

TEST REPORT

FCC Applicant: Legrand/Pass & Seymour
Address: 50 Boyd Ave, Syracuse, New York 13029, United States
IC Applicant: Pass & Seymour, Inc d/b/a Legrand
Address: 50 Boyd Ave, Syracuse, NY 13209, United States
Manufacturer/ Factory: Computime Electronics (Shenzhen) Company Limited
Address: Yuekenguangyu Industrial Park, Kangqiao Road 88#,
Danzhutou Community, Nanwan Street office, Longgang
District, Shenzhen, China.

Equipment Under Test (EUT)

Product Name: Thermostat
Model No.: WZ3TSTATH
Trade Mark: Legrand
FCC ID: 2AU5DWZ3TSTAT
IC: 25764-WZ3TSTAT
Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247
RSS-Gen Issue 5
RSS-247 Issue 2
Date of sample receipt: June 23, 2020
Date of Test: June 24, 2020-January 21, 2021
Date of report issued: January 21, 2021
Test Result : PASS *

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

Authorized Signature:

A circular blue ink stamp from Global United Technology Services Co., Ltd. (GTS) is visible. The stamp contains the text "GLOBAL UNITED TECHNOLOGY SERVICES CO., LTD." around the perimeter and "GTS" in the center. A handwritten signature in blue ink is written over the stamp.

Robinson Lo

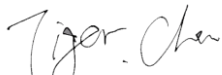
Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Version

Version No.	Date	Description
00	January 21, 2021	Original

Prepared By:

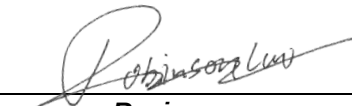


Project Engineer

Date:

January 21, 2021

Check By:



Reviewer

Date:

January 21, 2021

3 Contents

	Page
1 COVER PAGE.....	1
2 VERSION.....	2
3 CONTENTS	3
4 TEST SUMMARY	4
5 GENERAL INFORMATION.....	5
5.1 GENERAL DESCRIPTION OF EUT	5
5.2 TEST MODE	7
5.3 DESCRIPTION OF SUPPORT UNITS	7
5.4 TEST FACILITY.....	7
5.5 TEST LOCATION	7
5.6 ADDITIONAL INSTRUCTIONS.....	7
6 TEST INSTRUMENTS LIST	8
7 TEST RESULTS AND MEASUREMENT DATA.....	10
7.1 ANTENNA REQUIREMENT	10
7.2 CONDUCTED EMISSIONS	11
7.3 CONDUCTED PEAK OUTPUT POWER.....	14
7.4 CHANNEL BANDWIDTH & 99% OCCUPY BANDWIDTH.....	16
7.5 POWER SPECTRAL DENSITY	26
7.6 BAND EDGES.....	32
7.6.1 Conducted Emission Method.....	32
7.6.2 Radiated Emission Method.....	37
7.7 SPURIOUS EMISSION.....	54
7.7.1 Conducted Emission Method.....	54
7.7.2 Radiated Emission Method.....	59
7.8 FREQUENCY STABILITY	88
8 TEST SETUP PHOTO.....	91
9 EUT CONSTRUCTIONAL DETAILS	91

4 Test Summary

Test Item	Section	Result
Antenna requirement	FCC part 15.203/15.247 (c) RSS-Gen Section 6.8	Pass
AC Power Line Conducted Emission	FCC part 15.207 RSS-Gen Section 8.8	Pass
Conducted Peak Output Power	FCC part 15.247 (b)(3) RSS-247 Section 5.4(d)	Pass
Channel Bandwidth & 99% OCB	FCC part 15.247 (a)(2) RSS-247 Section 5.2(a) & RSS-Gen 6.7	Pass
Power Spectral Density	FCC part 15.247 (e) RSS-247 Section 5.2(b)	Pass
Band Edge	FCC part 15.247(d) RSS-Gen 8.10 & RSS-247 5.5	Pass
Spurious Emission	FCC part 15.205/15.209 RSS-Gen Section 8.9 & 8.10	Pass

Remark: Test according to ANSI C63.10:2013 and RSS-Gen

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

Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	± 4.34dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 4.24dB	(1)
Radiated Emission	1GHz ~ 26.5GHz	± 4.68dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	± 3.45dB	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

5 General Information

5.1 General Description of EUT

Product Name:	Thermostat
Model No.:	WZ3TSTATH
Serial No.:	N/A
Test sample(s) ID:	GTS202006000241-1
Sample(s) Status	Engineer sample
Hardware version:	1.0
Software version:	1.0
Channel numbers:	802.11b/802.11g /802.11n(HT20): 11 802.11n(HT40):7
Channel separation:	5MHz
Modulation technology:	802.11b: Direct Sequence Spread Spectrum (DSSS) 802.11g/802.11n(HT20)/802.11n(HT40): Orthogonal Frequency Division Multiplexing (OFDM)
Antenna Type:	Integral Antenna
Antenna gain:	ANT 1: 0dBi(declare by applicant) ANT 2: 0dBi(declare by applicant)
Power supply:	AC 24V

Operation Frequency each of channel							
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		

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:

Test channel	Frequency (MHz)	
	802.11b/802.11g/802.11n(HT20)	802.11n(HT40)
Lowest channel	2412MHz	2422MHz
Middle channel	2437MHz	2437MHz
Highest channel	2462MHz	2452MHz

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode
<i>Remark: During the test, the dutycycle >98%, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.</i>	

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:				
Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.				
Mode	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)
Data rate	1Mbps	6Mbps	6.5Mbps	13Mbps

5.3 Description of Support Units

Manufacturer	Description	Model	Serial Number
Supplied by client	AC adaptor	PPI76-24V05AC	N/A

5.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations: ● FCC —Registration No.: 381383 Global United Technology Services Co., Ltd., Shenzhen 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 files. Registration 381383. ● IC —Registration No.: 9079A The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A. ● NVLAP (LAB CODE:600179-0) Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0
--

5.5 Test Location

All tests were performed at:
Global United Technology Services Co., Ltd. Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102 Tel: 0755-27798480 Fax: 0755-27798960

5.6 Additional Instructions

Test Software	Test command provide by manufacturer.
Power level setup	Default

6 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	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 02 2020	July. 01 2025
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 25 2020	June. 24 2021
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 25 2020	June. 24 2021
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 25 2020	June. 24 2021
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 25 2020	June. 24 2021
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 25 2020	June. 24 2021
9	Coaxial Cable	GTS	N/A	GTS211	June. 25 2020	June. 24 2021
10	Coaxial cable	GTS	N/A	GTS210	June. 25 2020	June. 24 2021
11	Coaxial Cable	GTS	N/A	GTS212	June. 25 2020	June. 24 2021
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 25 2020	June. 24 2021
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 25 2020	June. 24 2021
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 25 2020	June. 24 2021
15	Band filter	Amindeon	82346	GTS219	June. 25 2020	June. 24 2021
16	Power Meter	Anritsu	ML2495A	GTS540	June. 25 2020	June. 24 2021
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 25 2020	June. 24 2021
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 25 2020	June. 24 2021
19	Splitter	Agilent	11636B	GTS237	June. 25 2020	June. 24 2021
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 25 2020	June. 24 2021
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 18 2020	Oct. 17 2021
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 18 2020	Oct. 17 2021
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 18 2020	Oct. 17 2021
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 25 2020	June. 24 2021

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.15 2019	May.14 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 25 2020	June. 24 2021
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 25 2020	June. 24 2021
4	ENV216 2-L-V-NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	GTS226	June. 25 2020	June. 24 2021
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 25 2020	June. 24 2021
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 25 2020	June. 24 2021
9	ISN	SCHWARZBECK	NTFM 8158	GTD565	June. 25 2020	June. 24 2021

RF Conducted Test:						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 25 2020	June. 24 2021
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 25 2020	June. 24 2021
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 25 2020	June. 24 2021
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 25 2020	June. 24 2021
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 25 2020	June. 24 2021
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 25 2020	June. 24 2021
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 25 2020	June. 24 2021
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 25 2020	June. 24 2021

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 25 2020	June. 24 2021
2	Barometer	ChangChun	DYM3	GTS255	June. 25 2020	June. 24 2021

7 Test results and Measurement Data

7.1 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.	
Standard requirement:	RSS-Gen Section 6.8
A transmitter can only be sold or operated with antennas with which it was approved. When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. For transmitters of RF output power of 10 milliwatts or less, only the portion of the antenna gain that is in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power to demonstrate compliance with the radiated power limits specified in the applicable standard. For transmitters of output power greater than 10 milliwatts, the total antenna gain shall be added to the measured RF output power to demonstrate compliance to the specified radiated power	
EUT Antenna:	
<i>The antenna is Integral antenna, the best case gain of the ANT is 0dBi, reference to the appendix II for details</i>	

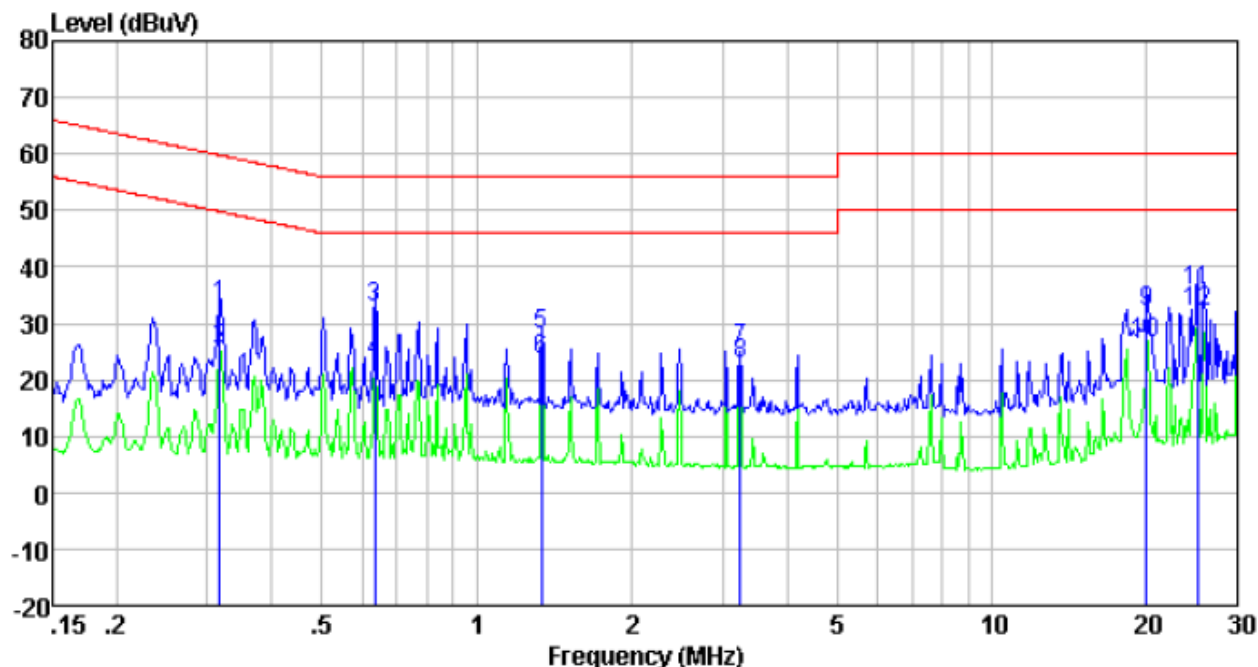
7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207 RSS-Gen Section 8.8					
Test Method:	ANSI C63.10:2013					
Test Frequency Range:	150KHz to 30MHz					
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto					
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 setup:	Reference Plane LISN AUX Equipment E.U.T LISN Filter EMI Receiver 40cm 80cm AC power Test table/Insulation plane Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m					
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.). This 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 C63.10:2013 on conducted measurement.					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test results:	Pass					

Measurement data

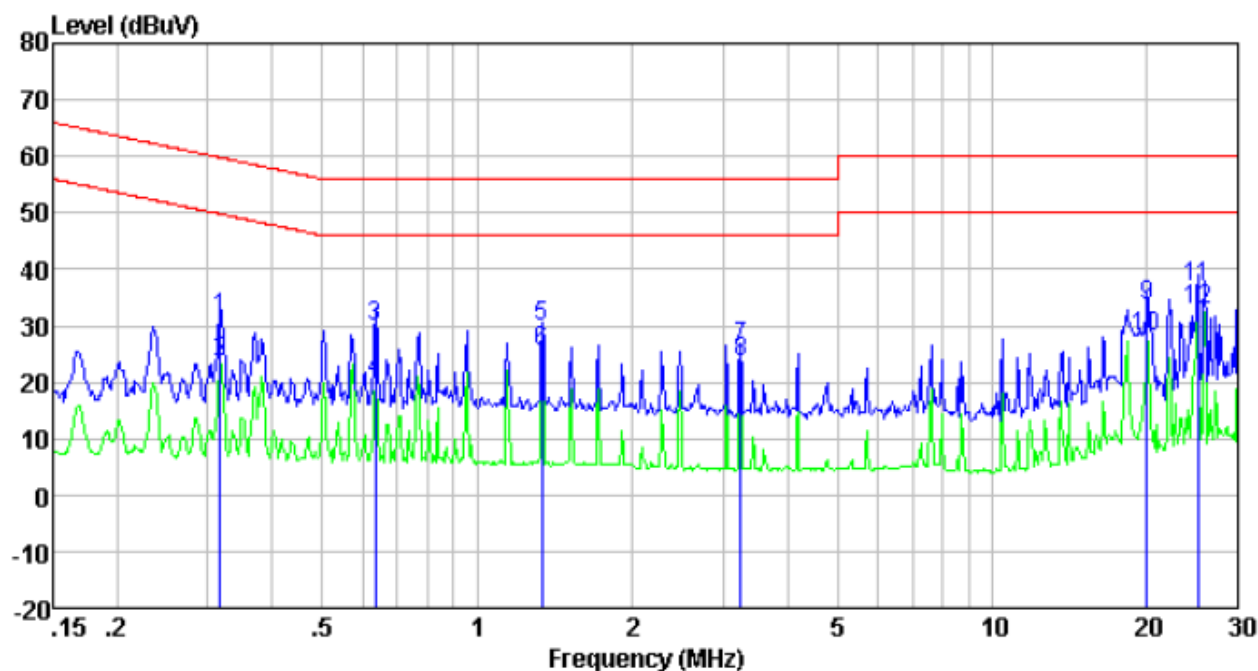
Pre-scan all test modes, found worst case at 802.11b 2412MHz of ANT 1, and so only show the test result of 802.11b 2412MHz of ANT 1

Line:



Freq. MHz	Read Level dBuV	Factor dB/m	Level dBuV	Limit Line dBuV	Over Limit dB	Remark
0.32	12.72	20.49	33.21	59.80	-26.59	QP
0.32	4.86	20.49	25.35	49.80	-24.45	Average
0.63	12.41	20.40	32.81	56.00	-23.19	QP
0.63	2.70	20.40	23.10	46.00	-22.90	Average
1.34	7.55	20.36	27.91	56.00	-28.09	QP
1.34	3.13	20.36	23.49	46.00	-22.51	Average
3.24	5.01	20.39	25.40	56.00	-30.60	QP
3.24	2.27	20.39	22.66	46.00	-23.34	Average
19.95	11.63	20.53	32.16	60.00	-27.84	QP
19.95	6.09	20.53	26.62	50.00	-23.38	Average
25.05	15.18	20.59	35.77	60.00	-24.23	QP
25.05	11.44	20.59	32.03	50.00	-17.97	Average

Neutral:

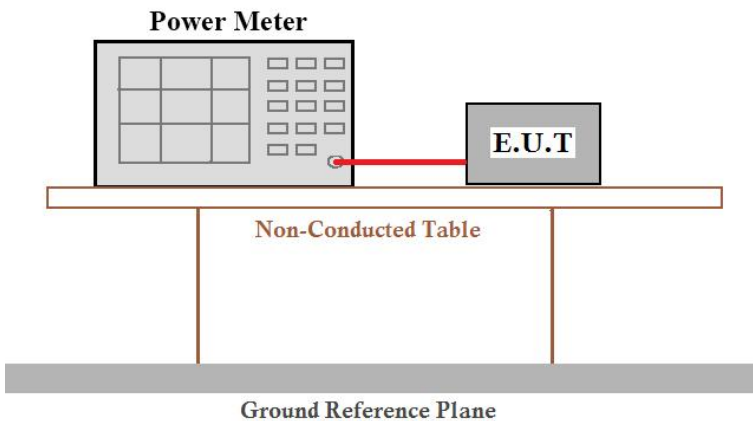


Freq. MHz	Read Level dBuV	Factor dB/m	Level dBuV	Limit Line dBuV	Over Limit dB	Remark
0.32	10.94	20.49	31.43	59.80	-28.37	QP
0.32	3.03	20.49	23.52	49.80	-26.28	Average
0.63	9.57	20.40	29.97	56.00	-26.03	QP
0.63	-0.31	20.40	20.09	46.00	-25.91	Average
1.34	9.29	20.36	29.65	56.00	-26.35	QP
1.34	4.87	20.36	25.23	46.00	-20.77	Average
3.24	5.88	20.39	26.27	56.00	-29.73	QP
3.24	3.16	20.39	23.55	46.00	-22.45	Average
19.95	12.83	20.53	33.36	60.00	-26.64	QP
19.95	7.41	20.53	27.94	50.00	-22.06	Average
25.05	16.15	20.59	36.74	60.00	-23.26	QP
25.05	12.08	20.59	32.67	50.00	-17.33	Average

Notes:

1. An initial pre-scan was performed on the line 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
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

7.3 Conducted Peak Output Power

Test Requirement :	FCC Part15 C Section 15.247 (b)(3) RSS-247 Section 5.4(d)
Test Method :	KDB558074 D01 DTS Meas Guidance v05r02 ANSI C63.10:2013 and RSS-Gen
Limit:	30dBm 36dBm(4W for e.i.r.p)
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

ANT 1:

Test CH	Peak Output Power (dBm)				Limit(dBm)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	17.11	11.99	12.19	11.98	30.00	Pass
Middle	16.95	11.69	11.78	11.96		
Highest	16.44	11.58	11.85	11.31		

Test CH	e.i.r.p (dBm)				Limit(dBm)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	17.11	11.99	12.19	11.98	36	Pass
Middle	16.95	11.69	11.78	11.96		
Highest	16.44	11.58	11.85	11.31		

ANT 2:

Test CH	Peak Output Power (dBm)				Limit(dBm)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	17.10	11.82	11.99	11.89	30.00	Pass
Middle	16.98	11.94	11.97	11.85		
Highest	16.17	11.59	11.91	11.81		

