



Engineering and Testing for EMC and Safety Compliance

**Certification Application Report
FCC Part 15.247 & Industry Canada RSS-210**

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FCC ID/IC:	MQO-TT-800-1-1/ 2570A-TT80011	Test Report Date:	October 25, 2010
Platform:	N/A	RTL Work Order Number:	2010175-2
Model Name/ Model Number:	A500 / TT-800-1-1	RTL Quote Number:	QRTL10-396
American National Standard Institute:	ANSI C63.4-2003 Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz		
FCC Classification:	DTS – Part 15 Digital Transmission System (WLAN portion)		
FCC Rule Part(s):	FCC Rules Part 15.247: Operation within the bands 920-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz Direct Sequence System (10-01-09)		
Industry Canada:	RSS-210 Issue 7: Low Power License-Exempt Communications Devices		
Digital Interface Information	Digital Interface was found to be compliant		
Frequency Range (MHz)	Output Power (W)	Frequency Tolerance	Emission Designator
2412-2462	0.118	N/A	9M60G7D
2412-2462	0.129	N/A	16M5G7D
5745-5825	0.083	N/A	16M5G7D

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, FCC 97-114, ANSI C63.4, and Industry Canada RSS-210.

Signature: 

Date: October 25, 2010

Typed/Printed Name: Desmond A. Fraser

Position: President

These tests are accredited and meet the requirements of ISO/IEC 17025 as verified by ANSI-ASQ National Accreditation Board/ACLASS. Refer to certificate and scope of accreditation AT-1445.

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The test results relate only to the item(s) tested.*

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Client: Vocollect, Inc.
Model #: TT-800-1-1
Standards: FCC 15.247 & RSS-210
FCC ID: MQO-TT-800-1-1
Report #: 2010175-2

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1 General Information

1.1 Scope

Applicable Standards:

- FCC Rules Part 15.247: 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.
- Industry Canada RSS-210: Low Power License-Exempt Communications Devices

1.2 Description of EUT

Equipment Under Test	Body Worn Terminal
Model	A500
Power Supply	Battery operated
Modulation Type	DSSS
Transfer Rate	1, 2, 5.5, 11, 6, 12, 18, 24, 36, 48, 54
Frequency Range	2412 – 2462 MHz, 5745 – 5825 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 C63.4 2003).

1.4 Related Submittal(s)/Grant(s)

This is an original certification application for Vocollect, Inc. Model Name: A500, Model # TT-800-1-1, FCC ID: MQO-TT-800-1-1, IC: 2570A-TT80011.

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 DSSS – 802.11b (11 Mbps); 802.11g (54 Mbps)

Channel	Frequency (MHz)
1	2412
6	2437
11	2462

Table 2-2: Channels Tested for DSSS – 802.11a (6 Mbps)

Channel	Frequency (MHz)
149	5745
157	5785
165	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. 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 2-3: Test Result Summary – FCC Part 15, Subpart C (Section 15.247) – DSSS WLAN

Standard	Test	Pass/Fail or N/A
FCC 15.207	AC Power Conducted Emissions	Pass
FCC 15.209	Radiated Emissions	Pass
FCC 15.247(a)(2)	6 dB Bandwidth	Pass
FCC 15.247(b)	Maximum Peak Power Output	Pass
FCC 15.247(d)	Antenna Conducted Spurious Emissions	Pass
FCC 15.247(e)	Power Spectral Density	Pass
FCC 15.247(d)	Band Edge Measurement	Pass

2.4 Test System Details

The test sample was received on September 20, 2010. 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	Cable Description	RTL Bar Code
A500 Talkman WLAN/Bluetooth Terminal	Vocollect, Inc.	TT-800-1-1	30100051	A500	N/A	19876
A500 Talkman WLAN/Bluetooth Terminal	Vocollect, Inc.	TT-800-1-1	30100030	A500	N/A	19877
Battery	Vocollect, Inc.	BT-700 (730037)	3501904392	N/A	N/A	19883
Battery	Vocollect, Inc.	BT-700 (730037)	3500201661	N/A	N/A	19884

Table 2-5: Support Equipment

Part	Manufacturer	Model	Serial Number	FCC ID	Cable Description	RTL Bar Code
Battery Charger	Vocollect, Inc.	CM-700-2	166300020A	N/A	9' unshielded	19879
Headset	Vocollect, Inc.	N/A	N/A	N/A	N/A	19869

2.5 Configuration of Tested System

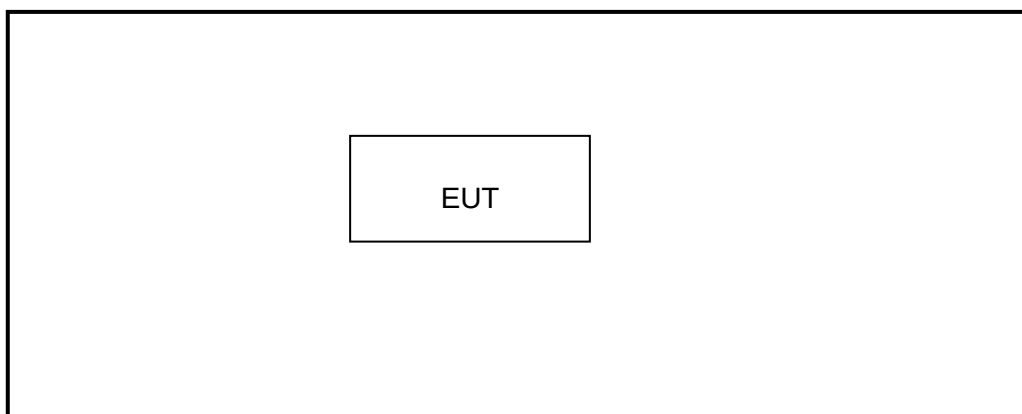


Figure 2-1: Configuration of System Under Test

3 Peak Output Power – FCC §15.247(b)(1); RSS-210 §A8.4(4)

3.1 Power Output Test Procedure

A conducted power measurement of the EUT was taken using an Agilent 4416A EPM-P Series Power Meter with an E9323A Peak and Average Power Sensor.

Table 3-1: Power Output Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901184	Agilent Technologies	E4416A	EPM-P Power Meter, single channel	GB41050573	11/18/10
901356	Agilent Technologies	E9323A	Power Sensor	31764-264	11/18/10

3.2 Power Output Test Data

Table 3-2: Power Output Test Data – 802.11a

Channel	Frequency (MHz)	Peak Power Conducted Output (dBm)
149	5745	19.2
157	5785	18.5
165	5825	17.4

Table 3-3: Power Output Test Data – 802.11b

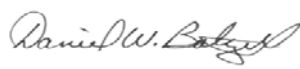
Channel	Frequency (MHz)	Peak Power Conducted Output (dBm)
1	2412	20.7
6	2437	20.7
11	2462	20.0

Table 3-4: Power Output Test Data – 802.11g

Channel	Frequency (MHz)	Peak Power Conducted Output (dBm)
1	2412	21.1
6	2437	20.7
11	2462	20.6

Test Personnel:

Daniel W. Baltzell
Test Engineer


Signature

September 20, 2010
Date Of Test

4 Compliance with the Band Edge – FCC §15.247(d); RSS-210 §2.2

4.1 Band Edge Test Procedure

The transmitter output was connected to its appropriate antenna. Peak (1 MHz RBW/VBW) and average (1 MHz RBW/10 Hz VBW) radiated measurements were taken with a suitable span to encompass the peak of the fundamental. A delta measurement was performed from the highest peak in the restricted band to the peak of the fundamental, and subtracted from the field strength; the result was compared to the limit in the restricted band (54 dBuV/m).

