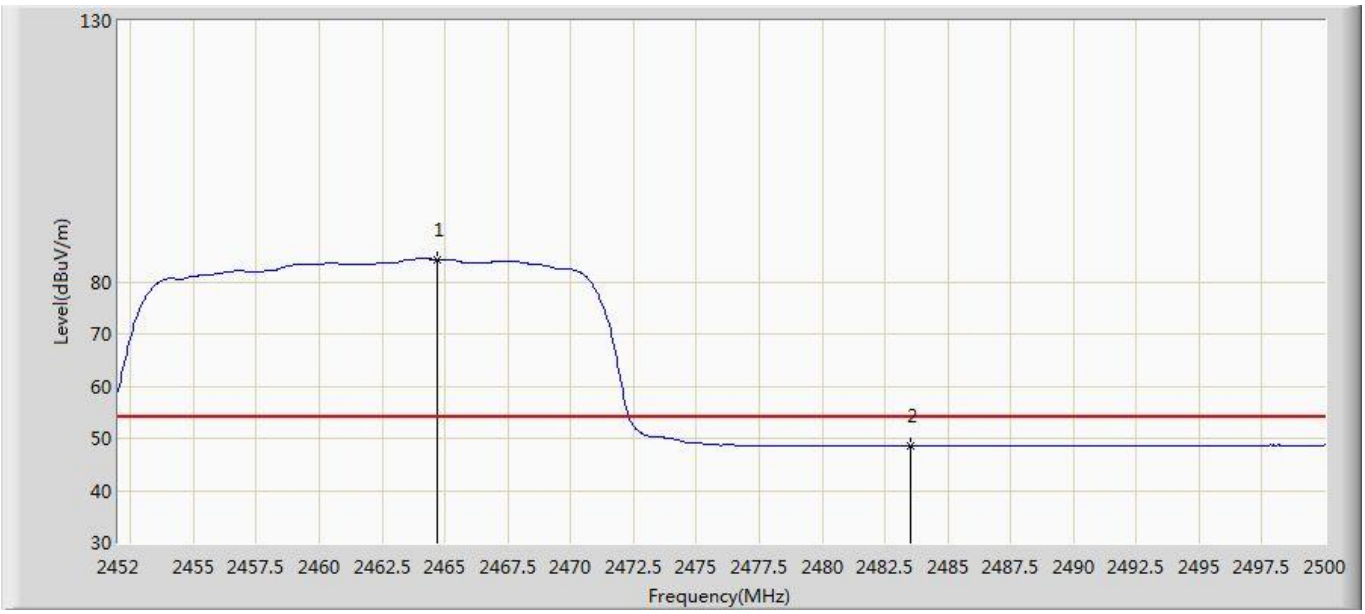
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	52.501	17.000	-1.499	54.000	35.502	AV
2		*	2414.272	102.848	67.289	N/A	N/A	35.559	AV

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:02
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 3: Transmit at Channel 2462MHz by 802.11n(20MHz) (With Antenna AG-24015)	



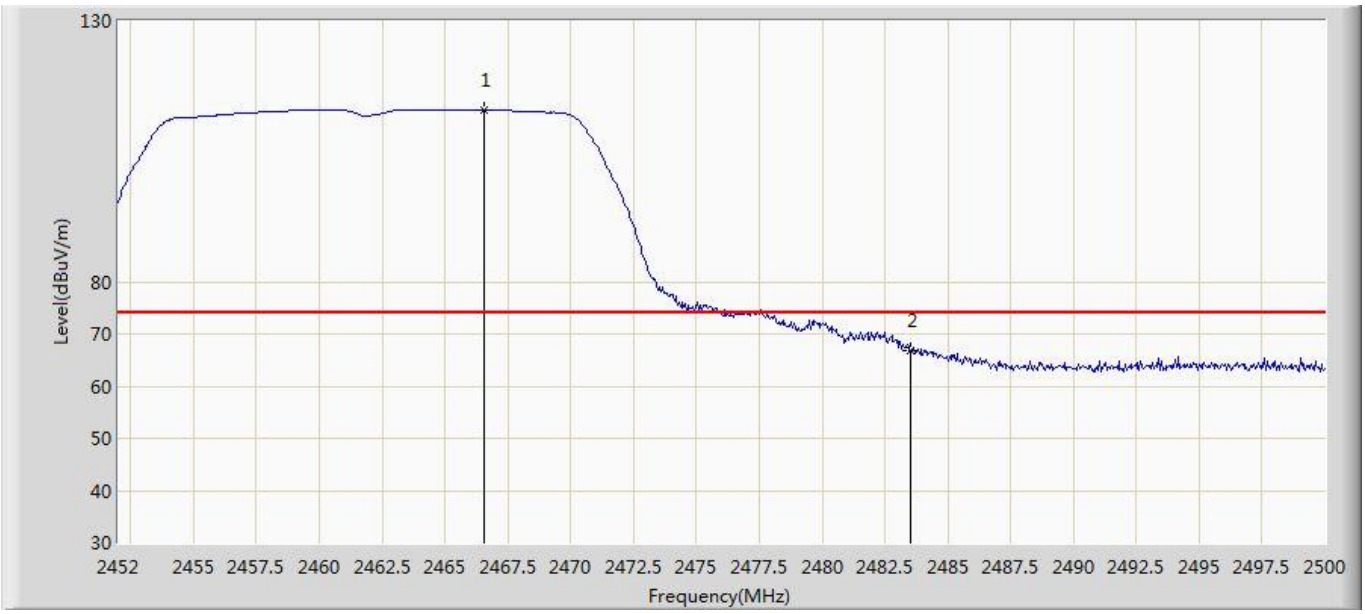
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2465.968	94.307	58.630	N/A	N/A	35.677	PK
2			2483.500	60.838	25.112	-13.162	74.000	35.725	PK

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:02
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 3: Transmit at Channel 2462MHz by 802.11n(20MHz) (With Antenna AG-24015)	



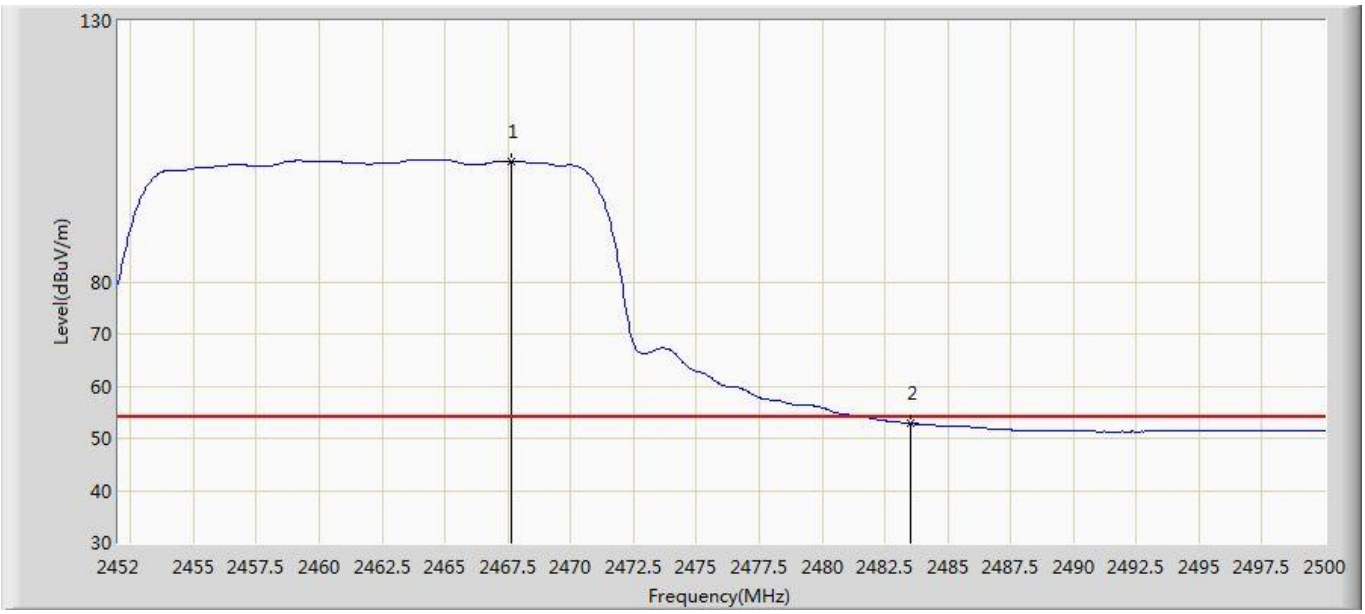
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2464.672	84.308	48.634	N/A	N/A	35.674	AV
2			2483.500	48.430	12.704	-5.570	54.000	35.725	AV

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:03
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 3: Transmit at Channel 2462MHz by 802.11n(20MHz) (With Antenna AG-24015)	



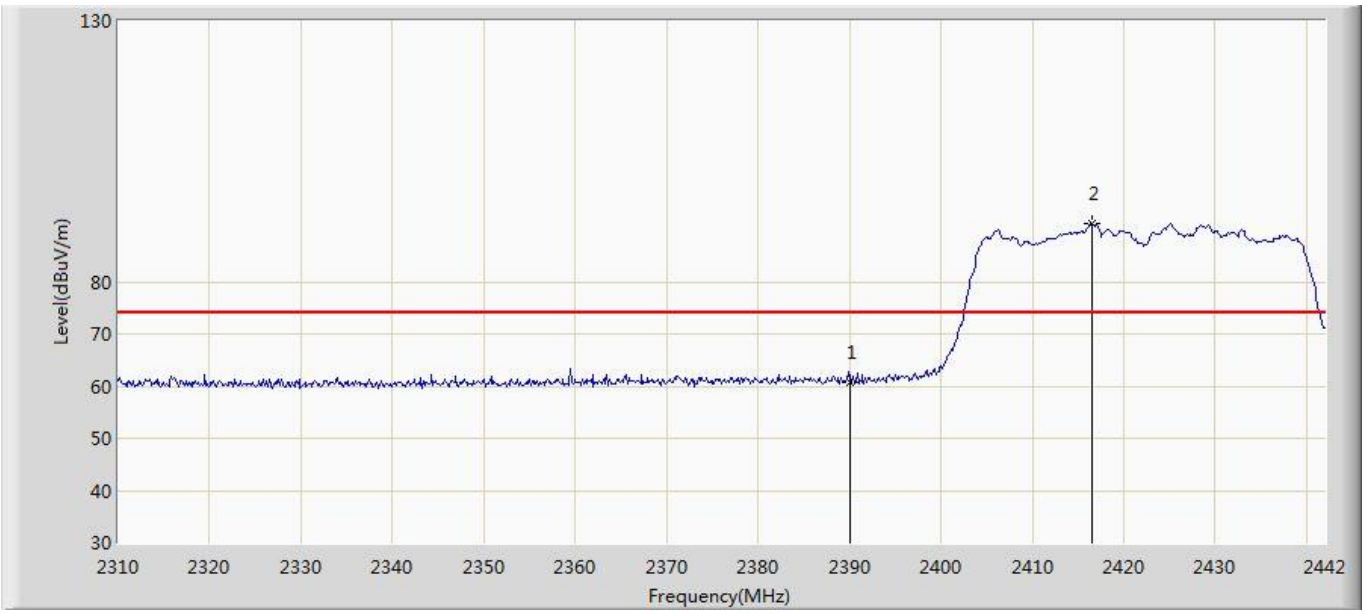
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2466.544	112.902	77.223	N/A	N/A	35.679	PK
2			2483.500	66.827	31.102	-7.173	74.000	35.725	PK

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:03
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 3: Transmit at Channel 2462MHz by 802.11n(20MHz) (With Antenna AG-24015)	



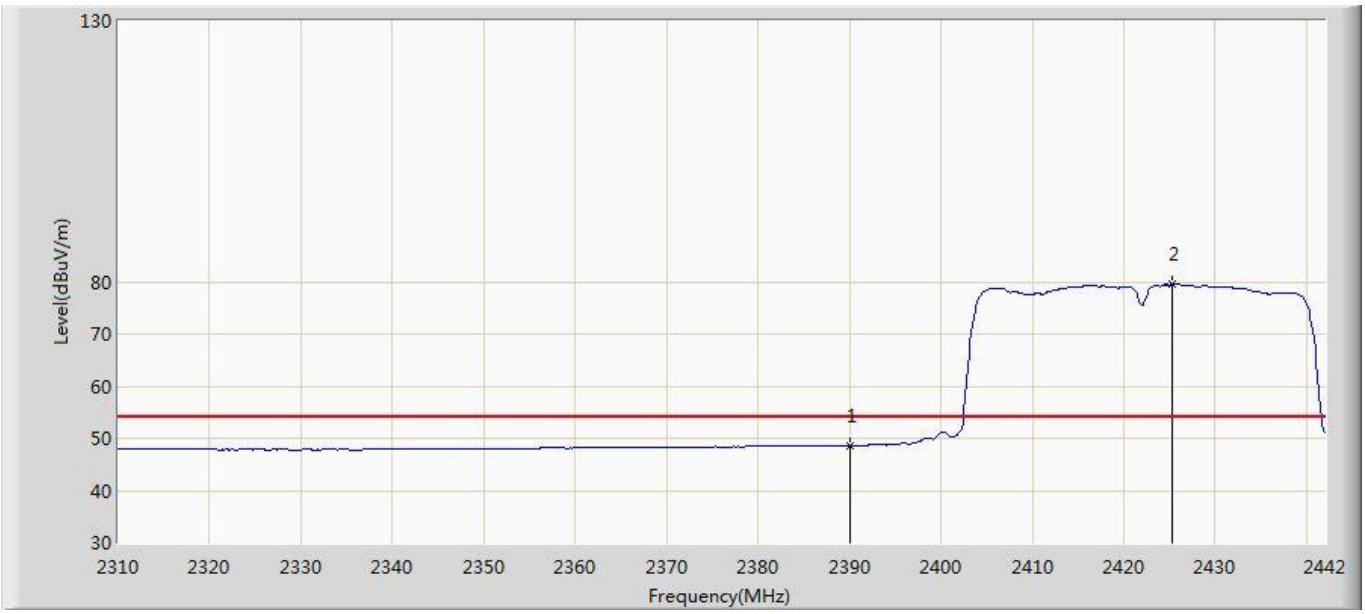
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2467.648	103.170	67.488	N/A	N/A	35.682	AV
2			2483.500	52.797	17.072	-1.203	54.000	35.725	AV

