Engineering Solutions & Electromagnetic Compatibility Services

Certification Application Report
FCC Part 15.407 & ISED RSS-247

Test Lab:		Applicant:	
Rhein Tech Laboratories, Inc. Phone: 703-689 0368 360 Herndon Parkway www.rheintech.com Suite 1400 Herndon, VA 20170 E-Mail: atcbinfo@rheintech.com		Harris Corporation 221 Jefferson Ridge Parkway Lynchburg, VA 24501 USA	
FCC ID/ IC	OWDTR-0161-E/ 3636B-0161	**Test Report Date**	September 23, 2019
Platform	N/A	**RTL Work Order #**	2019062
Model **Model #/HVIN**	XL-200M XZ-MPM1M	**RTL Quote Number**	QRTL19-062A
American National Standard Institute	ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices		
FCC Classification	NII-Unlicensed National Information Infrastructure TX		
FCC Rule Part(s)	FCC Rules Part 15.407: Unlicensed National Information Infrastructure Devices - General Technical Requirements (10/01/18)		
ISED Standards	RSS-247 Issue 2: Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices RSS-Gen Issue 5: General Requirements for Compliance of Radio Apparatus		
Digital Interface Information	Digital Interface was found to be compliant		
Frequency Range (MHz)	**Output Power (mW) Peak Conducted**	**Frequency Tolerance**	**Emission Designator**
5170 – 5240	3.2	N/A	17M5G7D
5745 – 5825	2.9	N/A	17M5G7D

I, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this test report. No modifications were made to the equipment during testing in order to achieve compliance with these standards. Furthermore, there was no deviation from, additions to, or exclusions from, the applicable parts of FCC Part 2, FCC Part 15, ANSI C63.10, and ISED RSS-247 and RSS-Gen.

Signature: _____ Date: September 23, 2019

Typed/Printed Name: Desmond A. Fraser Position: President

These tests are accredited and meet the requirements of ISO/IEC 17025 as verified by ANAB. Refer to certificate and scope of accreditation AT-1445. This report replaces DRAFT R0.1.

This report may not be reproduced, except in full, without the written approval of Rhein Tech Laboratories, Inc. and Harris Corporation. The test results relate only to the item(s) tested.

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1 General Information

1.1 Scope

Applicable Standards

- FCC Rules Part 15.407: Unlicensed National Information Infrastructure Devices - General Technical Requirements
- ISED RSS-247: Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
- ISED RSS-Gen Issue 5: General Requirements for Compliance of Radio Apparatus

1.2 Description of EUT

Equipment Under Test	Mobile Radio
Model / Model #	XL-200M / XZ-MPM1M
Power Supply	13.6 VDC
Modulation Type	OFDM (802.11 a)
Frequency Range	5170 – 5240 MHz 5745 – 5825 MHz

1.3 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located at 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. This site has been fully described in a report and approved by the Federal Communications Commission to perform AC line conducted and radiated emissions testing (ANSI C63.10-2013).

1.4 Related Submittal(s)/Grant(s)

This is an original certification application for Harris Corporation Model XL-200M Multi-Band Mobile, VL/V/U/7/8/9, Model #/HVIN: XZ-MPM1M, FCC ID: OWDTR-0161-E, IC: 3636B-0161.

1.5 Modifications

No modifications were required for compliance.

2 Test Information

2.1 Description of Test Modes

In accordance with FCC 15.31(m), and because the EUT utilizes an operating band greater than 10 MHz, the following frequencies were tested.

Table 2-1: Channels Tested for Wi-Fi 802.11a

Channel (#)	Frequency (MHz)
34 (U-NII1)	5170
36 (U-NII1)	5180
38 (U-NII1)	5190
40 (U-NII1)	5200
42 (U-NII1)	5210
44 (U-NII1)	5220
46 (U-NII1)	5230
48 (U-NII1)	5240
149 (U-NII3)	5745
151 (U-NII3)	5755
153 (U-NII3)	5765
155 (U-NII3)	5775
157 (U-NII3)	5785
159 (U-NII3)	5795
161 (U-NII3)	5805
165 (U-NII3)	5825

2.2 Exercising the EUT

The EUT was tested in all three orthogonal planes in order to determine worst-case emissions. The EUT was provided with software to continuously transmit during testing. The carrier was also checked to verify that information was being transmitted, and all modes were investigated and the worst-case mode was used for final testing. There were no deviations from the test standard(s) and/or methods. The test results reported relate only to the item tested.

2.3 Test Result Summary

Table 2-2: Test Result Summary – FCC Part 15, Subpart C (Section 15.407); ISED RSS-247, RSS-Gen

FCC	ISED	Test	Result
FCC 15.207	RSS-Gen 8.8	AC Conducted Emissions	N/A
FCC 15.209	RSS-247 6.2; RSS-Gen 6.13	Radiated Emissions	Pass
FCC 15.407(a/1/3)	RSS-247 6.2; RSS-Gen 6.12	Maximum Peak Power Output	Pass
FCC 15.407(a/1/3)	RSS-247 6.2	Power Spectral Density	Pass
FCC 15.407(g)	RSS-Gen 6.11	Frequency Stability	N/A
FCC 15.407(b)(7)	RSS-247 6.2	Band Edge Measurement	Pass
FCC 15.407(b)(6)	RSS-247 6.2	Antenna Conducted Spurious Emissions	Pass
FCC 15.407(a) and (e)	RSS-247 6.2	26 dB and 6dB Bandwidth	Pass
N/A	RSS-Gen 6.7/ TRC-43	99% Bandwidth	Pass

2.4 Tested System Details

The test samples were received on September 4, 2018. The FCC identifiers for all applicable equipment, plus descriptions of all cables used in the tested system, are identified in the following tables.

Table 2-3: Equipment Under Test (EUT)

Part	Manufacturer	Model/ HVIN	Serial Number	FCC ID	RTL Bar Code
Vehicular Communication Hub (VCH)	Harris Corporation	XL-200M / XZ-MPM1M	048	OWDTR-0161-E	23081
Control Head	Harris Corporation	XL-CH Mobile Control Head/ N/A	085	OWDTR-0161-E	23080

Table 2-4: Support Equipment

Part	Manufacturer	Model	PN/SN	FCC ID	RTL Bar Code
Laptop	ASUS	N550J	F2N0CY33003067G	N/A	N/A

Table 2-5: Auxiliary Equipment

Part	Manufacturer	Model	PN/SN	FCC ID	RTL Bar Code
USB Mobile Mic	N/A	USB Mobile Mic	14050-6010-01/V22e	N/A	22756
Remote Speaker	N/A	Remote Speaker	14050-6100-01	N/A	N/A
Analog Deskmic	N/A	Analog Deskmic	MC-014121-003	N/A	N/A
CH Mounting Kit	N/A	CH Mounting Kit	14050-6210-01	N/A	N/A
VCH Mounting Kit	N/A	VCH Mounting Kit	14050-6200-01	N/A	N/A
Ethernet Cable, overmold, 45cm	N/A	N/A	14050-6300-01	N/A	N/A
Ethernet Cable, overmold, 9m	N/A	N/A	14050-6300-02	N/A	N/A
DC power cables (CH)	N/A	N/A	CA-012616-001	N/A	N/A
DC power cables (VCH)	N/A	N/A	CA-012365-001	N/A	N/A

2.5 Configuration of Tested System

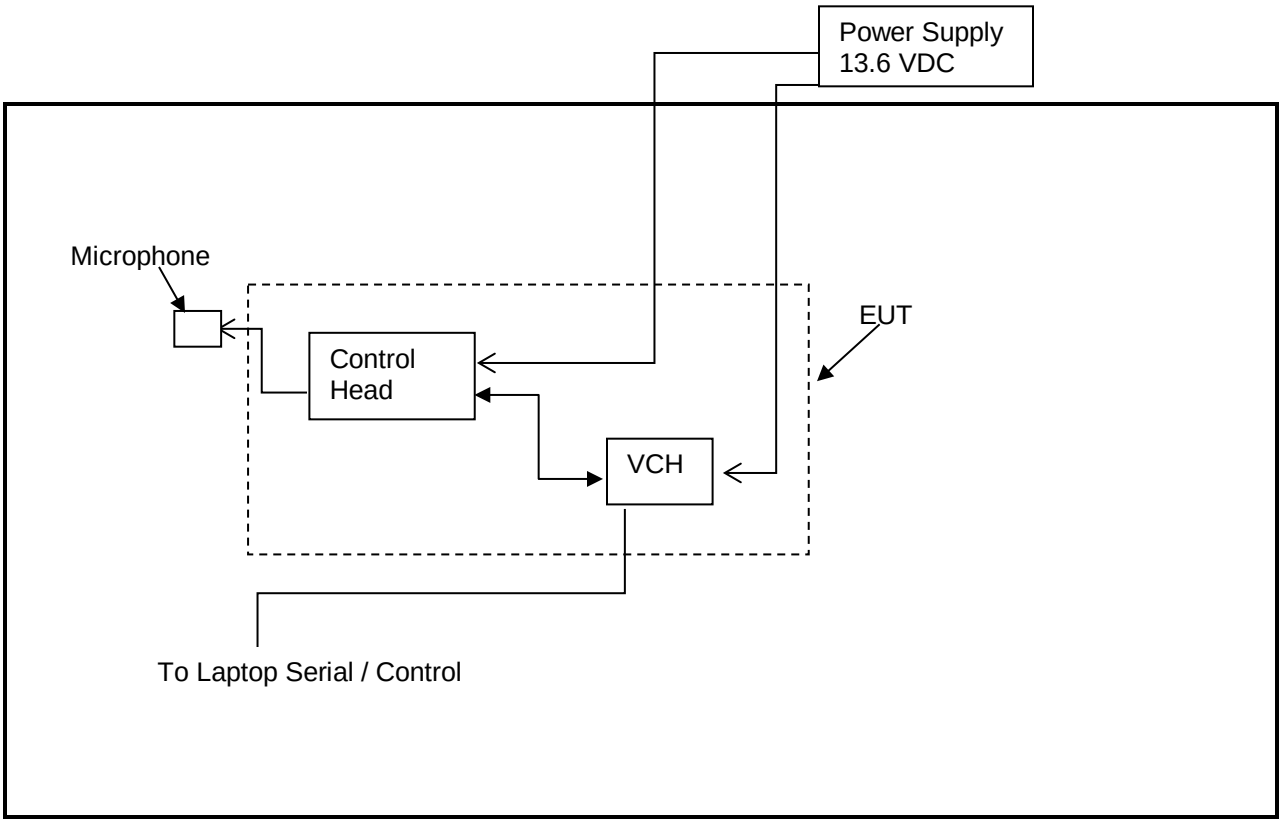


Figure 2-1: Configuration of System Under Test

3 Peak Output Power – FCC 15.407(a/1/3); RSS-247 6.2, RSS-Gen 6.12

3.1 Power Output Test Procedure

A conducted power measurement of the EUT was taken using an Agilent Analyzer with a 50 ohm attenuator.

Table 3-1: Power Output Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901583	Agilent Technologies	N9010A	EXA Signal Analyzer (10 Hz-26.5 GHz)	MY51250846	2/6/20

3.2 Power Output Test Results

Table 3-2: Power Output Test Data – U-NII1 – 802.11a (58.5 Mbps)

Channel (#)	Frequency (MHz)	Conducted Peak Power (dBm)	Limit (dBm)	Margin (dB)
34	5170	5.0	30.0	-25.0
40	5200	4.4	30.0	-25.6
48	5240	5.1	30.0	-24.9

Table 3-3: Power Output Test Data – U-NII3 – 802.11a (58.5 Mbps)

Channel (#)	Frequency (MHz)	Conducted Peak Power (dBm)	Limit (dBm)	Margin (dB)
149	5745	4.6	30.0	-25.4
157	5785	4.4	30.0	-25.6
165	5825	3.8	30.0	-26.2

Note: EUT was programmed to TX with 58.5 Mbps rate, 20 MHz bandwidth and 10 dBm power level for all three test frequencies.

Highest conducted peak power measured: 5.1 dBm ≈ 3.2 mW for U-NII1
4.6 dBm ≈ 2.9 mW for U-NII3

$P(Watts) = 10^{(dBm / 10)} / 1000$

Measurement uncertainty: ±0.5 dB. This measurement uncertainty is an expanded uncertainty for 95% confidence level received with a coverage factor k=2.

<u>Results: Pass</u>

Test Personnel:

Khue Do		September 13, 2018
Test Engineer	Signature	Date of Test

4 Compliance with the Band Edge – FCC 15.407(b)(7); RSS-247 6.2

4.1 Band Edge Test Procedure

The transmitter output was connected to its appropriate antenna. 1 MHz integrated peak (100 kHz RBW/300 kHz VBW) and 1 MHz integrated average (100 MHz RBW/300 kHz VBW) corrected measurements were taken within the restricted band to show compliance.

Table 4-1: Band Edge Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901583	Agilent Technologies	N9010A	EXA Signal Analyzer (10 Hz-26.5 GHz)	MY51250846	02/06/20

4.2 Restricted Band Edge Test Results

Note: EUT was programmed to TX with 58.5 Mbps rate, 20 MHz bandwidth and 10 dBm power level for all three test frequencies.

