

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 our 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

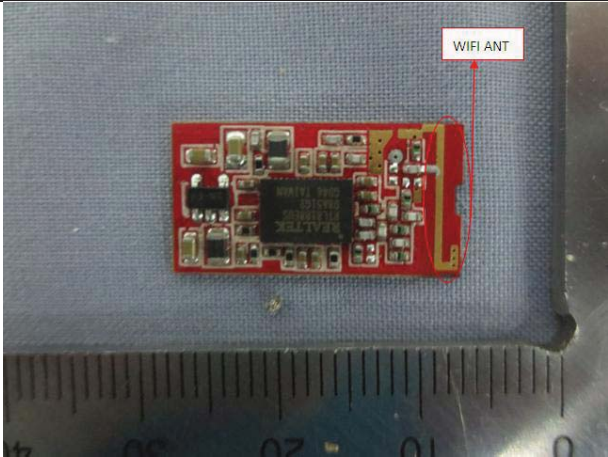
5.7 Test Instruments list

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:

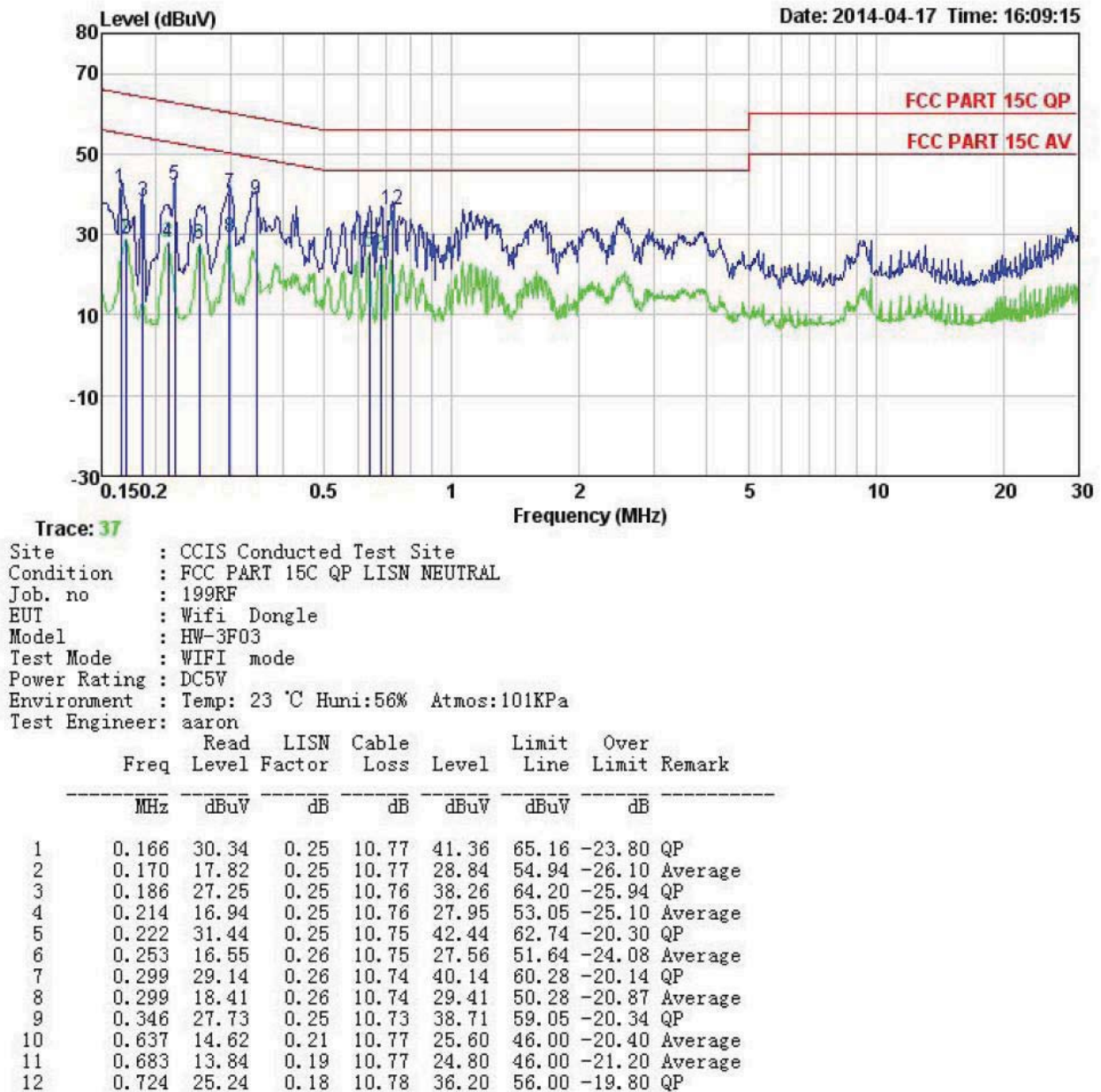
Standard requirement:	FCC Part15 C Section 15.203 /247(c)
<i>15.203 requirement:</i> <i>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that 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.</i> <i>15.247(c) (1)(i) requirement:</i> <i>(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.</i>	
E.U.T Antenna:	
<i>The antenna is an internal antenna which cannot replace by end-user, the best case gain of the antenna is -5 dBi.</i>	
	

6.2 Conducted Emission

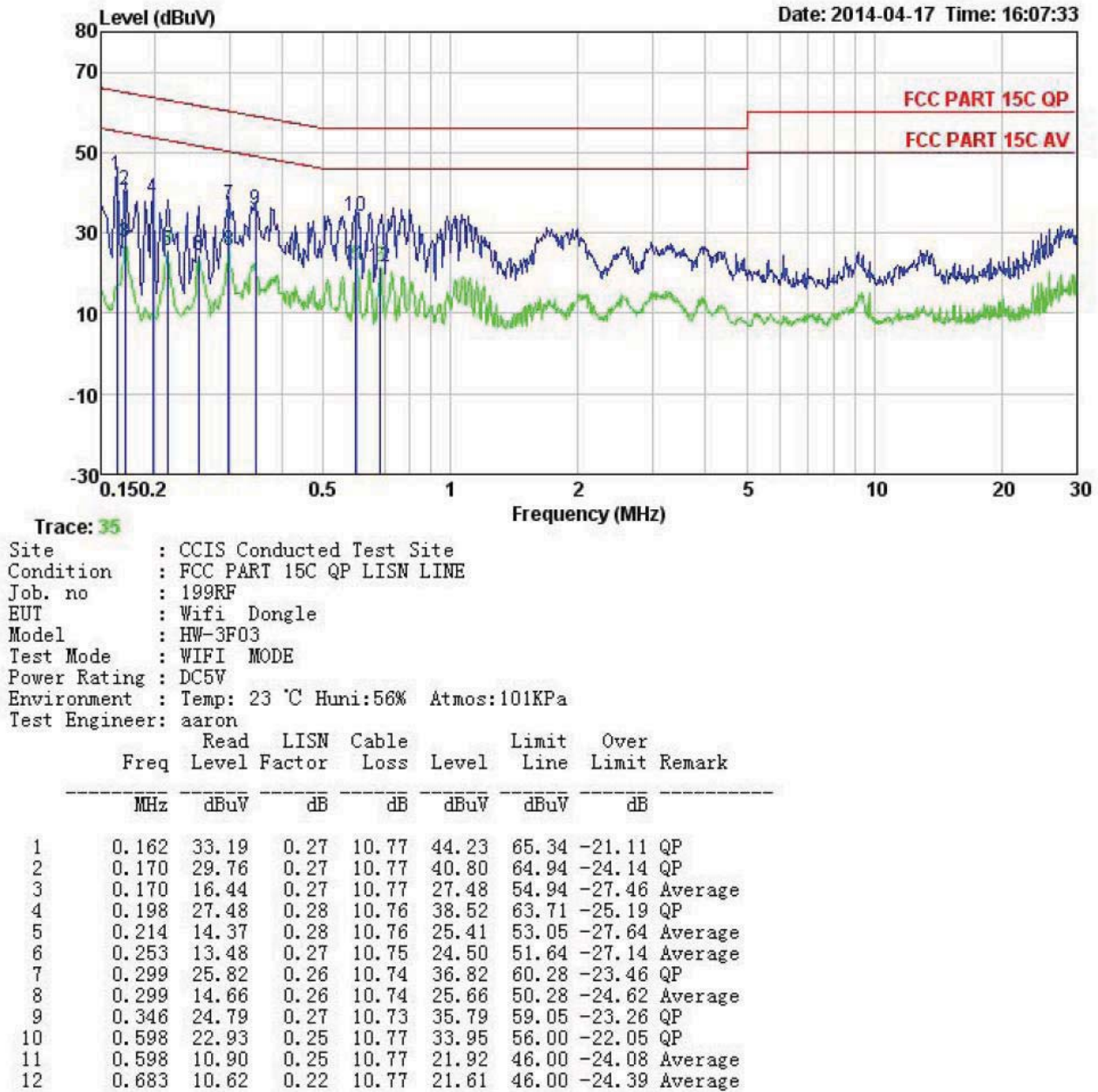
Test Requirement:	FCC Part15 C Section 15.207																
Test Method:	ANSI C63.4: 2003																
Test Frequency Range:	150 kHz to 30 MHz																
Class / Severity:	Class B																
Receiver setup:	RBW=9 kHz, VBW=30 kHz																
Limit:	<table><tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr><tr><th>Quasi-peak</th><th>Average</th></tr><tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr><tr><td>0.5-5</td><td>56</td><td>46</td></tr><tr><td>5-30</td><td>60</td><td>50</td></tr></table> * Decreases with the logarithm of the frequency.			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
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															
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:	Reference Plane Test table/Insulation plane <i>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</i>																
Test Instruments:	Refer to section 5.6 for details																
Test mode:	Refer to section 5.3 for details																
Test results:	Passed																

Measurement Data

Neutral:



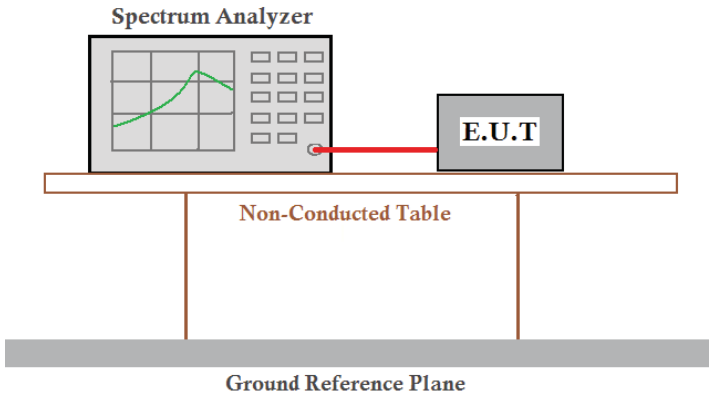
Line:



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

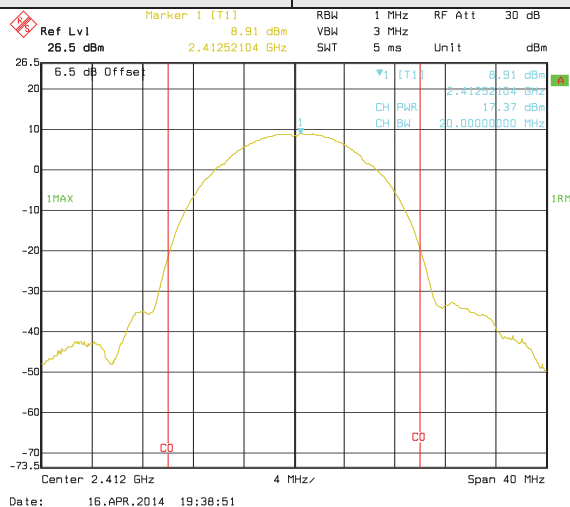
Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.4:2003 and KDB558074
Limit:	30dBm
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by two vertical legs. Below the table is a Ground Reference Plane.
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

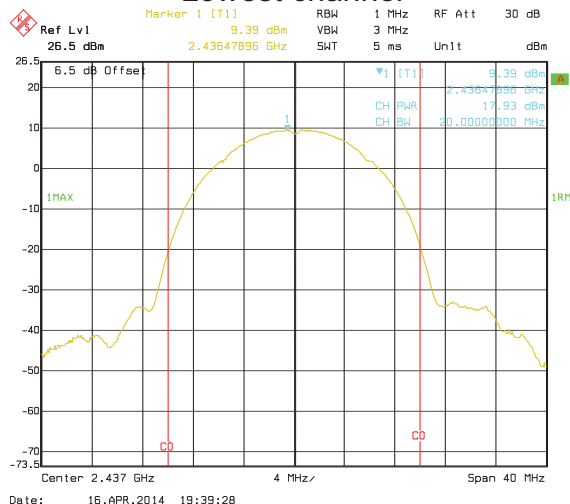
Test CH	Maximum Conducted Output Power (dBm)				Limit(dBm)	Result
	802.11b	802.11g	802.11n(H20)	802.11n(H40)		
Lowest	17.37	15.30	13.05	13.48	30.00	Pass
Middle	17.93	15.23	13.46	13.48		
Highest	17.81	15.18	13.92	13.28		

Test plot as follows:

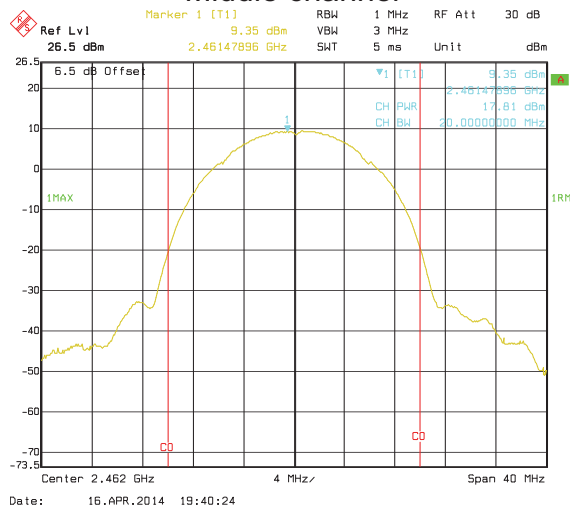
Test mode:	802.11b
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Lowest channel