Table 4-1: Band Edge Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	Spectrum Analyzer	US44020346	11/11/10
900878	Rhein Tech Laboratories	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	Not Required
901517	Insulated Wire Inc.	KPS-1503-360-KPS-09302008	RF cable 36"	NA	10/19/10
901242	Rhein Tech Laboratories	WRT-000-0003	Wood rotating table	N/A	Not Required
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	6/13/11

4.2 Restricted Band Edge Test Results

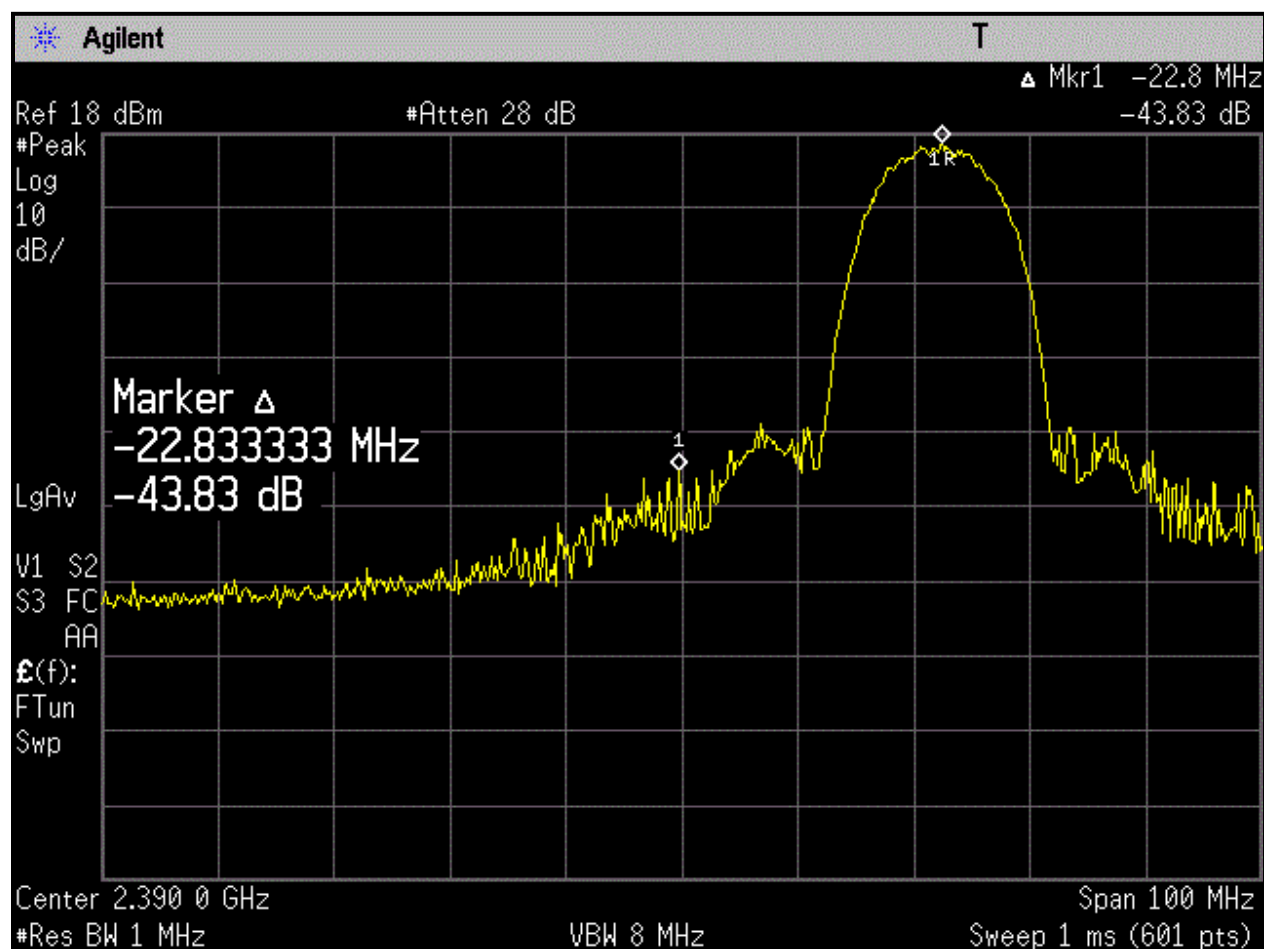
4.2.1 Calculation of Lower Band Edge – 802.11b

81.8 dBuV/m is the field strength measurement, from which the delta measurement of 43.8 dB is subtracted (reference plots), resulting in a level of 38.0 dBuV/m. This level has a margin of 16 dB below the limit of 54 dBuV/m.

Calculation: $81.8 \text{ dBuV/m} - 43.8 \text{ dB} - 54 \text{ dBuV/m} = -16 \text{ dB}$

Peak Field Strength of Lower Band Edge (1 MHz RBW/1 MHz VBW) = 117.3 dBuV/m
 Average Field Strength of Lower Band Edge (1 MHz RBW/10 Hz VBW) = 81.8 dBuV/m
 Delta measurement = 43.8 dB

Plot 4-1: Lower Band Edge: Channel 1 (TX Frequency 2412 MHz)



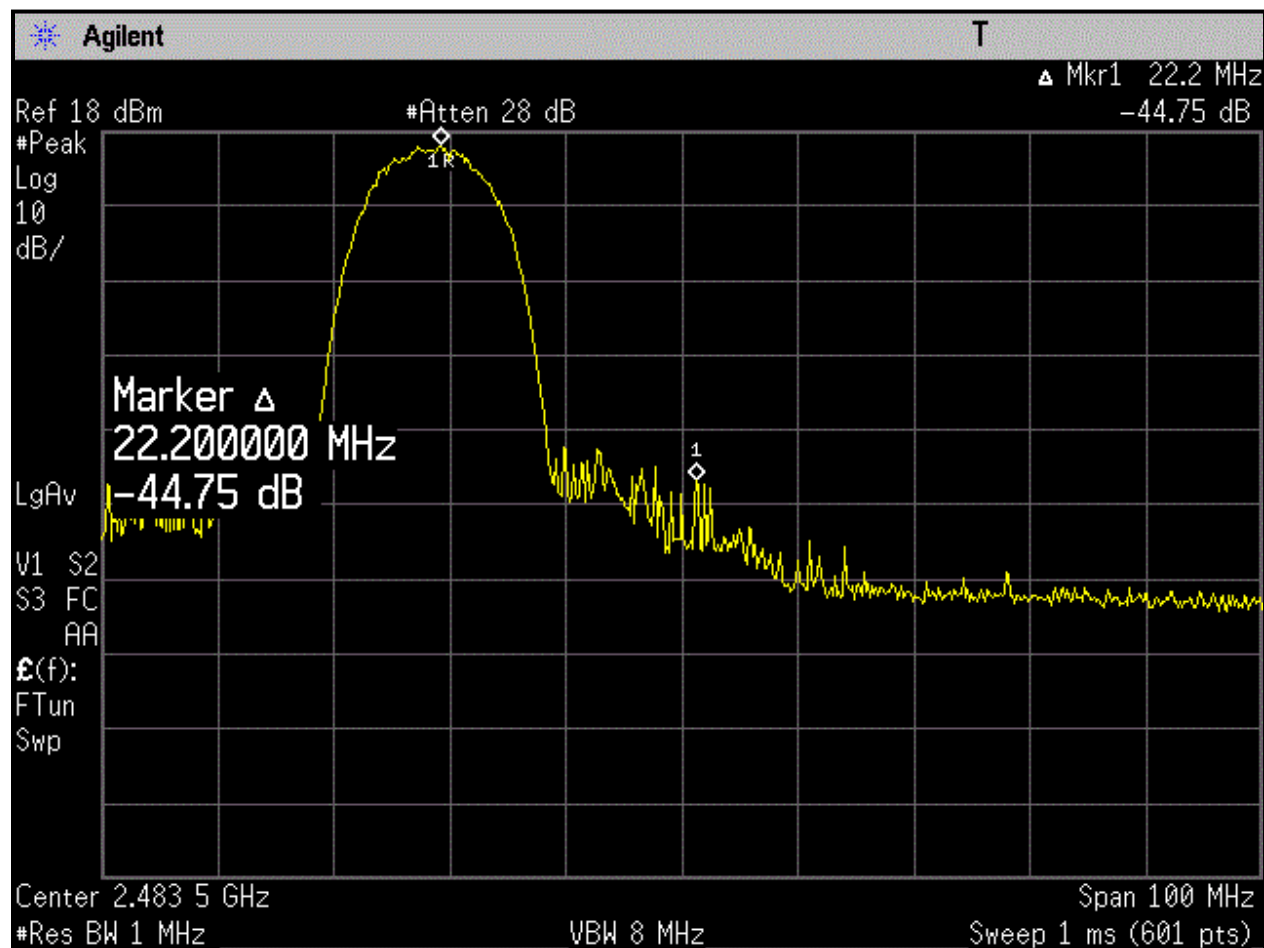
4.2.2 Calculation of Upper Band Edge – 802.11b

