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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:
December 27, 2022

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

Report No.: HCT-RF-2212-FC020

FCC ID:	**A3LSMM146B**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**
Model:	SM-M146B/DSN
Additional Model:	-
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-2212-FC020	December 27, 2022	- First Approval Report

Table of Contents

1. GENERAL INFORMATION

EUT DESCRIPTION

Model	SM-M146B/DSN	
Additional Model	–	
EUT Type	Mobile Phone	
Power Supply	DC 4.2 V	
Modulation Type	OFDM : 802.11a, 802.11n, 802.11ac	
Frequency Range (MHz)	U-NII-1	20 MHz BW : 5180 - 5240 40 MHz BW : 5190 - 5230 80 MHz BW : 5210
	U-NII-2A	20 MHz BW : 5260 - 5320 40 MHz BW : 5270 - 5310 80 MHz BW : 5290
	U-NII-2C	20 MHz BW : 5500 - 5720 40 MHz BW : 5510 - 5710 80 MHz BW : 5530 – 5690
	U-NII-3	20 MHz BW : 5745 - 5825 40 MHz BW : 5755 - 5795 80 MHz BW : 5775
Straddle channel	Supported	
TDWR Band	Supported	
Dynamic Frequency Selection	Slave without radar detection	
Date(s) of Tests	November 17, 2022 ~ December 27, 2022	
Serial number	Radiated : R3CTA0Z2XBJ Conducted : R3CTA0GVDBB	

2. MAXIMUM OUTPUT POWER

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

Band	Mode	Power	
		(dBm)	(W)
UNII1	802.11a	15.40	0.035
	802.11n (HT20)	15.33	0.034
	802.11n (HT40)	14.41	0.028
	802.11ac (VHT20)	15.35	0.034
	802.11ac (VHT40)	14.08	0.026
	802.11ac (VHT80)	10.32	0.011
UNII2A	802.11a	15.79	0.038
	802.11n (HT20)	15.57	0.036
	802.11n (HT40)	14.17	0.026
	802.11ac (VHT20)	15.58	0.036
	802.11ac (VHT40)	13.93	0.025
	802.11ac (VHT80)	9.67	0.009
UNII2C	802.11a	15.42	0.035
	802.11n (HT20)	15.14	0.033
	802.11n (HT40)	14.59	0.029
	802.11ac (VHT20)	15.17	0.033
	802.11ac (VHT40)	14.26	0.027
	802.11ac (VHT80)	12.71	0.019
UNII3	802.11a	15.50	0.035
	802.11n (HT20)	15.49	0.035
	802.11n (HT40)	14.64	0.029
	802.11ac (VHT20)	15.25	0.033
	802.11ac (VHT40)	14.23	0.026
	802.11ac (VHT80)	12.39	0.017

3. TEST METHODOLOGY

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

EUT CONFIGURATION

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

EUT EXERCISE

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

GENERAL TEST PROCEDURES

Conducted Emissions

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

Radiated Emissions

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

DESCRIPTION OF TEST MODES

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

4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards.
Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.
Detailed description of test facility was submitted to the Commission and accepted dated April 02, 2018 (Registration Number: KR0032).

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.
Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.
All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203, §15.407:

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

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

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

7. MEASUREMENT UNCERTAINTY

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

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

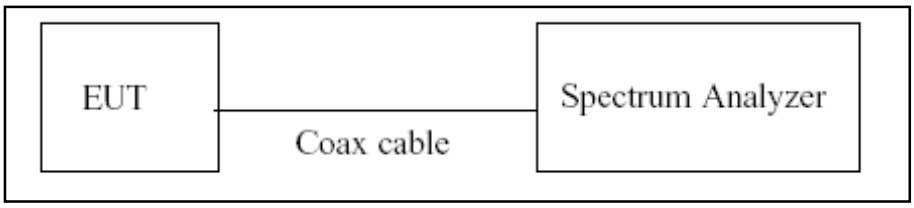
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

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

8. DESCRIPTION OF TESTS

8.1. Duty Cycle

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

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

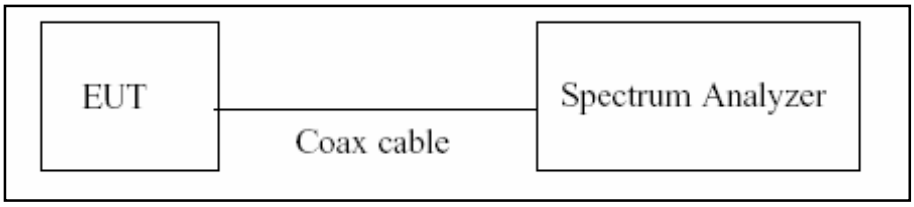
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (≥ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on}/ T_{total} and Duty Cycle Factor = 10log(1/Duty Cycle)

8.2. 6 dB Bandwidth & 26 dB Bandwidth

Limit

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

Test Configuration



Test Procedure(26 dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

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

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

Test Procedure (6 dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

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

1. RBW = 100 kHz
2. VBW ≥ 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.

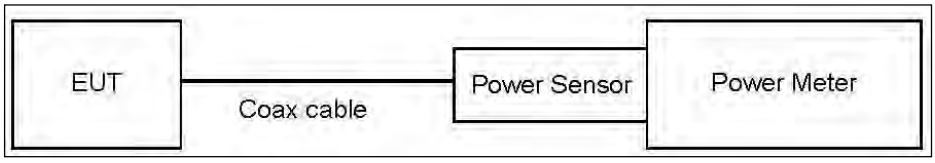
8.3. Output Power Measurement

Limit

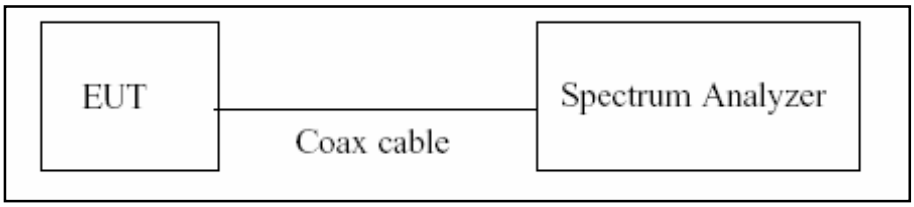
Band	Limit
UNII 1	- Master : Not exceed 1 W(=30 dBm) - Slave : Not exceed 250 mW(=23.98 dBm)
UNII 2A, 2C	Not exceed the lesser of 250 mW or 11 dBm + 10 log B, (where B is the 26 dB emission bandwidth in megahertz.)
UNII 3	Not exceed 1 W(=30 dBm)

Test Configuration

Power Meter



Spectrum Analyzer(Only Straddle Channel)



Test Procedure(Power Meter)

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

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

Test Procedure (Spectrum Analyzer)

The transmitter output is connected to the Spectrum Analyzer.

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

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

1. Measure the duty cycle.
2. Set span to encompass the 26 dB EBW of the signal.
3. RBW = 1 MHz.
4. VBW ≥ 3 MHz.
5. Number of points in sweep ≥ 2 x span/RBW.
6. Sweep time = auto.
7. Detector = RMS.
8. Do not use sweep triggering. Allow the sweep to "free run".
9. Trace average at least 100 traces in power averaging(RMS) mode
10. Integrated bandwidth = OBW
11. Add 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) = Measured Value(dBm) + ATT loss(dB) + Cable loss(dB) + Duty Cycle Factor(dB)

Note

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

Band	Loss(dB)
UNII 1	20.82
UNII 2A	20.82
UNII 2C	20.82
UNII 3	20.82

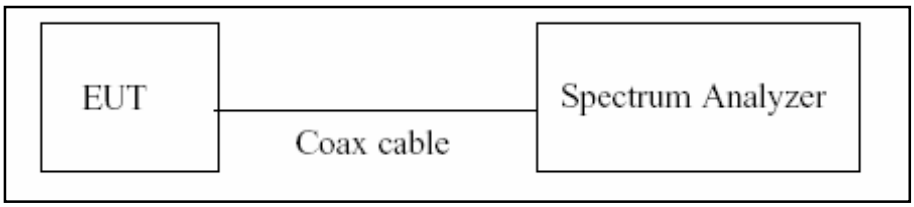
(Actual value of loss for the attenuator and cable combination)

8.4. Power Spectral Density

Limit

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

Test Configuration



Test Procedure

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

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

Sample Calculation

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

Note

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

Band	Loss(dB)
UNII 1	20.82
UNII 2A	20.82
UNII 2C	20.82
UNII 3	20.82

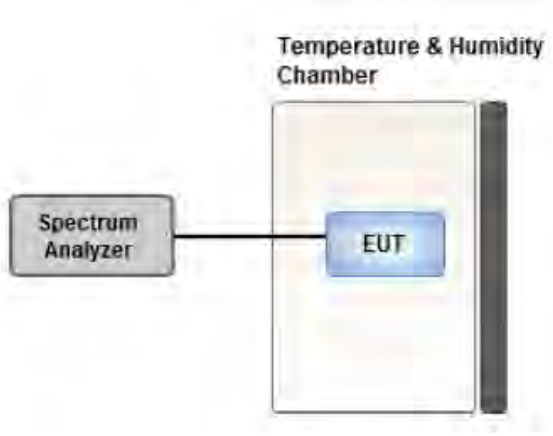
(Actual value of loss for the attenuator and cable combination)

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 battery 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) = Measured Value + Correction Factor

8.7. Radiated Test

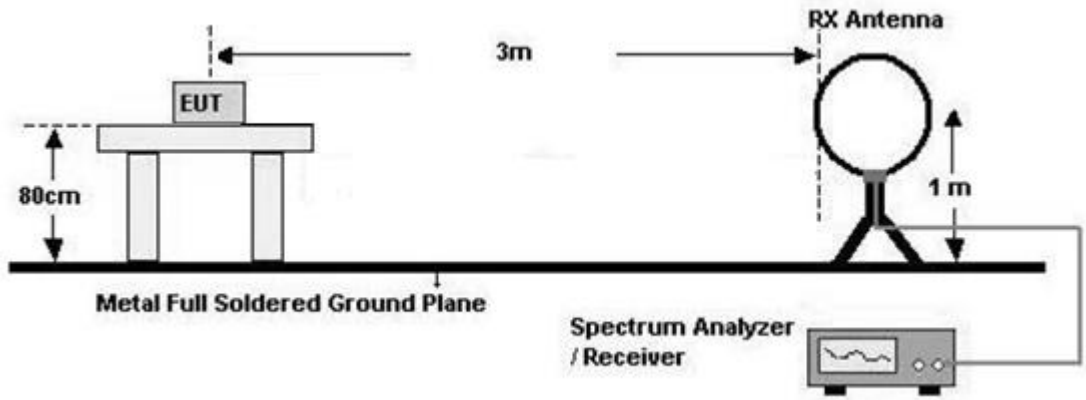
Limit

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.

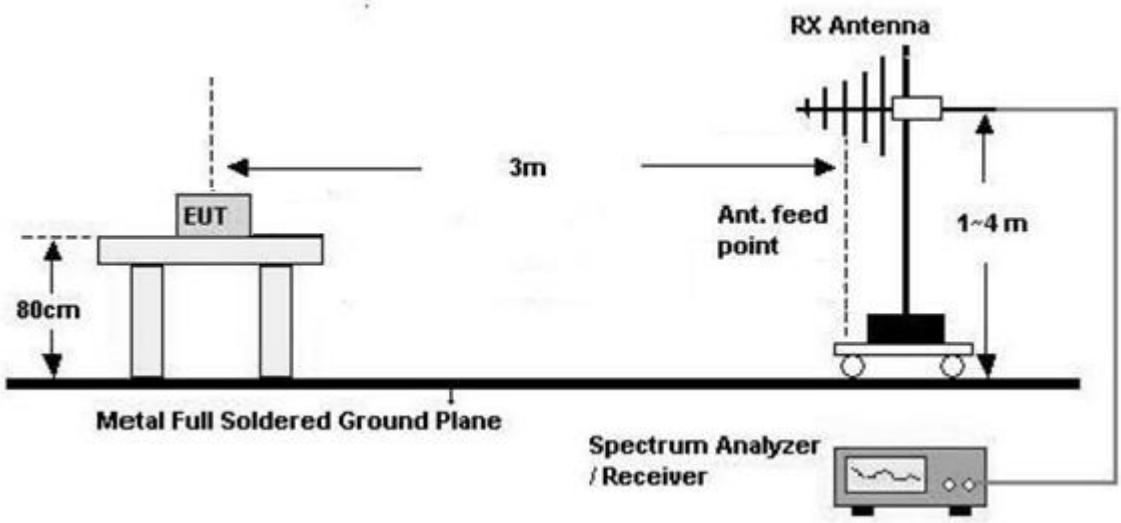
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Test Configuration

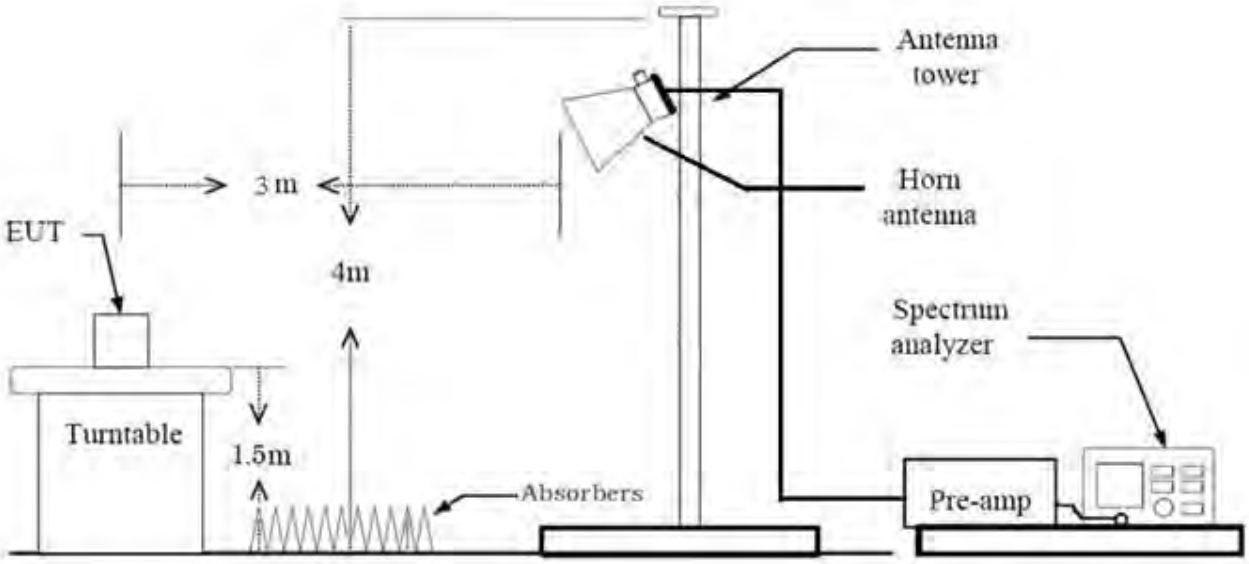
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions (Below 30 MHz)

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

KDB 414788 OFS and Chamber Correlation Justification

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

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

Test Procedure of Radiated spurious emissions (Below 1 GHz)

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8 m above ground plane.
3. The Hybrid antenna was placed at a location 3 m from the EUT, which is varied from 1 m to 4 m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Spectrum Setting
   (1) Measurement Type(Peak):
      - Measured Frequency Range : 30 MHz – 1 GHz
      - Detector = Peak
      - Trace = Maxhold
      - RBW = 100 kHz
      - VBW ≥ 3 x RBW
   (2) Measurement Type(Quasi-peak):
      - Measured Frequency Range : 30 MHz – 1 GHz
      - Detector = Quasi-Peak
      - RBW = 120 kHz

   ※ In general, (1) is used mainly
7. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L)
8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

Test Procedure of Radiated spurious emissions (Above 1 GHz)

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

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

- RBW = 1 MHz
- VBW ≥ 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 %) = VBW ≤ RBW/100(i.e., 10 kHz) but not less than 10 Hz.
- VBW(Duty cycle is < 98 %) = 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 % duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of 1/x, where x is the duty cycle.

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

Test Procedure of Radiated Restricted Band Edge

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting
   (1) Measurement Type(Peak, G.5 in KDB 789033 v02r01):
   - RBW = 1 MHz
   - VBW ≥ 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 %) = VBW ≤ RBW/100(i.e., 10 kHz) but not less than 10 Hz.
   - VBW(Duty cycle is < 98 %) = 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 % duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of 1/x, where x is the duty cycle.

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

The actual setting value of VBW

Mode	Worst Data rate (Mbps)	Duty Cycle	Duty Cycle Factor (dB)	The actual setting value of VBW (Hz)
802.11a	6	0.925	0.340	1 000
802.11n(HT20)	MCS0	0.920	0.363	1 000
802.11n(HT40)	MCS0	0.862	0.646	2 000
802.11ac(VHT20)	MCS0	0.927	0.331	1 000
802.11ac(VHT40)	MCS0	0.874	0.584	2 000
802.11ac(VHT80)	MCS0	0.756	1.216	5 000

8.8. Worst case configuration and mode

Radiated test

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

Radiated test(RSDB)

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

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

Note : Bluetooth RSDB Data refer to Bluetooth Test Report.

AC Power line Conducted Emissions

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone + External accessories(Earphone, etc)+Travel Adapter, Stand alone + Travel Adapter
   - Worstcase : Stand alone + Travel Adapter

Conducted test

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

9. SUMMARY OF TEST RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
26 dB Bandwidth	§15.407 (for Power Measurement)	N/A	Conducted	PASS
6 dB Bandwidth	§15.407(e)	> 500 kHz (5725-5850 MHz)(UNII-3)		PASS
Maximum Conducted Output Power	§15.407(a)(1),(2),(3)	< 250 mW(5150-5250 MHz) < 250 mW or 11+10log$_{10}$ (BW) dBm (5250-5350 MHz) < 250 mW or 11+10log$_{10}$ (BW) dBm (5470-5725 MHz) <1 W (5725-5850 MHz)		PASS
Maximum Power Spectral Density	§15.407(a)(1),(2),(3)	<11 dBm/ MHz (5150-5250 MHz) <11 dBm/ MHz (5250-5350 MHz) <11 dBm/ MHz (5470-5725 MHz) <30 dBm/500 kHz(5725-5850 MHz)		PASS
AC Conducted Emissions 150 kHz-30 MHz	15.207 15.407(b)(9)	<FCC 15.207 limits		PASS
Frequency Stability	§15.407(g) §2.1055	Maintained within the band		PASS
Undesirable Emissions	§15.407(b) (1),(2),(3),(4)	<-27 dBm/MHz EIRP (UNII1, 2A, 2C) cf. Section 8.6 (UNII 3)	Radiated	PASS
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	15.205, 15.407(b)(9),(10)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		PASS

10. TEST RESULT

10.1 DUTY CYCLE

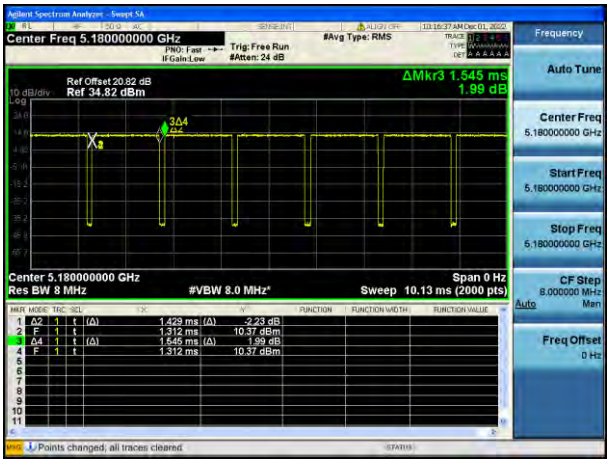
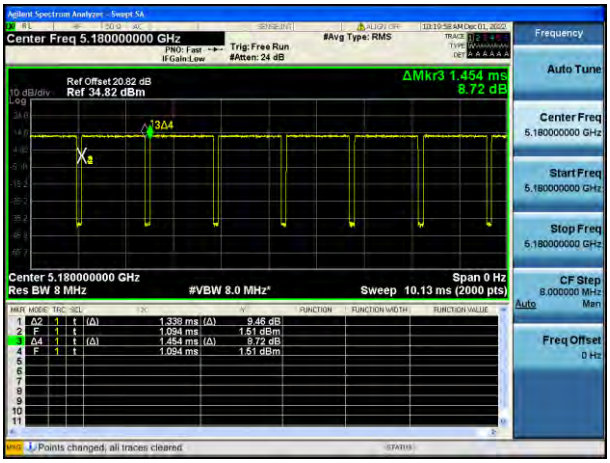
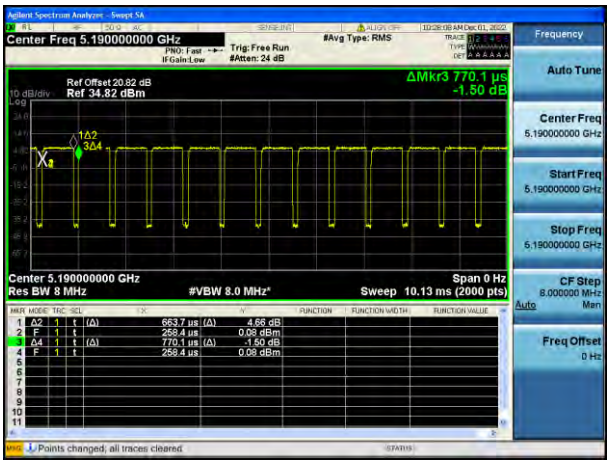
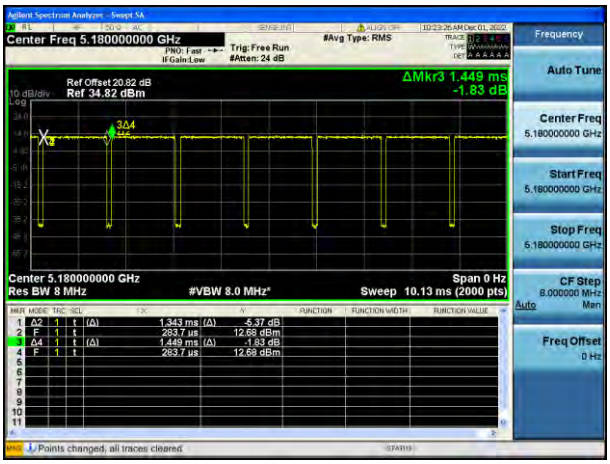
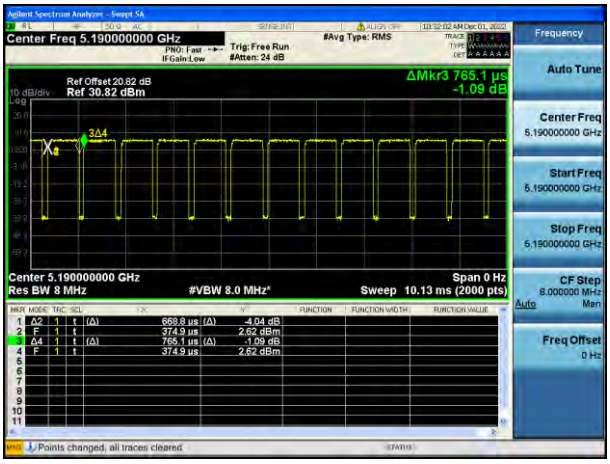
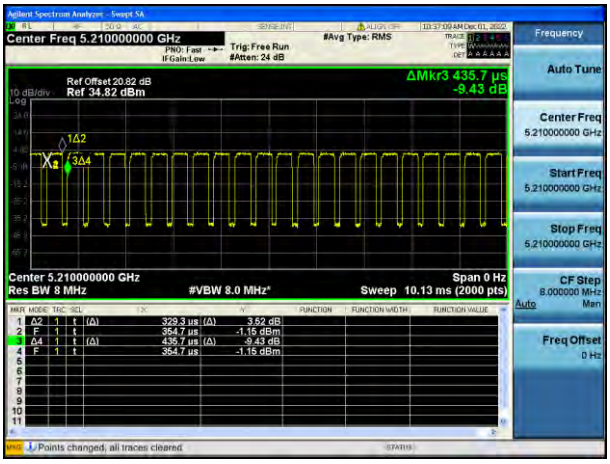
Mode	Data Rate (Mbps)	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11a	6	1.429	1.545	0.925	0.340
	9	0.963	1.079	0.892	0.496
	12	0.725	0.851	0.851	0.700
	18	0.491	0.598	0.822	0.851
	24	0.370	0.497	0.745	1.279
	36	0.253	0.365	0.694	1.584
	48	0.193	0.309	0.623	2.055
	54	0.180	0.293	0.615	2.114