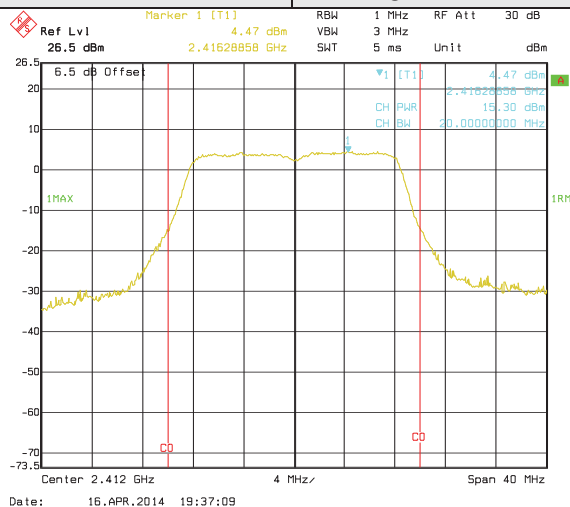


Middle channel

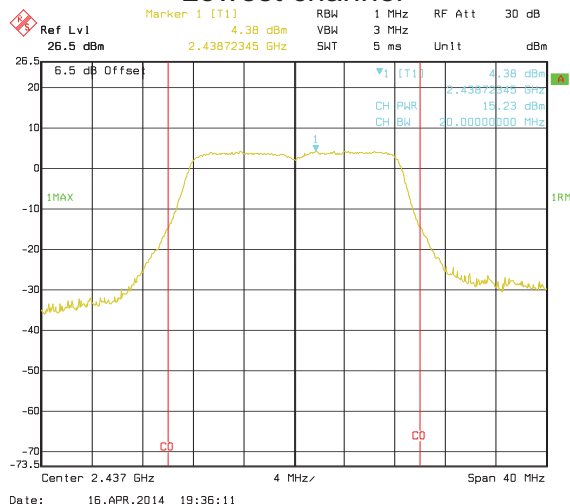


Highest channel

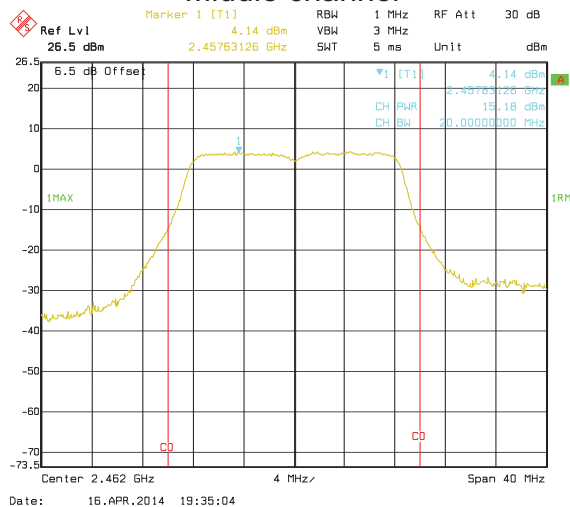
Test mode:	802.11g
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Lowest channel

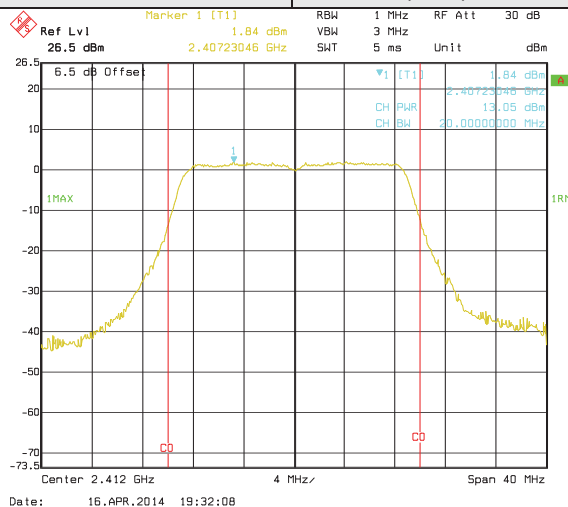


Middle channel

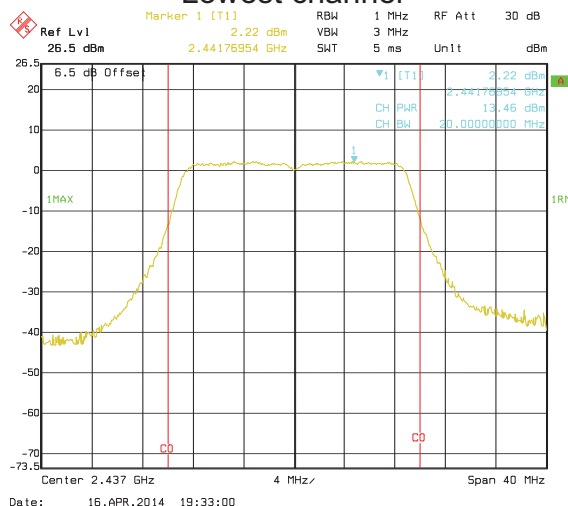


Highest channel

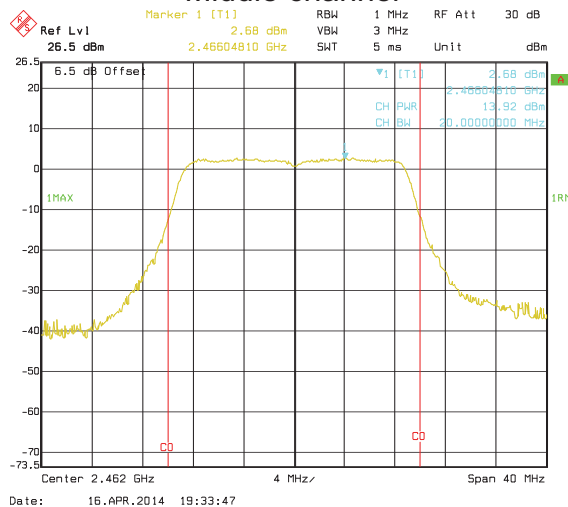
Test mode:	802.11n(H20)
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Lowest channel

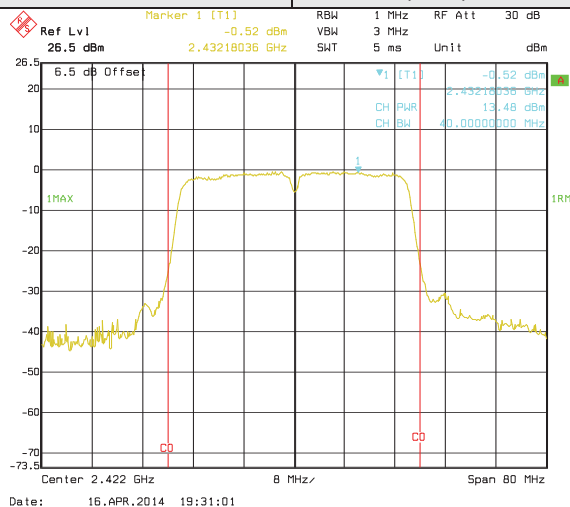


Middle channel

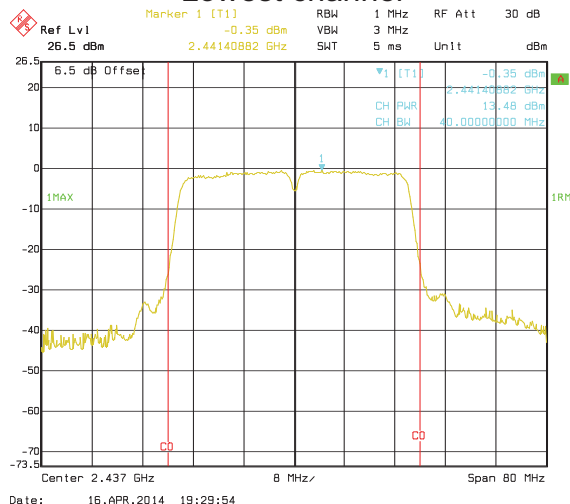


Highest channel

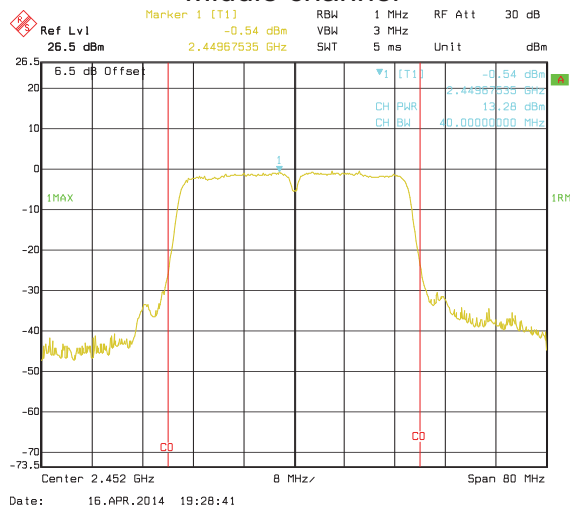
Test mode:	802.11n(H40)
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Lowest channel

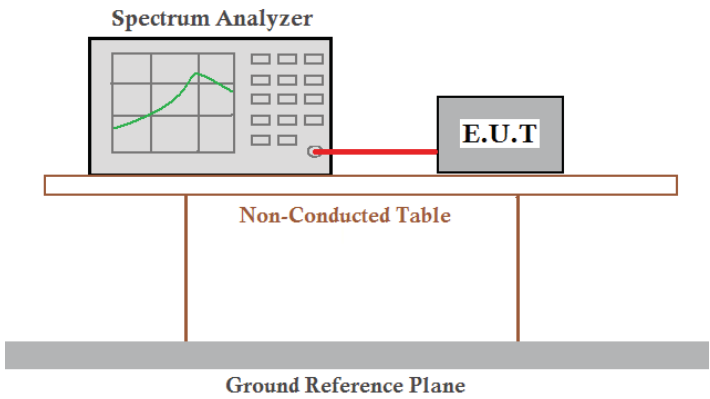


Middle channel



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

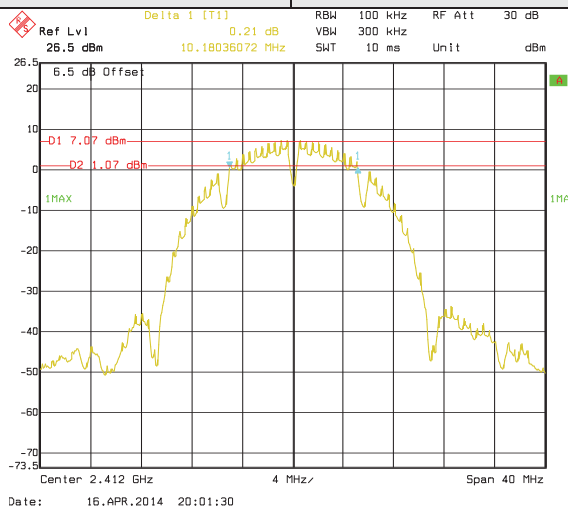
Measurement Data

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		

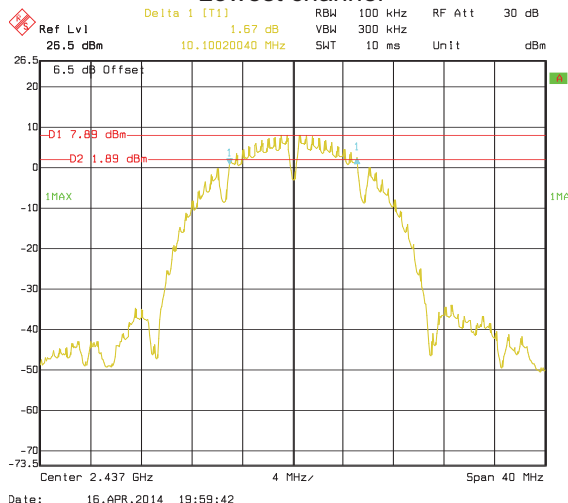
Test CH	99% Occupy Bandwidth (MHz)				Limit(kHz)	Result
	802.11b	802.11g	802.11n(H20)	802.11n(H40)		
Lowest	14.91	16.59	17.80	36.07	N/A	N/A
Middle	14.91	16.59	17.72	36.07		
Highest	14.99	16.59	17.72	36.07		

Test plot as follows:

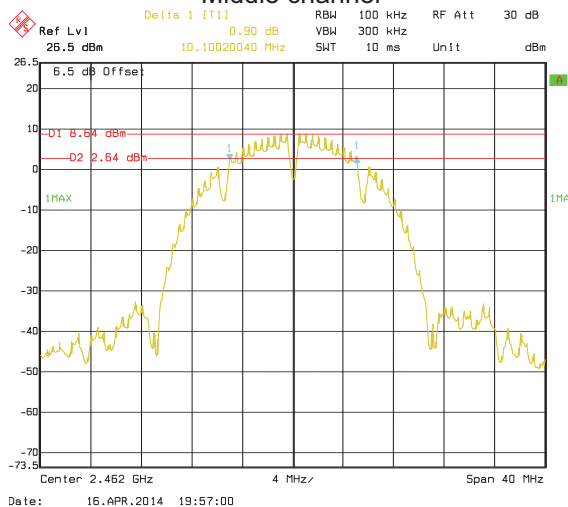
Test mode:6dB OBW	802.11b
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Lowest channel

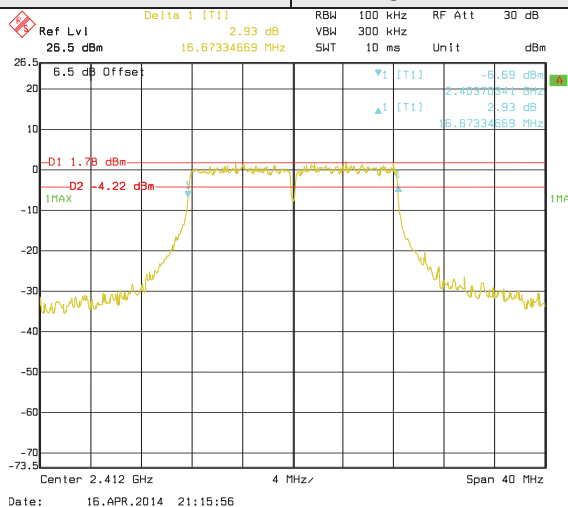


Middle channel

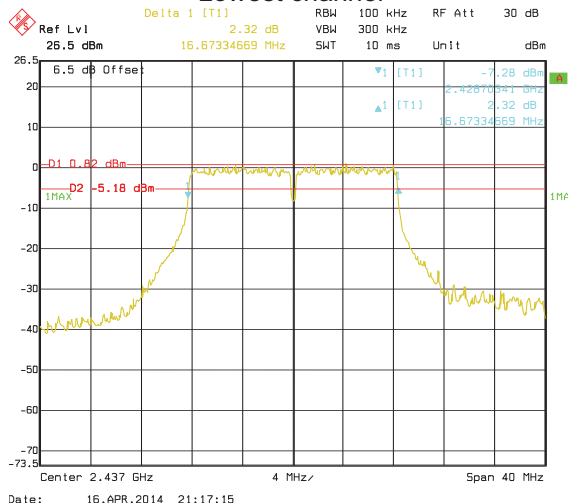


Highest channel

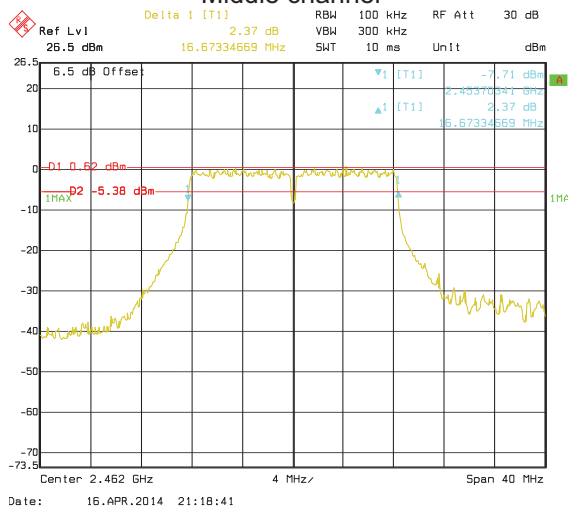
Test mode:6dB OBW	802.11g
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Lowest channel

