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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:
February 10, 2021

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

Report No.: HCT-RF-2102-FC003

FCC ID:	**A3LSMA326U**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**

Model:	SM-A326U
Additional Model:	SM-A326U1/DS, SM-S326DL
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 : Woong Jin 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)

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2102-FC003	February 10, 2021	- First Approval Report

Table of Contents

1. GENERAL INFORMATION

EUT DESCRIPTION

Model	SM-A326U	
Additional Model	SM-A326U1/DS, SM-S326DL	
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	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
Straddle channel	Supported	
TDWR Band	Supported	
Dynamic Frequency Selection	Slave without radar detection	
Date(s) of Tests	December 22, 2020 ~ February 04, 2021	
Serial number	Radiated: R3CNC01K89M Conducted: 4C19CDC0BB1C7ECE	

2. MAXIMUM OUTPUT POWER

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

Band	Mode	Output Power	
		(dBm)	(W)
UNII1	802.11a	16.77	0.048
	802.11n (HT20)	16.51	0.045
	802.11n (HT40)	16.58	0.045
	802.11ac (VHT20)	16.48	0.044
	802.11ac (VHT40)	16.53	0.045
	802.11ac (VHT80)	13.08	0.020
UNII2A	802.11a	17.63	0.058
	802.11n (HT20)	17.45	0.056
	802.11n (HT40)	17.37	0.055
	802.11ac (VHT20)	17.44	0.055
	802.11ac (VHT40)	17.31	0.054
	802.11ac (VHT80)	13.62	0.023
UNII2C	802.11a	17.65	0.058
	802.11n (HT20)	17.61	0.058
	802.11n (HT40)	17.06	0.051
	802.11ac (VHT20)	17.64	0.058
	802.11ac (VHT40)	16.94	0.049
	802.11ac (VHT80)	13.56	0.023
UNII3	802.11a	16.76	0.047
	802.11n (HT20)	16.75	0.047
	802.11n (HT40)	16.83	0.048
	802.11ac (VHT20)	16.74	0.047
	802.11ac (VHT40)	17.09	0.051
	802.11ac (VHT80)	12.72	0.019

3. TEST METHODOLOGY

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

EUT CONFIGURATION

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

EUT EXERCISE

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

GENERAL TEST PROCEDURES

Conducted Emissions

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

Radiated Emissions

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

DESCRIPTION OF TEST MODES

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

4. INSTRUMENT CALIBRATION

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

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

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

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

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

5.2 EQUIPMENT

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

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

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

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203, §15.407:

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

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

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

7. MEASUREMENT UNCERTAINTY

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

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

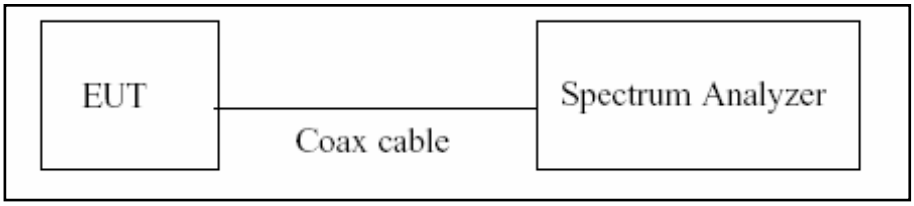
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

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

8. DESCRIPTION OF TESTS

8.1. Duty Cycle

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

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

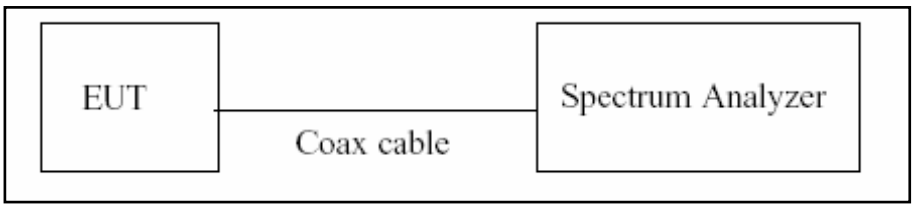
1. RBW = 8 MHz (the largest availble value)
2. VBW = 8 MHz (≥ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on}/ T_{total} and Duty Cycle Factor = 10log(1/Duty Cycle)

8.2. 6dB Bandwidth & 26dB Bandwidth

Limit

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

Test Configuration



Test Procedure(26dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

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

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

Test Procedure (6dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

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

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

Note:

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

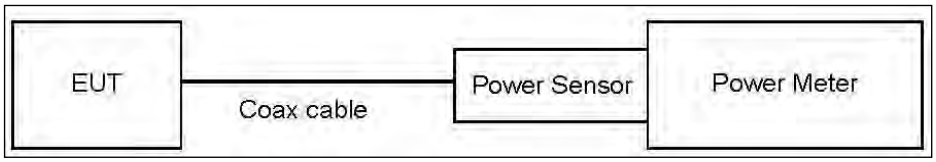
8.3. Output Power Measurement

Limit

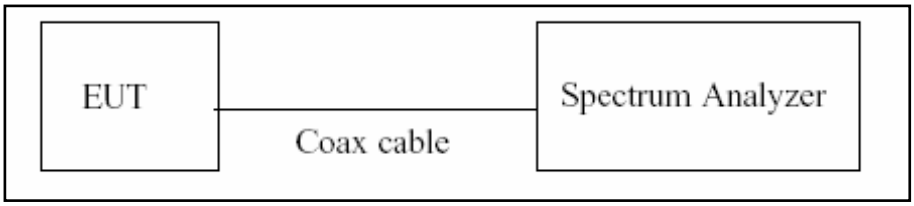
Band	Limit
UNII 1	- Master : Not exceed 1 W(=30dBm) - Slave : Not exceed 250 mW(=23.98 dBm)
UNII 2A, 2C	Not exceed the lesser of 250 mW or 11 dBm + 10 log B, (where B is the 26 dB emission bandwidth in megahertz.)
UNII 3	Not exceed 1 W(=30dBm)

Test Configuration

Power Meter



Spectrum Analyzer(Only Straddle Channel)



Test Procedure(Power Meter)

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

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

Test Procedure(Spectrum Analyzer)

The transmitter output is connected to the Spectrum Analyzer.

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

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

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

Sample Calculation

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

Note

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

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

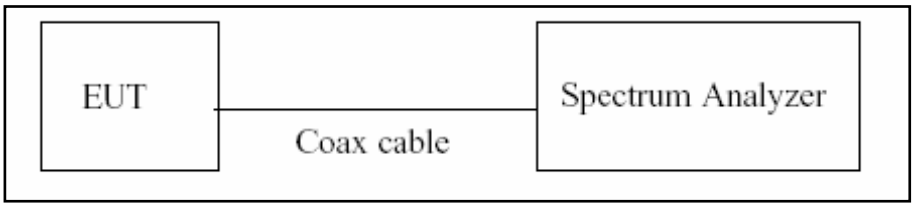
(Actual value of loss for the attenuator and cable combination)

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
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

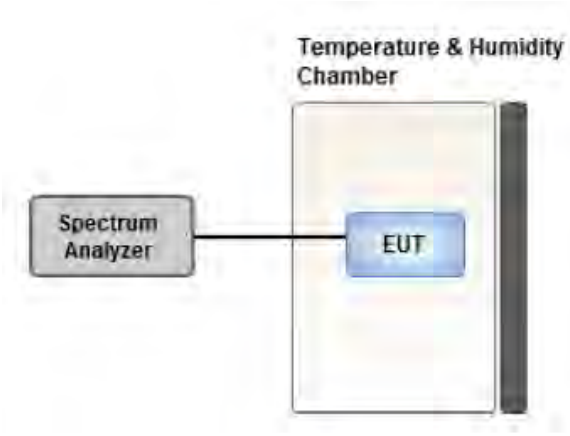
(Actual value of loss for the attenuator and cable combination)

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.

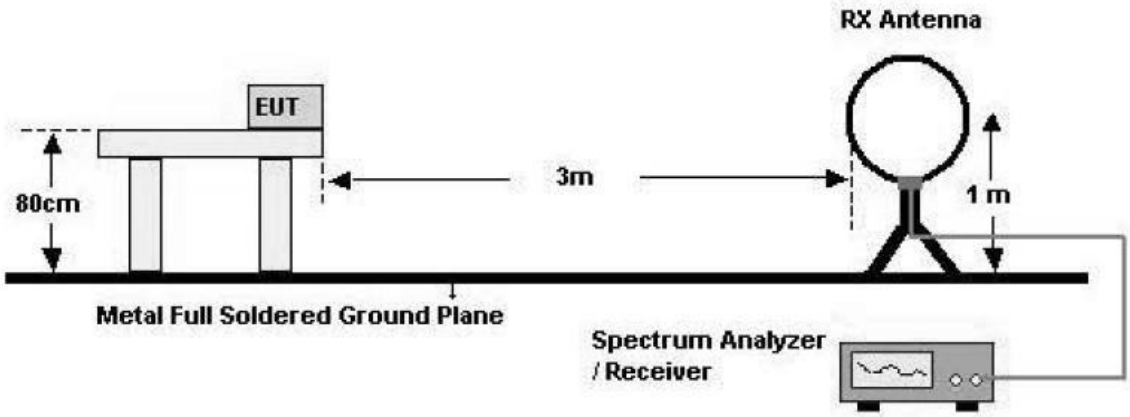
3. UNII 3: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below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

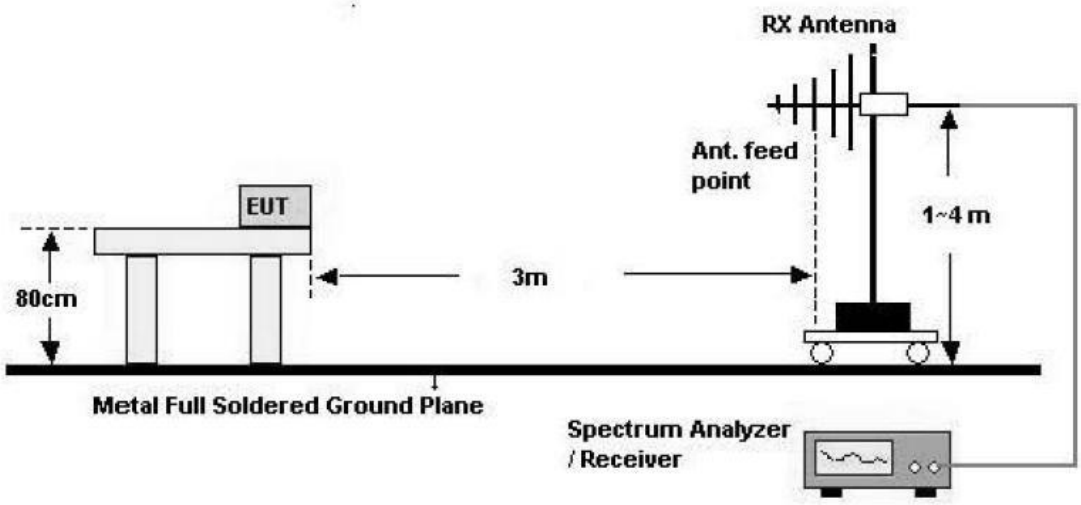
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

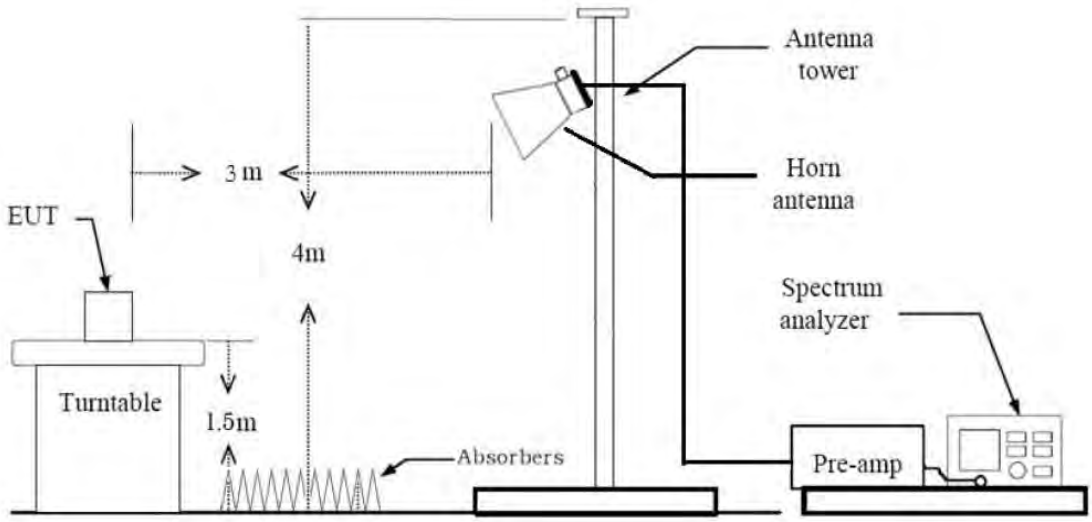
Below 30 MHz



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(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 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(A.G) + Attenuator + Distance Factor(D.F)

The actual setting value of VBW

Mode	Worst Data rate (Mbps)	Duty Cycle	Duty Cycle Factor (dB)	The actual setting value of VBW (Hz)
802.11a	6	0.968	0.139	1000
802.11n(HT20)	MCS 0	0.967	0.144	1000
802.11n(HT40)	MCS 0	0.937	0.281	2000
802.11ac(VHT20)	MCS 0	0.968	0.141	1000
802.11ac(VHT40)	MCS 0	0.938	0.278	2000
802.11ac(VHT80)	MCS 0	0.882	0.544	5000

8.8. Worst case configuration and mode

Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone, Stand alone + External accessories(Earphone, etc)
   - Worstcase : Stand alone
2. EUT Axis
   - Radiated Spurious Emissions : Y, Z
   - Radiated Restricted Band Edge : Y
3. All datarate of operation were investigated and the worst case datarate results are reported
   - 802.11a : 6 Mbps
   - 802.11n_HT20 : MCS0
   - 802.11n_HT40 : MCS0
   - 802.11ac_VHT20 : MCS0
   - 802.11ac_VHT40 : MCS0
   - 802.11ac_VHT80 : MCS0
4. Radiated Spurious Emission
   - All modulation of operation were investigated and the worst case modulation results are reported.
     (Worstcase : 802.11a_6 Mbps)
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-A326U, SM-A326U1/DS, SM-S326DL were tested and the worst case results are reported.
   - Worst case : SM-A326U
7. We were performed the RSE test in condition of co-location. There has no significant emission raised.
   - WWAN+WLAN 5GHz+BT

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

Description	Bluetooth Emission	5 GHz Emission
Antenna	WIFI/BT	WIFI/BT
Channel	0	60
Data Rate	1 Mbps	6 Mbps
Mode	GFSK : DH5	802.11a

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-A326U, SM-A326U1/DS, SM-S326DL were tested and the worst case results are reported.
   - Worst case : SM-A326U

Conducted test

1. All datarate of operation were investigated and the worst case datarate results are reported.
2. SM-A326U, SM-A326U1/DS, SM-S326DL were tested and the worst case results are reported.
   - Worst case : SM-A326U

9. SUMMARY OF TEST RESULTS

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

10. TEST RESULT

10.1 DUTY CYCLE

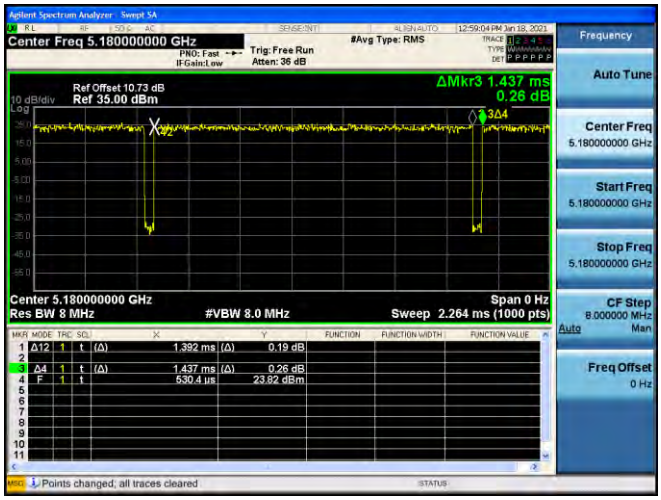
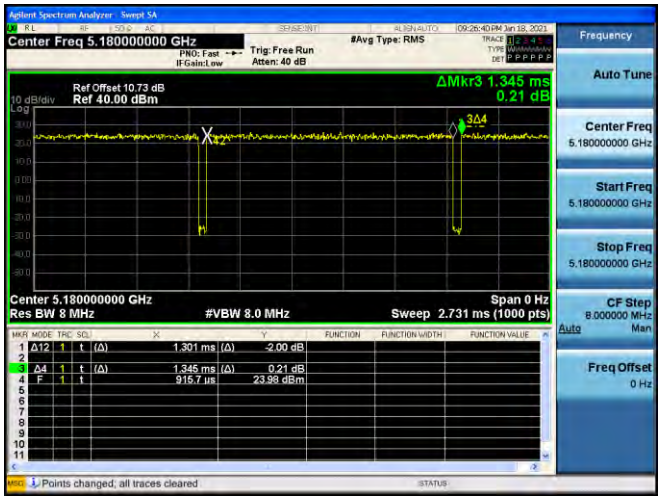
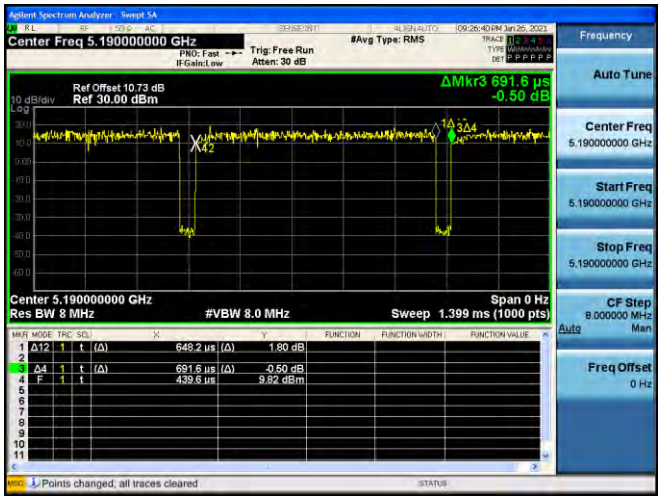
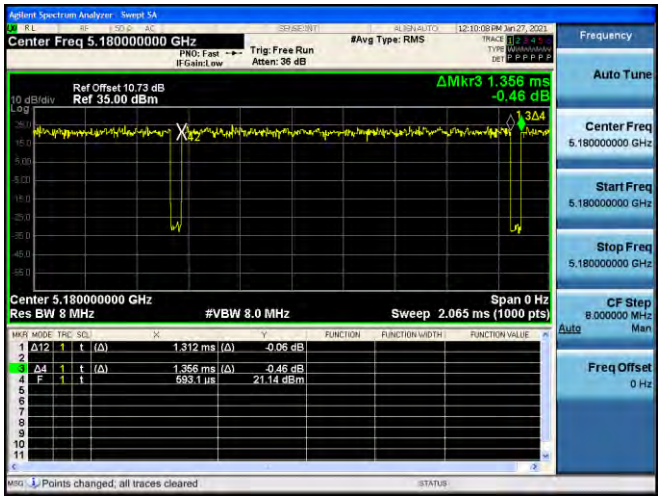
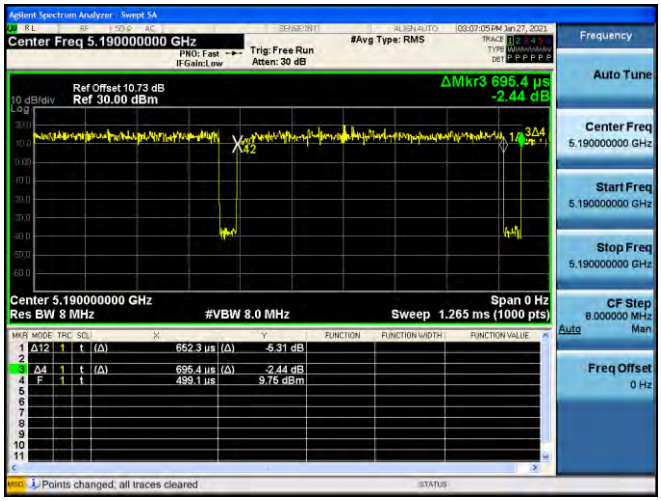
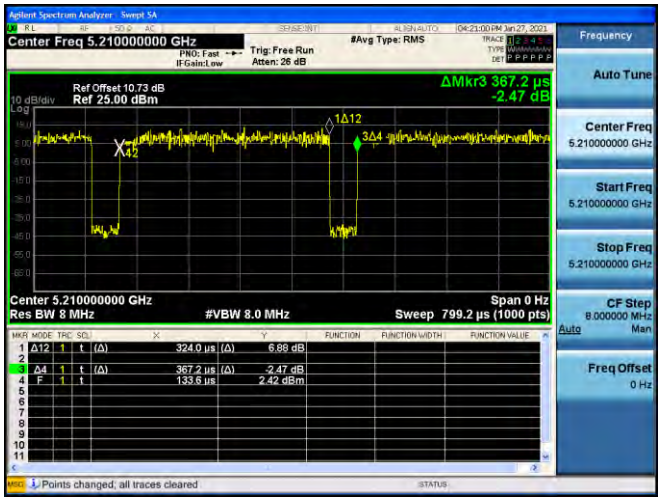
Mode	Data Rate (Mbps)	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11a	6	1.392	1.437	0.968	0.139
	9	0.936	0.981	0.954	0.205
	12	0.708	0.753	0.941	0.264
	18	0.479	0.524	0.914	0.390
	24	0.364	0.409	0.890	0.506
	36	0.252	0.297	0.849	0.710
	48	0.192	0.237	0.811	0.909
	54	0.176	0.221	0.795	0.995

Mode	MCS Index	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11n (HT20)	0	1.301	1.345	0.967	0.144
	1	0.667	0.712	0.937	0.282
	2	0.460	0.505	0.911	0.404
	3	0.352	0.397	0.887	0.520
	4	0.248	0.293	0.847	0.721
	5	0.196	0.241	0.814	0.893
	6	0.180	0.225	0.801	0.963
	7	0.164	0.209	0.786	1.046
802.11n (HT40)	0	0.648	0.692	0.937	0.281
	1	0.344	0.388	0.887	0.523
	2	0.240	0.284	0.845	0.733
	3	0.192	0.236	0.815	0.889
	4	0.140	0.184	0.763	1.176
	5	0.116	0.160	0.725	1.394
	6	0.104	0.148	0.703	1.532
	7	0.100	0.144	0.695	1.581

Mode	MCS Index	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11ac (VHT20)	0	1.312	1.356	0.968	0.141
	1	0.676	0.721	0.937	0.283
	2	0.464	0.509	0.912	0.400
	3	0.360	0.405	0.889	0.509
	4	0.252	0.297	0.849	0.712
	5	0.200	0.245	0.815	0.889
	6	0.184	0.229	0.804	0.948
	7	0.168	0.213	0.789	1.028
	8	0.148	0.193	0.767	1.150
802.11ac (VHT40)	0	0.652	0.695	0.938	0.278
	1	0.348	0.392	0.887	0.520
	2	0.244	0.288	0.846	0.726
	3	0.196	0.241	0.815	0.886
	4	0.144	0.188	0.765	1.164
	5	0.120	0.164	0.733	1.350
	6	0.108	0.152	0.709	1.491
	7	0.104	0.148	0.702	1.537
	8	0.092	0.136	0.680	1.675
	9	0.088	0.132	0.667	1.757
802.11ac (VHT80)	0	0.324	0.367	0.882	0.544
	1	0.184	0.228	0.809	0.920
	2	0.136	0.179	0.758	1.205
	3	0.112	0.156	0.721	1.422
	4	0.088	0.132	0.670	1.739
	5	0.076	0.129	0.592	2.275
	6	0.072	0.134	0.540	2.673
	7	0.072	0.125	0.579	2.371
	8	0.064	0.117	0.549	2.608
	9	0.065	0.126	0.514	2.887

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.

