

# FCC UNII REPORT

## Certification

<b>Applicant Name:</b> SAMSUNG Electronics Co., Ltd.	<b>Date of Issue:</b> December 11, 2020
<b>Address:</b> 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea	<b>Test Site/Location:</b> 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
	<b>Report No.:</b> HCT-RF-2012-FC009

<b>FCC ID:</b>	<b>A3LSMA326B</b>
<b>APPLICANT:</b>	<b>SAMSUNG Electronics Co., Ltd.</b>

<b>Model:</b>	SM-A326B/DS
<b>Additional Model:</b>	SM-A326B
<b>EUT Type:</b>	Mobile Phone
<b>Modulation type</b>	OFDM
<b>FCC Classification:</b>	Unlicensed National Information Infrastructure(NII)
<b>FCC Rule Part(s):</b>	Part 15.407

Engineering Statement:

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

Report No.: HCT-RF-2012-FC009

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REVIEWED BY



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Report prepared by : Jeong Ho Kim  
Engineer of Telecommunication Testing Center

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Report approved by : Kwon Jeong  
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)

\* The report shall not be reproduced except in full(only partly) without approval of the laboratory.

## Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2012-FC009	December 11, 2020	- First Approval Report

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## 1. GENERAL INFORMATION

### EUT DESCRIPTION

<b>Model</b>	SM-A326B/DS	
<b>Additional Model</b>	SM-A326B	
<b>EUT Type</b>	Mobile Phone	
<b>Power Supply</b>	DC 3.86 V	
<b>Modulation Type</b>	OFDM : 802.11a, 802.11n, 802.11ac	
<b>Frequency Range (MHz)</b>	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
<b>Antenna Specification</b>	Antenna type: LDS Peak Gain: UNII 1: -3.79 dBi, UNII 2A: -3.28 dBi, UNII 2C: -3.21 dBi UNII 3: -5.09 dBi	
<b>Straddle channel</b>	Supported	
<b>TDWR Band</b>	Supported	
<b>Dynamic Frequency Selection</b>	Slave without radar detection	
<b>Date(s) of Tests</b>	November 04, 2020 ~ December 08, 2020	

**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	16.61	0.046
	802.11n (HT20)	15.48	0.035
	802.11n (HT40)	14.53	0.028
	802.11ac (VHT20)	15.49	0.035
	802.11ac (VHT40)	15.49	0.035
	802.11ac (VHT80)	13.31	0.021
UNII2A	802.11a	16.62	0.046
	802.11n (HT20)	15.48	0.035
	802.11n (HT40)	14.51	0.028
	802.11ac (VHT20)	15.51	0.036
	802.11ac (VHT40)	15.40	0.035
	802.11ac (VHT80)	12.27	0.017
UNII2C	802.11a	16.42	0.044
	802.11n (HT20)	15.44	0.035
	802.11n (HT40)	14.44	0.028
	802.11ac (VHT20)	15.43	0.035
	802.11ac (VHT40)	15.34	0.034
	802.11ac (VHT80)	12.92	0.020
UNII3	802.11a	16.64	0.046
	802.11n (HT20)	15.50	0.036
	802.11n (HT40)	14.64	0.029
	802.11ac (VHT20)	15.64	0.037
	802.11ac (VHT40)	15.60	0.036
	802.11ac (VHT80)	13.00	0.020

### 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.

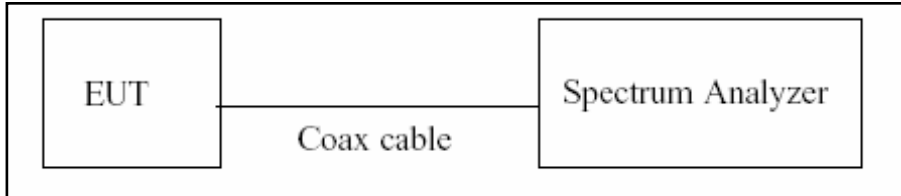
The measurement data shown herein meets or exceeds the  $U_{\text{CISPR}}$  measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

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.

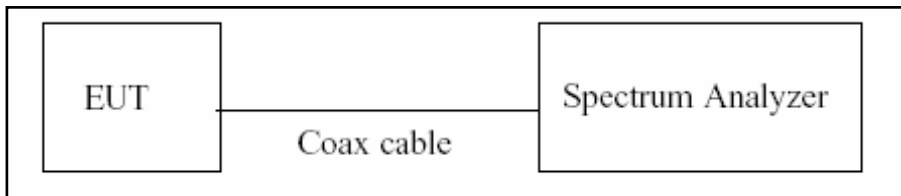
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz ( $\geq$  RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure  $T_{total}$  and  $T_{on}$
8. Calculate Duty Cycle =  $T_{on} / T_{total}$  and Duty Cycle Factor =  $10\log(1/\text{Duty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

## 8.2. 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  $\geq 3 \times$  RBW
3. Detector = Peak
4. Trace mode = max hold
5. Allow the trace to stabilize
6. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points(upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### Note:

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

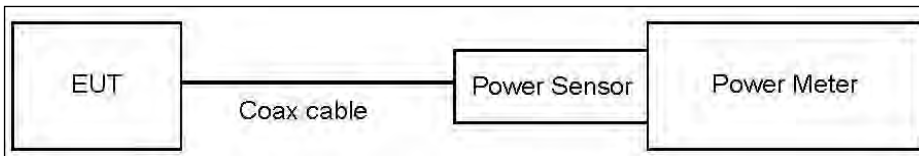
**8.3. Output Power Measurement**

**Limit**

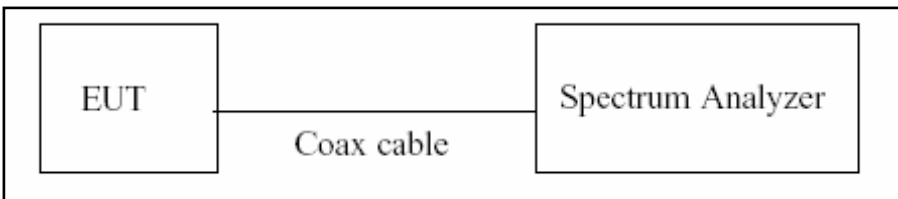
Band	Limit
UNII 1	- Master : Not exceed 1 W(=30dBm) - Slave : Not exceed 250 mW(=23.98 dBm)
UNII 2A, 2C	Not exceed the lesser of 250 mW or 11 dBm + 10 log B, (where B is the 26 dB emission bandwidth in megahertz.)
UNII 3	Not exceed 1 W(=30dBm)

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

**Sample Calculation**

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

**Note**

1. Spectrum reading values are not plot data.

The power results in plot is already including the actual values of loss for the attenuator and cable combination.

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

<b>Band</b>	<b>Loss(dB)</b>
UNII 1	10.78
UNII 2A	10.78
UNII 2C	10.78
UNII 3	10.78

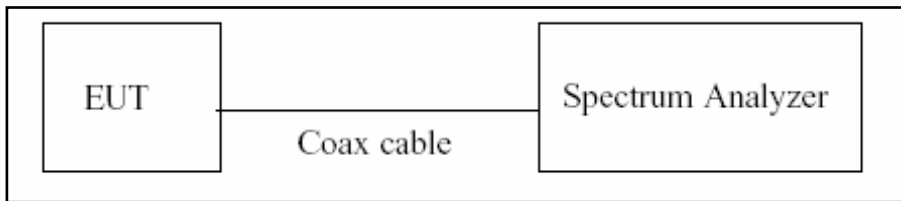
(Actual value of loss for the attenuator and cable combination)

**8.4. Power Spectral Density**

**Limit**

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

**Test Configuration**



**Test Procedure**

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

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

**Sample Calculation**

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

**Note**

1. Spectrum reading values are not plot data.

The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.

2. Spectrum offset = Attenuator loss(10 dB) + Cable loss + EUT Cable loss

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

<b>Band</b>	<b>Loss(dB)</b>
UNII 1	10.78
UNII 2A	10.78
UNII 2C	10.78
UNII 3	10.78

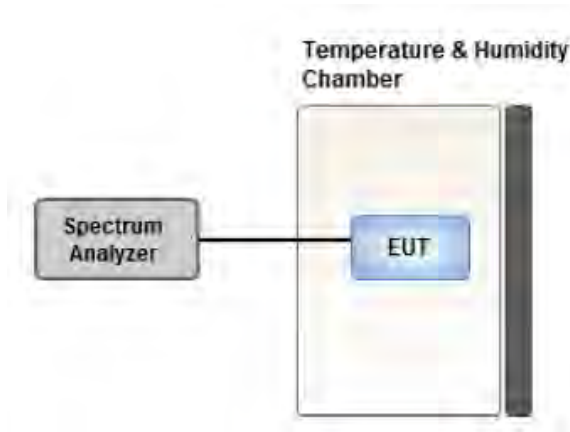
(Actual value of loss for the attenuator and cable combination)

## 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 °C and 50 °C.
2. The temperature was incremented by 10 °C intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.
3. The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.
4. While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.



## 8.6. AC Power line Conducted Emissions

### Limit

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

Frequency Range (MHz)	Limits (dB $\mu$ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56 <sup>(a)</sup>	56 to 46 <sup>(a)</sup>
0.50 to 5	56	46
5 to 30	60	50

<sup>(a)</sup>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**

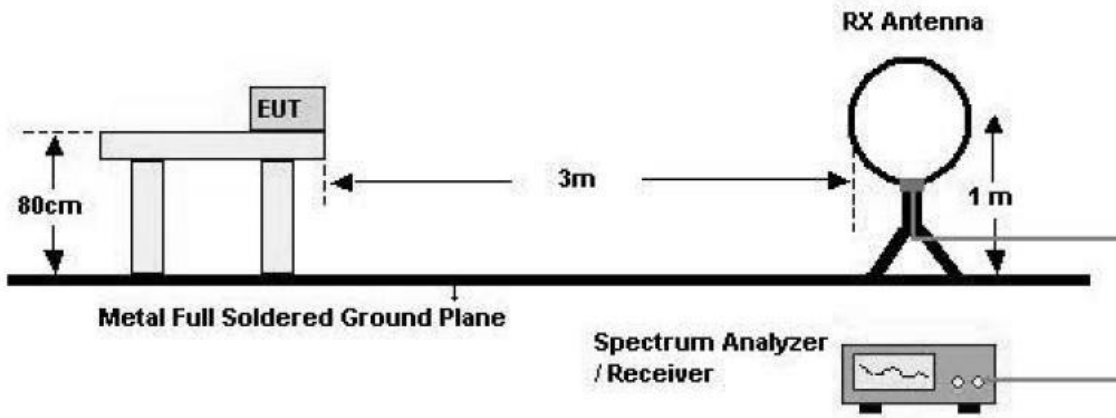
**Limit**

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.

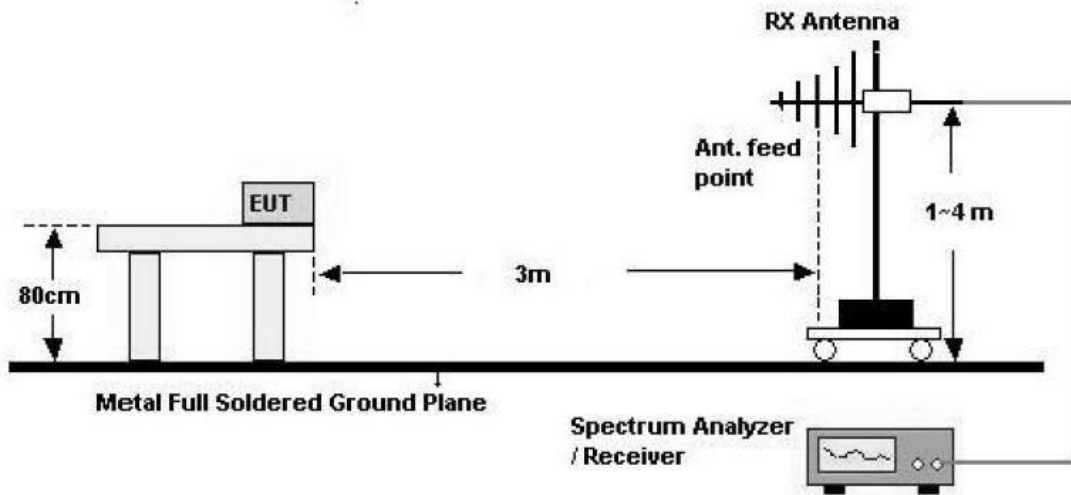
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

**Test Configuration**

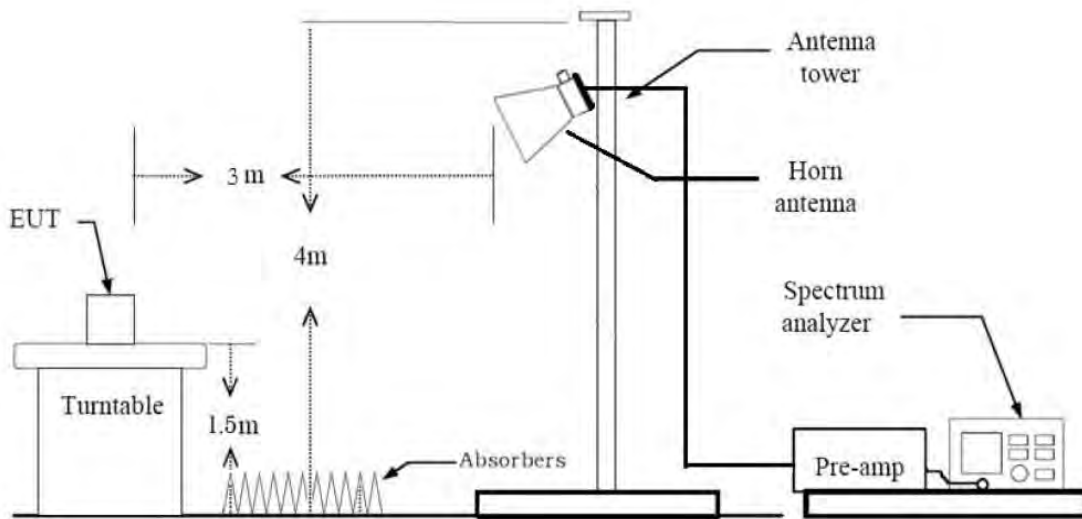
Below 30 MHz



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) =  $40\log(3\text{ m}/300\text{ m}) = -80\text{ dB}$   
Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 MHz) =  $40\log(3\text{ m}/30\text{ m}) = -40\text{ dB}$   
Measurement Distance : 3 m
8. Spectrum Setting
  - Frequency Range = 9 kHz ~ 30 MHz
  - Detector = Peak
  - Trace = Maxhold
  - RBW = 9 kHz
  - VBW  $\geq 3 \times$  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  $\geq$  3 x RBW
  - (2) Measurement Type(Quasi-peak):
    - Measured Frequency Range : 30 MHz – 1 GHz
    - Detector = Quasi-Peak
    - RBW = 120 kHz
- ※ In general, (1) is used mainly
7. Total = 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  $\geq$  3 MHz
- Detector = Peak
- Sweep Time = auto
- Trace mode = max hold
- Allow sweeps to continue until the trace stabilizes.

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

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

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

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

### **Test Procedure of Radiated Restricted Band Edge**

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.
8. Spectrum Setting
  - (1) Measurement Type(Peak, G.5 in KDB 789033 v02r01):
    - RBW = 1 MHz
    - VBW  $\geq$  3 MHz
    - Detector = Peak
    - Sweep Time = auto
    - Trace mode = max hold
    - Allow sweeps to continue until the trace stabilizes.Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately  $1/x$ , where x is the duty cycle.
  - (2) Measurement Type(Average, G.6.d in KDB 789033 v02r01):
    - RBW = 1 MHz
    - VBW(Duty cycle  $\geq$  98 percent) =  $VBW \leq RBW/100$ (i.e., 10 kHz) but not less than 10 Hz.
    - VBW(Duty cycle is < 98 percent) =  $VBW \geq 1/T$ , where T is the minimum transmission duration.
    - The analyzer is set to linear detector mode.
    - Detector = Peak.
    - Sweep time = auto.
    - Trace mode = max hold.
    - Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98 percent duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of  $1/x$ , where x is the duty cycle.

9. Measured Frequency Range :

- 4 500 MHz ~ 5 150 MHz
- 5 350 MHz ~ 5 460 MHz
- 5 460 MHz ~ 5 470 MHz
- (75 MHz or more below the 5 725 MHz) ~ 5 725 MHz
- 5 850 MHz ~ (75 MHz or more above the 5 850 MHz)

10. Distance extrapolation factor =  $20\log(\text{test distance} / \text{specific distance})$  (dB)

11. Total = Reading Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(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	0.969	0.137	1000
802.11n(HT20)	MCS 0(6.5)	0.966	0.151	1000
802.11n(HT40)	MCS 0(13.5)	0.936	0.285	3000
802.11ac(VHT20)	MCS 0(6.5)	0.967	0.148	1000
802.11ac(VHT40)	MCS 0(13.5)	0.937	0.284	3000
802.11ac(VHT80)	MCS 0(29.3)	0.882	0.545	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,Y
  - Radiated Restricted Band Edge : X,Y
3. All datarate of operation were investigated and the worst case datarate results are reported
4. All position of loop antenna were investigated and the test result is a no critical peak found at all positions.
  - Position : Horizontal, Vertical, Parallel to the ground plane
5. Radiated Spurious Emission
  - UNII 1, 2A, 2C, 3 : 802.11a
  - In order to simplify the report, We only have attached RSE result of worst case.  
(= Highest power of Each bands)
6. SM-A326B/DS, SM-A326B were tested and the worst case results are reported.  
(Worst case : SM-A326B/DS)

### AC Power line Conducted Emissions

1. All modes of operation were investigated and the worst case configuration results are reported.
  - Mode : Stand alone + External accessories(Earphone, etc)+Travel Adapter,  
Stand alone + Travel Adapter
  - Worstcase : Stand alone + Travel Adapter
2. SM-A326B/DS, SM-A326B were tested and the worst case results are reported.  
(Worst case : SM-A326B/DS)

### Conducted test

1. All datarate of operation were investigated and the worst case datarate results are reported.
2. SM-A326B/DS, SM-A326B were tested and the worst case results are reported.  
(Worst case : SM-A326B/DS)

**9. SUMMARY OF TEST RESULTS**

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

## 10. TEST RESULT

### 10.1 DUTY CYCLE

Mode	Data Rate (Mbps)	T <sub>on</sub> (ms)	T <sub>total</sub> (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11a	6	1.392	1.436	0.969	0.137
	9	0.936	0.980	0.955	0.202
	12	0.707	0.752	0.940	0.268
	18	0.480	0.525	0.914	0.390
	24	0.365	0.410	0.890	0.506
	36	0.252	0.297	0.850	0.706
	48	0.192	0.237	0.810	0.918
	54	0.176	0.221	0.797	0.985

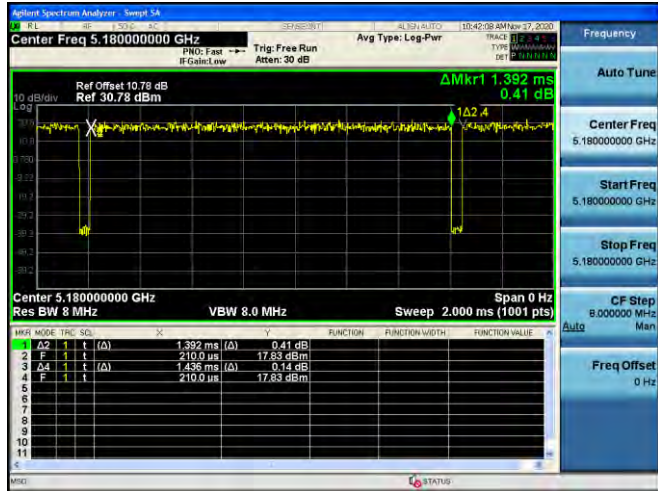
Mode	MCS Index	T <sub>on</sub> (ms)	T <sub>total</sub> (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11n (HT20)	0	1.300	1.346	0.966	0.151
	1	0.668	0.713	0.937	0.283
	2	0.460	0.505	0.911	0.406
	3	0.352	0.397	0.887	0.522
	4	0.248	0.293	0.847	0.721
	5	0.196	0.241	0.813	0.901
	6	0.180	0.225	0.801	0.966
	7	0.164	0.209	0.783	1.060
802.11n (HT40)	0	0.648	0.692	0.936	0.285
	1	0.344	0.388	0.887	0.523
	2	0.240	0.284	0.845	0.732
	3	0.192	0.236	0.813	0.902
	4	0.140	0.184	0.762	1.182
	5	0.116	0.160	0.726	1.389
	6	0.104	0.148	0.702	1.538
	7	0.100	0.144	0.695	1.578

