



SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

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Report No.: SHEM170400212002
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1 Cover Page

RF TEST REPORT

Application No.:	SHEM1704002120CR
Applicant:	Hangzhou Hikvision Digital Technology Co., Ltd.
FCC ID:	2ADTD-T03C2N00
Equipment Under Test (EUT):	
NOTE: The following sample(s) was/were submitted and identified by the client as	
Product Name:	Wireless Transmitter & Receiver
Model No.(EUT):	DS-3WF01C-2N
Standards:	FCC PART 15 Subpart C: 2016
Date of Receipt:	2017-04-14
Date of Test:	2017-04-14 to 2017-05-05
Date of Issue:	2017-06-18
Test Result:	Pass*

*In the configuration tested, the EUT detailed in this report complied with the standards specified above.



Parlam Zhan

E&E Section Manager

SGS-CSTC (Shanghai) Co., Ltd.

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00	/	2017-06-18	/	Original

Authorized for issue by:			
Engineer		Eddy Zong	
		Print Name	
Clerk		Vincent Zhu	
		Print Name	
Reviewer		Parlam Zhan	
		Print Name	



3 Test Summary

Test Item	FCC Requirement	Test method	Result
Antenna Requirement	FCC Part 15, Subpart C Section 15.203/15.247 (c)	---	PASS
AC Power Line Conducted Emission	FCC Part 15, Subpart C Section 15.207	ANSI C63.10 (2013) Section 6.2	PASS
Minimum 6dB Bandwidth	FCC Part 15, Subpart C Section 15.247 (a)(2)	ANSI C63.10 (2013) Section 11.8.1	PASS
Conducted Peak Output Power	FCC Part 15, Subpart C Section 15.247 (b)(3)	ANSI C63.10 (2013) Section 11.9.1.2	PASS
Power Spectrum Density	FCC Part 15, Subpart C Section 15.247 (e)	ANSI C63.10 (2013) Section 11.10.2	PASS
RF Conducted Spurious Emissions and Band-edge	FCC Part 15, Subpart C Section 15.247(d)	ANSI C63.10 (2013) Section 11.11&11.13.3.2	PASS
Radiated Spurious Emissions and Band-edge	FCC Part 15, Subpart C Section 15.209&15.205	ANSI C63.10 (2013) Section 6.4&6.5&6.6&6.10	PASS

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5 General Information

5.1 Client Information

Applicant:	Hangzhou Hikvision Digital Technology Co., Ltd.
Address of Applicant:	No. 555 Qianmo Road, Binjiang District, Hangzhou 310052, China
Manufacturer:	Hangzhou Hikvision Digital Technology Co., Ltd.
Address of Manufacturer:	No. 555 Qianmo Road, Binjiang District, Hangzhou 310052, China
Factory:	1. Hangzhou Hikvision Technology Co., Ltd. 2. Hangzhou Hikvision Electronics Co., Ltd.
Address of Factory:	1. No.700, Dongliu Road, Binjiang District, Hangzhou Ctiy,Zhejiang, 310052, China 2. No.299, Qiushi Road,Tonglu Economic Development Zone,Tonglu County, Hangzhou,Zhejiang,310052,China.

5.2 General Description of E.U.T

Product Description:	Fixed product with WiFi function	
Power Supply:	DC 12V 1A	
Test Voltage:	AC 120V 60Hz for adapter	
Adapter:	Manufacturer:	DVE
	Model No.:	DSA-12G-12FEU
	Rated Input:	AC 100~240V, 50/60Hz 0.3A
	Rated Output:	DC 12V 1.0A
	AC port:	2 wires
	DC port:	150 cm

5.3 Technical Specifications

Operation Frequency:	802.11 b/g/n(HT20): 2412MHz~2462MHz 802.11 n(HT40): 2422MHz~2452MHz
Modulation Technique:	802.11 b: DSSS(CCK, DQPSK, DBPSK) 802.11 g/n(HT20/n/HT40): OFDM(64QAM, 16QAM, QPSK, BPSK)
Data Rate:	802.11b: 1/2/5.5/11Mbps, 802.11g: 6/9/12/18/24/36/48/54Mbps 802.11n: MCS0-15 up to 300Mbps (2T X 2R MIMO)
Number of Channel:	802.11 b/g/n(HT20): 11 802.11 n(HT40): 7
Antenna Type:	Integral antenna
Antenna Gain:	Antenna A: 6 dBi, Antenna B: 6 dBi Two transmit signals are correlated with each other, Directional gain = 6 + 10 log(2) dBi=9dBi

5.4 Test Mode

Test Mode	Description of Test Mode
Engineering mode	Using test software to control EUT working in continuous transmitting in max power level

5.5 Test Channel

	802.11 b/g/n20(HT20)					802.11 n40(HT40)		
	Channel	Frequency	Data rate			Channel	Frequency	Data rate
			b	g	n(HT20)			
lowest channel	CH01	2412MHz	1Mbps	6Mbps	MCS0	CH03	2422MHz	MCS0
Middle channel	CH06	2437MHz	1Mbps	6Mbps	MCS0	CH06	2437MHz	MCS0
Highest channel	CH11	2462MHz	1Mbps	6Mbps	MCS0	CH09	2452MHz	MCS0

Remark: Preliminary tests were performed in all tests in different data rates and antenna configurations at lowest channel, the data rates of worse case as above were chosen for final test.

5.6 Description of Support Units

The EUT has been tested with support equipments as below.

Description	Manufacturer	Model No.	Supplied By
Laptop	Lenovo	ThinkPad X100e	SGS

Software name	Manufacturer	Version	Supplied By
Atheros Radio Test2	Atheros	V 2.3	SGS

5.7 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Tel: +86 21 6191 5666
Fax: +86 21 6191 5678

5.8 Test Facility

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

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683.

- **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A-1.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-3868, C-4336, T-2221, G-830 respectively.

5.9 Measurement Uncertainty

No.	Parameter	Measurement Uncertainty
1	Radio Frequency	< ±1 × 10 ⁻⁵
2	Total RF power, conducted	< ±1.5 dB
3	RF power density, conducted	< ±3 dB
4	Spurious emissions, conducted	< ±3 dB
5	All emissions, radiated	< ±6 dB (Below 1GHz) < ±6 dB (Above 1GHz)
6	Temperature	< ±1°C
7	Humidity	< ±5 %
8	DC and low frequency voltages	< ±3 %

6 Equipments Used during Test

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due date
1	Power meter	Rohde & Schwarz	NRP	101641	2017-01-14	2018-01-13
2	Power Sensor	Rohde & Schwarz	NRP-Z22	101096	2016-08-06	2017-08-05
3	Spectrum Analyzer	Rohde & Schwarz	FSP-30	2705121009	2017-01-14	2018-01-13
4	EMI test receiver	Rohde & Schwarz	ESU40	100109	2017-02-13	2018-01-15
5	Active Loop Antenna (9kHz to 30MHz)	Rohde & Schwarz	FMZB1519	1519-034	2017-02-13	2018-01-15
6	Broadband UHF-VHF ANTENNA (25MHz to 2GHz)	SCHWARZBECK	VULB9168	9168-313	2017-02-13	2018-01-15
7	Ultra broadband antenna (25MHz to 3GHz)	Rohde & Schwarz	HL562	100227	2016-08-30	2017-08-29
8	Horn Antenna (1GHz to 18GHz)	Rohde & Schwarz	HF906	100284	2017-02-13	2018-01-15
9	Horn Antenna (1GHz to 18GHz)	SCHWARZBECK	BBHA9120D	9120D-679	2017-02-13	2018-01-15
10	Horn Antenna(14GHz to 40GHz)	SCHWARZBECK	BBHA 9170	BBHA917-0373	2017-02-13	2018-01-15
11	Pre-amplifier (9KHz – 2GHz)	LNA6900	TESEQ	71033	/	/
12	Pre-amplifier (1GHz – 26.5GHz)	SCHWARZBECK	SCU-F0118- G40-BZ4- CSS(F)	10001	2017-01-14	2018-01-13
13	Pre-amplifie (14GHz – 40GHz)	SCHWARZBECK	SCU-F1840- G35-BZ3- CSS(F)	10001	2017-01-14	2018-01-13
14	Tunable Notch Filter	Wainwright Instruments GmbH	WRCT800.0/880 .0-0.2/40-5SSK	170397 169777 169780 192507	/	/
15	High pass Filter	FSCW	HP 12/2800- 5AA2	19A45-02	/	/
16	High-low temperature cabinet	Suzhou Zhihe	TL-40	50110050	2016-09-11	2017-09-10
17	AC power stabilizer	WOCEN	6100	51122	2017-01-14	2018-01-13
18	DC power	QJE	QJ30003SII	3573/4/3	2017-01-14	2018-01-13
19	Signal Generator (Interferer)	Rohde & Schwarz	SMR40	100555	2016-08-13	2017-08-12
20	Signal Generator (Blocker)	Rohde & Schwarz	SMJ100A	101394	2017-01-14	2018-01-13
21	Splitter	Anritsu	MA1612A	M12265	/	/
22	Coupler	e-meca	803-S-1	900-M01	/	/

7 Test Results

7.1 E.U.T. test conditions

Requirements: 15.31(e) For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

Operating Environment:	Temperature: 20.0 -25.0 °C
	Humidity: 35-75 % RH
	Atmospheric Pressure: 99.2 -102 kPa

Test frequencies: According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

Frequency range over which device operates	Number of frequencies	Location in the range of operation
1 MHz or less	1	Middle
1 to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

Pursuant to Part 15.31(c) For swept frequency equipment, measurements shall be made with the frequency sweep stopped at those frequencies chosen for the measurements to be reported.

7.2 Antenna Requirement

Standard 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

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The antenna is integral antenna and no consideration of replacement. The gain of the antenna is less than 6 dBi



7.3 Conducted Emissions on Mains Terminals

Frequency Range: 150 KHz to 30 MHz

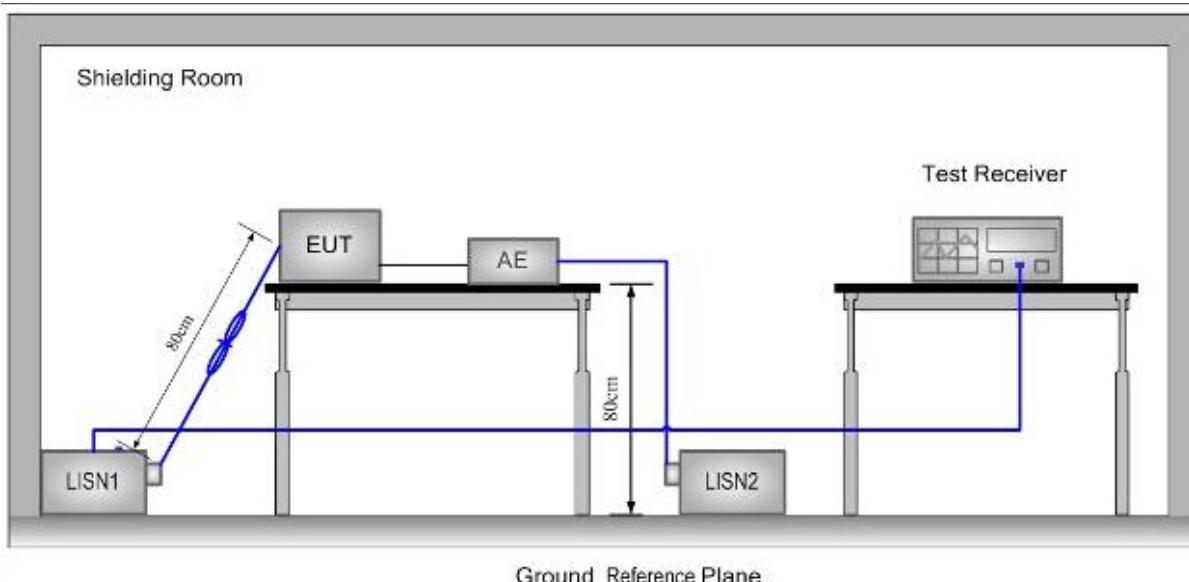
Limit:

Frequency range MHz	Class B Limits: dB (μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Note1: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.

Note2: The lower limit is applicable at the transition frequency.

Test Setup:



Test Procedure:

- 1) The mains terminal disturbance voltage was measured with the EUT in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides $50\Omega/50\mu\text{H} + 5\Omega$ linear impedance. The power cables of all other units of the EUT were connected to a second LISN, which was bonded to the ground reference plane in the same way as the LISN for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance was between the closest points of the LISN and the EUT. The mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m. All other units of the EUT and associated



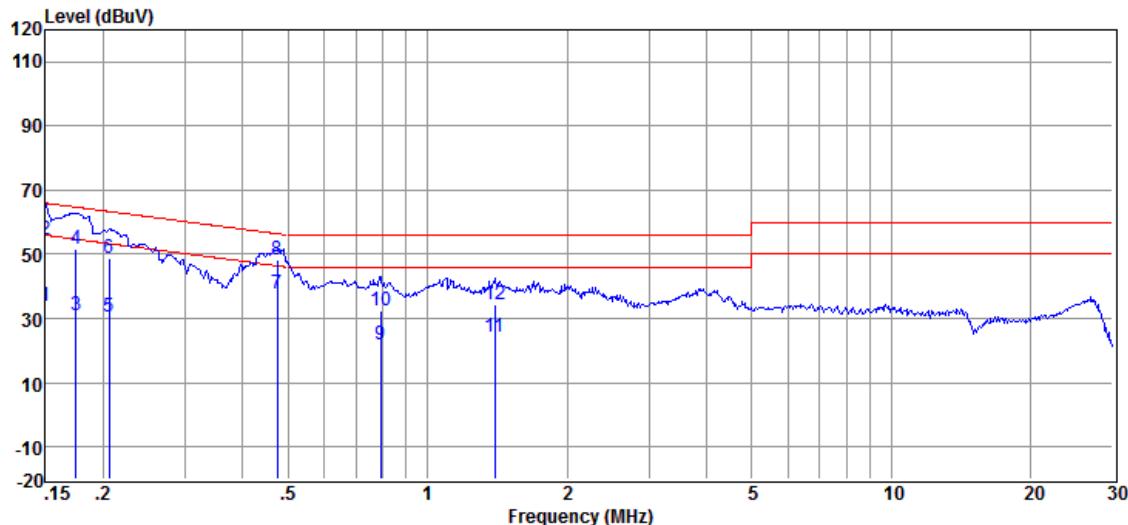
equipment were at least 0.8 m from the LISN.

Remark: Pre-scan was performed with peak detected on all ports, Quasi-peak & average measurements were performed at the frequencies at which maximum peak emission level were detected. Pretest under all modes; choose the worst case mode (802.11b in Middle channel) record on the report. Please see the attached Quasi-peak and Average test results.

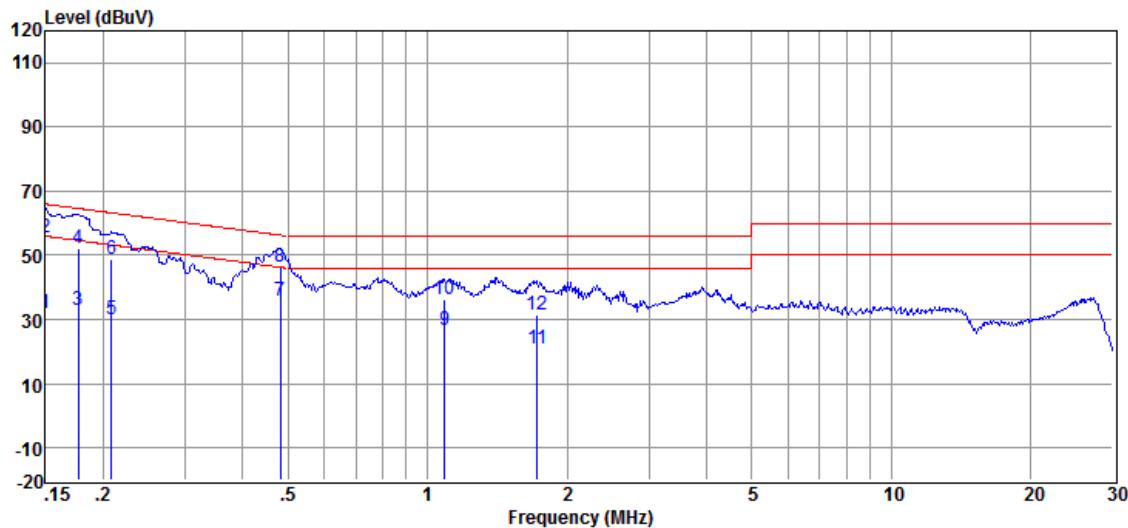
Test Result: Pass

Test Data:

Test Mode:	802.11b	Test Channel:	Middle
Test Port:	AC Live Line		



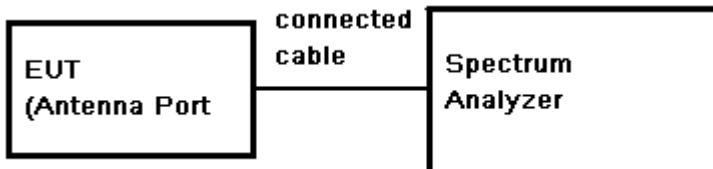
Item	Freq.	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dB μ V)	(dB)	(dB)	(dB μ V)	(dB μ V)	(dB)	
1	0.150	23.60	0.05	10.15	33.80	56.00	-22.20	Average
2	0.150	44.42	0.05	10.15	54.62	66.00	-11.38	QP
3	0.175	20.97	0.07	10.15	31.19	54.72	-23.53	Average
4	0.175	41.35	0.07	10.15	51.57	64.72	-13.15	QP
5	0.206	20.35	0.09	10.15	30.59	53.36	-22.77	Average
6	0.206	38.32	0.09	10.15	48.56	63.36	-14.80	QP
7	0.474	27.26	0.10	10.17	37.53	46.45	-8.92	Average
8	0.474	37.88	0.10	10.17	48.15	56.45	-8.30	QP
9	0.792	11.48	0.09	10.18	21.75	46.00	-24.25	Average
10	0.792	22.05	0.09	10.18	32.32	56.00	-23.68	QP
11	1.396	13.81	0.08	10.19	24.08	46.00	-21.92	Average
12	1.396	24.31	0.08	10.19	34.58	56.00	-21.42	QP

Test Port: AC Neutral Line

Item	Freq.	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dB μ V)	(dB)	(dB)	(dB μ V)	(dB μ V)	(dB)	
1	0.150	21.98	0.05	10.15	32.18	56.00	-23.82	Average
2	0.150	45.17	0.05	10.15	55.37	66.00	-10.63	QP
3	0.177	22.55	0.05	10.15	32.75	54.64	-21.89	Average
4	0.177	41.95	0.05	10.15	52.15	64.64	-12.49	QP
5	0.208	20.01	0.05	10.15	30.21	53.27	-23.06	Average
6	0.208	38.67	0.05	10.15	48.87	63.27	-14.40	QP
7	0.481	25.74	0.04	10.17	35.95	46.32	-10.37	Average
8	0.481	36.23	0.04	10.17	46.44	56.32	-9.88	QP
9	1.088	16.55	0.05	10.18	26.78	46.00	-19.22	Average
10	1.088	25.96	0.05	10.18	36.19	56.00	-19.81	QP
11	1.725	10.41	0.06	10.19	20.66	46.00	-25.34	Average
12	1.725	21.02	0.06	10.19	31.27	56.00	-24.73	QP

Remark: Level = Read Level + LISN/ISN Factor + Cable Loss.

7.4 6dB Occupied Bandwidth

Test Configuration:**Test Procedure:**

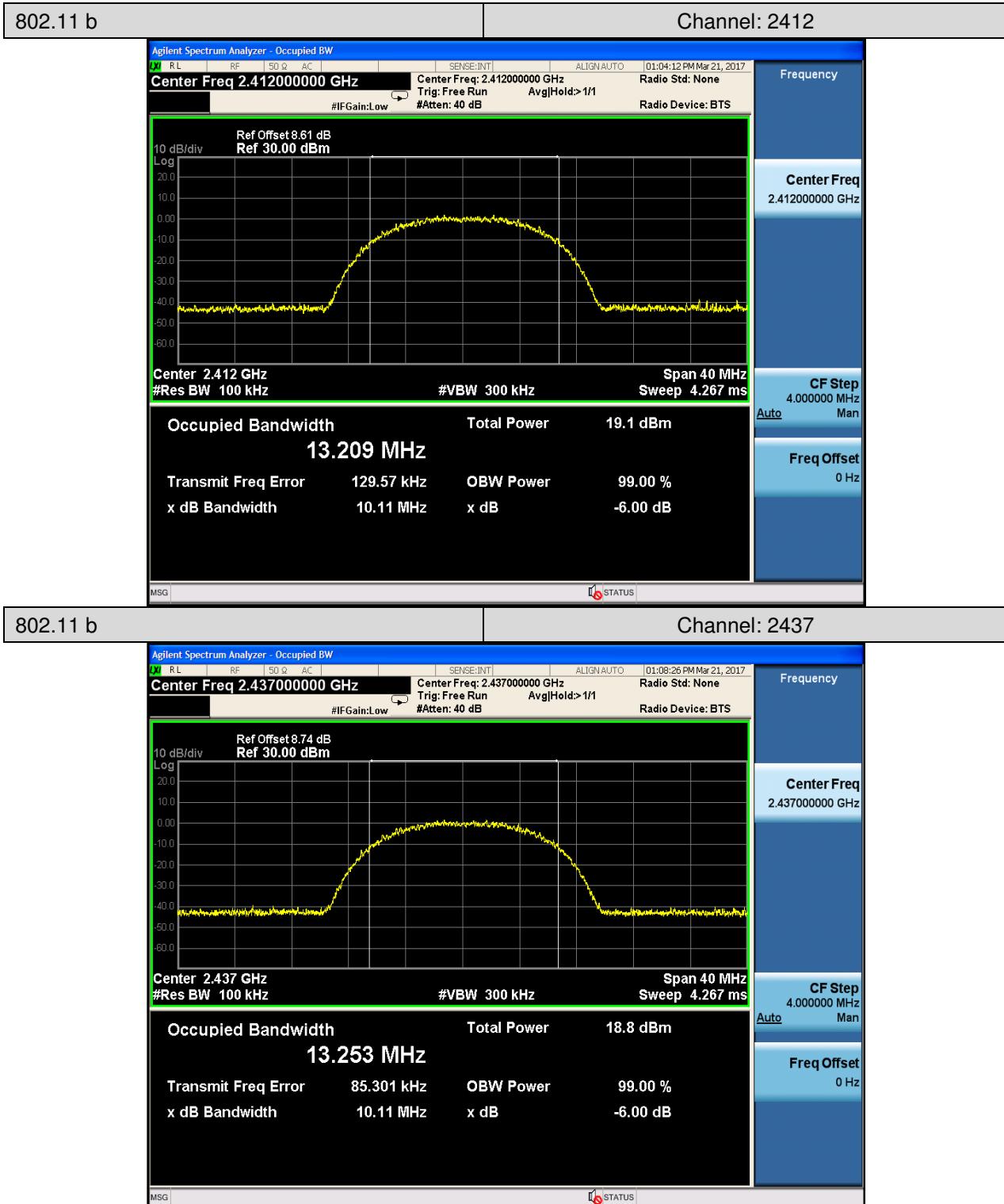
- 1) Place the EUT on the table and set it in transmitting mode.
- 2) Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3) Set the spectrum analyzer as RBW=100KHz, VBW≥3* RBW, Detector=Peak, Trace mode= Max hold, Sweep=Auto couple.
- 4) Mark the peak frequency and -6dB (upper and lower) frequency.
- 5) Repeat above procedures until all frequency measured was complete.