Mode	MCS Index	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11n (HT20)	0	1.338	1.454	0.920	0.363
	1	0.684	0.795	0.860	0.656
	2	0.471	0.578	0.816	0.884
	3	0.365	0.471	0.774	1.112
	4	0.258	0.375	0.689	1.617
	5	0.198	0.304	0.650	1.871
	6	0.182	0.289	0.632	1.996
	7	0.167	0.284	0.589	2.297
802.11n (HT40)	0	0.664	0.770	0.862	0.646
	1	0.350	0.466	0.750	1.249
	2	0.248	0.365	0.681	1.671
	3	0.198	0.294	0.672	1.724
	4	0.142	0.258	0.549	2.604
	5	0.114	0.228	0.502	2.993
	6	0.108	0.221	0.491	3.087
	7	0.101	0.208	0.488	3.118

Mode	MCS Index	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11ac (VHT20)	0	1.343	1.449	0.927	0.331
	1	0.694	0.811	0.856	0.674
	2	0.471	0.583	0.809	0.922
	3	0.370	0.476	0.776	1.099
	4	0.258	0.365	0.708	1.498
	5	0.208	0.324	0.640	1.935
	6	0.187	0.304	0.616	2.101
	7	0.172	0.289	0.597	2.242
	8	0.152	0.263	0.577	2.389
802.11ac (VHT40)	0	0.669	0.765	0.874	0.584
	1	0.355	0.456	0.778	1.091
	2	0.248	0.350	0.710	1.487
	3	0.203	0.309	0.656	1.833
	4	0.147	0.243	0.604	2.188
	5	0.117	0.228	0.511	2.915
	6	0.112	0.223	0.504	2.974
	7	0.101	0.221	0.459	3.380
	8	0.093	0.209	0.446	3.505
	9	0.088	0.200	0.442	3.549
802.11ac (VHT80)	0	0.329	0.436	0.756	1.216
	1	0.187	0.304	0.617	2.099
	2	0.142	0.248	0.571	2.430
	3	0.117	0.218	0.535	2.717
	4	0.091	0.198	0.462	3.358
	5	0.081	0.198	0.410	3.869
	6	0.076	0.196	0.389	4.106
	7	0.073	0.193	0.379	4.217
	8	0.071	0.188	0.377	4.238
	9	0.066	0.182	0.361	4.424

Note:

In order to simplify the report, attached plots were only the 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	19.75	16.267
5200	40	20.27	16.290
5240	48	19.97	16.303
5260	52	19.84	16.286
5300	60	19.04	16.276
5320	64	19.20	16.285
5500	100	19.34	16.262
5600	120	19.24	16.308
5720	144	19.30	16.279
5745	149	19.53	16.248
5785	157	19.58	16.312
5825	165	19.64	16.262

802.11n(HT20) Mode		26dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	19.74	17.375
5200	40	21.50	17.422
5240	48	21.70	17.409
5260	52	19.80	17.381
5300	60	21.60	17.427
5320	64	21.29	17.405
5500	100	20.10	17.365
5600	120	20.33	17.426
5720	144	19.95	17.398
5745	149	20.11	17.392
5785	157	20.31	17.397
5825	165	19.69	17.432

802.11n(HT40) Mode		26dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	40.51	35.955
5230	46	40.04	35.843
5270	54	39.69	35.904
5310	62	40.22	35.890
5510	102	40.18	35.847
5590	118	40.15	35.833
5710	142	40.19	35.858
5755	151	40.46	35.889
5795	159	39.72	35.859

802.11ac(VHT20) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	19.97	17.379
5200	40	20.23	17.404
5240	48	20.82	17.460
5260	52	21.81	17.388
5300	60	19.93	17.409
5320	64	22.30	17.393
5500	100	20.06	17.367
5600	120	20.18	17.380
5720	144	19.97	17.373
5745	149	20.27	17.432
5785	157	20.62	17.375
5825	165	20.67	17.426

802.11ac(VHT40) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	39.64	35.862
5230	46	41.01	35.812
5270	54	39.96	35.858
5310	62	40.55	35.871
5510	102	39.77	35.840
5590	118	40.20	35.897
5710	142	40.60	35.836
5755	151	39.96	35.825
5795	159	39.99	35.939

802.11ac(VHT80) Mode		26 dB Bandwidth [MHz]	99 % bandwidth [MHz]
Frequency [MHz]	Channel No.		
5210	42	85.46	76.340
5290	58	86.13	76.393
5530	106	85.27	76.259
5610	122	87.78	76.320
5690	138	85.56	76.191
5775	155	89.19	76.207

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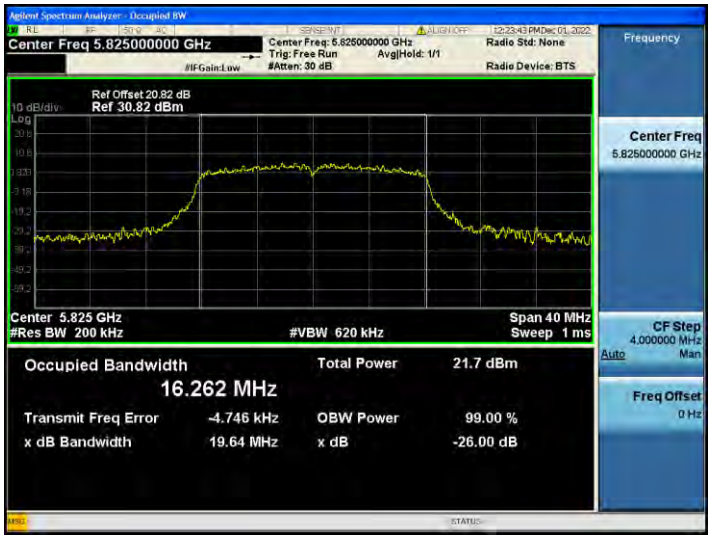
▣ Test Plots(802.11a)

Note:

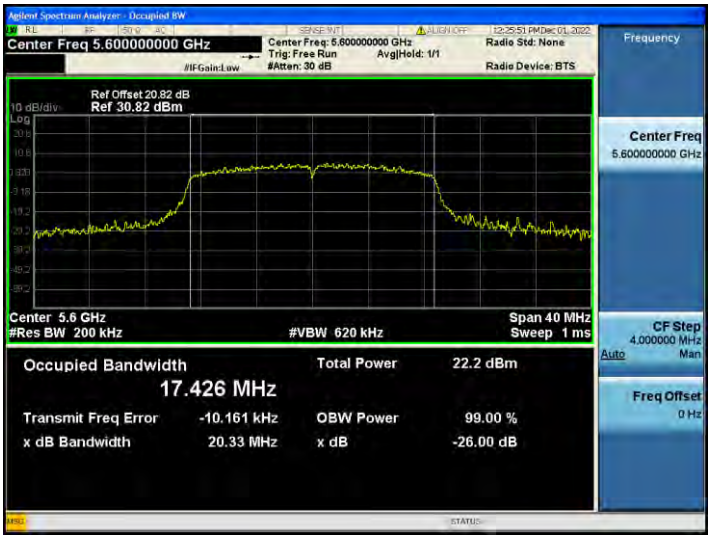
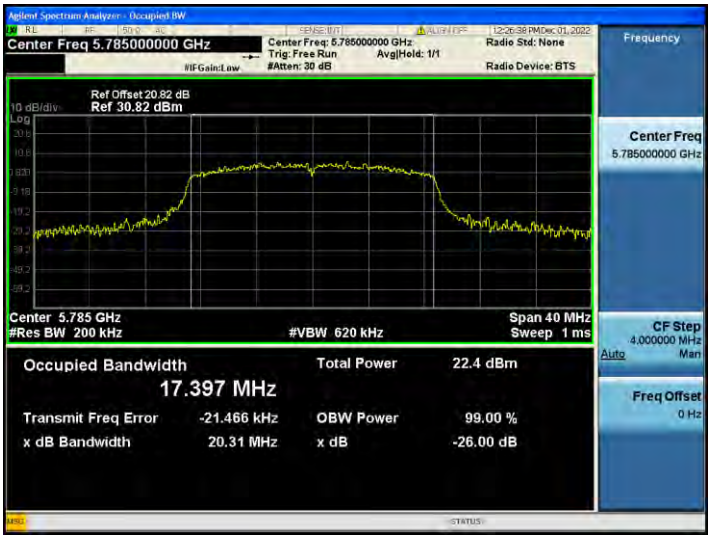
In order to simplify the report, attached plots were only the widest channel.

802.11a UNII 1 BAND 26 dB Bandwidth (CH 40)	802.11a UNII 2A BAND 26 dB Bandwidth (CH 52)
	
802.11a UNII 2C BAND 26 dB Bandwidth (CH 100)	**802.11a UNII 3 BAND 26 dB Bandwidth (CH 165)**
	

▣ Test Plots(802.11n(HT20))

Note:

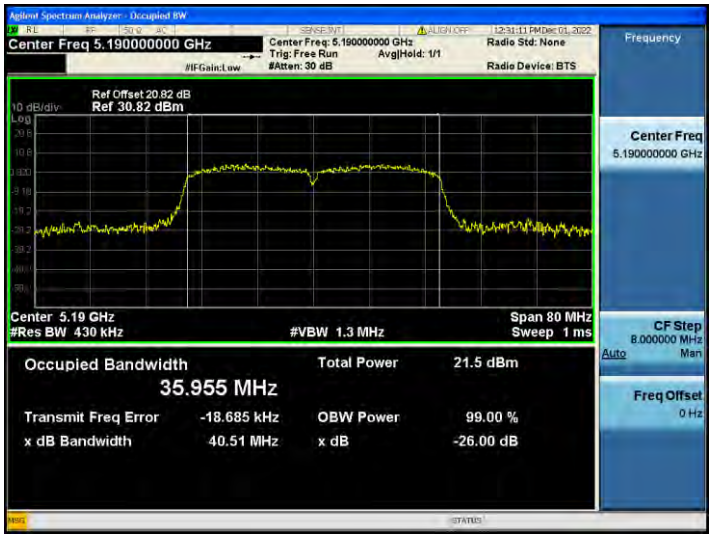
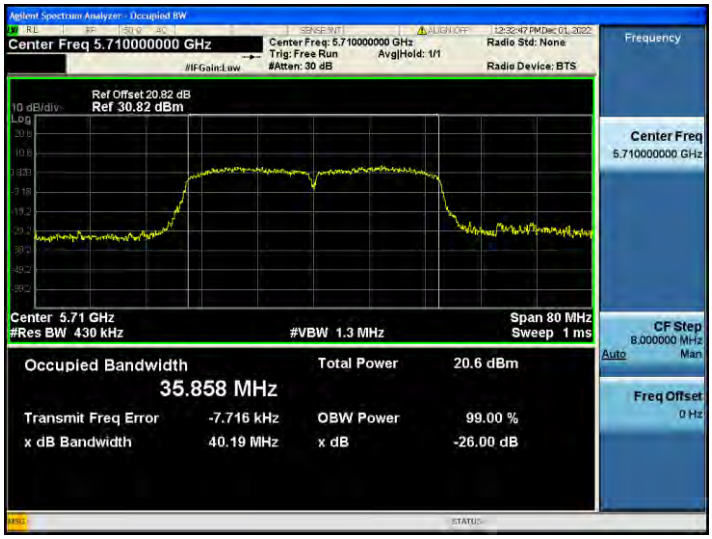
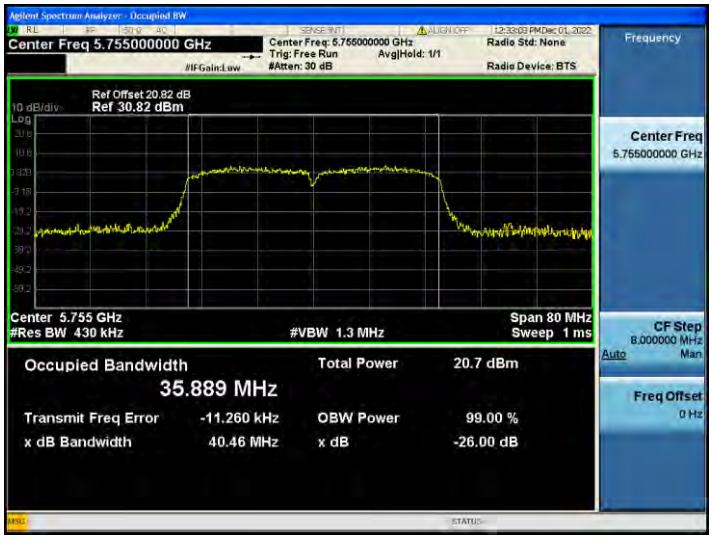
In order to simplify the report, attached plots were only the widest channel.

802.11n_HT20 UNII 1 BAND 26 dB Bandwidth(CH 48)	802.11n_HT20 UNII 2A BAND 26 dB Bandwidth(CH 60)
	
802.11n_HT20 UNII 2C BAND 26 dB Bandwidth(CH 120)	**802.11n_HT20 UNII 3 BAND 26 dB Bandwidth(CH 157)**
	

▣ Test Plots(802.11n(HT40))

Note:

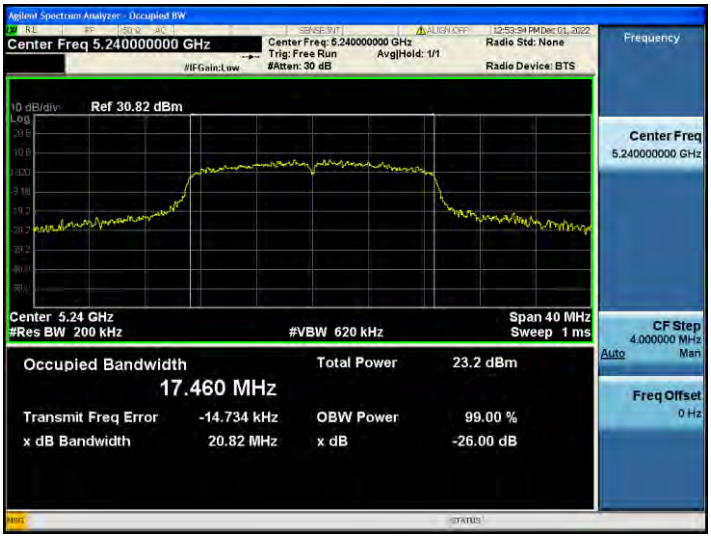
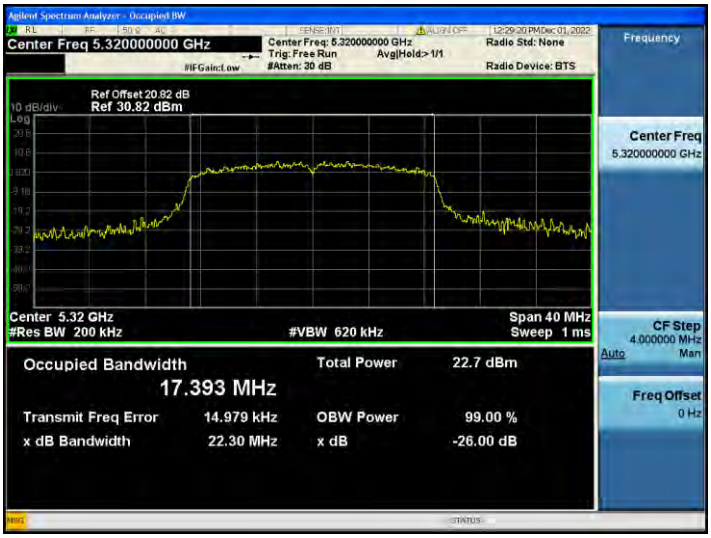
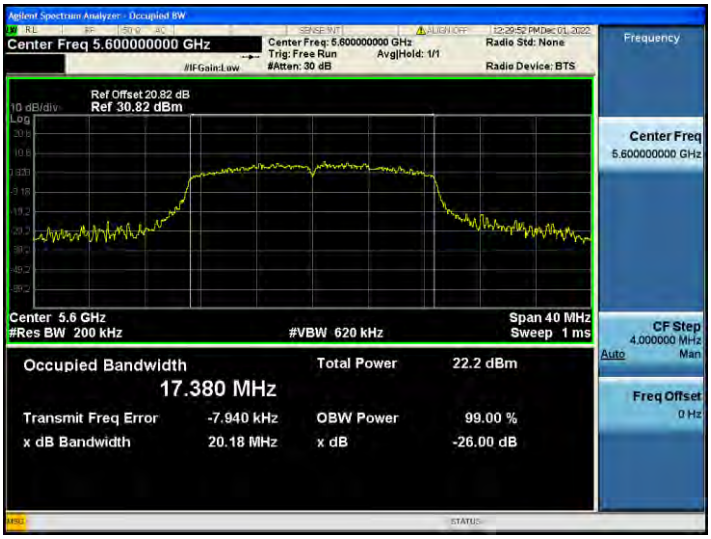
In order to simplify the report, attached plots were only the widest channel.

802.11n_HT40 UNII 1 BAND 26 dB Bandwidth(CH 38)	802.11n_HT40 UNII 2A BAND 26 dB Bandwidth (CH 62)
	
802.11n_HT40 UNII 2C BAND 26 dB Bandwidth(CH 142)	**802.11n_HT40 UNII 3 BAND 26 dB Bandwidth (CH 151)**
	

▣ Test Plots(802.11ac(VHT20))

Note:

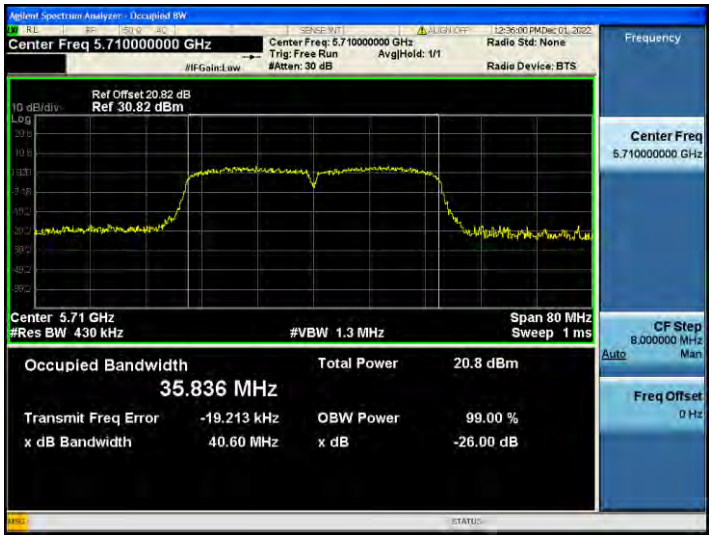
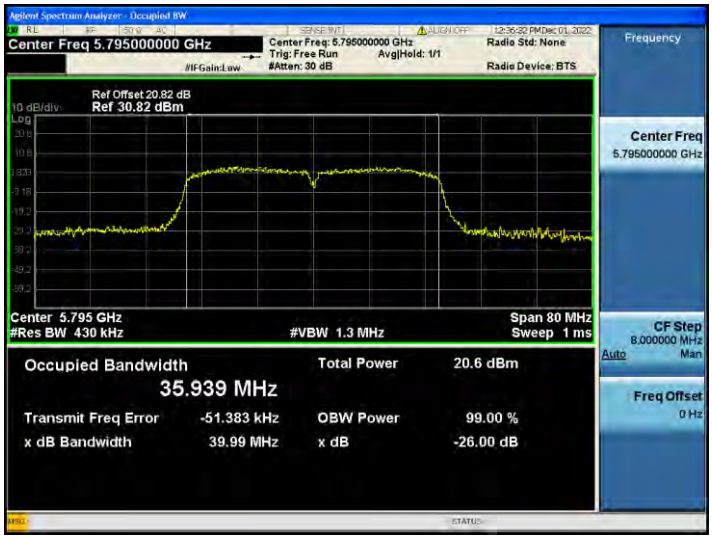
In order to simplify the report, attached plots were only the widest channel.

