HCT CO.,LTD.

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FCC UNII REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Address:
129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Date of Issue:
December 03, 2018

Test Site/Location:
HCT CO., LTD., 74,Seoicheon-ro 578beon-gil,Majang-myeo,Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Report No.: HCT-RF-1811-FC035-R2

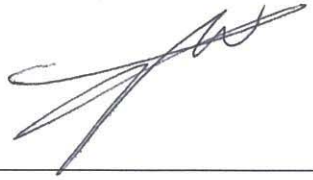
FCC ID:	**A3LSMA920N**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**

Model:	SM-A920N
EUT Type:	Smart Phone
Modulation type	OFDM
FCC Classification:	Unlicensed National Information Infrastructure(UNII)
FCC Rule Part(s):	Part 15.407

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)



Report prepared by : Kwon Jeong
Engineer of Telecommunication testing center

Approved by : Jong Seok Lee
Manager of Telecommunication testing center

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-1811-FC035	November 27, 2018	- First Approval Report
HCT-RF-1811-FC035-R1	November 28, 2018	- Revised the power limit of straddle channels
HCT-RF-1811-FC035-R2	December 03, 2018	- Added the data of 99% bandwidth

Table of Contents

1. GENERAL INFORMATION

EUT DESCRIPTION

Model	SM-A920N	
EUT Type	Smart Phone	
Power Supply	DC 3.85 V	
Battery Information	Model: EB-BA920ABU Type: Li-ion battery	
Travel Adapter Information	Model : EP-TA20KWK Manufacture: SOLUM	
Modulation Type	OFDM : 802.11a, 802.11n, 802.11ac	
Frequency Range (MHz)	UNII 1	20MHz BW : 5180 - 5240 40MHz BW : 5190 - 5230 80MHz BW : 5210
	UNII 2A	20MHz BW : 5260 - 5320 40MHz BW : 5270 - 5310 80MHz BW : 5290
	UNII 2C	20MHz BW : 5500 - 5720 40MHz BW : 5510 - 5710 80MHz BW : 5530 – 5690
	UNII 3	20MHz BW : 5745 - 5825 40MHz BW : 5755 - 5795 80MHz BW : 5775
Antenna Type	FPCB	
Antenna Peak gain (dBi)	UNII 1 : -7.18(Ant1)/ -8.18(Ant2) UNII 2A : -7.19(Ant1)/ -8.77(Ant2) UNII 2C : -7.51(Ant1)/ -7.63(Ant2) UNII 3 : -8.11(Ant1)/ -7.37(Ant2)	
Straddle channel	Supported	
TDWR Band	Supported	
Dynamic Frequency Selection	Slave without radar detection	
Date(s) of Tests	November 06, 2018 ~ November 26, 2018	

ANTENNA CONFIGURATIONS

1. The device employs MIMO technology. Below are the possible configurations

Configurations	SISO		SDM	CDD
	Ant1	Ant2	Ant1 + Ant2	Ant1 + Ant2
802.11a	O	O	X	O
802.11n	O	O	O	O
802.11ac	O	O	O	O

Note:

1. O = Support, X = Not Support
2. SISO = Single Input Single Output
3. SDM = Spatial Diversity Multiplexing
4. CDD = Cyclic Delay Diversity

2. This device supports simultaneous transmission operation, which allows for two SISO channels to operate independent of one another in the 2.4GHz and 5GHz bands simultaneously on each antenna.

Frequency	Supported
2.4 GHz Ant 1 + 5 GHz Ant 2	O
2.4 GHz Ant 2 + 5 GHz Ant 1	X
2.4 GHz Ant 1 + 5 GHz Ant 1	X
2.4 GHz Ant 2 + 5 GHz Ant 2	X

2. MAXIMUM OUTPUT POWER

The transmitter has a maximum total conducted average output power as follows:

Band	Mode	Ant1 Power (dBm)	Ant2 Power (dBm)	Ant1+ Ant2 Power (dBm)	Ant1+ Ant2 Power (W)
UNII1	802.11a	15.853	16.683	19.276	0.085
	802.11n (HT20)	14.415	15.755	18.138	0.065
	802.11n (HT40)	13.737	14.937	17.389	0.055
	802.11ac (VHT20)	14.589	15.819	18.258	0.067
	802.11ac (VHT40)	13.747	14.867	17.354	0.054
	802.11ac (VHT80)	10.005	10.485	13.262	0.021
UNII2A	802.11a	15.683	16.493	19.041	0.080
	802.11n (HT20)	14.285	15.605	18.005	0.063
	802.11n (HT40)	13.277	14.867	17.155	0.052
	802.11ac (VHT20)	14.419	15.759	18.076	0.064
	802.11ac (VHT40)	13.317	14.847	17.160	0.052
	802.11ac (VHT80)	9.975	10.745	13.387	0.022
UNII2C	802.11a	16.643	16.533	19.454	0.088
	802.11n (HT20)	15.175	15.045	17.646	0.058
	802.11n (HT40)	14.917	14.587	17.719	0.059
	802.11ac (VHT20)	15.359	14.759	17.489	0.056
	802.11ac (VHT40)	14.877	14.477	17.676	0.059
	802.11ac (VHT80)	14.675	14.355	17.431	0.055
UNII3	802.11a	16.903	14.663	18.873	0.077
	802.11n (HT20)	15.625	13.405	17.502	0.056
	802.11n (HT40)	14.917	13.097	16.746	0.047
	802.11ac (VHT20)	15.589	13.669	17.672	0.059
	802.11ac (VHT40)	14.967	12.927	16.894	0.049
	802.11ac (VHT80)	14.845	13.265	17.137	0.052

3. TEST METHODOLOGY

The measurement procedure described in FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01 dated December 14, 2017 entitled “Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part15, Subpart E” and ANSI C63.10(Version : 2013) ‘the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices’ were used in the measurement.

EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.407 under the FCC Rules Part 15 Subpart E.

GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1GHz. Above 1GHz with 1.5m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3.75 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 8 of ANSI C63.10. (Version: 2013)

Conducted Antenna Terminal

See Section from 8.1 to 8.4.(KDB 789033 D02 v02r01)

DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards.

Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.

Detailed description of test facility was submitted to the Commission and accepted dated April 02, 2018 (Registration Number: KR0032).

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203, §15.407:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

* The antennas of this E.U.T are permanently attached.

* The E.U.T Complies with the requirement of §15.203, §15.407

7. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95 % level of confidence.

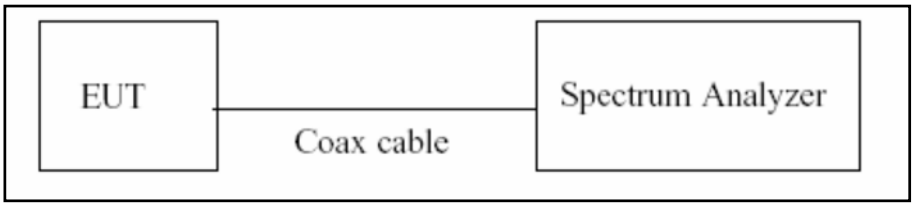
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (±dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70
Radiated Disturbance (18 GHz ~ 40 GHz)	5.71

8. DESCRIPTION OF TESTS

8.1. Duty Cycle

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

We tested according to Procedure B.2 in KDB 789033 D02 v02r01.

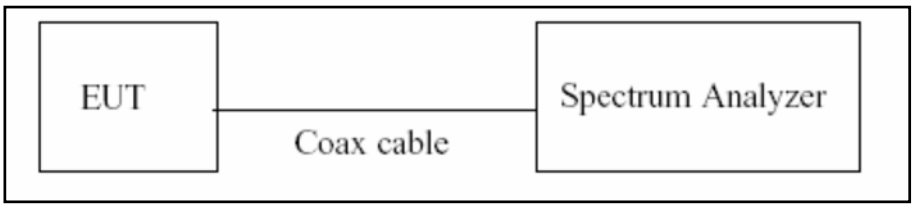
1. RBW = 8 MHz (the largest availble value)
2. VBW = 8 MHz (≥ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on}/ T_{total} and Duty Cycle Factor = 10*log(1/Duty Cycle)

8.2. Bandwidth Measurement

Limit

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Configuration



Test Procedure(26dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

We tested according to Procedure C.1 in KDB 789033 D02 v02r01.

1. RBW = approximately 1 % of the emission bandwidth
2. VBW > RBW
3. Detector = Peak
4. Trace mode = max hold
5. Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1 %.

Test Procedure(6dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

We tested according to Procedure C.2 in KDB 789033 D02 v02r01.

1. RBW = 100 kHz
2. VBW ≥ 3*RBW
3. Detector = Peak
4. Trace mode = max hold
5. Allow the trace to stabilize
6. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points(upper and lower frequencies) that are attenuated by 6 dB relative to the maximum lever measured in the fundamental emission.

Note:

1. We tested X dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer.
2. DFS test channels should be defined. So, We performed the OBW test to prove that no part of the fundamental emissions of any channels belong to UNII1 and UNII3 band for DFS.
3. The 26 dB bandwidth is used to determine the conducted power limits.

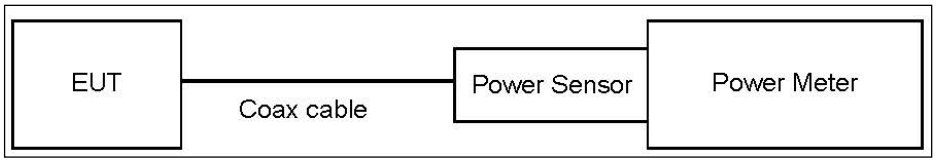
8.3. Output Power Measurement

Limit

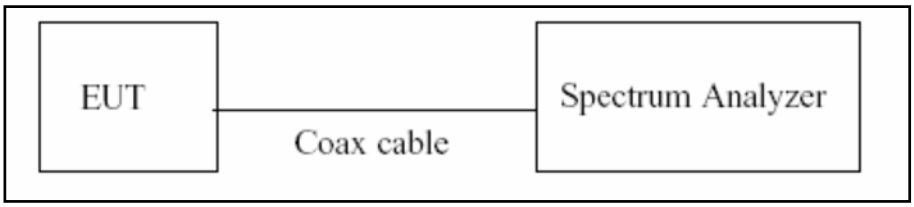
Band	Limit
UNII 1	- Master : Not exceed 1 W(=30dBm) - Slave : Not exceed 250 mW(=23.98 dBm)
UNII 2A, 2C	Not exceed the lesser of 250 mW or 11 dBm + 10 log B, (where B is the 26 dB emission bandwidth in megahertz.)
UNII 3	Not exceed 1 W(=30dBm)

Test Configuration

Power Meter(BW : 20MHz)



Spectrum Analyzer(BW : 40MHz, 80MHz)



Test Procedure(Power Meter)

We tested according to Procedure E.3.a in KDB 789033 D02 v02r01.

1. Measure the duty cycle.
2. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
3. Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

Test Procedure(Spectrum Analyzer)

The transmitter output is connected to the Spectrum Analyzer.

We use the spectrum analyzer's integrated band power measurement function.

We tested according to Procedure E.2.d) in KDB 789033 D02 v02r01.

1. Measure the duty cycle.
2. Set span to encompass the 26 dB EBW of the signal.
3. RBW = 1 MHz.
4. VBW ≥ 3 MHz.
5. Number of points in sweep ≥ 2*span/RBW.
6. Sweep time = auto.
7. Detector = RMS.
8. Do not use sweep triggering. Allow the sweep to "free run".
9. Trace average at least 100 traces in power averaging(RMS) mode
10. Integrated bandwidth = OBW
11. Add 10log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

Sample Calculation

Total Power(dBm) = Reading Value(dBm) + ATT loss(dB) + Cable loss(dB) + Duty Cycle Factor(dB)

Note

1. Spectrum reading values are not plot data.
   The power results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss
3. Actual value of loss for the attenuator and cable combination is below table.

Band	Loss(dB)
UNII 1	11.2
UNII 2A	11.2
UNII 2C	11.2
UNII 3	11.2

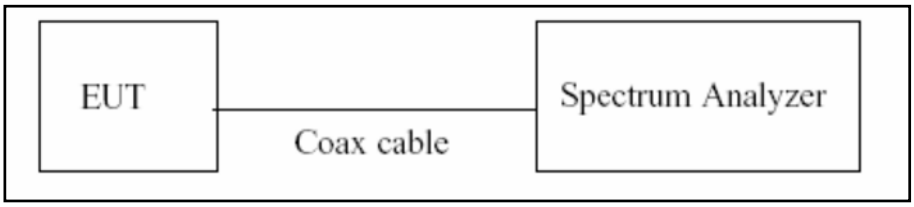
(Actual value of loss for the attenuator and cable combination)

8.4. Power Spectral Density

Limit

Band	Limit
UNII 1	11 dBm/MHz
UNII 2A, 2C	11 dBm/MHz
UNII 3	30 dBm/500 kHz

Test Configuration



Test Procedure

We tested according to Procedure F in KDB 789033 D02 v02r01.

1. Set span to encompass the entire emission bandwidth(EBW) of the signal.
2. RBW = 1 MHz(510 kHz for UNII 3)
3. VBW ≥ 3 MHz
4. Number of points in sweep ≥ 2*span/RBW.
5. Sweep time = auto.
6. Detector = RMS(i.e., power averaging), if available. Otherwise, use sample detector mode.
7. Do not use sweep triggering. Allow the sweep to “free run”.
8. Trace average at least 100 traces in power averaging(RMS) mode
9. Use the peak search function on the spectrum analyzer to find the peak of the spectrum.
10. If Method SA-2 was used, add 10 log(1/x), where x is the duty cycle, to the peak of the spectrum.

Sample Calculation

Total PSD(dBm) = Reading Value(dBm) + ATT loss(dB) + Cable loss(dB) + Duty Cycle Factor(dB)

Note

1. Spectrum reading values are not plot data.
   The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss + Cable loss
3. Actual value of loss for the attenuator and cable combination is below table.

Band	Loss(dB)
UNII 1	11.2
UNII 2A	11.2
UNII 2C	11.2
UNII 3	11.2

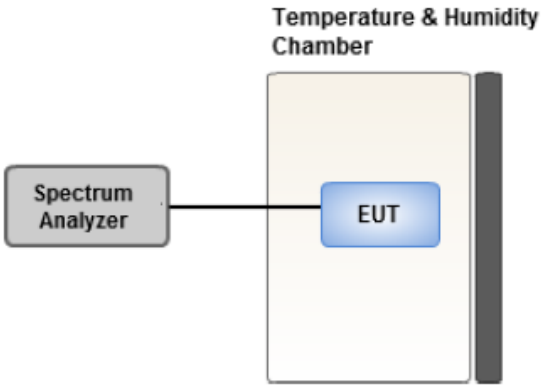
(Actual value of loss for the attenuator and cable combination)

8.5. Frequency Stability

Limit

Maintained within the band

Test Configuration



Test Procedure

1. The EUT was placed inside an environmental chamber as the temperature in the chamber was varied between -30 ℃ and 50 ℃.
2. The temperature was incremented by 10 ℃ intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.
3. The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battety operating end point which shall be specified by the manufacturer.

8.6. AC Power line Conducted Emissions

Limit

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dBμV)	
	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

*Decreases with the logarithm of the frequency.

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

Test Configuration

See test photographs attached in Annex A for the actual connections between EUT and support equipment.

Test Procedure

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Detectors : Quasi Peak and Average Detector.

