

FCC TEST REPORT

REPORT NO.: FCI1001081R

MODEL NO.: Virtu 901

RECEIVED: Jan. 22, 2010

TESTED: Jan. 25, 2010 to Feb. 08, 2010

APPLICANT: AsiaRF Ltd.

ADDRESS: 4F, No.2, Lane560, Zhongzheng Rd., Xindian City, Taipei Country 231, Taiwan

ISSUED BY: SHENZHEN SETEK TECHNOLOGY CO., LTD.

LAB LOCATION: 2/F,A3 Bldg, East Industry Zone, Overseas Chinese Town,
Shenzhen, China

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SHENZHEN SETEK TECHNOLOGY CO., LTD.

Our website: www.setek.com.cn

E-mail: service@setek.com.cn

TEL:86-755-26966362

FAX: 86-755-26966270

Prepared for : AsiaRF Ltd.

Address : 4F, No.2, Lane560, Zhongzheng Rd., Xindian City, Taipei Country
231, Taiwan

Product : Wireless AP Router

Model No(s). : Virtu 901

Trademark : ViBRAVO

Test Standard : FCC Part 15 Paragraph 15.247

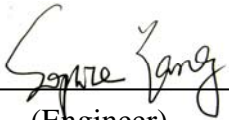
Prepared by : SHENZHEN SETEK TECHNOLOGY CO., LTD.

Address : 2/F, A3 Bldg, East Industry Zone, Overseas Chinese Town,
Shenzhen, China
Tel: (86-755) 26966362 Fax:(86-755) 26966270


Test Lab : SEM Test Compliance Service Co., Ltd.

Address : 3/F, Jinbao Commerce Bldg., Xin'an Fanshen Rd., Bao'an District,
Shenzhen, P. R. China

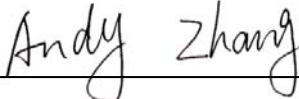
FCC R.N. : FCC Registration Number: 994117

Prepared by : 

(Engineer)

Reviewer by : 

(Project Engineer)

Approved by : 

(Manager)

Report Number : FCI1001081R

Date of Test : Jan. 25, 2010 to Feb. 08, 2010

Date of Report : Feb. 09, 2010

FCC ID : TKZVirtu901

The device described above is tested by SHENZHEN SETEK TECHNOLOGY CO., LTD. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. This report applies to above tested sample only and shall not be reproduced in part without written approval of SHENZHEN SETEK TECHNOLOGY CO., LTD.

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1. GENERAL INFORMATION

1.1 Description of Device (EUT)

Applicant : AsiaRF Ltd.

Address : 4F, No.2, Lane560, Zhongzheng Rd., Xindian City, Taipei
Country 231, Taiwan

Manufacturer : AsiaRF Ltd.

Address : Room 606, Light Industry Foreign Trade Building, No.1002,
Aiguo Road, Luohu District, 518000, Shenzhen City, China

EUT : Wireless AP Router

Model Number(s) : Virtu 901

Description of EUT : DTS

Description of Antenna : Special Antenna

Power Supply : DC12V

Operation Frequency : 2412 MHz ~ 2462 MHz / 2422 MHz ~2452 MHz

Number of Channels : 11/7

Received : Jan. 22, 2010

Date of Test : Jan. 25, 2010 to Feb. 08, 2010

1.2 Test Summary

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.203;§15.247(c)(1)(i)	Antenna Requirement	Compliant
§15.207	Conducted Emission	Compliant
§15.247(e)	Power Spectral Density	Compliant
§15.247(a)(2)	6 dB Bandwidth	Compliant
§15.247(b)(3)	Power Output	Compliant
§15.209(a)(d)	Radiated Emission	Compliant
§15.247(d)	Band edge	Compliant
§1.1307(b)	Maximum Permissible Exposure	Compliant

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1.3. Description of Support Device

The EUT has been tested as an independent unit.

1.4. Standards Applicable for Testing

The customer requested FCC tests for a Wireless AP Router. The standards used were FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 of the Federal Communication Commissions rules.

1.5. List of Measuring Equipments Used

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4408B	MY44210575	May 27,2009	1 Year
2.	Test Receiver	Rohde & Schwarz	ESIB26	100234	May 27,2009	1 Year
3.	Bilog Antenna	Schwarzbeck	VULB9163	142	May 27,2009	1 Year
4.	Loop Antenna	EMCO	6502	00042960	May 27,2009	1 Year
5.	50 Coaxial Switch	Anritsu Corp	MP59B	6100237248	May 27,2009	1 Year
6.	Cable	Schwarzbeck	AK9513(1m)	CR RX2	May 27,2009	1 Year
7.	Cable	Schwarzbeck	AK9513(10m)	AC RX1	May 27,2009	1 Year
8.	Cable	Rosenberger	N/A(6m)	CR RX1	May 27,2009	1 Year
9.	Cable	Rosenberger	N/A(10m)	FP2RX2	May 27,2009	1 Year
9.	DC Power Filter	MPE	23872C	N/A	May 27,2009	1 Year
10.	Single Phase Power Line Filter	MPE	23332C	N/A	May 27,2009	1 Year
11.	3 Phase Power Line Filter	MPE	23333C	N/A	May 27,2009	1 Year
12.	Signal Generator	HP	8648A	3625U00573	May 27,2009	1 Year
13.	Test Receiver	Rohde & Schwarz	ESCS30	100350	May 27,2009	1 Year
14.	L.I.S.N.	Rohde & Schwarz	ESH2-Z5	834549/005	May 27,2009	1 Year
15.	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100006	May 27,2009	1 Year
16.	RF Cable	FUJIKURA	RG-55/U	LISN Cable	May 27,2009	1 Year
17.	Spectrum Analyzer	Agilent	E4446A	MY43360126	May 27,2009	1 Year
18.	Spectrum Analyzer	Agilent	E7405A	US41160416	May 27,2009	1 Year
19.	Horn Antenna	Rohde & Schwarz	HF906	100039	May 27,2009	1 Year
20.	Horn Antenna	Schwarzbeck	BBHA9170	154	May 27,2009	1 Year

1.6. Test Facility

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

FCC – Registration No.: 994117

SEM Test Compliance Service Co., Ltd., the EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission.

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2. ANTENNA REQUIREMENT

2.1 Standard Applicable

According to FCC 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

The antenna gain is 2dBi.

2.2 Test Result

This product has a unique and integral antenna, fulfill the requirement of this section.

3. CONDUCTED EMISSION TEST

3.1 Standard Applicable

According to FCC 15.207 Conducted margin for a Class B device

3.2 Test Equipment

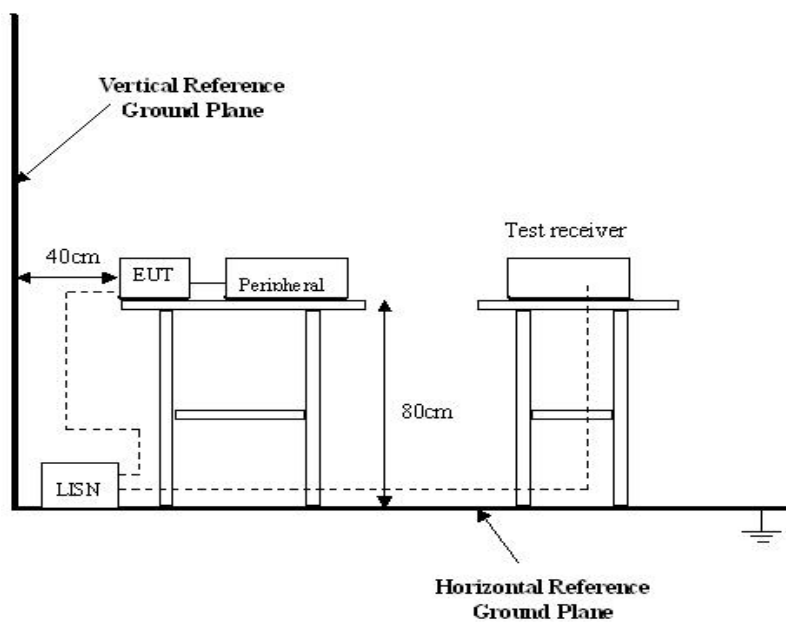
Please refer to Section 1.5. this report.

3.3 Test Procedure

1. The EUT was tested according to ANSI C63.4: 2003. The frequency spectrum from 150kHz to 30MHz was investigated.
2. The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

3.4 Conducted Test Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15 Paragraph 15.207 limits.



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3.5 Environmental Conditions

Test Voltage: AC 120V/60Hz
 Mode: TX On connect to PC
 Temperature: 21 °C
 Humidity: 52%RH

3.6 Summary of Test Results

LINE CONDUCTED EMISSIONS				FCC 15.207	
Frequency	Amplitude	Detector	Phase	Limit	Margin
MHz	dB μ V	QP/Ave/Pk	Line/Neutral	dB μ V	dB
11.994	46.45	Ave	Line	50.00	-3.54
0.210	48.08	Ave	Line	53.20	-5.12
0.338	42.86	Ave	Neutral	49.45	-6.39
0.206	54.54	QP	Line	63.36	-8.82
11.994	40.25	Ave	Neutral	50.00	-9.74
0.434	37.18	Ave	Neutral	47.17	-9.99
0.434	37.13	Ave	Line	47.17	-10.04
0.210	52.44	QP	Neutral	63.20	-10.76
6.258	48.75	QP	Line	60.00	-11.24
4.886	44.36	QP	Neutral	56.00	-11.63
5.378	48.06	QP	Neutral	60.00	-11.93
0.386	46.19	QP	Neutral	58.04	-11.95
4.380	44.46	QP	Line	57.09	-12.63
4.066	33.03	Ave	Line	46.00	-12.96

Note: Emissions attenuation more than 20dB are not report.

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4 POWER SPECTRAL DENSITY

4.1 Standard Applicable

According to 15.247(a)(1)(iii), For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

4.2 Test Equipment List and Details

Please refer to Section 1.5. this report.

4.3 Test Procedure

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set center frequency of spectrum analyzer = operating frequency.
3. Set the spectrum analyzer as RBW, VBW=3KHz, Span = 300kHz.
4. Repeat above procedures until all frequency measured was complete.

4.4 Environmental Conditions

Test Voltage:	DC 12V
Mode:	TX On
Temperature:	21 C
Humidity:	52%RH

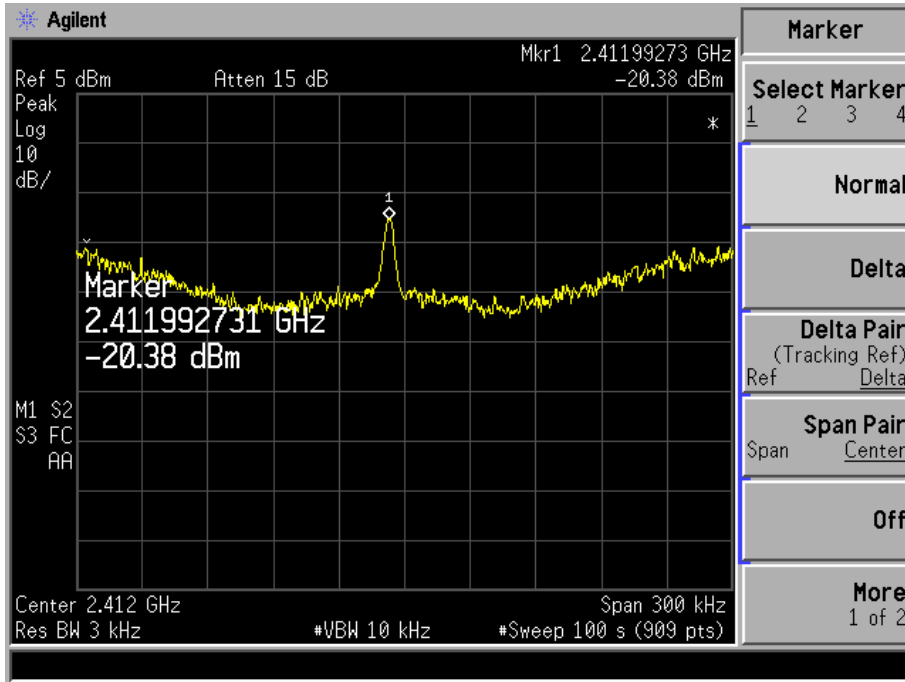
4.5 Summary of Test Results

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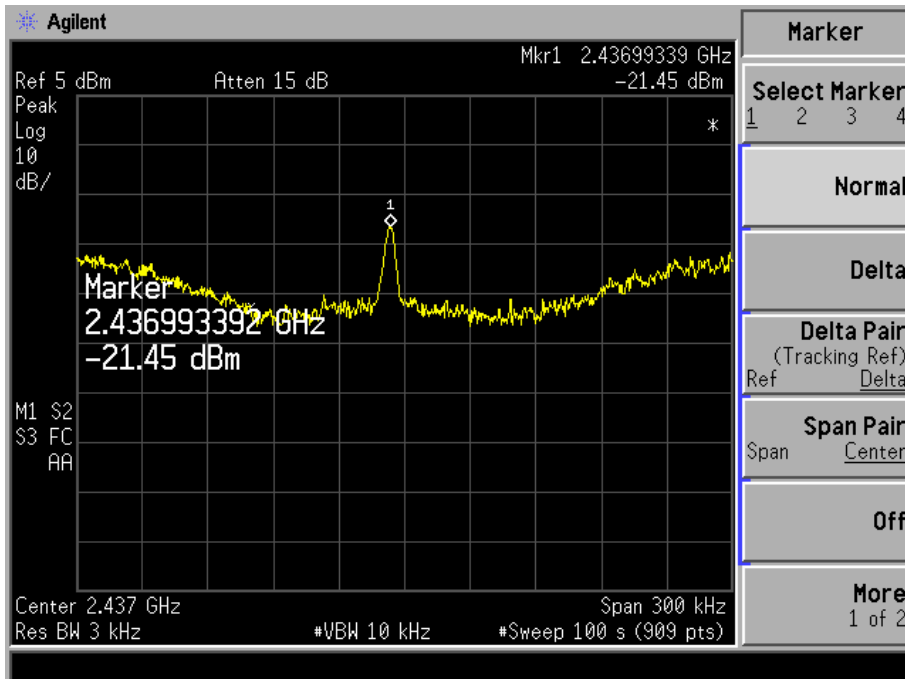
Test mode	Test channel	Reading Chain 0	Reading Chain 1	Total PSD	Limit dBm/3kHz
802.11b	Low channel (2412MHz)	-20.38	-20.57	-17.46	8
	Middle channel (2437MHz)	-21.45	-21.05	-18.24	8
	High channel (2462MHz)	-28.77	-28.78	-25.76	8
802.11g	Low channel (2412MHz)	-21.15	-21.2	-18.16	8
	Middle channel (2437MHz)	-21.29	-20.45	-17.84	8
	High channel (2462MHz)	-24.5	-24.14	-21.31	8
802.11n/HT20	Low channel (2412MHz)	-21.2	-21.26	-18.22	8
	Middle channel (2437MHz)	-20.88	-20.82	-17.84	8
	High channel (2462MHz)	-24.5	-21.26	-19.57	8
802.11n/HT40	Low channel (2422MHz)	-25.51	-25.66	-22.57	8
	Middle channel (2437MHz)	-18.38	-18.4	-15.38	8
	High channel (2452MHz)	-21.86	-21.83	-18.83	8

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For Chain 0 Test
 For 802.11b
 Low Channel:

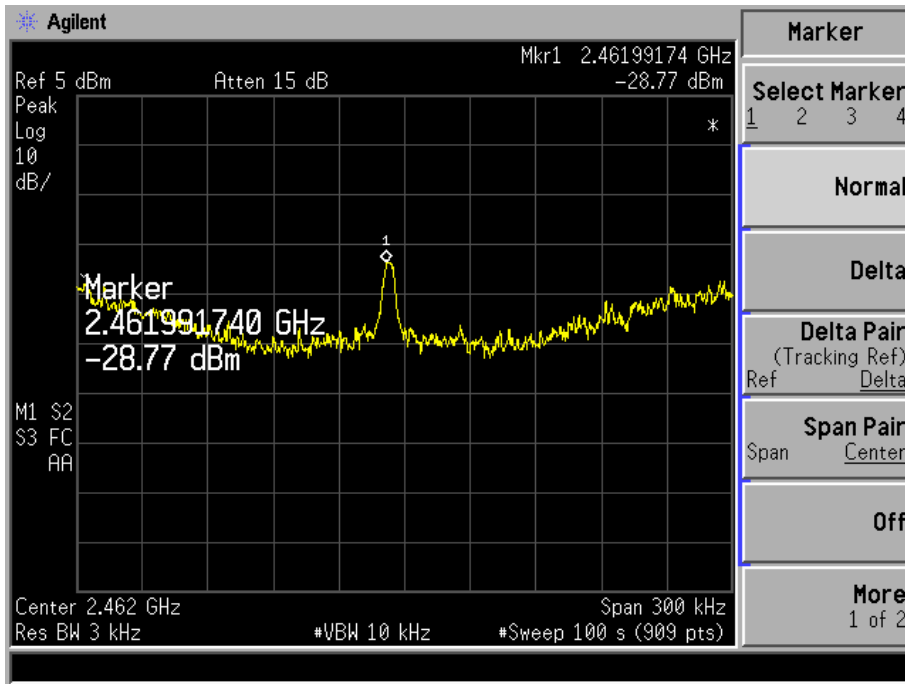


Mid Channel:

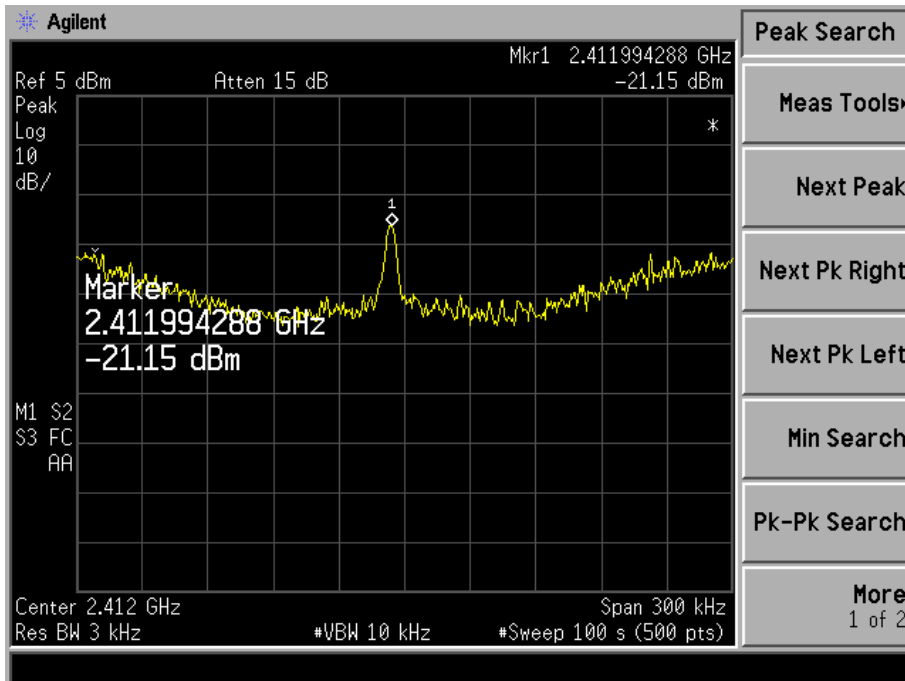


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High Channel:

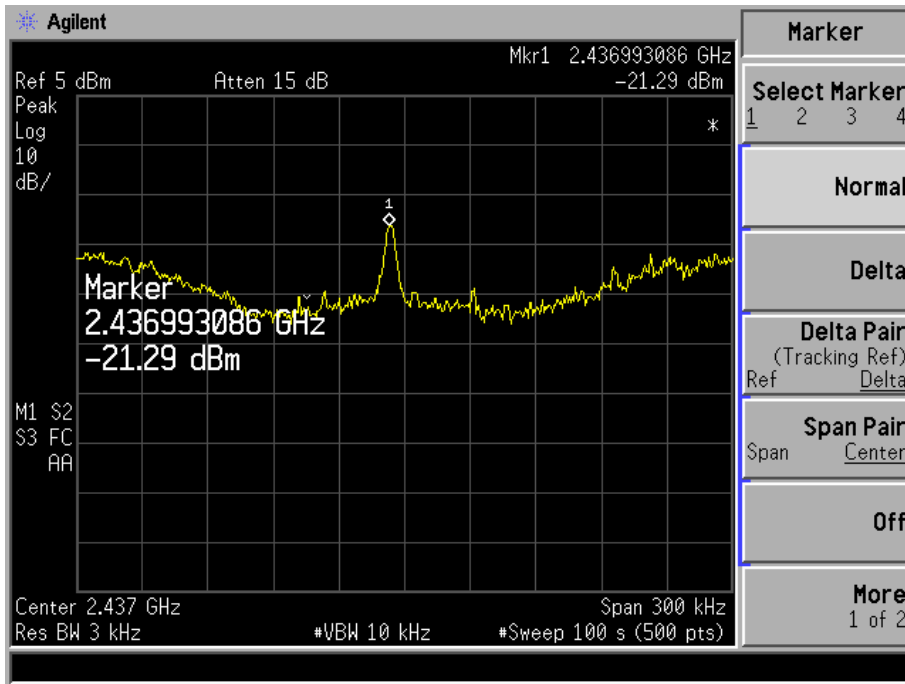


For 802.11g
Low Channel:

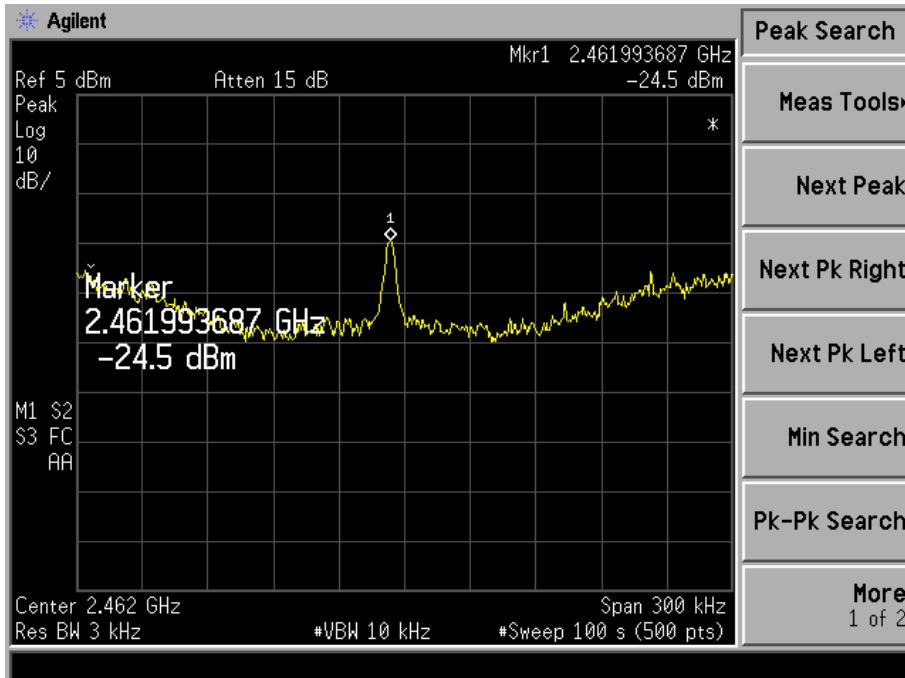


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Mid Channel:

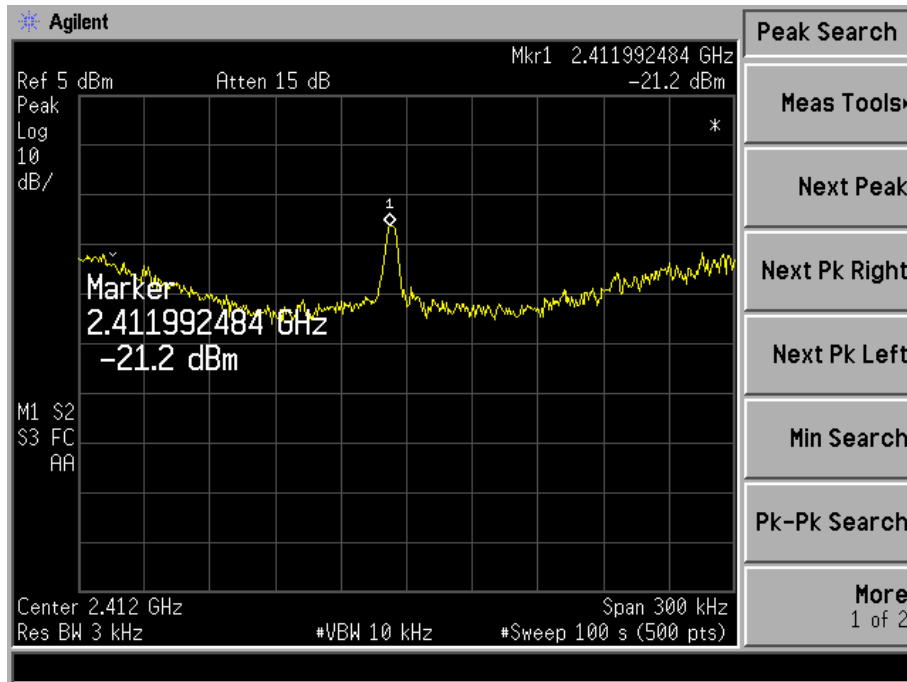


High Channel:

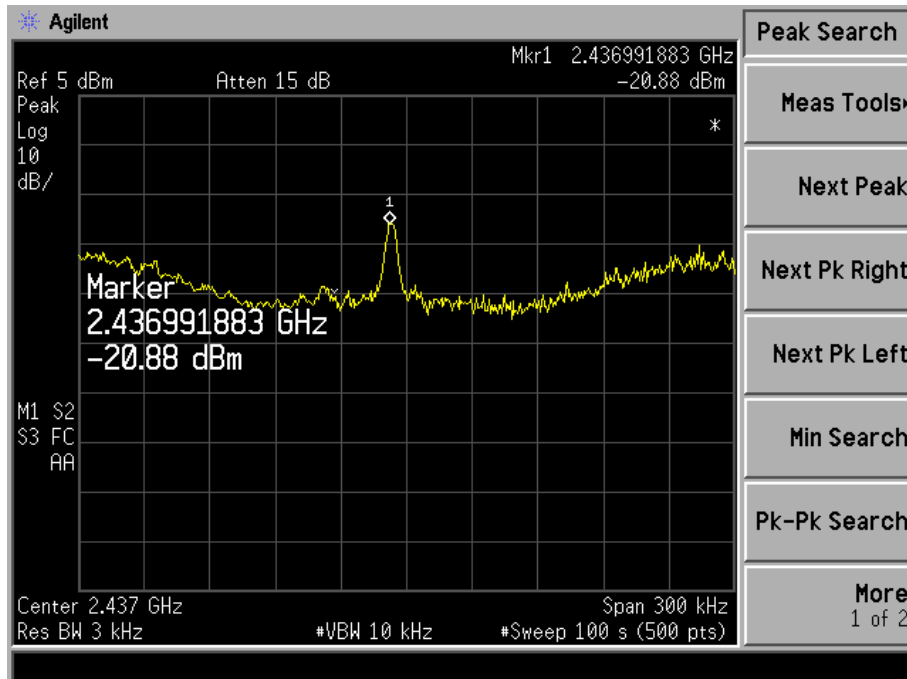


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For 802.11n/HT20
Low Channel:

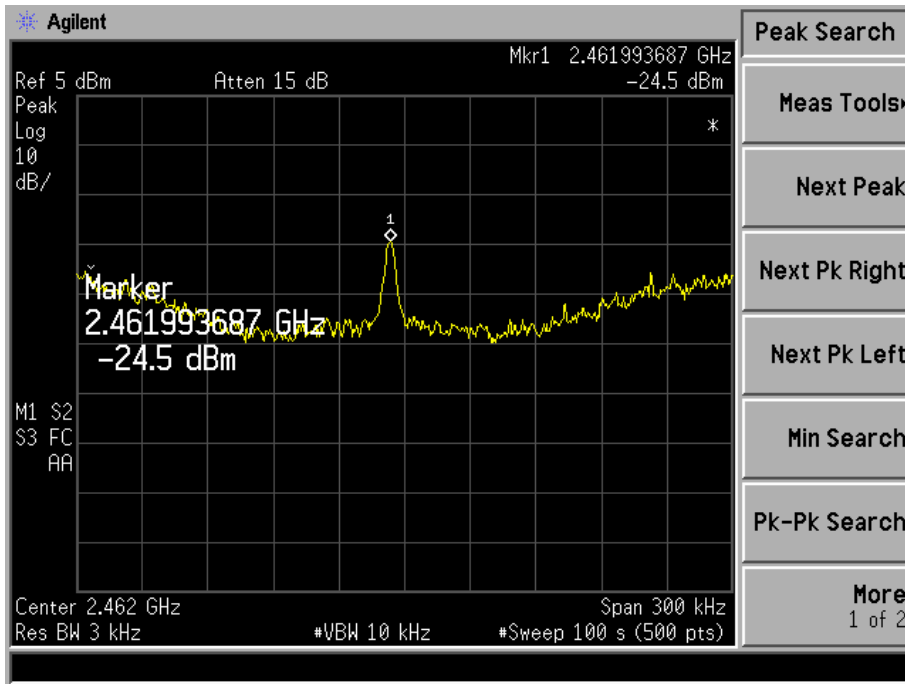


Middle Channel:

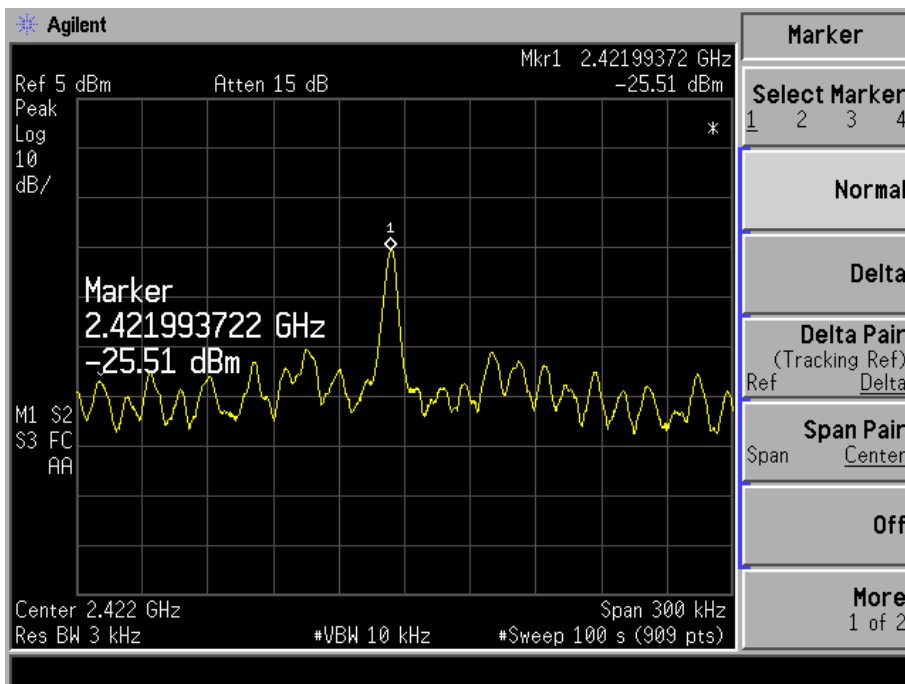


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High Channel:

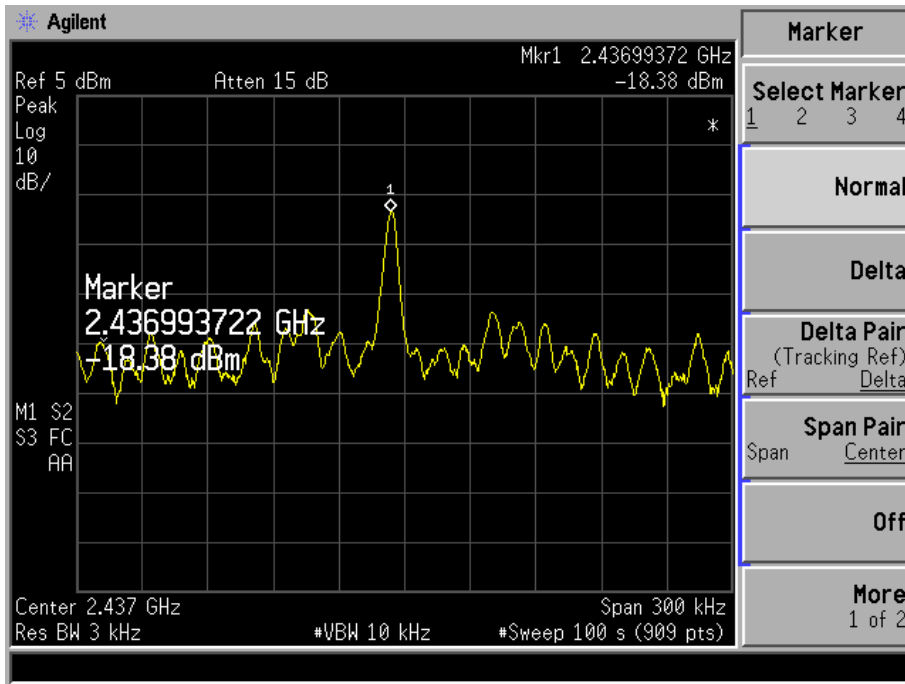


For 802.11n/HT40
Low Channel:

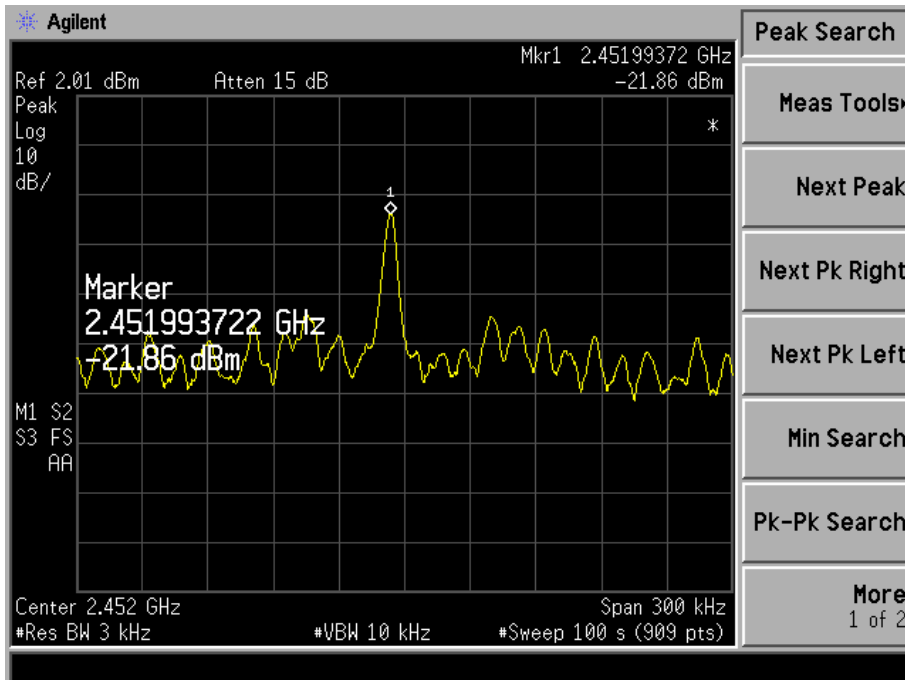


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Middle Channel:

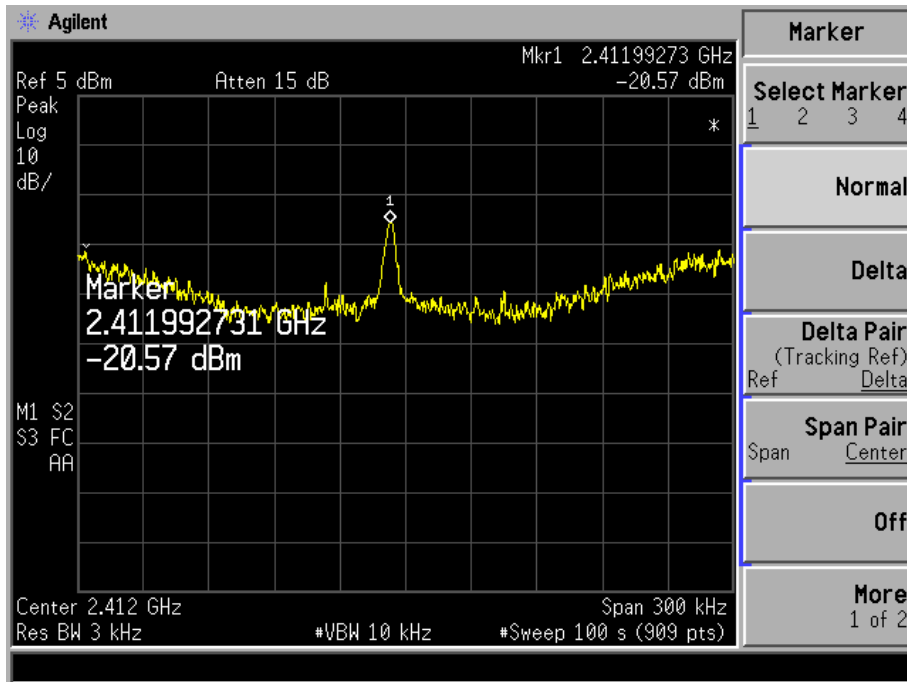


High Channel:

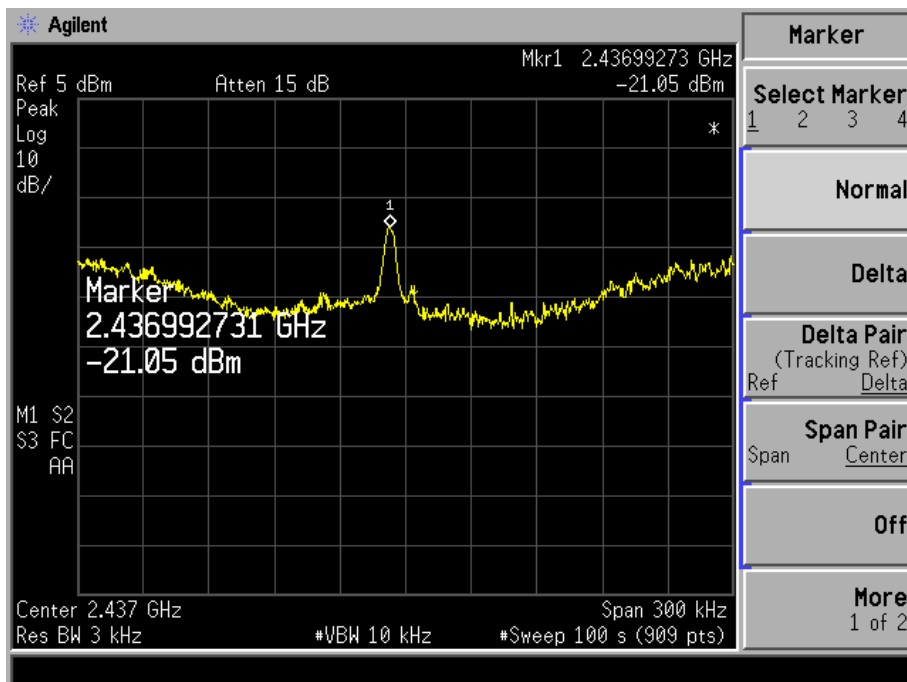


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For Chain 1 Test
 For 802.11b
 Low Channel:

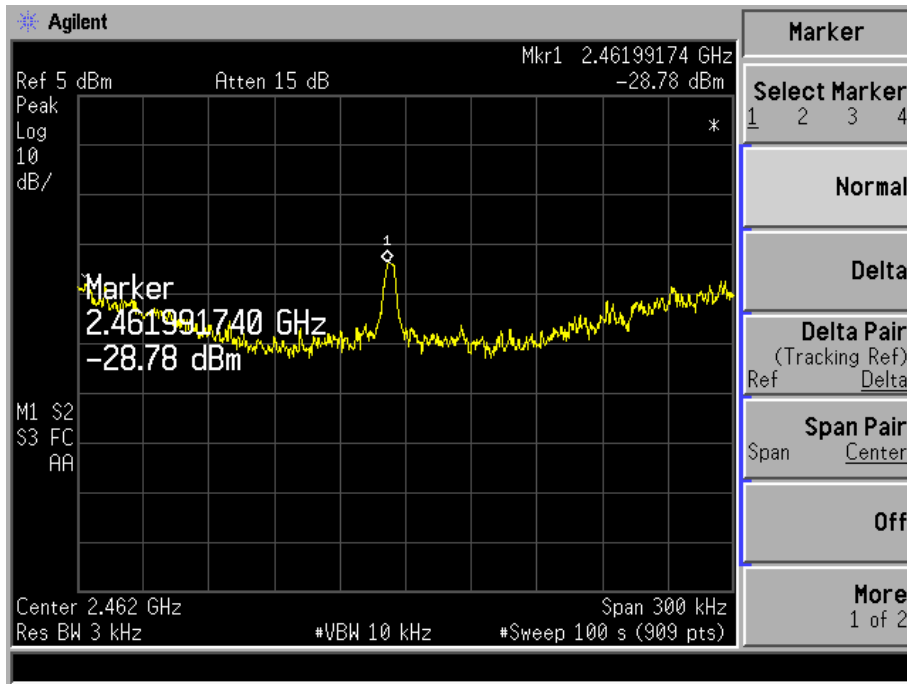


Middle Channel:

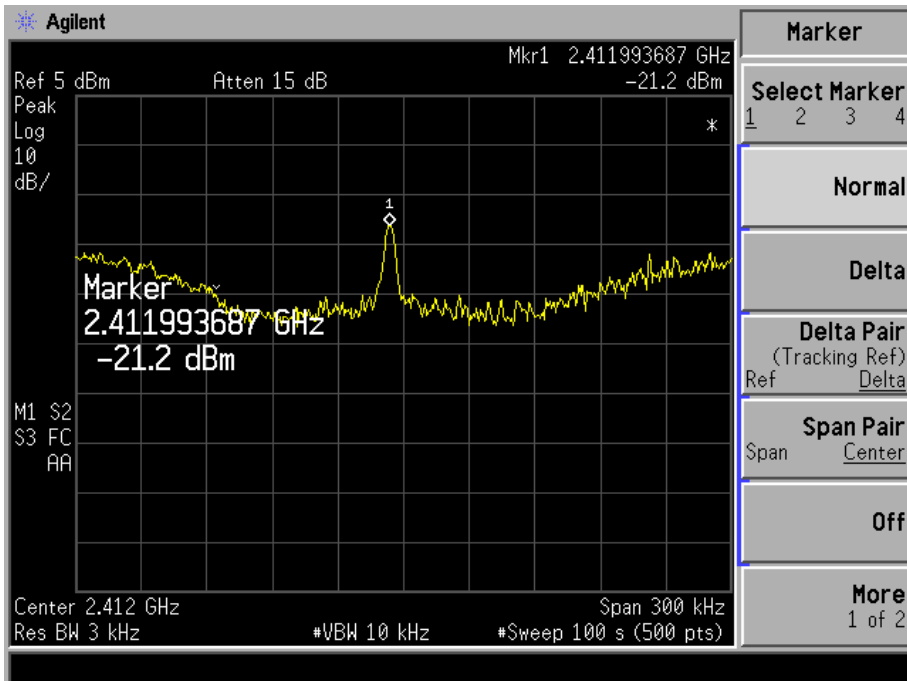


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High Channel:

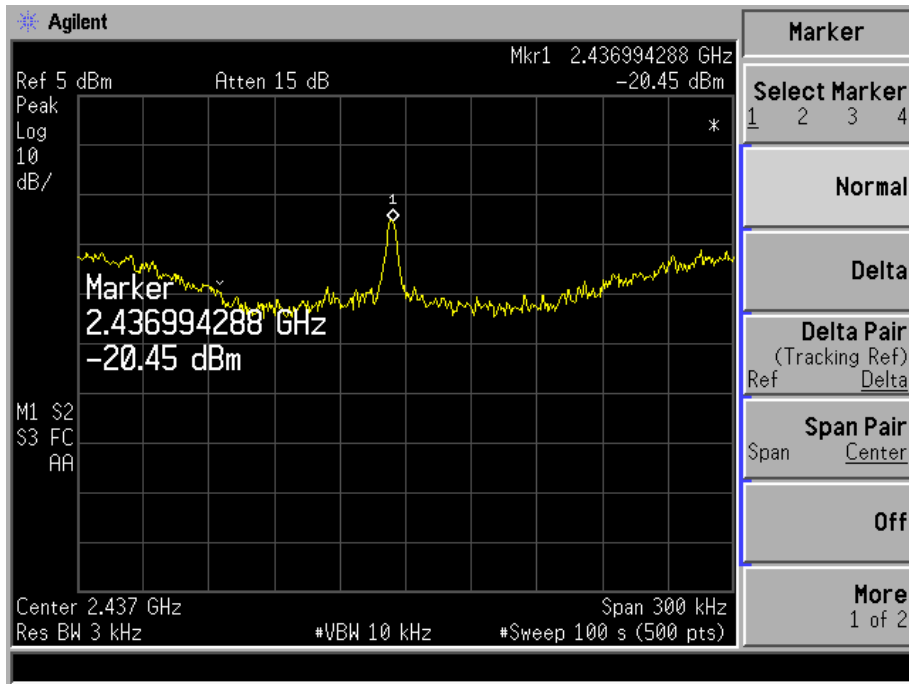


For 802.11g
Low Channel:

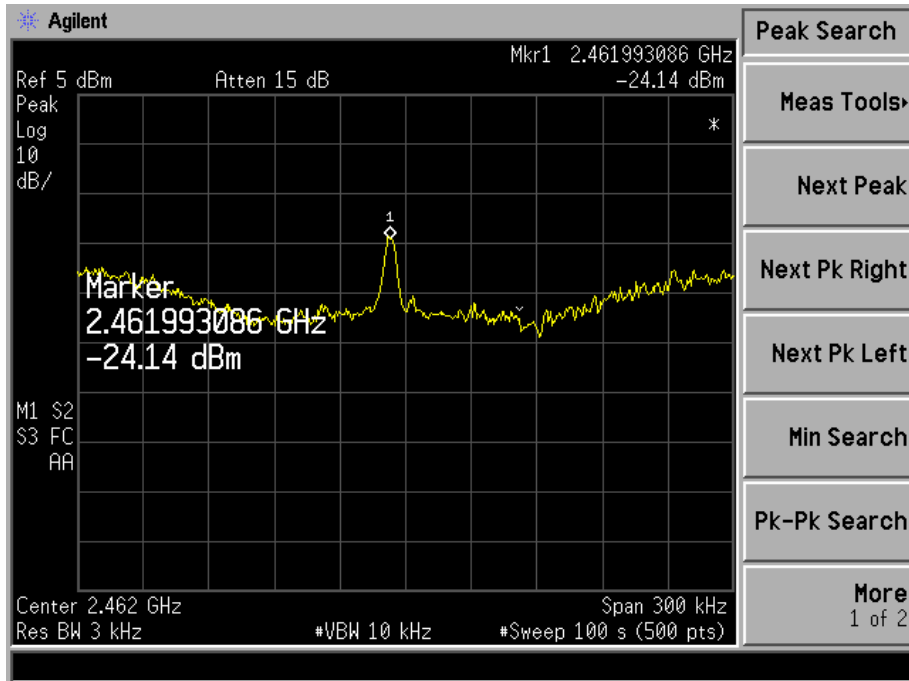


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Middle Channel:



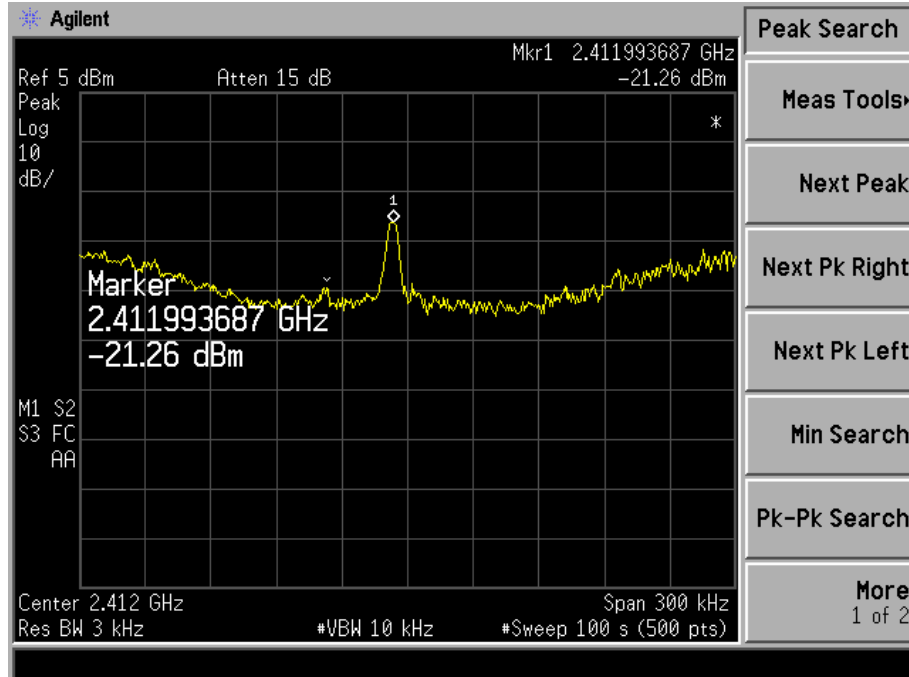
High Channel:



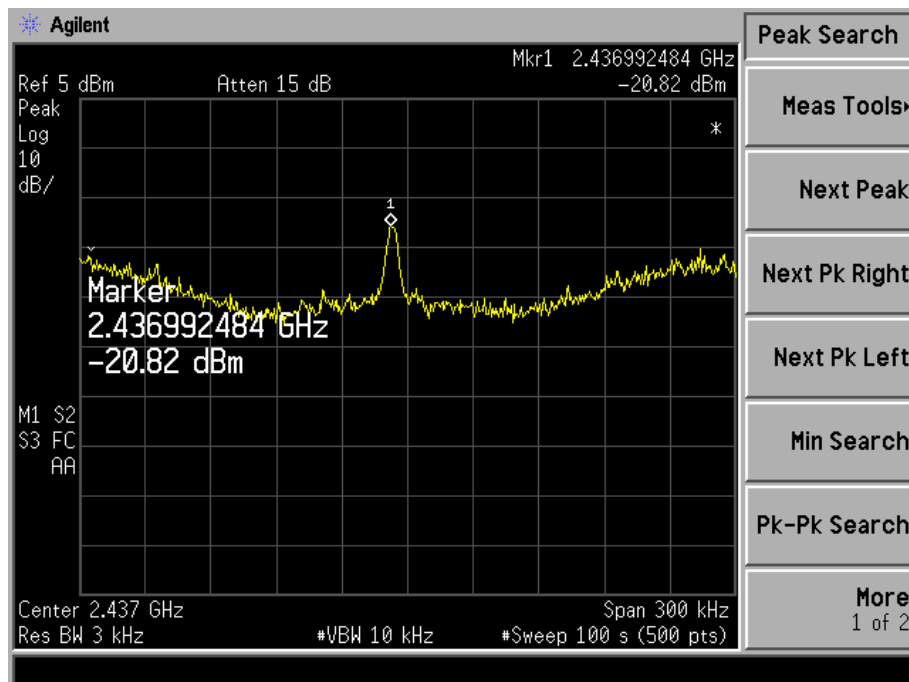
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For 802.11n HT20

Low Channel:

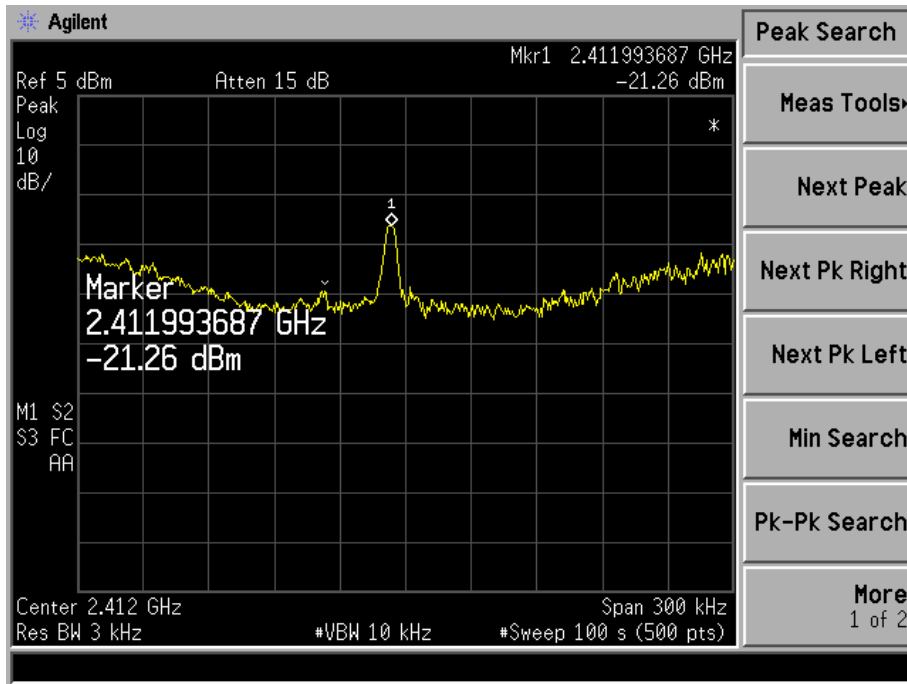


Middle Channel:



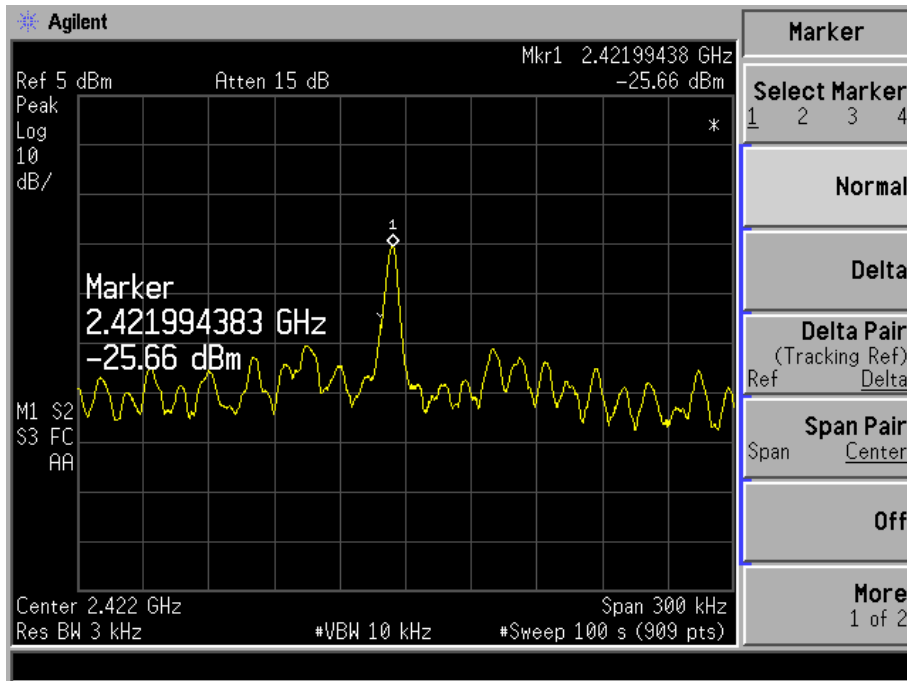
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High Channel:



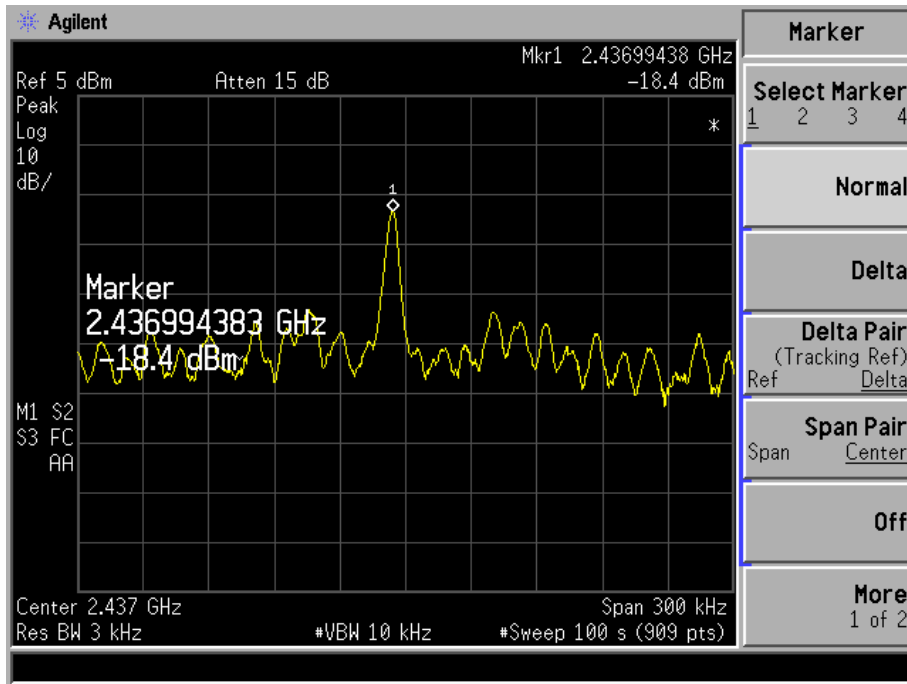
For 802.11nHT40

Low Channel:

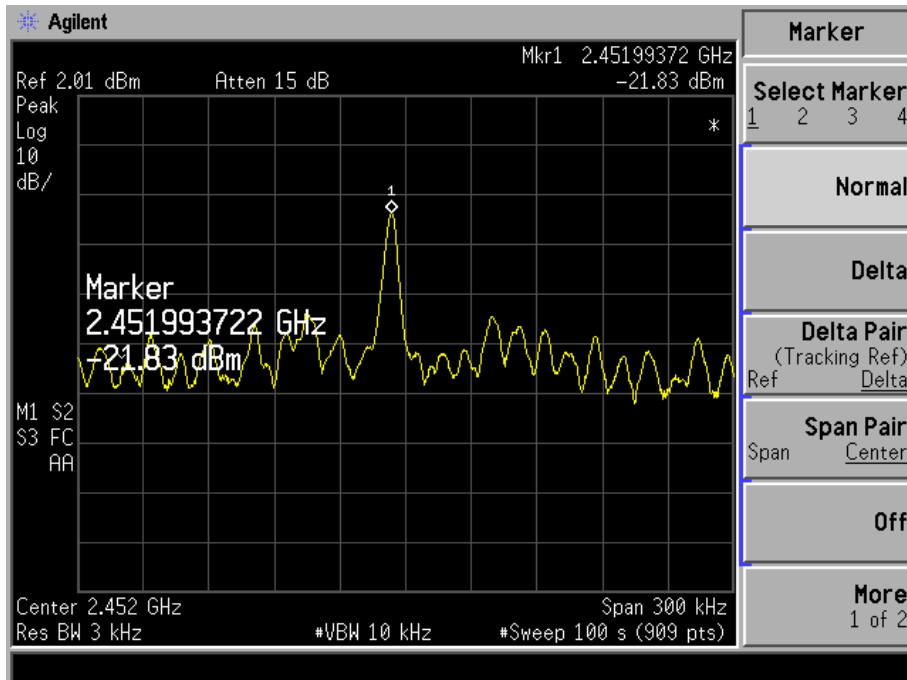


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Middle Channel:



High Channel:



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5 -6dB BANDWIDTH

Standard Applicable

According to 15.247(a)(2). Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

5.1 Test Equipment List and Details

Please refer to Section 1.5. this report.

5.2 Test Procedure

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set center frequency of spectrum analyzer = operating frequency.
3. The spectrum analyzer as RBW=100kHz , BVW>RBW, Sweep=auto
4. Mark the peak frequency and –6dB (upper and lower) frequency.

5.3 Environmental Conditions

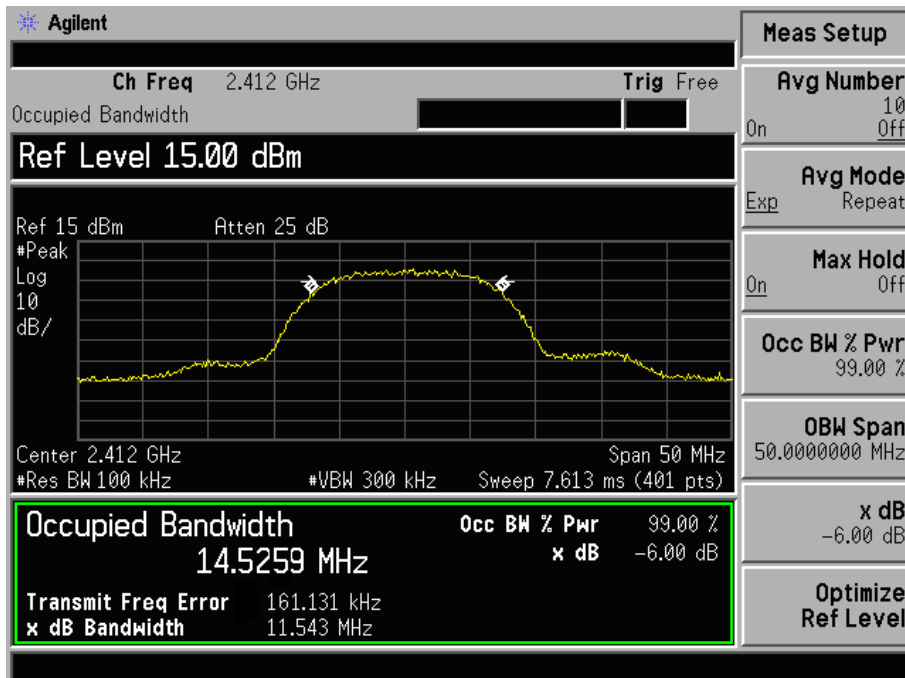
Test Voltage:	DC 12V
Mode:	TX On
Temperature:	24 C
Humidity:	52%RH

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5.4 Summary of Test Results

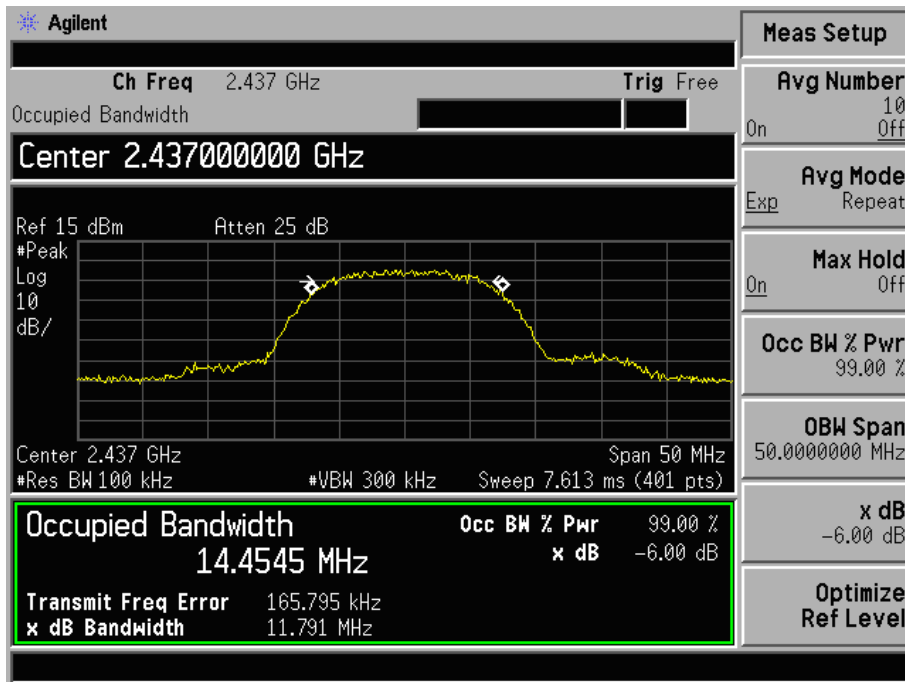
Test mode	Frequency MHz	6 dB Bandwidth kHz Chain 0	6 dB Bandwidth kHz Chain 1	Limit kHz
802.11b	2412	11543	11671	500
	2437	11791	11628	500
	2462	11361	11945	500
802.11g	2412	16420	16412	500
	2437	16821	16523	500
	2462	16383	16584	500
802.11n/HT20	2412	16775	16587	500
	2437	16850	16794	500
	2462	16401	16436	500
802.11n/HT40	2422	35434	35304	500
	2437	35365	35768	500
	2452	34885	34730	500

For Chain 0 Test
 For 802.11b
 Low Channel:

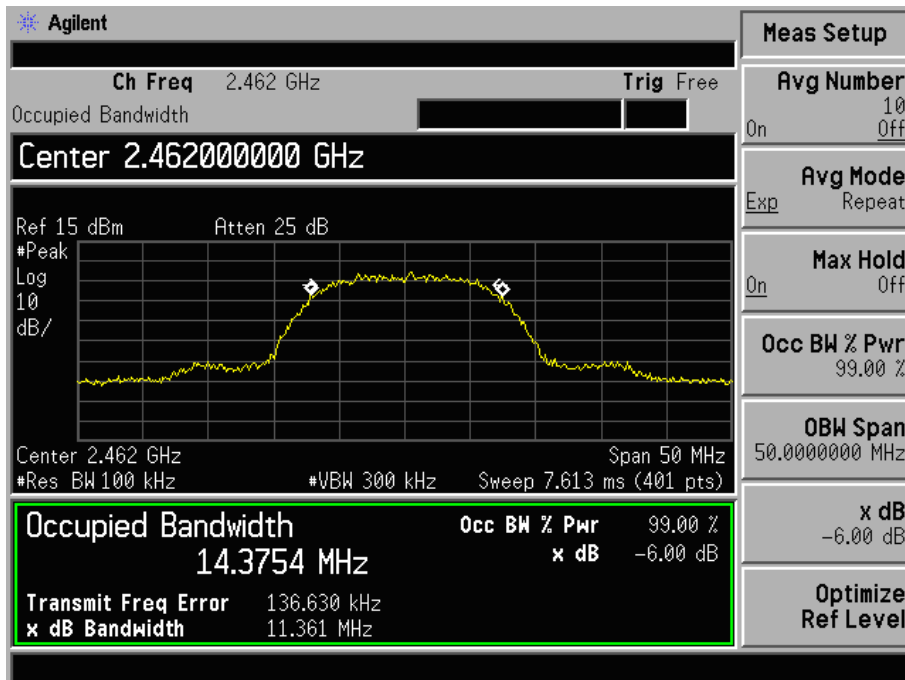


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Mid Channel:

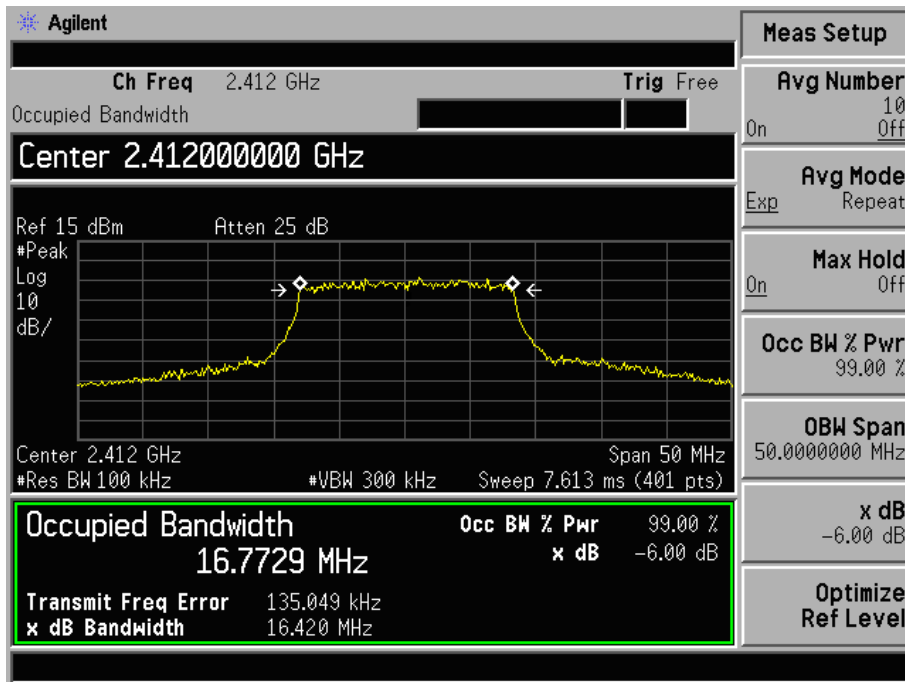


High Channel:

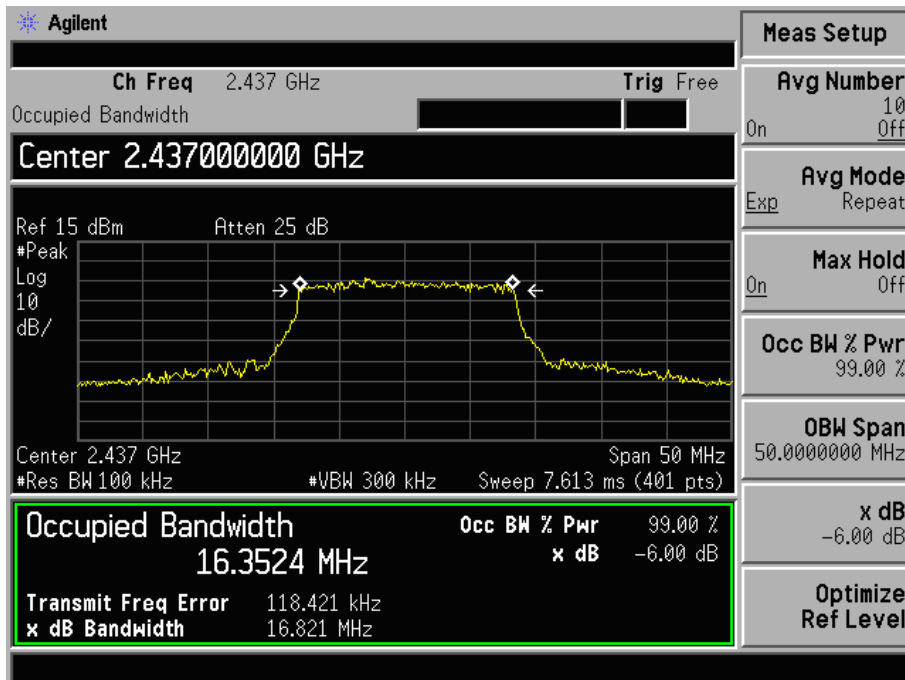


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For 802.11g
Low Channel:

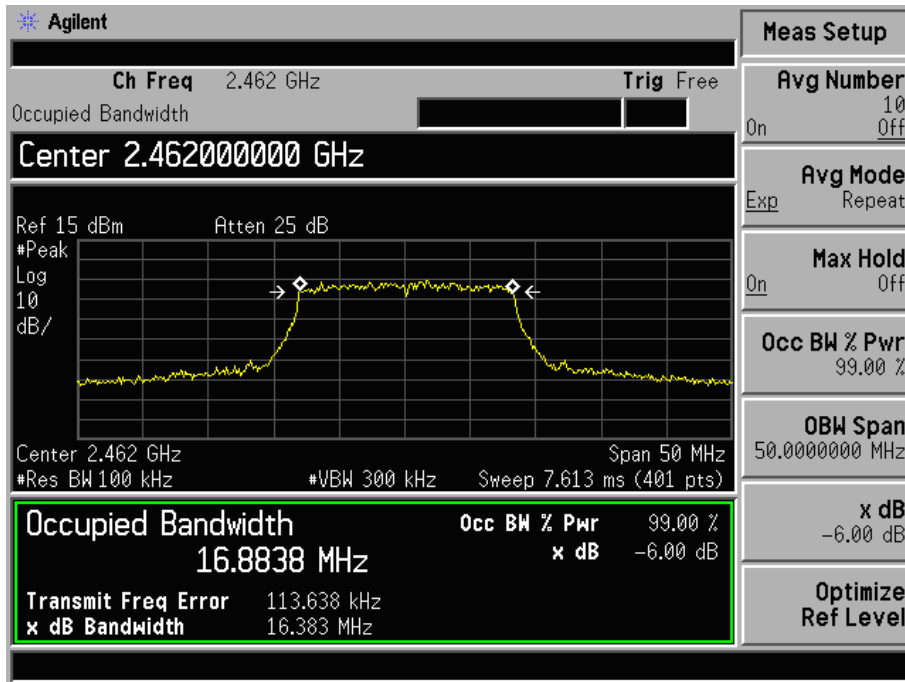


Mid Channel:

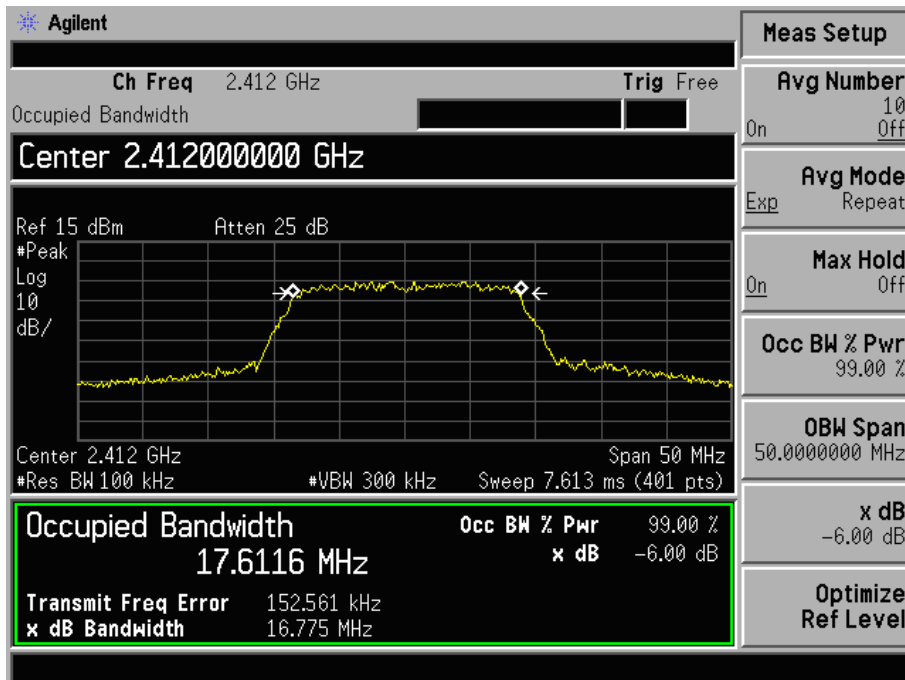


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High Channel:

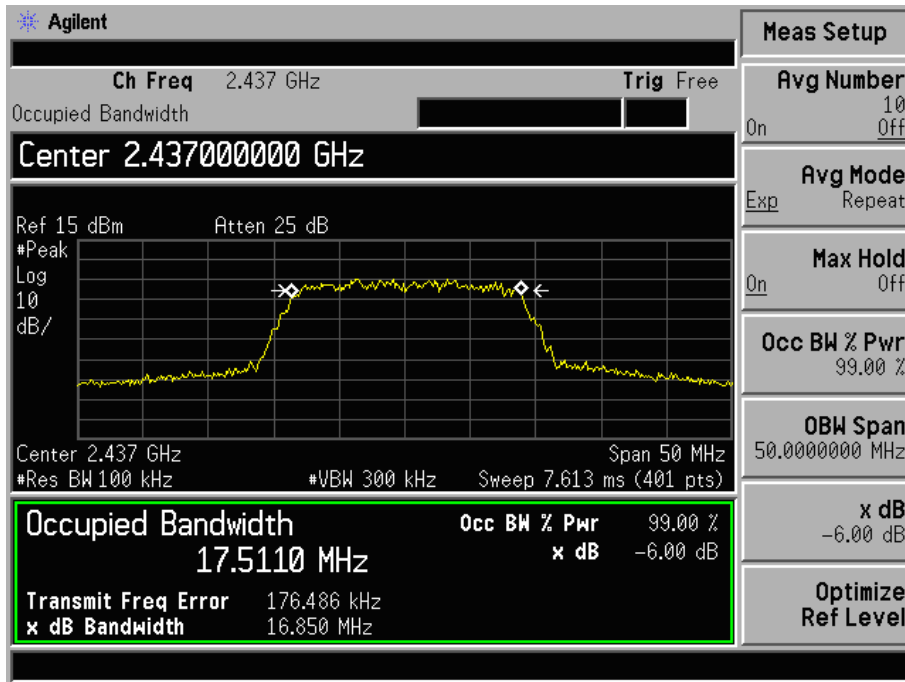


For 802.11n/HT20
Low Channel:

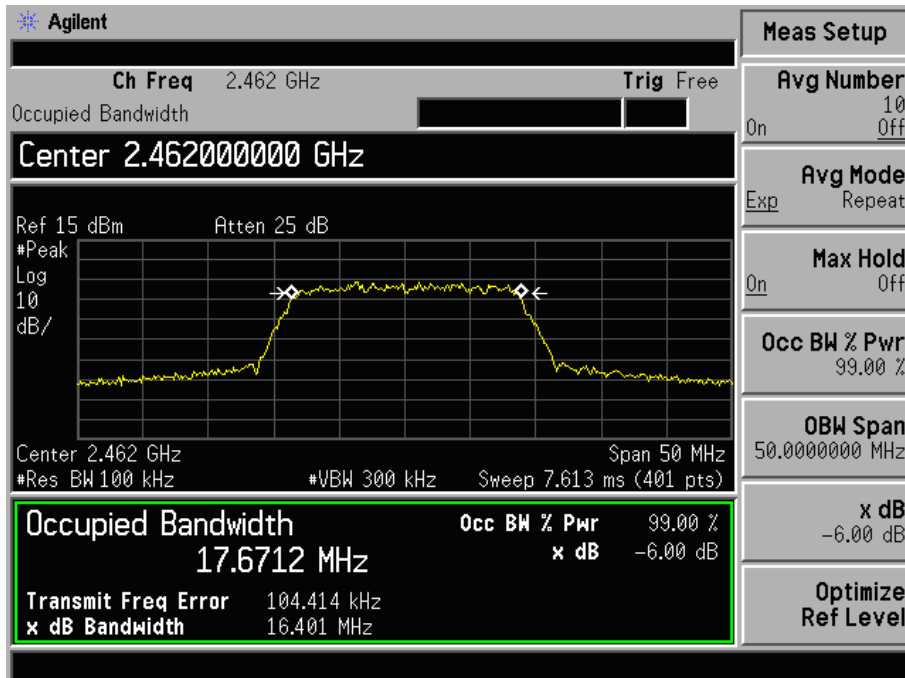


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Middle Channel:

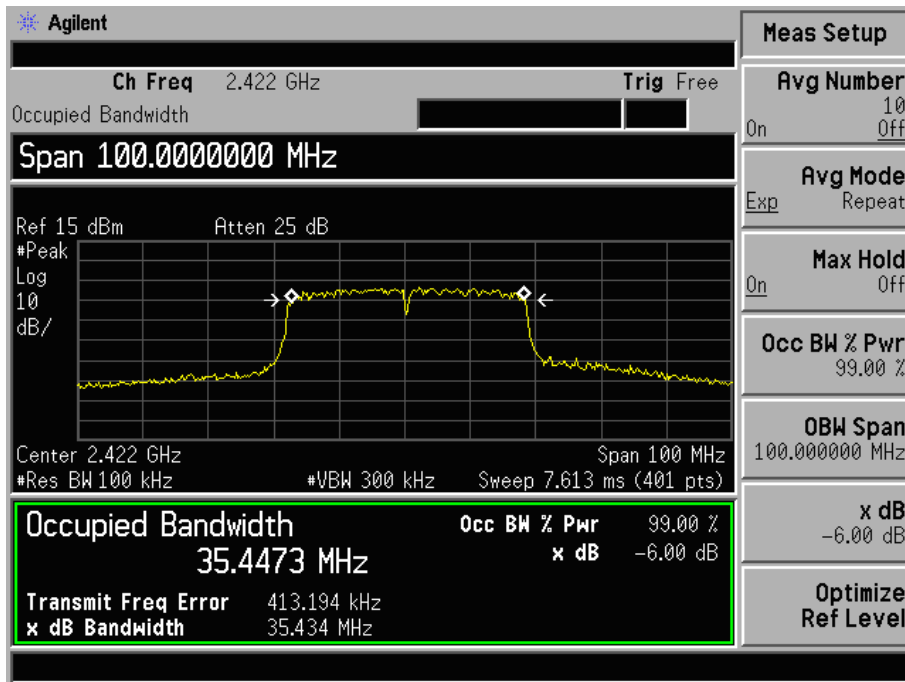


High Channel:

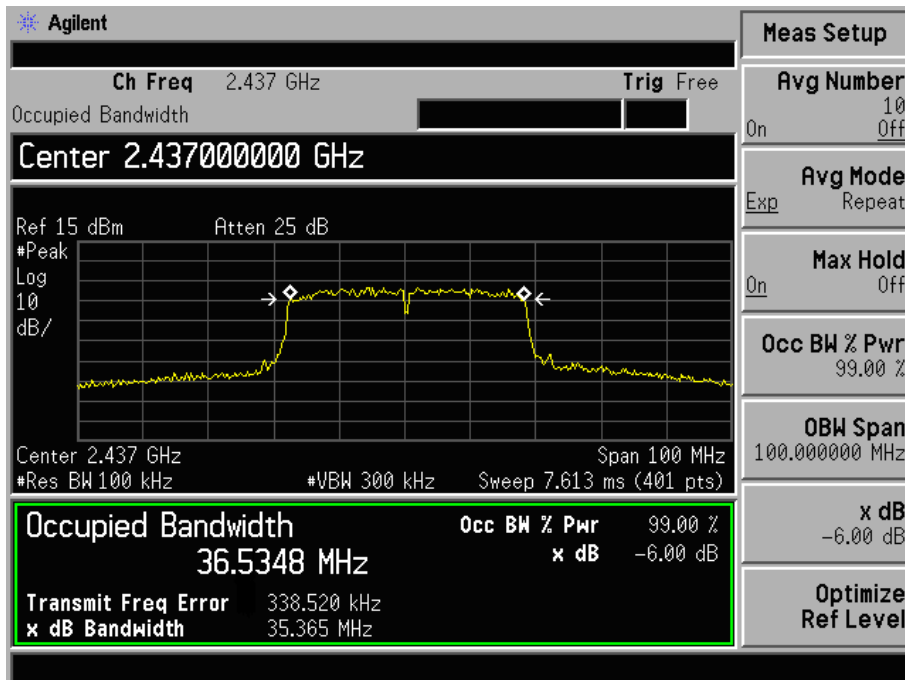


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For 802.11n/HT40
Low Channel:

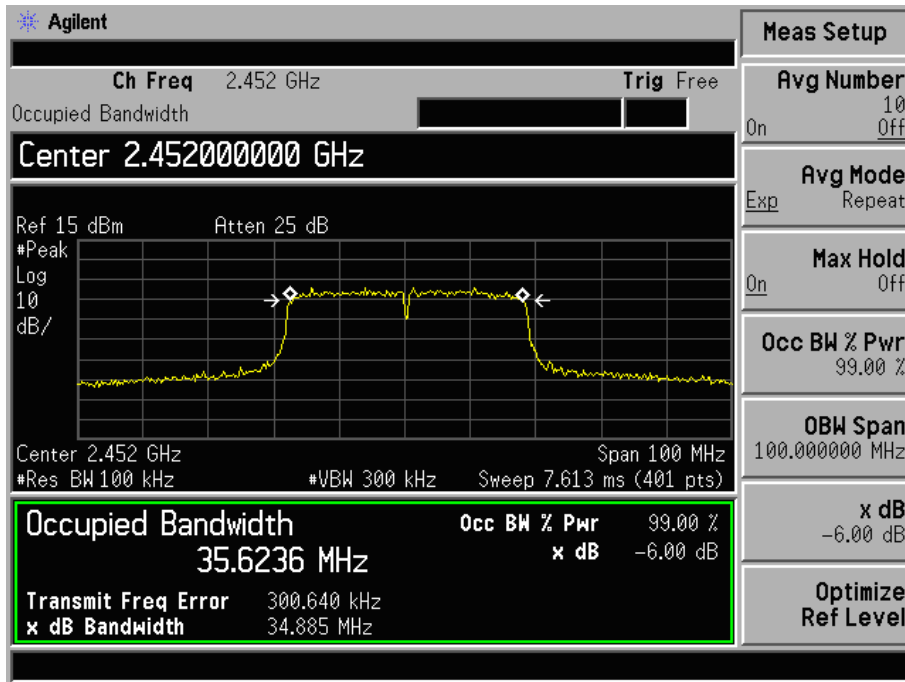


Middle Channel:

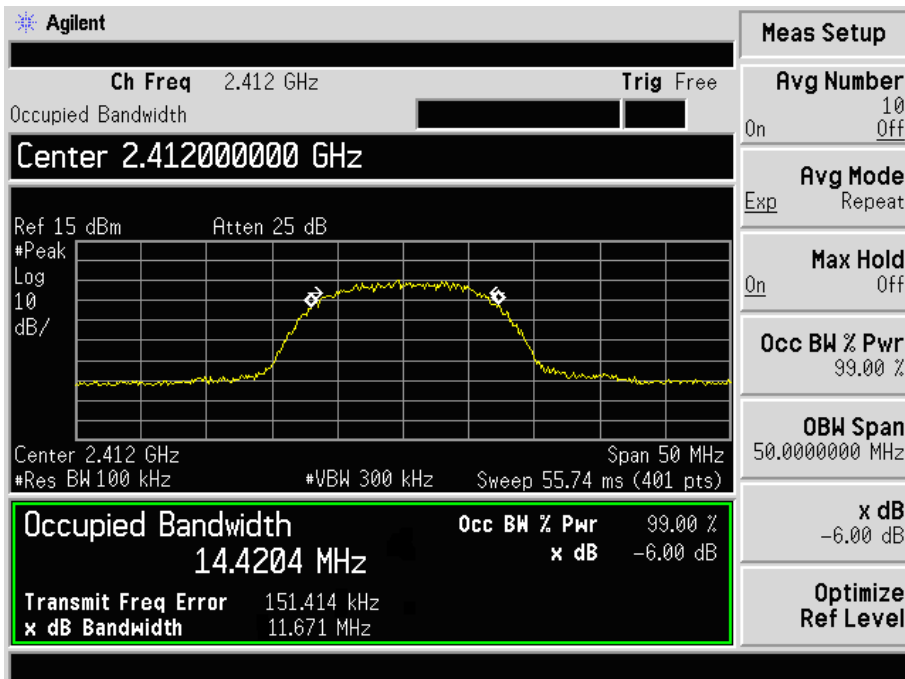


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High Channel:

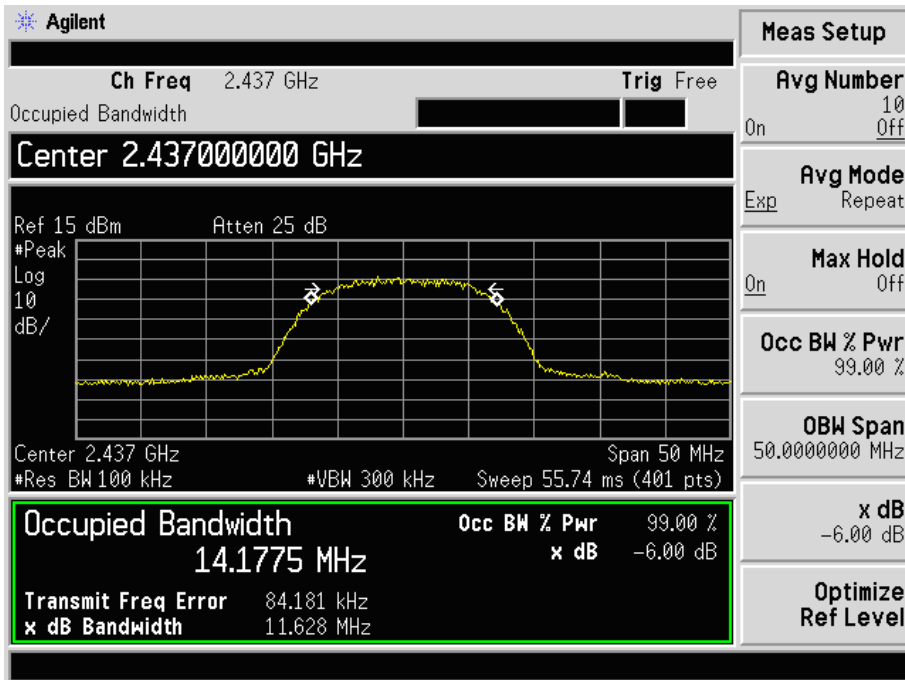


For Chain 1 Test
For 802.11b
Low Channel:

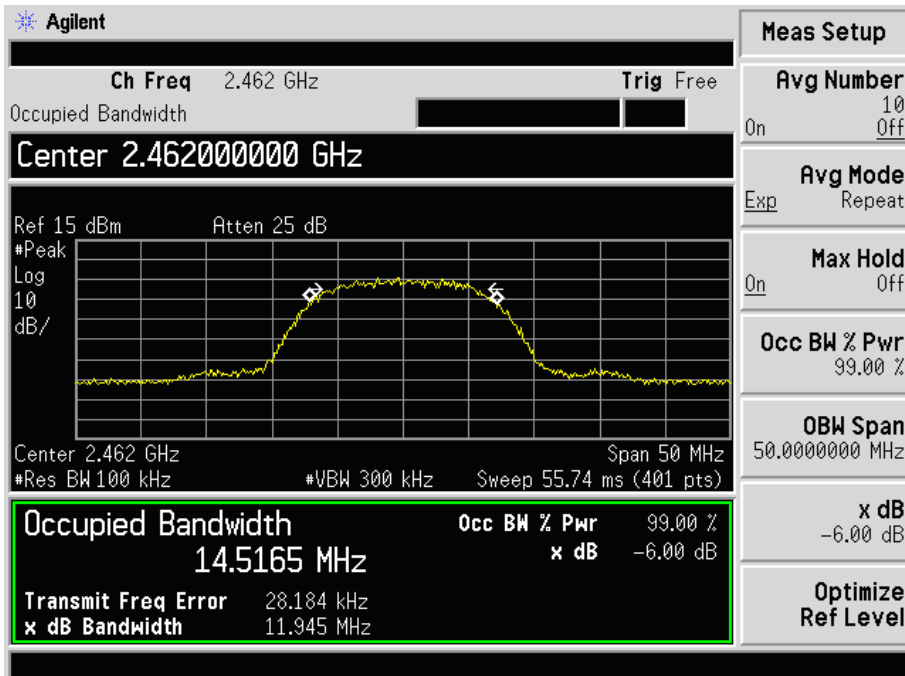


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Middle Channel:

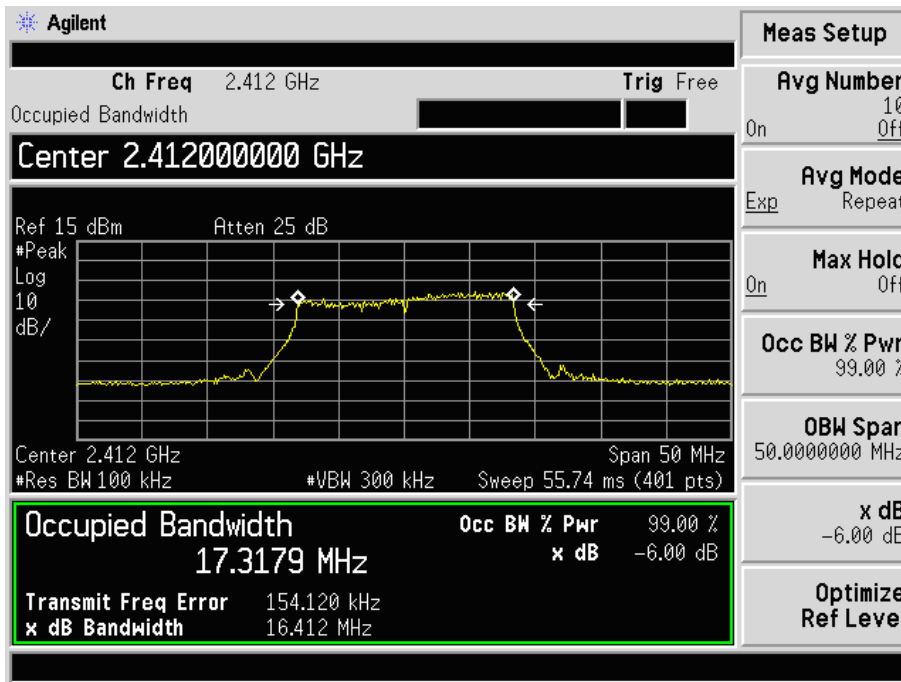


High Channel:

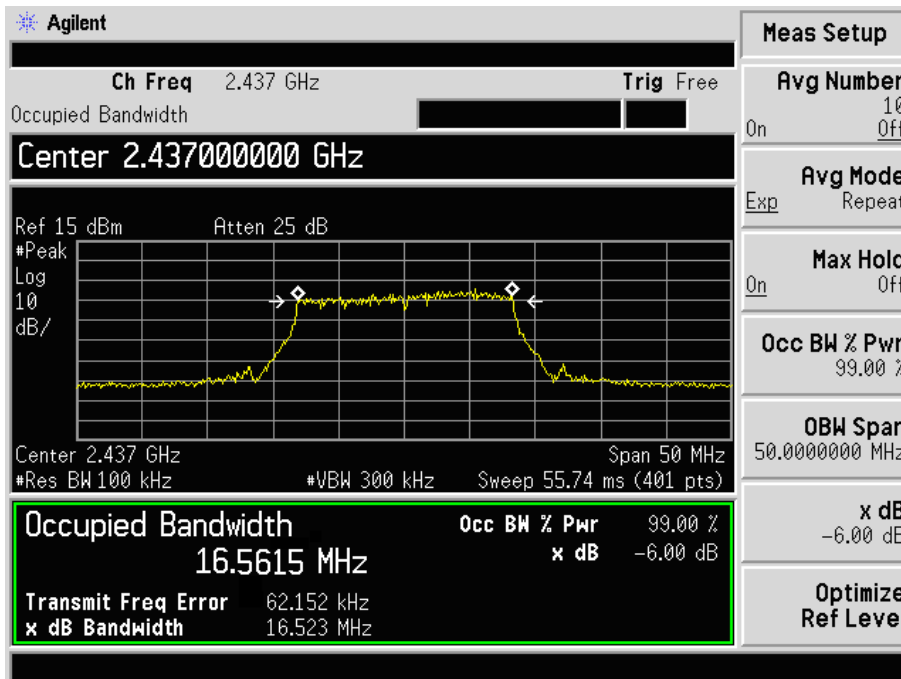


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For 802.11g
Low Channel:

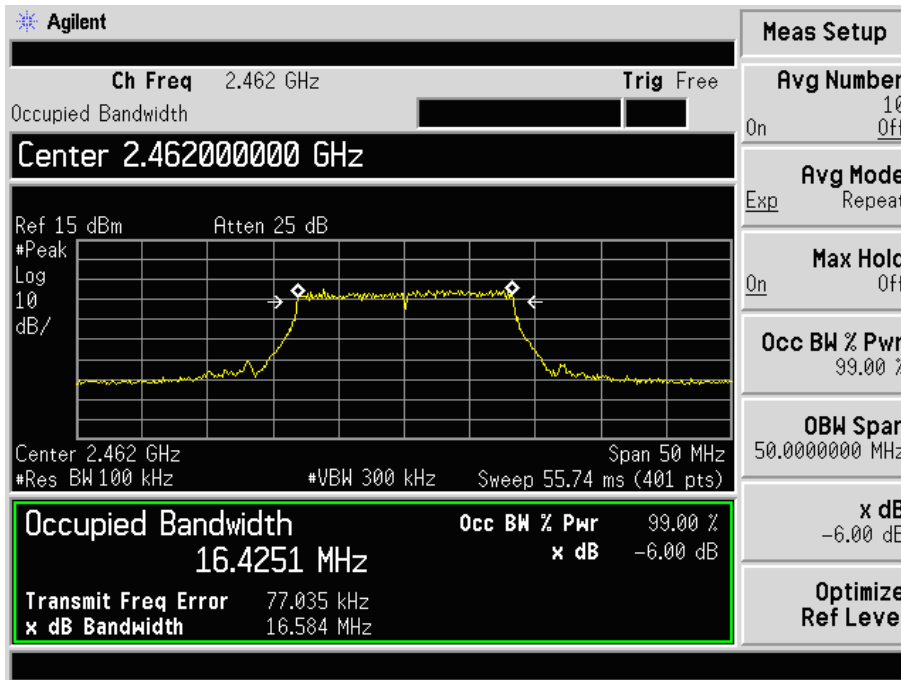


Middle Channel:



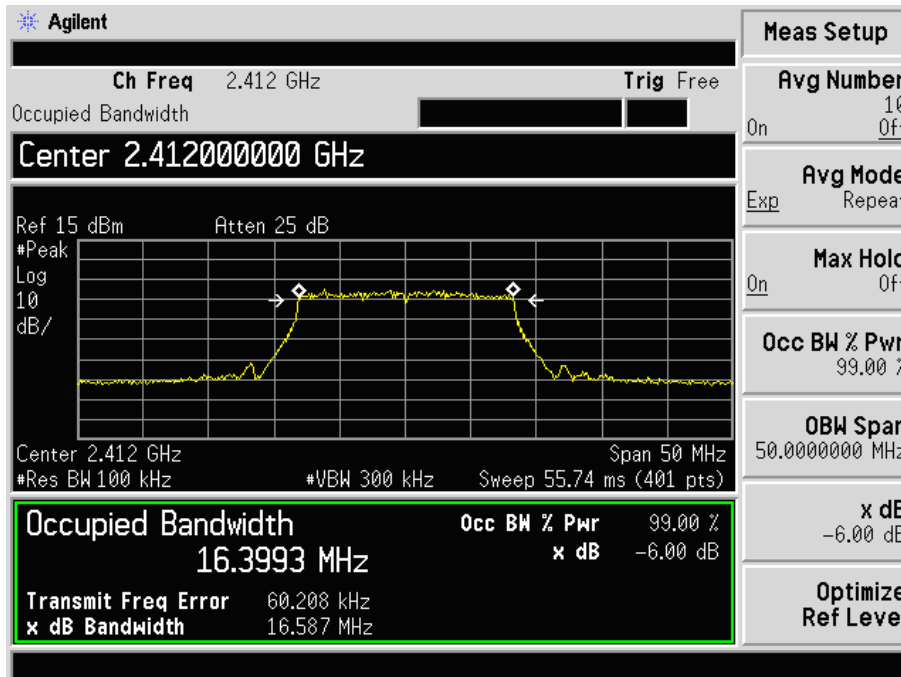
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High Channel:



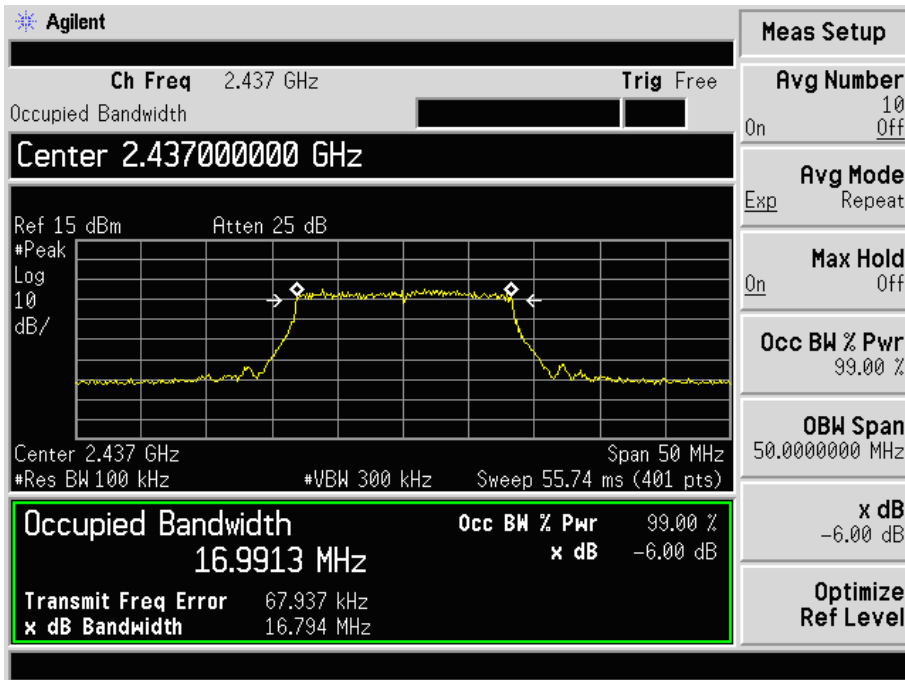
For 802.11n HT20

Low Channel:

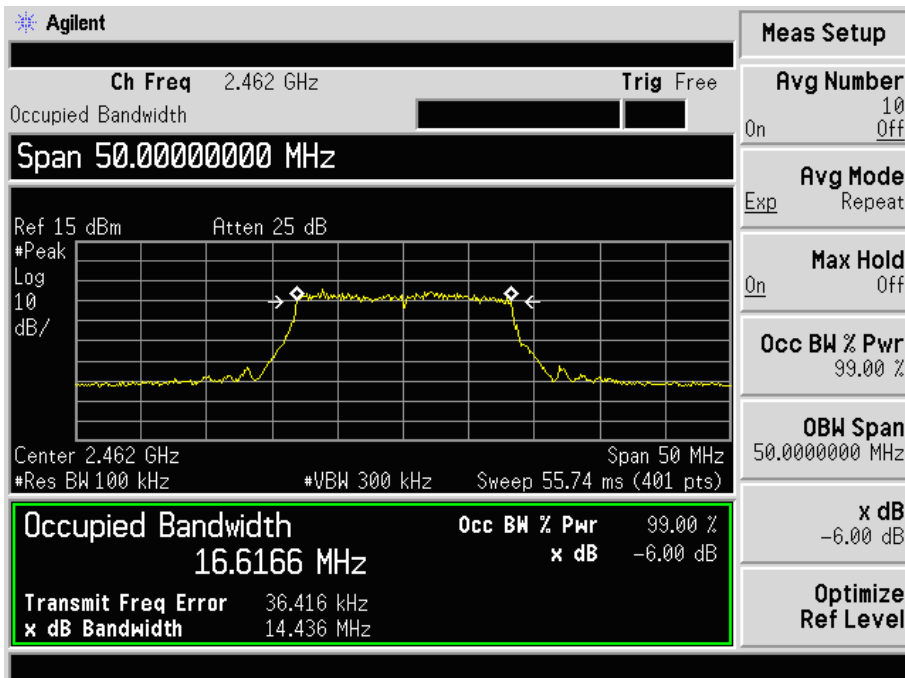


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Middle Channel:



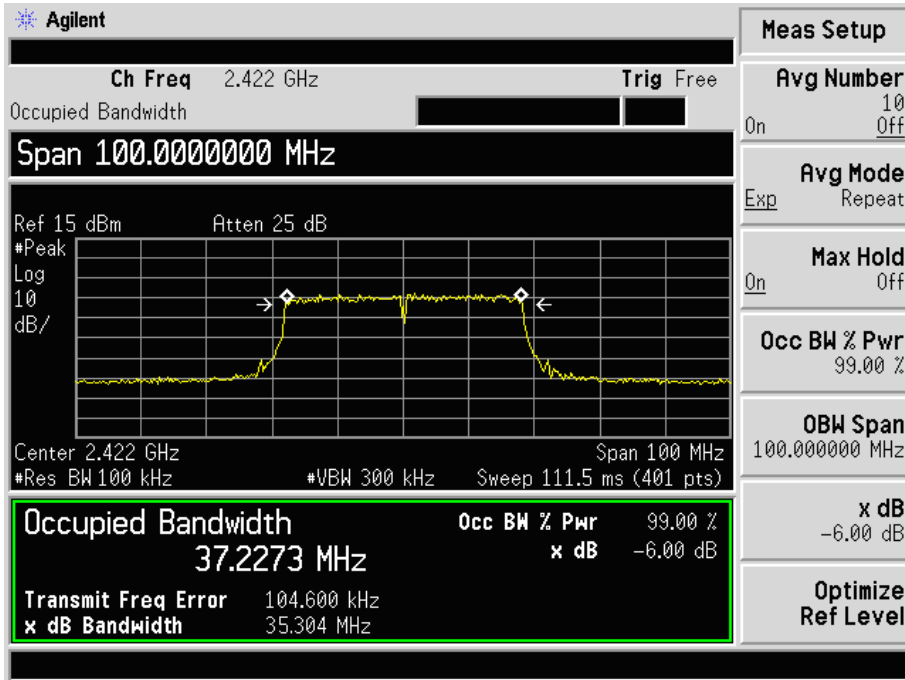
High Channel:



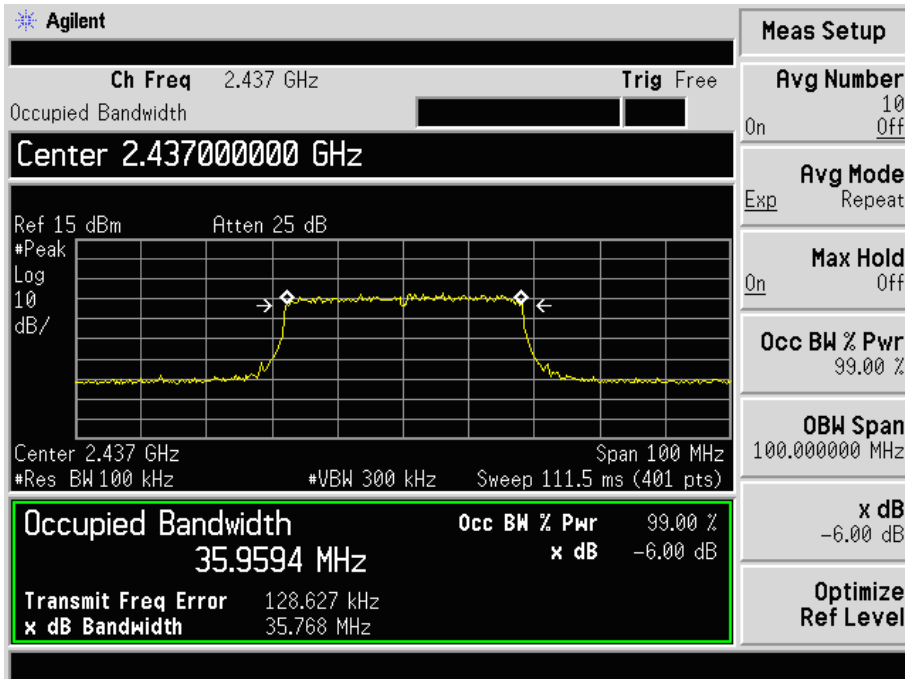
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For 802.11nHT40

Low Channel:

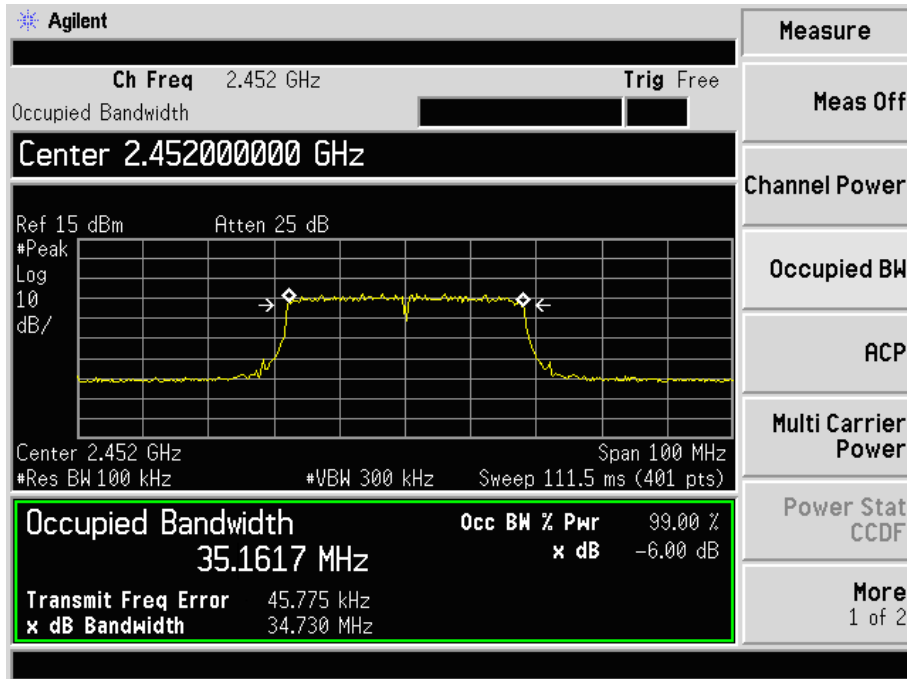


Middle Channel:



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High Channel:



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6 POWER OUTPUT

6.1 Standard Applicable

According to 15.247(b)(3). For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

6.2 Test Equipment List and Details

Please refer to Section 1.5. this report.

