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FCC UNII REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Address:
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Date of Issue:
31 October 2019

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

Report No.: HCT-RF-1910-FC002

FCC ID:	**A3LSMG770F**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**
Model:	SM-G770F/DS
Additional Model:	SM-G770F/DSM, SM-G770F
EUT Type:	Mobile Phone
Modulation type	OFDM
FCC Classification:	Unlicensed National Information Infrastructure(UNII)
FCC Rule Part(s):	Part 15.407

Engineering Statement:

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

Report prepared by : Jeong Ho Kim
Engineer of Telecommunication testing center

Approved by : Kwon Jeong
Manager of Telecommunication testing center

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-1910-FC002	31 October 2019	- First Approval Report

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)

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1. GENERAL INFORMATION

EUT DESCRIPTION

Model	SM-G770F/DS	
Additional Model	SM-G770F/DSM, SM-G770F	
EUT Type	Mobile Phone	
Power Supply	DC 3.85 V	
Battery Information	Model: EB-BA907ABY L Type: Li-ion Battery	
Travel Adapter Information	Model : EP-TA845 Manufacture: SOLUM	
Data Cable Information	Model : EP-DN975BBE Manufacture: RF TECH	
Ear-jack Information	Model : GHSS028-W9 Manufacture: BUJEON	
Modulation Type	OFDM : 802.11a, 802.11n, 802.11ac	
Frequency Range (MHz)	U-NII-1	20MHz BW : 5180 - 5240 40MHz BW : 5190 - 5230 80MHz BW : 5210
	U-NII-2A	20MHz BW : 5260 - 5320 40MHz BW : 5270 - 5310 80MHz BW : 5290
	U-NII-2C	20MHz BW : 5500 - 5720 40MHz BW : 5510 - 5710 80MHz BW : 5530 – 5690
	U-NII-3	20MHz BW : 5745 - 5825 40MHz BW : 5755 - 5795 80MHz BW : 5775
Antenna Specification	Antenna type: LDS Ant.1 Peak Gain : -6.45 dBi(UNII 1, 2A, 2C, 3) Ant.2 Peak Gain : -4.55 dBi(UNII 1, 2A, 2C, 3)	
Straddle channel	Supported	
TDWR Band	Supported	
Dynamic Frequency Selection	Slave without radar detection	
Date(s) of Tests	September 16, 2019 ~ October 29, 2019	

ANTENNA CONFIGURATIONS

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

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

Note:

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

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

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

3. Directional Gain Calculation

According to KDB 662911 D01 Multiple Transmitter Output v02r01 F) 2) e) (iii)

Directional gain = $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS}) dBi

(N_{ANT} = 2, N_{SS} = 2, $G_{ANT\ MAX}$ is.the gain of the antenna having the highest gain)

Band	Ant Gain (dBi)		N_{ANT}/ N_{ss}	Directional Gain (= $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS})) (dBi)
UNII 1,2A,2C,3	ANT1	-6.54	2 / 2	-2.48
	ANT2	-4.55		

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	15.69	0.037	16.26	0.042	19.00	0.079
	802.11n (HT20)	15.66	0.037	16.27	0.042	18.98	0.079
	802.11n (HT40)	15.29	0.034	14.71	0.030	18.02	0.063
	802.11ac (VHT20)	15.58	0.036	16.53	0.045	19.09	0.081
	802.11ac (VHT40)	15.14	0.033	14.82	0.030	17.99	0.063
	802.11ac (VHT80)	11.19	0.013	10.62	0.012	13.93	0.025
UNII2A	802.11a	15.53	0.036	16.31	0.043	18.95	0.079
	802.11n (HT20)	15.55	0.036	16.32	0.043	18.96	0.079
	802.11n (HT40)	15.69	0.037	15.51	0.036	18.61	0.073
	802.11ac (VHT20)	15.50	0.035	16.47	0.044	19.02	0.080
	802.11ac (VHT40)	15.62	0.036	15.58	0.036	18.61	0.073
	802.11ac (VHT80)	12.38	0.017	12.26	0.017	15.33	0.034
UNII2C	802.11a	15.70	0.037	16.25	0.042	19.00	0.079
	802.11n (HT20)	15.69	0.037	16.18	0.041	18.95	0.078
	802.11n (HT40)	14.97	0.031	15.74	0.038	18.38	0.069
	802.11ac (VHT20)	15.62	0.036	16.08	0.041	18.87	0.077
	802.11ac (VHT40)	14.92	0.031	15.77	0.038	18.37	0.069
	802.11ac (VHT80)	12.42	0.017	12.89	0.019	15.67	0.037
UNII3	802.11a	15.82	0.038	16.46	0.044	19.16	0.082
	802.11n (HT20)	15.74	0.037	16.32	0.043	19.04	0.080
	802.11n (HT40)	14.50	0.028	15.56	0.036	18.07	0.064
	802.11ac (VHT20)	15.84	0.038	16.35	0.043	19.11	0.082
	802.11ac (VHT40)	14.49	0.028	15.57	0.036	18.07	0.064
	802.11ac (VHT80)	12.17	0.016	12.78	0.019	15.50	0.035

3. TEST METHODOLOGY

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

EUT CONFIGURATION

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

EUT EXERCISE

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

GENERAL TEST PROCEDURES

Conducted Emissions

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

Radiated Emissions

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

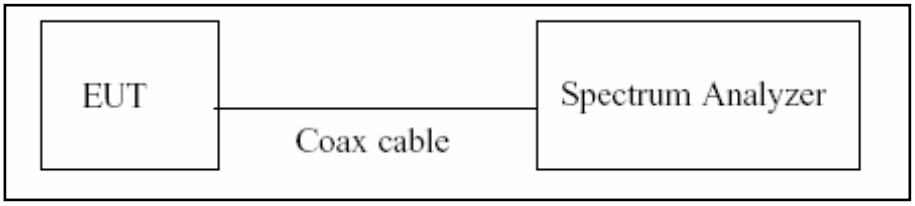
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

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.

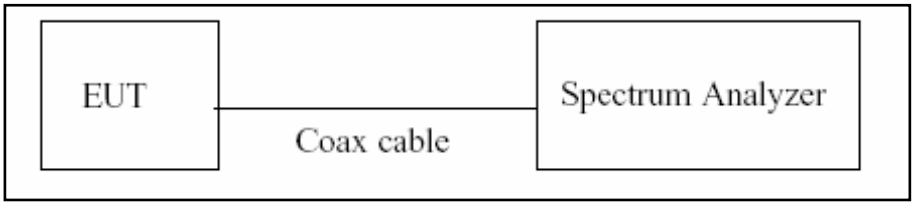
1. RBW = 8 MHz (the largest availble value)
2. VBW = 8 MHz (≥ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on}/ T_{total} and Duty Cycle Factor = 10log(1/Duty Cycle)

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.

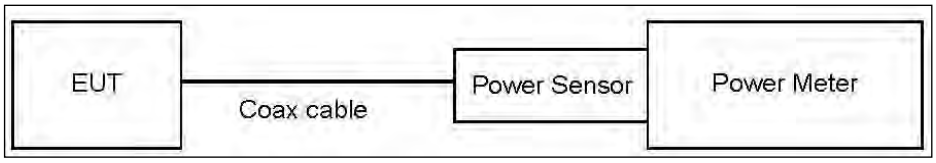
8.3. Output Power Measurement

Limit

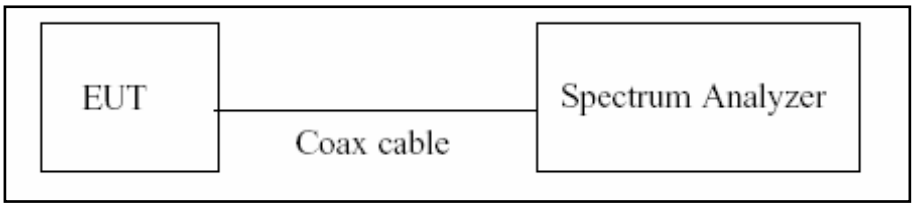
Band	Limit
UNII 1	- Master : Not exceed 1 W(=30dBm) - Slave : Not exceed 250 mW(=23.98 dBm)
UNII 2A, 2C	Not exceed the lesser of 250 mW or 11 dBm + 10 log B, (where B is the 26 dB emission bandwidth in megahertz.)
UNII 3	Not exceed 1 W(=30dBm)

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

Band	Loss(dB)
UNII 1	20.73
UNII 2A	20.73
UNII 2C	20.73
UNII 3	20.73

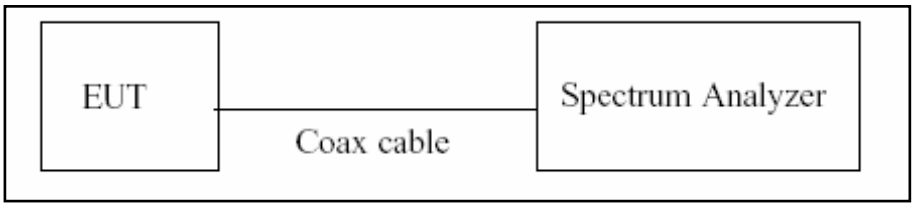
(Actual value of loss for the attenuator and cable combination)

8.4. Power Spectral Density

Limit

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

Test Configuration



Test Procedure

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

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

Sample Calculation

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

Note

1. Spectrum reading values are not plot data.
   The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss(20 dB) + Cable loss
3. Actual value of loss for the attenuator and cable combination is below table.

Band	Loss(dB)
UNII 1	20.73
UNII 2A	20.73
UNII 2C	20.73
UNII 3	20.73

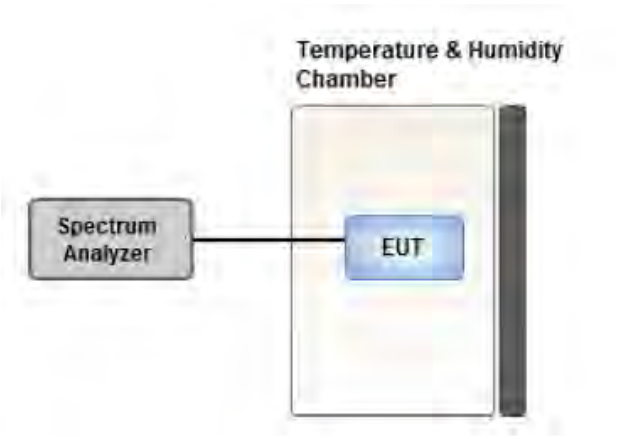
(Actual value of loss for the attenuator and cable combination)

8.5. Frequency Stability

Limit

Maintained within the band

Test Configuration



Test Procedure

1. The EUT was placed inside an environmental chamber as the temperature in the chamber was varied between -30 ℃ and 50 ℃.
2. The temperature was incremented by 10 ℃ intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.
3. The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battety operating end point which shall be specified by the manufacturer.
4. While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.

8.6. AC Power line Conducted Emissions

Limit

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

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56[(a)]	56 to 46[(a)]
0.50 to 5	56	46
5 to 30	60	50

[(a)]Decreases with the logarithm of the frequency.

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

Test Configuration

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

Test Procedure

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

Sample Calculation

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

8.7. Radiated Test

Limit

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

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

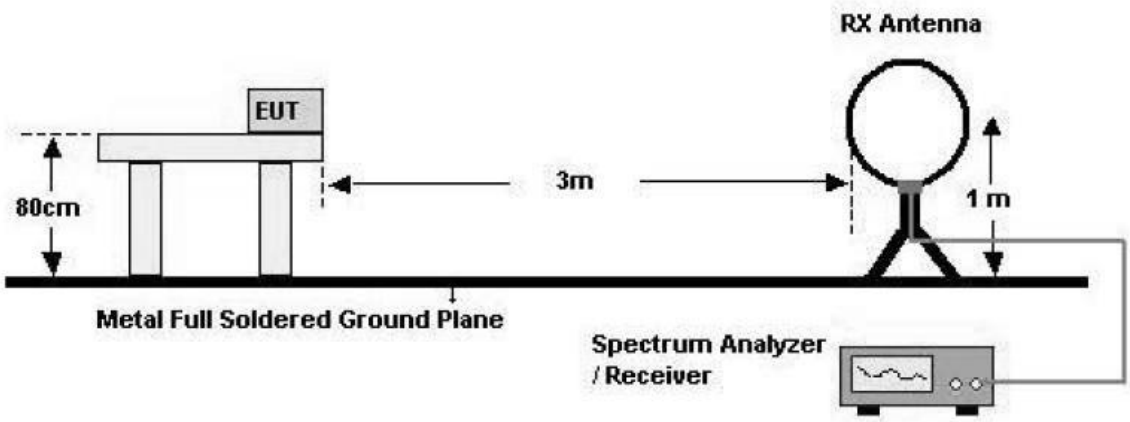
3. UNII 3: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below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

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

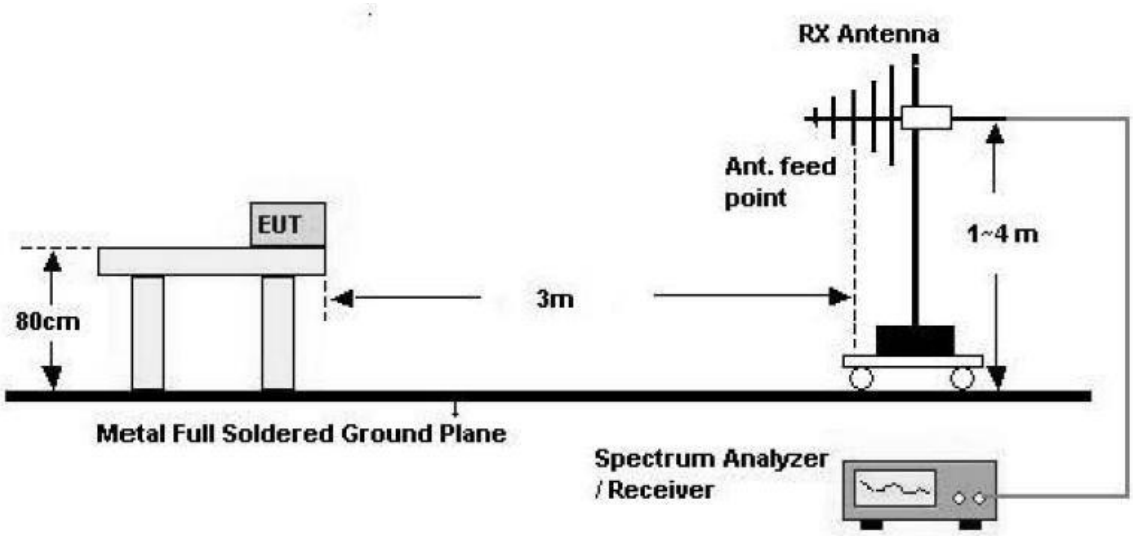
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