Test CH	e.i.r.p (dBm)				Limit(dBm)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	17.10	11.82	11.99	11.89	36	Pass
Middle	16.98	11.94	11.97	11.85		
Highest	16.17	11.59	11.91	11.81		

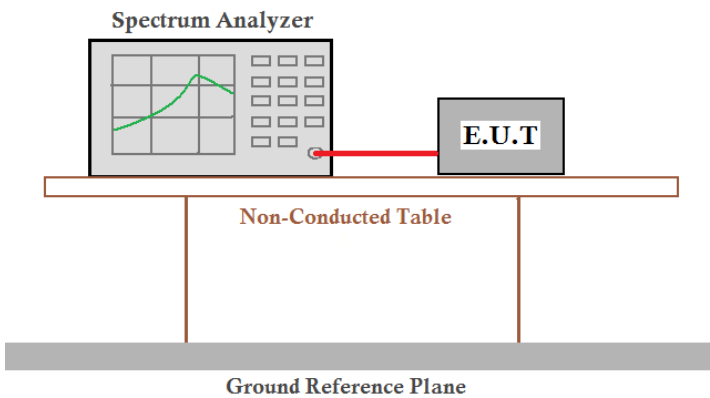
MIMO:

Modulation	Test CH	Peak Output Power (dBm)		Sum Output Power (dBm)	Limit (dBm)	Result
802.11n(HT20)	Lowest	ANT 1	12.19	15.10	30	Pass
		ANT 2	11.98			
	Middle	ANT 1	11.78	14.89		
		ANT 2	11.97			
	Highest	ANT 1	11.85	14.89		
		ANT 2	11.91			
Modulation	Test CH	Peak Output Power (dBm)		Sum Output Power (dBm)	Limit (dBm)	Result
802.11n(HT40)	Lowest	ANT 1	11.98	14.95	30	Pass
		ANT 2	11.89			
	Middle	ANT 1	11.96	14.92		
		ANT 2	11.85			
	Highest	ANT 1	11.31	14.58		
		ANT 2	11.81			

Note: transmit signals are completely *uncorrelated*,

Directional gain= $10 \times \log [(10^{0/10} + 10^{0/10})/2]$ =0dBi

7.4 Channel Bandwidth & 99% Occupancy Bandwidth

Test Requirement :	FCC Part15 C Section 15.247 (a)(2) RSS-Gen Section 6.7 & RSS-247 Section 5.2(a)
Test Method :	KDB558074 D01 DTS Meas Guidance v05r02 ANSI C63.10:2013 and RSS-Gen
Limit:	>500KHz
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer, showing a frequency spectrum on its screen, is connected to an Equipment Under Test (E.U.T.) by a red cable. Both the Spectrum Analyzer and the E.U.T. are positioned on a Non-Conducted Table. This table is supported by two vertical legs. Below the table, a Ground Reference Plane is indicated by a thick grey bar.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

ANT 1:

Test CH	Channel Bandwidth (MHz)				Limit(KHz)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	10.133	16.419	17.565	36.093	>500	Pass
Middle	10.114	16.366	17.659	35.659		
Highest	10.046	16.414	17.570	35.899		

Test CH	99% Occupy Bandwidth (MHz)				Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)	
Lowest	13.6698	16.5723	17.6313	36.0831	Pass
Middle	13.6572	16.6112	17.6287	36.1309	
Highest	13.6567	16.6123	17.6378	36.1875	

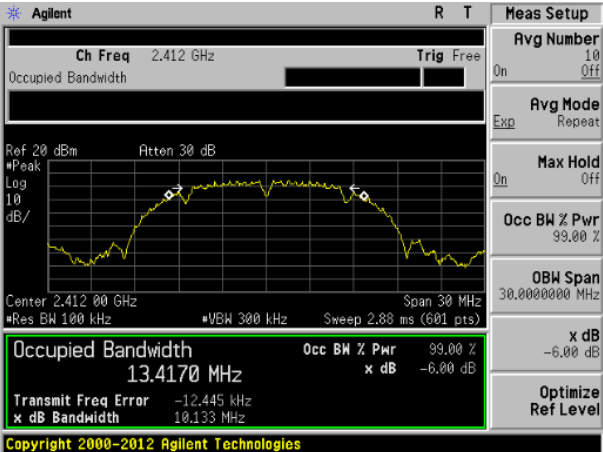
ANT 2:

Test CH	Channel Bandwidth (MHz)				Limit(KHz)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	10.080	16.430	17.591	36.056	>500	Pass
Middle	10.097	16.399	17.598	35.666		
Highest	10.083	16.515	17.609	35.875		

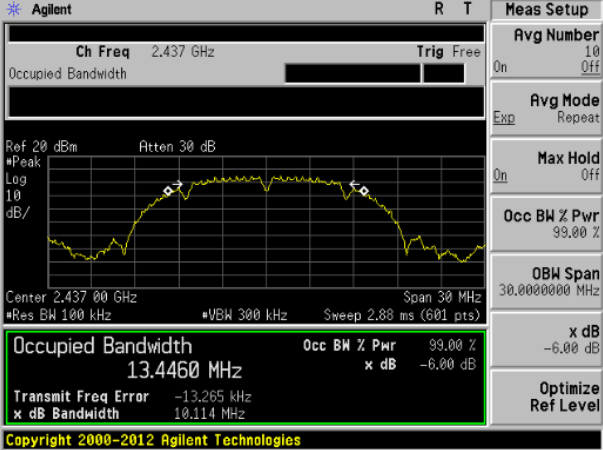
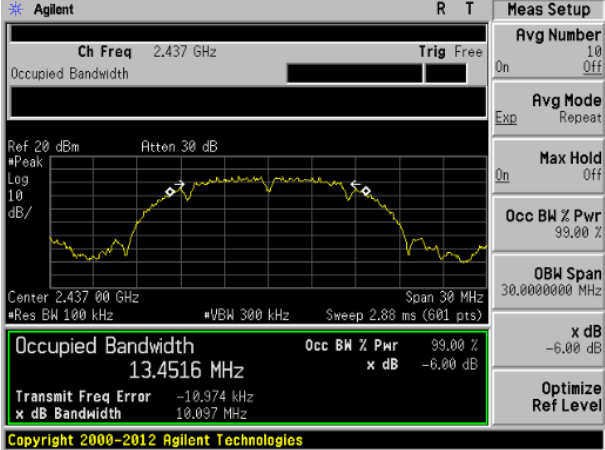
Test CH	99% Occupy Bandwidth (MHz)				Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)	
Lowest	13.7195	16.5782	17.6612	36.1557	Pass
Middle	13.6376	16.6118	17.6311	36.1073	
Highest	13.6031	16.5628	17.6369	36.0963	

Test plot as follows:

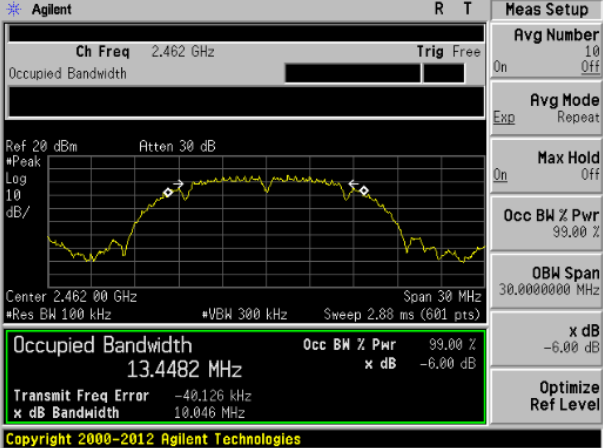
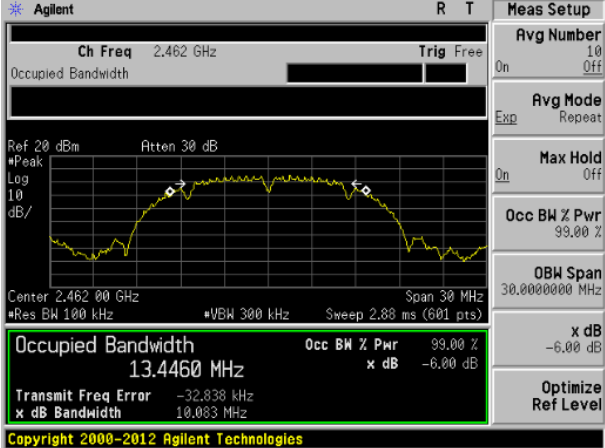
Channel Bandwidth:

802.11b	ANT 1	802.11b	ANT 2
			

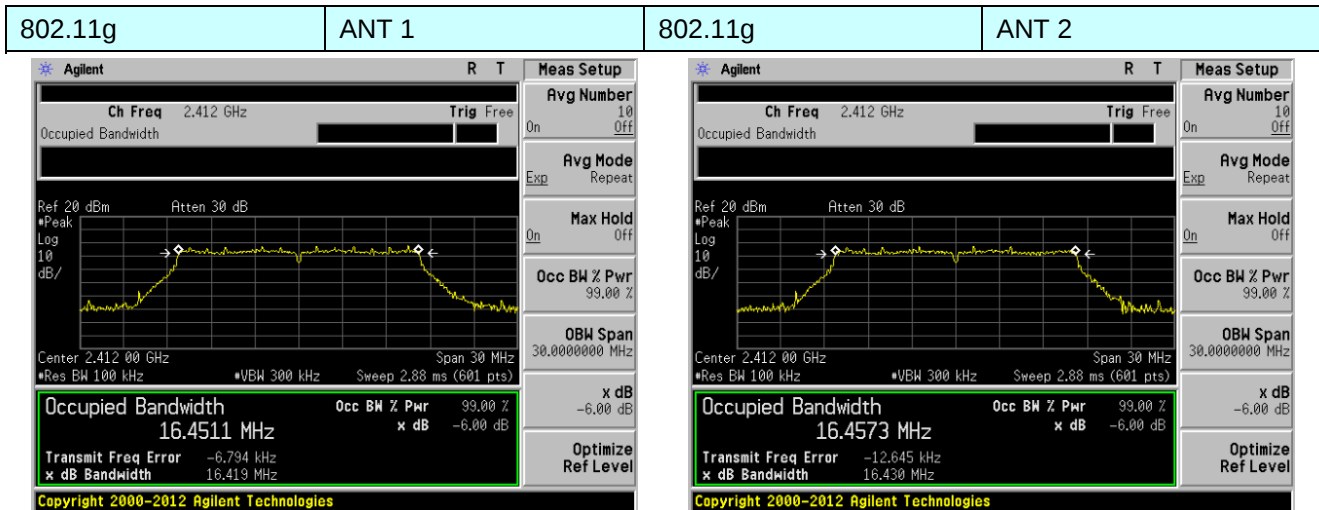
Lowest channel

			
--	--	---	--

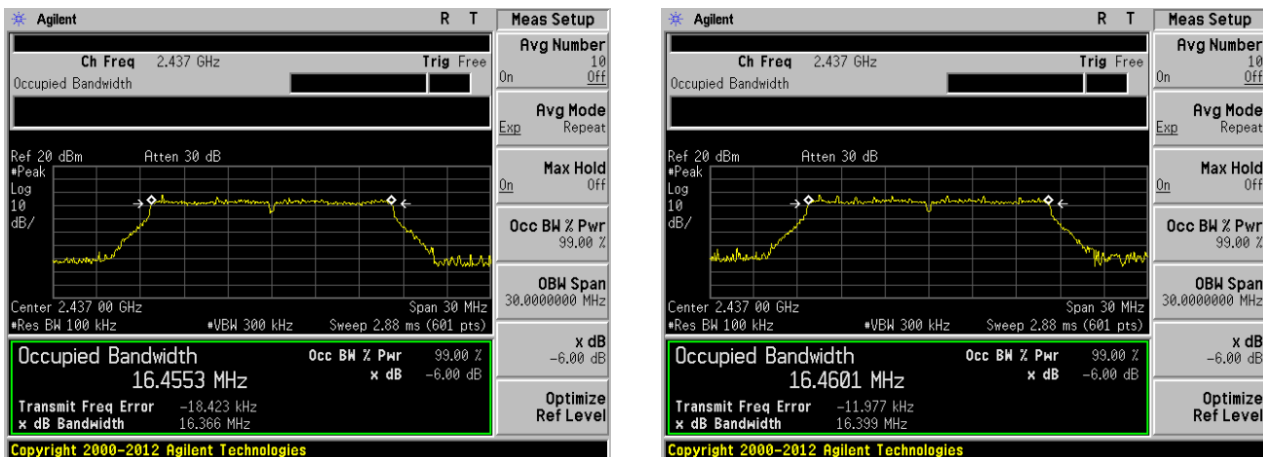
Middle channel

			
---	--	--	--

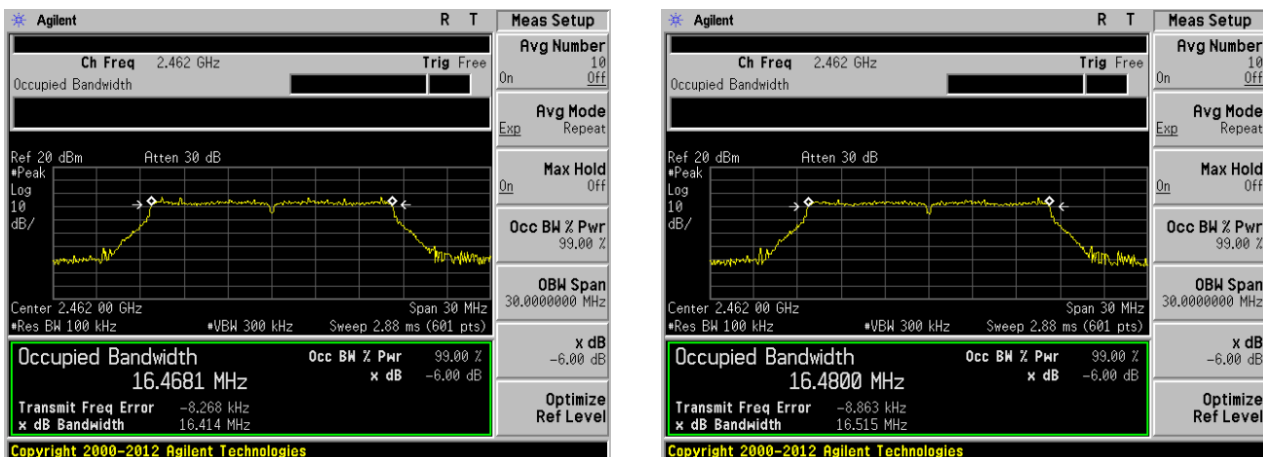
Highest channel



Lowest channel

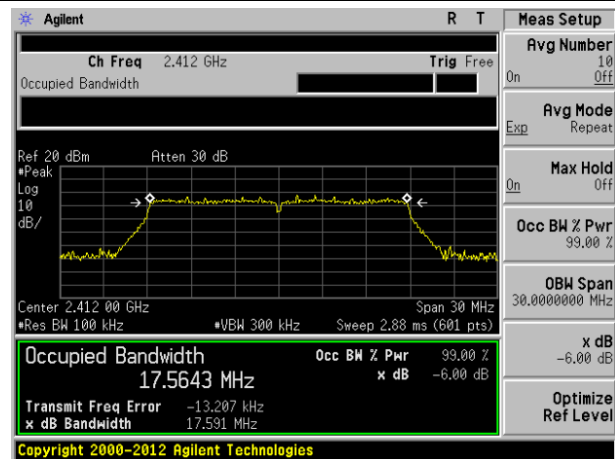
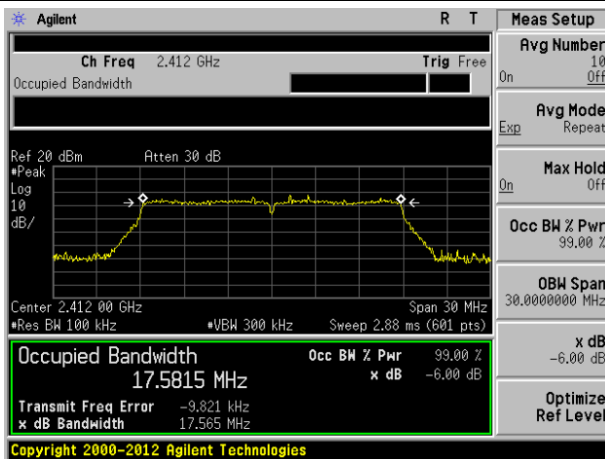


Middle channel

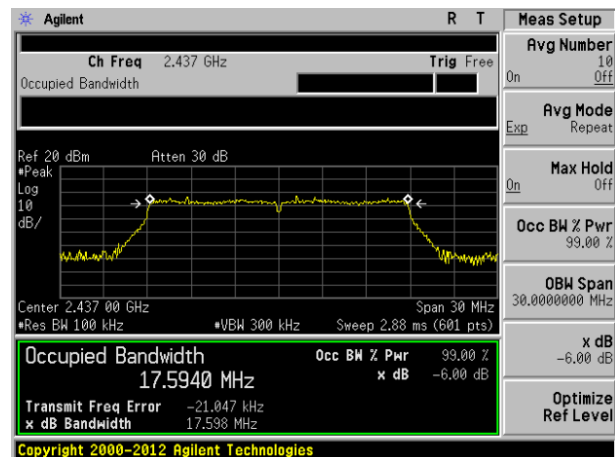
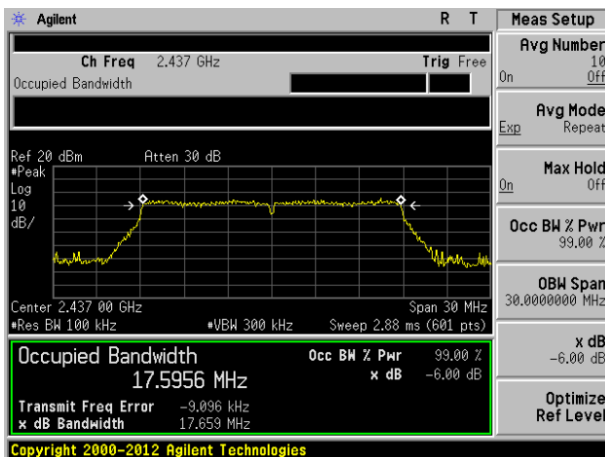


