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TEL: +82-31-645-6300 FAX: +82-31-645-6401

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:
May 27, 2021

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

Report No.: HCT-RF-2105-FC063

FCC ID:	**A3LSMM325FV**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**
Model:	SM-M325FV/DS
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 : Sang Hoon Lee
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-2105-FC063	May 27, 2021	- First Approval Report

Table of Contents

1. GENERAL INFORMATION

EUT DESCRIPTION

Model	SM-M325FV/DS	
Additional Model	-	
EUT Type	Mobile Phone	
Power Supply	DC 3.86 V	
Modulation Type	OFDM : 802.11a, 802.11n, 802.11ac	
Frequency Range (MHz)	U-NII-1	20MHz BW : 5180 - 5240 40MHz BW : 5190 - 5230 80MHz BW : 5210
	U-NII-2A	20MHz BW : 5260 - 5320 40MHz BW : 5270 - 5310 80MHz BW : 5290
	U-NII-2C	20MHz BW : 5500 - 5720 40MHz BW : 5510 - 5710 80MHz BW : 5530 – 5690
	U-NII-3	20MHz BW : 5745 - 5825 40MHz BW : 5755 - 5795 80MHz BW : 5775
Straddle channel	Supported	
TDWR Band	Supported	
Dynamic Frequency Selection	Slave without radar detection	
Date(s) of Tests	April 19, 2021 ~ May 27, 2021	
Serial number	Radiated: UDU1500M Conducted: UDN0325H	

2. MAXIMUM OUTPUT POWER

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

Band	Mode	Output Power	
		(dBm)	(W)
UNII1	802.11a	16.33	0.043
	802.11n (HT20)	16.37	0.043
	802.11n (HT40)	15.34	0.034
	802.11ac (VHT20)	16.25	0.042
	802.11ac (VHT40)	15.29	0.034
	802.11ac (VHT80)	13.29	0.021
UNII2A	802.11a	16.38	0.043
	802.11n (HT20)	16.31	0.043
	802.11n (HT40)	15.33	0.034
	802.11ac (VHT20)	16.26	0.042
	802.11ac (VHT40)	15.25	0.033
	802.11ac (VHT80)	14.23	0.027
UNII2C	802.11a	16.35	0.043
	802.11n (HT20)	16.27	0.042
	802.11n (HT40)	15.15	0.033
	802.11ac (VHT20)	16.16	0.041
	802.11ac (VHT40)	15.04	0.032
	802.11ac (VHT80)	13.95	0.025
UNII3	802.11a	16.45	0.044
	802.11n (HT20)	16.35	0.043
	802.11n (HT40)	15.25	0.034
	802.11ac (VHT20)	16.22	0.042
	802.11ac (VHT40)	15.11	0.032
	802.11ac (VHT80)	13.80	0.024

3. TEST METHODOLOGY

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

EUT CONFIGURATION

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

EUT EXERCISE

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

GENERAL TEST PROCEDURES

Conducted Emissions

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

Radiated Emissions

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

DESCRIPTION OF TEST MODES

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

4. INSTRUMENT CALIBRATION

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

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

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

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

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

5.2 EQUIPMENT

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

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

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

6. ANTENNA REQUIREMENTS

According to FCC 47 CFR §15.203, §15.407:

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

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

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

7. MEASUREMENT UNCERTAINTY

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

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

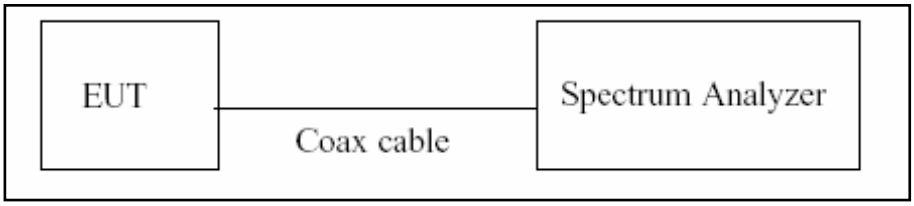
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

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

8. DESCRIPTION OF TESTS

8.1. Duty Cycle

Test Configuration



Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

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

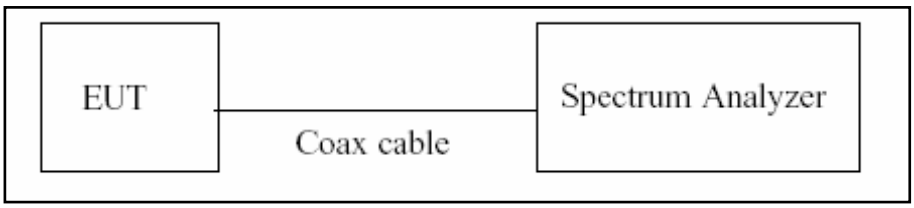
1. RBW = 8 MHz (the largest availble value)
2. VBW = 8 MHz (≥ RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on}/ T_{total} and Duty Cycle Factor = 10log(1/Duty Cycle)

8.2. 6dB Bandwidth & 26dB Bandwidth

Limit

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

Test Configuration



Test Procedure(26dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

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

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

Test Procedure (6dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

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

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

Note:

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

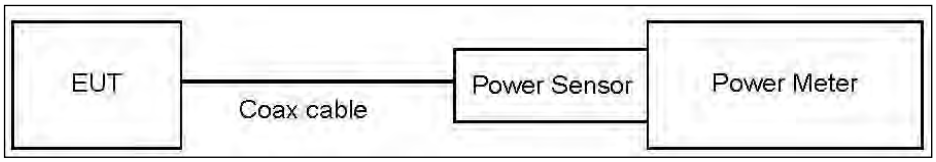
8.3. Output Power Measurement

Limit

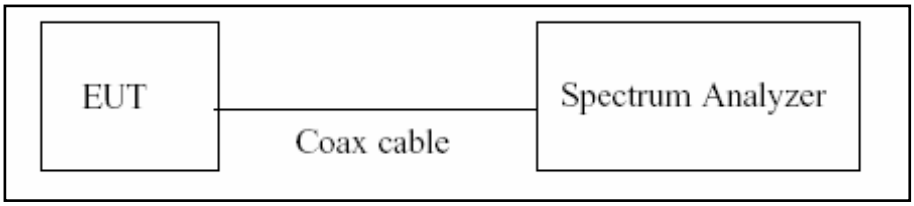
Band	Limit
UNII 1	- Master : Not exceed 1 W(=30dBm) - Slave : Not exceed 250 mW(=23.98 dBm)
UNII 2A, 2C	Not exceed the lesser of 250 mW or 11 dBm + 10 log B, (where B is the 26 dB emission bandwidth in megahertz.)
UNII 3	Not exceed 1 W(=30dBm)

Test Configuration

Power Meter



Spectrum Analyzer(Only Straddle Channel)



Test Procedure(Power Meter)

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

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

Test Procedure(Spectrum Analyzer)

The transmitter output is connected to the Spectrum Analyzer.

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

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

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

Sample Calculation

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

Note

1. Spectrum reading values are not plot data.
   The power results in plot is already including the actual values of loss for the attenuator and cable combination.
2. Spectrum offset = Attenuator loss(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

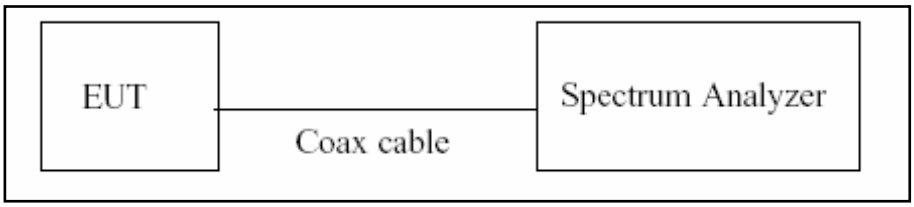
(Actual value of loss for the attenuator and cable combination)

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

Note

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

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

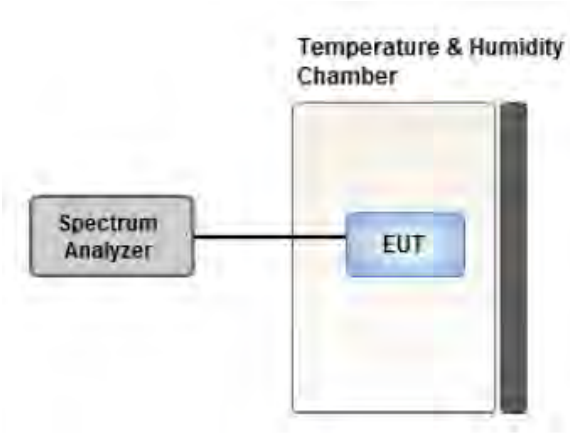
(Actual value of loss for the attenuator and cable combination)

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 battety operating end point which shall be specified by the manufacturer.
4. While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.

8.6. AC Power line Conducted Emissions

Limit

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

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

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

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

Test Configuration

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

Test Procedure

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

Sample Calculation

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

8.7. Radiated Test

Limit

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

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

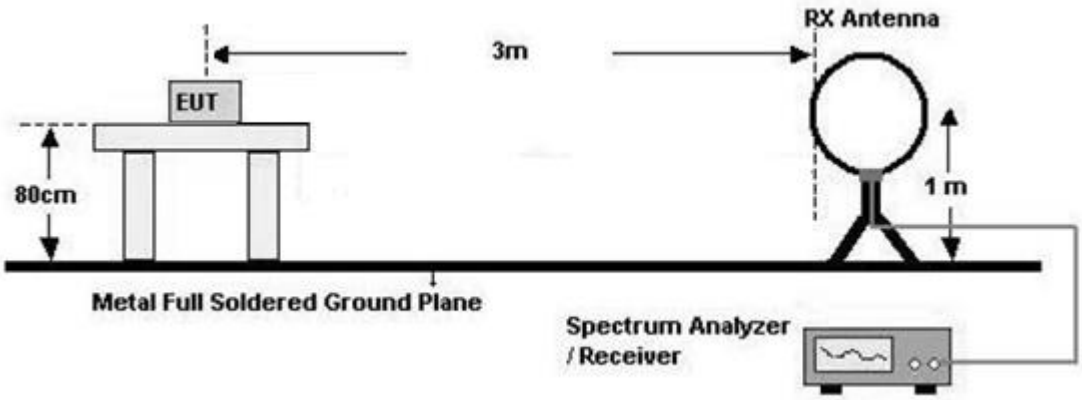
3. UNII 3: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below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

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

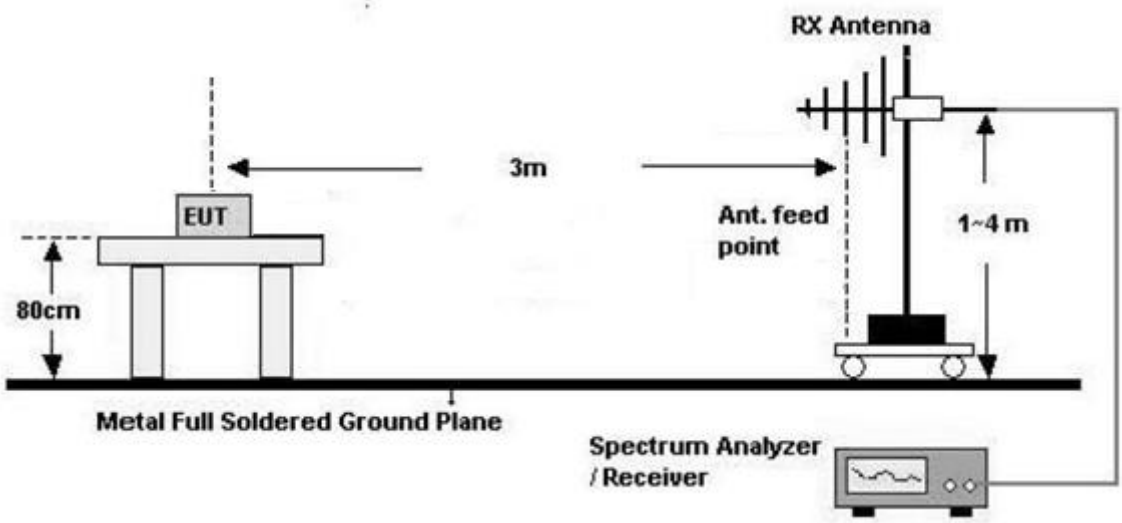
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

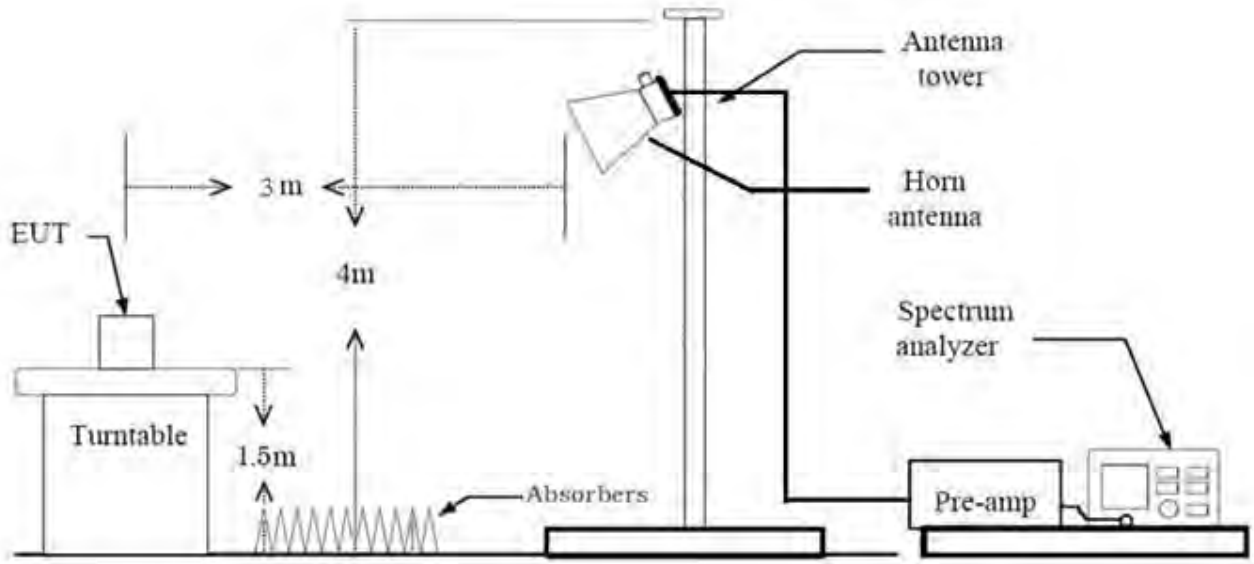
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Procedure of Radiated spurious emissions(Below 30 MHz)

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

KDB 414788 OFS and Chamber Correlation Justification

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

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

Test Procedure of Radiated spurious emissions(Below 1GHz)

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

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

Test Procedure of Radiated spurious emissions (Above 1 GHz)

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

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

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

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

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

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

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

Test Procedure of Radiated Restricted Band Edge

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting
   (1) Measurement Type(Peak, G.5 in KDB 789033 v02r01):
   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep Time = auto
   - Trace mode = max hold
   - Allow sweeps to continue until the trace stabilizes.
     Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately 1/x, where x is the duty cycle.

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

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

The actual setting value of VBW

Mode	Worst Data rate (Mbps)	Duty Cycle	Duty Cycle Factor (dB)	The actual setting value of VBW (Hz)
802.11a	6	0.968	0.141	1000
802.11n(HT20)	MCS0	0.966	0.151	1000
802.11n(HT40)	MCS0	0.936	0.286	3000
802.11ac(VHT20)	MCS0	0.966	0.148	1000
802.11ac(VHT40)	MCS0	0.936	0.288	3000
802.11ac(VHT80)	MCS0	0.879	0.561	5000

8.8. Worst case configuration and mode

Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
   - Mode : Stand alone, Stand alone + External accessories(Earphone, etc)
   - Worstcase : Stand alone
2. EUT Axis
   - Radiated Spurious Emissions : X, Z
   - Radiated Restricted Band Edge : X, Y
3. All datarate of operation were investigated and the worst case datarate results are reported
   - 802.11a : 6 Mbps
   - 802.11n_HT20 : MCS0
   - 802.11n_HT40 : MCS0
   - 802.11ac_VHT20 : MCS0
   - 802.11ac_VHT40 : MCS0
   - 802.11ac_VHT80 : MCS0
4. Radiated Spurious Emission
   - All modulation of operation were investigated and the worst case modulation results are reported.
     (Worstcase : 802.11a_6 Mbps)
5. All position of loop antenna were investigated and the test result is a no critical peak found at all positions.
   - Position : Horizontal, Vertical, Parallel to the ground plane
6. We were performed the RSE test in condition of co-location. There has no significant emission raised.
   - WWAN+WLAN 5GHz+BT

Radiated test(DBS)

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

Description	Bluetooth Emission	5 GHz Emission
Antenna	WIFI/BT	WIFI/BT
Channel	78	165
Data Rate	339 Bytes	6 Mbps
Mode	GFSK : DH5	802.11a

AC Power line Conducted Emissions

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

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
26dB Bandwidth	§15.407 (for Power Measurement)	N/A	Conducted	PASS
6 dB Bandwidth	§15.407(e)	>500 kHz (5725-5850 MHz)		PASS
Maximum Conducted Output Power	§15.407(a)(1)(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
Peak 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
Frequency Stability	§15.407(g) §2.1055	Maintained within the band		PASS
AC Conducted Emissions 150 kHz-30 MHz	15.207 15.407(b)(8)	<FCC 15.207 limits		PASS
Undesirable Emissions	§15.407(b) (1)(2)(3)(4)	<-27 dBm/MHz EIRP (UNII1, 2A, 2C) cf. Section 8.7 (UNII 3)	Radiated	PASS
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	15.205, 15.407(b)(9)(10)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		PASS

