RHEIN TECH LABORATORIES, INC.

Engineering Solutions & Electromagnetic Compatibility Services

Certification Application Report
FCC Part 15.247

Test Lab:	Applicant:
Rhein Tech Laboratories, Inc. 360 Herndon Parkway Suite 1400 Herndon, VA 20170 Email: atcbinfo@rheintech.com Phone: 703-689-0368 Fax: 703-689-2056 www.rheintech.com	HandEra, Inc. 2859 104th Street Des Moines, IA 50322 Contact: Mark Kubovich Phone: 515-252-7522 x114

FCC ID	URZ-PHRPAD60	**Test Report Date**	November 9, 2018
Platform	N/A	**RTL Work Order #**	2018199
Model Number	PHRPAD60	**RTL Quote #**	QRTL18-199A

American National Standard Institute	ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
FCC Classification	DTS – Part 15 Digital Transmission System
FCC Rule Part	Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz (10-01-17)
Digital Interface Information	Digital Interface was found to be compliant

Frequency Range (MHz)	Output Power Peak Conducted (mW)	Frequency Tolerance	Emission Designator
2412-2462	107.2	N/A	N/A

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, and ANSI C63.10.

Signature: 

Date: November 9, 2018

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.

Table of Contents

Figure Index

Table Index

Plot Index

Appendix Index

Photograph Index

1 General Information

1.1 Scope

Applicable Standards:

FCC Rules Part 15.247 (10-01-17): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz.

1.2 Description of EUT

Equipment Under Test	Wi-Fi Tablet
Model Number	PHRPAD60
Power Supply	Internal battery, charged in docking station
Modulation Type	DSSS, OFDM (802.11 b/g/n)
Frequency Range	2412 – 2462 MHz
Antenna Connector Type	Internal
Antenna Types	Internal

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 FCC certification application for HandEra, Inc. Model PHRPAD60, FCC ID: URZ-PHRPAD60.

1.5 Modifications

No modifications were required.

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

Channel	Frequency (MHz)
1	2412
6	2437
11	2462

Table 2-2: Data Rates

Technology	Rate (Mbps)
802.11b	11
802.11g	54
802.11n	NMCS7

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 Results Summary

Table 2-3: Test Results Summary – FCC Part 15, Subpart C (Section 15.247)

FCC Reference	C63.10 Procedure	Test	Result
FCC 15.207	6.2	AC Power Conducted Emissions	Pass
FCC 15.209	6.5, 6.6	Radiated Emissions	Pass
FCC 15.247(a)(2)	11.8	6 dB Bandwidth	Pass
FCC 15.247(b)(1)	11.9	Maximum Peak Power Output	Pass
FCC 15.247(d)	11.12.2	Antenna Conducted Spurious Emissions	Pass
FCC 15.247(d)	11.12.2	Band Edge Measurement	Pass
FCC 15.247(e)	11.10	Power Spectral Density	Pass

2.4 Test System Details

The test samples were received on October 26, 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 2-4: Equipment Under Test

Part	Manufacturer	Model #	Serial Number	FCC ID	RTL Bar Code
Tablet Pad 6 (Conducted)	Phreesia	PHRPAD60	A16947600C07 0440FE0728E012	URZ-PHRPAD60	23118
Tablet Pad 6 (Conducted)	Phreesia	PHRPAD60	A16947600C07F54 FFF07264C2	URZ-PHRPAD60	23119
Tablet Pad 6 (Radiated)	Phreesia	PHRPAD60	A16947600C07F54 FFF07264C2	URZ-PHRPAD60	23120
Tablet Pad 6 (Radiated)	Phreesia	PHRPAD60	A16947600C07EFE FFD0732CAAC	URZ-PHRPAD60	22774
Charging Dock (USB)	Phreesia	N/A	N/A	N/A	23122
Charging Dock (Ethernet)	Phreesia	N/A	N/A	N/A	23124

Table 2-5: Auxiliary Equipment

Part	Manufacturer	Model #	Serial Number	FCC ID	RTL Bar Code
Power Adaptor	TZY	AP36-150240DP	1807-00114RoHS	N/A	23126
Ethernet Cable	N/A	N/A	N/A	N/A	23125

2.5 Configuration of Tested System

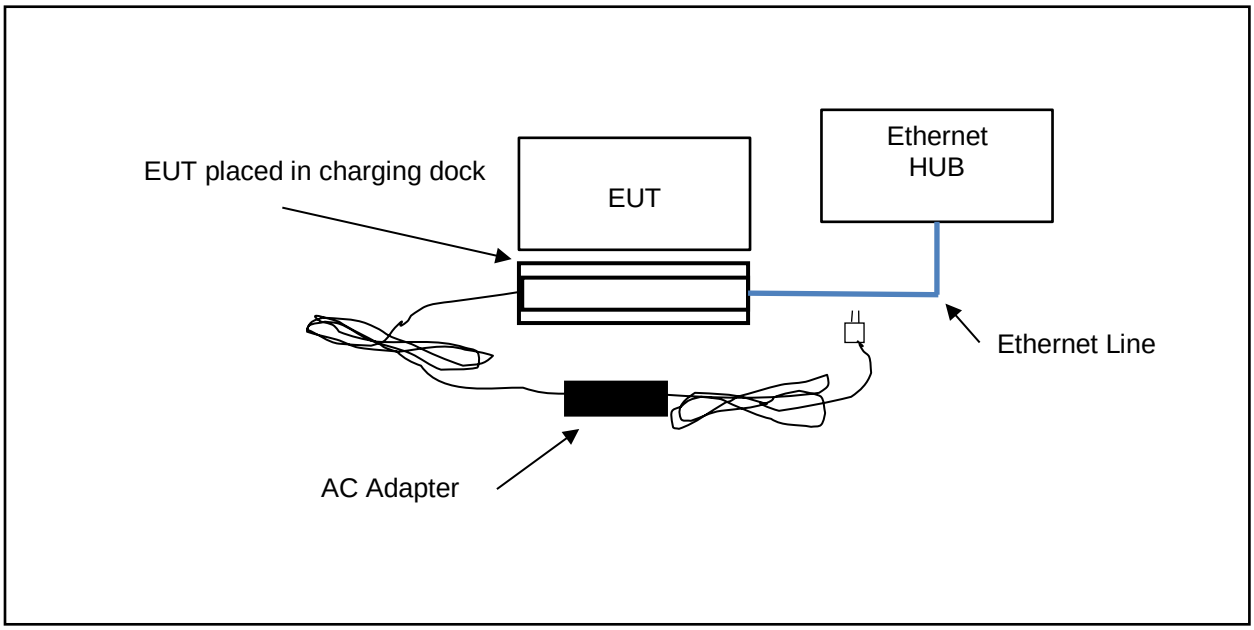


Figure 2-1: Configuration of System Under Test

Note: The charging dock with the RJ-45 connection was connected to an Ethernet HUB via an Ethernet cable for AC Conducted Emissions, Conducted Emissions on the Ethernet cable, and Unintentional Emissions.

3 Peak Output Power – §15.247(b)(3), C63.10 11.9

3.1 Power Output Test Procedure

A conducted power measurement of the EUT was taken using the integrated band power method. The following settings were used:

RBW = 1 MHz
VBW = 3 MHz
Span = 1.5 x DTS bandwidth
Detector = Peak
Sweep = Auto Couple
Trace = Max Hold

Table 3-1: Peak Output Power Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901139	Weinschel Corp	48-20-34	Attenuator 20 dB, 100 W (DC – 18 GHz)	BK5859	4/23/19
901583	Agilent Technologies	N9010A	EXA Signal Analyzer (10 Hz-26.5 GHz)	MY51250846	2/6/20

3.2 Peak Output Power Test Results

Table 3-2: Peak Output Power Data

Modulation Scheme	Peak Output Power (dBm)		
	Low (2412 MHz)	Mid (2437 MHz)	High (2462 MHz)
802.11b (11 Mbps)	19.2	18.9	18.8
802.11g (54 Mbps)	20.3	20.2	20.2
802.11n (MCS7)	20.1	20.1	20.0

Table 3-3: Peak Output Power Data – Worst Case

Channel (#)	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)	Result (Pass / Fail)
1	2412	20.3	30.0	-9.7	Pass
6	2437	20.2	30.0	-9.8	Pass
11	2462	20.2	30.0	-9.8	Pass

Highest conducted peak power measured: 20.3 dBm ≈ 107.2 mW

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

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

Results: Pass

Test Personnel:

Khue Do		October 29, 2018
Test Engineer	Signature	Date of Test

4 Compliance with the Band Edge – §15.247(d), C63.10 11.13

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	2/6/20

4.2 Band Edge Test Results

Conversion of dBm to dBµV/m at 3 m.

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

802.11g (54 Mbps) was determined to be the worst case modulation scheme.

4.3 Band Edge Plots

Plot 4-1: Lower Band Edge: 802.11g (54.0 Mbps) – Average

Table 4-2: Lower Band Edge: 802.11g (54.0 Mbps) – Average

Frequency (MHz)	Measured Average Level (dBm)	Field Strength Conversion (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)
2385.0	-49.5	45.7	54.0	-8.3

Plot 4-2: Lower Band Edge: 802.11g (54.0 Mbps) – Peak

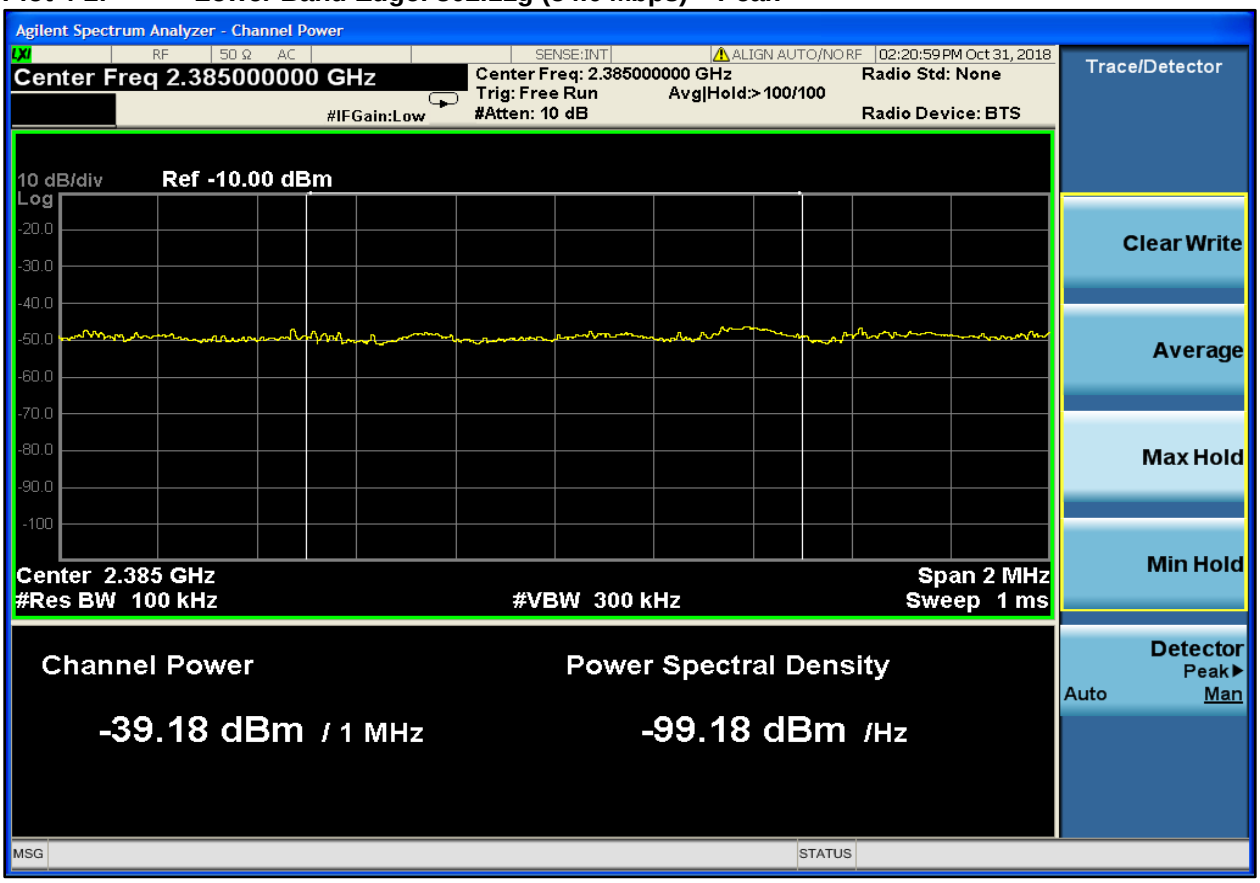


Table 4-3: Lower Band Edge: 802.11g (54.0 Mbps) – Peak

Frequency (MHz)	Measured Peak Level (dBm)	Field Strength Conversion (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)
2385.0	-39.2	56.0	74.0	-18.0

Plot 4-3: Upper Band Edge: 802.11g (54.0 Mbps) – Average

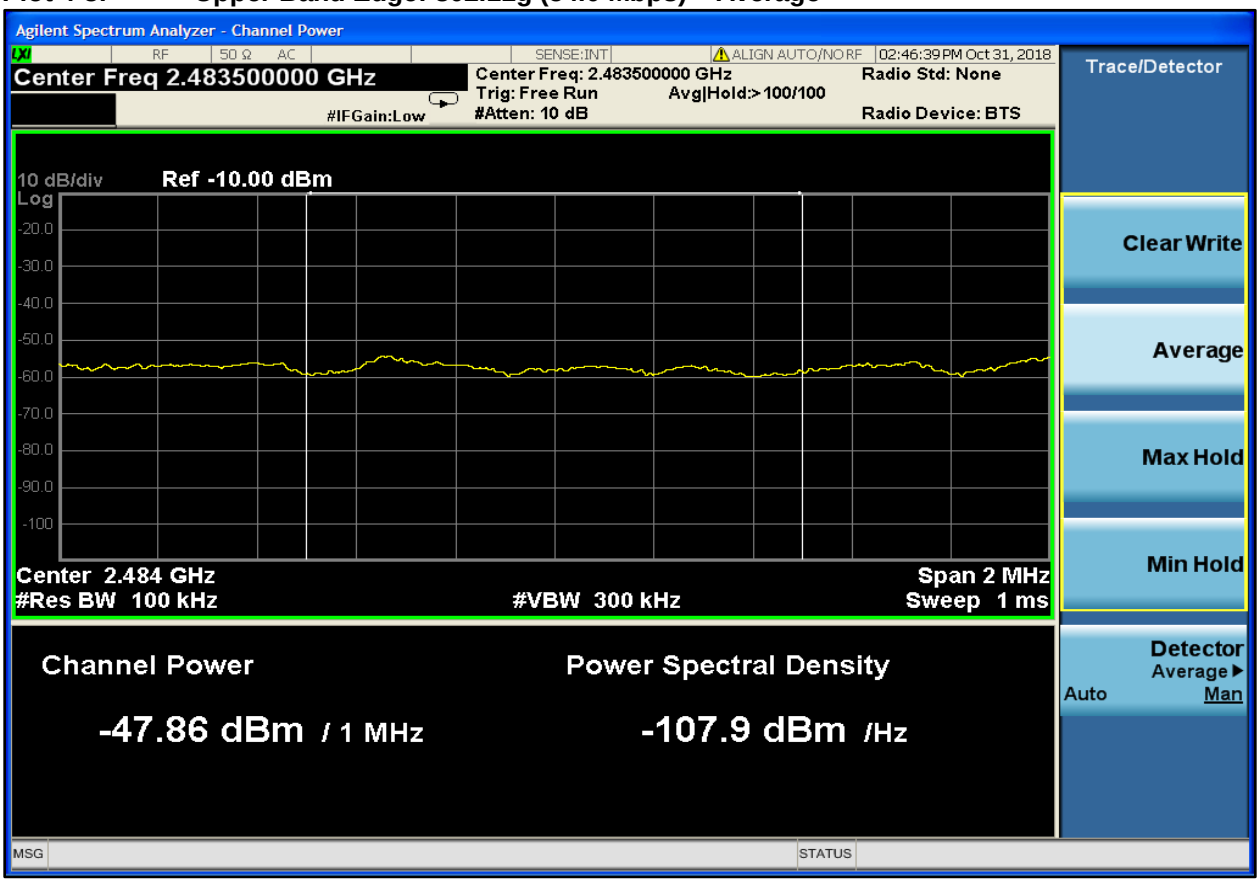


Table 4-4: Upper Band Edge: 802.11g (54.0 Mbps) – Average

Frequency (MHz)	Measured Average Level (dBm)	Field Strength Conversion (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)
2484.0	-47.9	47.3	54.0	-6.7