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:03
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 4: Transmit at Channel 2422MHz by 802.11n(40MHz) (With Antenna AG-24015)	



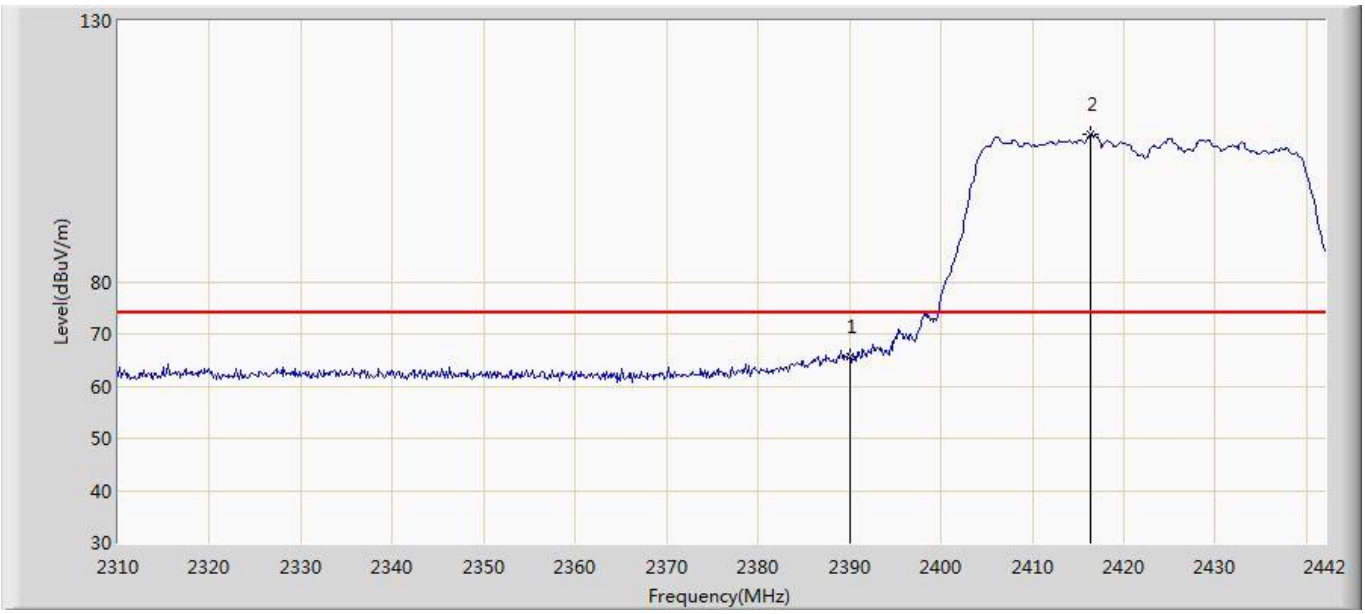
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	60.845	25.344	-13.155	74.000	35.502	PK
2		*	2416.524	91.226	55.662	N/A	N/A	35.565	PK

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:03
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 4: Transmit at Channel 2422MHz by 802.11n(40MHz) (With Antenna AG-24015)	



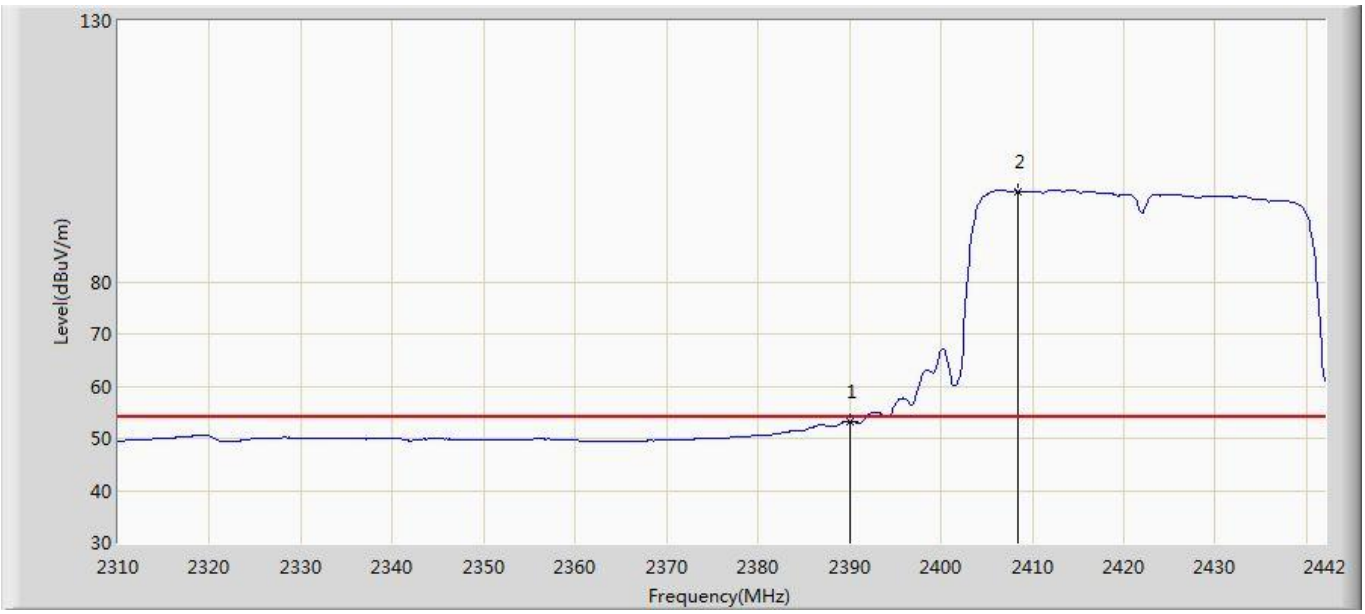
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	48.599	13.098	-5.401	54.000	35.502	AV
2		*	2425.368	79.455	43.870	N/A	N/A	35.586	AV

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:03
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 4: Transmit at Channel 2422MHz by 802.11n(40MHz) (With Antenna AG-24015)	



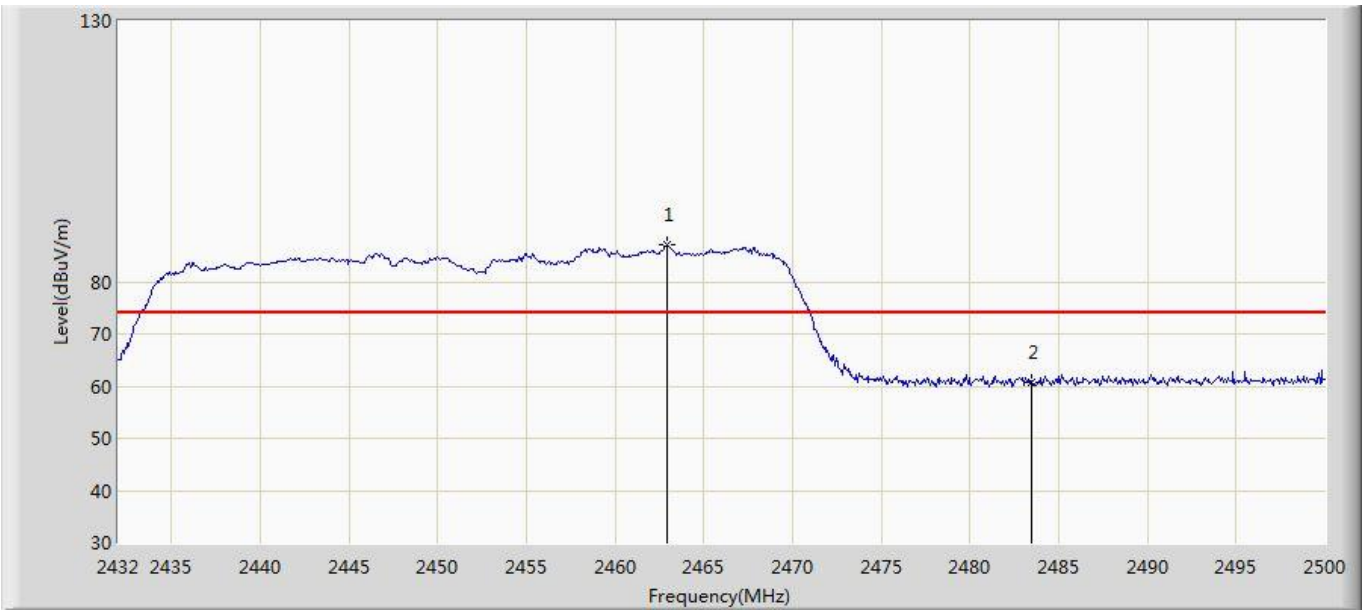
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	65.701	30.200	-8.299	74.000	35.502	PK
2		*	2416.392	108.155	72.591	N/A	N/A	35.564	PK

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:03
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 4: Transmit at Channel 2422MHz by 802.11n(40MHz) (With Antenna AG-24015)	



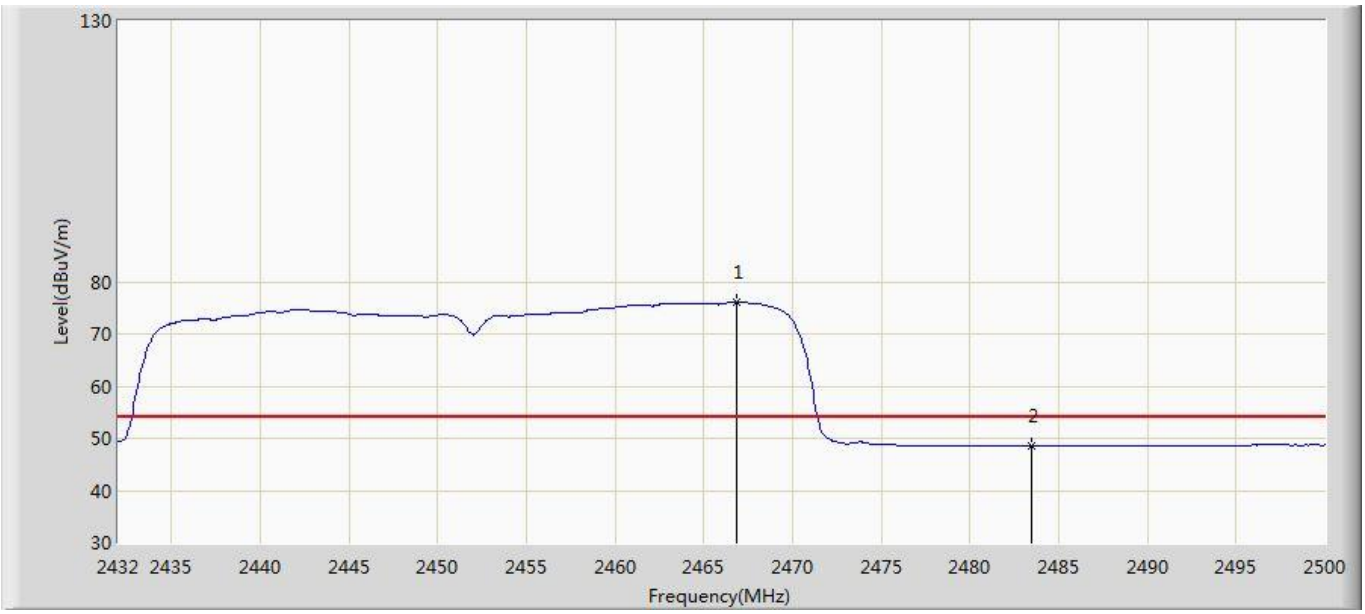
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1			2390.000	53.258	17.757	-0.742	54.000	35.502	AV
2		*	2408.340	97.384	61.840	N/A	N/A	35.545	AV

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:03
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 4: Transmit at Channel 2452MHz by 802.11n(40MHz) (With Antenna AG-24015)	



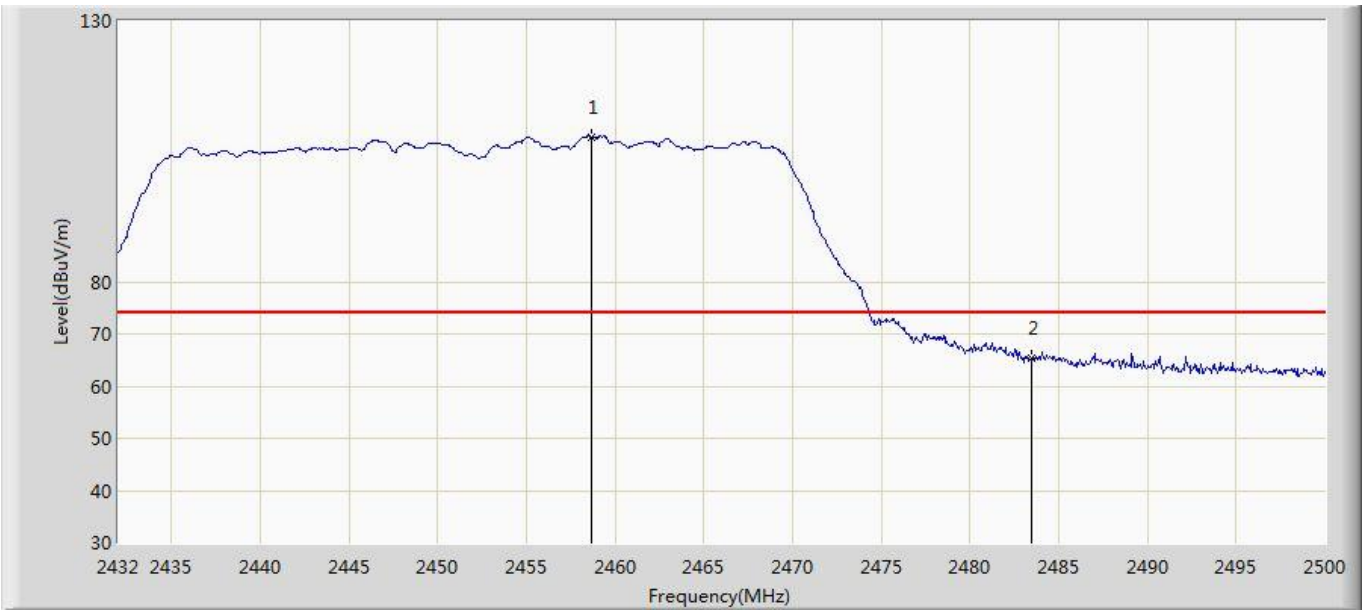
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2462.940	87.087	51.418	N/A	N/A	35.669	PK
2			2483.500	60.669	24.943	-13.331	74.000	35.725	PK

