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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:
July 09, 2020

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

Report No.: HCT-RF-2006-FC085-R1

FCC ID:	**A3LSMN980F**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**

According to the Evaluation report, all of the data contained herein is reused from the reference FCC ID : A3LSMN981B report.

Model:	SM-N980F/DS
Additional Model	SM-N980F
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 : Kwon Jeong
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 KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2006-FC085	June 30, 2020	- First Approval Report
HCT-RF-2006-FC085-R1	July 09, 2020	- Added the antenna information (page 5.) - Edit typo (page 6, page 29) - Modified the Max. RF Output Power:list (page 8, UNII 2C VHT40) - Added the note (page 27.)

Table of Contents

1. GENERAL INFORMATION

EUT DESCRIPTION

Model	SM-N980F/DS	
Additional Model	SM-N980F	
EUT Type	Mobile Phone	
Power Supply	DC 3.88 V	
Battery Information	Model: EB-BN-980ABY Type: Li-ion Battery	
Travel Adapter Information	Model : EP-TA800 Manufacture: SOLUM	
Data Cable Information	Model : EP-DG980BBE Manufacture: RFTech	
Ear-jack Information	Model : YBD-19HS-026 Manufacture: ALMUS	
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 (Ant 1: WIFI Antenna #1) (Ant 2 : WIFI ANTENNA #2)	Antenna type: LDS Peak Gain : Ant.1: UNII 1: -6.77 dBi / UNII 2A: -8.04 dBi / UNII 2C: -7.24 dBi / UNII 3: -6.33 dBi Ant.2: UNII 1: 0.43 dBi / UNII 2A: 0.56 dBi / UNII 2C: -2.05 dBi / UNII 3: -3.16 dBi	
Straddle channel	Supported	
TDWR Band	Supported	
Dynamic Frequency Selection	Slave without radar detection	
Date(s) of Tests	May 12, 2020 ~ June 23, 2020	

ANTENNA CONFIGURATIONS

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

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

Note:

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

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

	5GHz WIFI		2.4GHz WIFI		Test case
	Ant1	Ant2	Ant1	Ant2	
2.4 GHz + 5 GHz RSDB Only	A			B	O
		A	B		O
	A		B		-
		A		B	-
2.4 GHz + 5 GHz RSDB & MIMO	A	A	B		-
	A	A		B	-
	A		B	B	-
		A	B	B	-
2.4 GHz + 5 GHz RSDB MIMO	A	A	B	B	O

3. Directional Gain Calculation

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

Directional gain =

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

Band	Ant Gain (dBi)		N_{ANT}/ N_{ss}	Directional Gain (dBi)
UNII 1	ANT1	-6.77	2 / 2	0.57
	ANT2	0.43		
UNII 2A	ANT1	-8.04	2 / 2	0.29
	ANT2	0.56		
UNII 2C	ANT1	-7.24	2 / 2	-1.25
	ANT2	-2.05		
UNII 3	ANT1	-6.33	2 / 2	-1.59
	ANT2	-3.16		

2. MAXIMUM OUTPUT POWER

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

Band	Mode	SISO				MIMO	
		Ant1 Power		Ant2 Power		Ant 1 + Ant 2 Power	
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)
UNII1	802.11a	16.54	0.045	16.55	0.045	19.56	0.090
	802.11n (HT20)	16.54	0.045	16.74	0.047	19.65	0.092
	802.11n (HT40)	15.98	0.040	16.08	0.041	19.04	0.080
	802.11ac (VHT20)	16.56	0.045	16.59	0.046	19.54	0.090
	802.11ac (VHT40)	16.07	0.040	16.05	0.040	19.04	0.080
	802.11ac (VHT80)	11.73	0.015	11.74	0.015	14.75	0.030
UNII2A	802.11a	16.69	0.047	16.70	0.047	19.69	0.093
	802.11n (HT20)	16.76	0.047	16.77	0.048	19.77	0.095
	802.11n (HT40)	16.08	0.041	16.05	0.040	19.08	0.081
	802.11ac (VHT20)	16.80	0.048	16.80	0.048	19.80	0.096
	802.11ac (VHT40)	16.03	0.040	16.05	0.040	19.07	0.081
	802.11ac (VHT80)	11.75	0.015	11.80	0.015	14.79	0.030
UNII2C	802.11a	16.84	0.048	16.99	0.050	19.93	0.098
	802.11n (HT20)	16.95	0.050	16.88	0.049	19.93	0.098
	802.11n (HT40)	16.45	0.044	16.38	0.043	19.43	0.088
	802.11ac (VHT20)	16.99	0.050	16.98	0.050	19.99	0.100
	802.11ac (VHT40)	16.48	0.044	16.56	0.045	19.53	0.090
	802.11ac (VHT80)	15.23	0.033	15.39	0.035	18.32	0.068
UNII3	802.11a	17.17	0.052	17.28	0.053	20.23	0.105
	802.11n (HT20)	17.21	0.053	17.17	0.052	20.19	0.104
	802.11n (HT40)	16.61	0.046	16.75	0.047	19.69	0.093
	802.11ac (VHT20)	17.23	0.053	17.31	0.054	20.24	0.106
	802.11ac (VHT40)	16.54	0.045	16.83	0.048	19.59	0.091
	802.11ac (VHT80)	15.30	0.034	15.29	0.034	18.31	0.068

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.

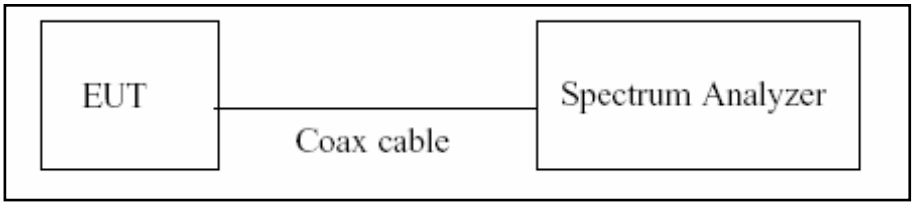
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

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.

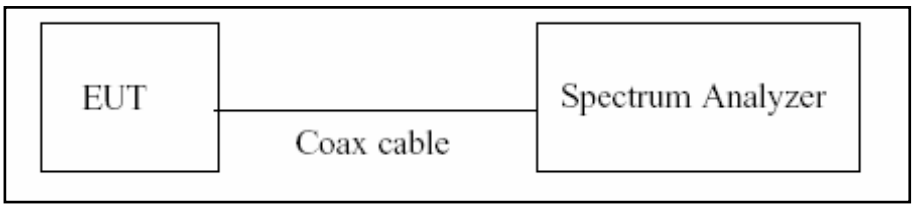
1. RBW = 8 MHz (the largest availble value)
2. VBW = 8 MHz (≥ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on}/ T_{total} and Duty Cycle Factor = 10log(1/Duty Cycle)

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.

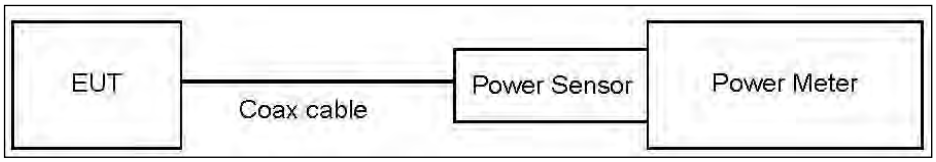
8.3. Output Power Measurement

Limit

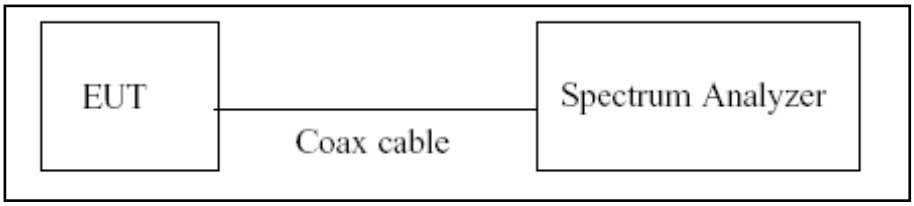
Band	Limit
UNII 1	- Master : Not exceed 1 W(=30dBm) - Slave : Not exceed 250 mW(=23.98 dBm)
UNII 2A, 2C	Not exceed the lesser of 250 mW or 11 dBm + 10 log B, (where B is the 26 dB emission bandwidth in megahertz.)
UNII 3	Not exceed 1 W(=30dBm)

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
3. Actual value of loss for the attenuator and cable combination is below table.

Band	Ant.1 Loss(dB)	Ant.2 Loss(dB)
UNII 1	11.35	10.73
UNII 2A	11.35	10.73
UNII 2C	11.35	10.73
UNII 3	11.35	10.73

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

Note

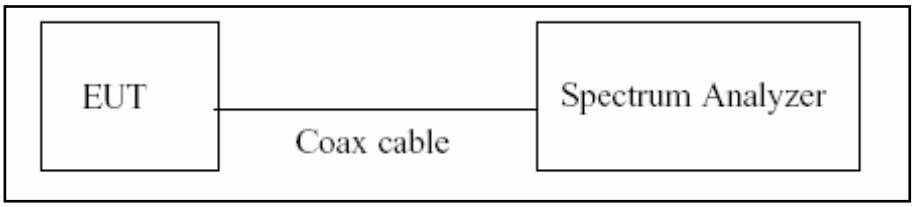
Ant.1 Loss(dB) = 10.73 dB + 0.62 dB (Exten Cable) = 11.35 dB

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
3. Actual value of loss for the attenuator and cable combination is below table.

Band	Ant.1 Loss(dB)	Ant.2 Loss(dB)
UNII 1	11.35	10.73
UNII 2A	11.35	10.73
UNII 2C	11.35	10.73
UNII 3	11.35	10.73

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

Note

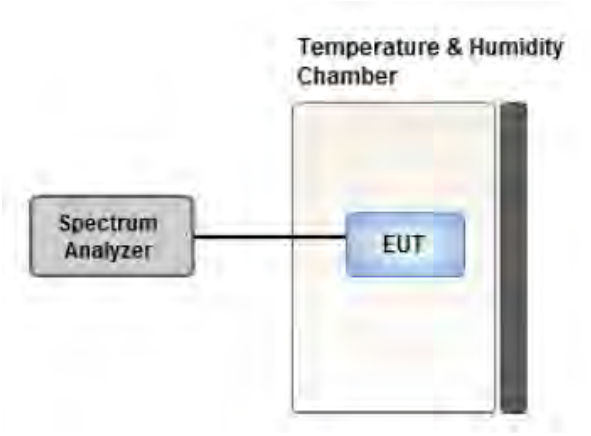
Ant.1 Loss(dB) = 10.73 dB + 0.62 dB (Exten Cable) = 11.35 dB

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.

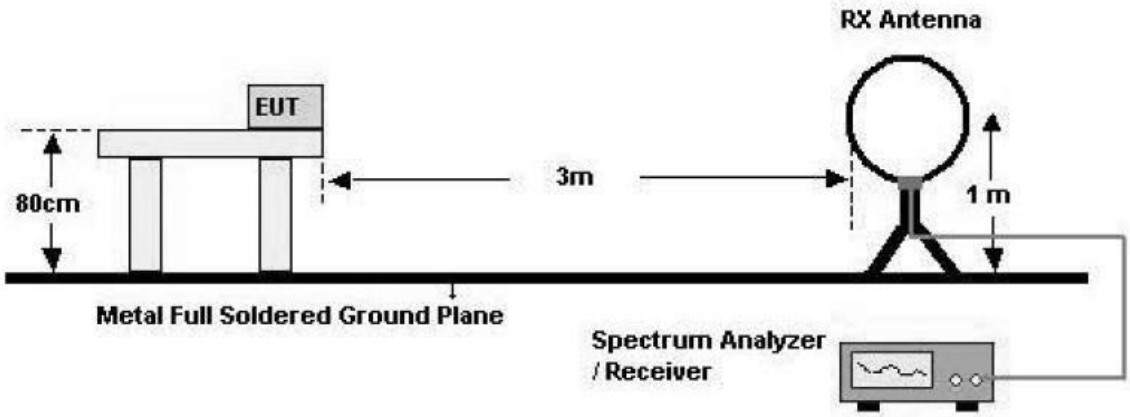
3. UNII 3: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below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

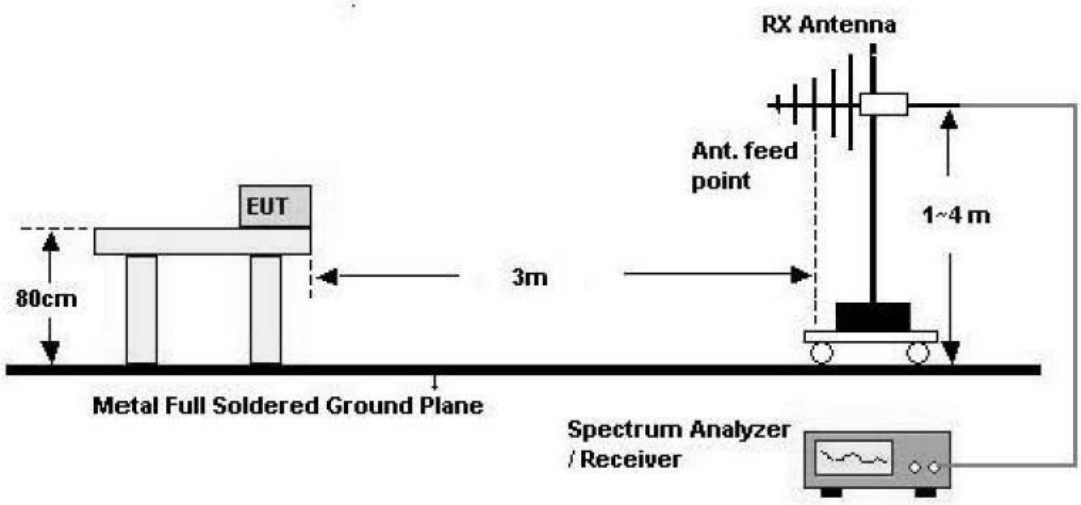
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

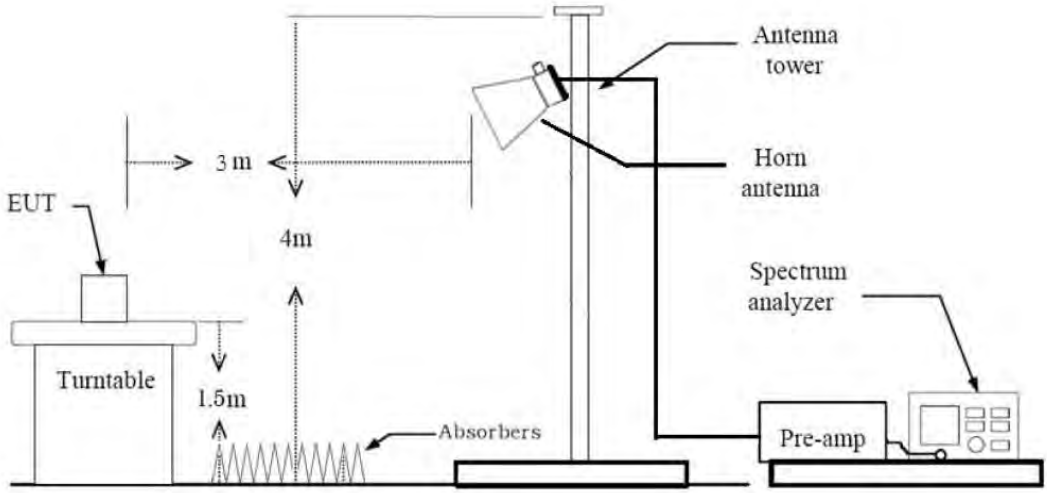
Below 30 MHz



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	0.936	0.289	1000
802.11n(HT20)	MCS 0	0.932	0.307	1000
802.11n(HT40)	MCS 0	0.869	0.609	2000
802.11ac(VHT20)	MCS 0	0.932	0.305	1000
802.11ac(VHT40)	MCS 0	0.872	0.595	2000
802.11ac(VHT80)	MCS 0	0.858	0.667	2000

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 : X,Z
   - Radiated Restricted Band Edge : Z
3. All datarate of operation were investigated and the worst case datarate results are reported
   - Mode : Ant1(SISO), Ant2(SISO), Ant1+Ant2(SDM), Ant1+Ant2(CDD)
   - Worstcase : Ant1+Ant2(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. SM-N980F/DS, SM-N980F were tested and the worst case results are reported.
   (Worst case : SM-N980F/DS)
6. Radiated Spurious Emission
   : : All band of operation were investigated and the worst case band results are reported.
   - Worstcase band : UNII 3

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. The following tables show the worst case configurations determined during testing.