802.11ac_VHT20 UNII 1 BAND 26 dB Bandwidth(CH 48)	802.11ac_VHT20 UNII 2A BAND 26 dB Bandwidth(CH 64)
	
802.11ac_VHT20 UNII 2C BAND 26 dB Bandwidth(CH 120)	**802.11ac_VHT20 UNII 3 BAND 26 dB Bandwidth(CH 165)**
	

▣ Test Plots(802.11ac(VHT40))

Note:

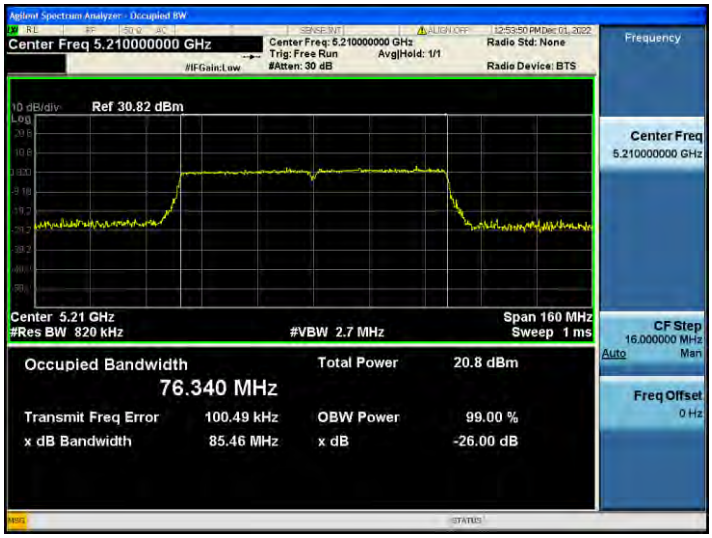
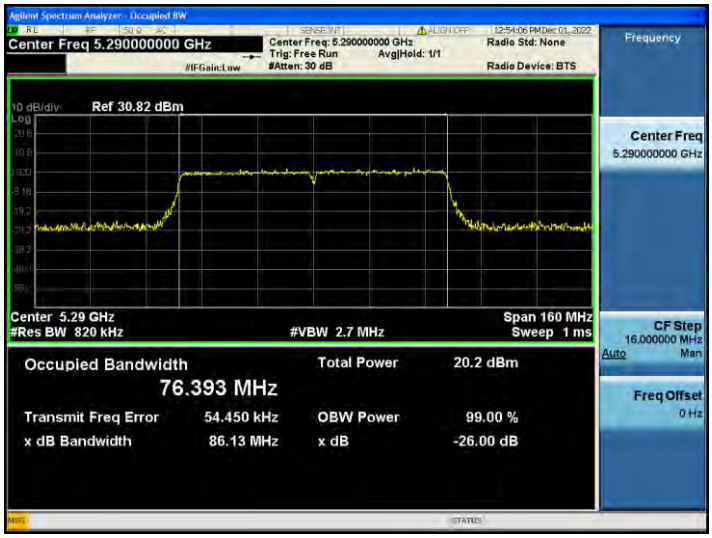
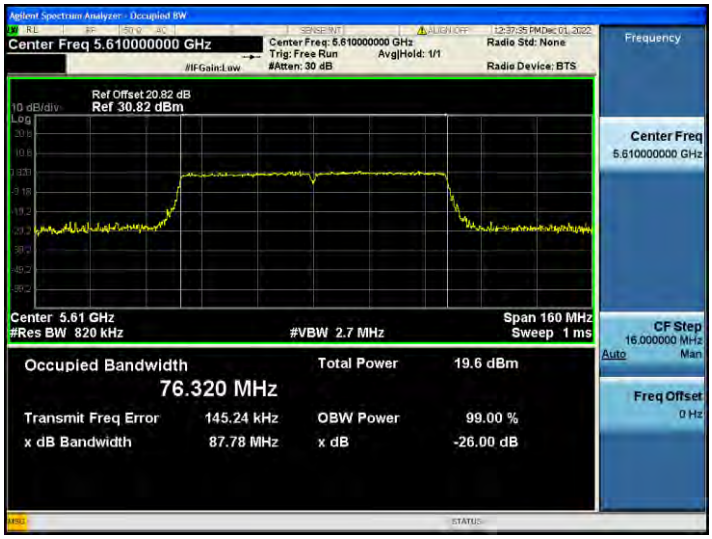
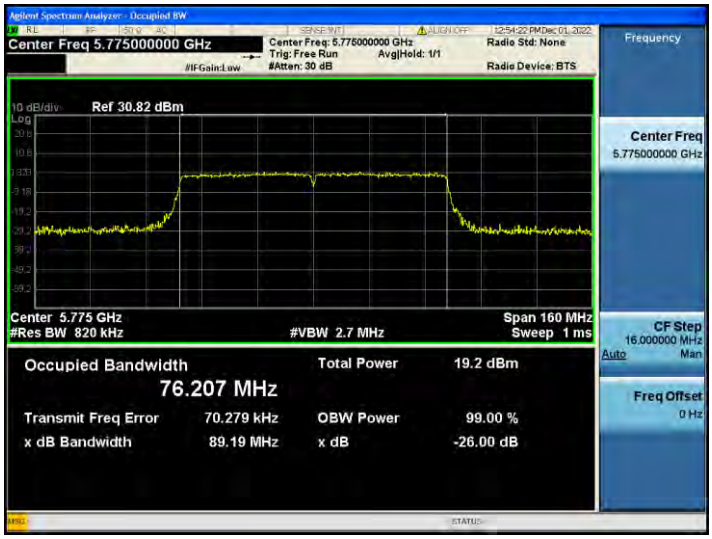
In order to simplify the report, attached plots were only the widest channel.

802.11ac_VHT40 UNII 1 BAND 26 dB Bandwidth(CH 46)	802.11ac_VHT40 UNII 2A BAND 26 dB Bandwidth (CH 62)
	
802.11ac_VHT40 UNII 2C BAND 26 dB Bandwidth(CH 142)	**802.11ac_VHT40 UNII 3 BAND 26 dB Bandwidth (CH 159)**
	

▣ Test Plots(802.11ac(VHT80))

Note:

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

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

10.3 6 dB BANDWIDTH

802.11a Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	13.89	> 0.5	Pass
5785	157	14.18	> 0.5	Pass
5825	165	14.10	> 0.5	Pass

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.16	> 0.5	Pass
5785	157	15.15	> 0.5	Pass
5825	165	15.06	> 0.5	Pass

802.11n(HT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.17	> 0.5	Pass
5795	159	35.16	> 0.5	Pass

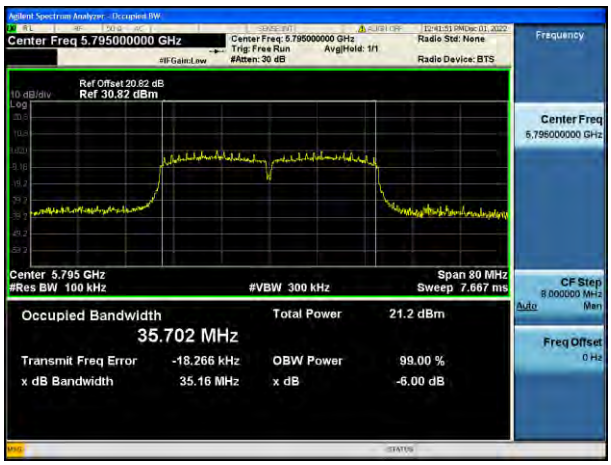
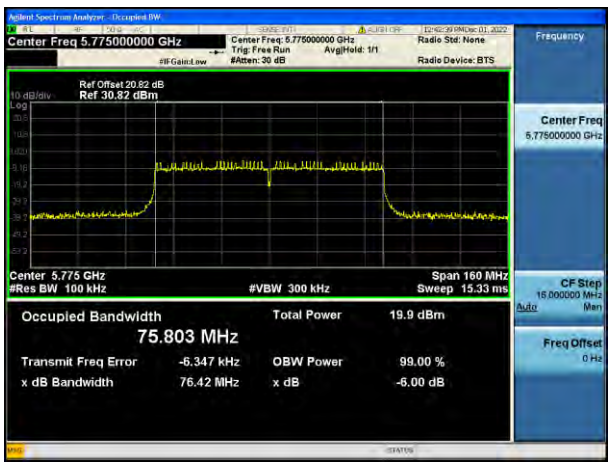
802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.10	> 0.5	Pass
5785	157	15.11	> 0.5	Pass
5825	165	15.05	> 0.5	Pass

802.11ac(VHT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.13	> 0.5	Pass
5795	159	35.18	> 0.5	Pass

802.11ac(VHT80) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	76.42	> 0.5	Pass

▣ Test Plots

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

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

Limit

(UNII 1) : 23.98 dBm

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

(UNII 3) : 30.00 dBm

802.11a Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase Datarate [Mbps]
Frequency [MHz]	Channel No.					
5180	36	13.28	1.279	14.56	23.98	24M
5200	40	13.57	1.279	14.85	23.98	24M
5240	48	14.12	1.279	15.40	23.98	24M
5260	52	13.57	1.279	14.84	23.97	24M
5300	60	14.49	1.279	15.77	23.80	24M
5320	64	14.21	1.584	15.79	23.83	36M
5500	100	13.07	1.279	14.35	23.87	24M
5600	120	13.83	1.584	15.42	23.84	36M
5720	144	13.13	1.584	14.72	23.85	36M
5745	149	14.22	1.279	15.50	30.00	24M
5785	157	14.05	1.279	15.33	30.00	24M
5825	165	13.13	1.584	14.71	30.00	36M

802.11n(20 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5180	36	11.34	2.297	13.63	23.98	MCS7
5200	40	13.13	1.617	14.75	23.98	MCS4
5240	48	13.71	1.617	15.33	23.98	MCS4
5260	52	13.09	1.617	14.71	23.97	MCS4
5300	60	13.95	1.617	15.57	23.98	MCS4
5320	64	13.92	1.617	15.53	23.98	MCS4
5500	100	11.61	1.617	13.23	23.98	MCS4
5600	120	13.52	1.617	15.14	23.98	MCS4
5720	144	13.20	1.617	14.82	23.98	MCS4
5745	149	13.87	1.617	15.49	30.00	MCS4
5785	157	13.78	1.617	15.40	30.00	MCS4
5825	165	12.92	1.617	14.54	30.00	MCS4

802.11n(40 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5190	38	11.81	2.604	14.41	23.98	MCS4
5230	46	11.55	2.604	14.16	23.98	MCS4
5270	54	11.57	2.604	14.17	23.98	MCS4
5310	62	9.55	2.993	12.54	23.98	MCS5
5510	102	8.28	2.993	11.27	23.98	MCS5
5590	118	11.69	2.604	14.30	23.98	MCS4
5710	142	11.98	2.604	14.59	23.98	MCS4
5755	151	11.85	2.604	14.46	30.00	MCS4
5795	159	12.03	2.604	14.64	30.00	MCS4

802.11ac(20 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5180	36	11.34	2.242	13.59	23.98	MCS7
5200	40	13.35	1.498	14.84	23.98	MCS4
5240	48	13.85	1.498	15.35	23.98	MCS4
5260	52	13.12	1.498	14.62	23.98	MCS4
5300	60	14.01	1.498	15.50	23.98	MCS4
5320	64	14.08	1.498	15.58	23.98	MCS4
5500	100	11.53	1.498	13.03	23.98	MCS4
5600	120	13.67	1.498	15.17	23.98	MCS4
5720	144	13.26	1.498	14.76	23.98	MCS4
5745	149	13.75	1.498	15.25	30.00	MCS4
5785	157	13.62	1.498	15.12	30.00	MCS4
5825	165	12.95	1.498	14.45	30.00	MCS4

802.11ac(40 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5190	38	12.25	1.833	14.08	23.98	MCS3
5230	46	11.93	1.833	13.77	23.98	MCS3
5270	54	12.10	1.833	13.93	23.98	MCS3
5310	62	9.48	3.380	12.86	23.98	MCS7
5510	102	8.05	3.380	11.43	23.98	MCS7
5590	118	12.14	1.833	13.97	23.98	MCS3
5710	142	12.43	1.833	14.26	23.98	MCS3
5755	151	12.39	1.833	14.23	30.00	MCS3
5795	159	12.37	1.833	14.20	30.00	MCS3

802.11ac(80 MHz) Mode		Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase MCS Index
Frequency [MHz]	Channel No.					
5210	42	6.10	4.217	10.32	23.98	MCS7
5290	58	5.56	4.106	9.67	23.98	MCS6
5530	106	7.55	2.099	9.65	23.98	MCS1
5610	122	9.36	3.358	12.71	23.98	MCS4
5690	138	9.05	3.358	12.40	23.98	MCS4
5775	155	9.03	3.358	12.39	30.00	MCS4

10.5 POWER SPECTRAL DENSITY

802.11a Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase Datarate [Mbps]	Limit
Frequency [MHz]	Channel No.					
5180	36	3.753	1.279	5.032	24M	11 dBm/MHz
5200	40	3.795	1.279	5.074	24M	
5240	48	4.536	1.279	5.815	24M	
5260	52	3.522	1.279	4.801	24M	
5300	60	4.869	1.279	6.148	24M	
5320	64	4.458	1.584	6.042	36M	
5500	100	3.308	1.279	4.587	24M	
5600	120	4.136	1.584	5.720	36M	
5720	144	4.176	1.584	5.760	36M	
5745	149	1.773	1.279	3.052	24M	30 dBm/500 kHz
5785	157	1.814	1.279	3.093	24M	
5825	165	0.954	1.584	2.538	36M	

802.11n(20 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5180	36	1.610	2.297	3.907	MCS7	11 dBm/MHz
5200	40	3.938	1.617	5.555	MCS4	
5240	48	3.652	1.617	5.269	MCS4	
5260	52	3.728	1.617	5.345	MCS4	
5300	60	3.997	1.617	5.614	MCS4	
5320	64	4.282	1.617	5.899	MCS4	
5500	100	1.897	1.617	3.514	MCS4	
5600	120	4.254	1.617	5.871	MCS4	
5720	144	3.684	1.617	5.301	MCS4	
5745	149	1.458	1.617	3.075	MCS4	30 dBm/500 kHz
5785	157	1.444	1.617	3.061	MCS4	
5825	165	0.546	1.617	2.163	MCS4	

802.11n(40 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5190	38	-1.006	2.604	1.598	MCS4	11 dBm/MHz
5230	46	-1.768	2.604	0.836	MCS4	
5270	54	-1.613	2.604	0.991	MCS4	
5310	62	-3.206	2.993	-0.213	MCS5	
5510	102	-4.686	2.993	-1.693	MCS5	
5590	118	-1.336	2.604	1.268	MCS4	
5710	142	-1.353	2.604	1.251	MCS4	
5755	151	-3.616	2.604	-1.012	MCS4	30 dBm /500 kHz
5795	159	-3.937	2.604	-1.333	MCS4	

802.11ac(20 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5180	36	2.002	2.242	4.244	MCS7	11 dBm/MHz
5200	40	3.762	1.498	5.260	MCS4	
5240	48	4.059	1.498	5.557	MCS4	
5260	52	3.733	1.498	5.231	MCS4	
5300	60	4.446	1.498	5.944	MCS4	
5320	64	4.261	1.498	5.759	MCS4	
5500	100	1.835	1.498	3.333	MCS4	
5600	120	3.630	1.498	5.128	MCS4	
5720	144	3.697	1.498	5.195	MCS4	
5745	149	1.551	1.498	3.049	MCS4	30 dBm/500 kHz
5785	157	1.263	1.498	2.761	MCS4	
5825	165	0.820	1.498	2.318	MCS4	

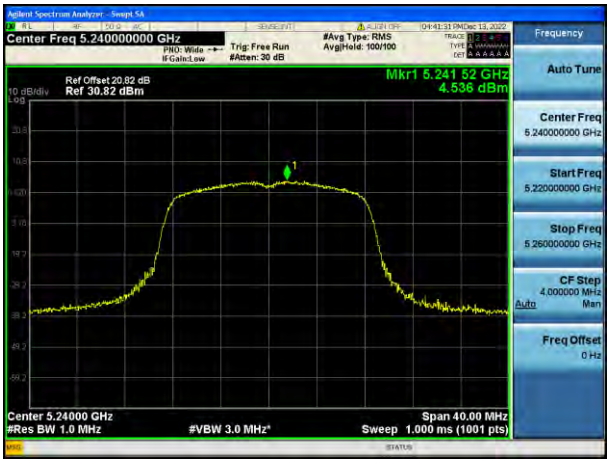
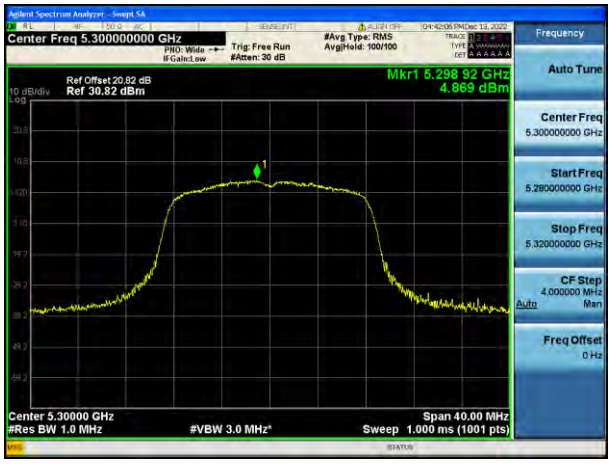
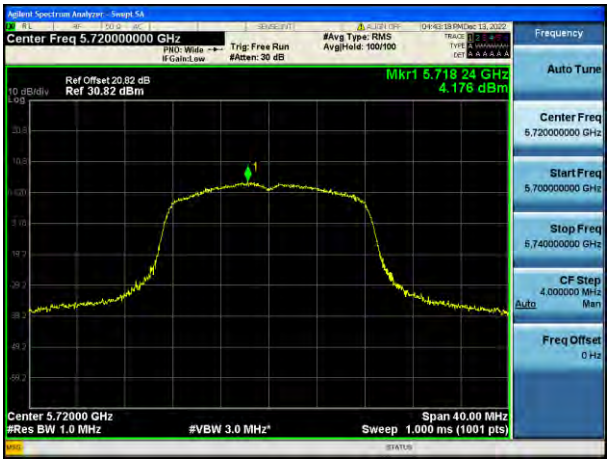
802.11ac(40 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5190	38	-0.462	1.833	1.371	MCS3	11 dBm/MHz
5230	46	-1.439	1.833	0.394	MCS3	
5270	54	-1.213	1.833	0.620	MCS3	
5310	62	-3.113	3.380	0.267	MCS7	
5510	102	-5.350	3.380	-1.970	MCS7	
5590	118	-1.365	1.833	0.468	MCS3	
5710	142	-0.596	1.833	1.237	MCS3	
5755	151	-3.714	1.833	-1.881	MCS3	30 dBm/500 kHz
5795	159	-3.323	1.833	-1.490	MCS3	

802.11ac(80 MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm/MHz]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5210	42	-10.679	4.217	-6.462	MCS7	11 dBm/MHz
5290	58	-10.910	4.106	-6.804	MCS6	
5530	106	-9.574	2.099	-7.475	MCS1	
5610	122	-7.681	3.358	-4.323	MCS4	
5690	138	-7.917	3.358	-4.559	MCS4	
5775	155	-10.286	3.358	-6.928	MCS4	30 dBm/500 kHz

▣ Test Plots(802.11a)

Note:

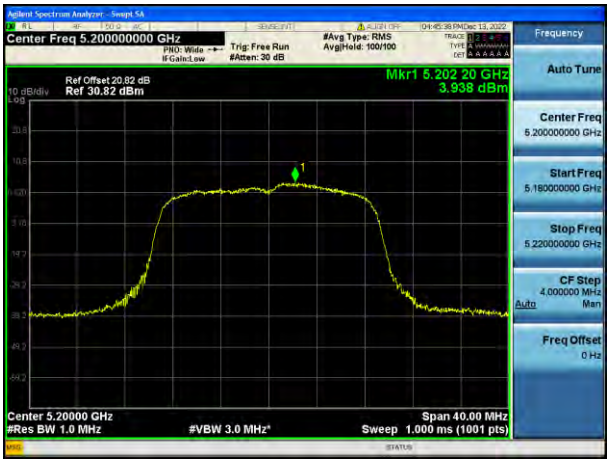
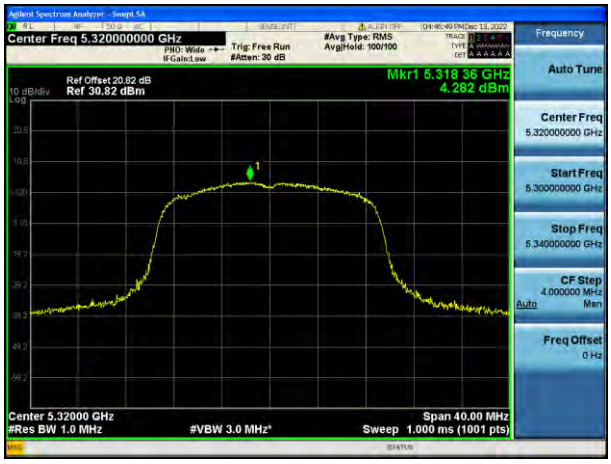
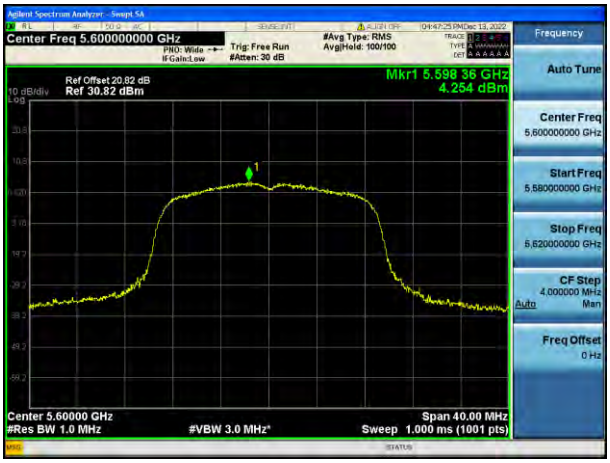
In order to simplify the report, attached plots were only channel of the highest power.