Conversion of dBm to dBµV/m at 3 m.

dBµV/m = dBm + 104.7 – (20 * LOG(3m)) = dBm + 95.2

4.1 Band Edge Plots

Plot 4-1: Lower Band Edge – Average – U-NII1 – 802.11a (58.5 Mbps)

Table 4-2: Lower Band Edge Average – U-NII1 – 802.11a (58.5 Mbps)

Frequency (MHz)	Measured Average Level (dBm)	Field Strength Conversion (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)
5150	-59.0	36.2	54.0	-17.8

Plot 4-2: Lower Band Edge – Peak – U-NII1 – 802.11a (58.5 Mbps)

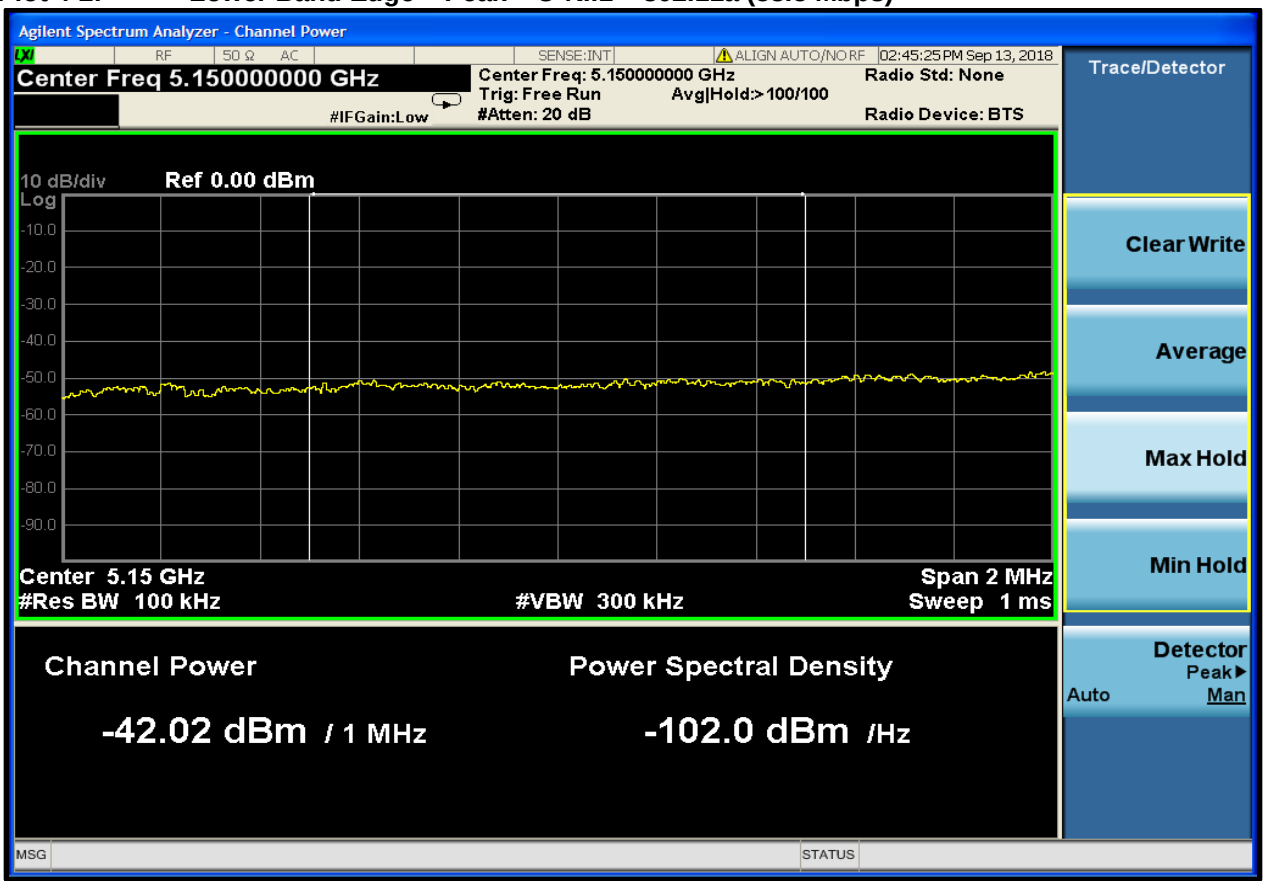


Table 4-3: Lower Band Edge Peak – U-NII1 – 802.11a (58.5 Mbps)

Frequency (MHz)	Measured Peak Level (dBm)	Field Strength Conversion (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)
5150	-42.0	53.2	74.0	-20.8

Plot 4-3: Upper Band Edge – Average – U-NII1 – 802.11a (58.5 Mbps)

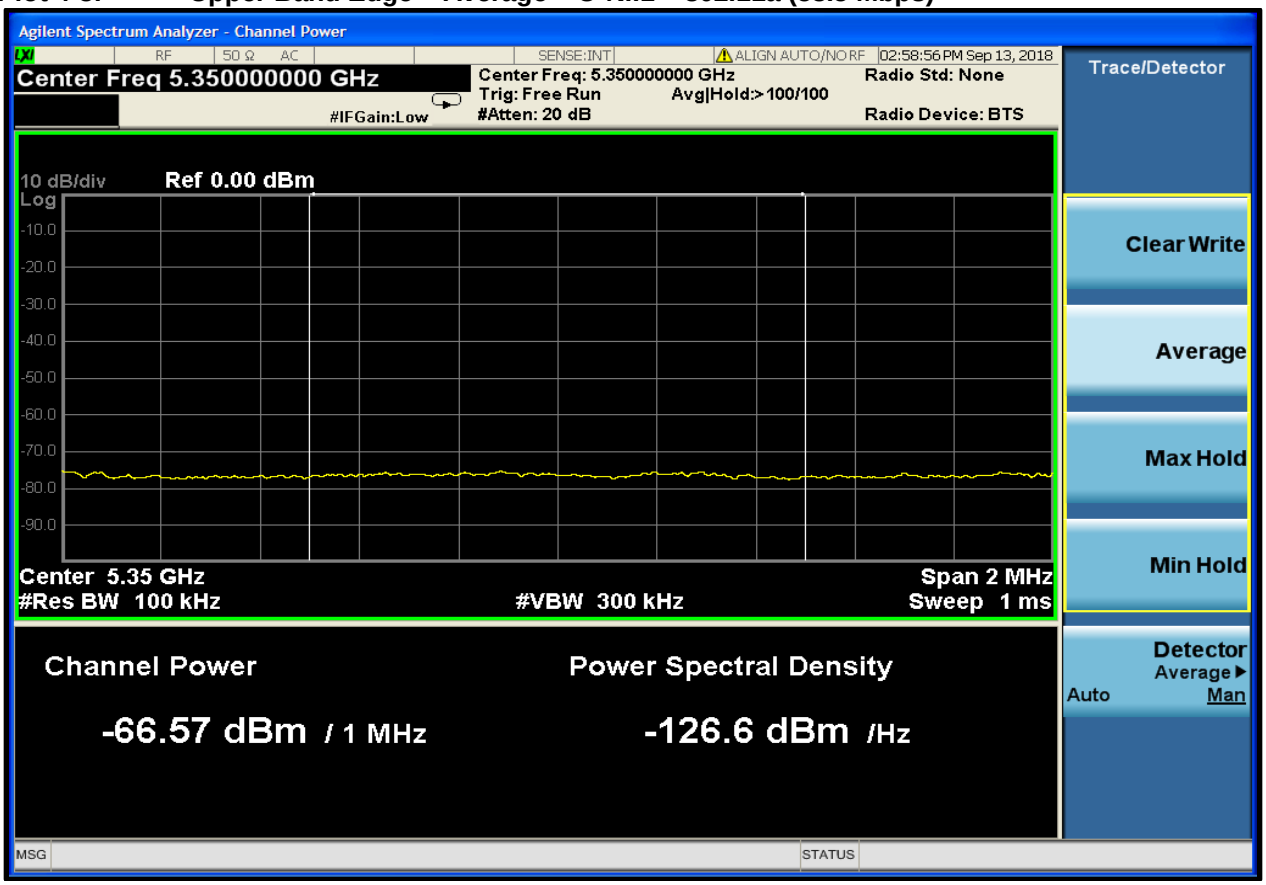


Table 4-4: Upper Band Edge Average – U-NII1 – 802.11a (58.5 Mbps)

Frequency (MHz)	Measured Average Level (dBm)	Field Strength Conversion (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)
5350	-66.6	28.6	54.0	-25.4

Plot 4-4: Upper Band Edge – Peak – U-NII1 – 802.11a (58.5 Mbps)

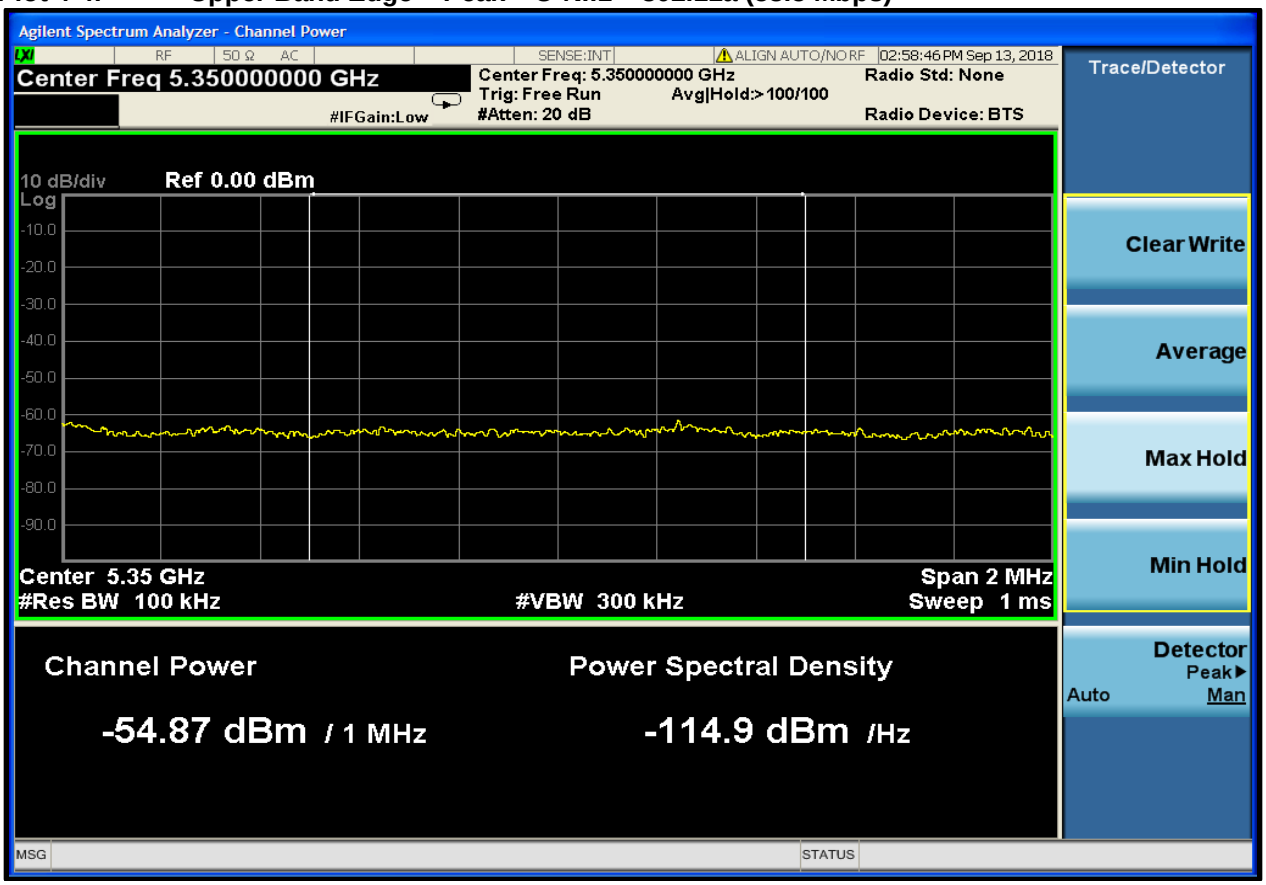
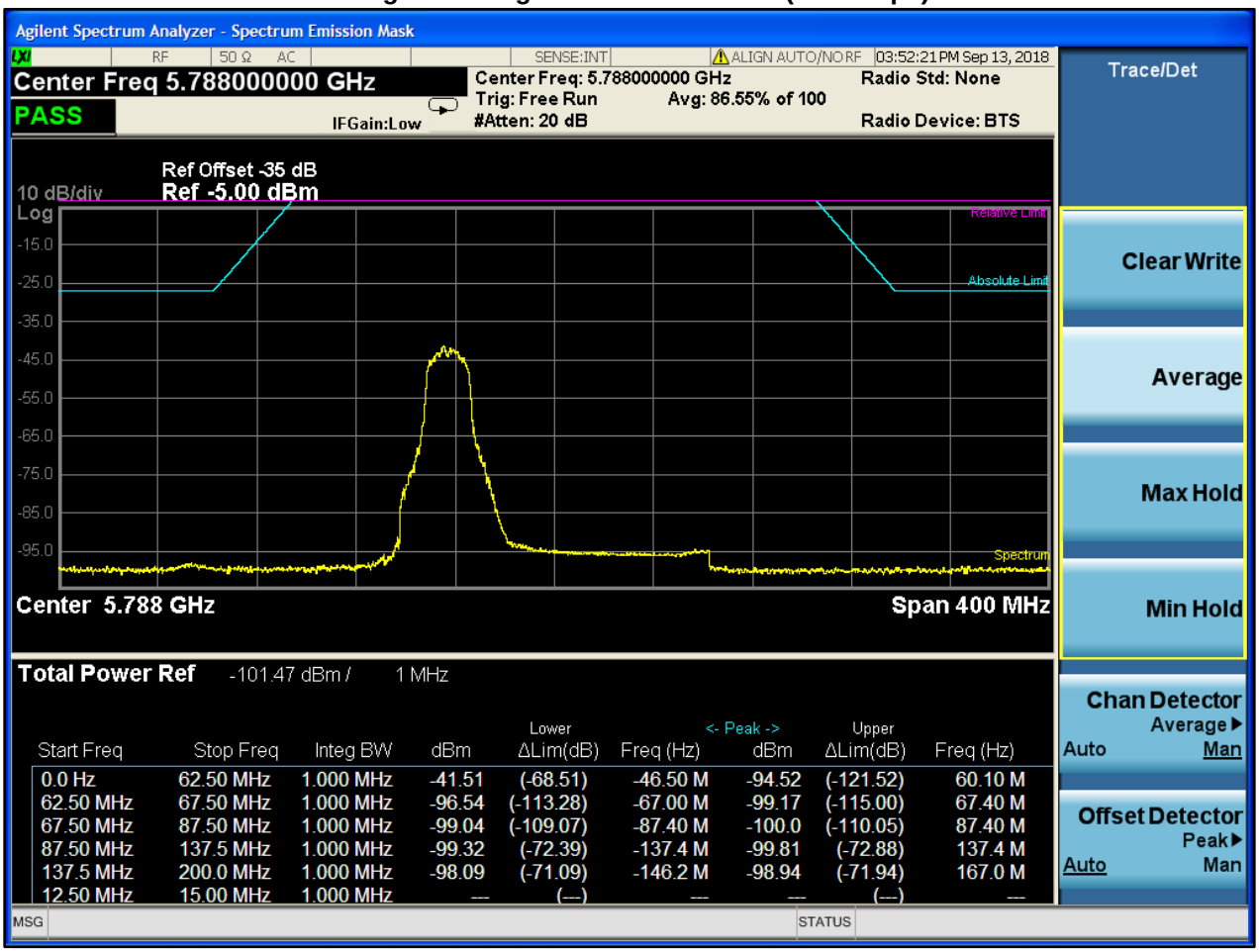


Table 4-5: Upper Band Edge Peak – U-NII1 – 802.11a (58.5 Mbps)

