

# FCC UNII REPORT

## Certification

<b>Applicant Name:</b> SAMSUNG Electronics Co., Ltd.	<b>Date of Issue:</b> September 15, 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-2009-FC014

<b>FCC ID:</b>	<b>A3LSMA426B</b>
<b>APPLICANT:</b>	<b>SAMSUNG Electronics Co., Ltd.</b>

<b>Model:</b>	SM-A426B/DS
<b>Additional Model</b>	SM-A426B
<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-2009-FC014

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REVIEWED BY



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Report prepared by : Jung Ki Lim  
Engineer of Telecommunication Testing Center

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Report approved by : Jong Seok Lee  
Manager of Telecommunication Testing Center

This test results were applied only to the test methods required by the standard.

This laboratory is not accredited for the test results marked \*.

The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

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

## Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2009-FC014	September 15, 2020	- First Approval Report

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## 1. GENERAL INFORMATION

### EUT DESCRIPTION

<b>Model</b>	SM-A426B/DS	
<b>Additional Model</b>	SM-A426B	
<b>EUT Type</b>	Mobile Phone	
<b>Power Supply</b>	DC 3.86 V	
<b>Battery Information</b>	Model: EB-BA426ABY Type: Li-ion Battery	
<b>Travel Adapter Information</b>	Model : EP-TA200 Manufacture: SOLUM	
<b>Data Cable Information</b>	Model : EP-DR140AWE Manufacture: RFTECH	
<b>Ear-jack Information</b>	Model : EHS64AVFWE Manufacture: CRESYN	
<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: MFA Peak Gain : UNII 1: 0.1 dBi / UNII 2A : - 0.8 dBi / UNII 2C: 0.8 dBi / UNII 3: 0.2 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>	August 25, 2020~ September 14, 2020	

## 2. MAXIMUM OUTPUT POWER

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

Band	Mode	RF Output Power	
		(dBm)	(W)
UNII1	802.11a	16.38	0.043
	802.11n (HT20)	16.38	0.043
	802.11n (HT40)	15.25	0.033
	802.11ac (VHT20)	15.41	0.035
	802.11ac (VHT40)	14.43	0.028
	802.11ac (VHT80)	13.64	0.023
UNII2A	802.11a	16.99	0.050
	802.11n (HT20)	16.99	0.050
	802.11n (HT40)	15.88	0.039
	802.11ac (VHT20)	15.96	0.039
	802.11ac (VHT40)	14.85	0.031
	802.11ac (VHT80)	13.51	0.022
UNII2C	802.11a	16.92	0.049
	802.11n (HT20)	16.86	0.049
	802.11n (HT40)	15.84	0.038
	802.11ac (VHT20)	15.79	0.038
	802.11ac (VHT40)	14.77	0.030
	802.11ac (VHT80)	13.59	0.023
UNII3	802.11a	16.69	0.047
	802.11n (HT20)	16.62	0.046
	802.11n (HT40)	15.40	0.035
	802.11ac (VHT20)	15.53	0.036
	802.11ac (VHT40)	14.54	0.028
	802.11ac (VHT80)	13.59	0.023

### 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.

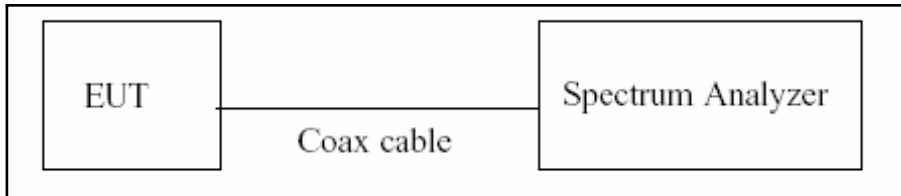
The measurement data shown herein meets or exceeds the  $U_{\text{CISPR}}$  measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

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.

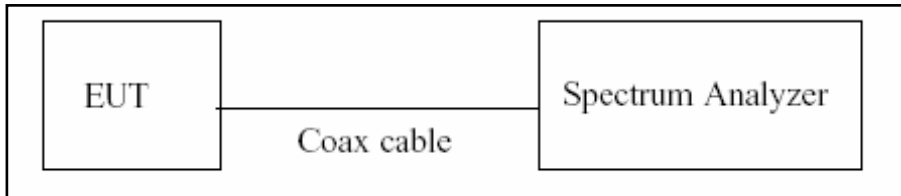
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz ( $\geq$  RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure  $T_{total}$  and  $T_{on}$
8. Calculate Duty Cycle =  $T_{on} / T_{total}$  and Duty Cycle Factor =  $10\log(1/\text{Duty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

## 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.

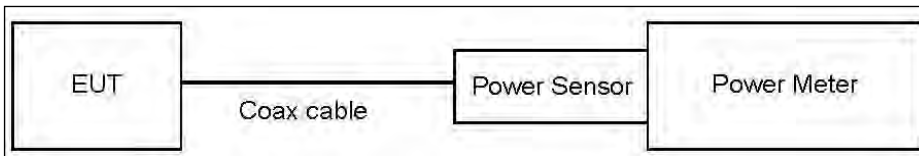
**8.3. Output Power Measurement**

**Limit**

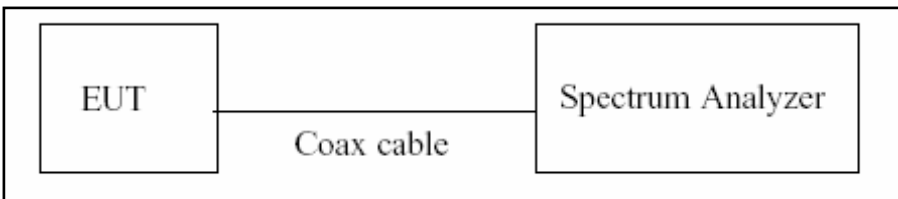
Band	Limit
UNII 1	- Master : Not exceed 1 W(=30dBm) - Slave : Not exceed 250 mW(=23.98 dBm)
UNII 2A, 2C	Not exceed the lesser of 250 mW or 11 dBm + 10 log B, (where B is the 26 dB emission bandwidth in megahertz.)
UNII 3	Not exceed 1 W(=30dBm)

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

**Sample Calculation**

Total Power(dBm) = 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.

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

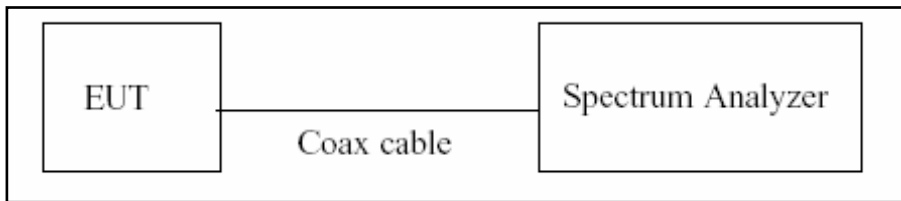
(Actual value of loss for the attenuator and cable combination)

**8.4. Power Spectral Density**

**Limit**

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

**Test Configuration**



**Test Procedure**

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

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

**Sample Calculation**

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

**Note**

1. Spectrum reading values are not plot data.

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

2. Spectrum offset = Attenuator loss(10 dB) + Cable loss + 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	10.73
UNII 2A	10.73
UNII 2C	10.73
UNII 3	10.73

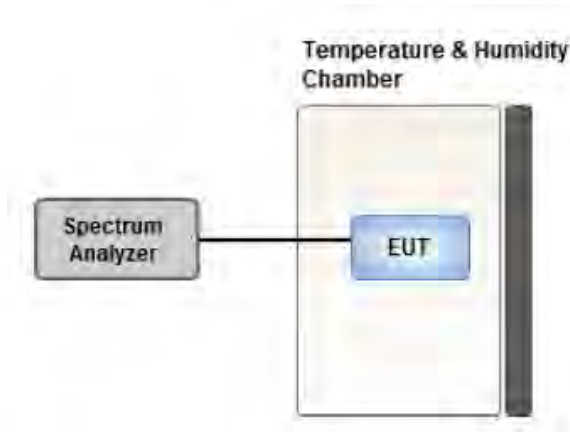
(Actual value of loss for the attenuator and cable combination)

## 8.5. Frequency Stability

### Limit

Maintained within the band

### Test Configuration



### Test Procedure

1. The EUT was placed inside an environmental chamber as the temperature in the chamber was varied between -30 °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**

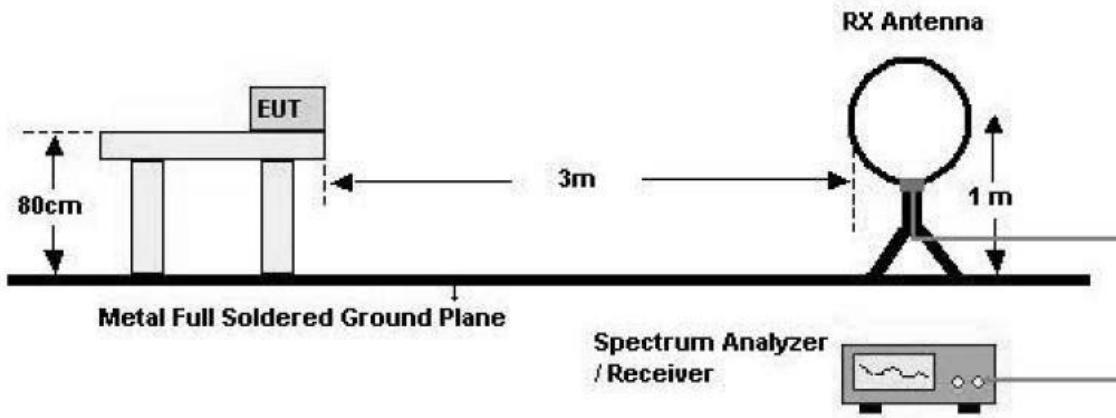
**Limit**

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.

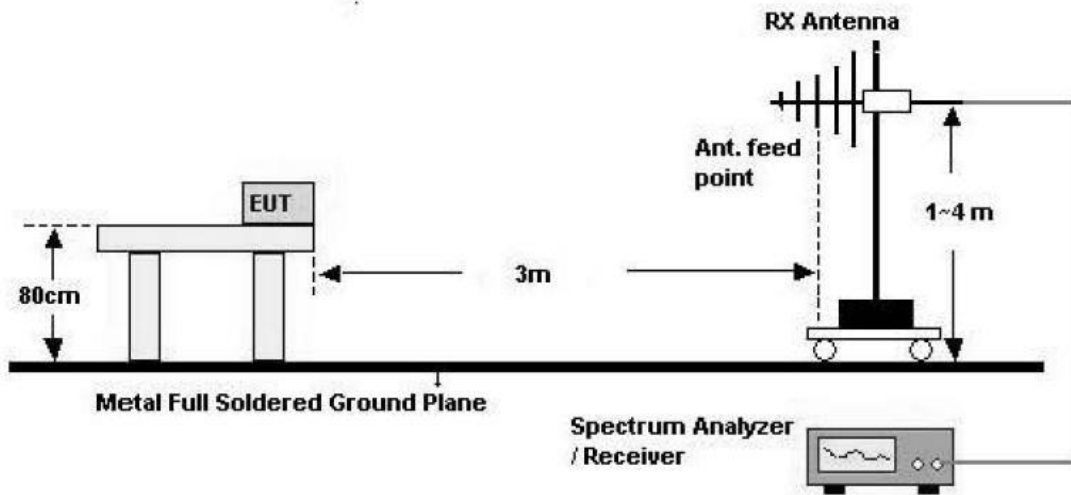
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

**Test Configuration**

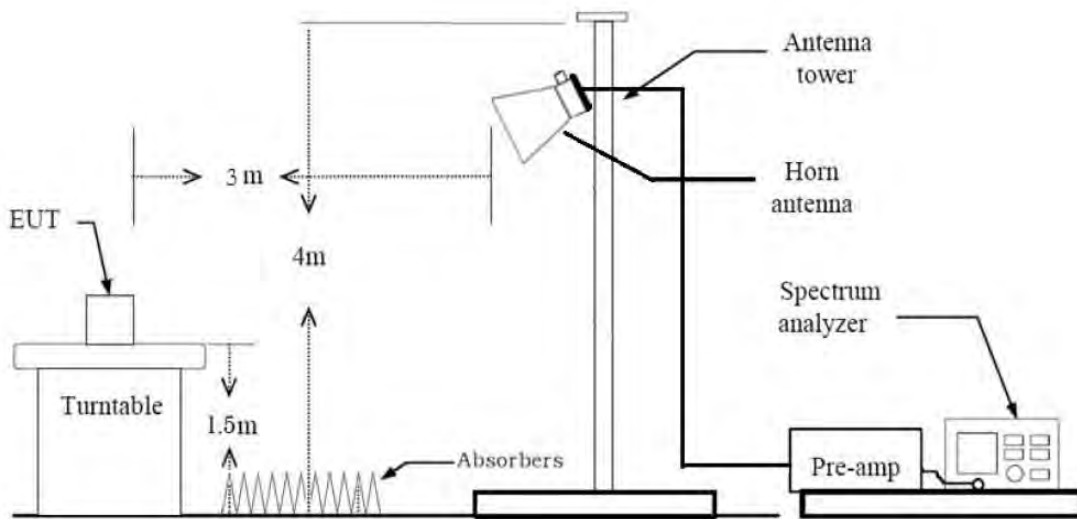
Below 30 MHz



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) =  $\text{VBW} \leq \text{RBW}/100$ (i.e., 10 kHz) but not less than 10 Hz.
    - VBW(Duty cycle is < 98 percent) =  $\text{VBW} \geq 1/T$ , 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	0.972	0.121	1000
802.11n(HT20)	MCS 0	0.971	0.130	1000
802.11n(HT40)	MCS 0	0.949	0.226	2000
802.11ac(VHT20)	MCS 0	0.974	0.113	1000
802.11ac(VHT40)	MCS 0	0.950	0.223	2000
802.11ac(VHT80)	MCS 0	0.903	0.444	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
  - Radiated Restricted Band Edge : Y,Z
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-A426B/DS, SM-A426B were tested and the worst case results are reported.  
(Worst case : SM-A426B/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-A426B/DS, SM-A426B were tested and the worst case results are reported.  
(Worst case : SM-A426B/DS)

### Conducted test

1. All datarate of operation were investigated and the worst case datarate results are reported.
2. SM-A426B/DS, SM-A426B were tested and the worst case results are reported.  
(Worst case : SM-A426B/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 (UNII1, 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	1.429	1.469	0.972	0.121
	9	0.963	0.998	0.964	0.157
	12	0.730	0.765	0.954	0.206
	18	0.491	0.532	0.924	0.344
	24	0.375	0.410	0.914	0.393
	36	0.253	0.294	0.862	0.645
	48	0.203	0.238	0.851	0.700
	54	0.177	0.218	0.814	0.894

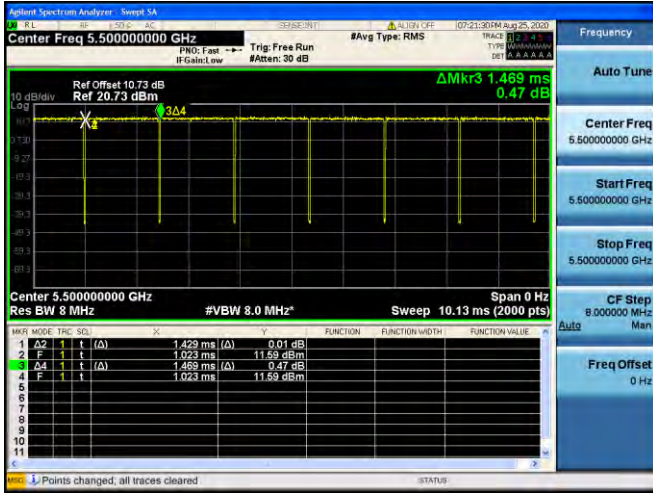
Mode	MCS Index	T <sub>on</sub> (ms)	T <sub>total</sub> (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11n (HT20)	0	1.338	1.378	0.971	0.130
	1	0.689	0.725	0.951	0.218
	2	0.471	0.512	0.921	0.358
	3	0.365	0.400	0.911	0.403
	4	0.253	0.294	0.862	0.645
	5	0.198	0.238	0.830	0.810
	6	0.187	0.223	0.841	0.752
	7	0.167	0.203	0.825	0.835
802.11n (HT40)	0	0.664	0.699	0.949	0.226
	1	0.350	0.385	0.908	0.420
	2	0.253	0.284	0.893	0.492
	3	0.198	0.233	0.848	0.717
	4	0.147	0.182	0.806	0.939
	5	0.117	0.152	0.767	1.154
	6	0.111	0.147	0.759	1.200
	7	0.101	0.137	0.741	1.303

Mode	MCS Index	T <sub>on</sub> (ms)	T <sub>total</sub> (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11ac (VHT20)	0	1.348	1.383	0.974	0.113
	1	0.699	0.735	0.952	0.215
	2	0.476	0.512	0.931	0.312
	3	0.365	0.405	0.900	0.458
	4	0.263	0.299	0.881	0.548
	5	0.203	0.238	0.851	0.700
	6	0.187	0.223	0.841	0.752
	7	0.172	0.208	0.829	0.813
	8	0.152	0.187	0.811	0.911
802.11ac (VHT40)	0	0.674	0.709	0.950	0.223
	1	0.355	0.390	0.909	0.414
	2	0.253	0.289	0.877	0.569
	3	0.198	0.238	0.830	0.810
	4	0.152	0.187	0.811	0.911
	5	0.122	0.157	0.774	1.112
	6	0.111	0.147	0.759	1.200
	7	0.106	0.142	0.750	1.249
	8	0.096	0.132	0.731	1.362
	9	0.086	0.122	0.708	1.498
802.11ac (VHT80)	0	0.329	0.365	0.903	0.444
	1	0.187	0.223	0.841	0.752
	2	0.142	0.177	0.800	0.969
	3	0.117	0.152	0.767	1.154
	4	0.091	0.127	0.720	1.427
	5	0.081	0.117	0.696	1.576
	6	0.076	0.111	0.682	1.663
	7	0.071	0.111	0.636	1.963
	8	0.071	0.106	0.667	1.761
	9	0.066	0.101	0.650	1.871

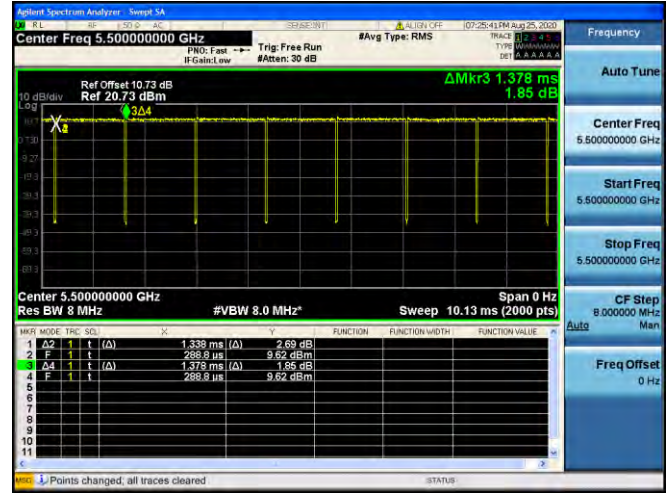
**Note:**

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

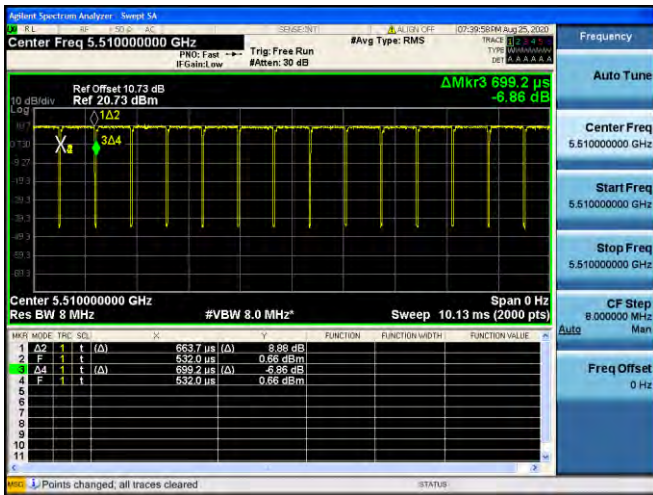
802.11a



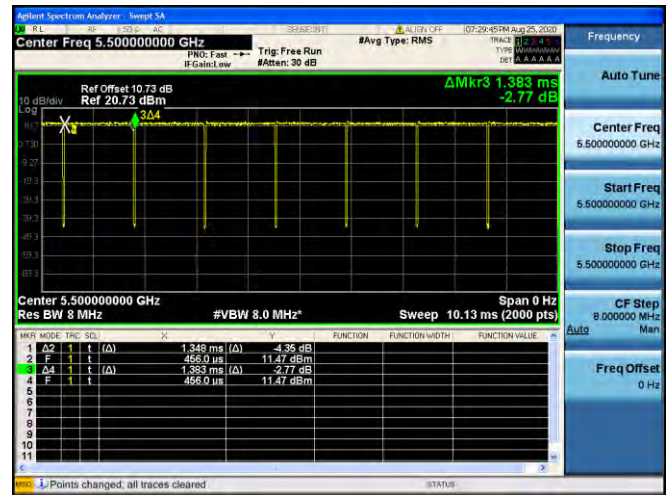
802.11n(HT20)



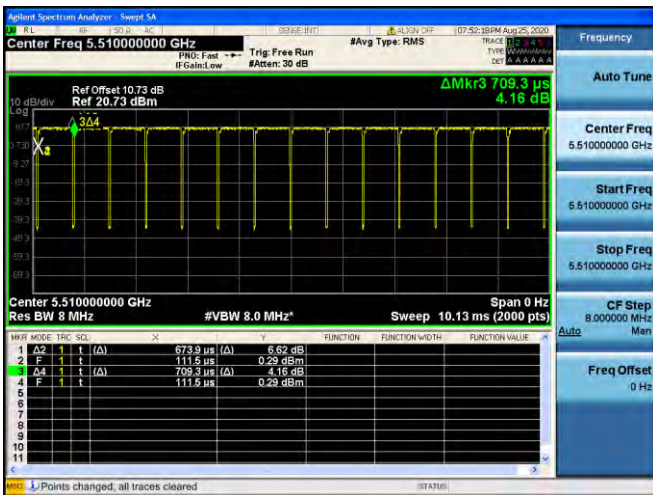
802.11n(HT40)



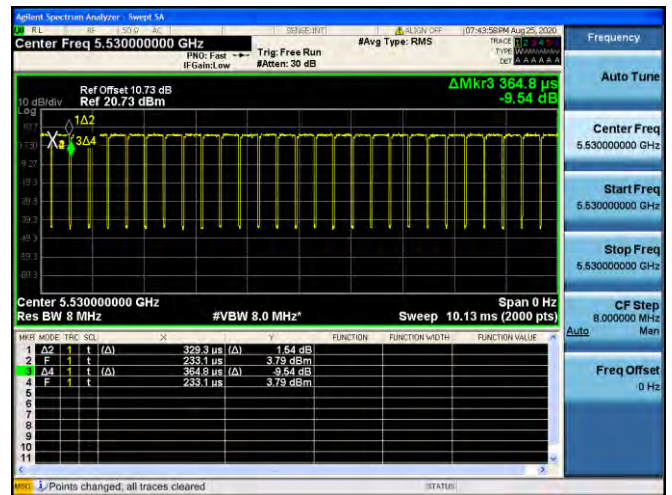
802.11ac(VHT20)



802.11ac(VHT40)



802.11ac(VHT80)



**10.2 26 dB BANDWIDTH**

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

Straddle channel data were added in section 10.7.1.