82.4 dBuV/m is the field strength measurement, from which the delta measurement of 44.8 dB is subtracted (reference plots), resulting in a level of 37.6 dBuV/m. This level has a margin of 16.4 dB below the limit of 54 dBuV/m.

Calculation: $82.4 \text{ dBuV/m} - 44.8 \text{ dB} - 54 \text{ dBuV/m} = -16.4 \text{ dB}$

Peak Field Strength of Upper Band Edge (1 MHz RBW/1 MHz VBW) = 116.2 dBuV/m
Average Field Strength of Upper Band Edge (1 MHz RBW/10 Hz VBW) = 82.4 dBuV/m
Delta measurement = 44.8 dB

Plot 4-2: Upper Band Edge: Channel 11 (TX Frequency 2462 MHz)



4.2.3 Calculation of Lower Band Edge – 802.11g

79.6 dBuV/m is the field strength measurement, from which the delta measurement of 34.8 dB is subtracted (reference plots), resulting in a level of 44.8 dBuV/m. This level has a margin of 9.2 dB below the limit of 54 dBuV/m.

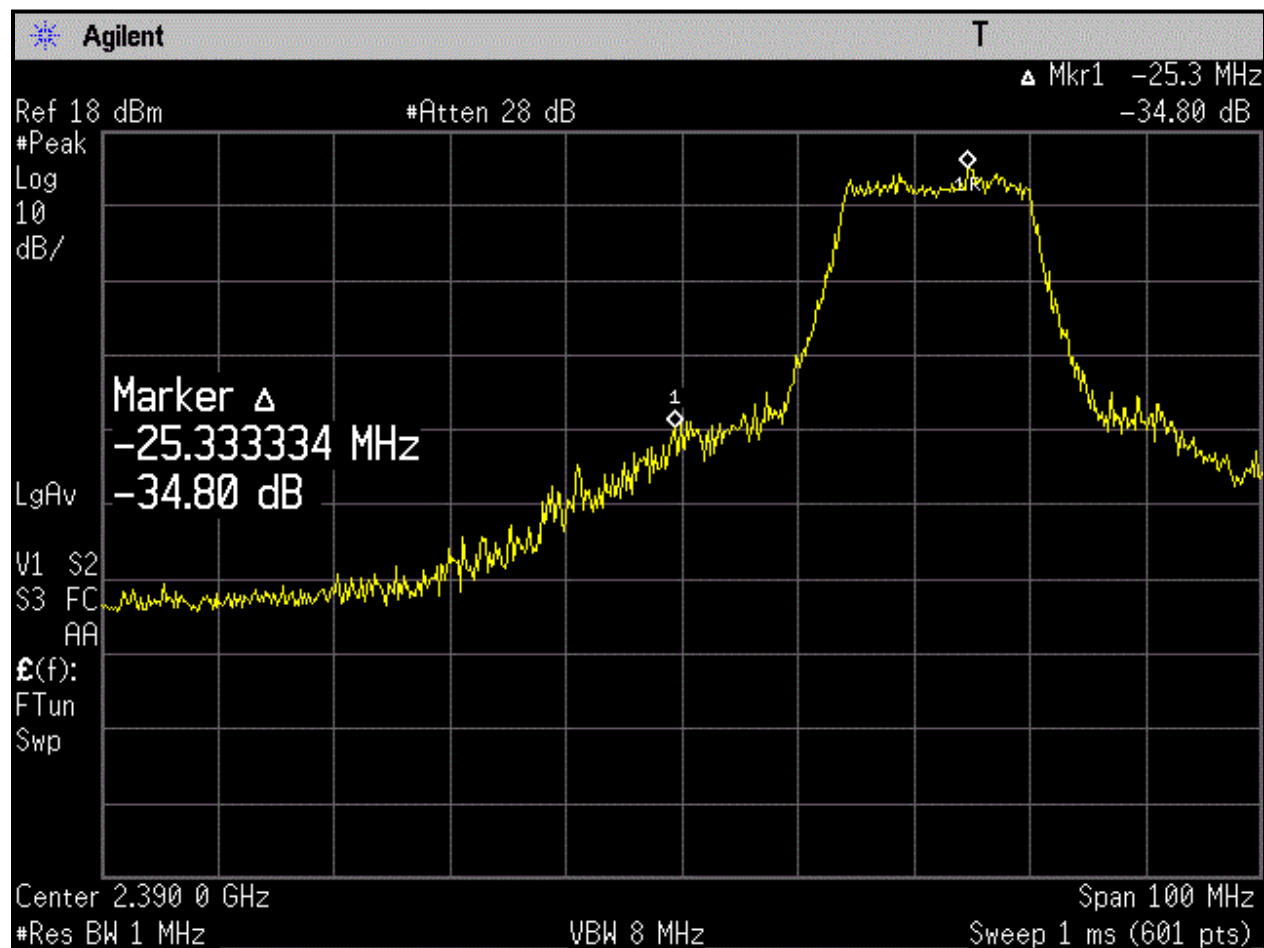
Calculation: $79.6 \text{ dBuV/m} - 34.8 \text{ dB} - 54 \text{ dBuV/m} = -9.2 \text{ dB}$

Peak Field Strength of Lower Band Edge (1 MHz RBW/1 MHz VBW) = 113.3 dBuV/m

Average Field Strength of Lower Band Edge (1 MHz RBW/10 Hz VBW) = 79.6 dBuV/m

Delta measurement = 34.8 dB

Plot 4-3: Lower Band Edge: Channel 1 (TX Frequency 2412 MHz)



