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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:
August 27, 2020

Test Site/Location:
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA

Report No.: HCT-RF-2008-FC063

FCC ID:	**A3LSMG781U**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**

According to the Evaluation report, all of the data contained herein is reused from the reference FCC ID : A3LSMG781V report.

Model:	SM-G781U
Additional Model	SM-G781U1/DS, SM-G781W
EUT Type:	Mobile Phone
Modulation type	OFDM
FCC Classification:	Unlicensed National Information Infrastructure(NII)
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. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance.

REVIEWED BY

Report prepared by : Jung Ki Lim
Engineer of Telecommunication Testing Center

Report approved by : Jong Seok Lee
Manager of Telecommunication Testing Center

This test results were applied only to the test methods required by the standard.

This laboratory is not accredited for the test results marked *.
The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2008-FC063	August 27, 2020	- First Approval Report

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1. GENERAL INFORMATION

EUT DESCRIPTION

Model	SM-G781U	
Additional Model	SM-G781U1/DS, SM-G781W	
EUT Type	Mobile Phone	
Power Supply	DC 3.85 V	
Battery Information	Model: EB-BG781ABY Type: Li-ion Battery	
Travel Adapter Information (15W)	Model : EP-TA200 Manufacture: DONGYANG E&P	
Travel Adapter Information (25W)	Model : EP-TA800 Manufacture: DONGYANG E&P	
Data Cable Information (15W)	Model : EP-DG780BWE Manufacture: KSD	
Data Cable Information (25W)	Model : EP-DG980BBE Manufacture: KSD	
Ear-jack Information	Model : GH59-15252A Manufacture: CRESYN	
Modulation Type	OFDM : 802.11a, 802.11n, 802.11ac	
Frequency Range (MHz)	U-NII-1	20MHz BW : 5180 - 5240 40MHz BW : 5190 - 5230 80MHz BW : 5210
	U-NII-2A	20MHz BW : 5260 - 5320 40MHz BW : 5270 - 5310 80MHz BW : 5290
	U-NII-2C	20MHz BW : 5500 - 5720 40MHz BW : 5510 - 5710 80MHz BW : 5530 – 5690
	U-NII-3	20MHz BW : 5745 - 5825 40MHz BW : 5755 - 5795 80MHz BW : 5775
Antenna Specification	Antenna type: LDS+ metal Peak Gain : Ant.1: UNII 1: -2.95 dBi / UNII 2A, UNII 2C: -3.84 dBi / UNII 3: -5.66 dBi Ant.2: UNII 1: -0.15 dBi / UNII 2A, UNII 2C: 0.28 dBi / UNII 3: -2.19 dBi	
Straddle channel	Supported	
TDWR Band	Supported	
Dynamic Frequency Selection	Slave without radar detection	
Date(s) of Tests	July 08, 2020 ~ August 13, 2020	

ANTENNA CONFIGURATIONS

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

Configurations	SISO		SDM	CDD
	Ant.1	Ant.2	Ant.1 + Ant.2	Ant.1 + Ant.2
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 channels to operate independent of one another in the 2.4GHz and 5GHz bands simultaneously on each antenna.

RSDB Scenario	2.4 GHz WiFi Ant.1	2.4 GHz WiFi Ant.2	5GHz WiFi Ant.1	5GHz WiFi Ant.2	Bluetooth Ant.1	Bluetooth Ant.2
2.4 GHz WiFi MIMO + 5GHz WiFi	On	On	On			
2.4 GHz WiFi MIMO + 5GHz WiFi MIMO	On	On	On	On		
2.4 GHz WiFi + 5GHz WiFi + Bluetooth		On	On		On	
2.4 GHz WiFi + 5GHz WiFi MIMO + Bluetooth		On	On	On	On	

Non-DBS	2.4 GHz WiFi Ant.1	2.4 GHz WiFi Ant.2	5GHz WiFi Ant.1	5GHz WiFi Ant.2	Bluetooth Ant.1	Bluetooth Ant.2
2.4 GHz WiFi MIMO + 5GHz WiFi MIMO + Bluetooth			On	On	On	
			On	On		On

3. Directional Gain Calculation

According to KDB 662911 D01 Multiple Transmitter Output v02r01 F) 2) f) (ii)

Directional gain =

$$\bullet \quad DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

Band	Ant Gain (dBi)		N_{ANT}/ N_{ss}	Directional Gain (dBi)
UNII 1	ANT.1	-2.95	2 / 2	1.57
	ANT.2	-0.15		
UNII 2A, UNII 2C	ANT.1	-3.84	2 / 2	1.47
	ANT.2	0.28		
UNII 3	ANT.1	-5.66	2 / 2	-0.74
	ANT.2	-2.19		

2. MAXIMUM OUTPUT POWER

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

Band	Mode	SISO				MIMO	
		Ant.1 Power		Ant.2 Power		Ant.1 + Ant.2 Power	
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)
UNII1	802.11a	16.45	0.044	16.81	0.048	19.64	0.092
	802.11n (HT20)	16.28	0.042	16.83	0.048	19.57	0.091
	802.11n (HT40)	15.03	0.032	15.47	0.035	18.27	0.067
	802.11ac (VHT20)	16.29	0.043	16.81	0.048	19.57	0.091
	802.11ac (VHT40)	15.13	0.033	15.43	0.035	18.29	0.068
	802.11ac (VHT80)	13.87	0.024	14.24	0.027	17.07	0.051
UNII2A	802.11a	16.70	0.047	16.98	0.050	19.85	0.097
	802.11n (HT20)	16.53	0.045	16.98	0.050	19.77	0.095
	802.11n (HT40)	14.95	0.031	15.40	0.035	18.19	0.066
	802.11ac (VHT20)	16.52	0.045	16.99	0.050	19.77	0.095
	802.11ac (VHT40)	15.04	0.032	15.38	0.035	18.22	0.066
	802.11ac (VHT80)	14.05	0.025	14.42	0.028	17.25	0.053
UNII2C	802.11a	15.82	0.038	15.97	0.040	18.91	0.078
	802.11n (HT20)	16.50	0.045	16.99	0.050	19.76	0.095
	802.11n (HT40)	15.19	0.033	15.77	0.038	18.50	0.071
	802.11ac (VHT20)	16.45	0.044	16.98	0.050	19.74	0.094
	802.11ac (VHT40)	15.16	0.033	15.76	0.038	18.46	0.070
	802.11ac (VHT80)	13.93	0.025	14.81	0.030	17.40	0.055
UNII3	802.11a	16.34	0.043	16.97	0.050	19.68	0.093
	802.11n (HT20)	16.22	0.042	16.92	0.049	19.59	0.091
	802.11n (HT40)	15.06	0.032	15.59	0.036	18.30	0.068
	802.11ac (VHT20)	16.41	0.044	16.93	0.049	19.69	0.093
	802.11ac (VHT40)	15.07	0.032	15.58	0.036	18.29	0.068
	802.11ac (VHT80)	14.18	0.026	14.59	0.029	17.40	0.055

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 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 6.6.5 of ANSI C63.10. (Version: 2013)

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."

(1) The antennas of this E.U.T are permanently attached.

(2) 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.

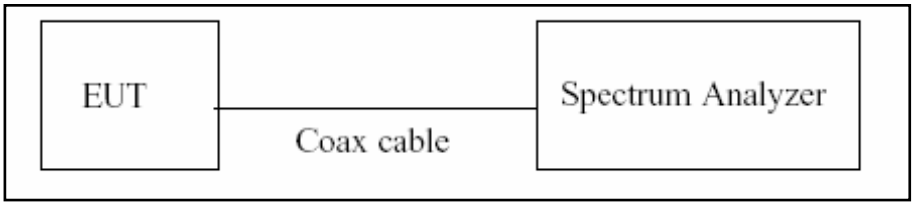
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

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)	5.05

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.

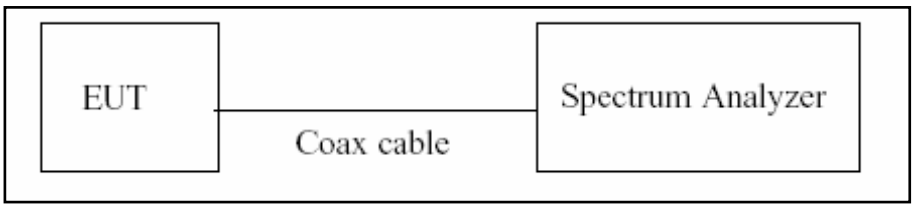
1. RBW = 8 MHz (the largest availble value)
2. VBW = 8 MHz (≥ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on}/ T_{total} and Duty Cycle Factor = 10log(1/Duty Cycle)

8.2. 6dB Bandwidth & 26dB Bandwidth

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 x 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.

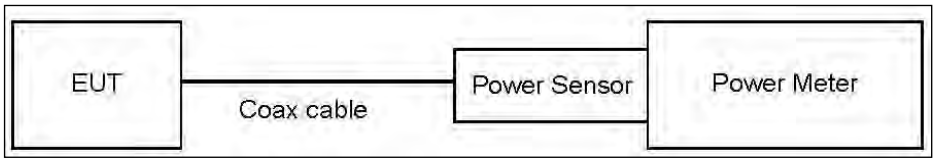
8.3. Output Power Measurement

Limit

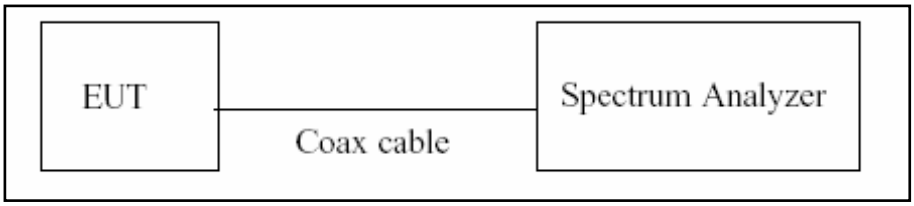
Band	Limit
UNII 1	- Master : Not exceed 1 W(=30dBm) - Slave : Not exceed 250 mW(=23.98 dBm)
UNII 2A, 2C	Not exceed the lesser of 250 mW or 11 dBm + 10 log B, (where B is the 26 dB emission bandwidth in megahertz.)
UNII 3	Not exceed 1 W(=30dBm)

Test Configuration

Power Meter



Spectrum Analyzer(Only Straddle Channel)



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 x 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(10 dB) + Cable loss + EUT Cable loss
3. Actual value of loss for the attenuator and cable combination is below table.

Band	Loss(dB)
UNII 1	11.53
UNII 2A	11.53
UNII 2C	11.53
UNII 3	11.53

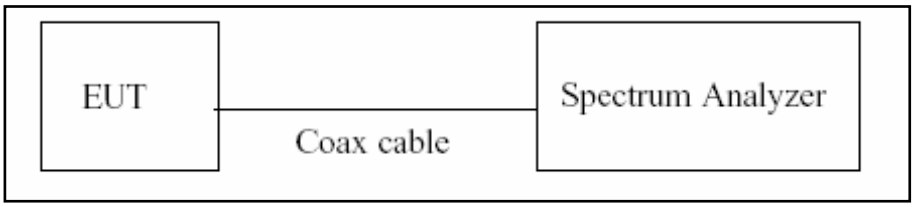
(Actual value of loss for the attenuator and cable combination)

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 x 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(10 dB) + Cable loss + EUT Cable loss
3. Actual value of loss for the attenuator and cable combination is below table.

Band	Loss(dB)
UNII 1	11.53
UNII 2A	11.53
UNII 2C	11.53
UNII 3	11.53

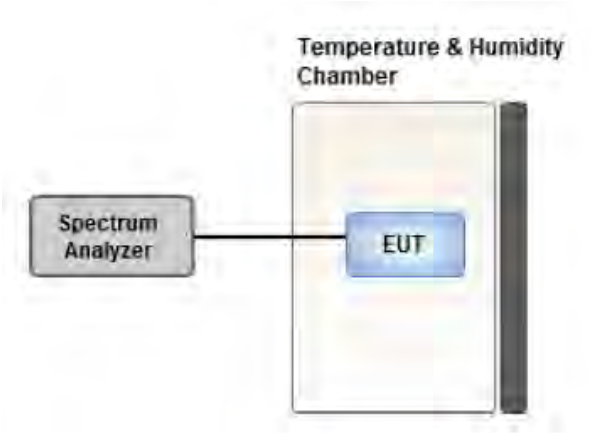
(Actual value of loss for the attenuator and cable combination)

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.
4. While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.

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[a]	56 to 46[a]
0.50 to 5	56	46
5 to 30	60	50

[a]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.

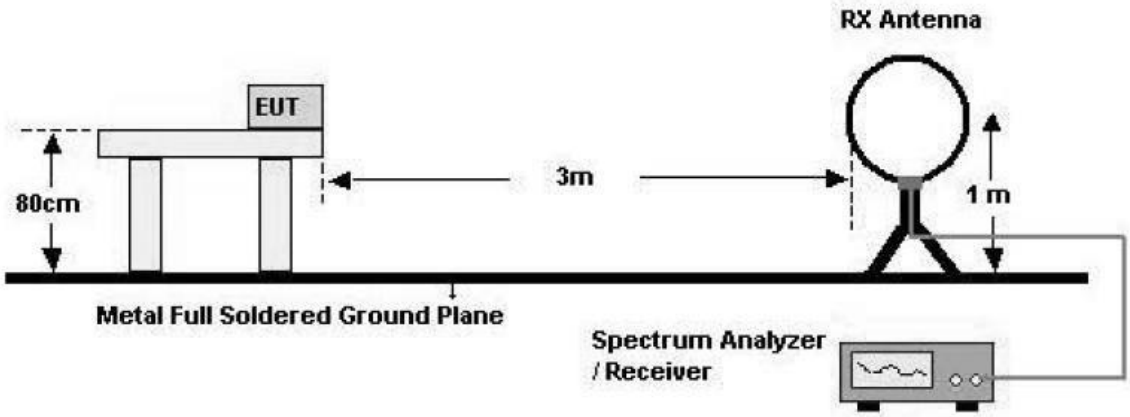
3. UNII 3: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below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

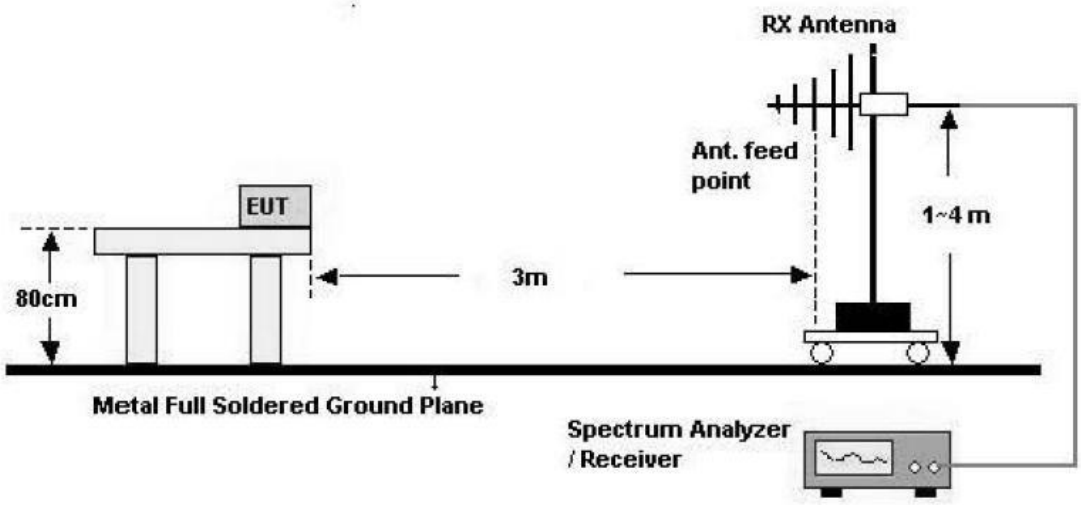
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

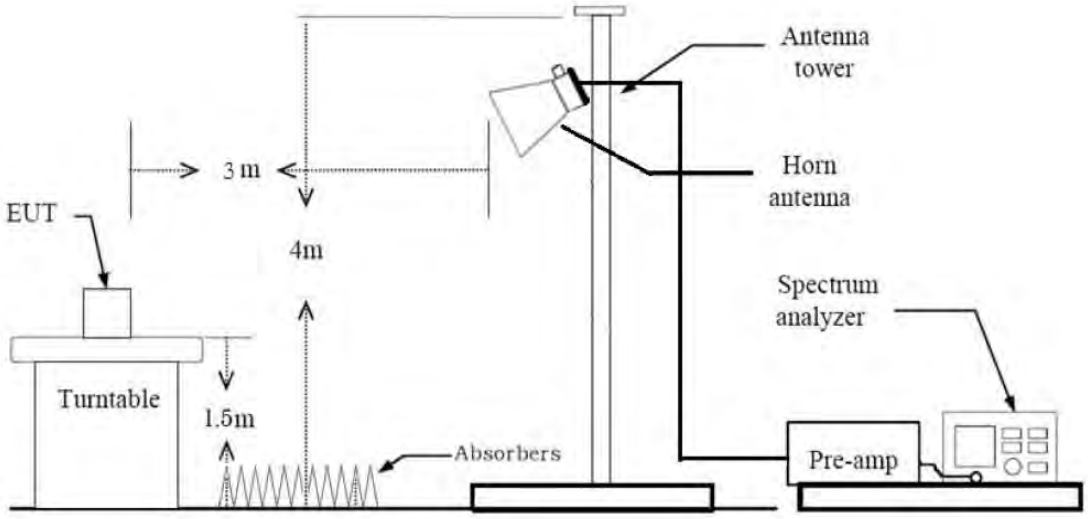
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions(Below 30 MHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3m from the EUT
3. The EUT is placed on a turntable, which is 0.8m above ground plane.
4. .We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor(0.009 MHz – 0.490 MHz) = 40log(3 m/300 m) = - 80 dB
   Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = 40log(3 m/30 m) = - 40 dB
   Measurement Distance : 3 m
8. Spectrum Setting
   - Frequency Range = 9 kHz ~ 30 MHz
   - Detector = Peak
   - Trace = Maxhold
   - RBW = 9 kHz
   - VBW ≥ 3 x RBW
9. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
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.

KDB 414788 OFS and Chamber Correlation Justification

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making
measurements in the near field.
OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

Test Procedure of Radiated spurious emissions(Below 1GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8m above ground plane.
3. The Hybrid antenna was placed at a location 3m from the EUT, which is varied from 1m to 4m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Spectrum Setting
   (1) Measurement Type(Peak):
      - Measured Frequency Range : 30 MHz – 1 GHz
      - Detector = Peak
      - Trace = Maxhold
      - RBW = 100 kHz
      - VBW ≥ 3 x RBW
   (2) Measurement Type(Quasi-peak):
      - Measured Frequency Range : 30 MHz – 1 GHz
      - Detector = Quasi-Peak
      - RBW = 120 kHz

   ※ In general, (1) is used mainly
7. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L)
8. 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.

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 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. 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.

9. 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
10. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency
11. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
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 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. 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.

9. Measured Frequency Range :
   - 4 500 MHz ~ 5 150 MHz
   - 5 350 MHz ~ 5 460 MHz
   - 5 460 MHz ~ 5 470 MHz
   - (75 MHz or more below the 5 725 MHz) ~ 5 725 MHz
   - 5 850 MHz ~ (75 MHz or more above the 5 850 MHz)
10. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
11. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Attenuator + 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)
802.11a	6	0.990	0.044	1000
802.11n(HT20)	MCS 0	0.997	0.012	1000
802.11n(HT40)	MCS 0	0.996	0.018	1000
802.11ac(VHT20)	MCS 0	0.997	0.012	1000
802.11ac(VHT40)	MCS 0	0.997	0.012	1000
802.11ac(VHT80)	MCS 0	0.997	0.012	1000

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. EUT Axis
   - Radiated Spurious Emissions : Y
   - Radiated Restricted Band Edge : X,Z
3. All datarate of operation were investigated and the worst case datarate results are reported
   - Mode : Ant.1(SISO), Ant.2(SISO), Ant.1+Ant.2(SDM), Ant.1+Ant.2(CDD)
   - Worstcase : Ant.1+Ant.2(CDD)
4. All position of loop antenna were investigated and the test result is a no critical peak found at all positions.
   - Position : Horizontal, Vertical, Parallel to the ground plane
5. Radiated Spurious Emission
   - UNII 1, 2A, 3 : 802.11a
   - UNII 2C : 802.11n
   - In order to simplify the report, We only have attached RSE result of worst case.
     (= Highest power of Each bands)
6. SM-G781W, SM-G781U, SM-G781U1/DS were tested and the worst case results are reported.

