FCC REPORT (WIFI)

Applicant:	HUNG WAI PRODUCTS LIMITED
Address of Applicant:	Unit 11, 12/F., New Commerce Centre, 19 On Sum Street, Shatin, Hong Kong
Equipment Under Test (EUT)	
Product Name:	150Mbps 802.11b/g/n Nano WLAN Adapter
Model No.:	HW-3F03
FCC ID:	2AB6Z-HW-3F03
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Date of sample receipt:	10 Apr., 2014
Date of Test:	11 Apr ., to 17 Apr., 2014
Date of report issued:	18 Apr., 2014
Test Result:	PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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2 Version

Version No.	Date	Description
00	*18 Apr., 2014*	*Original*

Prepared by: Sera Xiang ***Date:*** *18 Apr ., 2014*

Report Clerk

Reviewed by: aaron Fei ***Date:*** *18 Apr ., 2014*

Project Engineer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(3)	Pass
6dB Emission Bandwidth 99% Occupied Bandwidth	15.247 (a)(2)	Pass
Power Spectral Density	15.247 (e)	Pass
Band Edge	15.247(d)	Pass
Spurious Emission	15.205/15.209	Pass

Pass: The EUT complies with the essential requirements in the standard.

5 General Information

5.1 Client Information

Applicant:	HUNG WAI PRODUCTS LIMITED
Address of Applicant:	Unit 11, 12/F., New Commerce Centre, 19 On Sum Street, Shatin, Hong Kong
Manufacturer/Factory:	HUNG WAI ELECTRONICS (HUIZHOU) LTD.
Address of Manufacturer/ Factory:	3rd floor, NO. 3, Minfeng Road, Huinan High and New Tchnology Industry Park, Huiao Avenue, Huizhou City, Guangdong

5.2 General Description of E.U.T.

Product Name:	150Mbps 802.11b/g/n Nano WLAN Adapter
Model No.:	HW-3F03
Operation Frequency:	2412MHz~2462MHz (802.11b/802.11g/802.11n(H20)) 2422MHz~2452MHz (802.11n(H40))
Channel numbers:	11 for 802.11b/802.11g/802.11(H20) 7 for 802.11n(H40)
Channel separation:	5MHz
Modulation technology: (IEEE 802.11b)	Direct Sequence Spread Spectrum (DSSS)
Modulation technology: (IEEE 802.11g/802.11n)	Orthogonal Frequency Division Multiplexing(OFDM)
Data speed (IEEE 802.11b):	1Mbps, 2Mbps, 5.5Mbps, 11Mbps
Data speed (IEEE 802.11g):	6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps,54Mbps
Data speed (IEEE 802.11n):	Up to 150Mbps
Antenna Type:	Internal Antenna
Antenna gain:	-5 dBi
Power supply:	DC 5V

Operation Frequency each of channel For 802.11b/g/n(H20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

Operation Frequency each of channel For 802.11n(H40)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
		4	2427MHz	7	2442MHz		
		5	2432MHz	8	2447MHz		
3	2422MHz	6	2437MHz	9	2452MHz		

Note:
In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

802.11b/802.11g/802.11n (H20)

Channel	Frequency
The lowest channel	2412MHz
The middle channel	2437MHz
The Highest channel	2462MHz

802.11n (H40)

Channel	Frequency
The lowest channel	2422MHz
The middle channel	2437MHz
The Highest channel	2452MHz

5.3 Test environment and mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Operation mode	Keep the EUT in continuous transmitting with modulation

The sample was placed 0.8m above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

Mode	Data rate
802.11b	1Mbps
802.11g	6Mbps
802.11n(H20)	6.5Mbps
802.11n(H40)	13.5Mbps

Final Test Mode:

According to ANSI C63.4 standards, the test results are both the “worst case” and “worst setup” 1Mbps for 802.11b, 6Mbps for 802.11g, 6.5Mbps for 802.11n(H20) and 13.5 Mbps for 802.11n(H40). Duty cycle setting during the transmission is 100% with maximum power setting for all modulations.

5.4 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC - Registration No.: 817957**

Shenzhen Zhongjian Nanfang Testing 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 out files. Registration 817957, February 27, 2012.

- **IC - Registration No.: 10106A-1**

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L6048**

Shenzhen Zhongjian Nanfang Testing Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6048.

5.5 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
Address: No.B-C, 1/F., Building 2, Laodong No.2 Industrial Park, Xixiang Road,
Bao'an District, Shenzhen, Guangdong, China
Tel: +86-755-23118282
Fax: +86-755-23116366

5.6 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC ID/DoC
LENOVO	Notebook	ThinkPad SL510	LR-7Y97D	DoC

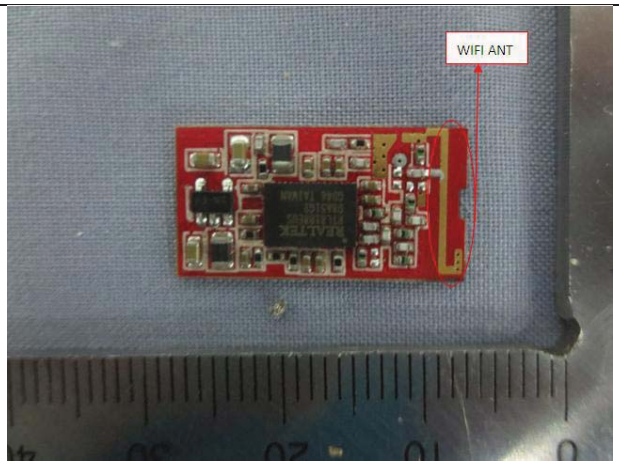
5.7 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	SAEMC	9(L)*6(W)* 6(H)	CCIS0001	June 09 2013	June 08 2014
2	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	CCIS0005	May 25 2013	May 24 2014
3	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	CCIS0006	May 25 2013	May 24 2014
4	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
5	Coaxial Cable	CCIS	N/A	CCIS0016	Apr. 01 2014	Mar. 31 2015
6	Coaxial Cable	CCIS	N/A	CCIS0017	Apr. 01 2014	Mar. 31 2015
7	Coaxial cable	CCIS	N/A	CCIS0018	Apr. 01 2014	Mar. 31 2015
8	Coaxial Cable	CCIS	N/A	CCIS0019	Apr. 01 2014	Mar. 31 2015
9	Coaxial Cable	CCIS	N/A	CCIS0087	Apr. 01 2014	Mar. 31 2015
10	Amplifier(10kHz-1.3GHz)	HP	8447D	CCIS0003	Apr. 01 2014	Mar. 31 2015
11	Amplifier(1GHz-18GHz)	Compliance Direction Systems Inc.	PAP-1G18	CCIS0011	June 09 2013	June 08 2014
12	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	Apr. 01 2014	Mar. 31 2015
13	Horn Antenna	ETS-LINDGREN	3160	GTS217	Feb. 30 2014	Feb. 29 2015
14	Printer	HP	HP LaserJet P1007	N/A	N/A	N/A
15	Positioning Controller	UC	UC3000	CCIS0015	N/A	N/A
16	Spectrum analyzer 9k-30GHz	Rohde & Schwarz	FSP	CCIS0023	May. 25 2013	May. 24 2014
17	EMI Test Receiver	Rohde & Schwarz	ESPI	CCIS0022	Apr 01 2013	Mar. 31 2014
18	Loop antenna	Laplace instrument	RF300	EMC0701	Aug. 12 2013	Aug. 11 2014
19	Universal radio communication tester	Rhode & Schwarz	CMU200	CCIS0069	May. 25 2013	May. 24 2014
20	Signal Analyzer	Rohde & Schwarz	FSIQ3	CCIS0088	May. 25 2013	May. 24 2014

Conducted Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
1	Shielding Room	ZhongShuo Electron	11.0(L)x4.0(W)x3.0(H)	CCIS0061	June 09 2013	June 08 2014
2	EMI Test Receiver	Rohde & Schwarz	ESCI	CCIS0002	May 25 2013	May 24 2014
3	LISN	CHASE	MN2050D	CCIS0074	Apr 01 2014	Mar. 31 2015
4	Coaxial Cable	CCIS	N/A	CCIS0086	Apr. 01 2014	Mar. 31 2015
5	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

6 Test results and Measurement Data

6.1 Antenna requirement:

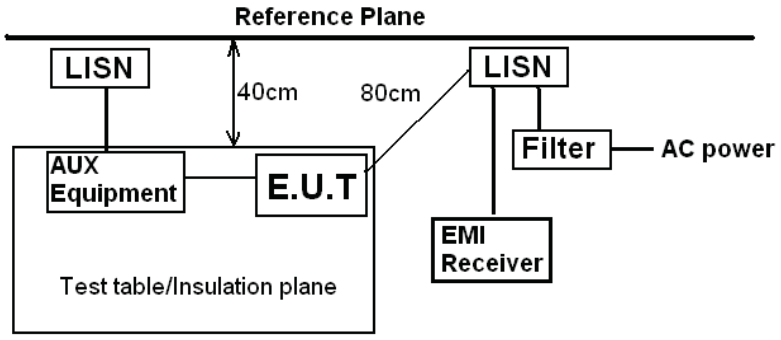
Standard requirement:	FCC Part15 C Section 15.203 /247(c)
15.203 requirement: *An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.* *15.247(c) (1)(i) requirement:* *(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.*	
E.U.T Antenna:	
The antenna is an internal antenna which cannot replace by end-user, the best case gain of the antenna is -5 dBi.	
	

6.2 Conducted Emission

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.4: 2003
Test Frequency Range:	150 kHz to 30 MHz
Class / Severity:	Class B
Receiver setup:	RBW=9 kHz, VBW=30 kHz
Limit:	

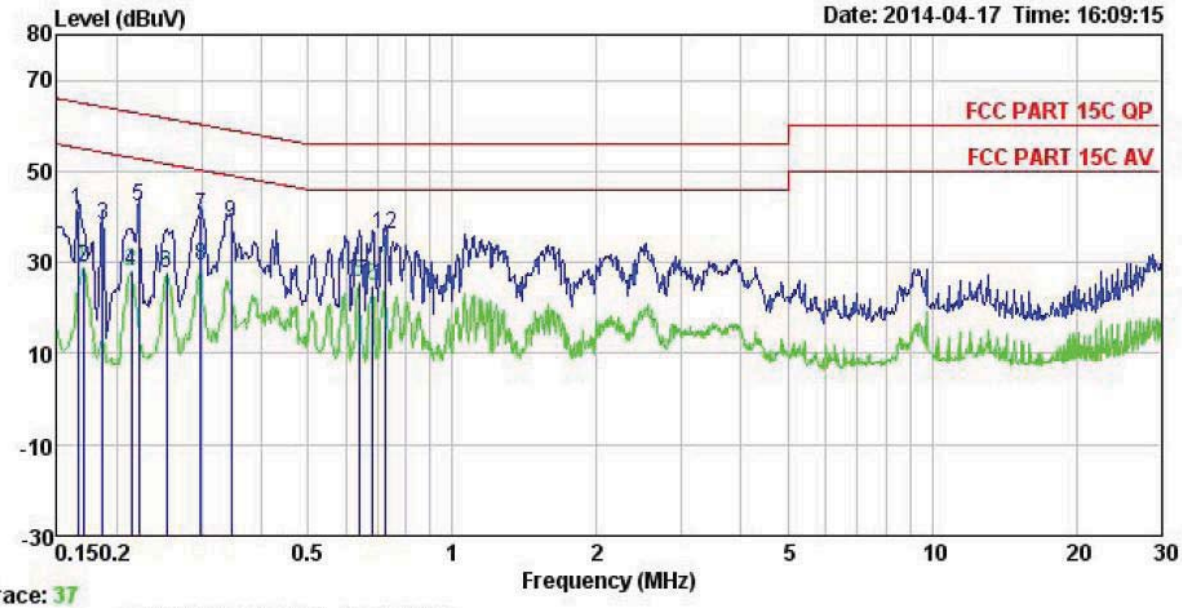
Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

Test procedure	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.), which provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.
Test setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

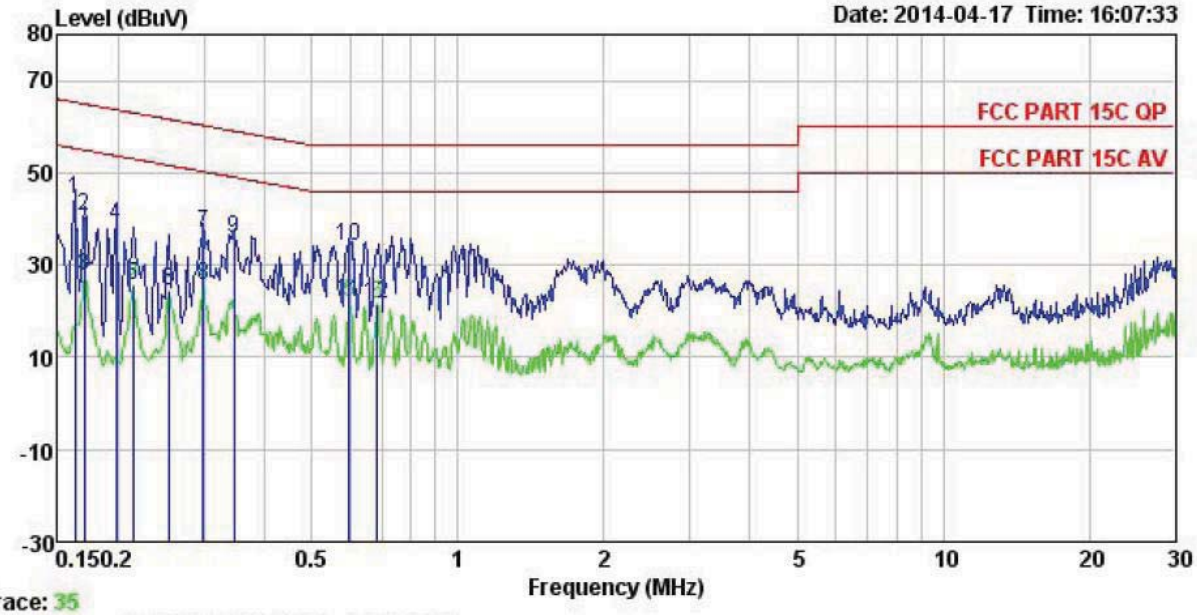
Neutral:



Site : CCIS Conducted Test Site
Condition : FCC PART 15C QP LISN NEUTRAL
Job. no : 199RF
EUT : Wifi Dongle
Model : HW-3F03
Test Mode : WIFI mode
Power Rating : DC5V
Environment : Temp: 23 ℃ Huni:56% Atmos:101KPa
Test Engineer: aaron

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.166	30.34	0.25	10.77	41.36	65.16	-23.80	QP
2	0.170	17.82	0.25	10.77	28.84	54.94	-26.10	Average
3	0.186	27.25	0.25	10.76	38.26	64.20	-25.94	QP
4	0.214	16.94	0.25	10.76	27.95	53.05	-25.10	Average
5	0.222	31.44	0.25	10.75	42.44	62.74	-20.30	QP
6	0.253	16.55	0.26	10.75	27.56	51.64	-24.08	Average
7	0.299	29.14	0.26	10.74	40.14	60.28	-20.14	QP
8	0.299	18.41	0.26	10.74	29.41	50.28	-20.87	Average
9	0.346	27.73	0.25	10.73	38.71	59.05	-20.34	QP
10	0.637	14.62	0.21	10.77	25.60	46.00	-20.40	Average
11	0.683	13.84	0.19	10.77	24.80	46.00	-21.20	Average
12	0.724	25.24	0.18	10.78	36.20	56.00	-19.80	QP

Line:



Trace: 35

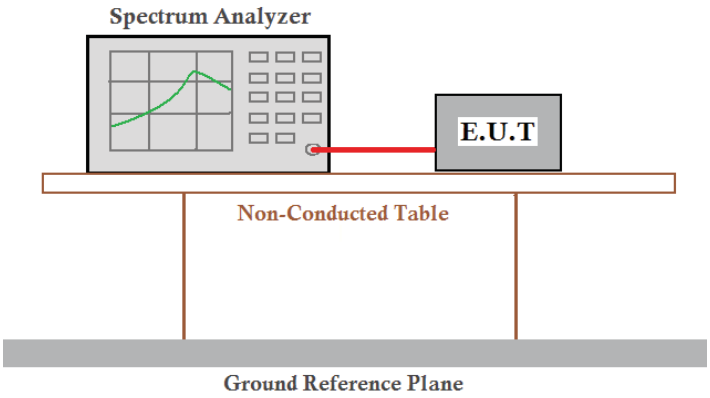
Site : CCIS Conducted Test Site
Condition : FCC PART 15C QP LISN LINE
Job. no : 199RF
EUT : Wifi Dongle
Model : HW-3F03
Test Mode : WIFI MODE
Power Rating : DC5V
Environment : Temp: 23 ℃ Huni:56% Atmos:101KPa
Test Engineer: aaron

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.162	33.19	0.27	10.77	44.23	65.34	-21.11	QP
2	0.170	29.76	0.27	10.77	40.80	64.94	-24.14	QP
3	0.170	16.44	0.27	10.77	27.48	54.94	-27.46	Average
4	0.198	27.48	0.28	10.76	38.52	63.71	-25.19	QP
5	0.214	14.37	0.28	10.76	25.41	53.05	-27.64	Average
6	0.253	13.48	0.27	10.75	24.50	51.64	-27.14	Average
7	0.299	25.82	0.26	10.74	36.82	60.28	-23.46	QP
8	0.299	14.66	0.26	10.74	25.66	50.28	-24.62	Average
9	0.346	24.79	0.27	10.73	35.79	59.05	-23.26	QP
10	0.598	22.93	0.25	10.77	33.95	56.00	-22.05	QP
11	0.598	10.90	0.25	10.77	21.92	46.00	-24.08	Average
12	0.683	10.62	0.22	10.77	21.61	46.00	-24.39	Average

Notes:

1. An initial pre-scan was performed on the live and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level =Receiver Read level + LISN Factor + Cable Loss

6.3 Conducted Output Power

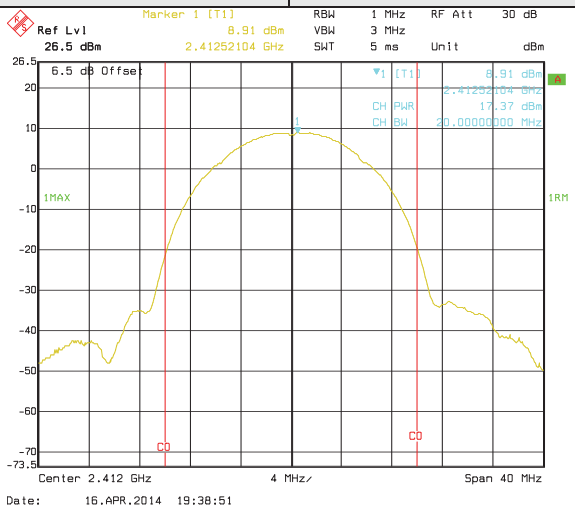
Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.4:2003 and KDB558074
Limit:	30dBm
Test setup:	
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed
Remark:	Test method refer to KDB558074 (DTS Measure Guidance) section 8.2, option 1.

