

# FCC UNII REPORT

## Certification

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**Applicant Name:**  
SAMSUNG Electronics Co., Ltd.

**Date of Issue:**  
December 18, 2023

**Address:**  
129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

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

**Report No.:** HCT-RF-2312-FC003

<b>FCC ID:</b>	<b>A3LSMM156B</b>
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<b>APPLICANT:</b>	<b>SAMSUNG Electronics Co., Ltd.</b>
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<b>Model:</b>	SM-M156B/DSN
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<b>Additional Model:</b>	-
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<b>EUT Type:</b>	Mobile Phone
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<b>Modulation type</b>	OFDM
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<b>FCC Classification:</b>	Unlicensed National Information Infrastructure(NII)
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<b>FCC Rule Part(s):</b>	Part 15.407
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**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-2312-FC003

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**REVIEWED BY**



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**Report prepared by : Sang Hoon Lee**  
**Engineer of Telecommunication Testing Center**

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

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.  
This test results were applied only to the test methods required by the standard.

**Test Report Statement:**

The above Test Report is not related to the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA.

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

## Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2312-FC003	December 18, 2023	- First Approval Report

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## 1. GENERAL INFORMATION

### EUT DESCRIPTION

<b>Model</b>	SM-M156B/DSN	
<b>Additional Model</b>	-	
<b>EUT Type</b>	Mobile Phone	
<b>Power Supply</b>	DC 4.20 V	
<b>Modulation Type</b>	OFDM : 802.11a, 802.11n, 802.11ac	
<b>Frequency Range (MHz)</b>	U-NII-1	20 MHz BW : 5180 - 5240 40 MHz BW : 5190 - 5230 80 MHz BW : 5210
	U-NII-2A	20 MHz BW : 5260 - 5320 40 MHz BW : 5270 - 5310 80 MHz BW : 5290
	U-NII-2C	20 MHz BW : 5500 - 5720 40 MHz BW : 5510 - 5710 80 MHz BW : 5530 - 5690
	U-NII-3	20 MHz BW : 5745 - 5825 40 MHz BW : 5755 - 5795 80 MHz BW : 5775
<b>Straddle channel</b>	Supported	
<b>TDWR Band</b>	Supported	
<b>Dynamic Frequency Selection</b>	Slave without radar detection	
<b>Antenna Specification</b>	Type: MFA Peak Gain : UNII 1: -7.4 dBi UNII 2A, UNII 2C: -7.7 dBi UNII 3: -7.0 dBi	
<b>Date(s) of Tests</b>	November 14, 2023 ~ December 14, 2023	
<b>Serial number</b>	Conducted : R3CWA0QSYTA Radiated : R3CWA0QSXYD	

## 2. MAXIMUM OUTPUT POWER

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

Band	Mode	Power	
		(dBm)	(W)
UNII1	802.11a	17.86	0.061
	802.11n (HT20)	17.74	0.059
	802.11n (HT40)	15.19	0.033
	802.11ac (VHT20)	17.24	0.053
	802.11ac (VHT40)	15.21	0.033
	802.11ac (VHT80)	12.15	0.016
UNII2A	802.11a	17.82	0.061
	802.11n (HT20)	17.62	0.058
	802.11n (HT40)	15.17	0.033
	802.11ac (VHT20)	17.16	0.052
	802.11ac (VHT40)	15.16	0.033
	802.11ac (VHT80)	11.99	0.016
UNII2C	802.11a	17.87	0.061
	802.11n (HT20)	17.70	0.059
	802.11n (HT40)	15.71	0.037
	802.11ac (VHT20)	17.70	0.059
	802.11ac (VHT40)	15.69	0.037
	802.11ac (VHT80)	14.38	0.027
UNII3	802.11a	17.85	0.061
	802.11n (HT20)	17.82	0.061
	802.11n (HT40)	15.77	0.038
	802.11ac (VHT20)	17.71	0.059
	802.11ac (VHT40)	15.70	0.037
	802.11ac (VHT80)	14.03	0.025

### **3. TEST METHODOLOGY**

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

#### **EUT CONFIGURATION**

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

#### **EUT EXERCISE**

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

#### **GENERAL TEST PROCEDURES**

##### **Conducted Emissions**

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

##### **Radiated Emissions**

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

#### **DESCRIPTION OF TEST MODES**

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

#### **4. INSTRUMENT CALIBRATION**

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

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

#### **5. FACILITIES AND ACCREDITATIONS**

##### **5.1 FACILITIES**

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

Detailed description of test facility was submitted to the Commission and accepted dated March 31, 2022 (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.

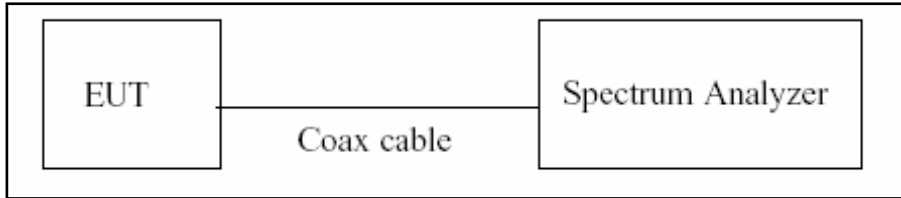
The measurement data shown herein meets or exceeds the  $U_{\text{CISPR}}$  measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.90 ( Confidence level about 95 %, $k=2$ )
Radiated Disturbance (9 kHz ~ 30 MHz)	4.14 ( Confidence level about 95 %, $k=2$ )
Radiated Disturbance (30 MHz ~ 1 GHz)	5.82 ( Confidence level about 95 %, $k=2$ )
Radiated Disturbance (1 GHz ~ 18 GHz)	5.74 ( Confidence level about 95 %, $k=2$ )
Radiated Disturbance (18 GHz ~ 40 GHz)	5.76 ( Confidence level about 95 %, $k=2$ )
Radiated Disturbance (Above 40 GHz)	5.52 ( Confidence level about 95 %, $k=2$ )

## 8. DESCRIPTION OF TESTS

### 8.1. Duty Cycle

#### Test Configuration



#### Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

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

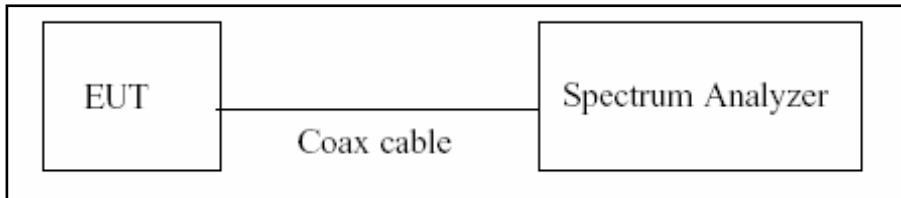
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz ( $\geq$  RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure  $T_{total}$  and  $T_{on}$
8. Calculate Duty Cycle =  $T_{on} / T_{total}$  and Duty Cycle Factor =  $10\log(1/\text{Duty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

## 8.2. 6 dB Bandwidth & 26 dB Bandwidth

### Limit

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

### Test Configuration



### Test Procedure(26 dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

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

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

### Test Procedure (6 dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

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

1. RBW = 100 kHz
2. VBW  $\geq 3 \times$  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.

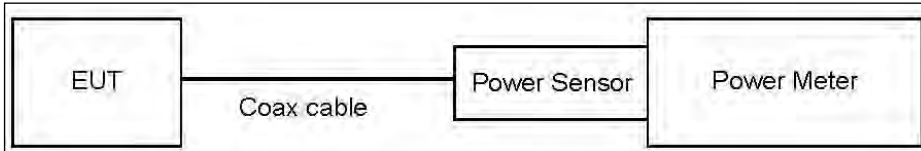
**8.3. Output Power Measurement**

**Limit**

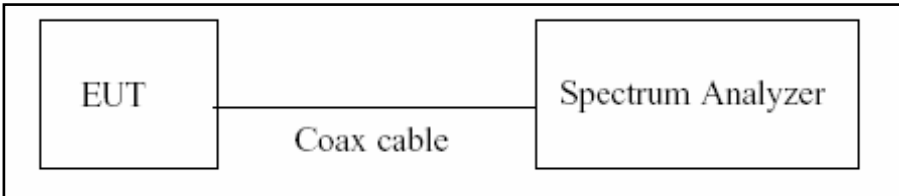
Band	Limit
UNII 1	- Master : Not exceed 1 W(=30 dBm) - Slave : Not exceed 250 mW(=23.98 dBm)
UNII 2A, 2C	Not exceed the lesser of 250 mW or 11 dBm + 10 log B, (where B is the 26 dB emission bandwidth in megahertz.)
UNII 3	Not exceed 1 W(=30 dBm)

**Test Configuration**

Power Meter



Spectrum Analyzer(Only Straddle Channel)



**Test Procedure(Power Meter)**

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

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

**Test Procedure (Spectrum Analyzer)**

The transmitter output is connected to the Spectrum Analyzer.

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

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

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

**Note**

1. Spectrum Measured Levels are not plot data.

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

2. Spectrum offset Loss = Attenuator loss(20 dB) + Cable loss + EUT Cable loss(0.56 dB)

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

Band	Loss(dB)
UNII 1	21.40
UNII 2A	21.40
UNII 2C	21.40
UNII 3	21.40

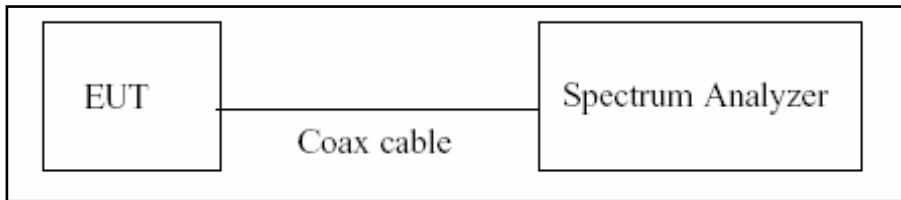
(Actual value of loss for the attenuator and cable combination)

**8.4. Power Spectral Density**

**Limit**

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

**Test Configuration**



**Test Procedure**

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

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

**Sample Calculation**

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

**Note**

1. Spectrum Measured Levels are not plot data.

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

2. Spectrum offset Loss = Attenuator loss(20 dB) + Cable loss + EUT Cable loss(0.56 dB)

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

<b>Band</b>	<b>Loss(dB)</b>
UNII 1	21.40
UNII 2A	21.40
UNII 2C	21.40
UNII 3	21.40

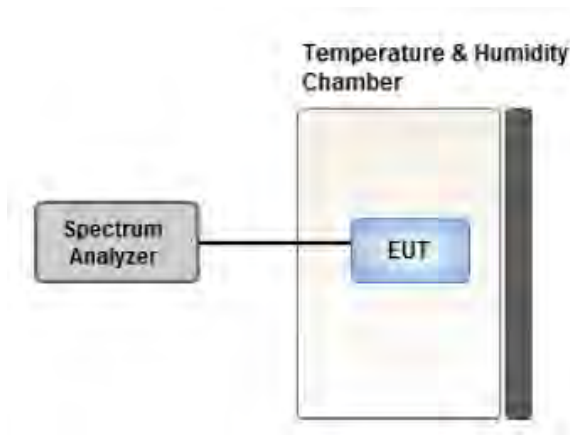
(Actual value of loss for the attenuator and cable combination)

## 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) = Measured Value + Correction Factor

**8.7. Radiated Test**

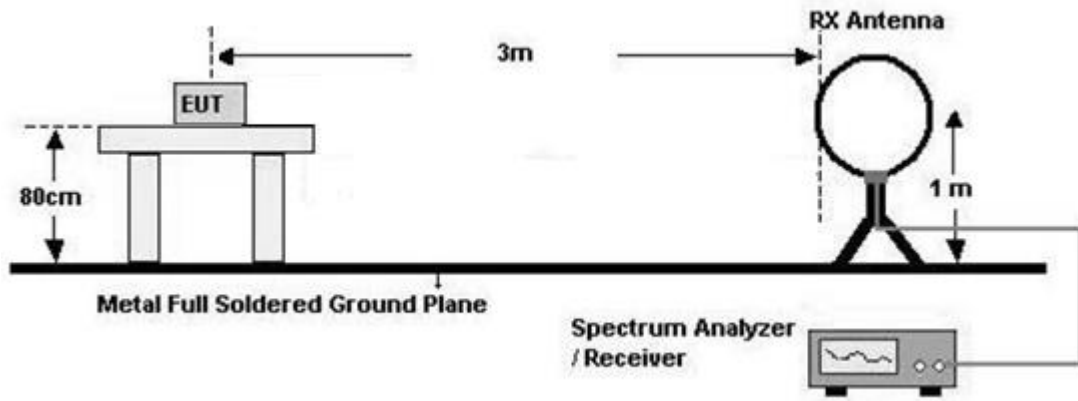
**Limit**

1. UNII 1: All emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.
2. UNII 2A, 2C: All emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz.
3. UNII 3: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
4. All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Section 15.209.

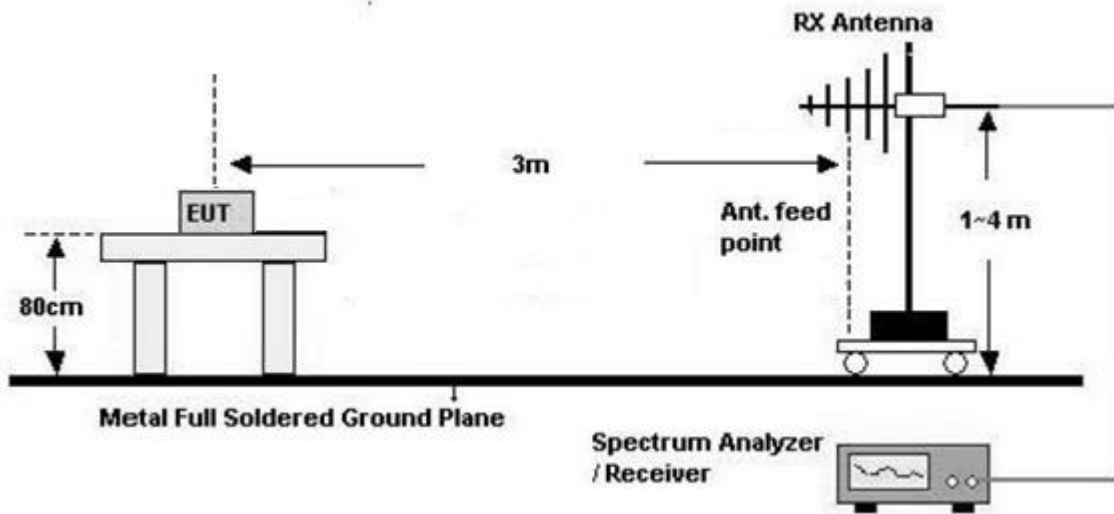
Frequency (MHz)	Field Strength (µV/m)	Measurement Distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

**Test Configuration**

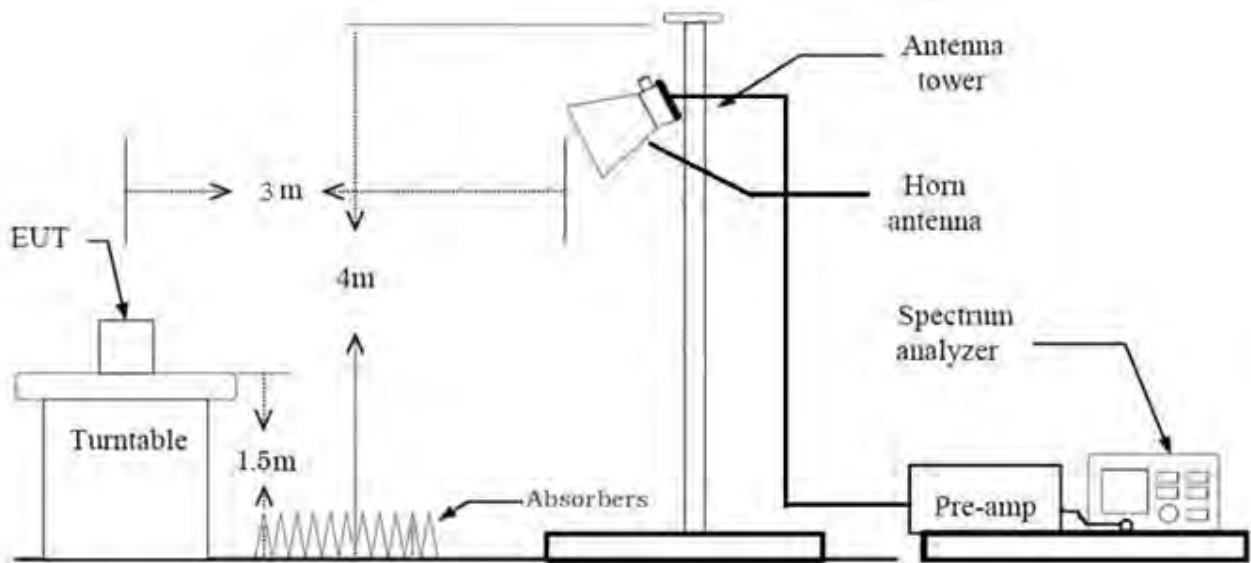
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz

**Test Procedure of Radiated spurious emissions(Below 30 MHz)**

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

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### **KDB 414788 OFS and Chamber Correlation Justification**

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

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

### **Test Procedure of Radiated spurious emissions(Below 1 GHz)**

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8 m above ground plane.
3. The Hybrid antenna was placed at a location 3 m from the EUT, which is varied from 1 m to 4 m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Spectrum Setting
  - (1) Measurement Type(Peak):
    - Measured Frequency Range : 30 MHz – 1 GHz
    - Detector = Peak
    - Trace = Maxhold
    - RBW = 100 kHz
    - VBW  $\geq$  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 = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L)
8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

---

**Test Procedure of Radiated spurious emissions (Above 1 GHz)**

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

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

- RBW = 1 MHz
- VBW  $\geq$  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 %) =  $VBW \leq RBW/100$ (i.e., 10 kHz) but not less than 10 Hz.
- VBW(Duty cycle is  $<$  98 %) =  $VBW \geq 1/T$ , 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 % 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 = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G) + Distance Factor(D.F)

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

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

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

- RBW = 1 MHz
- VBW  $\geq$  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 %) =  $VBW \leq RBW/100$ (i.e., 10 kHz) but not less than 10 Hz.
- VBW(Duty cycle is < 98 %) =  $VBW \geq 1/T$ , 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 % 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 = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G) + Attenuator(ATT)  
+ Distance Factor(D.F)

**The actual setting value of VBW**

Mode	Worst Data rate (Mbps)	Duty Cycle	Duty Cycle Factor (dB)	The actual setting value of VBW (Hz)
802.11a	6	0.968	0.140	1 000
802.11n(HT20)	MCS0	0.966	0.150	1 000
802.11n(HT40)	MCS0	0.938	0.279	3 000
802.11ac(VHT20)	MCS0	0.968	0.140	1 000
802.11ac(VHT40)	MCS0	0.938	0.277	3 000
802.11ac(VHT80)	MCS0	0.800	0.969	5 000



## 8.8. Worst case configuration and mode

### Conducted test

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

### Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
  - Mode : Stand alone, Stand alone + External accessories(Earphone, etc)
  - Worstcase : Stand alone
2. EUT Axis
  - Radiated Spurious Emissions : X
  - Radiated Restricted Band Edge : X
3. All datarate of operation were investigated and the worst case datarate results are reported.
  - 802.11a : 6 Mbps
  - 802.11n\_HT20 : MCS0
  - 802.11n\_HT40 : MCS0
  - 802.11ac\_VHT20 : MCS0
  - 802.11ac\_VHT40 : MCS0
  - 802.11ac\_VHT80 : MCS0
4. Radiated Spurious Emission
  - All modulation of operation were investigated and the worst case modulation results are reported.  
(Worstcase : 802.11a\_6 Mbps)
5. All position of loop antenna were investigated and the test result is a no critical peak found at all positions.
  - Position : Horizontal, Vertical, Parallel to the ground plane

**Radiated test(RSDB)**

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

- Mode : Stand alone, Stand alone + External accessories(Earphone., etc)
- Worstcase : Stand alone

2. EUT Axis

- Radiated Spurious Emissions : X

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

Description	Bluetooth Emission	5 GHz Emission
Antenna	WIFI/BT	WIFI/BT
Channel	78	165
Data Rate	1 Mbps	6 Mbps
Mode	GFSK: DH5	802.11a

**Note :** Bluetooth RSDB Data refer to [BT] Test Report.

**AC Power line Conducted Emissions**

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

- Mode : Stand alone + External accessories(Earphone, etc)+Travel Adapter, Stand alone + Travel Adapter
- Worstcase : Stand alone + Travel Adapter