Limit: ≥ 500 kHz**Test Result:** Pass**Test Data:**

Test Mode	Test Channel	Antenna A EBW[MHz]	Antenna B EBW[MHz]	Limit	Verdict
11B	2412	10.11	9.641	0.5	PASS
11B	2437	10.11	10.20	0.5	PASS
11B	2462	9.606	9.957	0.5	PASS
11G	2412	16.32	16.39	0.5	PASS
11G	2437	16.33	16.37	0.5	PASS
11G	2462	16.08	16.08	0.5	PASS
11N20SISO	2412	16.67	17.20	0.5	PASS
11N20SISO	2437	17.26	16.89	0.5	PASS
11N20SISO	2462	16.65	17.17	0.5	PASS
11N40SISO	2422	36.41	35.12	0.5	PASS
11N40SISO	2437	35.13	35.12	0.5	PASS
11N40SISO	2452	35.36	35.11	0.5	PASS
11N20MIMO	2412	17.69	17.67	0.5	PASS
11N20MIMO	2437	16.94	16.65	0.5	PASS
11N20MIMO	2462	16.66	16.93	0.5	PASS
11N40MIMO	2422	35.07	35.08	0.5	PASS
11N40MIMO	2437	35.10	35.10	0.5	PASS
11N40MIMO	2452	33.87	35.34	0.5	PASS

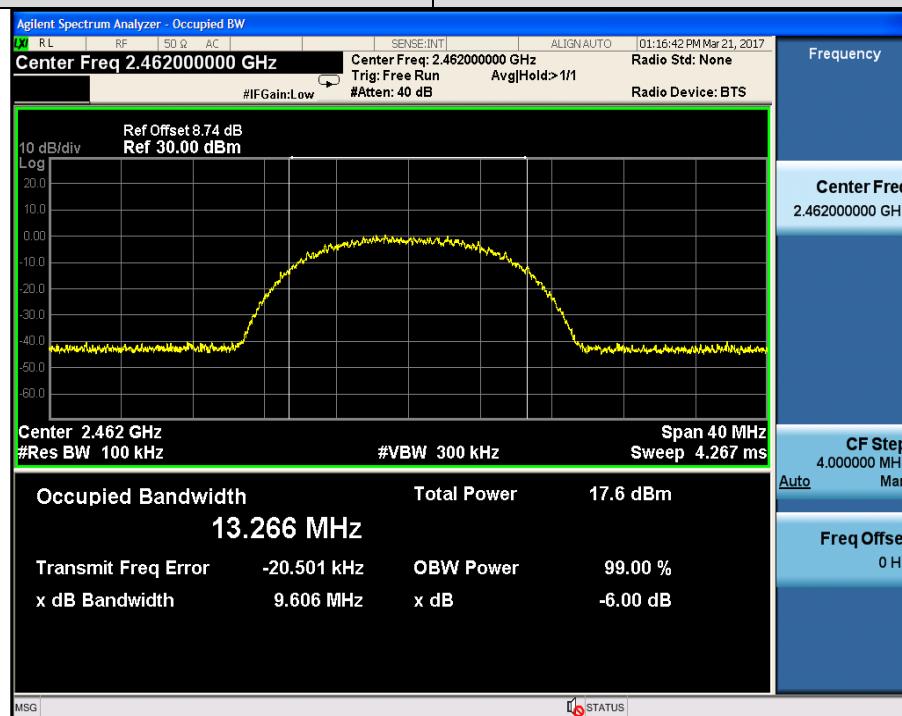
Test plot as follows:

Antenna A



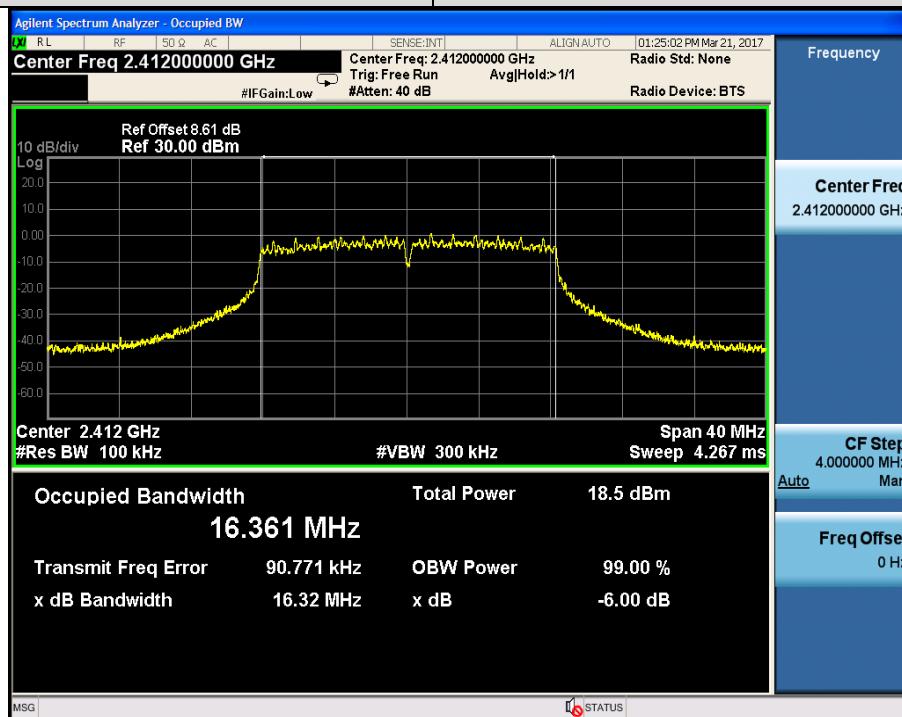
802.11 b

Channel: 2462



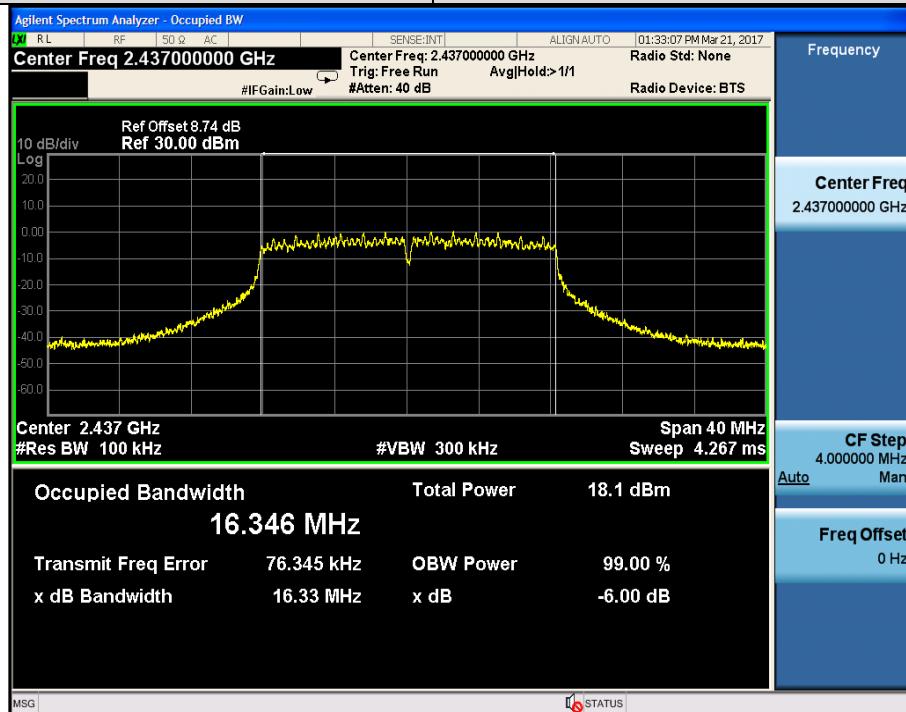
802.11 g

Channel: 2412



802.11 g

Channel: 2437



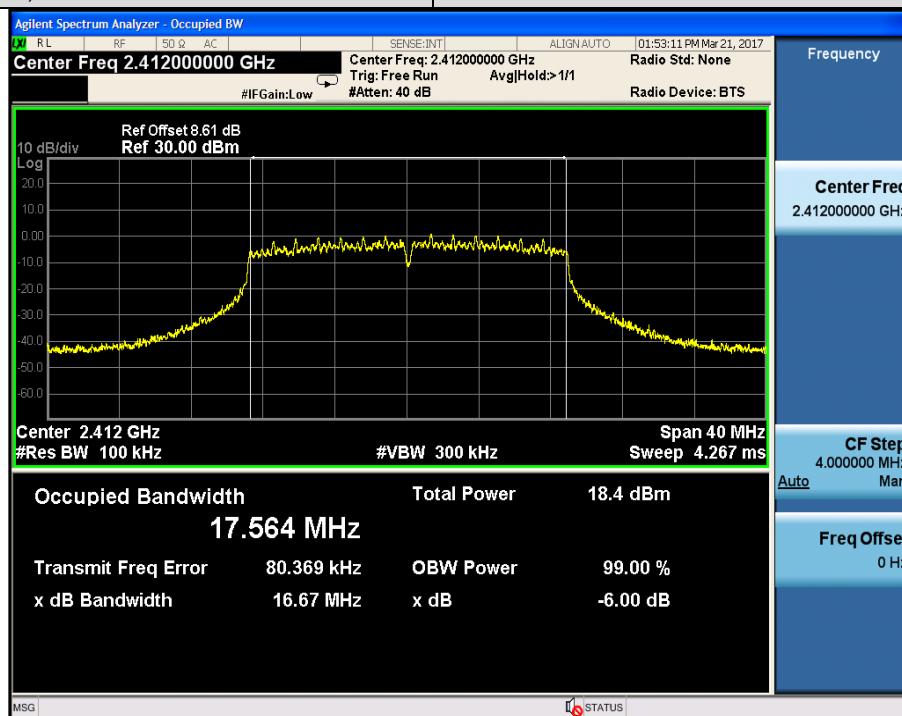
802.11 g

Channel: 2462



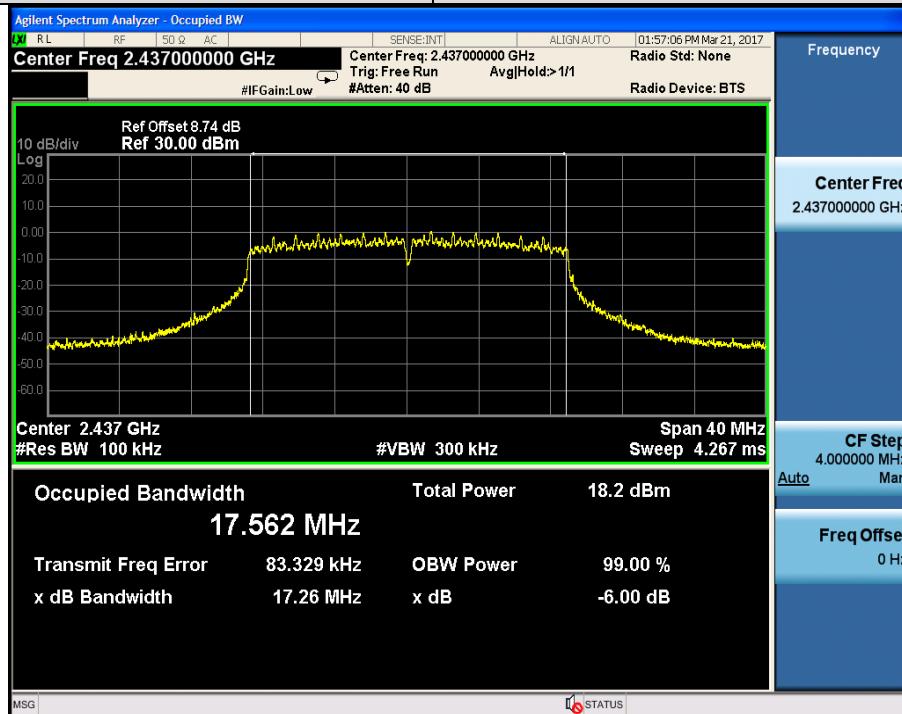
802.11 n (HT20)

Channel: 2412



802.11 n (HT20)

Channel: 2437



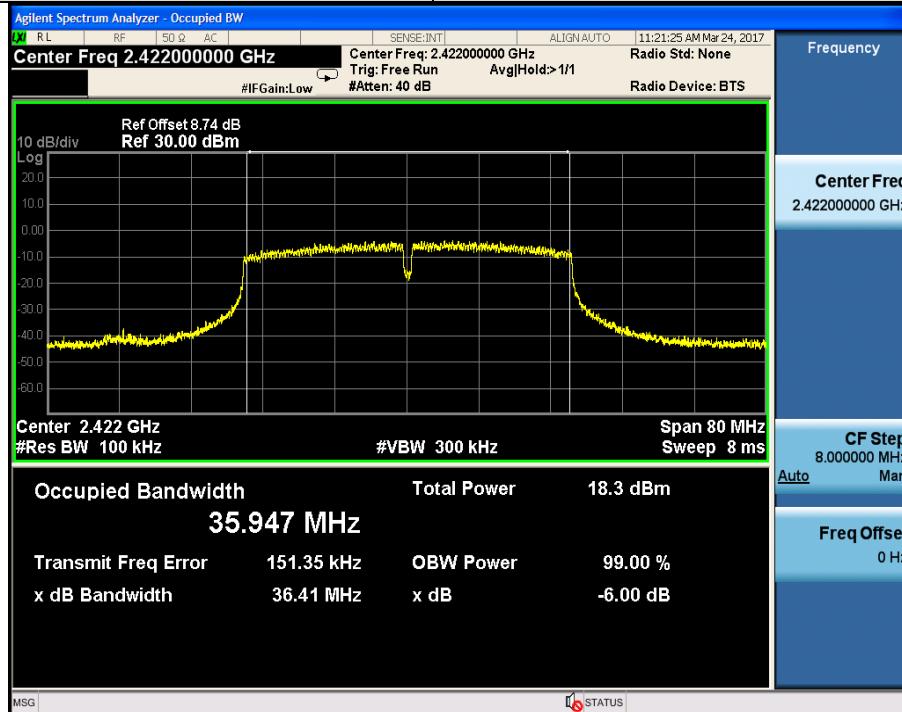
802.11 n (HT20)

Channel: 2462



802.11 n (HT40)

Channel: 2422



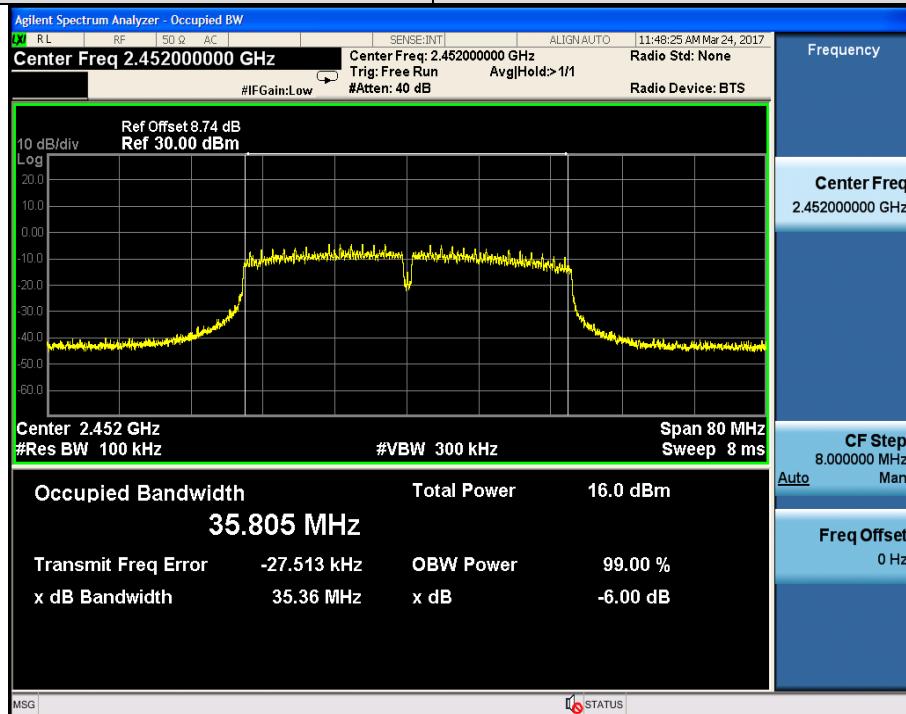
802.11 n (HT40)

Channel: 2437



802.11 n (HT40)

Channel: 2452



MIMO

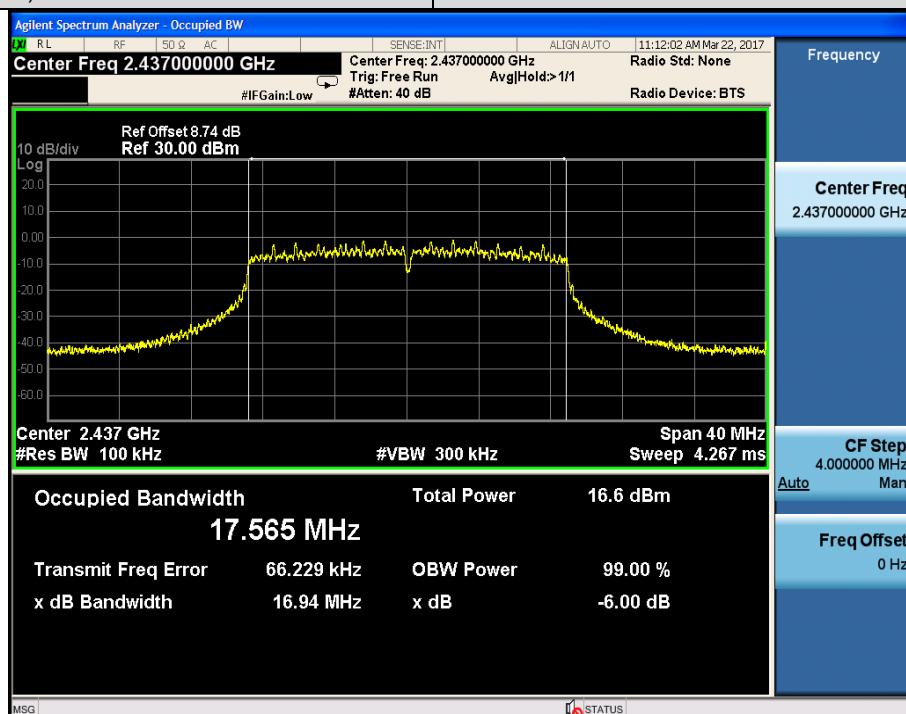
802.11 n (HT20)

Channel: 2412



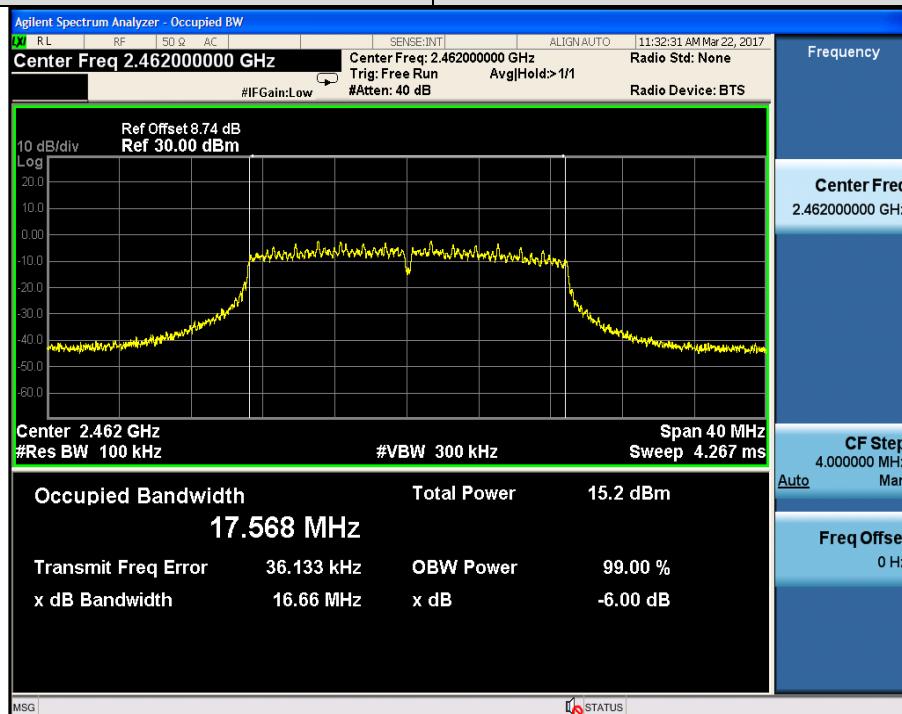
802.11 n (HT20)

Channel: 2437



802.11 n (HT20)

Channel: 2462



802.11 n (HT40)

Channel: 2422



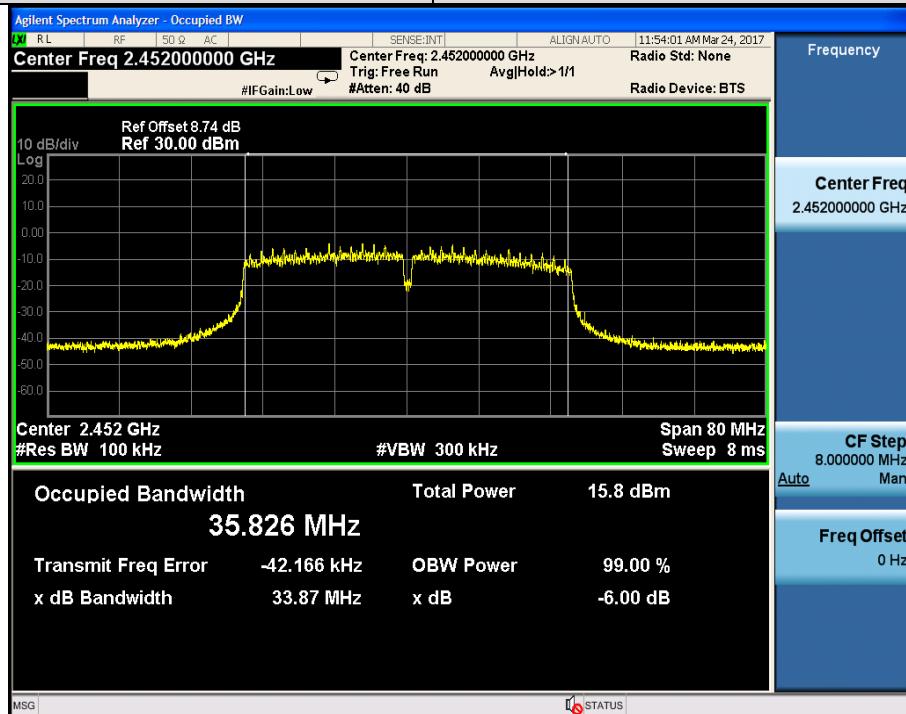
802.11 n (HT40)

Channel: 2437



802.11 n (HT40)