10. TEST RESULT

10.1 DUTY CYCLE

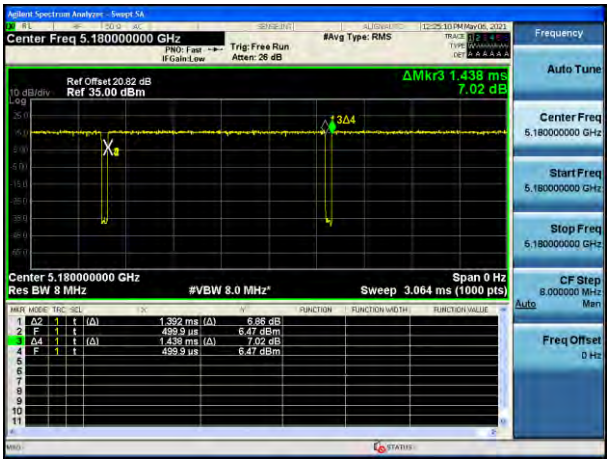
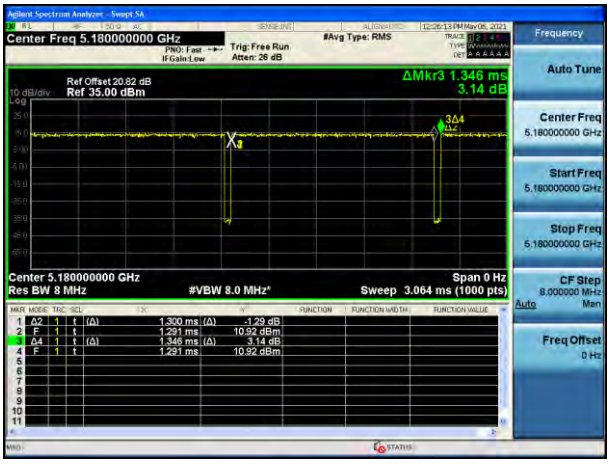
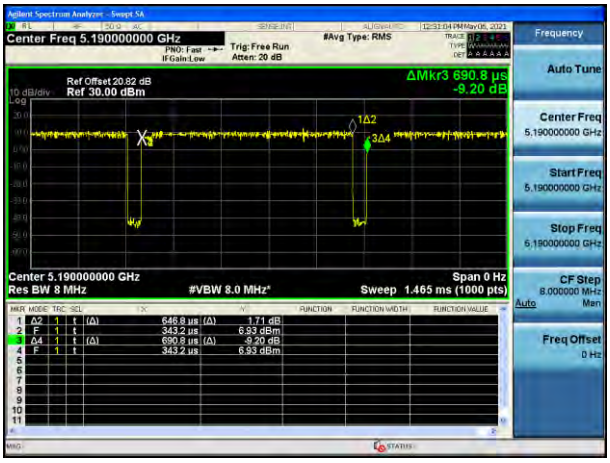
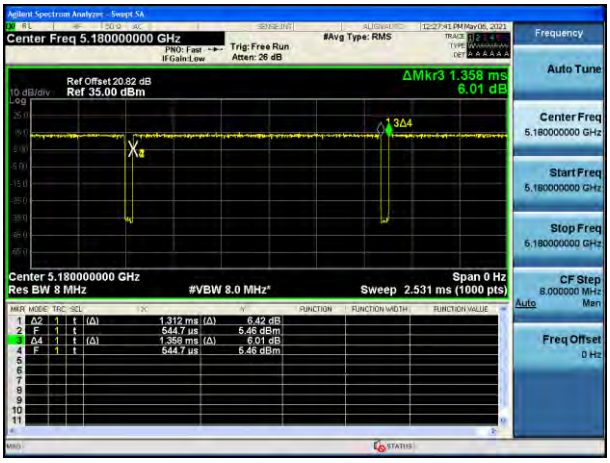
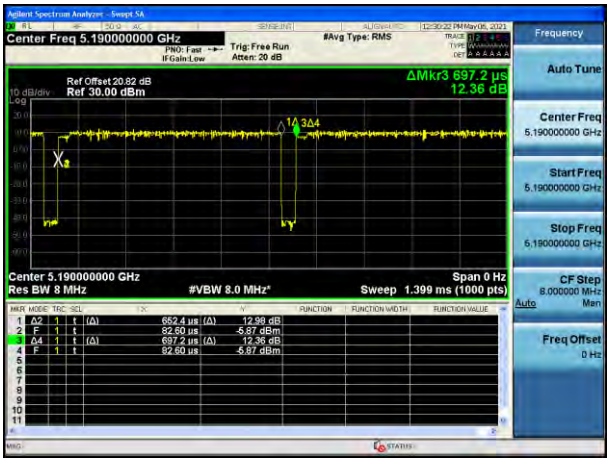
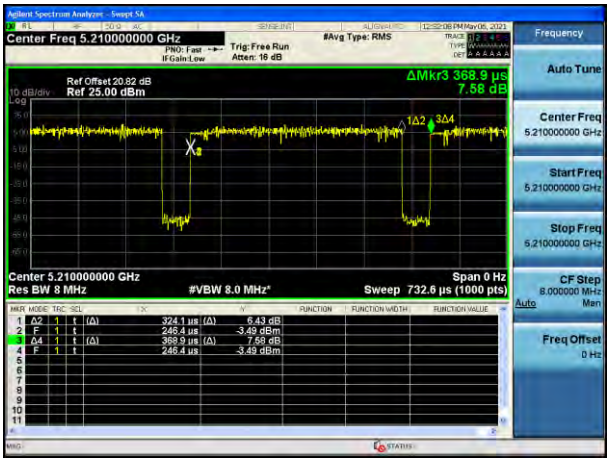
Mode	Data Rate (Mbps)	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11a	6	1.392	1.438	0.968	0.141
	9	0.938	0.981	0.955	0.198
	12	0.708	0.754	0.939	0.271
	18	0.480	0.524	0.915	0.384
	24	0.364	0.408	0.890	0.504
	36	0.252	0.296	0.849	0.711
	48	0.192	0.237	0.813	0.902
	54	0.176	0.221	0.797	0.985

Mode	MCS Index	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11n (HT20)	0	1.300	1.346	0.966	0.151
	1	0.668	0.712	0.938	0.279
	2	0.460	0.504	0.912	0.400
	3	0.352	0.397	0.886	0.523
	4	0.248	0.293	0.847	0.720
	5	0.196	0.241	0.814	0.892
	6	0.180	0.225	0.801	0.964
	7	0.164	0.209	0.786	1.048
802.11n (HT40)	0	0.647	0.691	0.936	0.286
	1	0.344	0.387	0.888	0.515
	2	0.240	0.284	0.845	0.729
	3	0.192	0.236	0.814	0.893
	4	0.140	0.184	0.761	1.189
	5	0.116	0.160	0.725	1.399
	6	0.104	0.148	0.703	1.534
	7	0.100	0.144	0.692	1.602

Mode	MCS Index	T_{on} (ms)	T_{total} (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11ac (VHT20)	0	1.312	1.358	0.966	0.148
	1	0.676	0.721	0.938	0.279
	2	0.464	0.509	0.912	0.400
	3	0.360	0.404	0.891	0.499
	4	0.252	0.297	0.848	0.714
	5	0.200	0.245	0.818	0.875
	6	0.184	0.229	0.805	0.942
	7	0.168	0.213	0.790	1.021
	8	0.148	0.193	0.768	1.144
802.11ac (VHT40)	0	0.652	0.697	0.936	0.288
	1	0.348	0.392	0.888	0.517
	2	0.244	0.288	0.847	0.720
	3	0.196	0.241	0.815	0.889
	4	0.144	0.188	0.766	1.158
	5	0.120	0.164	0.730	1.365
	6	0.108	0.152	0.711	1.484
	7	0.104	0.148	0.701	1.542
	8	0.092	0.136	0.676	1.698
	9	0.088	0.132	0.665	1.772
802.11ac (VHT80)	0	0.324	0.369	0.879	0.561
	1	0.184	0.229	0.806	0.939
	2	0.136	0.180	0.755	1.223
	3	0.112	0.157	0.717	1.443
	4	0.088	0.132	0.666	1.766
	5	0.076	0.120	0.632	1.990
	6	0.072	0.116	0.619	2.080
	7	0.072	0.117	0.620	2.075
	8	0.064	0.108	0.593	2.271
	9	0.064	0.108	0.592	2.279

Note:

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

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

10.2 26 dB BANDWIDTH

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

Straddle channel data were added in section 10.7.1.

802.11a Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	20.83	16.484
5200	40	22.38	16.545
5240	48	19.93	16.518
5260	52	22.03	16.514
5300	60	19.90	16.469
5320	64	20.03	16.525
5500	100	19.79	16.436
5600	120	23.11	16.537
5720	144	22.73	16.513
5745	149	20.87	16.513
5785	157	20.81	16.537
5825	165	19.99	16.488

802.11n(HT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	20.55	17.602
5200	40	19.98	17.624
5240	48	20.55	17.605
5260	52	20.79	17.592
5300	60	19.97	17.567
5320	64	20.09	17.602
5500	100	20.01	17.596
5600	120	20.41	17.636
5720	144	20.17	17.585
5745	149	20.41	17.624
5785	157	20.81	17.633
5825	165	20.17	17.603

802.11n(HT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	40.49	35.993
5230	46	40.25	36.061
5270	54	40.34	36.056
5310	62	40.07	36.008
5510	102	40.30	36.034
5590	118	40.60	36.101
5710	142	40.87	36.059
5755	151	40.42	36.091
5795	159	40.27	36.126

802.11ac(VHT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	19.97	17.575
5200	40	20.28	17.563
5240	48	20.87	17.575
5260	52	20.15	17.603
5300	60	20.18	17.584
5320	64	20.01	17.557
5500	100	19.94	17.559
5600	120	20.08	17.591
5720	144	19.87	17.558
5745	149	20.08	17.549
5785	157	20.06	17.568
5825	165	20.03	17.596

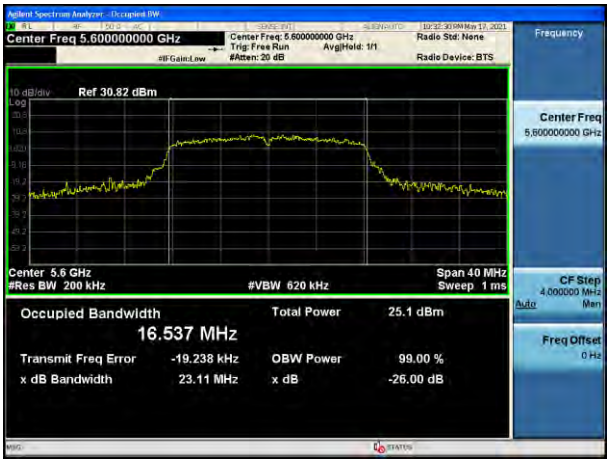
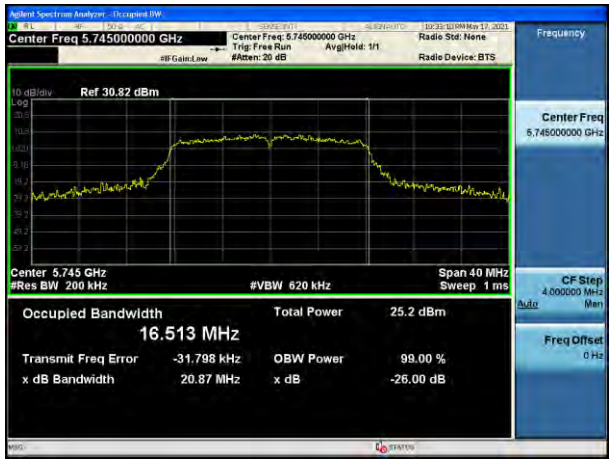
802.11ac(VHT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	40.07	35.994
5230	46	40.24	35.949
5270	54	40.42	36.009
5310	62	40.35	36.015
5510	102	40.21	36.001
5590	118	40.27	35.964
5710	142	39.96	35.989
5755	151	40.19	35.965
5795	159	40.58	35.959

802.11ac(VHT80) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5210	42	80.77	75.191
5290	58	80.85	75.224
5530	106	80.79	75.237
5610	122	80.73	75.196
5690	138	80.81	75.339
5775	155	80.55	75.269

▣ Test Plots(802.11a)

Note:

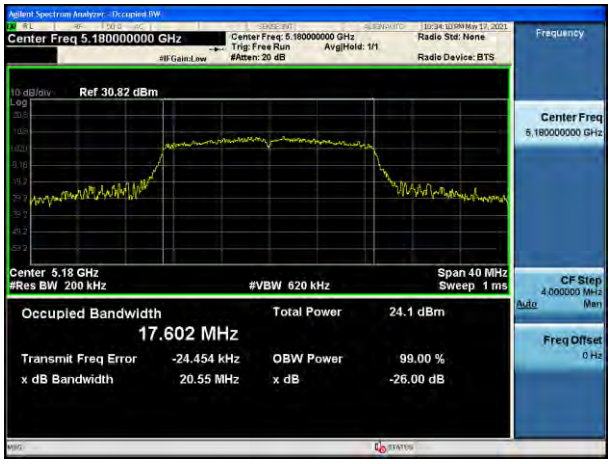
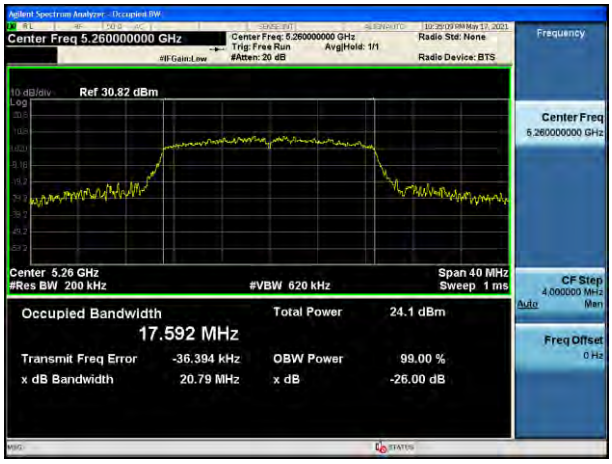
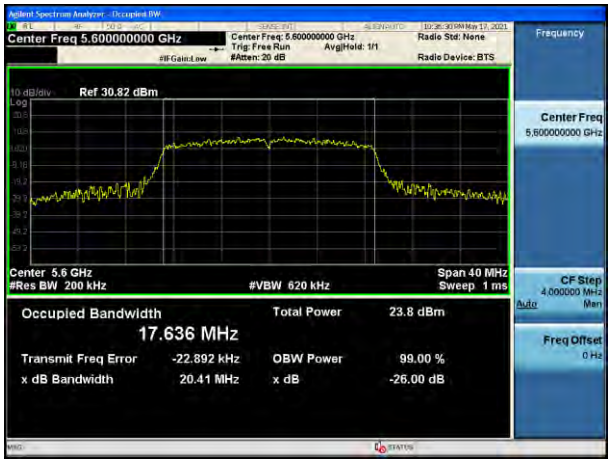
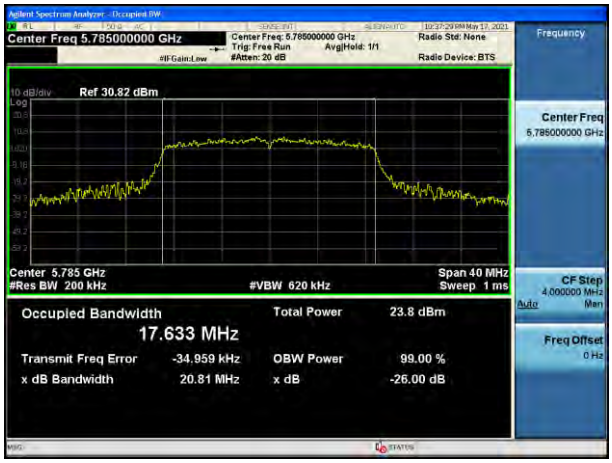
In order to simplify the report, attached plots were only the most wide channel.

802.11a UNII 1 BAND 26dB Bandwidth (CH 40)	802.11a UNII 2A BAND 26dB Bandwidth (CH 52)
	
802.11a UNII 2C BAND 26dB Bandwidth (CH 120)	**802.11a UNII 3 BAND 26dB Bandwidth (CH 149)**
	

▣ Test Plots(802.11n(HT20))

Note:

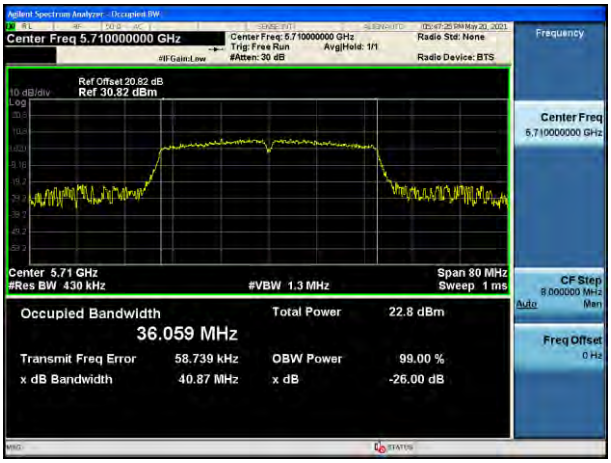
In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT20 UNII 1 BAND 26dB Bandwidth(CH 36)	802.11n_HT20 UNII 2A BAND 26dB Bandwidth(CH 52)
	
802.11n_HT20 UNII 2C BAND 26dB Bandwidth(CH 120)	**802.11n_HT20 UNII 3 BAND 26dB Bandwidth(CH 157)**
	

▣ Test Plots(802.11n(HT40))

Note:

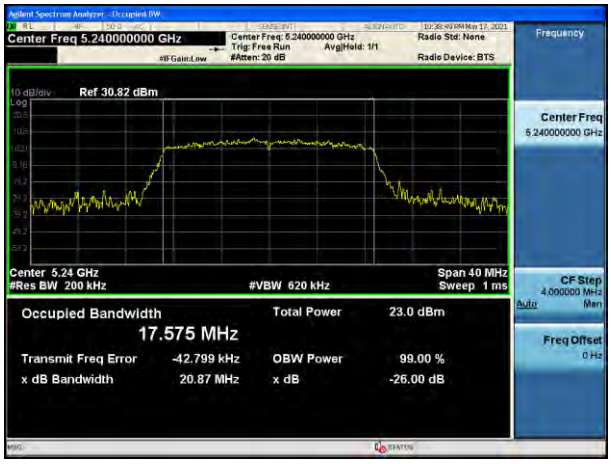
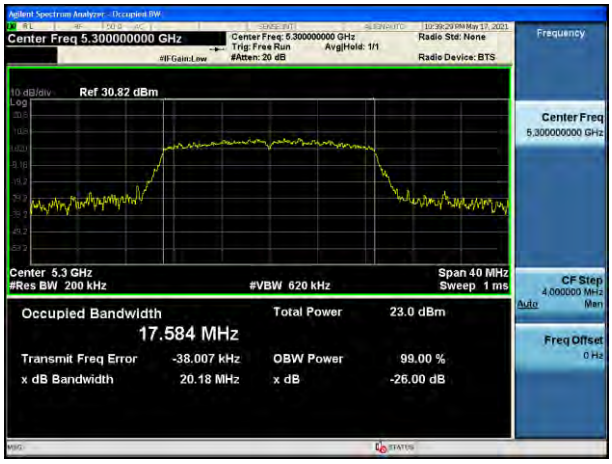
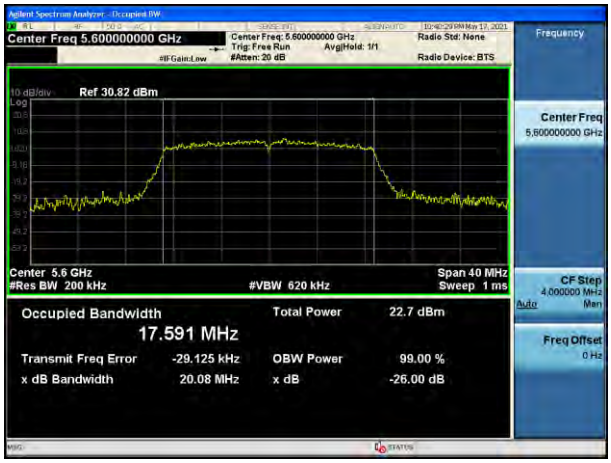
In order to simplify the report, attached plots were only the most wide channel.