**9. SUMMARY OF TEST RESULTS**

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
26 dB Bandwidth	§15.407 (for Power Measurement)	N/A	Conducted	PASS
6 dB Bandwidth	§15.407(e)	> 500 kHz (5725-5850 MHz)(UNII-3)		PASS
Maximum Conducted Output Power	§15.407(a)(1),(2),(3)	< 250 mW(5150-5250 MHz)  < 250 mW or 11+10log <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
Maximum Power Spectral Density	§15.407(a)(1),(2),(3)	<11 dBm/ MHz (5150-5250 MHz) <11 dBm/ MHz (5250-5350 MHz) <11 dBm/ MHz (5470-5725 MHz) <30 dBm/500 kHz(5725-5850 MHz)		PASS
AC Conducted Emissions 150 kHz-30 MHz	15.207 15.407(b)(9)	<FCC 15.207 limits		PASS
Frequency Stability	§15.407(g) §2.1055	Maintained within the band		PASS
Undesirable Emissions	§15.407(b) (1),(2),(3),(4)	<-27 dBm/MHz EIRP (UNII1, 2A, 2C) cf. Section 8.6 (UNII 3)		PASS
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	15.205, 15.407(b)(9),(10)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	Radiated	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	1.391	1.436	0.968	0.140
	9	0.935	0.980	0.953	0.207
	12	0.707	0.752	0.939	0.272
	18	0.479	0.524	0.913	0.395
	24	0.365	0.410	0.889	0.512
	36	0.251	0.405	0.619	2.085
	48	0.190	0.403	0.472	3.264
	54	0.175	0.408	0.429	3.680

Mode	MCS Index	T <sub>on</sub> (ms)	T <sub>total</sub> (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11n (HT20)	0	1.300	1.345	0.966	0.150
	1	0.666	0.712	0.936	0.288
	2	0.459	0.504	0.910	0.412
	3	0.352	0.405	0.869	0.611
	4	0.248	0.403	0.616	2.102
	5	0.198	0.403	0.491	3.093
	6	0.180	0.403	0.447	3.501
	7	0.162	0.403	0.403	3.952
802.11n (HT40)	0	0.649	0.692	0.938	0.279
	1	0.342	0.405	0.844	0.738
	2	0.241	0.405	0.594	2.264
	3	0.193	0.405	0.475	3.233
	4	0.142	0.405	0.350	4.559
	5	0.117	0.405	0.287	5.414
	6	0.104	0.405	0.256	5.913
	7	0.099	0.405	0.244	6.131

Mode	MCS Index	T <sub>on</sub> (ms)	T <sub>total</sub> (ms)	Duty Cycle	Duty Cycle Factor(dB)
802.11ac (VHT20)	0	1.312	1.355	0.968	0.140
	1	0.676	0.722	0.937	0.283
	2	0.464	0.509	0.910	0.407
	3	0.360	0.405	0.887	0.518
	4	0.251	0.405	0.619	2.085
	5	0.200	0.405	0.494	3.065
	6	0.185	0.405	0.456	3.408
	7	0.170	0.405	0.419	3.780
	8	0.149	0.405	0.369	4.333
802.11ac (VHT40)	0	0.654	0.697	0.938	0.277
	1	0.347	0.405	0.856	0.674
	2	0.243	0.405	0.600	2.218
	3	0.195	0.405	0.481	3.176
	4	0.144	0.405	0.356	4.482
	5	0.122	0.405	0.300	5.229
	6	0.109	0.405	0.269	5.707
	7	0.104	0.405	0.256	5.913
	8	0.091	0.405	0.225	6.478
	9	0.086	0.405	0.213	6.726
802.11ac (VHT80)	0	0.324	0.405	0.800	0.969
	1	0.185	0.405	0.456	3.408
	2	0.137	0.405	0.338	4.717
	3	0.111	0.405	0.275	5.607
	4	0.089	0.405	0.219	6.601
	5	0.076	0.405	0.188	7.270
	6	0.071	0.403	0.176	7.542
	7	0.071	0.403	0.176	7.542
	8	0.063	0.403	0.157	8.035
	9	0.063	0.403	0.157	8.035

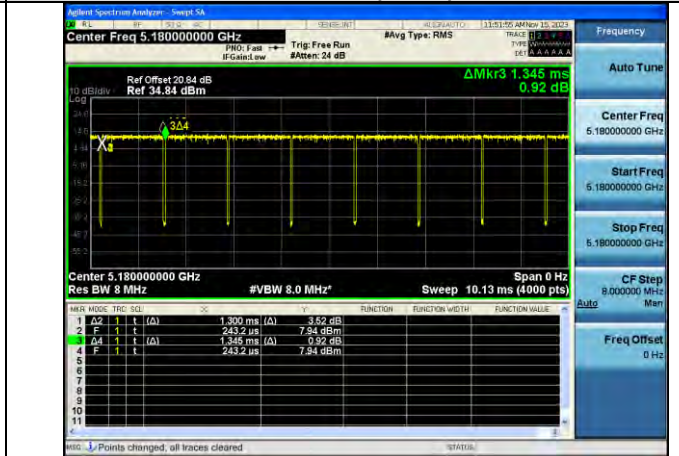
**Note:**

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

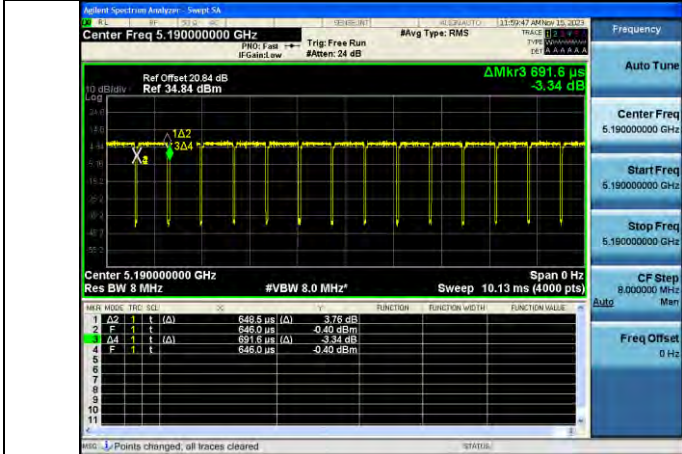
802.11a



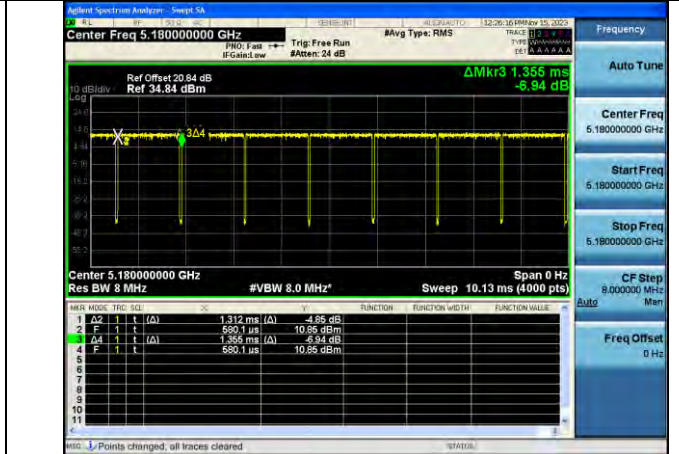
802.11n(HT20)



802.11n(HT40)



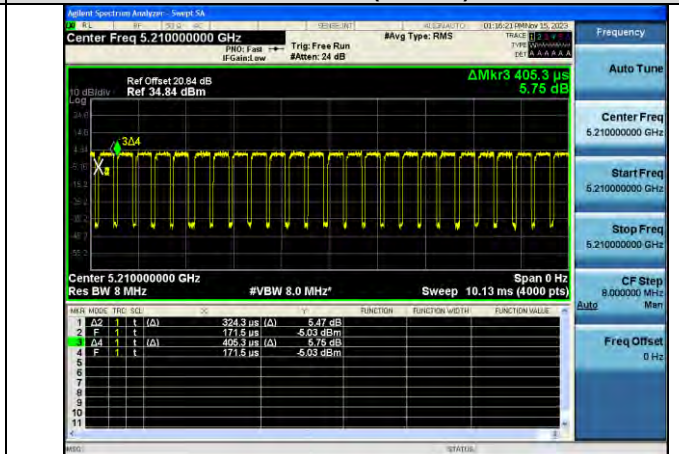
802.11ac(VHT20)



802.11ac(VHT40)



802.11ac(VHT80)



## 10.2 26 dB Bandwidth

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

Straddle channel data were added in section 10.7.1.

Mode	Frequency [MHz]	Channel No.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
802.11a	5180	36	29.70	17.023
	5200	40	28.78	17.040
	5240	48	29.53	17.119
	5260	52	29.73	16.997
	5300	60	29.59	17.092
	5320	64	28.84	17.039
	5500	100	27.10	16.734
	5600	120	26.69	16.762
	5720	144	27.82	16.844
	5745	149	23.82	16.753
	5785	157	26.18	16.773
	5825	165	25.75	16.727

Mode	Frequency [MHz]	Channel No.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
802.11n (HT20)	5180	36	30.34	17.892
	5200	40	32.10	17.951
	5240	48	33.35	18.216
	5260	52	31.82	18.199
	5300	60	32.59	18.208
	5320	64	32.68	18.192
	5500	100	26.70	17.755
	5600	120	28.89	17.818
	5720	144	27.45	17.792
	5745	149	26.60	17.705
	5785	157	28.01	17.748
	5825	165	29.28	17.756

Mode	Frequency [MHz]	Channel No.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
802.11ac (VHT20)	5180	36	29.65	17.921
	5200	40	29.68	17.936
	5240	48	29.59	17.939
	5260	52	29.85	17.944
	5300	60	31.52	18.056
	5320	64	30.94	17.978
	5500	100	25.29	17.743
	5600	120	24.55	17.694
	5720	144	25.77	17.765
	5745	149	24.87	17.709
	5785	157	25.07	17.726
	5825	165	28.62	17.736

Mode	Frequency [MHz]	Channel No.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
802.11n (HT40)	5190	38	65.16	36.199
	5230	46	65.32	36.206
	5270	54	63.64	36.200
	5310	62	64.61	36.243
	5510	102	40.64	36.187
	5590	118	51.88	36.164
	5710	142	60.25	36.156
	5755	151	45.32	36.161
	5795	159	56.98	36.114

Mode	Frequency [MHz]	Channel No.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
802.11ac (VHT40)	5190	38	40.71	36.127
	5230	46	40.09	36.063
	5270	54	40.15	36.095
	5310	62	40.34	36.148
	5510	102	40.01	36.036
	5590	118	40.10	36.034
	5710	142	39.90	36.053
	5755	151	40.00	36.023
	5795	159	40.13	36.062

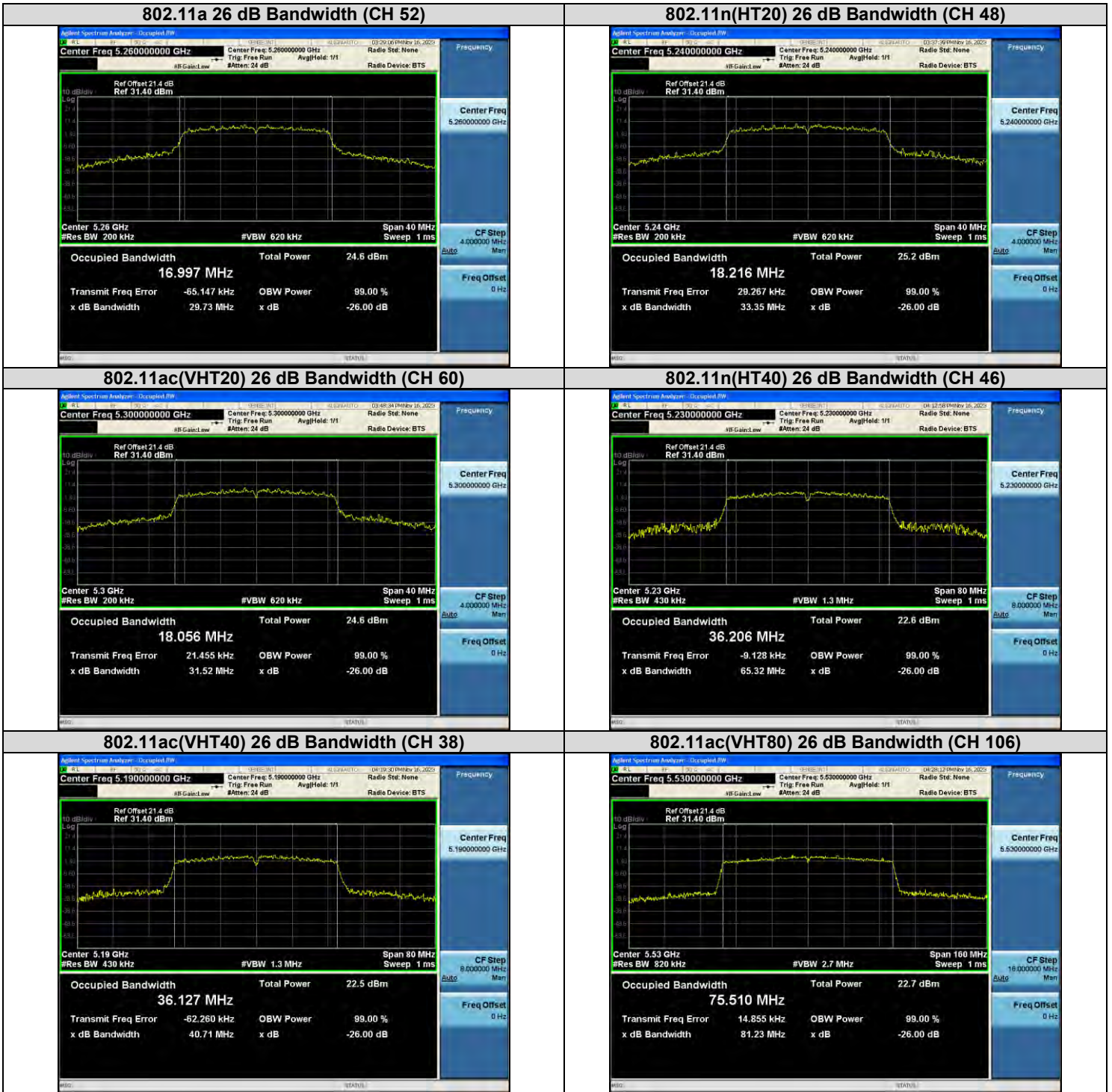
Mode	Frequency [MHz]	Channel No.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
802.11ac (VHT80)	5210	42	81.15	75.552
	5290	58	81.00	75.471
	5530	106	81.23	75.510
	5610	122	81.17	75.501
	5690	138	80.96	75.501
	5775	155	80.99	75.431



**Test Plots**

**Note:**

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



**10.3 6 dB BANDWIDTH**

Mode	Frequency [MHz]	Channel No.	6 dB Bandwidth [MHz]	Limit [MHz]
802.11a	5745	149	15.15	0.500
	5785	157	15.14	0.500
	5825	165	15.16	0.500

Mode	Frequency [MHz]	Channel No.	6 dB Bandwidth [MHz]	Limit [MHz]
802.11n(HT20)	5745	149	15.16	0.500
	5785	157	15.13	0.500
	5825	165	15.08	0.500

Mode	Frequency [MHz]	Channel No.	6 dB Bandwidth [MHz]	Limit [MHz]
802.11ac(VHT20)	5745	149	15.12	0.500
	5785	157	15.15	0.500
	5825	165	15.14	0.500

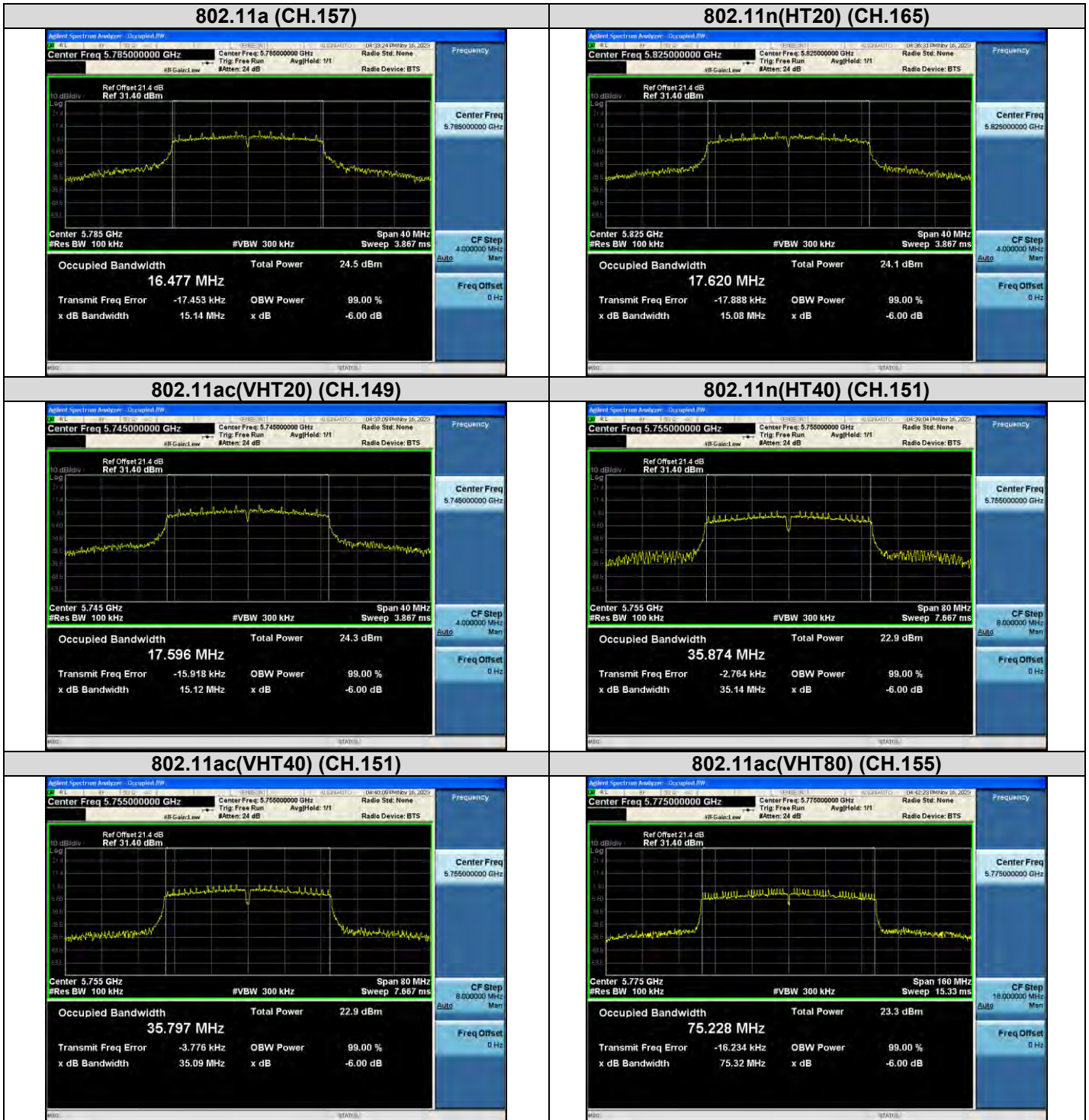
Mode	Frequency [MHz]	Channel No.	6 dB Bandwidth [MHz]	Limit [MHz]
802.11n(HT40)	5755	151	35.14	0.500
	5795	159	35.17	0.500

Mode	Frequency [MHz]	Channel No.	6 dB Bandwidth [MHz]	Limit [MHz]
802.11ac(VHT40)	5755	151	35.09	0.500
	5795	159	35.17	0.500

Mode	Frequency [MHz]	Channel No.	6 dB Bandwidth [MHz]	Limit [MHz]
802.11ac(VHT80)	5775	155	75.32	0.500

**Test Plots**

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



**10.4 OUTPUT POWER MEASUREMENT**

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

Straddle channel data were added in section 10.7.3.