UNII 1 (Ch. 48)	UNII 2A (Ch. 60)
	
UNII 2C (Ch. 144)	**UNII 3 (Ch. 157)**
	

▣ Test Plots(802.11n(HT20))

Note:

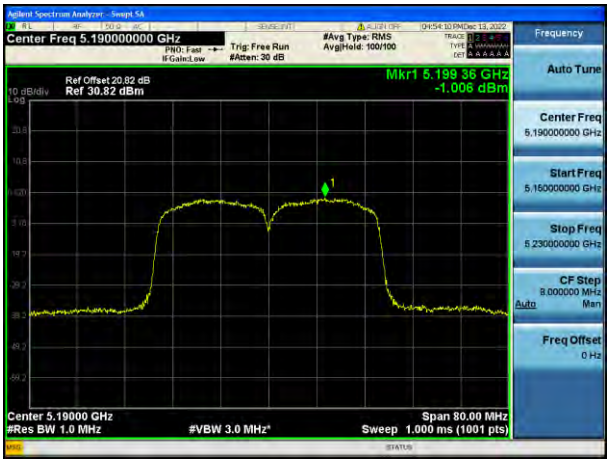
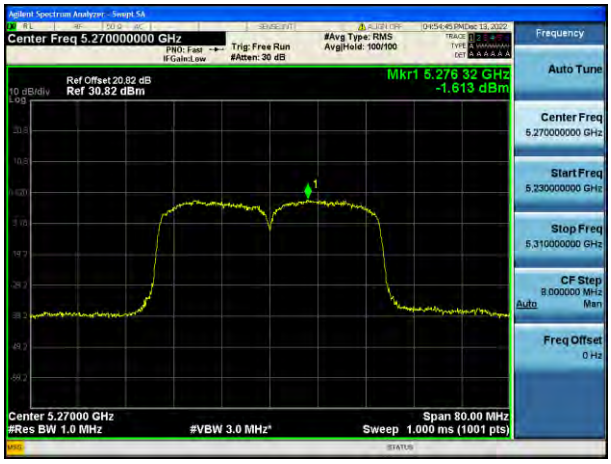
In order to simplify the report, attached plots were only channel of the highest power.

UNII 1 (Ch. 40)	UNII 2A (Ch. 64)
	
UNII 2C (Ch. 120)	**UNII 3 (Ch. 149)**
	

▣ Test Plots(802.11n(HT40))

Note:

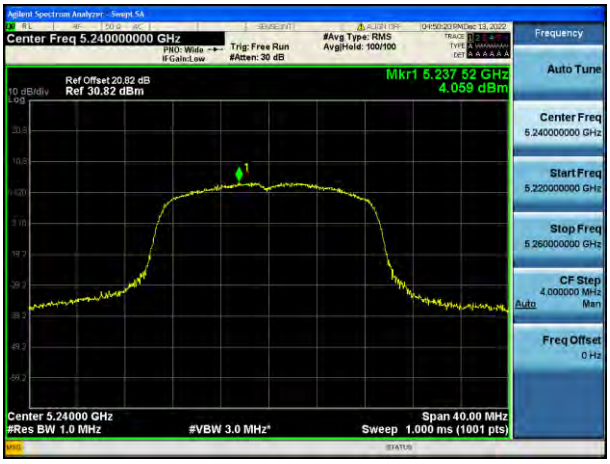
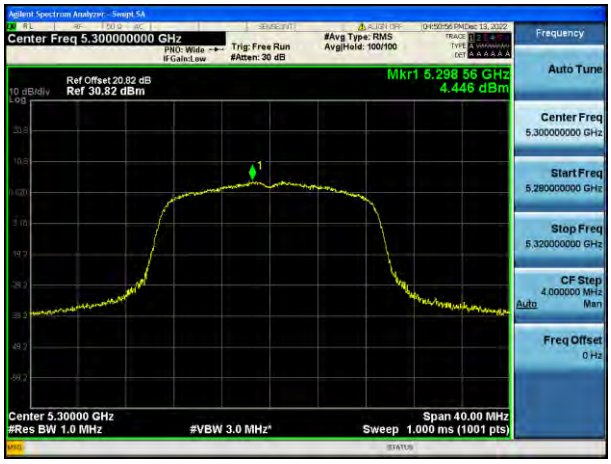
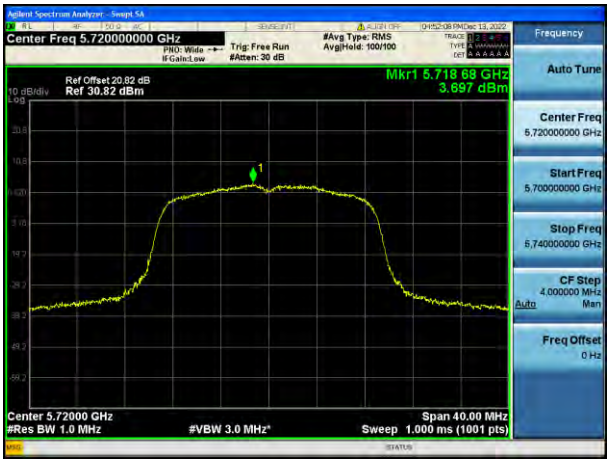
In order to simplify the report, attached plots were only channel of the highest power.

UNII 1 (Ch. 38)	UNII 2A (Ch. 54)
	
UNII 2C (Ch. 118)	**UNII 3 (Ch. 151)**
	

▣ Test Plots(802.11ac(VHT20))

Note:

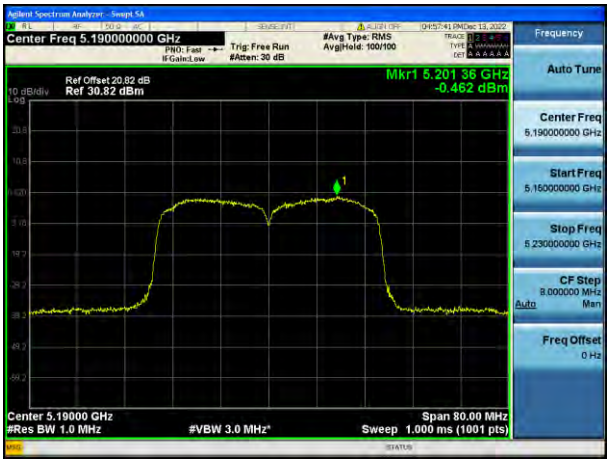
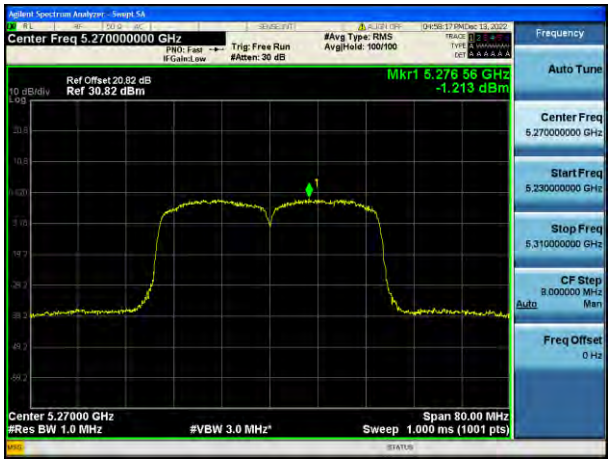
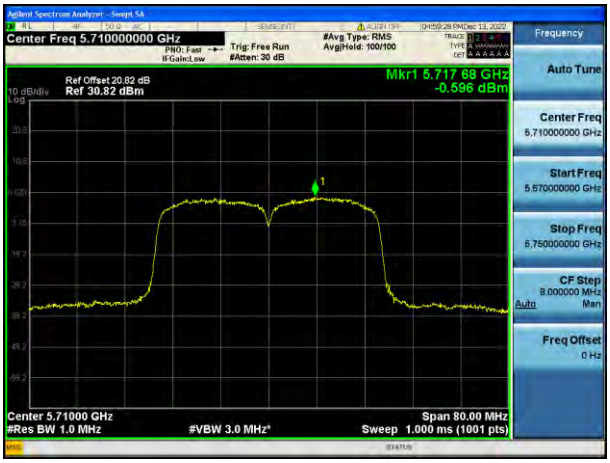
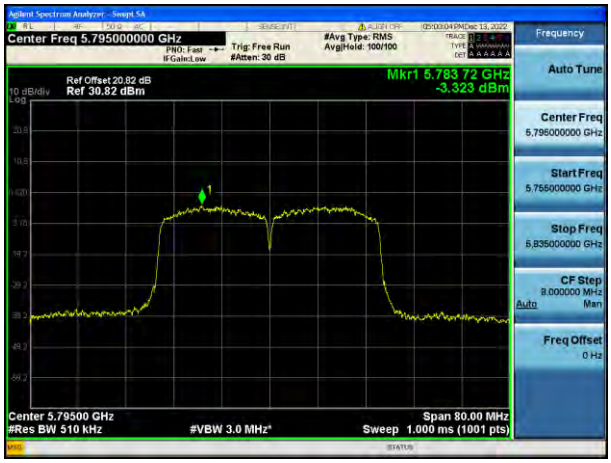
In order to simplify the report, attached plots were only channel of the highest power.

UNII 1 (Ch. 48)	UNII 2A (Ch. 60)
	
UNII 2C (Ch. 144)	**UNII 3 (Ch. 149)**
	

▣ Test Plots(802.11ac(VHT40))

Note:

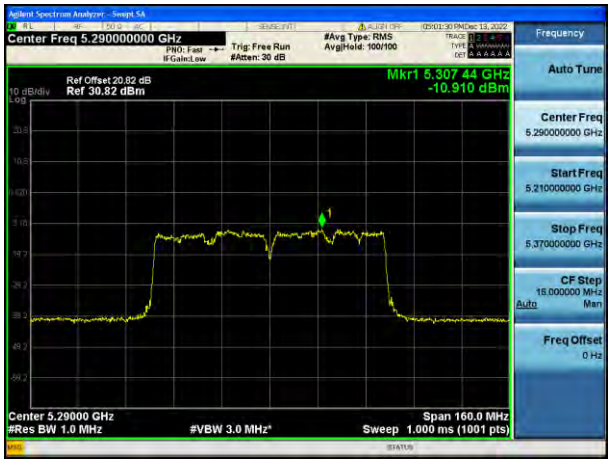
In order to simplify the report, attached plots were only channel of the highest power.

UNII 1 (Ch. 38)	UNII 2A (Ch. 54)
	
UNII 2C (Ch. 142)	**UNII 3 (Ch. 159)**
	

▣ Test Plots(802.11ac(VHT80))

Note:

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

UNII 1 (Ch. 42)	UNII 2A (Ch. 58)
	
UNII 2C (Ch. 122)	**UNII 3 (Ch. 155)**
	

10.6 FREQUENCY STABILITY.

10.6.1 80 MHz BW

Startup after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	4.20 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5210067.89	67.89
100%		-30	5210088.04	88.04
100%		-20	5210084.96	84.96
100%		-10	5210078.28	78.28
100%		0	5210073.67	73.67
100%		+10	5210070.54	70.54
100%		+30	5210071.21	71.21
100%		+40	5210079.86	79.86
100%		+50	5210084.86	84.86
High	4.40	+20	5210086.89	86.89
Low	3.80	+20	5210087.68	87.68

Note:

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

OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,290,000,000 Hz
CHANNEL:	58
REFERENCE VOLTAGE:	4.20 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5290065.19	65.19
100%		-30	5290085.86	85.86
100%		-20	5290082.23	82.23
100%		-10	5290075.35	75.35
100%		0	5290070.59	70.59
100%		+10	5290066.75	66.75
100%		+30	5290068.30	68.30
100%		+40	5290077.01	77.01
100%		+50	5290080.16	80.16
High	4.40	+20	5290082.34	82.34
Low	3.80	+20	5290082.91	82.91

Note:

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

OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,530,000,000 Hz
CHANNEL:	106
REFERENCE VOLTAGE:	4.20 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5530068.30	68.30
100%		-30	5530087.43	87.43
100%		-20	5530083.93	83.93
100%		-10	5530078.51	78.51
100%		0	5530073.81	73.81
100%		+10	5530071.11	71.11
100%		+30	5530070.55	70.55
100%		+40	5530078.84	78.84
100%		+50	5530083.58	83.58
High	4.40	+20	5530087.04	87.04
Low	3.80	+20	5530086.84	86.84

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:	4.20 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5775067.66	67.66
100%		-30	5775086.56	86.56
100%		-20	5775083.07	83.07
100%		-10	5775076.96	76.96
100%		0	5775072.41	72.41
100%		+10	5775069.84	69.84
100%		+30	5775071.50	71.50
100%		+40	5775080.50	80.50
100%		+50	5775083.72	83.72
High	4.40	+20	5775084.88	84.88
Low	3.80	+20	5775087.39	87.39

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:	4.20 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5210070.18	70.18
100%		-30	5210090.43	90.43
100%		-20	5210087.88	87.88
100%		-10	5210082.14	82.14
100%		0	5210077.33	77.33
100%		+10	5210074.62	74.62
100%		+30	5210073.79	73.79
100%		+40	5210083.72	83.72
100%		+50	5210087.56	87.56
High	4.40	+20	5210088.02	88.02
Low	3.80	+20	5210087.85	87.85

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:	4.20 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5290070.58	70.58
100%		-30	5290090.28	90.28
100%		-20	5290087.73	87.73
100%		-10	5290082.62	82.62
100%		0	5290078.50	78.50
100%		+10	5290076.19	76.19
100%		+30	5290073.47	73.47
100%		+40	5290083.22	83.22
100%		+50	5290089.30	89.30
High	4.40	+20	5290090.66	90.66
Low	3.80	+20	5290087.72	87.72

Note:

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

OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,530,000,000 Hz
CHANNEL:	106
REFERENCE VOLTAGE:	4.20 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5530069.47	69.47
100%		-30	5530088.94	88.94
100%		-20	5530086.01	86.01
100%		-10	5530080.24	80.24
100%		0	5530077.01	77.01
100%		+10	5530073.11	73.11
100%		+30	5530072.59	72.59
100%		+40	5530082.29	82.29
100%		+50	5530088.26	88.26
High	4.40	+20	5530089.44	89.44
Low	3.80	+20	5530087.73	87.73

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:	4.20 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5775073.04	73.04
100%		-30	5775092.16	92.16
100%		-20	5775088.90	88.90
100%		-10	5775083.64	83.64
100%		0	5775079.93	79.93
100%		+10	5775076.75	76.75
100%		+30	5775076.94	76.94
100%		+40	5775085.13	85.13
100%		+50	5775090.35	90.35
High	4.40	+20	5775092.26	92.26
Low	3.80	+20	5775090.01	90.01

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:	4.20 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5210076.88	76.88
100%		-30	5210096.65	96.65
100%		-20	5210093.16	93.16
100%		-10	5210087.44	87.44
100%		0	5210083.04	83.04
100%		+10	5210080.11	80.11
100%		+30	5210080.40	80.40
100%		+40	5210089.43	89.43
100%		+50	5210094.25	94.25
High	4.40	+20	5210095.70	95.70
Low	3.80	+20	5210096.28	96.28

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 2A
OPERATING FREQUENCY:	5,290,000,000 Hz
CHANNEL:	58
REFERENCE VOLTAGE:	4.20 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5290074.12	74.12
100%		-30	5290093.79	93.79
100%		-20	5290089.92	89.92
100%		-10	5290084.79	84.79
100%		0	5290081.45	81.45
100%		+10	5290078.24	78.24
100%		+30	5290077.79	77.79
100%		+40	5290088.27	88.27
100%		+50	5290094.14	94.14
High	4.40	+20	5290093.99	93.99
Low	3.80	+20	5290092.93	92.93

Note:

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

OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,530,000,000 Hz
CHANNEL:	106
REFERENCE VOLTAGE:	4.20 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5530077.91	77.91
100%		-30	5530098.06	98.06
100%		-20	5530094.79	94.79
100%		-10	5530088.10	88.10
100%		0	5530083.26	83.26
100%		+10	5530080.00	80.00
100%		+30	5530081.31	81.31
100%		+40	5530090.19	90.19
100%		+50	5530094.69	94.69
High	4.40	+20	5530096.41	96.41
Low	3.80	+20	5530095.80	95.80

Note:

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

OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,775,000,000 Hz
CHANNEL:	155
REFERENCE VOLTAGE:	4.20 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5775078.45	78.45
100%		-30	5775099.17	99.17
100%		-20	5775095.34	95.34
100%		-10	5775089.83	89.83
100%		0	5775086.54	86.54
100%		+10	5775084.17	84.17
100%		+30	5775081.07	81.07
100%		+40	5775090.52	90.52
100%		+50	5775093.98	93.98
High	4.40	+20	5775095.91	95.91
Low	3.80	+20	5775096.01	96.01

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:	4.20 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5210080.69	80.69
100%		-30	5210100.08	100.08
100%		-20	5210097.77	97.77
100%		-10	5210090.86	90.86
100%		0	5210086.06	86.06
100%		+10	5210082.67	82.67
100%		+30	5210083.70	83.70
100%		+40	5210092.40	92.40
100%		+50	5210098.33	98.33
High	4.40	+20	5210100.62	100.62
Low	3.80	+20	5210098.86	98.86

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:	4.20 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5290078.99	78.99
100%		-30	5290098.83	98.83
100%		-20	5290095.23	95.23
100%		-10	5290089.80	89.80
100%		0	5290086.60	86.60
100%		+10	5290083.30	83.30
100%		+30	5290083.03	83.03
100%		+40	5290092.25	92.25
100%		+50	5290097.03	97.03
High	4.40	+20	5290097.77	97.77
Low	3.80	+20	5290096.43	96.43

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.

OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,530,000,000 Hz
CHANNEL:	106
REFERENCE VOLTAGE:	4.20 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5530081.20	81.20
100%		-30	5530101.14	101.14
100%		-20	5530098.98	98.98
100%		-10	5530092.10	92.10
100%		0	5530088.50	88.50
100%		+10	5530085.72	85.72
100%		+30	5530084.12	84.12
100%		+40	5530094.38	94.38
100%		+50	5530099.27	99.27
High	4.40	+20	5530100.09	100.09
Low	3.80	+20	5530100.78	100.78

Note:

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

OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,775,000,000 Hz
CHANNEL:	155
REFERENCE VOLTAGE:	4.20 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5775080.37	80.37
100%		-30	5775100.52	100.52
100%		-20	5775096.76	96.76
100%		-10	5775091.10	91.10
100%		0	5775087.18	87.18
100%		+10	5775084.93	84.93
100%		+30	5775083.94	83.94
100%		+40	5775091.36	91.36
100%		+50	5775096.65	96.65
High	4.40	+20	5775099.66	99.66
Low	3.80	+20	5775099.67	99.67

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 26 dB Bandwidth

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26 dB Bandwidth [MHz]
802.11a	UNII 2C	5720	144	5710.80	14.20
802.11n(HT20)				5710.24	14.76
802.11ac(VHT20)				5710.00	15.00
802.11a	UNII 3	5720	144	5729.52	4.52
802.11n(HT20)				5729.92	4.92
802.11ac(VHT20)				5729.76	4.76

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26 dB Bandwidth [MHz]
802.11n(HT40)	UNII 2C	5710	142	5690.32	34.68
802.11ac(VHT40)				5690.16	34.84
802.11n(HT40)	UNII 3	5710	142	5730.16	5.16
802.11ac(VHT40)				5729.84	4.84

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26 dB Bandwidth [MHz]
802.11ac(VHT80)	UNII 2C	5690	138	5646.48	78.52
	UNII 3	5690	138	5733.36	8.36

Note:

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

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

▣ Test Plots (26 dB Bandwidth)

802.11a UNII Band	802.11n(HT20) UNII Band
	

802.11ac(VHT20) UNII Band


▣ Test Plots (26 dB Bandwidth)

802.11n(HT40) UNII Band	802.11ac(VHT40) UNII Band
	
802.11ac(VHT80) UNII Band	
	

10.7.2 6 dB Bandwidth

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
802.11a	UNII 3	5720	144	5727.56	2.56	> 0.5
802.11n(HT20)				5727.56	2.56	> 0.5
802.11ac(VHT20)				5727.60	2.60	> 0.5