Highest channel

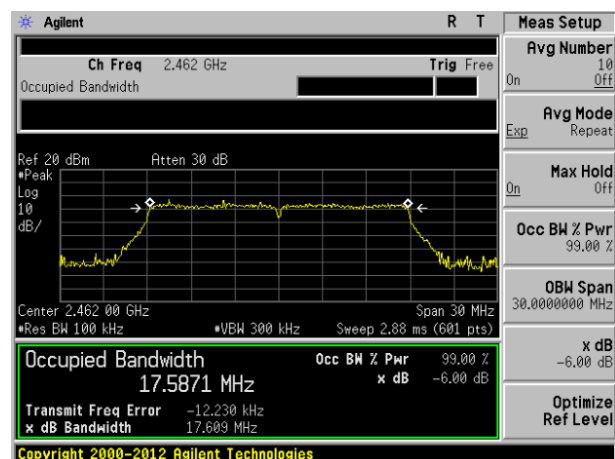
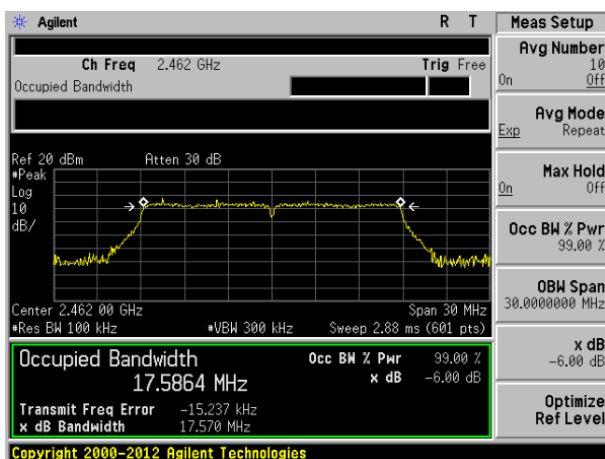
802.11n(HT20)	ANT 1	802.11n(HT20)	ANT 2
---------------	-------	---------------	-------



Lowest channel

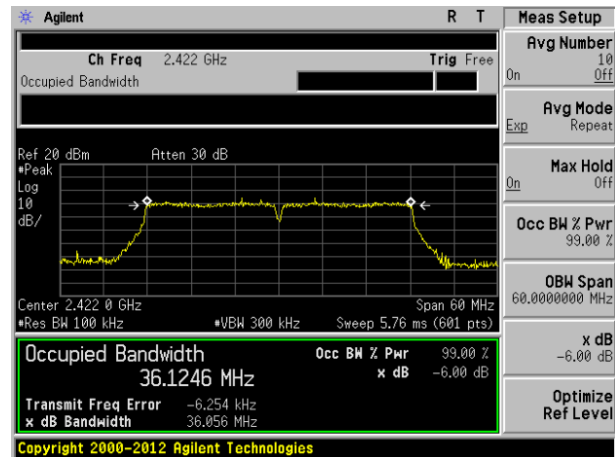
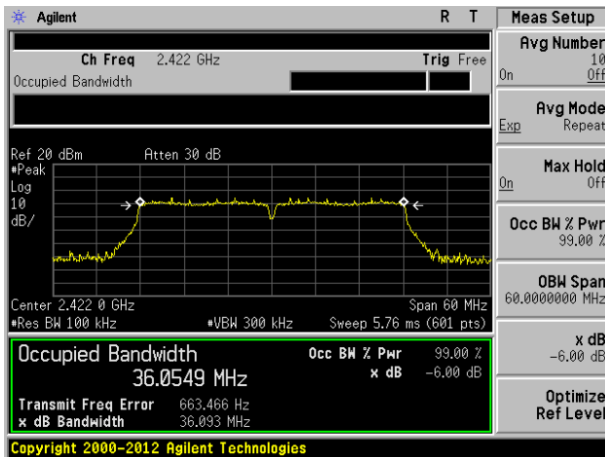


Middle channel

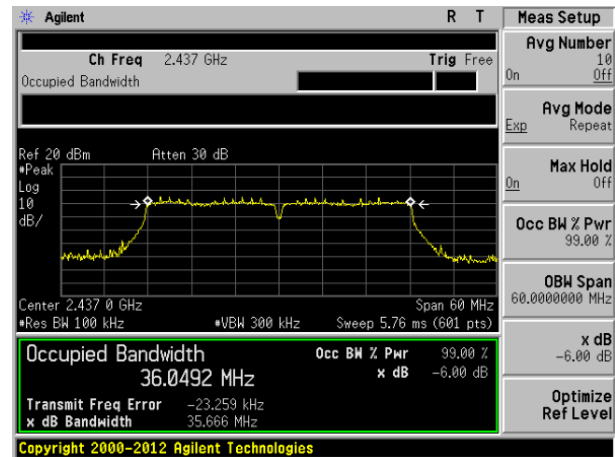
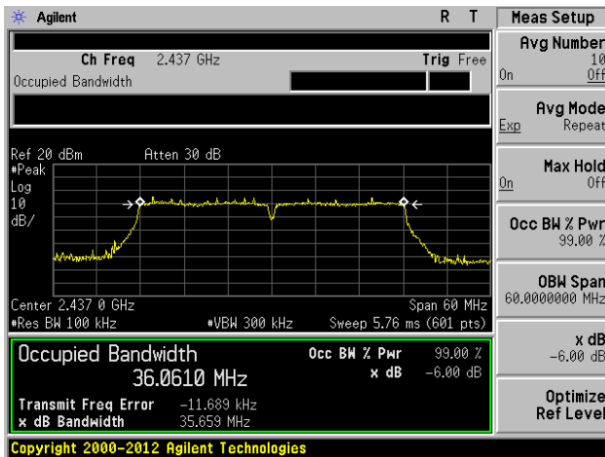


Highest channel

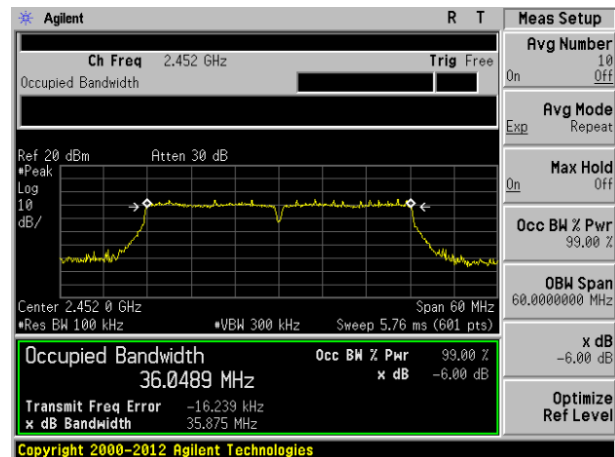
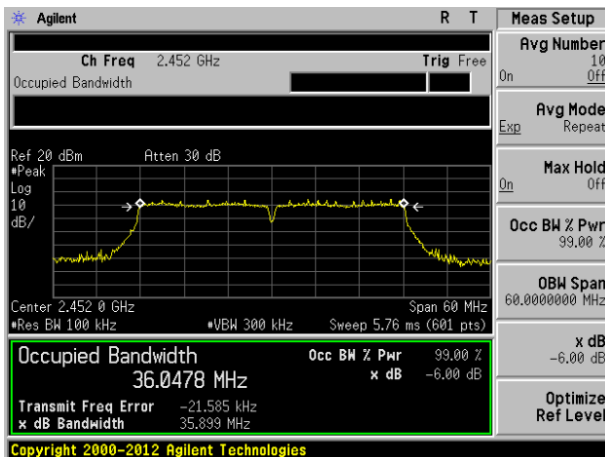
802.11n(HT40)	ANT 1	802.11n(HT40)	ANT 2
---------------	-------	---------------	-------



Lowest channel



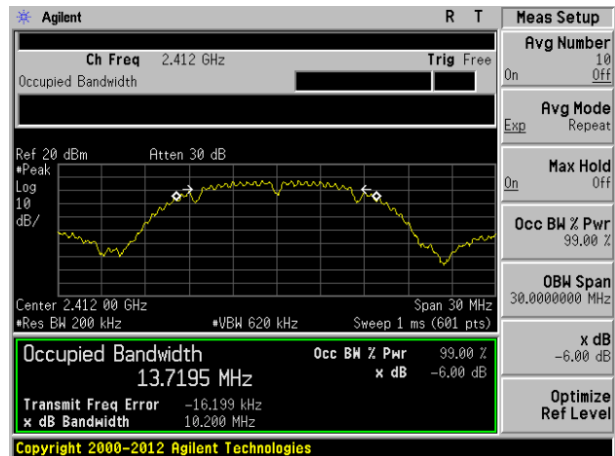
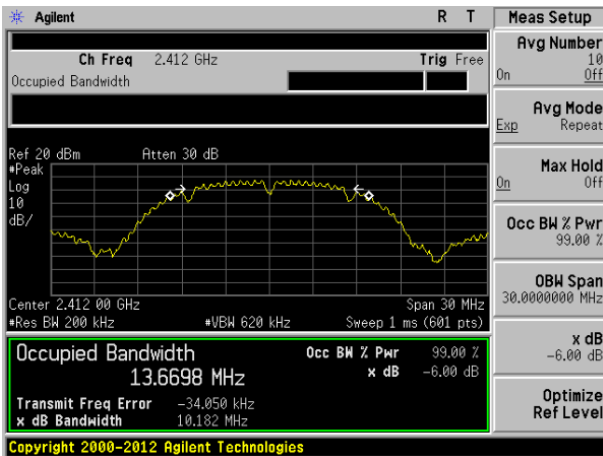
Middle channel



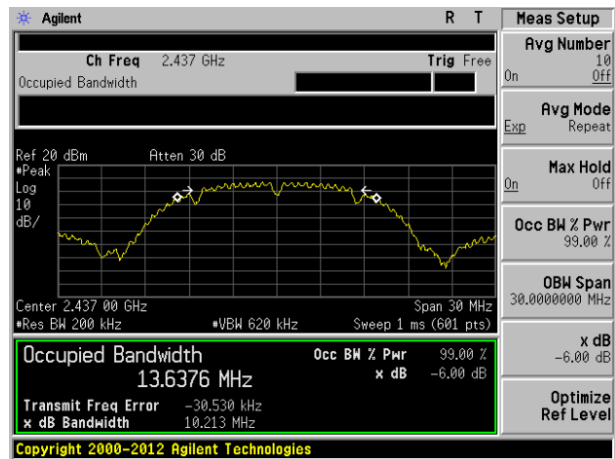
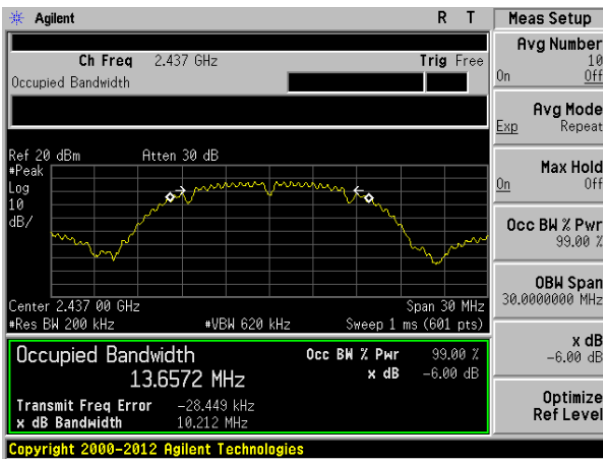
Highest channel

99% Occupancy Bandwidth:

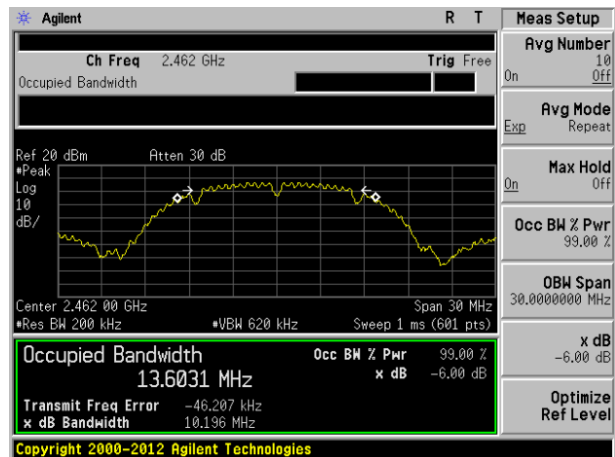
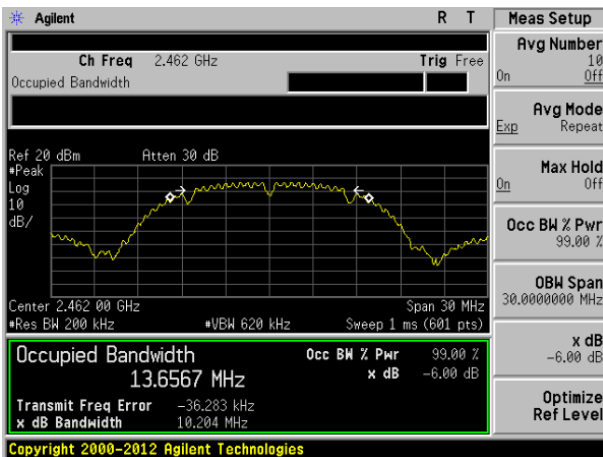
802.11b	ANT 1	802.11b	ANT 2
---------	-------	---------	-------



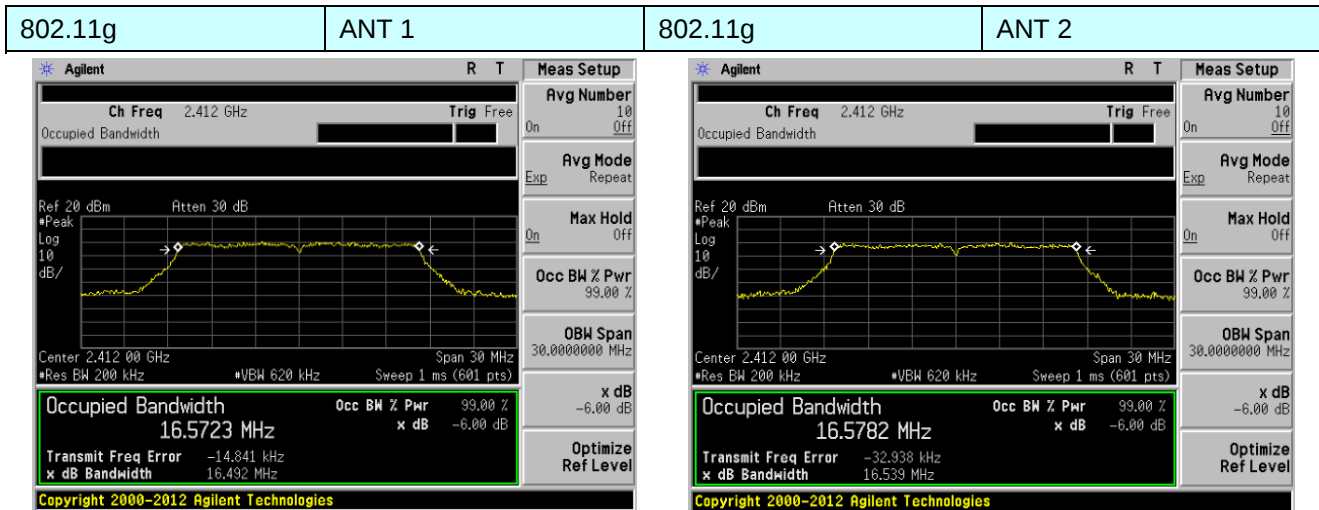
Lowest channel



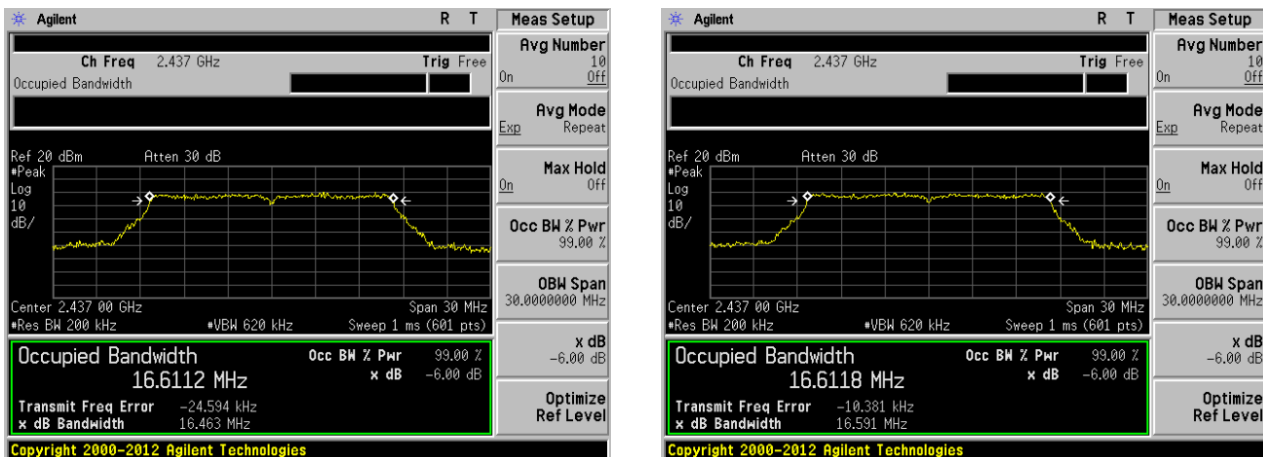
Middle channel



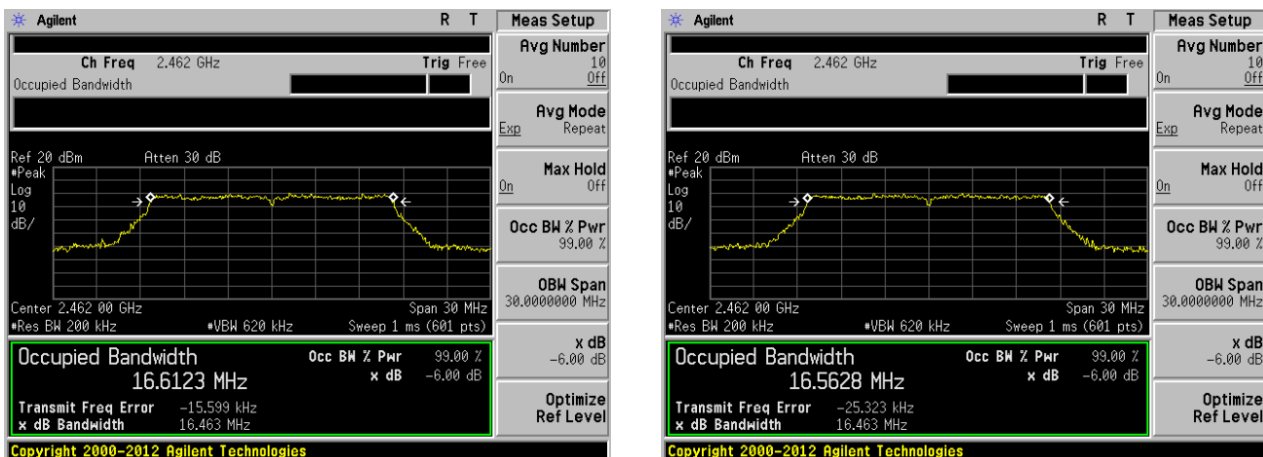
Highest channel



Lowest channel

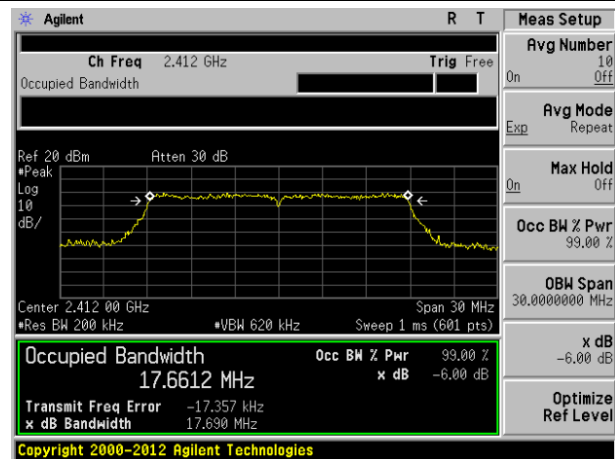
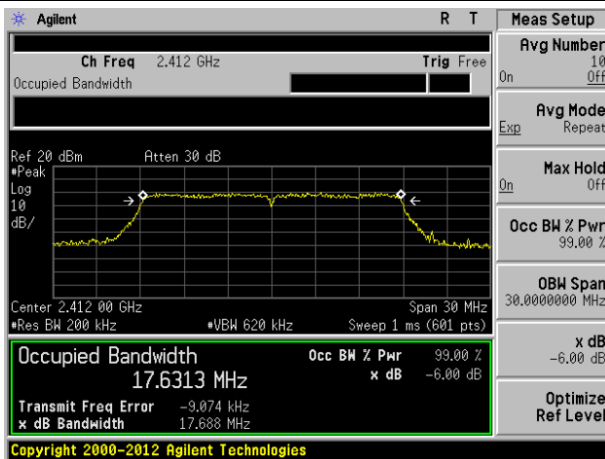


