

FCC UNII REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Date of Issue:
May 02, 2022

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Report No.: HCT-RF-2205-FC003

FCC ID: A3LSMG736B

APPLICANT: SAMSUNG Electronics Co., Ltd.

Model: SM-G736B/DS

Additional Model: SM-G736B

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.

Report No.: HCT-RF-2205-FC003

REVIEWED BY



Report prepared by : Jeong Ho Kim
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)

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2205-FC003	May 02, 2022	- First Approval Report

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1. GENERAL INFORMATION

EUT DESCRIPTION

Model	SM-G736B/DS	
Additional Model	SM-G736B	
EUT Type	Mobile Phone	
Power Supply	DC 3.86 V	
Modulation Type	OFDM : 802.11a, 802.11n, 802.11ac	
Frequency Range (MHz)	U-NII-1	20 MHz BW : 5180 - 5240 40 MHz BW : 5190 - 5230 80 MHz BW : 5210 160 MHz BW : 5250
	U-NII-2A	20 MHz BW : 5260 - 5320 40 MHz BW : 5270 - 5310 80 MHz BW : 5290 160 MHz BW : 5570
	U-NII-2C	20 MHz BW : 5500 - 5720 40 MHz BW : 5510 - 5710 80 MHz BW : 5530 - 5690
	U-NII-3	20 MHz BW : 5745 - 5825 40 MHz BW : 5755 - 5795 80 MHz BW : 5775
Straddle channel	Supported	
TDWR Band	Supported	
Dynamic Frequency Selection	Slave without radar detection	
Date(s) of Tests	March 28, 2022 ~ May 02, 2022	
Serial number	Radiated: R3CT20AKBFL Conducted : R3CT20AKENH	

ANTENNA CONFIGURATIONS

1. Antenna configuration

Configurations	SISO		MIMO	
	Ant.1	Ant.2	SDM	CDD
802.11a	O	X	O	X
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
- (5) SISO test was performed for the MIMO test result.

2.This device supports simultaneous transmission operation, which allows for two channels to operate independent of one another in the Bluetooth, 5 GHz or 6 GHz bands simultaneously on each antenna.

DBS	2.4 GHz	2.4 GHz	5 GHz	5 GHz	6 GHz	6 GHz	Bluetooth Ant.1	Bluetooth Ant.2
	WiFi Ant.1	WiFi Ant.2	WiFi Ant.1	WiFi Ant.2	WiFi Ant.1	WiFi Ant.2		
Bluetooth ANT.1 + 6 GHz WiFi MIMO					on	on	on	
Bluetooth ANT.1 + 5GHz WiFi MIMO			on	on	-	-	on	-

3. Directional Gain Calculation

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

Directional gain =

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

Band	Ant Gain (dBi)		N_{ANT}/ N_{SS}	Directional Gain (dBi)
UNII 1	ANT1	-1.40	2 / 2	1.97
	ANT2	-0.70		
UNII 2A	ANT1	-1.30	2 / 2	2.17
	ANT2	-0.40		
UNII 2C	ANT1	-0.40	2 / 2	2.61
	ANT2	-0.40		
UNII 3	ANT1	0.40	2 / 2	3.12
	ANT2	-0.20		

Note

According to Ansi C63.10-2013 section 14.4.3, the directional gain is calculated using the formula, where GN is the gain of the nth antenna and NANT is the total number of antennas used.

$$Directional\ Gain = 10 \cdot \log \left(\frac{10^{(ANT1\ Gain/20)} + 10^{(ANT2\ Gain/20)}}{2} \right) \text{ dBi}$$

Sample MIMO Calculation:

Ex) Ant 1 : 11.58 dBm Ant 2 : 12.08 dBm

$$Ant1 + Ant 2 = MIMO$$

$$(11.58 \text{ dBm} + 12.08 \text{ dBm}) = (14.387 \text{ mW} + 16.143 \text{ mW}) = 30.53 \text{ mW} = 14.88 \text{ dBm}$$

2. MAXIMUM OUTPUT POWER

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

Band	Mode	Ant.1 Power		Ant.2 Power		MIMO	
		Ant.1 + Ant.2 Power					
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)
UNII1	802.11a	15.12	0.032	14.61	0.029	17.88	0.061
	802.11n (HT20)	15.09	0.032	14.61	0.029	17.86	0.061
	802.11n (HT40)	14.13	0.026	13.34	0.022	16.76	0.047
	802.11ac (VHT20)	14.95	0.031	14.41	0.028	17.70	0.059
	802.11ac (VHT40)	14.21	0.026	13.40	0.022	16.83	0.048
	802.11ac (VHT80)	10.43	0.011	9.32	0.009	12.92	0.020
UNII2A	802.11a	15.74	0.038	16.21	0.042	18.98	0.079
	802.11n (HT20)	15.58	0.036	16.06	0.040	18.84	0.077
	802.11n (HT40)	13.56	0.023	14.17	0.026	16.88	0.049
	802.11ac (VHT20)	14.42	0.028	15.09	0.032	17.78	0.060
	802.11ac (VHT40)	13.57	0.023	14.18	0.026	16.90	0.049
	802.11ac (VHT80)	10.16	0.010	10.18	0.010	13.18	0.021
UNII2C	802.11a	15.47	0.035	15.31	0.034	18.40	0.069
	802.11n (HT20)	15.38	0.034	15.40	0.035	18.40	0.069
	802.11n (HT40)	13.43	0.022	13.50	0.022	16.47	0.044
	802.11ac (VHT20)	14.43	0.028	14.27	0.027	17.36	0.054
	802.11ac (VHT40)	13.58	0.023	13.57	0.023	16.58	0.046
	802.11ac (VHT80)	11.92	0.016	11.58	0.014	14.76	0.030
UNII3	802.11a	15.23	0.033	14.83	0.030	18.04	0.064
	802.11n (HT20)	15.26	0.034	14.84	0.030	18.05	0.064
	802.11n (HT40)	13.36	0.022	13.01	0.020	16.20	0.042
	802.11ac (VHT20)	14.22	0.026	13.88	0.024	17.06	0.051
	802.11ac (VHT40)	13.42	0.022	13.08	0.020	16.27	0.042
	802.11ac (VHT80)	9.13	0.008	9.03	0.008	12.09	0.016

802.11ac (VHT160)

Band	Mode	Ant.1 Power		Ant.2 Power		MIMO	
		Ant.1 + Ant.2 Power					
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)
UNII1-2A	802.11ac (VHT160)	-2.23	0.001	0.27	0.001	2.21	0.002
UNII2C		11.65	0.015	11.25	0.013	14.46	0.028

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 30 MHz 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 1 GHz. Above 1 GHz with 1.5 m 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.

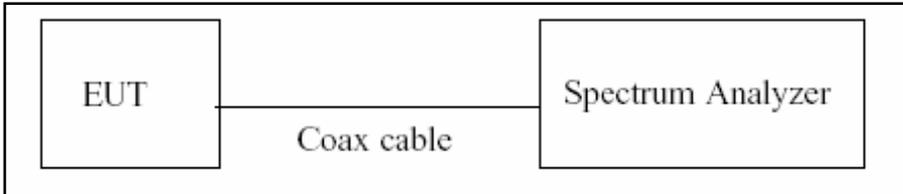
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	2.00 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.40 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.74 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.51 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.92 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (Above 40 GHz)	5.48 (Confidence level about 95 %, $k=2$)

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.

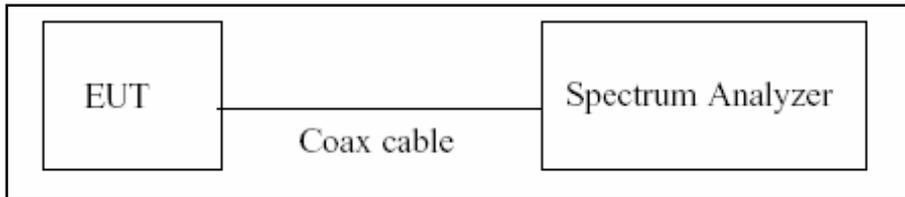
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (\geq RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = $10\log(1/\text{Duty Cycle})$

8.2. 6 dB Bandwidth & 26 dB Bandwidth

Limit

Within the 5.725-5.85 GHz(NII-3), the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Configuration



Test Procedure(26 dB 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 (6 dB 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 $\geq 3 \times$ 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 level 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.

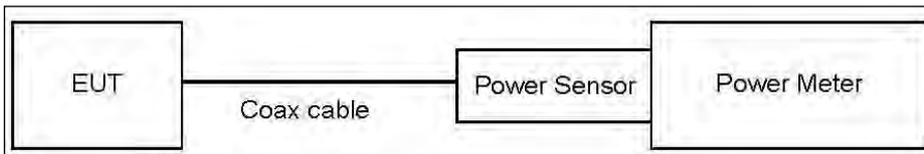
8.3. Output Power Measurement

Limit

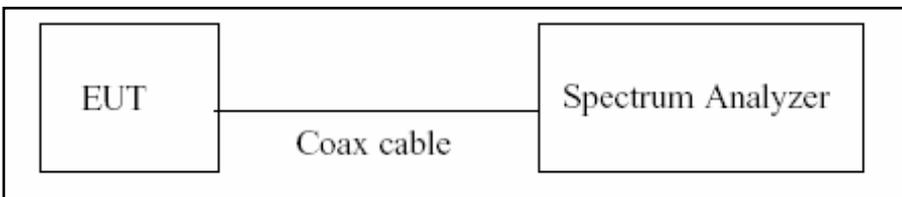
Band	Limit
UNII 1	- Master : Not exceed 1 W(=30 dBm) - Slave : Not exceed 250 mW(=23.98 dBm)
UNII 2A, 2C	Not exceed the lesser of 250 mW or 11 dBm + 10 log B, (where B is the 26 dB emission bandwidth in megahertz.)
UNII 3	Not exceed 1 W(=30 dBm)

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 $10\log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

Sample Calculation

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

Note

1. Spectrum Measured Levels 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

Ant.1: Loss = Attenuator loss(10 dB) + Cable loss + EUT cable Loss

Ant.2: Loss = Attenuator loss(10 dB) + Cable loss

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

Band	Ant.1 Loss(dB)	Ant.2 Loss(dB)
UNII 1	11.62	10.80
UNII 2A	11.62	10.80
UNII 2C	11.62	10.80
UNII 3	11.62	10.80

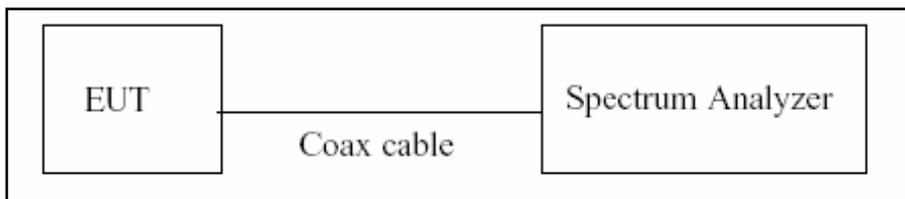
(Actual value of loss for the attenuator and cable combination)

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) = Measured Value(dBm) + ATT loss(dB) + Cable loss(dB) + Duty Cycle Factor(dB)

Note

1. Spectrum Measured Levels 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

Ant.1: Loss = Attenuator loss(10 dB) + Cable loss + EUT cable Loss

Ant.2: Loss = Attenuator loss(10 dB) + Cable loss

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

Band	Ant.1 Loss(dB)	Ant.2 Loss(dB)
UNII 1	11.62	10.80
UNII 2A	11.62	10.80
UNII 2C	11.62	10.80
UNII 3	11.62	10.80

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

8.5. 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 μ H/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dB μ V)	
	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) = Measured Value + Correction Factor

8.6. Radiated Test

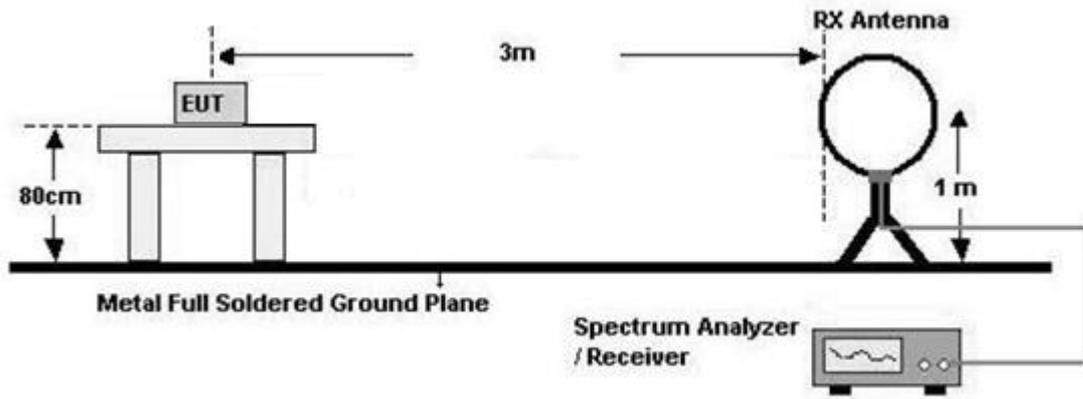
Limit

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.

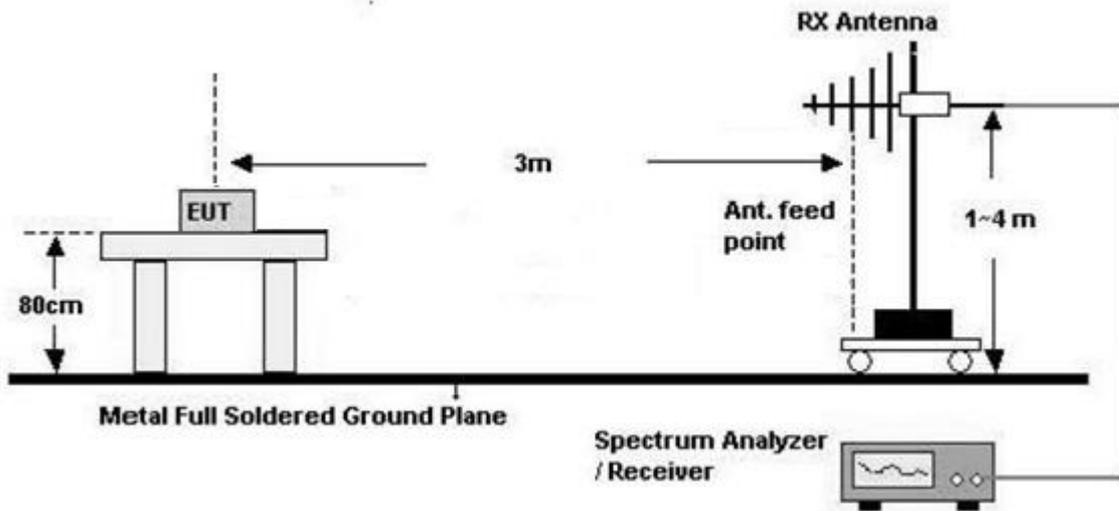
Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

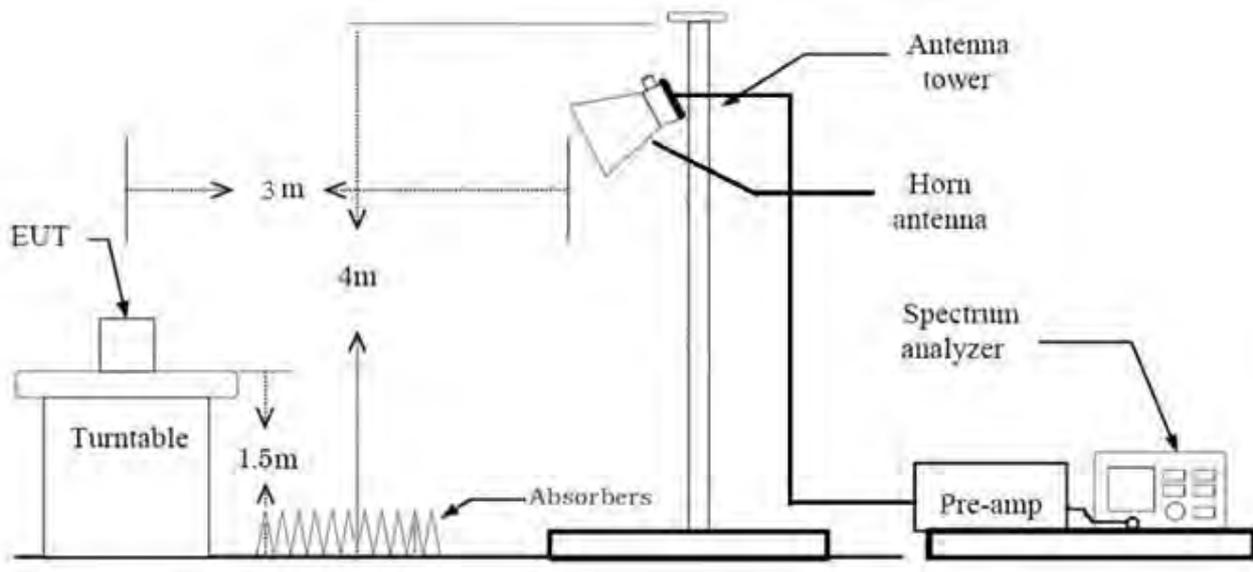
Below 30 MHz



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 3 m from the EUT
3. The EUT is placed on a turntable, which is 0.8 m 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) = $40\log(3\text{ m}/300\text{ m}) = - 80\text{ dB}$
Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) = $40\log(3\text{ m}/30\text{ m}) = - 40\text{ dB}$
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 = Measured 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 1 GHz)

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 0.8 m above ground plane.
3. The Hybrid antenna was placed at a location 3 m from the EUT, which is varied from 1 m to 4 m 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 \geq 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 = Measured 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 1 m to 4 m 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 \geq 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 \geq 98 %) = $VBW \leq RBW/100$ (i.e., 10 kHz) but not less than 10 Hz.
- VBW(Duty cycle is $<$ 98 %) = $VBW \geq 1/T$, 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 % duty cycle. For lower duty cycles, increase the minimum 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 = $20\log(\text{test distance} / \text{specific distance})$ (dB)
12. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.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 1 m to 4 m 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 \geq 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 \geq 98 %) = $VBW \leq RBW/100$ (i.e., 10 kHz) but not less than 10 Hz.
- VBW(Duty cycle is < 98 %) = $VBW \geq 1/T$, 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 % duty cycle. For lower duty cycles, increase the minimum 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 = $20\log(\text{test distance} / \text{specific distance})$ (dB)

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

The actual setting value of VBW

Mode	Worst Data rate (Mbps)	Duty Cycle	Duty Cycle Factor (dB)	The actual setting value of VBW (Hz)
802.11a	6	0.935	0.292	2000
802.11n(HT20)	MCS0	0.925	0.339	2000
802.11n(HT40)	MCS0	0.865	0.629	5000
802.11ac(VHT20)	MCS0	0.929	0.322	2000
802.11ac(VHT40)	MCS0	0.866	0.624	5000
802.11ac(VHT80)	MCS0	0.763	1.178	10000
802.11ac(VHT160)	MCS0	0.648	1.883	10000

8.7. Worst case configuration and mode

Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
 - Mode : Stand alone, Stand alone + External accessories(Earphone, etc)
 - Worstcase : Stand alone
2. EUT Axis
 - Radiated Spurious Emissions : Y
 - Radiated Restricted Band Edge : Z
3. All datarate of operation were investigated and the worst case datarate results are reported.
 - Mode : Ant.1(SISO), Ant.1+Ant.2(SDM), Ant.1+Ant.2(CDD)
 - Worstcase : Ant.1+Ant.2(CDD)
 - 802.11a : 6 Mbps
 - 802.11n_HT20 : MCS0
 - 802.11n_HT40 : MCS0
 - 802.11ac_VHT20 : MCS0
 - 802.11ac_VHT40 : MCS0
 - 802.11ac_VHT80 : MCS0
 - 802.11ac_VHT160: MCS0
4. Radiated Spurious Emission
 - All modulation of operation were investigated and the worst case modulation results are reported.
(Worstcase : 802.11a_6Mbps, UNII1 HT20 ~ VHT160)
5. 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
6. SM-G736B/DS, SM-G736B were tested and the worst case results are reported.
(Worst case : SM-G736B/DS)

Radiated test(DBS)

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

Description	Bluetooth Emission	5 GHz Emission
Antenna	WIFI/BT	WIFI/BT
Channel	0	36
Data Rate	1 Mbps	6 Mbps
Mode	GFSK : DH5	802.11a

4. This device supports simultaneous transmission operation, which allows for two channels to operate independent of one another in the Bluetooth, 5 GHz or 6 GHz bands simultaneously on each antenna.