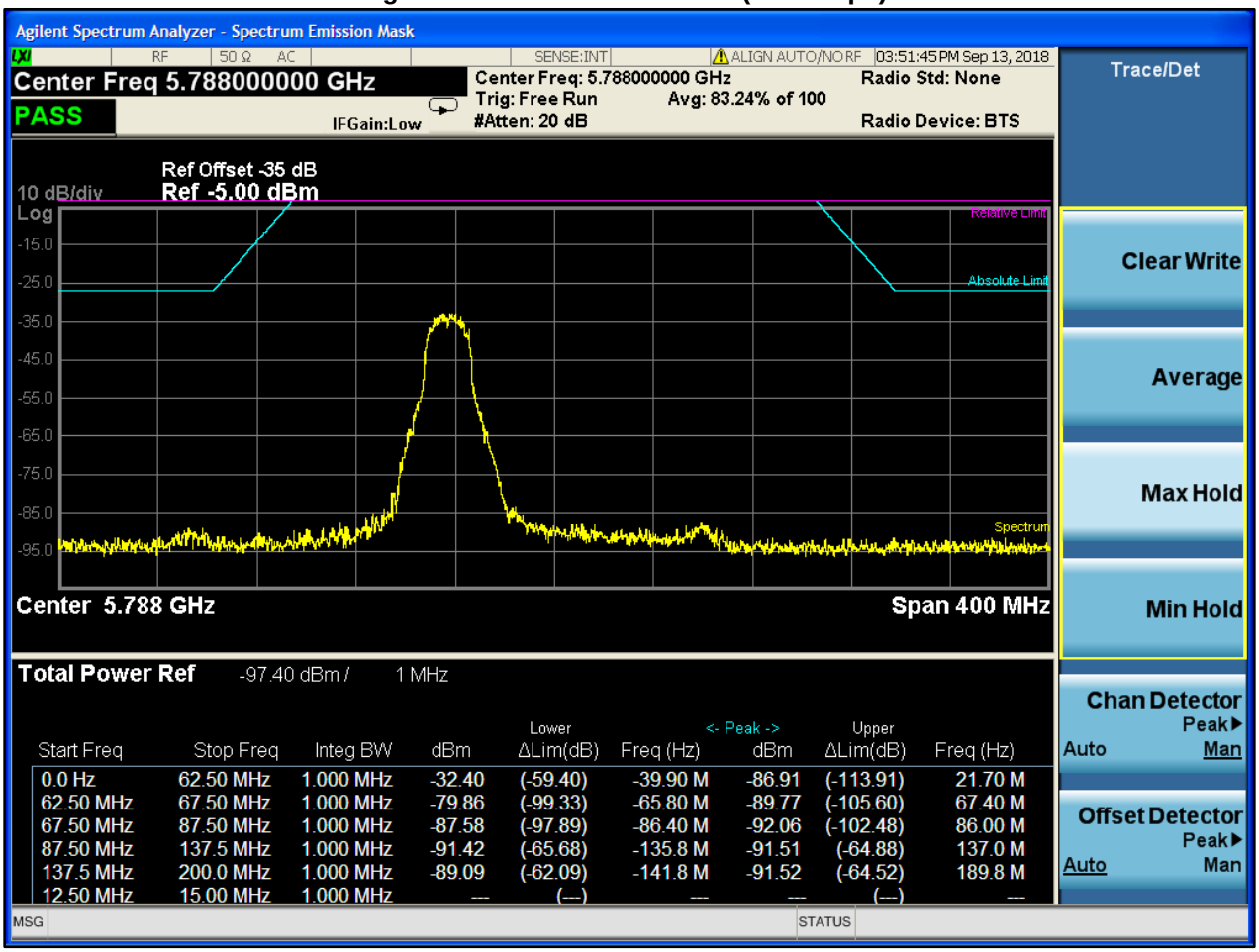
Frequency (MHz)	Measured Peak Level (dBm)	Field Strength Conversion (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)
5350	-54.9	40.3	74.0	-33.7

Plot 4-5: Lower Band Edge – Average – U-NII3 – 802.11a (58.5 Mbps)



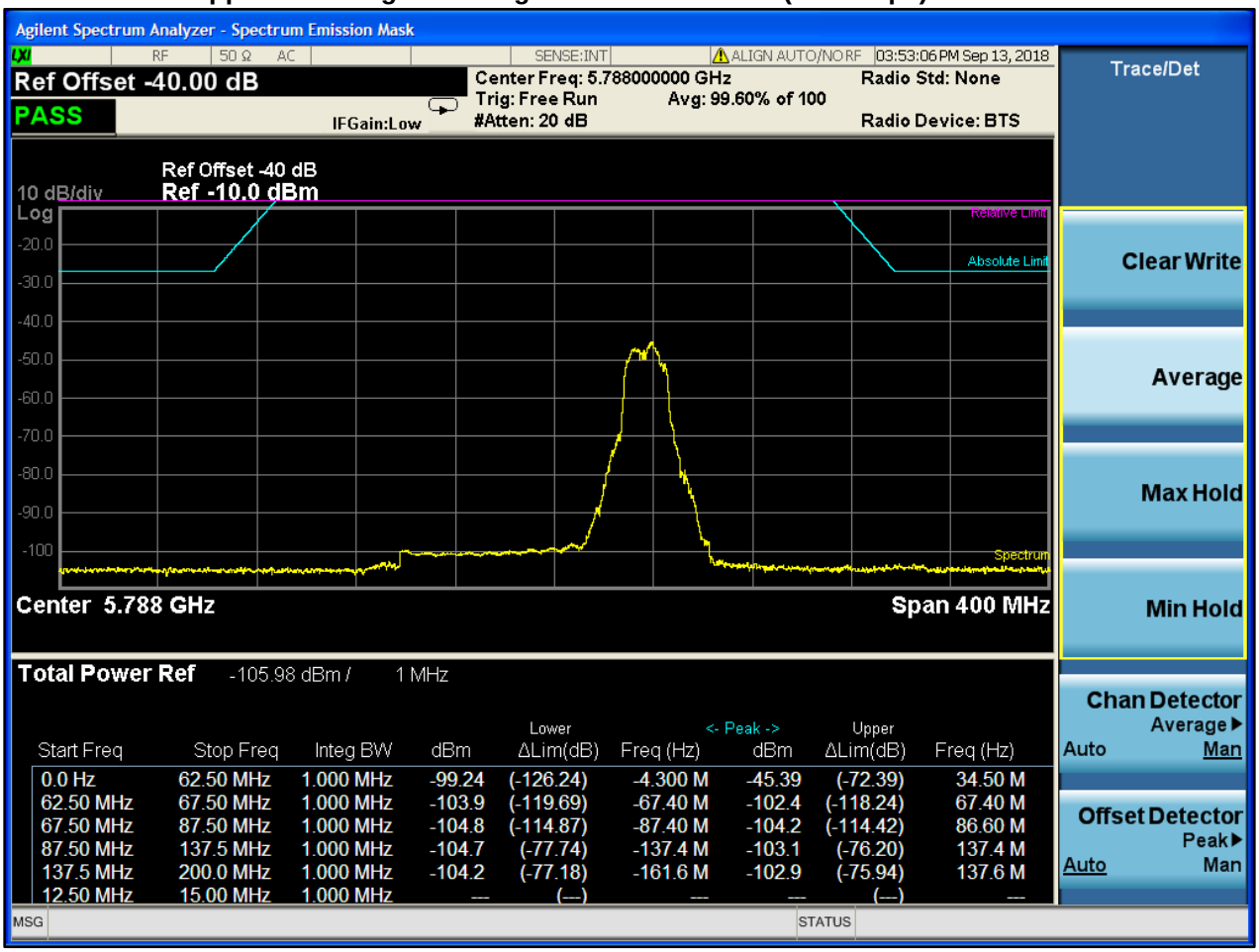
Start Freq	Stop Freq	Integ BW	dBm	Lower ΔLim(dB)	Freq (Hz)	<- Peak -> dBm	Upper ΔLim(dB)	Freq (Hz)
0.0 Hz	62.50 MHz	1.000 MHz	-41.51	(-68.51)	-46.50 M	-94.52	(-121.52)	60.10 M
62.50 MHz	67.50 MHz	1.000 MHz	-96.54	(-113.28)	-67.00 M	-99.17	(-115.00)	67.40 M
67.50 MHz	87.50 MHz	1.000 MHz	-99.04	(-109.07)	-87.40 M	-100.0	(-110.05)	87.40 M
87.50 MHz	137.5 MHz	1.000 MHz	-99.32	(-72.39)	-137.4 M	-99.81	(-72.88)	137.4 M
137.5 MHz	200.0 MHz	1.000 MHz	-98.09	(-71.09)	-146.2 M	-98.94	(-71.94)	167.0 M
12.50 MHz	15.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---

Plot 4-6: Lower Band Edge – Peak – U-NII3 – 802.11a (58.5 Mbps)

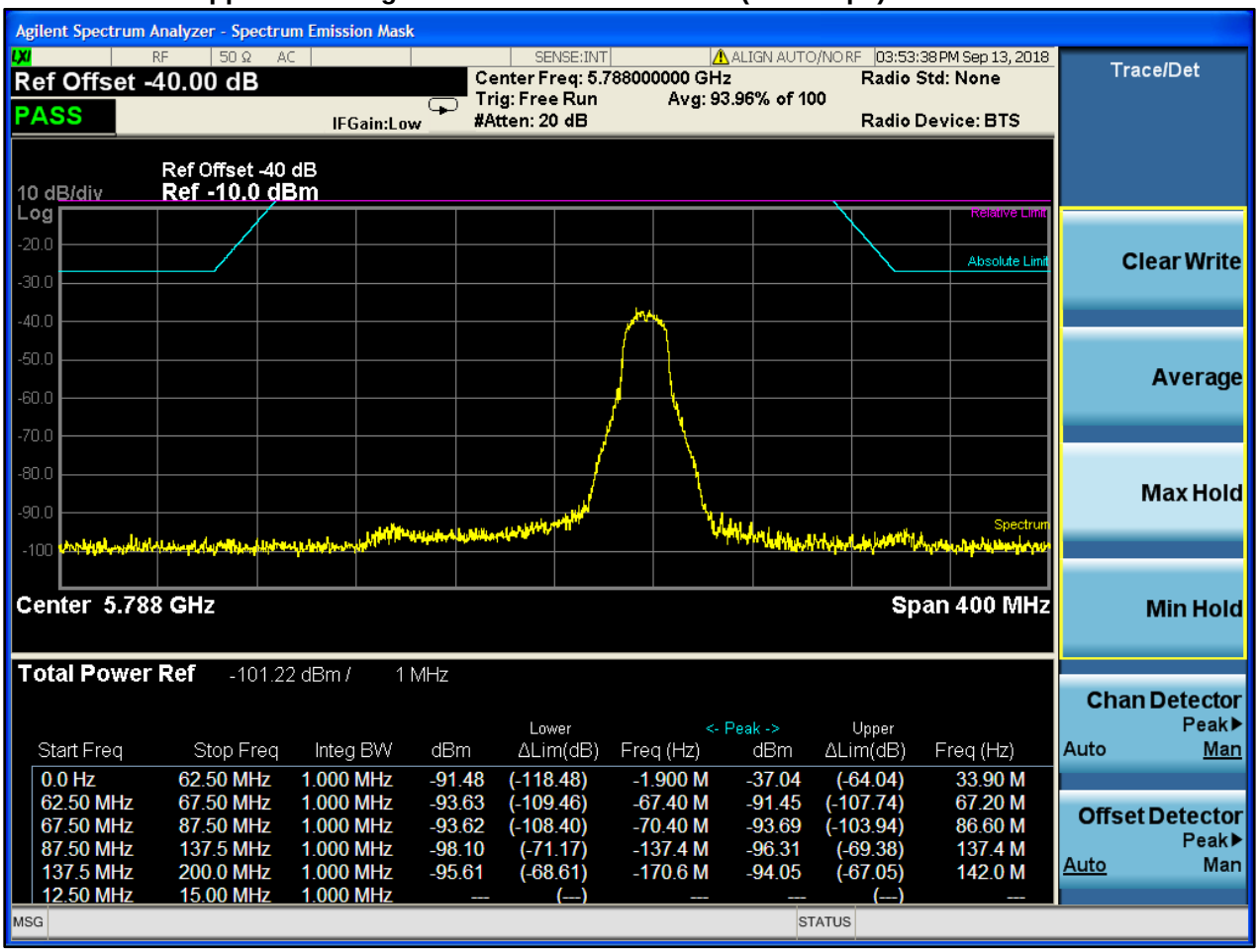


Start Freq	Stop Freq	Integ BW	dBm	Lower ΔLim(dB)	Freq (Hz)	<- Peak -> dBm	Upper ΔLim(dB)	Freq (Hz)
0.0 Hz	62.50 MHz	1.000 MHz	-32.40	(-59.40)	-39.90 M	-86.91	(-113.91)	21.70 M
62.50 MHz	67.50 MHz	1.000 MHz	-79.86	(-99.33)	-65.80 M	-89.77	(-105.60)	67.40 M
67.50 MHz	87.50 MHz	1.000 MHz	-87.58	(-97.89)	-86.40 M	-92.06	(-102.48)	86.00 M
87.50 MHz	137.5 MHz	1.000 MHz	-91.42	(-65.68)	-135.8 M	-91.51	(-64.88)	137.0 M
137.5 MHz	200.0 MHz	1.000 MHz	-89.09	(-62.09)	-141.8 M	-91.52	(-64.52)	189.8 M
12.50 MHz	15.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---

Plot 4-7: Upper Band Edge – Average – U-NII3 – 802.11a (58.5 Mbps)



Plot 4-8: Upper Band Edge – Peak – U-NII3 – 802.11a (58.5 Mbps)



Start Freq	Stop Freq	Integ BW	dBm	Lower ΔLim(dB)	Freq (Hz)	<- Peak -> dBm	Upper ΔLim(dB)	Freq (Hz)
0.0 Hz	62.50 MHz	1.000 MHz	-91.48	(-118.48)	-1.900 M	-37.04	(-64.04)	33.90 M
62.50 MHz	67.50 MHz	1.000 MHz	-93.63	(-109.46)	-67.40 M	-91.45	(-107.74)	67.20 M
67.50 MHz	87.50 MHz	1.000 MHz	-93.62	(-108.40)	-70.40 M	-93.69	(-103.94)	86.60 M
87.50 MHz	137.5 MHz	1.000 MHz	-98.10	(-71.17)	-137.4 M	-96.31	(-69.38)	137.4 M
137.5 MHz	200.0 MHz	1.000 MHz	-95.61	(-68.61)	-170.6 M	-94.05	(-67.05)	142.0 M
12.50 MHz	15.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---

Measurement uncertainty: ±0.5 dB. This measurement uncertainty is an expanded uncertainty for 95% confidence level received with a coverage factor k=2.

<u>Results: Pass</u>

Test Personnel:

Khue Do		September 13, 2018
Test Engineer	Signature	Date of Test

5 Antenna Conducted Spurious Emissions – FCC 15.407(b)(6); RSS-247 6.2

5.1 Antenna Conducted Spurious Emissions Test Procedures

Antenna conducted spurious emissions per FCC 15.407(b)(6) were measured from the EUT antenna port using a 50-ohm spectrum analyzer with the resolution bandwidth set at 1 MHz, and the video bandwidth set at > 3 x RBW.

5.2 Antenna Conducted Spurious Emissions Test Results

No harmonics or spurs were found within 20 dB (note that we are reporting power as peak) of the carrier level from the carrier to the 10th harmonic of the carrier frequency.