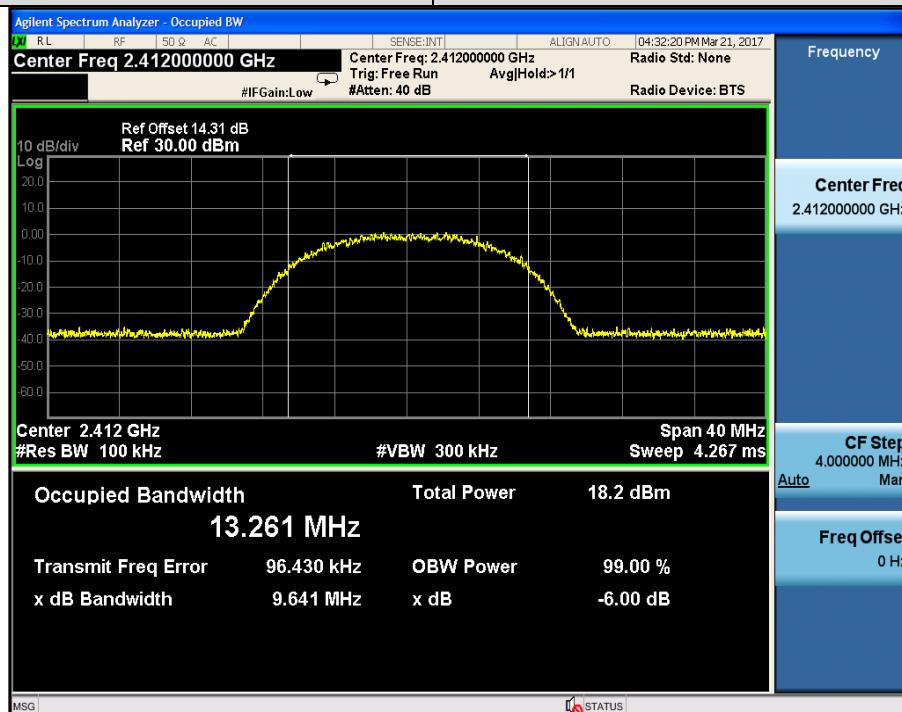
Channel: 2452



Antenna B

802.11 b

Channel: 2412



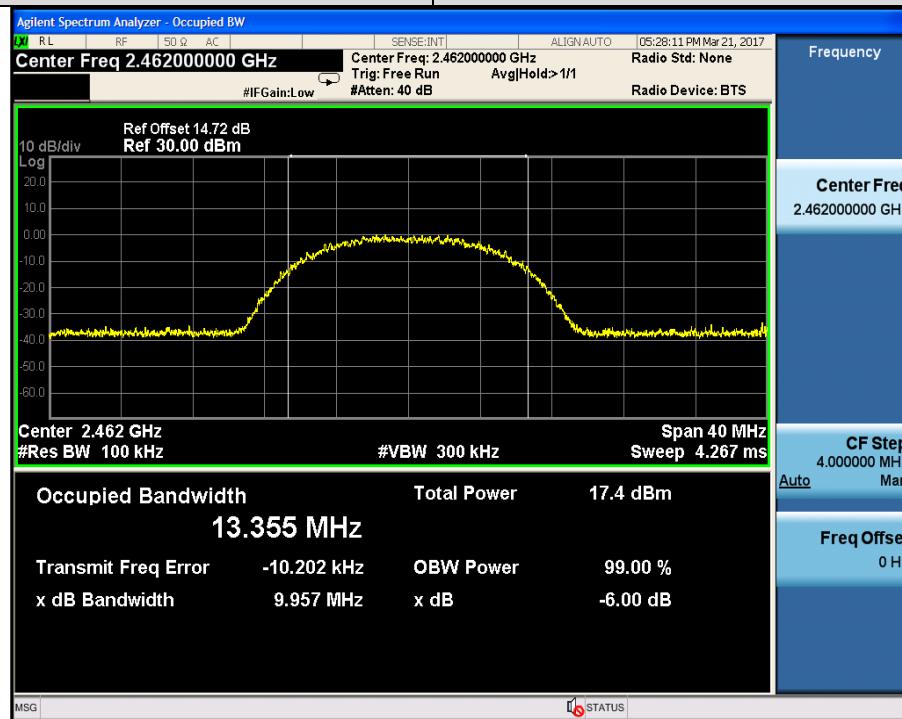
802.11 b

Channel: 2437



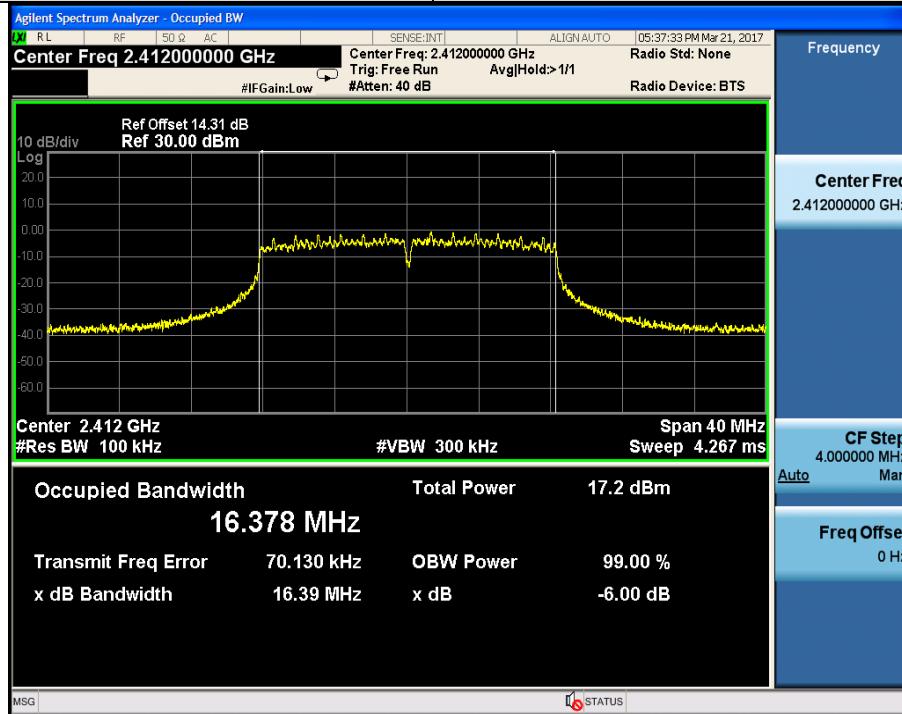
802.11 b

Channel: 2462



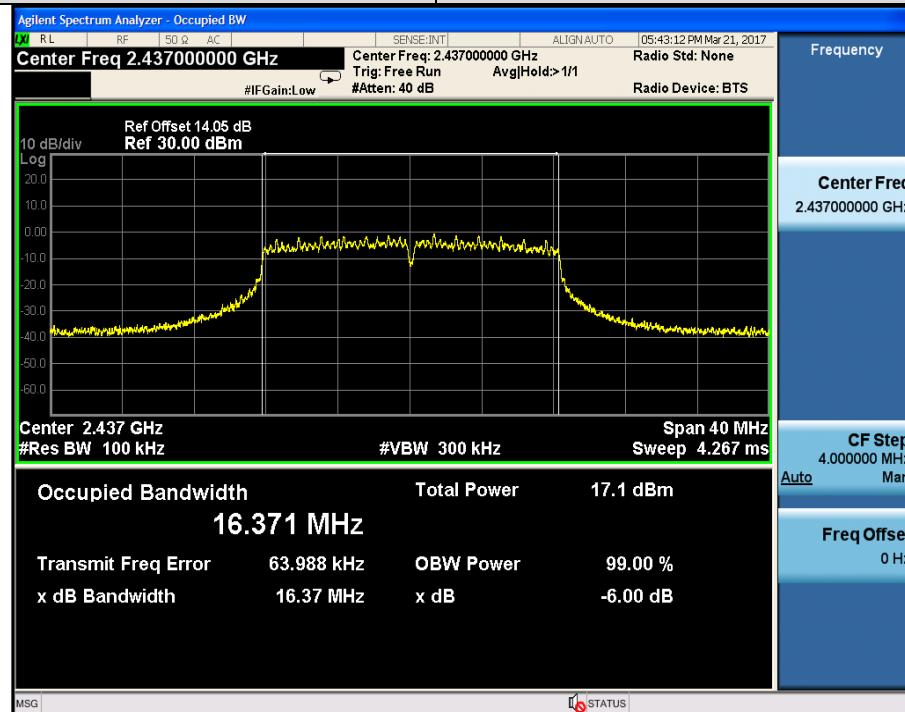
802.11 g

Channel: 2412



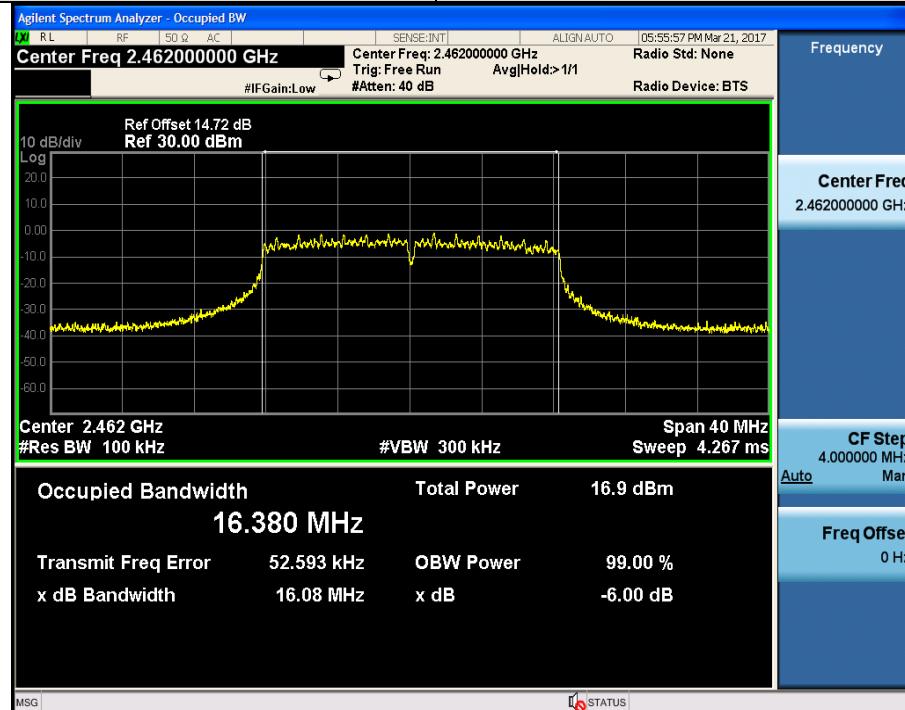
802.11 g

Channel: 2437



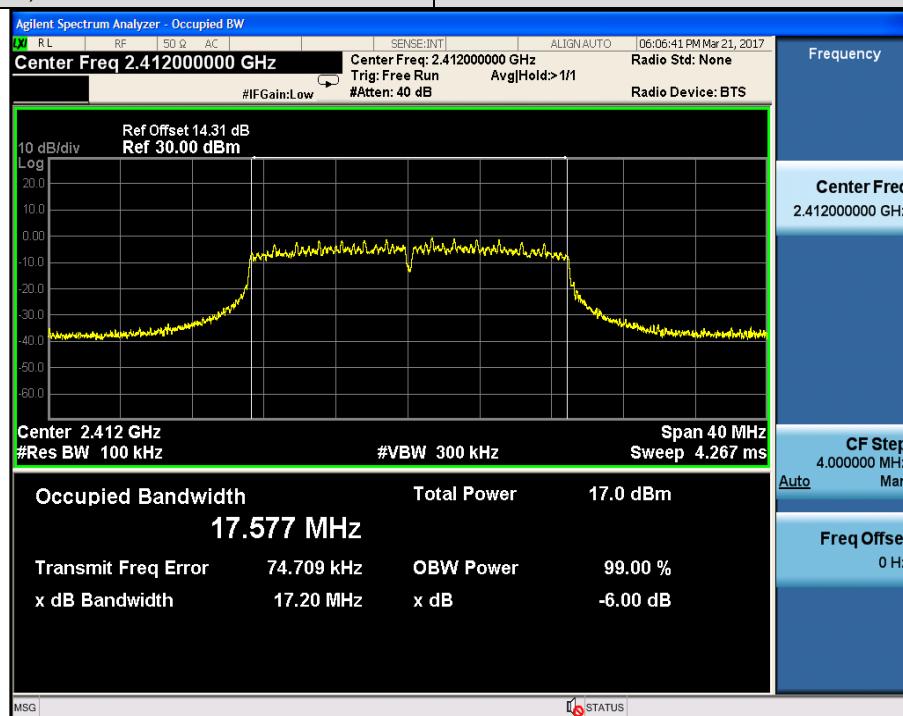
802.11 g

Channel: 2462



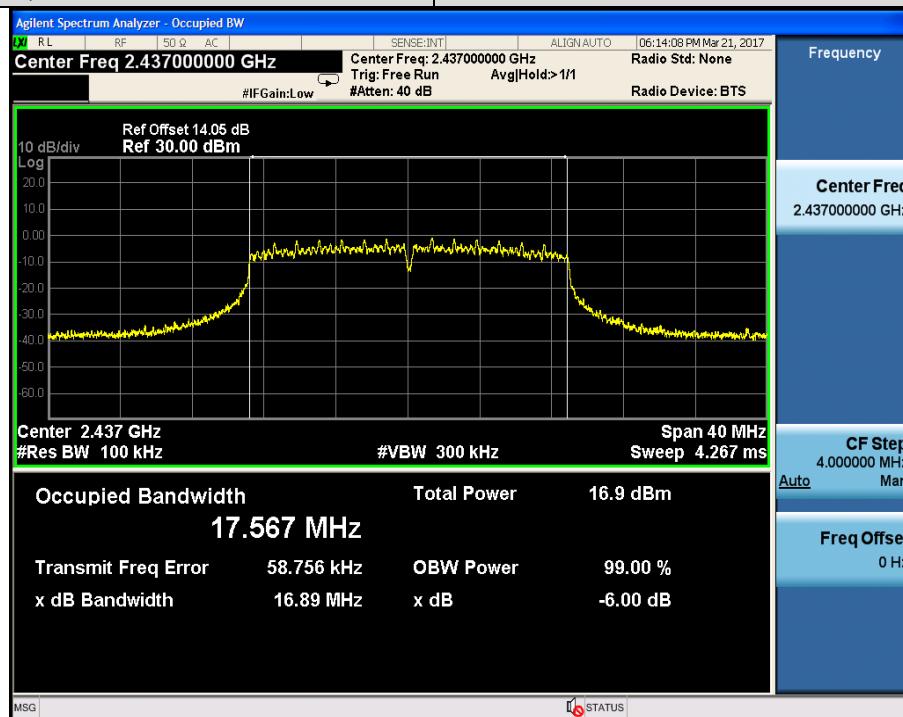
802.11 n (HT20)

Channel: 2412



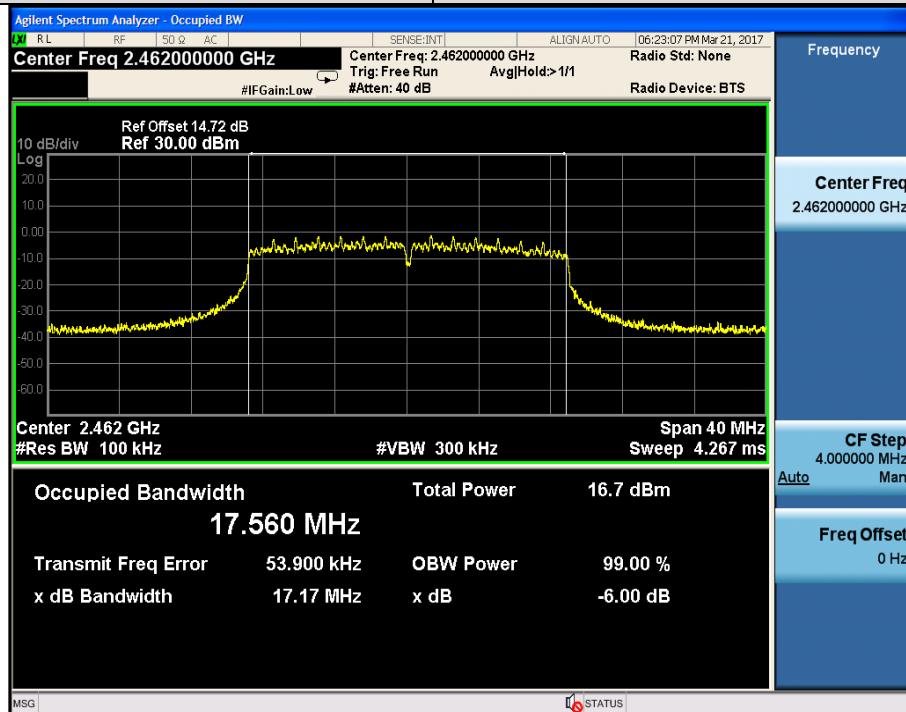
802.11 n (HT20)

Channel: 2437



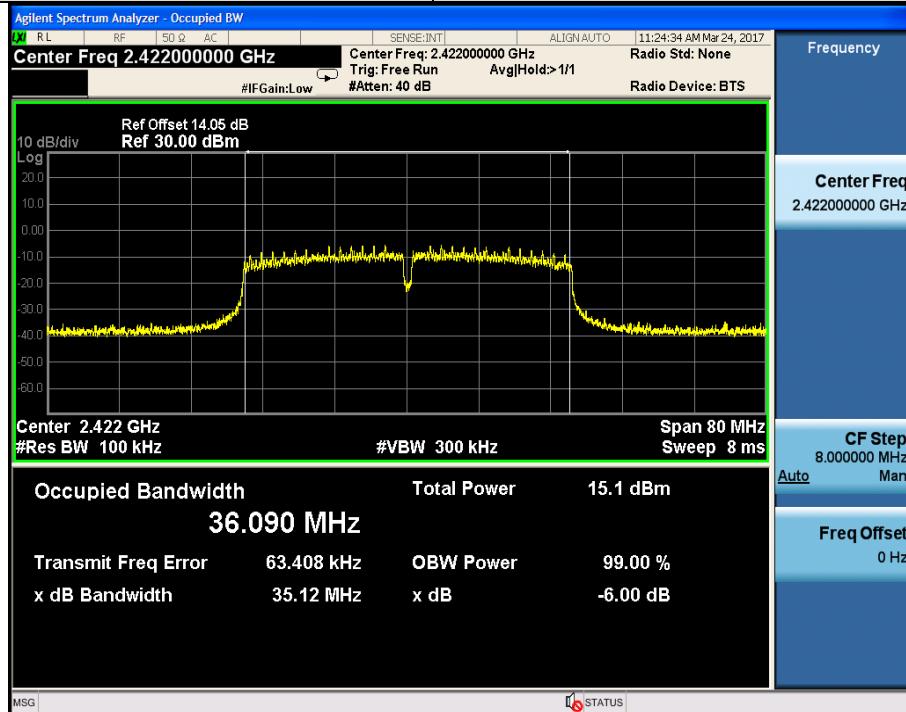
802.11 n (HT20)

Channel: 2462



802.11 n (HT40)

Channel: 2422



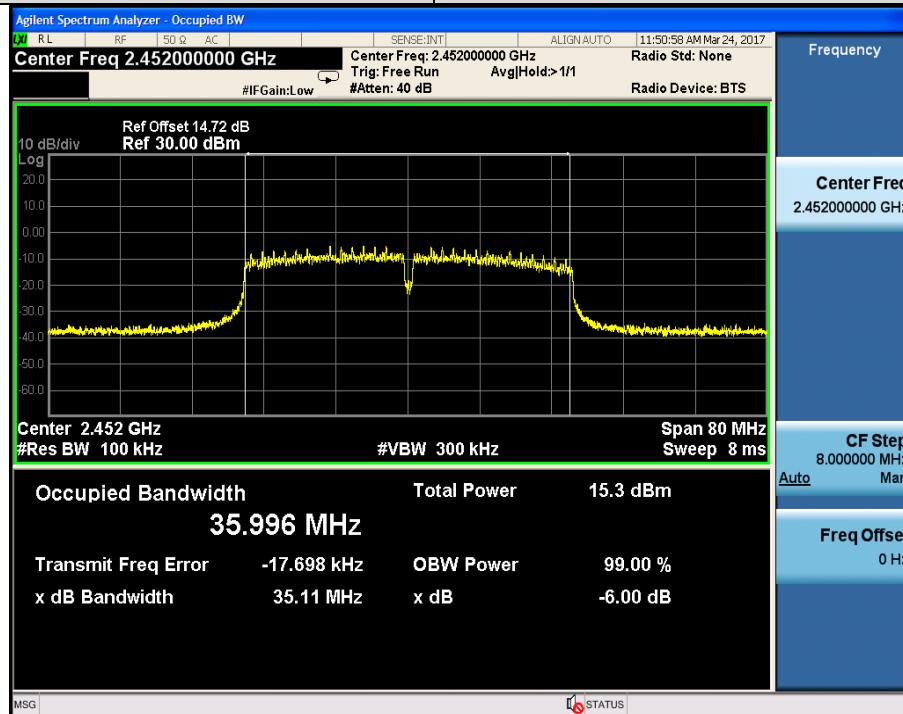
802.11 n (HT40)

Channel: 2437

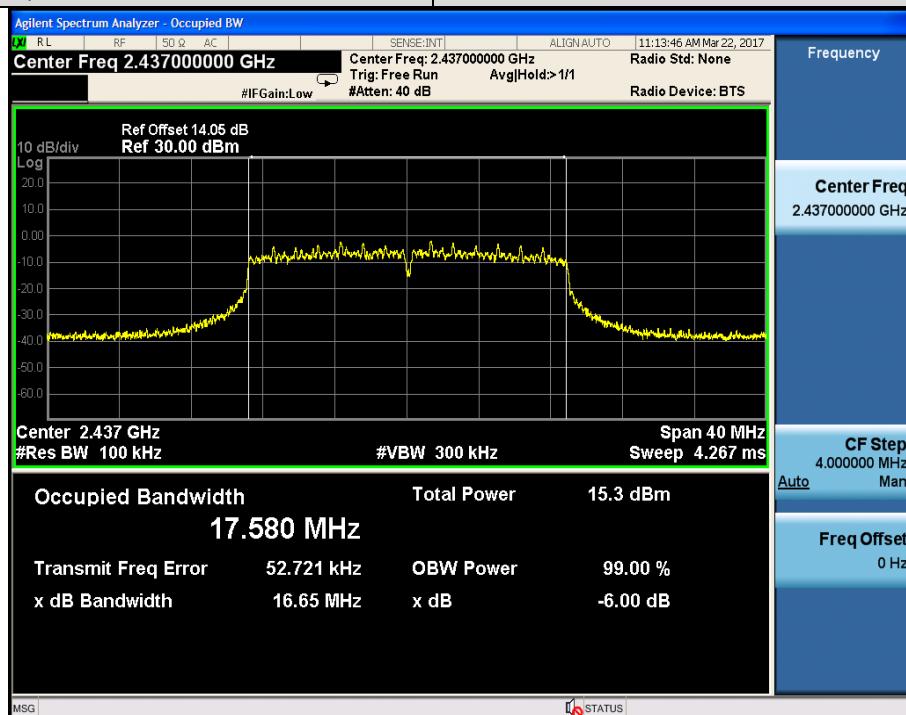


802.11 n (HT40)

Channel: 2452



MIMO
802.11 n (HT20)
Channel: 2412

802.11 n (HT20)
Channel: 2437


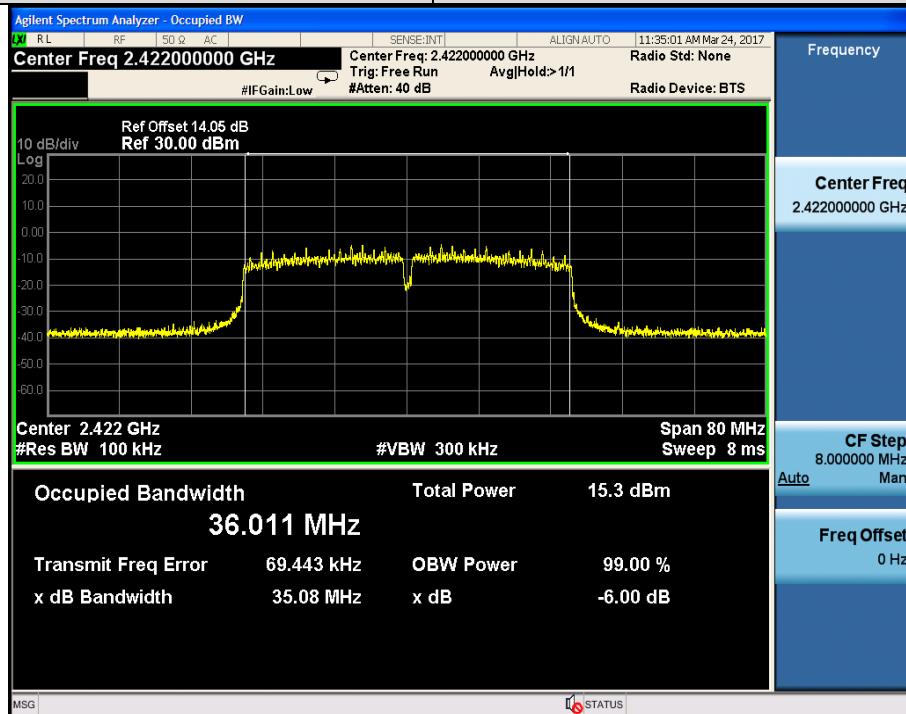
802.11 n (HT20)

Channel: 2462



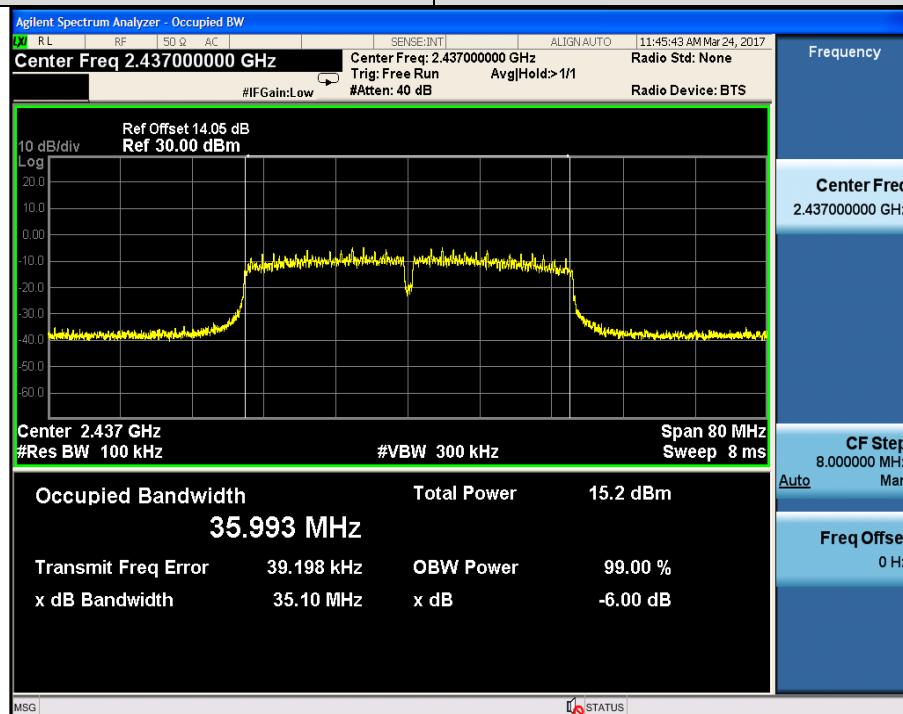
802.11 n (HT40)

Channel: 2422



802.11 n (HT40)

Channel: 2437



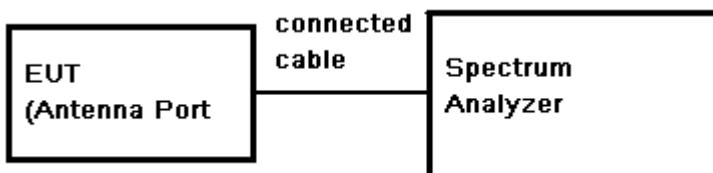
802.11 n (HT40)

Channel: 2452



7.5 Conducted Peak Output Power

Test Configuration:



Test Procedure:

- 1) Place the EUT on the table and set it in transmitting mode.
- 2) Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum.
- 3) Set the spectrum analyzer as RBW=0.51MHz, VBW≥3* RBW,
Detector=Peak, Span≥1.5 × DTS bandwidth, Trace mode= Max hold,
Sweep=Auto couple
- 4) Allow trace to fully stabilize.
- 5) Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges
- 6) Record the max. Power channel reading.
- 7) Repeat above procedures until all the frequency measured were complete.