Measurement Data

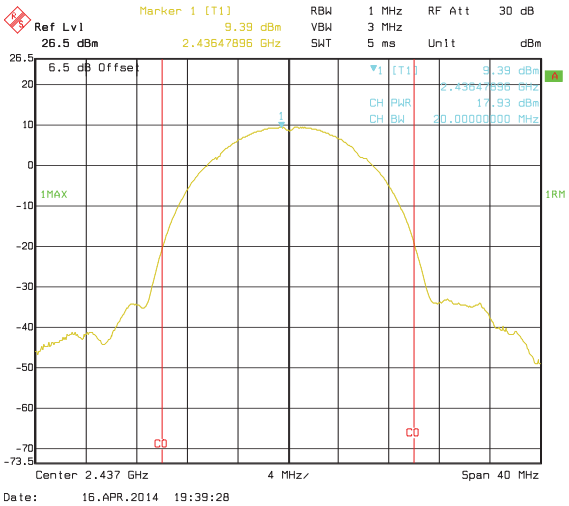
Test CH	Maximum Conducted Output Power (dBm)				Limit(dBm)	Result
	802.11b	802.11g	802.11n(H20)	802.11n(H40)		
Lowest	17.37	15.30	13.05	13.48	30.00	Pass
Middle	17.93	15.23	13.46	13.48		
Highest	17.81	15.18	13.92	13.28		

Test plot as follows:

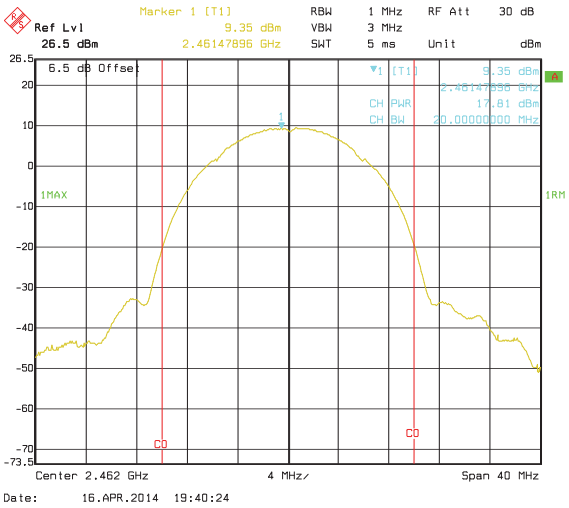
Test mode:	802.11b



Lowest channel

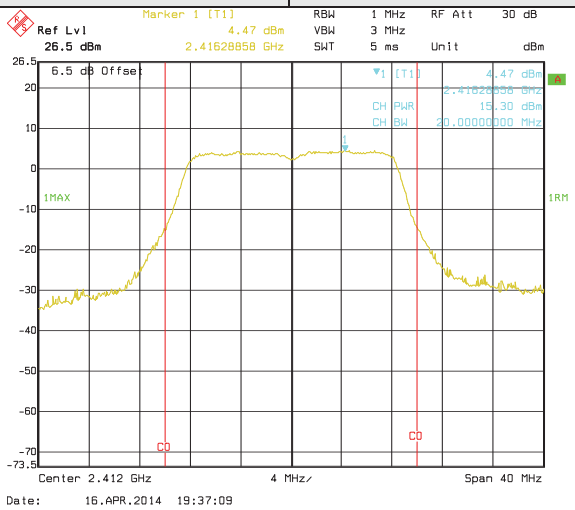


Middle channel

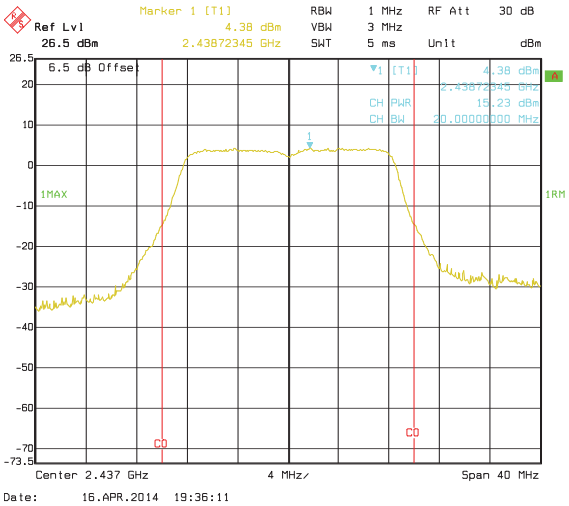


Highest channel

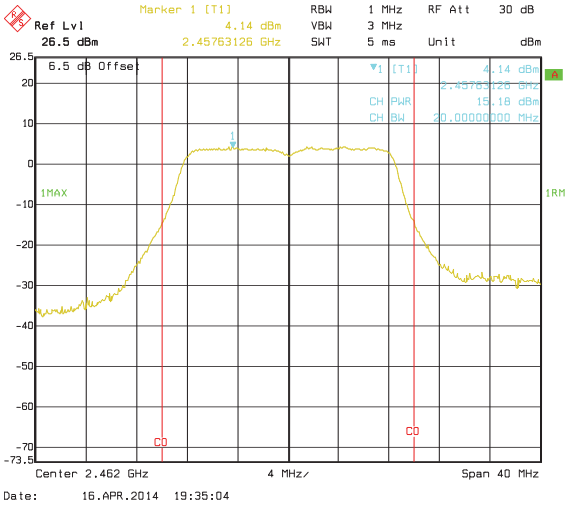
Test mode:	802.11g



Lowest channel

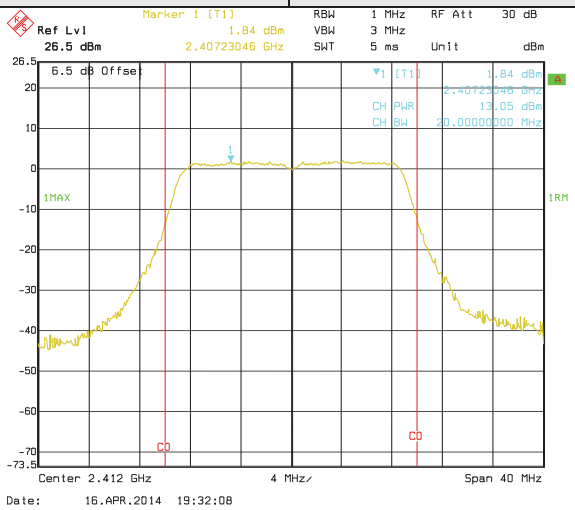


Middle channel

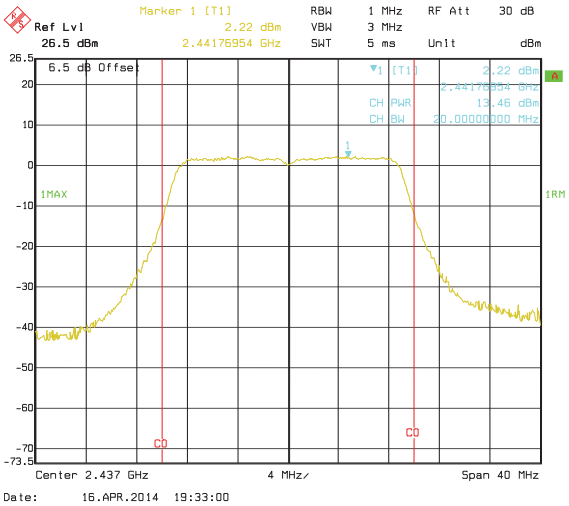


Highest channel

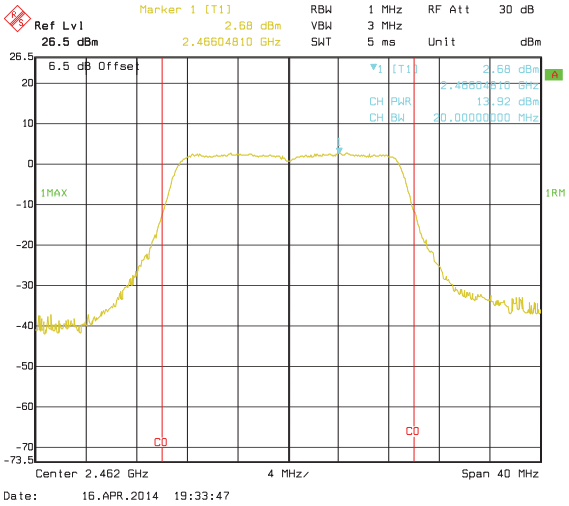
Test mode:	802.11n(H20)



Lowest channel

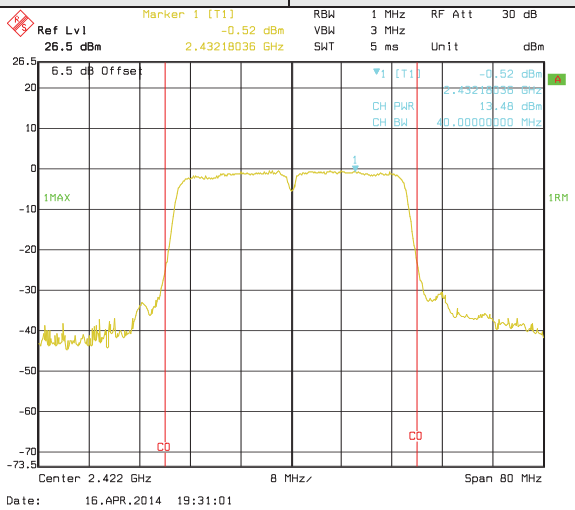


Middle channel

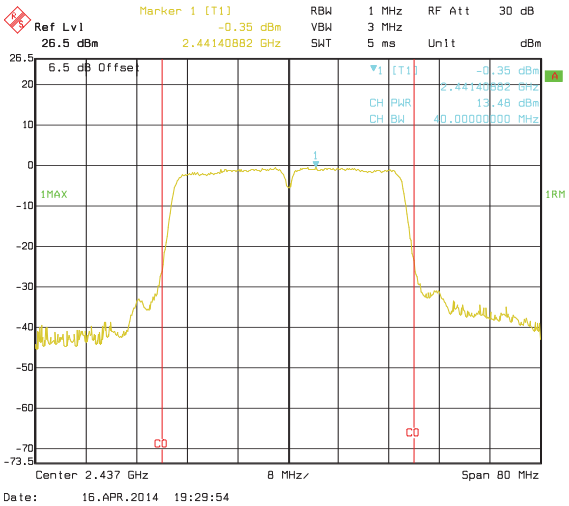


Highest channel

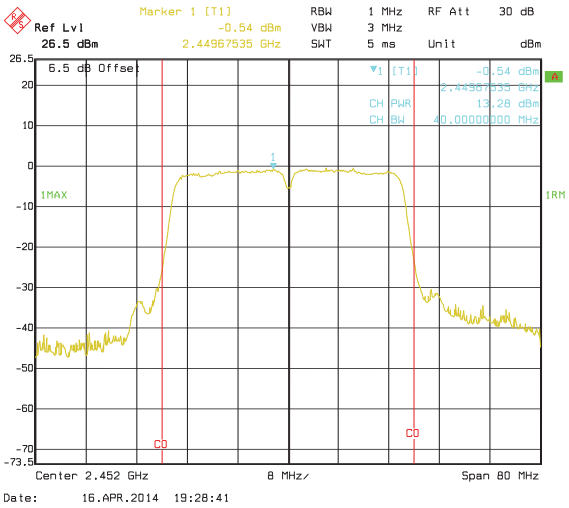
Test mode:	802.11n(H40)



Lowest channel

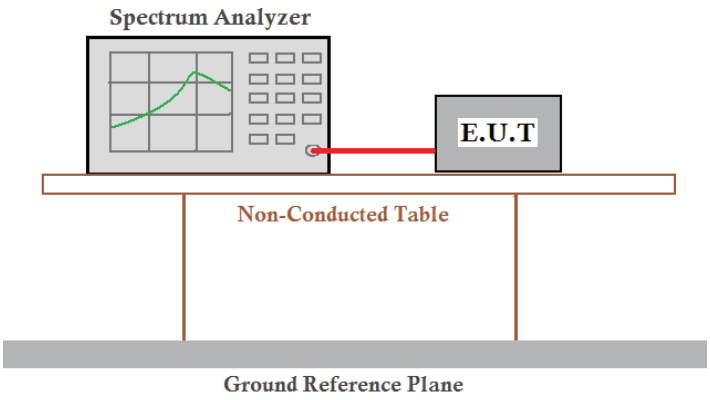


Middle channel



Highest channel

6.4 Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	ANSI C63.4:2003 and KDB558074
Limit:	>500kHz
Test setup:	
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

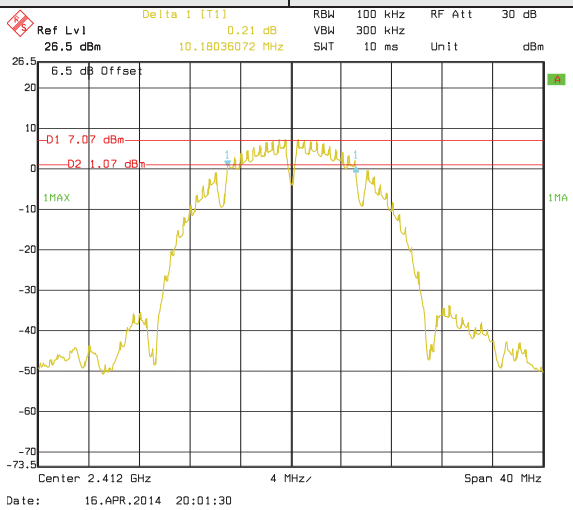
Measurement Data

Test CH	6dB Emission Bandwidth (MHz)				Limit(kHz)	Result
	802.11b	802.11g	802.11n(H20)	802.11n(H40)		
Lowest	10.18	16.67	17.96	36.55	>500	Pass
Middle	10.10	16.67	18.04	36.71		
Highest	10.10	16.67	18.04	36.71		

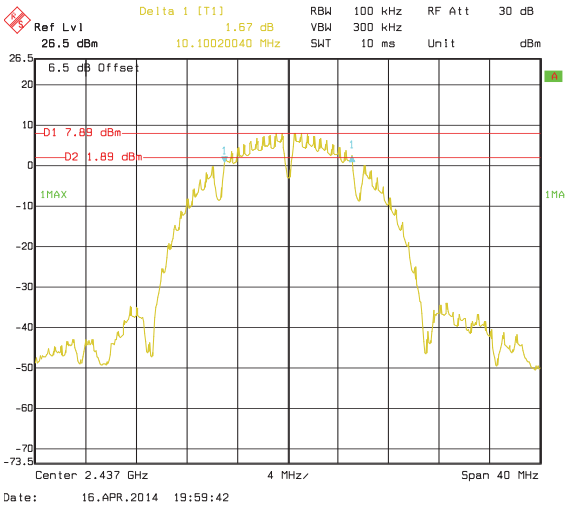
Test CH	99% Occupy Bandwidth (MHz)				Limit(kHz)	Result
	802.11b	802.11g	802.11n(H20)	802.11n(H40)		
Lowest	14.91	16.59	17.80	36.07	N/A	N/A
Middle	14.91	16.59	17.72	36.07		
Highest	14.99	16.59	17.72	36.07		