Plot 4-4: Upper Band Edge: 802.11g (54.0 Mbps) – Peak

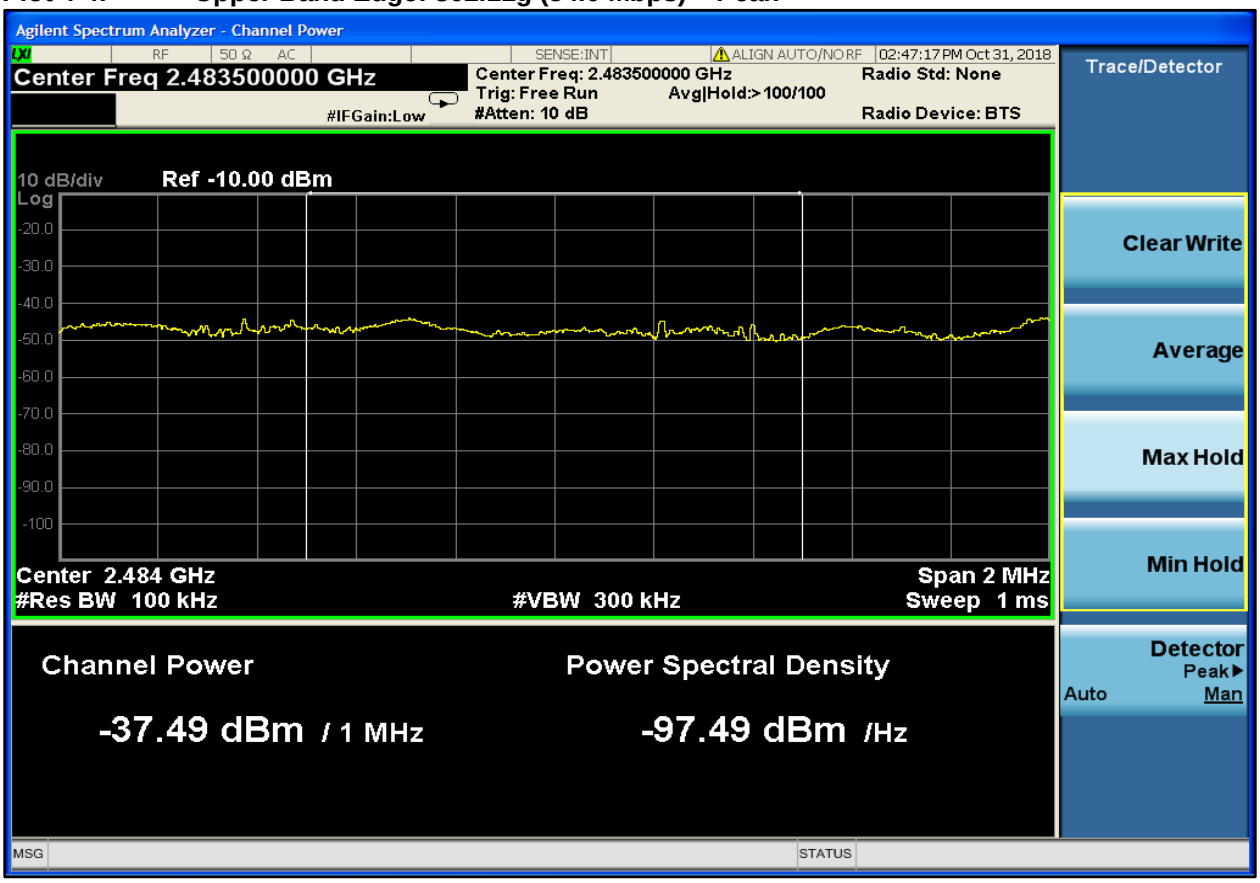


Table 4-5: Upper Band Edge: 802.11g (54.0 Mbps) – Peak

Frequency (MHz)	Measured Peak Level (dBm)	Field Strength Conversion (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)
2484.0	-37.5	57.7	74.0	-16.3

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		October 31, 2018
Test Engineer	Signature	Date of Test

5 Antenna Conducted Spurious Emissions – §15.247(d), C63.10 11.12.2

5.1 Antenna Conducted Spurious Emissions Test Procedures

Antenna spurious emissions per FCC 15.247(d) were measured from the EUT antenna port using a 50 ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 100 kHz. The modulated carrier was identified at the following frequencies: 2412 MHz, 2437 MHz and 2462 MHz.

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

5.2 Antenna Conducted Spurious Emissions Test Results

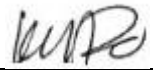
802.11g (54 Mbps) was determined to be the worst case modulation scheme.

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.

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		October 31, 2018
Test Engineer	Signature	Date of Test

6 6 dB Bandwidth – §15.247(a)(2), C63.10 11.8

6.1 6 dB Bandwidth Test Procedure

The minimum 6 dB bandwidths per FCC 15.247(a)(2) were measured using a 50 ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 1 MHz. The device was modulated. The minimum 6 dB bandwidths are presented below.

Table 6-1: 6 dB Bandwidth Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901139	Weinschel Corp	48-20-34	Attenuator 20 dB, 100 W (DC – 18 GHz)	BK5859	4/23/19
901583	Agilent Technologies	N9010A	EXA Signal Analyzer (10 Hz-26.5 GHz)	MY51250846	2/6/20

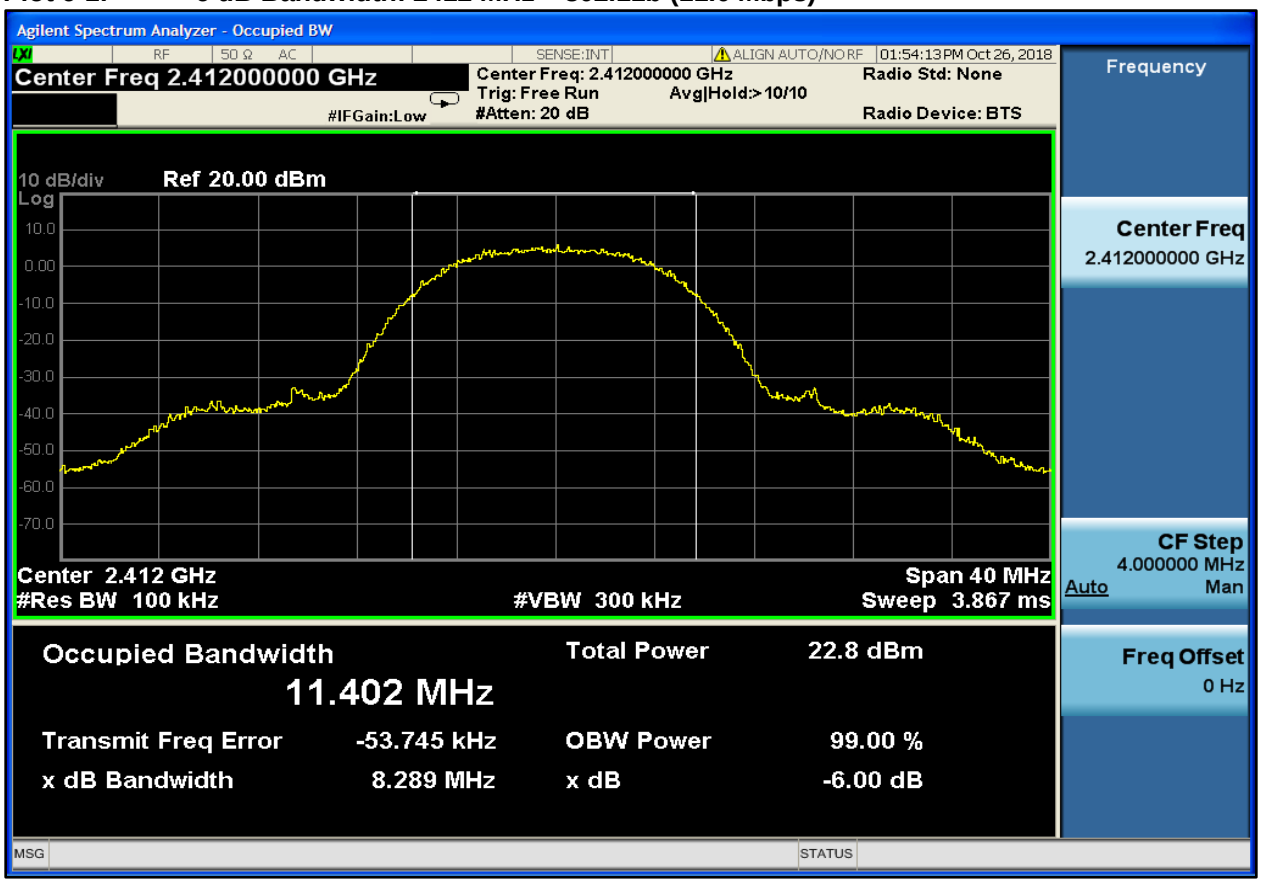
6.2 6 dB Bandwidth Test Results

Table 6-2: 6 dB Bandwidth Test Data

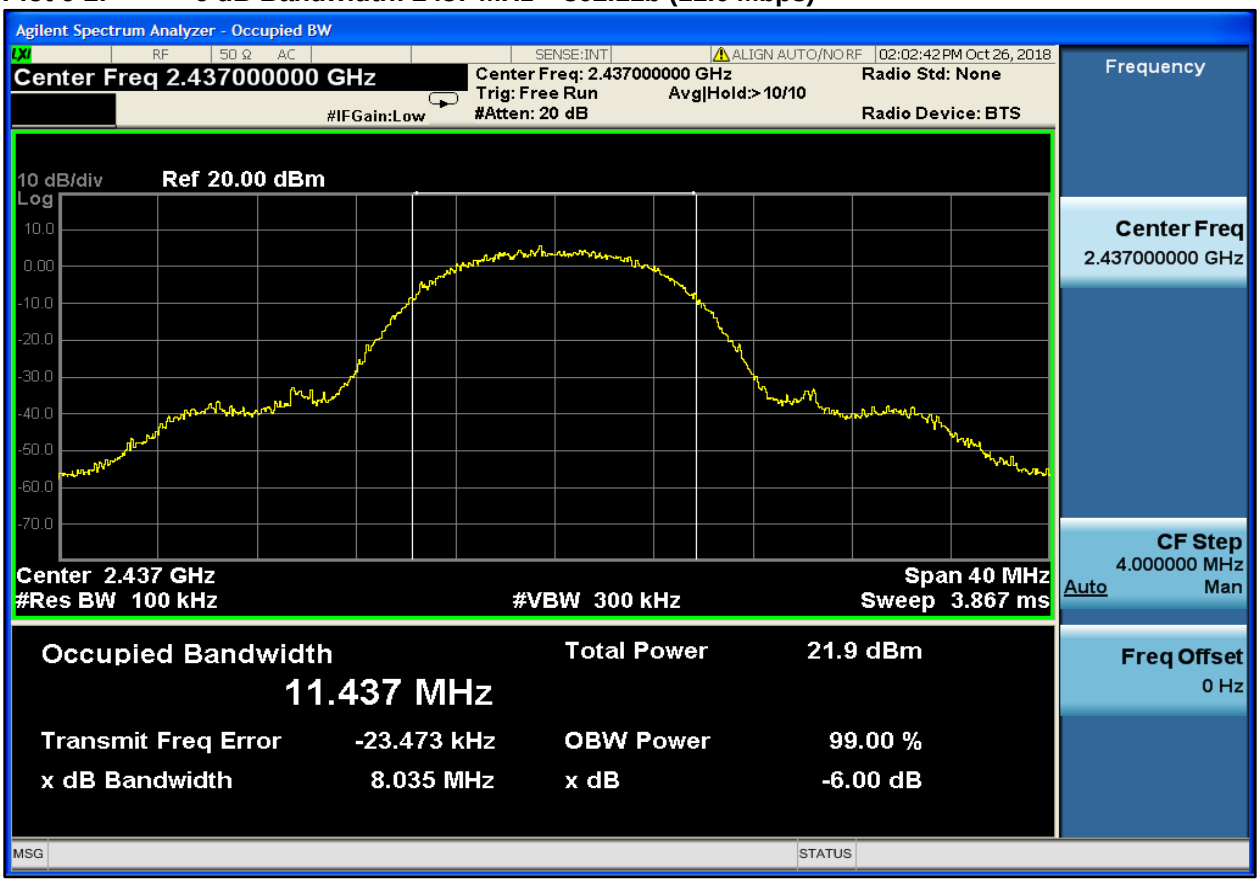
Modulation Scheme	6 dB Bandwidth (MHz)				
	Low (2412 MHz)	Mid (2437 MHz)	High (2462 MHz)	Limit (MHz)	Result (Pass / Fail)
802.11b (11 Mbps)	8.289	8.035	8.570	≥ 0.500	Pass
802.11g (54 Mbps)	15.970	15.980	15.720	≥ 0.500	Pass
802.11n (MCS7)	17.640	17.660	17.620	≥ 0.500	Pass