Table 5-1: Antenna Conducted Spurious Emissions Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901583	Agilent Technologies	N9010A	EXA Signal Analyzer (10 Hz-26.5 GHz)	MY51250846	2/6/20

Measurement uncertainty: ±0.5 dB. This measurement uncertainty is an expanded uncertainty for 95% confidence level received with a coverage factor k=2.

<u>Results: Pass</u>

Test Personnel:

Khue Do		September 13 – 14, 2018
Test Engineer	Signature	Dates of Test

6 Bandwidths – FCC 15.407(a) and (e); RSS-247 6.2; RSS-Gen 6.7

6.1 Bandwidth Test Procedure

The minimum 6 dB, 26 dB and 99% bandwidths per FCC 15.407(a) and (e), RSS-247 6.2 and RSS-Gen 6.7 were measured using a 50-ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at ≥ 3 x RBW. The device was modulated, (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

Table 6-1: Bandwidth Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901583	Agilent Technologies	N9010A	EXA Signal Analyzer (10 Hz-26.5 GHz)	MY51250846	2/6/20

6.2 Modulated Bandwidth Test Results

Note: EUT was programmed to TX with 58.5 Mbps rate for all three test frequencies.

Table 6-2: Modulated Bandwidth Test Data – U-NII1 – 802.11a (58.5 Mbps)

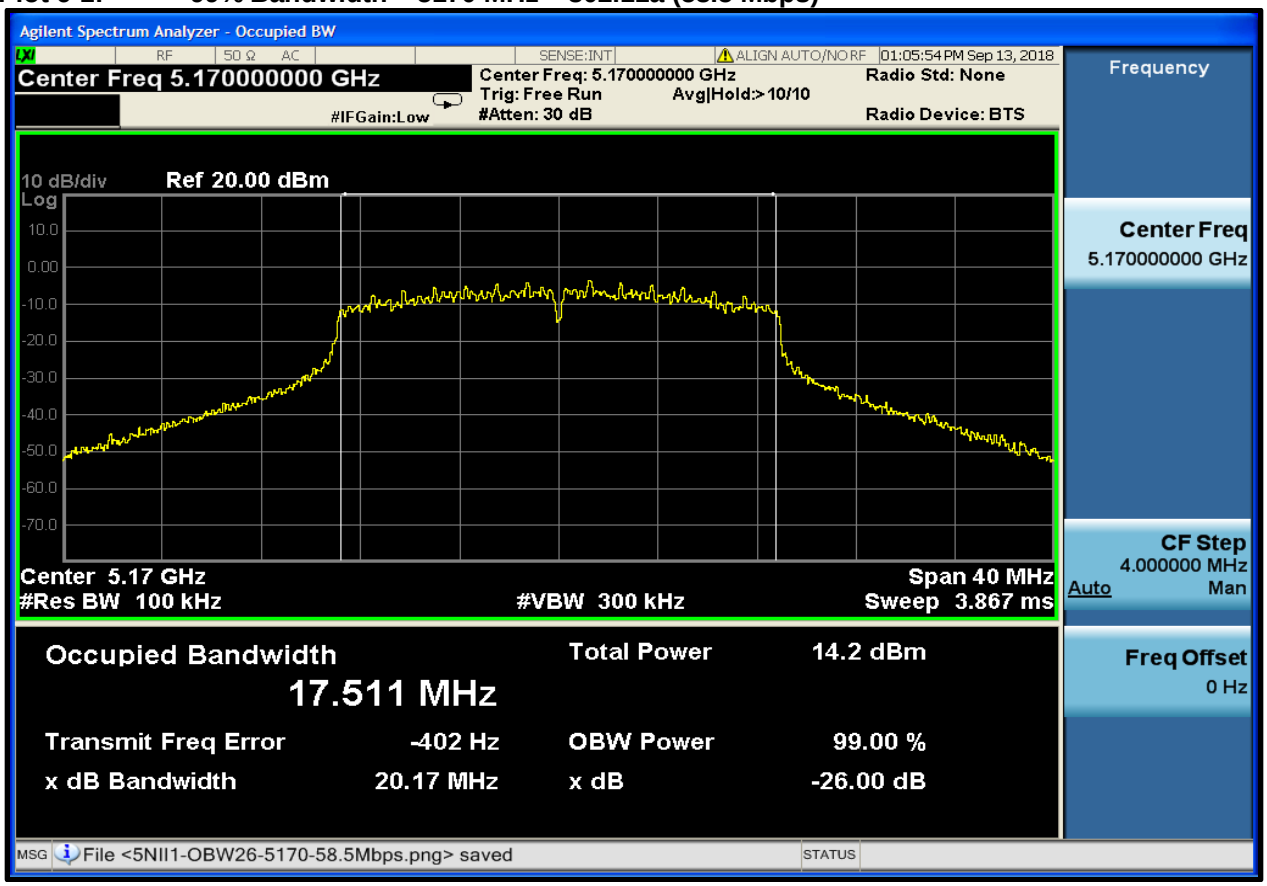
Channel (#)	Frequency (MHz)	99% Bandwidth (MHz)
34	5170	17.511
40	5200	17.479
48	5240	17.503

Table 6-3: Modulated Bandwidth Test Data – U-NII3 – 802.11a (58.5 Mbps)

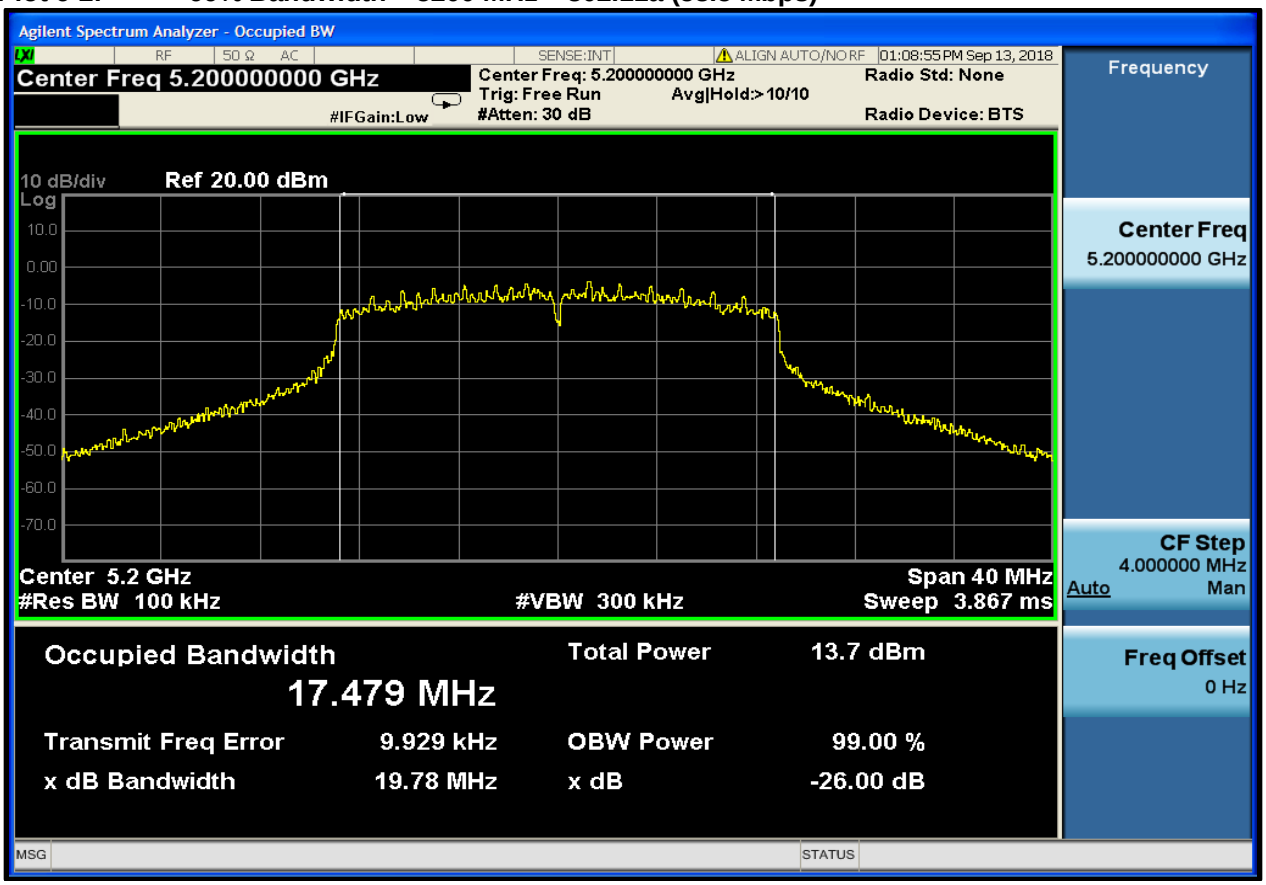
Channel (#)	Frequency (MHz)	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)
149	5745	15.13	17.512
157	5785	15.15	17.505
165	5825	15.44	17.520

6.3 Bandwidth Plots – U-NII1

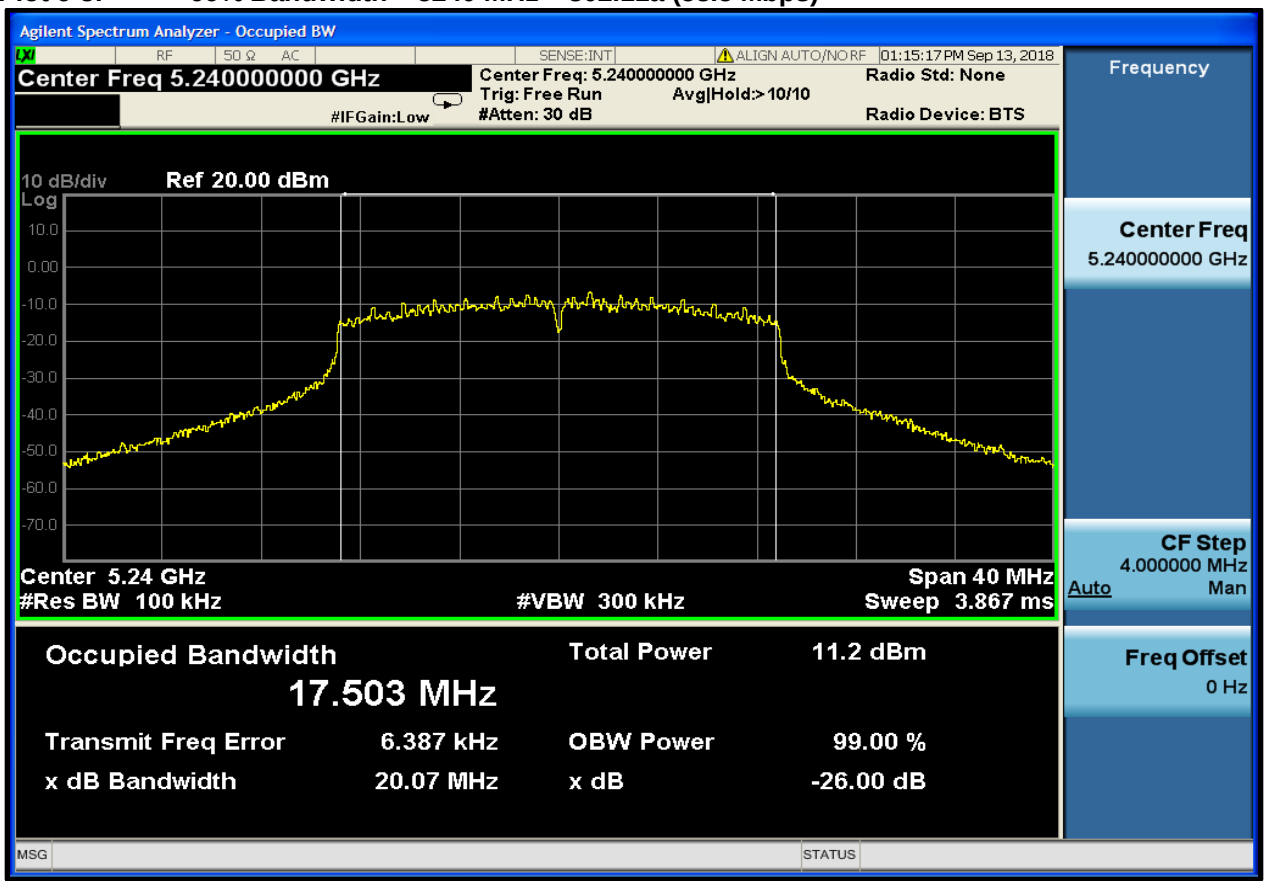
Plot 6-1: 99% Bandwidth – 5170 MHz – 802.11a (58.5 Mbps)



Plot 6-2: 99% Bandwidth – 5200 MHz – 802.11a (58.5 Mbps)

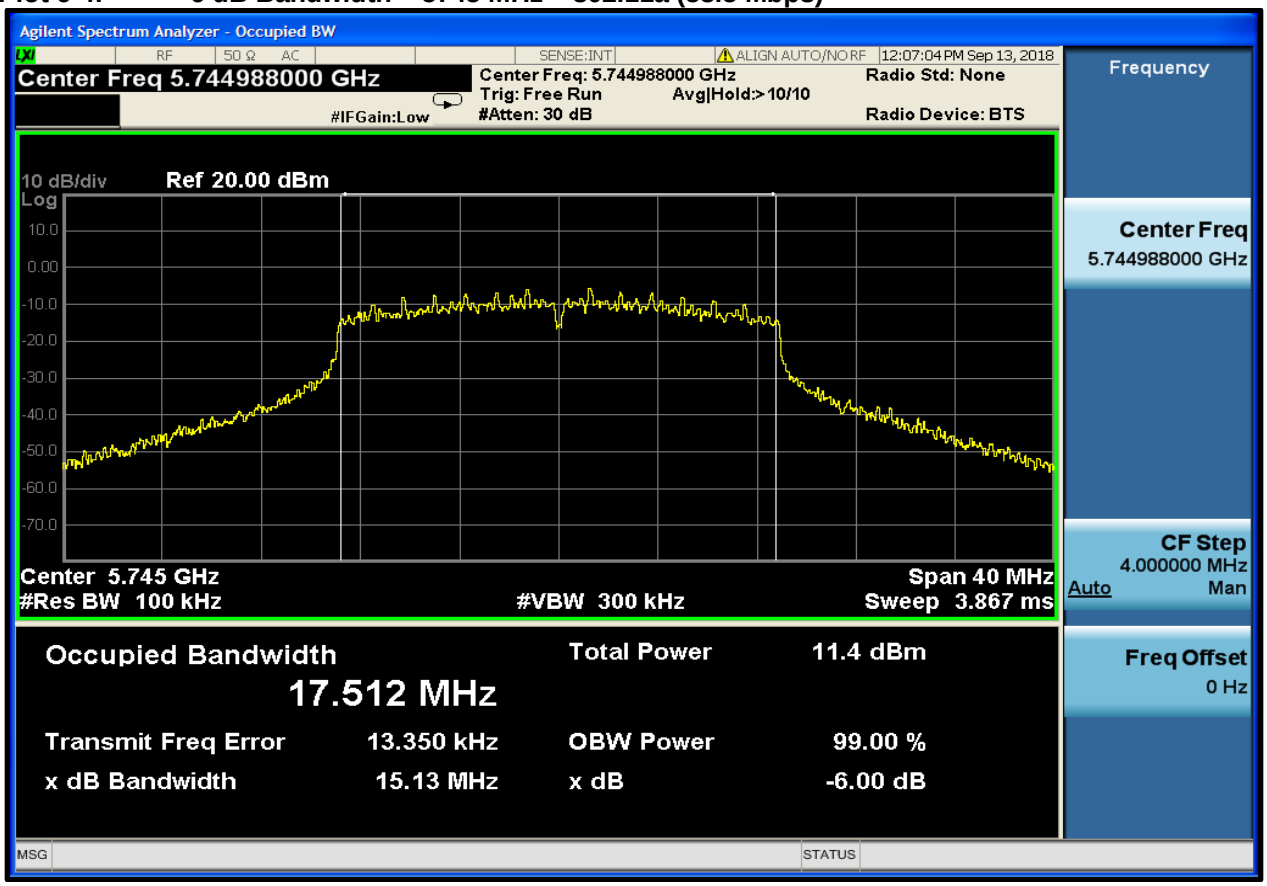


Plot 6-3: 99% Bandwidth – 5240 MHz – 802.11a (58.5 Mbps)