(Worst case : SM-G781U)

Radiated test(DBS)

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 : Y
3. Test case

RSDB Scenario	2.4 GHz WiFi Ant.1	2.4 GHz WiFi Ant.2	5GHz WiFi Ant.1	5GHz WiFi Ant.2	Bluetooth Ant.1	Bluetooth Ant.2	Test case
2.4 GHz WiFi MIMO + 5GHz WiFi	On	On	On				-
2.4 GHz WiFi MIMO + 5GHz WiFi MIMO	On	On	On	On			Case 1
2.4 GHz WiFi + 5GHz WiFi + Bluetooth		On	On		On		-
2.4 GHz WiFi + 5GHz WiFi MIMO + Bluetooth		On	On	On	On		Case 2

Non-DBS	2.4 GHz WiFi Ant.1	2.4 GHz WiFi Ant.2	5GHz WiFi Ant.1	5GHz WiFi Ant.2	Bluetooth Ant.1	Bluetooth Ant.2	Test case
2.4 GHz WiFi MIMO + 5GHz WiFi MIMO + Bluetooth			On	On	On		-
			On	On		On	Case 3

4. The following tables show the worst case configurations determined during testing.
(Worst case: The lowest margin condition the channels and modes were selected for test.)

Test case	Description	2.4 GHz Emission	5 GHz Emission	Bluetooth Emission
1	Antenna	Ant All	Ant All	-
	Channel	11	165	-
	Data Rate	1 Mbps	6 Mbps	-
	Mode	802.11b	802.11a	-

Test case	Description	2.4 GHz Emission	5 GHz Emission	Bluetooth Emission
2	Antenna	Ant 2	Ant All	Ant 1
	Channel	11	165	78
	Data Rate	1 Mbps	6 Mbps	1 Mbps
	Mode	802.11b	802.11a	DH-5

Test case	Description	2.4 GHz Emission	5 GHz Emission	Bluetooth Emission
3	Antenna	-	Ant All	Ant 2
	Channel	-	165	78
	Data Rate	-	6 Mbps	1 Mbps
	Mode	-	802.11a	DH-5

5. SM-G781W, SM-G781U, SM-G781U1/DS were tested and the worst case results are reported.
(Worst case : SM-G781U)

AC Power line Conducted Emissions

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone + External accessories(Earphone, etc)+Travel Adapter,
     Stand alone + Travel Adapter
   - Worstcase : Stand alone + Travel Adapter
2. SM-G781W, SM-G781U, SM-G781U1/DS were tested and the worst case results are reported.

(Worst case : SM-G781U)

Conducted test

1. All datarate of operation were investigated and the worst case datarate results are reported.
2. SM-G781W, SM-G781U, SM-G781U1/DS were tested and the worst case results are reported.

(Worst case : SM-G781U)

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+10log$_{10}$ (BW) dBm (5250-5350 MHz) < 250 mW or 11+10log$_{10}$ (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

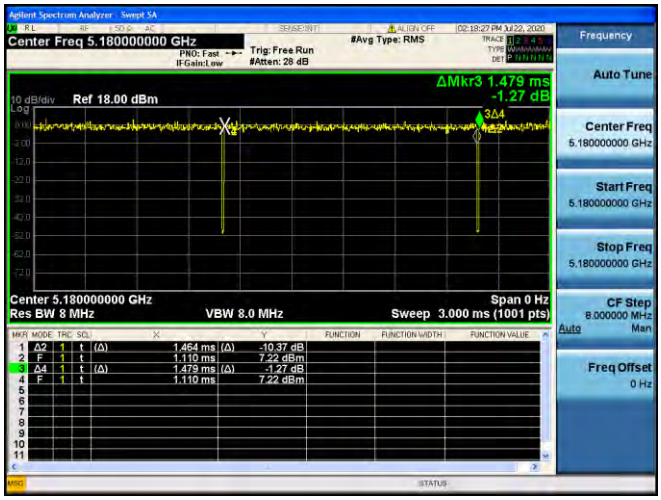
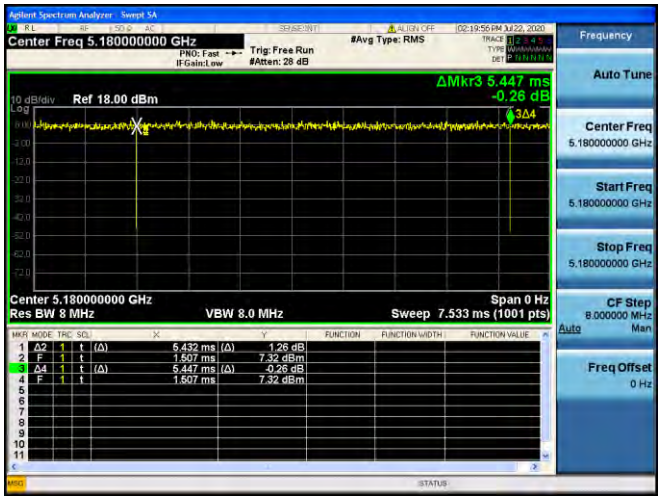
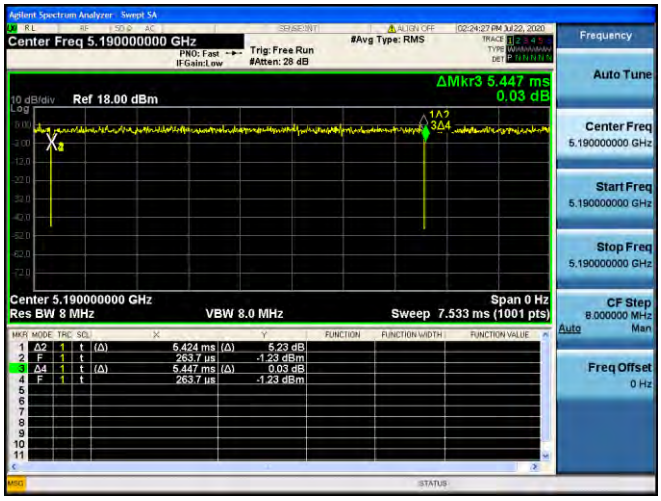
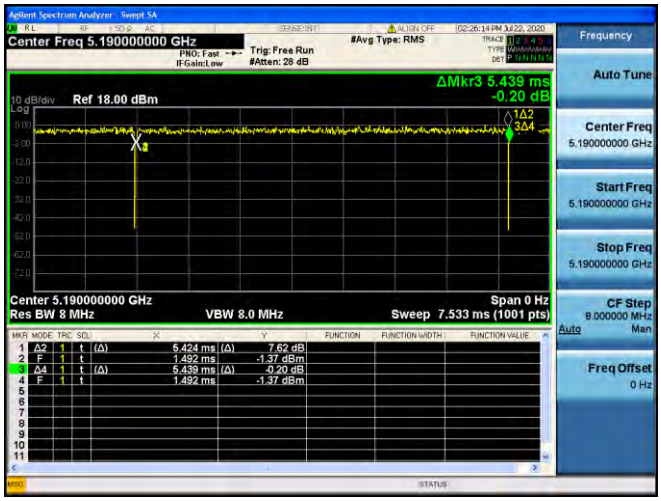
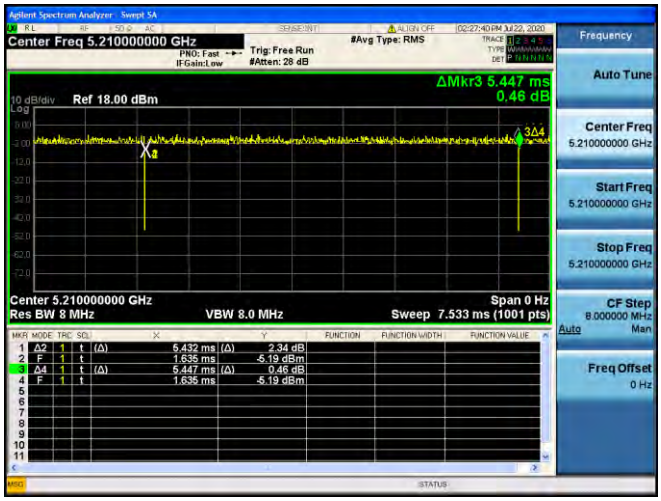
Mode	Data Rate (Mbps)	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11a	6	1.464	1.479	0.990	0.044
	9	0.984	1.002	0.982	0.080
	12	0.744	0.759	0.980	0.087
	18	0.504	0.522	0.966	0.152
	24	0.384	0.399	0.962	0.166
	36	0.264	0.282	0.936	0.286
	48	0.426	0.657	0.648	1.882
	54	0.391	0.618	0.633	1.988

Mode	MCS Index	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11n (HT20)	0	5.432	5.447	0.997	0.012
	1	5.432	5.448	0.997	0.013
	2	5.432	5.448	0.997	0.013
	3	5.424	5.440	0.997	0.013
	4	5.424	5.440	0.997	0.013
	5	5.432	5.448	0.997	0.013
	6	5.432	5.448	0.997	0.013
	7	5.432	5.448	0.997	0.013
802.11n (HT40)	0	5.424	5.447	0.996	0.018
	1	5.424	5.447	0.996	0.018
	2	5.424	5.447	0.996	0.018
	3	5.432	5.447	0.997	0.012
	4	5.424	5.447	0.996	0.018
	5	5.424	5.447	0.996	0.018
	6	5.424	5.447	0.996	0.018
	7	5.432	5.454	0.996	0.018

Mode	MCS Index	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11ac (VHT20)	0	5.432	5.447	0.997	0.012
	1	5.425	5.443	0.997	0.014
	2	5.432	5.447	0.997	0.012
	3	5.432	5.447	0.997	0.012
	4	5.432	5.447	0.997	0.012
	5	5.432	5.447	0.997	0.012
	6	5.424	5.447	0.996	0.018
	7	5.432	5.447	0.997	0.012
	8	5.432	5.447	0.997	0.012
802.11ac (VHT40)	0	5.424	5.439	0.997	0.012
	1	5.424	5.439	0.997	0.012
	2	5.432	5.447	0.997	0.012
	3	5.424	5.439	0.997	0.012
	4	5.432	5.447	0.997	0.012
	5	5.432	5.447	0.997	0.012
	6	5.432	5.447	0.997	0.012
	7	5.424	5.439	0.997	0.012
	8	5.424	5.447	0.996	0.018
	9	5.424	5.447	0.996	0.018
802.11ac (VHT80)	0	5.432	5.447	0.997	0.012
	1	5.432	5.447	0.997	0.012
	2	5.432	5.448	0.997	0.013
	3	5.424	5.440	0.997	0.013
	4	5.424	5.440	0.997	0.013
	5	5.432	5.447	0.997	0.012
	6	5.424	5.447	0.996	0.018
	7	5.424	5.447	0.996	0.018
	8	5.424	5.439	0.997	0.012
	9	5.432	5.447	0.997	0.012

Note:

In order to simplify the report, attached plots were only lowest datarate.

802.11a	802.11n(HT20)
	
802.11n(HT40)	**802.11ac(VHT20)**
	
802.11ac(VHT40)	**802.11ac(VHT80)**
	

10.2 26 dB BANDWIDTH

Straddle channel data in the table below are for reporting purposes only.

Straddle channel data were added in section 10.7.1.

[ANT.1]

802.11a Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	20.02	16.343
5200	40	18.89	16.338
5240	48	19.05	16.343
5260	52	19.43	16.346
5300	60	18.72	16.352
5320	64	18.88	16.334
5500	100	18.92	16.327
5600	120	18.67	16.331
5720	144	19.33	16.346
5745	149	19.42	16.334
5785	157	20.21	16.359
5825	165	20.17	16.353

802.11n(HT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	19.97	17.557
5200	40	20.16	17.538
5240	48	20.21	17.552
5260	52	19.87	17.539
5300	60	19.90	17.539
5320	64	20.12	17.549
5500	100	20.33	17.547
5600	120	19.96	17.551
5720	144	20.15	17.563
5745	149	19.73	17.549
5785	157	20.28	17.560
5825	165	19.90	17.563

802.11n(HT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	39.31	35.921
5230	46	39.41	35.951
5270	54	39.38	35.944
5310	62	39.22	35.925
5510	102	39.41	35.992
5590	118	39.14	35.977
5710	142	39.41	35.927
5755	151	39.22	35.980
5795	159	39.72	35.947

802.11ac(VHT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	20.35	17.543
5200	40	20.27	17.535
5240	48	20.21	17.531
5260	52	19.97	17.541
5300	60	20.55	17.545
5320	64	20.17	17.533
5500	100	20.25	17.549
5600	120	20.35	17.540
5720	144	20.22	17.558
5745	149	20.14	17.557
5785	157	20.70	17.580
5825	165	20.54	17.586

802.11ac(VHT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	39.64	35.970
5230	46	39.24	35.985
5270	54	39.21	35.977
5310	62	39.69	35.970
5510	102	39.02	35.974
5590	118	39.66	35.972
5710	142	39.22	35.951
5755	151	39.77	35.996
5795	159	39.62	36.014

802.11ac(VHT80) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5210	42	81.17	75.310
5290	58	80.92	75.233
5530	106	81.28	75.330
5610	122	81.25	75.295
5690	138	81.74	75.282
5775	155	81.05	75.302

[ANT.2]

802.11a Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	18.64	16.330
5200	40	18.93	16.337
5240	48	18.99	16.338
5260	52	18.83	16.339
5300	60	18.87	16.352
5320	64	18.80	16.338
5500	100	19.45	16.350
5600	120	18.64	16.353
5720	144	19.55	16.353
5745	149	18.91	16.336
5785	157	19.07	16.340
5825	165	19.14	16.348

802.11n(HT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	20.33	17.523
5200	40	19.98	17.544
5240	48	19.64	17.526
5260	52	20.15	17.545
5300	60	19.72	17.543
5320	64	20.04	17.547
5500	100	20.45	17.544
5600	120	20.39	17.558
5720	144	20.02	17.550
5745	149	19.97	17.547
5785	157	20.30	17.535
5825	165	20.01	17.533

802.11n(HT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	39.65	35.972
5230	46	39.31	35.921
5270	54	39.67	35.966
5310	62	39.67	35.968
5510	102	39.65	35.973
5590	118	39.56	35.944
5710	142	39.72	35.955
5755	151	39.20	35.987
5795	159	39.23	35.970

802.11ac(VHT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	19.90	17.521
5200	40	20.30	17.540
5240	48	20.24	17.510
5260	52	20.35	17.563
5300	60	19.98	17.546
5320	64	19.97	17.546
5500	100	19.56	17.532
5600	120	20.25	17.542
5720	144	19.90	17.510
5745	149	19.94	17.536
5785	157	19.91	17.525
5825	165	20.12	17.537

802.11ac(VHT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	39.50	35.991
5230	46	39.75	35.970
5270	54	39.53	35.950
5310	62	39.65	35.995
5510	102	39.58	35.967
5590	118	39.47	35.939
5710	142	39.13	35.981
5755	151	39.09	36.013
5795	159	39.34	35.972

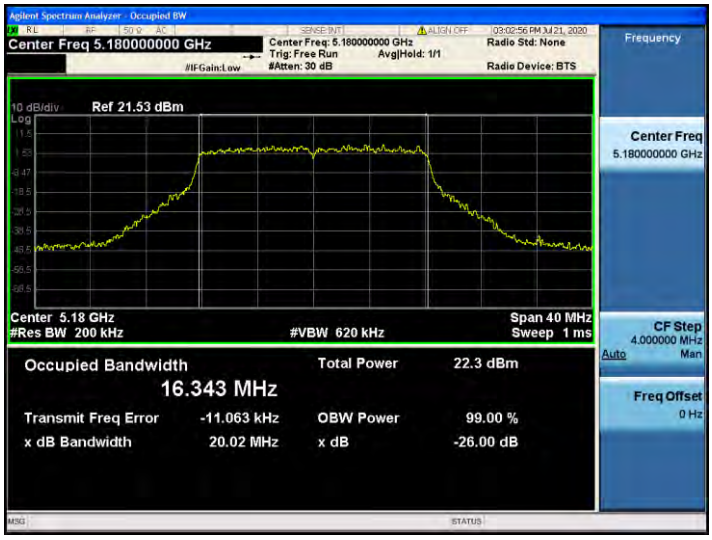
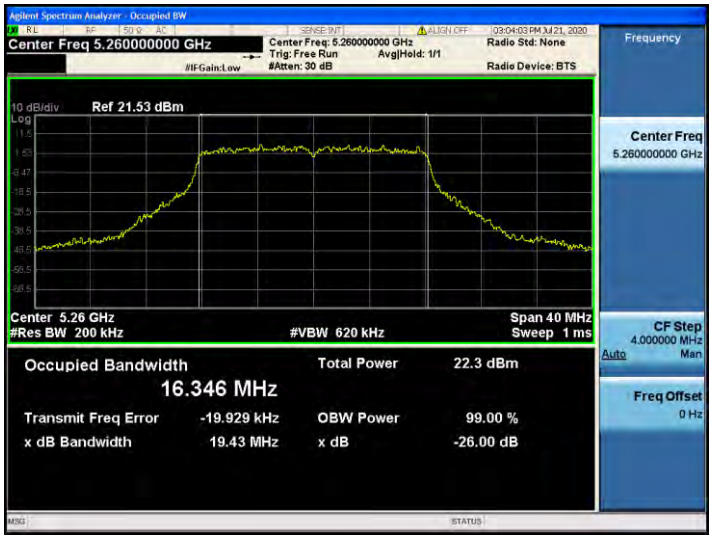
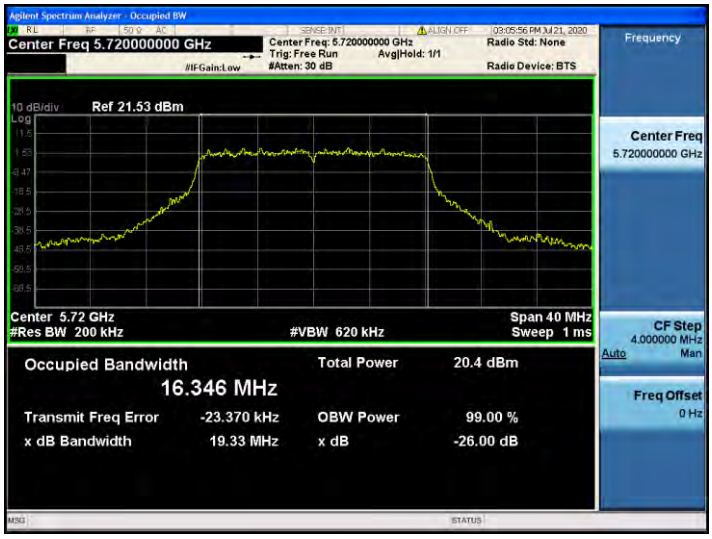
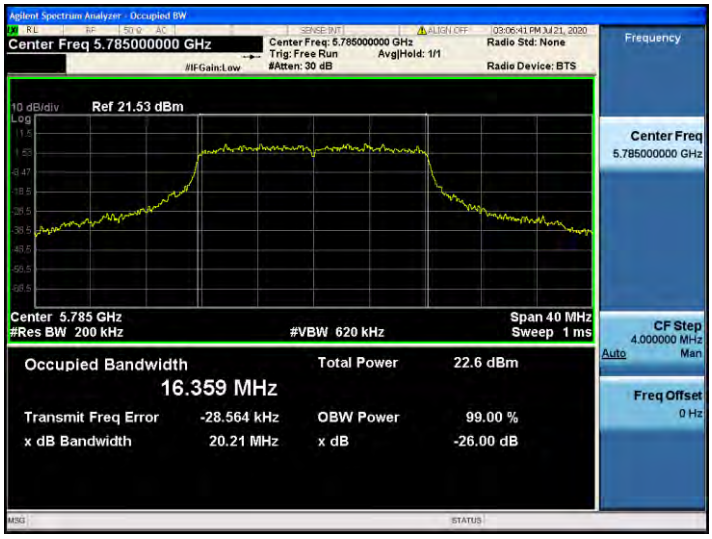
802.11ac(VHT80) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5210	42	81.88	75.299
5290	58	81.42	75.261
5530	106	81.40	75.245
5610	122	81.42	75.209
5690	138	80.56	75.214
5775	155	81.22	75.216

[ANT.1]

▣ Test Plots(802.11a)

Note:

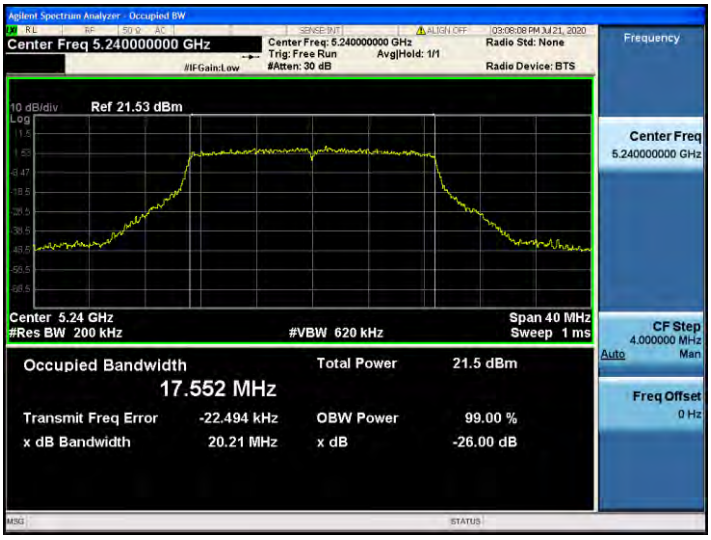
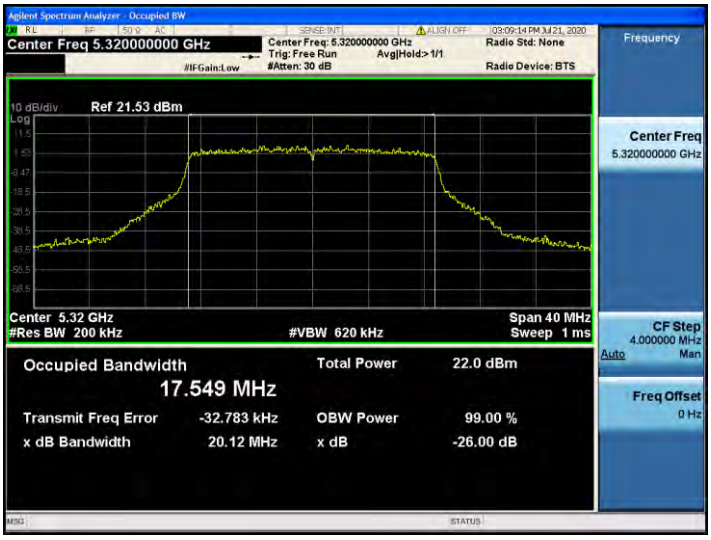
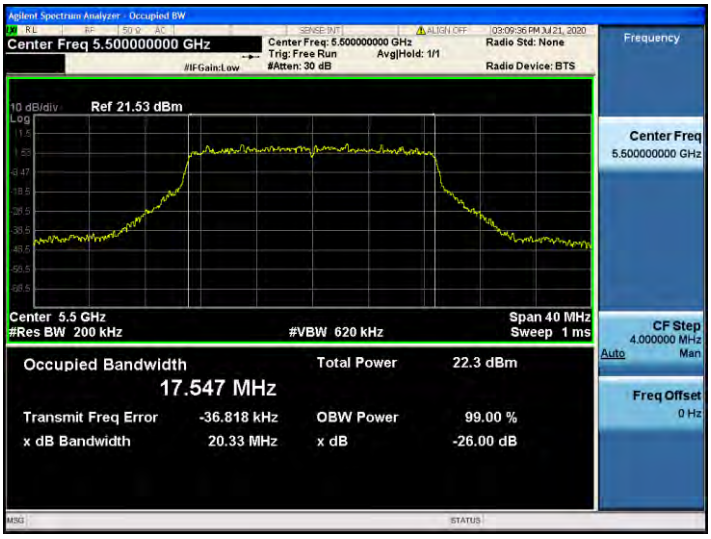
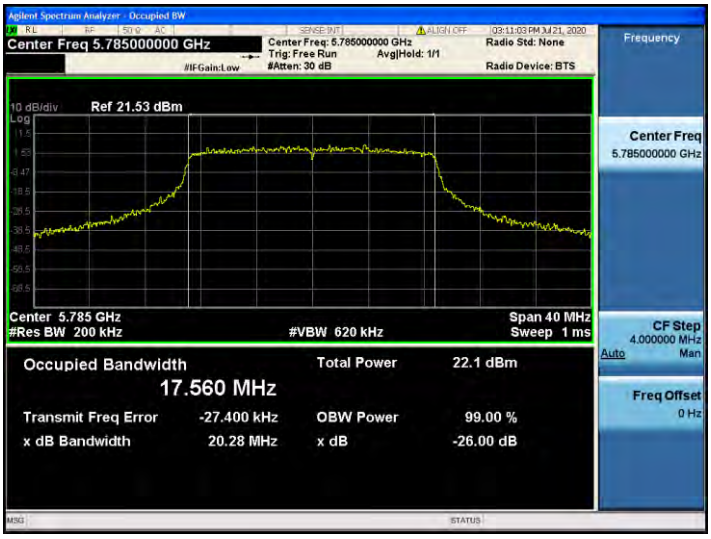
In order to simplify the report, attached plots were only the most wide channel.

802.11a UNII 1 BAND 26dB Bandwidth (CH 36)	802.11a UNII 2A BAND 26dB Bandwidth (CH 52)
	
802.11a UNII 2C BAND 26dB Bandwidth (CH 144)	**802.11a UNII 3 BAND 26dB Bandwidth (CH 157)**
	

▣ Test Plots(802.11n(HT20))

Note:

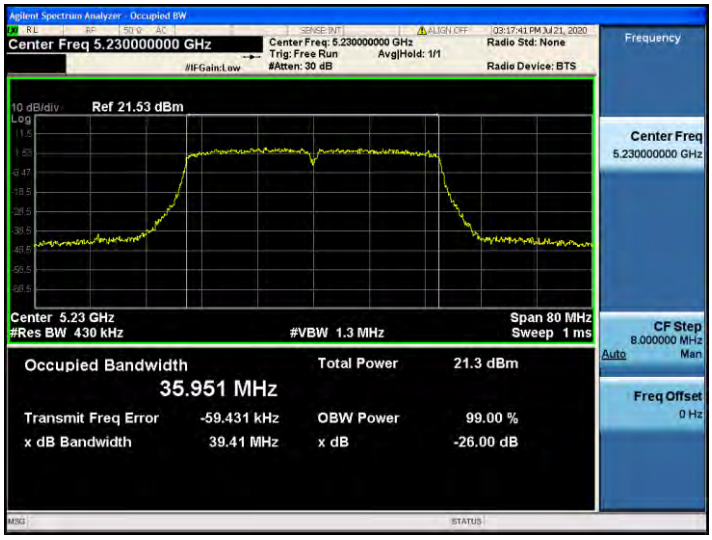
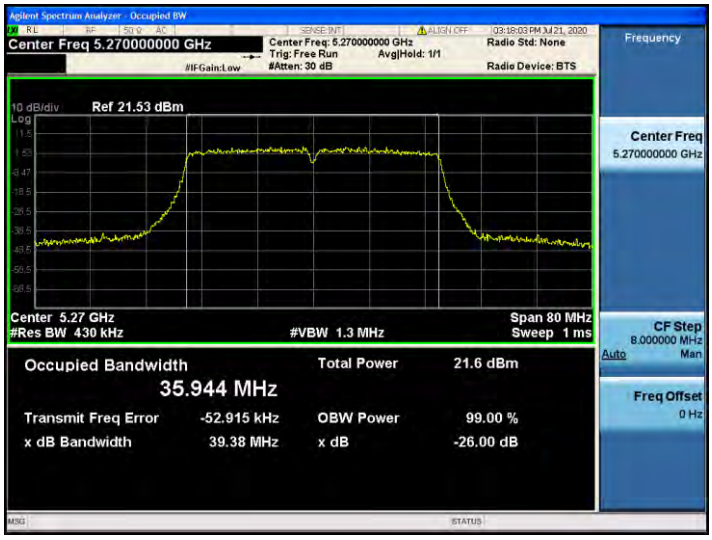
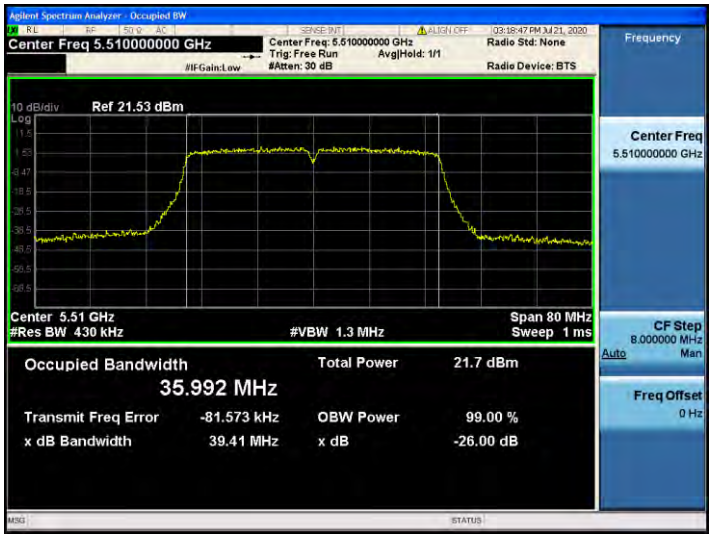
In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT20 UNII 1 BAND 26dB Bandwidth(CH 48)	802.11n_HT20 UNII 2A BAND 26dB Bandwidth(CH 64)
	
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:

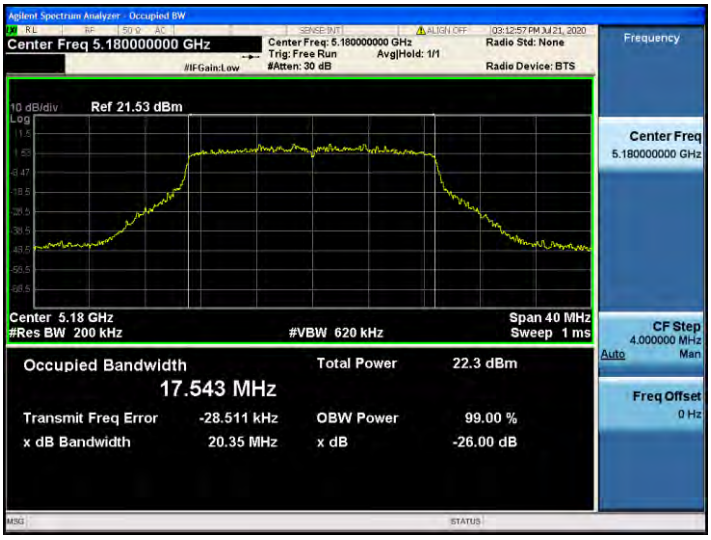
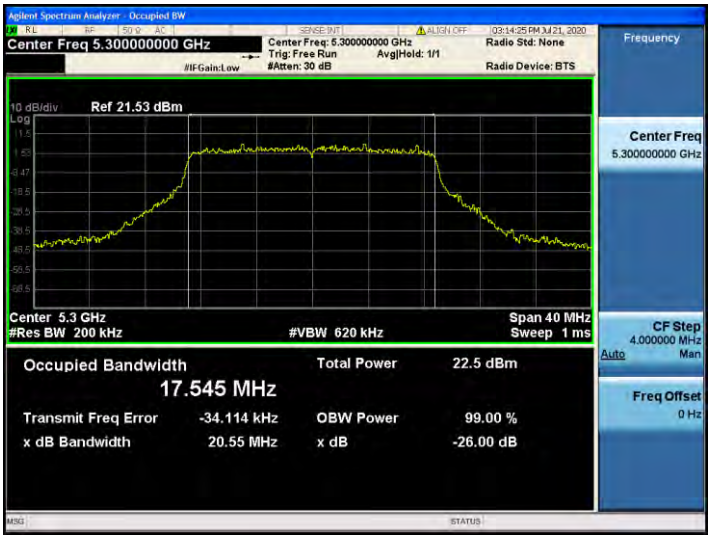
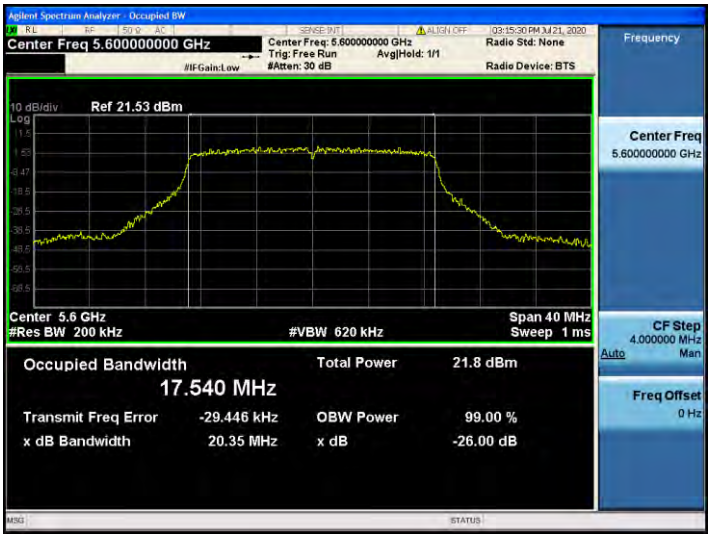
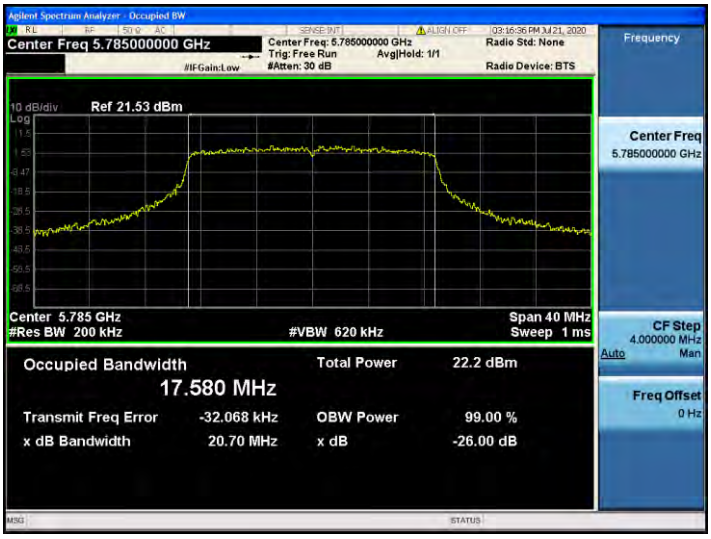
In order to simplify the report, attached plots were only the most wide channel.

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 102)	**802.11n_HT40 UNII 3 BAND 26dB Bandwidth (CH 159)**
	

▣ Test Plots(802.11ac(VHT20))

Note:

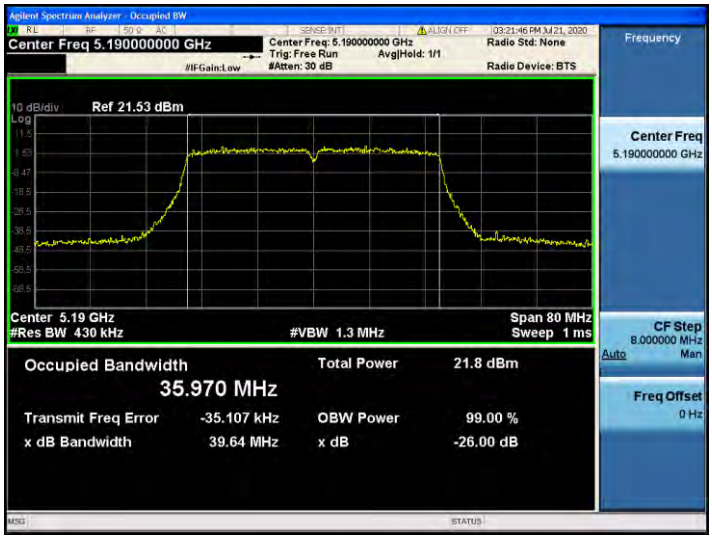
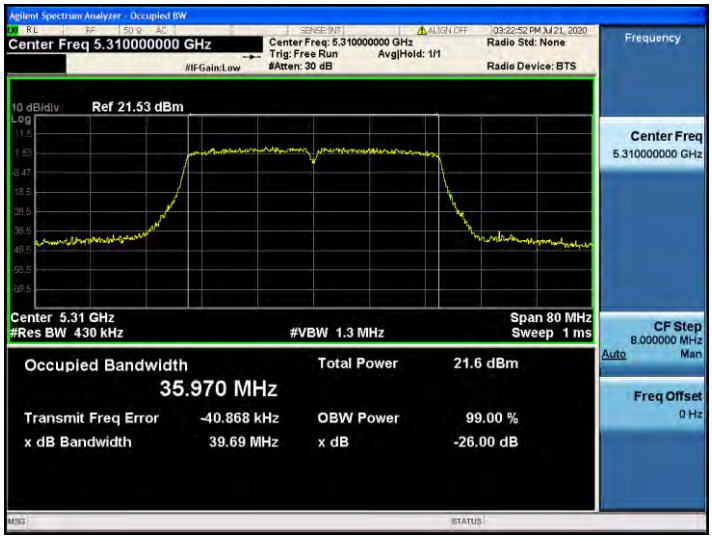
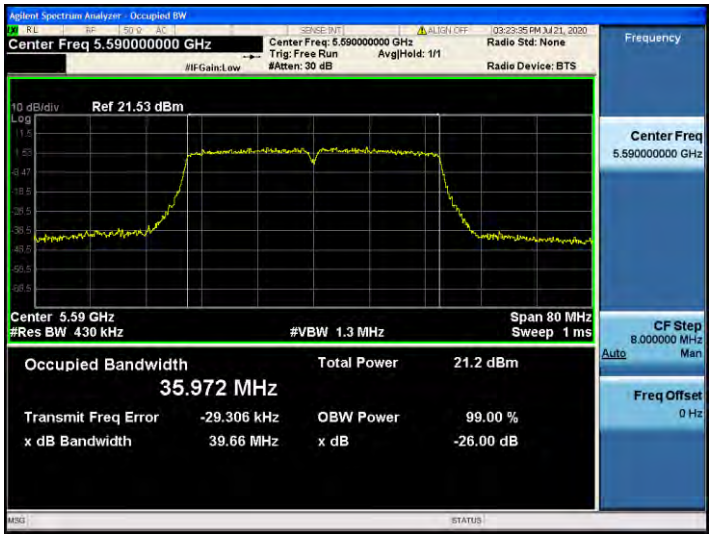
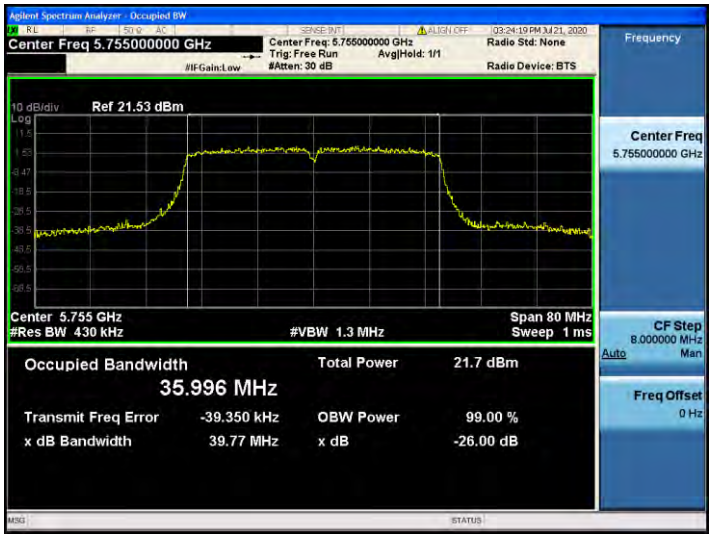
In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT20 UNII 1 BAND 26dB Bandwidth(CH 36)	802.11ac_VHT20 UNII 2A BAND 26dB Bandwidth(CH 60)
	
802.11ac_VHT20 UNII 2C BAND 26dB Bandwidth(CH 120)	**802.11ac_VHT20 UNII 3 BAND 26dB Bandwidth(CH 157)**
	

▣ Test Plots(802.11ac(VHT40))

Note:

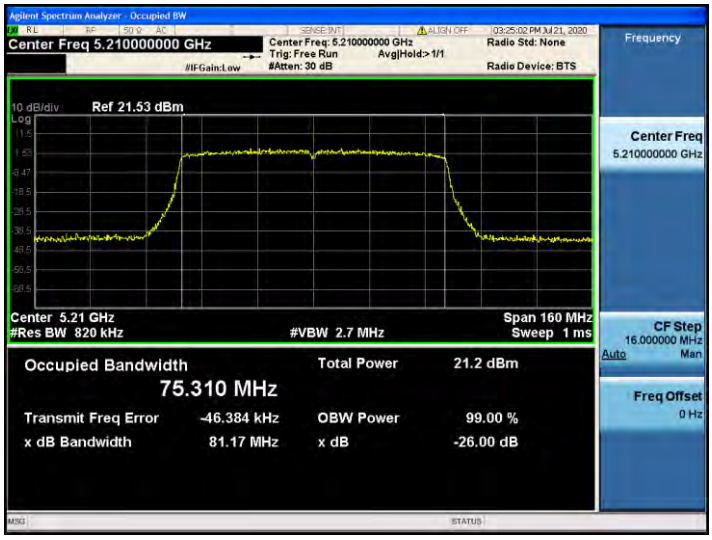
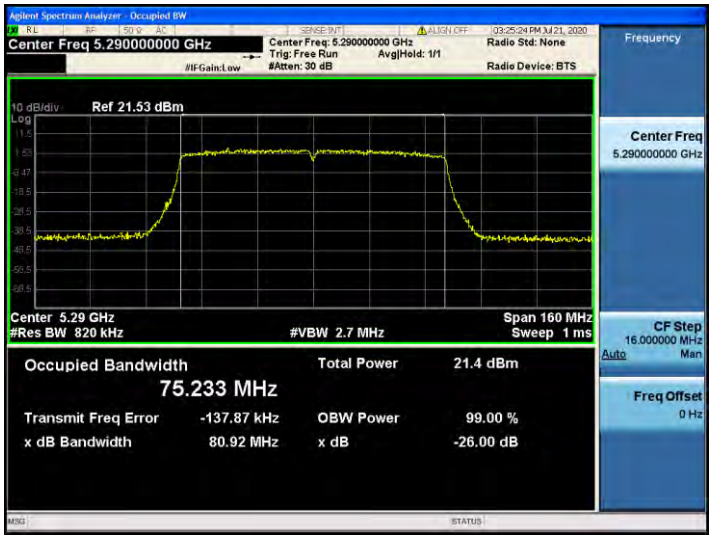
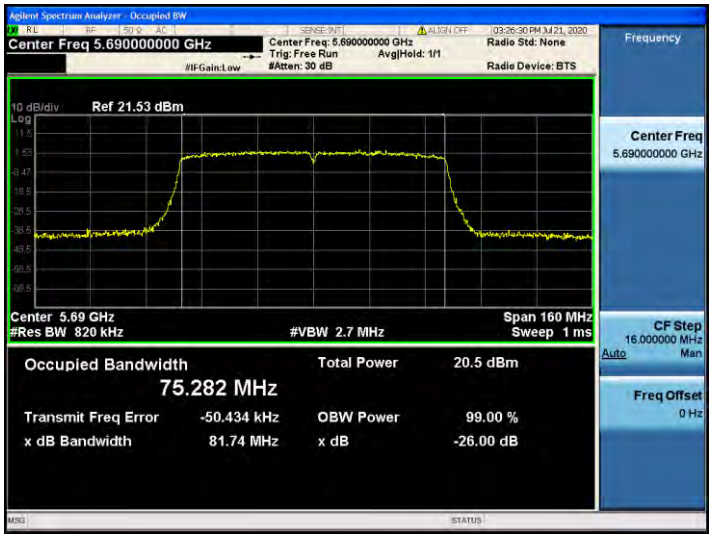
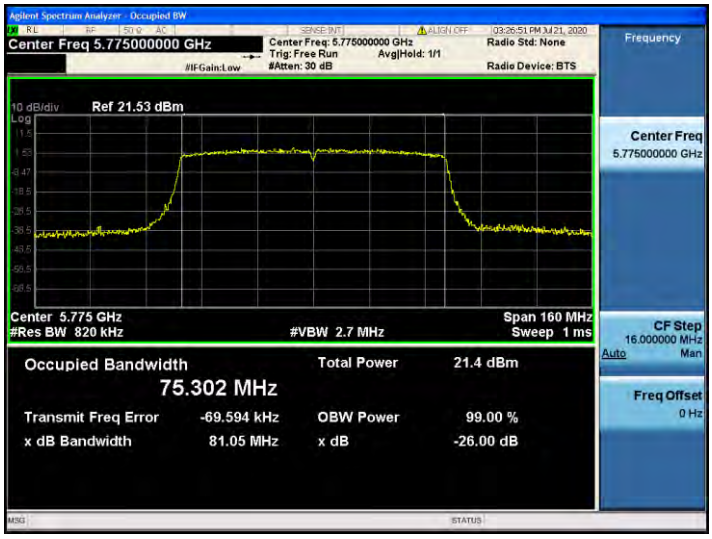
In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT40 UNII 1 BAND 26dB Bandwidth(CH 38)	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.

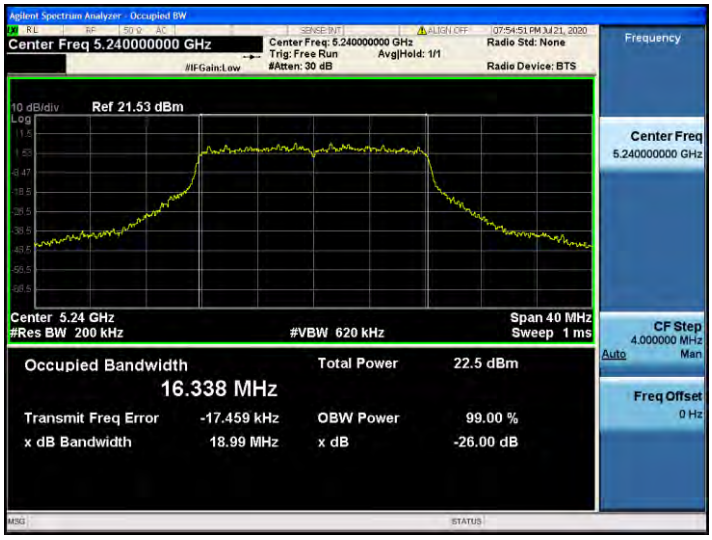
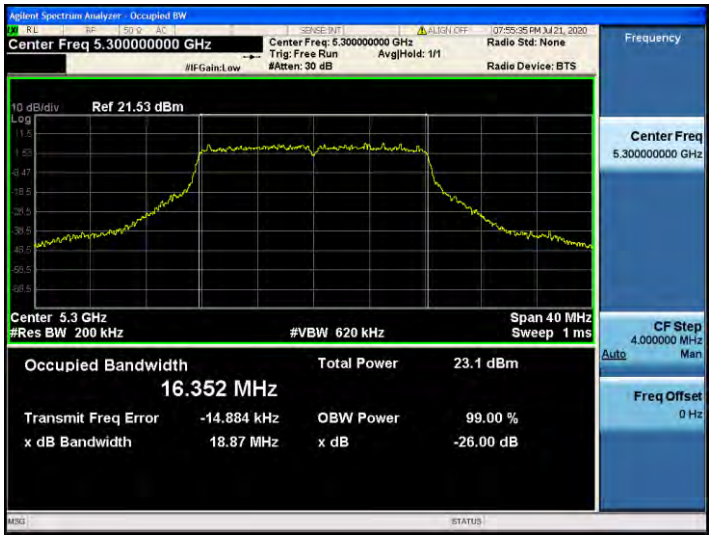
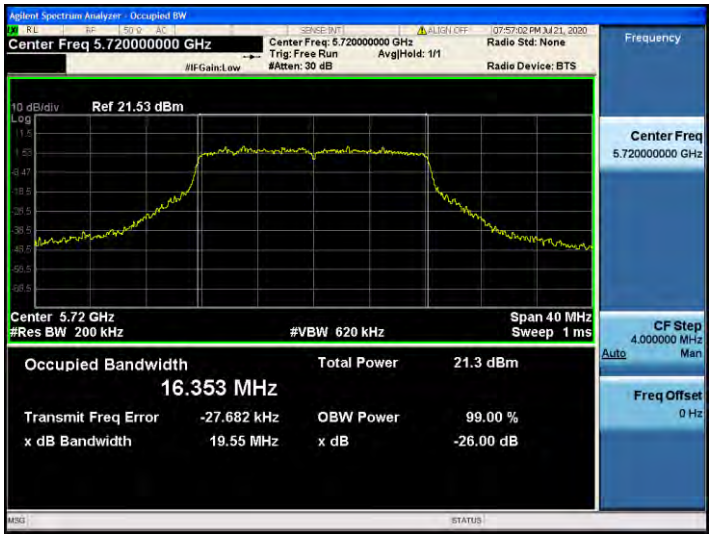
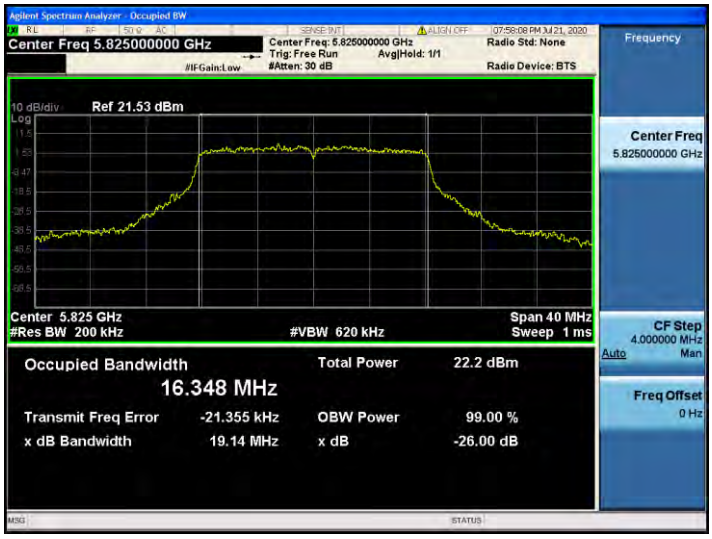
802.11ac_VHT80 UNII 1 BAND 26dB Bandwidth(CH 42)	802.11ac_VHT80 UNII 2A BAND 26dB Bandwidth (CH 58)
	
802.11ac_VHT80 UNII 2C BAND 26dB Bandwidth(CH 138)	**802.11ac_VHT80 UNII 3 BAND 26dB Bandwidth (CH 155)**
	

[ANT.2]

▣ Test Plots(802.11a)

Note:

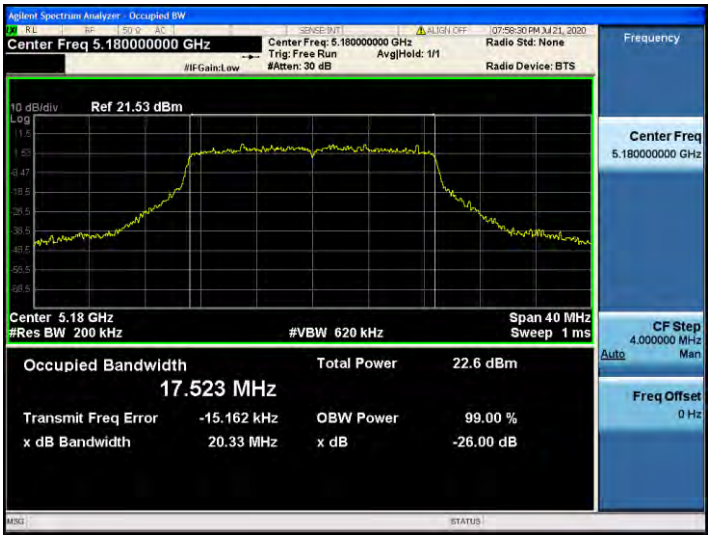
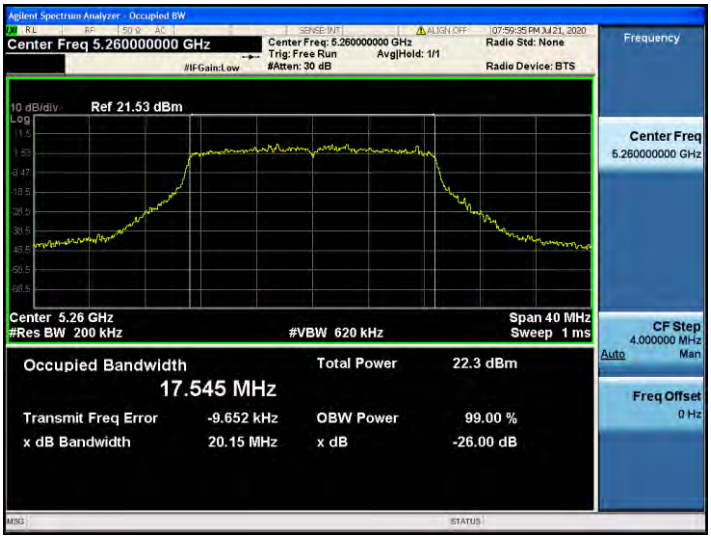
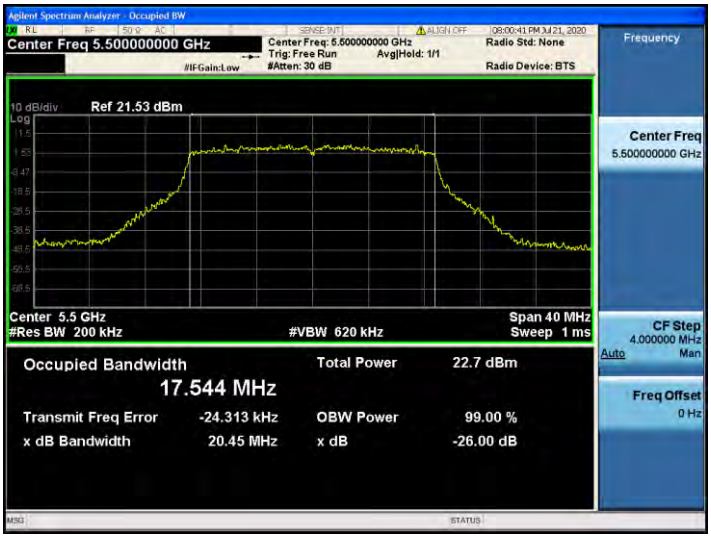
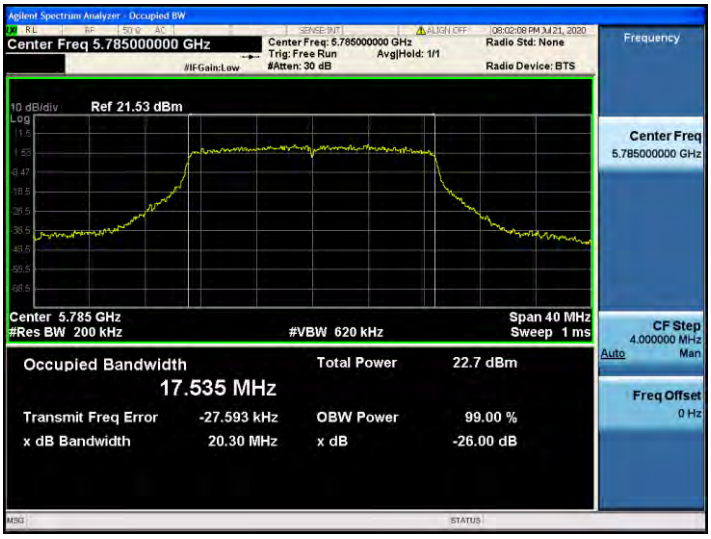
In order to simplify the report, attached plots were only the most wide channel.

802.11a UNII 1 BAND 26dB Bandwidth (CH 48)	802.11a UNII 2A BAND 26dB Bandwidth (CH 60)
	
802.11a UNII 2C BAND 26dB Bandwidth (CH 144)	**802.11a UNII 3 BAND 26dB Bandwidth (CH 165)**
	

▣ Test Plots(802.11n(HT20))

Note:

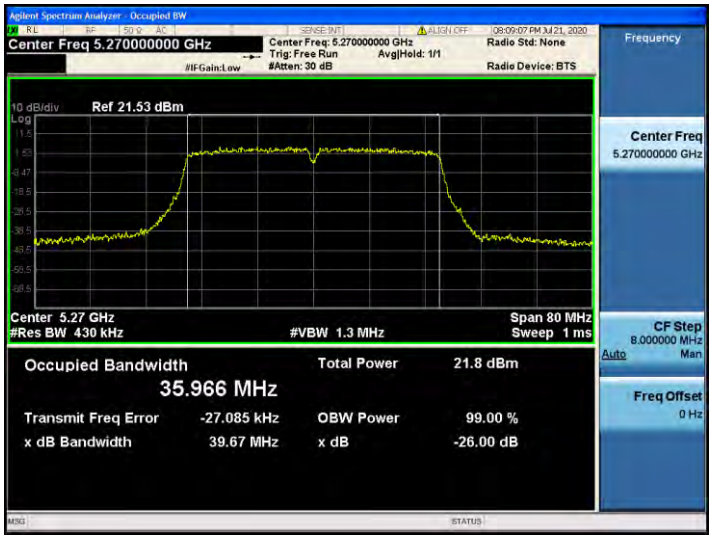
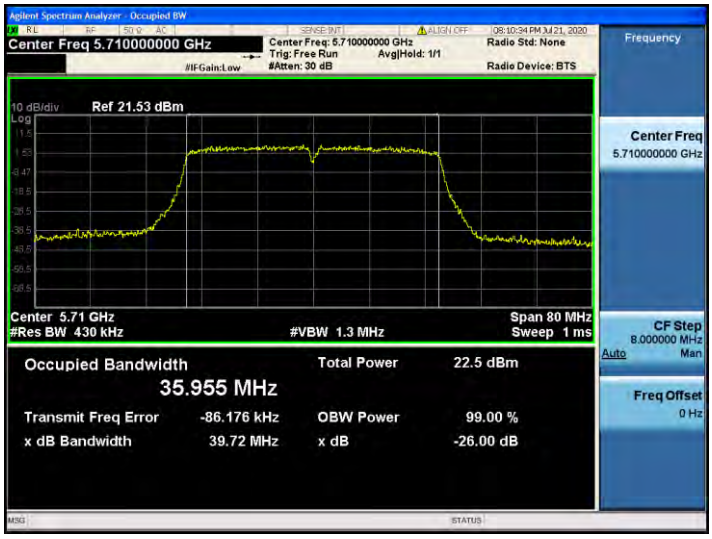
In order to simplify the report, attached plots were only the most wide channel.

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 157)**
	

▣ Test Plots(802.11n(HT40))

Note:

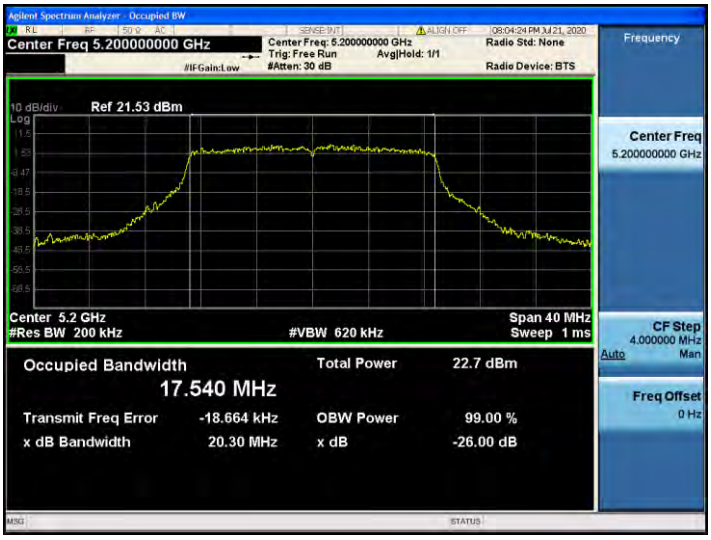
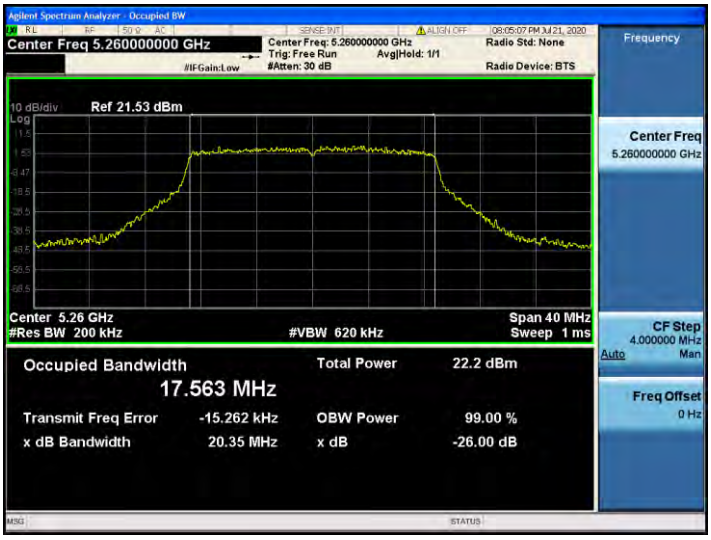
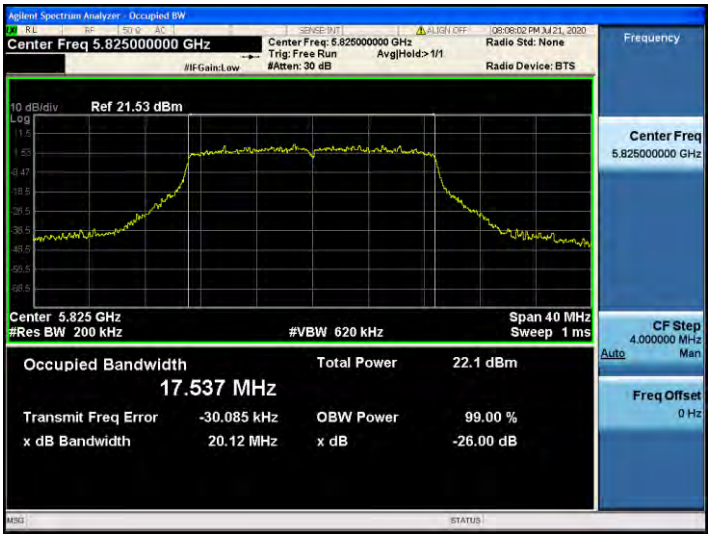
In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT40 UNII 1 BAND 26dB Bandwidth(CH 38)	802.11n_HT40 UNII 2A BAND 26dB Bandwidth (CH 54)
	