DBS	2.4 GHz	2.4 GHz	5 GHz	5 GHz	6 GHz	6 GHz	Bluetooth Ant.1	Bluetooth Ant.2	Test case
	WiFi Ant.1	WiFi Ant.2	WiFi Ant.1	WiFi Ant.2	WiFi Ant.1	WiFi Ant.2			
Bluetooth ANT.1 + 6 GHz WiFi MIMO					on	on	on		
Bluetooth ANT.1 + 5GHz WiFi MIMO			on	on	-	-	on	-	<u>Case 1</u>

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-G736B/DS, SM-G736B were tested and the worst case results are reported.
(Worst case : SM-G736B/DS)

Conducted test

1. All datarate of operation were investigated and the worst case datarate results are reported.
2. SM-G736B/DS, SM-G736B were tested and the worst case results are reported.
(Worst case : SM-G736B/DS)

9. SUMMARY OF TEST RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
26 dB Bandwidth	§15.407 (for Power Measurement)	N/A	Conducted	PASS
6 dB Bandwidth	§15.407(e)	>500 kHz (5725-5850 MHz)(UNII-3)		PASS
Maximum Conducted Output Power	§15.407(a)(1),(2),(3)	< 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
Maximum EIRP Output Power	§15.407(a)(1)(3)(iii)	< EIRP 30dBm (5850-5925 MHz)		
Maximum Power Spectral Density	§15.407(a)(1),(2),(3)	<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
AC Conducted Emissions 150 kHz-30 MHz	15.207 15.407(b)(9)	<FCC 15.207 limits		PASS
Undesirable Emissions	§15.407(b) (1),(2),(3),(4)	<-27 dBm/MHz EIRP (UNII1, 2A, 2C) cf. Section 8.6 (UNII 3)		PASS
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	15.205, 15.407(b)(9),(10)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	Radiated	PASS

10. TEST RESULT

10.1 DUTY CYCLE

Mode	Data Rate (Mbps)	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11a	6	1.459	1.561	0.935	0.292
	9	0.983	1.079	0.911	0.406
	12	0.745	0.841	0.886	0.528
	18	0.502	0.603	0.832	0.799
	24	0.380	0.481	0.789	1.027
	36	0.263	0.360	0.732	1.353
	48	0.203	0.299	0.678	1.688
	54	0.182	0.284	0.643	1.919

Mode	MCS Index	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11n (HT20)	0	1.246	1.348	0.925	0.339
	1	0.643	0.745	0.864	0.635
	2	0.436	0.537	0.811	0.908
	3	0.339	0.441	0.770	1.134
	4	0.243	0.339	0.716	1.448
	5	0.193	0.289	0.667	1.761
	6	0.172	0.269	0.642	1.928
	7	0.157	0.258	0.608	2.162
802.11n (HT40)	0	0.618	0.714	0.865	0.629
	1	0.329	0.426	0.774	1.114
	2	0.233	0.329	0.708	1.502
	3	0.187	0.284	0.661	1.800
	4	0.132	0.233	0.565	2.478
	5	0.111	0.208	0.537	2.704
	6	0.106	0.203	0.525	2.798
	7	0.096	0.193	0.500	3.010

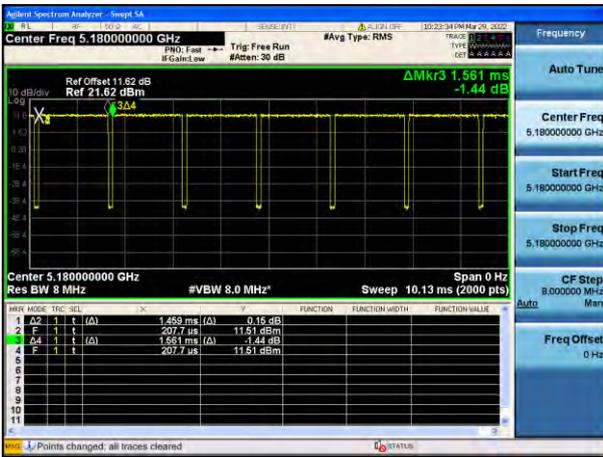
Mode	MCS Index	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11ac (VHT20)	0	1.251	1.348	0.929	0.322
	1	0.649	0.745	0.871	0.601
	2	0.446	0.542	0.822	0.849
	3	0.345	0.446	0.773	1.120
	4	0.243	0.339	0.716	1.448
	5	0.193	0.289	0.667	1.761
	6	0.177	0.274	0.648	1.883
	7	0.167	0.263	0.635	1.975
	8	0.147	0.243	0.604	2.188
802.11ac (VHT40)	0	0.623	0.719	0.866	0.624
	1	0.329	0.431	0.765	1.165
	2	0.233	0.329	0.708	1.502
	3	0.187	0.284	0.661	1.800
	4	0.137	0.238	0.574	2.407
	5	0.111	0.213	0.524	2.808
	6	0.106	0.203	0.525	2.798
	7	0.101	0.198	0.513	2.900
	8	0.091	0.193	0.474	3.245
	9	0.086	0.182	0.472	3.259
802.11ac (VHT80)	0	0.309	0.405	0.763	1.178
	1	0.177	0.274	0.648	1.883
	2	0.132	0.228	0.578	2.382
	3	0.106	0.203	0.525	2.798
	4	0.086	0.182	0.472	3.259
	5	0.076	0.172	0.441	3.554
	6	0.071	0.167	0.424	3.724
	7	0.066	0.162	0.406	3.912
	8	0.066	0.162	0.406	3.912
	9	0.066	0.162	0.406	3.912

Mode	MCS Index	T _{on} (ms)	T _{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11ac (VHT160)	0	0.177	0.274	0.648	1.883
	1	0.111	0.208	0.537	2.704
	2	0.086	0.182	0.472	3.259
	3	0.076	0.172	0.441	3.554
	4	0.066	0.162	0.406	3.912
	5	0.061	0.157	0.387	4.122
	6	0.056	0.152	0.367	4.357
	7	0.056	0.152	0.367	4.357
	8	0.056	0.152	0.367	4.357
	9	0.056	0.156	0.359	4.449

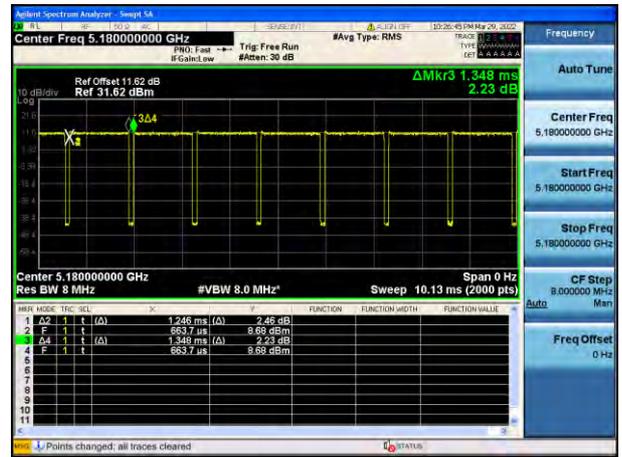
Note:

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

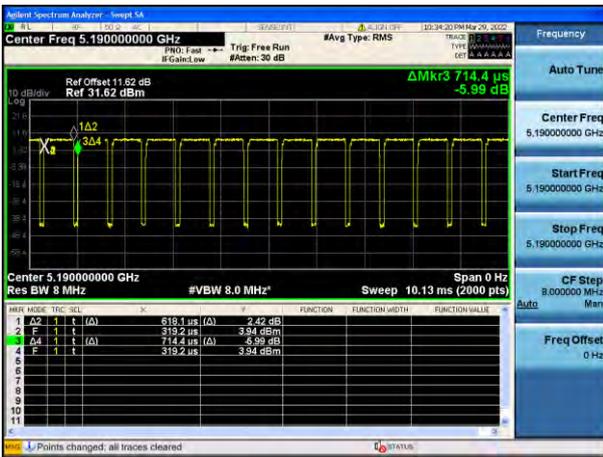
802.11a



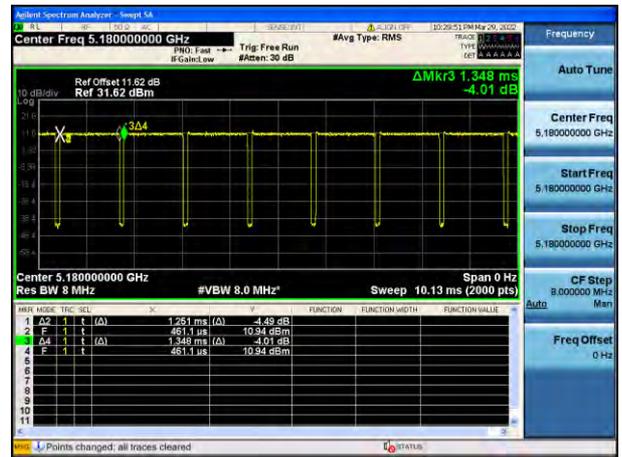
802.11n(HT20)



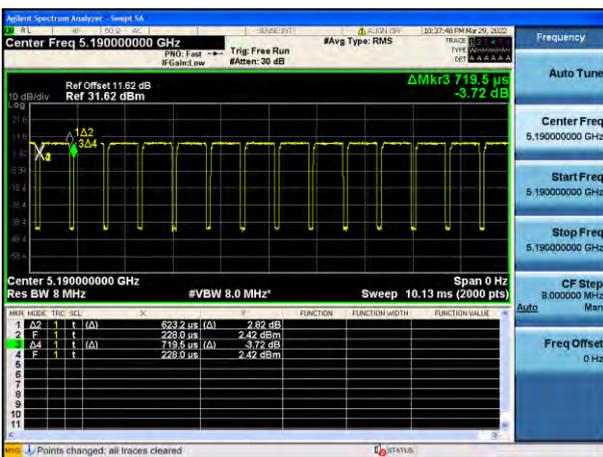
802.11n(HT40)



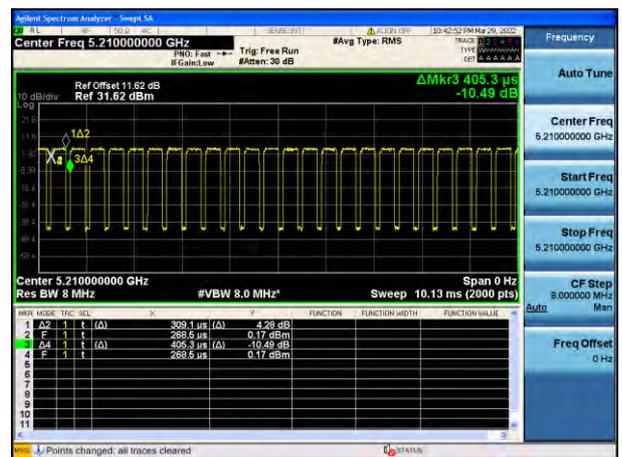
802.11ac(VHT20)

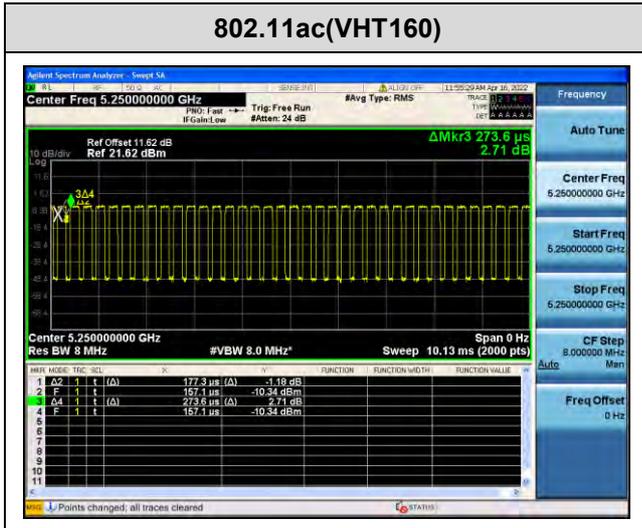


802.11ac(VHT40)



802.11ac(VHT80)





10.2 26 dB Bandwidth

Straddle channel data in the table below are for reporting purposes only. Straddle channel data were added in section 10.7.1.

[Ant.1]

802.11a Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	18.99	16.388
5200	40	20.20	16.378
5240	48	19.17	16.382
5260	52	19.67	16.373
5300	60	19.52	16.370
5320	64	19.16	16.366
5500	100	19.52	16.392
5600	120	19.08	16.411
5720	144	18.85	16.361
5745	149	19.37	16.395
5785	157	19.55	16.392
5825	165	19.10	16.366

802.11n(HT20) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	20.35	17.567
5200	40	20.38	17.565
5240	48	20.40	17.582
5260	52	20.49	17.575
5300	60	20.40	17.579
5320	64	20.07	17.570
5500	100	20.19	17.596
5600	120	20.27	17.572
5720	144	20.83	17.605
5745	149	20.43	17.573
5785	157	20.28	17.577
5825	165	20.59	17.587

802.11n(HT40) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	40.01	36.048
5230	46	39.67	36.004
5270	54	39.92	36.024
5310	62	39.82	36.062
5510	102	39.96	36.032
5590	118	39.31	36.020
5710	142	39.77	36.000
5755	151	39.68	36.066
5795	159	39.61	36.050

802.11ac(VHT20) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	20.37	17.584
5200	40	20.58	17.572
5240	48	20.77	17.587
5260	52	20.28	17.585
5300	60	20.69	17.597
5320	64	20.38	17.581
5500	100	20.64	17.577
5600	120	20.35	17.584
5720	144	20.36	17.588
5745	149	20.53	17.588
5785	157	20.33	17.584
5825	165	20.35	17.592

802.11ac(VHT40) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	40.05	36.033
5230	46	40.11	36.010
5270	54	39.66	36.014
5310	62	40.01	36.032
5510	102	39.43	36.017
5590	118	39.84	36.037
5710	142	40.05	36.033
5755	151	39.74	36.033
5795	159	40.00	36.009

802.11ac(VHT80) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5210	42	81.29	75.425
5290	58	81.44	75.444
5530	106	81.32	75.452
5610	122	81.33	75.422
5690	138	81.51	75.403
5775	155	81.34	75.379

802.11ac(VHT160) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5250	50	165.1	154.75
5570	114	165.6	154.63

[Ant.2]

802.11a Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	19.92	16.369
5200	40	19.27	16.383
5240	48	19.09	16.378
5260	52	19.68	16.375
5300	60	19.56	16.384
5320	64	19.69	16.382
5500	100	19.67	16.391
5600	120	19.60	16.375
5720	144	19.50	16.386
5745	149	19.76	16.375
5785	157	19.50	16.389
5825	165	19.67	16.384

802.11n(HT20) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	20.10	17.573
5200	40	20.83	17.588
5240	48	20.46	17.572
5260	52	20.54	17.582
5300	60	20.45	17.577
5320	64	20.62	17.590
5500	100	20.26	17.594
5600	120	20.14	17.577
5720	144	20.74	17.584
5745	149	20.38	17.582
5785	157	20.26	17.573
5825	165	20.44	17.569

802.11n(HT40) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	39.97	36.042
5230	46	39.71	36.042
5270	54	39.58	36.026
5310	62	40.04	36.057
5510	102	39.97	36.126
5590	118	39.96	35.992
5710	142	39.95	35.990
5755	151	39.79	36.069
5795	159	39.79	36.034

802.11ac(VHT20) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	20.04	17.583
5200	40	20.31	17.581
5240	48	20.02	17.596
5260	52	20.25	17.592
5300	60	20.44	17.589
5320	64	20.36	17.573
5500	100	20.16	17.597
5600	120	20.63	17.584
5720	144	20.17	17.587
5745	149	20.13	17.577
5785	157	20.25	17.563
5825	165	19.95	17.575

802.11ac(VHT40) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	39.79	36.054
5230	46	39.96	36.094
5270	54	40.16	36.027
5310	62	40.25	36.013
5510	102	39.68	36.015
5590	118	39.87	36.022
5710	142	40.14	36.016
5755	151	39.59	36.039
5795	159	39.99	36.055

802.11ac(VHT80) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5210	42	81.28	75.448
5290	58	81.46	75.398
5530	106	81.14	75.431
5610	122	81.38	75.393
5690	138	81.00	75.417
5775	155	81.22	75.365

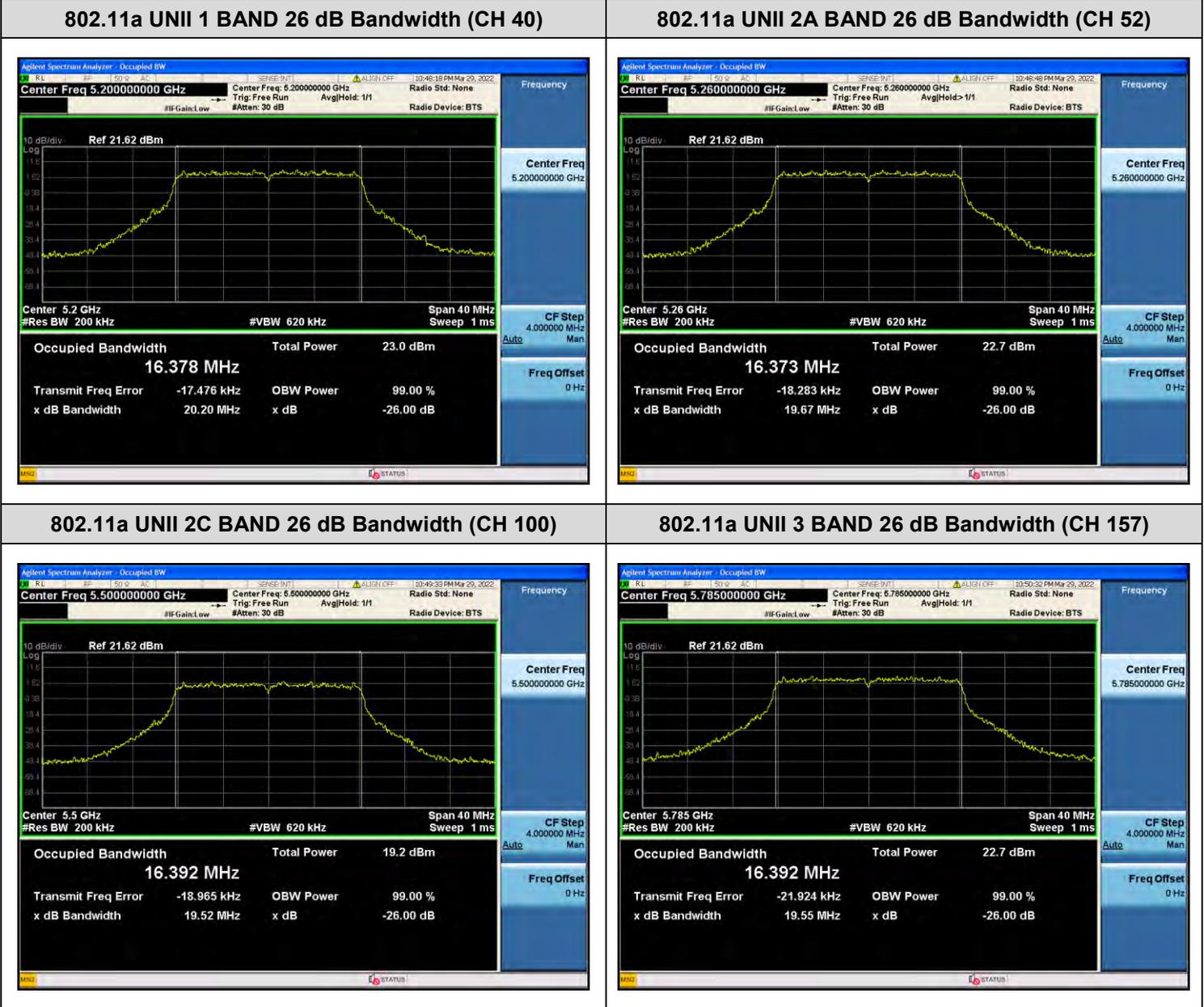
802.11ac(VHT160) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5250	50	165.7	154.98
5570	114	165.4	154.26

[Ant.1]

☐ Test Plots(802.11a)

Note:

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

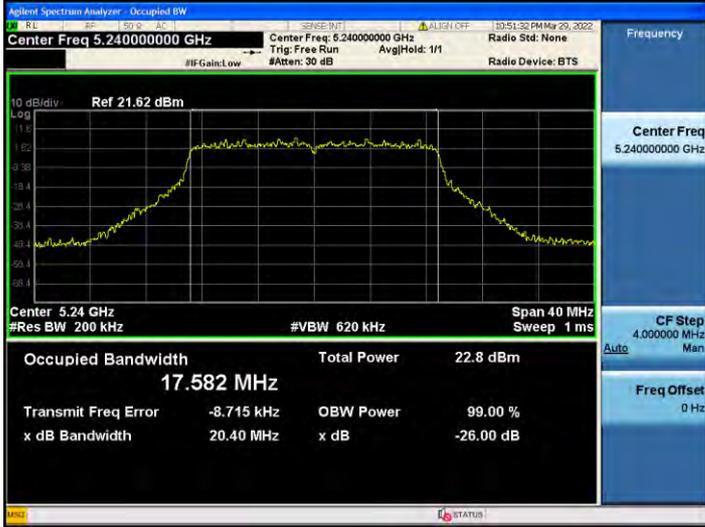


☐ Test Plots(802.11n(HT20))

Note:

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

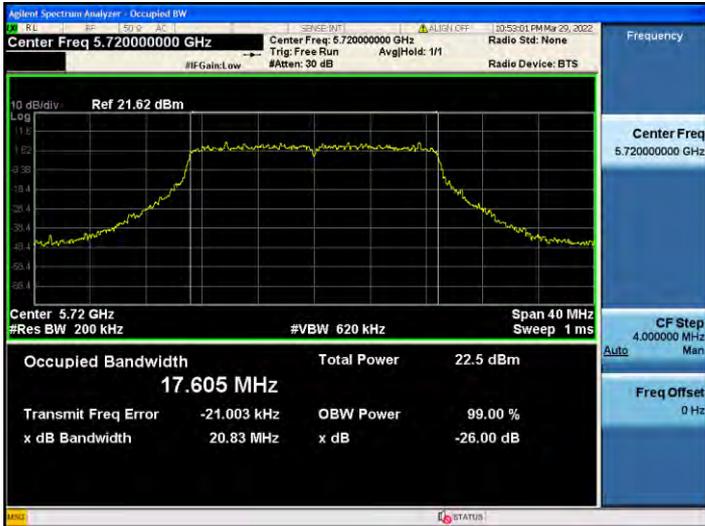
802.11n_HT20 UNII 1 BAND 26 dB Bandwidth(CH 48)



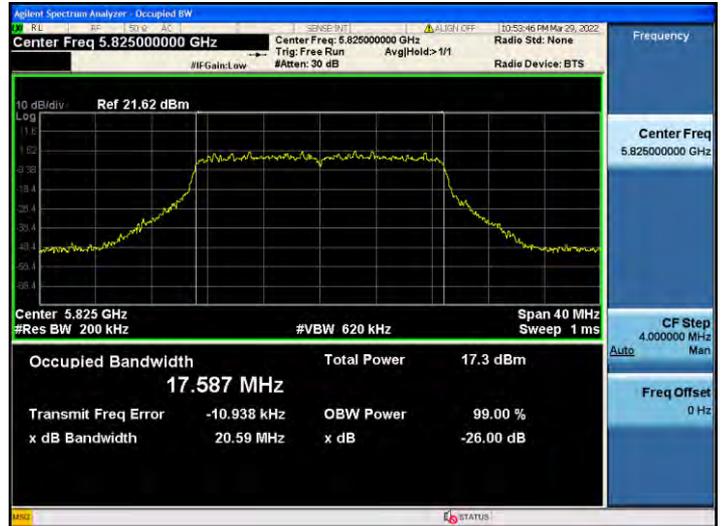
802.11n_HT20 UNII 2A BAND 26 dB Bandwidth(CH 52)