Test Limit: 30dBm

Test Result: Pass



Test Data:

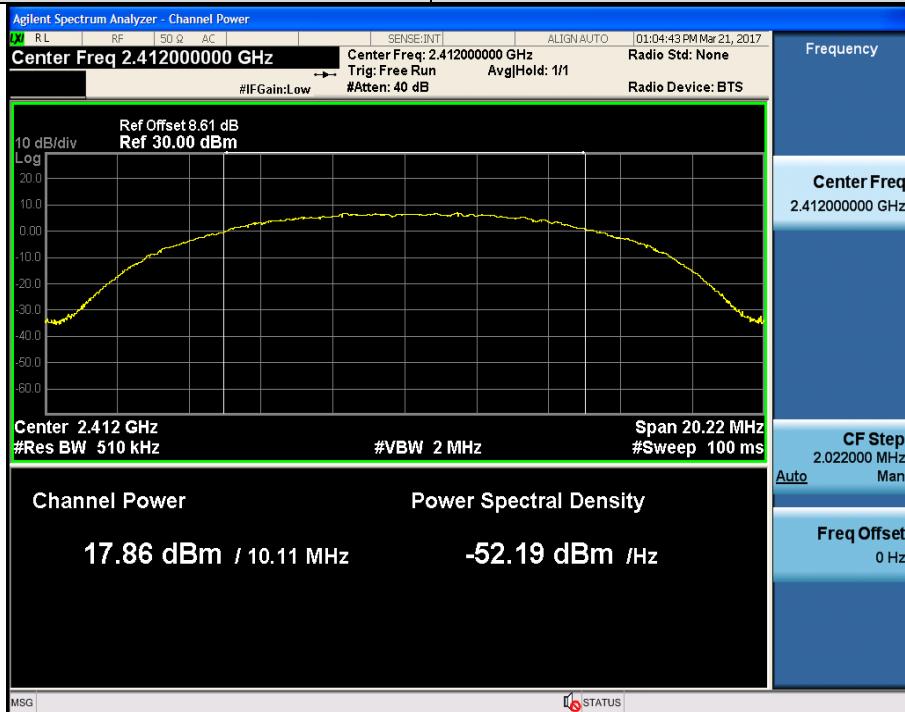
Test Mode	Channel	Antenna A Power[dBm]	Antenna B Power[dBm]	MIMO Power[dBm]	Limit[dBm]	Verdict
11B	2412	17.86	16.82	N/A	30	PASS
11B	2437	17.58	16.28	N/A	30	PASS
11B	2462	16.19	16.21	N/A	30	PASS
11G	2412	19.15	17.89	N/A	30	PASS
11G	2437	18.98	17.76	N/A	30	PASS
11G	2462	17.71	17.56	N/A	30	PASS
11N20SISO	2412	18.91	17.65	N/A	30	PASS
11N20SISO	2437	18.76	17.37	N/A	30	PASS
11N20SISO	2462	17.48	17.27	N/A	30	PASS
11N40SISO	2422	19.26	15.74	N/A	30	PASS
11N40SISO	2437	17.65	15.88	N/A	30	PASS
11N40SISO	2452	16.7	15.9	N/A	30	PASS
11N20MIMO	2412	17.28	16.43	19.89	27*	PASS
11N20MIMO	2437	17.01	15.72	19.42	27*	PASS
11N20MIMO	2462	15.62	15.46	18.55	27*	PASS
11N40MIMO	2422	17.85	15.95	20.01	27*	PASS
11N40MIMO	2437	17.31	15.85	19.65	27*	PASS
11N40MIMO	2452	16.29	15.9	19.11	27*	PASS

Remark*: Two transmit signals are correlated with each other, Directional gain = $6 + 10 \log (2)$ dBi=9dBi, which is 3 dB exceeds 6 dBi. Therefore, the limit shall be reduced by 3 dB.

Test plot as follows:

Antenna A:

802.11 b	Channel: 2412
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802.11 b	Channel: 2437
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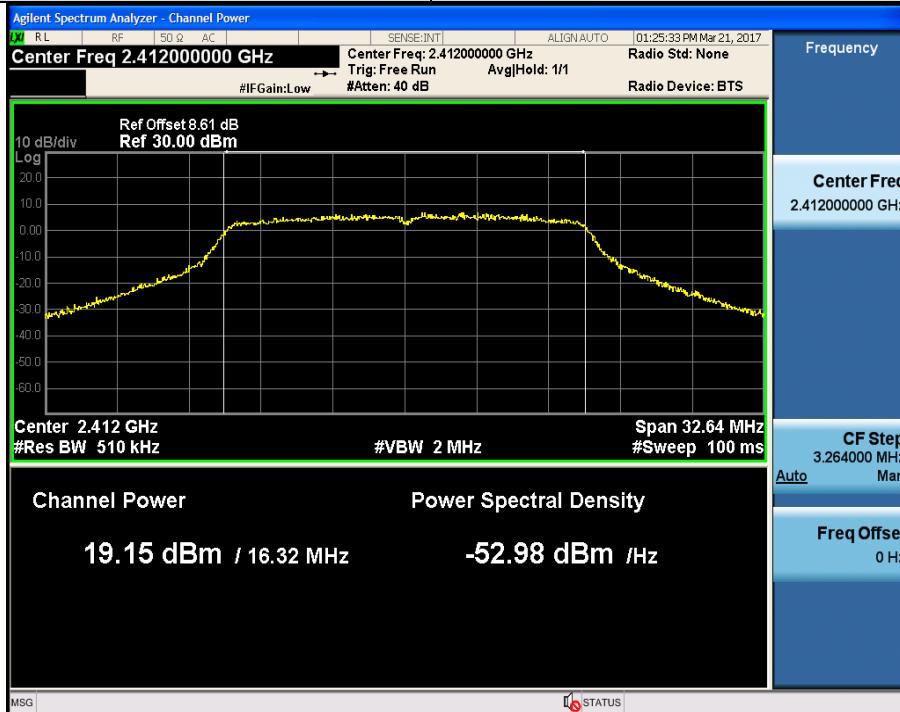
802.11 b

Channel: 2462



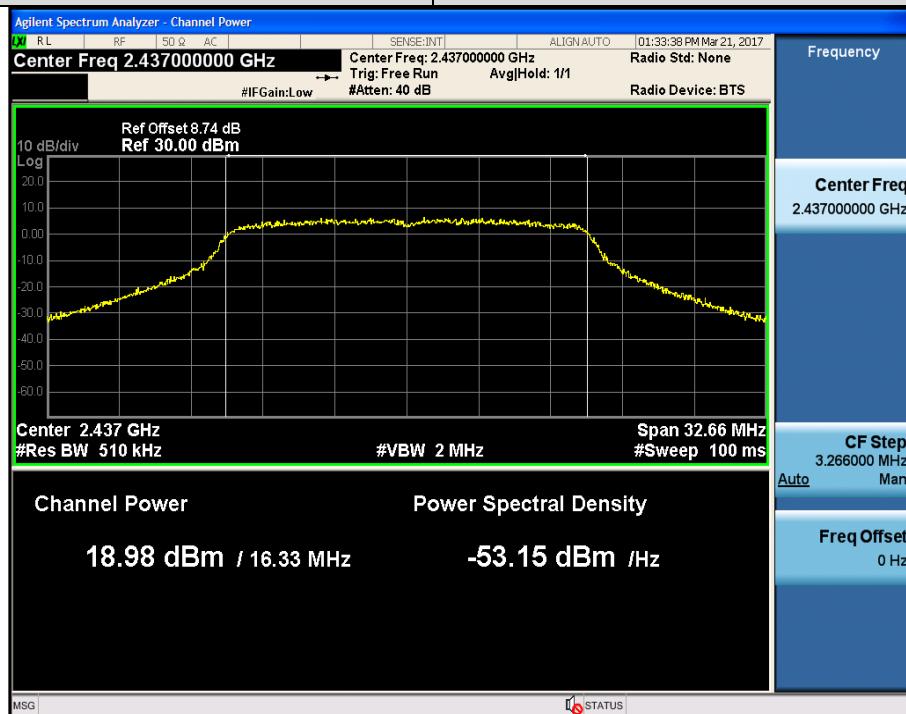
802.11 g

Channel: 2412



802.11 g

Channel: 2437



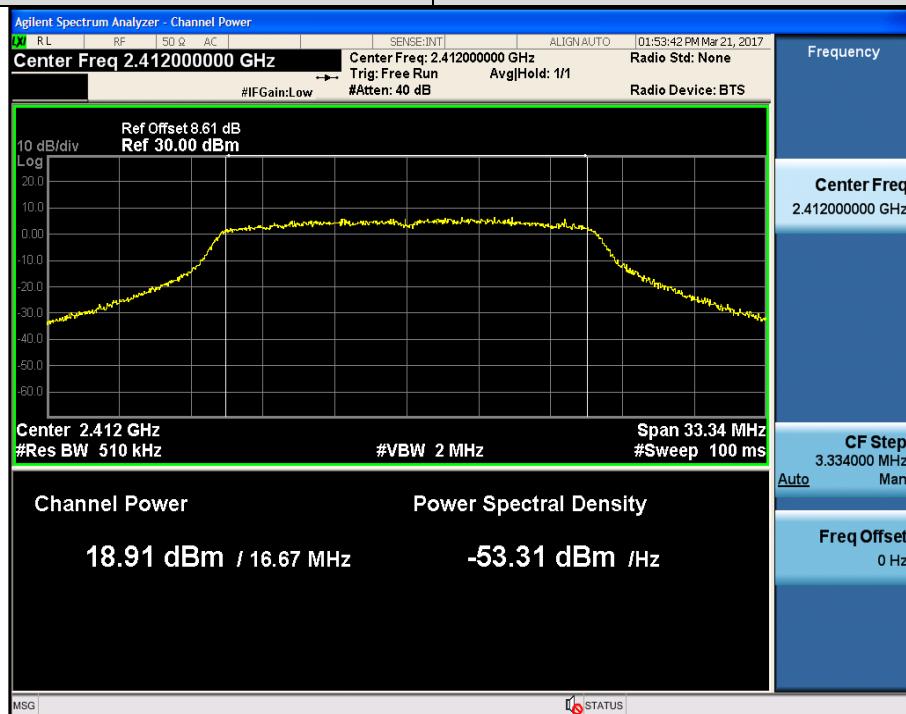
802.11 g

Channel: 2462



802.11 n (HT20)

Channel: 2412



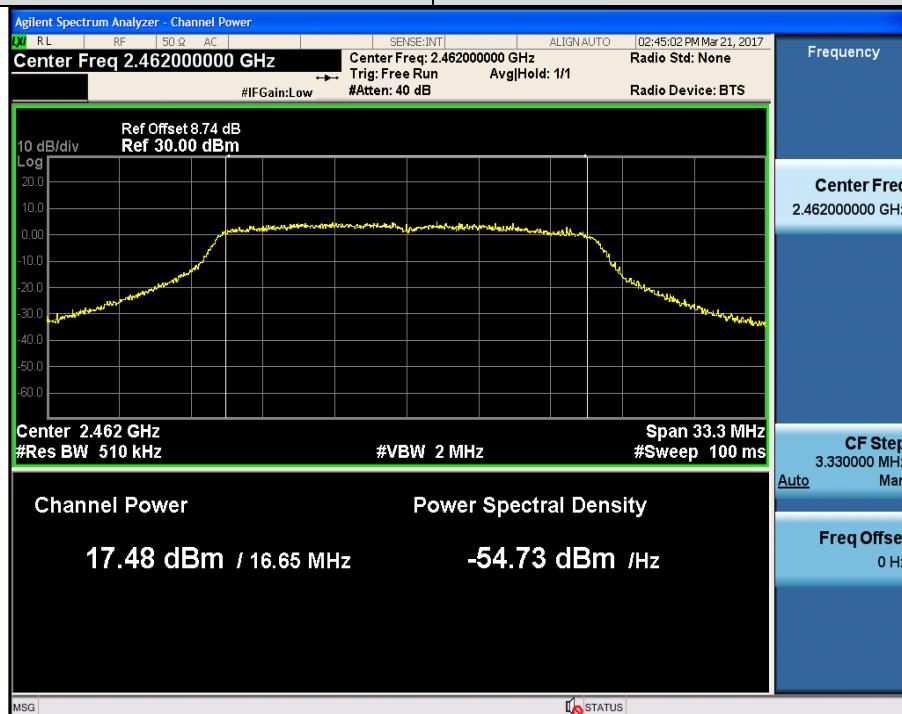
802.11 n (HT20)

Channel: 2437



802.11 n (HT20)

Channel: 2462



802.11 n (HT40)

Channel: 2422



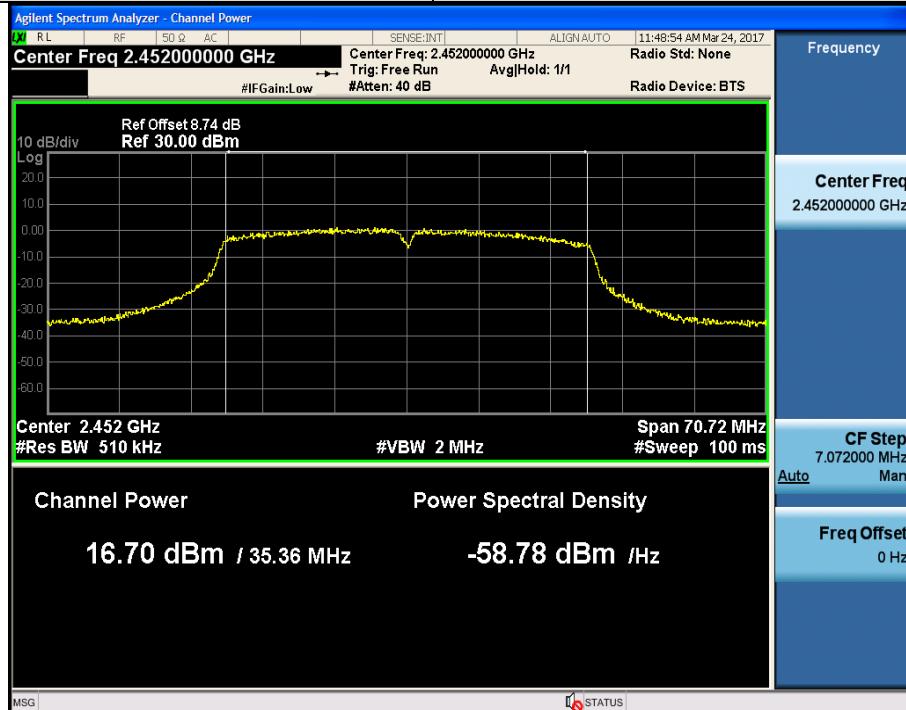
802.11 n (HT40)

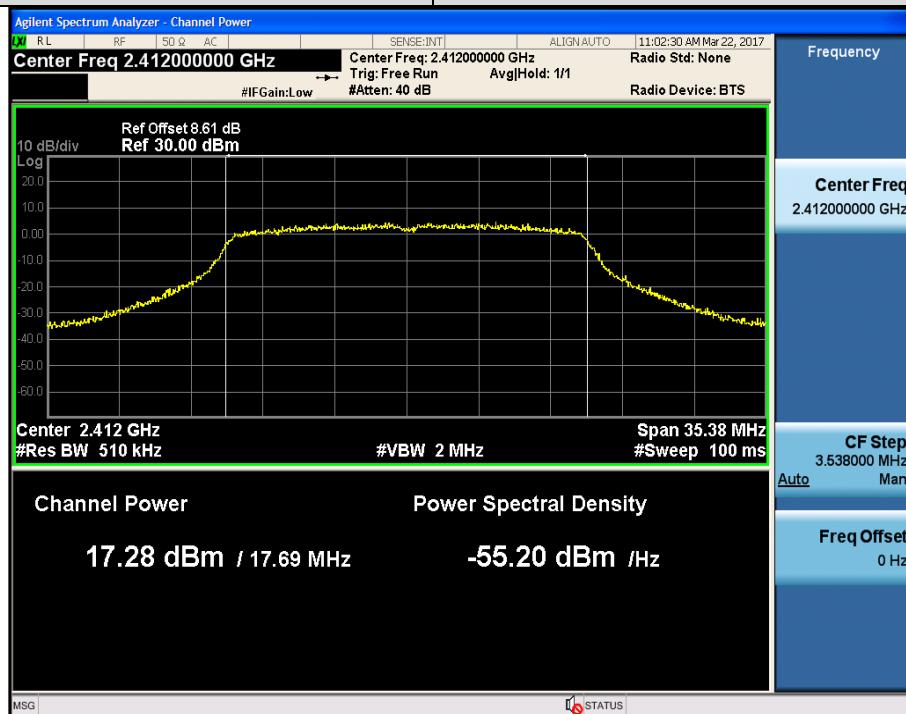
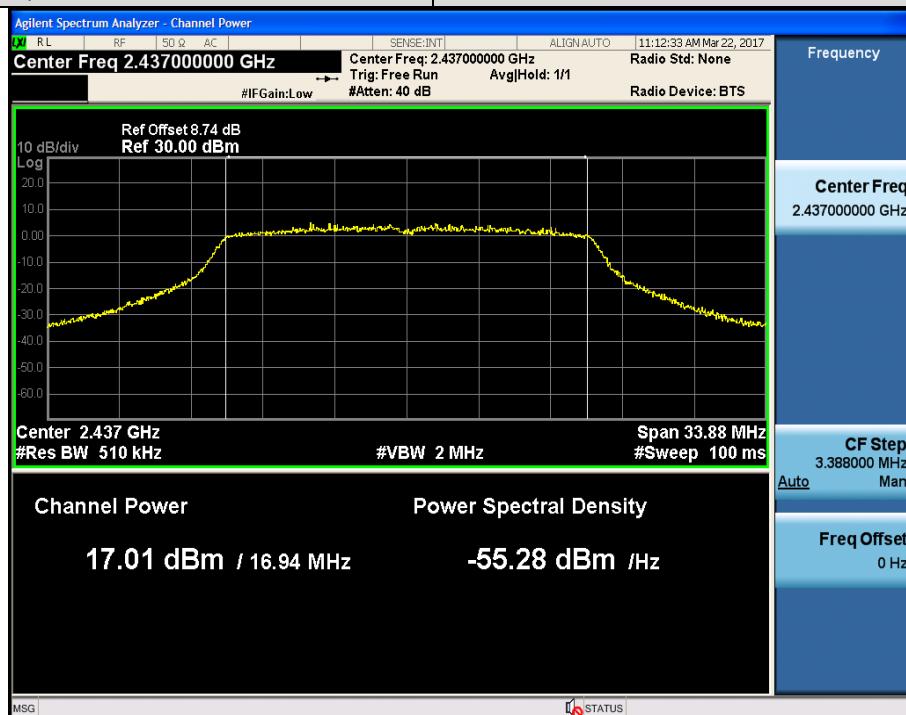
Channel: 2437



802.11 n (HT40)

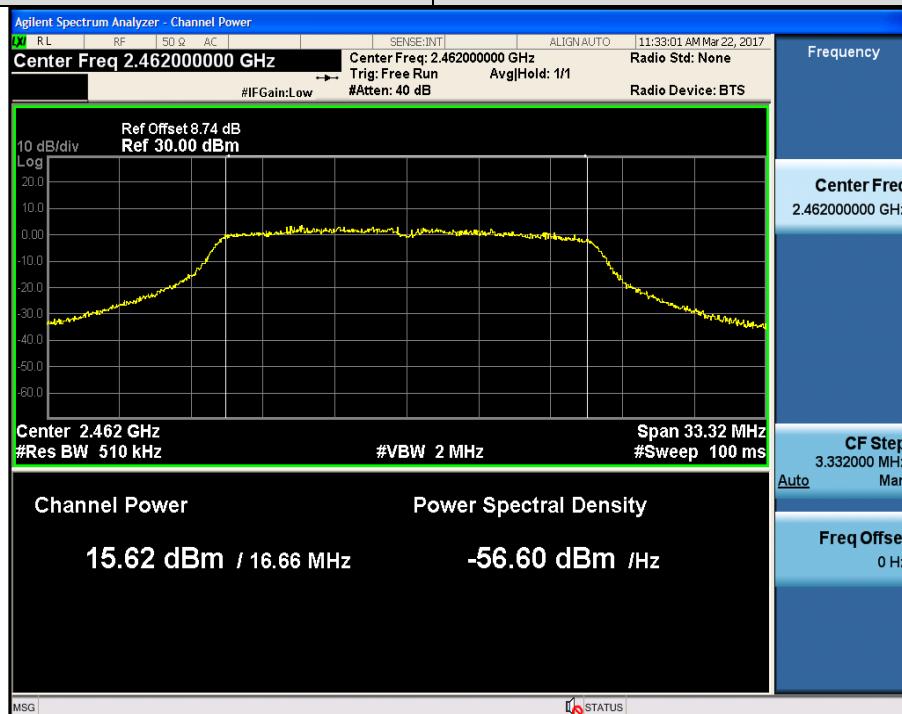
Channel: 2452



MIMO:
802.11 n (HT20)
Channel: 2412

802.11 n (HT20)
Channel: 2437


802.11 n (HT20)

Channel: 2462



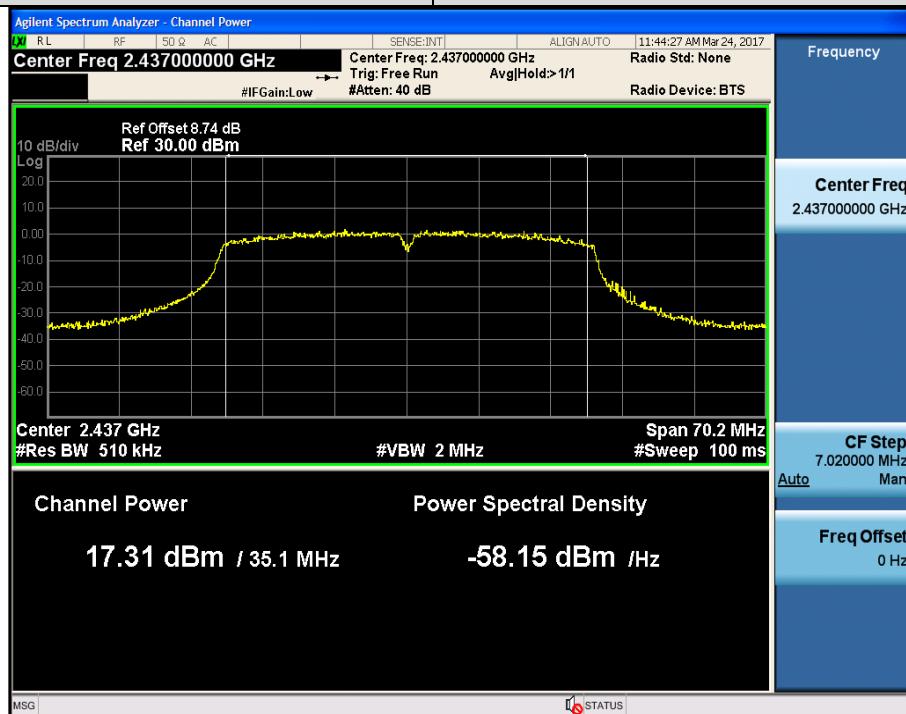
802.11 n (HT40)

Channel: 2422



802.11 n (HT40)

Channel: 2437



802.11 n (HT40)

Channel: 2452



Antenna B:

802.11 b	Channel: 2412
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802.11 b	Channel: 2437
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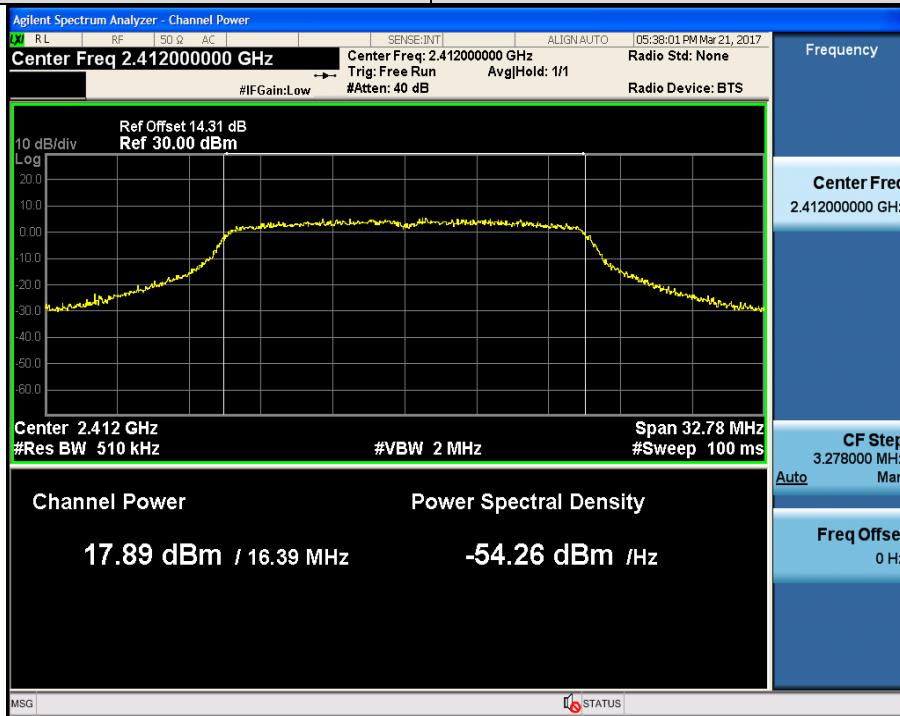
802.11 b