6.3 6 dB Bandwidth Plots

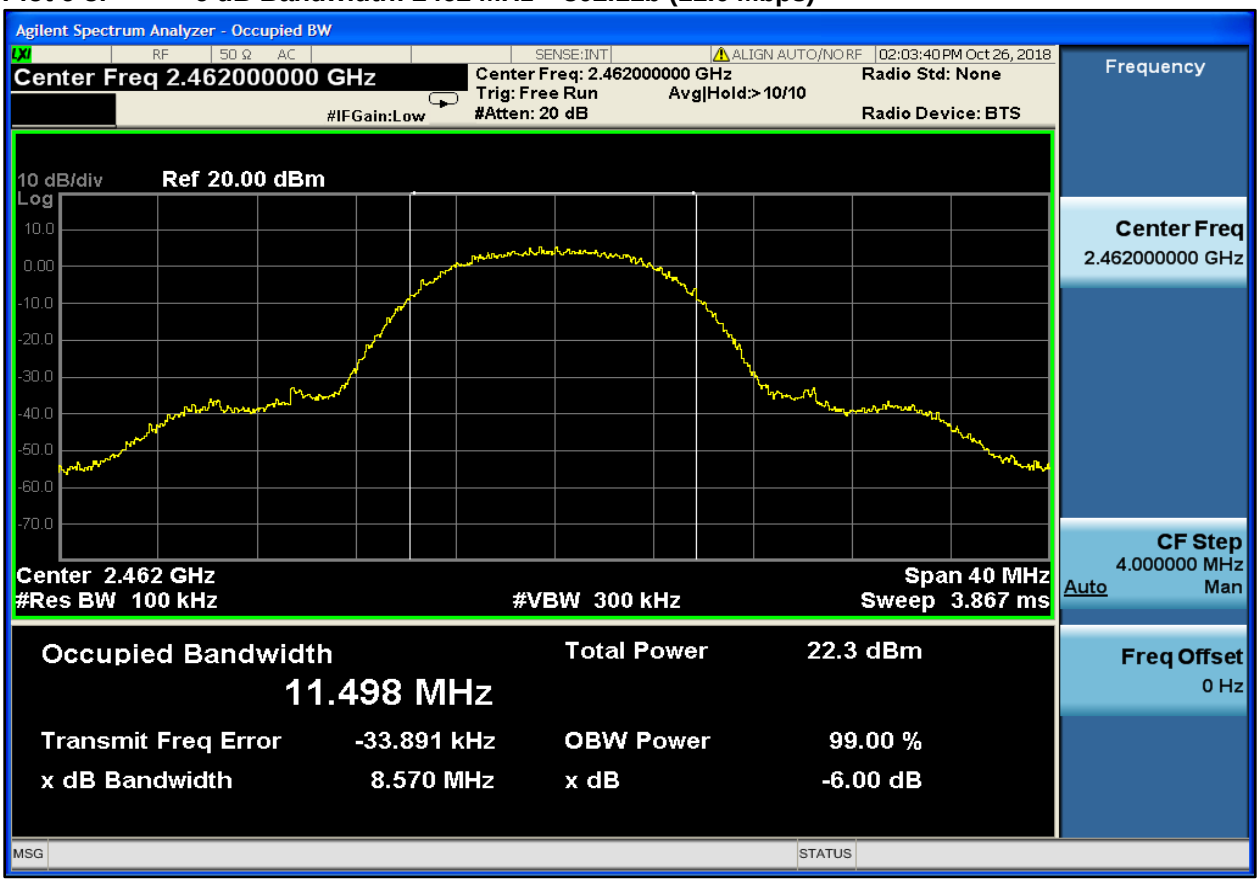
Plot 6-1: 6 dB Bandwidth: 2412 MHz – 802.11b (11.0 Mbps)



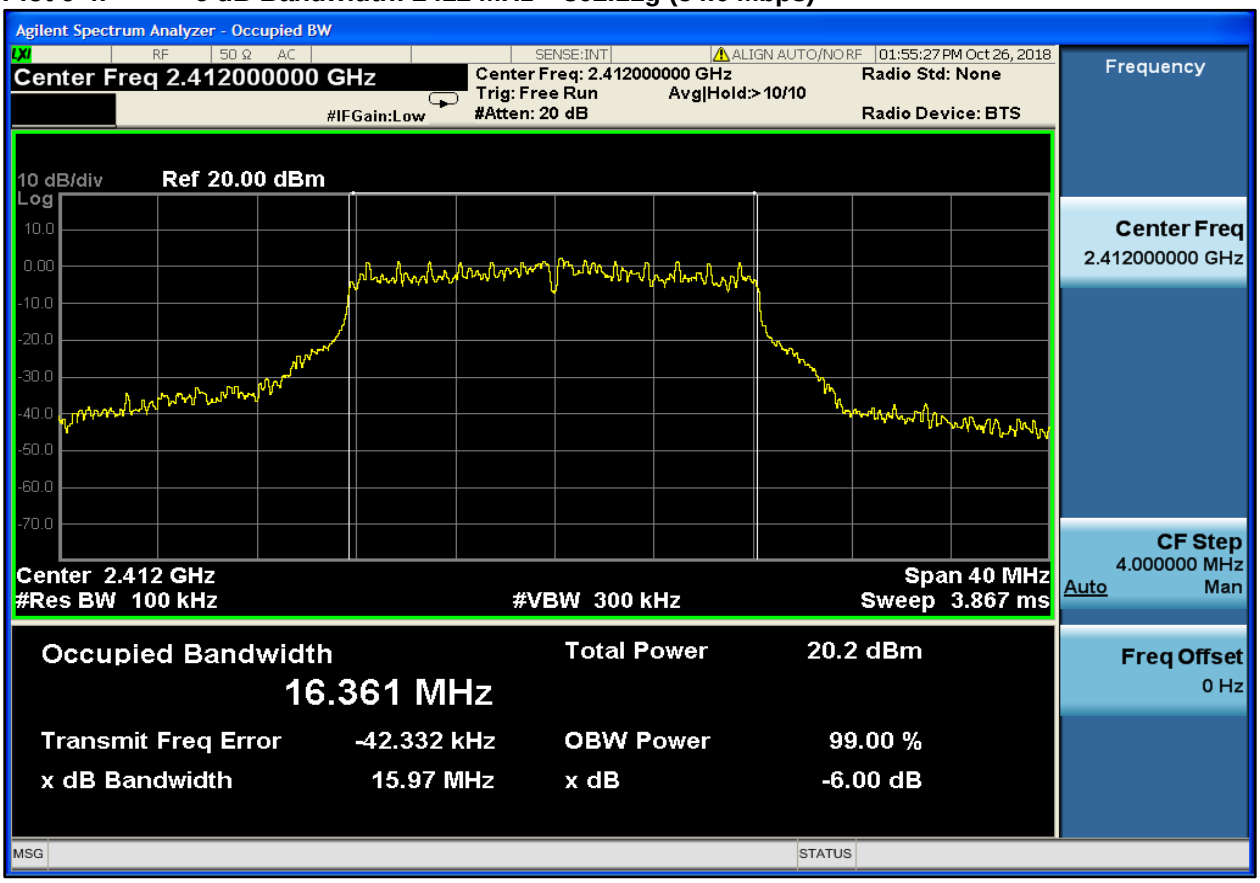
Plot 6-2: 6 dB Bandwidth: 2437 MHz – 802.11b (11.0 Mbps)



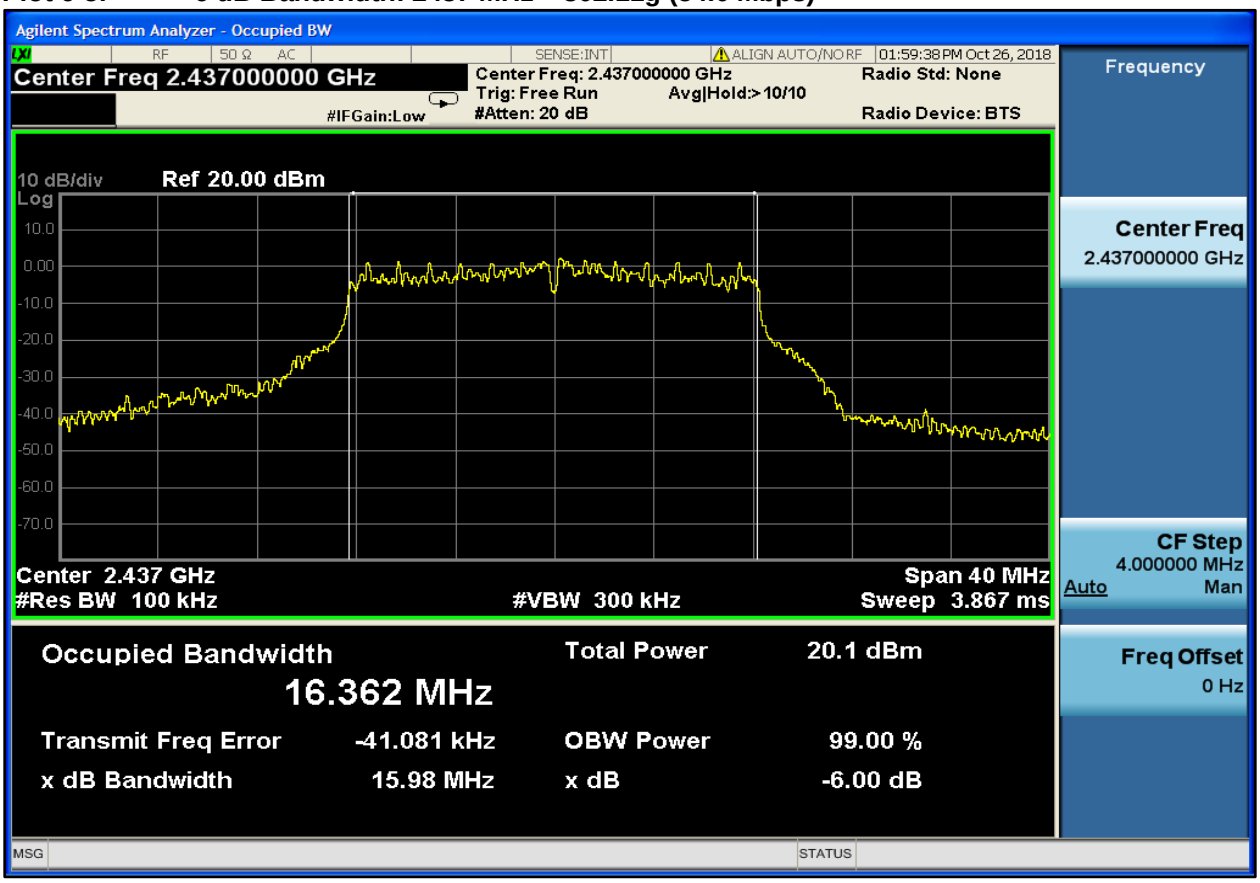
Plot 6-3: 6 dB Bandwidth: 2462 MHz – 802.11b (11.0 Mbps)



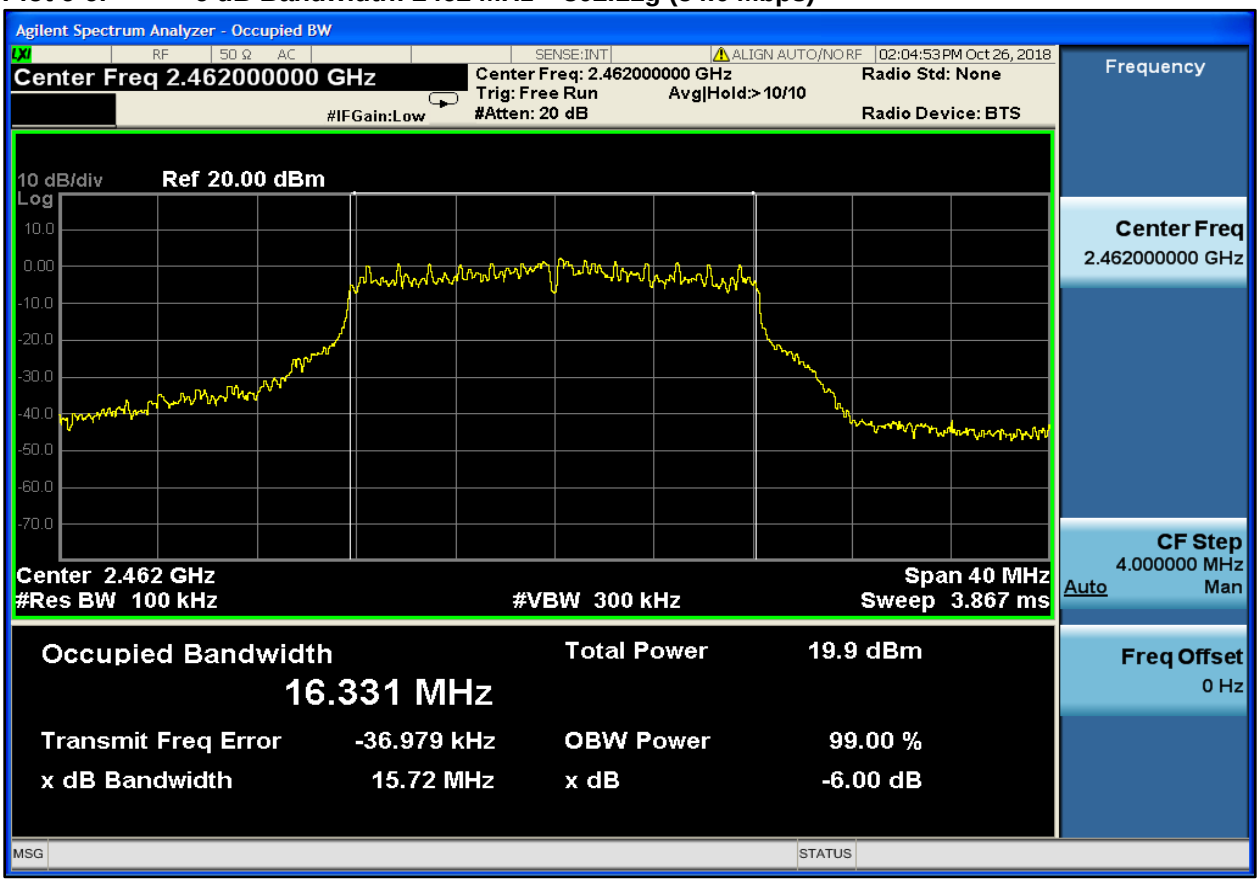
Plot 6-4: 6 dB Bandwidth: 2412 MHz – 802.11g (54.0 Mbps)



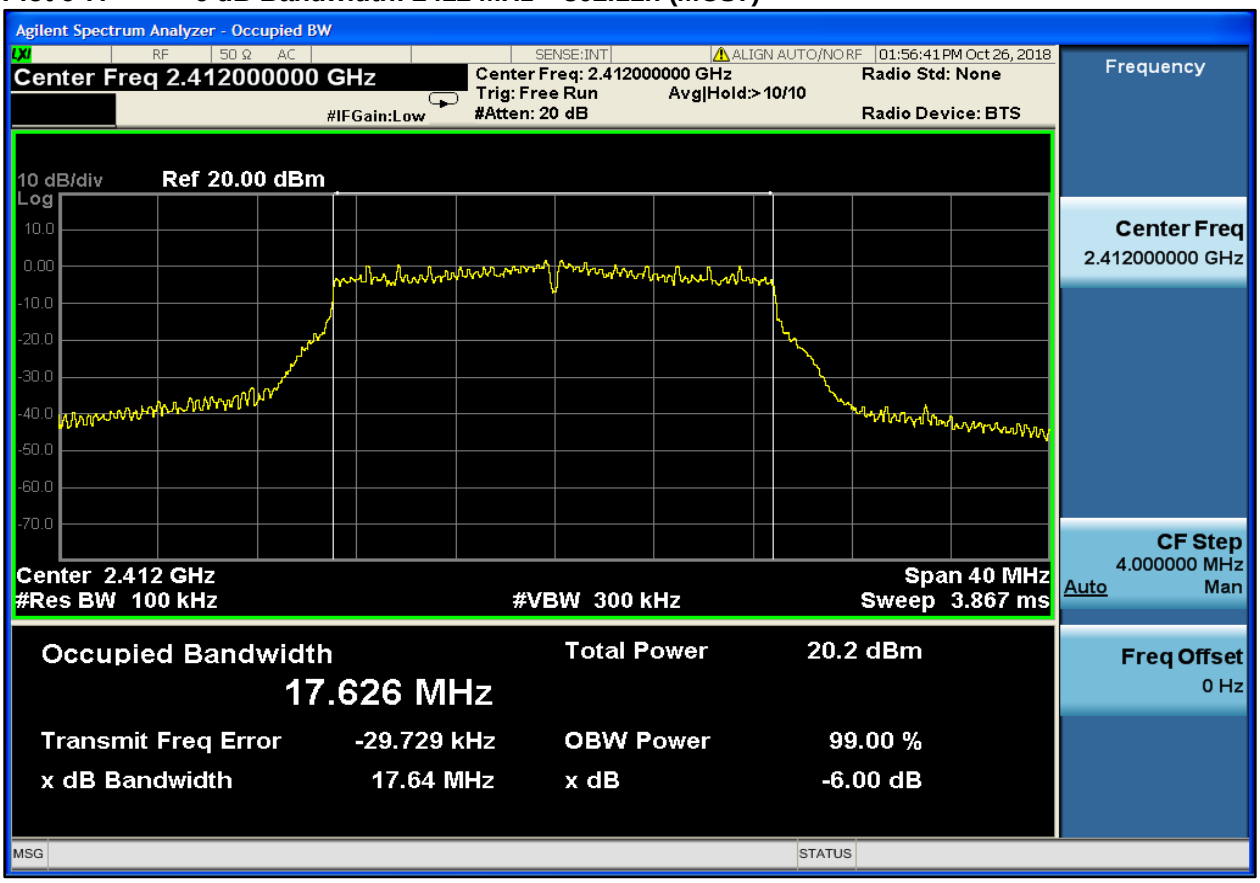
Plot 6-5: 6 dB Bandwidth: 2437 MHz – 802.11g (54.0 Mbps)