802.11n_HT20 UNII 2C BAND 26 dB Bandwidth(CH 144)



802.11n_HT20 UNII 3 BAND 26 dB Bandwidth(CH 165)

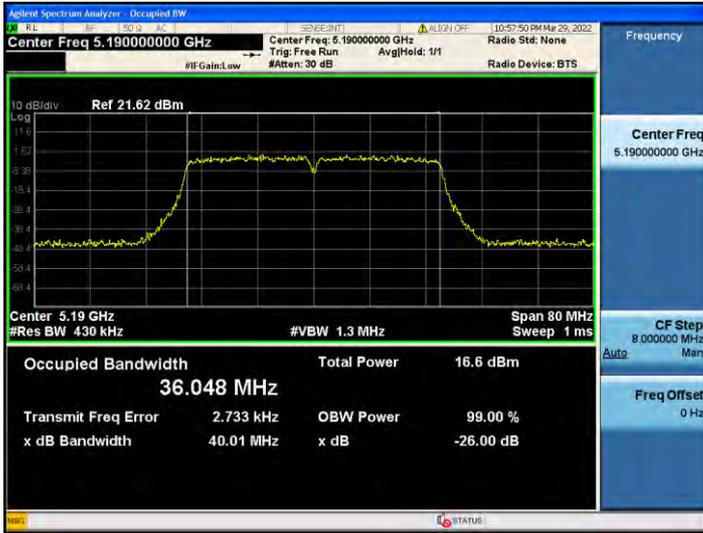


☐ Test Plots(802.11n(HT40))

Note:

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

802.11n_HT40 UNII 1 BAND 26 dB Bandwidth(CH 38)



802.11n_HT40 UNII 2A BAND 26 dB Bandwidth (CH 54)



802.11n_HT40 UNII 2C BAND 26 dB Bandwidth(CH 102)



802.11n_HT40 UNII 3 BAND 26 dB Bandwidth (CH 151)

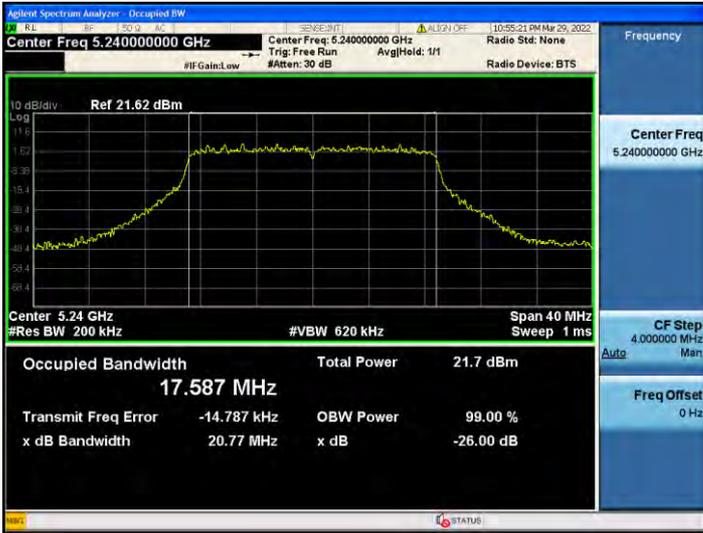


☐ Test Plots(802.11ac(VHT20))

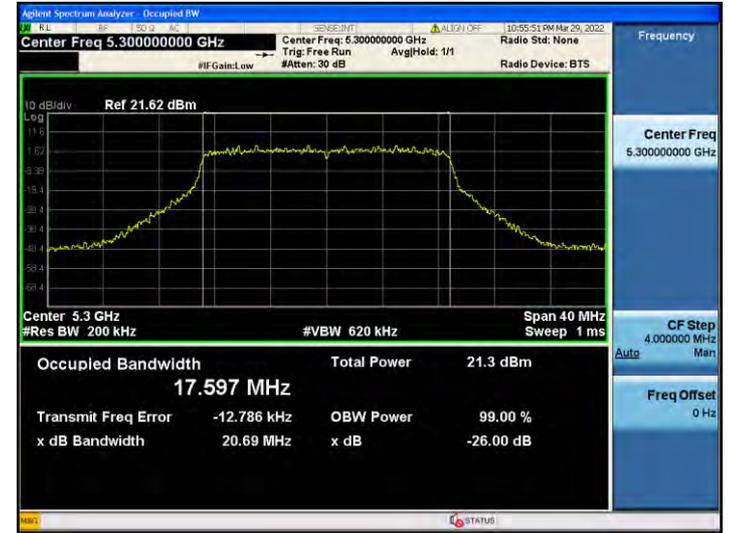
Note:

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

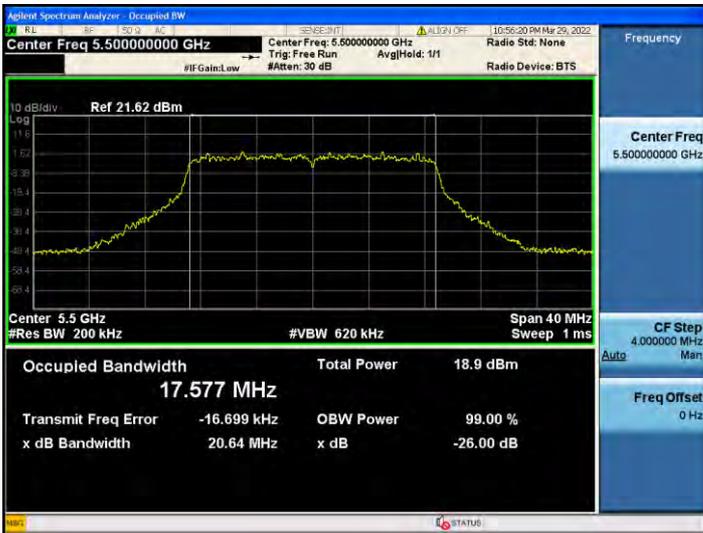
802.11ac_VHT20 UNII 1 BAND 26 dB Bandwidth(CH 48)



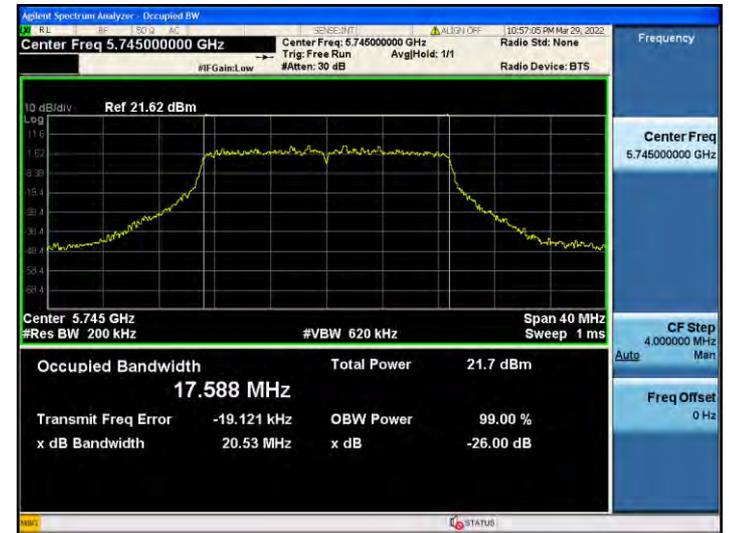
802.11ac_VHT20 UNII 2A BAND 26 dB Bandwidth(CH 60)



802.11ac_VHT20 UNII 2C BAND 26 dB Bandwidth(CH 100)



802.11ac_VHT20 UNII 3 BAND 26 dB Bandwidth(CH 149)

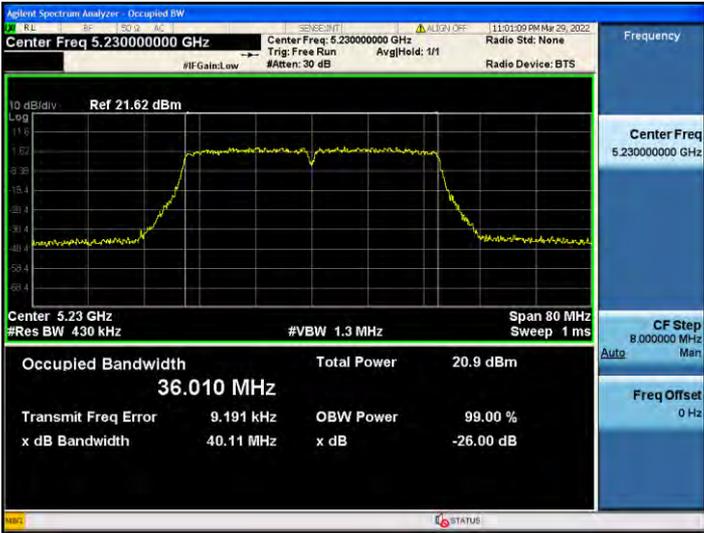


☐ Test Plots(802.11ac(VHT40))

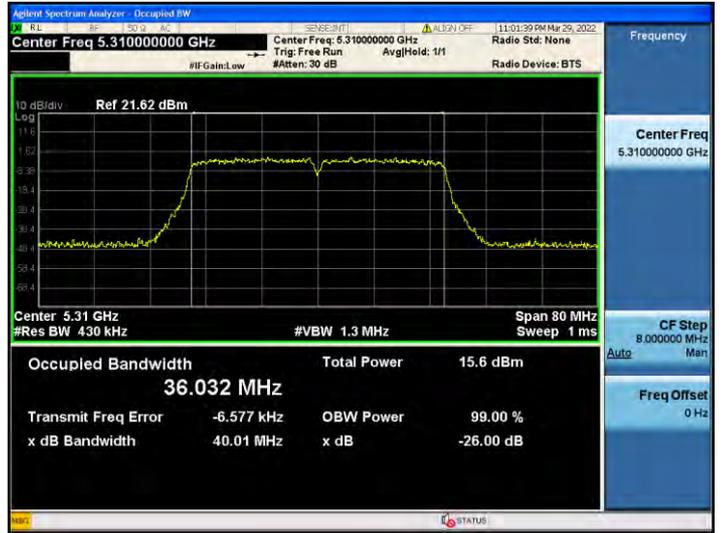
Note:

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

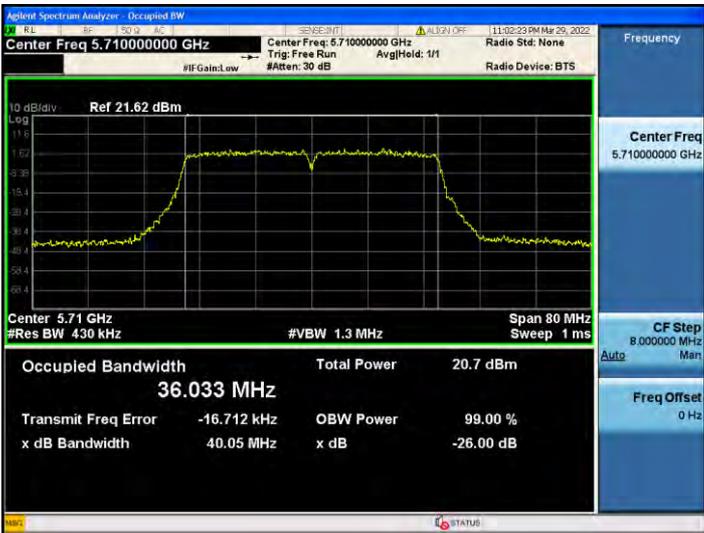
802.11ac_VHT40 UNII 1 BAND 26 dB Bandwidth(CH 46)



802.11ac_VHT40 UNII 2A BAND 26 dB Bandwidth (CH 62)



802.11ac_VHT40 UNII 2C BAND 26 dB Bandwidth(CH 142)



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

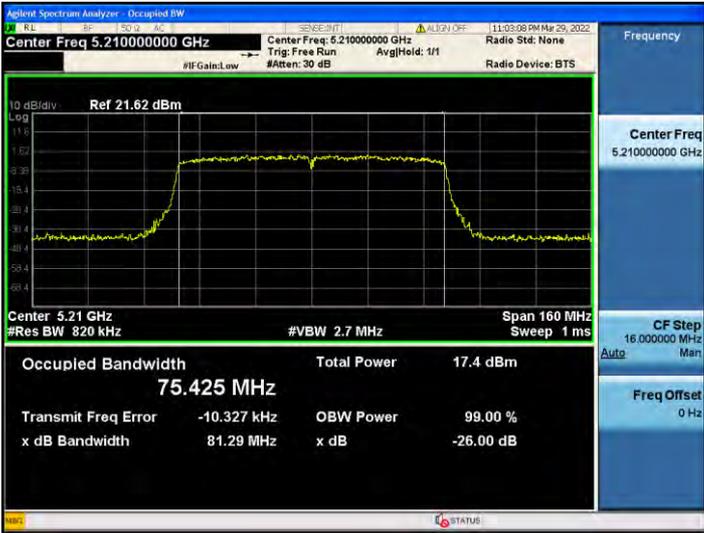


☐ Test Plots(802.11ac(VHT80))

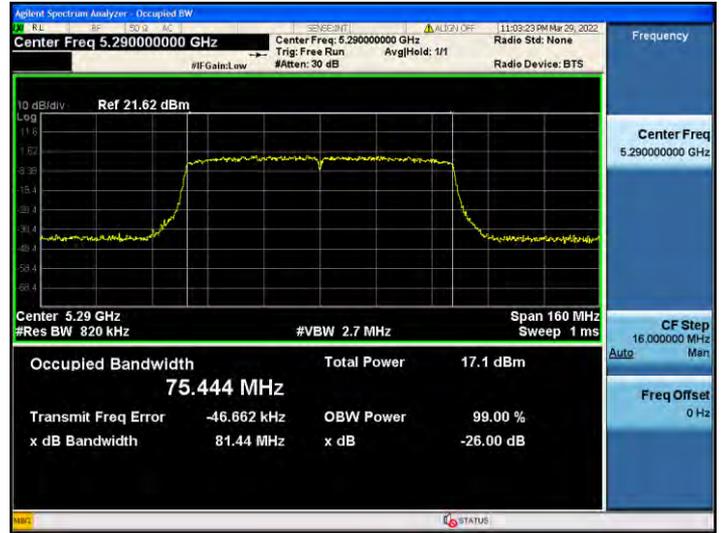
Note:

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

802.11ac_VHT80 UNII 1 BAND 26 dB Bandwidth(CH 42)



802.11ac_VHT80 UNII 2A BAND 26 dB Bandwidth (CH 58)



802.11ac_VHT80 UNII 2C BAND 26 dB Bandwidth(CH 138)



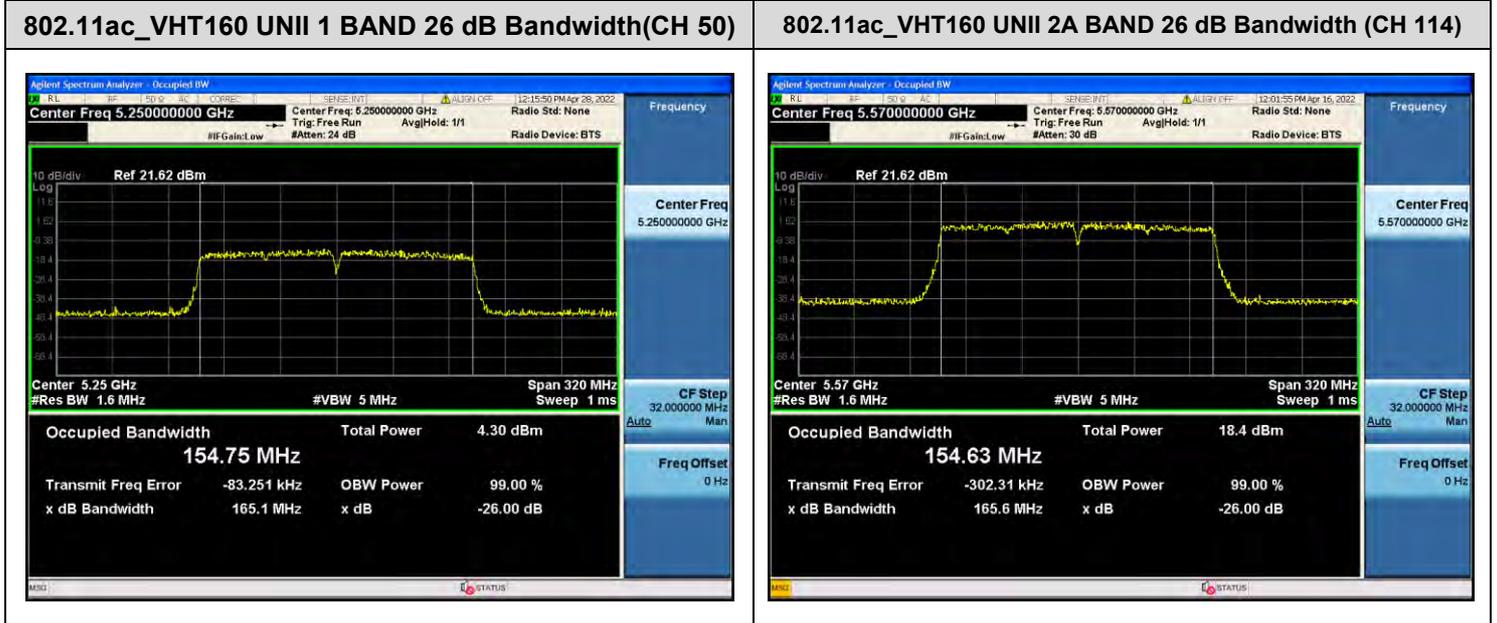
802.11ac_VHT80 UNII 3 BAND 26 dB Bandwidth (CH 155)



☑ Test Plots(802.11ac(VHT160))

Note:

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

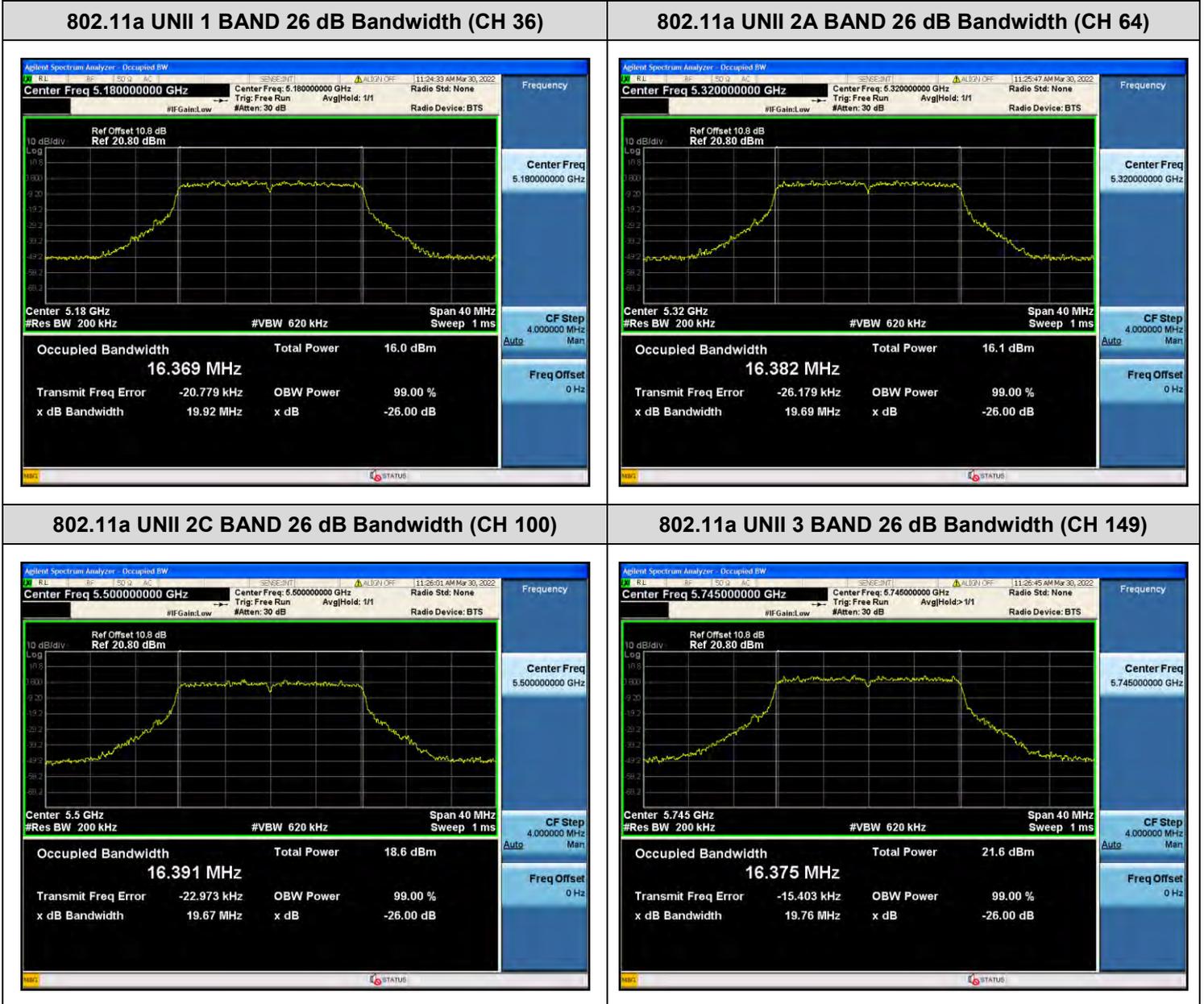


[Ant.2]

☐ Test Plots(802.11a)

Note:

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

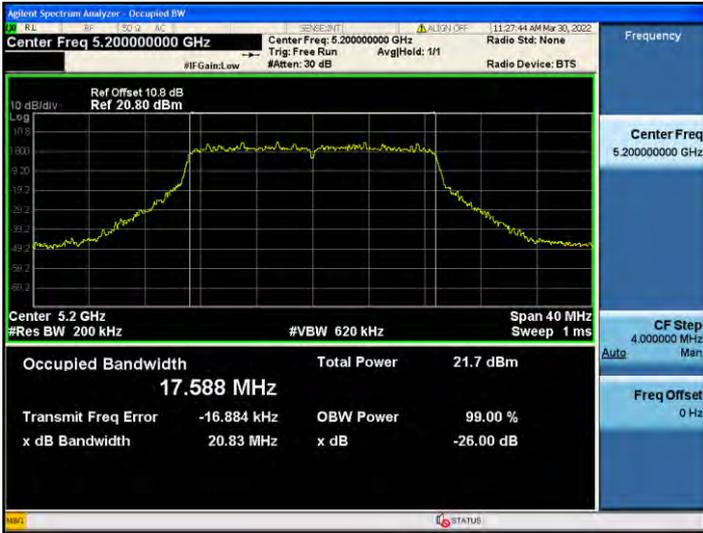


☐ Test Plots(802.11n(HT20))

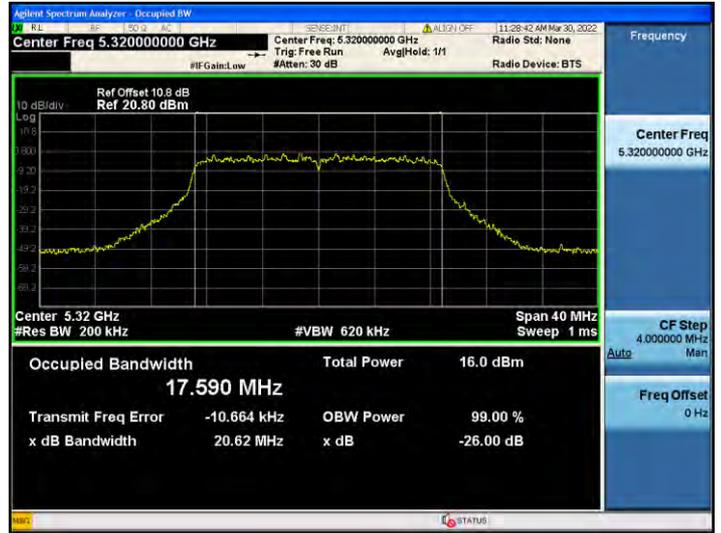
Note:

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

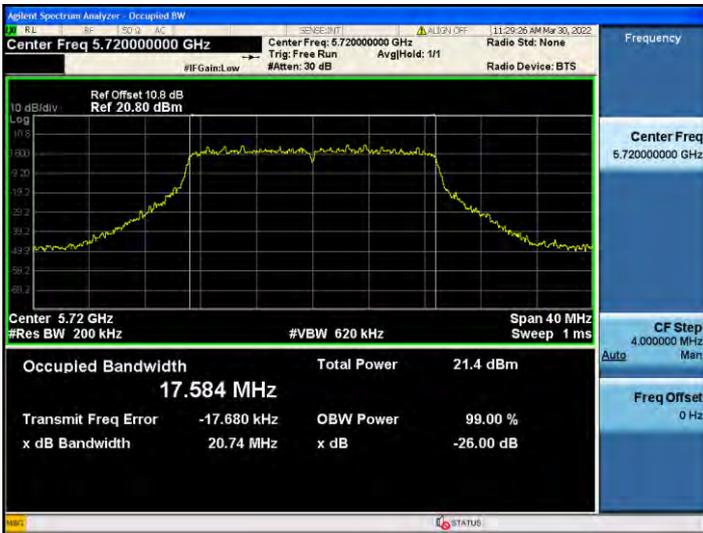
802.11n_HT20 UNII 1 BAND 26 dB Bandwidth(CH 40)



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



802.11n_HT20 UNII 2C BAND 26 dB Bandwidth(CH 144)



802.11n_HT20 UNII 3 BAND 26 dB Bandwidth(CH 165)

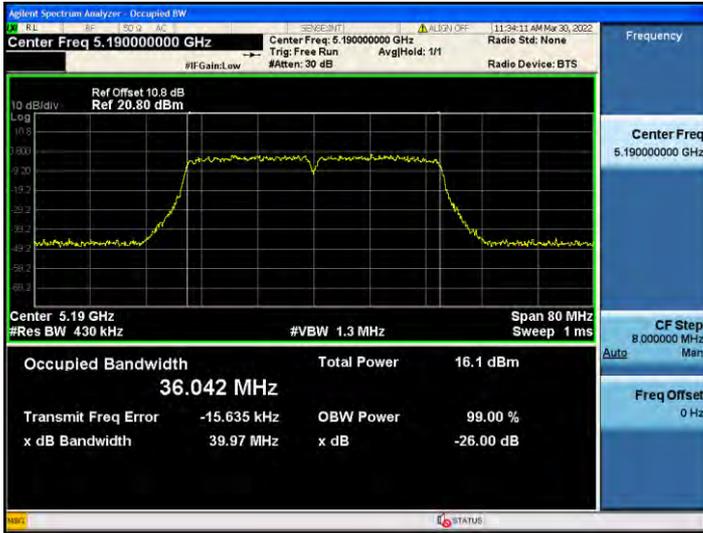


☐ Test Plots(802.11n(HT40))

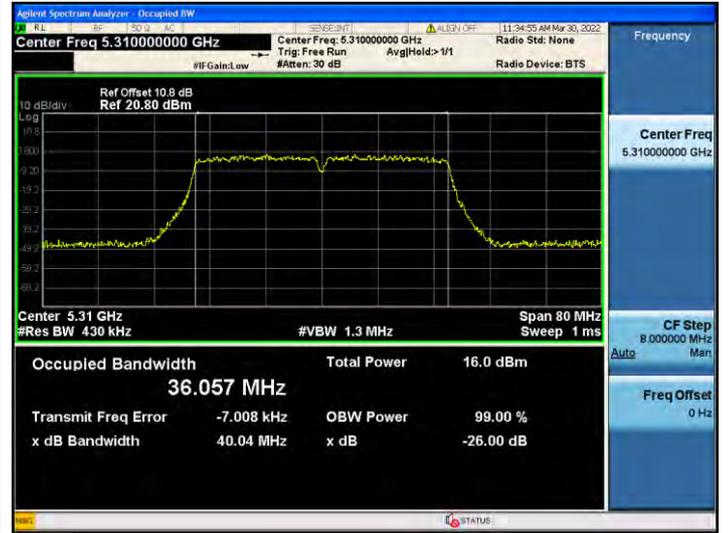
Note:

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

802.11n_HT40 UNII 1 BAND 26 dB Bandwidth(CH 38)



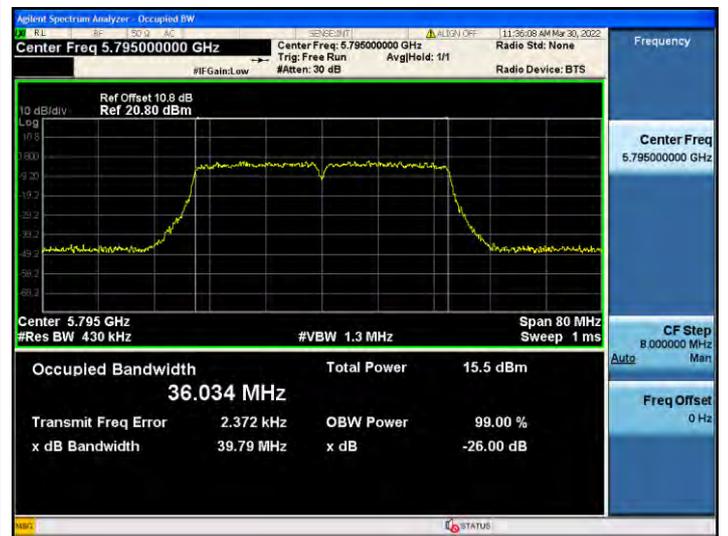
802.11n_HT40 UNII 2A BAND 26 dB Bandwidth (CH 62)



802.11n_HT40 UNII 2C BAND 26 dB Bandwidth(CH 102)



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

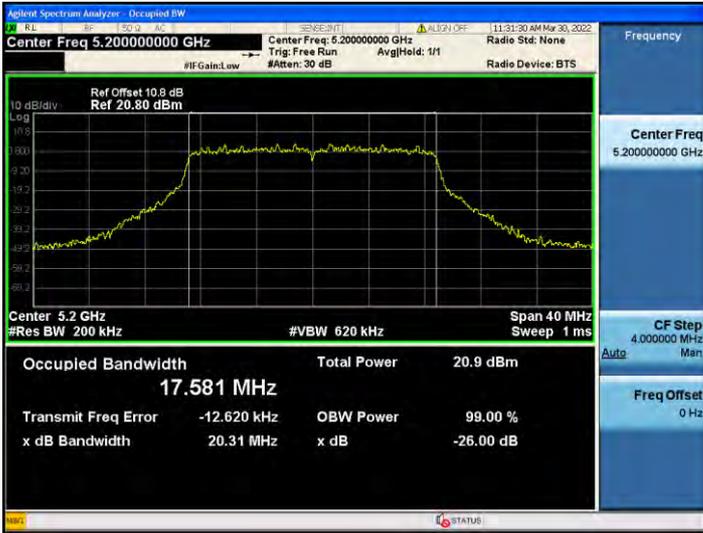


☐ Test Plots(802.11ac(VHT20))

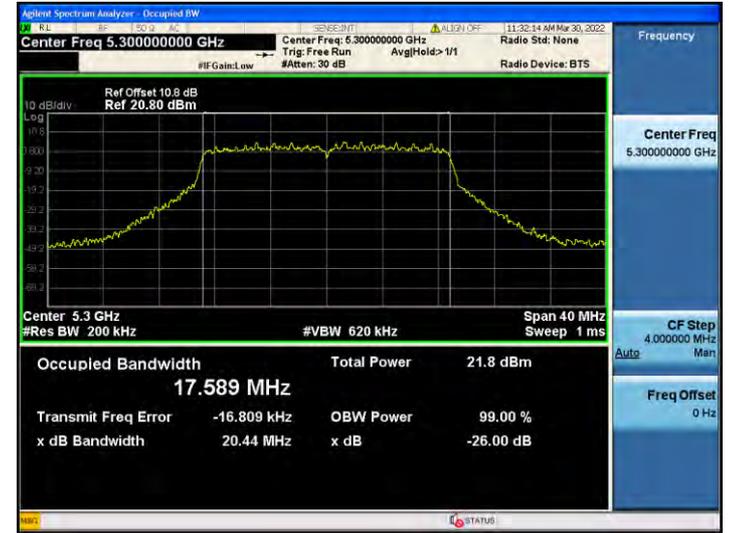
Note:

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

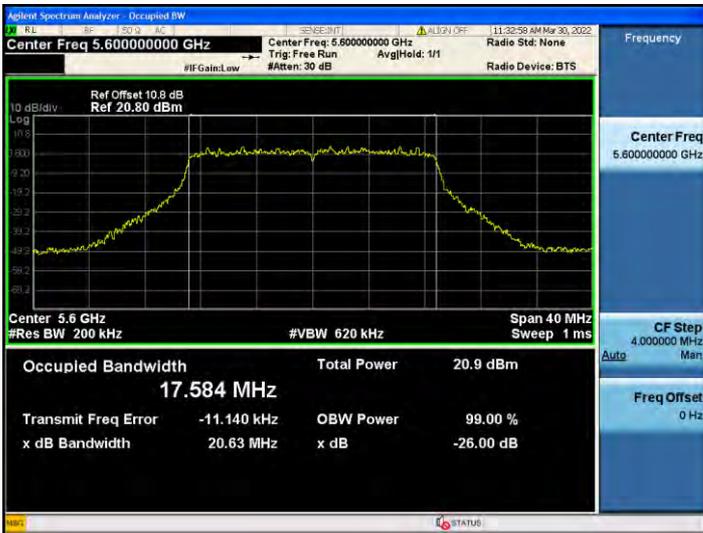
802.11ac_VHT20 UNII 1 BAND 26 dB Bandwidth(CH 40)



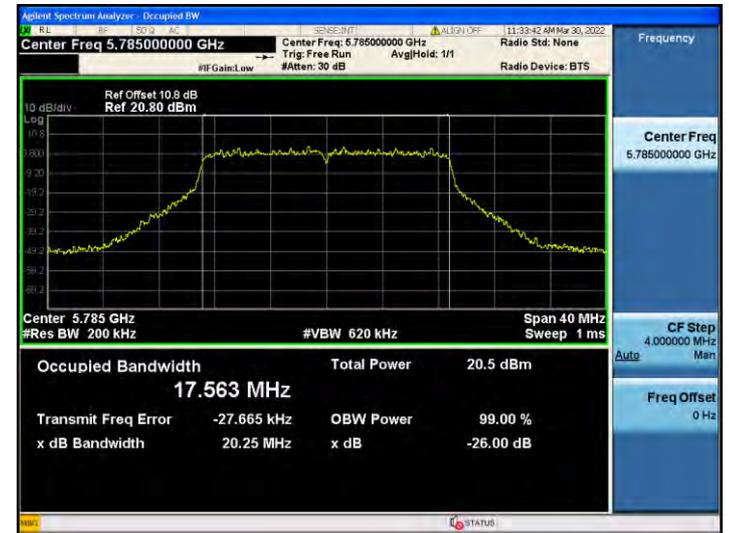
802.11ac_VHT20 UNII 2A BAND 26 dB Bandwidth(CH 60)



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



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



☐ Test Plots(802.11ac(VHT40))

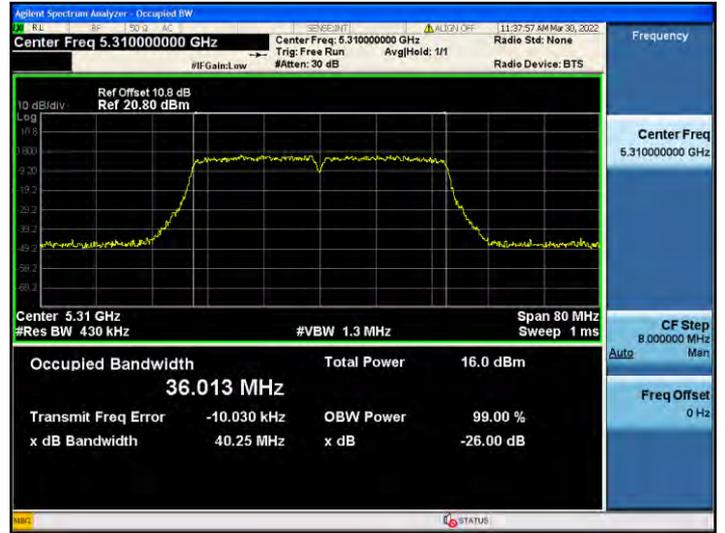
Note:

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

802.11ac_VHT40 UNII 1 BAND 26 dB Bandwidth(CH 46)



802.11ac_VHT40 UNII 2A BAND 26 dB Bandwidth (CH 62)



802.11ac_VHT40 UNII 2C BAND 26 dB Bandwidth(CH 142)



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



☐ Test Plots(802.11ac(VHT80))

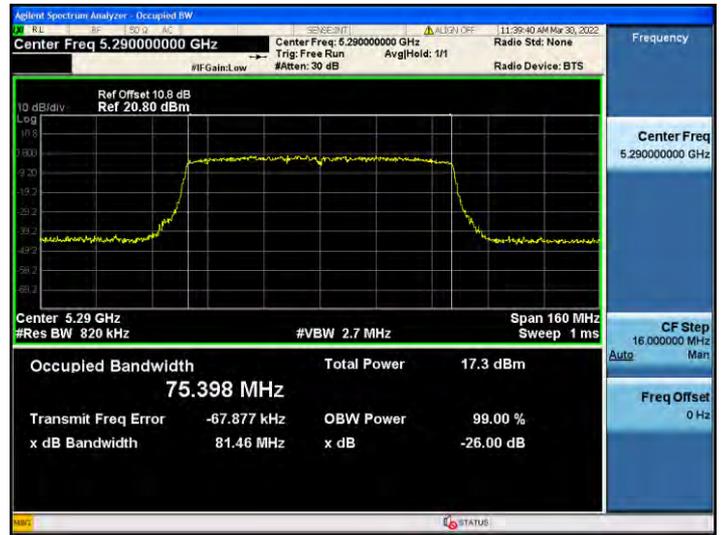
Note:

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

802.11ac_VHT80 UNII 1 BAND 26 dB Bandwidth(CH 42)



802.11ac_VHT80 UNII 2A BAND 26 dB Bandwidth (CH 58)



802.11ac_VHT80 UNII 2C BAND 26 dB Bandwidth(CH 122)



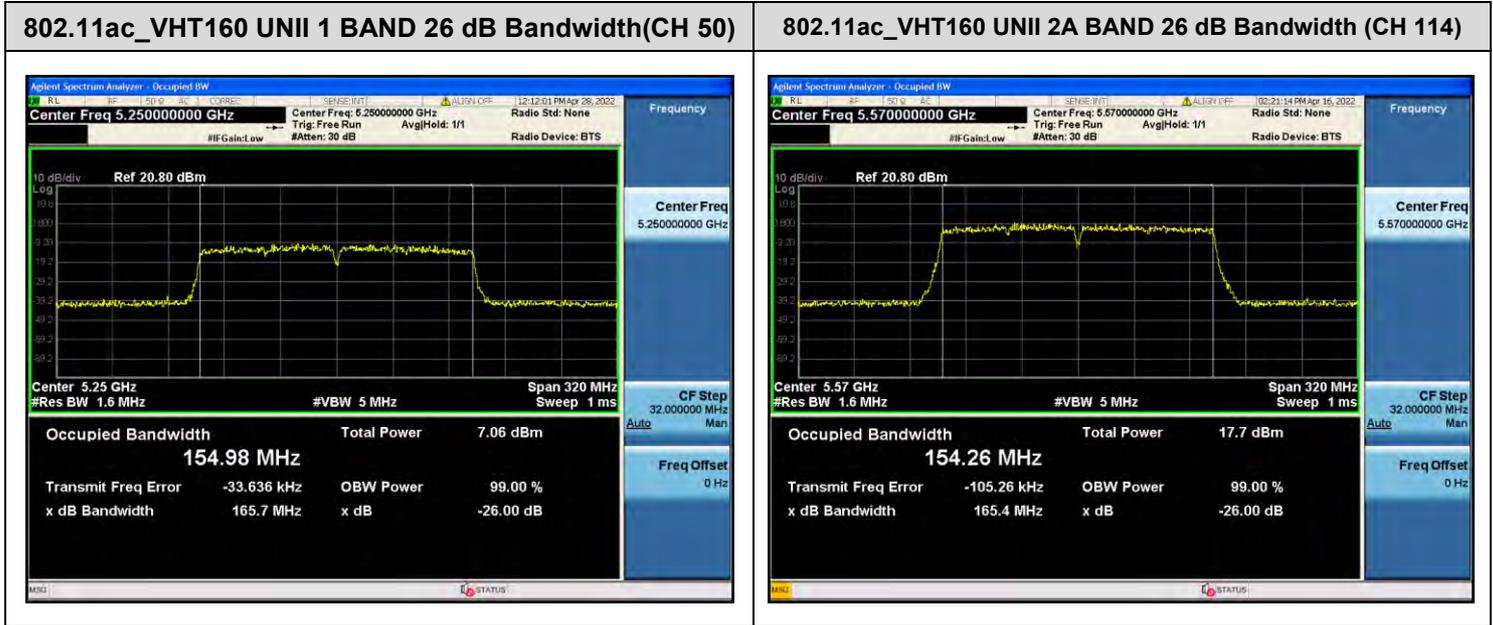
802.11ac_VHT80 UNII 3 BAND 26 dB Bandwidth (CH 155)



☐ Test Plots(802.11ac(VHT160))

Note:

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



10.3 6 dB BANDWIDTH
[Ant.1]

802.11a Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.31	> 0.5	Pass
5785	157	16.34	> 0.5	Pass
5825	165	16.07	> 0.5	Pass

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.86	> 0.5	Pass
5785	157	16.57	> 0.5	Pass
5825	165	16.84	> 0.5	Pass

802.11n(HT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.24	> 0.5	Pass
5795	159	35.97	> 0.5	Pass

802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.30	> 0.5	Pass
5785	157	16.83	> 0.5	Pass
5825	165	16.86	> 0.5	Pass

802.11ac(VHT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.46	> 0.5	Pass
5795	159	35.51	> 0.5	Pass

802.11ac(VHT80) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	75.33	> 0.5	Pass

[Ant.2]

802.11a Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.06	> 0.5	Pass
5785	157	16.32	> 0.5	Pass
5825	165	16.30	> 0.5	Pass

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.84	> 0.5	Pass
5785	157	16.78	> 0.5	Pass
5825	165	16.81	> 0.5	Pass

802.11n(HT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.72	> 0.5	Pass
5795	159	35.53	> 0.5	Pass

802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	16.93	> 0.5	Pass
5785	157	16.88	> 0.5	Pass
5825	165	16.56	> 0.5	Pass

802.11ac(VHT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.25	> 0.5	Pass
5795	159	35.20	> 0.5	Pass

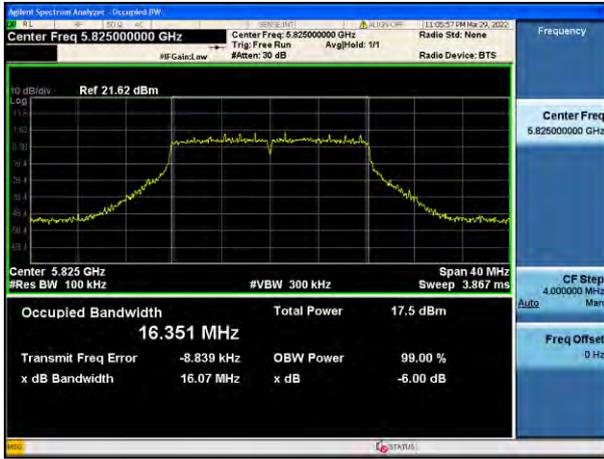
802.11ac(VHT80) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	75.41	> 0.5	Pass