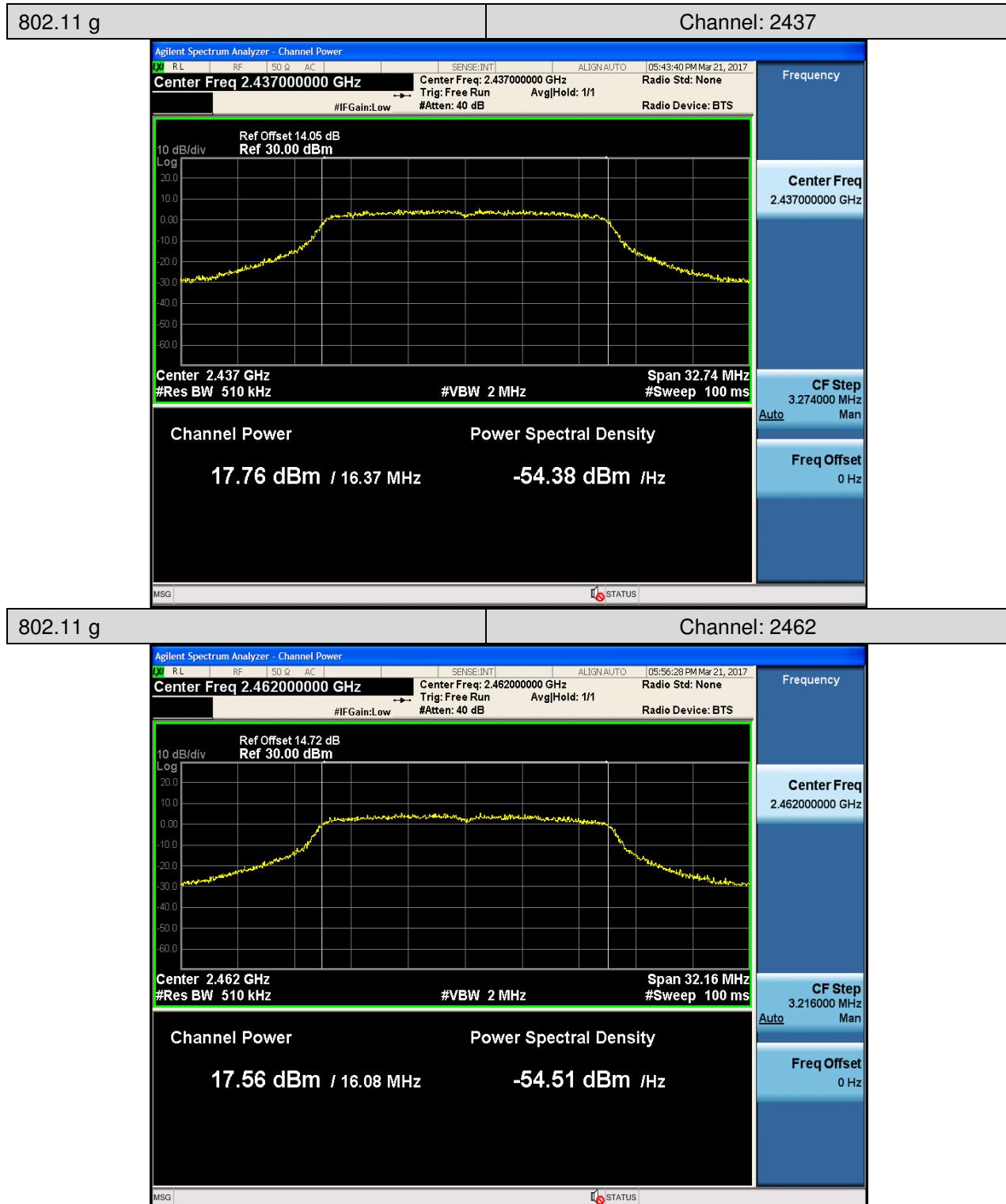
Channel: 2462



802.11 g

Channel: 2412





802.11 n (HT20)

Channel: 2412



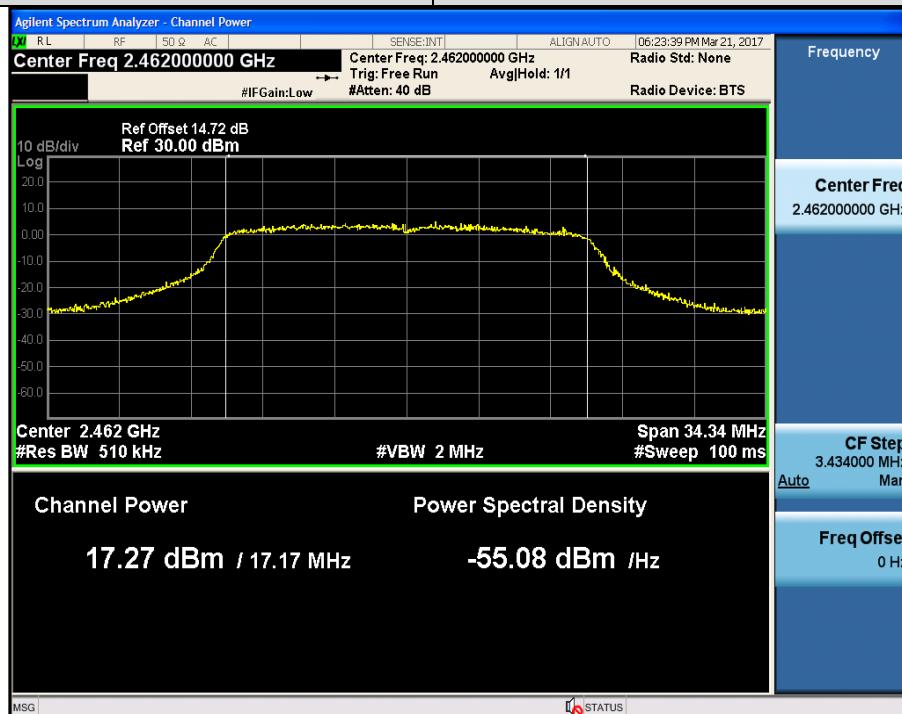
802.11 n (HT20)

Channel: 2437



802.11 n (HT20)

Channel: 2462



802.11 n (HT40)

Channel: 2422



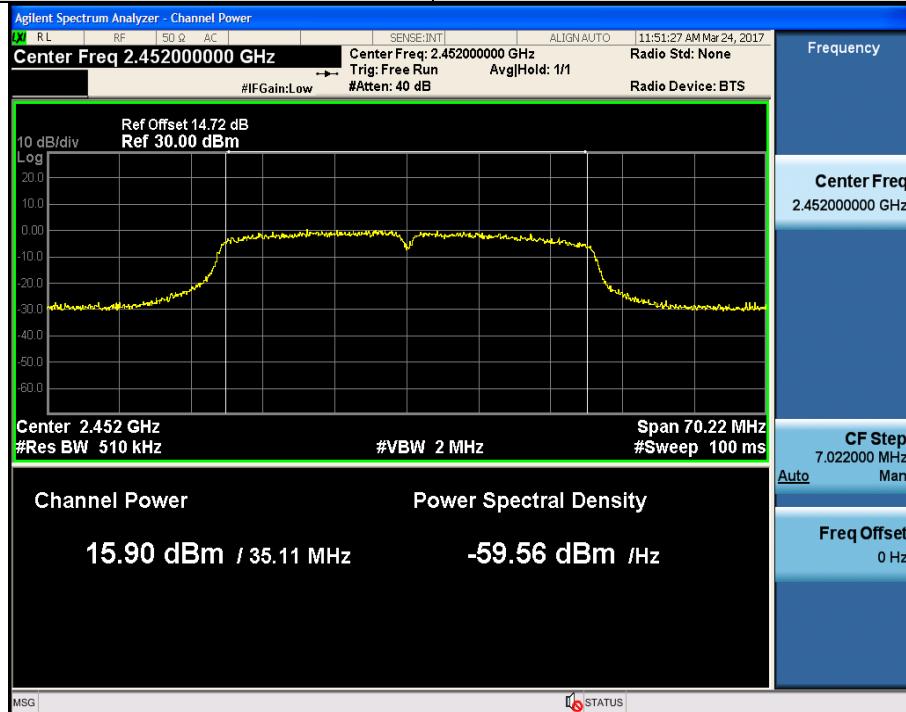
802.11 n (HT40)

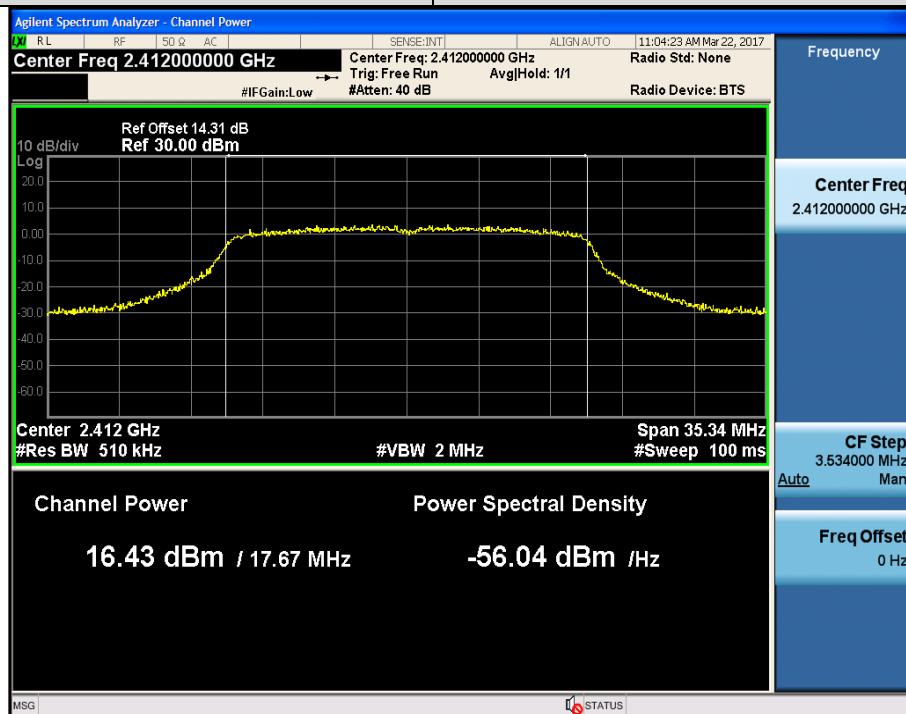
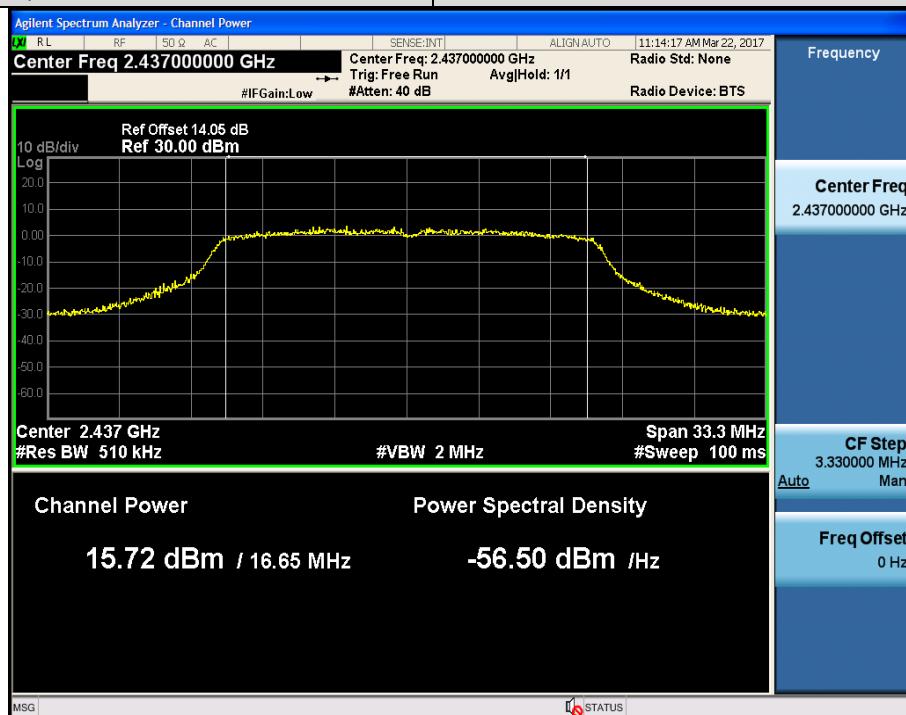
Channel: 2437



802.11 n (HT40)

Channel: 2452



MIMO:
802.11 n (HT20)
Channel: 2412

802.11 n (HT20)
Channel: 2437


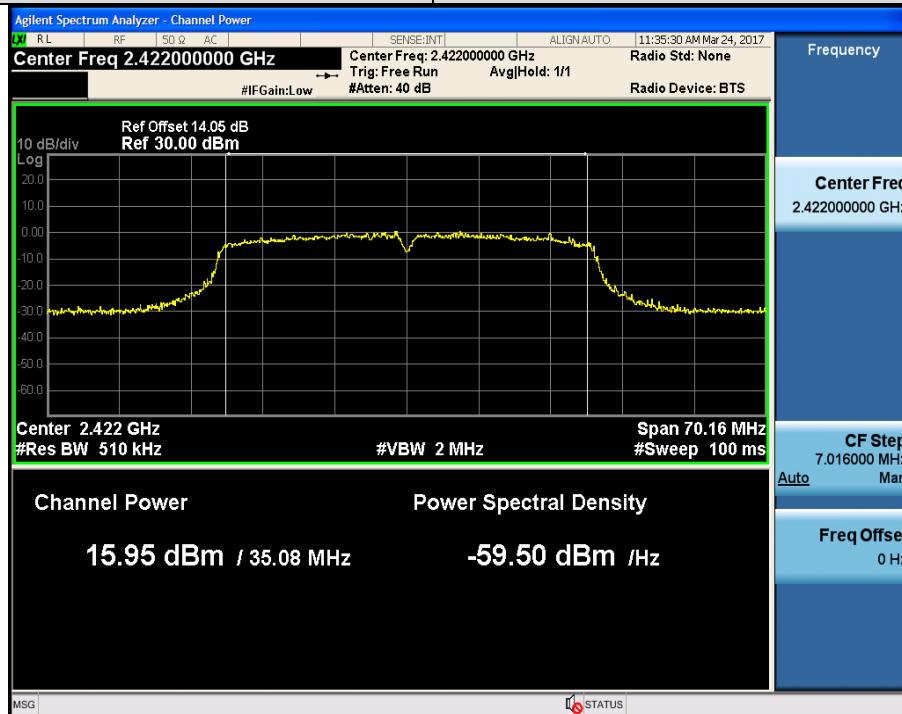
802.11 n (HT20)

Channel: 2462



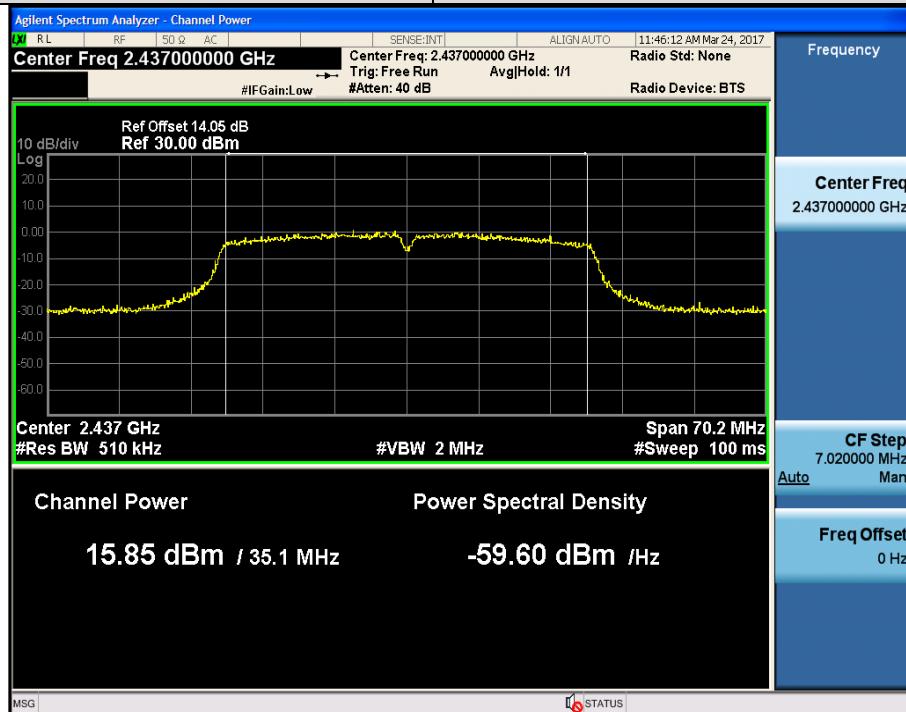
802.11 n (HT40)

Channel: 2422



802.11 n (HT40)

Channel: 2437



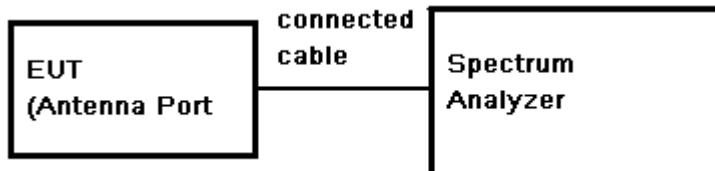
802.11 n (HT40)

Channel: 2452



7.6 Peak Power Spectral Density

Test Configuration:



Test Procedure:

- 1) Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
- 2) Set the spectrum analyzer: Center Frequency= Channel Frequency, RBW = 3 kHz VBW = 10 kHz. Span= 1.5 times the DTS bandwidth, Sweep = auto; Detector = Peak; Trace mode=max hold, Trace=Max hold.
- 3) Use the peak marker function to determine the maximum amplitude level within the RBW.
- 4) Record the marker level for the particular mode.
- 5) Repeat these steps for other channel and modes.

Test Limit: 8dBm/3kHz

Test Result: Pass



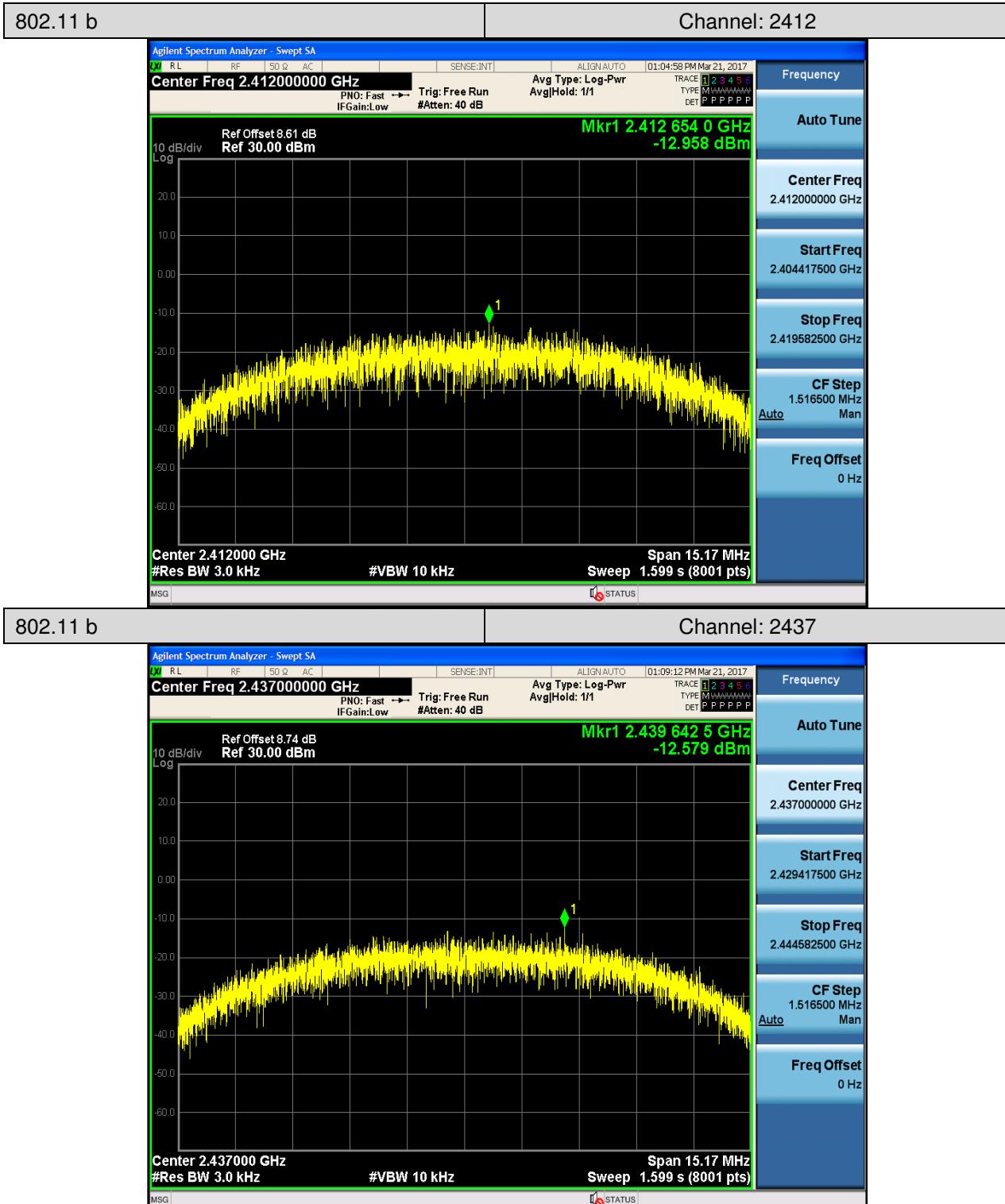
Test Data:

Test Mode	Channel	Antenna A PSD[dBm/3kHz]	Antenna B PSD[dBm/3KHz]	MIMO PSD[dBm/3KHz]	Limit[dBm/3KHz]	Verdict
11B	2412	-12.958	-13.777	N/A	8.00	PASS
11B	2437	-12.579	-14.272	N/A	8.00	PASS
11B	2462	-14.391	-14.212	N/A	8.00	PASS
11G	2412	-13.767	-16.794	N/A	8.00	PASS
11G	2437	-14.008	-16.242	N/A	8.00	PASS
11G	2462	-15.749	-16.287	N/A	8.00	PASS
11N20SISO	2412	-15.186	-16.352	N/A	8.00	PASS
11N20SISO	2437	-14.751	-17.225	N/A	8.00	PASS
11N20SISO	2462	-15.914	-17.655	N/A	8.00	PASS
11N40SISO	2422	-17.916	-21.224	N/A	8.00	PASS
11N40SISO	2437	-19.547	-20.797	N/A	8.00	PASS
11N40SISO	2452	-19.502	-19.696	N/A	8.00	PASS
11N20MIMO	2412	-16.312	-16.355	-13.32	5.00*	PASS
11N20MIMO	2437	-15.68	-16.404	-13.02	5.00*	PASS
11N20MIMO	2462	-17.552	-18.751	-15.10	5.00*	PASS
11N40MIMO	2422	-18.336	-18.503	-15.41	5.00*	PASS
11N40MIMO	2437	-19.236	-18.937	-16.07	5.00*	PASS
11N40MIMO	2452	-19.25	-18.254	-15.71	5.00*	PASS

Remark *: Two transmit signals are correlated with each other, Directional gain = $6 + 10 \log (2)$ dBi=9dBi, which is 3 dB exceeds 6 dBi. Therefore, the limit shall be reduced by 3 dB.