Description	2.4 GHz Emission	5 GHz Emission
Antenna	Ant 1, Ant 2, Ant ALL	Ant 1, Ant 2, Ant ALL
Channel	1, 6	159
Data Rate	1 Mbps, 6.5 Mbps (MCS 0)	6.5 Mbps (MCS 0)
Mode	802.11b, 802.11ax	802.11ax

4. SM-N980F/DS, SM-N980F were tested and the worst case results are reported.
(Worst case : SM-N980F/DS)
5. Please refer to the SM-N980F/DS [UNII] 802.11ax Test Report.

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-N980F/DS, SM-N980F were tested and the worst case results are reported.

(Worst case : SM-N980F/DS)

Conducted test

1. All datarate of operation were investigated and the worst case datarate results are reported
2. SM-N980F/DS, SM-N980F were tested and the worst case results are reported.

(Worst case : SM-N980F/DS)

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

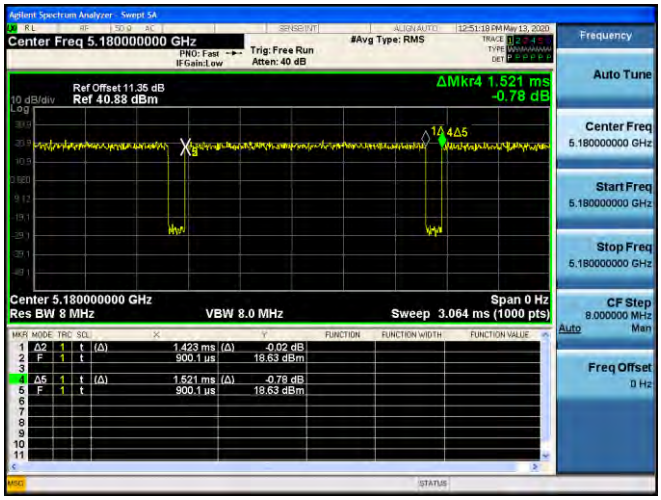
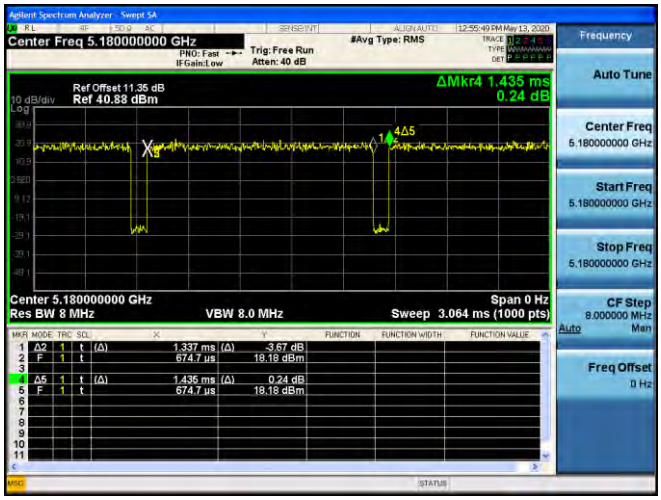
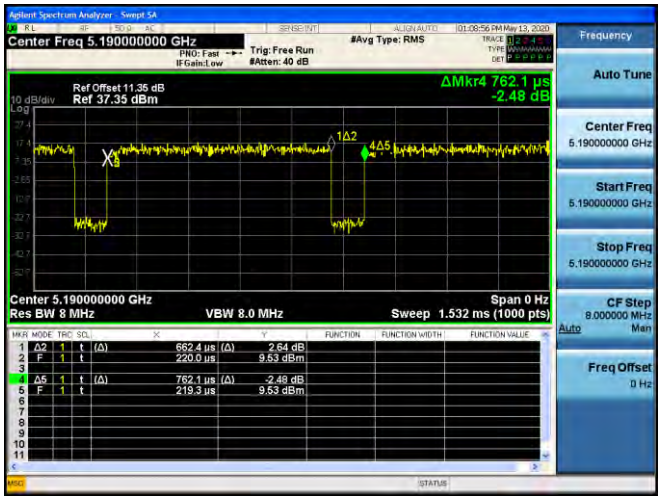
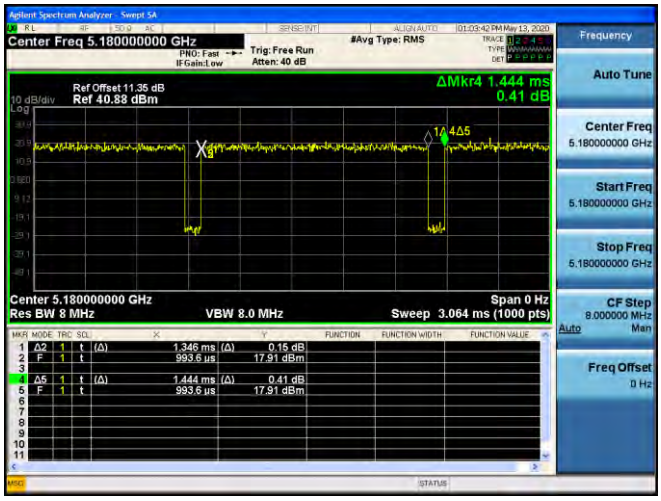
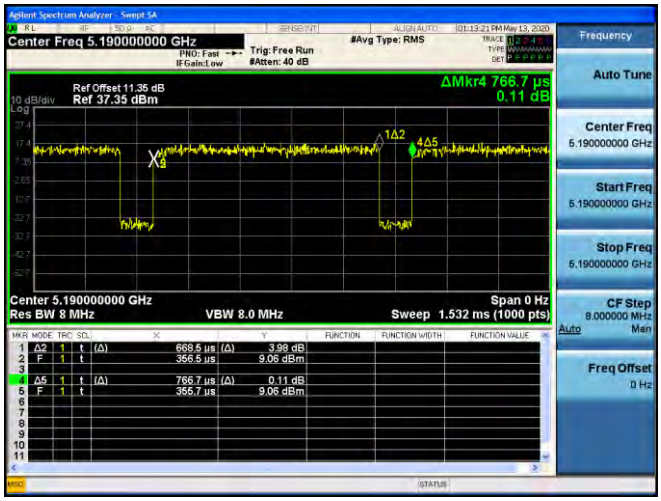
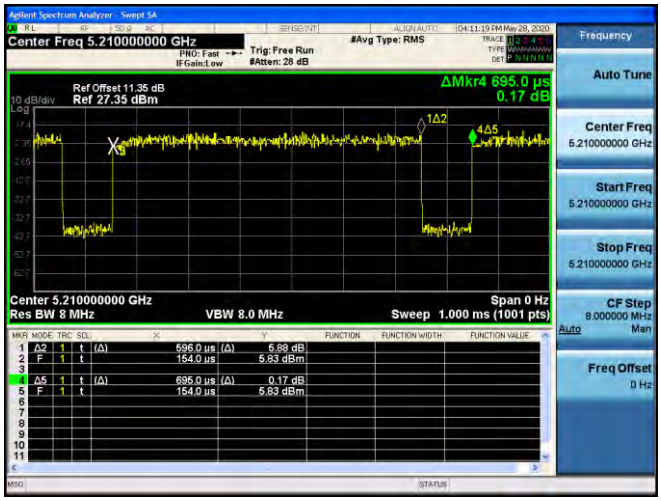
Mode	Data Rate (Mbps)	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11a	6	1.423	1.521	0.936	0.289
	9	0.960	1.058	0.907	0.423
	12	0.724	0.825	0.877	0.568
	18	0.491	0.589	0.833	0.792
	24	0.371	0.469	0.791	1.019
	36	0.255	0.353	0.722	1.417
	48	0.196	0.294	0.667	1.760
	54	0.181	0.279	0.648	1.883

Mode	MCS Index	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11n (HT20)	0	1.337	1.435	0.932	0.307
	1	0.690	0.788	0.876	0.577
	2	0.469	0.570	0.823	0.848
	3	0.362	0.463	0.781	1.071
	4	0.255	0.356	0.715	1.454
	5	0.199	0.298	0.670	1.740
	6	0.184	0.282	0.652	1.854
	7	0.169	0.267	0.632	1.991
802.11n (HT40)	0	0.662	0.762	0.869	0.609
	1	0.350	0.449	0.778	1.090
	2	0.247	0.345	0.716	1.453
	3	0.196	0.294	0.667	1.760
	4	0.144	0.242	0.594	2.260
	5	0.117	0.215	0.543	2.655
	6	0.107	0.206	0.522	2.822
	7	0.101	0.199	0.507	2.952

Mode	MCS Index	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11ac (VHT20)	0	1.346	1.444	0.932	0.305
	1	0.693	0.791	0.876	0.575
	2	0.475	0.574	0.829	0.816
	3	0.368	0.466	0.790	1.026
	4	0.258	0.359	0.718	1.439
	5	0.206	0.304	0.677	1.695
	6	0.187	0.285	0.656	1.831
	7	0.172	0.270	0.636	1.964
	8	0.153	0.252	0.610	2.150
802.11ac (VHT40)	0	0.669	0.767	0.872	0.595
	1	0.356	0.455	0.781	1.073
	2	0.252	0.351	0.716	1.449
	3	0.199	0.299	0.667	1.762
	4	0.147	0.247	0.596	2.246
	5	0.119	0.219	0.543	2.655
	6	0.112	0.212	0.529	2.767
	7	0.104	0.202	0.515	2.879
	8	0.095	0.195	0.488	3.113
	9	0.087	0.187	0.465	3.326
802.11ac (VHT80)	0	0.596	0.695	0.858	0.667
	1	0.319	0.420	0.760	1.195
	2	0.227	0.327	0.694	1.585
	3	0.179	0.279	0.642	1.928
	4	0.135	0.234	0.577	2.389
	5	0.112	0.212	0.528	2.771
	6	0.103	0.202	0.510	2.925
	7	0.095	0.195	0.487	3.123
	8	0.088	0.187	0.471	3.274
	9	0.084	0.183	0.459	3.382

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.

[ANT1]

802.11a Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	21.34	16.763
5200	40	21.27	16.788
5240	48	21.45	16.736
5260	52	21.38	16.757
5300	60	21.04	16.730
5320	64	21.36	16.725
5500	100	21.28	16.750
5600	120	21.45	16.791
5720	144	21.42	16.715
5745	149	21.23	16.807
5785	157	21.30	16.767
5825	165	21.37	16.780

802.11n(HT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	21.51	17.858
5200	40	21.42	17.927
5240	48	21.59	17.898
5260	52	21.60	17.881
5300	60	21.59	17.910
5320	64	21.37	17.848
5500	100	21.52	17.909
5600	120	21.61	17.939
5720	144	22.05	17.929
5745	149	21.44	17.967
5785	157	21.85	17.917
5825	165	21.70	17.896

802.11n(HT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	40.03	36.338
5230	46	39.79	36.315
5270	54	39.79	36.295
5310	62	39.62	36.295
5510	102	39.75	36.294
5590	118	39.60	36.253
5710	142	39.87	36.395
5755	151	39.81	36.392
5795	159	39.94	36.301

802.11ac(VHT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	21.45	17.909
5200	40	21.39	17.875
5240	48	21.44	17.941
5260	52	21.36	17.850
5300	60	21.42	17.864
5320	64	21.41	17.884
5500	100	21.59	17.905
5600	120	21.73	17.966
5720	144	21.69	17.922
5745	149	21.47	17.940
5785	157	21.54	17.883
5825	165	21.65	17.892

802.11ac(VHT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	39.68	36.240
5230	46	40.10	36.273
5270	54	39.90	36.305
5310	62	39.78	36.280
5510	102	39.74	36.283
5590	118	40.00	36.297
5710	142	39.97	36.336
5755	151	39.85	36.340
5795	159	40.08	36.248

802.11ac(VHT80) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5210	42	81.71	75.757
5290	58	81.40	75.685
5530	106	81.34	75.695
5610	122	81.72	75.729
5690	138	81.34	75.805
5775	155	81.69	75.756

[ANT2]

802.11a Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	21.08	16.776
5200	40	21.34	16.759
5240	48	21.46	16.831
5260	52	21.27	16.758
5300	60	21.35	16.751
5320	64	21.17	16.764
5500	100	21.34	16.781
5600	120	21.50	16.819
5720	144	23.28	16.892
5745	149	24.42	16.914
5785	157	24.53	16.900
5825	165	25.20	16.947

802.11n(HT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	21.35	17.894
5200	40	21.40	17.939
5240	48	21.82	17.891
5260	52	21.42	17.891
5300	60	21.46	17.875
5320	64	21.53	17.917
5500	100	21.52	17.906
5600	120	21.50	17.923
5720	144	23.12	17.987
5745	149	21.76	17.989
5785	157	21.65	17.982
5825	165	24.56	17.956

802.11n(HT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	39.77	36.248
5230	46	39.79	36.289
5270	54	39.80	36.316
5310	62	39.72	36.292
5510	102	39.62	36.261
5590	118	40.93	36.386
5710	142	52.90	36.418
5755	151	65.58	36.354
5795	159	65.23	36.357

802.11ac(VHT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	21.53	17.937
5200	40	21.32	17.879
5240	48	21.50	17.895
5260	52	21.54	17.921
5300	60	21.42	17.911
5320	64	21.52	17.894
5500	100	21.18	17.891
5600	120	21.72	17.958
5720	144	24.78	17.942
5745	149	22.71	17.951
5785	157	24.31	17.936
5825	165	22.84	17.990

802.11ac(VHT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	39.93	36.262
5230	46	39.61	36.305
5270	54	40.16	36.263
5310	62	39.82	36.260
5510	102	39.74	36.285
5590	118	39.83	36.326
5710	142	40.04	36.374
5755	151	41.14	36.388
5795	159	40.76	36.317