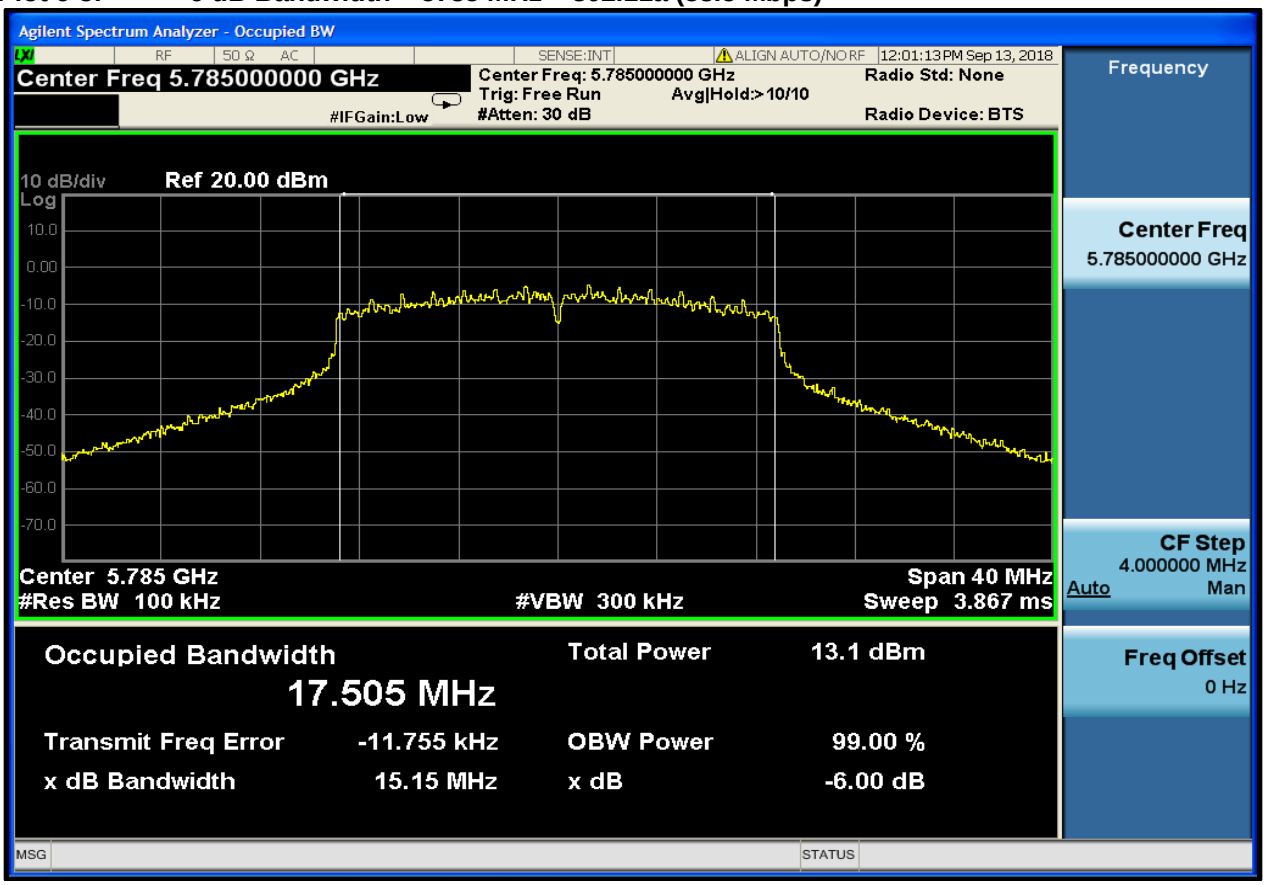


6.4 Bandwidth Plots – U-NII3

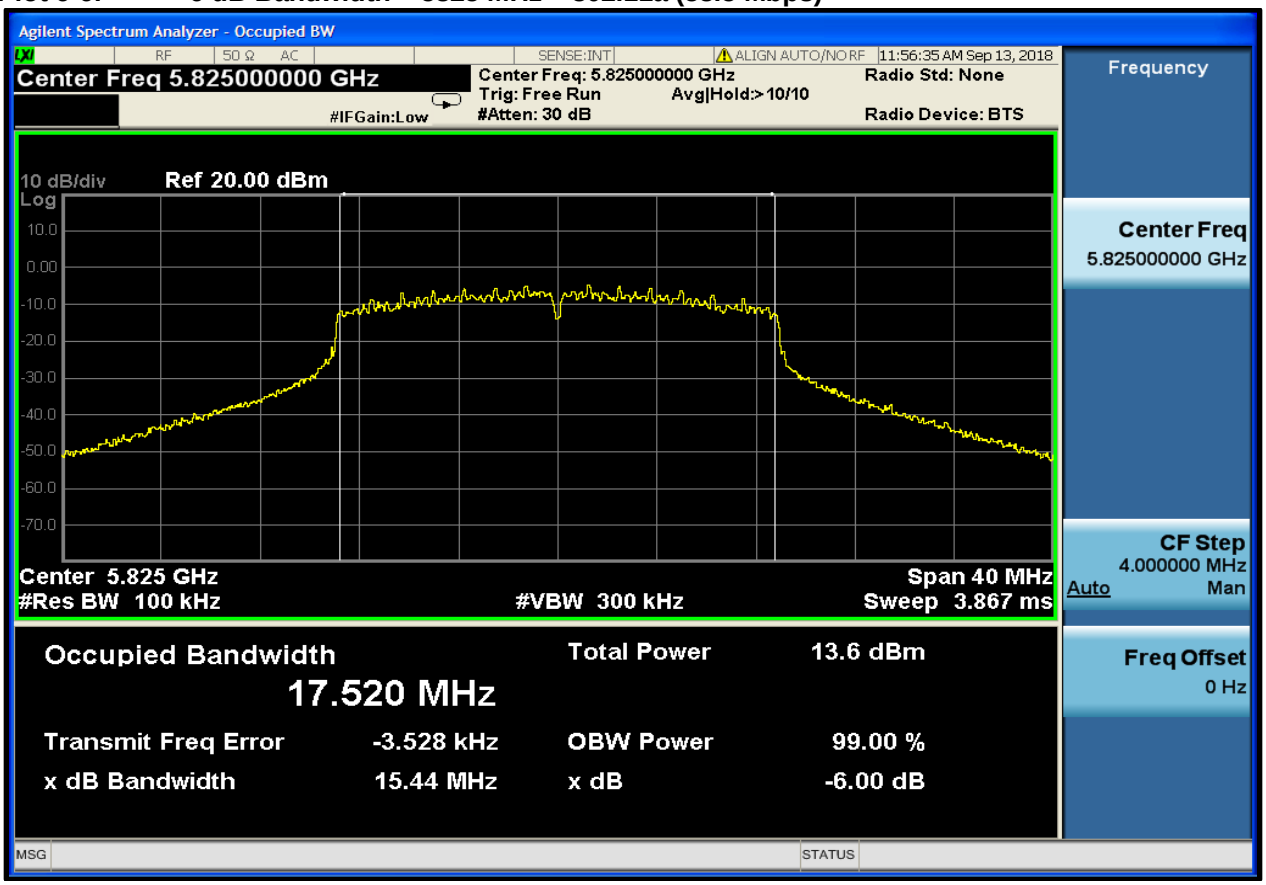
Plot 6-4: 6 dB Bandwidth – 5745 MHz – 802.11a (58.5 Mbps)



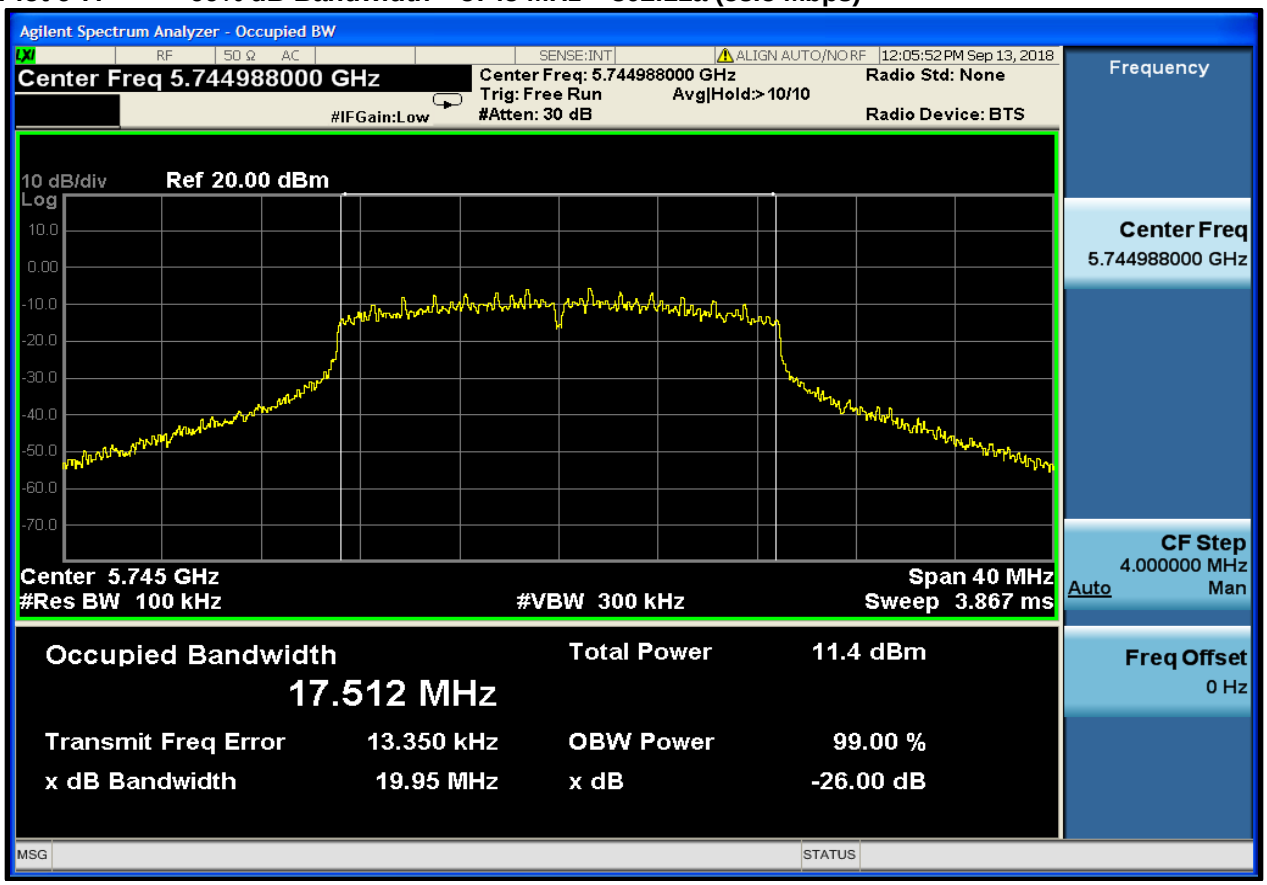
Plot 6-5: 6 dB Bandwidth – 5785 MHz – 802.11a (58.5 Mbps)



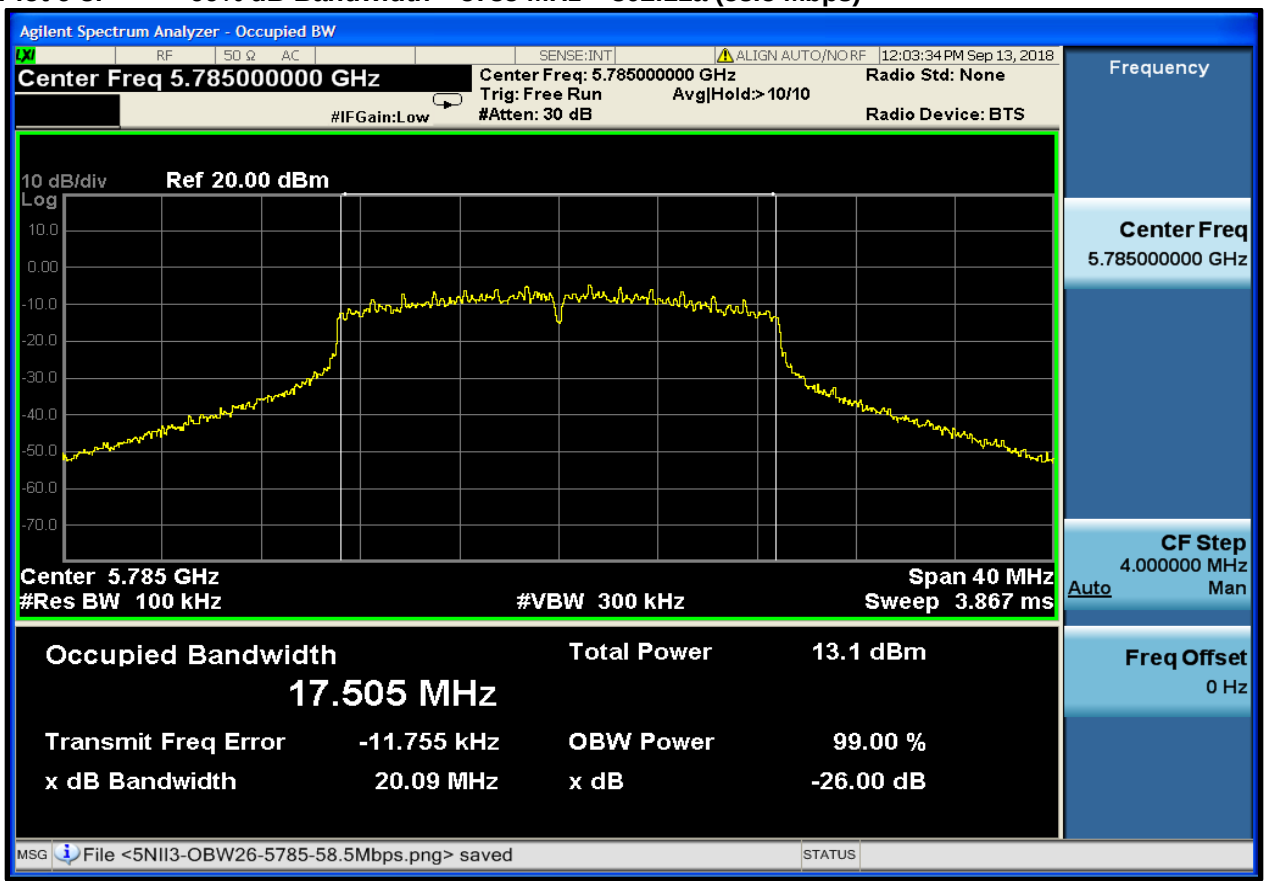
Plot 6-6: 6 dB Bandwidth – 5825 MHz – 802.11a (58.5 Mbps)



