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FCC UNII REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

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

Date of Issue:
October 29, 2020

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

Report No.: HCT-RF-2010-FC012

FCC ID:	**A3LSMG991U**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**

Model:	SM-G991U
Additional Model:	SM-G991U1
EUT Type:	Mobile Phone
Modulation type	OFDM
FCC Classification:	Unlicensed National Information Infrastructure(NII)
FCC Rule Part(s):	Part 15.407

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance.

REVIEWED BY

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

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

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

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

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2010-FC012	October 29, 2020	- First Approval Report

Table of Contents

1. GENERAL INFORMATION

EUT DESCRIPTION

Model	SM-G991U		
Additional Model	SM-G991U1		
EUT Type	Mobile Phone		
Power Supply	DC 3.88 V		
Battery Information	Model: EB-BG991ABY Type: Li-ion Battery		
Travel Adapter Information	Model : EP-TA800 Manufacture: DONGYANG E&P		
Data Cable Information	Model : EP-DN980BBZ Manufacture: RF-Tech		
Ear-jack Information	Model : YBD-19HS-026 Manufacture: ALMUS		
Modulation Type	OFDM : 802.11a, 802.11n, 802.11ac		
Frequency Range (MHz)	U-NII-1	20MHz BW : 5180 - 5240 40MHz BW : 5190 - 5230 80MHz BW : 5210	
	U-NII-2A	20MHz BW : 5260 - 5320 40MHz BW : 5270 - 5310 80MHz BW : 5290	
	U-NII-2C	20MHz BW : 5500 - 5720 40MHz BW : 5510 - 5710 80MHz BW : 5530 – 5690	
	U-NII-3	20MHz BW : 5745 - 5825 40MHz BW : 5755 - 5795 80MHz BW : 5775	
Antenna Specification	Antenna type Ant.1: Metal, Ant.2: LDS		
	Peak Gain		
	Ant.1 UNII 1: -6.71 dBi UNII 2A: -6.55 dBi UNII 2C: -6.66 dBi UNII 3: -6.69 dBi	Ant.2 UNII 1: -7.11 dBi UNII 2A: -6.59 dBi UNII 2C: -6.30 dBi UNII 3: -7.30 dBi	
Straddle channel	Supported		
TDWR Band	Supported		
Dynamic Frequency Selection	Slave without radar detection		
Date(s) of Tests	September 15, 2020 ~ October 28, 2020		

ANTENNA CONFIGURATIONS

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

Configurations	SISO		SDM	CDD
	Ant.1	Ant.2	Ant.1 + Ant.2	Ant.1 + Ant.2
802.11a	X	X	X	O
802.11n	X	X	O	O
802.11ac	X	X	O	O

Note:

(1) O = Support, X = Not Support

(2) SISO = Single Input Single Output

(3) SDM = Spatial Diversity Multiplexing

(4) CDD = Cyclic Delay Diversity

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

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

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

3. Directional Gain Calculation

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

Directional gain =

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

Band	Ant Gain (dBi)		N_{ANT}/ N_{ss}	Directional Gain (dBi)
UNII 1	ANT.1	-6.71	2 / 2	-3.90
	ANT.2	-7.11		
UNII 2A	ANT.1	-6.55	2 / 2	-3.56
	ANT.2	-6.59		
UNII 2C	ANT.1	-6.66	2 / 2	-3.47
	ANT.2	-6.30		
UNII 3	ANT.1	-6.69	2 / 2	-3.98
	ANT.2	-7.30		

2. MAXIMUM OUTPUT POWER

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

Band	Mode	SISO				MIMO	
		Ant.1 Power		Ant.2 Power		Ant.1 + Ant.2 Power	
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)
UNII1	802.11a	17.60	0.058	17.71	0.059	20.67	0.117
	802.11n (HT20)	17.60	0.058	17.69	0.059	20.65	0.116
	802.11n (HT40)	15.84	0.038	16.16	0.041	19.01	0.080
	802.11ac (VHT20)	17.56	0.057	17.63	0.058	20.61	0.115
	802.11ac (VHT40)	15.76	0.038	16.21	0.042	19.00	0.079
	802.11ac (VHT80)	13.67	0.023	13.92	0.025	16.80	0.048
UNII2A	802.11a	17.26	0.053	16.89	0.049	20.07	0.102
	802.11n (HT20)	17.23	0.053	16.87	0.049	20.07	0.102
	802.11n (HT40)	16.11	0.041	15.76	0.038	18.95	0.079
	802.11ac (VHT20)	17.27	0.053	16.99	0.050	20.12	0.103
	802.11ac (VHT40)	16.14	0.041	15.80	0.038	18.98	0.079
	802.11ac (VHT80)	13.04	0.020	12.14	0.016	15.62	0.036
UNII2C	802.11a	17.71	0.059	17.76	0.060	20.74	0.119
	802.11n (HT20)	17.86	0.061	17.80	0.060	20.83	0.121
	802.11n (HT40)	16.12	0.041	15.93	0.039	19.04	0.080
	802.11ac (VHT20)	17.91	0.062	17.67	0.058	20.79	0.120
	802.11ac (VHT40)	16.13	0.041	15.91	0.039	19.03	0.080
	802.11ac (VHT80)	15.04	0.032	15.34	0.034	18.18	0.066
UNII3	802.11a	17.83	0.061	17.76	0.060	20.80	0.120
	802.11n (HT20)	17.80	0.060	17.69	0.059	20.75	0.119
	802.11n (HT40)	16.05	0.040	16.31	0.043	19.19	0.083
	802.11ac (VHT20)	17.90	0.062	17.80	0.060	20.86	0.122
	802.11ac (VHT40)	16.04	0.040	16.23	0.042	19.15	0.082
	802.11ac (VHT80)	14.76	0.030	15.55	0.036	18.18	0.066

3. TEST METHODOLOGY

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

EUT CONFIGURATION

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

EUT EXERCISE

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

GENERAL TEST PROCEDURES

Conducted Emissions

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

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1GHz. Above 1GHz with 1.5m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 6.6.5 of ANSI C63.10. (Version: 2013)

DESCRIPTION OF TEST MODES

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

4. INSTRUMENT CALIBRATION

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

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

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

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

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

5.2 EQUIPMENT

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

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

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

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203, §15.407:

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

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

(2) The E.U.T Complies with the requirement of §15.203, §15.407

7. MEASUREMENT UNCERTAINTY

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

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

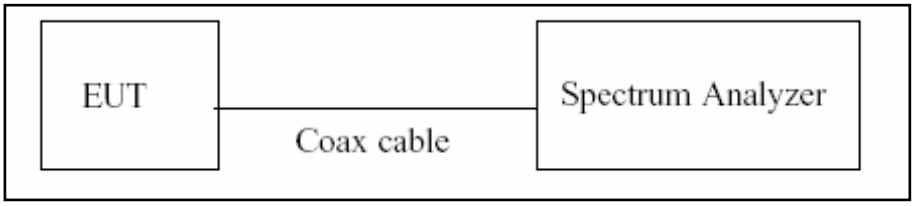
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70
Radiated Disturbance (18 GHz ~ 40 GHz)	5.05

8. DESCRIPTION OF TESTS

8.1. Duty Cycle

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

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

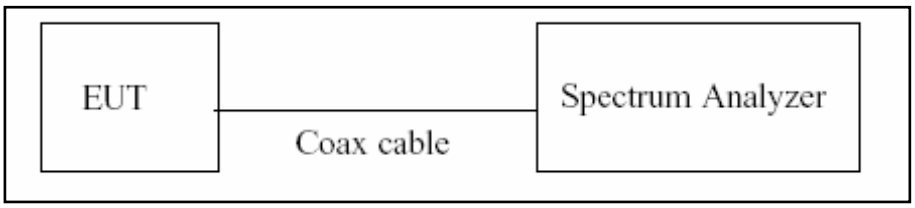
1. RBW = 8 MHz (the largest availble value)
2. VBW = 8 MHz (≥ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on}/ T_{total} and Duty Cycle Factor = 10log(1/Duty Cycle)

8.2. 6dB Bandwidth & 26dB Bandwidth

Limit

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

Test Configuration



Test Procedure(26dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

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

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

Test Procedure (6dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

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

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

Note:

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

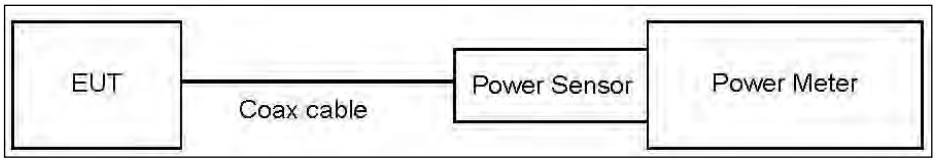
8.3. Output Power Measurement

Limit

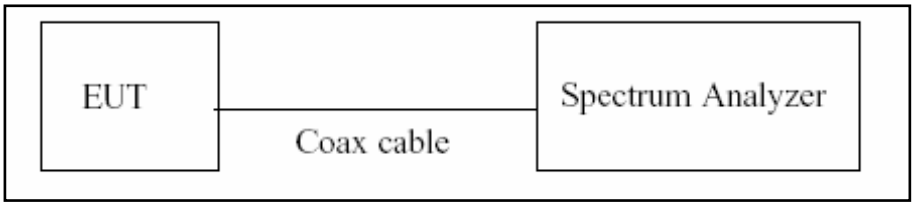
Band	Limit
UNII 1	- Master : Not exceed 1 W(=30dBm) - Slave : Not exceed 250 mW(=23.98 dBm)
UNII 2A, 2C	Not exceed the lesser of 250 mW or 11 dBm + 10 log B, (where B is the 26 dB emission bandwidth in megahertz.)
UNII 3	Not exceed 1 W(=30dBm)

Test Configuration

Power Meter



Spectrum Analyzer(Only Straddle Channel)



Test Procedure(Power Meter)

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

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

Test Procedure(Spectrum Analyzer)

The transmitter output is connected to the Spectrum Analyzer.

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

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

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

Sample Calculation

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

Note

1. Spectrum reading values are not plot data.
   The power results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss(10 dB) + Cable loss + EUT Cable loss
3. Actual value of loss for the attenuator and cable combination is below table.

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

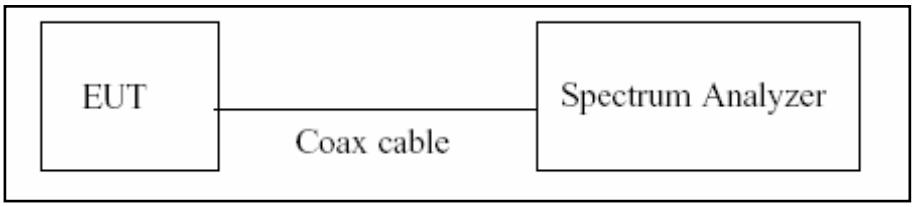
(Actual value of loss for the attenuator and cable combination)

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

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

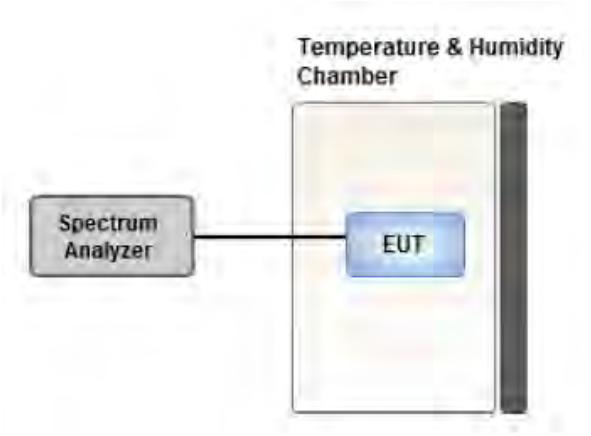
(Actual value of loss for the attenuator and cable combination)

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.

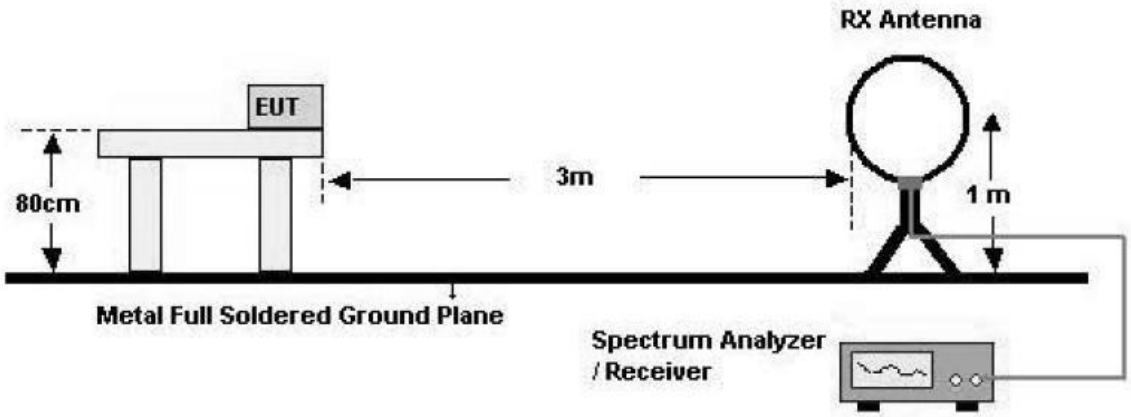
3. UNII 3: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below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

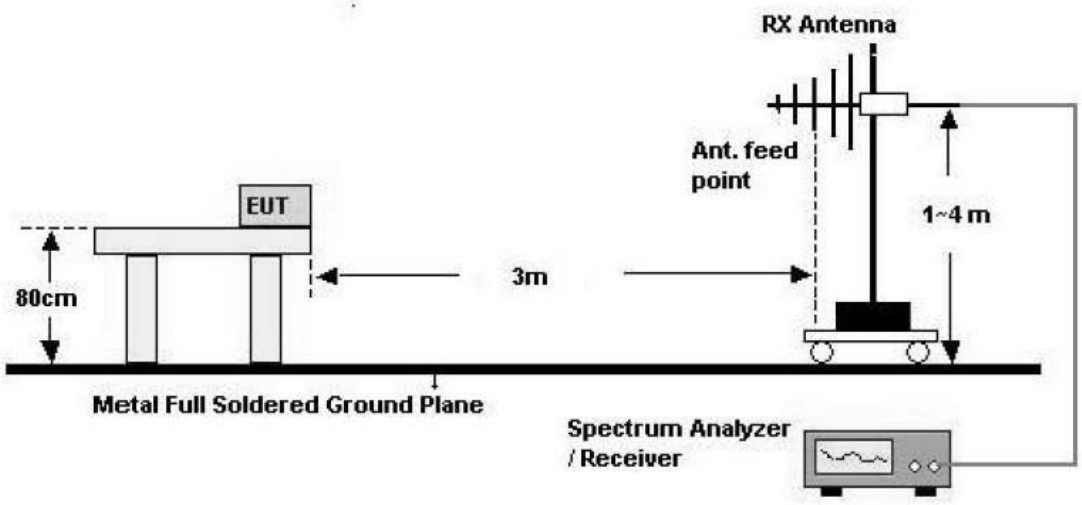
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

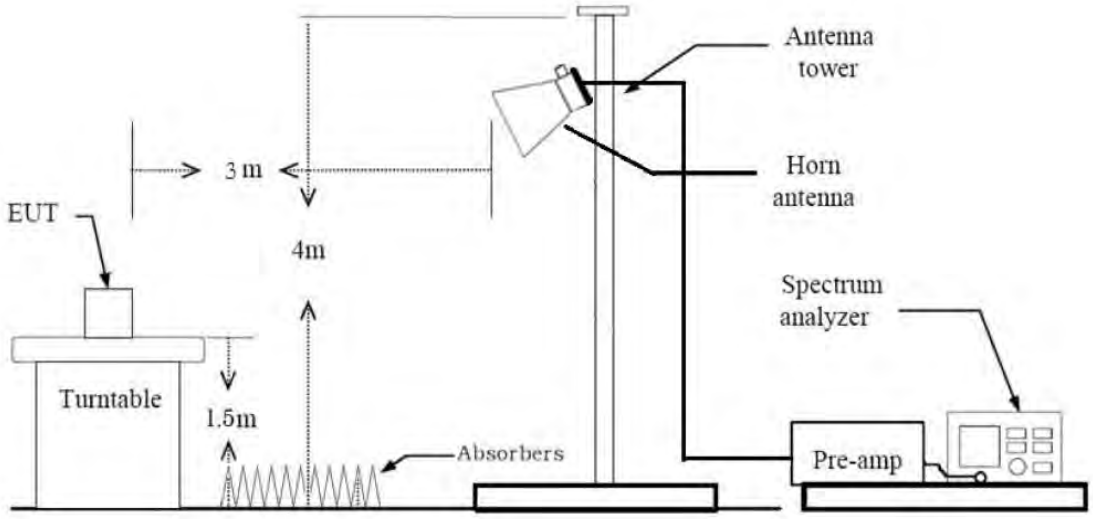
Below 30 MHz



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. The Hybrid antenna was placed at a location 3m from the EUT, which is varied from 1m to 4m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Spectrum Setting
   (1) Measurement Type(Peak):
      - Measured Frequency Range : 30 MHz – 1 GHz
      - Detector = Peak
      - Trace = Maxhold
      - RBW = 100 kHz
      - VBW ≥ 3 x RBW
   (2) Measurement Type(Quasi-peak):
      - Measured Frequency Range : 30 MHz – 1 GHz
      - Detector = Quasi-Peak
      - RBW = 120 kHz
   ※ In general, (1) is used mainly
7. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L)
8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

Test Procedure of Radiated spurious emissions (Above 1 GHz)

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting

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

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

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

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

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

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

Test Procedure of Radiated Restricted Band Edge

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting

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

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

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

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

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

9. Measured Frequency Range :
   - 4 500 MHz ~ 5 150 MHz
   - 5 350 MHz ~ 5 460 MHz
   - 5 460 MHz ~ 5 470 MHz
   - (75 MHz or more below the 5 725 MHz) ~ 5 725 MHz
   - 5 850 MHz ~ (75 MHz or more above the 5 850 MHz)
10. Distance extrapolation factor = 20log (test distance / specific distance) (dB)
11. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Attenuator + Distance Factor(D.F)

The actual setting value of VBW (for MIMO)

Mode	Worst Data rate (Mbps)	Duty Cycle	Duty Cycle Factor (dB)	The actual setting value of VBW (Hz)
802.11a	6	0.937	0.283	1000
802.11n(HT20)	MCS 0	0.930	0.317	1000
802.11n(HT40)	MCS 0	0.868	0.617	2000
802.11ac(VHT20)	MCS 0	0.875	0.578	2000
802.11ac(VHT40)	MCS 0	0.783	1.065	3000
802.11ac(VHT80)	MCS 0	0.660	1.806	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 : X,Y
   - Radiated Restricted Band Edge : X,Y
3. All datarate of operation were investigated and the worst case datarate results are reported
   - Mode : Ant.1(SISO), Ant.2(SISO), Ant.1+Ant.2(SDM), Ant.1+Ant.2(CDD)
   - Worstcase : Ant.1+Ant.2(CDD)
4. All position of loop antenna were investigated and the test result is a no critical peak found at all positions.
   - Position : Horizontal, Vertical, Parallel to the ground plane
5. Radiated Spurious Emission
   -UNII 1, 2A, 2C, 3 : 802.11a
   - In order to simplify the report, We only have attached RSE result of worst case.
   (= Highest power of Each bands)
6. SM-G991U, SM-G991U1 were tested and the worst case results are reported.