Mode	MCS Index	T <sub>on</sub> (ms)	T <sub>total</sub> (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11ac (VHT20)	0	1.310	1.355	0.967	0.148
	1	0.676	0.721	0.938	0.276
	2	0.464	0.509	0.910	0.407
	3	0.360	0.405	0.889	0.513
	4	0.252	0.297	0.848	0.714
	5	0.200	0.245	0.816	0.881
	6	0.184	0.229	0.803	0.951
	7	0.168	0.213	0.789	1.031
	8	0.148	0.193	0.767	1.154
802.11ac (VHT40)	0	0.651	0.695	0.937	0.284
	1	0.348	0.392	0.888	0.517
	2	0.245	0.288	0.848	0.716
	3	0.196	0.240	0.817	0.877
	4	0.144	0.188	0.765	1.166
	5	0.120	0.164	0.733	1.352
	6	0.108	0.152	0.712	1.476
	7	0.104	0.148	0.704	1.525
	8	0.092	0.136	0.676	1.701
	9	0.088	0.132	0.666	1.766
802.11ac (VHT80)	0	0.325	0.368	0.882	0.545
	1	0.184	0.227	0.809	0.922
	2	0.136	0.180	0.757	1.212
	3	0.112	0.155	0.721	1.418
	4	0.088	0.132	0.669	1.748
	5	0.076	0.120	0.634	1.979
	6	0.072	0.116	0.624	2.049
	7	0.072	0.116	0.622	2.062
	8	0.064	0.116	0.551	2.591
	9	0.064	0.117	0.548	2.612

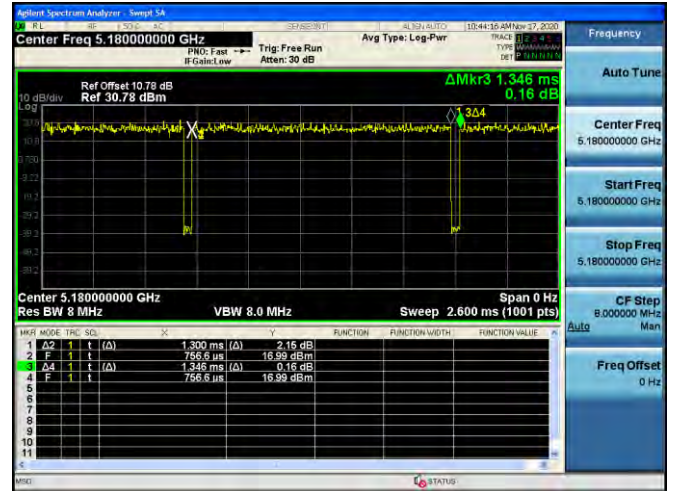
**Note:**

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

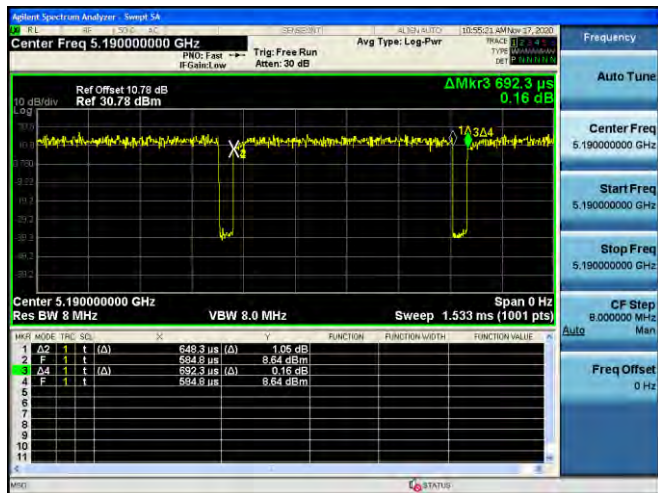
802.11a



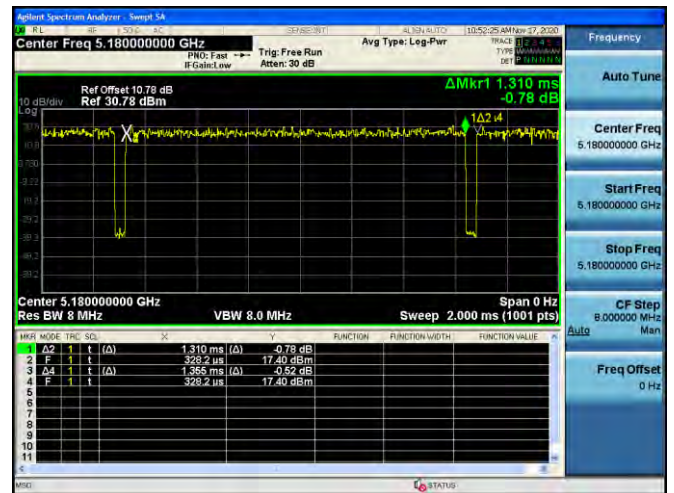
802.11n(HT20)



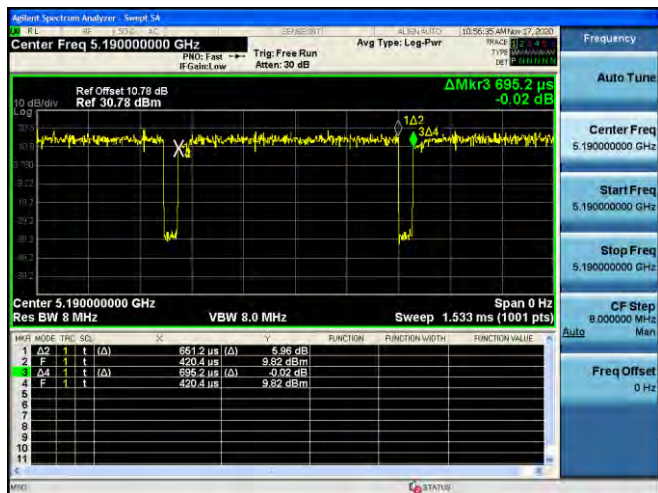
802.11n(HT40)



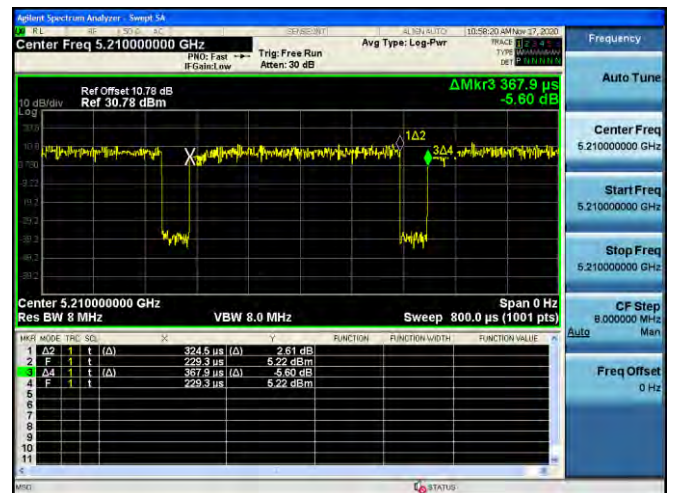
802.11ac(VHT20)



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	21.19	16.748
5200	40	20.08	16.596
5240	48	21.21	16.569
5260	52	19.94	16.607
5300	60	20.36	16.652
5320	64	21.98	16.617
5500	100	19.76	16.450
5600	120	22.74	16.633
5720	144	21.88	16.667
5745	149	20.94	16.546
5785	157	23.95	16.674
5825	165	19.91	16.541

802.11n(HT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	22.29	17.770
5200	40	22.19	17.816
5240	48	21.70	17.790
5260	52	21.31	17.750
5300	60	21.04	17.827
5320	64	20.74	17.749
5500	100	20.15	17.637
5600	120	23.01	17.768
5720	144	24.40	17.827
5745	149	20.79	17.614
5785	157	20.39	17.616
5825	165	21.77	17.616

802.11n(HT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	40.63	36.144
5230	46	40.63	36.121
5270	54	40.49	36.134
5310	62	40.29	36.020
5510	102	40.04	35.960
5590	118	40.33	36.176
5710	142	40.98	36.181
5755	151	40.89	36.150
5795	159	40.77	36.206

802.11ac(VHT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	20.37	17.682
5200	40	21.08	17.712
5240	48	20.30	17.685
5260	52	21.49	17.636
5300	60	20.38	17.687
5320	64	20.48	17.677
5500	100	19.91	17.567
5600	120	20.59	17.712
5720	144	21.67	17.668
5745	149	20.39	17.620
5785	157	20.11	17.621
5825	165	20.11	17.581

802.11ac(VHT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	40.26	36.002
5230	46	43.43	35.972
5270	54	40.32	36.014
5310	62	40.15	35.963
5510	102	40.03	35.936
5590	118	40.17	36.002
5710	142	39.98	36.095
5755	151	40.97	36.049
5795	159	40.81	36.113

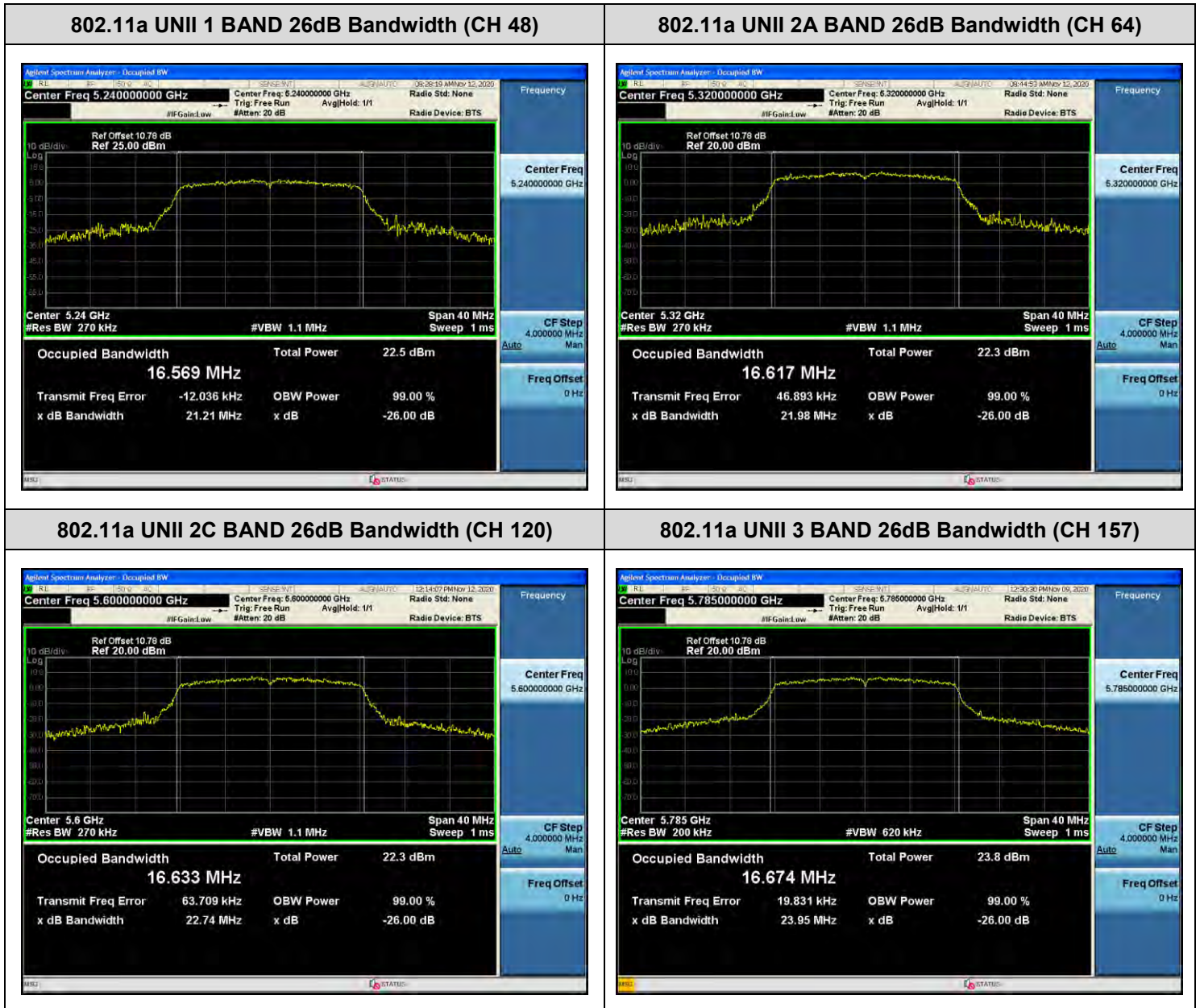
802.11ac(VHT80) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5210	42	80.95	75.132
5290	58	80.74	75.083
5530	106	80.60	75.118
5610	122	80.62	75.130
5690	138	80.81	75.165
5775	155	80.85	75.158



☐ Test Plots(802.11a)

Note:

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



☐ Test Plots(802.11n(HT20))

Note:

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

802.11n\_HT20 UNII 1 BAND 26dB Bandwidth(CH 36)



802.11n\_HT20 UNII 2A BAND 26dB Bandwidth(CH 52)



802.11n\_HT20 UNII 2C BAND 26dB Bandwidth(CH 144)



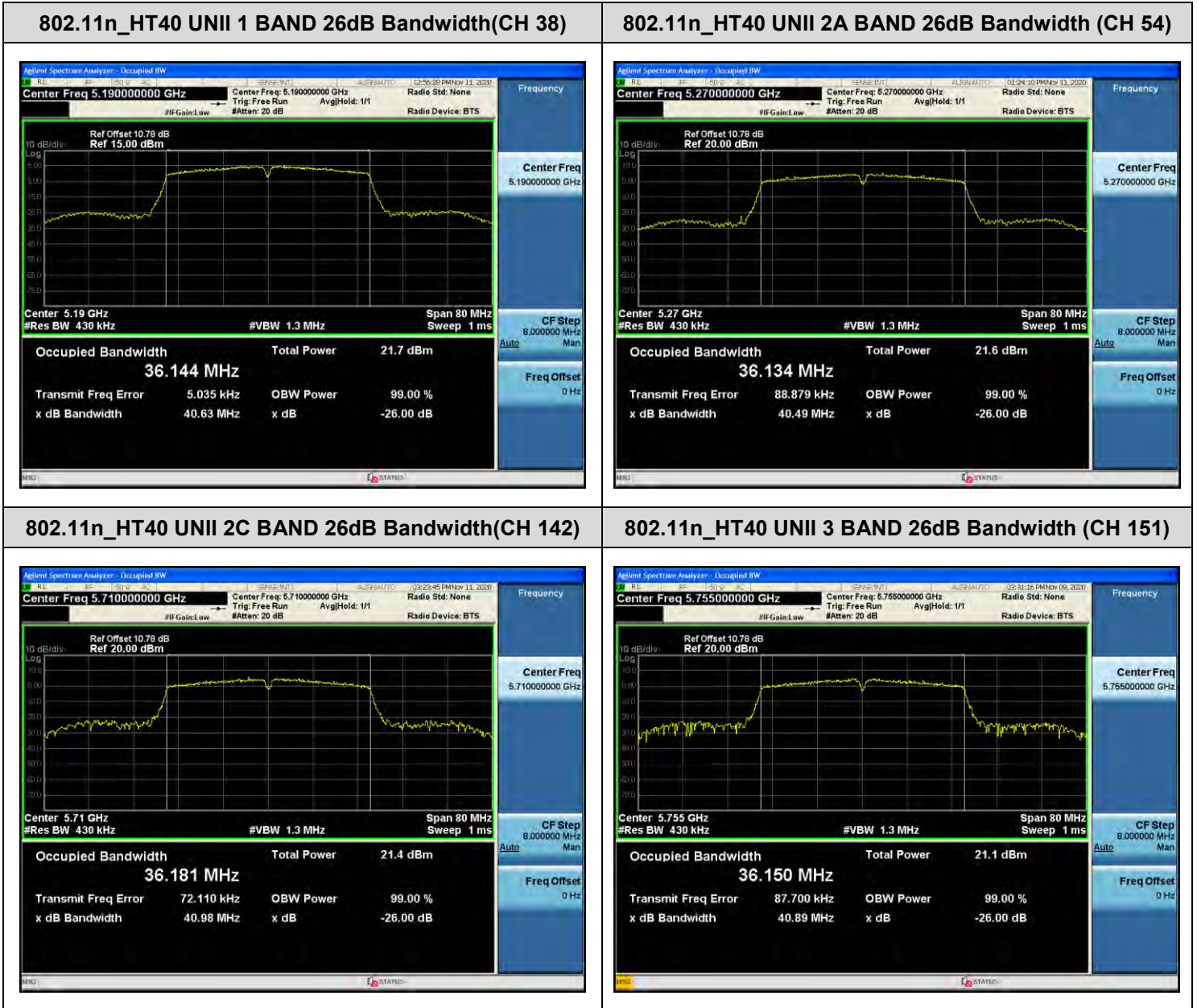
802.11n\_HT20 UNII 3 BAND 26dB Bandwidth(CH 165)



☐ Test Plots(802.11n(HT40))

Note:

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

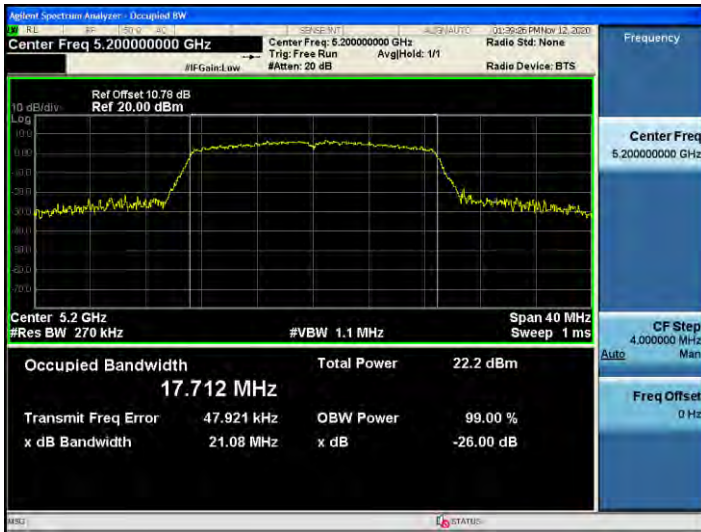


☐ Test Plots(802.11ac(VHT20))

Note:

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

802.11ac\_VHT20 UNII 1 BAND 26dB Bandwidth(CH 40)



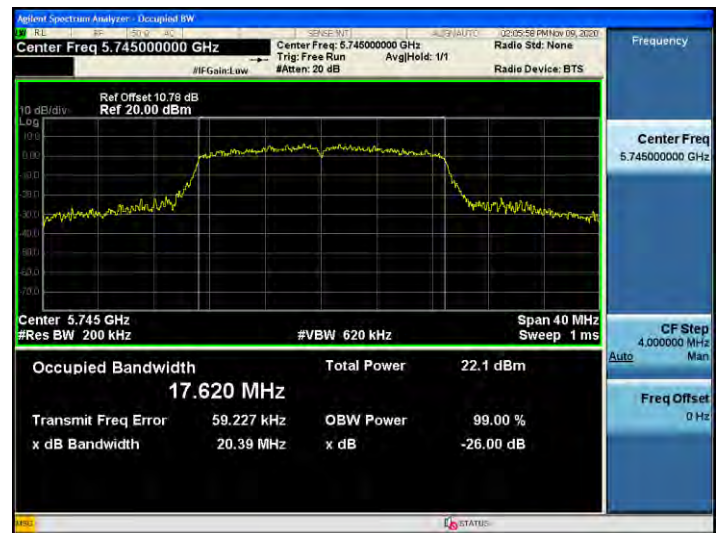
802.11ac\_VHT20 UNII 2A BAND 26dB Bandwidth(CH 52)



802.11ac\_VHT20 UNII 2C BAND 26dB Bandwidth(CH 144)



802.11ac\_VHT20 UNII 3 BAND 26dB Bandwidth(CH 149)



☐ Test Plots(802.11ac(VHT40))

Note:

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

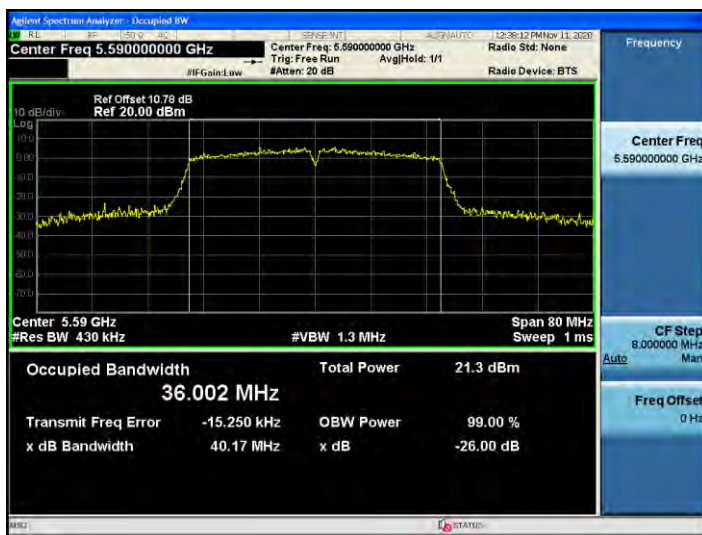
802.11ac\_VHT40 UNII 1 BAND 26dB Bandwidth(CH 46)



802.11ac\_VHT40 UNII 2A BAND 26dB Bandwidth (CH 54)



802.11ac\_VHT40 UNII 2C BAND 26dB Bandwidth(CH 118)



802.11ac\_VHT40 UNII 3 BAND 26dB Bandwidth (CH 151)



☐ Test Plots(802.11ac(VHT80))