Sample Calculation

Quasi-peak(Final Result) = Reading Value + Correction Factor

8.7. Radiated Test

Limit

1. UNII 1: All emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of −27 dBm/MHz.

2. UNII 2A, 2C: All emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of −27 dBm/MHz.

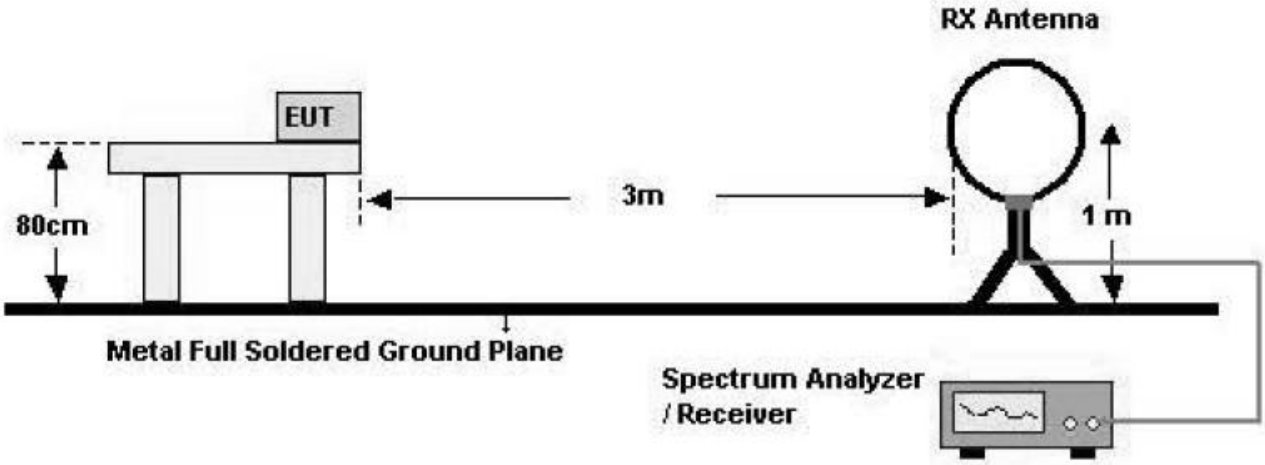
3. UNII 3: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

4. All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Section 15.209.

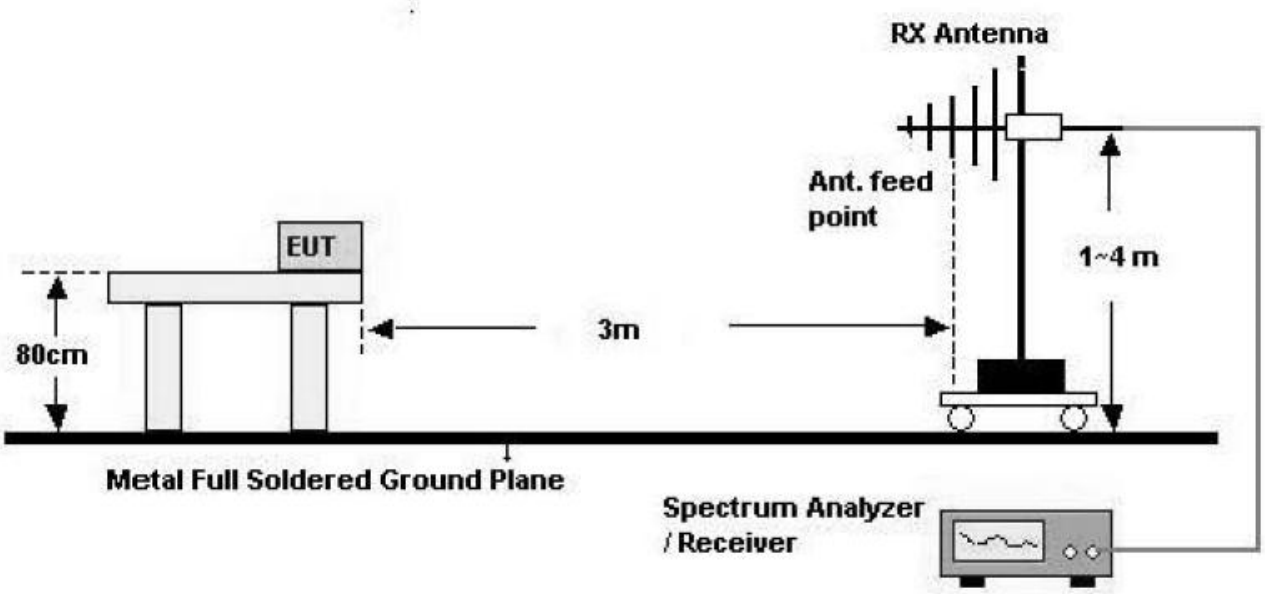
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

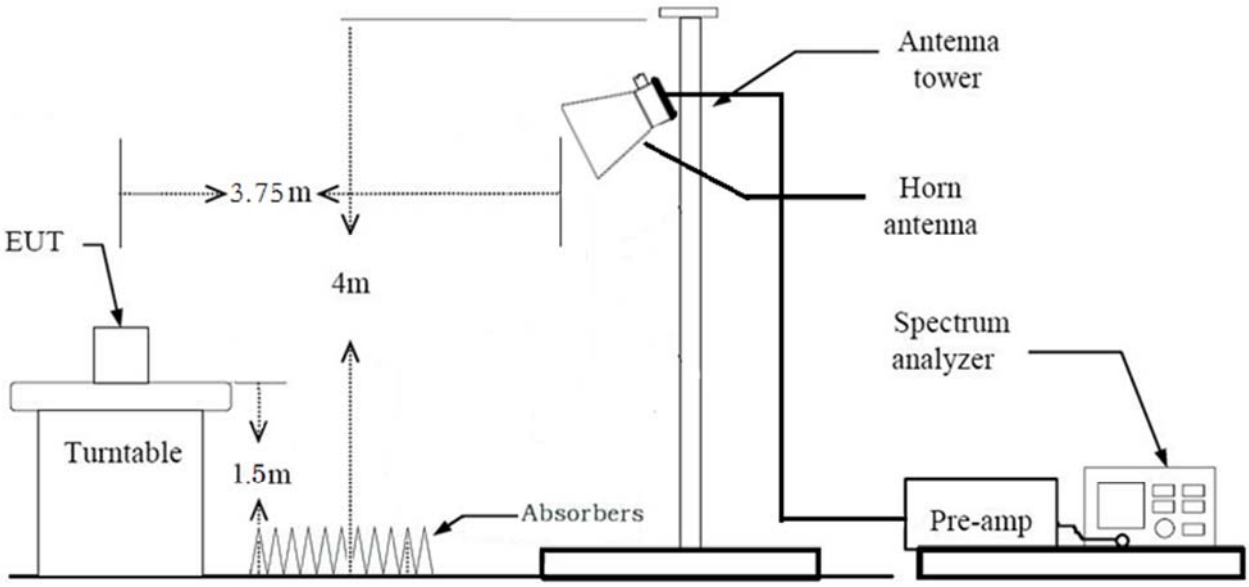
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz


Antenna
tower
Horn
antenna
Spectrum
analyzer
3.75m
EUT
4m
Turntable
1.5m
Absorbers
Pre-amp

Test Procedure of Radiated spurious emissions (Above 1 GHz)

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3.75 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. According to SVSWR requirement in ANSI 63.4-2014, We performed the radiated test at 3.75 m distance from center of turn table. So, we applied the distance factor(reference distance : 3 m).
   *Distance extrapolation factor = 20*log (test distance / specific distance) (dB)
6. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
7. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
8. The unit was tested with its standard battery.
9. Spectrum Setting
   (1) Measurement Type(Peak, G.5 in KDB 789033 v02r01):
   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep Time = auto
   - Trace mode = max hold
   - Allow sweeps to continue until the trace stabilizes.
     Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately 1/x, where x is the duty cycle.

   (2) Measurement Type(Average, G.6.d in KDB 789033 v02r01):
   - RBW = 1 MHz
   - VBW(Duty cycle ≥ 98 percent) = VBW ≤ RBW/100(i.e., 10 kHz) but not less than 10 Hz.
   - VBW(Duty cycle is < 98 percent) = VBW ≥ 1/T, where T is the minimum transmission duration.
   - The analyzer is set to linear detector mode.
   - Detector = Peak.
   - Sweep time = auto.
   - Trace mode = max hold.
   - Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98 percent duty cycle. For lower duty cycles, increase the minimym number of traces by a factor of 1/x, where x is the duty cycle.

10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor

11. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency

12. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Distance Factor(D.F)

Test Procedure of Radiated Restricted Band Edge

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3.75 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. According to SVSWR requirement in ANSI 63.4-2014, We performed the radiated test at 3.75 m distance from center of turn table. So, we applied the distance factor(reference distance : 3 m).
   *Distance extrapolation factor = 20*log (test distance / specific distance) (dB)
6. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
7. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
8. The unit was tested with its standard battery.
9. Spectrum Setting
   (1) Measurement Type(Peak, G.5 in KDB 789033 v02r01):
   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep Time = auto
   - Trace mode = max hold
   - Allow sweeps to continue until the trace stabilizes.
     Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately 1/x, where x is the duty cycle.

   (2) Measurement Type(Average, G.6.d in KDB 789033 v02r01):
   - RBW = 1 MHz
   - VBW(Duty cycle ≥ 98 percent) = VBW ≤ RBW/100(i.e., 10 kHz) but not less than 10 Hz.
   - VBW(Duty cycle is < 98 percent) = VBW ≥ 1/T, where T is the minimum transmission duration.
   - The analyzer is set to linear detector mode.
   - Detector = Peak.
   - Sweep time = auto.
   - Trace mode = max hold.
   - Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98 percent duty cycle. For lower duty cycles, increase the minimym number of traces by a factor of 1/x, where x is the duty cycle.

10. Measured Frequency Range :

- 4500MHz ~ 5150MHz
- 5350MHz ~ 5460MHz
- 5460MHz ~ 5470MHz
- (75 MHz or more below the 5725MHz) ~ 5725MHz
- 5850MHz ~ (75 MHz or more above the 5850MHz)

11. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Distance Factor(D.F)

The actual setting value of VBW

Mode	Worst Data rate (Mbps)	Duty Cycle	Duty Cycle Factor (dB)	The actual setting value of VBW (Hz)
a	6	0.933	0.301	1000
802.11n(HT20)	MCS 0	0.929	0.320	1000
802.11ac(VHT20)	MCS 0	0.931	0.311	1000
802.11n(HT40)	MCS 0	0.871	0.600	3000
802.11ac(VHT40)	MCS 0	0.872	0.595	3000
802.11ac(VHT80)	MCS 0	0.778	1.090	10000

8.8. Worst case configuration and mode

Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone, Stand alone + external accessories(earphone, etc)
   - Worstcase : Stand alone
2. All configurations of antenna were investigated and the worst case configuration results are reported.
   - Mode : Ant1(SISO), Ant2(SISO), Ant1+Ant2(SDM), Ant1+Ant2(CDD)
   - Worstcase : Ant1+Ant2(CDD)
3. EUT Axis
   - Radiated Spurious Emissions : X
   - Radiated Restricted Band Edge : Y
4. All datarate of operation were investigated and the worst case datarate results are reported
   - 802.11a : 6Mbps
   - 802.11n : MCS0
   - 802.11ac : MCS0

Radiated test(RSDB)

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone, Stand alone + external accessories(earphone, etc)
   - Worstcase : Stand alone
2. EUT Axis
   - Radiated Spurious Emissions : X
3. The following tables show the worst case configurations determined during testing.

Description	2.4 GHz Emission	5 GHz Emission
Antenna	1	2
Channel	11	165
Data Rate	1Mbps	6Mbps
Mode	802.11b	802.11a

AC Power line Conducted Emissions

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone+Earphone+Travel Adapter, Stand alone+Travel Adapter
   - Worstcase : Stand alone+Travel Adapter

Conducted test

1. All datarate of operation were investigated and the worst case datarate results are reported
   - 802.11a : 18Mbps
   - 802.11n : MCS5
   - 802.11ac : MCS5

9. SUMMARY OF TEST RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
26dB Bandwidth	§15.407 (for Power Measurement)	N/A	Conducted	PASS
6 dB Bandwidth	§15.407(e)	>500 kHz (5725-5850 MHz)		PASS
Maximum Conducted Output Power	§15.407(a)(1)	< 250 mW(5150-5250 MHz) < 250 mW or 11+10 log log $_{10}$ (BW) dBm (5250-5350 MHz) < 250 mW or 11+10 log log $_{10}$ (BW) dBm (5470-5725 MHz) <1 W(5725-5850 MHz)		PASS
Peak Power Spectral Density	§15.407(a)(1),(5)	<11 dBm/ MHz (5150-5250 MHz) <11 dBm/ MHz (5250-5350 MHz) <11 dBm/ MHz (5470-5725 MHz) <30 dBm/500 kHz(5725-5850 MHz)		PASS
Frequency Stability	§15.407(g) §2.1055	Maintained within the band		PASS
AC Conducted Emissions 150 kHz-30 MHz	15.207	<FCC 15.207 limits		PASS
Undesirable Emissions	§15.407(b)	<-27 dBm/MHz EIRP (UNII1, 2A, 2C) cf. Section 8.7 (UNII 3)	Radiated	PASS
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	15.205, 15.407(b)(5), (6)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		PASS

10. TEST RESULT

10.1 DUTY CYCLE

Mode	Data Rate (Mbps)	Duty Cycle	Duty Cycle Factor (dB)
802.11a	6	0.933	0.301
	9	0.906	0.429
	12	0.881	0.550
	18	0.837	0.773
	24	0.797	0.985
	36	0.730	1.367
	48	0.680	1.675
	54	0.657	1.824

Mode	MCS Index	Duty Cycle	Duty Cycle Factor (dB)
802.11n(HT20)	0	0.929	0.320
	1	0.875	0.580
	2	0.831	0.804
	3	0.792	1.013
	4	0.731	1.361
	5	0.680	1.675
	6	0.662	1.791
	7	0.642	1.925
802.11n(HT40)	0	0.871	0.600
	1	0.787	1.040
	2	0.724	1.403
	3	0.677	1.694
	4	0.607	2.168
	5	0.555	2.557
	6	0.537	2.700
	7	0.519	2.848

Mode	MCS Index	Duty Cycle	Duty Cycle Factor (dB)
802.11ac(VHT20)	0	0.931	0.311
	1	0.876	0.575
	2	0.832	0.799
	3	0.792	1.013
	4	0.734	1.343
	5	0.684	1.649
	6	0.666	1.765
	7	0.647	1.891
	8	0.619	2.083
802.11ac(VHT40)	0	0.872	0.595
	1	0.790	1.024
	2	0.728	1.379
	3	0.680	1.675
	4	0.612	2.132
	5	0.564	2.487
	6	0.548	2.612
	7	0.529	2.765
	8	0.507	2.950
	9	0.487	3.125
802.11ac(VHT80)	0	0.778	1.090
	1	0.668	1.752
	2	0.601	2.211
	3	0.557	2.541
	4	0.499	3.019
	5	0.464	3.335
	6	0.452	3.449
	7	0.438	3.585
	8	0.425	3.716
	9	0.410	3.872

10.2 26DB BANDWIDTH

[Ant1]

802.11a Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	19.94	16.446
5200	40	20.68	16.448
5240	48	20.34	16.463
5260	52	20.13	16.461
5300	60	20.47	16.454
5320	64	20.32	16.451
5500	100	20.99	16.492
5600	120	20.92	16.488
5720	144	20.02	16.484
5745	149	19.64	16.469
5785	157	20.67	16.463
5825	165	19.44	16.444

802.11n(HT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	21.48	17.755
5200	40	21.84	17.754
5240	48	21.49	17.747
5260	52	22.11	17.767
5300	60	22.07	17.766
5320	64	21.94	17.731
5500	100	21.95	17.764
5600	120	21.24	17.752
5720	144	21.43	17.745
5745	149	21.81	17.777
5785	157	21.72	17.780
5825	165	21.84	17.758

802.11n(HT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	43.57	36.390
5230	46	43.40	36.422
5270	54	45.65	36.495
5310	62	43.01	36.406
5510	102	43.52	36.369
5590	118	50.90	36.665
5710	142	46.13	36.484
5755	151	44.22	36.549
5795	159	44.52	36.430

802.11ac(VHT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	21.91	17.758
5200	40	21.79	17.766
5240	48	22.21	17.770
5260	52	21.95	17.752
5300	60	22.22	17.783
5320	64	21.55	17.759
5500	100	22.27	17.790
5600	120	22.01	17.775
5720	144	21.83	17.773
5745	149	22.46	17.805
5785	157	22.84	17.770
5825	165	22.53	17.788