Middle channel

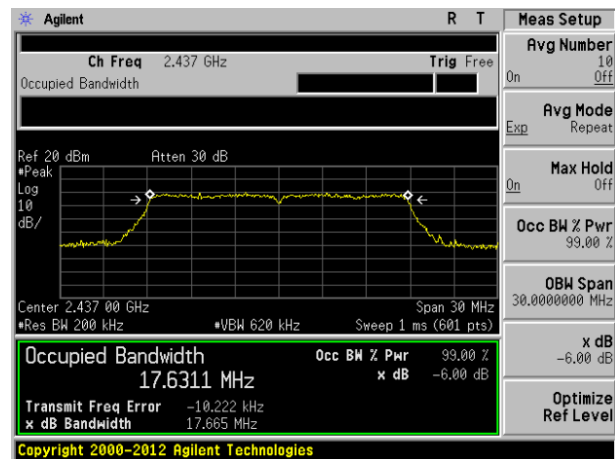
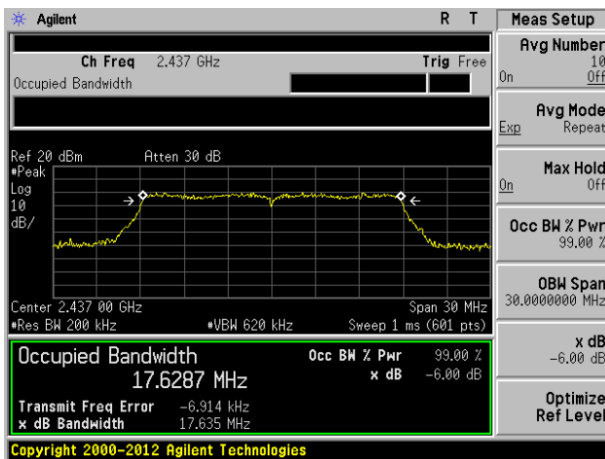


Highest channel

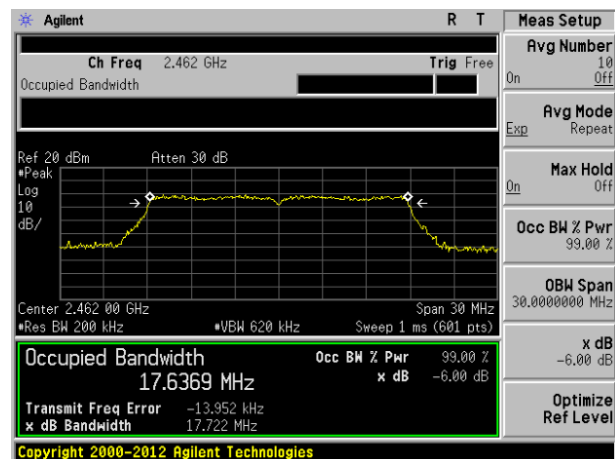
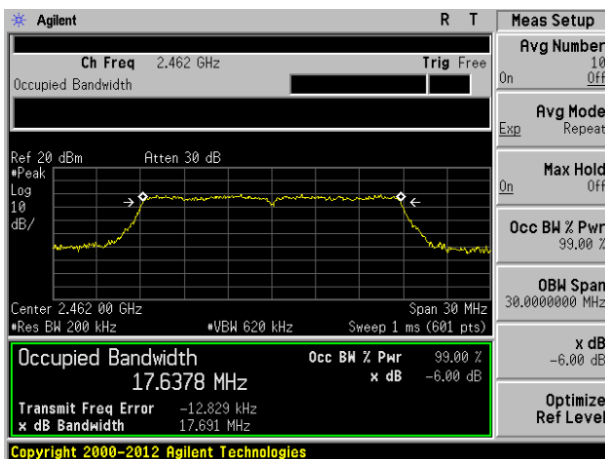
802.11n(HT20)	ANT 1	802.11n(HT20)	ANT 2
---------------	-------	---------------	-------



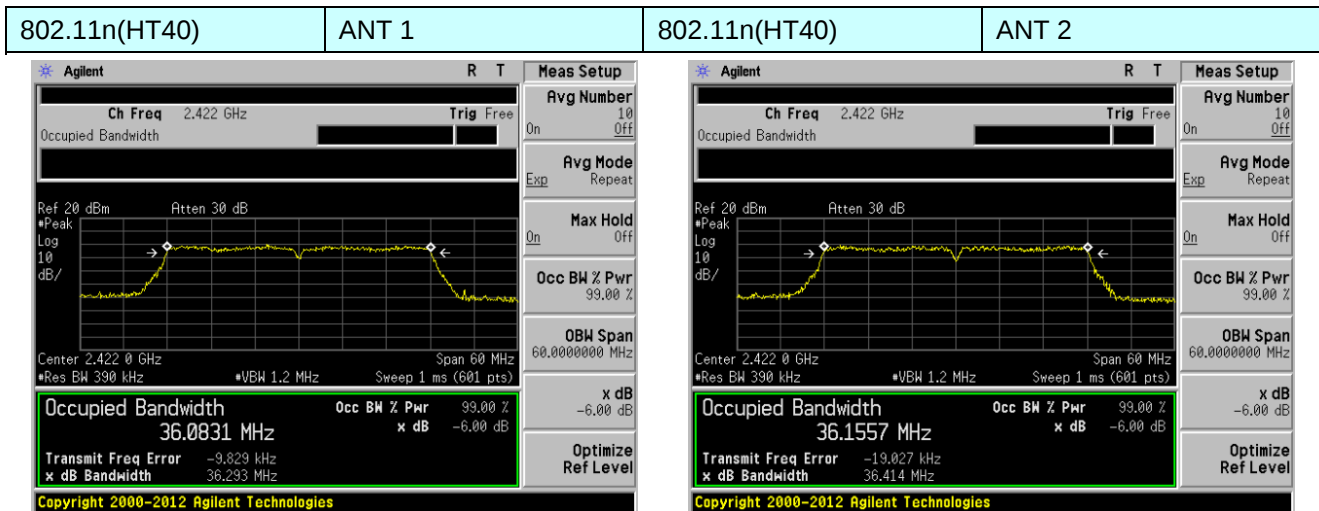
Lowest channel



Middle channel



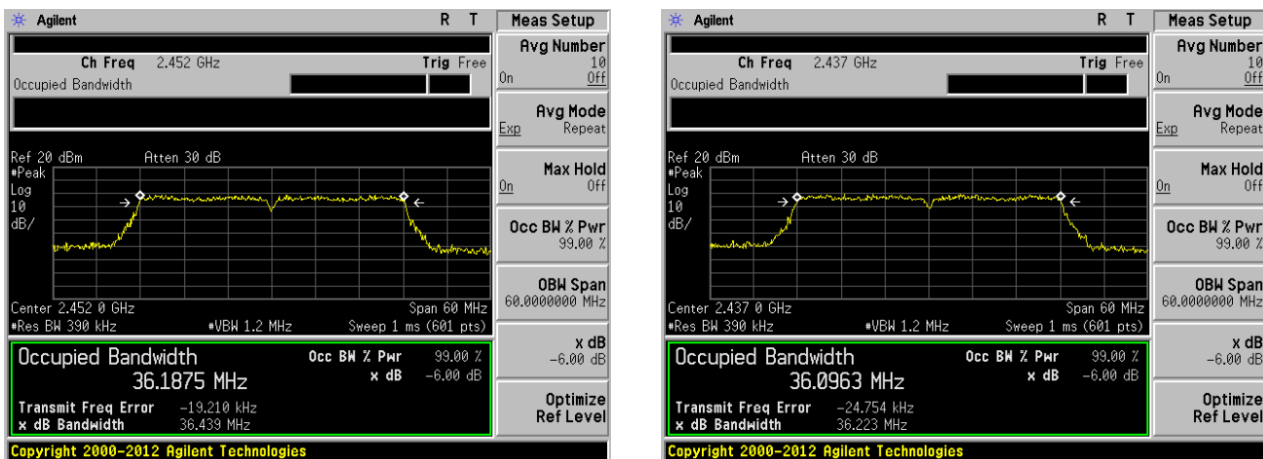
Highest channel



Lowest channel

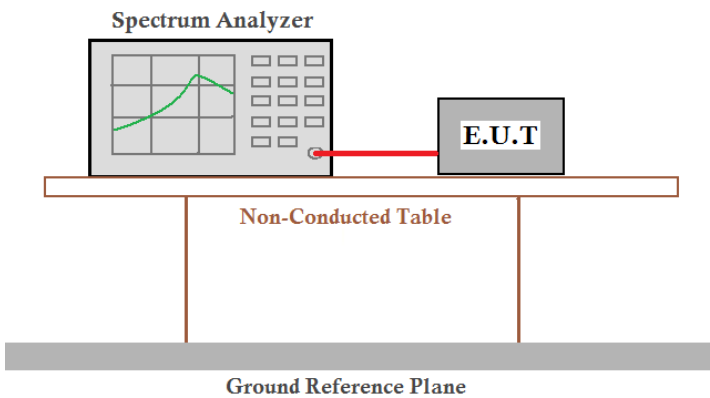


Middle channel



Highest channel

7.5 Power Spectral Density

Test Requirement:	FCC Part15 C Section 15.247 (e) RSS-247 Section 5.2(b)
Test Method:	KDB558074 D01 DTS Meas Guidance v05r02 ANSI C63.10:2013 and RSS-Gen
Limit:	8dBm/3kHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

ANT 1:

Test CH	Power Spectral Density (dBm/3kHz)				Limit (dBm/3kHz)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	-9.61	-18.54	-17.17	-21.18	8.00	Pass
Middle	-9.91	-18.66	-16.17	-20.38		
Highest	-9.65	-18.66	-17.75	-21.06		

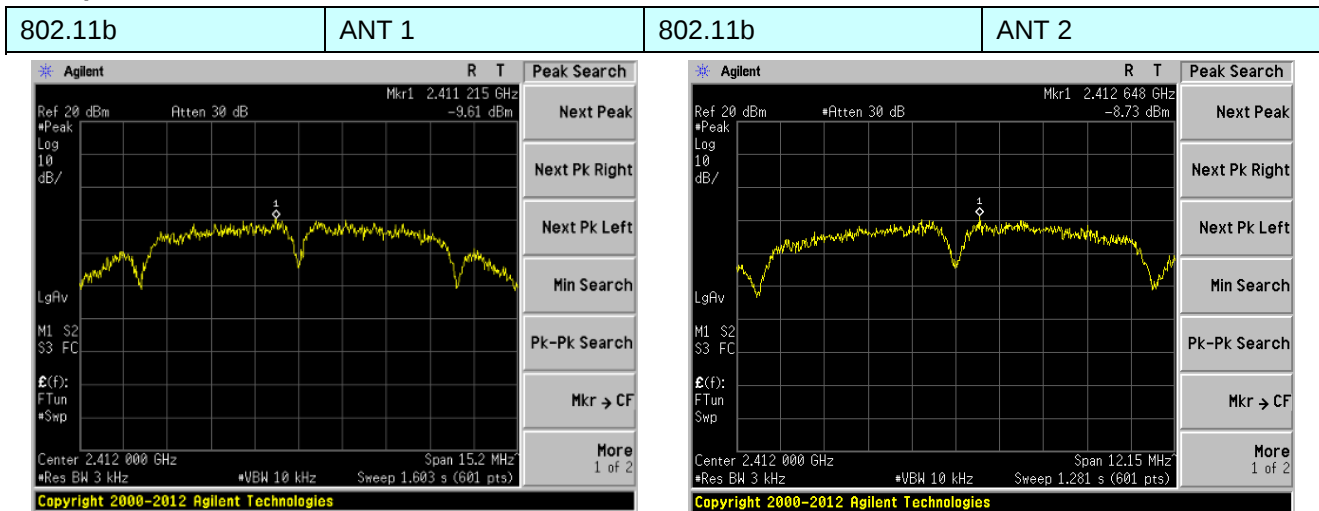
ANT 2:

Test CH	Power Spectral Density (dBm/3kHz)				Limit (dBm/3kHz)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	-8.73	-17.78	-16.82	-20.63	8.00	Pass
Middle	-9.73	-17.35	-16.59	-19.85		
Highest	-9.65	-18.21	-17.44	-20.18		

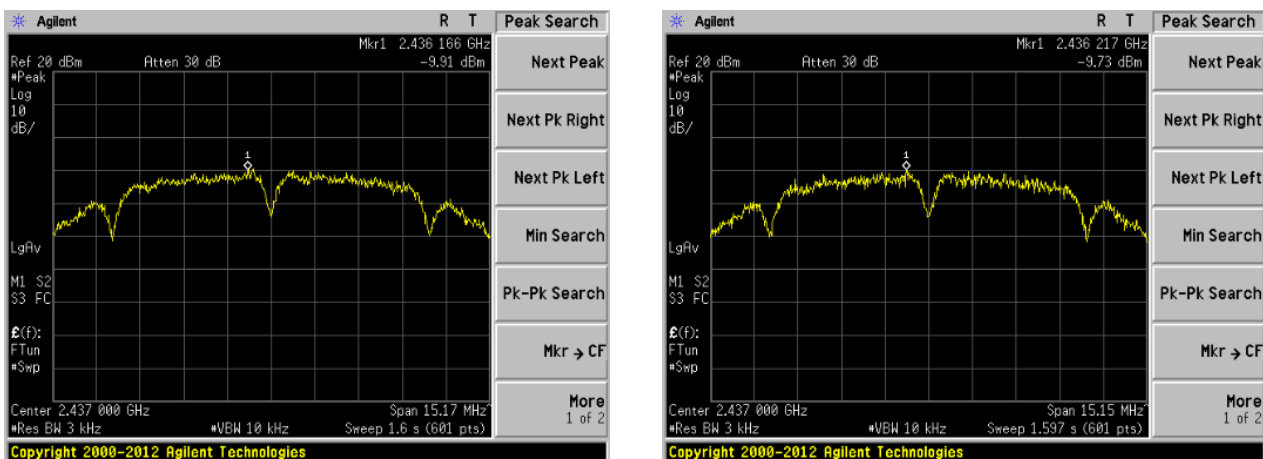
MIMO:

Modulation	Test CH	Power Spectral Density (dBm/3kHz)		Sum Output Power(dBm)	Limit (dBm/3kHz)	Result
802.11n(HT20)	Lowest	ANT 1	-17.17	-13.98	8	Pass
		ANT 2	-16.82			
	Middle	ANT 1	-16.17	-13.36		
		ANT 2	-16.59			
	Highest	ANT 1	-17.75	-14.58		
		ANT 2	-17.44			
Modulation	Test CH	Power Spectral Density (dBm/3kHz)		Sum Output Power(dBm)	Limit (dBm/3kHz)	Result
802.11n(HT40)	Lowest	ANT 1	-21.18	-17.89	8	Pass
		ANT 2	-20.63			
	Middle	ANT 1	-20.38	-17.10		
		ANT 2	-19.85			
	Highest	ANT 1	-21.06	-17.59		
		ANT 2	-20.18			

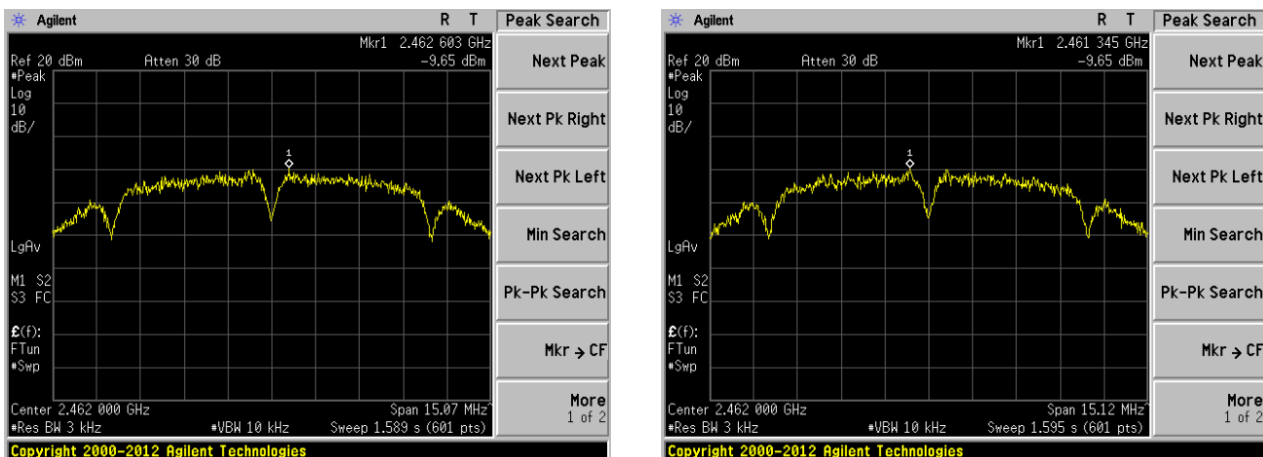
Test plot as follows:



Lowest channel

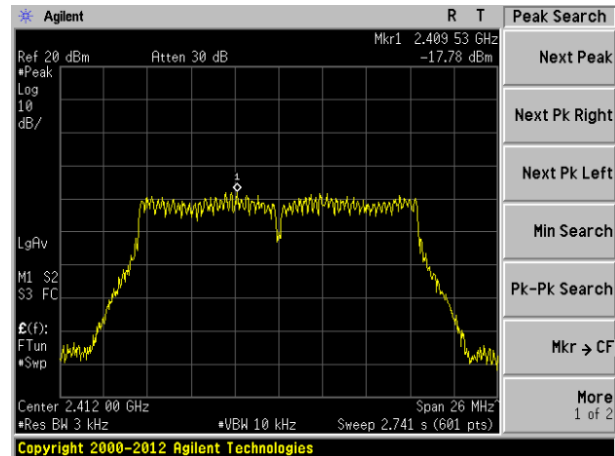
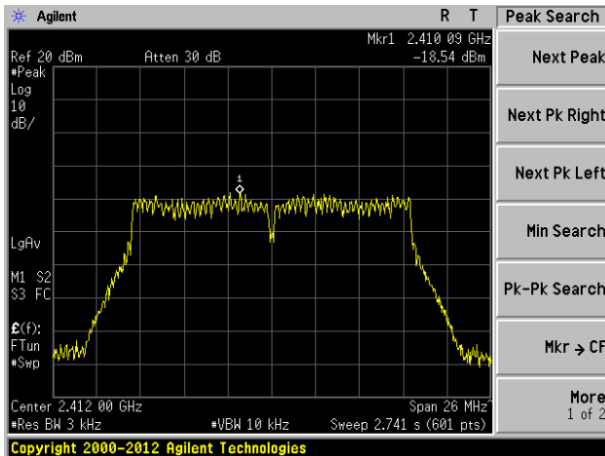


Middle channel

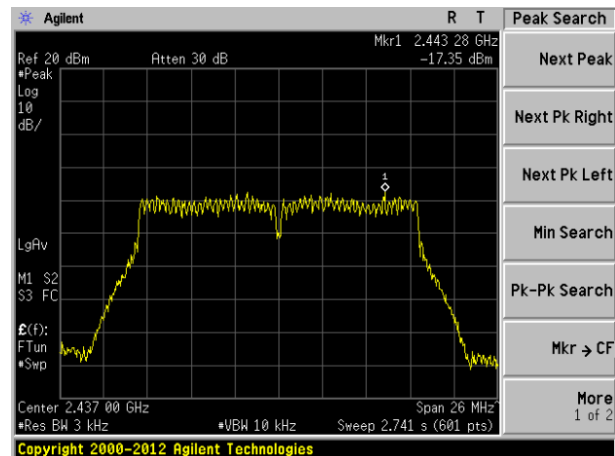
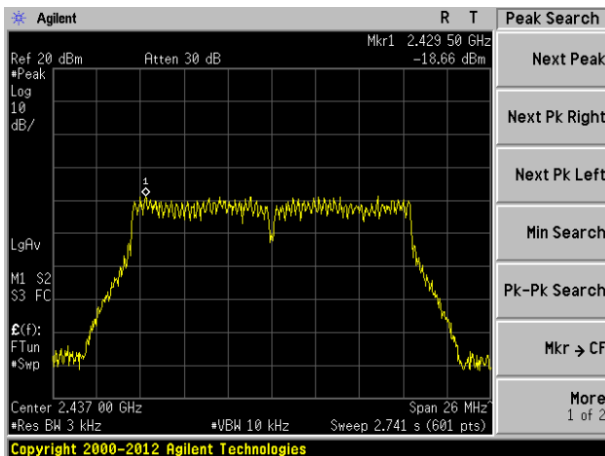


Highest channel

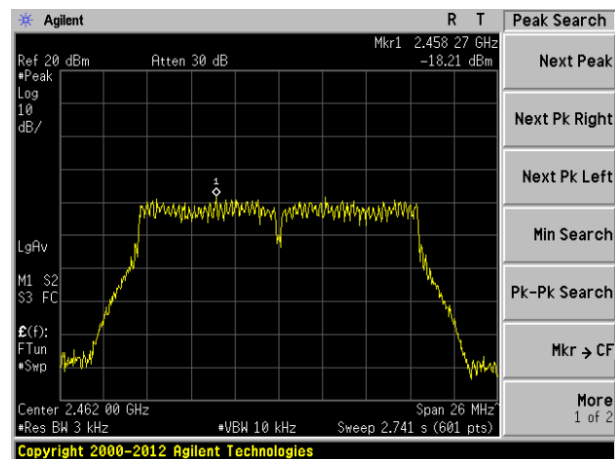
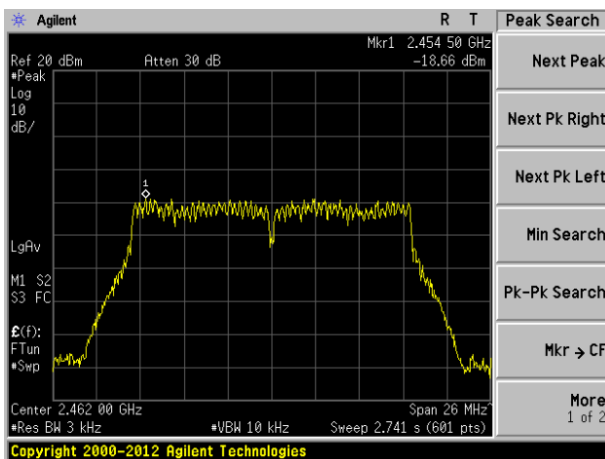
802.11g	ANT 1	802.11g	ANT 2
---------	-------	---------	-------



Lowest channel

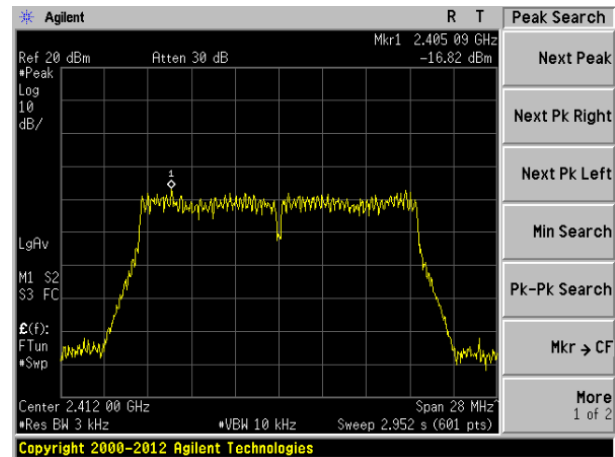
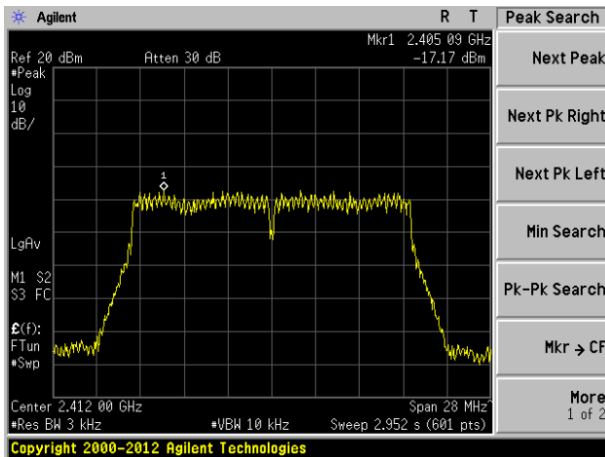


Middle channel

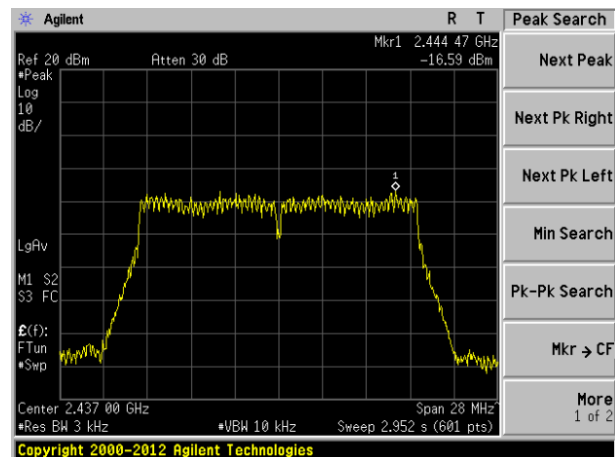
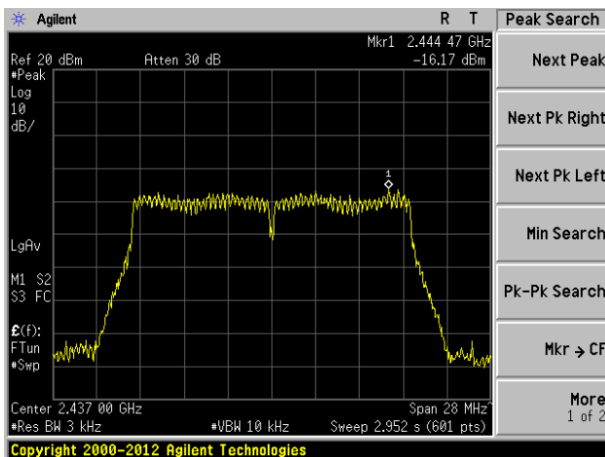


Highest channel

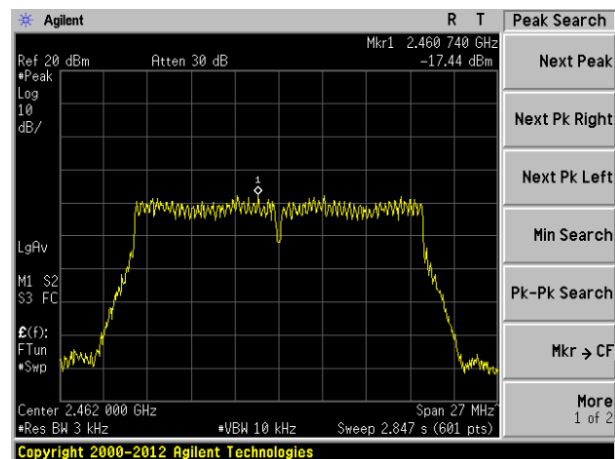
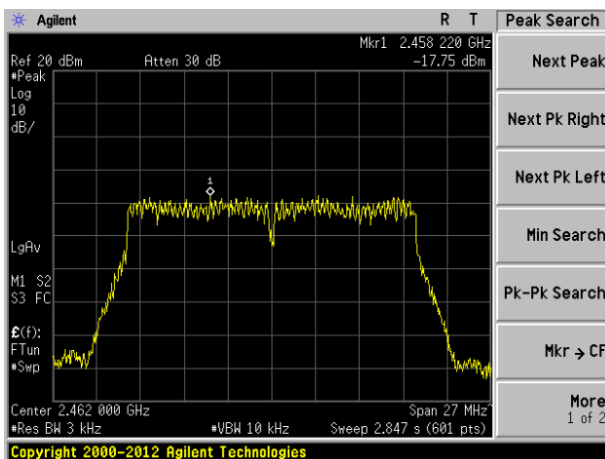
802.11n(HT20)	ANT 1	802.11n(HT20)	ANT 2
---------------	-------	---------------	-------



Lowest channel

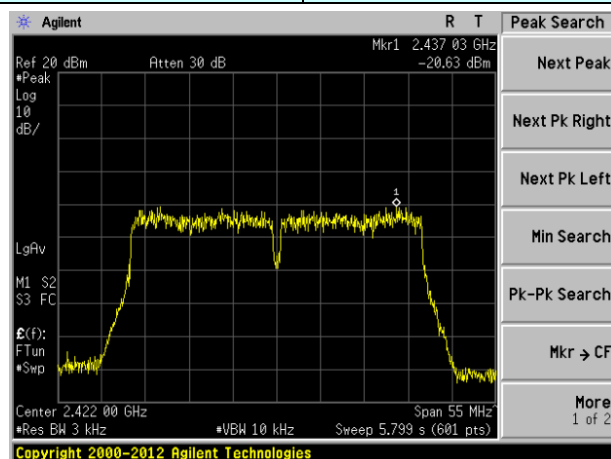
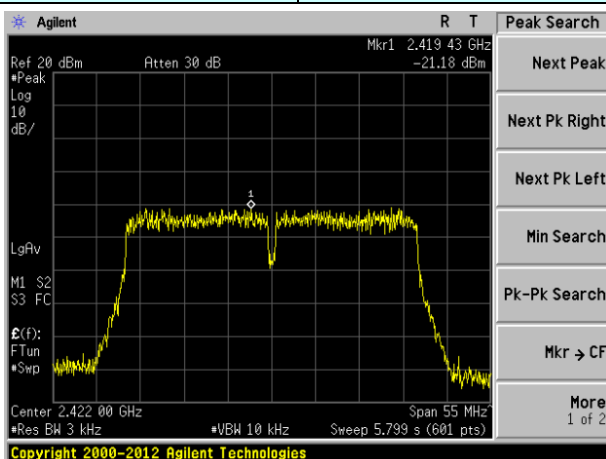


Middle channel

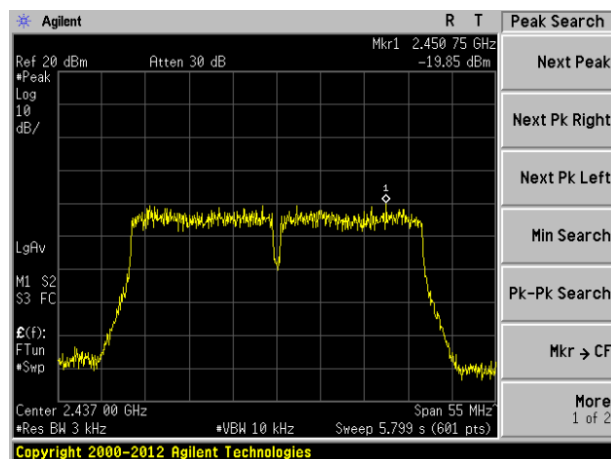
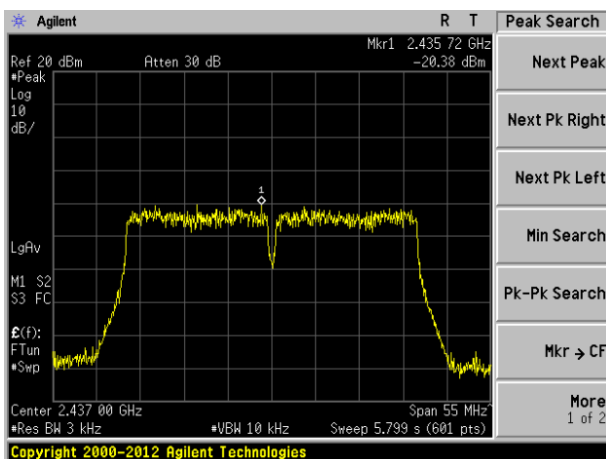


Highest channel

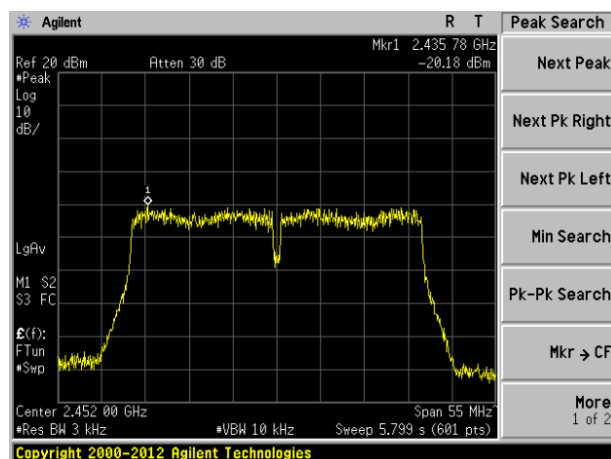
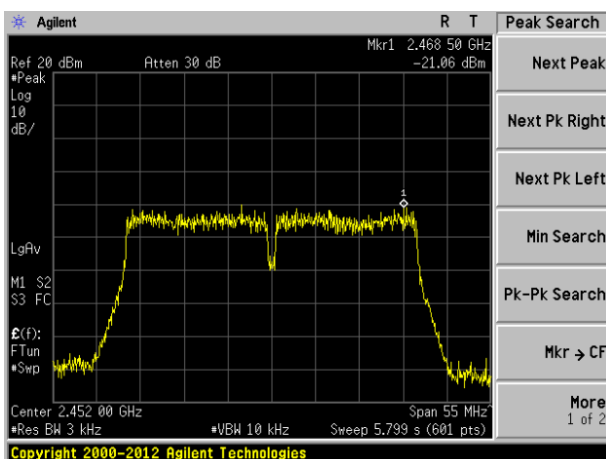
802.11n(HT40)	ANT 1	802.11n(HT40)	ANT 2
---------------	-------	---------------	-------