802.11n_HT40 UNII 1 BAND 26dB Bandwidth(CH 38)	802.11n_HT40 UNII 2A BAND 26dB Bandwidth (CH 54)
	
802.11n_HT40 UNII 2C BAND 26dB Bandwidth(CH 142)	**802.11n_HT40 UNII 3 BAND 26dB Bandwidth (CH 151)**
	

▣ Test Plots(802.11ac(VHT20))

Note:

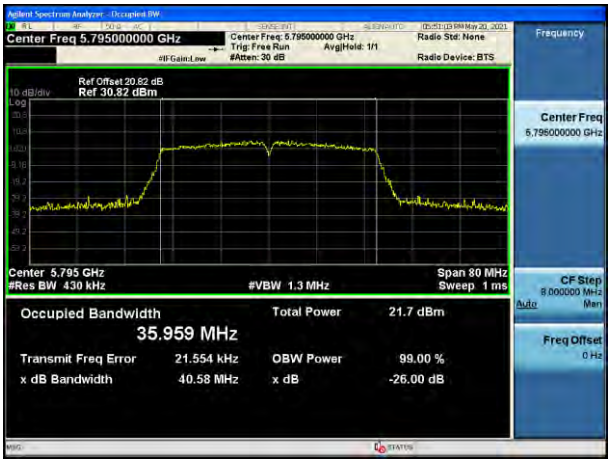
In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT20 UNII 1 BAND 26dB Bandwidth(CH 48)	802.11ac_VHT20 UNII 2A BAND 26dB Bandwidth(CH 60)
	
802.11ac_VHT20 UNII 2C BAND 26dB Bandwidth(CH 120)	**802.11ac_VHT20 UNII 3 BAND 26dB Bandwidth(CH 149)**
	

▣ Test Plots(802.11ac(VHT40))

Note:

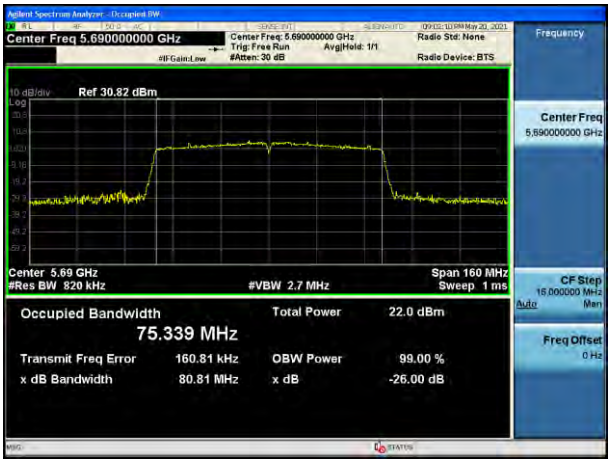
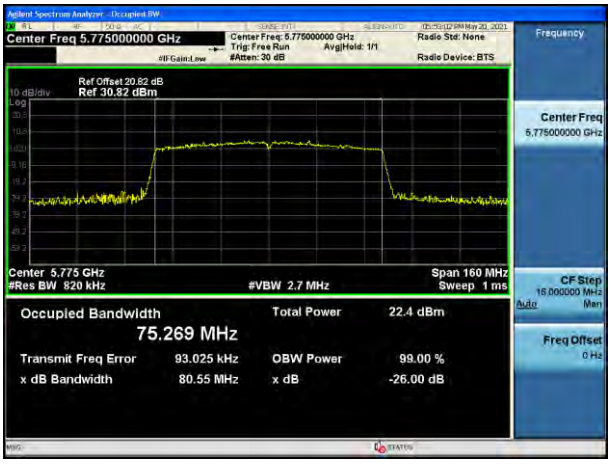
In order to simplify the report, attached plots were only the most wide channel.

802.11ac_VHT40 UNII 1 BAND 26dB Bandwidth(CH 46)	802.11ac_VHT40 UNII 2A BAND 26dB Bandwidth (CH 54)
	
802.11ac_VHT40 UNII 2C BAND 26dB Bandwidth(CH 118)	**802.11ac_VHT40 UNII 3 BAND 26dB Bandwidth (CH 159)**
	

▣ Test Plots(802.11ac(VHT80))

Note:

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

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

10.3 6dB BANDWIDTH

802.11a Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.13	> 0.5	Pass
5785	157	15.05	> 0.5	Pass
5825	165	15.64	> 0.5	Pass

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.15	> 0.5	Pass
5785	157	15.11	> 0.5	Pass
5825	165	15.10	> 0.5	Pass

802.11n(HT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.08	> 0.5	Pass
5795	159	35.21	> 0.5	Pass

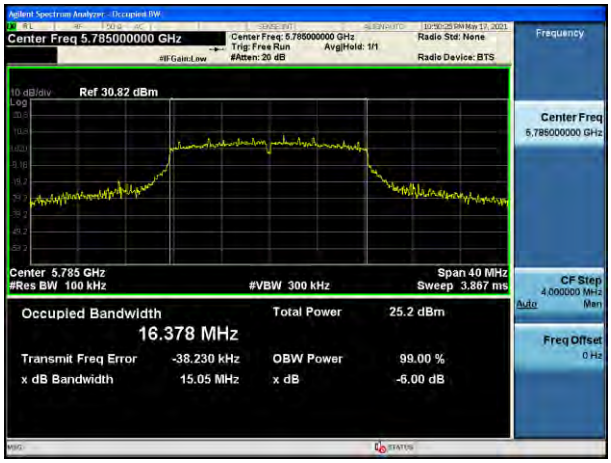
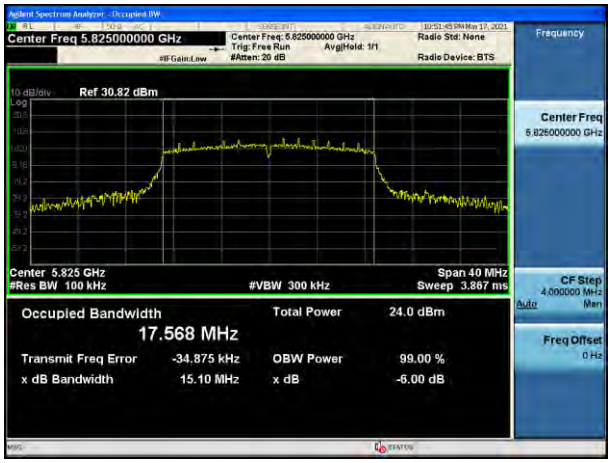
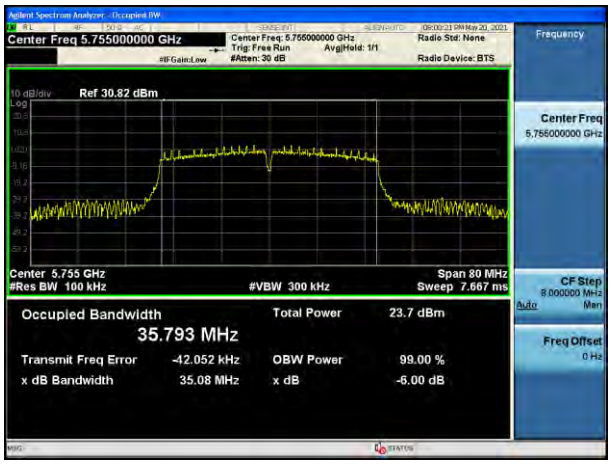
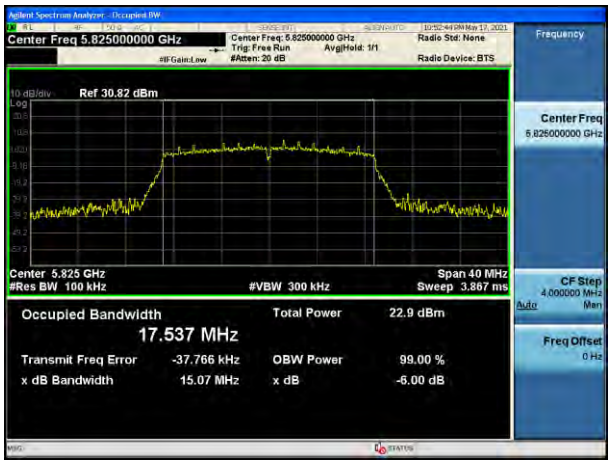
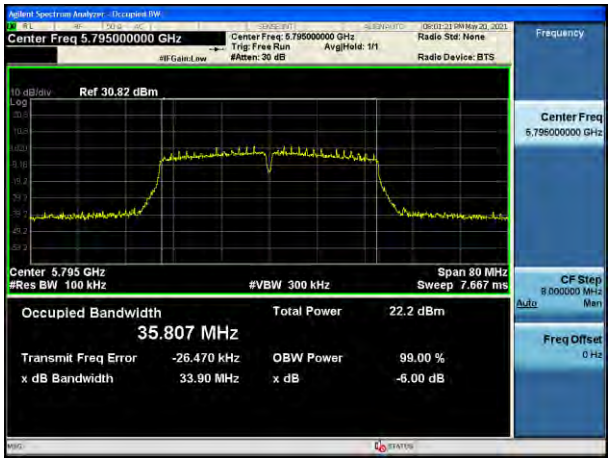
802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.16	> 0.5	Pass
5785	157	15.48	> 0.5	Pass
5825	165	15.07	> 0.5	Pass

802.11ac(VHT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.06	> 0.5	Pass
5795	159	33.90	> 0.5	Pass

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

▣ Test Plots

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

802.11a (CH.157)	802.11n(HT20) (CH.165)
	
802.11n(HT40) (CH.151)	**802.11ac(VHT20) (CH.165)**
	
802.11ac(VHT40) (CH.159)	**802.11ac(VHT80) (CH.155)**
	

10.4 OUTPUT POWER MEASUREMENT

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

Straddle channel data were added in section 10.7.3.

802.11a Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)	Worstcase Datarate (Mbps)
Frequency [MHz]	Channel No.						
5180	36	15	15.11	0.985	16.09	23.98	54
5200	40	15	15.62	0.711	16.33	23.98	36
5240	48	15	16.05	0.271	16.32	23.98	12
5260	52	15	15.94	0.384	16.32	23.98	18
5300	60	15	16.24	0.141	16.38	23.98	6
5320	64	15	16.18	0.141	16.32	23.98	6
5500	100	14	14.99	0.271	15.26	23.98	12
5600	120	15	16.05	0.141	16.19	23.98	6
5720	144	15	16.21	0.141	16.35	23.98	6
5745	149	15	16.07	0.384	16.45	30.00	18
5785	157	15	16.00	0.141	16.14	30.00	6
5825	165	15	15.67	0.384	16.06	30.00	18

802.11n(20MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)	Worstcase MCS Index
Frequency [MHz]	Channel No.						
5180	36	15	15.74	0.523	16.27	23.98	MCS3
5200	40	15	15.79	0.523	16.31	23.98	MCS3
5240	48	15	16.09	0.279	16.37	23.98	MCS1
5260	52	15	15.73	0.523	16.25	23.98	MCS3
5300	60	15	16.04	0.279	16.31	23.98	MCS1
5320	64	15	16.12	0.151	16.27	23.98	MCS0
5500	100	14	14.60	0.523	15.13	23.98	MCS3
5600	120	15	15.55	0.523	16.07	23.98	MCS3
5720	144	15	16.12	0.151	16.27	23.98	MCS0
5745	149	15	16.20	0.151	16.35	30.00	MCS0
5785	157	15	15.84	0.279	16.12	30.00	MCS1
5825	165	15	15.55	0.400	15.95	30.00	MCS2

802.11n(40MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)	Worstcase MCS Index
Frequency [MHz]	Channel No.						
5190	38	14	15.03	0.286	15.32	23.98	MCS0
5230	46	14	14.83	0.515	15.34	23.98	MCS1
5270	54	14	14.38	0.893	15.28	23.98	MCS3
5310	62	14	14.81	0.515	15.33	23.98	MCS1
5510	102	12	12.79	0.286	13.08	23.98	MCS0
5590	118	14	14.72	0.286	15.01	23.98	MCS0
5710	142	14	14.63	0.515	15.15	23.98	MCS1
5755	151	14	14.97	0.286	15.25	30.00	MCS0
5795	159	14	14.35	0.515	14.86	30.00	MCS1

802.11ac(20MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)	Worstcase MCS Index
Frequency [MHz]	Channel No.						
5180	36	15	15.85	0.400	16.25	23.98	MCS2
5200	40	15	15.53	0.714	16.24	23.98	MCS4
5240	48	15	15.50	0.714	16.22	23.98	MCS4
5260	52	15	16.11	0.148	16.26	23.98	MCS0
5300	60	15	16.10	0.148	16.25	23.98	MCS0
5320	64	15	15.91	0.279	16.19	23.98	MCS1
5500	100	14	14.94	0.148	15.09	23.98	MCS0
5600	120	15	15.84	0.148	15.99	23.98	MCS0
5720	144	15	16.01	0.148	16.16	23.98	MCS0
5745	149	15	15.82	0.400	16.22	30.00	MCS2
5785	157	15	15.76	0.148	15.91	30.00	MCS0
5825	165	15	15.71	0.148	15.86	30.00	MCS0

802.11ac(40MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)	Worstcase MCS Index
Frequency [MHz]	Channel No.						
5190	38	14	14.54	0.720	15.26	23.98	MCS2
5230	46	14	15.01	0.288	15.29	23.98	MCS0
5270	54	14	14.94	0.288	15.22	23.98	MCS0
5310	62	14	14.96	0.288	15.25	23.98	MCS0
5510	102	12	12.20	0.720	12.92	23.98	MCS2
5590	118	14	14.17	0.720	14.89	23.98	MCS2
5710	142	14	14.75	0.288	15.04	23.98	MCS0
5755	151	14	14.39	0.720	15.11	30.00	MCS2
5795	159	14	14.49	0.288	14.78	30.00	MCS0

802.11ac(80MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)	Worstcase MCS Index
Frequency [MHz]	Channel No.						
5210	42	12	12.73	0.561	13.29	23.98	MCS0
5290	58	13	13.67	0.561	14.23	23.98	MCS0
5530	106	11	11.53	0.561	12.10	23.98	MCS0
5610	122	13	13.39	0.561	13.95	23.98	MCS0
5690	138	13	12.58	1.223	13.80	23.98	MCS2
5775	155	13	12.86	0.939	13.80	30.00	MCS1

10.5 POWER SPECTRAL DENSITY

802.11a Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Worstcase Datarate (Mbps)	Limit
Frequency [MHz]	Channel No.					
5180	36	5.541	0.985	6.526	54	11 dBm/MHz
5200	40	5.593	0.711	6.304	36	
5240	48	5.895	0.271	6.166	12	
5260	52	6.001	0.384	6.385	18	
5300	60	6.020	0.141	6.161	6	
5320	64	6.180	0.141	6.321	6	
5500	100	4.833	0.271	5.104	12	
5600	120	5.725	0.141	5.866	6	
5720	144	6.139	0.141	6.280	6	
5745	149	3.105	0.384	3.489	18	30 dBm/500kHz
5785	157	3.105	0.141	3.246	6	
5825	165	3.011	0.384	3.395	18	

802.11n(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5180	36	5.820	0.523	6.343	MCS3	11 dBm/MHz
5200	40	5.645	0.523	6.168	MCS3	
5240	48	5.829	0.279	6.108	MCS1	
5260	52	5.614	0.523	6.137	MCS3	
5300	60	5.925	0.279	6.204	MCS1	
5320	64	6.263	0.151	6.414	MCS0	
5500	100	4.415	0.523	4.938	MCS3	
5600	120	5.677	0.523	6.200	MCS3	
5720	144	5.908	0.151	6.059	MCS0	
5745	149	3.511	0.151	3.662	MCS0	30 dBm/500kHz
5785	157	3.038	0.279	3.317	MCS1	
5825	165	3.064	0.400	3.464	MCS2	

802.11n(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5190	38	1.793	0.286	2.079	MCS0	11 dBm/MHz
5230	46	1.699	0.515	2.214	MCS1	
5270	54	1.265	0.893	2.158	MCS3	
5310	62	1.705	0.515	2.220	MCS1	
5510	102	-0.211	0.286	0.075	MCS0	
5590	118	1.488	0.286	1.774	MCS0	
5710	142	1.721	0.515	2.236	MCS1	
5755	151	-1.086	0.286	-0.800	MCS0	30 dBm /500kHz
5795	159	-1.309	0.515	-0.794	MCS1	

802.11ac(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5180	36	5.618	0.400	6.018	MCS2	11 dBm/MHz
5200	40	5.458	0.714	6.172	MCS4	
5240	48	5.218	0.714	5.932	MCS4	
5260	52	5.744	0.148	5.892	MCS0	
5300	60	6.074	0.148	6.222	MCS0	
5320	64	5.727	0.279	6.006	MCS1	
5500	100	4.570	0.148	4.718	MCS0	
5600	120	5.331	0.148	5.479	MCS0	
5720	144	5.707	0.148	5.855	MCS0	
5745	149	2.990	0.400	3.390	MCS2	30 dBm/500kHz
5785	157	2.689	0.148	2.837	MCS0	
5825	165	2.708	0.148	2.856	MCS0	

802.11ac(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5190	38	1.339	0.720	2.059	MCS2	11 dBm/MHz
5230	46	2.006	0.288	2.294	MCS0	
5270	54	1.553	0.288	1.841	MCS0	
5310	62	1.668	0.288	1.956	MCS0	
5510	102	-1.137	0.720	-0.417	MCS2	
5590	118	0.841	0.720	1.561	MCS2	
5710	142	1.785	0.288	2.073	MCS0	
5755	151	-1.540	0.720	-0.820	MCS2	30 dBm/500kHz
5795	159	-1.645	0.288	-1.357	MCS0	

802.11ac(80MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Worstcase MCS Index	Limit
Frequency [MHz]	Channel No.					
5210	42	-3.556	0.561	-2.995	MCS0	11 dBm/MHz
5290	58	-2.547	0.561	-1.986	MCS0	
5530	106	-4.811	0.561	-4.250	MCS0	
5610	122	-2.935	0.561	-2.374	MCS0	
5690	138	-3.797	1.223	-2.574	MCS2	
5775	155	-6.422	0.939	-5.483	MCS1	30 dBm/500kHz

▣ Test Plots(802.11a)

Note:

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

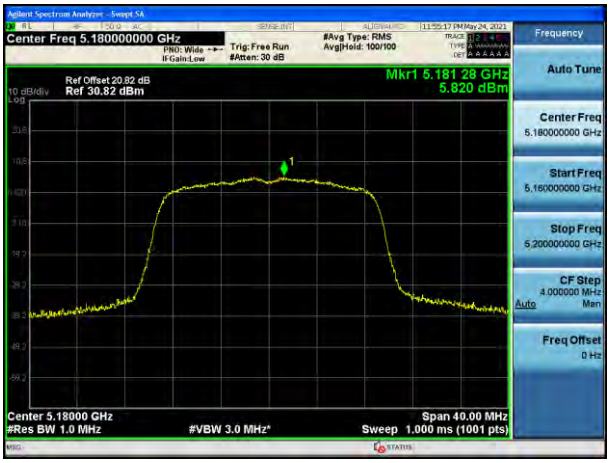
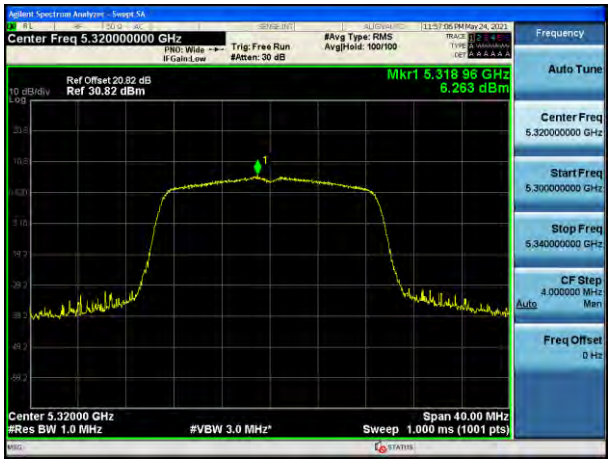
UNII 1 (Ch. 36)	UNII 2A (Ch. 52)
	

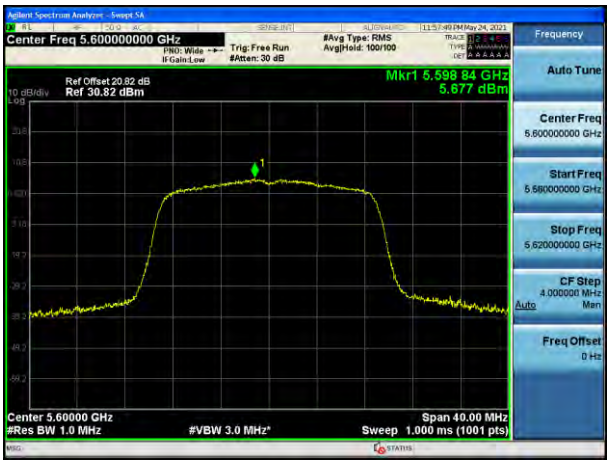
UNII 2C (Ch. 144)	UNII 3 (Ch. 149)
	

▣ Test Plots(802.11n(HT20))

Note:

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

UNII 1 (Ch. 36)	UNII 2A (Ch. 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 highest power.