802.11a Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	20.16	16.425
5200	40	21.22	16.410
5240	48	20.33	16.358
5260	52	20.57	16.394
5300	60	20.47	16.390
5320	64	20.71	16.394
5500	100	20.00	16.394
5600	120	19.98	16.417
5720	144	20.22	16.396
5745	149	19.79	16.381
5785	157	20.81	16.390
5825	165	20.22	16.383

802.11n(HT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	22.78	17.594
5200	40	20.33	17.619
5240	48	20.56	17.601
5260	52	20.44	17.578
5300	60	21.63	17.574
5320	64	20.49	17.593
5500	100	21.03	17.570
5600	120	20.66	17.545
5720	144	20.40	17.557
5745	149	21.34	17.566
5785	157	19.91	17.561
5825	165	20.55	17.565

<b>802.11n(HT40) Mode</b>		<b>26dB Bandwidth [MHz]</b>	<b>99% bandwidth [MHz]</b>
<b>Frequency [MHz]</b>	<b>Channel No.</b>		
5190	38	39.73	35.939
5230	46	40.02	35.979
5270	54	40.02	35.953
5310	62	39.92	35.933
5510	102	39.87	35.983
5590	118	39.89	35.972
5710	142	39.86	35.992
5755	151	39.64	35.997
5795	159	39.99	35.948

<b>802.11ac(VHT20) Mode</b>		<b>26dB Bandwidth [MHz]</b>	<b>99% bandwidth [MHz]</b>
<b>Frequency [MHz]</b>	<b>Channel No.</b>		
5180	36	21.58	17.595
5200	40	21.09	17.575
5240	48	21.09	17.535
5260	52	21.11	17.574
5300	60	20.15	17.535
5320	64	21.00	17.595
5500	100	20.51	17.598
5600	120	20.66	17.575
5720	144	21.71	17.575
5745	149	22.17	17.576
5785	157	20.87	17.571
5825	165	20.36	17.562



802.11ac(VHT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	39.87	35.965
5230	46	39.79	35.893
5270	54	39.83	35.965
5310	62	39.83	35.975
5510	102	39.85	35.942
5590	118	39.97	35.971
5710	142	40.26	35.993
5755	151	40.11	35.956
5795	159	39.82	36.027

802.11ac(VHT80) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5210	42	81.65	75.085
5290	58	80.98	75.048
5530	106	80.72	74.969
5610	122	81.00	74.947
5690	138	81.58	75.058
5775	155	80.90	75.130

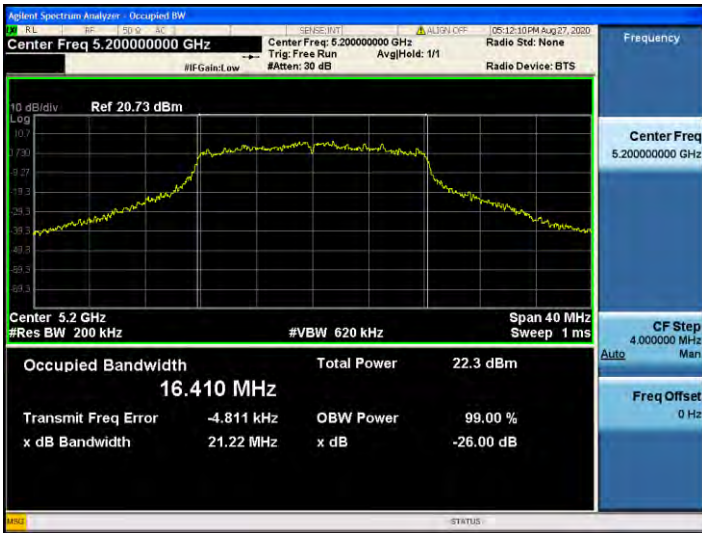


☐ Test Plots(802.11a)

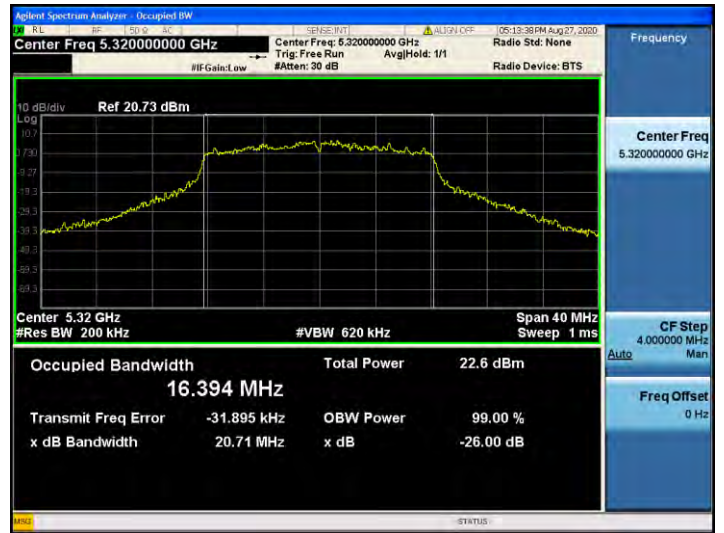
Note:

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

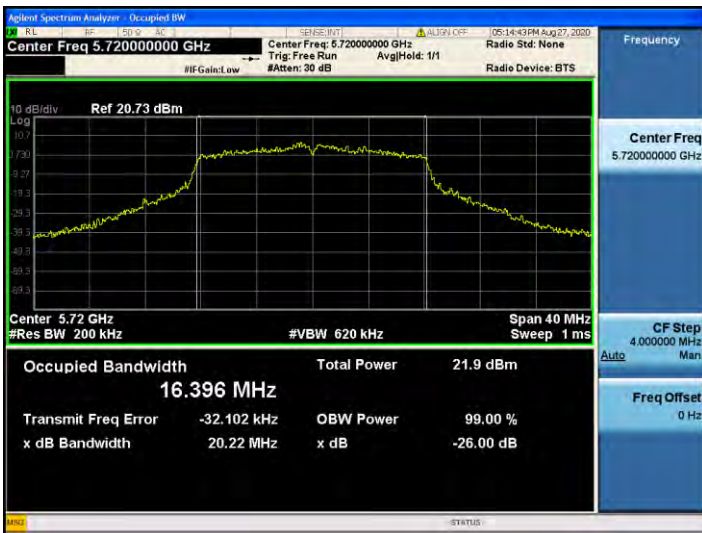
**802.11a UNII 1 BAND 26dB Bandwidth (CH 40)**



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



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



**802.11a UNII 3 BAND 26dB Bandwidth (CH 157)**



☐ Test Plots(802.11n(HT20))

Note:

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

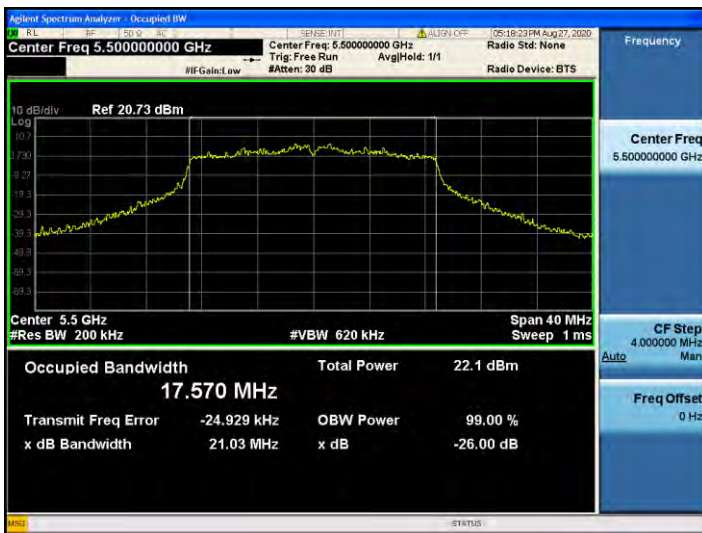
802.11n\_HT20 UNII 1 BAND 26dB Bandwidth(CH 36)



802.11n\_HT20 UNII 2A BAND 26dB Bandwidth(CH 60)



802.11n\_HT20 UNII 2C BAND 26dB Bandwidth(CH 100)



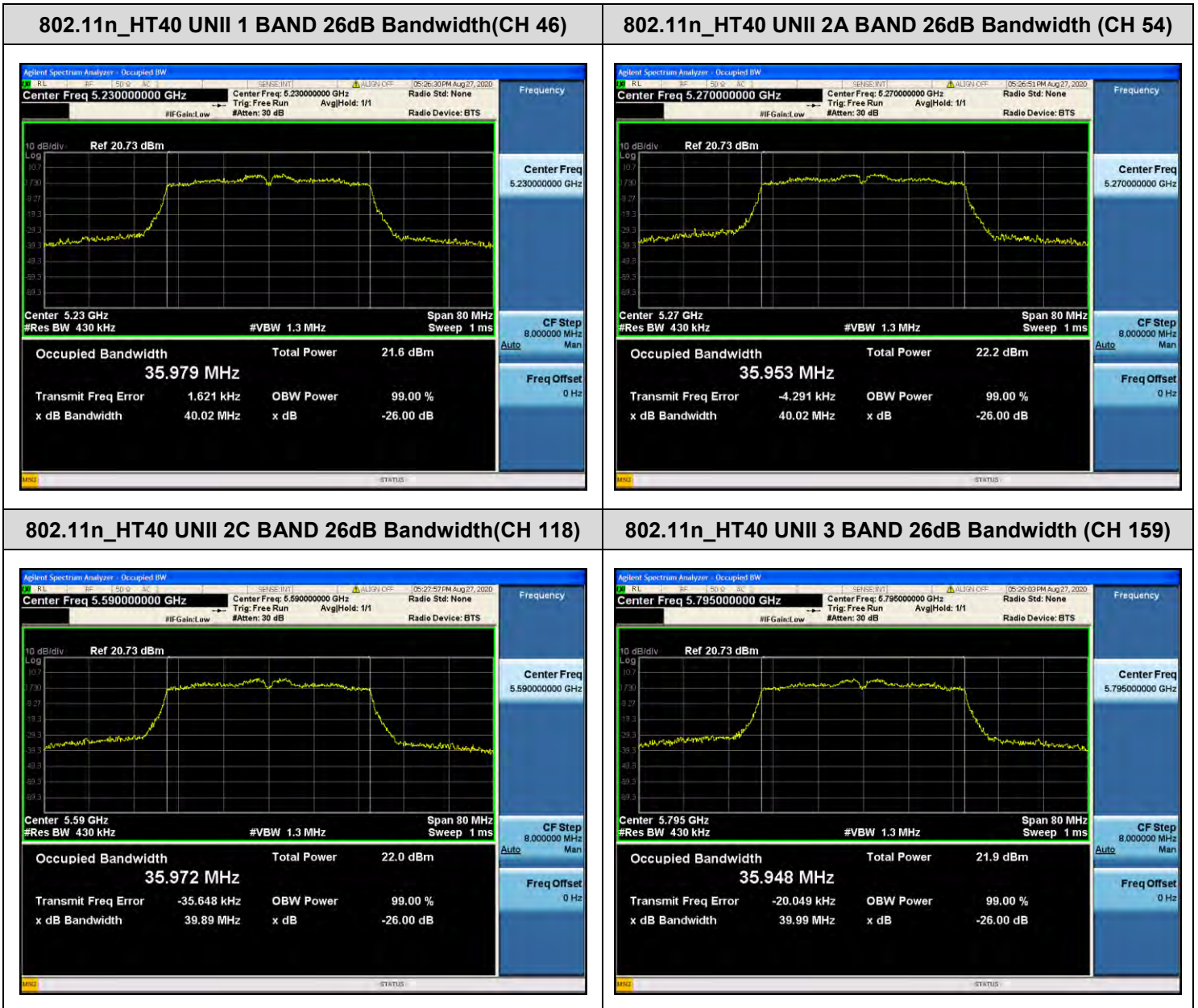
802.11n\_HT20 UNII 3 BAND 26dB Bandwidth(CH 149)



☐ Test Plots(802.11n(HT40))

Note:

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



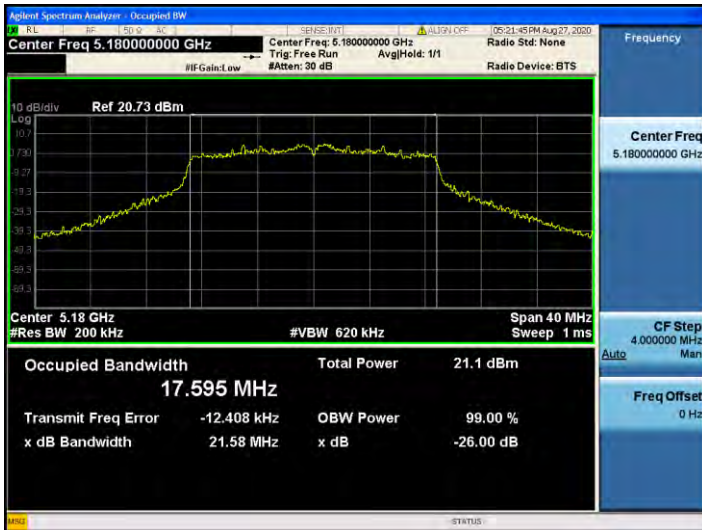


☐ Test Plots(802.11ac(VHT20))

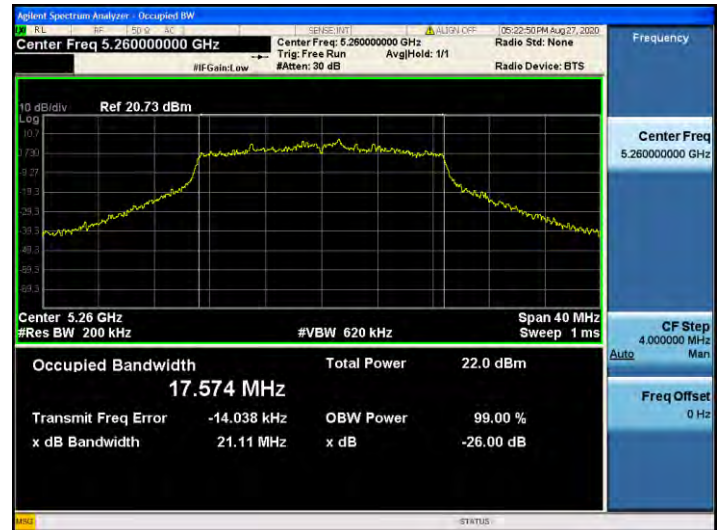
Note:

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

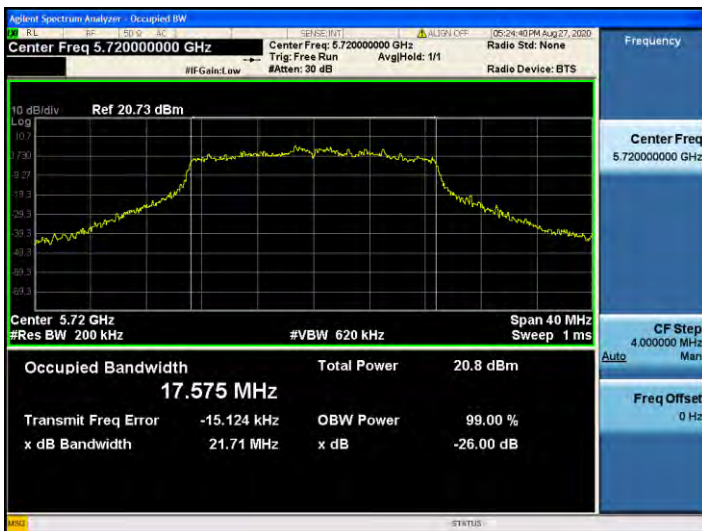
802.11ac\_VHT20 UNII 1 BAND 26dB Bandwidth(CH 36)



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 38)**



**802.11ac\_VHT40 UNII 2A BAND 26dB Bandwidth (CH 62)**



**802.11ac\_VHT40 UNII 2C BAND 26dB Bandwidth(CH 142)**



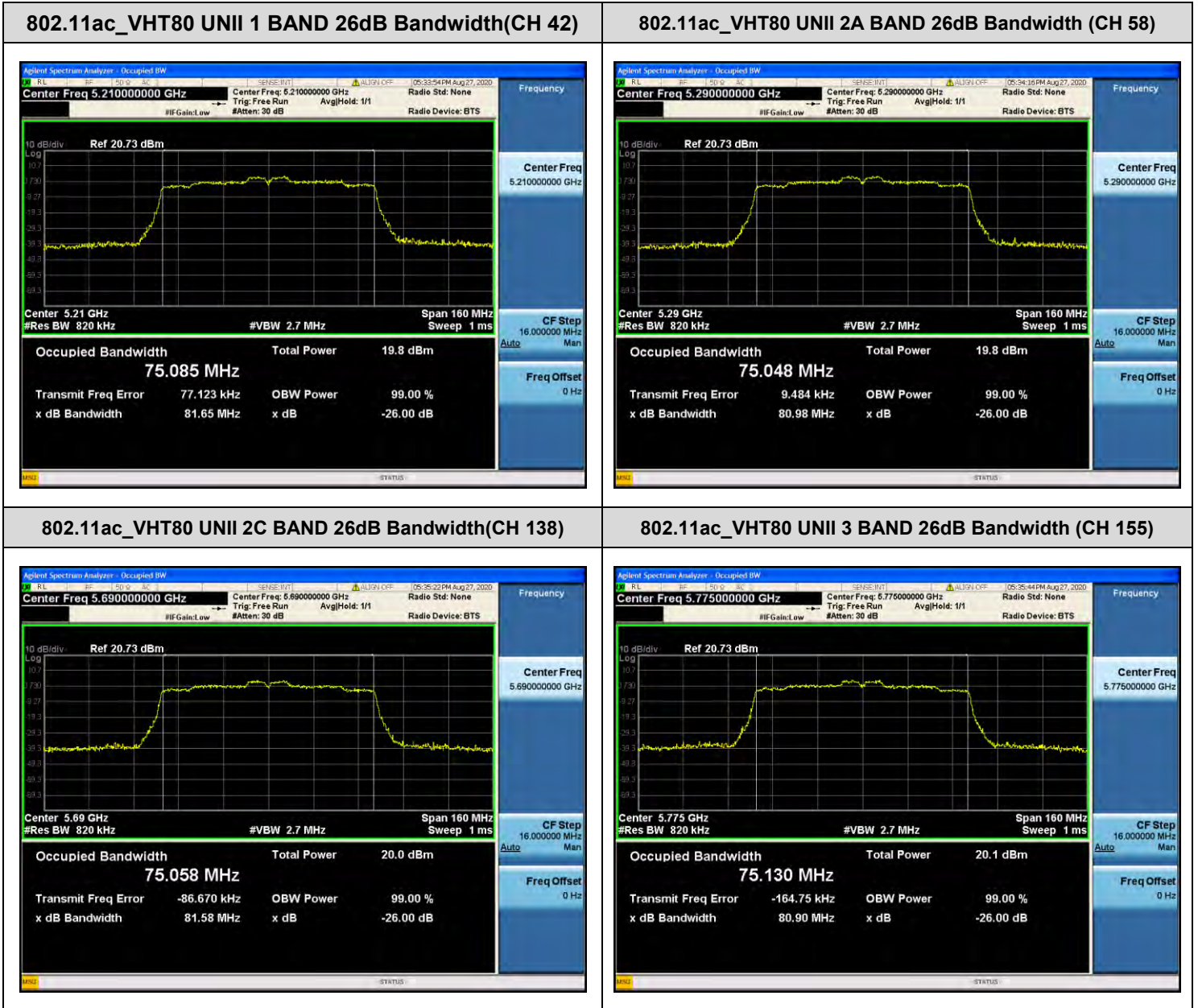
**802.11ac\_VHT40 UNII 3 BAND 26dB Bandwidth (CH 151)**



☐ Test Plots(802.11ac(VHT80))

Note:

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





**10.3 6dB BANDWIDTH**

802.11a Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	13.79	> 0.5	Pass
5785	157	12.56	> 0.5	Pass
5825	165	13.84	> 0.5	Pass

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.07	> 0.5	Pass
5785	157	10.11	> 0.5	Pass
5825	165	13.85	> 0.5	Pass

802.11n(HT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	33.87	> 0.5	Pass
5795	159	35.10	> 0.5	Pass

802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	13.81	> 0.5	Pass
5785	157	15.04	> 0.5	Pass
5825	165	15.01	> 0.5	Pass

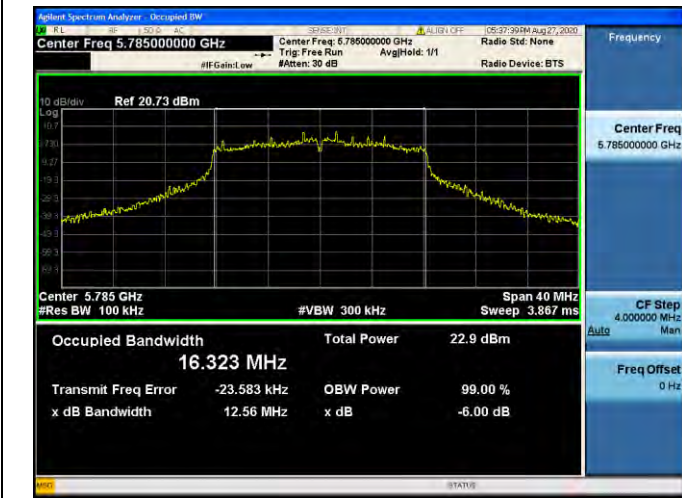
802.11ac(VHT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	32.60	> 0.5	Pass
5795	159	35.07	> 0.5	Pass

802.11ac(VHT80) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	66.29	> 0.5	Pass

**Test Plots**

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

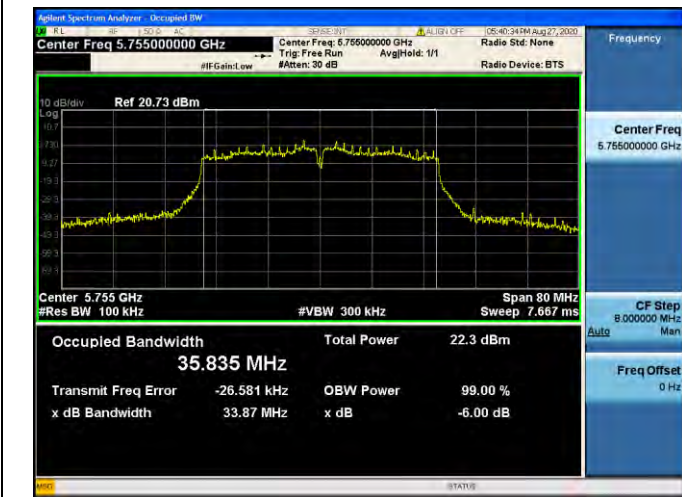
**802.11a (CH.157)**



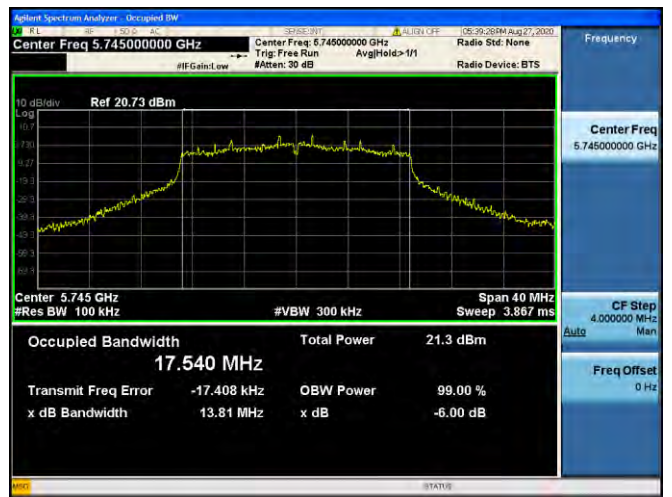
**802.11n(HT20) (CH.157)**



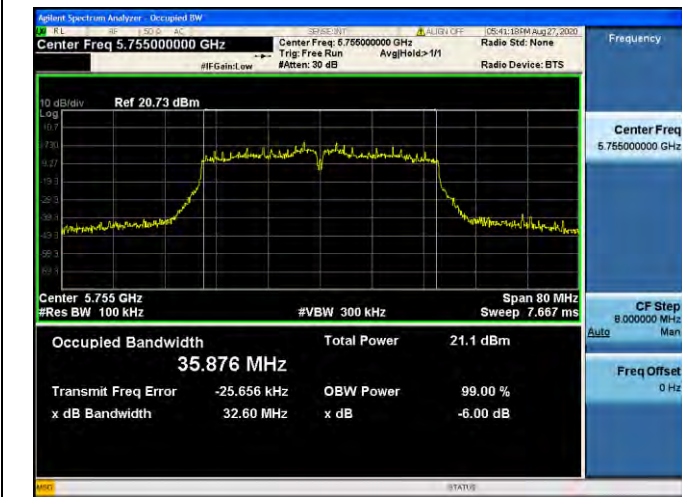
**802.11n(HT40) (CH.151)**



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



**802.11ac(VHT40) (CH.151)**



**802.11ac(VHT80) (CH.155)**





**10.4 OUTPUT POWER MEASUREMENT**

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

Straddle channel data were added in section 10.7.3.