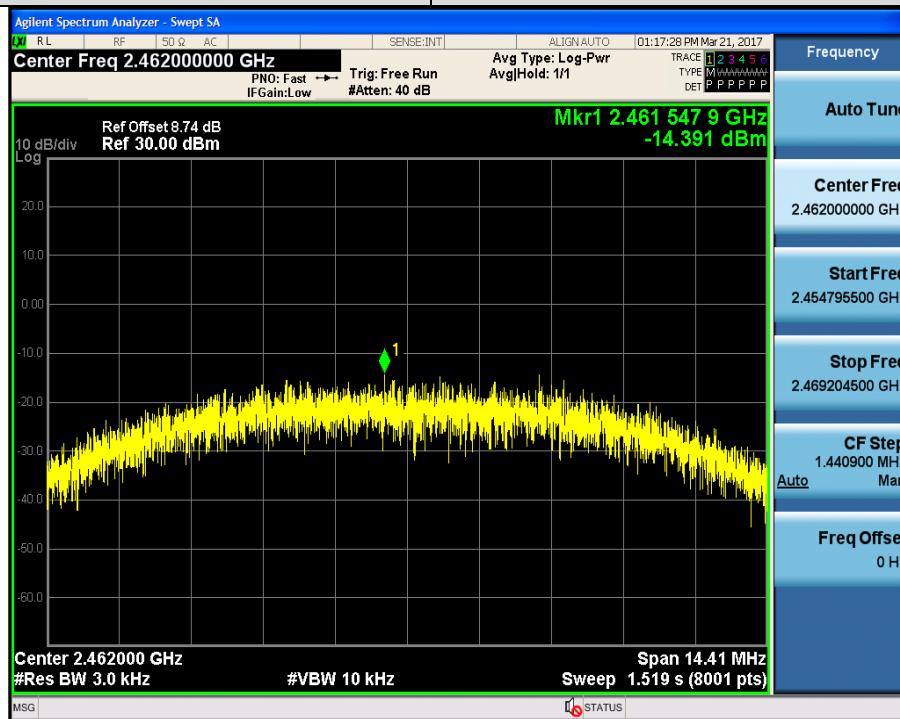
Test plot as follows:

Antenna A



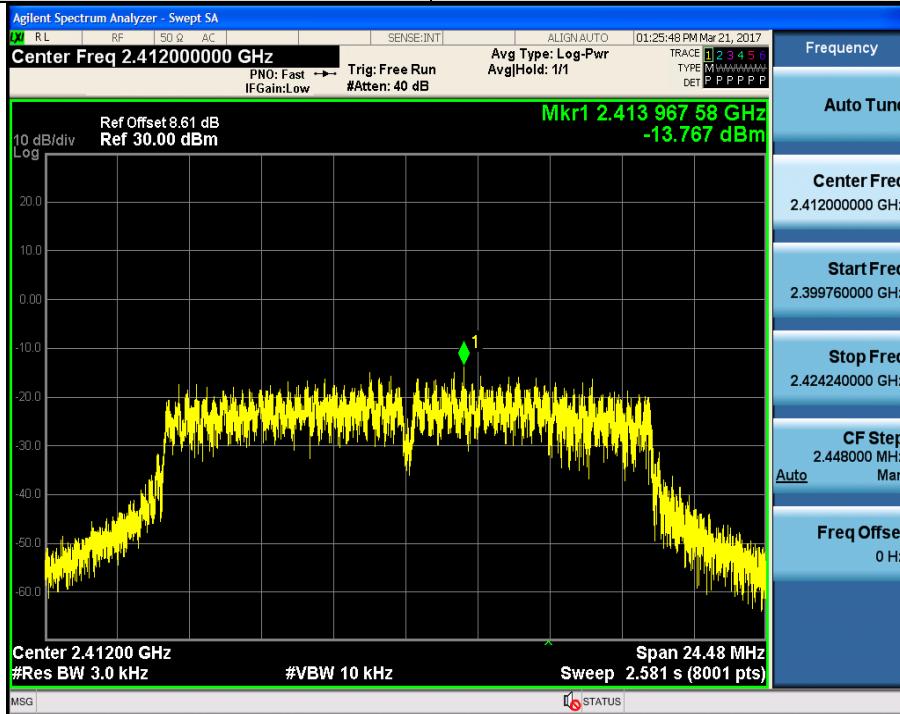
802.11 b

Channel: 2462



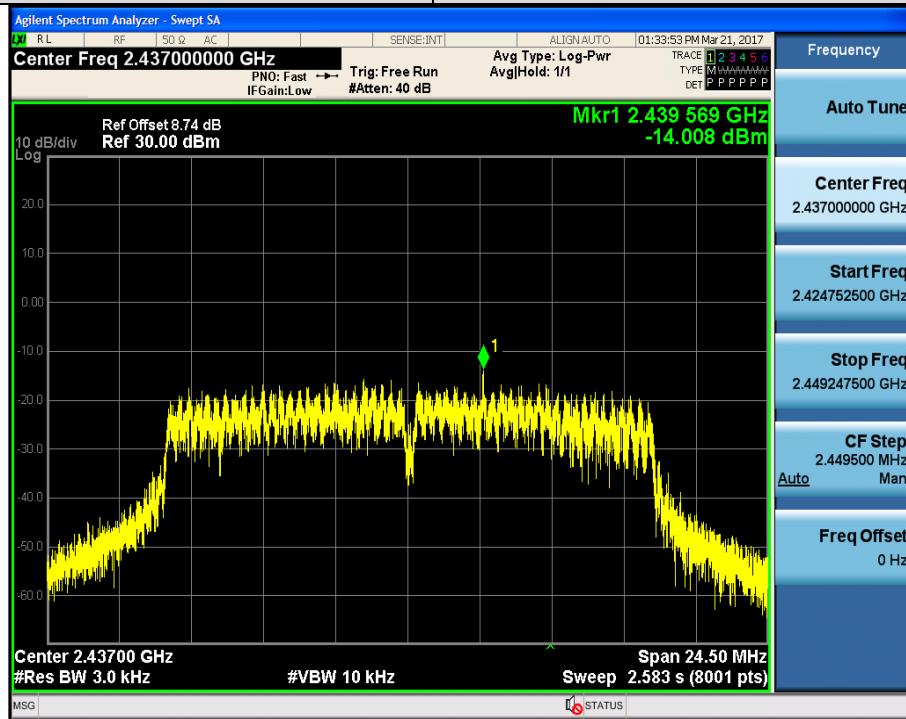
802.11 g

Channel: 2412



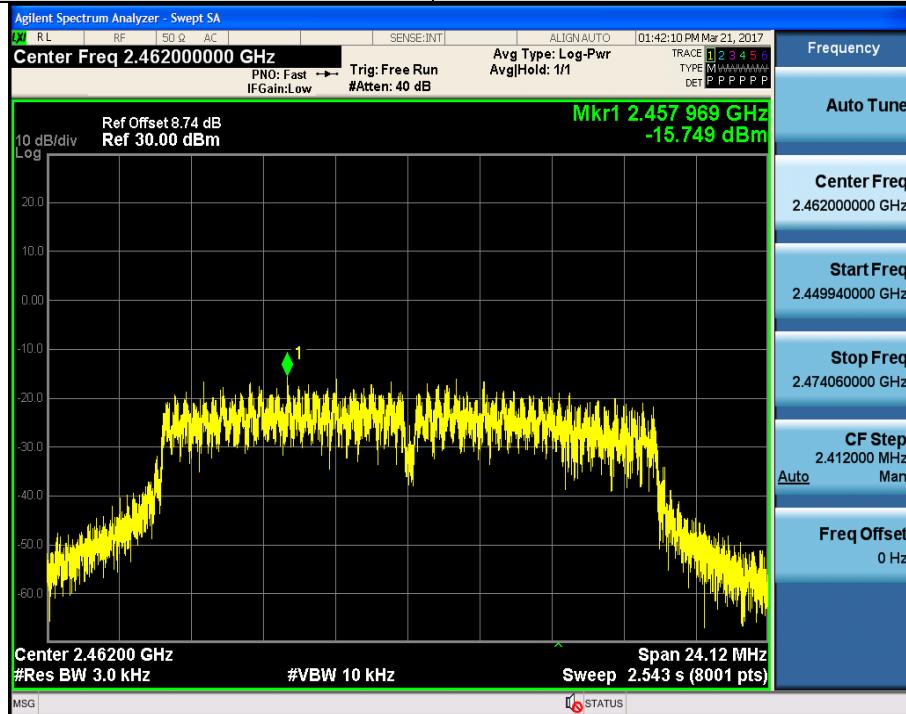
802.11 g

Channel: 2437



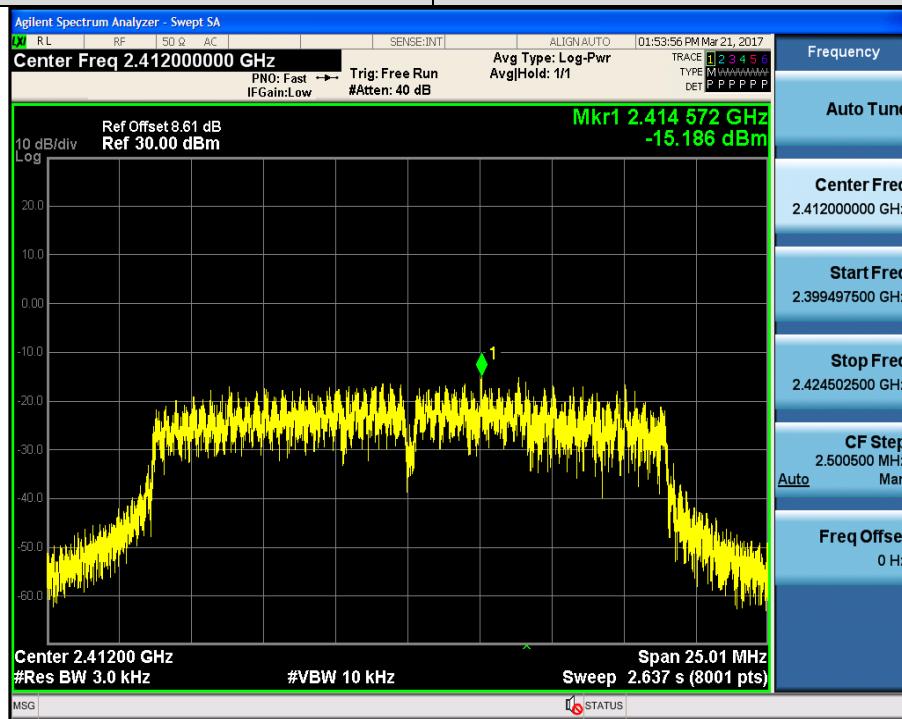
802.11 g

Channel: 2462



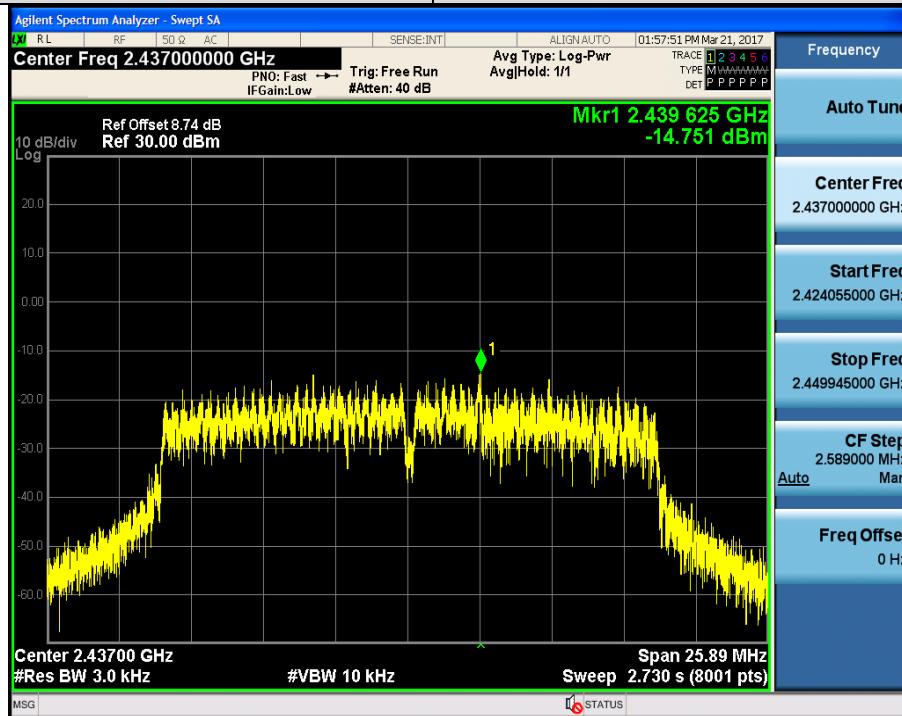
802.11 n (HT20)

Channel: 2412



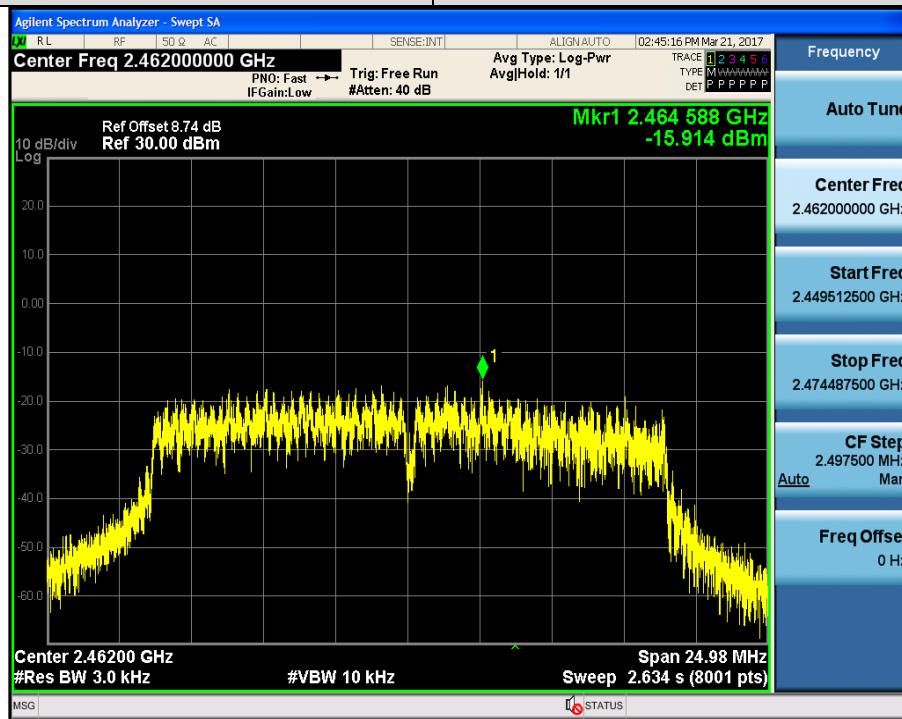
802.11 n (HT20)

Channel: 2437



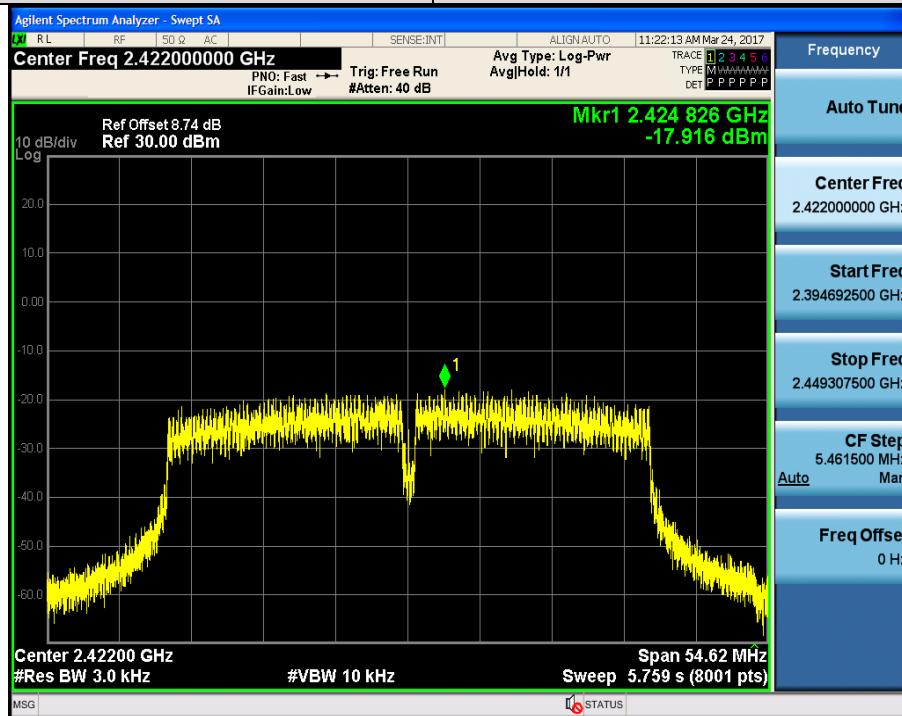
802.11 n (HT20)

Channel: 2462



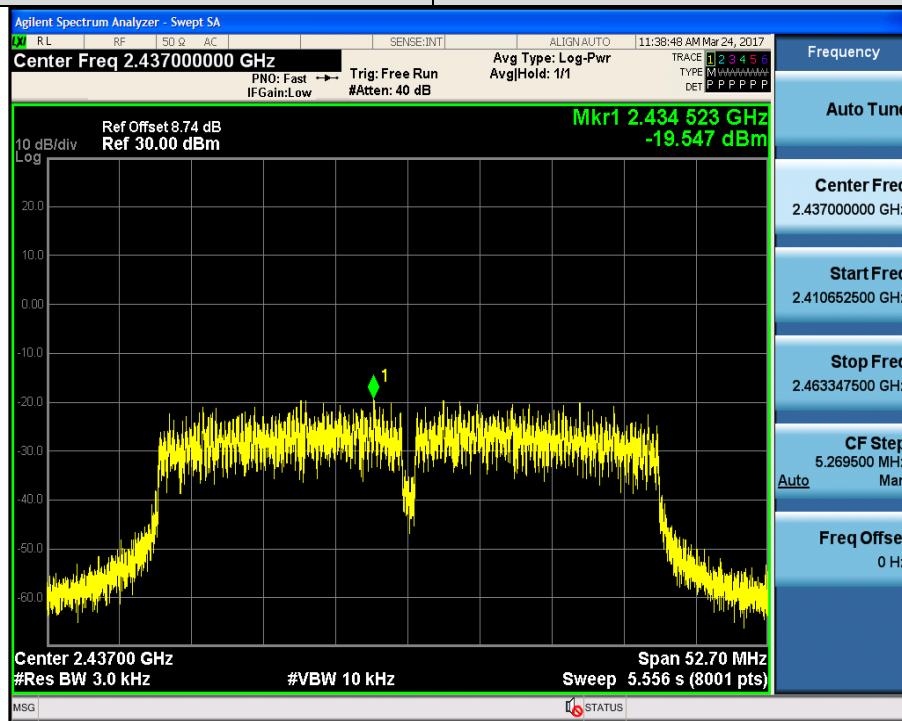
802.11 n (HT40)

Channel: 2422



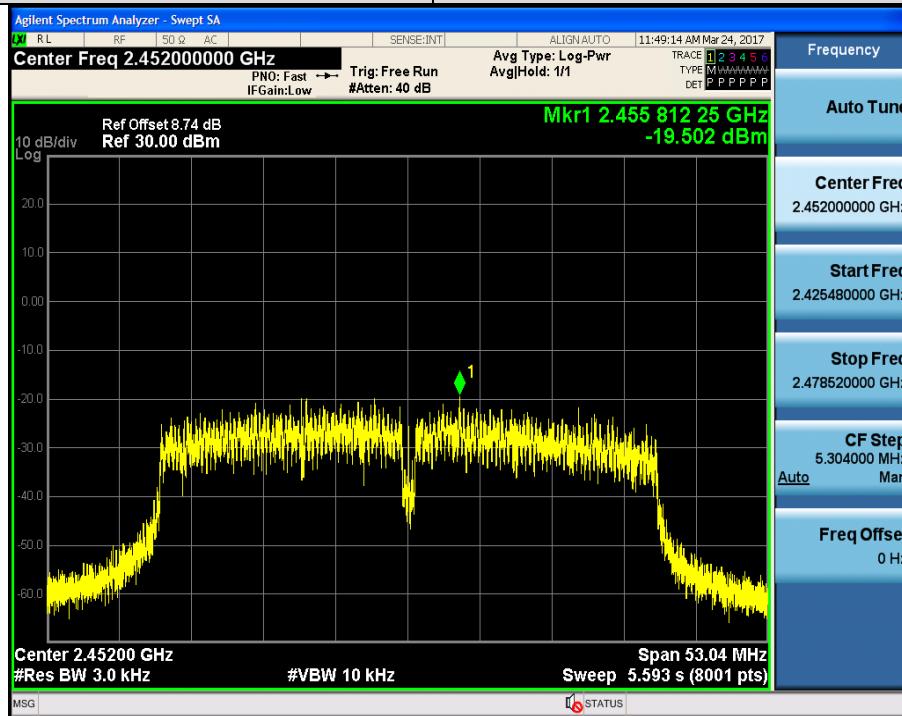
802.11 n (HT40)

Channel: 2437



802.11 n (HT40)

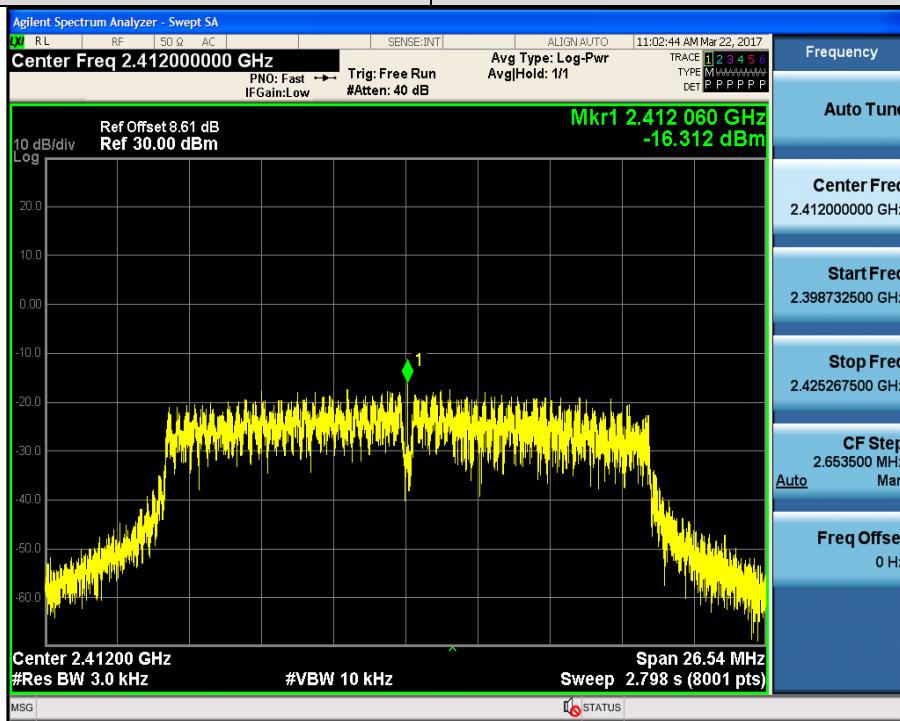
Channel: 2452



MIMO:

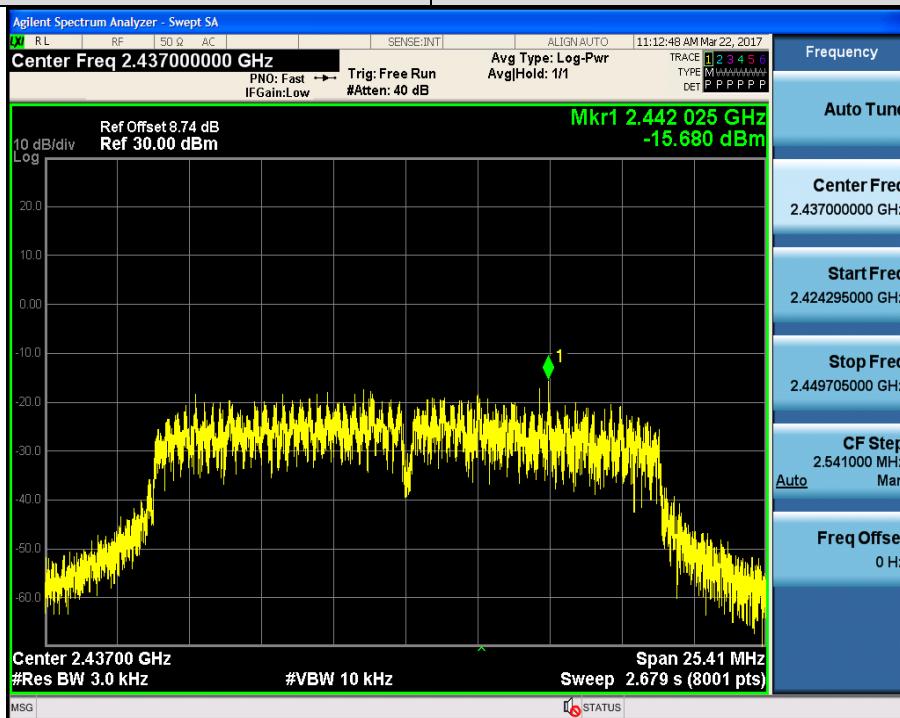
802.11 n (HT20)