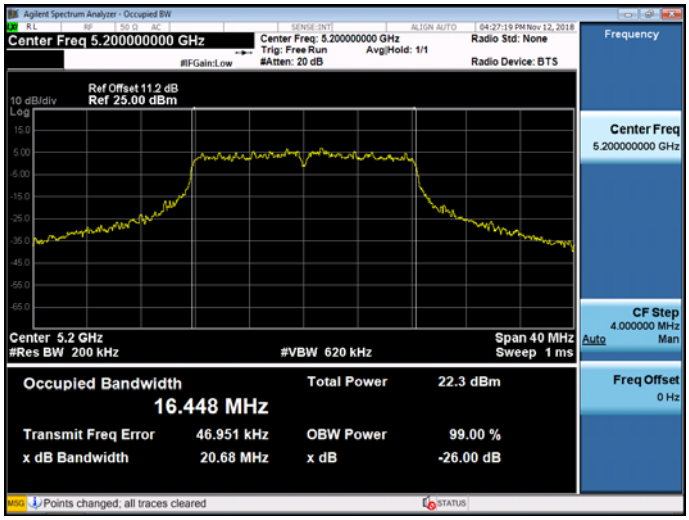
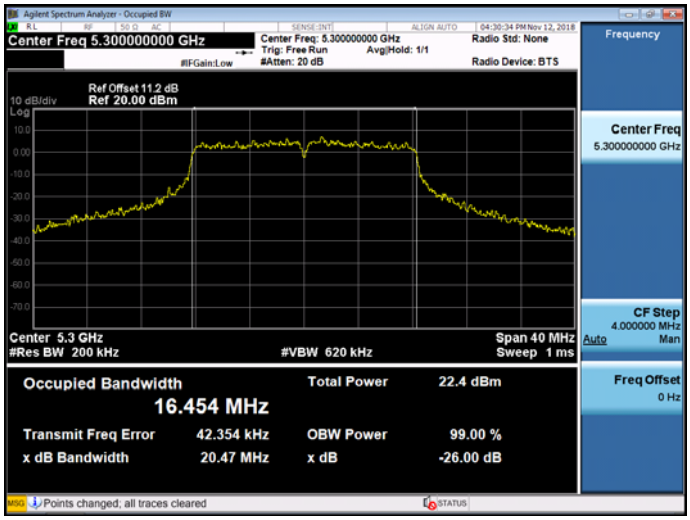
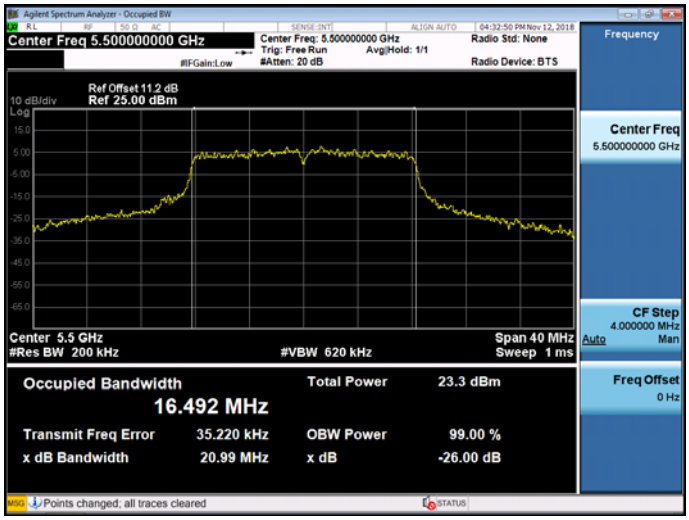
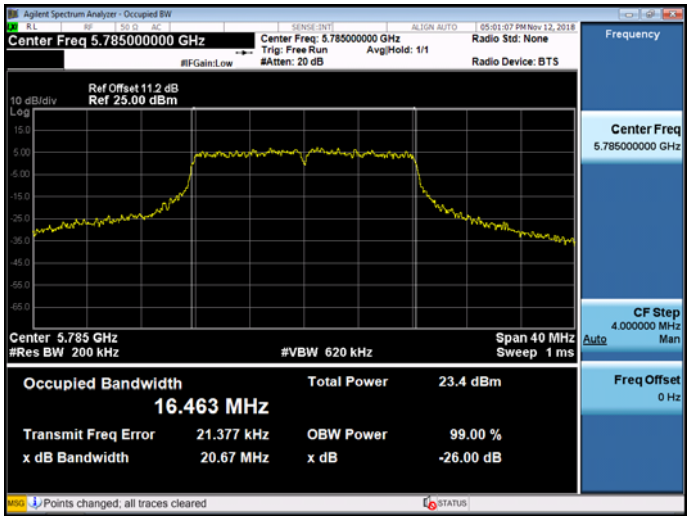
802.11ac(VHT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	43.70	36.445
5230	46	51.22	36.530
5270	54	44.37	36.579
5310	62	44.87	36.439
5510	102	43.81	36.400
5590	118	58.74	36.602
5710	142	55.29	36.482
5755	151	58.70	36.631
5795	159	56.49	36.530

802.11ac(VHT80) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5210	42	90.57	76.088
5290	58	89.27	76.079
5530	106	91.36	76.168
5610	122	100.40	76.074
5690	138	94.58	76.190
5775	155	94.71	76.170

▣ Test Plots(802.11a)

Note:

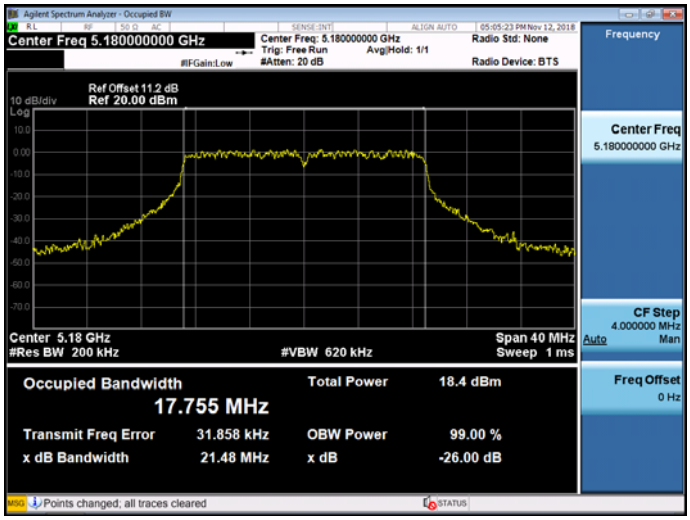
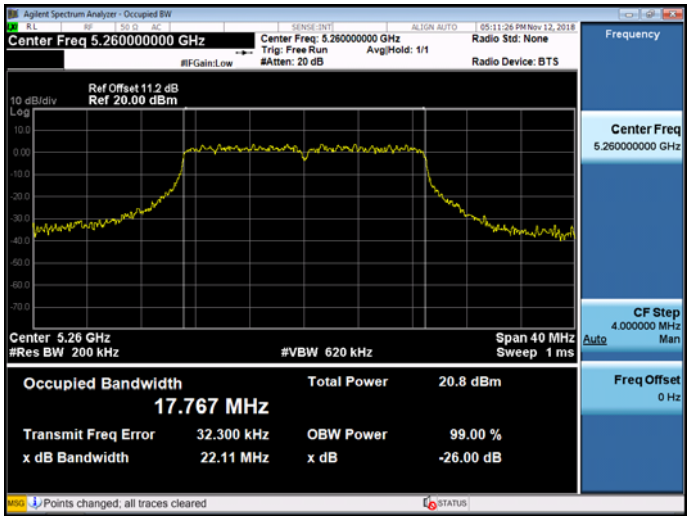
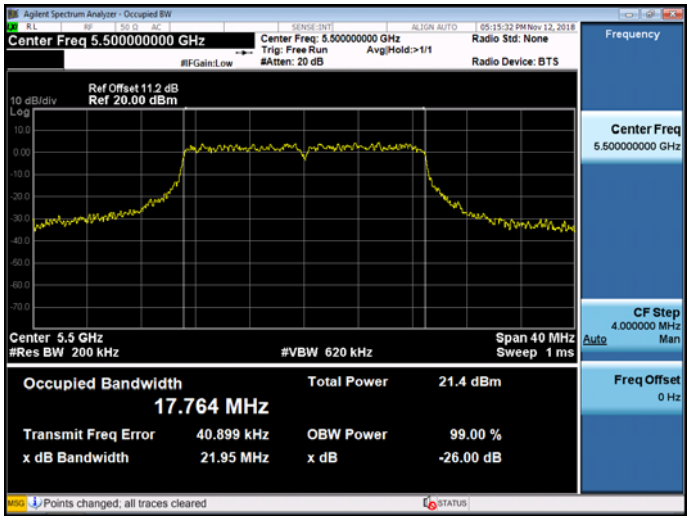
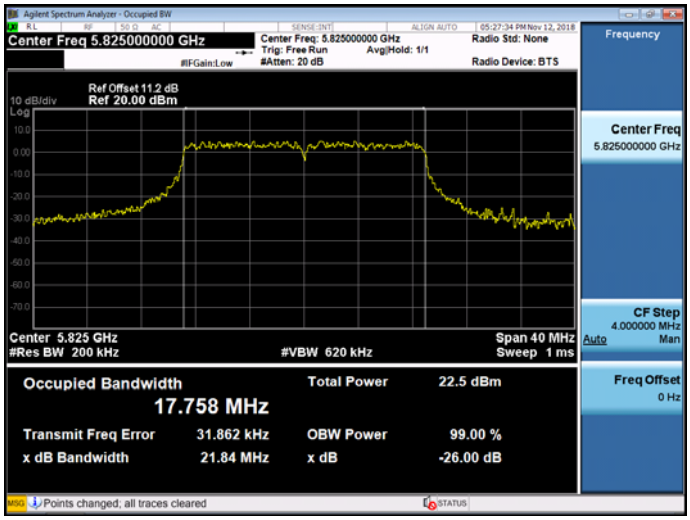
In order to simplify the report, attached plots were only the most wide channel.

802.11a UNII 1 BAND 26dB Bandwidth (CH 40)	802.11a UNII 2A BAND 26dB Bandwidth (CH 60)
	
802.11a UNII 2C BAND 26dB Bandwidth (CH100)	**802.11a UNII 3 BAND 26dB Bandwidth (CH 157)**
	

▣ Test Plots(802.11n(HT20))

Note:

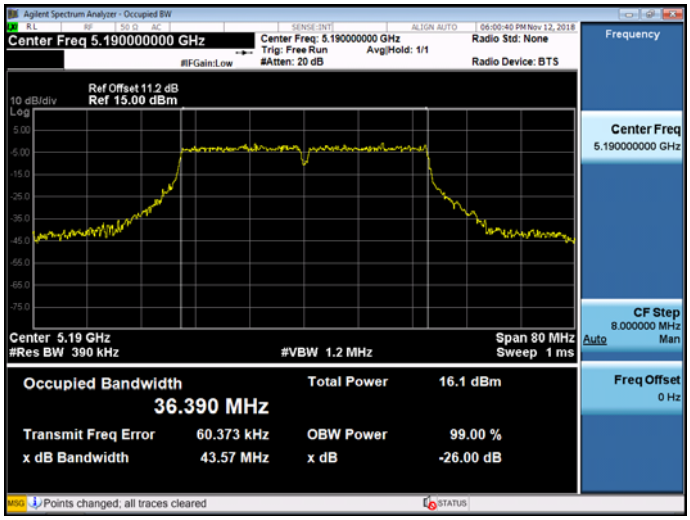
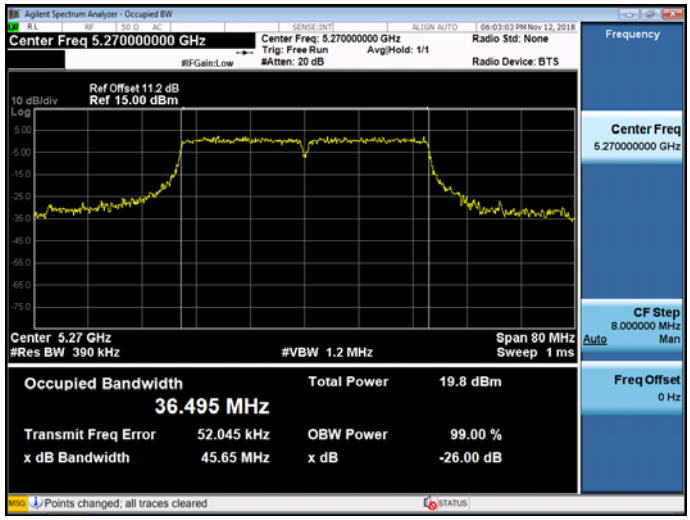
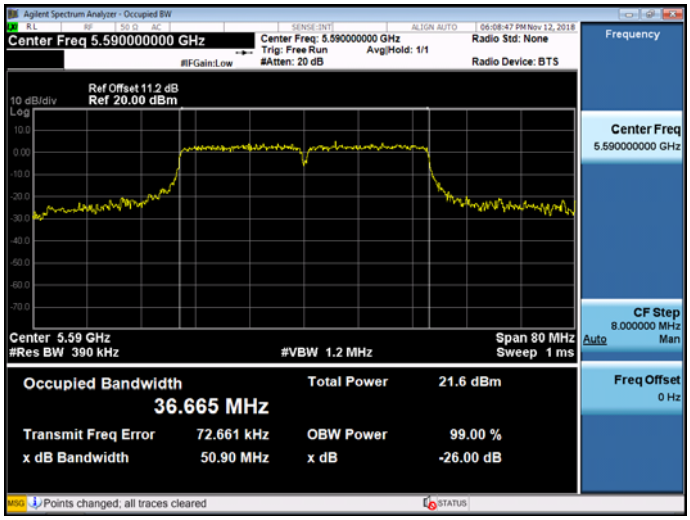
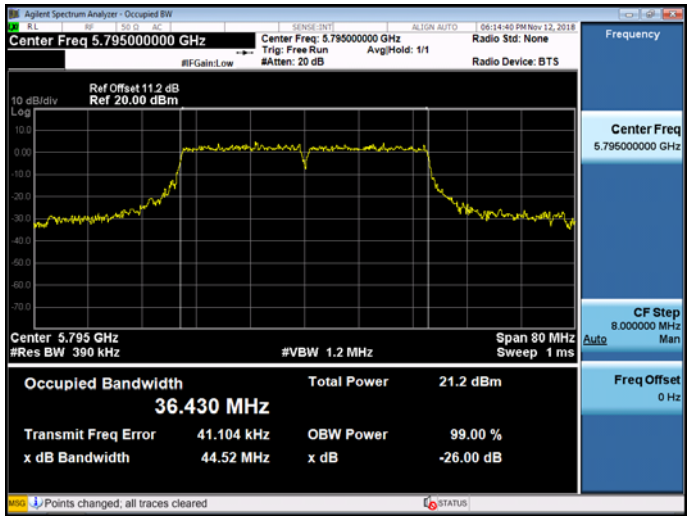
In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT20 UNII 1 BAND 26dB Bandwidth(CH 36)	802.11n_HT20 UNII 2A BAND 26dB Bandwidth(CH 52)
	
802.11n_HT20 UNII 2C BAND 26dB Bandwidth(CH 100)	**802.11n_HT20 UNII 3 BAND 26dB Bandwidth(CH 165)**
	

▣ Test Plots(802.11n(HT40))

Note:

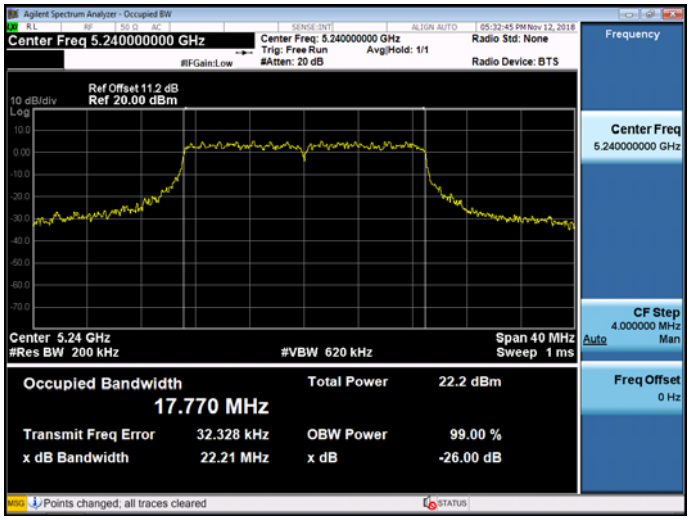
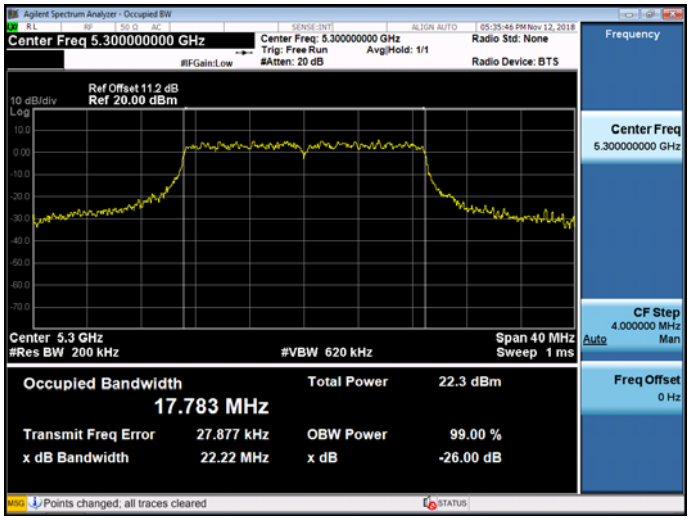
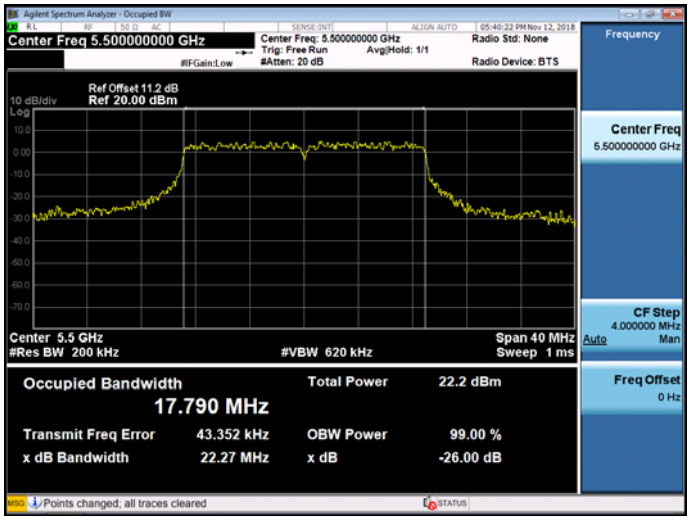
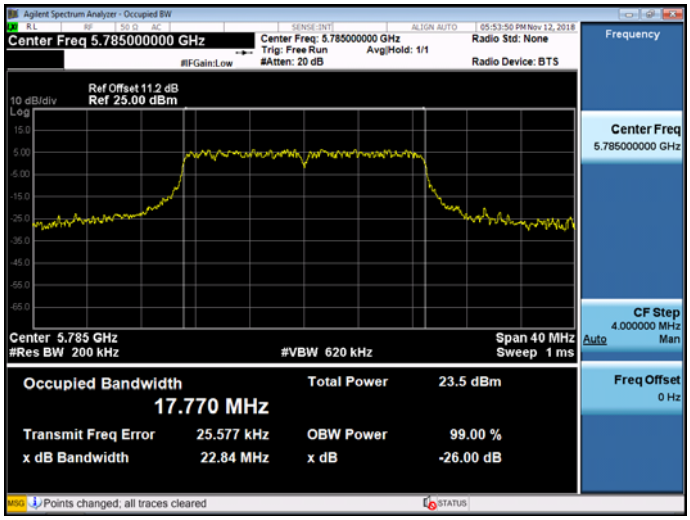
In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT40 UNII 1 BAND 26dB Bandwidth(CH 38)	802.11n_HT40 UNII 2A BAND 26dB Bandwidth (CH 54)
	