802.11a Mode		Power Level Setting	Measured Power [dBm]	Duty Cycle Factor (dB)	Total Power [dBm]	Limit (dBm)
Frequency [MHz]	Channel No.					
5180	36	16	15.96	0.344	16.30	23.98
5200	40	16	16.00	0.344	16.34	23.98
5240	48	15	16.04	0.344	16.38	23.98
5260	52	16	16.65	0.344	16.99	23.98
5300	60	16	16.63	0.344	16.97	23.98
5320	64	16	16.44	0.344	16.79	23.98
5500	100	17	16.11	0.344	16.46	23.98
5600	120	17	16.58	0.344	16.92	23.98
5720	144	17	15.77	0.344	16.11	23.98
5745	149	17	15.80	0.344	16.14	30.00
5785	157	17	16.35	0.344	16.69	30.00
5825	165	17	16.30	0.344	16.64	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	16	15.42	0.810	16.23	23.98
5200	40	16	15.49	0.810	16.30	23.98
5240	48	15	15.57	0.810	16.38	23.98
5260	52	16	16.13	0.810	16.94	23.98
5300	60	16	16.18	0.810	16.99	23.98
5320	64	16	15.88	0.810	16.69	23.98
5500	100	17	15.61	0.810	16.42	23.98
5600	120	17	16.05	0.810	16.86	23.98
5720	144	17	15.26	0.810	16.07	23.98
5745	149	17	15.35	0.810	16.16	30.00
5785	157	17	15.81	0.810	16.62	30.00
5825	165	17	15.77	0.810	16.58	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	13	11.99	1.303	13.29	23.98
5230	46	14	13.94	1.303	15.25	23.98
5270	54	15	14.58	1.303	15.88	23.98
5310	62	15	14.40	1.303	15.71	23.98
5510	102	15	13.23	1.303	14.53	23.98
5590	118	16	14.54	1.303	15.84	23.98
5710	142	16	14.10	1.303	15.40	23.98
5755	151	16	13.79	1.303	15.09	30.00
5795	159	16	14.10	1.303	15.40	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	14.26	0.911	15.17	23.98
5200	40	15	14.43	0.911	15.34	23.98
5240	48	14	14.50	0.911	15.41	23.98
5260	52	15	15.05	0.911	15.96	23.98
5300	60	15	14.88	0.911	15.79	23.98
5320	64	15	14.62	0.911	15.53	23.98
5500	100	16	14.36	0.911	15.27	23.98
5600	120	16	14.88	0.911	15.79	23.98
5720	144	16	13.99	0.911	14.90	23.98
5745	149	16	14.18	0.911	15.09	30.00
5785	157	16	14.62	0.911	15.53	30.00
5825	165	16	14.58	0.911	15.49	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	13	11.81	1.498	13.31	23.98
5230	46	13	12.94	1.498	14.43	23.98
5270	54	14	13.35	1.498	14.85	23.98
5310	62	14	13.18	1.498	14.68	23.98
5510	102	15	13.06	1.498	14.55	23.98
5590	118	15	13.27	1.498	14.77	23.98
5710	142	15	12.68	1.498	14.18	23.98
5755	151	15	12.72	1.498	14.22	30.00
5795	159	15	13.05	1.498	14.54	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	12	11.68	1.963	13.64	23.98
5290	58	12	11.55	1.963	13.51	23.98
5530	106	14	11.63	1.963	13.59	23.98
5610	122	13	11.44	1.963	13.40	23.98
5690	138	14	11.58	1.963	13.54	23.98
5775	155	14	11.63	1.963	13.59	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	6.987	0.344	7.331	11 dBm/MHz
5200	40	6.971	0.344	7.315	
5240	48	7.288	0.344	7.632	
5260	52	8.038	0.344	8.382	
5300	60	7.803	0.344	8.147	
5320	64	7.539	0.344	7.883	
5500	100	6.859	0.344	7.203	
5600	120	7.473	0.344	7.817	
5720	144	6.773	0.344	7.117	
5745	149	4.372	0.344	4.716	30 dBm/500kHz
5785	157	5.041	0.344	5.385	
5825	165	5.117	0.344	5.461	

802.11n(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	4.519	0.810	5.329	11 dBm/MHz
5200	40	4.389	0.810	5.199	
5240	48	4.623	0.810	5.433	
5260	52	5.161	0.810	5.971	
5300	60	5.156	0.810	5.966	
5320	64	5.057	0.810	5.867	
5500	100	4.475	0.810	5.285	
5600	120	4.923	0.810	5.733	
5720	144	4.398	0.810	5.208	
5745	149	1.626	0.810	2.436	30 dBm/500kHz z
5785	157	2.348	0.810	3.158	
5825	165	1.917	0.810	2.727	

802.11n(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5190	38	-2.011	1.303	-0.708	11 dBm/MHz
5230	46	0.054	1.303	1.357	
5270	54	0.763	1.303	2.066	
5310	62	0.514	1.303	1.817	
5510	102	-1.177	1.303	0.126	
5590	118	0.473	1.303	1.776	
5710	142	-0.083	1.303	1.220	
5755	151	-2.324	1.303	-1.021	30 dBm /500kHz
5795	159	-2.191	1.303	-0.888	

802.11ac(20MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5180	36	3.250	0.911	4.161	11 dBm/MHz
5200	40	3.213	0.911	4.124	
5240	48	3.201	0.911	4.112	
5260	52	3.881	0.911	4.792	
5300	60	3.694	0.911	4.605	
5320	64	3.527	0.911	4.438	
5500	100	3.573	0.911	4.484	
5600	120	3.814	0.911	4.725	
5720	144	2.957	0.911	3.868	
5745	149	0.355	0.911	1.266	
5785	157	0.843	0.911	1.754	
5825	165	0.923	0.911	1.834	

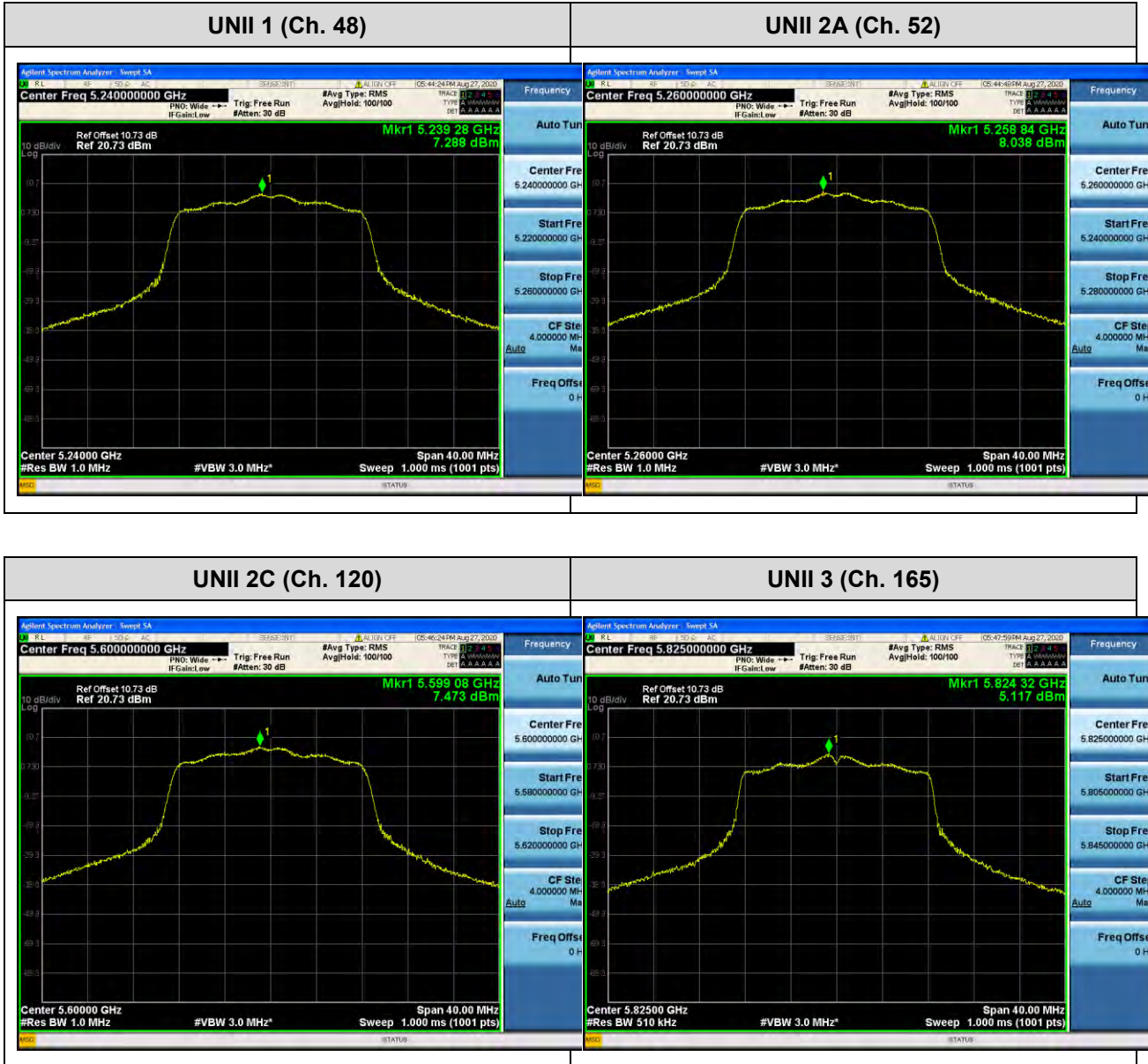
802.11ac(40MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5190	38	-2.014	1.498	-0.516	11 dBm/MHz
5230	46	-0.881	1.498	0.617	
5270	54	-0.738	1.498	0.760	
5310	62	-0.978	1.498	0.520	
5510	102	-1.116	1.498	0.382	
5590	118	-0.714	1.498	0.784	
5710	142	-1.277	1.498	0.221	
5755	151	-3.525	1.498	-2.027	30 dBm/500kHz
5795	159	-3.342	1.498	-1.844	

802.11ac(80MHz) Mode		Measured PSD [dBm]	Duty Cycle Factor (dB)	Total PSD [dBm]	Limit
Frequency [MHz]	Channel No.				
5210	42	-5.510	1.963	-3.547	11 dBm/MHz
5290	58	-5.732	1.963	-3.769	
5530	106	-5.288	1.963	-3.325	
5610	122	-5.369	1.963	-3.406	
5690	138	-5.529	1.963	-3.566	
5775	155	-7.689	1.963	-5.726	30 dBm/500kHz

☐ Test Plots(802.11a)

Note:

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

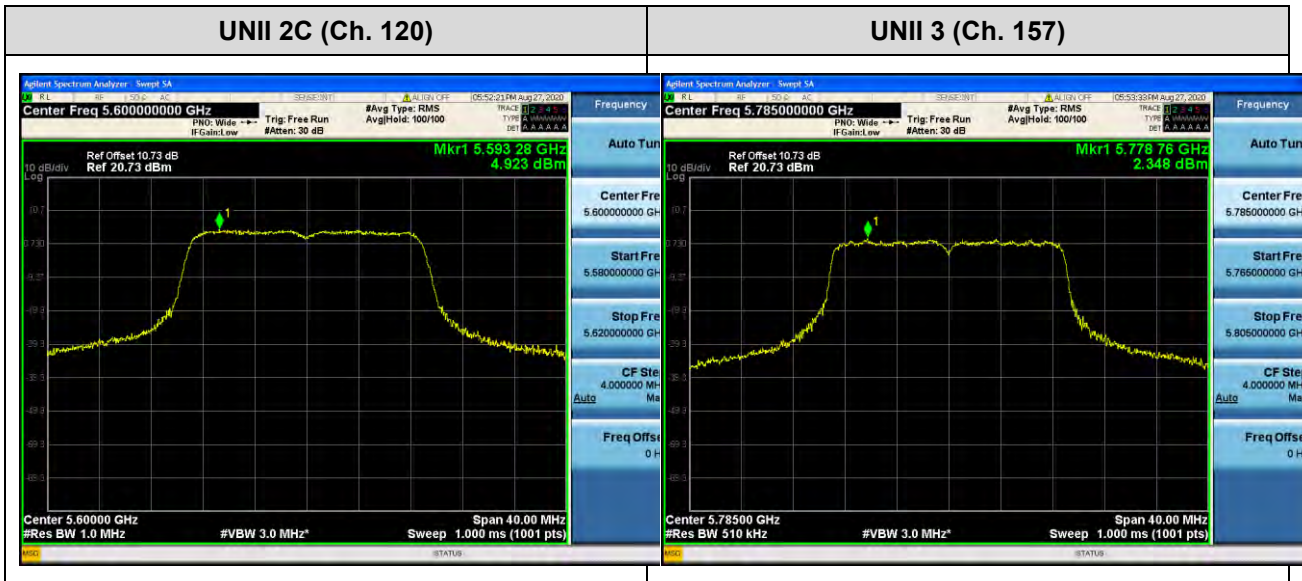
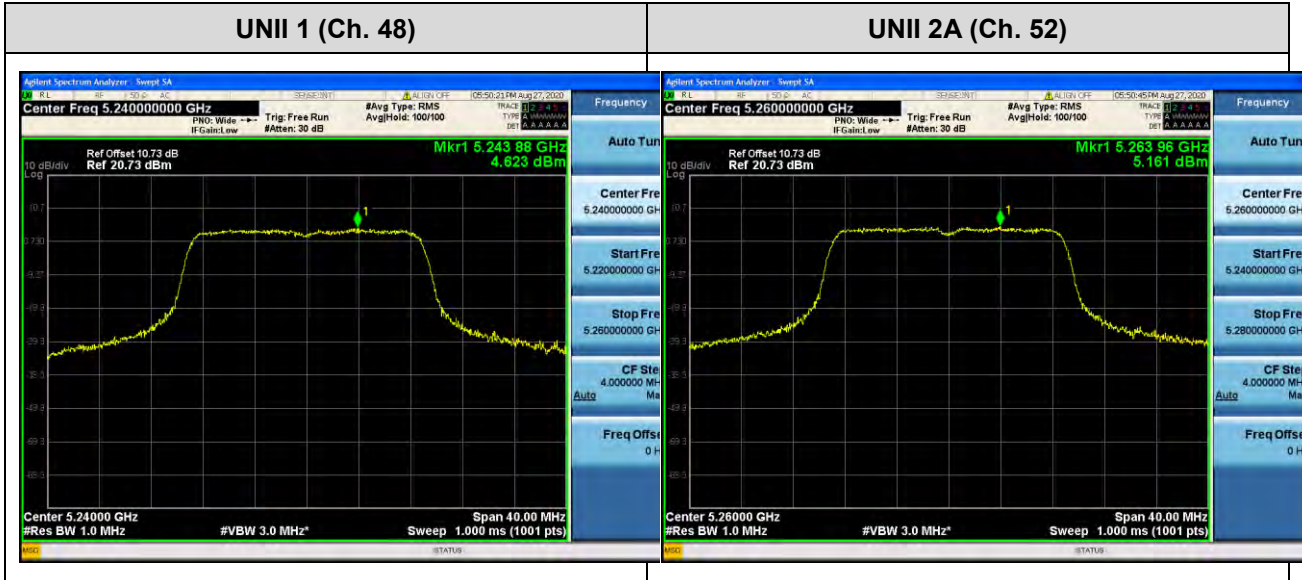




Test Plots(802.11n(HT20))

Note:

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

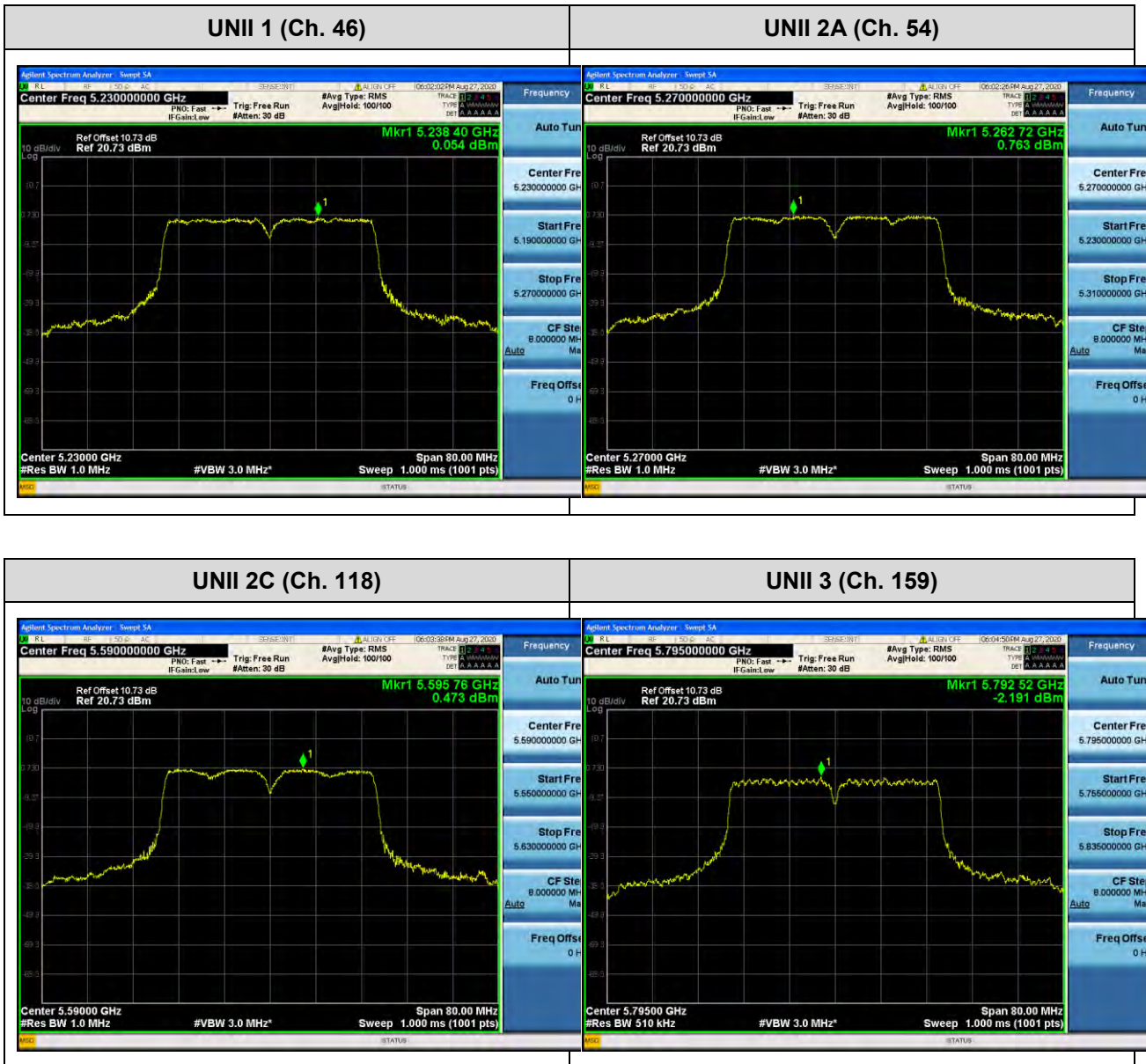




☐ Test Plots(802.11n(HT40))

Note:

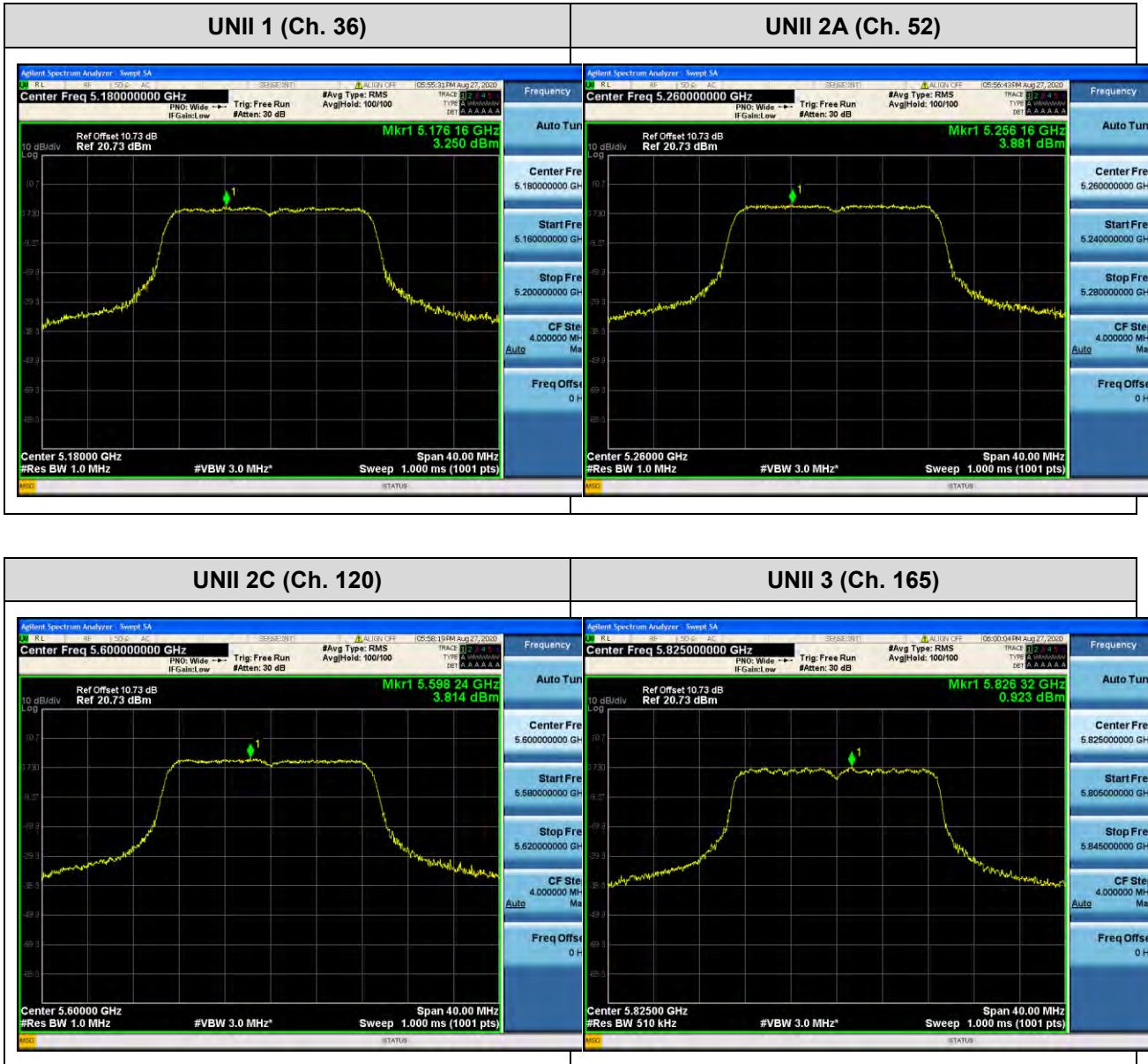
In order to simplify the report, attached plots were only channel of highest power.