# Limit

(UNII 1) : 23.98 dBm

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

(UNII 3) : 30.00 dBm

Frequency [MHz]	Channel	Datarate	Mode	Mea.Power [dBm]	D.C.F [dB]	Total Power [dBm]	Limit [dBm]
5180	36	6M	a	16.91	0.140	17.05	23.98
5200	40	6M	a	17.40	0.140	17.54	23.98
5240	48	6M	a	17.72	0.140	17.86	23.98
5260	52	6M	a	17.68	0.140	17.82	23.98
5300	60	6M	a	17.49	0.140	17.63	23.98
5320	64	6M	a	16.60	0.140	16.74	23.98
5500	100	6M	a	15.49	0.140	15.63	23.98
5600	120	6M	a	17.73	0.140	17.87	23.98
5720	144	6M	a	17.62	0.140	17.76	23.98
5745	149	6M	a	17.71	0.140	17.85	30.00
5785	157	6M	a	17.67	0.140	17.81	30.00
5825	165	6M	a	17.45	0.140	17.59	30.00

Frequency [MHz]	Channel	Datarate	Mode	Mea. Power [dBm]	D.C.F [dB]	Total Power [dBm]	Limit [dBm]
5180	36	MCS0	n20	16.74	0.150	16.89	23.98
5200	40	MCS0	n20	17.20	0.150	17.35	23.98
5240	48	MCS0	n20	17.59	0.150	17.74	23.98
5260	52	MCS0	n20	17.47	0.150	17.62	23.98
5300	60	MCS0	n20	17.34	0.150	17.49	23.98
5320	64	MCS0	n20	16.86	0.150	17.01	23.98
5500	100	MCS0	n20	15.27	0.150	15.42	23.98
5600	120	MCS0	n20	17.55	0.150	17.70	23.98
5720	144	MCS0	n20	17.04	0.150	17.19	23.98
5745	149	MCS0	n20	17.53	0.150	17.68	30.00
5785	157	MCS0	n20	17.56	0.150	17.71	30.00
5825	165	MCS0	n20	17.67	0.150	17.82	30.00

Frequency [MHz]	Channel	Datarate	Mode	Mea. Power [dBm]	D.C.F [dB]	Total Power [dBm]	Limit [dBm]
5180	36	MCS0	ac20	16.72	0.140	16.86	23.98
5200	40	MCS0	ac20	16.76	0.140	16.90	23.98
5240	48	MCS0	ac20	17.10	0.140	17.24	23.98
5260	52	MCS0	ac20	17.02	0.140	17.16	23.98
5300	60	MCS0	ac20	16.86	0.140	17.00	23.98
5320	64	MCS0	ac20	16.42	0.140	16.56	23.98
5500	100	MCS0	ac20	15.27	0.140	15.41	23.98
5600	120	MCS0	ac20	17.56	0.140	17.70	23.98
5720	144	MCS0	ac20	17.05	0.140	17.19	23.98
5745	149	MCS0	ac20	17.52	0.140	17.66	30.00
5785	157	MCS0	ac20	17.57	0.140	17.71	30.00
5825	165	MCS0	ac20	17.28	0.140	17.42	30.00

Frequency [MHz]	Channel	Datarate	Mode	Mea. Power [dBm]	D.C.F [dB]	Total Power [dBm]	Limit [dBm]
5190	38	MCS0	n40	14.17	0.279	14.45	23.98
5230	46	MCS0	n40	14.91	0.279	15.19	23.98
5270	54	MCS0	n40	14.89	0.279	15.17	23.98
5310	62	MCS0	n40	14.81	0.279	15.09	23.98
5510	102	MCS0	n40	13.09	0.279	13.37	23.98
5590	118	MCS0	n40	15.43	0.279	15.71	23.98
5710	142	MCS0	n40	14.86	0.279	15.14	23.98
5755	151	MCS0	n40	15.50	0.279	15.77	30.00
5795	159	MCS0	n40	15.37	0.279	15.65	30.00

Frequency [MHz]	Channel	Datarate	Mode	Mea. Power [dBm]	D.C.F [dB]	Total Power [dBm]	Limit [dBm]
5190	38	MCS0	ac40	14.21	0.277	14.48	23.98
5230	46	MCS0	ac40	14.93	0.277	15.21	23.98
5270	54	MCS0	ac40	14.88	0.277	15.16	23.98
5310	62	MCS0	ac40	14.84	0.277	15.12	23.98
5510	102	MCS0	ac40	12.91	0.277	13.19	23.98
5590	118	MCS0	ac40	15.41	0.277	15.69	23.98
5710	142	MCS0	ac40	14.83	0.277	15.11	23.98
5755	151	MCS0	ac40	15.42	0.277	15.70	30.00
5795	159	MCS0	ac40	15.41	0.277	15.69	30.00

Frequency [MHz]	Channel	Datarate	Mode	Mea. Power [dBm]	D.C.F [dB]	Total Power [dBm]	Limit [dBm]
5210	42	MCS0	ac80	11.18	0.969	12.15	23.98
5290	58	MCS0	ac80	11.02	0.969	11.99	23.98
5530	106	MCS0	ac80	11.60	0.969	12.57	23.98
5610	122	MCS0	ac80	13.15	0.969	14.12	23.98
5690	138	MCS0	ac80	13.41	0.969	14.38	23.98
5775	155	MCS0	ac80	13.06	0.969	14.03	30.00

**10.5 POWER SPECTRAL DENSITY**

Frequency [MHz]	Channel	Datarate	Mode	Mea. PSD [dBm/MHz]	D.C.F [dB]	Total PSD [dBm/MHz]	Limit
5180	36	6M	a	6.673	0.140	6.813	11 dBm/MHz
5200	40	6M	a	6.975	0.140	7.115	11 dBm/MHz
5240	48	6M	a	7.678	0.140	7.818	11 dBm/MHz
5260	52	6M	a	7.351	0.140	7.491	11 dBm/MHz
5300	60	6M	a	7.005	0.140	7.145	11 dBm/MHz
5320	64	6M	a	6.595	0.140	6.735	11 dBm/MHz
5500	100	6M	a	5.401	0.140	5.541	11 dBm/MHz
5600	120	6M	a	7.582	0.140	7.722	11 dBm/MHz
5720	144	6M	a	6.994	0.140	7.134	11 dBm/MHz
5745	149	6M	a	4.979	0.140	5.119	30 dBm/500kHz
5785	157	6M	a	4.750	0.140	4.890	30 dBm/500kHz
5825	165	6M	a	4.594	0.140	4.734	30 dBm/500kHz

Frequency [MHz]	Channel	Datarate	Mode	Mea. PSD [dBm/MHz]	D.C.F [dB]	Total PSD [dBm/MHz]	Limit
5180	36	MCS0	n20	6.354	0.150	6.504	11 dBm/MHz
5200	40	MCS0	n20	6.260	0.150	6.410	11 dBm/MHz
5240	48	MCS0	n20	6.773	0.150	6.923	11 dBm/MHz
5260	52	MCS0	n20	7.039	0.150	7.189	11 dBm/MHz
5300	60	MCS0	n20	6.479	0.150	6.629	11 dBm/MHz
5320	64	MCS0	n20	6.163	0.150	6.313	11 dBm/MHz
5500	100	MCS0	n20	4.675	0.150	4.825	11 dBm/MHz
5600	120	MCS0	n20	7.106	0.150	7.256	11 dBm/MHz
5720	144	MCS0	n20	6.643	0.150	6.793	11 dBm/MHz
5745	149	MCS0	n20	4.439	0.150	4.589	30 dBm/500kHz
5785	157	MCS0	n20	4.556	0.150	4.706	30 dBm/500kHz
5825	165	MCS0	n20	4.184	0.150	4.334	30 dBm/500kHz

Frequency [MHz]	Channel	Datarate	Mode	Mea. PSD [dBm/MHz]	D.C.F [dB]	Total PSD [dBm/MHz]	Limit
5180	36	MCS0	ac20	6.247	0.140	6.387	11 dBm/MHz
5200	40	MCS0	ac20	6.265	0.140	6.405	11 dBm/MHz
5240	48	MCS0	ac20	6.834	0.140	6.974	11 dBm/MHz
5260	52	MCS0	ac20	6.713	0.140	6.853	11 dBm/MHz
5300	60	MCS0	ac20	6.530	0.140	6.670	11 dBm/MHz
5320	64	MCS0	ac20	5.993	0.140	6.133	11 dBm/MHz
5500	100	MCS0	ac20	4.851	0.140	4.991	11 dBm/MHz
5600	120	MCS0	ac20	7.102	0.140	7.242	11 dBm/MHz
5720	144	MCS0	ac20	6.675	0.140	6.815	11 dBm/MHz
5745	149	MCS0	ac20	4.539	0.140	4.679	30 dBm/500kHz
5785	157	MCS0	ac20	4.465	0.140	4.605	30 dBm/500kHz
5825	165	MCS0	ac20	4.181	0.140	4.321	30 dBm/500kHz

Frequency [MHz]	Channel	Datarate	Mode	Mea. PSD [dBm/MHz]	D.C.F [dB]	Total PSD [dBm/MHz]	Limit
5190	38	MCS0	n40	0.906	0.279	1.185	11 dBm/MHz
5230	46	MCS0	n40	1.529	0.279	1.808	11 dBm/MHz
5270	54	MCS0	n40	1.511	0.279	1.790	11 dBm/MHz
5310	62	MCS0	n40	1.532	0.279	1.811	11 dBm/MHz
5510	102	MCS0	n40	-0.321	0.279	-0.042	11 dBm/MHz
5590	118	MCS0	n40	2.135	0.279	2.414	11 dBm/MHz
5710	142	MCS0	n40	1.682	0.279	1.961	11 dBm/MHz
5755	151	MCS0	n40	-0.803	0.279	-0.524	30 dBm/500kHz
5795	159	MCS0	n40	-1.009	0.279	-0.730	30 dBm/500kHz

Frequency [MHz]	Channel	Datarate	Mode	Mea. PSD [dBm/MHz]	D.C.F [dB]	Total PSD [dBm/MHz]	Limit
5190	38	MCS0	ac40	0.818	0.277	1.095	11 dBm/MHz
5230	46	MCS0	ac40	1.809	0.277	2.086	11 dBm/MHz
5270	54	MCS0	ac40	1.512	0.277	1.789	11 dBm/MHz
5310	62	MCS0	ac40	1.524	0.277	1.801	11 dBm/MHz
5510	102	MCS0	ac40	-0.329	0.277	-0.052	11 dBm/MHz
5590	118	MCS0	ac40	2.204	0.277	2.481	11 dBm/MHz
5710	142	MCS0	ac40	1.665	0.277	1.942	11 dBm/MHz
5755	151	MCS0	ac40	-0.359	0.277	-0.082	30 dBm/500kHz
5795	159	MCS0	ac40	-0.781	0.277	-0.504	30 dBm/500kHz

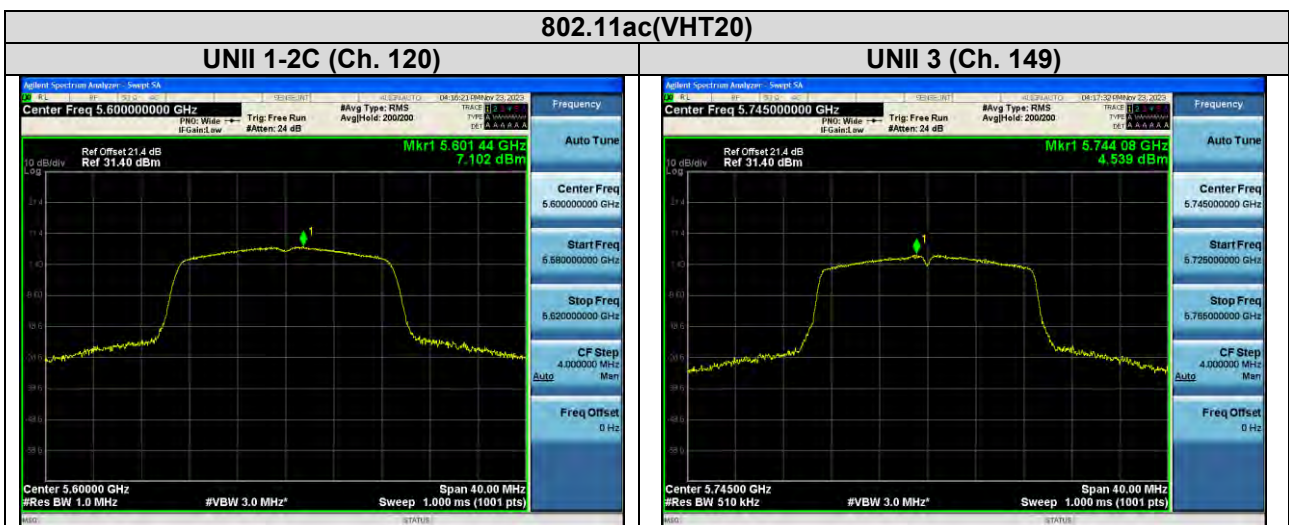
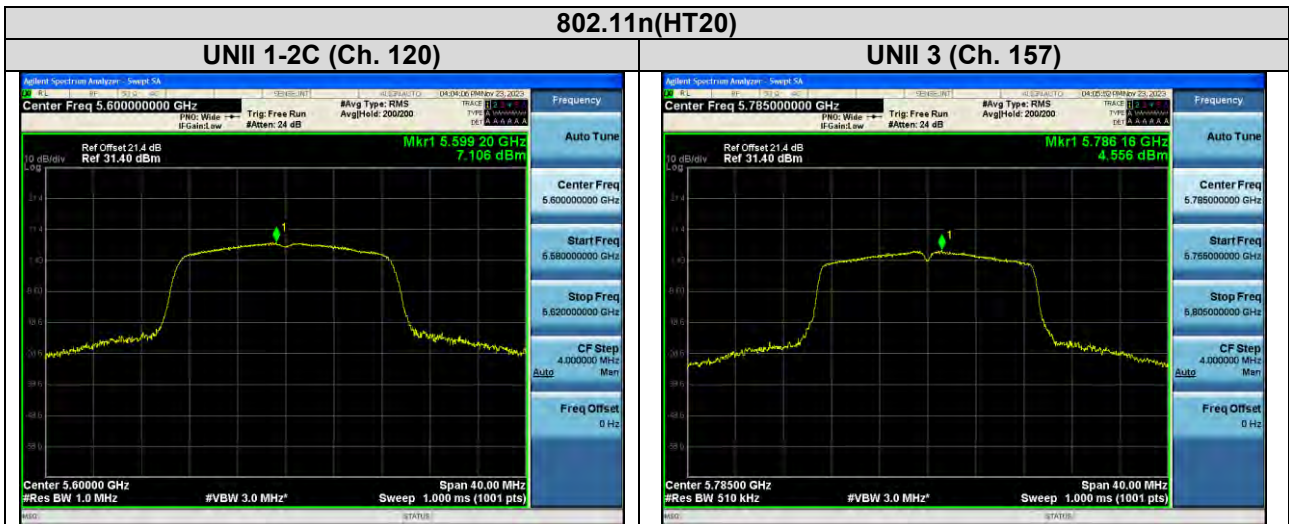
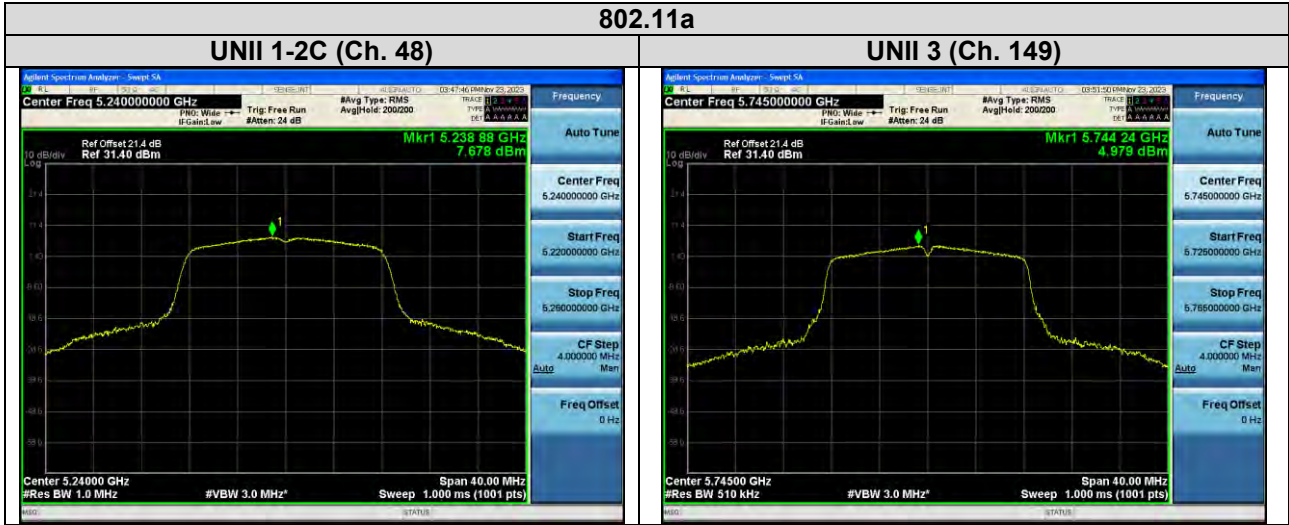


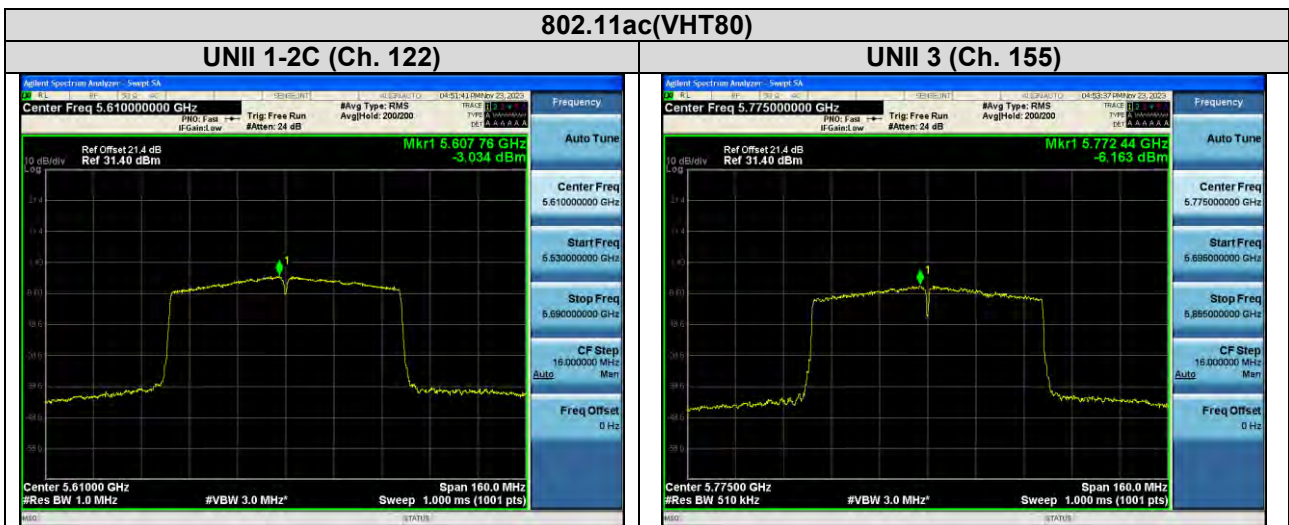
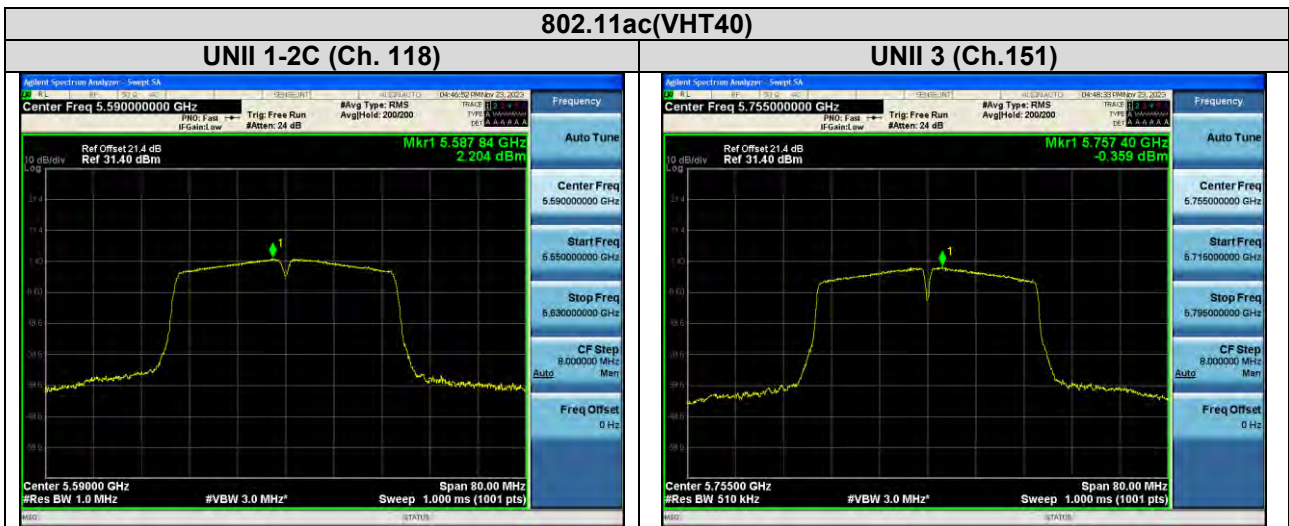
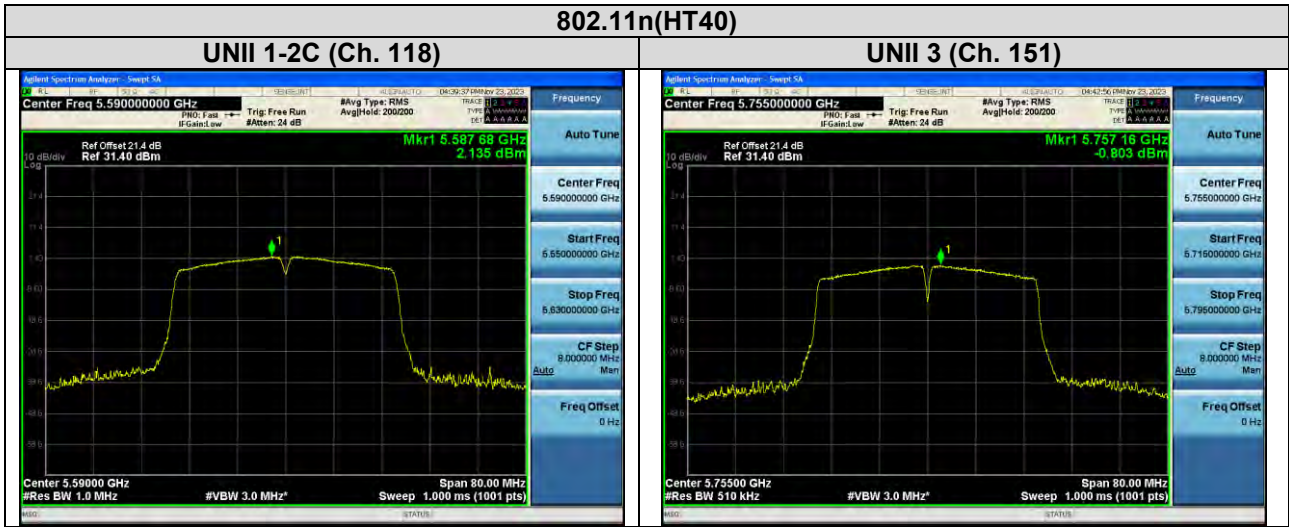
Frequency [MHz]	Channel	Datarate	Mode	Mea. PSD [dBm/MHz]	D.C.F [dB]	Total PSD [dBm/MHz]	Limit
5210	42	MCS0	ac80	-5.239	0.969	-4.270	11 dBm/MHz
5290	58	MCS0	ac80	-5.507	0.969	-4.538	11 dBm/MHz
5530	106	MCS0	ac80	-5.106	0.969	-4.137	11 dBm/MHz
5610	122	MCS0	ac80	-3.034	0.969	-2.065	11 dBm/MHz
5690	138	MCS0	ac80	-3.041	0.969	-2.072	11 dBm/MHz
5775	155	MCS0	ac80	-6.163	0.969	-5.194	30 dBm/500kHz