UNII 1 (Ch. 46)	UNII 2A (Ch. 62)
	

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

▣ Test Plots(802.11ac(VHT20))

Note:

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

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

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

▣ Test Plots(802.11ac(VHT40))

Note:

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

UNII 1 (Ch. 46)	UNII 2A (Ch. 62)
	

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

▣ Test Plots(802.11ac(VHT80))

Note:

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

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

UNII 2C (Ch. 122)	UNII 3 (Ch. 155)
	

10.6 FREQUENCY STABILITY.

10.6.1 80MHz BW

Startup after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,180,000,000 Hz
CHANNEL:	36
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5180038.96	38.96
100%		-30	5180053.23	53.23
100%		-20	5180046.30	46.30
100%		-10	5180040.19	40.19
100%		0	5180035.49	35.49
100%		+10	5180031.89	31.89
100%		+30	5180031.44	31.44
100%		+40	5180040.81	40.81
100%		+50	5180045.90	45.90
High	4.43	+20	5180045.26	45.26
Low	3.65	+20	5180046.00	46.00

Note:

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

OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,260,000,000 Hz
CHANNEL:	52
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5260039.24	39.24
100%		-30	5260052.62	52.62
100%		-20	5260044.57	44.57
100%		-10	5260038.98	38.98
100%		0	5260033.95	33.95
100%		+10	5260031.28	31.28
100%		+30	5260032.48	32.48
100%		+40	5260041.89	41.89
100%		+50	5260045.67	45.67
High	4.43	+20	5260043.95	43.95
Low	3.65	+20	5260047.70	47.70

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:	5,500,000,000 Hz
CHANNEL:	100
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5500040.12	40.12
100%		-30	5500052.31	52.31
100%		-20	5500046.06	46.06
100%		-10	5500039.60	39.60
100%		0	5500036.05	36.05
100%		+10	5500033.40	33.40
100%		+30	5500031.96	31.96
100%		+40	5500042.43	42.43
100%		+50	5500048.34	48.34
High	4.43	+20	5500052.58	52.58
Low	3.65	+20	5500053.28	53.28

Note:

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

OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,745,000,000 Hz
CHANNEL:	149
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5745041.08	41.08
100%		-30	5745052.69	52.69
100%		-20	5745046.14	46.14
100%		-10	5745039.22	39.22
100%		0	5745035.61	35.61
100%		+10	5745032.95	32.95
100%		+30	5745032.39	32.39
100%		+40	5745041.07	41.07
100%		+50	5745046.83	46.83
High	4.43	+20	5745052.43	52.43
Low	3.65	+20	5745053.03	53.03

Note:

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

2 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,180,000,000 Hz
CHANNEL:	36
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5180039.67	39.67
100%		-30	5180052.84	52.84
100%		-20	5180046.63	46.63
100%		-10	5180040.34	40.34
100%		0	5180036.27	36.27
100%		+10	5180032.39	32.39
100%		+30	5180032.48	32.48
100%		+40	5180040.88	40.88
100%		+50	5180045.71	45.71
High	4.43	+20	5180051.50	51.50
Low	3.65	+20	5180052.94	52.94

Note:

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

OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,260,000,000 Hz
CHANNEL:	52
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5260041.52	41.52
100%		-30	5260052.92	52.92
100%		-20	5260045.34	45.34
100%		-10	5260038.69	38.69
100%		0	5260035.42	35.42
100%		+10	5260032.80	32.80
100%		+30	5260032.33	32.33
100%		+40	5260041.24	41.24
100%		+50	5260045.76	45.76
High	4.43	+20	5260051.19	51.19
Low	3.65	+20	5260051.55	51.55

Note:

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

OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,500,000,000 Hz
CHANNEL:	100
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5500043.76	43.76
100%		-30	5500051.75	51.75
100%		-20	5500045.35	45.35
100%		-10	5500039.55	39.55
100%		0	5500034.71	34.71
100%		+10	5500031.64	31.64
100%		+30	5500030.98	30.98
100%		+40	5500040.64	40.64
100%		+50	5500045.42	45.42
High	4.43	+20	5500051.45	51.45
Low	3.65	+20	5500052.35	52.35

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:	5,745,000,000 Hz
CHANNEL:	149
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5745045.40	45.40
100%		-30	5745053.55	53.55
100%		-20	5745045.54	45.54
100%		-10	5745039.17	39.17
100%		0	5745035.63	35.63
100%		+10	5745033.27	33.27
100%		+30	5745031.14	31.14
100%		+40	5745039.11	39.11
100%		+50	5745042.73	42.73
High	4.43	+20	5745050.29	50.29
Low	3.65	+20	5745051.47	51.47

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:	5,180,000,000 Hz
CHANNEL:	36
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5180043.22	43.22
100%		-30	5180053.32	53.32
100%		-20	5180046.73	46.73
100%		-10	5180043.11	43.11
100%		0	5180043.47	43.47
100%		+10	5180041.04	41.04
100%		+30	5180047.44	47.44
100%		+40	5180052.04	52.04
100%		+50	5180057.79	57.79
High	4.43	+20	5180055.42	55.42
Low	3.65	+20	5180054.11	54.11

Note:

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

OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,260,000,000 Hz
CHANNEL:	52
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5260045.07	45.07
100%		-30	5260052.36	52.36
100%		-20	5260046.24	46.24
100%		-10	5260042.88	42.88
100%		0	5260042.59	42.59
100%		+10	5260041.16	41.16
100%		+30	5260047.11	47.11
100%		+40	5260051.77	51.77
100%		+50	5260055.94	55.94
High	4.43	+20	5260053.84	53.84
Low	3.65	+20	5260055.07	55.07

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:	5,500,000,000 Hz
CHANNEL:	100
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5500048.14	48.14
100%		-30	5500053.02	53.02
100%		-20	5500046.43	46.43
100%		-10	5500043.54	43.54
100%		0	5500043.70	43.70
100%		+10	5500040.83	40.83
100%		+30	5500046.20	46.20
100%		+40	5500050.89	50.89
100%		+50	5500056.86	56.86
High	4.43	+20	5500055.64	55.64
Low	3.65	+20	5500056.16	56.16

Note:

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

OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,745,000,000 Hz
CHANNEL:	149
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5745049.68	49.68
100%		-30	5745053.32	53.32
100%		-20	5745046.72	46.72
100%		-10	5745044.33	44.33
100%		0	5745043.49	43.49
100%		+10	5745041.13	41.13
100%		+30	5745046.34	46.34
100%		+40	5745049.61	49.61
100%		+50	5745052.87	52.87
High	4.43	+20	5745052.93	52.93
Low	3.65	+20	5745053.72	53.72

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.

10 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,180,000,000 Hz
CHANNEL:	36
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5180046.92	46.92
100%		-30	5180052.74	52.74
100%		-20	5180045.94	45.94
100%		-10	5180042.30	42.30
100%		0	5180042.40	42.40
100%		+10	5180039.56	39.56
100%		+30	5180046.99	46.99
100%		+40	5180051.01	51.01
100%		+50	5180054.69	54.69
High	4.43	+20	5180053.35	53.35
Low	3.65	+20	5180055.41	55.41

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:	5,260,000,000 Hz
CHANNEL:	52
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5260048.23	48.23
100%		-30	5260052.71	52.71
100%		-20	5260045.93	45.93
100%		-10	5260042.88	42.88
100%		0	5260041.94	41.94
100%		+10	5260041.50	41.50
100%		+30	5260047.04	47.04
100%		+40	5260050.83	50.83
100%		+50	5260054.53	54.53
High	4.43	+20	5260053.37	53.37
Low	3.65	+20	5260054.86	54.86

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 2C
OPERATING FREQUENCY:	5,500,000,000 Hz
CHANNEL:	100
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5500050.15	50.15
100%		-30	5500052.02	52.02
100%		-20	5500045.48	45.48
100%		-10	5500042.79	42.79
100%		0	5500042.88	42.88
100%		+10	5500043.65	43.65
100%		+30	5500047.74	47.74
100%		+40	5500051.32	51.32
100%		+50	5500057.03	57.03
High	4.43	+20	5500055.38	55.38
Low	3.65	+20	5500054.92	54.92

Note:

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

OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,745,000,000 Hz
CHANNEL:	149
REFERENCE VOLTAGE:	3.86 VDC

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5745052.83	52.83
100%		-30	5745053.53	53.53
100%		-20	5745045.80	45.80
100%		-10	5745043.51	43.51
100%		0	5745042.81	42.81
100%		+10	5745042.24	42.24
100%		+30	5745046.78	46.78
100%		+40	5745050.40	50.40
100%		+50	5745055.72	55.72
High	4.43	+20	5745054.99	54.99
Low	3.65	+20	5745053.88	53.88

Note:

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

10.7 STRADDLE CHANNEL

10.7.1 26dB Bandwidth

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26dB Bandwidth [MHz]
802.11a	UNII 2C	5720	144	5710.28	14.72
802.11n(HT20)				5710.00	15.00
802.11ac(VHT20)				5710.04	14.96
802.11a	UNII 3	5720	144	5729.84	4.84
802.11n(HT20)				5730.04	5.04
802.11ac(VHT20)				5729.88	4.88

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26dB Bandwidth [MHz]
802.11n(HT40)	UNII 2C	5710	142	5690.08	34.92
802.11ac(VHT40)				5690.00	35.00
802.11n(HT40)	UNII 3	5710	142	5730.40	5.40
802.11ac(VHT40)				5730.00	5.00

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26dB Bandwidth [MHz]
802.11ac(VHT80)	UNII 2C	5690	138	5649.68	75.32
	UNII 3	5690	138	5730.64	5.64

Note:

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

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

▣ Test Plots (26dB Bandwidth)

802.11a UNII Band	802.11n(HT20) UNII Band
	
802.11ac(VHT20) UNII Band	
	

▣ Test Plots (26dB Bandwidth)

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

10.7.2 6dB Bandwidth

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6dB Bandwidth [MHz]	Limit [MHz]
802.11a	UNII 3	5720	144	5727.80	2.80	> 0.5
802.11n(HT20)				5728.16	3.16	> 0.5
802.11ac(VHT20)				5728.16	3.16	> 0.5

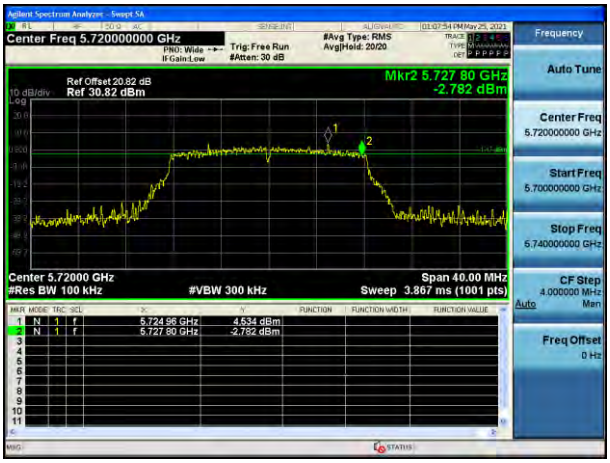
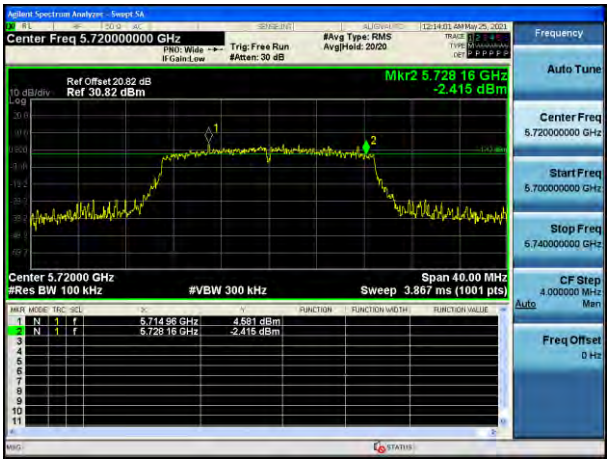
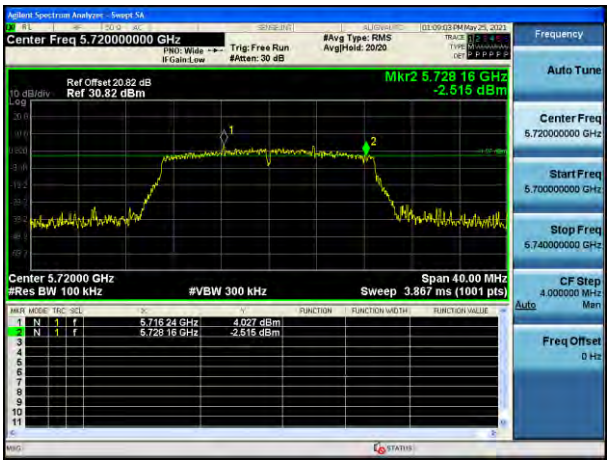
Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6dB Bandwidth [MHz]	Limit [MHz]
802.11n(HT40)	UNII 3	5710	142	5727.60	2.60	> 0.5
802.11ac(VHT40)				5727.84	2.84	> 0.5

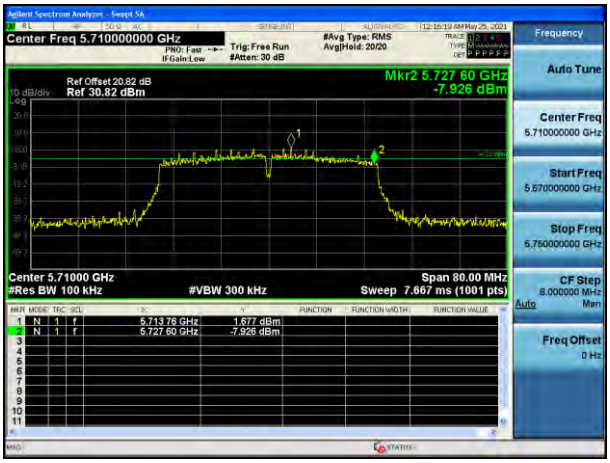
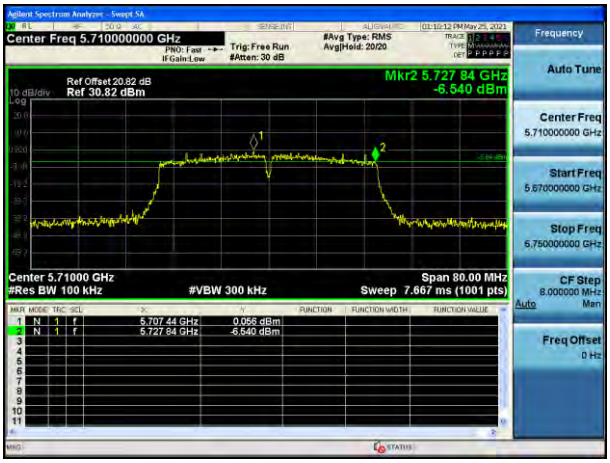
Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6dB Bandwidth [MHz]	Limit [MHz]
802.11ac(VHT80)	UNII 3	5690	138	5727.76	2.76	> 0.5

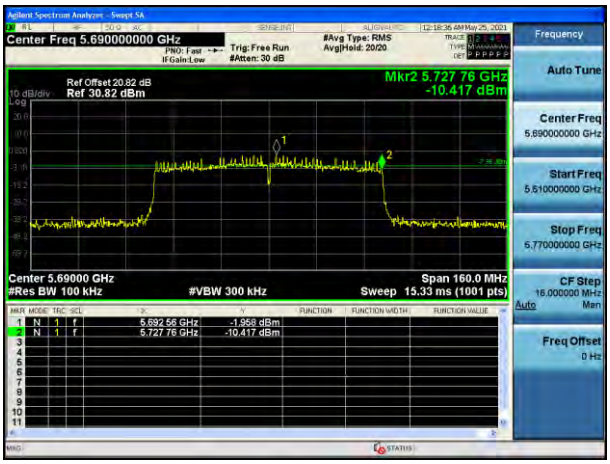
Note:

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

▣ Test Plots(UNII 3 Band 6dB Bandwidth)

802.11a CH.144	802.11n_HT20 CH.144
	
802.11ac_VHT20 CH.144	
	

802.11n_HT40 CH.142	802.11ac_VHT40 CH.142
	

802.11ac_VHT80 CH.138


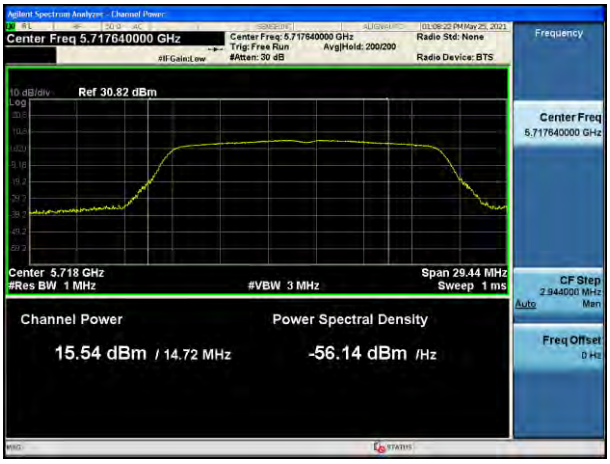
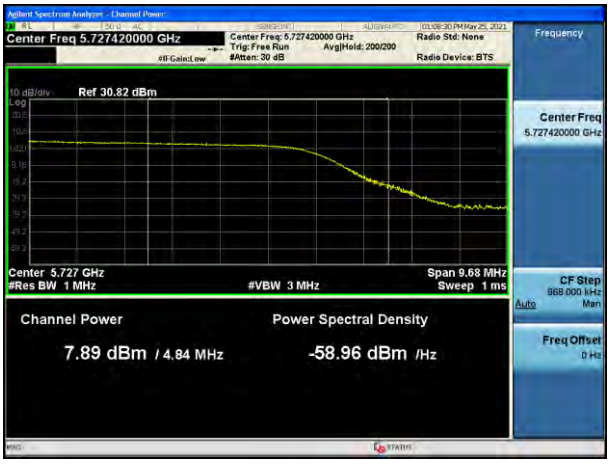
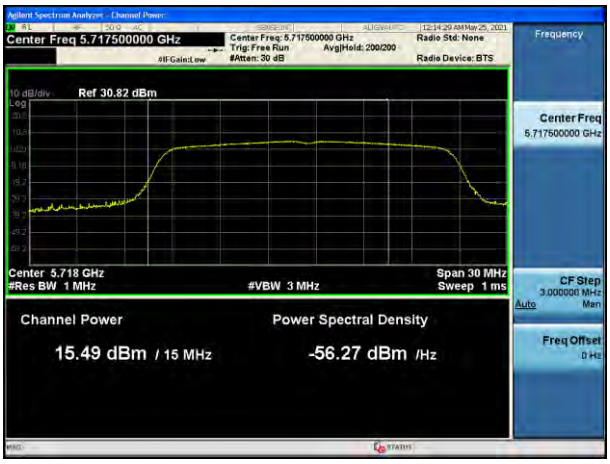
10.7.3 Output Power