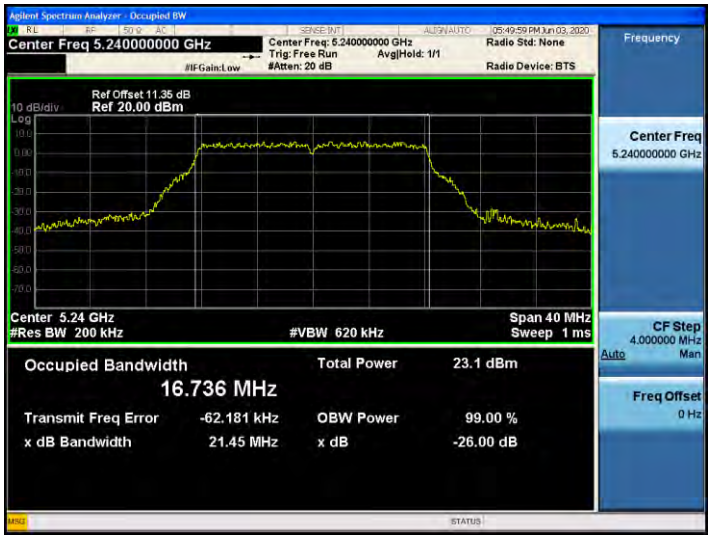
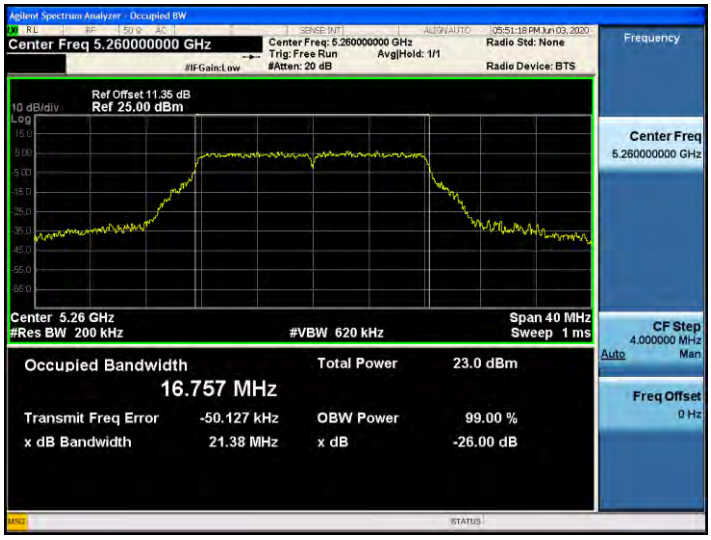
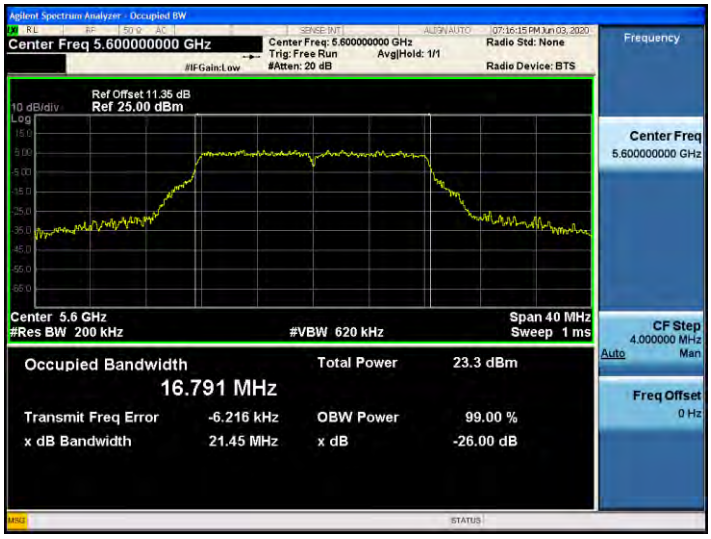
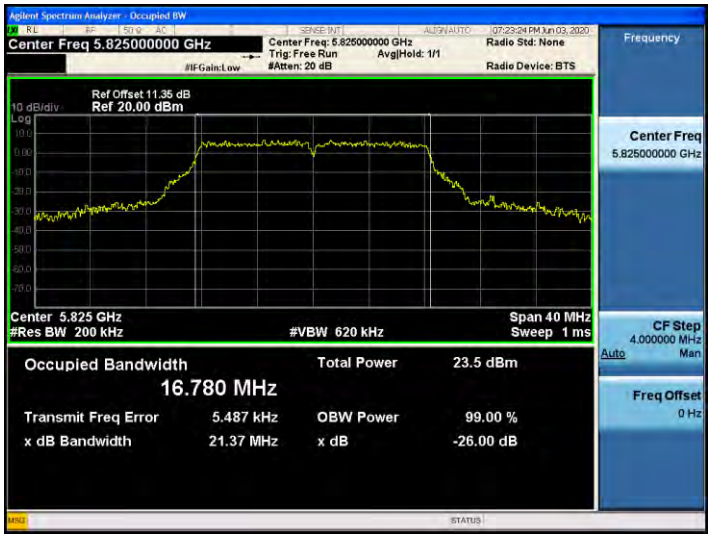
802.11ac(VHT80) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5210	42	81.36	75.649
5290	58	81.14	75.690
5530	106	81.24	75.680
5610	122	81.27	75.751
5690	138	81.68	75.814
5775	155	81.99	75.777

[ANT1]

▣ Test Plots(802.11a)

Note:

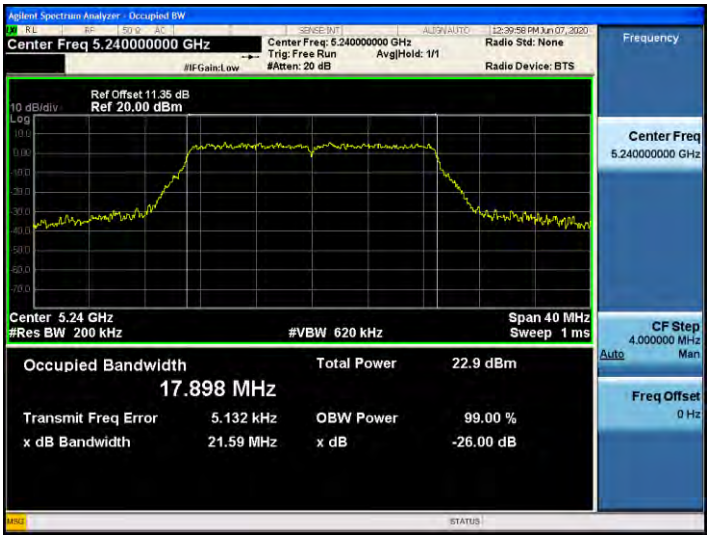
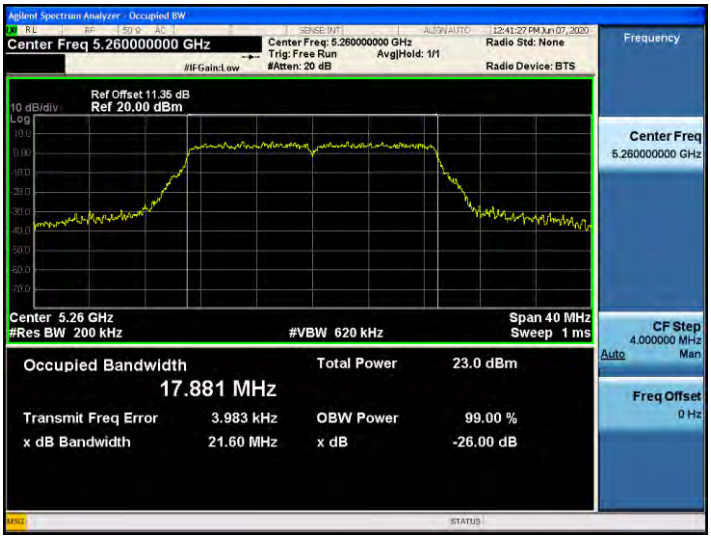
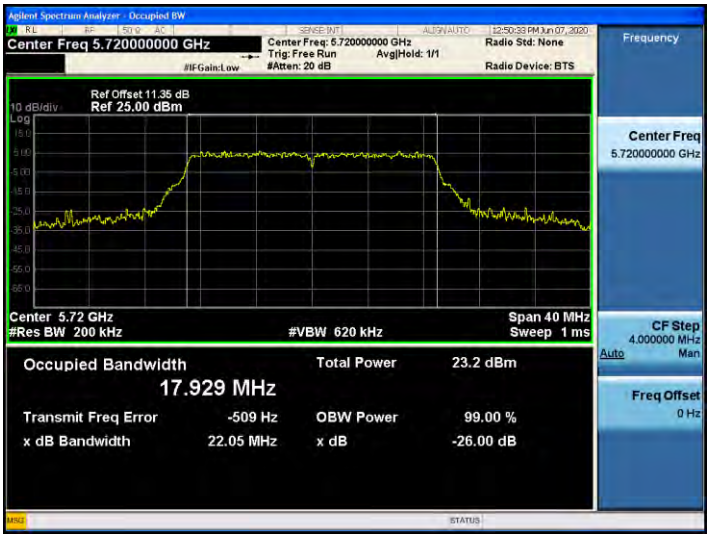
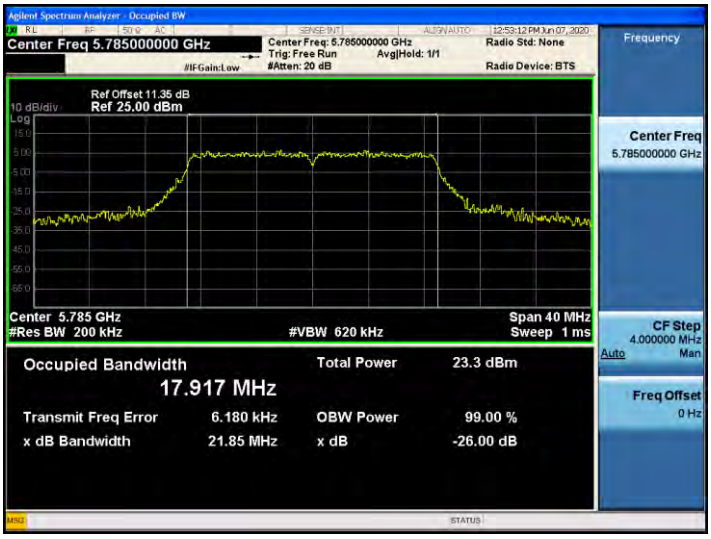
In order to simplify the report, attached plots were only the most wide channel.

802.11a UNII 1 BAND 26dB Bandwidth (CH 48)	802.11a UNII 2A BAND 26dB Bandwidth (CH 52)
	
802.11a UNII 2C BAND 26dB Bandwidth (CH 120)	**802.11a UNII 3 BAND 26dB Bandwidth (CH 165)**
	

▣ Test Plots(802.11n(HT20))

Note:

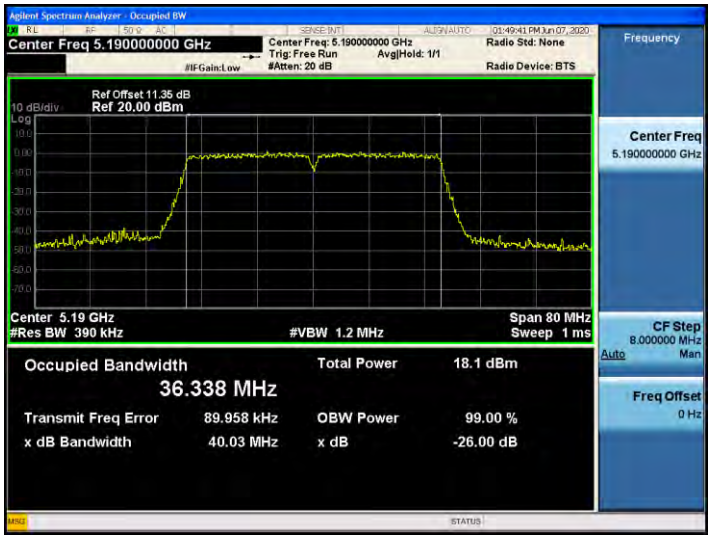
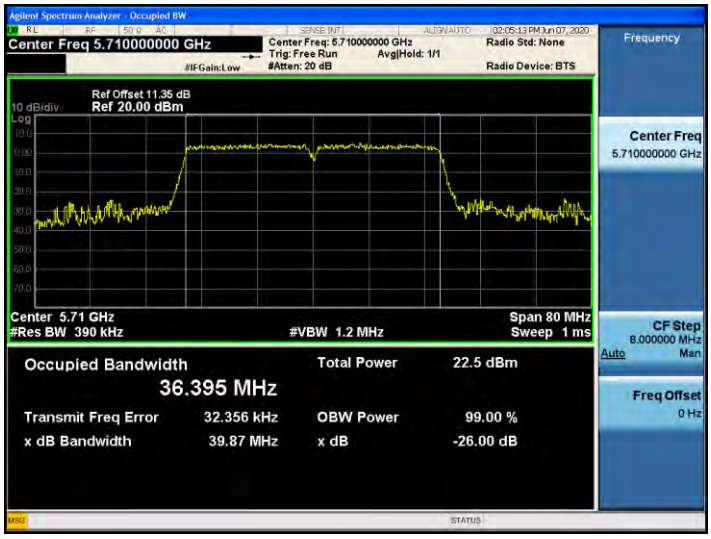
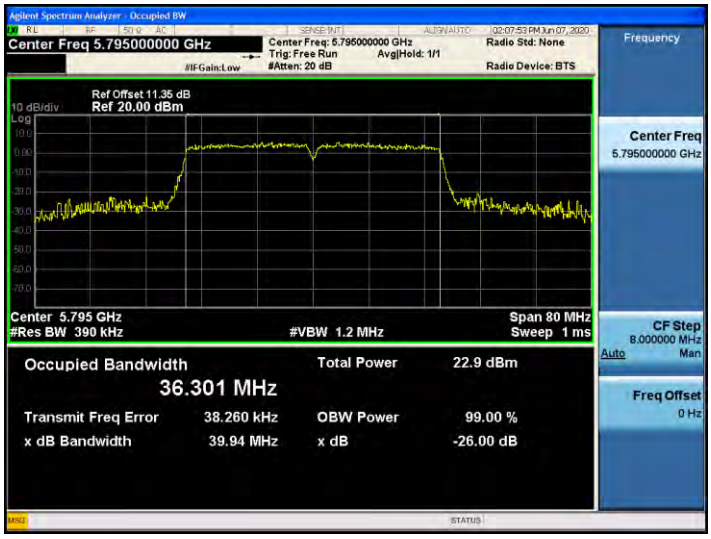
In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT20 UNII 1 BAND 26dB Bandwidth(CH 48)	802.11n_HT20 UNII 2A BAND 26dB Bandwidth(CH 52)
	
802.11n_HT20 UNII 2C BAND 26dB Bandwidth(CH 144)	**802.11n_HT20 UNII 3 BAND 26dB Bandwidth(CH 157)**
	

▣ Test Plots(802.11n(HT40))

Note:

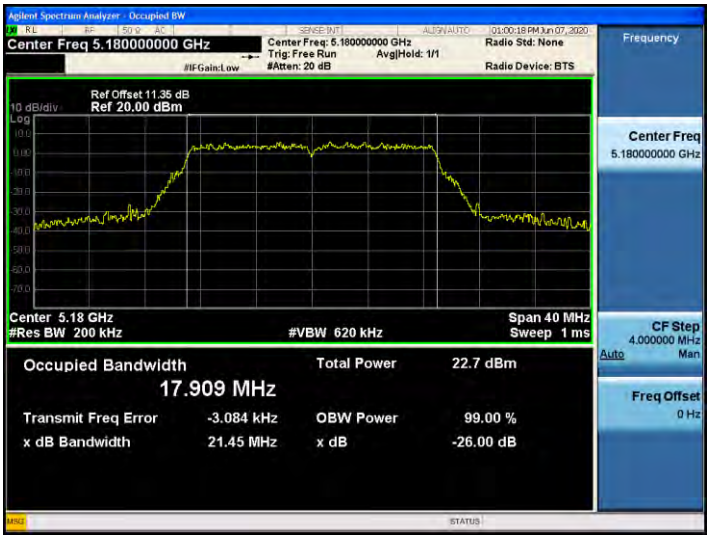
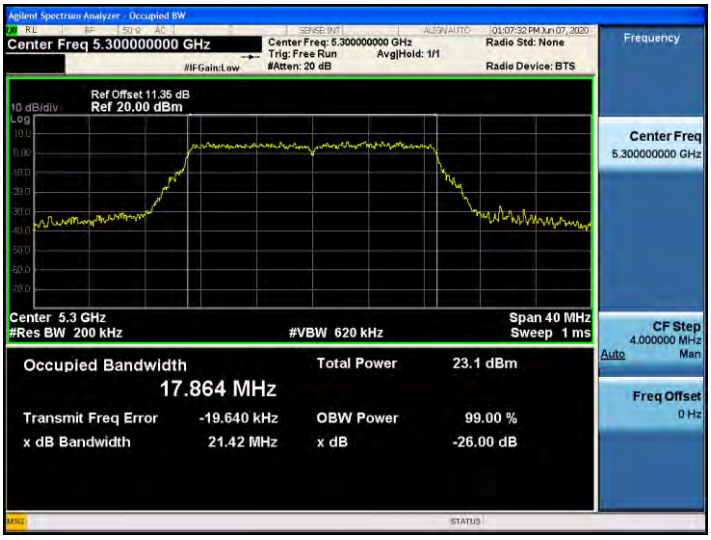
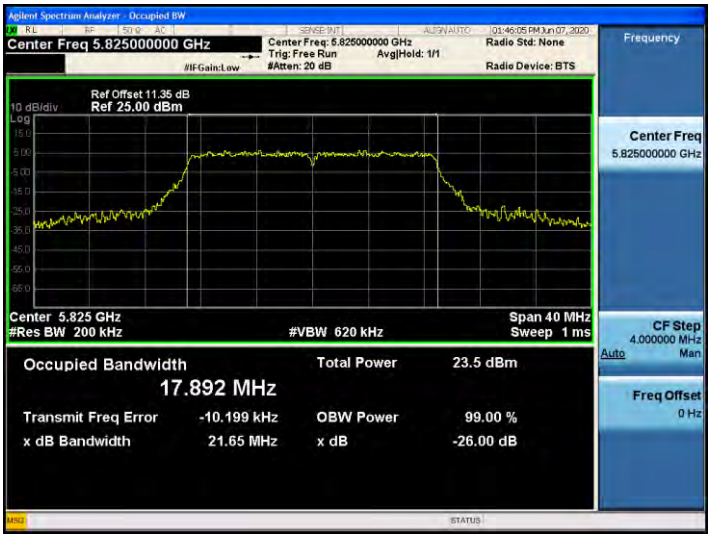
In order to simplify the report, attached plots were only the most wide channel.