Note:

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

**802.11ac\_VHT80 UNII 1 BAND 26dB Bandwidth(CH 42)**



**802.11ac\_VHT80 UNII 2A BAND 26dB Bandwidth (CH 58)**



**802.11ac\_VHT80 UNII 2C BAND 26dB Bandwidth(CH 138)**



**802.11ac\_VHT80 UNII 3 BAND 26dB Bandwidth (CH 155)**



**10.3 6dB BANDWIDTH**

802.11a 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	15.13	> 0.5	Pass

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.17	> 0.5	Pass
5785	157	15.17	> 0.5	Pass
5825	165	13.86	> 0.5	Pass

802.11n(HT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.17	> 0.5	Pass
5795	159	35.15	> 0.5	Pass

802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.04	> 0.5	Pass
5785	157	15.09	> 0.5	Pass
5825	165	15.12	> 0.5	Pass

802.11ac(VHT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.17	> 0.5	Pass
5795	159	35.15	> 0.5	Pass

802.11ac(VHT80) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	75.23	> 0.5	Pass

**Test Plots**

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

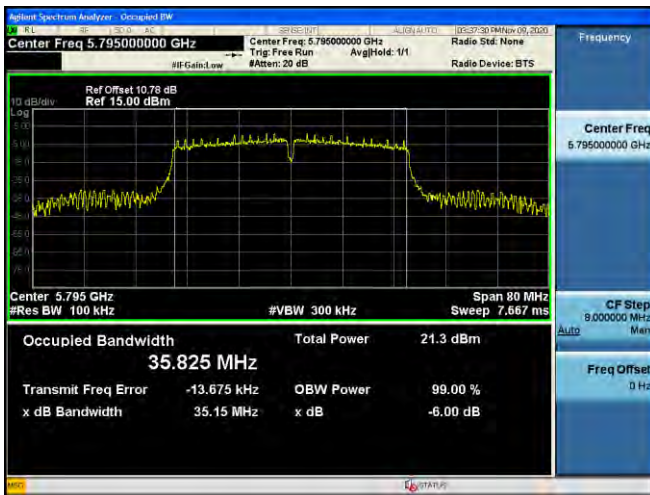
**802.11a (CH.157)**



**802.11n(HT20) (CH.165)**



**802.11n(HT40) (CH.159)**



**802.11ac(VHT20) (CH.149)**



**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)
Frequency [MHz]	Channel No.					
5180	36	16	15.97	0.506	16.47	23.98
5200	40	16	16.13	0.390	16.52	23.98
5240	48	16	16.22	0.390	16.61	23.98
5260	52	16	16.42	0.202	16.62	23.98
5300	60	16	16.29	0.268	16.56	23.98
5320	64	16	16.16	0.268	16.43	23.98
5500	100	14	14.21	0.202	14.41	23.98
5600	120	16	15.26	0.985	16.25	23.98
5720	144	16	15.72	0.706	16.42	23.98
5745	149	16	15.65	0.985	16.64	30.00
5785	157	16	15.57	0.985	16.56	30.00
5825	165	16	15.86	0.268	16.13	30.00

802.11n(20MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	15	14.40	0.966	15.37	23.98
5200	40	15	14.30	1.060	15.36	23.98
5240	48	15	14.42	1.060	15.48	23.98
5260	52	15	14.58	0.901	15.48	23.98
5300	60	15	14.93	0.522	15.45	23.98
5320	64	15	14.42	0.901	15.32	23.98
5500	100	14	14.03	0.283	14.31	23.98
5600	120	15	14.33	0.901	15.23	23.98
5720	144	15	14.48	0.966	15.44	23.98
5745	149	15	14.37	1.060	15.44	30.00
5785	157	15	14.60	0.901	15.50	30.00
5825	165	15	14.48	0.901	15.38	30.00

802.11n(40MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5190	38	14	13.27	1.182	14.45	23.98
5230	46	14	13.63	0.902	14.53	23.98
5270	54	14	13.78	0.732	14.51	23.98
5310	62	13	12.63	0.902	13.54	23.98
5510	102	10	9.66	0.523	10.18	23.98
5590	118	14	13.30	0.902	14.20	23.98
5710	142	14	13.54	0.902	14.44	23.98
5755	151	14	13.91	0.732	14.64	30.00
5795	159	14	13.52	0.902	14.42	30.00

802.11ac(20MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	15	14.43	0.951	15.38	23.98
5200	40	15	14.22	1.154	15.37	23.98
5240	48	15	14.54	0.951	15.49	23.98
5260	52	15	14.63	0.881	15.51	23.98
5300	60	15	14.94	0.513	15.45	23.98
5320	64	15	14.82	0.513	15.34	23.98
5500	100	14	13.39	0.881	14.27	23.98
5600	120	15	14.80	0.407	15.20	23.98
5720	144	15	14.40	1.031	15.43	23.98
5745	149	15	15.23	0.407	15.64	30.00
5785	157	15	14.61	0.881	15.49	30.00
5825	165	15	14.67	0.714	15.39	30.00

802.11ac(40MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5190	38	15	14.73	0.716	15.45	23.98
5230	46	15	13.78	1.701	15.49	23.98
5270	54	15	14.88	0.517	15.40	23.98
5310	62	13	13.07	0.517	13.59	23.98
5510	102	10	9.68	0.517	10.19	23.98
5590	118	15	14.45	0.716	15.17	23.98
5710	142	15	14.18	1.166	15.34	23.98
5755	151	15	14.73	0.877	15.60	30.00
5795	159	15	14.50	0.877	15.38	30.00

802.11ac(80MHz) Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5210	42	13	12.39	0.922	13.31	23.98
5290	58	12	11.06	1.212	12.27	23.98
5530	106	10	8.25	1.748	10.00	23.98
5610	122	13	11.99	0.922	12.91	23.98
5690	138	13	12.00	0.922	12.92	23.98
5775	155	13	12.08	0.922	13.00	30.00

**10.5 POWER SPECTRAL DENSITY**

802.11a Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	6.000	0.506	6.506	11 dBm/MHz
5200	40	6.125	0.390	6.515	
5240	48	5.936	0.390	6.326	
5260	52	6.567	0.202	6.769	
5300	60	6.334	0.268	6.602	
5320	64	6.069	0.268	6.337	
5500	100	4.122	0.202	4.324	
5600	120	4.965	0.985	5.950	
5720	144	5.385	0.706	6.091	
5745	149	3.268	0.985	4.253	
5785	157	2.411	0.985	3.396	
5825	165	2.905	0.268	3.173	

802.11n(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	4.272	0.966	5.238	11 dBm/MHz
5200	40	3.641	1.060	4.701	
5240	48	4.084	1.060	5.144	
5260	52	4.324	0.901	5.225	
5300	60	4.221	0.522	4.743	
5320	64	4.497	0.901	5.398	
5500	100	3.755	0.283	4.038	
5600	120	4.381	0.901	5.282	
5720	144	4.136	0.966	5.102	
5745	149	1.722	1.060	2.782	
5785	157	2.033	0.901	2.934	
5825	165	1.428	0.901	2.329	

802.11n(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5190	38	0.010	1.182	1.192	11 dBm/MHz
5230	46	0.285	0.902	1.187	
5270	54	0.391	0.732	1.123	
5310	62	-0.526	0.902	0.376	
5510	102	-3.580	0.523	-3.057	
5590	118	0.036	0.902	0.938	
5710	142	0.254	0.902	1.156	
5755	151	-1.801	0.732	-1.069	30 dBm /500kHz
5795	159	-2.476	0.902	-1.574	

802.11ac(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	4.188	0.951	5.139	11 dBm/MHz
5200	40	3.883	1.154	5.037	
5240	48	4.305	0.951	5.256	
5260	52	4.404	0.881	5.285	
5300	60	4.686	0.513	5.199	
5320	64	4.453	0.513	4.966	
5500	100	3.500	0.881	4.381	
5600	120	4.503	0.407	4.910	
5720	144	3.750	1.031	4.781	
5745	149	2.271	0.407	2.678	
5785	157	1.910	0.881	2.791	
5825	165	1.731	0.714	2.445	

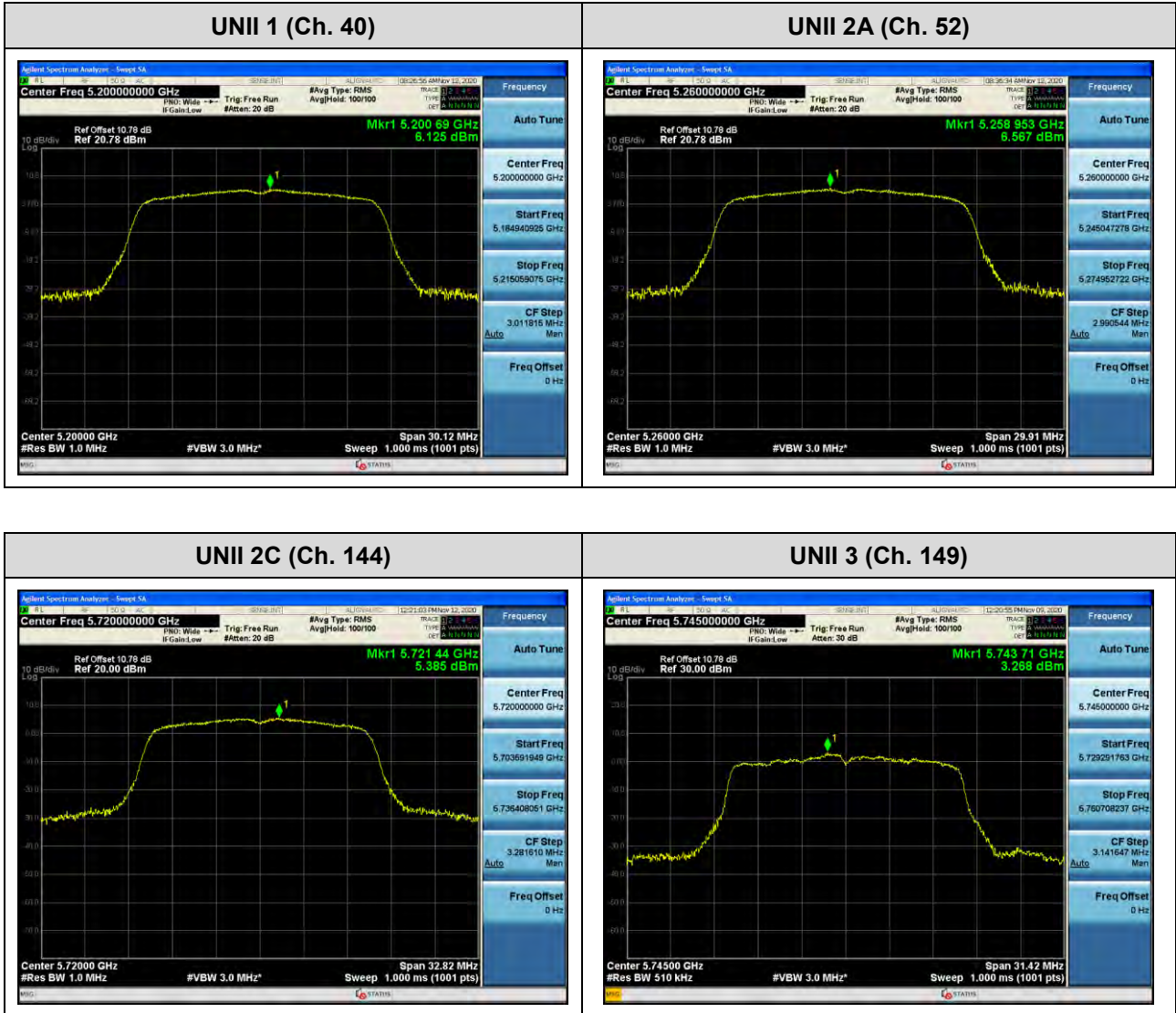
802.11ac(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5190	38	1.387	0.716	2.103	11 dBm/MHz
5230	46	1.384	1.701	3.085	
5270	54	1.488	0.517	2.005	
5310	62	-0.245	0.517	0.272	
5510	102	-3.641	0.517	-3.124	
5590	118	1.128	0.716	1.844	
5710	142	1.386	1.166	2.552	
5755	151	-1.266	0.877	-0.389	30 dBm/500kHz
5795	159	-1.050	0.877	-0.173	

802.11ac(80MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5210	42	-3.909	0.922	-2.987	11 dBm/MHz
5290	58	-5.052	1.212	-3.840	
5530	106	-7.824	1.748	-6.076	
5610	122	-4.055	0.922	-3.133	
5690	138	-4.048	0.922	-3.126	
5775	155	-6.732	0.922	-5.810	30 dBm/500kHz

Test Plots(802.11a)

Note:

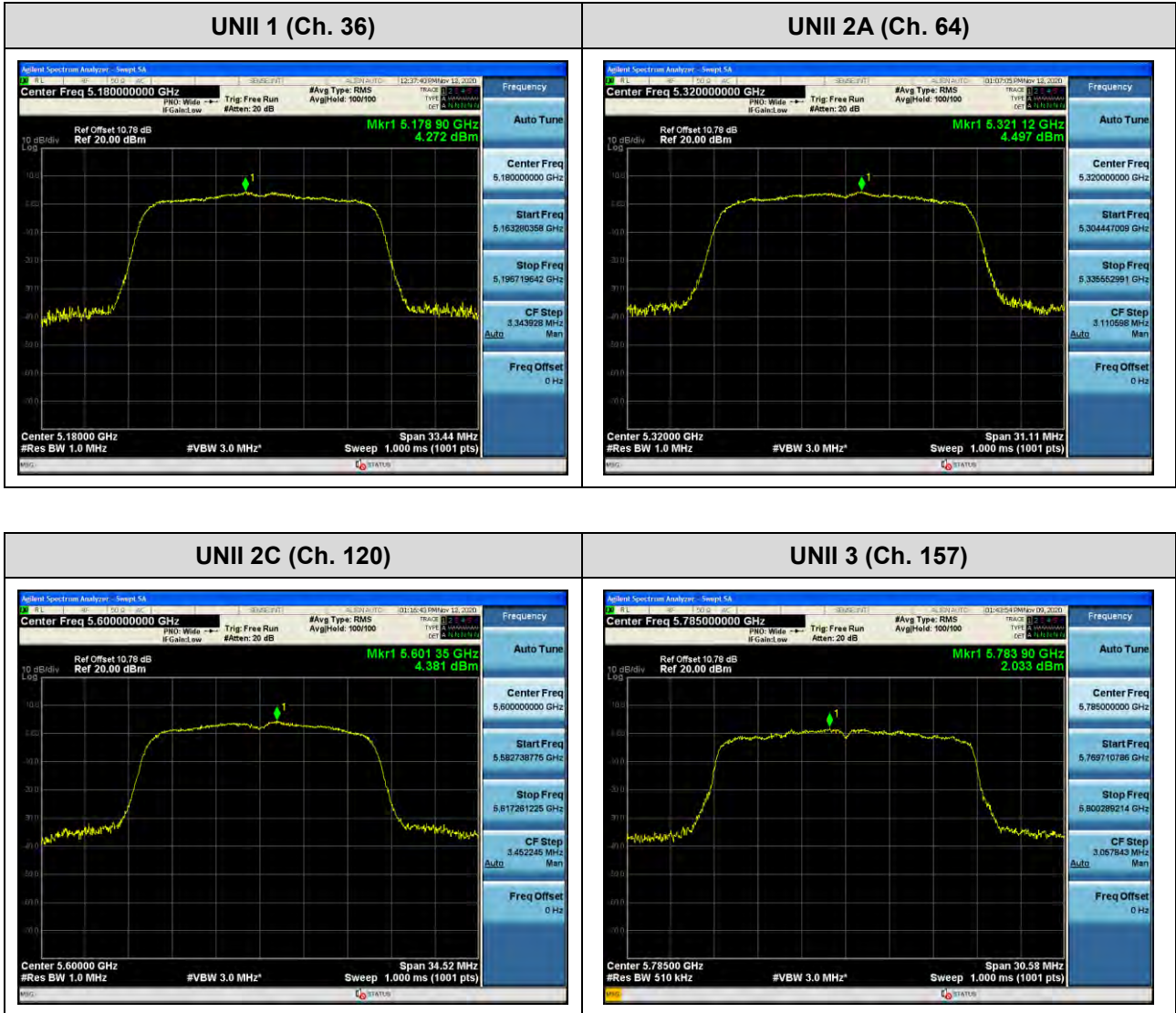
In order to simplify the report, attached plots were only channel of highest power.



Test Plots(802.11n(HT20))

Note:

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

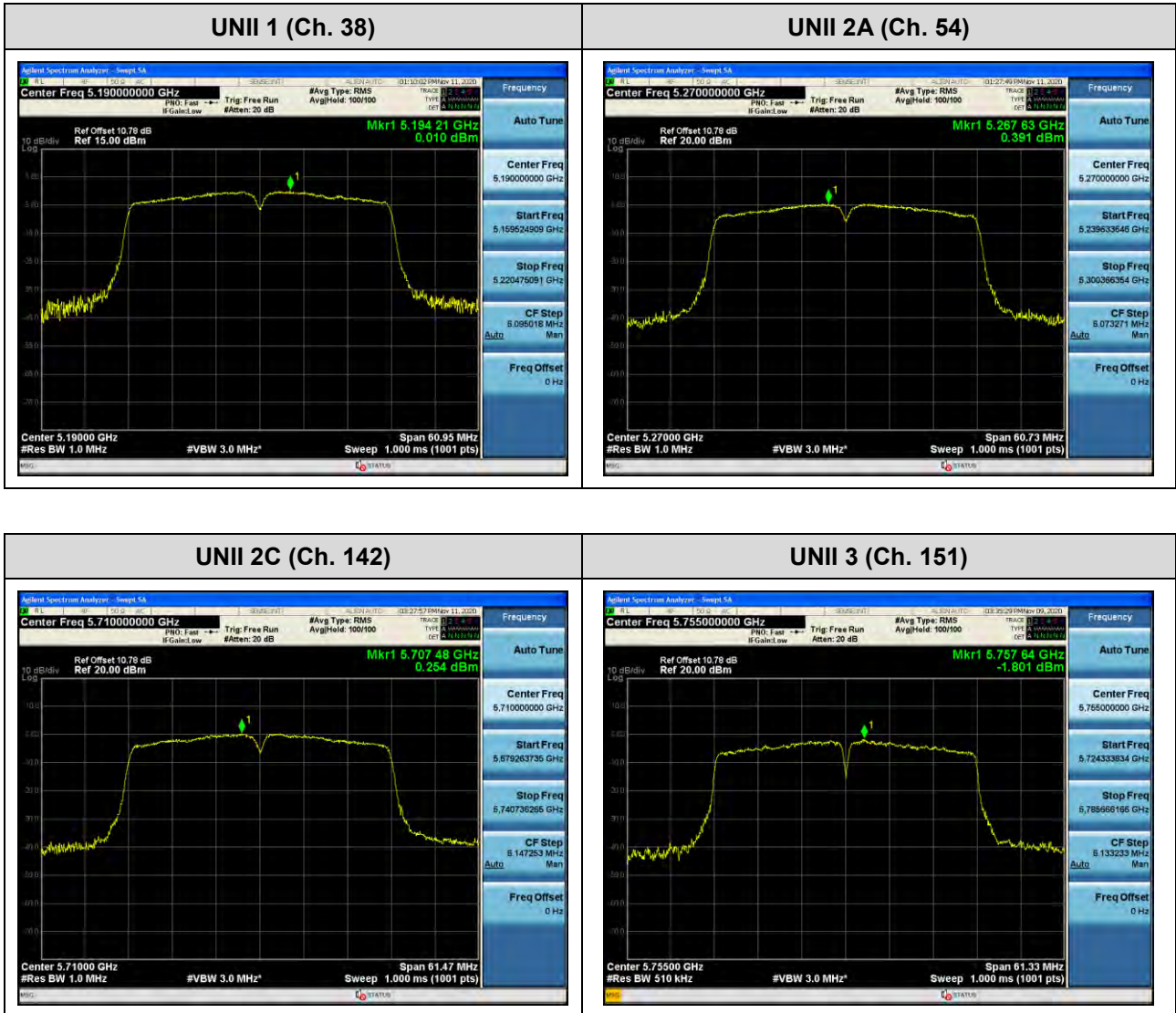




☐ Test Plots(802.11n(HT40))

Note:

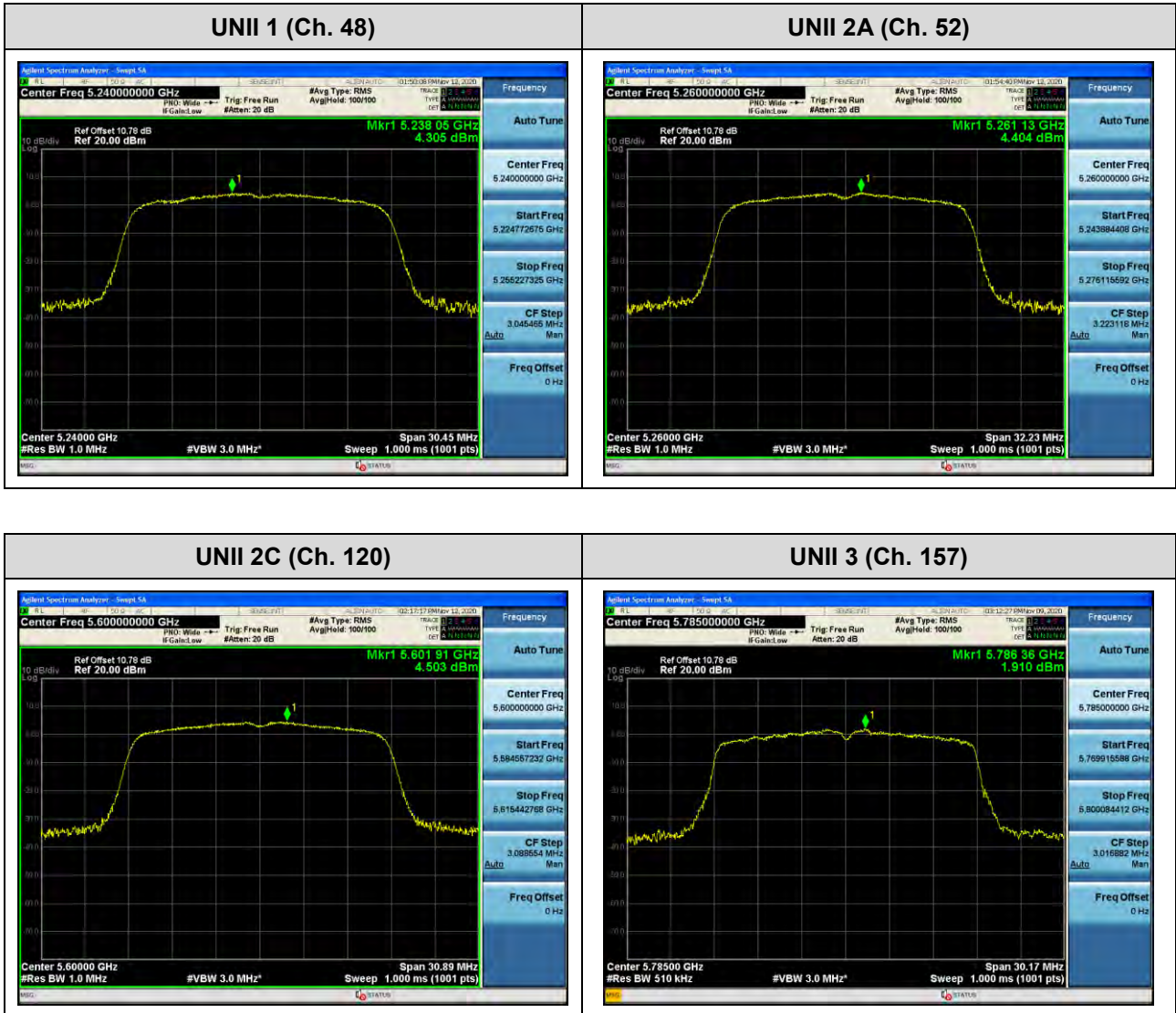
In order to simplify the report, attached plots were only channel of highest power.



