TEST REPORT

Reference No.	:	WTS16S1166013-2E V3
FCC ID.....	:	2AKIG-313805
Applicant	:	Sound Service Musikanlagen-Vertriebsgesellschaft mbH
Address	:	Am Spitzberg 3, DE-15834 Rangsdorf, Germany
Manufacturer	:	CMG Global Limited
Address	:	Flat A, 9/Floor, Wah Kit Commercial Centre, 300-302 Des Voeux Road Central, Hong Kong, China
Product Name	:	Nowsonic Stage Router Pro
Model No.	:	313805
Brand	:	Nowsonic
Standards.....	:	FCC CFR47 Part 15 C Section 15.407:2016
Date of Receipt sample.....	:	Nov. 21, 2016
Date of Test.....	:	Nov. 22 –Dec.25, 2016
Date of Issue	:	Feb. 23, 2017
Test Result	:	**Pass**

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

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2 Laboratories Introduction

Waltek Services Test Group Ltd is a professional third-party testing and certification organization with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by CNAS (China National Accreditation Service for Conformity Assessment) AQSIQ, CMA and IECEE for CBTL. Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC(The Federal Communications Commission), CPSC(Consumer Product Safety Commission), CEC(California energy efficiency), IC(Industry Canada) and ELI(Efficient Lighting Initiative). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as UL, Intertek(ETL-SEMKO), CSA, TÜV Rheinland, TÜV SÜD, etc.

Waltek Services Test Group Ltd. is one of the largest and the most comprehensive third party testing organizations in China, our headquarter located in Shenzhen and have branches in Foshan, Dongguan, Zhongshan, Suzhou,Ningbo and Hong Kong, Our test capability covered four large fields: safety test. ElectroMagnetic Compatibility(EMC), reliablity and energy performance, Chemical test. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

2 Test Summary

Test Items	Test Requirement	Result
Conducted Emissions	15.207(a)	PASS
Radiated Emissions	15.407(a) 15.205(a) 15.209(a)	PASS
Duty Cycle	KDB 789033	--
6dB Bandwidth	15.407(a)	PASS
26 dB Emission Bandwidth & 99% Occupied Bandwidth	15.407(a)	PASS
Maximum Conducted Output Power	15.407(a)	PASS
Power Spectral Density	15.407(a)	PASS
Restricted bands around fundamental frequency	15.407(a)	PASS
Antenna Requirement	15.203	PASS
Maximum Permissible Exposure (Exposure of Humans to RF Fields)	1.1307(b)(1)	PASS

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4 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS16S1166013-2E	Nov. 21, 2016	Nov. 22 – Dec.25, 2016	Dec. 27, 2016	original	-	Replaced
WTS16S1166013-2E V1	Nov. 21, 2016	Nov. 22 – Dec.25, 2016	Feb. 13, 2017	Version 1	Updated	Replaced
WTS16S1166013-2E V2	Nov. 21, 2016	Nov. 22 – Dec.25, 2016	Feb. 15, 2017	Version 2	Updated	Replaced
WTS16S1166013-2E V3	Nov. 21, 2016	Nov. 22 – Dec.25, 2016	Feb. 23, 2017	Version 2	Updated	Valid

5 General Information

5.1 General Description of E.U.T.

Product Name:	Nowsonic Stage Router Pro
Model No.:	313805
Model Description:	N/A
Wi-Fi Specification:	5G-802.11a/n/ac HT20 /n/ac HT40 /ac HT80
Antenna Gain:	4.0 dBi
Type of Modulation:	IEEE 802.11a MIMO(QPSK/BPSK/16QAM/64QAM,54Mbps max.) IEEE 802.11n MIMO (BPSK/QPSK/16QAM/64QAM,HT20:72Mbps max., HT40:150Mbps max.) IEEE802.11ac MIMO (BPSK/QPSK/16QAM/64QAM,HT20:78Mbpsmax. HT40:180Mbps max, HT80:433Mbps max)
The lowest oscillator:	25MHz
The max output power:	18.53 dBm
Hardware Version:	V2.0
Software Version:	nowpro_en_9_970
Storage location	Internal storage

5.2 Details of E.U.T.

Technical Data:	AC 120V/60Hz

5.3 Channel List

Band I (5.15-5.25GHz)			
channel	**Frequency(MHz)**	**channel**	**Frequency(MHz)**
36	5180	38	5190
40	5200	42	5210
44	5220	46	5230
48	5240		

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

For 802.11a/n(HT20)/ ac(HT20):

channel	**Frequency(MHz)**	**channel**	**Frequency(MHz)**
36	5180	40	5200
48	5240		

For 802.11 n(HT40)/ ac(HT40):

channel	**Frequency(MHz)**	**channel**	**Frequency(MHz)**
38	5190	46	5230

For 802.11 ac(HT80):

channel	**Frequency(MHz)**	**channel**	**Frequency(MHz)**
42	5210	/	/

Note:The transmitter output signals for this device are completely uncorrelated. The device don't transmit simultaneously in multiple channels in single or multiple frequency bands and uses carrier aggregation techniques similar to IEEE 802.11ac.

5.4 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: 7760A-1**

  Waltek Services(Shenzhen) Co., Ltd. Has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration number 7760A-1,October 15, 2015.

- **FCC Test Site 1#– Registration No.: 880581**

  Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 880581, April 29, 2014.

- **FCC Test Site 2#– Registration No.: 328995**

  Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 328995, December 3, 2014.

6 Equipment Used during Test

6.1 Equipments List

Conducted Emissions Test Site 1#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMI Test Receiver	R&S	ESCI	100947	Sep.12,2016	Sep.11,2017
2.	LISN	R&S	ENV216	101215	Sep.12,2016	Sep.11,2017
3.	Cable	Top	TYPE16(3.5M)	-	Sep.12,2016	Sep.11,2017
Conducted Emissions Test Site 2#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMI Test Receiver	R&S	ESCI	101155	Sep.12,2016	Sep.11,2017
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	Sep.12,2016	Sep.11,2017
3.	Limiter	York	MTS-IMP-136	261115-001-0024	Sep.12,2016	Sep.11,2017
4.	Cable	LARGE	RF300	-	Sep.12,2016	Sep.11,2017
3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1	Spectrum Analyzer	R&S	FSP	100091	Apr.29, 2016	Apr.28, 2017
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	Apr.09,2016	Apr.08,2017
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr.09,2016	Apr.08,2017
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Sep.12,2016	Sep.11,2017
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr.09,2016	Apr.08,2017
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	Apr.09,2016	Apr.08,2017
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Apr.13,2016	Apr.12,2017
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	Apr.13,2016	Apr.12,2017
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No**	**Last Calibration Date**	**Calibration Due Date**
1	Test Receiver	R&S	ESCI	101296	Apr.13,2016	Apr.12,2017
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	Apr.09,2016	Apr.08,2017
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	Apr.13,2016	Apr.12,2017
4	Cable	HUBER+SUHNER	CBL2	525178	Apr.13,2016	Apr.12,2017

RF Conducted Testing						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	Sep.12,2016	Sep.11,2017
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	Sep.12,2016	Sep.11,2017
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	Sep.12,2016	Sep.11,2017

6.2 Description of Support Units

Equipment	Manufacturer	Model No.	Series No.
/	/	/	/

6.3 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	± 1 x 10^{-6}
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (30M~1000MHz)
	± 5.47 dB (1000M~25000MHz)
Conducted Emissions test	± 3.64 dB (AC mains 150KHz~30MHz)
Confidence interval：95%. Confidence factor:k=2	

6.4 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

7 Conducted Emission

Test Requirement: FCC CFR 47 Part 15 Section 15.207

Test Method: ANSI C63.10:2013

Test Result: PASS

Frequency Range: 150kHz to 30MHz

Class/Severity: Class B

Limit:

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

7.1 E.U.T. Operation

Operating Environment **:**

Temperature: 21.5 °C

Humidity: 51.9 % RH

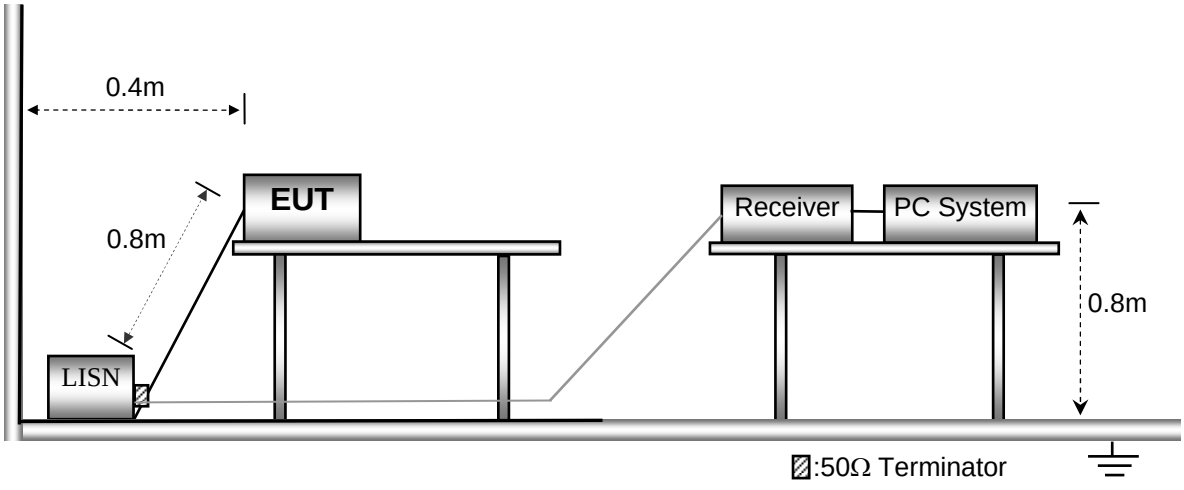
Atmospheric Pressure: 101.2kPa

EUT Operation **:**

The test was performed in TX transmitting mode, the test data were shown in the report.

7.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.4.



7.3 Measurement Description

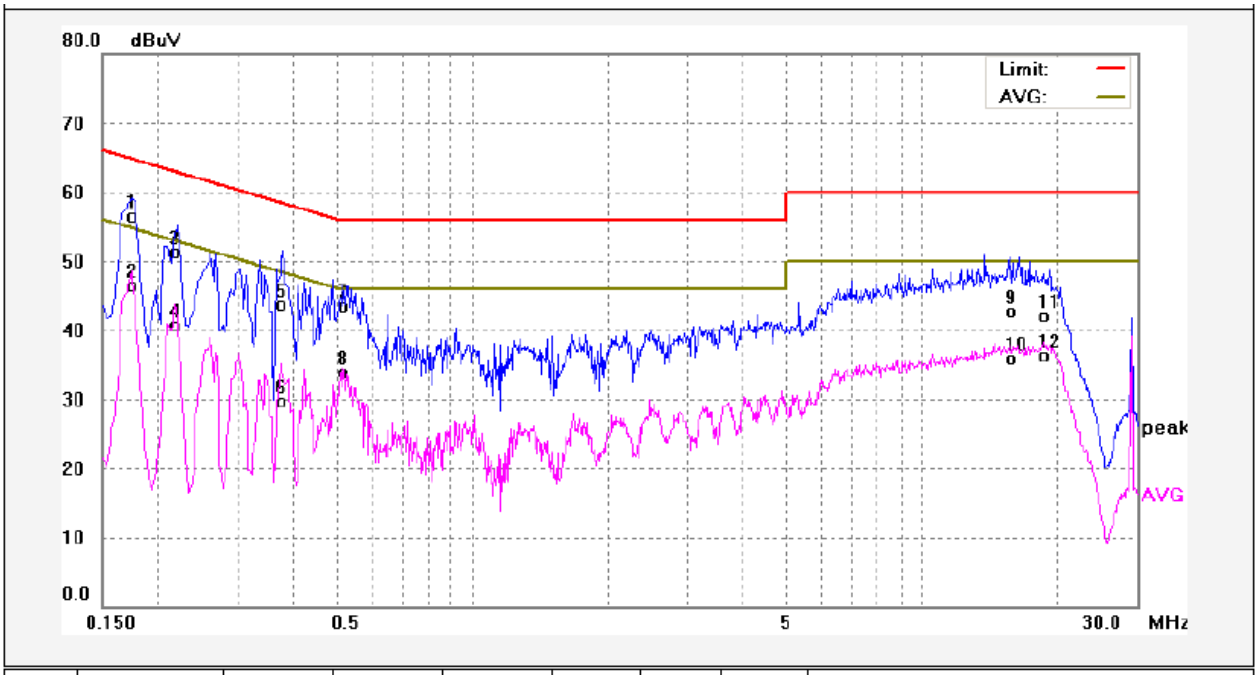
The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

7.4 Conducted Emission Test Result

An initial pre-scan was performed on the live and neutral lines. only the worst data (802.11n20 mode middle channel) were reported.

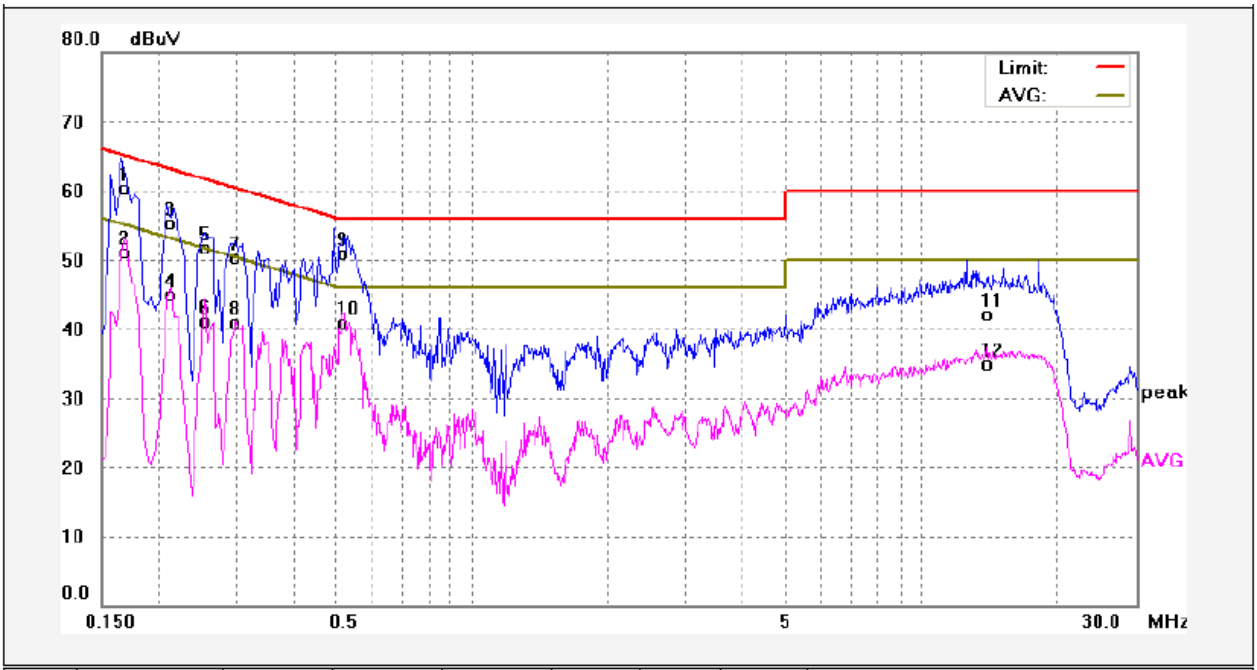
ANT 1+ANT 2

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1740	46.95	9.64	56.59	64.76	-8.17	QP	
2	0.1740	36.91	9.64	46.55	54.76	-8.21	AVG	
3	0.2180	41.71	9.63	51.34	62.89	-11.55	QP	
4	0.2180	31.08	9.63	40.71	52.89	-12.18	AVG	
5	0.3740	34.02	9.63	43.65	58.41	-14.76	QP	
6	0.3740	20.13	9.63	29.76	48.41	-18.65	AVG	
7	0.5180	33.78	9.66	43.44	56.00	-12.56	QP	
8	0.5180	24.22	9.66	33.88	46.00	-12.12	AVG	
9	15.7220	32.42	10.25	42.67	60.00	-17.33	QP	
10	15.7220	25.63	10.25	35.88	50.00	-14.12	AVG	
11	18.6259	31.84	10.31	42.15	60.00	-17.85	QP	
12	18.6259	25.99	10.31	36.30	50.00	-13.70	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1700	50.72	9.64	60.36	64.96	-4.60	QP	
2	0.1700	41.50	9.64	51.14	54.96	-3.82	AVG	
3	0.2140	45.66	9.63	55.29	63.04	-7.75	QP	
4	0.2140	35.29	9.63	44.92	53.04	-8.12	AVG	
5	0.2540	42.14	9.64	51.78	61.62	-9.84	QP	
6	0.2540	31.51	9.64	41.15	51.62	-10.47	AVG	
7	0.2980	40.74	9.64	50.38	60.30	-9.92	QP	
8	0.2980	31.25	9.64	40.89	50.30	-9.41	AVG	
9	0.5140	41.26	9.66	50.92	56.00	-5.08	QP	
10	0.5140	31.33	9.66	40.99	46.00	-5.01	AVG	
11	13.9660	31.88	10.22	42.10	60.00	-17.90	QP	
12	13.9660	24.63	10.22	34.85	50.00	-15.15	AVG	

8 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.407

Test Method: ANSI C63.10:2013

Test Result: PASS

Measurement Distance: 3m

Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

8.1 EUT Operation

Operating Environment **:**

Temperature: 23.5 °C

Humidity: 52.1 % RH

Atmospheric Pressure: 101.2kPa

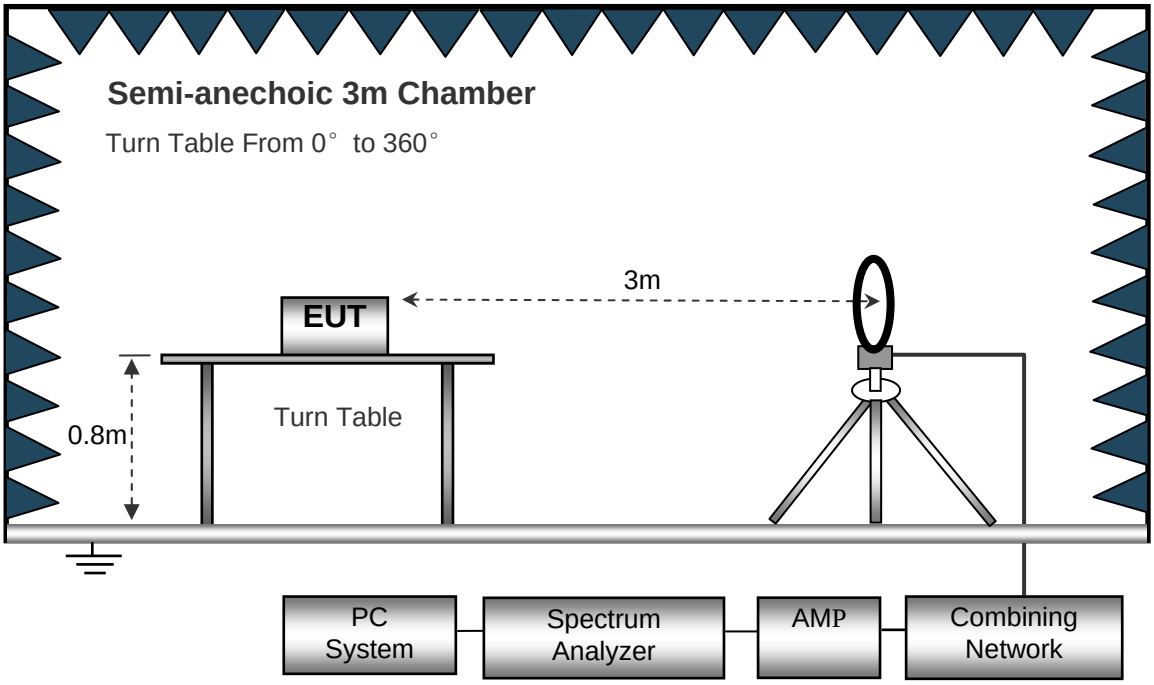
EUT Operation **:**

The test was performed in transmitting mode, the test data were shown in the report.

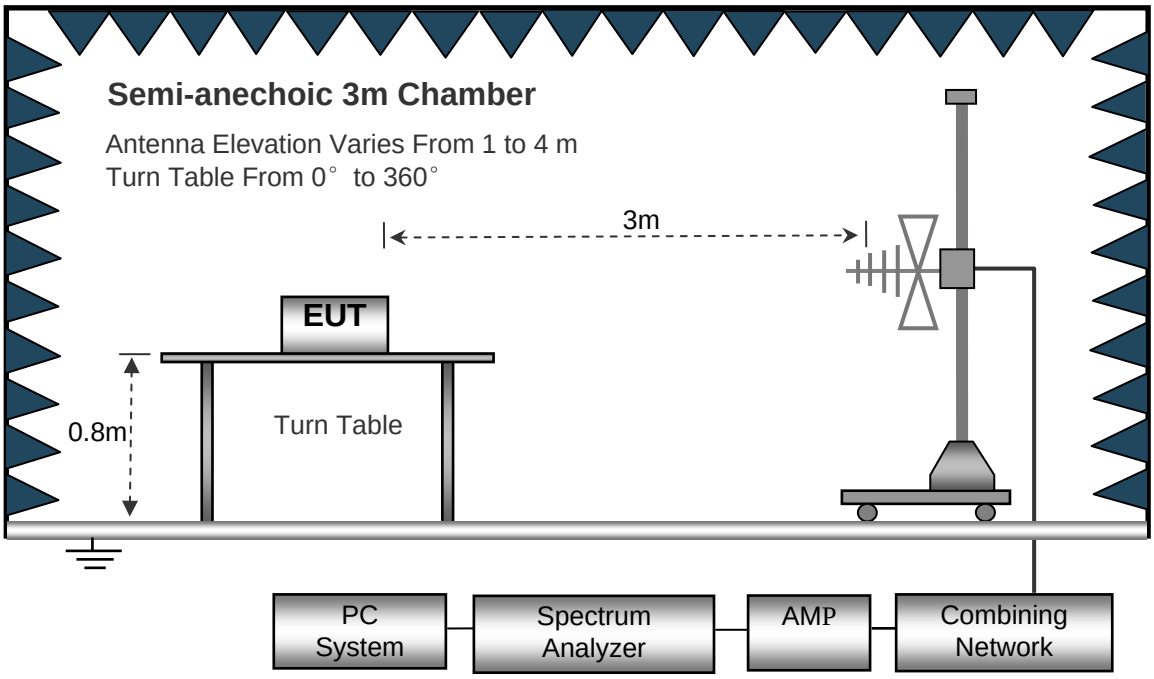
8.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4.

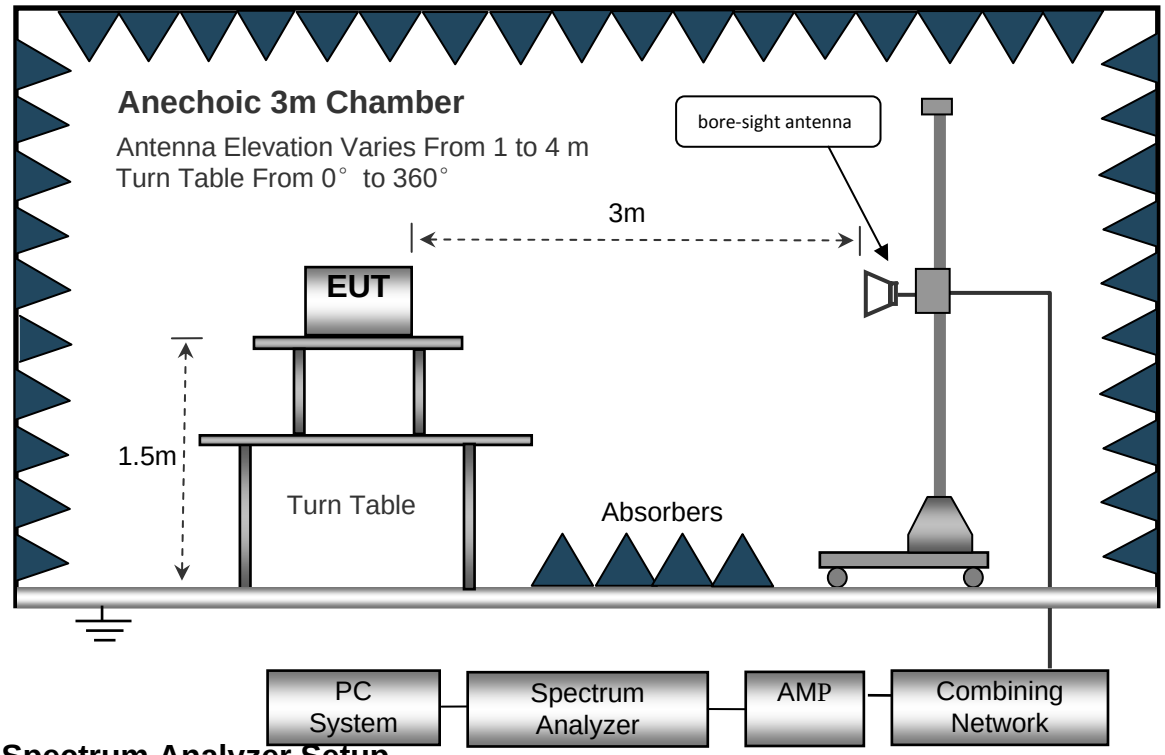
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



8.3 Spectrum Analyzer Setup

Below 30MHz

Sweep Speed ..... Auto
IF Bandwidth..... 10kHz
Video Bandwidth..... 10kHz
Resolution Bandwidth..... 10kHz

30MHz ~ 1GHz

Sweep Speed ..... Auto
Detector ..... PK
Resolution Bandwidth..... 100kHz
Video Bandwidth..... 300kHz

Above 1GHz

Sweep Speed ..... Auto
Detector ..... PK
Resolution Bandwidth..... 1MHz
Video Bandwidth..... 3MHz
Detector ..... Ave.
Resolution Bandwidth..... 1MHz
Video Bandwidth..... 10Hz

8.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane for below 1GHz and 1.5m for above 1GHz.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are performed in X,Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),the worst condition was tested putting the eut in Z axis,so the worst data were shown as follow.
8. A 2.4GHz high –pass filter is used druing radiated emissions above 1GHz measurement.

Corrected Amplitude & Margin Calculation

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

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – Limit

8.5 Summary of Test Results

Test Frequency: 9KHz~30MHz

Frequency	Measurement results dBμV @3m	Detector PK/QP	Correct factor dB/m	Extrapolation factor dB	Measurement results (calculated) dBμV/m @30m	Limits dBμV/m @30m	Margin dB
(MHz)	Measurement results	Detector	Correct factor	Extrapolation factor	Measurement results (calculated)	Limits	Margin
802.11a ANT 1+ANT 2							
6.022	25.42	QP	21.84	40.00	7.26	29.54	-22.28
8.304	27.34	QP	21.02	40.00	8.36	29.54	-21.18
26.127	23.14	QP	20.55	40.00	3.69	29.54	-25.85
802.11n (HT20) ANT 1+ANT 2							
6.022	25.21	QP	21.84	40.00	7.05	29.54	-22.49
8.304	27.43	QP	21.02	40.00	8.45	29.54	-21.09
26.127	24.35	QP	20.55	40.00	4.90	29.54	-24.64
802.11 ac(HT20) ANT 1+ANT 2							
6.022	24.77	QP	21.84	40.00	6.61	29.54	-22.93
8.304	26.66	QP	21.02	40.00	7.68	29.54	-21.86
26.127	25.14	QP	20.55	40.00	5.69	29.54	-23.85
802.11n(HT40) ANT 1+ANT 2							
6.022	23.77	QP	21.84	40.00	5.61	29.54	-23.93
8.304	26.43	QP	21.02	40.00	7.45	29.54	-22.09
26.127	25.71	QP	20.55	40.00	6.26	29.54	-23.28
802.11ac(HT40) ANT 1+ANT 2							
6.022	23.28	QP	21.84	40.00	5.12	29.54	-24.42
8.304	26.55	QP	21.02	40.00	7.57	29.54	-21.97
26.127	25.35	QP	20.55	40.00	5.90	29.54	-23.64
802.11ac(HT80) ANT 1+ANT 2							
6.022	24.28	QP	21.84	40.00	6.12	29.54	-23.42
8.304	26.54	QP	21.02	40.00	7.56	29.54	-21.98
26.127	25.64	QP	20.55	40.00	6.19	29.54	-23.35

Test Frequency : 30MHz ~ 18GHz

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11a band I Low Channel 5180MHz ANT 1+ANT 2									
223.45	41.15	QP	69	1.9	H	-11.62	29.53	46.00	-16.47
223.45	36.22	QP	118	2.0	V	-11.62	24.60	46.00	-21.40
4536.45	52.44	PK	35	1.3	H	-2.03	50.41	74.00	-23.59
4536.45	46.83	Ave	35	1.3	V	-2.03	44.80	54.00	-9.20
5130.09	52.53	PK	303	1.6	H	-1.02	51.51	74.00	-22.49
5130.09	49.82	Ave	303	1.6	V	-1.02	48.80	54.00	-5.20
10360.00	41.51	PK	25	1.8	H	5.33	46.84	74.00	-27.16
10360.00	36.79	Ave	25	1.8	V	5.33	42.12	54.00	-11.89
5365.15	43.12	PK	359	1.6	H	-1.21	41.91	74.00	-32.09
5365.15	38.68	Ave	359	1.6	V	-1.21	37.47	54.00	-16.53

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11a band I middle channel 5200MHz ANT 1+ANT 2									
223.45	40.22	QP	19	1.8	H	-11.62	28.60	46.00	-17.40
223.45	35.00	QP	200	1.7	V	-11.62	23.38	46.00	-22.62
4536.39	51.69	PK	68	1.5	H	-1.94	49.75	74.00	-24.25
4536.39	46.47	Ave	68	1.5	V	-1.94	44.53	54.00	-9.47
5112.87	54.47	PK	169	1.4	H	-1.06	53.41	74.00	-20.59
5112.87	50.05	Ave	169	1.4	V	-1.06	48.99	54.00	-5.01
10400.00	41.37	PK	105	1.4	H	5.21	46.58	74.00	-27.42
10400.00	35.31	Ave	105	1.4	V	5.21	40.52	54.00	-13.48
5366.78	45.11	PK	107	1.5	H	-1.37	43.74	74.00	-30.26
5366.78	38.42	Ave	107	1.5	V	-1.37	37.05	54.00	-16.95

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11a band I High channel 5240MHz ANT 1+ANT 2									
223.45	40.14	QP	191	2.0	H	-11.62	28.52	46.00	-17.48
223.45	35.95	QP	144	1.7	V	-11.62	24.33	46.00	-21.67
4511.33	51.27	PK	124	1.3	H	-2.24	49.03	74.00	-24.97
4511.33	46.13	Ave	124	1.3	V	-2.24	43.89	54.00	-10.11
5129.02	55.30	PK	304	1.5	H	-1.09	54.21	74.00	-19.79
5129.02	49.97	Ave	304	1.5	V	-1.09	48.88	54.00	-5.12
10480.00	41.23	PK	175	1.8	H	5.14	46.37	74.00	-27.63
10480.00	35.98	Ave	175	1.8	V	5.14	41.12	54.00	-12.88
5360.78	45.97	PK	156	1.4	H	-1.38	44.59	74.00	-29.41
5360.78	37.26	Ave	156	1.4	V	-1.38	35.88	54.00	-18.12

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11n(HT20) band I low Channel 5180MHz ANT 1+ANT 2									
223.45	41.02	QP	191	1.5	H	-11.62	29.40	46.00	-16.60
223.45	37.05	QP	31	1.3	V	-11.62	25.43	46.00	-20.57
4523.14	51.64	PK	152	1.8	H	-2.14	49.50	74.00	-24.50
4523.14	42.67	Ave	152	1.8	V	-2.14	40.53	54.00	-13.47
5126.10	44.59	PK	275	1.7	H	-1.06	43.53	74.00	-30.47
5126.10	40.26	Ave	275	1.7	V	-1.06	39.20	54.00	-14.80
10360.00	42.60	PK	30	1.2	H	5.33	47.93	74.00	-26.07
10360.00	35.90	Ave	30	1.2	V	5.33	41.23	54.00	-12.77
5357.62	46.21	PK	151	1.6	H	-1.26	44.95	74.00	-29.05
5357.62	38.15	Ave	151	1.6	V	-1.26	36.89	54.00	-17.11

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11n(HT20) band I middle channel 5200MHz ANT 1+ANT 2									
223.45	42.31	QP	11	1.1	H	-11.62	30.69	46.00	-15.31
223.45	36.42	QP	8	2.0	V	-11.62	24.80	46.00	-21.20
4536.25	52.42	PK	14	1.3	H	-2.12	50.30	74.00	-23.70
4536.25	42.89	Ave	14	1.3	V	-2.12	40.77	54.00	-13.23
5124.28	46.59	PK	311	1.1	H	-1.06	45.53	74.00	-28.47
5124.28	40.49	Ave	311	1.1	V	-1.06	39.43	54.00	-14.57
10400.00	40.28	PK	36	1.1	H	5.21	45.49	74.00	-28.51
10400.00	35.56	Ave	36	1.1	V	5.21	40.77	54.00	-13.23
5379.04	45.48	PK	177	1.0	H	-1.07	44.41	74.00	-29.59
5379.04	39.02	Ave	177	1.0	V	-1.07	37.95	54.00	-16.05

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11n(HT20) band I High channel 5240MHz ANT 1+ANT 2									
223.45	41.81	QP	235	1.9	H	-11.62	30.19	46.00	-15.81
223.45	36.14	QP	158	1.2	V	-11.62	24.52	46.00	-21.48
4532.99	52.95	PK	134	1.5	H	-1.96	50.99	74.00	-23.01
4532.99	44.23	Ave	134	1.5	V	-1.96	42.27	54.00	-11.73
5145.38	48.40	PK	198	1.2	H	-1.06	47.34	74.00	-26.66
5145.38	40.30	Ave	198	1.2	V	-1.06	39.24	54.00	-14.76
10480.00	40.53	PK	74	1.2	H	5.14	45.67	74.00	-28.33
10480.00	38.09	Ave	74	1.2	V	5.14	43.23	54.00	-10.77
5373.20	45.25	PK	324	1.4	H	-1.10	44.15	74.00	-29.85
5373.20	38.25	Ave	324	1.4	V	-1.10	37.15	54.00	-16.85

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11ac(HT20) band I low Channel 5180MHz ANT 1+ANT 2									
223.45	43.60	QP	348	1.1	H	-11.62	31.98	46.00	-14.02
223.45	37.94	QP	70	1.8	V	-11.62	26.32	46.00	-19.68
4506.40	49.69	PK	243	1.3	H	-1.86	47.83	74.00	-26.17
4506.40	39.50	Ave	243	1.3	V	-1.86	37.64	54.00	-16.36
5116.26	44.95	PK	20	1.8	H	-1.06	43.89	74.00	-30.11
5116.26	40.49	Ave	20	1.8	V	-1.06	39.43	54.00	-14.57
10360.00	38.72	PK	289	1.7	H	5.33	44.05	74.00	-29.95
10360.00	35.35	Ave	289	1.7	V	5.33	40.68	54.00	-13.32
5350.66	46.97	PK	188	1.7	H	-1.06	45.91	74.00	-28.09
5350.66	39.72	Ave	188	1.7	V	-1.06	38.66	54.00	-15.34

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11ac(HT20) band I middle channel 5200MHz ANT 1+ANT 2									
223.45	42.92	QP	178	1.4	H	-11.62	31.30	46.00	-14.70
223.45	37.29	QP	85	1.5	V	-11.62	25.67	46.00	-20.33
4535.51	50.48	PK	1	1.7	H	-1.82	48.66	74.00	-25.34
4535.51	39.55	Ave	1	1.7	V	-1.82	37.73	54.00	-16.27
5140.09	44.16	PK	320	1.4	H	-1.06	43.10	74.00	-30.90
5140.09	41.24	Ave	320	1.4	V	-1.06	40.18	54.00	-13.82
10400.00	42.29	PK	147	1.8	H	5.21	47.50	74.00	-26.50
10400.00	37.11	Ave	147	1.8	V	5.21	42.32	54.00	-11.68
5359.93	46.00	PK	193	1.6	H	-1.09	44.91	74.00	-29.09
5359.93	39.99	Ave	193	1.6	V	-1.09	38.90	54.00	-15.10

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11ac(HT20) band I High channel 5240MHz ANT 1+ANT 2									
223.45	42.53	QP	161	1.1	H	-11.62	30.91	46.00	-15.09
223.45	37.12	QP	89	1.8	V	-11.62	25.50	46.00	-20.50
4532.36	49.78	PK	241	1.7	H	-1.81	47.97	74.00	-26.03
4532.36	39.90	Ave	241	1.7	V	-1.81	38.09	54.00	-15.91
5135.03	43.19	PK	136	1.1	H	-1.06	42.13	74.00	-31.87
5135.03	41.57	Ave	136	1.1	V	-1.06	40.51	54.00	-13.49
10480.00	40.82	PK	80	1.5	H	5.14	45.96	74.00	-28.04
10480.00	37.06	Ave	80	1.5	V	5.14	42.20	54.00	-11.80
5385.84	46.08	PK	285	1.6	H	-1.04	45.04	74.00	-28.96
5385.84	37.22	Ave	285	1.6	V	-1.04	36.18	54.00	-17.82

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11n(HT40) band I low Channel 5190MHz ANT 1+ANT 2									
223.45	42.71	QP	242	1.5	H	-11.62	31.09	46.00	-14.91
223.45	38.02	QP	330	1.9	V	-11.62	26.40	46.00	-19.60
4513.16	44.89	PK	29	1.9	H	-1.89	43.00	74.00	-31.00
4513.16	34.65	Ave	29	1.9	V	-1.89	32.76	54.00	-21.24
5119.67	46.91	PK	318	1.7	H	-1.06	45.85	74.00	-28.15
5119.67	38.58	Ave	318	1.7	V	-1.06	37.52	54.00	-16.48
10380.00	39.59	PK	298	1.0	H	5.26	44.85	74.00	-29.15
10380.00	35.44	Ave	298	1.0	V	5.26	40.70	54.00	-13.30
5350.21	46.07	PK	196	1.6	H	-1.03	45.04	74.00	-28.96
5350.21	37.85	Ave	196	1.6	V	-1.03	36.82	54.00	-17.18

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11n(HT40) band I high Channel 5230MHz ANT 1+ANT 2									
223.45	41.75	QP	192	1.5	H	-11.62	30.13	46.00	-15.87
223.45	37.74	QP	78	2.0	V	-11.62	26.12	46.00	-19.88
4521.58	43.98	PK	246	1.9	H	-1.94	42.04	74.00	-31.96
4521.58	35.65	Ave	246	1.9	V	-1.94	33.71	54.00	-20.29
5145.18	46.57	PK	114	1.1	H	-1.06	45.51	74.00	-28.49
5145.18	38.21	Ave	114	1.1	V	-1.06	37.15	54.00	-16.85
10460.00	41.05	PK	355	1.5	H	5.28	46.33	74.00	-27.67
10480.00	36.66	Ave	355	1.5	V	5.28	41.94	54.00	-12.06
5362.09	45.76	PK	216	1.5	H	-1.05	44.71	74.00	-29.29
5362.09	39.21	Ave	216	1.5	V	-1.05	38.16	54.00	-15.84

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11ac(HT40) band I low Channel 5190MHz ANT 1+ANT 2									
223.45	41.15	QP	154	1.0	H	-11.62	29.53	74.00	-44.47
223.45	37.53	QP	117	1.9	V	-11.62	25.91	74.00	-48.09
4538.37	39.96	PK	62	1.4	H	-1.91	38.05	74.00	-35.95
4538.37	31.90	Ave	62	1.4	V	-1.91	29.99	54.00	-24.01
5128.07	45.25	PK	29	1.2	H	-1.06	44.19	74.00	-29.81
5128.07	39.28	Ave	29	1.2	V	-1.06	38.22	54.00	-15.78
10380.00	39.91	PK	2	1.6	H	5.26	45.17	74.00	-28.83
10380.00	34.46	Ave	2	1.6	V	5.26	39.72	54.00	-14.28
5373.00	46.54	PK	132	1.8	H	-1.03	45.51	74.00	-28.49
5373.00	38.61	Ave	132	1.8	V	-1.03	37.58	54.00	-16.42

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11ac(HT40) band I high Channel 5230MHz ANT 1+ANT 2									
223.45	41.06	QP	218	1.0	H	-11.62	29.44	74.00	-44.56
223.45	36.86	QP	186	1.6	V	-11.62	25.24	74.00	-48.76
4505.26	40.93	PK	43	1.6	H	-1.93	39.00	74.00	-35.00
4505.26	31.63	Ave	43	1.6	V	-1.93	29.70	54.00	-24.30
5115.63	45.26	PK	306	1.4	H	-1.06	44.20	74.00	-29.80
5115.63	38.96	Ave	306	1.4	V	-1.06	37.90	54.00	-16.10
10460.00	41.29	PK	250	1.1	H	5.28	46.57	74.00	-27.43
10480.00	37.37	Ave	250	1.1	V	5.28	42.65	54.00	-11.35
5380.76	46.56	PK	153	1.7	H	-1.04	45.52	74.00	-28.48
5380.76	37.34	Ave	153	1.7	V	-1.04	36.30	54.00	-17.70

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.407/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11ac(HT80) band I high Channel 5210MHz ANT 1+ANT 2									
223.45	36.30	QP	324	1.4	H	-11.62	24.68	54.00	-29.32
4504.78	38.22	QP	265	1.3	V	-11.62	26.60	54.00	-27.40
4523.86	29.64	PK	154	1.3	H	-1.88	27.76	74.00	-46.24
4523.86	42.34	Ave	154	1.3	V	-1.88	40.46	54.00	-13.54
5139.92	35.71	PK	182	1.5	H	-1.06	34.65	74.00	-39.35
5139.92	46.71	Ave	182	1.5	V	-1.06	45.65	54.00	-8.35
10420.00	42.41	PK	273	1.8	H	4.65	47.06	74.00	-26.94
10420.00	37.25	Ave	273	1.8	V	4.65	41.90	54.00	-12.10
5365.92	46.70	PK	240	1.2	H	-1.13	45.57	74.00	-28.43
5365.92	39.68	Ave	240	1.2	V	-1.13	38.55	54.00	-15.45

Test Frequency: 18GHz~40GHz

The measurements were more than 20 dB below the limit and not reported.