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:

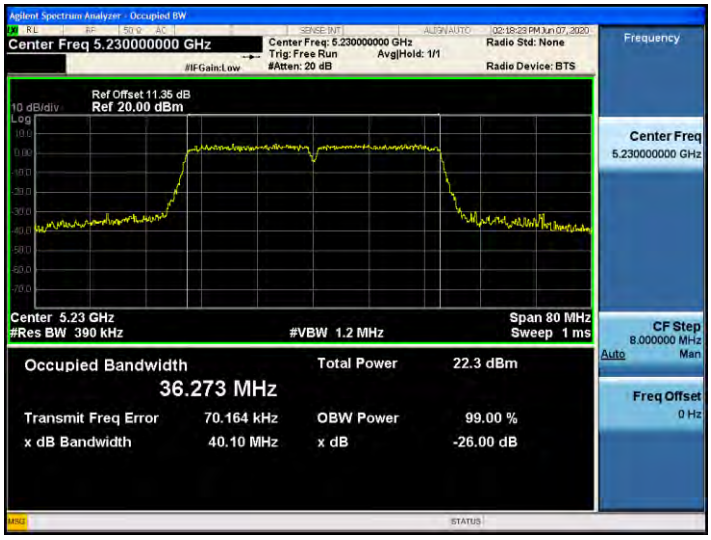
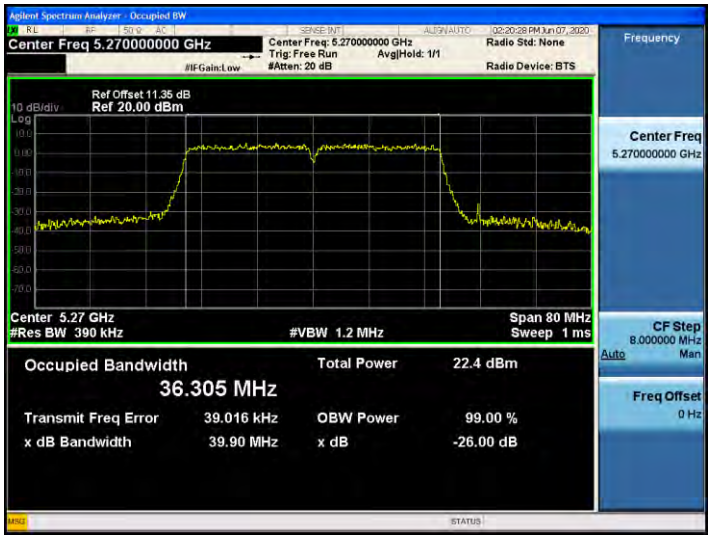
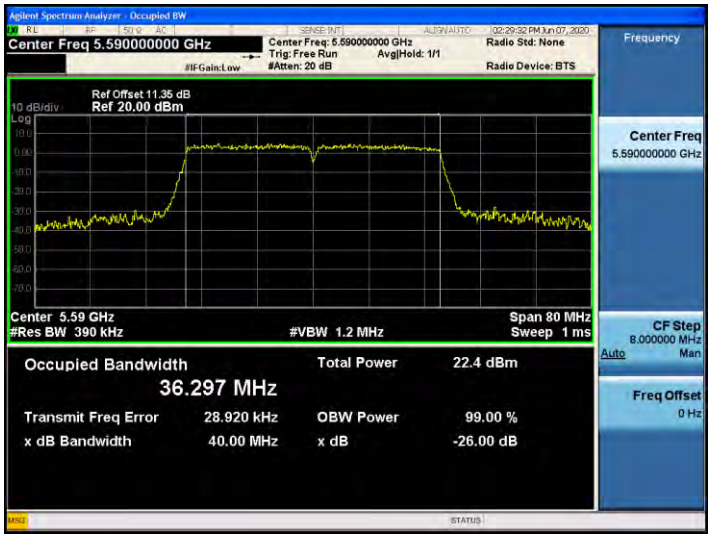
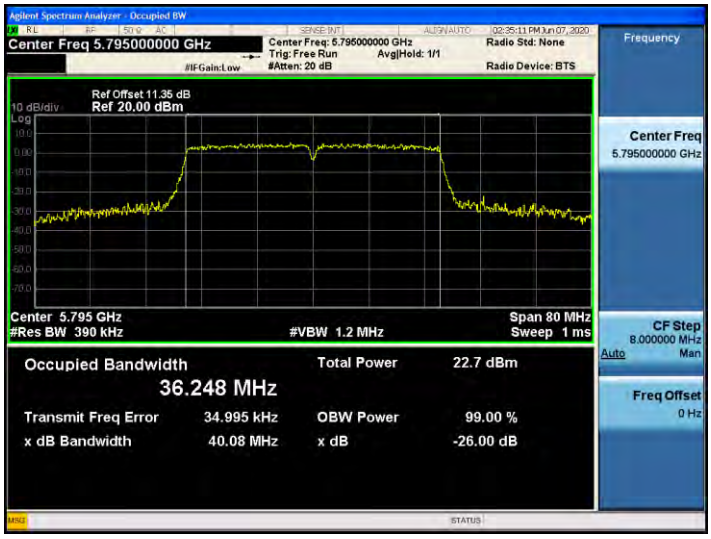
In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT20 UNII 1 BAND 26dB Bandwidth(CH 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 165)**
	

▣ Test Plots(802.11ac(VHT40))

Note:

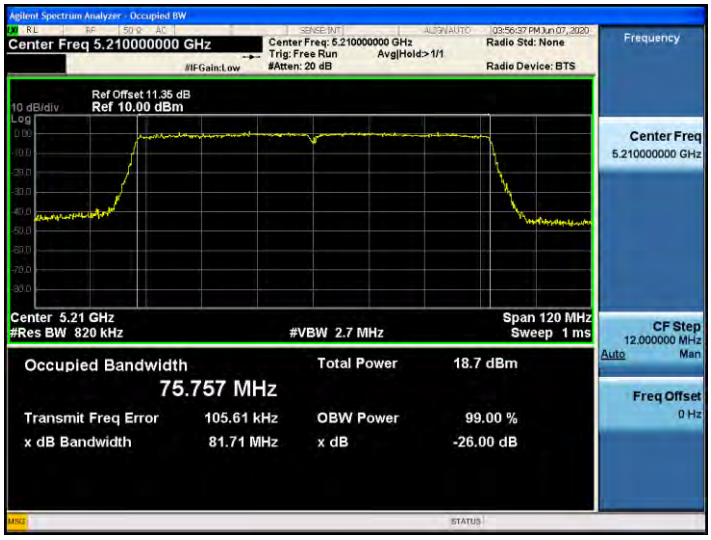
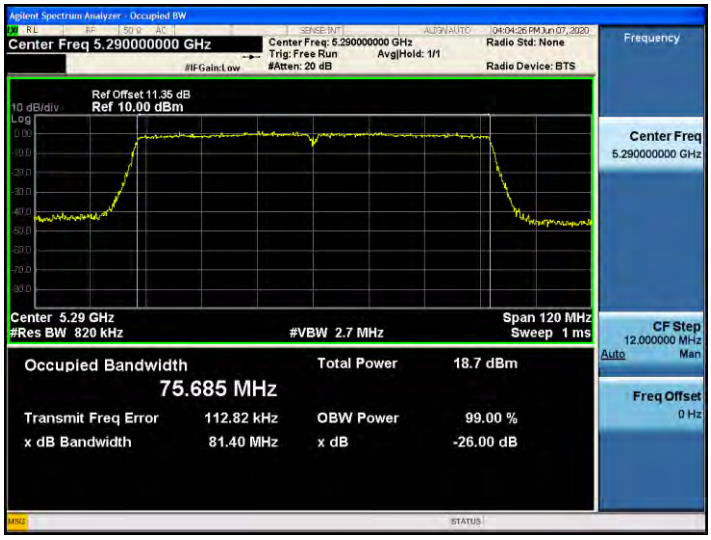
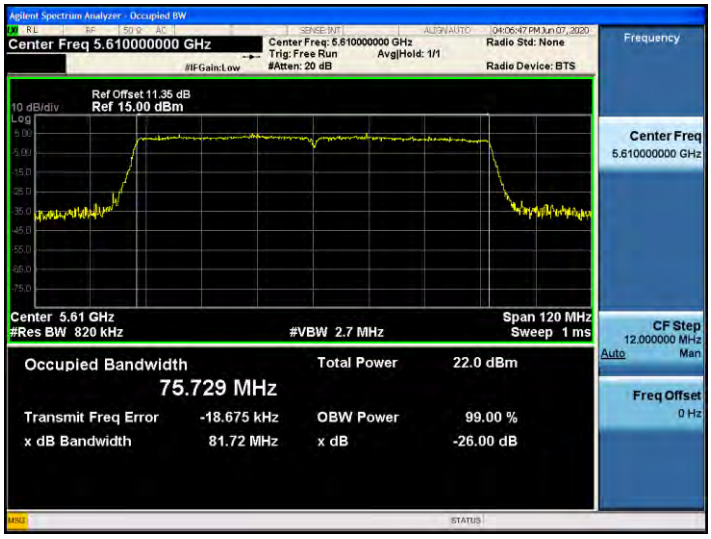
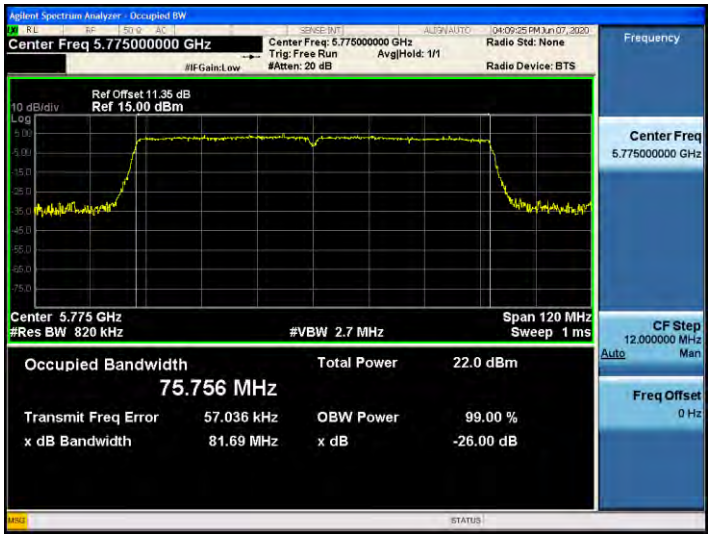
In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT40 UNII 1 BAND 26dB Bandwidth(CH 46)	802.11ac_VHT40 UNII 2A BAND 26dB Bandwidth (CH 54)
	
802.11ac_VHT40 UNII 2C BAND 26dB Bandwidth(CH 118)	**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.

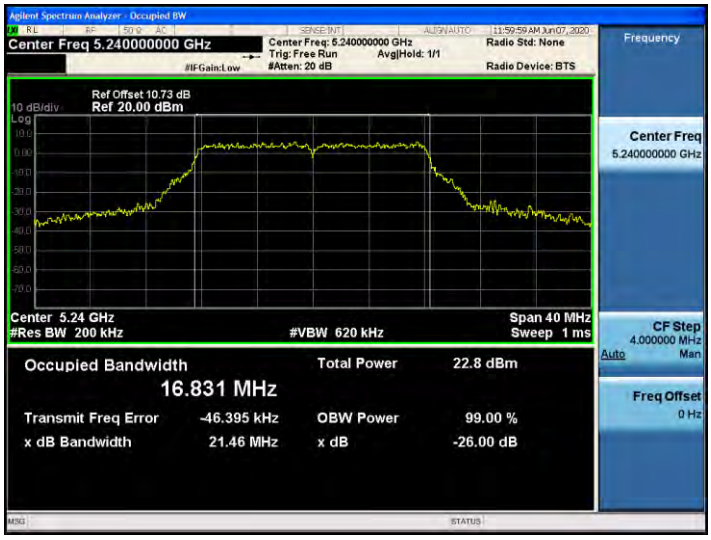
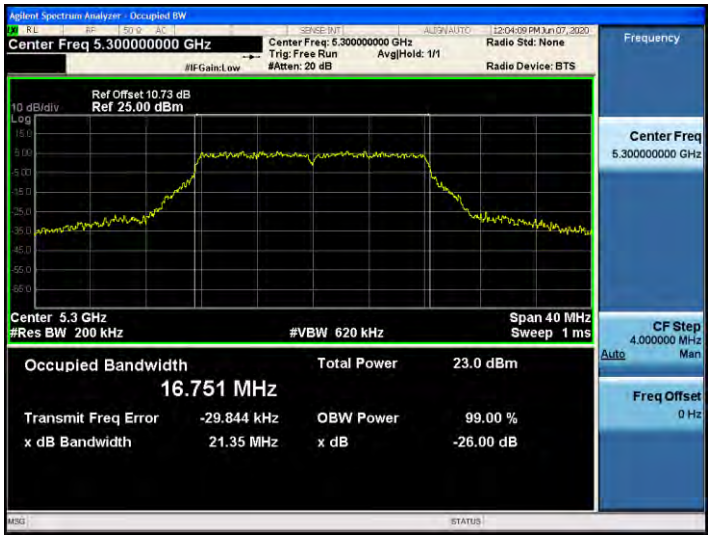
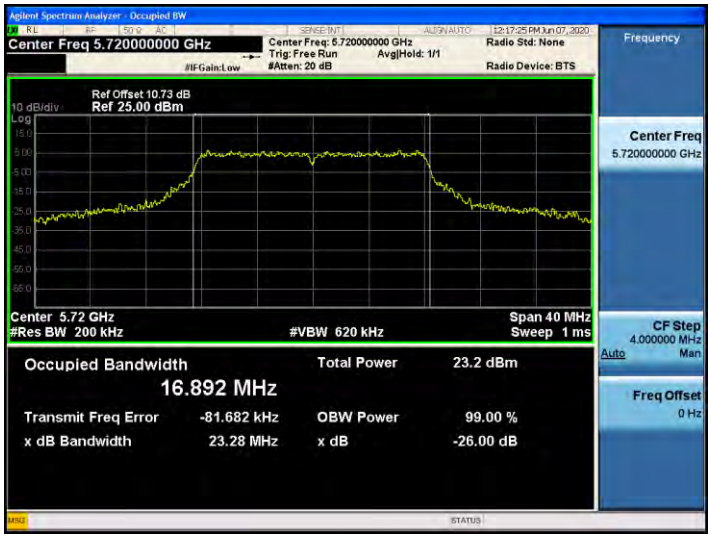
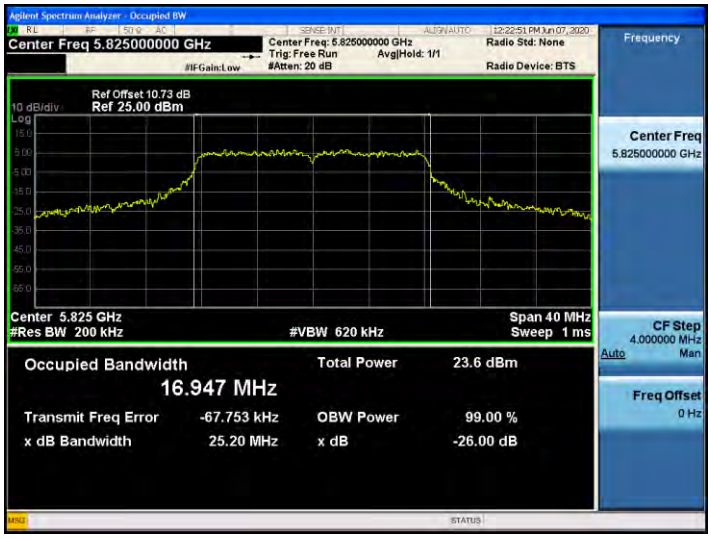
802.11ac_VHT80 UNII 1 BAND 26dB Bandwidth(CH 42)	802.11ac_VHT80 UNII 2A BAND 26dB Bandwidth (CH 58)
	
802.11ac_VHT80 UNII 2C BAND 26dB Bandwidth(CH 122)	**802.11ac_VHT80 UNII 3 BAND 26dB Bandwidth (CH 155)**
	

[ANT2]

▣ Test Plots(802.11a)

Note:

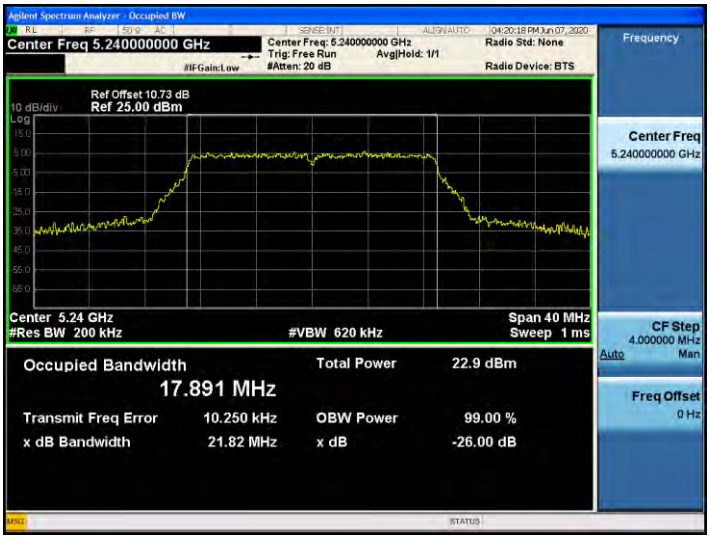
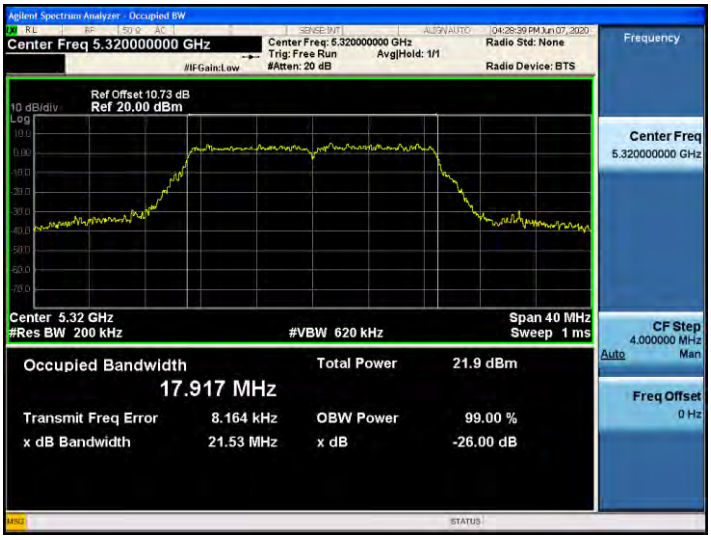
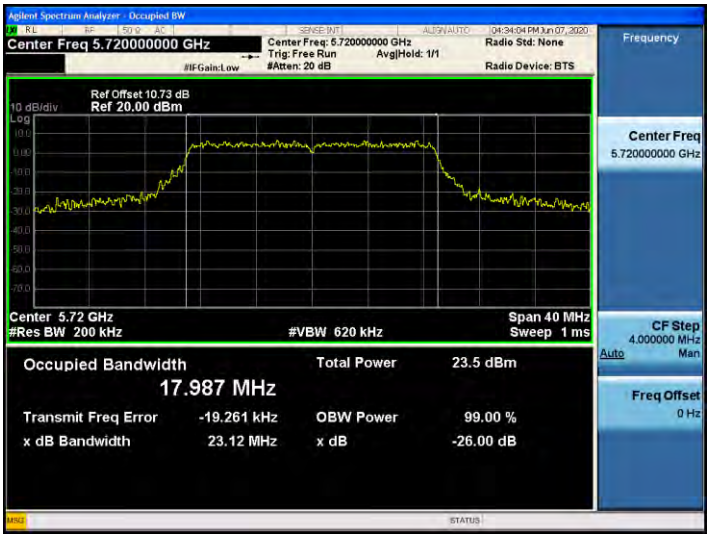
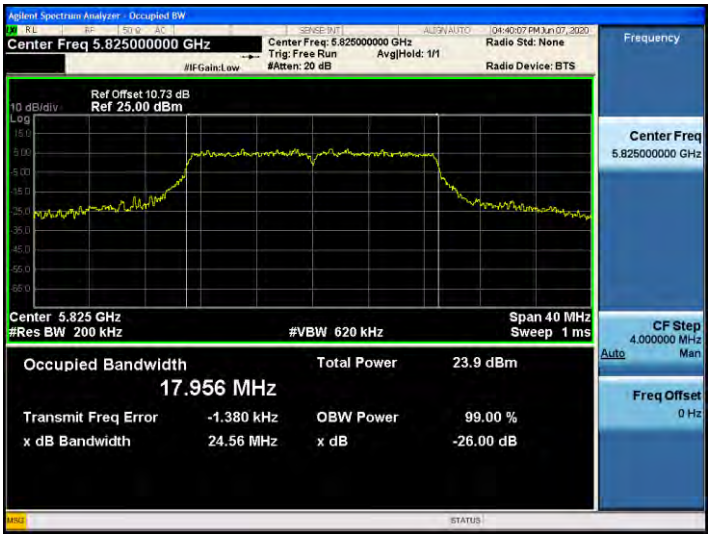
In order to simplify the report, attached plots were only the most wide channel.

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:

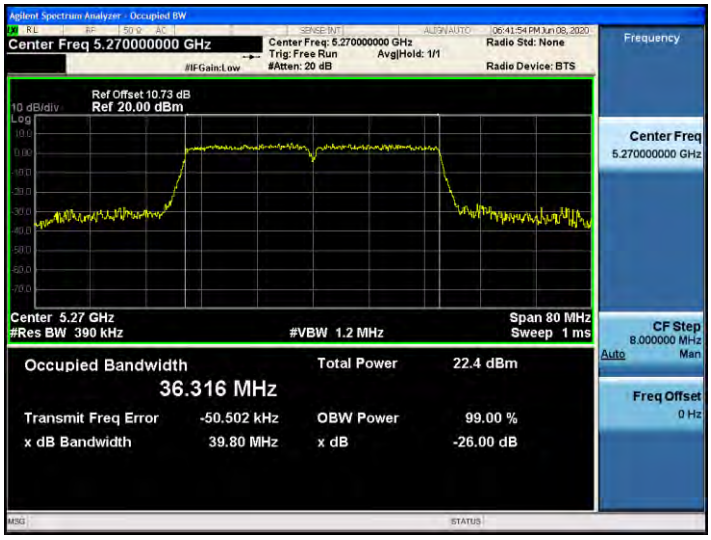
In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT20 UNII 1 BAND 26dB Bandwidth(CH 48)	802.11n_HT20 UNII 2A BAND 26dB Bandwidth(CH 64)
	
802.11n_HT20 UNII 2C BAND 26dB Bandwidth(CH 144)	**802.11n_HT20 UNII 3 BAND 26dB Bandwidth(CH 165)**
	

▣ Test Plots(802.11n(HT40))

Note:

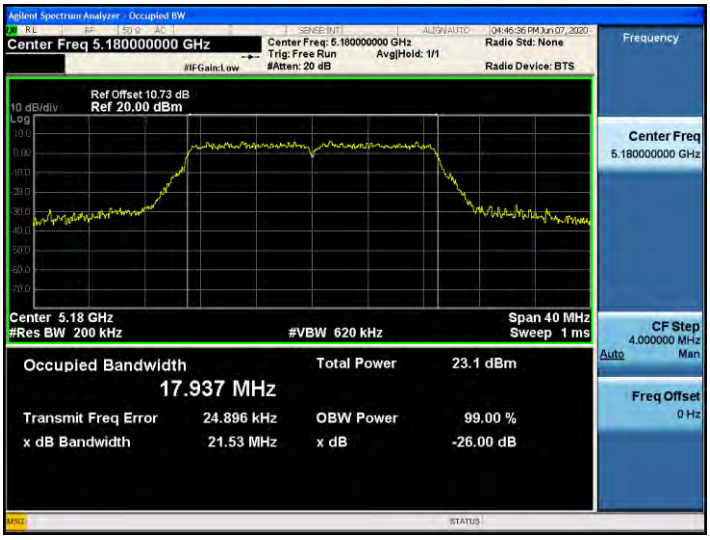
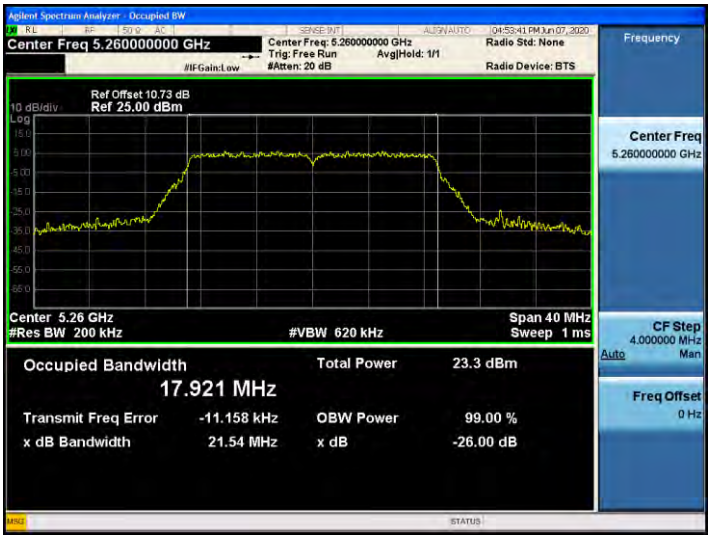
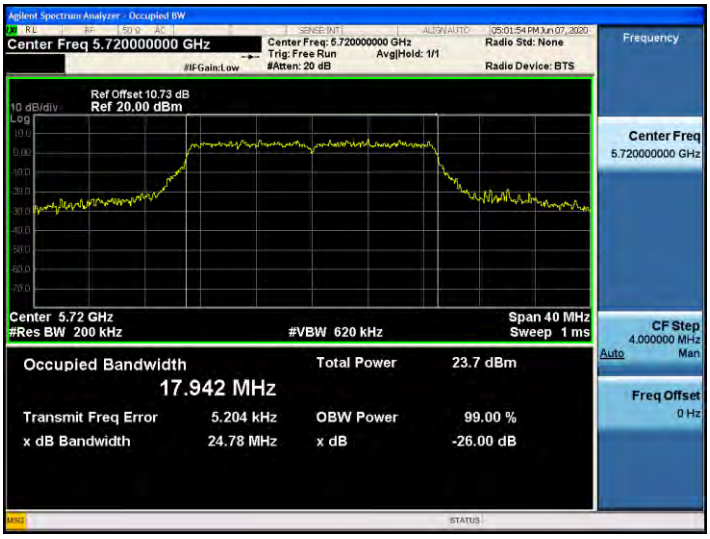
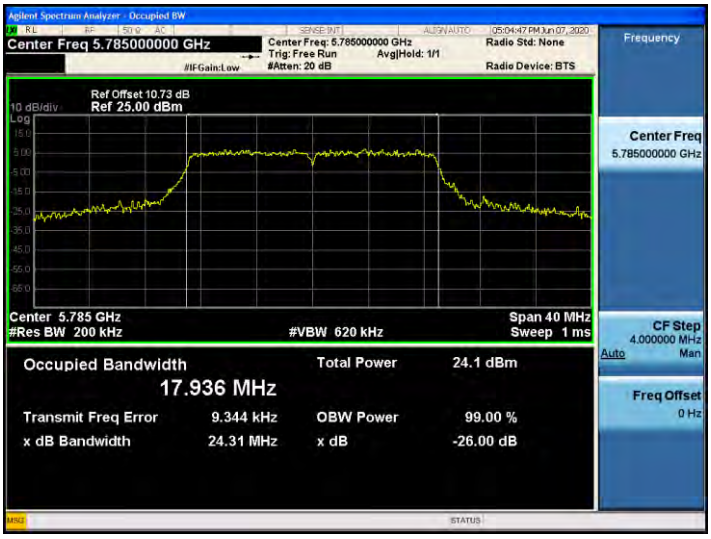
In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT40 UNII 1 BAND 26dB Bandwidth(CH 46)	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 151)**
	

▣ Test Plots(802.11ac(VHT20))

Note:

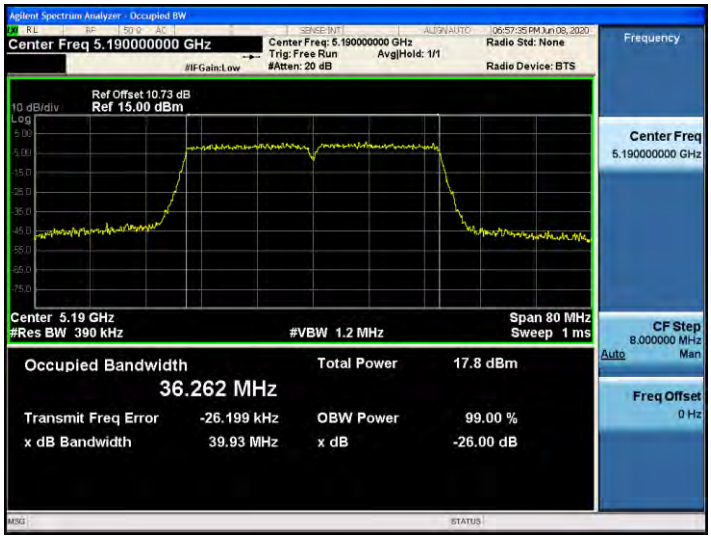
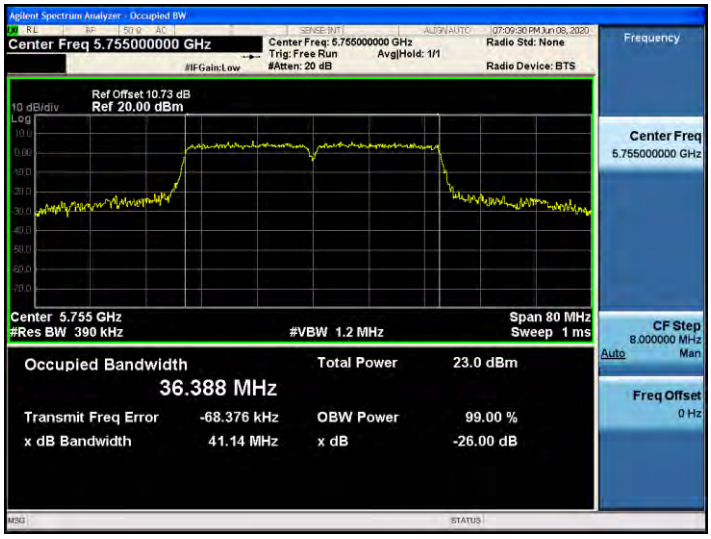
In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT20 UNII 1 BAND 26dB Bandwidth(CH 36)	802.11ac_VHT20 UNII 2A BAND 26dB Bandwidth(CH 52)
	
802.11ac_VHT20 UNII 2C BAND 26dB Bandwidth(CH 144)	**802.11ac_VHT20 UNII 3 BAND 26dB Bandwidth(CH 157)**
	

▣ Test Plots(802.11ac(VHT40))

Note:

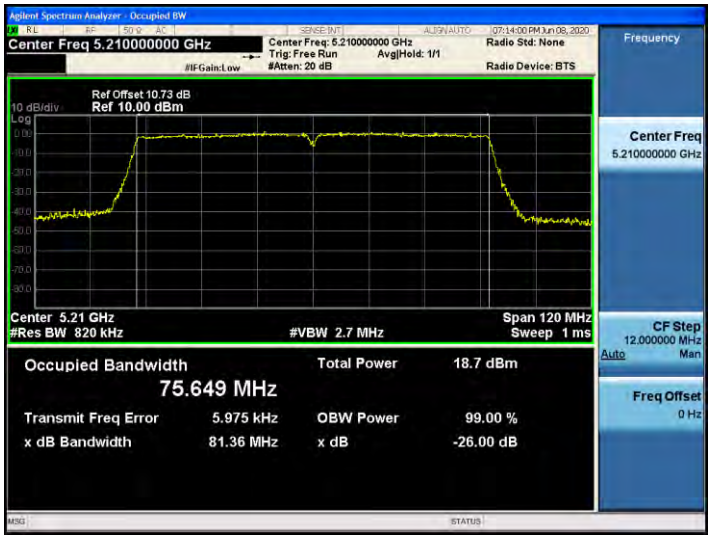
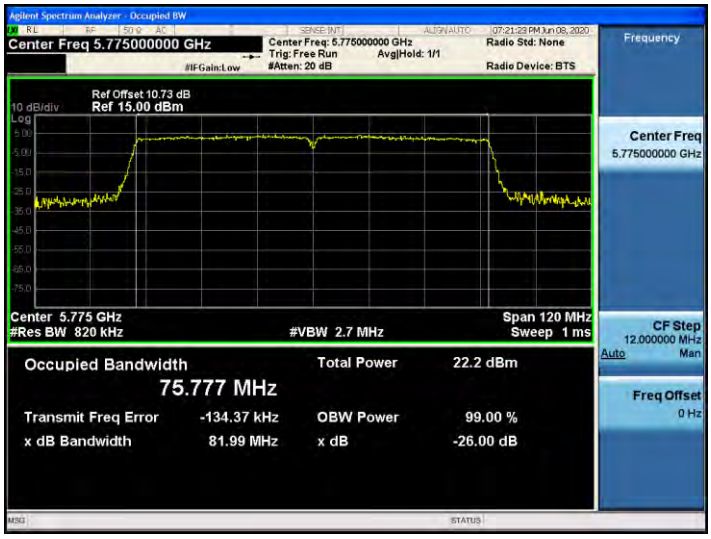
In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT40 UNII 1 BAND 26dB Bandwidth(CH 38)	802.11ac_VHT40 UNII 2A BAND 26dB Bandwidth (CH 54)
	