Test Plots(802.11ac(VHT20))

Note:

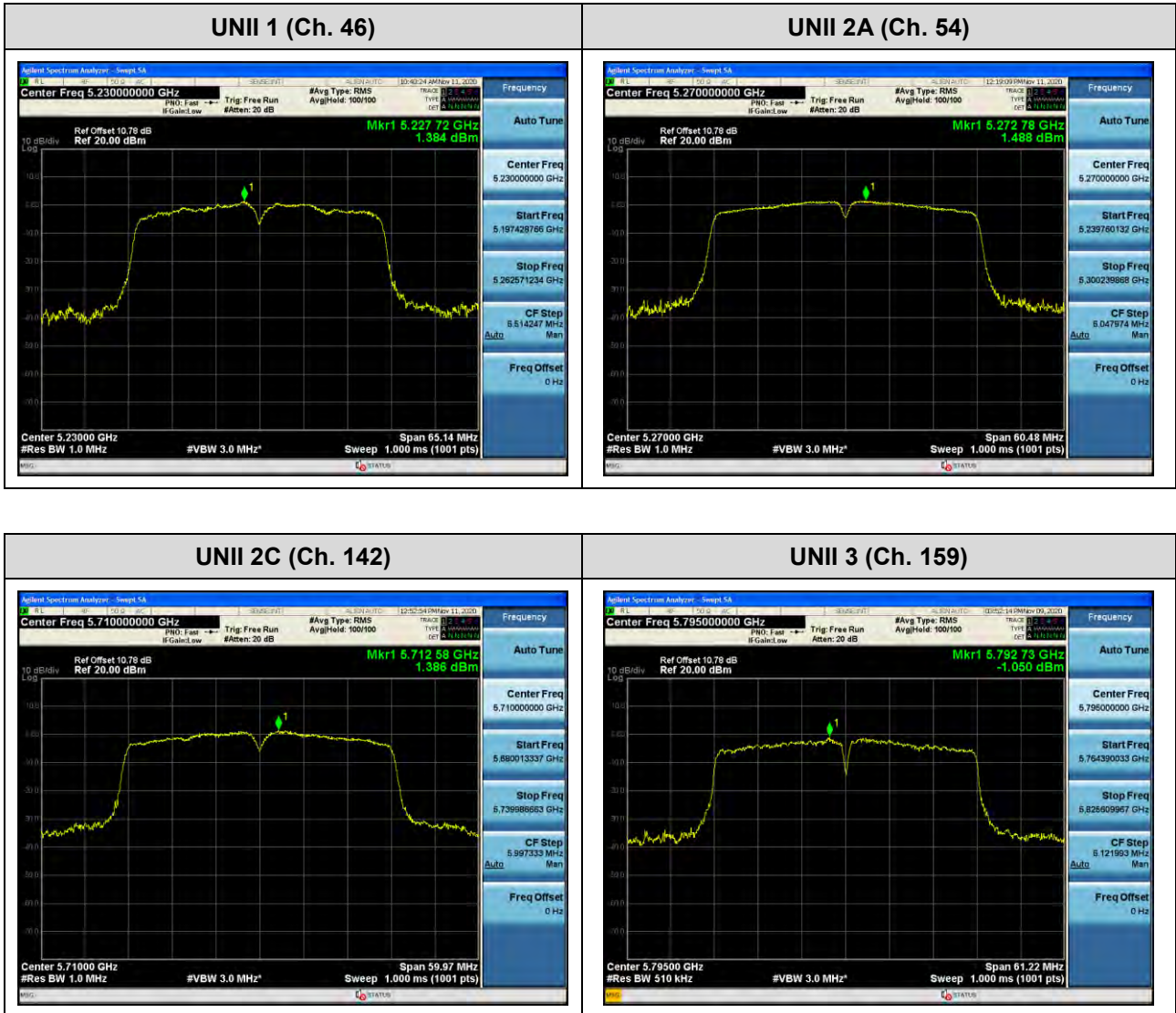
In order to simplify the report, attached plots were only channel of highest power.



Test Plots(802.11ac(VHT40))

Note:

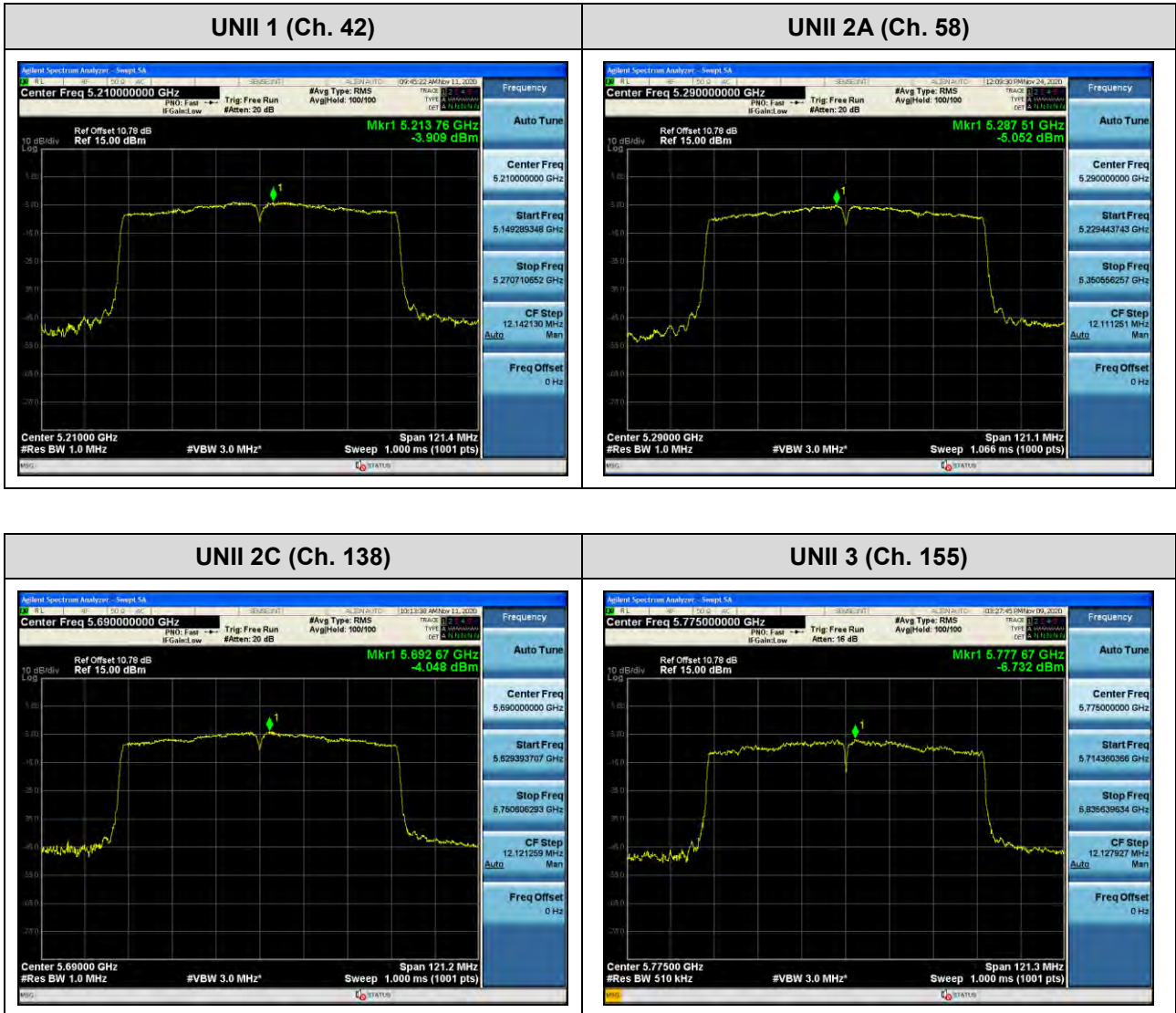
In order to simplify the report, attached plots were only channel of highest power.



Test Plots(802.11ac(VHT80))

Note:

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



**10.6 FREQUENCY STABILITY.**

**10.6.1 80MHz BW**

**Startup after the EUT is energized**

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5210038.15	38.15
100%		-30	5210061.35	61.35
100%		-20	5210054.60	54.60
100%		-10	5210048.29	48.29
100%		0	5210044.20	44.20
100%		+10	5210040.90	40.90
100%		+30	5210041.65	41.65
100%		+40	5210049.73	49.73
100%		+50	5210054.92	54.92
LOW		3.60	+20	5210052.96
HIGH	4.43	+20	5210051.41	51.41

**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: 5,290,000,000 Hz  
 CHANNEL: 58  
 REFERENCE VOLTAGE: 3.86 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5290039.37	39.37
100%		-30	5290063.84	63.84
100%		-20	5290056.09	56.09
100%		-10	5290049.37	49.37
100%		0	5290046.24	46.24
100%		+10	5290043.16	43.16
100%		+30	5290041.54	41.54
100%		+40	5290050.17	50.17
100%		+50	5290053.89	53.89
LOW		3.60	+20	5290055.65
HIGH	4.43	+20	5290055.19	55.19

**Note:**

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5530038.71	38.71
100%		-30	5530062.15	62.15
100%		-20	5530054.70	54.70
100%		-10	5530048.26	48.26
100%		0	5530043.16	43.16
100%		+10	5530040.17	40.17
100%		+30	5530042.21	42.21
100%		+40	5530052.67	52.67
100%		+50	5530057.21	57.21
LOW		3.60	+20	5530054.17
HIGH	4.43	+20	5530052.70	52.70

**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 3  
 OPERATING FREQUENCY: 5,775,000,000 Hz  
 CHANNEL: 155  
 REFERENCE VOLTAGE: 3.86 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5775039.50	39.50
100%		-30	5775063.34	63.34
100%		-20	5775055.87	55.87
100%		-10	5775050.20	50.20
100%		0	5775045.93	45.93
100%		+10	5775042.52	42.52
100%		+30	5775043.01	43.01
100%		+40	5775052.30	52.30
100%		+50	5775056.55	56.55
LOW		3.60	+20	5775055.25
HIGH	4.43	+20	5775054.70	54.70

**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.



**2 minutes after the EUT is energized**

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5210040.35	40.35
100%		-30	5210063.52	63.52
100%		-20	5210056.43	56.43
100%		-10	5210049.42	49.42
100%		0	5210044.76	44.76
100%		+10	5210040.66	40.66
100%		+30	5210044.08	44.08
100%		+40	5210054.28	54.28
100%		+50	5210059.64	59.64
LOW		3.60	+20	5210054.99
HIGH	4.43	+20	5210053.46	53.46

**Note:**

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5290042.19	42.19
100%		-30	5290066.64	66.64
100%		-20	5290059.70	59.70
100%		-10	5290052.70	52.70
100%		0	5290047.76	47.76
100%		+10	5290044.04	44.04
100%		+30	5290045.84	45.84
100%		+40	5290054.19	54.19
100%		+50	5290057.36	57.36
LOW		3.60	+20	5290059.02
HIGH	4.43	+20	5290057.46	57.46

**Note:**

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5530041.28	41.28
100%		-30	5530065.28	65.28
100%		-20	5530057.60	57.60
100%		-10	5530051.88	51.88
100%		0	5530048.60	48.60
100%		+10	5530045.78	45.78
100%		+30	5530044.05	44.05
100%		+40	5530052.25	52.25
100%		+50	5530056.39	56.39
LOW		3.60	+20	5530057.14
HIGH	4.43	+20	5530056.48	56.48

**Note:**

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5775043.61	43.61
100%		-30	5775068.42	68.42
100%		-20	5775060.88	60.88
100%		-10	5775055.77	55.77
100%		0	5775051.33	51.33
100%		+10	5775048.77	48.77
100%		+30	5775047.30	47.30
100%		+40	5775056.00	56.00
100%		+50	5775061.93	61.93
LOW		3.60	+20	5775057.68
HIGH	4.43	+20	5775058.29	58.29

**Note:**

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

**5 minutes after the EUT is energized**

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5210045.19	45.19
100%		-30	5210069.96	69.96
100%		-20	5210062.26	62.26
100%		-10	5210055.99	55.99
100%		0	5210051.19	51.19
100%		+10	5210047.62	47.62
100%		+30	5210048.10	48.10
100%		+40	5210056.23	56.23
100%		+50	5210060.79	60.79
LOW		3.60	+20	5210060.63
HIGH	4.43	+20	5210061.03	61.03

**Note:**

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5290044.64	44.64
100%		-30	5290068.13	68.13
100%		-20	5290060.08	60.08
100%		-10	5290054.66	54.66
100%		0	5290051.34	51.34
100%		+10	5290047.33	47.33
100%		+30	5290047.18	47.18
100%		+40	5290055.50	55.50
100%		+50	5290059.39	59.39
LOW		3.60	+20	5290060.75
HIGH	4.43	+20	5290058.49	58.49

**Note:**

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5530047.35	47.35
100%		-30	5530071.75	71.75
100%		-20	5530065.29	65.29
100%		-10	5530058.37	58.37
100%		0	5530054.68	54.68
100%		+10	5530051.00	51.00
100%		+30	5530050.01	50.01
100%		+40	5530059.22	59.22
100%		+50	5530064.19	64.19
LOW		3.60	+20	5530062.38
HIGH	4.43	+20	5530062.01	62.01

**Note:**

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5775048.07	48.07
100%		-30	5775071.45	71.45
100%		-20	5775064.42	64.42
100%		-10	5775057.39	57.39
100%		0	5775053.34	53.34
100%		+10	5775050.14	50.14
100%		+30	5775051.23	51.23
100%		+40	5775060.02	60.02
100%		+50	5775065.72	65.72
LOW		3.60	+20	5775062.37
HIGH	4.43	+20	5775063.10	63.10

**Note:**

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



**10 minutes after the EUT is energized**

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5210049.21	49.21
100%		-30	5210072.46	72.46
100%		-20	5210066.21	66.21
100%		-10	5210059.43	59.43
100%		0	5210054.42	54.42
100%		+10	5210051.42	51.42
100%		+30	5210051.46	51.46
100%		+40	5210060.62	60.62
100%		+50	5210066.40	66.40
LOW		3.60	+20	5210063.43
HIGH	4.43	+20	5210062.44	62.44

**Note:**

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5290048.98	48.98
100%		-30	5290072.91	72.91
100%		-20	5290065.02	65.02
100%		-10	5290058.38	58.38
100%		0	5290053.38	53.38
100%		+10	5290050.72	50.72
100%		+30	5290051.64	51.64
100%		+40	5290059.80	59.80
100%		+50	5290062.93	62.93
LOW		3.60	+20	5290065.85
HIGH	4.43	+20	5290064.13	64.13

**Note:**

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5530051.64	51.64
100%		-30	5530075.89	75.89
100%		-20	5530069.13	69.13
100%		-10	5530063.84	63.84
100%		0	5530060.21	60.21
100%		+10	5530057.79	57.79
100%		+30	5530054.65	54.65
100%		+40	5530062.56	62.56
100%		+50	5530066.20	66.20
LOW		3.60	+20	5530068.00
HIGH	4.43	+20	5530066.97	66.97

**Note:**

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	3.86	+20(Ref)	5775053.77	53.77
100%		-30	5775078.59	78.59
100%		-20	5775071.13	71.13
100%		-10	5775065.07	65.07
100%		0	5775061.25	61.25
100%		+10	5775058.46	58.46
100%		+30	5775056.37	56.37
100%		+40	5775065.44	65.44
100%		+50	5775069.31	69.31
LOW		3.60	+20	5775069.90
HIGH	4.43	+20	5775067.74	67.74

**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	5710.20	14.80
802.11n(HT20)				5710.04	14.96
802.11ac(VHT20)				5710.08	14.92
802.11a	UNII 3	5720	144	5729.96	4.96
802.11n(HT20)				5730.12	5.12
802.11ac(VHT20)				5730.16	5.16

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26dB Bandwidth [MHz]
802.11n(HT40)	UNII 2C	5710	142	5689.92	35.08
802.11ac(VHT40)				5690.00	35.00
802.11n(HT40)	UNII 3	5710	142	5730.08	5.08
802.11ac(VHT40)				5729.92	4.92

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26dB Bandwidth [MHz]
802.11ac(VHT80)	UNII 2C	5690	138	5649.92	75.08
	UNII 3	5690	138	5730.20	5.20

**Note:**

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

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

Test Plots (26dB Bandwidth)

802.11a UNII Band



802.11n(HT20) UNII Band



802.11ac(VHT20) UNII Band



Test Plots (26dB Bandwidth)

802.11n(HT40) UNII Band



802.11ac(VHT40) UNII Band



802.11ac(VHT80) UNII Band



**10.7.2 6dB Bandwidth**

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

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6dB Bandwidth [MHz]	Limit [MHz]
802.11n(HT40)	UNII 3	5710	142	5727.68	2.68	> 0.5
802.11ac(VHT40)				5727.68	2.68	> 0.5

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

**Note:**

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

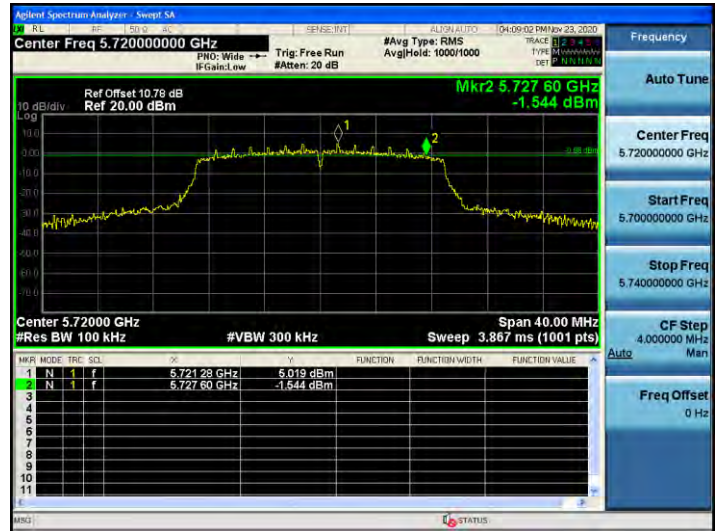


☐ Test Plots(UNII 3 Band 6dB Bandwidth)