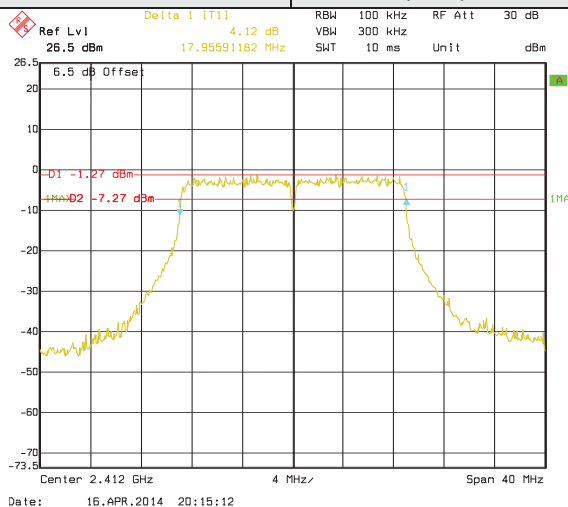


Middle channel

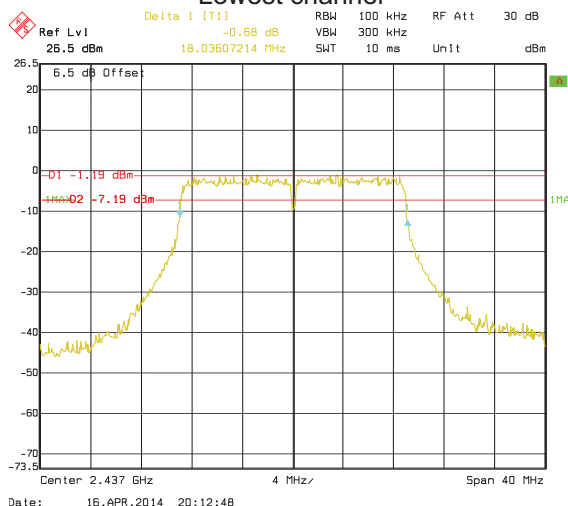


Highest channel

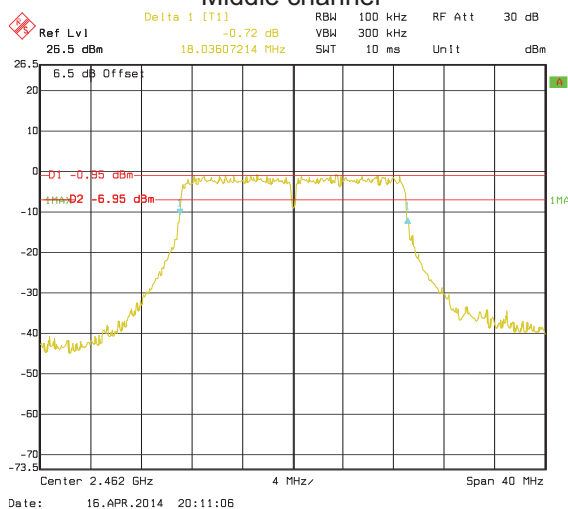
Test mode:6dB OBW	802.11n(H20)
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Lowest channel



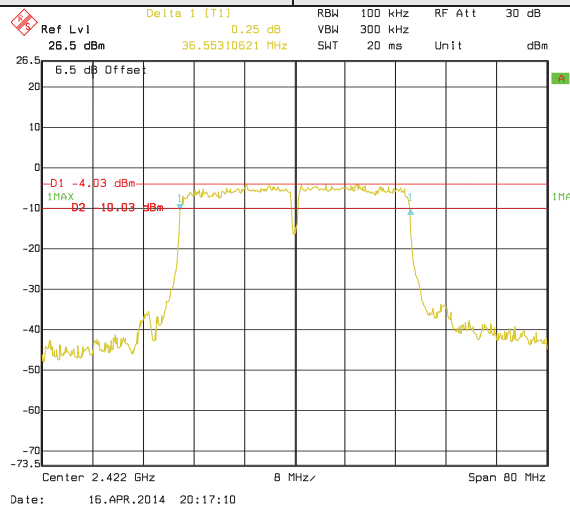
Middle channel



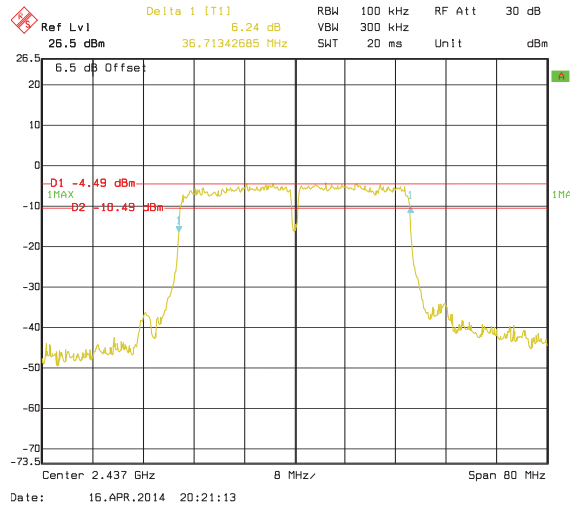
Highest channel

Test mode: 6dB OBW

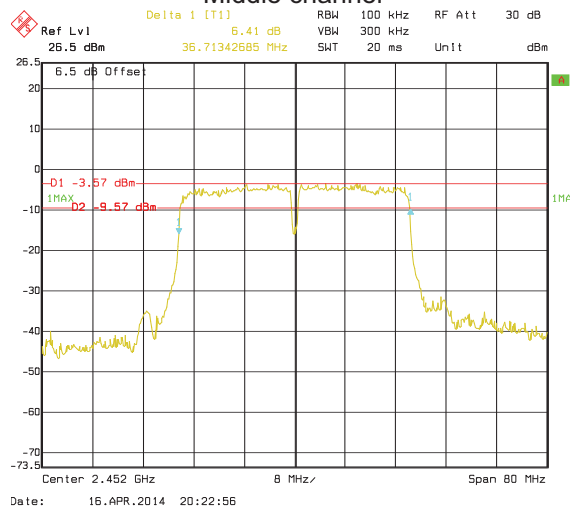
802.11n(H40)



Lowest channel

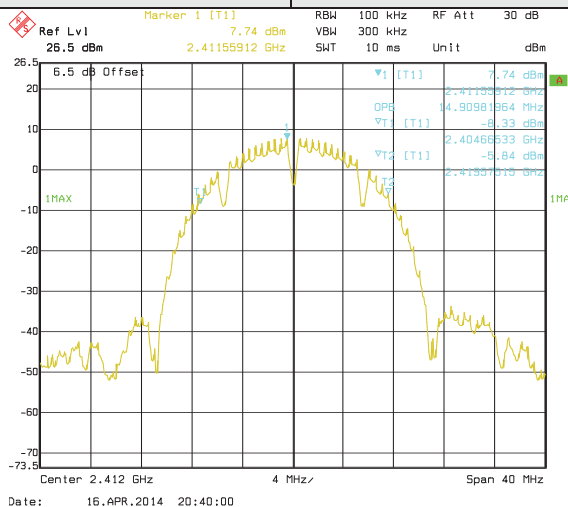


Middle channel

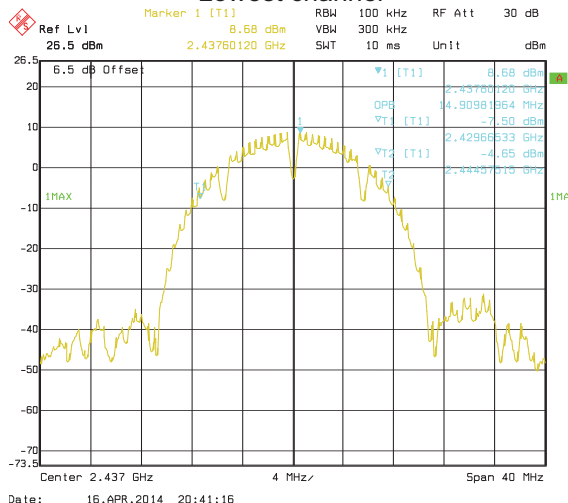


Highest channel

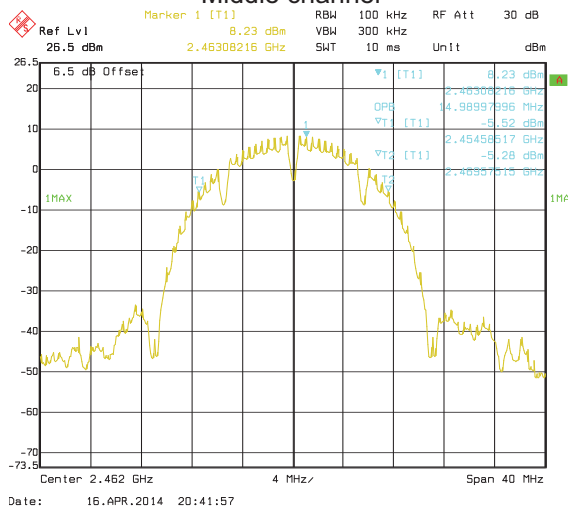
Test mode:99% OBW	802.11b
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Lowest channel

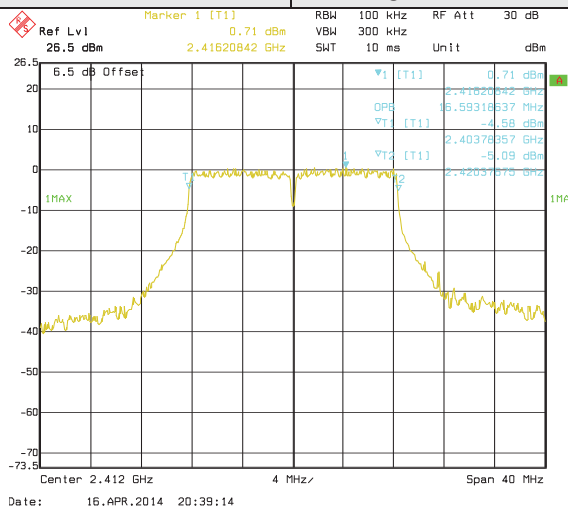


Middle channel

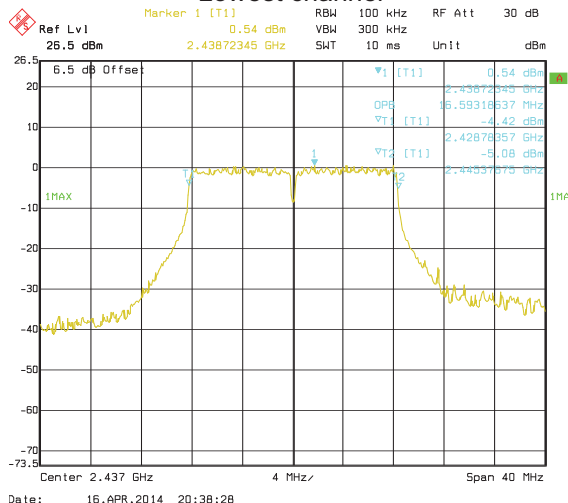


Highest channel

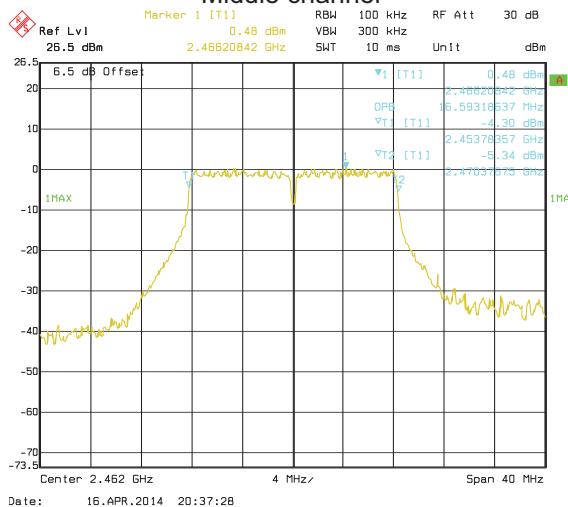
Test mode: 99% OBW	802.11g
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Lowest channel

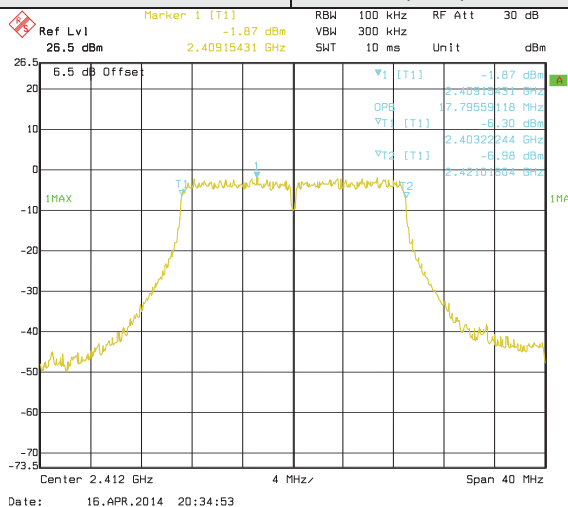


Middle channel

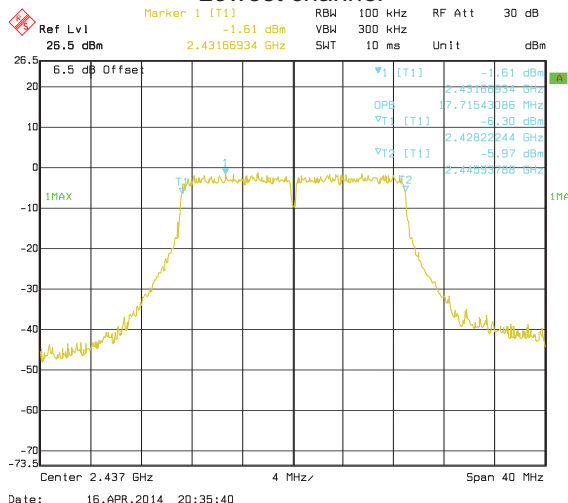


Highest channel

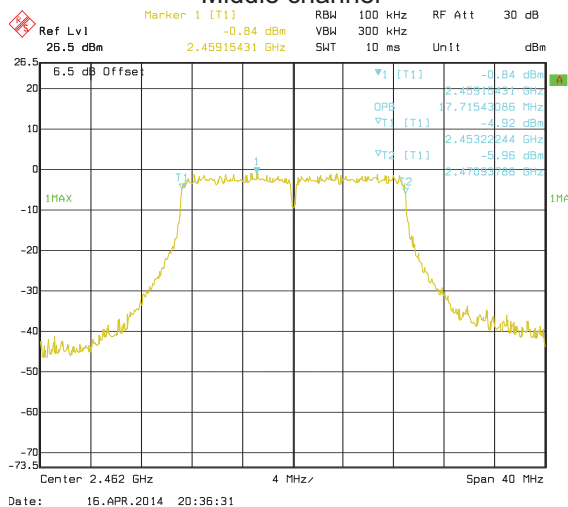
Test mode: 99% OBW	802.11n(H20)
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Lowest channel