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:03
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 4: Transmit at Channel 2452MHz by 802.11n(40MHz) (With Antenna AG-24015)	



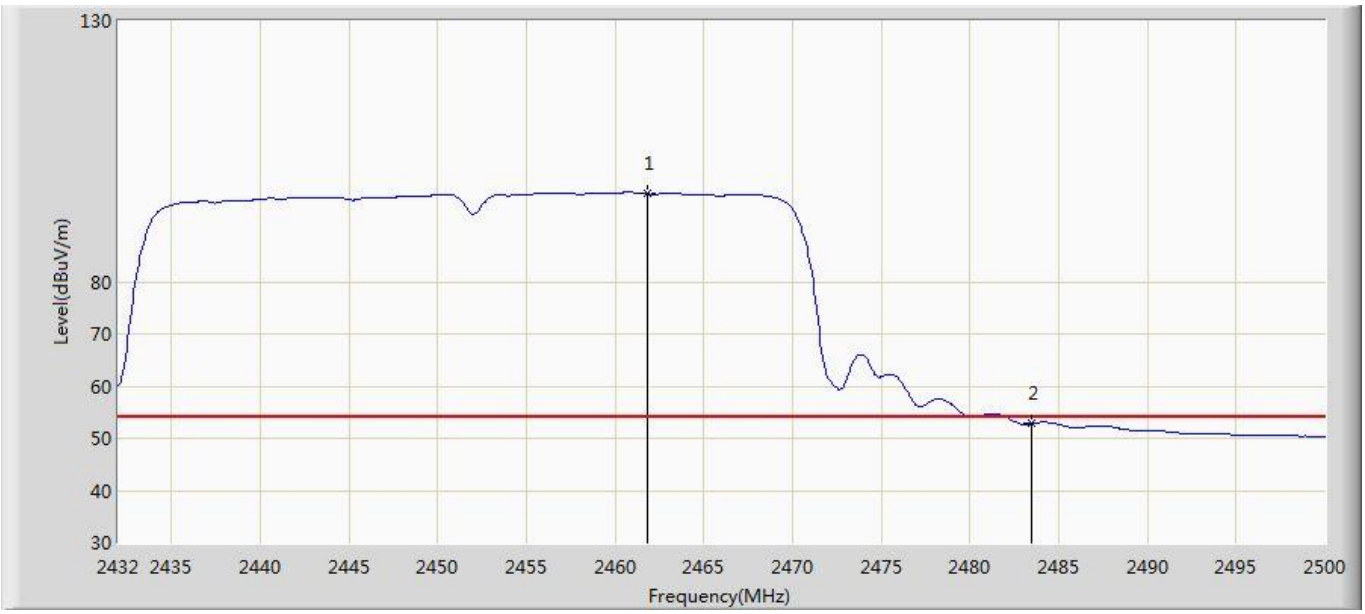
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2466.884	76.048	40.368	N/A	N/A	35.680	AV
2			2483.500	48.470	12.745	-5.530	54.000	35.725	AV

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:04
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 4: Transmit at Channel 2452MHz by 802.11n(40MHz) (With Antenna AG-24015)	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2458.656	107.805	72.145	N/A	N/A	35.660	PK
2			2483.500	65.254	29.529	-8.746	74.000	35.725	PK

Engineer: Roy	
Site: AC1	Time: 2013/11/26 - 12:04
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: WiFi USB Dongle Versa3	Power: DC 5V
Note: Mode 4: Transmit at Channel 2452MHz by 802.11n(40MHz) (With Antenna AG-24015)	



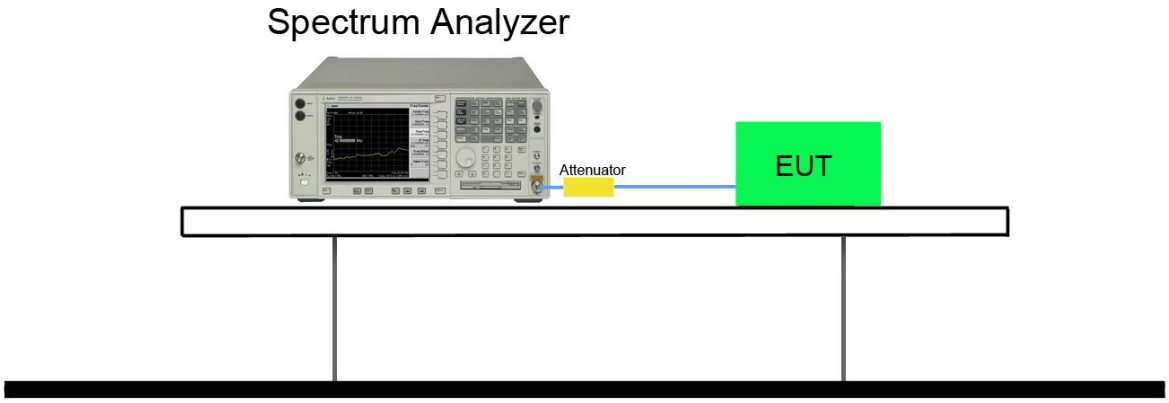
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor	Type
1		*	2461.784	96.952	61.285	N/A	N/A	35.667	AV
2			2483.500	52.876	17.151	-1.124	54.000	35.725	AV

8. Operation Frequency Range of 20dB Bandwidth

8.1. Limit

20 dB bandwidth of the emission is contained within the operation frequency band.

8.2. Test Setup



8.3. Test Procedure

The EUT was tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Span greater than RBW.

8.4. Test Result

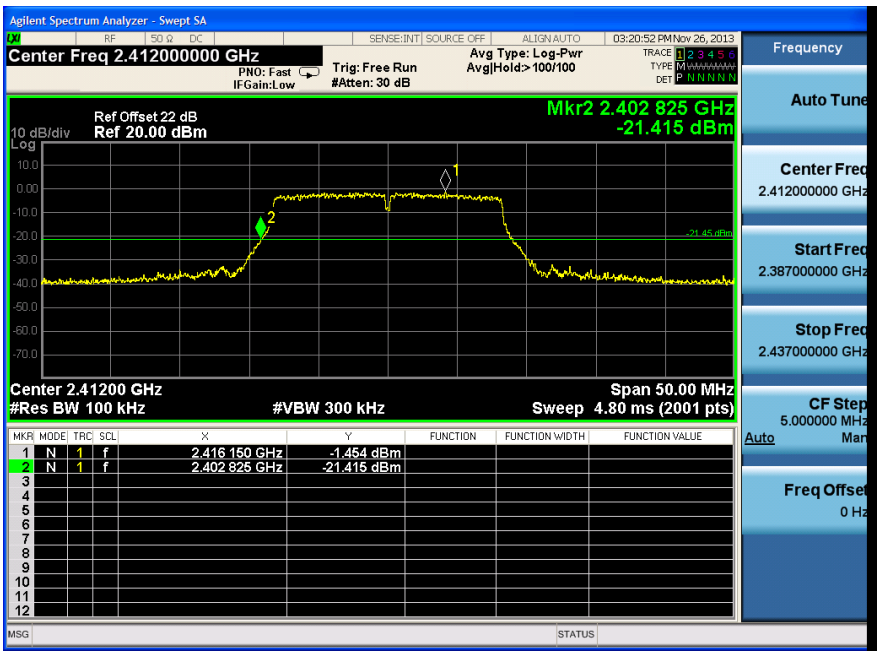
Product	:	WiFi USB Dongle Versa3
Test Item	:	Operation Frequency Range of 20dB Bandwidth
Test Site	:	TR3
Test Mode	:	Mode 1: Transmit by 802.11b

Channel 01 (2412MHz)

Channel 11 (2462MHz)

Product	:	WiFi USB Dongle Versa3
Test Item	:	Operation Frequency Range of 20dB Bandwidth
Test Site	:	TR3
Test Mode	:	Mode 2: Transmit by 802.11g

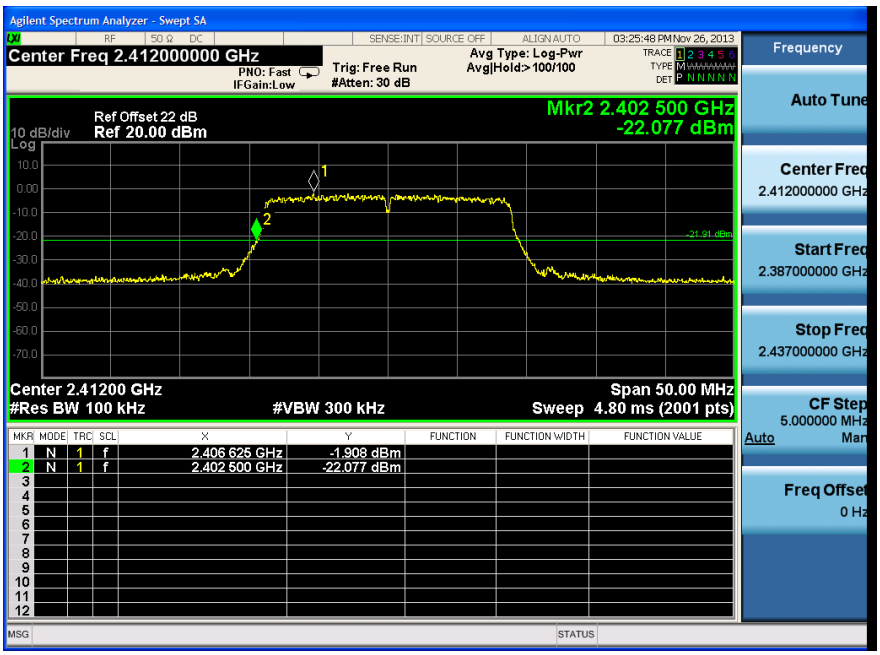
Channel 01 (2412MHz)



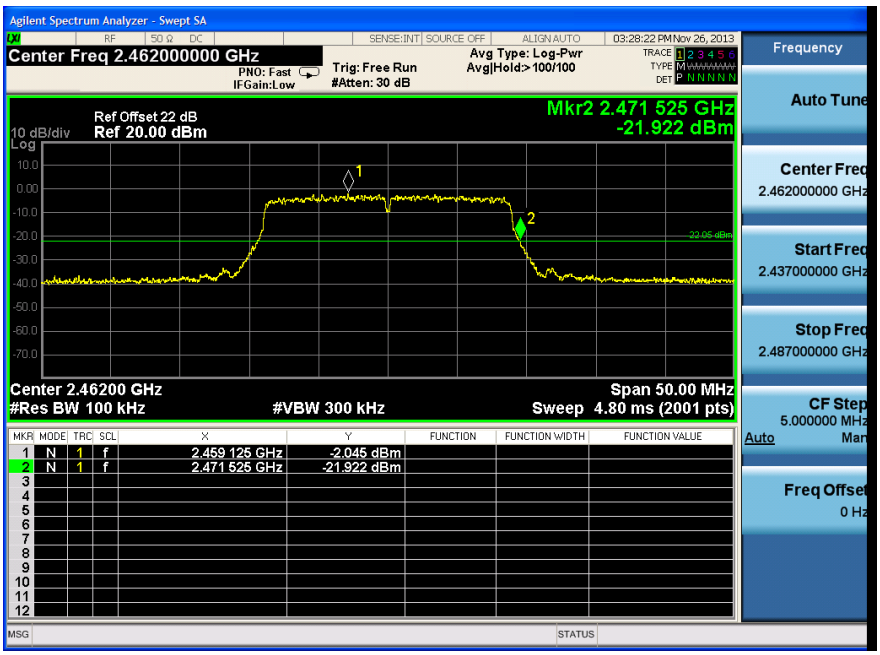
Channel 11 (2462MHz)

Product	:	WiFi USB Dongle Versa3
Test Item	:	Operation Frequency Range of 20dB Bandwidth
Test Site	:	TR3
Test Mode	:	Mode 3: Transmit by 802.11n(20MHz)

Channel 01 (2412MHz)

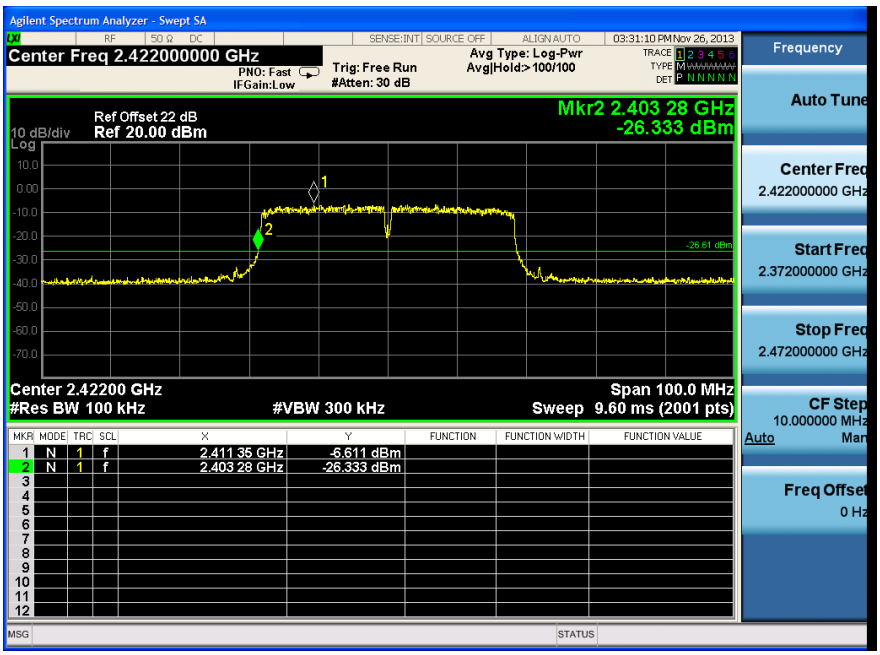


Channel 11 (2462MHz)