802.11ac_VHT40 UNII 2C BAND 26dB Bandwidth(CH 142)	**802.11ac_VHT40 UNII 3 BAND 26dB Bandwidth (CH 151)**
	

▣ Test Plots(802.11ac(VHT80))

Note:

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

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

10.3 6dB BANDWIDTH

[ANT1]

802.11a Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.41	> 0.5	Pass
5785	157	16.42	> 0.5	Pass
5825	165	16.39	> 0.5	Pass

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.63	> 0.5	Pass
5785	157	17.63	> 0.5	Pass
5825	165	17.62	> 0.5	Pass

802.11n(HT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.99	> 0.5	Pass
5795	159	36.04	> 0.5	Pass

802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.64	> 0.5	Pass
5785	157	17.59	> 0.5	Pass
5825	165	17.63	> 0.5	Pass

802.11ac(VHT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	36.00	> 0.5	Pass
5795	159	36.02	> 0.5	Pass

802.11ac(VHT80) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	75.50	> 0.5	Pass

[ANT2]

802.11a Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.38	> 0.5	Pass
5785	157	16.36	> 0.5	Pass
5825	165	16.37	> 0.5	Pass

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.63	> 0.5	Pass
5785	157	17.63	> 0.5	Pass
5825	165	17.61	> 0.5	Pass

802.11n(HT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	36.31	> 0.5	Pass
5795	159	36.04	> 0.5	Pass

802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.64	> 0.5	Pass
5785	157	17.61	> 0.5	Pass
5825	165	17.63	> 0.5	Pass

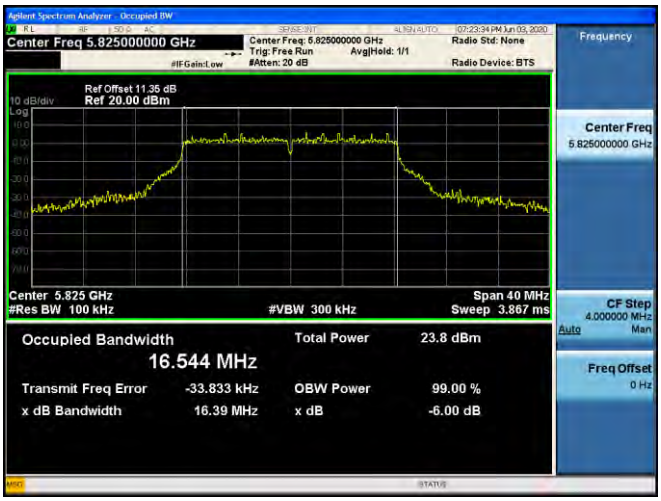
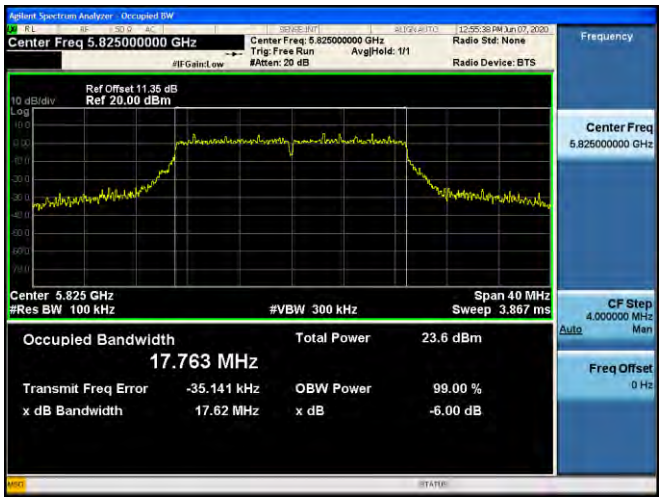
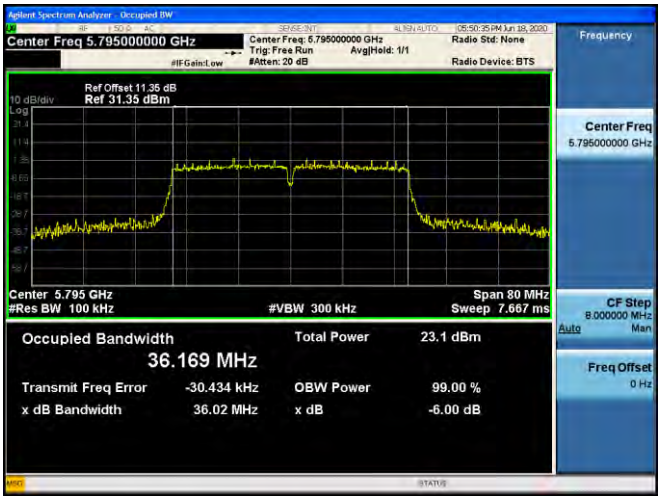
802.11ac(VHT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	36.37	> 0.5	Pass
5795	159	36.11	> 0.5	Pass

802.11ac(VHT80) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	76.01	> 0.5	Pass

[ANT1]

▣ Test Plots

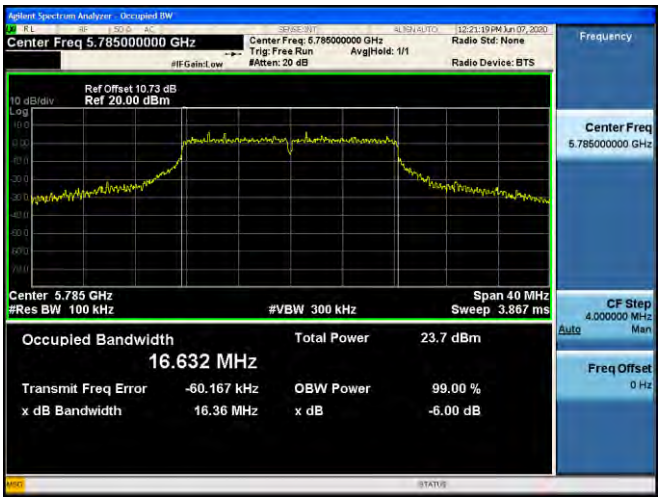
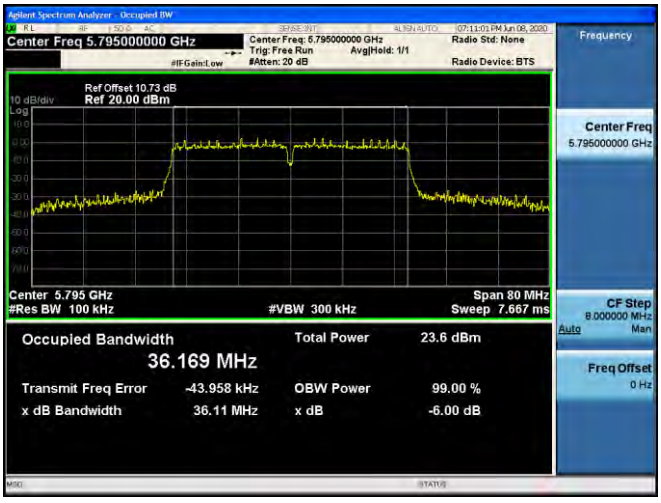
Note: In order to simplify the report, attached plots were only the most narrow channel.

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

[ANT2]

▣ Test Plots

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

802.11a (CH.157)	802.11n(HT20) (CH.165)
	
802.11n(HT40) (CH.159)	**802.11ac(VHT20) (CH.157)**
	
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.

[ANT1]

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	14.44	1.883	16.32	23.98
5200	40	17	14.47	1.883	16.35	23.98
5240	48	17	14.66	1.883	16.54	23.98
5260	52	17	14.77	1.883	16.65	23.98
5300	60	17	14.81	1.883	16.69	23.98
5320	64	16	13.89	1.883	15.77	23.98
5500	100	16	13.78	1.883	15.66	23.98
5600	120	17	14.91	1.883	16.79	23.98
5720	144	17	14.96	1.883	16.84	23.98
5745	149	17	15.01	1.883	16.89	30.00
5785	157	17	15.27	1.883	17.15	30.00
5825	165	17	15.29	1.883	17.17	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	14.55	1.991	16.54	23.98
5200	40	17	14.42	1.991	16.41	23.98
5240	48	17	14.55	1.991	16.54	23.98
5260	52	17	14.68	1.991	16.67	23.98
5300	60	17	14.77	1.991	16.76	23.98
5320	64	16	13.68	1.991	15.67	23.98
5500	100	16	13.56	1.991	15.55	23.98
5600	120	17	14.96	1.991	16.95	23.98
5720	144	17	14.84	1.991	16.83	23.98
5745	149	17	14.88	1.991	16.87	30.00
5785	157	17	15.18	1.991	17.17	30.00
5825	165	17	15.22	1.991	17.21	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	12	9.96	1.760	11.72	23.98
5230	46	16	14.22	1.760	15.98	23.98
5270	54	16	14.32	1.760	16.08	23.98
5310	62	12	10.06	1.760	11.82	23.98
5510	102	12	10.28	1.760	12.04	23.98
5590	118	16	14.36	1.760	16.12	23.98
5710	142	16	14.69	1.760	16.45	23.98
5755	151	16	14.75	1.760	16.51	30.00
5795	159	16	14.85	1.760	16.61	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	14.41	2.150	16.56	23.98
5200	40	17	14.35	2.150	16.50	23.98
5240	48	17	14.38	2.150	16.53	23.98
5260	52	17	14.63	2.150	16.78	23.98
5300	60	17	14.65	2.150	16.80	23.98
5320	64	16	13.53	2.150	15.68	23.98
5500	100	16	13.48	2.150	15.63	23.98
5600	120	17	14.84	2.150	16.99	23.98
5720	144	17	14.66	2.150	16.81	23.98
5745	149	17	14.76	2.150	16.91	30.00
5785	157	17	15.08	2.150	17.23	30.00
5825	165	17	14.99	2.150	17.14	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	12	8.48	3.326	11.81	23.98
5230	46	16	12.74	3.326	16.07	23.98
5270	54	16	12.70	3.326	16.03	23.98
5310	62	12	8.71	3.326	12.04	23.98
5510	102	12	8.91	3.326	12.24	23.98
5590	118	16	12.88	3.326	16.21	23.98
5710	142	16	13.15	3.326	16.48	23.98
5755	151	16	13.12	3.326	16.45	30.00
5795	159	16	13.21	3.326	16.54	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	12	8.35	3.382	11.73	23.98
5290	58	12	8.37	3.382	11.75	23.98
5530	106	12	8.62	3.382	12.00	23.98
5610	122	15	11.76	3.382	15.14	23.98
5690	138	15	11.85	3.382	15.23	23.98
5775	155	15	11.92	3.382	15.30	30.00

[ANT2]

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	14.62	1.883	16.50	23.98
5200	40	17	14.58	1.883	16.46	23.98
5240	48	17	14.67	1.883	16.55	23.98
5260	52	17	14.82	1.883	16.70	23.98
5300	60	17	14.77	1.883	16.65	23.98
5320	64	16	13.68	1.883	15.56	23.98
5500	100	16	13.67	1.883	15.55	23.98
5600	120	17	15.06	1.883	16.94	23.98
5720	144	17	15.11	1.883	16.99	23.98
5745	149	17	15.15	1.883	17.03	30.00
5785	157	17	15.40	1.883	17.28	30.00
5825	165	17	15.35	1.883	17.23	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	14.50	1.991	16.49	23.98
5200	40	17	14.55	1.991	16.54	23.98
5240	48	17	14.75	1.991	16.74	23.98
5260	52	17	14.78	1.991	16.77	23.98
5300	60	17	14.77	1.991	16.76	23.98
5320	64	16	13.71	1.991	15.70	23.98
5500	100	16	13.51	1.991	15.50	23.98
5600	120	17	14.89	1.991	16.88	23.98
5720	144	17	14.89	1.991	16.88	23.98
5745	149	17	15.01	1.991	17.00	30.00
5785	157	17	15.18	1.991	17.17	30.00
5825	165	17	15.16	1.991	17.15	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	12	9.82	1.760	11.58	23.98
5230	46	16	14.32	1.760	16.08	23.98
5270	54	16	14.29	1.760	16.05	23.98
5310	62	12	9.85	1.760	11.61	23.98
5510	102	12	9.87	1.760	11.63	23.98
5590	118	16	14.35	1.760	16.11	23.98
5710	142	16	14.62	1.760	16.38	23.98
5755	151	16	14.99	1.760	16.75	30.00
5795	159	16	14.99	1.760	16.75	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	14.28	2.150	16.43	23.98
5200	40	17	14.33	2.150	16.48	23.98
5240	48	17	14.44	2.150	16.59	23.98
5260	52	17	14.65	2.150	16.80	23.98
5300	60	17	14.61	2.150	16.76	23.98
5320	64	16	13.51	2.150	15.66	23.98
5500	100	16	13.41	2.150	15.56	23.98
5600	120	17	14.82	2.150	16.97	23.98
5720	144	17	14.83	2.150	16.98	23.98
5745	149	17	14.92	2.150	17.07	30.00
5785	157	17	15.16	2.150	17.31	30.00
5825	165	17	15.01	2.150	17.16	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	12	8.34	3.326	11.67	23.98
5230	46	16	12.72	3.326	16.05	23.98
5270	54	16	12.72	3.326	16.05	23.98
5310	62	12	8.48	3.326	11.81	23.98
5510	102	12	8.52	3.326	11.85	23.98
5590	118	16	13.12	3.326	16.45	23.98
5710	142	16	13.23	3.326	16.56	23.98
5755	151	16	13.50	3.326	16.83	30.00
5795	159	16	13.46	3.326	16.79	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	12	8.31	3.434	11.74	23.98
5290	58	12	8.37	3.434	11.80	23.98
5530	106	12	8.41	3.434	11.84	23.98
5610	122	15	11.85	3.434	15.28	23.98
5690	138	15	11.96	3.434	15.39	23.98
5775	155	15	11.86	3.434	15.29	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	16.32	16.50	19.42	23.98
5200	40	17	16.35	16.46	19.42	23.98
5240	48	17	16.54	16.55	19.56	23.98
5260	52	17	16.65	16.70	19.69	23.98
5300	60	17	16.69	16.65	19.68	23.98
5320	64	16	15.77	15.60	18.68	23.98
5500	100	16	15.66	15.55	18.62	23.98
5600	120	17	16.79	16.94	19.88	23.98
5720	144	17	16.84	16.99	19.93	23.98
5745	149	17	16.89	17.03	19.97	30.00
5785	157	17	17.15	17.28	20.23	30.00
5825	165	17	17.17	17.23	20.21	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	16.54	16.49	19.53	23.98
5200	40	17	16.41	16.54	19.49	23.98
5240	48	17	16.54	16.74	19.65	23.98
5260	52	17	16.67	16.77	19.73	23.98
5300	60	17	16.76	16.76	19.77	23.98
5320	64	16	15.67	15.70	18.70	23.98
5500	100	16	15.55	15.50	18.54	23.98
5600	120	17	16.95	16.88	19.93	23.98
5720	144	17	16.83	16.88	19.87	23.98
5745	149	17	16.87	17.00	19.95	30.00
5785	157	17	17.17	17.17	20.18	30.00
5825	165	17	17.21	17.15	20.19	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	12	11.72	11.58	14.66	23.98
5230	46	16	15.98	16.08	19.04	23.98
5270	54	16	16.08	16.05	19.08	23.98
5310	62	12	11.82	11.61	14.73	23.98
5510	102	12	12.04	11.63	14.85	23.98
5590	118	16	16.12	16.11	19.13	23.98
5710	142	16	16.45	16.38	19.43	23.98
5755	151	16	16.51	16.75	19.64	30.00
5795	159	16	16.61	16.75	19.69	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	16.56	16.43	19.51	23.98
5200	40	17	16.50	16.48	19.50	23.98
5240	48	17	16.53	16.59	19.57	23.98
5260	52	17	16.78	16.80	19.80	23.98
5300	60	17	16.80	16.76	19.79	23.98
5320	64	16	15.68	15.66	18.68	23.98
5500	100	16	15.63	15.56	18.61	23.98
5600	120	17	16.99	16.97	19.99	23.98
5720	144	17	16.81	16.98	19.91	23.98
5745	149	17	16.91	17.07	20.00	30.00
5785	157	17	17.23	17.31	20.28	30.00
5825	165	17	17.14	17.16	20.16	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	12	11.81	11.67	14.75	23.98
5230	46	16	16.07	16.05	19.07	23.98
5270	54	16	16.03	16.05	19.05	23.98
5310	62	12	12.04	11.81	14.93	23.98
5510	102	12	12.24	11.85	15.06	23.98
5590	118	16	16.21	16.45	19.34	23.98
5710	142	16	16.48	16.56	19.53	23.98
5755	151	16	16.45	16.83	19.65	30.00
5795	159	16	16.54	16.79	19.67	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	12	11.73	11.74	14.75	23.98
5290	58	12	11.75	11.80	14.79	23.98
5530	106	12	12.00	11.84	14.93	23.98
5610	122	15	15.14	15.28	18.22	23.98
5690	138	15	15.23	15.39	18.32	23.98
5775	155	15	15.30	15.29	18.31	30.00