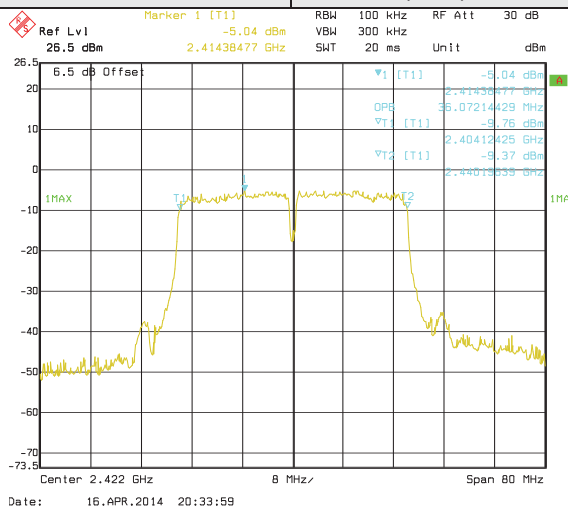


Middle channel

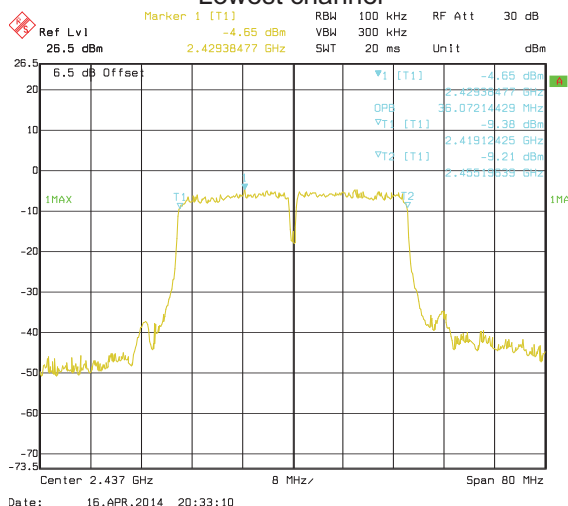


Highest channel

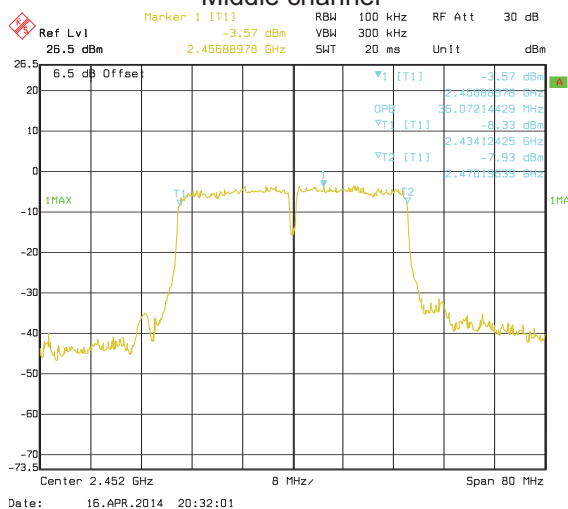
Test mode: 99% OBW	802.11n(H40)
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Lowest channel

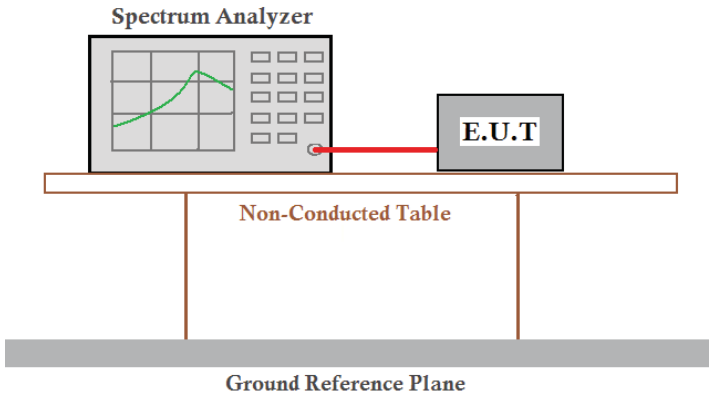


Middle channel



Highest channel

6.5 Power Spectral Density

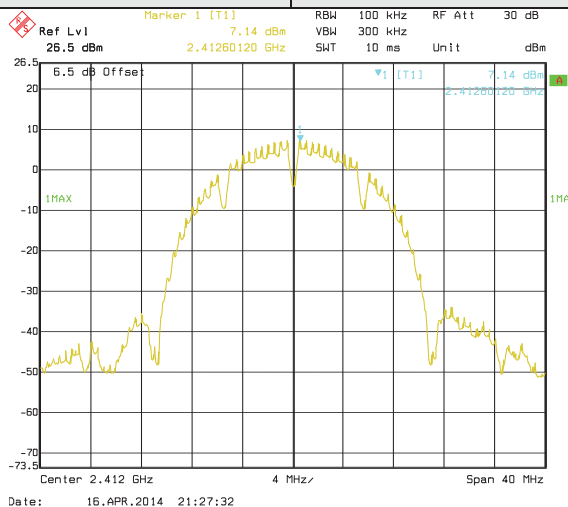
Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	ANSI C63.4:2003 and KDB558074
Limit:	8dBm
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.
Test Instruments:	Refer to section 5.6 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

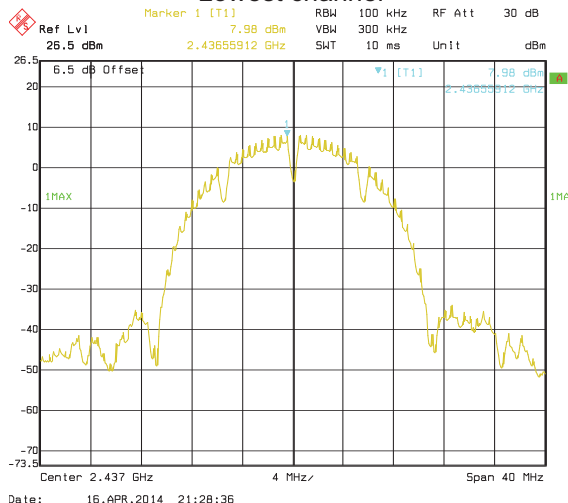
Test CH	Power Spectral Density (dBm)				Limit(dBm)	Result
	802.11b	802.11g	802.11n(H20)	802.11n(H40)		
Lowest	7.14	0.93	-1.68	-4.92	8.00	Pass
Middle	7.98	0.66	-1.36	-4.46		
Highest	7.66	0.52	-0.75	-3.61		

Test plot as follows:

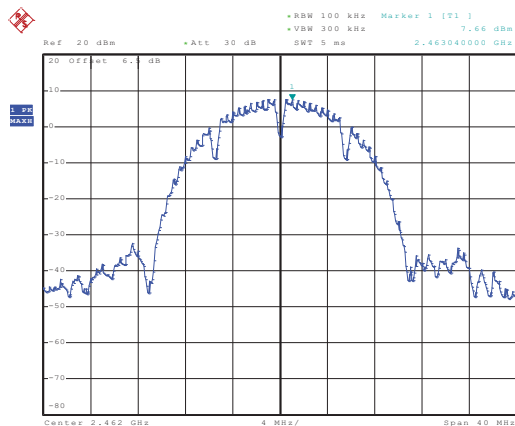
Test mode:	802.11b
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Lowest channel

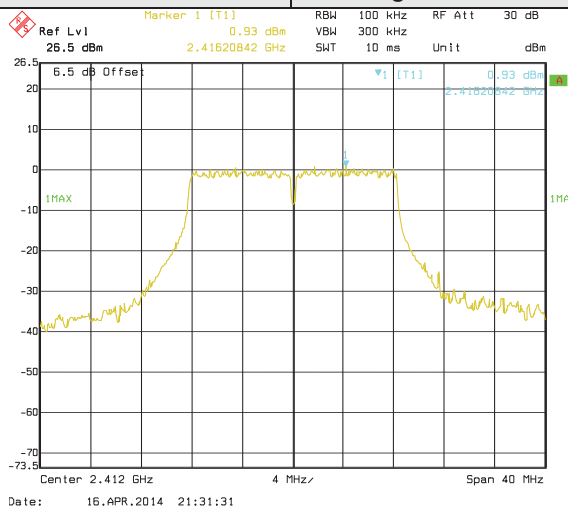


Middle channel

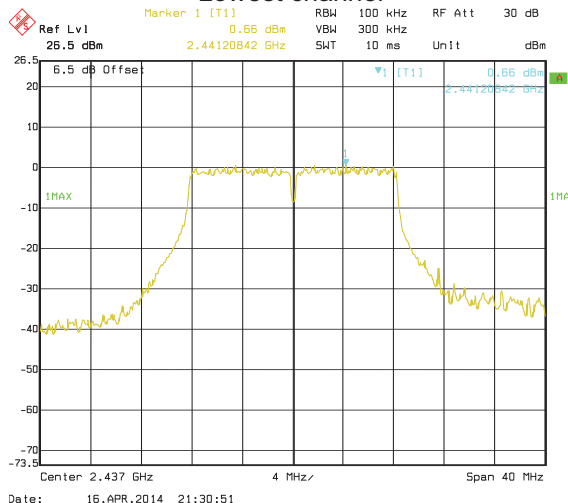


Highest channel

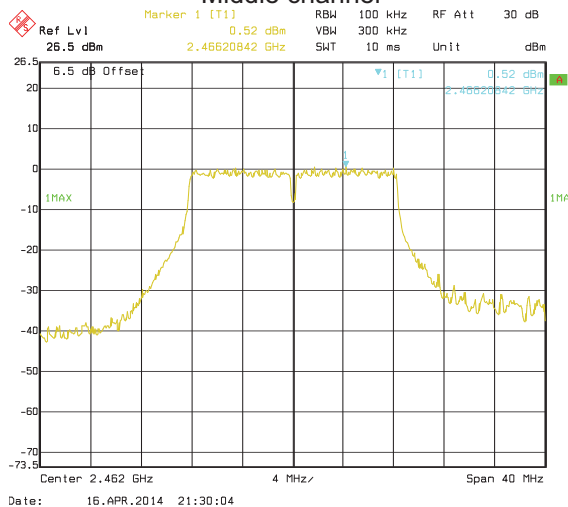
Test mode:	802.11g
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Lowest channel

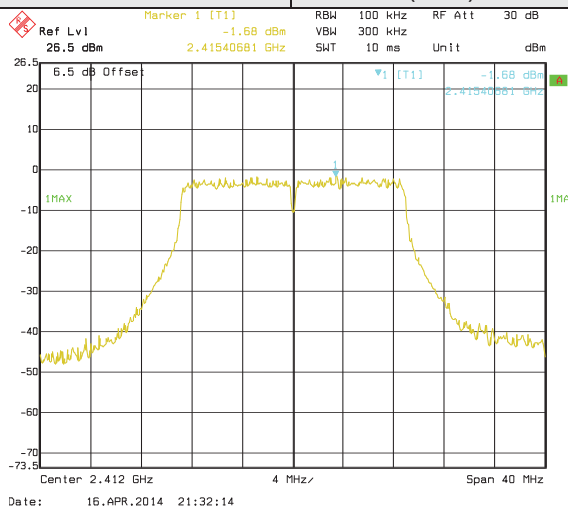


Middle channel

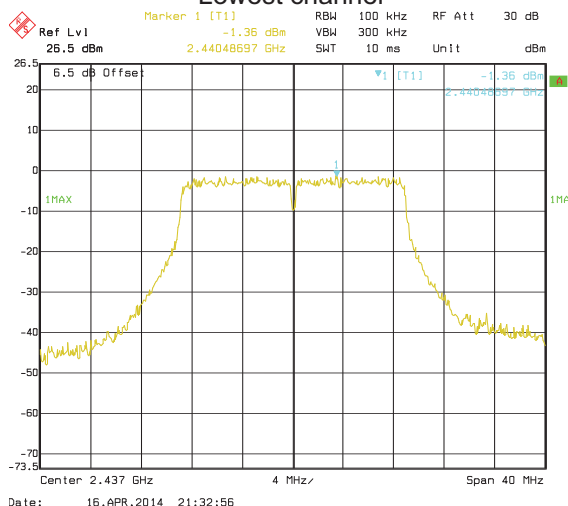


Highest channel

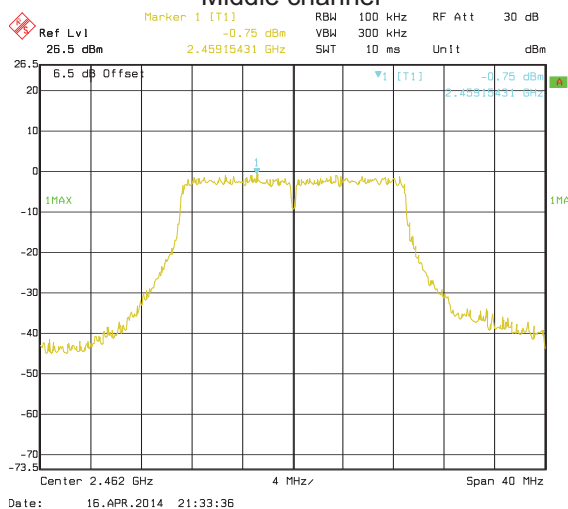
Test mode:	802.11n(H20)
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Lowest channel

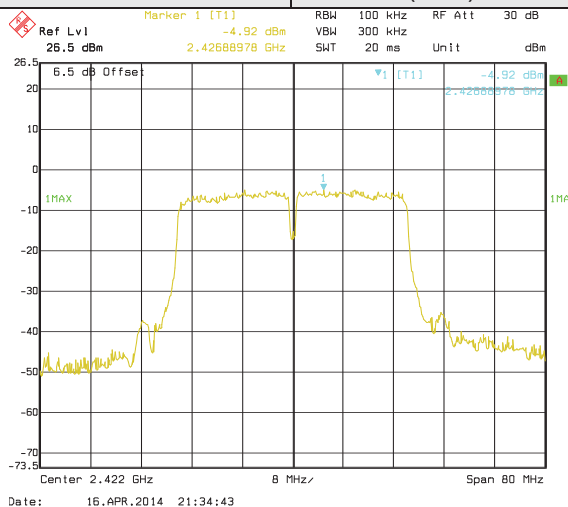


Middle channel

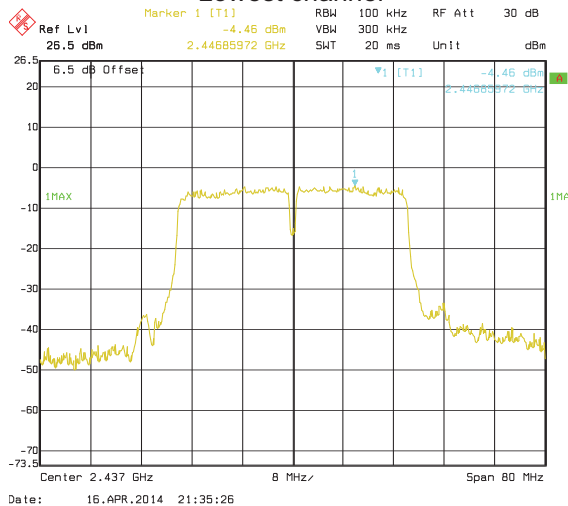


Highest channel

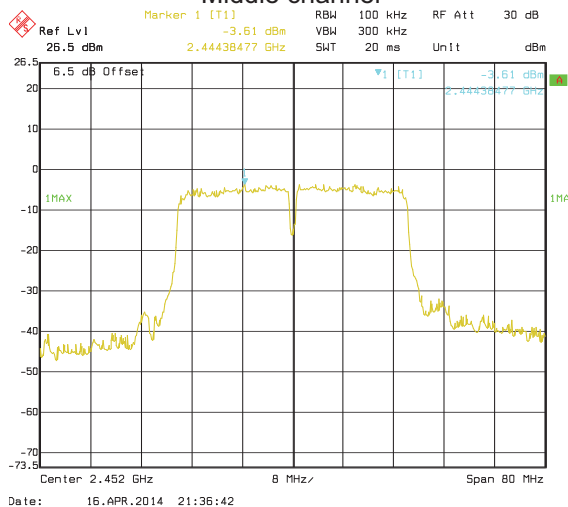
Test mode:	802.11n(H40)
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Lowest channel