[Ant.1]

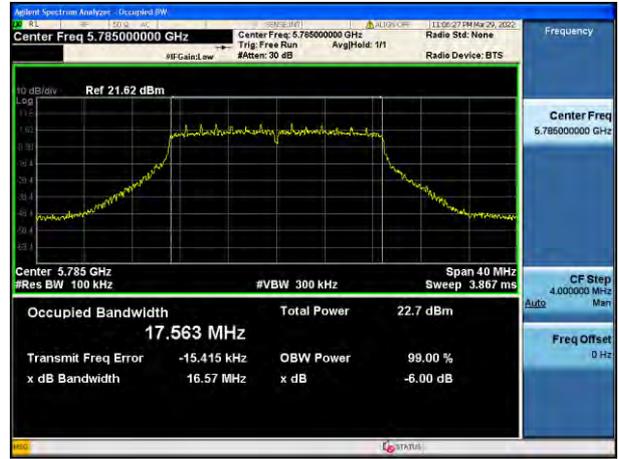
☑ Test Plots

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

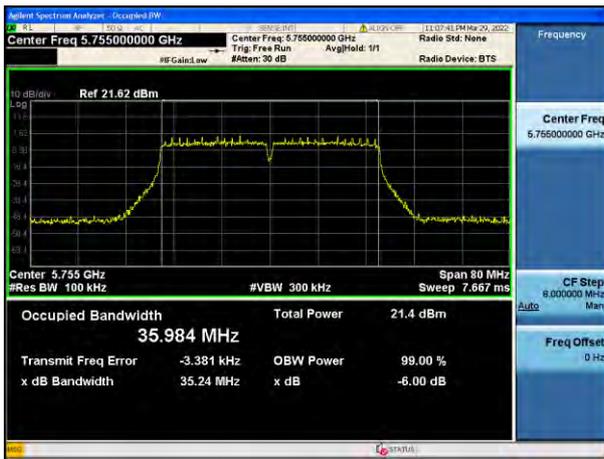
802.11a (CH.165)



802.11n(HT20) (CH.157)



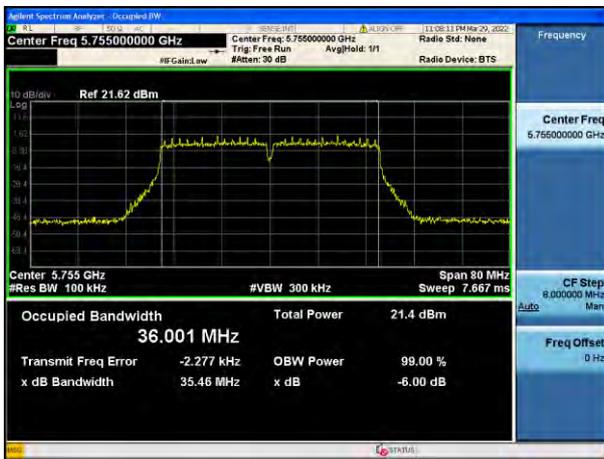
802.11n(HT40) (CH.151)



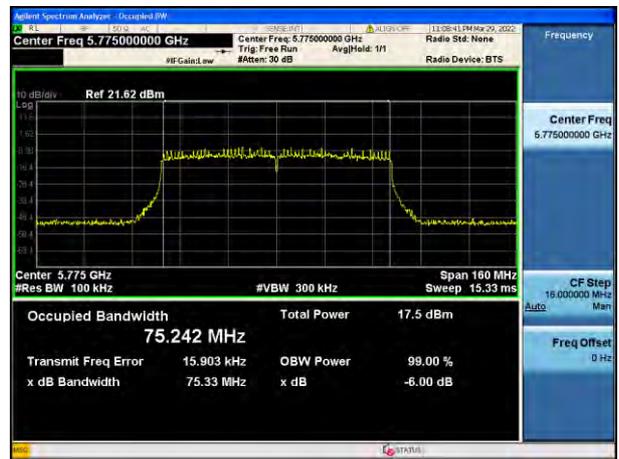
802.11ac(VHT20) (CH.157)



802.11ac(VHT40) (CH.151)



802.11ac(VHT80) (CH.155)

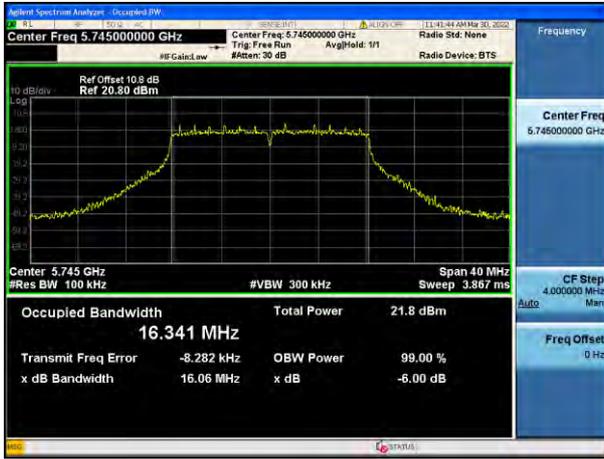


[Ant.2]

☑ Test Plots

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

802.11a (CH.149)



802.11n(HT20) (CH.157)



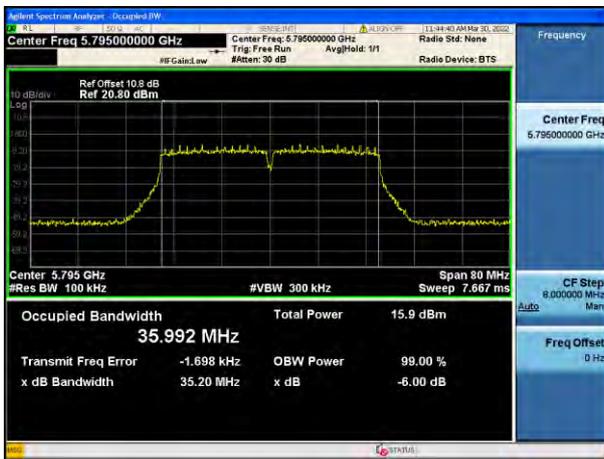
802.11n(HT40) (CH.159)



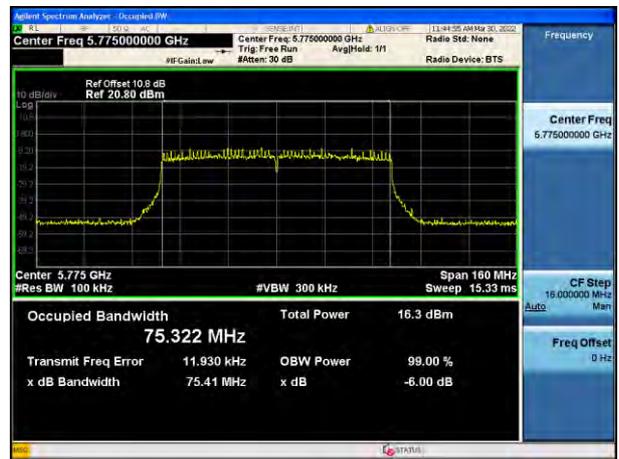
802.11ac(VHT20) (CH.165)



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.

Limit

(UNII 1) : 23.98 dBm

(UNII 2A, 2C) : 23.98 dBm or 11 dBm + 10 log B, (where B is the 26 dB emission bandwidth in megahertz.)

(UNII 3) : 30.00 dBm

[Ant.1]

802.11a Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase Datarate [Mbps]
Frequency [MHz]	Channel No.					
5180	36	9.67	0.292	9.96	23.98	6M
5200	40	14.69	0.292	14.98	23.98	6M
5240	48	14.83	0.292	15.12	23.98	6M
5260	52	15.37	0.292	15.66	23.94	6M
5300	60	15.45	0.292	15.74	23.90	6M
5320	64	9.16	0.292	9.45	23.82	6M
5500	100	12.51	0.292	12.80	23.90	6M
5600	120	15.18	0.292	15.47	23.80	6M
5720	144	14.85	0.292	15.14	23.75	6M
5745	149	14.94	0.292	15.23	30.00	6M
5785	157	14.81	0.292	15.10	30.00	6M
5825	165	9.06	0.292	9.35	30.00	6M

802.11n(20 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5180	36	7.61	2.162	9.78	23.98	MCS7
5200	40	12.81	2.162	14.97	23.98	MCS7
5240	48	12.92	2.162	15.09	23.98	MCS7
5260	52	13.42	2.162	15.58	23.98	MCS7
5300	60	13.42	2.162	15.58	23.98	MCS7
5320	64	7.19	2.162	9.35	23.98	MCS7
5500	100	10.59	2.162	12.75	23.98	MCS7
5600	120	13.22	2.162	15.38	23.98	MCS7
5720	144	13.08	2.162	15.24	23.98	MCS7
5745	149	13.10	2.162	15.26	30.00	MCS7
5785	157	12.90	2.162	15.06	30.00	MCS7
5825	165	7.05	2.162	9.21	30.00	MCS7

802.11n(40 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5190	38	7.41	2.478	9.89	23.98	MCS4
5230	46	11.65	2.478	14.13	23.98	MCS4
5270	54	11.08	2.478	13.56	23.98	MCS4
5310	62	6.96	2.478	9.44	23.98	MCS4
5510	102	10.27	2.478	12.74	23.98	MCS4
5590	118	10.95	2.478	13.43	23.98	MCS4
5710	142	10.79	2.478	13.27	23.98	MCS4
5755	151	10.89	2.478	13.36	30.00	MCS4
5795	159	6.47	2.478	8.95	30.00	MCS4

802.11ac(20 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5180	36	8.05	1.761	9.81	23.98	MCS5
5200	40	13.02	1.761	14.78	23.98	MCS5
5240	48	13.19	1.761	14.95	23.98	MCS5
5260	52	12.65	1.761	14.41	23.98	MCS5
5300	60	12.66	1.761	14.42	23.98	MCS5
5320	64	7.52	1.761	9.28	23.98	MCS5
5500	100	10.96	1.761	12.72	23.98	MCS5
5600	120	12.67	1.761	14.43	23.98	MCS5
5720	144	12.41	1.761	14.17	23.98	MCS5
5745	149	12.46	1.761	14.22	30.00	MCS5
5785	157	12.21	1.761	13.97	30.00	MCS5
5825	165	7.43	1.761	9.19	30.00	MCS5

802.11ac(40 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5190	38	8.81	1.165	9.98	23.98	MCS1
5230	46	13.04	1.165	14.21	23.98	MCS1
5270	54	12.40	1.165	13.57	23.98	MCS1
5310	62	8.30	1.165	9.47	23.98	MCS1
5510	102	11.70	1.165	12.86	23.98	MCS1
5590	118	12.41	1.165	13.58	23.98	MCS1
5710	142	12.17	1.165	13.34	23.98	MCS1
5755	151	12.26	1.165	13.42	30.00	MCS1
5795	159	7.82	1.165	8.99	30.00	MCS1

802.11ac(80 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5210	42	6.52	3.912	10.43	23.98	MCS7
5290	58	6.25	3.912	10.16	23.98	MCS7
5530	106	7.07	3.912	10.98	23.98	MCS7
5610	122	8.01	3.912	11.92	23.98	MCS7
5690	138	7.79	3.912	11.71	23.98	MCS7
5775	155	5.22	3.912	9.13	30.00	MCS7

802.11ac(160 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5250	50	-5.48	3.259	-2.23	23.98	MCS2
5570	114	8.39	3.259	11.65	23.98	MCS2

[Ant.2]

802.11a Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase Datarate [Mbps]
Frequency [MHz]	Channel No.					
5180	36	9.02	0.292	9.31	23.98	6M
5200	40	14.25	0.292	14.54	23.98	6M
5240	48	14.32	0.292	14.61	23.98	6M
5260	52	15.92	0.292	16.21	23.94	6M
5300	60	15.90	0.292	16.19	23.91	6M
5320	64	8.94	0.292	9.23	23.94	6M
5500	100	11.58	0.292	11.87	23.94	6M
5600	120	15.02	0.292	15.31	23.92	6M
5720	144	14.51	0.292	14.80	23.90	6M
5745	149	14.54	0.292	14.83	30.00	6M
5785	157	14.53	0.292	14.82	30.00	6M
5825	165	9.45	0.292	9.74	30.00	6M

802.11n(20 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5180	36	7.12	2.162	9.28	23.98	MCS7
5200	40	12.27	2.162	14.43	23.98	MCS7
5240	48	12.45	2.162	14.61	23.98	MCS7
5260	52	13.85	2.162	16.01	23.98	MCS7
5300	60	13.90	2.162	16.06	23.98	MCS7
5320	64	6.94	2.162	9.10	23.98	MCS7
5500	100	9.80	2.162	11.96	23.98	MCS7
5600	120	13.24	2.162	15.40	23.98	MCS7
5720	144	12.70	2.162	14.87	23.98	MCS7
5745	149	12.64	2.162	14.81	30.00	MCS7
5785	157	12.68	2.162	14.84	30.00	MCS7
5825	165	7.52	2.162	9.68	30.00	MCS7

802.11n(40 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5190	38	6.91	2.478	9.39	23.98	MCS4
5230	46	10.86	2.478	13.34	23.98	MCS4
5270	54	11.69	2.478	14.17	23.98	MCS4
5310	62	6.76	2.478	9.23	23.98	MCS4
5510	102	9.56	2.478	12.04	23.98	MCS4
5590	118	11.02	2.478	13.50	23.98	MCS4
5710	142	10.45	2.478	12.93	23.98	MCS4
5755	151	10.54	2.478	13.01	30.00	MCS4
5795	159	6.16	2.478	8.64	30.00	MCS4

802.11ac(20 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5180	36	7.55	1.761	9.31	23.98	MCS5
5200	40	12.45	1.761	14.21	23.98	MCS5
5240	48	12.65	1.761	14.41	23.98	MCS5
5260	52	13.31	1.761	15.07	23.98	MCS5
5300	60	13.33	1.761	15.09	23.98	MCS5
5320	64	7.42	1.761	9.18	23.98	MCS5
5500	100	10.11	1.761	11.87	23.98	MCS5
5600	120	12.51	1.761	14.27	23.98	MCS5
5720	144	12.01	1.761	13.77	23.98	MCS5
5745	149	12.12	1.761	13.88	30.00	MCS5
5785	157	12.02	1.761	13.78	30.00	MCS5
5825	165	7.88	1.761	9.64	30.00	MCS5

802.11ac(40 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5190	38	8.30	1.165	9.47	23.98	MCS1
5230	46	12.23	1.165	13.40	23.98	MCS1
5270	54	13.02	1.165	14.18	23.98	MCS1
5310	62	8.10	1.165	9.26	23.98	MCS1
5510	102	10.92	1.165	12.09	23.98	MCS1
5590	118	12.40	1.165	13.57	23.98	MCS1
5710	142	11.95	1.165	13.12	23.98	MCS1
5755	151	11.92	1.165	13.08	30.00	MCS1
5795	159	7.61	1.165	8.78	30.00	MCS1

802.11ac(80 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5210	42	5.41	3.912	9.32	23.98	MCS7
5290	58	6.26	3.912	10.18	23.98	MCS7
5530	106	6.18	3.912	10.09	23.98	MCS7
5610	122	7.67	3.912	11.58	23.98	MCS7
5690	138	7.13	3.912	11.04	23.98	MCS7
5775	155	5.12	3.912	9.03	30.00	MCS7

802.11ac(160 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5250	50	-2.99	3.259	0.27	23.98	MCS2
5570	114	7.99	3.259	11.25	23.98	MCS2

[MIMO]

802.11a Mode		Ant.1 Measured Power [dBm] + Duty Cycle Factor[dB]	Ant.2 Measured Power (dBm) + Duty Cycle Factor[dB]	MIMO Total Power [dBm]	Limit [dBm]	Worstcase Datarate [Mbps]
Frequency [MHz]	Channel No.					
5180	36	9.96	9.31	12.66	23.98	6M
5200	40	14.98	14.54	17.78	23.98	6M
5240	48	15.12	14.61	17.88	23.98	6M
5260	52	15.66	16.21	18.96	23.98	6M
5300	60	15.74	16.19	18.98	23.98	6M
5320	64	9.45	9.23	12.35	23.98	6M
5500	100	12.80	11.87	15.37	23.98	6M
5600	120	15.47	15.31	18.40	23.98	6M
5720	144	15.14	14.80	17.98	23.98	6M
5745	149	15.23	14.83	18.04	30.00	6M
5785	157	15.10	14.82	17.97	30.00	6M
5825	165	9.35	9.74	12.56	30.00	6M

802.11n(20 MHz) Mode		Ant.1 Measured Power [dBm] + Duty Cycle Factor[dB]	Ant.2 Measured Power (dBm) + Duty Cycle Factor[dB]	MIMO Total Power [dBm]	Limit [dBm]	Worstcase MCS INDEX
Frequency [MHz]	Channel No.					
5180	36	9.78	9.28	12.55	23.98	MCS7
5200	40	14.97	14.43	17.72	23.98	MCS7
5240	48	15.09	14.61	17.86	23.98	MCS7
5260	52	15.58	16.01	18.81	23.98	MCS7
5300	60	15.58	16.06	18.84	23.98	MCS7
5320	64	9.35	9.10	12.24	23.98	MCS7
5500	100	12.75	11.96	15.38	23.98	MCS7
5600	120	15.38	15.40	18.40	23.98	MCS7
5720	144	15.24	14.87	18.07	23.98	MCS7
5745	149	15.26	14.81	18.05	30.00	MCS7
5785	157	15.06	14.84	17.96	30.00	MCS7
5825	165	9.21	9.68	12.46	30.00	MCS7

802.11n(40 MHz) Mode		Ant.1 Measured Power [dBm] + Duty Cycle Factor[dB]	Ant.2 Measured Power (dBm) + Duty Cycle Factor[dB]	MIMO Total Power [dBm]	Limit [dBm]	Worstcase MCS INDEX
Frequency [MHz]	Channel No.					
5190	38	9.89	9.39	12.65	23.98	MCS4
5230	46	14.13	13.34	16.76	23.98	MCS4
5270	54	13.56	14.17	16.88	23.98	MCS4
5310	62	9.44	9.23	12.35	23.98	MCS4
5510	102	12.74	12.04	15.41	23.98	MCS4
5590	118	13.43	13.50	16.47	23.98	MCS4
5710	142	13.27	12.93	16.11	23.98	MCS4
5755	151	13.36	13.01	16.20	30.00	MCS4
5795	159	8.95	8.64	11.81	30.00	MCS4

802.11ac(20 MHz) Mode		Ant.1 Measured Power [dBm] + Duty Cycle Factor[dB]	Ant.2 Measured Power (dBm) + Duty Cycle Factor[dB]	MIMO Total Power [dBm]	Limit [dBm]	Worstcase MCS INDEX
Frequency [MHz]	Channel No.					
5180	36	9.81	9.31	12.58	23.98	MCS5
5200	40	14.78	14.21	17.52	23.98	MCS5
5240	48	14.95	14.41	17.70	23.98	MCS5
5260	52	14.41	15.07	17.76	23.98	MCS5
5300	60	14.42	15.09	17.78	23.98	MCS5
5320	64	9.28	9.18	12.24	23.98	MCS5
5500	100	12.72	11.87	15.33	23.98	MCS5
5600	120	14.43	14.27	17.36	23.98	MCS5
5720	144	14.17	13.77	16.99	23.98	MCS5
5745	149	14.22	13.88	17.06	30.00	MCS5
5785	157	13.97	13.78	16.89	30.00	MCS5
5825	165	9.19	9.64	12.43	30.00	MCS5

802.11ac(40 MHz) Mode		Ant.1 Measured Power [dBm] + Duty Cycle Factor[dB]	Ant.2 Measured Power (dBm) + Duty Cycle Factor[dB]	MIMO Total Power [dBm]	Limit [dBm]	Worstcase MCS INDEX
Frequency [MHz]	Channel No.					
5190	38	9.98	9.47	12.74	23.98	MCS1
5230	46	14.21	13.40	16.83	23.98	MCS1
5270	54	13.57	14.18	16.90	23.98	MCS1
5310	62	9.47	9.26	12.38	23.98	MCS1
5510	102	12.86	12.09	15.50	23.98	MCS1
5590	118	13.58	13.57	16.58	23.98	MCS1
5710	142	13.34	13.12	16.24	23.98	MCS1
5755	151	13.42	13.08	16.27	30.00	MCS1
5795	159	8.99	8.78	11.89	30.00	MCS1

802.11ac(80 MHz) Mode		Ant.1 Measured Power [dBm] + Duty Cycle Factor[dB]	Ant.2 Measured Power (dBm) + Duty Cycle Factor[dB]	MIMO Total Power [dBm]	Limit [dBm]	Worstcase MCS INDEX
Frequency [MHz]	Channel No.					
5210	42	10.43	9.32	12.92	23.98	MCS7
5290	58	10.16	10.18	13.18	23.98	MCS7
5530	106	10.98	10.09	13.57	23.98	MCS7
5610	122	11.92	11.58	14.76	23.98	MCS7
5690	138	11.71	11.04	14.40	23.98	MCS7
5775	155	9.13	9.03	12.09	30.00	MCS7

802.11ac(160 MHz) Mode		Ant.1 Measured Power [dBm] + Duty Cycle Factor[dB]	Ant.2 Measured Power (dBm) + Duty Cycle Factor[dB]	MIMO Total Power [dBm]	Limit [dBm]	Worstcase MCS INDEX
Frequency [MHz]	Channel No.					
5250	50	-2.23	0.27	2.21	23.98	MCS2
5570	114	11.65	11.25	14.46	23.98	MCS2

10.5 POWER SPECTRAL DENSITY

[Ant.1]

802.11a Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase Datarate [Mbps]	Limit
Frequency [MHz]	Channel No.					
5180	36	-0.876	0.292	-0.584	6M	11 dBm/MHz
5200	40	3.992	0.292	4.284	6M	
5240	48	4.069	0.292	4.361	6M	
5260	52	4.800	0.292	5.092	6M	
5300	60	4.798	0.292	5.090	6M	
5320	64	-1.528	0.292	-1.236	6M	
5500	100	1.779	0.292	2.071	6M	
5600	120	4.410	0.292	4.702	6M	
5720	144	5.644	0.292	5.936	6M	
5745	149	2.586	0.292	2.878	6M	
5785	157	2.379	0.292	2.671	6M	30 dBm/500 kHz
5825	165	-3.360	0.292	-3.068	6M	