10.5 POWER SPECTRAL DENSITY

[ANT1]

802.11a Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	3.759	1.883	5.642	11 dBm/MHz
5200	40	3.515	1.883	5.398	
5240	48	3.644	1.883	5.527	
5260	52	4.093	1.883	5.976	
5300	60	4.057	1.883	5.940	
5320	64	3.118	1.883	5.001	
5500	100	3.084	1.883	4.967	
5600	120	4.029	1.883	5.912	
5720	144	4.209	1.883	6.092	
5745	149	1.487	1.883	3.370	30 dBm/500kHz
5785	157	1.506	1.883	3.389	
5825	165	1.739	1.883	3.622	

802.11n(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	3.064	1.991	5.055	11 dBm/MHz
5200	40	2.937	1.991	4.928	
5240	48	2.979	1.991	4.970	
5260	52	3.720	1.991	5.711	
5300	60	3.627	1.991	5.618	
5320	64	2.532	1.991	4.523	
5500	100	2.645	1.991	4.636	
5600	120	3.786	1.991	5.777	
5720	144	3.665	1.991	5.656	
5745	149	1.232	1.991	3.223	30 dBm/500kHz
5785	157	1.361	1.991	3.352	
5825	165	1.324	1.991	3.315	

802.11n(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5190	38	-4.313	1.760	-2.553	11 dBm/MHz
5230	46	-0.084	1.760	1.676	
5270	54	-0.102	1.760	1.658	
5310	62	-4.240	1.760	-2.480	
5510	102	-3.972	1.760	-2.212	
5590	118	0.383	1.760	2.143	
5710	142	0.419	1.760	2.179	
5755	151	-2.144	1.760	-0.384	30 dBm /500kHz
5795	159	-2.100	1.760	-0.340	

802.11ac(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	3.083	2.150	5.233	11 dBm/MHz
5200	40	3.066	2.150	5.216	
5240	48	3.093	2.150	5.243	
5260	52	3.314	2.150	5.464	
5300	60	3.617	2.150	5.767	
5320	64	2.593	2.150	4.743	
5500	100	2.446	2.150	4.596	
5600	120	3.917	2.150	6.067	
5720	144	3.630	2.150	5.780	
5745	149	1.331	2.150	3.481	30 dBm/500kHz
5785	157	1.311	2.150	3.461	
5825	165	1.368	2.150	3.518	

802.11ac(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5190	38	-5.481	3.326	-2.155	11 dBm/MHz
5230	46	-1.105	3.326	2.221	
5270	54	-0.950	3.326	2.376	
5310	62	-5.285	3.326	-1.959	
5510	102	-5.326	3.326	-2.000	
5590	118	-0.896	3.326	2.430	
5710	142	-0.701	3.326	2.625	
5755	151	-2.979	3.326	0.347	30 dBm/500kHz
5795	159	-2.923	3.326	0.403	

802.11ac(80MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5210	42	-8.553	3.382	-5.171	11 dBm/MHz
5290	58	-8.630	3.382	-5.248	
5530	106	-8.490	3.382	-5.108	
5610	122	-4.888	3.382	-1.506	
5690	138	-4.834	3.382	-1.452	
5775	155	-7.702	3.382	-4.320	30 dBm/500kHz

[ANT2]

802.11a Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	3.536	1.883	5.419	11 dBm/MHz
5200	40	3.521	1.883	5.404	
5240	48	3.623	1.883	5.506	
5260	52	3.979	1.883	5.862	
5300	60	4.169	1.883	6.052	
5320	64	3.247	1.883	5.130	
5500	100	3.243	1.883	5.126	
5600	120	4.126	1.883	6.009	
5720	144	4.170	1.883	6.053	
5745	149	1.411	1.883	3.294	30 dBm/500kHz
5785	157	1.664	1.883	3.547	
5825	165	1.614	1.883	3.497	

802.11n(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	3.315	1.991	5.306	11 dBm/MHz
5200	40	3.133	1.991	5.124	
5240	48	3.206	1.991	5.197	
5260	52	3.551	1.991	5.542	
5300	60	3.591	1.991	5.582	
5320	64	2.405	1.991	4.396	
5500	100	2.549	1.991	4.540	
5600	120	3.785	1.991	5.776	
5720	144	3.736	1.991	5.727	
5745	149	1.211	1.991	3.202	30 dBm/500kHz
5785	157	1.559	1.991	3.550	
5825	165	1.769	1.991	3.760	

802.11n(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5190	38	-4.003	1.760	-2.243	11 dBm/MHz
5230	46	-0.017	1.760	1.743	
5270	54	-0.026	1.760	1.734	
5310	62	-4.434	1.760	-2.674	
5510	102	-3.984	1.760	-2.224	
5590	118	0.407	1.760	2.167	
5710	142	0.596	1.760	2.356	
5755	151	-2.029	1.760	-0.269	30 dBm /500kHz
5795	159	-2.009	1.760	-0.249	

802.11ac(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	3.269	2.150	5.419	11 dBm/MHz
5200	40	3.177	2.150	5.327	
5240	48	3.374	2.150	5.524	
5260	52	3.451	2.150	5.601	
5300	60	3.399	2.150	5.549	
5320	64	2.599	2.150	4.749	
5500	100	2.333	2.150	4.483	
5600	120	3.929	2.150	6.079	
5720	144	3.954	2.150	6.104	
5745	149	1.422	2.150	3.572	30 dBm/500kHz
5785	157	1.463	2.150	3.613	
5825	165	1.480	2.150	3.630	

802.11ac(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5190	38	-5.358	3.326	-2.032	11 dBm/MHz
5230	46	-1.008	3.326	2.318	
5270	54	-0.844	3.326	2.482	
5310	62	-5.589	3.326	-2.263	
5510	102	-5.251	3.326	-1.925	
5590	118	-0.928	3.326	2.398	
5710	142	-0.875	3.326	2.451	
5755	151	-2.967	3.326	0.359	30 dBm/500kHz
5795	159	-2.927	3.326	0.399	

802.11ac(80MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5210	42	-8.231	3.382	-4.849	11 dBm/MHz
5290	58	-8.519	3.382	-5.137	
5530	106	-8.337	3.382	-4.955	
5610	122	-4.679	3.382	-1.297	
5690	138	-4.716	3.382	-1.334	
5775	155	-7.505	3.382	-4.123	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	5.642	5.419	8.542	11 dBm/MHz
5200	40	5.398	5.404	8.412	
5240	48	5.527	5.506	8.527	
5260	52	5.976	5.862	8.930	
5300	60	5.940	6.052	9.007	
5320	64	5.001	5.130	8.076	
5500	100	4.967	5.126	8.058	
5600	120	5.912	6.009	8.971	
5720	144	6.092	6.053	9.083	
5745	149	3.370	3.294	6.343	30 dBm/500kHz
5785	157	3.389	3.547	6.479	
5825	165	3.622	3.497	6.570	

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	5.055	5.306	8.192	11 dBm/MHz
5200	40	4.928	5.124	8.037	
5240	48	4.970	5.197	8.095	
5260	52	5.711	5.542	8.637	
5300	60	5.618	5.582	8.610	
5320	64	4.523	4.396	7.470	
5500	100	4.636	4.540	7.598	
5600	120	5.777	5.776	8.787	
5720	144	5.656	5.727	8.702	
5745	149	3.223	3.202	6.223	30 dBm/500kHz
5785	157	3.352	3.550	6.462	
5825	165	3.315	3.760	6.553	

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	-2.553	-2.243	0.615	11 dBm/MHz
5230	46	1.676	1.743	4.720	
5270	54	1.658	1.734	4.707	
5310	62	-2.480	-2.674	0.435	
5510	102	-2.212	-2.224	0.792	
5590	118	2.143	2.167	5.165	
5710	142	2.179	2.356	5.279	
5755	151	-0.384	-0.269	2.684	30 dBm /500kHz
5795	159	-0.340	-0.249	2.716	

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	5.233	5.419	8.337	11 dBm/MHz
5200	40	5.216	5.327	8.282	
5240	48	5.243	5.524	8.396	
5260	52	5.464	5.601	8.543	
5300	60	5.767	5.549	8.670	
5320	64	4.743	4.749	7.756	
5500	100	4.596	4.483	7.550	
5600	120	6.067	6.079	9.083	
5720	144	5.780	6.104	8.955	
5745	149	3.481	3.572	6.537	30 dBm/500kHz
5785	157	3.461	3.613	6.548	
5825	165	3.518	3.630	6.585	

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	-2.155	-2.032	0.917	11 dBm/MHz
5230	46	2.221	2.318	5.280	
5270	54	2.376	2.482	5.439	
5310	62	-1.959	-2.263	0.902	
5510	102	-2.000	-1.925	1.048	
5590	118	2.430	2.398	5.424	
5710	142	2.625	2.451	5.549	
5755	151	0.347	0.359	3.363	30 dBm /500kHz
5795	159	0.403	0.399	3.411	

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	-5.171	-4.849	-1.997	11 dBm/MHz
5290	58	-5.248	-5.137	-2.182	
5530	106	-5.108	-4.955	-2.021	
5610	122	-1.506	-1.297	1.610	
5690	138	-1.452	-1.334	1.617	
5775	155	-4.320	-4.123	-1.210	30 dBm /500kHz

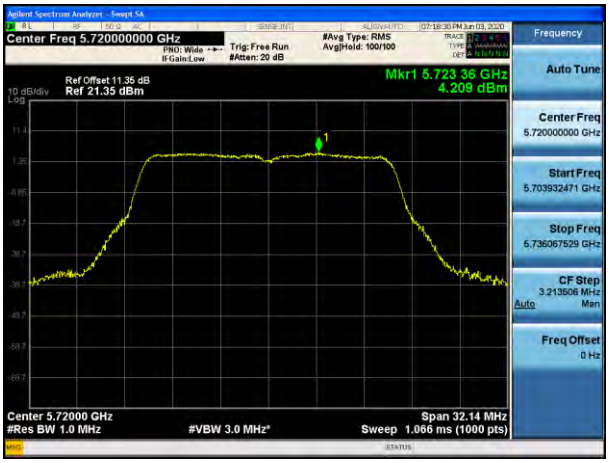
[ANT1]

▣ Test Plots(802.11a)

Note:

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

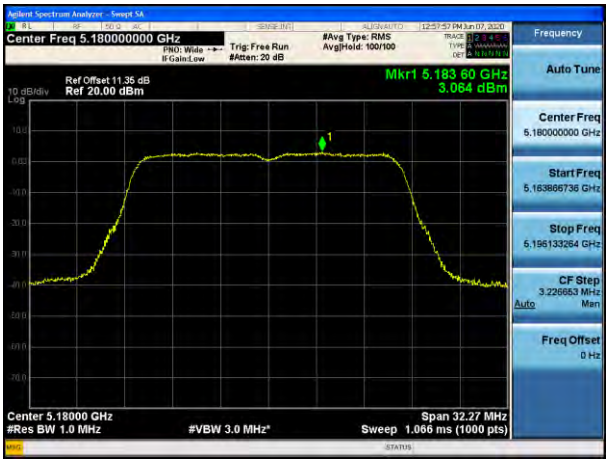
UNII 1 (Ch. 36)	UNII 2A (Ch. 52)
	

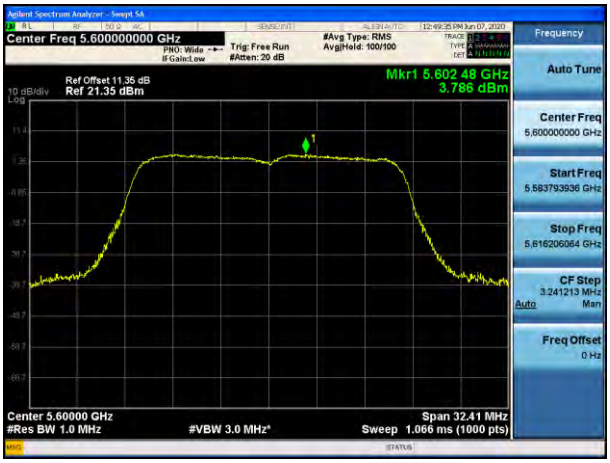
UNII 2C (Ch. 144)	UNII 3 (Ch. 165)
	

▣ Test Plots(802.11n(HT20))

Note:

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

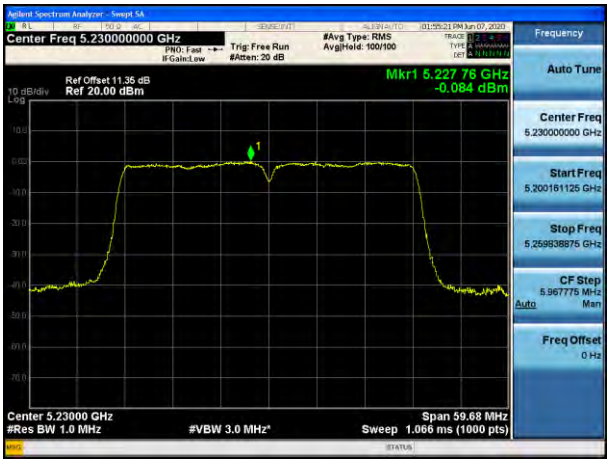
UNII 1 (Ch. 36)	UNII 2A (Ch. 52)
	

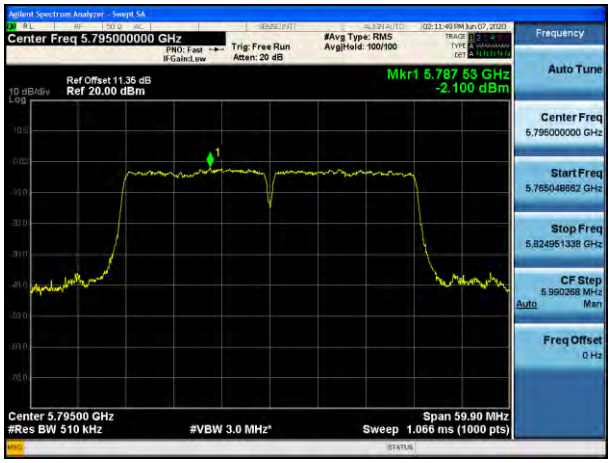
UNII 2C (Ch. 120)	UNII 3 (Ch. 157)
	

▣ Test Plots(802.11n(HT40))

Note:

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

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

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. 48)	UNII 2A (Ch. 60)
	

UNII 2C (Ch. 120)	UNII 3 (Ch. 165)
	

▣ Test Plots(802.11ac(VHT40))