**Test Plots**

**Note:**

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





**10.6 FREQUENCY STABILITY.**

**10.6.1 80 MHz BW**

**Startup after the EUT is energized**

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5210034.24	34.24
100%		-30	5210008.19	8.19
100%		-20	5210012.84	12.84
100%		-10	5210016.45	16.45
100%		0	5210020.89	20.89
100%		+10	5210029.13	29.13
100%		+30	5210037.62	37.62
100%		+40	5210042.72	42.72
100%		+50	5210053.53	53.53
High		4.40	+20	5210033.08
Low	3.80	+20	5210031.66	31.66

**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:	<u>UNII Band 2A</u>
OPERATING FREQUENCY:	<u>5,290,000,000 Hz</u>
CHANNEL:	<u>58</u>
REFERENCE VOLTAGE:	<u>4.20 VDC</u>

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5290031.43	31.43
100%		-30	5290008.97	8.97
100%		-20	5290013.37	13.37
100%		-10	5290016.73	16.73
100%		0	5290021.18	21.18
100%		+10	5290026.21	26.21
100%		+30	5290035.88	35.88
100%		+40	5290044.30	44.30
100%		+50	5290058.02	58.02
High		4.40	+20	5290032.03
Low	3.80	+20	5290034.74	34.74

**Note:**

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5530035.05	35.05
100%		-30	5530007.77	7.77
100%		-20	5530010.18	10.18
100%		-10	5530019.35	19.35
100%		0	5530025.17	25.17
100%		+10	5530030.48	30.48
100%		+30	5530036.39	36.39
100%		+40	5530040.30	40.30
100%		+50	5530050.09	50.09
High		4.40	+20	5530034.49
Low	3.80	+20	5530034.85	34.85

**Note:**

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5775032.25	32.25
100%		-30	5775008.80	8.80
100%		-20	5775015.02	15.02
100%		-10	5775017.98	17.98
100%		0	5775023.12	23.12
100%		+10	5775027.61	27.61
100%		+30	5775035.38	35.38
100%		+40	5775043.23	43.23
100%		+50	5775052.04	52.04
High		4.40	+20	5775031.43
Low	3.80	+20	5775035.66	35.66

**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:	<u>UNII Band 1</u>
OPERATING FREQUENCY:	<u>5,210,000,000 Hz</u>
CHANNEL:	<u>42</u>
REFERENCE VOLTAGE:	<u>4.20 VDC</u>

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5210035.96	35.96
100%		-30	5210009.04	9.04
100%		-20	5210015.81	15.81
100%		-10	5210018.57	18.57
100%		0	5210023.77	23.77
100%		+10	5210025.05	25.05
100%		+30	5210039.09	39.09
100%		+40	5210043.96	43.96
100%		+50	5210058.67	58.67
High		4.40	+20	5210030.68
Low	3.80	+20	5210031.71	31.71

**Note:**

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



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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5290034.46	34.46
100%		-30	5290010.54	10.54
100%		-20	5290012.35	12.35
100%		-10	5290020.72	20.72
100%		0	5290022.44	22.44
100%		+10	5290028.86	28.86
100%		+30	5290040.55	40.55
100%		+40	5290048.18	48.18
100%		+50	5290059.75	59.75
High		4.40	+20	5290032.97
Low	3.80	+20	5290031.02	31.02

**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:	<u>UNII Band 2C</u>
OPERATING FREQUENCY:	<u>5,530,000,000 Hz</u>
CHANNEL:	<u>106</u>
REFERENCE VOLTAGE:	<u>4.20 VDC</u>

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5530032.08	32.08
100%		-30	5530010.71	10.71
100%		-20	5530011.37	11.37
100%		-10	5530015.99	15.99
100%		0	5530021.11	21.11
100%		+10	5530026.02	26.02
100%		+30	5530036.49	36.49
100%		+40	5530047.96	47.96
100%		+50	5530059.80	59.80
High		4.40	+20	5530033.77
Low	3.80	+20	5530033.11	33.11

**Note:**

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5775030.47	30.47
100%		-30	5775009.99	9.99
100%		-20	5775012.06	12.06
100%		-10	5775017.71	17.71
100%		0	5775020.42	20.42
100%		+10	5775029.41	29.41
100%		+30	5775040.93	40.93
100%		+40	5775045.80	45.80
100%		+50	5775055.68	55.68
High		4.40	+20	5775031.23
Low	3.80	+20	5775034.06	34.06

**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:	<u>UNII Band 1</u>
OPERATING FREQUENCY:	<u>5,210,000,000 Hz</u>
CHANNEL:	<u>42</u>
REFERENCE VOLTAGE:	<u>4.20 VDC</u>

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5210034.05	34.05
100%		-30	5210006.40	6.40
100%		-20	5210013.02	13.02
100%		-10	5210016.94	16.94
100%		0	5210021.99	21.99
100%		+10	5210025.36	25.36
100%		+30	5210035.86	35.86
100%		+40	5210040.59	40.59
100%		+50	5210057.45	57.45
High		4.40	+20	5210030.59
Low	3.80	+20	5210034.46	34.46

**Note:**

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5290033.87	33.87
100%		-30	5290006.75	6.75
100%		-20	5290010.11	10.11
100%		-10	5290020.77	20.77
100%		0	5290021.66	21.66
100%		+10	5290025.03	25.03
100%		+30	5290039.55	39.55
100%		+40	5290048.90	48.90
100%		+50	5290058.30	58.30
High		4.40	+20	5290034.23
Low	3.80	+20	5290030.88	30.88

**Note:**

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5530030.94	30.94
100%		-30	5530007.06	7.06
100%		-20	5530013.49	13.49
100%		-10	5530017.09	17.09
100%		0	5530024.15	24.15
100%		+10	5530027.58	27.58
100%		+30	5530037.96	37.96
100%		+40	5530046.53	46.53
100%		+50	5530052.39	52.39
High		4.40	+20	5530031.33
Low	3.80	+20	5530033.07	33.07

**Note:**

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5775031.93	31.93
100%		-30	5775006.55	6.55
100%		-20	5775015.53	15.53
100%		-10	5775016.34	16.34
100%		0	5775021.62	21.62
100%		+10	5775030.21	30.21
100%		+30	5775035.29	35.29
100%		+40	5775046.33	46.33
100%		+50	5775052.37	52.37
High		4.40	+20	5775032.39
Low	3.80	+20	5775032.92	32.92

**Note:**

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

**10 minutes after the EUT is energized**

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5210035.13	35.13
100%		-30	5210006.64	6.64
100%		-20	5210010.43	10.43
100%		-10	5210016.81	16.81
100%		0	5210021.94	21.94
100%		+10	5210025.36	25.36
100%		+30	5210036.33	36.33
100%		+40	5210048.19	48.19
100%		+50	5210058.27	58.27
High		4.40	+20	5210035.26
Low	3.80	+20	5210035.17	35.17

**Note:**

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



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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5290032.85	32.85
100%		-30	5290009.76	9.76
100%		-20	5290014.97	14.97
100%		-10	5290016.40	16.40
100%		0	5290021.89	21.89
100%		+10	5290026.40	26.40
100%		+30	5290035.59	35.59
100%		+40	5290042.76	42.76
100%		+50	5290057.98	57.98
High		4.40	+20	5290032.24
Low	3.80	+20	5290032.82	32.82

**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:	<u>UNII Band 2C</u>
OPERATING FREQUENCY:	<u>5,530,000,000 Hz</u>
CHANNEL:	<u>106</u>
REFERENCE VOLTAGE:	<u>4.20 VDC</u>

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5530034.37	34.37
100%		-30	5530005.60	5.60
100%		-20	5530011.14	11.14
100%		-10	5530019.93	19.93
100%		0	5530025.02	25.02
100%		+10	5530028.47	28.47
100%		+30	5530040.39	40.39
100%		+40	5530046.39	46.39
100%		+50	5530052.93	52.93
High		4.40	+20	5530030.06
Low	3.80	+20	5530032.87	32.87

**Note:**

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

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

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	4.20	+20(Ref)	5775032.19	32.19
100%		-30	5775008.88	8.88
100%		-20	5775012.43	12.43
100%		-10	5775017.76	17.76
100%		0	5775020.49	20.49
100%		+10	5775025.04	25.04
100%		+30	5775036.57	36.57
100%		+40	5775040.28	40.28
100%		+50	5775050.47	50.47
High		4.40	+20	5775032.92
Low	3.80	+20	5775030.11	30.11

**Note:**

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

**10.7 STRADDLE CHANNEL**

**10.7.1 26 dB Bandwidth**

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26 dB Bandwidth [MHz]
802.11a	UNII 2C	5720	144	5707.64	17.36
802.11n(HT20)				5708.16	16.84
802.11ac(VHT20)				5709.24	15.76
802.11a	UNII 3	5720	144	5732.28	7.28
802.11n(HT20)				5731.32	6.32
802.11ac(VHT20)				5733.76	8.76

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26 dB Bandwidth [MHz]
802.11n(HT40)	UNII 2C	5710	142	5689.28	35.72
802.11ac(VHT40)				5689.92	35.08
802.11n(HT40)	UNII 3	5710	142	5731.36	6.36
802.11ac(VHT40)				5730.16	5.16

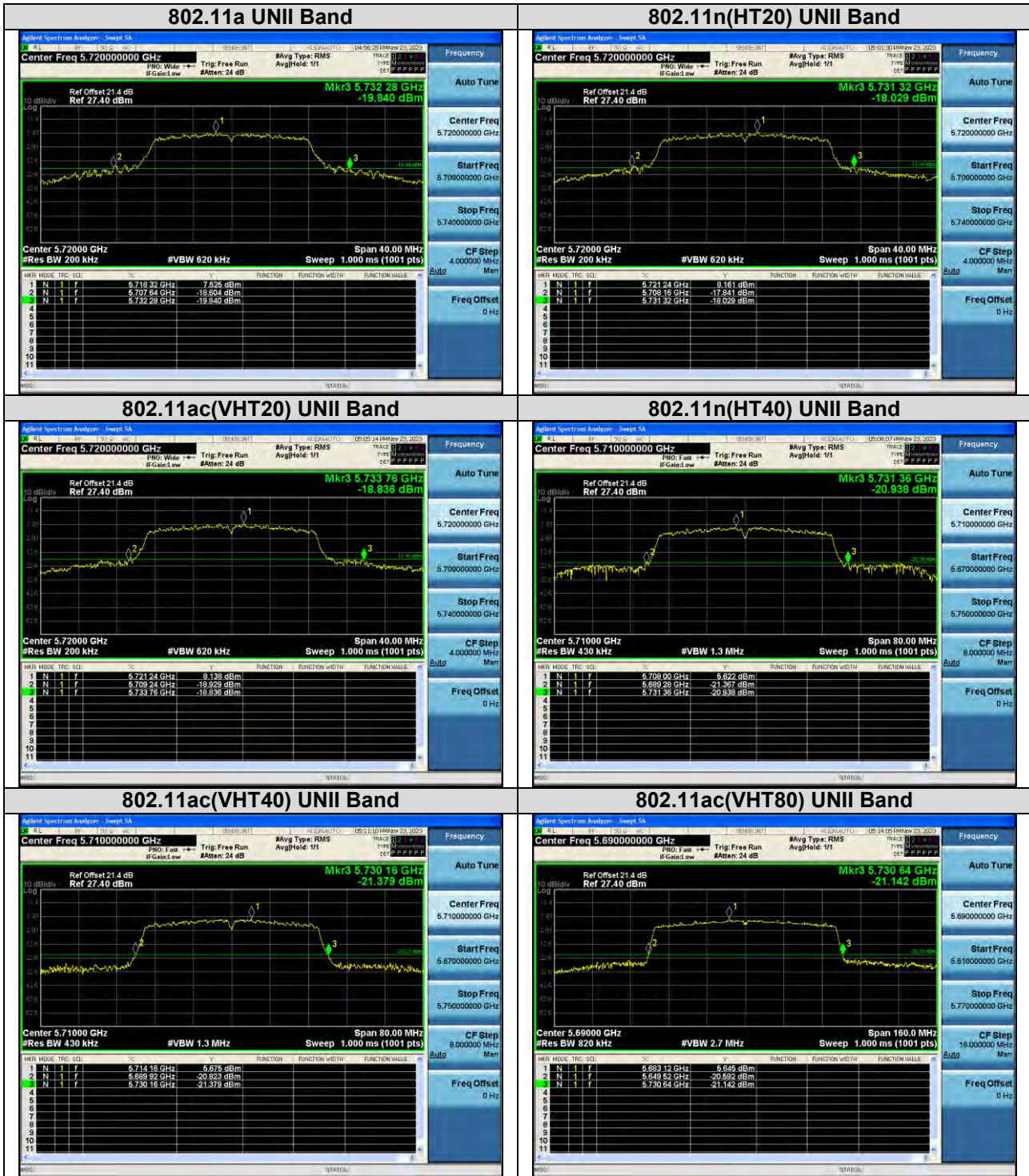
Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26 dB Bandwidth [MHz]
802.11ac(VHT80)	UNII 2C	5690	138	5649.52	75.48
	UNII 3	5690	138	5730.64	5.64

**Note:**

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

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

Test Plots (26 dB Bandwidth)



**10.7.2 6 dB Bandwidth**

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
802.11a	UNII 3	5720	144	5727.56	2.56	> 0.5
802.11n(HT20)				5727.56	2.56	> 0.5
802.11ac(VHT20)				5727.56	2.56	> 0.5
802.11n(HT40)	UNII 3	5710	142	5727.60	2.60	> 0.5
802.11ac(VHT40)				5727.60	2.60	> 0.5
802.11ac(VHT80)	UNII 3	5690	138	5727.76	2.76	> 0.5

**Note:**

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

Test Plots(Band 6 dB Bandwidth)



**10.7.3 Output Power**

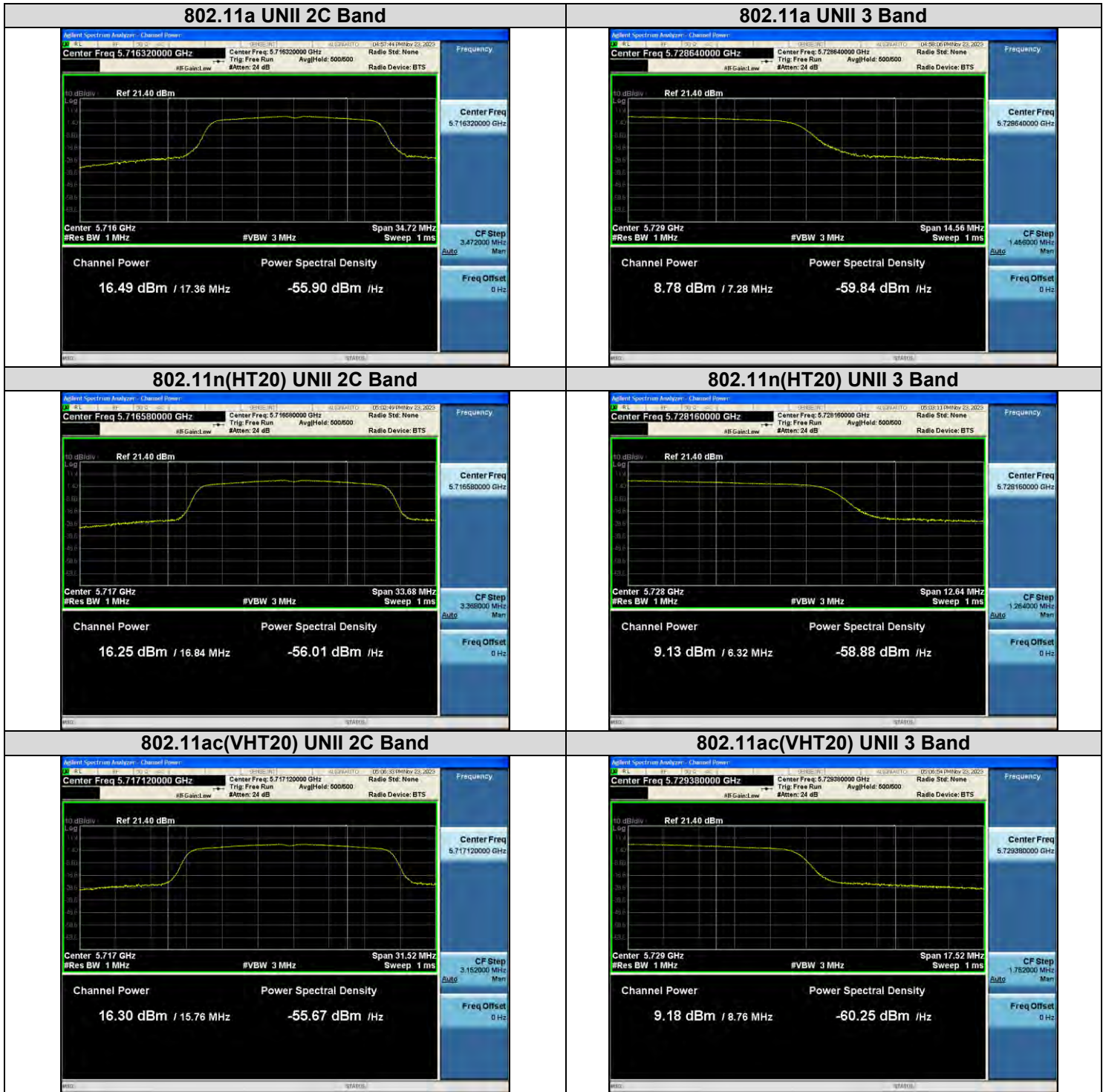
Mode	Frequency [MHz]	Channel	Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase Datarate
802.11a	5720 (UNII 2C Band)	144	16.49	0.140	16.63	23.40	6 Mbps
802.11n(HT20)			16.25	0.150	16.40	23.26	MCS0
802.11ac(VHT20)			16.30	0.140	16.44	22.98	MCS0
802.11a	5720 (UNII 3 Band)	144	8.78	0.140	8.92	30.00	6 Mbps
802.11n(HT20)			9.13	0.150	9.28	30.00	MCS0
802.11ac(VHT20)			9.18	0.140	9.32	30.00	MCS0