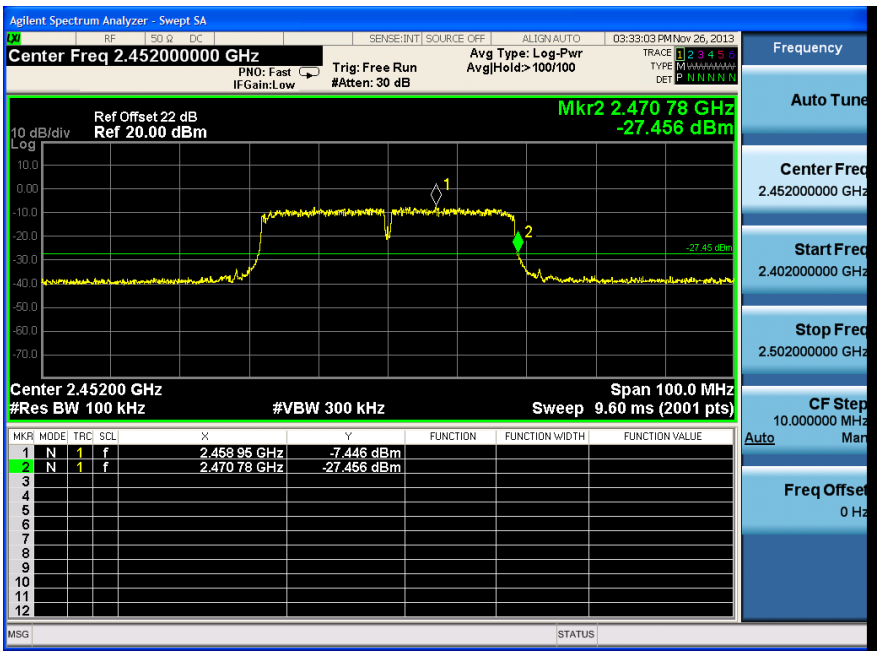


Product	:	WiFi USB Dongle Versa3
Test Item	:	Operation Frequency Range of 20dB Bandwidth
Test Site	:	TR3
Test Mode	:	Mode 4: Transmit by 802.11n(40MHz)

Channel 03 (2422MHz)



Channel 09 (2452MHz)

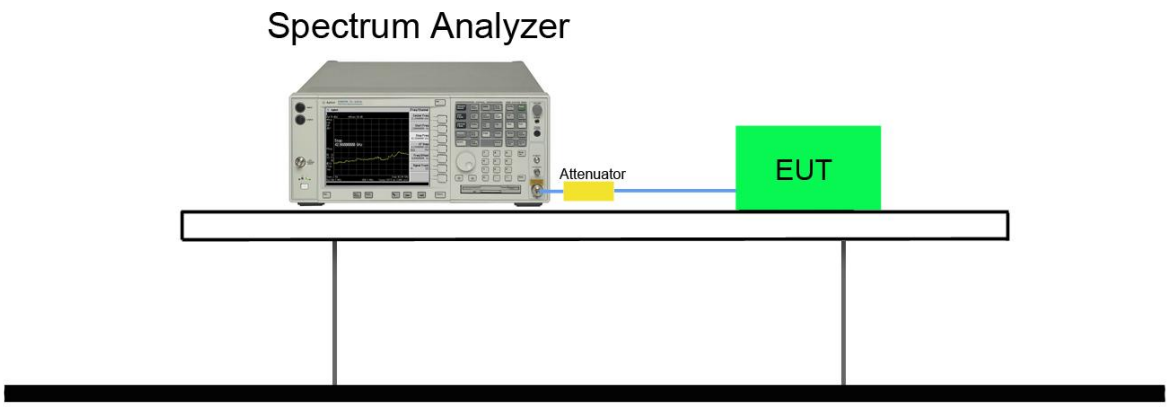


9. Occupied Bandwidth

9.1. Limit

The minimum 6dB bandwidth shall be at least 500 kHz.

9.2. Test Setup



9.3. Test Procedure

The EUT was tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

DTS bandwidth OPTION 2:

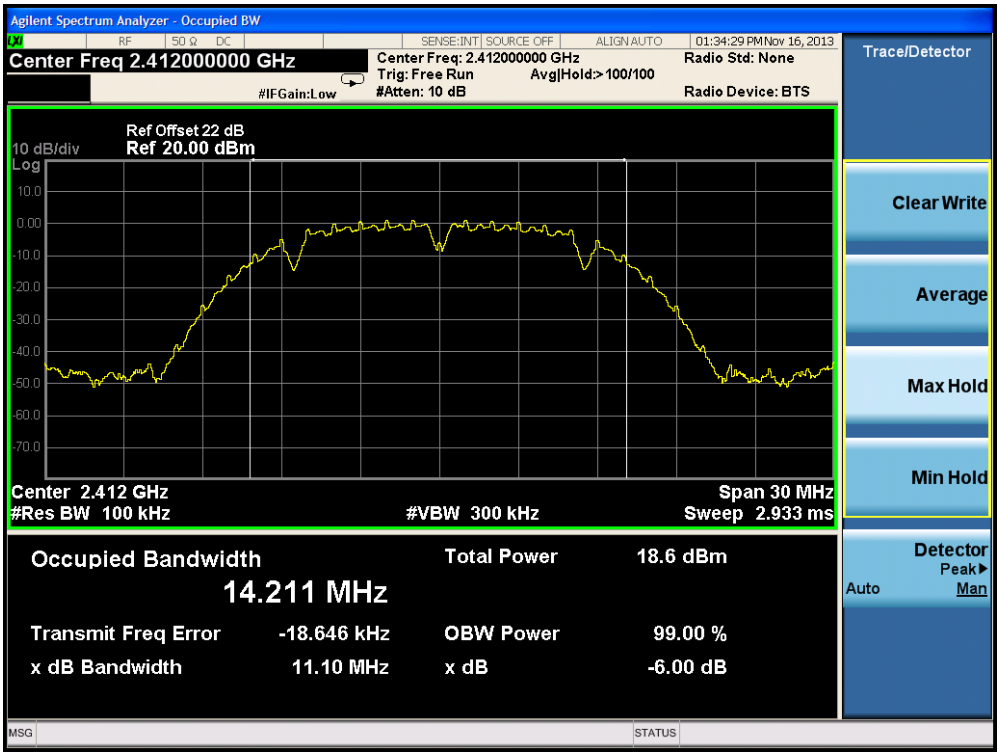
The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW ≥ 3 * RBW, peak detector with maximum hold) is implemented by the instrumentation function.

9.4. Test Result

Product	:	WiFi USB Dongle Versa3
Test Item	:	6dB Occupied Bandwidth
Test Site	:	TR3
Test Mode	:	Mode 1: Transmit by 802.11b

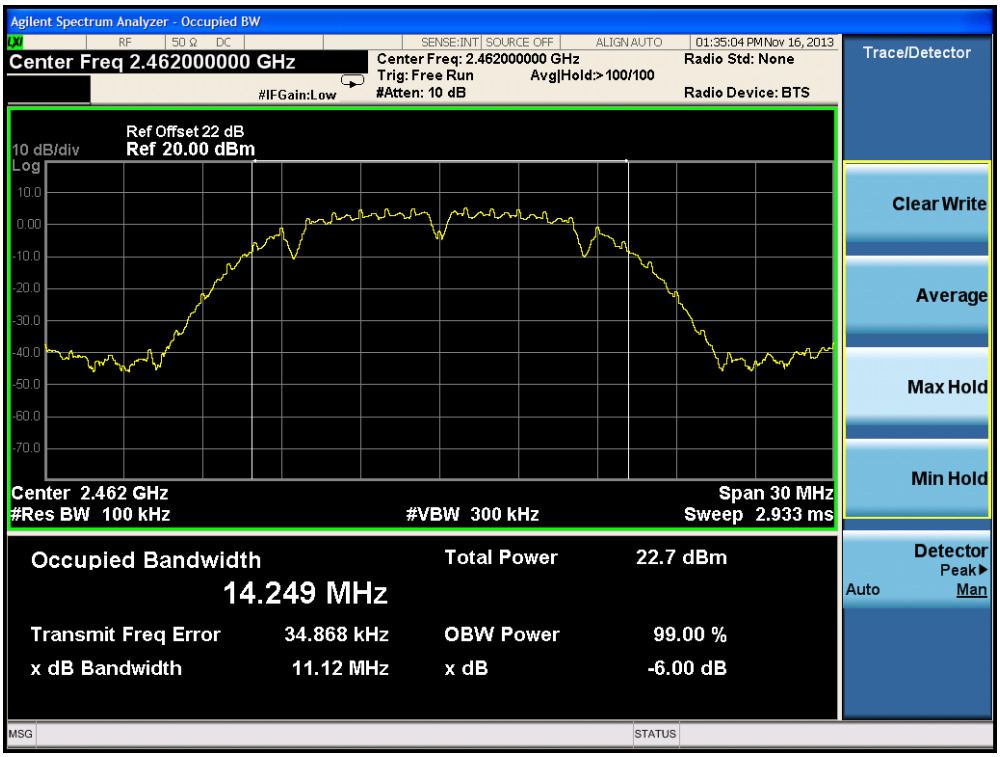
Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
01	2412	11100	500	Pass
06	2437	10190	500	Pass
11	2462	11120	500	Pass

Channel 01 (2412MHz)



Channel 06 (2437MHz)

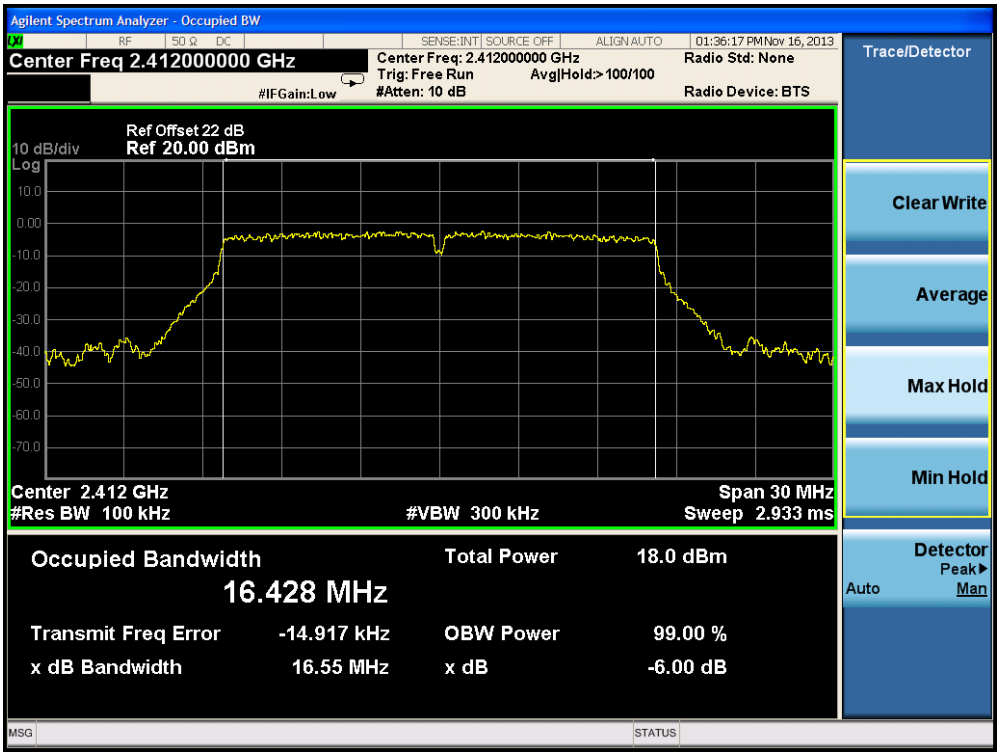
Channel 11 (2462MHz)



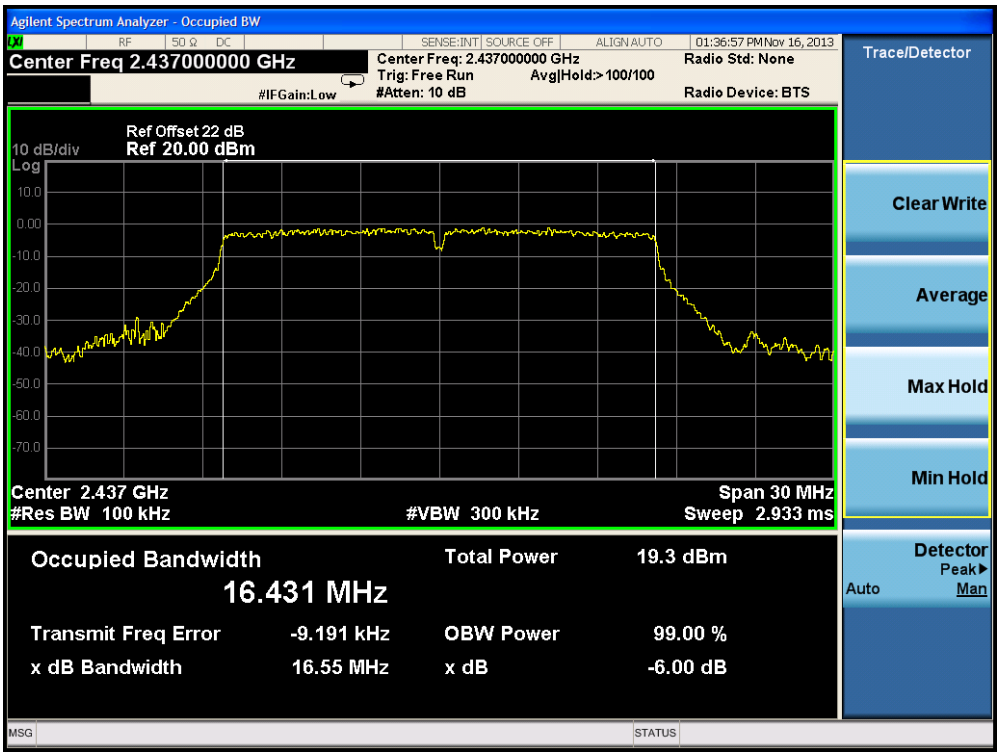
Product	:	WiFi USB Dongle Versa3
Test Item	:	6dB Occupied Bandwidth
Test Site	:	TR3
Test Mode	:	Mode 2: Transmit by 802.11g

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
01	2412	16550	500	Pass
06	2437	16550	500	Pass
11	2462	16530	500	Pass