802.11n_HT40 UNII 2C BAND 26dB Bandwidth(CH 118)	**802.11n_HT40 UNII 3 BAND 26dB Bandwidth (CH 159)**
	

▣ Test Plots(802.11ac(VHT20))

Note:

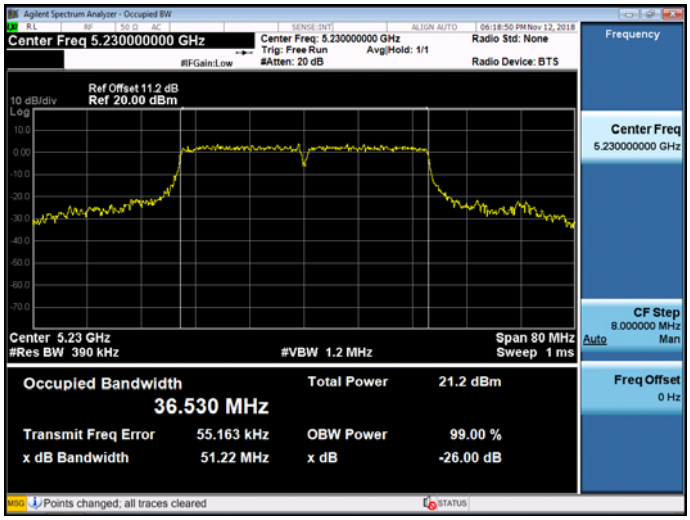
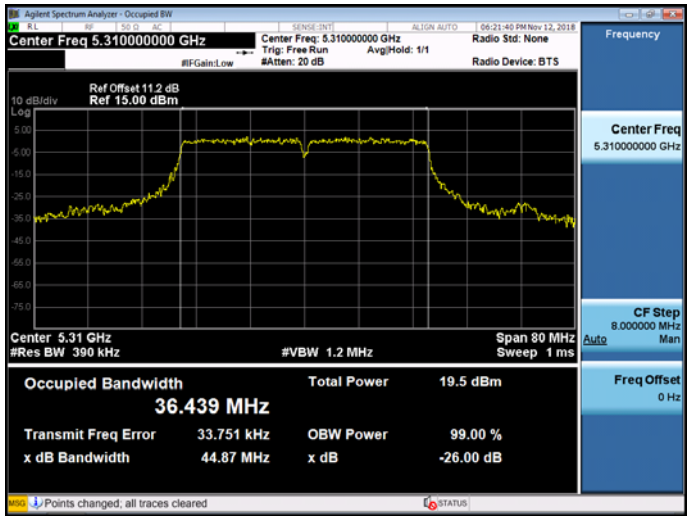
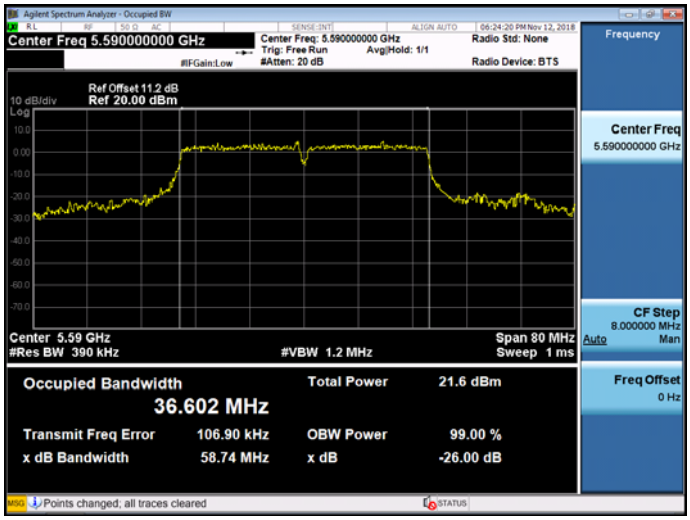
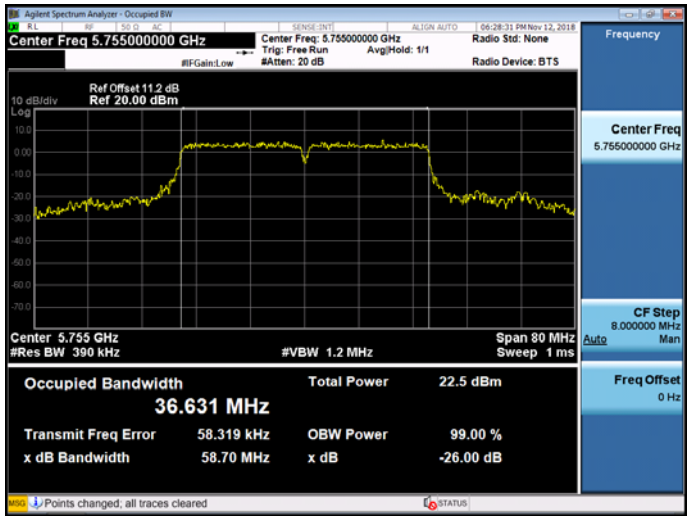
In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT20 UNII 1 BAND 26dB Bandwidth(CH 48)	802.11ac_VHT20 UNII 2A BAND 26dB Bandwidth(CH 60)
	
802.11ac_VHT20 UNII 2C BAND 26dB Bandwidth(CH 100)	**802.11ac_VHT20 UNII 3 BAND 26dB Bandwidth(CH 157)**
	

▣ Test Plots(802.11ac(VHT40))

Note:

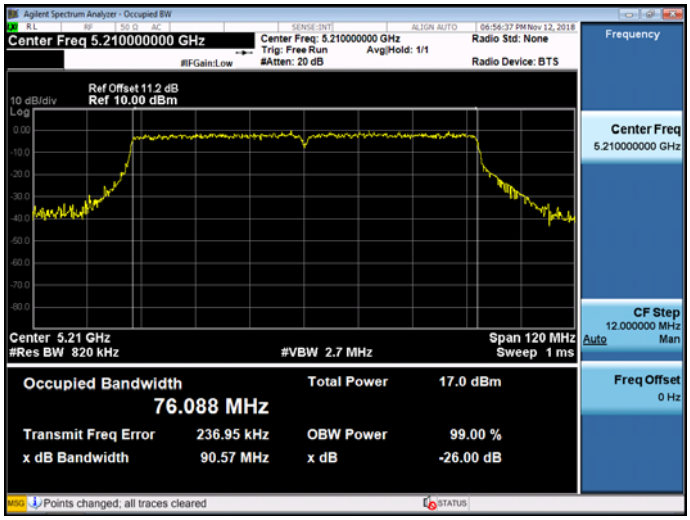
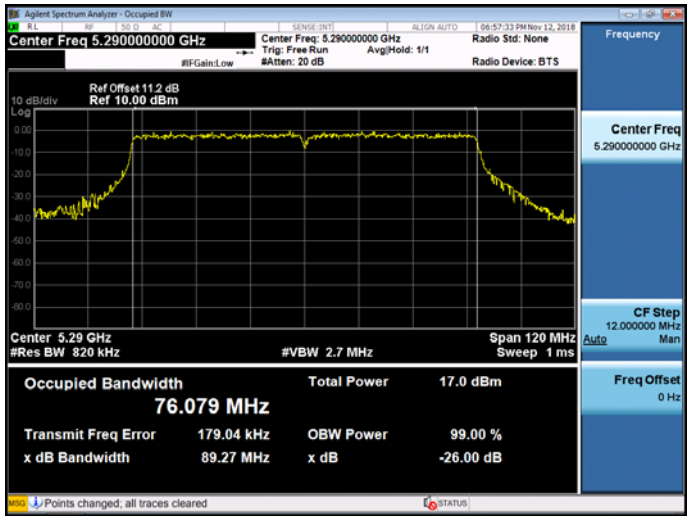
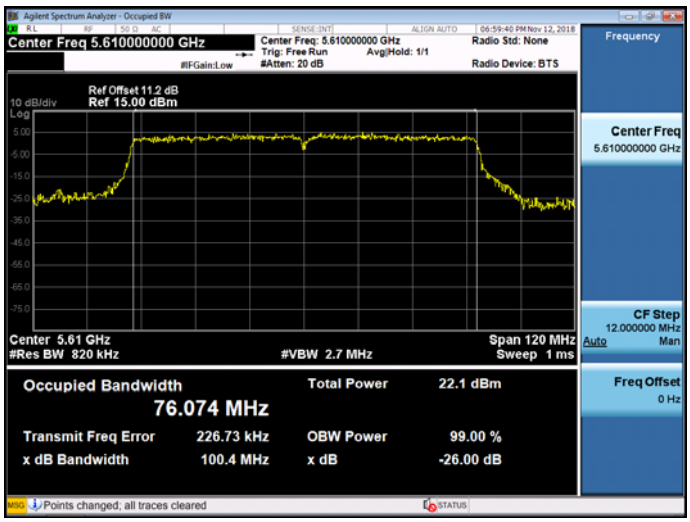
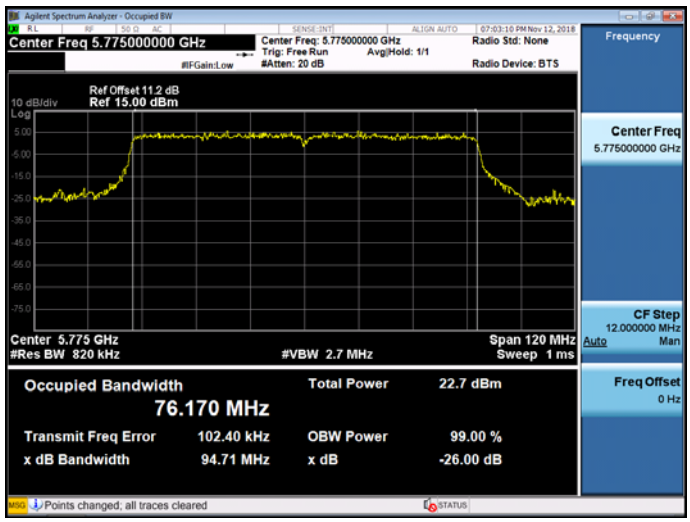
In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT40 UNII 1 BAND 26dB Bandwidth(CH 46)	802.11ac_VHT40 UNII 2A BAND 26dB Bandwidth (CH 62)
	
802.11ac_VHT40 UNII 2C BAND 26dB Bandwidth(CH 118)	**802.11ac_VHT40 UNII 3 BAND 26dB Bandwidth (CH 151)**
	

▣ Test Plots(802.11ac(VHT80))

Note:

In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT80 UNII 1 BAND 26dB Bandwidth(CH 42)	802.11ac_VHT80 UNII 2A BAND 26dB Bandwidth (CH 58)
	
802.11ac_VHT80 UNII 2C BAND 26dB Bandwidth(CH 122)	**802.11ac_VHT80 UNII 3 BAND 26dB Bandwidth (CH 155)**
	

[Ant2]

802.11a Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	19.66	16.469
5200	40	21.43	16.508
5240	48	20.73	16.501
5260	52	20.74	16.509
5300	60	20.42	16.489
5320	64	20.14	16.479
5500	100	20.51	16.460
5600	120	19.37	16.432
5720	144	19.92	16.447
5745	149	20.45	16.416
5785	157	19.47	16.427
5825	165	19.90	16.454

802.11n(HT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	21.24	17.726
5200	40	22.65	17.794
5240	48	22.57	17.782
5260	52	21.52	17.766
5300	60	22.00	17.761
5320	64	21.32	17.766
5500	100	21.69	17.776
5600	120	21.62	17.761
5720	144	21.32	17.753
5745	149	21.75	17.785
5785	157	22.06	17.764
5825	165	21.73	17.755

802.11n(HT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	43.04	36.401
5230	46	47.70	36.437
5270	54	47.64	36.479
5310	62	44.81	36.516
5510	102	42.69	36.357
5590	118	45.42	36.432
5710	142	43.90	36.387
5755	151	44.15	36.437
5795	159	43.51	36.419

802.11ac(VHT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	22.43	17.773
5200	40	23.14	17.833
5240	48	25.40	17.830
5260	52	28.96	17.813
5300	60	22.51	17.818
5320	64	21.40	17.761
5500	100	22.15	17.776
5600	120	21.69	17.758
5720	144	22.42	17.752
5745	149	22.15	17.746
5785	157	21.47	17.752
5825	165	22.08	17.765

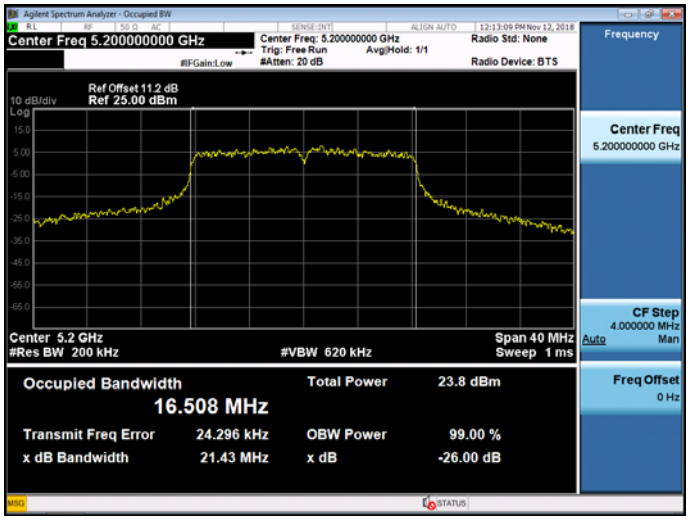
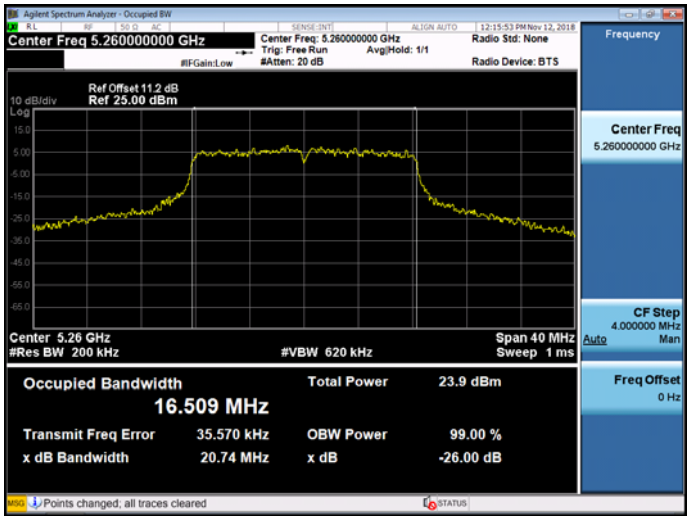
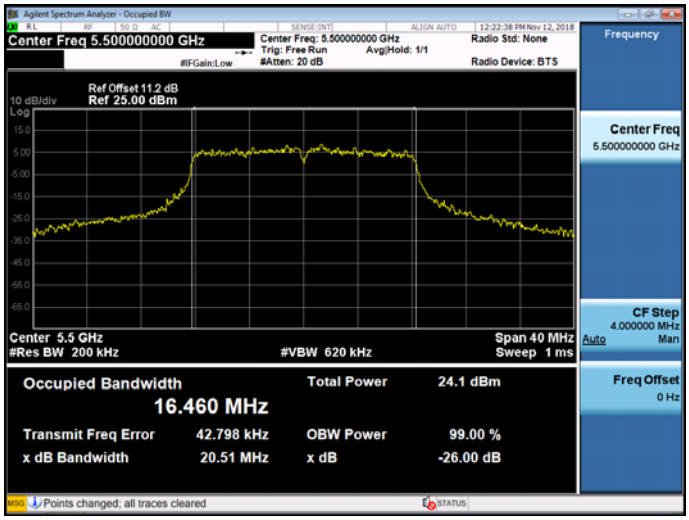
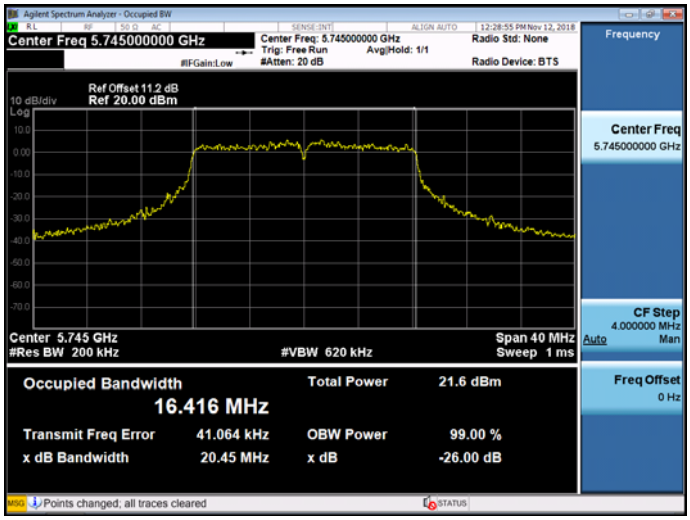
802.11ac(VHT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	43.11	36.430
5230	46	65.63	36.785
5270	54	58.65	36.567
5310	62	43.82	36.518
5510	102	43.15	36.411
5590	118	43.07	36.433
5710	142	42.95	36.494
5755	151	44.62	36.502
5795	159	44.43	36.455