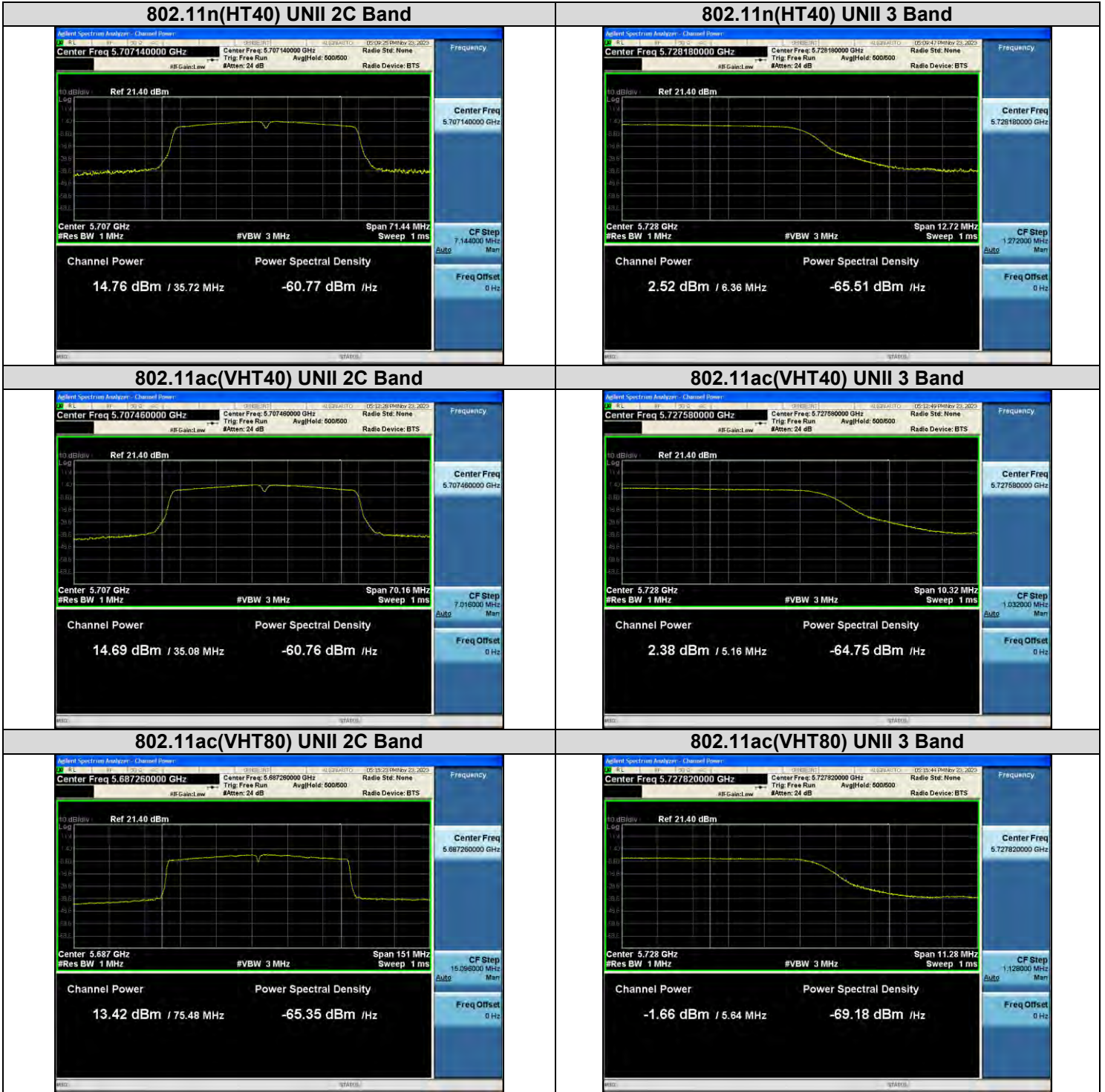
Mode	Frequency [MHz]	Channel	Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase Datarate
802.11n(HT40)	5710 (UNII 2C Band)	142	14.76	0.279	15.04	23.98	MCS0
802.11ac(VHT40)			14.69	0.277	14.97	23.98	MCS0
802.11n(HT40)	5710 (UNII 3 Band)	142	2.52	0.279	2.80	30.00	MCS0
802.11ac(VHT40)			2.38	0.277	2.65	30.00	MCS0

Mode	Frequency [MHz]	Channel	Measured Power [dBm]	Duty Cycle Factor [dB]	Total Power [dBm]	Limit [dBm]	Worstcase Datarate
802.11ac(VHT80)	5690 (UNII 2C Band)	138	13.42	0.969	14.39	23.98	MCS0
	5690 (UNII 3 Band)	138	-1.66	0.969	-0.69	30.00	MCS0



**Test Plots**





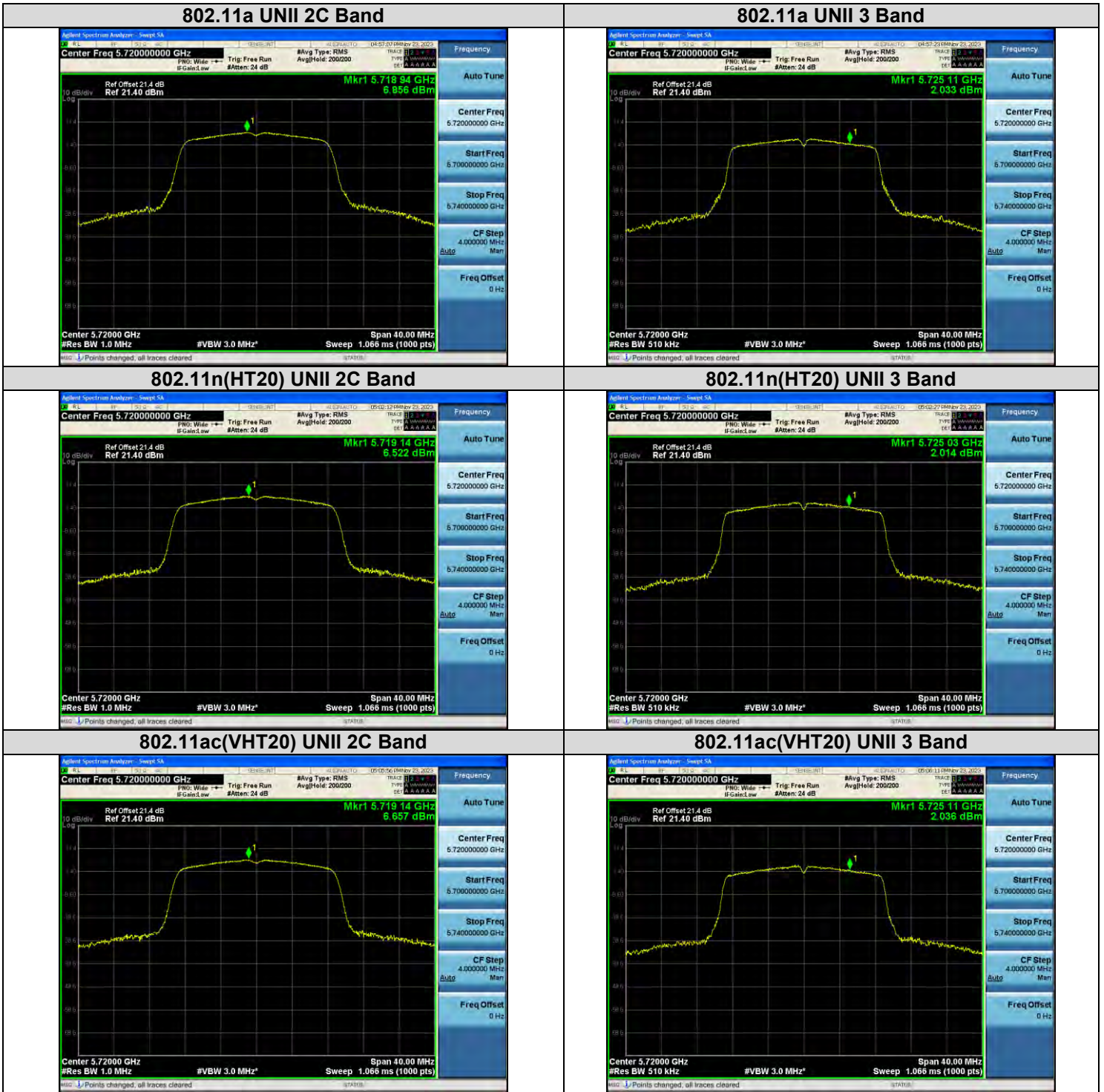
**10.7.4 Power Spectral Density**

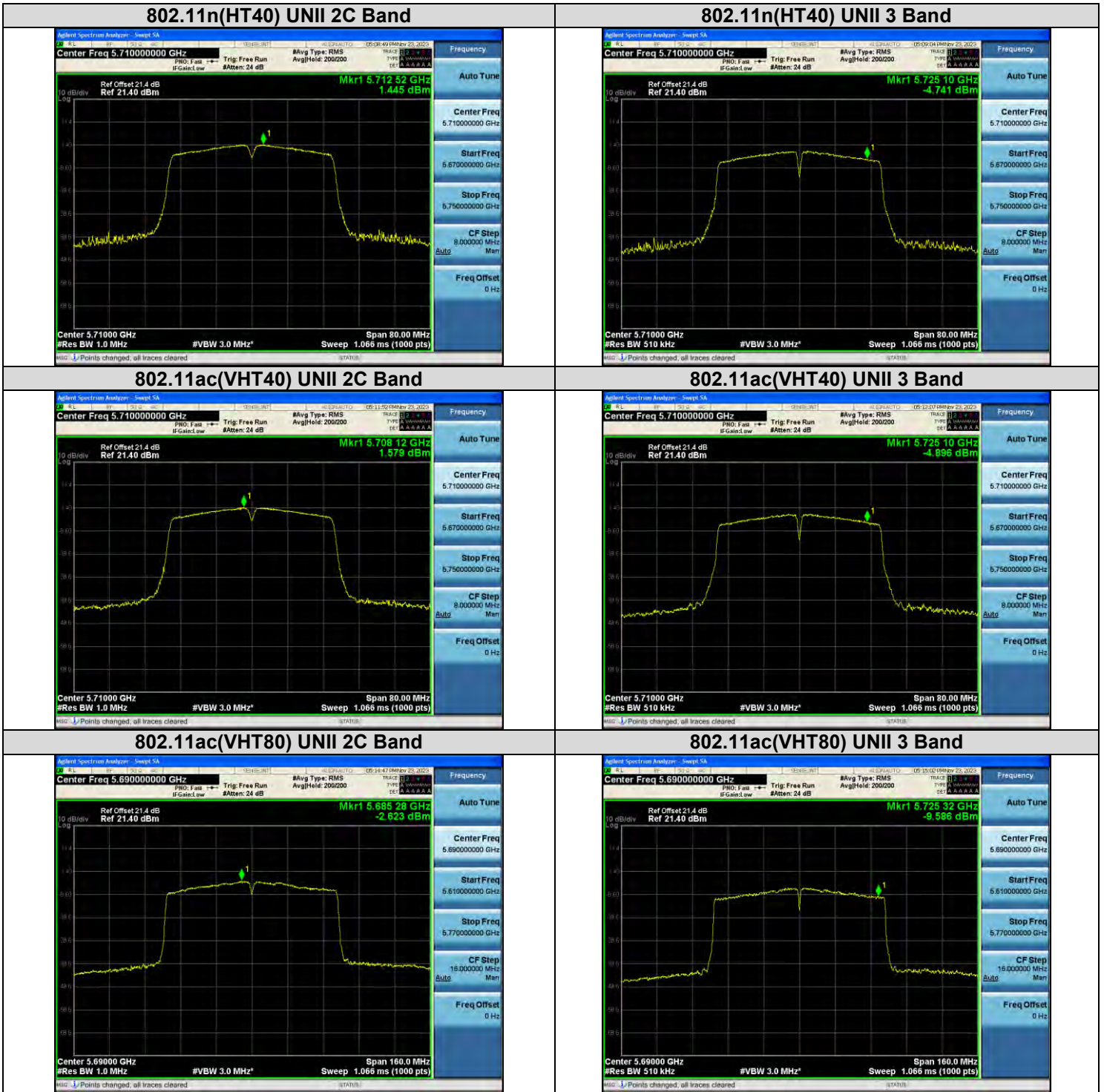
Mode	Frequency [MHz]	Channel	Measured Density [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm]	Limit [dBm]	Worstcase Datarate
802.11a	5720 (UNII 2C)	144	6.856	0.140	6.996	11 dBm/ MHz	6 Mbps
802.11n(HT20)			6.522	0.150	6.671		MCS0
802.11ac(VHT20)			6.657	0.140	6.797		MCS0
802.11a	5720 (UNII 3)	144	2.033	0.140	2.174	30 dBm/ 500 kHz	6 Mbps
802.11n(HT20)			2.014	0.150	2.164		MCS0
802.11ac(VHT20)			2.036	0.140	2.176		MCS0

Mode	Frequency [MHz]	Channel	Measured Density [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm]	Limit [dBm]	Worstcase Datarate
802.11n(HT40)	5710 (UNII 2C)	142	1.445	0.279	1.725	11 dBm/ MHz	MCS0
802.11ac(VHT40)			1.579	0.277	1.856		MCS0
802.11n(HT40)	5710 (UNII 3)	142	-4.741	0.279	1.725	30 dBm/ 500 kHz	MCS0
802.11ac(VHT40)			-4.896	0.277	1.856		MCS0

Mode	Frequency [MHz]	Channel	Measured Density [dBm]	Duty Cycle Factor [dB]	Total PSD [dBm]	Limit [dBm]	Worstcase Datarate
802.11ac(VHT80)	5690 (UNII 2C)	138	-2.623	0.969	-1.653	11 dBm/ MHz	MCS0
	5690 (UNII 3)	138	-9.586	0.969	-8.616	30 dBm/ 500 kHz	MCS0

**Test Plots**





**10.8 RADIATED SPURIOUS EMISSIONS**

**Frequency Range : 9 kHz – 30 MHz**

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

**Note:**

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

**Frequency Range : Below 1 GHz**

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

**Note:**

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

**Frequency Range : Above 1 GHz**

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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+ D.F-A.G [dB]	POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
10360	45.85	7.94	V	53.79	68.20	14.41	PK
15540	41.08	13.08	V	54.16	73.98	19.82	PK
15540	27.42	13.08	V	40.50	53.98	13.48	AV
10360	46.09	7.94	H	54.03	68.20	14.17	PK
15540	41.02	13.08	H	54.10	73.98	19.88	PK
15540	27.33	13.08	H	40.41	53.98	13.57	AV

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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+ D.F-A.G [dB]	POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
10400	44.73	7.89	V	52.62	68.20	15.58	PK
15600	40.22	13.09	V	53.31	73.98	20.67	PK
15600	27.33	13.09	V	40.42	53.98	13.56	AV
10400	44.51	7.89	H	52.40	68.20	15.80	PK
15600	40.05	13.09	H	53.14	73.98	20.84	PK
15600	27.12	13.09	H	40.21	53.98	13.77	AV

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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+ D.F-A.G [dB]	POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
10480	44.51	8.23	V	52.74	68.20	15.46	PK
15720	40.29	13.40	V	53.69	73.98	20.29	PK
15720	26.85	13.40	V	40.25	53.98	13.73	AV
10480	44.62	8.23	H	52.85	68.20	15.35	PK
15720	40.02	13.40	H	53.42	73.98	20.56	PK
15720	26.71	13.40	H	40.11	53.98	13.87	AV

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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+ D.F-A.G [dB]	POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
10520	44.15	8.82	V	52.97	68.20	15.23	PK
15780	41.65	13.53	V	55.18	73.98	18.80	PK
15780	27.75	13.53	V	41.28	53.98	12.70	AV
10520	43.88	8.82	H	52.70	68.20	15.50	PK
15780	41.48	13.53	H	55.01	73.98	18.97	PK
15780	27.62	13.53	H	41.15	53.98	12.83	AV



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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+ D.F-A.G [dB]	POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
10600	44.12	9.44	V	53.56	73.98	20.42	PK
10600	30.52	9.44	V	39.96	53.98	14.02	AV
15900	41.66	13.06	V	54.72	73.98	19.26	PK
15900	28.21	13.06	V	41.27	53.98	12.71	AV
10600	43.95	9.44	H	53.39	73.98	20.59	PK
10600	30.32	9.44	H	39.76	53.98	14.22	AV
15900	41.45	13.06	H	54.51	73.98	19.47	PK
15900	28.11	13.06	H	41.17	53.98	12.81	AV

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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+ D.F-A.G [dB]	POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
10640	43.21	9.48	V	52.69	73.98	21.29	PK
10640	29.86	9.48	V	39.34	53.98	14.64	AV
15960	41.12	12.65	V	53.77	73.98	20.21	PK
15960	27.85	12.65	V	40.50	53.98	13.48	AV
10640	42.77	9.48	H	52.25	73.98	21.73	PK
10640	29.66	9.48	H	39.14	53.98	14.84	AV
15960	41.05	12.65	H	53.70	73.98	20.28	PK
15960	27.77	12.65	H	40.42	53.98	13.56	AV

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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+ D.F-A.G [dB]	POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
11000	43.21	9.40	V	52.61	73.98	21.37	PK
11000	29.62	9.40	V	39.02	53.98	14.96	AV
16500	41.95	11.61	V	53.56	68.20	14.64	PK
11000	43.25	9.40	H	52.65	73.98	21.33	PK
11000	29.72	9.40	H	39.12	53.98	14.86	AV
16500	42.14	11.61	H	53.75	68.20	14.45	PK

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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+ D.F-A.G [dB]	POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
11200	42.98	9.91	V	52.89	73.98	21.09	PK
11200	29.55	9.91	V	39.46	53.98	14.52	AV
16800	42.41	11.21	V	53.62	68.20	14.58	PK
11200	43.15	9.91	H	53.06	73.98	20.92	PK
11200	29.62	9.91	H	39.53	53.98	14.45	AV
16800	42.36	11.21	H	53.57	68.20	14.63	PK

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

Frequency [MHz]	Measured Value [dB $\mu$ V]	C.L+A.F+ D.F-A.G [dB]	POL [H/V]	Total [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Measurement Type
11440	42.15	10.51	V	52.66	73.98	21.32	PK
11440	29.11	10.51	V	39.62	53.98	14.36	AV
17160	42.08	11.74	V	53.82	68.20	14.38	PK
11440	42.12	10.51	H	52.63	73.98	21.35	PK
11440	28.92	10.51	H	39.43	53.98	14.55	AV
17160	41.66	11.74	H	53.40	68.20	14.80	PK

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

Frequency [MHz]	Measured Value [dB $\mu$ V]	C.L+A.F+ D.F-A.G [dB]	POL [H/V]	Total [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Measurement Type
11490	42.69	10.26	V	52.95	73.98	21.03	PK
11490	29.11	10.26	V	39.37	53.98	14.61	AV
17235	41.37	12.32	V	53.69	68.20	14.51	PK
11490	42.55	10.26	H	52.81	73.98	21.17	PK
11490	28.99	10.26	H	39.25	53.98	14.73	AV
17235	41.24	12.32	H	53.56	68.20	14.64	PK

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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+ D.F-A.G [dB]	POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
11570	43.07	9.44	V	52.51	73.98	21.47	PK
11570	29.54	9.44	V	38.98	53.98	15.00	AV
17355	41.84	12.88	V	54.72	68.20	13.48	PK
11570	42.95	9.44	H	52.39	73.98	21.59	PK
11570	29.20	9.44	H	38.64	53.98	15.34	AV
17355	41.62	12.88	H	54.50	68.20	13.70	PK

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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+ D.F-A.G [dB]	POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
11650	43.30	11.61	V	54.91	73.98	19.07	PK
11650	30.18	11.61	V	41.79	53.98	12.19	AV
17475	40.66	13.82	V	54.48	68.20	13.72	PK
11650	42.71	11.61	H	54.32	73.98	19.66	PK
11650	29.55	11.61	H	41.16	53.98	12.82	AV
17475	40.74	13.82	H	54.56	68.20	13.64	PK