☐ Test Plots(802.11ac(VHT20))

Note:

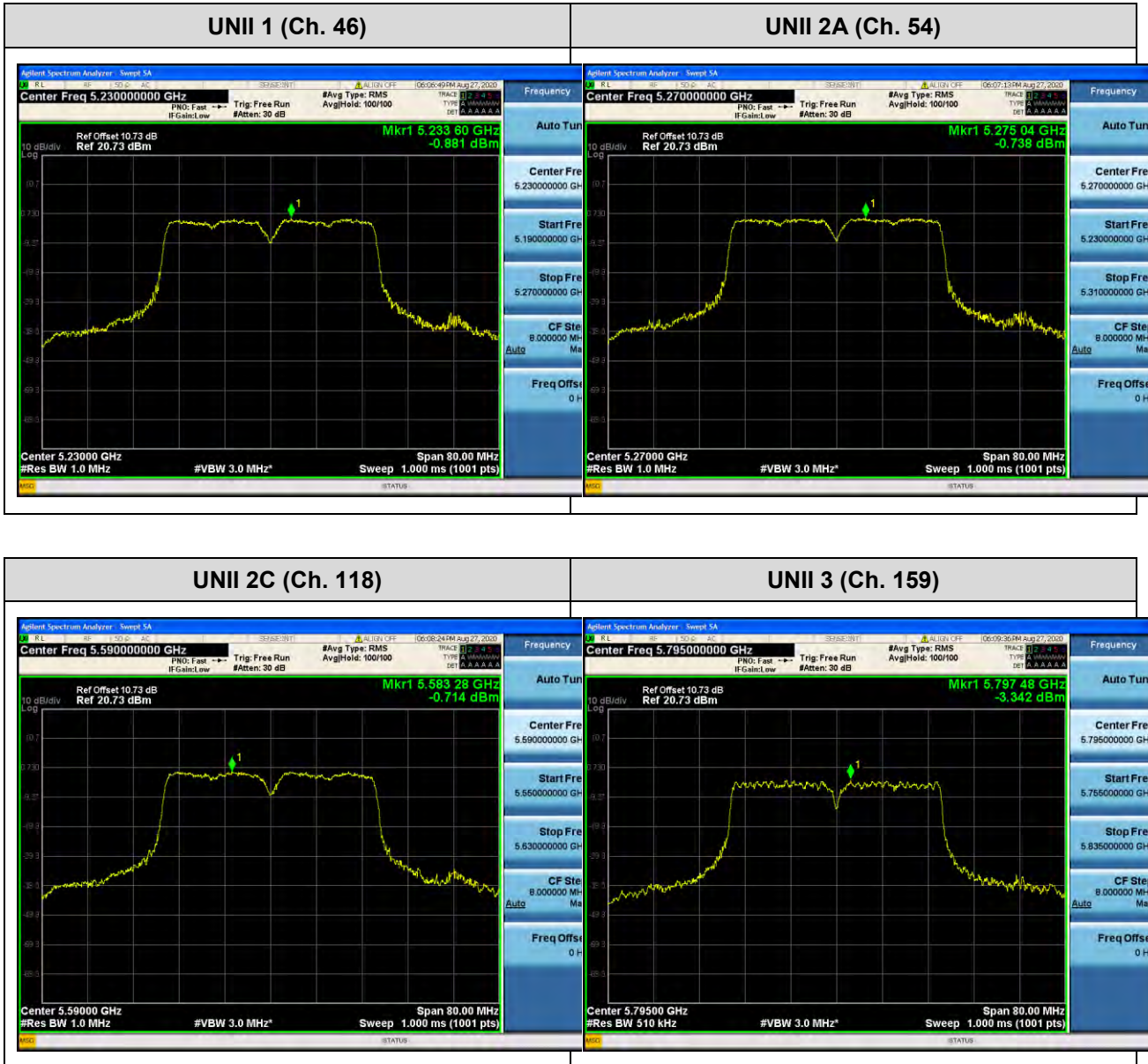
In order to simplify the report, attached plots were only channel of highest power.



☐ Test Plots(802.11ac(VHT40))

Note:

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

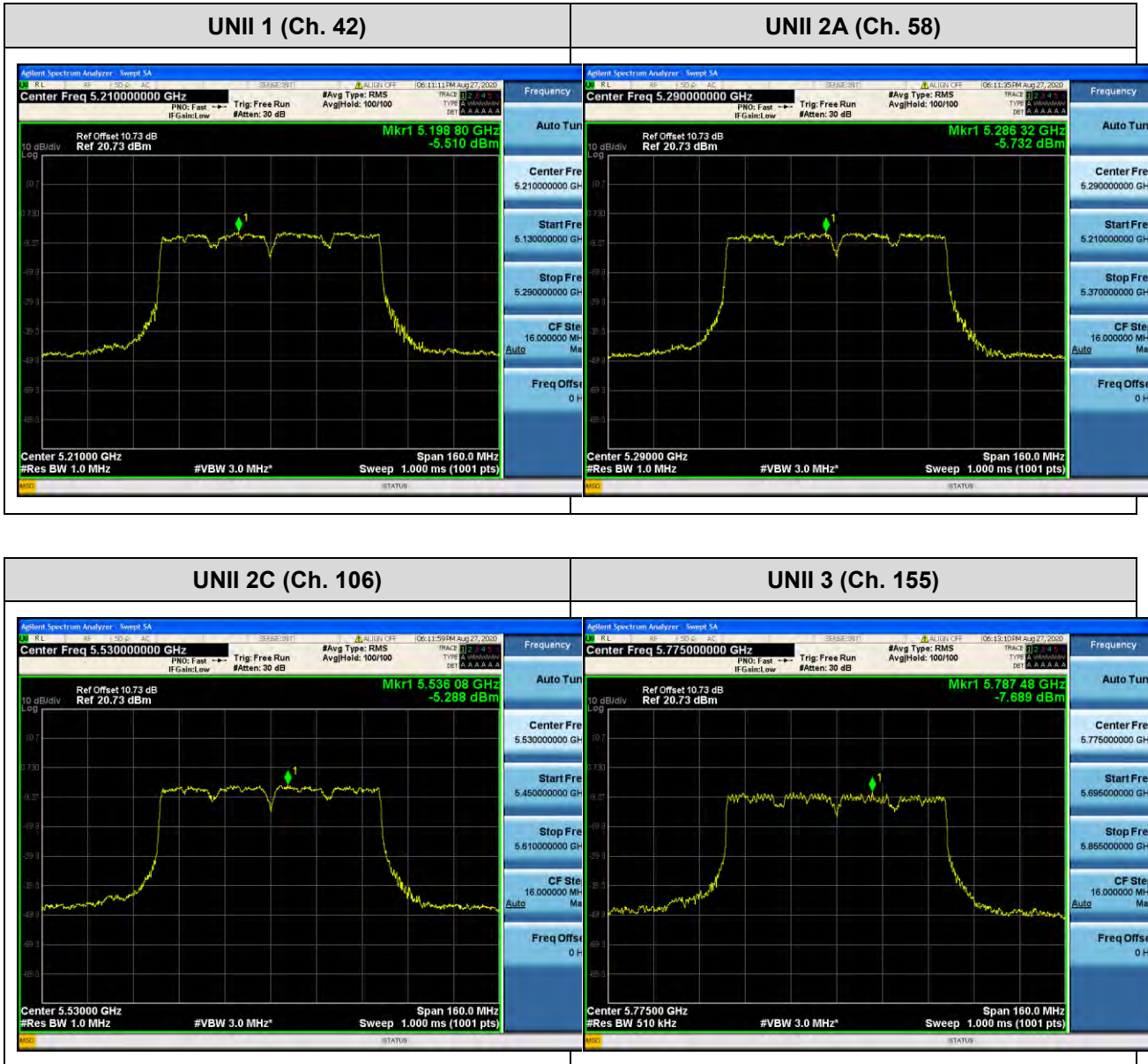




☐ Test Plots(802.11ac(VHT80))

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)	5210053.07	53.07
100%		-30	5210064.73	64.73
100%		-20	5210038.09	38.09
100%		-10	5210055.70	55.70
100%		0	5210011.36	11.36
100%		+10	5210058.37	58.37
100%		+30	5210072.06	72.06
100%		+40	5210094.63	94.63
100%		+50	5210076.21	76.21
Batt. Endpoint		3.4	+20	5210067.41

**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)	5290088.66	88.66
100%		-30	5290081.13	81.13
100%		-20	5290024.82	24.82
100%		-10	5290014.91	14.91
100%		0	5290034.21	34.21
100%		+10	5290046.96	46.96
100%		+30	5290009.37	9.37
100%		+40	5290019.20	19.2
100%		+50	5290013.50	13.50
Batt. Endpoint	3.4	+20	5290032.75	32.75

**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)	5530016.59	16.59
100%		-30	5530059.97	59.97
100%		-20	5530058.18	58.18
100%		-10	5530052.59	52.59
100%		0	5530042.39	42.39
100%		+10	5530054.33	54.33
100%		+30	5530083.24	83.24
100%		+40	5530079.86	79.86
100%		+50	5530092.87	92.87
Batt. Endpoint		3.4	+20	5530040.33

**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)	5775057.81	57.81
100%		-30	5775080.90	80.90
100%		-20	5775069.71	69.71
100%		-10	5775049.74	49.74
100%		0	5775040.44	40.44
100%		+10	5775036.86	36.86
100%		+30	5775015.65	15.65
100%		+40	5775037.49	37.49
100%		+50	5775003.17	3.17
Batt. Endpoint	3.4	+20	5775058.67	58.67

**Note:**

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



**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)	5210012.39	12.39
100%		-30	5210007.06	7.06
100%		-20	5210060.70	60.70
100%		-10	5210063.88	63.88
100%		0	5210001.56	1.56
100%		+10	5210018.23	18.23
100%		+30	5210084.06	84.06
100%		+40	5210086.63	86.63
100%		+50	5210066.49	66.49
Batt. Endpoint		3.4	+20	5210016.32

**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)	5290073.22	73.22
100%		-30	5290074.62	74.62
100%		-20	5290014.03	14.03
100%		-10	5290030.04	30.04
100%		0	5290044.53	44.53
100%		+10	5290098.32	98.32
100%		+30	5290065.85	65.85
100%		+40	5290040.08	40.08
100%		+50	5290072.67	72.67
Batt. Endpoint	3.4	+20	5290062.83	62.83

**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)	5530051.74	51.74
100%		-30	5530087.45	87.45
100%		-20	5530041.96	41.96
100%		-10	5530084.43	84.43
100%		0	5530018.95	18.95
100%		+10	5530055.62	55.62
100%		+30	5530079.56	79.56
100%		+40	5530091.99	91.99
100%		+50	5530082.78	82.78
Batt. Endpoint	3.4	+20	5530090.50	90.5

**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)	5775007.02	7.02
100%		-30	5775022.49	22.49
100%		-20	5775083.33	83.33
100%		-10	5775073.38	73.38
100%		0	5775031.21	31.21
100%		+10	5775043.21	43.21
100%		+30	5775028.95	28.95
100%		+40	5775034.88	34.88
100%		+50	5775035.52	35.52
Batt. Endpoint	3.4	+20	5775010.04	10.04

**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)	5210004.64	4.64
100%		-30	5210065.84	65.84
100%		-20	5210054.36	54.36
100%		-10	5210068.81	68.81
100%		0	5210005.59	5.59
100%		+10	5210090.89	90.89
100%		+30	5210075.89	75.89
100%		+40	5210032.27	32.27
100%		+50	5210010.42	10.42
Batt. Endpoint		3.4	+20	5210077.05

**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)	5290012.60	12.60
100%		-30	5290017.75	17.75
100%		-20	5290032.41	32.41
100%		-10	5290078.14	78.14
100%		0	5290074.73	74.73
100%		+10	5290001.94	1.94
100%		+30	5290017.72	17.72
100%		+40	5290032.55	32.55
100%		+50	5290047.39	47.39
Batt. Endpoint	3.4	+20	5290009.08	9.08

**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)	5530045.57	45.57
100%		-30	5530041.45	41.45
100%		-20	5530007.93	7.93
100%		-10	5530031.31	31.31
100%		0	5530007.12	7.12
100%		+10	5530054.71	54.71
100%		+30	5530099.77	99.77
100%		+40	5530086.62	86.62
100%		+50	5530061.99	61.99
Batt. Endpoint	3.4	+20	5530070.30	70.3

**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)	5775065.22	65.22
100%		-30	5775022.24	22.24
100%		-20	5775013.98	13.98
100%		-10	5775055.39	55.39
100%		0	5775034.41	34.41
100%		+10	5775029.10	29.1
100%		+30	5775040.64	40.64
100%		+40	5775021.89	21.89
100%		+50	5775002.31	2.31
Batt. Endpoint	3.4	+20	5775077.91	77.91

**Note:**

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



**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)	5210005.06	5.06
100%		-30	5210076.18	76.18
100%		-20	5210028.15	28.15
100%		-10	5210089.86	89.86
100%		0	5210046.09	46.09
100%		+10	5210028.58	28.58
100%		+30	5210056.17	56.17
100%		+40	5210003.32	3.32
100%		+50	5210075.16	75.16
Batt. Endpoint		3.4	+20	5210012.52

**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)	5290037.59	37.59
100%		-30	5290089.58	89.58
100%		-20	5290099.83	99.83
100%		-10	5290082.82	82.82
100%		0	5290031.88	31.88
100%		+10	5290037.67	37.67
100%		+30	5290065.25	65.25
100%		+40	5290007.50	7.5
100%		+50	5290056.18	56.18
Batt. Endpoint	3.4	+20	5290028.21	28.21

**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)	5530017.52	17.52
100%		-30	5530063.30	63.30
100%		-20	5530045.87	45.87
100%		-10	5530026.71	26.71
100%		0	5530062.70	62.7
100%		+10	5530066.67	66.67
100%		+30	5530077.26	77.26
100%		+40	5530026.69	26.69
100%		+50	5530014.74	14.74
Batt. Endpoint		3.4	+20	5530023.04

**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)	5775011.03	11.03
100%		-30	5775047.50	47.50
100%		-20	5775041.69	41.69
100%		-10	5775051.21	51.21
100%		0	5775035.36	35.36
100%		+10	5775061.88	61.88
100%		+30	5775034.75	34.75
100%		+40	5775013.40	13.4
100%		+50	5775002.33	2.33
Batt. Endpoint	3.4	+20	5775080.93	80.93

**Note:**

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

**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	5710.36	14.64
802.11n(HT20)				5708.76	16.24
802.11ac(VHT20)				5709.04	15.96
802.11a	UNII 3	5720	144	5729.88	4.88
802.11n(HT20)				5730.64	5.64
802.11ac(VHT20)				5730.44	5.44

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26dB Bandwidth [MHz]
802.11n(HT40)	UNII 2C	5710	142	5688.40	36.60
802.11ac(VHT40)				5688.40	36.60
802.11n(HT40)	UNII 3	5710	142	5731.68	6.68
802.11ac(VHT40)				5731.60	6.60

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26dB Bandwidth [MHz]
802.11ac(VHT80)	UNII 2C	5690	138	5647.44	77.56
	UNII 3	5690	138	5735.28	10.28

**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	5727.56	2.56	> 0.5
802.11n(HT20)				5728.84	3.84	> 0.5
802.11ac(VHT20)				5728.8	3.8	> 0.5

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6dB Bandwidth [MHz]	Limit [MHz]
802.11n(HT40)	UNII 3	5710	142	5728.08	3.08	> 0.5
802.11ac(VHT40)				5728.24	3.24	> 0.5

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6dB Bandwidth [MHz]	Limit [MHz]
802.11ac(VHT80)	UNII 3	5690	138	5728.24	3.24	> 0.5

**Note:**

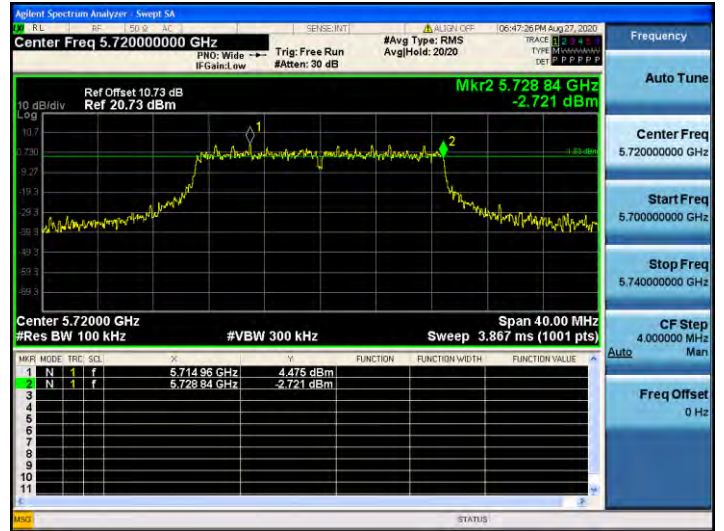
6dB Bandwidth = Measured Frequency[MHz] – 5725MHz

Test Plots(UNII 3 Band 6dB Bandwidth)

802.11a CH.144



802.11n\_HT20 CH.144



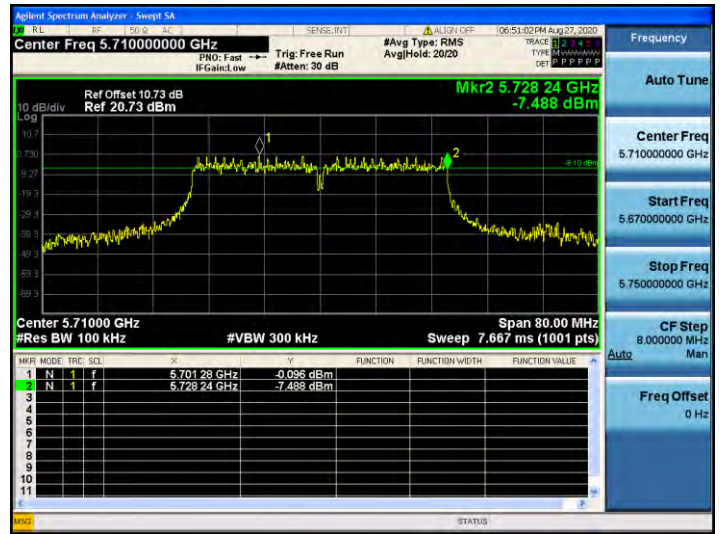
802.11ac\_VHT20 CH.144



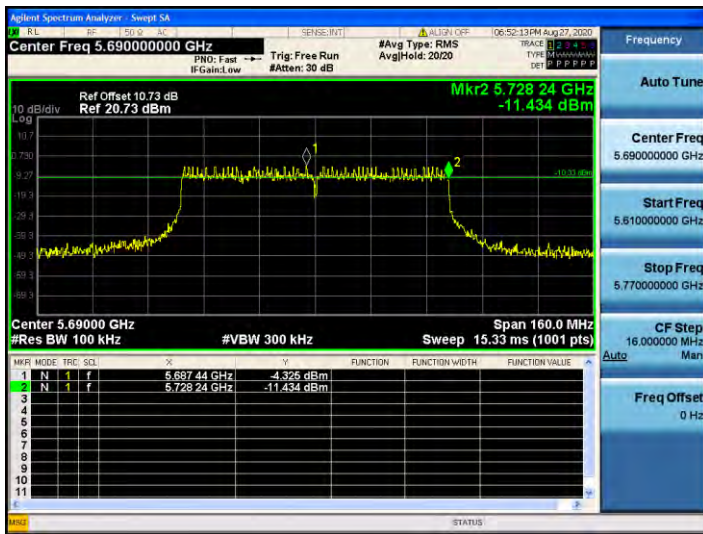
802.11n\_HT40 CH.142



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	15.26	0.344	15.61	22.66
802.11n(HT20)			14.31	0.810	15.12	23.11
802.11ac(VHT20)			13.09	0.911	14.00	23.03
802.11a	5720 (UNII 3 Band)	144	6.82	0.344	7.16	30.00
802.11n(HT20)			8.61	0.810	9.42	30.00
802.11ac(VHT20)			7.38	0.911	8.29	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	13.63	1.303	14.93	23.98
802.11ac(VHT40)			12.37	1.498	13.87	23.98
802.11n(HT40)	5710 (UNII 3 Band)	142	3.55	1.303	4.86	30.00
802.11ac(VHT40)			2.30	1.498	3.80	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	11.54	1.963	13.50	23.98
	5690 (UNII 3 Band)	138	-2.34	1.963	-0.37	30.00