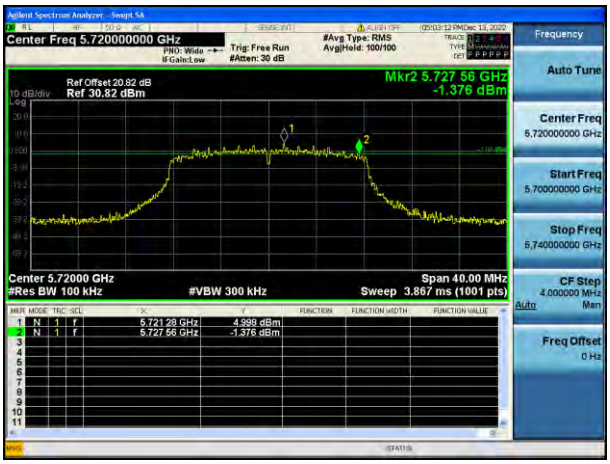
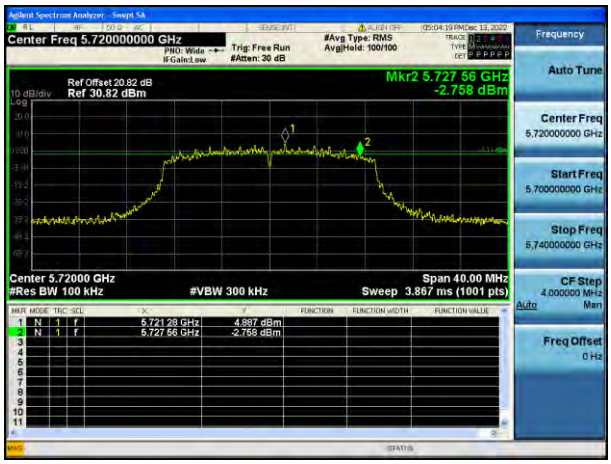
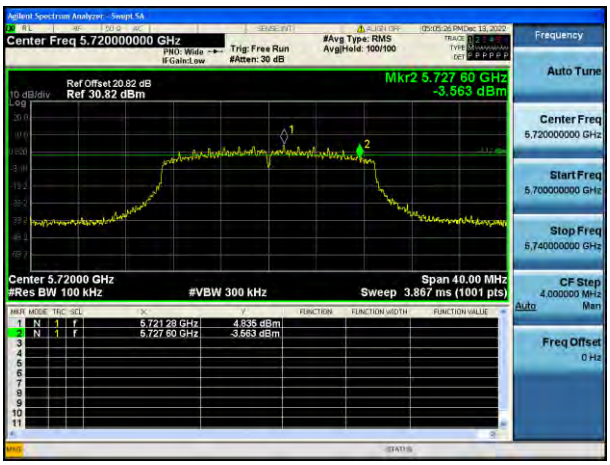
Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
802.11n(HT40)	UNII 3	5710	142	5727.60	2.60	> 0.5
802.11ac(VHT40)				5727.60	2.60	> 0.5

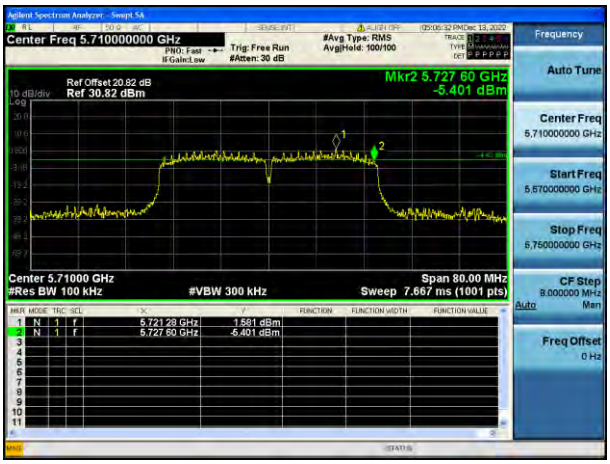
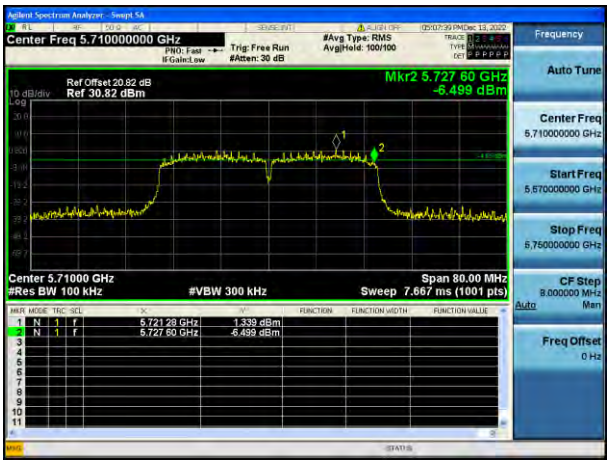
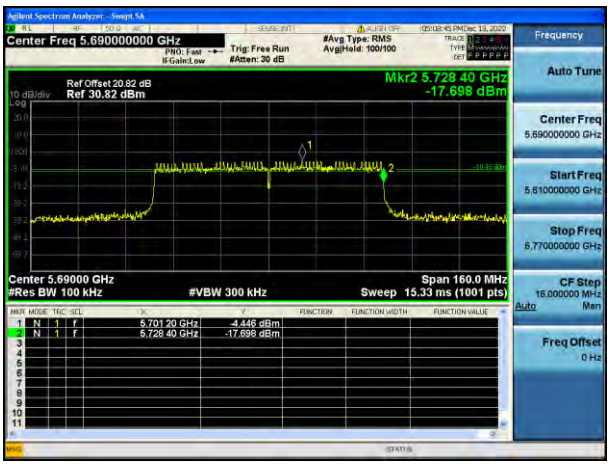
Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
802.11ac(VHT80)	UNII 3	5690	138	5728.40	3.40	> 0.5

Note:

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

▣ Test Plots(UNII 3 Band 6 dB 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	
	

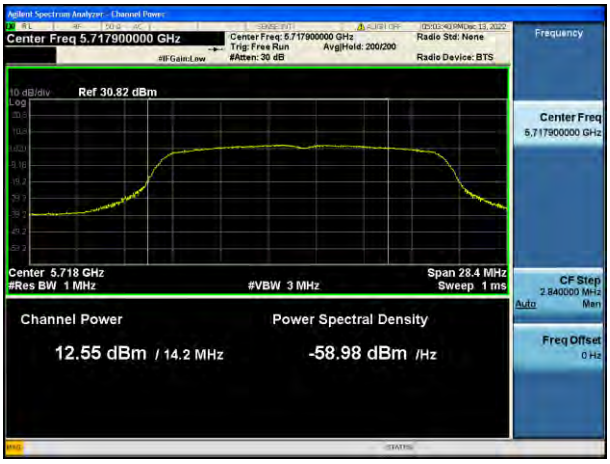
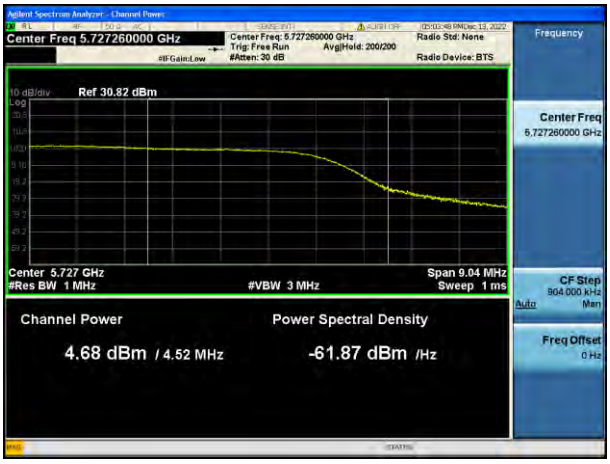
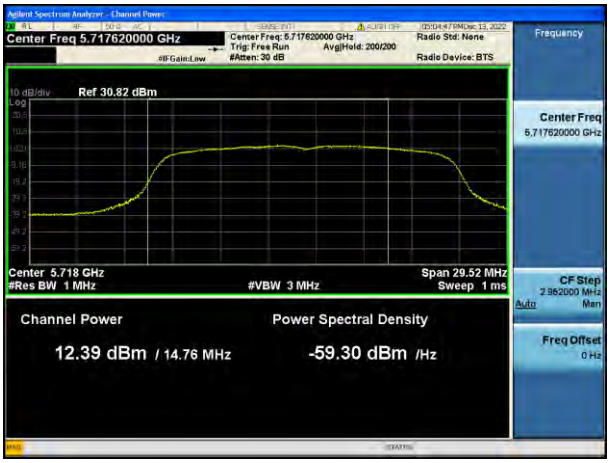
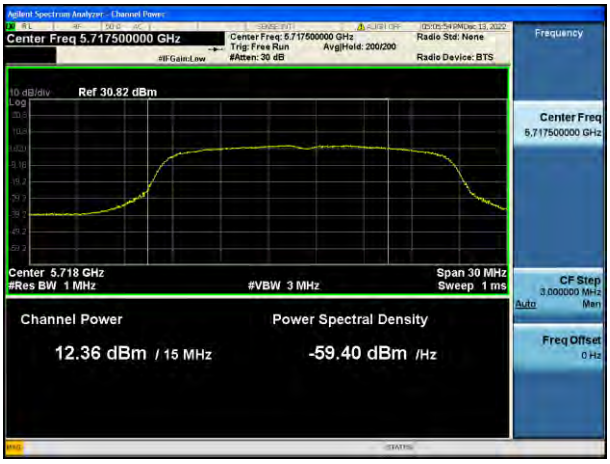
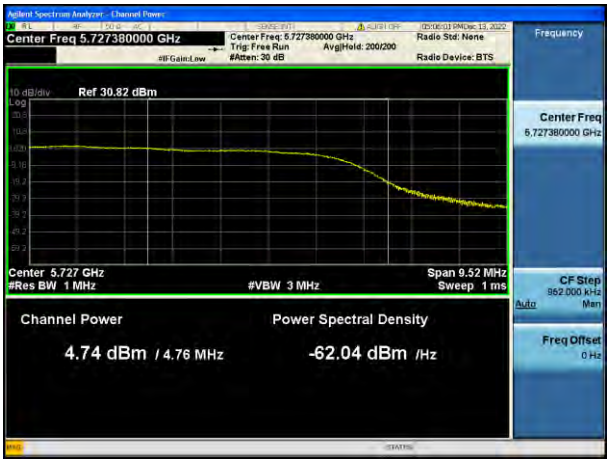
10.7.3 Output Power

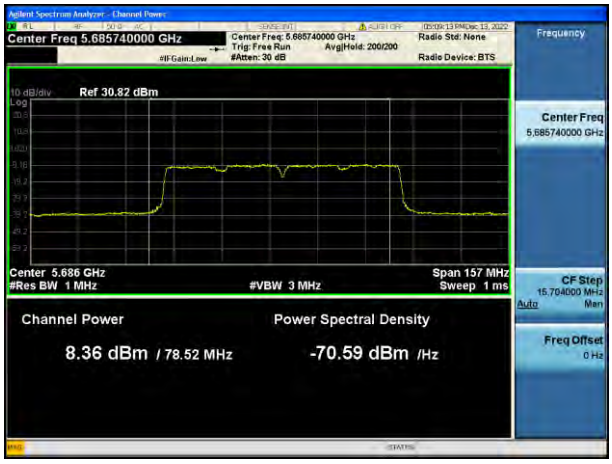
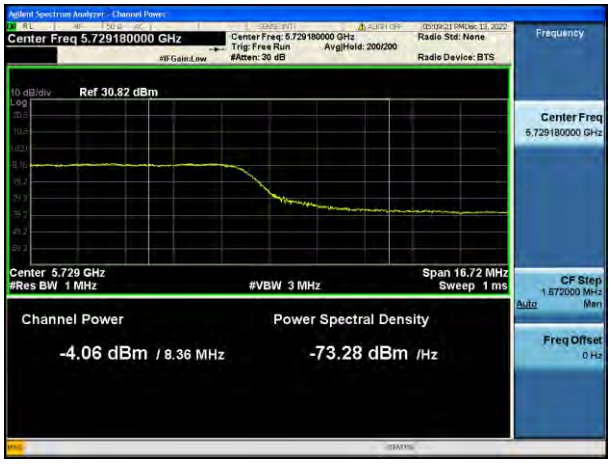
Mode	Frequency [MHz]	Channel	Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase Datarate
802.11a	5720 (UNII 2C Band)	144	12.55	1.584	14.13	22.52	36 Mbps
802.11n(HT20)			12.39	1.617	14.01	22.69	MCS4
802.11ac(VHT20)			12.36	1.498	13.86	22.76	MCS4
802.11a	5720 (UNII 3 Band)	144	4.68	1.584	6.27	30.00	36 Mbps
802.11n(HT20)			4.87	1.617	6.49	30.00	MCS4
802.11ac(VHT20)			4.74	1.498	6.24	30.00	MCS4

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	11.76	2.604	14.36	23.98	MCS4
802.11ac(VHT40)			12.25	1.833	14.09	23.98	MCS3
802.11n(HT40)	5710 (UNII 3 Band)	142	0.25	2.604	2.86	30.00	MCS4
802.11ac(VHT40)			0.54	1.833	2.38	30.00	MCS3

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	8.36	3.358	11.72	23.98	MCS4
	5690 (UNII 3 Band)	138	-4.06	3.358	-0.70	30.00	MCS4

▣ 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**
	

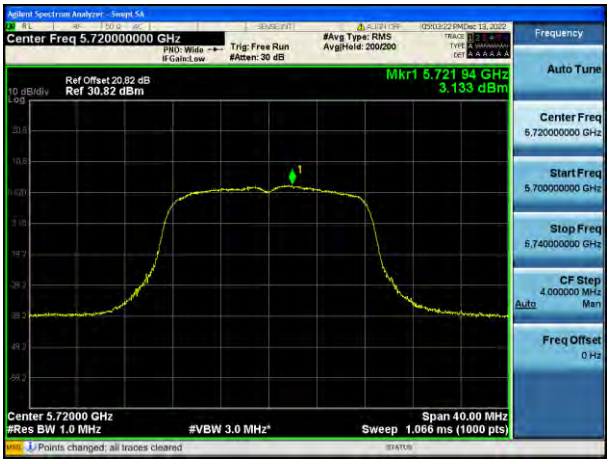
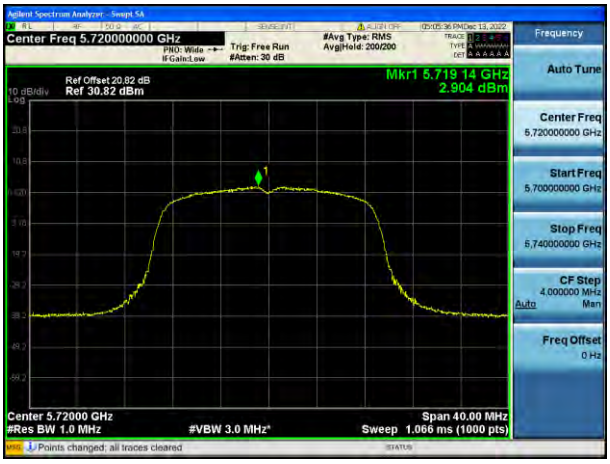
10.7.4 Power Spectral Density

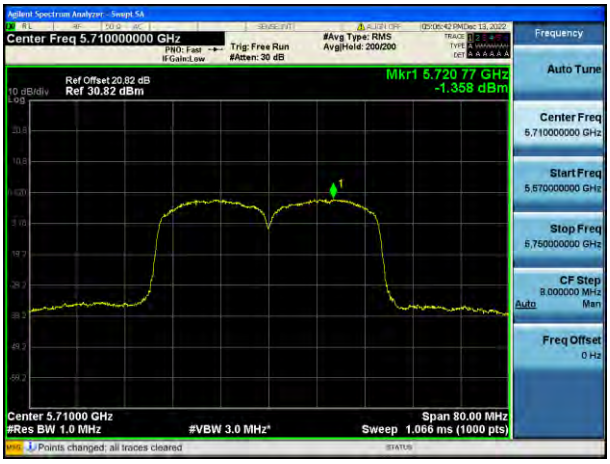
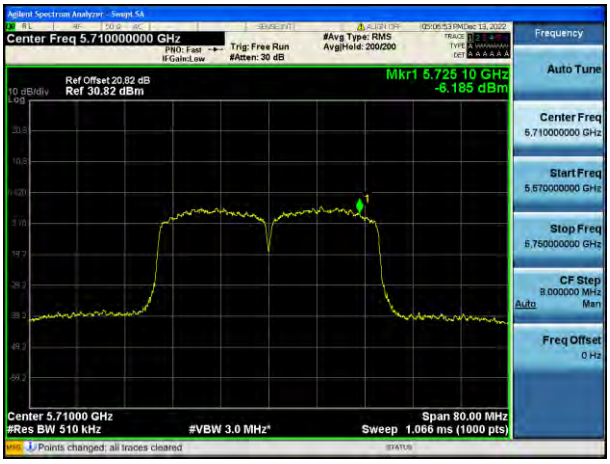
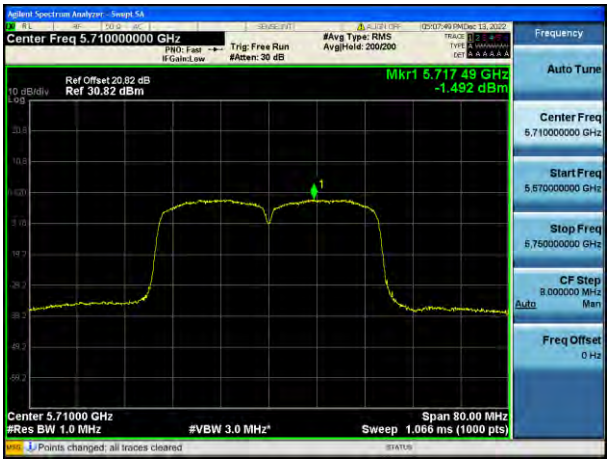
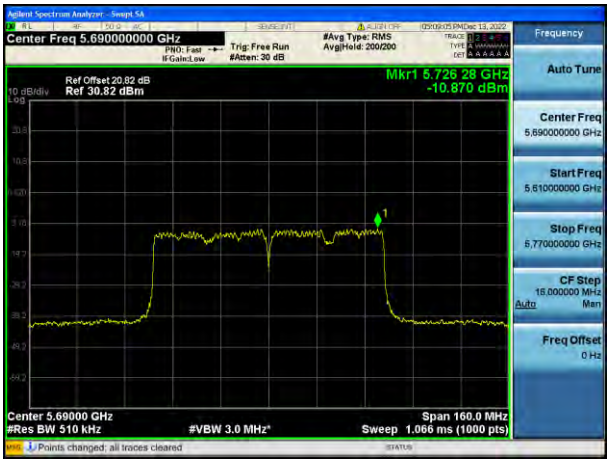
Mode	Frequency [MHz]	Channel	Measured Density [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm]	Limit [dBm]	Worstcase Datarate
802.11a	5720 (UNII 2C)	144	3.133	1.584	4.716	11 dBm/ MHz	36 Mbps
802.11n(HT20)			2.592	1.617	4.209		MCS4
802.11ac(VHT20)			2.904	1.498	4.402		MCS4
802.11a	5720 (UNII 3)	144	-1.427	1.584	0.157	30 dBm /500 kHz	36 Mbps
802.11n(HT20)			-1.369	1.617	0.248		MCS4
802.11ac(VHT20)			-1.921	1.498	-0.424		MCS4

Mode	Frequency [MHz]	Channel	Measured Density [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm]	Limit [dBm]	Worstcase Datarate
802.11n(HT40)	5710 (UNII 2C)	142	-1.358	2.604	1.247	11 dBm/ MHz	MCS4
802.11ac(VHT40)			-1.492	1.833	0.341		MCS3
802.11n(HT40)	5710 (UNII 3)	142	-6.185	2.604	-3.581	30 dBm/ 500 kHz	MCS4
802.11ac(VHT40)			-5.066	1.833	-3.233		MCS3

Mode	Frequency [MHz]	Channel	Measured Density [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm]	Limit [dBm]	Worstcase Datarate
802.11ac(VHT80)	5690 (UNII 2C)	138	-8.087	3.358	-4.729	11 dBm/ MHz	MCS4
	5690 (UNII 3)	138	-10.870	3.358	-7.512	30 dBm/ 500 kHz	MCS4

▣ 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 – 30 MHz

Frequency	Measured Value	A.F+D.F+C.L	POL	Total	Limit	Margin
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]
No Critical peaks found						

Note:

1. The Measured Value 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 (dBμV) + Distance extrapolation factor

Frequency Range : Below 1 GHz

Frequency	Measured Value	A.F+C.L	POL	Total	Limit	Margin
[MHz]	[dBμV]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/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]	Measured Value [dBµV]	CL+AF+DF-AG [dB/m]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
10360	54.25	8.12	V	62.37	68.20	5.83	PK
15540	42.33	12.95	V	55.28	73.98	18.70	PK
15540	28.64	12.95	V	41.59	53.98	12.39	AV
10360	52.57	8.12	H	60.69	68.20	7.51	PK
15540	41.76	12.95	H	54.71	73.98	19.27	PK
15540	28.02	12.95	H	40.97	53.98	13.01	AV

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG [dB/m]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
10400	54.78	8.14	V	62.92	68.20	5.28	PK
15600	41.48	13.29	V	54.77	73.98	19.21	PK
15600	28.40	13.29	V	41.69	53.98	12.29	AV
10400	52.69	8.14	H	60.83	68.20	7.37	PK
15600	40.71	13.29	H	54.00	73.98	19.98	PK
15600	27.64	13.29	H	40.93	53.98	13.05	AV

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG [dB/m]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
10480	53.72	8.62	V	62.34	68.20	5.86	PK
15720	42.38	13.21	V	55.59	73.98	18.39	PK
15720	28.35	13.21	V	41.56	53.98	12.42	AV
10480	52.96	8.62	H	61.58	68.20	6.62	PK
15720	41.49	13.21	H	54.70	73.98	19.28	PK
15720	27.75	13.21	H	40.96	53.98	13.02	AV

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG [dB/m]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
10520	53.19	8.85	V	62.04	68.20	6.16	PK
15780	41.63	12.87	V	54.50	73.98	19.48	PK
15780	28.54	12.87	V	41.41	53.98	12.57	AV
10520	51.79	8.85	H	60.64	68.20	7.56	PK
15780	41.47	12.87	H	54.34	73.98	19.64	PK
15780	28.23	12.87	H	41.10	53.98	12.88	AV

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG [dB/m]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
10600	54.07	9.35	V	63.42	73.98	10.56	PK
10600	41.49	9.35	V	50.84	53.98	3.14	AV
15900	43.18	12.56	V	55.74	73.98	18.24	PK
15900	29.43	12.56	V	41.99	53.98	11.99	AV
10600	51.22	9.35	H	60.57	73.98	13.41	PK
10600	39.33	9.35	H	48.68	53.98	5.30	AV
15900	43.03	12.56	H	55.59	73.98	18.39	PK
15900	29.66	12.56	H	42.22	53.98	11.76	AV