802.11a Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	19.71	16.454
5200	40	19.65	16.450
5240	48	19.69	16.433
5260	52	19.61	16.455
5300	60	19.74	16.445
5320	64	19.54	16.434
5500	100	19.82	16.482
5600	120	19.74	16.402
5720	144	19.96	16.426
5745	149	19.73	16.425
5785	157	19.80	16.409
5825	165	19.77	16.427

802.11n(HT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	19.82	17.593
5200	40	19.91	17.540
5240	48	19.82	17.534
5260	52	19.73	17.552
5300	60	19.82	17.551
5320	64	19.89	17.544
5500	100	19.93	17.593
5600	120	19.83	17.572
5720	144	19.82	17.588
5745	149	19.69	17.582
5785	157	19.78	17.557
5825	165	19.89	17.565

802.11n(HT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	39.98	36.042
5230	46	40.48	36.080
5270	54	40.72	36.166
5310	62	40.15	35.981
5510	102	40.00	35.945
5590	118	40.31	35.968
5710	142	40.00	35.979
5755	151	40.33	35.975
5795	159	39.72	36.006

802.11ac(VHT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	19.98	17.575
5200	40	20.12	17.571
5240	48	20.14	17.598
5260	52	20.14	17.556
5300	60	19.99	17.590
5320	64	20.51	17.587
5500	100	20.26	17.534
5600	120	19.97	17.568
5720	144	20.17	17.576
5745	149	20.22	17.544
5785	157	20.16	17.577
5825	165	20.09	17.582

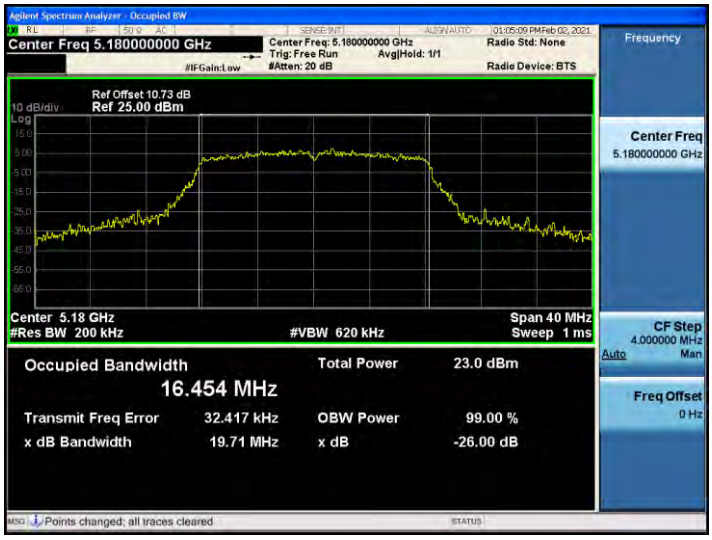
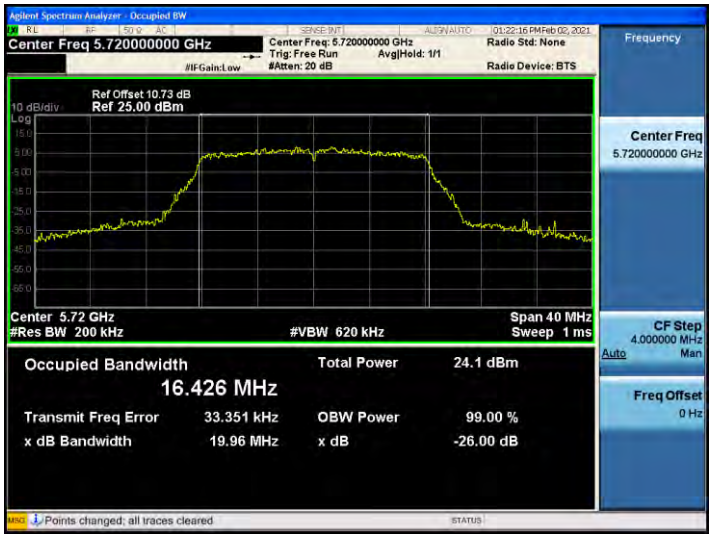
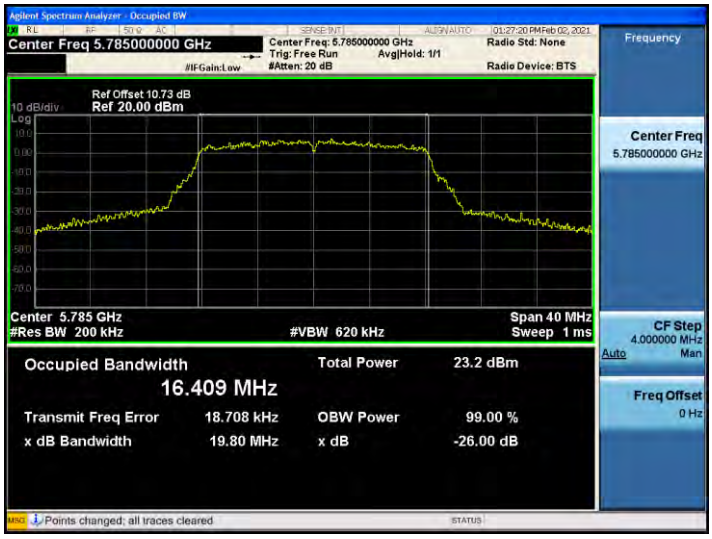
802.11ac(VHT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	40.17	35.996
5230	46	40.31	35.933
5270	54	40.48	35.987
5310	62	39.92	35.940
5510	102	39.90	35.956
5590	118	40.15	35.958
5710	142	40.20	35.990
5755	151	40.12	36.002
5795	159	40.66	35.923

802.11ac(VHT80) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5210	42	80.41	75.097
5290	58	80.60	75.069
5530	106	80.19	75.136
5610	122	80.54	75.106
5690	138	80.25	75.141
5775	155	80.06	75.099

▣ Test Plots(802.11a)

Note:

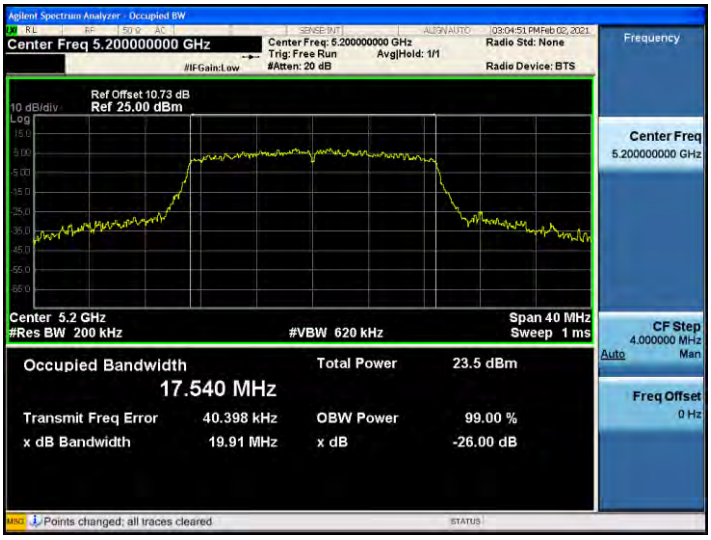
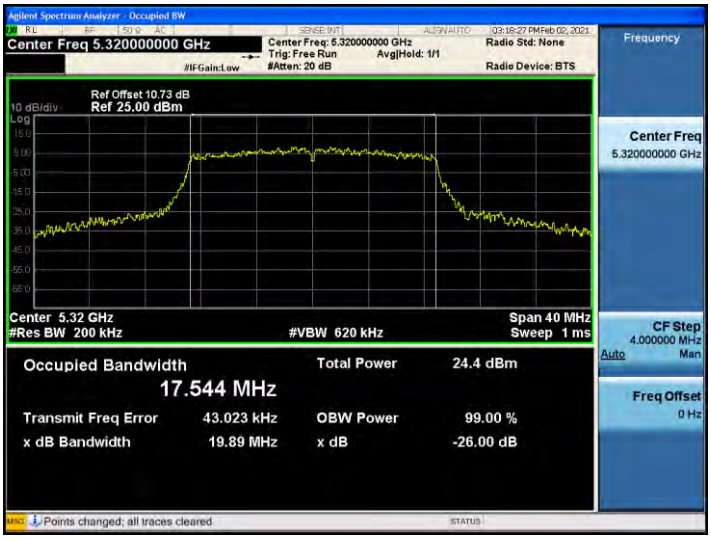
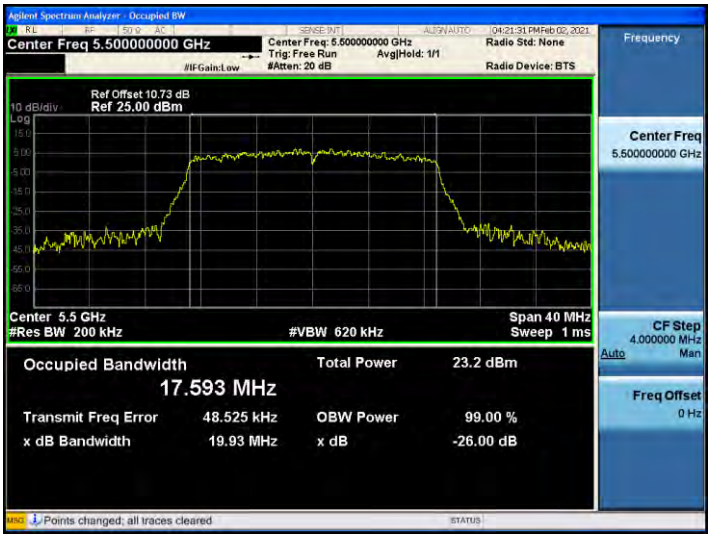
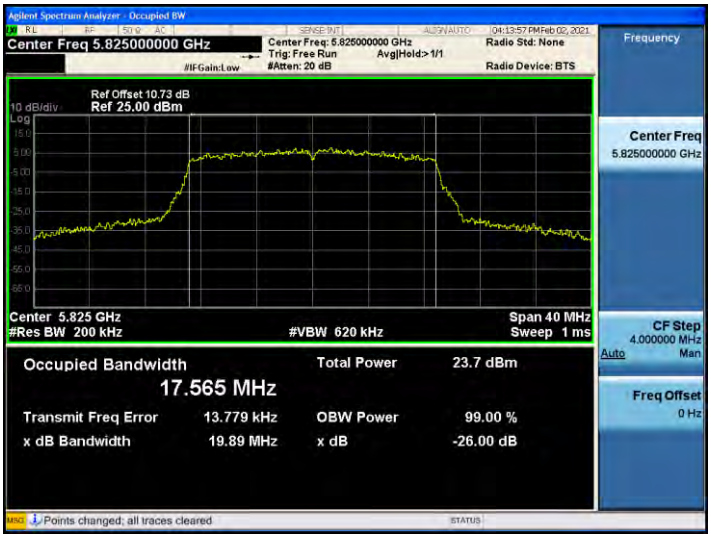
In order to simplify the report, attached plots were only the most wide channel.

802.11a UNII 1 BAND 26dB Bandwidth (CH 36)	802.11a UNII 2A BAND 26dB Bandwidth (CH 60)
	
802.11a UNII 2C BAND 26dB Bandwidth (CH 144)	**802.11a UNII 3 BAND 26dB Bandwidth (CH 157)**
	

▣ Test Plots(802.11n(HT20))

Note:

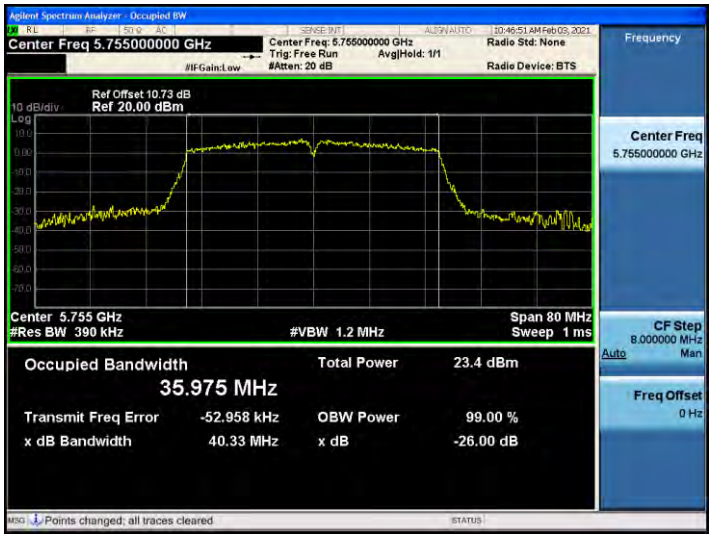
In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT20 UNII 1 BAND 26dB Bandwidth(CH 40)	802.11n_HT20 UNII 2A BAND 26dB Bandwidth(CH 64)
	
802.11n_HT20 UNII 2C BAND 26dB Bandwidth(CH 100)	**802.11n_HT20 UNII 3 BAND 26dB Bandwidth(CH 165)**
	

▣ Test Plots(802.11n(HT40))

Note:

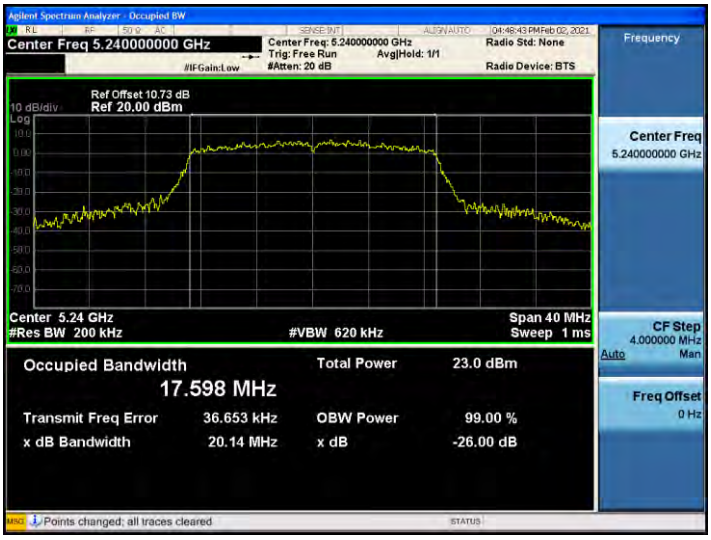
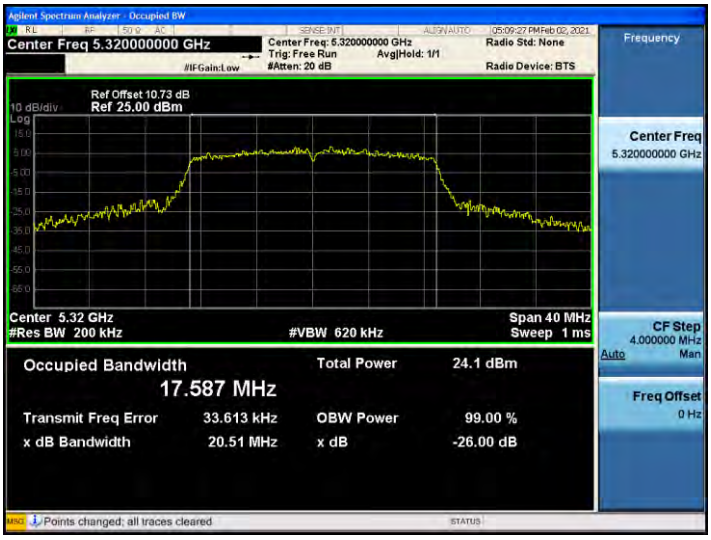
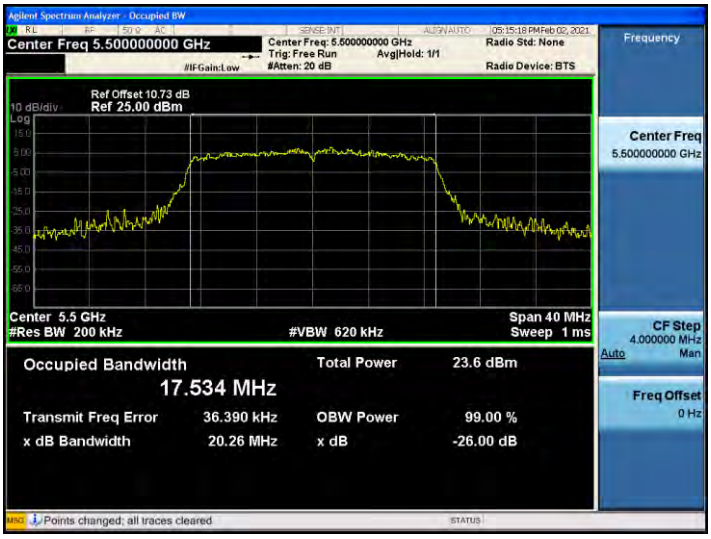
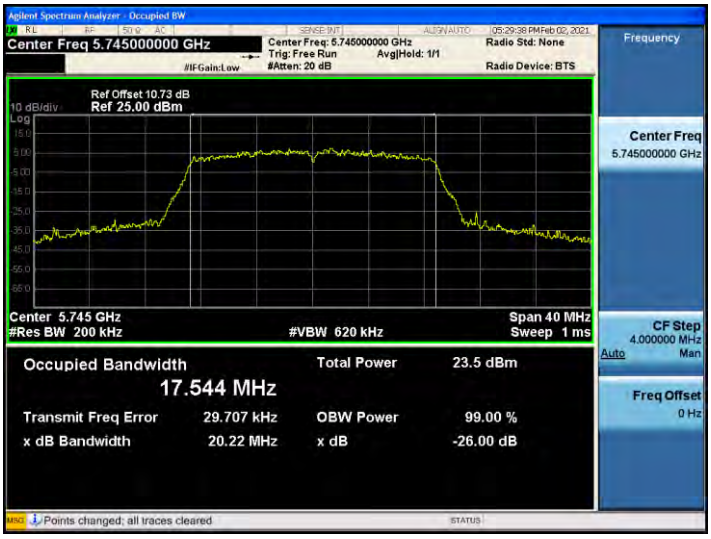
In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT40 UNII 1 BAND 26dB Bandwidth(CH 46)	802.11n_HT40 UNII 2A BAND 26dB Bandwidth (CH 54)
	
802.11n_HT40 UNII 2C BAND 26dB Bandwidth(CH 118)	**802.11n_HT40 UNII 3 BAND 26dB Bandwidth (CH 151)**
	

▣ Test Plots(802.11ac(VHT20))

Note:

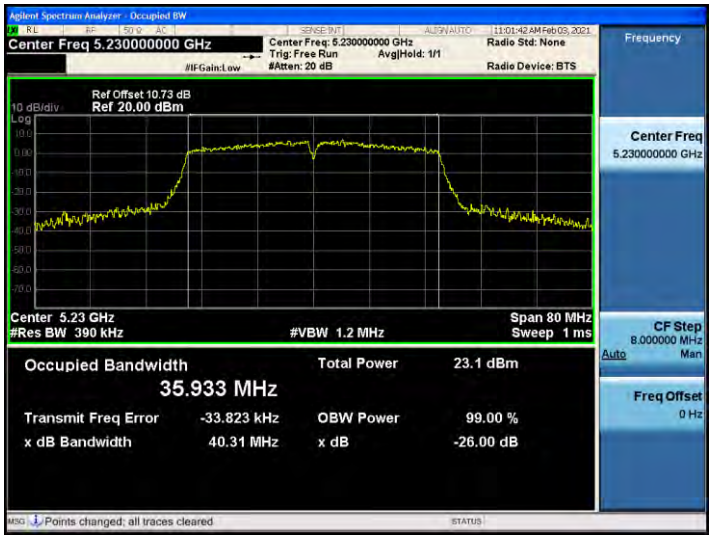
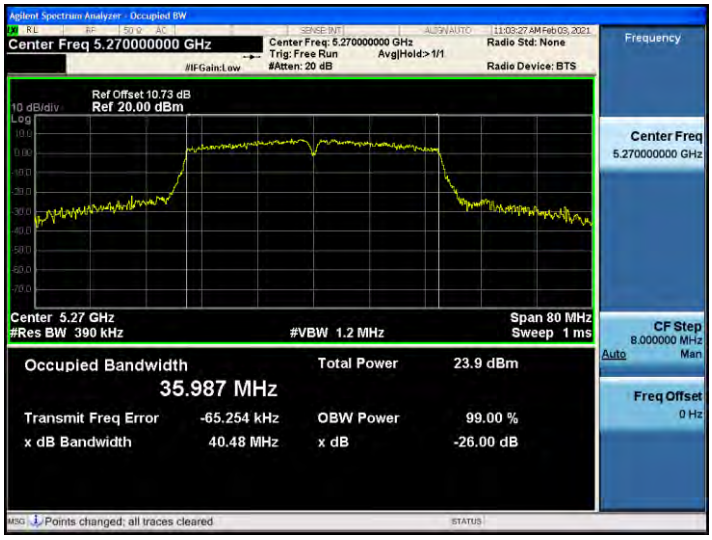
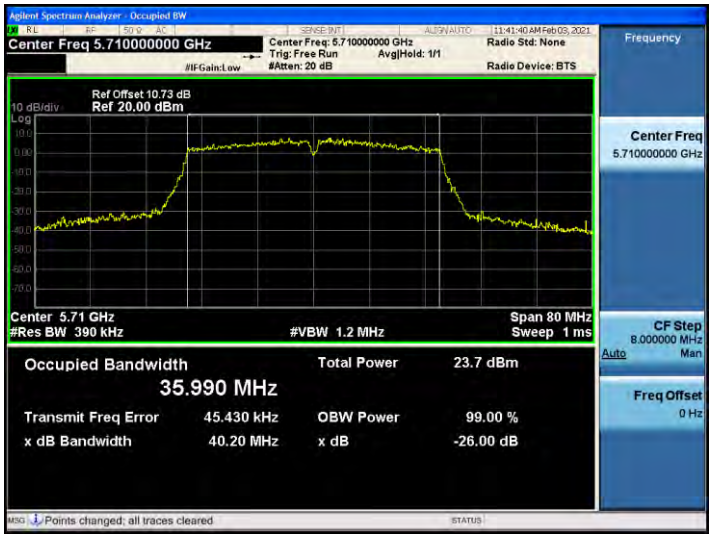
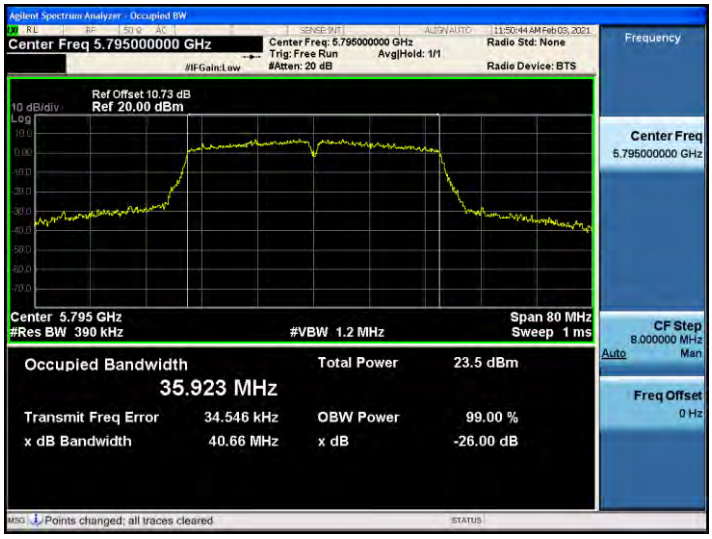
In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT20 UNII 1 BAND 26dB Bandwidth(CH 48)	802.11ac_VHT20 UNII 2A BAND 26dB Bandwidth(CH 64)
	