9 Duty cycle

Test Requirement:	47 CFR Part 15C 15.407
Test Method:	ANSI C63.10: 2013
Test Limit:	N/A
Test Result:	PASS
Remark:	Through Pre-scan, and found 802.11a at lowest channel is the worst case. Only the worst case is recorded in the report.

9.1 Summary of Test Results

ANT 1

802.11a mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
36	100	100	100
802.11n(HT20) mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
36	100	100	100
802.11ac(HT20) mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
36	100	100	100
802.11n(HT40) mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
38	100	100	100
802.11ac(HT40) mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
38	100	100	100
802.11ac(HT80) mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
42	100	100	100

ANT 2

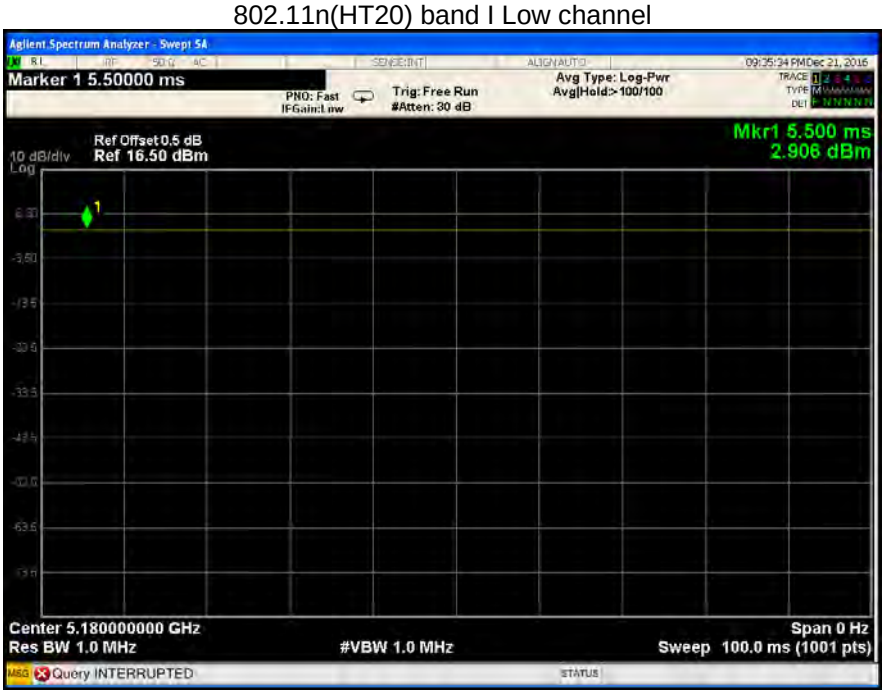
802.11a mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
36	100	100	100
802.11n(HT20) mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
36	100	100	100
802.11ac(HT20) mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
36	100	100	100
802.11n(HT40) mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
38	100	100	100
802.11ac(HT40) mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
38	100	100	100
802.11ac(HT80) mode			
channel	On time(ms)	Period(ms)	Duty Cycle(%)
42	100	100	100

Test result plots shown as follows:

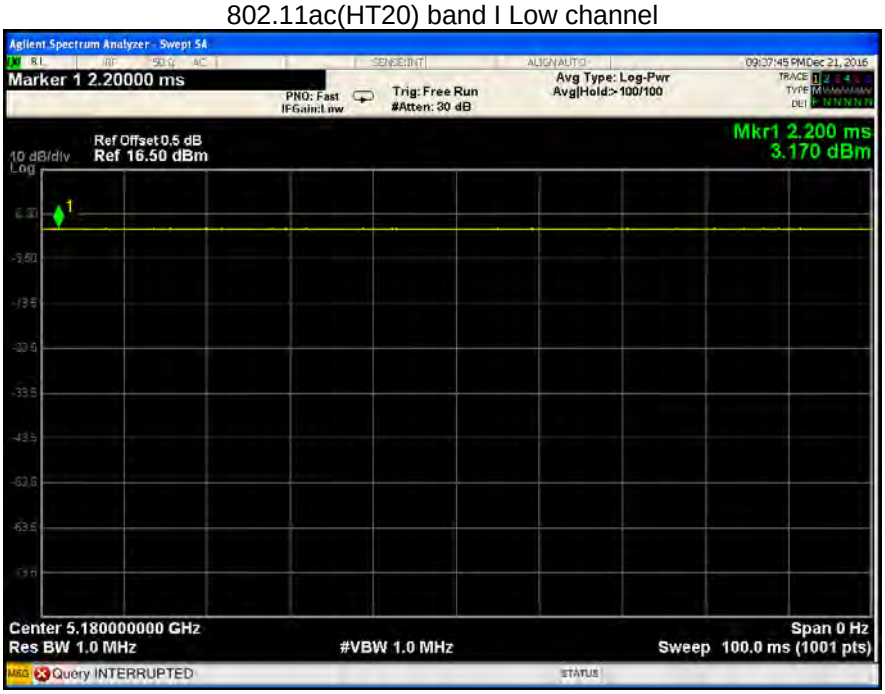
ANT 1

802.11a band I Low channel

802.11n(HT20) band I Low channel

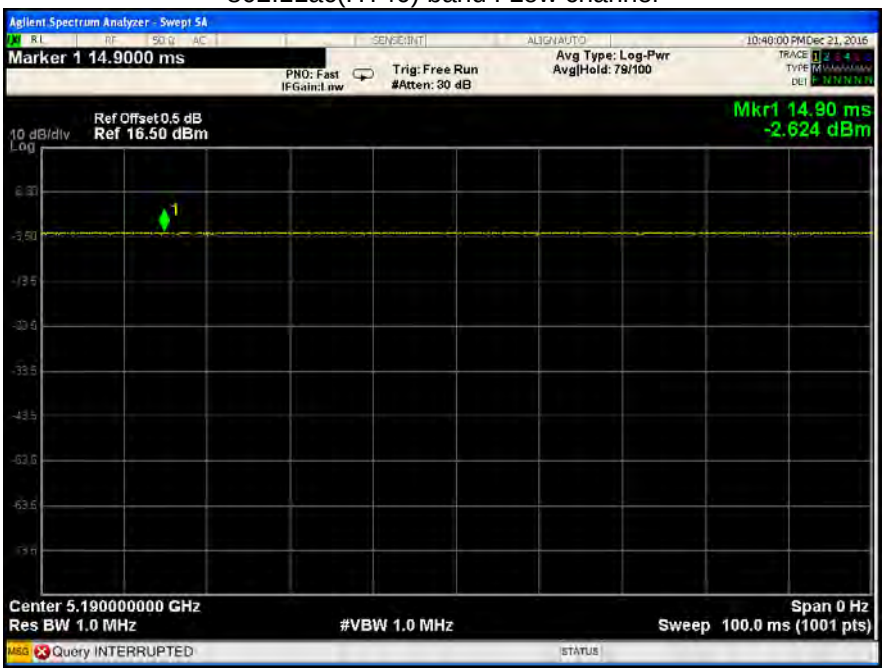


802.11ac(HT20) band I Low channel

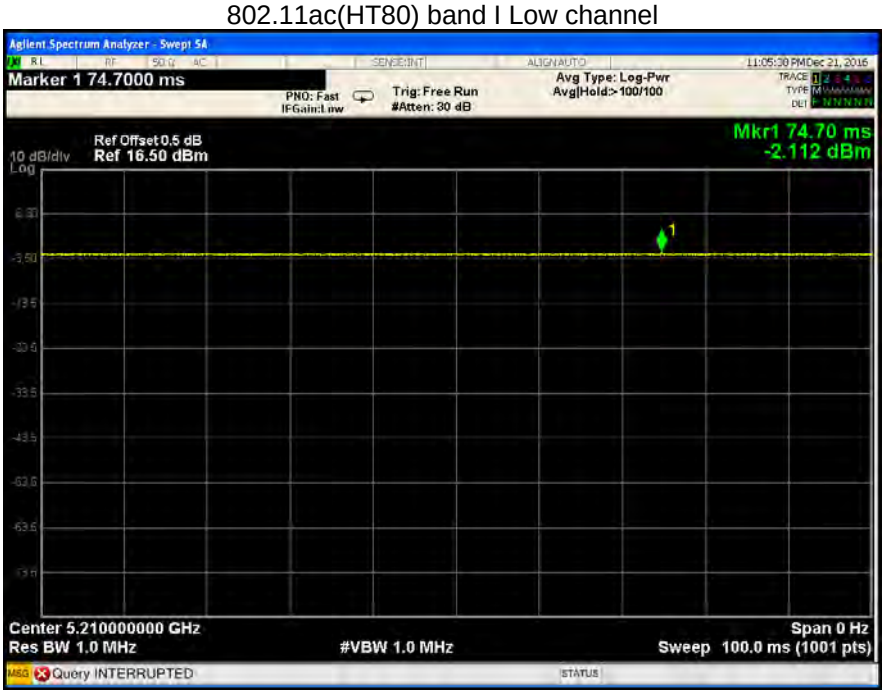


802.11n(HT40) band I Low channel

802.11ac(HT40) band I Low channel

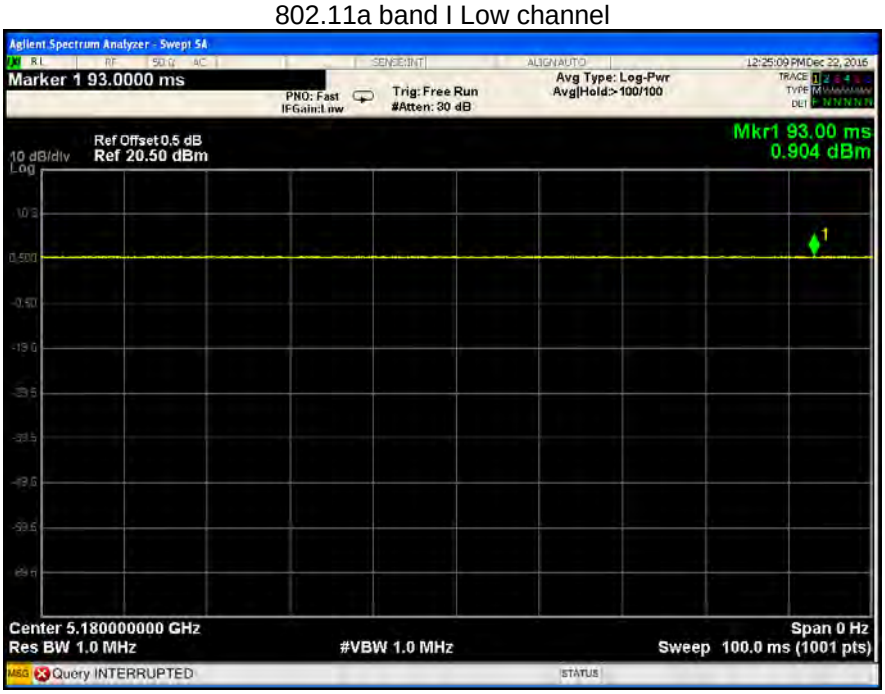


802.11ac(HT80) band I Low channel

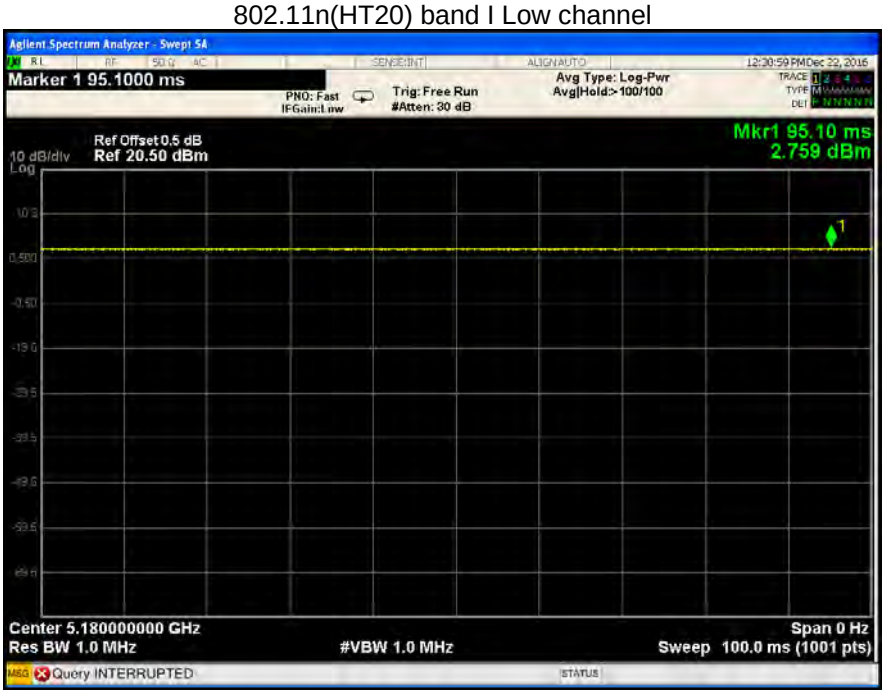


ANT 2

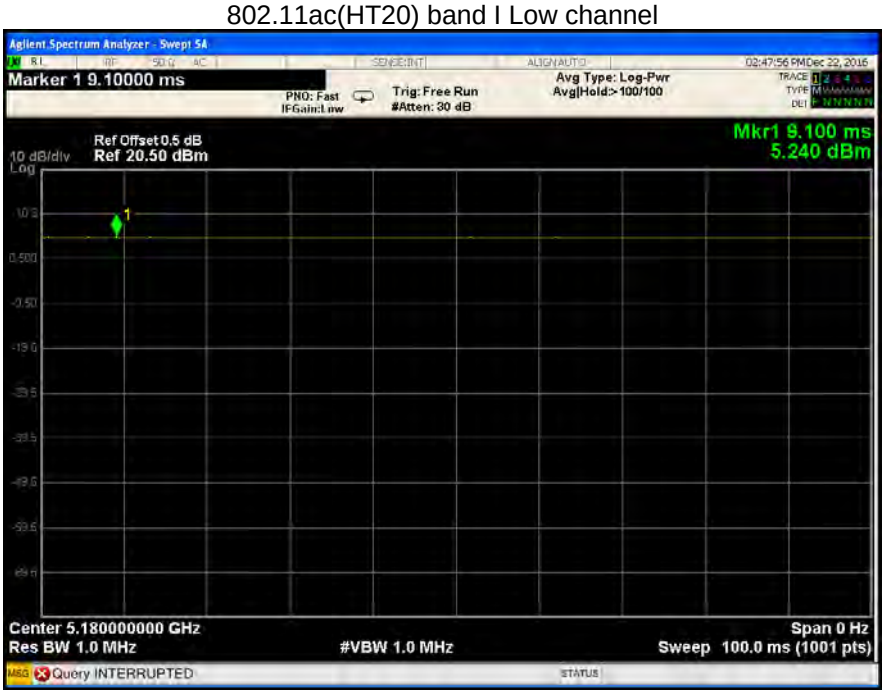
802.11a band I Low channel



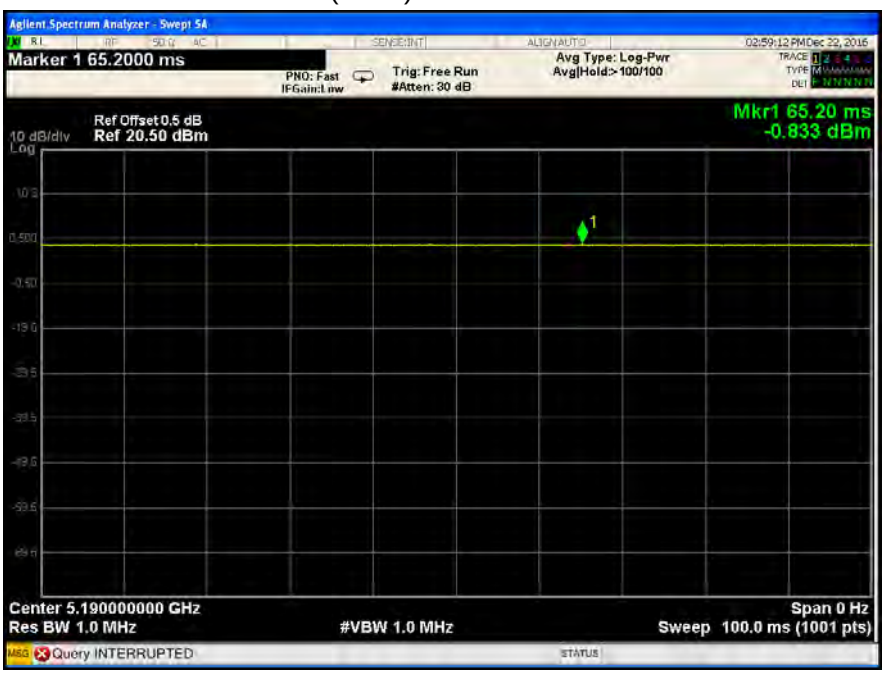
802.11n(HT20) band I Low channel



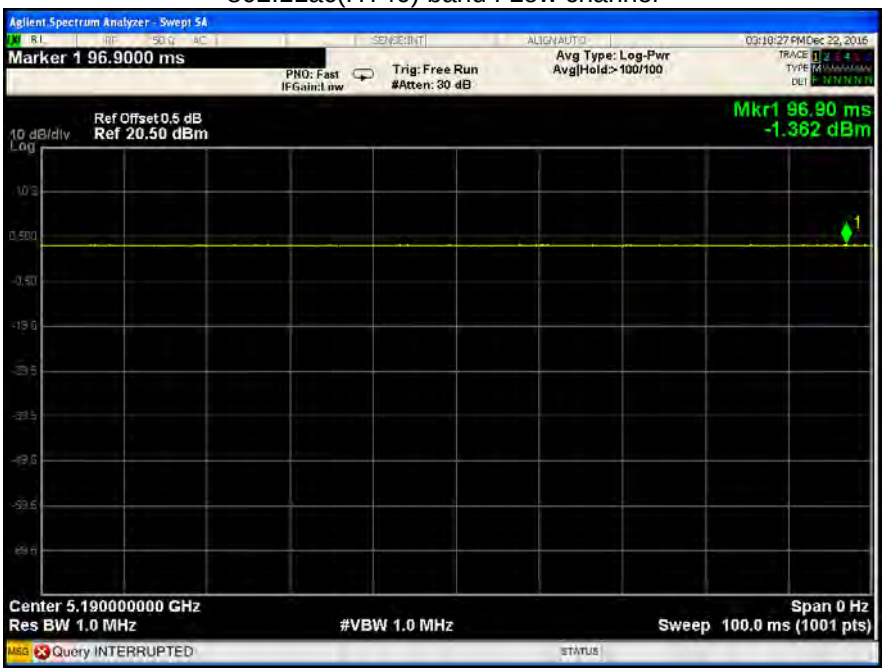
802.11ac(HT20) band I Low channel



802.11n(HT40) band I Low channel



802.11ac(HT40) band I Low channel



802.11ac(HT80) band I Low channel

10 Band Edge

Test Requirement:	FCC CFR47 Part 15 Section 15.407
Test Method:	ANSI C63.10 2013
Test Limit:	For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27dBm/MHz.
Test Result:	PASS

10.1 Test Produce

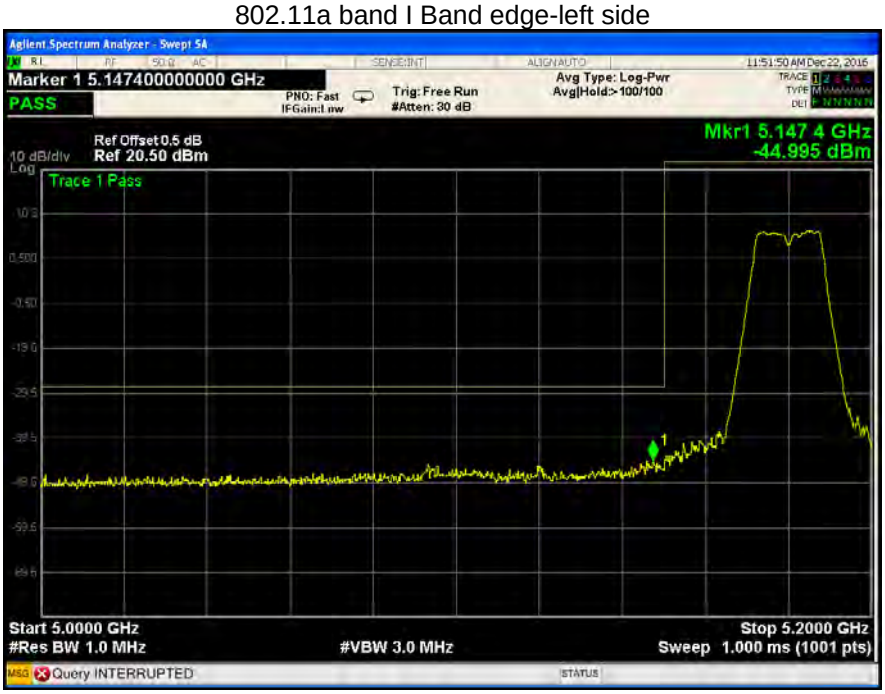
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

10.2 Test Result

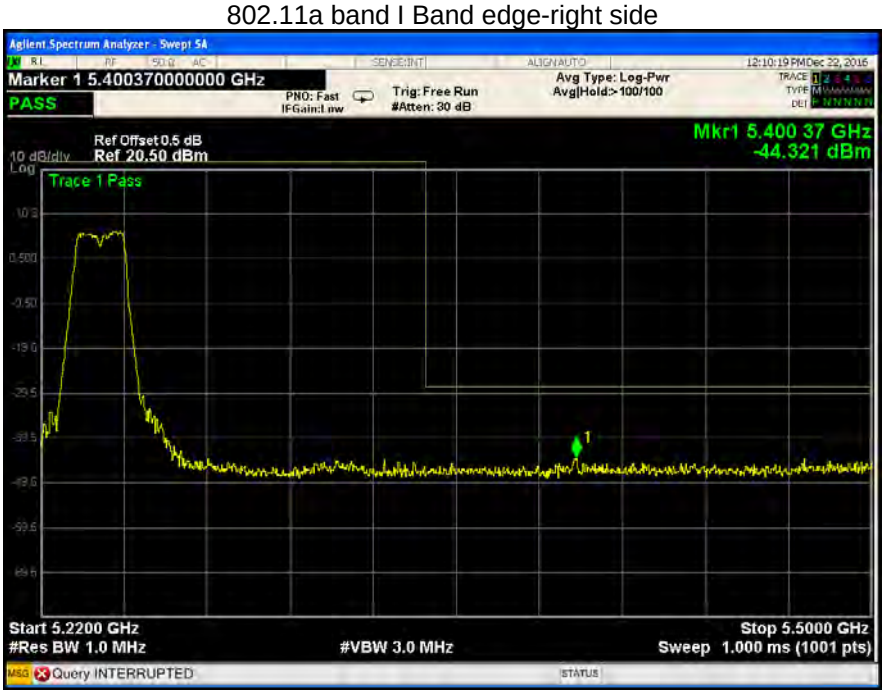
Test result plots shown as follows:

ANT 1

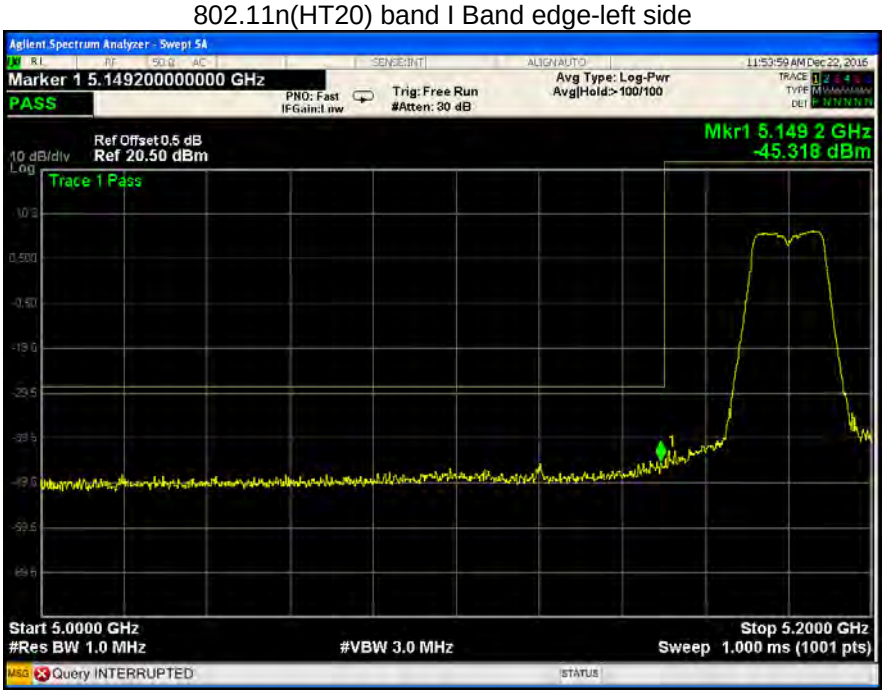
802.11a band I Band edge-left side



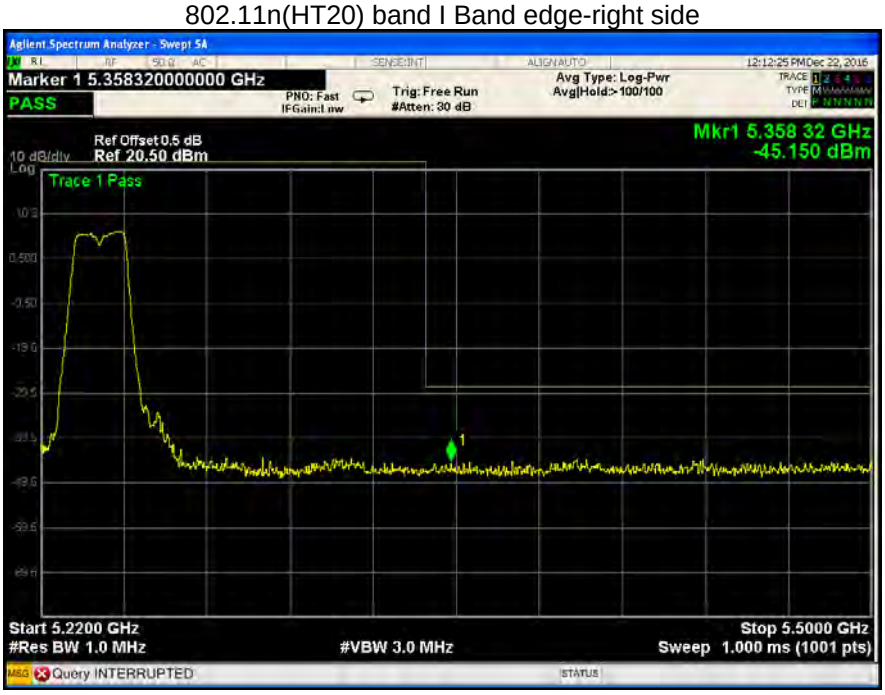
802.11a band I Band edge-right side



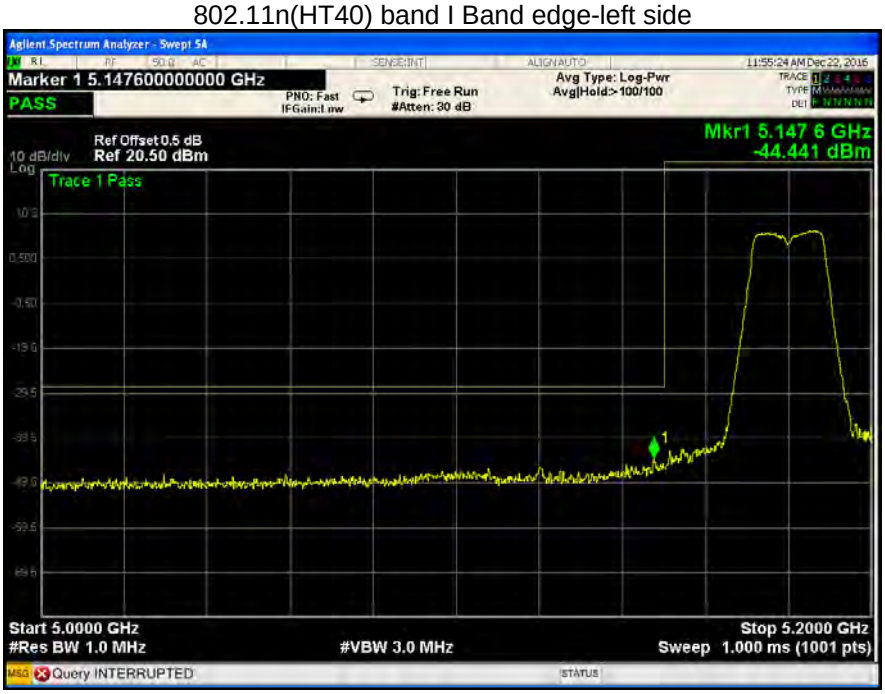
802.11n(HT20) band I Band edge-left side



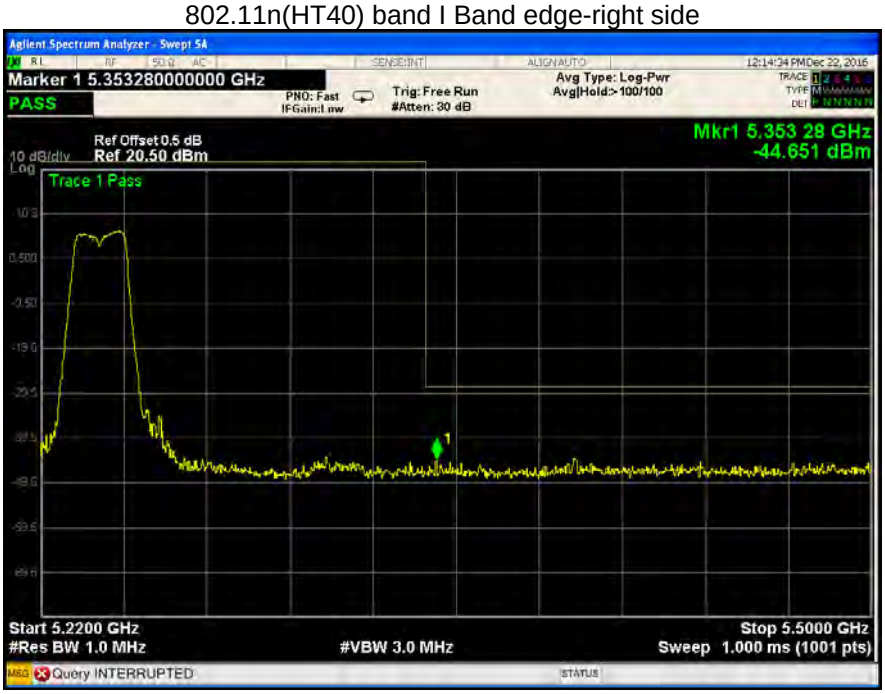
802.11n(HT20) band I Band edge-right side



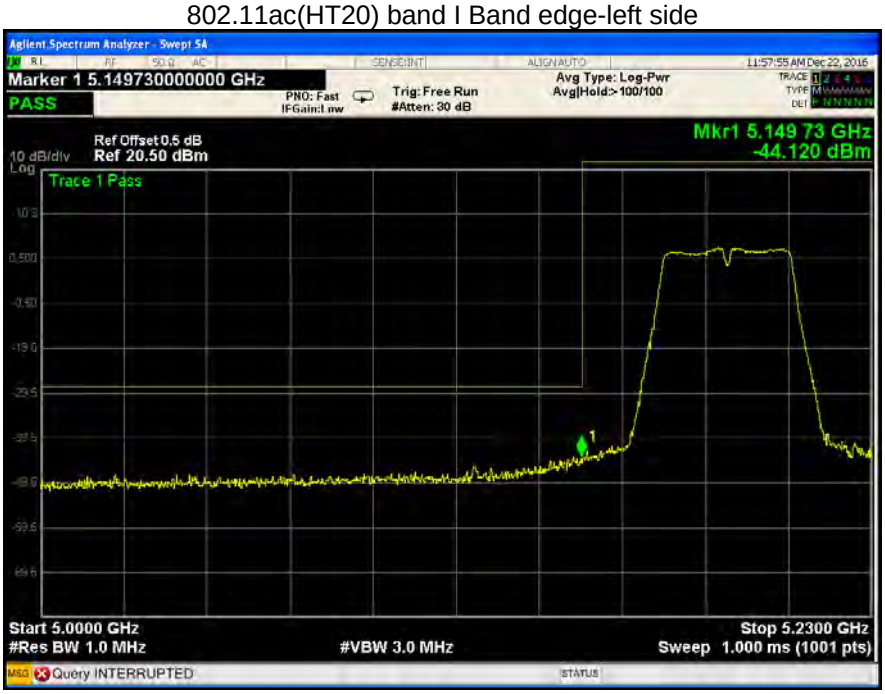
802.11n(HT40) band I Band edge-left side



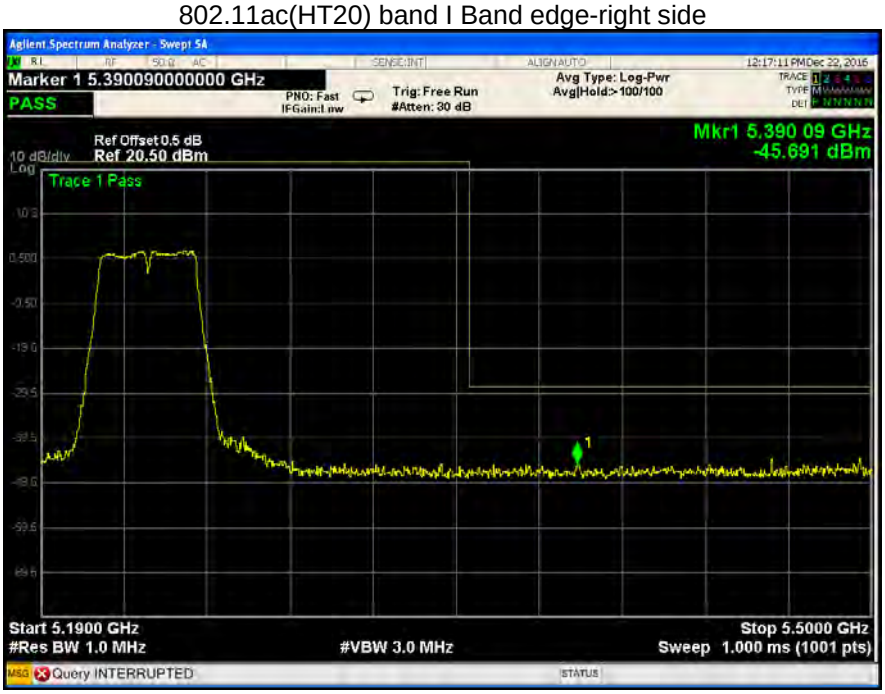
802.11n(HT40) band I Band edge-right side



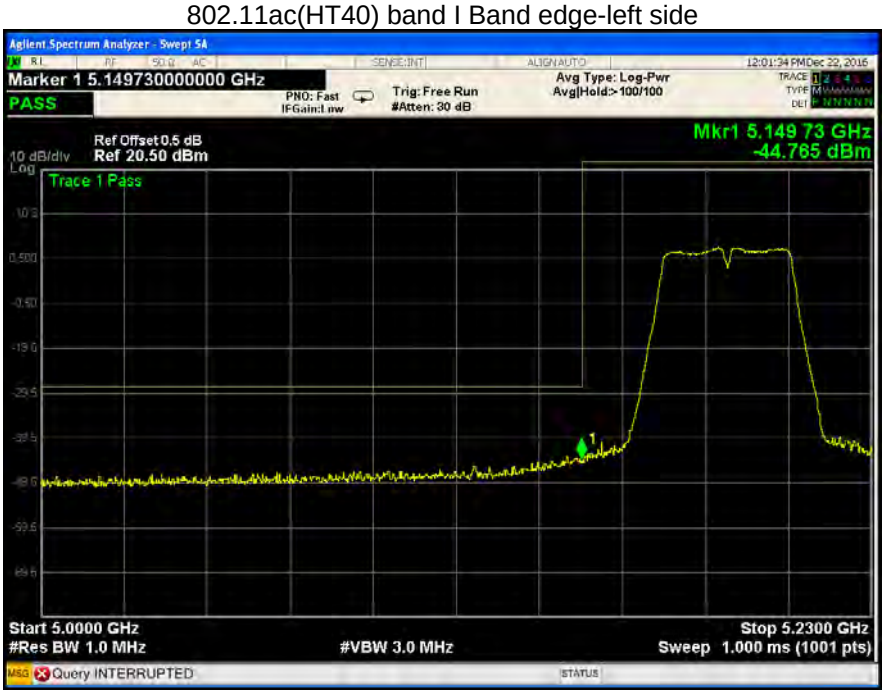
802.11ac(HT20) band I Band edge-left side