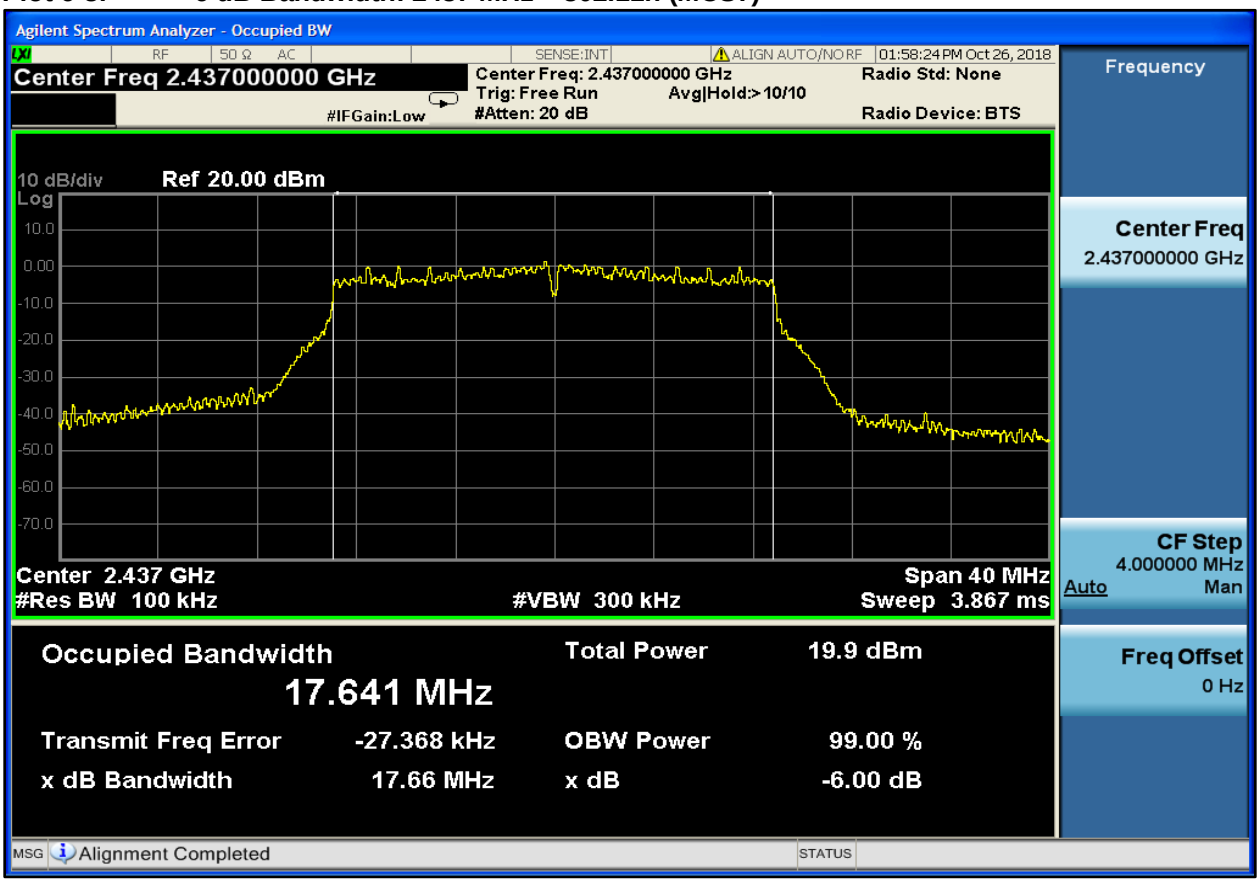
Plot 6-6: 6 dB Bandwidth: 2462 MHz – 802.11g (54.0 Mbps)



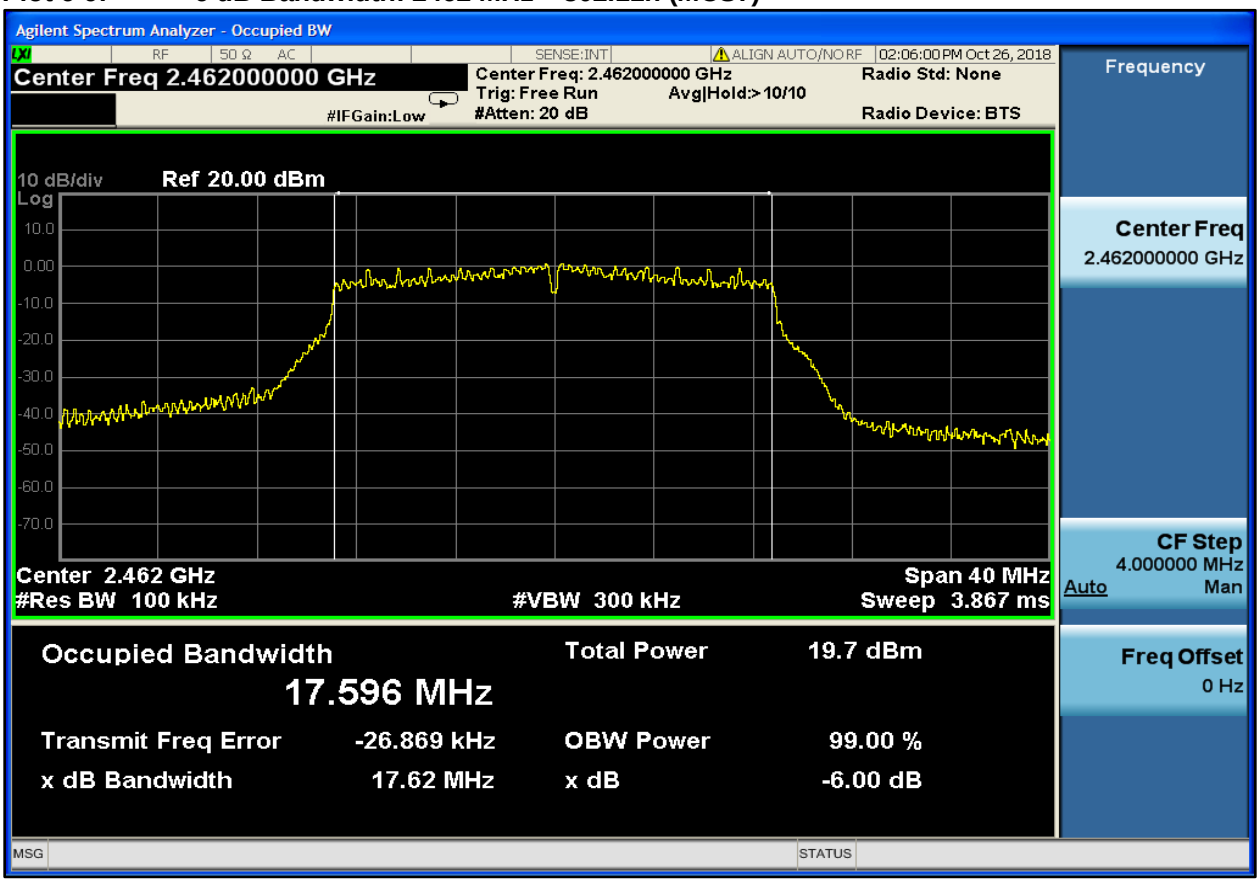
Plot 6-7: 6 dB Bandwidth: 2412 MHz – 802.11n (MCS7)



Plot 6-8: 6 dB Bandwidth: 2437 MHz – 802.11n (MCS7)



Plot 6-9: 6 dB Bandwidth: 2462 MHz – 802.11n (MCS7)



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		October 26, 2018
Test Engineer	Signature	Date of Test

7 Power Spectral Density – §15.247(e), C63.10 11.10

7.1 Power Spectral Density Test Procedure

The power spectral density per FCC 15.247(e) was measured using a 50-ohm spectrum analyzer with the resolution bandwidth set at 3 kHz, the video bandwidth set at 30 kHz, and auto sweep time. The spectral lines were resolved for the modulated carriers at 2412 MHz, 2437 MHz, and 2462 MHz for Wi-Fi. These levels are below the +8 dBm limit.

Table 7-1: Power Spectral Density 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

7.2 Power Spectral Density Test Results

Table 7-2: PSD Test Data

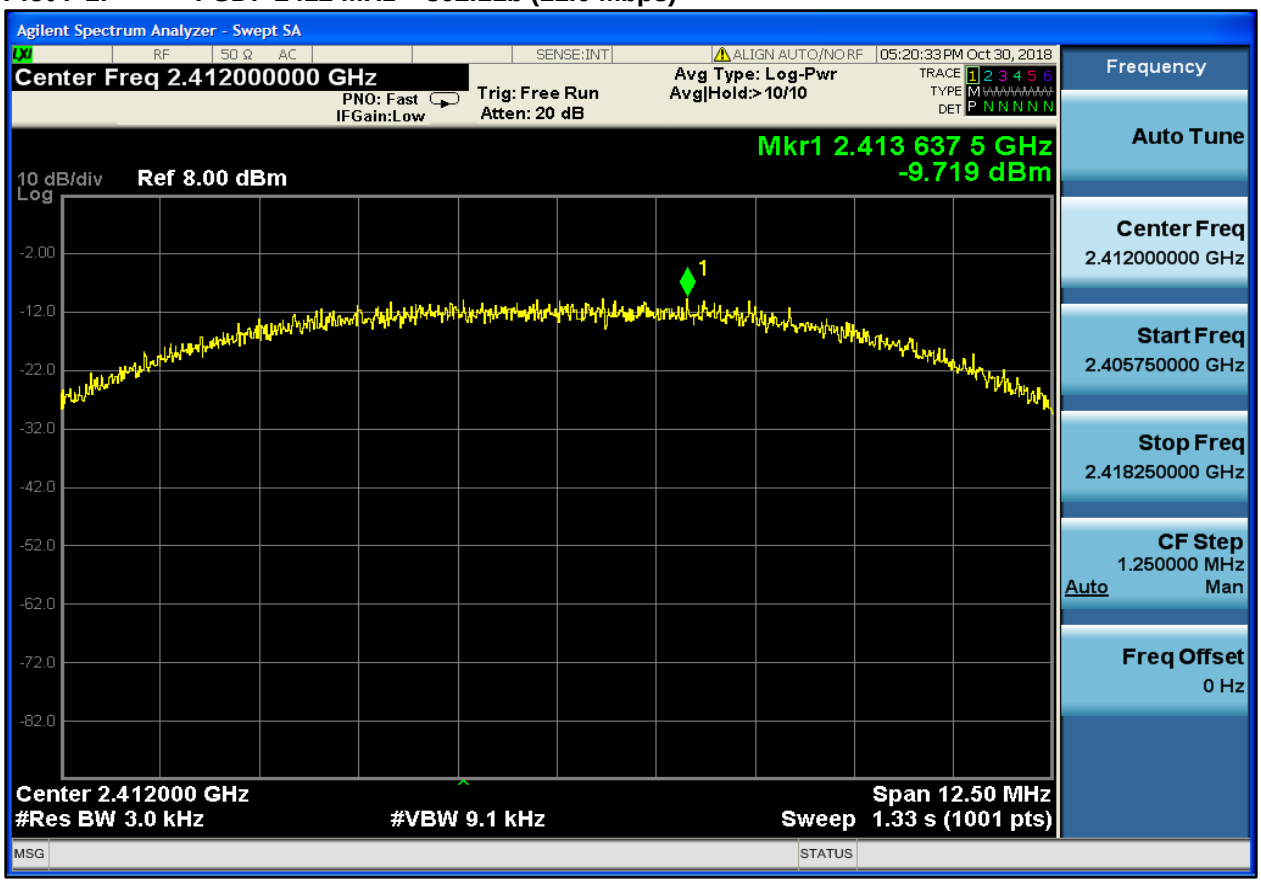
Modulation Scheme	PSD (dBm)		
	Low (2412 MHz)	Mid (2437 MHz)	High (2462 MHz)
802.11b (11 Mbps)	-9.7	-9.0	-9.4
802.11g (54 Mbps)	-11.8	-11.8	-11.8
802.11n (MCS7)	-12.2	-12.6	-13.1

Table 7-3: PSD Test Data – Worst Case

Channel (#)	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)	Result (Pass / Fail)
1	2412	-9.7	8.0	-17.7	Pass
6	2437	-9.0	8.0	-17.0	Pass
11	2462	-9.4	8.0	-17.4	Pass

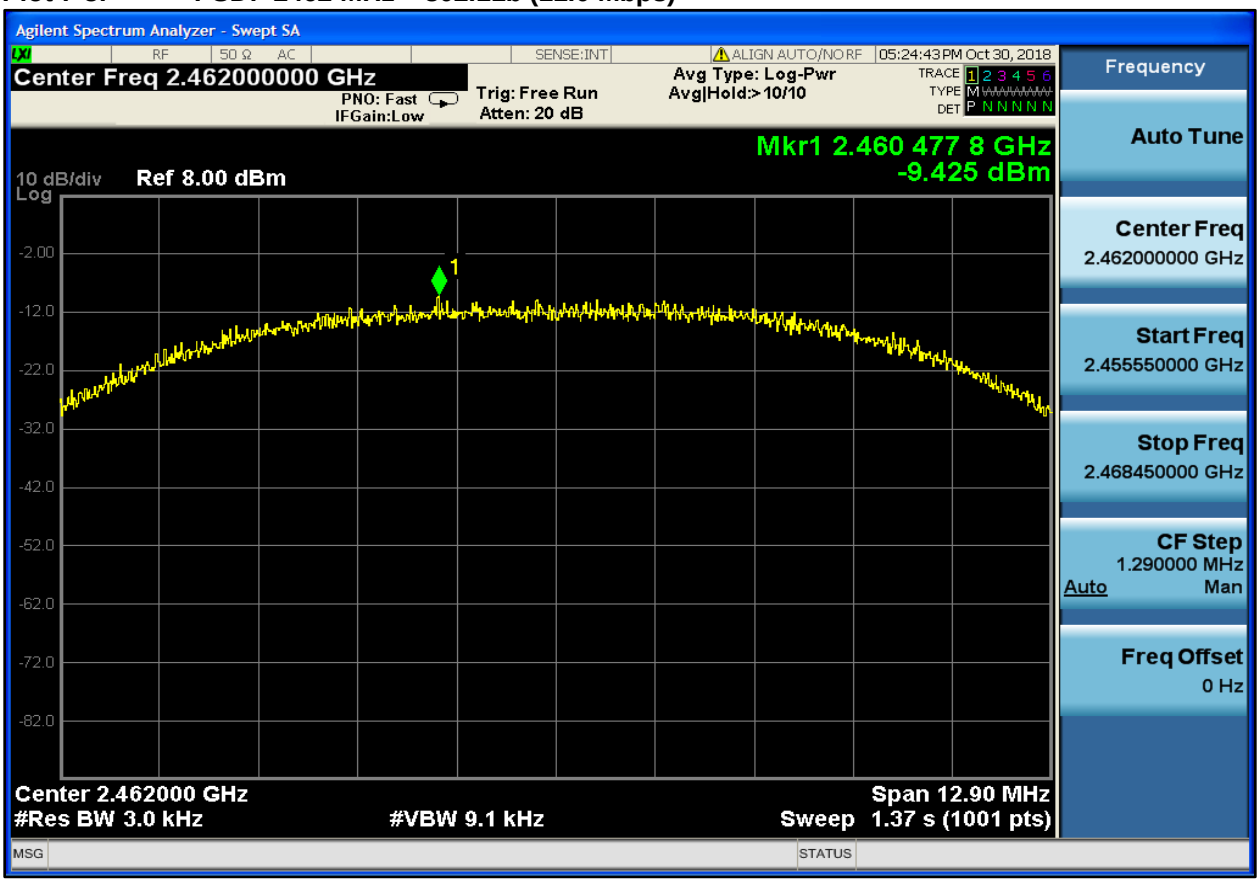
7.3 Power Spectral Density Plots

Plot 7-1: PSD: 2412 MHz – 802.11b (11.0 Mbps)