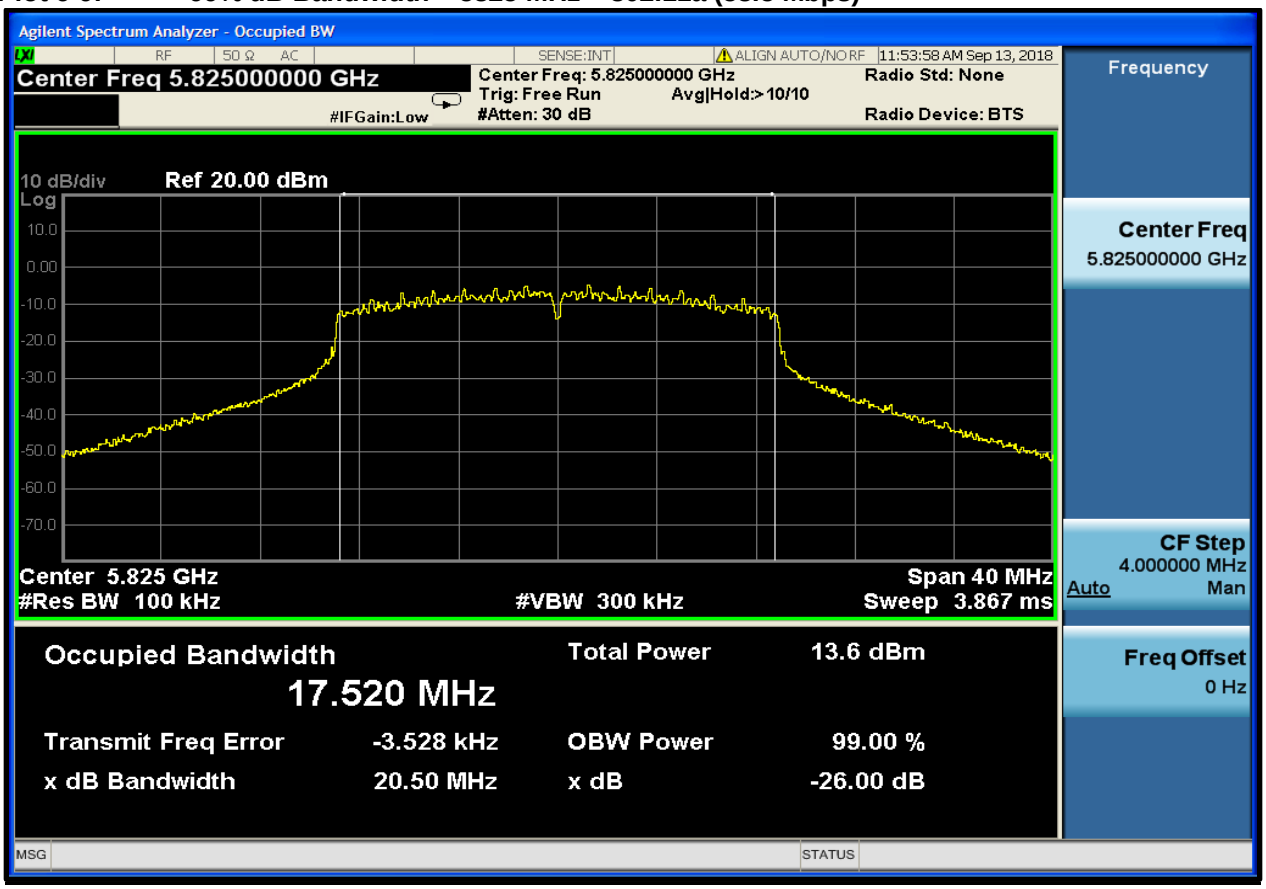
Plot 6-7: 99% dB Bandwidth – 5745 MHz – 802.11a (58.5 Mbps)



Plot 6-8: 99% dB Bandwidth – 5785 MHz – 802.11a (58.5 Mbps)



Plot 6-9: 99% dB Bandwidth – 5825 MHz – 802.11a (58.5 Mbps)



Measurement uncertainty: ±1 x 10^{-6} Hz. This measurement uncertainty is an expanded uncertainty for 95% confidence level received with a coverage factor k=2.

Test Personnel:

Khue Do		September 13, 2018
Test Engineer	Signature	Date of Test

7 Power Spectral Density – FCC 15.407(a1/3); RSS-247 6.2

7.1 Power Spectral Density Test Procedure

The power spectral density per FCC 15.407(a)(1)(3) was measured using a 50-ohm spectrum analyzer. The spectral lines were resolved for the modulated carriers. These levels are below the limits. See the power spectral density table and plots.

7.2 Power Spectral Density Test Results

Note: EUT was programmed to TX with 58.5 Mbps rate, 20 MHz bandwidth and 10 dBm power level for all three test frequencies.

Table 7-1: Power Spectral Density Test Data – U-NII1 – 802.11a (58.5 Mbps)

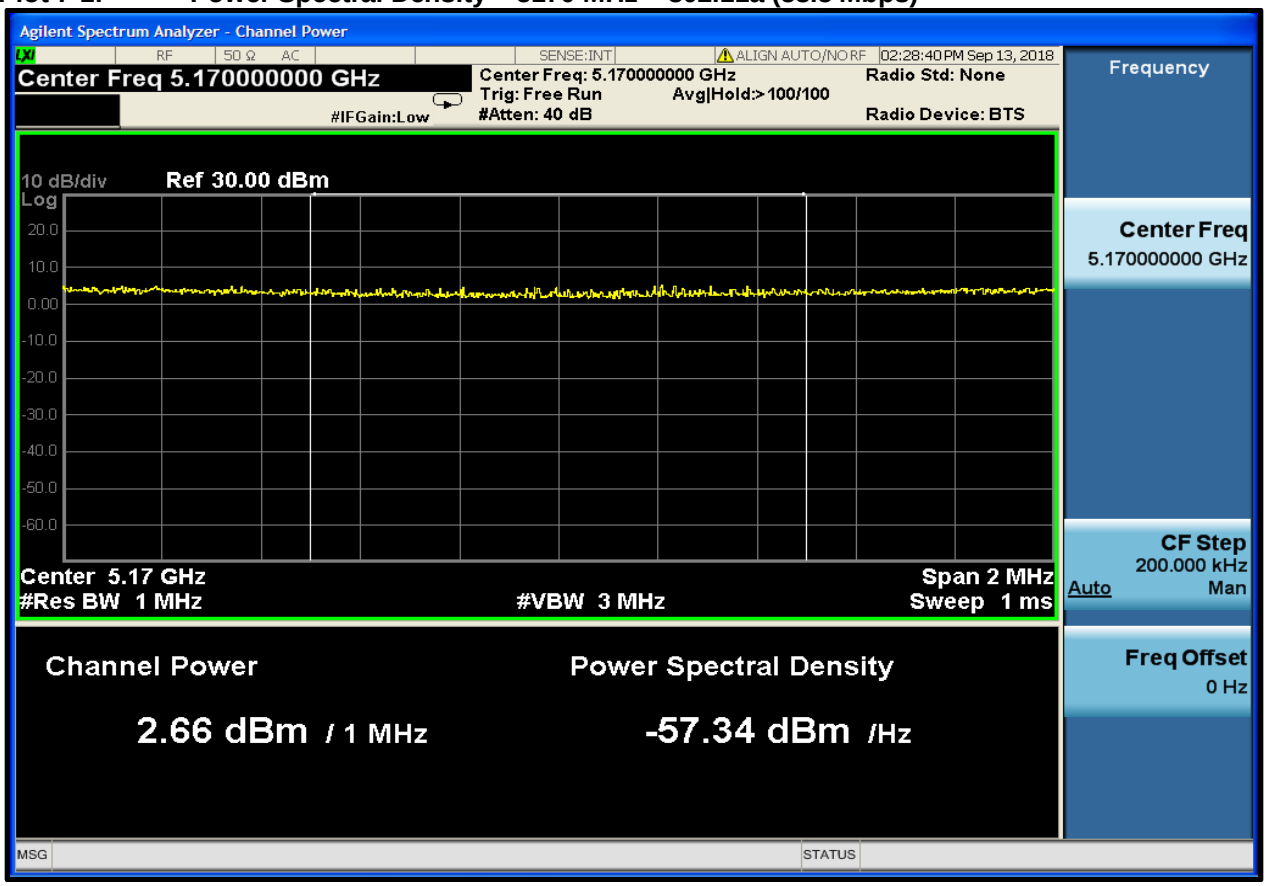
Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)	Result (Pass / Fail)
5170	2.7	17.0	-14.3	Pass
5200	2.2	17.0	-14.8	Pass
5240	3.1	17.0	-13.9	Pass

Table 7-2: Power Spectral Density Test Data – U-NII3 – 802.11a (58.5 Mbps)

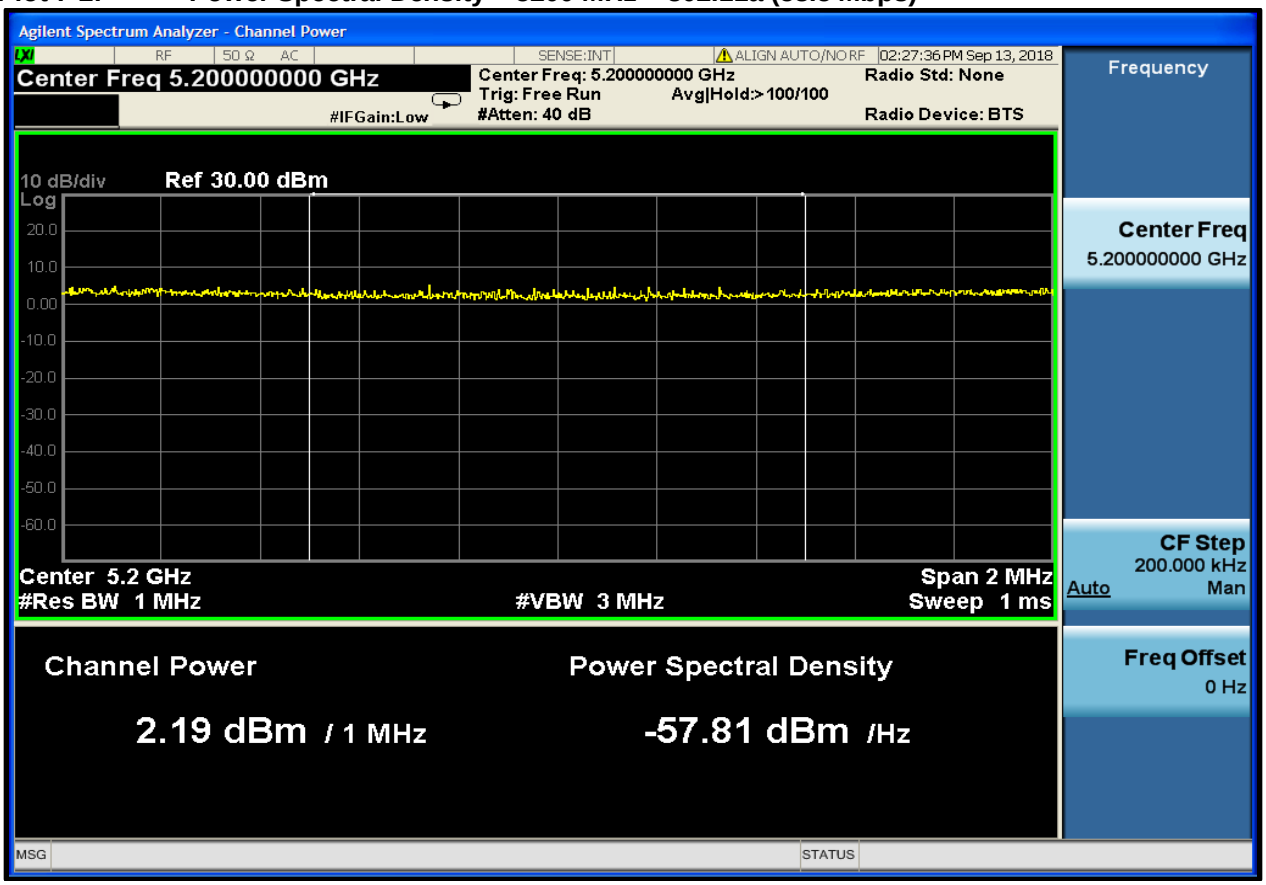
Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)	Result (Pass / Fail)
5745	-1.0	30.0	-31.0	Pass
5785	-1.3	30.0	-31.3	Pass
5825	-1.0	30.0	-31.0	Pass