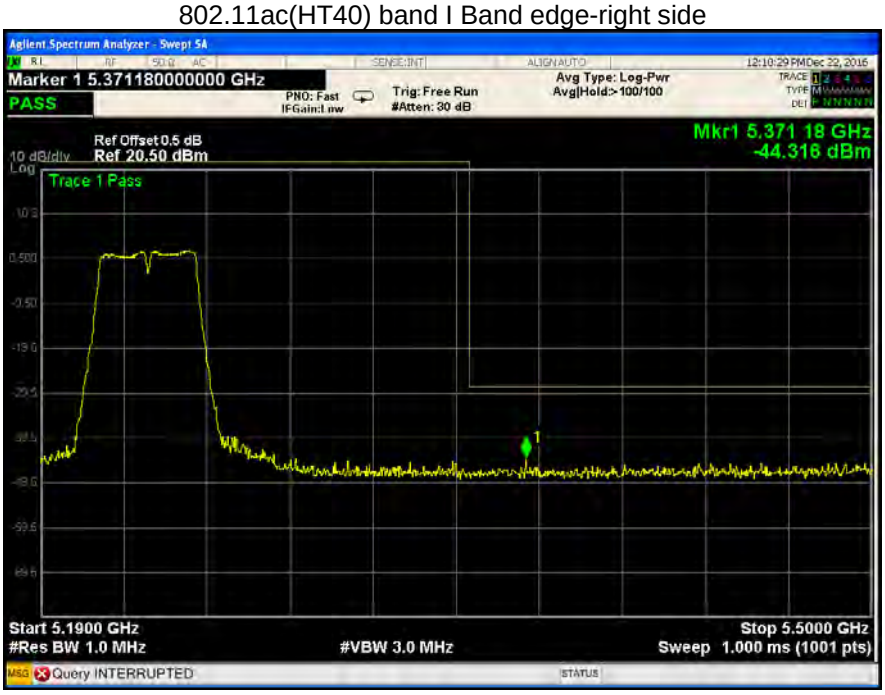
802.11ac(HT20) band I Band edge-right side



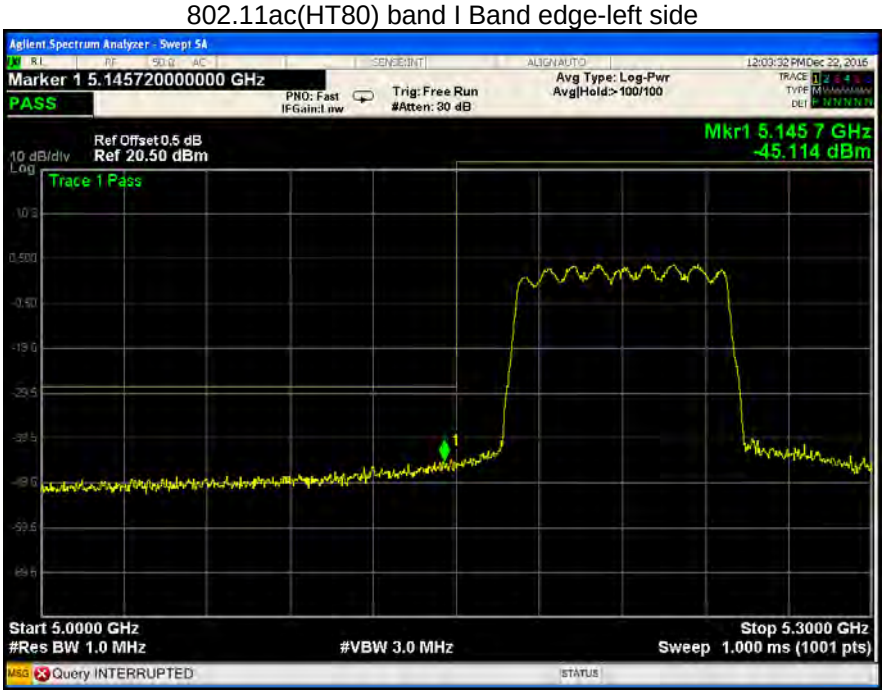
802.11ac(HT40) band I Band edge-left side



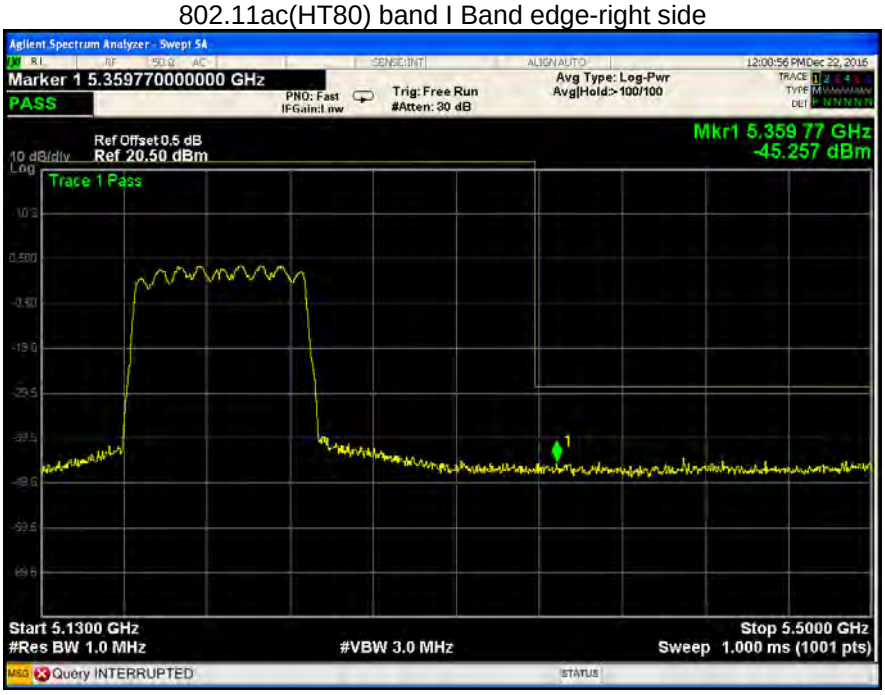
802.11ac(HT40) band I Band edge-right side



802.11ac(HT80) band I Band edge-left side

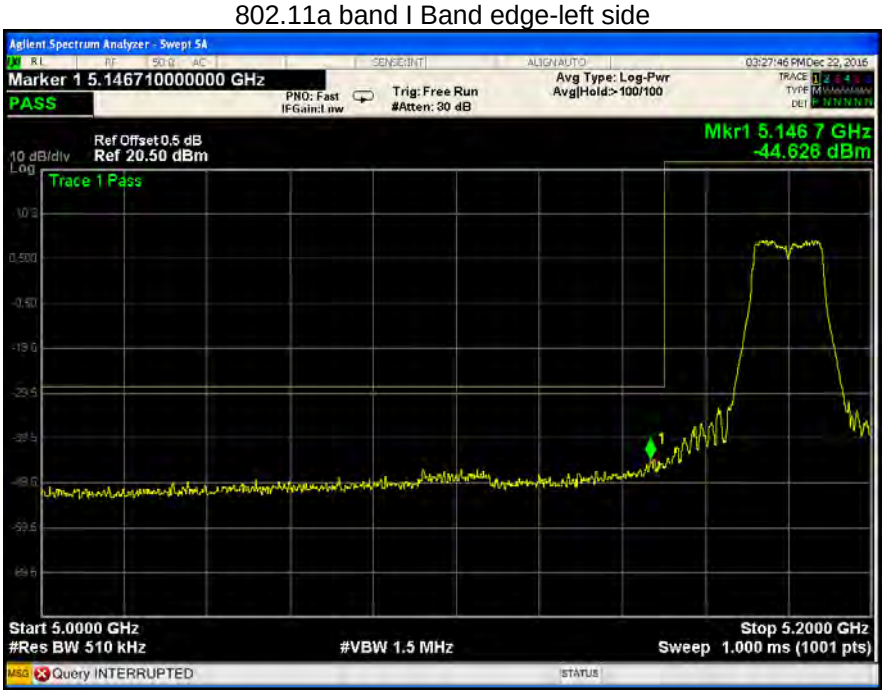


802.11ac(HT80) band I Band edge-right side

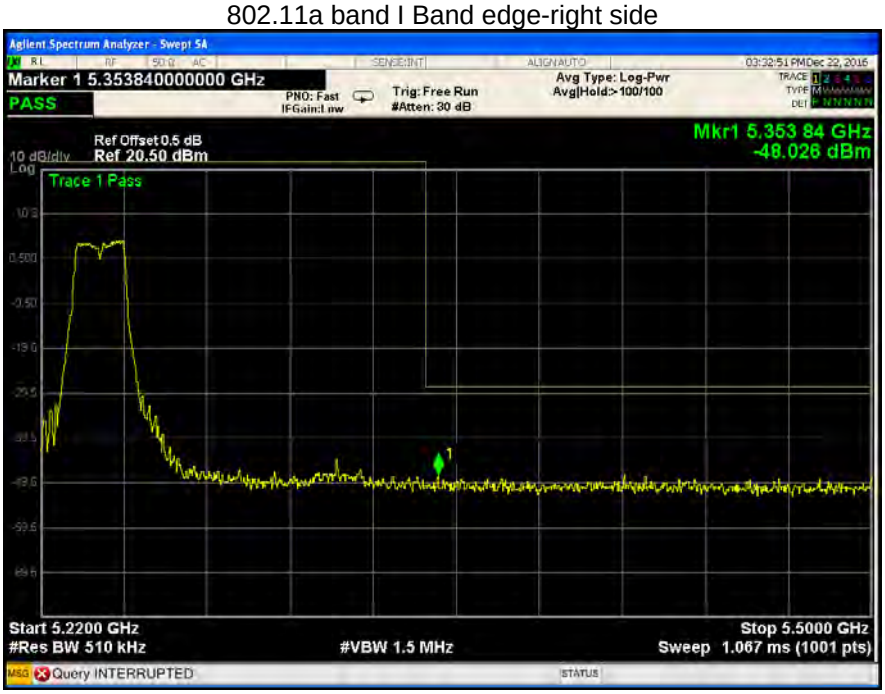


ANT 2

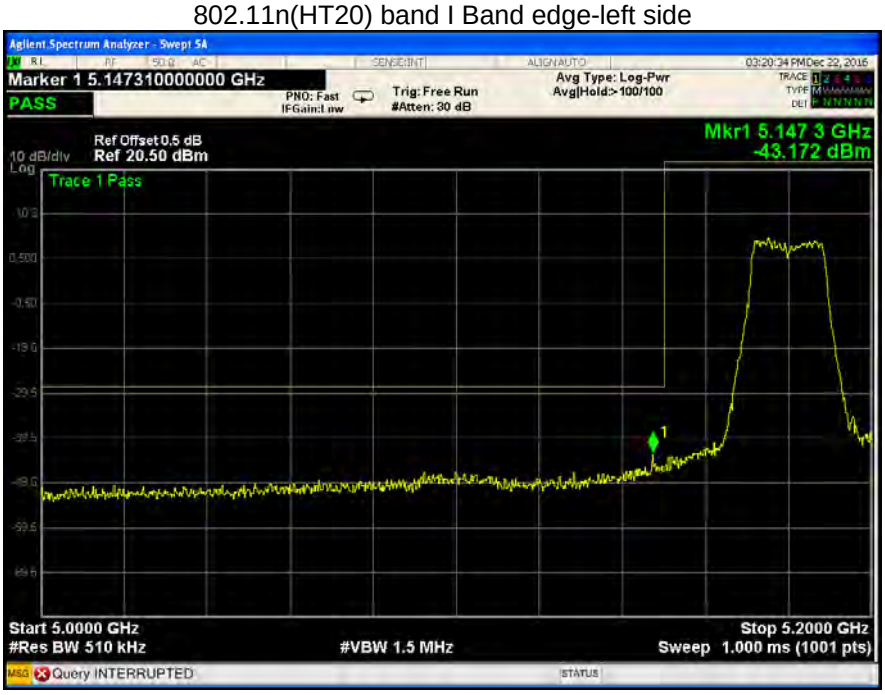
802.11a band I Band edge-left side



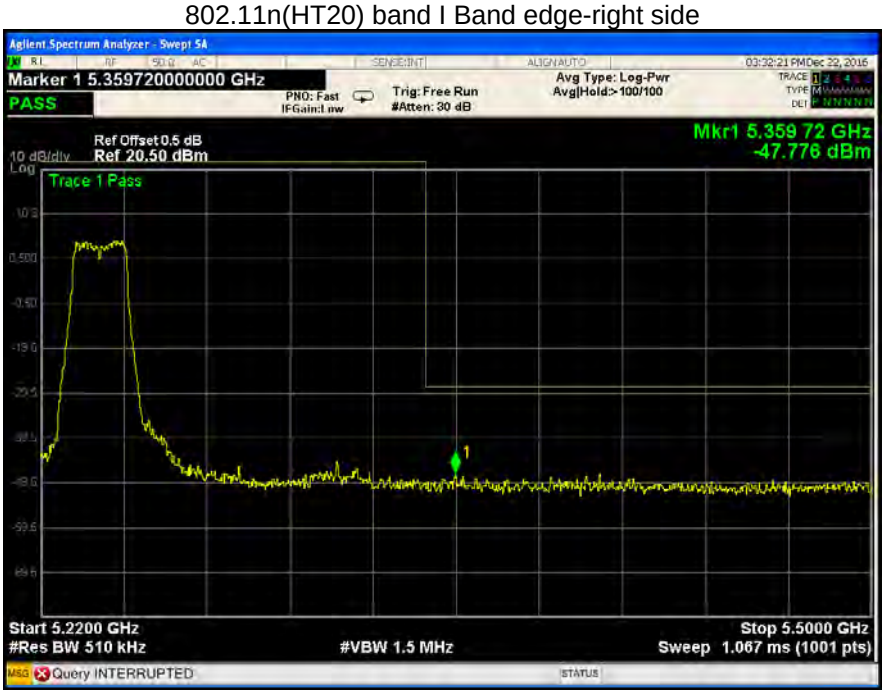
802.11a band I Band edge-right side



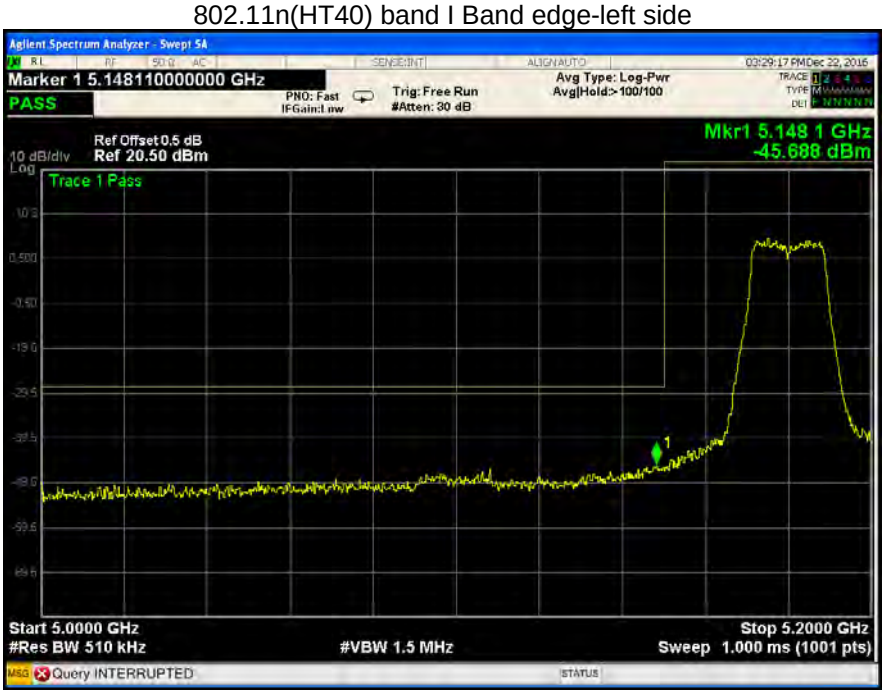
802.11n(HT20) band I Band edge-left side



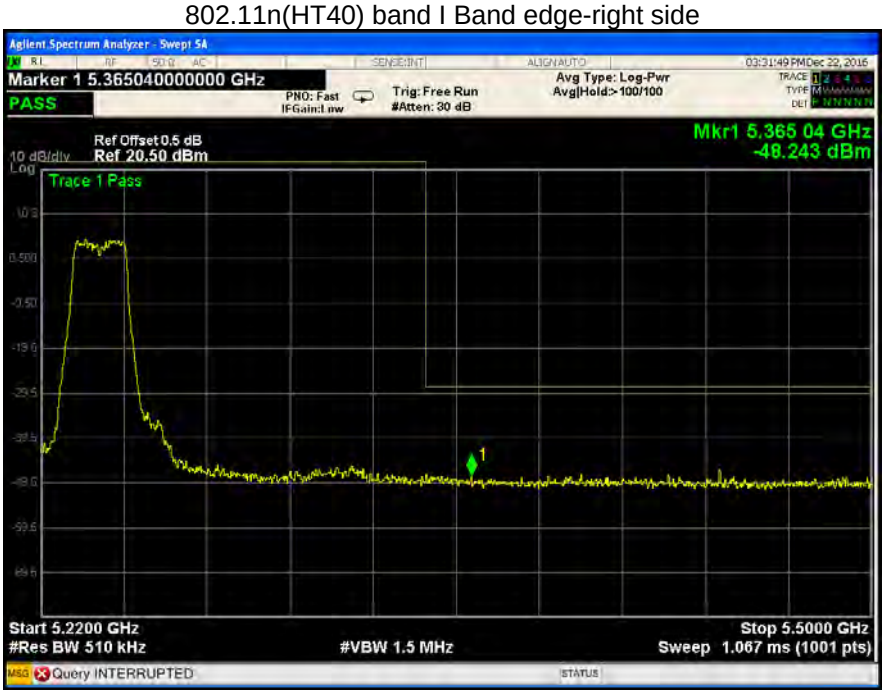
802.11n(HT20) band I Band edge-right side



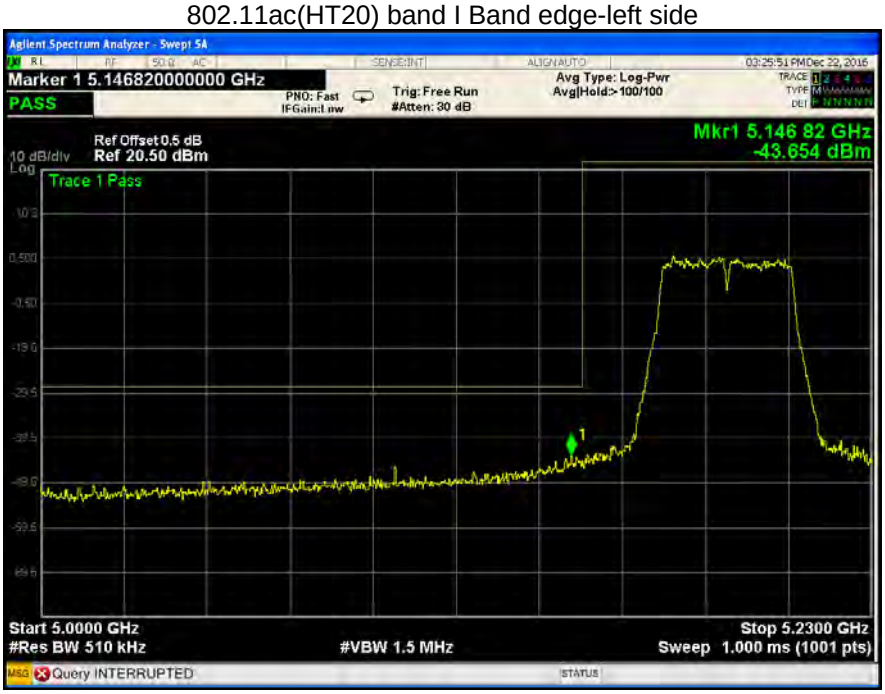
802.11n(HT40) band I Band edge-left side



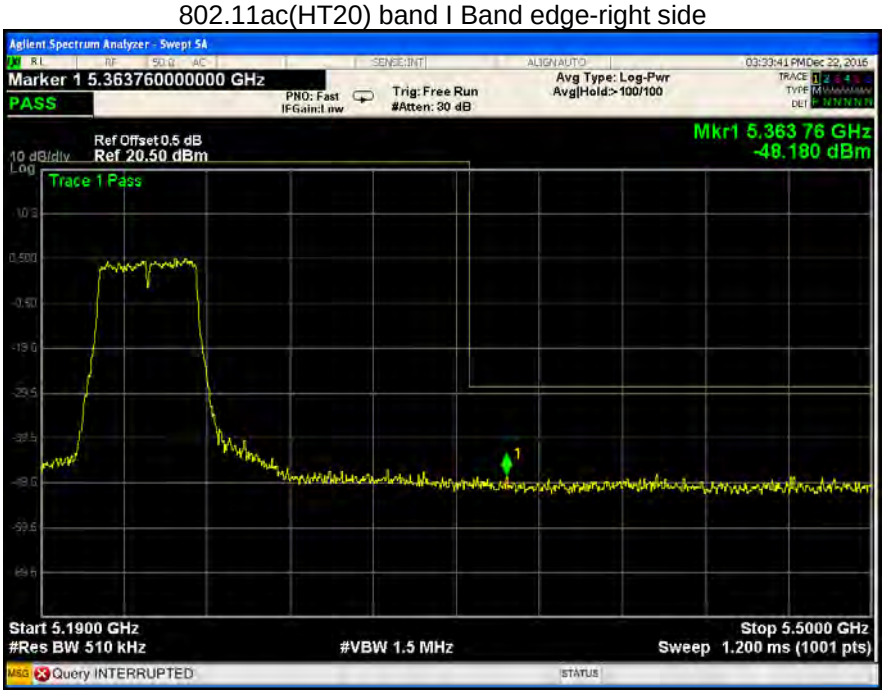
802.11n(HT40) band I Band edge-right side



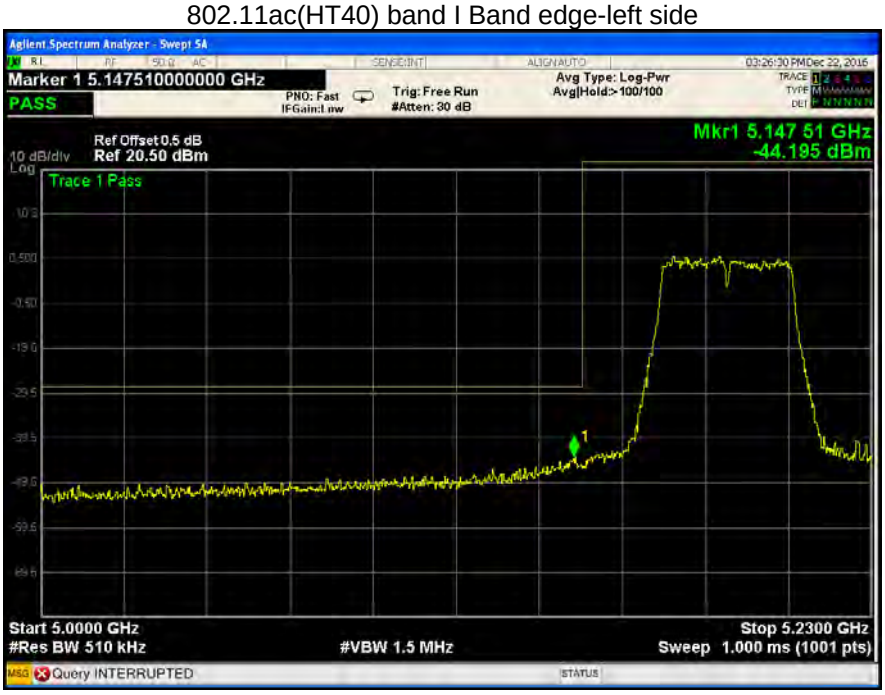
802.11ac(HT20) band I Band edge-left side



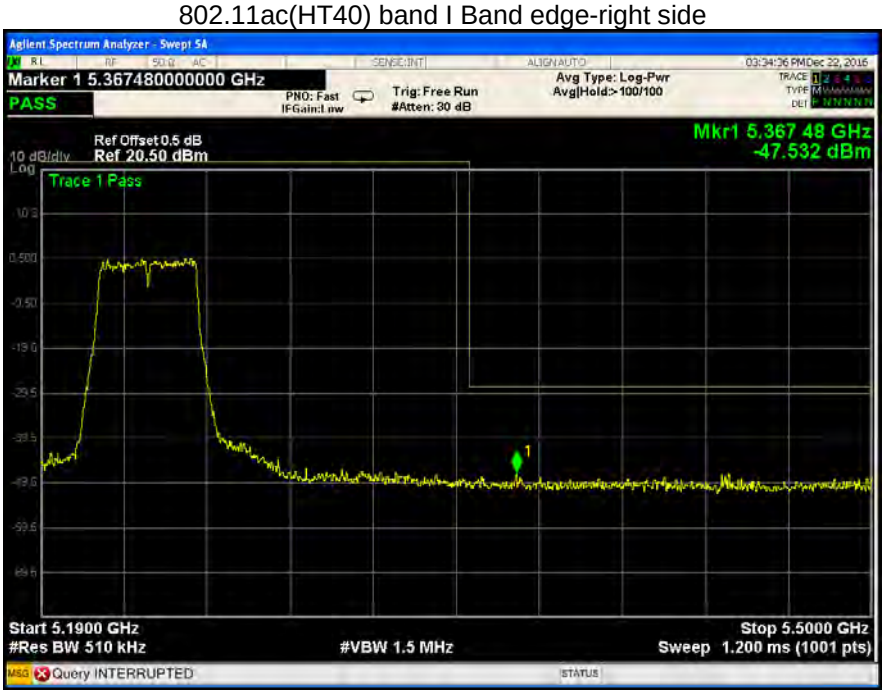
802.11ac(HT20) band I Band edge-right side



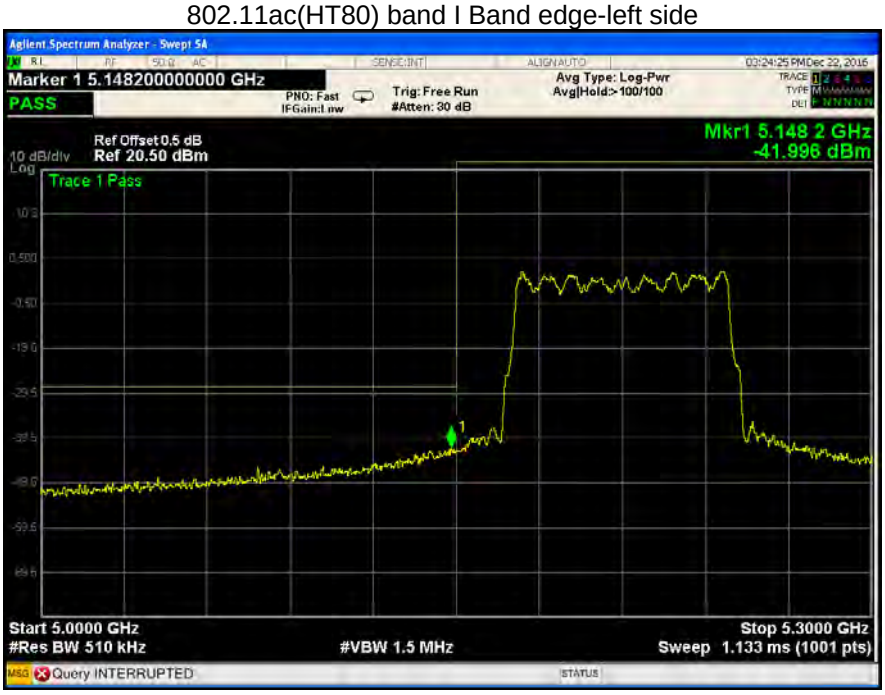
802.11ac(HT40) band I Band edge-left side



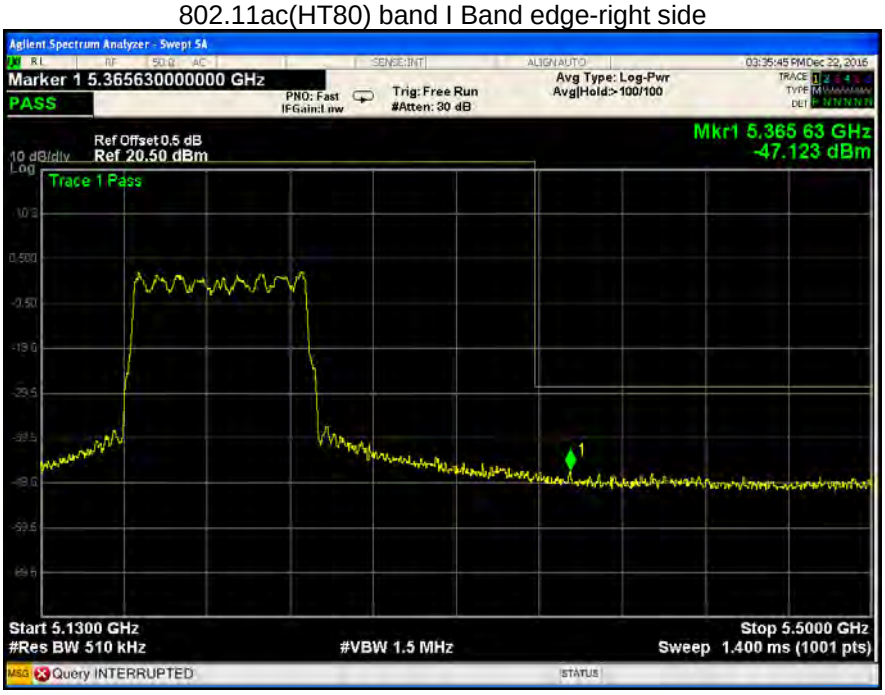
802.11ac(HT40) band I Band edge-right side



802.11ac(HT80) band I Band edge-left side



802.11ac(HT80) band I Band edge-right side



11 26 dB Bandwidth and 99% Occupied Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.407 (a)
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v01r01 KDB 644545 D03 Guidance for IEEE 802.11ac v01
Test Limit:	No restriction limits
Test Result:	PASS

11.1 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

11.2 Test Result:

ANT 1

Band	Operation mode	26 dB Bandwidth (MHz)			99% Bandwidth (MHz)		
		Low	Middle	High	Low	Middle	High
Band I	802.11a	20.64	20.79	20.72	16.61	16.61	16.62
	802.11n(HT20)	21.58	21.53	21.65	17.74	17.75	17.75
	802.11ac(HT20)	21.58	21.69	21.58	17.76	17.76	17.78
	802.11n(HT40)	43.14	/	43.14	36.31	/	36.40
	802.11ac(HT40)	42.83	/	43.28	36.29	/	36.40
	802.11ac(HT80)	82.73	/	/	75.44	/	/

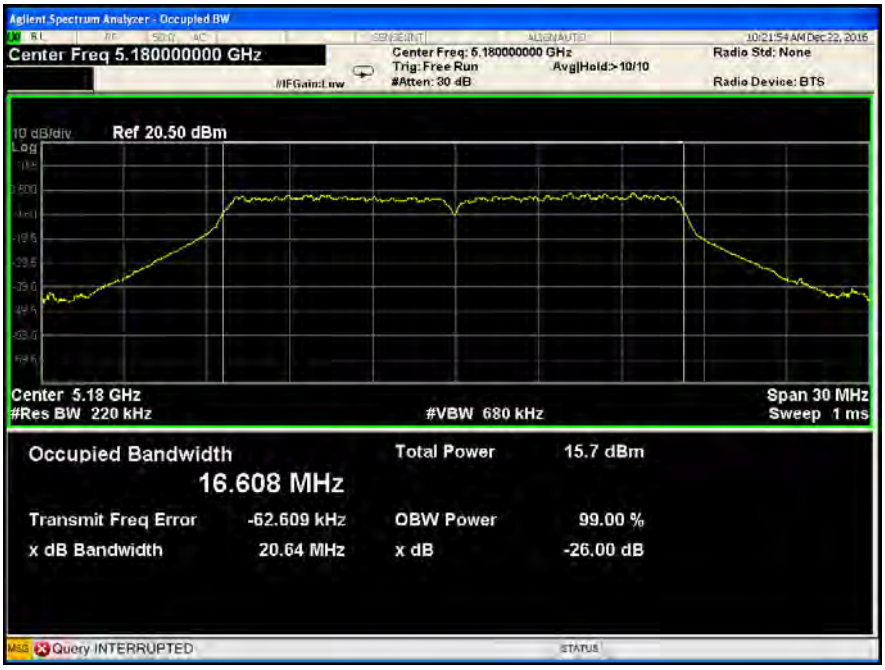
ANT 2

Band	Operation mode	26 dB Bandwidth (MHz)			99% Bandwidth (MHz)		
		Low	Middle	High	Low	Middle	High
Band I	802.11a	21.44	21.40	21.43	16.68	16.69	16.68
	802.11n(HT20)	22.24	22.09	22.25	17.84	17.83	17.84
	802.11ac(HT20)	22.14	22.17	22.17	17.86	17.87	17.86
	802.11n(HT40)	43.07	/	43.33	36.35	/	36.35
	802.11ac(HT40)	43.22	/	43.05	36.33	/	36.35
	802.11ac(HT80)	84.82	/	/	75.94	/	/

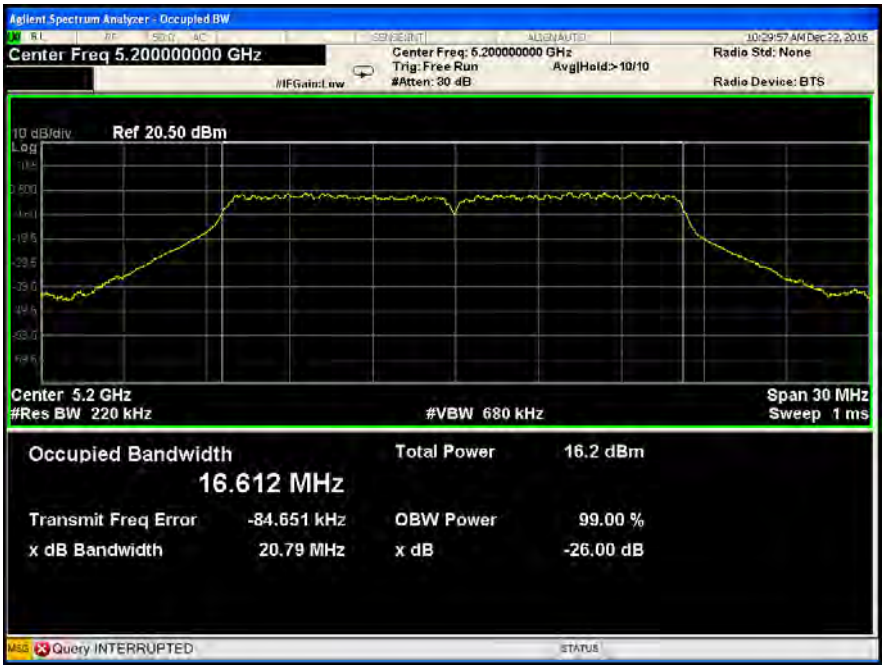
Test result plots shown as follows:

ANT 1

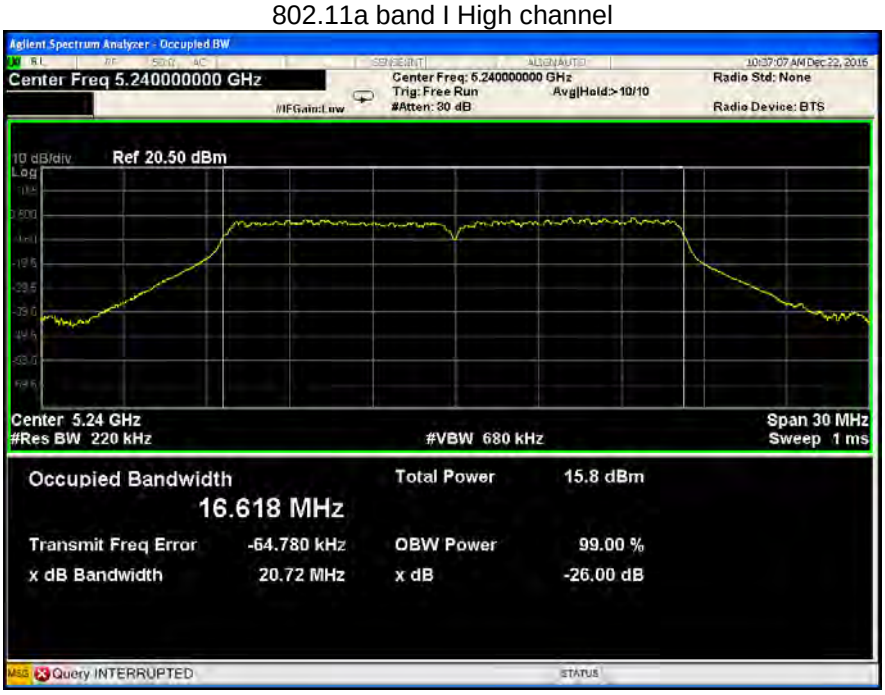
802.11a band I Low channel



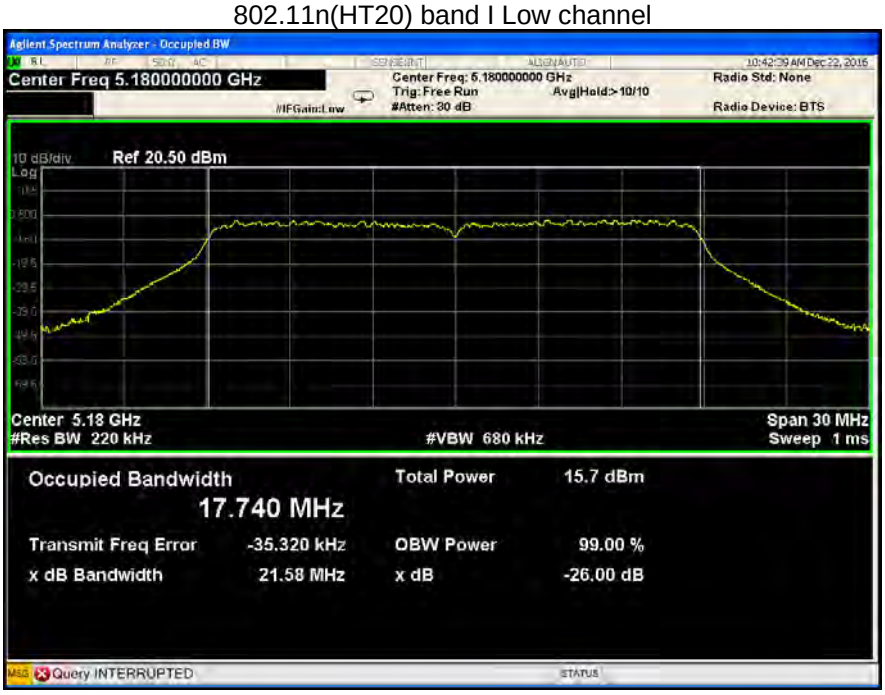
802.11a band I Middle channel



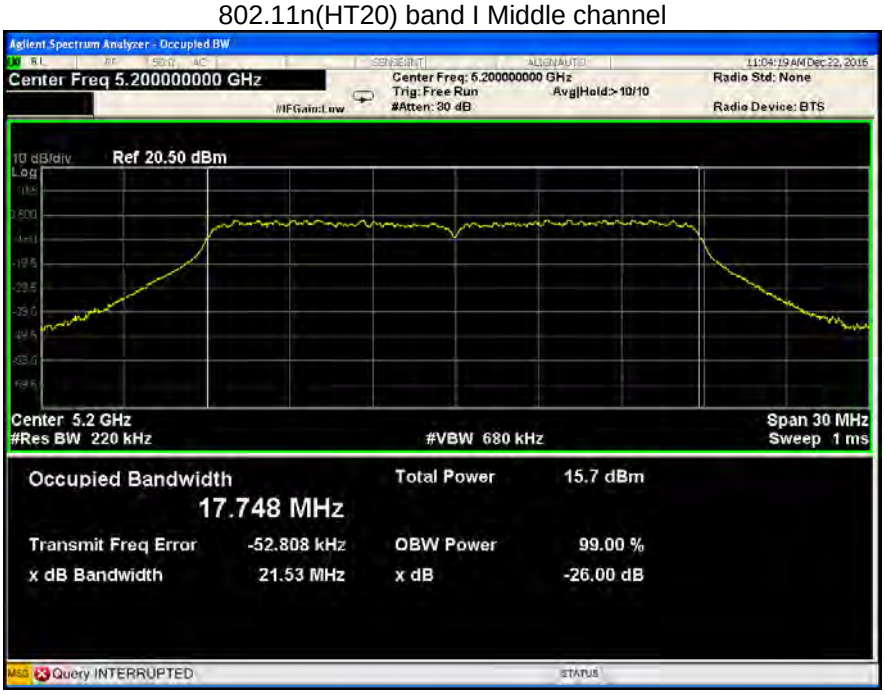
802.11a band I High channel



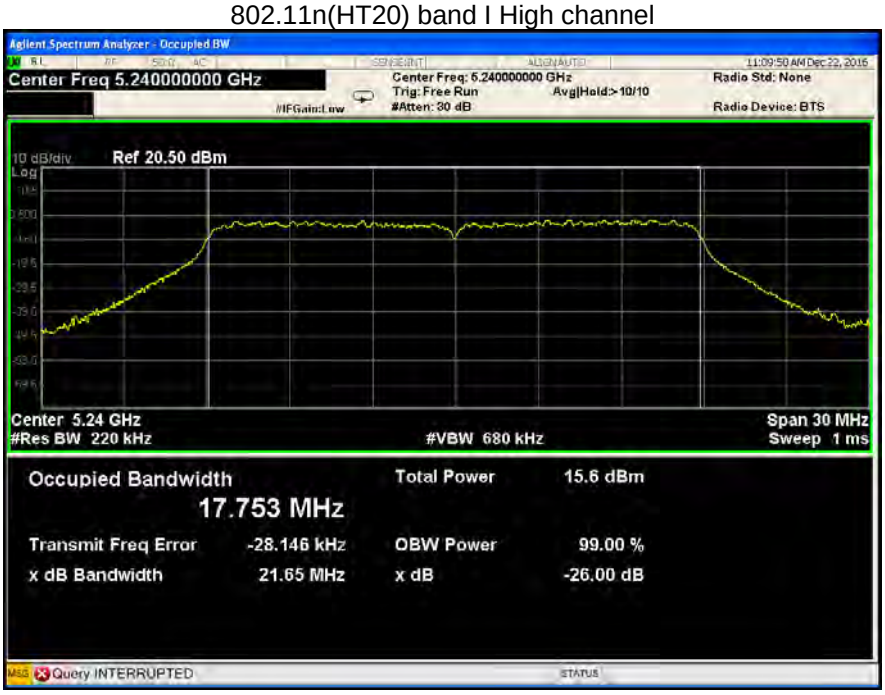
802.11n(HT20) band I Low channel



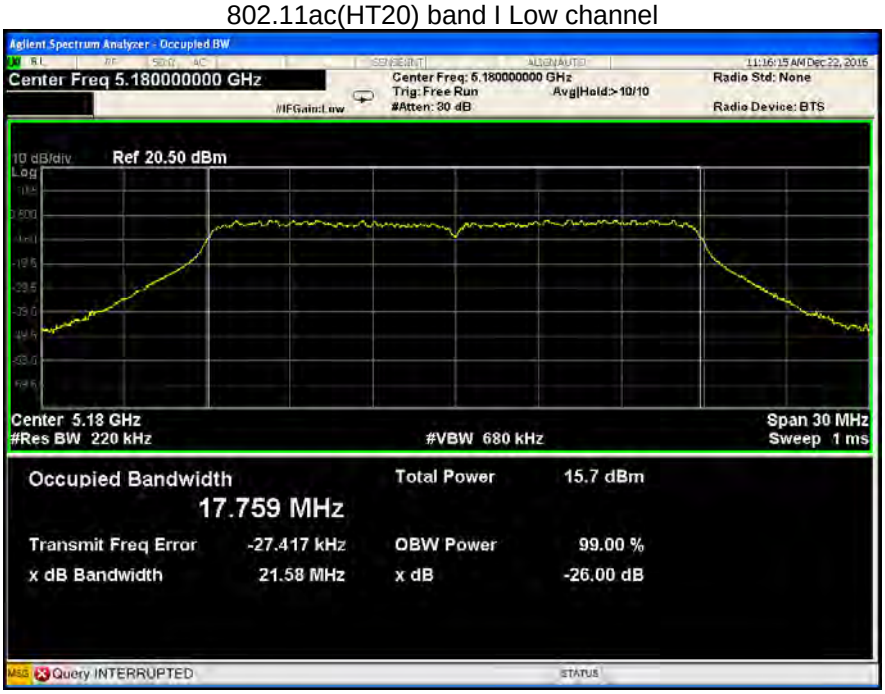
802.11n(HT20) band I Middle channel



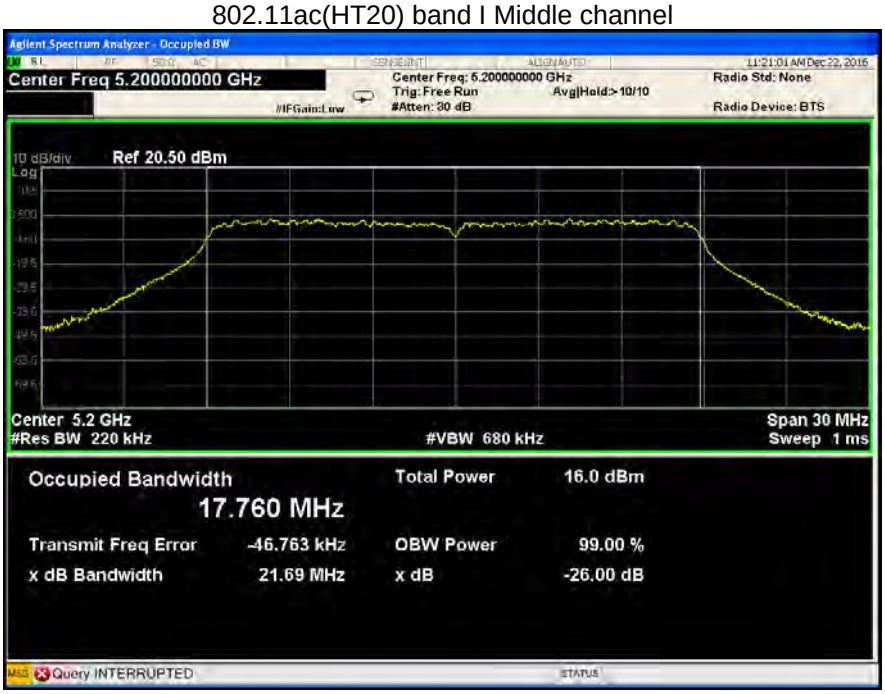
802.11n(HT20) band I High channel



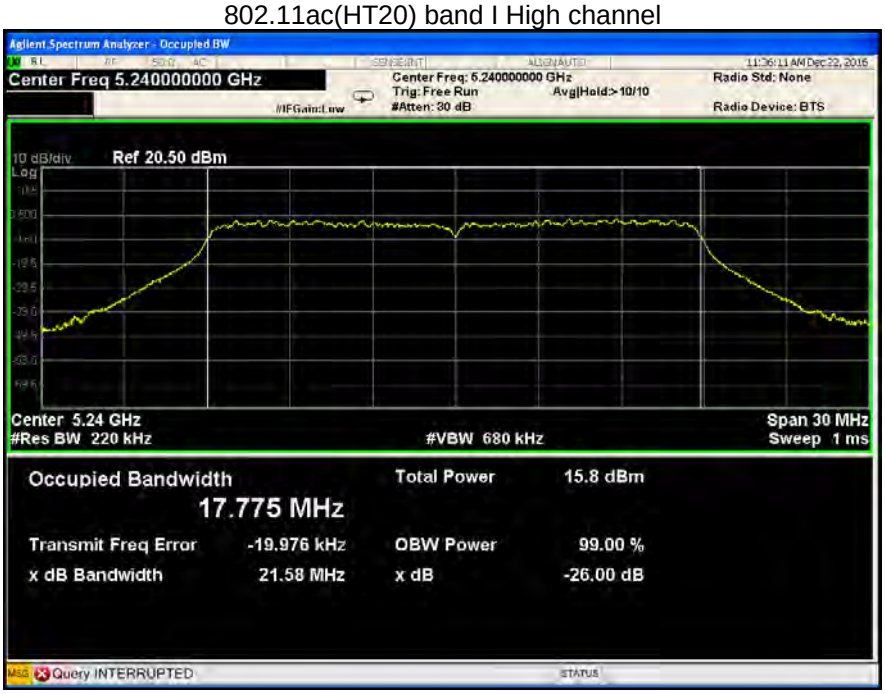
802.11ac(HT20) band I Low channel



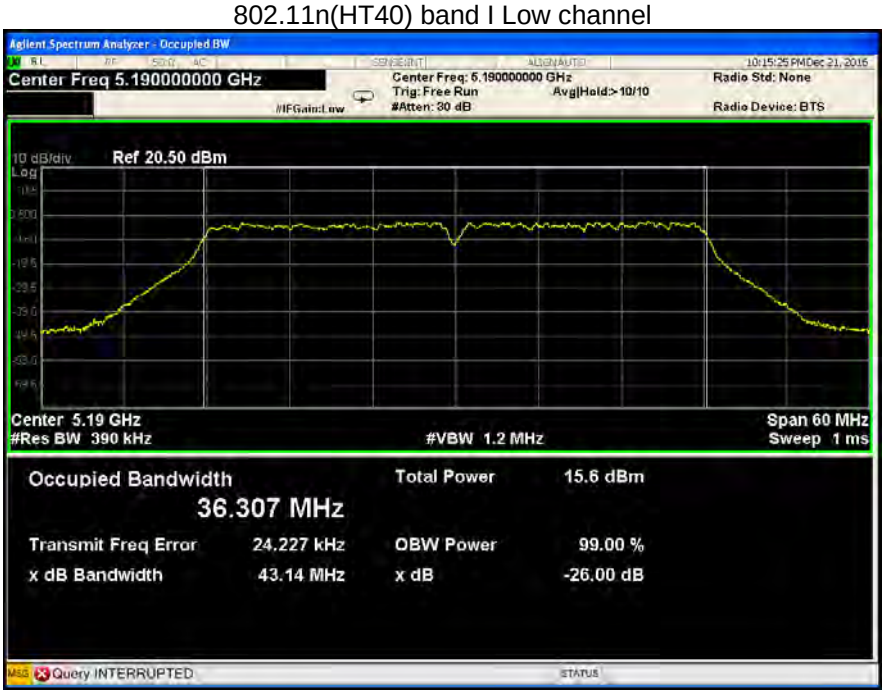
802.11ac(HT20) band I Middle channel



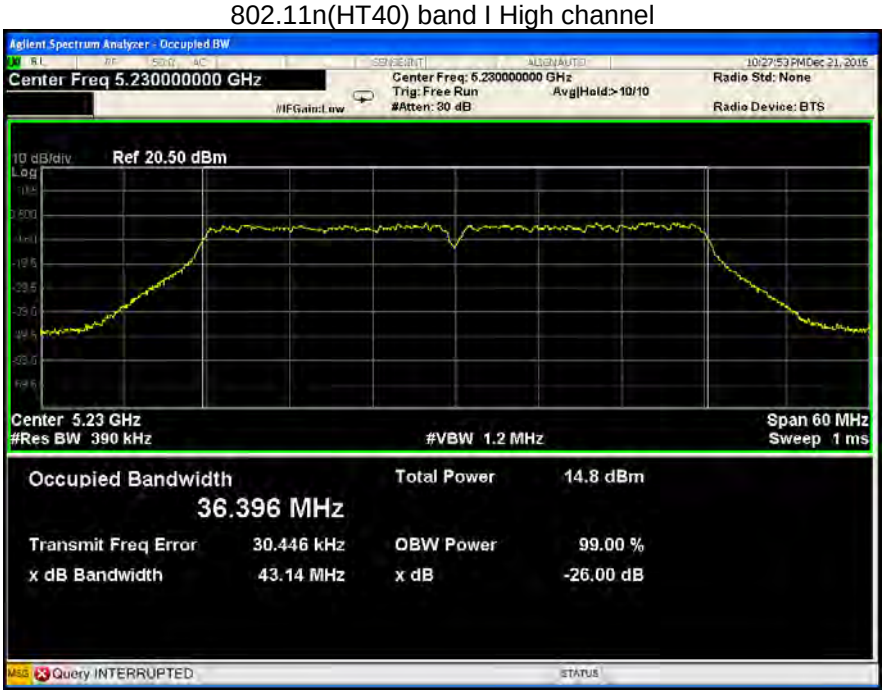
802.11ac(HT20) band I High channel



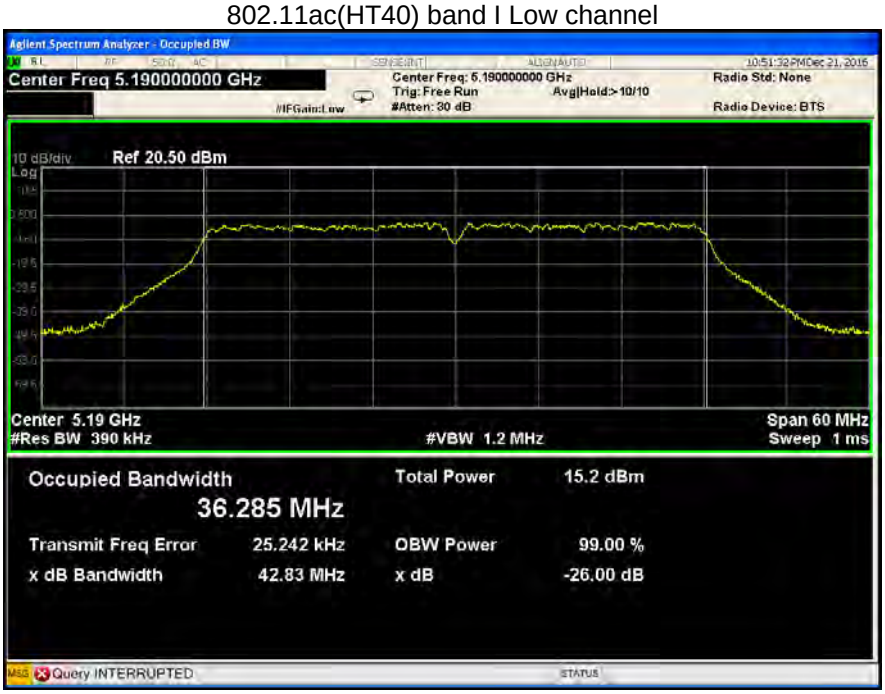
802.11n(HT40) band I Low channel



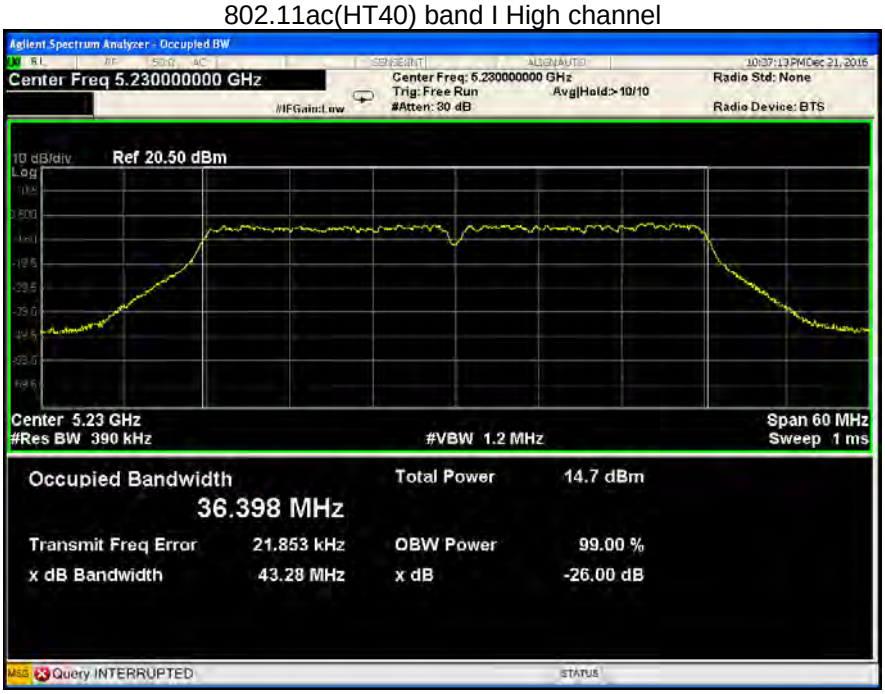
802.11n(HT40) band I High channel



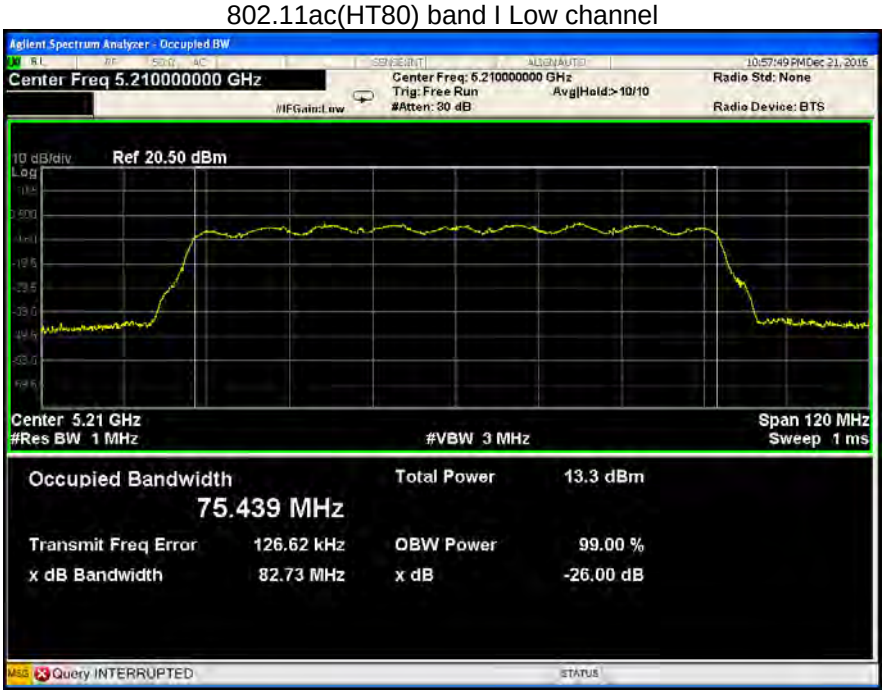
802.11ac(HT40) band I Low channel



802.11ac(HT40) band I High channel

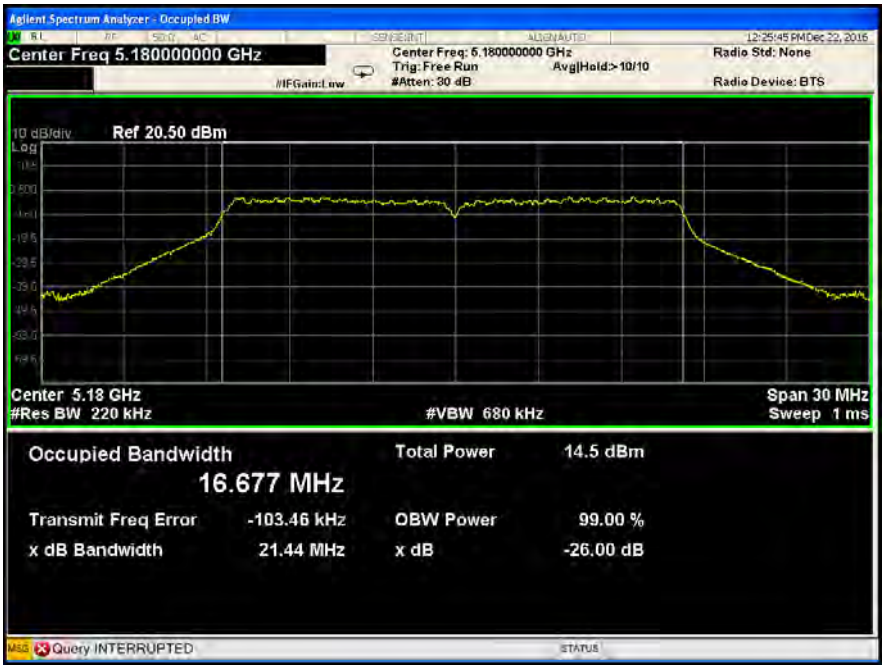


802.11ac(HT80) band I Low channel

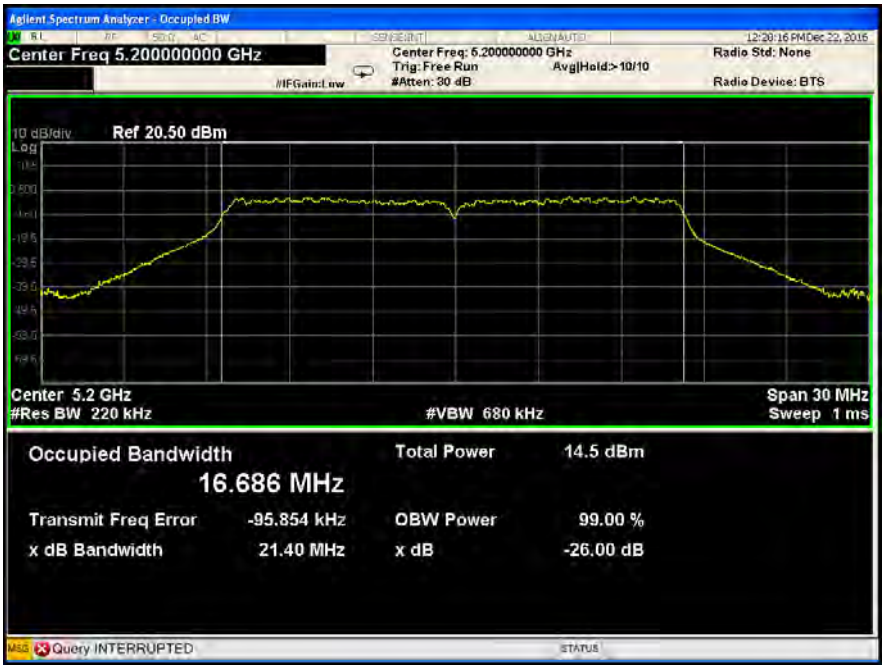


ANT 2

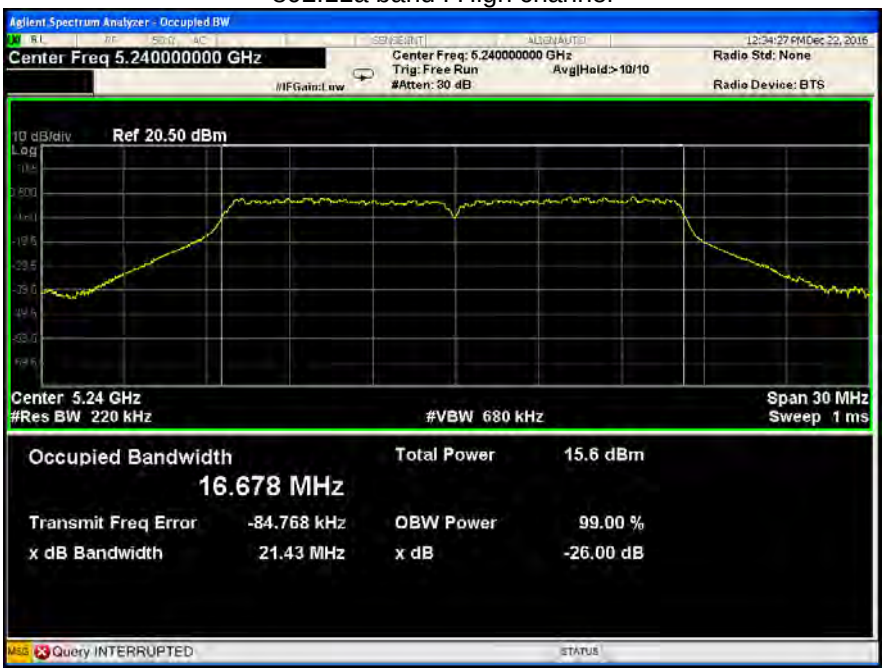
802.11a band I Low channel



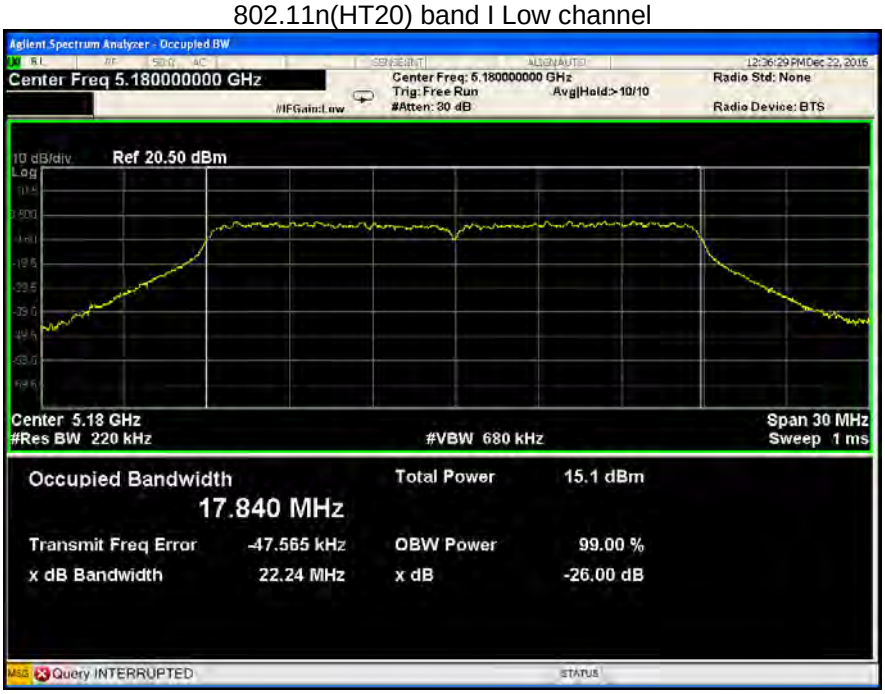
802.11a band I Middle channel



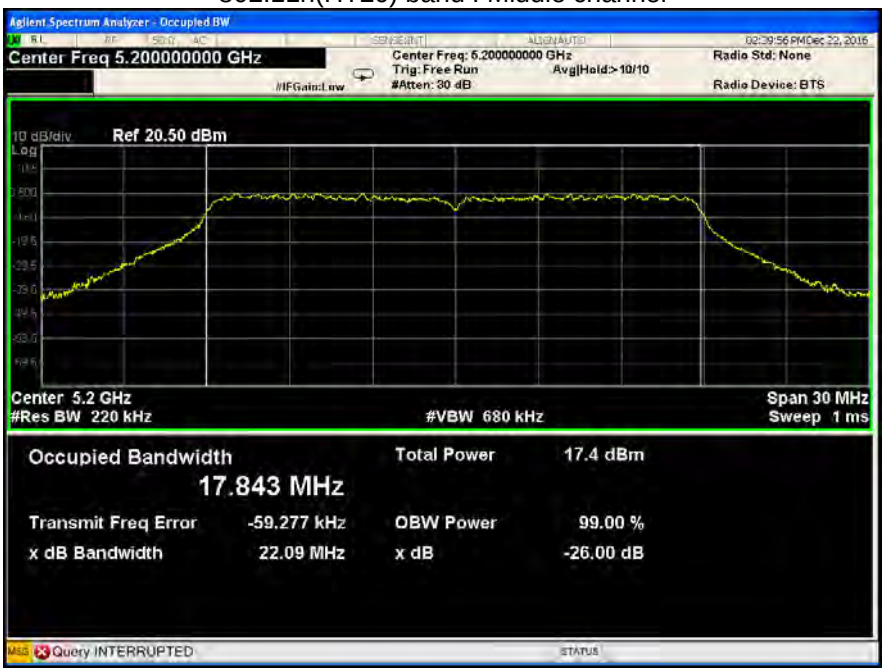
802.11a band I High channel



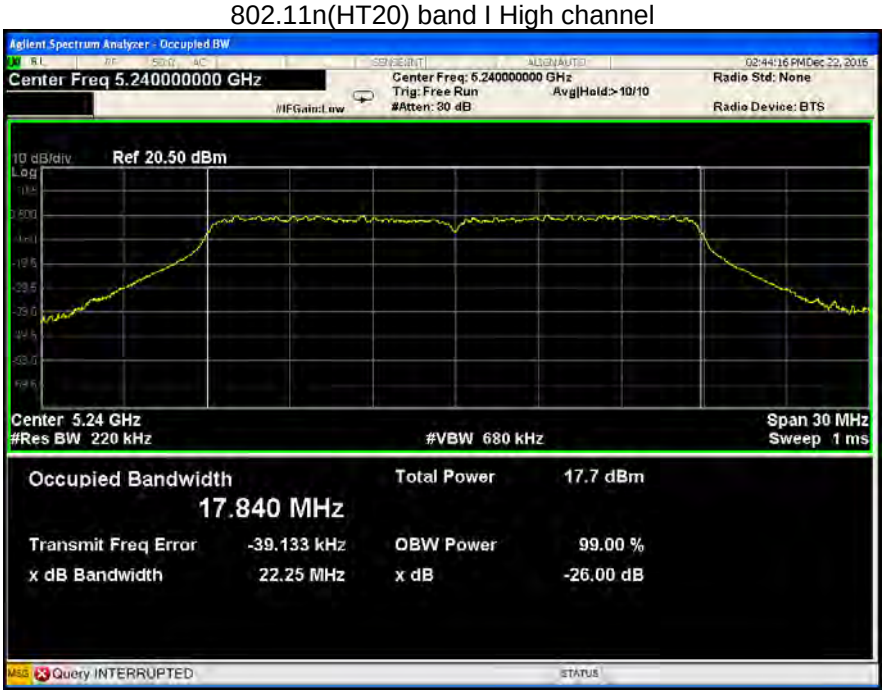
802.11n(HT20) band I Low channel



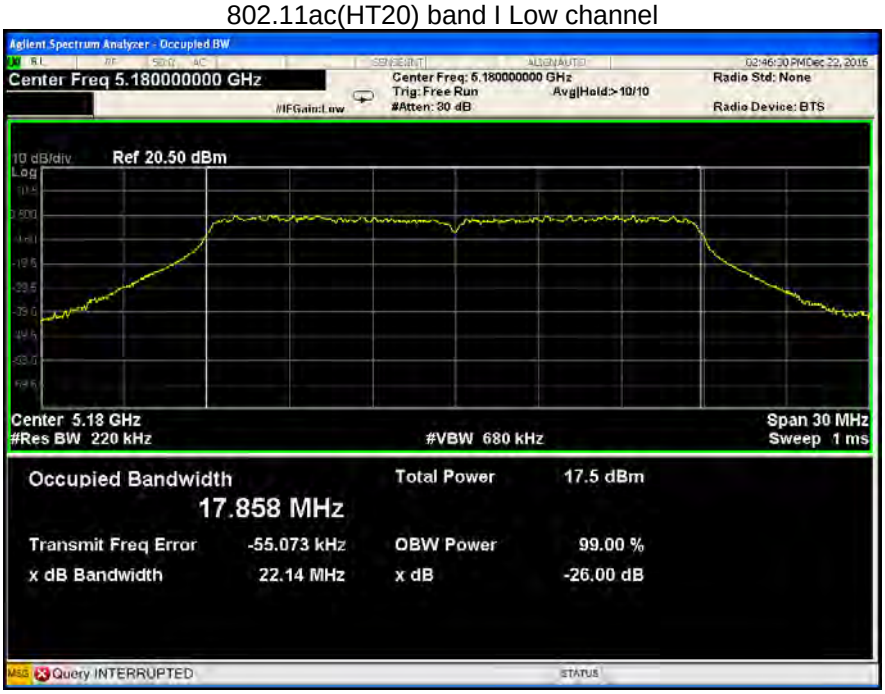
802.11n(HT20) band I Middle channel



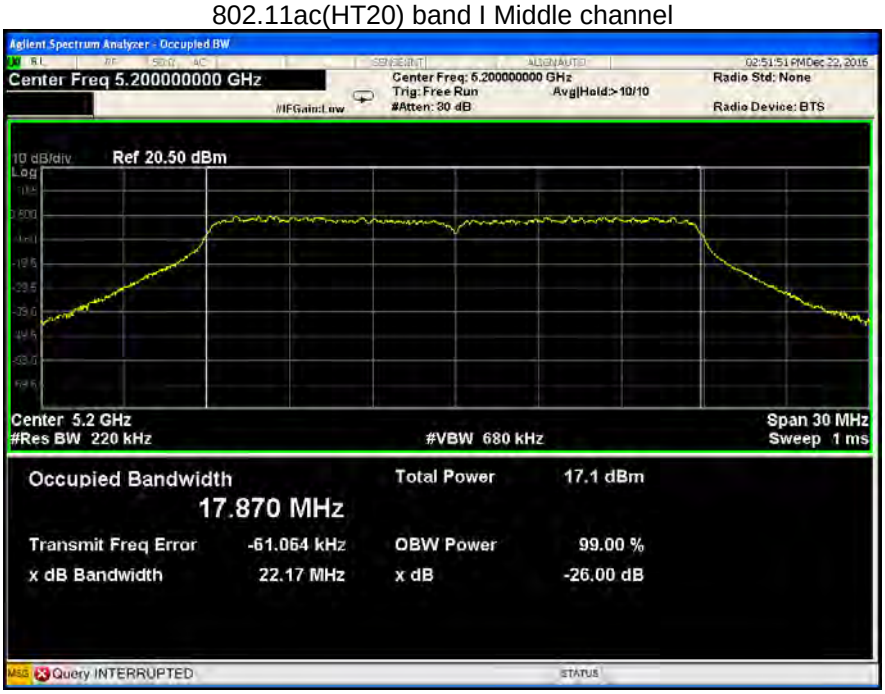
802.11n(HT20) band I High channel



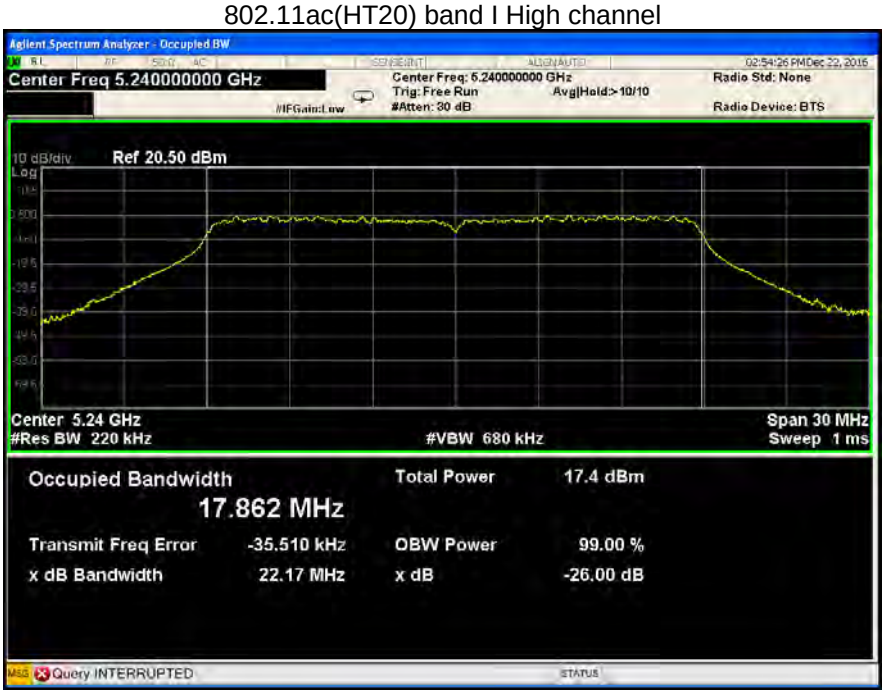
802.11ac(HT20) band I Low channel



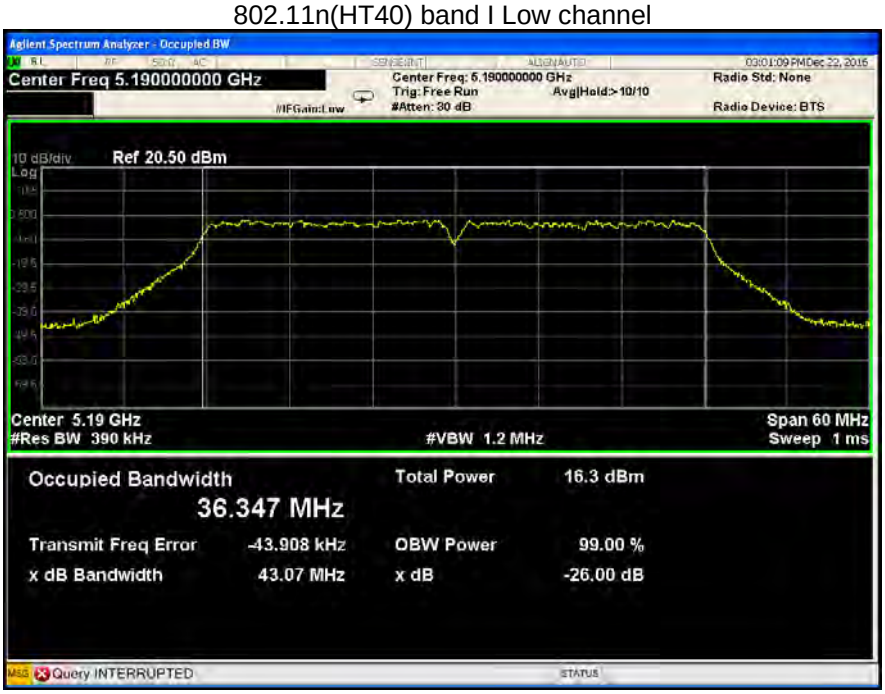
802.11ac(HT20) band I Middle channel



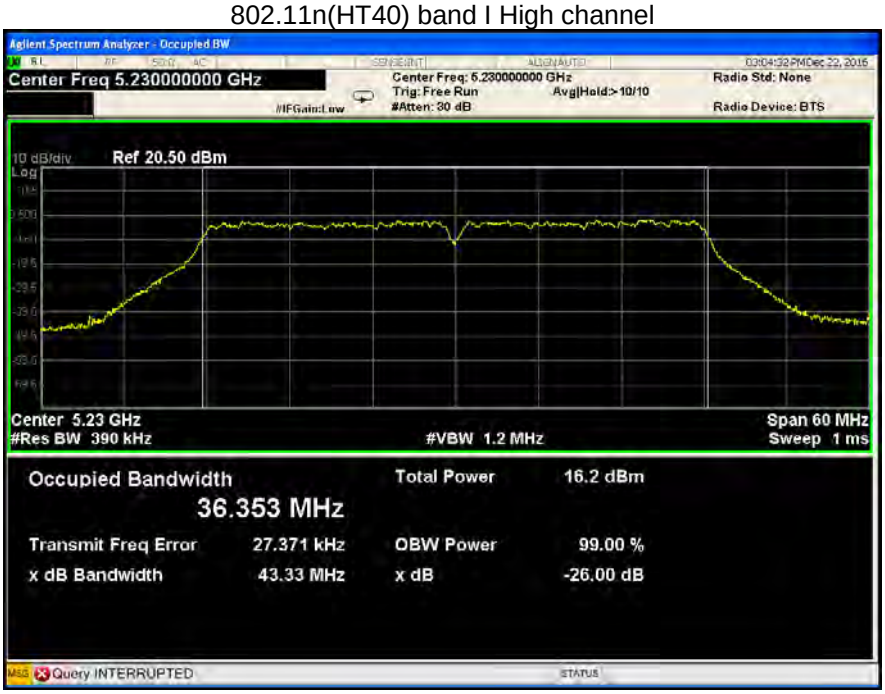
802.11ac(HT20) band I High channel



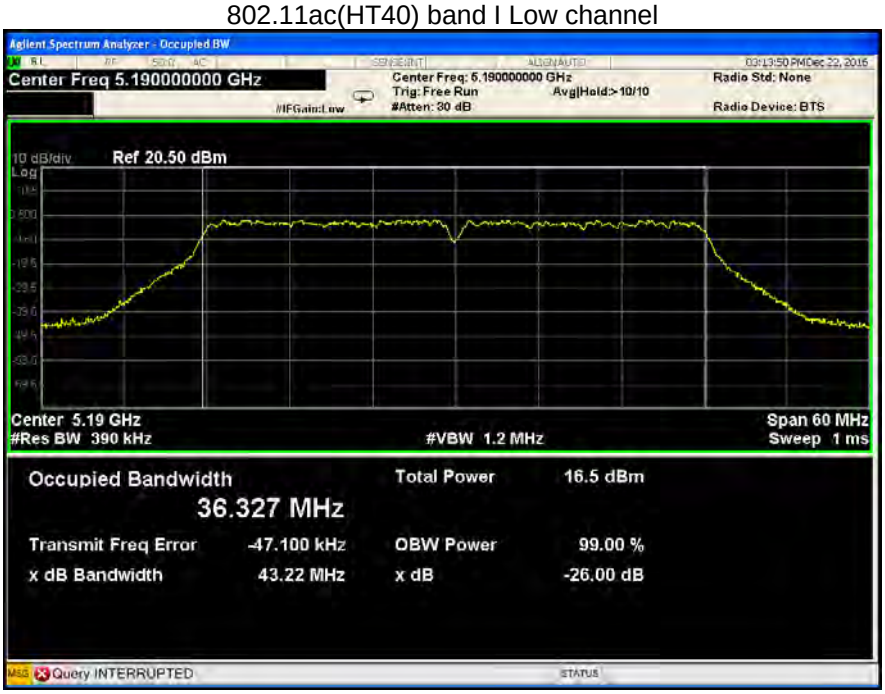
802.11n(HT40) band I Low channel



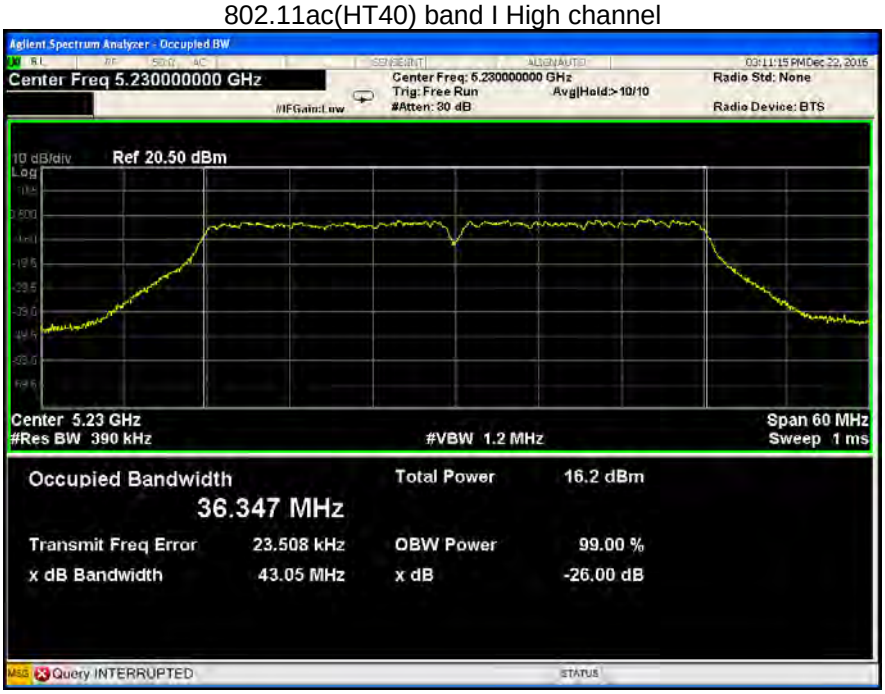
802.11n(HT40) band I High channel



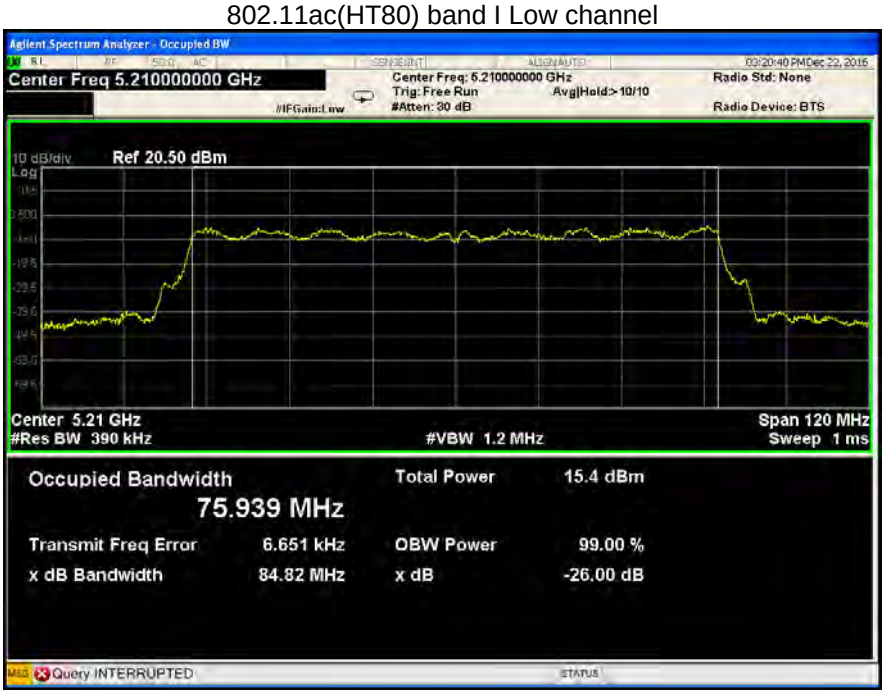
802.11ac(HT40) band I Low channel



802.11ac(HT40) band I High channel



802.11ac(HT80) band I Low channel



12 Conducted Output Power

Test Requirement:	FCC CFR47 Part 15 Section 15.407(a)
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v01r01 KDB 644545 D03 Guidance for IEEE 802.11ac v01
Test Limit:	30dBm
Test Result:	PASS
Remark:	Conducted output power= measurement power+10log(1/x) X is duty cycle=1, so 10log(1/1)=0 Conducted output power= measurement power