802.11ac(VHT80) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5210	42	89.55	76.198
5290	58	88.54	76.096
5530	106	88.73	76.108
5610	122	88.33	76.040
5690	138	90.27	76.018
5775	155	89.86	76.037

▣ Test Plots(802.11a)

Note:

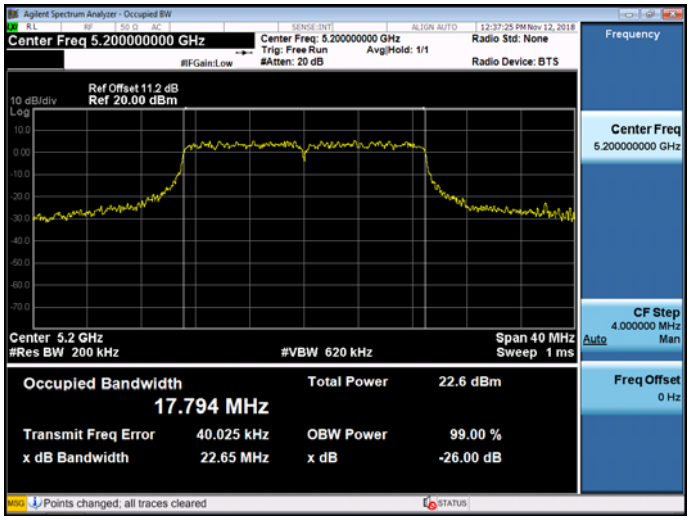
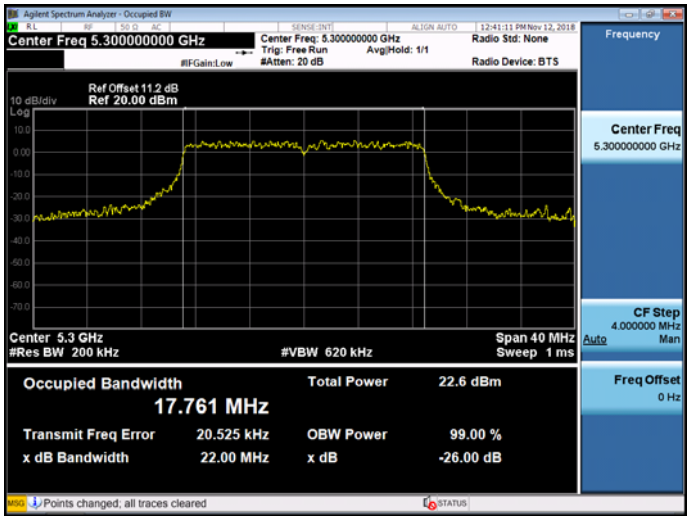
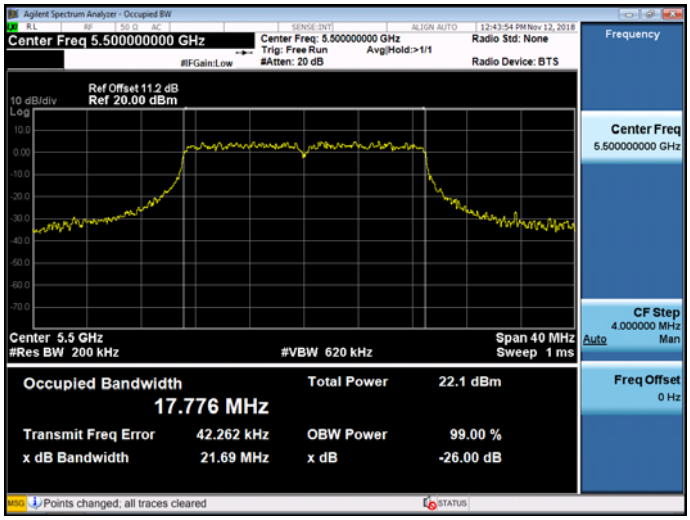
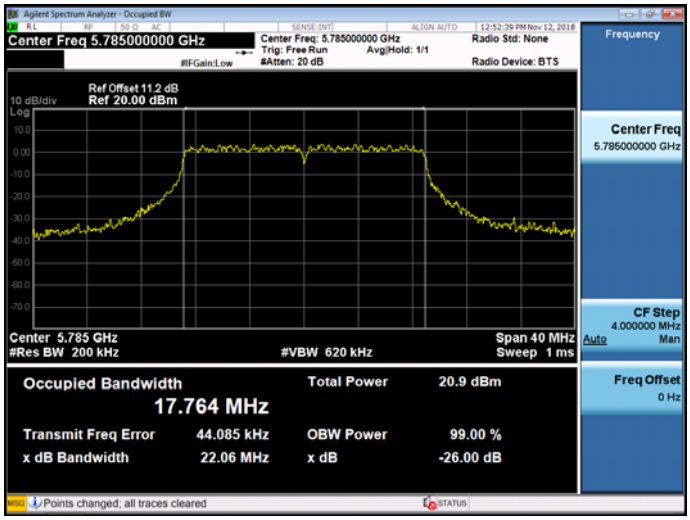
In order to simplify the report, attached plots were only the most wide channel.

802.11a UNII 1 BAND 26dB Bandwidth (CH 40)	802.11a UNII 2A BAND 26dB Bandwidth (CH 52)
	
802.11a UNII 2C BAND 26dB Bandwidth (CH100)	**802.11a UNII 3 BAND 26dB Bandwidth (CH 149)**
	

▣ Test Plots(802.11n(HT20))

Note:

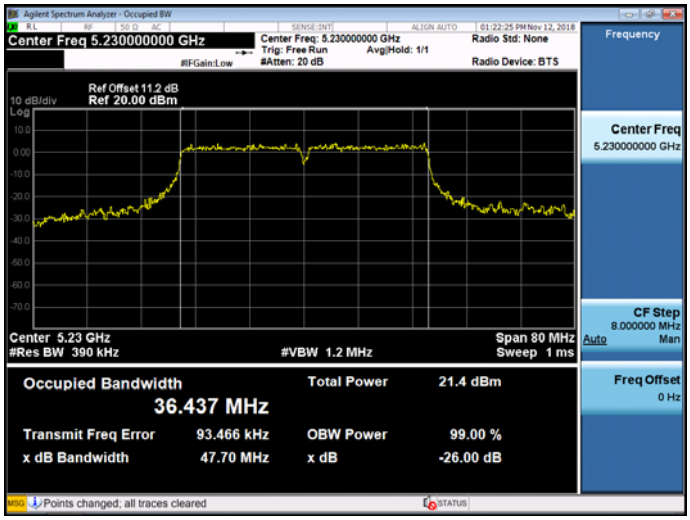
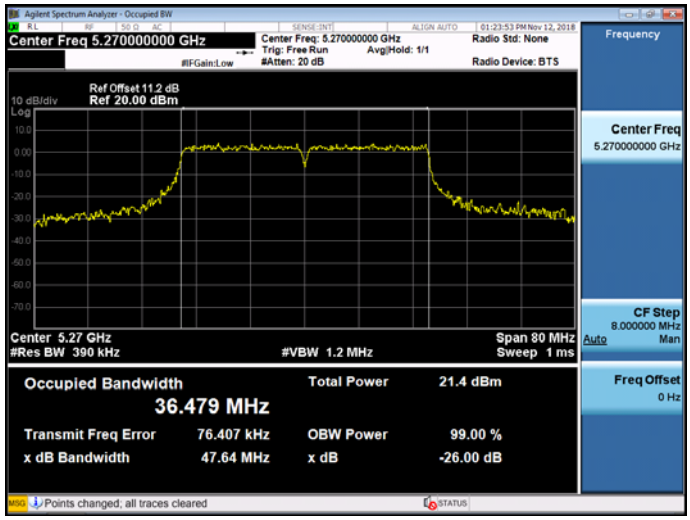
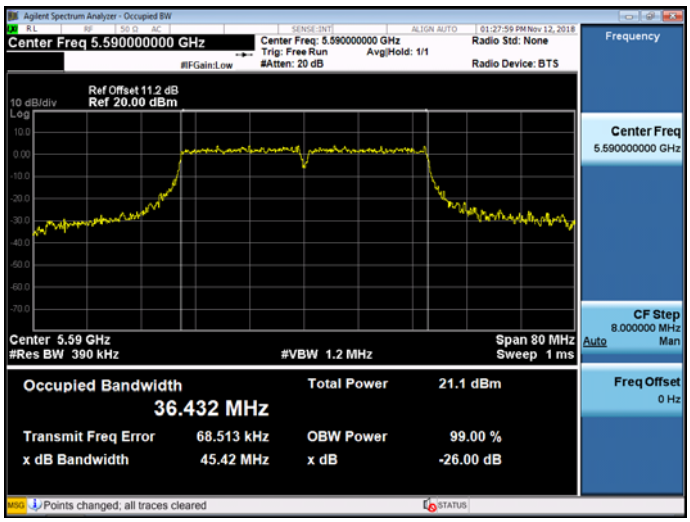
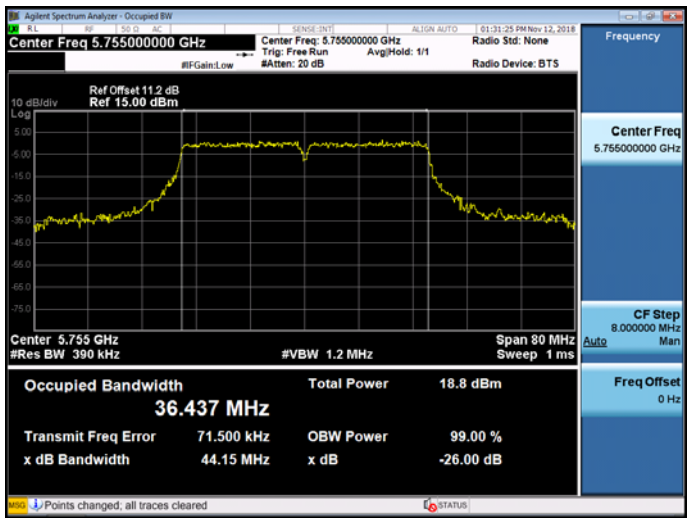
In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT20 UNII 1 BAND 26dB Bandwidth(CH 40)	802.11n_HT20 UNII 2A BAND 26dB Bandwidth(CH 60)
	
802.11n_HT20 UNII 2C BAND 26dB Bandwidth(CH 100)	**802.11n_HT20 UNII 3 BAND 26dB Bandwidth(CH 157)**
	

▣ Test Plots(802.11n(HT40))

Note:

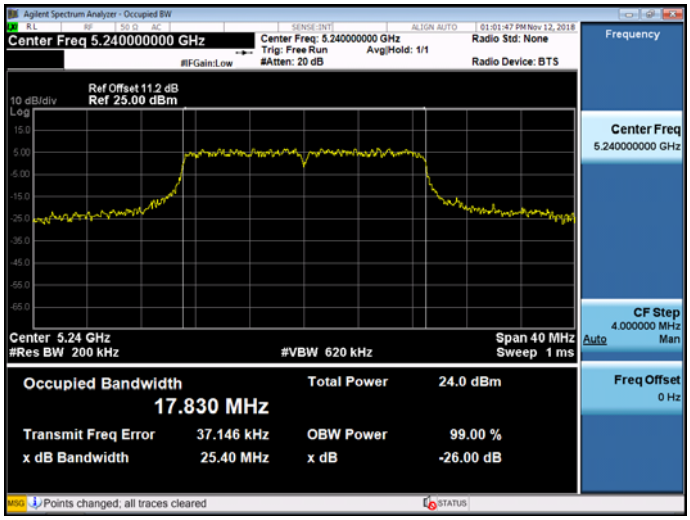
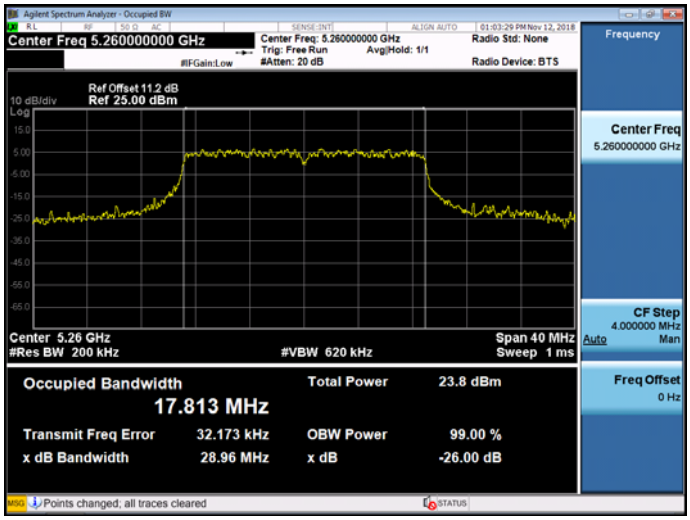
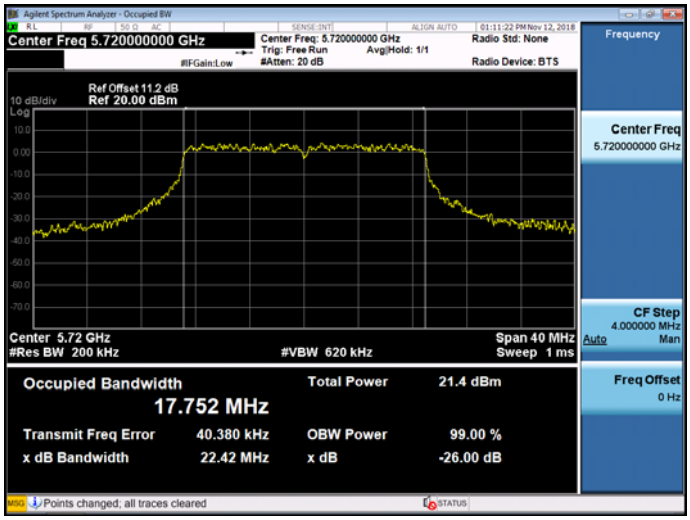
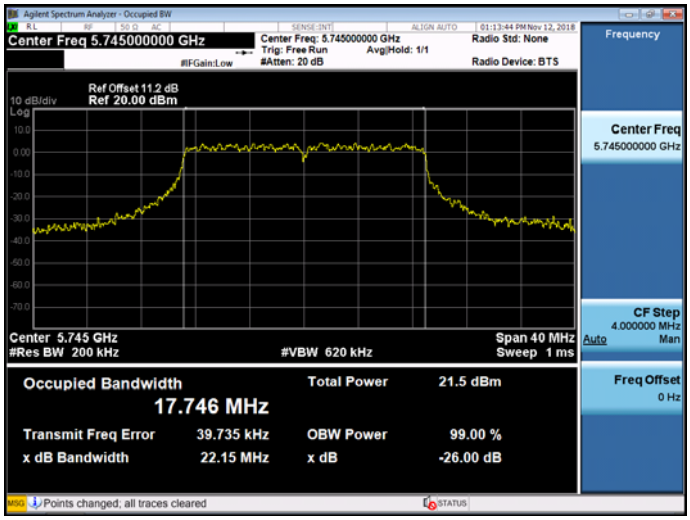
In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT40 UNII 1 BAND 26dB Bandwidth(CH 46)	802.11n_HT40 UNII 2A BAND 26dB Bandwidth (CH 54)
	
802.11n_HT40 UNII 2C BAND 26dB Bandwidth(CH 118)	**802.11n_HT40 UNII 3 BAND 26dB Bandwidth (CH 151)**
	

▣ Test Plots(802.11ac(VHT20))

Note:

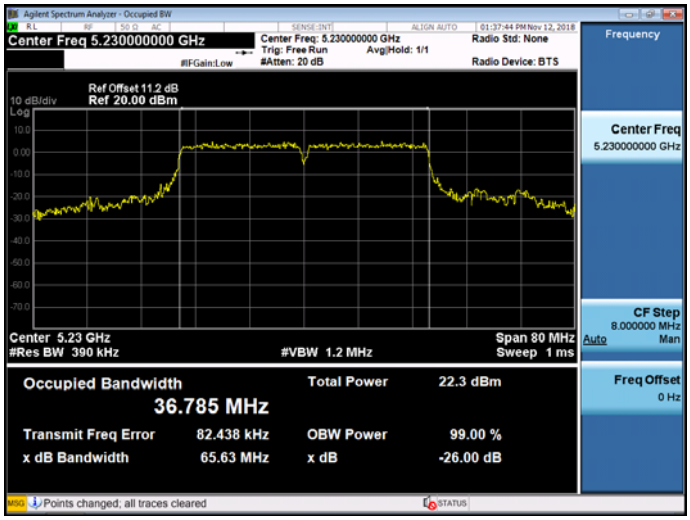
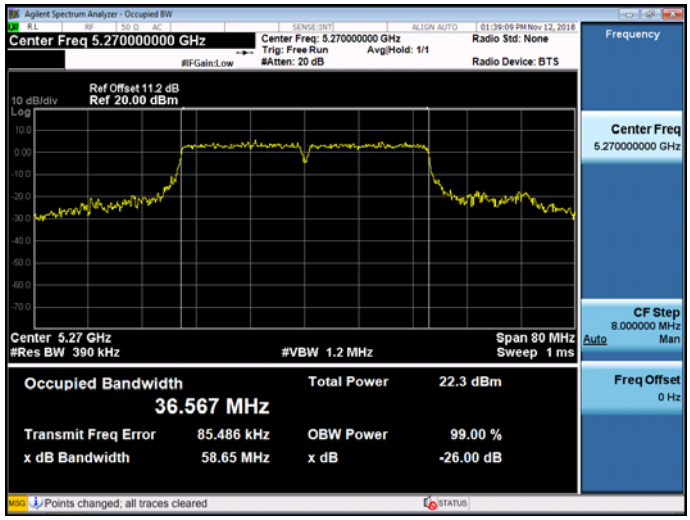
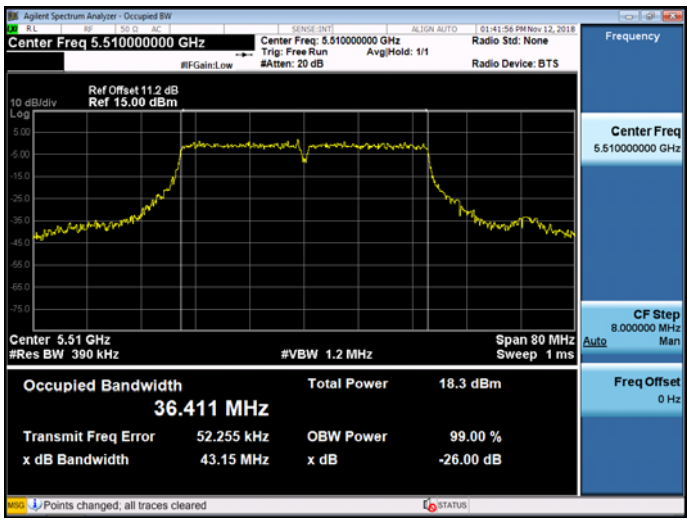
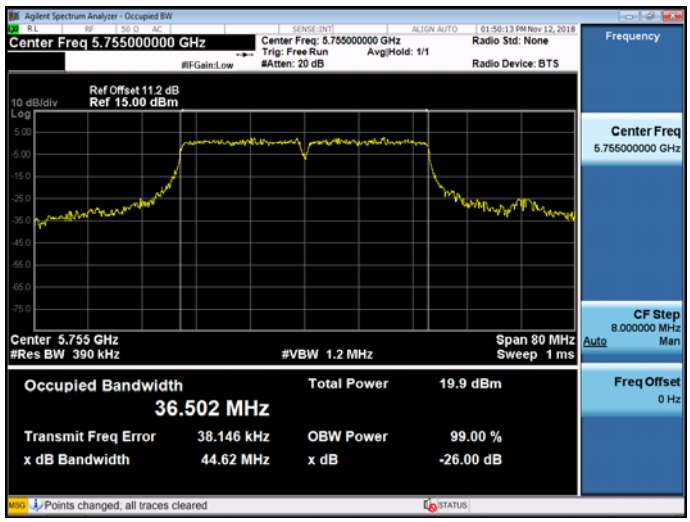
In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT20 UNII 1 BAND 26dB Bandwidth(CH 48)	802.11ac_VHT20 UNII 2A BAND 26dB Bandwidth(CH 52)
	
802.11ac_VHT20 UNII 2C BAND 26dB Bandwidth(CH 144)	**802.11ac_VHT20 UNII 3 BAND 26dB Bandwidth(CH 149)**
	

▣ Test Plots(802.11ac(VHT40))

Note:

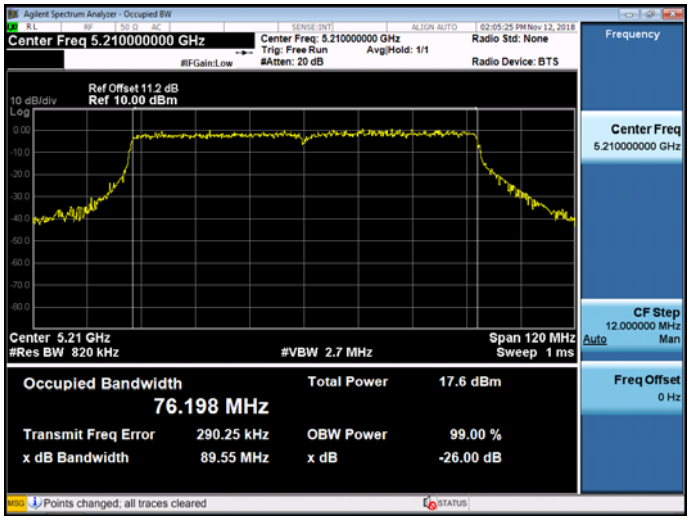
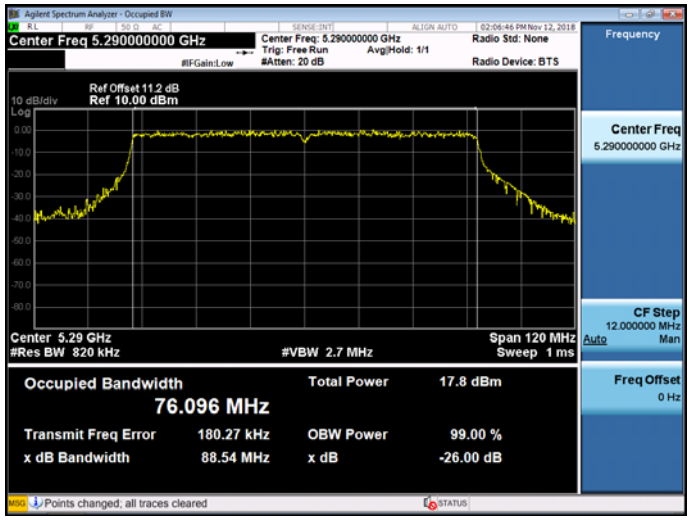
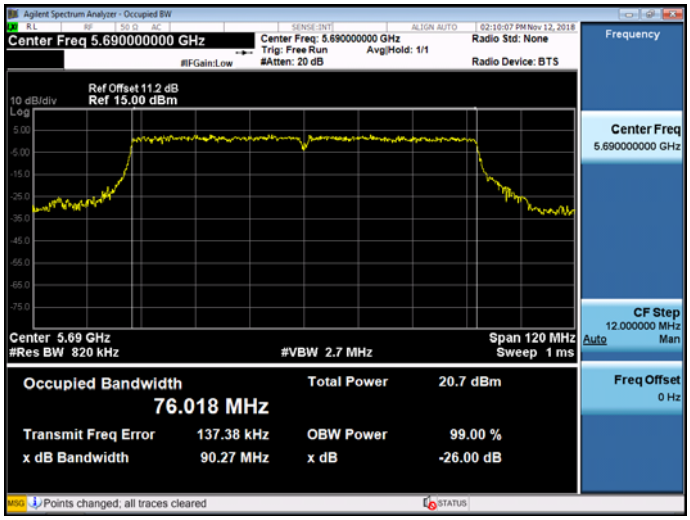
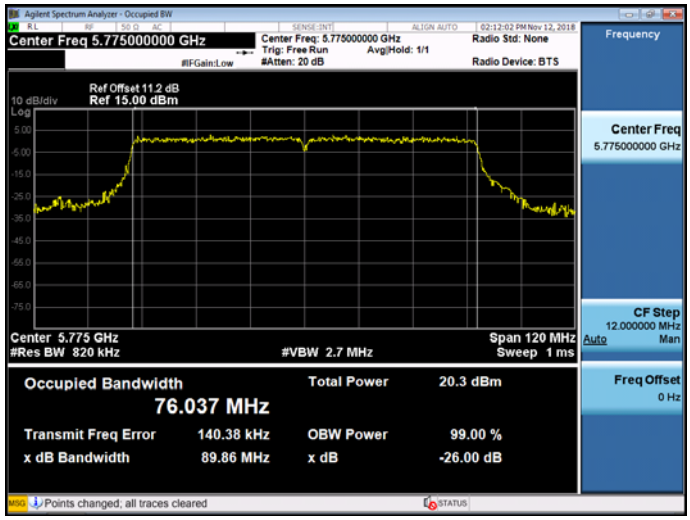
In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT40 UNII 1 BAND 26dB Bandwidth(CH 46)	802.11ac_VHT40 UNII 2A BAND 26dB Bandwidth (CH 54)
	
802.11ac_VHT40 UNII 2C BAND 26dB Bandwidth(CH 102)	**802.11ac_VHT40 UNII 3 BAND 26dB Bandwidth (CH 151)**
	

▣ Test Plots(802.11ac(VHT80))

Note:

In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT80 UNII 1 BAND 26dB Bandwidth(CH 42)	802.11ac_VHT80 UNII 2A BAND 26dB Bandwidth (CH 58)
	
802.11ac_VHT80 UNII 2C BAND 26dB Bandwidth(CH 138)	**802.11ac_VHT80 UNII 3 BAND 26dB Bandwidth (CH 155)**
	

10.3 6DB BANDWIDTH

[Ant1]

802.11a Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.47	> 0.5	Pass
5785	157	15.39	> 0.5	Pass
5825	165	15.42	> 0.5	Pass

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.71	> 0.5	Pass
5785	157	17.67	> 0.5	Pass
5825	165	17.67	> 0.5	Pass

802.11n(HT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	36.47	> 0.5	Pass
5795	159	36.44	> 0.5	Pass

802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.68	> 0.5	Pass
5785	157	17.70	> 0.5	Pass
5825	165	17.70	> 0.5	Pass

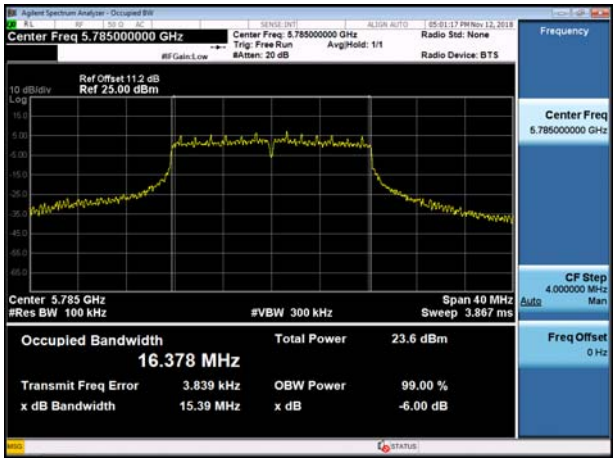
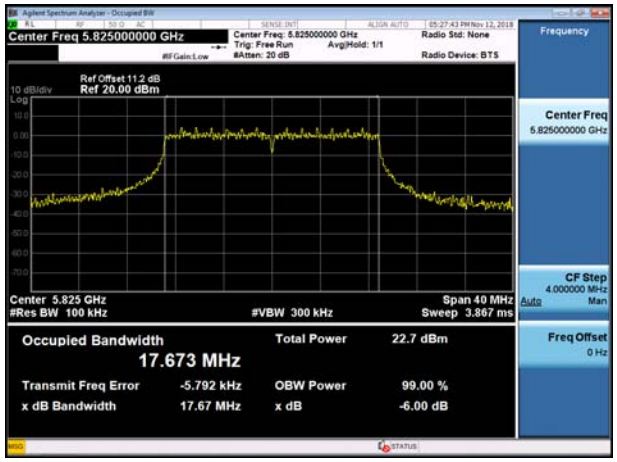
802.11ac(VHT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	36.46	> 0.5	Pass
5795	159	36.46	> 0.5	Pass

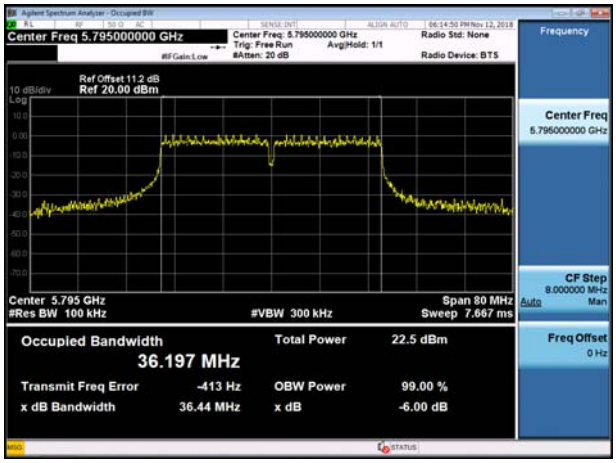
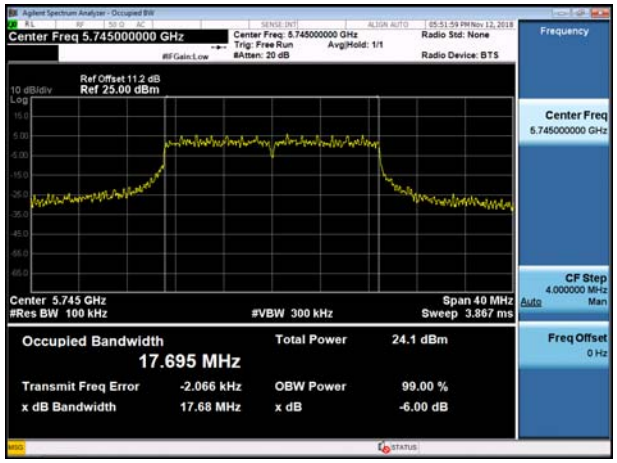
802.11ac(VHT80) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	76.40	> 0.5	Pass

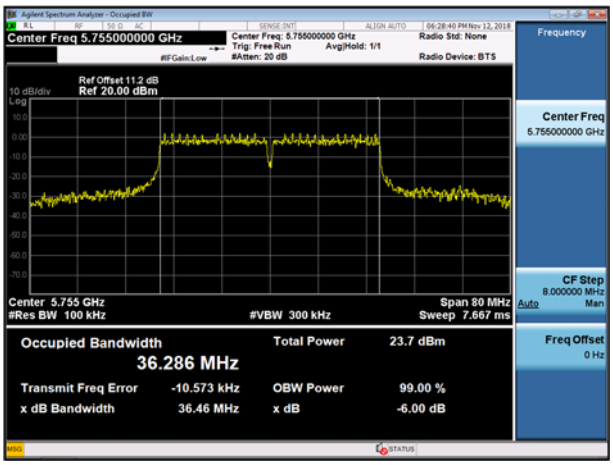
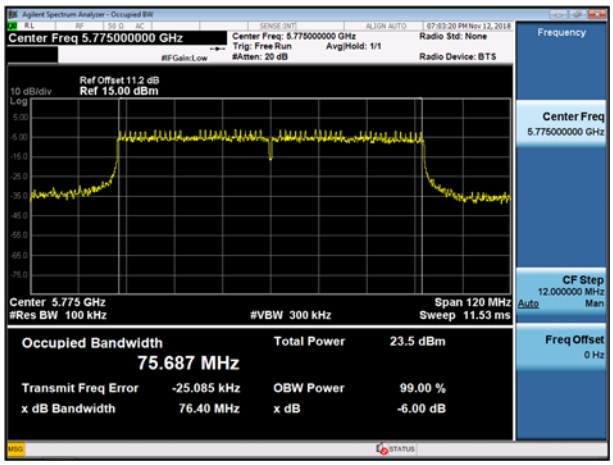
▣ Test Plots

Note:

In order to simplify the report, attached plots were only the most narrow channel.