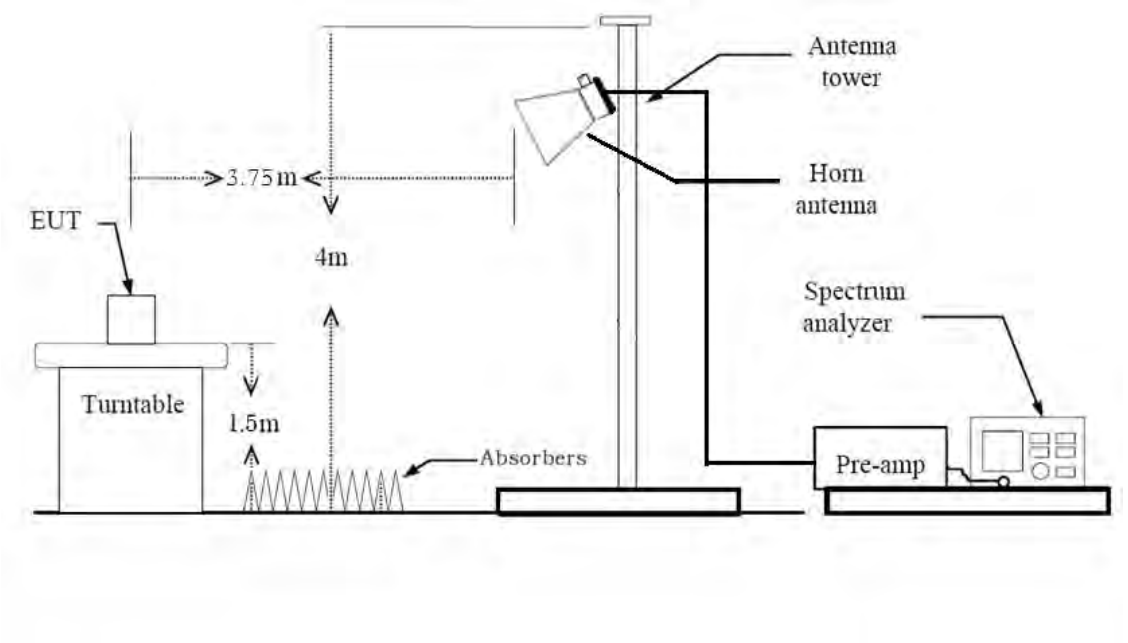
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions(Below 30 MHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3m from the EUT
3. The EUT is placed on a turntable, which is 0.8m above ground plane.
4. .We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor(0.009 MHz – 0.490 MHz) = 40log(3 m/300 m) = - 80 dB
   Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = 40log(3 m/30 m) = - 40 dB
   Measurement Distance : 3 m
8. Spectrum Setting
   - Frequency Range = 9 kHz ~ 30 MHz
   - Detector = Peak
   - Trace = Maxhold
   - RBW = 9 kHz
   - VBW ≥ 3 x RBW
9. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

KDB 414788 OFS and Chamber Correlation Justification

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making
measurements in the near field.

OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

Test Procedure of Radiated spurious emissions(Below 1GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.

2. The EUT is placed on a turntable, which is 0.8m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. 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
6. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L)
7. 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 3.75 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. According to SVSWR requirement in ANSI 63.4-2014, We performed the radiated test at 3.75 m distance from center of turn table. So, we applied the distance factor(reference distance : 3 m).
   - ◆ Distance extrapolation factor = 20log (test distance / specific distance) (dB)
6. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
7. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
8. The unit was tested with its standard battery.
9. Spectrum Setting

(1) Measurement Type(Peak, G.5 in KDB 789033 v02r01):

- RBW = 1 MHz
- VBW ≥ 3 MHz
- Detector = Peak
- Sweep Time = auto
- Trace mode = max hold
- Allow sweeps to continue until the trace stabilizes.

Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately 1/x, where x is the duty cycle.

(2) Measurement Type(Average, G.6.d in KDB 789033 v02r01):

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

10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor
11. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency
12. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Distance Factor(D.F)

Test Procedure of Radiated Restricted Band Edge

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3.75 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. According to SVSWR requirement in ANSI 63.4-2014, We performed the radiated test at 3.75 m distance from center of turn table. So, we applied the distance factor(reference distance : 3 m).
   - ◆ Distance extrapolation factor = 20log (test distance / specific distance) (dB)
6. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
7. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
8. The unit was tested with its standard battery.
9. Spectrum Setting

   (1) Measurement Type(Peak, G.5 in KDB 789033 v02r01):
   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep Time = auto
   - Trace mode = max hold
   - Allow sweeps to continue until the trace stabilizes.
     Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately 1/x, where x is the duty cycle.

   (2) Measurement Type(Average, G.6.d in KDB 789033 v02r01):
   - RBW = 1 MHz
   - VBW(Duty cycle ≥ 98 percent) = VBW ≤ RBW/100(i.e., 10 kHz) but not less than 10 Hz.
   - VBW(Duty cycle is < 98 percent) = VBW ≥ 1/T, where T is the minimum transmission duration.
   - The analyzer is set to linear detector mode.
   - Detector = Peak.
   - Sweep time = auto.
   - Trace mode = max hold.
   - Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98 percent duty cycle. For lower duty cycles, increase the minimym number of traces by a factor of 1/x, where x is the duty cycle.
10. Measured Frequency Range :
    - 4500MHz ~ 5150MHz
    - 5350MHz ~ 5460MHz
    - 5460MHz ~ 5470MHz
    - (75 MHz or more below the 5725MHz) ~ 5725MHz
    - 5850MHz ~ (75 MHz or more above the 5850MHz)

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

The actual setting value of VBW

Mode	Worst Data rate (Mbps)	Duty Cycle	Duty Cycle Factor (dB)	The actual setting value of VBW (Hz)
802.11a	6	0.975	0.112	1000
802.11n(HT20)	MCS 0	0.972	0.122	1000
802.11n(HT40)	MCS 0	0.948	0.233	3000
802.11ac(VHT20)	MCS 0	0.975	0.109	1000
802.11ac(VHT40)	MCS 0	0.950	0.222	3000
802.11ac(VHT80)	MCS 0	0.902	0.446	10000

8.8. Worst case configuration and mode

Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone, Stand alone + External accessories(Earphone, etc)
   - Worstcase : Stand alone
2. EUT Axis
   - Radiated Spurious Emissions : Y
   - Radiated Restricted Band Edge : Y
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-G770F/DSM, SM-G770F, SM-G770F/DS were tested and the worst case results are reported.

(Worst case : SM-G770F/DS)

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

Description	2.4 GHz Emission	5 GHz Emission
Antenna	1	2
Channel	1, 6, 11	36, 100, 165
Data Rate	1 Mbps	6 Mbps
Mode	802.11b	802.11a

4. SM-G770F/DSM, SM-G770F, SM-G770F/DS were tested and the worst case results are reported.

(Worst case : SM-G770F/DS)

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-G770F/DSM, SM-G770F, SM-G770F/DS were tested and the worst case results are reported.

(Worst case : SM-G770F/DS)

Conducted test

1. All datarate of operation were investigated and the worst case datarate results are reported
2. SM-G770F/DSM, SM-G770F, SM-G770F/DS were tested and the worst case results are reported.

(Worst case : SM-G770F/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+10 log $\log_{10}$ (BW) dBm (5250-5350 MHz) < 250 mW or 11+10 log $\log_{10}$ (BW) dBm (5470-5725 MHz) <1 W(5725-5850 MHz)		PASS
Peak Power Spectral Density	§15.407(a)(1),(5)	<11 dBm/ MHz (5150-5250 MHz) <11 dBm/ MHz (5250-5350 MHz) <11 dBm/ MHz (5470-5725 MHz) <30 dBm/500 kHz(5725-5850 MHz)		PASS
Frequency Stability	§15.407(g) §2.1055	Maintained within the band		PASS
AC Conducted Emissions 150 kHz-30 MHz	15.207	<FCC 15.207 limits		PASS
Undesirable Emissions	§15.407(b)	<-27 dBm/MHz EIRP (UNII1, 2A, 2C) cf. Section 8.7 (UNII 3)	Radiated	PASS
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	15.205, 15.407(b)(5), (6)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		PASS

10. TEST RESULT

10.1 DUTY CYCLE

Mode	Data Rate (Mbps)	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11a	6	1.430	1.468	0.975	0.112
	9	0.961	0.998	0.963	0.163
	12	0.729	0.766	0.952	0.214
	18	0.492	0.529	0.929	0.318
	24	0.376	0.414	0.910	0.412
	36	0.257	0.292	0.878	0.563
	48	0.200	0.236	0.847	0.721
	54	0.180	0.216	0.833	0.793

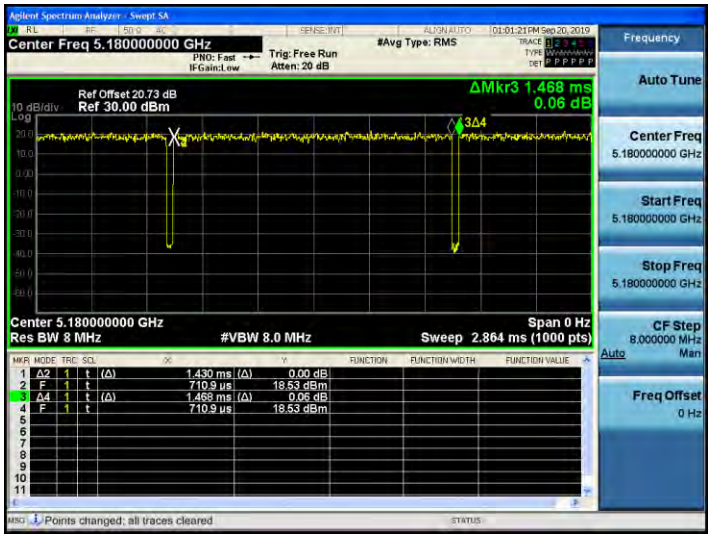
Mode	MCS Index	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11n (HT20)	0	1.339	1.378	0.972	0.122
	1	0.687	0.724	0.950	0.224
	2	0.473	0.510	0.929	0.322
	3	0.364	0.401	0.907	0.425
	4	0.256	0.292	0.877	0.571
	5	0.200	0.236	0.847	0.719
	6	0.184	0.220	0.836	0.776
	7	0.168	0.204	0.824	0.843
802.11n (HT40)	0	0.664	0.701	0.948	0.233
	1	0.352	0.387	0.908	0.418
	2	0.248	0.284	0.873	0.588
	3	0.196	0.232	0.845	0.731
	4	0.144	0.180	0.800	0.967
	5	0.116	0.152	0.762	1.182
	6	0.108	0.144	0.748	1.261
	7	0.100	0.136	0.735	1.336

Mode	MCS Index	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11ac (VHT20)	0	1.350	1.385	0.975	0.109
	1	0.697	0.733	0.950	0.223
	2	0.477	0.513	0.929	0.322
	3	0.368	0.405	0.909	0.412
	4	0.260	0.296	0.879	0.562
	5	0.204	0.240	0.849	0.713
	6	0.188	0.224	0.840	0.759
	7	0.172	0.208	0.825	0.833
	8	0.152	0.188	0.807	0.932
802.11ac (VHT40)	0	0.672	0.707	0.950	0.222
	1	0.356	0.393	0.907	0.423
	2	0.253	0.289	0.875	0.578
	3	0.200	0.236	0.848	0.718
	4	0.148	0.184	0.805	0.943
	5	0.120	0.156	0.768	1.144
	6	0.112	0.148	0.756	1.213
	7	0.104	0.140	0.742	1.295
	8	0.096	0.132	0.726	1.388
	9	0.088	0.124	0.710	1.487
802.11ac (VHT80)	0	0.332	0.368	0.902	0.446
	1	0.188	0.225	0.839	0.764
	2	0.140	0.176	0.795	0.999
	3	0.116	0.152	0.762	1.180
	4	0.092	0.128	0.716	1.451
	5	0.080	0.116	0.687	1.632
	6	0.076	0.112	0.677	1.692
	7	0.072	0.108	0.665	1.770
	8	0.068	0.104	0.651	1.866
	9	0.064	0.100	0.640	1.939

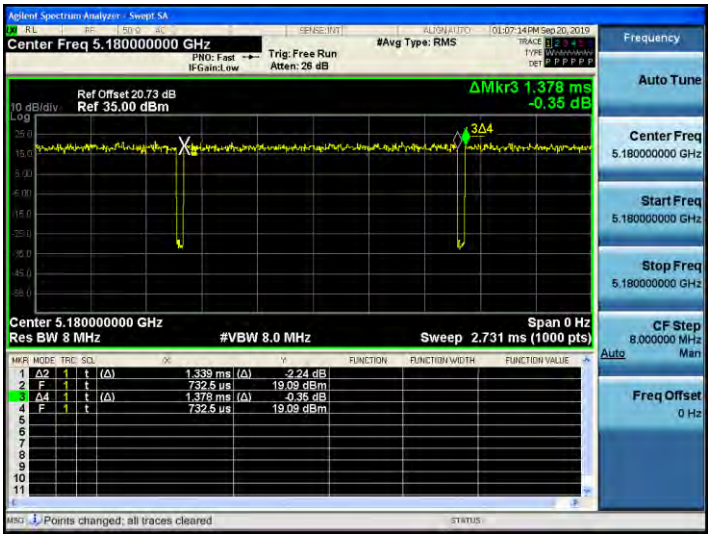
Note:

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

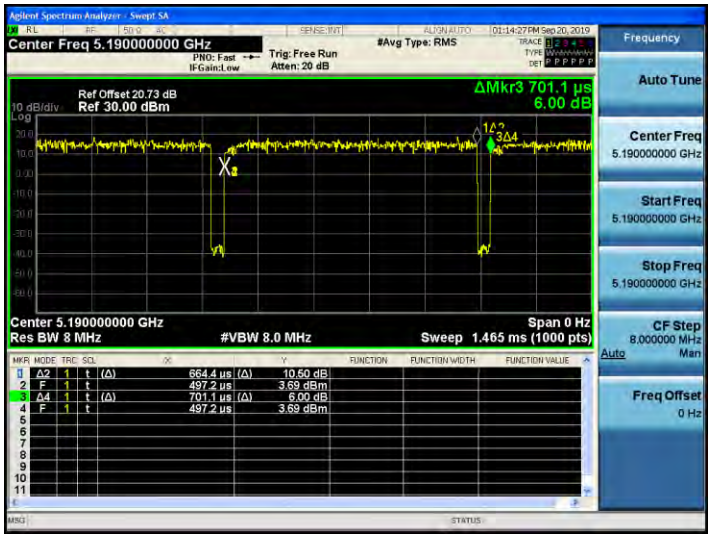
802.11a



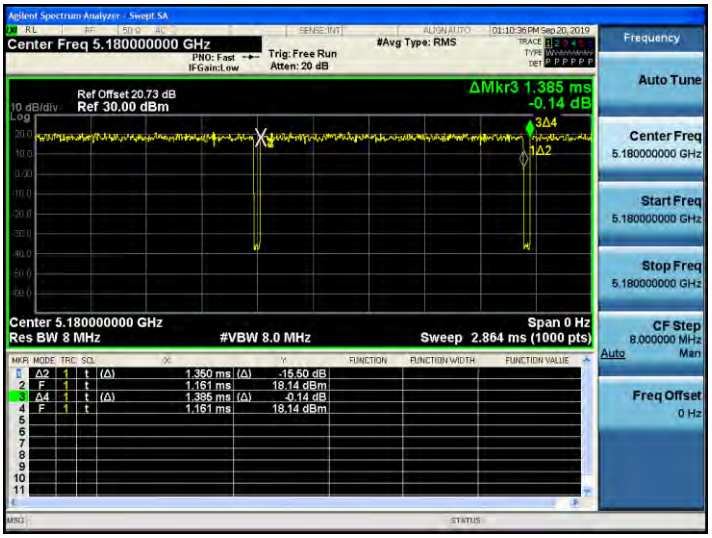
802.11n(HT20)



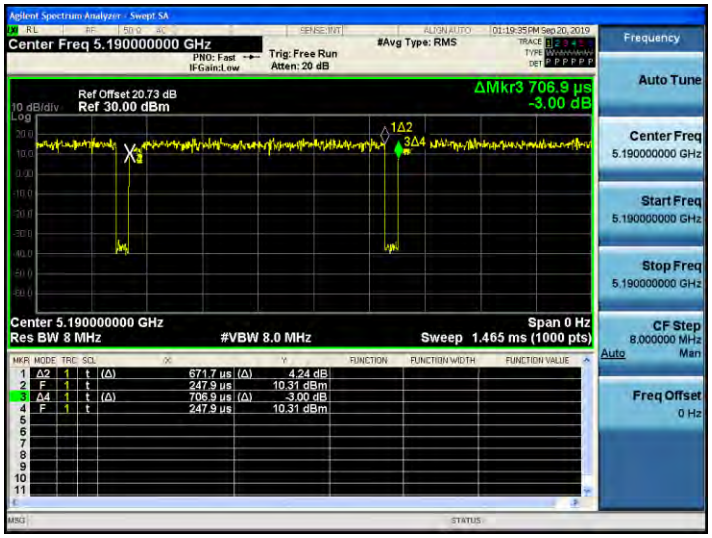
802.11n(HT40)



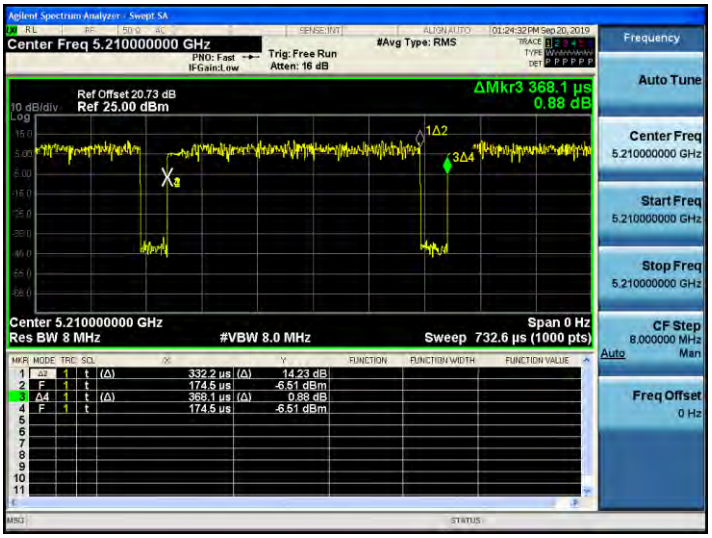
802.11ac(VHT20)



802.11ac(VHT40)



802.11ac(VHT80)



10.2 26dB 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	19.85	16.367
5200	40	19.62	16.371
5240	48	19.67	16.370
5260	52	19.27	16.387
5300	60	19.56	16.339
5320	64	19.40	16.383
5500	100	20.14	16.392
5600	120	20.05	16.357
5720	144	19.59	16.383
5745	149	19.71	16.352
5785	157	19.76	16.364
5825	165	19.77	16.349

802.11n(HT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	20.09	17.562
5200	40	20.54	17.561
5240	48	20.79	17.566
5260	52	20.02	17.555
5300	60	20.40	17.552
5320	64	20.48	17.580
5500	100	20.46	17.577
5600	120	20.96	17.572
5720	144	21.00	17.556
5745	149	20.54	17.546
5785	157	21.48	17.574
5825	165	20.14	17.556

802.11n(HT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	39.53	35.921
5230	46	40.13	35.972
5270	54	39.74	35.944
5310	62	39.79	35.990
5510	102	40.05	35.970
5590	118	39.73	35.925
5710	142	40.16	36.007
5755	151	39.81	35.998
5795	159	39.84	36.025

802.11ac(VHT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	20.46	17.559
5200	40	20.61	17.552
5240	48	20.46	17.551
5260	52	20.45	17.574
5300	60	20.55	17.557
5320	64	20.75	17.560
5500	100	21.11	17.556
5600	120	21.13	17.579
5720	144	22.20	17.577
5745	149	20.45	17.553
5785	157	20.74	17.574
5825	165	21.08	17.569

802.11ac(VHT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	40.41	35.981
5230	46	39.97	35.971
5270	54	40.07	35.908
5310	62	40.22	35.973
5510	102	39.81	36.010
5590	118	39.89	35.980
5710	142	40.00	35.991
5755	151	40.06	36.023
5795	159	39.72	35.948

802.11ac(VHT80) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5210	42	81.21	75.009
5290	58	81.17	74.878
5530	106	81.94	75.218
5610	122	80.37	75.084
5690	138	81.08	74.906
5775	155	81.36	74.900

[ANT2]

802.11a Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	20.05	16.397
5200	40	19.73	16.389
5240	48	19.60	16.378
5260	52	20.66	16.378
5300	60	20.18	16.382
5320	64	20.03	16.392
5500	100	20.15	16.379
5600	120	20.32	16.404
5720	144	19.62	16.371
5745	149	19.81	16.404
5785	157	20.84	16.383
5825	165	19.78	16.383

802.11n(HT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	20.58	17.573
5200	40	20.96	17.564
5240	48	20.95	17.568
5260	52	21.11	17.572
5300	60	20.30	17.577
5320	64	21.09	17.582
5500	100	21.01	17.581
5600	120	20.58	17.577
5720	144	20.89	17.568
5745	149	21.67	17.584
5785	157	20.70	17.570
5825	165	20.52	17.554

802.11n(HT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	39.79	35.882
5230	46	40.17	35.989
5270	54	39.96	35.903
5310	62	40.49	36.039
5510	102	39.96	35.997
5590	118	40.07	35.949
5710	142	40.29	35.978
5755	151	40.10	36.013
5795	159	39.92	35.949

802.11ac(VHT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	20.37	17.588
5200	40	20.89	17.576
5240	48	20.06	17.557
5260	52	20.04	17.548
5300	60	21.01	17.575
5320	64	20.76	17.567
5500	100	20.90	17.574
5600	120	20.99	17.568
5720	144	20.69	17.581
5745	149	20.30	17.563
5785	157	21.09	17.526
5825	165	20.36	17.569

802.11ac(VHT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	40.26	35.918
5230	46	39.87	36.004
5270	54	40.15	35.932
5310	62	39.75	36.013
5510	102	40.11	35.958
5590	118	40.01	35.964
5710	142	40.03	35.975
5755	151	39.80	35.965
5795	159	39.87	35.955

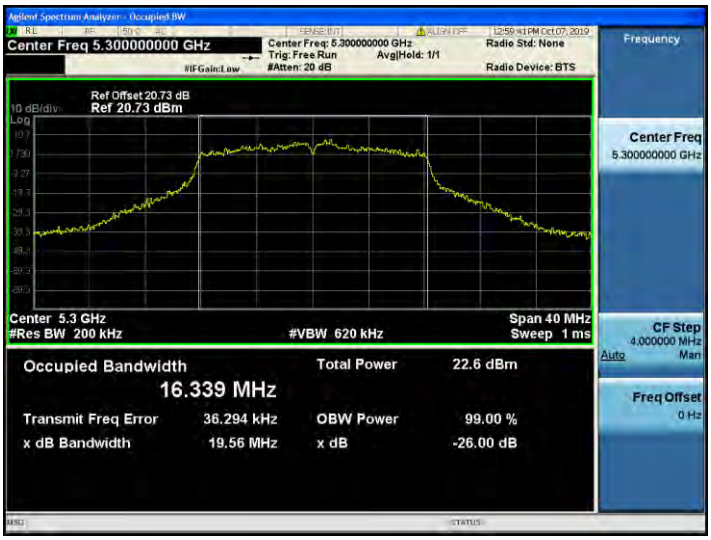
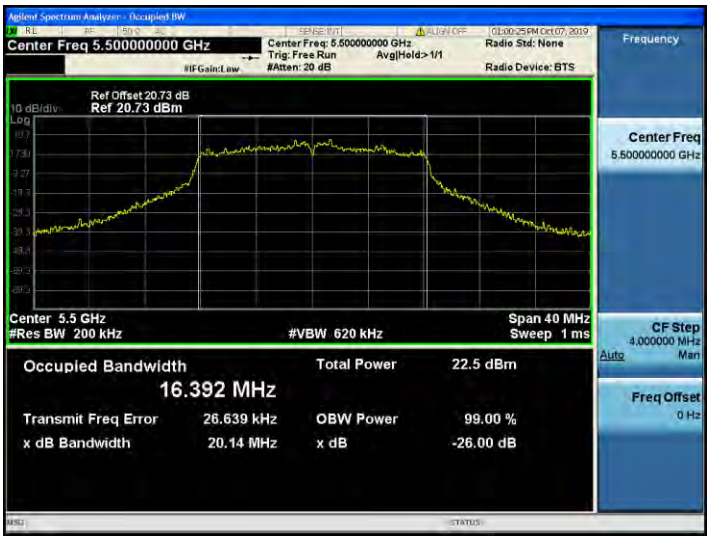
802.11ac(VHT80) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5210	42	81.32	75.183
5290	58	80.97	75.004
5530	106	81.69	75.207
5610	122	81.17	74.987
5690	138	81.16	74.901
5775	155	80.98	74.944

[ANT1]

▣ Test Plots(802.11a)

Note:

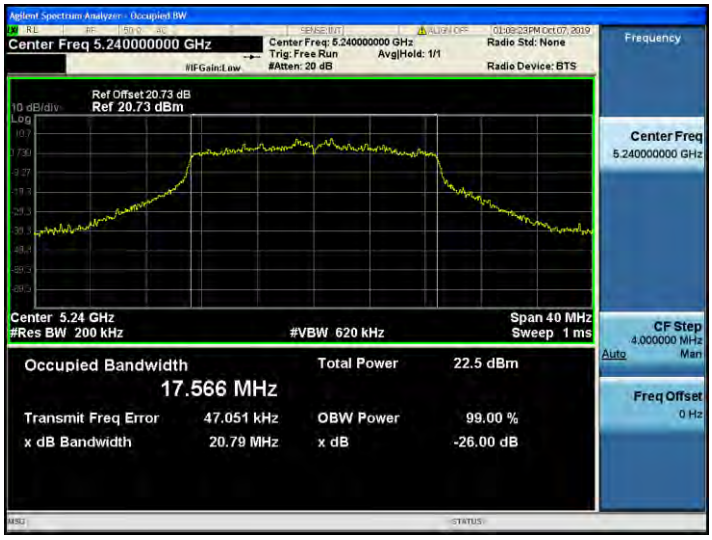
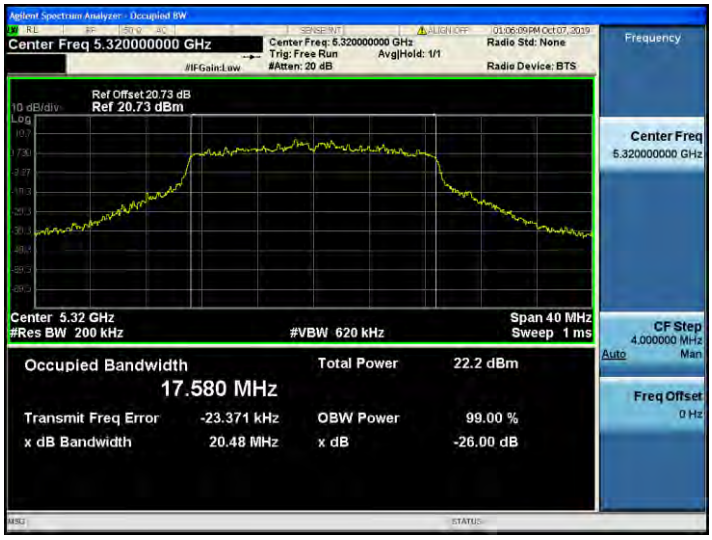
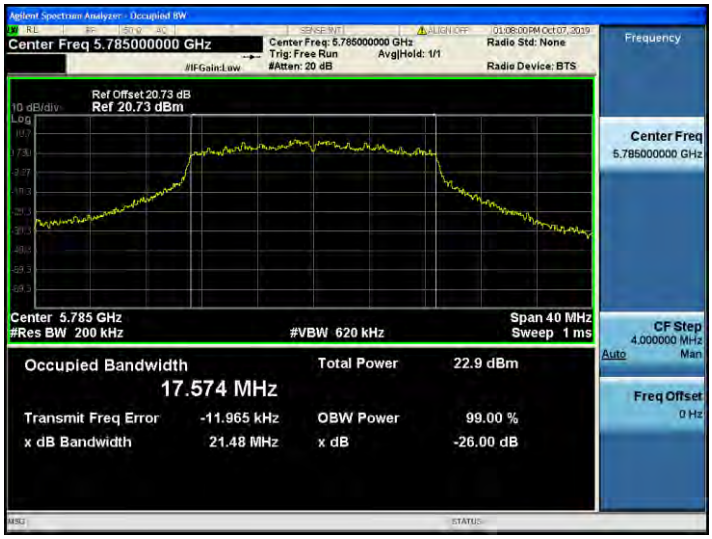
In order to simplify the report, attached plots were only the most wide channel.