6.3 Test Procedure

The device under test has an integral antenna and the power was measured on a radiated basis.

6.4 Environmental Conditions

Test Voltage:	DC 12V
Mode:	TX On
Temperature:	21 °C
Humidity:	52%RH

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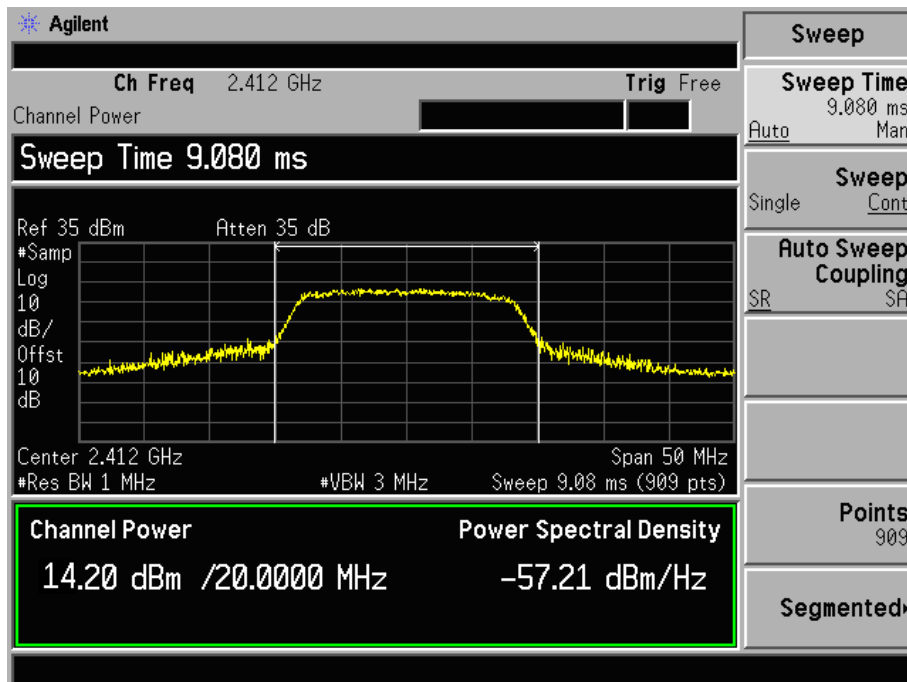
6.5 Summary of Test Results/Plots

Test mode	Frequency MHz	Chain 0 Reading dBm	Chain 1 Reading dBm	Total Output power W	Limit W
802.11b	2412	14.20	14.27	0.05303	1
	2437	14.53	14.65	0.05755	1
	2462	13.36	13.37	0.04340	1
802.11g	2412	11.68	11.95	0.03039	1
	2437	14.35	13.75	0.05094	1
	2462	12.58	12.58	0.03623	1
802.11n/HT20	2412	11.48	11.98	0.02984	1
	2437	13.01	12.79	0.03901	1
	2462	11.25	11.50	0.02746	1
802.11n/HT40	2422	8.92	8.53	0.01493	1
	2437	8.08	8.07	0.01284	1
	2452	8.40	8.30	0.01368	1

For Chain 0 test plots

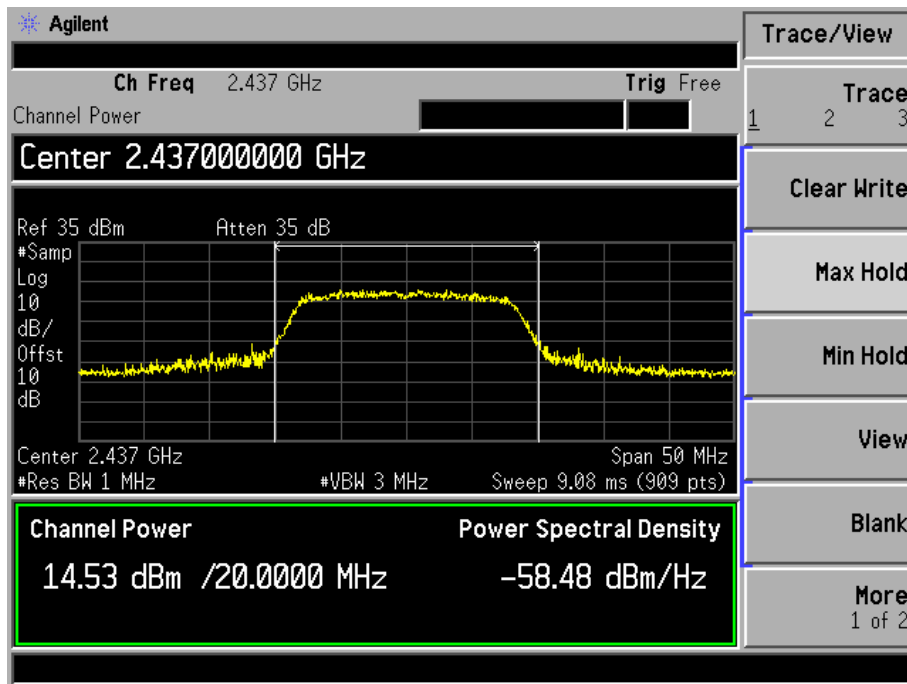
For 802.11b

Low Channel:

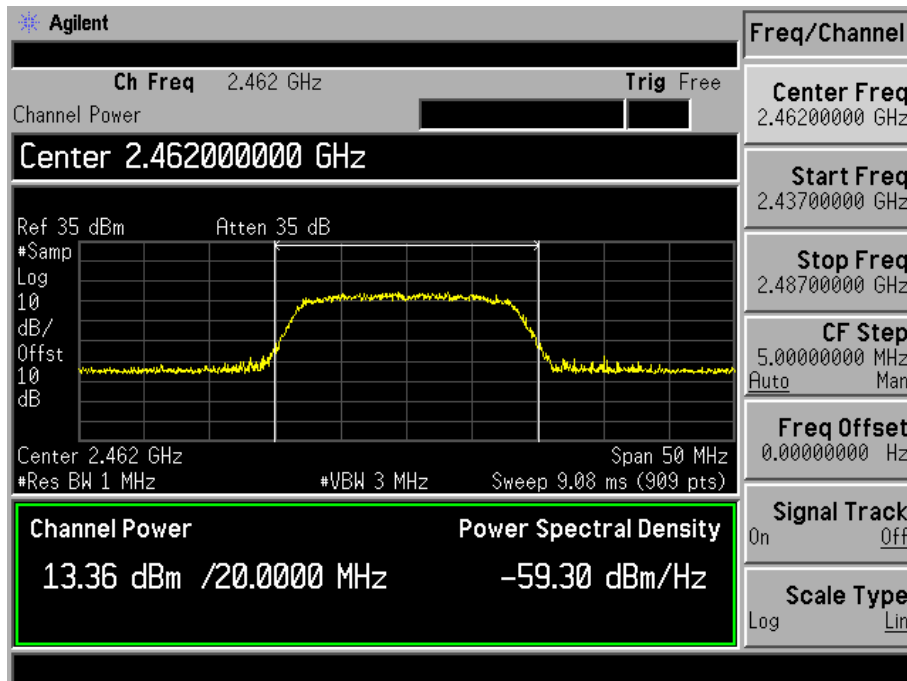


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Middle Channel:

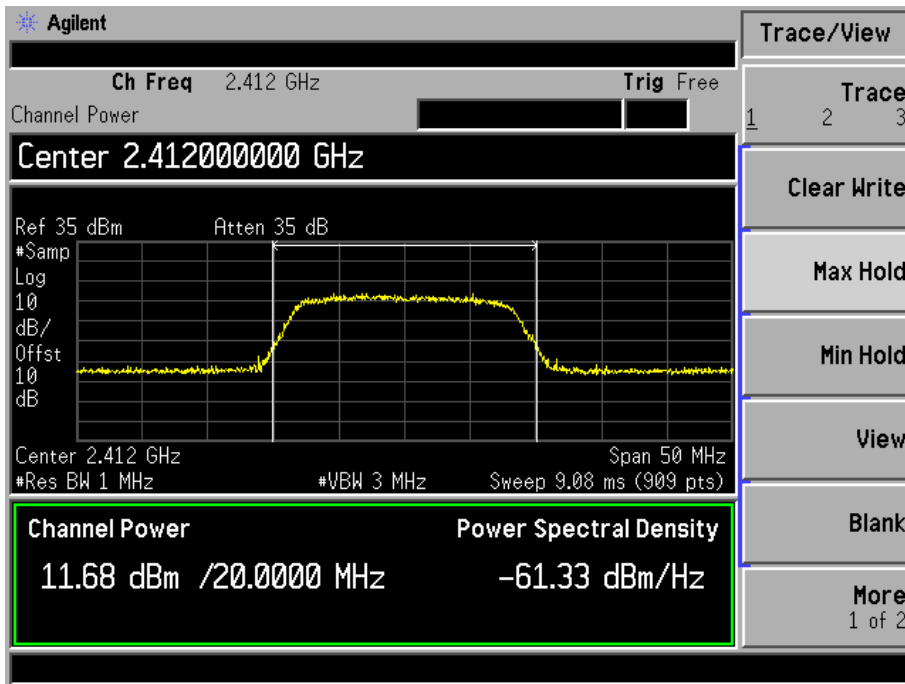


High Channel:

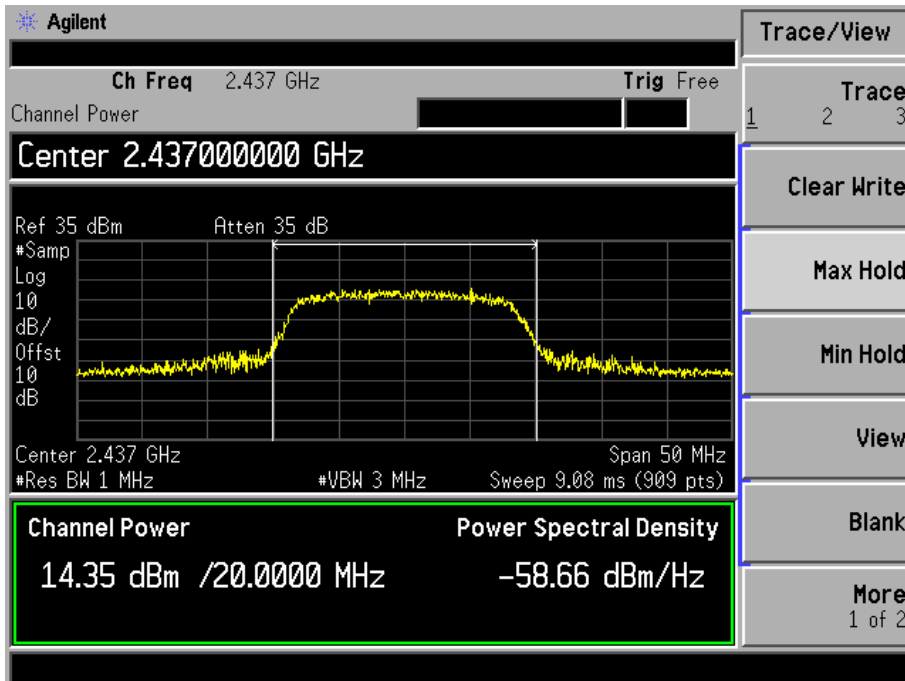


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For 802.11g
Low Channel:

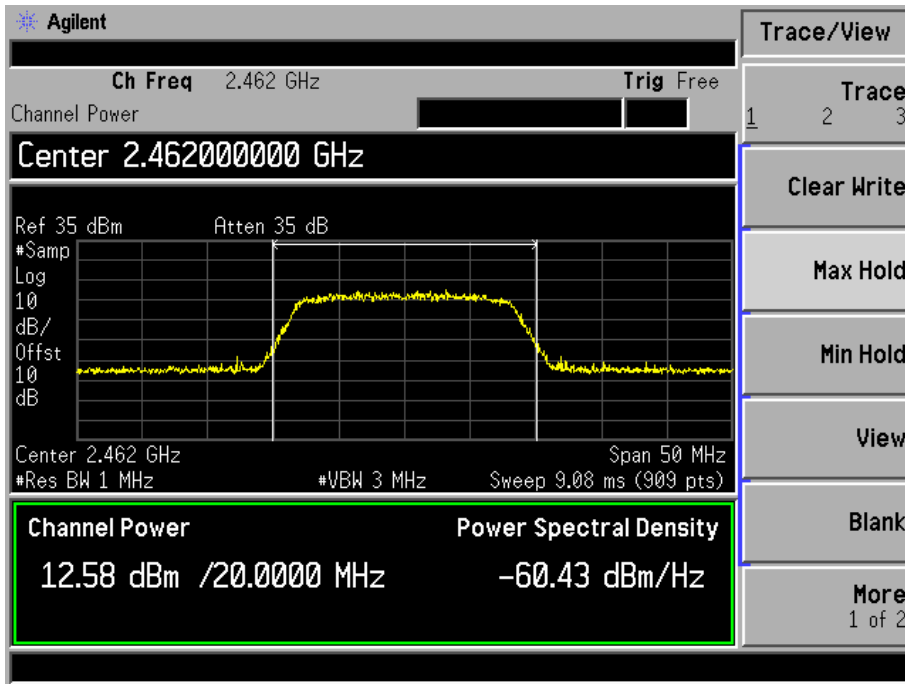


Middle Channel:



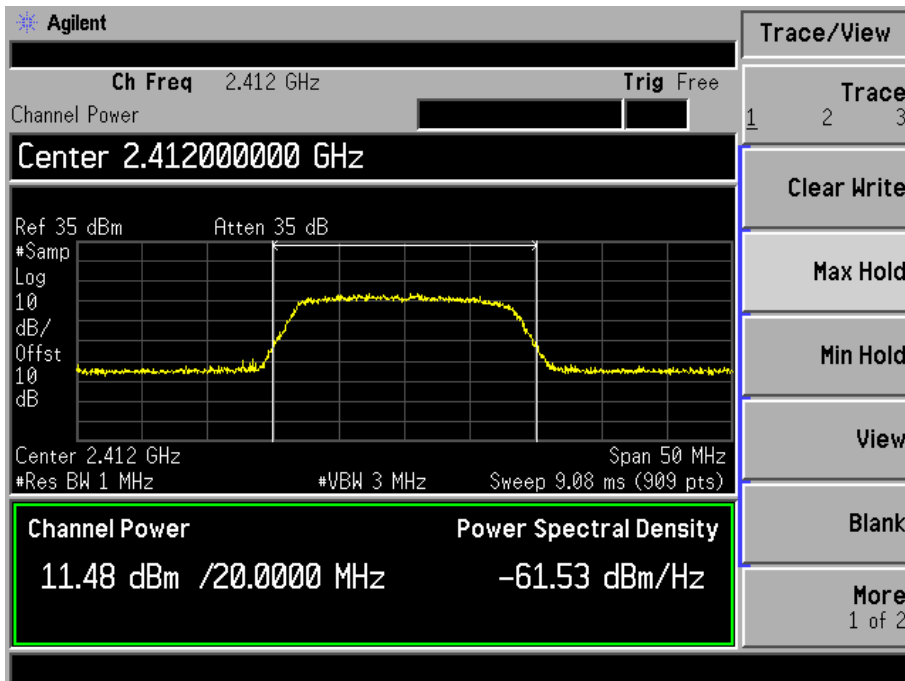
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High Channel:



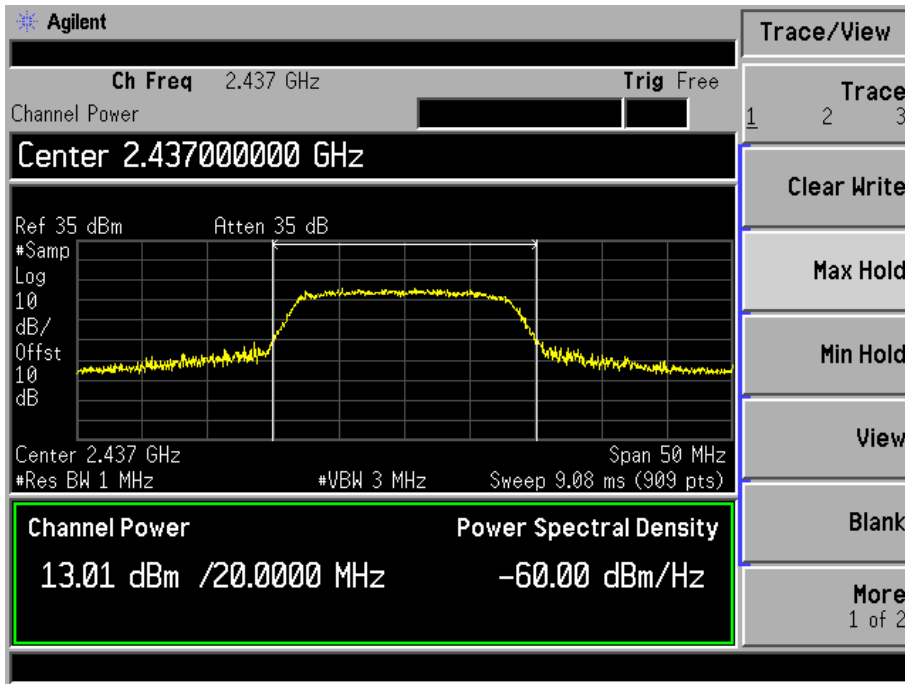
For 802.11n/HT20

Low Channel:

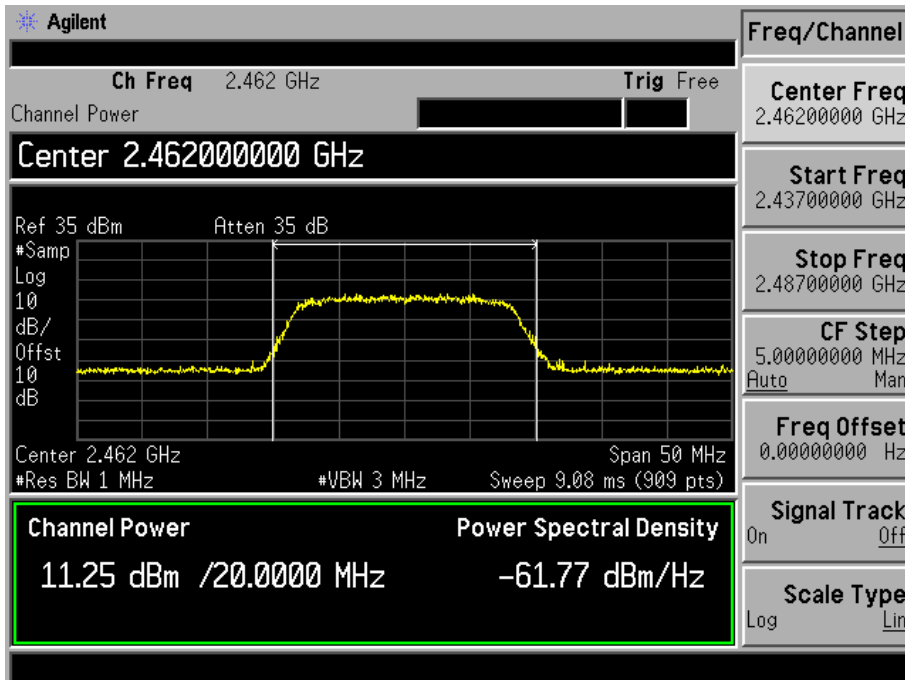


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Middle Channel:

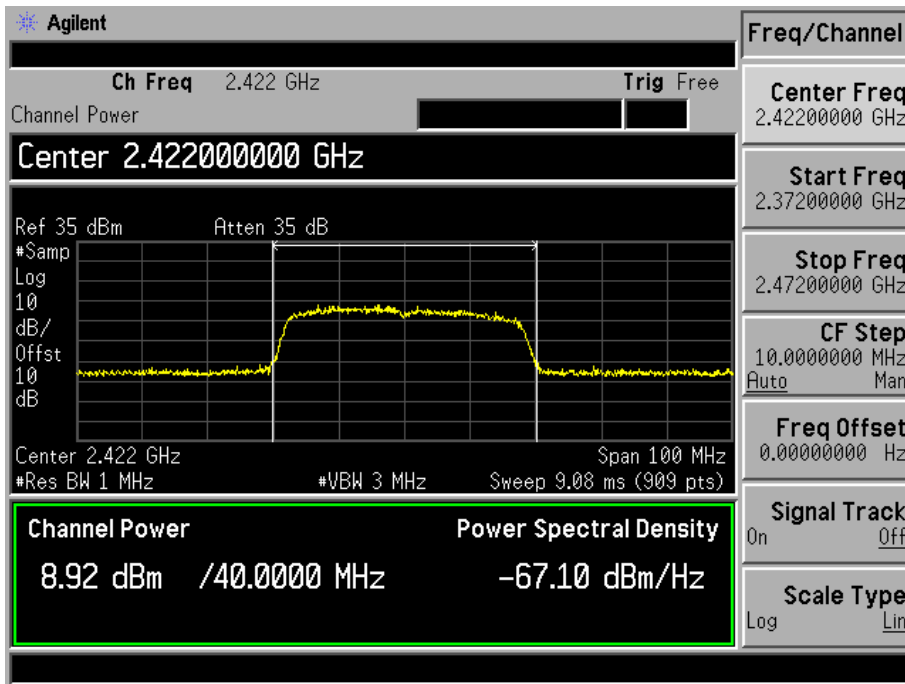


High Channel:

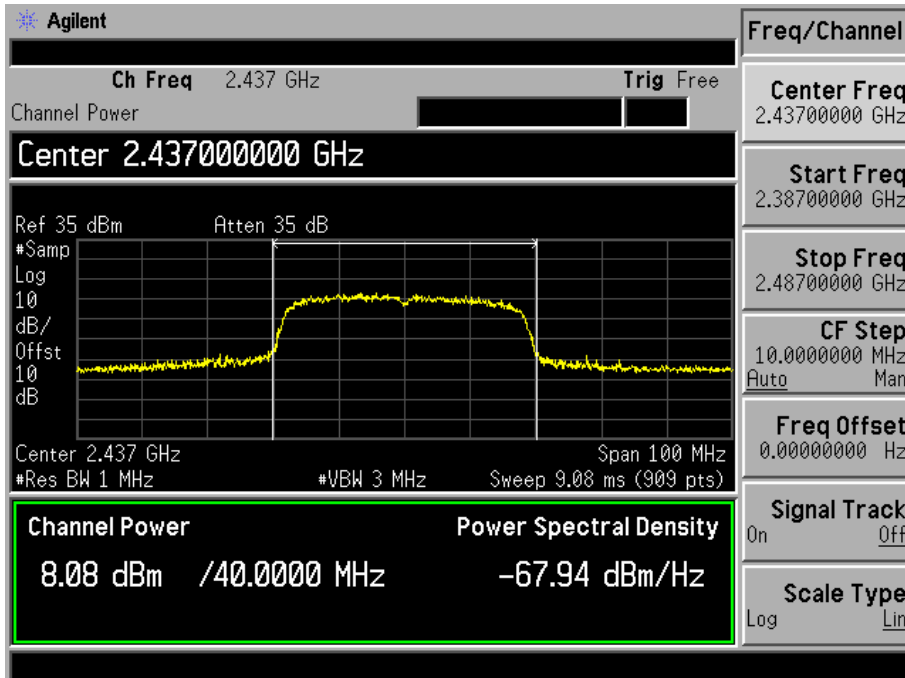


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For 802.11n/HT40
Low Channel:

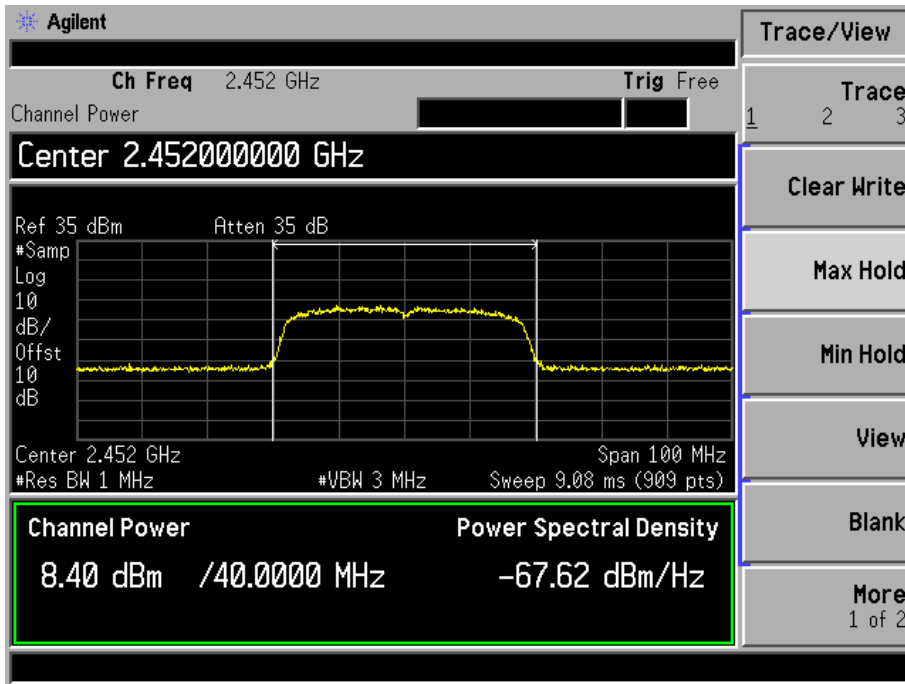


Middle Channel:



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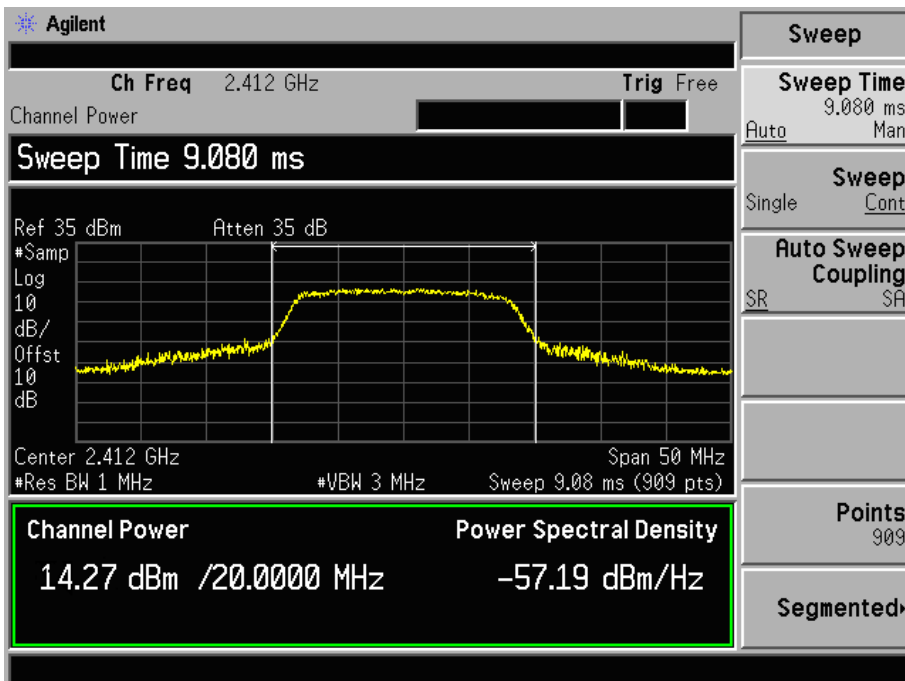
High Channel:



For Chain 1 test mode plots

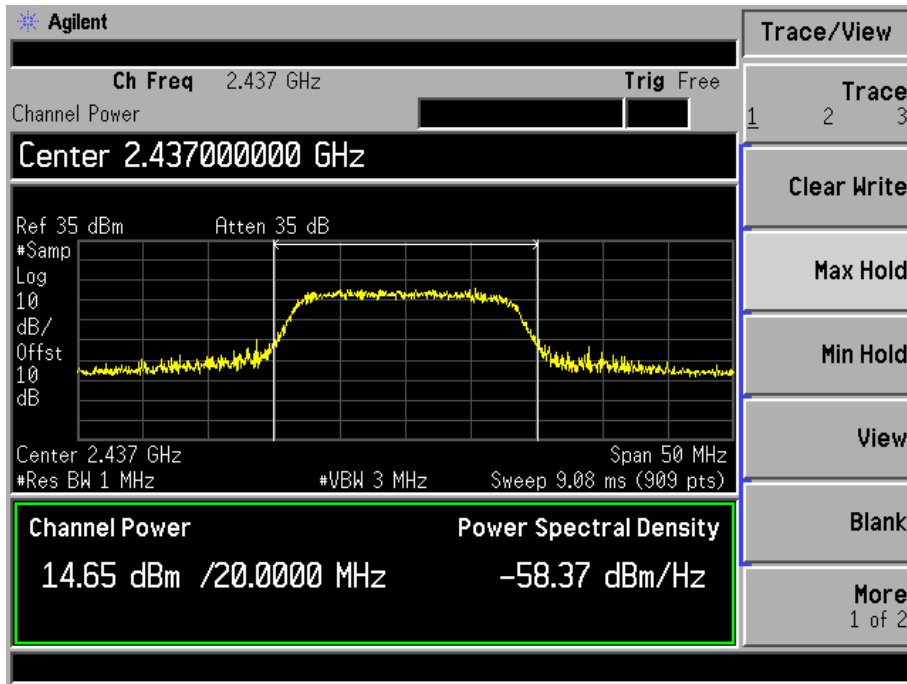
For 802.11b

Low Channel:

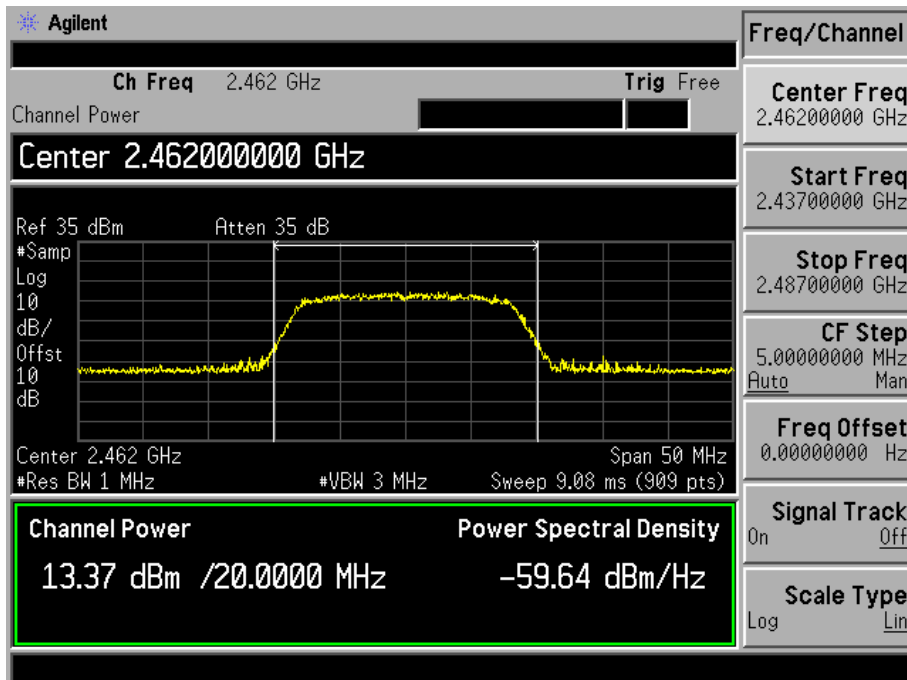


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Middle Channel:

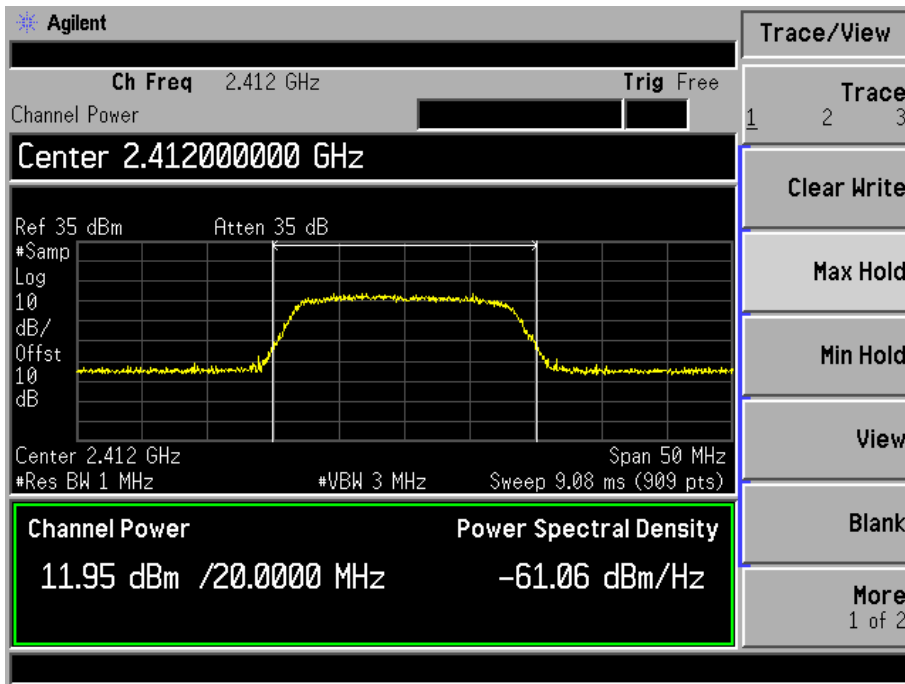


High Channel:

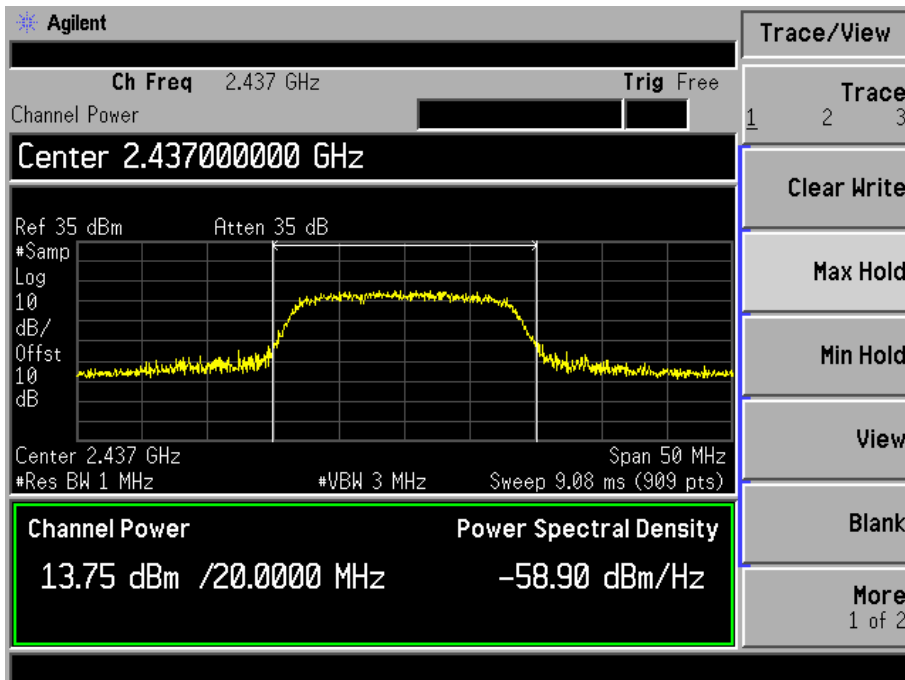


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For 802.11g
Low Channel:

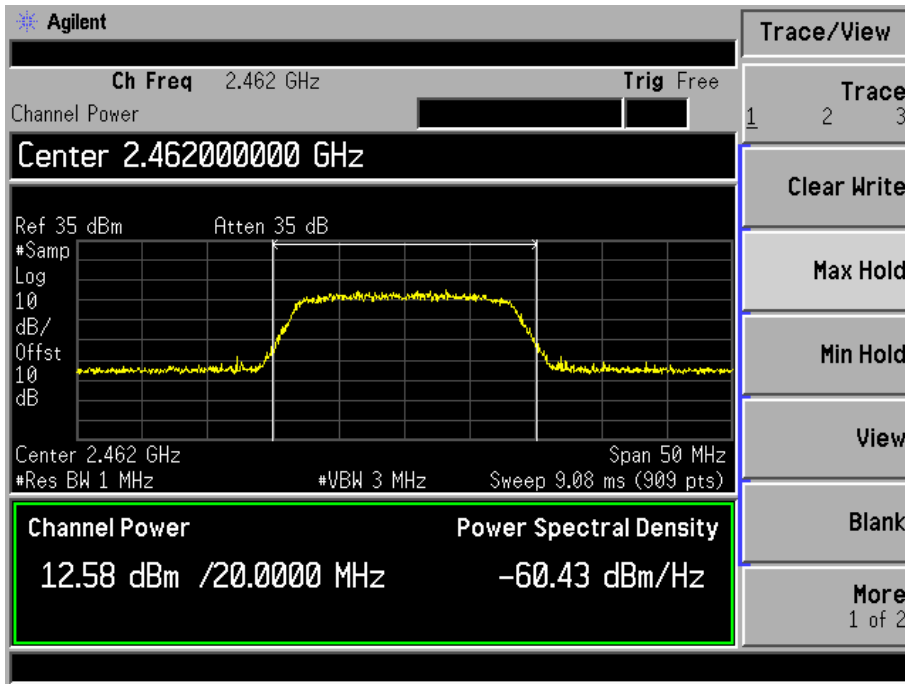


Middle Channel:

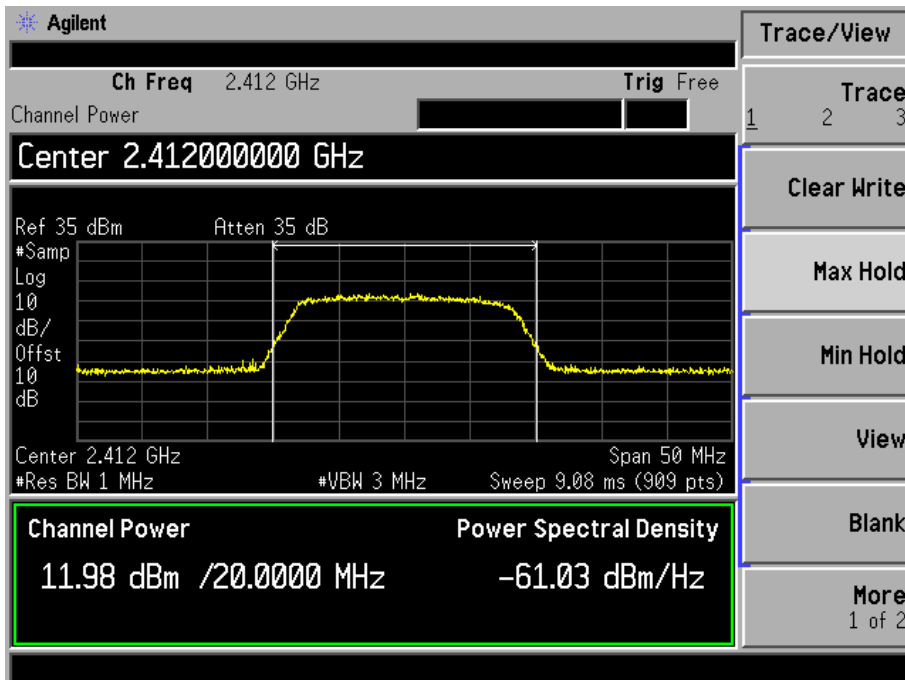


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High Channel:

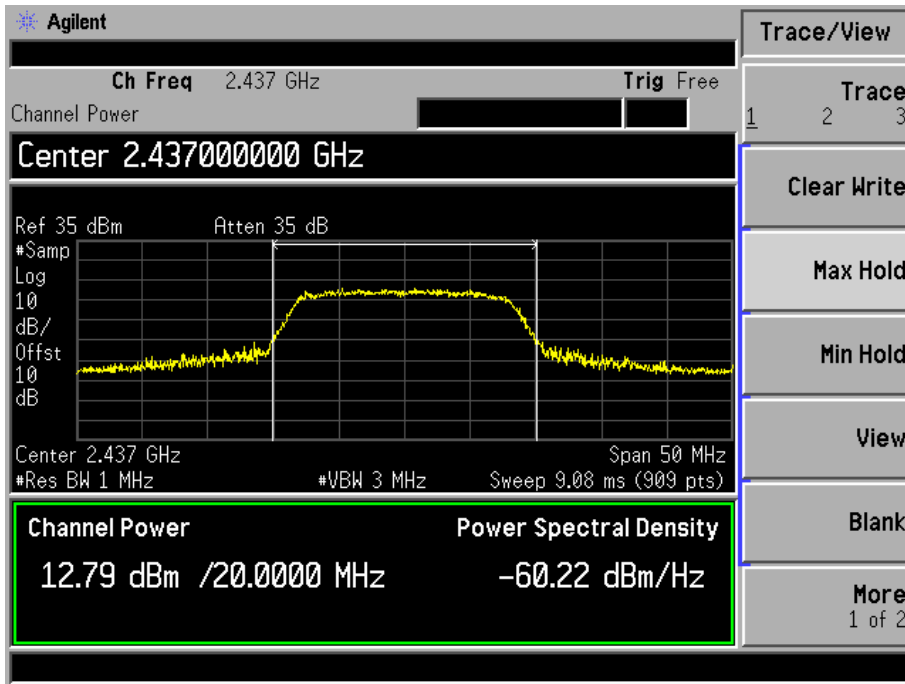


For 802.11n(HT20)
Low Channel:

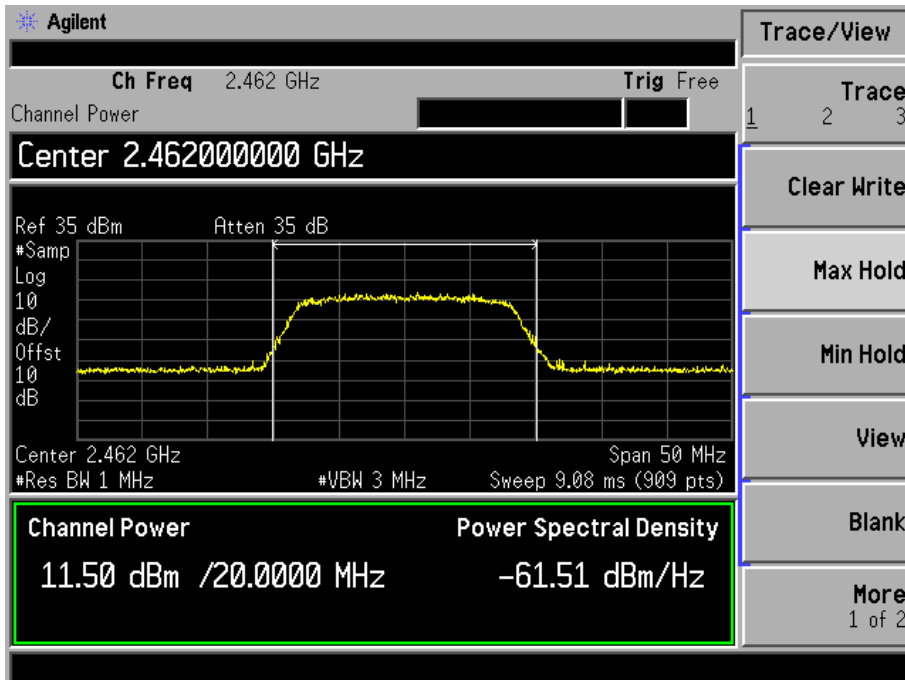


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Middle Channel:

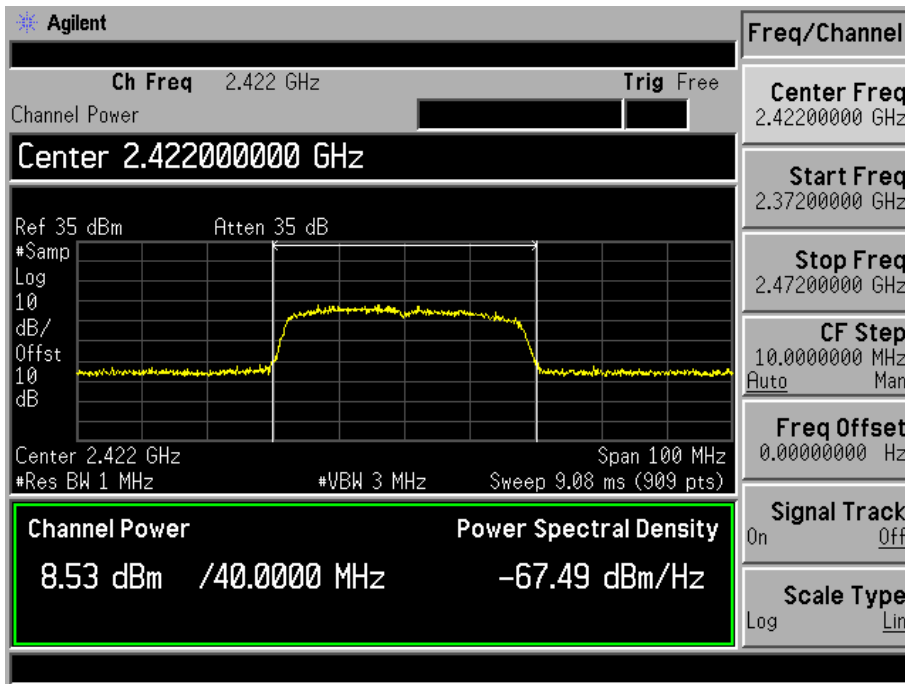


High Channel:

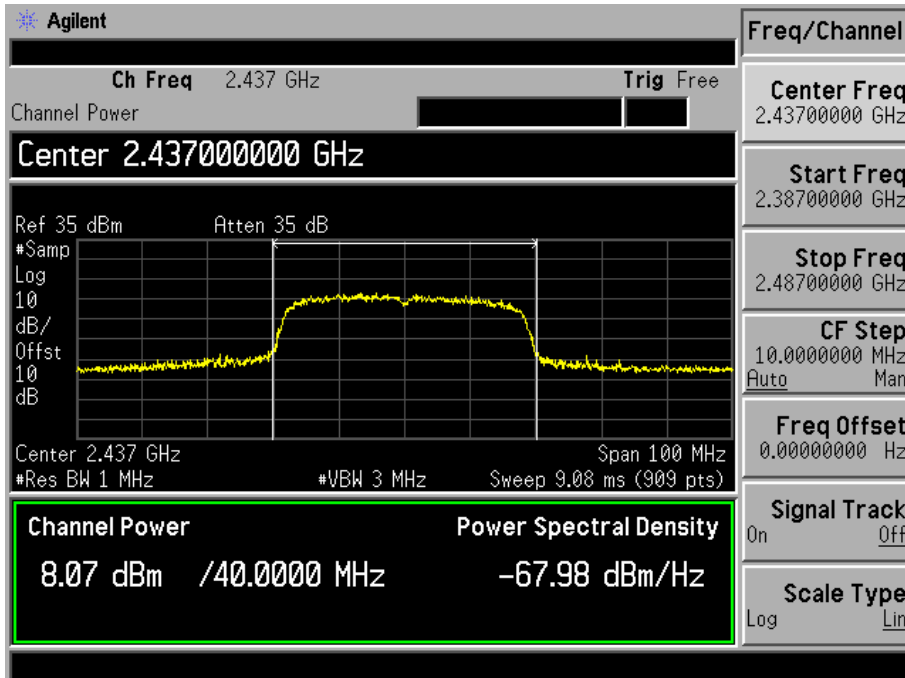


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For 802.11n(HT40)
Low Channel:

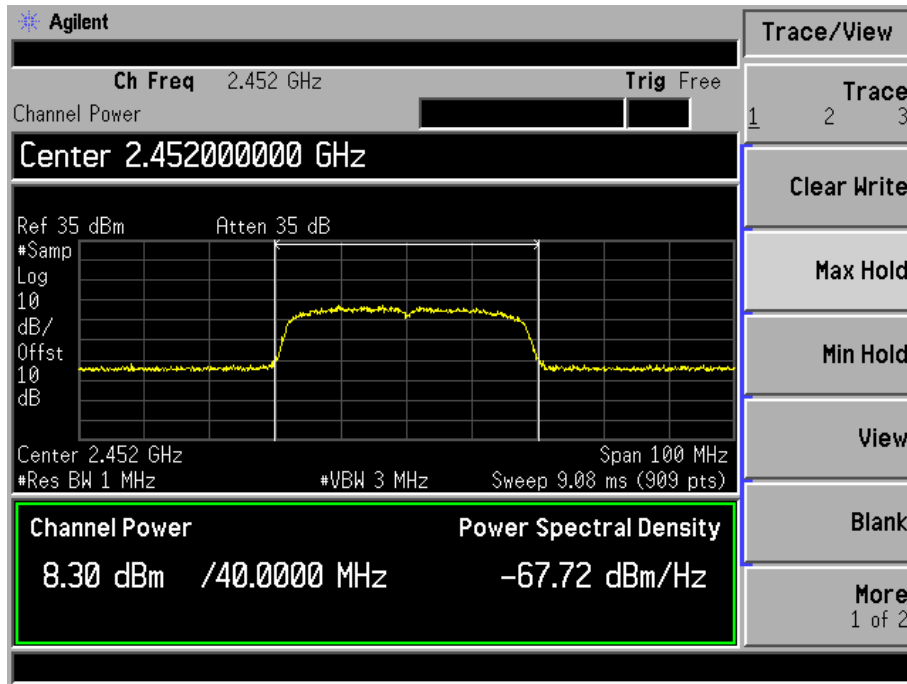


Middle Channel:



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High Channel:



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7 FIELD STRENGTH OF SPURIOUS EMISSIONS

7.1 Measurement Uncertainty

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ± 2.9 dB.

7.2 Standard Applicable

According to §15.247(c), 15.205 15.209(b) & 15.35 (b), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Section 15.209:

30 - 88 MHz 40 dBuV/m @3M

88 -216 MHz 43.5 dBuV/m @3M

216 -960 MHz 46 dBuV/m @3M

Above 960 MHz 54dBuV/m @3M

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

Emissions that fall in the restricted bands (15.205) must be less than 54dBuV/m otherwise the spurious and harmonics must be attenuated by at least 20dB.