(Worst case : SM-G991U)

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,Y
3. Test case

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

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

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

(Worst case: The lowest margin condition the channels and modes were selected for test.)

Test case	Description	2.4 GHz Emission	5 GHz Emission
1	Antenna	Ant.2	Ant All
	Channel	6	165
	Data Rate	1 Mbps	6 Mbps
	Mode	802.11b	802.11a

Test case	Description	2.4 GHz Emission	5 GHz Emission
2	Antenna	Ant All	Ant All
	Channel	1	165
	Data Rate	6 Mbps	6 Mbps
	Mode	802.11g	802.11a

Test case	Description	5 GHz Emission	Bluetooth Emission
3	Antenna	Ant All	Ant.1
	Channel	165	0
	Data Rate	6 Mbps	1 Mbps
	Mode	802.11a	DH-5

5. SM-G991U, SM-G991U1 were tested and the worst case results are reported.

(Worst case : SM-G991U)

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-G991U, SM-G991U1 were tested and the worst case results are reported.

(Worst case : SM-G991U)

Conducted test

1. All datarate of operation were investigated and the worst case datarate results are reported.

2. SM-G991U, SM-G991U1 were tested and the worst case results are reported.

(Worst case : SM-G991U)

9. SUMMARY OF TEST RESULTS

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

10. TEST RESULT

10.1 DUTY CYCLE

[SISO]

Mode	Data Rate (Mbps)	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11a	6	1.429	1.525	0.937	0.283
	9	0.958	1.059	0.904	0.437
	12	0.725	0.826	0.877	0.569
	18	0.491	0.593	0.829	0.814
	24	0.370	0.471	0.785	1.052
	36	0.253	0.355	0.714	1.461
	48	0.193	0.294	0.655	1.836
	54	0.177	0.279	0.636	1.963

Mode	MCS Index	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11n (HT20)	0	1.338	1.439	0.930	0.317
	1	0.689	0.785	0.877	0.568
	2	0.471	0.573	0.823	0.846
	3	0.365	0.461	0.791	1.017
	4	0.258	0.355	0.729	1.375
	5	0.198	0.299	0.661	1.798
	6	0.182	0.284	0.643	1.919
	7	0.167	0.263	0.635	1.975
802.11n (HT40)	0	0.664	0.765	0.868	0.617
	1	0.350	0.451	0.775	1.105
	2	0.248	0.350	0.710	1.487
	3	0.198	0.294	0.672	1.724
	4	0.147	0.243	0.604	2.188
	5	0.117	0.213	0.548	2.615
	6	0.106	0.208	0.512	2.906
	7	0.100	0.200	0.500	3.010

Mode	MCS Index	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11ac (VHT20)	0	1.348	1.444	0.933	0.300
	1	0.694	0.795	0.873	0.592
	2	0.471	0.573	0.823	0.846
	3	0.365	0.466	0.783	1.065
	4	0.263	0.360	0.732	1.353
	5	0.208	0.304	0.683	1.654
	6	0.187	0.289	0.649	1.877
	7	0.177	0.279	0.636	1.963
	8	0.147	0.248	0.592	2.278
802.11ac (VHT40)	0	0.669	0.765	0.874	0.584
	1	0.355	0.456	0.778	1.091
	2	0.253	0.350	0.725	1.399
	3	0.203	0.299	0.678	1.688
	4	0.152	0.248	0.612	2.131
	5	0.122	0.218	0.558	2.533
	6	0.111	0.213	0.524	2.808
	7	0.104	0.204	0.510	2.926
	8	0.096	0.198	0.487	3.123
	9	0.091	0.193	0.474	3.245
802.11ac (VHT80)	0	0.329	0.431	0.765	1.165
	1	0.187	0.284	0.661	1.800
	2	0.142	0.243	0.583	2.341
	3	0.117	0.218	0.535	2.717
	4	0.096	0.193	0.500	3.010
	5	0.081	0.177	0.457	3.399
	6	0.076	0.177	0.429	3.680
	7	0.071	0.171	0.415	3.817
	8	0.068	0.168	0.405	3.928
	9	0.064	0.162	0.395	4.033

Note:

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

[MIMO]

Mode	Data Rate (Mbps)	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11a	6	1.429	1.525	0.937	0.283
	9	0.958	1.059	0.904	0.437
	12	0.725	0.826	0.877	0.569
	18	0.491	0.593	0.829	0.814
	24	0.370	0.471	0.785	1.052
	36	0.253	0.355	0.714	1.461
	48	0.193	0.294	0.655	1.836
	54	0.177	0.279	0.636	1.963

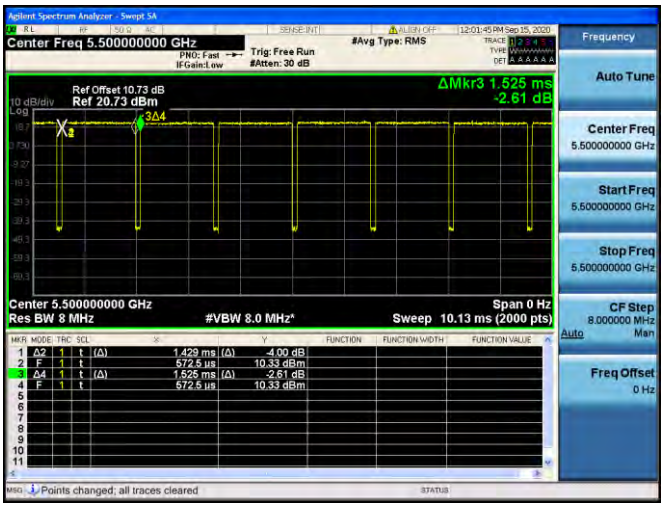
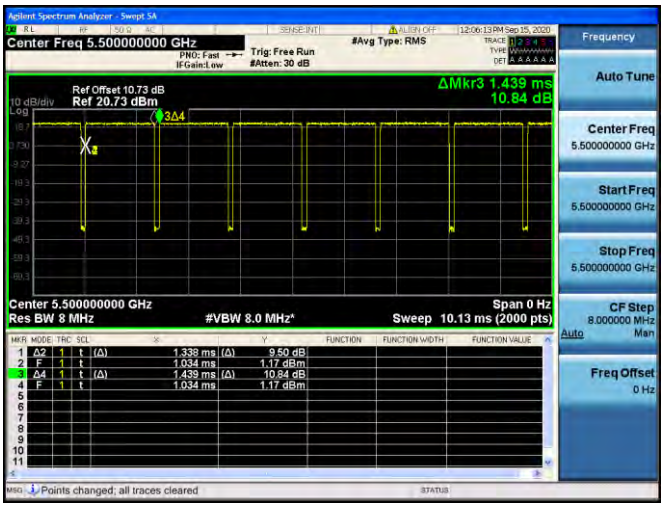
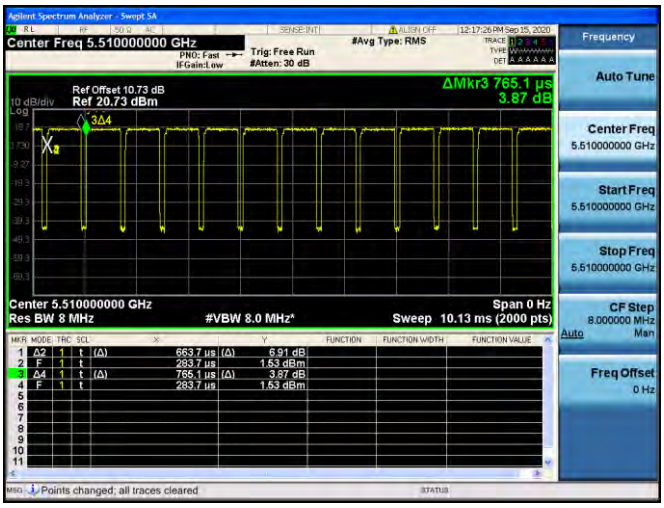
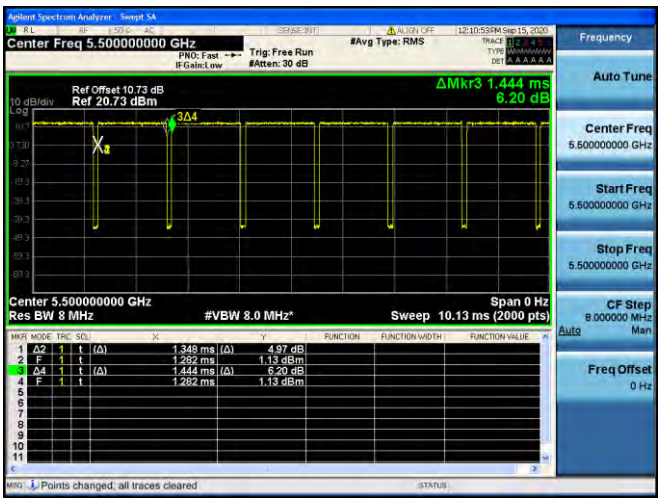
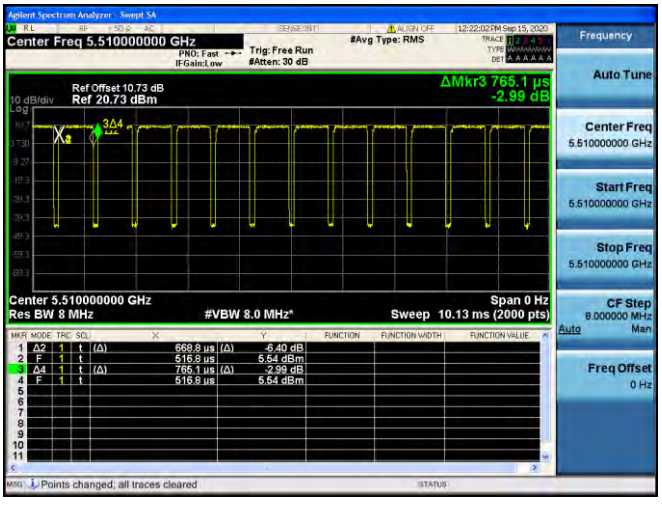
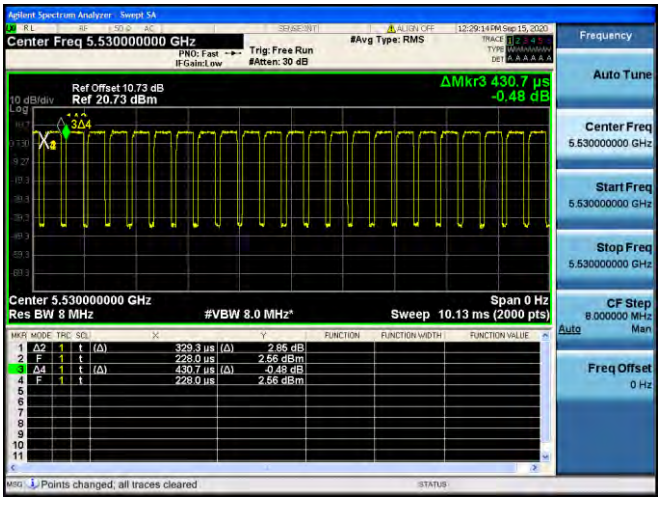
Mode	MCS Index	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11n (HT20)	0	1.338	1.439	0.930	0.317
	1	0.689	0.785	0.877	0.568
	2	0.471	0.573	0.823	0.846
	3	0.365	0.461	0.791	1.017
	4	0.258	0.355	0.729	1.375
	5	0.198	0.299	0.661	1.798
	6	0.182	0.284	0.643	1.919
	7	0.167	0.263	0.635	1.975
802.11n (HT40)	0	0.664	0.765	0.868	0.617
	1	0.350	0.451	0.775	1.105
	2	0.248	0.350	0.710	1.487
	3	0.198	0.294	0.672	1.724
	4	0.147	0.243	0.604	2.188
	5	0.117	0.213	0.548	2.615
	6	0.106	0.208	0.512	2.906
	7	0.100	0.200	0.500	3.010

Mode	MCS Index	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11ac (VHT20)	0	0.696	0.795	0.875	0.578
	1	0.372	0.471	0.790	1.025
	2	0.264	0.363	0.727	1.383
	3	0.210	0.309	0.680	1.677
	4	0.156	0.255	0.612	2.134
	5	0.126	0.225	0.560	2.518
	6	0.120	0.219	0.548	2.613
	7	0.111	0.210	0.529	2.769
	8	0.099	0.198	0.500	3.010
802.11ac (VHT40)	0	0.360	0.460	0.783	1.065
	1	0.204	0.302	0.675	1.704
	2	0.152	0.250	0.608	2.161
	3	0.122	0.222	0.550	2.600
	4	0.100	0.198	0.504	2.973
	5	0.084	0.182	0.462	3.358
	6	0.080	0.180	0.444	3.522
	7	0.076	0.174	0.437	3.597
	8	0.070	0.170	0.412	3.854
	9	0.067	0.167	0.401	3.966
802.11ac (VHT80)	0	0.192	0.291	0.660	1.806
	1	0.120	0.218	0.550	2.593
	2	0.096	0.195	0.492	3.078
	3	0.084	0.184	0.457	3.405
	4	0.072	0.171	0.421	3.757
	5	0.064	0.163	0.393	4.060
	6	0.063	0.163	0.387	4.128
	7	0.060	0.160	0.375	4.260
	8	0.059	0.159	0.372	4.291
	9	0.055	0.155	0.355	4.500

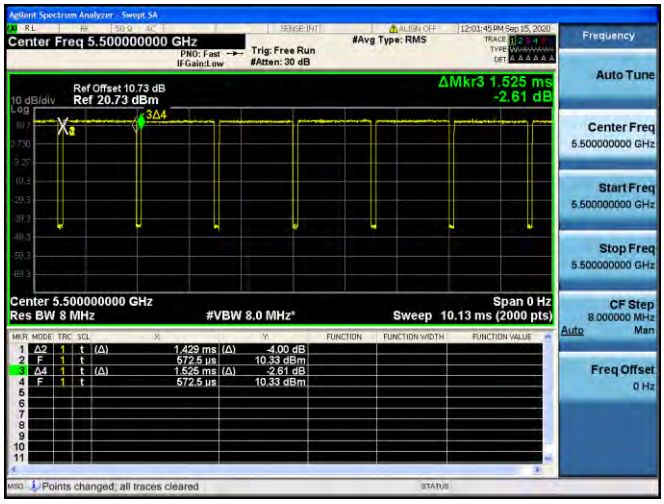
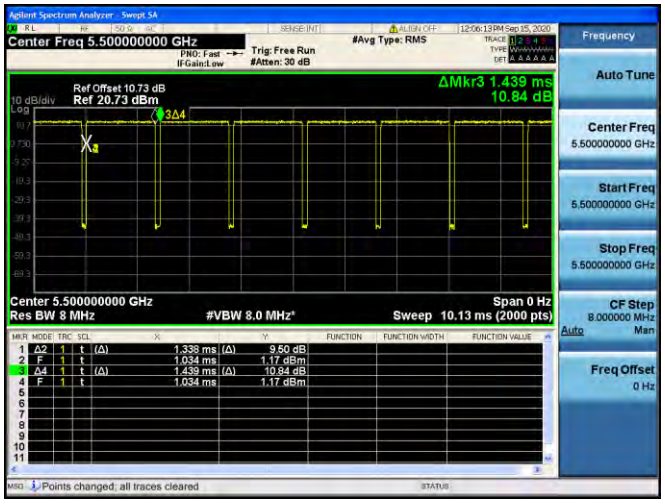
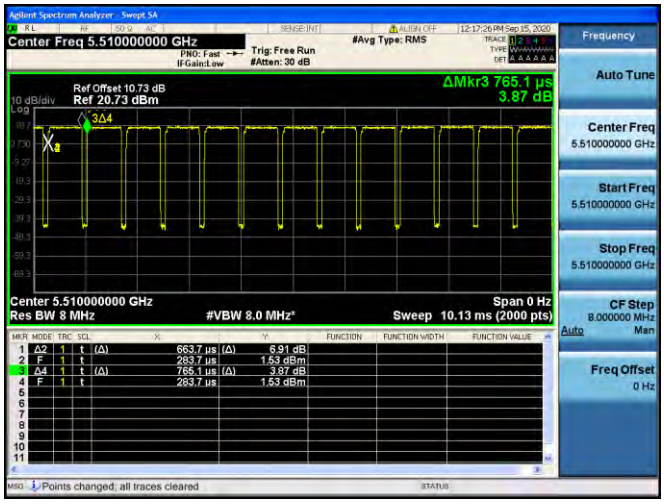
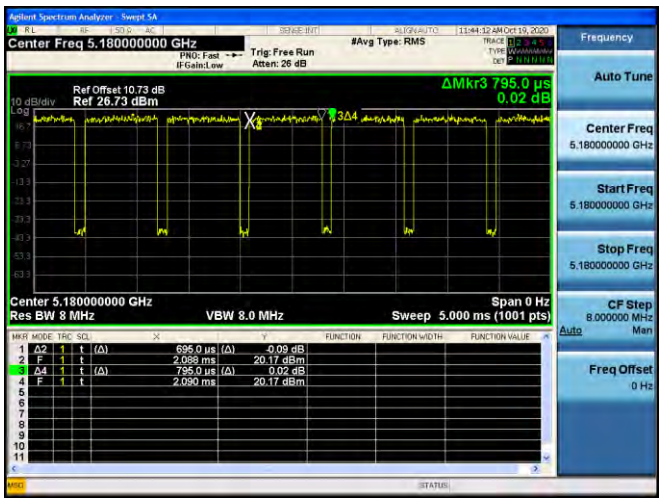
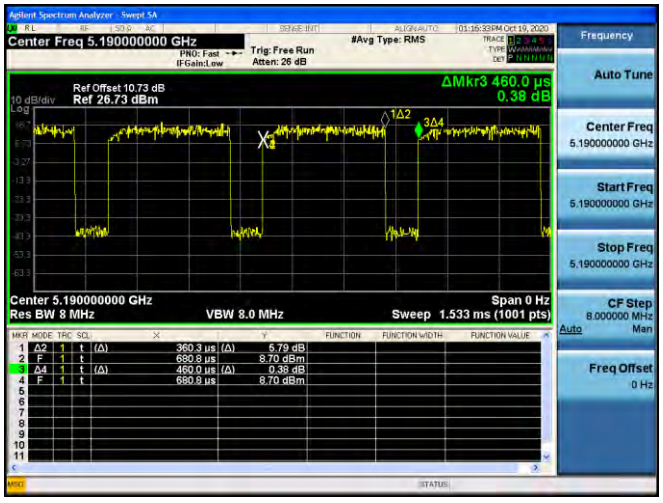
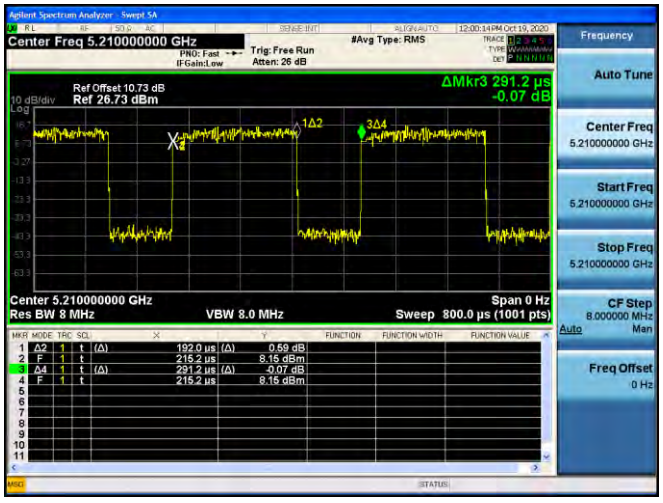
Note:

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

[SISO]

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

[MIMO]

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

10.2 26 dB BANDWIDTH

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

Straddle channel data were added in section 10.7.1.