Lowest channel



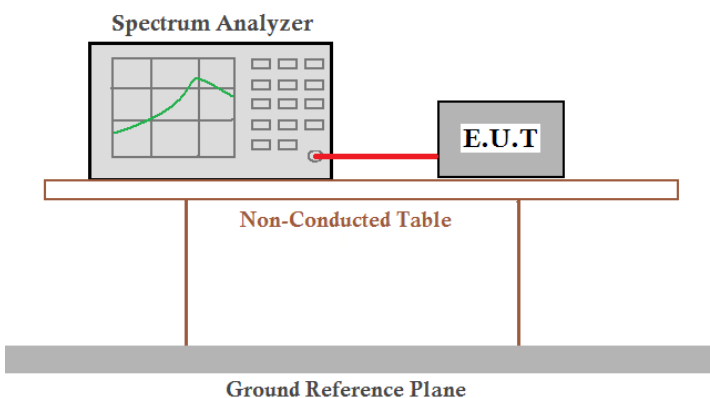
Middle channel



Highest channel

7.6 Band edges

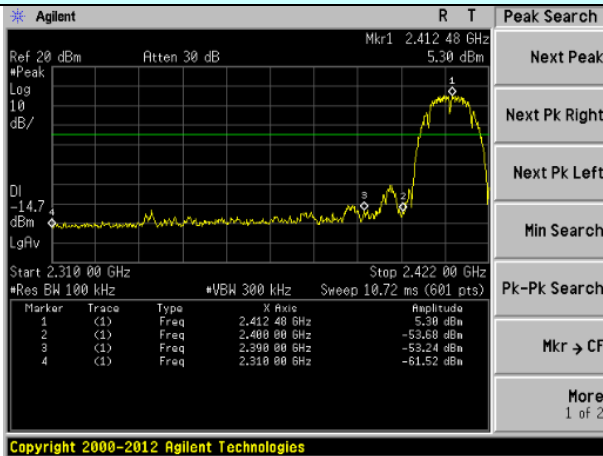
7.6.1 Conducted Emission Method

Test Requirement:	FCC Part15 C Section 15.247 (d) RSS-247 Section 5.5
Test Method:	KDB558074 D01 DTS Meas Guidance v05r02 ANSI C63.10:2013 & RSS-Gen
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 two vertical legs and sits on a Ground Reference Plane.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

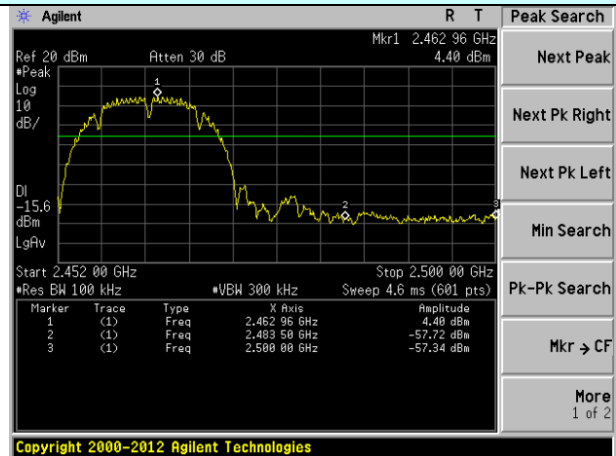
Test plot as follows:

ANT 1:

Test mode:	802.11b
------------	---------

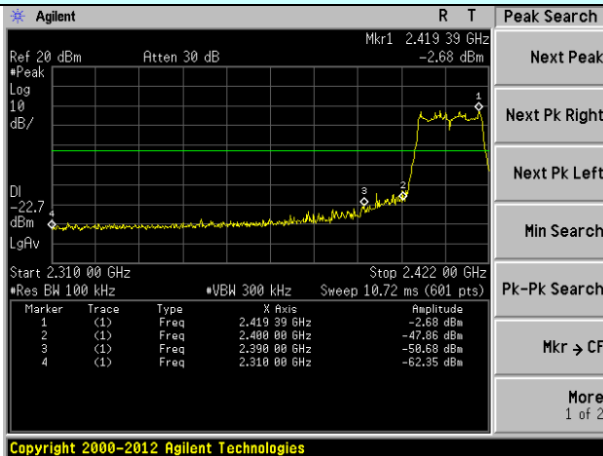


Lowest channel

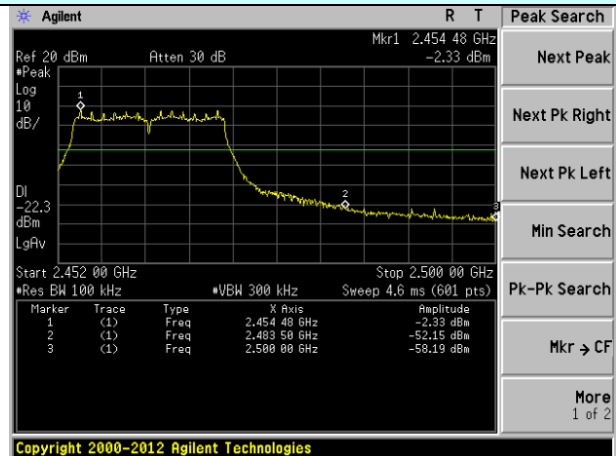


Highest channel

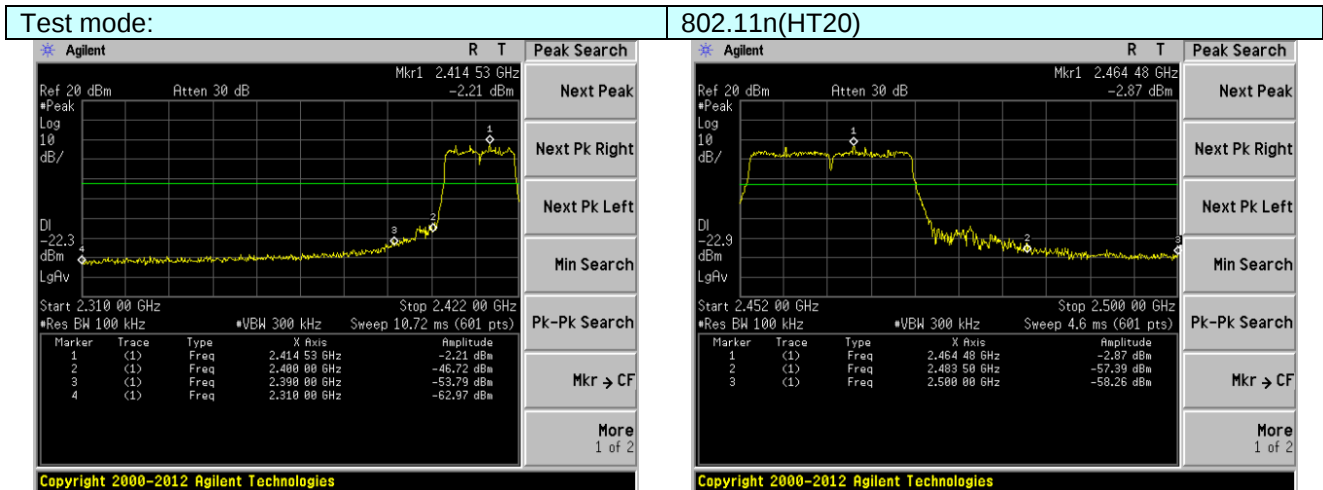
Test mode:	802.11g
------------	---------



Lowest channel

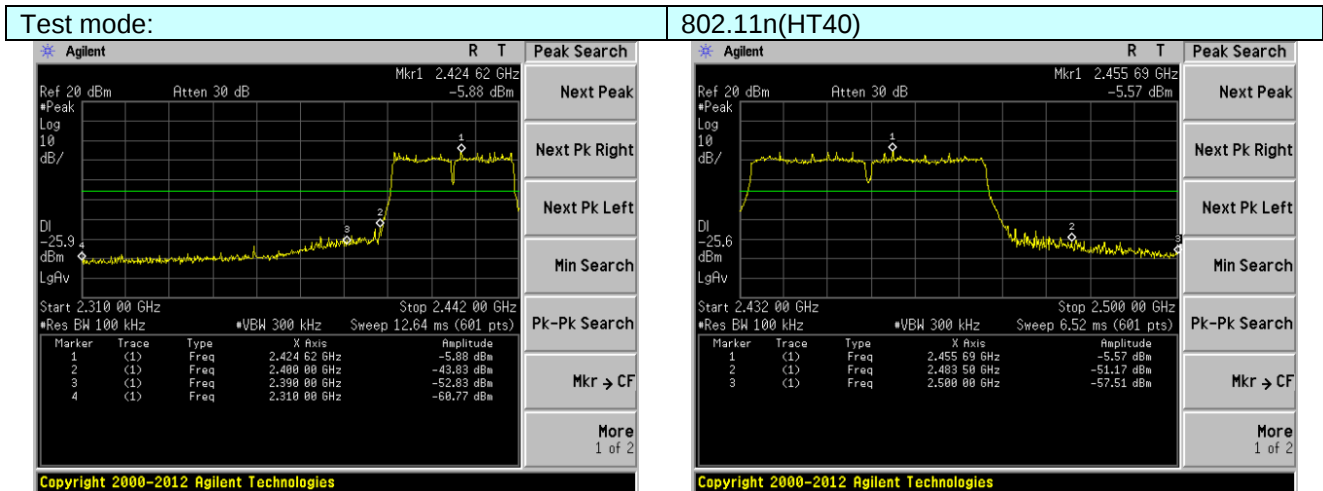


Highest channel



Lowest channel

Highest channel

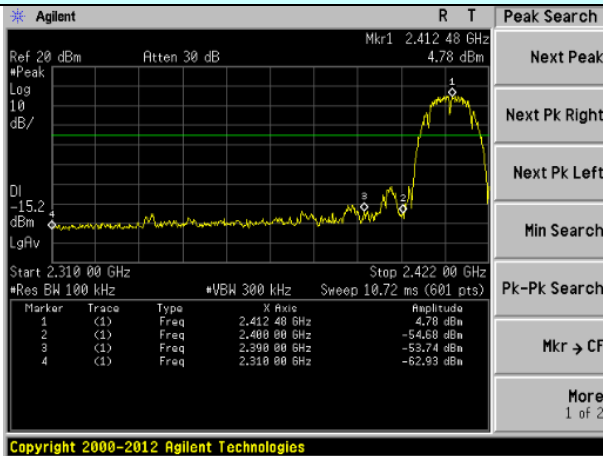


Lowest channel

Highest channel

ANT 2:

Test mode:	802.11b
------------	---------

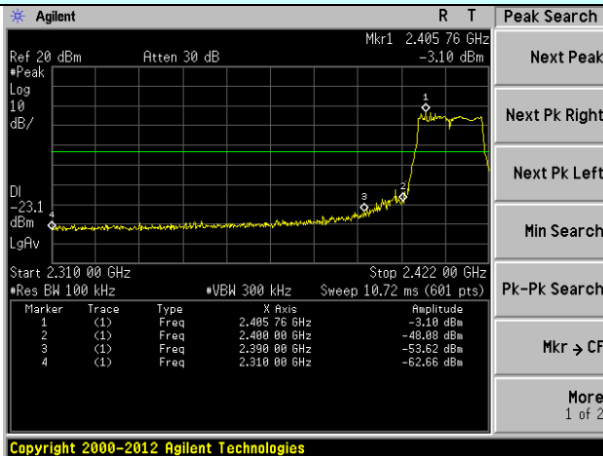


Lowest channel

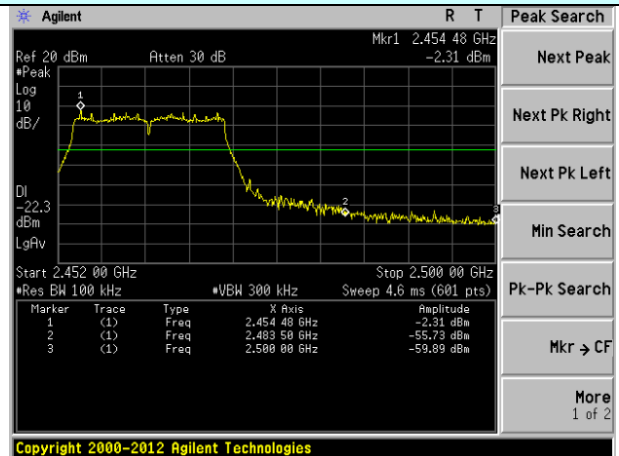


Highest channel

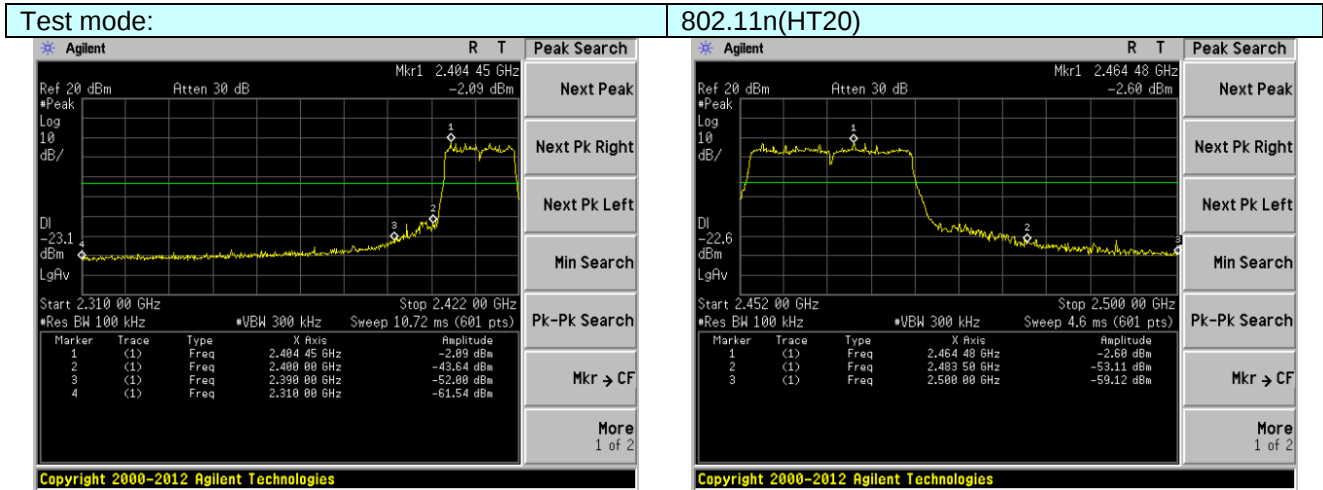
Test mode:	802.11g
------------	---------



Lowest channel

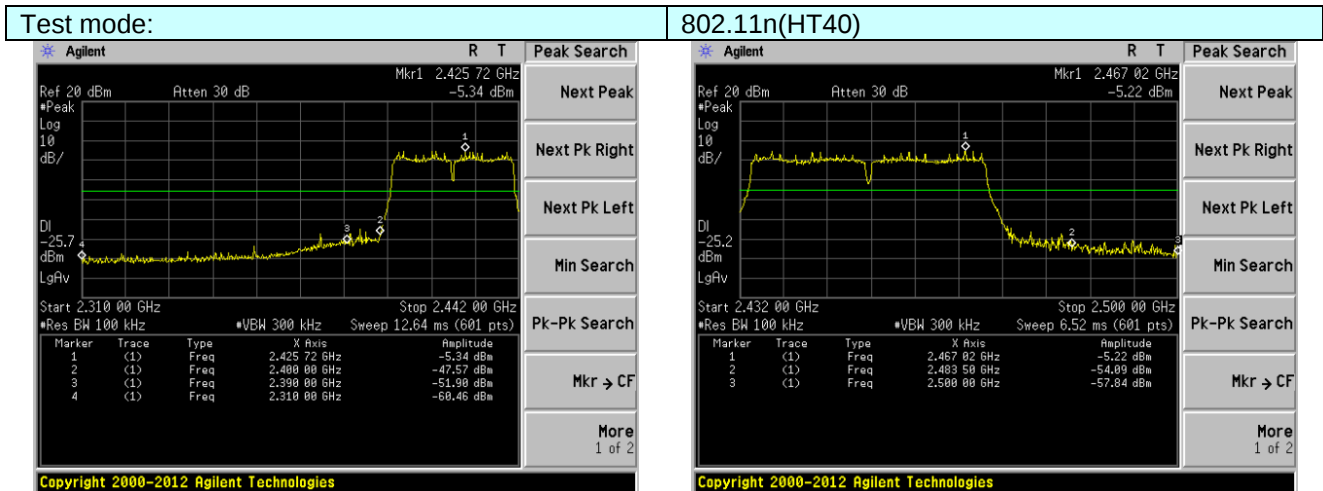


Highest channel



Lowest channel

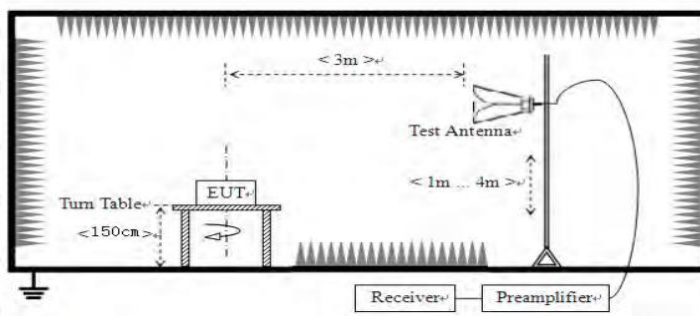
Highest channel



Lowest channel

Highest channel

7.6.2 Radiated Emission Method

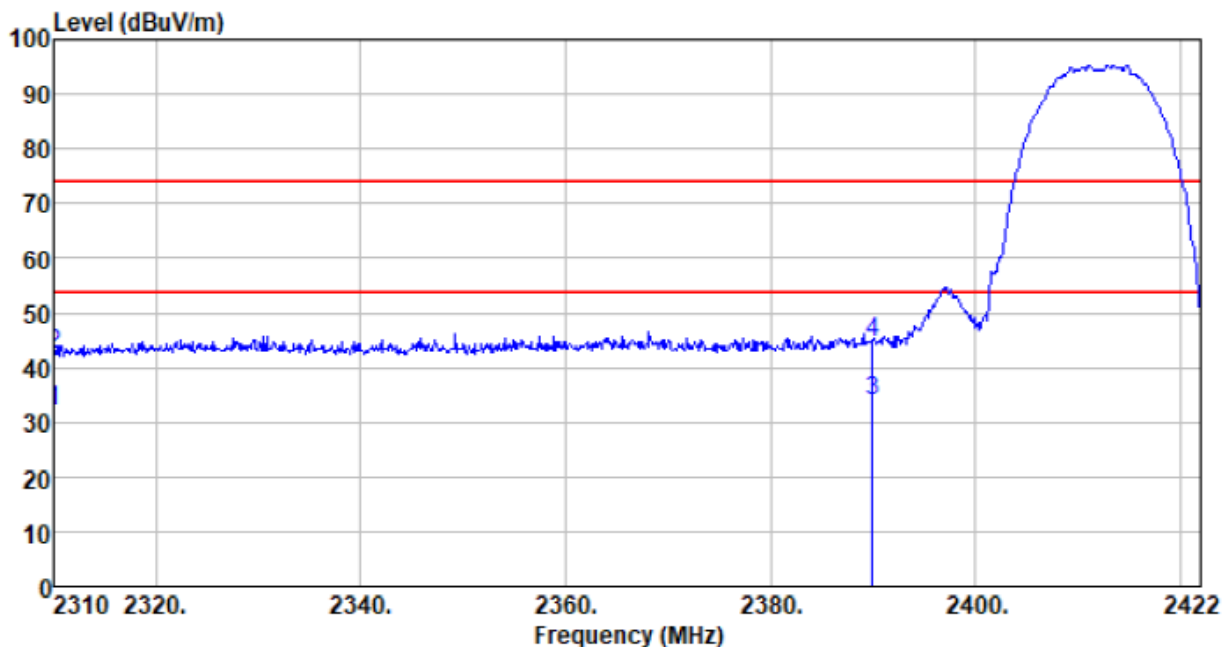
Test Requirement:	FCC Part15 C Section 15.209 and 15.205 RSS-247 3.3 & RSS-Gen Section 8.9				
Test Method:	ANSI C63.10: 2013 & RSS-Gen				
Test Frequency Range:	All of the restrict bands were tested, only the worst band's (2310MHz to 2500MHz) data was showed.				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Average	1MHz	3MHz	Average
Limit:	Frequency		Limit (dBuV/m @3m)		Value
	Above 1GHz		54.00		Average
			74.00		Peak
Test setup:					
Test Procedure:	1. The EUT was placed on the top of a rotating table 1.5 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. 7. The radiation measurements are performed in X, Y, Z axis positioning. And found the Y axis positioning which it is worse case, only the test worst case mode is recorded in the report.				
Test Instruments:	Refer to section 6.0 for details				
Test mode:	Refer to section 5.2 for details				
Test results:	Pass				

Measurement data:

All antennas have test, only the worst case ANT 2 report.