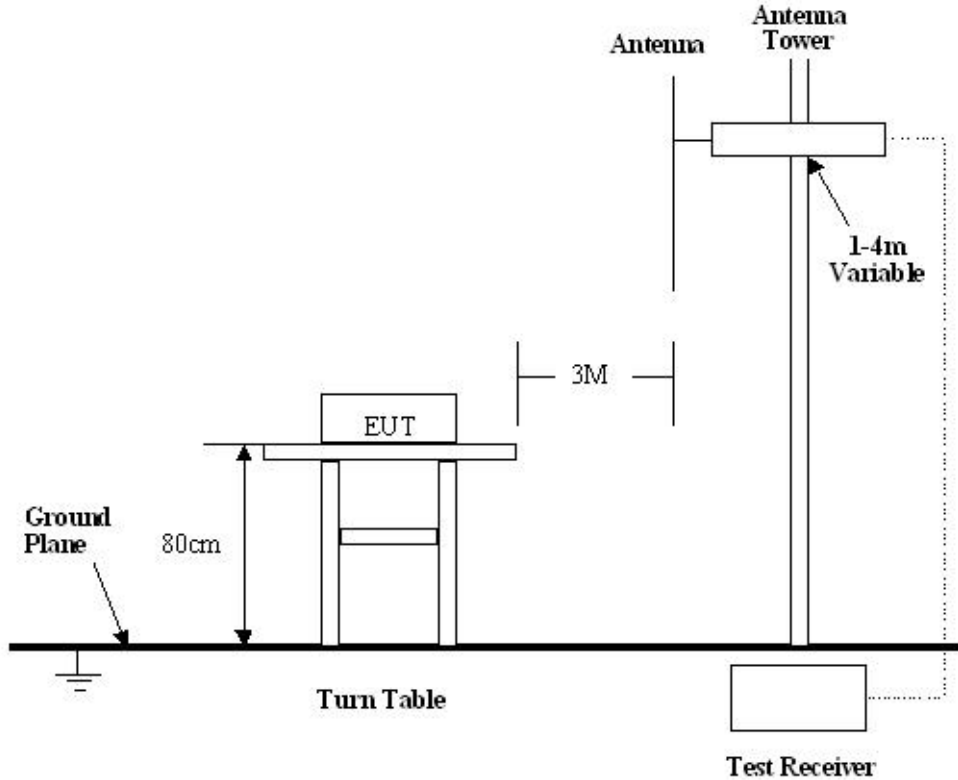
7.3 Test Equipment List and Details

Please refer to Section 1.5. this report.

7.4 Test Procedure

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.205 15.247(a) and FCC Part 15.209 Limit. The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle. The spacing between the peripherals was 10 cm.

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7.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15 Limit}$$

7.6 Environmental Conditions

Test Voltage:	DC 12V
Mode:	TX On
Temperature:	21°C
Humidity:	52% RH

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7.7 Summary of Test Results/Plots

According to the data below, the FCC Part 15.205, 15.209 and 15.247 standards, and had the worst margin of:

Spurious Emission From 30 MHz to 1 GHz
 Test mode: Transmitting (802.11b Middel Channel)
 Horizontal

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	124.9249	33.51	4.57	38.08	43.50	-5.42	QP
2	201.4539	25.32	5.73	31.05	43.50	-12.45	peak
3	512.9478	22.10	13.20	35.30	46.00	-10.70	peak
4	124.9249	33.51	4.57	38.08	43.50	-5.42	QP

Vertical

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	124.9249	30.70	4.57	35.27	43.50	-8.23	peak
2	384.5447	27.67	9.96	37.63	46.00	-8.37	peak
3	958.7135	18.95	19.80	38.75	46.00	-7.25	peak

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Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11g Middle Channel)

Horizontal

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	124.9249	31.85	4.57	36.42	43.50	-7.08	peak
2	208.6580	29.15	5.97	35.12	43.50	-8.38	peak
3	255.8226	32.47	7.82	40.29	46.00	-5.71	QP
4	527.5707	23.96	13.51	37.47	46.00	-8.53	peak

Vertical

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	124.9249	31.53	4.57	36.10	43.50	-7.40	peak
2	250.4859	25.35	7.69	33.04	46.00	-12.96	peak
3	502.2473	21.75	12.97	34.72	46.00	-11.28	peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11n/HT20 Middle Channel)

Horizontal

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	77.4680	29.11	2.77	31.88	40.00	-8.12	peak
2	124.9249	31.48	4.57	36.05	43.50	-7.45	peak
3	210.1294	28.65	6.01	34.66	43.50	-8.84	peak

Vertical

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	124.9249	31.42	4.57	35.99	43.50	-7.51	peak
2	250.4859	26.58	7.69	34.27	46.00	-11.73	peak
3	502.2473	23.91	12.97	36.88	46.00	-9.12	peak

Spurious Emission From 30 MHz to 1 GHz

Test mode: Transmitting (802.11n/HT40 Low Channel)

Horizontal

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	208.6580	28.99	5.97	34.96	43.50	-8.54	peak
2	250.4859	28.22	7.69	35.91	46.00	-10.09	peak

Vertical

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	124.9249	32.18	4.57	36.75	43.50	-6.75	peak
2	194.4985	26.17	5.67	31.84	43.50	-11.66	peak

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Spurious Emission Above 1GHz
 Test Mode: Transmitting (802.11b)

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (1G to 25GHz)										
4824.0	PK	55.1	90	V	34.1	5.2	33.0	61.4	74	-12.6
7236.0	PK	51.2	270	V	37.4	6.1	33.5	61.2	74	-12.8
7236.0	PK	50	180	H	37.4	6.1	33.5	60.0	74	-14.0
4824.0	PK	54.4	45	H	34.1	5.2	33.0	60.7	74	-13.3
4824.0	AV	45.7	270	V	34.1	5.2	33.0	52.0	54	-2.0
7236.0	AV	41.4	90	V	37.4	6.1	33.5	51.4	54	-2.6
7236.0	AV	40.2	45	H	37.4	6.1	33.5	50.2	54	-3.8
4824.0	AV	44.4	60	H	34.1	5.2	33.0	50.7	54	-3.3
Middle Channel (1G to 25GHz)										
7311.0	PK	51.8	45	V	37.4	6.1	33.5	61.8	74	-12.2
4874.0	PK	54.0	270	V	34.1	5.2	33.0	60.3	74	-13.7
7311.0	PK	49.5	45	H	37.4	6.1	33.5	59.5	74	-14.5
4874.0	PK	53.9	180	H	34.1	5.2	33.0	60.2	74	-13.8
7311.0	AV	42.6	270	V	37.4	6.1	33.5	52.6	54	-1.4
4874.0	AV	45.5	90	V	34.1	5.2	33.0	51.8	54	-2.2
7311.0	AV	40.2	60	H	37.4	6.1	33.5	50.2	54	-3.8
4874.0	AV	42.4	45	H	34.1	5.2	33.0	48.7	54	-5.3
High Channel (1G to 25GHz)										
4924.0	PK	55.4	270	V	34.1	5.2	33.0	61.7	74	-12.3
7386.0	PK	51.5	45	V	37.4	6.1	33.5	61.5	74	-12.5
4924.0	PK	53.8	180	H	34.1	5.2	33.0	60.1	74	-13.9
7386.0	PK	49.7	45	H	37.4	6.1	33.5	59.7	74	-14.3
4924.0	AV	46.4	90	V	34.1	5.2	33.0	52.7	54	-1.3
7386.0	AV	41.8	270	V	37.4	6.1	33.5	51.8	54	-2.2
4924.0	AV	45.0	60	H	34.1	5.2	33.0	51.3	54	-2.7
7386.0	AV	40.6	60	H	37.4	6.1	33.5	50.6	54	-3.4

Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics, which above 5th Harmonics is close to the noise base even antenna close up to 1meter distance according the measurement of ANSI C63.4.

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Spurious Emission Above 1GHz
 Test Mode: Transmitting (802.11g)

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (1G to 25GHz)										
4824.0	PK	56.0	90	V	34.1	5.2	33.0	62.3	74	-11.7
7236.0	PK	51.8	270	V	37.4	6.1	33.5	61.8	74	-12.2
7236.0	PK	50.5	180	H	37.4	6.1	33.5	60.5	74	-13.5
4824.0	PK	56.2	45	H	34.1	5.2	33.0	62.5	74	-11.5
4824.0	AV	46.3	270	V	34.1	5.2	33.0	52.6	54	-1.4
7236.0	AV	41.8	90	V	37.4	6.1	33.5	51.8	54	-2.2
7236.0	AV	40.9	45	H	37.4	6.1	33.5	50.9	54	-3.1
4824.0	AV	45.1	60	H	34.1	5.2	33.0	51.4	54	-2.6
Middle Channel (1G to 25GHz)										
7311.0	PK	52.6	45	V	37.4	6.1	33.5	62.6	74	-11.4
4874.0	PK	55.2	270	V	34.1	5.2	33.0	61.5	74	-12.5
7311.0	PK	50.5	45	H	37.4	6.1	33.5	60.5	74	-13.5
4874.0	PK	54.8	180	H	34.1	5.2	33.0	61.1	74	-12.9
7311.0	AV	42.4	270	V	37.4	6.1	33.5	52.4	54	-1.6
4874.0	AV	45.2	90	V	34.1	5.2	33.0	51.5	54	-2.5
7311.0	AV	40.7	60	H	37.4	6.1	33.5	50.7	54	-3.3
4874.0	AV	43.3	45	H	34.1	5.2	33.0	49.6	54	-4.4
High Channel (1G to 25GHz)										
4924.0	PK	55.6	270	V	34.1	5.2	33.0	61.9	74	-12.1
7386.0	PK	51.7	45	V	37.4	6.1	33.5	61.7	74	-12.3
4924.0	PK	54.5	180	H	34.1	5.2	33.0	60.8	74	-13.2
7386.0	PK	50.5	45	H	37.4	6.1	33.5	60.5	74	-13.5
4924.0	AV	46.0	90	V	34.1	5.2	33.0	52.3	54	-1.7
7386.0	AV	41.4	270	V	37.4	6.1	33.5	51.4	54	-2.6
4924.0	AV	44.9	60	H	34.1	5.2	33.0	51.2	54	-2.8
7386.0	AV	40.3	60	H	37.4	6.1	33.5	50.3	54	-3.7

Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics, which above 5th Harmonics is close to the noise base even antenna close up to 1meter distance according the measurement of ANSI C63.4.

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Spurious Emission Above 1GHz
 Test Mode: Transmitting (802.11n/HT20)

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (1G to 25GHz)										
4824.0	PK	55.3	90	V	34.1	5.2	33	61.6	74	-12.4
7236.0	PK	50.6	270	V	37.4	6.1	33.5	60.6	74	-13.4
7236.0	PK	43.6	180	H	37.4	6.1	33.5	53.6	74	-20.4
4824.0	PK	52.3	45	H	34.1	5.2	33	58.6	74	-15.4
4824.0	AV	43.6	270	V	34.1	5.2	33	49.9	54	-4.1
7236.0	AV	39.2	90	V	37.4	6.1	33.5	49.2	54	-4.8
7236.0	AV	30.4	45	H	37.4	6.1	33.5	40.4	54	-13.6
4824.0	AV	40.1	60	H	34.1	5.2	33	46.4	54	-7.6
Middle Channel (1G to 25GHz)										
7311.0	PK	52.2	45	V	37.4	6.1	33.5	62.2	74	-11.8
4874.0	PK	53.4	270	V	34.1	5.2	33	59.7	74	-14.3
7311.0	PK	49.5	45	H	37.4	6.1	33.5	59.5	74	-14.5
4874.0	PK	51.2	180	H	34.1	5.2	33	57.5	74	-16.5
7311.0	AV	40.1	270	V	37.4	6.1	33.5	50.1	54	-3.9
4874.0	AV	42.2	90	V	34.1	5.2	33	48.5	54	-5.5
7311.0	AV	37.9	60	H	37.4	6.1	33.5	47.9	54	-6.1
4874.0	AV	39.8	45	H	34.1	5.2	33	46.1	54	-7.9
High Channel (1G to 25GHz)										
4924.0	PK	54.6	270	V	34.1	5.2	33	60.9	74	-13.1
7386.0	PK	51.2	45	V	37.4	6.1	33.5	61.2	74	-12.8
4924.0	PK	51.6	180	H	34.1	5.2	33	57.9	74	-16.1
7386.0	PK	48.2	45	H	37.4	6.1	33.5	58.2	74	-15.8
4924.0	AV	43.1	90	V	34.1	5.2	33	49.4	54	-4.6
7386.0	AV	39.7	270	V	37.4	6.1	33.5	49.7	54	-4.3
4924.0	AV	42.1	60	H	34.1	5.2	33	48.4	54	-5.6
7386.0	AV	37.5	60	H	37.4	6.1	33.5	47.5	54	-6.5

Note: Testing is carried out with frequency rang 30MHz to the tenth harmonics, which above 5th Harmonics is close to the noise base even antenna close up to 1meter distance according the measurement of ANSI C63.4.

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Spurious Emission Above 1GHz

Test Mode: Transmitting (802.11n/HT40)

Frequency MHz	Detector	Meter Reading dBuV	Direction Degree	Polar H / V	Antenna Loss dB	Cable loss dB	Amplifier dB	Correction Amplitude dBuV/m	Limit dBuV/m	Margin dB
Low Channel (1G to 25GHz)										
4844	PK	52.3	90	V	34.1	5.2	33	62.3	74	-11.7
7236	PK	50.4	270	V	37.4	6.1	33.5	60.4	74	-13.6
7236	PK	43.6	180	H	37.4	6.1	33.5	53.6	74	-20.4
4824	PK	48.6	45	H	34.1	5.2	33	58.6	74	-15.4
4824	AV	39.9	270	V	34.1	5.2	33	49.9	54	-4.1
7236	AV	39.3	90	V	37.4	6.1	33.5	49.3	54	-4.7
7236	AV	29.5	45	H	37.4	6.1	33.5	39.5	54	-14.5
4824	AV	37.1	60	H	34.1	5.2	33	47.1	54	-6.9
Middle Channel (1G to 25GHz)										
7311	PK	51.9	45	V	37.4	6.1	33.5	61.9	74	-12.1
4874	PK	48.4	270	V	34.1	5.2	33	58.4	74	-15.6
7311	PK	47.3	45	H	37.4	6.1	33.5	57.3	74	-16.7
4874	PK	46.8	180	H	34.1	5.2	33	56.8	74	-17.2
7311	AV	40.1	270	V	37.4	6.1	33.5	50.1	54	-3.9
4874	AV	37.3	90	V	34.1	5.2	33	47.3	54	-6.7
7311	AV	36.8	60	H	37.4	6.1	33.5	46.8	54	-7.2
4874	AV	36.2	45	H	34.1	5.2	33	46.2	54	-7.8
High Channel (1G to 25GHz)										
4904	PK	49.1	270	V	33.9	5.2	33	59.1	74	-14.9
7356	PK	50.6	45	V	37	6.1	33.5	60.6	74	-13.4
4904	PK	46.3	180	H	34.1	5.2	33	56.3	74	-17.7
7356	PK	47.5	45	H	37.4	6.1	33.5	57.5	74	-16.5
4904	AV	38.8	90	V	34.1	5.2	33	48.8	54	-5.2
7356	AV	39.2	270	V	37.4	6.1	33.5	49.2	54	-4.8
4904	AV	37.8	60	H	34.1	5.2	33	47.8	54	-6.2
7356	AV	37.1	60	H	37.4	6.1	33.5	47.1	54	-6.9

Note: Testing is carried out with frequency rang 30MHz to *the tenth harmonics, which above 5th Harmonics is close to the noise base even antenna close up to 1meter distance according the measurement of ANSI C63.4.*

The device described above is tested by SHENZHEN SETEK TECHNOLOGY CO., LTD. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. This report applies to above tested sample only and shall not be reproduced in part without written approval of SHENZHEN SETEK TECHNOLOGY CO., LTD.

8 OUT OF BAND EMISSIONS

8.1 Standard Applicable

According to §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits.

8.2 Test Equipment List and Details

Please refer to Section 1.5. this report.

8.3 Test Procedure

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW, VBW=100KHz, Span=50MHz, Sweep = auto
3. Set the Lowest and Highest Transmitting Channel, observed the outside band of 2400MHz to 2438.5MHz, then mark the higher-level emission for comparing with the FCC rules.

8.4 Environmental Conditions

Test Voltage:	DC 12V
Mode:	TX On
Temperature:	21 °C
Humidity:	52%RH

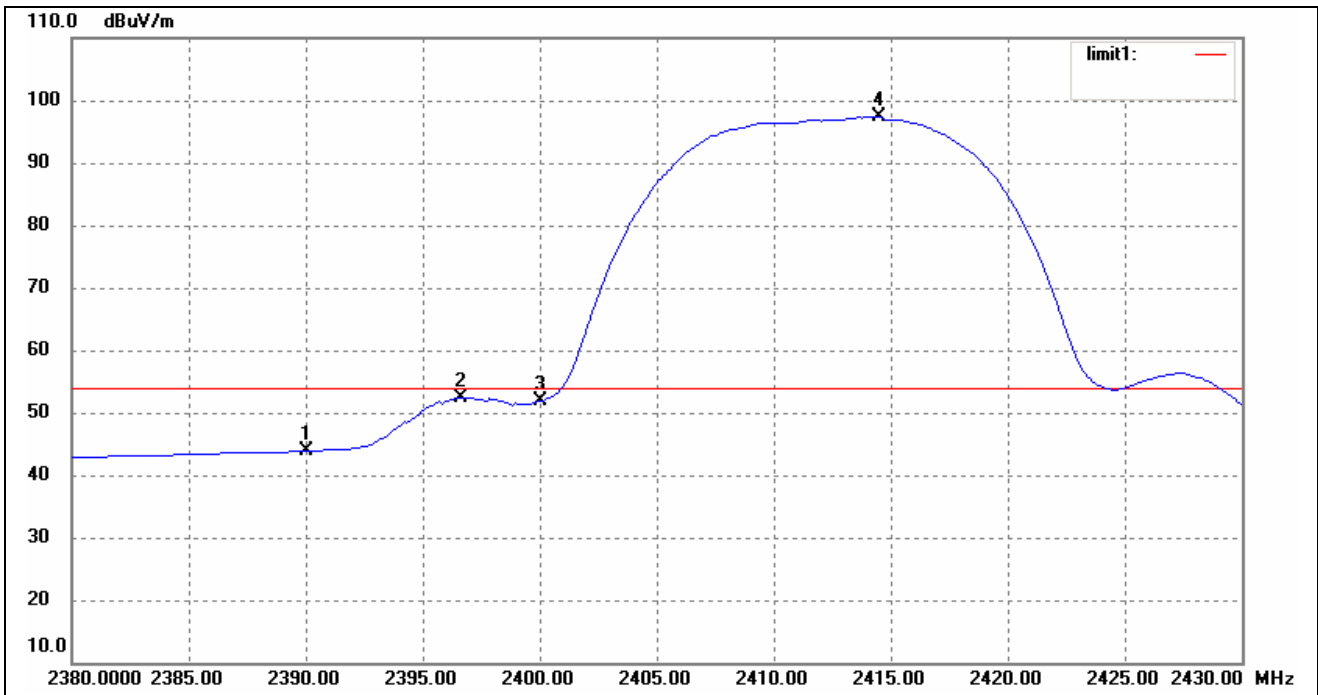
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8.510.5 Summary of Test Results/Plots

Test mode	Frequency MHz	Limit dBuV /dB	Result
802.11b	2396.633	<54dBuV	Pass
	2400.000	>20dB	Pass
	2476.152	<54dBuV	Pass
802.11g	2390.000	<54dBuV	Pass
	2400.000	>20dB	Pass
	2483.500	<54dBuV	Pass
802.11n/HT20	2390.000	<54dBuV	Pass
	2400.000	>20dB	Pass
	2483.500	<54dBuV	Pass
802.11n/HT40	2390.000	<54dBuV	Pass
	2400.000	>20dB	Pass
	2483.500	<54dBuV	Pass

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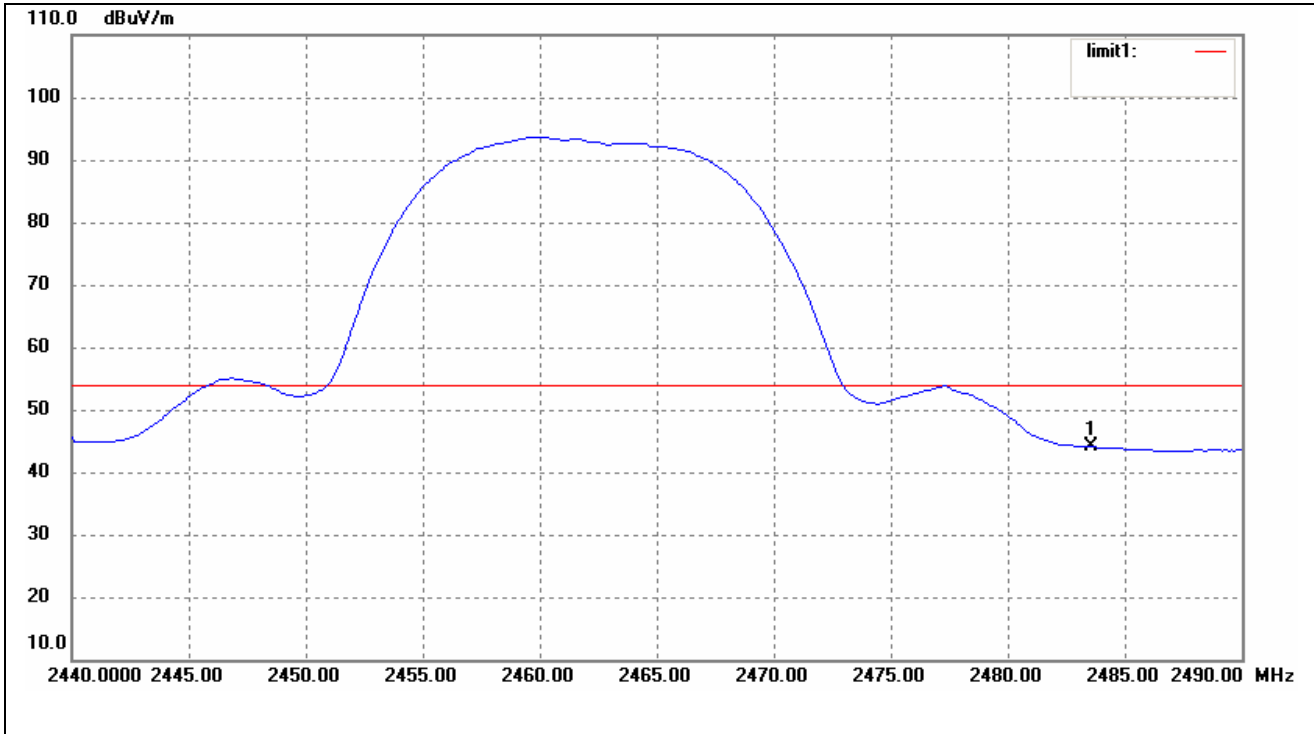
For 802.11b
Lowest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	8.31	35.59	43.90	54.00	-10.10	Ave
	2390.000	20.31	35.59	55.90	74.00	-18.10	peak
2	2396.633	16.74	35.65	52.39	54.00	-1.61	Ave
3	2400.000	16.17	35.68	51.85	54.00	-2.15	Ave
4	2414.369	61.66	35.73	97.39	/	/	Ave

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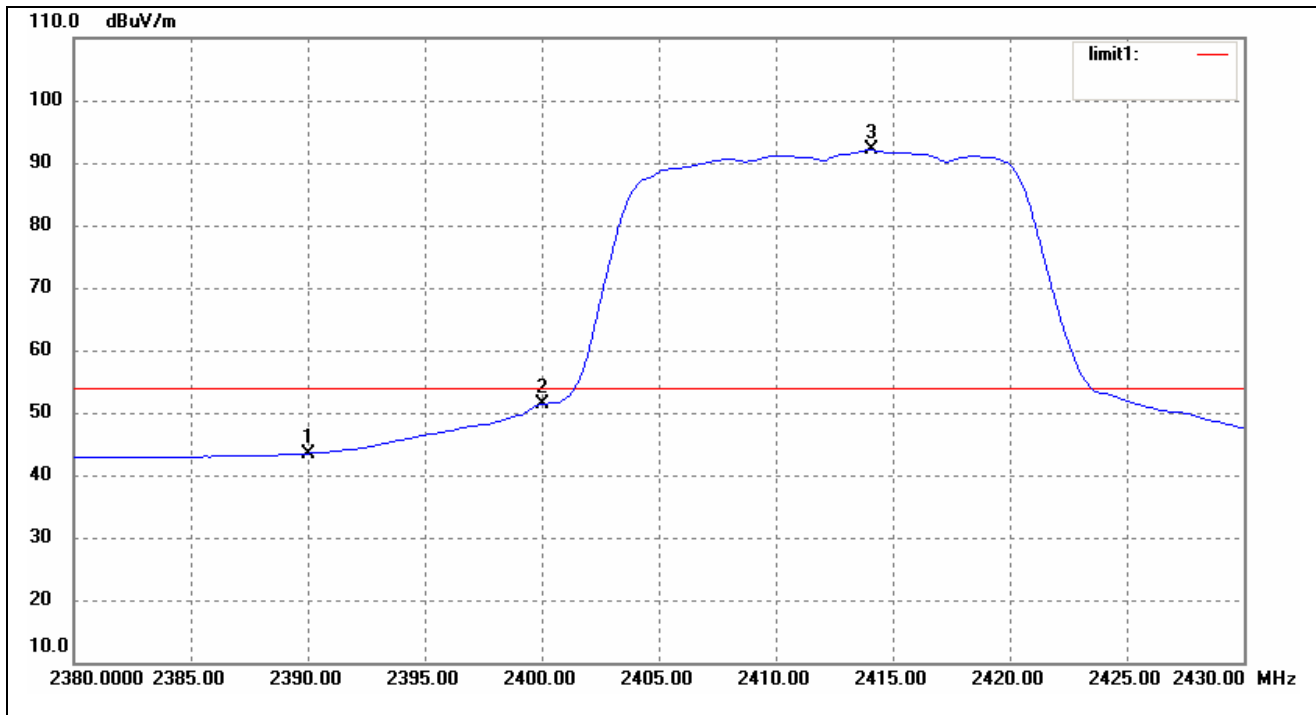
Highest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	8.11	35.97	44.08	54.00	-9.92	Ave
	2483.500	21.01	35.97	56.98	74.00	-17.02	peak

The device described above is tested by SHENZHEN SETEK TECHNOLOGY CO., LTD. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. This report applies to above tested sample only and shall not be reproduced in part without written approval of SHENZHEN SETEK TECHNOLOGY CO., LTD.