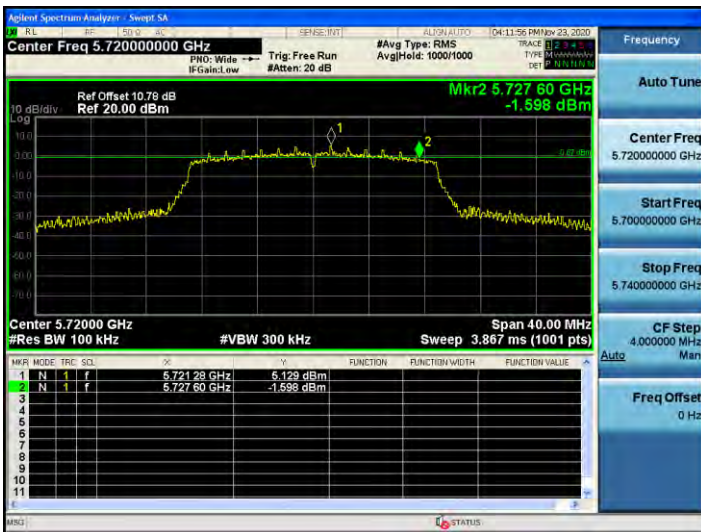
802.11a CH.144



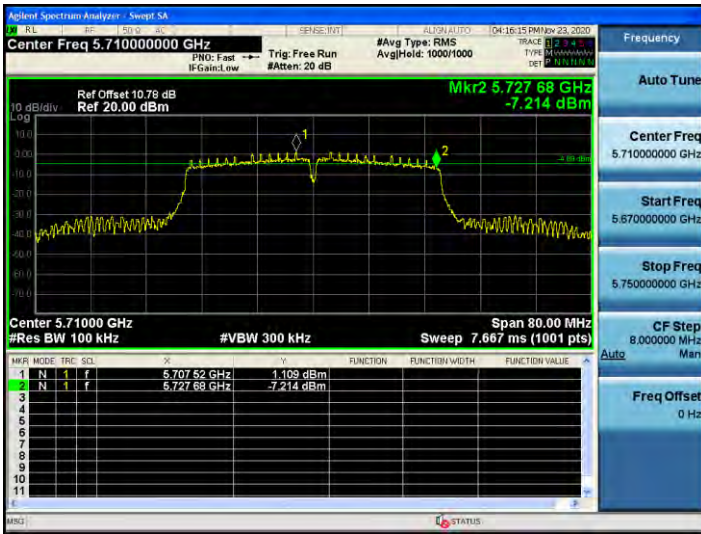
802.11n\_HT20 CH.144



802.11ac\_VHT20 CH.144



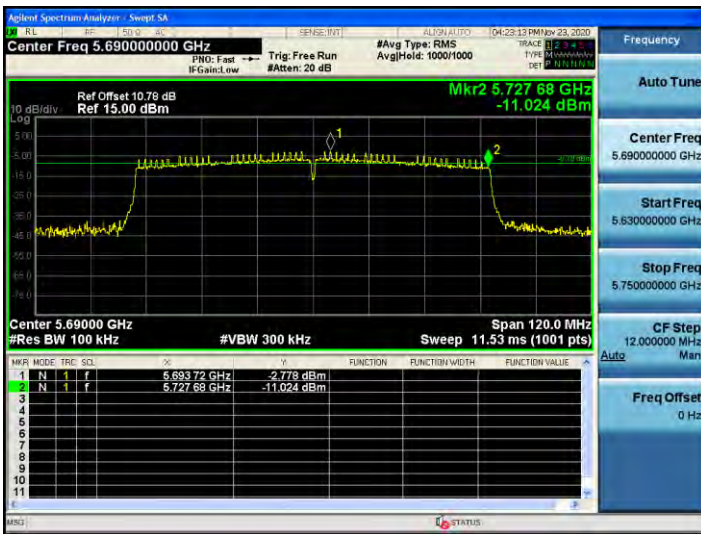
802.11n\_HT40 CH.142



802.11ac\_VHT40 CH.142



802.11ac\_VHT80 CH.138



**10.7.3 Output Power**

Mode	Frequency [MHz]	Channel	Measured Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)
802.11a	5720 (UNII 2C Band)	144	14.68	0.706	15.38	22.70
802.11n(HT20)			13.24	0.966	14.21	22.75
802.11ac(VHT20)			13.17	1.031	14.20	22.74
802.11a	5720 (UNII 3 Band)	144	7.19	0.706	7.90	30.00
802.11n(HT20)			6.14	0.966	7.10	30.00
802.11ac(VHT20)			6.06	1.031	7.09	30.00

Mode	Frequency [MHz]	Channel	Measured Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)
802.11n(HT40)	5710 (UNII 2C Band)	142	12.85	0.902	13.75	23.98
802.11ac(VHT40)			13.50	1.166	14.66	23.98
802.11n(HT40)	5710 (UNII 3 Band)	142	0.68	0.902	1.58	30.00
802.11ac(VHT40)			1.33	1.166	2.50	30.00

Mode	Frequency [MHz]	Channel	Measured Power (dBm)	Duty Cycle Factor (dB)	Total Power (dBm)	Limit (dBm)
802.11ac(VHT80)	5690 (UNII 2C Band)	138	11.31	0.922	12.23	23.98
	5690 (UNII 3 Band)	138	-4.02	0.922	-3.10	30.00

**Test Plots**

**802.11a UNII 2C Band**



**802.11a UNII 3 Band**



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



**802.11n(HT20) UNII 3 Band**



**802.11ac(VHT20) UNII 2C Band**

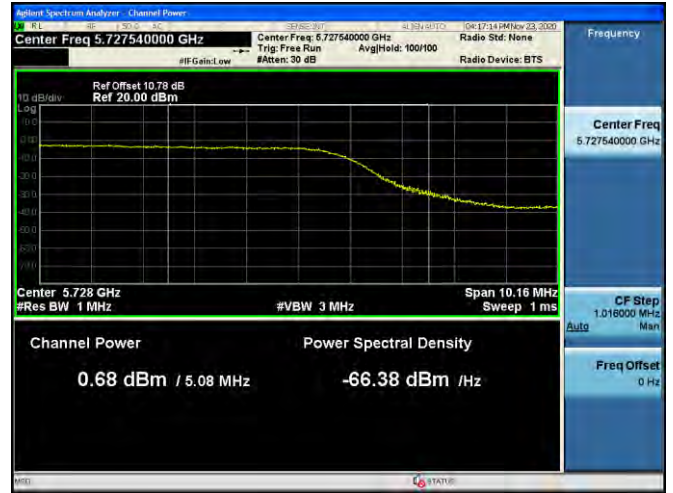


**802.11ac(VHT20) UNII 3 Band**



**802.11n(HT40) UNII 2C Band**

**802.11n(HT40) UNII 3 Band**



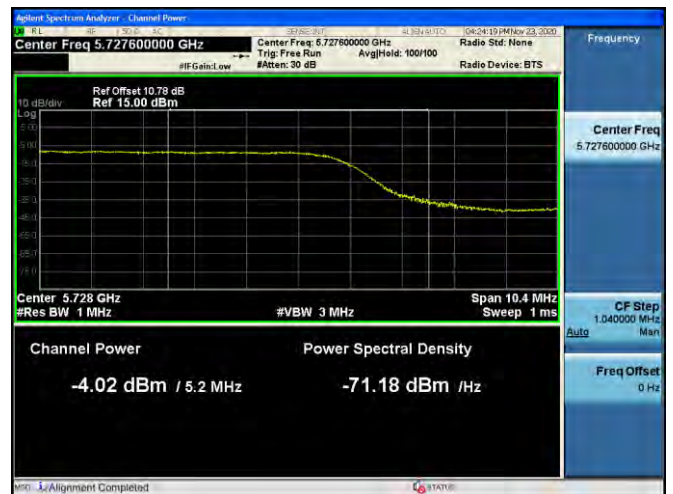
**802.11ac(VHT40) UNII 2C Band**

**802.11ac(VHT40) UNII 3 Band**



**802.11ac(VHT80) UNII 2C Band**

**802.11ac(VHT80) UNII 3 Band**



**10.7.4 Power Spectral Density**

Mode	Frequency [MHz]	Channel	Measured Density (dBm)	Duty Cycle Factor (dB)	Total PSD (dBm)	Limit (dBm)
802.11a	5720 (UNII 2C Band)	144	5.499	0.706	6.205	11dBm/ MHz
802.11n(HT20)			4.158	0.966	5.124	
802.11ac(VHT20)			4.066	1.031	5.097	
802.11a	5720 (UNII 3 Band)	144	0.844	0.706	1.550	30 dBm/ 500kHz
802.11n(HT20)			-0.665	0.966	0.301	
802.11ac(VHT20)			-0.791	1.031	0.240	

Mode	Frequency [MHz]	Channel	Measured Density (dBm)	Duty Cycle Factor (dB)	Total PSD (dBm)	Limit (dBm)
802.11n(HT40)	5710 (UNII 2C Band)	142	0.250	0.902	1.152	11dBm/ MHz
802.11ac(VHT40)			0.596	1.166	1.762	
802.11n(HT40)	5710 (UNII 3 Band)	142	-6.267	0.902	-5.365	30 dBm/ 500kHz
802.11ac(VHT40)			-5.591	1.166	-4.425	

Mode	Frequency [MHz]	Channel	Measured Density (dBm)	Duty Cycle Factor (dB)	Total PSD (dBm)	Limit (dBm)
802.11ac(VHT80)	5690 (UNII 2C Band)	138	-4.333	0.922	-3.411	11dBm/ MHz
	5690 (UNII 3 Band)	138	-11.743	0.922	-10.821	30 dBm/ 500kHz

☐ Test Plots

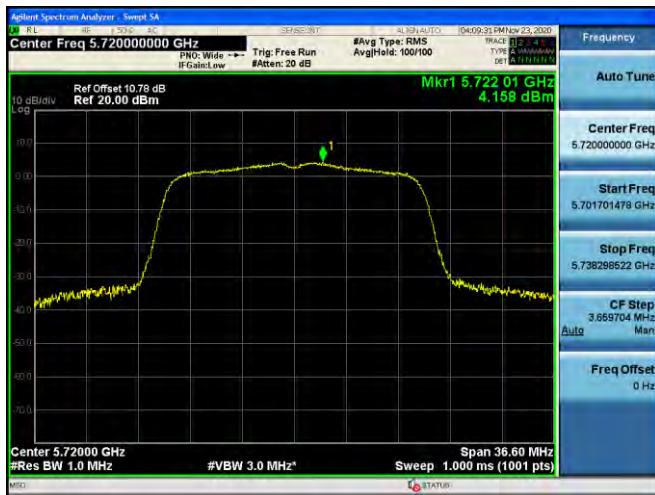
802.11a UNII 2C Band



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



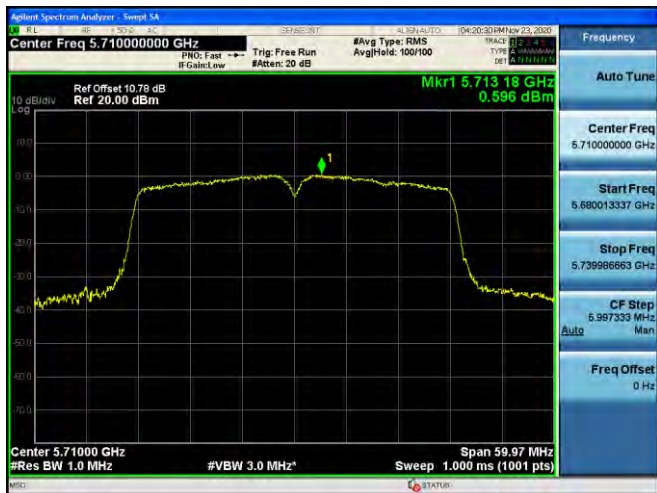
**802.11n(HT40) UNII 2C Band**



**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 =  $40\log(\text{specific distance} / \text{test distance})$  (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	44.19	9.17	V	53.36	68.20	14.84	PK
15540	40.71	13.42	V	54.13	73.98	19.85	PK
15540	27.00	13.42	V	40.42	53.98	13.56	AV
10360	44.68	9.17	H	53.85	68.20	14.35	PK
15540	40.58	13.42	H	54.00	73.98	19.98	PK
15540	26.88	13.42	H	40.30	53.98	13.68	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	43.99	9.57	V	53.56	68.20	14.64	PK
15600	39.72	13.16	V	52.88	73.98	21.10	PK
15600	26.51	13.16	V	39.67	53.98	14.31	AV
10400	44.28	9.57	H	53.85	68.20	14.35	PK
15600	40.29	13.16	H	53.45	73.98	20.53	PK
15600	26.54	13.16	H	39.70	53.98	14.28	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	43.89	9.94	V	53.83	68.20	14.37	PK
15720	40.10	13.28	V	53.38	73.98	20.60	PK
15720	26.55	13.28	V	39.83	53.98	14.15	AV
10480	44.45	9.94	H	54.39	68.20	13.81	PK
15720	39.78	13.28	H	53.06	73.98	20.92	PK
15720	26.63	13.28	H	39.91	53.98	14.07	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	43.86	9.96	V	53.82	68.20	14.38	PK
15780	40.35	13.29	V	53.64	73.98	20.34	PK
15780	27.21	13.29	V	40.50	53.98	13.48	AV
10520	43.41	9.96	H	53.37	68.20	14.83	PK
15780	40.44	13.29	H	53.73	73.98	20.25	PK
15780	27.33	13.29	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	42.67	10.34	V	53.01	73.98	20.97	PK
10600	29.49	10.34	V	39.83	53.98	14.15	AV
15900	41.05	13.19	V	54.24	73.98	19.74	PK
15900	27.69	13.19	V	40.88	53.98	13.10	AV
10600	42.34	10.34	H	52.68	73.98	21.30	PK
10600	29.45	10.34	H	39.79	53.98	14.19	AV
15900	40.89	13.19	H	54.08	73.98	19.90	PK
15900	27.59	13.19	H	40.78	53.98	13.20	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	43.32	10.30	V	53.62	73.98	20.36	PK
10640	29.52	10.30	V	39.82	53.98	14.16	AV
15960	41.47	12.29	V	53.76	73.98	20.22	PK
15960	27.53	12.29	V	39.82	53.98	14.16	AV
10640	43.29	10.30	H	53.59	73.98	20.39	PK
10640	29.47	10.30	H	39.77	53.98	14.21	AV
15960	41.32	12.29	H	53.61	73.98	20.37	PK
15960	27.49	12.29	H	39.78	53.98	14.20	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	42.42	11.12	V	53.54	73.98	20.44	PK
11000	29.19	11.12	V	40.31	53.98	13.67	AV
16500	42.28	12.50	V	54.78	68.20	13.42	PK
11000	42.19	11.12	H	53.31	73.98	20.67	PK
11000	29.05	11.12	H	40.17	53.98	13.81	AV
16500	42.27	12.50	H	54.77	68.20	13.43	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	42.82	11.12	V	53.94	73.98	20.04	PK
11200	29.15	11.12	V	40.27	53.98	13.71	AV
16800	41.50	13.64	V	55.14	68.20	13.06	PK
11200	42.41	11.12	H	53.53	73.98	20.45	PK
11200	29.07	11.12	H	40.19	53.98	13.79	AV
16800	41.29	13.64	H	54.93	68.20	13.27	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	41.26	11.26	V	52.52	73.98	21.46	PK
11440	28.21	11.26	V	39.47	53.98	14.51	AV
17160	40.92	14.70	V	55.62	68.20	12.58	PK
11440	41.83	11.26	H	53.09	73.98	20.89	PK
11440	28.41	11.26	H	39.67	53.98	14.31	AV
17160	41.26	14.70	H	55.96	68.20	12.24	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	42.51	11.54	V	54.05	73.98	19.93	PK
11490	29.02	11.54	V	40.56	53.98	13.42	AV
17235	41.55	15.28	V	56.83	68.20	11.37	PK
11490	42.33	11.54	H	53.87	73.98	20.11	PK
11490	28.54	11.54	H	40.08	53.98	13.90	AV
17235	41.81	15.28	H	57.09	68.20	11.11	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	43.23	10.94	V	54.17	73.98	19.81	PK
11570	29.91	10.94	V	40.85	53.98	13.13	AV
17355	40.82	15.94	V	56.76	68.20	11.44	PK
11570	42.05	10.94	H	52.99	73.98	20.99	PK
11570	28.94	10.94	H	39.88	53.98	14.10	AV
17355	40.41	15.94	H	56.35	68.20	11.85	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	43.63	10.39	V	54.02	73.98	19.96	PK
11650	30.11	10.39	V	40.50	53.98	13.48	AV
17475	40.51	17.24	V	57.75	68.20	10.45	PK
11650	43.33	10.39	H	53.72	73.98	20.26	PK
11650	30.04	10.39	H	40.43	53.98	13.55	AV
17475	40.76	17.24	H	58.00	68.20	10.20	PK

**Note:**

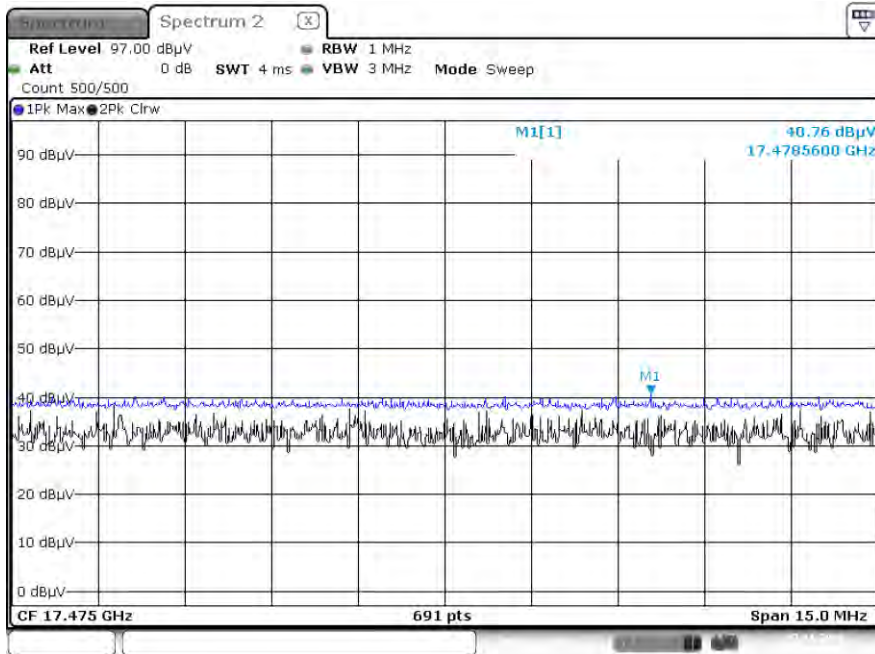
All Modes of operation were investigated and the worst case configuration results are reported.

[Worst case]

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

■ Test Plots

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



**Note:**

Only the worst case plots for Radiated Spurious Emissions.