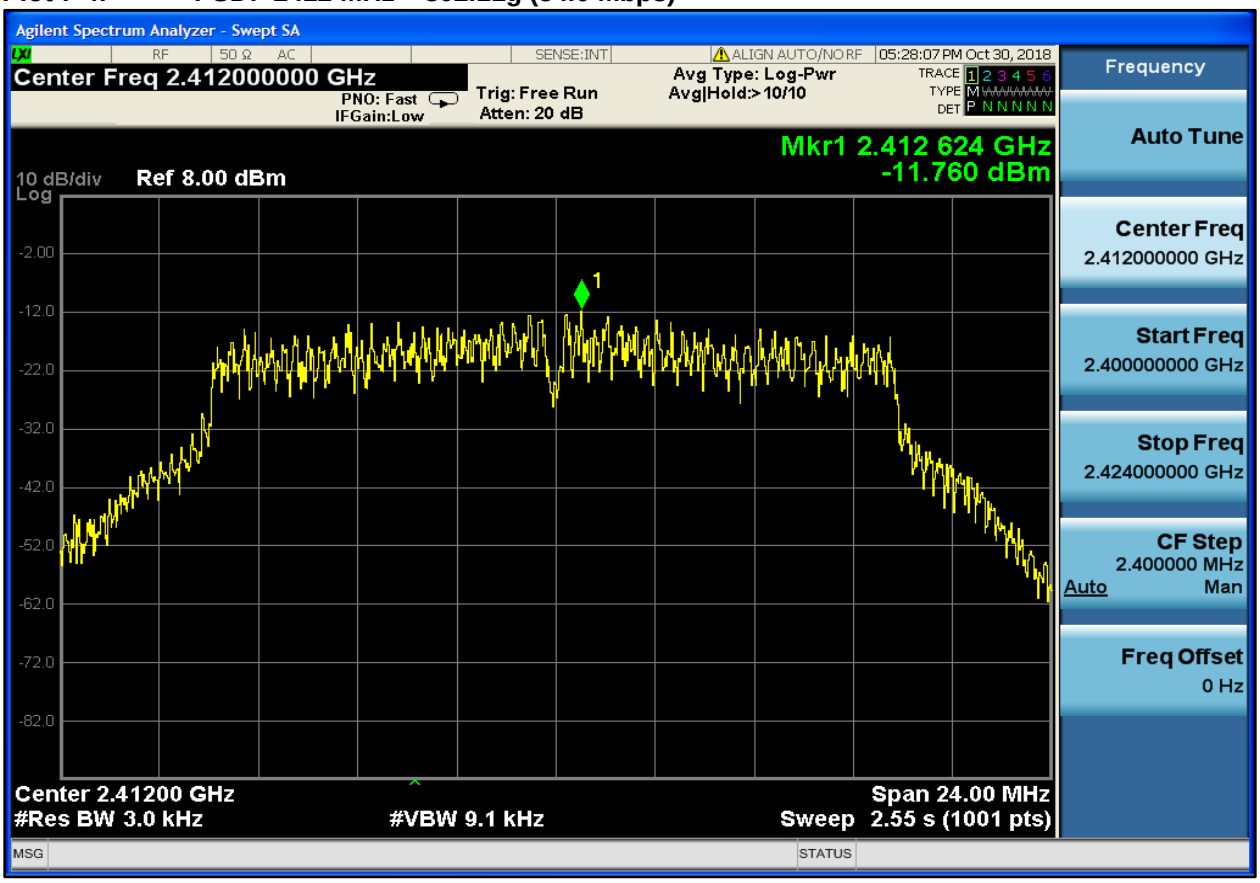


Plot 7-2: PSD: 2437 MHz – 802.11b (11.0 Mbps)

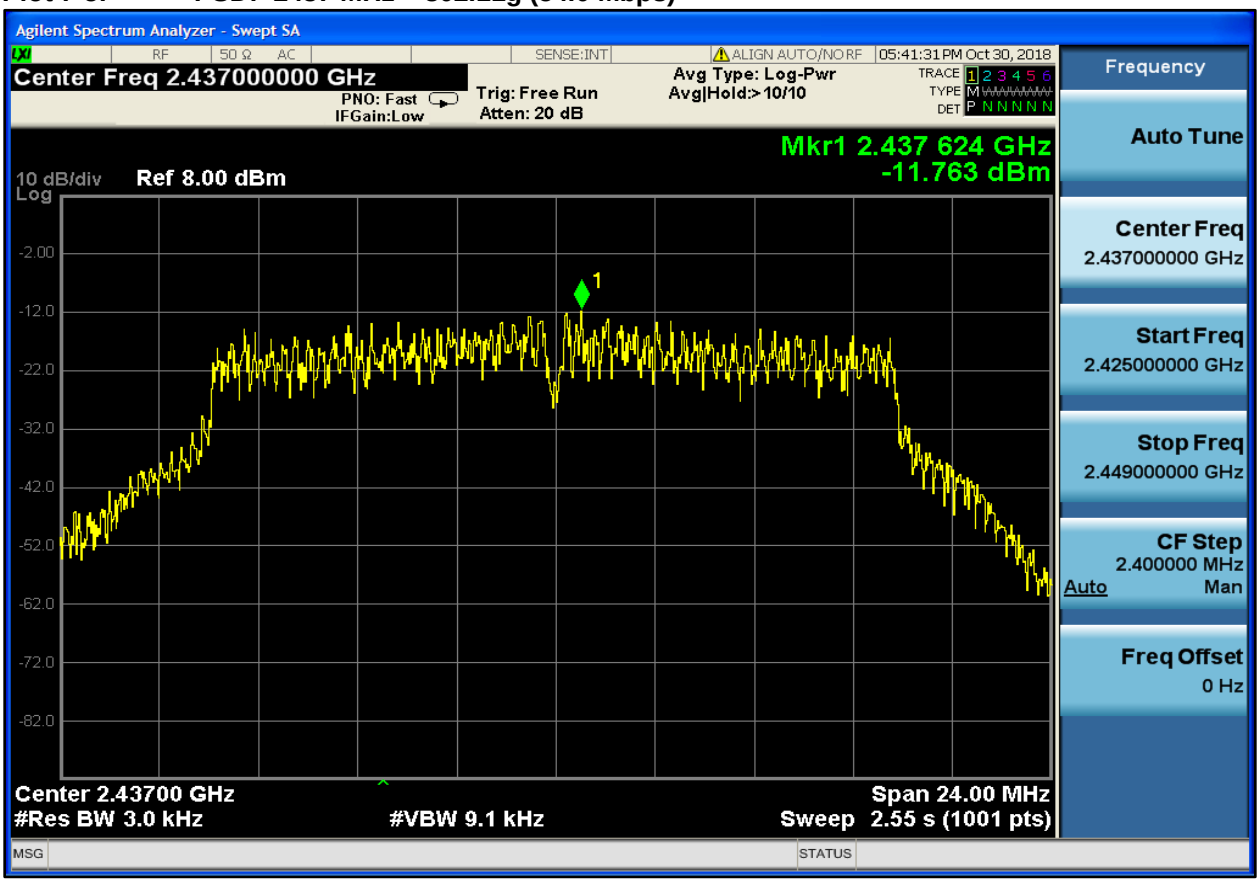
Plot 7-3: PSD: 2462 MHz – 802.11b (11.0 Mbps)



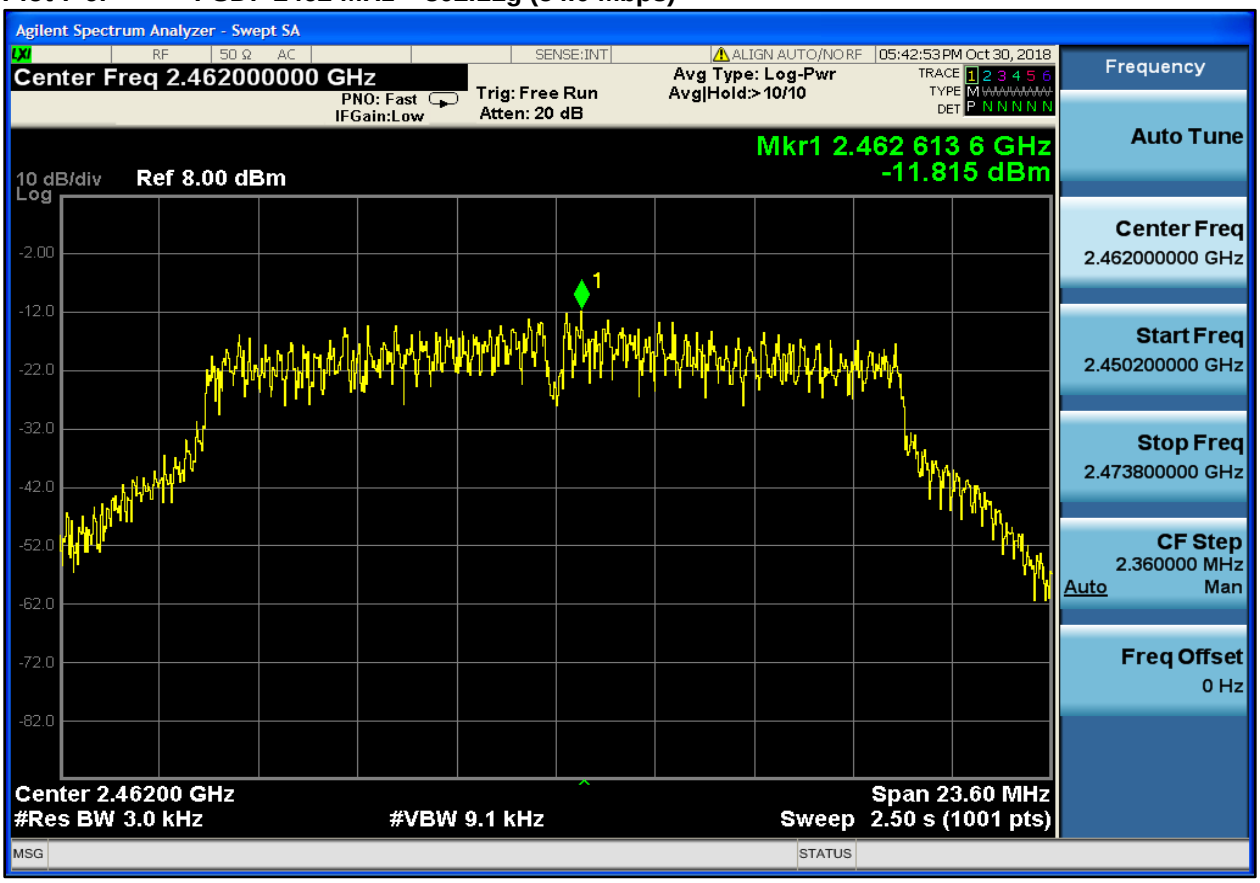
Plot 7-4: PSD: 2412 MHz – 802.11g (54.0 Mbps)



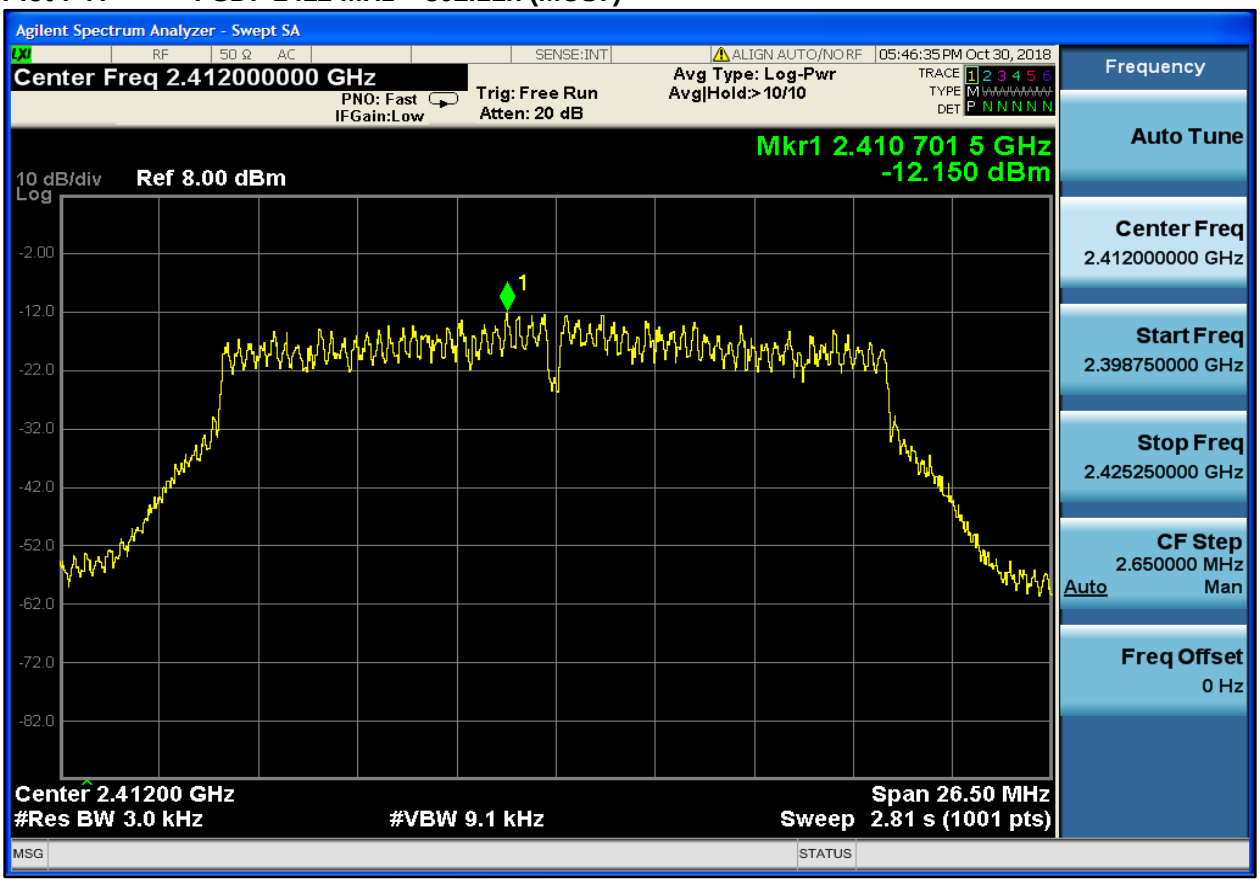
Plot 7-5: PSD: 2437 MHz – 802.11g (54.0 Mbps)