Mode	Frequency [MHz]	Channel	Measured Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)	Worstcase Datarate
802.11a	5720 (UNII 2C Band)	144	15.54	0.141	15.68	22.68	6 Mbps
802.11n(HT20)			15.49	0.151	15.64	22.76	MCS0
802.11ac(VHT20)			15.25	0.148	15.40	22.75	MCS0
802.11a	5720 (UNII 3 Band)	144	7.89	0.141	8.03	30.00	6 Mbps
802.11n(HT20)			8.35	0.151	8.50	30.00	MCS0
802.11ac(VHT20)			8.13	0.148	8.28	30.00	MCS0

Mode	Frequency [MHz]	Channel	Measured Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)	Worstcase Datarate
802.11n(HT40)	5710 (UNII 2C Band)	142	14.62	0.515	15.13	23.98	MCS1
802.11ac(VHT40)			14.58	0.288	14.87	23.98	MCS0
802.11n(HT40)	5710 (UNII 3 Band)	142	2.41	0.515	2.92	30.00	MCS1
802.11ac(VHT40)			2.26	0.288	2.55	30.00	MCS0

Mode	Frequency [MHz]	Channel	Measured Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)	Worstcase Datarate
802.11ac(VHT80)	5690 (UNII 2C Band)	138	12.50	1.223	13.73	12.50	MCS2
	5690 (UNII 3 Band)	138	-2.76	1.223	-1.54	-2.76	MCS2

▣ Test Plots_

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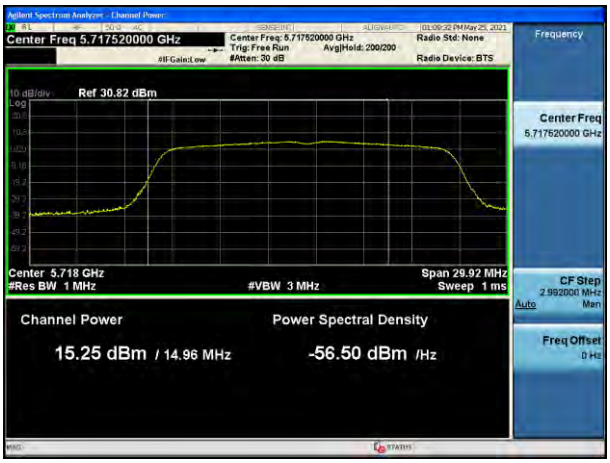
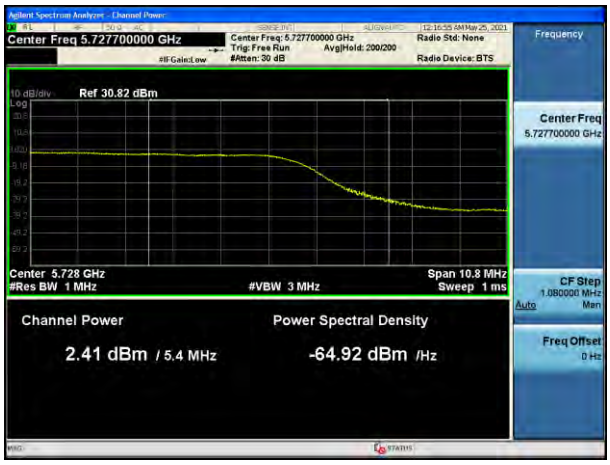
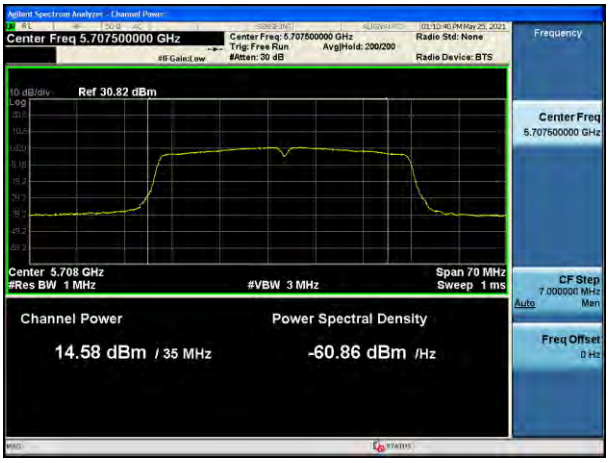
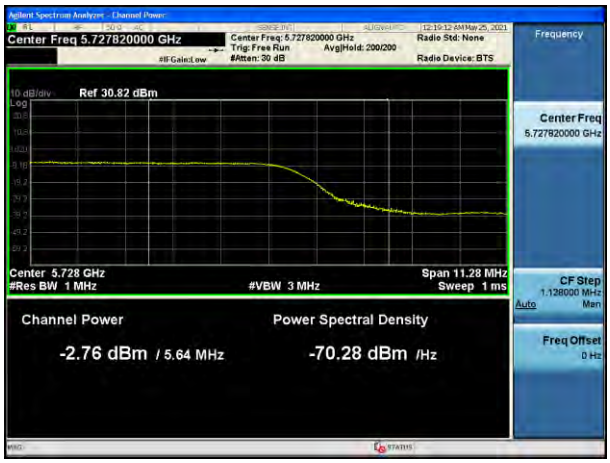
	

802.11n(HT40) UNII 2C Band	802.11n(HT40) UNII 3 Band
	
802.11ac(VHT40) UNII 2C Band	**802.11ac(VHT40) UNII 3 Band**
	
802.11ac(VHT80) UNII 2C Band	**802.11ac(VHT80) UNII 3 Band**
	

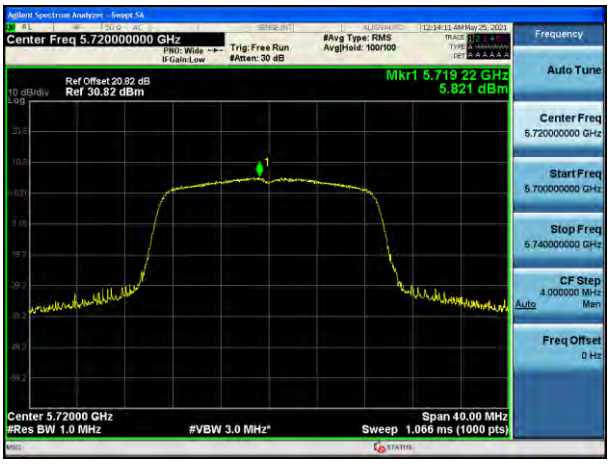
10.7.4 Power Spectral Density

Mode	Frequency [MHz]	Channel	Measured Density (dBm)	Duty Cycle Factor (dB)	Total PSD (dBm)	Limit (dBm)	Worstcase Datarate
802.11a	5720 (UNII 2C Band)	144	6.244	0.141	6.385	11dBm/ MHz	6 Mbps
802.11n(HT20)			5.821	0.151	5.972		MCS0
802.11ac(VHT20)			5.741	0.148	5.889		MCS0
802.11a	5720 (UNII 3 Band)	144	1.618	0.141	1.759	30 dB/ 500kHz	6 Mbps
802.11n(HT20)			1.151	0.151	1.302		MCS0
802.11ac(VHT20)			0.828	0.148	0.976		MCS0

Mode	Frequency [MHz]	Channel	Measured Density (dBm)	Duty Cycle Factor (dB)	Total PSD (dBm)	Limit (dBm)	Worstcase Datarate
802.11n(HT40)	5710 (UNII 2C Band)	142	1.497	0.515	2.012	11dBm/ MHz	MCS1
802.11ac(VHT40)			1.523	0.288	1.811		MCS0
802.11n(HT40)	5710 (UNII 3 Band)	142	-4.487	0.515	-3.972	30 dB/ 500kHz	MCS1
802.11ac(VHT40)			-5.150	0.288	-4.862		MCS0

Mode	Frequency [MHz]	Channel	Measured Density (dBm)	Duty Cycle Factor (dB)	Total PSD (dBm)	Limit (dBm)	Worstcase Datarate
802.11ac(VHT80)	5690 (UNII 2C Band)	138	-3.670	1.223	-2.447	11dBm/ MHz	MCS2
	5690 (UNII 3 Band)	138	-10.108	1.223	-8.884	30 dBm/ 500kHz	MCS2

▣ Test Plots

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

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

10.8 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30MHz

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

Note:

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

Frequency Range : Below 1 GHz

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

Note:

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

Frequency Range : Above 1 GHz

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

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10360	44.72	8.90	V	53.62	68.20	14.58	PK
15540	40.65	13.15	V	53.80	73.98	20.18	PK
15540	26.51	13.15	V	39.66	53.98	14.32	AV
10360	45.06	8.90	H	53.96	68.20	14.24	PK
15540	40.61	13.15	H	53.76	73.98	20.22	PK
15540	26.44	13.15	H	39.59	53.98	14.39	AV

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

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10400	45.23	9.11	V	54.34	68.20	13.86	PK
15600	39.91	13.41	V	53.32	73.98	20.66	PK
15600	25.90	13.41	V	39.31	53.98	14.67	AV
10400	45.54	9.11	H	54.65	68.20	13.55	PK
15600	39.99	13.41	H	53.40	73.98	20.58	PK
15600	25.96	13.41	H	39.37	53.98	14.61	AV

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

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10480	45.40	9.54	V	54.94	68.20	13.26	PK
15720	40.07	13.05	V	53.12	73.98	20.86	PK
15720	25.86	13.05	V	38.91	53.98	15.07	AV
10480	45.77	9.54	H	55.31	68.20	12.89	PK
15720	39.98	13.05	H	53.03	73.98	20.95	PK
15720	25.76	13.05	H	38.81	53.98	15.17	AV

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

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10520	43.29	9.80	V	53.09	68.20	15.11	PK
15780	41.36	13.51	V	54.87	73.98	19.11	PK
15780	27.16	13.51	V	40.67	53.98	13.31	AV
10520	44.85	9.80	H	54.65	68.20	13.55	PK
15780	40.91	13.51	H	54.42	73.98	19.56	PK
15780	27.11	13.51	H	40.62	53.98	13.36	AV

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

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10600	42.86	10.27	V	53.13	73.98	20.85	PK
10600	29.16	10.27	V	39.43	53.98	14.55	AV
15900	40.78	13.01	V	53.79	73.98	20.19	PK
15900	27.65	13.01	V	40.66	53.98	13.32	AV
10600	43.04	10.27	H	53.31	73.98	20.67	PK
10600	29.52	10.27	H	39.79	53.98	14.19	AV
15900	40.25	13.01	H	53.26	73.98	20.72	PK
15900	27.49	13.01	H	40.50	53.98	13.48	AV

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

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10640	41.78	10.41	V	52.19	73.98	21.79	PK
10640	30.27	10.41	V	40.68	53.98	13.30	AV
15960	40.16	13.53	V	53.69	73.98	20.29	PK
15960	27.44	13.53	V	40.97	53.98	13.01	AV
10640	43.56	10.41	H	53.97	73.98	20.01	PK
10640	30.45	10.41	H	40.86	53.98	13.12	AV
15960	39.19	13.53	H	52.72	73.98	21.26	PK
15960	27.15	13.53	H	40.68	53.98	13.30	AV

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

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11000	43.16	10.99	V	54.15	73.98	19.83	PK
11000	29.34	10.99	V	40.33	53.98	13.65	AV
16500	41.45	12.68	V	54.13	68.20	14.07	PK
11000	42.69	10.99	H	53.68	73.98	20.30	PK
11000	29.03	10.99	H	40.02	53.98	13.96	AV
16500	41.19	12.68	H	53.87	68.20	14.33	PK

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

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11200	44.93	10.77	V	55.70	73.98	18.28	PK
11200	30.45	10.77	V	41.22	53.98	12.76	AV
16800	41.30	14.18	V	55.48	68.20	12.72	PK
11200	44.85	10.77	H	55.62	73.98	18.36	PK
11200	30.27	10.77	H	41.04	53.98	12.94	AV
16800	41.41	14.18	H	55.59	68.20	12.61	PK

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

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F. [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11440	44.99	11.37	V	56.36	73.98	17.62	PK
11440	30.40	11.37	V	41.77	53.98	12.21	AV
17160	40.68	15.11	V	55.79	68.20	12.41	PK
11440	44.48	11.37	H	55.85	73.98	18.13	PK
11440	30.14	11.37	H	41.51	53.98	12.47	AV
17160	41.21	15.11	H	56.32	68.20	11.88	PK

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

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11490	45.64	11.29	V	56.93	73.98	17.05	PK
11490	30.63	11.29	V	41.92	53.98	12.06	AV
17235	40.84	15.41	V	56.25	68.20	11.95	PK
11490	45.28	11.29	H	56.57	73.98	17.41	PK
11490	30.49	11.29	H	41.78	53.98	12.20	AV
17235	41.51	15.41	H	56.92	68.20	11.28	PK

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

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11570	45.55	10.65	V	56.20	73.98	17.78	PK
11570	30.85	10.65	V	41.50	53.98	12.48	AV
17355	40.37	16.11	V	56.48	68.20	11.72	PK
11570	45.23	10.65	H	55.88	73.98	18.10	PK
11570	30.62	10.65	H	41.27	53.98	12.71	AV
17355	40.85	16.11	H	56.96	68.20	11.24	PK

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

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11650	45.66	10.20	V	55.86	73.98	18.12	PK
11650	31.10	10.20	V	41.30	53.98	12.68	AV
17475	40.30	17.45	V	57.75	68.20	10.45	PK
11650	45.47	10.20	H	55.67	73.98	18.31	PK
11650	30.97	10.20	H	41.17	53.98	12.81	AV
17475	40.70	17.45	H	58.15	68.20	10.05	PK

Note:

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

[Worst case]

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

[DBS Mode]

WLAN/BT Ant : 802.11a ch.165 & Bluetooth Ch. 78 (GFSK)

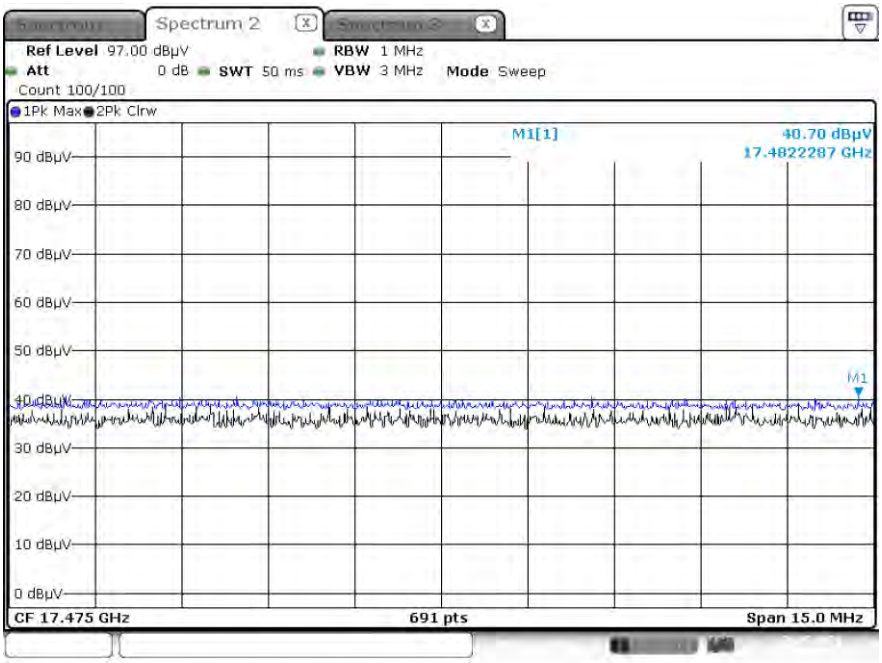
Operation Mode:	802.11a & GFSK
Transfer Rate:	6 Mbps & 339bytes
Operating Frequency	5825 & 2480 MHz
Channel No.	165 Ch & 78 Ch

Frequency [MHz]	Reading [dBuV]	A.F+C.L -A.G+D.F [dB]	Pol. [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
11650	45.94	10.20	V	56.14	73.98	17.84	PK
11650	31.38	10.20	V	41.58	53.98	12.40	AV
17475	40.29	17.45	V	57.74	68.20	10.46	PK
11650	45.67	10.20	H	55.87	73.98	18.11	PK
11650	30.96	10.20	H	41.16	53.98	12.82	AV
17475	40.66	17.45	H	58.11	68.20	10.09	PK

Note : Bluetooth DBS Data refer to BT Test Report.

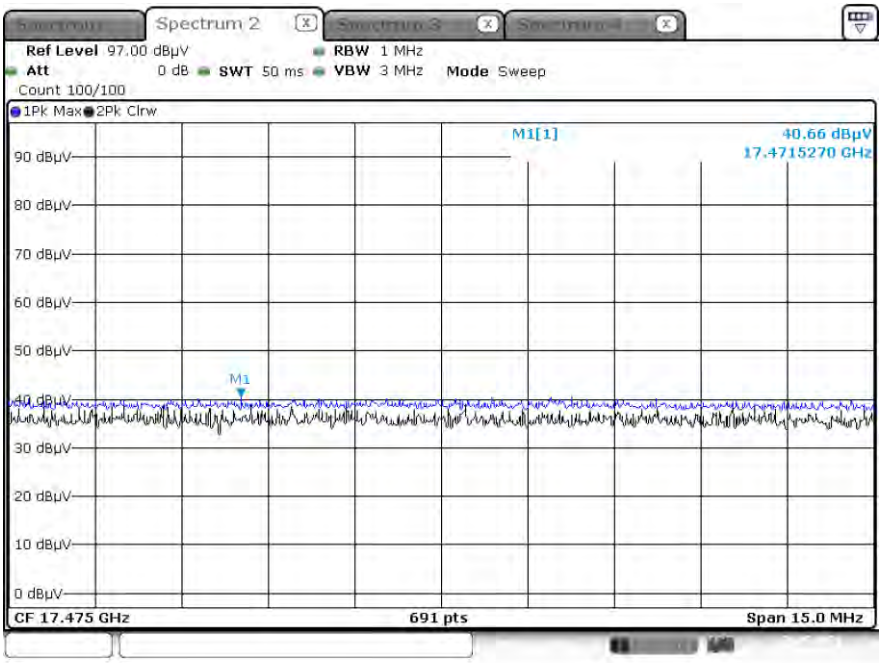
▣ Test Plots

Peak Reading (802.11a, Ch.165 3rd Harmonic, Z-H)



[DBS Mode]

Peak Reading (3rd,802.11a ch.165 & Bluetooth Ch.78 (GFSK), Z-H)



Note:

Only the worst case plots for Radiated Spurious Emissions.