Test plot as follows:

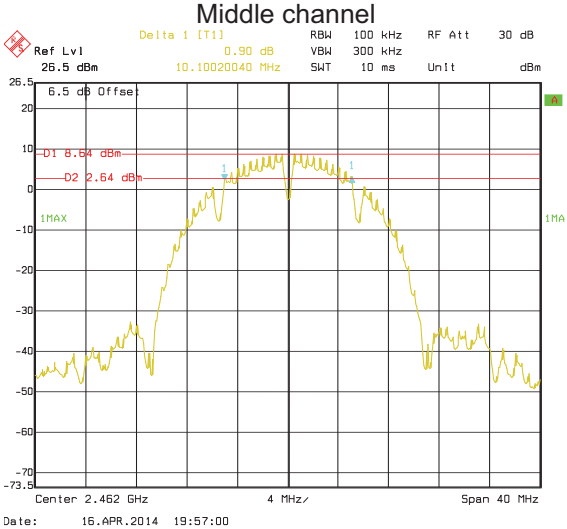
Test mode:6dB OBW	802.11b



Lowest channel

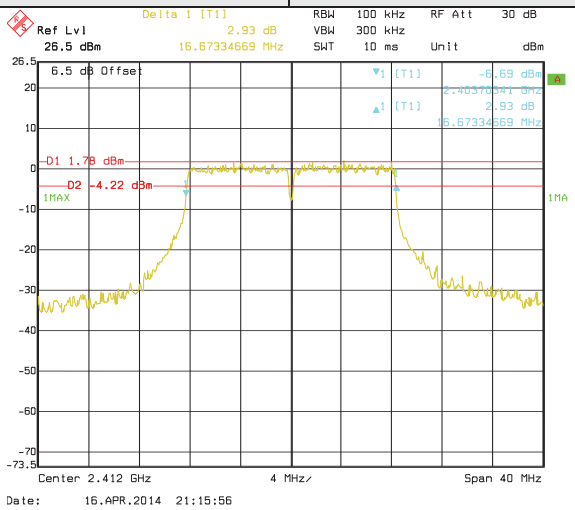


Middle channel

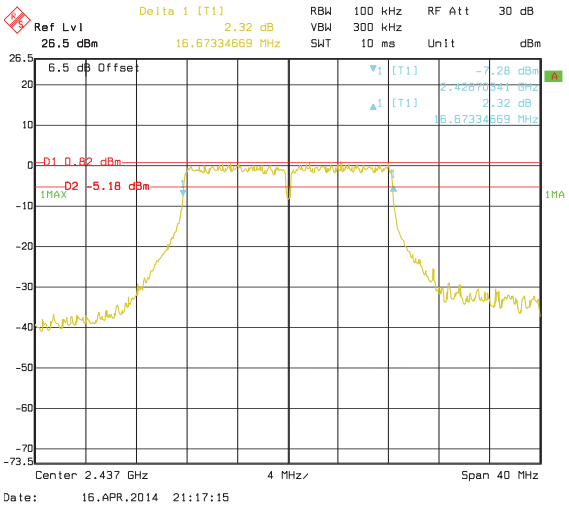


Highest channel

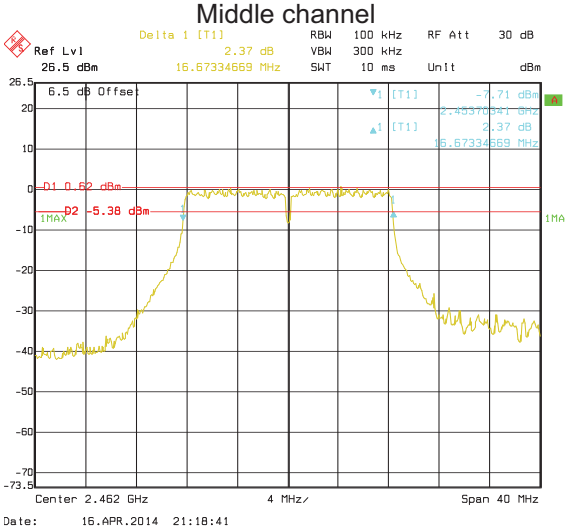
Test mode:6dB OBW	802.11g



Lowest channel

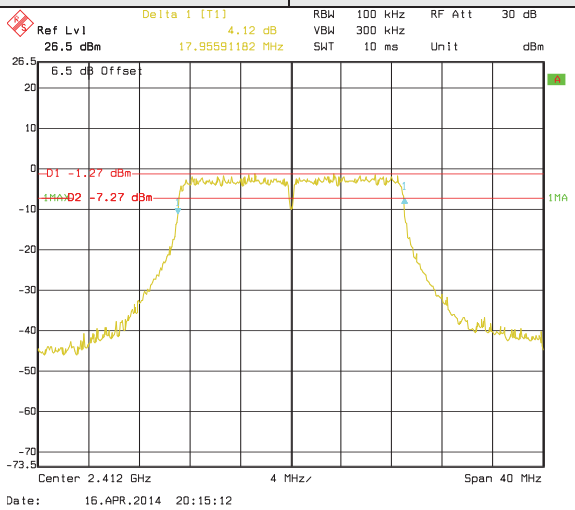


Middle channel

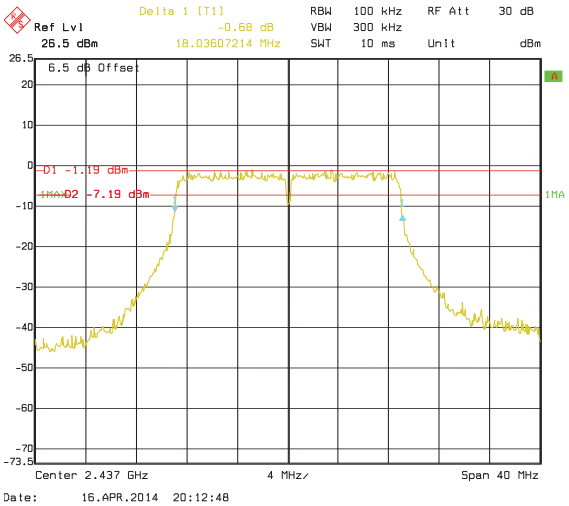


Highest channel

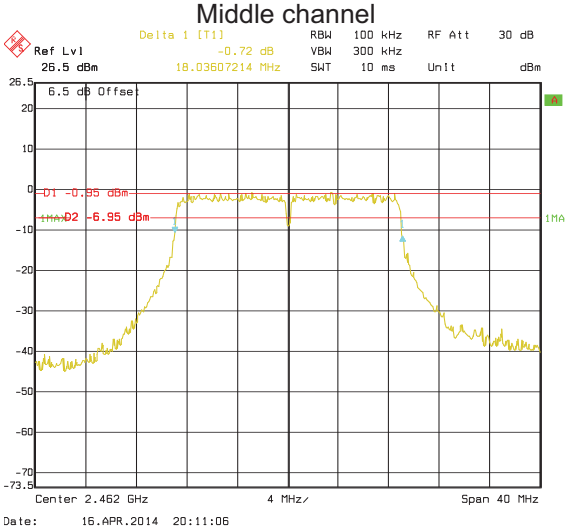
Test mode:6dB OBW	802.11n(H20)



Lowest channel

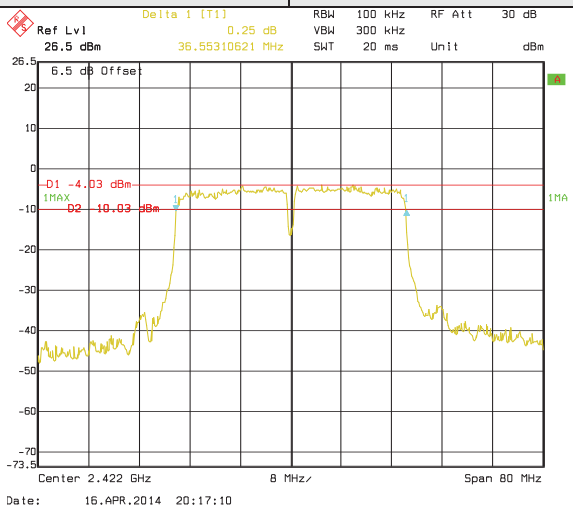


Middle channel

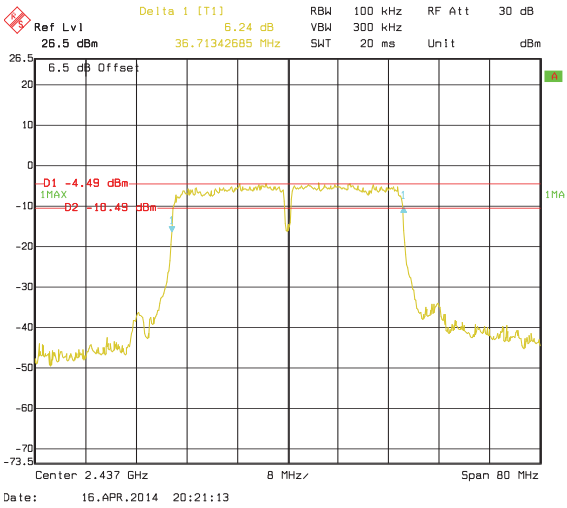


Highest channel

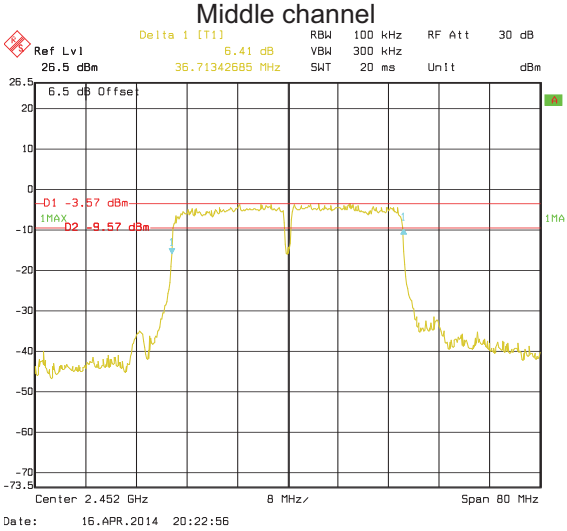
Test mode:6dB OBW	802.11n(H40)



Lowest channel

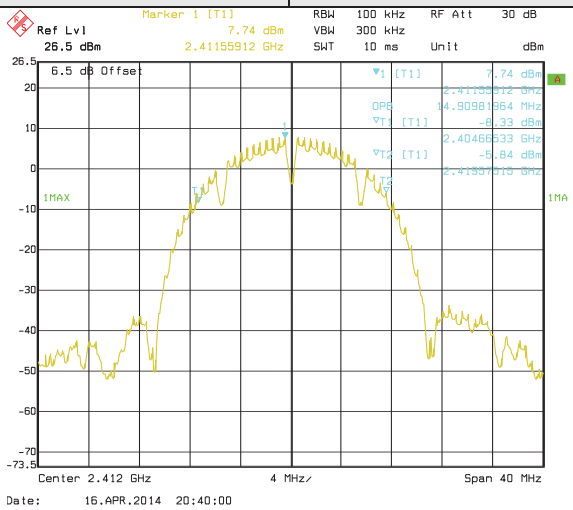


Middle channel

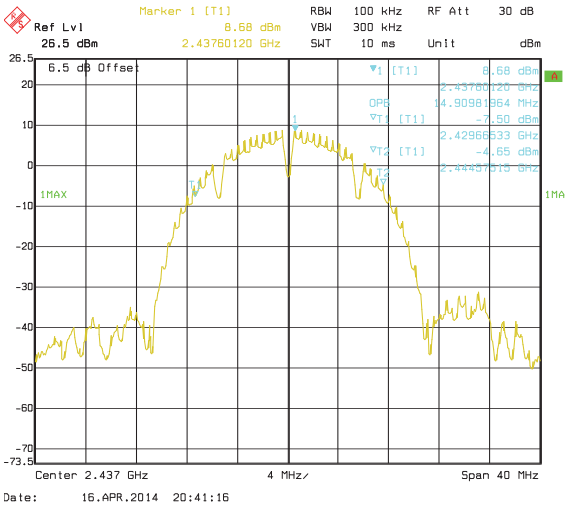


Highest channel

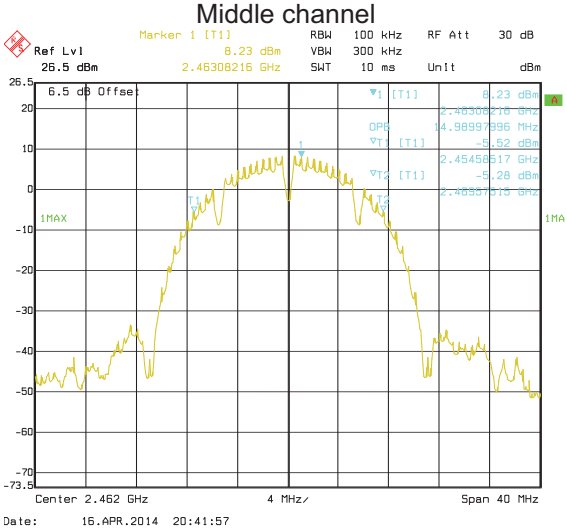
Test mode:99% OBW	802.11b



Lowest channel

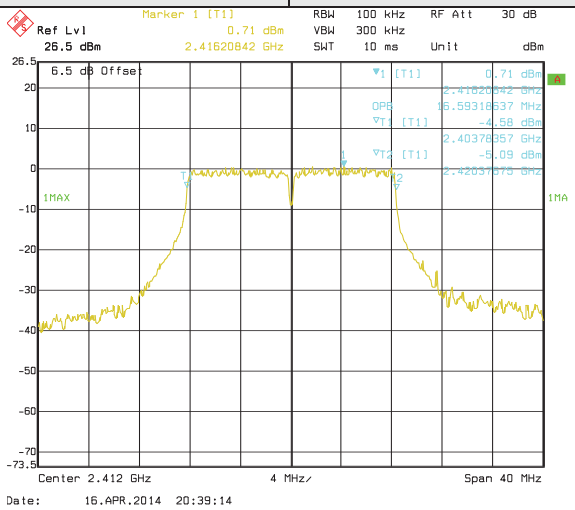


Middle channel

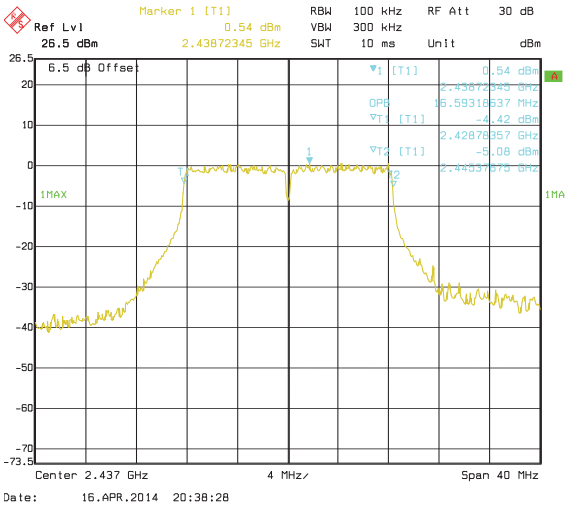


Highest channel

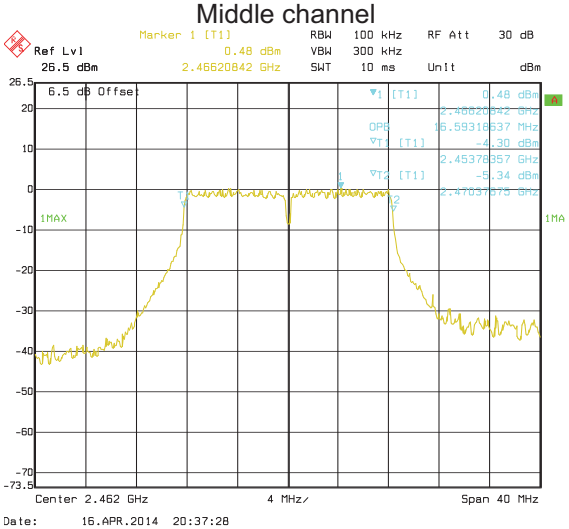
Test mode: 99% OBW	802.11g



Lowest channel

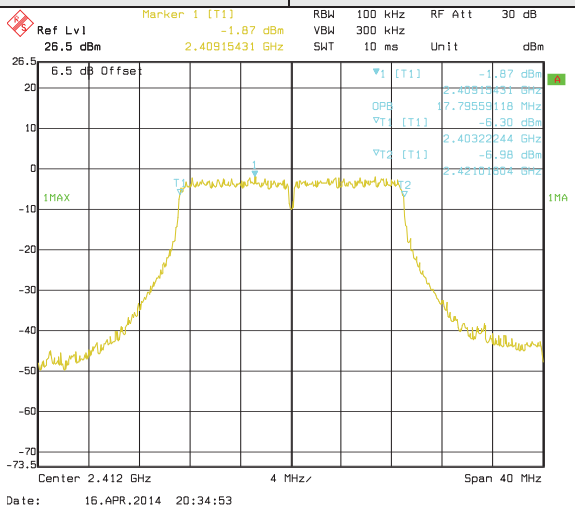


Middle channel

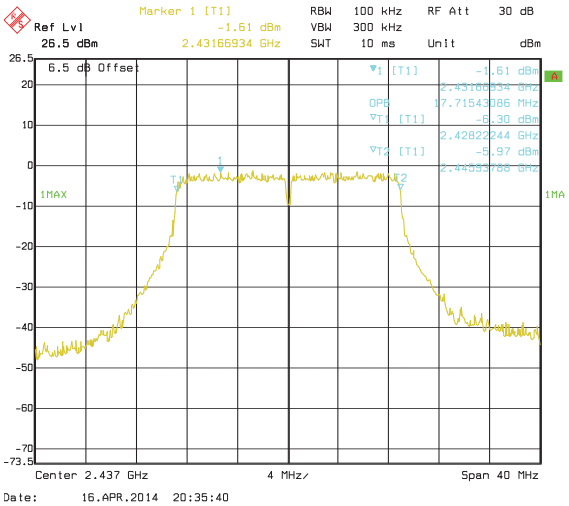


Highest channel

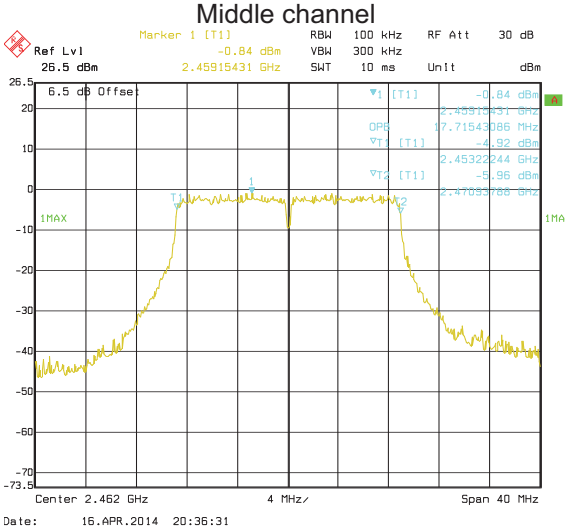
Test mode: 99% OBW	802.11n(H20)