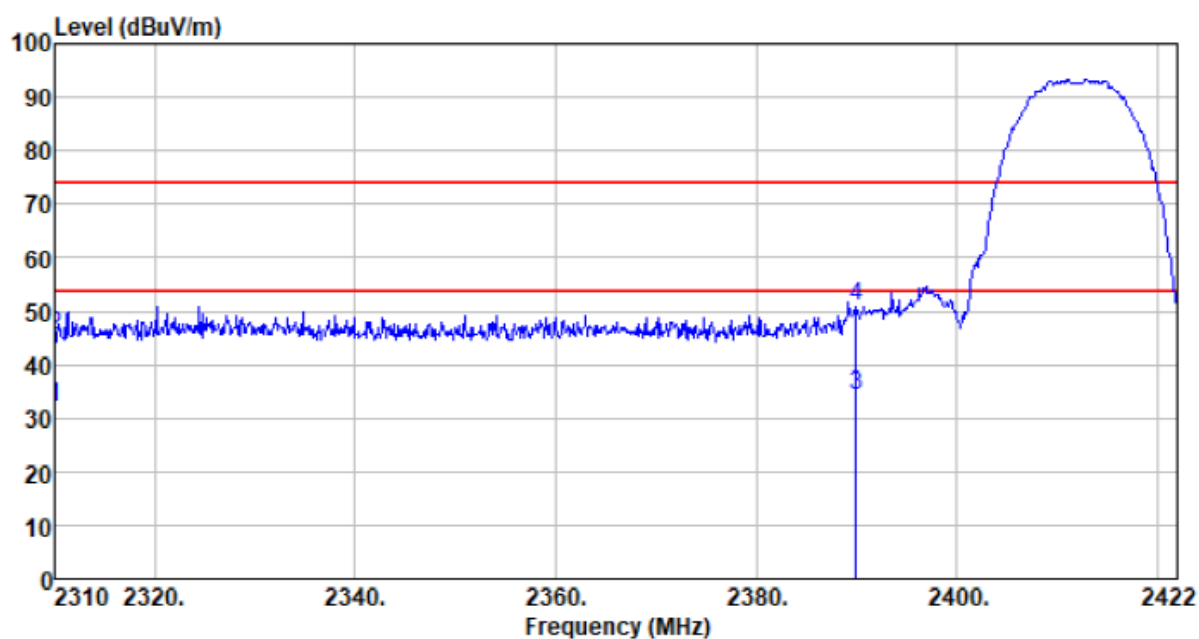
Test mode:	802.11b	Test channel:	Lowest
------------	---------	---------------	--------

Horizontal:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	32.52	27.14	2.81	30.43	32.04	54.00	-21.96	Average
2310.000	42.99	27.14	2.81	30.43	42.51	74.00	-31.49	Peak
2390.000	33.74	27.37	2.91	30.24	33.78	54.00	-20.22	Average
2390.000	44.43	27.37	2.91	30.24	44.47	74.00	-29.53	Peak

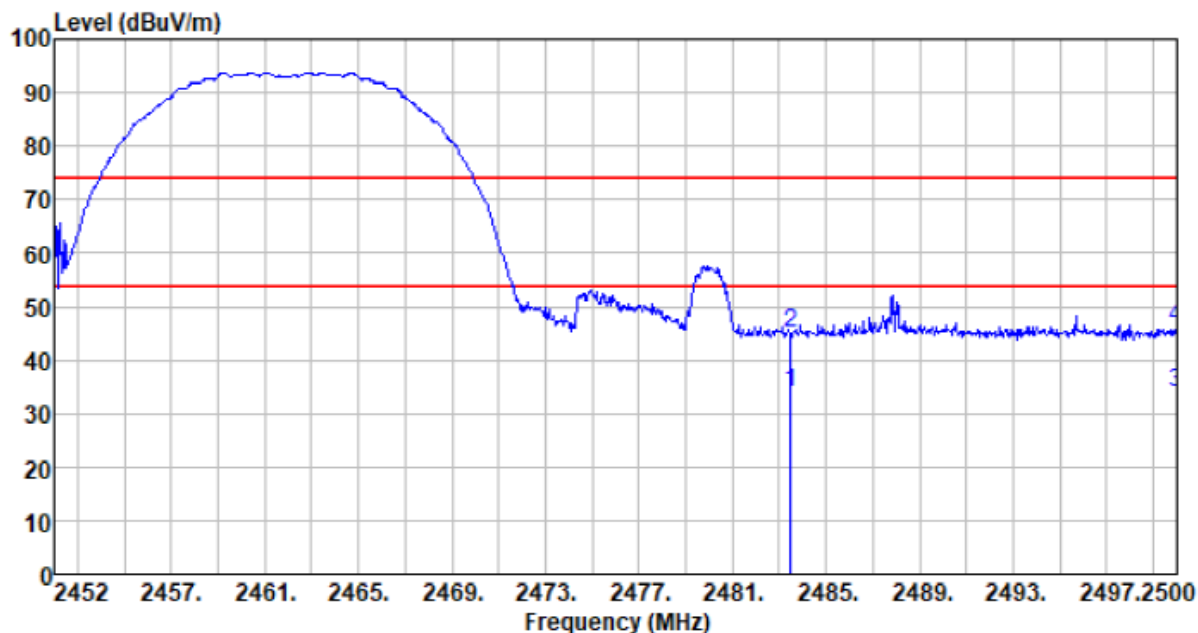
Vertical:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	32.62	27.14	2.81	30.43	32.14	54.00	-21.86	Average
2310.000	45.97	27.14	2.81	30.43	45.49	74.00	-28.51	Peak
2390.000	34.20	27.37	2.91	30.24	34.24	54.00	-19.76	Average
2390.000	50.84	27.37	2.91	30.24	50.88	74.00	-23.12	Peak

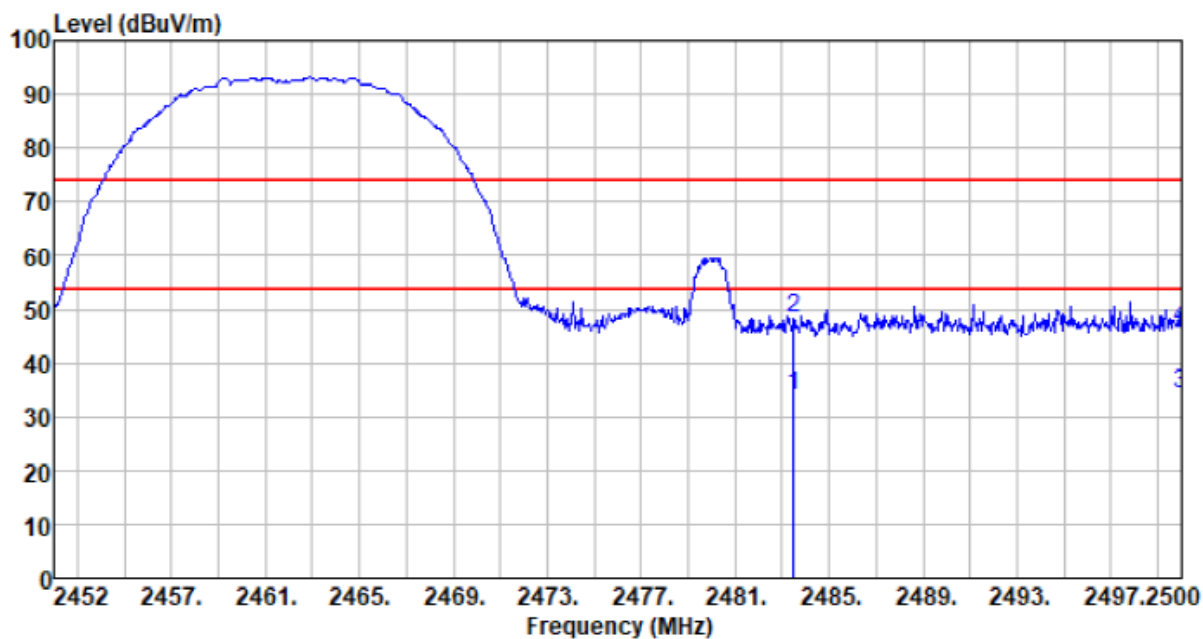
Test mode:	802.11b	Test channel:	Highest
------------	---------	---------------	---------

Horizontal:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2483.500	33.26	27.66	2.99	30.12	33.79	54.00	-20.21	Average
2483.500	44.65	27.66	2.99	30.12	45.18	74.00	-28.82	Peak
2500.000	33.35	27.70	3.01	30.13	33.93	54.00	-20.07	Average
2500.000	45.62	27.70	3.01	30.13	46.20	74.00	-27.80	Peak

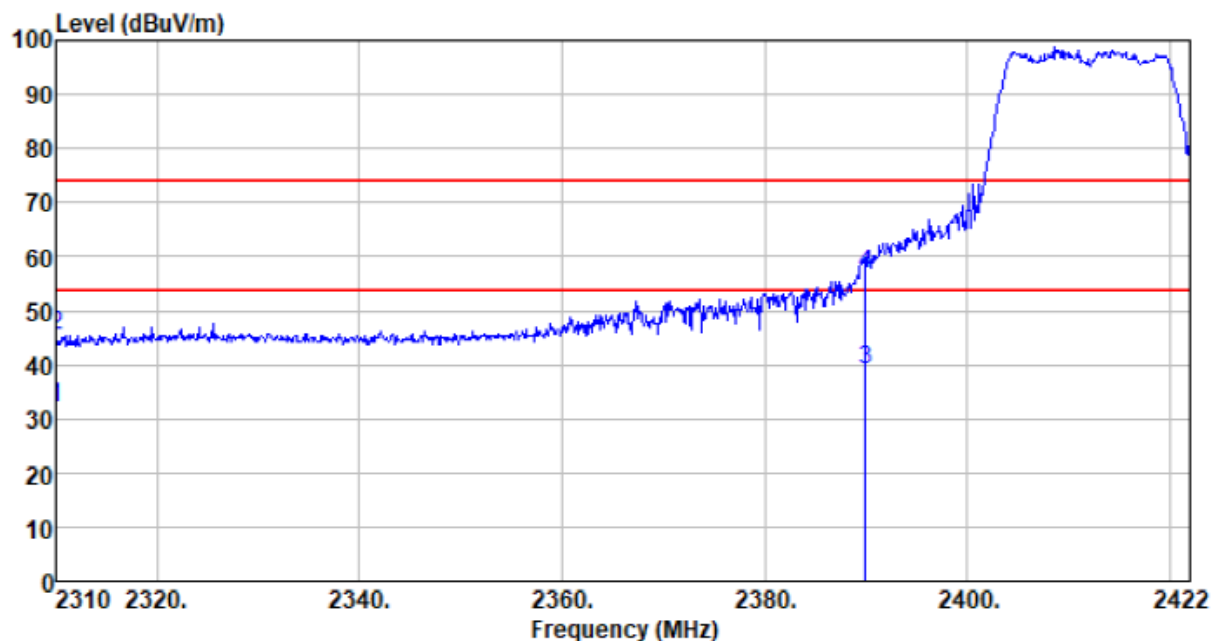
Vertical:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2483.500	33.54	27.66	2.99	30.12	34.07	54.00	-19.93	Average
2483.500	47.79	27.66	2.99	30.12	48.32	74.00	-25.68	Peak
2500.000	33.59	27.70	3.01	30.13	34.17	54.00	-19.83	Average
2500.000	45.91	27.70	3.01	30.13	46.49	74.00	-27.51	Peak

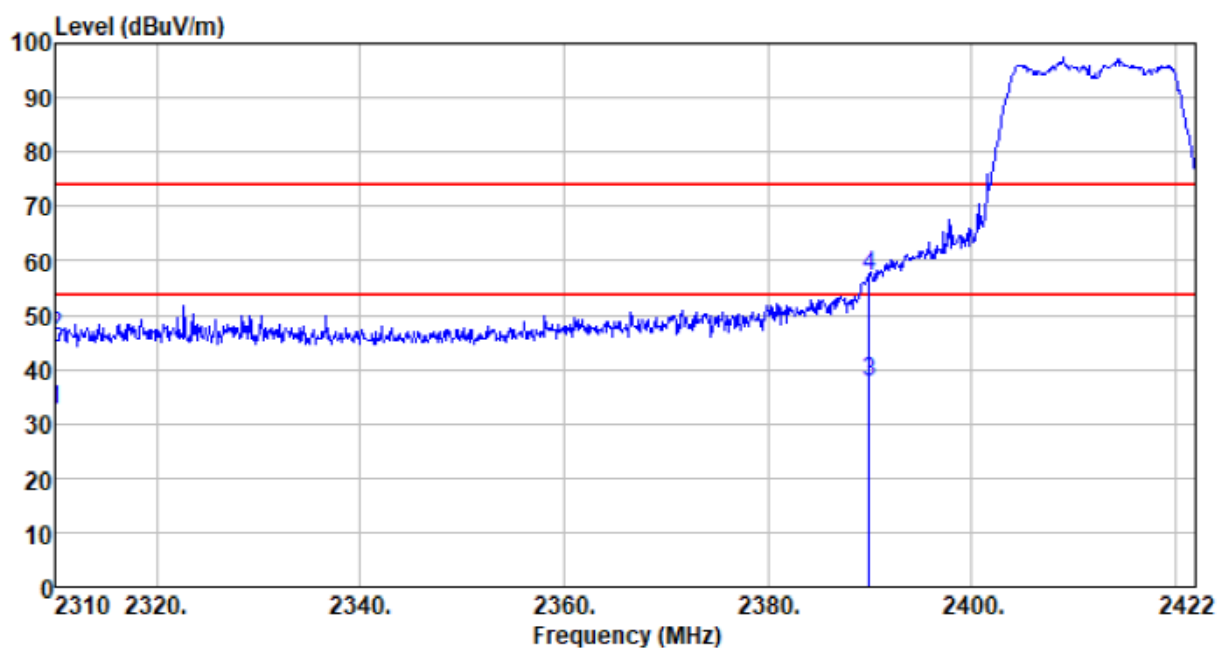
Test mode:	802.11g	Test channel:	Lowest
------------	---------	---------------	--------

Horizontal:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	32.64	27.14	2.81	30.43	32.16	54.00	-21.84	Average
2310.000	46.00	27.14	2.81	30.43	45.52	74.00	-28.48	Peak
2390.000	39.00	27.37	2.91	30.24	39.04	54.00	-14.96	Average
2390.000	56.80	27.37	2.91	30.24	56.84	74.00	-17.16	Peak

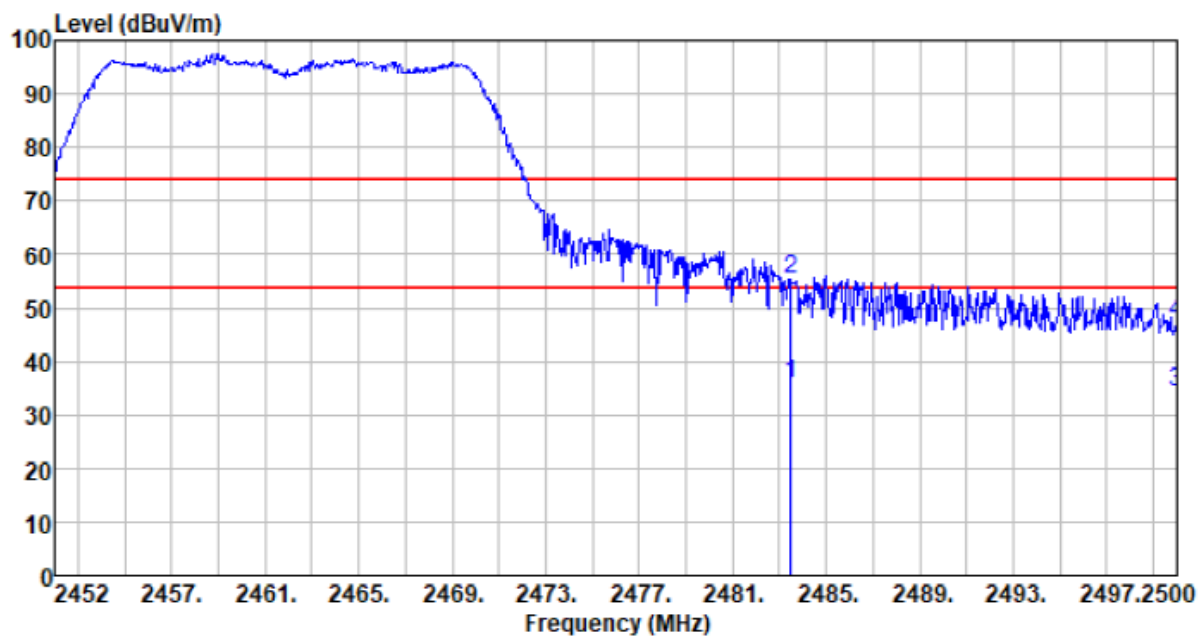
Vertical:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	33.01	27.14	2.81	30.43	32.53	54.00	-21.47	Average
2310.000	46.59	27.14	2.81	30.43	46.11	74.00	-27.89	Peak
2390.000	37.58	27.37	2.91	30.24	37.62	54.00	-16.38	Average
2390.000	57.24	27.37	2.91	30.24	57.28	74.00	-16.72	Peak