10.9 RADIATED RESTRICTED BAND EDGE

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

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	56.61	7.81	H	64.42	73.98	9.56	PK
5150	38.89	7.81	H	46.70	53.98	7.28	AV
5150	55.91	7.81	V	63.72	73.98	10.26	PK
5150	37.33	7.81	V	45.14	53.98	8.84	AV

Band :	UNII 2A
Operation Mode:	802.11 a
Transfer Rate:	1 Mbps
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	62.33	7.51	H	69.84	73.98	4.14	PK
5350	39.57	7.51	H	47.08	53.98	6.90	AV
5350	60.15	7.51	V	67.66	73.98	6.32	PK
5350	38.86	7.51	V	46.37	53.98	7.61	AV

Band :	UNII 2C
Operation Mode:	802.11 a
Transfer Rate:	1 Mbps
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	49.45	8.15	H	57.60	73.98	16.38	PK
5460	33.67	8.15	H	41.82	53.98	12.16	AV
5470	54.01	8.21	H	62.22	68.20	5.98	PK
5460	48.77	8.15	V	56.92	73.98	17.06	PK
5460	32.68	8.15	V	40.83	53.98	13.15	AV
5470	53.29	8.21	V	61.50	68.20	6.70	PK

Band :	UNII 2C
Operation Mode:	802.11 a
Transfer Rate:	1 Mbps
Operating Frequency	5520 MHz
Channel No.	104 Ch

Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	50.89	8.15	H	59.04	73.98	14.94	PK
5460	34.25	8.15	H	42.40	53.98	11.58	AV
5470	55.24	8.21	H	63.45	68.20	4.75	PK
5460	49.41	8.15	V	57.56	73.98	16.42	PK
5460	33.13	8.15	V	41.28	53.98	12.70	AV
5470	54.59	8.21	V	62.80	68.20	5.40	PK

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

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	51.56	7.81	H	59.37	73.98	14.61	PK
5150	36.48	7.81	H	44.29	53.98	9.69	AV
5150	50.72	7.81	V	58.53	73.98	15.45	PK
5150	35.31	7.81	V	43.12	53.98	10.86	AV

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

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	57.96	7.51	H	65.47	73.98	8.51	PK
5350	37.81	7.51	H	45.32	53.98	8.66	AV
5350	57.67	7.51	V	65.18	73.98	8.80	PK
5350	36.74	7.51	V	44.25	53.98	9.73	AV

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

Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	49.59	8.15	H	57.74	73.98	16.24	PK
5460	33.88	8.15	H	42.03	53.98	11.95	AV
5470	56.69	8.21	H	64.90	68.20	3.30	PK
5460	48.50	8.15	V	56.65	73.98	17.33	PK
5460	32.79	8.15	V	40.94	53.98	13.04	AV
5470	55.78	8.21	V	63.99	68.20	4.21	PK

Band :	UNII 2C
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5520 MHz
Channel No.	104 Ch

Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	48.80	8.15	H	56.95	73.98	17.03	PK
5460	33.88	8.15	H	42.03	53.98	11.95	AV
5470	53.83	8.21	H	62.04	68.20	6.16	PK
5460	48.16	8.15	V	56.31	73.98	17.67	PK
5460	33.34	8.15	V	41.49	53.98	12.49	AV
5470	52.52	8.21	V	60.73	68.20	7.47	PK

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

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	48.01	7.81	H	55.82	73.98	18.16	PK
5150	34.42	7.81	H	42.23	53.98	11.75	AV
5150	47.74	7.81	V	55.55	73.98	18.43	PK
5150	33.26	7.81	V	41.07	53.98	12.91	AV

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

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	54.85	7.51	H	62.36	73.98	11.62	PK
5350	37.19	7.51	H	44.70	53.98	9.28	AV
5350	53.53	7.51	V	61.04	73.98	12.94	PK
5350	36.92	7.51	V	44.43	53.98	9.55	AV

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

Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	51.87	8.15	H	60.02	73.98	13.96	PK
5460	33.69	8.15	H	41.84	53.98	12.14	AV
5470	56.19	8.21	H	64.40	68.20	3.80	PK
5460	49.51	8.15	V	57.66	73.98	16.32	PK
5460	32.58	8.15	V	40.73	53.98	13.25	AV
5470	54.46	8.21	V	62.67	68.20	5.53	PK

Band :	UNII 2C
Operation Mode:	802.11 ac_VHT20
Transfer MCS Index:	0
Operating Frequency	5520 MHz
Channel No.	104 Ch

Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	49.86	8.15	H	58.01	73.98	15.97	PK
5460	33.83	8.15	H	41.98	53.98	12.00	AV
5470	50.89	8.21	H	59.10	68.20	9.10	PK
5460	48.73	8.15	V	56.88	73.98	17.10	PK
5460	33.72	8.15	V	41.87	53.98	12.11	AV
5470	50.35	8.21	V	58.56	68.20	9.64	PK

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

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	61.87	7.81	H	69.68	73.98	4.30	PK
5150	43.02	7.81	H	50.83	53.98	3.15	AV
5150	60.55	7.81	V	68.36	73.98	5.62	PK
5150	42.89	7.81	V	50.70	53.98	3.28	AV

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

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	62.54	7.51	H	70.05	73.98	3.93	PK
5350	42.25	7.51	H	49.76	53.98	4.22	AV
5350	61.68	7.51	V	69.19	73.98	4.79	PK
5350	41.94	7.51	V	49.45	53.98	4.53	AV

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

Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	50.29	8.15	H	58.44	73.98	15.54	PK
5460	34.58	8.15	H	42.73	53.98	11.25	AV
5470	56.10	8.21	H	64.31	68.20	3.89	PK
5460	50.11	8.15	V	58.26	73.98	15.72	PK
5460	34.24	8.15	V	42.39	53.98	11.59	AV
5470	55.46	8.21	V	63.67	68.20	4.53	PK

Band :	UNII 2C
Operation Mode:	802.11 n_HT40
Transfer MCS Index:	0
Operating Frequency	5550 MHz
Channel No.	110 Ch

Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	50.01	8.15	H	58.16	73.98	15.82	PK
5460	33.92	8.15	H	42.07	53.98	11.91	AV
5470	51.35	8.21	H	59.56	68.20	8.64	PK
5460	49.56	8.15	V	57.71	73.98	16.27	PK
5460	32.76	8.15	V	40.91	53.98	13.07	AV
5470	50.63	8.21	V	58.84	68.20	9.36	PK

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

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	60.20	7.81	H	68.01	73.98	5.97	PK
5150	43.33	7.81	H	51.14	53.98	2.84	AV
5150	58.55	7.81	V	66.36	73.98	7.62	PK
5150	42.58	7.81	V	50.39	53.98	3.59	AV

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

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	63.42	7.51	H	70.93	73.98	3.05	PK
5350	42.06	7.51	H	49.57	53.98	4.41	AV
5350	61.72	7.51	V	69.23	73.98	4.75	PK
5350	40.72	7.51	V	48.23	53.98	5.75	AV

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

Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	46.02	8.15	H	54.17	73.98	19.81	PK
5460	34.56	8.15	H	42.71	53.98	11.27	AV
5470	54.72	8.21	H	62.93	68.20	5.27	PK
5460	45.39	8.15	V	53.54	73.98	20.44	PK
5460	33.28	8.15	V	41.43	53.98	12.55	AV
5470	53.82	8.21	V	62.03	68.20	6.17	PK

Band :	UNII 2C
Operation Mode:	802.11 ac_VHT40
Transfer MCS Index:	0
Operating Frequency	5550 MHz
Channel No.	110 Ch

Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	47.25	8.15	H	55.40	73.98	18.58	PK
5460	33.04	8.15	H	41.19	53.98	12.79	AV
5470	48.79	8.21	H	57.00	68.20	11.20	PK
5460	46.66	8.15	V	54.81	73.98	19.17	PK
5460	32.98	8.15	V	41.13	53.98	12.85	AV
5470	47.99	8.21	V	56.20	68.20	12.00	PK

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

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	57.81	7.81	H	65.62	73.98	8.36	PK
5150	43.24	7.81	H	51.05	53.98	2.93	AV
5150	56.36	7.81	V	64.17	73.98	9.81	PK
5150	42.61	7.81	V	50.42	53.98	3.56	AV

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

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	61.73	7.51	H	69.24	73.98	4.74	PK
5350	42.47	7.51	H	49.98	53.98	4.00	AV
5350	60.27	7.51	V	67.78	73.98	6.20	PK
5350	41.43	7.51	V	48.94	53.98	5.04	AV

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

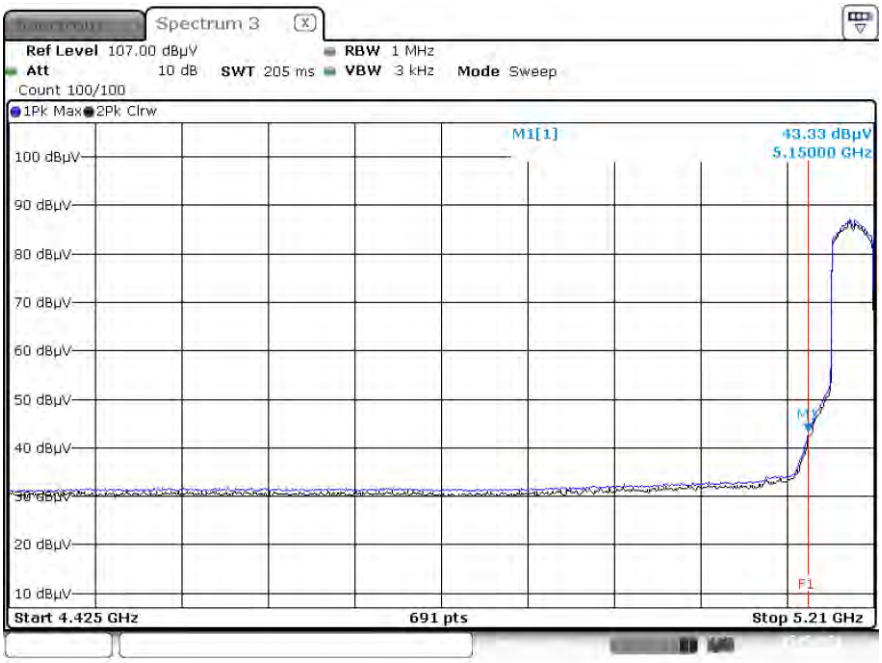
Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	51.48	8.15	H	59.63	73.98	14.35	PK
5460	37.92	8.15	H	46.07	53.98	7.91	AV
5470	54.09	8.21	H	62.30	68.20	5.90	PK
5460	50.43	8.15	V	58.58	73.98	15.40	PK
5460	37.11	8.15	V	45.26	53.98	8.72	AV
5470	53.22	8.21	V	61.43	68.20	6.77	PK

Band :	UNII 2C
Operation Mode:	802.11 ac_VHT80
Transfer MCS Index:	0
Operating Frequency	5610 MHz
Channel No.	122 Ch

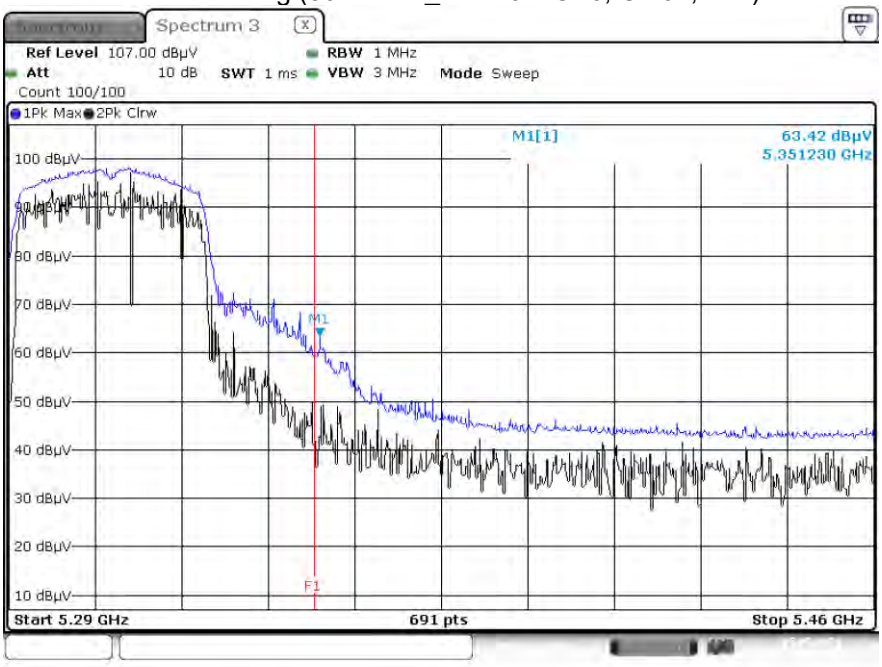
Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	47.37	8.15	H	55.52	73.98	18.46	PK
5460	32.99	8.15	H	41.14	53.98	12.84	AV
5470	48.33	8.21	H	56.54	68.20	11.66	PK
5460	46.70	8.15	V	54.85	73.98	19.13	PK
5460	31.77	8.15	V	39.92	53.98	14.06	AV
5470	47.82	8.21	V	56.03	68.20	12.17	PK

▣ Test Plots(UNII 1, 2A, 2C)

Average Reading (802.11 ac_VHT40 MCS0, Ch.38, X-H)



Peak Reading (802.11 ac_VHT40 MCS0, Ch.62, X-H)

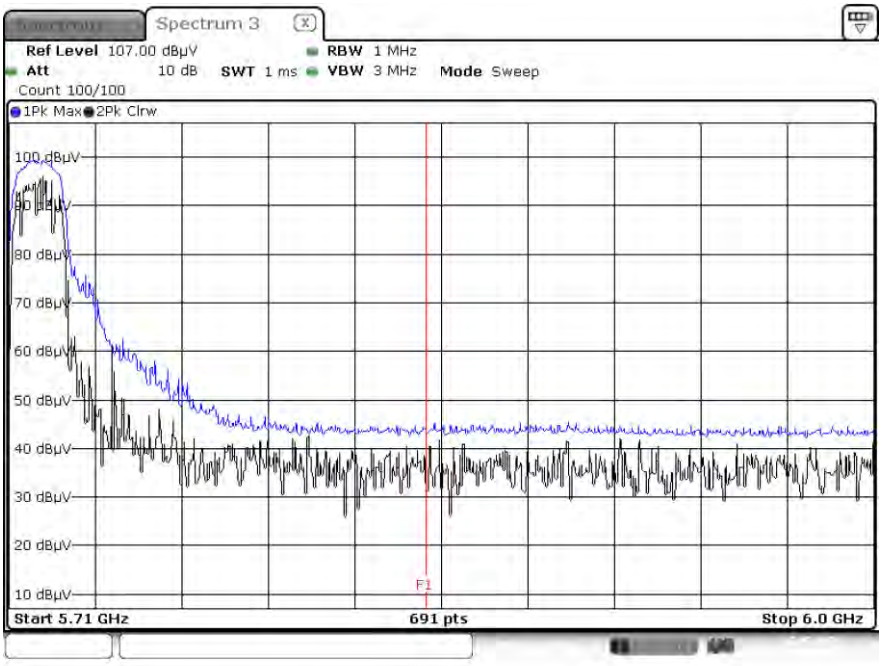


Note:

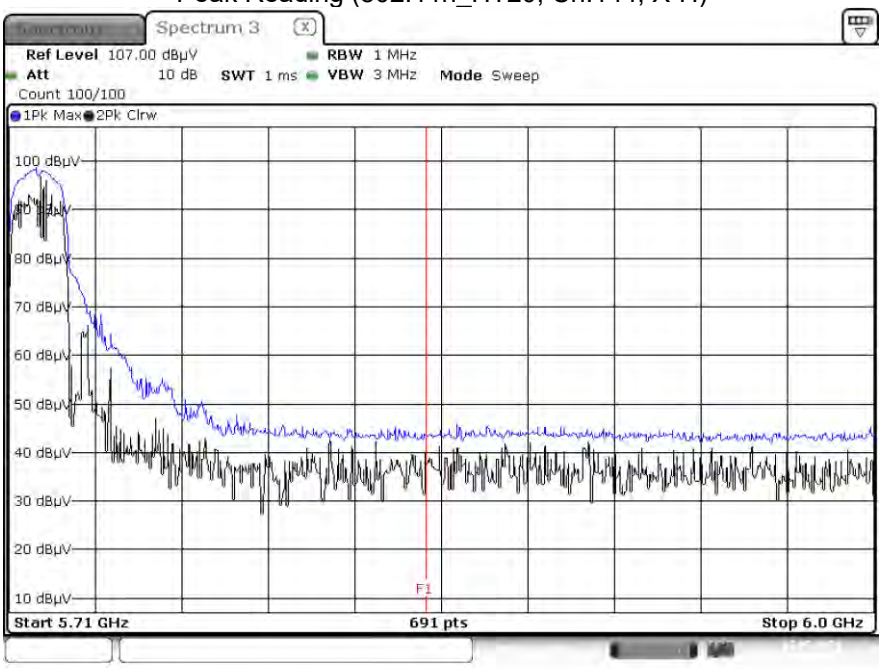
Only the worst case plots for Radiated Restricted Band Edge.

▣ Test Plots(Straddle Channel)

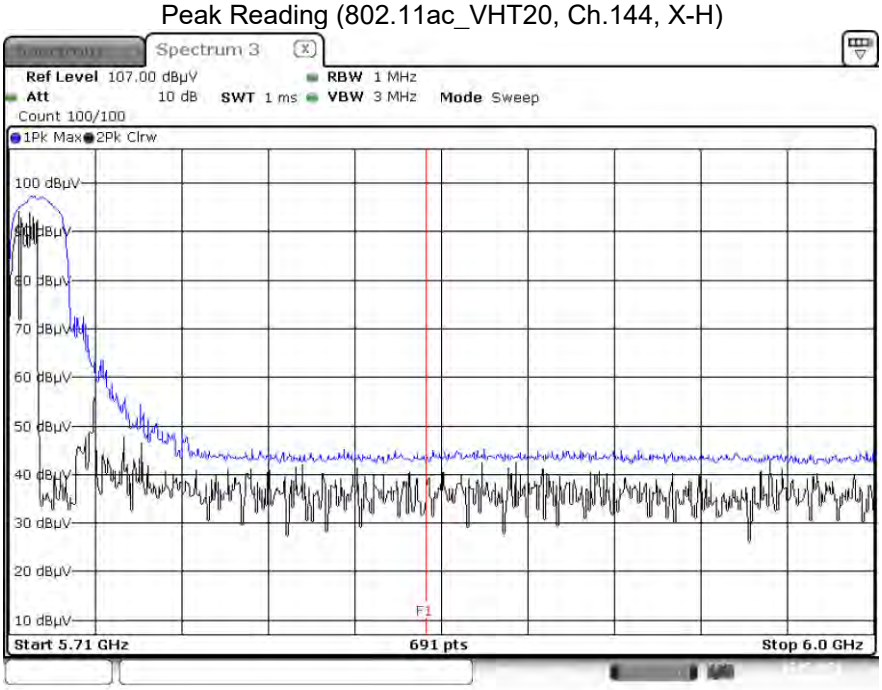
Peak Reading (802.11a, Ch.144, X-H)