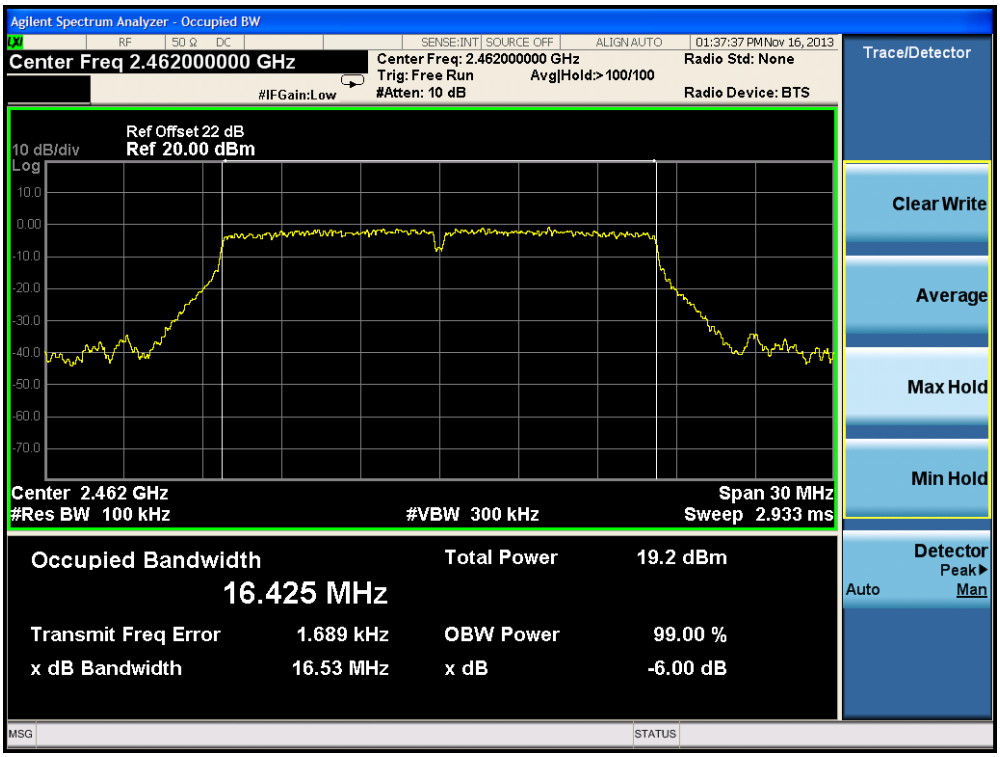
Channel 01 (2412MHz)



Channel 06 (2437MHz)



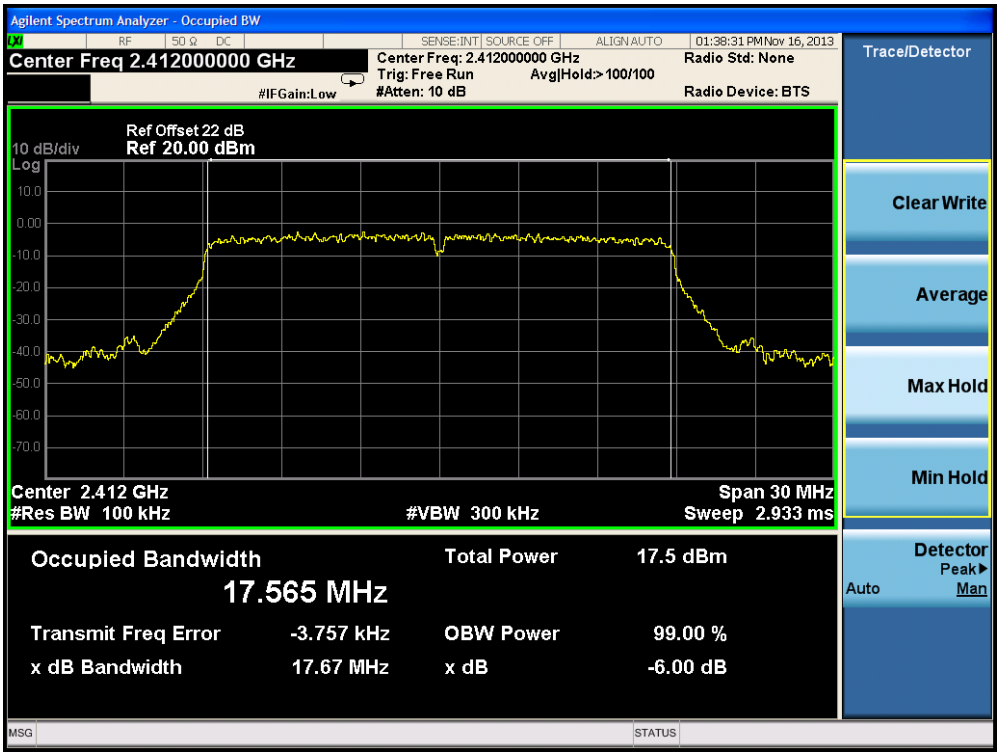
Channel 11 (2462MHz)



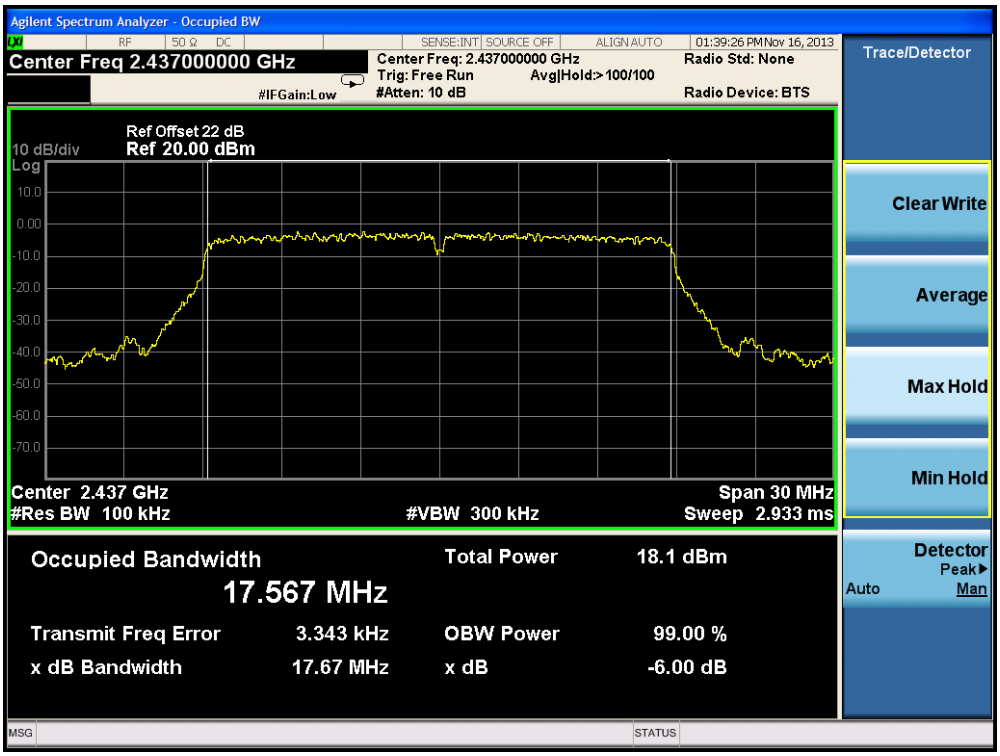
Product	:	WiFi USB Dongle Versa3
Test Item	:	6dB Occupied Bandwidth
Test Site	:	TR3
Test Mode	:	Mode 3: Transmit by 802.11n(20MHz)

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
01	2412	17670	500	Pass
06	2437	17670	500	Pass
11	2462	17690	500	Pass

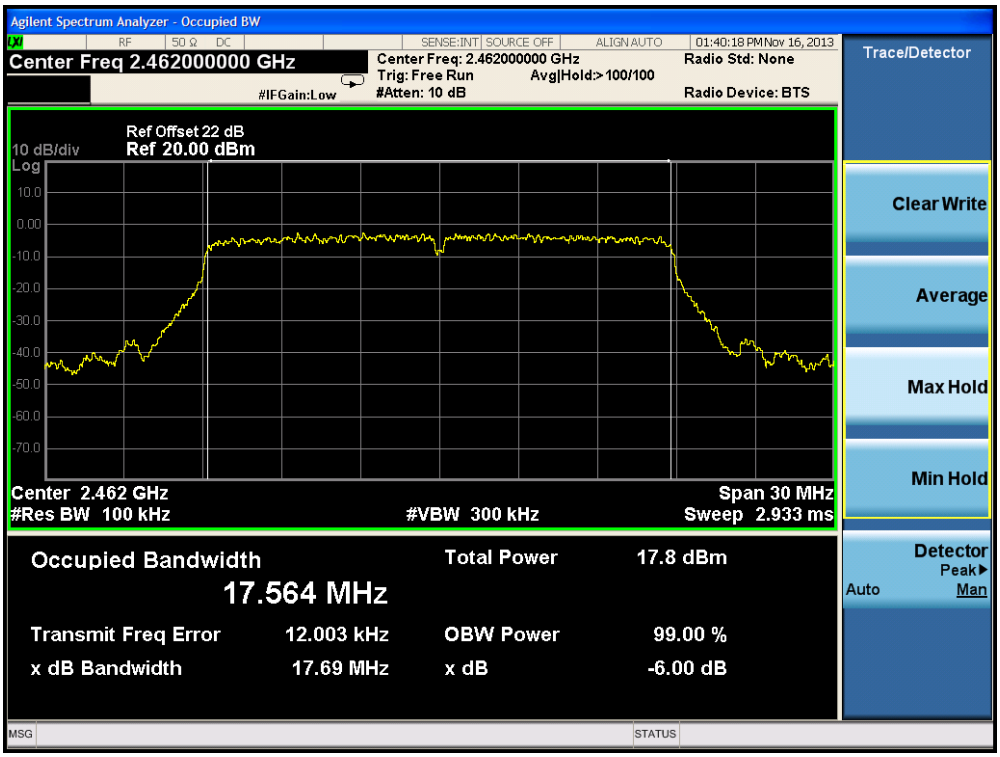
Channel 01 (2412MHz)



Channel 06 (2437MHz)



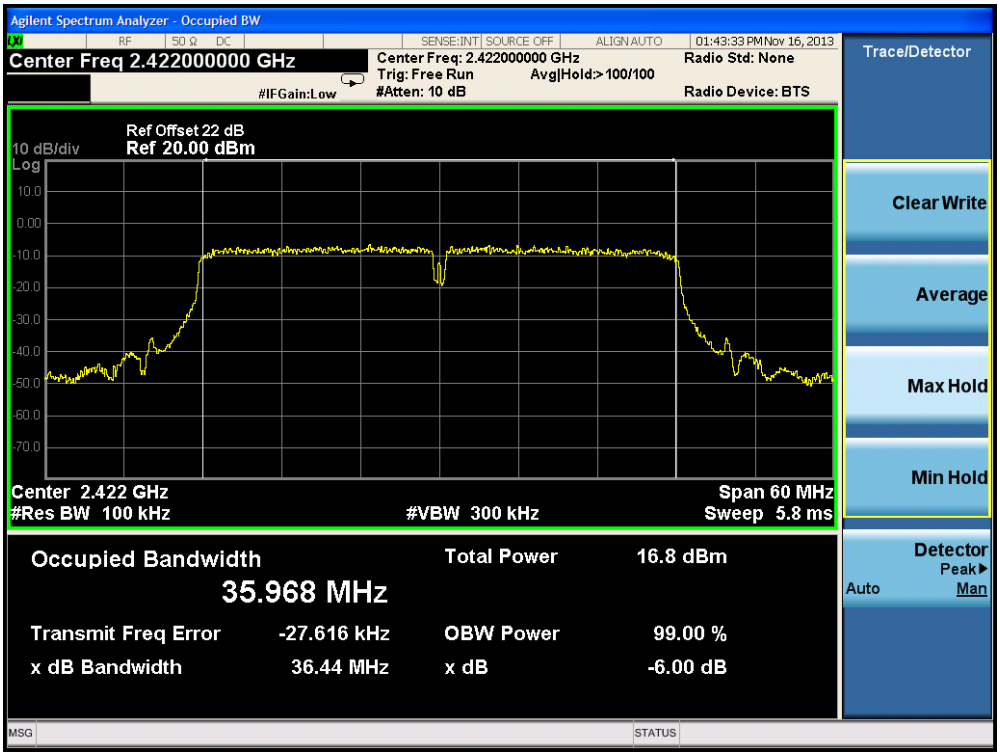
Channel 11 (2462MHz)



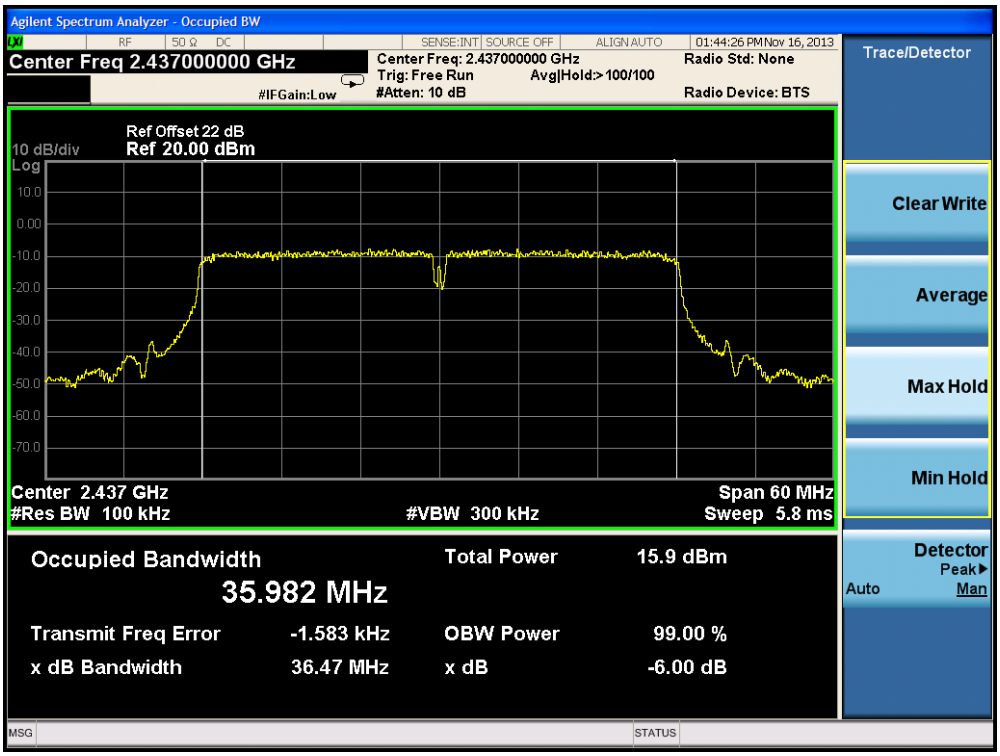
Product	:	WiFi USB Dongle Versa3
Test Item	:	6dB Occupied Bandwidth
Test Site	:	TR3
Test Mode	:	Mode 4: Transmit by 802.11n(40MHz)