802.11a UNII 1 BAND 26dB Bandwidth (CH 36)	802.11a UNII 2A BAND 26dB Bandwidth (CH 60)
	
802.11a UNII 2C BAND 26dB Bandwidth (CH 100)	**802.11a UNII 3 BAND 26dB Bandwidth (CH 165)**
	

▣ Test Plots(802.11n(HT20))

Note:

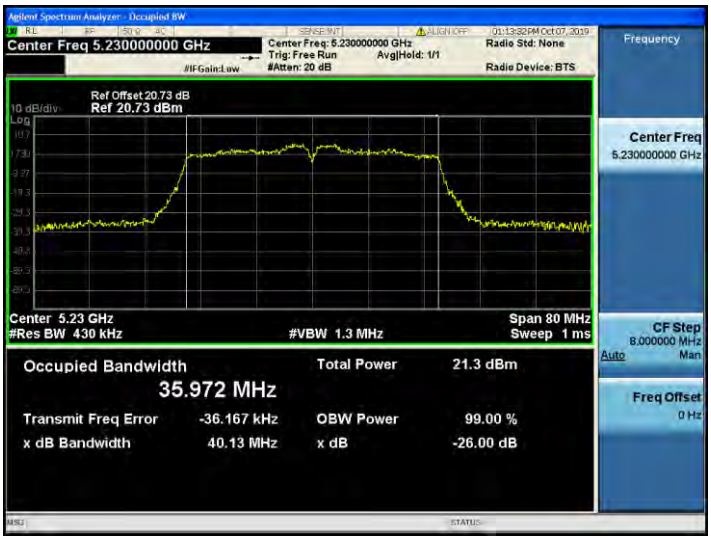
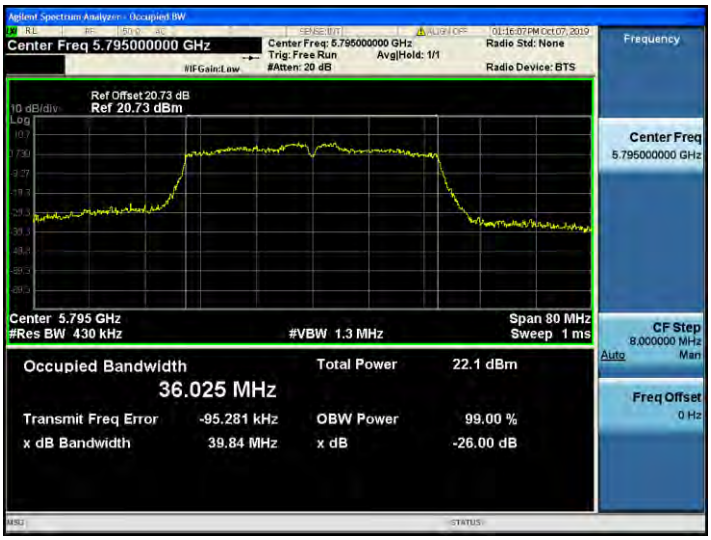
In order to simplify the report, attached plots were only the most wide channel.

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 157)**
	

▣ Test Plots(802.11n(HT40))

Note:

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

802.11n_HT40 UNII 1 BAND 26dB Bandwidth(CH 46)	802.11n_HT40 UNII 2A BAND 26dB Bandwidth (CH 62)
	
802.11n_HT40 UNII 2C BAND 26dB Bandwidth(CH 142)	**802.11n_HT40 UNII 3 BAND 26dB Bandwidth (CH 159)**
	

▣ Test Plots(802.11ac(VHT20))

Note:

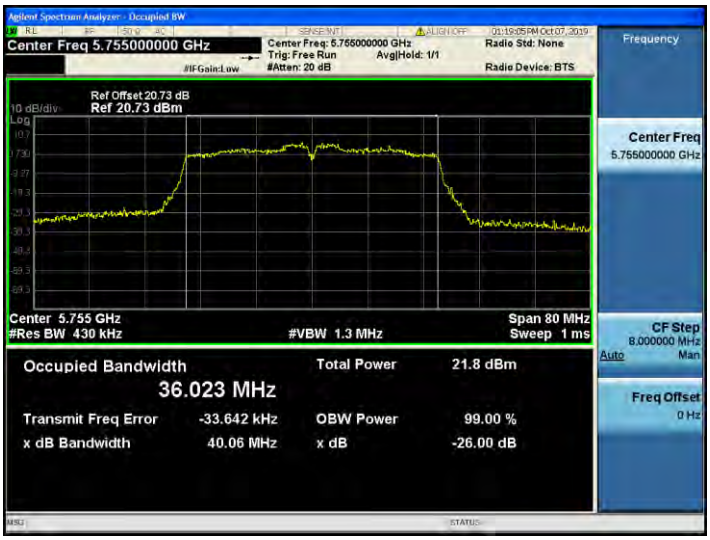
In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT20 UNII 1 BAND 26dB Bandwidth(CH 40)	802.11ac_VHT20 UNII 2A BAND 26dB Bandwidth(CH 64)
802.11ac_VHT20 UNII 2C BAND 26dB Bandwidth(CH 144)	**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 38)	802.11ac_VHT40 UNII 2A BAND 26dB Bandwidth (CH 62)
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.

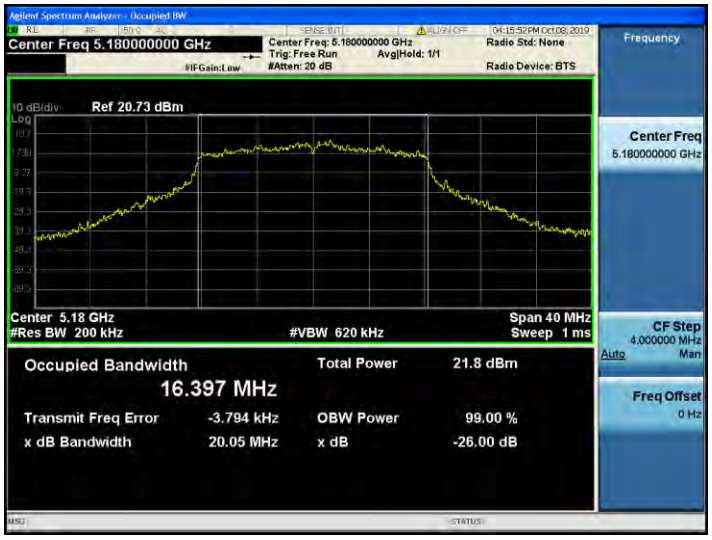
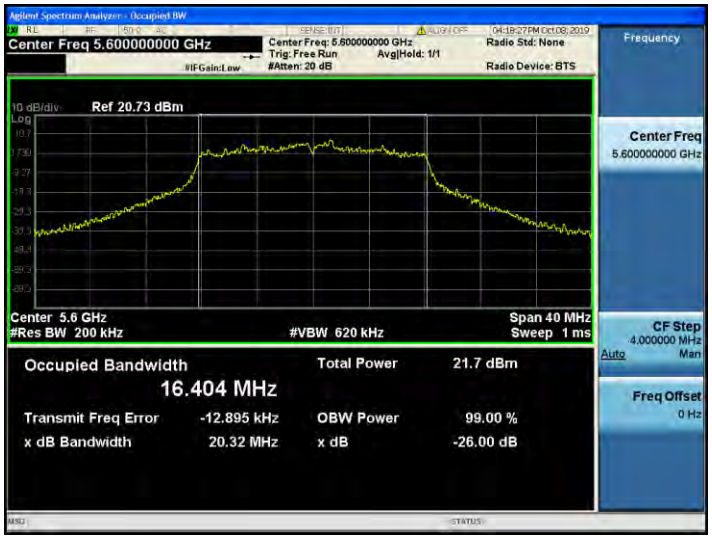
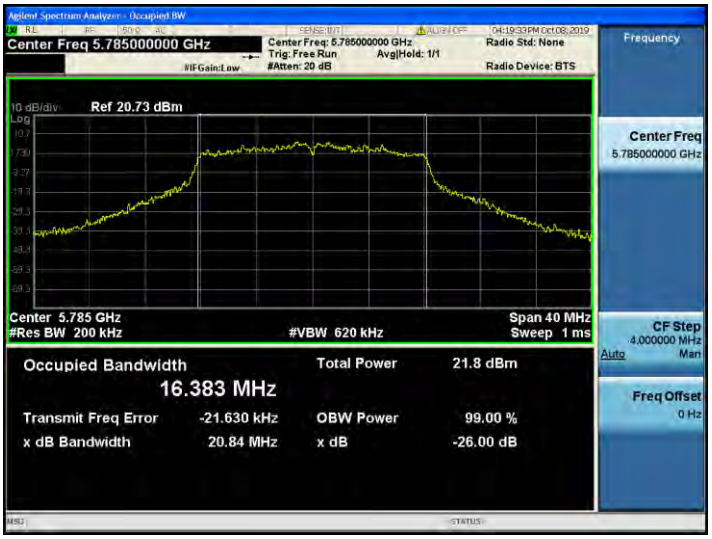
802.11ac_VHT80 UNII 1 BAND 26dB Bandwidth(CH 42)	802.11ac_VHT80 UNII 2A BAND 26dB Bandwidth (CH 58)
802.11ac_VHT80 UNII 2C BAND 26dB Bandwidth(CH 106)	**802.11ac_VHT80 UNII 3 BAND 26dB Bandwidth (CH 155)**

[ANT2]

▣ Test Plots(802.11a)

Note:

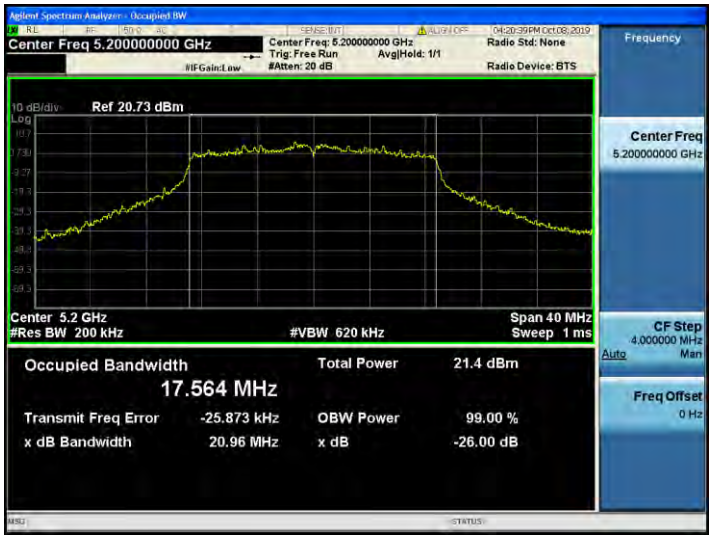
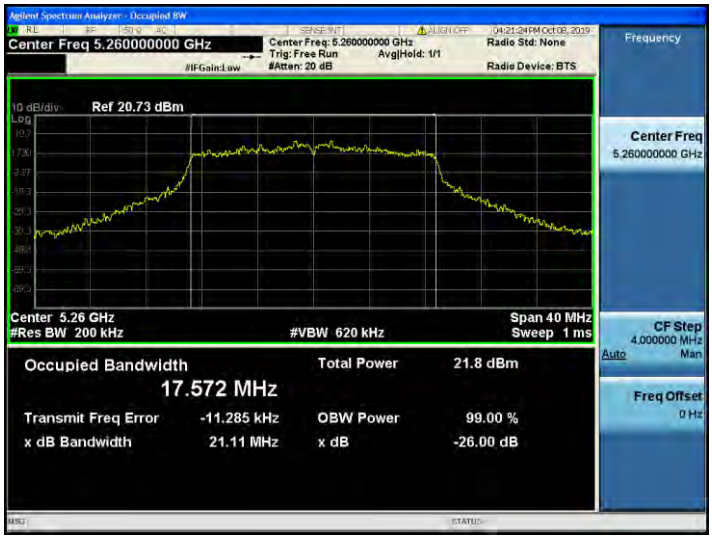
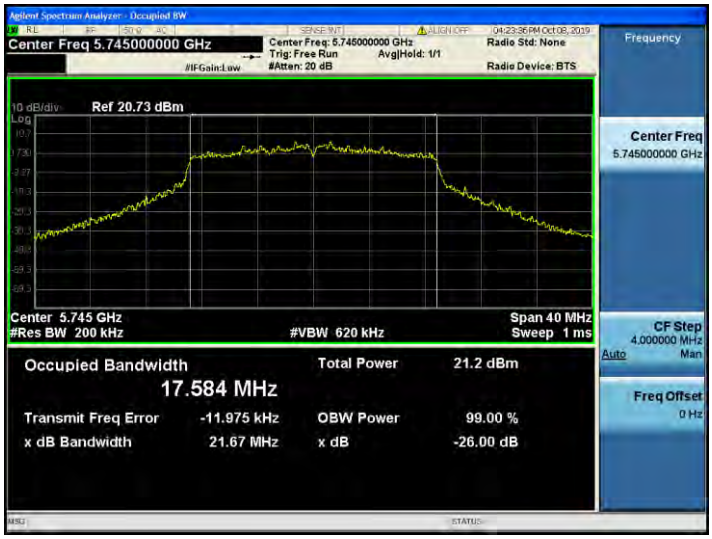
In order to simplify the report, attached plots were only the most wide channel.