Note:

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

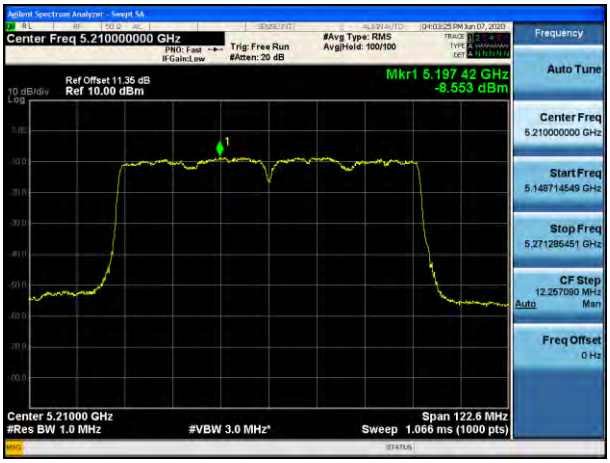
UNII 1 (Ch. 46)	UNII 2A (Ch. 54)
	

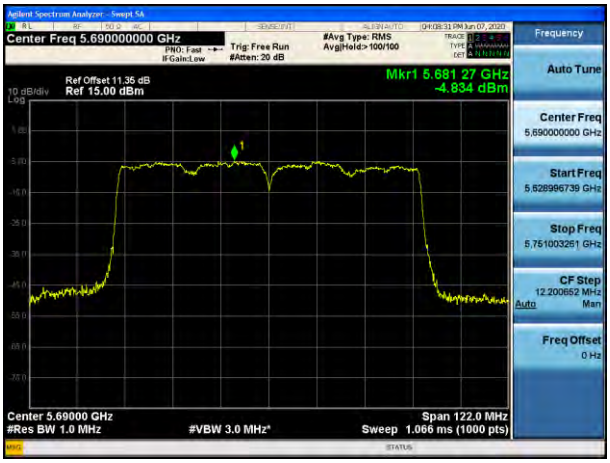
UNII 2C (Ch. 142)	UNII 3 (Ch. 159)
	

▣ 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)
	

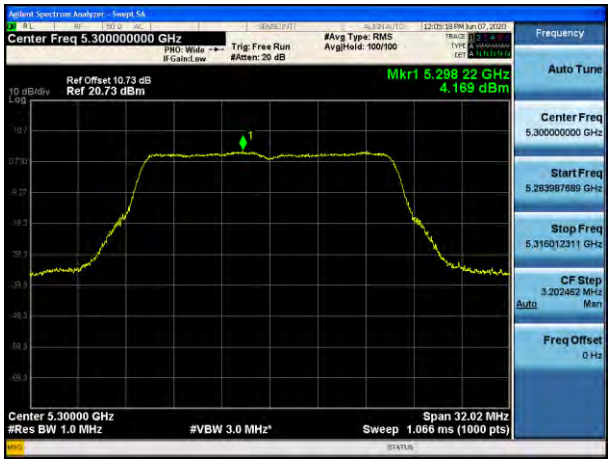
UNII 2C (Ch. 138)	UNII 3 (Ch. 155)
	

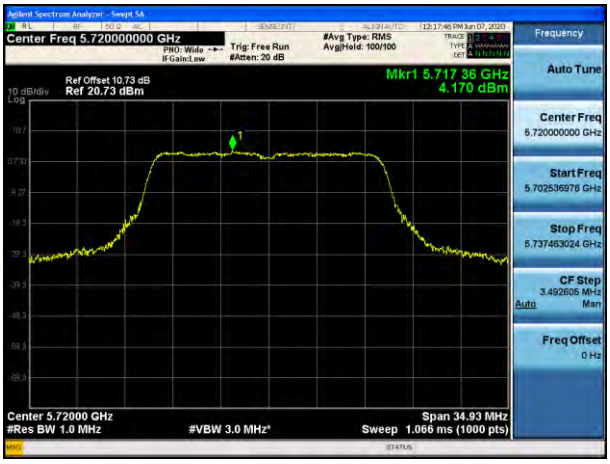
[ANT2]

▣ Test Plots(802.11a)

Note:

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

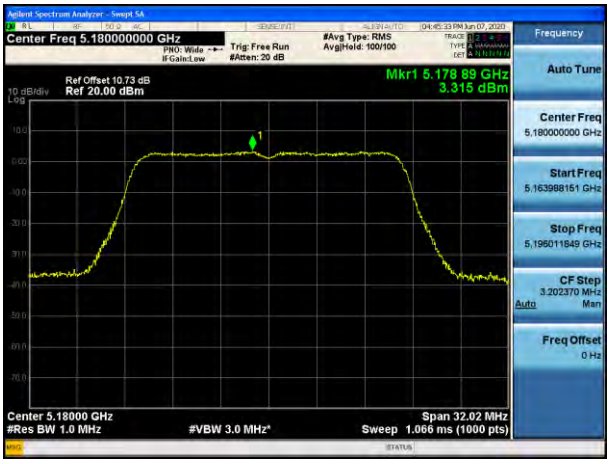
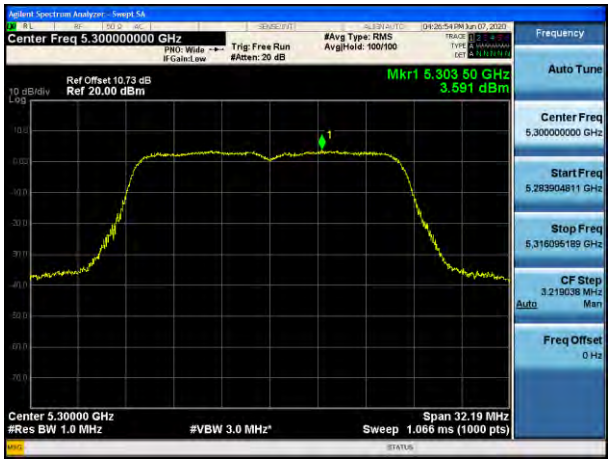
UNII 1 (Ch. 48)	UNII 2A (Ch. 60)
	

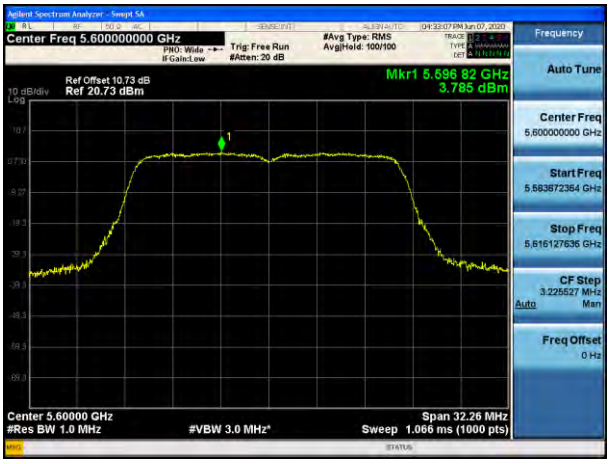
UNII 2C (Ch. 144)	UNII 3 (Ch. 157)
	

▣ 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)
	

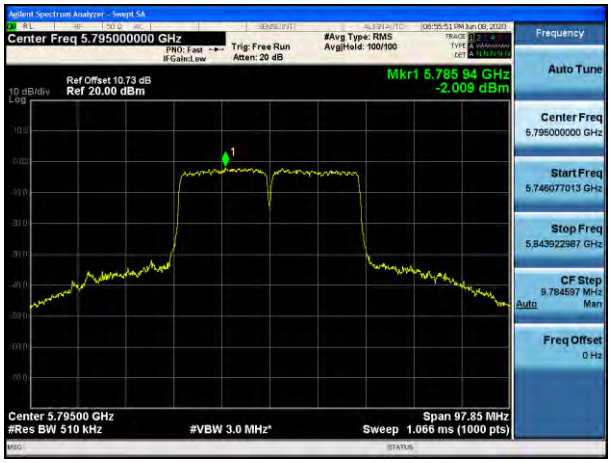
UNII 2C (Ch. 120)	UNII 3 (Ch. 165)
	

▣ Test Plots(802.11n(HT40))

Note:

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

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

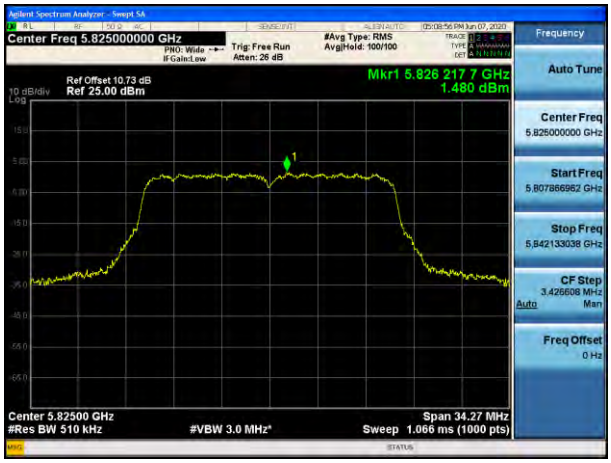
UNII 2C (Ch. 142)	UNII 3 (Ch. 159)
	

▣ Test Plots(802.11ac(VHT20))

Note:

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

UNII 1 (Ch. 48)	UNII 2A (Ch. 52)
	

UNII 2C (Ch. 144)	UNII 3 (Ch. 165)
	

▣ Test Plots(802.11ac(VHT40))

Note:

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

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

UNII 2C (Ch. 142)	UNII 3 (Ch. 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. 122)	UNII 3 (Ch. 155)
	

10.6 FREQUENCY STABILITY.

10.6.1 80MHz BW

[ANT1]

Startup after the EUT is energized

OPERATING BAND: UNII Band 1
OPERATING FREQUENCY: 5,210,000,000 Hz
CHANNEL: 42
REFERENCE VOLTAGE: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5210090.98	90.98
100%		-30	5210030.67	30.67
100%		-20	5210088.35	88.35
100%		-10	5210022.64	22.64
100%		0	5210057.14	57.14
100%		+10	5210006.32	6.32
100%		+30	5210058.72	58.72
100%		+40	5210054.28	54.28
100%		+50	5210066.92	66.92
Batt. Endpoint	3.4	+20	5210070.49	70.49

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: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5290082.18	82.18
100%		-30	5290056.05	56.05
100%		-20	5290039.76	39.76
100%		-10	5290032.92	32.92
100%		0	5290080.44	80.44
100%		+10	5290069.99	69.99
100%		+30	5290070.24	70.24
100%		+40	5290089.48	89.48
100%		+50	5290062.96	62.96
Batt. Endpoint	3.4	+20	5290053.97	53.97

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: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5530085.84	85.84
100%		-30	5530022.64	22.64
100%		-20	5530007.09	7.09
100%		-10	5530086.73	86.73
100%		0	5530069.29	69.29
100%		+10	5530018.79	18.79
100%		+30	5530041.23	41.23
100%		+40	5530055.28	55.28
100%		+50	5530035.75	35.75
Batt. Endpoint	3.4	+20	5530003.66	3.66

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: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5775081.57	81.57
100%		-30	5775071.62	71.62
100%		-20	5775089.33	89.33
100%		-10	5775086.03	86.03
100%		0	5775012.41	12.41
100%		+10	5775049.98	49.98
100%		+30	5775016.20	16.2
100%		+40	5775092.84	92.84
100%		+50	5775054.53	54.53
Batt. Endpoint	3.4	+20	5775075.52	75.52

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: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5210083.33	83.33
100%		-30	5210065.62	65.62
100%		-20	5210028.94	28.94
100%		-10	5210052.83	52.83
100%		0	5210078.74	78.74
100%		+10	5210095.13	95.13
100%		+30	5210018.61	18.61
100%		+40	5210008.49	8.49
100%		+50	5210078.43	78.43
Batt. Endpoint	3.4	+20	5210094.66	94.66

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: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5290053.98	53.98
100%		-30	5290048.66	48.66
100%		-20	5290064.87	64.87
100%		-10	5290097.34	97.34
100%		0	5290008.31	8.31
100%		+10	5290022.30	22.3
100%		+30	5290044.05	44.05
100%		+40	5290056.76	56.76
100%		+50	5290052.59	52.59
Batt. Endpoint	3.4	+20	5290088.51	88.51

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: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5530075.63	75.63
100%		-30	5530040.81	40.81
100%		-20	5530053.25	53.25
100%		-10	5530023.83	23.83
100%		0	5530057.69	57.69
100%		+10	5530089.88	89.88
100%		+30	5530016.71	16.71
100%		+40	5530092.17	92.17
100%		+50	5530079.51	79.51
Batt. Endpoint	3.4	+20	5530008.31	8.31

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 3
OPERATING FREQUENCY: 5,775,000,000 Hz
CHANNEL: 155
REFERENCE VOLTAGE: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5775089.56	89.56
100%		-30	5775099.53	99.53
100%		-20	5775026.38	26.38
100%		-10	5775032.16	32.16
100%		0	5775061.06	61.06
100%		+10	5775005.02	5.02
100%		+30	5775047.55	47.55
100%		+40	5775090.22	90.22
100%		+50	5775066.17	66.17
Batt. Endpoint	3.4	+20	5775062.08	62.08

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:	3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5210081.48	81.48
100%		-30	5210077.05	77.05
100%		-20	5210094.09	94.09
100%		-10	5210038.57	38.57
100%		0	5210002.97	2.97
100%		+10	5210049.93	49.93
100%		+30	5210009.37	9.37
100%		+40	5210022.76	22.76
100%		+50	5210059.29	59.29
Batt. Endpoint	3.4	+20	5210032.72	32.72

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: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5290042.80	42.80
100%		-30	5290044.56	44.56
100%		-20	5290070.52	70.52
100%		-10	5290053.41	53.41
100%		0	5290045.86	45.86
100%		+10	5290050.89	50.89
100%		+30	5290090.57	90.57
100%		+40	5290061.46	61.46
100%		+50	5290043.59	43.59
Batt. Endpoint	3.4	+20	5290010.25	10.25

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: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5530067.11	67.11
100%		-30	5530017.92	17.92
100%		-20	5530057.76	57.76
100%		-10	5530093.91	93.91
100%		0	5530071.68	71.68
100%		+10	5530031.20	31.2
100%		+30	5530043.86	43.86
100%		+40	5530055.99	55.99
100%		+50	5530012.40	12.40
Batt. Endpoint	3.4	+20	5530059.93	59.93

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: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5775027.70	27.70
100%		-30	5775097.58	97.58
100%		-20	5775038.82	38.82
100%		-10	5775055.07	55.07
100%		0	5775033.96	33.96
100%		+10	5775021.25	21.25
100%		+30	5775097.62	97.62
100%		+40	5775008.37	8.37
100%		+50	5775032.66	32.66
Batt. Endpoint	3.4	+20	5775016.99	16.99

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.

10 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5210018.16	18.16
100%		-30	5210077.81	77.81
100%		-20	5210092.37	92.37
100%		-10	5210087.29	87.29
100%		0	5210058.23	58.23
100%		+10	5210041.30	41.30
100%		+30	5210090.80	90.80
100%		+40	5210099.47	99.47
100%		+50	5210049.61	49.61
Batt. Endpoint	3.4	+20	5210036.93	36.93

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: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5290075.93	75.93
100%		-30	5290092.76	92.76
100%		-20	5290073.78	73.78
100%		-10	5290091.41	91.41
100%		0	5290013.92	13.92
100%		+10	5290020.24	20.24
100%		+30	5290067.77	67.77
100%		+40	5290010.71	10.71
100%		+50	5290024.26	24.26
Batt. Endpoint	3.4	+20	5290012.93	12.93

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: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5530058.72	58.72
100%		-30	5530040.18	40.18
100%		-20	5530049.37	49.37
100%		-10	5530025.55	25.55
100%		0	5530035.43	35.43
100%		+10	5530040.20	40.2
100%		+30	5530045.14	45.14
100%		+40	5530056.96	56.96
100%		+50	5530058.87	58.87
Batt. Endpoint	3.4	+20	5530031.51	31.51

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: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5775032.31	32.31
100%		-30	5775031.45	31.45
100%		-20	5775078.88	78.88
100%		-10	5775015.41	15.41
100%		0	5775072.74	72.74
100%		+10	5775013.30	13.3
100%		+30	5775016.13	16.13
100%		+40	5775019.35	19.35
100%		+50	5775026.44	26.44
Batt. Endpoint	3.4	+20	5775002.62	2.62

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.