Lowest channel

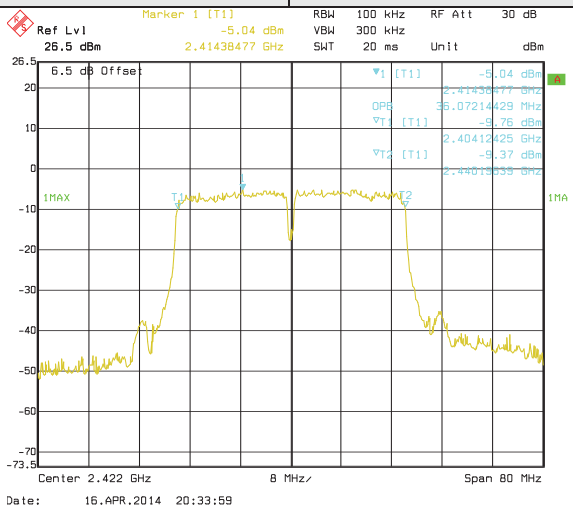


Middle channel

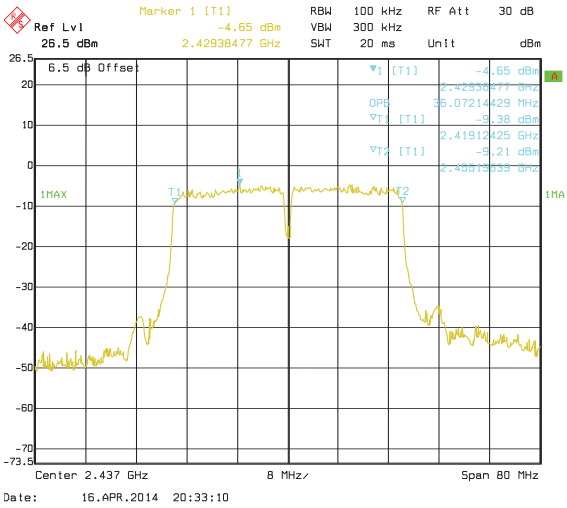


Highest channel

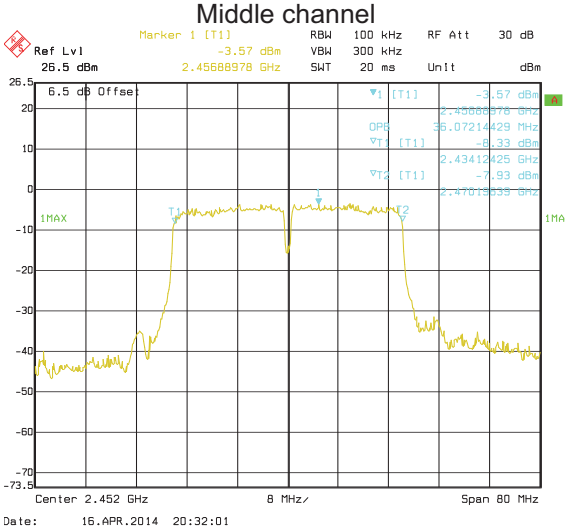
Test mode: 99% OBW	802.11n(H40)



Lowest channel

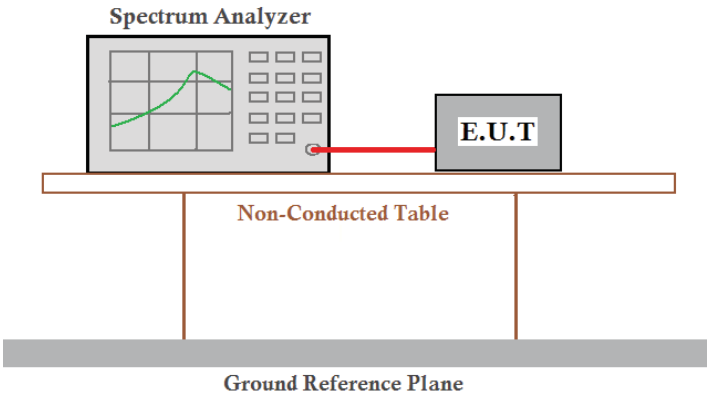


Middle channel



Highest channel

6.5 Power Spectral Density

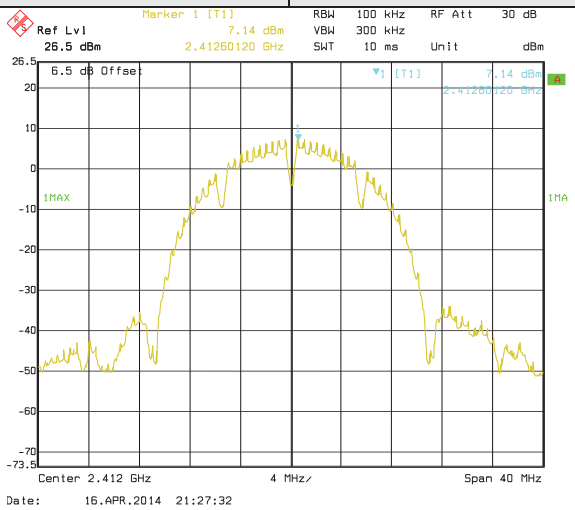
Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	ANSI C63.4:2003 and KDB558074
Limit:	8dBm
Test setup:	
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

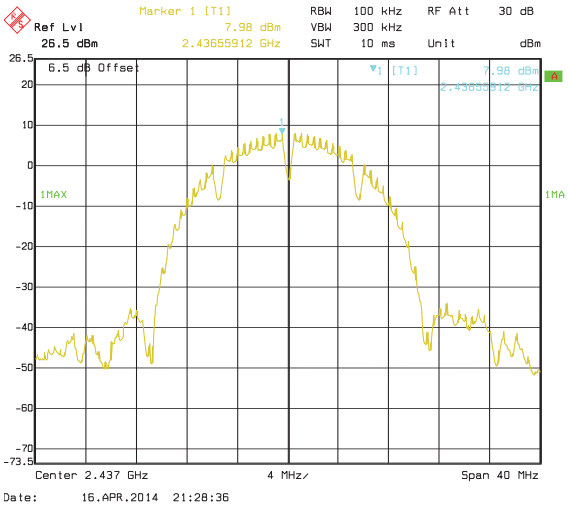
Test CH	Power Spectral Density (dBm)				Limit(dBm)	Result
	802.11b	802.11g	802.11n(H20)	802.11n(H40)		
Lowest	7.14	0.93	-1.68	-4.92	8.00	Pass
Middle	7.98	0.66	-1.36	-4.46		
Highest	7.66	0.52	-0.75	-3.61		

Test plot as follows:

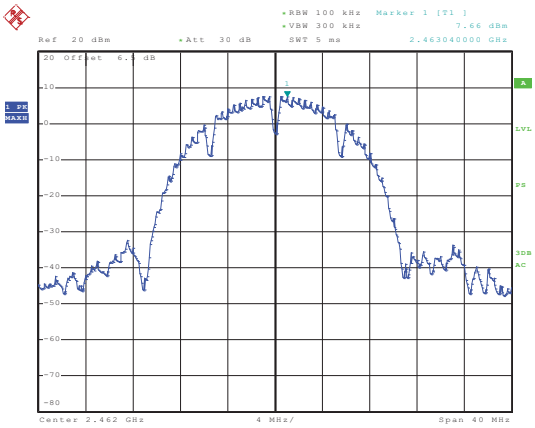
Test mode:	802.11b



Lowest channel

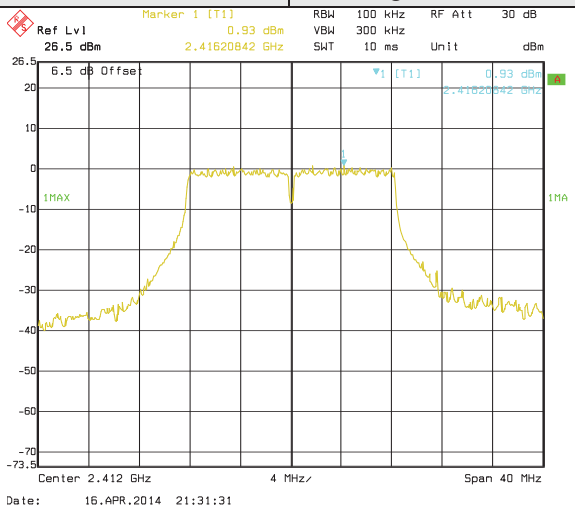


Middle channel

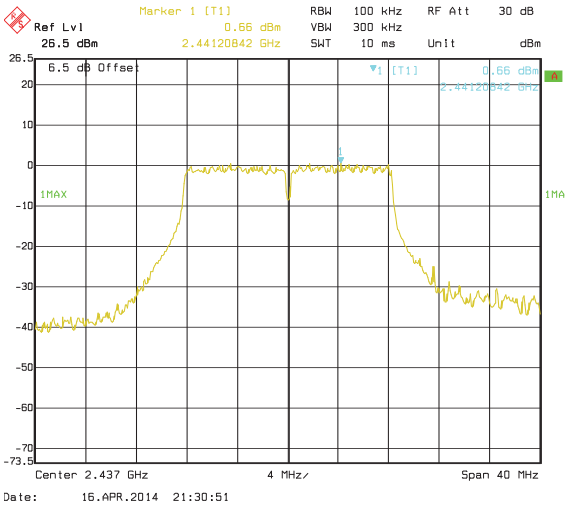


Highest channel

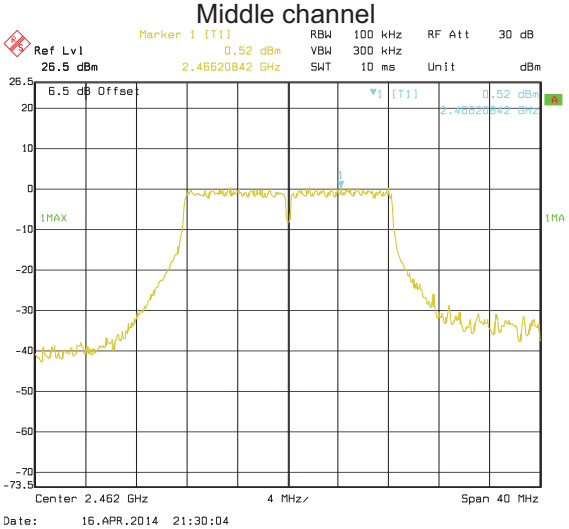
Test mode:	802.11g



Lowest channel

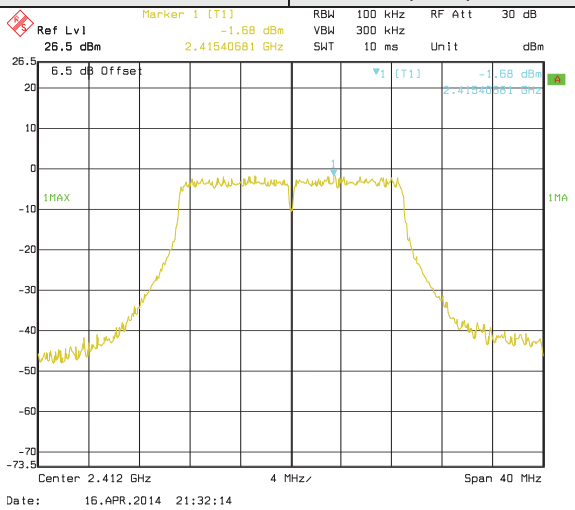


Middle channel

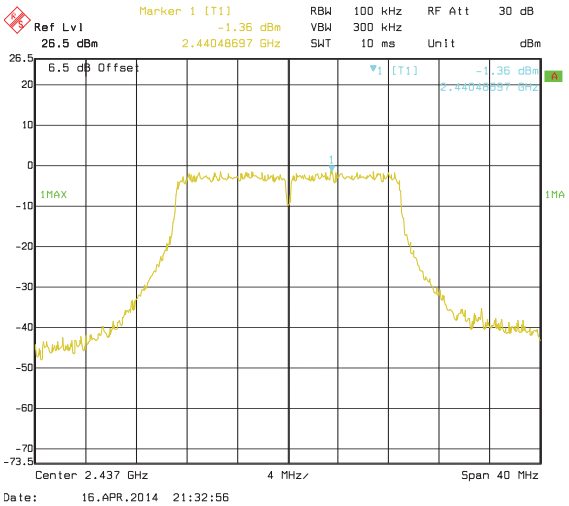


Highest channel

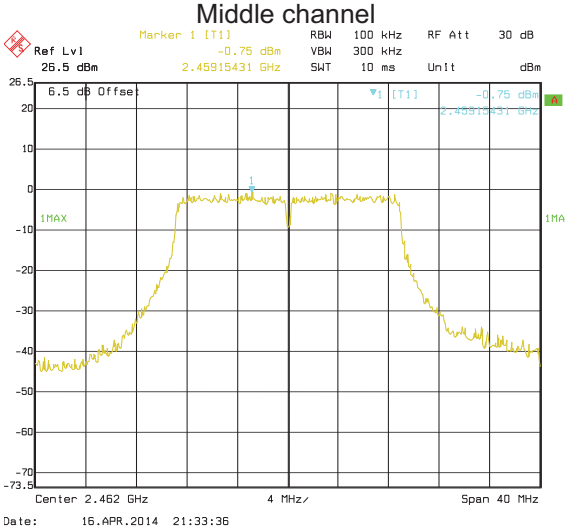
Test mode:	802.11n(H20)