**10.9 RADIATED RESTRICTED BAND EDGE**

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

Frequency [MHz]	Reading dBuV	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	54.54	8.02	H	62.56	73.98	11.42	PK
5150	38.00	8.02	H	46.02	53.98	7.96	AV
5150	55.62	8.02	V	63.64	73.98	10.34	PK
5150	36.70	8.02	V	44.72	53.98	9.26	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+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	58.04	7.87	H	65.91	73.98	8.07	PK
5350	36.76	7.87	H	44.63	53.98	9.35	AV
5350	55.90	7.87	V	63.77	73.98	10.21	PK
5350	36.22	7.87	V	44.09	53.98	9.89	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+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	49.67	8.35	H	58.02	73.98	15.96	PK
5460	33.44	8.35	H	41.79	53.98	12.19	AV
5470	55.50	8.31	H	63.81	68.20	4.39	PK
5460	48.91	8.35	V	57.26	73.98	16.72	PK
5460	33.08	8.31	V	41.39	53.98	12.59	AV
5470	54.73	8.31	V	63.04	68.20	5.16	PK

Band : UNII 2C  
 Operation Mode: 802.11 a  
 Transfer Rate: 6 Mbps  
 Operating Frequency 5520 MHz  
 Channel No. 104 Ch

Frequency [MHz]	Reading DBuV	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	45.67	8.35	H	54.02	73.98	19.96	PK
5460	32.83	8.35	H	41.18	53.98	12.80	AV
5470	49.46	8.31	H	57.77	68.20	10.43	PK
5460	45.18	8.35	V	53.53	73.98	20.45	PK
5460	32.56	8.31	V	40.87	53.98	13.11	AV
5470	48.66	8.31	V	56.97	68.20	11.23	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	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	57.84	8.02	H	65.86	73.98	8.12	PK
5150	35.11	8.02	H	43.13	53.98	10.85	AV
5150	56.87	8.02	V	64.89	73.98	9.09	PK
5150	34.02	8.02	V	42.04	53.98	11.94	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	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	55.39	7.87	H	63.26	73.98	10.72	PK
5350	35.74	7.87	H	43.61	53.98	10.37	AV
5350	54.48	7.87	V	62.35	73.98	11.63	PK
5350	34.56	7.87	V	42.43	53.98	11.55	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	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	49.22	8.35	H	57.57	73.98	16.41	PK
5460	33.56	8.35	H	41.91	53.98	12.07	AV
5470	56.94	8.31	H	65.25	68.20	2.95	PK
5460	48.87	8.35	V	57.22	73.98	16.76	PK
5460	32.64	8.31	V	40.95	53.98	13.03	AV
5470	56.26	8.31	V	64.57	68.20	3.63	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	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	45.72	8.35	H	54.07	73.98	19.91	PK
5460	32.81	8.35	H	41.16	53.98	12.82	AV
5470	49.24	8.31	H	57.55	68.20	10.65	PK
5460	45.63	8.35	V	53.98	73.98	20.00	PK
5460	32.25	8.31	V	40.56	53.98	13.42	AV
5470	48.55	8.31	V	56.86	68.20	11.34	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	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	54.92	8.02	H	62.94	73.98	11.04	PK
5150	34.90	8.02	H	42.92	53.98	11.06	AV
5150	54.36	8.02	V	62.38	73.98	11.60	PK
5150	33.47	8.02	V	41.49	53.98	12.49	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	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	57.66	7.87	H	65.53	73.98	8.45	PK
5350	36.53	7.87	H	44.4	53.98	9.58	AV
5350	56.72	7.87	V	64.59	73.98	9.39	PK
5350	35.68	7.87	V	43.55	53.98	10.43	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	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	50.19	8.35	H	58.54	73.98	15.44	PK
5460	33.73	8.35	H	42.08	53.98	11.90	AV
5470	56.25	8.31	H	64.56	68.20	3.64	PK
5460	49.72	8.35	V	58.07	73.98	15.91	PK
5460	33.51	8.31	V	41.82	53.98	12.16	AV
5470	55.68	8.31	V	63.99	68.20	4.21	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	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	45.68	8.35	H	54.03	73.98	19.95	PK
5460	32.92	8.35	H	41.27	53.98	12.71	AV
5470	48.25	8.31	H	56.56	68.20	11.64	PK
5460	45.09	8.35	V	53.44	73.98	20.54	PK
5460	32.43	8.31	V	40.74	53.98	13.24	AV
5470	47.53	8.31	V	55.84	68.20	12.36	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	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	60.28	8.02	H	68.30	73.98	5.68	PK
5150	39.82	8.02	H	47.84	53.98	6.14	AV
5150	59.84	8.02	V	67.86	73.98	6.12	PK
5150	39.70	8.02	V	47.72	53.98	6.26	AV

Band : UNII 2A  
 Operation Mode: 802.11 n\_HT40  
 Transfer MCS Index: 0  
 Operating Frequency 5270 MHz  
 Channel No. 54 Ch

Frequency [MHz]	Reading dBuV	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	47.07	7.87	H	54.94	73.98	19.04	PK
5350	34.43	7.87	H	42.3	53.98	11.68	AV
5350	45.94	7.87	V	53.81	73.98	20.17	PK
5350	33.68	7.87	V	41.55	53.98	12.43	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	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	61.79	7.87	H	69.66	73.98	4.32	PK
5350	40.43	7.87	H	48.3	53.98	5.68	AV
5350	60.25	7.87	V	68.12	73.98	5.86	PK
5350	39.17	7.87	V	47.04	53.98	6.94	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	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	46.29	8.35	H	54.64	73.98	19.34	PK
5460	33.44	8.35	H	41.79	53.98	12.19	AV
5470	54.09	8.31	H	62.4	68.20	5.80	PK
5460	45.86	8.35	V	54.21	73.98	19.77	PK
5460	33.32	8.31	V	41.63	53.98	12.35	AV
5470	53.24	8.31	V	61.55	68.20	6.65	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	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	45.75	8.35	H	54.10	73.98	19.88	PK
5460	33.39	8.35	H	41.74	53.98	12.24	AV
5470	47.25	8.31	H	55.56	68.20	12.64	PK
5460	45.32	8.35	V	53.67	73.98	20.31	PK
5460	33.02	8.31	V	41.33	53.98	12.65	AV
5470	46.63	8.31	V	54.94	68.20	13.26	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	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	57.47	8.02	H	65.49	73.98	8.49	PK
5150	40.66	8.02	H	48.68	53.98	5.30	AV
5150	57.13	8.02	V	65.15	73.98	8.83	PK
5150	40.02	8.02	V	48.04	53.98	5.94	AV

Band : UNII 2A  
 Operation Mode: 802.11 ac\_VHT40  
 Transfer MCS Index: 0  
 Operating Frequency 5270 MHz  
 Channel No. 54 Ch

Frequency [MHz]	Reading dBuV	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	48.43	7.87	H	56.30	73.98	17.68	PK
5350	34.33	7.87	H	42.2	53.98	11.78	AV
5350	48.12	7.87	V	55.99	73.98	17.99	PK
5350	33.69	7.87	V	41.56	53.98	12.42	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	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	61.96	7.87	H	69.83	73.98	4.15	PK
5350	40.16	7.87	H	48.03	53.98	5.95	AV
5350	60.28	7.87	V	68.15	73.98	5.83	PK
5350	39.52	7.87	V	47.39	53.98	6.59	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	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	46.33	8.35	H	54.68	73.98	19.30	PK
5460	33.86	8.35	H	42.21	53.98	11.77	AV
5470	51.61	8.31	H	59.92	68.20	8.28	PK
5460	45.62	8.35	V	53.97	73.98	20.01	PK
5460	33.24	8.31	V	41.55	53.98	12.43	AV
5470	50.89	8.31	V	59.2	68.20	9.00	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	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	45.73	8.35	H	54.08	73.98	19.90	PK
5460	33.39	8.35	H	41.74	53.98	12.24	AV
5470	46.56	8.31	H	54.87	68.20	13.33	PK
5460	44.69	8.35	V	53.04	73.98	20.94	PK
5460	32.87	8.31	V	41.18	53.98	12.80	AV
5470	45.78	8.31	V	54.09	68.20	14.11	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	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	54.84	8.02	H	62.86	73.98	11.12	PK
5150	40.20	8.02	H	48.22	53.98	5.76	AV
5150	54.12	8.02	V	62.14	73.98	11.84	PK
5150	38.43	8.02	V	46.45	53.98	7.53	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	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	60.99	7.87	H	68.86	73.98	5.12	PK
5350	42.88	7.87	H	50.75	53.98	3.23	AV
5350	58.62	7.87	V	66.49	73.98	7.49	PK
5350	42.70	7.87	V	50.57	53.98	3.41	AV

Band : UNII 2C  
 Operation Mode: 802.11 ac\_VHT80  
 Transfer MCS Index: 0  
 Operating Frequency 5530 MHz  
 Channel No. 106 Ch

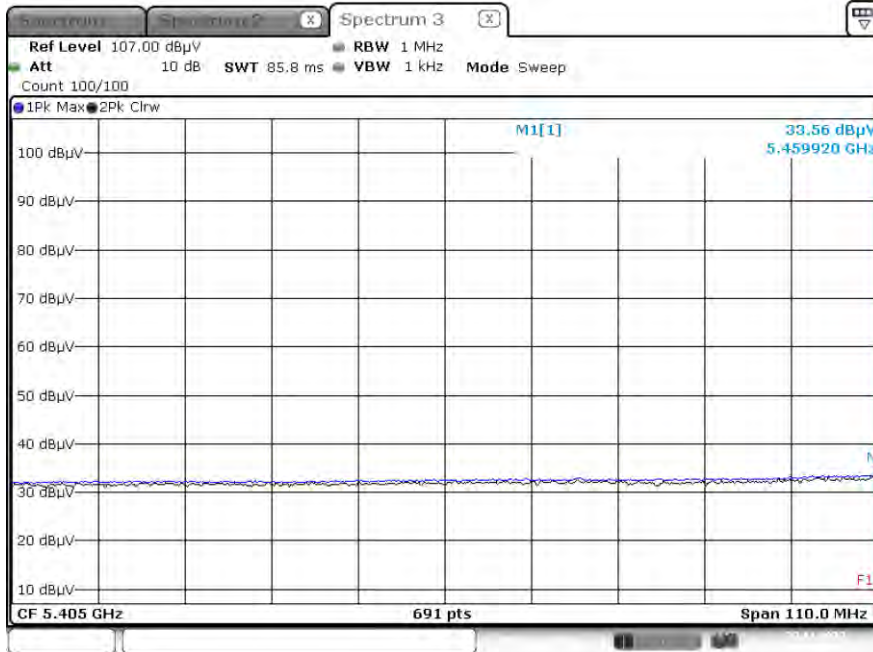
Frequency [MHz]	Reading DBuV	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	50.63	8.35	H	58.98	73.98	15.00	PK
5460	36.85	8.35	H	45.2	53.98	8.78	AV
5470	53.16	8.31	H	61.47	68.20	6.73	PK
5460	50.03	8.35	V	58.38	73.98	15.60	PK
5460	36.24	8.31	V	44.55	53.98	9.43	AV
5470	52.47	8.31	V	60.78	68.20	7.42	PK

Band : UNII 2C  
 Operation Mode: 802.11 ac\_VHT80  
 Transfer MCS Index: 0  
 Operating Frequency 5610 MHz  
 Channel No. 122 Ch

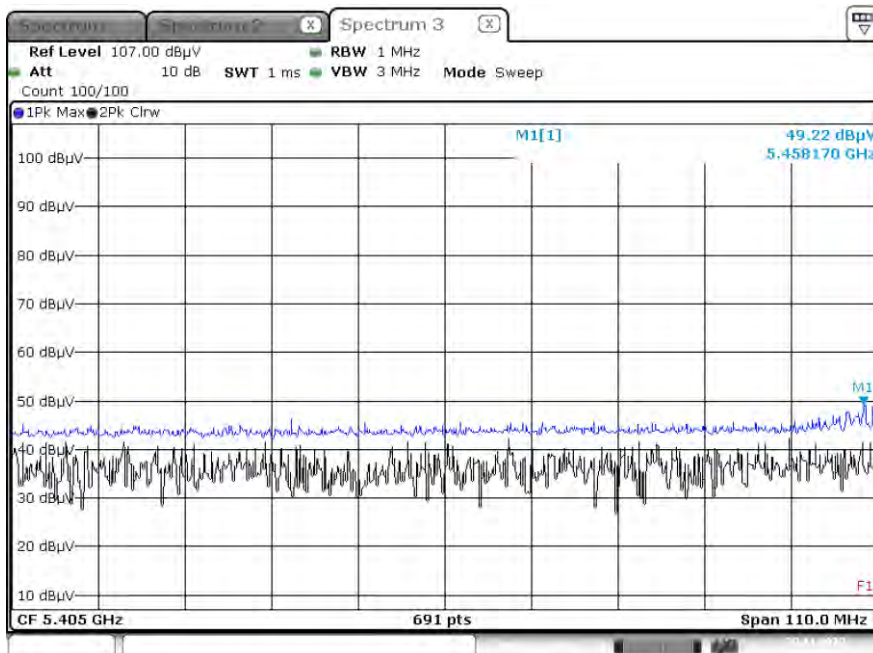
Frequency [MHz]	Reading DBuV	A.F+C.L- A.G+ATT+D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	45.13	8.35	H	53.48	73.98	20.50	PK
5460	33.38	8.35	H	41.73	53.98	12.25	AV
5470	45.86	8.31	H	54.17	68.20	14.03	PK
5460	44.62	8.35	V	52.97	73.98	21.01	PK
5460	33.08	8.31	V	41.39	53.98	12.59	AV
5470	45.22	8.31	V	53.53	68.20	14.67	PK

■ Test Plots(UNII 1, 2A, 2C)

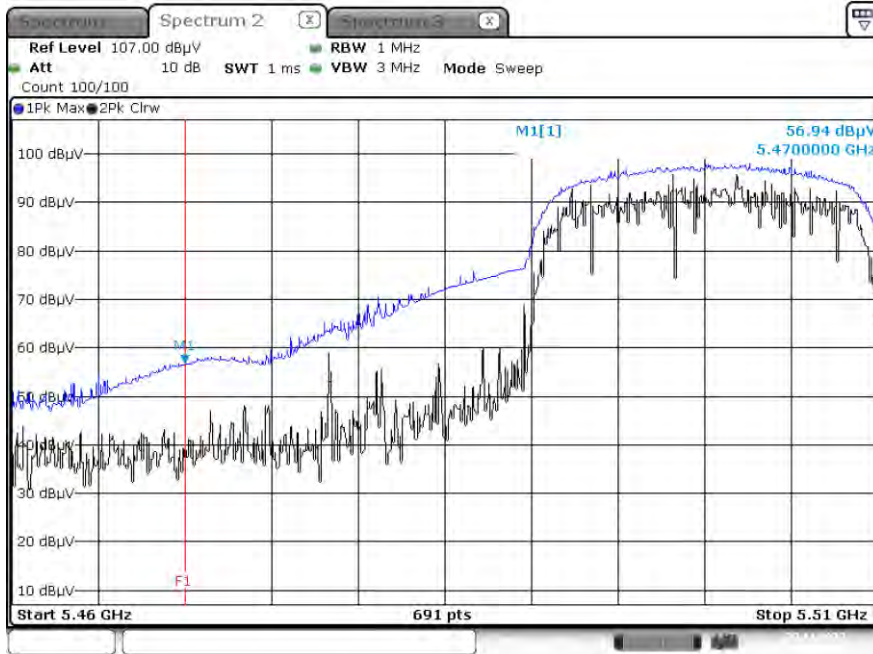
Average Reading (802.11 n(HT20)\_MCS0, Ch.100, Y-H)



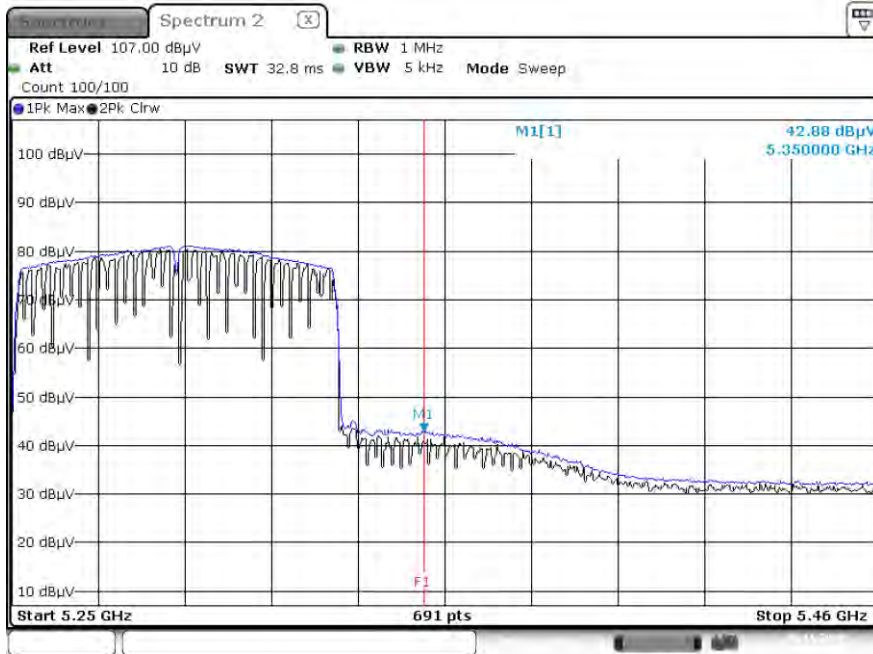
Peak Reading (802.11 n(HT20)\_MCS0, Ch.100, Y-H)



Peak Reading (802.11 n(HT20)\_MCS0, Ch.100, Y-H)

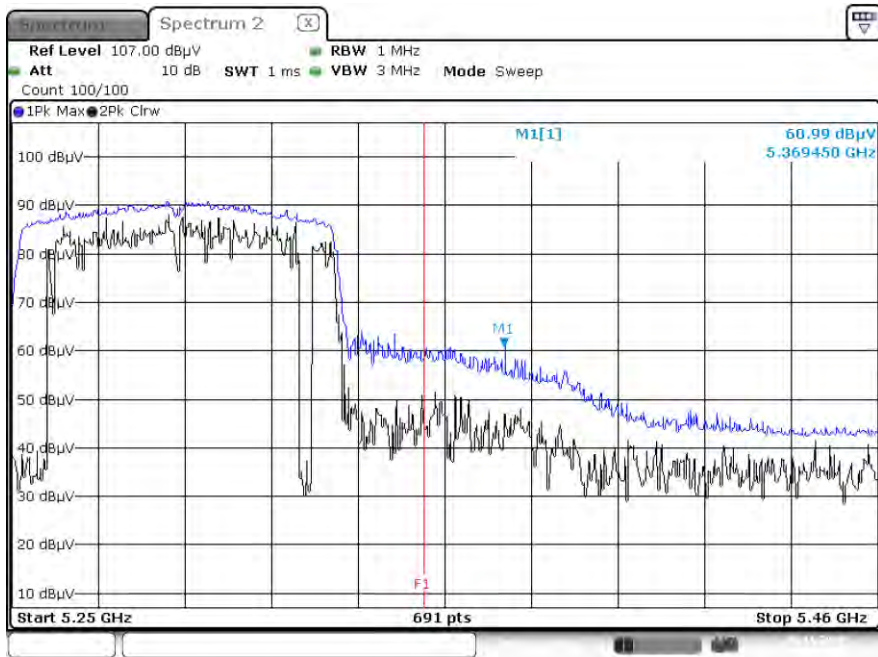


Average Reading (802.11 ac(VHT80)\_MCS0, Ch.58, Y-H)





Peak Reading (802.11 ac(VHT80)\_MCS0, Ch.58, Y-H)

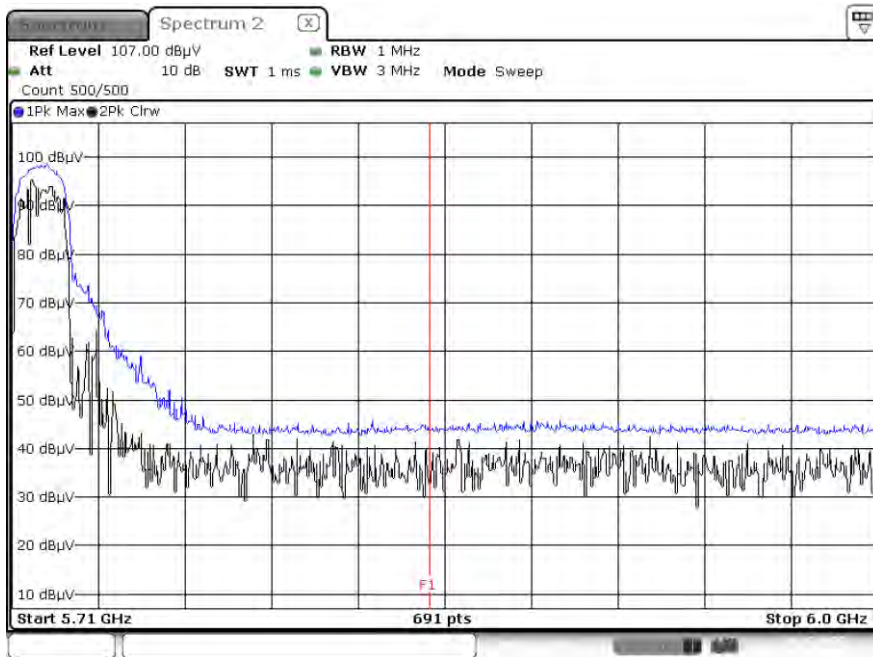


**Note:**

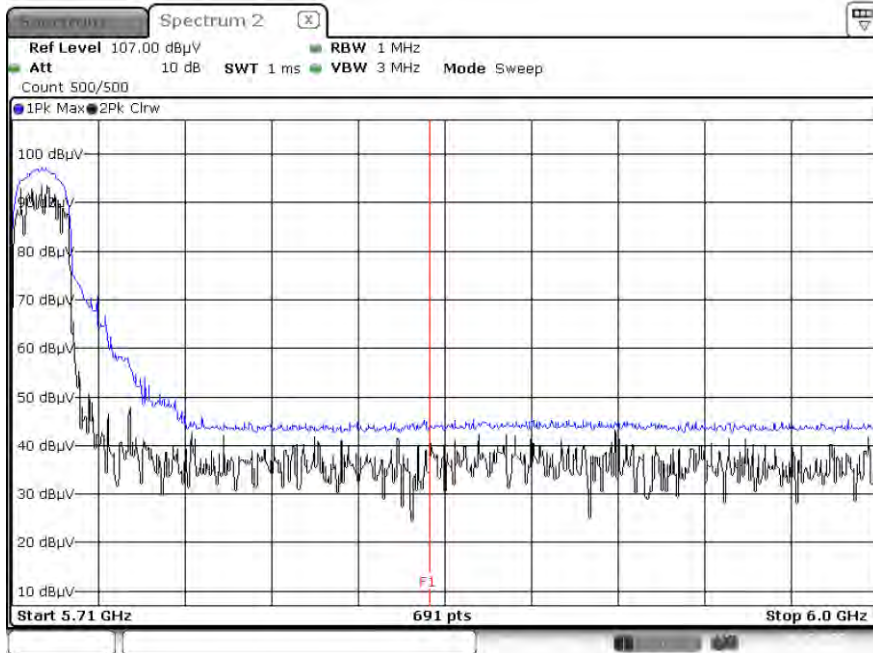
Only the worst case plots for Radiated Restricted Band Edge.