802.11a UNII 1 BAND 26dB Bandwidth (CH 36)	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 157)**
	

▣ Test Plots(802.11n(HT20))

Note:

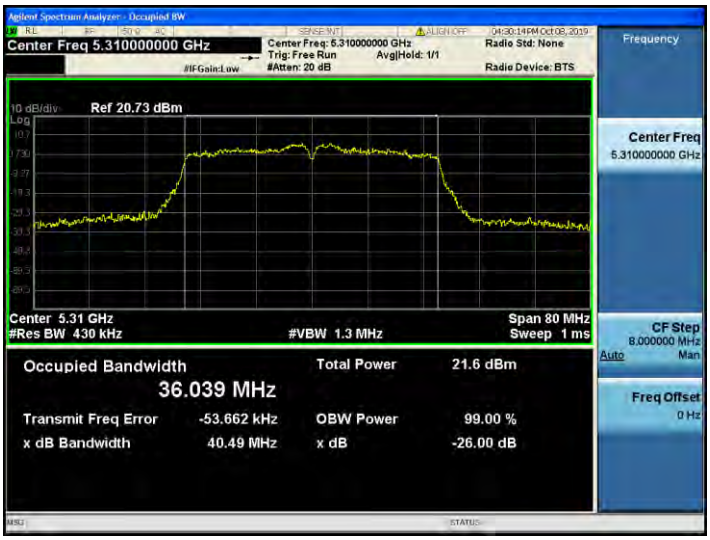
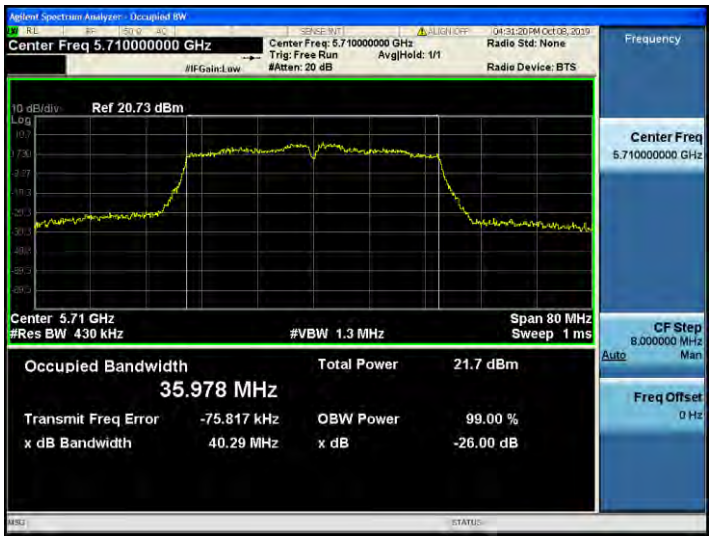
In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT20 UNII 1 BAND 26dB Bandwidth(CH 40)	802.11n_HT20 UNII 2A BAND 26dB Bandwidth(CH 52)
	
802.11n_HT20 UNII 2C BAND 26dB Bandwidth(CH 100)	**802.11n_HT20 UNII 3 BAND 26dB Bandwidth(CH 149)**
	

▣ 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 62)
	
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 40)

802.11ac_VHT20 UNII 2A BAND 26dB Bandwidth(CH 60)

802.11ac_VHT20 UNII 2C BAND 26dB Bandwidth(CH 120)

802.11ac_VHT20 UNII 3 BAND 26dB Bandwidth(CH 157)

▣ Test Plots(802.11ac(VHT40))

Note:

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

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

802.11ac_VHT40 UNII 2A BAND 26dB Bandwidth (CH 54)

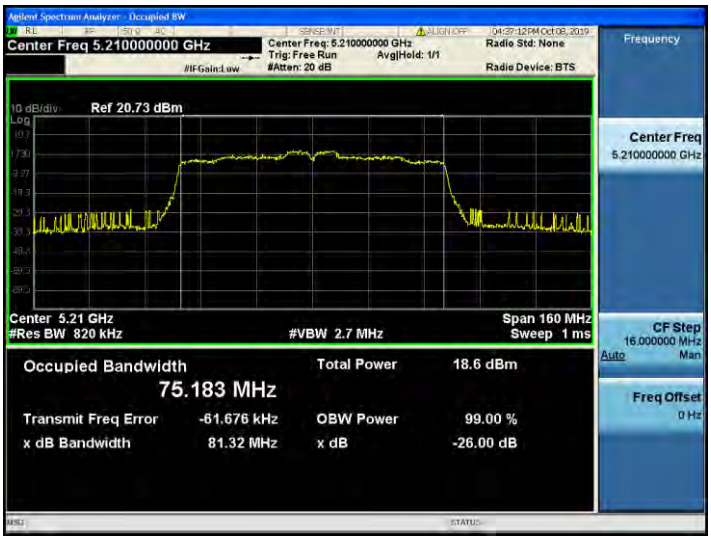
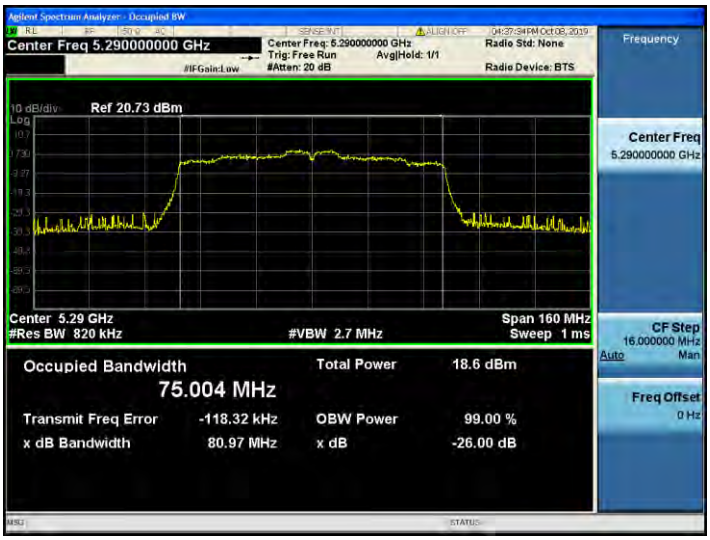
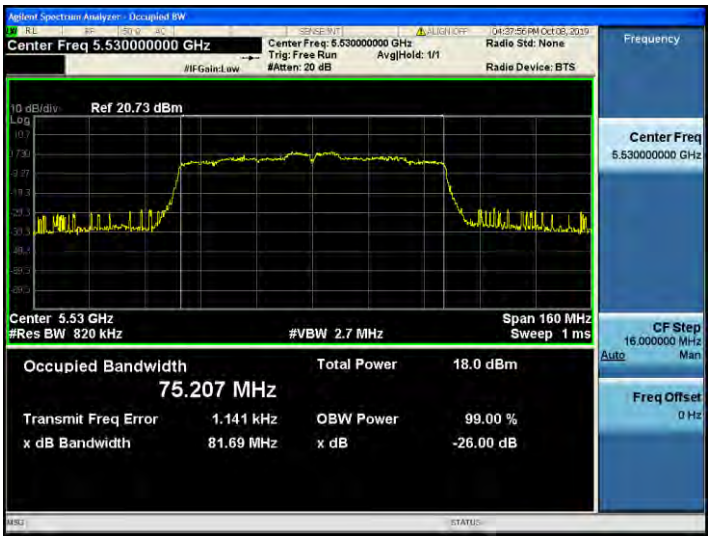
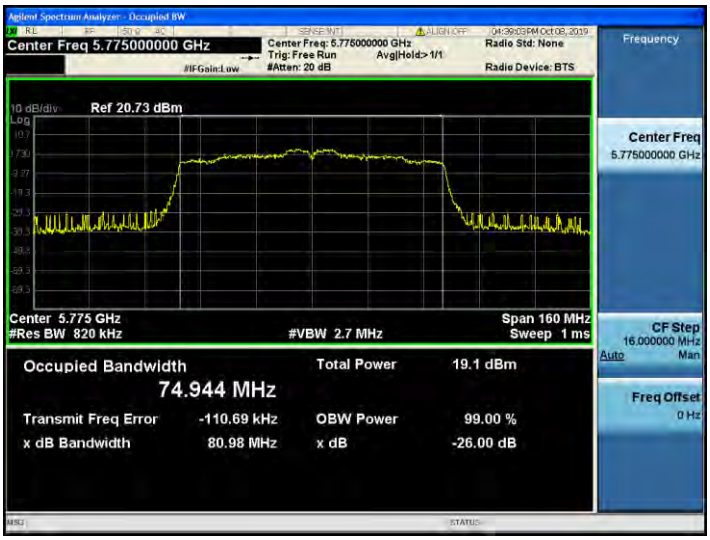
802.11ac_VHT40 UNII 2C BAND 26dB Bandwidth(CH 102)

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

▣ Test Plots(802.11ac(VHT80))

Note:

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

802.11ac_VHT80 UNII 1 BAND 26dB Bandwidth(CH 42)	802.11ac_VHT80 UNII 2A BAND 26dB Bandwidth (CH 58)
	
802.11ac_VHT80 UNII 2C BAND 26dB Bandwidth(CH 106)	**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	11.37	> 0.5	Pass
5785	157	14.98	> 0.5	Pass
5825	165	15.04	> 0.5	Pass

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.72	> 0.5	Pass
5785	157	13.82	> 0.5	Pass
5825	165	13.84	> 0.5	Pass

802.11n(HT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.15	> 0.5	Pass
5795	159	32.59	> 0.5	Pass

802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	12.59	> 0.5	Pass
5785	157	13.83	> 0.5	Pass
5825	165	12.60	> 0.5	Pass

802.11ac(VHT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.06	> 0.5	Pass
5795	159	33.78	> 0.5	Pass

802.11ac(VHT80) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	60.24	> 0.5	Pass

[ANT2]

802.11a Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	12.63	> 0.5	Pass
5785	157	15.07	> 0.5	Pass
5825	165	13.86	> 0.5	Pass

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	13.83	> 0.5	Pass
5785	157	15.09	> 0.5	Pass
5825	165	13.83	> 0.5	Pass

802.11n(HT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	33.86	> 0.5	Pass
5795	159	32.52	> 0.5	Pass

802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.07	> 0.5	Pass
5785	157	10.15	> 0.5	Pass
5825	165	15.07	> 0.5	Pass

802.11ac(VHT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.06	> 0.5	Pass
5795	159	33.79	> 0.5	Pass

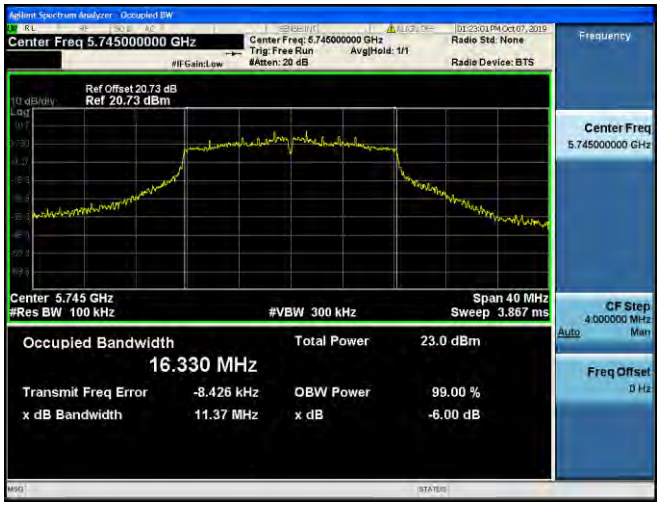
802.11ac(VHT80) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	53.93	> 0.5	Pass

[ANT1]

▣ Test Plots

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

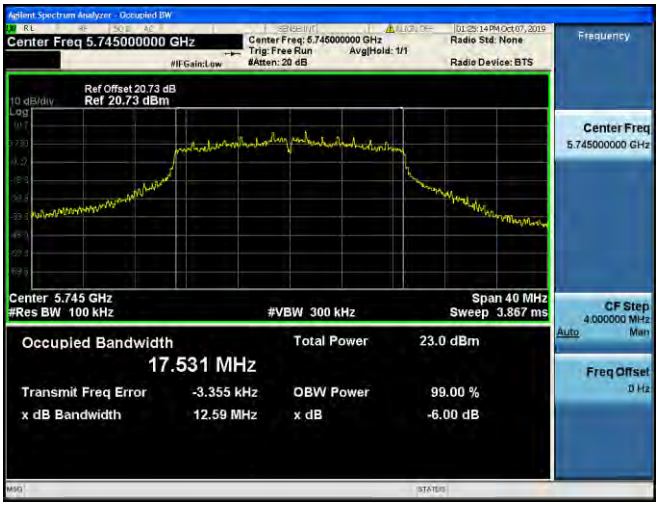
802.11a (CH.149)



802.11n(HT20) (CH.157)

802.11n(HT40) (CH.159)

802.11ac(VHT20) (CH.149)



802.11ac(VHT40) (CH.159)

802.11ac(VHT80) (CH.155)

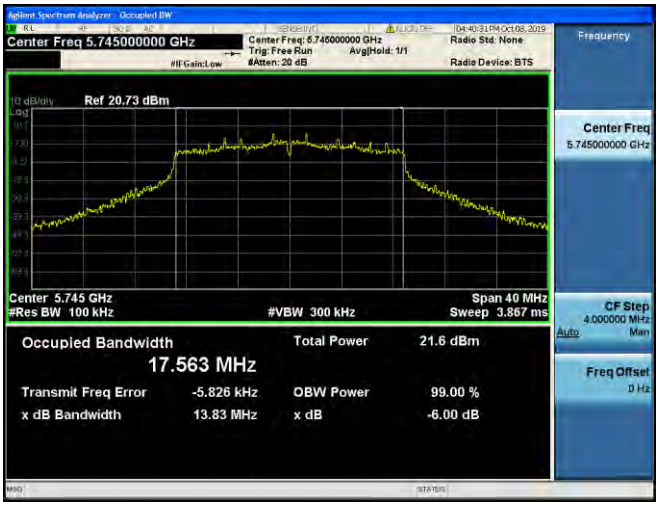
[ANT2]

▣ Test Plots

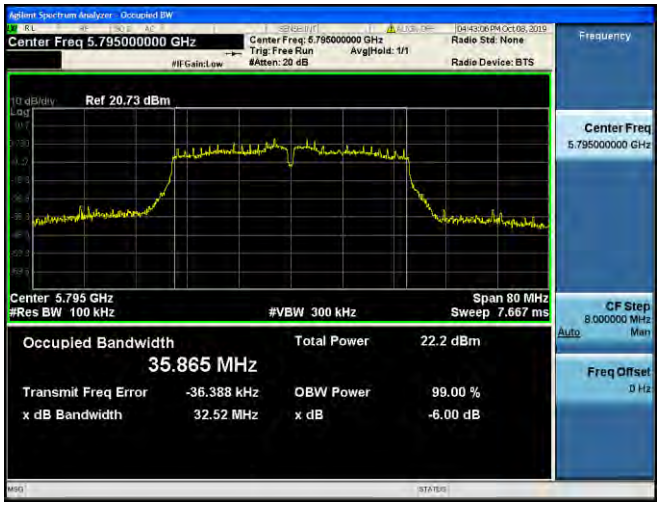
Note: In order to simplify the report, attached plots were only the most narrow channel.