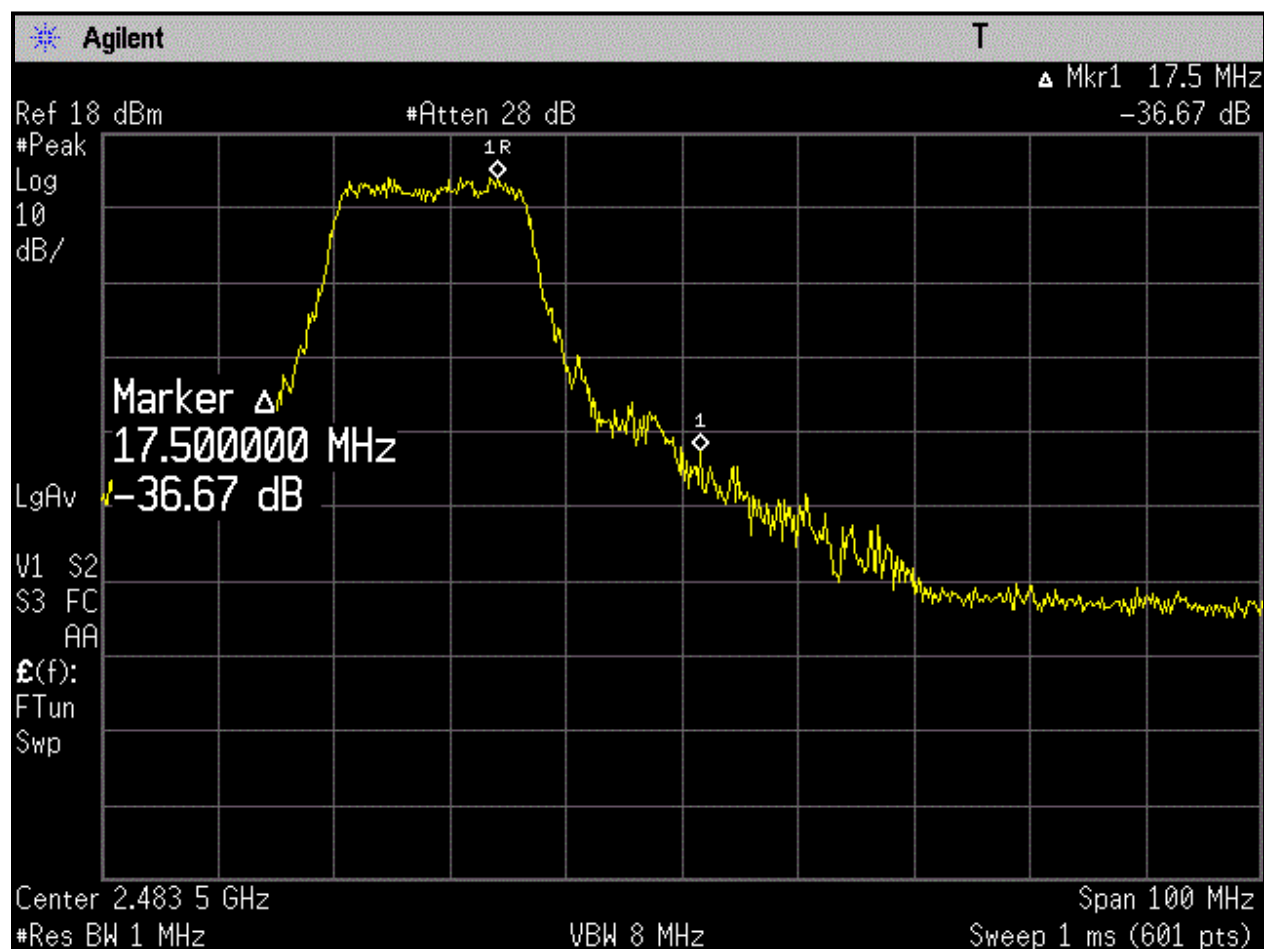
4.2.4 Calculation of Upper Band Edge – 802.11g

81.6 dBuV/m is the field strength measurement, from which the delta measurement of 36.7 dB is subtracted (reference plots), resulting in a level of 44.9 dBuV/m. This level has a margin of 9.1 dB below the limit of 54 dBuV/m.

Calculation: $81.6 \text{ dBuV/m} - 36.7 \text{ dB} - 54 \text{ dBuV/m} = -9.1 \text{ dB}$

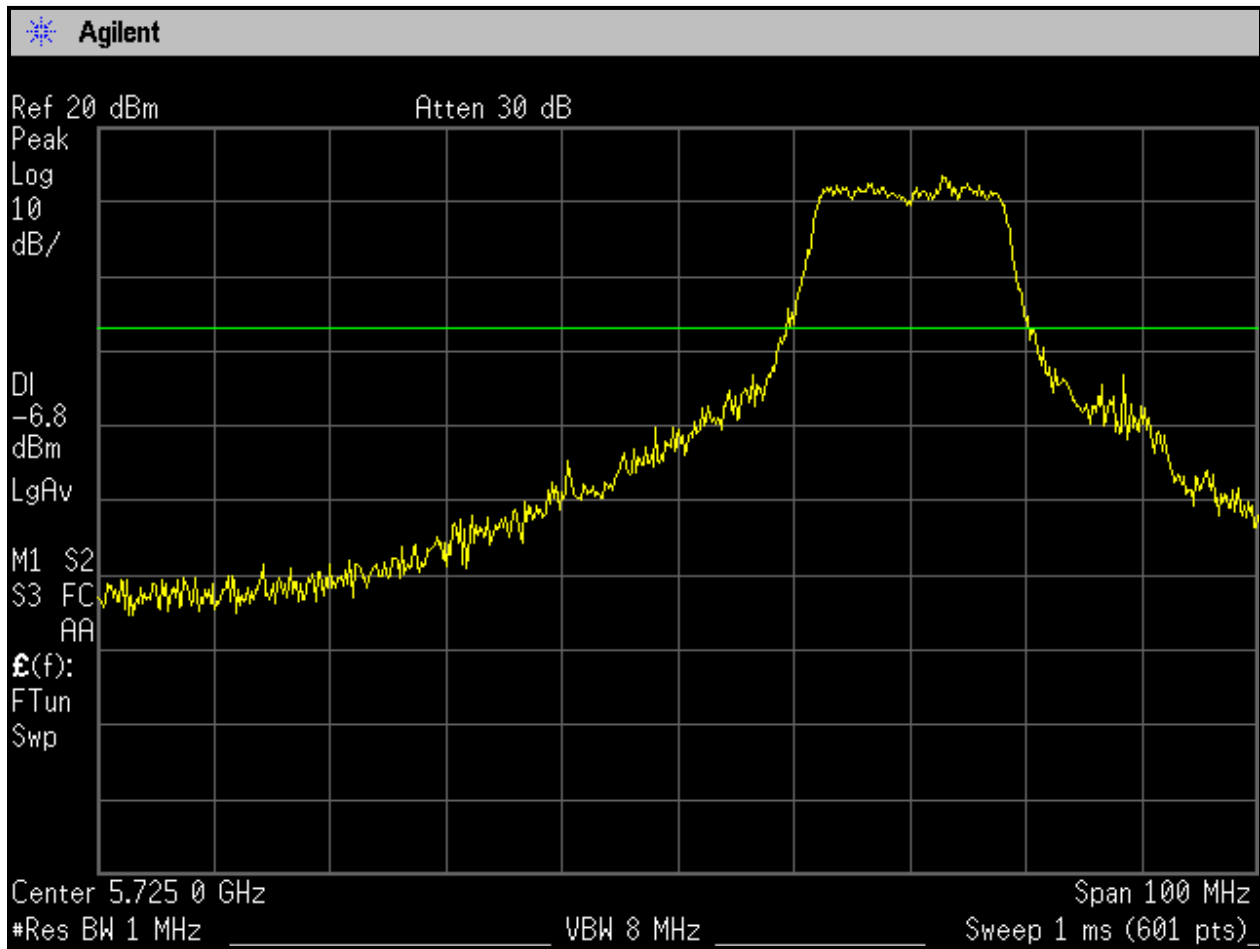
Peak Field Strength of Upper Band Edge (1 MHz RBW/1 MHz VBW) = 114.6 dBuV/m
 Average Field Strength of Upper Band Edge (1 MHz RBW/10 Hz VBW) = 81.6 dBuV/m
 Delta measurement = 36.7 dB