**[RSDB Mode]****Bluetooth\_Ch. 78\_DH5\_GFSK + WLAN\_5 GHz\_802.11a\_6 Mbps\_Ch.165**

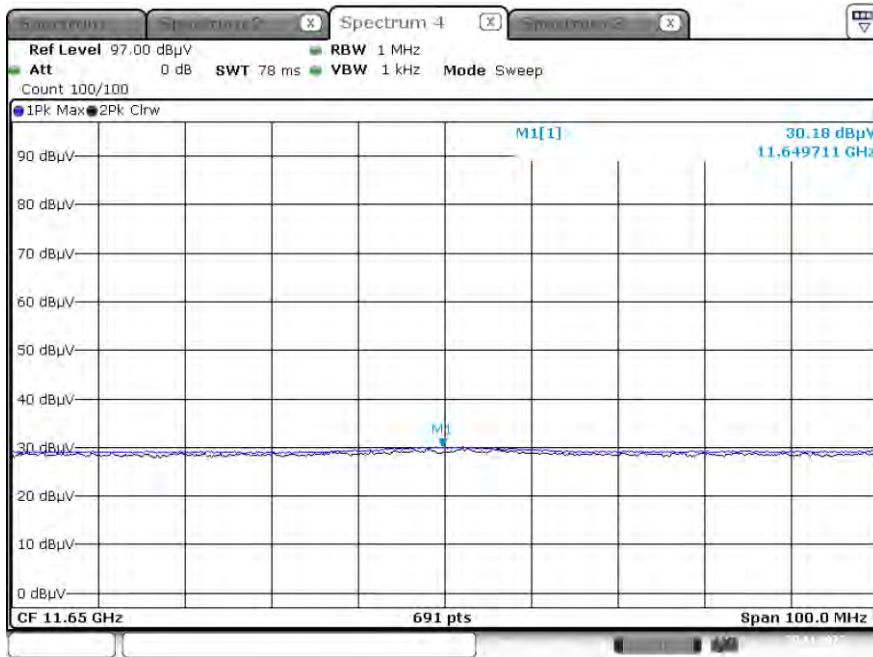
Frequency [MHz]	Measured Value [dB $\mu$ V]	C.L+A.F+ D.F-A.G [dB]	POL [H/V]	Total [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Measurement Type
11650	43.72	11.61	V	55.33	73.98	18.65	PK
11650	30.43	11.61	V	42.04	53.98	11.94	AV
17475	40.95	13.82	V	54.77	68.20	13.43	PK
11650	43.25	11.61	H	54.86	73.98	19.12	PK
11650	30.04	11.61	H	41.65	53.98	12.33	AV
17475	41.08	13.82	H	54.90	68.20	13.30	PK

**Note :**

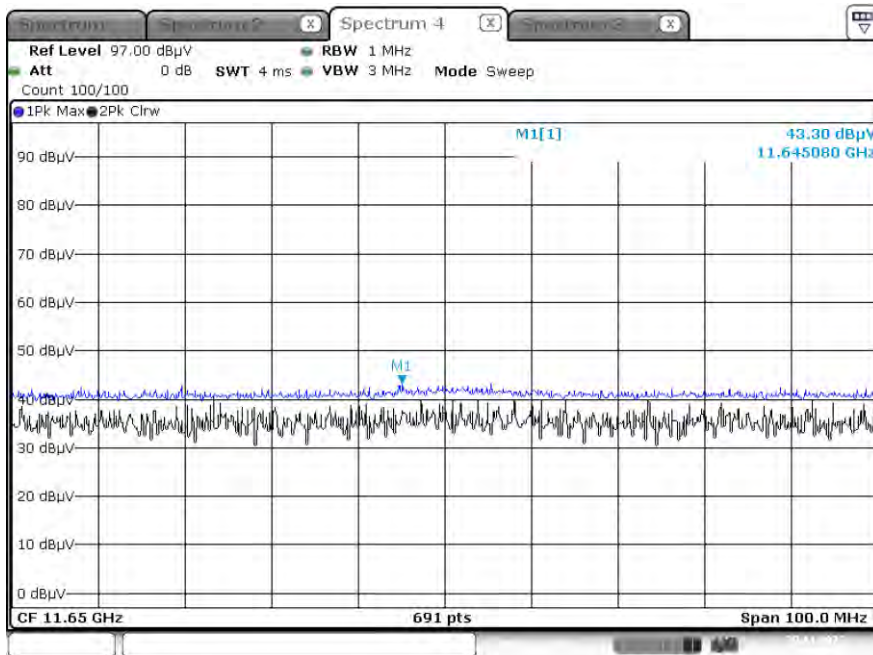
Bluetooth RSDB Data refer to [BT] Test Report.

▣ Test Plots

Average Result (802.11a, Ch.165 2nd Spurious Emissions, X-V)



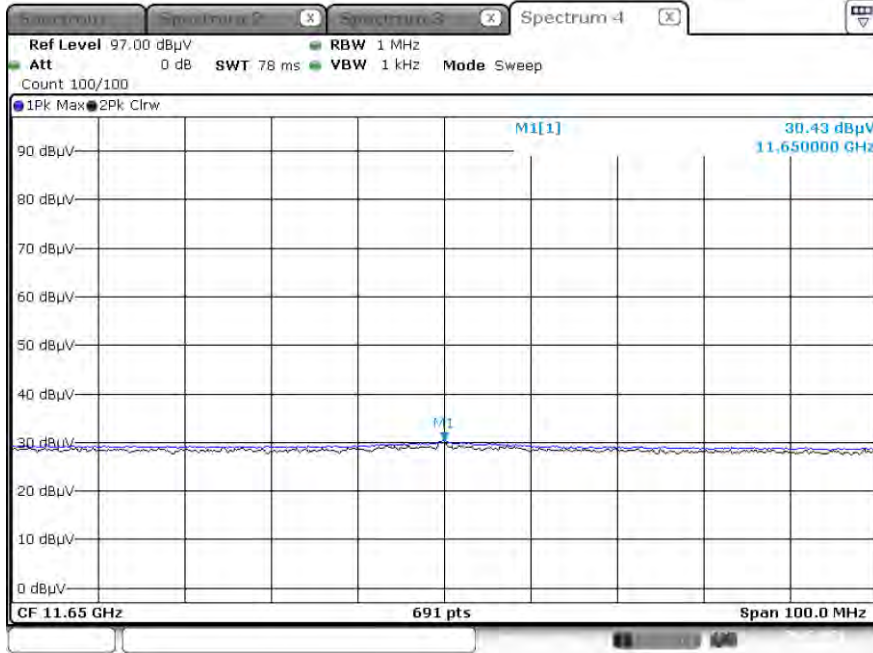
Peak Result (802.11a, Ch.165 2nd Spurious Emissions, X-V)



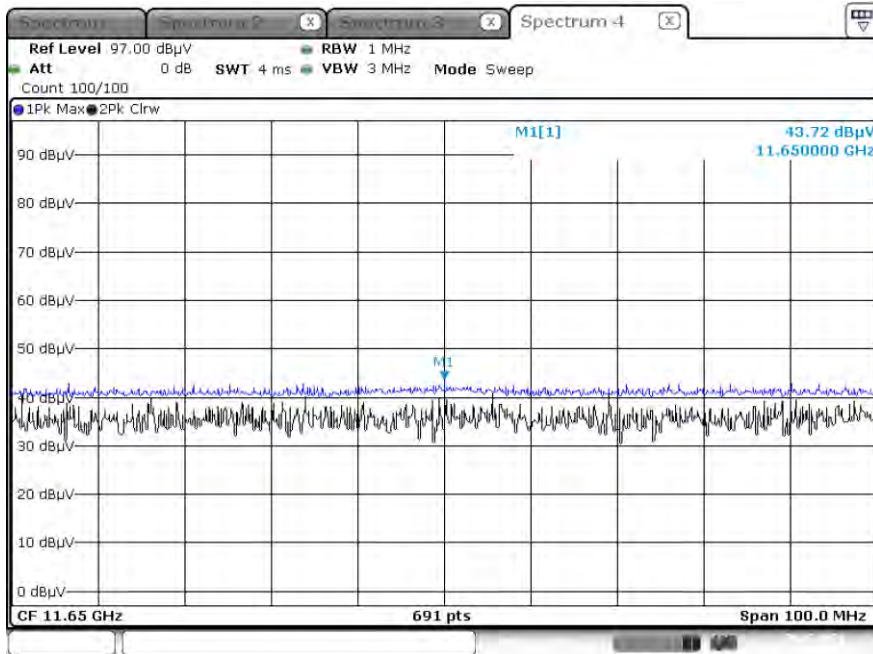
[RSDB Mode]

Bluetooth\_Ch. 78\_DH5\_GFSK + WLAN\_5 GHz\_802.11a\_6 Mbps\_Ch.165

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



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



**Note:**

Only the worst case plots for Radiated Spurious Emissions.

**10.9 RADIATED RESTRICTED BAND EDGE**

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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+D.F- A.G+ATT [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5150	59.85	8.70	H	68.55	73.98	5.43	PK
5150	41.88	8.70	H	50.58	53.98	3.40	AV
5150	59.32	8.70	V	68.02	73.98	5.96	PK
5150	41.55	8.70	V	50.25	53.98	3.73	AV

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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+D.F- A.G+ATT [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
# 5350	57.00	8.50	H	65.50	73.98	8.48	PK
5350	40.60	8.50	H	49.10	53.98	4.88	AV
# 5350	56.85	8.50	V	65.35	73.98	8.63	PK
5350	40.12	8.50	V	48.62	53.98	5.36	AV

Note : # Integration method Used (KDB 789033 D02 v02r01 Section 3) d) (ii)



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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+D.F- A.G+ATT [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5460	56.19	9.03	H	65.22	73.98	8.76	PK
5460	36.28	9.03	H	45.31	53.98	8.67	AV
# 5470	53.98	9.03	H	63.01	68.20	5.19	PK
5460	55.12	9.03	V	64.15	73.98	9.83	PK
5460	35.32	9.03	V	44.35	53.98	9.63	AV
# 5470	52.41	9.03	V	61.44	68.20	6.76	PK

Note : # Integration method Used (KDB 789033 D02 v02r01 Section 3) d) (ii)

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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+D.F- A.G+ATT [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5150	61.14	8.70	H	69.84	73.98	4.14	PK
5150	42.28	8.70	H	50.98	53.98	3.00	AV
5150	61.05	8.70	V	69.75	73.98	4.23	PK
5150	42.12	8.70	V	50.82	53.98	3.16	AV

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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+D.F- A.G+ATT [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
# 5350	57.87	8.50	H	66.37	73.98	7.61	PK
5350	41.23	8.50	H	49.73	53.98	4.25	AV
# 5350	57.41	8.50	V	65.91	73.98	8.07	PK
5350	40.95	8.50	V	49.45	53.98	4.53	AV

Note : # Integration method Used (KDB 789033 D02 v02r01 Section 3) d) (ii)

Band : UNII 2C  
 Operation Mode: 802.11 n\_HT20  
 Transfer MCS Index: 0  
 Operating Frequency: 5500 MHz  
 Channel No. 100 Ch

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+D.F- A.G+ATT [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5460	56.78	9.03	H	65.81	73.98	8.17	PK
5460	36.51	9.03	H	45.54	53.98	8.44	AV
# 5470	54.12	9.03	H	63.15	68.20	5.05	PK
5460	55.02	9.03	V	64.05	73.98	9.93	PK
5460	35.41	9.03	V	44.44	53.98	9.54	AV
# 5470	53.05	9.03	V	62.08	68.20	6.12	PK

Note : # Integration method Used (KDB 789033 D02 v02r01 Section 3) d) (ii)

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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+D.F- A.G+ATT [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5150	60.90	8.70	H	69.60	73.98	4.38	PK
5150	42.09	8.70	H	50.79	53.98	3.19	AV
5150	60.51	8.70	V	69.21	73.98	4.77	PK
5150	41.85	8.70	V	50.55	53.98	3.43	AV

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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+D.F- A.G+ATT [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
# 5350	57.72	8.50	H	66.22	73.98	7.76	PK
5350	41.09	8.50	H	49.59	53.98	4.39	AV
# 5350	57.55	8.50	V	66.05	73.98	7.93	PK
5350	40.89	8.50	V	49.39	53.98	4.59	AV

Note : # Integration method Used (KDB 789033 D02 v02r01 Section 3) d) (ii)

Band : UNII 2C  
 Operation Mode: 802.11 ac\_VHT20  
 Transfer MCS Index: 0  
 Operating Frequency: 5500 MHz  
 Channel No. 100 Ch

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+D.F- A.G+ATT [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5460	56.35	9.03	H	65.38	73.98	8.60	PK
5460	36.04	9.03	H	45.07	53.98	8.91	AV
# 5470	53.59	9.03	H	62.62	68.20	5.58	PK
5460	54.85	9.03	V	63.88	73.98	10.10	PK
5460	35.51	9.03	V	44.54	53.98	9.44	AV
# 5470	52.85	9.03	V	61.88	68.20	6.32	PK

Note : # Integration method Used (KDB 789033 D02 v02r01 Section 3) d) (ii)

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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+D.F- A.G+ATT [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5150	62.18	8.70	H	70.88	73.98	3.10	PK
5150	40.78	8.70	H	49.48	53.98	4.50	AV
5150	62.05	8.70	V	70.75	73.98	3.23	PK
5150	40.55	8.70	V	49.25	53.98	4.73	AV

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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+D.F- A.G+ATT [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
# 5350	57.61	8.50	H	66.11	73.98	7.87	PK
5350	42.16	8.50	H	50.66	53.98	3.32	AV
# 5350	57.48	8.50	V	65.98	73.98	8.00	PK
5350	41.85	8.50	V	50.35	53.98	3.63	AV

Note : # Integration method Used (KDB 789033 D02 v02r01 Section 3) d) (ii)

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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+D.F- A.G+ATT [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5460	55.24	9.03	H	64.27	73.98	9.71	PK
5460	36.40	9.03	H	45.43	53.98	8.55	AV
# 5470	55.81	9.03	H	64.84	68.20	3.36	PK
5460	55.05	9.03	V	64.08	73.98	9.90	PK
5460	36.32	9.03	V	45.35	53.98	8.63	AV
# 5470	55.55	9.03	V	64.58	68.20	3.62	PK

Note : # Integration method Used (KDB 789033 D02 v02r01 Section 3) d) (ii)

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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+D.F- A.G+ATT [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5150	61.52	8.70	H	70.22	73.98	3.76	PK
5150	40.84	8.70	H	49.54	53.98	4.44	AV
5150	61.32	8.70	V	70.02	73.98	3.96	PK
5150	40.44	8.70	V	49.14	53.98	4.84	AV

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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+D.F- A.G+ATT [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
# 5350	56.98	8.50	H	65.48	73.98	8.50	PK
5350	42.08	8.50	H	50.58	53.98	3.40	AV
# 5350	56.59	8.50	V	65.09	73.98	8.89	PK
5350	41.85	8.50	V	50.35	53.98	3.63	AV

Note : # Integration method Used (KDB 789033 D02 v02r01 Section 3) d) (ii)



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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+D.F- A.G+ATT [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5460	53.97	9.03	H	63.00	73.98	10.98	PK
5460	36.03	9.03	H	45.06	53.98	8.92	AV
# 5470	53.10	9.03	H	62.13	68.20	6.07	PK
5460	53.71	9.03	V	62.74	73.98	11.24	PK
5460	35.85	9.03	V	44.88	53.98	9.10	AV
# 5470	52.85	9.03	V	61.88	68.20	6.32	PK

Note : # Integration method Used (KDB 789033 D02 v02r01 Section 3) d) (ii)

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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+D.F- A.G+ATT [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5150	55.99	8.70	H	64.69	73.98	9.29	PK
5150	42.10	8.70	H	50.8	53.98	3.18	AV
5150	55.62	8.70	V	64.32	73.98	9.66	PK
5150	41.85	8.70	V	50.55	53.98	3.43	AV

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

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+D.F- A.G+ATT [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5350	56.62	8.50	H	65.12	73.98	8.86	PK
5350	41.59	8.50	H	50.09	53.98	3.89	AV
5350	56.32	8.50	V	64.82	73.98	9.16	PK
5350	41.32	8.50	V	49.82	53.98	4.16	AV

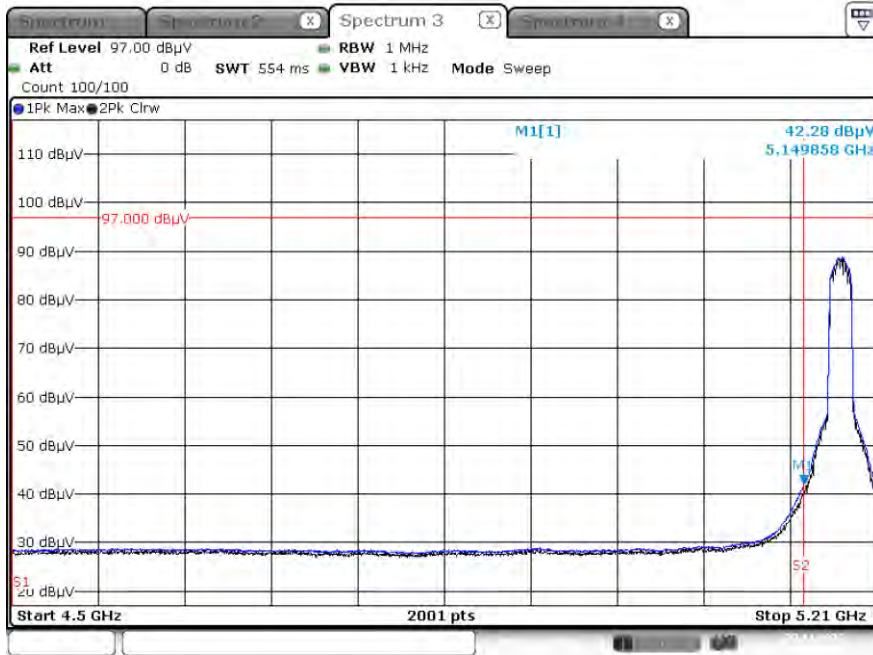
Band : UNII 2C  
 Operation Mode: 802.11 ac\_VHT80  
 Transfer MCS Index: 0  
 Operating Frequency: 5530 MHz  
 Channel No. 106 Ch

Frequency [MHz]	Measured Value [dBμV]	C.L+A.F+D.F- A.G+ATT [dB]	ANT. POL [H/V]	Total [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Measurement Type
5460	61.48	9.03	H	70.51	73.98	3.47	PK
5460	41.66	9.03	H	50.69	53.98	3.29	AV
# 5470	54.51	9.03	H	63.54	68.20	4.66	PK
5460	60.22	9.03	V	69.25	73.98	4.73	PK
5460	41.11	9.03	V	50.14	53.98	3.84	AV
# 5470	54.12	9.03	V	63.15	68.20	5.05	PK

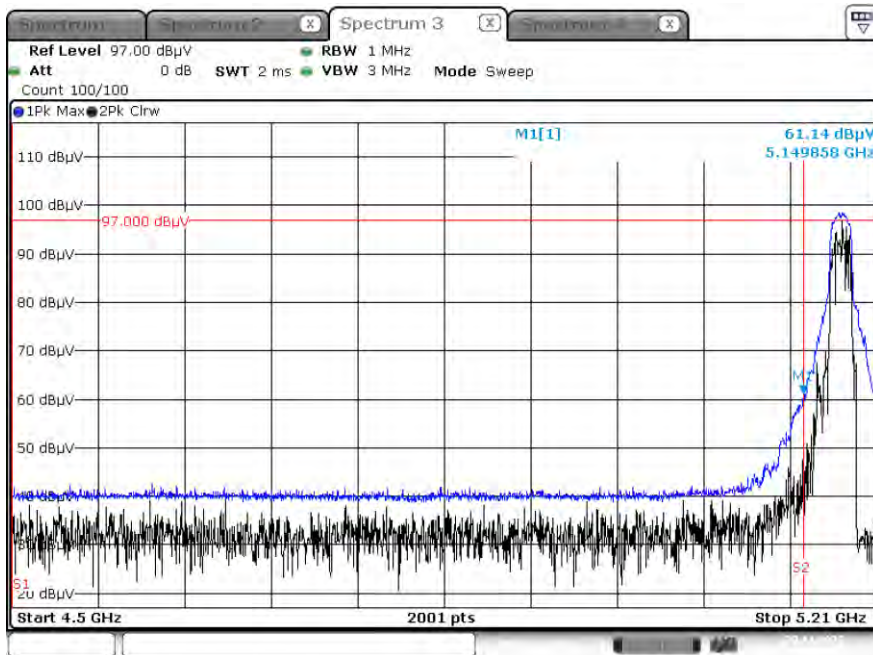
Note : # Integration method Used (KDB 789033 D02 v02r01 Section 3) d) (ii)