802.11n(20 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5180	36	-2.941	2.162	-0.779	MCS7	11 dBm/MHz
5200	40	2.033	2.162	4.195	MCS7	
5240	48	2.560	2.162	4.722	MCS7	
5260	52	3.042	2.162	5.204	MCS7	
5300	60	2.709	2.162	4.871	MCS7	
5320	64	-3.417	2.162	-1.255	MCS7	
5500	100	0.033	2.162	2.195	MCS7	
5600	120	2.529	2.162	4.691	MCS7	
5720	144	3.551	2.162	5.713	MCS7	
5745	149	0.676	2.162	2.838	MCS7	
5785	157	0.720	2.162	2.882	MCS7	30 dBm/500 kHz
5825	165	-4.832	2.162	-2.670	MCS7	

802.11n(40 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5190	38	-6.186	2.478	-3.708	MCS4	11 dBm/MHz
5230	46	-2.063	2.478	0.415	MCS4	
5270	54	-2.253	2.478	0.225	MCS4	
5310	62	-6.437	2.478	-3.959	MCS4	
5510	102	-3.450	2.478	-0.972	MCS4	
5590	118	-2.661	2.478	-0.183	MCS4	
5710	142	-1.669	2.478	0.809	MCS4	
5755	151	-3.887	2.478	-1.409	MCS4	30 dBm /500 kHz
5795	159	-8.278	2.478	-5.800	MCS4	

802.11ac(20 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5180	36	-2.869	1.761	-1.108	MCS5	11 dBm/MHz
5200	40	2.823	1.761	4.584	MCS5	
5240	48	2.851	1.761	4.612	MCS5	
5260	52	2.234	1.761	3.995	MCS5	
5300	60	1.956	1.761	3.717	MCS5	
5320	64	-2.880	1.761	-1.119	MCS5	
5500	100	0.105	1.761	1.866	MCS5	
5600	120	1.765	1.761	3.526	MCS5	
5720	144	2.731	1.761	4.492	MCS5	
5745	149	-0.034	1.761	1.727	MCS5	
5785	157	0.234	1.761	1.995	MCS5	30 dBm/500 kHz
5825	165	-4.813	1.761	-3.052	MCS5	

802.11ac(40 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5190	38	-4.853	1.165	-3.688	MCS1	11 dBm/MHz
5230	46	-0.787	1.165	0.378	MCS1	
5270	54	-1.325	1.165	-0.160	MCS1	
5310	62	-5.565	1.165	-4.400	MCS1	
5510	102	-2.161	1.165	-0.996	MCS1	
5590	118	-1.230	1.165	-0.065	MCS1	
5710	142	-0.327	1.165	0.838	MCS1	
5755	151	-3.056	1.165	-1.891	MCS1	30 dBm/500 kHz
5795	159	-7.332	1.165	-6.167	MCS1	

802.11ac(80 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5210	42	-9.983	3.912	-6.071	MCS7	11 dBm/MHz
5290	58	-10.061	3.912	-6.149	MCS7	
5530	106	-9.692	3.912	-5.780	MCS7	
5610	122	-8.817	3.912	-4.905	MCS7	
5690	138	-7.570	3.912	-3.658	MCS7	
5775	155	-13.208	3.912	-9.296	MCS7	30 dBm/500 kHz

802.11ac(160 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5250	50	-25.128	3.259	-21.869	MCS2	11 dBm/MHz
5570	114	-11.805	3.259	-8.546	MCS2	

[Ant.2]

802.11a Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase Datarate [Mbps]	Limit
Frequency [MHz]	Channel No.					
5180	36	-1.802	0.292	-1.510	6M	11 dBm/MHz
5200	40	2.939	0.292	3.231	6M	
5240	48	3.356	0.292	3.648	6M	
5260	52	4.857	0.292	5.149	6M	
5300	60	4.974	0.292	5.266	6M	
5320	64	-1.828	0.292	-1.536	6M	
5500	100	0.538	0.292	0.830	6M	
5600	120	4.078	0.292	4.370	6M	
5720	144	3.664	0.292	3.956	6M	
5745	149	1.005	0.292	1.297	6M	30 dBm/500 kHz
5785	157	0.698	0.292	0.990	6M	
5825	165	-4.298	0.292	-4.006	6M	

802.11n(20 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5180	36	-3.739	2.162	-1.577	MCS7	11 dBm/MHz
5200	40	1.246	2.162	3.408	MCS7	
5240	48	1.501	2.162	3.663	MCS7	
5260	52	3.269	2.162	5.431	MCS7	
5300	60	3.442	2.162	5.604	MCS7	
5320	64	-3.888	2.162	-1.726	MCS7	
5500	100	-1.315	2.162	0.847	MCS7	
5600	120	2.428	2.162	4.590	MCS7	
5720	144	2.051	2.162	4.213	MCS7	
5745	149	-0.867	2.162	1.295	MCS7	30 dBm/500 kHz
5785	157	-0.897	2.162	1.265	MCS7	
5825	165	-5.497	2.162	-3.335	MCS7	

802.11n(40 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5190	38	-6.913	2.478	-4.435	MCS4	11 dBm/MHz
5230	46	-2.651	2.478	-0.173	MCS4	
5270	54	-2.004	2.478	0.474	MCS4	
5310	62	-6.621	2.478	-4.143	MCS4	
5510	102	-4.420	2.478	-1.942	MCS4	
5590	118	-2.904	2.478	-0.426	MCS4	
5710	142	-3.362	2.478	-0.884	MCS4	
5755	151	-5.536	2.478	-3.058	MCS4	30 dBm /500 kHz
5795	159	-10.048	2.478	-7.570	MCS4	

802.11ac(20 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5180	36	-3.364	1.761	-1.603	MCS5	11 dBm/MHz
5200	40	1.447	1.761	3.208	MCS5	
5240	48	1.696	1.761	3.457	MCS5	
5260	52	2.615	1.761	4.376	MCS5	
5300	60	3.016	1.761	4.777	MCS5	
5320	64	-3.666	1.761	-1.905	MCS5	
5500	100	-0.925	1.761	0.836	MCS5	
5600	120	1.615	1.761	3.376	MCS5	
5720	144	1.049	1.761	2.810	MCS5	
5745	149	-1.266	1.761	0.495	MCS5	
5785	157	-1.332	1.761	0.429	MCS5	30 dBm/500 kHz
5825	165	-5.411	1.761	-3.650	MCS5	

802.11ac(40 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5190	38	-5.622	1.165	-4.457	MCS1	11 dBm/MHz
5230	46	-1.814	1.165	-0.649	MCS1	
5270	54	-0.933	1.165	0.232	MCS1	
5310	62	-6.021	1.165	-4.856	MCS1	
5510	102	-3.181	1.165	-2.016	MCS1	
5590	118	-1.706	1.165	-0.541	MCS1	
5710	142	-2.156	1.165	-0.991	MCS1	
5755	151	-4.748	1.165	-3.583	MCS1	30 dBm/500 kHz
5795	159	-8.634	1.165	-7.469	MCS1	

802.11ac(80 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5210	42	-11.157	3.912	-7.245	MCS7	11 dBm/MHz
5290	58	-10.262	3.912	-6.350	MCS7	
5530	106	-10.324	3.912	-6.412	MCS7	
5610	122	-8.925	3.912	-5.013	MCS7	
5690	138	-9.401	3.912	-5.489	MCS7	
5775	155	-14.013	3.912	-10.101	MCS7	

802.11ac(160 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5250	50	-23.178	3.259	-19.919	MCS2	11 dBm/MHz
5570	114	-12.275	3.259	-9.016	MCS2	

[MIMO]

802.11a Mode		ANT.1 Measured PSD[dBm] + Duty Cycle Factor [dB]	ANT.2 Measured PSD[dBm] + Duty Cycle Factor [dB]	MIMO Total PSD [dBm/MHz]	Worstcase Datarate [Mbps]	Limit
Frequency [MHz]	Channel No.					
5180	36	-0.584	-1.510	1.988	6M	11 dBm/MHz
5200	40	4.284	3.231	6.799	6M	
5240	48	4.361	3.648	7.029	6M	
5260	52	5.092	5.149	8.130	6M	
5300	60	5.090	5.266	8.189	6M	
5320	64	-1.236	-1.536	1.626	6M	
5500	100	2.071	0.830	4.505	6M	
5600	120	4.702	4.370	7.549	6M	
5720	144	5.936	3.956	8.068	6M	
5745	149	2.878	1.297	5.169	6M	
5785	157	2.671	0.990	4.921	6M	30 dBm/500 kHz
5825	165	-3.068	-4.006	-0.502	6M	

802.11n(20 MHz) Mode		ANT.1 Measured PSD[dBm] + Duty Cycle Factor [dB]	ANT.2 Measured PSD[dBm] + Duty Cycle Factor [dB]	MIMO Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5180	36	-0.779	-1.577	1.851	MCS7	11 dBm/MHz
5200	40	4.195	3.408	6.830	MCS7	
5240	48	4.722	3.663	7.235	MCS7	
5260	52	5.204	5.431	8.329	MCS7	
5300	60	4.871	5.604	8.263	MCS7	
5320	64	-1.255	-1.726	1.526	MCS7	
5500	100	2.195	0.847	4.583	MCS7	
5600	120	4.691	4.590	7.651	MCS7	
5720	144	5.713	4.213	8.038	MCS7	
5745	149	2.838	1.295	5.145	MCS7	
5785	157	2.882	1.265	5.159	MCS7	30 dBm/500 kHz
5825	165	-2.670	-3.335	0.021	MCS7	

802.11n(40 MHz) Mode		ANT.1 Measured PSD[dBm] + Duty Cycle Factor [dB]	ANT.2 Measured PSD[dBm] + Duty Cycle Factor [dB]	MIMO Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5190	38	-3.708	-4.435	-1.046	MCS4	11 dBm/MHz
5230	46	0.415	-0.173	3.141	MCS4	
5270	54	0.225	0.474	3.361	MCS4	
5310	62	-3.959	-4.143	-1.040	MCS4	
5510	102	-0.972	-1.942	1.580	MCS4	
5590	118	-0.183	-0.426	2.707	MCS4	
5710	142	0.809	-0.884	3.055	MCS4	
5755	151	-1.409	-3.058	0.854	MCS4	30 dBm/500 kHz
5795	159	-5.800	-7.570	-3.585	MCS4	

802.11ac(20 MHz) Mode		ANT.1 Measured PSD[dBm] + Duty Cycle Factor [dB]	ANT.2 Measured PSD[dBm] + Duty Cycle Factor [dB]	MIMO Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5180	36	-1.108	-1.603	1.662	MCS5	11 dBm/MHz
5200	40	4.584	3.208	6.960	MCS5	
5240	48	4.612	3.457	7.083	MCS5	
5260	52	3.995	4.376	7.200	MCS5	
5300	60	3.717	4.777	7.289	MCS5	
5320	64	-1.119	-1.905	1.516	MCS5	
5500	100	1.866	0.836	4.392	MCS5	
5600	120	3.526	3.376	6.462	MCS5	
5720	144	4.492	2.810	6.742	MCS5	
5745	149	1.727	0.495	4.165	MCS5	30 dBm/500 kHz
5785	157	1.995	0.429	4.292	MCS5	
5825	165	-3.052	-3.650	-0.330	MCS5	

802.11ac(40 MHz) Mode		ANT.1 Measured PSD[dBm] + Duty Cycle Factor [dB]	ANT.2 Measured PSD[dBm] + Duty Cycle Factor [dB]	MIMO Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5190	38	-3.688	-4.457	-1.045	MCS1	11 dBm/MHz
5230	46	0.378	-0.649	2.905	MCS1	
5270	54	-0.160	0.232	3.051	MCS1	
5310	62	-4.400	-4.856	-1.612	MCS1	
5510	102	-0.996	-2.016	1.534	MCS1	
5590	118	-0.065	-0.541	2.714	MCS1	
5710	142	0.838	-0.991	3.029	MCS1	30 dBm/500 kHz
5755	151	-1.891	-3.583	0.355	MCS1	
5795	159	-6.167	-7.469	-3.759	MCS1	

802.11ac(80 MHz) Mode		ANT.1 Measured PSD[dBm] + Duty Cycle Factor [dB]	ANT.2 Measured PSD[dBm] + Duty Cycle Factor [dB]	MIMO Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5210	42	-6.071	-7.245	-3.608	MCS7	11 dBm/MHz
5290	58	-6.149	-6.350	-3.238	MCS7	
5530	106	-5.780	-6.412	-3.074	MCS7	
5610	122	-4.905	-5.013	-1.948	MCS7	
5690	138	-3.658	-5.489	-1.467	MCS7	
5775	155	-9.296	-10.101	-6.670	MCS7	30 dBm/500 kHz

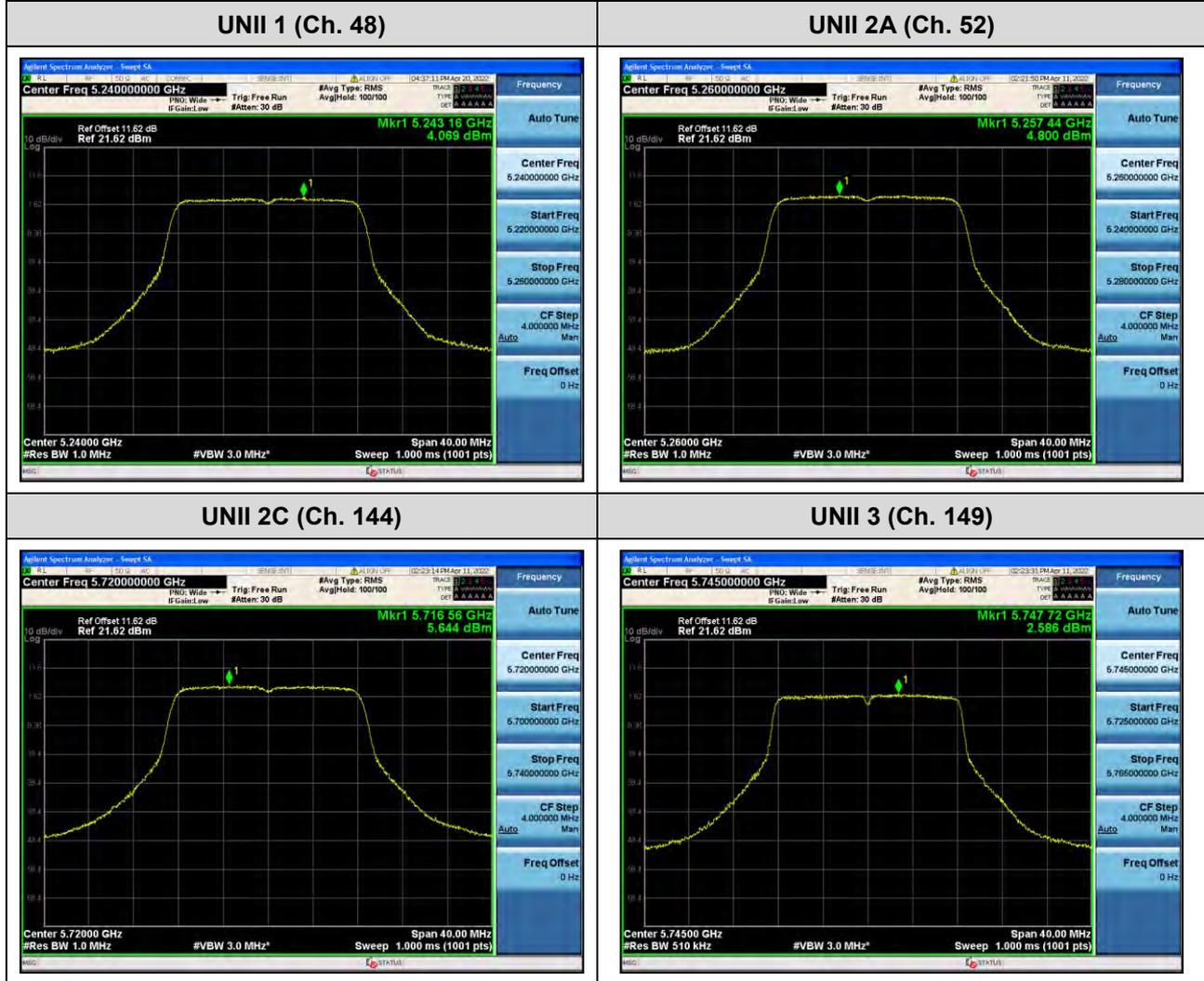
802.11ac(160 MHz) Mode		ANT.1 Measured PSD[dBm] + Duty Cycle Factor [dB]	ANT.2 Measured PSD[dBm] + Duty Cycle Factor [dB]	MIMO Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5250	50	-21.869	-19.919	-17.776	MCS2	11 dBm/MHz
5570	114	-8.546	-9.016	-5.765	MCS2	

[Ant.1]

☐ Test Plots(802.11a)

Note:

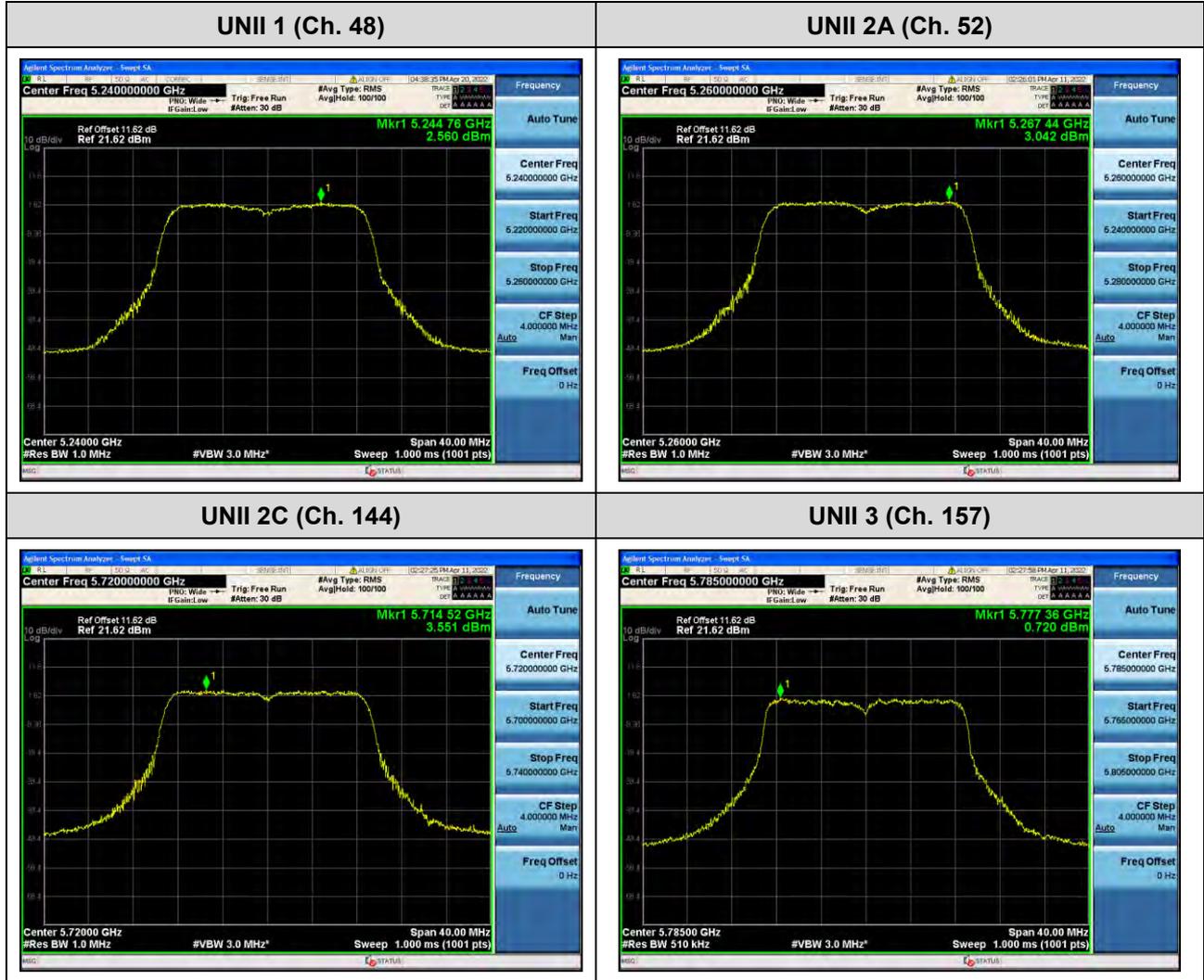
In order to simplify the report, attached plots were only channel of highest power.