802.11ac_VHT20 UNII 2C BAND 26dB Bandwidth(CH 100)	**802.11ac_VHT20 UNII 3 BAND 26dB Bandwidth(CH 149)**
	

▣ Test Plots(802.11ac(VHT40))

Note:

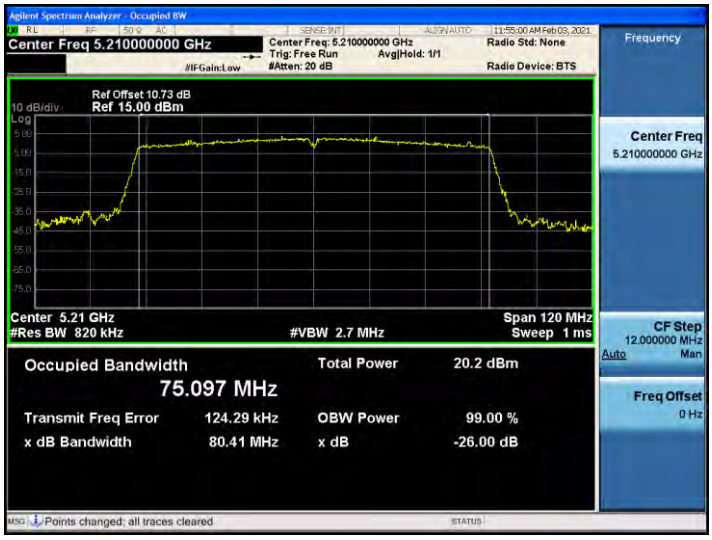
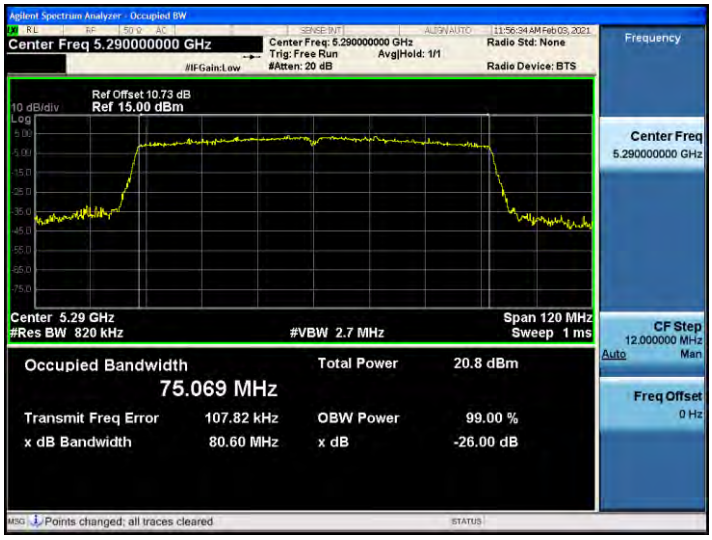
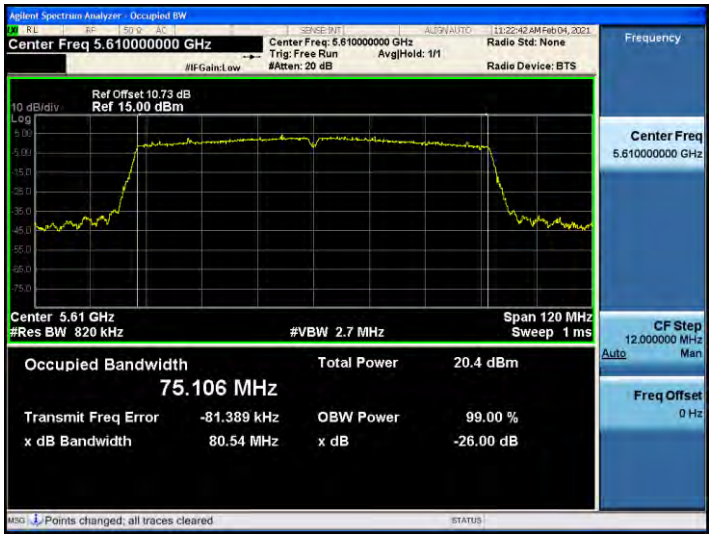
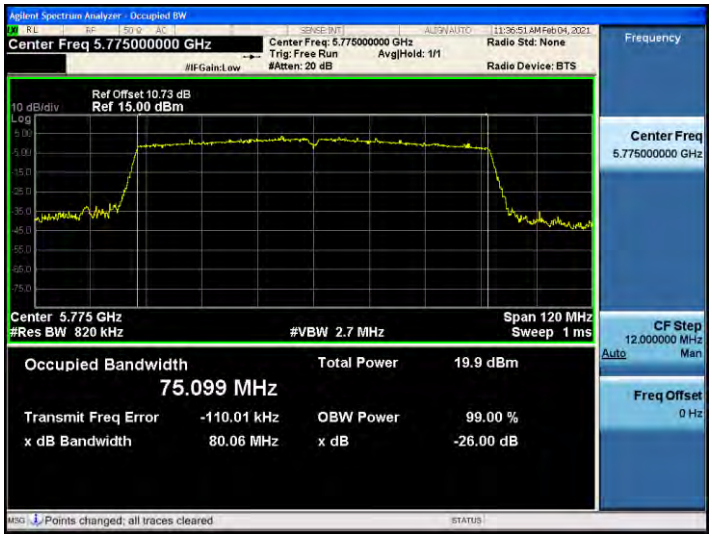
In order to simplify the report, attached plots were only the most wide channel.

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 122)	**802.11ac_VHT80 UNII 3 BAND 26dB Bandwidth (CH 155)**
	

10.3 6dB BANDWIDTH

802.11a Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	13.08	> 0.5	Pass
5785	157	15.11	> 0.5	Pass
5825	165	15.43	> 0.5	Pass

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.77	> 0.5	Pass
5785	157	16.93	> 0.5	Pass
5825	165	16.63	> 0.5	Pass

802.11n(HT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	33.94	> 0.5	Pass
5795	159	35.15	> 0.5	Pass

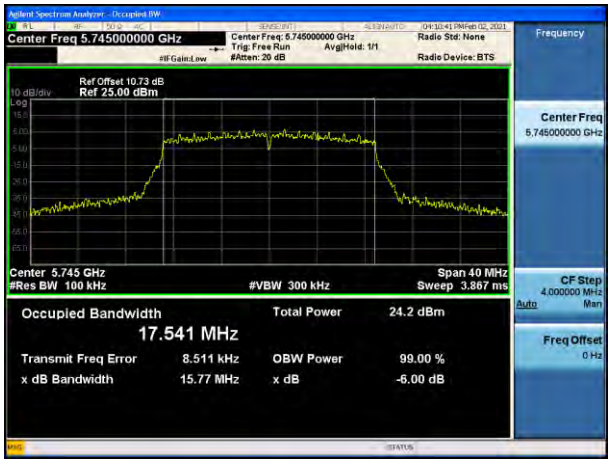
802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	12.69	> 0.5	Pass
5785	157	15.34	> 0.5	Pass
5825	165	15.08	> 0.5	Pass

802.11ac(VHT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.01	> 0.5	Pass
5795	159	35.12	> 0.5	Pass

802.11ac(VHT80) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	75.24	> 0.5	Pass

▣ Test Plots

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

802.11a (CH.149)	802.11n(HT20) (CH.149)
	
802.11n(HT40) (CH.151)	**802.11ac(VHT20) (CH.149)**
	
802.11ac(VHT40) (CH.151)	**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.

802.11a Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)	Worstcase Datarate (Mbps)
Frequency [MHz]	Channel No.						
5180	36	17	16.37	0.139	16.51	23.98	6
5200	40	17	16.63	0.139	16.77	23.98	6
5240	48	17	16.43	0.139	16.57	23.98	6
5260	52	17	17.05	0.139	17.19	23.92	6
5300	60	17	17.42	0.139	17.56	23.95	6
5320	64	17	17.49	0.139	17.63	23.91	6
5500	100	17	16.95	0.139	17.09	23.97	6
5600	120	17	16.68	0.139	16.82	23.95	6
5720	144	17	17.51	0.139	17.65	23.98	6
5745	149	17	16.62	0.139	16.76	30.00	6
5785	157	17	16.55	0.139	16.69	30.00	6
5825	165	17	16.62	0.139	16.76	30.00	6

802.11n(20MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)	Worstcase MCS Index
Frequency [MHz]	Channel No.						
5180	36	17	15.31	0.963	16.28	23.98	MCS6
5200	40	17	15.55	0.963	16.51	23.98	MCS6
5240	48	17	15.34	0.963	16.30	23.98	MCS6
5260	52	17	15.95	0.963	16.91	23.95	MCS6
5300	60	17	16.27	0.963	17.23	23.97	MCS6
5320	64	17	16.49	0.963	17.45	23.98	MCS6
5500	100	16	15.19	0.963	16.16	23.98	MCS6
5600	120	17	15.78	0.963	16.74	23.97	MCS6
5720	144	17	16.65	0.963	17.61	23.97	MCS6
5745	149	17	15.76	0.963	16.72	30.00	MCS6
5785	157	17	15.70	0.963	16.66	30.00	MCS6
5825	165	17	15.78	0.963	16.75	30.00	MCS6

802.11n(40MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)	Worstcase MCS Index
Frequency [MHz]	Channel No.						
5190	38	15	14.43	0.281	14.71	23.98	MCS0
5230	46	17	16.30	0.281	16.58	23.98	MCS0
5270	54	17	17.09	0.281	17.37	23.98	MCS0
5310	62	14	14.54	0.281	14.82	23.98	MCS0
5510	102	14	13.94	0.281	14.22	23.98	MCS0
5590	118	17	16.67	0.281	16.95	23.98	MCS0
5710	142	16	16.78	0.281	17.06	23.98	MCS0
5755	151	17	16.50	0.281	16.78	30.00	MCS0
5795	159	17	16.55	0.281	16.83	30.00	MCS0

802.11ac(20MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)	Worstcase MCS Index
Frequency [MHz]	Channel No.						
5180	36	17	16.14	0.141	16.29	23.98	MCS0
5200	40	17	16.34	0.141	16.48	23.98	MCS0
5240	48	17	16.17	0.141	16.31	23.98	MCS0
5260	52	17	16.92	0.141	17.06	23.98	MCS0
5300	60	17	17.15	0.141	17.29	23.98	MCS0
5320	64	17	17.30	0.141	17.44	23.98	MCS0
5500	100	17	16.92	0.141	17.06	23.98	MCS0
5600	120	17	16.69	0.141	16.83	23.98	MCS0
5720	144	17	17.50	0.141	17.64	23.98	MCS0
5745	149	17	16.58	0.141	16.72	30.00	MCS0
5785	157	17	16.53	0.141	16.67	30.00	MCS0
5825	165	17	16.59	0.141	16.74	30.00	MCS0

802.11ac(40MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)	Worstcase MCS Index
Frequency [MHz]	Channel No.						
5190	38	15	14.38	0.278	14.66	23.98	MCS0
5230	46	17	16.25	0.278	16.53	23.98	MCS0
5270	54	17	17.03	0.278	17.31	23.98	MCS0
5310	62	14	14.51	0.278	14.79	23.98	MCS0
5510	102	14	14.03	0.278	14.31	23.98	MCS0
5590	118	17	16.66	0.278	16.94	23.98	MCS0
5710	142	16	16.63	0.278	16.91	23.98	MCS0
5755	151	17	16.81	0.278	17.09	30.00	MCS0
5795	159	17	16.73	0.278	17.01	30.00	MCS0

802.11ac(80MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)	Worstcase MCS Index
Frequency [MHz]	Channel No.						
5210	42	13	12.53	0.544	13.08	23.98	MCS0
5290	58	13	13.07	0.544	13.62	23.98	MCS0
5530	106	13	13.01	0.544	13.56	23.98	MCS0
5610	122	13	12.72	0.544	13.26	23.98	MCS0
5690	138	12	12.44	0.544	12.99	23.98	MCS0
5775	155	13	12.18	0.544	12.72	30.00	MCS0

10.5 POWER SPECTRAL DENSITY

802.11a Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Worstcase Datarate (Mbps)	Limit
Frequency [MHz]	Channel No.					
5180	36	6.334	0.139	6.473	6	11 dBm/MHz
5200	40	6.591	0.139	6.730	6	
5240	48	6.453	0.139	6.592	6	
5260	52	7.068	0.139	7.207	6	
5300	60	7.178	0.139	7.317	6	
5320	64	7.478	0.139	7.617	6	
5500	100	6.971	0.139	7.110	6	
5600	120	6.497	0.139	6.636	6	
5720	144	7.497	0.139	7.636	6	
5745	149	3.759	0.139	3.898	6	30 dBm/500kHz
5785	157	3.694	0.139	3.833	6	
5825	165	3.697	0.139	3.836	6	

802.11n(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5180	36	5.182	0.963	6.145	MCS6	11 dBm/MHz
5200	40	5.505	0.963	6.468	MCS6	
5240	48	5.149	0.963	6.112	MCS6	
5260	52	5.946	0.963	6.909	MCS6	
5300	60	6.179	0.963	7.142	MCS6	
5320	64	6.373	0.963	7.336	MCS6	
5500	100	5.573	0.963	6.536	MCS6	
5600	120	5.538	0.963	6.501	MCS6	
5720	144	6.759	0.963	7.722	MCS6	
5745	149	2.854	0.963	3.817	MCS6	30 dBm/500 kHz
5785	157	3.020	0.963	3.983	MCS6	
5825	165	3.383	0.963	4.346	MCS6	

802.11n(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5190	38	1.438	0.281	1.719	MCS0	11 dBm/MHz
5230	46	3.351	0.281	3.632	MCS0	
5270	54	3.789	0.281	4.070	MCS0	
5310	62	1.156	0.281	1.437	MCS0	
5510	102	0.754	0.281	1.035	MCS0	
5590	118	3.527	0.281	3.808	MCS0	
5710	142	3.628	0.281	3.909	MCS0	
5755	151	0.828	0.281	1.109	MCS0	30 dBm /500kHz
5795	159	0.591	0.281	0.872	MCS0	

802.11ac(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5180	36	5.891	0.141	6.032	MCS0	11 dBm/MHz
5200	40	6.225	0.141	6.366	MCS0	
5240	48	6.170	0.141	6.311	MCS0	
5260	52	6.738	0.141	6.879	MCS0	
5300	60	7.043	0.141	7.184	MCS0	
5320	64	7.182	0.141	7.323	MCS0	
5500	100	6.526	0.141	6.667	MCS0	
5600	120	6.446	0.141	6.587	MCS0	
5720	144	7.169	0.141	7.310	MCS0	
5745	149	3.787	0.141	3.928	MCS0	30 dBm/500kHz
5785	157	3.585	0.141	3.726	MCS0	
5825	165	3.705	0.141	3.846	MCS0	

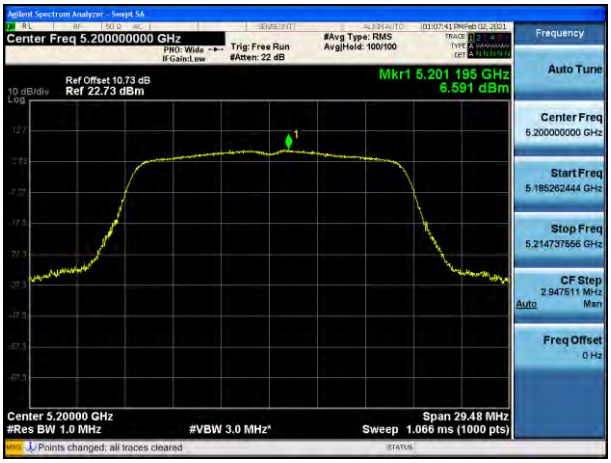
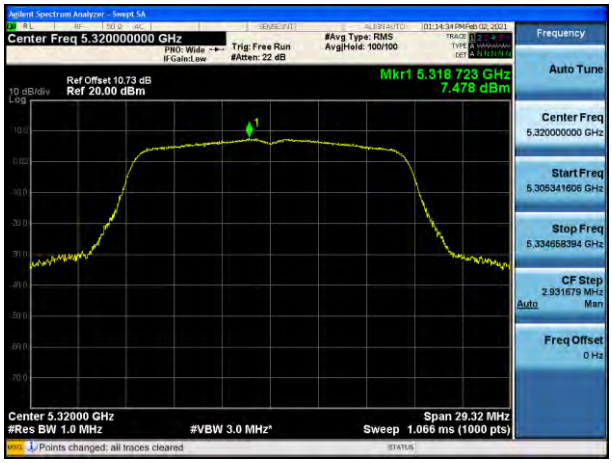
802.11ac(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5190	38	1.156	0.278	1.434	MCS0	11 dBm/MHz
5230	46	2.843	0.278	3.121	MCS0	
5270	54	4.008	0.278	4.286	MCS0	
5310	62	1.250	0.278	1.528	MCS0	
5510	102	0.669	0.278	0.947	MCS0	
5590	118	3.423	0.278	3.701	MCS0	
5710	142	3.580	0.278	3.858	MCS0	
5755	151	1.083	0.278	1.361	MCS0	30 dBm/500kHz
5795	159	0.898	0.278	1.176	MCS0	

802.11ac(80MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5210	42	-3.727	0.544	-3.183	MCS0	11 dBm/MHz
5290	58	-3.245	0.544	-2.701	MCS0	
5530	106	-3.268	0.544	-2.724	MCS0	
5610	122	-3.575	0.544	-3.031	MCS0	
5690	138	-3.921	0.544	-3.377	MCS0	
5775	155	-6.837	0.544	-6.293	MCS0	30 dBm/500kHz

▣ 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. 40)	UNII 2A (Ch. 64)
	

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

▣ Test Plots(802.11n(HT40))

Note:

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

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

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

▣ Test Plots(802.11ac(VHT20))

Note:

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

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

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

▣ Test Plots(802.11ac(VHT40))

Note:

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

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

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

▣ Test Plots(802.11ac(VHT80))

Note:

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

UNII 1 (Ch. 42)	UNII 2A (Ch. 58)
	

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

10.6 FREQUENCY STABILITY.

10.6.1 80MHz BW

Startup after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5210031.84	31.84
100%		-30	5210009.65	9.65
100%		-20	5210012.68	12.68
100%		-10	5210020.62	20.62
100%		0	5210020.50	20.50
100%		+10	5210030.71	30.71
100%		+30	5210040.48	40.48
100%		+40	5210041.98	41.98
100%		+50	5210053.48	53.48
Batt. Endpoint	3.40	+20	5210032.63	32.63

Note:

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

OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,290,000,000 Hz
CHANNEL:	58
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5290030.77	30.77
100%		-30	5290007.40	7.40
100%		-20	5290013.62	13.62
100%		-10	5290017.41	17.41
100%		0	5290020.99	20.99
100%		+10	5290028.02	28.02
100%		+30	5290038.75	38.75
100%		+40	5290045.83	45.83
100%		+50	5290058.76	58.76
Batt. Endpoint	3.40	+20	5290030.58	30.58

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:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5530035.44	35.44
100%		-30	5530006.94	6.94
100%		-20	5530013.26	13.26
100%		-10	5530020.64	20.64
100%		0	5530022.20	22.2
100%		+10	5530029.85	29.85
100%		+30	5530036.17	36.17
100%		+40	5530041.46	41.46
100%		+50	5530056.09	56.09
Batt. Endpoint	3.40	+20	5530030.25	30.25

Note:

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

OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,775,000,000 Hz
CHANNEL:	155
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5775033.14	33.14
100%		-30	5775008.51	8.51
100%		-20	5775010.21	10.21
100%		-10	5775018.21	18.21
100%		0	5775020.87	20.87
100%		+10	5775030.27	30.27
100%		+30	5775037.32	37.32
100%		+40	5775049.43	49.43
100%		+50	5775050.19	50.19
Batt. Endpoint	3.40	+20	5775035.94	35.94

Note:

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

2 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5210030.46	30.46
100%		-30	5210007.16	7.16
100%		-20	5210010.37	10.37
100%		-10	5210018.80	18.80
100%		0	5210022.72	22.72
100%		+10	5210028.38	28.38
100%		+30	5210035.81	35.81
100%		+40	5210047.72	47.72
100%		+50	5210053.63	53.63
Batt. Endpoint	3.40	+20	5210035.48	35.48

Note:

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

OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,290,000,000 Hz
CHANNEL:	58
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5290035.84	35.84
100%		-30	5290010.94	10.94
100%		-20	5290010.35	10.35
100%		-10	5290015.49	15.49
100%		0	5290021.43	21.43
100%		+10	5290030.57	30.57
100%		+30	5290036.36	36.36
100%		+40	5290045.76	45.76
100%		+50	5290052.91	52.91
Batt. Endpoint	3.40	+20	5290030.24	30.24

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:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5530034.95	34.95
100%		-30	5530005.14	5.14
100%		-20	5530014.28	14.28
100%		-10	5530015.43	15.43
100%		0	5530024.40	24.4
100%		+10	5530030.12	30.12
100%		+30	5530039.93	39.93
100%		+40	5530046.21	46.21
100%		+50	5530050.95	50.95
Batt. Endpoint	3.40	+20	5530032.55	32.55

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:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5775035.63	35.63
100%		-30	5775008.40	8.40
100%		-20	5775013.36	13.36
100%		-10	5775016.12	16.12
100%		0	5775024.82	24.82
100%		+10	5775028.67	28.67
100%		+30	5775040.65	40.65
100%		+40	5775040.94	40.94
100%		+50	5775055.41	55.41
Batt. Endpoint	3.40	+20	5775033.90	33.90

Note:

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

5 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5210032.08	32.08
100%		-30	5210007.70	7.70
100%		-20	5210014.96	14.96
100%		-10	5210020.82	20.82
100%		0	5210025.36	25.36
100%		+10	5210030.51	30.51
100%		+30	5210039.26	39.26
100%		+40	5210044.11	44.11
100%		+50	5210059.48	59.48
Batt. Endpoint	3.40	+20	5210031.88	31.88

Note:

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

OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,290,000,000 Hz
CHANNEL:	58
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5290032.17	32.17
100%		-30	5290006.08	6.08
100%		-20	5290013.39	13.39
100%		-10	5290018.26	18.26
100%		0	5290022.20	22.20
100%		+10	5290030.02	30.02
100%		+30	5290039.32	39.32
100%		+40	5290045.14	45.14
100%		+50	5290052.76	52.76
Batt. Endpoint	3.40	+20	5290032.51	32.51

Note:

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

OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,530,000,000 Hz
CHANNEL:	106
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5530032.42	32.42
100%		-30	5530006.56	6.56
100%		-20	5530012.25	12.25
100%		-10	5530016.69	16.69
100%		0	5530021.80	21.80
100%		+10	5530025.10	25.10
100%		+30	5530038.74	38.74
100%		+40	5530043.79	43.79
100%		+50	5530052.54	52.54
Batt. Endpoint	3.40	+20	5530034.92	34.92

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:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5775034.42	34.42
100%		-30	5775007.57	7.57
100%		-20	5775010.95	10.95
100%		-10	5775016.56	16.56
100%		0	5775024.85	24.85
100%		+10	5775030.50	30.50
100%		+30	5775035.52	35.52
100%		+40	5775040.60	40.60
100%		+50	5775056.34	56.34
Batt. Endpoint	3.40	+20	5775035.16	35.16

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:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5210032.15	32.15
100%		-30	5210010.50	10.50
100%		-20	5210014.91	14.91
100%		-10	5210017.81	17.81
100%		0	5210021.59	21.59
100%		+10	5210030.49	30.49
100%		+30	5210036.64	36.64
100%		+40	5210042.11	42.11
100%		+50	5210056.52	56.52
Batt. Endpoint	3.40	+20	5210032.14	32.14