802.11a (CH.149)

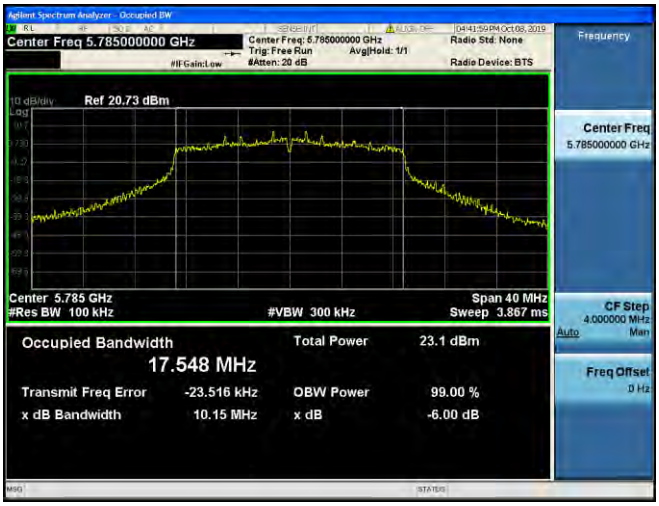
802.11n(HT20) (CH.149)



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	15.00	15.25	0.412	15.66	23.98
5200	40	15.00	15.28	0.412	15.69	23.98
5240	48	15.00	14.91	0.412	15.32	23.98
5260	52	15.00	15.00	0.412	15.41	23.98
5300	60	15.00	15.12	0.412	15.53	23.98
5320	64	15.00	14.80	0.412	15.21	23.98
5500	100	8.00	8.02	0.412	8.43	23.98
5600	120	15.00	15.29	0.412	15.70	23.98
5720	144	15.00	15.28	0.412	15.69	23.98
5745	149	15.00	15.38	0.412	15.79	30.00
5785	157	15.00	15.41	0.412	15.82	30.00
5825	165	15.00	14.91	0.412	15.33	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	15.00	15.07	0.425	15.50	23.98
5200	40	15.00	15.23	0.425	15.66	23.98
5240	48	15.00	14.85	0.425	15.28	23.98
5260	52	15.00	14.95	0.425	15.38	23.98
5300	60	15.00	15.12	0.425	15.55	23.98
5320	64	15.00	14.82	0.425	15.25	23.98
5500	100	7.00	7.07	0.425	7.50	23.98
5600	120	15.00	15.26	0.425	15.69	23.98
5720	144	15.00	15.20	0.425	15.63	23.98
5745	149	15.00	15.31	0.425	15.74	30.00
5785	157	15.00	15.30	0.425	15.73	30.00
5825	165	15.00	14.88	0.425	15.31	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	12.50	12.37	0.731	13.10	23.98
5230	46	15.00	14.56	0.731	15.29	23.98
5270	54	15.00	14.96	0.731	15.69	23.98
5310	62	15.00	14.75	0.731	15.48	23.98
5510	102	9.00	7.73	0.731	8.46	23.98
5590	118	15.00	14.24	0.731	14.97	23.98
5710	142	14.00	13.93	0.731	14.66	23.98
5755	151	14.00	13.55	0.731	14.28	30.00
5795	159	14.00	13.77	0.731	14.50	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	15.00	15.09	0.412	15.50	23.98
5200	40	15.00	15.17	0.412	15.58	23.98
5240	48	15.00	14.79	0.412	15.20	23.98
5260	52	15.00	14.88	0.412	15.30	23.98
5300	60	15.00	15.09	0.412	15.50	23.98
5320	64	15.00	14.89	0.412	15.30	23.98
5500	100	5.00	5.14	0.412	5.56	23.98
5600	120	15.00	15.20	0.412	15.62	23.98
5720	144	15.00	15.17	0.412	15.59	23.98
5745	149	15.00	15.29	0.412	15.71	30.00
5785	157	15.00	15.43	0.412	15.84	30.00
5825	165	15.00	14.93	0.412	15.35	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	12.00	11.82	0.718	12.54	23.98
5230	46	15.00	14.42	0.718	15.14	23.98
5270	54	15.00	14.90	0.718	15.62	23.98
5310	62	15.00	14.71	0.718	15.43	23.98
5510	102	9.00	7.66	0.718	8.38	23.98
5590	118	15.00	14.20	0.718	14.92	23.98
5710	142	14.00	13.93	0.718	14.65	23.98
5755	151	14.00	13.61	0.718	14.33	30.00
5795	159	14.00	13.77	0.718	14.49	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	11.00	10.01	1.180	11.19	23.98
5290	58	12.00	11.20	1.180	12.38	23.98
5530	106	12.00	9.92	1.180	11.10	23.98
5610	122	12.00	10.54	1.180	11.72	23.98
5690	138	12.00	11.24	1.180	12.42	23.98
5775	155	12.00	10.99	1.180	12.17	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	15.00	15.85	0.412	16.26	23.98
5200	40	15.00	15.48	0.412	15.89	23.98
5240	48	15.00	15.73	0.412	16.14	23.98
5260	52	15.00	15.90	0.412	16.31	23.98
5300	60	15.00	15.29	0.412	15.70	23.98
5320	64	15.00	15.30	0.412	15.71	23.98
5500	100	8.00	8.58	0.412	8.99	23.98
5600	120	15.00	15.84	0.412	16.25	23.98
5720	144	15.00	15.71	0.412	16.12	23.98
5745	149	15.00	15.58	0.412	15.99	30.00
5785	157	15.00	16.05	0.412	16.46	30.00
5825	165	15.00	15.34	0.412	15.75	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	15.00	15.84	0.425	16.27	23.98
5200	40	15.00	15.47	0.425	15.90	23.98
5240	48	15.00	15.74	0.425	16.17	23.98
5260	52	15.00	15.89	0.425	16.32	23.98
5300	60	15.00	15.27	0.425	15.70	23.98
5320	64	15.00	15.29	0.425	15.72	23.98
5500	100	7.00	7.44	0.425	7.87	23.98
5600	120	15.00	15.75	0.425	16.18	23.98
5720	144	15.00	15.67	0.425	16.10	23.98
5745	149	15.00	15.48	0.425	15.91	30.00
5785	157	15.00	15.89	0.425	16.32	30.00
5825	165	15.00	15.22	0.425	15.65	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	12.50	11.77	0.731	12.51	23.98
5230	46	15.00	13.98	0.731	14.71	23.98
5270	54	15.00	14.78	0.731	15.51	23.98
5310	62	15.00	14.58	0.731	15.31	23.98
5510	102	9.00	8.82	0.731	9.55	23.98
5590	118	15.00	14.66	0.731	15.39	23.98
5710	142	14.00	15.01	0.731	15.74	23.98
5755	151	14.00	14.83	0.731	15.56	30.00
5795	159	14.00	14.25	0.731	14.98	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	15.00	16.12	0.412	16.53	23.98
5200	40	15.00	15.84	0.412	16.25	23.98
5240	48	15.00	15.94	0.412	16.35	23.98
5260	52	15.00	16.06	0.412	16.47	23.98
5300	60	15.00	15.46	0.412	15.87	23.98
5320	64	15.00	15.42	0.412	15.83	23.98
5500	100	5.00	5.41	0.412	5.82	23.98
5600	120	15.00	15.67	0.412	16.08	23.98
5720	144	15.00	15.60	0.412	16.01	23.98
5745	149	15.00	15.38	0.412	15.79	30.00
5785	157	15.00	15.94	0.412	16.35	30.00
5825	165	15.00	15.28	0.412	15.69	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	12.00	11.36	0.718	12.08	23.98
5230	46	15.00	14.10	0.718	14.82	23.98
5270	54	15.00	14.86	0.718	15.58	23.98
5310	62	15.00	14.67	0.718	15.39	23.98
5510	102	9.00	8.88	0.718	9.60	23.98
5590	118	15.00	14.68	0.718	15.40	23.98
5710	142	14.00	15.05	0.718	15.77	23.98
5755	151	14.00	14.85	0.718	15.57	30.00
5795	159	14.00	14.29	0.718	15.01	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	11.00	9.44	1.180	10.62	23.98
5290	58	12.00	11.08	1.180	12.26	23.98
5530	106	12.00	10.50	1.180	11.68	23.98
5610	122	12.00	10.65	1.180	11.83	23.98
5690	138	12.00	11.71	1.180	12.89	23.98
5775	155	12.00	11.60	1.180	12.78	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	15.00	15.66	16.26	18.98	23.98
5200	40	15.00	15.69	15.89	18.80	23.98
5240	48	15.00	15.32	16.14	18.76	23.98
5260	52	15.00	15.41	16.31	18.89	23.98
5300	60	15.00	15.53	15.70	18.63	23.98
5320	64	15.00	15.21	15.71	18.48	23.98
5500	100	8.00	8.43	8.99	11.73	23.98
5600	120	15.00	15.70	16.25	18.99	23.98
5720	144	15.00	15.69	16.12	18.92	23.98
5745	149	15.00	15.79	15.99	18.90	30.00
5785	157	15.00	15.82	16.46	19.16	30.00
5825	165	15.00	15.33	15.75	18.56	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	15.00	15.50	16.27	18.91	23.98
5200	40	15.00	15.66	15.90	18.79	23.98
5240	48	15.00	15.28	16.17	18.76	23.98
5260	52	15.00	15.38	16.32	18.89	23.98
5300	60	15.00	15.55	15.70	18.64	23.98
5320	64	15.00	15.25	15.72	18.50	23.98
5500	100	7.00	7.50	7.87	10.70	23.98
5600	120	15.00	15.69	16.18	18.95	23.98
5720	144	15.00	15.63	16.10	18.88	23.98
5745	149	15.00	15.74	15.91	18.84	30.00
5785	157	15.00	15.73	16.32	19.05	30.00
5825	165	15.00	15.31	15.65	18.49	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	12.50	13.10	12.51	15.83	23.98
5230	46	15.00	15.29	14.71	18.02	23.98
5270	54	15.00	15.69	15.51	18.61	23.98
5310	62	15.00	15.48	15.31	18.41	23.98
5510	102	9.00	8.46	9.55	12.05	23.98
5590	118	15.00	14.97	15.39	18.20	23.98
5710	142	14.00	14.66	15.74	18.24	23.98
5755	151	14.00	14.28	15.56	17.98	30.00
5795	159	14.00	14.50	14.98	17.76	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	15.00	15.50	16.53	19.06	23.98
5200	40	15.00	15.58	16.25	18.94	23.98
5240	48	15.00	15.20	16.35	18.82	23.98
5260	52	15.00	15.30	16.47	18.93	23.98
5300	60	15.00	15.50	15.87	18.70	23.98
5320	64	15.00	15.30	15.83	18.58	23.98
5500	100	5.00	5.56	5.82	8.70	23.98
5600	120	15.00	15.62	16.08	18.87	23.98
5720	144	15.00	15.59	16.01	18.82	23.98
5745	149	15.00	15.71	15.79	18.76	30.00
5785	157	15.00	15.84	16.35	19.11	30.00
5825	165	15.00	15.35	15.69	18.53	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	12.00	12.54	12.08	15.33	23.98
5230	46	15.00	15.14	14.82	17.99	23.98
5270	54	15.00	15.62	15.58	18.61	23.98
5310	62	15.00	15.43	15.39	18.42	23.98
5510	102	9.00	8.38	9.60	12.04	23.98
5590	118	15.00	14.92	15.40	18.18	23.98
5710	142	14.00	14.65	15.77	18.26	23.98
5755	151	14.00	14.33	15.57	18.00	30.00
5795	159	14.00	14.49	15.01	17.77	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	11.00	11.19	10.62	13.92	23.98
5290	58	12.00	12.38	12.26	15.33	23.98
5530	106	12.00	11.10	11.68	14.41	23.98
5610	122	12.00	11.72	11.83	14.79	23.98
5690	138	12.00	12.42	12.89	15.67	23.98
5775	155	12.00	12.17	12.78	15.50	30.00

10.5 POWER SPECTRAL DENSITY

[ANT1]

802.11a Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.				
5180	36	6.584	0.412	6.996	11
5200	40	5.522	0.412	5.934	11
5240	48	5.183	0.412	5.595	11
5260	52	6.545	0.412	6.957	11
5300	60	6.302	0.412	6.714	11
5320	64	6.198	0.412	6.610	11
5500	100	-1.308	0.412	-0.896	11
5600	120	5.687	0.412	6.099	11
5720	144	6.587	0.412	6.999	11
5745	149	3.845	0.412	4.257	30
5785	157	3.840	0.412	4.252	30
5825	165	3.838	0.412	4.250	30

802.11n(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.				
5180	36	6.194	0.425	6.619	11
5200	40	6.396	0.425	6.821	11
5240	48	5.709	0.425	6.134	11
5260	52	5.682	0.425	6.107	11
5300	60	6.209	0.425	6.634	11
5320	64	5.524	0.425	5.949	11
5500	100	-2.045	0.425	-1.620	11
5600	120	5.111	0.425	5.536	11
5720	144	6.352	0.425	6.777	11
5745	149	3.159	0.425	3.584	30
5785	157	3.284	0.425	3.709	30
5825	165	3.536	0.425	3.961	30

802.11n(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.				
5190	38	0.659	0.731	1.390	11
5230	46	2.333	0.731	3.064	11
5270	54	3.287	0.731	4.018	11
5310	62	2.947	0.731	3.678	11
5510	102	-4.397	0.731	-3.666	11
5590	118	2.524	0.731	3.255	11
5710	142	2.088	0.731	2.819	11
5755	151	-1.062	0.731	-0.331	30
5795	159	-0.490	0.731	0.241	30

802.11ac(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.				
5180	36	6.450	0.412	6.862	11
5200	40	5.952	0.412	6.364	11
5240	48	5.606	0.412	6.018	11
5260	52	5.696	0.412	6.108	11
5300	60	6.051	0.412	6.463	11
5320	64	5.590	0.412	6.002	11
5500	100	-4.999	0.412	-4.587	11
5600	120	5.165	0.412	5.577	11
5720	144	5.840	0.412	6.252	11
5745	149	2.958	0.412	3.370	30
5785	157	3.534	0.412	3.946	30
5825	165	3.573	0.412	3.985	30

802.11ac(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.				
5190	38	-0.014	0.718	0.704	11
5230	46	2.540	0.718	3.258	11
5270	54	2.907	0.718	3.625	11
5310	62	2.653	0.718	3.371	11
5510	102	-4.431	0.718	-3.713	11
5590	118	1.988	0.718	2.706	11
5710	142	2.013	0.718	2.731	11
5755	151	-1.097	0.718	-0.379	30
5795	159	-0.806	0.718	-0.088	30