Plot 4-4: Upper Band Edge: Channel 11 (TX Frequency 2462 MHz)

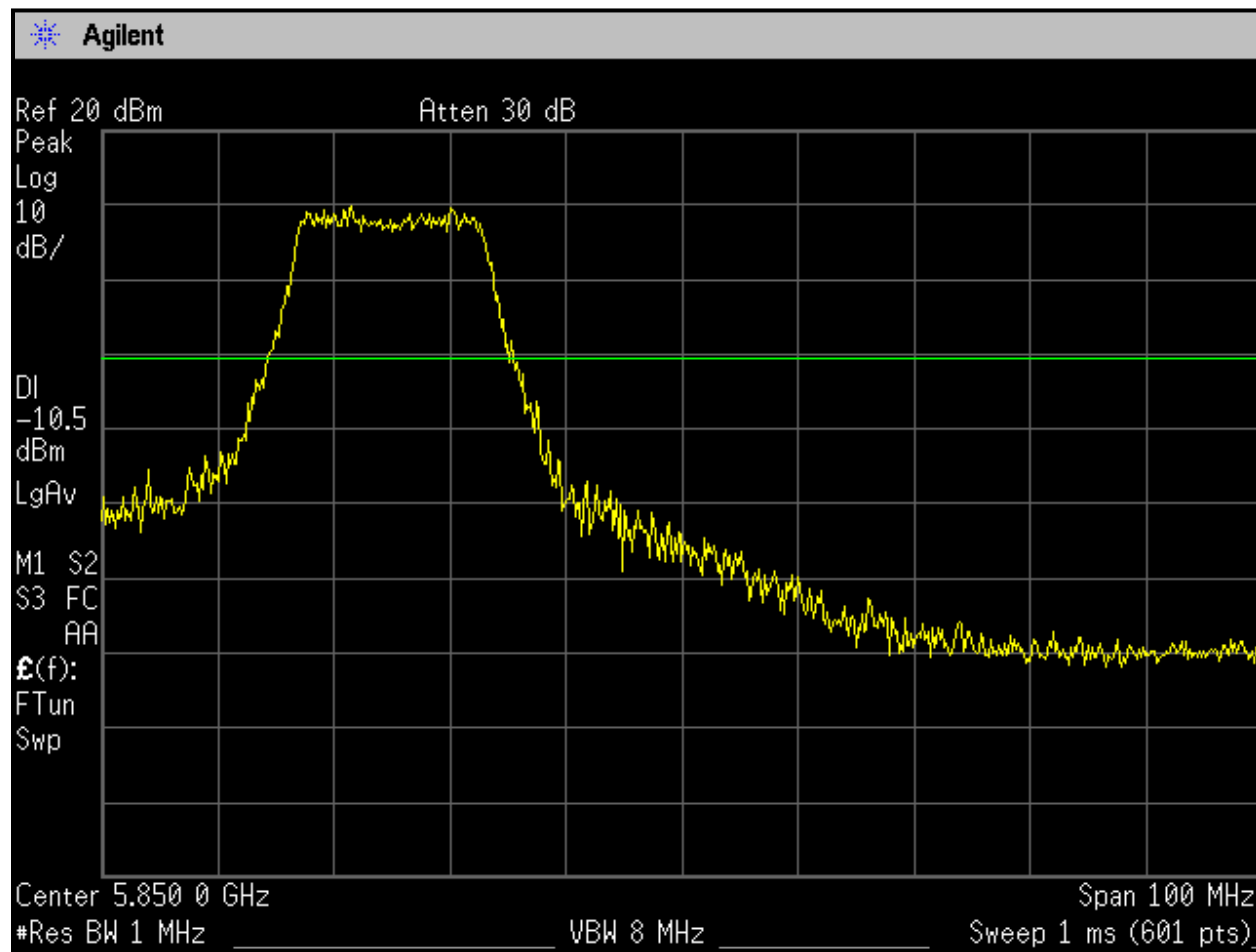


4.2.5 Lower Band Edge – 802.11a

Plot 4-5: Lower Band Edge: Channel 149 (TX Frequency 5745 MHz)



Plot 4-6: Upper Band Edge: Channel 165 (TX Frequency 5825 MHz)



Test Personnel:

Daniel W. Baltzell
Test Engineer

Daniel W. Baltzell
Signature

September 21&22, 2010
Dates Of Test

5 Antenna Conducted Spurious Emissions – FCC §15.247(d); RSS-Gen

5.1 Antenna Conducted Spurious Emissions Test Procedures

Antenna spurious emissions per FCC 15.247(c) 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, and 5745 MHz, 5785 MHz and 5825 MHz.

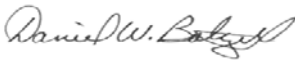
5.2 Antenna Conducted Spurious Emissions Test Results

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. Per FCC 15.31(o), no data is being reported.

Table 5-1: Antenna Conducted Spurious Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	Spectrum Analyzer	US44020346	11/11/10

Test Personnel:

Daniel W. Baltzell		September 21, 2010
Test Engineer	Signature	Date Of Test

6 6 dB Bandwidth – FCC §15.247(a)(2); RSS-210 §A8.2

6.1 6 db Bandwidth Test Procedure – Minimum 6 dB Bandwidth

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 300 Hz. 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
901413	Agilent Technologies	E4448A	Spectrum Analyzer	US44020346	11/11/10

6.2 6 dB Bandwidth Test Results

Table 6-2: 6 dB Bandwidth Test Data – 802.11a

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass/Fail
149	5745	16.5	0.5	Pass
157	5785	16.5	0.5	Pass
165	5825	16.5	0.5	Pass