7.3 Power Spectral Density Plots – U-NII1

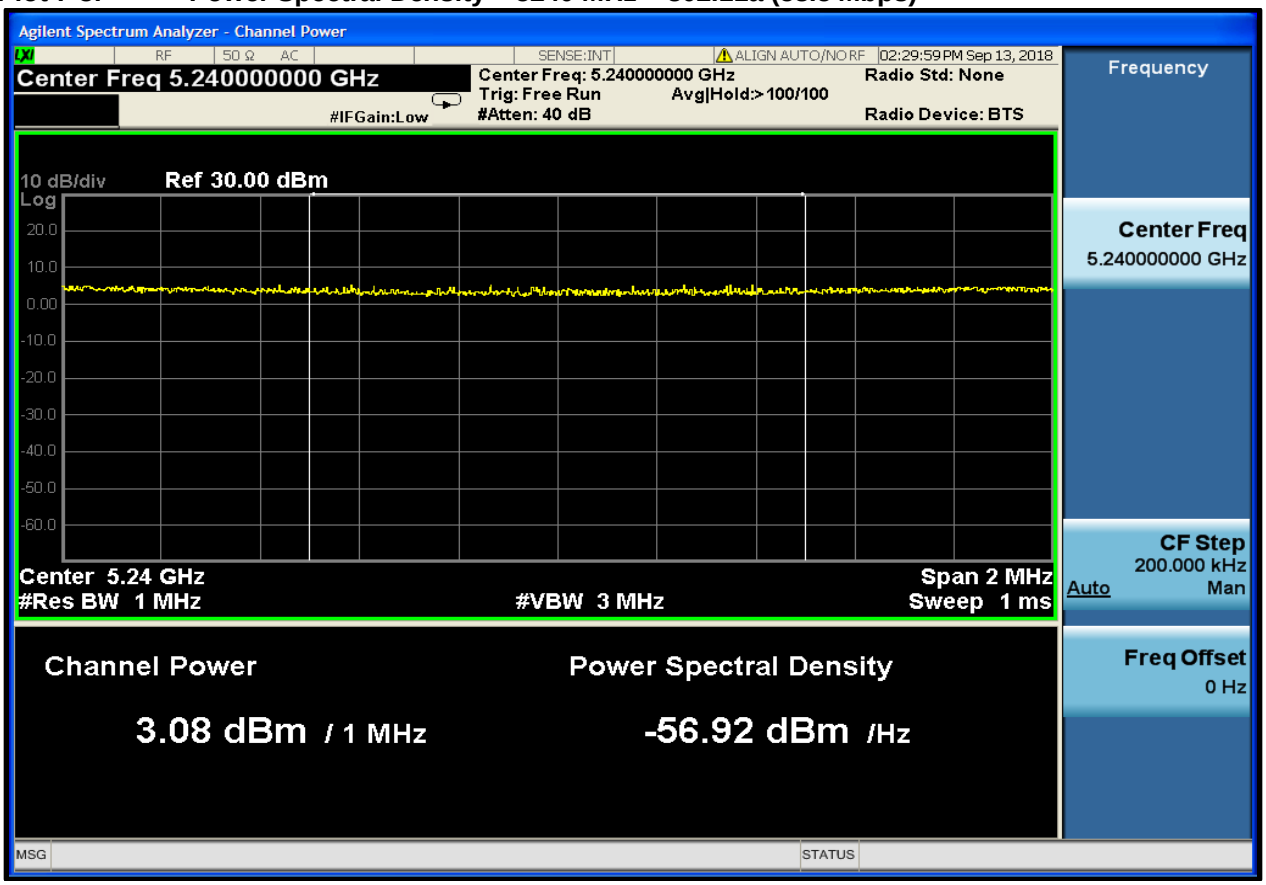
Plot 7-1: Power Spectral Density – 5170 MHz – 802.11a (58.5 Mbps)



Plot 7-2: Power Spectral Density – 5200 MHz – 802.11a (58.5 Mbps)

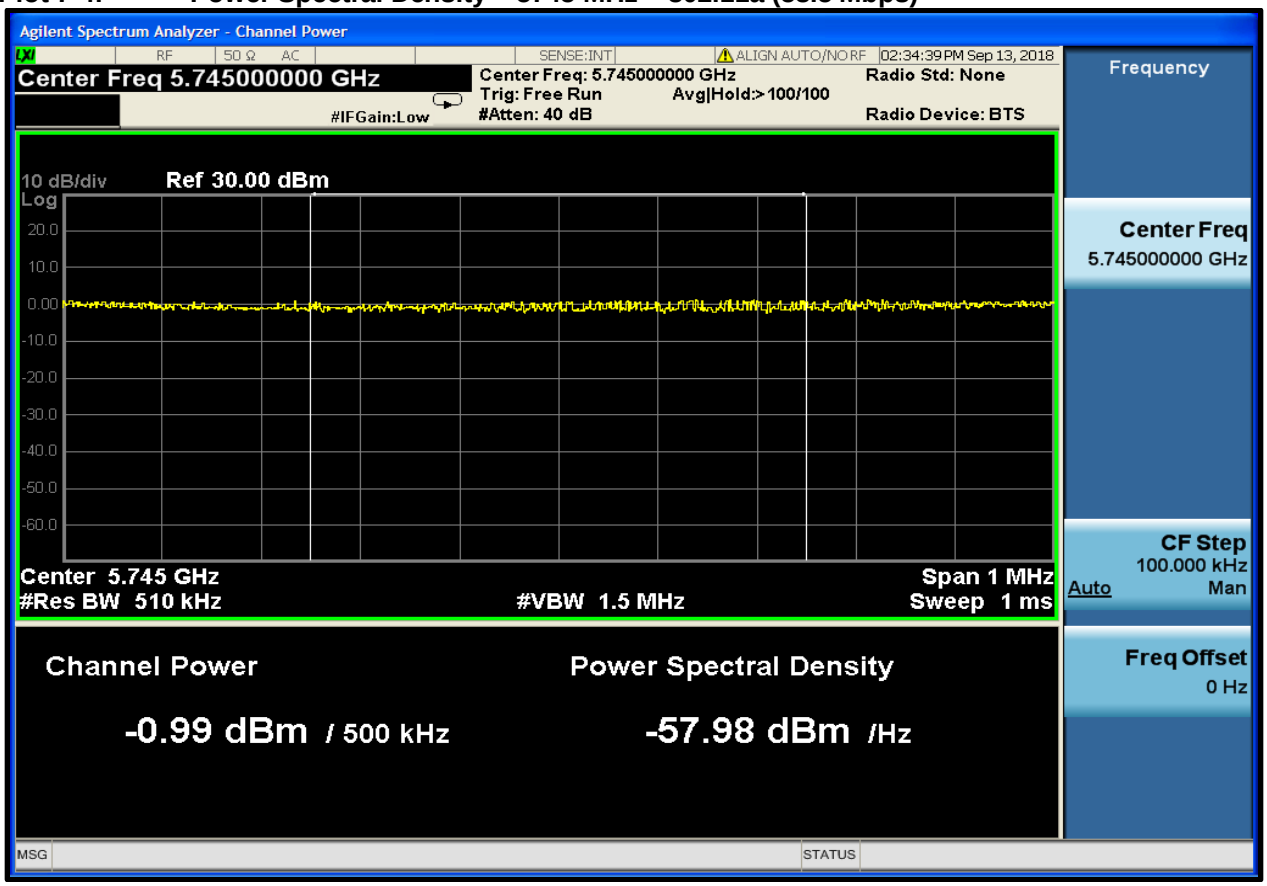


Plot 7-3: Power Spectral Density – 5240 MHz – 802.11a (58.5 Mbps)

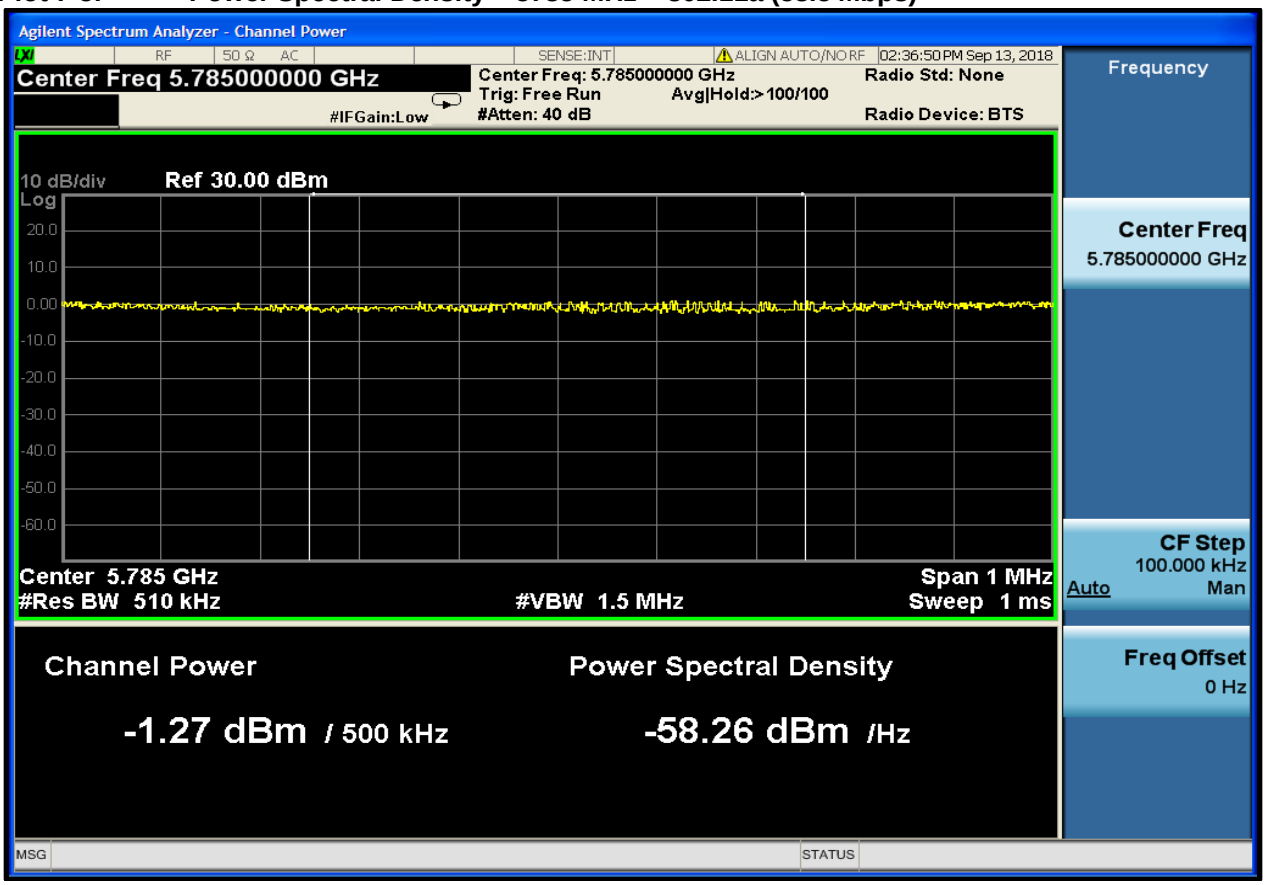


7.4 Power Spectral Density Plots – U-NII3

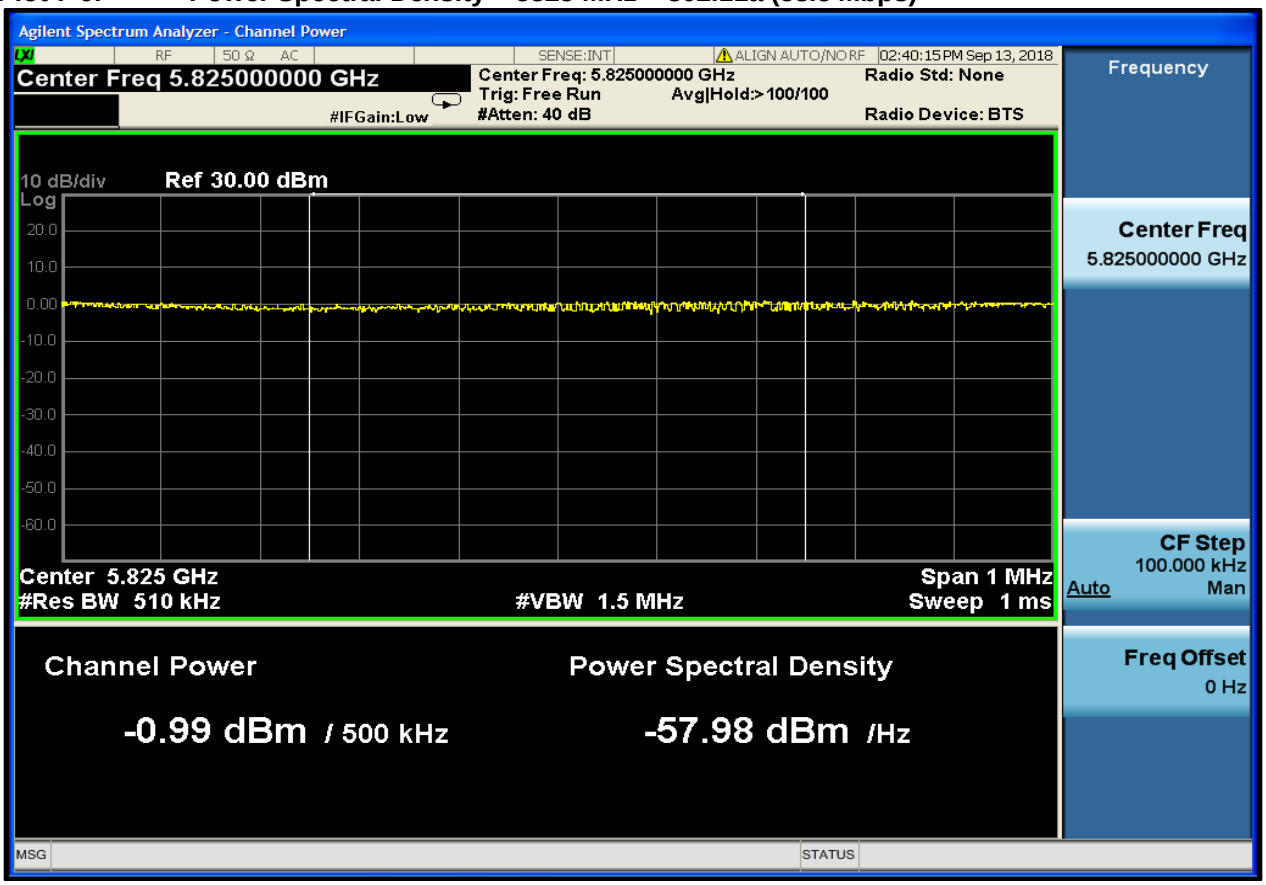
Plot 7-4: Power Spectral Density – 5745 MHz – 802.11a (58.5 Mbps)



Plot 7-5: Power Spectral Density – 5785 MHz – 802.11a (58.5 Mbps)



Plot 7-6: Power Spectral Density – 5825 MHz – 802.11a (58.5 Mbps)



Measurement uncertainty: ±0.5 dB. This measurement uncertainty is an expanded uncertainty for 95% confidence level received with a coverage factor k=2.

Results: Pass

Test Personnel:

Khue Do		September 13, 2018
Test Engineer	Signature	Date of Test

8 Frequency Stability – FCC 15.407(g); RSS-Gen 6.11

8.1 Frequency Stability Test Procedure

The EUT was placed inside the temperature chamber and supplied by nominal 13.6 VDC. The EUT was connected to an analyzer which was located outside of the chamber. The temperature was set to the lowest level of -30.0°C and the EUT was allowed to stabilize with power off for a period of 1 hour. The EUT was then powered up and the frequency was measured. This was continued at +20.0°C and +50.0°C. The chamber was allowed to stabilize between measurements for approximately 30 minutes. At +20.0°C, the EUT supply voltage was adjusted to 85% (11.56 VDC) and 115% (15.64 VDC) of the nominal voltage, and the frequency was recorded.