Channel: 2412



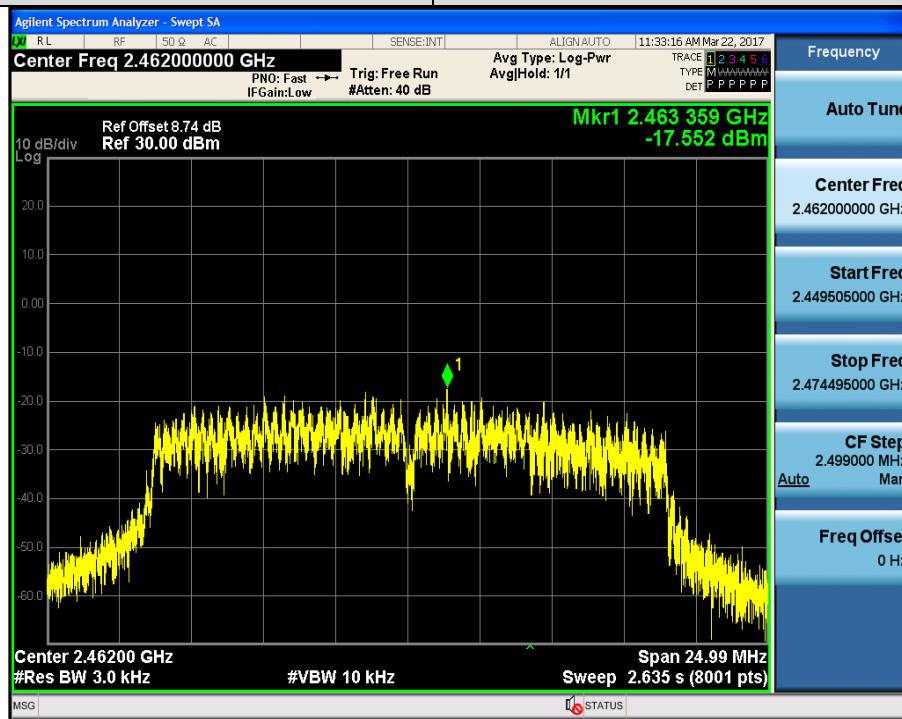
802.11 n (HT20)

Channel: 2437



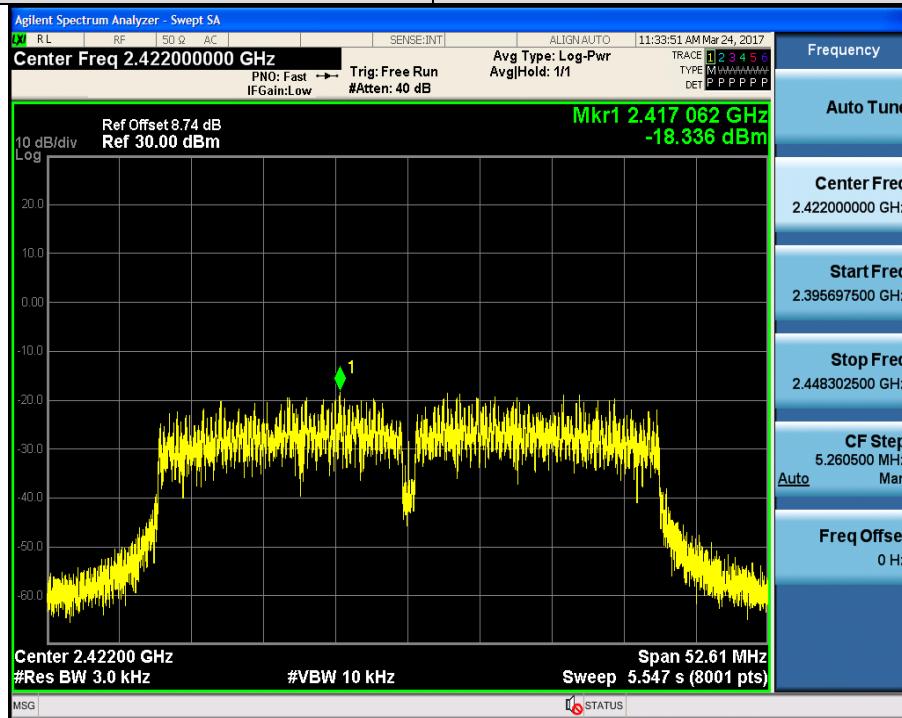
802.11 n (HT20)

Channel: 2462



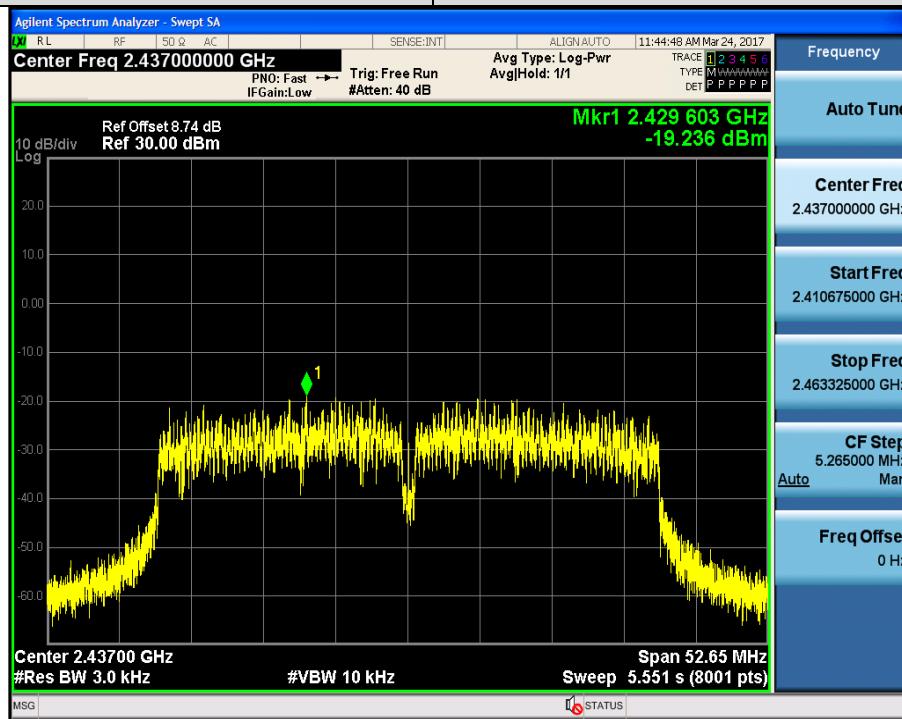
802.11 n (HT40)

Channel: 2422



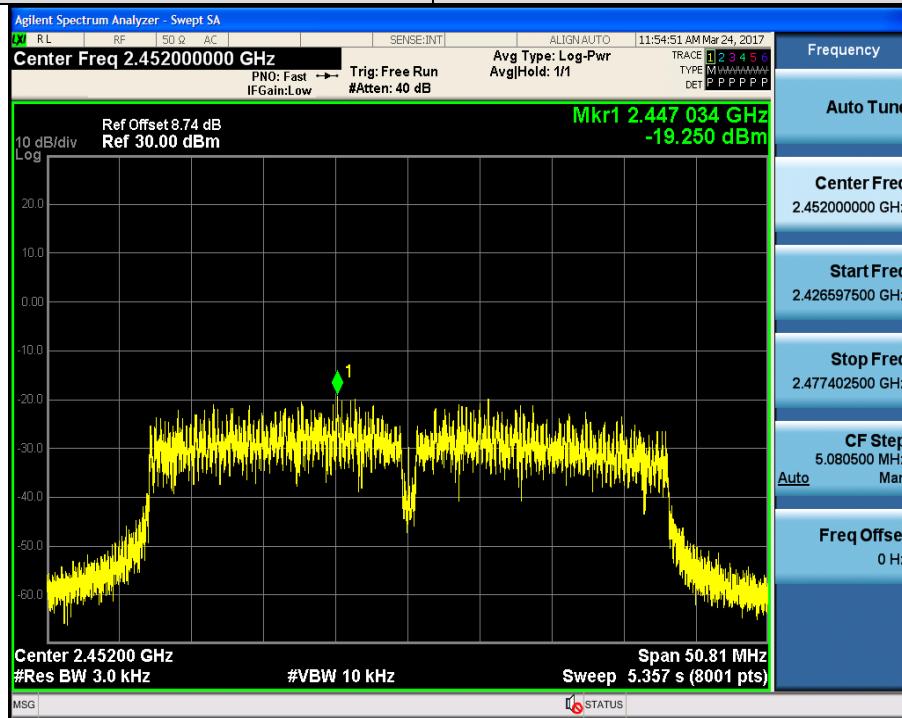
802.11 n (HT40)

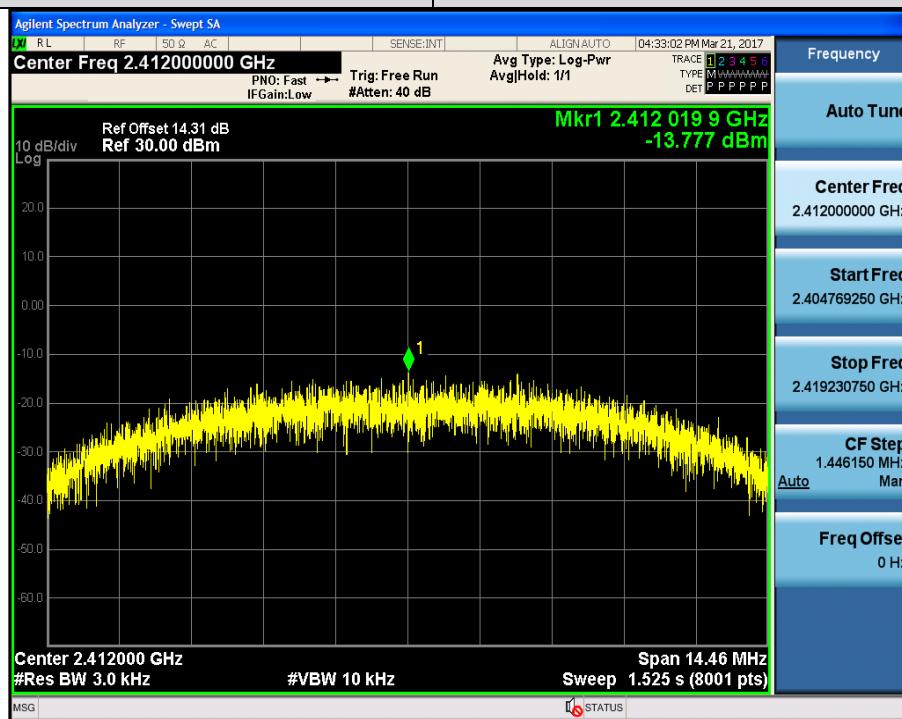
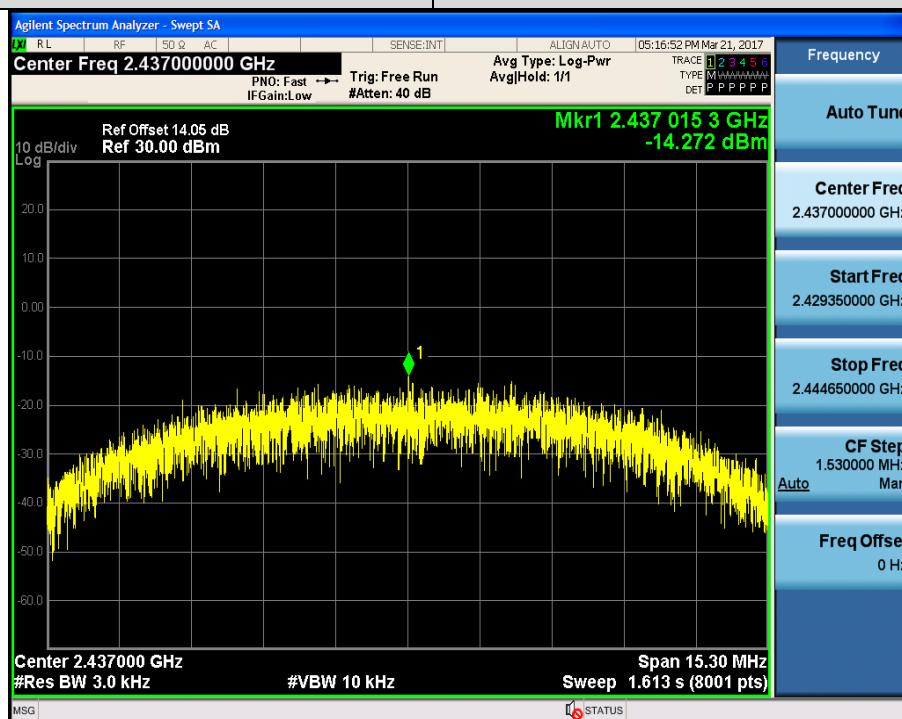
Channel: 2437



802.11 n (HT40)

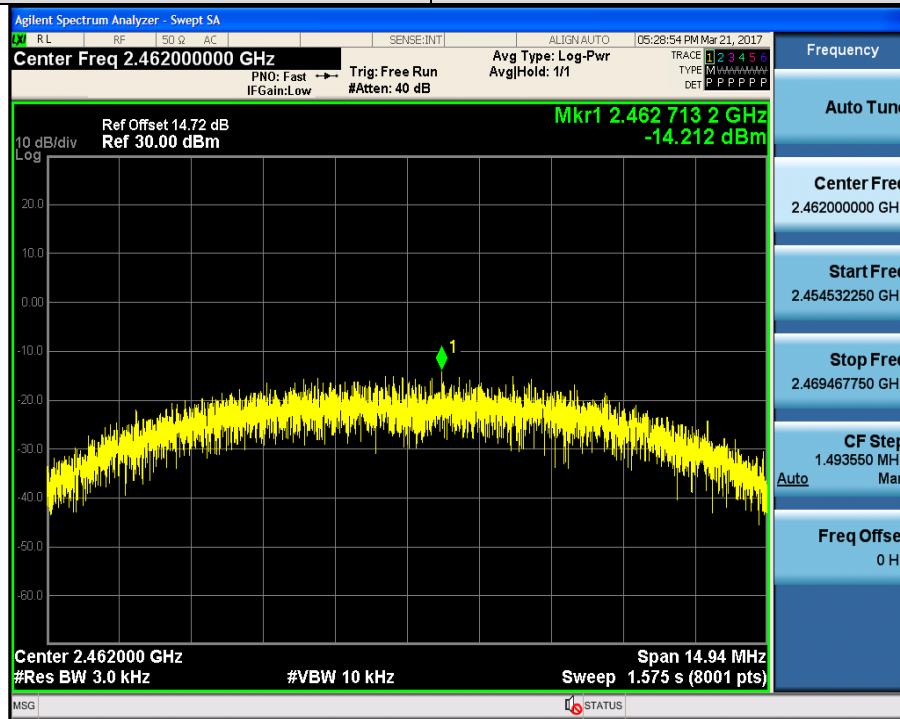
Channel: 2452



Antenna B:
802.11 b
Channel: 2412

802.11 b
Channel: 2437


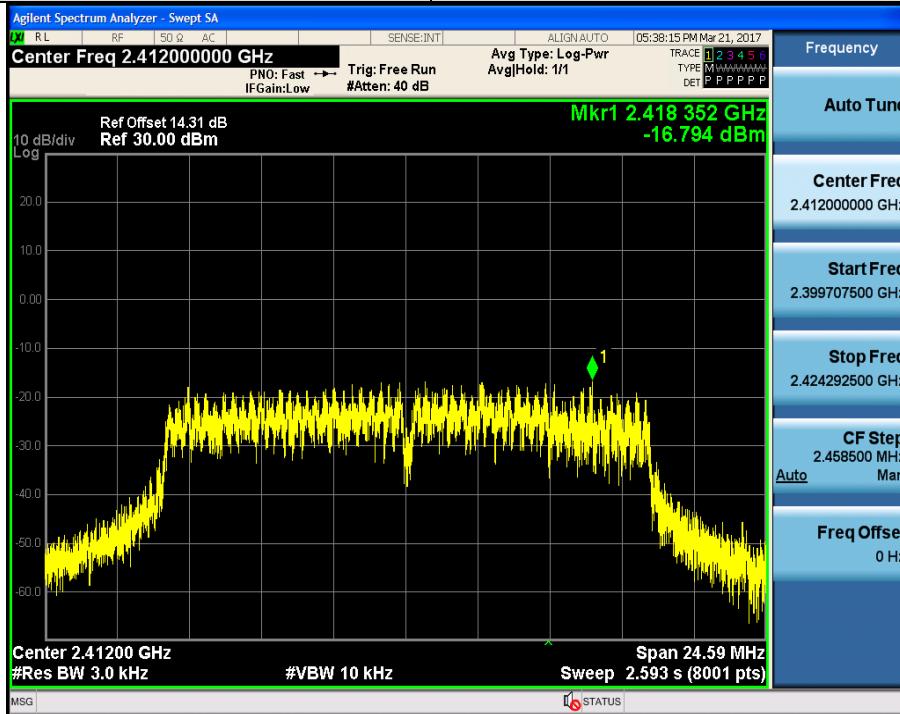
802.11 b

Channel: 2462



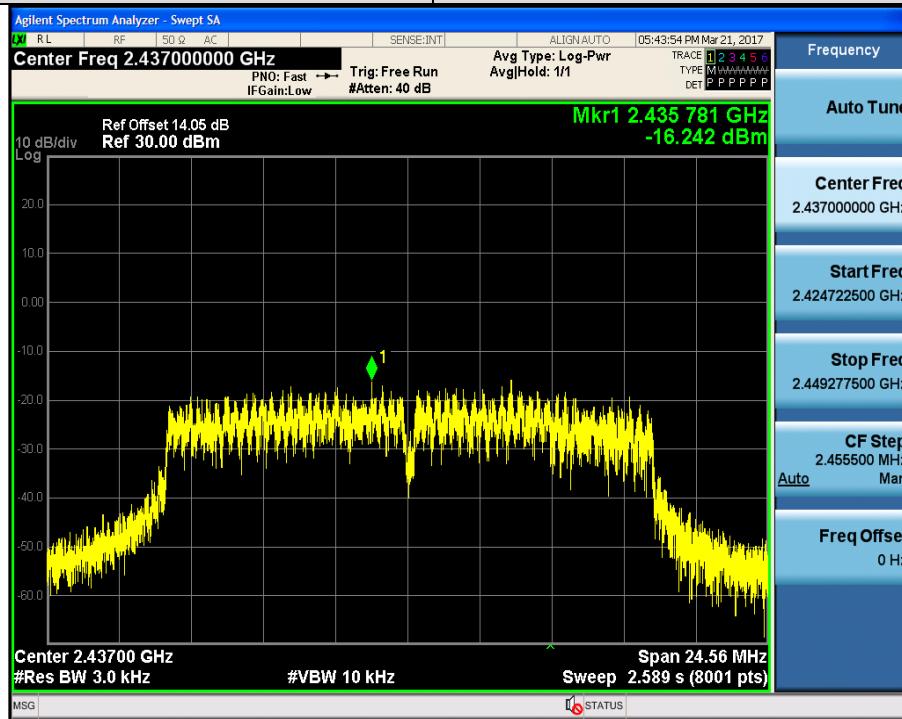
802.11 g

Channel: 2412



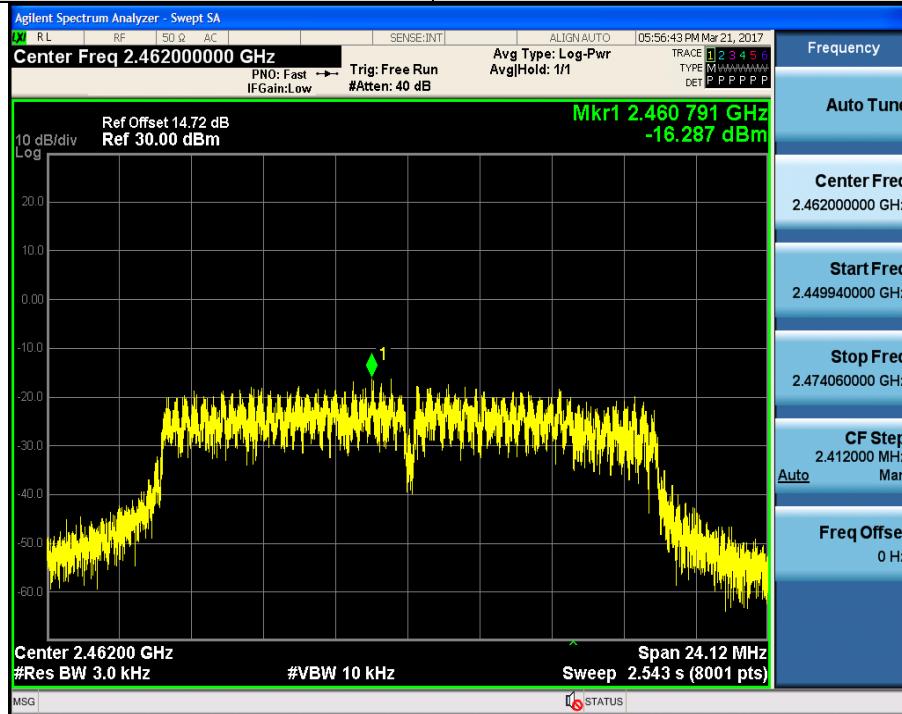
802.11 g

Channel: 2437



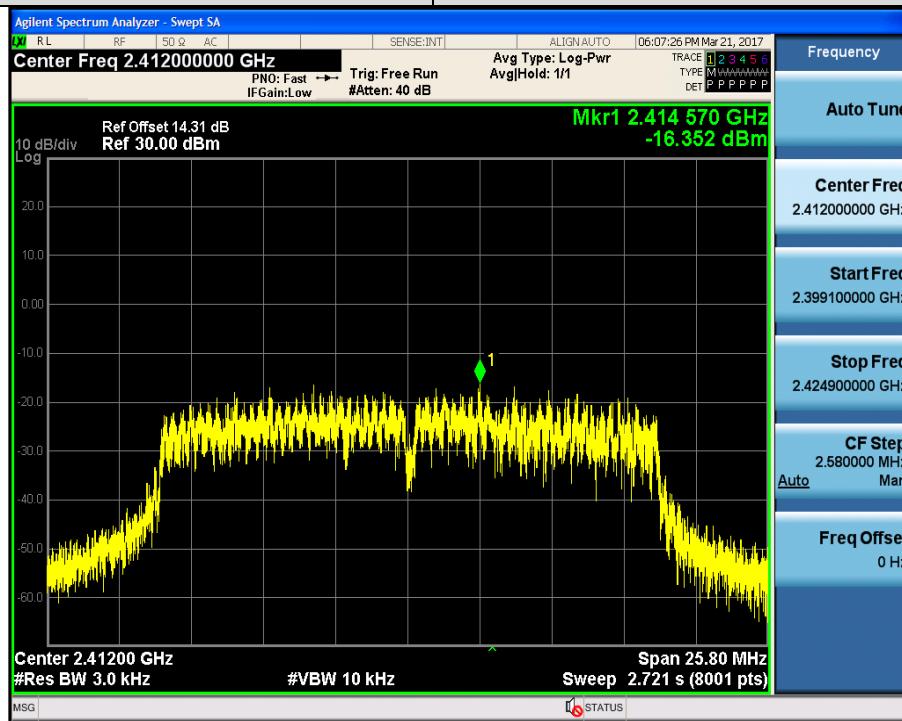
802.11 g

Channel: 2462



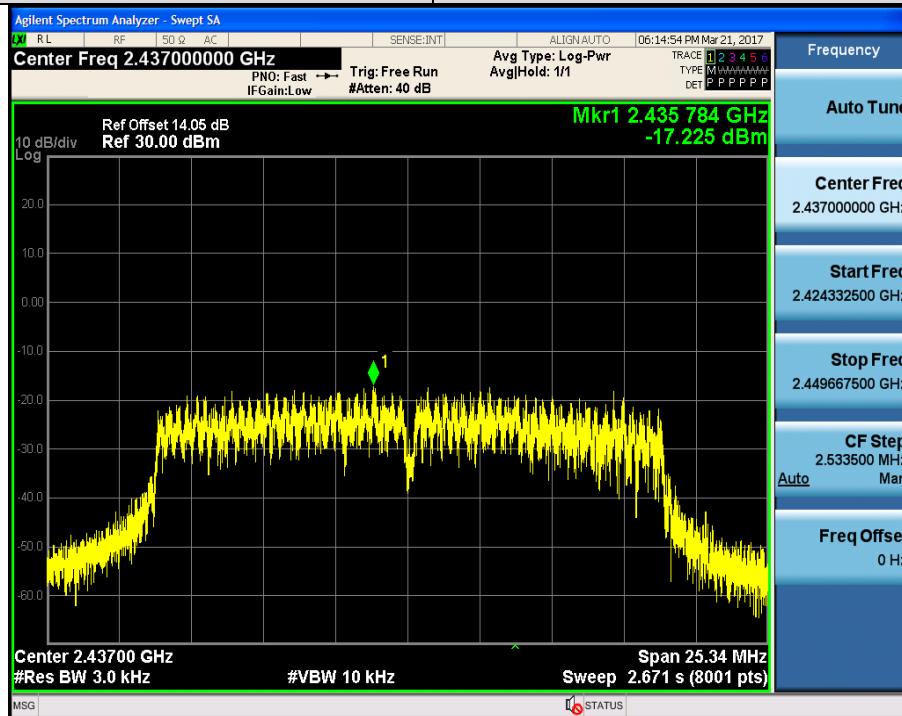
802.11 n (HT20)