[ANT.1]

802.11a Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	21.49	16.663
5200	40	21.59	16.836
5240	48	21.21	16.771
5260	52	21.19	16.820
5300	60	21.62	16.785
5320	64	21.18	16.594
5500	100	27.17	16.817
5600	120	28.71	17.271
5720	144	32.89	18.285
5745	149	35.67	18.197
5785	157	32.19	17.165
5825	165	28.73	17.147

802.11n(HT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	21.51	17.794
5200	40	24.37	17.962
5240	48	21.81	17.929
5260	52	21.64	17.958
5300	60	22.28	17.949
5320	64	21.87	17.808
5500	100	27.31	17.923
5600	120	32.36	18.292
5720	144	37.80	19.164
5745	149	37.48	19.403
5785	157	30.82	18.208
5825	165	30.15	18.181

802.11n(HT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	39.67	36.153
5230	46	39.87	36.335
5270	54	40.08	36.403
5310	62	39.67	36.219
5510	102	39.60	36.288
5590	118	71.33	36.507
5710	142	75.06	36.563
5755	151	74.67	36.632
5795	159	73.08	36.529

802.11ac(VHT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	21.32	17.775
5200	40	21.88	17.997
5240	48	21.32	17.948
5260	52	23.79	17.918
5300	60	21.45	17.970
5320	64	21.47	17.851
5500	100	27.06	17.976
5600	120	30.15	18.241
5720	144	38.72	19.055
5745	149	38.65	19.343
5785	157	31.46	18.258
5825	165	30.52	18.131

802.11ac(VHT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	39.50	36.209
5230	46	39.81	36.412
5270	54	40.42	36.337
5310	62	39.44	36.189
5510	102	40.46	36.246
5590	118	49.89	36.467
5710	142	62.41	36.554
5755	151	56.70	36.572
5795	159	61.53	36.534

802.11ac(VHT80) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5210	42	81.21	75.476
5290	58	81.23	75.451
5530	106	81.45	75.551
5610	122	81.69	75.790
5690	138	98.97	75.857
5775	155	82.60	75.777

[ANT.2]

802.11a Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	21.44	16.672
5200	40	22.46	16.848
5240	48	21.32	16.817
5260	52	21.38	16.788
5300	60	21.27	16.827
5320	64	21.13	16.641
5500	100	23.77	16.673
5600	120	23.79	16.880
5720	144	27.57	16.924
5745	149	26.06	16.994
5785	157	22.38	16.822
5825	165	22.11	16.812

802.11n(HT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	23.98	17.874
5200	40	23.50	18.040
5240	48	21.64	17.989
5260	52	21.71	17.929
5300	60	21.41	17.929
5320	64	21.96	17.798
5500	100	22.01	17.859
5600	120	26.87	18.065
5720	144	24.10	18.073
5745	149	27.94	18.107
5785	157	24.28	18.007
5825	165	25.84	17.978

802.11n(HT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	39.73	36.204
5230	46	43.35	36.455
5270	54	40.37	36.395
5310	62	39.70	36.207
5510	102	39.81	36.246
5590	118	50.83	36.389
5710	142	65.51	36.374
5755	151	73.21	36.459
5795	159	71.07	36.345

802.11ac(VHT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	22.52	17.877
5200	40	21.83	17.976
5240	48	22.07	17.973
5260	52	21.54	17.970
5300	60	22.22	17.919
5320	64	22.31	17.800
5500	100	22.28	17.851
5600	120	26.82	18.096
5720	144	27.45	18.095
5745	149	27.97	18.097
5785	157	27.19	18.024
5825	165	27.49	18.013

802.11ac(VHT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	39.68	36.215
5230	46	40.45	36.400
5270	54	40.46	36.454
5310	62	39.63	36.199
5510	102	39.67	36.244
5590	118	40.44	36.380
5710	142	39.82	36.419
5755	151	47.15	36.427
5795	159	44.32	36.418

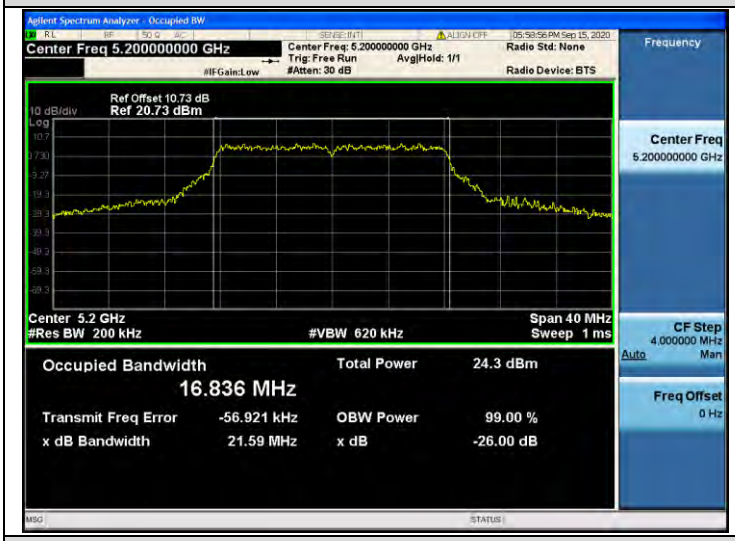
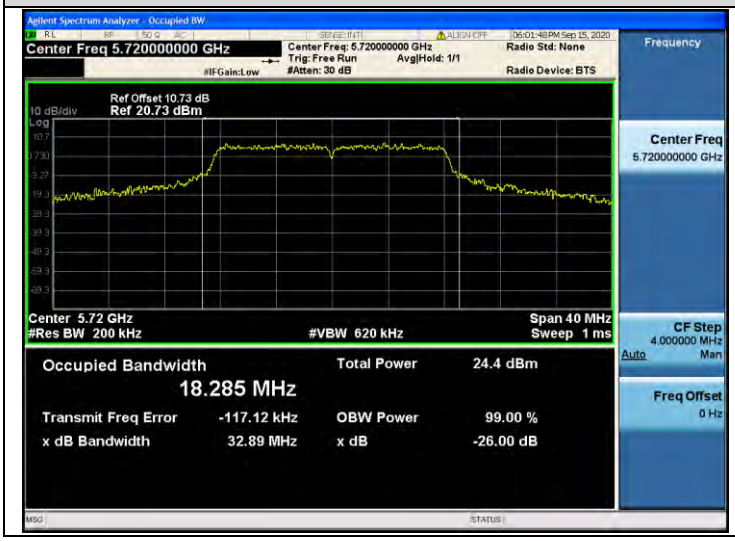
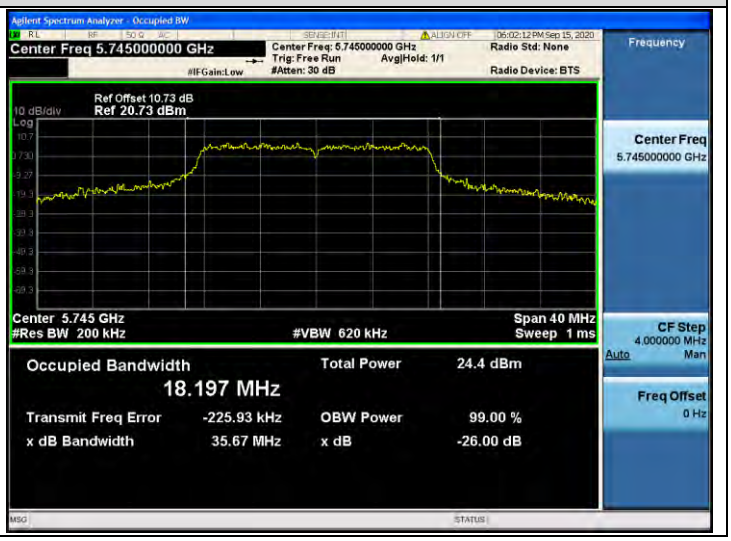
802.11ac(VHT80) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5210	42	80.59	75.448
5290	58	80.85	75.457
5530	106	81.55	75.496
5610	122	81.44	75.772
5690	138	81.72	75.825
5775	155	97.38	75.944

[ANT.1]

▣ Test Plots(802.11a)

Note:

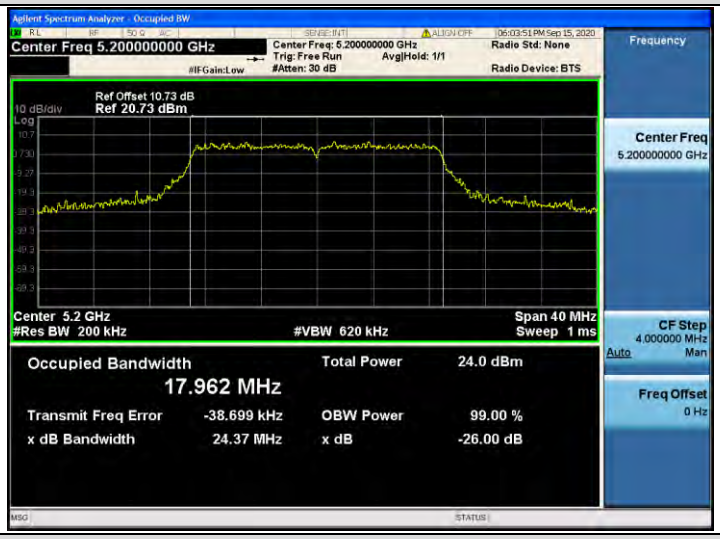
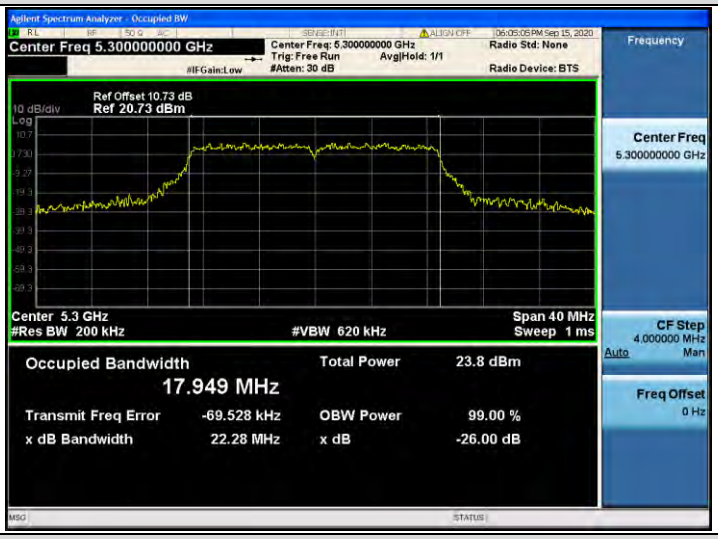
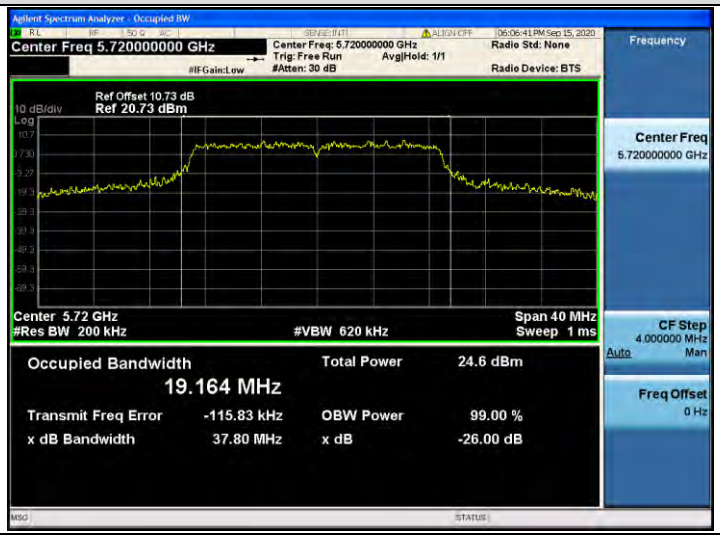
In order to simplify the report, attached plots were only the most wide channel.

802.11a UNII 1 BAND 26dB Bandwidth (CH 40)	802.11a UNII 2A BAND 26dB Bandwidth (CH 60)
	
802.11a UNII 2C BAND 26dB Bandwidth (CH 144)	**802.11a UNII 3 BAND 26dB Bandwidth (CH 149)**
	

▣ Test Plots(802.11n(HT20))

Note:

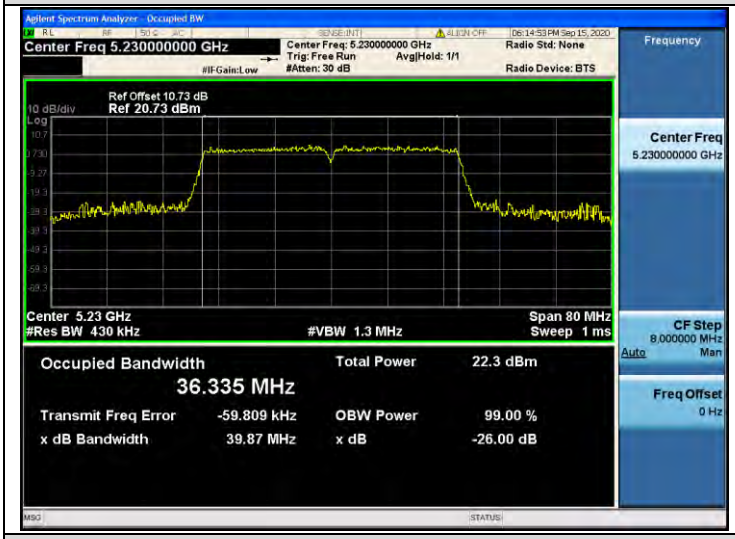
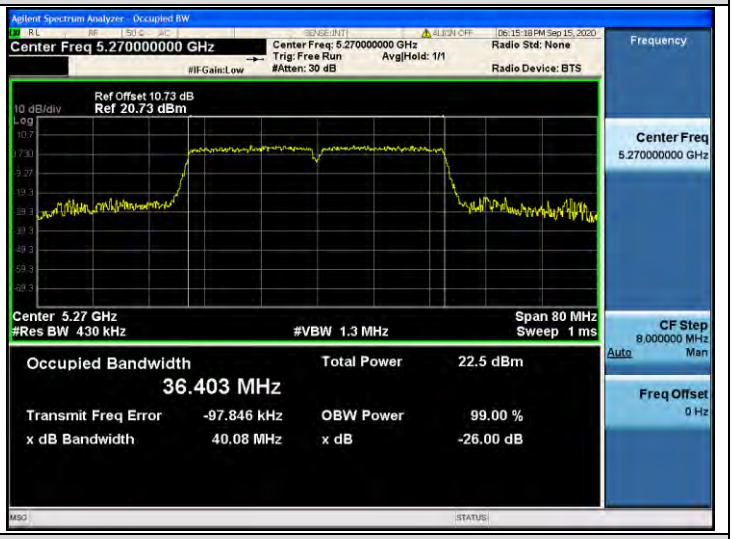
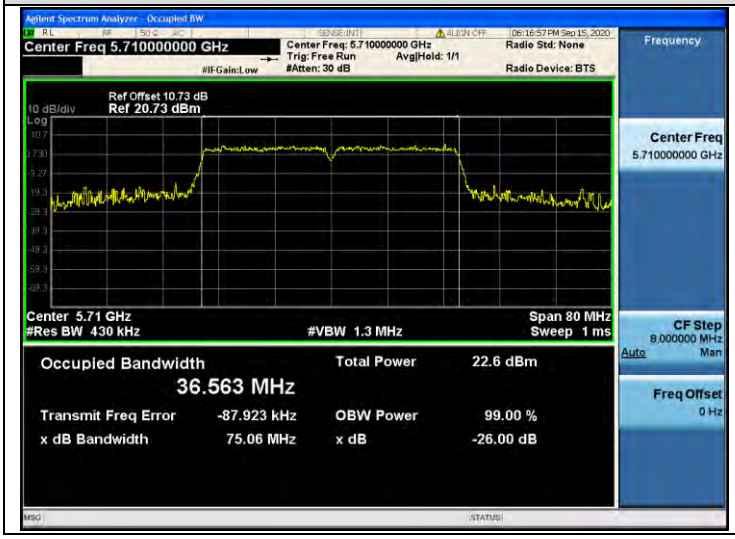
In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT20 UNII 1 BAND 26dB Bandwidth(CH 40)	802.11n_HT20 UNII 2A BAND 26dB Bandwidth(CH 60)
	