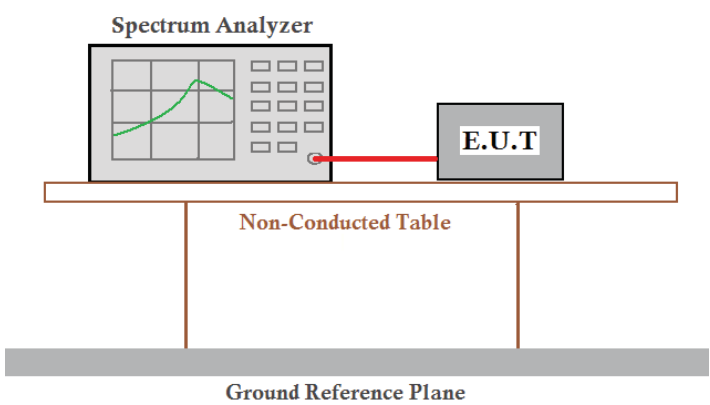
Middle channel



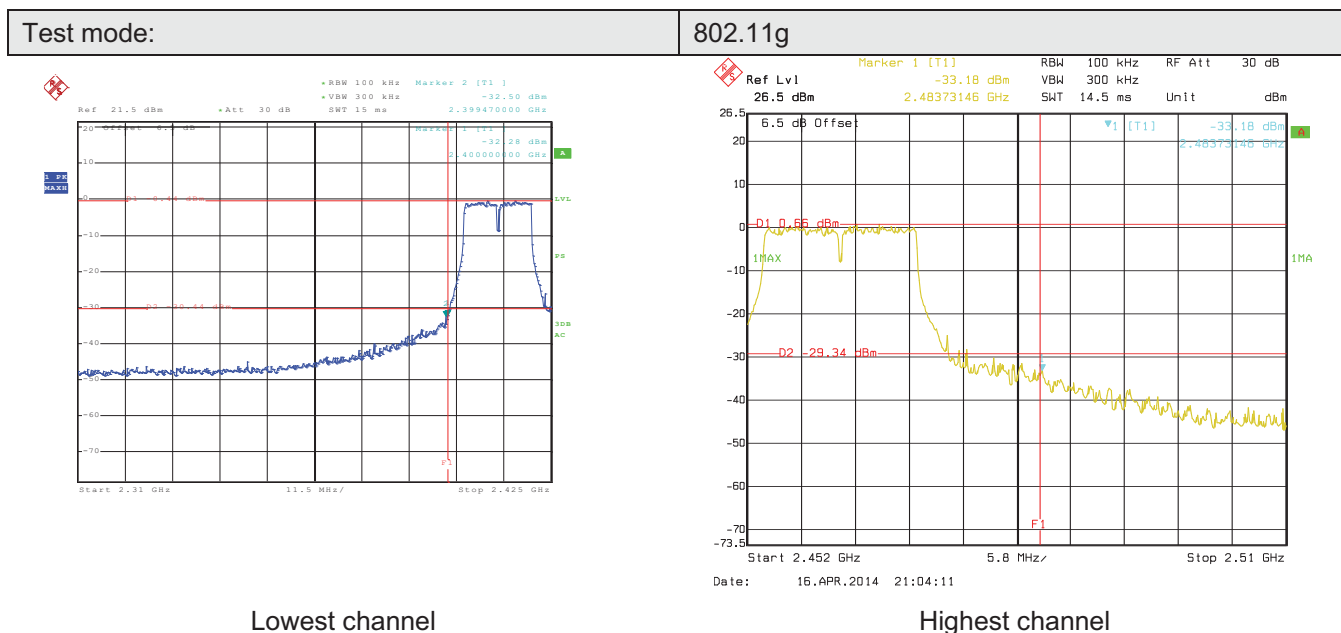
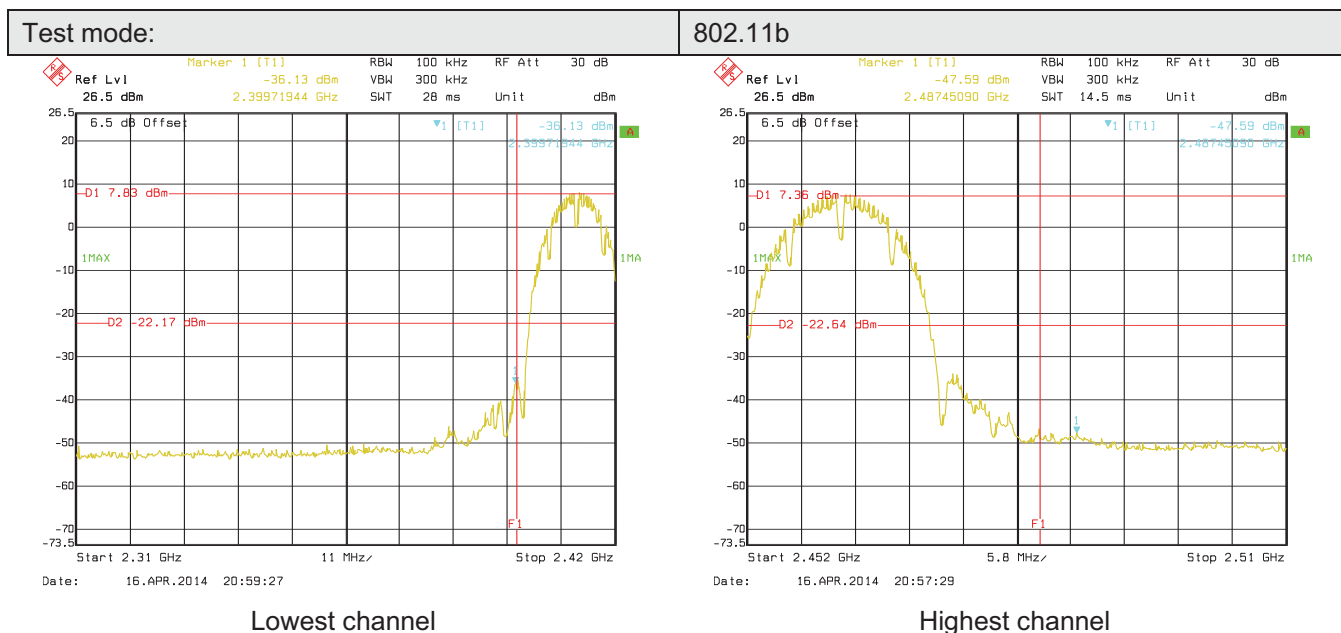
Highest channel

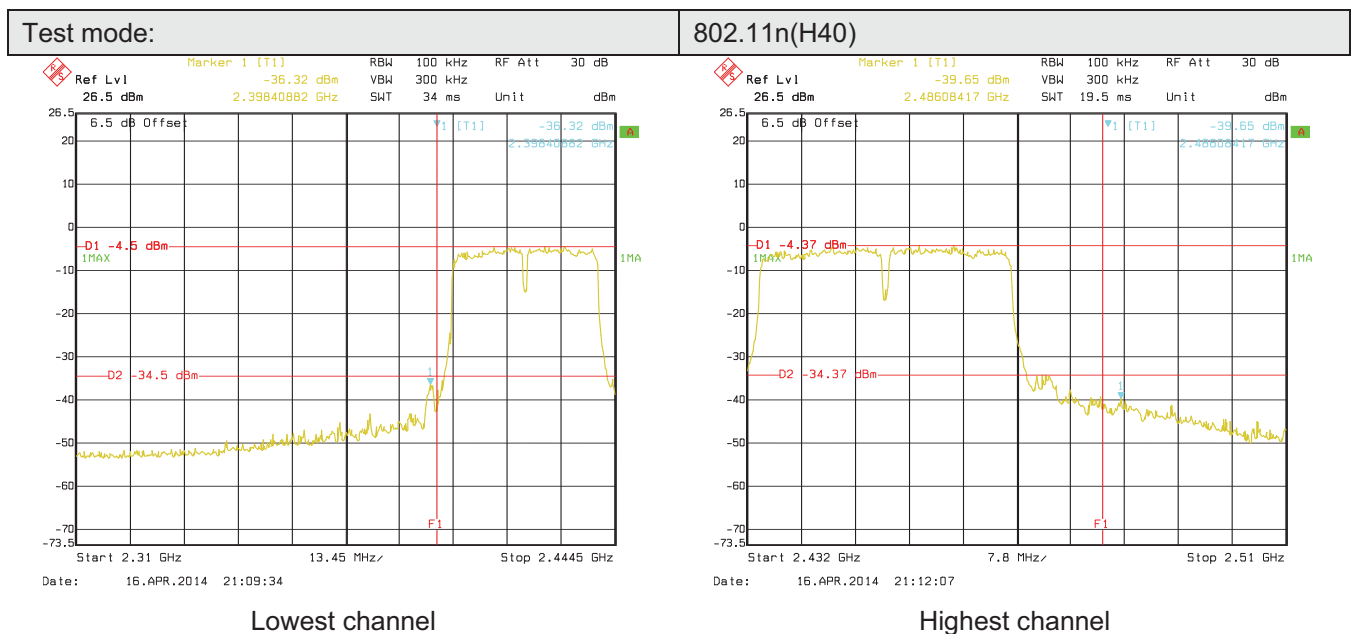
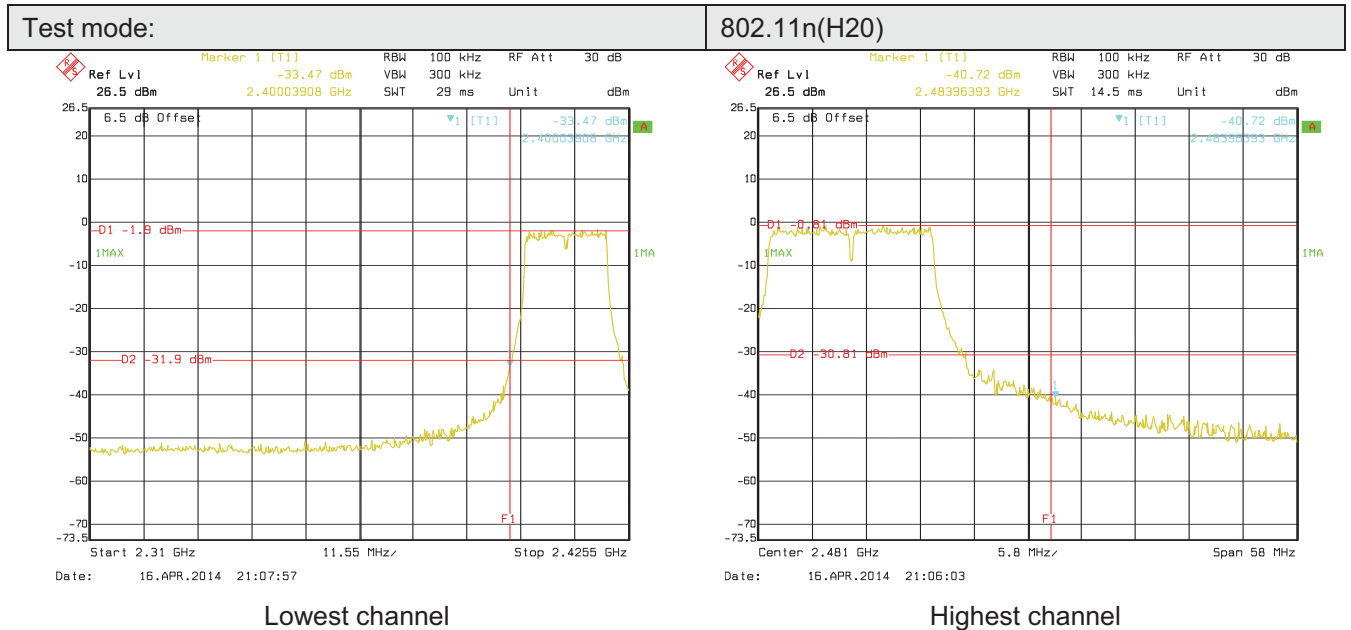
6.6 Band Edge

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:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.
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:





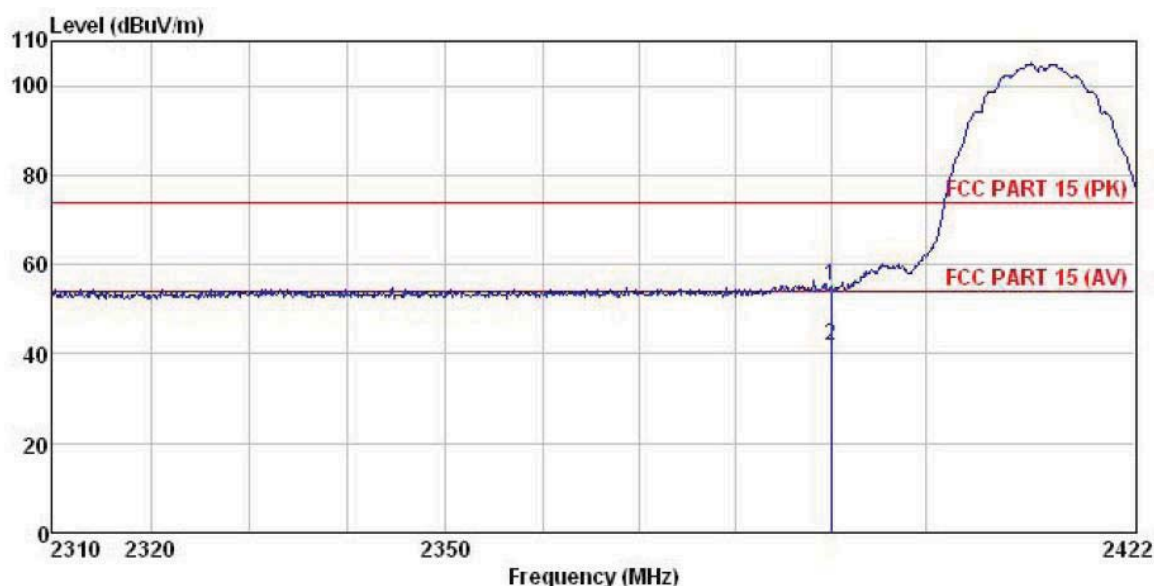
6.6.2 Radiated Emission Method

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:	<table><tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr><tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr><tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average Value</td></tr></table>					Frequency	Detector	RBW	VBW	Remark	Above 1GHz	Peak	1MHz	3MHz	Peak Value	Peak	1MHz	10Hz	Average Value
Frequency	Detector	RBW	VBW	Remark															
Above 1GHz	Peak	1MHz	3MHz	Peak Value															
	Peak	1MHz	10Hz	Average Value															
Limit:	<table><tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr><tr><td rowspan="2">Above 1GHz</td><td>54.00</td><td>Average Value</td></tr><tr><td>74.00</td><td>Peak Value</td></tr></table>					Frequency	Limit (dBuV/m @3m)	Remark	Above 1GHz	54.00	Average Value	74.00	Peak Value						
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:	EUT Turn Table 0.8m 3m 4m 1m Antenna Tower Horn Antenna Spectrum Analyzer Amplifier																		
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