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:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5290035.97	35.97
100%		-30	5290006.21	6.21
100%		-20	5290010.14	10.14
100%		-10	5290020.91	20.91
100%		0	5290022.12	22.12
100%		+10	5290028.33	28.33
100%		+30	5290036.18	36.18
100%		+40	5290046.21	46.21
100%		+50	5290054.54	54.54
Batt. Endpoint	3.40	+20	5290031.03	31.03

Note:

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

OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,530,000,000 Hz
CHANNEL:	106
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5530032.77	32.77
100%		-30	5530010.13	10.13
100%		-20	5530012.04	12.04
100%		-10	5530018.70	18.70
100%		0	5530025.49	25.49
100%		+10	5530027.77	27.77
100%		+30	5530035.25	35.25
100%		+40	5530048.44	48.44
100%		+50	5530056.05	56.05
Batt. Endpoint	3.40	+20	5530034.28	34.28

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:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5775034.07	34.07
100%		-30	5775006.52	6.52
100%		-20	5775012.20	12.20
100%		-10	5775016.12	16.12
100%		0	5775020.62	20.62
100%		+10	5775025.61	25.61
100%		+30	5775036.92	36.92
100%		+40	5775042.86	42.86
100%		+50	5775050.54	50.54
Batt. Endpoint	3.40	+20	5775035.43	35.43

Note:

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

10.7 STRADDLE CHANNEL

10.7.1 26dB Bandwidth

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26dB Bandwidth [MHz]
802.11a	UNII 2C	5720	144	5710.16	14.84
802.11n(HT20)				5710.20	14.80
802.11ac(VHT20)				5710.04	14.96
802.11a	UNII 3	5720	144	5729.84	4.84
802.11n(HT20)				5729.96	4.96
802.11ac(VHT20)				5730.08	5.08

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26dB Bandwidth [MHz]
802.11n(HT40)	UNII 2C	5710	142	5690.00	35.00
802.11ac(VHT40)				5690.00	35.00
802.11n(HT40)	UNII 3	5710	142	5730.08	5.08
802.11ac(VHT40)				5729.92	4.92

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26dB Bandwidth [MHz]
802.11ac(VHT80)	UNII 2C	5690	138	5649.32	75.68
	UNII 3	5690	138	5730.20	5.20

Note:

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

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

▣ Test Plots (26dB Bandwidth)

802.11a UNII Band	802.11n(HT20) UNII Band
	

802.11ac(VHT20) UNII Band


▣ Test Plots (26dB Bandwidth)

802.11n(HT40) UNII Band	802.11ac(VHT40) UNII Band
	

802.11ac(VHT80) UNII Band


10.7.2 6dB Bandwidth

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6dB Bandwidth [MHz]	Limit [MHz]
802.11a	UNII 3	5720	144	5727.60	2.60	> 0.5
802.11n(HT20)				5728.36	3.36	> 0.5
802.11ac(VHT20)				5727.60	2.60	> 0.5

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6dB Bandwidth [MHz]	Limit [MHz]
802.11n(HT40)	UNII 3	5710	142	5727.60	2.60	> 0.5
802.11ac(VHT40)				5727.60	2.60	> 0.5

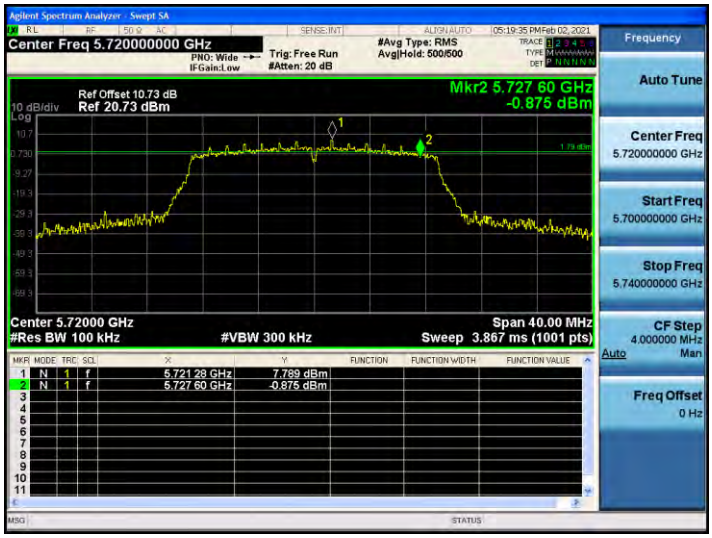
Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6dB Bandwidth [MHz]	Limit [MHz]
802.11ac(VHT80)	UNII 3	5690	138	5727.68	2.68	> 0.5

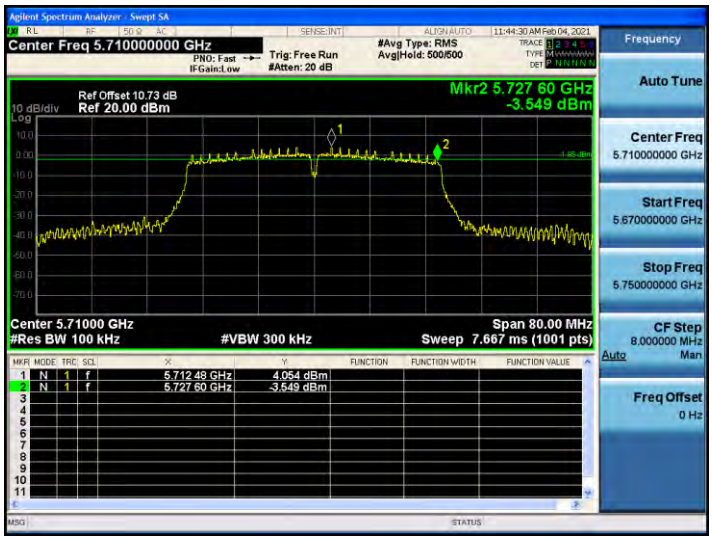
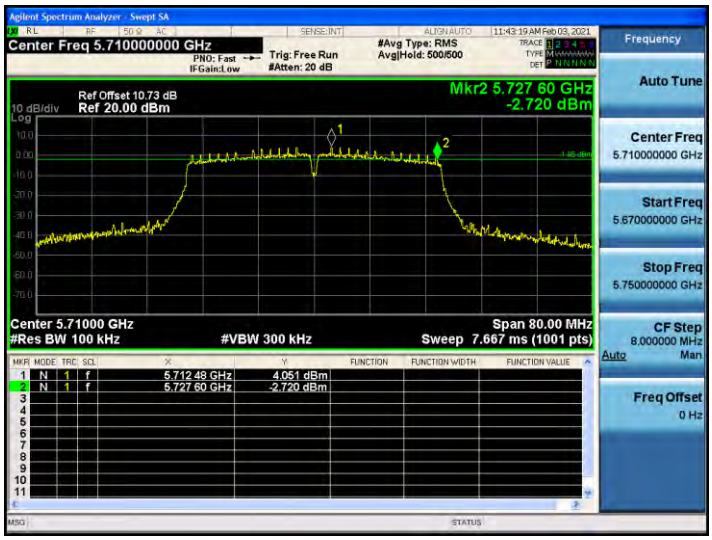
Note:

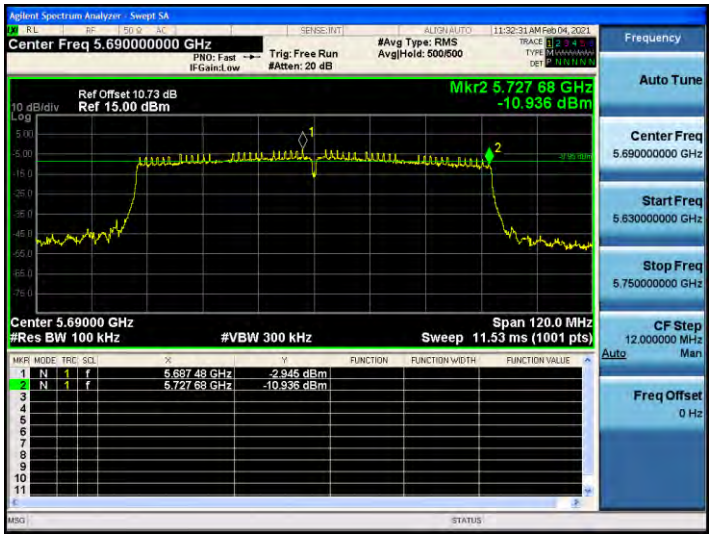
6dB Bandwidth = Measured Frequency[MHz] – 5725MHz

▣ Test Plots(UNII 3 Band 6dB Bandwidth)

802.11a CH.144	802.11n_HT20 CH.144
	

802.11ac_VHT20 CH.144


802.11n_HT40 CH.142	802.11ac_VHT40 CH.142
	

802.11ac_VHT80 CH.138


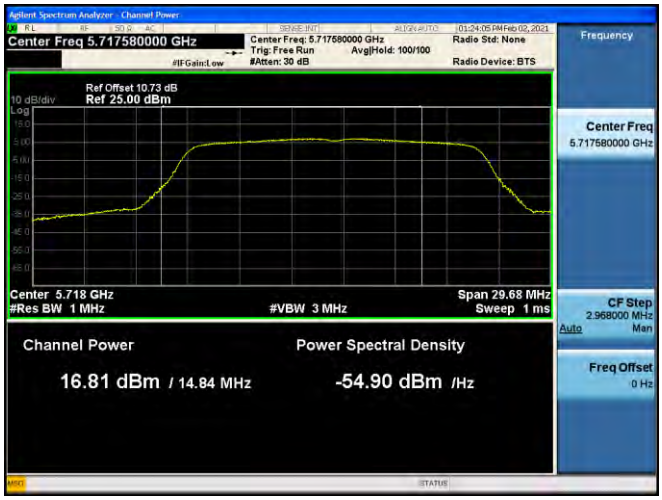
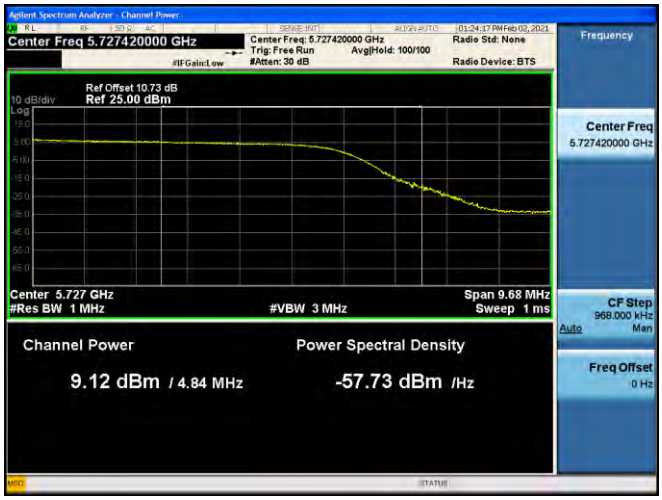
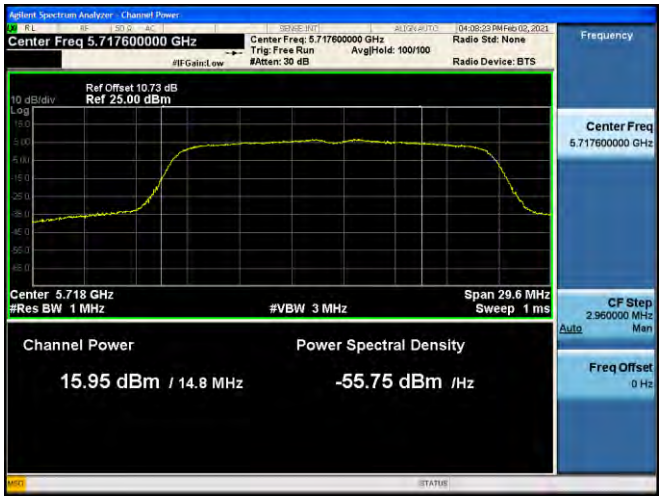
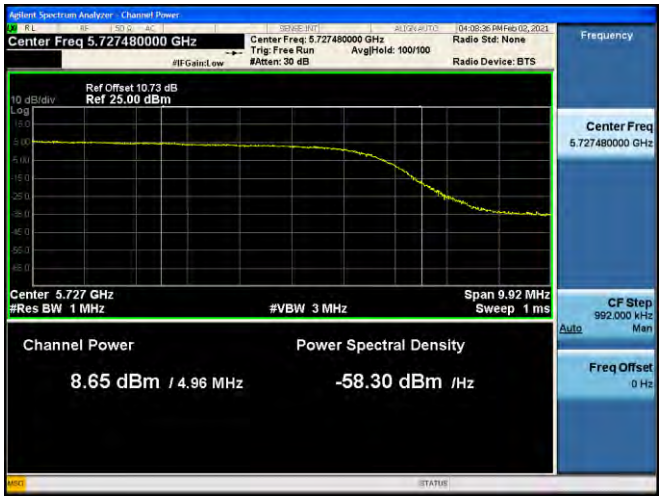
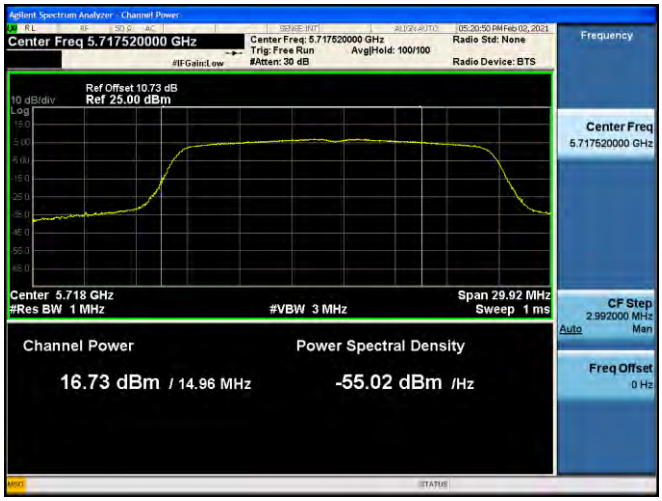
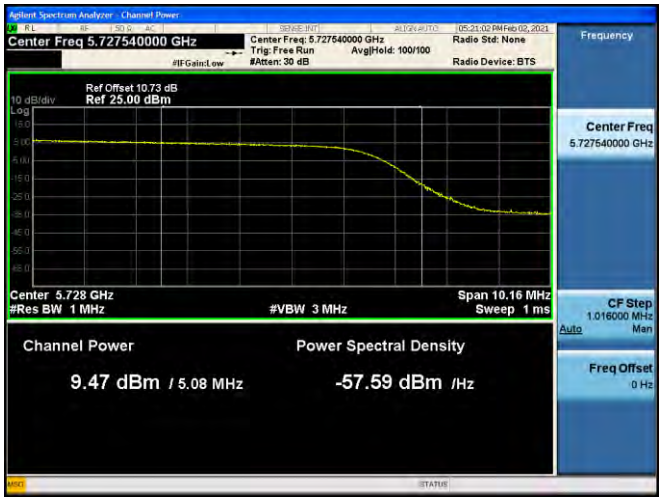
10.7.3 Output Power

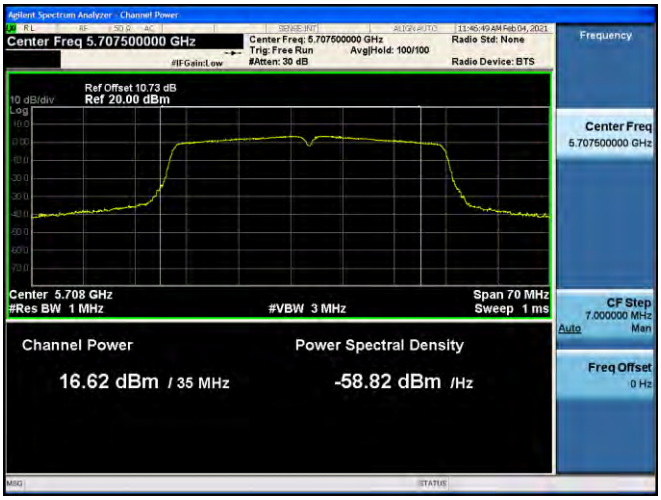
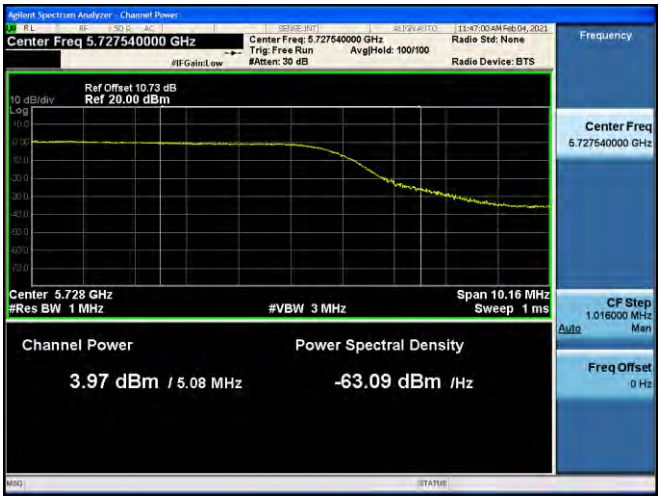
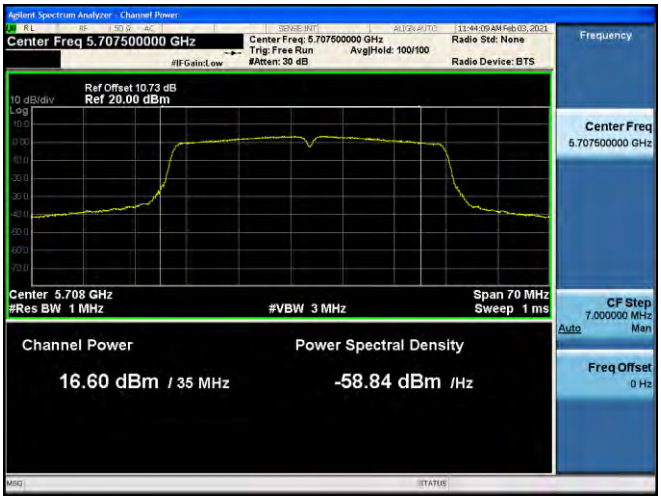
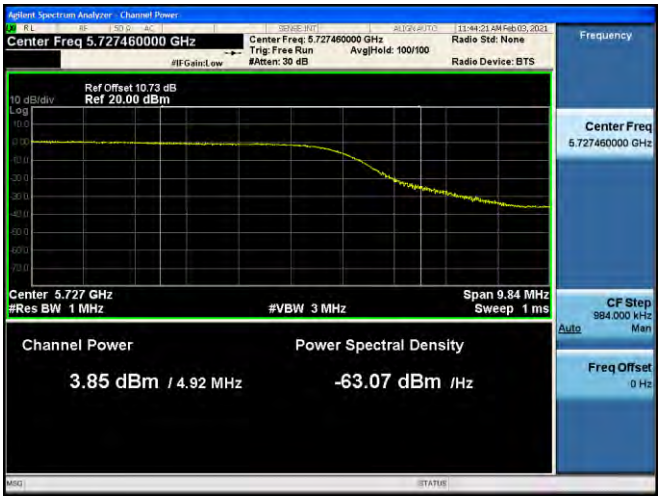
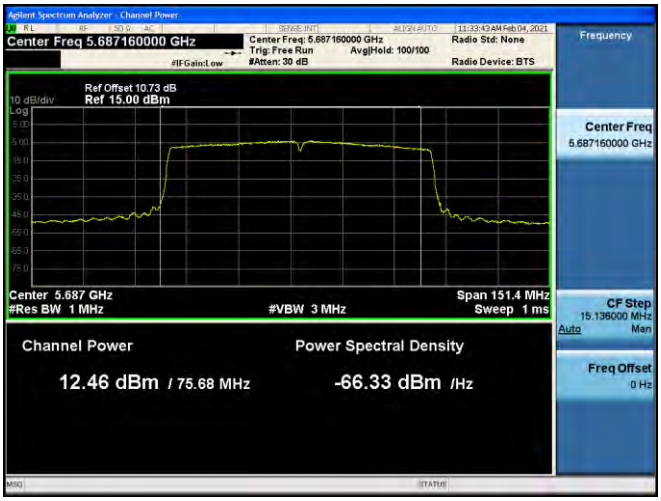
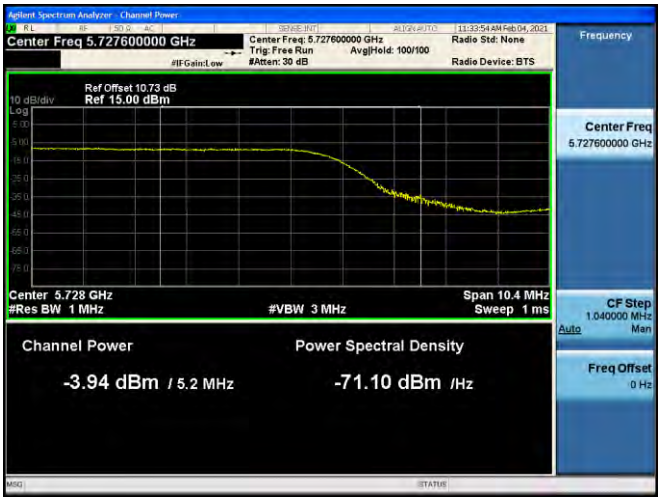
Mode	Frequency [MHz]	Channel	Measured Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)	Worstcase Datarate
802.11a	5720 (UNII 2C Band)	144	16.81	0.139	16.95	22.71	6 Mbps
802.11n(HT20)			15.95	0.963	16.91	22.70	MCS6
802.11ac(VHT20)			16.73	0.141	16.87	22.75	MCS0
802.11a	5720 (UNII 3 Band)	144	9.12	0.139	9.25	30.00	6 Mbps
802.11n(HT20)			8.65	0.963	9.61	30.00	MCS6
802.11ac(VHT20)			9.47	0.141	9.61	30.00	MCS0

Mode	Frequency [MHz]	Channel	Measured Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)	Worstcase Datarate
802.11n(HT40)	5710 (UNII 2C Band)	142	16.62	0.281	16.90	23.98	MCS0
802.11ac(VHT40)			16.60	0.278	16.88	23.98	MCS0
802.11n(HT40)	5710 (UNII 3 Band)	142	3.97	0.281	4.25	30.00	MCS0
802.11ac(VHT40)			3.85	0.278	4.13	30.00	MCS0

Mode	Frequency [MHz]	Channel	Measured Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)	Worstcase Datarate
802.11ac(VHT80)	5690 (UNII 2C Band)	138	12.46	0.544	13.01	23.98	MCS0
	5690 (UNII 3 Band)	138	-3.94	0.544	-3.40	30.00	MCS0

▣ Test Plots_

802.11a UNII 2C Band	802.11a UNII 3 Band
	
802.11n(HT20) UNII 2C Band	**802.11n(HT20) UNII 3 Band**
	
802.11ac(VHT20) UNII 2C Band	**802.11ac(VHT20) UNII 3 Band**
	

802.11n(HT40) UNII 2C Band	802.11n(HT40) UNII 3 Band
	
802.11ac(VHT40) UNII 2C Band	**802.11ac(VHT40) UNII 3 Band**
	
802.11ac(VHT80) UNII 2C Band	**802.11ac(VHT80) UNII 3 Band**
	

10.7.4 Power Spectral Density

Mode	Frequency [MHz]	Channel	Measured Density (dBm)	Duty Cycle Factor (dB)	Total PSD (dBm)	Limit (dBm)	Worstcase Datarate
802.11a	5720 (UNII 2C Band)	144	7.361	0.139	7.500	11dBm/ MHz	6 Mbps
802.11n(HT20)			6.516	0.963	7.479		MCS6
802.11ac(VHT20)			7.063	0.141	7.204		MCS0
802.11a	5720 (UNII 3 Band)	144	2.526	0.139	2.665	30 dB/ 500kHz	6 Mbps
802.11n(HT20)			1.991	0.963	2.954		MCS6
802.11ac(VHT20)			2.483	0.141	2.624		MCS0