802.11ac(80MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.				
5210	42	-4.566	1.180	-3.386	11
5290	58	-3.570	1.180	-2.390	11
5530	106	-5.288	1.180	-4.108	11
5610	122	-4.462	1.180	-3.282	11
5690	138	-3.927	1.180	-2.747	11
5775	155	-6.396	1.180	-5.216	30

[ANT2]

802.11a Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.				
5180	36	6.149	0.412	6.561	11
5200	40	5.659	0.412	6.071	11
5240	48	5.840	0.412	6.252	11
5260	52	6.338	0.412	6.750	11
5300	60	6.234	0.412	6.646	11
5320	64	5.947	0.412	6.359	11
5500	100	-0.084	0.412	0.328	11
5600	120	6.199	0.412	6.611	11
5720	144	7.140	0.412	7.552	11
5745	149	4.700	0.412	5.112	30
5785	157	4.561	0.412	4.973	30
5825	165	3.808	0.412	4.220	30

802.11n(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.				
5180	36	5.669	0.425	6.094	11
5200	40	5.278	0.425	5.703	11
5240	48	5.637	0.425	6.062	11
5260	52	5.862	0.425	6.287	11
5300	60	5.736	0.425	6.161	11
5320	64	5.526	0.425	5.951	11
5500	100	-1.889	0.425	-1.464	11
5600	120	5.773	0.425	6.198	11
5720	144	6.764	0.425	7.189	11
5745	149	4.381	0.425	4.806	30
5785	157	4.021	0.425	4.446	30
5825	165	3.241	0.425	3.666	30

802.11n(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.				
5190	38	-0.079	0.731	0.652	11
5230	46	2.246	0.731	2.977	11
5270	54	3.147	0.731	3.878	11
5310	62	2.650	0.731	3.381	11
5510	102	-3.052	0.731	-2.321	11
5590	118	2.933	0.731	3.664	11
5710	142	2.578	0.731	3.309	11
5755	151	0.080	0.731	0.811	30
5795	159	-0.394	0.731	0.337	30

802.11ac(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.				
5180	36	5.781	0.412	6.193	11
5200	40	5.313	0.412	5.725	11
5240	48	5.793	0.412	6.205	11
5260	52	5.862	0.412	6.274	11
5300	60	5.932	0.412	6.344	11
5320	64	5.426	0.412	5.838	11
5500	100	-3.885	0.412	-3.473	11
5600	120	5.565	0.412	5.977	11
5720	144	7.018	0.412	7.430	11
5745	149	4.294	0.412	4.706	30
5785	157	4.162	0.412	4.574	30
5825	165	3.022	0.412	3.434	30

802.11ac(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.				
5190	38	-0.388	0.718	0.330	11
5230	46	2.062	0.718	2.780	11
5270	54	2.999	0.718	3.717	11
5310	62	2.773	0.718	3.491	11
5510	102	-3.197	0.718	-2.479	11
5590	118	2.739	0.718	3.457	11
5710	142	3.023	0.718	3.741	11
5755	151	0.051	0.718	0.769	30
5795	159	-0.242	0.718	0.476	30

802.11ac(80MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.				
5210	42	-5.478	1.180	-4.298	11
5290	58	-3.245	1.180	-2.065	11
5530	106	-4.737	1.180	-3.557	11
5610	122	-4.226	1.180	-3.046	11
5690	138	-2.907	1.180	-1.727	11
5775	155	-5.724	1.180	-4.544	30

[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	6.996	6.561	9.794	11
5200	40	5.934	6.071	9.013	11
5240	48	5.595	6.252	8.946	11
5260	52	6.957	6.750	9.865	11
5300	60	6.714	6.646	9.690	11
5320	64	6.610	6.359	9.496	11
5500	100	-0.896	0.328	2.769	11
5600	120	6.099	6.611	9.372	11
5720	144	6.999	7.552	10.294	11
5745	149	4.257	5.112	7.715	30
5785	157	4.252	4.973	7.637	30
5825	165	4.250	4.220	7.245	30

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	6.619	6.094	9.375	11
5200	40	6.821	5.703	9.308	11
5240	48	6.134	6.062	9.109	11
5260	52	6.107	6.287	9.208	11
5300	60	6.634	6.161	9.414	11
5320	64	5.949	5.951	8.960	11
5500	100	-1.620	-1.464	1.469	11
5600	120	5.536	6.198	8.890	11
5720	144	6.777	7.189	9.998	11
5745	149	3.584	4.806	7.248	30
5785	157	3.709	4.446	7.103	30
5825	165	3.961	3.666	6.826	30

802.11n(40MHz) Mode		ANT 1 Measured Power(dBm) + Duty Cycle Factor (dB)	ANT 2 Measured Power(dBm) + Duty Cycle Factor (dB)	MIMO Result (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.				
5190	38	1.390	0.652	4.047	11
5230	46	3.064	2.977	6.031	11
5270	54	4.018	3.878	6.959	11
5310	62	3.678	3.381	6.542	11
5510	102	-3.666	-2.321	0.069	11
5590	118	3.255	3.664	6.475	11
5710	142	2.819	3.309	6.081	11
5755	151	-0.331	0.811	3.288	30
5795	159	0.241	0.337	3.300	30

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	6.862	6.193	9.551	11
5200	40	6.364	5.725	9.067	11
5240	48	6.018	6.205	9.123	11
5260	52	6.108	6.274	9.202	11
5300	60	6.463	6.344	9.415	11
5320	64	6.002	5.838	8.931	11
5500	100	-4.587	-3.473	-0.984	11
5600	120	5.577	5.977	8.792	11
5720	144	6.252	7.430	9.891	11
5745	149	3.370	4.706	7.100	30
5785	157	3.946	4.574	7.282	30
5825	165	3.985	3.434	6.729	30

802.11ac(40MHz) Mode		ANT 1 Measured Power(dBm) + Duty Cycle Factor (dB)	ANT 2 Measured Power(dBm) + Duty Cycle Factor (dB)	MIMO Result (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.				
5190	38	0.704	0.330	3.532	11
5230	46	3.258	2.780	6.036	11
5270	54	3.625	3.717	6.682	11
5310	62	3.371	3.491	6.442	11
5510	102	-3.713	-2.479	-0.042	11
5590	118	2.706	3.457	6.108	11
5710	142	2.731	3.741	6.276	11
5755	151	-0.379	0.769	3.243	30
5795	159	-0.088	0.476	3.214	30

802.11ac(80MHz) Mode		ANT 1 Measured Power(dBm) + Duty Cycle Factor (dB)	ANT 2 Measured Power(dBm) + Duty Cycle Factor (dB)	MIMO Result (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.				
5210	42	-3.386	-4.298	-0.807	11
5290	58	-2.390	-2.065	0.786	11
5530	106	-4.108	-3.557	-0.813	11
5610	122	-3.282	-3.046	-0.152	11
5690	138	-2.747	-1.727	0.804	11
5775	155	-5.216	-4.544	-1.856	30

[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. 149)

▣ Test Plots(802.11n(HT20))

Note:

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

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

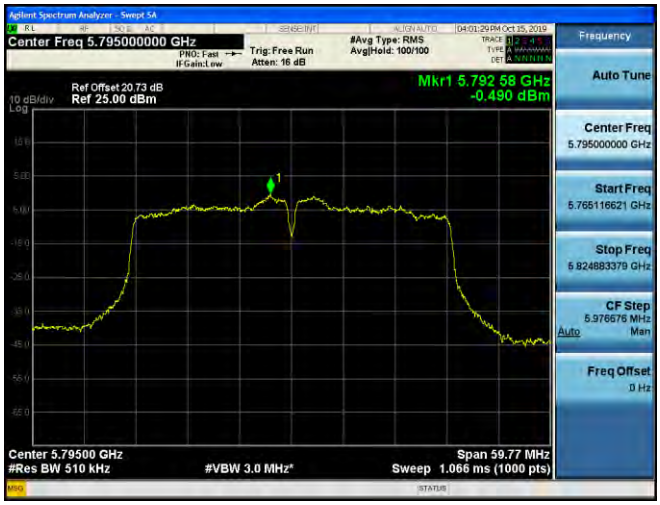
UNII 2C (Ch. 144)	UNII 3 (Ch. 165)

▣ 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)

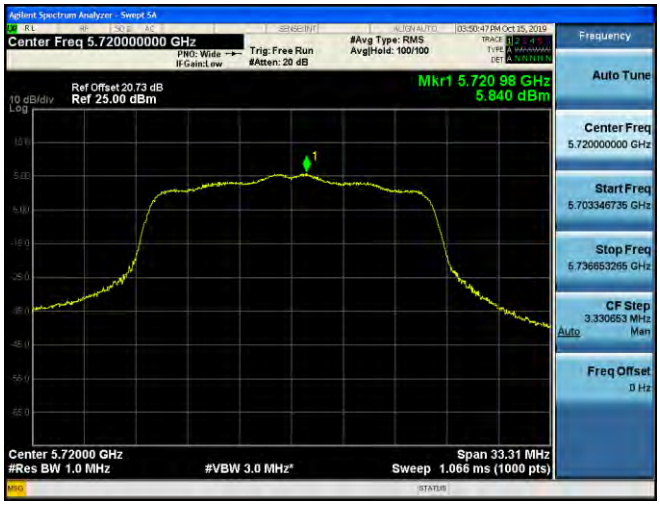
UNII 2C (Ch. 118)	UNII 3 (Ch. 159)
	

▣ Test Plots(802.11ac(VHT20))

Note:

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

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

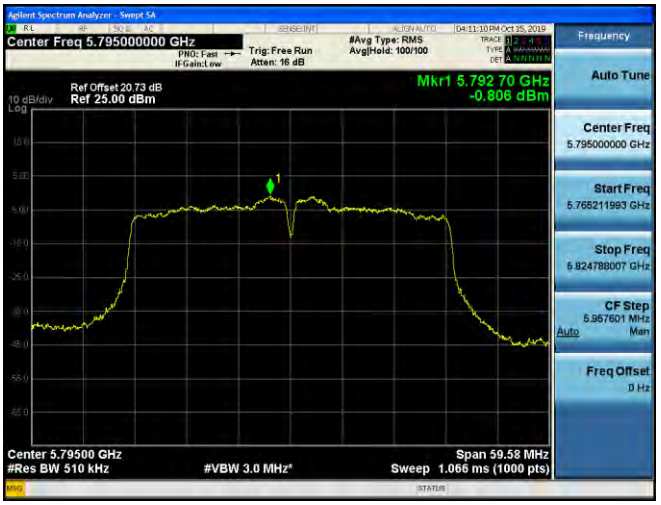
UNII 2C (Ch. 144)	UNII 3 (Ch. 165)
	

▣ 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)

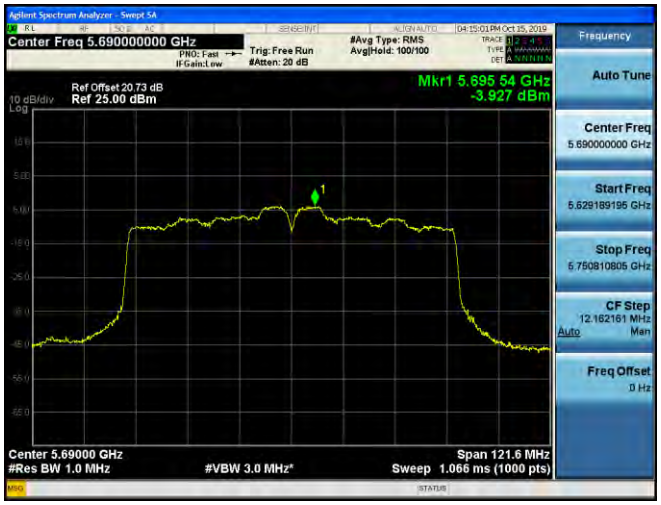
UNII 2C (Ch. 142)	UNII 3 (Ch. 159)
	

▣ 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. 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.

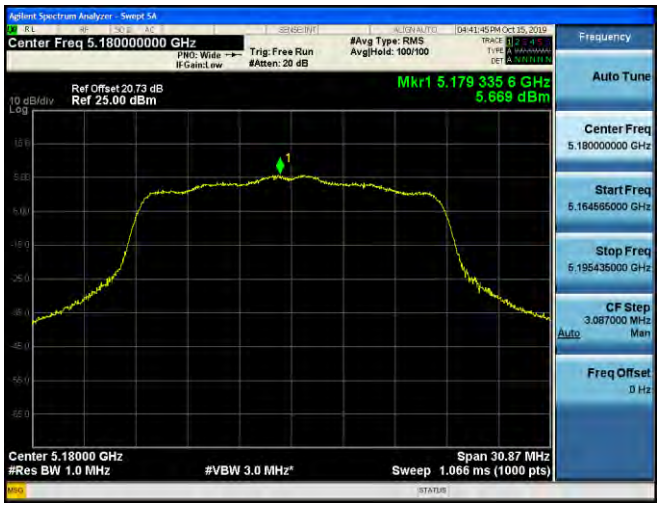
UNII 1 (Ch. 36)	UNII 2A (Ch. 52)

UNII 2C (Ch. 144)	UNII 3 (Ch. 149)

▣ 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)
	

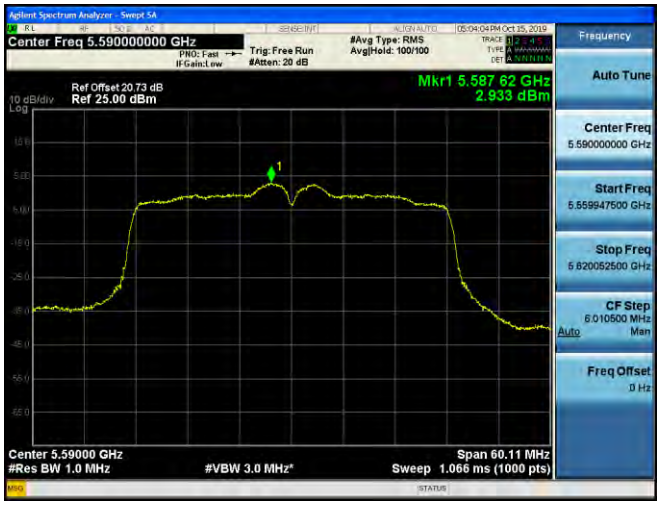
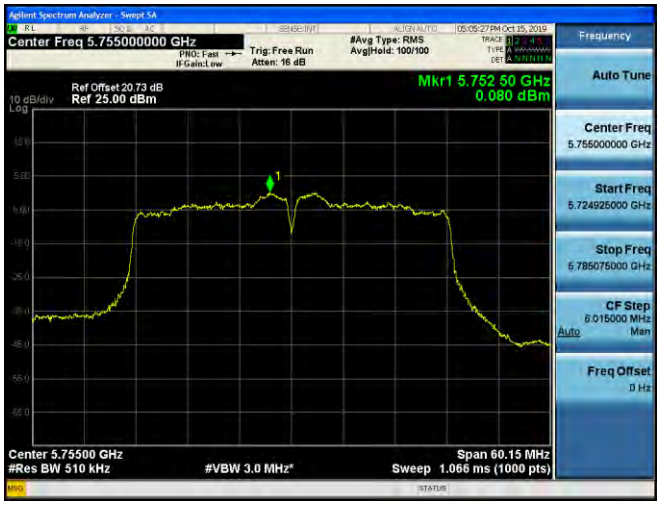
UNII 2C (Ch. 144)	UNII 3 (Ch. 149)