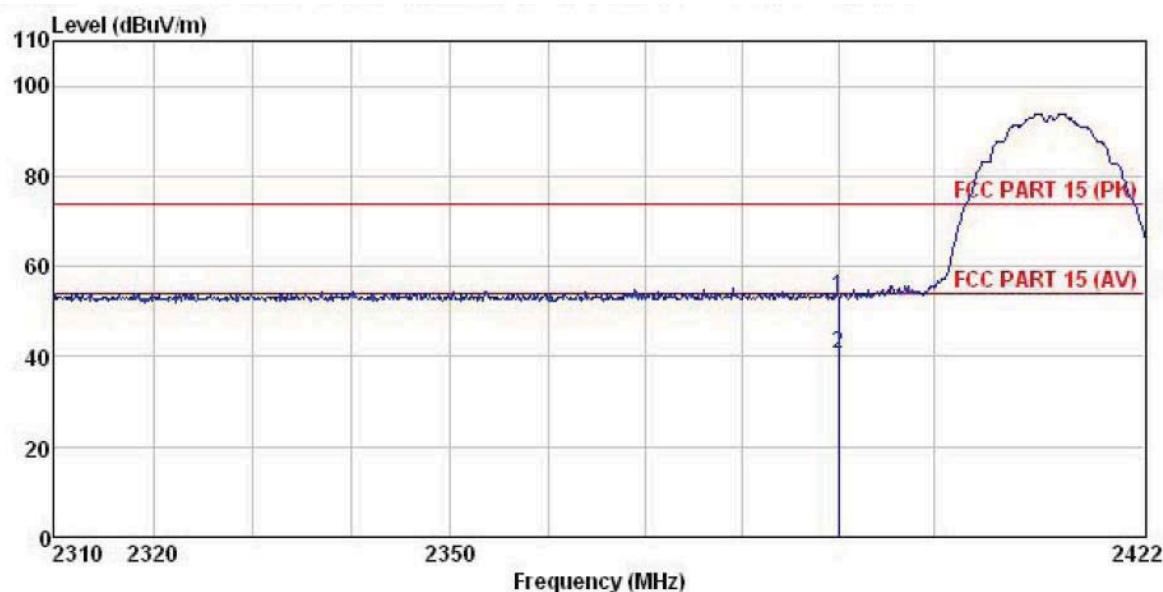
Horizontal:



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 Humi:55%
 Test Engineer: aaron
 REMARK :

	Freq	ReadAntenna	Cable Preamp		Limit	Over	
	Level Factor	Loss Factor	Level	Line	Limit	Remark	
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m
1	2390.000	21.79	27.58	5.67	0.00	55.04	74.00
2	2390.000	8.59	27.58	5.67	0.00	41.84	54.00

Vertical :

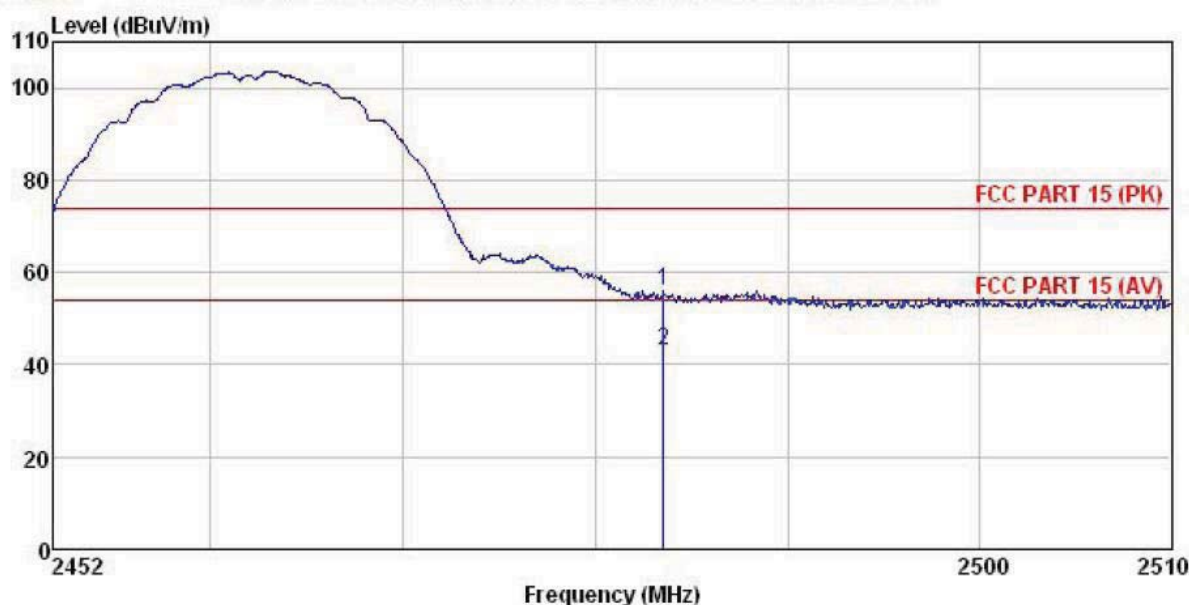


Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) VERTICAL
 EUT : Wifi Dongle
 Model : HW-3F03
 Test mode : TX B-L MODE
 Power Rating : DC5V
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: aaron
 REMARK :

	Freq	ReadAntenna	Cable	Preamp	Level	Limit	Over	
		Level	Factor	Loss	Factor	Line	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

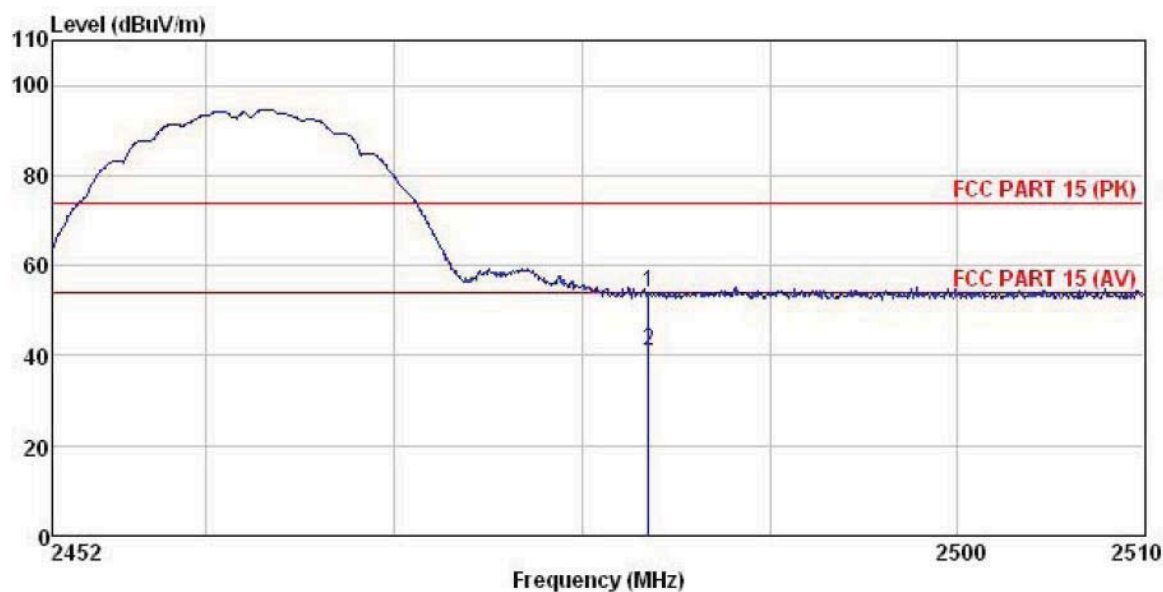
Horizontal:



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 Humi: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	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 :



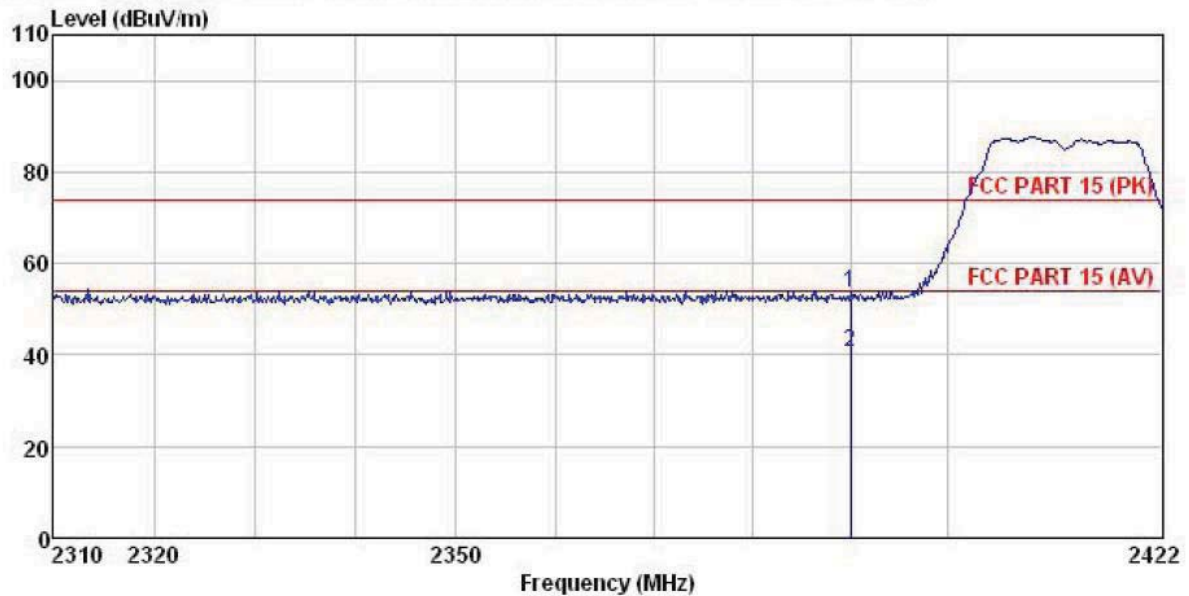
Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) VERTICAL
 EUT : Wifi Dongle
 Model : HW-3F03
 Test mode : TX B-H MODE
 Power Rating : DC5V
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: aaron
 REMARK :

	Freq	ReadAntenna	Cable	Preamp	Level	Limit	Over	
	MHz	Level	Factor	Loss	Factor	Line	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

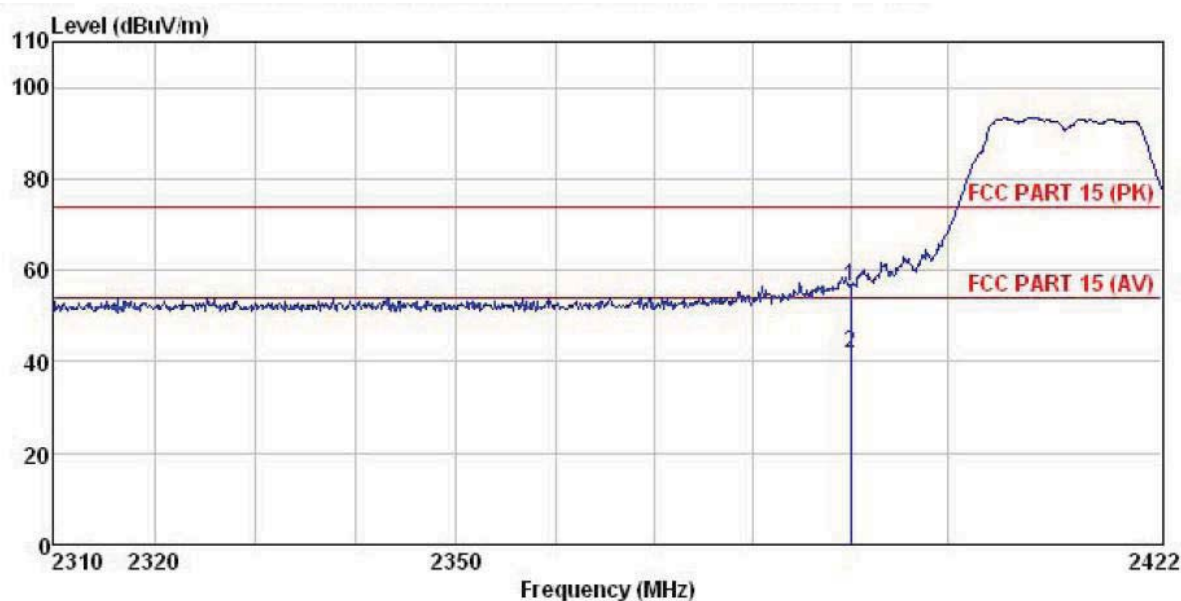
Horizontal :



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 Humi:55%
 Test Engineer: aaron
 REMARK :

	Freq	Read	Antenna	Cable	Preamp	Level	Limit	Over	
		Level	Factor	Loss	Factor	Line	Line	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

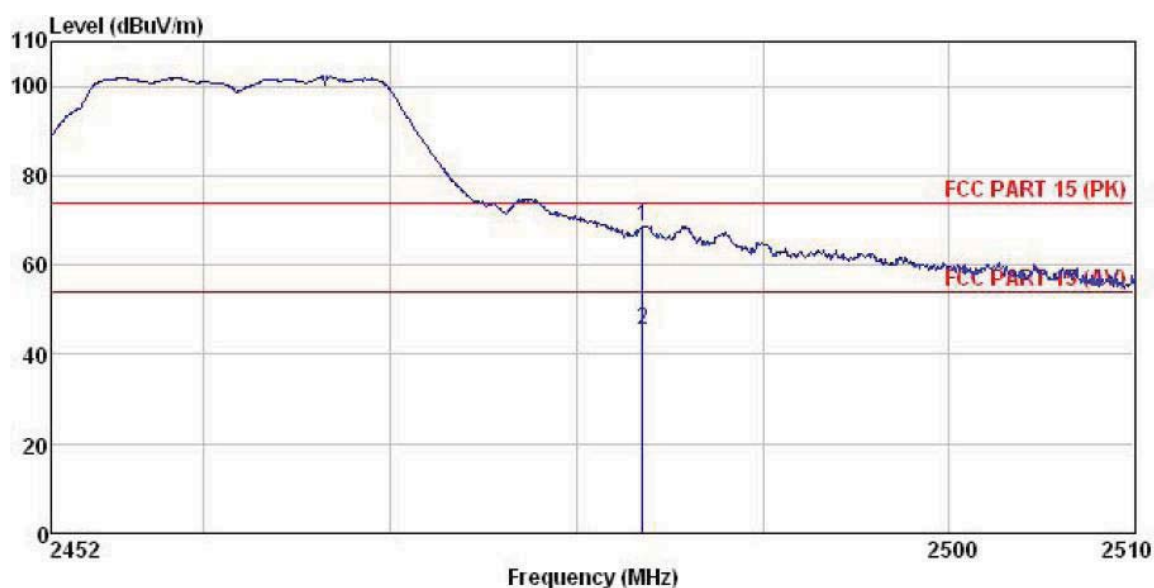
Vertical :



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°C Humi:55%
 Test Engineer: aaron
 REMARK :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit	Over	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