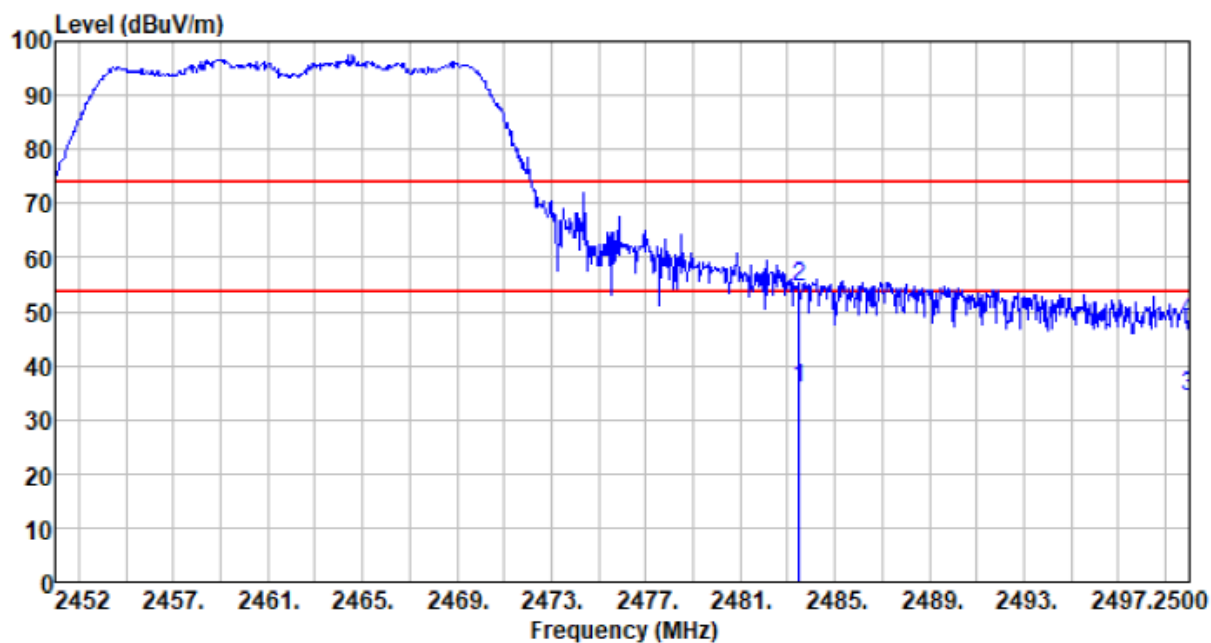
Test mode:	802.11g	Test channel:	Highest
------------	---------	---------------	---------

Horizontal:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamplifier factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2483.500	35.17	27.66	2.99	30.12	35.70	54.00	-18.30	Average
2483.500	54.92	27.66	2.99	30.12	55.45	74.00	-18.55	Peak
2500.000	33.58	27.70	3.01	30.13	34.16	54.00	-19.84	Average
2500.000	46.79	27.70	3.01	30.13	47.37	74.00	-26.63	Peak

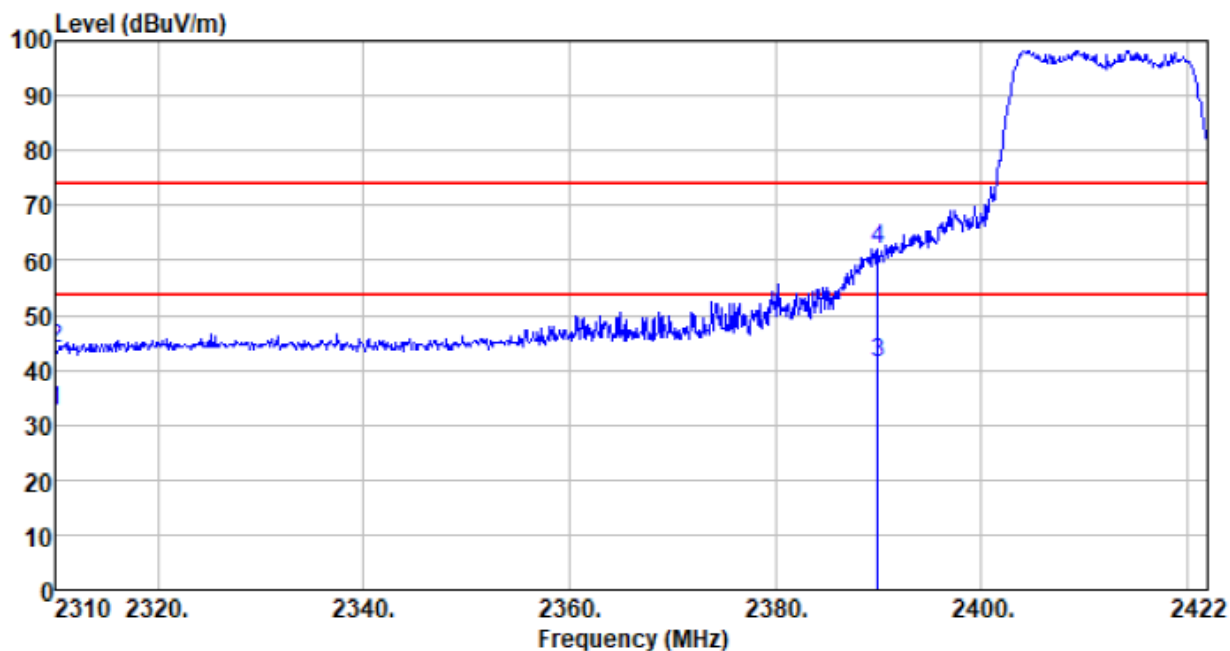
Vertical:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2483.500	35.36	27.66	2.99	30.12	35.89	54.00	-18.11	Average
2483.500	54.21	27.66	2.99	30.12	54.74	74.00	-19.26	Peak
2500.000	33.67	27.70	3.01	30.13	34.25	54.00	-19.75	Average
2500.000	47.81	27.70	3.01	30.13	48.39	74.00	-25.61	Peak

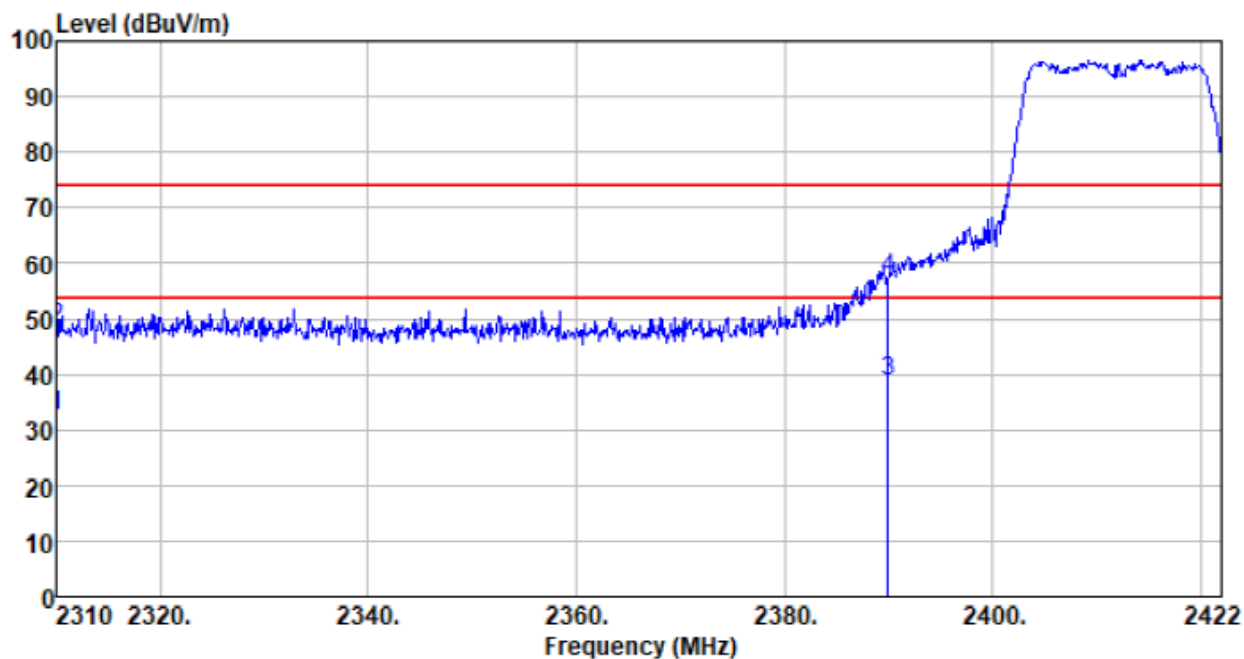
Test mode:	802.11n(HT20)	Test channel:	Lowest
------------	---------------	---------------	--------

Horizontal:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	32.84	27.14	2.81	30.43	32.36	54.00	-21.64	Average
2310.000	44.50	27.14	2.81	30.43	44.02	74.00	-29.98	Peak
2390.000	41.23	27.37	2.91	30.24	41.27	54.00	-12.73	Average
2390.000	62.04	27.37	2.91	30.24	62.08	74.00	-11.92	Peak

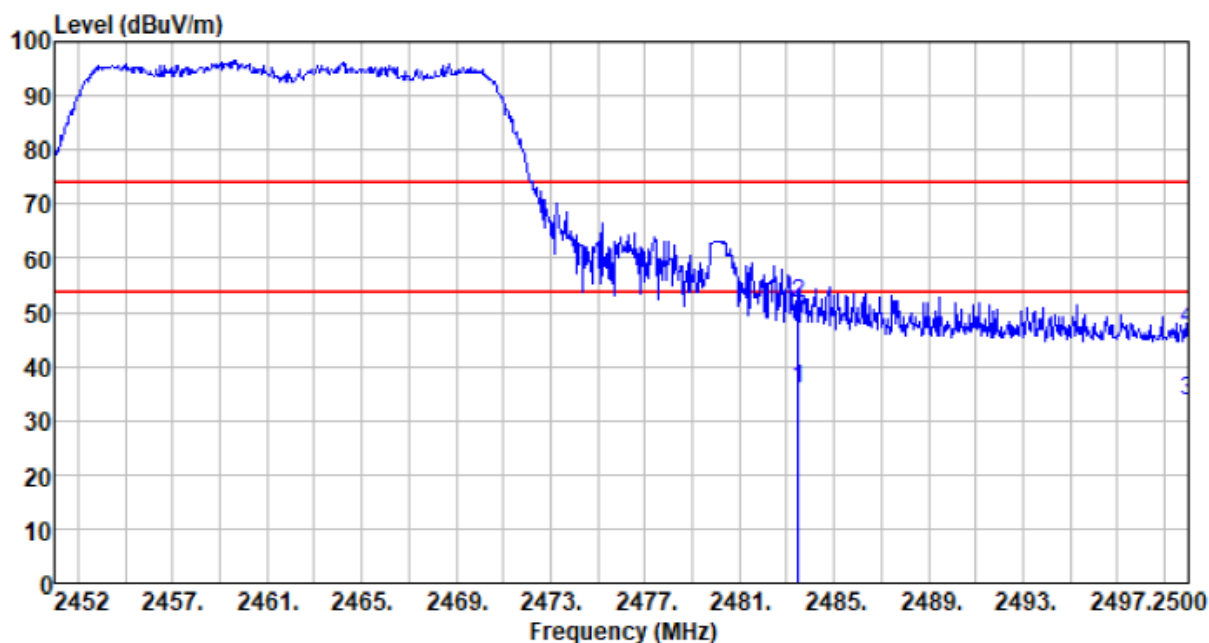
Vertical:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	32.97	27.14	2.81	30.43	32.49	54.00	-21.51	Average
2310.000	48.90	27.14	2.81	30.43	48.42	74.00	-25.58	Peak
2390.000	38.64	27.37	2.91	30.24	38.68	54.00	-15.32	Average
2390.000	57.24	27.37	2.91	30.24	57.28	74.00	-16.72	Peak

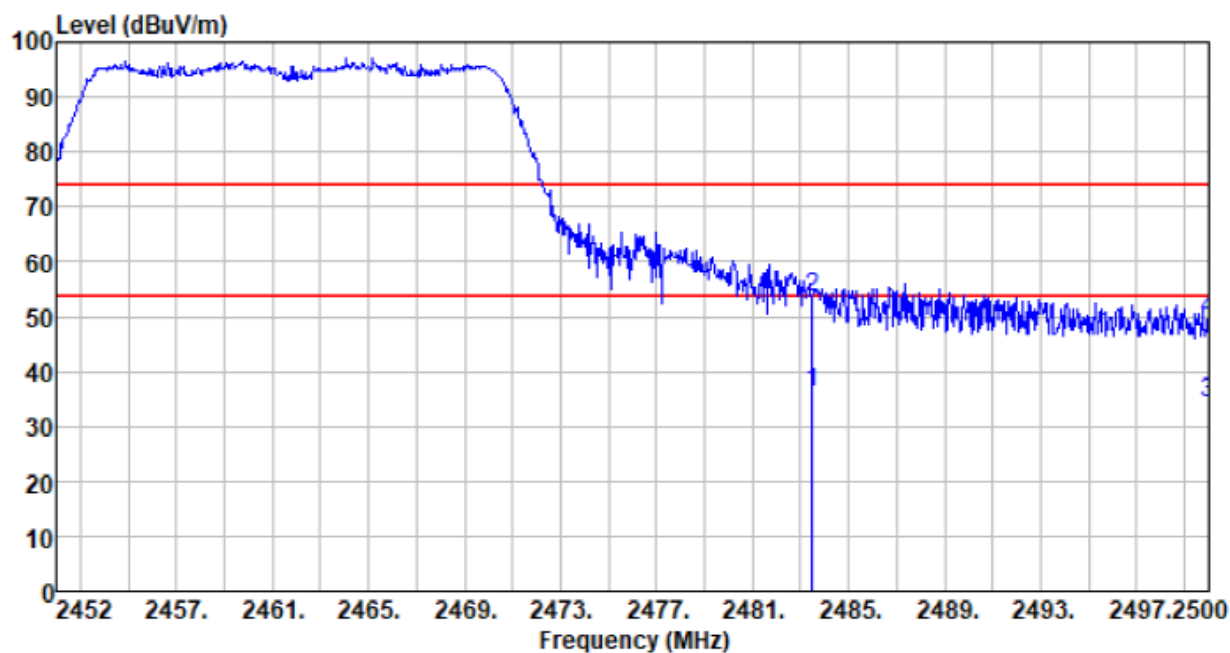
Test mode:	802.11n(HT20)	Test channel:	Highest
------------	---------------	---------------	---------

Horizontal:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2483.500	35.08	27.66	2.99	30.12	35.61	54.00	-18.39	Average
2483.500	50.98	27.66	2.99	30.12	51.51	74.00	-22.49	Peak
2500.000	33.10	27.70	3.01	30.13	33.68	54.00	-20.32	Average
2500.000	46.30	27.70	3.01	30.13	46.88	74.00	-27.12	Peak

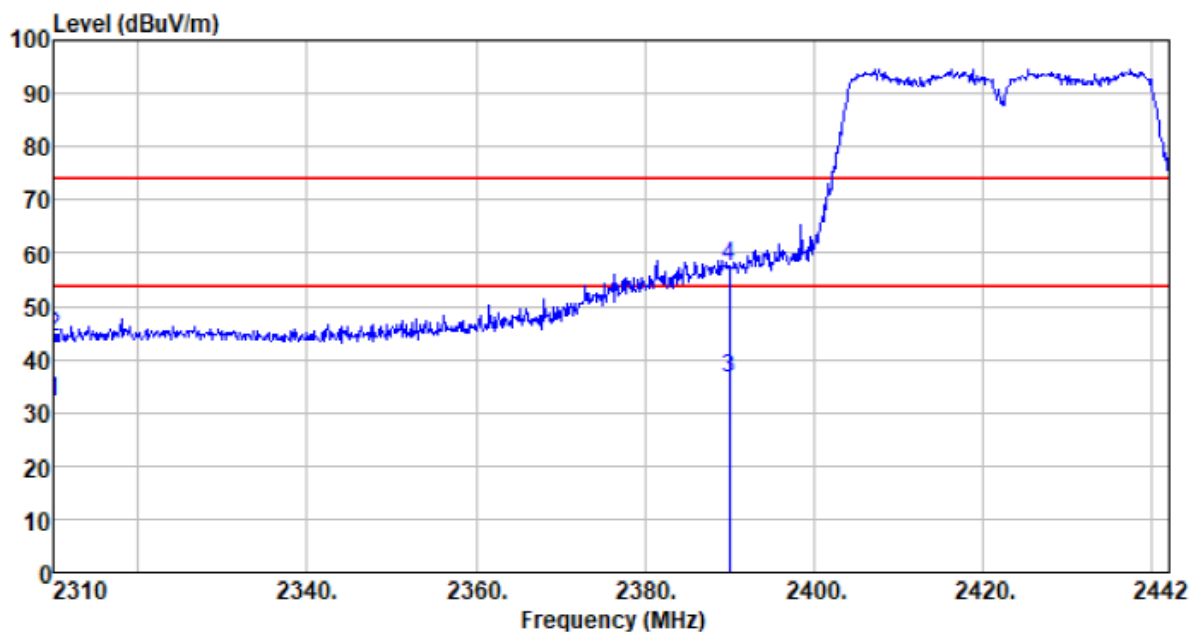
Vertical:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2483.500	35.69	27.66	2.99	30.12	36.22	54.00	-17.78	Average
2483.500	52.81	27.66	2.99	30.12	53.34	74.00	-20.66	Peak
2500.000	33.77	27.70	3.01	30.13	34.35	54.00	-19.65	Average
2500.000	48.80	27.70	3.01	30.13	49.38	74.00	-24.62	Peak

Test mode:	802.11n(HT40)	Test channel:	Lowest
------------	---------------	---------------	--------

Horizontal:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	32.41	27.14	2.81	30.43	31.93	54.00	-22.07	Average
2310.000	44.87	27.14	2.81	30.43	44.39	74.00	-29.61	Peak
2390.000	36.67	27.37	2.91	30.24	36.71	54.00	-17.29	Average
2390.000	57.60	27.37	2.91	30.24	57.64	74.00	-16.36	Peak