▣ Test Plots(802.11n(HT40))

Note:

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

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

UNII 2C (Ch. 118)	UNII 3 (Ch. 151)
	

▣ 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)

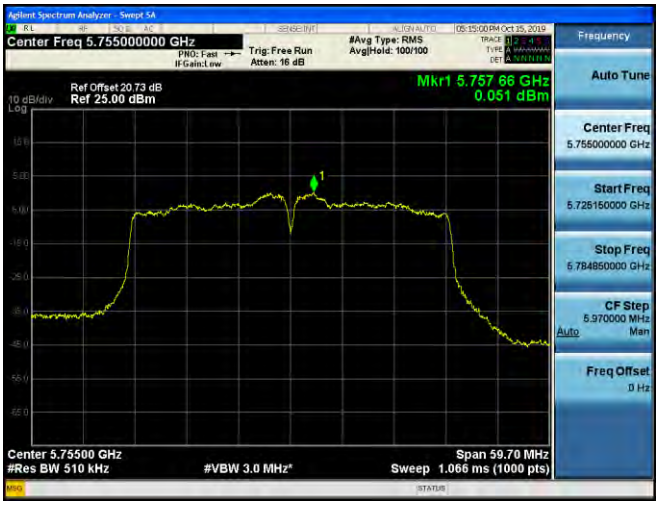
UNII 2C (Ch. 144)	UNII 3 (Ch. 149)

▣ Test Plots(802.11ac(VHT40))

Note:

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

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

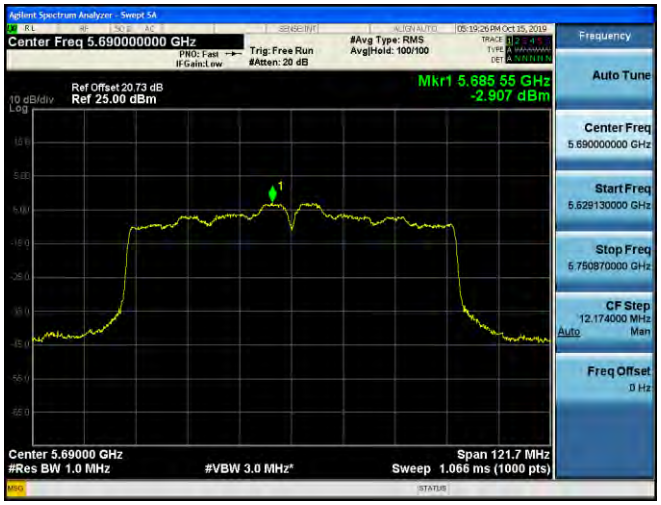
UNII 2C (Ch. 142)	UNII 3 (Ch. 151)
	

▣ 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)
	

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: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5210027.88	27.88
100%		-30	5210051.96	51.96
100%		-20	5210045.81	45.81
100%		-10	5210039.15	39.15
100%		0	5210034.28	34.28
100%		+10	5210031.60	31.60
100%		+30	5210031.44	31.44
100%		+40	5210039.53	39.53
100%		+50	5210044.27	44.27
Low	3.75	+20	5210046.14	46.14
High	4.35	+20	5210041.61	41.61

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5290029.54	29.54
100%		-30	5290054.15	54.15
100%		-20	5290046.80	46.80
100%		-10	5290040.96	40.96
100%		0	5290037.83	37.83
100%		+10	5290035.40	35.40
100%		+30	5290032.26	32.26
100%		+40	5290041.76	41.76
100%		+50	5290047.17	47.17
Low	3.75	+20	5290047.13	47.13
High	4.35	+20	5290043.11	43.11

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5530028.88	28.88
100%		-30	5530052.52	52.52
100%		-20	5530044.50	44.50
100%		-10	5530038.64	38.64
100%		0	5530034.73	34.73
100%		+10	5530032.42	32.42
100%		+30	5530031.18	31.18
100%		+40	5530040.71	40.71
100%		+50	5530045.62	45.62
Low	3.75	+20	5530046.97	46.97
High	4.35	+20	5530044.05	44.05

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5775030.16	30.16
100%		-30	5775054.54	54.54
100%		-20	5775047.18	47.18
100%		-10	5775042.02	42.02
100%		0	5775037.90	37.90
100%		+10	5775035.62	35.62
100%		+30	5775033.41	33.41
100%		+40	5775043.25	43.25
100%		+50	5775047.54	47.54
Low	3.75	+20	5775048.87	48.87
High	4.35	+20	5775044.72	44.72

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.

2 minutes after the EUT is energized

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5210030.62	30.62
100%		-30	5210054.74	54.74
100%		-20	5210048.05	48.05
100%		-10	5210042.76	42.76
100%		0	5210038.53	38.53
100%		+10	5210035.62	35.62
100%		+30	5210034.23	34.23
100%		+40	5210044.12	44.12
100%		+50	5210047.81	47.81
Low	3.75	+20	5210049.93	49.93
High	4.35	+20	5210046.64	46.64

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5290033.75	33.75
100%		-30	5290058.22	58.22
100%		-20	5290050.31	50.31
100%		-10	5290045.03	45.03
100%		0	5290039.97	39.97
100%		+10	5290036.31	36.31
100%		+30	5290037.43	37.43
100%		+40	5290047.80	47.80
100%		+50	5290051.69	51.69
Low	3.75	+20	5290052.86	52.86
High	4.35	+20	5290047.18	47.18

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5530032.29	32.29
100%		-30	5530056.71	56.71
100%		-20	5530049.79	49.79
100%		-10	5530043.53	43.53
100%		0	5530039.85	39.85
100%		+10	5530037.17	37.17
100%		+30	5530036.36	36.36
100%		+40	5530045.31	45.31
100%		+50	5530050.34	50.34
Low	3.75	+20	5530050.26	50.26
High	4.35	+20	5530047.06	47.06

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5775031.66	31.66
100%		-30	5775055.89	55.89
100%		-20	5775049.48	49.48
100%		-10	5775042.64	42.64
100%		0	5775037.91	37.91
100%		+10	5775035.13	35.13
100%		+30	5775034.88	34.88
100%		+40	5775043.69	43.69
100%		+50	5775047.04	47.04
Low	3.75	+20	5775051.31	51.31
High	4.35	+20	5775046.95	46.95

Note:

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

5 minutes after the EUT is energized

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5210032.12	32.12
100%		-30	5210055.75	55.75
100%		-20	5210048.49	48.49
100%		-10	5210042.66	42.66
100%		0	5210038.59	38.59
100%		+10	5210036.33	36.33
100%		+30	5210034.57	34.57
100%		+40	5210044.43	44.43
100%		+50	5210048.54	48.54
Low	3.75	+20	5210051.01	51.01
High	4.35	+20	5210046.65	46.65

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5290035.46	35.46
100%		-30	5290058.77	58.77
100%		-20	5290051.80	51.80
100%		-10	5290045.43	45.43
100%		0	5290042.23	42.23
100%		+10	5290039.95	39.95
100%		+30	5290039.47	39.47
100%		+40	5290050.06	50.06
100%		+50	5290055.81	55.81
Low	3.75	+20	5290052.71	52.71
High	4.35	+20	5290048.62	48.62

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.

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5530034.92	34.92
100%		-30	5530058.32	58.32
100%		-20	5530052.18	52.18
100%		-10	5530047.02	47.02
100%		0	5530042.24	42.24
100%		+10	5530039.69	39.69
100%		+30	5530037.21	37.21
100%		+40	5530047.49	47.49
100%		+50	5530052.97	52.97
Low	3.75	+20	5530052.44	52.44
High	4.35	+20	5530049.69	49.69

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5775035.29	35.29
100%		-30	5775058.69	58.69
100%		-20	5775051.02	51.02
100%		-10	5775044.69	44.69
100%		0	5775041.43	41.43
100%		+10	5775038.74	38.74
100%		+30	5775038.02	38.02
100%		+40	5775047.61	47.61
100%		+50	5775053.66	53.66
Low	3.75	+20	5775052.24	52.24
High	4.35	+20	5775049.43	49.43

Note:

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

10 minutes after the EUT is energized

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5210036.47	36.47
100%		-30	5210059.78	59.78
100%		-20	5210051.94	51.94
100%		-10	5210045.09	45.09
100%		0	5210040.60	40.60
100%		+10	5210037.87	37.87
100%		+30	5210040.49	40.49
100%		+40	5210047.89	47.89
100%		+50	5210053.91	53.91
Low	3.75	+20	5210053.45	53.45
High	4.35	+20	5210052.04	52.04

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5290034.85	34.85
100%		-30	5290059.25	59.25
100%		-20	5290052.07	52.07
100%		-10	5290045.27	45.27
100%		0	5290042.13	42.13
100%		+10	5290038.96	38.96
100%		+30	5290038.05	38.05
100%		+40	5290048.10	48.10
100%		+50	5290052.15	52.15
Low	3.75	+20	5290053.80	53.80
High	4.35	+20	5290050.40	50.40

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5530037.78	37.78
100%		-30	5530061.42	61.42
100%		-20	5530054.10	54.10
100%		-10	5530048.34	48.34
100%		0	5530043.96	43.96
100%		+10	5530040.81	40.81
100%		+30	5530040.81	40.81
100%		+40	5530050.71	50.71
100%		+50	5530056.10	56.10
Low	3.75	+20	5530055.39	55.39
High	4.35	+20	5530052.00	52.00

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5775038.43	38.43
100%		-30	5775062.06	62.06
100%		-20	5775054.62	54.62
100%		-10	5775048.63	48.63
100%		0	5775043.64	43.64
100%		+10	5775041.43	41.43
100%		+30	5775041.22	41.22
100%		+40	5775049.36	49.36
100%		+50	5775053.37	53.37
Low	3.75	+20	5775057.42	57.42
High	4.35	+20	5775052.78	52.78

Note:

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

[ANT2]

Startup after the EUT is energized

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5210030.12	30.12
100%		-30	5210054.11	54.11
100%		-20	5210046.91	46.91
100%		-10	5210041.22	41.22
100%		0	5210036.30	36.30
100%		+10	5210033.36	33.36
100%		+30	5210033.89	33.89
100%		+40	5210043.04	43.04
100%		+50	5210047.34	47.34
Low	3.75	+20	5210048.82	48.82
High	4.35	+20	5210044.66	44.66

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: 3.85 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5290028.95	28.95
100%		-30	5290052.78	52.78
100%		-20	5290045.72	45.72
100%		-10	5290040.46	40.46
100%		0	5290036.01	36.01
100%		+10	5290032.15	32.15
100%		+30	5290031.86	31.86
100%		+40	5290042.27	42.27
100%		+50	5290048.00	48.00
Low	3.75	+20	5290046.22	46.22
High	4.35	+20	5290043.90	43.90

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5530030.09	30.09
100%		-30	5530053.38	53.38
100%		-20	5530045.88	45.88
100%		-10	5530040.00	40.00
100%		0	5530035.82	35.82
100%		+10	5530033.47	33.47
100%		+30	5530033.43	33.43
100%		+40	5530043.20	43.20
100%		+50	5530049.29	49.29
Low	3.75	+20	5530047.00	47.00
High	4.35	+20	5530043.89	43.89

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5775032.45	32.45
100%		-30	5775057.24	57.24
100%		-20	5775050.38	50.38
100%		-10	5775043.66	43.66
100%		0	5775038.93	38.93
100%		+10	5775036.42	36.42
100%		+30	5775036.16	36.16
100%		+40	5775046.55	46.55
100%		+50	5775049.77	49.77
Low	3.75	+20	5775052.23	52.23
High	4.35	+20	5775046.53	46.53

Note:

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

2 minutes after the EUT is energized

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5210031.63	31.63
100%		-30	5210054.53	54.53
100%		-20	5210047.61	47.61
100%		-10	5210042.09	42.09
100%		0	5210037.89	37.89
100%		+10	5210034.17	34.17
100%		+30	5210035.19	35.19
100%		+40	5210043.04	43.04
100%		+50	5210046.47	46.47
Low	3.75	+20	5210051.20	51.20
High	4.35	+20	5210045.48	45.48

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5290032.24	32.24
100%		-30	5290055.87	55.87
100%		-20	5290049.56	49.56
100%		-10	5290044.30	44.30
100%		0	5290041.02	41.02
100%		+10	5290037.39	37.39
100%		+30	5290035.18	35.18
100%		+40	5290042.84	42.84
100%		+50	5290046.95	46.95
Low	3.75	+20	5290051.13	51.13
High	4.35	+20	5290046.68	46.68

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5530033.97	33.97
100%		-30	5530058.45	58.45
100%		-20	5530051.28	51.28
100%		-10	5530045.63	45.63
100%		0	5530042.08	42.08
100%		+10	5530038.69	38.69
100%		+30	5530037.10	37.10
100%		+40	5530047.42	47.42
100%		+50	5530052.24	52.24
Low	3.75	+20	5530052.15	52.15
High	4.35	+20	5530049.08	49.08

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.

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.85	+20(Ref)	5775033.92	33.92
100%		-30	5775057.39	57.39
100%		-20	5775050.11	50.11
100%		-10	5775043.35	43.35
100%		0	5775040.11	40.11
100%		+10	5775036.73	36.73
100%		+30	5775037.08	37.08
100%		+40	5775045.33	45.33
100%		+50	5775051.32	51.32
Low	3.75	+20	5775050.93	50.93
High	4.35	+20	5775047.52	47.52

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.