Mode	Frequency [MHz]	Channel	Measured Density (dBm)	Duty Cycle Factor (dB)	Total PSD (dBm)	Limit (dBm)	Worstcase Datarate
802.11n(HT40)	5710 (UNII 2C Band)	142	3.616	0.281	3.897	11dBm/ MHz	MCS0
802.11ac(VHT40)			3.467	0.278	3.745		MCS0
802.11n(HT40)	5710 (UNII 3 Band)	142	-3.106	0.281	-2.825	30 dB/ 500kHz	MCS0
802.11ac(VHT40)			-2.857	0.278	-2.579		MCS0

Mode	Frequency [MHz]	Channel	Measured Density (dBm)	Duty Cycle Factor (dB)	Total PSD (dBm)	Limit (dBm)	Worstcase Datarate
802.11ac(VHT80)	5690 (UNII 2C Band)	138	-3.806	0.544	-3.262	11dBm/ MHz	MCS0
	5690 (UNII 3 Band)	138	-11.155	0.544	-10.611	30 dBm/ 500kHz	MCS0

▣ Test Plots

802.11a UNII 2C Band	802.11a UNII 3 Band
	
802.11n(HT20) UNII 2C Band	**802.11n(HT20) UNII 3 Band**
	
802.11ac(VHT20) UNII 2C Band	**802.11ac(VHT20) UNII 3 Band**
	

802.11n(HT40) UNII 2C Band	802.11n(HT40) UNII 3 Band
	
802.11ac(VHT40) UNII 2C Band	**802.11ac(VHT40) UNII 3 Band**
	
802.11ac(VHT80) UNII 2C Band	**802.11ac(VHT80) UNII 3 Band**
	

10.8 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30MHz

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dBuV/m	dBm/m	dBm	(H/V)	dBuV/m	dBuV/m	dB
No Critical peaks found							

Note:

1. The reading of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
2. Distance extrapolation factor = 40log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dBuV) + Distance extrapolation factor

Frequency Range : Below 1 GHz

Frequency	Reading	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	dBuV/m	dBm/m	dBm	(H/V)	dBuV/m	dBuV/m	dB
No Critical peaks found							

Note:

1. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode

Frequency Range : Above 1 GHz

Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10360	58.19	0.49	V	58.68	68.20	9.52	PK
15540	56.46	2.62	V	59.08	73.98	14.90	PK
15540	42.15	2.62	V	44.77	53.98	9.21	AV
10360	56.12	0.49	H	56.61	68.20	11.59	PK
15540	56.78	2.62	H	59.40	73.98	14.58	PK
15540	43.58	2.62	H	46.20	53.98	7.78	AV

Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5200 MHz
Channel No.	40 Ch

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10400	61.89	1.38	V	63.27	68.20	4.93	PK
15600	57.23	1.50	V	58.73	73.98	15.25	PK
15600	43.37	1.50	V	44.87	53.98	9.11	AV
10400	60.91	1.38	H	62.29	68.20	5.91	PK
15600	56.98	1.50	H	58.48	73.98	15.50	PK
15600	42.95	1.50	H	44.45	53.98	9.53	AV

Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5240 MHz
Channel No.	48 Ch

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10480	62.81	-0.33	V	62.48	68.20	5.72	PK
15720	57.54	0.56	V	58.10	73.98	15.88	PK
15720	44.64	0.56	V	45.20	53.98	8.78	AV
10480	61.52	-0.33	H	61.19	68.20	7.01	PK
15720	57.12	0.56	H	57.68	73.98	16.30	PK
15720	44.21	0.56	H	44.77	53.98	9.21	AV

Band :	UNII 2A
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5260 MHz
Channel No.	52 Ch

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10520	64.09	-0.06	V	64.03	68.20	4.17	PK
15780	57.48	0.96	V	58.44	73.98	15.54	PK
15780	44.38	0.96	V	45.34	53.98	8.64	AV
10520	62.89	-0.06	H	62.83	68.20	5.37	PK
15780	56.25	0.96	H	57.21	73.98	16.77	PK
15780	43.12	0.96	H	44.08	53.98	9.90	AV

Band :	UNII 2A
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5300 MHz
Channel No.	60 Ch

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10600	63.45	-0.18	V	63.27	73.98	10.71	PK
10600	50.42	-0.18	V	50.24	53.98	3.74	AV
15900	57.07	-0.13	V	56.94	73.98	17.04	PK
15900	44.27	-0.13	V	44.14	53.98	9.84	AV
10600	63.68	-0.18	H	63.50	73.98	10.48	PK
10600	50.77	-0.18	H	50.59	53.98	3.39	AV
15900	56.85	-0.13	H	56.72	73.98	17.26	PK
15900	43.98	-0.13	H	43.85	53.98	10.13	AV

Band :	UNII 2A
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10640	61.95	-0.04	V	61.91	73.98	12.07	PK
10640	48.88	-0.04	V	48.84	53.98	5.14	AV
15960	56.65	-0.36	V	56.29	73.98	17.69	PK
15960	42.83	-0.36	V	42.47	53.98	11.51	AV
10640	62.16	-0.04	H	62.12	73.98	11.86	PK
10640	49.15	-0.04	H	49.11	53.98	4.87	AV
15960	56.22	-0.36	H	55.86	73.98	18.12	PK
15960	42.12	-0.36	H	41.76	53.98	12.22	AV

Band :	UNII 2C
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11000	59.55	1.75	V	61.30	73.98	12.68	PK
11000	46.66	1.75	V	48.41	53.98	5.57	AV
16500	51.15	1.06	V	52.21	68.20	15.99	PK
11000	59.64	1.75	H	61.39	73.98	12.59	PK
11000	46.79	1.75	H	48.54	53.98	5.44	AV
16500	51.03	1.06	H	52.09	68.20	16.11	PK

Band :	UNII 2C
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5600 MHz
Channel No.	120 Ch

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11200	60.98	0.26	V	61.24	73.98	12.74	PK
11200	48.02	0.26	V	48.28	53.98	5.70	AV
16800	50.89	3.41	V	54.30	68.20	13.90	PK
11200	61.32	0.26	H	61.58	73.98	12.40	PK
11200	48.45	0.26	H	48.71	53.98	5.27	AV
16800	51.49	3.41	H	54.90	68.20	13.30	PK

Band :	UNII 2C
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5720 MHz
Channel No.	144 Ch

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11440	60.12	0.74	V	60.86	73.98	13.12	PK
11440	46.12	0.74	V	46.86	53.98	7.12	AV
17160	52.70	5.47	V	58.17	68.20	10.03	PK
11440	60.27	0.74	H	61.01	73.98	12.97	PK
11440	46.22	0.74	H	46.96	53.98	7.02	AV
17160	51.85	5.47	H	57.32	68.20	10.88	PK

Band :	UNII 3
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5745MHz
Channel No.	149 Ch

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11490	58.78	0.57	V	59.35	73.98	14.63	PK
11490	45.25	0.57	V	45.82	53.98	8.16	AV
17235	53.72	5.22	V	58.94	68.20	9.26	PK
11490	59.65	0.57	H	60.22	73.98	13.76	PK
11490	46.16	0.57	H	46.73	53.98	7.25	AV
17235	52.85	5.22	H	58.07	68.20	10.13	PK

Band :	UNII 3
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5785 MHz
Channel No.	157 Ch

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11570	59.42	0.73	V	60.15	73.98	13.83	PK
11570	44.02	0.73	V	44.75	53.98	9.23	AV
17355	52.71	6.04	V	58.75	68.20	9.45	PK
11570	59.65	0.73	H	60.38	73.98	13.60	PK
11570	45.24	0.73	H	45.97	53.98	8.01	AV
17355	52.87	6.04	H	58.91	68.20	9.29	PK

Band :	UNII 3
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5825 MHz
Channel No.	165 Ch

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11650	58.71	-0.65	V	58.06	73.98	15.92	PK
11650	44.91	-0.65	V	44.26	53.98	9.72	AV
17475	52.12	7.62	V	59.74	68.20	8.46	PK
11650	58.52	-0.65	H	57.87	73.98	16.11	PK
11650	44.75	-0.65	H	44.10	53.98	9.88	AV
17475	53.16	7.62	H	60.78	68.20	7.42	PK

Note:

All Modes of operation were investigated and the worst case configuration results are reported.

[Worst case]

UNII 1, UNII 2A, UNII 2C, UNII 3 : 802.11a_6Mbps

[DBS Mode]

WLAN/BT Ant : 802.11a ch 60 & Bluetooth Ch 0 (GFSK)

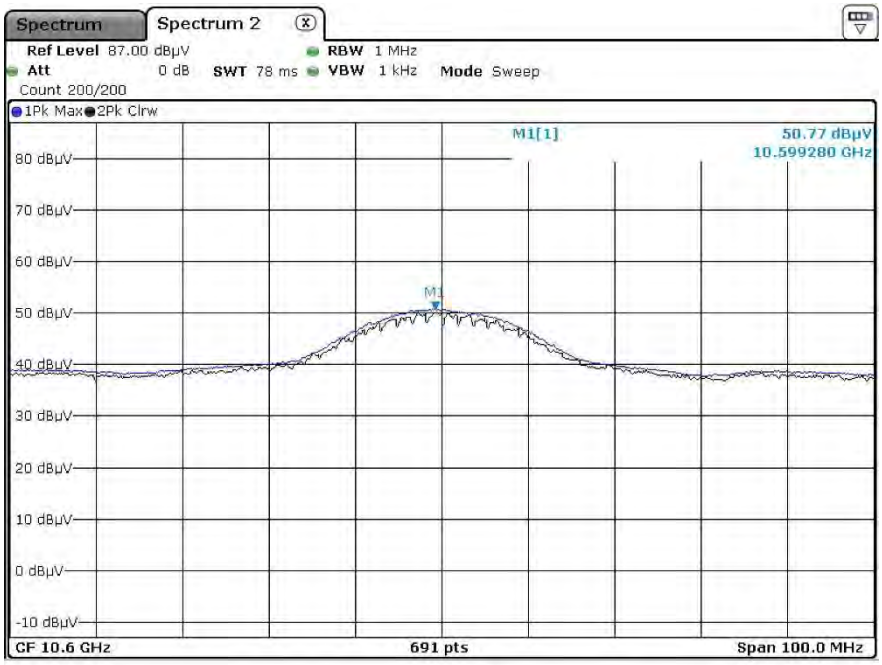
Operation Mode:	802.11a & GFSK
Transfer Rate:	6 Mbps & 1 Mbps
Operating Frequency	5300 & 2402 MHz
Channel No.	60 Ch & 0 Ch

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	Pol. [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10600	63.11	-0.18	V	62.93	73.98	11.05	PK
10600	50.22	-0.18	V	50.04	53.98	3.94	AV
15900	56.88	-0.13	V	56.75	73.98	17.23	PK
15900	44.12	-0.13	V	43.99	53.98	9.99	AV
10600	63.52	-0.18	H	63.34	73.98	10.64	PK
10600	50.61	-0.18	H	50.43	53.98	3.55	AV
15900	56.72	-0.13	H	56.59	73.98	17.39	PK
15900	43.81	-0.13	H	43.68	53.98	10.30	AV

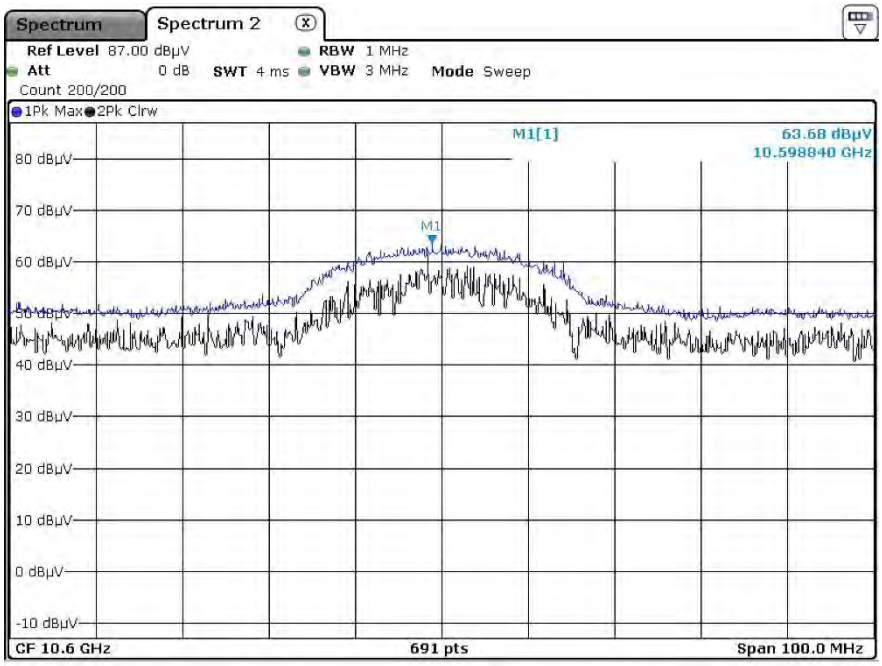
Note : Bluetooth DBS Data refer to BT Test Report.

▣ Test Plots

Average Reading (802.11a, Ch.60 2nd Harmonic, Y-H)



Peak Reading (802.11a, Ch.60 2nd Harmonic, Y-H)



Note:

Only the worst case plots for Radiated Spurious Emissions.

10.9 RADIATED RESTRICTED BAND EDGE

Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	56.80	12.72	H	69.52	73.98	4.46	PK
5150	36.23	12.72	H	48.95	53.98	5.03	AV
5150	56.12	12.72	V	68.84	73.98	5.14	PK
5150	35.22	12.72	V	47.94	53.98	6.04	AV

Band :	UNII 2A
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	56.16	12.38	H	68.54	73.98	5.44	PK
5350	36.07	12.38	H	48.45	53.98	5.53	AV
5350	55.48	12.38	V	67.86	73.98	6.12	PK
5350	35.02	12.38	V	47.4	53.98	6.58	AV

Band :	UNII 2C
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	46.53	13.91	H	60.44	73.98	13.54	PK
5460	32.52	13.91	H	46.43	53.98	7.55	AV
5470	52.10	13.46	H	65.56	68.20	2.64	PK
5460	45.42	13.91	V	59.33	73.98	14.65	PK
5460	31.52	13.91	V	45.43	53.98	8.55	AV
5470	51.25	13.46	V	64.71	68.20	3.49	PK

Band :	UNII 1
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	56.66	12.72	H	69.38	73.98	4.60	PK
5150	36.40	12.72	H	49.12	53.98	4.86	AV
5150	55.26	12.72	V	67.98	73.98	6.00	PK
5150	35.25	12.72	V	47.97	53.98	6.01	AV

Band :	UNII 2A
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	57.70	12.38	H	70.08	73.98	3.90	PK
5350	36.16	12.38	H	48.54	53.98	5.44	AV
5350	56.52	12.38	V	68.90	73.98	5.08	PK
5350	35.18	12.38	V	47.56	53.98	6.42	AV

Band :	UNII 2C
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	45.41	13.91	H	59.32	73.98	14.66	PK
5460	32.04	13.91	H	45.95	53.98	8.03	AV
5470	50.05	13.46	H	63.51	68.20	4.69	PK
5460	44.58	13.91	V	58.49	73.98	15.49	PK
5460	31.25	13.91	V	45.16	53.98	8.82	AV
5470	48.58	13.46	V	62.04	68.20	6.16	PK

Band :	UNII 1
Operation Mode:	802.11 ac_VHT20
Transfer MCS Index:	0
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	55.22	12.72	H	67.94	73.98	6.04	PK
5150	34.22	12.72	H	46.94	53.98	7.04	AV
5150	54.95	12.72	V	67.67	73.98	6.31	PK
5150	33.85	12.72	V	46.57	53.98	7.41	AV

Band :	UNII 2A
Operation Mode:	802.11 ac_VHT20
Transfer MCS Index:	0
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	55.83	12.38	H	68.21	73.98	5.77	PK
5350	36.06	12.38	H	48.44	53.98	5.54	AV
5350	55.21	12.38	V	67.59	73.98	6.39	PK
5350	35.62	12.38	V	48	53.98	5.98	AV

Band :	UNII 2C
Operation Mode:	802.11 ac_VHT20
Transfer MCS Index:	0
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	45.55	13.91	H	59.46	73.98	14.52	PK
5460	32.58	13.91	H	46.49	53.98	7.49	AV
5470	50.99	13.46	H	64.45	68.20	3.75	PK
5460	44.85	13.91	V	58.76	73.98	15.22	PK
5460	31.52	13.91	V	45.43	53.98	8.55	AV
5470	50.12	13.46	V	63.58	68.20	4.62	PK

Band :	UNII 1
Operation Mode:	802.11 n_HT40
Transfer MCS Index:	0
Operating Frequency	5190 MHz
Channel No.	38 Ch

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	54.10	12.72	H	66.82	73.98	7.16	PK
5150	37.88	12.72	H	50.60	53.98	3.38	AV
5150	53.85	12.72	V	66.57	73.98	7.41	PK
5150	37.25	12.72	V	49.97	53.98	4.01	AV

Band :	UNII 2A
Operation Mode:	802.11 n_HT40
Transfer MCS Index:	0
Operating Frequency	5310 MHz
Channel No.	62 Ch

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	57.12	12.38	H	69.50	73.98	4.48	PK
5350	37.76	12.38	H	50.14	53.98	3.84	AV
5350	56.22	12.38	V	68.60	73.98	5.38	PK
5350	36.52	12.38	V	48.90	53.98	5.08	AV

Band :	UNII 2C
Operation Mode:	802.11 n_HT40
Transfer MCS Index:	0
Operating Frequency	5510 MHz
Channel No.	102 Ch

Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	48.40	13.91	H	62.31	73.98	11.67	PK
5460	32.43	13.91	H	46.34	53.98	7.64	AV
5470	51.35	13.46	H	64.81	68.20	3.39	PK
5460	47.52	13.91	V	61.43	73.98	12.55	PK
5460	31.42	13.91	V	45.33	53.98	8.65	AV
5470	50.85	13.46	V	64.31	68.20	3.89	PK

Band :	UNII 1
Operation Mode:	802.11 ac_VHT40
Transfer MCS Index:	0
Operating Frequency	5190 MHz
Channel No.	38 Ch

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	54.23	12.72	H	66.95	73.98	7.03	PK
5150	37.95	12.72	H	50.67	53.98	3.31	AV
5150	53.85	12.72	V	66.57	73.98	7.41	PK
5150	36.85	12.72	V	49.57	53.98	4.41	AV

Band :	UNII 2A
Operation Mode:	802.11 ac_VHT40
Transfer MCS Index:	0
Operating Frequency	5310 MHz
Channel No.	62 Ch

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	57.69	12.38	H	70.07	73.98	3.91	PK
5350	37.79	12.38	H	50.17	53.98	3.81	AV
5350	56.85	12.38	V	69.23	73.98	4.75	PK
5350	36.85	12.38	V	49.23	53.98	4.75	AV

Band :	UNII 2C
Operation Mode:	802.11 ac_VHT40
Transfer MCS Index:	0
Operating Frequency	5510 MHz
Channel No.	102 Ch

Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	44.66	13.91	H	58.57	73.98	15.41	PK
5460	32.29	13.91	H	46.2	53.98	7.78	AV
5470	51.12	13.46	H	64.58	68.20	3.62	PK
5460	43.55	13.91	V	57.46	73.98	16.52	PK
5460	31.85	13.91	V	45.76	53.98	8.22	AV
5470	50.28	13.46	V	63.74	68.20	4.46	PK

Band :	UNII 1
Operation Mode:	802.11 ac_VHT80
Transfer MCS Index:	0
Operating Frequency	5210 MHz
Channel No.	42 Ch

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	52.87	12.72	H	65.59	73.98	8.39	PK
5150	38.45	12.72	H	51.17	53.98	2.81	AV
5150	51.55	12.72	V	64.27	73.98	9.71	PK
5150	37.25	12.72	V	49.97	53.98	4.01	AV

Band :	UNII 2A
Operation Mode:	802.11 ac_VHT80
Transfer MCS Index:	0
Operating Frequency	5290 MHz
Channel No.	58 Ch

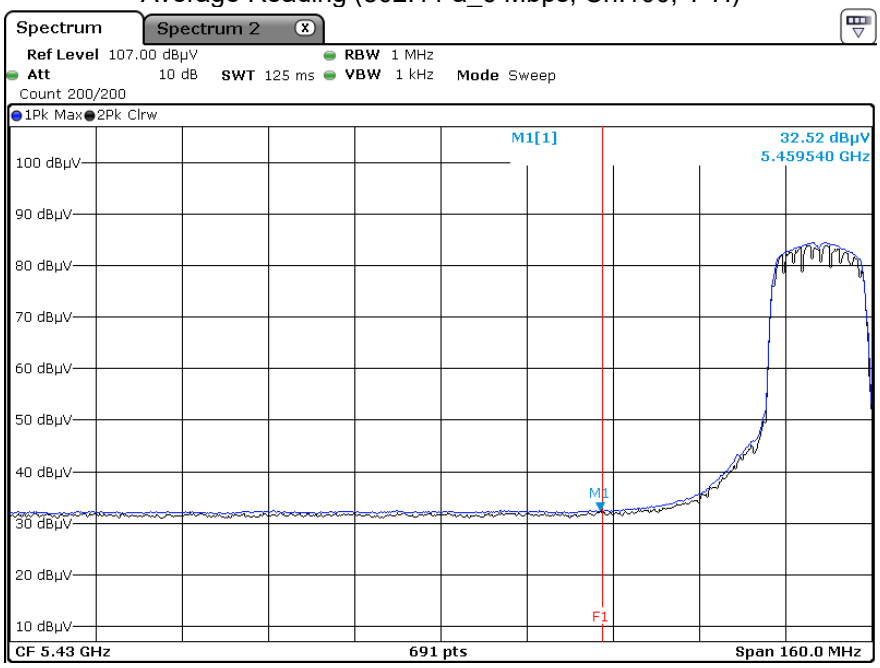
Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	56.22	12.38	H	68.60	73.98	5.38	PK
5350	39.47	12.38	H	51.85	53.98	2.13	AV
5350	55.85	12.38	V	68.23	73.98	5.75	PK
5350	38.58	12.38	V	50.96	53.98	3.02	AV

Band :	UNII 2C
Operation Mode:	802.11 ac_VHT80
Transfer MCS Index:	0
Operating Frequency	5530 MHz
Channel No.	106 Ch

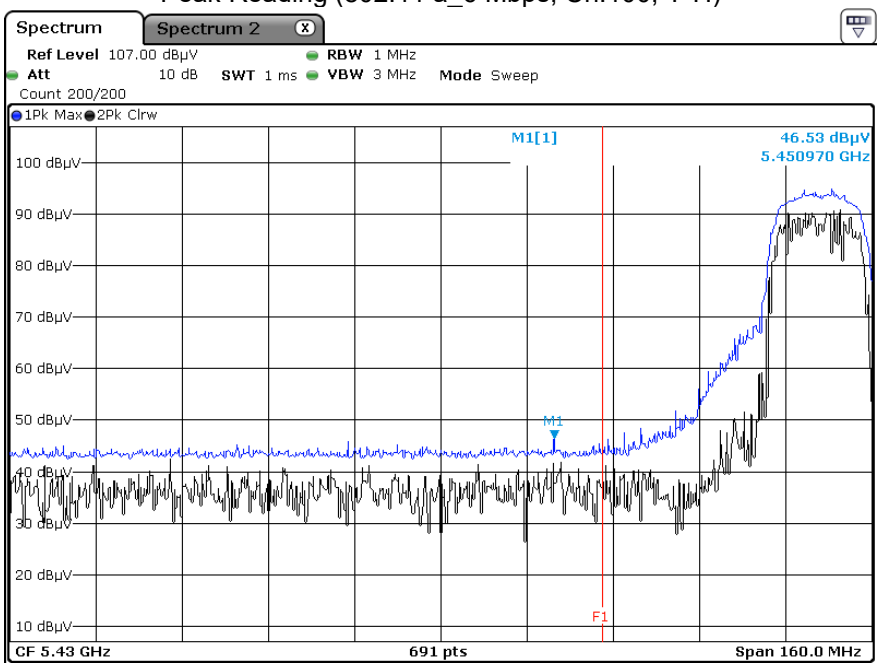
Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	47.54	13.91	H	61.45	73.98	12.53	PK
5460	34.47	13.91	H	48.38	53.98	5.60	AV
5470	50.99	13.46	H	64.45	68.20	3.75	PK
5460	46.85	13.91	V	60.76	73.98	13.22	PK
5460	33.85	13.91	V	47.76	53.98	6.22	AV
5470	49.69	13.46	V	63.15	68.20	5.05	PK