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG [dB/m]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
10640	53.90	9.15	V	63.05	73.98	10.93	PK
10640	41.31	9.15	V	50.46	53.98	3.52	AV
15960	42.83	12.21	V	55.04	73.98	18.94	PK
15960	29.54	12.21	V	41.75	53.98	12.23	AV
10640	51.81	9.15	H	60.96	73.98	13.02	PK
10640	39.41	9.15	H	48.56	53.98	5.42	AV
15960	43.45	12.21	H	55.66	73.98	18.32	PK
15960	29.79	12.21	H	42.00	53.98	11.98	AV

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG [dB/m]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
11000	49.12	10.19	V	59.31	73.98	14.67	PK
11000	36.65	10.19	V	46.84	53.98	7.14	AV
16500	42.90	12.17	V	55.07	68.20	13.13	PK
11000	47.64	10.19	H	57.83	73.98	16.15	PK
11000	34.98	10.19	H	45.17	53.98	8.81	AV
16500	42.32	12.17	H	54.49	68.20	13.71	PK

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG [dB/m]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
11200	45.97	10.29	V	56.26	73.98	17.72	PK
11200	33.43	10.29	V	43.72	53.98	10.26	AV
16800	45.55	13.25	V	58.80	68.20	9.40	PK
11200	44.61	10.29	H	54.90	73.98	19.08	PK
11200	31.95	10.29	H	42.24	53.98	11.74	AV
16800	44.69	13.25	H	57.94	68.20	10.26	PK

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG [dB/m]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
11440	44.89	10.43	V	55.32	73.98	18.66	PK
11440	32.04	10.43	V	42.47	53.98	11.51	AV
17160	45.97	13.78	V	59.75	68.20	8.45	PK
11440	44.23	10.43	H	54.66	73.98	19.32	PK
11440	31.08	10.43	H	41.51	53.98	12.47	AV
17160	45.79	13.78	H	59.57	68.20	8.63	PK

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG [dB/m]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
11490	44.72	10.81	V	55.53	73.98	18.45	PK
11490	31.60	10.81	V	42.41	53.98	11.57	AV
17235	46.59	14.28	V	60.87	68.20	7.33	PK
11490	43.32	10.81	H	54.13	73.98	19.85	PK
11490	30.44	10.81	H	41.25	53.98	12.73	AV
17235	45.87	14.28	H	60.15	68.20	8.05	PK

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG [dB/m]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
11570	46.13	10.13	V	56.26	73.98	17.72	PK
11570	32.60	10.13	V	42.73	53.98	11.25	AV
17355	46.13	15.62	V	61.75	68.20	6.45	PK
11570	44.16	10.13	H	54.29	73.98	19.69	PK
11570	31.54	10.13	H	41.67	53.98	12.31	AV
17355	46.16	15.62	H	61.78	68.20	6.42	PK

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG [dB/m]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
11650	45.10	9.58	V	54.68	73.98	19.30	PK
11650	32.64	9.58	V	42.22	53.98	11.76	AV
17475	44.12	17.18	V	61.30	68.20	6.90	PK
11650	45.27	9.58	H	54.85	73.98	19.13	PK
11650	32.26	9.58	H	41.84	53.98	12.14	AV
17475	43.95	17.18	H	61.13	68.20	7.07	PK

[RSDB Mode]

Bluetooth_Ch. 0_DH5_GFSK + WLAN_5 GHz_802.11a_6 Mbps_Ch.60

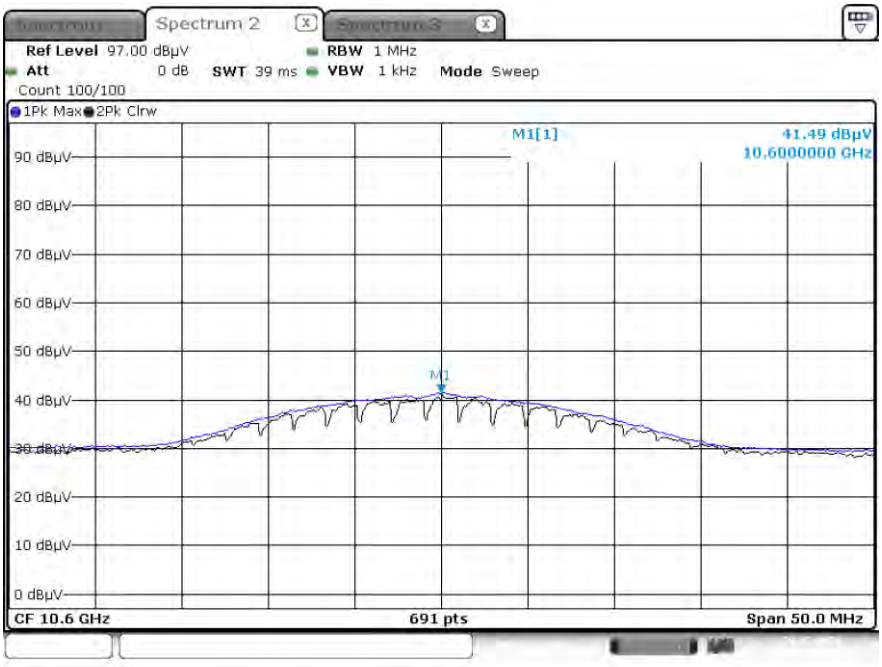
Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG [dB/m]	POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
10600	52.58	9.35	V	61.93	73.98	12.05	PK
10600	40.06	9.35	V	49.41	53.98	4.57	AV
15900	42.80	12.56	V	55.36	73.98	18.62	PK
15900	28.92	12.56	V	41.48	53.98	12.50	AV
10600	51.66	9.35	H	61.01	73.98	12.97	PK
10600	38.92	9.35	H	48.27	53.98	5.71	AV
15900	43.04	12.56	H	55.60	73.98	18.38	PK
15900	29.06	12.56	H	41.62	53.98	12.36	AV

Note :

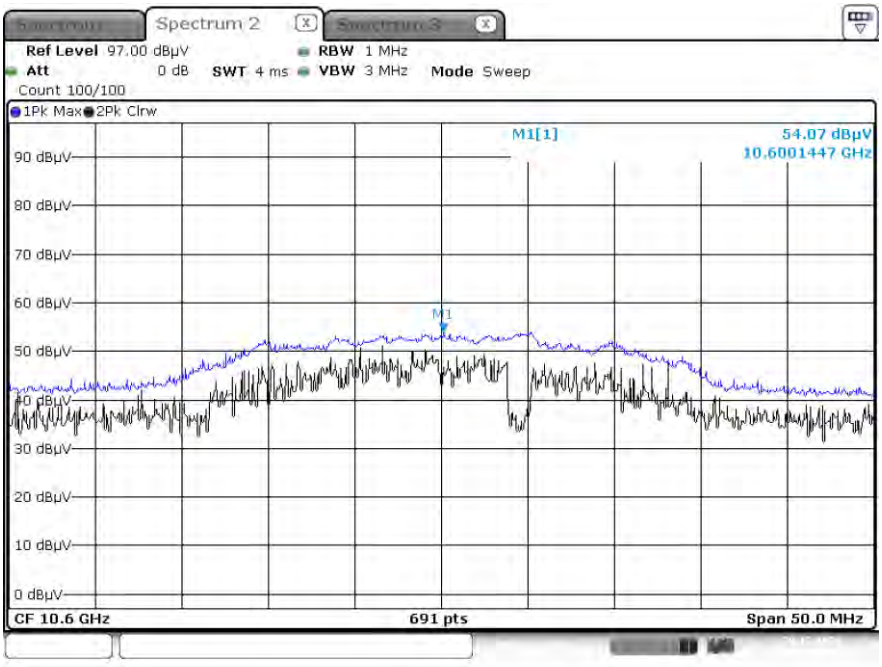
Bluetooth RSDB Data refer to Bluetooth Test Report.

▣ Test Plots

Average Result (802.11a, Ch.60 2nd Spurious Emissions, X-V)



Peak Result (802.11a, Ch.60 2nd Spurious Emissions, X-V)



Note:

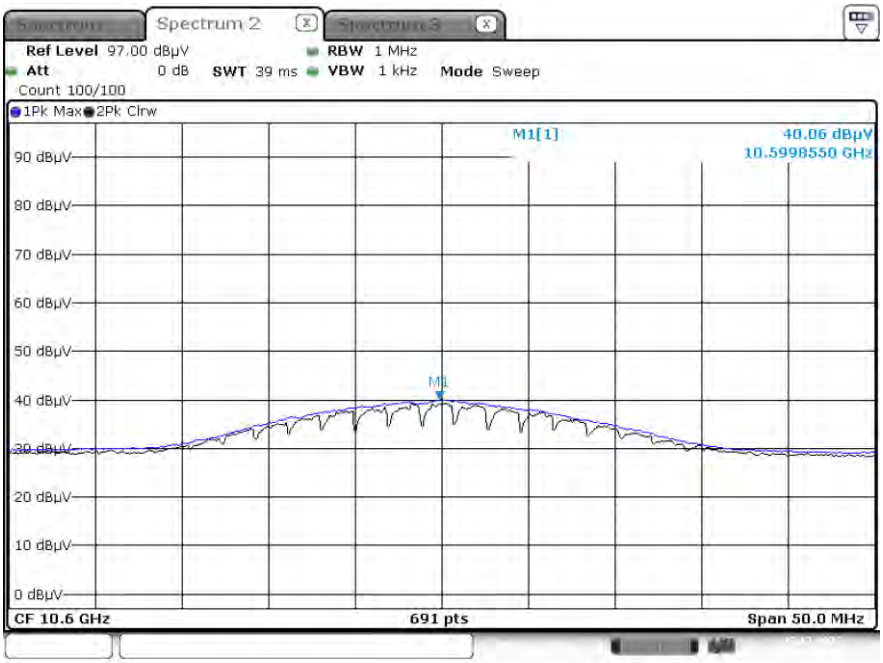
Only the worst case plots for Radiated Spurious Emissions.

▣ Test Plots

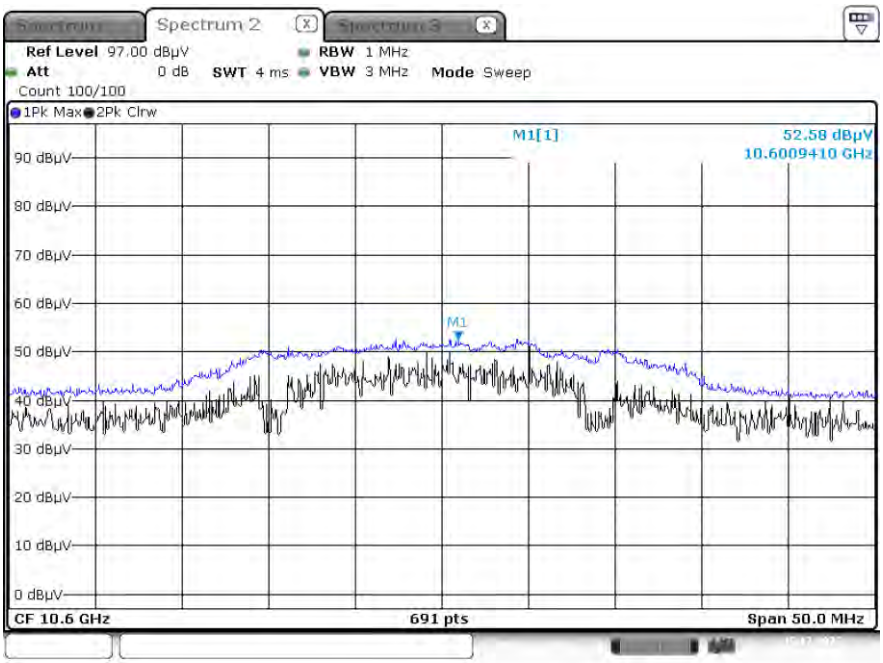
[RSDB Mode]

Bluetooth_Ch. 0_DH5_GFSK + WLAN_5 GHz_802.11a_6 Mbps_Ch.60

Average Result (2nd Spurious Emissions, X-V)



Peak Result (2nd Spurious Emissions, X-V)



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]	Measured Value [dBµV]	CL+AF+DF-AG+ATT [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5150	50.08	8.43	H	58.51	73.98	15.47	PK
5150	37.46	8.43	H	45.89	53.98	8.09	AV
5150	49.55	8.43	V	57.98	73.98	16.00	PK
5150	36.98	8.43	V	45.41	53.98	8.57	AV

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG+ATT [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5350	52.94	8.23	H	61.17	73.98	12.81	PK
5350	40.11	8.23	H	48.34	53.98	5.64	AV
5350	52.02	8.23	V	60.25	73.98	13.73	PK
5350	39.12	8.23	V	47.35	53.98	6.63	AV

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG+ATT [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5460	50.96	8.98	H	59.94	73.98	14.04	PK
5460	36.76	8.98	H	45.74	53.98	8.24	AV
5470	54.51	8.75	H	63.26	68.20	4.94	PK
5460	50.45	8.98	V	59.43	73.98	14.55	PK
5460	37.29	8.98	V	46.27	53.98	7.71	AV
5470	54.01	8.75	V	62.76	68.20	5.44	PK

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG+ATT [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5150	50.56	8.43	H	58.99	73.98	14.99	PK
5150	35.74	8.43	H	44.17	53.98	9.81	AV
5150	50.09	8.43	V	58.52	73.98	15.46	PK
5150	35.12	8.43	V	43.55	53.98	10.43	AV

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG+ATT [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5350	54.76	8.23	H	62.99	73.98	10.99	PK
5350	40.82	8.23	H	49.05	53.98	4.93	AV
5350	54.19	8.23	V	62.42	73.98	11.56	PK
5350	40.23	8.23	V	48.46	53.98	5.52	AV

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG+ATT [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5460	50.38	8.98	H	59.36	73.98	14.62	PK
5460	36.29	8.98	H	45.27	53.98	8.71	AV
5470	56.58	8.75	H	65.33	68.20	2.87	PK
5460	49.99	8.98	V	58.97	73.98	15.01	PK
5460	35.89	8.98	V	44.87	53.98	9.11	AV
5470	56.12	8.75	V	64.87	68.20	3.33	PK

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG+ATT [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5150	50.68	8.43	H	59.11	73.98	14.87	PK
5150	36.04	8.43	H	44.47	53.98	9.51	AV
5150	50.22	8.43	V	58.65	73.98	15.33	PK
5150	35.84	8.43	V	44.27	53.98	9.71	AV

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG+ATT [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5350	54.00	8.23	H	62.23	73.98	11.75	PK
5350	40.79	8.23	H	49.02	53.98	4.96	AV
5350	53.78	8.23	V	62.01	73.98	11.97	PK
5350	40.23	8.23	V	48.46	53.98	5.52	AV

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG+ATT [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5460	49.32	8.98	H	58.30	73.98	15.68	PK
5460	36.16	8.98	H	45.14	53.98	8.84	AV
5470	56.81	8.75	H	65.56	68.20	2.64	PK
5460	48.94	8.98	V	57.92	73.98	16.06	PK
5460	35.78	8.98	V	44.76	53.98	9.22	AV
5470	56.32	8.75	V	65.07	68.20	3.13	PK

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG+ATT [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5150	60.44	8.43	H	68.87	73.98	5.11	PK
5150	42.50	8.43	H	50.93	53.98	3.05	AV
5150	60.01	8.43	V	68.44	73.98	5.54	PK
5150	41.85	8.43	V	50.28	53.98	3.70	AV

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG+ATT [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5350	56.69	8.23	H	64.92	73.98	9.06	PK
5350	41.90	8.23	H	50.13	53.98	3.85	AV
5350	56.23	8.23	V	64.46	73.98	9.52	PK
5350	41.12	8.23	V	49.35	53.98	4.63	AV

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG+ATT [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5460	51.69	8.98	H	60.67	73.98	13.31	PK
5460	34.50	8.98	H	43.48	53.98	10.50	AV
5470	53.65	8.75	H	62.40	68.20	5.80	PK
5460	51.07	8.98	V	60.05	73.98	13.93	PK
5460	34.12	8.98	V	43.10	53.98	10.88	AV
5470	52.99	8.75	V	61.74	68.20	6.46	PK

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG+ATT [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5150	62.13	8.43	H	70.56	73.98	3.42	PK
5150	43.09	8.43	H	51.52	53.98	2.46	AV
5150	61.02	8.43	V	69.45	73.98	4.53	PK
5150	42.78	8.43	V	51.21	53.98	2.77	AV

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG+ATT [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5350	56.62	8.23	H	64.85	73.98	9.13	PK
5350	42.05	8.23	H	50.28	53.98	3.70	AV
5350	56.23	8.23	V	64.46	73.98	9.52	PK
5350	41.85	8.23	V	50.08	53.98	3.90	AV

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG+ATT [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5460	50.15	8.98	H	59.13	73.98	14.85	PK
5460	34.65	8.98	H	43.63	53.98	10.35	AV
5470	53.61	8.75	H	62.36	68.20	5.84	PK
5460	49.91	8.98	V	58.89	73.98	15.09	PK
5460	34.32	8.98	V	43.30	53.98	10.68	AV
5470	53.05	8.75	V	61.80	68.20	6.40	PK

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

Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG+ATT [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5150	54.22	8.43	H	62.65	73.98	11.33	PK
5150	40.40	8.43	H	48.83	53.98	5.15	AV
5150	53.99	8.43	V	62.42	73.98	11.56	PK
5150	39.78	8.43	V	48.21	53.98	5.77	AV

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

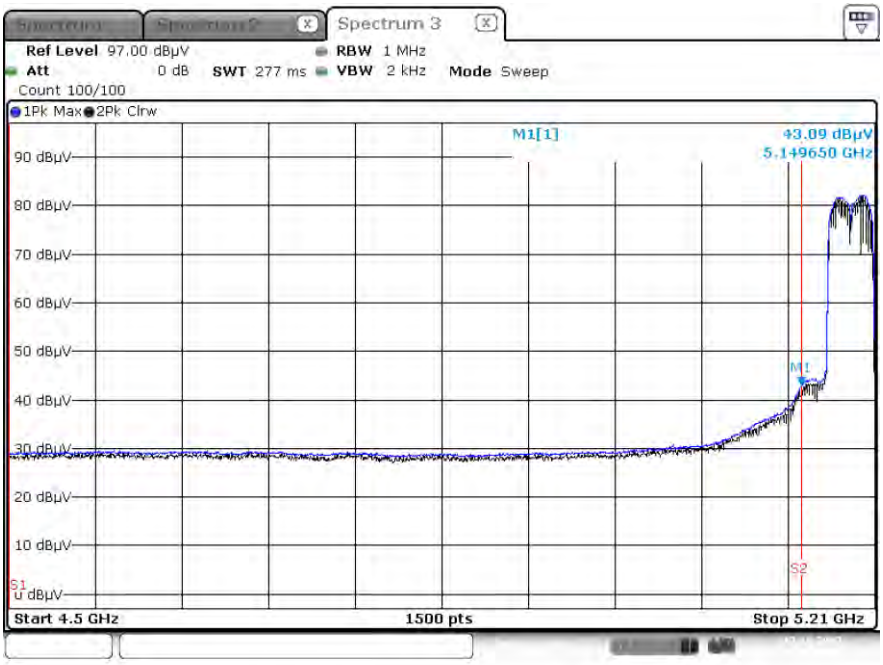
Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG+ATT [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5350	57.77	8.23	H	66.00	73.98	7.98	PK
5350	42.75	8.23	H	50.98	53.98	3.00	AV
5350	57.36	8.23	V	65.59	73.98	8.39	PK
5350	42.29	8.23	V	50.52	53.98	3.46	AV

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

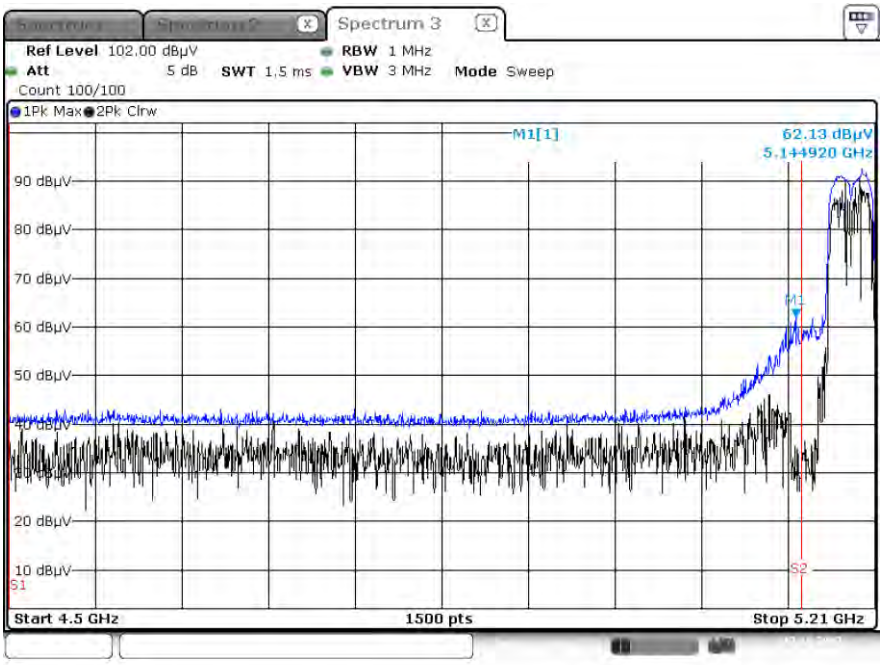
Frequency [MHz]	Measured Value [dBµV]	CL+AF+DF-AG+ATT [dB/m]	ANT. POL [H/V]	Total [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Measurement Type
5460	54.29	8.98	H	63.27	73.98	10.71	PK
5460	40.58	8.98	H	49.56	53.98	4.42	AV
5470	56.60	8.75	H	65.35	68.20	2.85	PK
5460	53.89	8.98	V	62.87	73.98	11.11	PK
5460	40.12	8.98	V	49.10	53.98	4.88	AV
5470	56.12	8.75	V	64.87	68.20	3.33	PK