802.11n_HT20 UNII 2C BAND 26dB Bandwidth(CH 144)	**802.11n_HT20 UNII 3 BAND 26dB Bandwidth(CH 149)**
	

▣ Test Plots(802.11n(HT40))

Note:

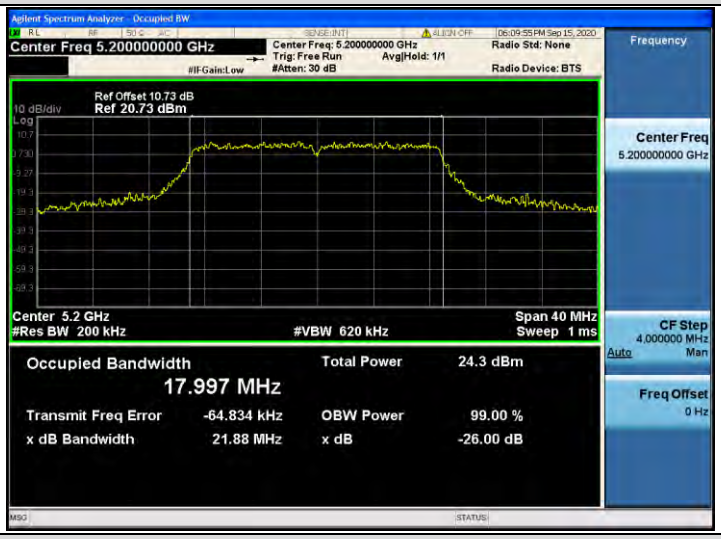
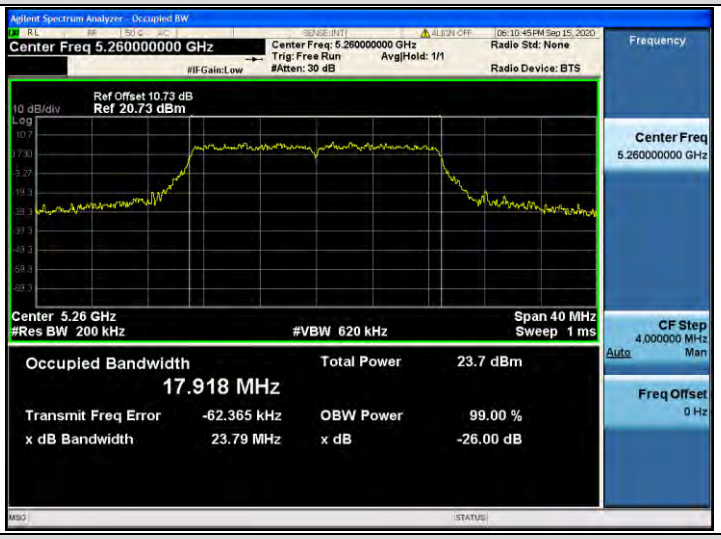
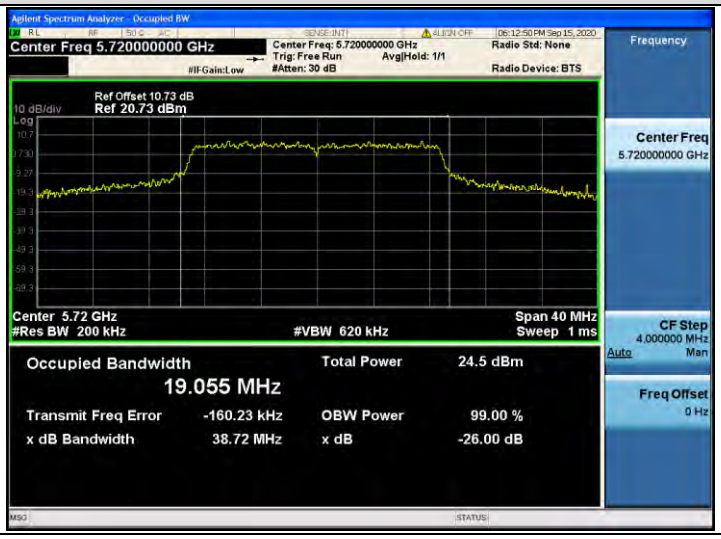
In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT40 UNII 1 BAND 26dB Bandwidth(CH 46)	802.11n_HT40 UNII 2A BAND 26dB Bandwidth (CH 54)
	
802.11n_HT40 UNII 2C BAND 26dB Bandwidth(CH 142)	**802.11n_HT40 UNII 3 BAND 26dB Bandwidth (CH 151)**
	

▣ Test Plots(802.11ac(VHT20))

Note:

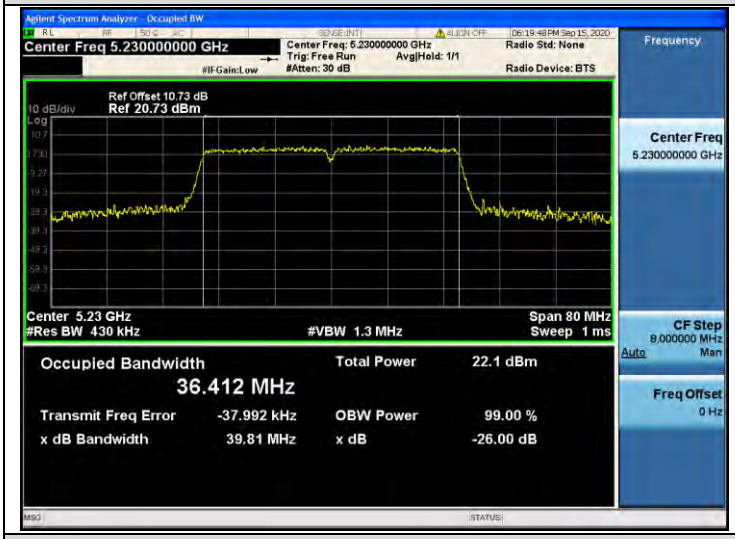
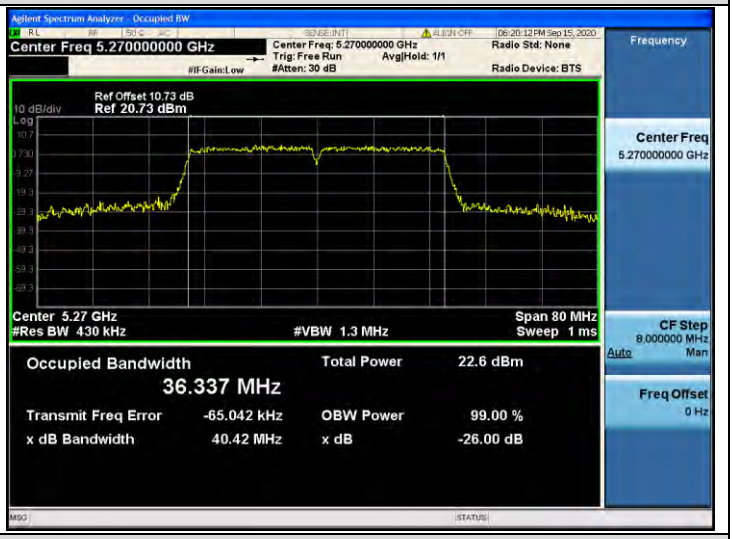
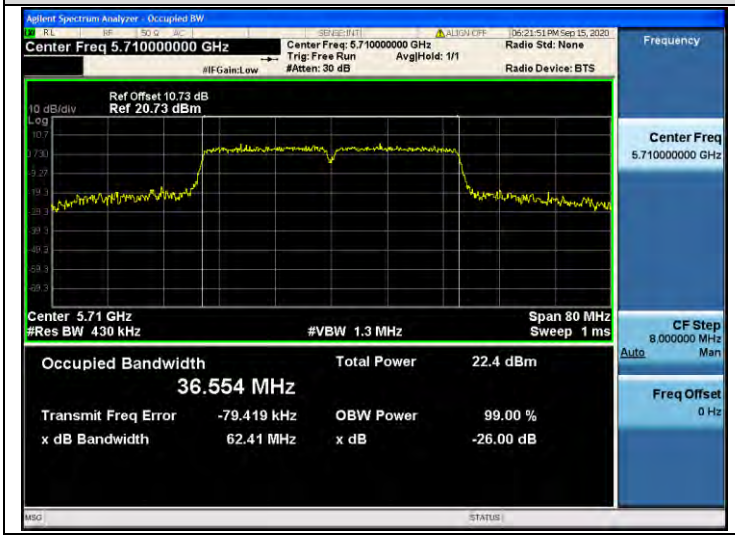
In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT20 UNII 1 BAND 26dB Bandwidth(CH 40)	802.11ac_VHT20 UNII 2A BAND 26dB Bandwidth(CH 52)
	
802.11ac_VHT20 UNII 2C BAND 26dB Bandwidth(CH 144)	**802.11ac_VHT20 UNII 3 BAND 26dB Bandwidth(CH 149)**
	

▣ Test Plots(802.11ac(VHT40))

Note:

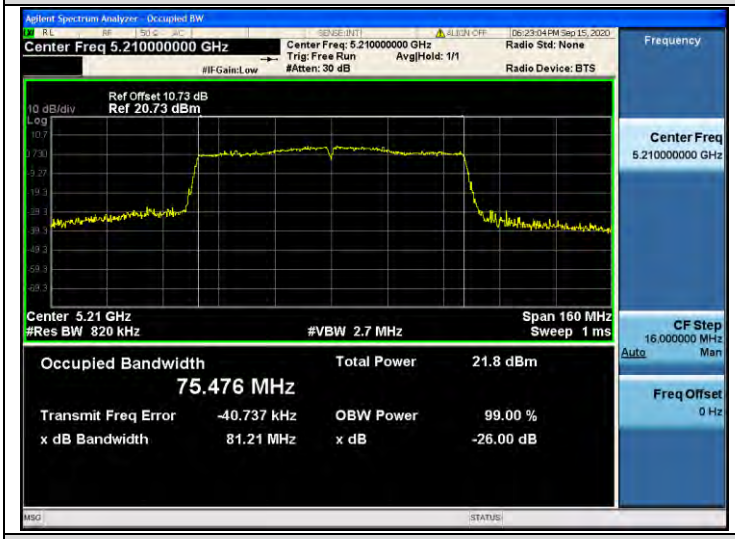
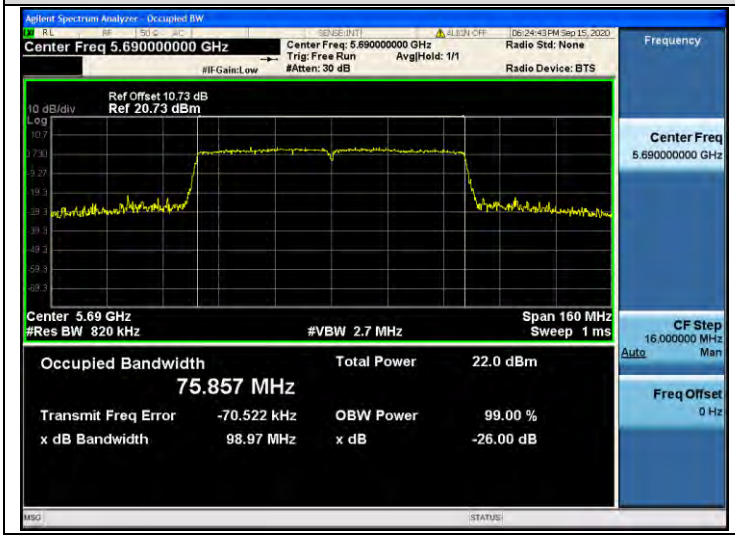
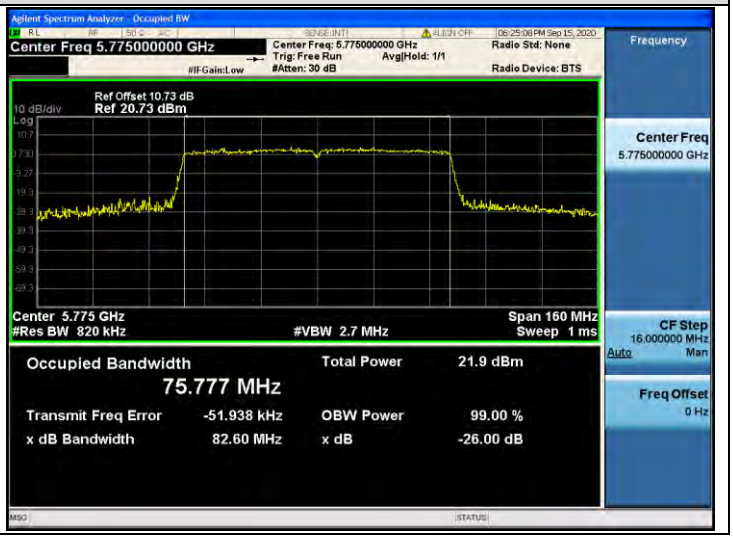
In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT40 UNII 1 BAND 26dB Bandwidth(CH 46)	802.11ac_VHT40 UNII 2A BAND 26dB Bandwidth (CH 54)
	
802.11ac_VHT40 UNII 2C BAND 26dB Bandwidth(CH 142)	**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.

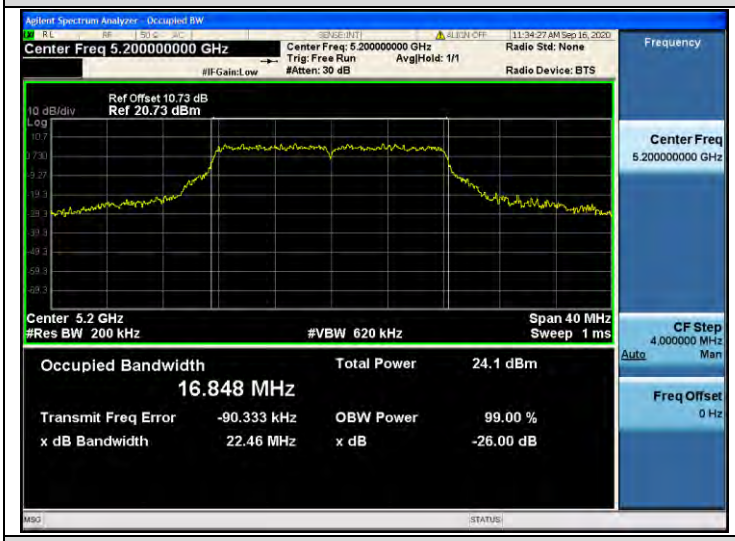
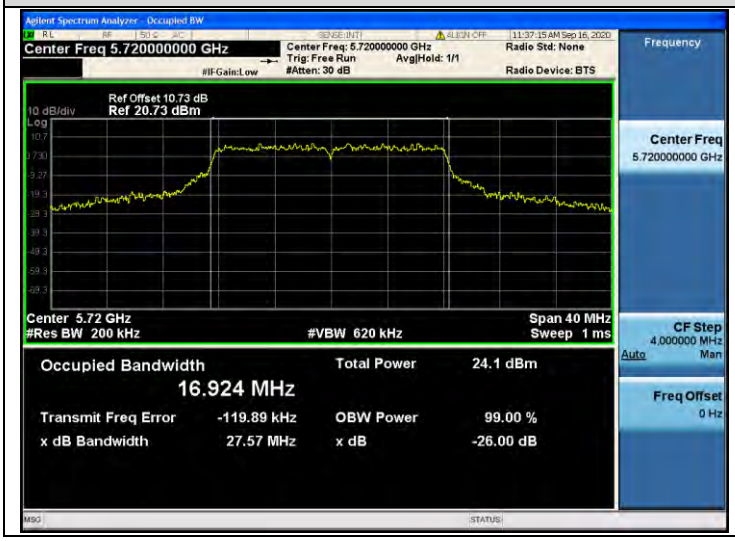
802.11ac_VHT80 UNII 1 BAND 26dB Bandwidth(CH 42)	802.11ac_VHT80 UNII 2A BAND 26dB Bandwidth (CH 58)
	
802.11ac_VHT80 UNII 2C BAND 26dB Bandwidth(CH 138)	**802.11ac_VHT80 UNII 3 BAND 26dB Bandwidth (CH 155)**
	

[ANT.2]

▣ Test Plots(802.11a)

Note:

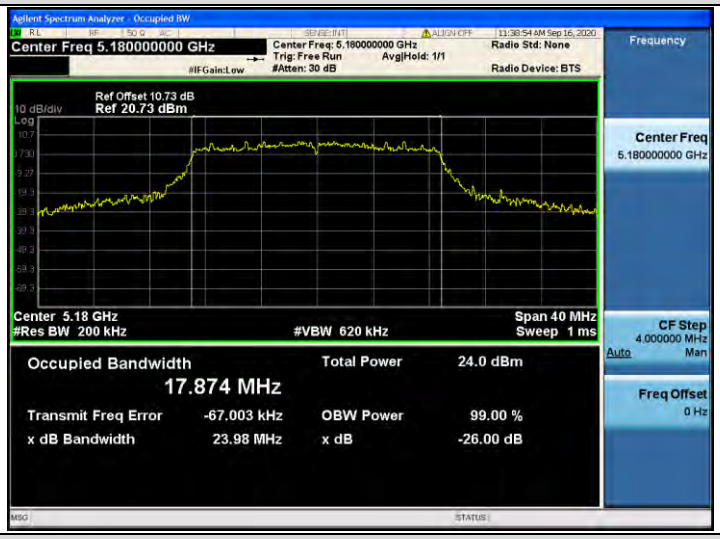
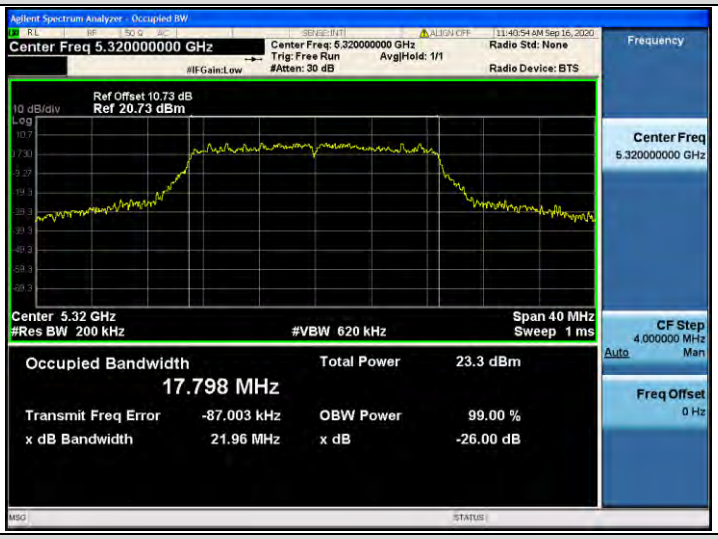
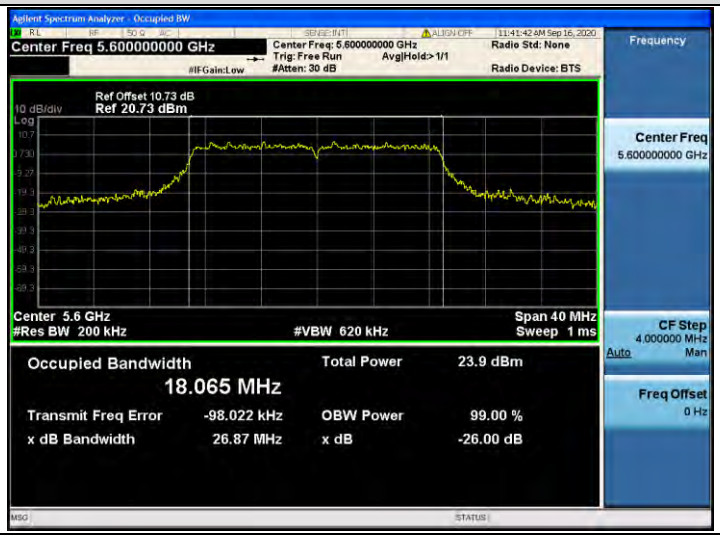
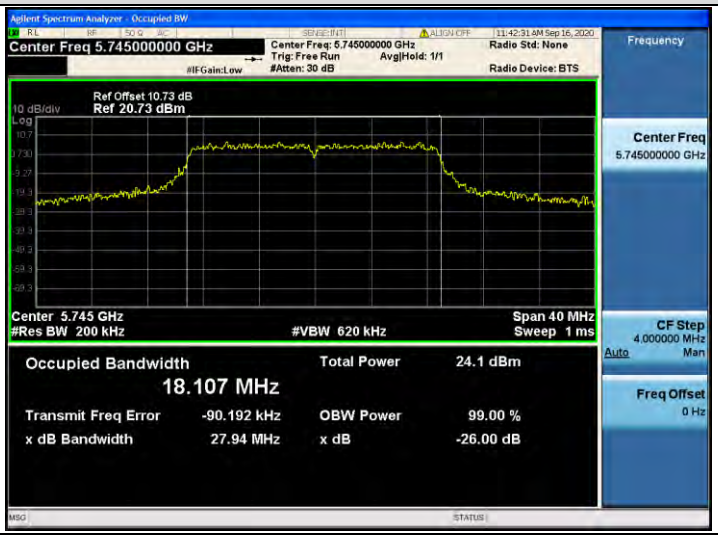
In order to simplify the report, attached plots were only the most wide channel.

802.11a UNII 1 BAND 26dB Bandwidth (CH 40)	802.11a UNII 2A BAND 26dB Bandwidth (CH 52)
	
802.11a UNII 2C BAND 26dB Bandwidth (CH 144)	**802.11a UNII 3 BAND 26dB Bandwidth (CH 149)**
	

▣ Test Plots(802.11n(HT20))

Note:

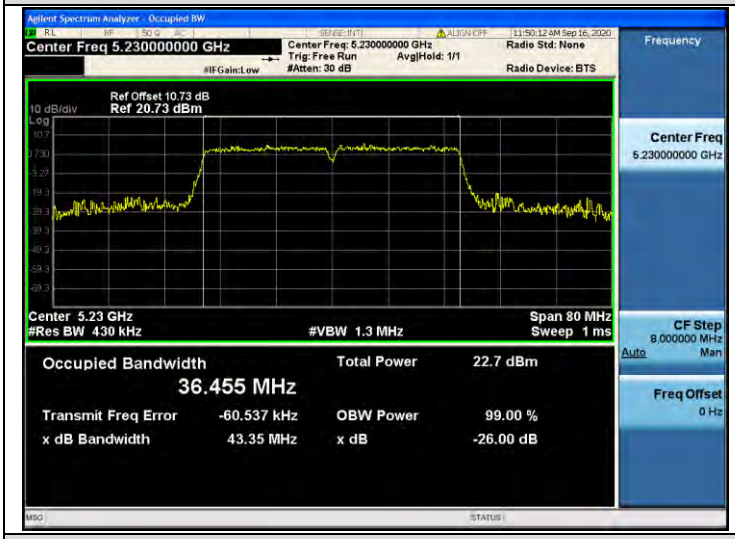
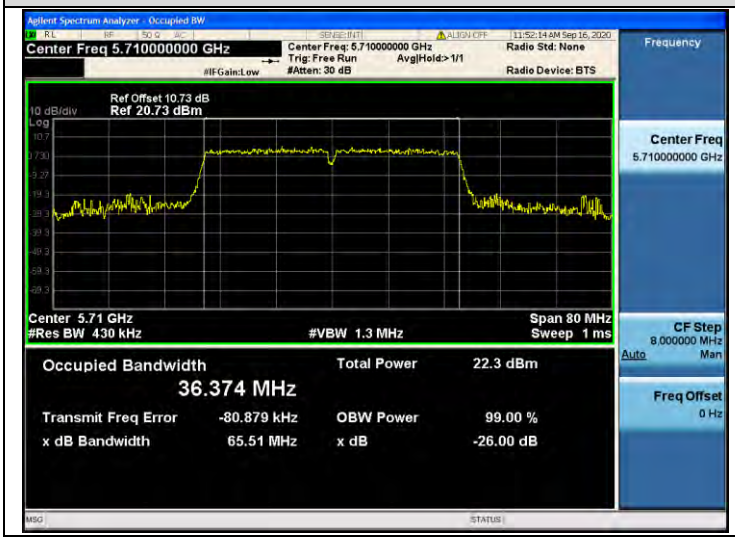
In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT20 UNII 1 BAND 26dB Bandwidth(CH 36)	802.11n_HT20 UNII 2A BAND 26dB Bandwidth(CH 64)
	
802.11n_HT20 UNII 2C BAND 26dB Bandwidth(CH 120)	**802.11n_HT20 UNII 3 BAND 26dB Bandwidth(CH 149)**
	

▣ Test Plots(802.11n(HT40))

Note:

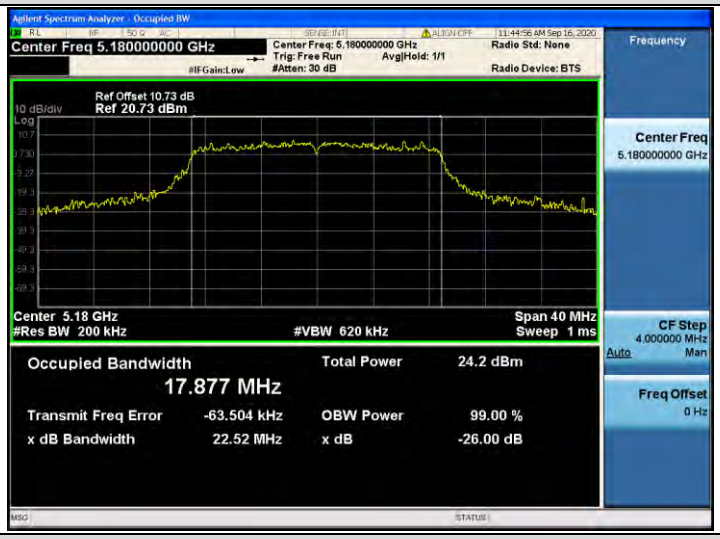
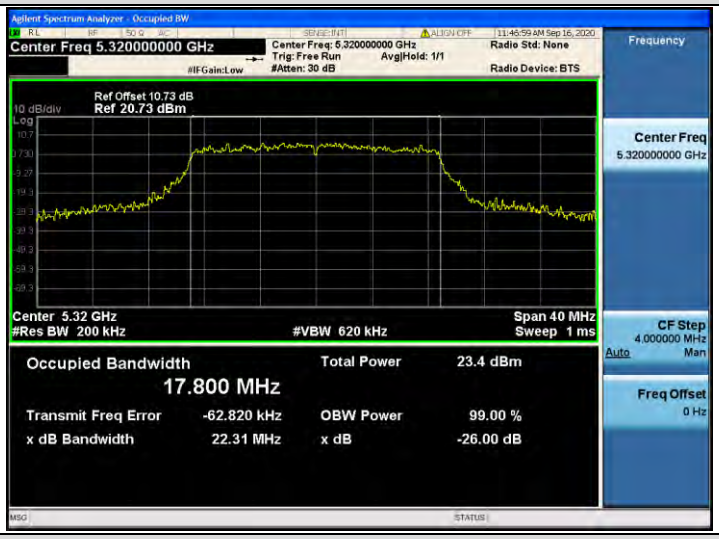
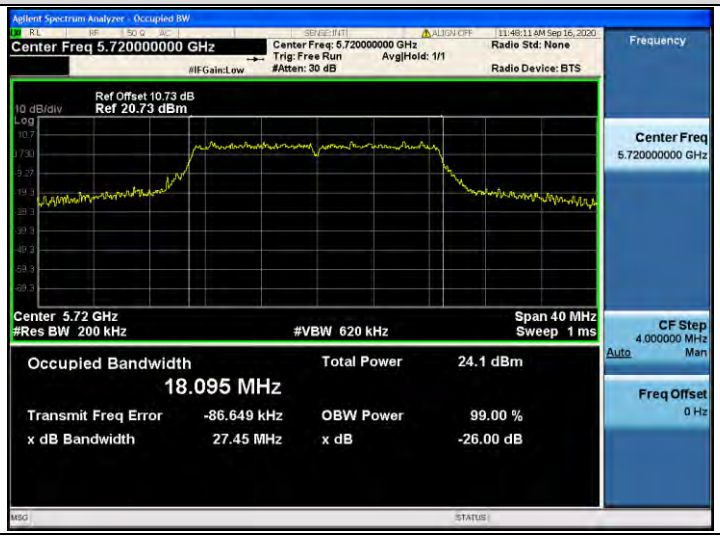
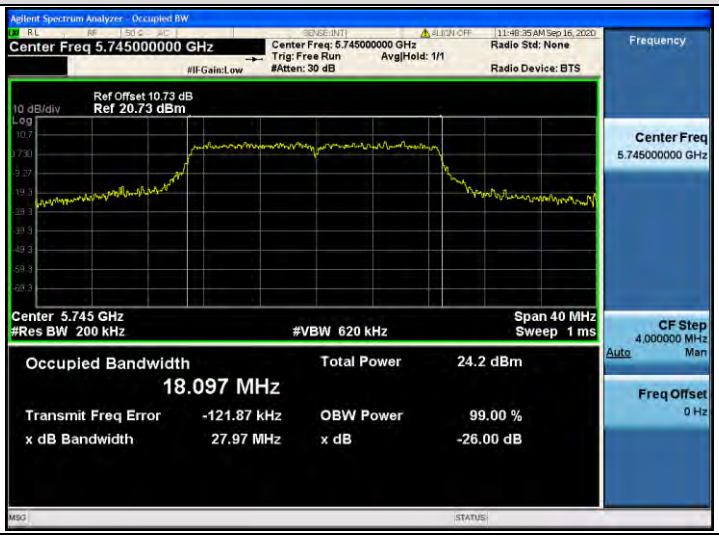
In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT40 UNII 1 BAND 26dB Bandwidth(CH 46)	802.11n_HT40 UNII 2A BAND 26dB Bandwidth (CH 54)
	
802.11n_HT40 UNII 2C BAND 26dB Bandwidth(CH 142)	**802.11n_HT40 UNII 3 BAND 26dB Bandwidth (CH 151)**
	

▣ Test Plots(802.11ac(VHT20))

Note:

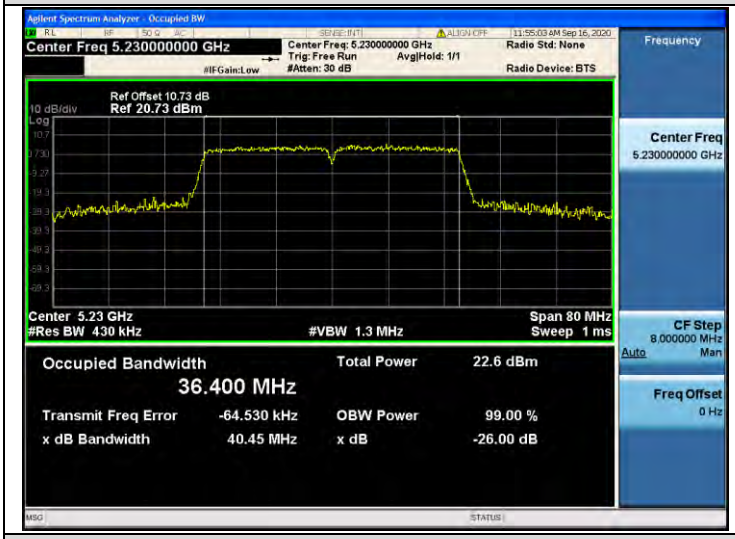
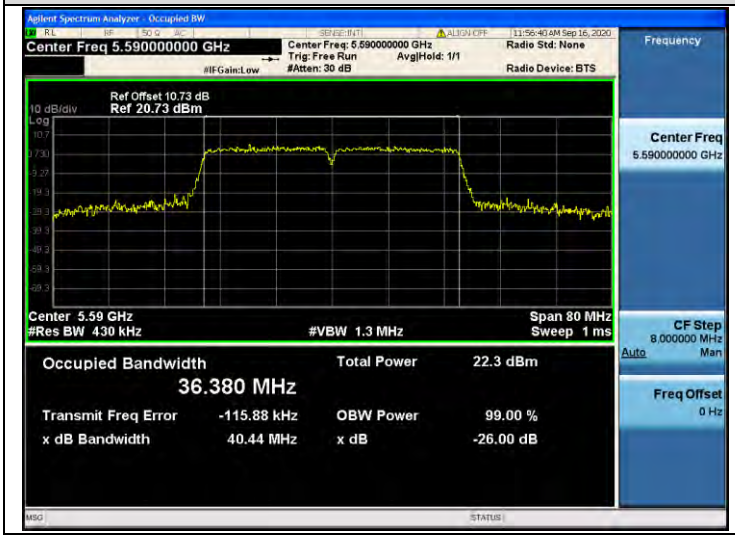
In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT20 UNII 1 BAND 26dB Bandwidth(CH 36)	802.11ac_VHT20 UNII 2A BAND 26dB Bandwidth(CH 64)
	
802.11ac_VHT20 UNII 2C BAND 26dB Bandwidth(CH 144)	**802.11ac_VHT20 UNII 3 BAND 26dB Bandwidth(CH 149)**
	

▣ Test Plots(802.11ac(VHT40))

Note:

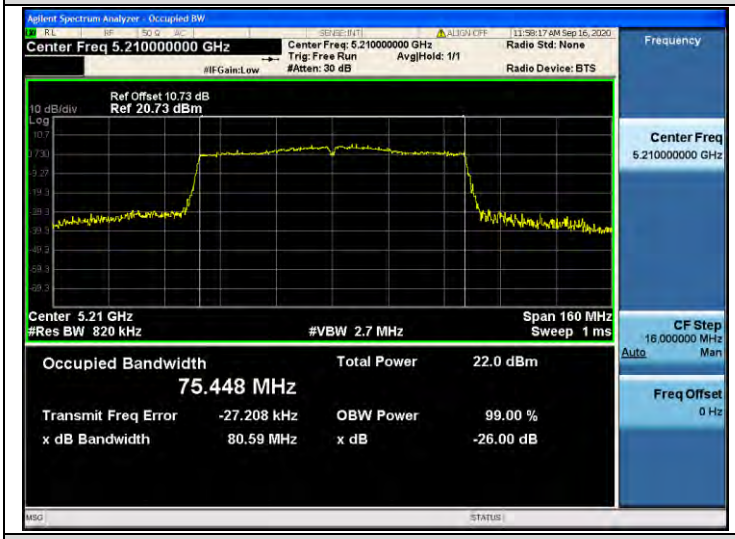
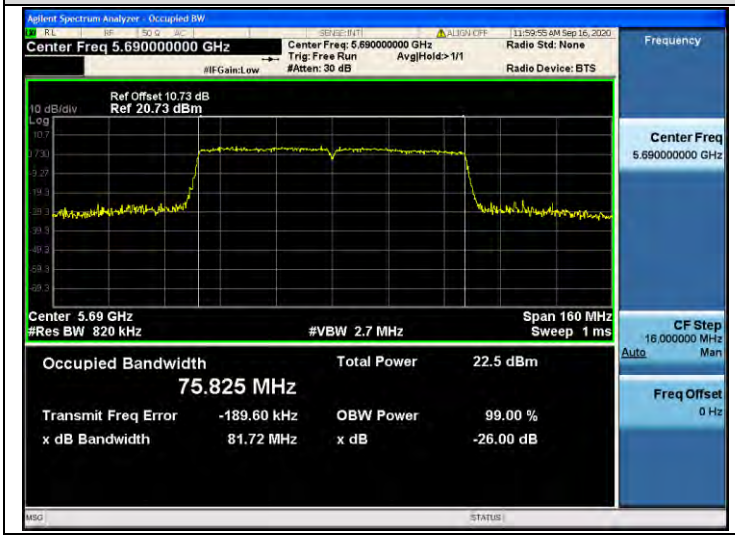
In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT40 UNII 1 BAND 26dB Bandwidth(CH 46)	802.11ac_VHT40 UNII 2A BAND 26dB Bandwidth (CH 54)
	
802.11ac_VHT40 UNII 2C BAND 26dB Bandwidth(CH 118)	**802.11ac_VHT40 UNII 3 BAND 26dB Bandwidth (CH 151)**
	

▣ Test Plots(802.11ac(VHT80))