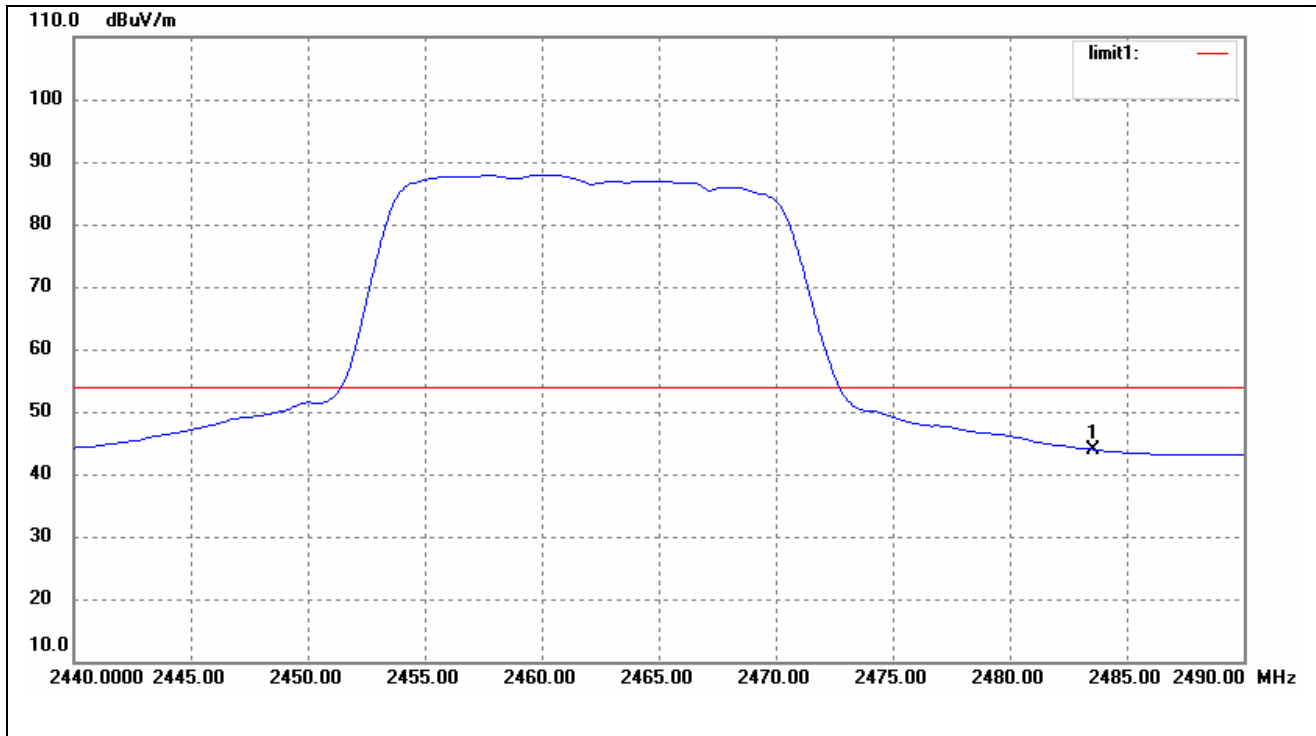
For 802.11g
Lowest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	7.90	35.59	43.49	54.00	-10.51	Ave
	2390.000	18.91	35.59	54.50	74.00	-19.5	peak
2	2400.000	15.77	35.68	51.45	54.00	-2.55	Ave
3	2413.968	56.30	35.73	92.03	/	/	Ave

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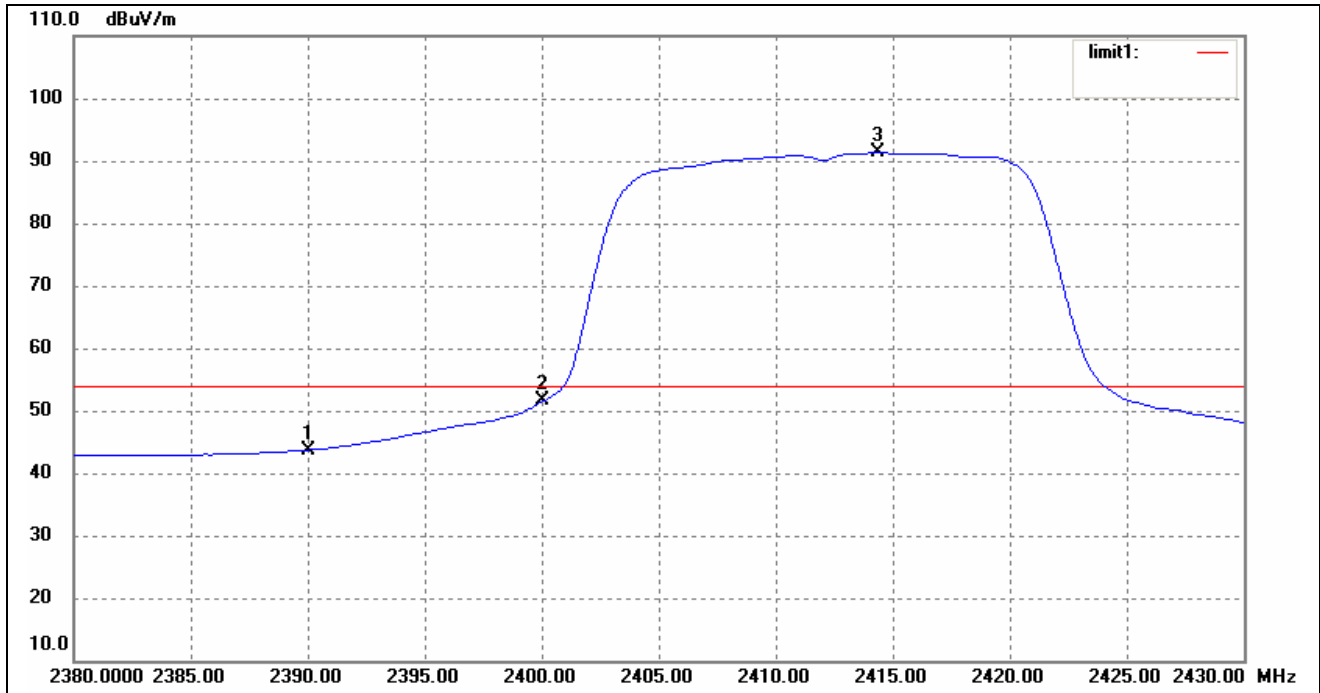
Highest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	7.98	35.97	43.95	54.00	-10.05	Ave
	2483.500	19.25	35.97	55.22	74.00	-18.78	peak

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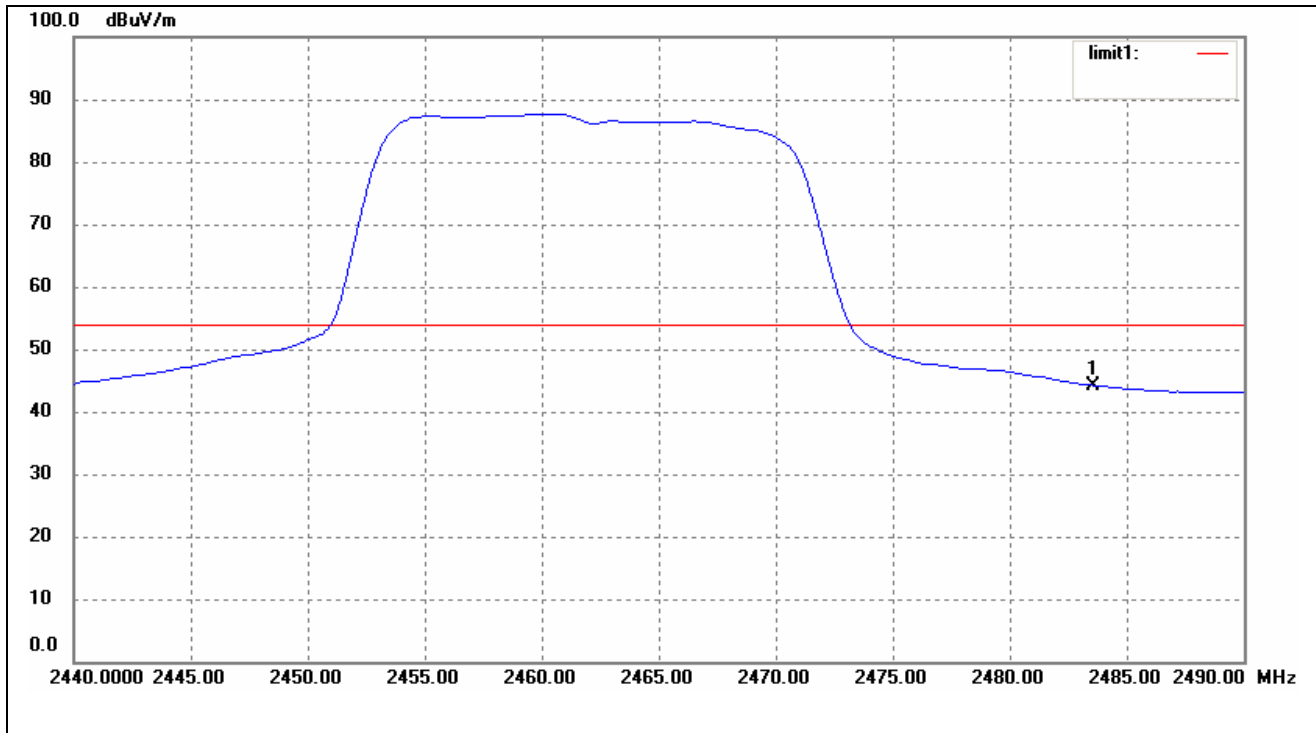
For 802.11n HT20
Lowest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	8.13	35.59	43.72	54.00	-10.28	Ave
	2390.000	20.01	35.59	55.60	74.00	-18.40	peak
2	2400.000	15.85	35.68	51.53	54.00	-2.47	Ave
3	2414.269	55.63	35.73	91.36	/	/	Ave

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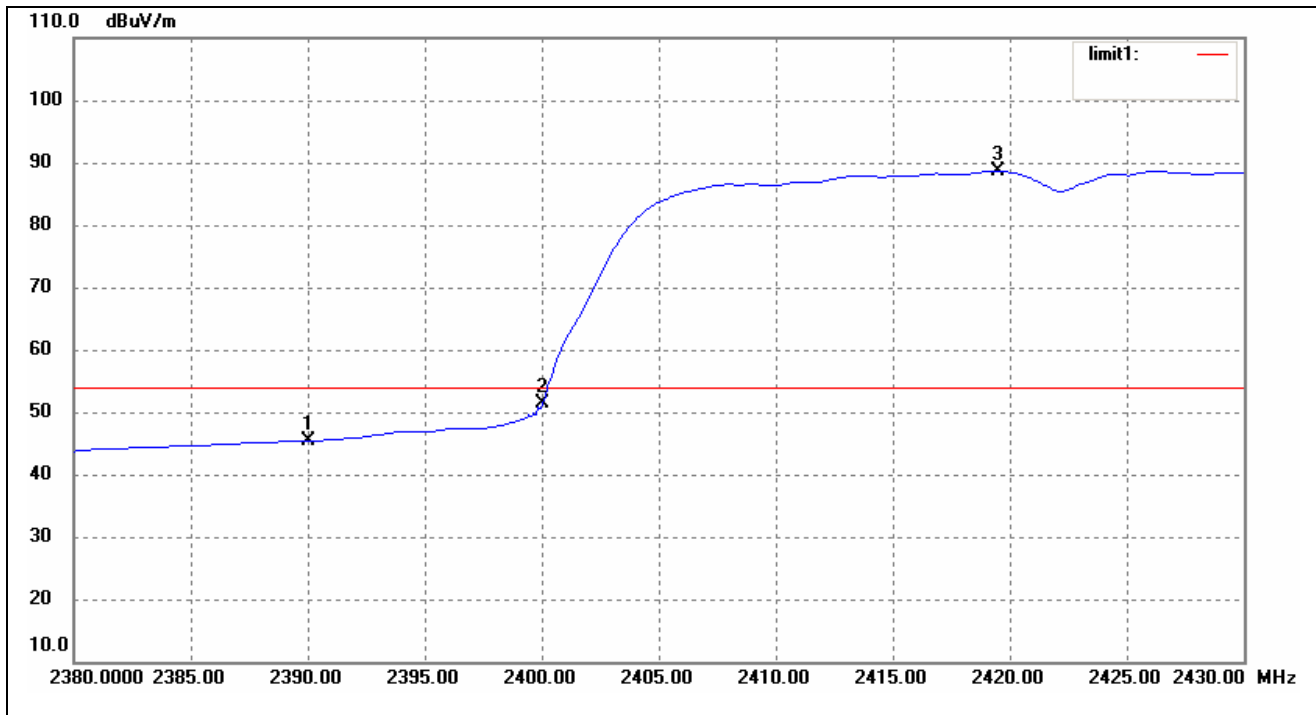
Highest Bandedge



No.	Frequenc y (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margi n (dB)	Degree (°)	Height (cm)	Remark
1	2483.500	8.26	35.97	44.23	54.00	-9.77	100	124	Ave
	2483.500	20.65	35.97	56.62	74.00	-17.38	100	124	peak

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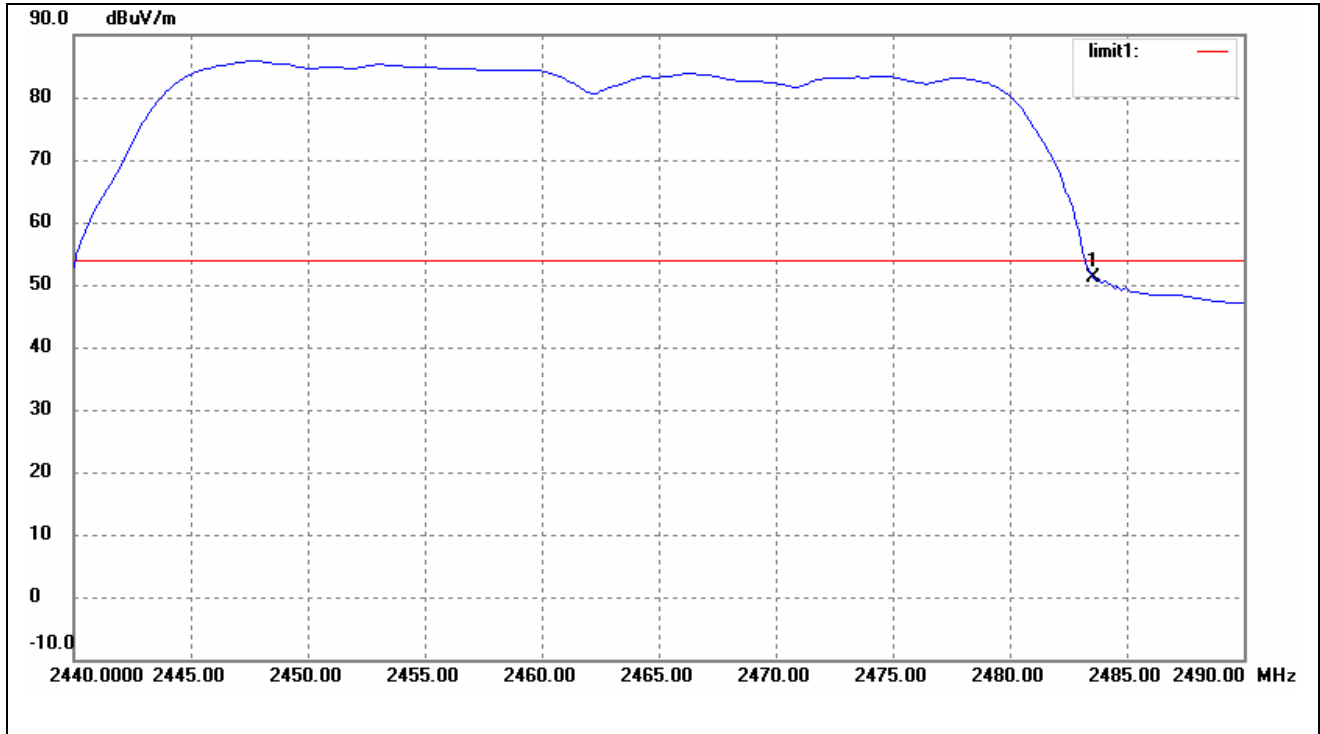
For 802.11n HT 40
Lowest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	9.89	35.59	45.48	54.00	-8.52	Ave
	2390.000	21.65	35.59	57.33	74.00	-16.67	peak
2	2400.000	15.68	35.68	51.36	54.00	-2.64	Ave
3	2419.479	52.84	35.75	88.59	/	/	Ave

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Highest Bandedge



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	15.26	35.97	51.23	54.00	-2.77	Ave
	2483.500	28.02	36.69	63.81	74.00	-10.19	peak

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9 MAXIMUM PERMISSIBLE EXPOSURE (MPE)

9.1 Standard Applicable

According to §1.1307(b)(1), system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

(a) Limits for Occupational / Controlled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100000			5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100000			1	30

Note: f = frequency in MHz: * = Plane-wave equivalents power density

9.2 MPE Calculation Method

$$S = (P \cdot G) / (4 \cdot \pi \cdot R^2)$$

S = power density (in appropriate units, e.g., mw/cm²)

P = power input to the antenna (in appropriate units, e.g., mw)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor is normally numeric gain.

R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

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9.3 MPE Calculation Result

Maximum peak output power at antenna input terminal: 17.60(dBm)

Maximum peak output power at antenna input terminal: 57.5535 (mW)

Prediction distance: 20 (cm)

Prediction frequency: 2437 (MHz)

Chain 0 Antenna gain (typical): 2 (dBi)

Chain 1 Antenna gain (typical): 2 (dBi)

Total Antenna gain (numeric): 3.16978(numeric)

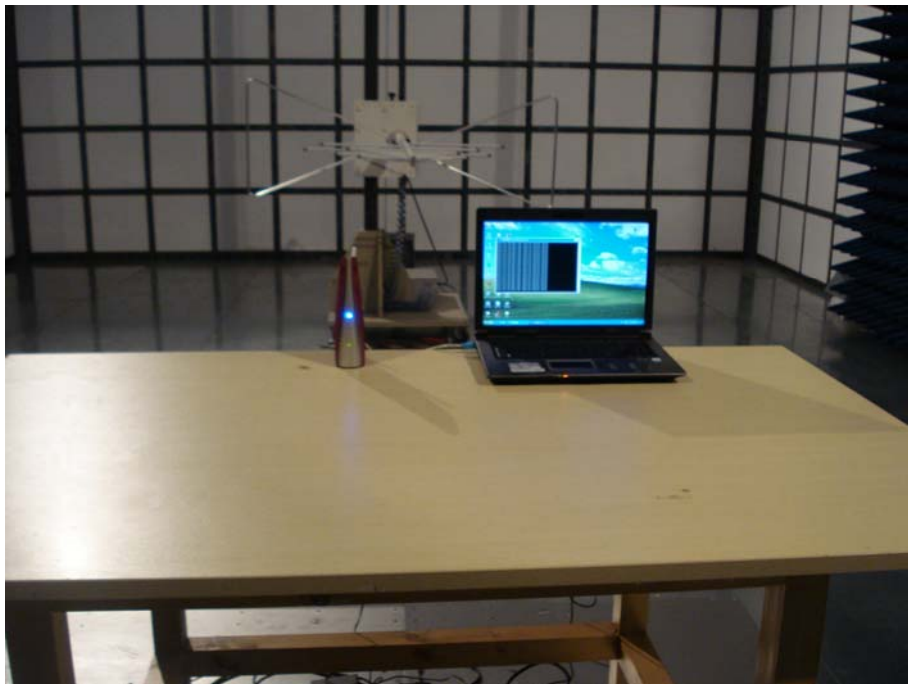
The worst case is power density at prediction frequency at 20cm: (mw/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm²)

0.03631 (mw/cm²) < 1 (mw/cm²)

Result: Pass

10 PHOTOGRAPHS OF TEST SETUP



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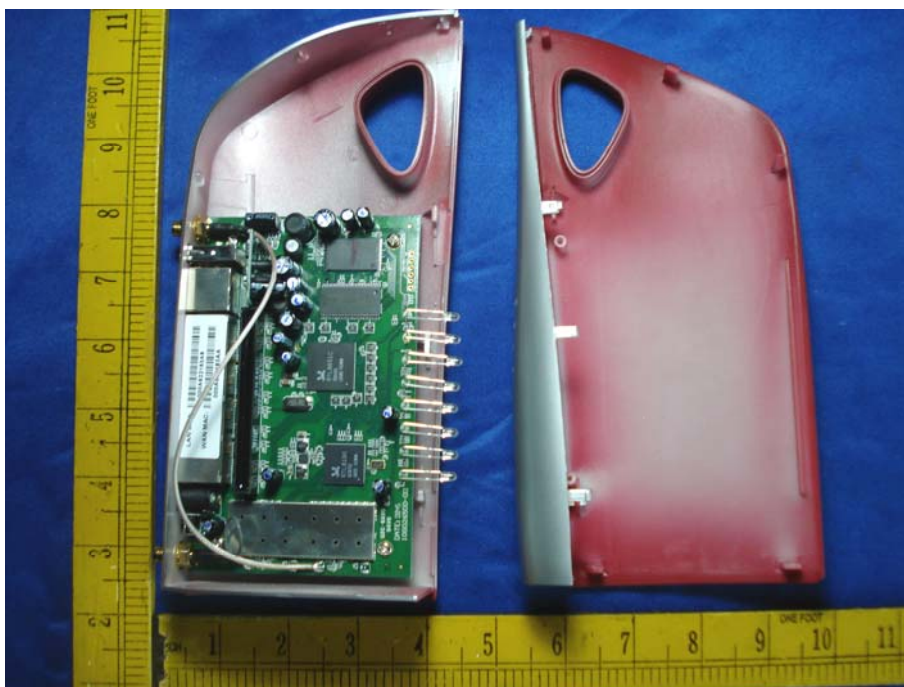
11 PHOTOGRAPHS OF EUT



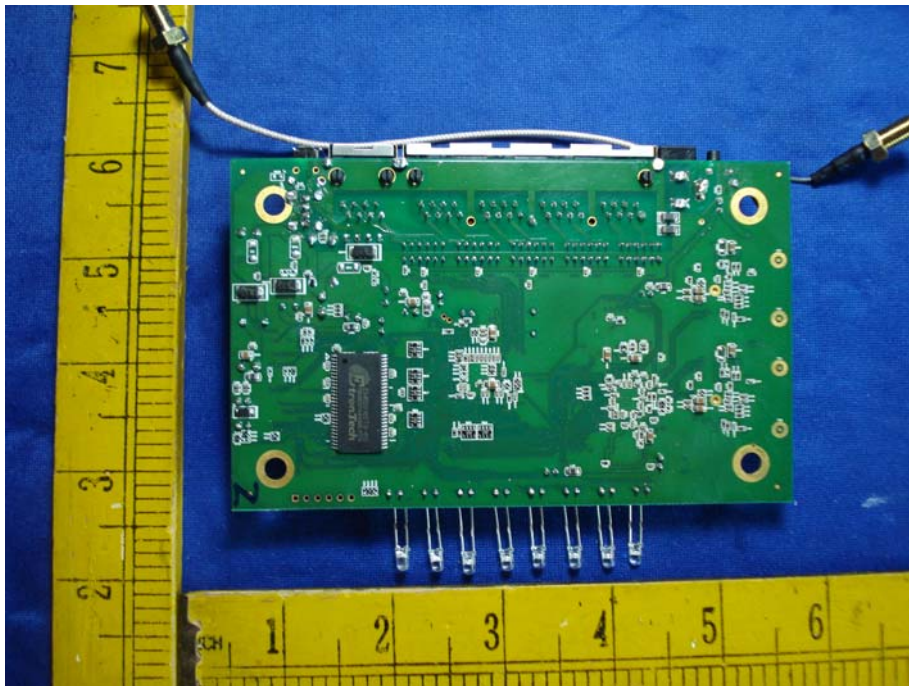
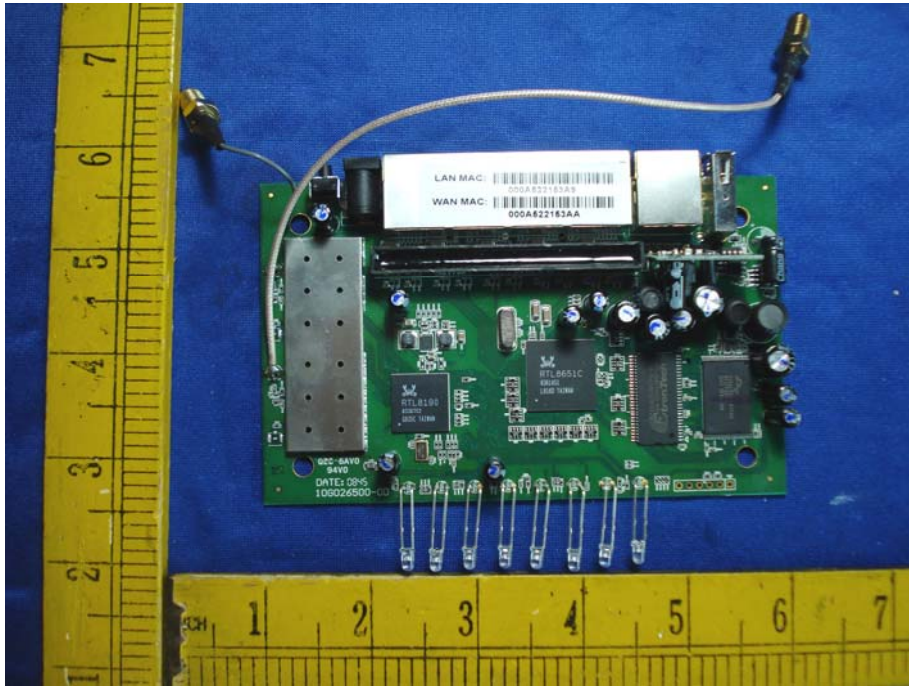
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12 FCC ID LABEL

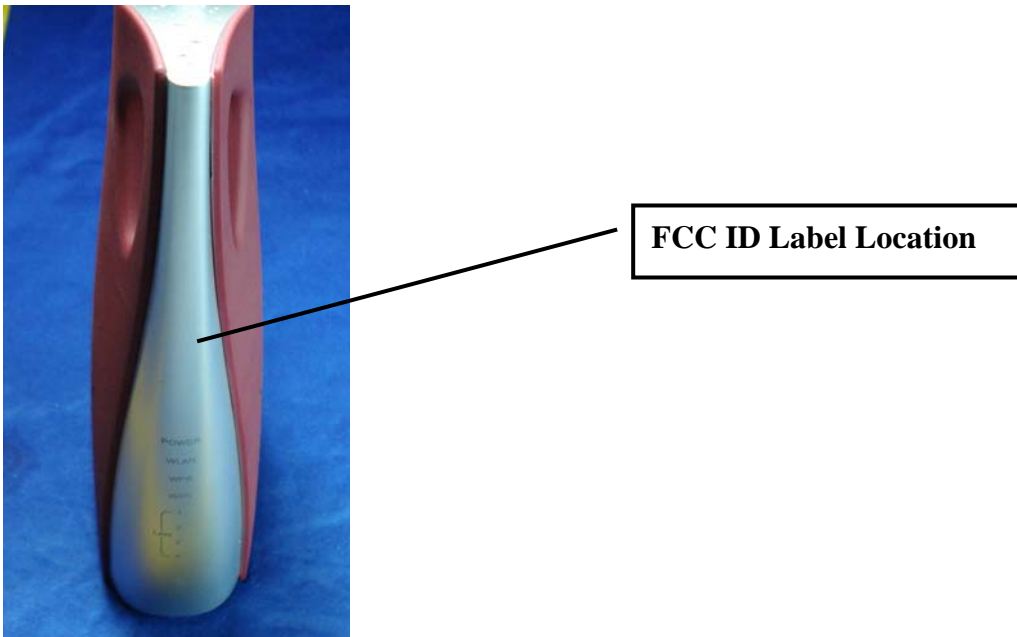
This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

The Label must not be a stick-on paper.

The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.



END of the Report

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