▣ Test Plots(Straddle Channel)

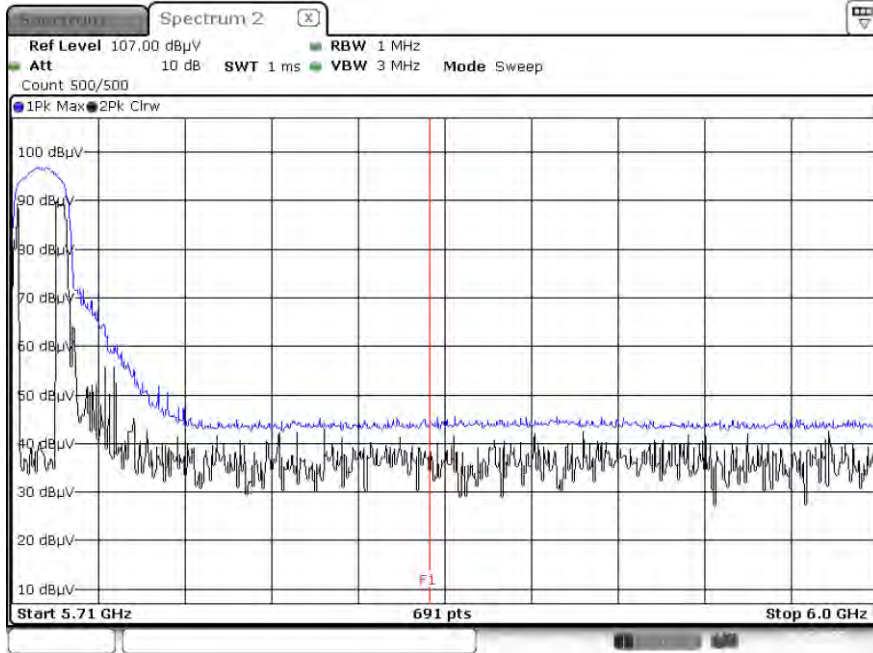
Peak Reading (802.11a, Ch.144, Y-H)



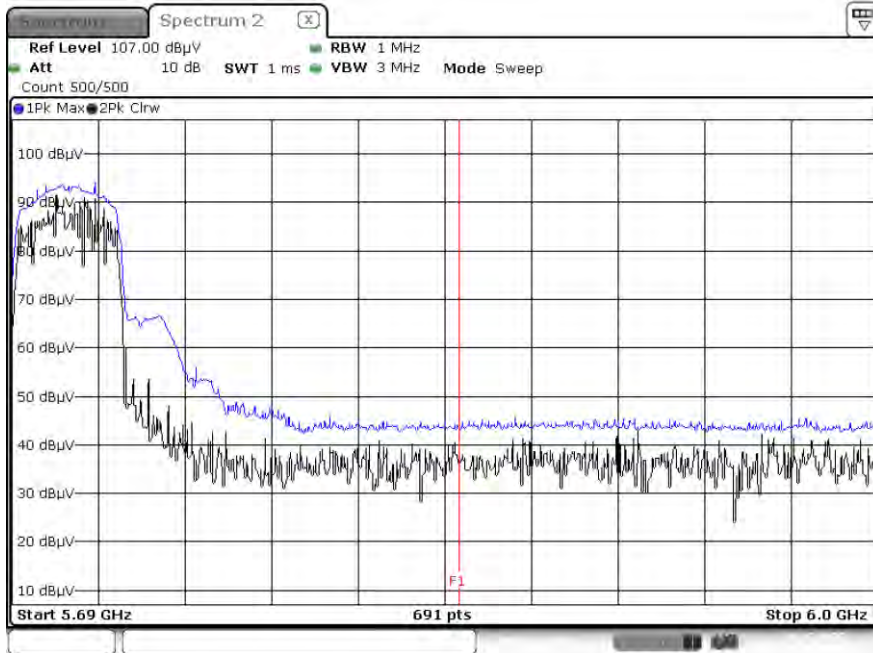
Peak Reading (802.11n\_HT20, Ch.144, Y-H)



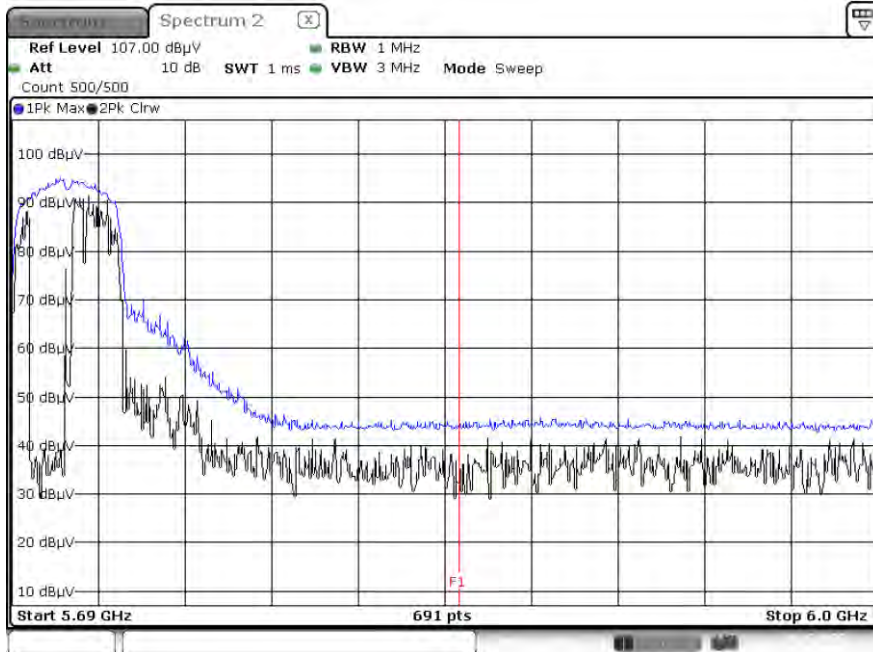
Peak Reading (802.11ac\_VHT20, Ch.144, Y-H)



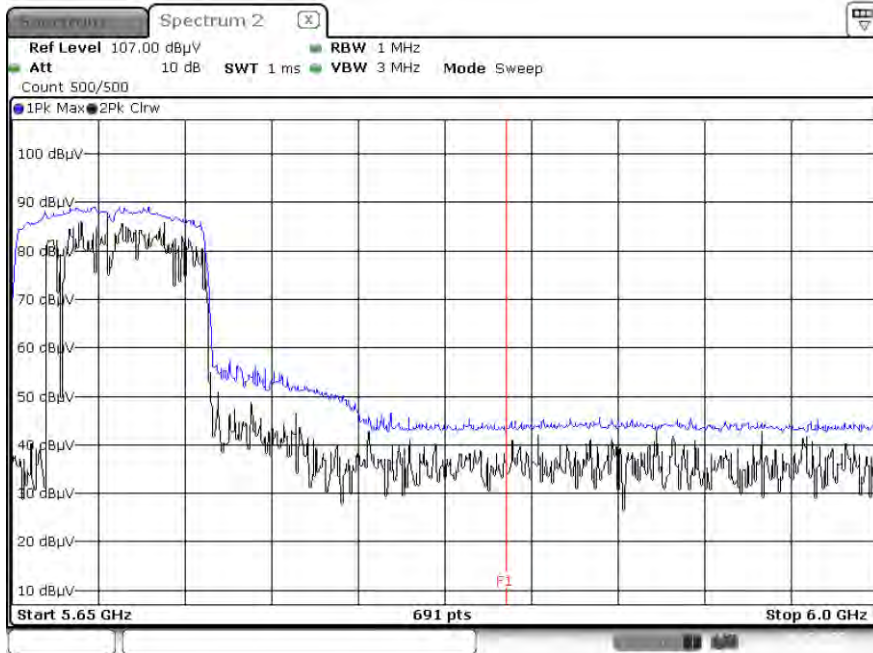
Peak Reading (802.11n\_HT40, Ch.142, Y-H)



Peak Reading (802.11ac\_VHT40, Ch.142, Y-H)



Peak Reading (802.11ac\_VHT80, Ch.138, Y-H)

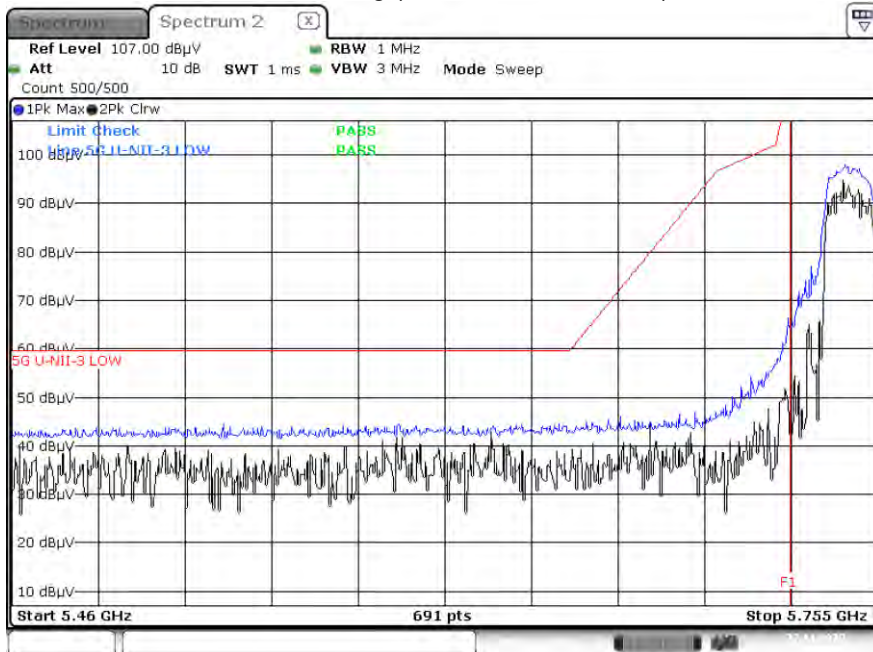


**Note :**

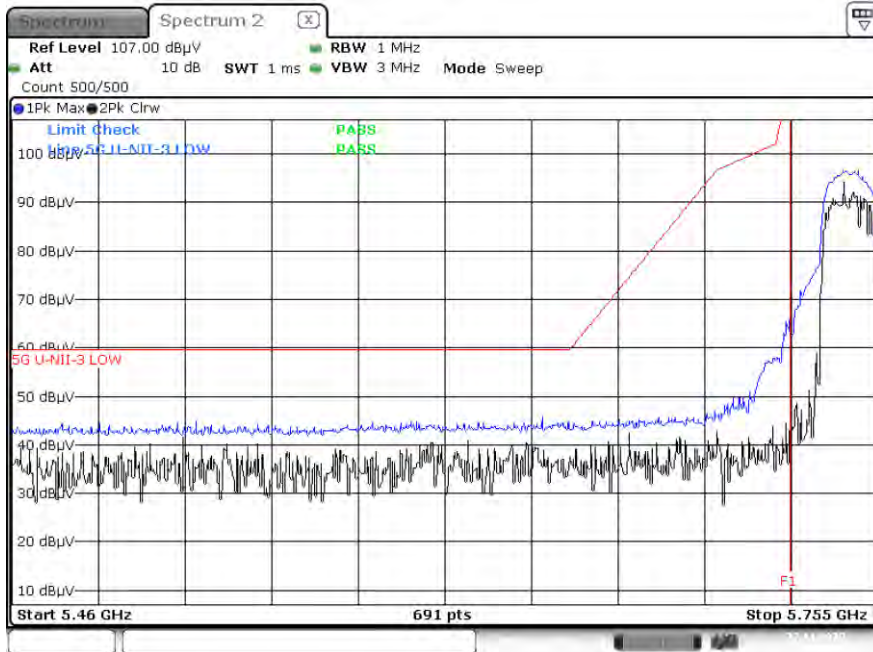
1. Only the worst case plots for Radiated Restricted Band Edge.
2. Red line : 5 850 MHz
3. Ambient Noise (Because of ambient noise, We attached only the worst plot without a data table)

▣ Test Plots(UNII 3)

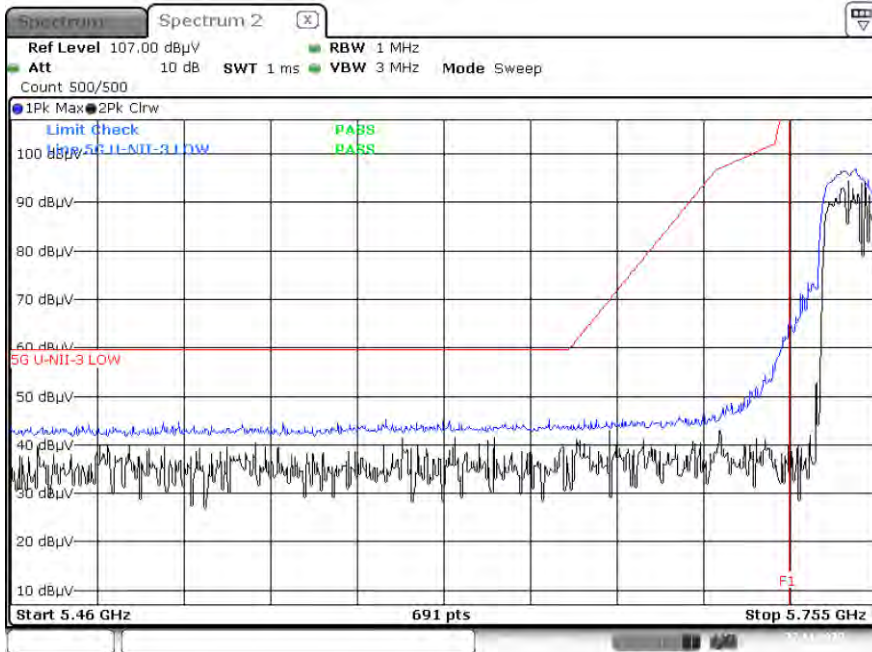
Peak Reading (802.11a, Ch.149, Y-H)



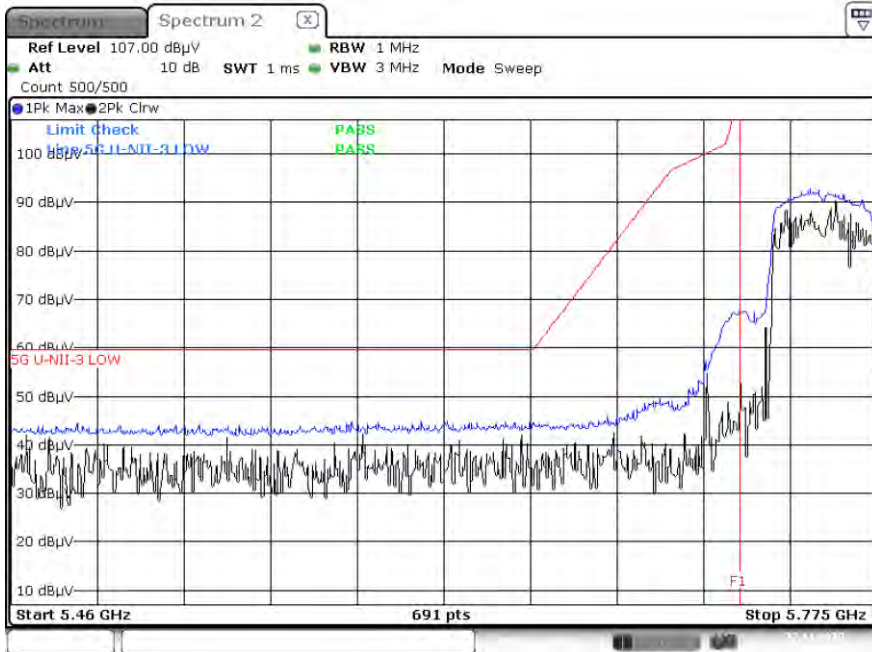
Peak Reading (802.11n\_HT20, Ch.149, Y-H)



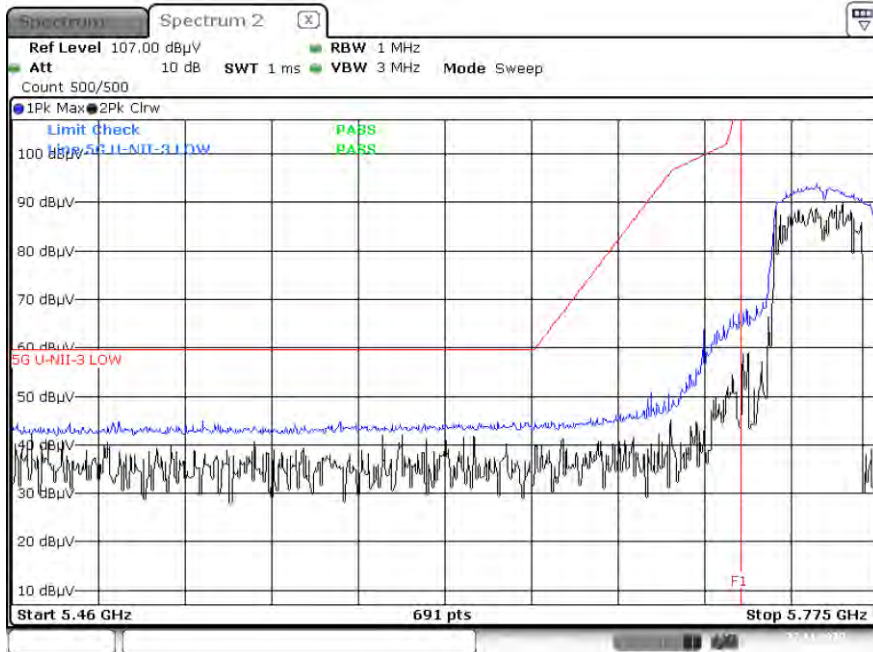
Peak Reading (802.11ac\_VHT20, Ch.149, Y-H)



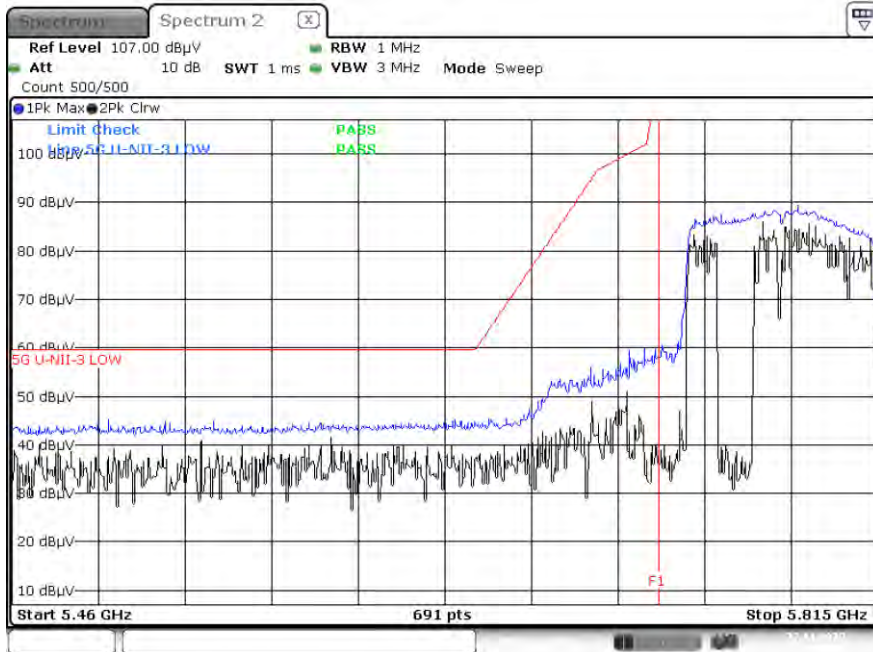
Peak Reading (802.11n\_HT40, Ch.151, Y-H)



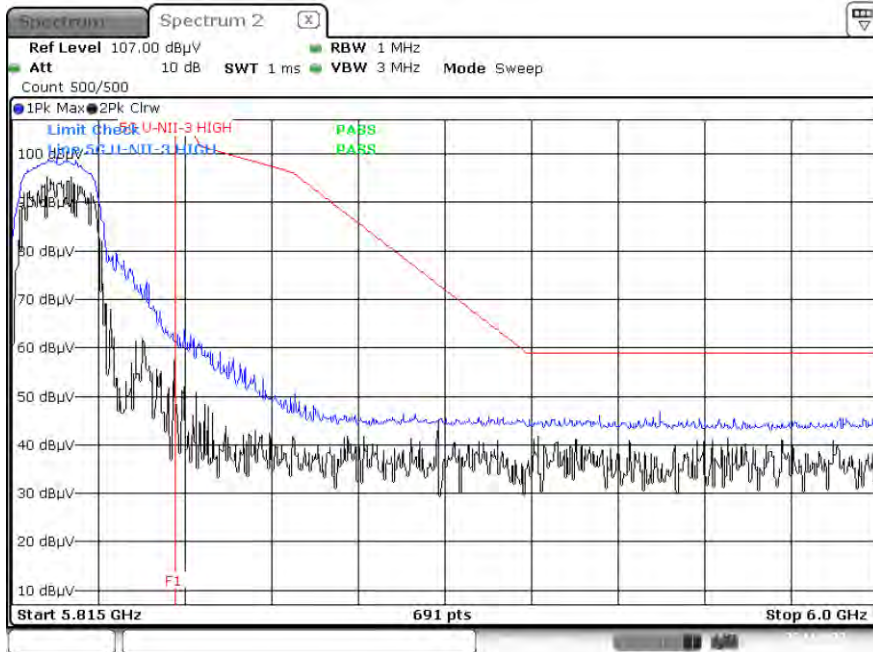
Peak Reading (802.11ac\_VHT40, Ch.151, Y-H)