Note:

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

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

10.3 6dB BANDWIDTH

[ANT.1]

802.11a Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.39	> 0.5	Pass
5785	157	16.39	> 0.5	Pass
5825	165	16.37	> 0.5	Pass

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.59	> 0.5	Pass
5785	157	17.61	> 0.5	Pass
5825	165	17.62	> 0.5	Pass

802.11n(HT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	36.36	> 0.5	Pass
5795	159	35.96	> 0.5	Pass

802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.60	> 0.5	Pass
5785	157	17.60	> 0.5	Pass
5825	165	17.60	> 0.5	Pass

802.11ac(VHT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	36.35	> 0.5	Pass
5795	159	35.77	> 0.5	Pass

802.11ac(VHT80) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	75.39	> 0.5	Pass

[ANT.2]

802.11a Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.39	> 0.5	Pass
5785	157	16.36	> 0.5	Pass
5825	165	16.37	> 0.5	Pass

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.60	> 0.5	Pass
5785	157	17.62	> 0.5	Pass
5825	165	17.57	> 0.5	Pass

802.11n(HT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	36.14	> 0.5	Pass
5795	159	35.74	> 0.5	Pass

802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.60	> 0.5	Pass
5785	157	17.61	> 0.5	Pass
5825	165	17.59	> 0.5	Pass

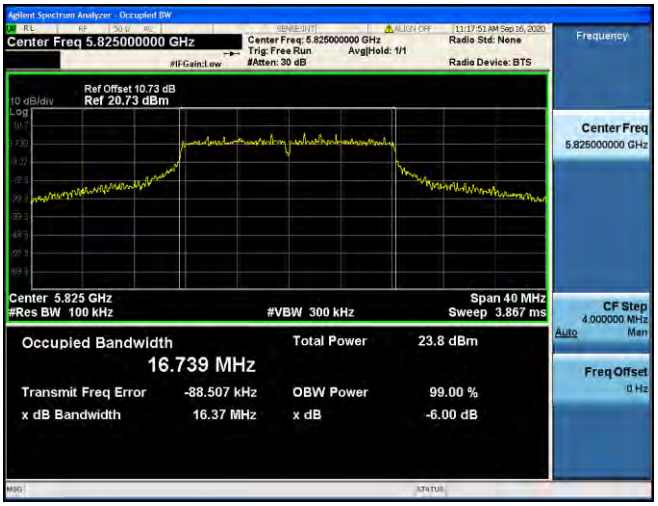
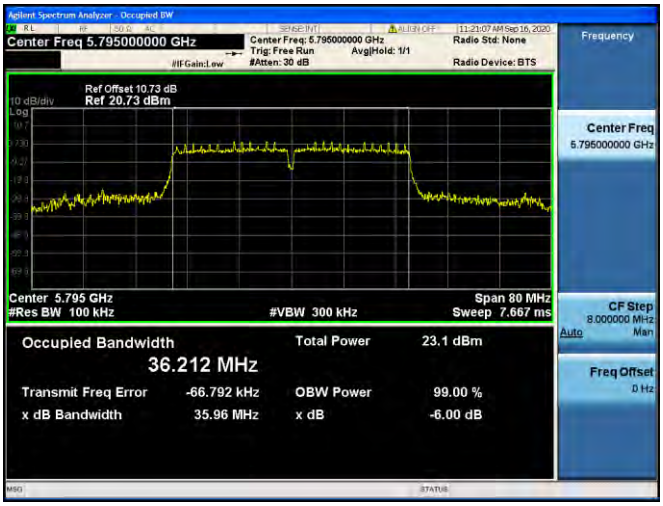
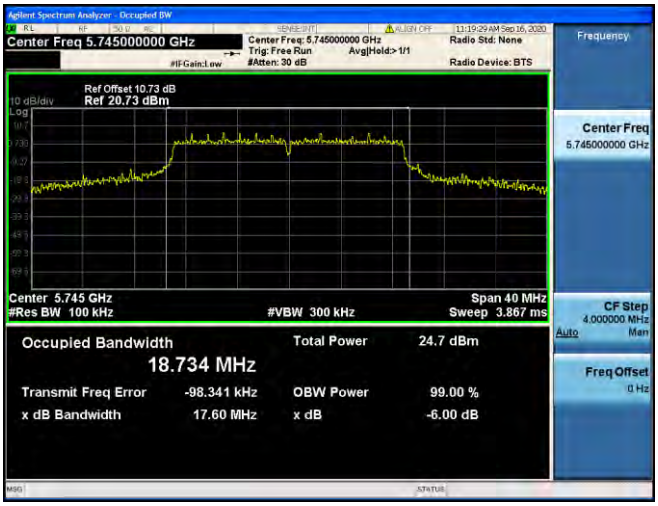
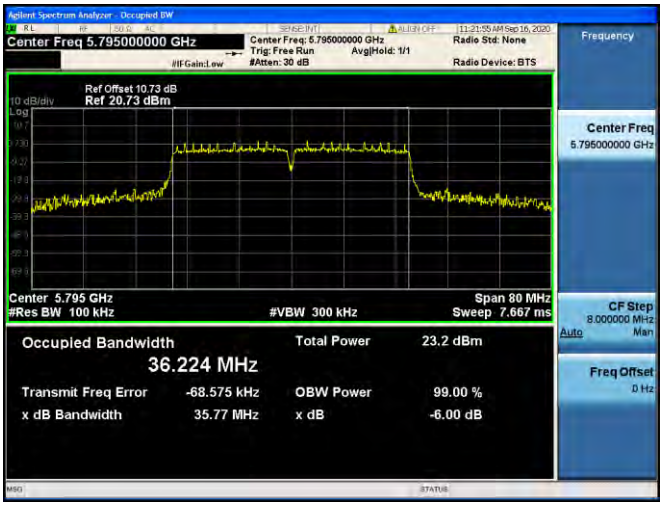
802.11ac(VHT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	36.33	> 0.5	Pass
5795	159	35.96	> 0.5	Pass

802.11ac(VHT80) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	75.58	> 0.5	Pass

[ANT.1]

▣ Test Plots

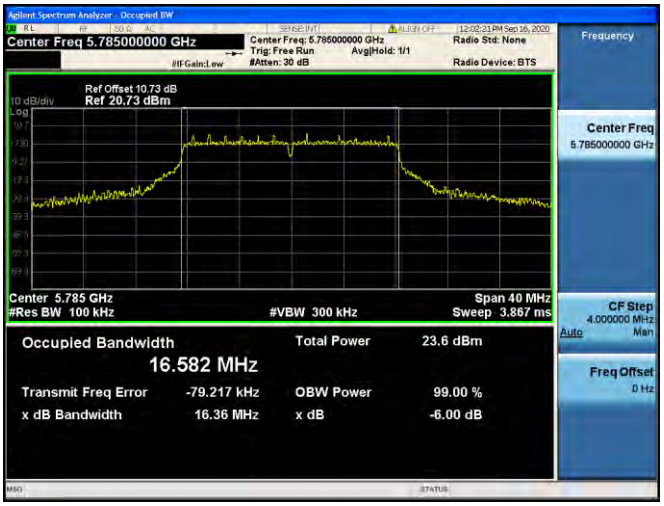
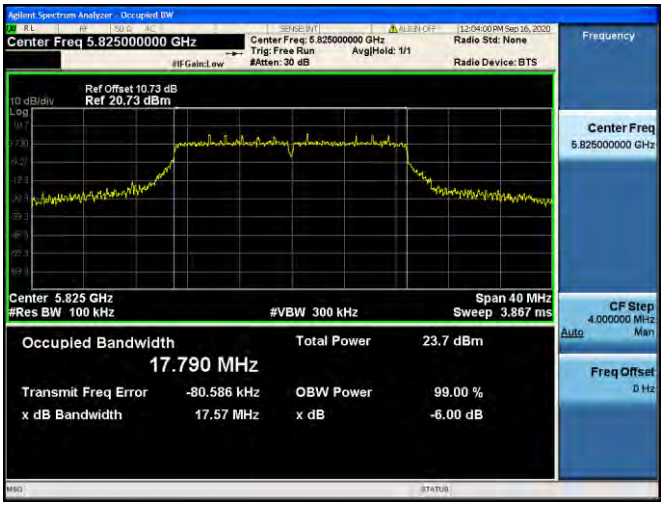
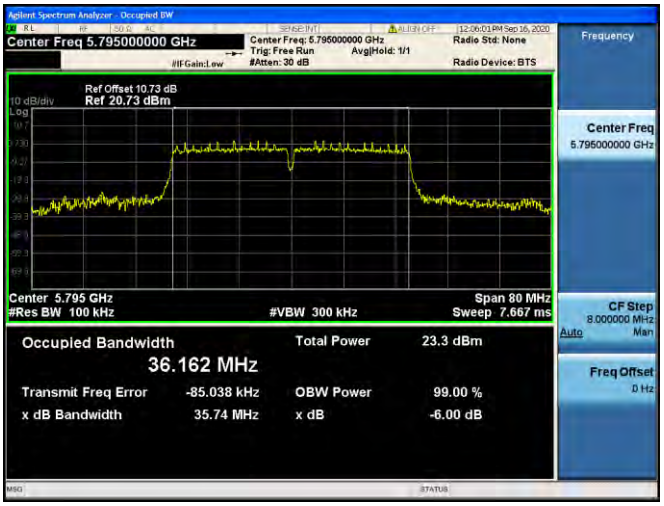
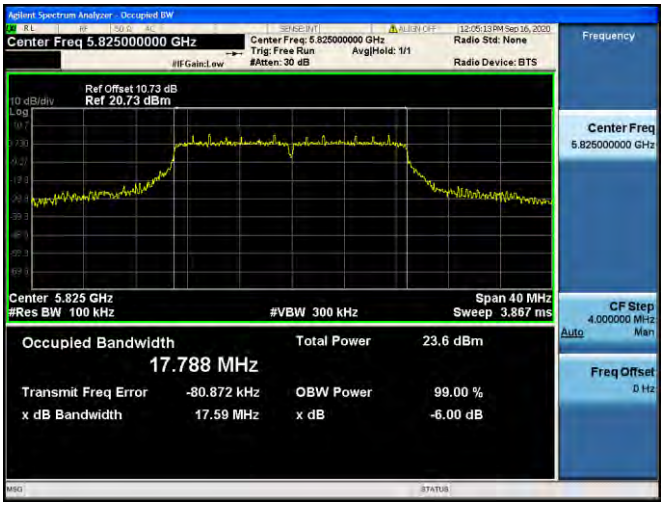
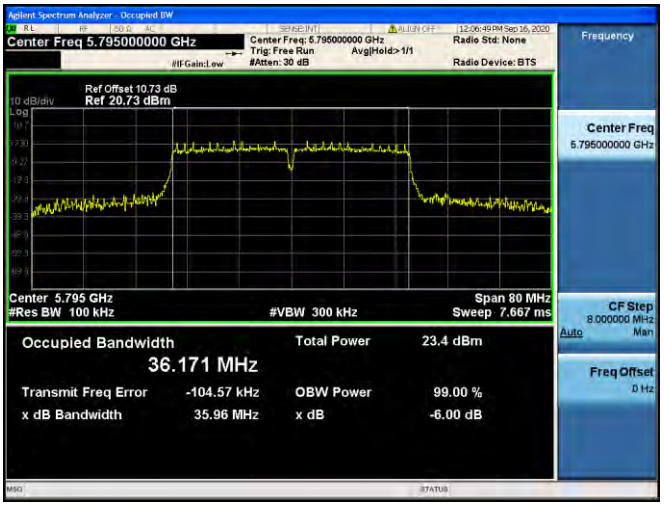
Note: In order to simplify the report, attached plots were only the most narrow channel.

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

[ANT.2]

▣ Test Plots

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

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

10.4 OUTPUT POWER MEASUREMENT

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

Straddle channel data were added in section 10.7.3.

[ANT.1]

802.11a Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	17	15.75	1.836	17.58	23.98
5200	40	17	15.77	1.836	17.60	23.98
5240	48	16	14.92	1.836	16.76	23.98
5260	52	16	15.36	1.836	17.20	23.98
5300	60	16	15.42	1.836	17.26	23.98
5320	64	16	15.39	1.836	17.23	23.98
5500	100	17	15.42	1.836	17.26	23.98
5600	120	17	15.69	1.836	17.53	23.98
5720	144	17	15.87	1.836	17.71	23.98
5745	149	17	15.99	1.836	17.83	30.00
5785	157	16	15.35	1.836	17.19	30.00
5825	165	16	15.32	1.836	17.16	30.00

802.11n(20MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	17	15.59	1.919	17.50	23.98
5200	40	17	15.68	1.919	17.60	23.98
5240	48	16	14.82	1.919	16.74	23.98
5260	52	16	15.09	1.919	17.01	23.98
5300	60	16	15.20	1.919	17.12	23.98
5320	64	16	15.31	1.919	17.23	23.98
5500	100	16	14.52	1.919	16.44	23.98
5600	120	17	15.92	1.919	17.84	23.98
5720	144	17	15.94	1.919	17.86	23.98
5745	149	17	15.88	1.919	17.80	30.00
5785	157	16	15.18	1.919	17.10	30.00
5825	165	16	15.12	1.919	17.04	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	14	13.75	0.617	14.37	23.98
5230	46	15	15.23	0.617	15.84	23.98
5270	54	15	15.50	0.617	16.11	23.98
5310	62	14	14.35	0.617	14.97	23.98
5510	102	12	12.25	0.617	12.87	23.98
5590	118	15	15.42	0.617	16.04	23.98
5710	142	15	15.50	0.617	16.12	23.98
5755	151	15	15.42	0.617	16.03	30.00
5795	159	15	15.43	0.617	16.05	30.00

802.11ac(20MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	17	15.28	2.278	17.56	23.98
5200	40	17	15.28	2.278	17.56	23.98
5240	48	16	14.44	2.278	16.72	23.98
5260	52	16	14.94	2.278	17.22	23.98
5300	60	16	14.99	2.278	17.27	23.98
5320	64	16	14.94	2.278	17.21	23.98
5500	100	15	13.36	2.278	15.64	23.98
5600	120	17	15.44	2.278	17.72	23.98
5720	144	17	15.64	2.278	17.91	23.98
5745	149	17	15.62	2.278	17.90	30.00
5785	157	16	14.92	2.278	17.20	30.00
5825	165	16	14.92	2.278	17.20	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	14	13.73	0.584	14.31	23.98
5230	46	15	15.18	0.584	15.76	23.98
5270	54	15	15.55	0.584	16.14	23.98
5310	62	14	14.41	0.584	14.99	23.98
5510	102	12	12.43	0.584	13.01	23.98
5590	118	15	15.38	0.584	15.96	23.98
5710	142	15	15.54	0.584	16.13	23.98
5755	151	15	15.45	0.584	16.04	30.00
5795	159	15	15.44	0.584	16.02	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	13	12.50	1.165	13.67	23.98
5290	58	12	11.87	1.165	13.04	23.98
5530	106	12	11.91	1.165	13.08	23.98
5610	122	14	13.81	1.165	14.98	23.98
5690	138	14	13.88	1.165	15.04	23.98
5775	155	14	13.59	1.165	14.76	30.00

[ANT.2]

802.11a Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	17	15.82	1.836	17.66	23.98
5200	40	17	15.87	1.836	17.71	23.98
5240	48	16	15.22	1.836	17.05	23.98
5260	52	16	14.82	1.836	16.66	23.98
5300	60	16	14.96	1.836	16.80	23.98
5320	64	16	15.05	1.836	16.89	23.98
5500	100	17	15.55	1.836	17.39	23.98
5600	120	17	15.89	1.836	17.72	23.98
5720	144	17	15.92	1.836	17.76	23.98
5745	149	17	15.92	1.836	17.76	30.00
5785	157	16	15.22	1.836	17.06	30.00
5825	165	16	15.12	1.836	16.96	30.00

802.11n(20MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	17	15.73	1.919	17.65	23.98
5200	40	17	15.77	1.919	17.69	23.98
5240	48	16	15.09	1.919	17.01	23.98
5260	52	16	14.78	1.919	16.69	23.98
5300	60	16	14.91	1.919	16.83	23.98
5320	64	16	14.95	1.919	16.87	23.98
5500	100	16	14.72	1.919	16.64	23.98
5600	120	17	15.88	1.919	17.80	23.98
5720	144	17	15.75	1.919	17.67	23.98
5745	149	17	15.77	1.919	17.69	30.00
5785	157	16	15.02	1.919	16.94	30.00
5825	165	16	14.97	1.919	16.88	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	14	14.20	0.617	14.82	23.98
5230	46	15	15.54	0.617	16.16	23.98
5270	54	15	15.15	0.617	15.76	23.98
5310	62	14	14.13	0.617	14.75	23.98
5510	102	12	12.28	0.617	12.90	23.98
5590	118	15	15.29	0.617	15.91	23.98
5710	142	15	15.32	0.617	15.93	23.98
5755	151	15	15.70	0.617	16.31	30.00
5795	159	15	15.60	0.617	16.22	30.00

802.11ac(20MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	17	15.29	2.278	17.57	23.98
5200	40	17	15.35	2.278	17.63	23.98
5240	48	16	14.70	2.278	16.98	23.98
5260	52	16	14.44	2.278	16.72	23.98
5300	60	16	14.65	2.278	16.93	23.98
5320	64	16	14.72	2.278	16.99	23.98
5500	100	15	13.37	2.278	15.65	23.98
5600	120	17	15.39	2.278	17.67	23.98
5720	144	17	15.37	2.278	17.65	23.98
5745	149	17	15.52	2.278	17.80	30.00
5785	157	16	14.91	2.278	17.18	30.00
5825	165	16	14.71	2.278	16.99	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	14	14.25	0.584	14.83	23.98
5230	46	15	15.62	0.584	16.21	23.98
5270	54	15	15.22	0.584	15.80	23.98
5310	62	14	14.22	0.584	14.80	23.98
5510	102	12	12.27	0.584	12.85	23.98
5590	118	15	15.29	0.584	15.87	23.98
5710	142	15	15.33	0.584	15.91	23.98
5755	151	15	15.65	0.584	16.23	30.00
5795	159	15	15.63	0.584	16.21	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	13	12.75	1.165	13.92	23.98
5290	58	12	10.97	1.165	12.14	23.98
5530	106	12	12.32	1.165	13.49	23.98
5610	122	14	14.18	1.165	15.34	23.98
5690	138	14	14.13	1.165	15.29	23.98
5775	155	14	14.39	1.165	15.55	30.00