▣ Test Plots(UNII 1, 2A, 2C)

Average Result\_(802.11 n\_HT20, MCS0, Ch.36, X-H)



Peak Result (802.11 n\_HT20, MCS0, Ch.36, X-H)

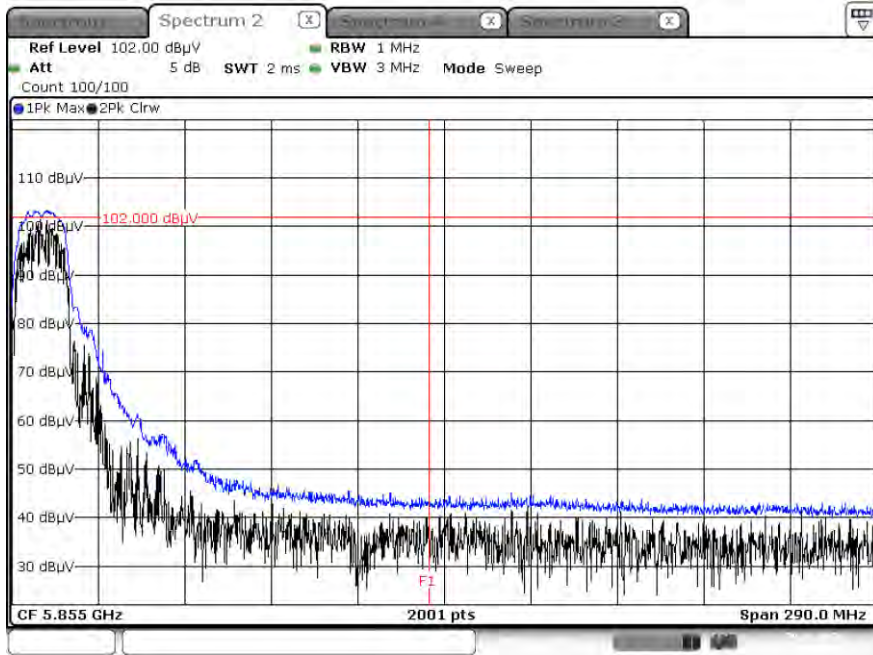


**Note:**

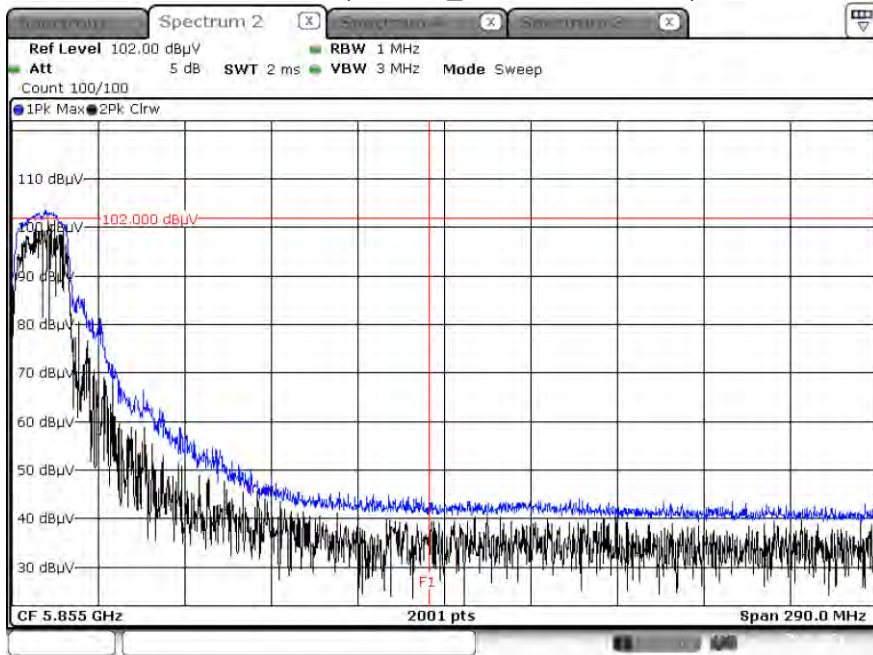
Only the worst case plots for Radiated Restricted Band Edge.

▣ Test Plots(Straddle Channel)

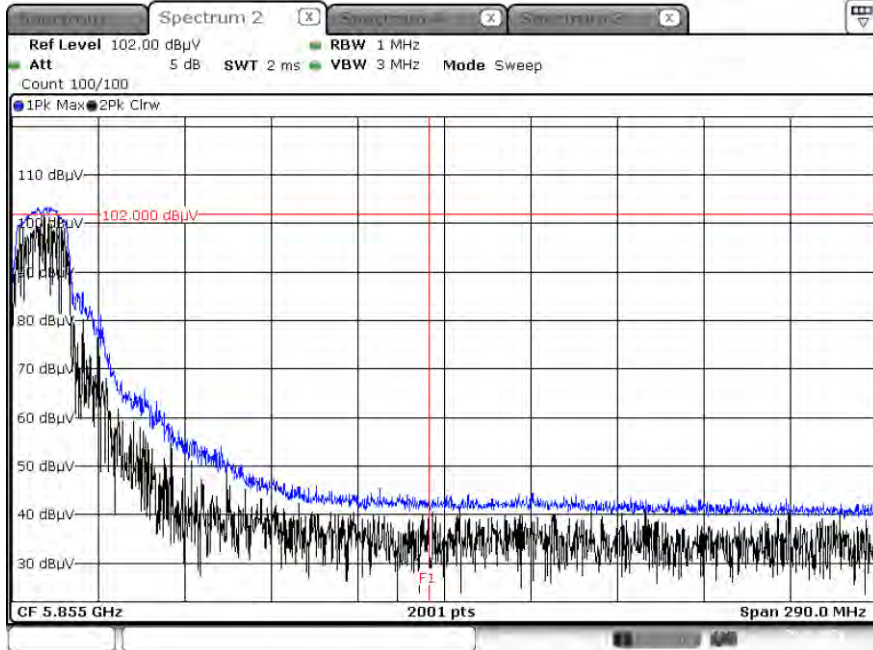
Peak Result (802.11a, Ch.144, X-H)



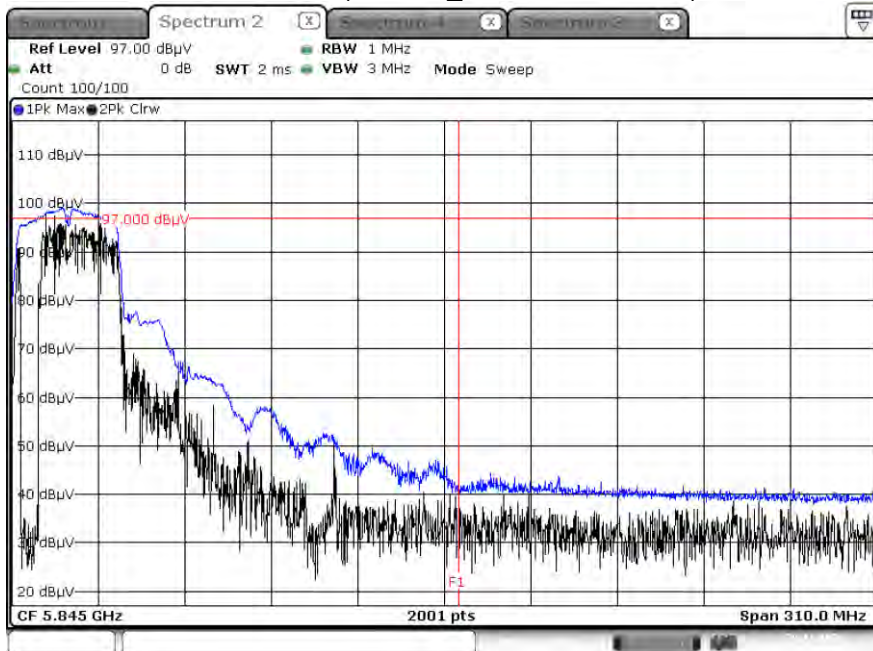
Peak Result (802.11n\_HT20, Ch.144, X-H)



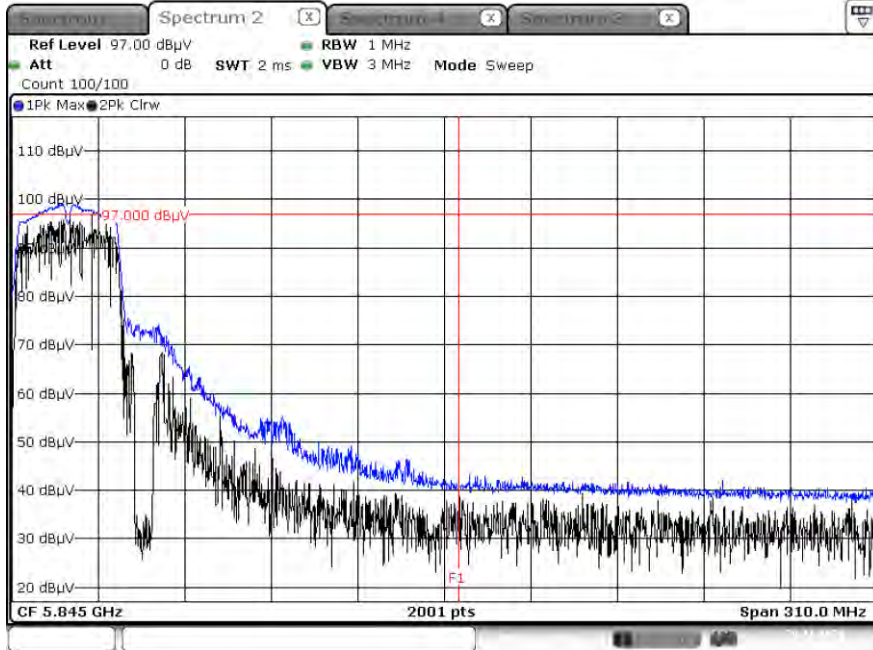
Peak Result (802.11ac\_VHT20, Ch.144, X-H)



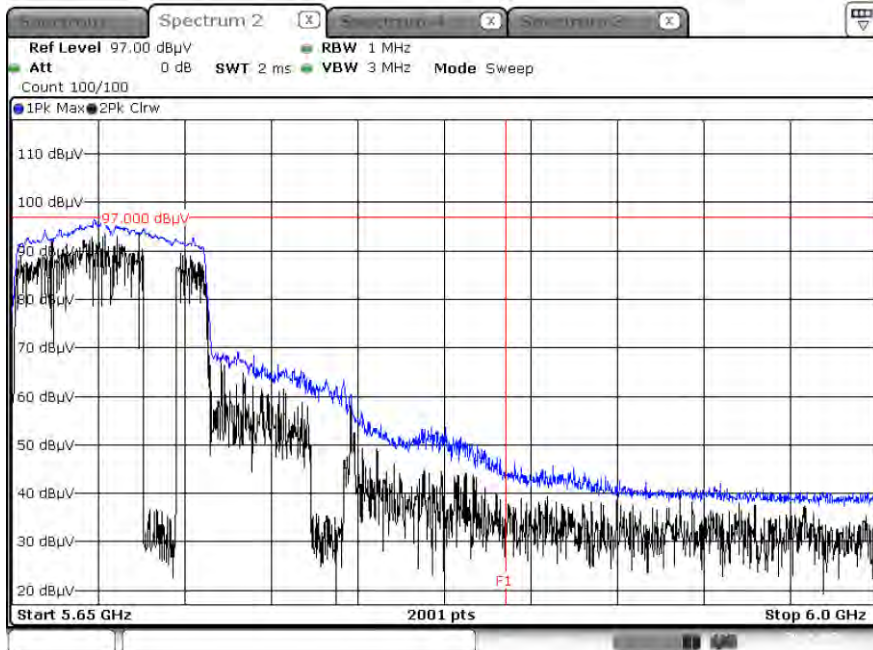
Peak Result (802.11n\_HT40, Ch.142, X-H)



Peak Result (802.11ac\_VHT40, Ch.142, X-H)



Peak Result (802.11ac\_VHT80, Ch.138, X-H)

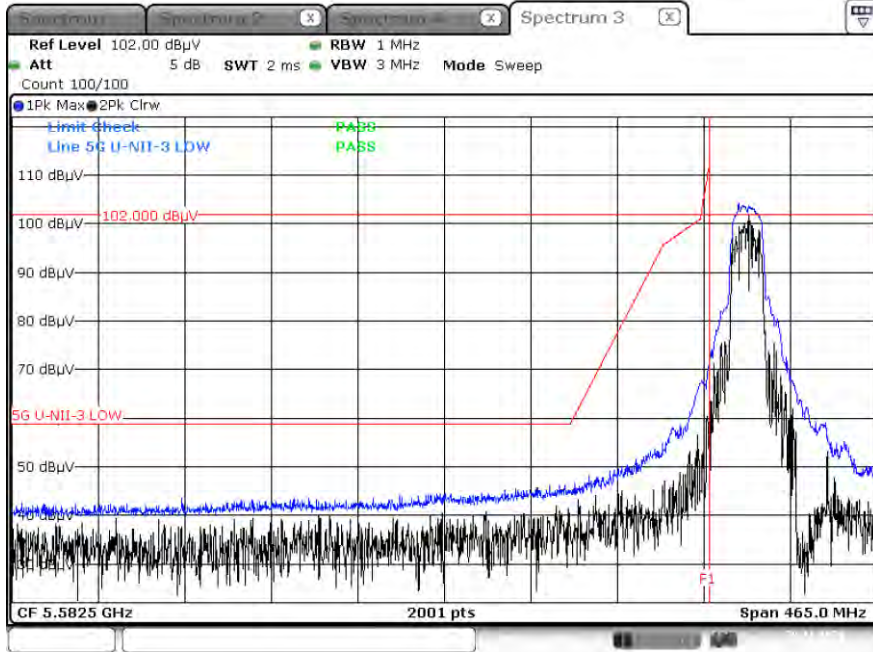


**Note :**

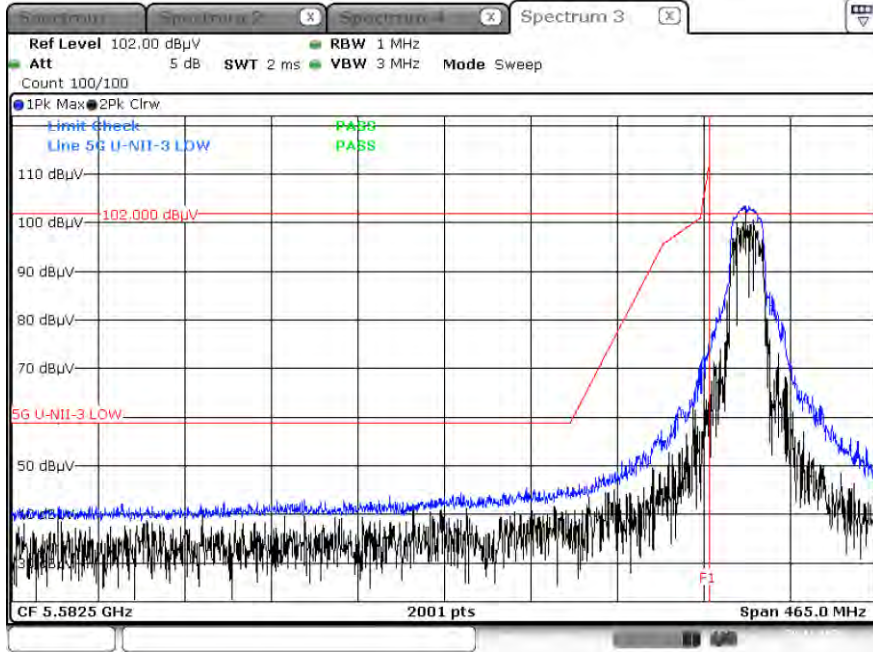
1. Only the worst case plots for Radiated Restricted Band Edge.
2. Red line : 5 850 MHz
3. Ambient Noise (Because of ambient noise, We attached only the worst plot without a data table)

▣ Test Plots(UNII 3)

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

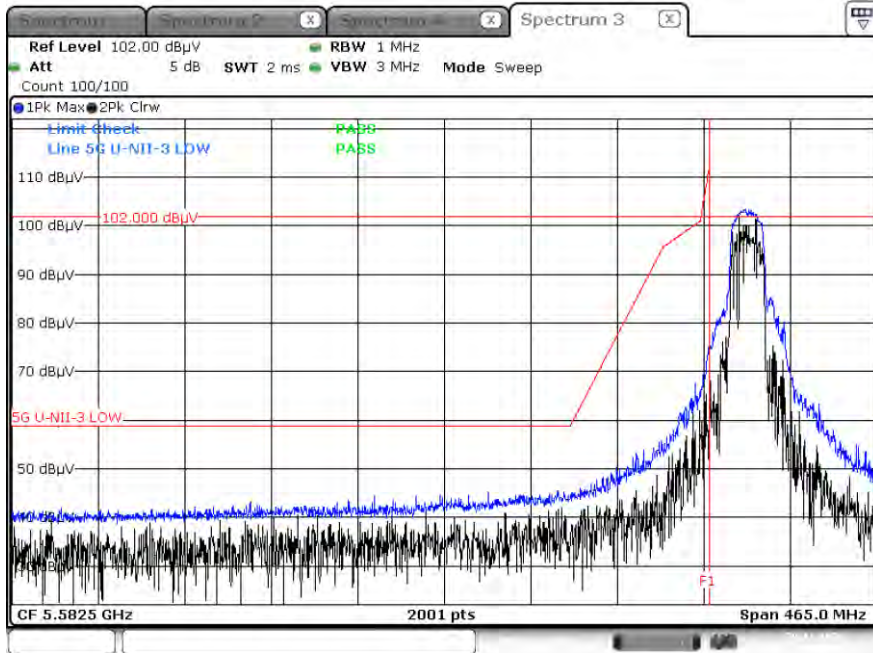


Peak Result (802.11n\_HT20, Ch.149, X-H)

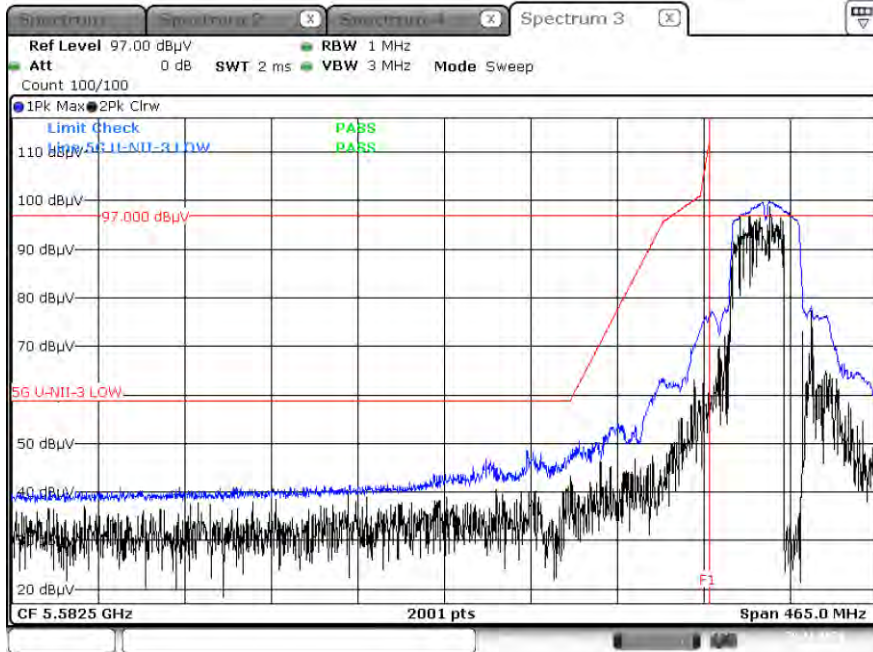




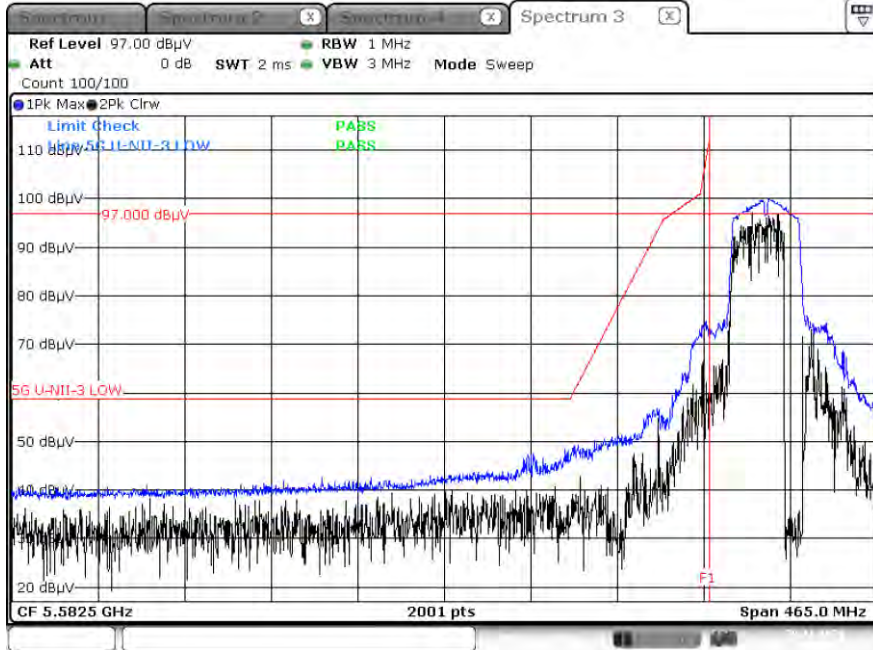
Peak Result (802.11ac\_VHT20, Ch.149, X-H)