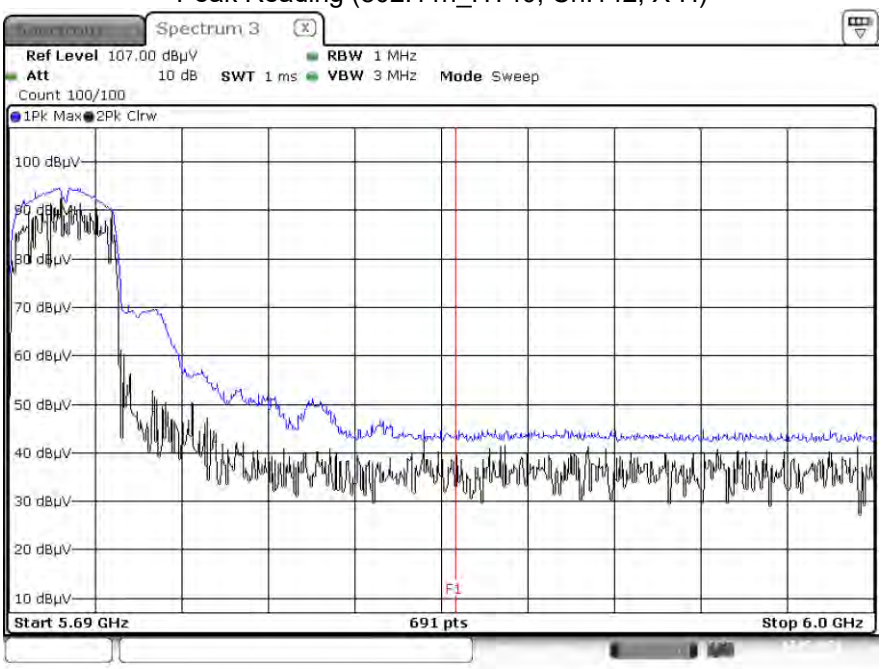
Peak Reading (802.11n_HT20, Ch.144, X-H)



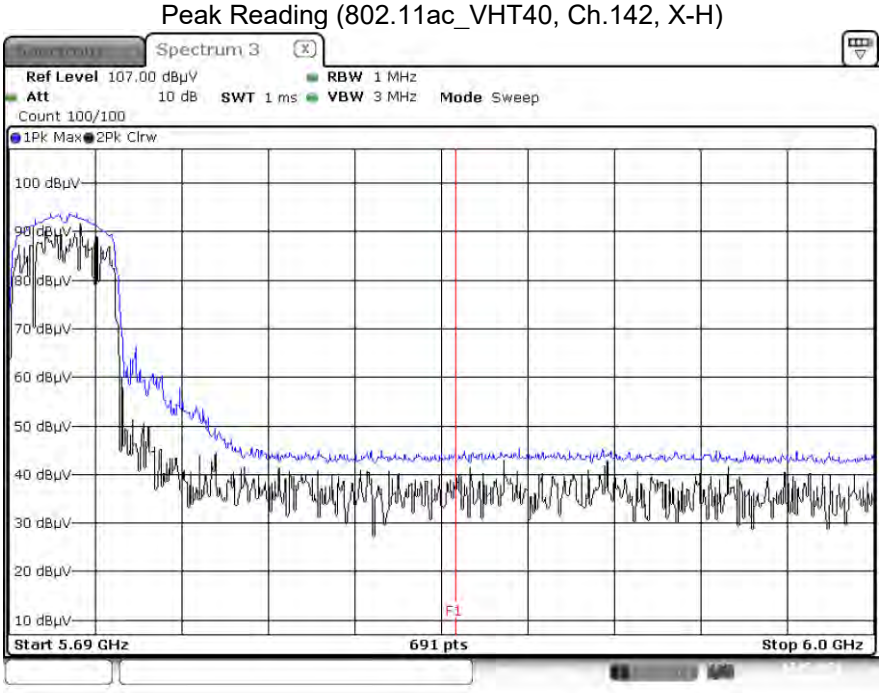
Peak Reading (802.11ac_VHT20, Ch.144, X-H)



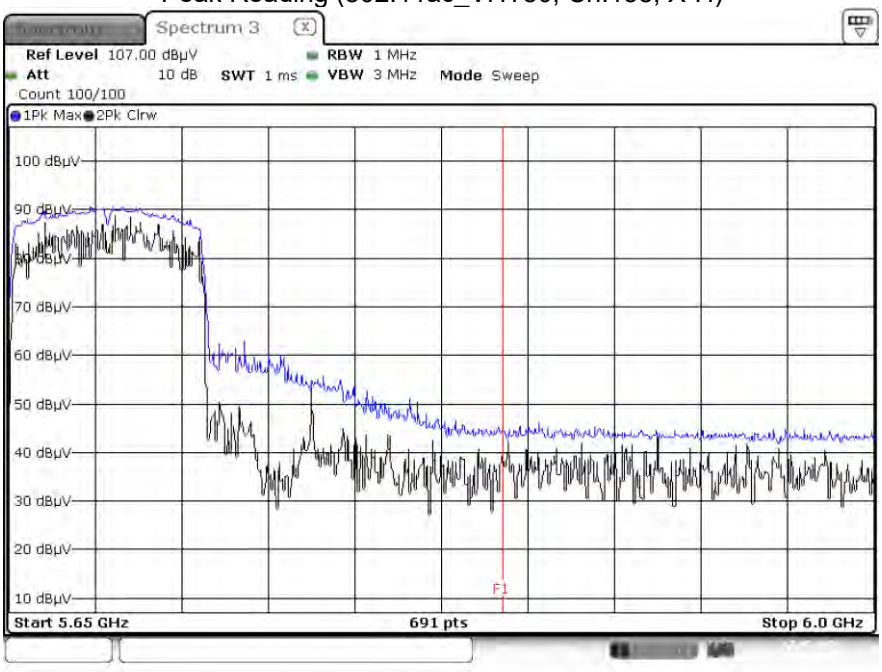
Peak Reading (802.11n_HT40, Ch.142, X-H)



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



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

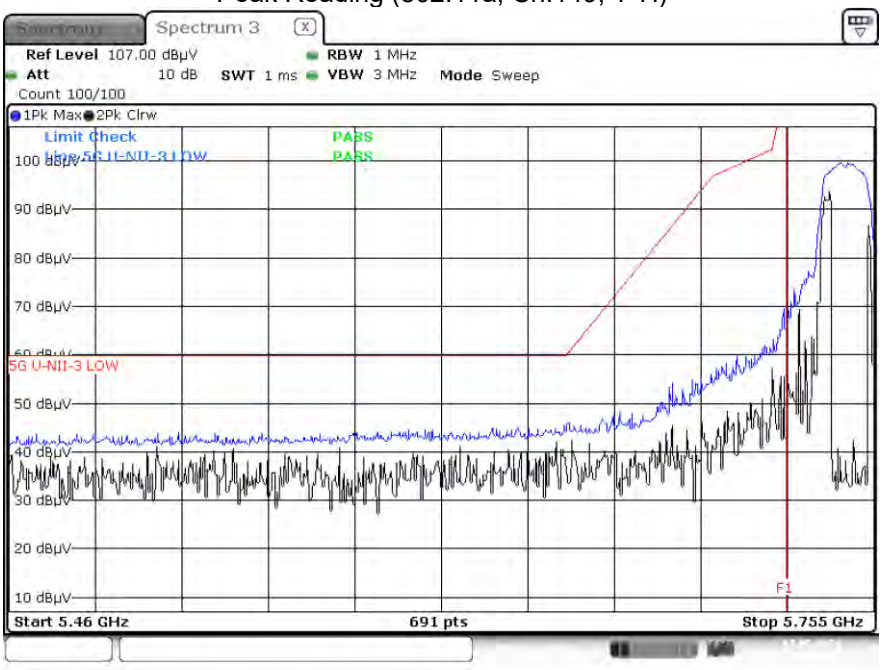


Note :

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)

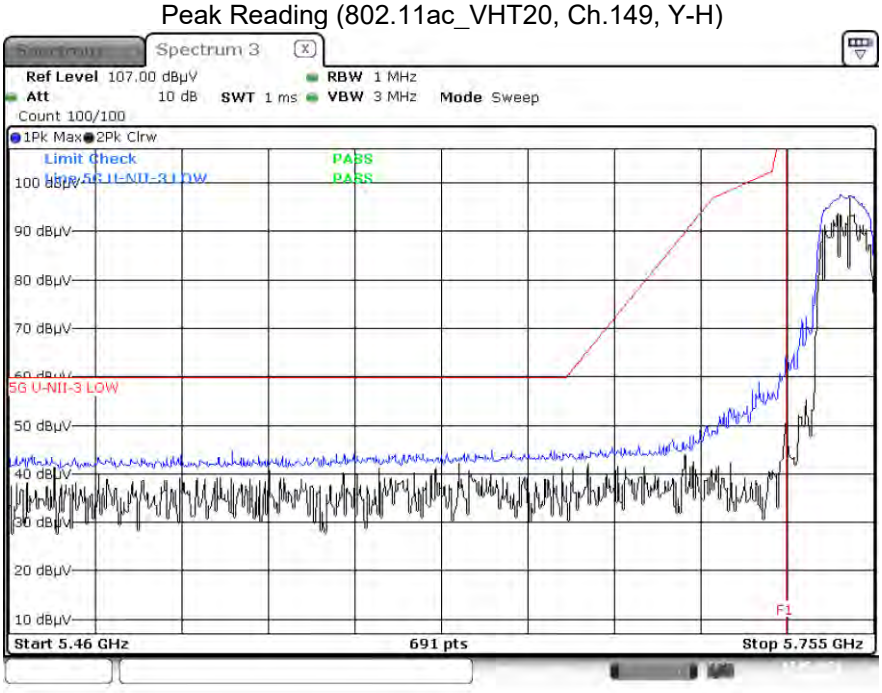
▣ Test Plots(UNII 3)

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

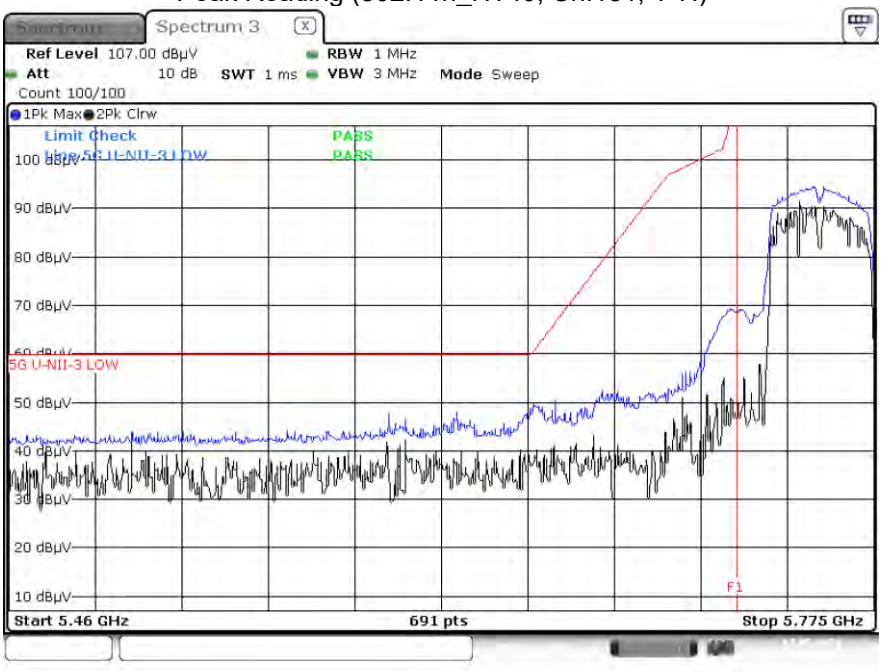


Peak Reading (802.11n_HT20, Ch.149, Y-H)

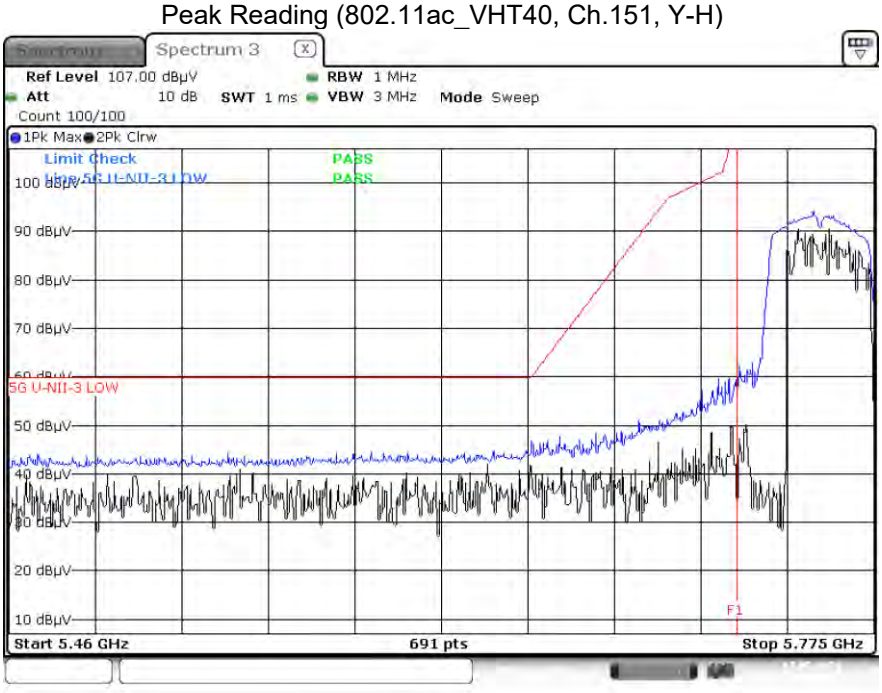
Peak Reading (802.11ac_VHT20, Ch.149, Y-H)



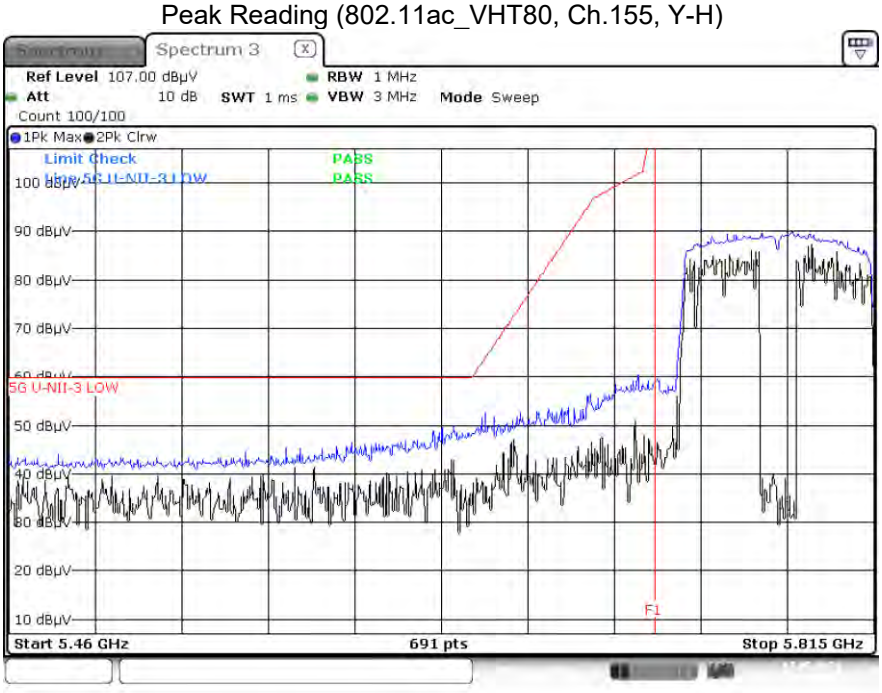
Peak Reading (802.11n_HT40, Ch.151, Y-H)



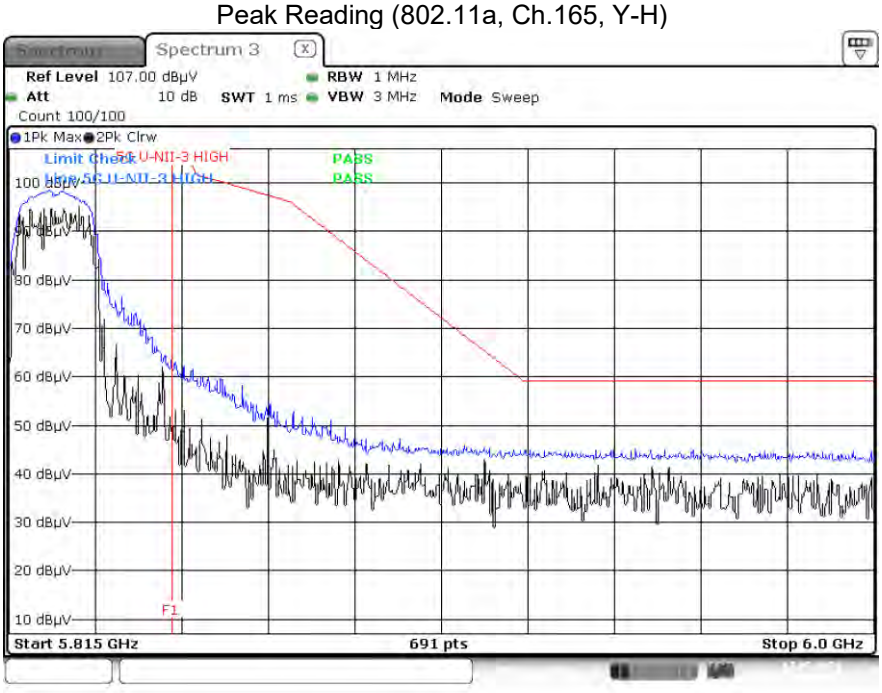
Peak Reading (802.11ac_VHT40, Ch.151, Y-H)



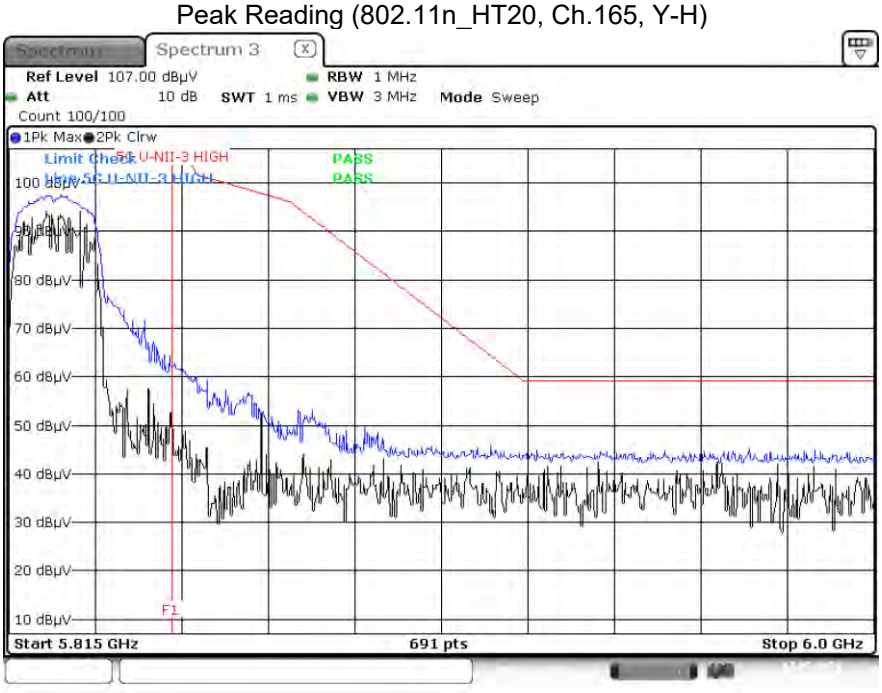
Peak Reading (802.11ac_VHT80, Ch.155, Y-H)