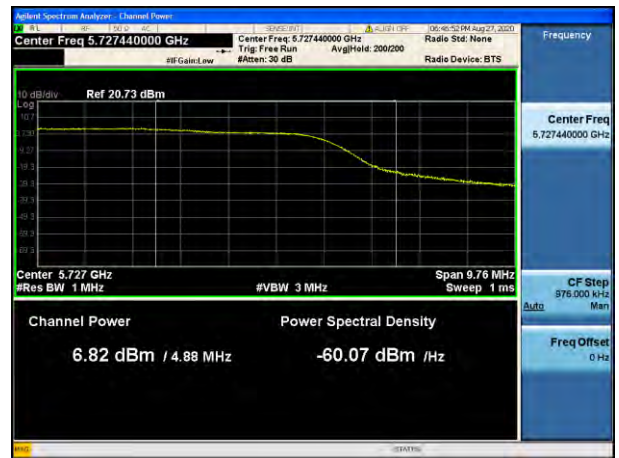


**Test Plots**

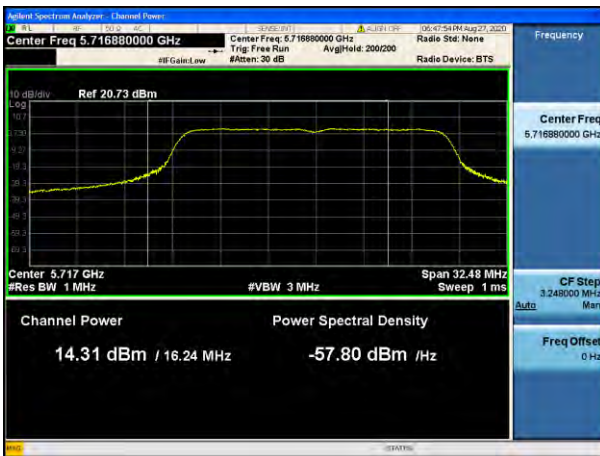
**802.11a UNII 2C Band**



**802.11a UNII 3 Band**



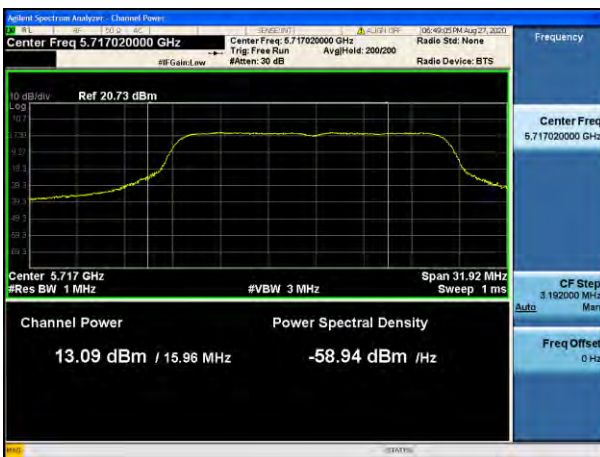
**802.11n(HT20) UNII 2C Band**



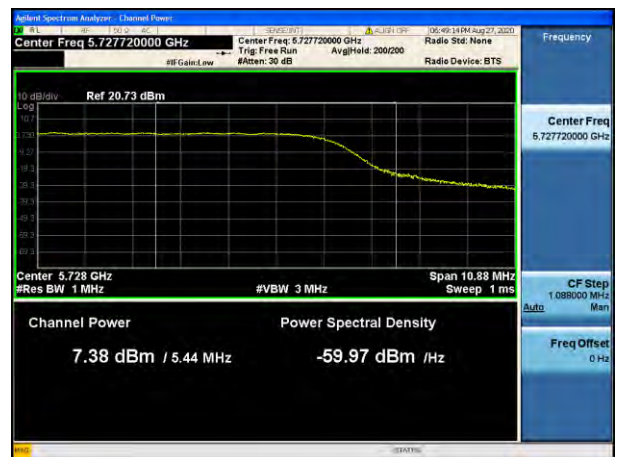
**802.11n(HT20) UNII 3 Band**



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



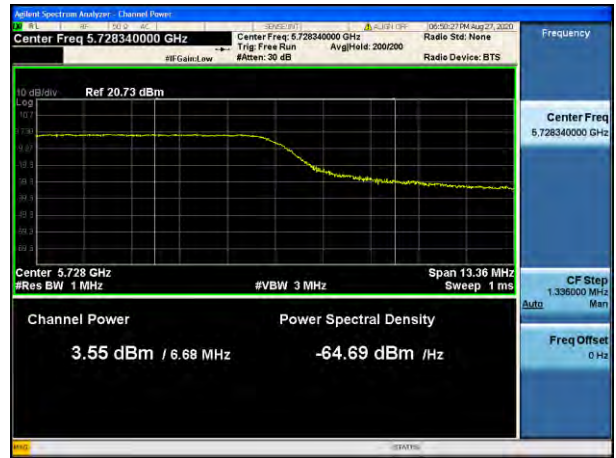
**802.11ac(VHT20) UNII 3 Band**



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



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



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



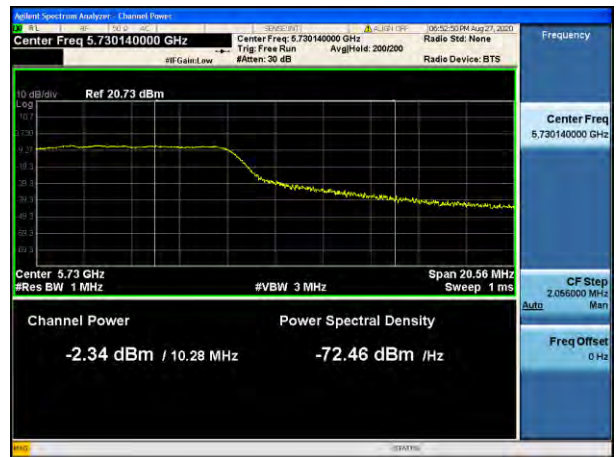
**802.11ac(VHT40) UNII 3 Band**



**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	6.917	0.344	7.261	11dBm/ MHz
802.11n(HT20)			4.055	0.810	4.865	
802.11ac(VHT20)			2.861	0.911	3.771	
802.11a	5720 (UNII 3 Band)	144	1.211	0.344	1.556	30 dBm/ 500kHz
802.11n(HT20)			0.928	0.810	1.738	
802.11ac(VHT20)			-0.168	0.911	0.743	

Mode	Frequency [MHz]	Channel	Measured Density (dBm)	Duty Cycle Factor (dB)	Total PSD (dBm)	Limit (dBm)
802.11n(HT40)	5710 (UNII 2C Band)	142	-0.102	1.303	1.201	11dBm/ MHz
802.11ac(VHT40)			-1.443	1.498	0.055	
802.11n(HT40)	5710 (UNII 3 Band)	142	-3.100	1.303	-1.797	30 dBm/ 500kHz
802.11ac(VHT40)			-4.200	1.498	-2.702	

Mode	Frequency [MHz]	Channel	Measured Density (dBm)	Duty Cycle Factor (dB)	Total PSD (dBm)	Limit (dBm)
802.11ac(VHT80)	5690 (UNII 2C Band)	138	-5.792	1.963	-3.829	11dBm/ MHz
	5690 (UNII 3 Band)	138	-9.630	1.963	-7.667	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	55.02	0.49	V	55.51	68.20	12.69	PK
15540	49.95	2.62	V	52.57	73.98	21.41	PK
15540	37.02	2.62	V	39.64	53.98	14.34	AV
10360	54.66	0.49	H	55.15	68.20	13.05	PK
15540	50.30	2.62	H	52.92	73.98	21.06	PK
15540	37.13	2.62	H	39.75	53.98	14.23	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	55.15	1.38	V	56.53	68.20	11.67	PK
15600	50.28	1.50	V	51.78	73.98	22.20	PK
15600	36.82	1.50	V	38.32	53.98	15.66	AV
10400	54.22	1.38	H	55.60	68.20	12.60	PK
15600	50.21	1.50	H	51.71	73.98	22.27	PK
15600	36.77	1.50	H	38.27	53.98	15.71	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	54.54	-0.33	V	54.21	68.20	13.99	PK
15720	50.81	0.56	V	51.37	73.98	22.61	PK
15720	37.40	0.56	V	37.96	53.98	16.02	AV
10480	54.19	-0.33	H	53.86	68.20	14.34	PK
15720	50.46	0.56	H	51.02	73.98	22.96	PK
15720	37.35	0.56	H	37.91	53.98	16.07	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	53.70	-0.06	V	53.64	68.20	14.56	PK
15780	49.54	0.96	V	50.50	73.98	23.48	PK
15780	36.82	0.96	V	37.78	53.98	16.20	AV
10520	54.00	-0.06	H	53.94	68.20	14.26	PK
15780	49.96	0.96	H	50.92	73.98	23.06	PK
15780	36.72	0.96	H	37.68	53.98	16.30	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	53.71	-0.18	V	53.53	73.98	20.45	PK
10600	40.15	-0.18	V	39.97	53.98	14.01	AV
15900	51.99	-0.13	V	51.86	73.98	22.12	PK
15900	37.88	-0.13	V	37.75	53.98	16.23	AV
10600	53.68	-0.18	H	53.50	73.98	20.48	PK
10600	40.07	-0.18	H	39.89	53.98	14.09	AV
15900	51.46	-0.13	H	51.33	73.98	22.65	PK
15900	38.07	-0.13	H	37.94	53.98	16.04	AV

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

Frequency [MHz]	Reading [dBuV]	A.F.+C.L. -A.G + D.F [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
10640	53.55	-0.04	V	53.51	73.98	20.47	PK
10640	39.99	-0.04	V	39.95	53.98	14.03	AV
15960	51.54	-0.36	V	51.18	73.98	22.80	PK
15960	37.90	-0.36	V	37.54	53.98	16.44	AV
10640	53.33	-0.04	H	53.29	73.98	20.69	PK
10640	39.71	-0.04	H	39.67	53.98	14.31	AV
15960	51.22	-0.36	H	50.86	73.98	23.12	PK
15960	37.88	-0.36	H	37.52	53.98	16.46	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	52.70	1.75	V	54.45	73.98	19.53	PK
11000	39.58	1.75	V	41.33	53.98	12.65	AV
16500	50.02	1.06	V	51.08	68.20	17.12	PK
11000	53.43	1.75	H	55.18	73.98	18.80	PK
11000	39.67	1.75	H	41.42	53.98	12.56	AV
16500	50.12	1.06	H	51.18	68.20	17.02	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	53.55	0.26	V	53.81	73.98	20.17	PK
11200	40.11	0.26	V	40.37	53.98	13.61	AV
16800	50.89	3.41	V	54.30	68.20	13.90	PK
11200	53.35	0.26	H	53.61	73.98	20.37	PK
11200	40.02	0.26	H	40.28	53.98	13.70	AV
16800	50.85	3.41	H	54.26	68.20	13.94	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	52.81	0.74	V	53.55	73.98	20.43	PK
11440	39.51	0.74	V	40.25	53.98	13.73	AV
17160	50.88	5.47	V	56.35	68.20	11.85	PK
11440	52.95	0.74	H	53.69	73.98	20.29	PK
11440	39.68	0.74	H	40.42	53.98	13.56	AV
17160	50.99	5.47	H	56.46	68.20	11.74	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	52.11	0.57	V	52.68	73.98	21.30	PK
11490	39.09	0.57	V	39.66	53.98	14.32	AV
17235	51.35	5.22	V	56.57	68.20	11.63	PK
11490	52.02	0.57	H	52.59	73.98	21.39	PK
11490	38.98	0.57	H	39.55	53.98	14.43	AV
17235	51.22	5.22	H	56.44	68.20	11.76	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	52.16	0.73	V	52.89	73.98	21.09	PK
11570	39.17	0.73	V	39.90	53.98	14.08	AV
17355	50.95	6.04	V	56.99	68.20	11.21	PK
11570	52.03	0.73	H	52.76	73.98	21.22	PK
11570	39.02	0.73	H	39.75	53.98	14.23	AV
17355	50.75	6.04	H	56.79	68.20	11.41	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	52.34	-0.65	V	51.69	73.98	22.29	PK
11650	39.35	-0.65	V	38.70	53.98	15.28	AV
17475	50.76	7.62	V	58.38	68.20	9.82	PK
11650	52.12	-0.65	H	51.47	73.98	22.51	PK
11650	39.22	-0.65	H	38.57	53.98	15.41	AV
17475	50.66	7.62	H	58.28	68.20	9.92	PK

**Note:**

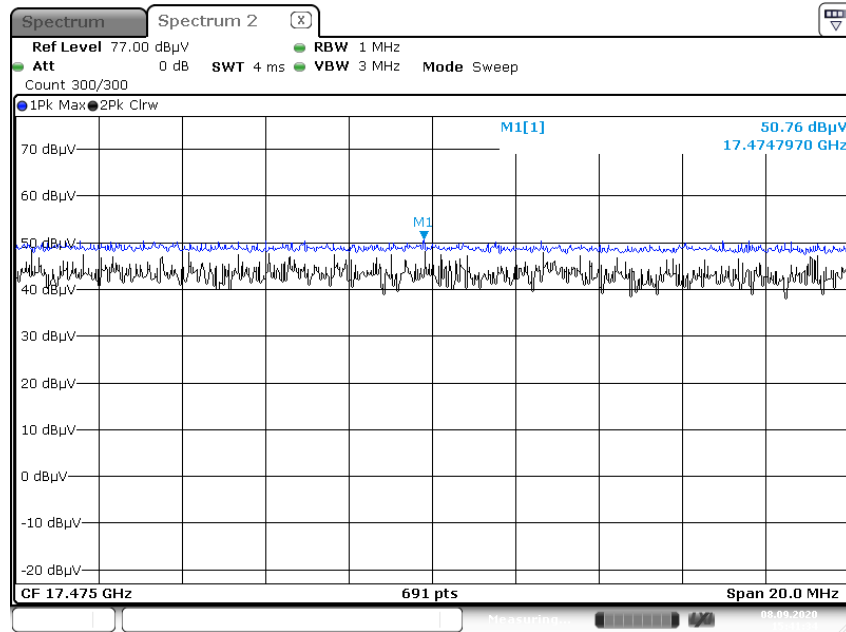
All Modes of operation were investigated and the worst case configuration results are reported.

[Worst case]

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

▣ Test Plots

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



Date: 8.SEP.2020 15:41:34

**Note:**

Only the worst case plots for Radiated Spurious Emissions.

**10.9 RADIATED RESTRICTED BAND EDGE**

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

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	50.74	5.75	H	56.49	73.98	17.49	PK
5150	40.03	5.75	H	45.78	53.98	8.20	AV
5150	51.55	5.75	V	57.30	73.98	16.68	PK
5150	40.25	5.75	V	46.00	53.98	7.98	AV

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

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	52.55	5.52	H	58.07	73.98	15.91	PK
5350	36.54	5.52	H	42.06	53.98	11.92	AV
5350	53.94	5.52	V	59.46	73.98	14.52	PK
5350	36.75	5.52	V	42.27	53.98	11.71	AV

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

Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	54.24	7.05	H	61.29	73.98	12.69	PK
5460	35.43	7.05	H	42.48	53.98	11.50	AV
5470	56.81	6.59	H	63.40	68.20	4.80	PK
5460	54.13	7.05	V	61.18	73.98	12.80	PK
5460	35.30	7.05	V	42.35	53.98	11.63	AV
5470	56.08	6.59	V	62.67	68.20	5.53	PK

Band : UNII 1  
 Operation Mode: 802.11 n\_HT20  
 Transfer MCS Index: 0  
 Operating Frequency 5180 MHz  
 Channel No. 36 Ch

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	51.98	5.75	H	57.73	73.98	16.25	PK
5150	39.16	5.75	H	44.91	53.98	9.07	AV
5150	52.54	5.75	V	58.29	73.98	15.69	PK
5150	39.75	5.75	V	45.50	53.98	8.48	AV

Band : UNII 2A  
 Operation Mode: 802.11 n\_HT20  
 Transfer MCS Index: 0  
 Operating Frequency 5320 MHz  
 Channel No. 64 Ch

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	54.32	5.52	H	59.84	73.98	14.14	PK
5350	36.53	5.52	H	42.05	53.98	11.93	AV
5350	54.55	5.52	V	60.07	73.98	13.91	PK
5350	36.70	5.52	V	42.22	53.98	11.76	AV

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

Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	53.45	7.05	H	60.50	73.98	13.48	PK
5460	35.33	7.05	H	42.38	53.98	11.60	AV
5470	56.97	6.59	H	63.56	68.20	4.64	PK
5460	53.14	7.05	V	60.19	73.98	13.79	PK
5460	35.09	7.05	V	42.14	53.98	11.84	AV
5470	56.37	6.59	V	62.96	68.20	5.24	PK



Band : UNII 1  
 Operation Mode: 802.11 ac\_VHT20  
 Transfer MCS Index: 0  
 Operating Frequency 5180 MHz  
 Channel No. 36 Ch

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	53.61	5.75	H	59.36	73.98	14.62	PK
5150	37.20	5.75	H	42.95	53.98	11.03	AV
5150	54.50	5.75	V	60.25	73.98	13.73	PK
5150	37.48	5.75	V	43.23	53.98	10.75	AV

Band : UNII 2A  
 Operation Mode: 802.11 ac\_VHT20  
 Transfer MCS Index: 0  
 Operating Frequency 5320 MHz  
 Channel No. 64 Ch

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	54.80	5.52	H	60.32	73.98	13.66	PK
5350	35.76	5.52	H	41.28	53.98	12.70	AV
5350	55.28	5.52	V	60.80	73.98	13.18	PK
5350	36.07	5.52	V	41.59	53.98	12.39	AV

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

Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	54.28	7.05	H	61.33	73.98	12.65	PK
5460	35.11	7.05	H	42.16	53.98	11.82	AV
5470	57.07	6.59	H	63.66	68.20	4.54	PK
5460	53.61	7.05	V	60.66	73.98	13.32	PK
5460	34.89	7.05	V	41.94	53.98	12.04	AV
5470	56.65	6.59	V	63.24	68.20	4.96	PK

Band : UNII 1  
 Operation Mode: 802.11 n\_HT40  
 Transfer MCS Index: 0  
 Operating Frequency 5190 MHz  
 Channel No. 38 Ch

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	54.66	5.75	H	60.41	73.98	13.57	PK
5150	43.17	5.75	H	48.92	53.98	5.06	AV
5150	55.40	5.75	V	61.15	73.98	12.83	PK
5150	43.76	5.75	V	49.51	53.98	4.47	AV

Band : UNII 2A  
 Operation Mode: 802.11 n\_HT40  
 Transfer MCS Index: 0  
 Operating Frequency 5310 MHz  
 Channel No. 62 Ch

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	57.58	5.52	H	63.10	73.98	10.88	PK
5350	44.51	5.52	H	50.03	53.98	3.95	AV
5350	58.10	5.52	V	63.62	73.98	10.36	PK
5350	44.87	5.52	V	50.39	53.98	3.59	AV

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

Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	51.70	7.05	H	58.75	73.98	15.23	PK
5460	37.21	7.05	H	44.26	53.98	9.72	AV
5470	57.97	6.59	H	64.56	68.20	3.64	PK
5460	51.53	7.05	V	58.58	73.98	15.40	PK
5460	36.80	7.05	V	43.85	53.98	10.13	AV
5470	56.19	6.59	V	62.78	68.20	5.42	PK

Band : UNII 1  
 Operation Mode: 802.11 ac\_VHT40  
 Transfer MCS Index: 0  
 Operating Frequency 5190 MHz  
 Channel No. 38 Ch

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	56.16	5.75	H	61.91	73.98	12.07	PK
5150	44.36	5.75	H	50.11	53.98	3.87	AV
5150	57.06	5.75	V	62.81	73.98	11.17	PK
5150	44.58	5.75	V	50.33	53.98	3.65	AV

Band : UNII 2A  
 Operation Mode: 802.11 ac\_VHT40  
 Transfer MCS Index: 0  
 Operating Frequency 5310 MHz  
 Channel No. 62 Ch

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	53.90	5.52	H	59.42	73.98	14.56	PK
5350	42.08	5.52	H	47.6	53.98	6.38	AV
5350	54.61	5.52	V	60.13	73.98	13.85	PK
5350	42.37	5.52	V	47.89	53.98	6.09	AV

Band : UNII 2C  
 Operation Mode: 802.11 ac\_VHT40  
 Transfer MCS Index: 0  
 Operating Frequency 5510 MHz  
 Channel No. 102 Ch

Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	52.40	7.05	H	59.45	73.98	14.53	PK
5460	37.55	7.05	H	44.6	53.98	9.38	AV
5470	58.00	6.59	H	64.59	68.20	3.61	PK
5460	51.78	7.05	V	58.83	73.98	15.15	PK
5460	37.30	7.05	V	44.35	53.98	9.63	AV
5470	57.54	6.59	V	64.13	68.20	4.07	PK

Band : UNII 1  
 Operation Mode: 802.11 ac\_VHT80  
 Transfer MCS Index: 0  
 Operating Frequency 5210 MHz  
 Channel No. 42 Ch

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5150	54.95	5.75	H	60.70	73.98	13.28	PK
5150	44.70	5.75	H	50.45	53.98	3.53	AV
5150	55.22	5.75	V	60.97	73.98	13.01	PK
5150	45.26	5.75	V	51.01	53.98	2.97	AV

Band : UNII 2A  
 Operation Mode: 802.11 ac\_VHT80  
 Transfer MCS Index: 0  
 Operating Frequency 5290 MHz  
 Channel No. 58 Ch

Frequency [MHz]	Reading dBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5350	52.60	5.52	H	58.12	73.98	15.86	PK
5350	41.77	5.52	H	47.29	53.98	6.69	AV
5350	53.63	5.52	V	59.15	73.98	14.83	PK
5350	41.90	5.52	V	47.42	53.98	6.56	AV

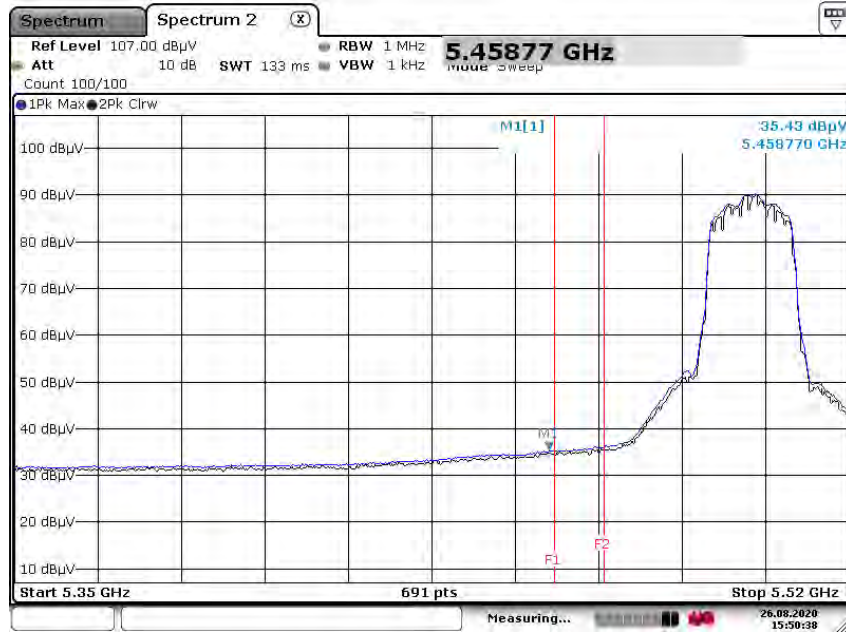


Band : UNII 2C  
 Operation Mode: 802.11 ac\_VHT80  
 Transfer MCS Index: 0  
 Operating Frequency 5530 MHz  
 Channel No. 106 Ch