▣ Test Plots(UNII 1, 2A, 2C)

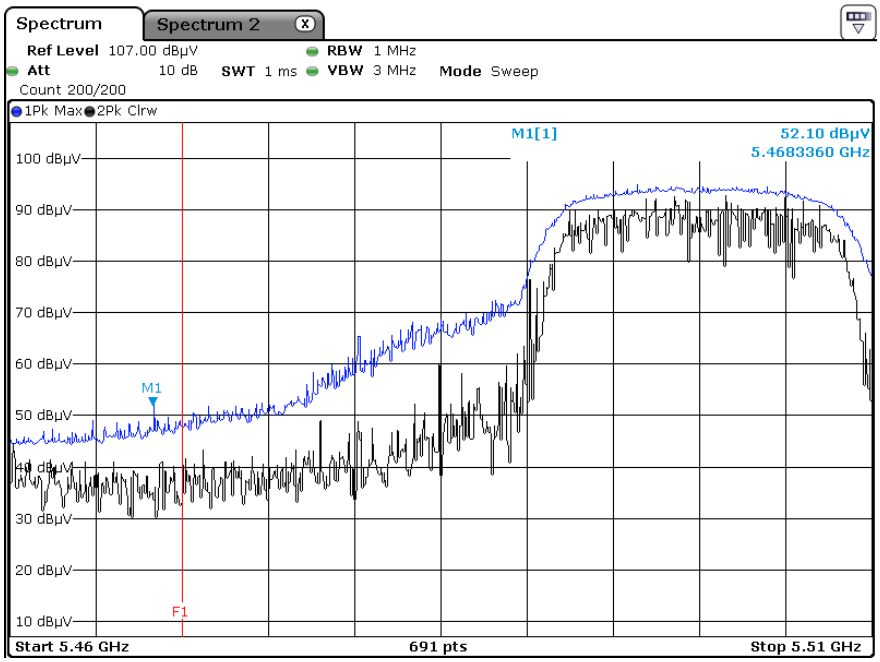
Average Reading (802.11 a_6 Mbps, Ch.100, Y-H)



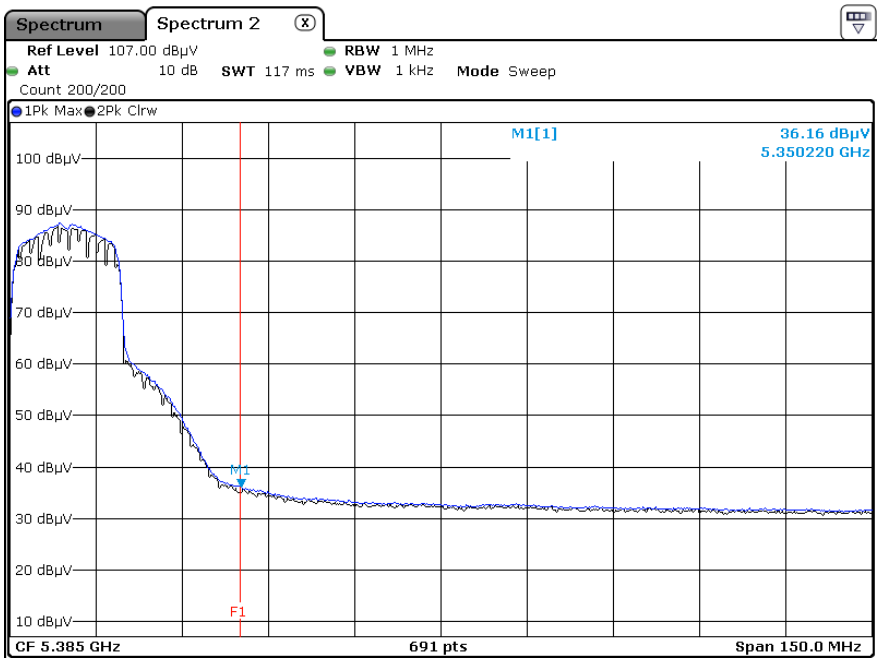
Peak Reading (802.11 a_6 Mbps, Ch.100, Y-H)



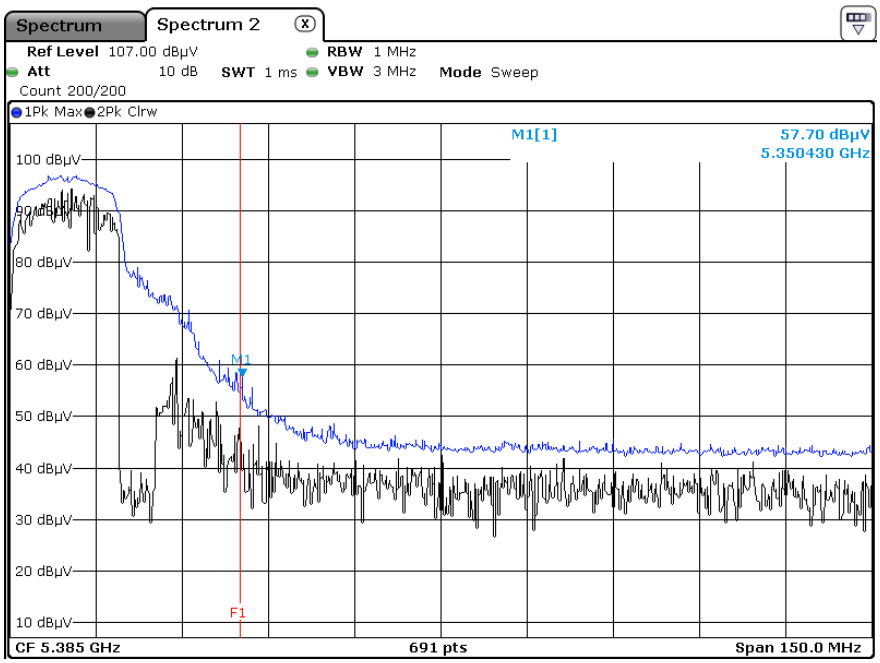
Peak Reading (802.11 a_6 Mbps, Ch.100, Y-H)



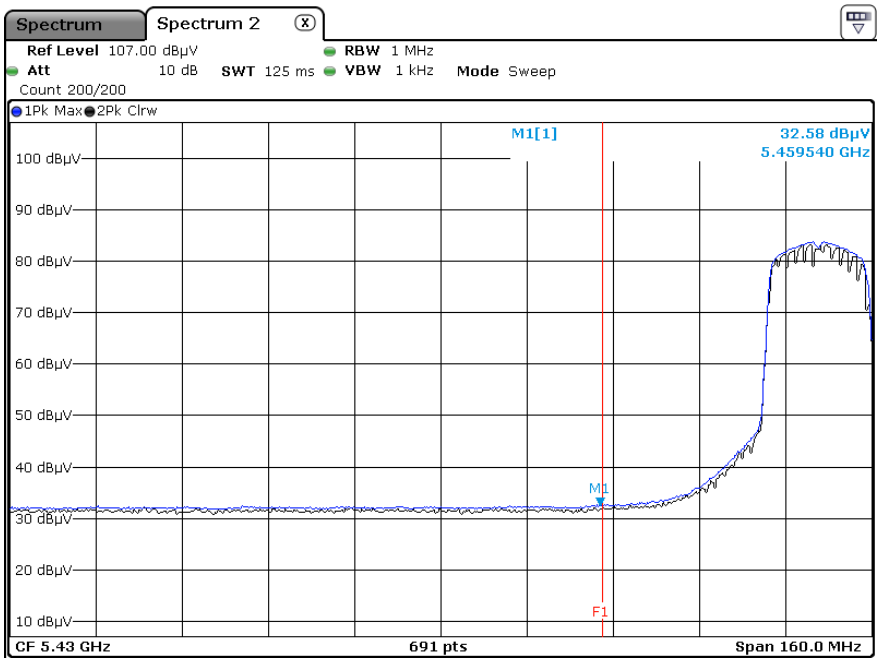
Average Reading (802.11 n(HT20)_MCS0, Ch.64, Y-H)



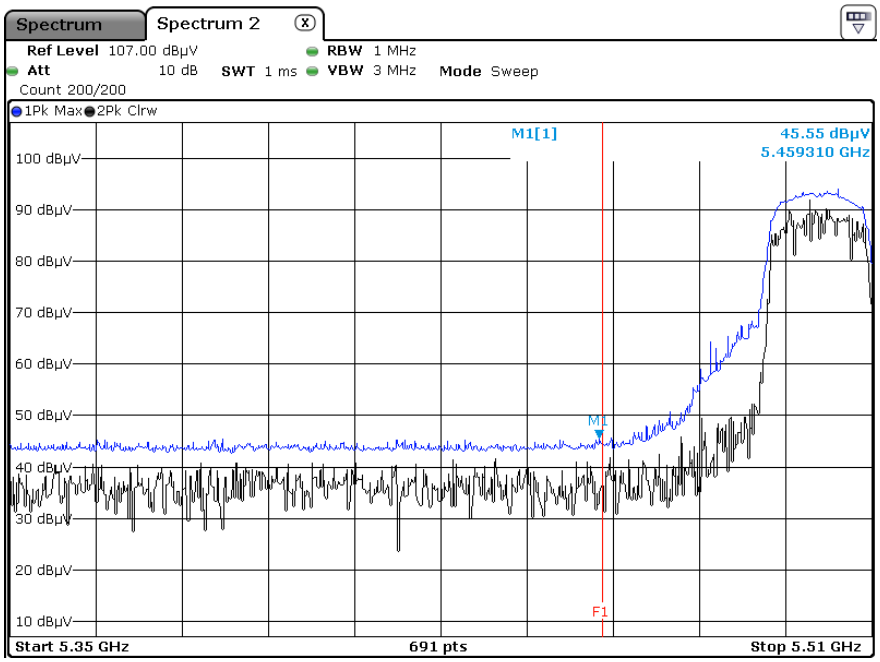
Peak Reading (802.11 n(HT20)_MCS0, Ch.64, Y-H)



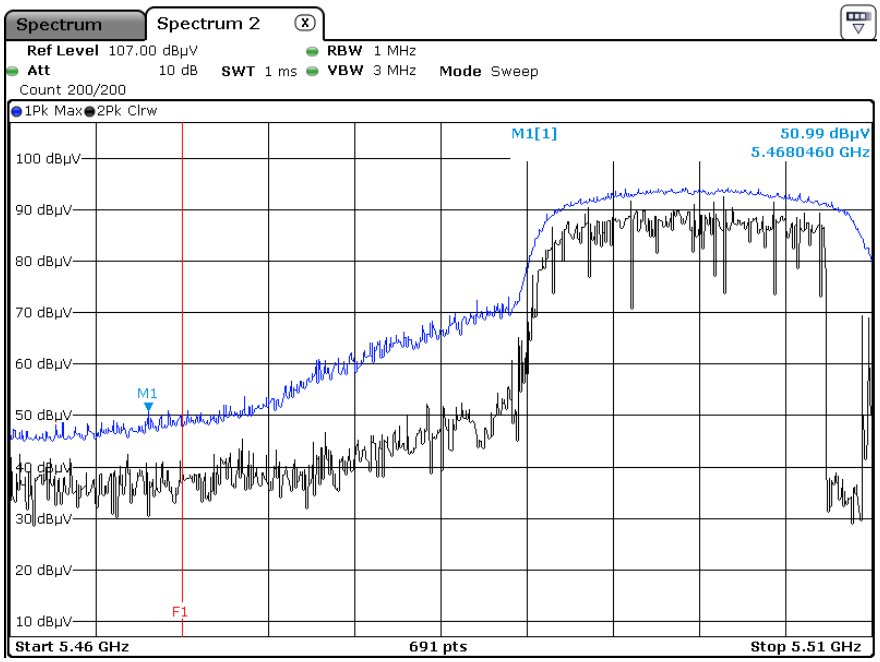
Average Reading (802.11 ac(VHT20)_MCS0, Ch.100, Y-H)



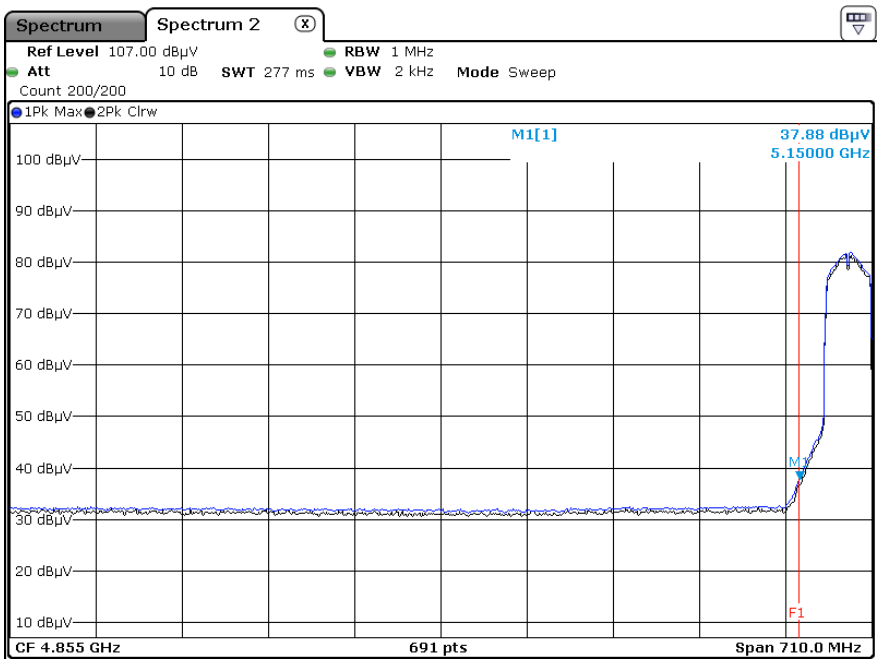
Peak Reading (802.11 ac(VHT20)_MCS0, Ch.100, Y-H)



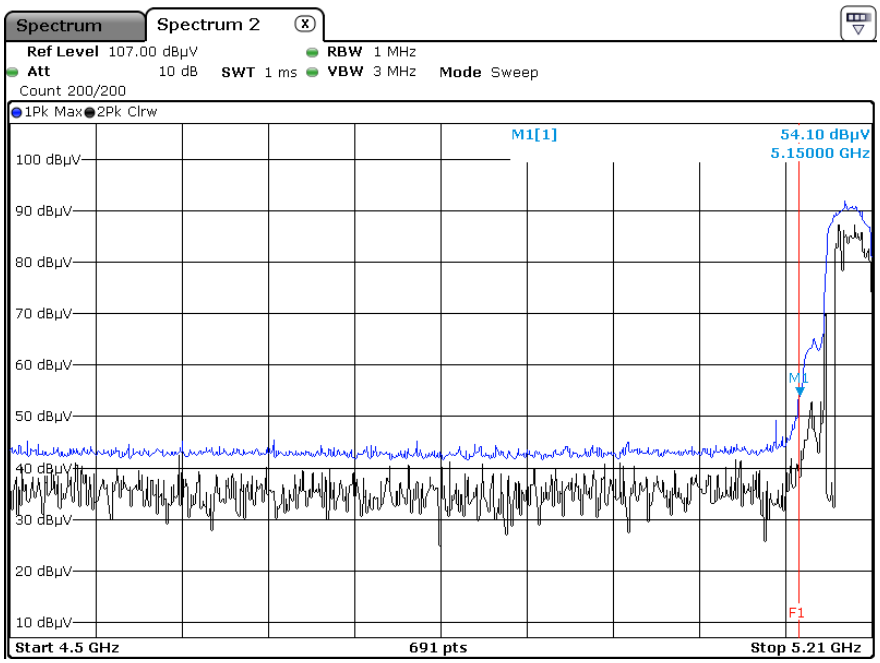
Peak Reading (802.11 ac(VHT20)_MCS0, Ch.100, Y-H)



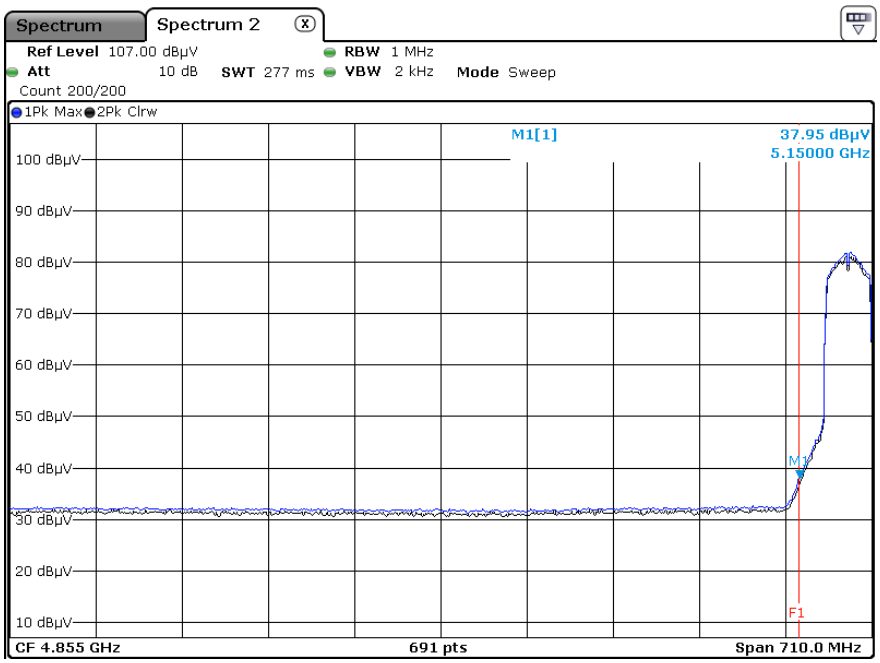
Average Reading (802.11 n(HT40)_MCS0, Ch.38, Y-H)



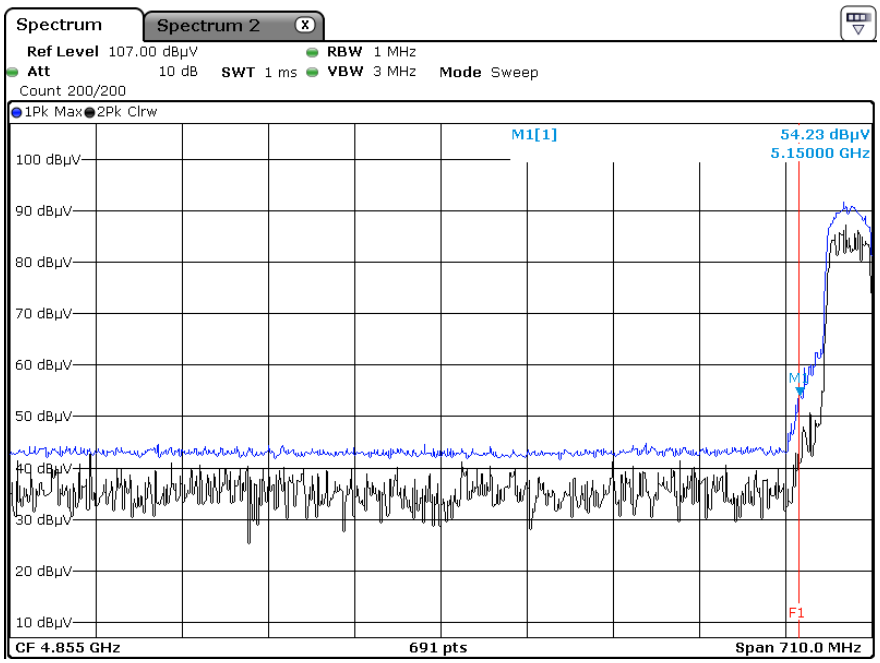
Peak Reading (802.11 n(HT40)_MCS0, Ch.38, Y-H)



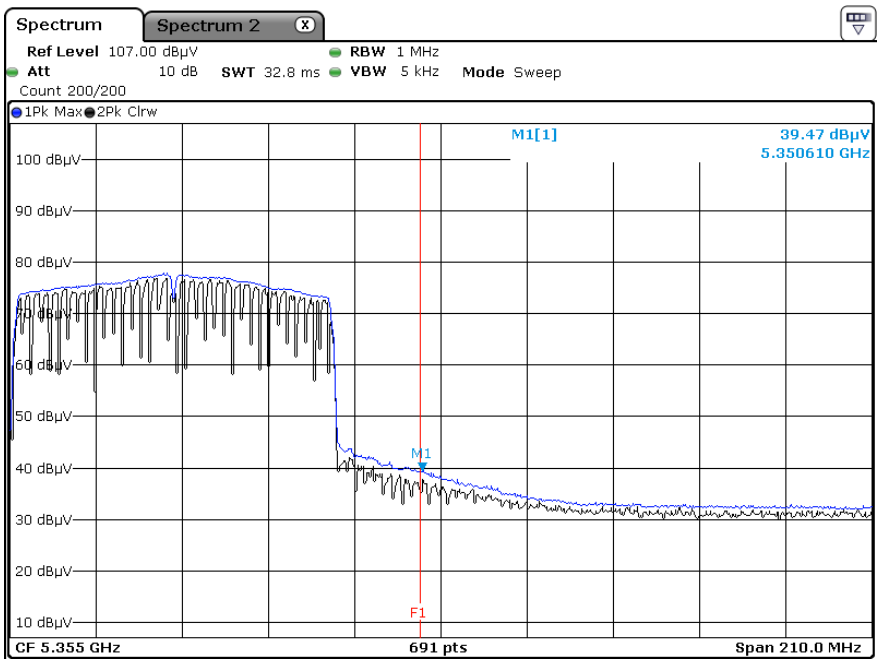
Average Reading (802.11 ac(VHT40)_MCS0, Ch.38, Y-H)



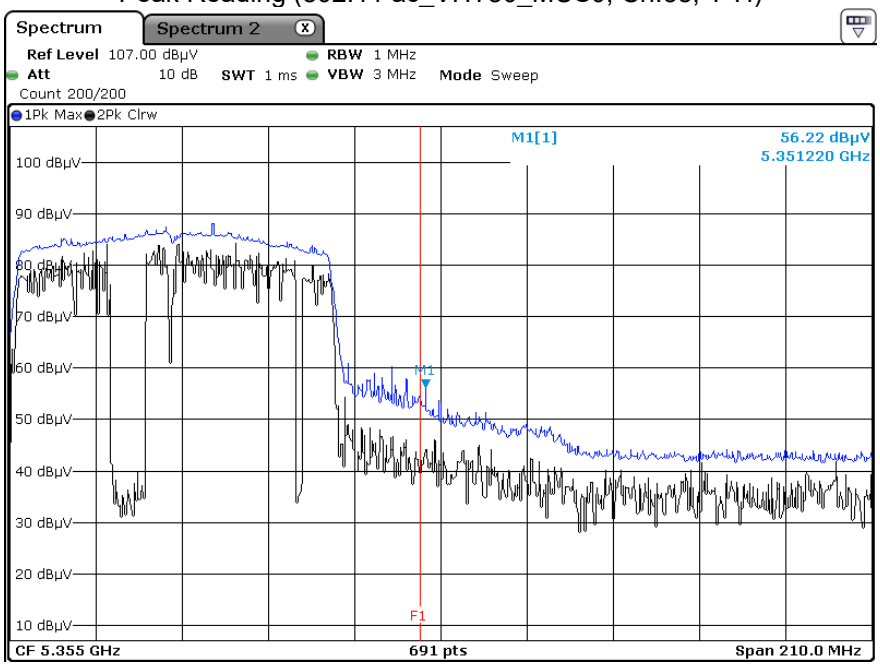
Peak Reading (802.11 ac(VHT40)_MCS0, Ch.38, Y-H)