Lowest channel

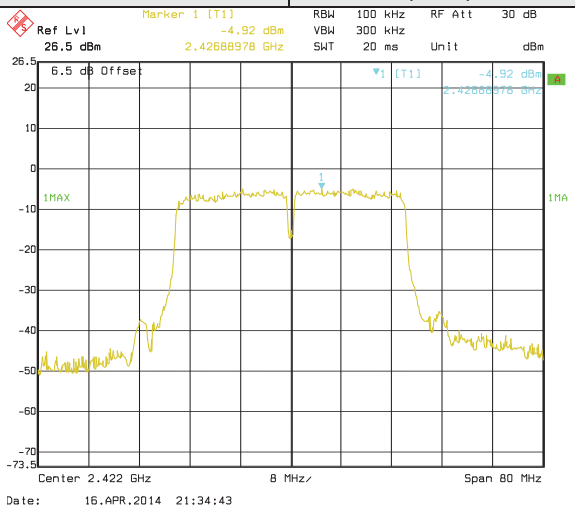


Middle channel

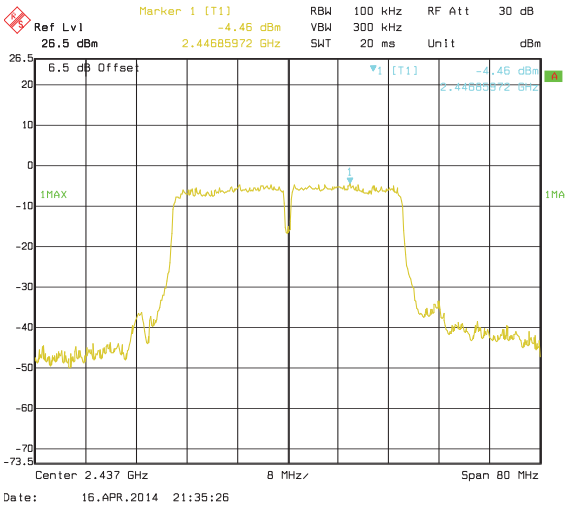


Highest channel

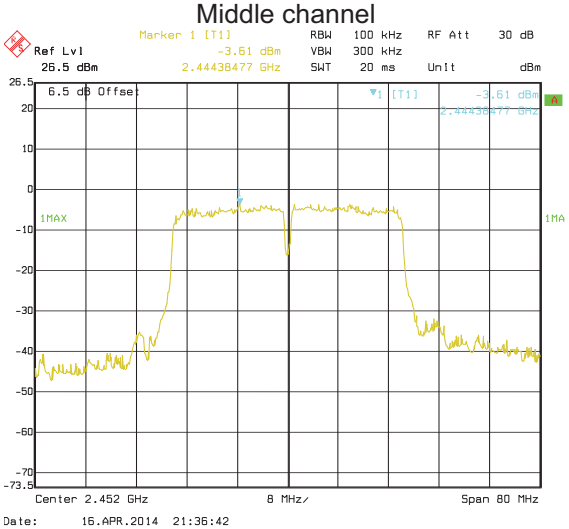
Test mode:	802.11n(H40)



Lowest channel



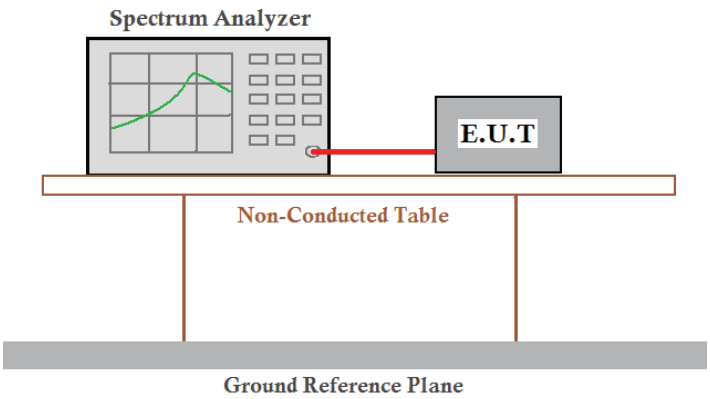
Middle channel



Highest channel

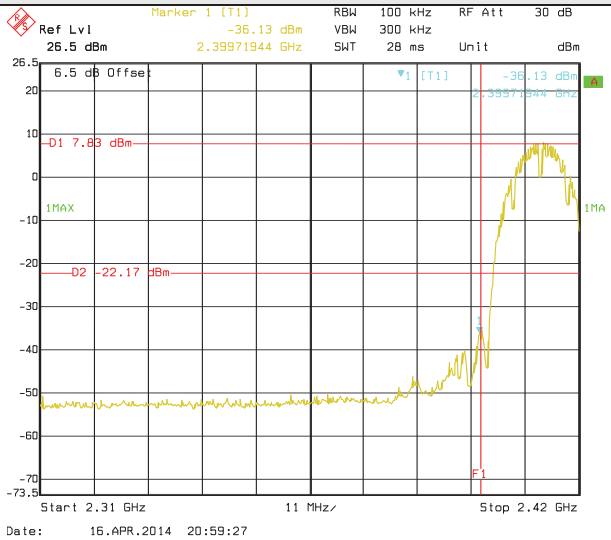
6.6 Band Edge

6.6.1 Conducted Emission Method

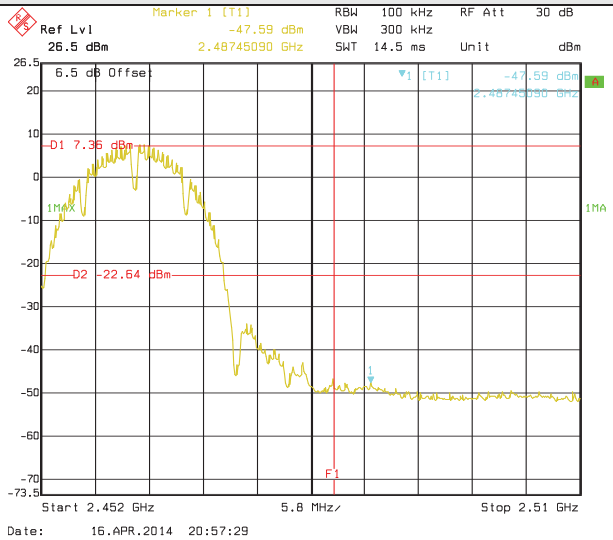
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.4:2003 and KDB558074
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 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.
Test setup:	
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Test plot as follows:

Test mode:	802.11b

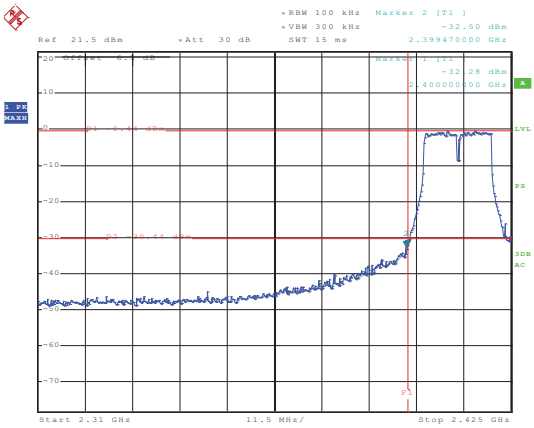


Lowest channel

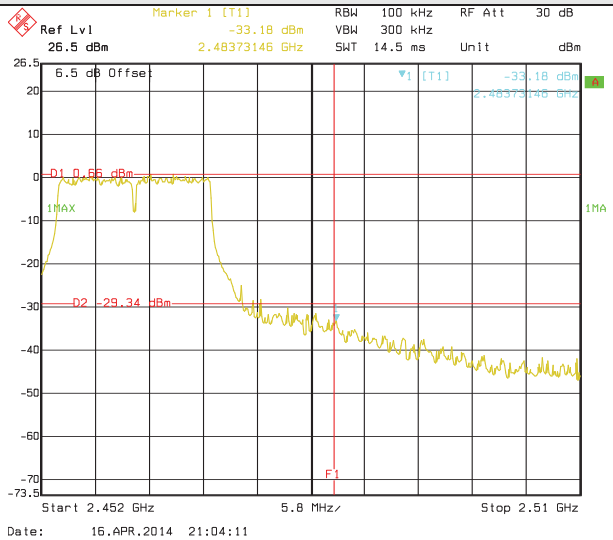


Highest channel

Test mode:	802.11g

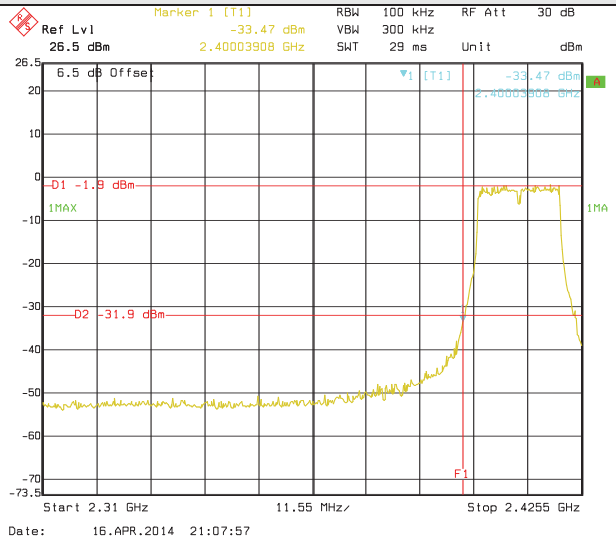


Lowest channel

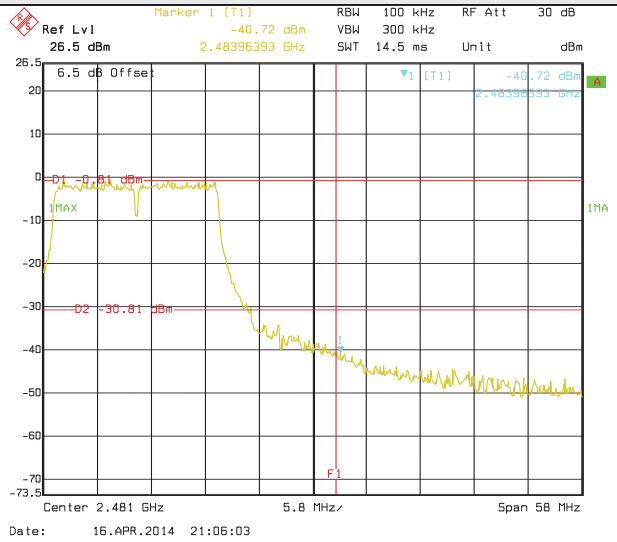


Highest channel

Test mode:	802.11n(H20)

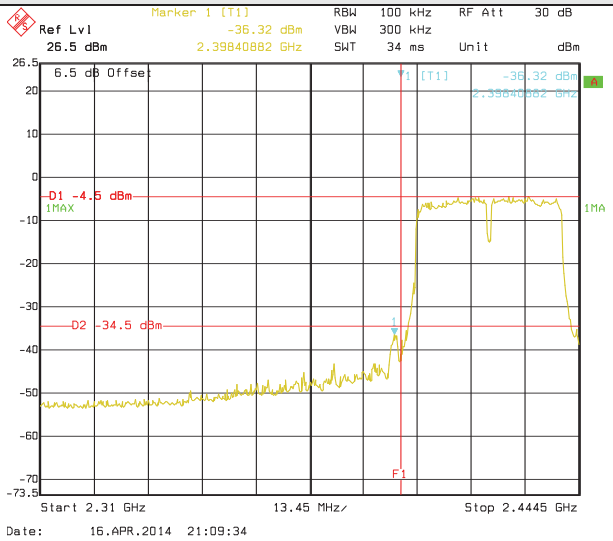


Lowest channel

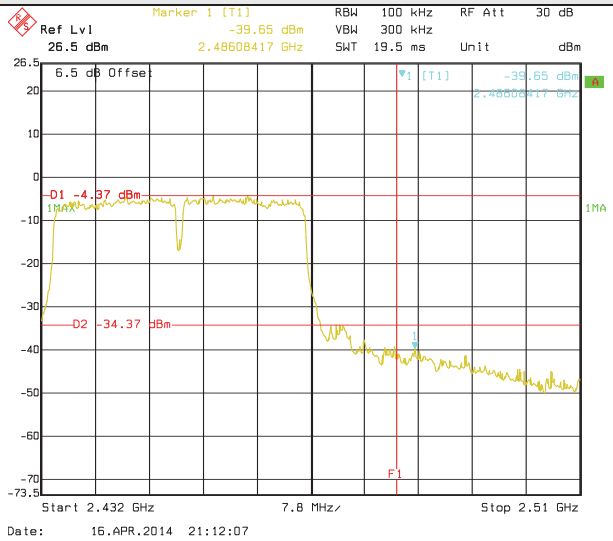


Highest channel

Test mode:	802.11n(H40)



Lowest channel



Highest channel

6.6.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205
Test Method:	ANSI C63.4: 2003
Test Frequency Range:	2.3GHz to 2.5GHz
Test site:	Measurement Distance: 3m
Receiver setup:	

Frequency	Detector	RBW	VBW	Remark
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	Peak	1MHz	10Hz	Average Value

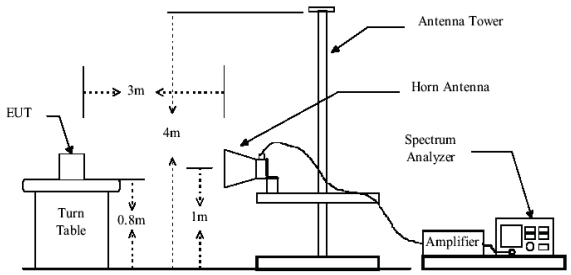
Limit:

Frequency	Limit (dBuV/m @3m)	Remark
Above 1GHz	54.00	Average Value
	74.00	Peak Value

Test Procedure:

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Test setup:

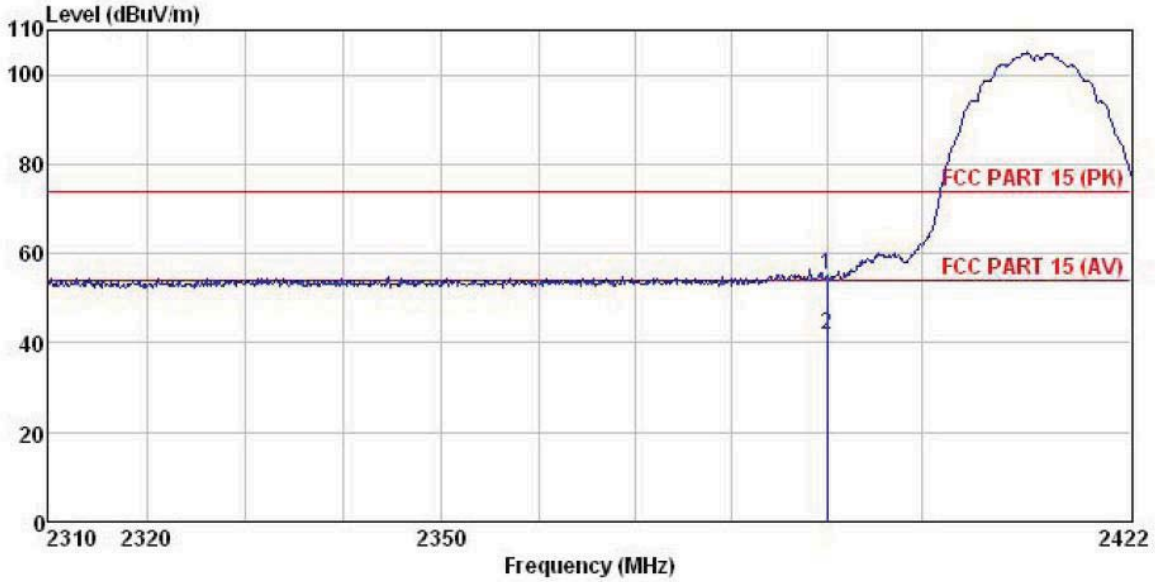


Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

802.11b

Test channel: Lowest

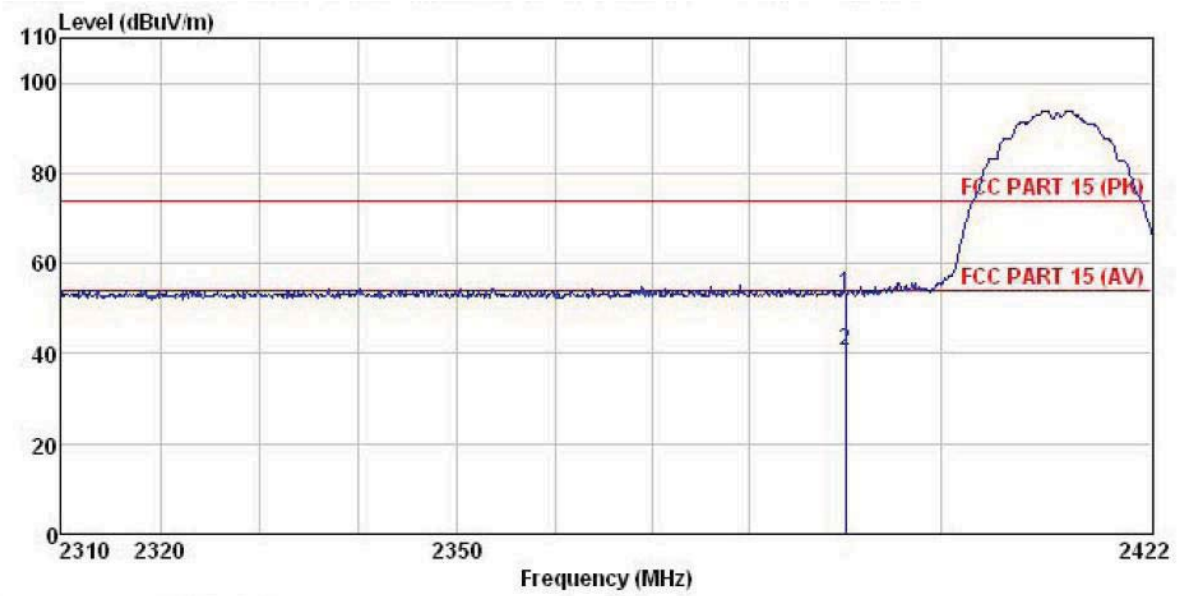
Horizontal:



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) HORIZONTAL
EUT : Wifi Dongle
Model : HW-3F03
Test mode : TX B-L MODE
Power Rating : DC5V
Environment : Temp:25.5°C Huni:55%
Test Engineer: aaron
REMARK :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	21.79	27.58	5.67	0.00	55.04	74.00	-18.96	Peak
2	2390.000	8.59	27.58	5.67	0.00	41.84	54.00	-12.16	Average

Vertical :

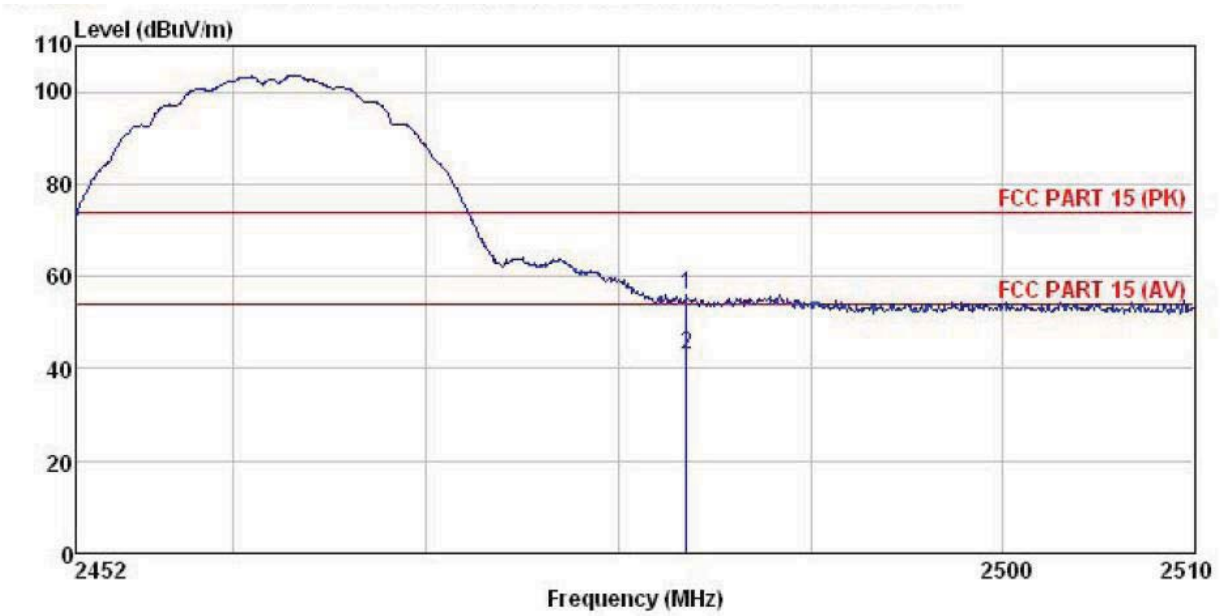


Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) VERTICAL
EUT : Wifi Dongle
Model : HW-3F03
Test mode : TX B-L MODE
Power Rating : DC5V
Environment : Temp:25.5℃ Huni:55%
Test Engineer: aaron
REMARK :

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	19.91	27.58	5.67	0.00	53.16	74.00	-20.84	Peak
2	2390.000	7.44	27.58	5.67	0.00	40.69	54.00	-13.31	Average

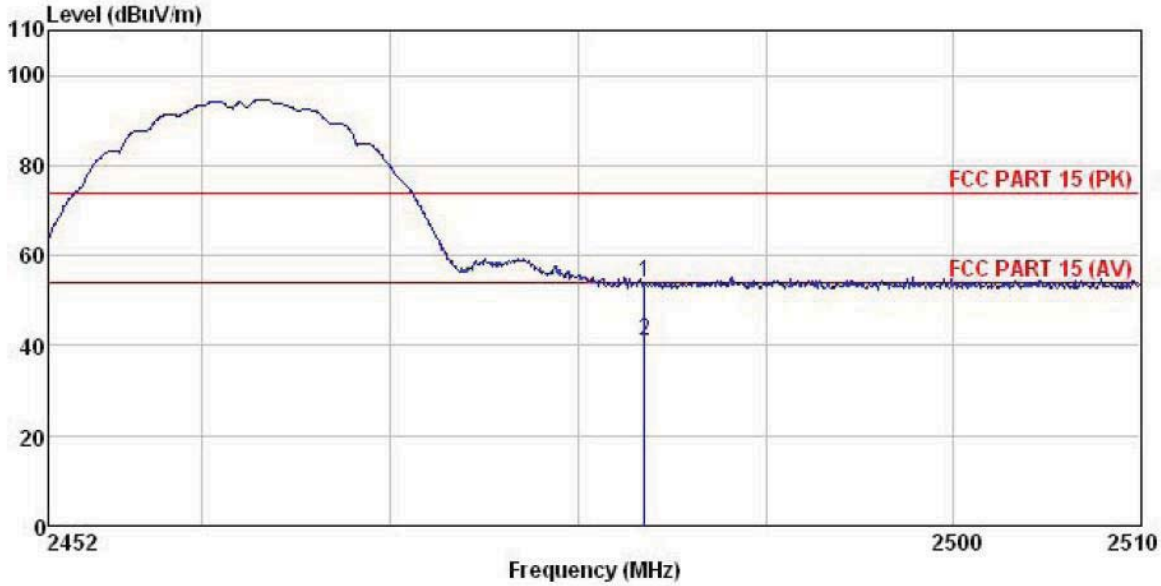
Test channel: Highest

Horizontal:




```
Site          : 3m chamber
Condition     : FCC PART 15 (PK) 3m BBHA9120(1G18) HORIZONTAL
EUT           : Wifi  Dongle
Model         : HW-3F03
Test mode     : TX  B-H  MODE
Power Rating  : DC5V
Environment   : Temp:25.5'C  Huni:55%
Test Engineer: aaron
REMARK        :
                 ReadAntenna  Cable Preamp         Limit   Over
          Freq  Level Factor   Loss Factor  Level   Line  Limit Remark
        --------- ------ ------ ------ ------ ------ ------ ------ ----------
               MHz   dBuV   dB/m     dB     dB dBuV/m dBuV/m     dB
  1    2483.500  22.78  27.52   5.70   0.00  56.00  74.00 -18.00 Peak
  2    2483.500   9.69  27.52   5.70   0.00  42.91  54.00 -11.09 Average
```

Vertical :

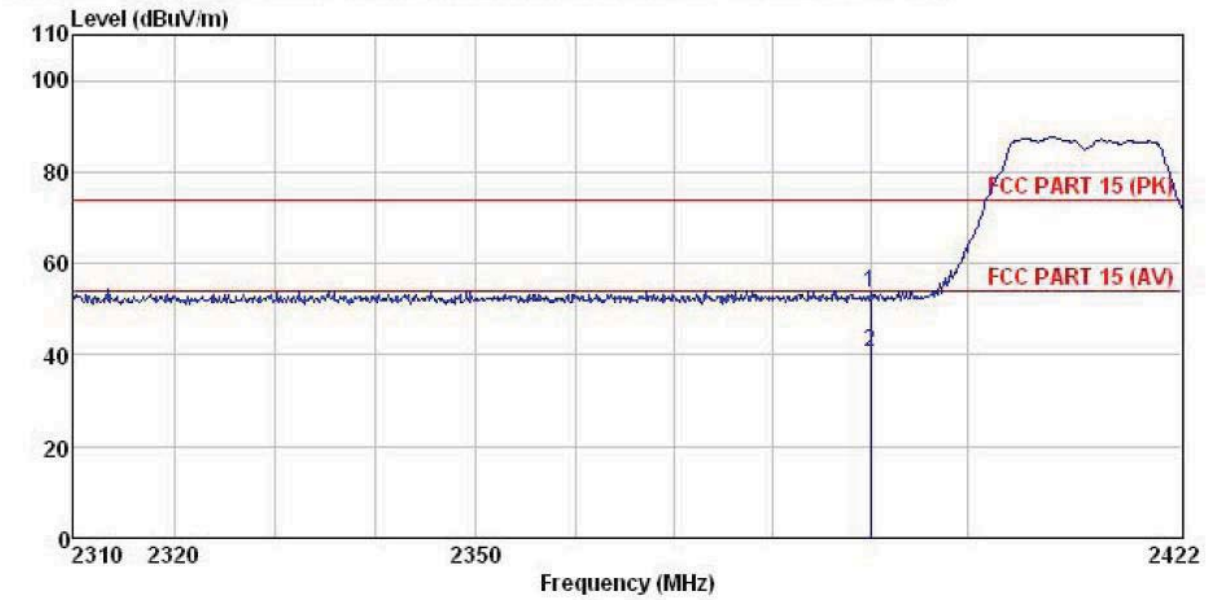


Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) VERTICAL
EUT : Wifi Dongle
Model : HW-3F03
Test mode : TX B-H MODE
Power Rating : DC5V
Environment : Temp:25.5℃ Huni:55%
Test Engineer: aaron
REMARK :

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	20.60	27.52	5.70	0.00	53.82	74.00	-20.18	Peak
2	2483.500	7.87	27.52	5.70	0.00	41.09	54.00	-12.91	Average

802.11g
Test channel: Lowest

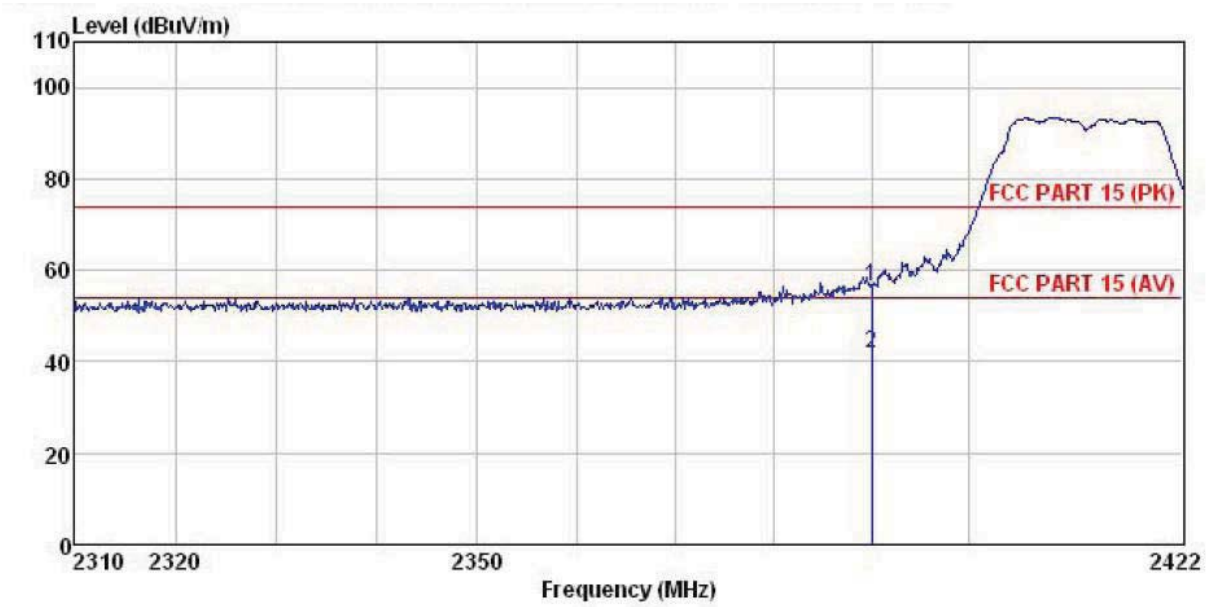
Horizontal :



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) HORIZONTAL
EUT : Wifi Dongle
Model : HW-3F03
Test mode : TX G-L MODE
Power Rating : DC5V
Environment : Temp:25.5'C Huni:55%
Test Engineer: aaron
REMARK :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	20.27	27.58	5.67	0.00	53.52	74.00	-20.48	Peak
2	2390.000	7.14	27.58	5.67	0.00	40.39	54.00	-13.61	Average

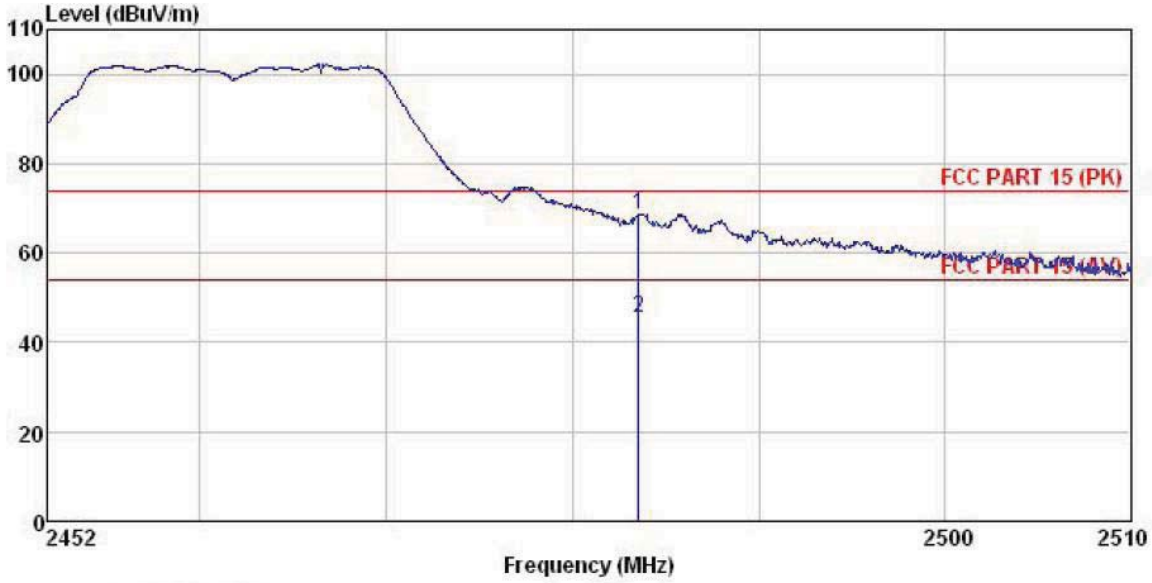
Vertical :



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) VERTICAL
EUT : Wifi Dongle
Model : HW-3F03
Test mode : TX G-L MODE
Power Rating : DC5V
Environment : Temp:25.5℃ Huni:55%
Test Engineer: aaron
REMARK :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	23.35	27.58	5.67	0.00	56.60	74.00	-17.40	Peak
2	2390.000	8.60	27.58	5.67	0.00	41.85	54.00	-12.15	Average

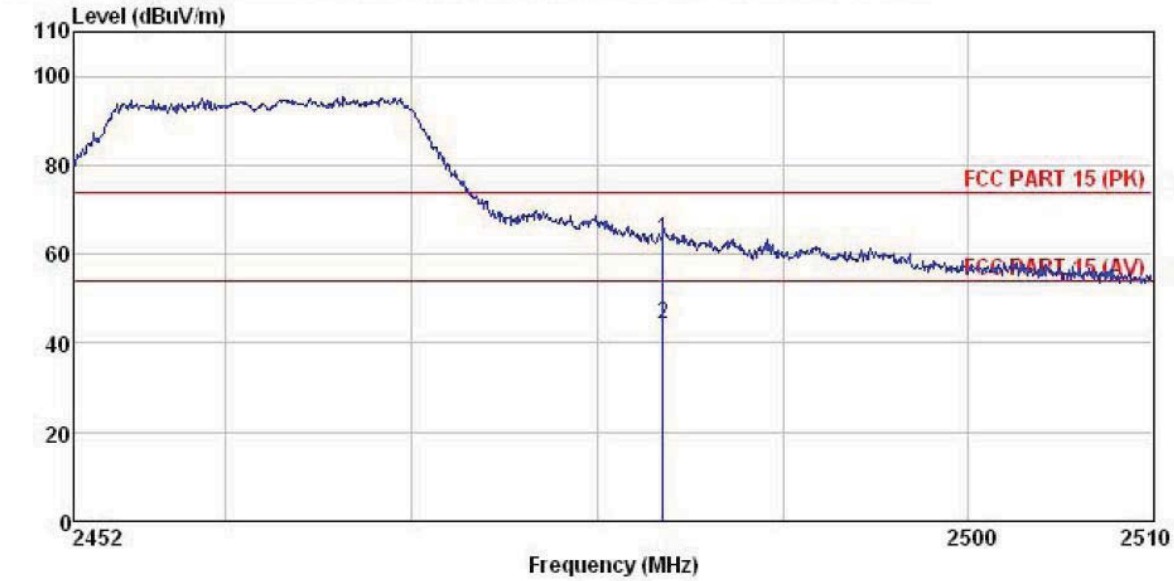
Test channel: Highest



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) HORIZONTAL
EUT : Wifi Dongle
Model : HW-3F03
Test mode : TX G-H MODE
Power Rating : DC5V
Environment : Temp:25.5℃ Huni:55%
Test Engineer: aaron
REMARK :