802.11a (CH.157)	802.11n(HT20) (CH.165)
	

802.11n(HT40) (CH.159)	802.11ac(VHT20) (CH.149)
	

802.11ac(VHT40) (CH.151)	802.11ac(VHT80) (CH.155)
	

[Ant2]

802.11a Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.38	> 0.5	Pass
5785	157	15.42	> 0.5	Pass
5825	165	16.17	> 0.5	Pass

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.75	> 0.5	Pass
5785	157	17.75	> 0.5	Pass
5825	165	17.72	> 0.5	Pass

802.11n(HT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	36.47	> 0.5	Pass
5795	159	36.38	> 0.5	Pass

802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.72	> 0.5	Pass
5785	157	17.67	> 0.5	Pass
5825	165	17.72	> 0.5	Pass

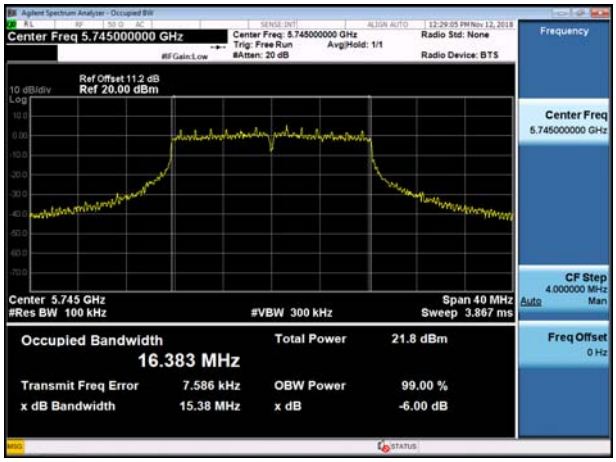
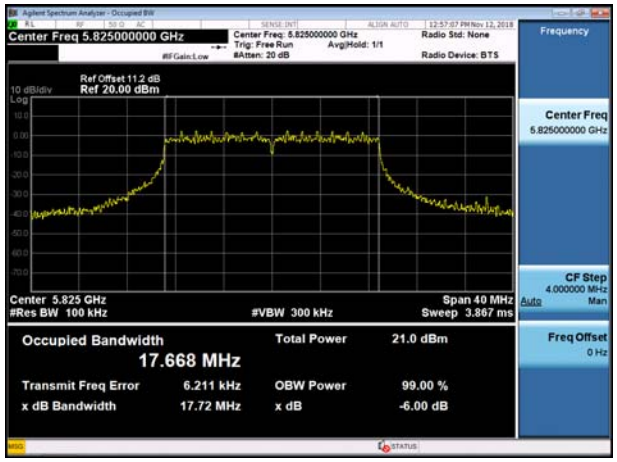
802.11ac(VHT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	36.48	> 0.5	Pass
5795	159	36.47	> 0.5	Pass

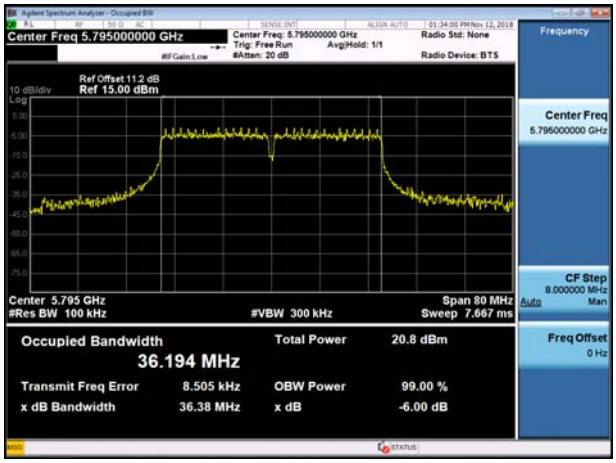
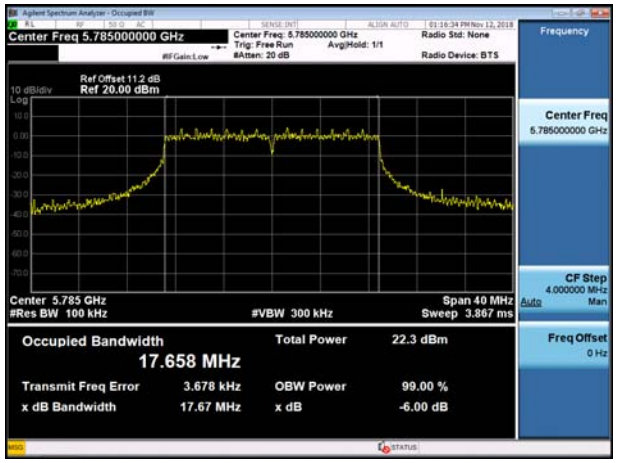
802.11ac(VHT80) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	76.42	> 0.5	Pass

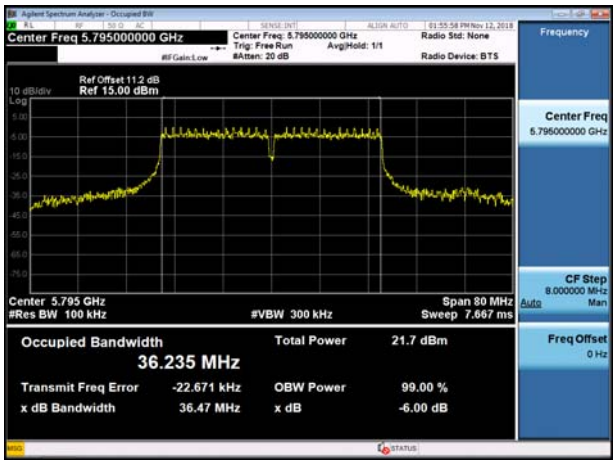
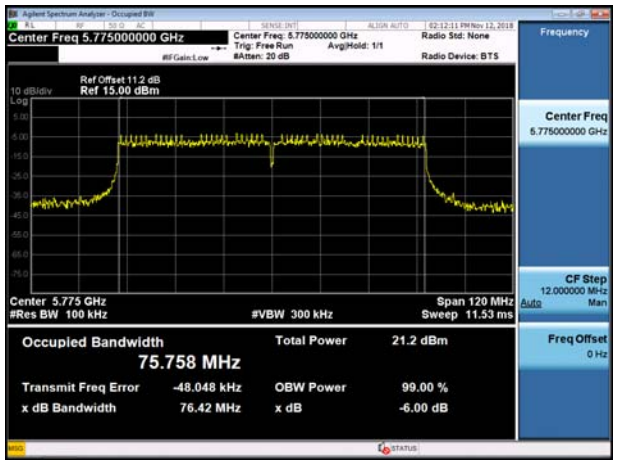
▣ Test Plots

Note:

In order to simplify the report, attached plots were only the most narrow channel.

802.11a (CH.149)	802.11n(HT20) (CH.165)
	

802.11n(HT40) (CH.159)	802.11ac(VHT20) (CH.157)
	

802.11ac(VHT40) (CH.159)	802.11ac(VHT80) (CH.155)
	

10.4 OUTPUT POWER MEASUREMENT

802.11a Mode		Duty Cycle Factor (dB)	Total Power [dBm]			Limit (dBm)
Frequency [MHz]	Channel No.		SISO (Ant 1)	SISO (Ant 2)	MIMO (Ant 1+2)	
5180	36	0.773	14.193	14.873	17.556	23.979
5200	40	0.773	15.743	16.683	19.248	23.979
5240	48	0.773	15.853	16.643	19.276	23.979
5260	52	0.773	15.513	16.493	19.041	23.979
5280	56	0.773	15.683	16.333	19.030	23.979
5320	64	0.773	15.473	16.043	18.777	23.979
5500	100	0.773	16.353	16.533	19.454	23.979
5600	120	0.773	16.643	15.653	19.186	23.979
5720	144	0.773	16.613	14.303	18.620	23.979
5745	149	0.773	16.903	14.493	18.873	30.000
5785	157	0.773	16.553	14.613	18.700	30.000
5825	165	0.773	16.243	14.663	18.535	30.000

802.11n(20MHz) Mode		Duty Cycle Factor (dB)	Total Power [dBm]			Limit (dBm)
Frequency [MHz]	Channel No.		SISO (Ant 1)	SISO (Ant 2)	MIMO (Ant 1+2)	
5180	36	1.675	12.535	13.405	16.002	23.979
5200	40	1.675	14.415	15.535	18.021	23.979
5240	48	1.675	14.395	15.755	18.138	23.979
5260	52	1.675	14.285	15.605	18.005	23.979
5280	56	1.675	14.235	15.335	17.830	23.979
5320	64	1.675	12.765	13.335	16.070	23.979
5500	100	1.675	14.185	15.045	17.646	23.979
5600	120	1.675	14.675	14.035	17.377	23.979
5720	144	1.675	15.175	13.445	17.406	23.979
5745	149	1.675	15.625	12.955	17.502	30.000
5785	157	1.675	15.065	13.405	17.324	30.000
5825	165	1.675	15.025	13.225	17.228	30.000

802.11n(40MHz) Mode		Duty Cycle Factor (dB)	Total Power [dBm]			Limit (dBm)
Frequency [MHz]	Channel No.		SISO (Ant 1)	SISO (Ant 2)	MIMO (Ant 1+2)	
5190	38	2.557	10.497	11.427	13.997	23.979
5230	46	2.557	13.737	14.937	17.389	23.979
5270	54	2.557	13.277	14.867	17.155	23.979
5310	62	2.557	11.947	12.627	15.311	23.979
5510	102	2.557	11.447	12.027	14.757	23.979
5590	118	2.557	14.827	14.587	17.719	23.979
5710	142	2.557	14.917	13.387	17.229	23.979
5755	151	2.557	14.917	12.107	16.746	30.000
5795	159	2.557	14.237	13.097	16.715	30.000

802.11ac(20MHz) Mode		Duty Cycle Factor (dB)	Total Power [dBm]			Limit (dBm)
Frequency [MHz]	Channel No.		SISO (Ant 1)	SISO (Ant 2)	MIMO (Ant 1+2)	
5180	36	1.649	12.889	13.869	16.417	23.979
5200	40	1.649	14.519	15.809	18.222	23.979
5240	48	1.649	14.589	15.819	18.258	23.979
5260	52	1.649	14.239	15.759	18.076	23.979
5280	56	1.649	14.419	15.569	18.043	23.979
5320	64	1.649	12.969	13.219	16.107	23.979
5500	100	1.649	14.179	14.759	17.489	23.979
5600	120	1.649	14.549	13.769	17.187	23.979
5720	144	1.649	15.359	13.229	17.434	23.979
5745	149	1.649	15.589	13.479	17.672	30.000
5785	157	1.649	15.309	13.669	17.577	30.000
5825	165	1.649	15.289	13.599	17.536	30.000

802.11ac(40MHz) Mode		Duty Cycle Factor (dB)	Total Power [dBm]			Limit (dBm)
Frequency [MHz]	Channel No.		SISO (Ant 1)	SISO (Ant 2)	MIMO (Ant 1+2)	
5190	38	2.487	10.887	11.737	14.343	23.979
5230	46	2.487	13.747	14.867	17.354	23.979
5270	54	2.487	13.317	14.847	17.160	23.979
5310	62	2.487	12.027	12.607	15.337	23.979
5510	102	2.487	11.417	11.677	14.559	23.979
5590	118	2.487	14.847	14.477	17.676	23.979
5710	142	2.487	14.877	13.317	17.177	23.979
5755	151	2.487	14.967	12.107	16.779	30.000
5795	159	2.487	14.667	12.927	16.894	30.000

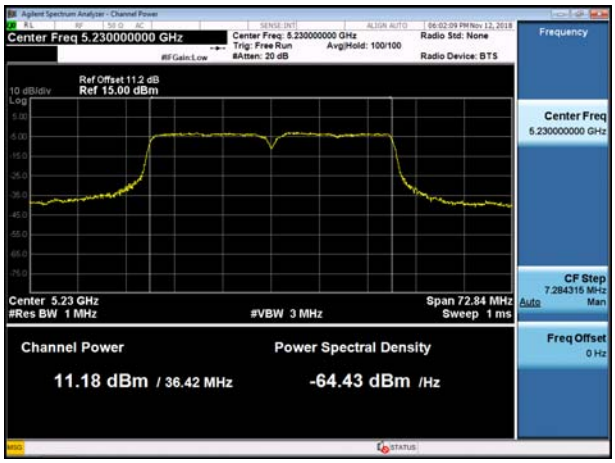
802.11ac(80MHz) Mode		Duty Cycle Factor (dB)	Total Power [dBm]			Limit (dBm)
Frequency [MHz]	Channel No.		SISO (Ant 1)	SISO (Ant 2)	MIMO (Ant 1+2)	
5210	42	3.335	10.005	10.485	13.262	23.979
5290	58	3.335	9.975	10.745	13.387	23.979
5530	106	3.335	10.005	10.525	13.283	23.979
5610	122	3.335	14.485	14.355	17.431	23.979
5690	138	3.335	14.675	13.615	17.187	23.979
5775	155	3.335	14.845	13.265	17.137	30.000

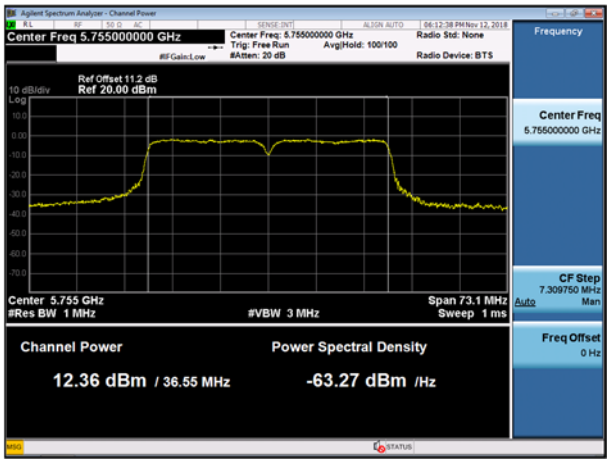
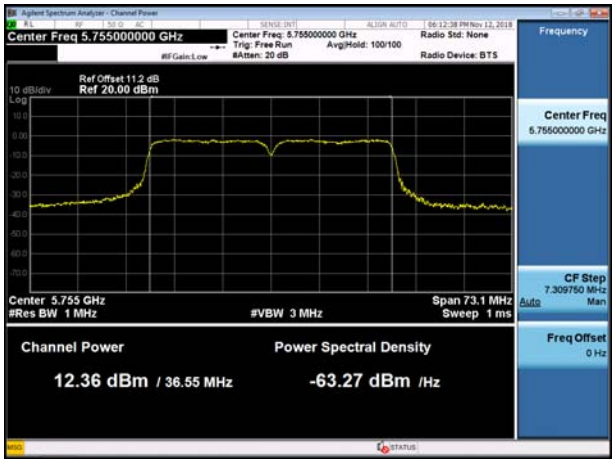
[Ant1]

▣ Test Plots(802.11n(HT40))

Note:

In order to simplify the report, attached plots were only channel of highest power.

UNII 1 (Ch. 46)	UNII 2A (Ch. 54)
	

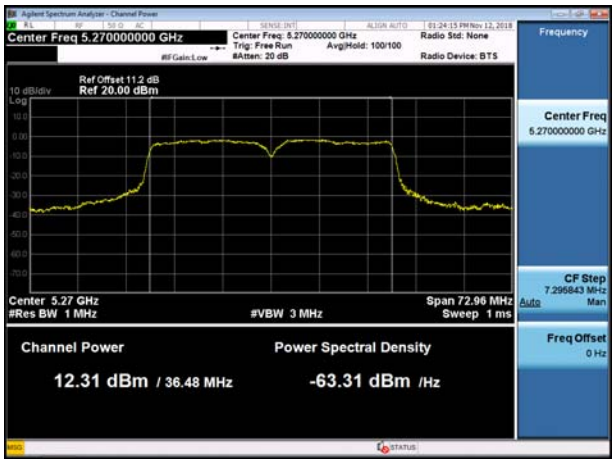
UNII 2C (Ch. 142)	UNII 3 (Ch. 151)
	

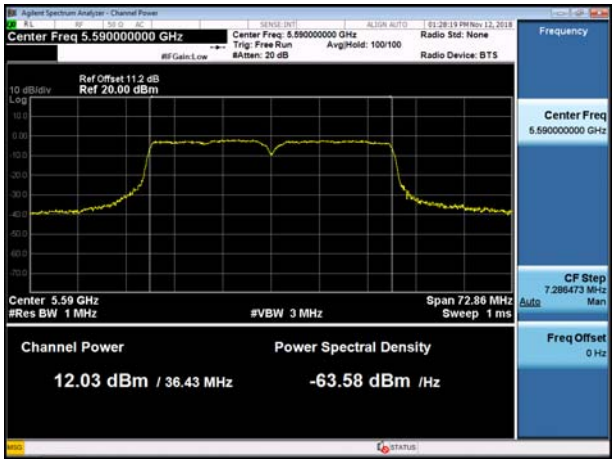
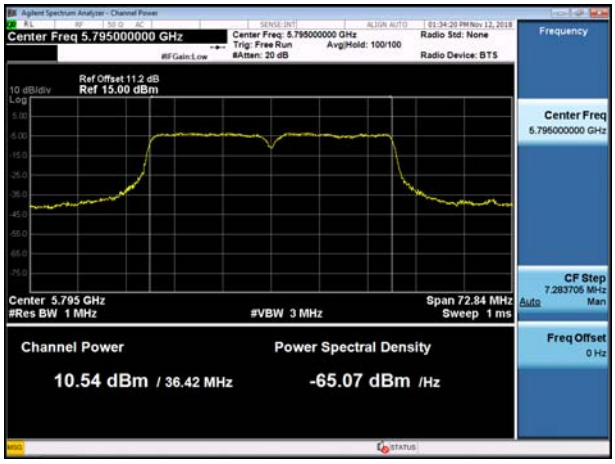
[Ant2]

▣ Test Plots(802.11n(HT40))

Note:

In order to simplify the report, attached plots were only channel of highest power.