Channel No.	Frequency (MHz)	Occupied Bandwidth (kHz)	Limit (kHz)	Result
03	2422	36440	500	Pass
06	2437	36470	500	Pass
09	2452	36470	500	Pass

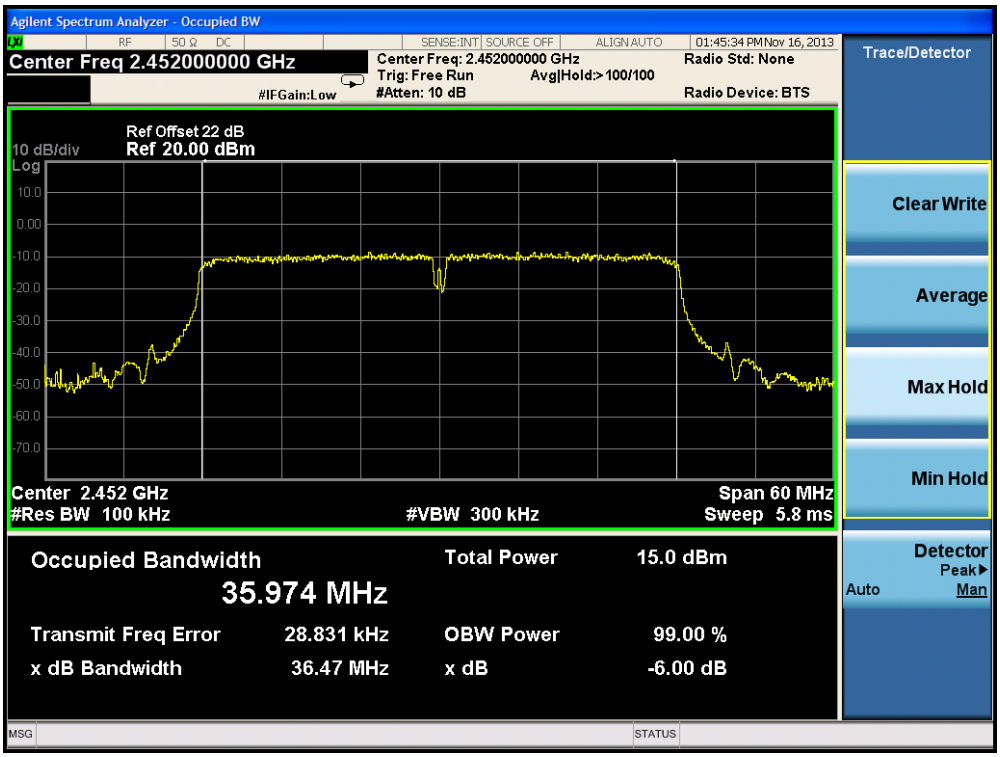
Channel 03 (2422MHz)



Channel 06 (2437MHz)



Channel 09 (2452MHz)



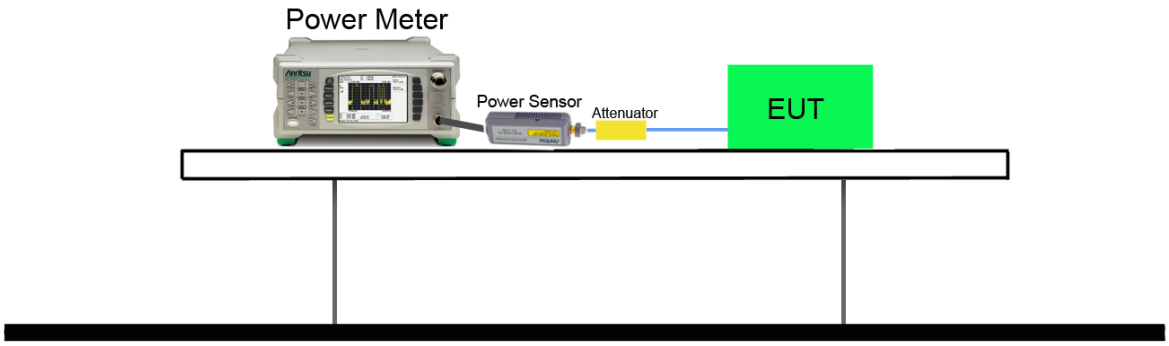
10. Power Output

10.1. Limit

The maximum peak power shall be less 1 Watt (30dBm).

Note: the conducted output power limit specified above is based on the use the antennas with directional gains that do not exceed 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values above, as appropriate, by the amount in dB that the directional gain of antenna exceeds 6 dBi.

10.2. Test Setup



10.3. Test Procedure

The EUT was tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

Use the broadband peak + average RF power meter to test peak power and record the result.

10.4. Test Result

Power output test was verified over all data rates of each mode shown as below, and then choose the maximum power output (blue marker) for final test of each channel.

MCS Index for 802.11n	Spatial Streams	Data Rate (Mbps)					
		802.11b	802.11g	20MHz Bandwidth		40MHz Bandwidth	
				800ns GI	400ns GI	800ns GI	400ns GI
0	1	1	6	6.5	7.2	13.5	15.0
1	1	2	9	13.0	14.4	27.0	30.0
2	1	5.5	12	19.5	21.7	40.5	45.0
3	1	11	18	26.0	28.9	54.0	60.0
4	1	---	24	39.0	43.3	81.0	90.0
5	1	---	36	52.0	57.8	108.0	120.0
6	1	---	48	58.5	65.0	121.5	135.0
7	1	---	54	65.0	72.2	135.0	150.0

Power output at various data rates:

Test Mode	Bandwidth	Frequency (MHz)	Channel	Data Rate	Peak Power (dBm)	Average Power (dBm)
802.11b	20	2437	6	1	19.26	16.33
				5.5	19.01	15.98
				11	18.87	15.56
802.11g	20	2437	6	6	22.01	12.53
				24	21.93	12.17
				54	21.70	12.03
802.11n	20	2437	6	MCS0	21.11	11.58
				MCS4	20.67	11.12
				MCS7	20.19	11.04
802.11n	40	2437	6	MCS0	17.25	6.81
				MCS4	16.66	6.23
				MCS7	16.13	5.95

Product	:	WiFi USB Dongle Versa3
Test Item	:	Power Output
Test Site	:	TR3
Test Mode	:	Mode 1: Transmit by 802.11b

Channel No.	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)	Limit (dBm)	Result
1	2412	16.18	12.88	27.00	Pass
6	2437	19.26	16.33	27.00	Pass
11	2462	18.94	15.97	27.00	Pass

Product	:	WiFi USB Dongle Versa3
Test Item	:	Power Output
Test Site	:	TR3
Test Mode	:	Mode 2: Transmit by 802.11g

Channel No.	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)	Limit (dBm)	Result
1	2412	20.01	10.75	27.00	Pass
6	2437	22.01	12.53	27.00	Pass
11	2462	21.82	12.36	27.00	Pass

Product	:	WiFi USB Dongle Versa3
Test Item	:	Power Output
Test Site	:	TR3
Test Mode	:	Mode 3: Transmit by 802.11n(20MHz)

Channel No.	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)	Limit (dBm)	Result
1	2412	20.02	11.38	27.00	Pass
6	2437	21.11	11.58	27.00	Pass
11	2462	20.87	10.95	27.00	Pass

Product	:	WiFi USB Dongle Versa3
Test Item	:	Power Output
Test Site	:	TR3
Test Mode	:	Mode 4: Transmit by 802.11n(40MHz)

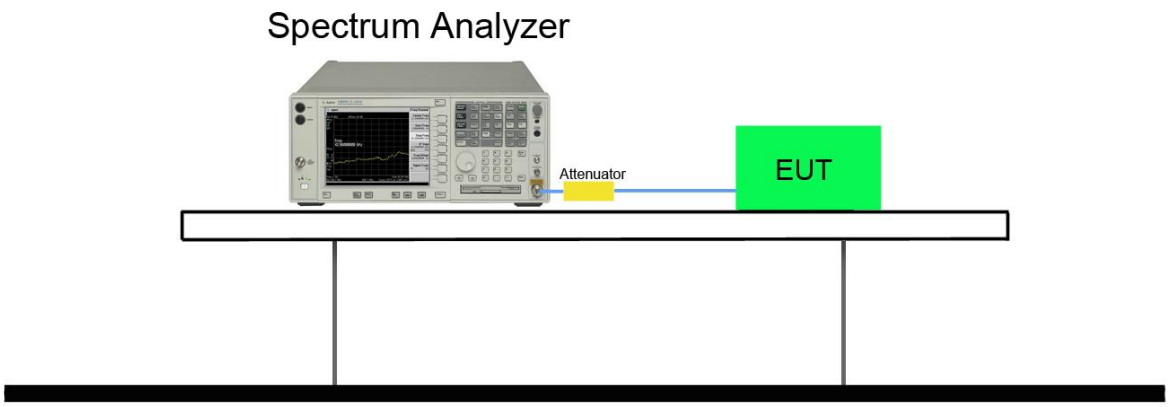
Channel No.	Frequency (MHz)	Peak Power (dBm)	Average Power (dBm)	Limit (dBm)	Result
1	2412	18.54	8.34	27.00	Pass
6	2437	17.25	6.81	27.00	Pass
11	2462	17.53	7.11	27.00	Pass

11. Power Spectral Density

11.1. Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiated to the Antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

11.2. Test Setup



11.3. Test Procedure

The EUT was tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

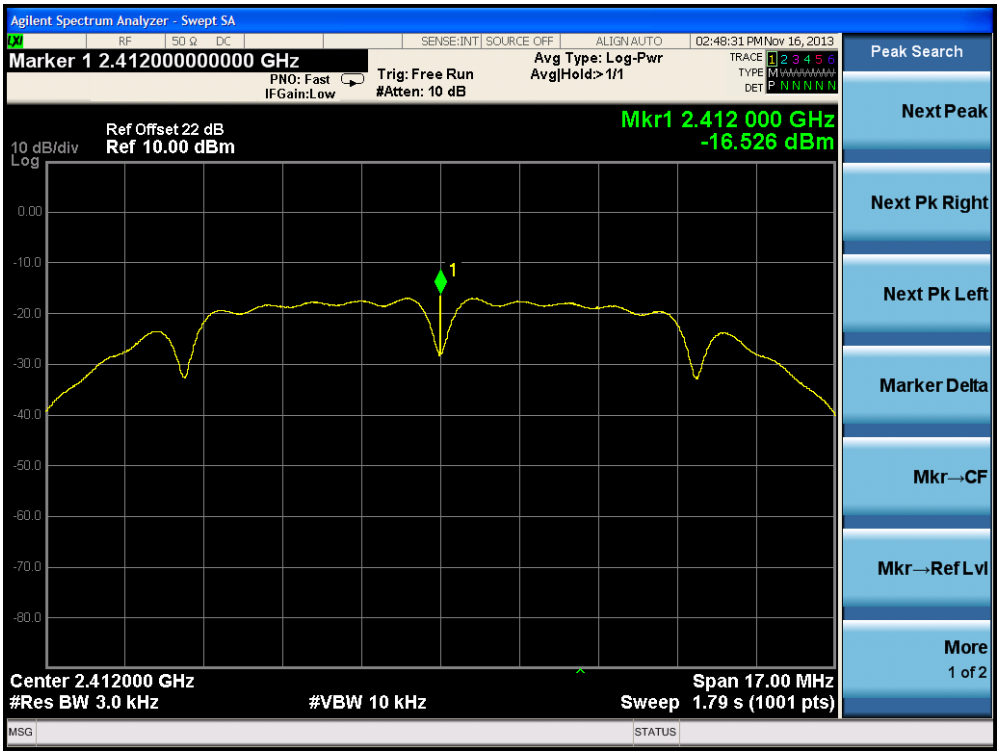
Set analyzer center frequency to DTS channel center frequency, the span to 1.5 times the DTS channel bandwidth, RBW ≥ 3 kHz, Set VBW ≥ 3 * RBW, Sweep time = auto couple, Detector = peak, Trace mode = max hold, Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level. If measured value exceed limit reduce RBW (no less than 3kHz) and repeat.

11.4. Test Result

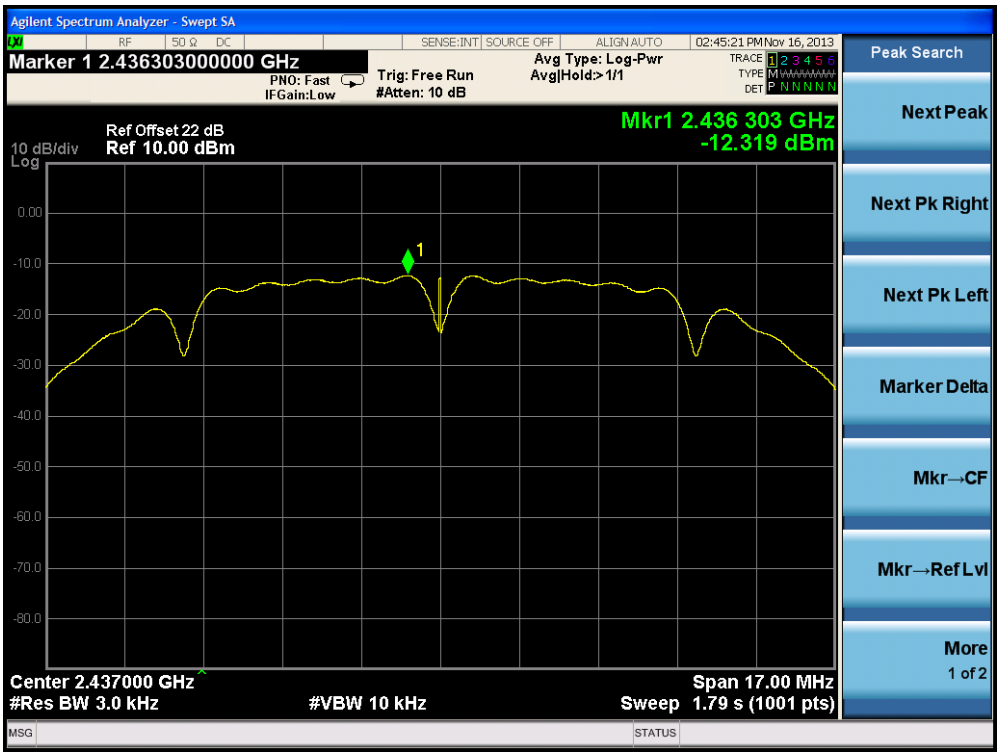
Product	:	WiFi USB Dongle Versa3
Test Item	:	Power Spectral Density
Test Site	:	TR3
Test Mode	:	Mode 1: Transmit by 802.11b