802.11n_HT40 UNII 2C BAND 26dB Bandwidth(CH 142)	**802.11n_HT40 UNII 3 BAND 26dB Bandwidth (CH 159)**
	

▣ Test Plots(802.11ac(VHT20))

Note:

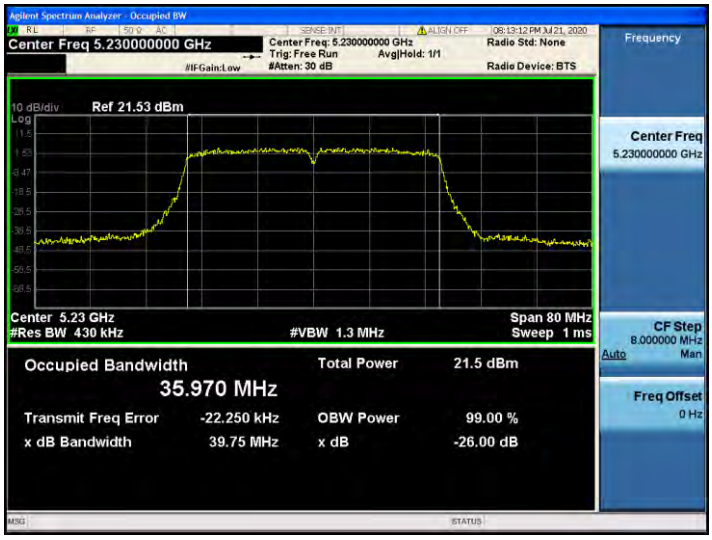
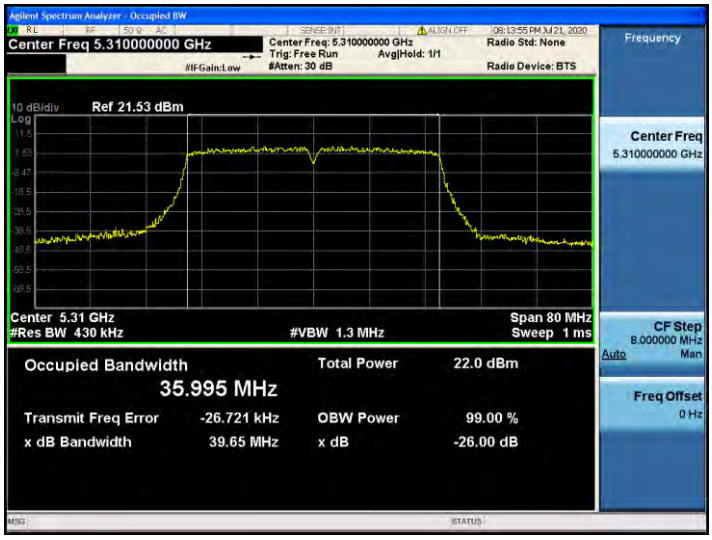
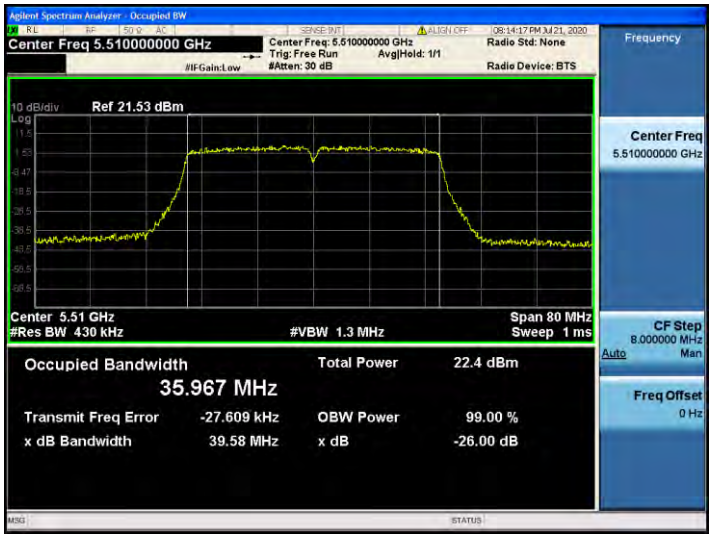
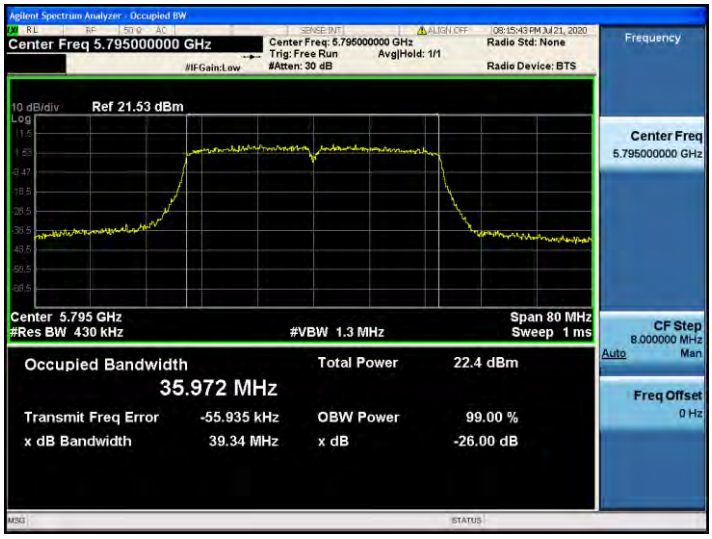
In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT20 UNII 1 BAND 26dB Bandwidth(CH 40)	802.11ac_VHT20 UNII 2A BAND 26dB Bandwidth(CH 52)
	
802.11ac_VHT20 UNII 2C BAND 26dB Bandwidth(CH 120)	**802.11ac_VHT20 UNII 3 BAND 26dB Bandwidth(CH 165)**
	

▣ Test Plots(802.11ac(VHT40))

Note:

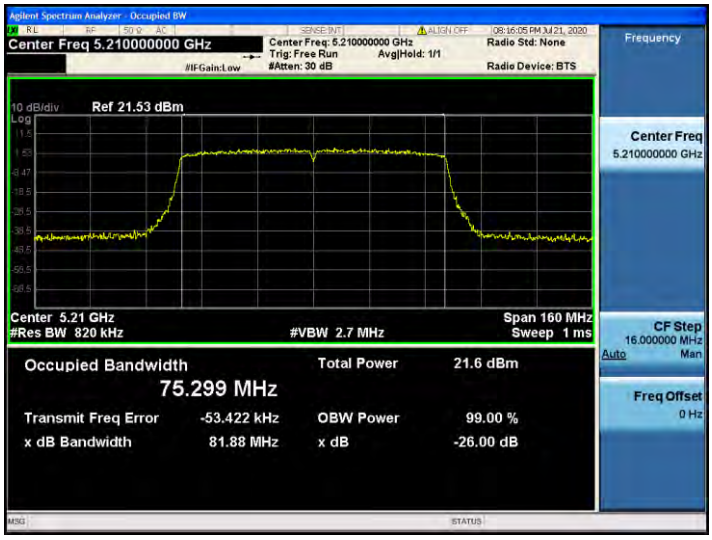
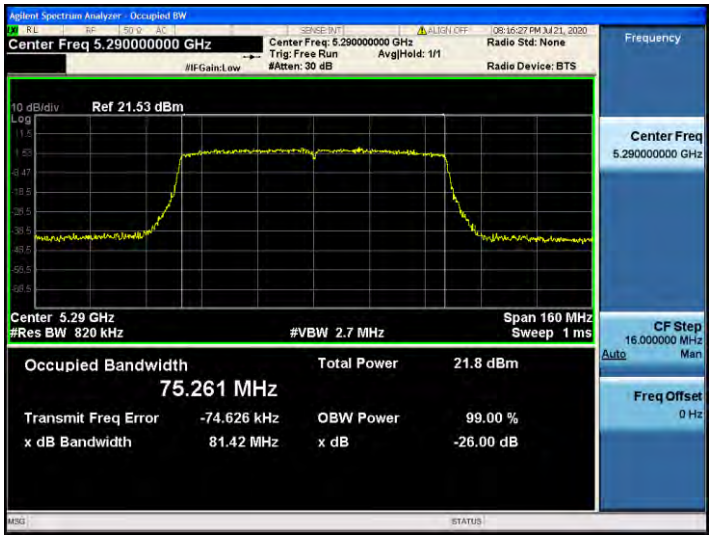
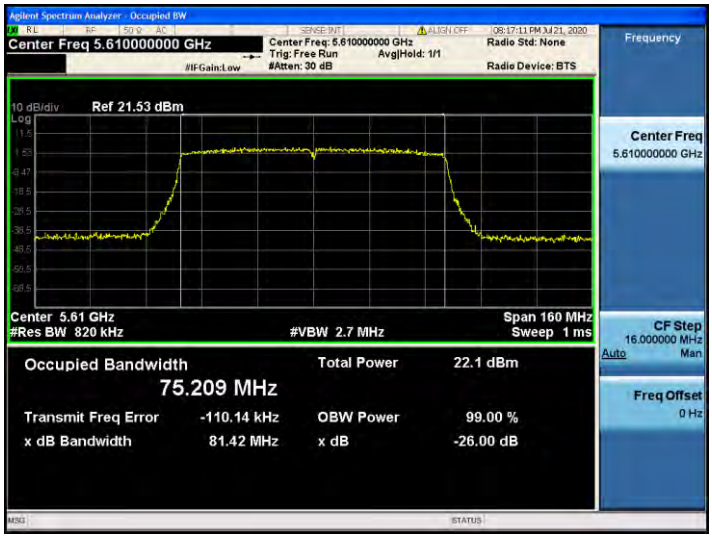
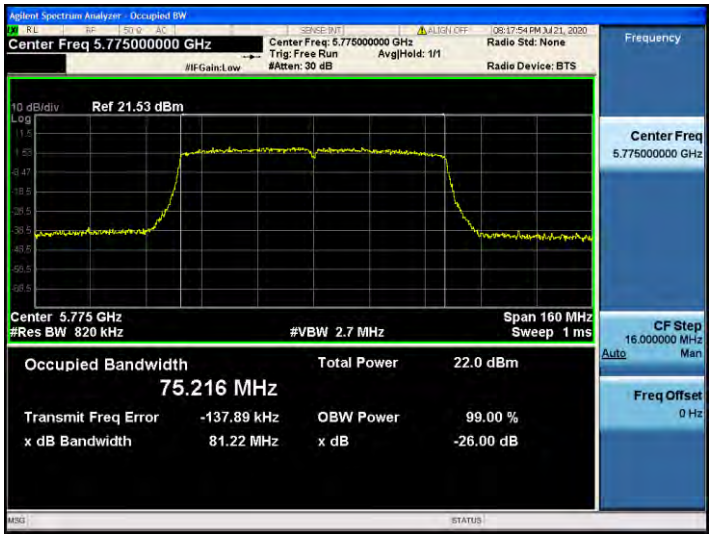
In order to simplify the report, attached plots were only the most wide channel.

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 102)	**802.11ac_VHT40 UNII 3 BAND 26dB Bandwidth (CH 159)**
	

▣ 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)**
	

10.3 6dB BANDWIDTH

[ANT.1]

802.11a Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.67	> 0.5	Pass
5785	157	15.56	> 0.5	Pass
5825	165	15.07	> 0.5	Pass

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.03	> 0.5	Pass
5785	157	16.30	> 0.5	Pass
5825	165	16.93	> 0.5	Pass

802.11n(HT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.23	> 0.5	Pass
5795	159	34.56	> 0.5	Pass

802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.54	> 0.5	Pass
5785	157	17.53	> 0.5	Pass
5825	165	17.57	> 0.5	Pass

802.11ac(VHT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.70	> 0.5	Pass
5795	159	35.16	> 0.5	Pass

802.11ac(VHT80) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	74.58	> 0.5	Pass

[ANT.2]

802.11a Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.69	> 0.5	Pass
5785	157	15.41	> 0.5	Pass
5825	165	15.38	> 0.5	Pass

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.23	> 0.5	Pass
5785	157	16.06	> 0.5	Pass
5825	165	16.81	> 0.5	Pass

802.11n(HT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.53	> 0.5	Pass
5795	159	35.08	> 0.5	Pass

802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.27	> 0.5	Pass
5785	157	16.55	> 0.5	Pass
5825	165	16.92	> 0.5	Pass

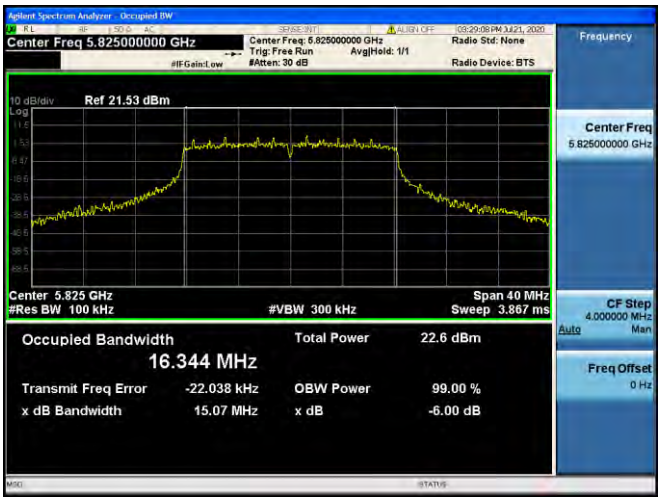
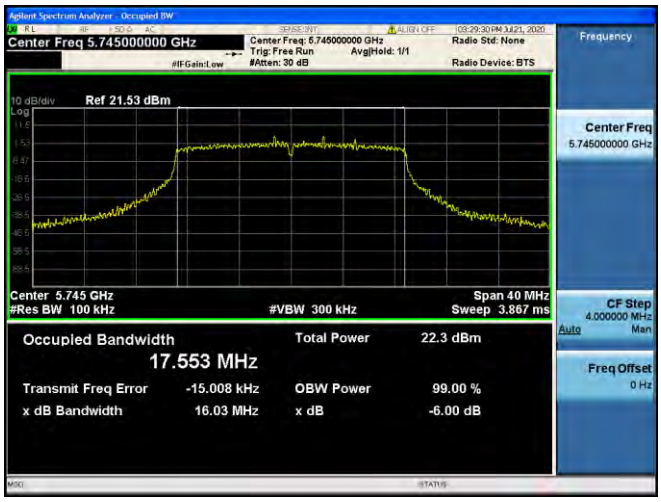
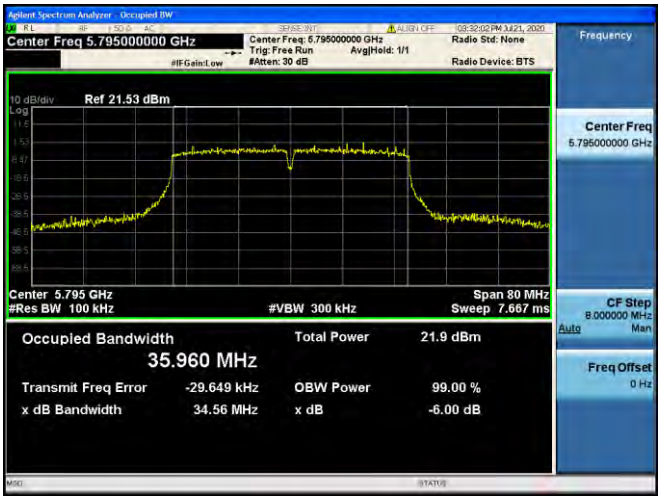
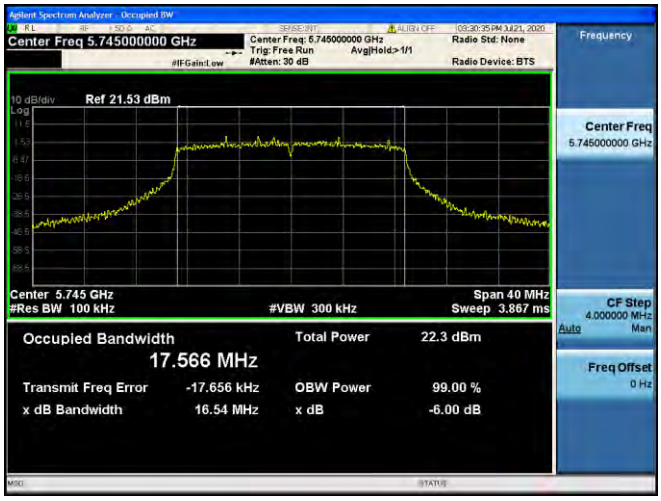
802.11ac(VHT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.98	> 0.5	Pass
5795	159	35.96	> 0.5	Pass

802.11ac(VHT80) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	70.87	> 0.5	Pass

[ANT.1]

▣ Test Plots

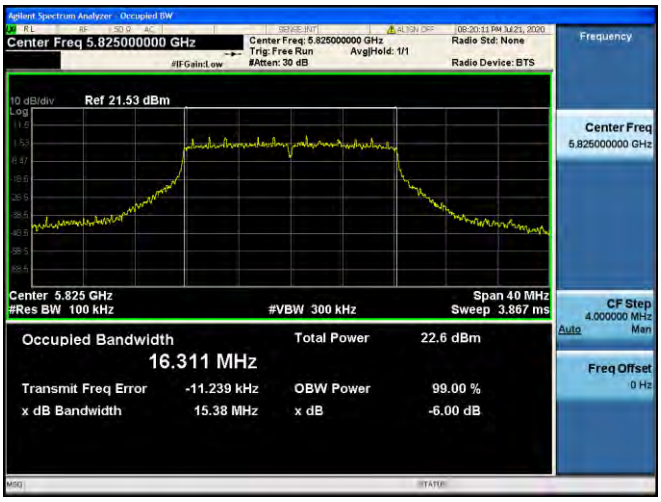
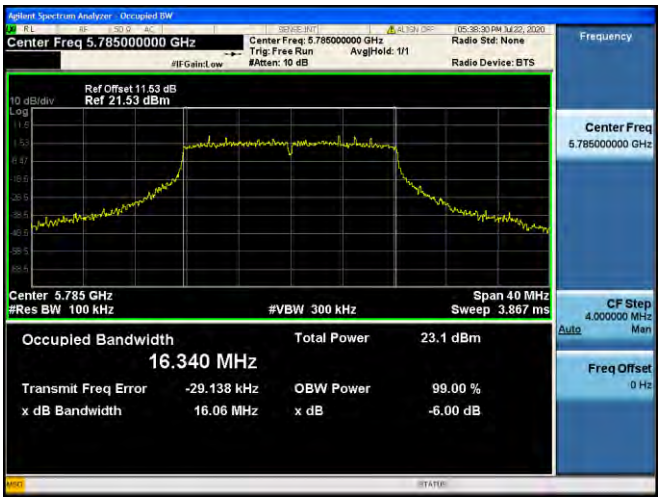
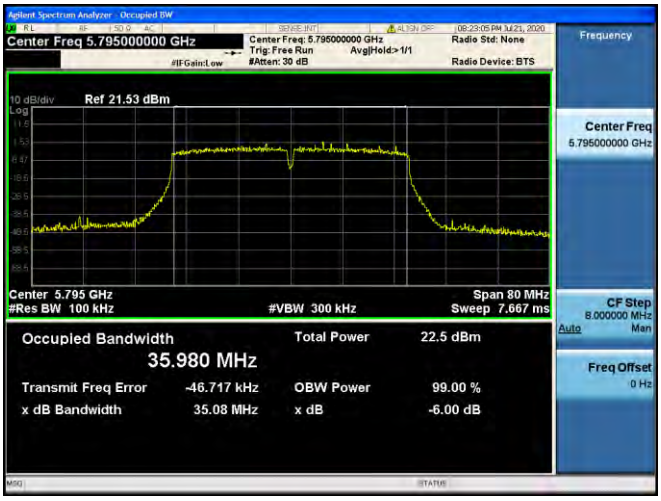
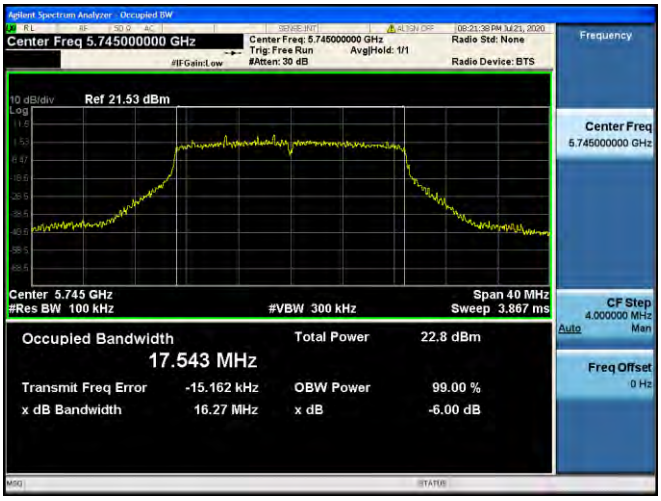
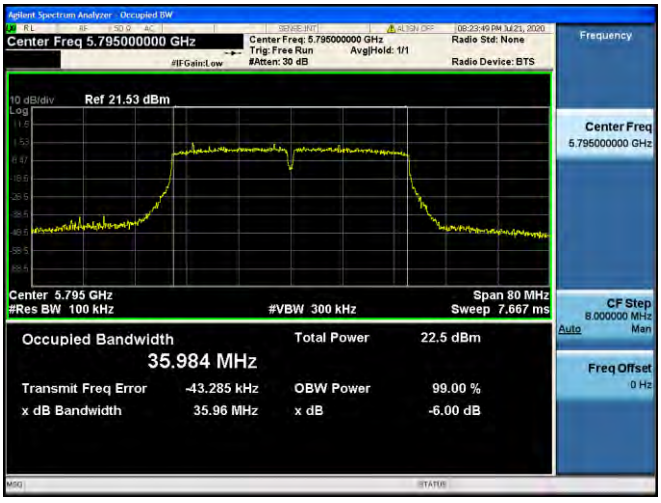
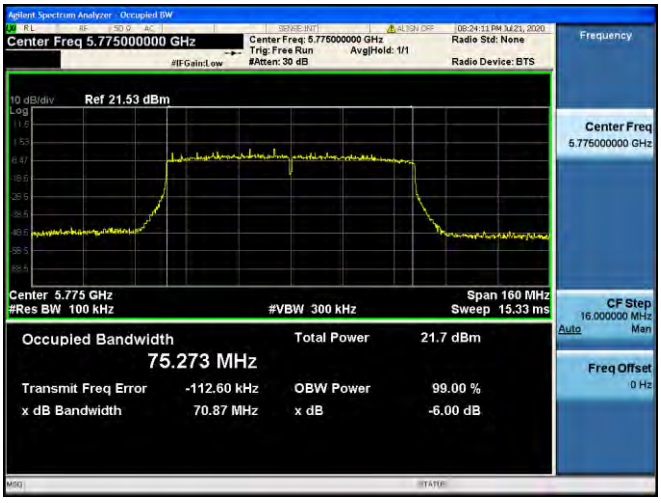
Note: In order to simplify the report, attached plots were only the most narrow channel.