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	35.40	27.52	5.70	0.00	68.62	74.00	-5.38	Peak
2	2483.500	12.41	27.52	5.70	0.00	45.63	54.00	-8.37	Average

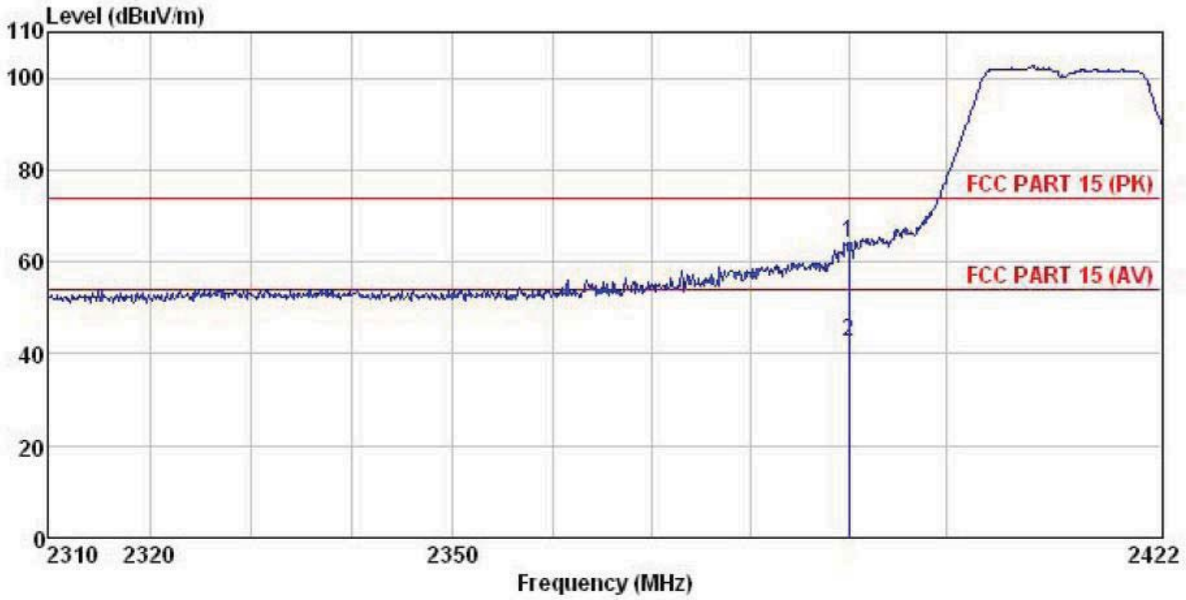
Vertical :



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) VERTICAL
EUT : Wifi Dongle
Model : HW-3F03
Test mode : TX G-H MODE
Power Rating : DC5V
Environment : Temp:25.5℃ Huni:55%
Test Engineer: aaron
REMARK :

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	30.20	27.52	5.70	0.00	63.42	74.00	-10.58	Peak
2	2483.500	10.95	27.52	5.70	0.00	44.17	54.00	-9.83	Average

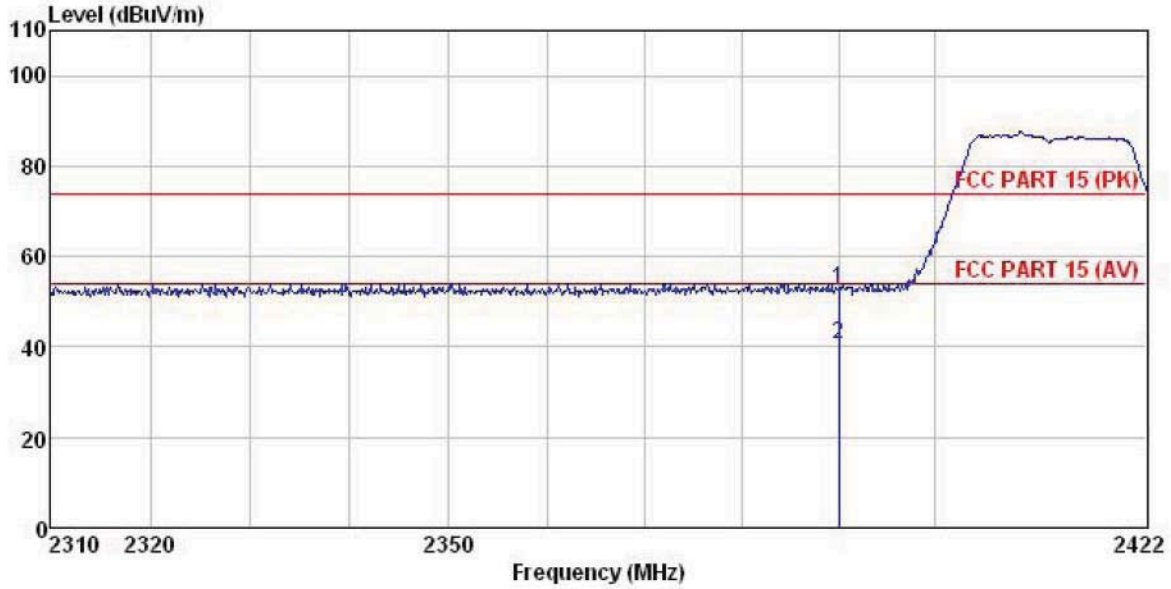
802.11n (H20)
Test channel: Lowest
Horizontal :



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) HORIZONTAL
EUT : Wifi Dongle
Model : HW-3F03
Test mode : TX N20-L MODE
Power Rating : DC5V
Environment : Temp:25.5℃ Huni:55%
Test Engineer: aaron
REMARK :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	30.70	27.58	5.67	0.00	63.95	74.00	-10.05	Peak
2	2390.000	9.50	27.58	5.67	0.00	42.75	54.00	-11.25	Average

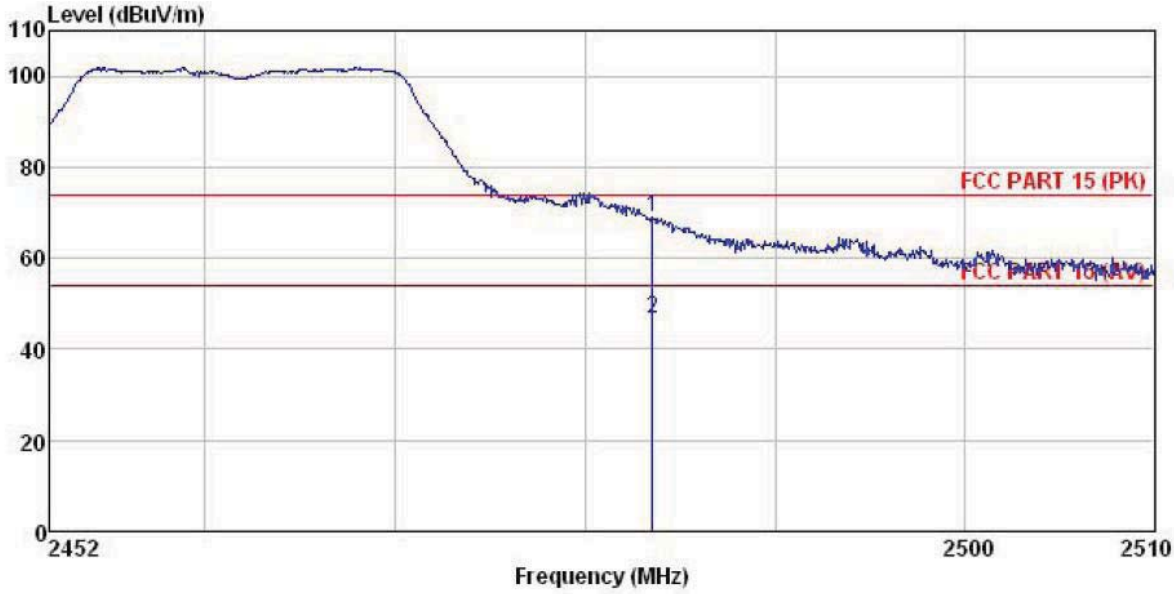
Vertical :



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) VERTICAL
EUT : Wifi Dongle
Model : HW-3F03
Test mode : TX N20-L MODE
Power Rating : DC5V
Environment : Temp:25.5℃ Huni:55%
Test Engineer: aaron
REMARK :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	19.46	27.58	5.67	0.00	52.71	74.00	-21.29	Peak
2	2390.000	7.40	27.58	5.67	0.00	40.65	54.00	-13.35	Average

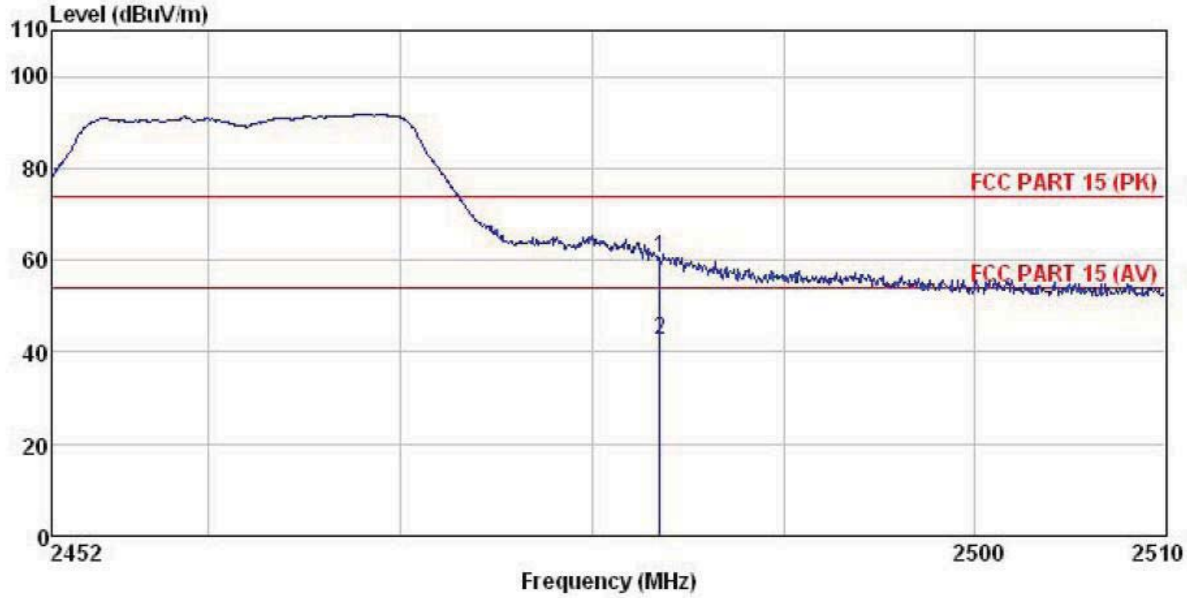
Test channel: Highest
Horizontal :



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) HORIZONTAL
EUT : Wifi Dongle
Model : HW-3F03
Test mode : TX N20-H MODE
Power Rating : DC5V
Environment : Temp:25.5℃ Huni:55%
Test Engineer: aaron
REMARK :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	35.74	27.52	5.70	0.00	68.96	74.00	-5.04	Peak
2	2483.500	13.42	27.52	5.70	0.00	46.64	54.00	-7.36	Average

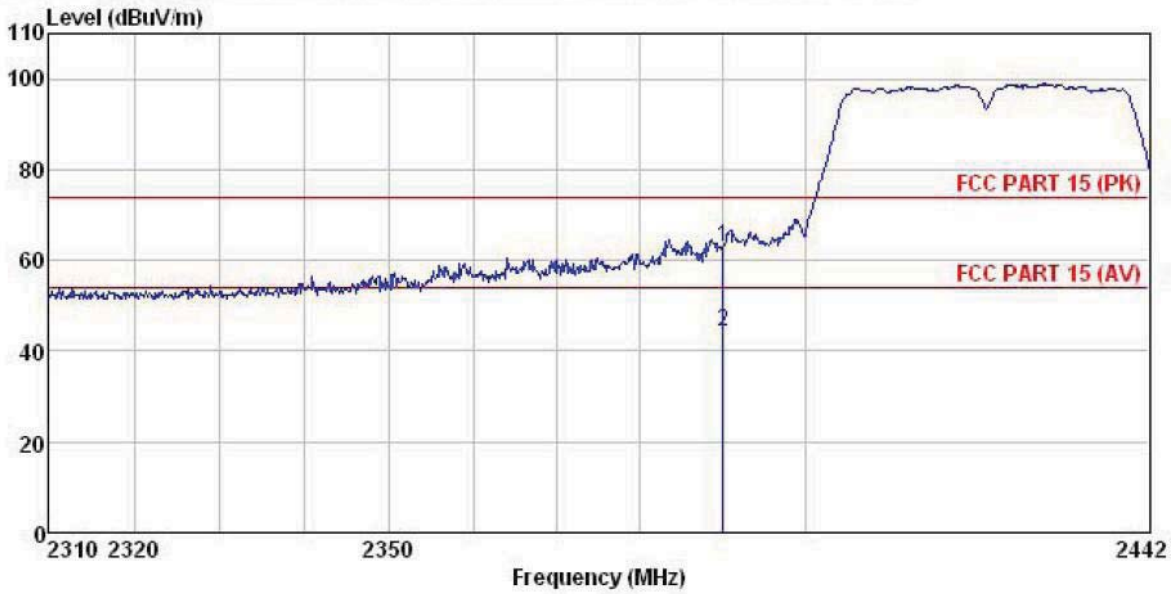
Vertical :



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) VERTICAL
EUT : Wifi Dongle
Model : HW-3F03
Test mode : TX N20-H MODE
Power Rating : DC5V
Environment : Temp:25.5°C Huni:55%
Test Engineer: aaron
REMARK :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	27.38	27.52	5.70	0.00	60.60	74.00	-13.40	Peak
2	2483.500	9.28	27.52	5.70	0.00	42.50	54.00	-11.50	Average

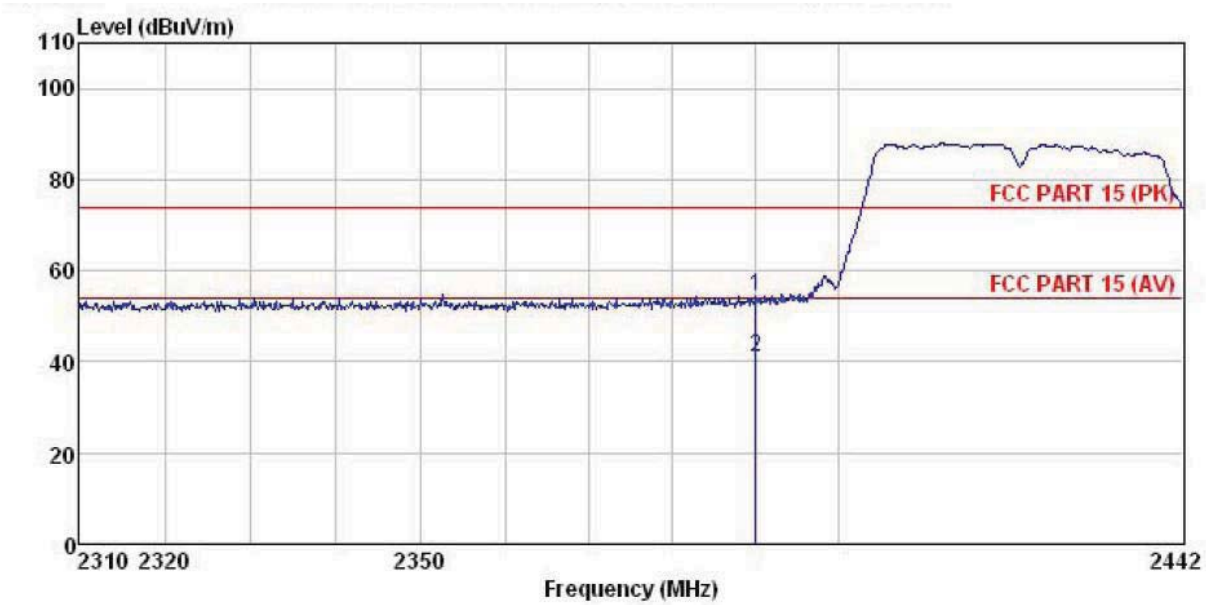
802.11n (H40)
Test channel: Lowest
Horizontal :



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) HORIZONTAL
EUT : Wifi Dongle
Model : HW-3F03
Test mode : TX N40-L MODE
Power Rating : DC5V
Environment : Temp:25.5°C Huni:55%
Test Engineer: aaron
REMARK :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	29.65	27.58	5.67	0.00	62.90	74.00	-11.10	Peak
2	2390.000	10.98	27.58	5.67	0.00	44.23	54.00	-9.77	Average