Channel No.	Frequency (MHz)	Measurement PSD (dBm)	Limit (dBm/3kHz)	Result
01	2412	-16.526	5	Pass
06	2437	-12.319	5	Pass
11	2462	-11.884	5	Pass

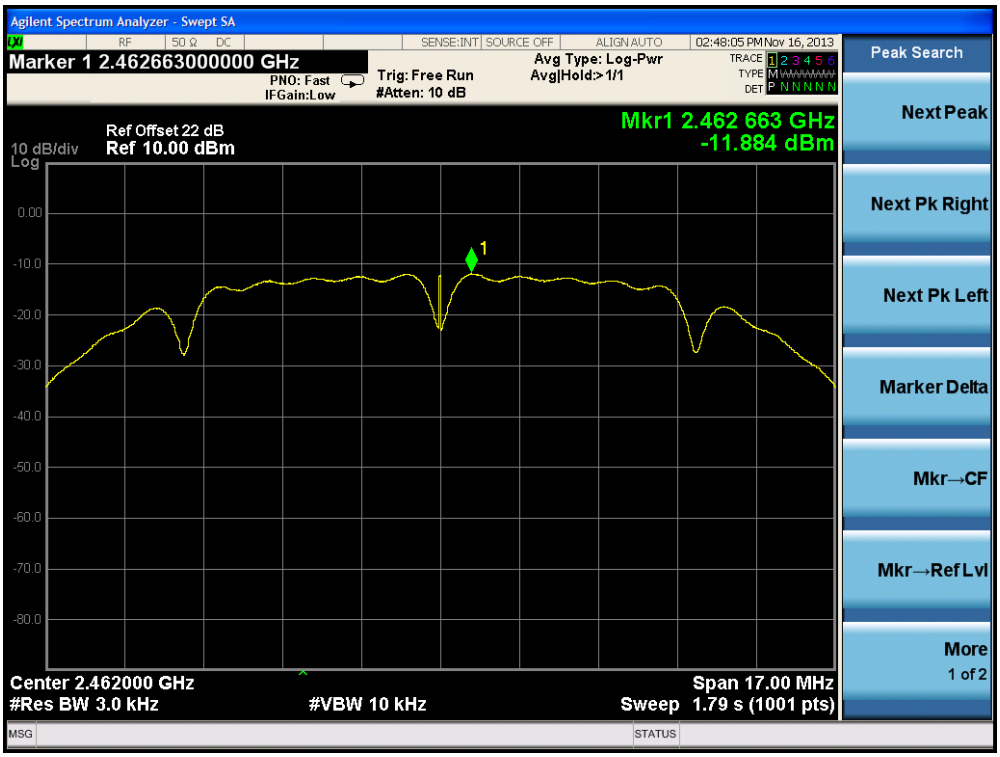
Channel 01 (2412MHz)



Channel 06 (2437MHz)



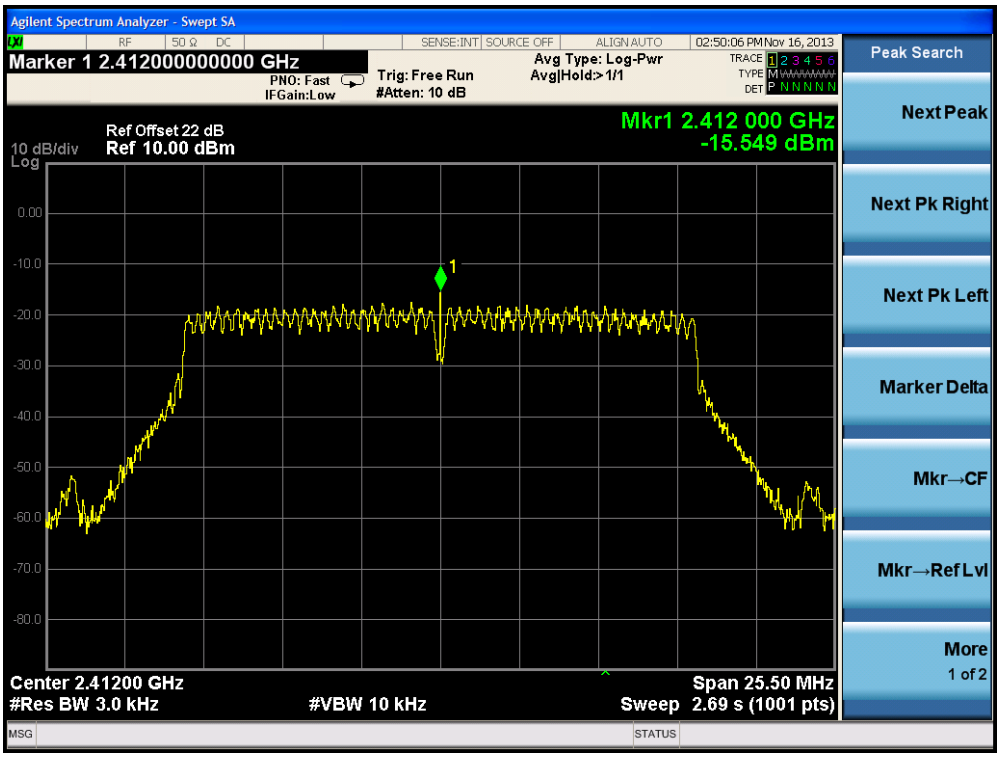
Channel 11 (2462MHz)



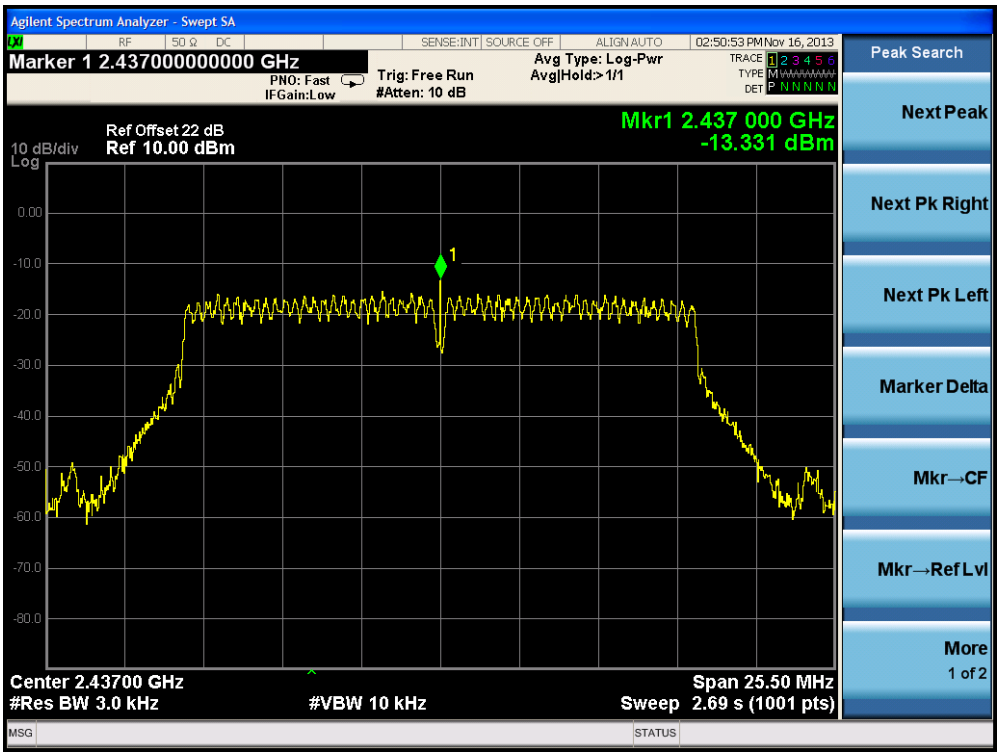
Product	:	WiFi USB Dongle Versa3
Test Item	:	Power Spectral Density
Test Site	:	TR3
Test Mode	:	Mode 2: Transmit by 802.11g

Channel No.	Frequency (MHz)	Measurement PSD (dBm)	Limit (dBm/3kHz)	Result
01	2412	-15.549	5	Pass
06	2437	-13.331	5	Pass
11	2462	-13.351	5	Pass

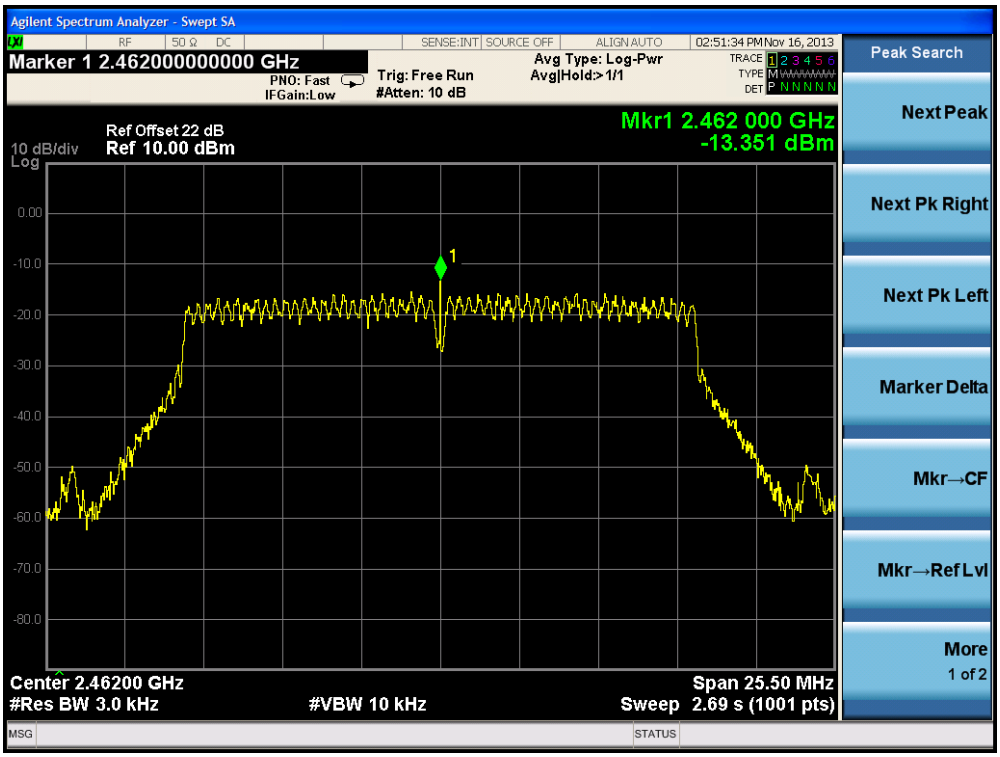
Channel 01 (2412MHz)



Channel 06 (2437MHz)



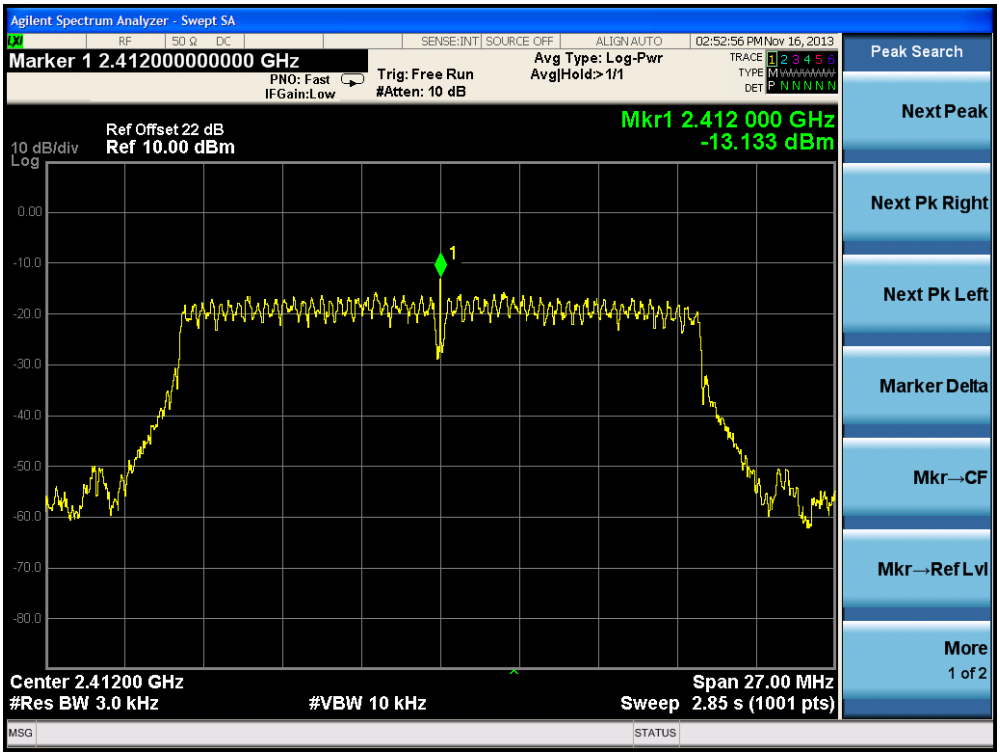
Channel 11 (2462MHz)