☐ Test Plots(802.11n(HT20))

Note:

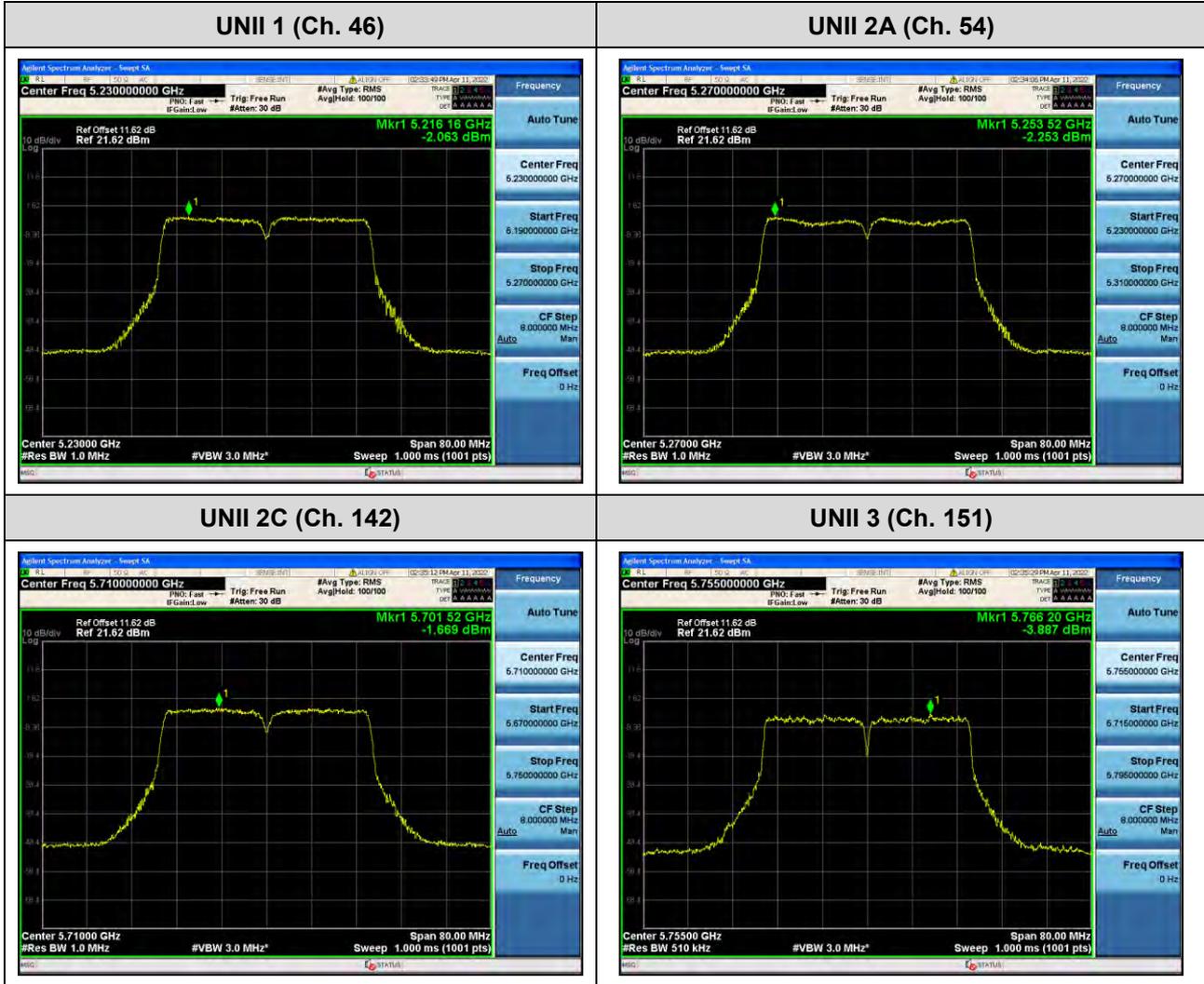
In order to simplify the report, attached plots were only channel of highest power.



☐ Test Plots(802.11n(HT40))

Note:

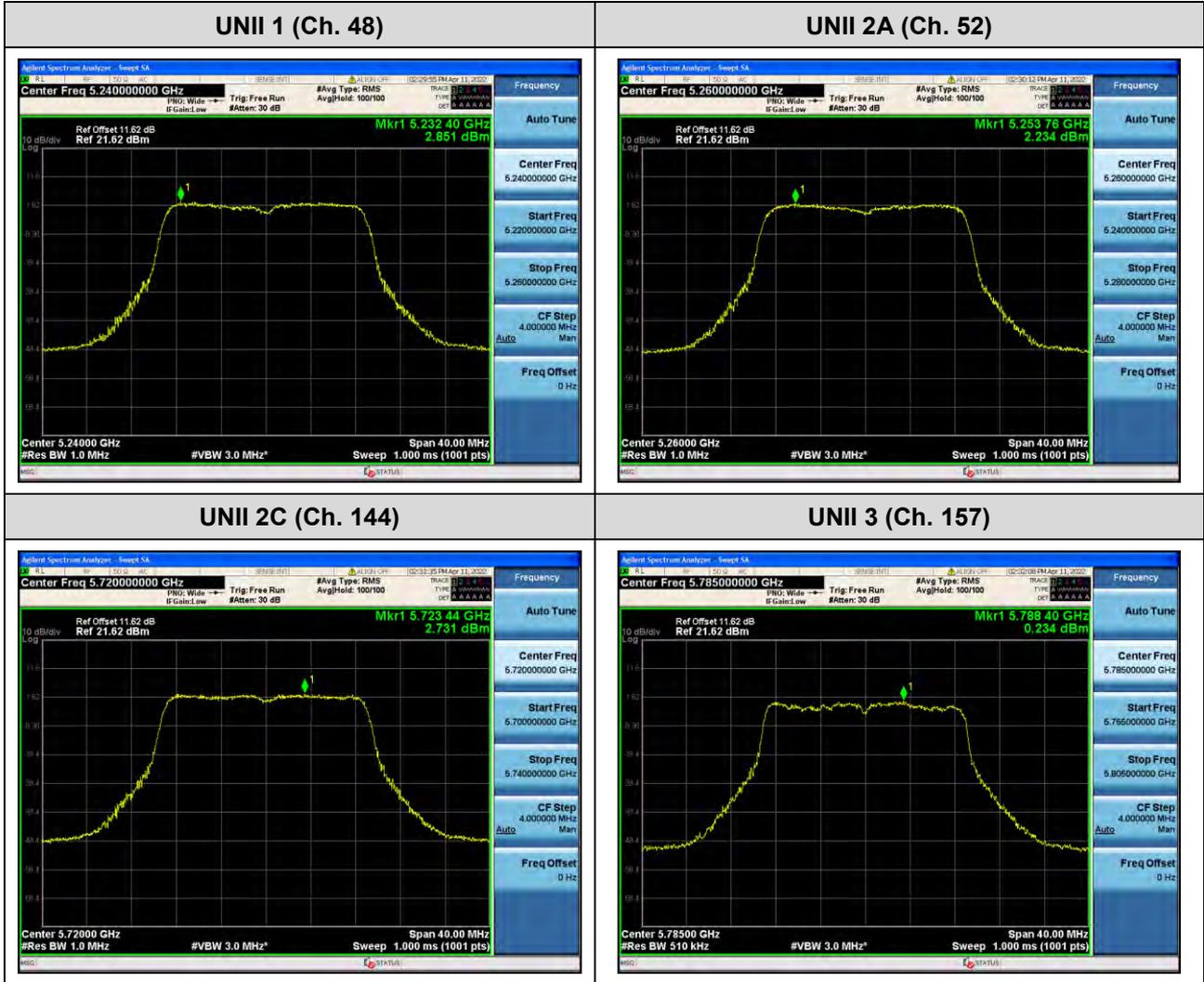
In order to simplify the report, attached plots were only channel of highest power.



☐ Test Plots(802.11ac(VHT20))

Note:

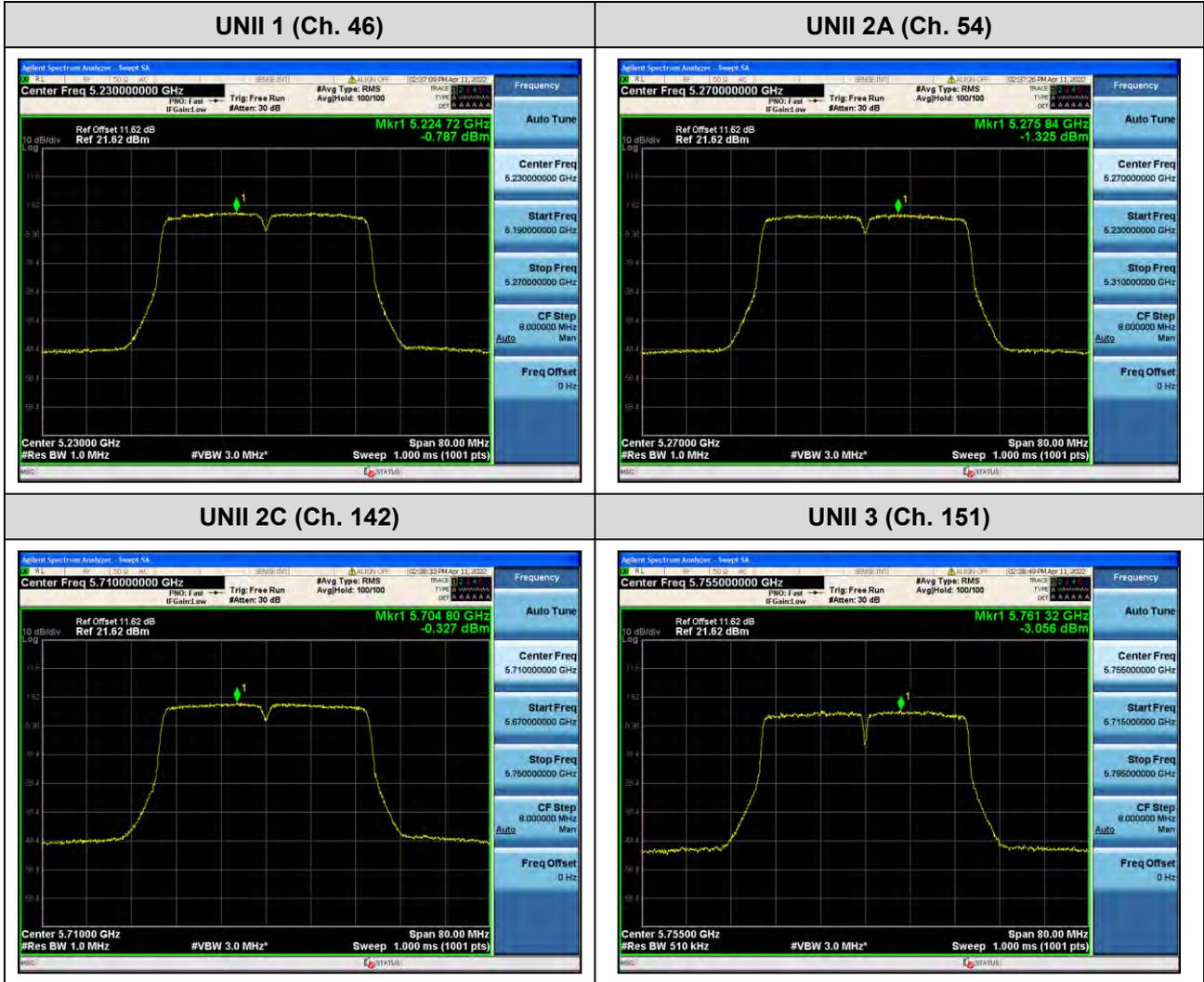
In order to simplify the report, attached plots were only channel of highest power.



☐ Test Plots(802.11ac(VHT40))

Note:

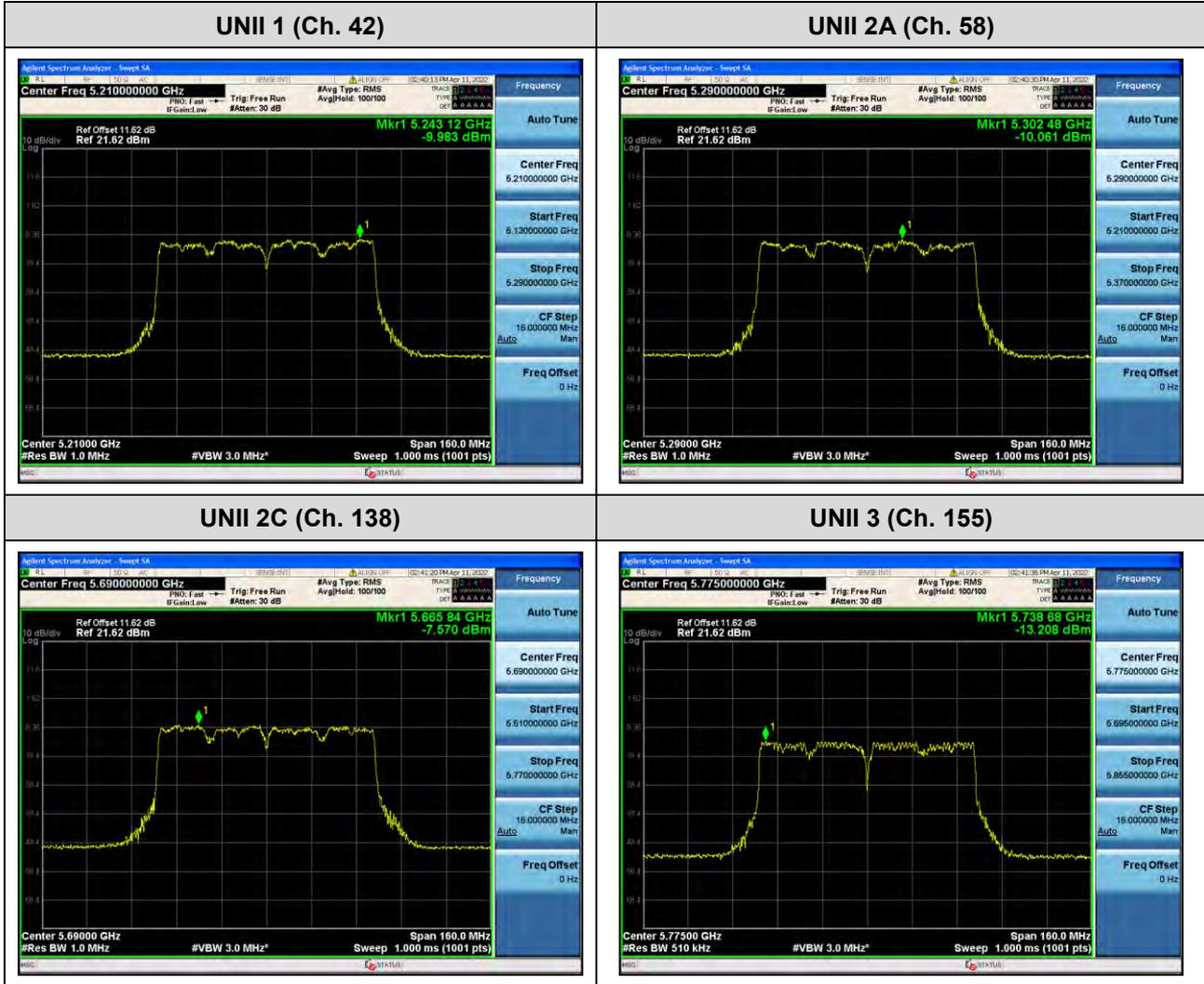
In order to simplify the report, attached plots were only channel of highest power.



☐ Test Plots(802.11ac(VHT80))

Note:

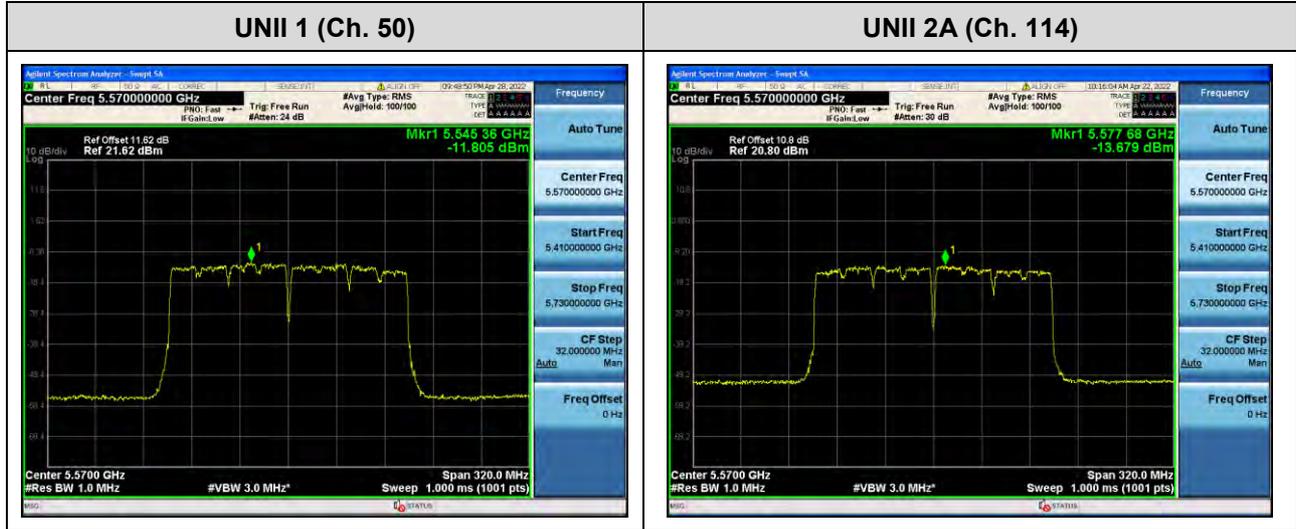
In order to simplify the report, attached plots were only channel of highest power.



☑ Test Plots(802.11ac(VHT160))

Note:

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

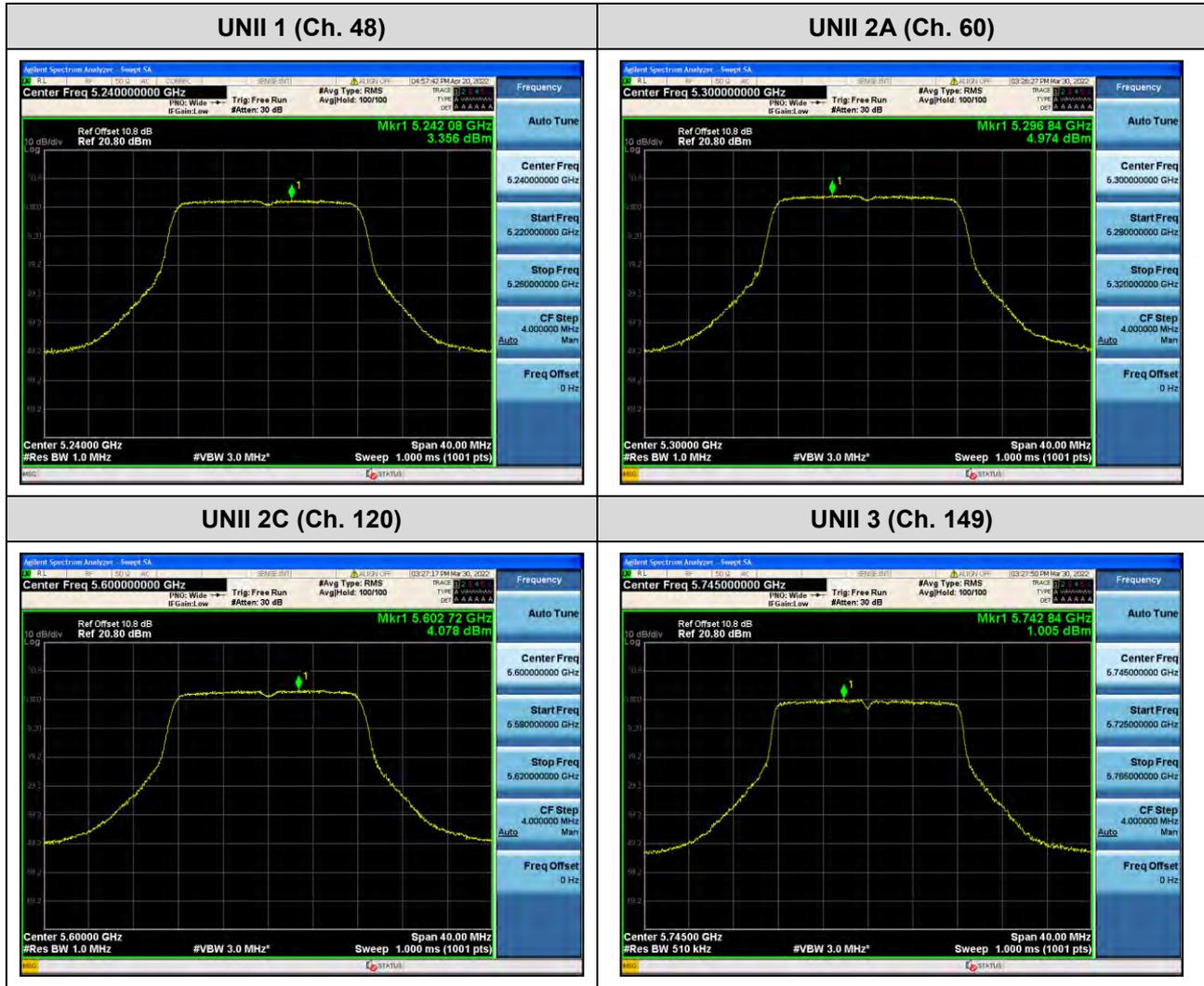


[Ant.2]

☑ Test Plots(802.11a)

Note:

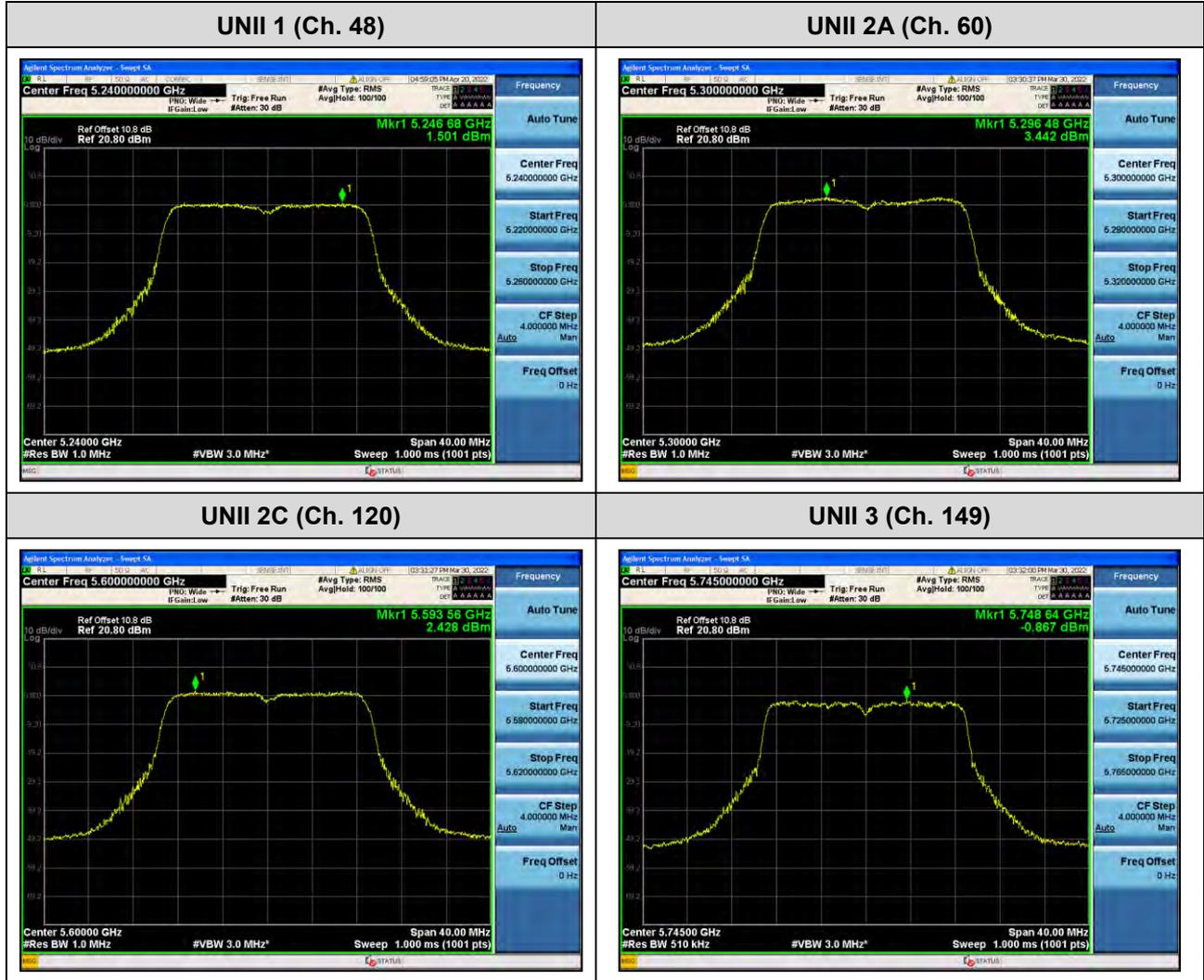
In order to simplify the report, attached plots were only channel of highest power.