Frequency [MHz]	Reading DBuV	C.L+A.F+ D.F-A.G + ATT [dB]	ANT. POL [H/V]	Total [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Measurement Type
5460	52.37	7.05	H	59.42	73.98	14.56	PK
5460	41.71	7.05	H	48.76	53.98	5.22	AV
5470	55.37	6.59	H	61.96	68.20	6.24	PK
5460	51.22	7.05	V	58.27	73.98	15.71	PK
5460	41.39	7.05	V	48.44	53.98	5.54	AV
5470	54.81	6.59	V	61.4	68.20	6.80	PK

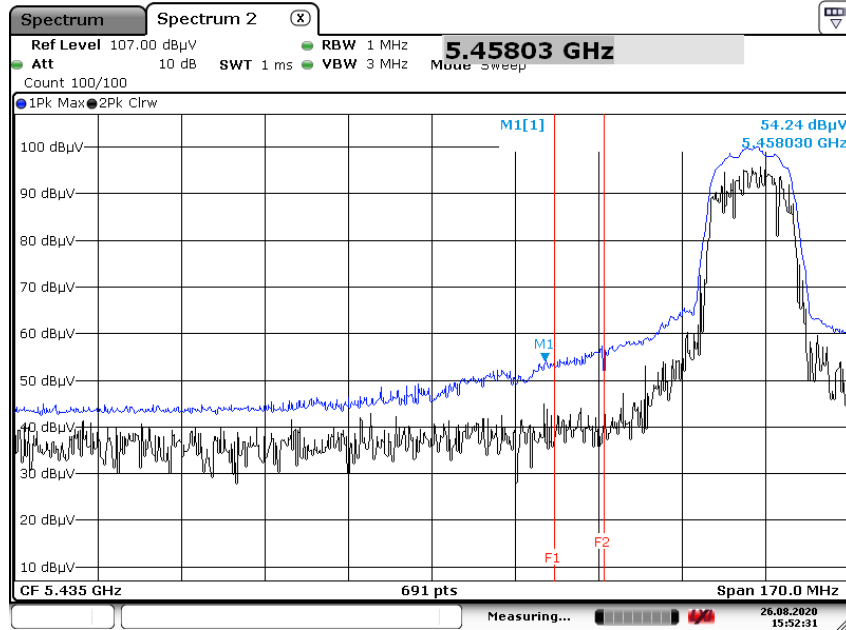
Test Plots(UNII 1, 2A, 2C)

Average Reading (802.11 a\_6 Mbps, Ch.100, Y-H)



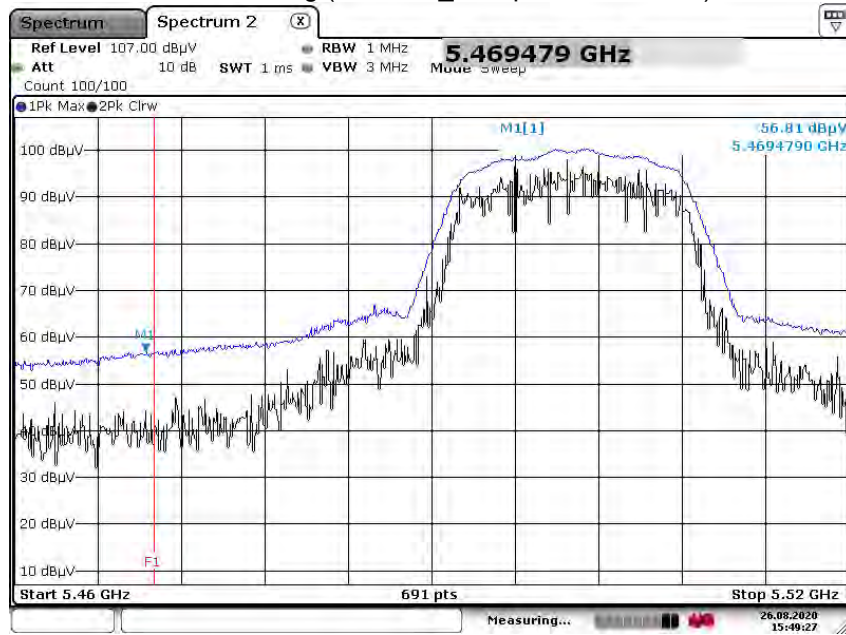
Date: 26.AUG.2020 15:50:38

Peak Reading (802.11 a\_6 Mbps, Ch.100, Y-H)



Date: 26.AUG.2020 15:52:30

Peak Reading (802.11 a\_6 Mbps, Ch.100, Y-H)



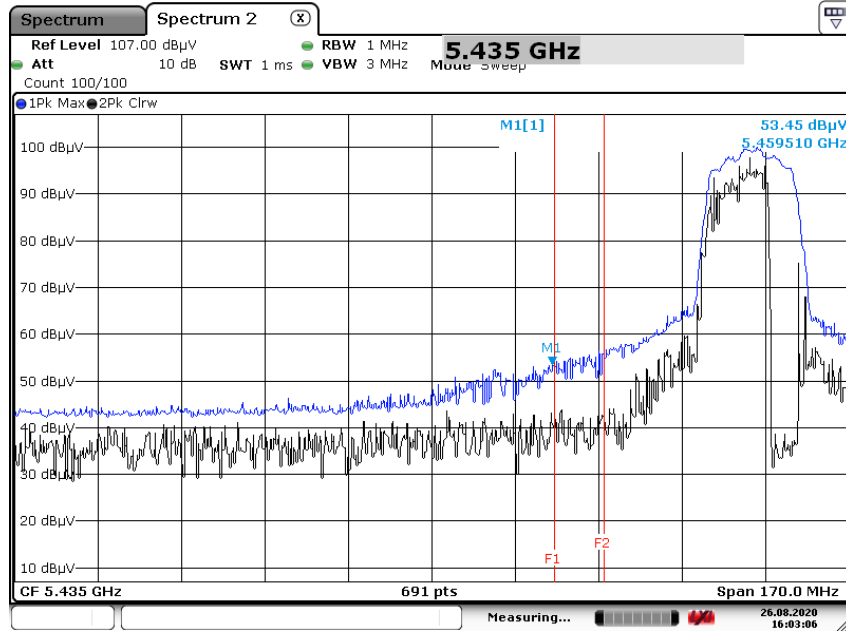
Date: 26.AUG.2020 15:49:27

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



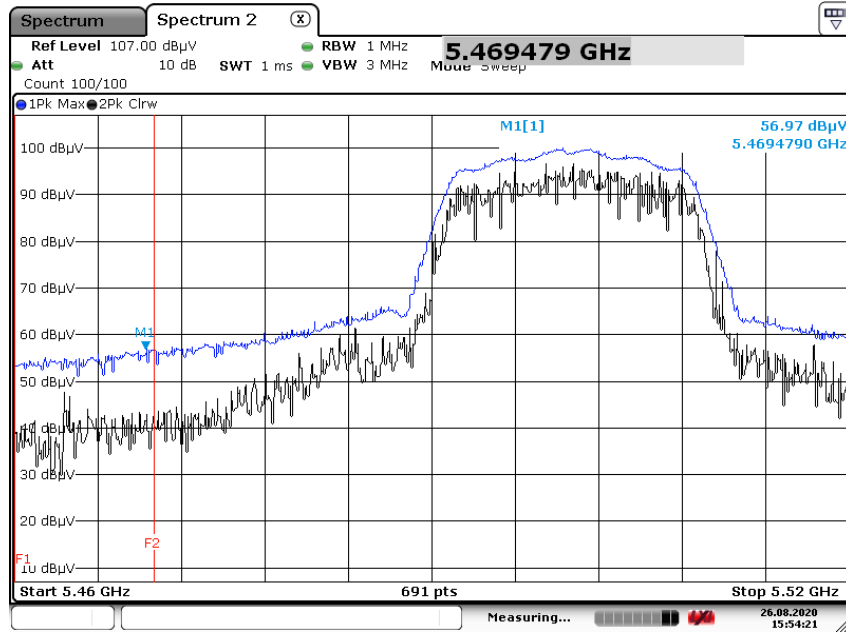
Date: 26.AUG.2020 15:55:07

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



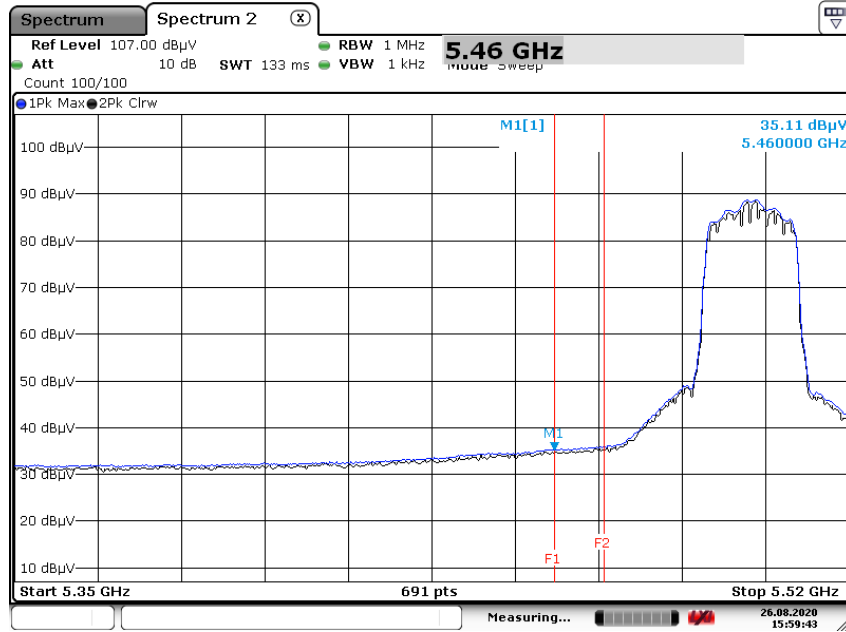
Date: 26.AUG.2020 16:03:07

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



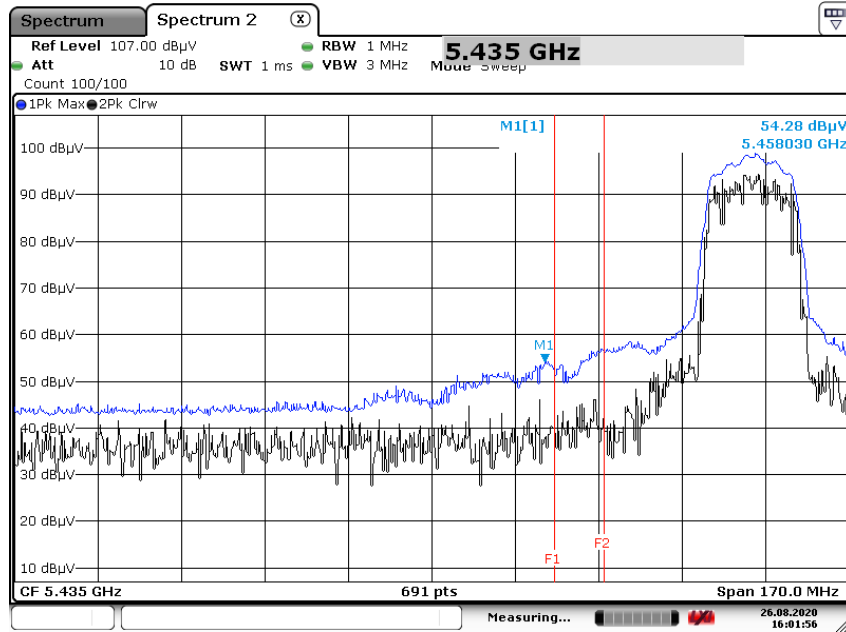
Date: 26.AUG.2020 15:54:21

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



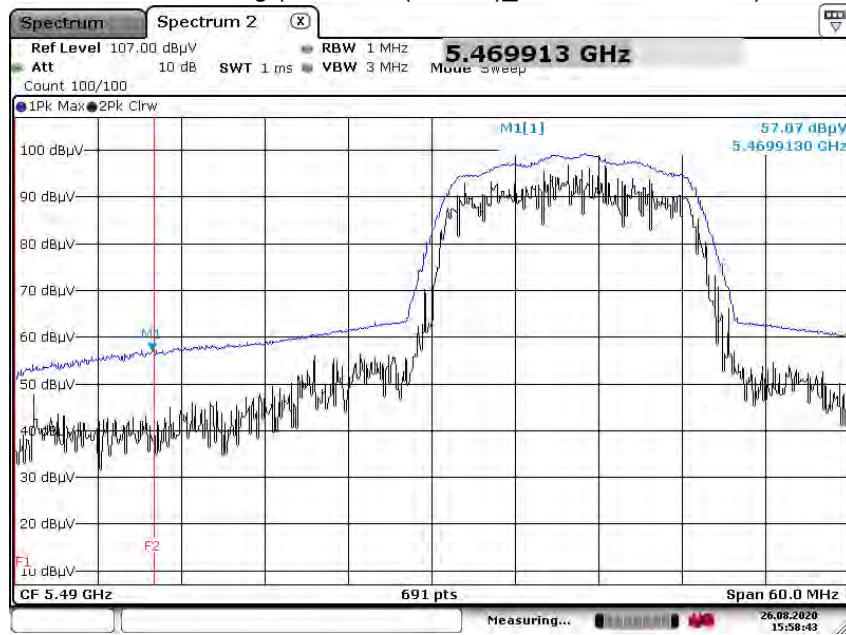
Date: 26.AUG.2020 15:59:44

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



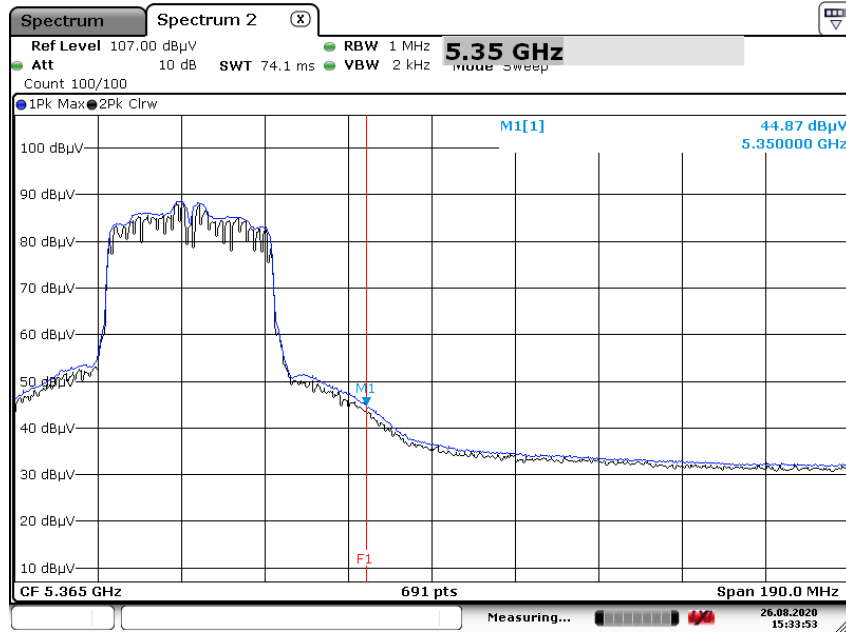
Date: 26.AUG.2020 16:01:57

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



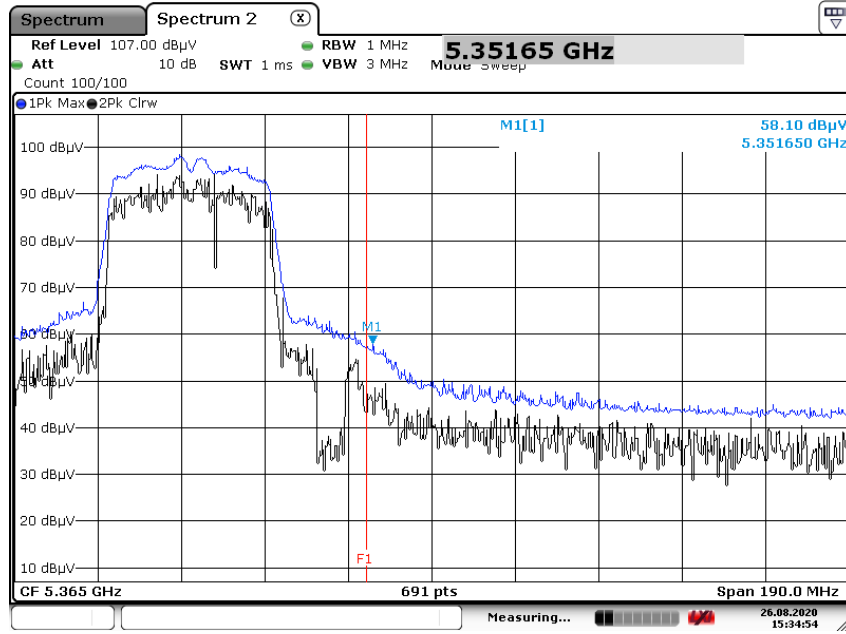
Date: 26.AUG.2020 15:58:43

Average Reading (802.11 n(HT40)\_MCS0, Ch.62, Y-V)



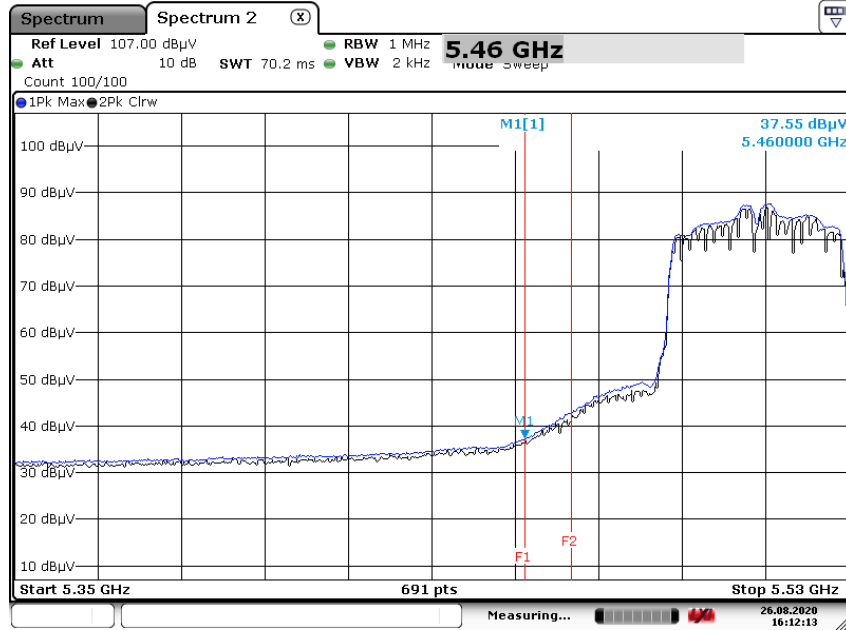
Date: 26.AUG.2020 15:53:53

Peak Reading (802.11 n(HT40)\_MCS0, Ch.62, Y-V)



Date: 26.AUG.2020 15:34:54

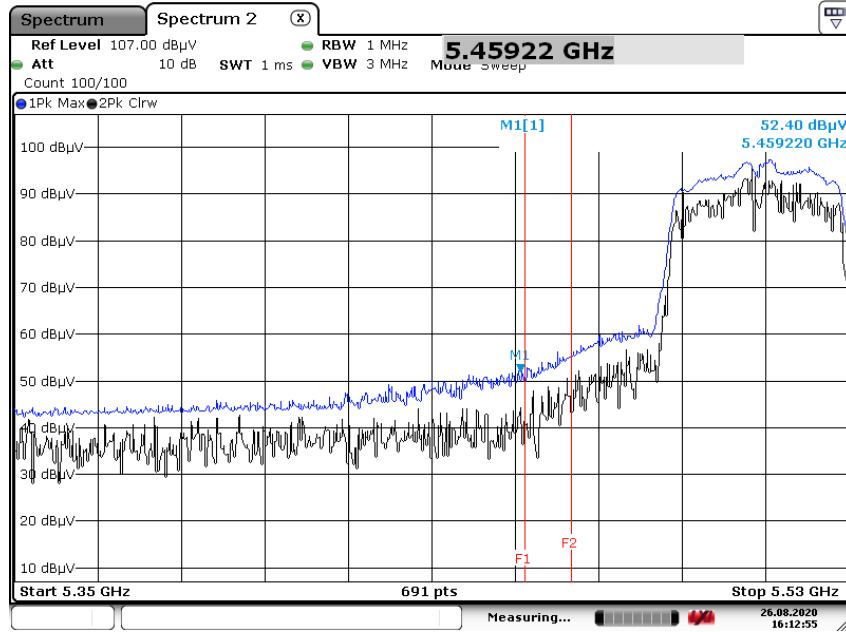
Average Reading (802.11 ac(VHT40)\_MCS0, Ch.102, Y-H)



Date: 26.AUG.2020 16:12:12

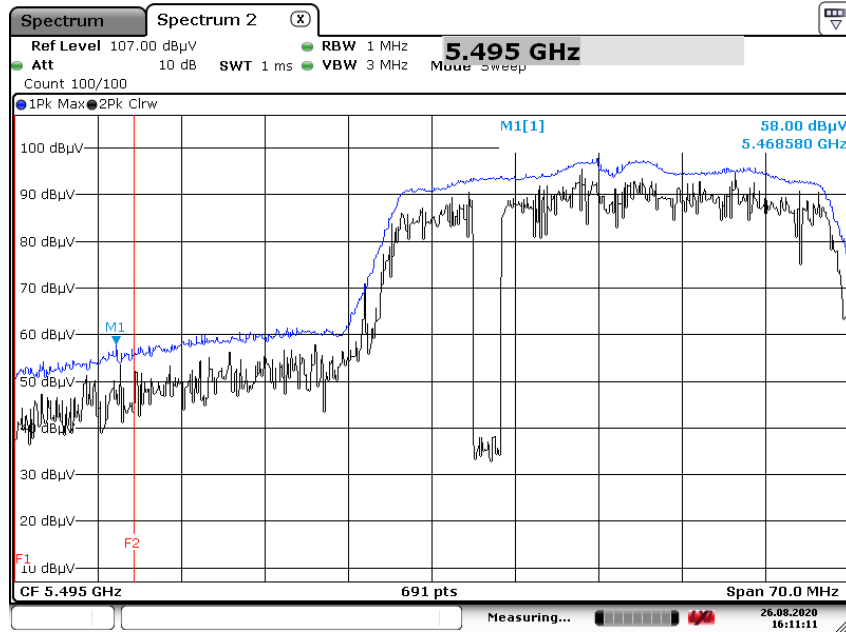


Peak Reading (802.11 ac(VHT40)\_MCS0, Ch.102, Y-H)