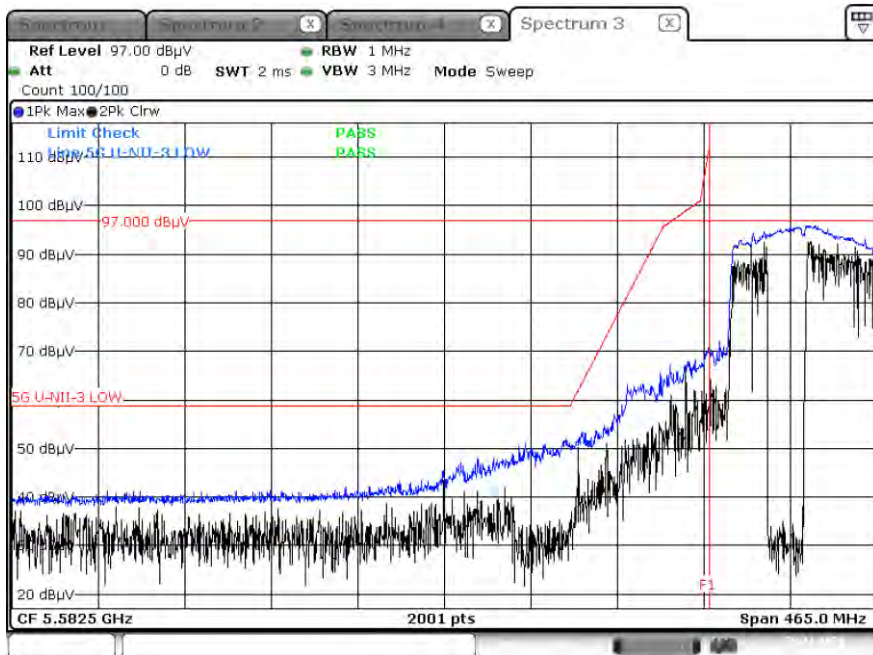
Peak Result (802.11n\_HT40, Ch.151, X-H)



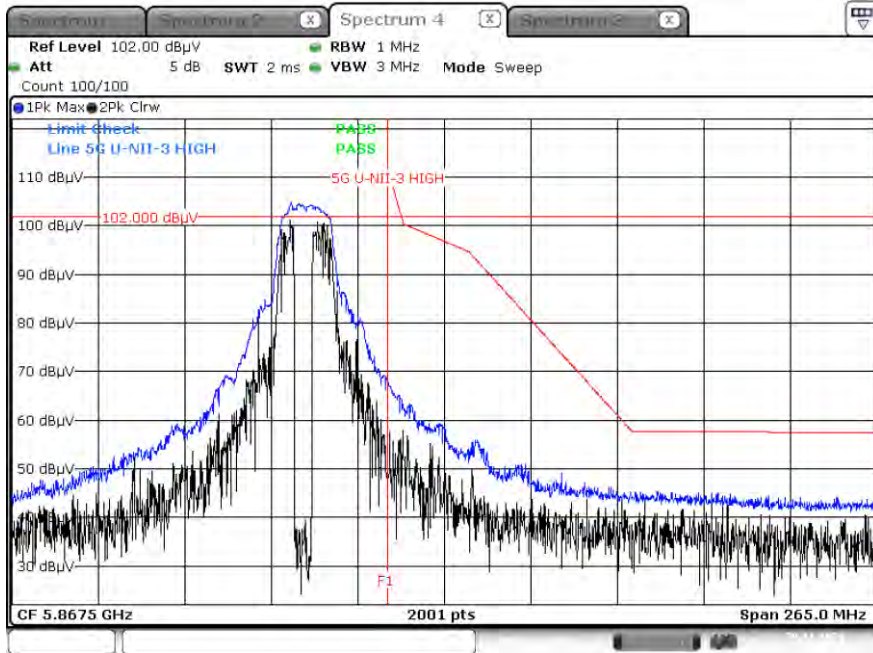
Peak Result (802.11ac\_VHT40, Ch.151, X-H)



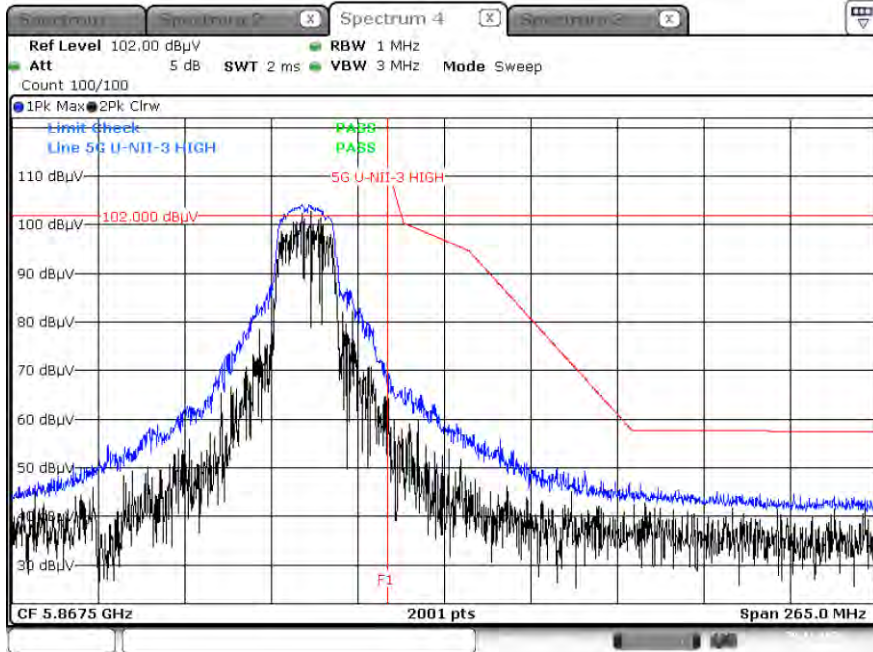
Peak Result (802.11ac\_VHT80, Ch.155, X-H)



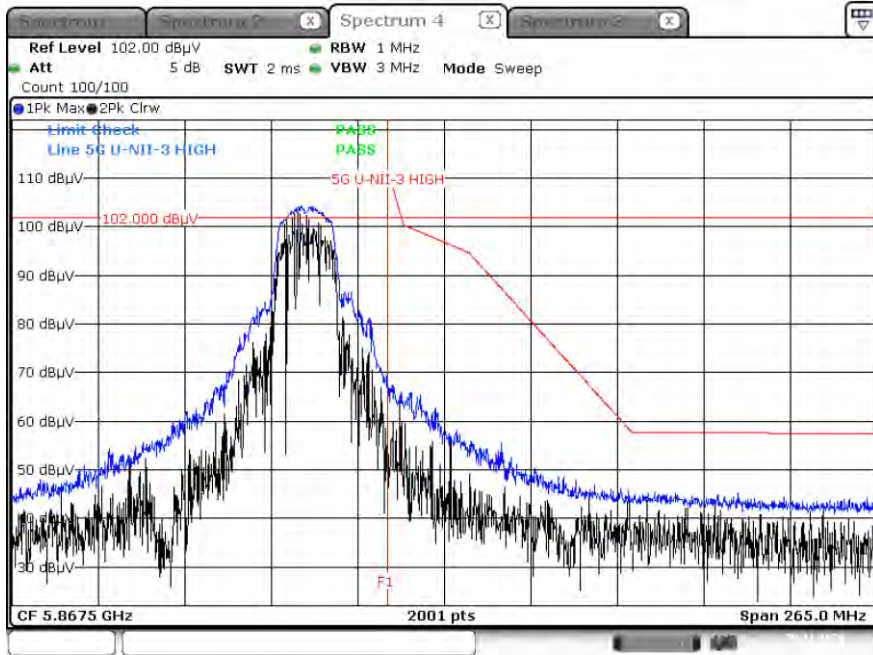
Peak Result (802.11a, Ch.165, X-H)



Peak Result (802.11n\_HT20, Ch.165, X-H)



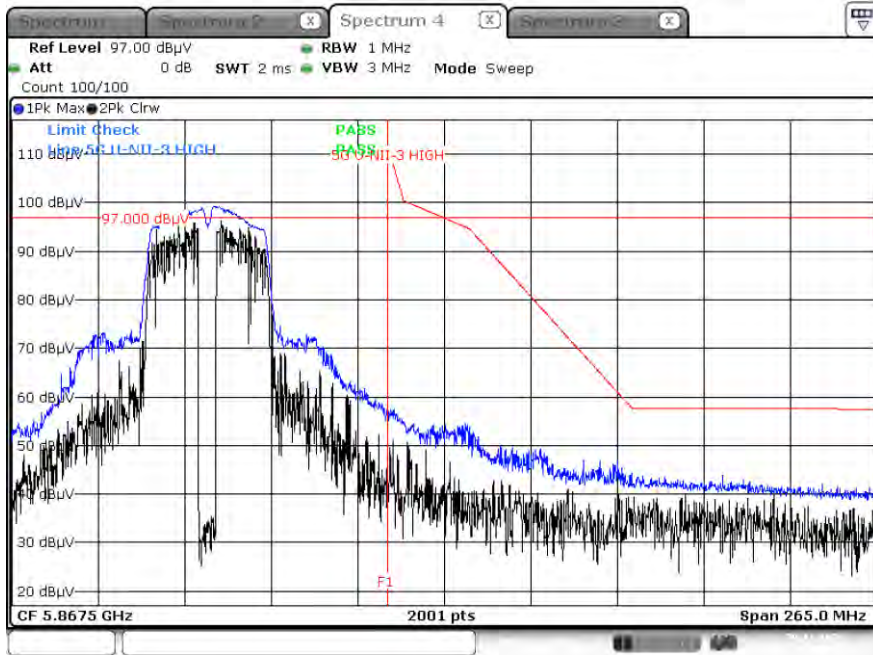
Peak Result (802.11ac\_VHT20, Ch.165, X-H)



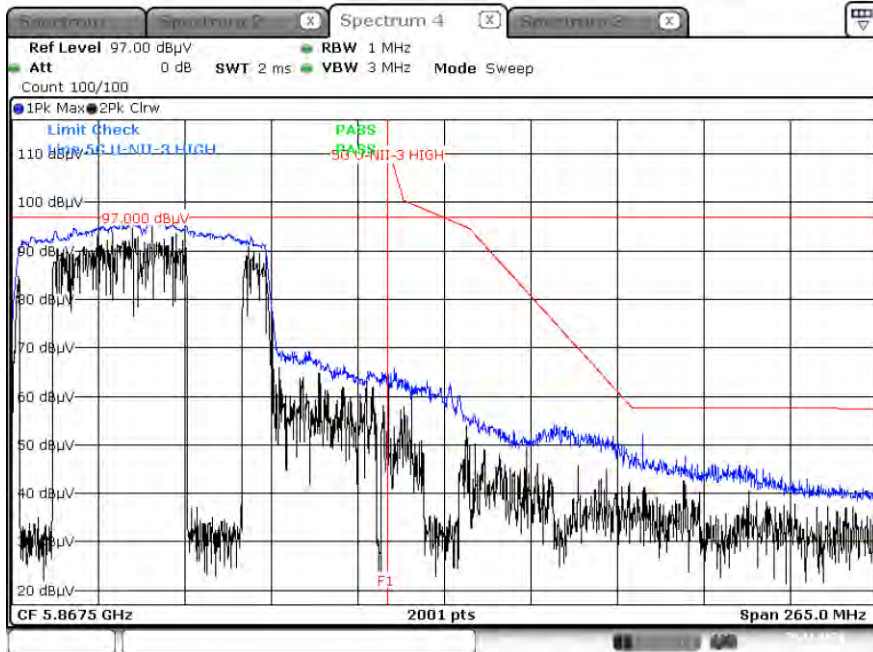
Peak Result (802.11n\_HT40, Ch.159, X-H)



Peak Result (802.11ac\_VHT40, Ch.159, X-H)



Peak Result (802.11ac\_VHT80, Ch.155, X-H)



**Note :**

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

**10.10 POWERLINE CONDUCTED EMISSIONS**

**Conducted Emissions**

WLAN 5G MODE

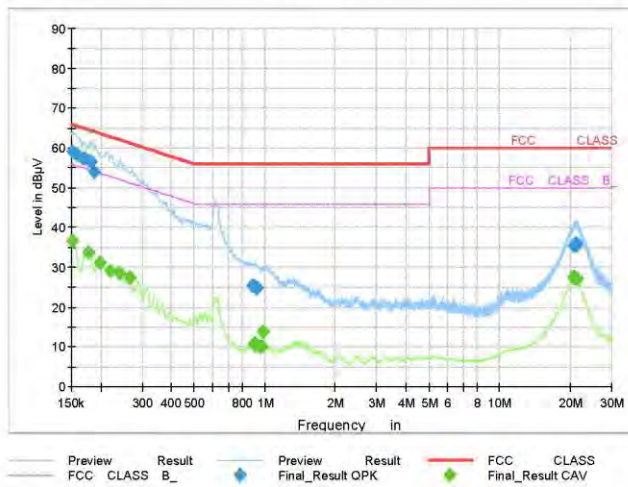
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**Test Report**

**Common Information**

EUT : SM-M156B/DSN  
Operating Conditions : WLAN 5G MODE

Full Spectrum



**Final Result QPK**

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1523	59.13	65.88	6.74	9,000	N	9.7
0.1568	58.66	65.63	6.97	9,000	N	9.7
0.1680	57.40	65.06	7.66	9,000	N	9.7
0.1725	57.36	64.84	7.48	9,000	N	9.7
0.1815	56.47	64.42	7.95	9,000	N	9.7
0.1883	53.83	64.11	10.28	9,000	N	9.7
0.8893	25.46	56.00	30.54	9,000	N	9.8
0.8938	25.29	56.00	30.71	9,000	N	9.8
0.9028	25.18	56.00	30.82	9,000	N	9.8
0.9095	25.20	56.00	30.80	9,000	N	9.8
0.9208	24.85	56.00	31.15	9,000	N	9.8
0.9298	24.75	56.00	31.25	9,000	N	9.8
20.7793	35.44	60.00	24.56	9,000	L1	10.9
20.8040	35.40	60.00	24.60	9,000	L1	10.9
21.1415	35.52	60.00	24.48	9,000	L1	10.9
21.1640	35.61	60.00	24.39	9,000	L1	10.9
21.1888	35.96	60.00	24.04	9,000	L1	10.9
21.2135	35.59	60.00	24.41	9,000	L1	10.9

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WLAN 5G MODE

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**Final Result CAV**

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1523	36.50	55.88	19.37	9.000	N	9.7
0.1770	33.86	54.63	20.76	9.000	N	9.7
0.1995	31.04	53.63	22.59	9.000	N	9.7
0.2198	29.03	52.83	23.79	9.000	N	9.7
0.2400	28.46	52.10	23.63	9.000	L1	9.7
0.2648	27.51	51.28	23.77	9.000	L1	9.7
0.8983	10.68	46.00	35.32	9.000	L1	9.8
0.9095	10.83	46.00	35.17	9.000	L1	9.8
0.9208	10.45	46.00	35.55	9.000	L1	9.8
0.9590	10.13	46.00	35.87	9.000	L1	9.8
0.9725	10.11	46.00	35.89	9.000	L1	9.8
0.9860	13.87	46.00	32.13	9.000	L1	9.8
20.7658	27.47	50.00	22.53	9.000	L1	10.9
20.7905	27.57	50.00	22.43	9.000	L1	10.9
20.9098	27.35	50.00	22.65	9.000	L1	10.9
20.9345	27.48	50.00	22.52	9.000	L1	10.9
21.4880	27.05	50.00	22.95	9.000	L1	10.9
21.5015	27.00	50.00	23.00	9.000	L1	10.9

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## 11. LIST OF TEST EQUIPMENT

### Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	08/02/2024	Annual
EMI Test Receiver	ESR	Rohde & Schwarz	101910	05/26/2024	Annual
Temperature Chamber	SU-642	ESPEC	0093008124	02/22/2024	Annual
Signal Analyzer	N9030A	Agilent	MY49432108	03/02/2024	Annual
Power Measurement Set	OSP 120	Rohde & Schwarz	101231	06/09/2024	Annual
Power Meter	N1911A	Agilent	MY45100523	03/06/2024	Annual
Power Sensor	N1921A	Agilent	MY57820067	03/06/2024	Annual
Directional Coupler	87300B	Agilent	3116A03621	10/30/2024	Annual
Power Splitter	11667B	Hewlett Packard	10545	02/06/2024	Annual
DC Power Supply	E3632A	Agilent	KR75303243	04/24/2024	Annual
Attenuator(10 dB)(DC-26.5 GHz)	8493C	HP	07560	06/12/2024	Annual
Attenuator(10 dB)(DC-26.5 GHz)	8493C	HP	08285	06/02/2024	Annual
Attenuator(20 dB)	18N-20dB	Rohde & Schwarz	8	03/08/2024	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A
FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	HCT CO., LTD.	N/A	N/A	N/A
Bluetooth Tester	CBT	Rohde & Schwarz	100752	01/12/2024	Annual

### Note:

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



**Radiated Test**

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller(Antenna mast)	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	N/A	N/A	N/A
EM1000 / Controller	EM1000	Audix	060520	N/A	N/A
Turn Table	N/A	Audix	N/A	N/A	N/A
Amp & Filter Bank Switch Controller	FBSM-01B	T&M system	TM19050002	N/A	N/A
Loop Antenna	1513	Schwarzbeck	1513-333	03/17/2024	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	08/16/2024	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1300	01/18/2024	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-2296	05/18/2024	Biennial
Horn Antenna(15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170342	09/29/2024	Biennial
Spectrum Analyzer	FSV(10 Hz ~ 40 GHz)	Rohde & Schwarz	101055	05/12/2024	Annual
Band Reject Filter	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments	2	01/05/2024	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	5	06/12/2024	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	6	06/12/2024	Annual
High Pass Filter(7 GHz ~ 18 GHz)	WHKX10-7150-8000-18000-50SS	Wainwright Instruments	1	03/02/2024	Annual
Power Amplifier	CBL18265035	CERNEX	22966	11/17/2024	Annual
Power Amplifier	CBL26405040	CERNEX	25956	03/02/2024	Annual
Bluetooth Tester	TC-3000C	TESCOM	3000C000175	03/28/2024	Annual
RF Switching System	FMSR-05B (HPF(3~18GHz) + LNA1(1~18GHz))	T&M system	S1L1	01/17/2024	Annual
RF Switching System	FMSR -05B (ATT(10dB) + LNA1(1~18GHz))	T&M system	S1L2	01/17/2024	Annual
RF Switching System	FMSR -05B (ATT(3dB) + LNA1(1~18GHz))	T&M system	S1L3	01/17/2024	Annual
RF Switching System	FMSR -05B (LNA1(1~18GHz))	T&M system	S1L4	01/17/2024	Annual
RF Switching System	FMSR -05B (HPF(7~18GHz) + LNA2(6~18GHz))	T&M system	S1L5	01/17/2024	Annual
RF Switching System	FMSR -05B (Thru(30MHz ~ 18GHz))	T&M system	S1L6	01/17/2024	Annual

**Note:**

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

**12. ANNEX A\_ TEST SETUP PHOTO**

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

<b>No.</b>	<b>Description</b>
1	HCT-RF-2312-FC003-P