12.1 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 = 1 MHz. VBW = 3 MHz. Sweep = auto; Detector Function = Peak, Set the span to fully encompass the DTS bandwidth.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

12.2 Test Result:

ANT 1：

Band	Operation mode	Conducted Output Power (dBm)		
		Low	Middle	High
Band I	802.11a	14.88	15.09	14.90
	802.11n(HT20)	15.19	15.31	15.17
	802.11ac(HT20)	15.23	15.61	15.26
	802.11n(HT40)	14.53	/	14.02
	802.11ac(HT40)	14.36	/	13.88
	802.11ac(HT80)	13.20	/	/

ANT 2：

Band	Operation mode	Conducted Output Power (dBm)		
		Low	Middle	High
Band I	802.11a	13.87	13.60	14.88
	802.11n(HT20)	14.20	16.92	16.84
	802.11ac(HT20)	16.97	16.61	16.92
	802.11n(HT40)	15.72	/	15.36
	802.11ac(HT40)	15.79	/	15.41
	802.11ac(HT80)	14.54	/	/

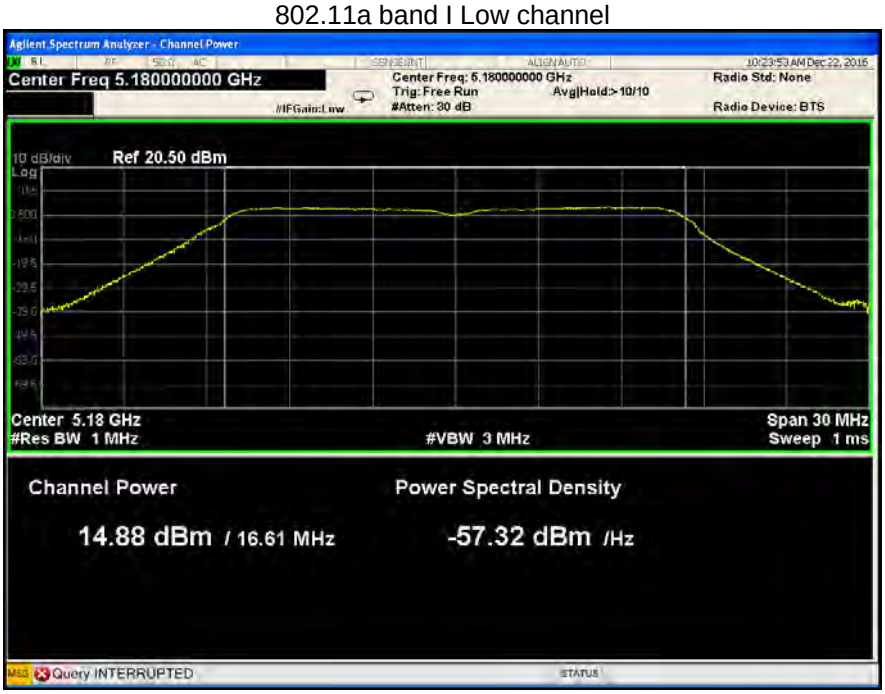
ANT 1+ANT 2：

Band	Operation mode	Conducted Output Power (dBm)		
		Low	Middle	High
Band I	802.11a	17.67	18.03	18.09
	802.11n(HT20)	17.53	18.20	18.33
	802.11ac(HT20)	17.5	18.35	18.53
	802.11n(HT40)	17.42	/	16.90
	802.11ac(HT40)	17.41	/	16.95
	802.11ac(HT80)	16.36	/	/

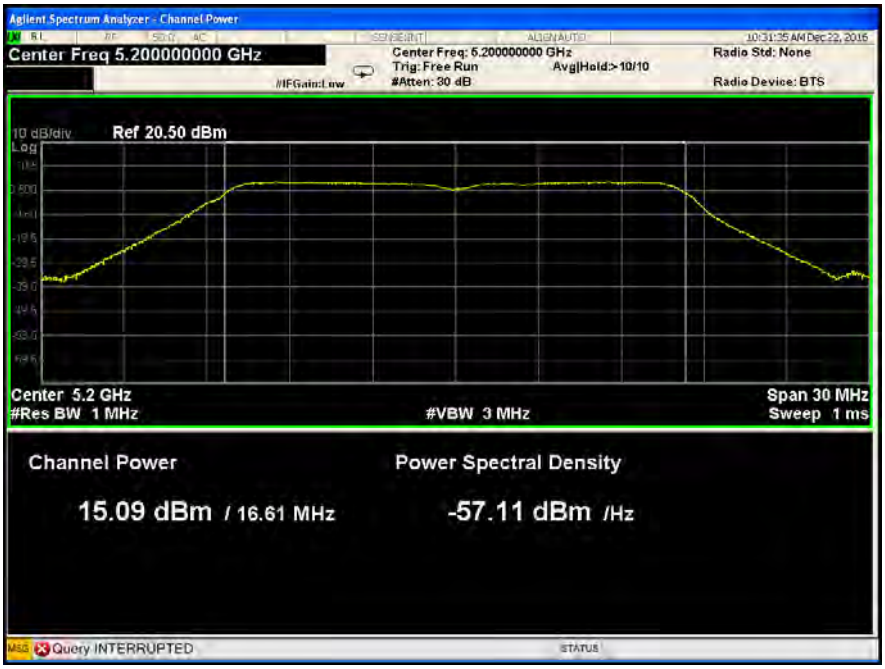
Test result plots shown as follows:

ANT 1

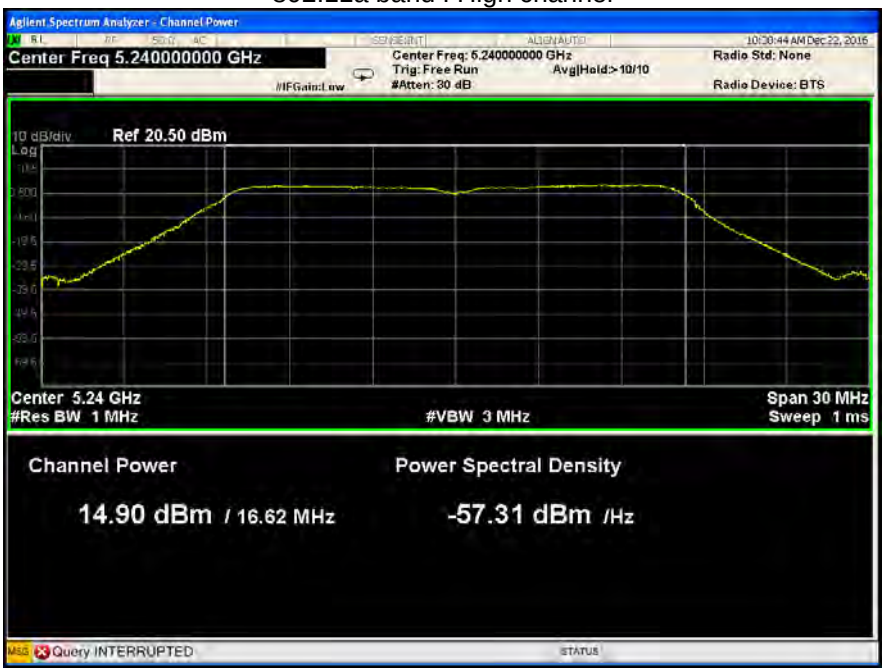
802.11a band I Low channel



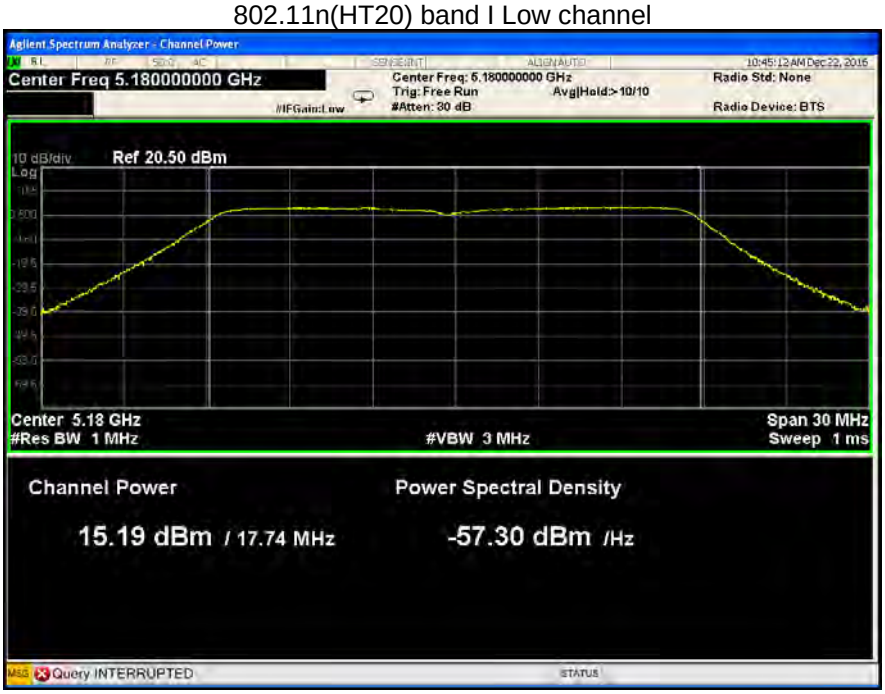
802.11a band I Middle channel



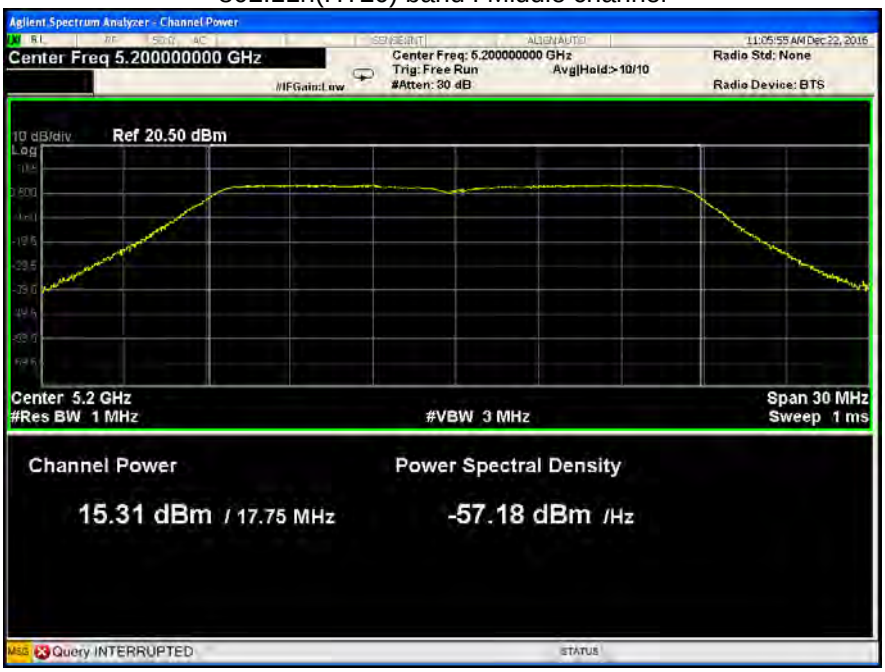
802.11a band I High channel



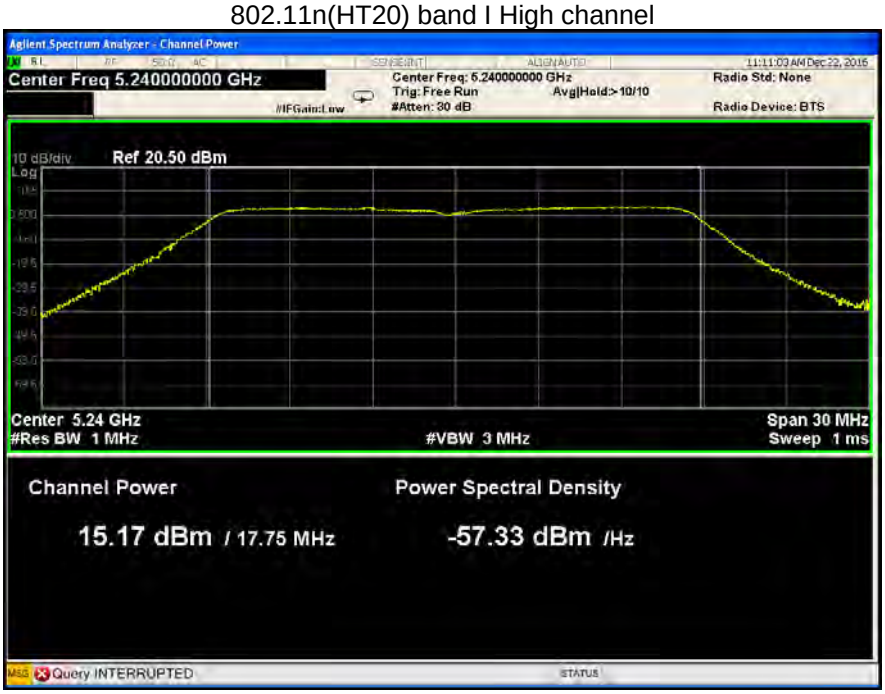
802.11n(HT20) band I Low channel



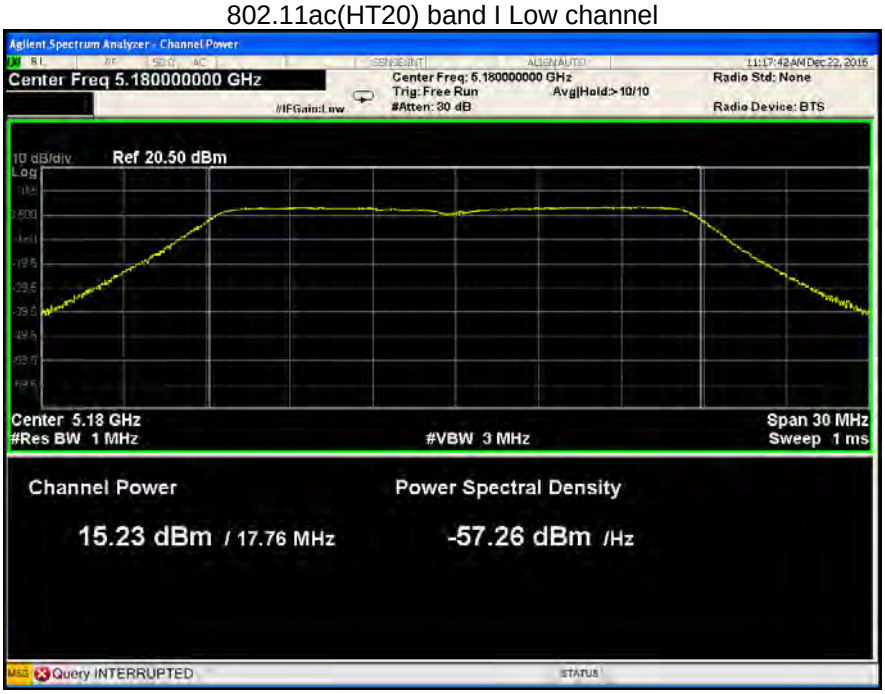
802.11n(HT20) band I Middle channel



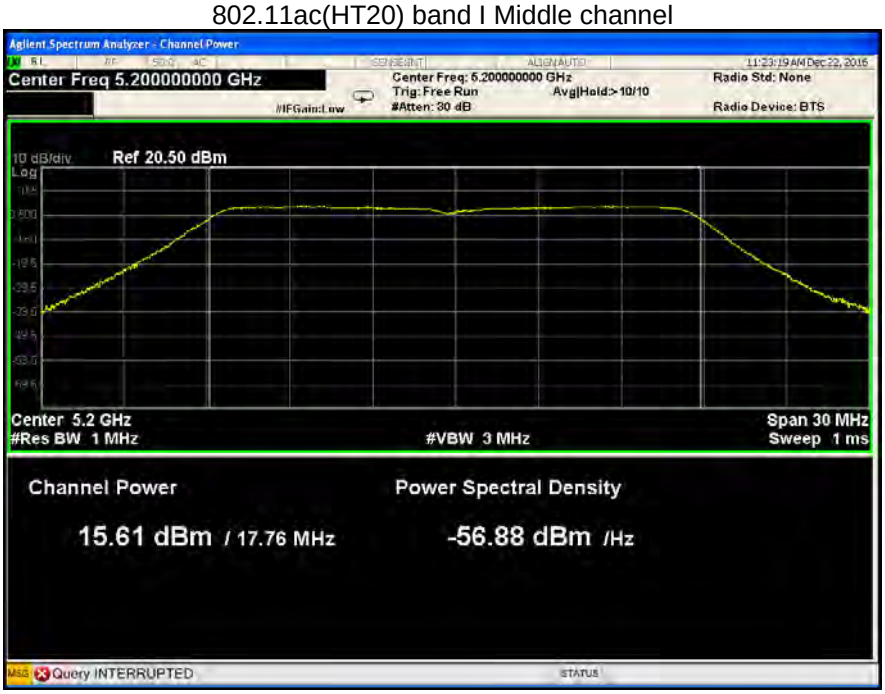
802.11n(HT20) band I High channel



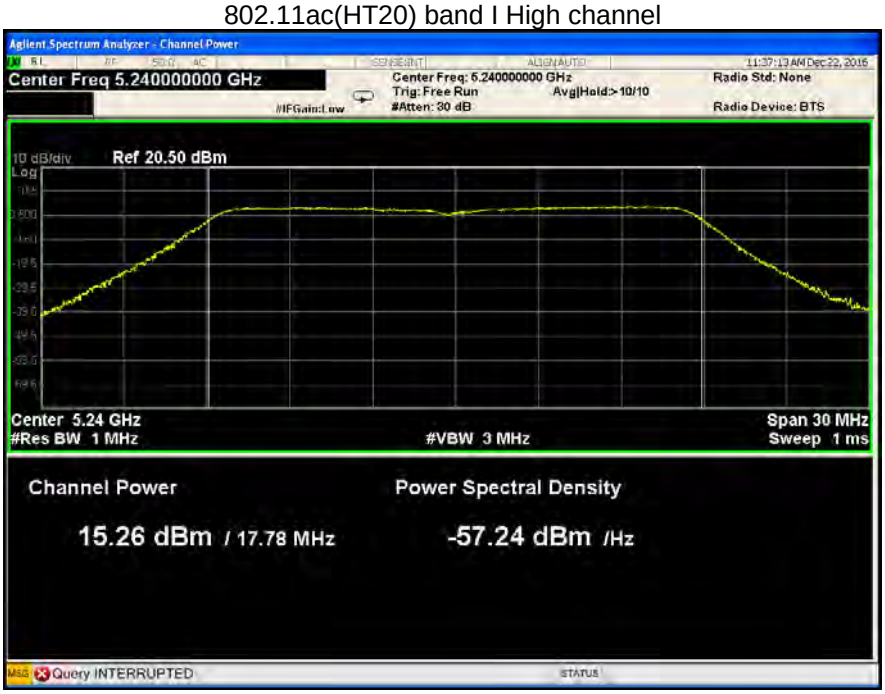
802.11ac(HT20) band I Low channel



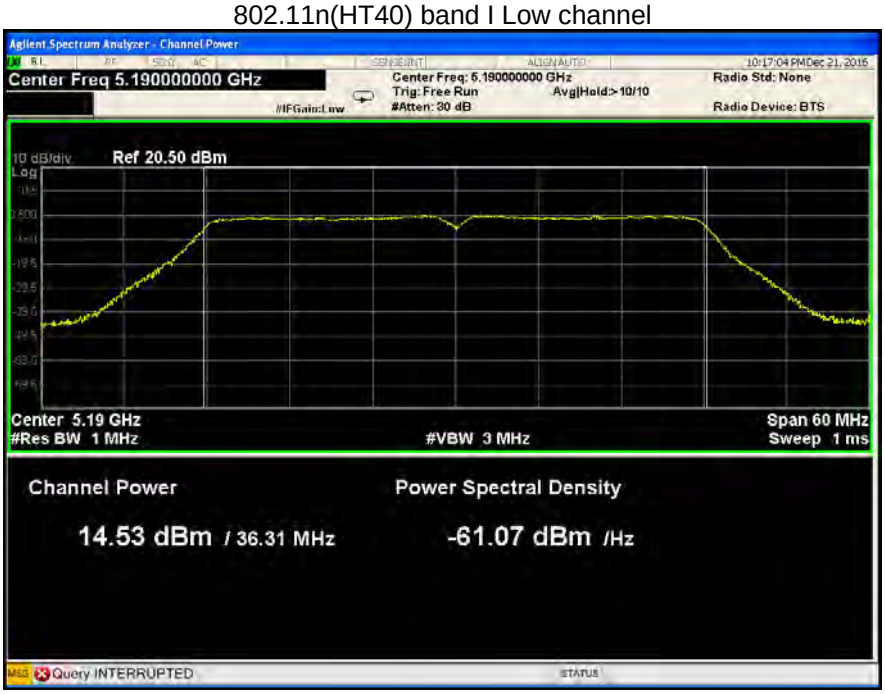
802.11ac(HT20) band I Middle channel



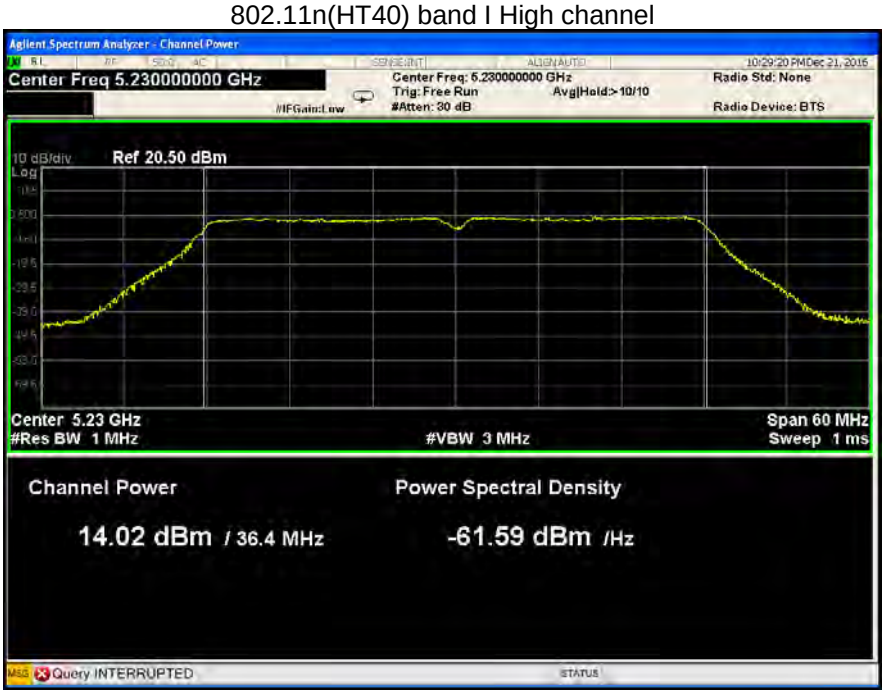
802.11ac(HT20) band I High channel



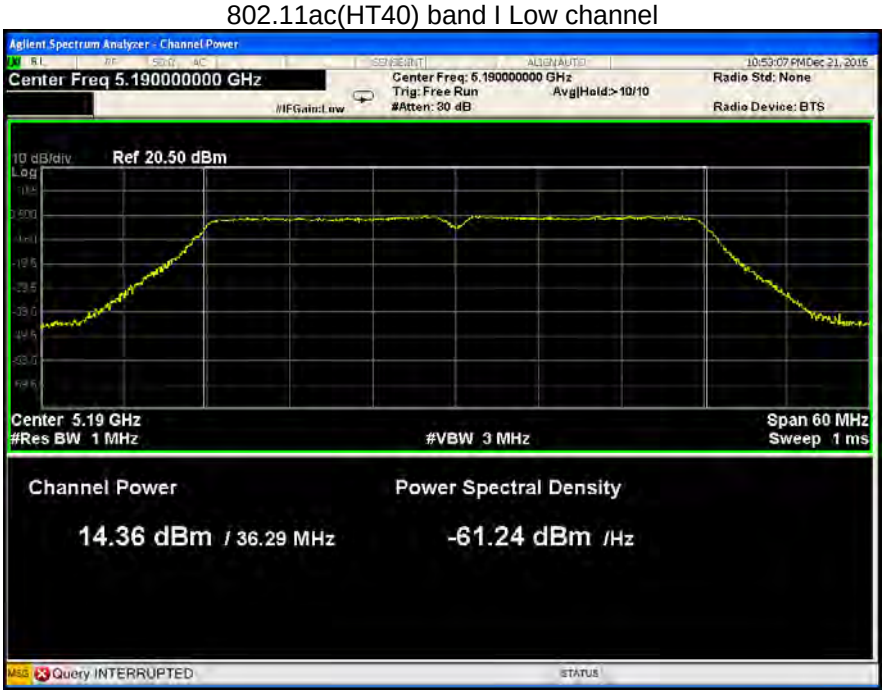
802.11n(HT40) band I Low channel



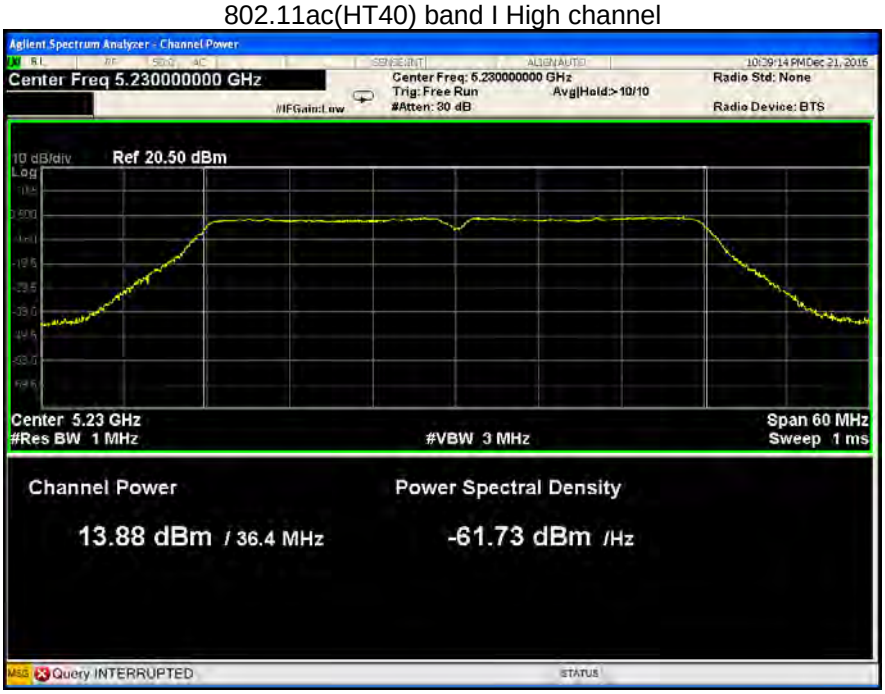
802.11n(HT40) band I High channel



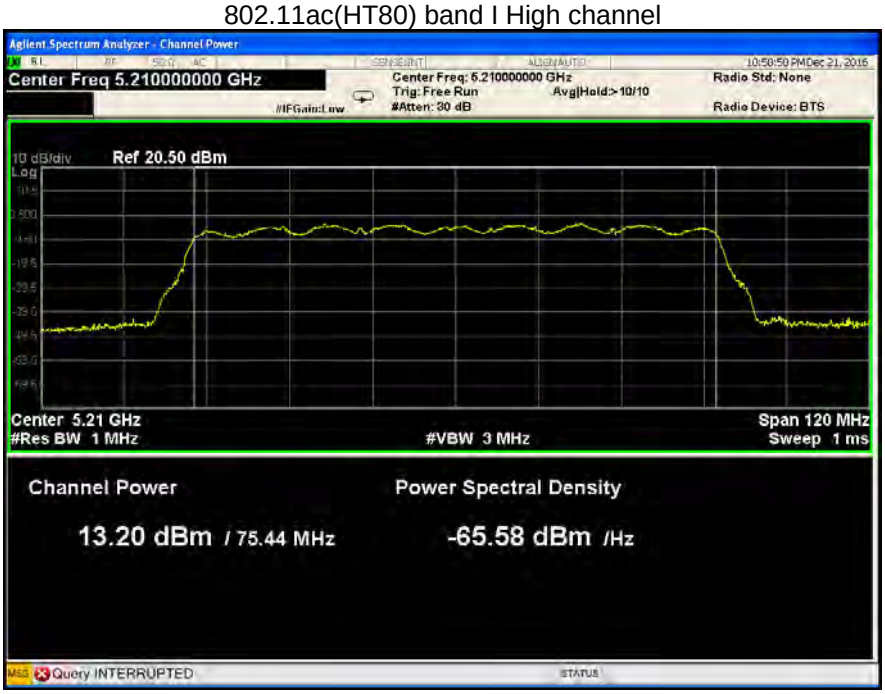
802.11ac(HT40) band I Low channel



802.11ac(HT40) band I High channel

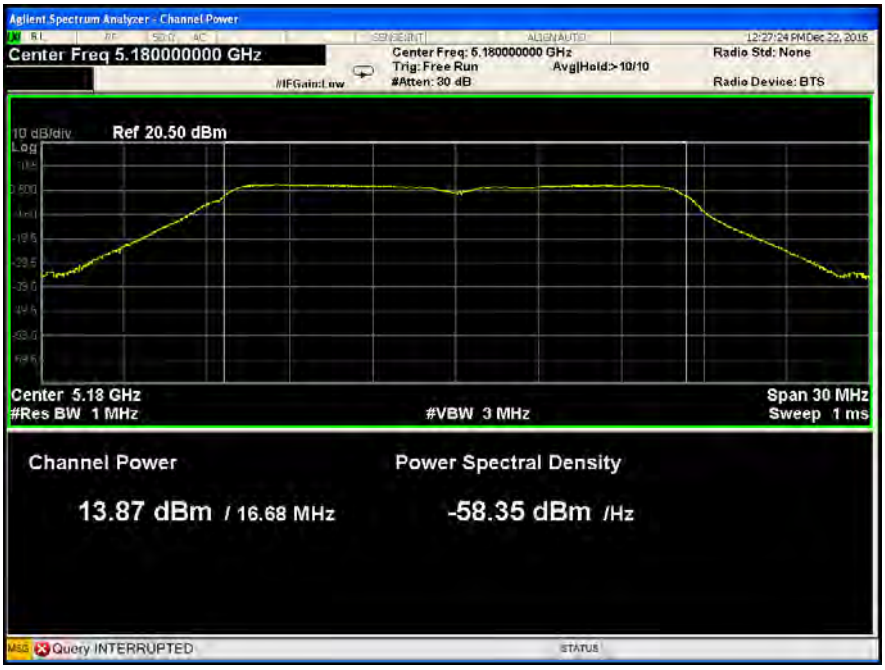


802.11ac(HT80) band I High channel

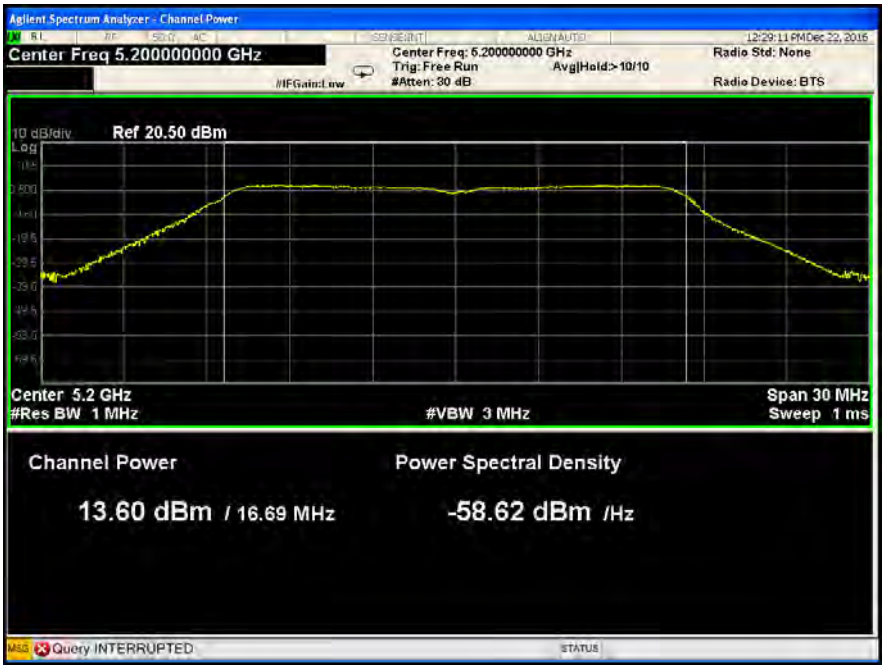


ANT 2

802.11a band I Low channel

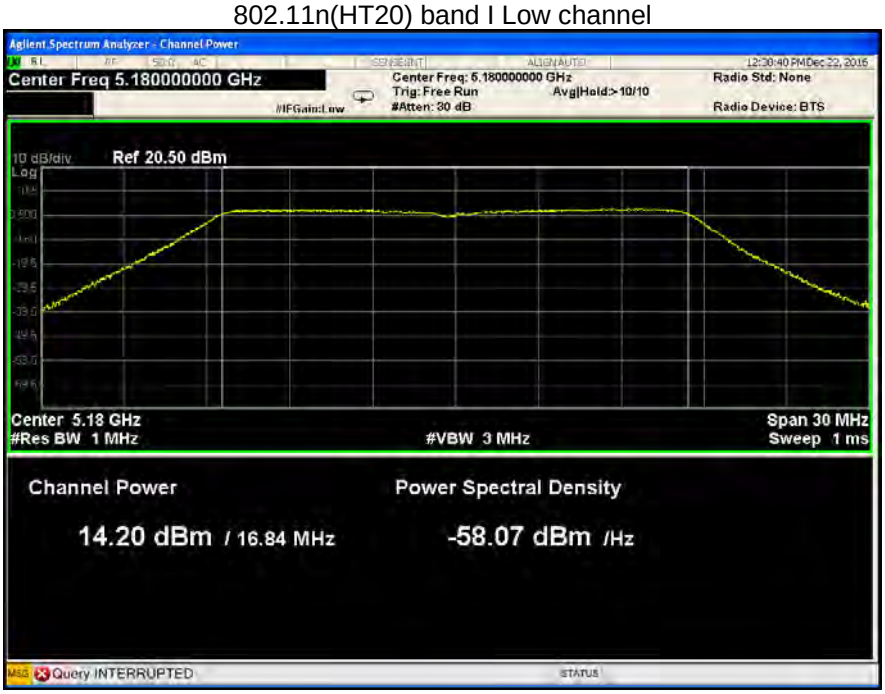


802.11a band I Middle channel

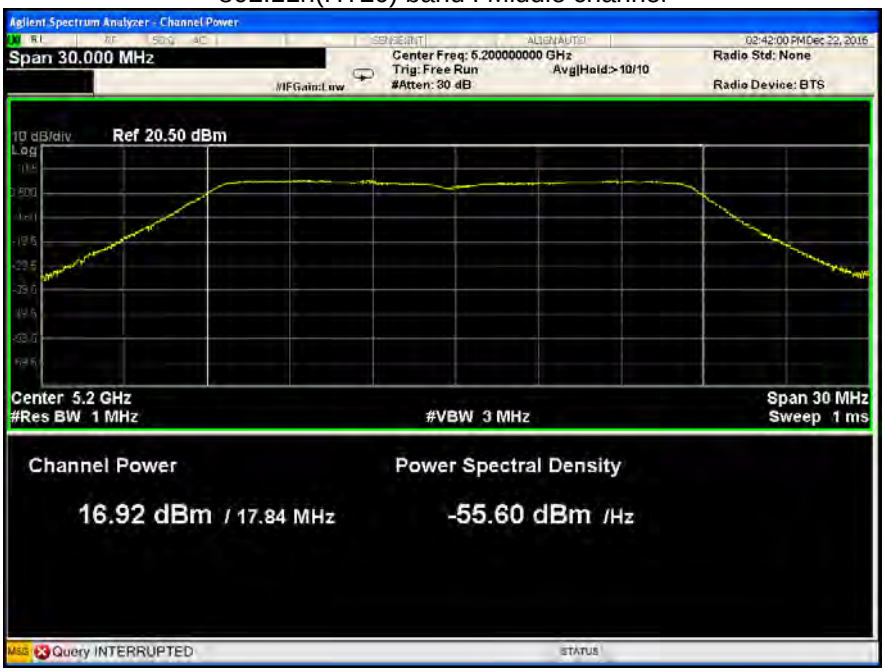


802.11a band I High channel

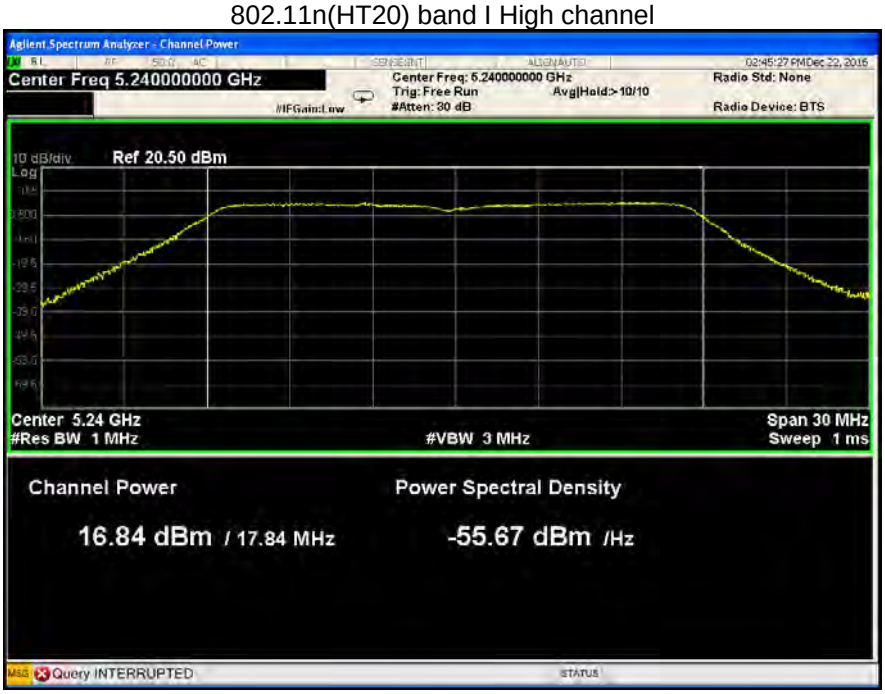
802.11n(HT20) band I Low channel



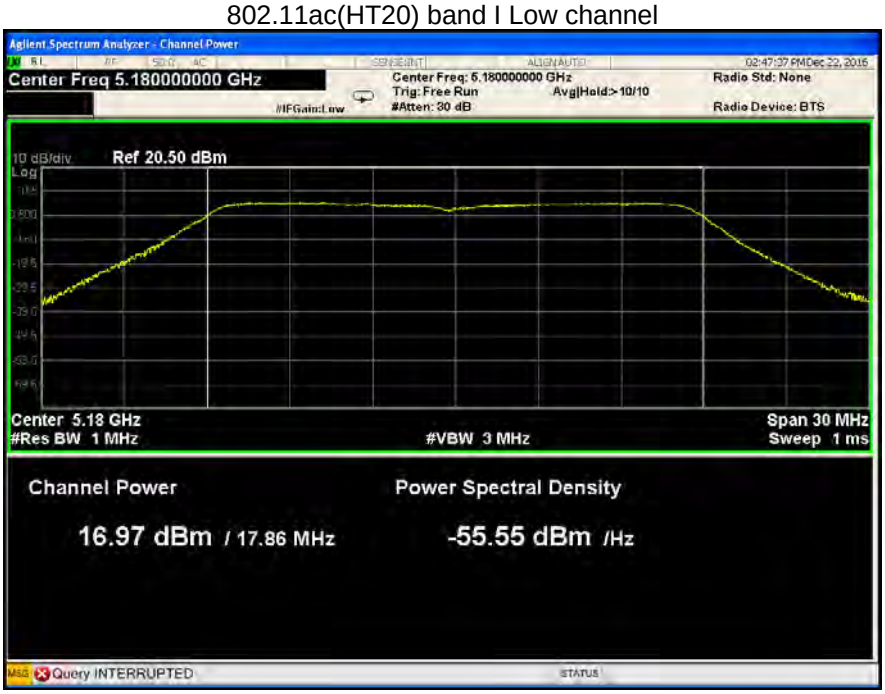
802.11n(HT20) band I Middle channel



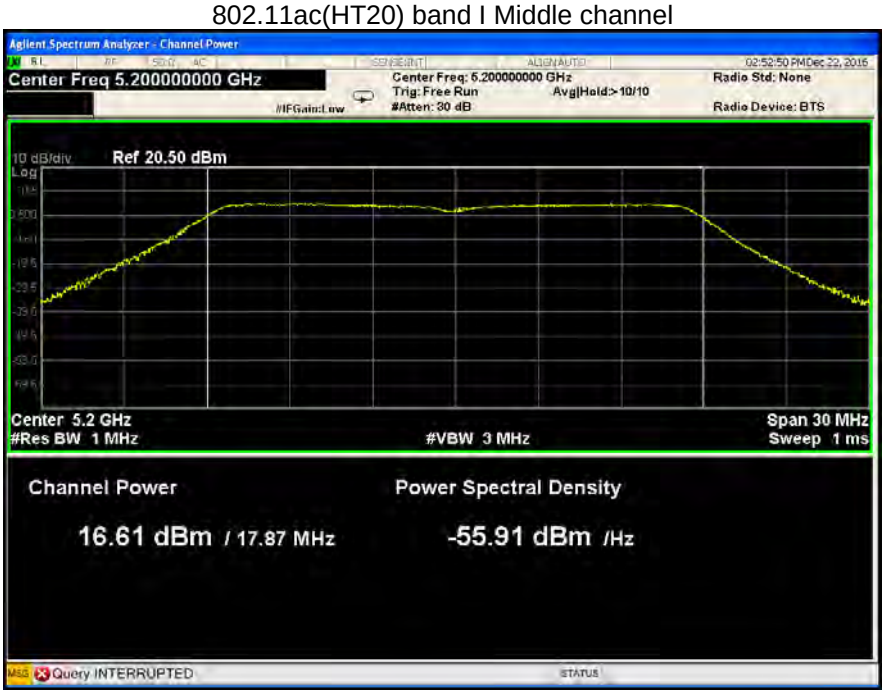
802.11n(HT20) band I High channel



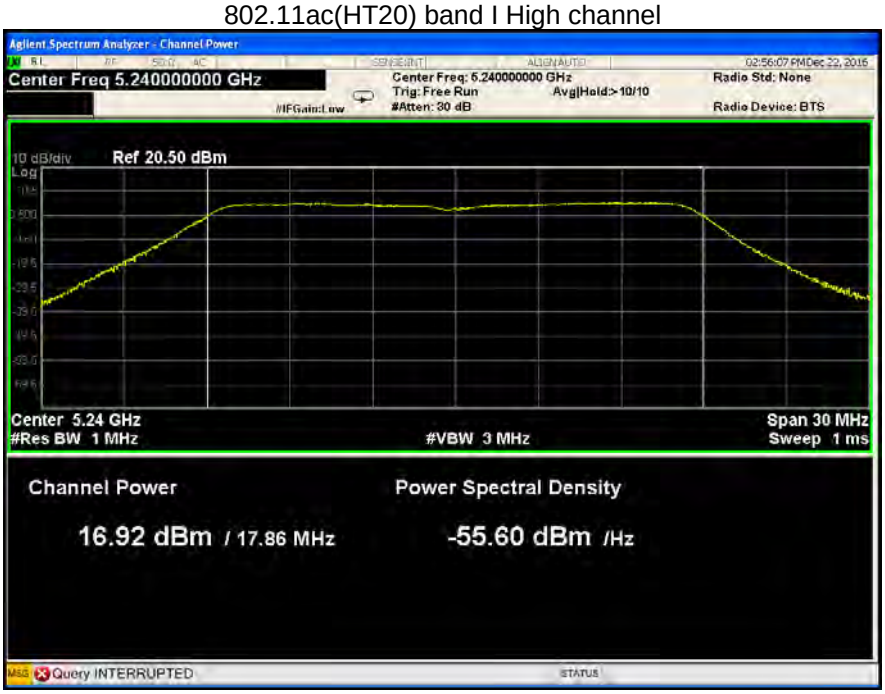
802.11ac(HT20) band I Low channel



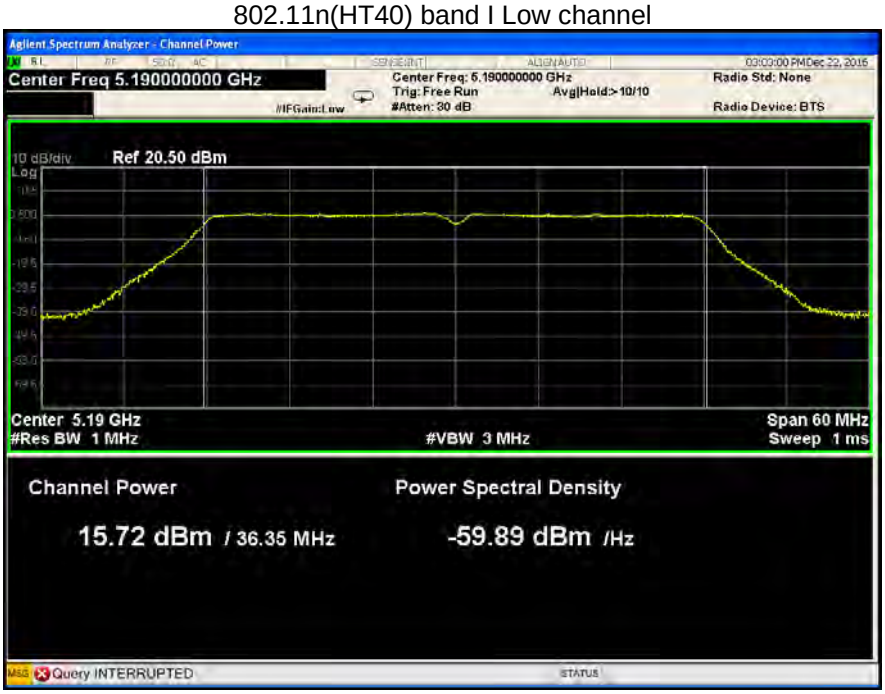
802.11ac(HT20) band I Middle channel



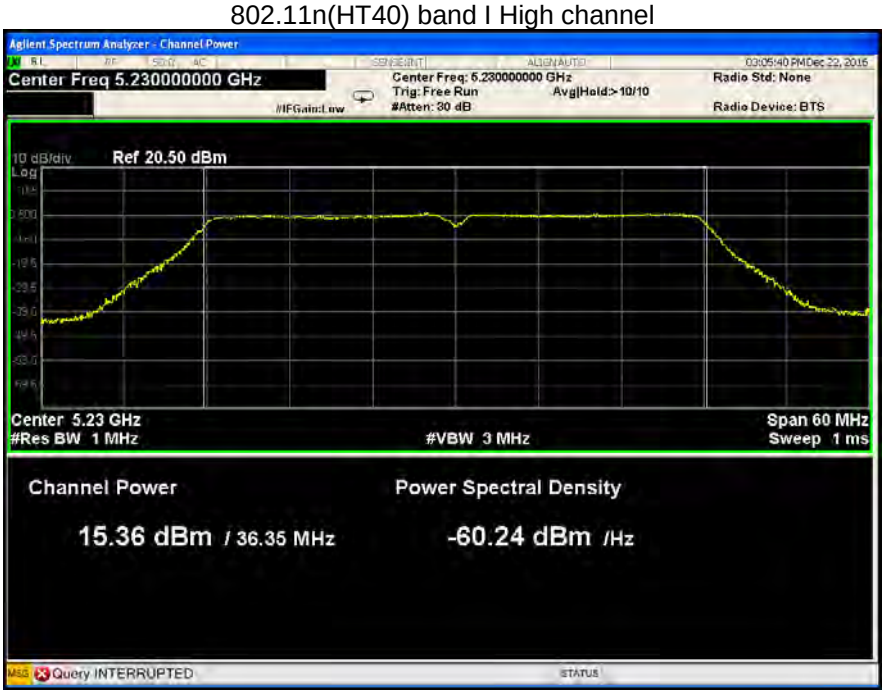
802.11ac(HT20) band I High channel



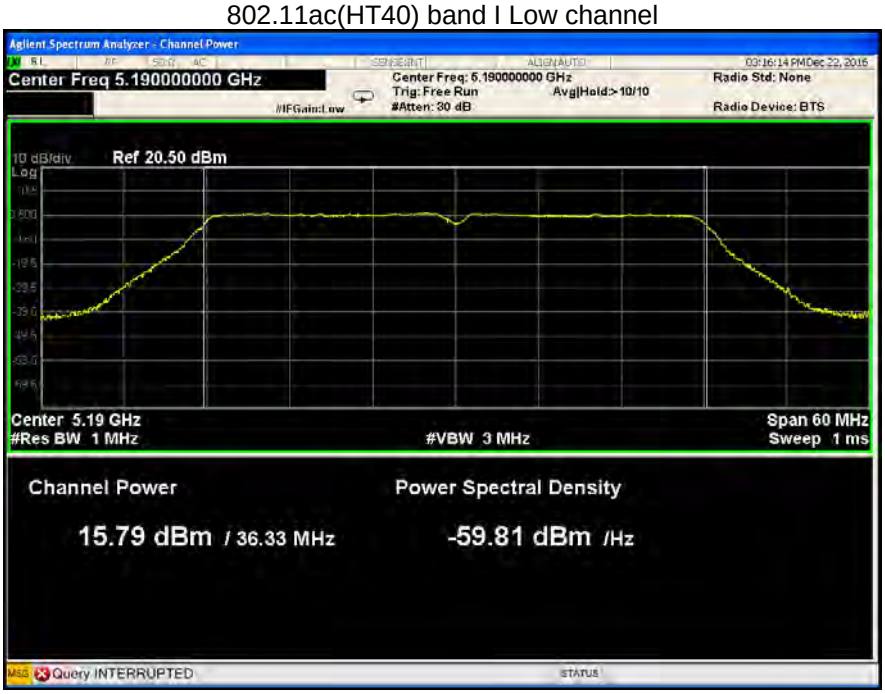
802.11n(HT40) band I Low channel



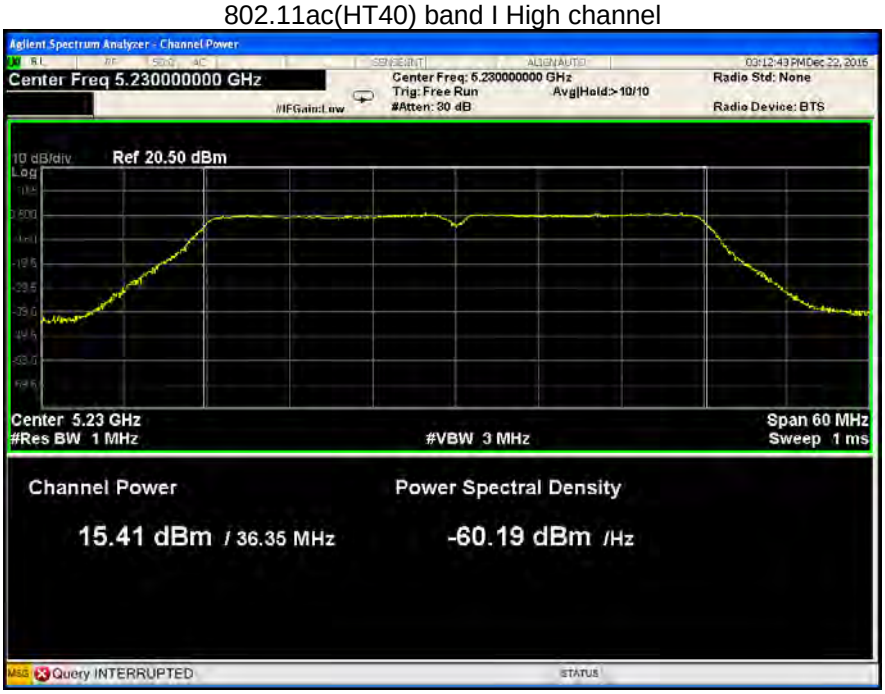
802.11n(HT40) band I High channel



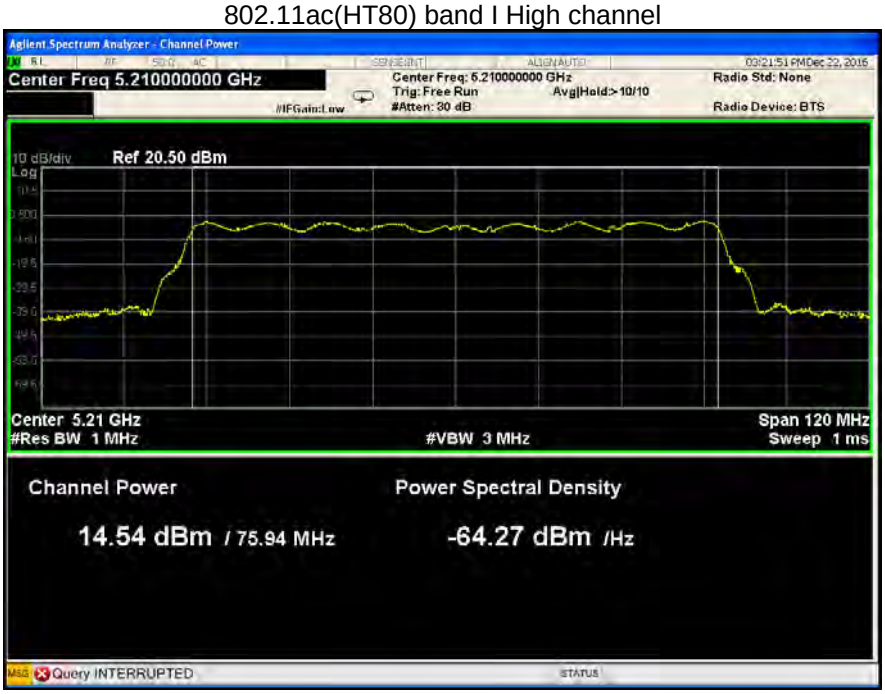
802.11ac(HT40) band I Low channel



802.11ac(HT40) band I High channel

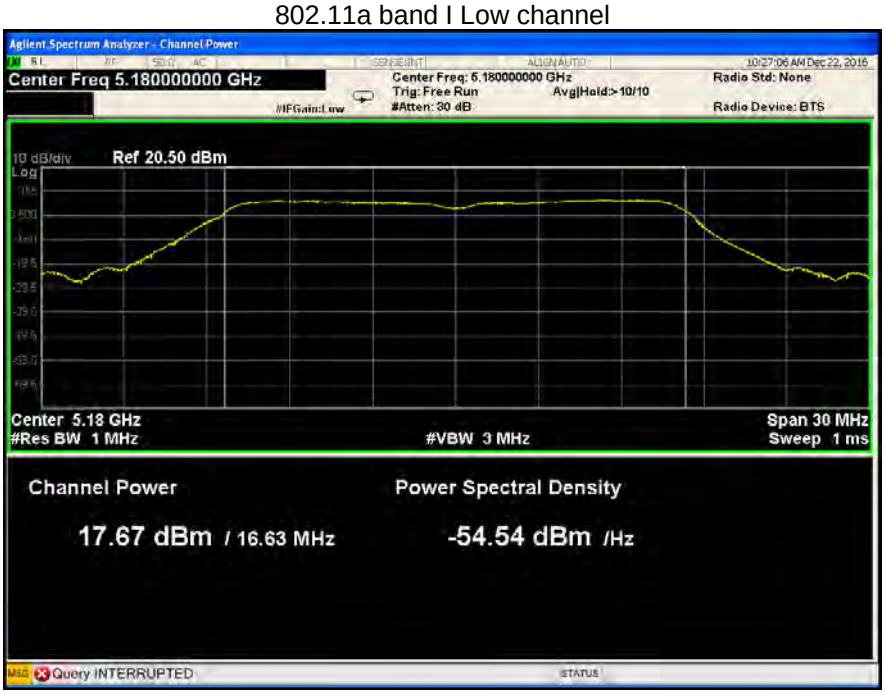


802.11ac(HT80) band I High channel

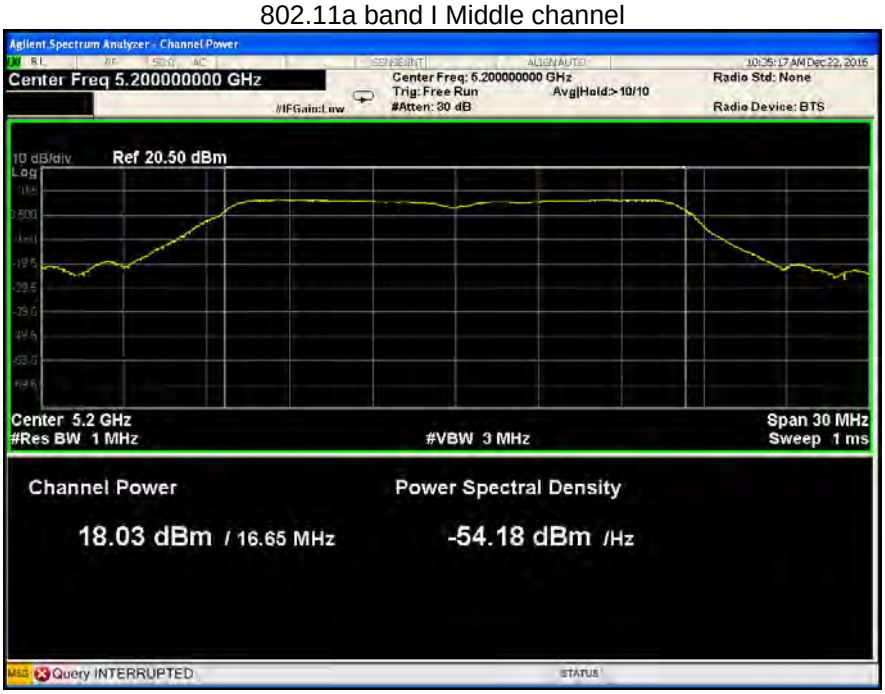


ANT 1+ANT 2

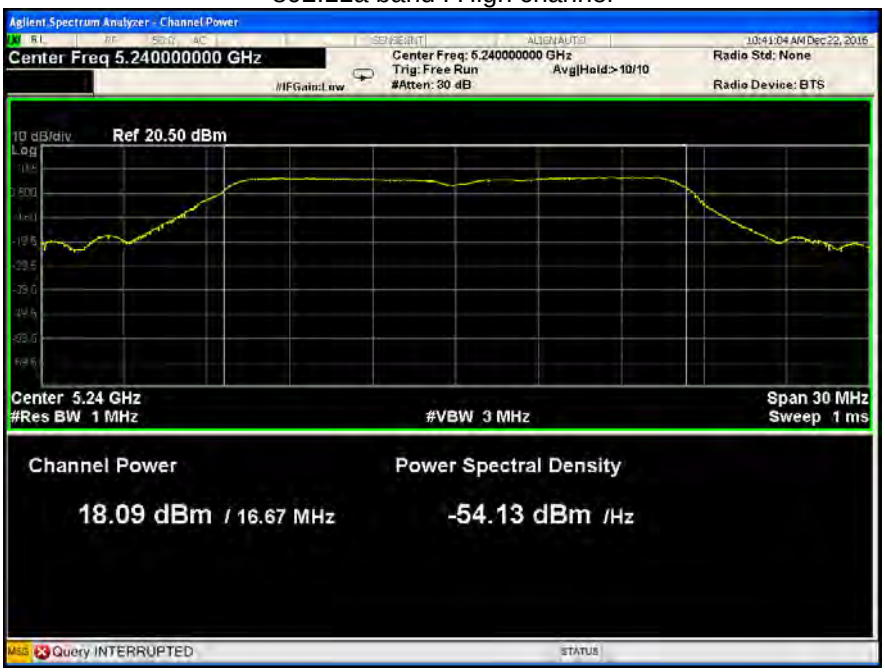
802.11a band I Low channel



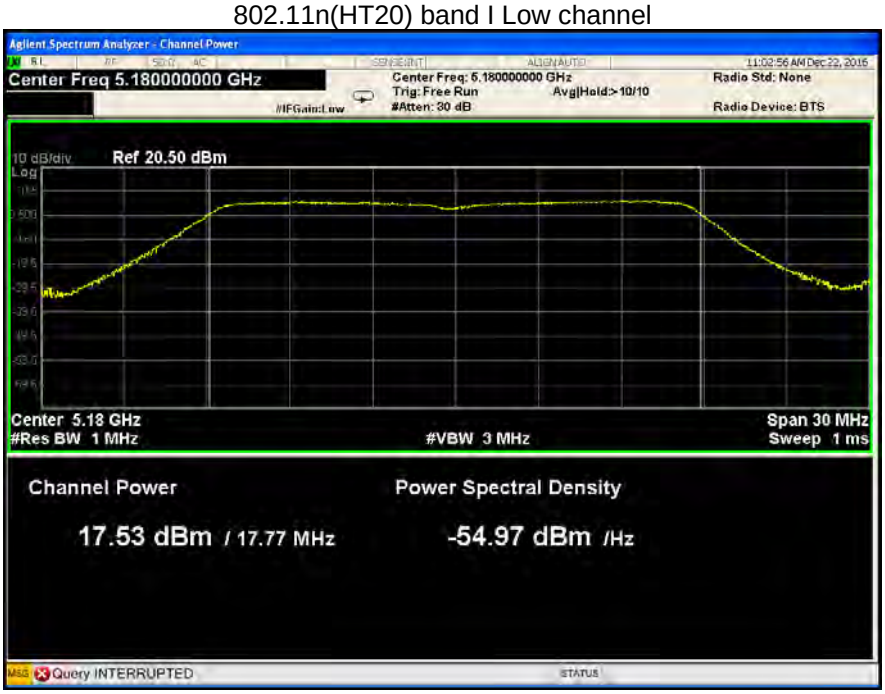
802.11a band I Middle channel