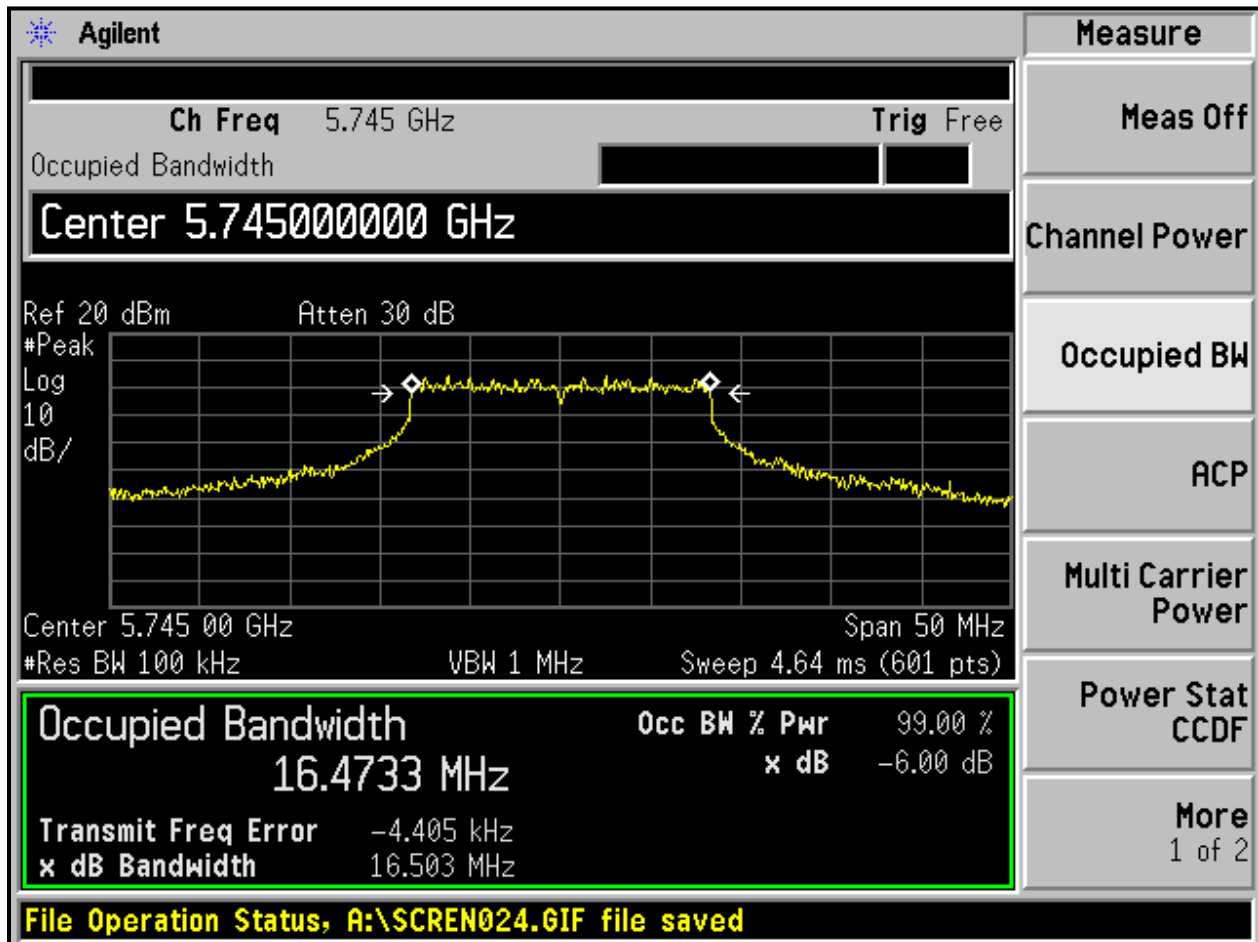
Table 6-3: 6 db Bandwidth Test Data – 802.11b

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass/Fail
1	2412	9.6	0.5	Pass
6	2437	9.6	0.5	Pass
11	2462	9.6	0.5	Pass

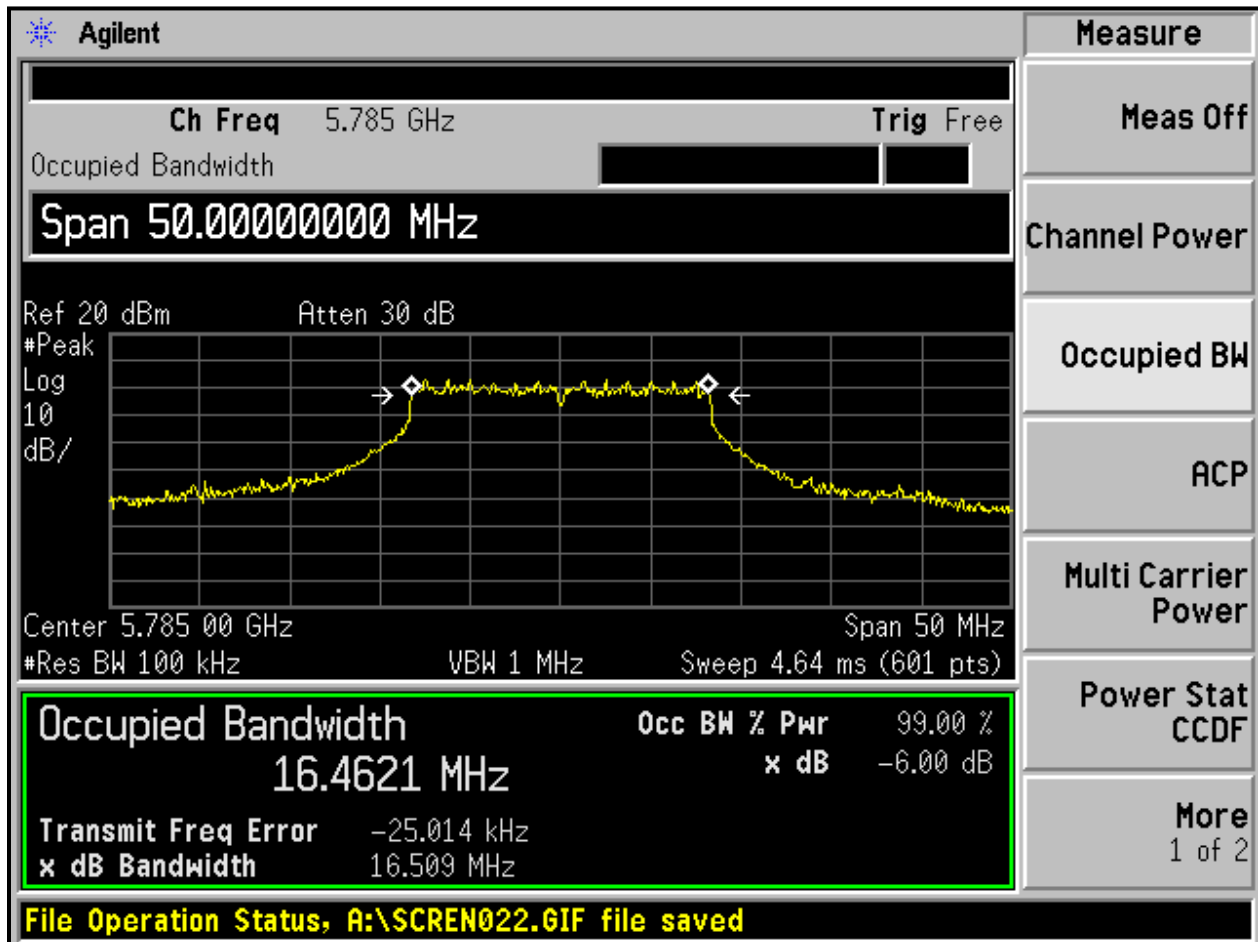
Table 6-4: 6 db Bandwidth Test Data – 802.11g

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass/Fail
1	2412	16.5	0.5	Pass
6	2437	16.5	0.5	Pass
11	2462	16.5	0.5	Pass