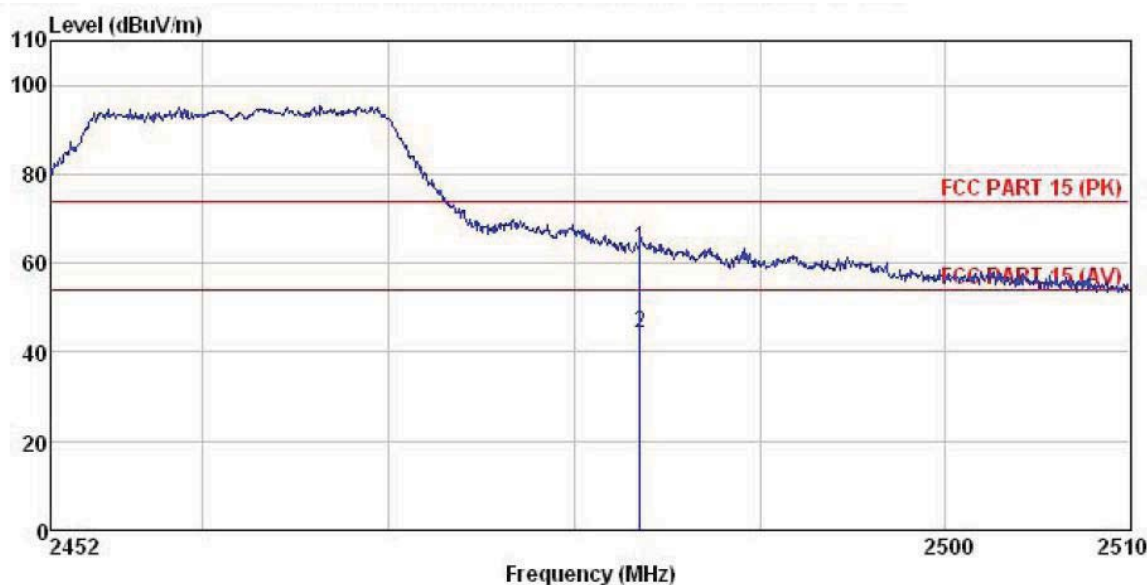
Test channel: Highest



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°C Humi:55%
 Test Engineer: aaron
 REMARK :

	Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit	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

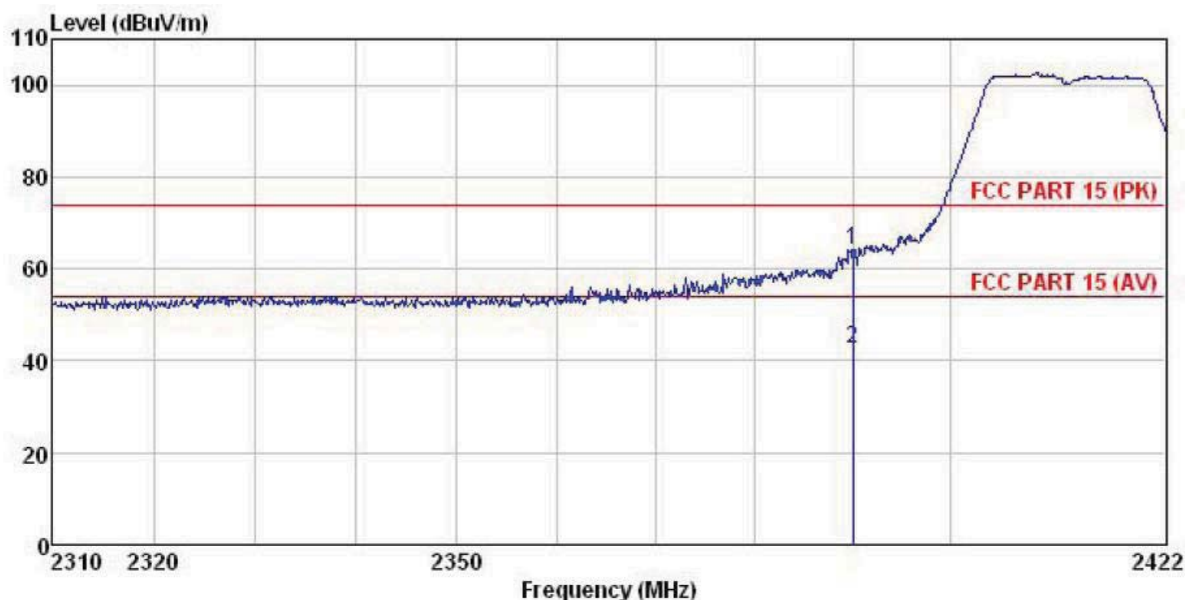
Vertical :



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°C Humi: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	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

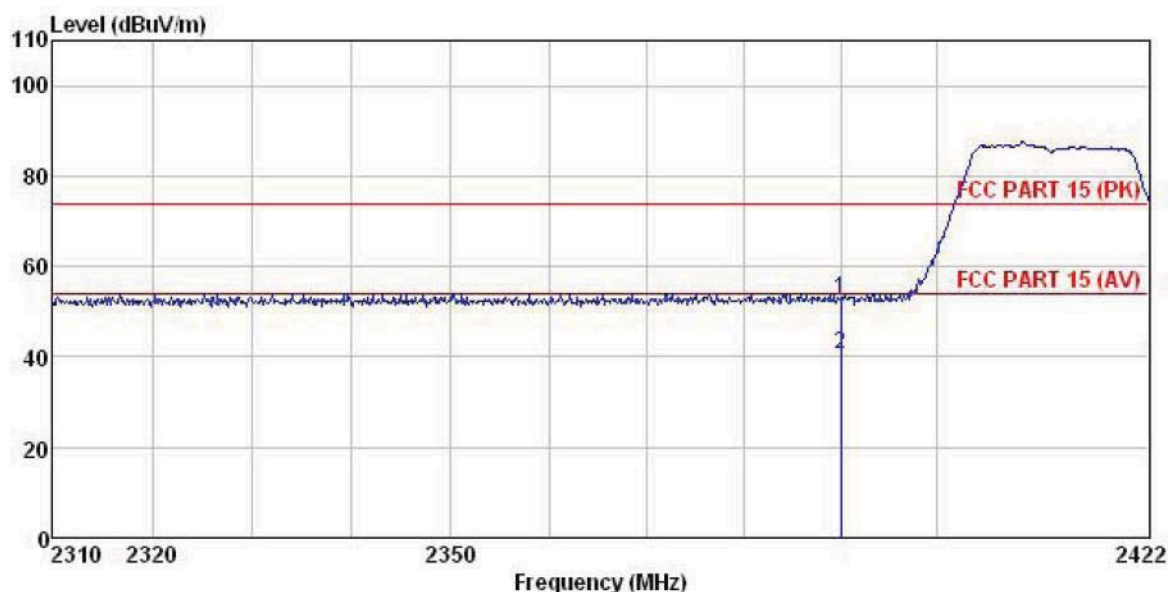
802.11n (H20)
Test channel: Lowest
Horizontal :



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°C Humi:55%
Test Engineer: aaron
REMARK :

	Freq	ReadAntenna	Cable Preamp		Limit	Over		
	Level Factor	Loss Factor	Level	Line	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 :

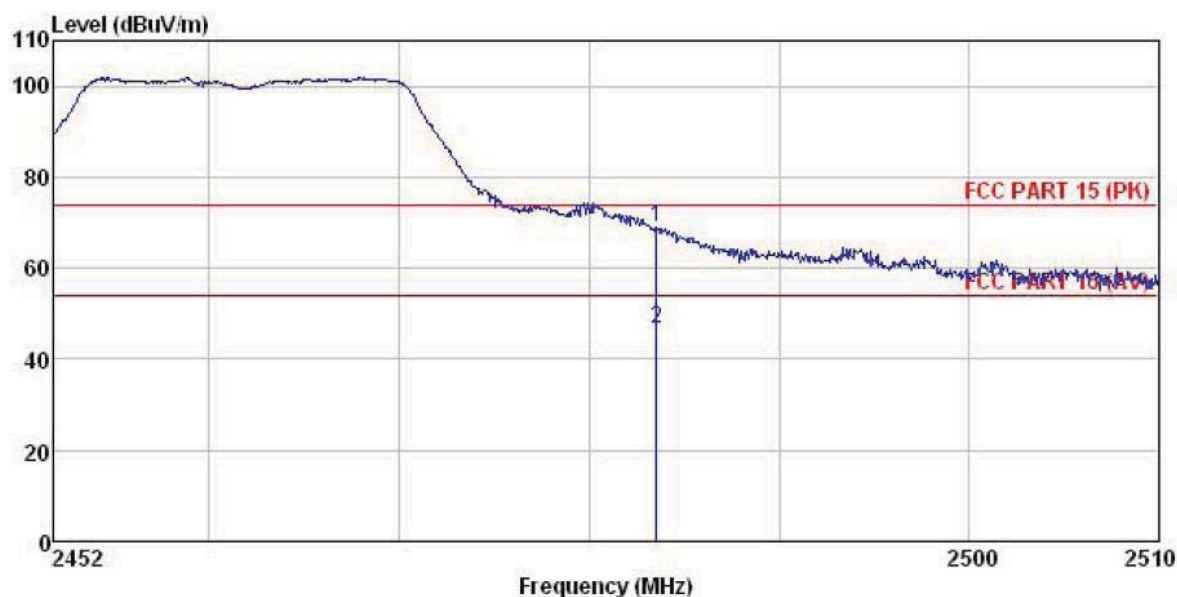


Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m BBHA9120(1G18) VERTICAL
 EUT : Wifi Dongle
 Model : HW-3F03
 Test mode : TX N20-L MODE
 Power Rating : DC5V
 Environment : Temp:25.5°C Humi:55%
 Test Engineer: aaron
 REMARK :

	Freq	ReadAntenna	Cable Preamp		Limit	Over		
		Level Factor	Loss Factor	Level	Line	Limit	Remark	
	MHz	dBuV	dB/m	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

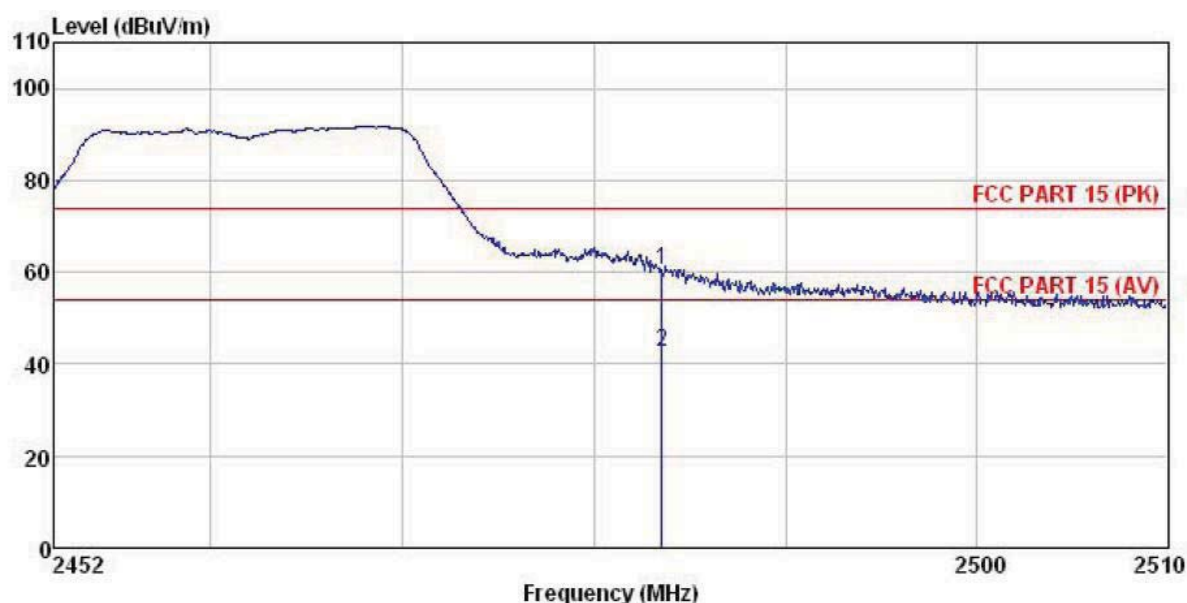
Horizontal :



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°C Humi:55%
 Test Engineer: aaron
 REMARK :

	Freq	ReadAntenna	Cable	Preamp		Limit	Over	
		Level	Factor	Loss	Factor	Level	Line	Limit
	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

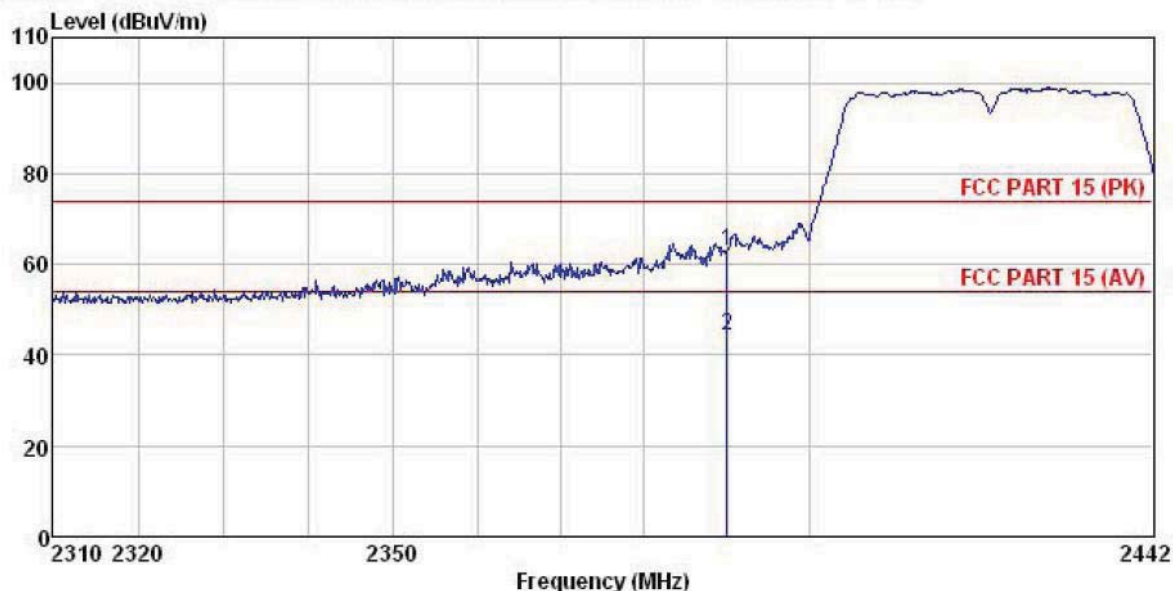
Vertical :



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 Humi:55%
 Test Engineer: aaron
 REMARK :

	Freq	ReadAntenna	Cable	Preamp	Limit	Over	
		Level	Factor	Loss	Factor	Line	Limit
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m
1	2483.500	27.38	27.52	5.70	0.00	60.60	74.00
2	2483.500	9.28	27.52	5.70	0.00	42.50	54.00

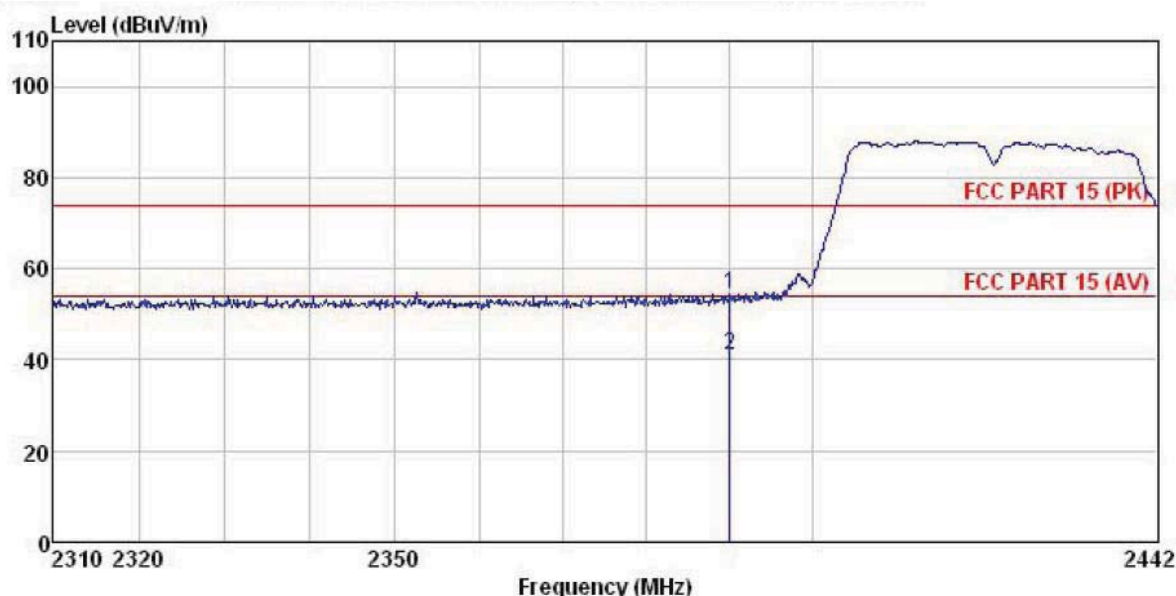
802.11n (H40)
Test channel: Lowest
Horizontal :