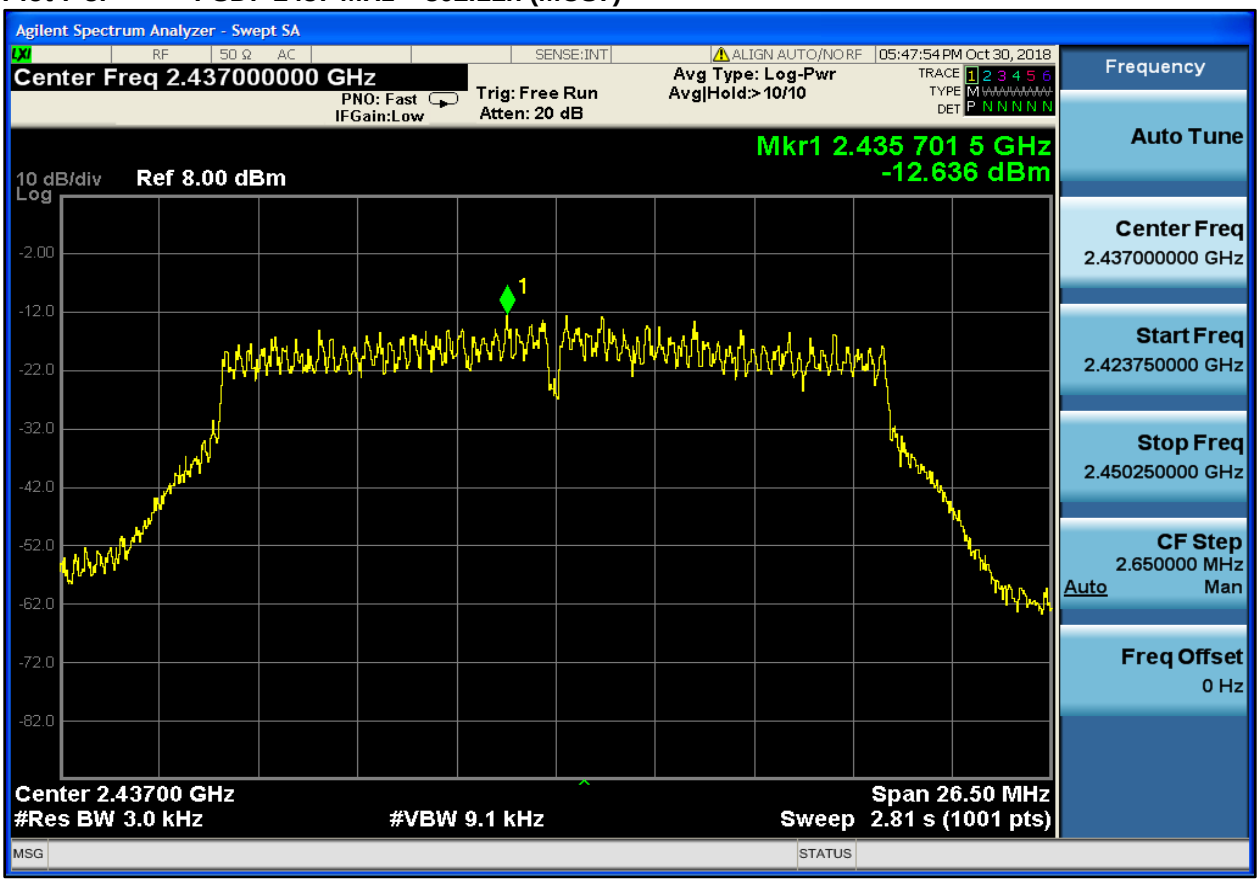
Plot 7-6: PSD: 2462 MHz – 802.11g (54.0 Mbps)



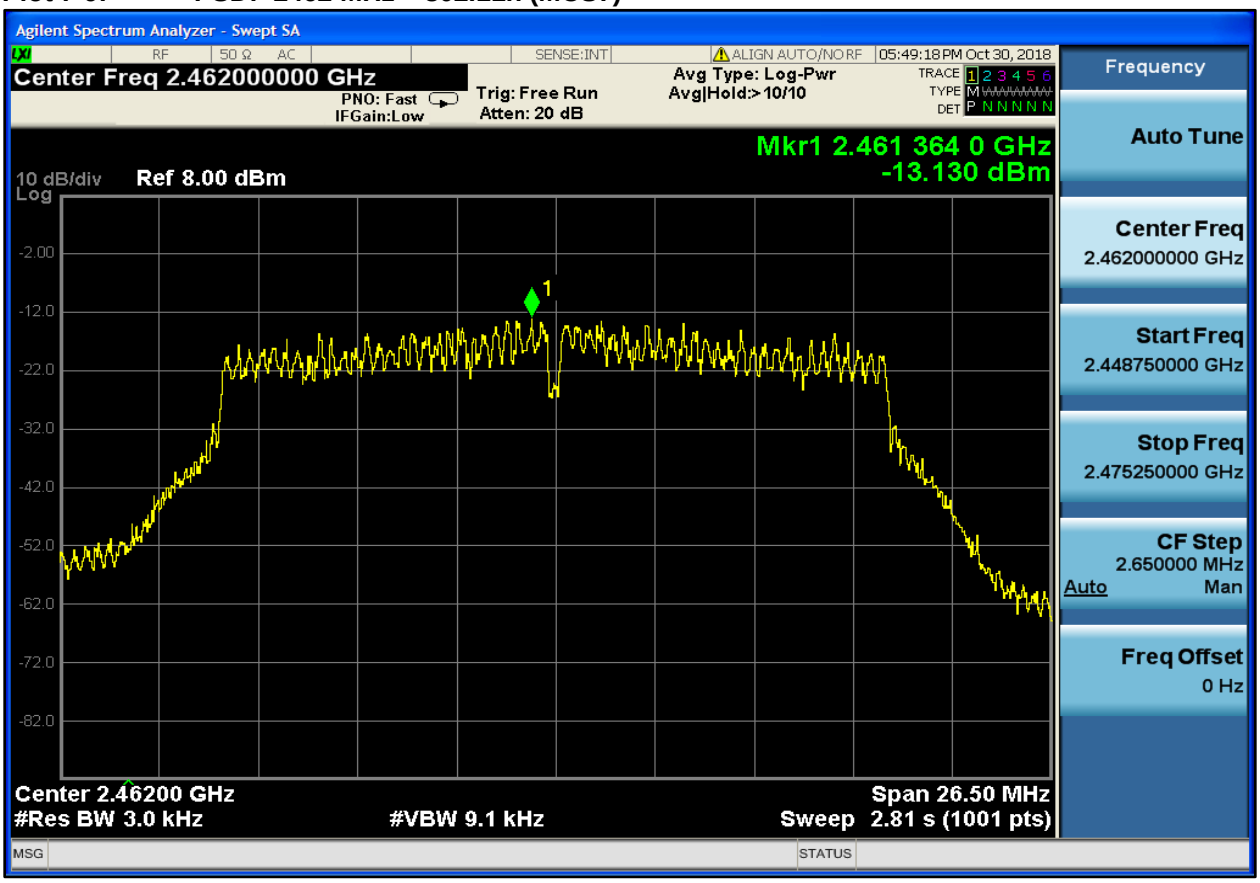
Plot 7-7: PSD: 2412 MHz – 802.11n (MCS7)



Plot 7-8: PSD: 2437 MHz – 802.11n (MCS7)



Plot 7-9: PSD: 2462 MHz – 802.11n (MCS7)



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		October 30, 2018
Test Engineer	Signature	Date of Test

8 AC Conducted Emissions – §15.207, C63.10 6.2

8.1 Limits of Conducted Emissions Measurement

Table 8-1: AC Conducted Emissions Limits

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-peak	Average
0.15 – 0.5	66-56	56-46
0.5 – 5.0	56	46
5.0 – 30.0	60	50

8.2 Conducted Emissions Measurement Test Procedure

The power line conducted emission measurements were performed in a type shielded enclosure. The EUT was placed on a wooden table. Power was fed to the EUT through a 50-ohm/50 microhenry Line Impedance Stabilization Network (LISN). The EUT LISN was fed power through an AC filter box mounted on the shielded enclosure. The filter box and EUT LISN housing are bonded to the ground plane of the shielded enclosure. A second LISN, the peripheral LISN, provides isolation for the EUT's auxiliary equipment. This peripheral LISN was also fed AC power.

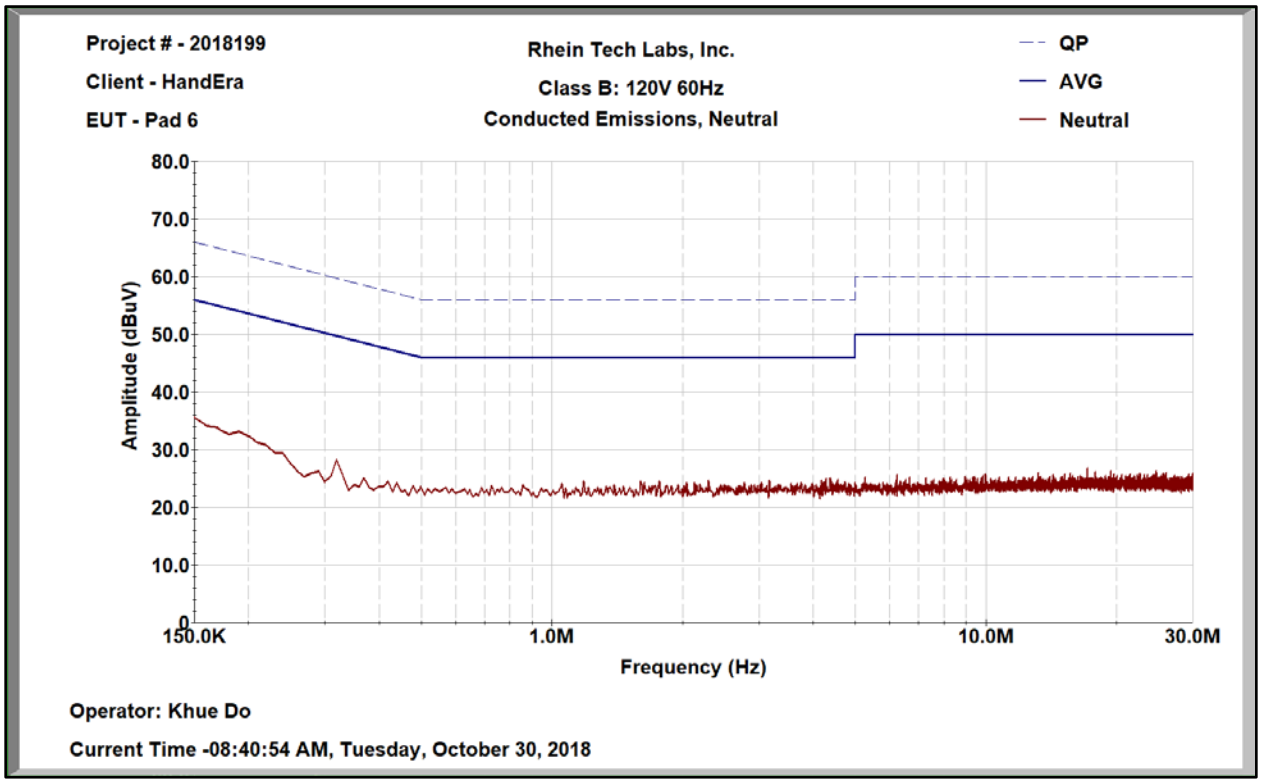
The spectrum analyzer was connected to the AC line through an isolation transformer. The 50-ohm output of the EUT LISN was connected to the spectrum analyzer input through a Solar 100 kHz high-pass filter. The filter is used to prevent overload of the spectrum analyzer from noise below 100 kHz. Conducted emission levels were measured on each current-carrying line with the spectrum analyzer operating in the CISPR quasi-peak mode (or peak mode if applicable). The analyzer's 6 dB bandwidth was set to 9 kHz. Video filter less than 10 times the resolution bandwidth is not used. Average measurements are performed in linear mode using a 10 kHz resolution bandwidth, a 1 Hz video bandwidth, by increasing the sweep time in order to obtain a calibrated measurement. The emission spectrum was scanned from 150 kHz to 30 MHz.

Table 8-2: AC Conducted Emissions Test Equipment

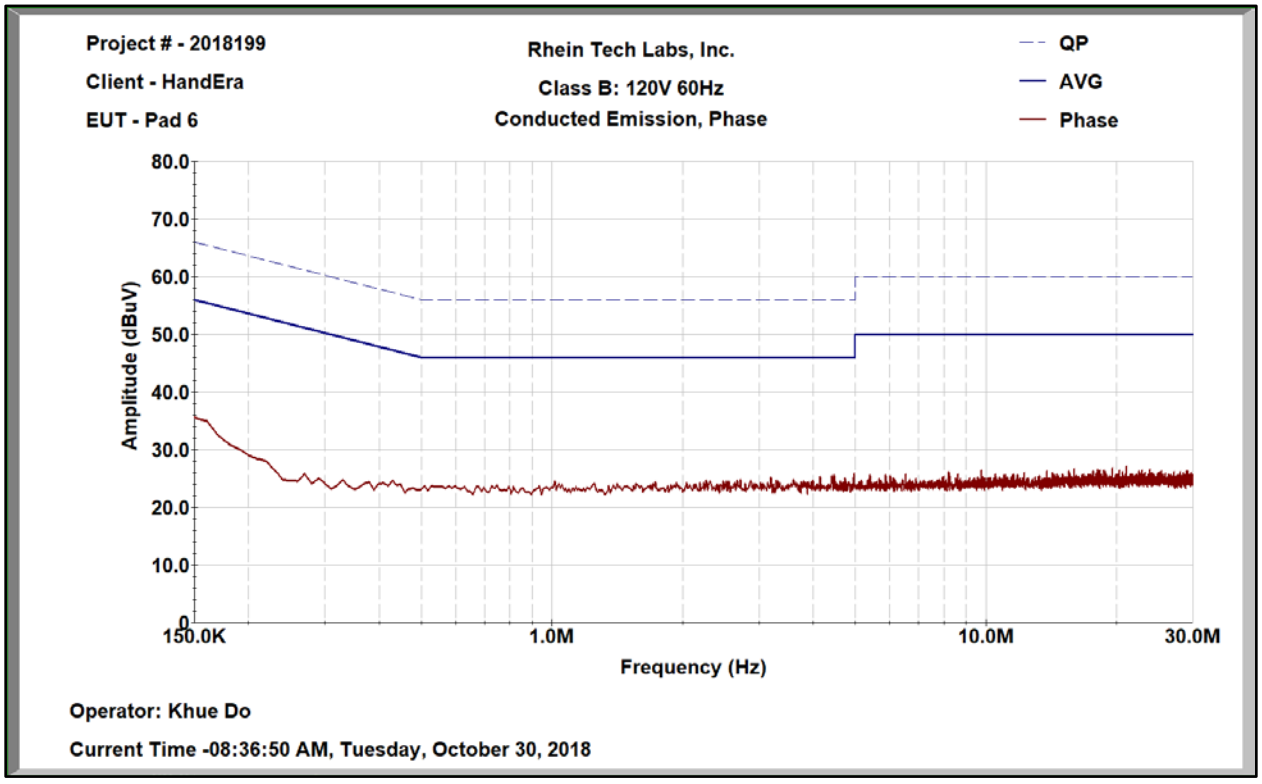
RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900339	Hewlett Packard	85650A	Quasi-Peak Adapter	2521A00743	4/26/19
900728	Solar	Type 8130-7.0	Filter	N/A	4/24/20
900930	Hewlett Packard	85662A	Spectrum Analyzer Display	3144A20839	4/16/19
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz–22 GHz)	3138A07771	4/26/19
901083	AFJ International	LS16/110VAC	16A LISN	16010020080	2/13/21
901636	Fischer Custom Communications	F-52	RF Current Probe (10 kHz-500 MHz)	130484	2/8/19
N/A	ETS-Lindgren	Tile! 7	Test Software	7.1.3.20	N/A