802.11a (CH.165)	802.11n(HT20) (CH.149)
	
802.11n(HT40) (CH.159)	**802.11ac(VHT20) (CH.149)**
	
802.11ac(VHT40) (CH.159)	**802.11ac(VHT80) (CH.155)**
	

[ANT.2]

▣ Test Plots

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

802.11a (CH.165)	802.11n(HT20) (CH.157)
	
802.11n(HT40) (CH.159)	**802.11ac(VHT20) (CH.149)**
	
802.11ac(VHT40) (CH.159)	**802.11ac(VHT80) (CH.155)**
	

10.4 OUTPUT POWER MEASUREMENT

Straddle channel data in the table below are for reporting purposes only.

Straddle channel data were added in section 10.7.3.

[ANT.1]

802.11a Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	17	16.23	0.152	16.39	23.98
5200	40	17	16.29	0.152	16.45	23.98
5240	48	17	15.88	0.152	16.03	23.98
5260	52	17	16.24	0.152	16.40	23.88
5300	60	17	16.54	0.152	16.70	23.72
5320	64	17	16.31	0.152	16.46	23.76
5500	100	17	15.67	0.152	15.82	23.77
5600	120	17	15.21	0.152	15.36	23.71
5720	144	17	14.41	0.152	14.57	23.86
5745	149	19	16.02	0.152	16.18	30.00
5785	157	19	16.19	0.152	16.34	30.00
5825	165	19	15.93	0.152	16.08	30.00

802.11n(20MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	17	16.22	0.013	16.23	23.98
5200	40	17	16.27	0.013	16.28	23.98
5240	48	17	15.90	0.013	15.91	23.98
5260	52	17	16.24	0.013	16.26	23.98
5300	60	17	16.51	0.013	16.53	23.98
5320	64	17	16.26	0.013	16.27	23.98
5500	100	18	16.49	0.013	16.50	23.98
5600	120	18	15.88	0.013	15.89	23.98
5720	144	19	16.00	0.013	16.01	23.98
5745	149	19	16.03	0.013	16.04	30.00
5785	157	19	16.21	0.013	16.22	30.00
5825	165	19	15.94	0.013	15.96	30.00

802.11n(40MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5190	38	15	15.01	0.018	15.03	23.98
5230	46	15	14.57	0.018	14.59	23.98
5270	54	15	14.90	0.018	14.92	23.98
5310	62	15	14.93	0.018	14.95	23.98
5510	102	16	15.17	0.018	15.19	23.98
5590	118	16	14.64	0.018	14.66	23.98
5710	142	17	14.75	0.018	14.77	23.98
5755	151	17	15.04	0.018	15.06	30.00
5795	159	17	14.96	0.018	14.97	30.00

802.11ac(20MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	17	16.20	0.012	16.21	23.98
5200	40	17	16.28	0.012	16.29	23.98
5240	48	17	15.87	0.012	15.88	23.98
5260	52	17	16.24	0.012	16.25	23.98
5300	60	17	16.51	0.012	16.52	23.98
5320	64	17	16.24	0.012	16.25	23.98
5500	100	18	16.44	0.012	16.45	23.98
5600	120	18	15.92	0.012	15.93	23.98
5720	144	19	16.11	0.012	16.13	23.98
5745	149	19	16.16	0.012	16.17	30.00
5785	157	19	16.40	0.012	16.41	30.00
5825	165	19	16.13	0.012	16.14	30.00

802.11ac(40MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5190	38	15	15.12	0.012	15.13	23.98
5230	46	15	14.60	0.012	14.61	23.98
5270	54	15	14.97	0.012	14.99	23.98
5310	62	15	15.02	0.012	15.04	23.98
5510	102	16	15.15	0.012	15.16	23.98
5590	118	16	14.59	0.012	14.60	23.98
5710	142	17	14.74	0.012	14.75	23.98
5755	151	17	15.06	0.012	15.07	30.00
5795	159	17	14.95	0.012	14.96	30.00

802.11ac(80MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5210	42	14	13.86	0.013	13.87	23.98
5290	58	14	14.04	0.013	14.05	23.98
5530	106	15	13.91	0.013	13.93	23.98
5610	122	15	13.62	0.013	13.63	23.98
5690	138	15	13.08	0.013	13.09	23.98
5775	155	16	14.16	0.013	14.18	30.00

[ANT.2]

802.11a Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	17	16.66	0.152	16.81	23.98
5200	40	17	16.65	0.152	16.80	23.98
5240	48	17	16.04	0.152	16.19	23.98
5260	52	17	16.34	0.152	16.49	23.75
5300	60	17	16.83	0.152	16.98	23.76
5320	64	17	16.59	0.152	16.74	23.74
5500	100	17	15.82	0.152	15.97	23.89
5600	120	17	15.82	0.152	15.97	23.70
5720	144	17	15.22	0.152	15.37	23.91
5745	149	19	16.70	0.152	16.85	30.00
5785	157	19	16.82	0.152	16.97	30.00
5825	165	19	16.19	0.152	16.34	30.00

802.11n(20MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	17	16.78	0.013	16.79	23.98
5200	40	17	16.82	0.013	16.83	23.98
5240	48	17	16.18	0.013	16.19	23.98
5260	52	17	16.49	0.013	16.50	23.98
5300	60	17	16.97	0.013	16.98	23.95
5320	64	17	16.70	0.013	16.71	23.98
5500	100	18	16.98	0.013	16.99	23.98
5600	120	18	16.98	0.013	16.99	23.98
5720	144	19	16.97	0.013	16.99	23.98
5745	149	19	16.68	0.013	16.69	30.00
5785	157	19	16.91	0.013	16.92	30.00
5825	165	19	16.19	0.013	16.20	30.00

802.11n(40MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5190	38	15	15.46	0.018	15.47	23.98
5230	46	15	14.79	0.018	14.81	23.98
5270	54	15	15.09	0.018	15.10	23.98
5310	62	15	15.38	0.018	15.40	23.98
5510	102	16	15.75	0.018	15.77	23.98
5590	118	16	15.42	0.018	15.44	23.98
5710	142	17	15.76	0.018	15.77	23.98
5755	151	17	15.42	0.018	15.44	30.00
5795	159	17	15.57	0.018	15.59	30.00

802.11ac(20MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	17	16.76	0.012	16.77	23.98
5200	40	17	16.79	0.012	16.81	23.98
5240	48	17	16.18	0.012	16.19	23.98
5260	52	17	16.47	0.012	16.49	23.98
5300	60	17	16.98	0.012	16.99	23.98
5320	64	17	16.70	0.012	16.71	23.98
5500	100	18	16.97	0.012	16.98	23.91
5600	120	18	16.97	0.012	16.98	23.98
5720	144	19	16.96	0.012	16.97	23.98
5745	149	19	16.66	0.012	16.67	30.00
5785	157	19	16.92	0.012	16.93	30.00
5825	165	19	16.20	0.012	16.21	30.00

802.11ac(40MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5190	38	15	15.41	0.018	15.43	23.98
5230	46	15	14.77	0.018	14.79	23.98
5270	54	15	15.06	0.018	15.08	23.98
5310	62	15	15.36	0.018	15.38	23.98
5510	102	16	15.69	0.018	15.71	23.98
5590	118	16	15.41	0.018	15.43	23.98
5710	142	17	15.74	0.018	15.76	23.98
5755	151	17	15.42	0.018	15.44	30.00
5795	159	17	15.56	0.018	15.58	30.00

802.11ac(80MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5210	42	14	14.23	0.013	14.24	23.98
5290	58	14	14.41	0.013	14.42	23.98
5530	106	15	14.79	0.013	14.81	23.98
5610	122	15	14.69	0.013	14.70	23.98
5690	138	15	14.21	0.013	14.22	23.98
5775	155	16	14.58	0.013	14.59	30.00

[MIMO]

802.11a Mode		Power Level Setting	Ant.1 Measured Power (dBm) + Duty Cycle Factor	Ant.2 Measured Power (dBm) + Duty Cycle Factor	MIMO Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	17	16.39	16.81	19.61	23.98
5200	40	17	16.45	16.80	19.64	23.98
5240	48	17	16.03	16.19	19.12	23.98
5260	52	17	16.40	16.49	19.45	23.75
5300	60	17	16.70	16.98	19.85	23.72
5320	64	17	16.46	16.74	19.61	23.74
5500	100	17	15.82	15.97	18.91	23.77
5600	120	17	15.36	15.97	18.69	23.70
5720	144	17	14.57	15.37	18.00	23.86
5745	149	19	16.18	16.85	19.54	30.00
5785	157	19	16.34	16.97	19.68	30.00
5825	165	19	16.08	16.34	19.22	30.00

802.11n(20MHz) Mode		Power Level Setting	Ant.1 Measured Power (dBm) + Duty Cycle Factor	Ant.2 Measured Power (dBm) + Duty Cycle Factor	MIMO Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	17	16.23	16.79	19.53	23.98
5200	40	17	16.28	16.83	19.57	23.98
5240	48	17	15.91	16.19	19.06	23.98
5260	52	17	16.26	16.50	19.39	23.98
5300	60	17	16.53	16.98	19.77	23.95
5320	64	17	16.27	16.71	19.51	23.98
5500	100	18	16.50	16.99	19.76	23.98
5600	120	18	15.89	16.99	19.49	23.98
5720	144	19	16.01	16.99	19.53	23.98
5745	149	19	16.04	16.69	19.39	30.00
5785	157	19	16.22	16.92	19.59	30.00
5825	165	19	15.96	16.20	19.09	30.00

802.11n(40MHz) Mode		Power Level Setting	Ant.1 Measured Power (dBm) + Duty Cycle Factor	Ant.2 Measured Power (dBm) + Duty Cycle Factor	MIMO Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5190	38	15	15.03	15.47	18.27	23.98
5230	46	15	14.59	14.81	17.71	23.98
5270	54	15	14.92	15.10	18.02	23.98
5310	62	15	14.95	15.40	18.19	23.98
5510	102	16	15.19	15.77	18.50	23.98
5590	118	16	14.66	15.44	18.08	23.98
5710	142	17	14.77	15.77	18.31	23.98
5755	151	17	15.06	15.44	18.26	30.00
5795	159	17	14.97	15.59	18.30	30.00

802.11ac(20MHz) Mode		Power Level Setting	Ant.1 Measured Power (dBm) + Duty Cycle Factor	Ant.2 Measured Power (dBm) + Duty Cycle Factor	MIMO Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	17	16.21	16.77	19.51	23.98
5200	40	17	16.29	16.81	19.57	23.98
5240	48	17	15.88	16.19	19.05	23.98
5260	52	17	16.25	16.49	19.38	23.98
5300	60	17	16.52	16.99	19.77	23.98
5320	64	17	16.25	16.71	19.50	23.98
5500	100	18	16.45	16.98	19.74	23.91
5600	120	18	15.93	16.98	19.50	23.98
5720	144	19	16.13	16.97	19.58	23.98
5745	149	19	16.17	16.67	19.44	30.00
5785	157	19	16.41	16.93	19.69	30.00
5825	165	19	16.14	16.21	19.19	30.00

802.11ac(40MHz) Mode		Power Level Setting	Ant.1 Measured Power (dBm) + Duty Cycle Factor	Ant.2 Measured Power (dBm) + Duty Cycle Factor	MIMO Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5190	38	15	15.13	15.43	18.29	23.98
5230	46	15	14.61	14.79	17.71	23.98
5270	54	15	14.99	15.08	18.04	23.98
5310	62	15	15.04	15.38	18.22	23.98
5510	102	16	15.16	15.71	18.46	23.98
5590	118	16	14.60	15.43	18.04	23.98
5710	142	17	14.75	15.76	18.29	23.98
5755	151	17	15.07	15.44	18.27	30.00
5795	159	17	14.96	15.58	18.29	30.00

802.11ac(80MHz) Mode		Power Level Setting	Ant.1 Measured Power (dBm) + Duty Cycle Factor	Ant.2 Measured Power (dBm) + Duty Cycle Factor	MIMO Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5210	42	14	13.87	14.24	17.07	23.98
5290	58	14	14.05	14.42	17.25	23.98
5530	106	15	13.93	14.81	17.40	23.98
5610	122	15	13.63	14.70	17.21	23.98
5690	138	15	13.09	14.22	16.70	23.98
5775	155	16	14.18	14.59	17.40	30.00

10.5 POWER SPECTRAL DENSITY

[ANT.1]

802.11a Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	5.666	0.152	5.818	11 dBm/MHz
5200	40	5.819	0.152	5.971	
5240	48	5.116	0.152	5.268	
5260	52	5.588	0.152	5.740	
5300	60	6.007	0.152	6.159	
5320	64	5.699	0.152	5.851	
5500	100	4.994	0.152	5.146	
5600	120	4.218	0.152	4.370	
5720	144	3.522	0.152	3.674	
5745	149	2.621	0.152	2.773	30 dBm/500kHz
5785	157	2.703	0.152	2.855	
5825	165	2.467	0.152	2.619	

802.11n(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	5.028	0.013	5.041	11 dBm/MHz
5200	40	5.171	0.013	5.184	
5240	48	4.756	0.013	4.769	
5260	52	5.088	0.013	5.101	
5300	60	5.252	0.013	5.265	
5320	64	5.016	0.013	5.029	
5500	100	5.387	0.013	5.400	
5600	120	4.581	0.013	4.594	
5720	144	4.739	0.013	4.752	
5745	149	2.082	0.013	2.095	30 dBm/500kHz
5785	157	2.114	0.013	2.127	
5825	165	1.928	0.013	1.941	

802.11n(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5190	38	1.085	0.018	1.103	11 dBm/MHz
5230	46	0.661	0.018	0.679	
5270	54	0.803	0.018	0.821	
5310	62	0.896	0.018	0.914	
5510	102	0.926	0.018	0.944	
5590	118	0.556	0.018	0.574	
5710	142	0.639	0.018	0.657	
5755	151	-1.836	0.018	-1.818	30 dBm /500kHz
5795	159	-1.835	0.018	-1.817	

802.11ac(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	5.220	0.012	5.232	11 dBm/MHz
5200	40	5.399	0.012	5.411	
5240	48	4.826	0.012	4.838	
5260	52	5.286	0.012	5.298	
5300	60	5.190	0.012	5.202	
5320	64	5.105	0.012	5.117	
5500	100	5.294	0.012	5.306	
5600	120	5.000	0.012	5.012	
5720	144	4.691	0.012	4.703	
5745	149	2.002	0.012	2.014	30 dBm/500kHz
5785	157	2.251	0.012	2.263	
5825	165	1.800	0.012	1.812	

802.11ac(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5190	38	0.975	0.012	0.987	11 dBm/MHz
5230	46	0.695	0.012	0.707	
5270	54	1.033	0.012	1.045	
5310	62	0.954	0.012	0.966	
5510	102	0.981	0.012	0.993	
5590	118	0.617	0.012	0.629	
5710	142	0.606	0.012	0.618	
5755	151	-1.913	0.012	-1.901	30 dBm/500kHz
5795	159	-1.971	0.012	-1.959	

802.11ac(80MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5210	42	-3.373	0.013	-3.360	11 dBm/MHz
5290	58	-2.914	0.013	-2.901	
5530	106	-3.428	0.013	-3.415	
5610	122	-3.636	0.013	-3.623	
5690	138	-4.027	0.013	-4.014	
5775	155	-6.040	0.013	-6.027	30 dBm/500kHz

[ANT.2]

802.11a Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	6.007	0.152	6.159	11 dBm/MHz
5200	40	6.057	0.152	6.209	
5240	48	5.464	0.152	5.616	
5260	52	5.740	0.152	5.892	
5300	60	6.395	0.152	6.547	
5320	64	5.986	0.152	6.138	
5500	100	5.619	0.152	5.771	
5600	120	5.365	0.152	5.517	
5720	144	4.461	0.152	4.613	
5745	149	3.194	0.152	3.346	30 dBm/500kHz
5785	157	3.825	0.152	3.977	
5825	165	2.668	0.152	2.820	

802.11n(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	5.588	0.013	5.601	11 dBm/MHz
5200	40	5.522	0.013	5.535	
5240	48	4.886	0.013	4.899	
5260	52	5.387	0.013	5.400	
5300	60	5.755	0.013	5.768	
5320	64	5.503	0.013	5.516	
5500	100	5.968	0.013	5.981	
5600	120	5.896	0.013	5.909	
5720	144	5.630	0.013	5.643	
5745	149	2.885	0.013	2.898	30 dBm/500kHz
5785	157	2.799	0.013	2.812	
5825	165	2.291	0.013	2.304	

802.11n(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5190	38	1.631	0.018	1.649	11 dBm/MHz
5230	46	0.764	0.018	0.782	
5270	54	0.957	0.018	0.975	
5310	62	1.504	0.018	1.522	
5510	102	1.647	0.018	1.665	
5590	118	1.495	0.018	1.513	
5710	142	1.808	0.018	1.826	
5755	151	-1.592	0.018	-1.574	30 dBm /500kHz
5795	159	-1.162	0.018	-1.144	

802.11ac(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	5.625	0.012	5.637	11 dBm/MHz
5200	40	5.655	0.012	5.667	
5240	48	4.801	0.012	4.813	
5260	52	5.299	0.012	5.311	
5300	60	5.721	0.012	5.733	
5320	64	5.464	0.012	5.476	
5500	100	5.724	0.012	5.736	
5600	120	5.737	0.012	5.749	
5720	144	5.689	0.012	5.701	
5745	149	2.763	0.012	2.775	30 dBm/500kHz
5785	157	2.809	0.012	2.821	
5825	165	1.883	0.012	1.895	

802.11ac(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5190	38	1.440	0.018	1.458	11 dBm/MHz
5230	46	0.799	0.018	0.817	
5270	54	0.904	0.018	0.922	
5310	62	1.286	0.018	1.304	
5510	102	1.749	0.018	1.767	
5590	118	1.344	0.018	1.362	
5710	142	1.822	0.018	1.840	
5755	151	-1.596	0.018	-1.578	30 dBm/500kHz
5795	159	-1.360	0.018	-1.342	