[MIMO]

802.11a Mode		Power Level Setting	Ant.1 Measured Power (dBm) + Duty Cycle Factor	Ant.2 Measured Power (dBm) + Duty Cycle Factor	MIMO Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	17	17.58	17.66	20.63	23.98
5200	40	17	17.60	17.71	20.67	23.98
5240	48	16	16.76	17.05	19.92	23.98
5260	52	16	17.20	16.66	19.95	23.98
5300	60	16	17.26	16.80	20.04	23.98
5320	64	16	17.23	16.89	20.07	23.98
5500	100	17	17.26	17.39	20.33	23.98
5600	120	17	17.53	17.72	20.64	23.98
5720	144	17	17.71	17.76	20.74	23.98
5745	149	17	17.83	17.76	20.80	30.00
5785	157	16	17.19	17.06	20.13	30.00
5825	165	16	17.16	16.96	20.07	30.00

802.11n(20MHz) Mode		Power Level Setting	Ant.1 Measured Power (dBm) + Duty Cycle Factor	Ant.2 Measured Power (dBm) + Duty Cycle Factor	MIMO Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	17	17.50	17.65	20.59	23.98
5200	40	17	17.60	17.69	20.65	23.98
5240	48	16	16.74	17.01	19.89	23.98
5260	52	16	17.01	16.69	19.86	23.98
5300	60	16	17.12	16.83	19.99	23.98
5320	64	16	17.23	16.87	20.07	23.98
5500	100	16	16.44	16.64	19.55	23.98
5600	120	17	17.84	17.80	20.83	23.98
5720	144	17	17.86	17.67	20.78	23.98
5745	149	17	17.80	17.69	20.75	30.00
5785	157	16	17.10	16.94	20.03	30.00
5825	165	16	17.04	16.88	19.97	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	14	14.37	14.82	17.61	23.98
5230	46	15	15.84	16.16	19.01	23.98
5270	54	15	16.11	15.76	18.95	23.98
5310	62	14	14.97	14.75	17.87	23.98
5510	102	12	12.87	12.90	15.89	23.98
5590	118	15	16.04	15.91	18.98	23.98
5710	142	15	16.12	15.93	19.04	23.98
5755	151	15	16.03	16.31	19.19	30.00
5795	159	15	16.05	16.22	19.14	30.00

802.11ac(20MHz) Mode		Power Level Setting	Ant.1 Measured Power (dBm) + Duty Cycle Factor	Ant.2 Measured Power (dBm) + Duty Cycle Factor	MIMO Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	17	17.56	17.57	20.57	23.98
5200	40	17	17.56	17.63	20.61	23.98
5240	48	16	16.72	16.98	19.86	23.98
5260	52	16	17.22	16.72	19.99	23.98
5300	60	16	17.27	16.93	20.11	23.98
5320	64	16	17.21	16.99	20.12	23.98
5500	100	15	15.64	15.65	18.65	23.98
5600	120	17	17.72	17.67	20.70	23.98
5720	144	17	17.91	17.65	20.79	23.98
5745	149	17	17.90	17.80	20.86	30.00
5785	157	16	17.20	17.18	20.20	30.00
5825	165	16	17.20	16.99	20.11	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	14	14.31	14.83	17.59	23.98
5230	46	15	15.76	16.21	19.00	23.98
5270	54	15	16.14	15.80	18.98	23.98
5310	62	14	14.99	14.80	17.91	23.98
5510	102	12	13.01	12.85	15.95	23.98
5590	118	15	15.96	15.87	18.93	23.98
5710	142	15	16.13	15.91	19.03	23.98
5755	151	15	16.04	16.23	19.15	30.00
5795	159	15	16.02	16.21	19.13	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	13	13.67	13.92	16.80	23.98
5290	58	12	13.04	12.14	15.62	23.98
5530	106	12	13.08	13.49	16.30	23.98
5610	122	14	14.98	15.34	18.18	23.98
5690	138	14	15.04	15.29	18.18	23.98
5775	155	14	14.76	15.55	18.18	30.00

10.5 POWER SPECTRAL DENSITY

[ANT.1]

802.11a Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	4.528	1.836	6.364	11 dBm/MHz
5200	40	4.814	1.836	6.650	
5240	48	3.968	1.836	5.804	
5260	52	4.447	1.836	6.283	
5300	60	4.366	1.836	6.202	
5320	64	4.222	1.836	6.058	
5500	100	4.623	1.836	6.459	
5600	120	4.736	1.836	6.572	
5720	144	4.822	1.836	6.658	
5745	149	2.053	1.836	3.889	30 dBm/500kHz
5785	157	1.428	1.836	3.264	
5825	165	1.538	1.836	3.374	

802.11n(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	4.338	1.919	6.257	11 dBm/MHz
5200	40	4.557	1.919	6.476	
5240	48	3.643	1.919	5.562	
5260	52	4.056	1.919	5.975	
5300	60	4.508	1.919	6.427	
5320	64	4.188	1.919	6.107	
5500	100	3.575	1.919	5.494	
5600	120	4.129	1.919	6.048	
5720	144	4.663	1.919	6.582	
5745	149	1.872	1.919	3.791	30 dBm/500kHz
5785	157	1.217	1.919	3.136	
5825	165	1.236	1.919	3.155	

802.11n(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5190	38	0.038	0.617	0.655	11 dBm/MHz
5230	46	0.564	0.617	1.181	
5270	54	1.327	0.617	1.944	
5310	62	1.271	0.617	1.888	
5510	102	-0.929	0.617	-0.312	
5590	118	0.613	0.617	1.230	
5710	142	1.039	0.617	1.656	
5755	151	-1.929	0.617	-1.312	30 dBm /500kHz
5795	159	-1.678	0.617	-1.061	

802.11ac(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	4.224	2.278	6.502	11 dBm/MHz
5200	40	4.181	2.278	6.459	
5240	48	3.204	2.278	5.482	
5260	52	3.758	2.278	6.036	
5300	60	4.015	2.278	6.293	
5320	64	3.559	2.278	5.837	
5500	100	2.117	2.278	4.395	
5600	120	4.235	2.278	6.513	
5720	144	4.265	2.278	6.543	
5745	149	1.209	2.278	3.487	30 dBm/500kHz
5785	157	1.082	2.278	3.360	
5825	165	0.809	2.278	3.087	

802.11ac(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5190	38	0.176	0.584	0.760	11 dBm/MHz
5230	46	0.559	0.584	1.143	
5270	54	0.907	0.584	1.491	
5310	62	0.748	0.584	1.332	
5510	102	-1.037	0.584	-0.453	
5590	118	0.504	0.584	1.088	
5710	142	0.862	0.584	1.446	
5755	151	-2.360	0.584	-1.776	30 dBm/500kHz
5795	159	-1.658	0.584	-1.074	

802.11ac(80MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5210	42	-3.708	1.165	-2.543	11 dBm/MHz
5290	58	-3.281	1.165	-2.116	
5530	106	-4.224	1.165	-3.059	
5610	122	-3.679	1.165	-2.514	
5690	138	-3.490	1.165	-2.325	
5775	155	-6.821	1.165	-5.656	30 dBm/500kHz

[ANT.2]

802.11a Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	5.026	1.836	6.862	11 dBm/MHz
5200	40	5.333	1.836	7.169	
5240	48	4.446	1.836	6.282	
5260	52	4.409	1.836	6.245	
5300	60	4.187	1.836	6.023	
5320	64	4.537	1.836	6.373	
5500	100	4.777	1.836	6.613	
5600	120	5.371	1.836	7.207	
5720	144	5.373	1.836	7.209	
5745	149	2.511	1.836	4.347	30 dBm/500kHz
5785	157	1.599	1.836	3.435	
5825	165	1.328	1.836	3.164	

802.11n(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	4.675	1.919	6.594	11 dBm/MHz
5200	40	4.549	1.919	6.468	
5240	48	4.367	1.919	6.286	
5260	52	3.679	1.919	5.598	
5300	60	3.844	1.919	5.763	
5320	64	4.080	1.919	5.999	
5500	100	4.074	1.919	5.993	
5600	120	4.557	1.919	6.476	
5720	144	4.611	1.919	6.530	
5745	149	2.472	1.919	4.391	30 dBm/500kHz
5785	157	1.892	1.919	3.811	
5825	165	1.120	1.919	3.039	

802.11n(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5190	38	1.078	0.617	1.695	11 dBm/MHz
5230	46	1.248	0.617	1.865	
5270	54	0.775	0.617	1.392	
5310	62	1.120	0.617	1.737	
5510	102	-0.553	0.617	0.064	
5590	118	0.808	0.617	1.425	
5710	142	1.070	0.617	1.687	
5755	151	-1.677	0.617	-1.060	30 dBm /500kHz
5795	159	-1.387	0.617	-0.770	

802.11ac(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	4.451	2.278	6.729	11 dBm/MHz
5200	40	4.508	2.278	6.786	
5240	48	4.129	2.278	6.407	
5260	52	3.737	2.278	6.015	
5300	60	3.847	2.278	6.125	
5320	64	3.655	2.278	5.933	
5500	100	2.415	2.278	4.693	
5600	120	4.699	2.278	6.977	
5720	144	4.247	2.278	6.525	
5745	149	1.693	2.278	3.971	30 dBm/500kHz
5785	157	1.073	2.278	3.351	
5825	165	1.460	2.278	3.738	

802.11ac(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5190	38	0.948	0.584	1.532	11 dBm/MHz
5230	46	1.490	0.584	2.074	
5270	54	0.911	0.584	1.495	
5310	62	1.093	0.584	1.677	
5510	102	-0.813	0.584	-0.229	
5590	118	0.905	0.584	1.489	
5710	142	1.099	0.584	1.683	
5755	151	-1.386	0.584	-0.802	30 dBm/500kHz
5795	159	-1.518	0.584	-0.934	

802.11ac(80MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5210	42	-3.091	1.165	-1.926	11 dBm/MHz
5290	58	-3.859	1.165	-2.694	
5530	106	-3.854	1.165	-2.689	
5610	122	-2.848	1.165	-1.683	
5690	138	-2.847	1.165	-1.682	
5775	155	-5.851	1.165	-4.686	30 dBm/500kHz

[MIMO]

802.11a Mode		ANT.1 Measured Power(dBm) + Duty Cycle Factor (dB)	ANT.2 Measured Power(dBm) + Duty Cycle Factor (dB)	MIMO Result (dBm)	Limit (dBm)
Frequency [MHz]	Channel No.				
5180	36	6.364	6.862	9.631	11 dBm/MHz
5200	40	6.650	7.169	9.928	
5240	48	5.804	6.282	9.060	
5260	52	6.283	6.245	9.275	
5300	60	6.202	6.023	9.124	
5320	64	6.058	6.373	9.229	
5500	100	6.459	6.613	9.547	
5600	120	6.572	7.207	9.912	
5720	144	6.658	7.209	9.953	
5745	149	3.889	4.347	7.135	30 dBm/500kHz
5785	157	3.264	3.435	6.361	
5825	165	3.374	3.164	6.281	

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	6.257	6.594	9.439	11 dBm/MHz
5200	40	6.476	6.468	9.482	
5240	48	5.562	6.286	8.949	
5260	52	5.975	5.598	8.801	
5300	60	6.427	5.763	9.118	
5320	64	6.107	5.999	9.063	
5500	100	5.494	5.993	8.761	
5600	120	6.048	6.476	9.277	
5720	144	6.582	6.530	9.566	
5745	149	3.791	4.391	7.112	30 dBm/500kHz
5785	157	3.136	3.811	6.497	
5825	165	3.155	3.039	6.108	

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	0.655	1.695	4.216	11 dBm/MHz
5230	46	1.181	1.865	4.547	
5270	54	1.944	1.392	4.687	
5310	62	1.888	1.737	4.824	
5510	102	-0.312	0.064	2.890	
5590	118	1.230	1.425	4.339	
5710	142	1.656	1.687	4.682	
5755	151	-1.312	-1.060	1.826	30 dBm /500kHz
5795	159	-1.061	-0.770	2.097	

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	6.502	6.729	9.627	11 dBm/MHz
5200	40	6.459	6.786	9.636	
5240	48	5.482	6.407	8.979	
5260	52	6.036	6.015	9.036	
5300	60	6.293	6.125	9.220	
5320	64	5.837	5.933	8.896	
5500	100	4.395	4.693	7.557	
5600	120	6.513	6.977	9.761	
5720	144	6.543	6.525	9.544	
5745	149	3.487	3.971	6.746	30 dBm/500kHz
5785	157	3.360	3.351	6.366	
5825	165	3.087	3.738	6.435	

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	0.760	1.532	4.173	11 dBm/MHz
5230	46	1.143	2.074	4.644	
5270	54	1.491	1.495	4.503	
5310	62	1.332	1.677	4.518	
5510	102	-0.453	-0.229	2.671	
5590	118	1.088	1.489	4.303	
5710	142	1.446	1.683	4.576	
5755	151	-1.776	-0.802	1.749	30 dBm /500kHz
5795	159	-1.074	-0.934	2.007	

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	-2.543	-1.926	0.787	11 dBm/MHz
5290	58	-2.116	-2.694	0.615	
5530	106	-3.059	-2.689	0.140	
5610	122	-2.514	-1.683	0.932	
5690	138	-2.325	-1.682	1.019	
5775	155	-5.656	-4.686	-2.134	30 dBm /500kHz

[ANT.1]

▣ Test Plots(802.11a)

Note:

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

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

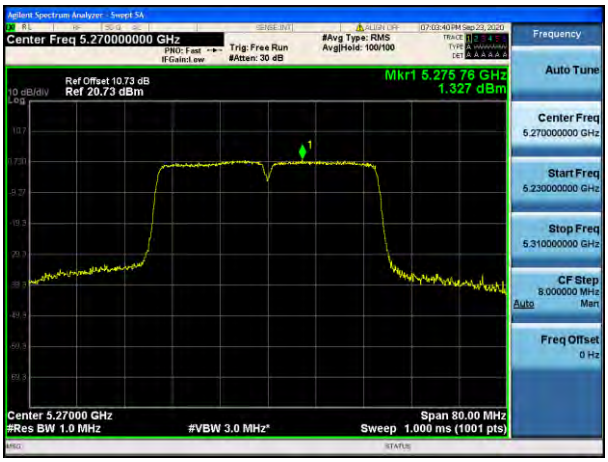
UNII 1 (Ch. 40)	UNII 2A (Ch. 60)
	

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

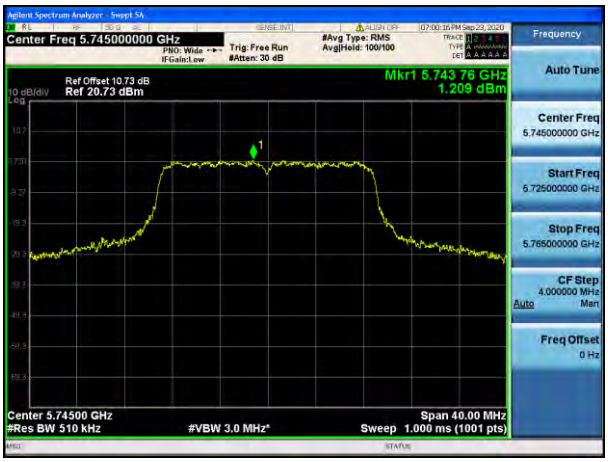
UNII 2C (Ch. 142)	UNII 3 (Ch. 159)
	

▣ Test Plots(802.11ac(VHT20))

Note:

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

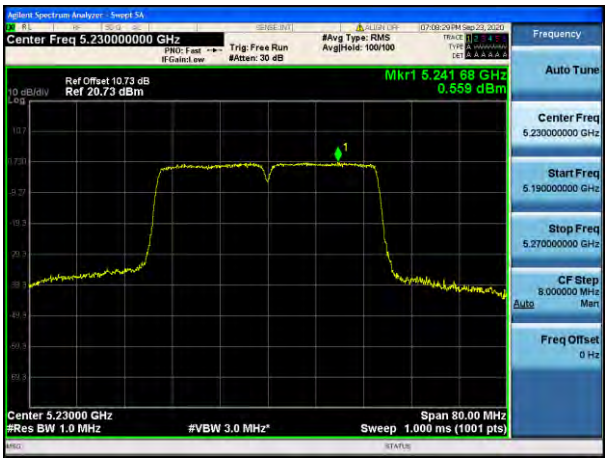
UNII 1 (Ch. 36)	UNII 2A (Ch. 60)
	

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. 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)
	

[ANT.2]

▣ Test Plots(802.11a)

Note:

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

UNII 1 (Ch. 40)	UNII 2A (Ch. 64)
	

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. 64)
	

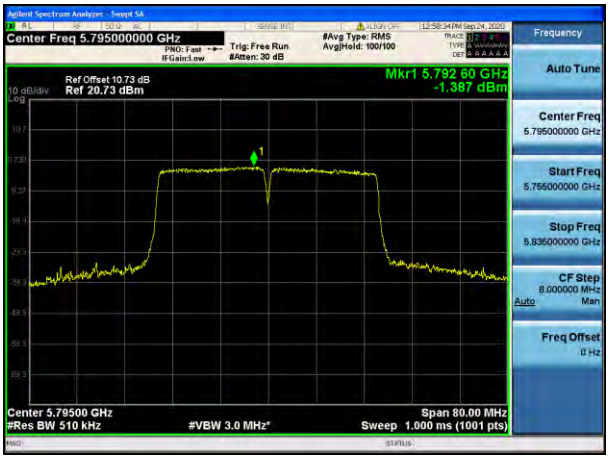
UNII 2C (Ch. 144)	UNII 3 (Ch. 149)
	

▣ 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. 62)
	

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

▣ Test Plots(802.11ac(VHT20))

Note:

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

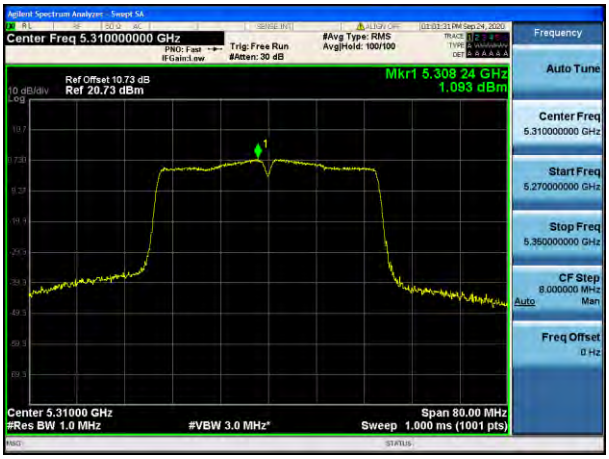
UNII 1 (Ch. 40)	UNII 2A (Ch. 60)
	