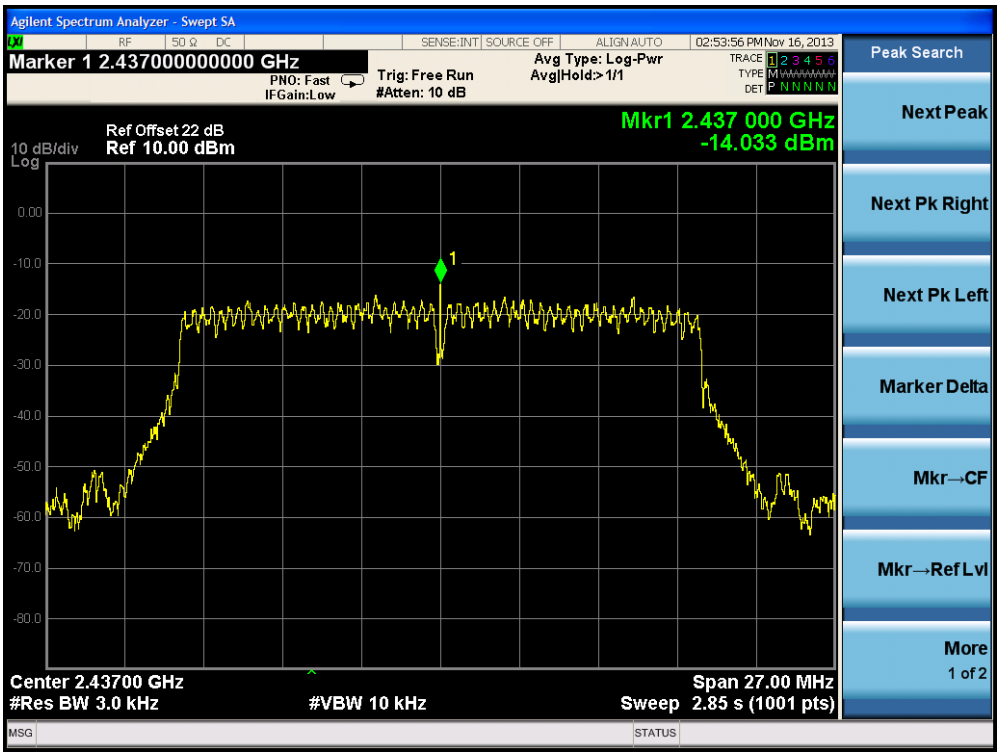
Product	:	WiFi USB Dongle Versa3
Test Item	:	Power Spectral Density
Test Site	:	TR3
Test Mode	:	Mode 3: Transmit by 802.11n(20MHz)

Channel No.	Frequency (MHz)	Measurement PSD (dBm)	Limit (dBm/3kHz)	Result
01	2412	-13.133	5	Pass
06	2437	-14.033	5	Pass
11	2462	-14.239	5	Pass

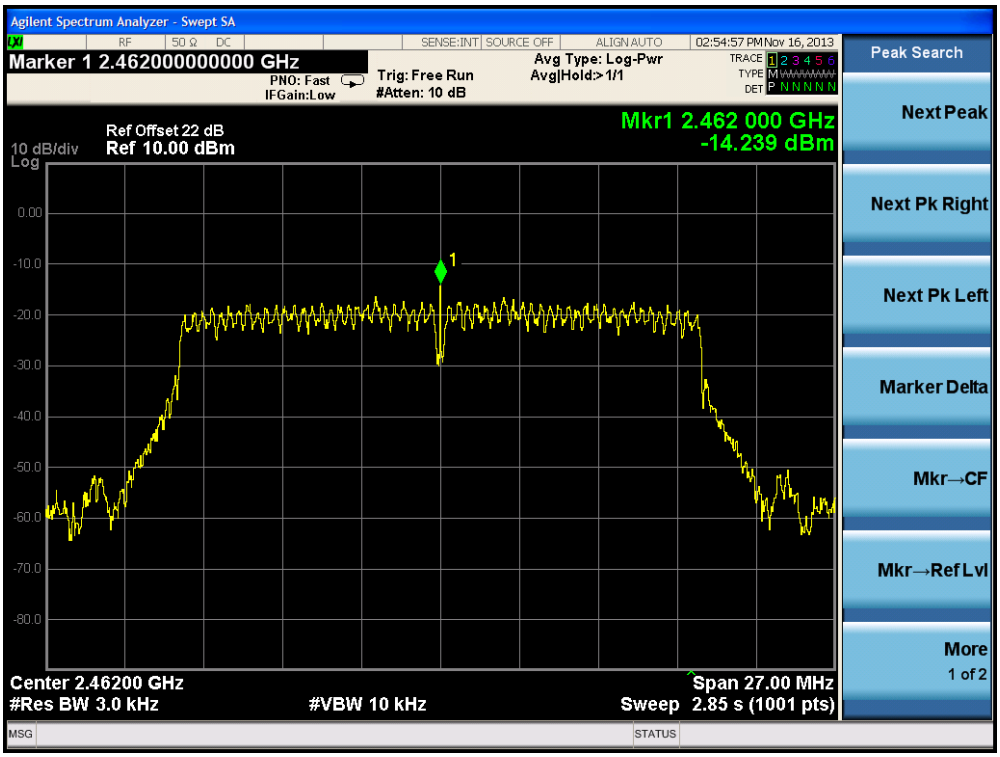
Channel 01 (2412MHz)



Channel 06 (2437MHz)



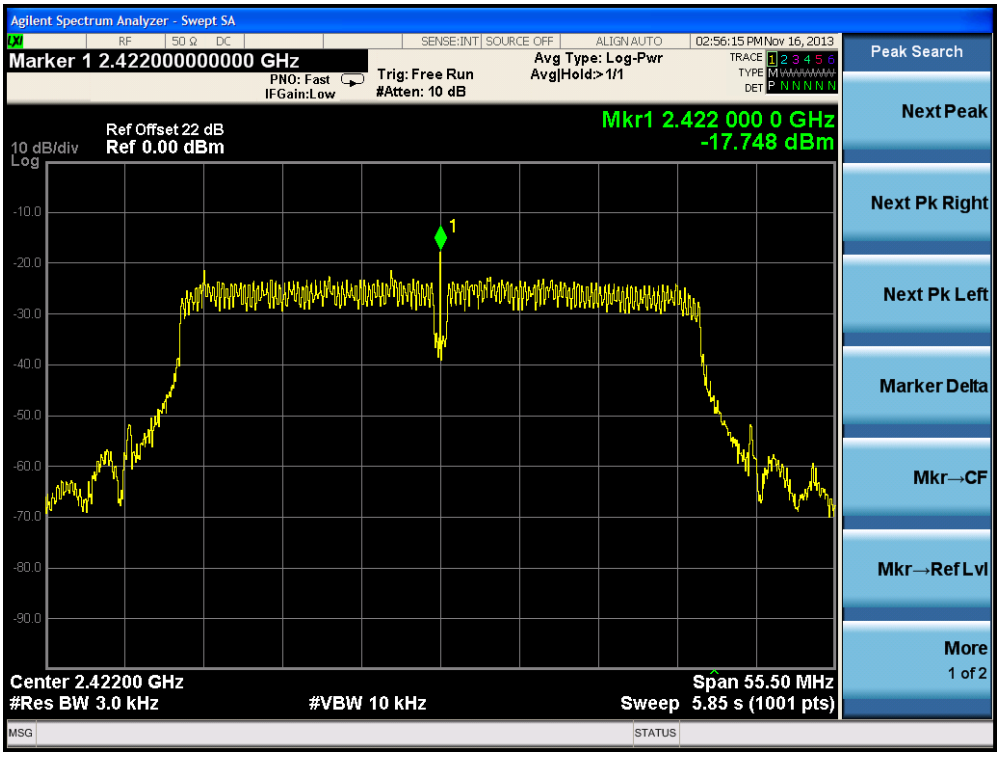
Channel 11 (2462MHz)



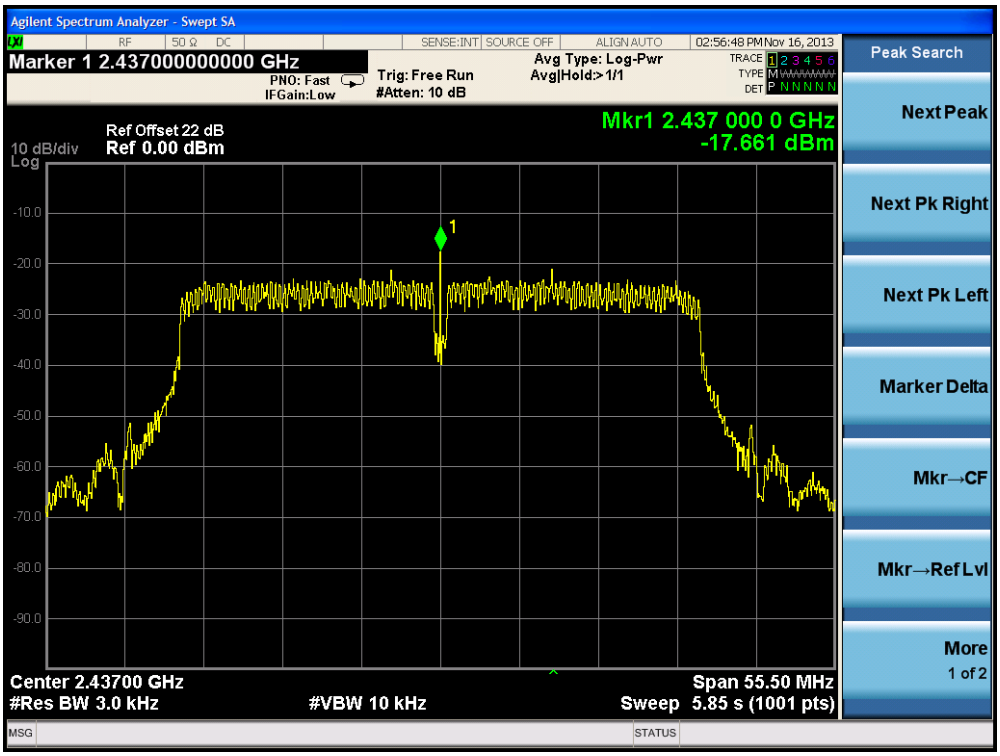
Product	:	WiFi USB Dongle Versa3
Test Item	:	Power Spectral Density
Test Site	:	TR3
Test Mode	:	Mode 4: Transmit by 802.11n(40MHz)

Channel No.	Frequency (MHz)	Measurement PSD (dBm)	Limit (dBm/3kHz)	Result
03	2422	-17.748	5	Pass
06	2437	-17.661	5	Pass
09	2452	-17.795	5	Pass

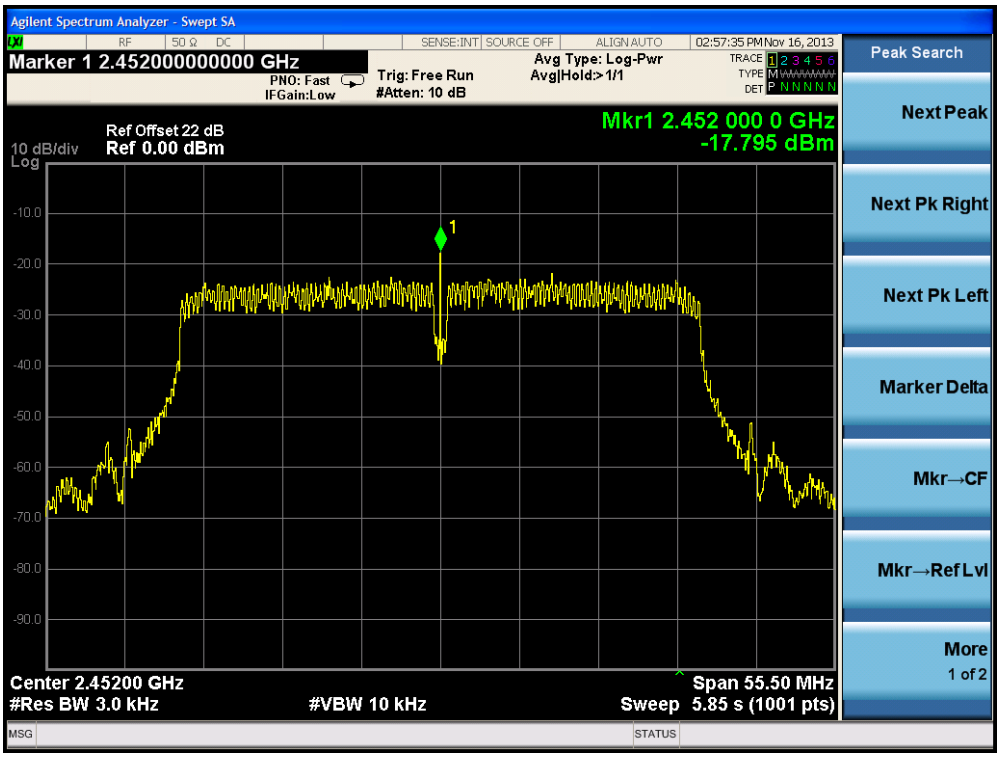
Channel 03 (2422MHz)



Channel 06 (2437MHz)



Channel 09 (2452MHz)



12. Measurement Uncertainty

Conducted Emission
The maximum measurement uncertainty is defined as: 9kHz~30MHz: ±2.02dB
Radiated disturbance
The maximum measurement uncertainty is defined as: Below 1GHz: ±3.8dB Above 1GHz: ±3.9dB
RF Antenna Conducted Spurious
The maximum measurement uncertainty is defined as: ±1.27 dB.
Radiated Emission Band Edge
The maximum measurement uncertainty is defined as: Above 1GHz: ±3.9dB
Operation Frequency Range of 20dB Bandwidth
The maximum measurement uncertainty is defined as: ±1 kHz.
Occupied Bandwidth
The maximum measurement uncertainty is defined as: ±1 kHz.
Power Output
The maximum measurement uncertainty is evaluated as ±1.27 dB.
Power Spectral Density
The maximum measurement uncertainty is evaluated as ±1.27 dB.

13. 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
Preamplifier	MRT	AP18G40	1310003	1 year	2014/10/08
Loop Antenna	Schwarzbeck	FMZB1519	1519-041	2 years	2014/09/13
TRILOG Antenna	Schwarzbeck	VULB9162	9162-047	2 years	2014/09/13
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1167	2 years	2014/09/13
Broadband Horn Antenna	Schwarzbeck	BBHA9170	9170-549	2 years	2014/09/13
Temperature/Humidity Meter	Anymetre	TH101B	AC1-01	1 year	2014/08/15

Operation Frequency Range of 20dB Bandwidth

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9010A	MY5144016A	1 year	2014/08/15
Temperature/Humidity Meter	Anymetre	TH101B	TR3-01	1 year	2014/08/15

Occupied Channel Bandwidth

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9010A	MY5144016A	1 year	2014/08/15
Temperature/Humidity Meter	Anymetre	TH101B	TR3-01	1 year	2014/08/15

Power Output

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
Power Meter	Anritsu	ML2495A	0905006	1 year	2014/11/01
Power Sensor	Anritsu	MA2411B	0846014	1 year	2014/11/01
Temperature/Humidity Meter	Anymetre	TH101B	TR3-01	1 year	2014/08/15

Power Spectral Density

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9010A	MY5144016A	1 year	2014/08/15
Temperature/Humidity Meter	Anymetre	TH101B	TR3-01	1 year	2014/08/15

The End