802.11ac(80MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5210	42	-2.686	0.013	-2.673	11 dBm/MHz
5290	58	-2.630	0.013	-2.617	
5530	106	-2.158	0.013	-2.145	
5610	122	-2.524	0.013	-2.511	
5690	138	-2.883	0.013	-2.870	
5775	155	-5.476	0.013	-5.463	30 dBm/500kHz

[MIMO]

802.11a Mode		ANT.1 Measured Power(dBm) + Duty Cycle Factor (dB)	ANT.2 Measured Power(dBm) + Duty Cycle Factor (dB)	MIMO Result (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.				
5180	36	5.818	6.159	9.003	11 dBm/MHz
5200	40	5.971	6.209	9.102	
5240	48	5.268	5.616	8.456	
5260	52	5.740	5.892	8.827	
5300	60	6.159	6.547	9.368	
5320	64	5.851	6.138	9.008	
5500	100	5.146	5.771	8.480	
5600	120	4.370	5.517	7.992	
5720	144	3.674	4.613	7.180	
5745	149	2.773	3.346	6.080	30 dBm/500kHz
5785	157	2.855	3.977	6.463	
5825	165	2.619	2.820	5.731	

802.11n(20MHz) Mode		ANT.1 Measured Power(dBm) + Duty Cycle Factor (dB)	ANT.2 Measured Power(dBm) + Duty Cycle Factor (dB)	MIMO Result (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.				
5180	36	5.041	5.601	8.340	11 dBm/MHz
5200	40	5.184	5.535	8.373	
5240	48	4.769	4.899	7.845	
5260	52	5.101	5.400	8.263	
5300	60	5.265	5.768	8.534	
5320	64	5.029	5.516	8.289	
5500	100	5.400	5.981	8.710	
5600	120	4.594	5.909	8.311	
5720	144	4.752	5.643	8.230	
5745	149	2.095	2.898	5.525	30 dBm/500kHz
5785	157	2.127	2.812	5.493	
5825	165	1.941	2.304	5.136	

802.11n(40MHz) Mode		ANT.1 Measured Power(dBm) + Duty Cycle Factor (dB)	ANT.2 Measured Power(dBm) + Duty Cycle Factor (dB)	MIMO Result (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.				
5190	38	1.103	1.649	4.395	11 dBm/MHz
5230	46	0.679	0.782	3.741	
5270	54	0.821	0.975	3.909	
5310	62	0.914	1.522	4.239	
5510	102	0.944	1.665	4.330	
5590	118	0.574	1.513	4.080	
5710	142	0.657	1.826	4.291	
5755	151	-1.818	-1.574	1.316	30 dBm /500kHz
5795	159	-1.817	-1.144	1.543	

802.11ac(20MHz) Mode		ANT.1 Measured Power(dBm) + Duty Cycle Factor (dB)	ANT.2 Measured Power(dBm) + Duty Cycle Factor (dB)	MIMO Result (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.				
5180	36	5.232	5.637	8.449	11 dBm/MHz
5200	40	5.411	5.667	8.551	
5240	48	4.838	4.813	7.836	
5260	52	5.298	5.311	8.315	
5300	60	5.202	5.733	8.486	
5320	64	5.117	5.476	8.310	
5500	100	5.306	5.736	8.537	
5600	120	5.012	5.749	8.406	
5720	144	4.703	5.701	8.241	
5745	149	2.014	2.775	5.421	30 dBm/500kHz
5785	157	2.263	2.821	5.561	
5825	165	1.812	1.895	4.864	

802.11ac(40MHz) Mode		ANT.1 Measured Power(dBm) + Duty Cycle Factor (dB)	ANT.2 Measured Power(dBm) + Duty Cycle Factor (dB)	MIMO Result (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.				
5190	38	0.987	1.458	4.239	11 dBm/MHz
5230	46	0.707	0.817	3.773	
5270	54	1.045	0.922	3.994	
5310	62	0.966	1.304	4.149	
5510	102	0.993	1.767	4.408	
5590	118	0.629	1.362	4.021	
5710	142	0.618	1.840	4.282	
5755	151	-1.901	-1.578	1.274	30 dBm /500kHz
5795	159	-1.959	-1.342	1.371	

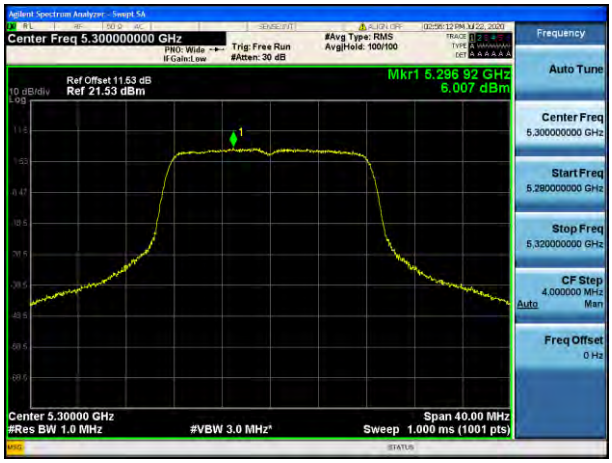
802.11ac(80MHz) Mode		ANT.1 Measured Power(dBm) + Duty Cycle Factor (dB)	ANT.2 Measured Power(dBm) + Duty Cycle Factor (dB)	MIMO Result (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.				
5210	42	-3.360	-2.673	0.007	11 dBm/MHz
5290	58	-2.901	-2.617	0.253	
5530	106	-3.415	-2.145	0.276	
5610	122	-3.623	-2.511	-0.021	
5690	138	-4.014	-2.870	-0.394	
5775	155	-6.027	-5.463	-2.726	30 dBm /500kHz

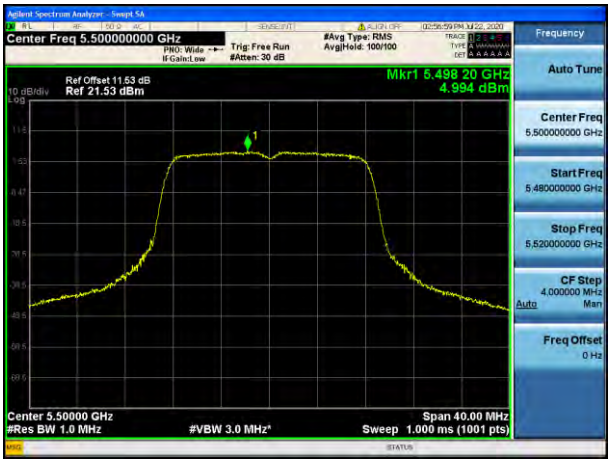
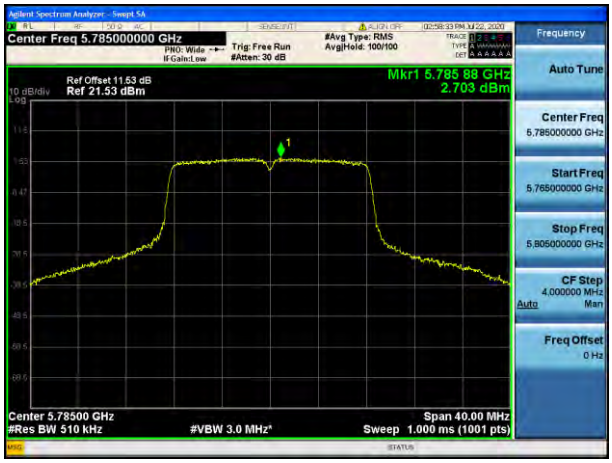
[ANT.1]

▣ Test Plots(802.11a)

Note:

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

UNII 1 (Ch. 40)	UNII 2A (Ch. 60)
	

UNII 2C (Ch. 100)	UNII 3 (Ch. 157)
	

▣ Test Plots(802.11n(HT20))

Note:

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

UNII 1 (Ch. 40)	UNII 2A (Ch. 60)
	

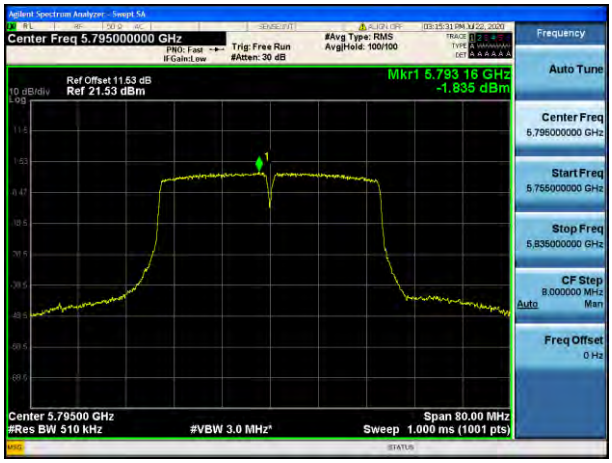
UNII 2C (Ch. 100)	UNII 3 (Ch. 157)
	

▣ Test Plots(802.11n(HT40))

Note:

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

UNII 1 (Ch. 38)	UNII 2A (Ch. 62)
	

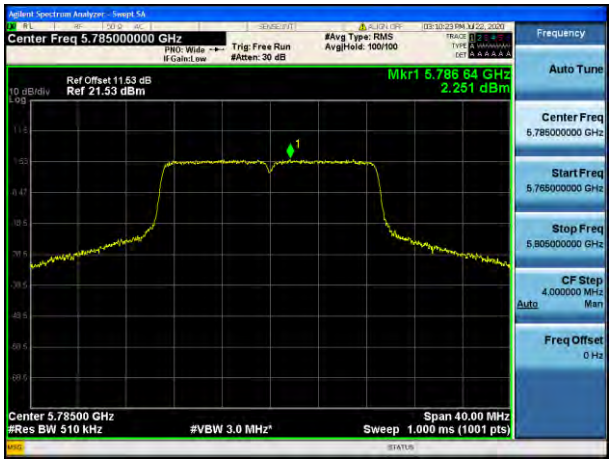
UNII 2C (Ch. 102)	UNII 3 (Ch. 159)
	

▣ Test Plots(802.11ac(VHT20))

Note:

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

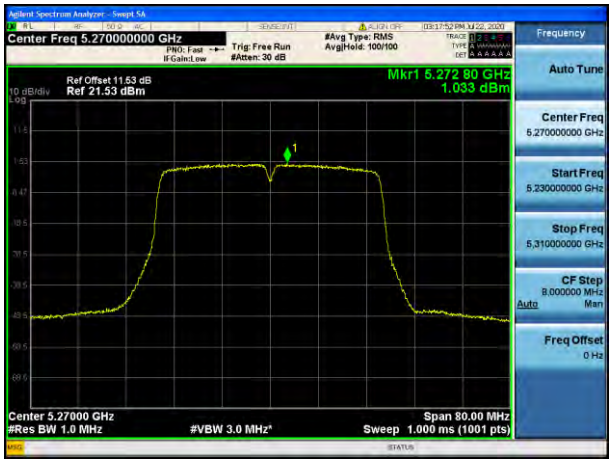
UNII 1 (Ch. 40)	UNII 2A (Ch. 52)
	

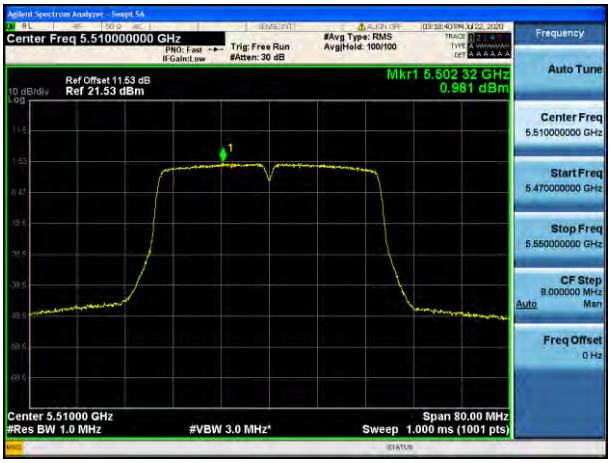
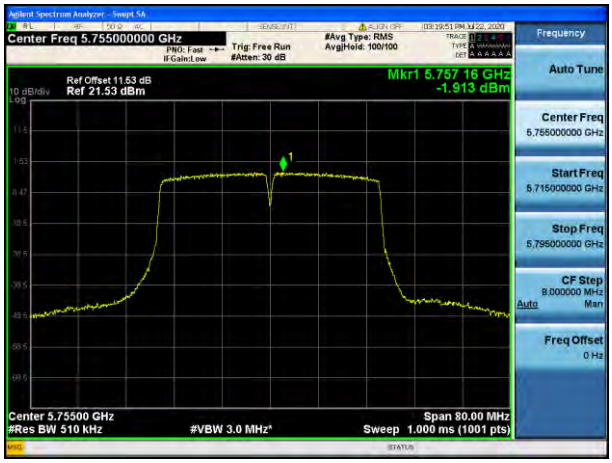
UNII 2C (Ch. 100)	UNII 3 (Ch. 157)
	

▣ Test Plots(802.11ac(VHT40))

Note:

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

UNII 1 (Ch. 38)	UNII 2A (Ch. 54)
	

UNII 2C (Ch. 102)	UNII 3 (Ch. 151)
	

▣ 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)
	

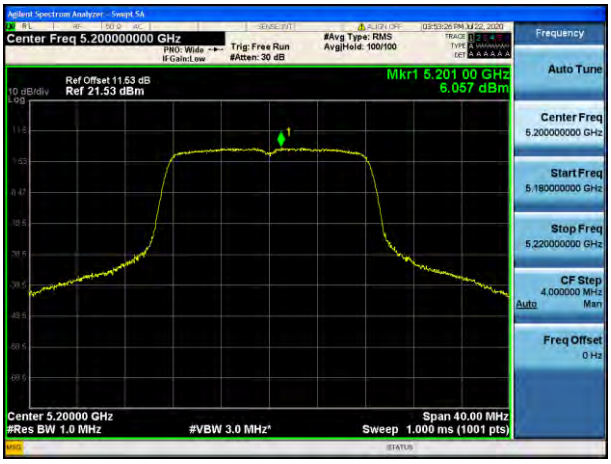
UNII 2C (Ch. 106)	UNII 3 (Ch. 155)
	

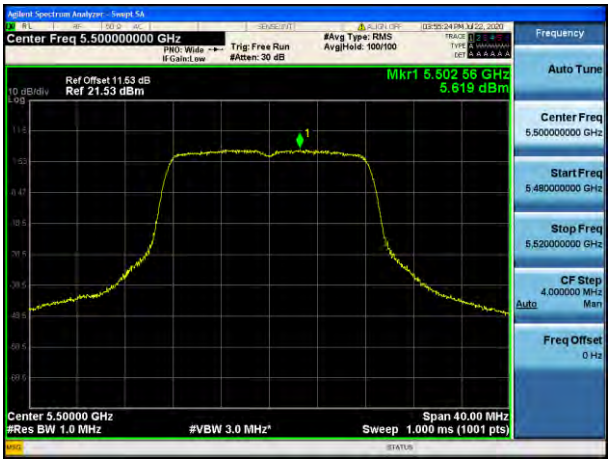
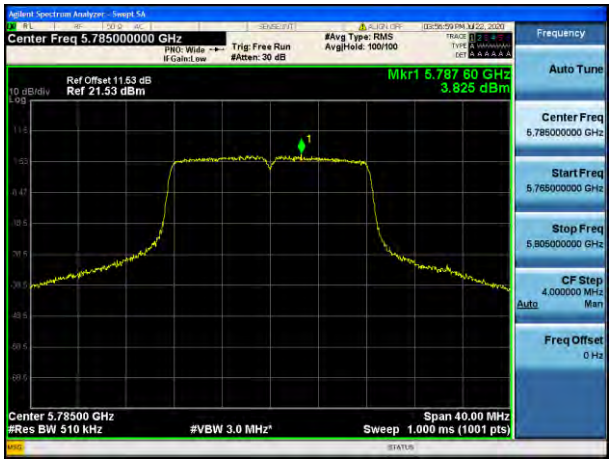
[ANT.2]

▣ Test Plots(802.11a)

Note:

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

UNII 1 (Ch. 40)	UNII 2A (Ch. 60)
	

UNII 2C (Ch. 100)	UNII 3 (Ch. 157)
	

▣ Test Plots(802.11n(HT20))

Note:

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

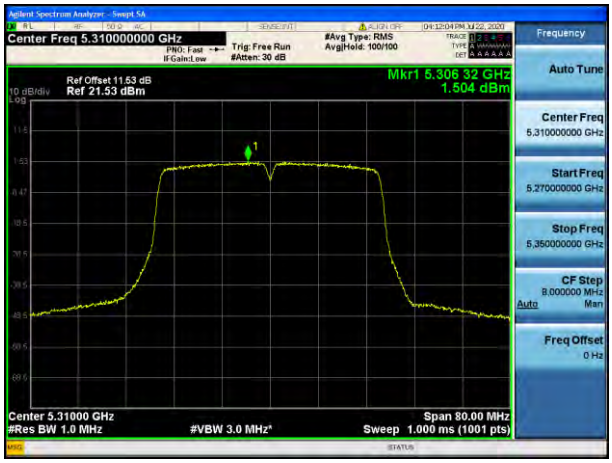
UNII 1 (Ch. 36)	UNII 2A (Ch. 60)
	

UNII 2C (Ch. 100)	UNII 3 (Ch. 149)
	

▣ Test Plots(802.11n(HT40))

Note:

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

UNII 1 (Ch. 38)	UNII 2A (Ch. 62)
	

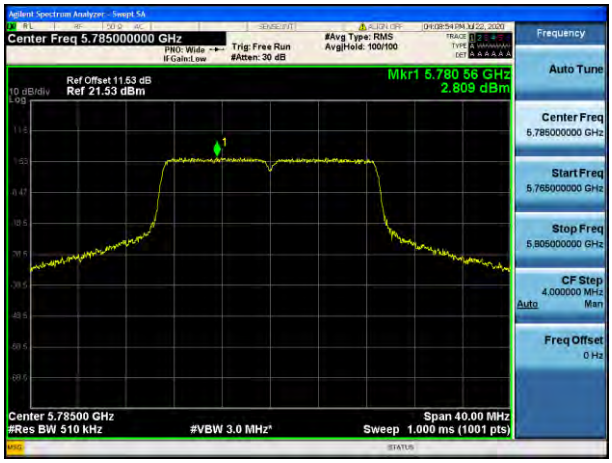
UNII 2C (Ch. 142)	UNII 3 (Ch. 159)
	

▣ Test Plots(802.11ac(VHT20))

Note:

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

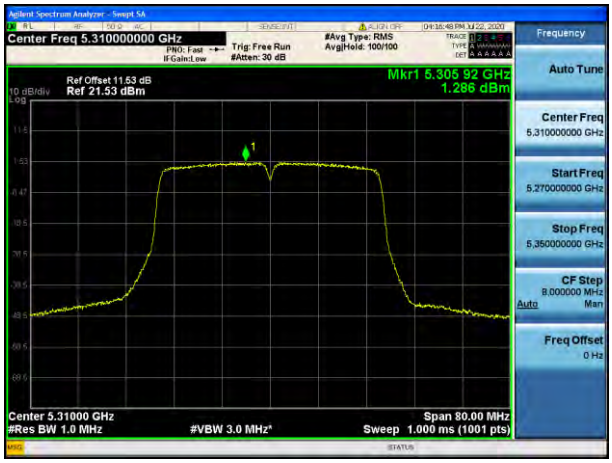
UNII 1 (Ch. 40)	UNII 2A (Ch. 60)
	

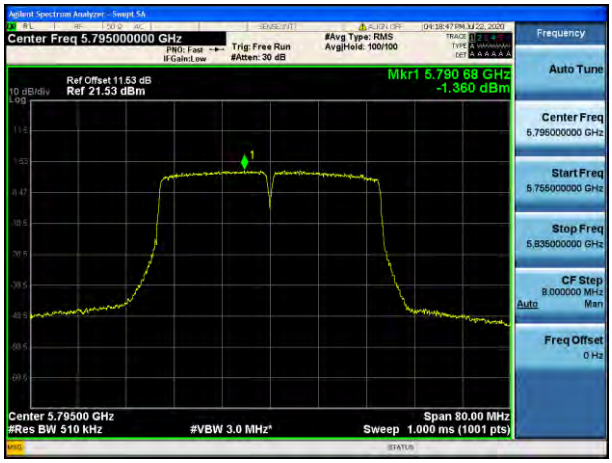
UNII 2C (Ch. 120)	UNII 3 (Ch. 157)
	

▣ Test Plots(802.11ac(VHT40))

Note:

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

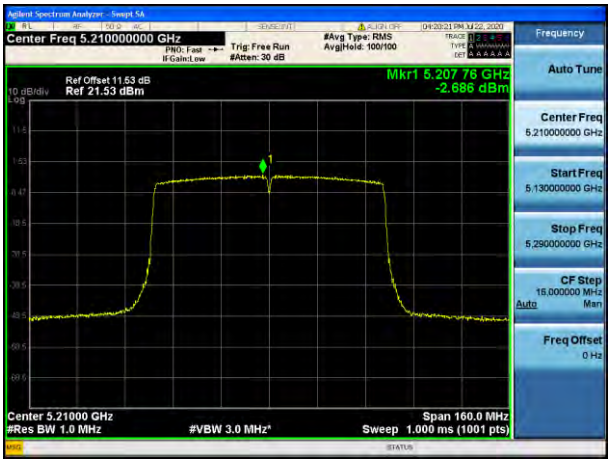
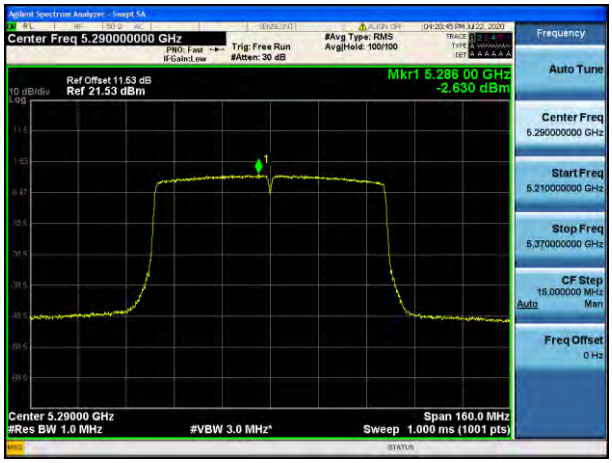
UNII 1 (Ch. 38)	UNII 2A (Ch. 62)
	

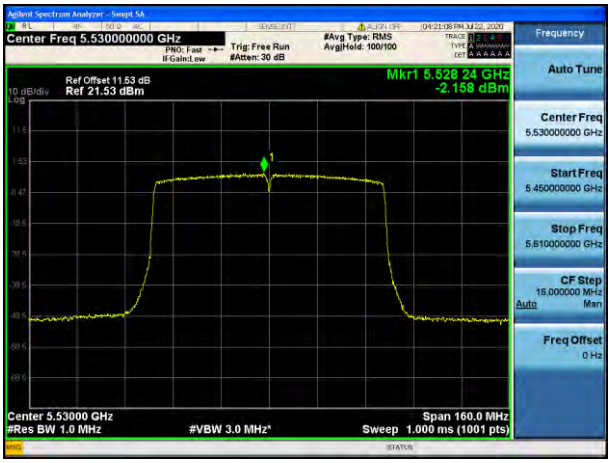
UNII 2C (Ch. 142)	UNII 3 (Ch. 159)
	

▣ 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. 106)	UNII 3 (Ch. 155)
	

10.6 FREQUENCY STABILITY.

10.6.1 80MHz BW

[ANT.1]

Startup after the EUT is energized

OPERATING BAND: UNII Band 1
OPERATING FREQUENCY: 5,210,000,000 Hz
CHANNEL: 42
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5210063.26	63.26
100%		-30	5210023.68	23.68
100%		-20	5210056.98	56.98
100%		-10	5210005.69	5.69
100%		0	5210074.58	74.58
100%		+10	5210088.42	88.42
100%		+30	5210029.42	29.42
100%		+40	5210053.92	53.92
100%		+50	5210008.55	8.55
Batt. Endpoint	3.40	+20	5210059.37	59.37

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2A
OPERATING FREQUENCY: 5,290,000,000 Hz
CHANNEL: 58
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5290044.38	44.38
100%		-30	5290098.38	98.38
100%		-20	5290031.59	31.59
100%		-10	5290064.79	64.79
100%		0	5290054.79	54.79
100%		+10	5290074.26	74.26
100%		+30	5290082.02	82.02
100%		+40	5290082.08	82.08
100%		+50	5290052.68	52.68
Batt. Endpoint	3.40	+20	5290055.15	55.15

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2C
OPERATING FREQUENCY: 5,530,000,000 Hz
CHANNEL: 106
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5530011.45	11.45
100%		-30	5530055.84	55.84
100%		-20	5530077.42	77.42
100%		-10	5530009.26	9.26
100%		0	5530047.60	47.6
100%		+10	5530092.38	92.38
100%		+30	5530079.40	79.4
100%		+40	5530087.74	87.74
100%		+50	5530037.13	37.13
Batt. Endpoint	3.40	+20	5530023.45	23.45

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 3
OPERATING FREQUENCY: 5,775,000,000 Hz
CHANNEL: 155
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5775087.05	87.05
100%		-30	5775072.51	72.51
100%		-20	5775007.49	7.49
100%		-10	5775014.67	14.67
100%		0	5775063.67	63.67
100%		+10	5775081.79	81.79
100%		+30	5775027.52	27.52
100%		+40	5775051.06	51.06
100%		+50	5775058.56	58.56
Batt. Endpoint	3.40	+20	5775043.63	43.63

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

2 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5210089.45	89.45
100%		-30	5210040.37	40.37
100%		-20	5210070.18	70.18
100%		-10	5210062.63	62.63
100%		0	5210021.69	21.69
100%		+10	5210070.44	70.44
100%		+30	5210044.95	44.95
100%		+40	5210089.94	89.94
100%		+50	5210047.18	47.18
Batt. Endpoint	3.40	+20	5210062.45	62.45

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2A
OPERATING FREQUENCY: 5,290,000,000 Hz
CHANNEL: 58
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5290033.20	33.20
100%		-30	5290064.90	64.90
100%		-20	5290074.06	74.06
100%		-10	5290080.93	80.93
100%		0	5290076.19	76.19
100%		+10	5290006.12	6.12
100%		+30	5290023.99	23.99
100%		+40	5290063.21	63.21
100%		+50	5290043.99	43.99
Batt. Endpoint	3.40	+20	5290093.03	93.03

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2C
OPERATING FREQUENCY: 5,530,000,000 Hz
CHANNEL: 106
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5530007.06	7.06
100%		-30	5530028.33	28.33
100%		-20	5530006.72	6.72
100%		-10	5530052.58	52.58
100%		0	5530048.81	48.81
100%		+10	5530039.77	39.77
100%		+30	5530034.88	34.88
100%		+40	5530093.08	93.08
100%		+50	5530035.09	35.09
Batt. Endpoint	3.40	+20	5530066.94	66.94

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 3
OPERATING FREQUENCY: 5,775,000,000 Hz
CHANNEL: 155
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5775033.34	33.34
100%		-30	5775033.45	33.45
100%		-20	5775067.42	67.42
100%		-10	5775073.86	73.86
100%		0	5775031.04	31.04
100%		+10	5775002.21	2.21
100%		+30	5775046.48	46.48
100%		+40	5775052.29	52.29
100%		+50	5775051.82	51.82
Batt. Endpoint	3.40	+20	5775037.62	37.62

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

5 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5210094.89	94.89
100%		-30	5210016.42	16.42
100%		-20	5210022.16	22.16
100%		-10	5210081.55	81.55
100%		0	5210045.83	45.83
100%		+10	5210034.95	34.95
100%		+30	5210064.92	64.92
100%		+40	5210090.31	90.31
100%		+50	5210057.77	57.77
Batt. Endpoint	3.40	+20	5210075.12	75.12

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2A
OPERATING FREQUENCY: 5,290,000,000 Hz
CHANNEL: 58
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5290069.50	69.50
100%		-30	5290022.03	22.03
100%		-20	5290082.92	82.92
100%		-10	5290040.56	40.56
100%		0	5290027.51	27.51
100%		+10	5290051.55	51.55
100%		+30	5290052.80	52.8
100%		+40	5290035.46	35.46
100%		+50	5290048.87	48.87
Batt. Endpoint	3.40	+20	5290018.31	18.31

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2C
OPERATING FREQUENCY: 5,530,000,000 Hz
CHANNEL: 106
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5530083.93	83.93
100%		-30	5530081.72	81.72
100%		-20	5530016.91	16.91
100%		-10	5530048.85	48.85
100%		0	5530032.36	32.36
100%		+10	5530039.43	39.43
100%		+30	5530057.25	57.25
100%		+40	5530052.30	52.3
100%		+50	5530034.31	34.31
Batt. Endpoint	3.40	+20	5530034.30	34.3

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 3
OPERATING FREQUENCY: 5,775,000,000 Hz
CHANNEL: 155
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5775014.11	14.11
100%		-30	5775065.97	65.97
100%		-20	5775099.23	99.23
100%		-10	5775008.22	8.22
100%		0	5775020.66	20.66
100%		+10	5775056.04	56.04
100%		+30	5775065.84	65.84
100%		+40	5775068.26	68.26
100%		+50	5775051.89	51.89
Batt. Endpoint	3.40	+20	5775054.65	54.65

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

10 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5210007.71	7.71
100%		-30	5210071.63	71.63
100%		-20	5210045.55	45.55
100%		-10	5210062.96	62.96
100%		0	5210067.83	67.83
100%		+10	5210076.69	76.69
100%		+30	5210099.96	99.96
100%		+40	5210004.30	4.30
100%		+50	5210036.52	36.52
Batt. Endpoint	3.40	+20	5210091.20	91.20

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2A
OPERATING FREQUENCY: 5,290,000,000 Hz
CHANNEL: 58
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5290068.10	68.10
100%		-30	5290010.60	10.60
100%		-20	5290063.94	63.94
100%		-10	5290035.03	35.03
100%		0	5290068.47	68.47
100%		+10	5290098.76	98.76
100%		+30	5290099.85	99.85
100%		+40	5290048.73	48.73
100%		+50	5290070.77	70.77
Batt. Endpoint	3.40	+20	5290086.17	86.17

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2C
OPERATING FREQUENCY: 5,530,000,000 Hz
CHANNEL: 106
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5530065.77	65.77
100%		-30	5530097.36	97.36
100%		-20	5530095.02	95.02
100%		-10	5530075.90	75.9
100%		0	5530065.88	65.88
100%		+10	5530033.07	33.07
100%		+30	5530083.21	83.21
100%		+40	5530048.37	48.37
100%		+50	5530053.97	53.97
Batt. Endpoint	3.40	+20	5530091.98	91.98

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 3
OPERATING FREQUENCY: 5,775,000,000 Hz
CHANNEL: 155
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5775020.62	20.62
100%		-30	5775021.69	21.69
100%		-20	5775099.81	99.81
100%		-10	5775044.38	44.38
100%		0	5775017.87	17.87
100%		+10	5775057.27	57.27
100%		+30	5775043.49	43.49
100%		+40	5775075.77	75.77
100%		+50	5775082.45	82.45
Batt. Endpoint	3.40	+20	5775025.11	25.11

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

[ANT.2]

Startup after the EUT is energized

OPERATING BAND: UNII Band 1
OPERATING FREQUENCY: 5,210,000,000 Hz
CHANNEL: 42
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5210099.99	99.99
100%		-30	5210058.03	58.03
100%		-20	5210091.68	91.68
100%		-10	5210044.72	44.72
100%		0	5210034.35	34.35
100%		+10	5210086.05	86.05
100%		+30	5210063.55	63.55
100%		+40	5210058.66	58.66
100%		+50	5210078.96	78.96
Batt. Endpoint	3.40	+20	5210078.22	78.22

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2A
OPERATING FREQUENCY: 5,290,000,000 Hz
CHANNEL: 58
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5290023.05	23.05
100%		-30	5290007.27	7.27
100%		-20	5290096.91	96.91
100%		-10	5290048.80	48.8
100%		0	5290002.15	2.15
100%		+10	5290003.61	3.61
100%		+30	5290047.35	47.35
100%		+40	5290007.30	7.3
100%		+50	5290030.11	30.11
Batt. Endpoint	3.40	+20	5290086.99	86.99

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2C
OPERATING FREQUENCY: 5,530,000,000 Hz
CHANNEL: 106
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5530019.42	19.42
100%		-30	5530008.50	8.50
100%		-20	5530066.14	66.14
100%		-10	5530023.80	23.8
100%		0	5530005.03	5.03
100%		+10	5530063.64	63.64
100%		+30	5530008.31	8.31
100%		+40	5530062.87	62.87
100%		+50	5530033.45	33.45
Batt. Endpoint	3.40	+20	5530083.88	83.88

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 3
OPERATING FREQUENCY: 5,775,000,000 Hz
CHANNEL: 155
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5775065.19	65.19
100%		-30	5775026.87	26.87
100%		-20	5775063.30	63.3
100%		-10	5775077.05	77.05
100%		0	5775063.77	63.77
100%		+10	5775099.71	99.71
100%		+30	5775012.92	12.92
100%		+40	5775062.62	62.62
100%		+50	5775001.52	1.52
Batt. Endpoint	3.40	+20	5775046.65	46.65

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

2 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5210037.02	37.02
100%		-30	5210020.47	20.47
100%		-20	5210099.95	99.95
100%		-10	5210098.99	98.99
100%		0	5210051.10	51.10
100%		+10	5210009.71	9.71
100%		+30	5210053.90	53.90
100%		+40	5210026.55	26.55
100%		+50	5210063.62	63.62
Batt. Endpoint	3.40	+20	5210030.70	30.70

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2A
OPERATING FREQUENCY: 5,290,000,000 Hz
CHANNEL: 58
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5290082.16	82.16
100%		-30	5290043.47	43.47
100%		-20	5290066.95	66.95
100%		-10	5290082.73	82.73
100%		0	5290046.75	46.75
100%		+10	5290071.72	71.72
100%		+30	5290024.56	24.56
100%		+40	5290036.65	36.65
100%		+50	5290005.95	5.95
Batt. Endpoint	3.40	+20	5290089.82	89.82

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2C
OPERATING FREQUENCY: 5,530,000,000 Hz
CHANNEL: 106
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5530036.35	36.35
100%		-30	5530014.54	14.54
100%		-20	5530071.94	71.94
100%		-10	5530026.72	26.72
100%		0	5530004.18	4.18
100%		+10	5530006.99	6.99
100%		+30	5530045.51	45.51
100%		+40	5530046.46	46.46
100%		+50	5530043.29	43.29
Batt. Endpoint	3.40	+20	5530037.02	37.02

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 3
OPERATING FREQUENCY: 5,775,000,000 Hz
CHANNEL: 155
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5775009.67	9.67
100%		-30	5775047.63	47.63
100%		-20	5775084.18	84.18
100%		-10	5775098.34	98.34
100%		0	5775040.42	40.42
100%		+10	5775088.76	88.76
100%		+30	5775028.82	28.82
100%		+40	5775029.56	29.56
100%		+50	5775082.62	82.62
Batt. Endpoint	3.40	+20	5775006.13	6.13

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

5 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5210031.11	31.11
100%		-30	5210081.19	81.19
100%		-20	5210034.56	34.56
100%		-10	5210072.32	72.32
100%		0	5210081.43	81.43
100%		+10	5210014.84	14.84
100%		+30	5210085.67	85.67
100%		+40	5210047.19	47.19
100%		+50	5210077.62	77.62
Batt. Endpoint	3.40	+20	5210069.57	69.57

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2A
OPERATING FREQUENCY: 5,290,000,000 Hz
CHANNEL: 58
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5290032.52	32.52
100%		-30	5290063.07	63.07
100%		-20	5290096.65	96.65
100%		-10	5290037.66	37.66
100%		0	5290018.67	18.67
100%		+10	5290060.13	60.13
100%		+30	5290073.33	73.33
100%		+40	5290021.76	21.76
100%		+50	5290031.37	31.37
Batt. Endpoint	3.40	+20	5290062.27	62.27

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2C
OPERATING FREQUENCY: 5,530,000,000 Hz
CHANNEL: 106
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5530064.55	64.55
100%		-30	5530069.38	69.38
100%		-20	5530026.83	26.83
100%		-10	5530071.35	71.35
100%		0	5530045.63	45.63
100%		+10	5530098.08	98.08
100%		+30	5530066.45	66.45
100%		+40	5530096.71	96.71
100%		+50	5530054.38	54.38
Batt. Endpoint	3.40	+20	5530015.29	15.29

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 3
OPERATING FREQUENCY: 5,775,000,000 Hz
CHANNEL: 155
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5775076.23	76.23
100%		-30	5775080.33	80.33
100%		-20	5775022.99	22.99
100%		-10	5775003.58	3.58
100%		0	5775033.12	33.12
100%		+10	5775072.52	72.52
100%		+30	5775003.08	3.08
100%		+40	5775038.89	38.89
100%		+50	5775036.15	36.15
Batt. Endpoint	3.40	+20	5775057.20	57.2

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

10 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5210077.52	77.52
100%		-30	5210065.79	65.79
100%		-20	5210002.22	2.22
100%		-10	5210043.30	43.30
100%		0	5210023.90	23.90
100%		+10	5210060.44	60.44
100%		+30	5210006.27	6.27
100%		+40	5210035.25	35.25
100%		+50	5210017.77	17.77
Batt. Endpoint	3.40	+20	5210025.32	25.32

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2A
OPERATING FREQUENCY: 5,290,000,000 Hz
CHANNEL: 58
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5290005.80	5.80
100%		-30	5290036.13	36.13
100%		-20	5290021.46	21.46
100%		-10	5290034.94	34.94
100%		0	5290063.09	63.09
100%		+10	5290097.32	97.32
100%		+30	5290054.96	54.96
100%		+40	5290063.29	63.29
100%		+50	5290080.79	80.79
Batt. Endpoint	3.40	+20	5290019.89	19.89

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 2C
OPERATING FREQUENCY: 5,530,000,000 Hz
CHANNEL: 106
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5530053.13	53.13
100%		-30	5530055.78	55.78
100%		-20	5530037.32	37.32
100%		-10	5530026.21	26.21
100%		0	5530050.23	50.23
100%		+10	5530067.70	67.7
100%		+30	5530032.58	32.58
100%		+40	5530087.72	87.72
100%		+50	5530020.51	20.51
Batt. Endpoint	3.40	+20	5530019.40	19.4

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

OPERATING BAND: UNII Band 3
OPERATING FREQUENCY: 5,775,000,000 Hz
CHANNEL: 155
REFERENCE VOLTAGE: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5775033.59	33.59
100%		-30	5775096.31	96.31
100%		-20	5775040.44	40.44
100%		-10	5775070.51	70.51
100%		0	5775008.43	8.43
100%		+10	5775068.05	68.05
100%		+30	5775046.94	46.94
100%		+40	5775021.54	21.54
100%		+50	5775002.93	2.93
Batt. Endpoint	3.40	+20	5775022.78	22.78

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

10.7 STRADDLE CHANNEL

10.7.1 26dB Bandwidth

[ANT.1]

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26dB Bandwidth [MHz]
802.11a	UNII 2C	5720	144	5710.76	14.24
802.11n(HT20)				5707.92	17.08
802.11ac(VHT20)				5706.48	18.52
802.11a	UNII 3	5720	144	5729.12	4.12
802.11n(HT20)				5733.04	8.04
802.11ac(VHT20)				5732.20	7.20

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26dB Bandwidth [MHz]
802.11n(HT40)	UNII 2C	5710	142	5690.32	34.68
802.11ac(VHT40)				5690.08	34.92
802.11n(HT40)	UNII 3	5710	142	5729.52	4.52
802.11ac(VHT40)				5729.60	4.60

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26dB Bandwidth [MHz]
802.11ac(VHT80)	UNII 2C	5690	138	5649.04	75.96
	UNII 3	5690	138	5730.32	5.32

Note:

[UNII 2C] 26dB Bandwidth = 5 725 MHz **-** Measured Frequency[MHz]

[UNII 3C] 26dB Bandwidth = Measured Frequency[MHz] – 5 725 MHz

[ANT.2]

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26dB Bandwidth [MHz]
802.11a	UNII 2C	5720	144	5710.76	14.24
802.11n(HT20)				5708.80	16.20
802.11ac(VHT20)				5707.88	17.12
802.11a	UNII 3	5720	144	5729.20	4.20
802.11n(HT20)				5731.68	6.68
802.11ac(VHT20)				5732.28	7.28

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26dB Bandwidth [MHz]
802.11n(HT40)	UNII 2C	5710	142	5690.16	34.84
802.11ac(VHT40)				5689.76	35.24
802.11n(HT40)	UNII 3	5710	142	5729.68	4.68
802.11ac(VHT40)				5729.60	4.60

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26dB Bandwidth [MHz]
802.11ac(VHT80)	UNII 2C	5690	138	5649.36	75.64
	UNII 3	5690	138	5730.48	5.48

Note:

[UNII 2C] 26dB Bandwidth = 5 725 MHz **-** Measured Frequency[MHz]

[UNII 3C] 26dB Bandwidth = Measured Frequency[MHz] – 5 725 MHz

[ANT.1]

▣ Test Plots (26dB Bandwidth)

802.11a UNII Band	802.11n(HT20) UNII Band
	

802.11ac(VHT20) UNII Band