▣ Test Plots(UNII 1, 2A, 2C)

Average Result_(802.11ac(VHT40), Ch.38, X-H)



Peak Result (802.11ac(VHT40), Ch.38, X-H)

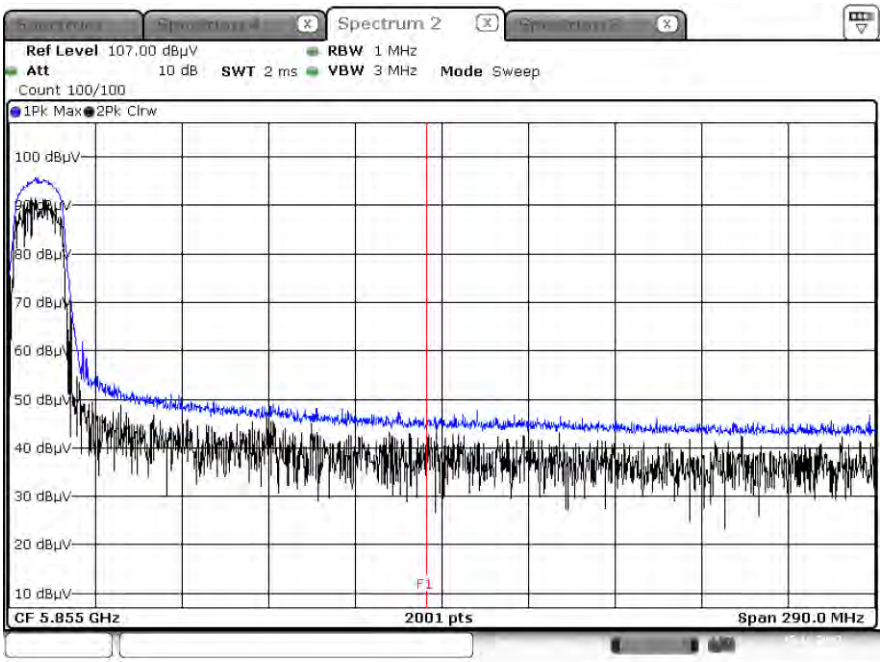


Note:

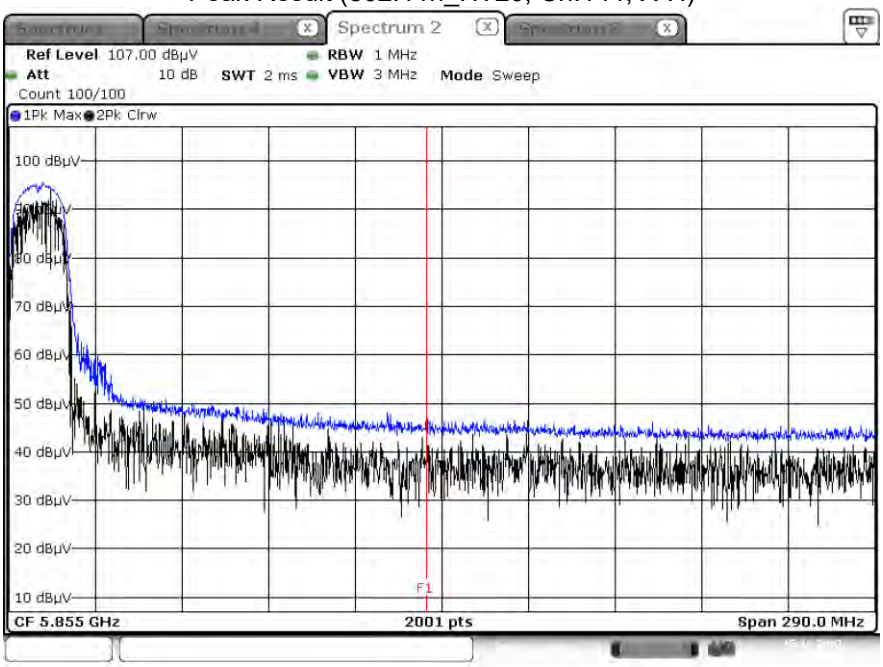
Only the worst case plots for Radiated Restricted Band Edge.

▣ Test Plots(Straddle Channel)

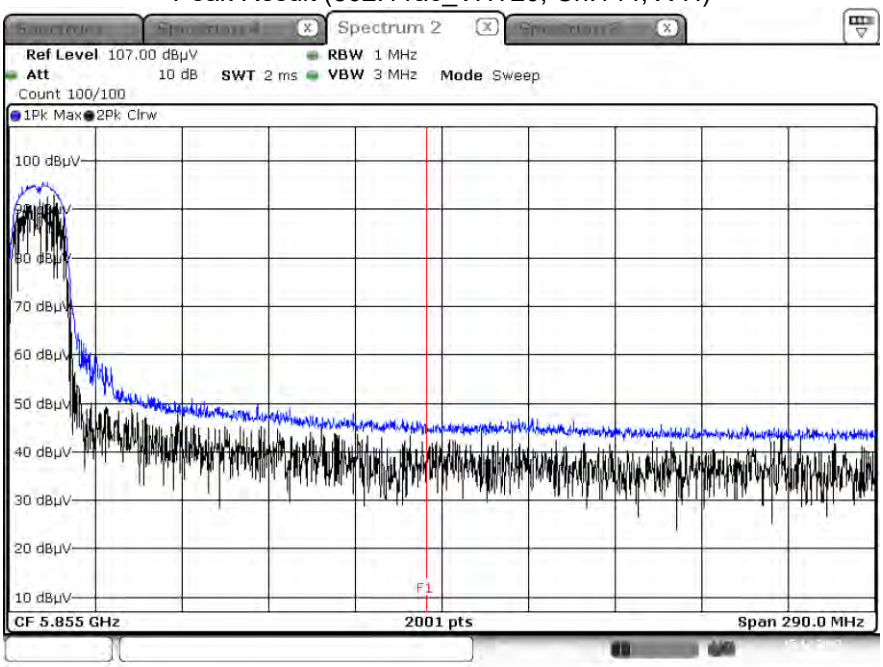
Peak Result (802.11a, Ch.144, X-H)



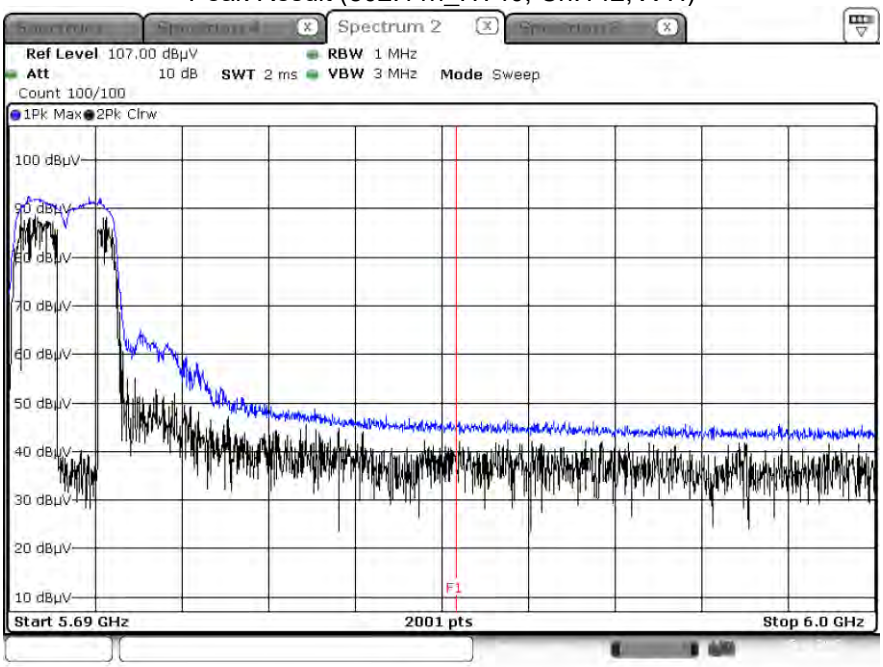
Peak Result (802.11n_HT20, Ch.144, X-H)



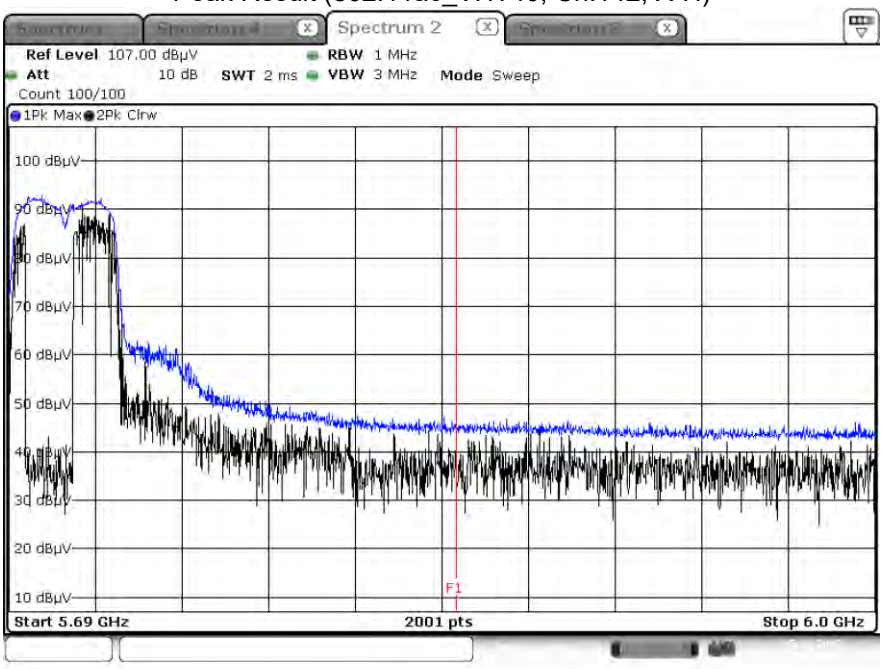
Peak Result (802.11ac_VHT20, Ch.144, X-H)



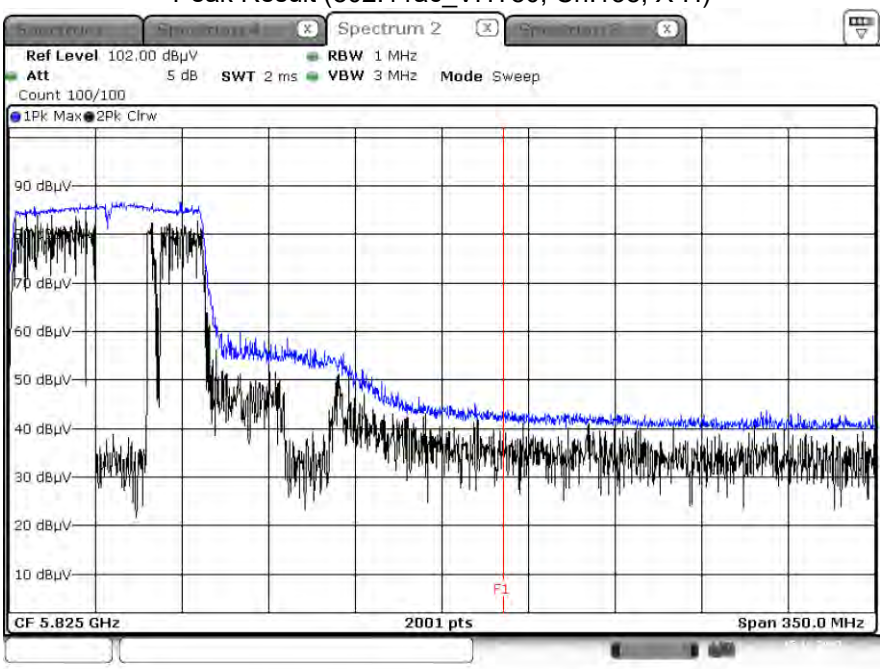
Peak Result (802.11n_HT40, Ch.142, X-H)



Peak Result (802.11ac_VHT40, Ch.142, X-H)



Peak Result (802.11ac_VHT80, Ch.138, X-H)

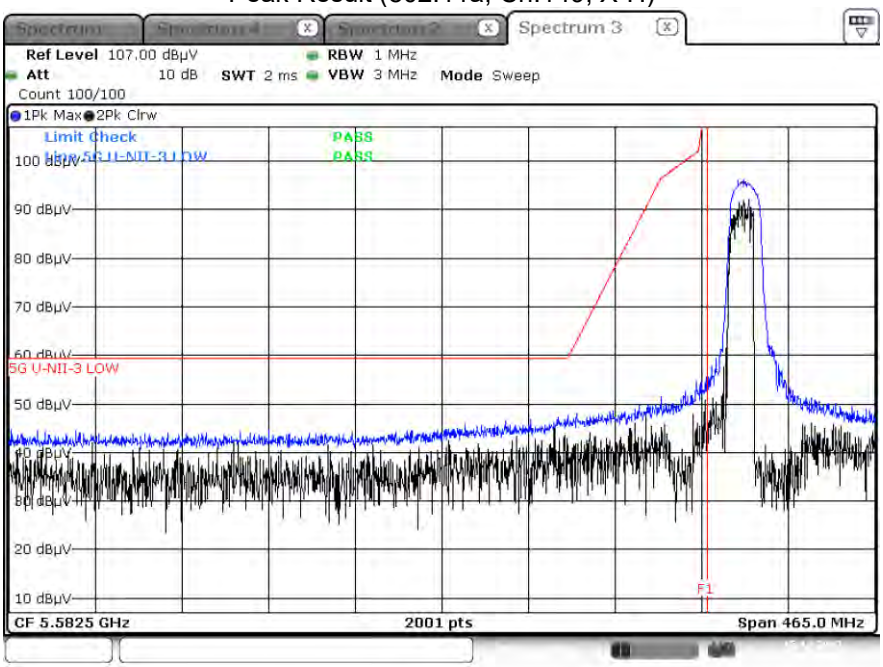


Note :

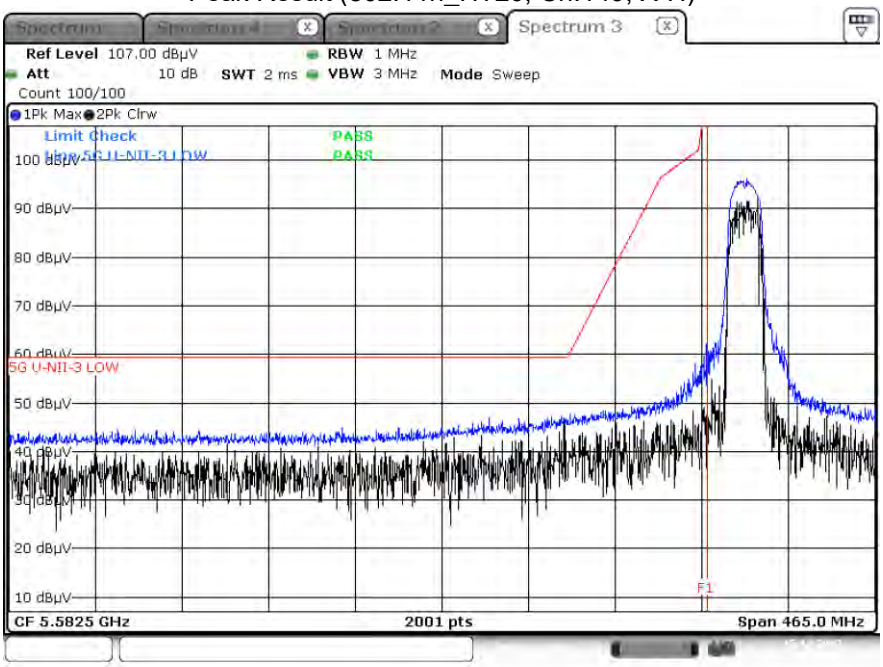
1. Only the worst case plots for Radiated Restricted Band Edge.
2. Red line : 5 850 MHz
3. Ambient Noise (Because of ambient noise, We attached only the worst plot without a data table)

▣ Test Plots(UNII 3)

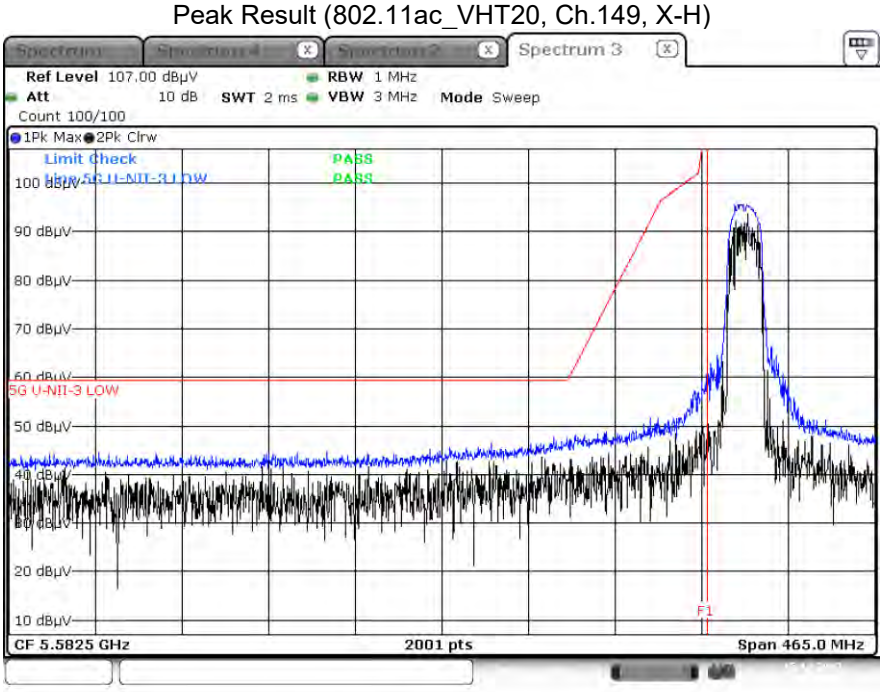
Peak Result (802.11a, Ch.149, X-H)



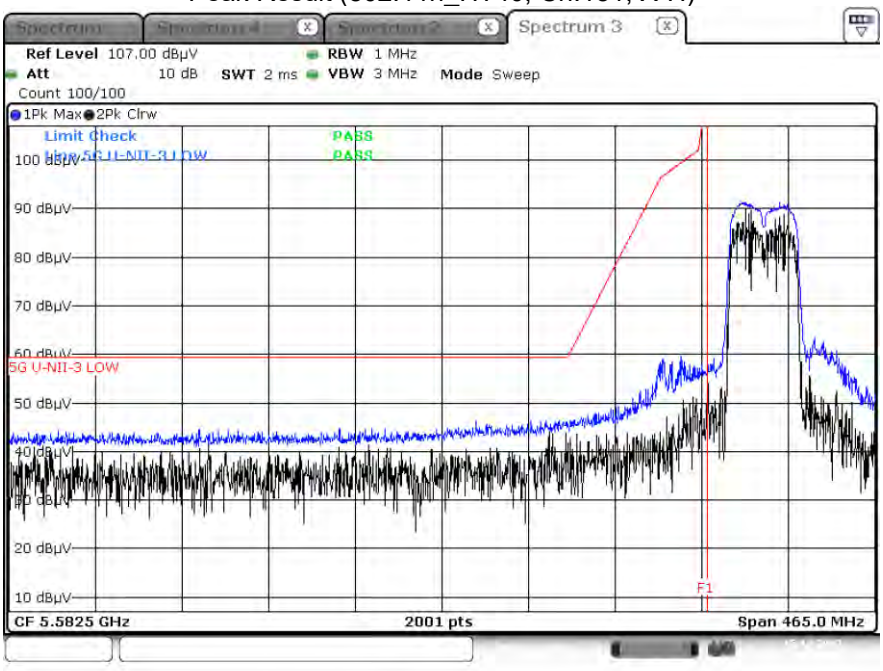
Peak Result (802.11n_HT20, Ch.149, X-H)



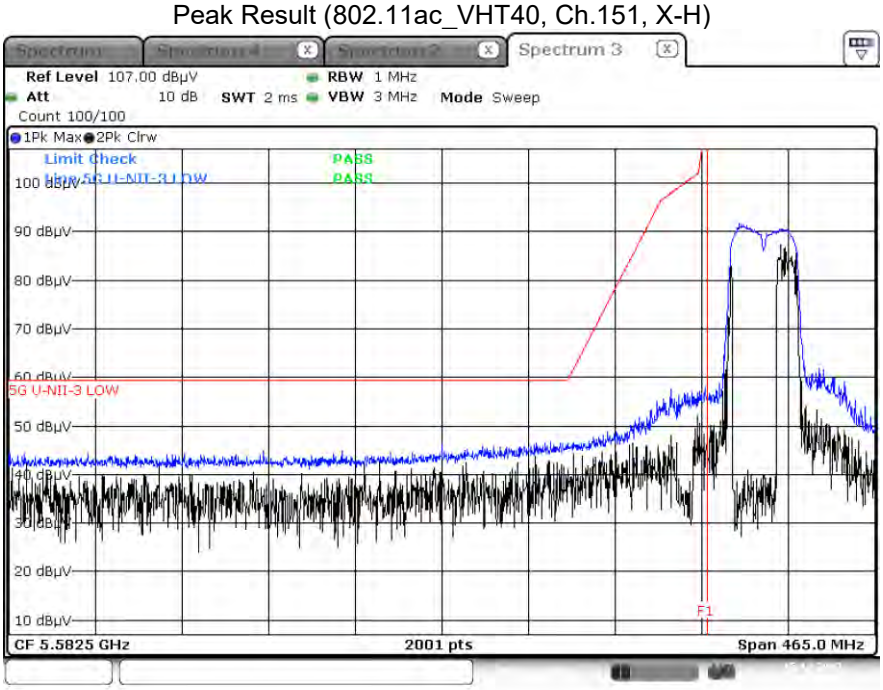
Peak Result (802.11ac_VHT20, Ch.149, X-H)