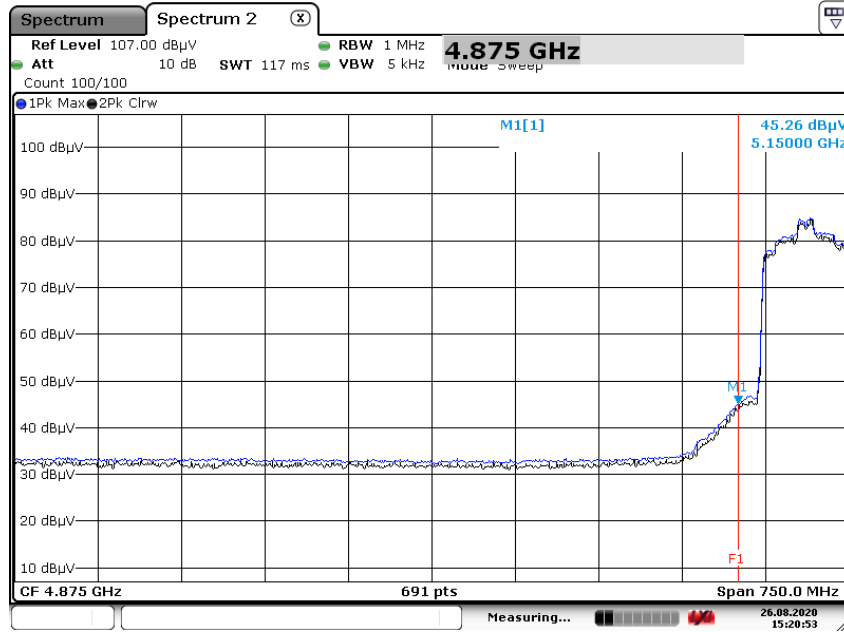
Date: 26.AUG.2020 16:12:55

Peak Reading (802.11 ac(VHT40)\_MCS0, Ch.102, Y-H)



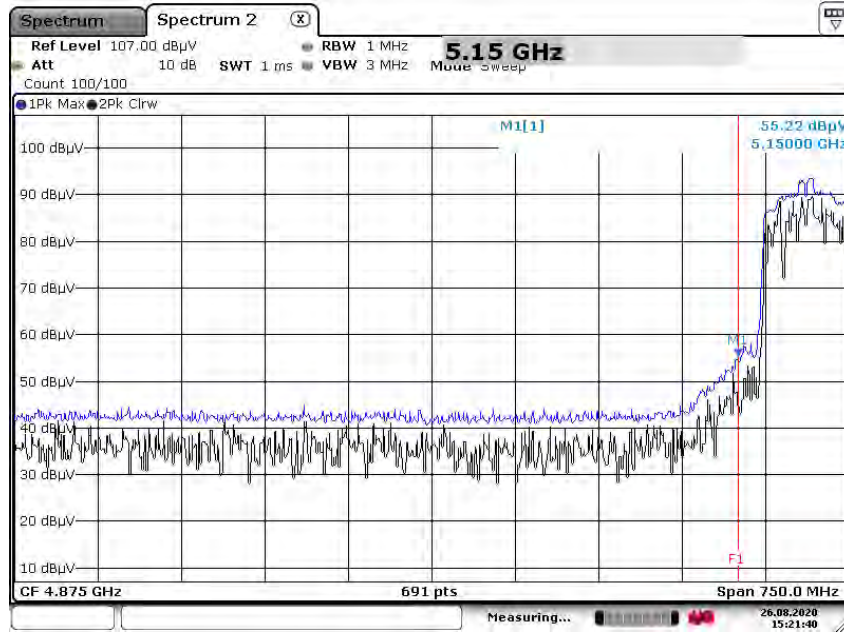
Date: 26.AUG.2020 16:11:12

Average Reading (802.11 ac(VHT80)\_MCS0, Ch.42, Y-V)



Date: 26.AUG.2020 15:20:53

Peak Reading (802.11 ac(VHT80)\_MCS0, Ch.42, Y-V)



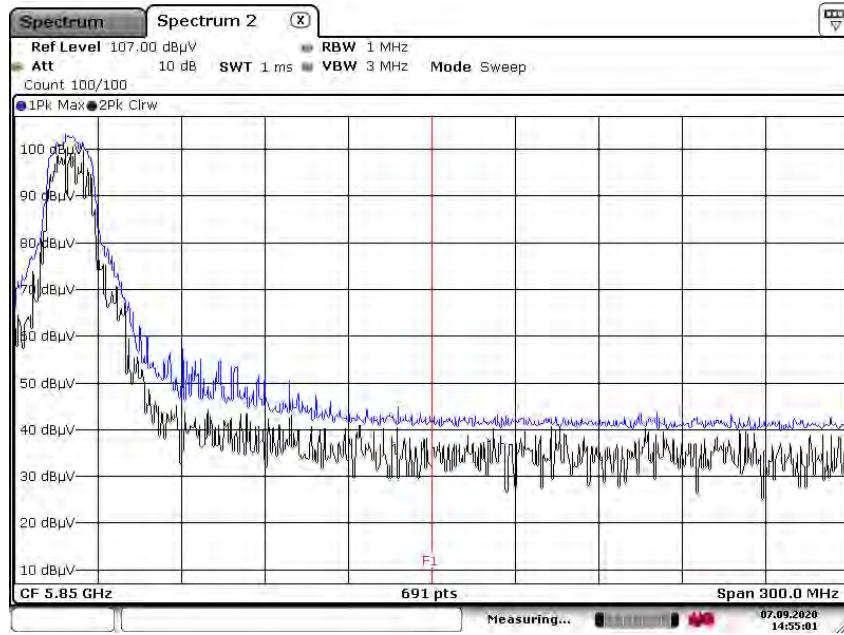
Date: 26.AUG.2020 15:21:39

**Note:**

Only the worst case plots for Radiated Restricted Band Edge.

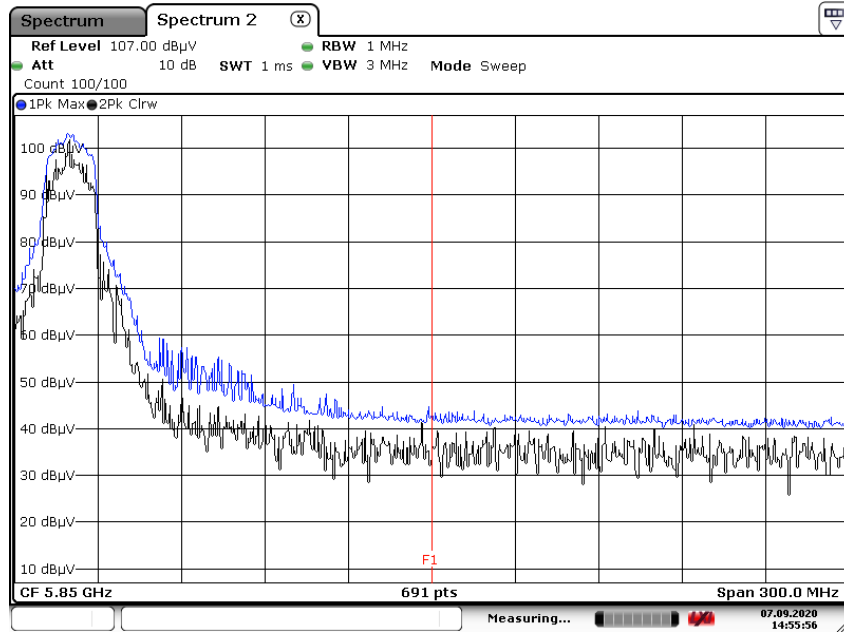
▣ Test Plots(Straddle Channel)

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



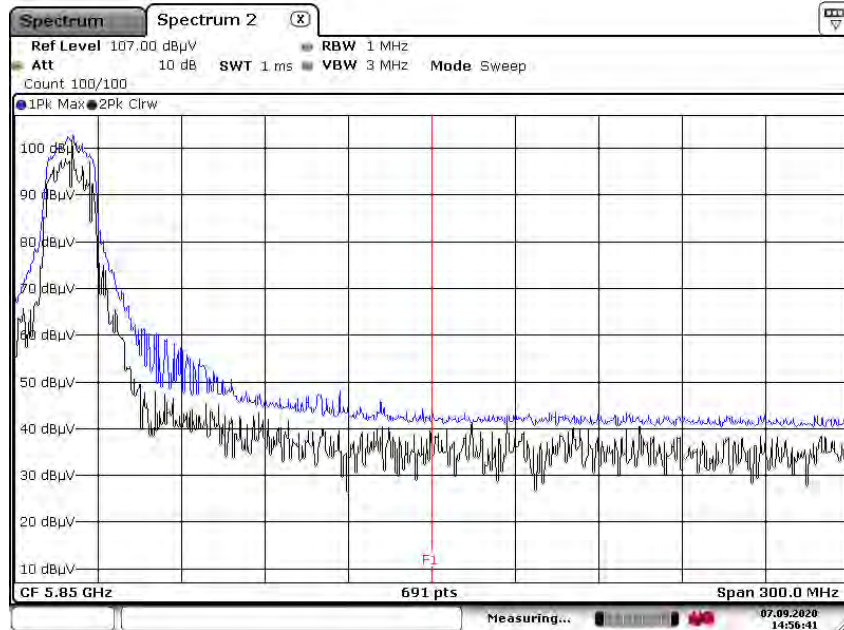
Date: 7.SEP.2020 14:55:01

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



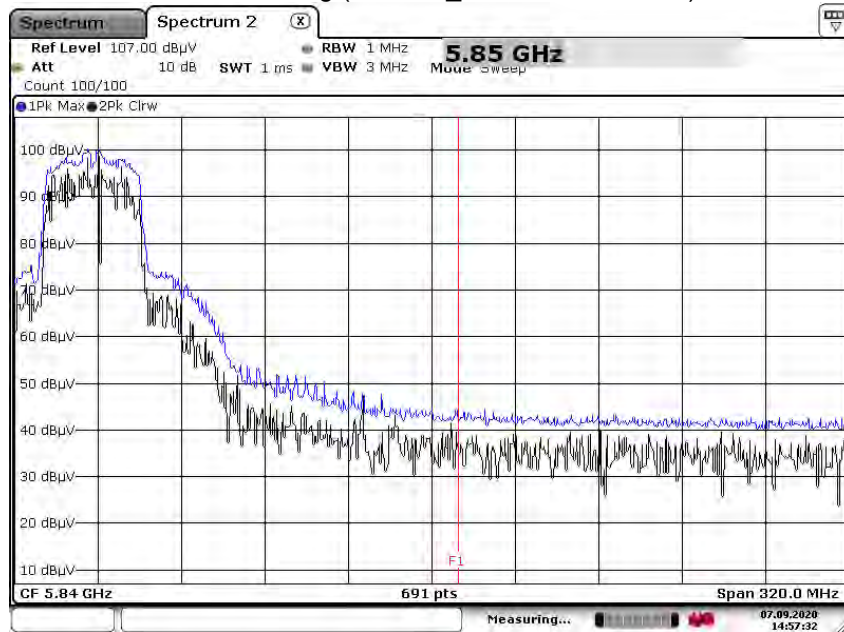
Date: 7.SEP.2020 14:55:56

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



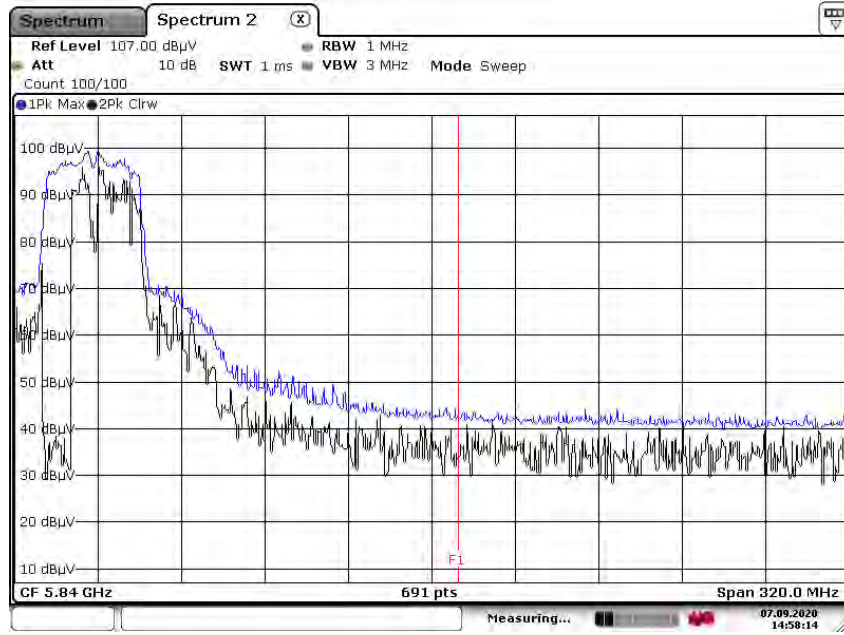
Date: 7.SEP.2020 14:56:41

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



Date: 7.SEP.2020 14:57:31

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



Date: 7.SEP.2020 14:58:14

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



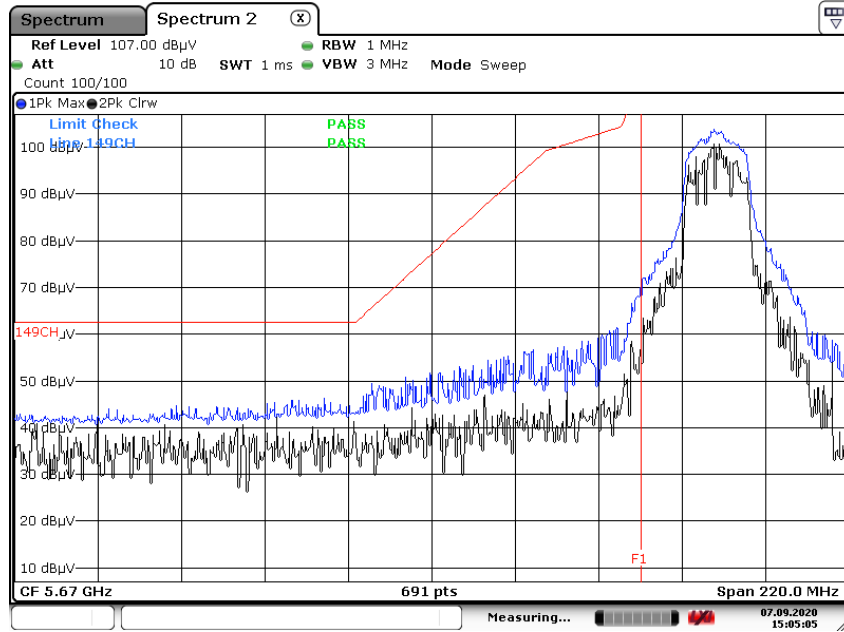
Date: 7.SEP.2020 14:59:19

**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)

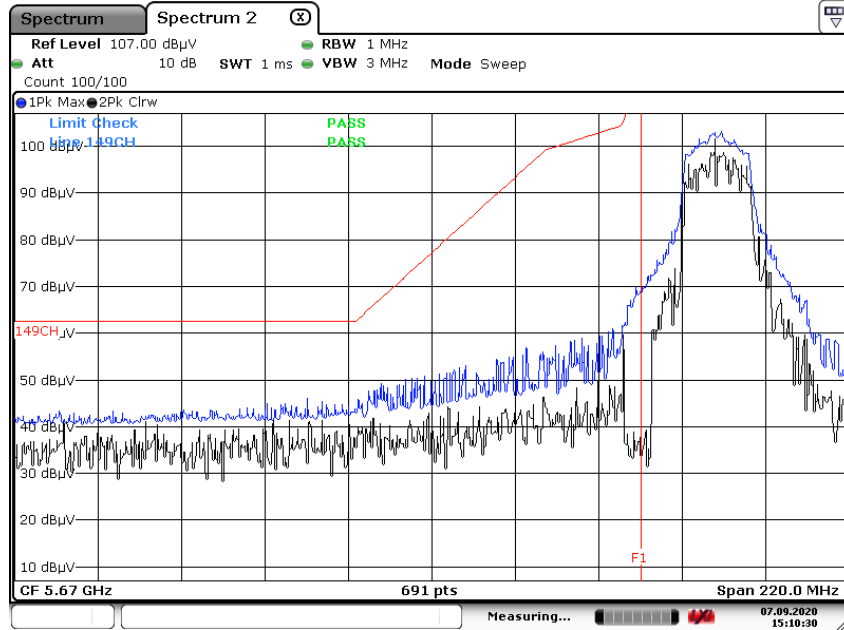
Test Plots(UNII 3)

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



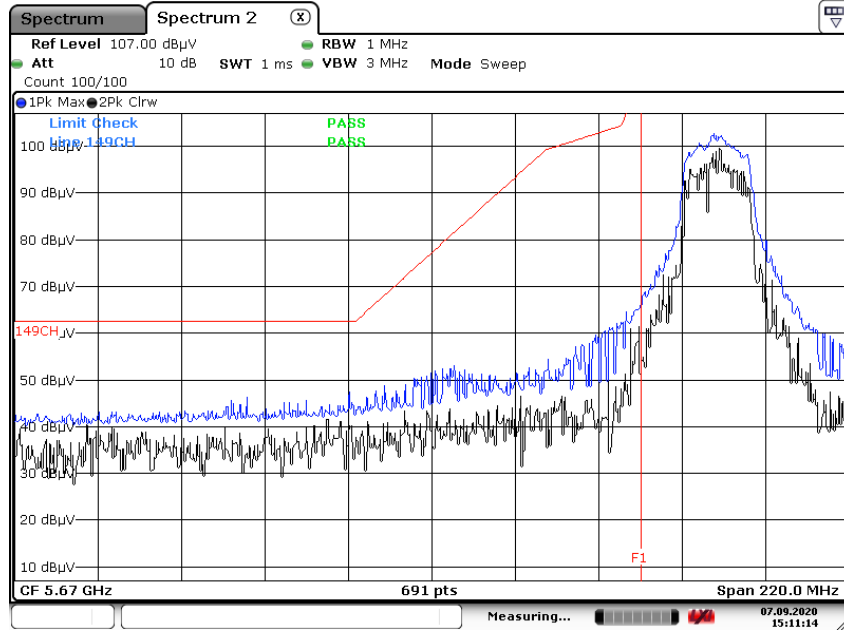
Date: 7.SEP.2020 15:05:05

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



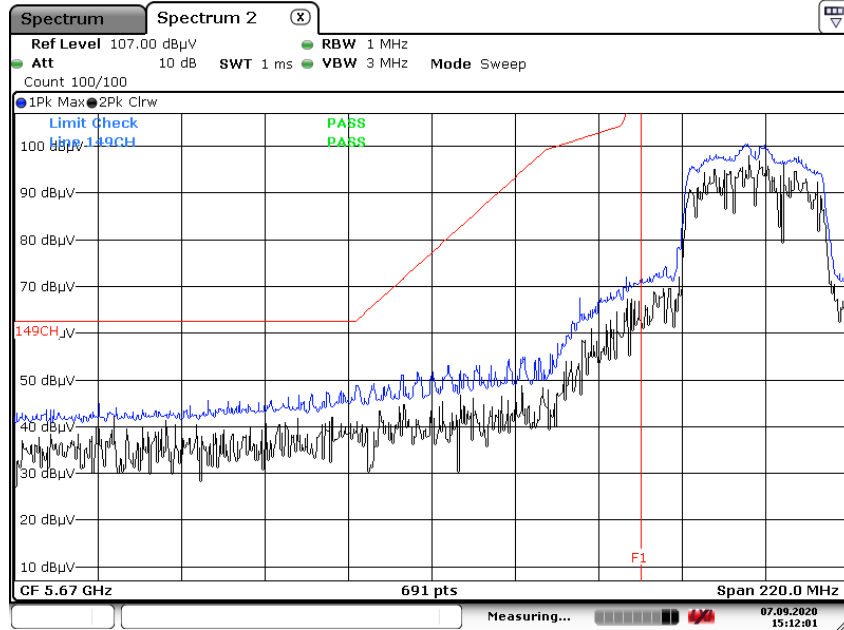
Date: 7.SEP.2020 15:10:30

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



Date: 7.SEP.2020 15:11:14

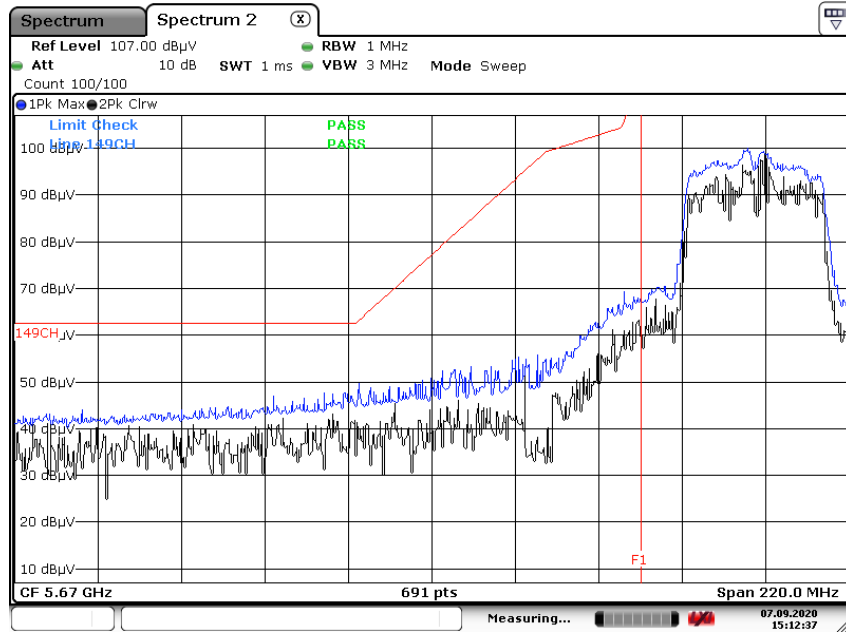
Peak Reading (802.11n\_HT40, Ch.151, Y-H)



Date: 7.SEP.2020 15:12:01

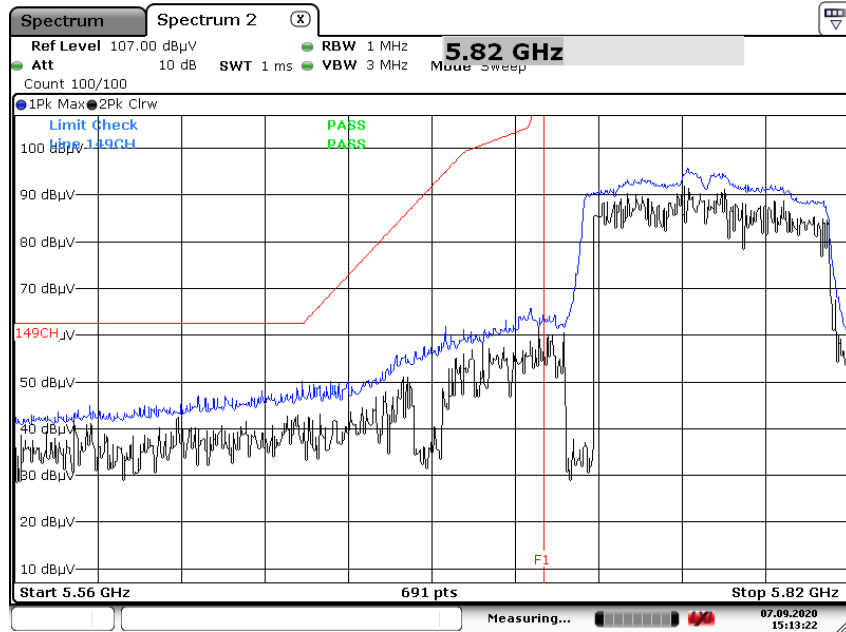


Peak Reading (802.11ac\_VHT40, Ch.151, Y-H)