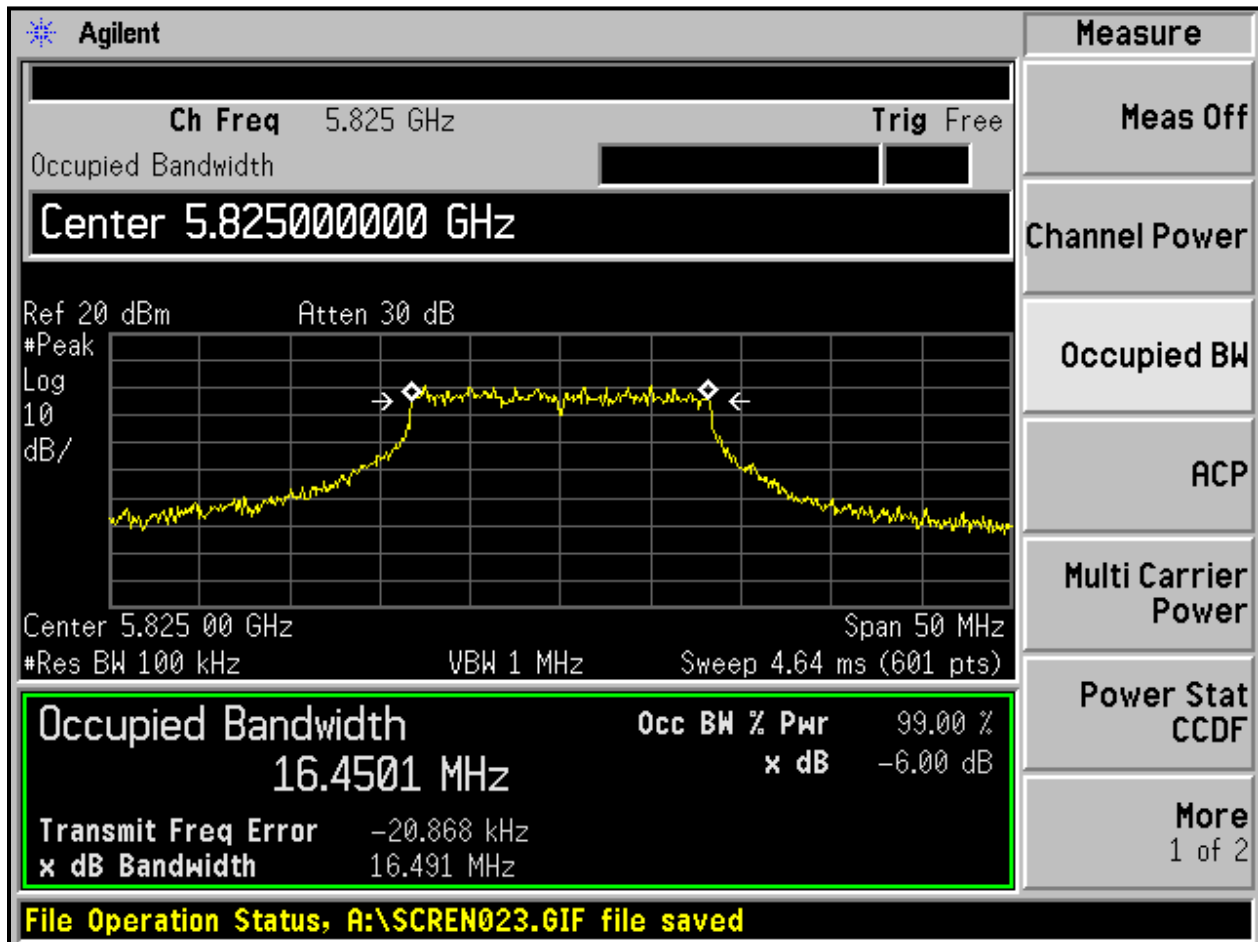
Plot 6-1: 6 dB Bandwidth Channel 149 (TX Frequency 5745 MHz) - 802.11a



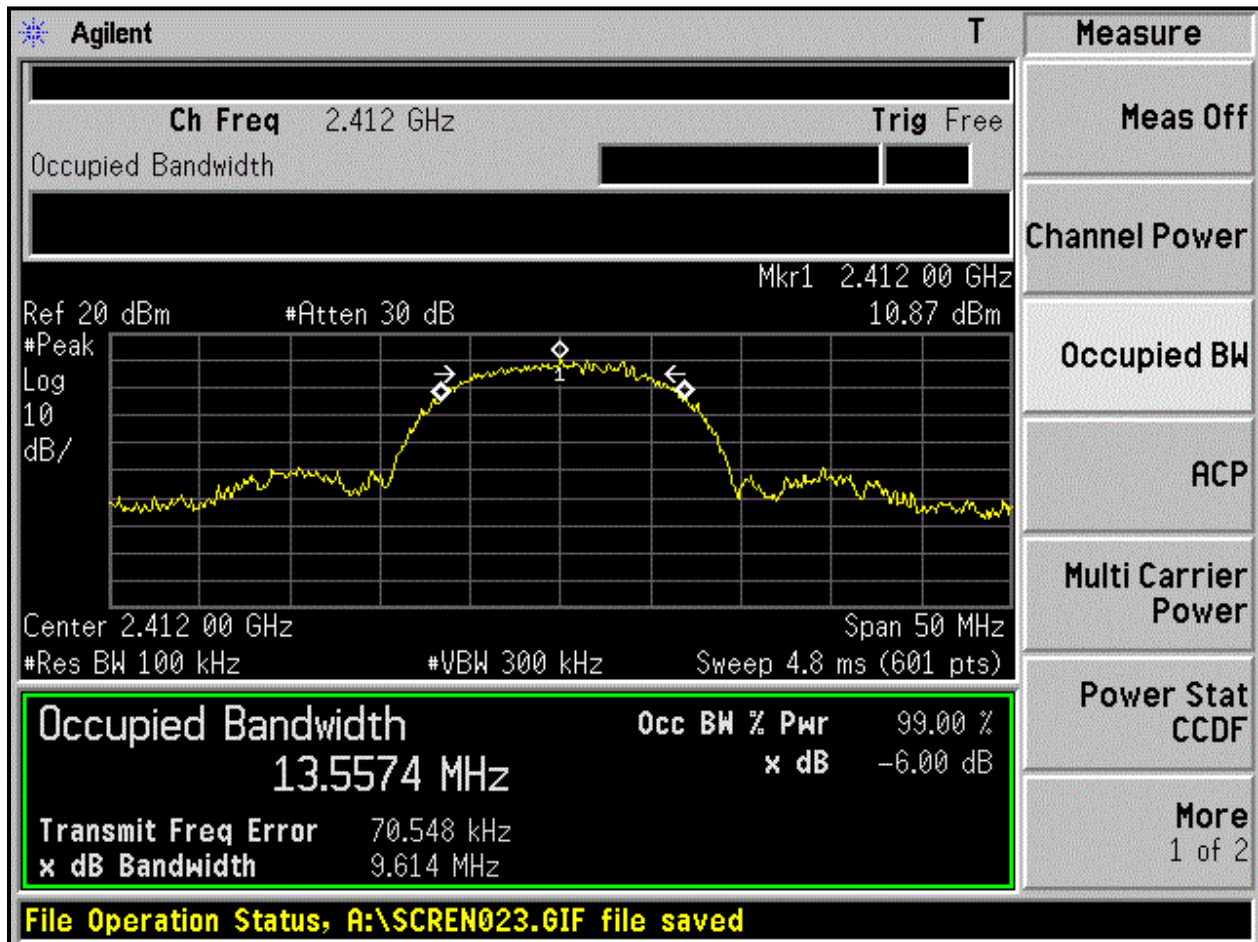
Plot 6-2: 6 dB Bandwidth Channel 157 (TX Frequency 5785 MHz) - 802.11a