8.2 Frequency Stability Test Result

Note: EUT was programmed to TX at 5200 MHz with 58.5 Mbps rate, 20 MHz bandwidth and 10 dBm power level.

Table 8-1: Frequency Stability at Extreme Temperatures

Temperature (°C)	Measured Frequency (MHz)	ppm
-30.0	5200.035	6.731
+20.0 (reference)	5200.055	10.577
+50.0	5199.995	-0.962

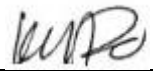
Table 8-2: Frequency Stability at Extreme Voltage Levels

Voltage (VDC)	Measured Frequency (MHz)	ppm
11.56	5199.995	-0.962
13.60 (reference)	5200.055	10.577
15.64	5200.005	0.962

Measurement uncertainty: ±0.5 dB. This measurement uncertainty is an expanded uncertainty for 95% confidence level received with a coverage factor k=2.

Results: Pass

Test Personnel:

Khue Do		September 18, 2018
Test Engineer	Signature	Date of Test

9 AC Conducted Emissions – FCC 15.207; RSS-Gen 8.8

Device is a mobile 13.6 VDC equipment; AC line conducted emissions measurements are not required.

10 Radiated Emissions – FCC 15.209; RSS-247 6.2; RSS-Gen 6.13/7.1

10.1 Limits of Radiated Emissions Measurement

Frequency (MHz)	Field Strength (µV/m)	Measurement Distance (m)
0.009-0.490	2400/f (kHz)	300
0.490-1.705	2400/f (kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

As shown in 15.35(b), for frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any circumstances of modulation.

10.2 Radiated Emissions Measurement Test Procedure

Before final measurements of radiated emissions were made on the open-field three/ten meter range, the EUT was scanned indoors at one and three meter distances. This was done in order to determine its emissions spectrum signature. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. This process was repeated during final radiated emissions measurements on the open-field range, at each frequency, in order to ensure that maximum emission amplitudes were attained.

Final radiated emissions measurements were made on the three/ten-meter, open-field test site. The EUT was placed on a nonconductive turntable 0.8 meters above the ground plane. The spectrum was examined from 9 kHz to the 10th harmonic of the highest fundamental transmitter frequency (24.8 GHz).

At each frequency, the EUT was rotated 360°, and the antenna was raised and lowered from 1 to 4 meters in order to determine the emission's maximum level. Measurements were taken using both horizontal and vertical antenna polarizations. For frequencies between 30 and 1000 MHz, the spectrum analyzer's 6 dB bandwidth was set to 120 kHz, and the analyzer was operated in the CISPR quasi-peak detection mode. For emissions above 1000 MHz, emissions are measured using the average detector function with a minimum resolution bandwidth of 1 MHz. No video filter less than 10 times the resolution bandwidth was used. The highest emission amplitudes relative to the appropriate limit were measured and recorded in this report.

Table 10-1: Radiated Emissions Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900772	EMCO	3161-02	Horn Antenna (2.0–4.0 GHz)	9804-1044	5/17/21
900321	EMCO	3161-03	Horn Antennas (4.0–8.2 GHz)	9508-1020	5/17/21
900323	EMCO	3160-7	Horn Antennas (8.2–12.4 GHz)	9605-1054	5/17/21
900356	EMCO	3160-08	Horn Antenna (12.4–18.0 GHz)	9607-1044	5/17/21
901218	EMCO	3160-09	Horn Antenna (18.0–26.5 GHz)	960281-003	5/17/21
900791	Chase	CBL6111B	Bilog Antenna (30–2000 MHz)	N/A	10/4/20
901581	Rohde & Schwarz	FSU	Spectrum Analyzer	1166.1660.50	4/26/21

10.3 Radiated Emissions Test Results

Table 10-2: Radiated Emissions Harmonics/Spurious – 5180 MHz, Peak Detector

Frequency (MHz)	Peak Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Peak Corrected (dBµV/m)	Conversion to dBm	Peak Limit (dBm/MHz)	Peak Margin (dB)
10360.0	12.7	42.6	55.3	-39.9	-7.0	-32.9
15540.0	14.6	48.8	63.5	-31.8	-7.0	-24.8
20720.0	14.7	54.0	68.8	-26.5	-7.0	-19.5
25900.0	15.9	56.3	72.2	-23.1	-7.0	-16.1

Table 10-3: Radiated Emissions Harmonics/Spurious – 5200 MHz, Peak Detector

Frequency (MHz)	Peak Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Peak Corrected (dBµV/m)	Conversion to dBm	Peak Limit (dBm/MHz)	Peak Margin (dB)
10400.0	13.3	42.7	56.0	-39.2	-7.0	-32.2
15600.0	14.1	49.0	63.1	-32.1	-7.0	-25.1
20800.0	14.0	54.1	68.1	-27.1	-7.0	-20.1
26000.0	15.5	56.2	71.7	-23.5	-7.0	-16.5

Table 10-4: Radiated Emissions Harmonics/Spurious – 5240 MHz, Peak Detector

Frequency (MHz)	Peak Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Peak Corrected (dBµV/m)	Conversion to dBm	Peak Limit (dBm/MHz)	Peak Margin (dB)
10480.0	13.4	42.9	56.3	-39.0	-7.0	-32.0
15720.0	14.1	48.8	62.9	-32.3	-7.0	-25.3
20960.0	14.7	54.1	68.8	-26.4	-7.0	-19.4
26200.0	15.6	56.3	71.9	-23.4	-7.0	-16.4

Table 10-5: Radiated Emissions Harmonics/Spurious – 5745 MHz, Peak Detector

Frequency (MHz)	Peak Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Peak Corrected (dBµV/m)	Conversion to dBm	Peak Limit (dBm/MHz)	Peak Margin (dB)
11490.0	12.8	43.3	56.1	-39.2	-7.0	-32.2
17235.0	14.8	49.5	64.2	-31.0	-7.0	-24.0
22980.0	15.3	55.3	70.6	-24.6	-7.0	-17.6
28725.0	16.6	61.4	78.0	-17.2	-7.0	-10.2

Table 10-6: Radiated Emissions Harmonics/Spurious – 5785 MHz, Peak Detector

Frequency (MHz)	Peak Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Peak Corrected (dBµV/m)	Conversion to dBm	Peak Limit (dBm/MHz)	Peak Margin (dB)
11570.0	13.6	43.4	57.0	-38.2	-7.0	-31.2
17355.0	14.7	49.5	64.2	-31.0	-7.0	-24.0
23140.0	15.7	55.2	70.8	-24.4	-7.0	-17.4
28925.0	16.6	61.5	78.2	-17.1	-7.0	-10.1

Table 10-7: Radiated Emissions Harmonics/Spurious – 5825 MHz, Peak Detector

Frequency (MHz)	Peak Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Peak Corrected (dBµV/m)	Conversion to dBm	Peak Limit (dBm/MHz)	Peak Margin (dB)
11650.0	13.3	43.6	56.9	-38.3	-7.0	-31.3
17475.0	14.3	49.6	63.9	-31.3	-7.0	-24.3
23300.0	15.8	55.3	71.1	-24.1	-7.0	-17.1
29125.0	16.6	61.5	78.1	-17.1	-7.0	-10.1

Table 10-8: Radiated Emissions Harmonics/Spurious – 5180 MHz, Average Detector

Frequency (MHz)	Average Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Average Corrected (dBµV/m)	Conversion to dBm	Average Limit (dBm/MHz)	Average Margin (dB)
10360.0	3.5	42.6	46.2	-49.1	-27.0	-22.1
15540.0	4.9	48.8	53.7	-41.5	-27.0	-14.5
20720.0	4.6	54.0	58.6	-36.6	-27.0	-9.6
25900.0	6.1	56.3	62.3	-32.9	-27.0	-5.9

Table 10-9: Radiated Emissions Harmonics/Spurious – 5200 MHz, Average Detector

Frequency (MHz)	Average Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Average Corrected (dBµV/m)	Conversion to dBm	Average Limit (dBm/MHz)	Average Margin (dB)
10400.0	3.3	42.7	46.0	-49.2	-27.0	-22.2
15600.0	4.5	49.0	53.5	-41.7	-27.0	-14.7
20800.0	4.5	54.1	58.6	-36.6	-27.0	-9.6
26000.0	6.0	56.2	62.2	-33.0	-27.0	-6.0

Table 10-10: Radiated Emissions Harmonics/Spurious – 5240 MHz, Average Detector

Frequency (MHz)	Average Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Average Corrected (dBµV/m)	Conversion to dBm	Average Limit (dBm/MHz)	Average Margin (dB)
10480.0	3.6	42.9	46.5	-48.7	-27.0	-21.7
15720.0	4.4	48.8	53.2	-42.0	-27.0	-15.0
20960.0	4.9	54.1	59.0	-36.3	-27.0	-9.3
26200.0	5.6	56.3	61.9	-33.4	-27.0	-6.4

Table 10-11: Radiated Emissions Harmonics/Spurious – 5745 MHz, Average Detector

Frequency (MHz)	Average Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Average Corrected (dBµV/m)	Conversion to dBm	Average Limit (dBm/MHz)	Average Margin (dB)
11490.0	3.1	43.3	46.3	-48.9	-27.0	-21.9
17235.0	4.3	49.5	53.8	-41.4	-27.0	-14.4
22980.0	5.3	55.3	60.6	-34.6	-27.0	-7.6
28725.0	5.0	61.4	66.4	-28.8	-27.0	-1.8

Table 10-12: Radiated Emissions Harmonics/Spurious – 5785 MHz, Average Detector

Frequency (MHz)	Average Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Average Corrected (dBµV/m)	Conversion to dBm	Average Limit (dBm/MHz)	Average Margin (dB)
11570.0	3.0	43.4	46.5	-48.8	-27.0	-21.8
17355.0	4.8	49.5	54.3	-40.9	-27.0	-13.9
23140.0	5.7	55.2	60.9	-34.3	-27.0	-7.3
28925.0	5.4	61.5	66.9	-28.3	-27.0	-1.3

Table 10-13: Radiated Emissions Harmonics/Spurious – 5825 MHz, Average Detector

Frequency (MHz)	Average Analyzer (dBµV/m)	Site Correction Factor (dB/m)	Average Corrected (dBµV/m)	Conversion to dBm	Average Limit (dBm/MHz)	Average Margin (dB)
11650.0	3.0	43.6	46.6	-48.6	-27.0	-21.6
17475.0	5.0	49.6	54.6	-40.6	-27.0	-13.6
23300.0	5.3	55.3	60.7	-34.6	-27.0	-7.6
29125.0	5.0	61.5	66.5	-28.7	-27.0	-1.7

Table 10-14: Unintentional Emissions Test Data

Temperature: 88.0°F Humidity: 34%										
Emission Frequency (MHz)	**Test Detector**	**Antenna Polarity (H/V)**	**Turntable Azimuth (°)**	**Antenna Height (m)**	**Analyzer Reading (dBµV)**	**Site Correction Factor (dB/m)**	**Emission Level (dBµV/m)**	**Limit (dBµV/m)**	**Margin (dB)**	**Pass/ Fail**
57.000	QP	V	180	1	54.8	-28.8	26.0	40.0	-14.0	Pass
83.330	QP	V	180	1	49.6	-28.3	21.3	40.0	-18.7	Pass
120.000	QP	V	180	1	63.3	-26.2	37.1	43.5	-6.4	Pass
125.000	QP	V	180	1	51.6	-26.7	24.9	43.5	-18.6	Pass
175.000	QP	V	180	1	54.7	-25.1	29.6	43.5	-13.9	Pass
225.000	QP	V	180	1	39.1	-23.2	15.8	46.0	-30.2	Pass
250.000	QP	V	180	1	45.1	-21.8	23.3	46.0	-22.7	Pass
275.000	QP	V	180	1	39.5	-20.8	18.8	46.0	-27.2	Pass
347.764	QP	V	180	1	37.6	-18.4	19.1	46.0	-26.9	Pass
350.000	QP	H	180	1	40.9	-18.3	22.6	46.0	-23.4	Pass
359.761	QP	H	180	1	27.7	-18.1	9.6	46.0	-36.4	Pass
371.757	QP	H	180	1	32.1	-18.6	13.5	46.0	-32.5	Pass
383.763	QP	V	180	1	34.8	-18.3	16.5	46.0	-29.5	Pass
395.750	QP	V	180	1	43.6	-17.0	26.6	46.0	-19.4	Pass
400.000	QP	H	180	1	44.8	-16.9	27.9	46.0	-18.1	Pass
407.730	QP	V	180	1	31.6	-16.4	15.2	46.0	-30.8	Pass
419.743	QP	H	180	1	28.6	-16.6	12.0	46.0	-34.0	Pass
431.740	QP	H	180	1	28.5	-17.1	11.4	46.0	-34.6	Pass
443.736	QP	H	180	1	29.2	-16.8	12.3	46.0	-33.7	Pass
455.733	QP	H	180	1	26.6	-16.2	10.4	46.0	-35.6	Pass
467.729	QP	H	180	1	27.7	-15.7	12.0	46.0	-34.0	Pass
491.722	QP	H	180	1	27.3	-15.5	11.9	46.0	-34.1	Pass
503.719	QP	H	180	1	26.5	-15.2	11.3	46.0	-34.7	Pass
515.715	QP	H	180	1	38.4	-14.5	23.9	46.0	-22.1	Pass
527.712	QP	H	180	1	37.9	-13.4	24.5	46.0	-21.5	Pass
539.708	QP	H	180	1	39.6	-13.2	26.5	46.0	-19.5	Pass
551.705	QP	H	180	1	27.0	-13.6	13.4	46.0	-32.6	Pass
563.701	QP	H	180	1	32.5	-14.2	18.3	46.0	-27.7	Pass
611.613	QP	H	180	1	32.5	-12.2	20.3	46.0	-25.7	Pass
623.609	QP	H	180	1	39.1	-12.1	27.0	46.0	-19.0	Pass

Measurement uncertainty: ±4.7 dB. This measurement uncertainty is an expanded uncertainty for 95% confidence level received with a coverage factor k=2.

Results: Pass

Test Personnel:

Dan Baltzell		September 3 & 15, 2019
Test Engineer	Signature	Dates of Test

11 Conclusion

The data in this NII measurement report shows that the EUT as tested, Harris Corporation XL-200M, Multi-Band Mobile, VL/V/U/7/8/9, Model #/HVIN XZ-MPM1M, FCC ID: OWDTR-0161-E, IC: 3636B-0161, complies with the applicable requirements of FCC Parts 2 and 15 and ISED RSS-247 and RSS-Gen.