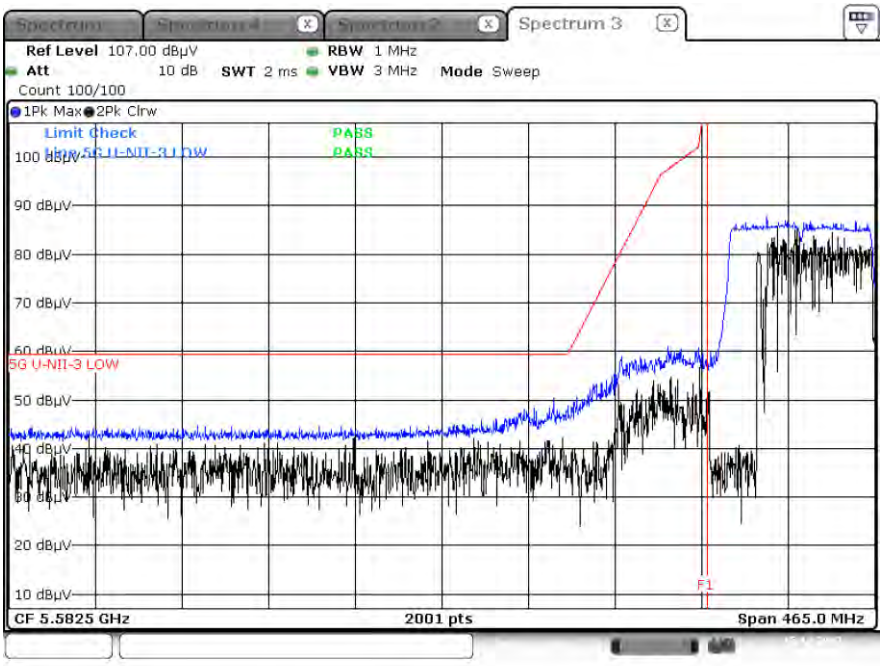
Peak Result (802.11n_HT40, Ch.151, X-H)



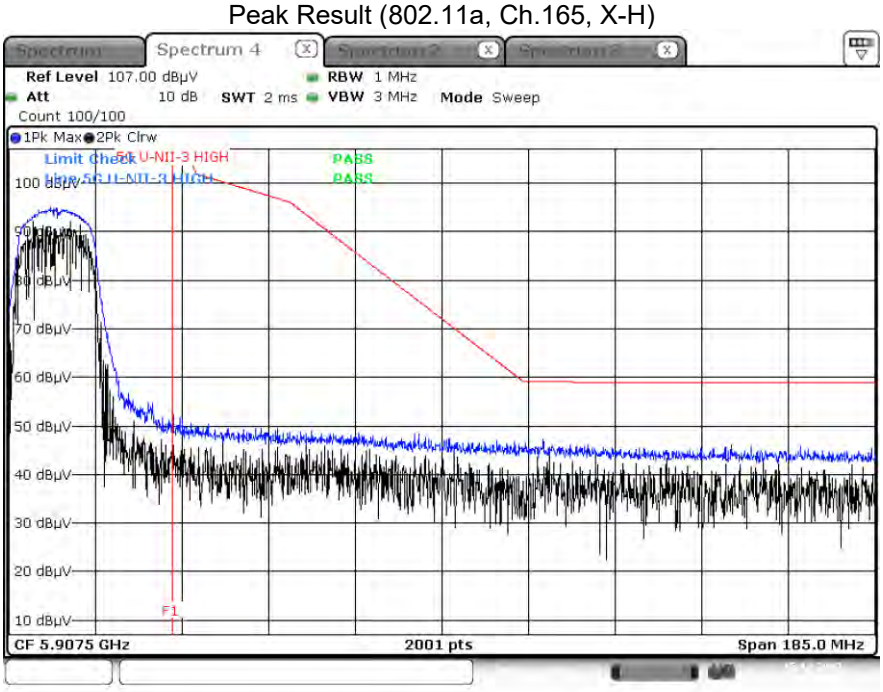
Peak Result (802.11ac_VHT40, Ch.151, X-H)



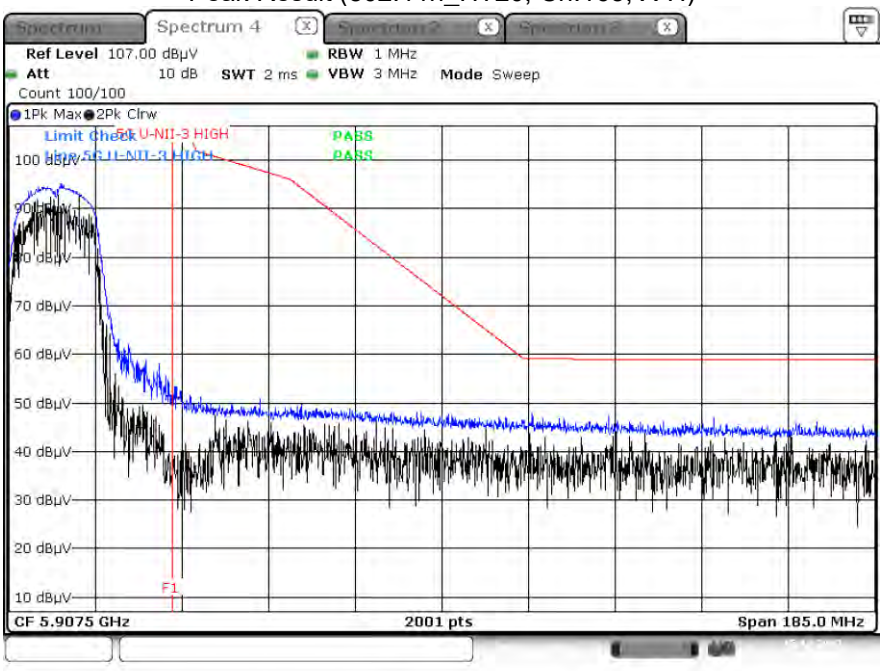
Peak Result (802.11ac_VHT80, Ch.155, X-H)



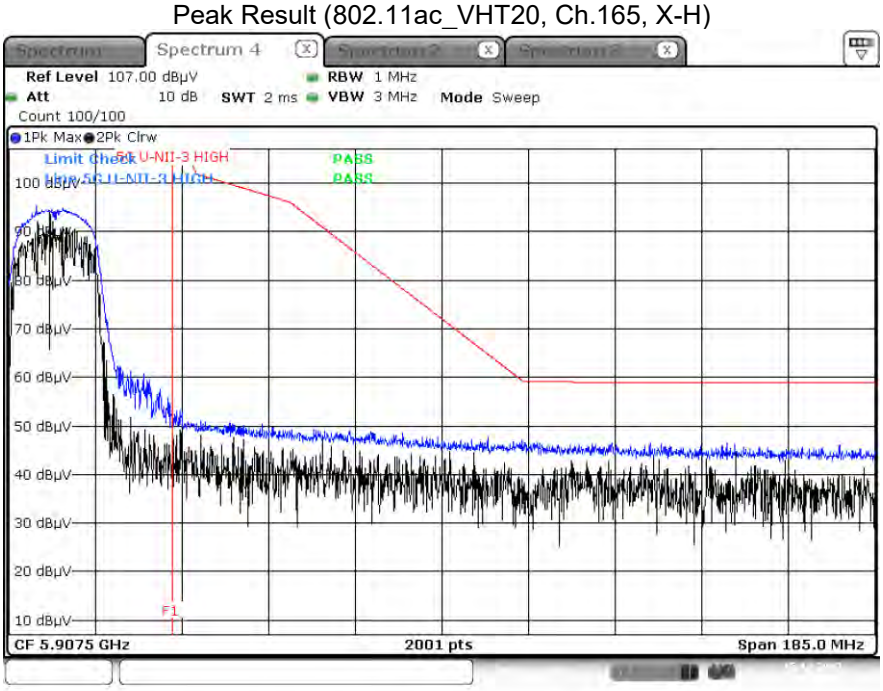
Peak Result (802.11a, Ch.165, X-H)



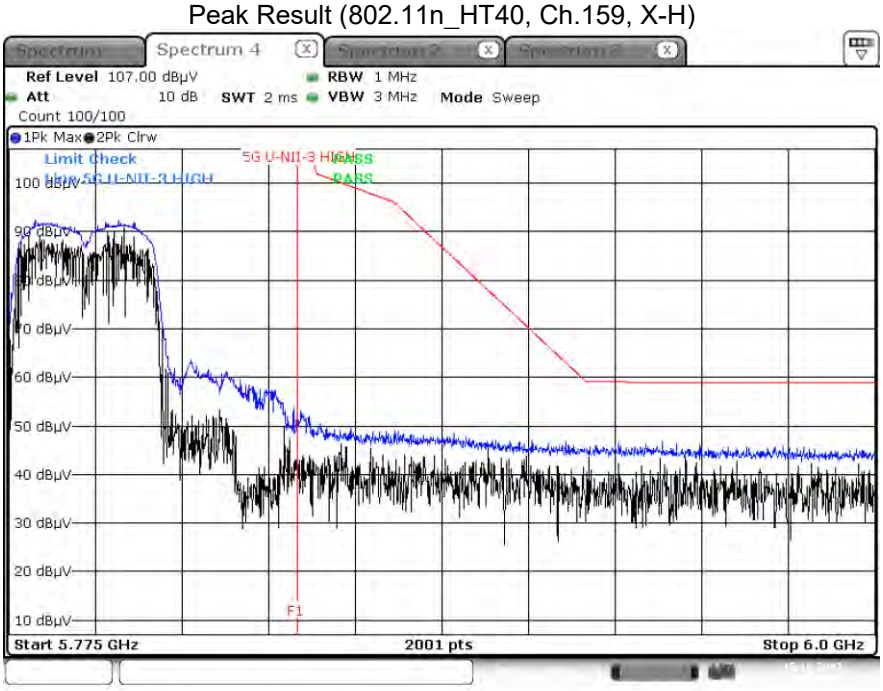
Peak Result (802.11n_HT20, Ch.165, X-H)



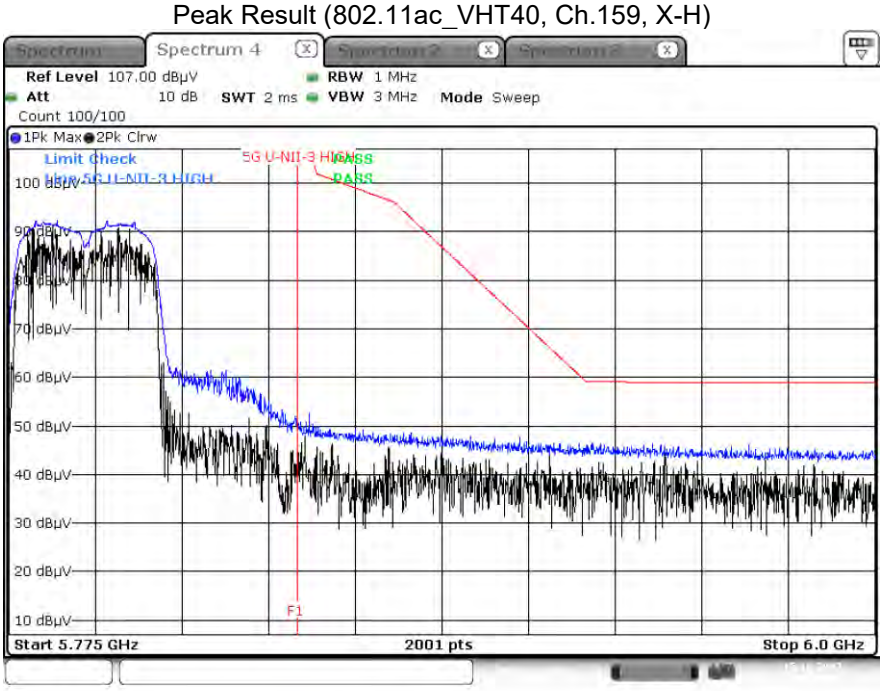
Peak Result (802.11ac_VHT20, Ch.165, X-H)



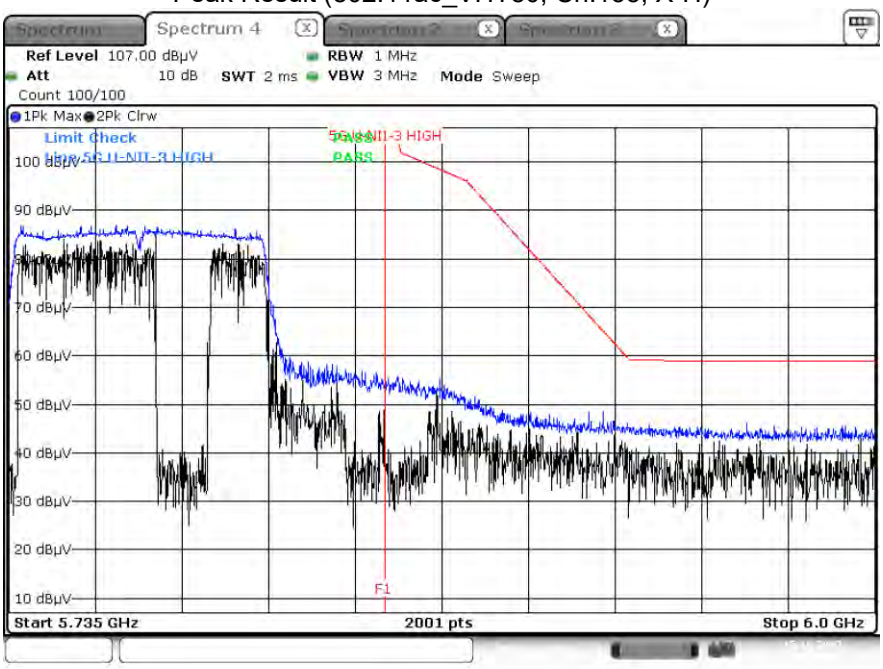
Peak Result (802.11n_HT40, Ch.159, X-H)



Peak Result (802.11ac_VHT40, Ch.159, X-H)



Peak Result (802.11ac_VHT80, Ch.155, X-H)



Note :

1. Only the worst case plots for U-NII-3 Out of Band e.i.r.p Emission.
2. U-NII-3 Low & High Band Edge RedLine is Final Test Limit about factor value compensation.

10.10 POWERLINE CONDUCTED EMISSIONS

Conducted Emissions

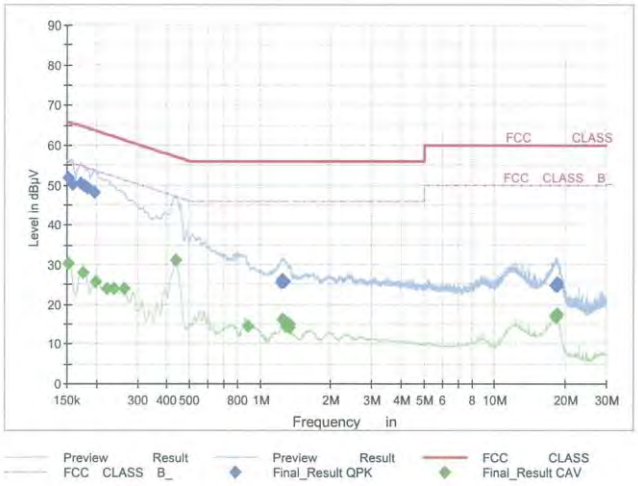
SM-M146BDSN_WLAN 5G MODE 1 / 2

Test Report

Common Information

EUT : SM-M146B/DSN
Operating Conditions : WLAN 5G MODE

Full Spectrum



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1523	52.00	65.88	13.88	1000.0	9.000	N	OFF	9.6
0.1590	50.27	65.52	15.25	1000.0	9.000	L1	OFF	9.7
0.1725	50.37	64.84	14.47	1000.0	9.000	L1	OFF	9.7
0.1770	50.00	64.63	14.62	1000.0	9.000	N	OFF	9.6
0.1838	49.23	64.31	15.09	1000.0	9.000	L1	OFF	9.7
0.1973	48.22	63.73	15.51	1000.0	9.000	L1	OFF	9.7
1.2245	25.31	56.00	30.69	1000.0	9.000	L1	OFF	9.7
1.2358	25.63	56.00	30.37	1000.0	9.000	L1	OFF	9.7
1.2425	26.32	56.00	29.68	1000.0	9.000	L1	OFF	9.7
1.2470	26.25	56.00	29.75	1000.0	9.000	L1	OFF	9.7
1.2628	25.71	56.00	30.29	1000.0	9.000	L1	OFF	9.7
1.2718	25.60	56.00	30.40	1000.0	9.000	L1	OFF	9.7
18.1648	24.77	60.00	35.23	1000.0	9.000	L1	OFF	10.3
18.1715	24.81	60.00	35.19	1000.0	9.000	L1	OFF	10.3
18.3740	24.67	60.00	35.33	1000.0	9.000	L1	OFF	10.3
18.4145	25.22	60.00	34.78	1000.0	9.000	L1	OFF	10.3
18.4235	25.48	60.00	34.52	1000.0	9.000	L1	OFF	10.3
18.4280	24.61	60.00	35.39	1000.0	9.000	L1	OFF	10.3

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SM-M146BDSN_WLAN 5G MODE 2 / 2

Final_Result_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1523	30.25	55.88	25.63	1000.0	9.000	N	OFF	9.6
0.1748	27.98	54.73	26.75	1000.0	9.000	N	OFF	9.6
0.1995	25.63	53.63	28.00	1000.0	9.000	N	OFF	9.6
0.2220	24.07	52.74	28.67	1000.0	9.000	N	OFF	9.6
0.2378	24.07	52.17	28.10	1000.0	9.000	L1	OFF	9.7
0.2625	23.97	51.35	27.38	1000.0	9.000	L1	OFF	9.7
0.4358	31.09	47.14	16.05	1000.0	9.000	N	OFF	9.6
0.8870	14.38	46.00	31.62	1000.0	9.000	N	OFF	9.7
1.2470	16.19	46.00	29.81	1000.0	9.000	L1	OFF	9.7
1.2673	15.95	46.00	30.05	1000.0	9.000	L1	OFF	9.7
1.2920	14.34	46.00	31.66	1000.0	9.000	L1	OFF	9.7
1.3235	14.93	46.00	31.07	1000.0	9.000	L1	OFF	9.7
1.3370	14.03	46.00	31.97	1000.0	9.000	L1	OFF	9.7
18.1715	17.14	50.00	32.86	1000.0	9.000	L1	OFF	10.3
18.2683	16.81	50.00	33.19	1000.0	9.000	L1	OFF	10.3
18.3200	16.89	50.00	33.11	1000.0	9.000	L1	OFF	10.3
18.3425	16.86	50.00	33.14	1000.0	9.000	L1	OFF	10.3
18.4190	17.46	50.00	32.54	1000.0	9.000	L1	OFF	10.3

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11. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	08/22/2023	Annual
EMI Test Receiver	ESR	Rohde & Schwarz	101910	06/07/2023	Annual
Temperature Chamber	SU-642	ESPEC	0093008124	03/04/2023	Annual
Signal Analyzer	N9030A	Agilent	MY49432108	03/08/2023	Annual
Power Measurement Set	OSP 120	Rohde & Schwarz	101231	06/14/2023	Annual
Power Meter	N1911A	Agilent	MY45100523	03/24/2023	Annual
Power Sensor	N1921A	Agilent	MY57820067	03/24/2023	Annual
Directional Coupler	87300B	Agilent	3116A03621	11/02/2023	Annual
Power Splitter	11667B	Hewlett Packard	10545	02/03/2023	Annual
DC Power Supply	E3632A	HP	KR75303243	04/25/2023	Annual
Attenuator(10 dB)(DC-26.5 GHz)	8493C	HP	08285	06/21/2023	Annual
Attenuator(20 dB)	18N-20dB	Rohde & Schwarz	8	03/07/2023	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A
FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	HCT CO., LTD.	N/A	N/A	N/A
Bluetooth Tester	CBT	Rohde & Schwarz	100808	02/22/2023	Annual

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

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller(Antenna mast)	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	N/A	N/A	N/A
EM1000 / Controller	EM1000	Audix	060520	N/A	N/A
Turn Table	N/A	Audix	N/A	N/A	N/A
Amp &Filter Bank Switch Controller	FBSM-01B	TNM system	TM19050002	N/A	N/A
Loop Antenna	FMZB 1513	Rohde & Schwarz	1513-333	03/17/2024	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	08/16/2024	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1300	01/18/2024	Biennial
Horn Antenna(15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170124	04/12/2023	Biennial
Spectrum Analyzer	FSV(10 Hz ~ 40 GHz)	Rohde & Schwarz	101055	05/16/2023	Annual
Band Reject Filter	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments	2	01/06/2023	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	5	06/13/2023	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	6	06/13/2023	Annual
High Pass Filter(7 GHz ~ 18 GHz)	WHKX10-7150-8000-18000-50SS	Wainwright Instruments	1	03/11/2023	Annual
Power Amplifier	CBL18265035	CERNEX	22966	12/01/2023	Annual
Power Amplifier	CBL26405040	CERNEX	25956	03/11/2023	Annual
Bluetooth Tester	TC-3000C	TESCOM	3000C000175	04/05/2023	Annual
HPF(3~18GHz)+LNA1(1~18GHz)	FMSR-05B	TNM system	F6	01/19/2023	Annual
ATT(10dB) + LNA1(1~18GHz)	FMSR -05B	TNM system	None	01/19/2023	Annual
ATT(3dB) + LNA1(1~18GHz)	FMSR -05B	TNM system	None	01/19/2023	Annual
LNA1(1~18GHz)	FMSR -05B	TNM system	25540	01/19/2023	Annual
HPF(7~18GHz)+LNA2(6~18GHz)	FMSR -05B	TNM system	28550	01/19/2023	Annual
Thru(30MHz ~ 18GHz)	FMSR -05B	TNM system	None	01/19/2023	Annual

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. Especially, 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-2212-FC020-P