8.3 Conducted Emissions Test Results

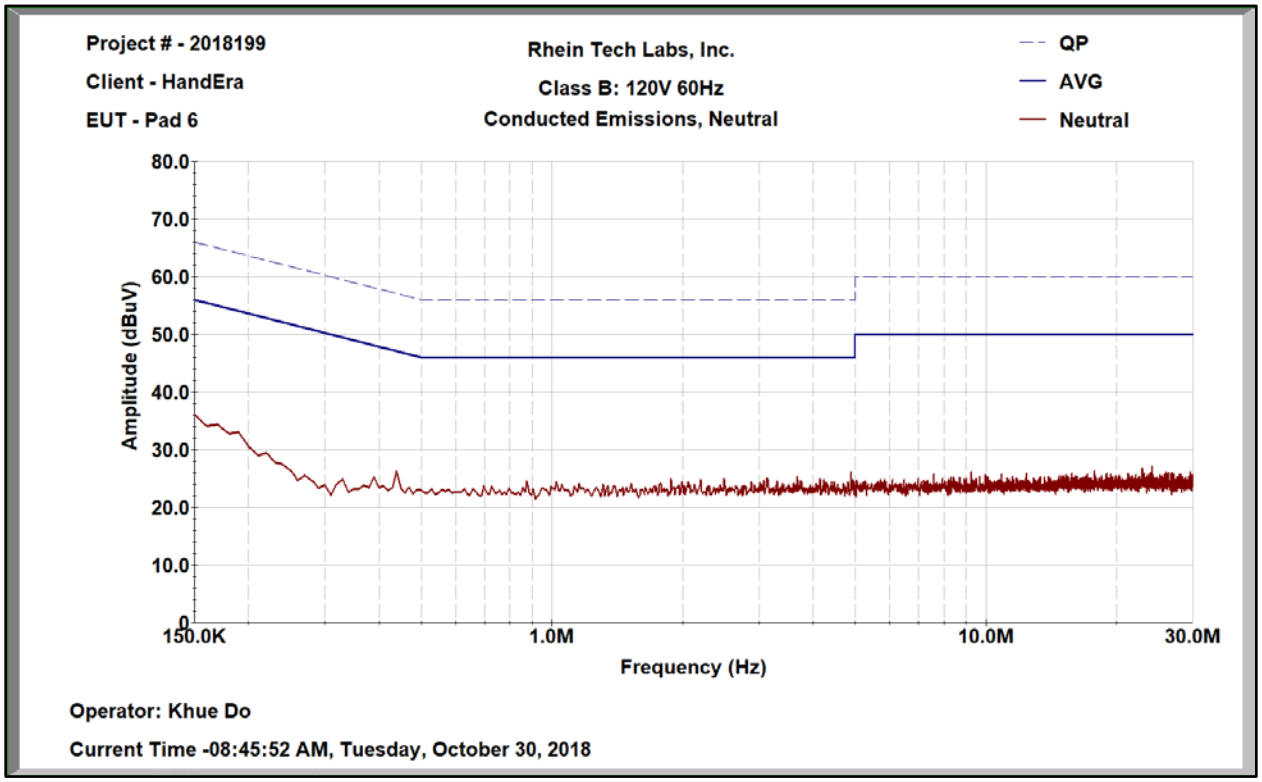
Plot 8-1: AC Conducted Emissions: Ethernet Dock – Neutral – RX Mode



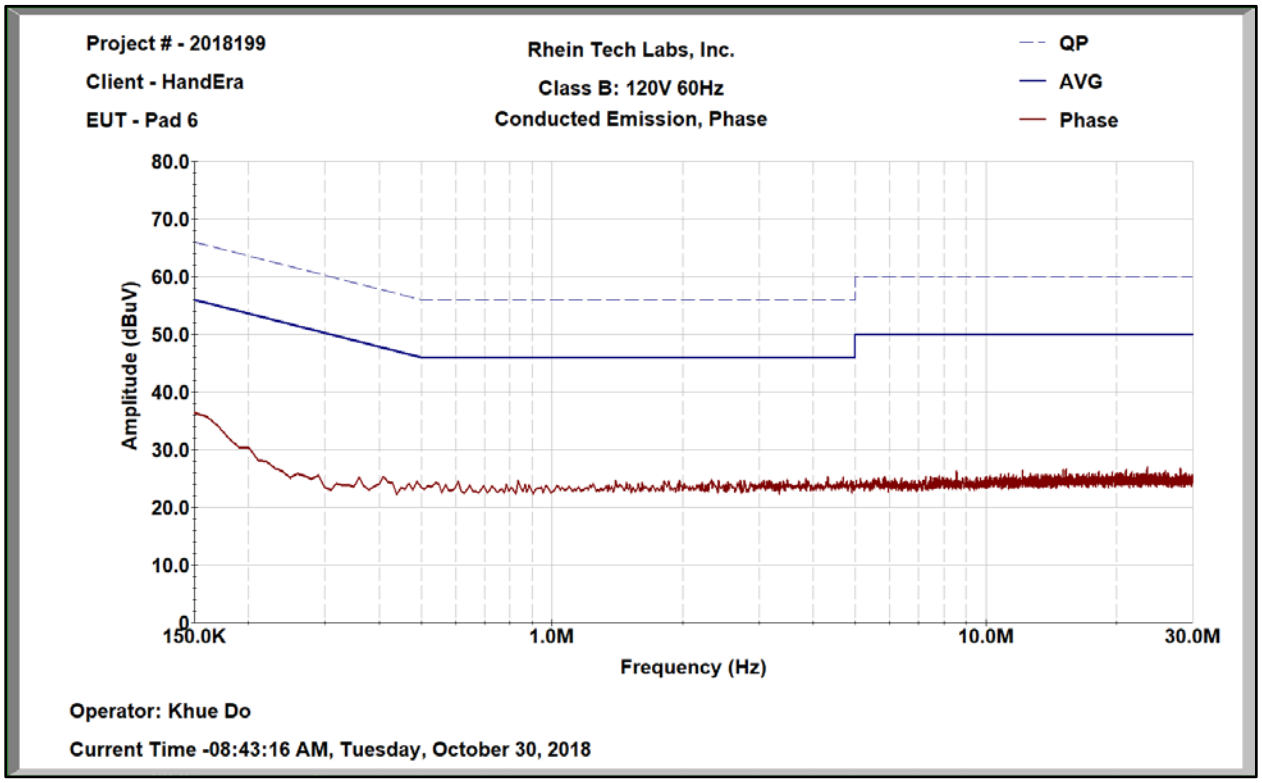
Plot 8-2: AC Conducted Emissions: Ethernet Dock – Phase – RX Mode



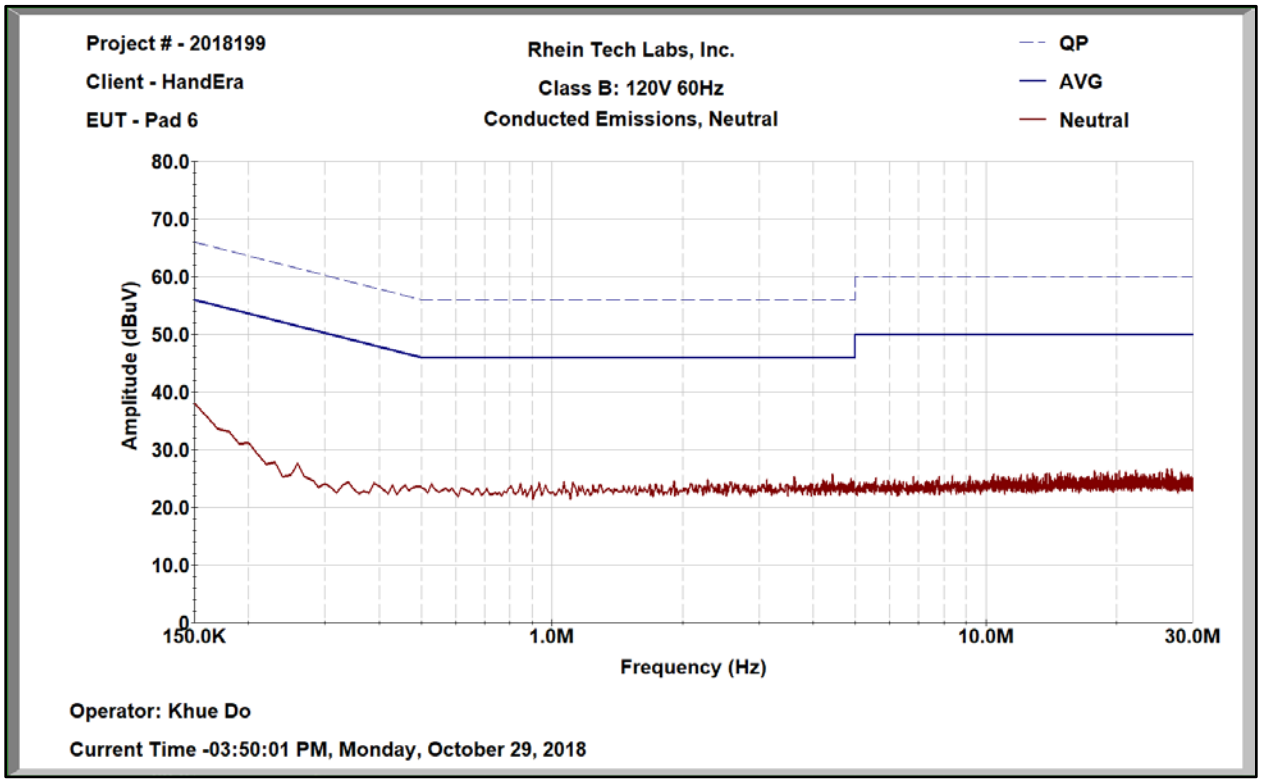
Plot 8-3: AC Conducted Emissions: Ethernet Dock – Neutral – TX Mode



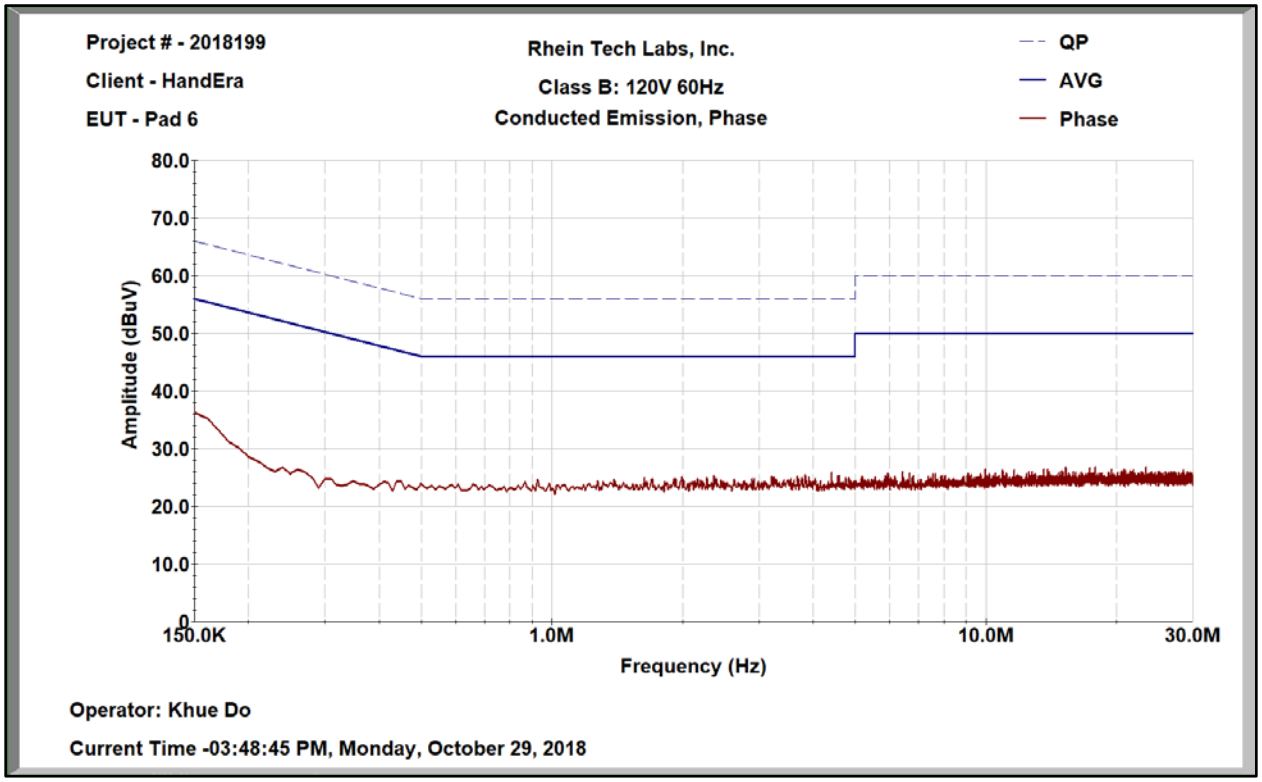
Plot 8-4: AC Conducted Emissions: Ethernet Dock – Phase – TX Mode



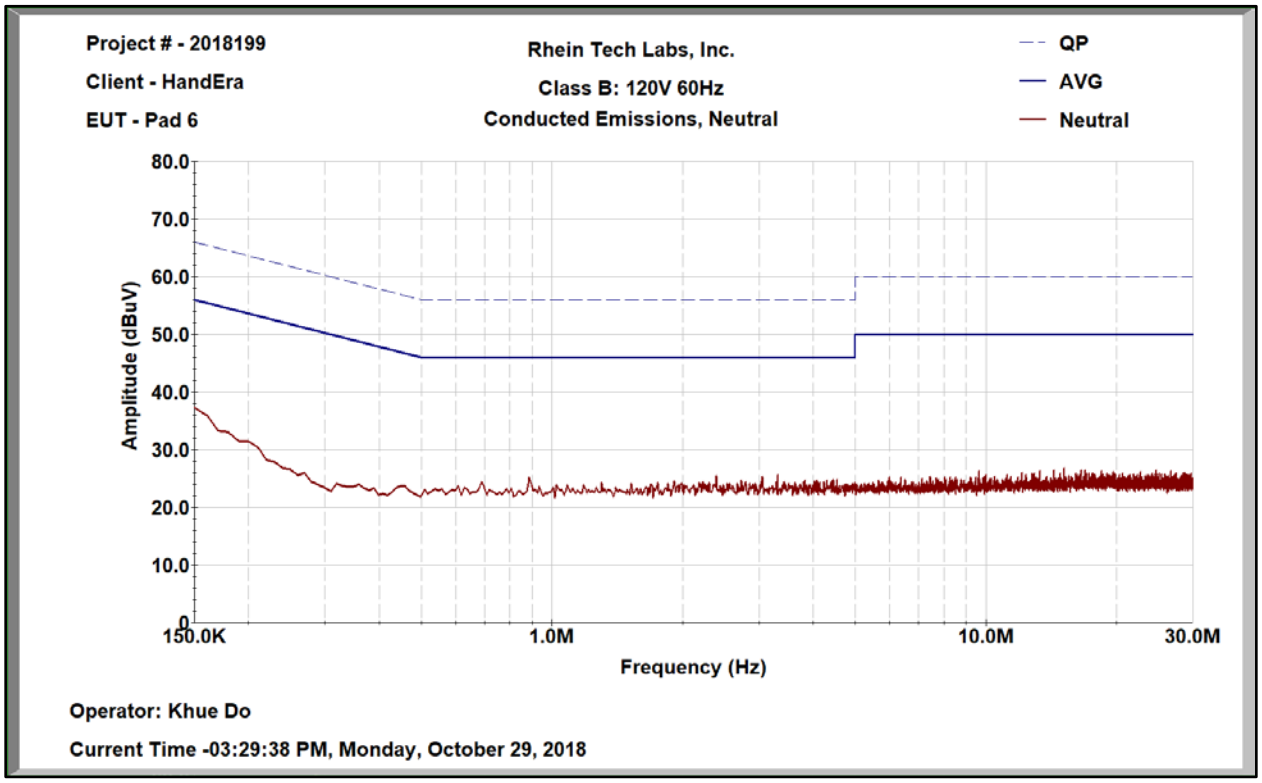
Plot 8-5: AC Conducted Emissions: USB Dock – Neutral – RX Mode