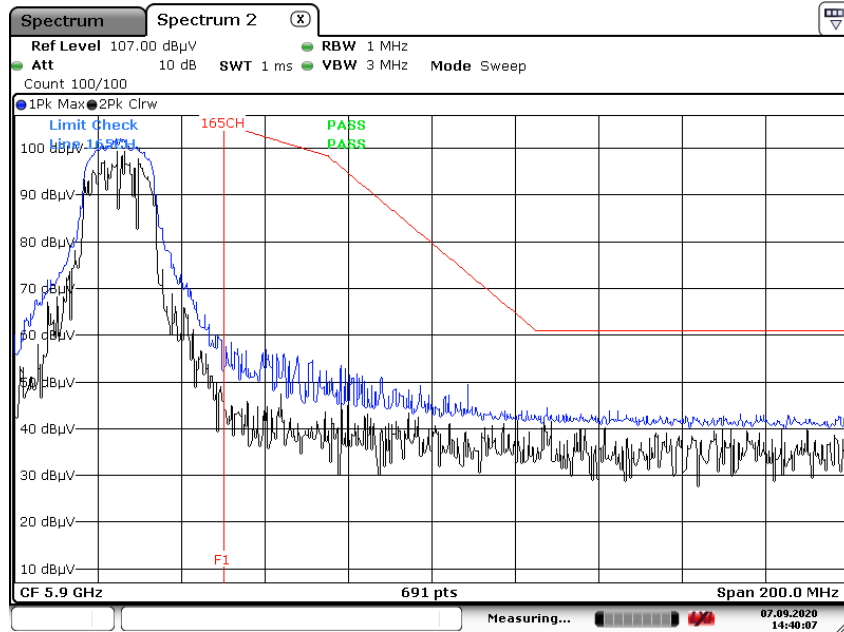
Date: 7.SEP.2020 15:12:37

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



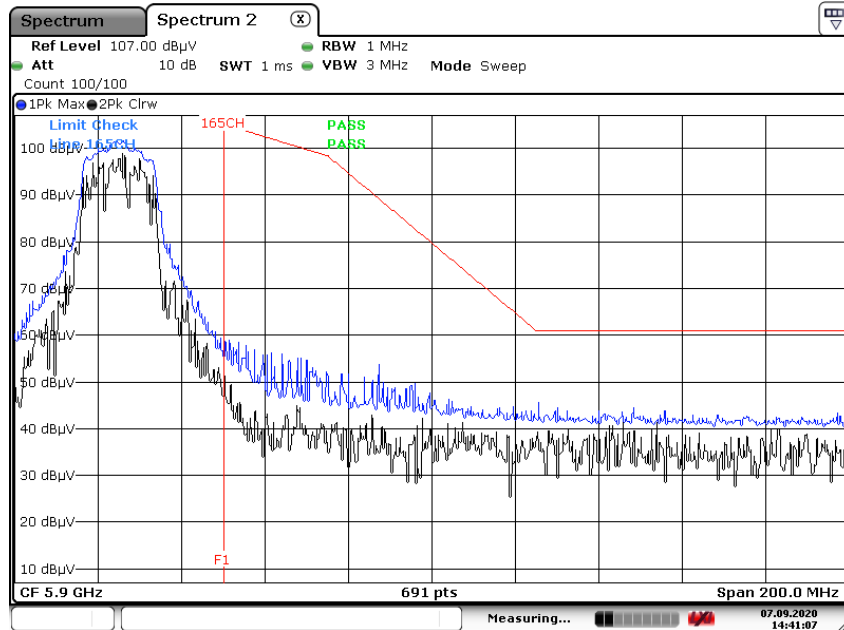
Date: 7.SEP.2020 15:13:22

Peak Reading (802.11a, Ch.165, Z-V)



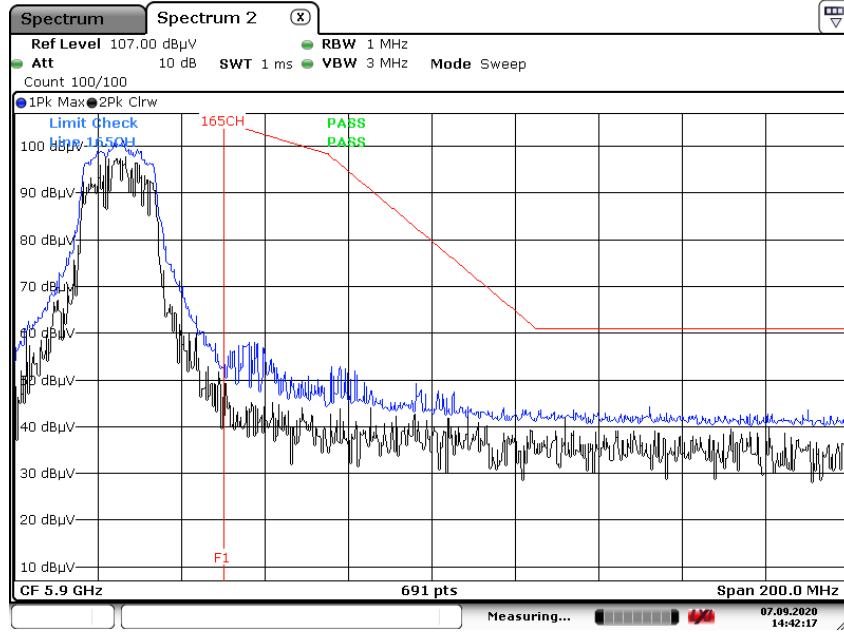
Date: 7.SEP.2020 14:40:06

Peak Reading (802.11n\_HT20, Ch.165, Z-V)



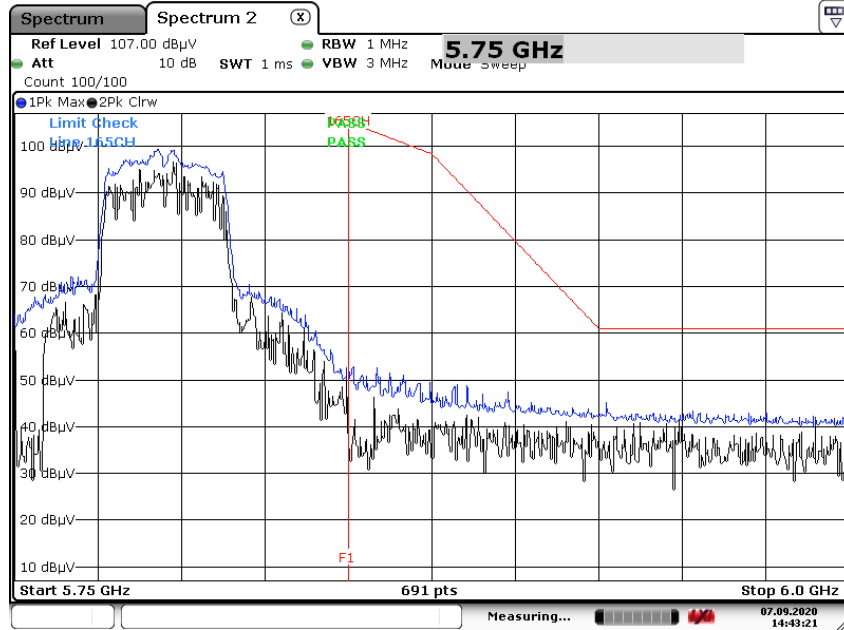
Date: 7.SEP.2020 14:41:07

Peak Reading (802.11ac\_VHT20, Ch.165, Z-V)



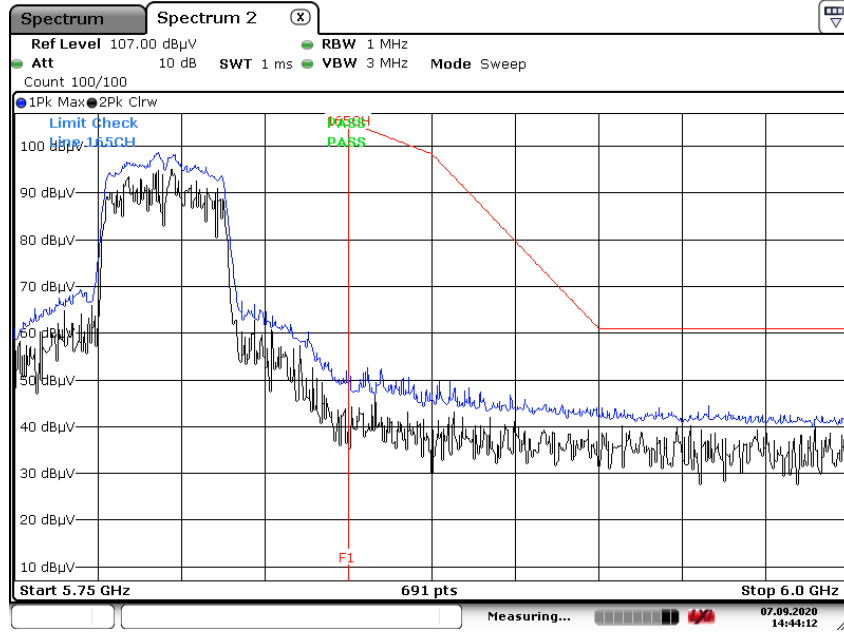
Date: 7.SEP.2020 14:42:17

Peak Reading (802.11n\_HT40, Ch.159, Z-V)



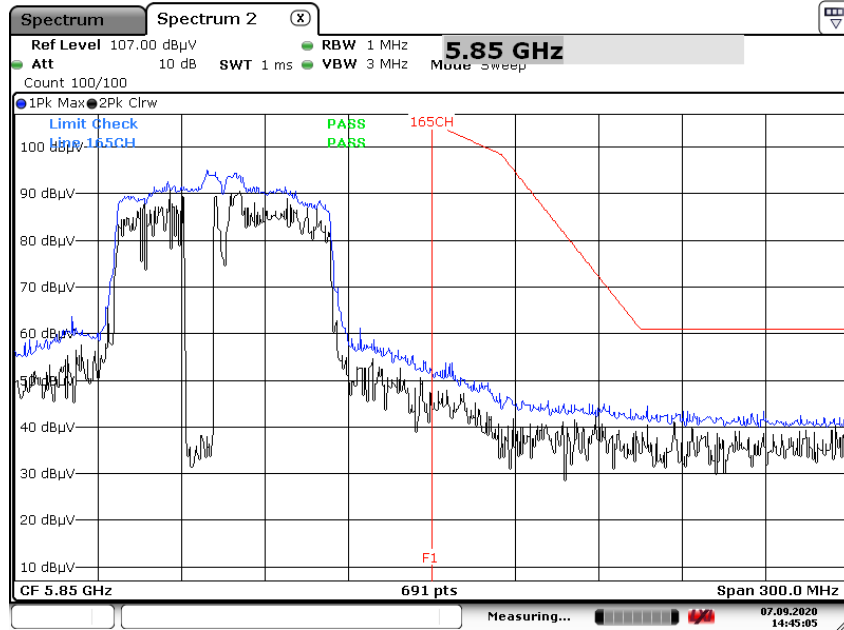
Date: 7.SEP.2020 14:43:21

Peak Reading (802.11ac\_VHT40, Ch.159, Z-V)



Date: 7.SEP.2020 14:44:12

Peak Reading (802.11ac\_VHT80, Ch.155, Z-V)



Date: 7.SEP.2020 14:45:05

**10.10 POWERLINE CONDUCTED EMISSIONS**  
**Conducted Emissions (Line 1)**

5GHz MODE L1

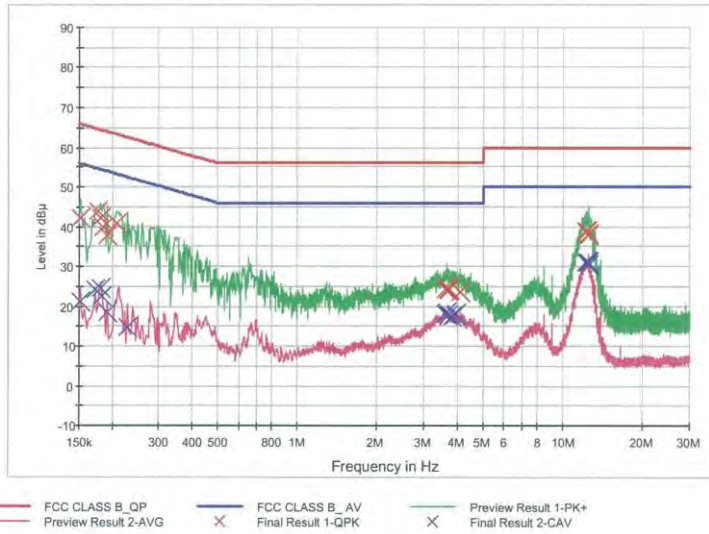
1 / 2

**HCT TEST Report**

**Common Information**

EUT: SM-A426B/DS  
 Manufacturer: SAMSUNG  
 Test Site: SHIELD ROOM  
 Operating Conditions: 5GHz MODE L1

FCC CLASS B\_Exten Cable



**Final Result 1**

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	42.3	9.000	Off	L1	9.8	23.6	65.9
0.176000	43.9	9.000	Off	L1	9.8	20.8	64.7
0.180000	42.1	9.000	Off	L1	9.8	22.4	64.5
0.186000	39.7	9.000	Off	L1	9.8	24.5	64.2
0.192000	37.7	9.000	Off	L1	9.8	26.2	63.9
0.208000	40.9	9.000	Off	L1	9.8	22.4	63.3
3.600000	24.3	9.000	Off	L1	9.9	31.7	56.0
3.638000	24.7	9.000	Off	L1	9.9	31.3	56.0
3.694000	24.0	9.000	Off	L1	10.0	32.0	56.0
3.702000	24.1	9.000	Off	L1	10.0	31.9	56.0
3.730000	24.2	9.000	Off	L1	10.0	31.8	56.0
4.096000	23.4	9.000	Off	L1	10.0	32.6	56.0
12.254000	38.8	9.000	Off	L1	10.3	21.2	60.0
12.310000	38.9	9.000	Off	L1	10.3	21.1	60.0
12.426000	38.0	9.000	Off	L1	10.3	22.0	60.0
12.434000	38.0	9.000	Off	L1	10.3	22.0	60.0
12.440000	38.0	9.000	Off	L1	10.3	22.0	60.0
12.450000	38.1	9.000	Off	L1	10.3	21.9	60.0

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5GHz MODE L1

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**Final Result 2**

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	21.1	9.000	Off	L1	9.8	34.8	55.9
0.172000	24.2	9.000	Off	L1	9.8	30.6	54.9
0.180000	24.5	9.000	Off	L1	9.8	30.0	54.5
0.184000	22.6	9.000	Off	L1	9.8	31.7	54.3
0.192000	18.4	9.000	Off	L1	9.8	35.6	53.9
0.228000	14.8	9.000	Off	L1	9.8	37.7	52.5
3.600000	18.1	9.000	Off	L1	9.9	27.9	46.0
3.638000	18.4	9.000	Off	L1	9.9	27.6	46.0
3.700000	17.8	9.000	Off	L1	10.0	28.2	46.0
3.824000	17.3	9.000	Off	L1	10.0	28.7	46.0
3.926000	17.9	9.000	Off	L1	10.0	28.1	46.0
3.956000	18.0	9.000	Off	L1	10.0	28.0	46.0
12.166000	31.0	9.000	Off	L1	10.3	19.0	50.0
12.254000	30.9	9.000	Off	L1	10.3	19.1	50.0
12.310000	31.1	9.000	Off	L1	10.3	18.9	50.0
12.426000	31.1	9.000	Off	L1	10.3	18.9	50.0
12.440000	30.4	9.000	Off	L1	10.3	19.6	50.0
12.450000	30.4	9.000	Off	L1	10.3	19.6	50.0

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**Conducted Emissions (Line 2)**

5GHz MODE N

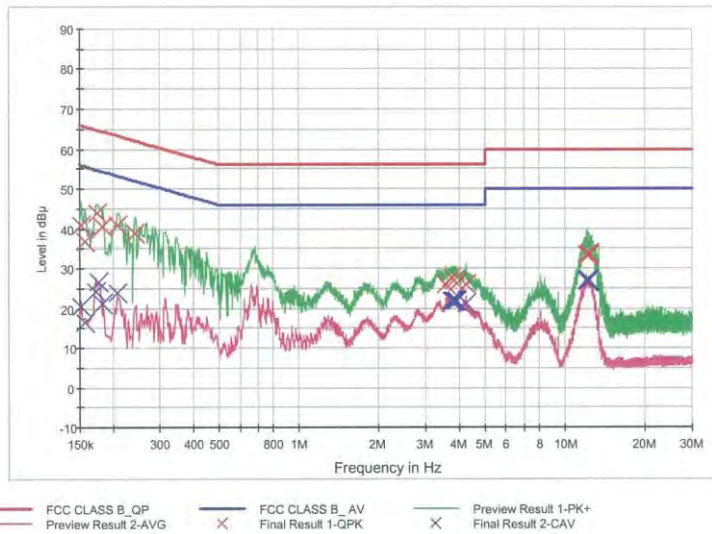
1 / 2

**HCT TEST Report**

**Common Information**

EUT: SM-A426B/DS  
 Manufacturer: SAMSUNG  
 Test Site: SHIELD ROOM  
 Operating Conditions: 5GHz MODE N

FCC CLASS B\_Exten Cable



**Final Result 1**

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	40.8	9.000	Off	N	9.8	25.1	65.9
0.158000	36.9	9.000	Off	N	9.8	28.7	65.6
0.174000	43.9	9.000	Off	N	9.8	20.8	64.8
0.184000	40.6	9.000	Off	N	9.8	23.7	64.3
0.208000	40.9	9.000	Off	N	9.8	22.4	63.3
0.242000	39.0	9.000	Off	N	9.8	23.1	62.0
3.586000	25.8	9.000	Off	N	10.0	30.2	56.0
3.742000	27.6	9.000	Off	N	10.0	28.4	56.0
3.818000	26.9	9.000	Off	N	10.0	29.1	56.0
3.904000	26.3	9.000	Off	N	10.0	29.7	56.0
4.248000	25.8	9.000	Off	N	10.0	30.2	56.0
4.252000	25.8	9.000	Off	N	10.0	30.2	56.0
12.050000	33.3	9.000	Off	N	10.3	26.7	60.0
12.056000	33.4	9.000	Off	N	10.3	26.6	60.0
12.208000	33.4	9.000	Off	N	10.3	26.6	60.0
12.306000	33.6	9.000	Off	N	10.3	26.4	60.0
12.330000	33.7	9.000	Off	N	10.3	26.3	60.0
12.334000	33.4	9.000	Off	N	10.3	26.6	60.0

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5GHz MODE N

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**Final Result 2**

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	20.6	9.000	Off	N	9.8	35.3	55.9
0.158000	16.5	9.000	Off	N	9.8	39.0	55.6
0.172000	24.2	9.000	Off	N	9.8	30.6	54.9
0.176000	26.7	9.000	Off	N	9.8	28.0	54.7
0.184000	21.1	9.000	Off	N	9.8	33.2	54.3
0.208000	23.8	9.000	Off	N	9.8	29.5	53.3
3.742000	21.9	9.000	Off	N	10.0	24.1	46.0
3.774000	21.9	9.000	Off	N	10.0	24.1	46.0
3.834000	21.9	9.000	Off	N	10.0	24.1	46.0
3.852000	21.8	9.000	Off	N	10.0	24.2	46.0
3.904000	21.8	9.000	Off	N	10.0	24.2	46.0
4.254000	21.1	9.000	Off	N	10.0	24.9	46.0
12.054000	27.0	9.000	Off	N	10.3	23.0	50.0
12.154000	26.7	9.000	Off	N	10.3	23.3	50.0
12.202000	26.9	9.000	Off	N	10.3	23.1	50.0
12.248000	27.4	9.000	Off	N	10.3	22.6	50.0
12.346000	27.0	9.000	Off	N	10.3	23.0	50.0
12.382000	26.9	9.000	Off	N	10.3	23.1	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
ESPAC	SU-642 /Temperature Chamber	03/18/2020	Annual	0093008124
Agilent	N9020A / Signal Analyzer	05/11/2020	Annual	MY51110085
Agilent	N9030A / Signal Analyzer	01/13/2020	Annual	MY49431210
Rohde & Schwarz	OSP 120 / Power Measurement Set	07/02/2020	Annual	101231
Agilent	N1911A / Power Meter	04/07/2020	Annual	MY45100523
Keysight	N1921A / Power Sensor	06/08/2020	Annual	MY57820067
Agilent	87300B / Directional Coupler	11/11/2019	Annual	3116A03621
Hewlett Packard	11667B / Power Splitter	05/25/2020	Annual	05001
Hewlett Packard	E3632A / DC Power Supply	06/12/2020	Annual	KR75303960
Agilent	8493C / Attenuator(10 dB)	06/26/2020	Annual	07560
Rohde & Schwarz	EMC32 / Software	N/A	N/A	N/A
HCT CO., LTD.	FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	N/A	N/A

### **Note:**

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

**Radiated Test**

Manufacturer	Model / Equipment	Calibration Date	Calibration Interval	Serial No.
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
Innco system	MA4640/800-XP-EP / Antenna Position Tower	N/A	N/A	N/A
Audix	EM1000 / Controller	N/A	N/A	060520
Audix	Turn Table	N/A	N/A	N/A
Rohde & Schwarz	Loop Antenna	05/18/2020	Biennial	1513-175
Schwarzbeck	VULB 9168 / Hybrid Antenna	03/22/2019	Biennial	760
Schwarzbeck	BBHA 9120D / Horn Antenna	04/29/2019	Biennial	9120D-937
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	11/29/2019	Biennial	BBHA9170541
Rohde & Schwarz	FSV40-N / Spectrum Analyzer	07/28/2020	Annual	102168
Agilent	N9030A / Signal Analyzer	01/13/2020	Annual	MY49431210
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
Wainwright Instruments	WHK3.0/18G-10EF / High Pass Filter	03/02/2020	Annual	8
Wainwright Instruments	WHKX8-6090-7000-18000-40SS/ High Pass Filter	03/02/2020	Annual	25
Api tech.	18B-03 / Attenuator (3 dB)	03/02/2020	Annual	1
Agilent	8493C-10 / Attenuator(10 dB)	03/02/2020	Annual	08285
CERNEX	CBLU1183540 / Power Amplifier	03/02/2020	Annual	22964
CERNEX	CBL06185030 / Power Amplifier	03/02/2020	Annual	22965
CERNEX	CBL18265035 / Power Amplifier	12/26/2019	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	03/23/2020	Annual	25956

**Note:**

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
3. 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-2009-FC014-P