UNII 1 (Ch. 46)	UNII 2A (Ch. 54)
	

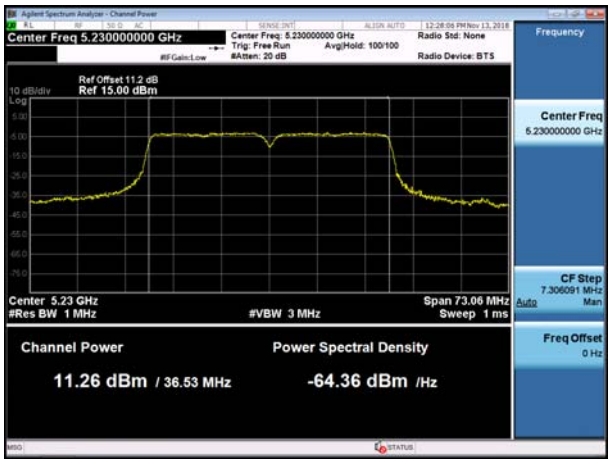
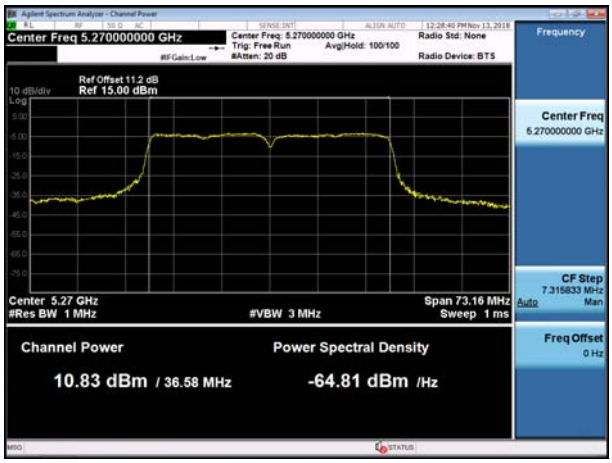
UNII 2C (Ch. 118)	UNII 3 (Ch. 159)
	

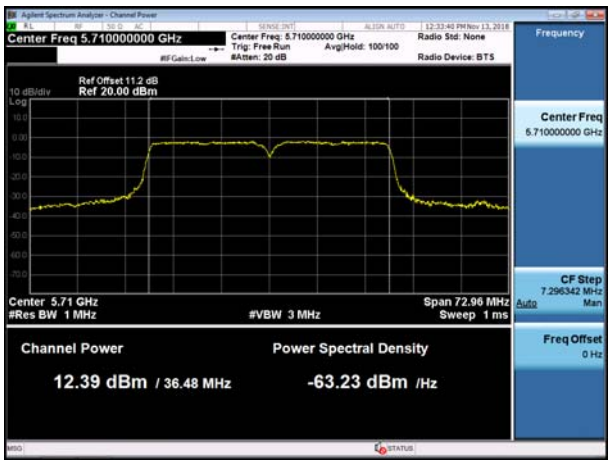
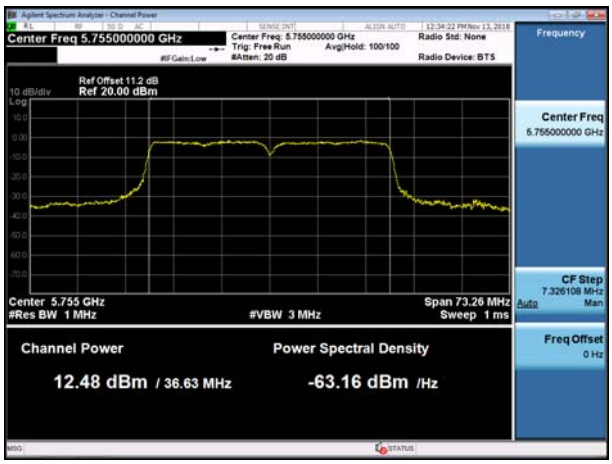
[Ant1]

▣ Test Plots(802.11ac(VHT40))

Note:

In order to simplify the report, attached plots were only channel of highest power.

UNII 1 (Ch. 46)	UNII 2A (Ch. 54)
	

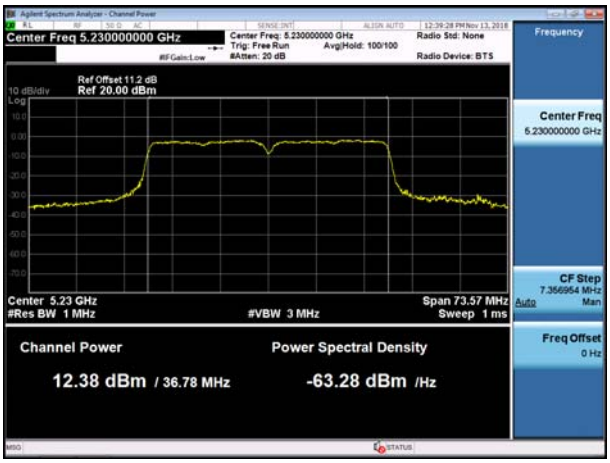
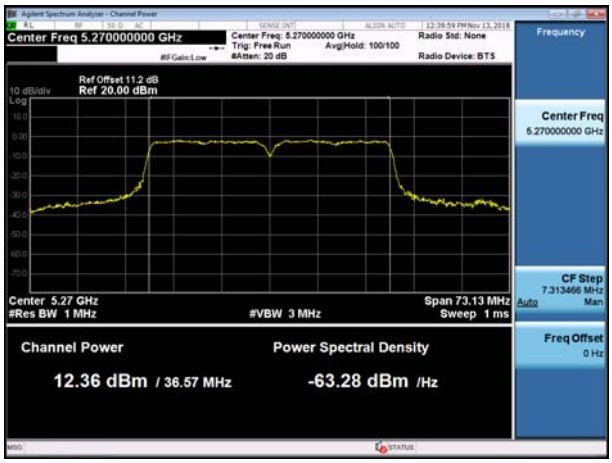
UNII 2C (Ch. 142)	UNII 3 (Ch. 151)
	

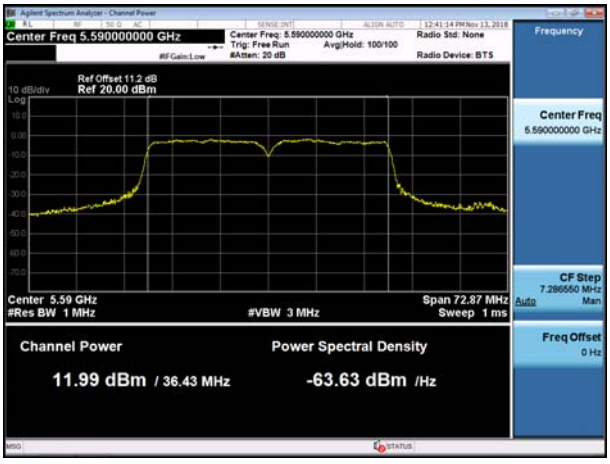
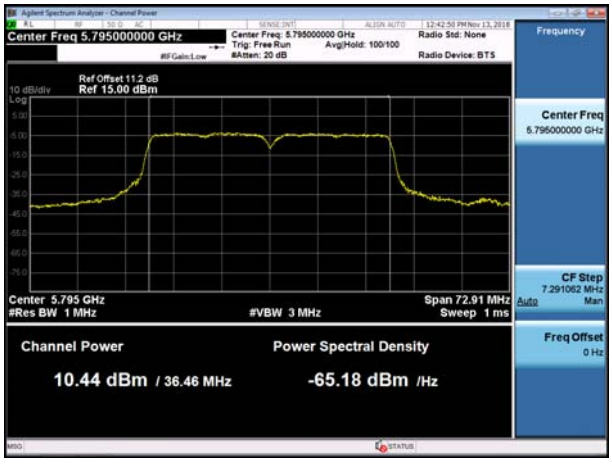
[Ant2]

▣ Test Plots(802.11ac(VHT40))

Note:

In order to simplify the report, attached plots were only channel of highest power.

UNII 1 (Ch. 46)	UNII 2A (Ch. 54)
	

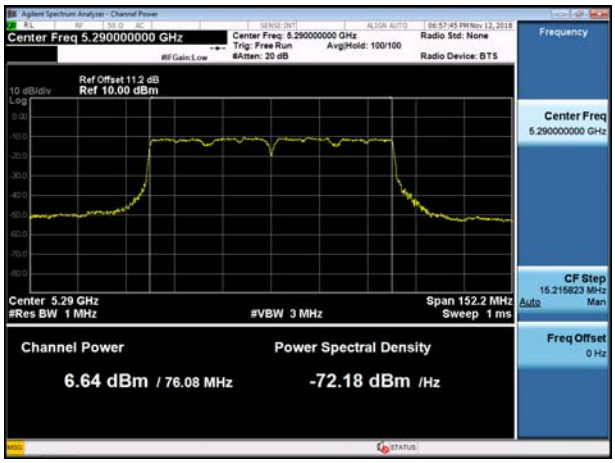
UNII 2C (Ch. 118)	UNII 3 (Ch. 159)
	

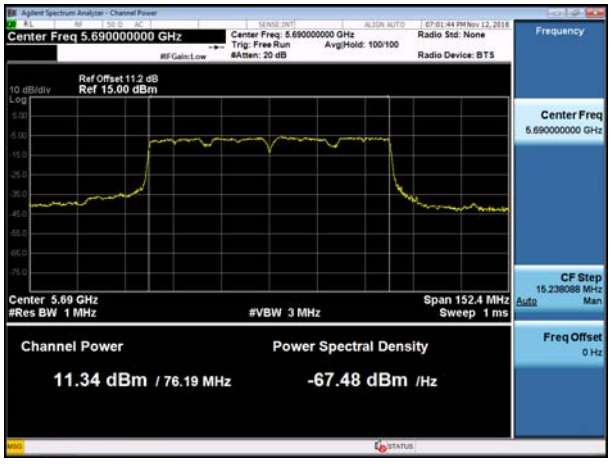
[Ant1]

▣ Test Plots(802.11ac(VHT80))

Note:

In order to simplify the report, attached plots were only channel of highest power.

UNII 1 (Ch. 42)	UNII 2A (Ch. 58)
	

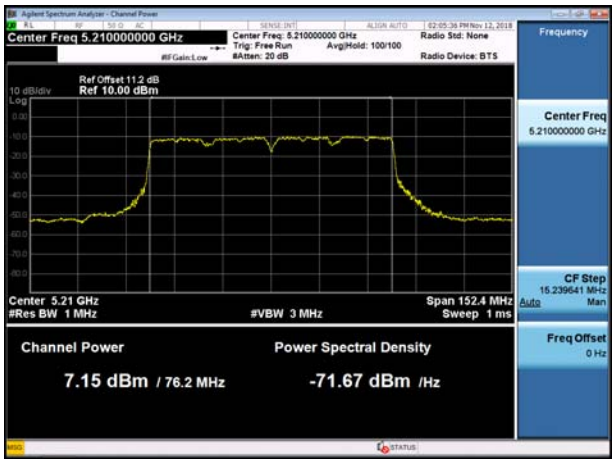
UNII 2C (Ch. 138)	UNII 3 (Ch. 155)
	

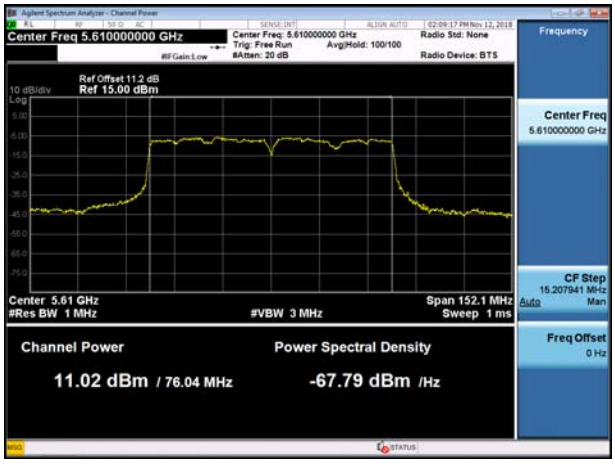
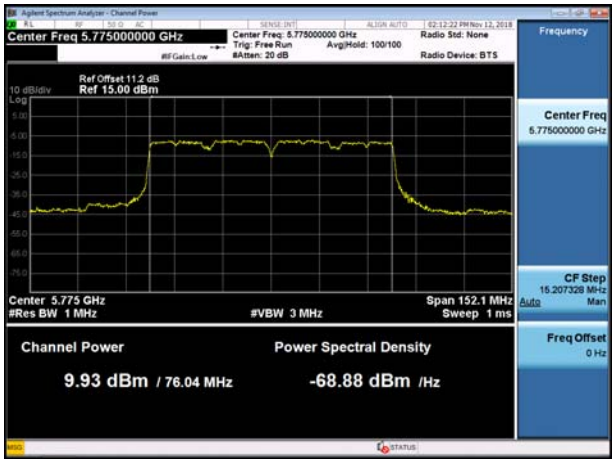
[Ant2]

▣ Test Plots(802.11ac(VHT80))

Note:

In order to simplify the report, attached plots were only channel of highest power.

UNII 1 (Ch. 42)	UNII 2A (Ch. 58)
	

UNII 2C (Ch. 122)	UNII 3 (Ch. 155)
	

10.5 POWER SPECTRAL DENSITY

802.11a		Duty Cycle Factor (dB)	Total PSD [dBm]			Limit (dBm)
Frequency [MHz]	Channel No.		SISO (Ant 1)	SISO (Ant 2)	MIMO (Ant 1+2)	
5180	36	0.773	3.568	5.040	7.376	11
5200	40	0.773	5.529	7.002	9.338	11
5240	48	0.773	5.549	7.135	9.424	11
5260	52	0.773	5.067	7.096	9.209	11
5300	60	0.773	5.372	6.649	9.067	11
5320	64	0.773	5.269	6.455	8.912	11
5500	100	0.773	6.164	7.261	9.757	11
5600	120	0.773	6.476	6.048	9.277	11
5720	144	0.773	6.297	4.787	8.617	11
5745	149	0.773	4.007	2.053	6.149	30
5785	157	0.773	4.002	2.126	6.175	30
5825	165	0.773	3.795	2.009	6.003	30

802.11n(HT20)		Duty Cycle Factor (dB)	Total PSD [dBm]			Limit (dBm)
Frequency [MHz]	Channel No.		SISO (Ant 1)	SISO (Ant 2)	MIMO (Ant 1+2)	
5180	36	1.675	0.477	1.359	3.951	11
5200	40	1.675	3.123	4.417	6.828	11
5240	48	1.675	3.016	4.807	7.013	11
5260	52	1.675	2.545	5.126	7.035	11
5300	60	1.675	3.150	4.427	6.845	11
5320	64	1.675	1.746	2.232	5.006	11
5500	100	1.675	3.170	3.968	6.598	11
5600	120	1.675	3.484	3.265	6.386	11
5720	144	1.675	4.036	2.341	6.281	11
5745	149	1.675	2.707	-0.138	4.524	30
5785	157	1.675	1.863	0.155	4.103	30
5825	165	1.675	1.583	-0.258	3.770	30

802.11n(HT40)		Duty Cycle Factor (dB)	Total PSD [dBm]			Limit (dBm)
Frequency [MHz]	Channel No.		SISO (Ant 1)	SISO (Ant 2)	MIMO (Ant 1+2)	
5190	38	2.557	-4.540	-3.099	-0.750	11
5230	46	2.557	-0.289	0.884	3.347	11
5270	54	2.557	-0.861	0.813	3.067	11
5310	62	2.557	-2.206	-1.278	1.293	11
5510	102	2.557	-2.476	-2.350	0.598	11
5590	118	2.557	0.881	0.483	3.697	11
5710	142	2.557	0.822	-0.446	3.244	11
5755	151	2.557	-1.474	-4.225	0.375	30
5795	159	2.557	-1.982	-3.237	0.446	30

802.11ac(VHT20)		Duty Cycle Factor (dB)	Total PSD [dBm]			Limit (dBm)
Frequency [MHz]	Channel No.		SISO (Ant 1)	SISO (Ant 2)	MIMO (Ant 1+2)	
5180	36	1.649	2.575	4.329	6.551	11
5200	40	1.649	4.087	5.670	7.961	11
5240	48	1.649	4.340	5.712	8.091	11
5260	52	1.649	3.565	5.329	7.547	11
5300	60	1.649	4.133	5.332	7.784	11
5320	64	1.649	2.378	3.405	5.933	11
5500	100	1.649	3.948	5.029	7.533	11
5600	120	1.649	4.612	4.042	7.347	11
5720	144	1.649	5.015	3.144	7.190	11
5745	149	1.649	2.980	0.735	5.012	30
5785	157	1.649	2.555	1.380	5.018	30
5825	165	1.649	2.284	0.820	4.624	30

802.11ac(VHT40)		Duty Cycle Factor (dB)	Total PSD [dBm]			Limit (dBm)
Frequency [MHz]	Channel No.		SISO (Ant 1)	SISO (Ant 2)	MIMO (Ant 1+2)	
5190	38	2.487	-2.339	-0.561	1.651	11
5230	46	2.487	1.125	2.213	4.713	11
5270	54	2.487	0.269	1.500	3.938	11
5310	62	2.487	-0.850	-0.342	2.422	11
5510	102	2.487	-2.622	-1.869	0.781	11
5590	118	2.487	1.019	0.585	3.818	11
5710	142	2.487	0.802	-0.356	3.272	11
5755	151	2.487	-0.526	-3.146	1.369	30
5795	159	2.487	-0.860	-2.194	1.535	30

802.11ac(VHT80)		Duty Cycle Factor (dB)	Total PSD [dBm]			Limit (dBm)
Frequency [MHz]	Channel No.		SISO (Ant 1)	SISO (Ant 2)	MIMO (Ant 1+2)	
5210	42	3.335	-6.917	-5.985	-3.416	11
5290	58	3.335	-6.971	-5.914	-3.400	11
5530	106	3.335	-6.049	-6.353	-3.188	11
5610	122	3.335	-1.866	-2.787	0.708	11
5690	138	3.335	-2.155	-3.106	0.406	11
5775	155	3.335	-3.669	-6.160	-1.728	30