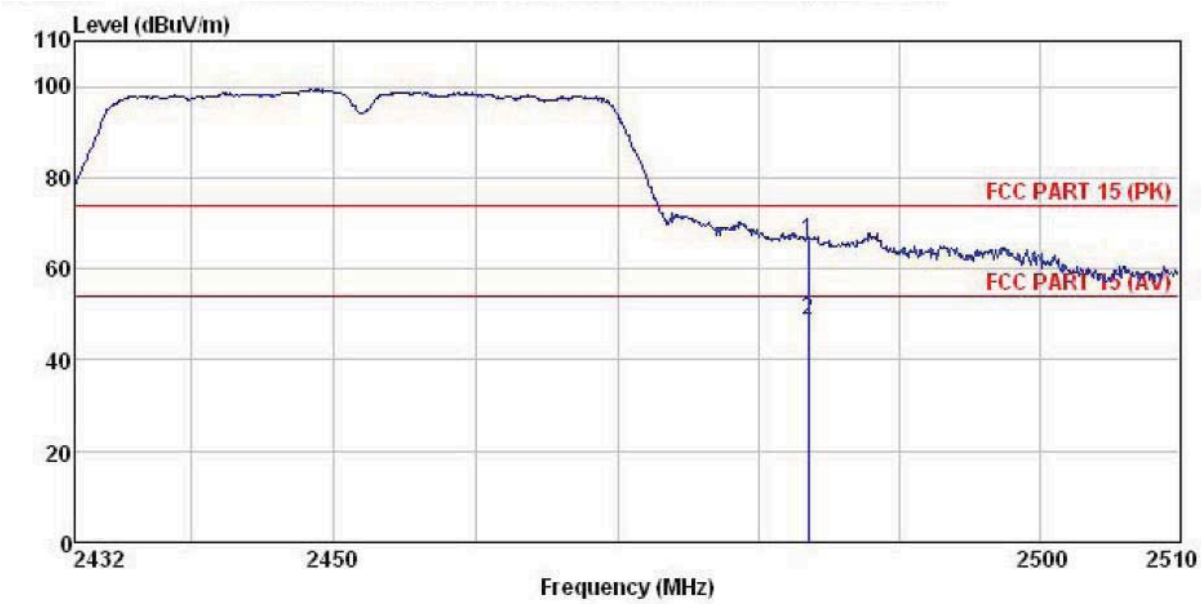
Vertical :



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) VERTICAL
EUT : Wifi Dongle
Model : HW-3F03
Test mode : TX N40-L MODE
Power Rating : DC5V
Environment : Temp:25.5℃ Huni:55%
Test Engineer: aaron
REMARK :

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2390.000	21.01	27.58	5.67	0.00	54.26	74.00	-19.74	Peak
2	2390.000	7.67	27.58	5.67	0.00	40.92	54.00	-13.08	Average

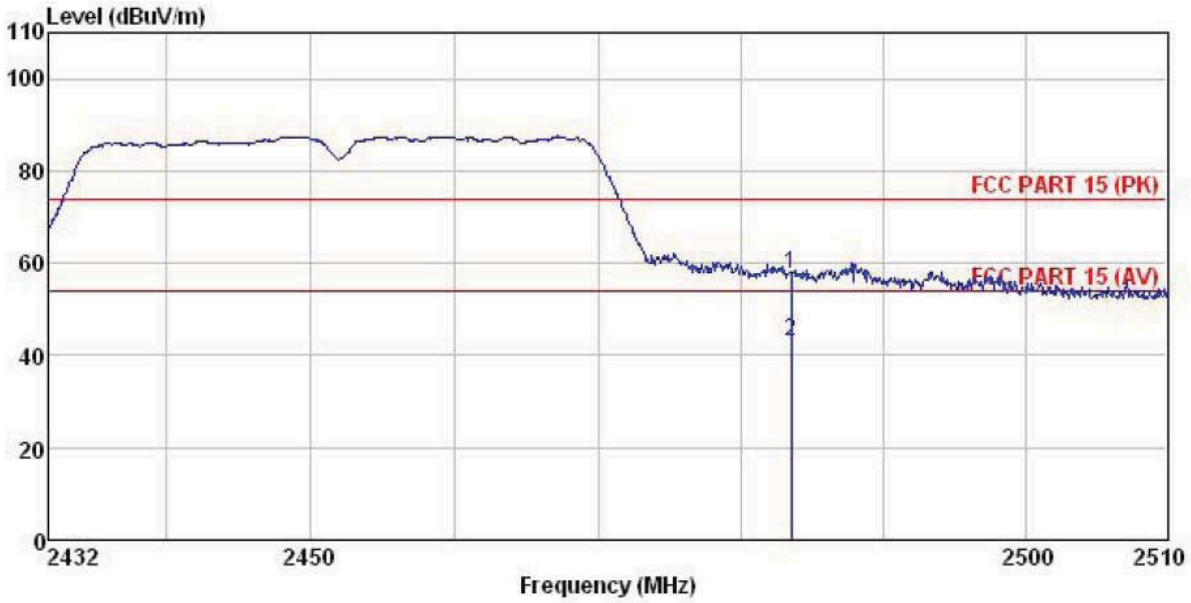
Test channel: Highest
Horizontal :



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) HORIZONTAL
EUT : Wifi Dongle
Model : HW-3F03
Test mode : TX N40-H MODE
Power Rating : DC5V
Environment : Temp:25.5℃ Huni:55%
Test Engineer: aaron
REMARK :

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	32.82	27.52	5.70	0.00	66.04	74.00	-7.96	Peak
2	2483.500	15.40	27.52	5.70	0.00	48.62	54.00	-5.38	Average

Vertical :



Site : 3m chamber
Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) VERTICAL
EUT : Wifi Dongle
Model : HW-3F03
Test mode : TX N40-H MODE
Power Rating : DC5V
Environment : Temp:25.5'C Huni:55%
Test Engineer: aaron
REMARK :

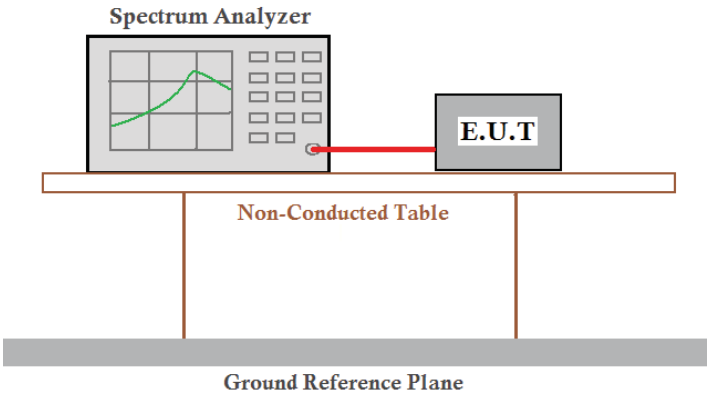
	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	2483.500	24.25	27.52	5.70	0.00	57.47	74.00	-16.53	Peak
2	2483.500	9.61	27.52	5.70	0.00	42.83	54.00	-11.17	Average

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

6.7 Spurious Emission

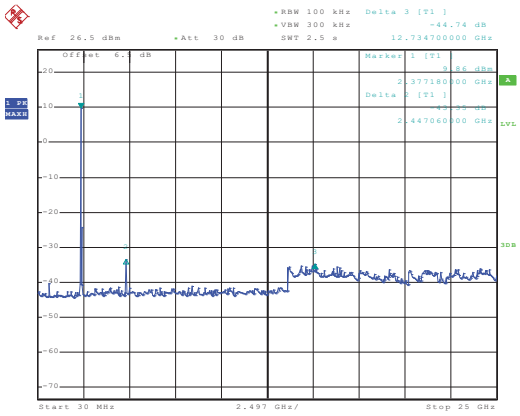
6.7.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.4:2003 and KDB558074
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.
Test setup:	
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Test plot as follows:

Test mode:	802.11b

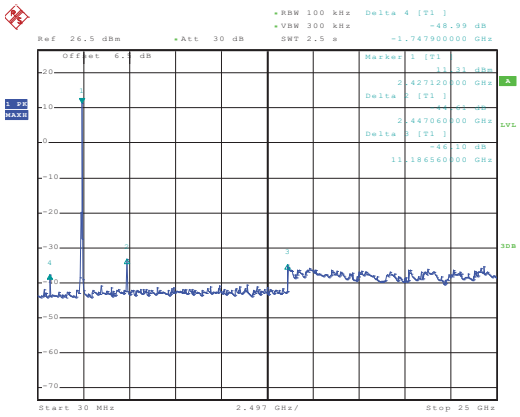
Lowest channel



Date: 17.APR.2014 00:48:53

30MHz~25GHz

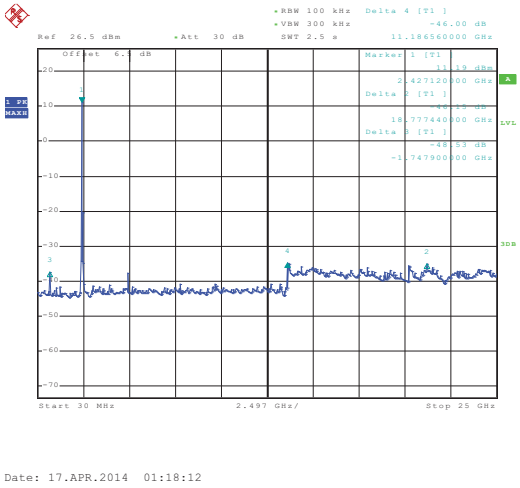
Middle channel



Date: 17.APR.2014 01:17:24

30MHz~25GHz

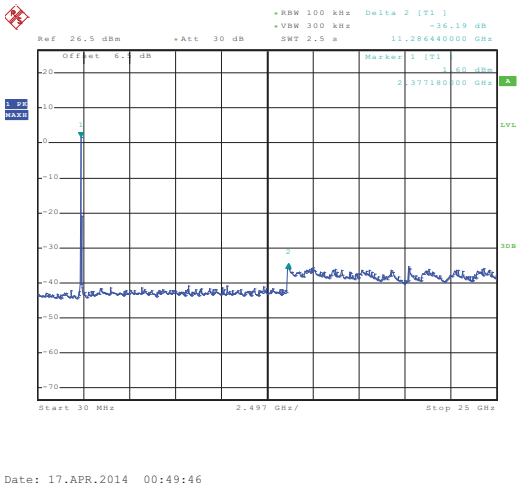
Highest channel



30MHz~25GHz

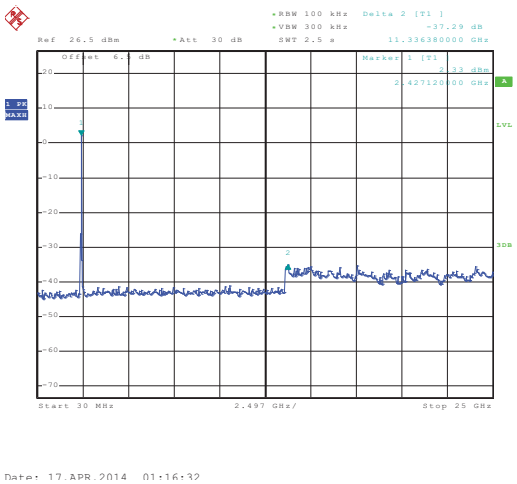
Test mode:	802.11g

Lowest channel



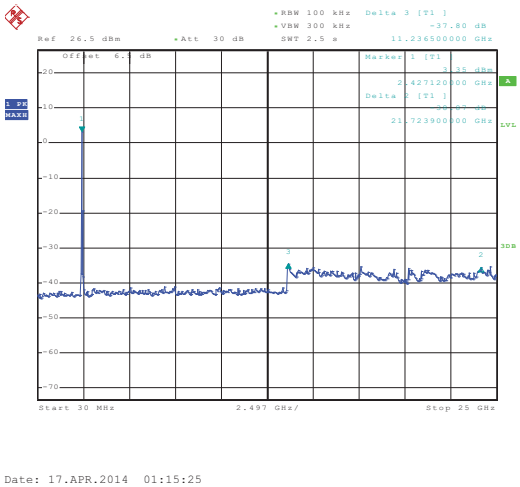
30MHz~25GHz

Middle channel



30MHz~25GHz

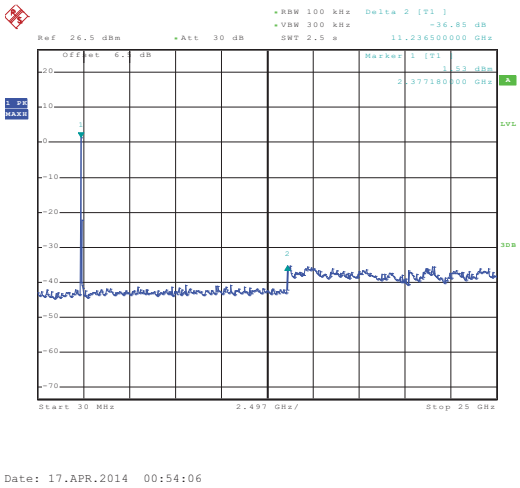
Highest channel



30MHz~25GHz

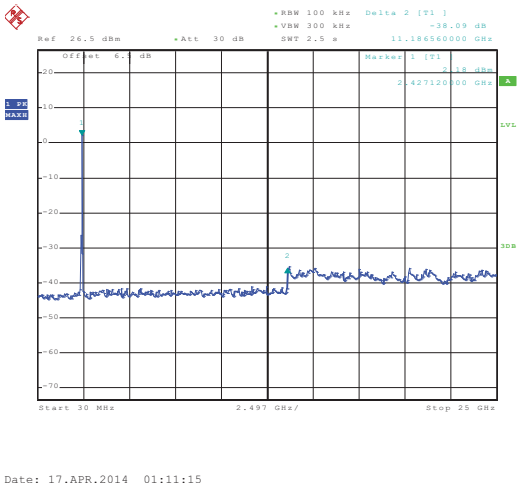
Test mode:	802.11n(H20)

Lowest channel



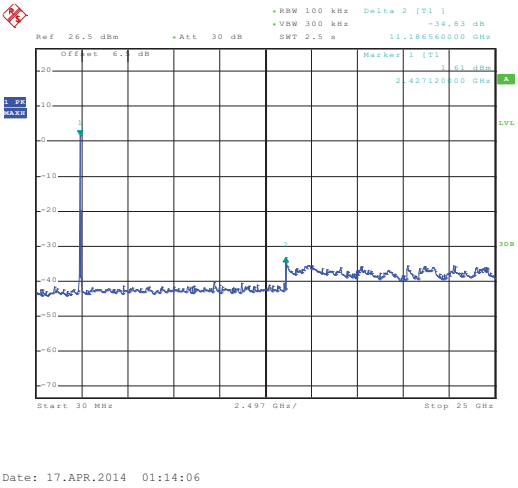
30MHz~25GHz

Middle channel



30MHz~25GHz

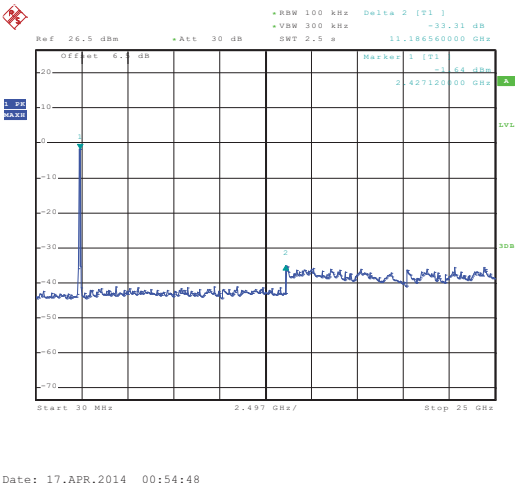
Highest channel



30MHz~25GHz

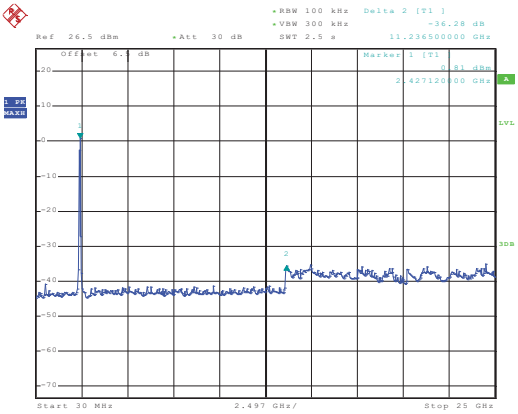
Test mode:	802.11n(H40)

Lowest channel



30MHz~25GHz

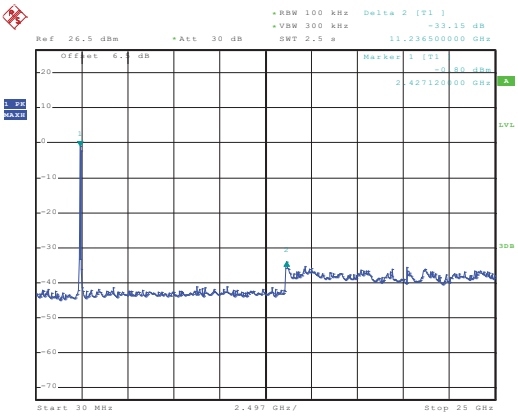
Middle channel



Date: 17.APR.2014 01:10:02

30MHz~25GHz

Highest channel



Date: 17.APR.2014 00:56:04

30MHz~25GHz