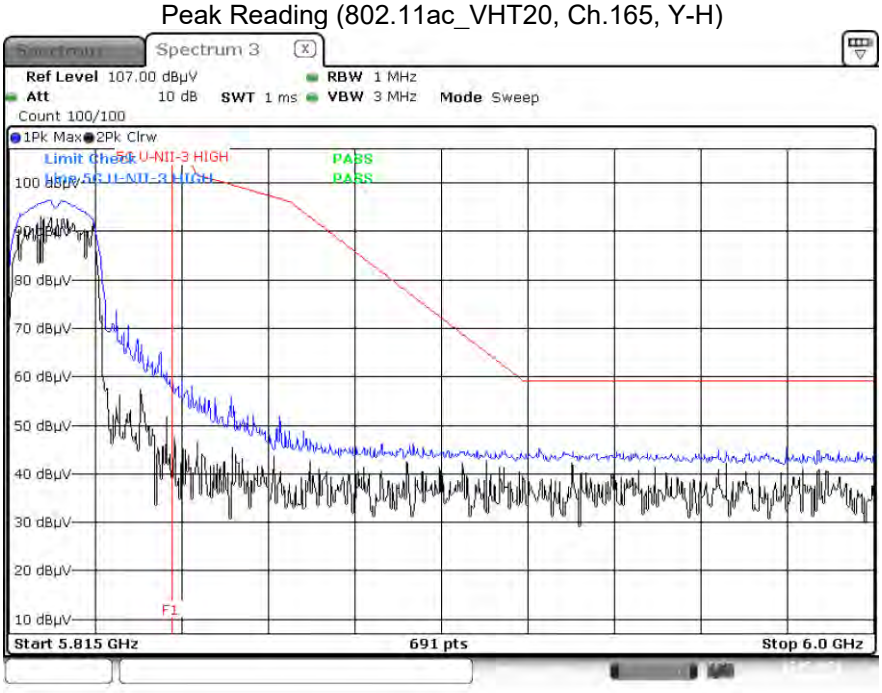
Peak Reading (802.11a, Ch.165, Y-H)



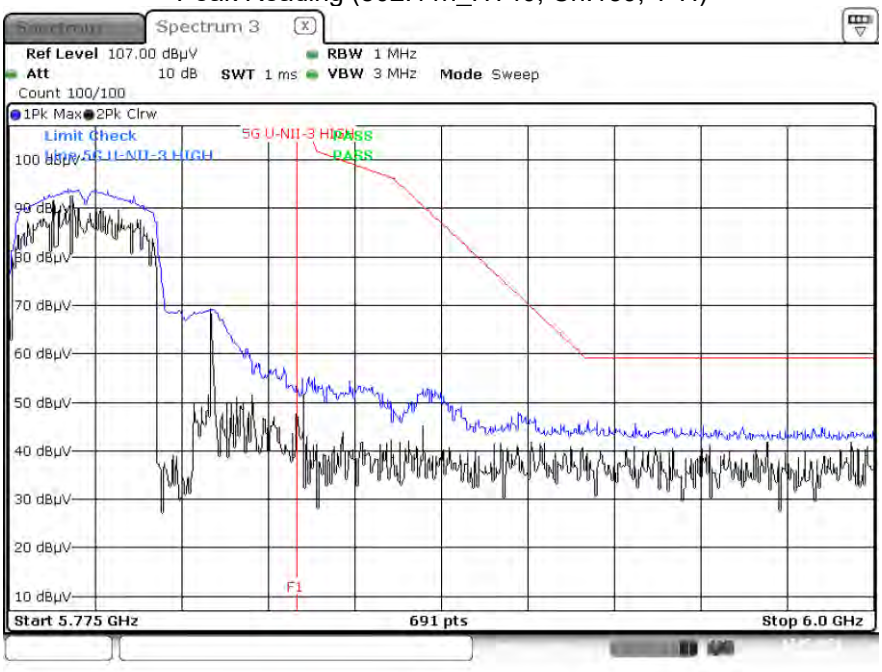
Peak Reading (802.11n_HT20, Ch.165, Y-H)



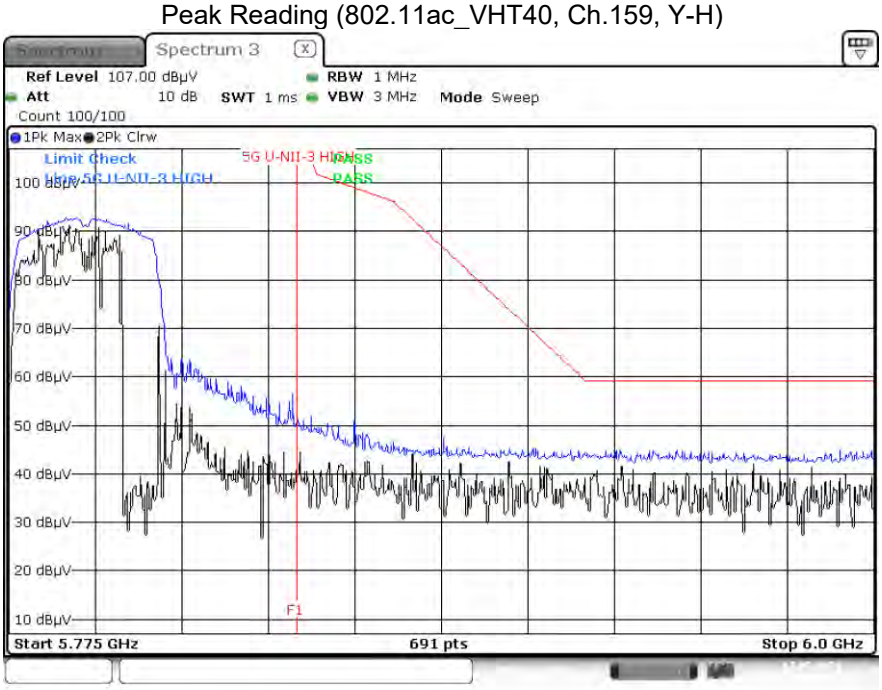
Peak Reading (802.11ac_VHT20, Ch.165, Y-H)



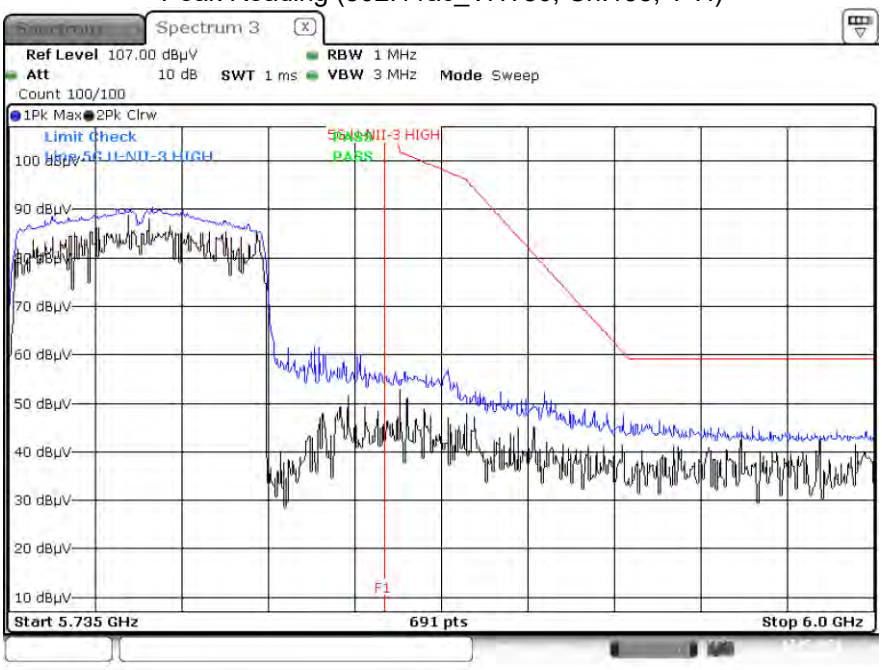
Peak Reading (802.11n_HT40, Ch.159, Y-H)



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



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



10.10 POWERLINE CONDUCTED EMISSIONS

Conducted Emissions (Line 1)

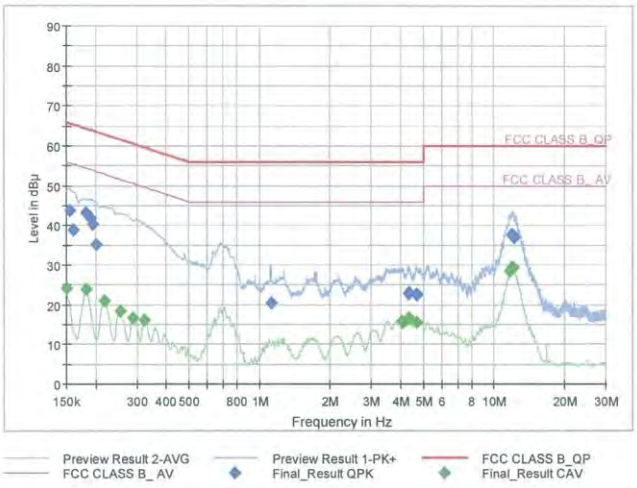
WLAN 5G MODE_L1 1 / 2

Test Report

Common Information

EUT :	SM-M325FV/DS
Manufacturer :	SAMSUNG
Test Site:	SHIELD ROOM
Operating Conditions :	WLAN 5G MODE_L1

Full Spectrum



Final_Result_QPK

Frequency (MHz)	QuasiPeak	Limit (dBuV	Margin	Bandwidth	Line	Filter	Corr. (dB)
0.1545	43.92	65.75	21.84	9.000	L1	OFF	9.6
0.1613	39.06	65.40	26.34	9.000	L1	OFF	9.6
0.1815	43.37	64.42	21.05	9.000	L1	OFF	9.6
0.1905	41.91	64.02	22.11	9.000	L1	OFF	9.6
0.1950	40.29	63.82	23.54	9.000	L1	OFF	9.6
0.2018	35.21	63.54	28.32	9.000	L1	OFF	9.6
1.1188	20.52	56.00	35.48	9.000	L1	OFF	9.6
4.3363	22.75	56.00	33.25	9.000	L1	OFF	9.7
4.3520	22.98	56.00	33.02	9.000	L1	OFF	9.7
4.6715	22.43	56.00	33.57	9.000	L1	OFF	9.7
4.6828	22.51	56.00	33.49	9.000	L1	OFF	9.7
4.7098	22.69	56.00	33.31	9.000	L1	OFF	9.7
11.9278	37.37	60.00	22.63	9.000	L1	OFF	9.9
11.9570	37.70	60.00	22.30	9.000	L1	OFF	9.9
11.9660	37.81	60.00	22.19	9.000	L1	OFF	9.9
11.9930	37.77	60.00	22.23	9.000	L1	OFF	9.9
12.0785	37.44	60.00	22.56	9.000	L1	OFF	9.9
12.1573	37.01	60.00	22.99	9.000	L1	OFF	9.9

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WLAN 5G MODE_L1 2 / 2

Final_Result_CAV

Frequency (MHz)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1500	24.18	56.00	31.82	9.000	L1	OFF	9.6
0.1815	23.93	54.42	30.49	9.000	L1	OFF	9.6
0.2175	21.06	52.91	31.85	9.000	L1	OFF	9.6
0.2535	18.58	51.64	33.06	9.000	L1	OFF	9.6
0.2895	16.69	50.54	33.85	9.000	L1	OFF	9.6
0.3210	16.05	49.68	33.63	9.000	L1	OFF	9.6
4.0483	15.81	46.00	30.19	9.000	L1	OFF	9.7
4.0708	15.76	46.00	30.24	9.000	L1	OFF	9.7
4.0820	15.50	46.00	30.50	9.000	L1	OFF	9.7
4.3453	16.71	46.00	29.29	9.000	L1	OFF	9.7
4.6715	15.69	46.00	30.31	9.000	L1	OFF	9.7
4.7098	15.53	46.00	30.47	9.000	L1	OFF	9.7
11.7230	28.66	50.00	21.34	9.000	L1	OFF	9.9
11.9233	29.20	50.00	20.80	9.000	L1	OFF	9.9
11.9278	29.25	50.00	20.75	9.000	L1	OFF	9.9
11.9413	29.24	50.00	20.76	9.000	L1	OFF	9.9
11.9593	29.33	50.00	20.67	9.000	L1	OFF	9.9
11.9953	29.33	50.00	20.67	9.000	L1	OFF	9.9

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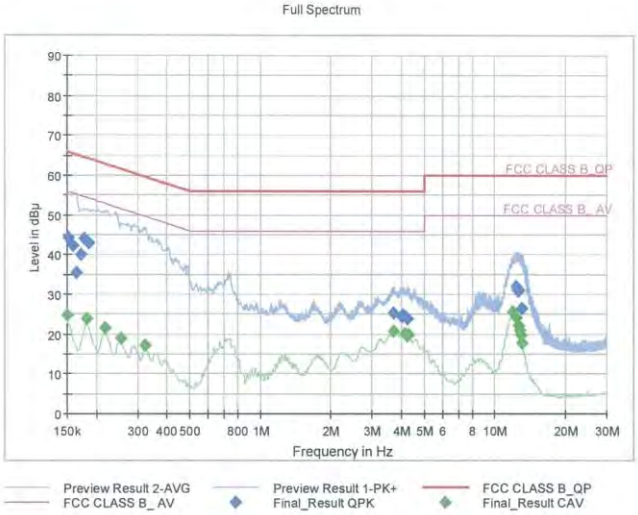
Conducted Emissions (Line 2)

WLAN 5G MODE_N 1 / 2

Test Report

Common Information

EUT :	SM-M325FV/DS
Manufacturer :	SAMSUNG
Test Site:	SHIELD ROOM
Operating Conditions :	WLAN 5G MODE_N



Final_Result_QPK

Frequency (MHz)	QuasiPeak	Limit (dBuV	Margin	Bandwidth	Line	Filter	Corr. (dB)
0.1523	44.54	65.88	21.34	9.000	N	OFF	9.6
0.1590	42.40	65.52	23.12	9.000	N	OFF	9.6
0.1635	35.58	65.28	29.70	9.000	N	OFF	9.6
0.1725	40.23	64.84	24.61	9.000	N	OFF	9.6
0.1770	44.07	64.63	20.55	9.000	N	OFF	9.6
0.1860	43.07	64.21	21.15	9.000	N	OFF	9.6
3.7085	25.26	56.00	30.74	9.000	N	OFF	9.7
4.0168	24.47	56.00	31.53	9.000	N	OFF	9.7
4.0235	24.48	56.00	31.52	9.000	N	OFF	9.7
4.0640	24.90	56.00	31.10	9.000	N	OFF	9.7
4.1518	24.61	56.00	31.39	9.000	N	OFF	9.7
4.2598	23.86	56.00	32.14	9.000	N	OFF	9.7
12.3868	32.12	60.00	27.88	9.000	N	OFF	9.8
12.5150	31.12	60.00	28.88	9.000	N	OFF	9.8
12.5465	31.22	60.00	28.78	9.000	N	OFF	9.8
12.5645	30.86	60.00	29.14	9.000	N	OFF	9.8
12.6388	30.74	60.00	29.26	9.000	N	OFF	9.8
13.0910	26.61	60.00	33.39	9.000	N	OFF	9.8

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WLAN 5G MODE_N 2 / 2

Final_Result_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1500	24.72	56.00	31.28	9.000	N	OFF	9.6
0.1815	24.06	54.42	30.36	9.000	N	OFF	9.6
0.2175	21.77	52.91	31.14	9.000	N	OFF	9.6
0.2535	19.04	51.64	32.60	9.000	N	OFF	9.6
0.3210	17.41	49.68	32.27	9.000	N	OFF	9.6
3.7085	20.66	46.00	25.34	9.000	N	OFF	9.7
4.1248	20.27	46.00	25.73	9.000	N	OFF	9.7
4.1495	20.13	46.00	25.87	9.000	N	OFF	9.7
4.1540	20.18	46.00	25.82	9.000	N	OFF	9.7
4.2395	19.48	46.00	26.52	9.000	N	OFF	9.7
4.3025	19.80	46.00	26.20	9.000	N	OFF	9.7
11.9210	25.65	50.00	24.35	9.000	N	OFF	9.8
12.3373	24.21	50.00	25.79	9.000	N	OFF	9.8
12.5645	22.28	50.00	27.72	9.000	N	OFF	9.8
12.7333	21.04	50.00	28.96	9.000	N	OFF	9.8
12.7423	20.95	50.00	29.05	9.000	N	OFF	9.8
12.8705	19.76	50.00	30.24	9.000	N	OFF	9.8
13.0370	17.85	50.00	32.15	9.000	N	OFF	9.8

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11. LIST OF TEST EQUIPMENT

Conducted Test

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Rohde & Schwarz	ENV216 / LISN	09/04/2020	Annual	102245
Rohde & Schwarz	ESR / EMI Test Receiver	09/16/2020	Annual	101910
ESPEC	SU-642 /Temperature Chamber	07/30/2020	Annual	0093000718
Agilent	N9020A / Signal Analyzer	05/03/2021	Annual	MY51110085
Agilent	N9030A / Signal Analyzer	03/09/2021	Annual	MY49432108
Agilent	N1911A / Power Meter	04/08/2021	Annual	MY45100523
Agilent	N1921A / Power Sensor	04/08/2021	Annual	MY57820067
Agilent	87300B / Directional Coupler	11/10/2020	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	02/09/2021	Annual	10545
HP	E3632A / DC Power Supply	09/16/2020	Annual	MY40004427
HP	8493C / Attenuator(10 dB)(DC-26.5 GHz)	06/26/2020	Annual	07560
HP	8493C / Attenuator(10 dB)(DC-26.5 GHz)	07/03/2020	Annual	08285
Rohde & Schwarz	18N-20dB / Attenuator(20 dB)	03/08/2021	Annual	8
Rohde & Schwarz	EMC32 / Software	N/A	N/A	N/A
HCT CO., LTD.	FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	N/A	N/A
Rohde & Schwarz	CBT / Bluetooth Tester	02/23/2021	Annual	100808

Note:

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

Radiated Test

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
Innco system	MA4640/800-XP-EP / Antenna Position Tower	N/A	N/A	N/A
Audix	EM1000 / Controller	N/A	N/A	060520
Audix	Turn Table	N/A	N/A	N/A
TNM system	FBSM-01B / Amp & Filter Bank Switch Controller	N/A	N/A	N/A
Schwarzbeck	Loop Antenna	03/19/2020	Biennial	1513-333
Schwarzbeck	VULB 9168 / Hybrid Antenna	08/02/2019	Biennial	01039
Schwarzbeck	BBHA 9120D / Horn Antenna	08/01/2019	Biennial	912D-1151
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	02/11/2020	Biennial	BBHA9170124
Rohde & Schwarz	FSV(10 Hz ~ 40 GHz) / Spectrum Analyzer	05/14/2021	Annual	101055
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	01/06/2021	Annual	2
Wainwright Instruments	WRCJV12-4900-5100-5900-6100-50SS	06/24/2021	Annual	5
Wainwright Instruments	WRCJV12-4900-5100-5900-6100-50SS	06/24/2021	Annual	6
CERNEX	CBL18265035 / Power Amplifier	12/04/2020	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	03/23/2021	Annual	25956
TESCOM	TC-3000C / Bluetooth Tester	04/19/2021	Annual	3000C000175
TNM system	FBSM-05B / HPF(3~18GHz) + LNA1(1~18GHz)	01/20/2021	Annual	F6
TNM system	FBSM-05B / ATT(10dB) + LNA1(1~18GHz)	01/20/2021	Annual	None
TNM system	FBSM-05B / ATT(3dB) + LNA1(1~18GHz)	01/20/2021	Annual	None
TNM system	FBSM-05B / LNA1(1~18GHz)	01/20/2021	Annual	25540
TNM system	FBSM-05B / HPF(7~18GHz) + LNA2(6~18GHz)	01/20/2021	Annual	28550
TNM system	FBSM-05B / Thru(30MHz ~ 18GHz)	01/20/2021	Annual	None

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-2105-FC063-P