Channel: 2412



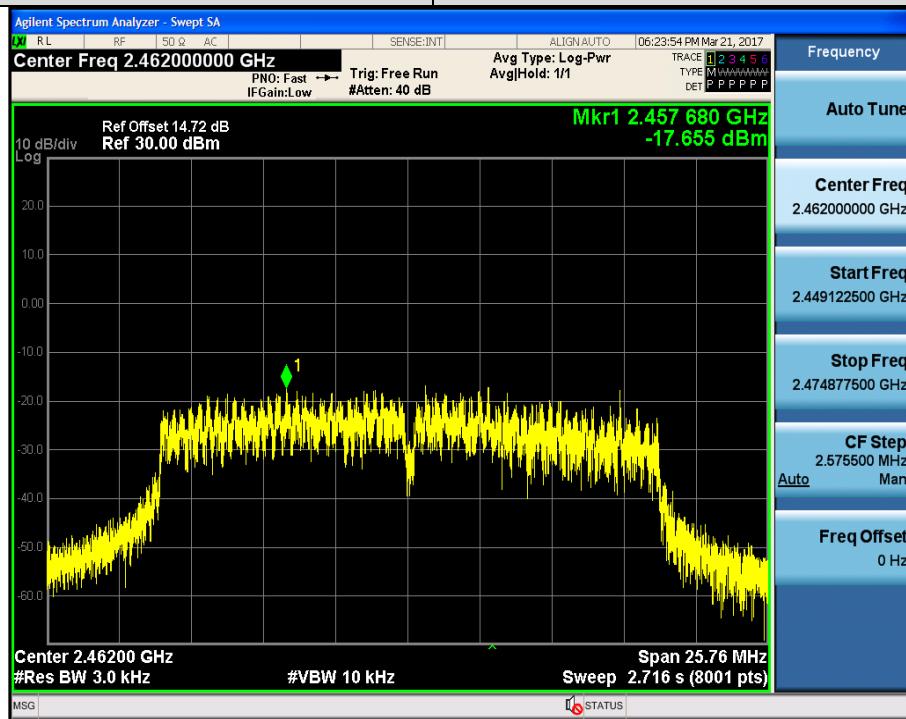
802.11 n (HT20)

Channel: 2437



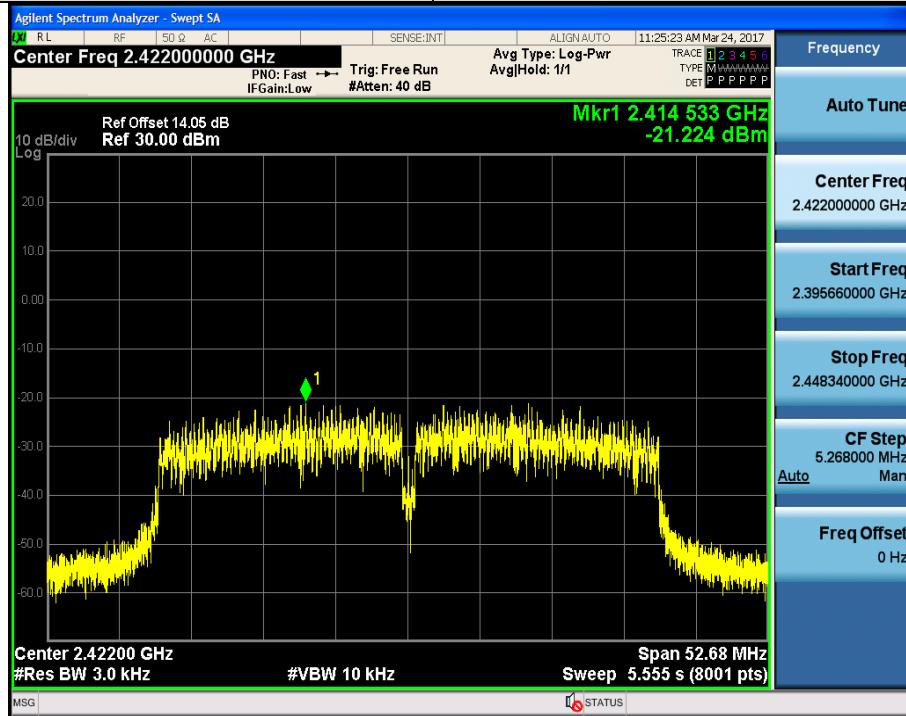
802.11 n (HT20)

Channel: 2462



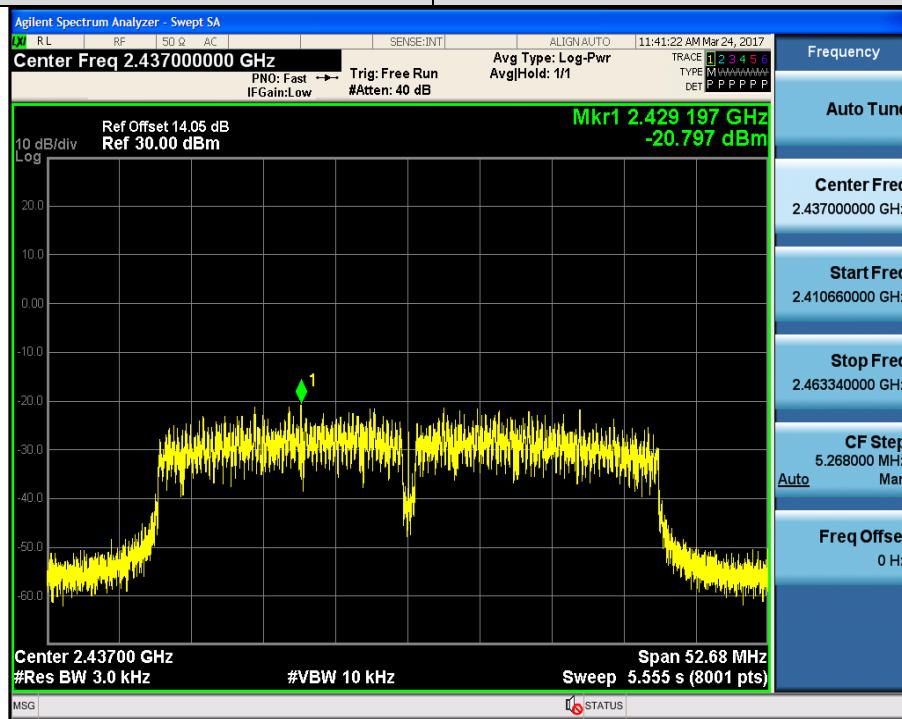
802.11 n (HT40)

Channel: 2422



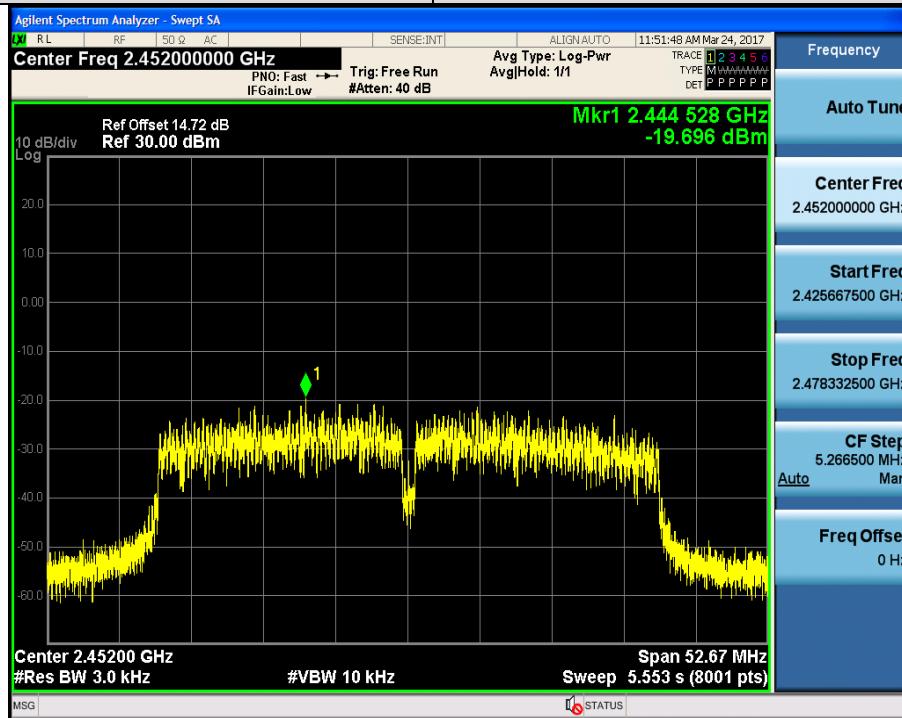
802.11 n (HT40)

Channel: 2437



802.11 n (HT40)

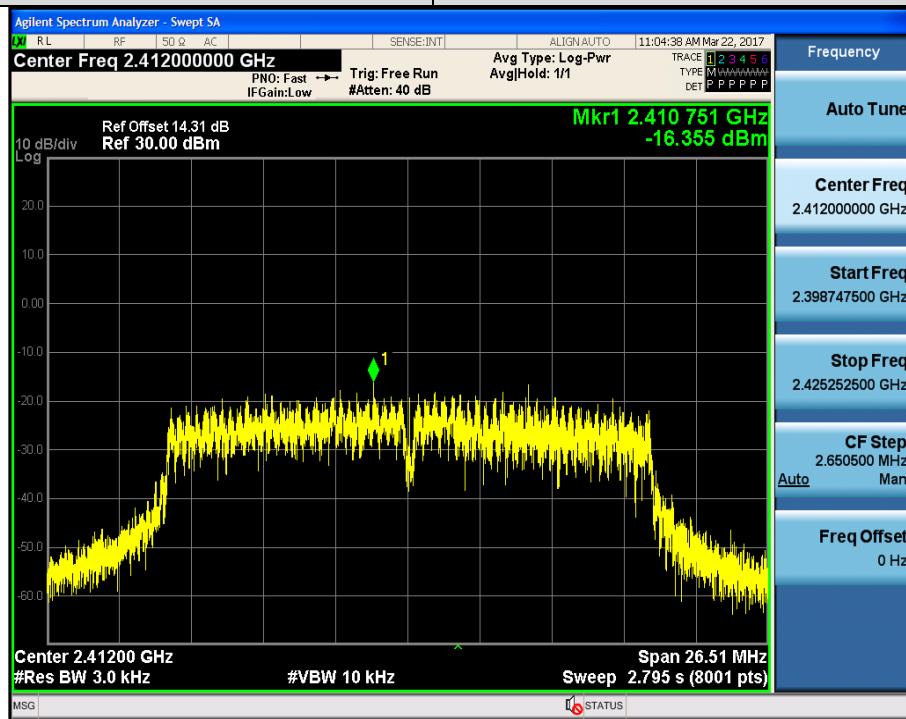
Channel: 2452



MIMO:

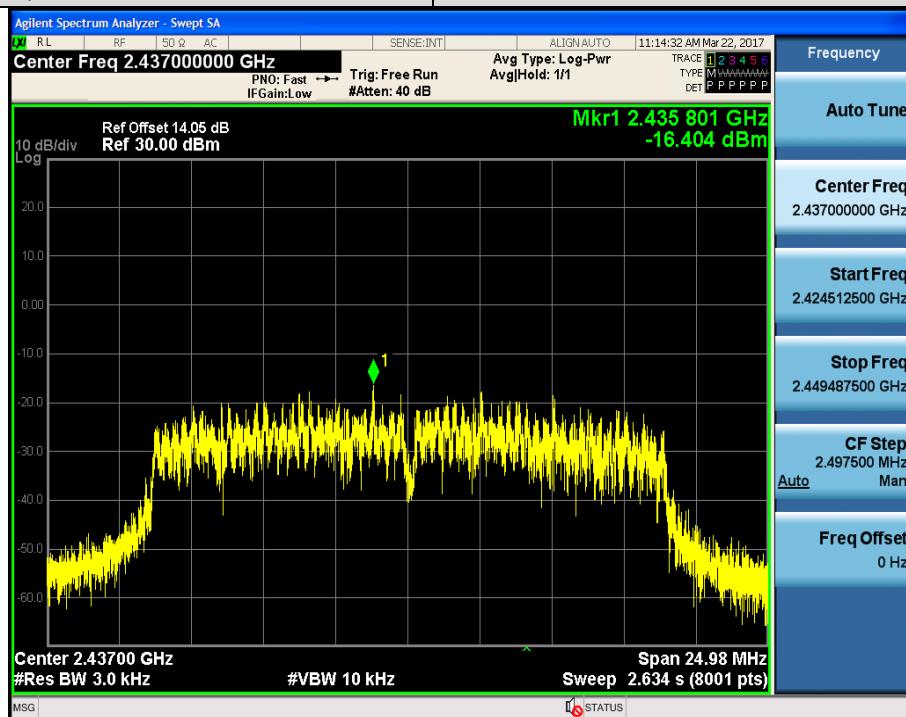
802.11 n (HT20)

Channel: 2412



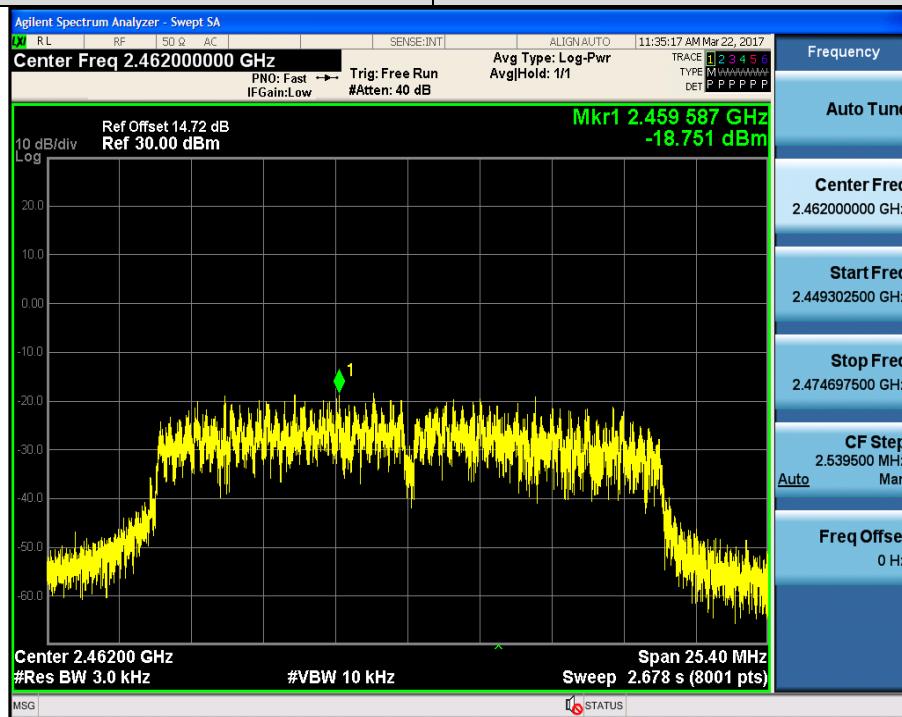
802.11 n (HT20)

Channel: 2437



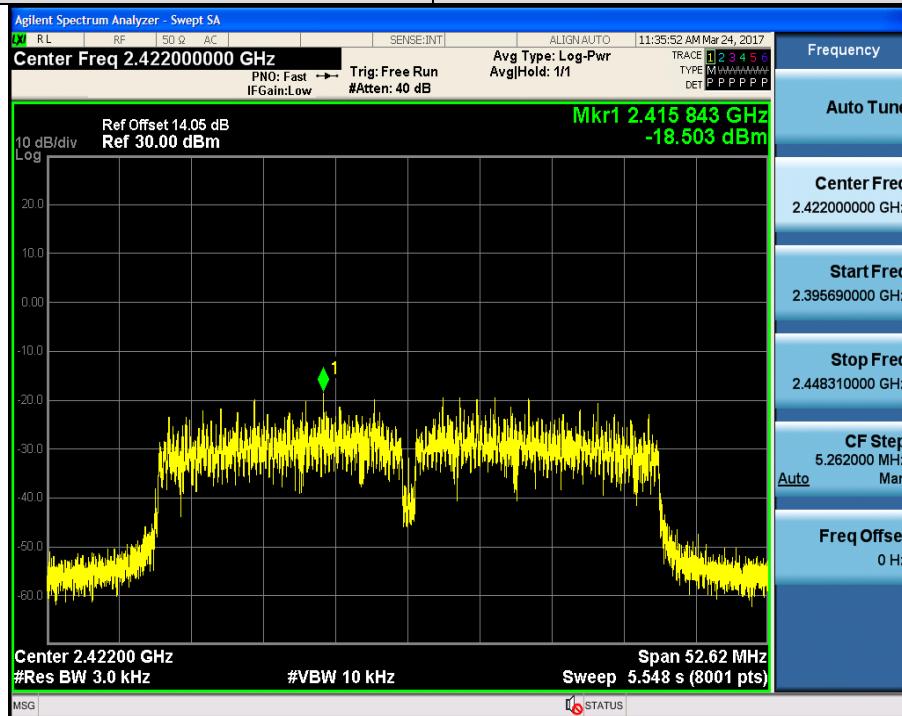
802.11 n (HT20)

Channel: 2462



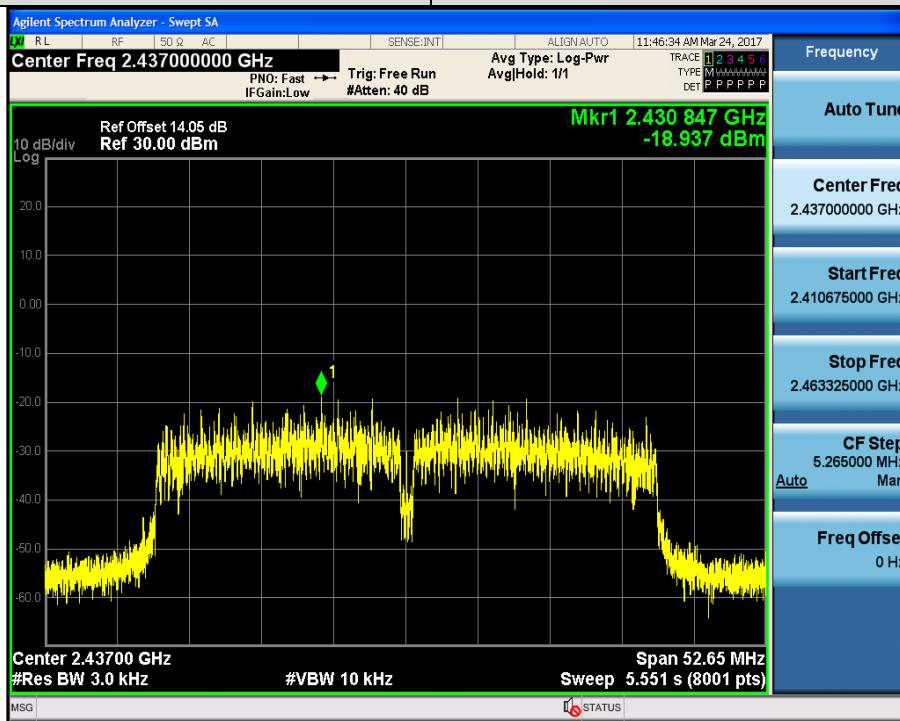
802.11 n (HT40)

Channel: 2422



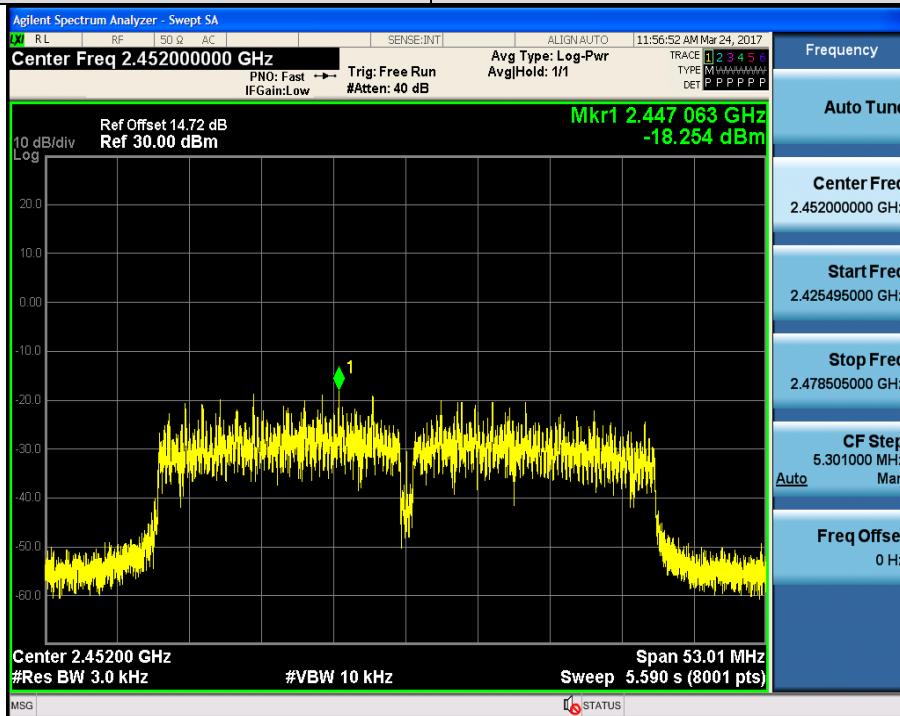
802.11 n (HT40)

Channel: 2437



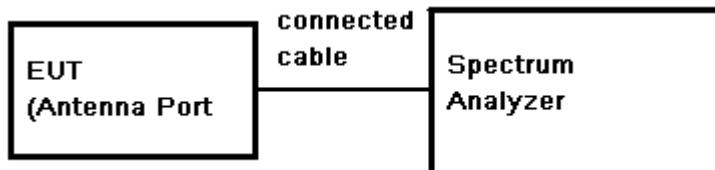
802.11 n (HT40)

Channel: 2452



7.7 Conducted Spurious Emissions and Band-edge

Test Configuration:



Test Procedure:

- 1) Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
- 2) Set the spectrum analyzer: RBW = 100KHz. VBW = 300KHz.
Sweep = auto; Detector Function = Peak (Max. hold).

Limit:

- (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.

Test Result:

Pass

7.7.1 Conducted spurious emission

Antenna A:

Test Mode	Test Channel	StartFre [MHz]	StopFre [MHz]	RBW [kHz]	VBW [kHz]	Pref[dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
11B	2412	30	10000	100	300	1.697	-45.120	-18.303	PASS
11B	2412	10000	26000	100	300	1.697	-35.519	-18.303	PASS
11B	2437	30	10000	100	300	1.419	-43.540	-18.581	PASS
11B	2437	10000	26000	100	300	1.419	-35.441	-18.581	PASS
11B	2462	30	10000	100	300	0.02	-44.620	-19.98	PASS
11B	2462	10000	26000	100	300	0.02	-34.858	-19.98	PASS
11G	2412	30	10000	100	300	0.785	-44.941	-19.215	PASS
11G	2412	10000	26000	100	300	0.785	-35.890	-19.215	PASS
11G	2437	30	10000	100	300	0.427	-44.547	-19.573	PASS
11G	2437	10000	26000	100	300	0.427	-35.310	-19.573	PASS
11G	2462	30	10000	100	300	-0.948	-43.394	-20.948	PASS
11G	2462	10000	26000	100	300	-0.948	-35.963	-20.948	PASS
11N20SISO	2412	30	10000	100	300	0.731	-44.695	-19.269	PASS
11N20SISO	2412	10000	26000	100	300	0.731	-35.014	-19.269	PASS
11N20SISO	2437	30	10000	100	300	0.462	-44.623	-19.538	PASS
11N20SISO	2437	10000	26000	100	300	0.462	-35.234	-19.538	PASS
11N20SISO	2462	30	10000	100	300	-0.969	-44.011	-20.969	PASS
11N20SISO	2462	10000	26000	100	300	-0.969	-34.632	-20.969	PASS
11N40SISO	2422	30	10000	100	300	-3.637	-45.278	-23.637	PASS
11N40SISO	2422	10000	26000	100	300	-3.637	-35.298	-23.637	PASS
11N40SISO	2437	30	10000	100	300	-3.646	-44.268	-23.646	PASS
11N40SISO	2437	10000	26000	100	300	-3.646	-35.339	-23.646	PASS
11N40SISO	2452	30	10000	100	300	-4.337	-44.162	-24.337	PASS
11N40SISO	2452	10000	26000	100	300	-4.337	-35.092	-24.337	PASS
11N20MIMO	2412	30	10000	100	300	-3.565	-44.302	-23.565	PASS
11N20MIMO	2412	10000	26000	100	300	-3.565	-34.461	-23.565	PASS
11N20MIMO	2437	30	10000	100	300	-0.996	-44.027	-20.996	PASS
11N20MIMO	2437	10000	26000	100	300	-0.996	-34.739	-20.996	PASS
11N20MIMO	2462	30	10000	100	300	-2.497	-44.343	-22.497	PASS
11N20MIMO	2462	10000	26000	100	300	-2.497	-35.450	-22.497	PASS