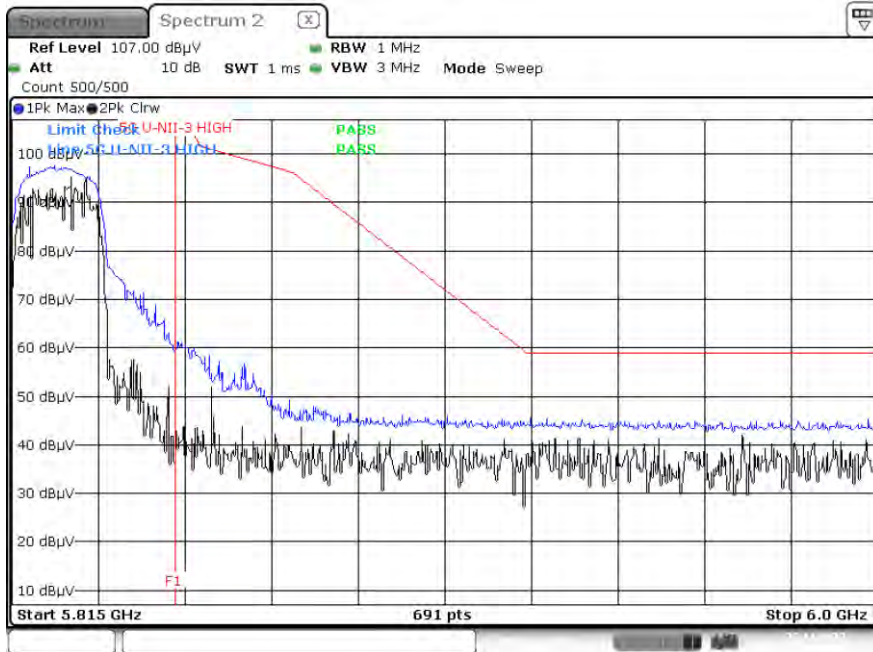
Peak Reading (802.11ac\_VHT80, Ch.155, Y-H)



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

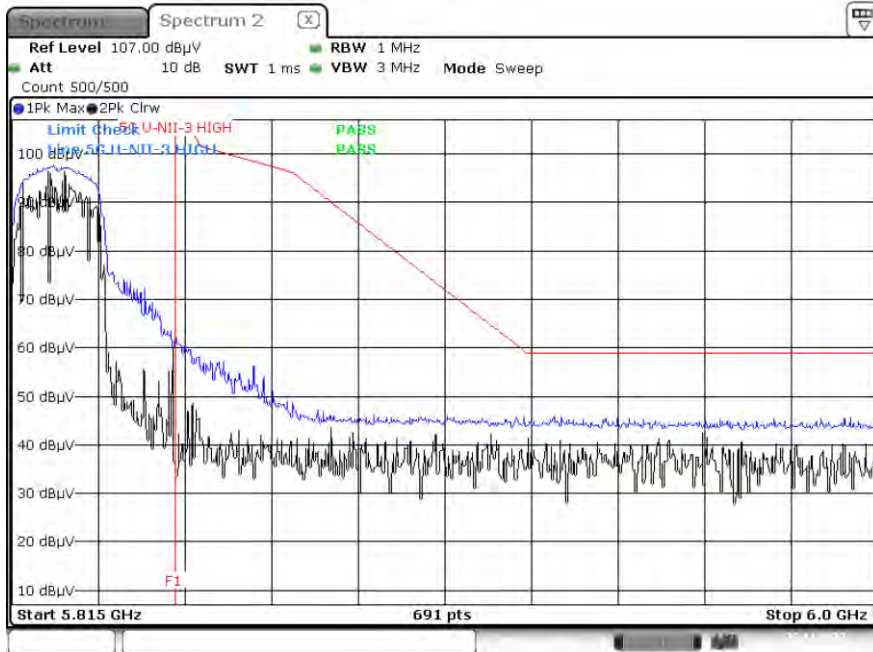


Peak Reading (802.11n\_HT20, Ch.165, Y-H)

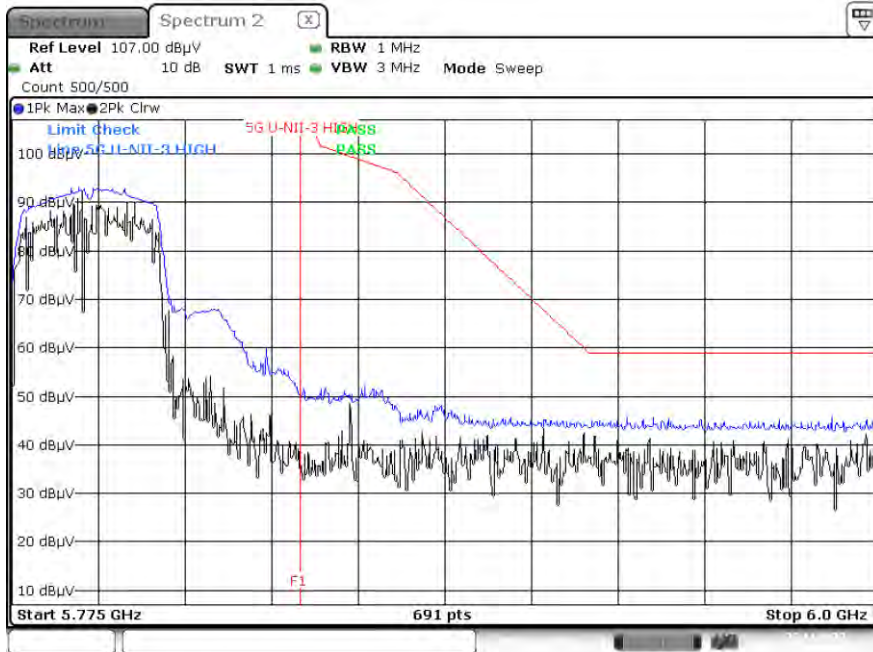




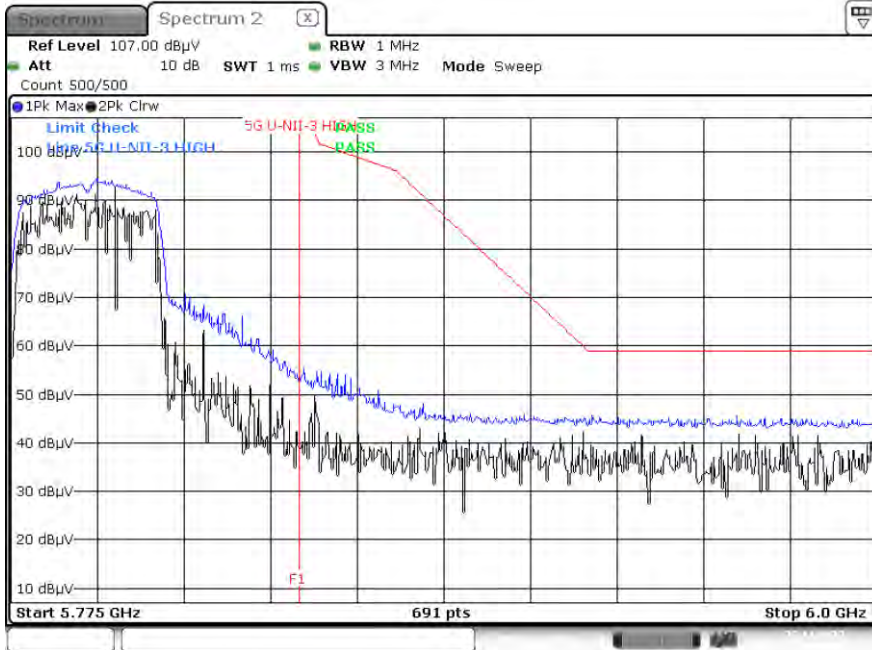
Peak Reading (802.11ac\_VHT20, Ch.165, Y-H)



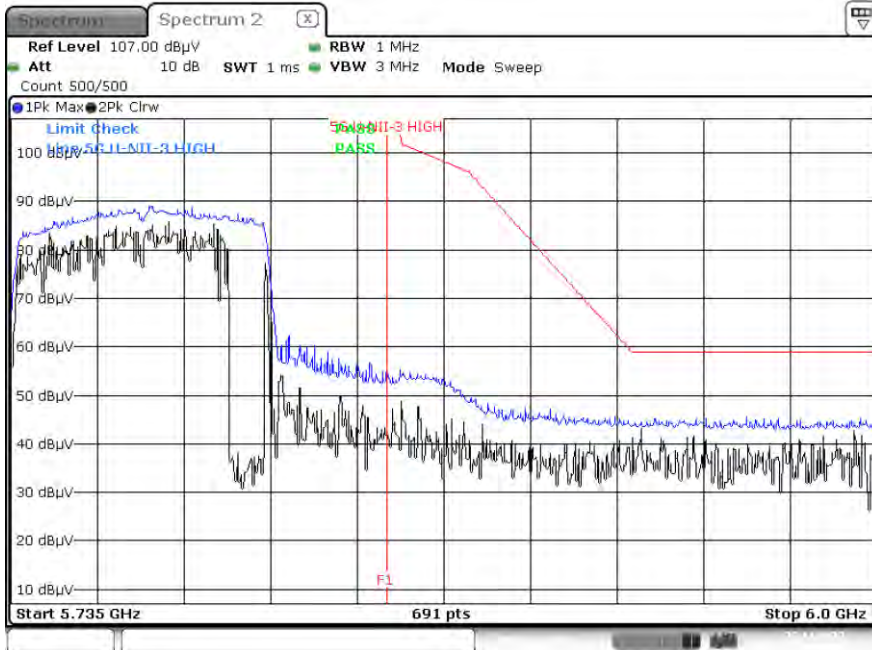
Peak Reading (802.11n\_HT40, Ch.159, Y-H)



Peak Reading (802.11ac\_VHT40, Ch.159, Y-H)



Peak Reading (802.11ac\_VHT80, Ch.155, Y-H)



**10.10 POWERLINE CONDUCTED EMISSIONS**

**Conducted Emissions (Line 1)**

Test

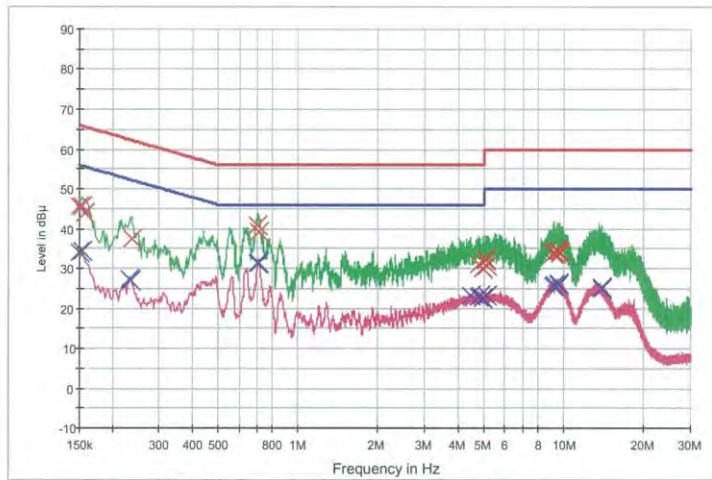
1 / 2

**HCT TEST Report**

**Common Information**

EUT: SM-A326B/DS  
 Manufacturer: SAMSUNG  
 Test Site: SHIELD ROOM  
 Operating Conditions: WLAN 5G MODE\_L1

FCC CLASS B\_Exten Cable



— FCC CLASS B\_OP      —×— FCC CLASS B\_AV      —×— Preview Result 1-PK+  
 —×— Preview Result 2-AVG      —×— Final Result 1-QPK      —×— Final Result 2-CAV

**Final Result 1**

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	45.4	9.000	Off	L1	9.8	20.6	66.0
0.154000	45.4	9.000	Off	L1	9.8	20.3	65.8
0.158000	43.9	9.000	Off	L1	9.8	21.7	65.6
0.236000	37.5	9.000	Off	L1	9.8	24.8	62.2
0.704000	40.8	9.000	Off	L1	9.8	15.2	56.0
0.712000	39.3	9.000	Off	L1	9.8	16.7	56.0
4.764000	31.1	9.000	Off	L1	10.0	24.9	56.0
4.944000	30.1	9.000	Off	L1	10.0	26.0	56.0
4.960000	30.0	9.000	Off	L1	10.0	26.0	56.0
5.086000	32.1	9.000	Off	L1	10.0	27.9	60.0
5.098000	32.4	9.000	Off	L1	10.0	27.6	60.0
5.128000	30.6	9.000	Off	L1	10.0	29.4	60.0
9.086000	33.8	9.000	Off	L1	10.2	26.2	60.0
9.230000	34.2	9.000	Off	L1	10.2	25.8	60.0
9.386000	34.4	9.000	Off	L1	10.2	25.6	60.0
9.566000	34.5	9.000	Off	L1	10.2	25.5	60.0
9.612000	34.2	9.000	Off	L1	10.2	25.8	60.0
9.616000	33.8	9.000	Off	L1	10.2	26.2	60.0

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**Final Result 2**

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	34.0	9.000	Off	L1	9.8	22.0	56.0
0.154000	34.4	9.000	Off	L1	9.8	21.4	55.8
0.230000	27.4	9.000	Off	L1	9.8	25.1	52.4
0.234000	27.0	9.000	Off	L1	9.8	25.3	52.3
0.704000	31.5	9.000	Off	L1	9.8	14.5	46.0
0.712000	31.3	9.000	Off	L1	9.8	14.7	46.0
4.456000	23.1	9.000	Off	L1	10.0	22.9	46.0
4.780000	23.0	9.000	Off	L1	10.0	23.0	46.0
4.818000	23.2	9.000	Off	L1	10.0	22.8	46.0
4.944000	22.4	9.000	Off	L1	10.0	23.6	46.0
4.960000	22.5	9.000	Off	L1	10.0	23.5	46.0
5.102000	23.2	9.000	Off	L1	10.0	26.8	50.0
9.086000	25.7	9.000	Off	L1	10.2	24.3	50.0
9.252000	26.0	9.000	Off	L1	10.2	24.0	50.0
9.484000	26.3	9.000	Off	L1	10.2	23.7	50.0
9.512000	26.1	9.000	Off	L1	10.2	23.9	50.0
13.784000	25.1	9.000	Off	L1	10.3	24.9	50.0
13.800000	25.0	9.000	Off	L1	10.3	25.0	50.0

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**Conducted Emissions (Line 2)**

Test

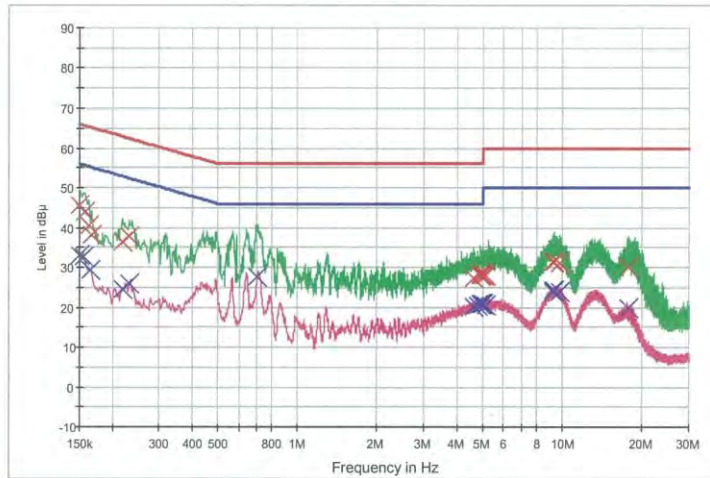
1 / 2

**HCT TEST Report**

**Common Information**

EUT: SM-A326B/DS  
 Manufacturer: SAMSUNG  
 Test Site: SHIELD ROOM  
 Operating Conditions: WLAN 5G MODE\_N

FCC CLASS B\_Exten Cable



— FCC CLASS B\_QP      × Final Result 1-QPK      × Final Result 2-CAV  
 — Preview Result 2-AVG      — FCC CLASS B\_AV

**Final Result 1**

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	45.4	9.000	Off	N	9.8	20.6	66.0
0.158000	44.0	9.000	Off	N	9.8	21.5	65.6
0.162000	40.6	9.000	Off	N	9.8	24.7	65.4
0.166000	38.0	9.000	Off	N	9.8	27.1	65.2
0.218000	36.4	9.000	Off	N	9.8	26.5	62.9
0.232000	37.6	9.000	Off	N	9.8	24.7	62.4
4.596000	27.2	9.000	Off	N	10.0	28.8	56.0
4.876000	28.1	9.000	Off	N	10.0	27.9	56.0
4.900000	28.3	9.000	Off	N	10.0	27.7	56.0
4.978000	28.4	9.000	Off	N	10.0	27.6	56.0
5.006000	28.1	9.000	Off	N	10.0	31.9	60.0
5.126000	28.0	9.000	Off	N	10.0	32.0	60.0
9.206000	31.2	9.000	Off	N	10.2	28.8	60.0
9.212000	31.3	9.000	Off	N	10.2	28.7	60.0
9.284000	31.3	9.000	Off	N	10.2	28.7	60.0
9.324000	31.5	9.000	Off	N	10.2	28.6	60.0
9.730000	30.9	9.000	Off	N	10.2	29.1	60.0
17.622000	29.9	9.000	Off	N	10.6	30.1	60.0

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**Final Result 2**

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	33.2	9.000	Off	N	9.8	22.8	56.0
0.156000	32.9	9.000	Off	N	9.8	22.8	55.7
0.164000	29.3	9.000	Off	N	9.8	26.0	55.3
0.218000	24.6	9.000	Off	N	9.8	28.3	52.9
0.232000	25.9	9.000	Off	N	9.8	26.5	52.4
0.704000	27.7	9.000	Off	N	9.8	18.3	46.0
4.596000	20.2	9.000	Off	N	10.0	25.8	46.0
4.774000	20.7	9.000	Off	N	10.0	25.3	46.0
4.900000	20.9	9.000	Off	N	10.0	25.1	46.0
4.978000	20.8	9.000	Off	N	10.0	25.2	46.0
5.006000	20.7	9.000	Off	N	10.0	29.3	50.0
5.126000	20.7	9.000	Off	N	10.0	29.3	50.0
9.180000	23.9	9.000	Off	N	10.2	26.1	50.0
9.206000	24.1	9.000	Off	N	10.2	25.9	50.0
9.212000	24.0	9.000	Off	N	10.2	26.0	50.0
9.284000	24.2	9.000	Off	N	10.2	25.8	50.0
9.730000	24.0	9.000	Off	N	10.2	26.0	50.0
17.622000	19.7	9.000	Off	N	10.6	30.3	50.0

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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	ESCI / Test Receiver	06/10/2020	Annual	100584
ESPEC	SU-642 / Temperature Chamber	07/30/2020	Annual	0093000718
Agilent	N9020A / Signal Analyzer	05/11/2020	Annual	MY51110085
Agilent	N9030A / Signal Analyzer	03/23/2020	Annual	MY49432108
Agilent	N1911A / Power Meter	04/07/2020	Annual	MY45100523
Agilent	N1921A / Power Sensor	06/08/2020	Annual	MY57820067
Agilent	87300B / Directional Coupler	11/10/2020	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	02/14/2020	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)	03/23/2020	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

### **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	05/18/2020	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	08/02/2019	Biennial	01039
Schwarzbeck	BBHA 9120D / Horn Antenna	06/28/2019	Biennial	1300
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	04/29/2019	Biennial	BBHA9170342
Rohde & Schwarz	FSP(10 Hz ~ 40 GHz) / Spectrum Analyzer	05/13/2020	Annual	101055
Wainwright Instruments	WRCJV2400/2483.5-2370/2520-60/12SS / Band Reject Filter	01/21/2020	Annual	2
Wainwright Instruments	WRCJV5100/5850-40/50-8EEK / Band Reject Filter	02/10/2020	Annual	1
CERNEX	CBL18265035 / Power Amplifier	12/26/2019	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	03/23/2020	Annual	25956
TNM system	FBSM-05B / HPF(3~18GHz) + LNA1(1~18GHz)	01/21/2020	Annual	F6
TNM system	FBSM-05B / ATT(10dB) + LNA1(1~18GHz)	01/21/2020	Annual	None
TNM system	FBSM-05B / ATT(3dB) + LNA1(1~18GHz)	01/21/2020	Annual	None
TNM system	FBSM-05B / LNA1(1~18GHz)	01/21/2020	Annual	25540
TNM system	FBSM-05B / HPF(7~18GHz) + LNA2(6~18GHz)	01/21/2020	Annual	28550
TNM system	FBSM-05B / Thru(30MHz ~ 18GHz)	01/21/2020	Annual	None
Weinschel	2-3 / Attenuator (3 dB)	10/07/2020	Annual	BR0617
H+S	5910-N-50-010 / Attenuator(10 dB)	10/28/2020	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-2012-FC009-P