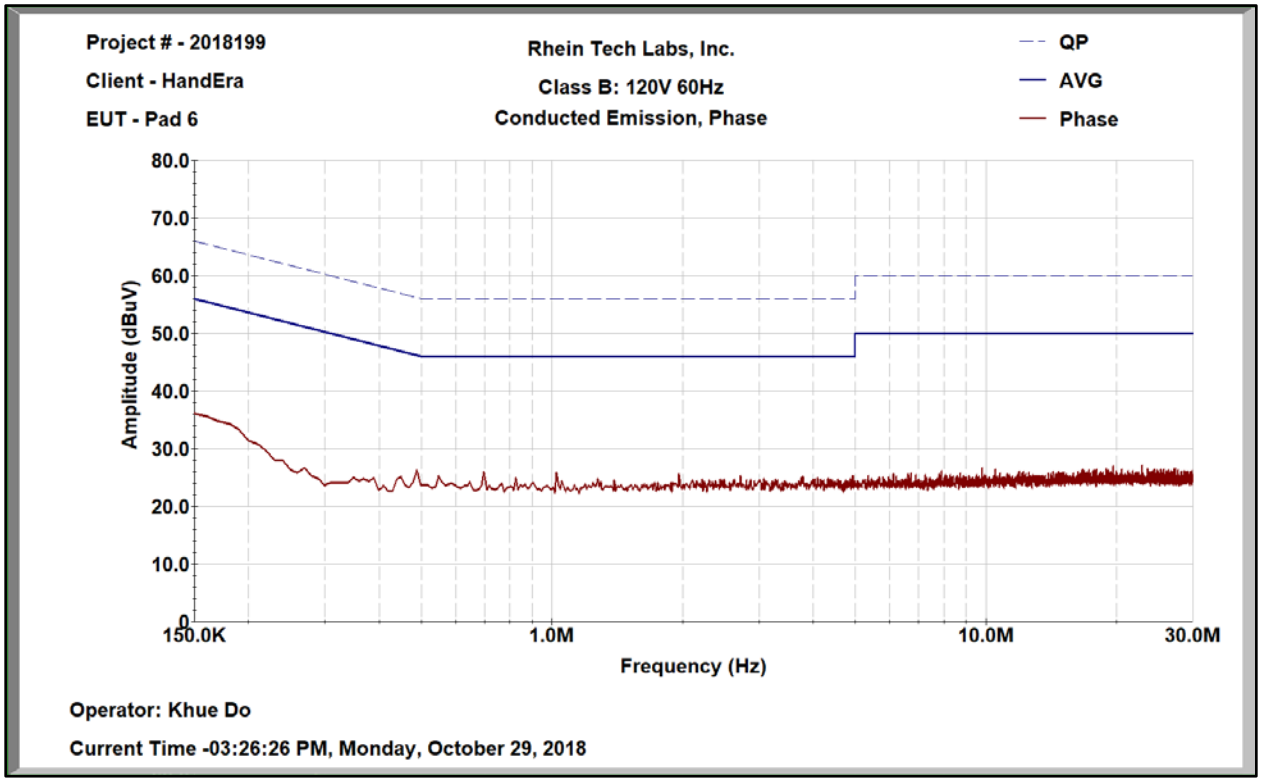
Plot 8-6: AC Conducted Emissions: USB Dock – Phase – RX Mode



Plot 8-7: AC Conducted Emissions: USB Dock – Neutral – TX Mode



Plot 8-8: AC Conducted Emissions: USB Dock – Phase – TX Mode



Plot 8-9: Conducted Emissions: Ethernet Line

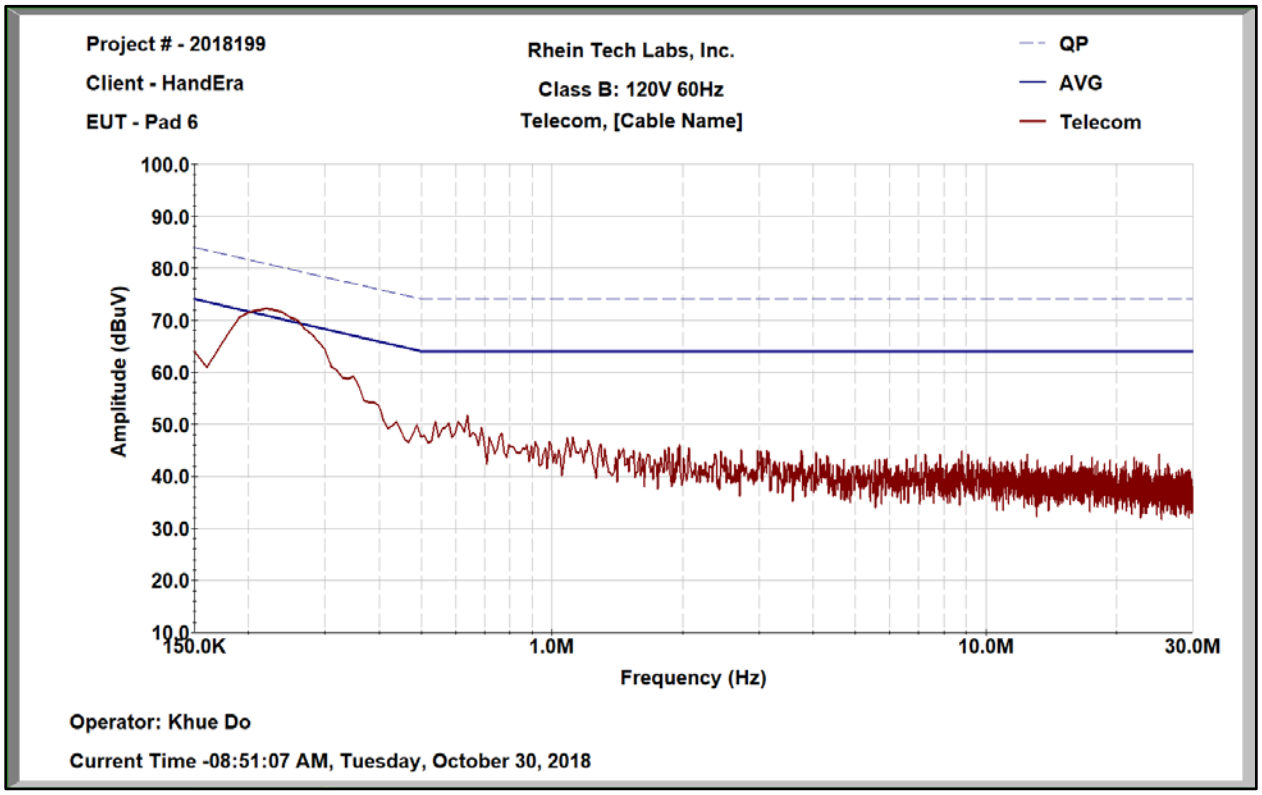


Table 8-3: Conducted Emissions: Ethernet Line Data

Frequency (MHz)	Detector	Raw (dBµV)	SCF (dB)	Corrected (dBµV)	Limit (dBµV)	Margin (dB)	Result (Pass / Fail)
0.250	QPK	23.4	35.4	58.8	80.5	-21.7	Pass
0.250	AVG	2.6	35.4	38.0	70.5	-32.5	Pass

Note: SCF – Site Correction Factor

Measurement uncertainty: ±3.6 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		October 29 – 30, 2018
Test Engineer	Signature	Dates of Test

9 Radiated Emissions – §15.209, C63.10 6.5, 6.6

9.1 Limits of Radiated Emissions Measurement

Table 9-1: Radiated Emissions Limits

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.

9.2 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 9-2: 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	4/9/19
900321	EMCO	3161-03	Horn Antennas (4.0–8.2 GHz)	9508-1020	4/9/19
900323	EMCO	3160-7	Horn Antennas (8.2–12.4 GHz)	9605-1054	4/9/19
900356	EMCO	3160-08	Horn Antenna (12.4–18.0 GHz)	9607-1044	4/9/19
901218	EMCO	3160-09	Horn Antenna (18.0–26.5 GHz)	960281-003	4/14/19
900791	Chase	CBL6111B	Bilog Antenna (30–2000 MHz)	N/A	10/4/20
900905	Rhein Tech Laboratories, Inc.	PR-1040	Preamplifier (10–2000 MHz)	1006	8/20/19
901723	Hewlett Packard	8449B	Preamplifier (1–26.5 GHz)	3008A00762	5/22/19
901583	Agilent Technologies	N9010A	EXA Signal Analyzer (10 Hz–26.5 GHz)	MY51250846	2/6/20
900913	Hewlett Packard	85462A	EMI Receiver RF Section (9 kHz–6.5 GHz)	3325A00159	4/4/19
900914	Hewlett Packard	8546OA	RF Filter Section (100 kHz-6.5 GHz)	3330A00107	4/4/19

9.3 Radiated Emissions Test Results

802.11g (54 Mbps) was determined to be the worst case modulation scheme.

Frequencies above the 3rd harmonics were measured at 1 m instead of 3 m.

Correction = 20 * LOG(1 m / 3 m) = -9.5 dB

Note: SCF – Site Correction Factor

Table 9-3: Radiated Emissions Harmonics/Spurious: 2412 MHz Peak

Frequency (MHz)	Peak Raw Analyzer (dBµV/m)	SCF (dB/m)	Peak Corrected (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)
4824	46.3	0.6	46.9	74.0	-27.1
12060	46.1	-10.7	35.4	74.0	-38.6
14472	49.5	-19.0	30.5	74.0	-43.5
19296	52.6	-8.4	44.2	74.0	-29.8

Table 9-4: Radiated Emissions Harmonics/Spurious: 2412 MHz Average

Frequency (MHz)	Average Raw Analyzer (dBµV/m)	SCF (dB/m)	Average Corrected (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)
4824	44.7	0.6	45.3	54.0	-8.7
12060	44.1	-10.7	33.4	54.0	-20.6
14472	47.0	-19.0	28.0	54.0	-26.0
19296	50.0	-8.4	41.6	54.0	-12.4

Table 9-5: Radiated Emissions Harmonics/Spurious: 2437 MHz Peak

Frequency (MHz)	Peak Raw Analyzer (dBµV/m)	SCF (dB/m)	Peak Corrected (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)
4874	50.0	0.3	50.3	74.0	-23.7
7311	49.8	1.7	51.5	74.0	-22.5
12185	49.0	-10.8	38.2	74.0	-35.8
19496	52.8	-8.4	44.4	74.0	-29.6

Table 9-6: Radiated Emissions Harmonics/Spurious: 2437 MHz Average

Frequency (MHz)	Average Raw Analyzer (dBµV/m)	SCF (dB/m)	Average Corrected (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)
4874	48.5	0.3	48.8	54.0	-5.2
7311	47.0	1.7	48.7	54.0	-5.3
12185	47.1	-10.8	36.3	54.0	-17.7
19496	50.8	-8.4	42.4	54.0	-11.6

Table 9-7: Radiated Emissions Harmonics/Spurious: 2462 MHz Peak

Frequency (MHz)	Peak Raw Analyzer (dBµV/m)	SCF (dB/m)	Peak Corrected (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)
4924	48.7	0.5	49.2	74.0	-24.8
7386	52.7	2.1	54.8	74.0	-19.2
12310	48.5	-9.8	38.7	74.0	-35.3
19696	52.9	-8.7	44.2	74.0	-29.8
22158	53.7	-7.8	45.9	74.0	-28.1

Table 9-8: Radiated Emissions Harmonics/Spurious: 2462 MHz Average

Frequency (MHz)	Average Raw Analyzer (dBµV/m)	SCF (dB/m)	Average Corrected (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)
4924	46.3	0.5	46.8	54.0	-7.2
7386	49.6	2.1	51.7	54.0	-2.3
12310	46.4	-9.8	36.6	54.0	-17.4
19696	50.5	-8.7	41.8	54.0	-12.2
22158	51.5	-7.8	43.7	54.0	-10.3

Table 9-9: Unintentional Emissions Test Data: Ethernet Dock

Temperature: 67.0°F Humidity: 86%										
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
74.150	QPK	V	135	1.0	52.9	-20.9	32.0	40.0	-8.0	PASS
112.498	QPK	H	225	3.0	43.9	-15.1	28.7	43.5	-14.8	PASS
225.041	QPK	H	225	1.0	56.8	-16.1	40.6	46.0	-5.4	PASS
237.525	QPK	H	225	1.0	57.3	-14.4	42.9	46.0	-3.1	PASS
245.300	QPK	H	225	1.0	51.8	-13.6	38.2	46.0	-7.8	PASS
333.602	QPK	H	180	1.0	39.9	-11.2	28.6	46.0	-17.4	PASS
393.600	QPK	H	180	1.0	39.0	-8.9	30.1	46.0	-15.9	PASS
395.995	QPK	H	180	1.0	43.4	-8.8	34.6	46.0	-11.4	PASS

Table 9-10: Unintentional Emissions Test Data: USB Dock

Temperature: 62.0°F Humidity: 75%										
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**
60.000	QPK	H	90	4.0	47.2	-22.1	25.1	40.0	-14.9	PASS
72.250	QPK	H	90	2.0	43.5	-21.1	22.3	40.0	-17.7	PASS
113.500	QPK	H	90	3.0	40.3	-15.1	25.2	43.5	-18.3	PASS
223.925	QPK	H	90	1.0	39.5	-16.2	23.2	46.0	-22.8	PASS
243.250	QPK	H	180	1.0	37.4	-13.8	23.6	46.0	-22.4	PASS
333.325	QPK	H	135	2.0	35.0	-11.2	23.7	46.0	-22.3	PASS
648.625	QPK	H	90	1.0	35.8	-3.1	32.7	46.0	-13.3	PASS

Measurement uncertainty: ±4.6 dB. This measurement uncertainty is an expanded uncertainty for 95% confidence level received with a coverage factor k=2.

Results: Pass

Test Personnel:

Khue N. Do		October 30 – 31, 2018, November 1, 2018
Test Engineer	Signature	Dates of Test

10 Conclusion

The data in this DTS measurement report shows that the EUT as tested, HandEra Model PHRPAD60, FCC ID: URZ-PHRPAD60, complies with the applicable requirements of FCC Parts 2 and 15.