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 Humi:55%
Test Engineer: aaron
REMARK :

	Freq	ReadAntenna Level	Cable Factor	Preamplifier Loss	Preamp Factor	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

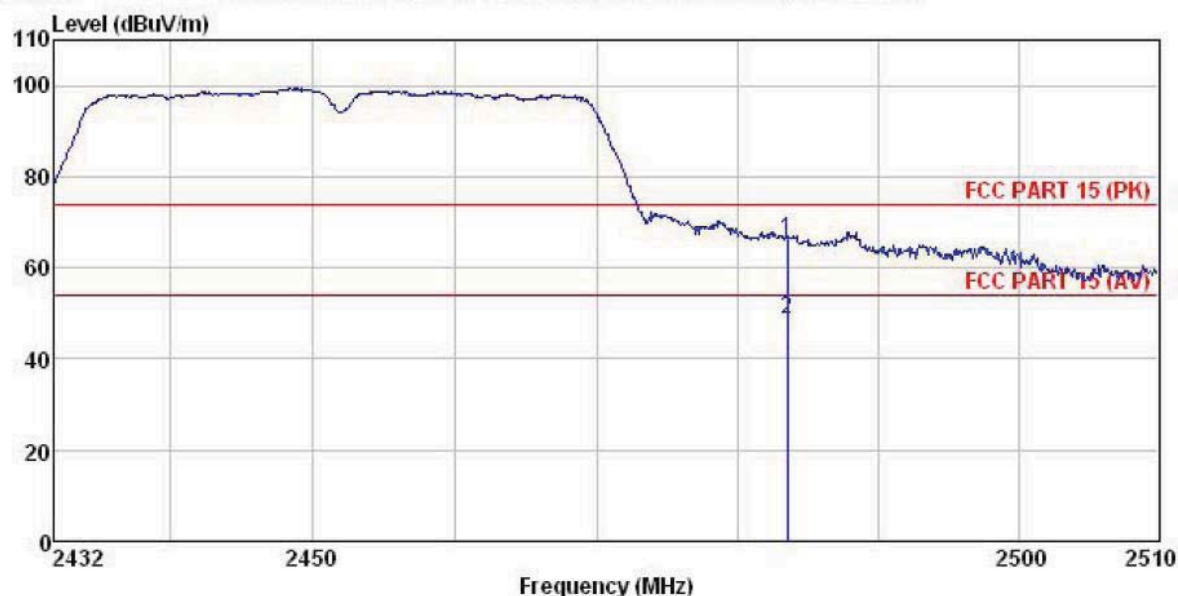
Vertical :



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°C Humi:55%
 Test Engineer: aaron
 REMARK :

	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit	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

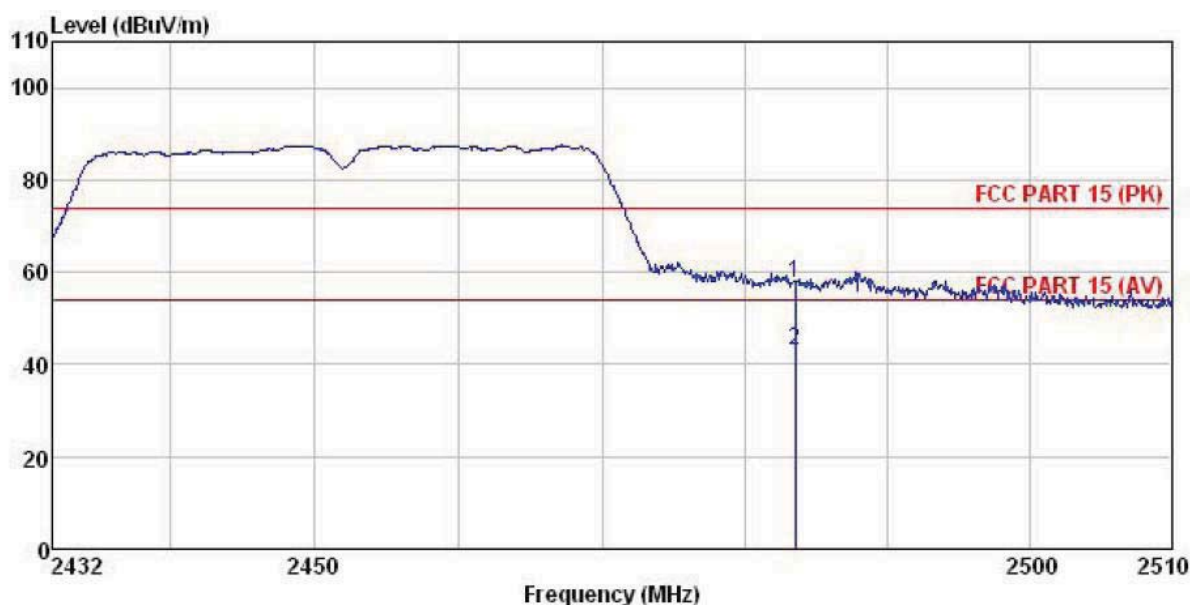
Test channel: Highest
Horizontal :



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°C Humi:55%
Test Engineer: aaron
REMARK :

	Freq	ReadAntenna Level	Factor	Cable Loss	Preamp Factor	Level	Limit	Over	
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	Remark
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 Humi:55%
 Test Engineer: aaron
 REMARK :

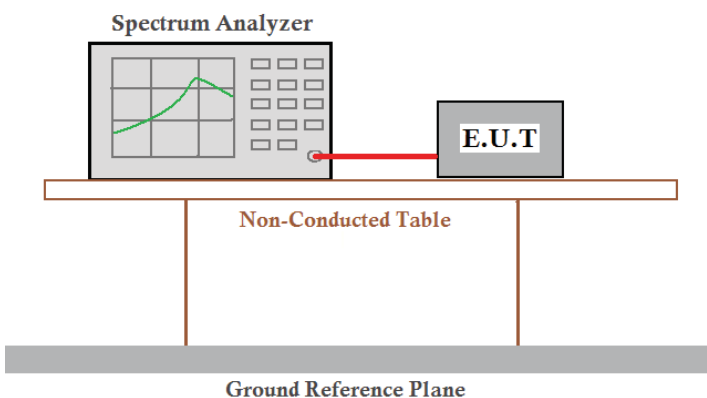
	Read	Antenna	Cable	Preamp		Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
-----MHz	-----dBuV	-----dB/m	-----dB	-----dB	-----dBuV/m	-----dBuV/m	-----dB	-----
1 2483.500	24.25	27.52	5.70	0.00	57.47	74.00	-16.53	Peak
2 2483.500	9.61	27.52	5.70	0.00	42.83	54.00	-11.17	Average

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

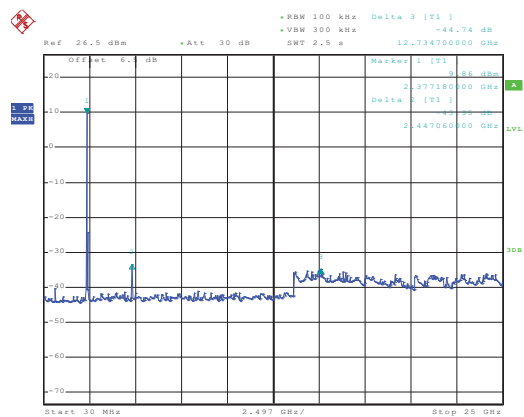
6.7.1 Conducted Emission Method

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:	 The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.
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
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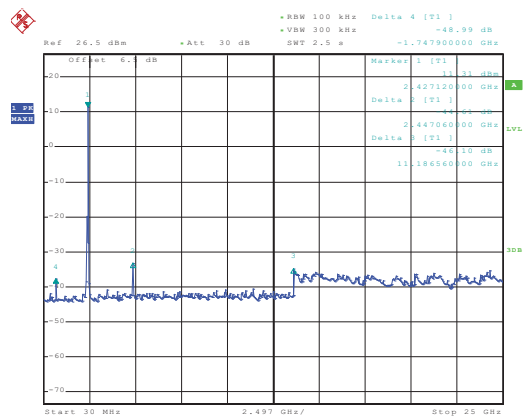
Lowest channel



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

30MHz~25GHz

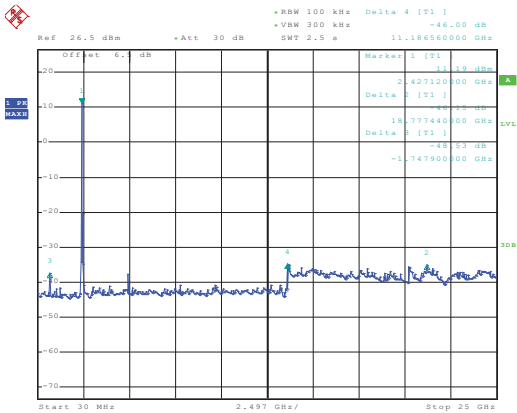
Middle channel



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

30MHz~25GHz

Highest channel

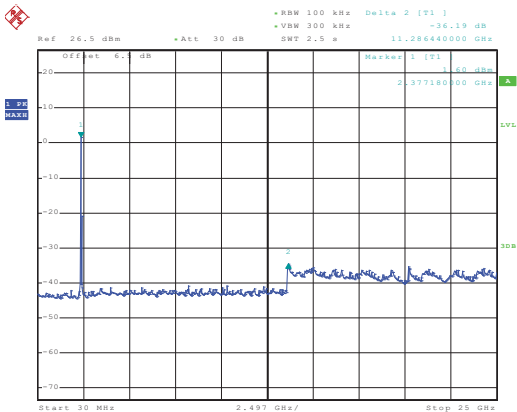


Date: 17.APR.2014 01:18:12

30MHz~25GHz

Test mode:	802.11g
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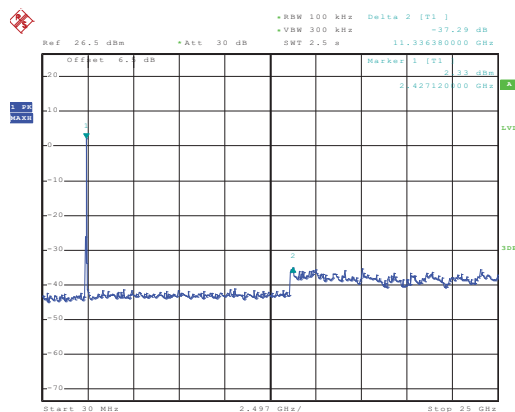
Lowest channel



Date: 17.APR.2014 00:49:46

30MHz~25GHz

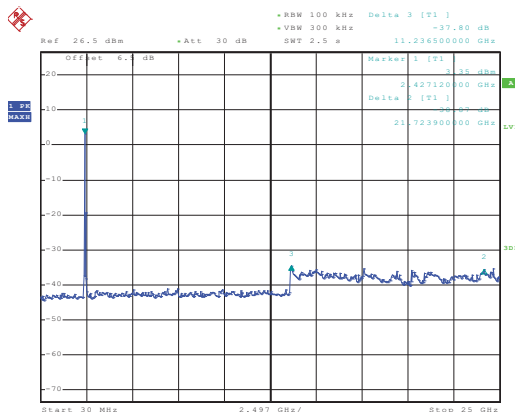
Middle channel



Date: 17.APR.2014 01:16:32

30MHz~25GHz

Highest channel

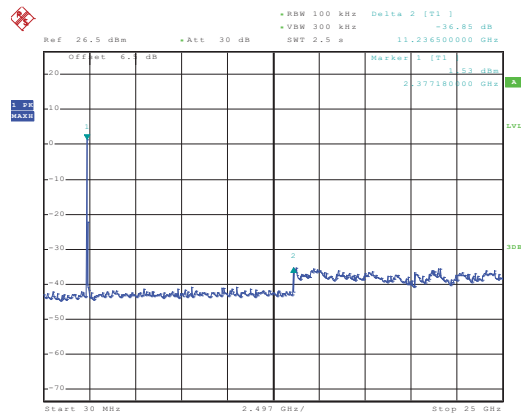


Date: 17.APR.2014 01:15:25

30MHz~25GHz

Test mode:	802.11n(H20)
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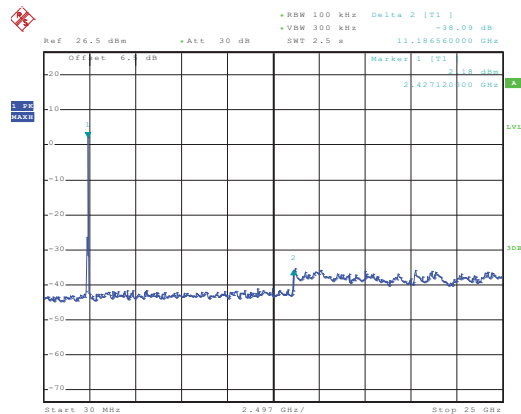
Lowest channel



Date: 17.APR.2014 00:54:06

30MHz~25GHz

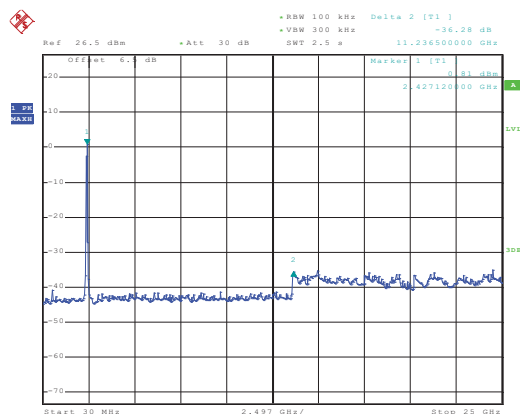
Middle channel



Date: 17.APR.2014 01:11:15

30MHz~25GHz

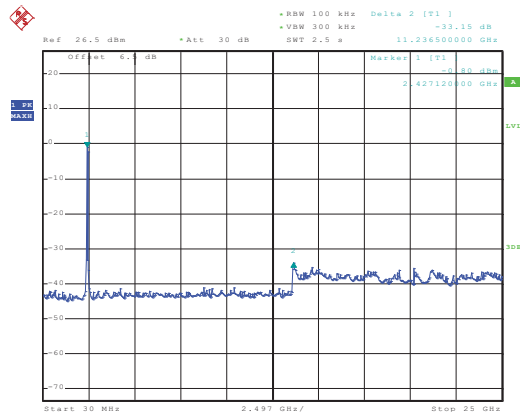
Middle channel



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

30MHz~25GHz

Highest channel



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

30MHz~25GHz