Average Reading (802.11 ac_VHT80_MCS0, Ch.58, Y-H)



Peak Reading (802.11 ac_VHT80_MCS0, Ch.58, Y-H)

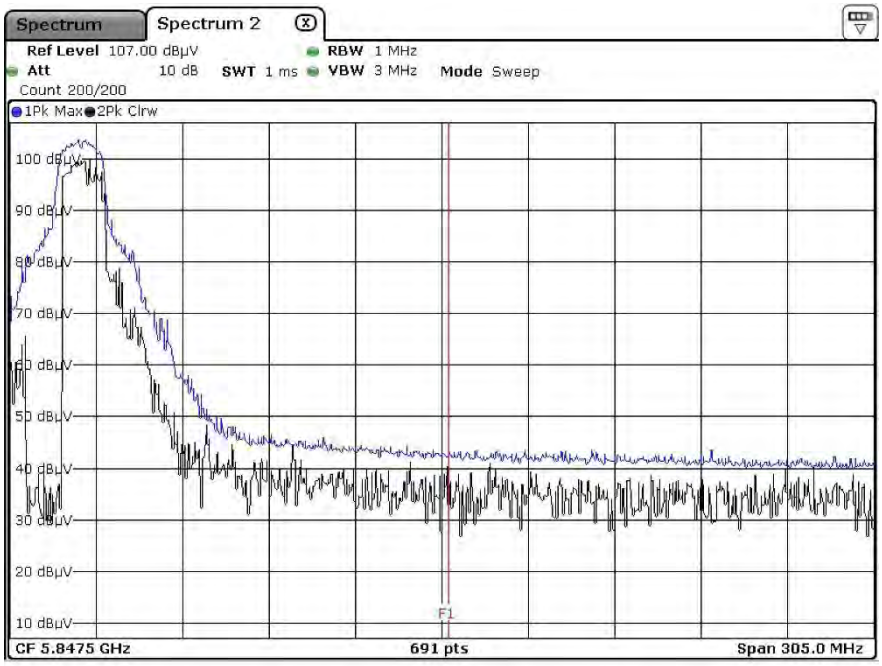


Note:

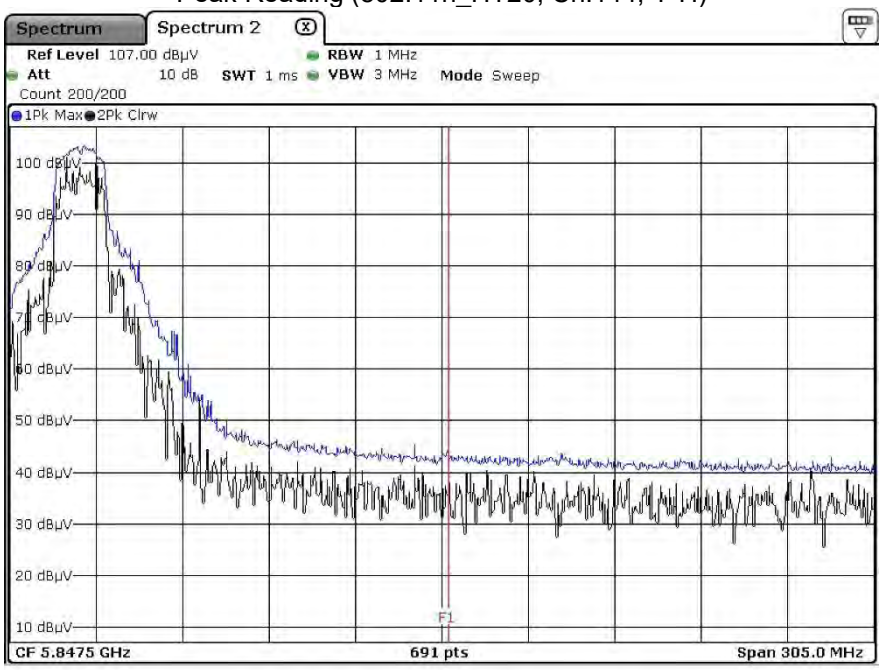
Only the worst case plots for Radiated Restricted Band Edge.

▣ Test Plots(Straddle Channel)

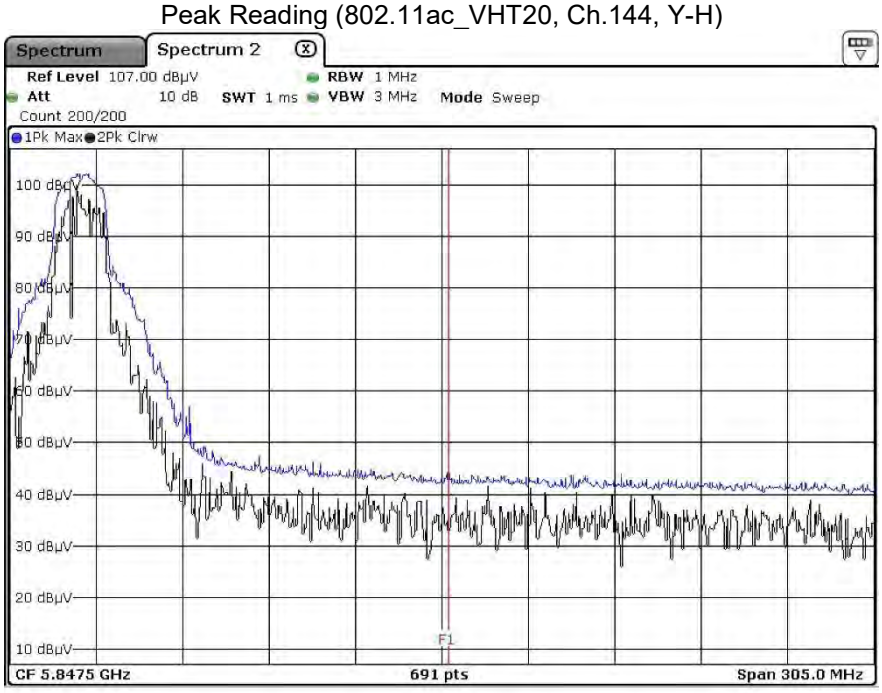
Peak Reading (802.11a, Ch.144, Y-H)



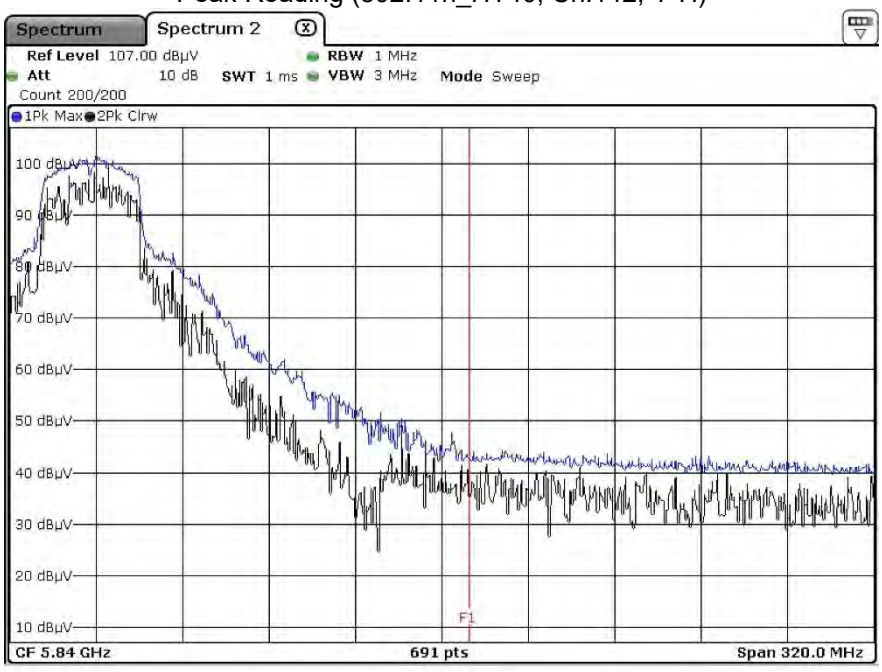
Peak Reading (802.11n_HT20, Ch.144, Y-H)



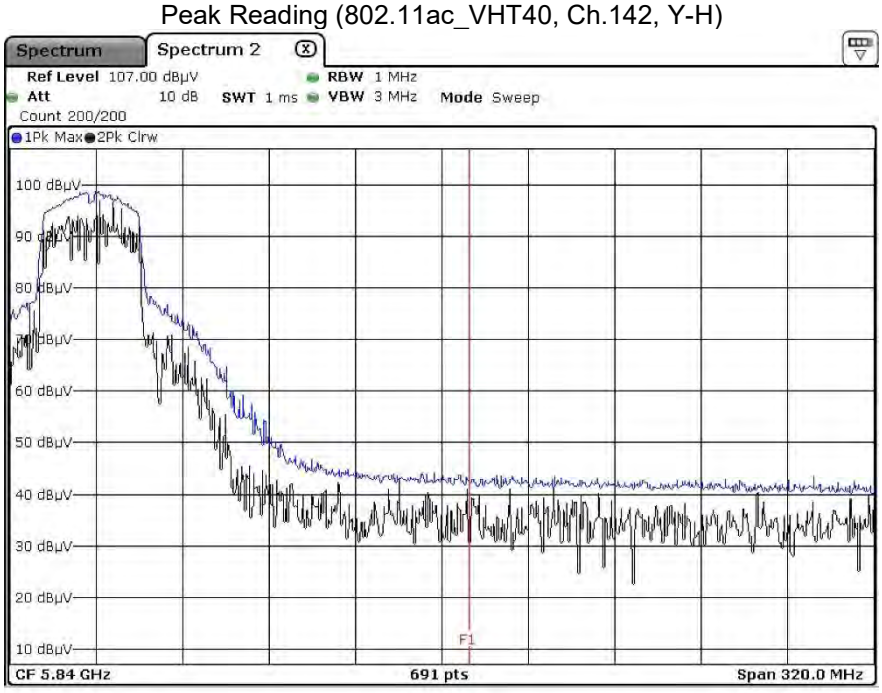
Peak Reading (802.11ac_VHT20, Ch.144, Y-H)



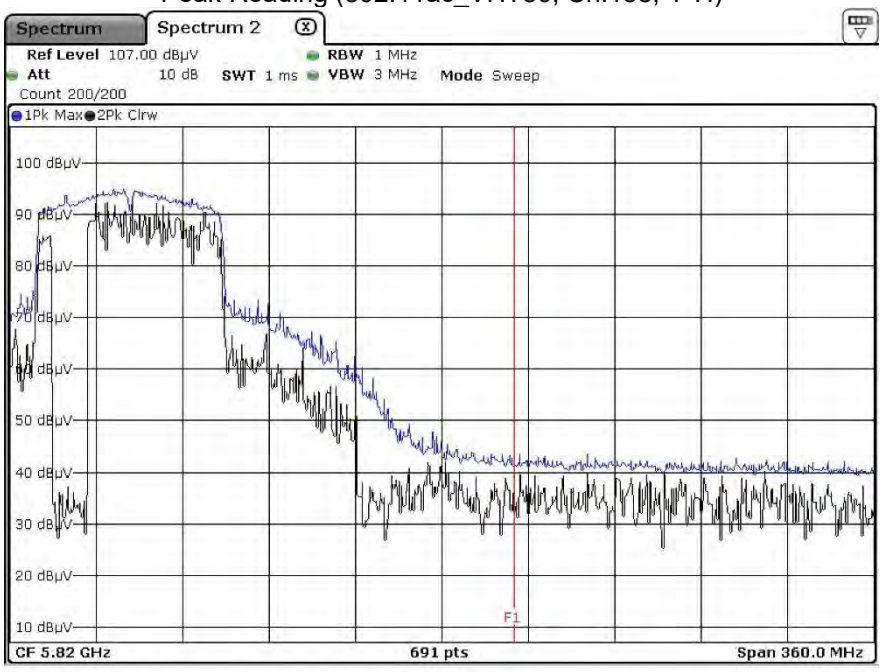
Peak Reading (802.11n_HT40, Ch.142, Y-H)



Peak Reading (802.11ac_VHT40, Ch.142, Y-H)



Peak Reading (802.11ac_VHT80, Ch.138, Y-H)

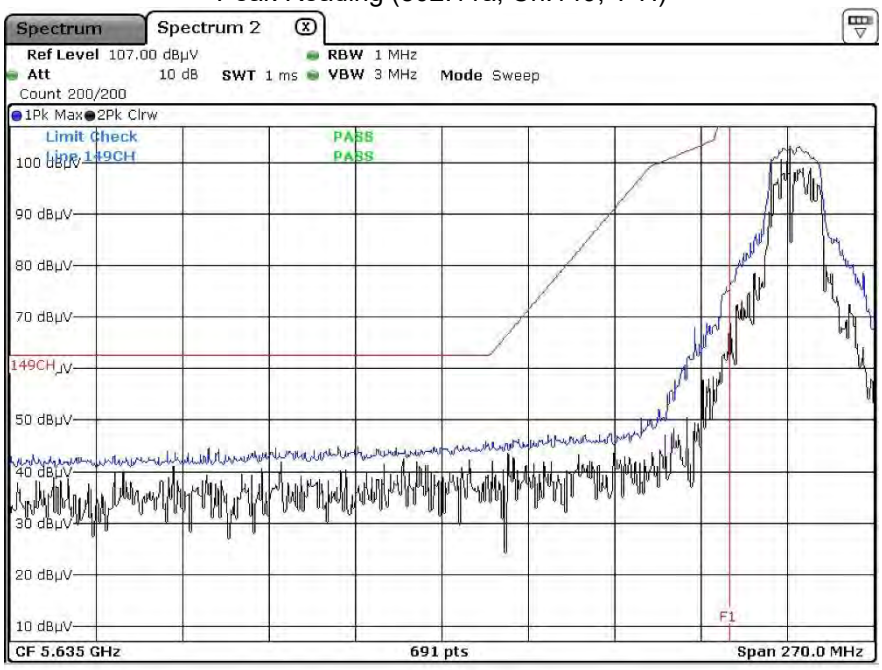


Note :

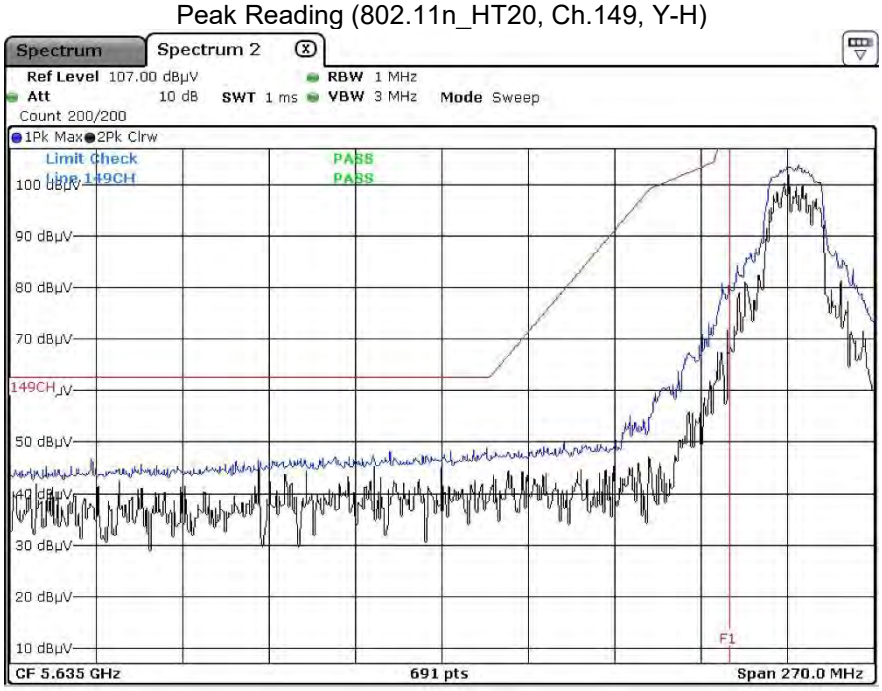
1. Only the worst case plots for Radiated Restricted Band Edge.
2. Red line : 5 850 MHz
3. Ambient Noise (Because of ambient noise, We attached only the worst plot without a data table)

▣ Test Plots(UNII 3)

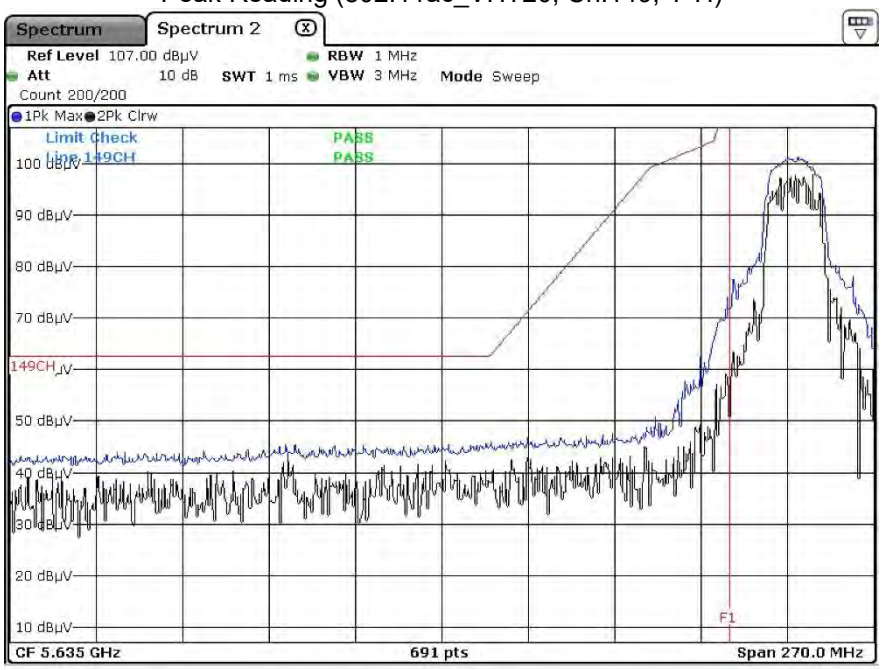
Peak Reading (802.11a, Ch.149, Y-H)



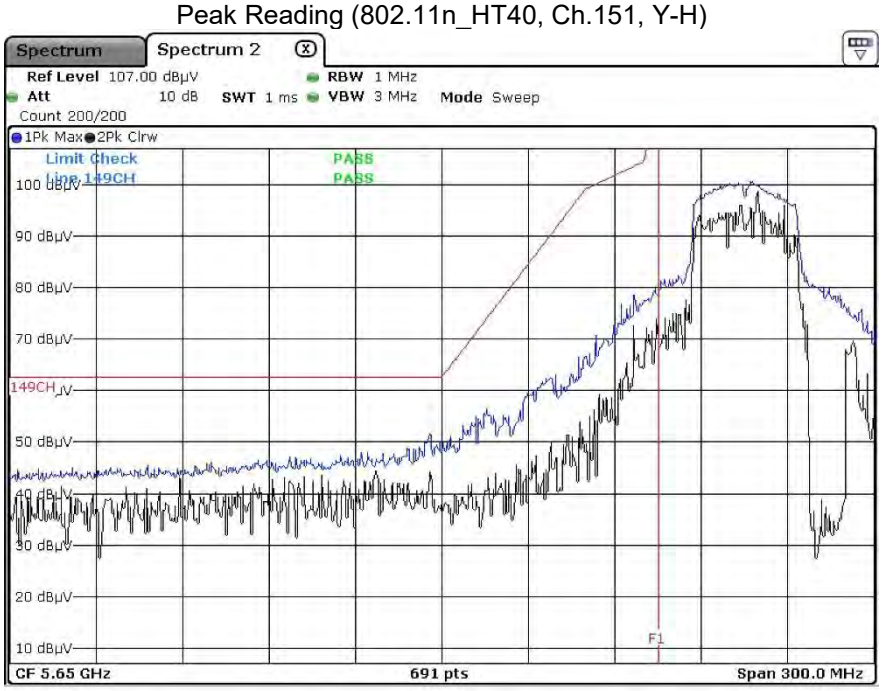
Peak Reading (802.11n_HT20, Ch.149, Y-H)



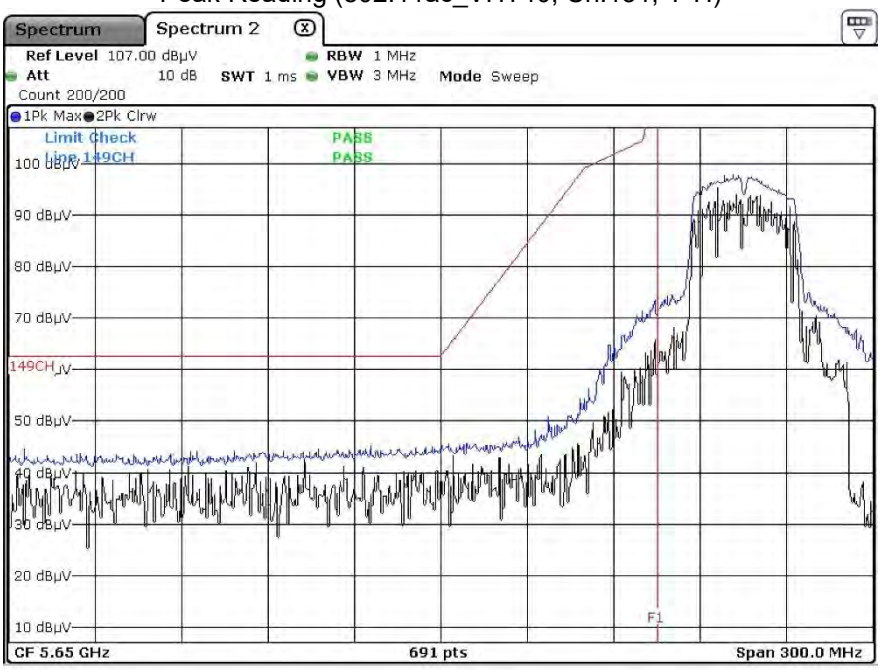
Peak Reading (802.11ac_VHT20, Ch.149, Y-H)



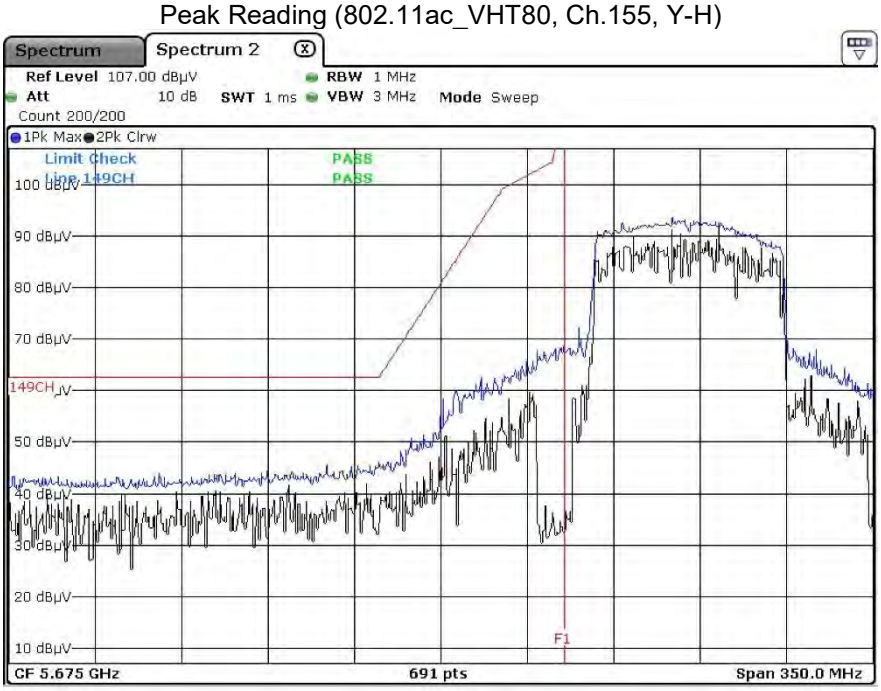
Peak Reading (802.11n_HT40, Ch.151, Y-H)