☐ Test Plots(802.11n(HT20))

Note:

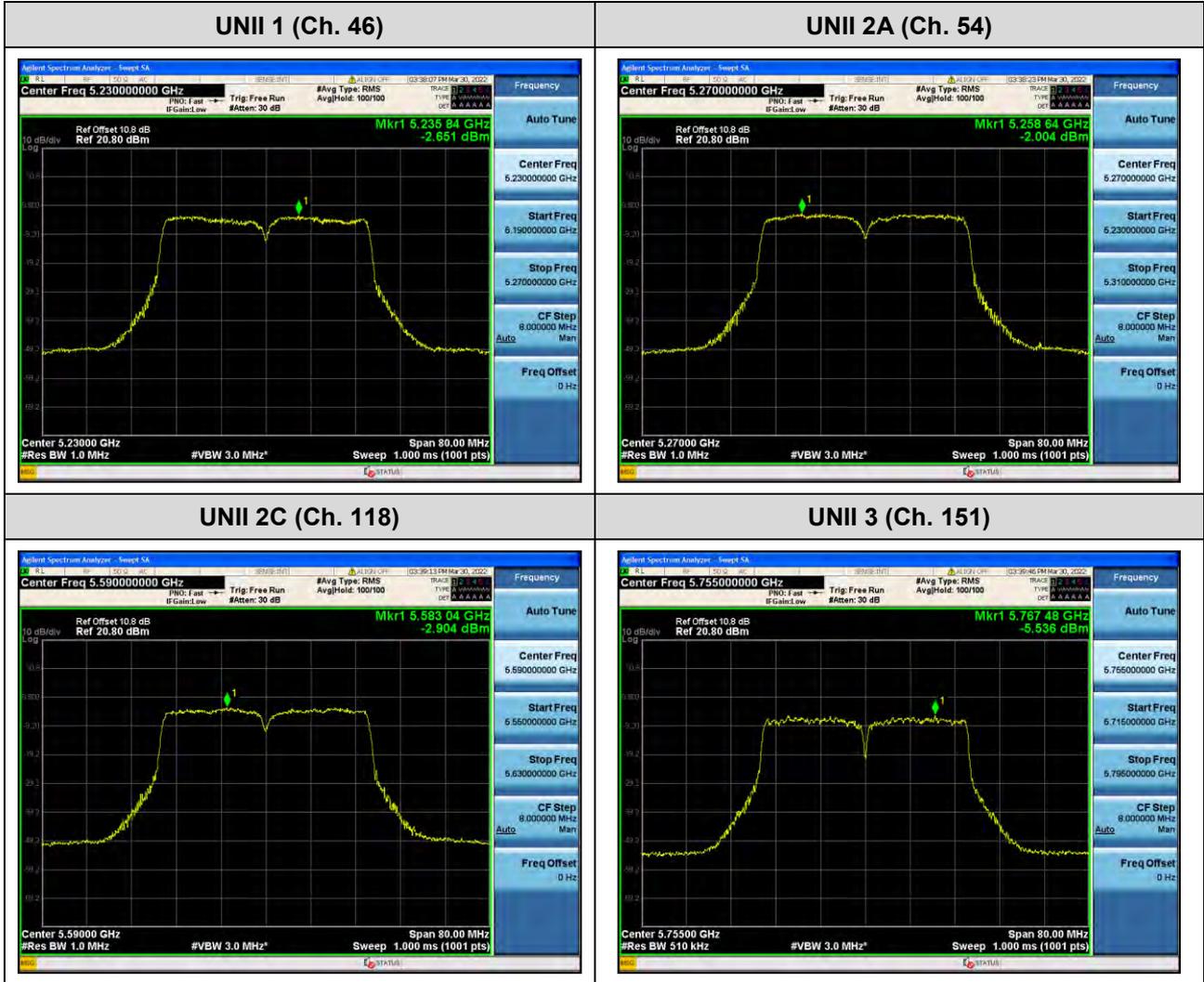
In order to simplify the report, attached plots were only channel of highest power.



☐ Test Plots(802.11n(HT40))

Note:

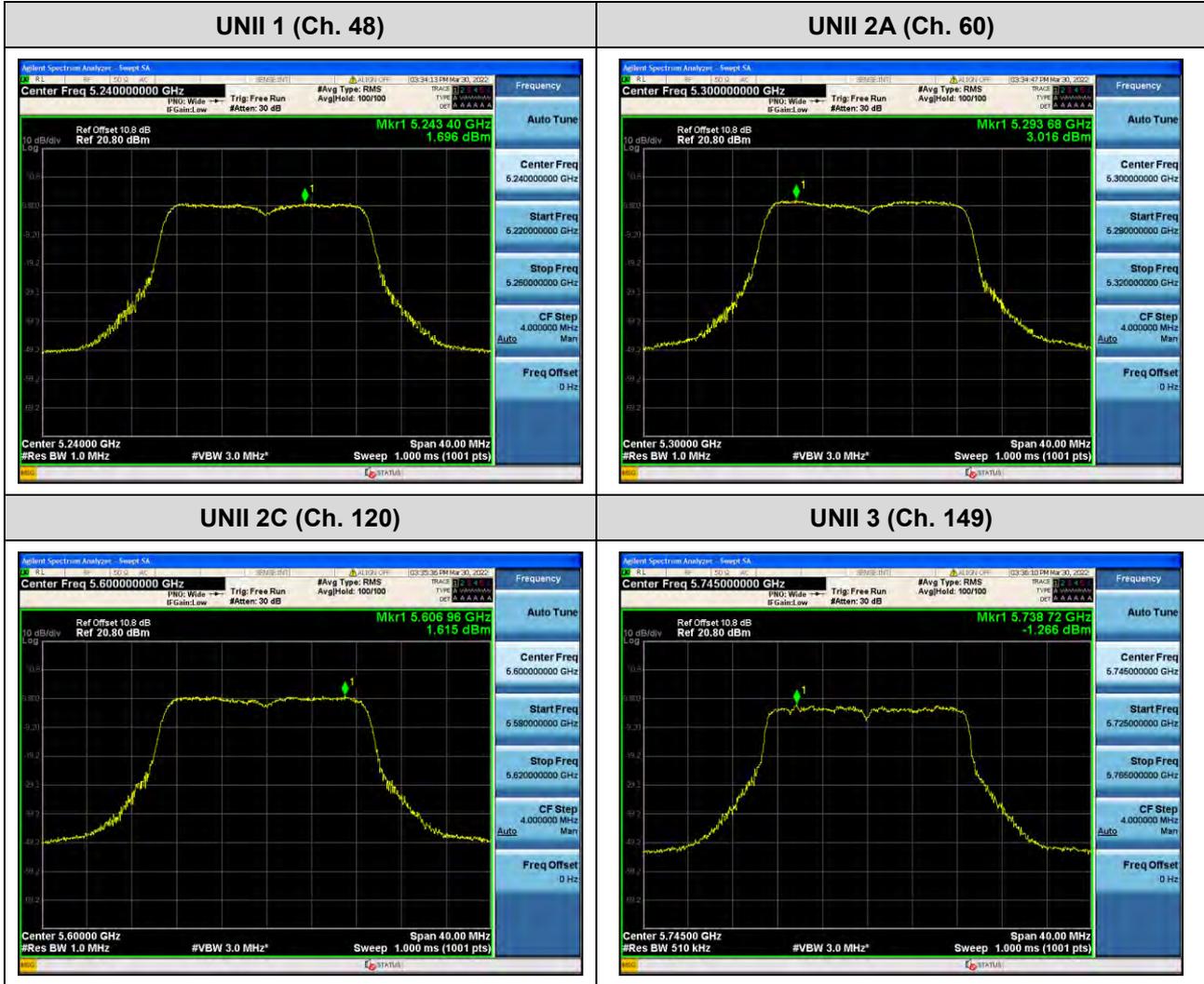
In order to simplify the report, attached plots were only channel of highest power.



☐ Test Plots(802.11ac(VHT20))

Note:

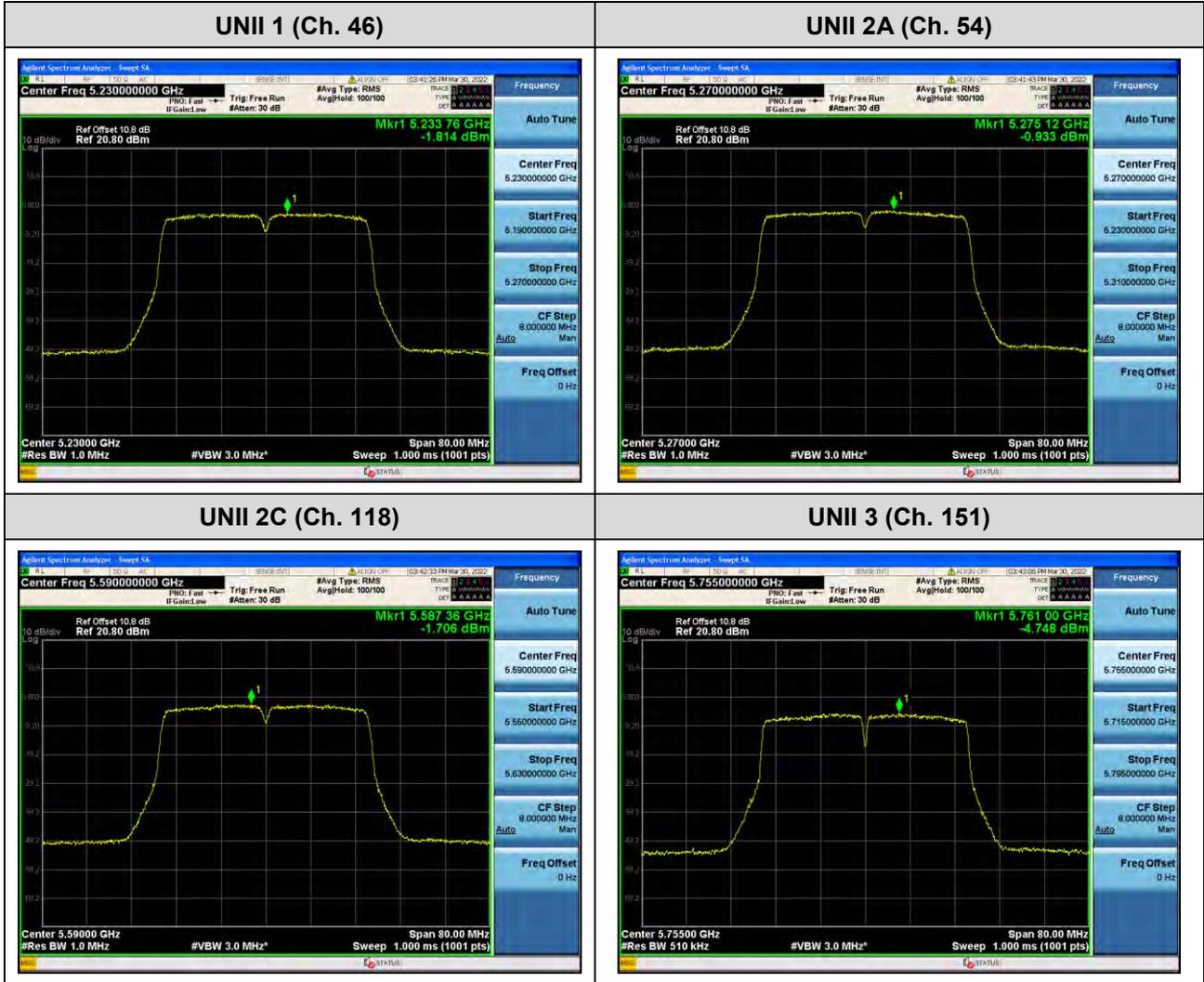
In order to simplify the report, attached plots were only channel of highest power.



☐ Test Plots(802.11ac(VHT40))

Note:

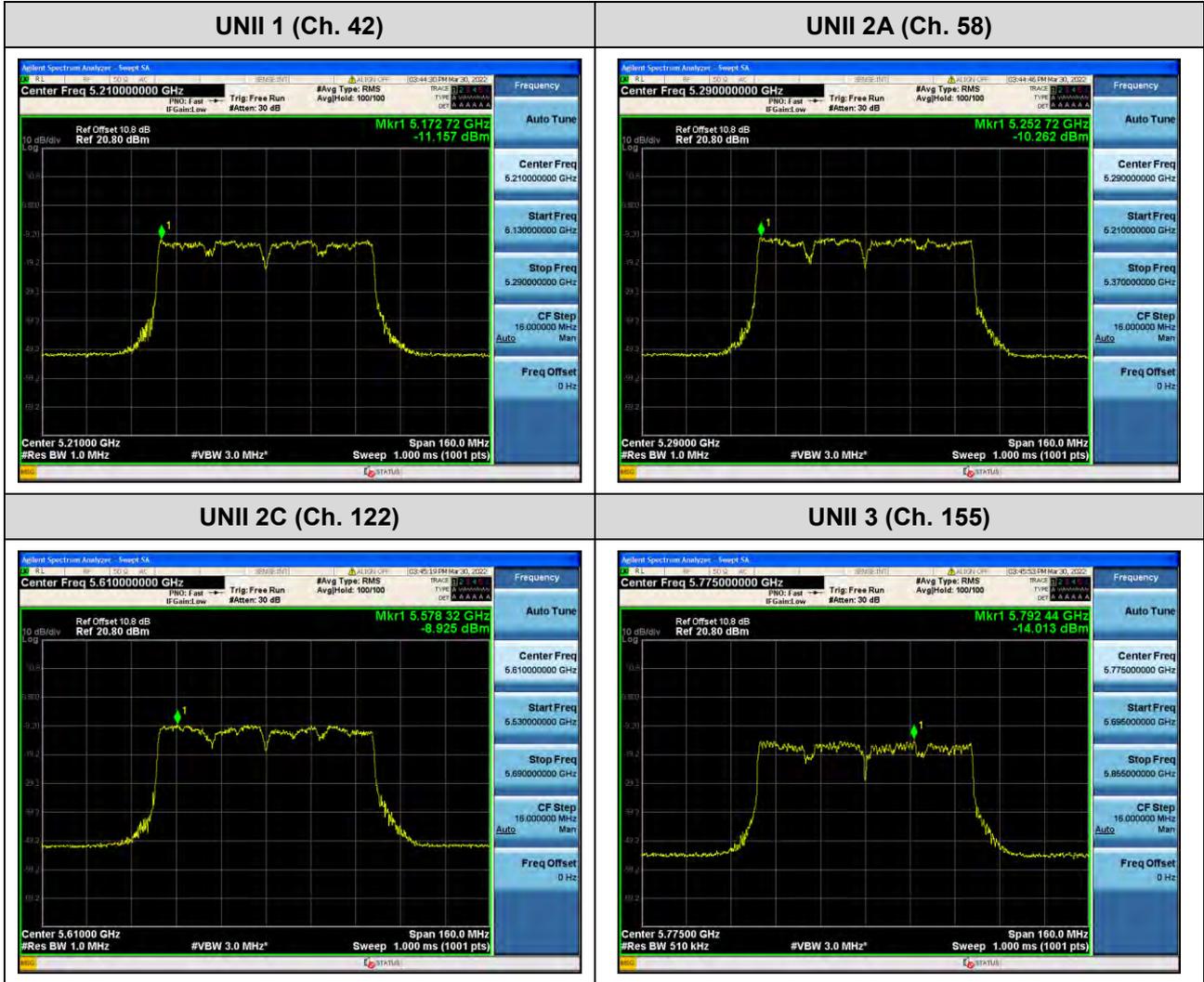
In order to simplify the report, attached plots were only channel of highest power.



☐ Test Plots(802.11ac(VHT80))

Note:

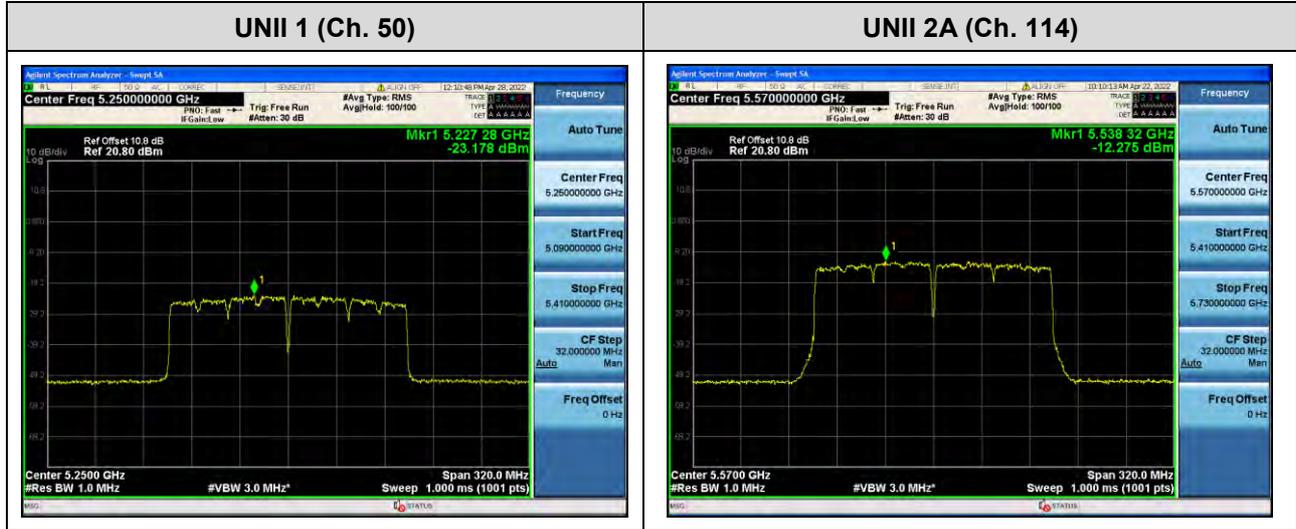
In order to simplify the report, attached plots were only channel of highest power.



☑ Test Plots(802.11ac(VHT160))

Note:

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



10.6 STRADDLE CHANNEL

10.6.1 26 dB Bandwidth

[Ant.1]

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26 dB Bandwidth [MHz]
802.11a	UNII 2C	5720	144	5709.88	15.12
802.11n(HT20)				5709.52	15.48
802.11ac(VHT20)				5709.36	15.64
802.11a	UNII 3	5720	144	5729.60	4.60
802.11n(HT20)				5730.48	5.48
802.11ac(VHT20)				5730.36	5.36

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26 dB Bandwidth [MHz]
802.11n(HT40)	UNII 2C	5710	142	5688.40	36.60
802.11ac(VHT40)				5690.16	34.84
802.11n(HT40)	UNII 3	5710	142	5731.36	6.36
802.11ac(VHT40)				5729.84	4.84

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26 dB Bandwidth [MHz]
802.11ac(VHT80)	UNII 2C	5690	138	5646.32	78.68
	UNII 3	5690	138	5734.16	9.16

Note:

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

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

[Ant.2]

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26 dB Bandwidth [MHz]
802.11a	UNII 2C	5720	144	5710.52	14.48
802.11n(HT20)				5709.44	15.56
802.11ac(VHT20)				5709.32	15.68
802.11a	UNII 3	5720	144	5729.60	4.60
802.11n(HT20)				5730.60	5.60
802.11ac(VHT20)				5730.32	5.32

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26 dB Bandwidth [MHz]
802.11n(HT40)	UNII 2C	5710	142	5688.40	36.60
802.11ac(VHT40)				5690.08	34.92
802.11n(HT40)	UNII 3	5710	142	5731.28	6.28
802.11ac(VHT40)				5729.68	4.68

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26 dB Bandwidth [MHz]
802.11ac(VHT80)	UNII 2C	5690	138	5646.32	78.68
	UNII 3	5690	138	5734.16	9.16

Note:

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

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

[Ant.1]

☐ Test Plots (26 dB Bandwidth)

802.11a UNII Band



802.11n(HT20) UNII Band



802.11ac(VHT20) UNII Band



☐ Test Plots (26 dB Bandwidth)

802.11n(HT40) UNII Band



802.11ac(VHT40) UNII Band



802.11ac(VHT80) UNII Band



[Ant.2]

☐ Test Plots (26 dB Bandwidth)

802.11a UNII Band



802.11n(HT20) UNII Band



802.11ac(VHT20) UNII Band