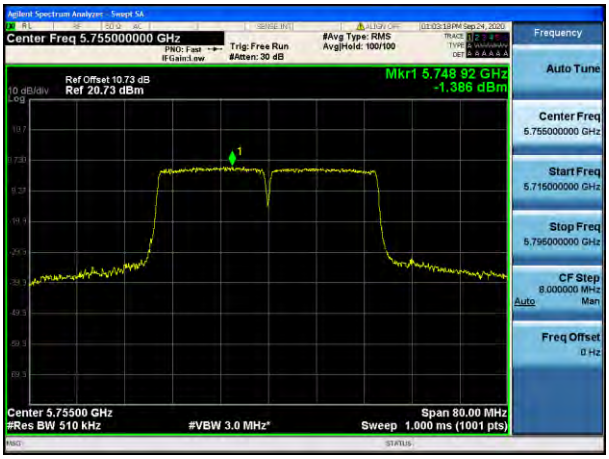
UNII 2C (Ch. 120)	UNII 3 (Ch. 149)
	

▣ 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. 62)
	

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

[ANT.1]

Startup after the EUT is energized

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5210079.88	79.88
100%		-30	5210028.90	28.90
100%		-20	5210038.79	38.79
100%		-10	5210032.28	32.28
100%		0	5210090.14	90.14
100%		+10	5210081.87	81.87
100%		+30	5210013.72	13.72
100%		+40	5210012.71	12.71
100%		+50	5210080.87	80.87
Batt. Endpoint	3.65	+20	5210099.81	99.81

Note:

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

OPERATING BAND: UNII Band 2A
OPERATING FREQUENCY: 5,290,000,000 Hz
CHANNEL: 58
REFERENCE VOLTAGE: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5290041.25	41.25
100%		-30	5290061.99	61.99
100%		-20	5290008.12	8.12
100%		-10	5290030.67	30.67
100%		0	5290043.08	43.08
100%		+10	5290097.04	97.04
100%		+30	5290089.26	89.26
100%		+40	5290099.17	99.17
100%		+50	5290031.86	31.86
Batt. Endpoint	3.65	+20	5290091.29	91.29

Note:

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

OPERATING BAND: UNII Band 2C
OPERATING FREQUENCY: 5,530,000,000 Hz
CHANNEL: 106
REFERENCE VOLTAGE: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5530019.94	19.94
100%		-30	5530085.96	85.96
100%		-20	5530002.99	2.99
100%		-10	5530069.16	69.16
100%		0	5530090.86	90.86
100%		+10	5530018.05	18.05
100%		+30	5530046.09	46.09
100%		+40	5530064.53	64.53
100%		+50	5530099.73	99.73
Batt. Endpoint	3.65	+20	5530005.66	5.66

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5775039.05	39.05
100%		-30	5775083.05	83.05
100%		-20	5775082.70	82.7
100%		-10	5775009.49	9.49
100%		0	5775060.74	60.74
100%		+10	5775020.08	20.08
100%		+30	5775011.28	11.28
100%		+40	5775084.06	84.06
100%		+50	5775071.72	71.72
Batt. Endpoint	3.65	+20	5775085.17	85.17

Note:

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

2 minutes after the EUT is energized

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5210065.28	65.28
100%		-30	5210059.46	59.46
100%		-20	5210071.38	71.38
100%		-10	5210040.77	40.77
100%		0	5210080.19	80.19
100%		+10	5210038.38	38.38
100%		+30	5210025.79	25.79
100%		+40	5210045.57	45.57
100%		+50	5210024.54	24.54
Batt. Endpoint	3.65	+20	5210031.49	31.49

Note:

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

OPERATING BAND: UNII Band 2A
OPERATING FREQUENCY: 5,290,000,000 Hz
CHANNEL: 58
REFERENCE VOLTAGE: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5290060.67	60.67
100%		-30	5290082.52	82.52
100%		-20	5290032.84	32.84
100%		-10	5290012.34	12.34
100%		0	5290085.35	85.35
100%		+10	5290051.79	51.79
100%		+30	5290041.07	41.07
100%		+40	5290083.71	83.71
100%		+50	5290077.43	77.43
Batt. Endpoint	3.65	+20	5290094.46	94.46

Note:

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

OPERATING BAND: UNII Band 2C
OPERATING FREQUENCY: 5,530,000,000 Hz
CHANNEL: 106
REFERENCE VOLTAGE: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5530099.09	99.09
100%		-30	5530055.16	55.16
100%		-20	5530099.38	99.38
100%		-10	5530059.55	59.55
100%		0	5530079.52	79.52
100%		+10	5530041.72	41.72
100%		+30	5530086.16	86.16
100%		+40	5530033.26	33.26
100%		+50	5530096.74	96.74
Batt. Endpoint	3.65	+20	5530001.21	1.21

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5775025.28	25.28
100%		-30	5775024.21	24.21
100%		-20	5775031.19	31.19
100%		-10	5775057.05	57.05
100%		0	5775060.94	60.94
100%		+10	5775063.68	63.68
100%		+30	5775099.72	99.72
100%		+40	5775047.04	47.04
100%		+50	5775067.06	67.06
Batt. Endpoint	3.65	+20	5775077.70	77.7

Note:

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

5 minutes after the EUT is energized

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5210036.36	36.36
100%		-30	5210088.74	88.74
100%		-20	5210076.13	76.13
100%		-10	5210087.31	87.31
100%		0	5210046.28	46.28
100%		+10	5210044.41	44.41
100%		+30	5210093.67	93.67
100%		+40	5210088.96	88.96
100%		+50	5210086.55	86.55
Batt. Endpoint	3.65	+20	5210013.33	13.33

Note:

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

OPERATING BAND: UNII Band 2A
OPERATING FREQUENCY: 5,290,000,000 Hz
CHANNEL: 58
REFERENCE VOLTAGE: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5290090.76	90.76
100%		-30	5290040.57	40.57
100%		-20	5290063.49	63.49
100%		-10	5290074.21	74.21
100%		0	5290002.56	2.56
100%		+10	5290084.44	84.44
100%		+30	5290068.91	68.91
100%		+40	5290093.70	93.7
100%		+50	5290018.93	18.93
Batt. Endpoint	3.65	+20	5290023.17	23.17

Note:

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

OPERATING BAND: UNII Band 2C
OPERATING FREQUENCY: 5,530,000,000 Hz
CHANNEL: 106
REFERENCE VOLTAGE: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5530039.53	39.53
100%		-30	5530008.42	8.42
100%		-20	5530033.44	33.44
100%		-10	5530043.80	43.8
100%		0	5530062.64	62.64
100%		+10	5530091.84	91.84
100%		+30	5530078.78	78.78
100%		+40	5530009.35	9.35
100%		+50	5530053.87	53.87
Batt. Endpoint	3.65	+20	5530072.49	72.49

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5775016.22	16.22
100%		-30	5775083.86	83.86
100%		-20	5775057.02	57.02
100%		-10	5775001.33	1.33
100%		0	5775093.34	93.34
100%		+10	5775014.39	14.39
100%		+30	5775036.11	36.11
100%		+40	5775053.45	53.45
100%		+50	5775016.69	16.69
Batt. Endpoint	3.65	+20	5775073.91	73.91

Note:

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

10 minutes after the EUT is energized

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5210016.36	16.36
100%		-30	5210048.18	48.18
100%		-20	5210010.40	10.40
100%		-10	5210063.74	63.74
100%		0	5210047.50	47.50
100%		+10	5210036.03	36.03
100%		+30	5210037.04	37.04
100%		+40	5210097.15	97.15
100%		+50	5210098.32	98.32
Batt. Endpoint	3.65	+20	5210098.49	98.49

Note:

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

OPERATING BAND: UNII Band 2A
OPERATING FREQUENCY: 5,290,000,000 Hz
CHANNEL: 58
REFERENCE VOLTAGE: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5290099.30	99.30
100%		-30	5290085.89	85.89
100%		-20	5290095.48	95.48
100%		-10	5290066.32	66.32
100%		0	5290062.38	62.38
100%		+10	5290035.11	35.11
100%		+30	5290086.42	86.42
100%		+40	5290007.48	7.48
100%		+50	5290070.25	70.25
Batt. Endpoint	3.65	+20	5290029.53	29.53

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.

OPERATING BAND: UNII Band 2C
OPERATING FREQUENCY: 5,530,000,000 Hz
CHANNEL: 106
REFERENCE VOLTAGE: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5530010.80	10.80
100%		-30	5530021.12	21.12
100%		-20	5530059.69	59.69
100%		-10	5530078.93	78.93
100%		0	5530086.09	86.09
100%		+10	5530009.35	9.35
100%		+30	5530003.66	3.66
100%		+40	5530038.47	38.47
100%		+50	5530067.50	67.50
Batt. Endpoint	3.65	+20	5530045.57	45.57

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5775074.86	74.86
100%		-30	5775075.72	75.72
100%		-20	5775047.25	47.25
100%		-10	5775048.59	48.59
100%		0	5775098.44	98.44
100%		+10	5775026.58	26.58
100%		+30	5775007.80	7.8
100%		+40	5775025.92	25.92
100%		+50	5775091.41	91.41
Batt. Endpoint	3.65	+20	5775064.65	64.65

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.

[ANT.2]

Startup after the EUT is energized

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5210022.52	22.52
100%		-30	5210087.77	87.77
100%		-20	5210071.17	71.17
100%		-10	5210075.32	75.32
100%		0	5210085.27	85.27
100%		+10	5210046.13	46.13
100%		+30	5210085.46	85.46
100%		+40	5210036.80	36.80
100%		+50	5210083.35	83.35
Batt. Endpoint	3.65	+20	5210082.80	82.80

Note:

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

OPERATING BAND: UNII Band 2A
OPERATING FREQUENCY: 5,290,000,000 Hz
CHANNEL: 58
REFERENCE VOLTAGE: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5290051.29	51.29
100%		-30	5290001.76	1.76
100%		-20	5290024.48	24.48
100%		-10	5290037.89	37.89
100%		0	5290039.95	39.95
100%		+10	5290054.89	54.89
100%		+30	5290087.36	87.36
100%		+40	5290040.65	40.65
100%		+50	5290093.71	93.71
Batt. Endpoint	3.65	+20	5290047.48	47.48

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 2C
OPERATING FREQUENCY: 5,530,000,000 Hz
CHANNEL: 106
REFERENCE VOLTAGE: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5530016.82	16.82
100%		-30	5530026.51	26.51
100%		-20	5530088.06	88.06
100%		-10	5530019.65	19.65
100%		0	5530091.31	91.31
100%		+10	5530007.90	7.9
100%		+30	5530078.74	78.74
100%		+40	5530099.95	99.95
100%		+50	5530045.16	45.16
Batt. Endpoint	3.65	+20	5530088.55	88.55

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5775076.69	76.69
100%		-30	5775036.70	36.70
100%		-20	5775038.37	38.37
100%		-10	5775086.48	86.48
100%		0	5775002.76	2.76
100%		+10	5775017.92	17.92
100%		+30	5775085.80	85.8
100%		+40	5775010.33	10.33
100%		+50	5775065.60	65.60
Batt. Endpoint	3.65	+20	5775036.27	36.27

Note:

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

2 minutes after the EUT is energized

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5210016.67	16.67
100%		-30	5210008.13	8.13
100%		-20	5210094.52	94.52
100%		-10	5210037.30	37.30
100%		0	5210036.92	36.92
100%		+10	5210042.21	42.21
100%		+30	5210009.59	9.59
100%		+40	5210046.32	46.32
100%		+50	5210084.22	84.22
Batt. Endpoint	3.65	+20	5210040.69	40.69

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 2A
OPERATING FREQUENCY: 5,290,000,000 Hz
CHANNEL: 58
REFERENCE VOLTAGE: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5290070.69	70.69
100%		-30	5290040.32	40.32
100%		-20	5290002.03	2.03
100%		-10	5290059.40	59.4
100%		0	5290018.83	18.83
100%		+10	5290058.02	58.02
100%		+30	5290005.53	5.53
100%		+40	5290073.90	73.9
100%		+50	5290014.42	14.42
Batt. Endpoint	3.65	+20	5290048.22	48.22

Note:

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

OPERATING BAND: UNII Band 2C
OPERATING FREQUENCY: 5,530,000,000 Hz
CHANNEL: 106
REFERENCE VOLTAGE: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5530015.44	15.44
100%		-30	5530092.15	92.15
100%		-20	5530061.45	61.45
100%		-10	5530042.76	42.76
100%		0	5530056.54	56.54
100%		+10	5530006.54	6.54
100%		+30	5530049.31	49.31
100%		+40	5530043.69	43.69
100%		+50	5530061.40	61.40
Batt. Endpoint	3.65	+20	5530033.51	33.51

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5775060.99	60.99
100%		-30	5775096.45	96.45
100%		-20	5775021.56	21.56
100%		-10	5775081.05	81.05
100%		0	5775025.38	25.38
100%		+10	5775033.08	33.08
100%		+30	5775074.43	74.43
100%		+40	5775074.27	74.27
100%		+50	5775021.89	21.89
Batt. Endpoint	3.65	+20	5775007.70	7.7

Note:

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

5 minutes after the EUT is energized

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5210041.49	41.49
100%		-30	5210093.36	93.36
100%		-20	5210056.63	56.63
100%		-10	5210021.82	21.82
100%		0	5210060.59	60.59
100%		+10	5210004.40	4.40
100%		+30	5210017.02	17.02
100%		+40	5210015.88	15.88
100%		+50	5210091.11	91.11
Batt. Endpoint	3.65	+20	5210059.33	59.33

Note:

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

OPERATING BAND: UNII Band 2A
OPERATING FREQUENCY: 5,290,000,000 Hz
CHANNEL: 58
REFERENCE VOLTAGE: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5290048.79	48.79
100%		-30	5290084.42	84.42
100%		-20	5290049.63	49.63
100%		-10	5290092.24	92.24
100%		0	5290079.63	79.63
100%		+10	5290073.27	73.27
100%		+30	5290001.98	1.98
100%		+40	5290076.85	76.85
100%		+50	5290005.29	5.29
Batt. Endpoint	3.65	+20	5290049.77	49.77

Note:

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

OPERATING BAND: UNII Band 2C
OPERATING FREQUENCY: 5,530,000,000 Hz
CHANNEL: 106
REFERENCE VOLTAGE: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5530028.67	28.67
100%		-30	5530058.44	58.44
100%		-20	5530037.18	37.18
100%		-10	5530068.84	68.84
100%		0	5530008.43	8.43
100%		+10	5530091.32	91.32
100%		+30	5530001.69	1.69
100%		+40	5530061.34	61.34
100%		+50	5530001.66	1.66
Batt. Endpoint	3.65	+20	5530081.72	81.72

Note:

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

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5775050.52	50.52
100%		-30	5775017.61	17.61
100%		-20	5775029.44	29.44
100%		-10	5775029.71	29.71
100%		0	5775036.34	36.34
100%		+10	5775003.85	3.85
100%		+30	5775082.75	82.75
100%		+40	5775093.31	93.31
100%		+50	5775002.35	2.35
Batt. Endpoint	3.65	+20	5775038.32	38.32

Note:

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

10 minutes after the EUT is energized

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5210008.15	8.15
100%		-30	5210068.79	68.79
100%		-20	5210016.73	16.73
100%		-10	5210037.08	37.08
100%		0	5210082.78	82.78
100%		+10	5210094.73	94.73
100%		+30	5210041.28	41.28
100%		+40	5210087.19	87.19
100%		+50	5210069.71	69.71
Batt. Endpoint	3.65	+20	5210083.83	83.83

Note:

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

OPERATING BAND: UNII Band 2A
OPERATING FREQUENCY: 5,290,000,000 Hz
CHANNEL: 58
REFERENCE VOLTAGE: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5290031.19	31.19
100%		-30	5290082.12	82.12
100%		-20	5290059.27	59.27
100%		-10	5290096.33	96.33
100%		0	5290032.23	32.23
100%		+10	5290001.26	1.26
100%		+30	5290005.26	5.26
100%		+40	5290004.69	4.69
100%		+50	5290014.82	14.82
Batt. Endpoint	3.65	+20	5290006.60	6.6

Note:

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

OPERATING BAND: UNII Band 2C
OPERATING FREQUENCY: 5,530,000,000 Hz
CHANNEL: 106
REFERENCE VOLTAGE: 3.88 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5530016.77	16.77
100%		-30	5530038.02	38.02
100%		-20	5530082.70	82.7
100%		-10	5530018.28	18.28
100%		0	5530053.87	53.87
100%		+10	5530031.81	31.81
100%		+30	5530084.25	84.25
100%		+40	5530058.36	58.36
100%		+50	5530027.50	27.50
Batt. Endpoint	3.65	+20	5530083.18	83.18

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

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.88	+20(Ref)	5775091.97	91.97
100%		-30	5775035.33	35.33
100%		-20	5775003.82	3.82
100%		-10	5775073.75	73.75
100%		0	5775064.75	64.75
100%		+10	5775010.34	10.34
100%		+30	5775027.91	27.91
100%		+40	5775028.37	28.37
100%		+50	5775009.57	9.57
Batt. Endpoint	3.65	+20	5775005.78	5.78

Note:

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

10.7 STRADDLE CHANNEL

10.7.1 26dB Bandwidth

[ANT.1]

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26dB Bandwidth [MHz]
802.11a	UNII 2C	5720	144	5705.20	19.80
802.11n(HT20)				5703.60	21.40
802.11ac(VHT20)				5704.24	20.76
802.11a	UNII 3	5720	144	5735.92	10.92
802.11n(HT20)				5735.12	10.12
802.11ac(VHT20)				5736.56	11.56

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26dB Bandwidth [MHz]
802.11n(HT40)	UNII 2C	5710	142	5673.04	51.96
802.11ac(VHT40)				5675.60	49.40
802.11n(HT40)	UNII 3	5710	142	5747.76	22.76
802.11ac(VHT40)				5739.68	14.68

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26dB Bandwidth [MHz]
802.11ac(VHT80)	UNII 2C	5690	138	5649.20	75.80
	UNII 3	5690	138	5730.64	5.64

Note:

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

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