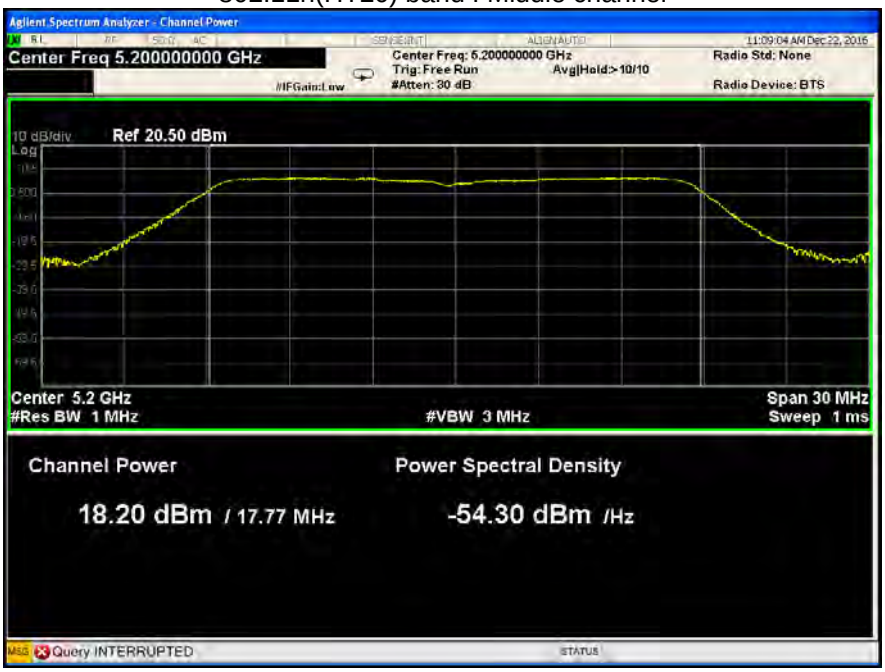
802.11a band I High channel



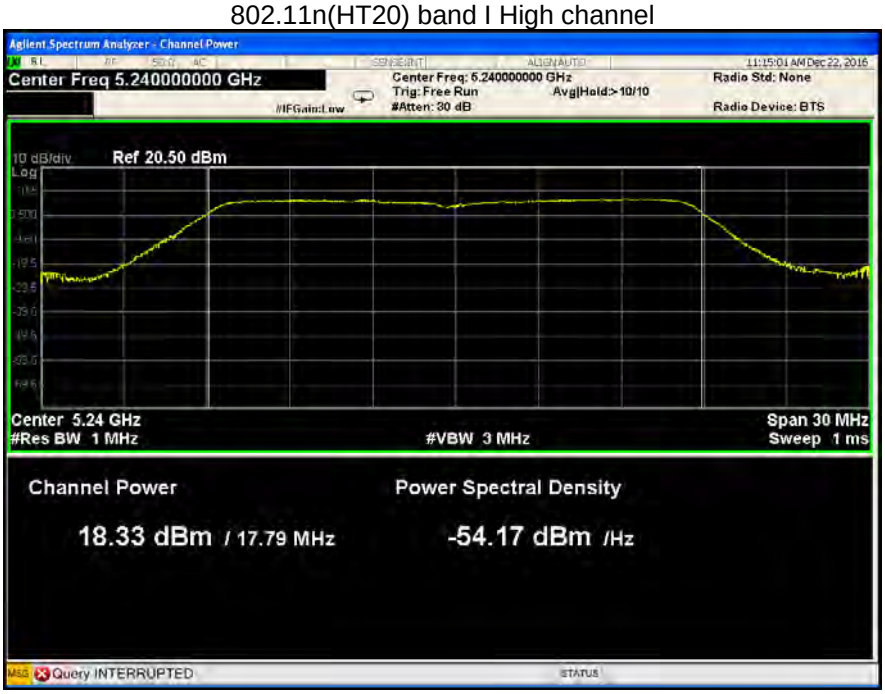
802.11n(HT20) band I Low channel



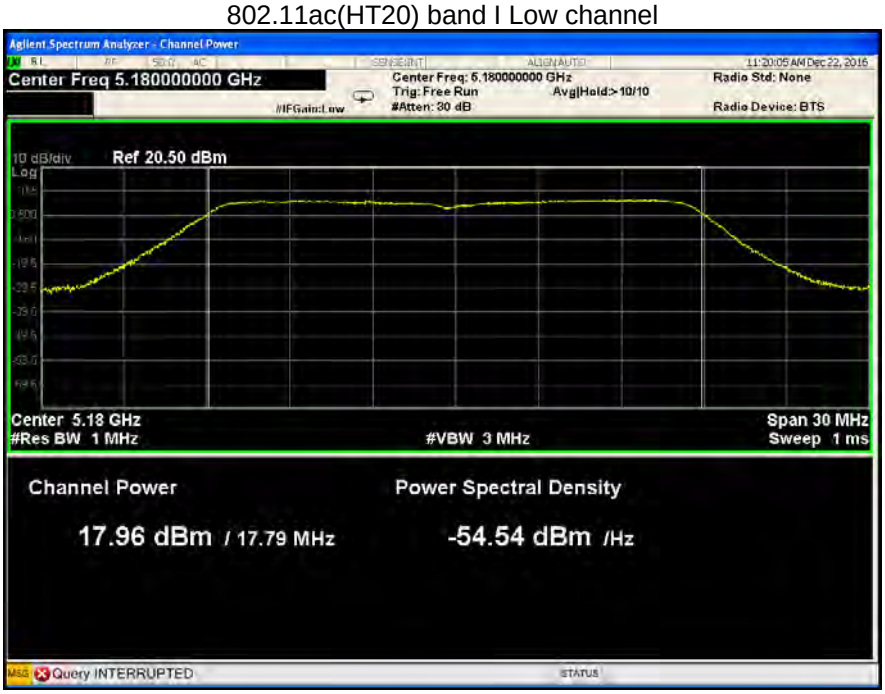
802.11n(HT20) band I Middle channel



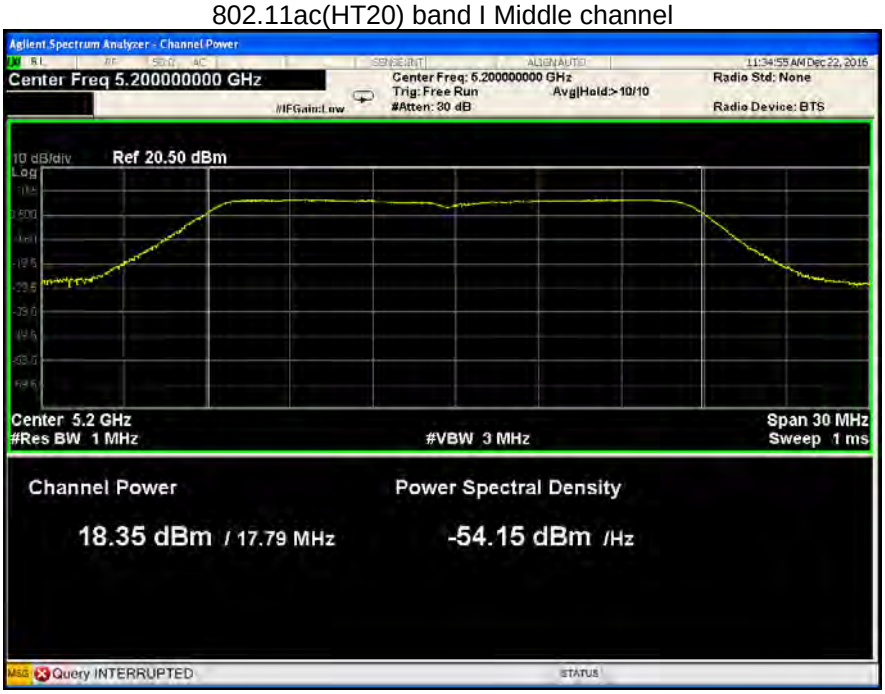
802.11n(HT20) band I High channel



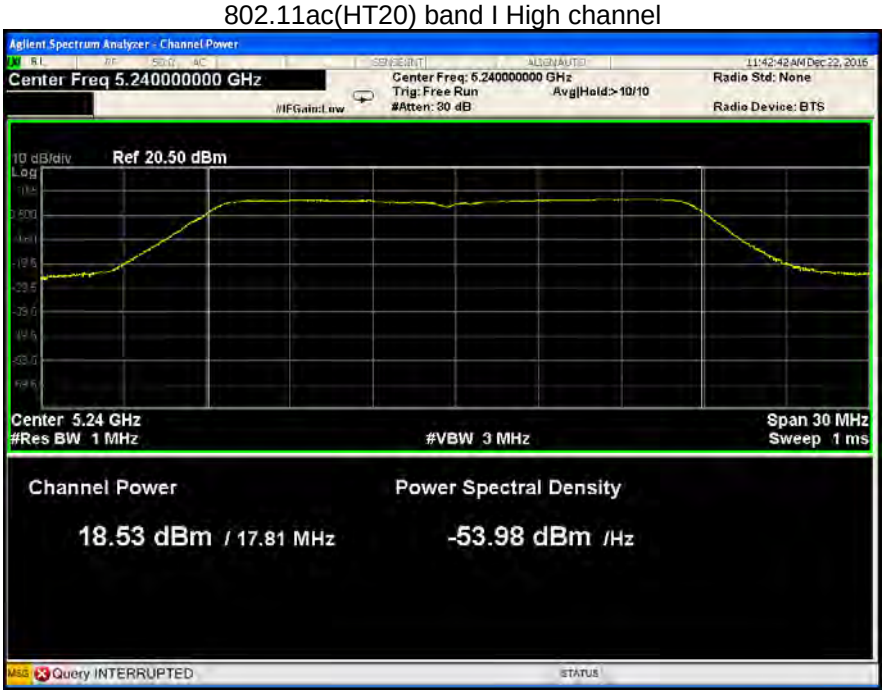
802.11ac(HT20) band I Low channel



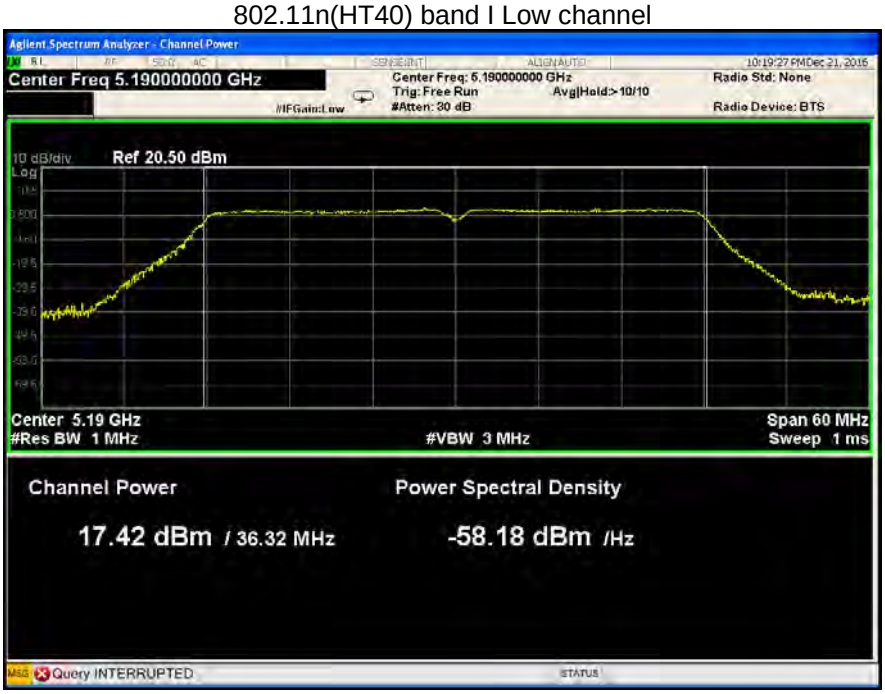
802.11ac(HT20) band I Middle channel



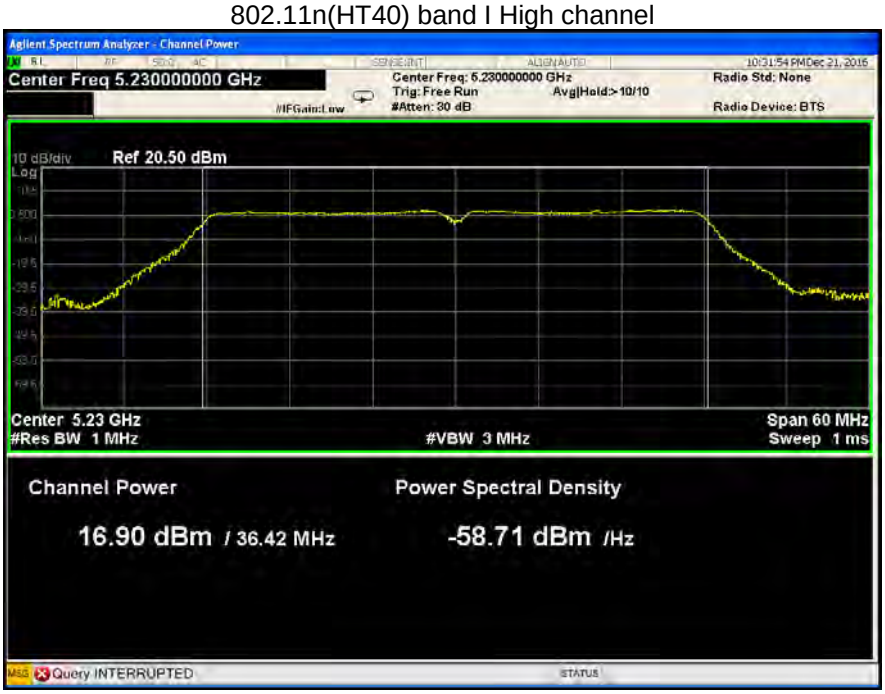
802.11ac(HT20) band I High channel



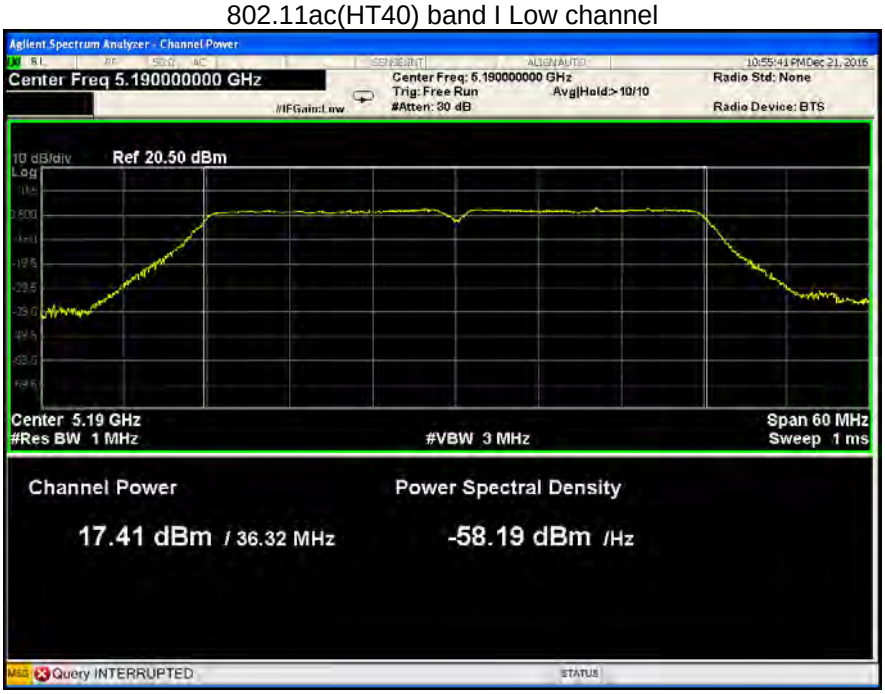
802.11n(HT40) band I Low channel



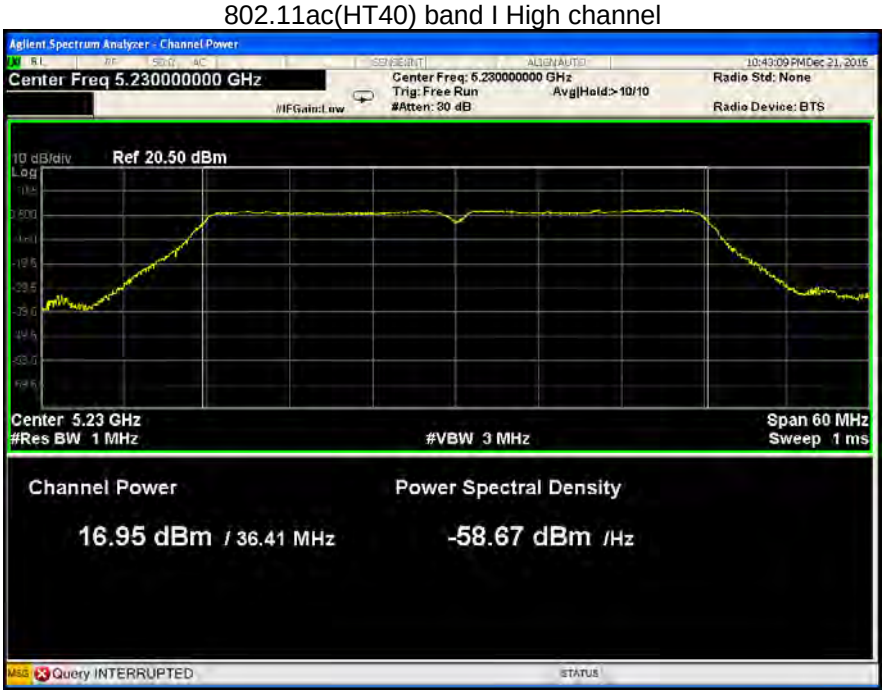
802.11n(HT40) band I High channel



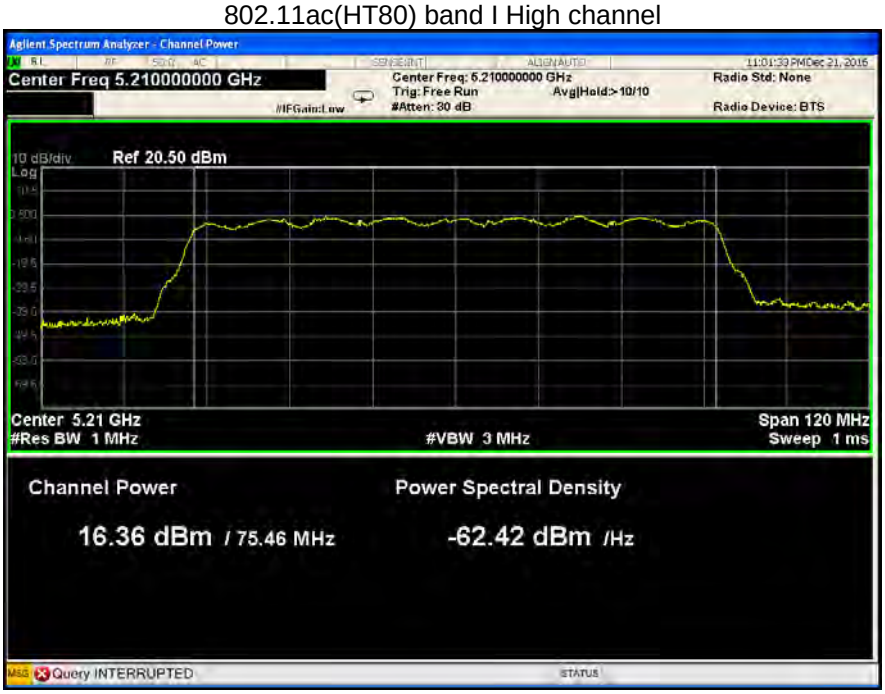
802.11ac(HT40) band I Low channel



802.11ac(HT40) band I High channel



802.11ac(HT80) band I High channel



13 Power Spectral density

Test Requirement:	FCC CFR47 Part 15 Section 15.407(a)
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v01r01 KDB 644545 D03 Guidance for IEEE 802.11ac v01
Test Limit:	≤17dBm/MHz for Operation in the band I(5150MHz-5250MHz)of device
Test Result:	PASS

13.1 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 = 510kHz/1MHz. VBW ≥3 RBW Sweep = auto; Detector Function = Peak. Trace = Max hold.

3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

13.2 Test Result:

ANT 1

Band	Operation mode	Power Spectral Density (dBm/MHz)		
		Low	Middle	High
Band I	802.11a	2.534	2.999	2.891
	802.11n(HT20)	2.670	3.100	3.044
	802.11ac(HT20)	2.848	3.321	3.007
	802.11n(HT40)	-0.453	/	-0.973
	802.11ac(HT40)	-0.730	/	-1.068
	802.11ac(HT80)	-4.089	/	/
	Limit	≤17dBm/MHz		

ANT 2

Band	Operation mode	Power Spectral Density (dBm/MHz)		
		Low	Middle	High
Band I	802.11a	1.489	1.620	3.414
	802.11n(HT20)	2.395	5.703	4.997
	802.11ac(HT20)	5.061	4.736	4.694
	802.11n(HT40)	0.943	/	0.348
	802.11ac(HT40)	0.627	/	0.368
	802.11ac(HT80)	-2.560	/	/
	Limit	≤17dBm/MHz		

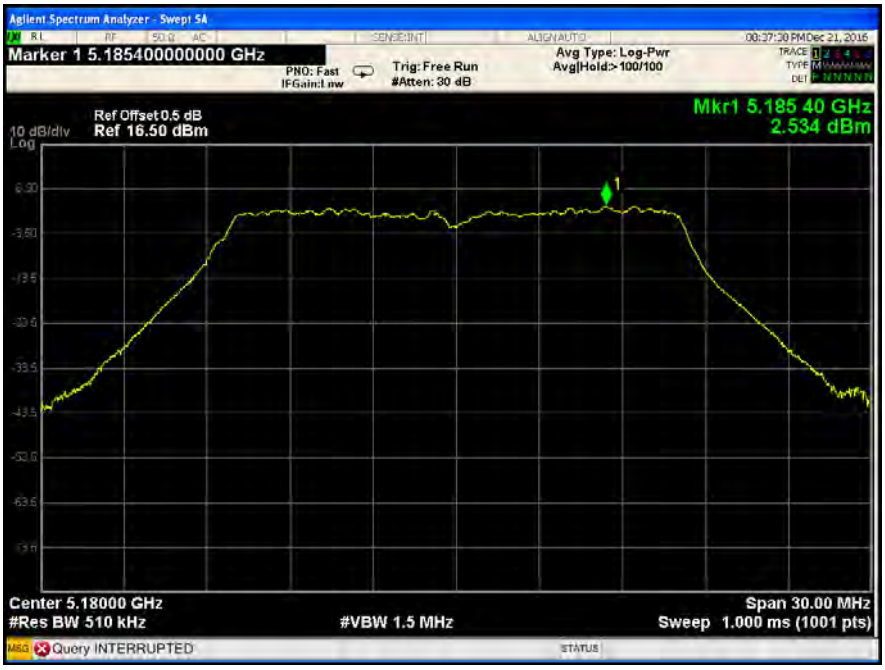
ANT 1+ANT 2

Band	Operation mode	Power Spectral Density (dBm/MHz)		
		Low	Middle	High
Band I	802.11a	5.427	5.897	5.985
	802.11n(HT20)	5.343	5.889	6.179
	802.11ac(HT20)	5.602	6.193	5.873
	802.11n(HT40)	2.369	/	2.224
	802.11ac(HT40)	2.341	/	1.886
	802.11ac(HT80)	-0.945	/	/
	Limit	≤17dBm/MHz		

Test result plots shown as follows:

ANT1

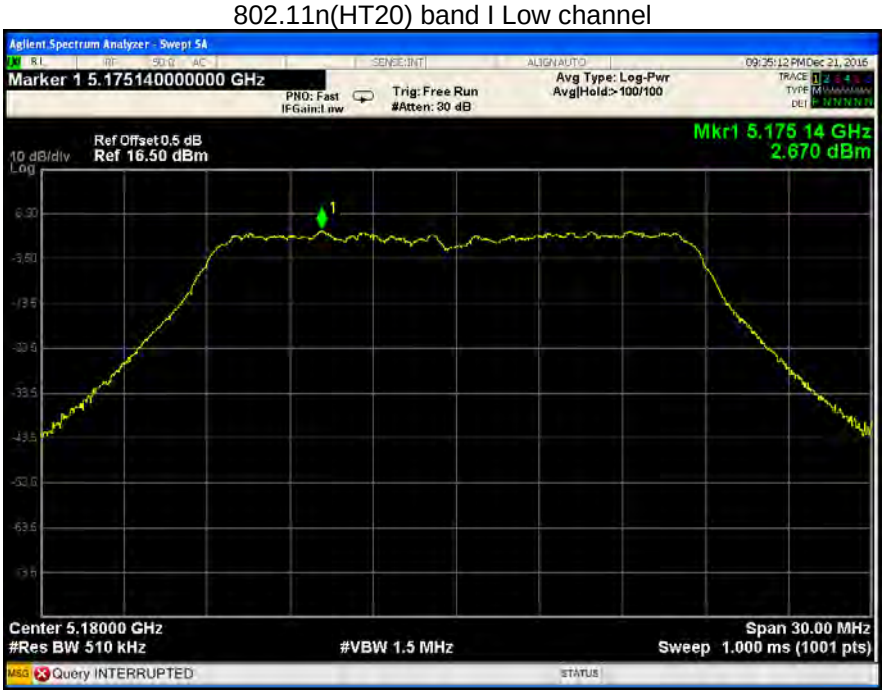
802.11a band I Low channel



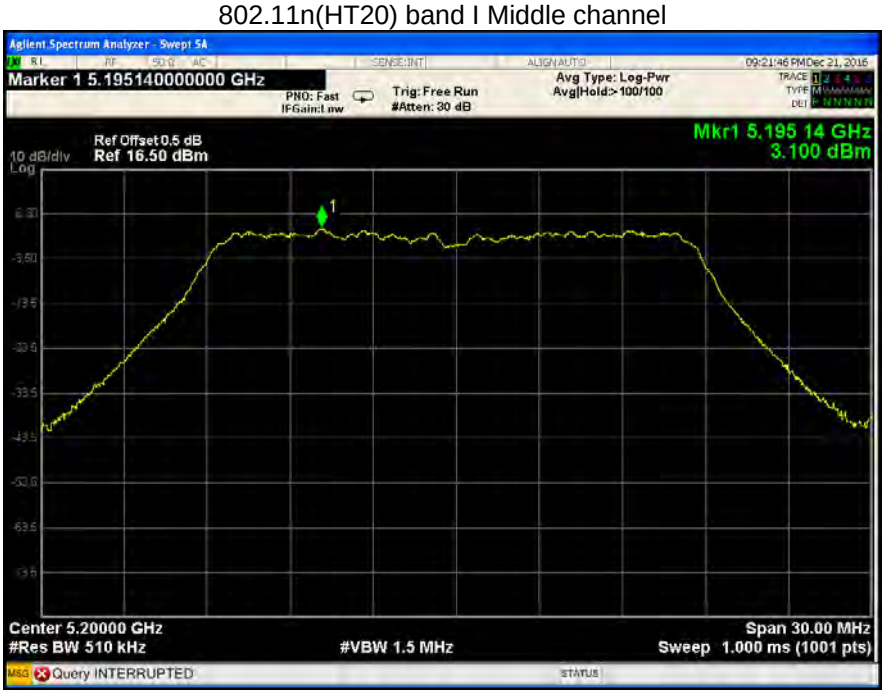
802.11a band I Middle channel

802.11a band I High channel

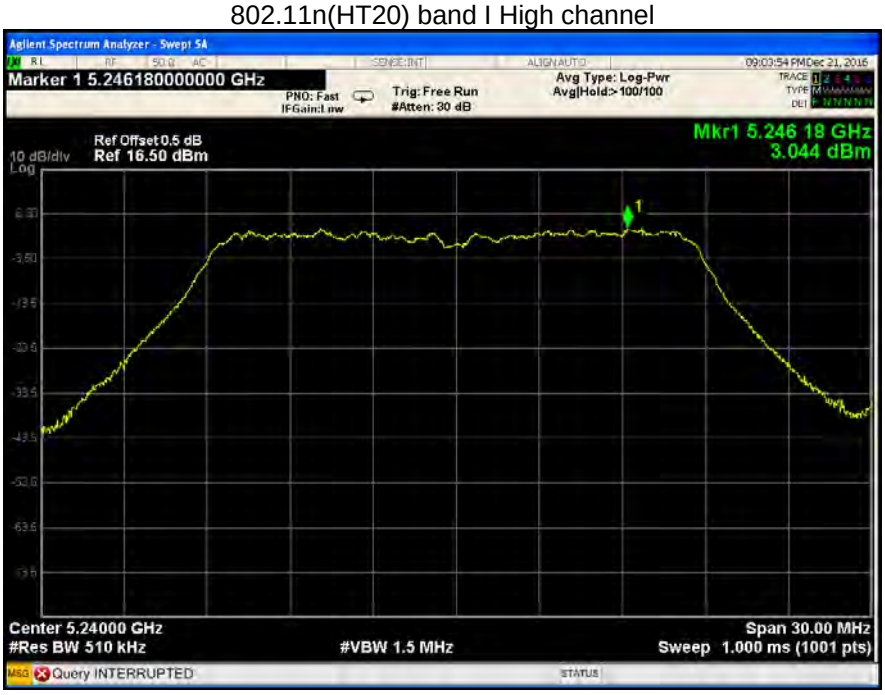
802.11n(HT20) band I Low channel



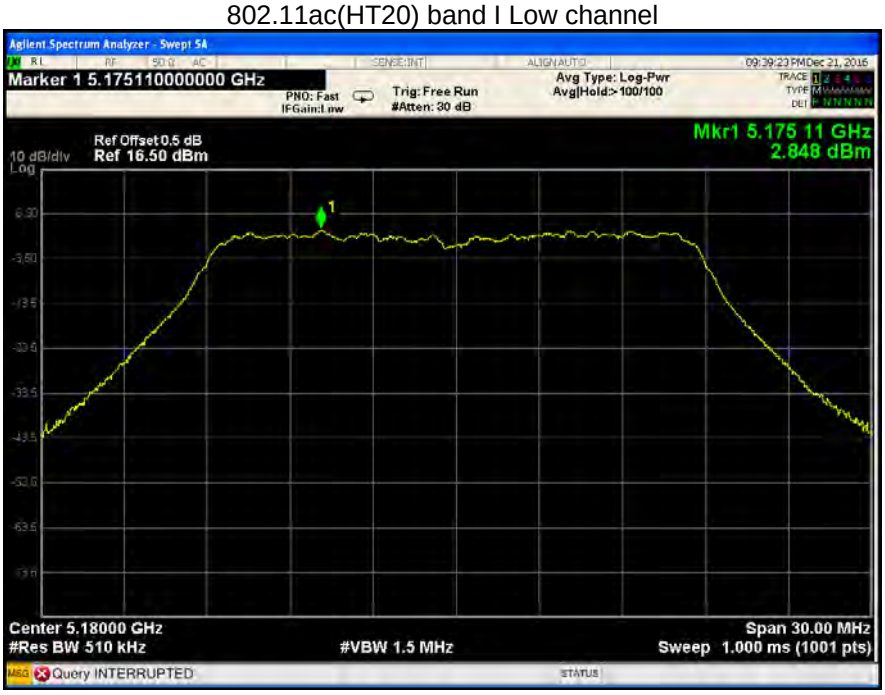
802.11n(HT20) band I Middle channel



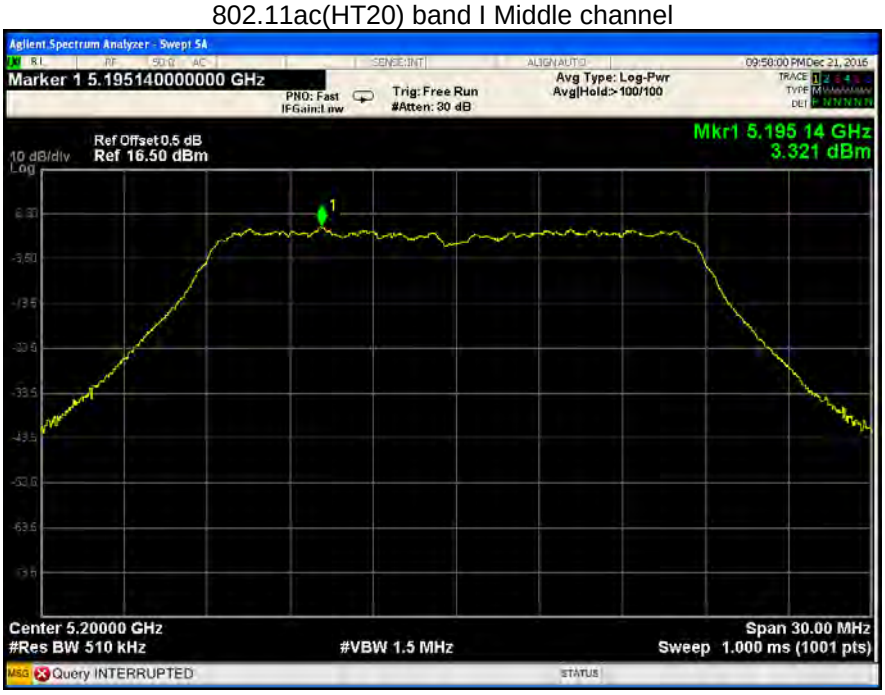
802.11n(HT20) band I High channel



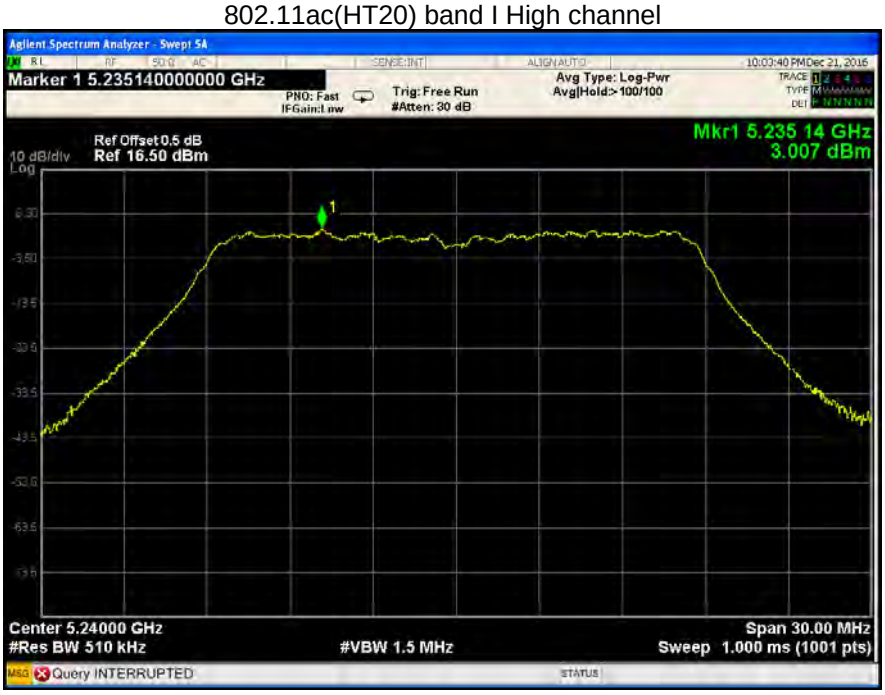
802.11ac(HT20) band I Low channel



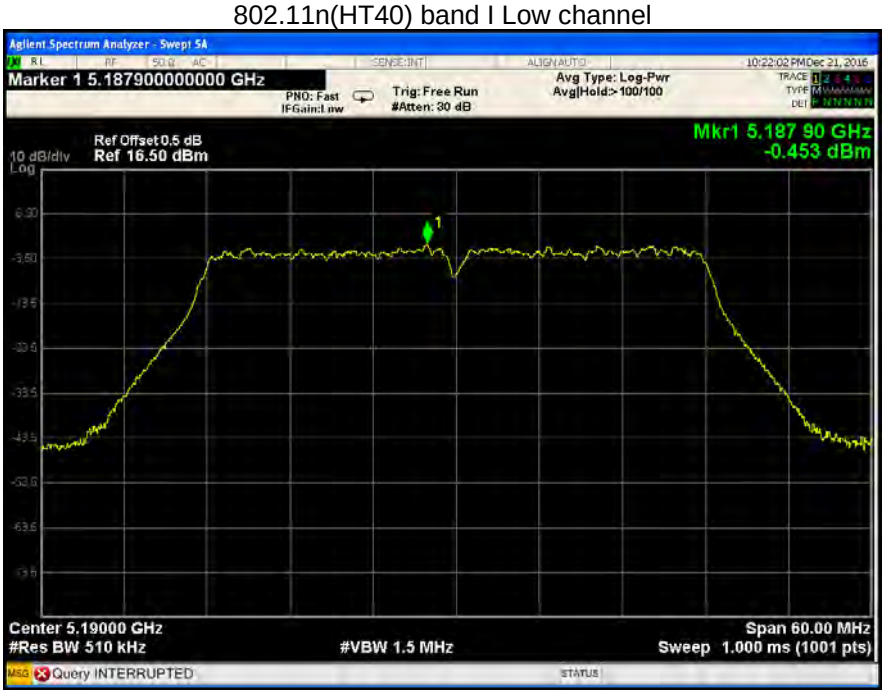
802.11ac(HT20) band I Middle channel



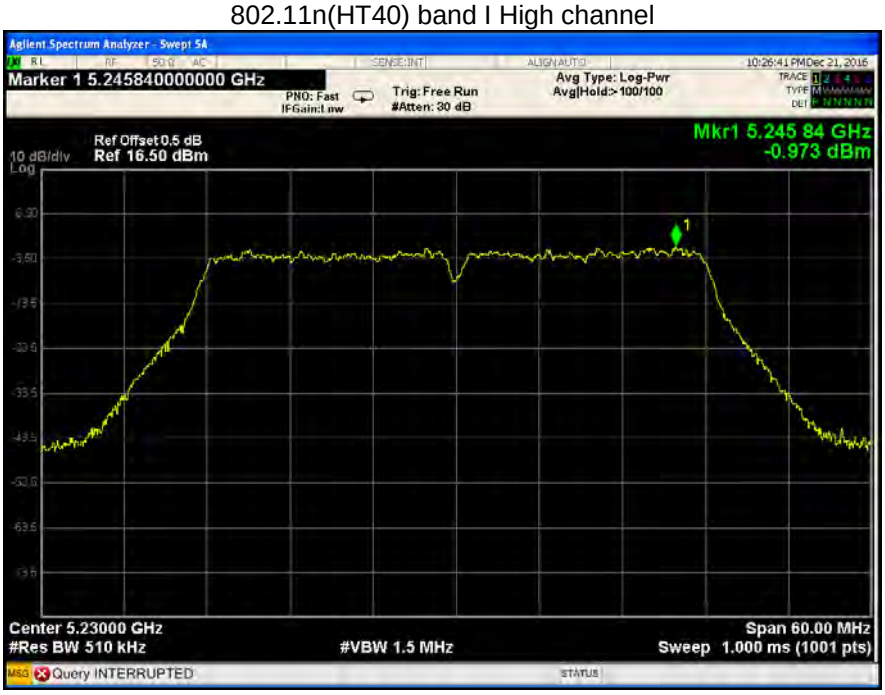
802.11ac(HT20) band I High channel



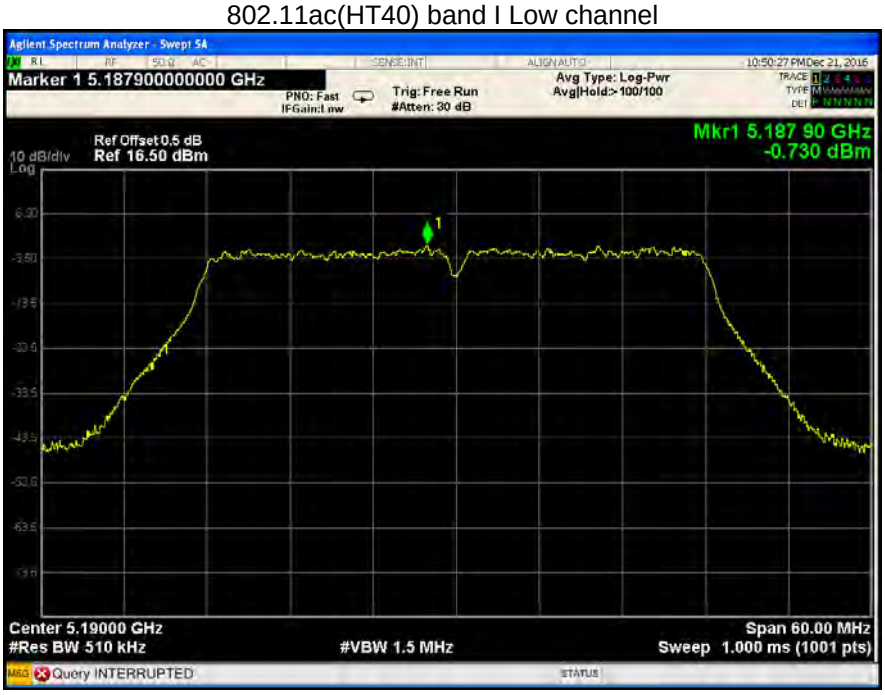
802.11n(HT40) band I Low channel



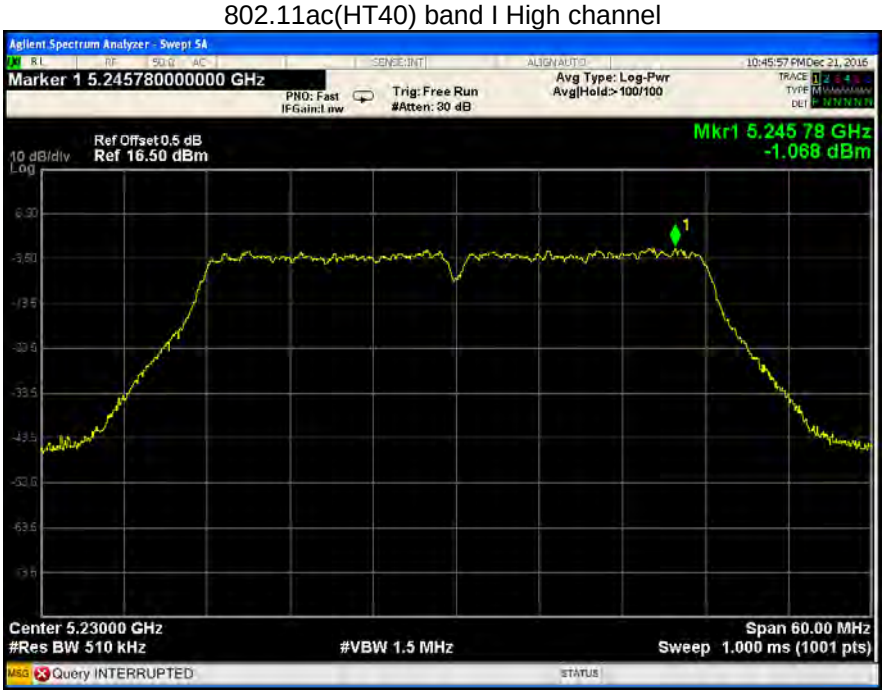
802.11n(HT40) band I High channel



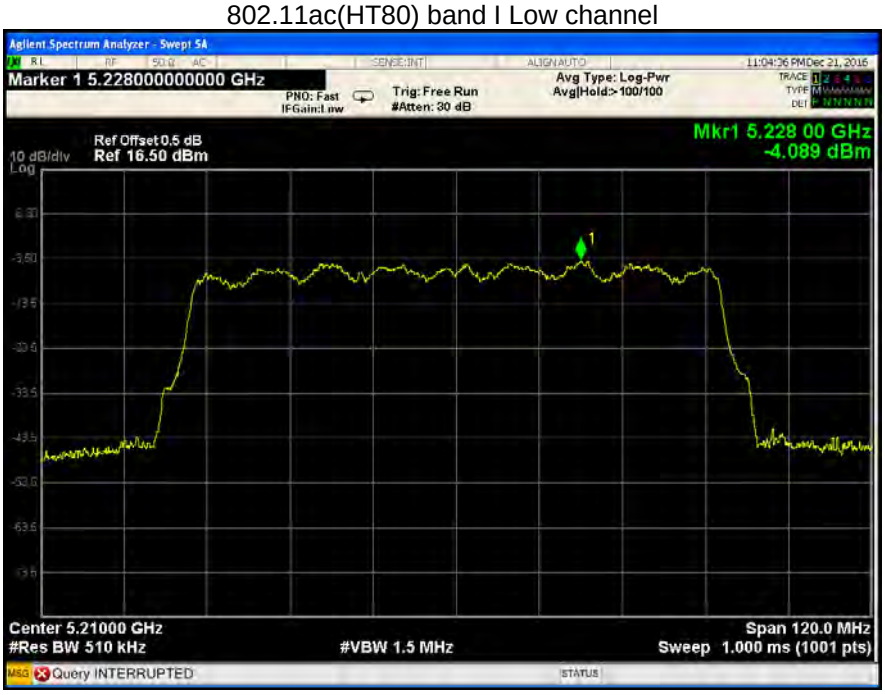
802.11ac(HT40) band I Low channel



802.11ac(HT40) band I High channel



802.11ac(HT80) band I Low channel



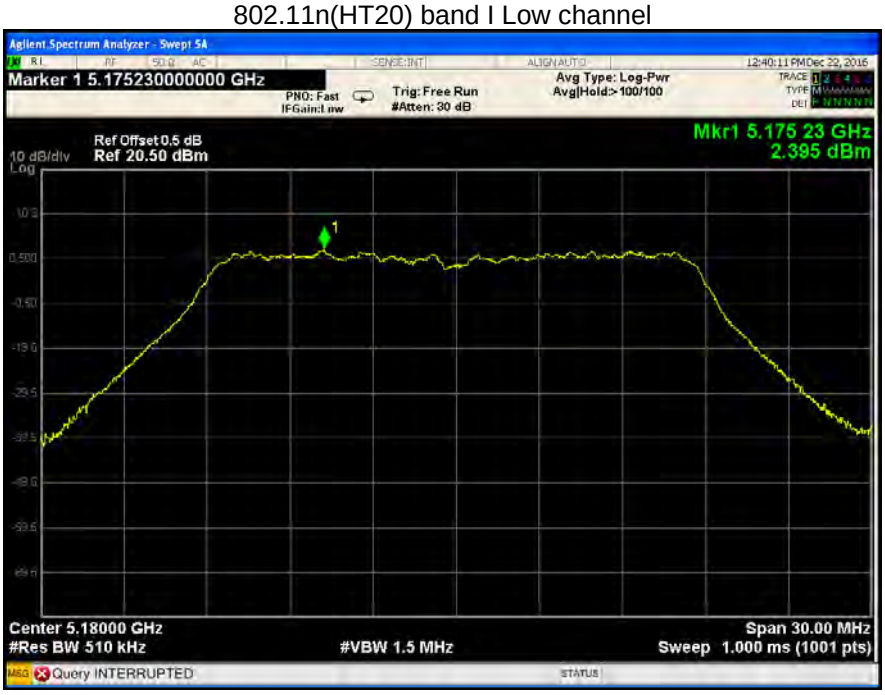
ANT2

802.11a band I Low channel

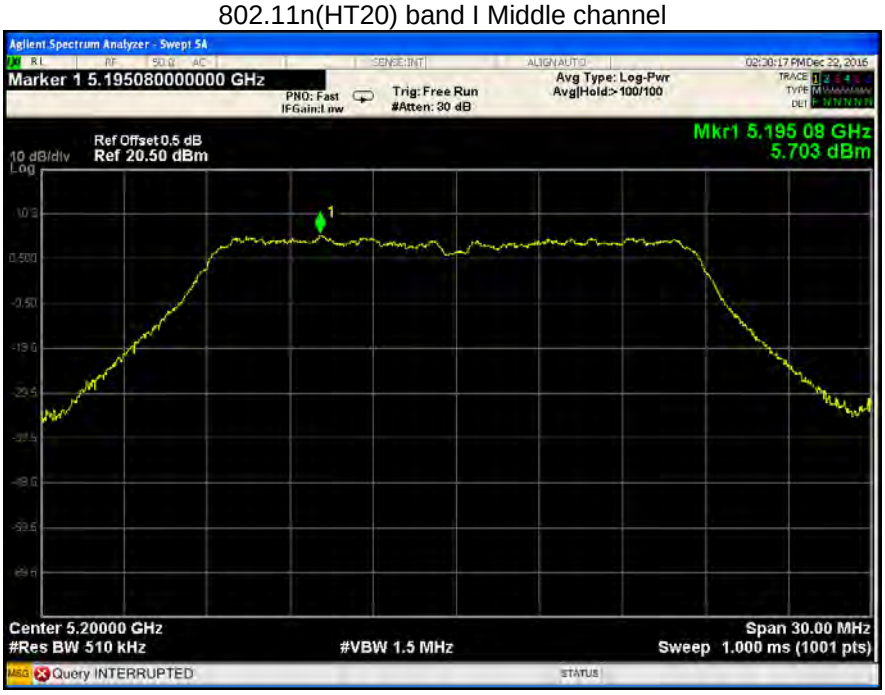
802.11a band I Middle channel

802.11a band I High channel

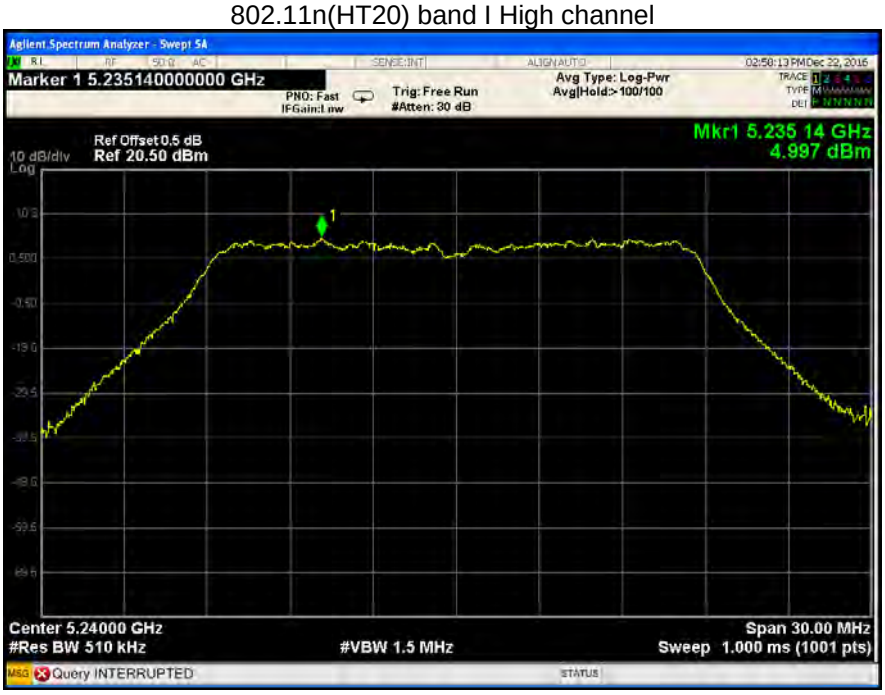
802.11n(HT20) band I Low channel



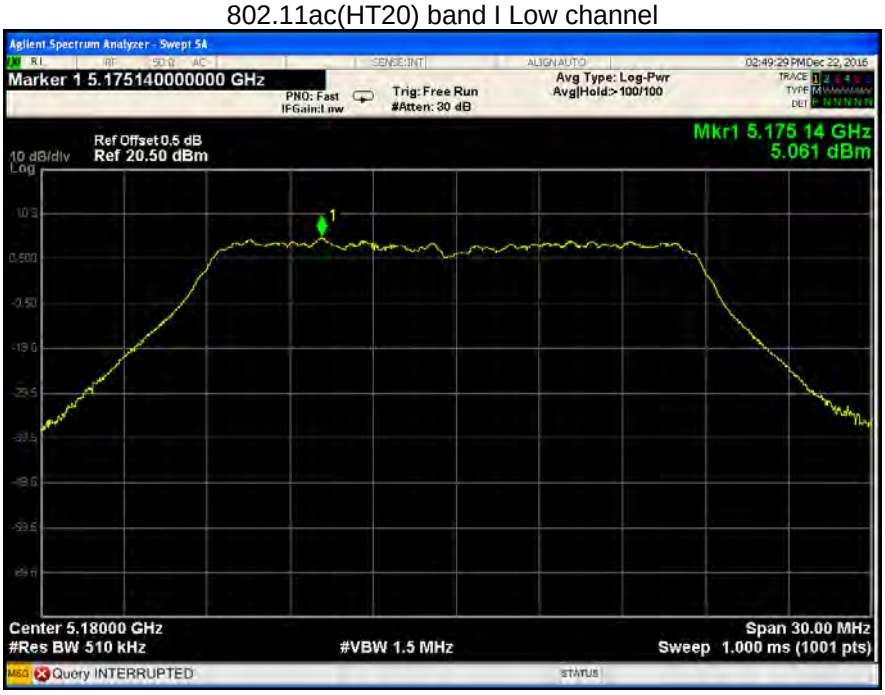
802.11n(HT20) band I Middle channel



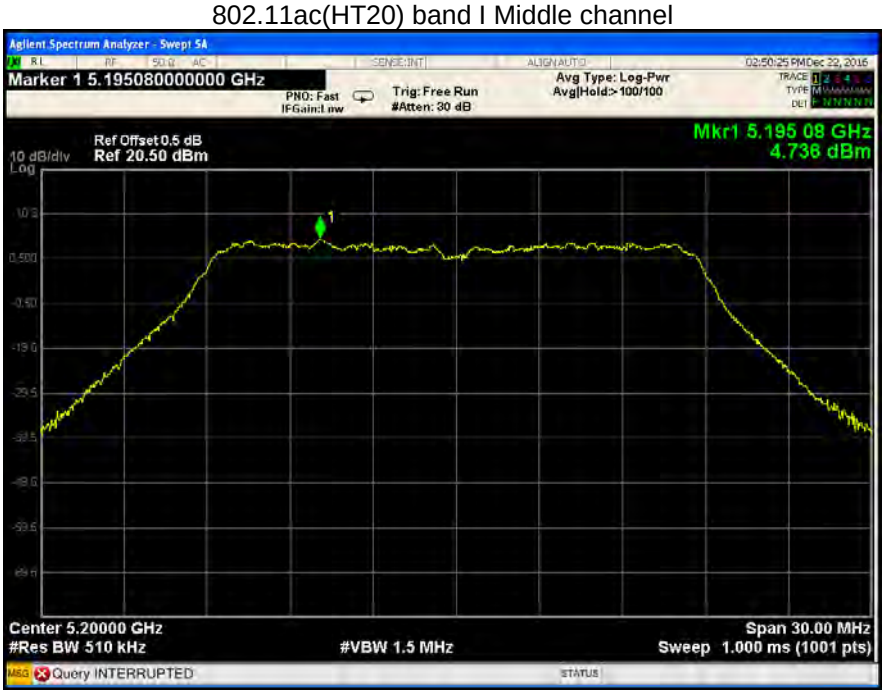
802.11n(HT20) band I High channel



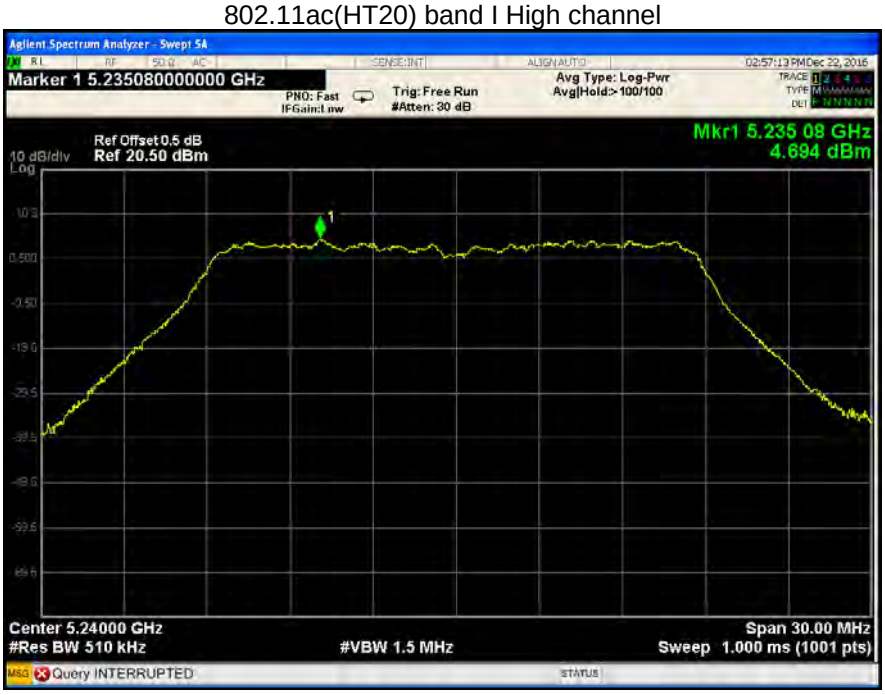
802.11ac(HT20) band I Low channel



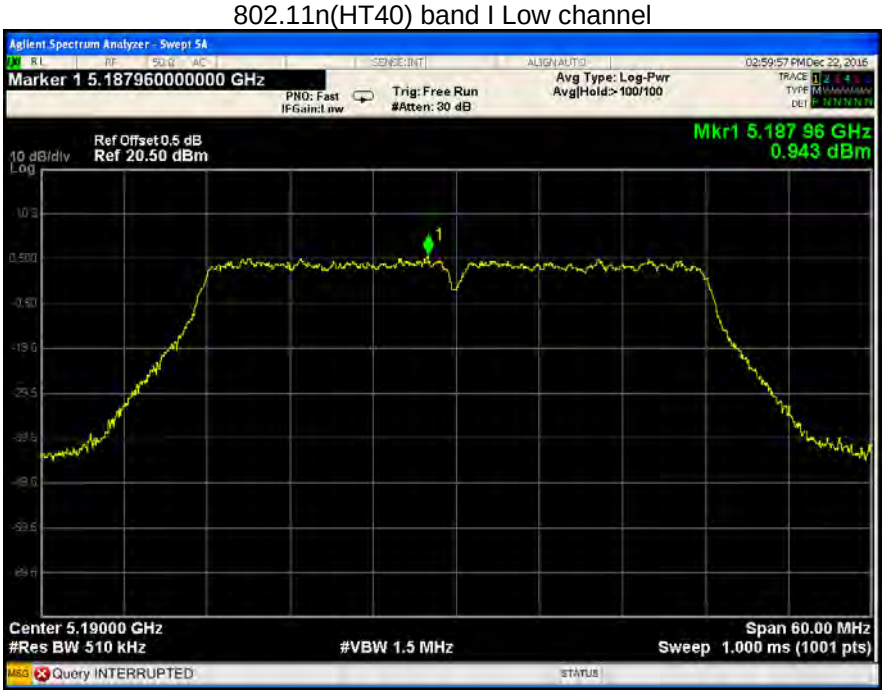
802.11ac(HT20) band I Middle channel



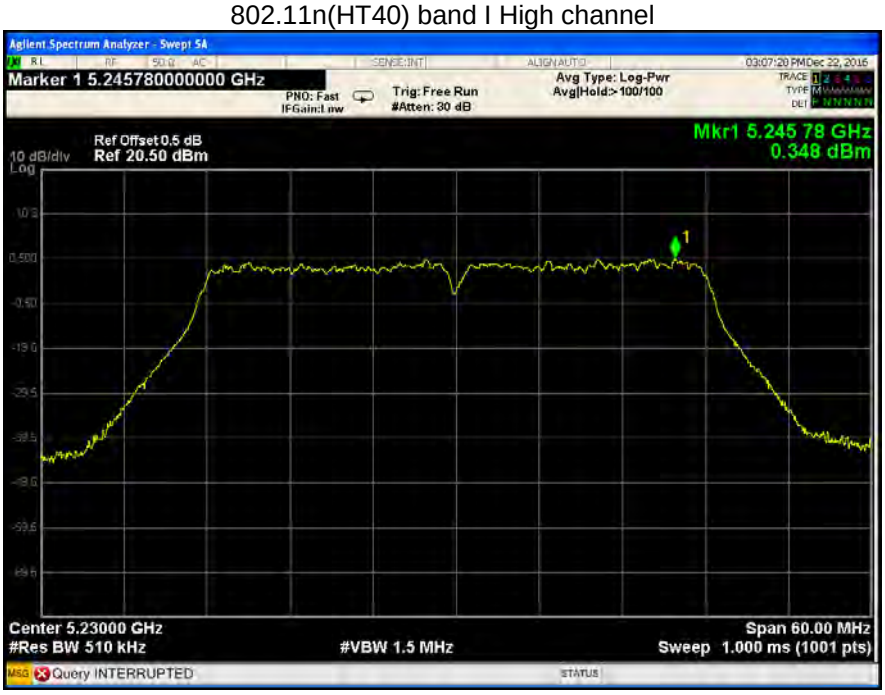
802.11ac(HT20) band I High channel



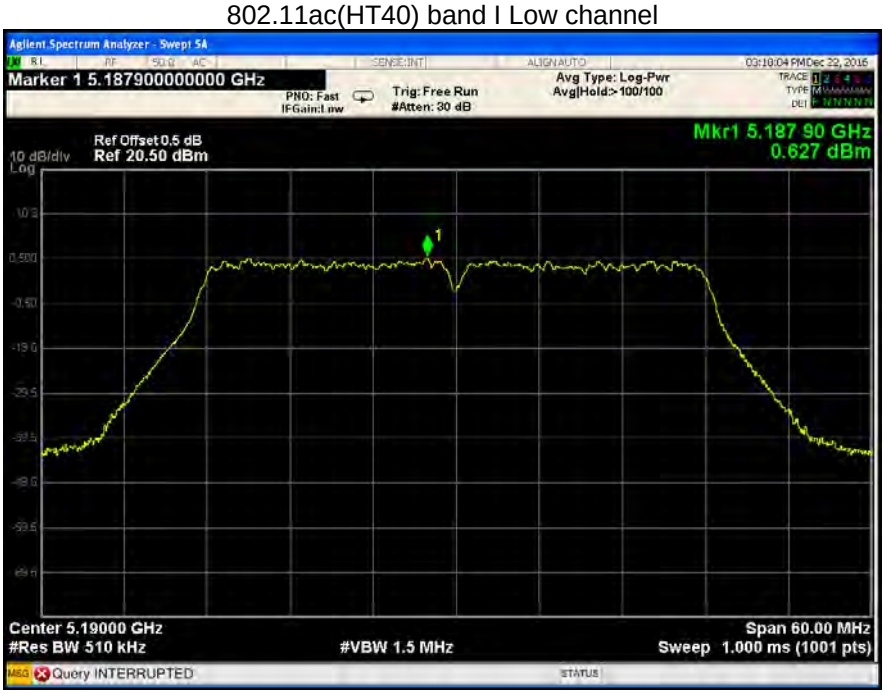
802.11n(HT40) band I Low channel



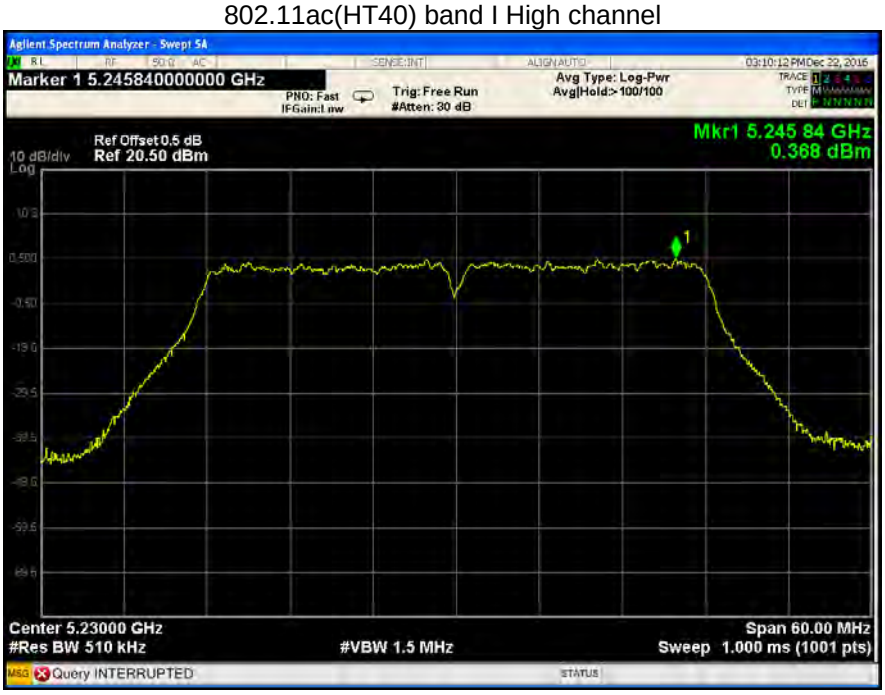
802.11n(HT40) band I High channel



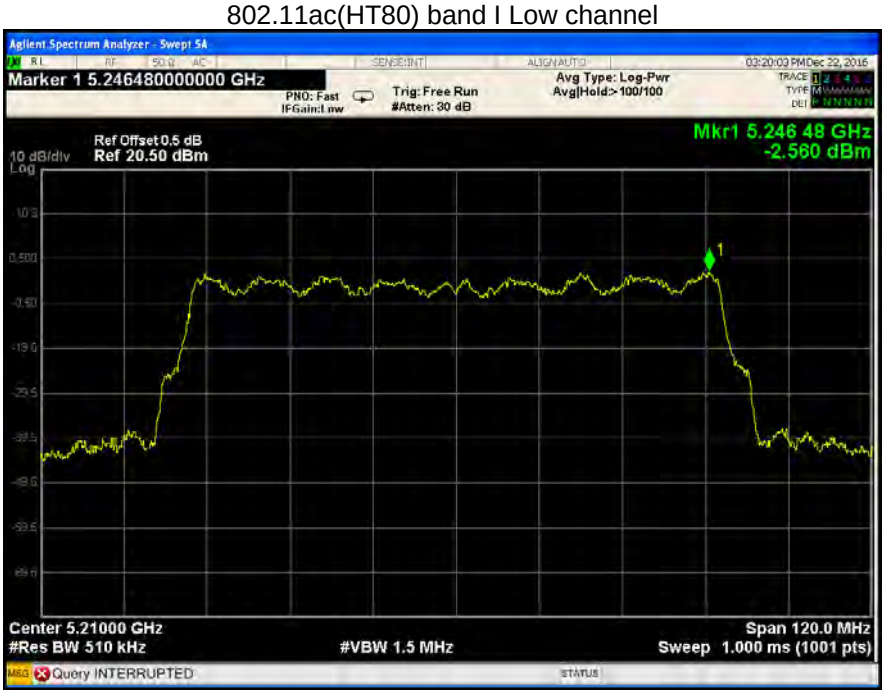
802.11ac(HT40) band I Low channel



802.11ac(HT40) band I High channel



802.11ac(HT80) band I Low channel

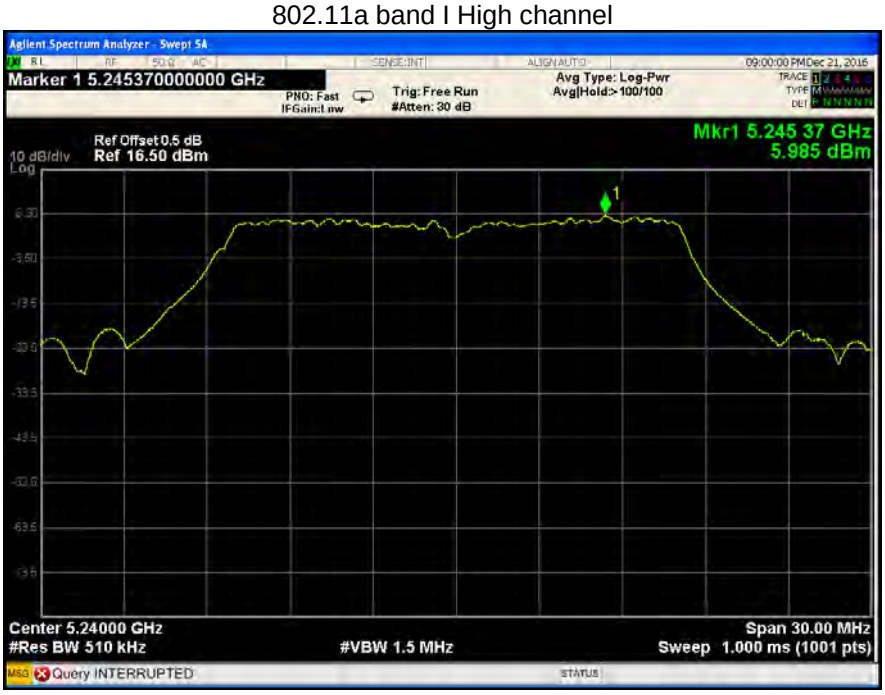


ANT1+ANT2

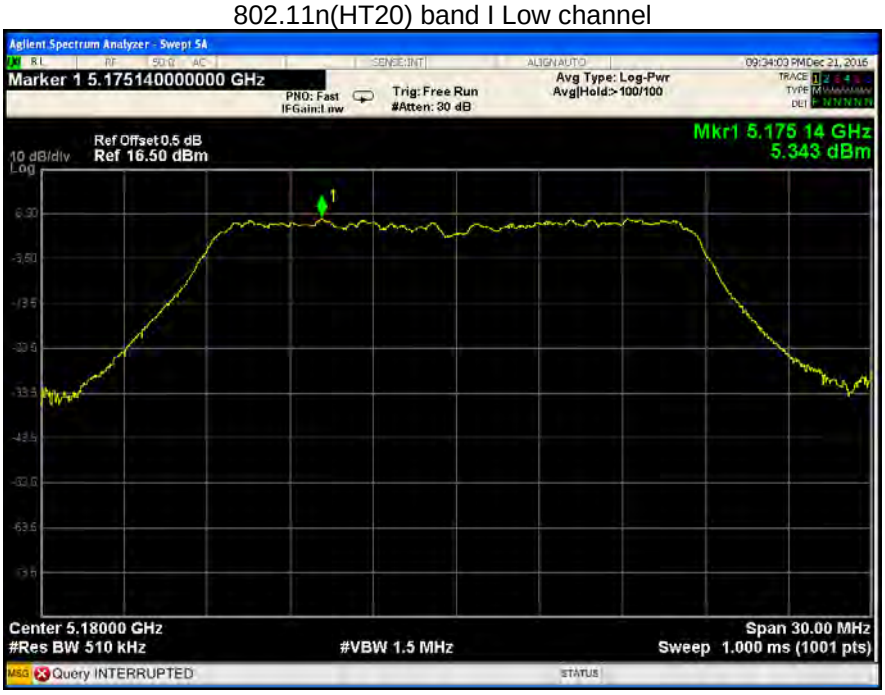
802.11a band I Low channel

802.11a band I Middle channel

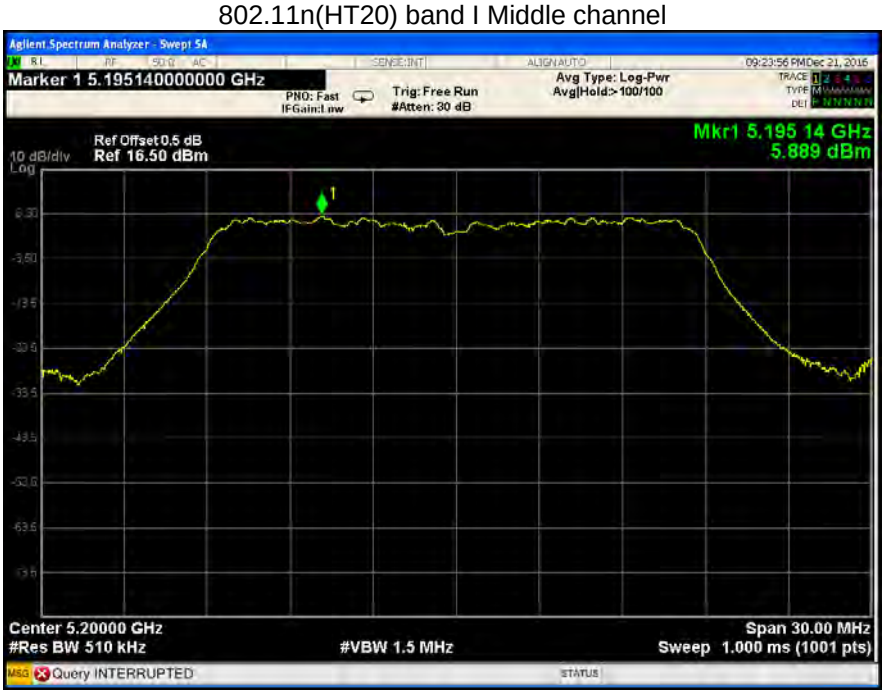
802.11a band I High channel



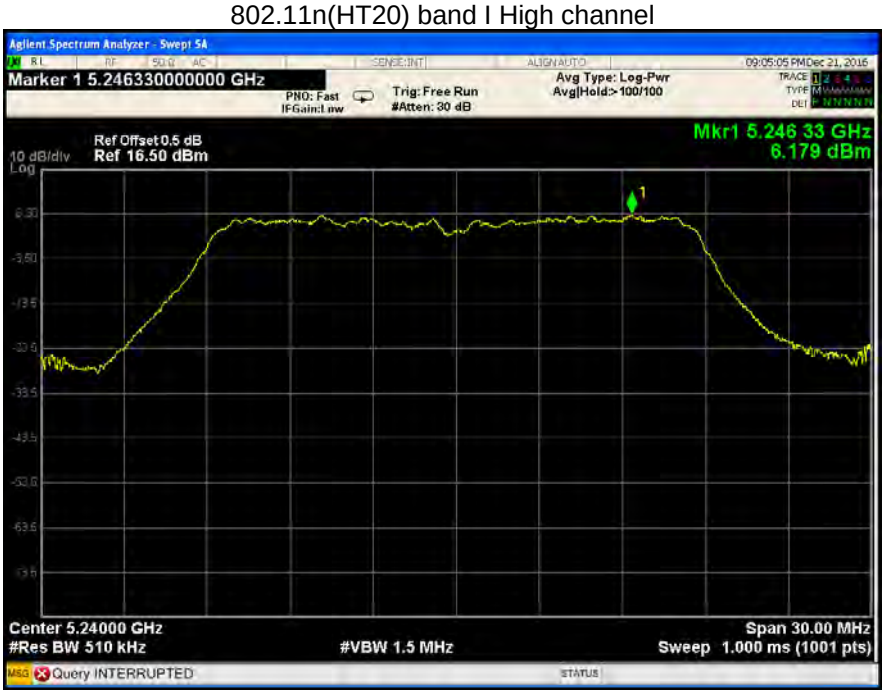
802.11n(HT20) band I Low channel



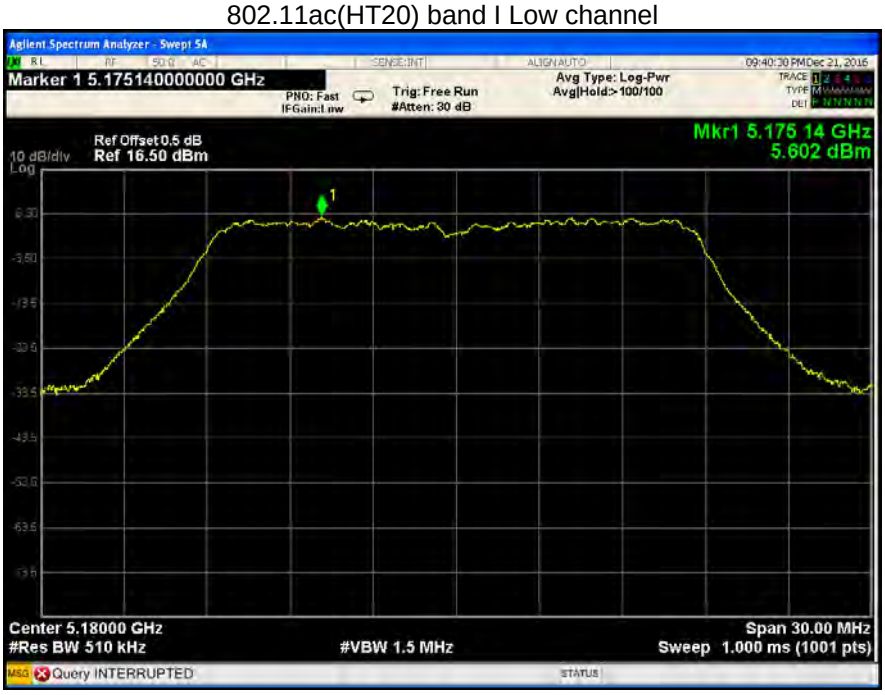
802.11n(HT20) band I Middle channel



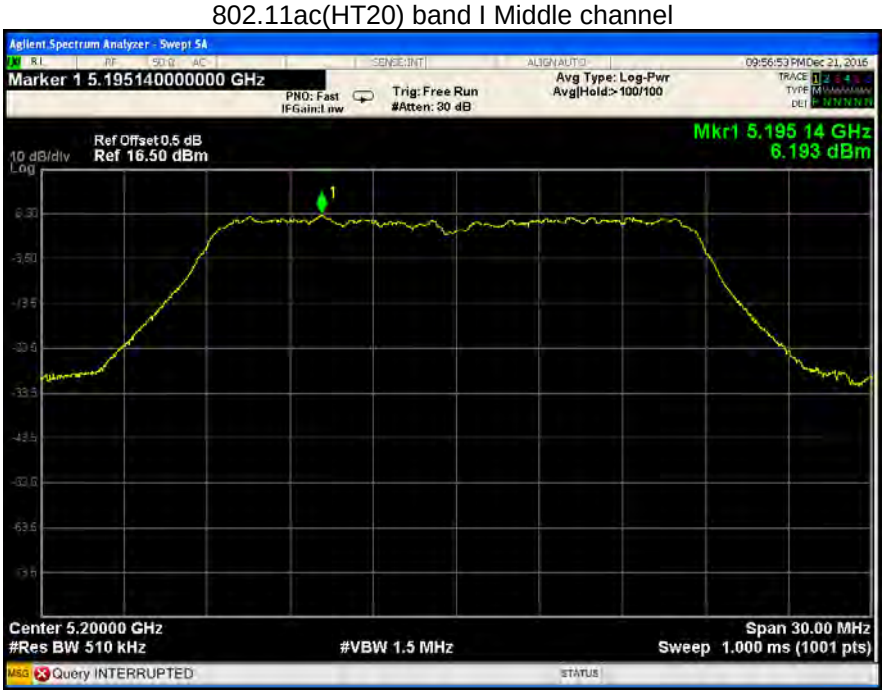
802.11n(HT20) band I High channel



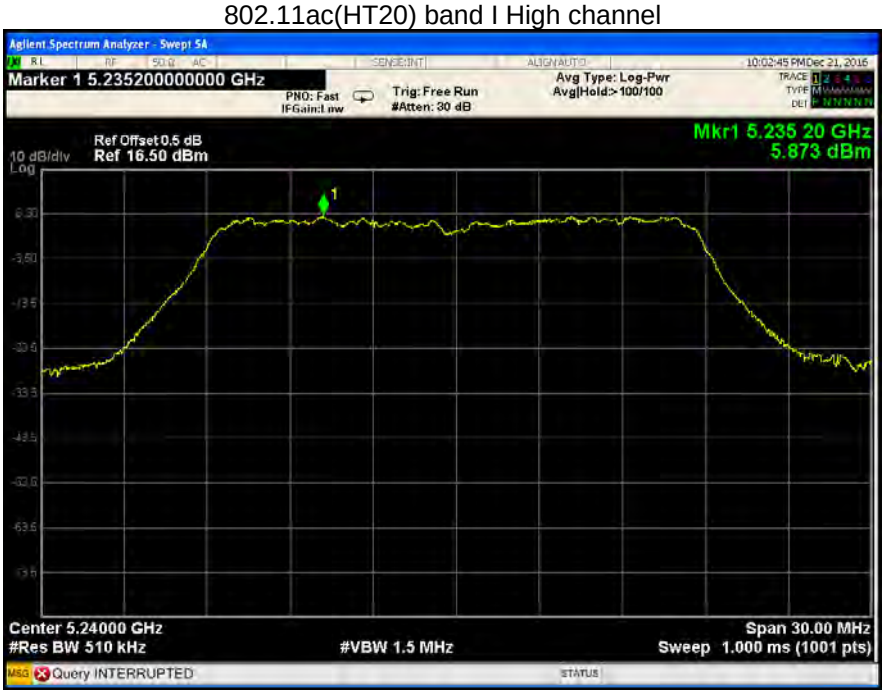
802.11ac(HT20) band I Low channel



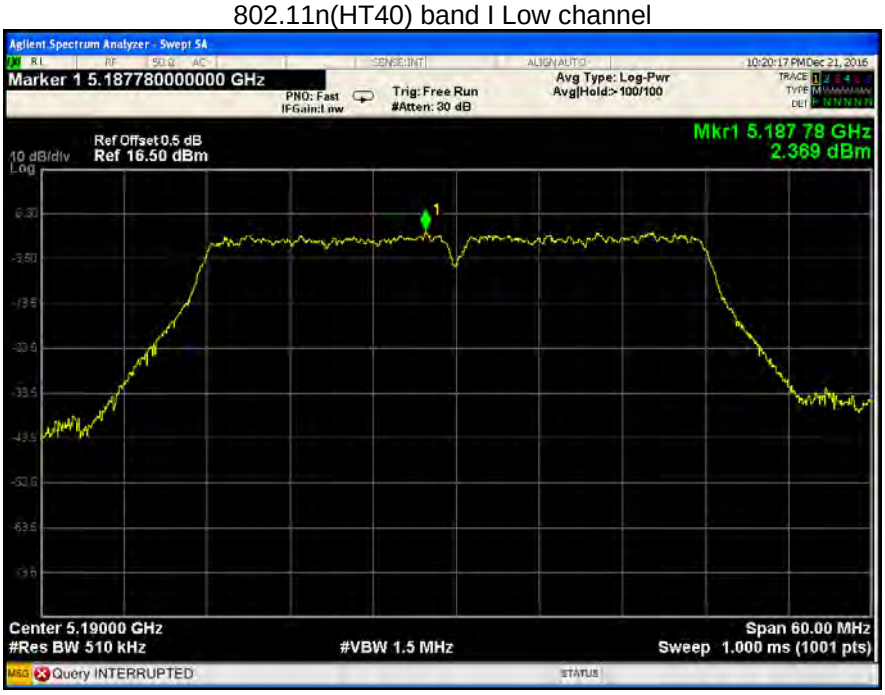
802.11ac(HT20) band I Middle channel



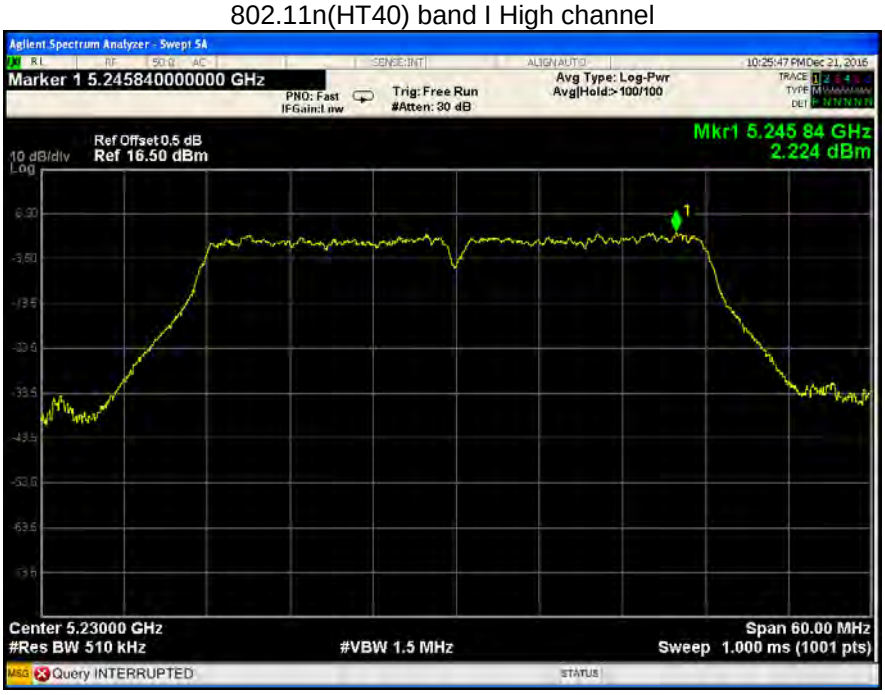
802.11ac(HT20) band I High channel



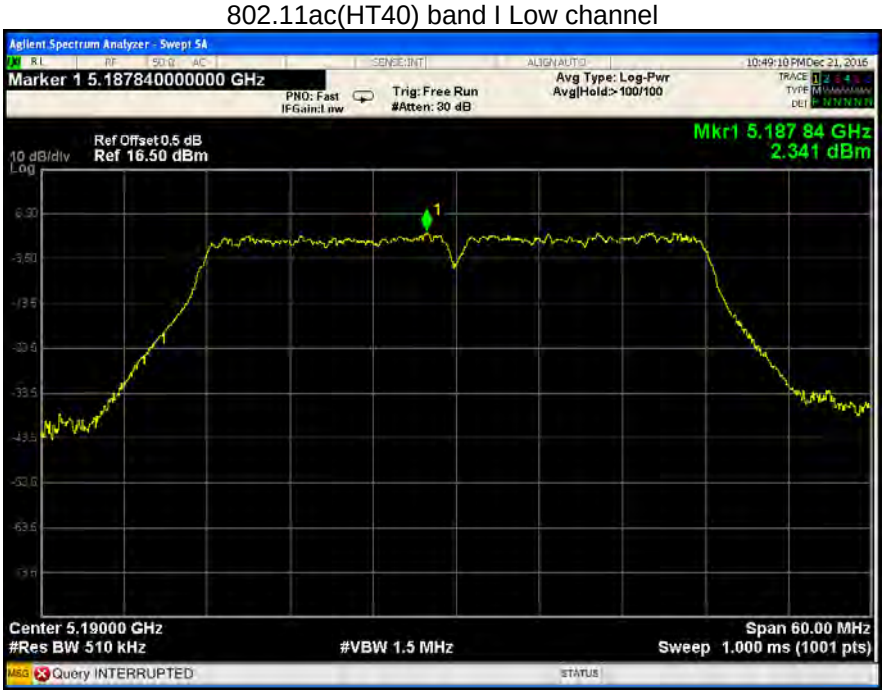
802.11n(HT40) band I Low channel



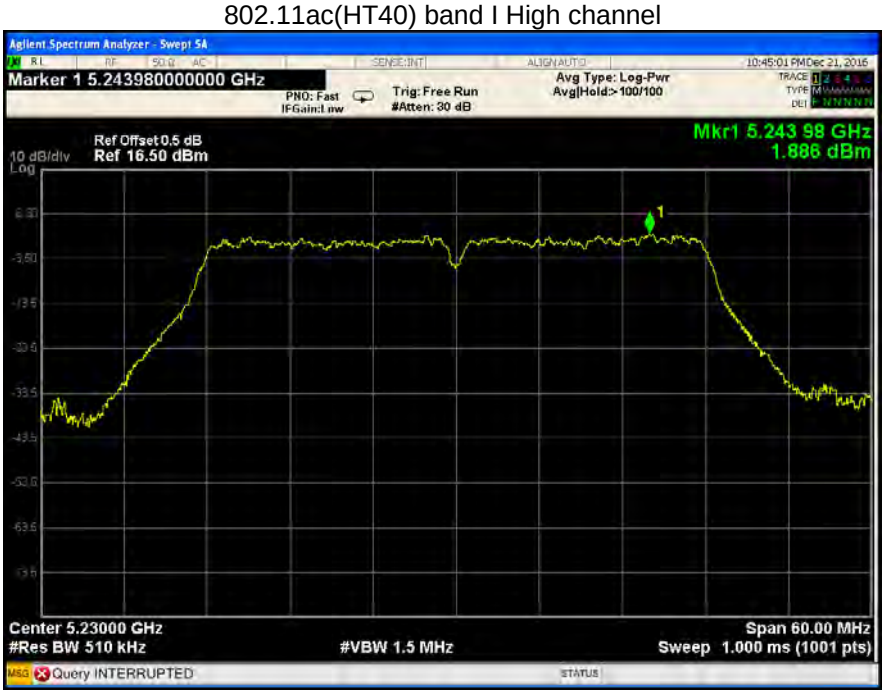
802.11n(HT40) band I High channel



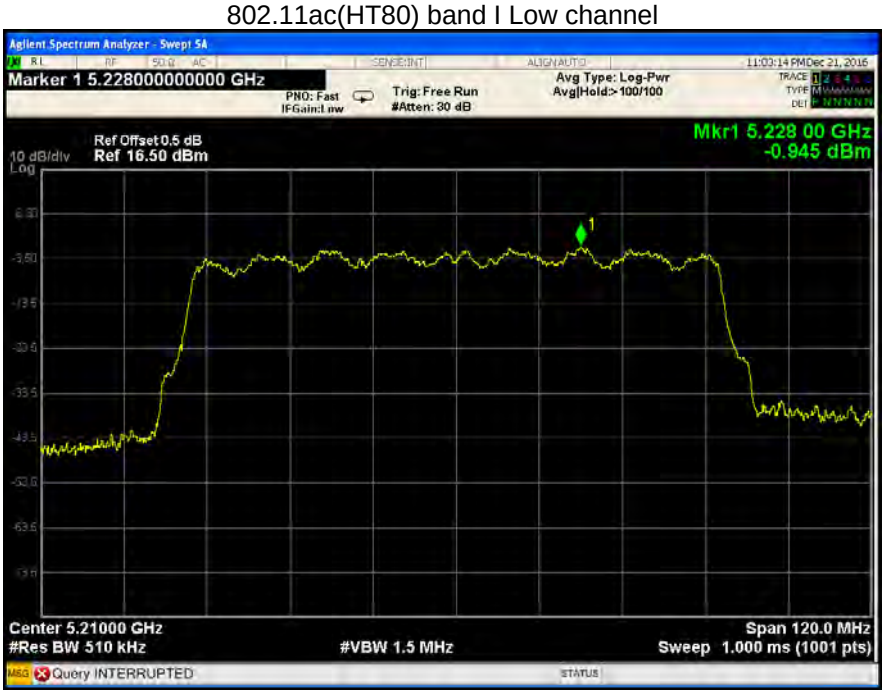
802.11ac(HT40) band I Low channel



802.11ac(HT40) band I High channel



802.11ac(HT80) band I Low channel



14 Antenna Requirement

According to the FCC Part 15 Paragraph 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. This product have four external antenna fulfill the requirement of this section through a special antenna interface with special custom thread. The size of the thread is a relatively common type of antenna interface and is designed for this product only. So as to meet the user can not replace the purpose of the antenna.

15 RF Exposure

Test Requirement: FCC Part 1.1307

Evaluation Method: FCC Part 2.1091

15.1 Requirements

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

15.2 The procedures / limit

(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 Time $\|E\|^2$,$\|H\|^2$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
1500-100,000			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 Time $\|E\|^2$,$\|H\|^2$ 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
1500-100,000			1.0	30

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

15.3 MPE Calculation Method

$$S = \frac{P \times G}{4 \times \pi \times R^2}$$

S = power density (in appropriate units, e.g. mW/cm^2)
P = output power 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 (appropriate units, e.g., cm)

From the peak EUT RF output power, the minimum mobile separation distance, R=20cm, as well as the gain of the used antenna, the RF power density can be obtained

Antenna Gain (dBi)	Antenna Gain (numeric)	Max. Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
4.00	2.512	18.53	71.29	0.035622	1

16 Photographs of test setup and EUT.

Note: Please refer to appendix: WTS16S1166013E _Photo.

======End of Report======