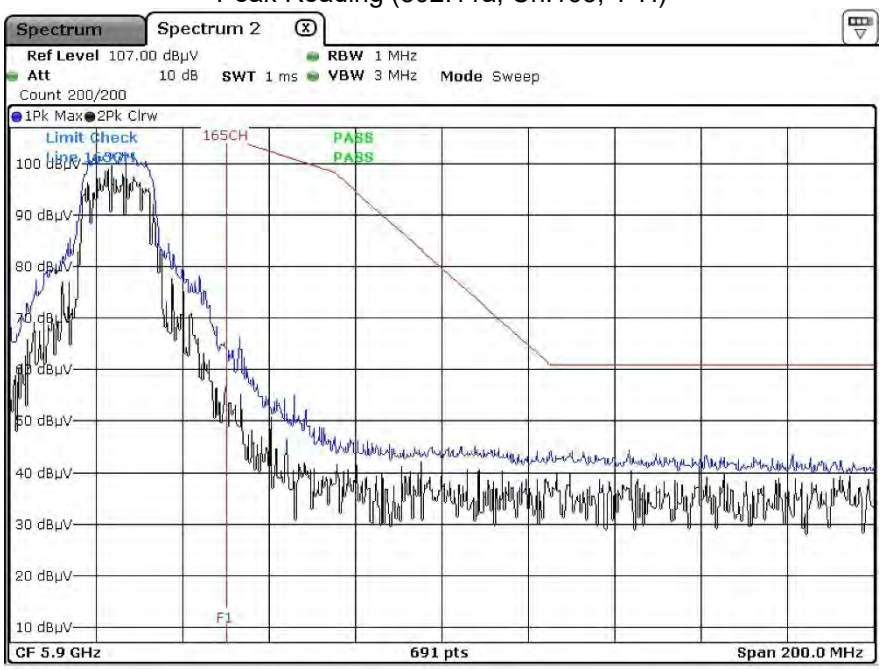
Peak Reading (802.11ac_VHT40, Ch.151, Y-H)



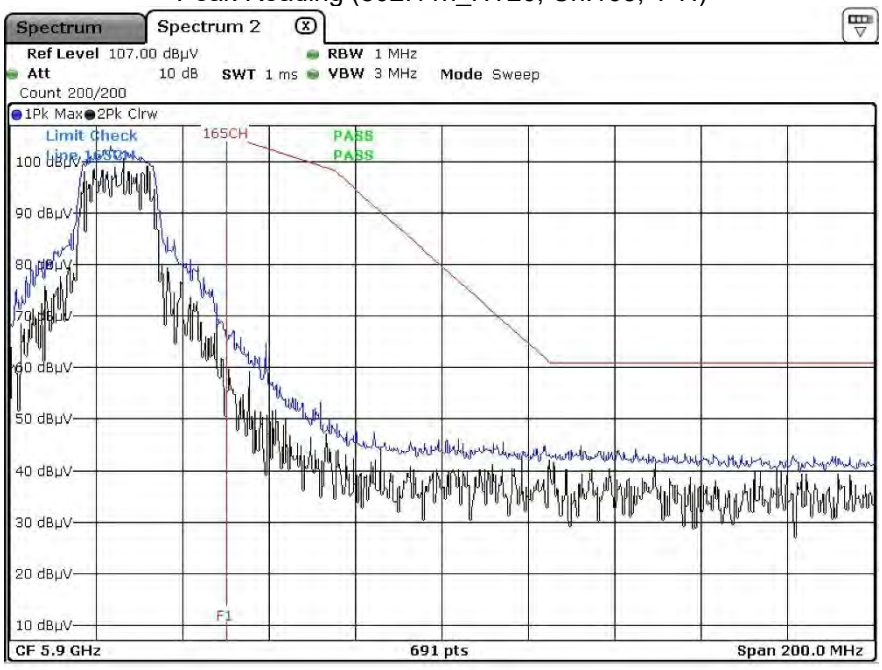
Peak Reading (802.11ac_VHT80, Ch.155, Y-H)



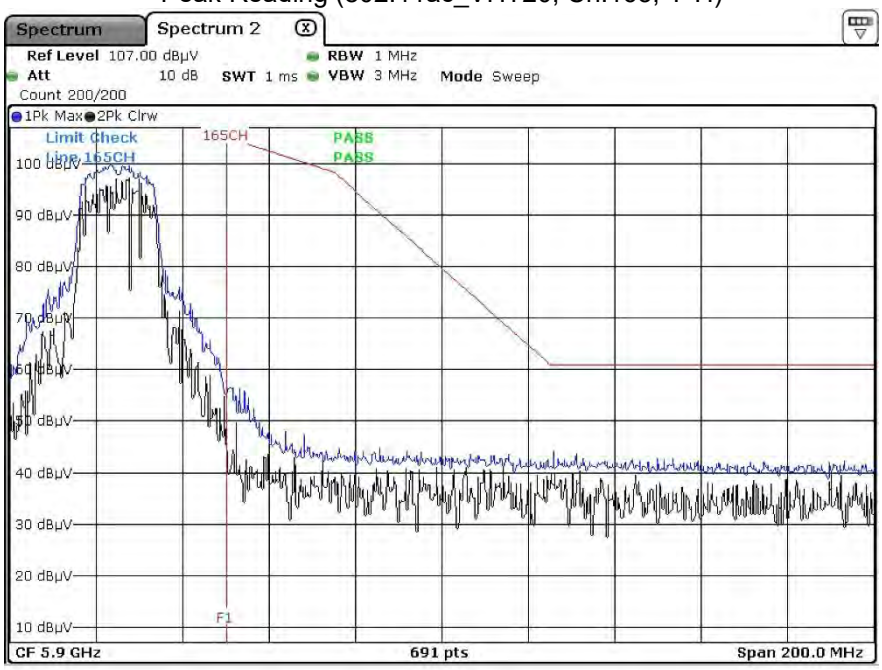
Peak Reading (802.11a, Ch.165, Y-H)



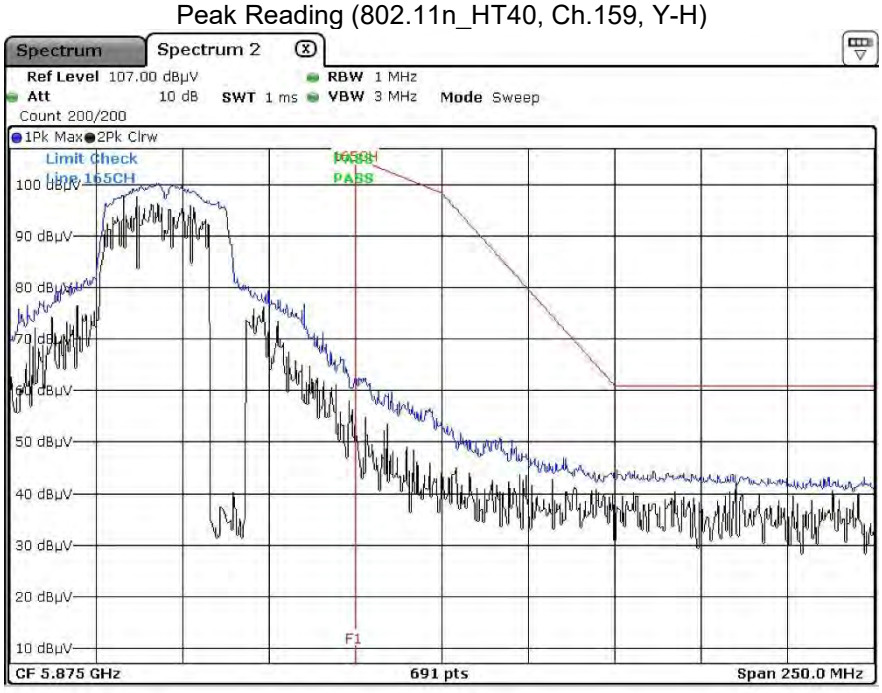
Peak Reading (802.11n_HT20, Ch.165, Y-H)



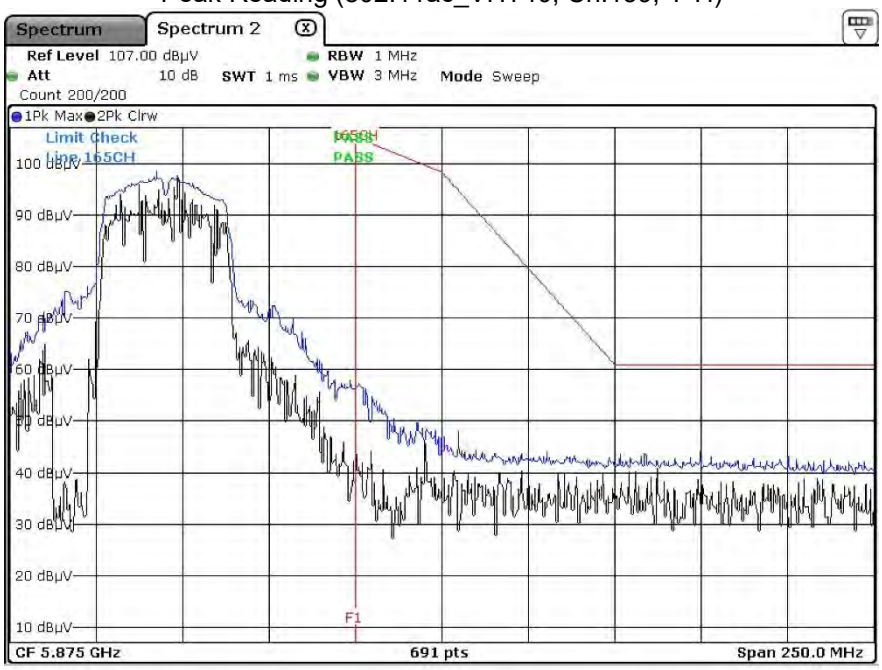
Peak Reading (802.11ac_VHT20, Ch.165, Y-H)



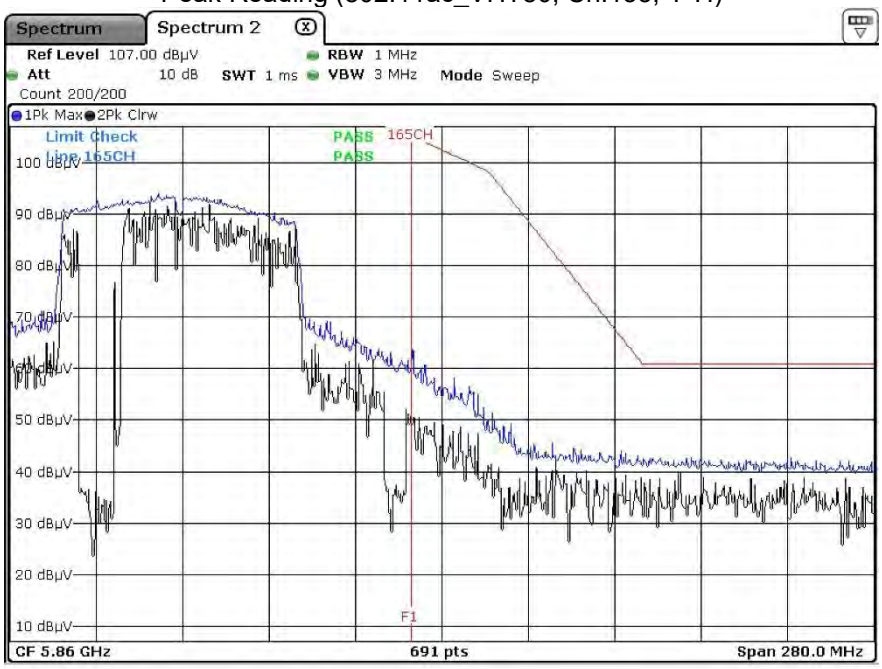
Peak Reading (802.11n_HT40, Ch.159, Y-H)



Peak Reading (802.11ac_VHT40, Ch.159, Y-H)



Peak Reading (802.11ac_VHT80, Ch.155, Y-H)



10.10 POWERLINE CONDUCTED EMISSIONS

Conducted Emissions (Line 1)

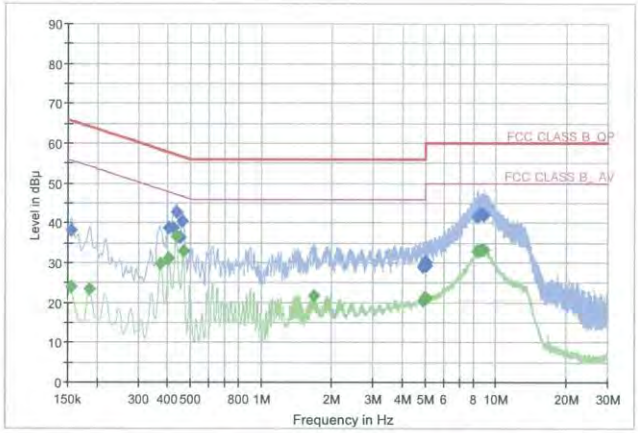
Test 1 / 2

Test Report

Common Information

EUT :	SM-A326U
Manufacturer :	SAMSUNG
Test Site:	SHIELD ROOM
Operating Conditions :	5G WLAN L1
Operator Name:	
Comment:	

Full Spectrum



Final_Result_QPK

Frequency (MHz)	QuasiPeak	Limit (dBuV	Margin	Bandwidth	Line	Filter	Corr. (dB)
0.154500	38.19	65.75	27.57	9.000	L1	OFF	9.6
0.404250	38.73	57.77	19.04	9.000	L1	OFF	9.6
0.424500	38.54	57.36	18.82	9.000	L1	OFF	9.6
0.435750	42.57	57.14	14.57	9.000	L1	OFF	9.6
0.451500	36.28	56.85	20.57	9.000	L1	OFF	9.6
0.462750	40.40	56.64	16.24	9.000	L1	OFF	9.6
4.894250	28.94	56.00	27.06	9.000	L1	OFF	9.9
4.923500	29.14	56.00	26.86	9.000	L1	OFF	9.9
5.013500	29.58	60.00	30.42	9.000	L1	OFF	9.9
5.020250	30.26	60.00	29.74	9.000	L1	OFF	9.9
5.051750	30.11	60.00	29.89	9.000	L1	OFF	9.9
5.094500	29.03	60.00	30.97	9.000	L1	OFF	9.9
8.357000	41.68	60.00	18.32	9.000	L1	OFF	10.0
8.388500	41.41	60.00	18.59	9.000	L1	OFF	10.0
8.638250	42.33	60.00	17.67	9.000	L1	OFF	10.0
8.856500	41.96	60.00	18.04	9.000	L1	OFF	10.0
8.888000	41.99	60.00	18.01	9.000	L1	OFF	10.0
8.919500	41.98	60.00	18.02	9.000	L1	OFF	10.0

Final_Result_CAV

2021-02-01 오후 7:01:15

Test 2 / 2

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.154500	23.92	55.75	31.83	9.000	L1	OFF	9.6
0.186000	23.41	54.21	30.81	9.000	L1	OFF	9.6
0.372750	29.70	48.44	18.74	9.000	L1	OFF	9.6
0.404250	31.25	47.77	16.51	9.000	L1	OFF	9.6
0.435750	36.71	47.14	10.44	9.000	L1	OFF	9.6
0.465000	32.92	46.60	13.69	9.000	L1	OFF	9.6
1.681250	21.57	46.00	24.43	9.000	L1	OFF	9.7
4.925750	20.55	46.00	25.45	9.000	L1	OFF	9.9
5.000000	20.86	46.00	25.14	9.000	L1	OFF	9.9
5.020250	21.21	50.00	28.79	9.000	L1	OFF	9.9
5.051750	21.14	50.00	28.86	9.000	L1	OFF	9.9
5.094500	20.93	50.00	29.07	9.000	L1	OFF	9.9
8.359250	33.01	50.00	16.99	9.000	L1	OFF	10.0
8.501000	33.02	50.00	16.98	9.000	L1	OFF	10.0
8.748500	33.25	50.00	16.75	9.000	L1	OFF	10.0
8.780000	33.31	50.00	16.69	9.000	L1	OFF	10.0
8.809250	33.17	50.00	16.83	9.000	L1	OFF	10.0
8.917250	33.23	50.00	16.77	9.000	L1	OFF	10.0

2021-02-01 오후 7:01:15

Conducted Emissions (Line 2)

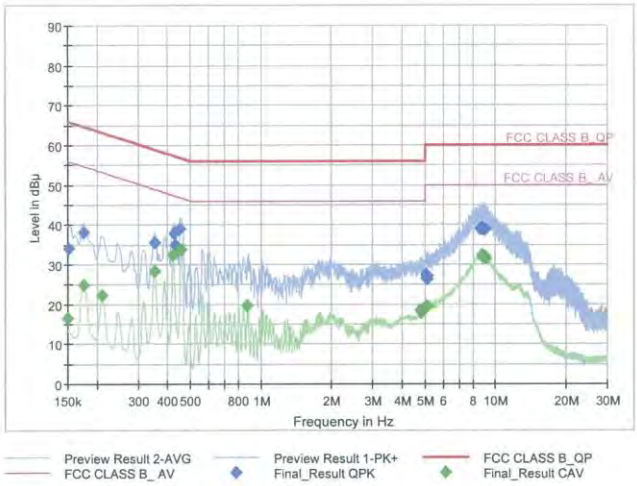
5G WLAN N 1 / 2

Test Report

Common Information

EUT :	SM-A326U
Manufacturer :	SAMSUNG
Test Site:	SHIELD ROOM
Operating Conditions :	5G WLAN N
Operator Name:	
Comment:	

Full Spectrum



Final_Result_QPK

Frequency (MHz)	QuasiPeak	Limit (dBuV	Margin	Bandwidth	Line	Filter	Corr. (dB)
0.152250	33.95	65.88	31.92	9.000	N	OFF	9.6
0.174750	38.19	64.73	26.54	9.000	N	OFF	9.6
0.352500	35.43	58.90	23.47	9.000	N	OFF	9.6
0.426750	37.70	57.32	19.62	9.000	N	OFF	9.6
0.431250	34.80	57.23	22.43	9.000	N	OFF	9.6
0.453750	39.08	56.81	17.72	9.000	N	OFF	9.6
5.054000	26.42	60.00	33.58	9.000	N	OFF	9.9
5.058500	26.49	60.00	33.51	9.000	N	OFF	9.9
5.092250	27.39	60.00	32.61	9.000	N	OFF	9.9
5.096750	26.65	60.00	33.35	9.000	N	OFF	9.9
5.128250	27.12	60.00	32.88	9.000	N	OFF	9.9
5.155250	26.25	60.00	33.75	9.000	N	OFF	9.9
8.577500	38.88	60.00	21.12	9.000	N	OFF	10.0
8.789000	39.09	60.00	20.91	9.000	N	OFF	10.0
8.825000	38.97	60.00	21.03	9.000	N	OFF	10.1
8.861000	38.81	60.00	21.19	9.000	N	OFF	10.1
9.000500	38.85	60.00	21.15	9.000	N	OFF	10.1
9.036500	38.67	60.00	21.33	9.000	N	OFF	10.1

Final_Result_CAV

2021-02-01 오후 6:59:37

5G WLAN N 2 / 2

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.150000	16.41	56.00	39.59	9.000	N	OFF	9.6
0.174750	24.91	54.73	29.82	9.000	N	OFF	9.6
0.210750	22.10	53.18	31.08	9.000	N	OFF	9.6
0.352500	28.18	48.90	20.73	9.000	N	OFF	9.6
0.422250	32.36	47.40	15.04	9.000	N	OFF	9.6
0.458250	33.77	46.72	12.95	9.000	N	OFF	9.6
0.880250	19.60	46.00	26.40	9.000	N	OFF	9.6
4.804250	18.40	46.00	27.60	9.000	N	OFF	9.9
4.851500	17.97	46.00	28.03	9.000	N	OFF	9.9
4.977500	18.83	46.00	27.17	9.000	N	OFF	9.9
5.092250	19.30	50.00	30.70	9.000	N	OFF	9.9
5.128250	19.39	50.00	30.61	9.000	N	OFF	9.9
8.791250	32.19	50.00	17.81	9.000	N	OFF	10.0
8.825000	31.99	50.00	18.01	9.000	N	OFF	10.1
8.861000	31.83	50.00	18.17	9.000	N	OFF	10.1
9.038750	31.88	50.00	18.12	9.000	N	OFF	10.1
9.059000	31.56	50.00	18.44	9.000	N	OFF	10.1
9.074750	31.57	50.00	18.43	9.000	N	OFF	10.1

2021-02-01 오후 6:59:37

11. LIST OF TEST EQUIPMENT

Conducted Test

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216 / LISN	09/04/2020	Annual	102245
Rohde & Schwarz	ESR / EMI Test Receiver	09/16/2020	Annual	101910
ESPAC	SU-642 /Temperature Chamber	03/18/2020	Annual	0093008124
Agilent	N9030A / Signal Analyzer	01/11/2021	Annual	MY49431210
Rohde & Schwarz	OSP 120 / Power Measurement Set	07/02/2020	Annual	101231
Agilent	N1911A / Power Meter	04/07/2020	Annual	MY45100523
Keysight	N1921A / Power Sensor	06/08/2020	Annual	MY57820067
Agilent	87300B / Directional Coupler	11/10/2020	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	05/25/2020	Annual	05001
Hewlett Packard	E3632A / DC Power Supply	06/12/2020	Annual	KR75303960
Agilent	8493C / Attenuator(10 dB)	06/26/2020	Annual	07560
Rohde & Schwarz	EMC32 / Software	N/A	N/A	N/A
HCT CO., LTD.	FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	N/A	N/A

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

Radiated Test

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
Innco system	MA4640/800-XP-EP / Antenna Position Tower	N/A	N/A	N/A
Audix	EM1000 / Controller	N/A	N/A	060520
Audix	Turn Table	N/A	N/A	N/A
Rohde & Schwarz	Loop Antenna	05/18/2020	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	03/22/2019	Biennial	760
Schwarzbeck	BBHA 9120D / Horn Antenna	04/29/2019	Biennial	9120D-937
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	11/29/2019	Biennial	BBHA9170541
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	07/28/2020	Annual	102168
Agilent	N9030A / Signal Analyzer	01/11/2021	Annual	MY49431210
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	01/06/2021	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	02/08/2021	Annual	1
Wainwright Instruments	WHK3.0/18G-10EF / High Pass Filter	03/02/2020	Annual	8
Wainwright Instruments	WHKX8-6090-7000-18000-40SS/ High Pass Filter	03/02/2020	Annual	25
Api tech.	18B-03 / Attenuator (3 dB)	03/02/2020	Annual	1
Agilent	8493C-10 / Attenuator(10 dB)	03/02/2020	Annual	08285
CERNEX	CBLU1183540 / Power Amplifier	03/02/2020	Annual	22964
CERNEX	CBL06185030 / Power Amplifier	03/02/2020	Annual	22965
CERNEX	CBL18265035 / Power Amplifier	12/04/2020	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	03/23/2020	Annual	25956

Note:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
3. Espectially, all antenna for measurement is calibrated in accordance with the requirements of C63.5(Version : 2017).

12. ANNEX A_ TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-2102-FC003-P