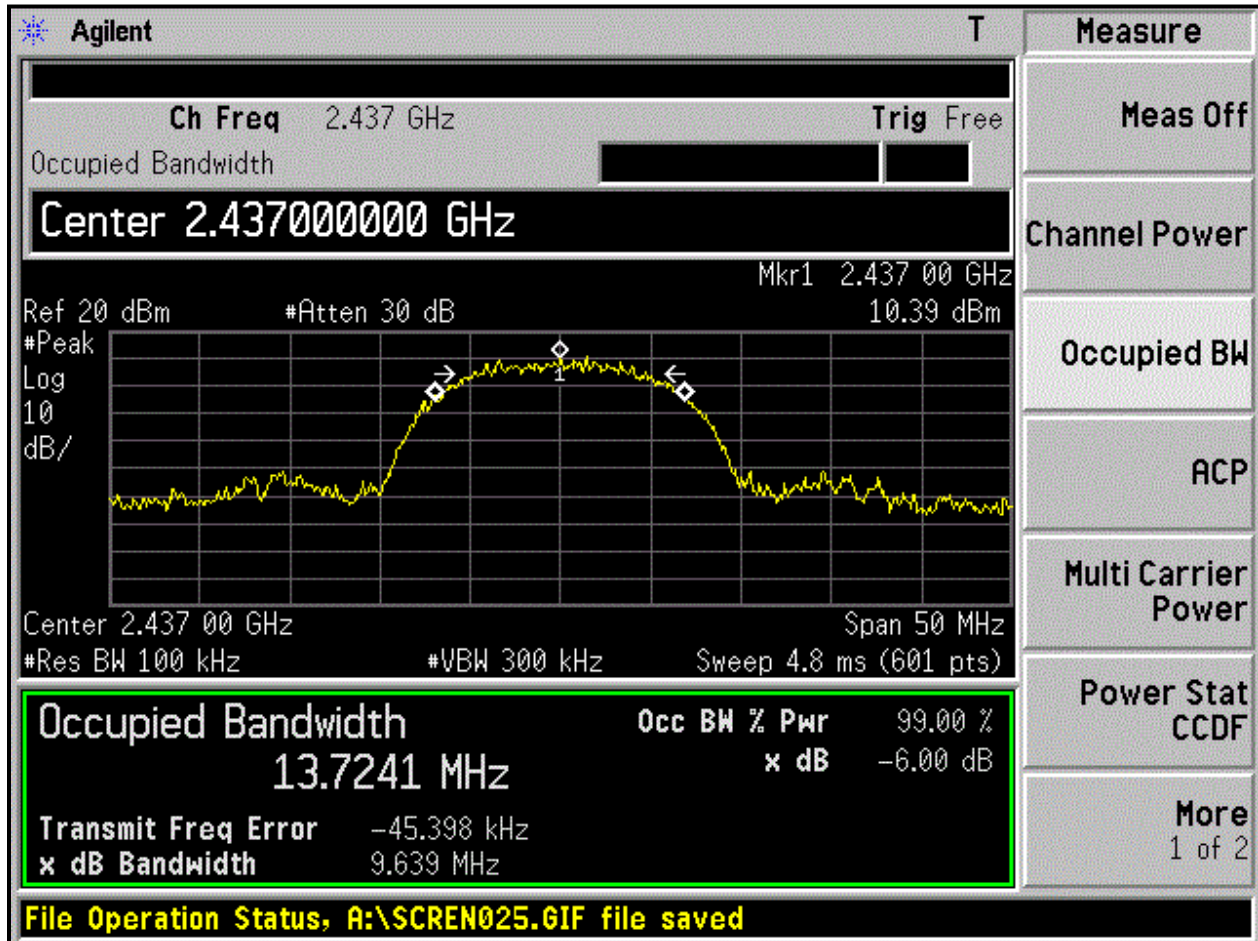
Plot 6-3: 6 dB Bandwidth Channel 165 (TX Frequency 5825 MHz) - 802.11a



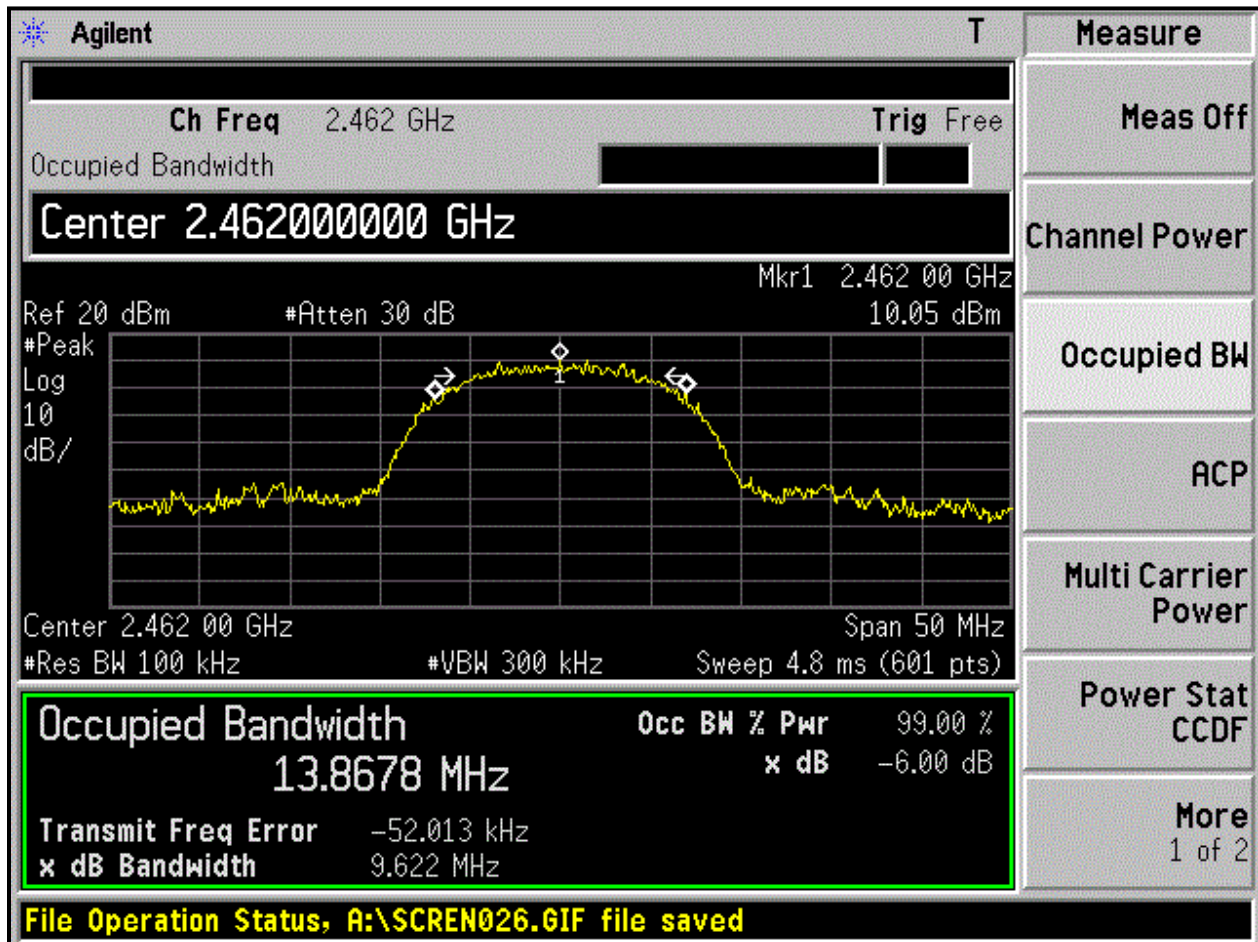
Plot 6-4: 6 dB Bandwidth Channel 1 (TX Frequency 2412 MHz) - 802.11b



Plot 6-5: 6 dB Bandwidth Channel 6 (TX Frequency 2437 MHz) - 802.11b



Plot 6-6: 6 dB Bandwidth Channel 11 (TX Frequency 2462 MHz) - 802.11b



Agilent T

Ch Freq 2.412 GHz Trig Free

Occupied Bandwidth

Center 2.41200000 GHz

Ref 20 dBm #Atten 30 dB Mkr1 2.412 00 GHz -2.92 dBm

#Peak Log 10 dB/

Center 2.412 00 GHz Span 50 MHz

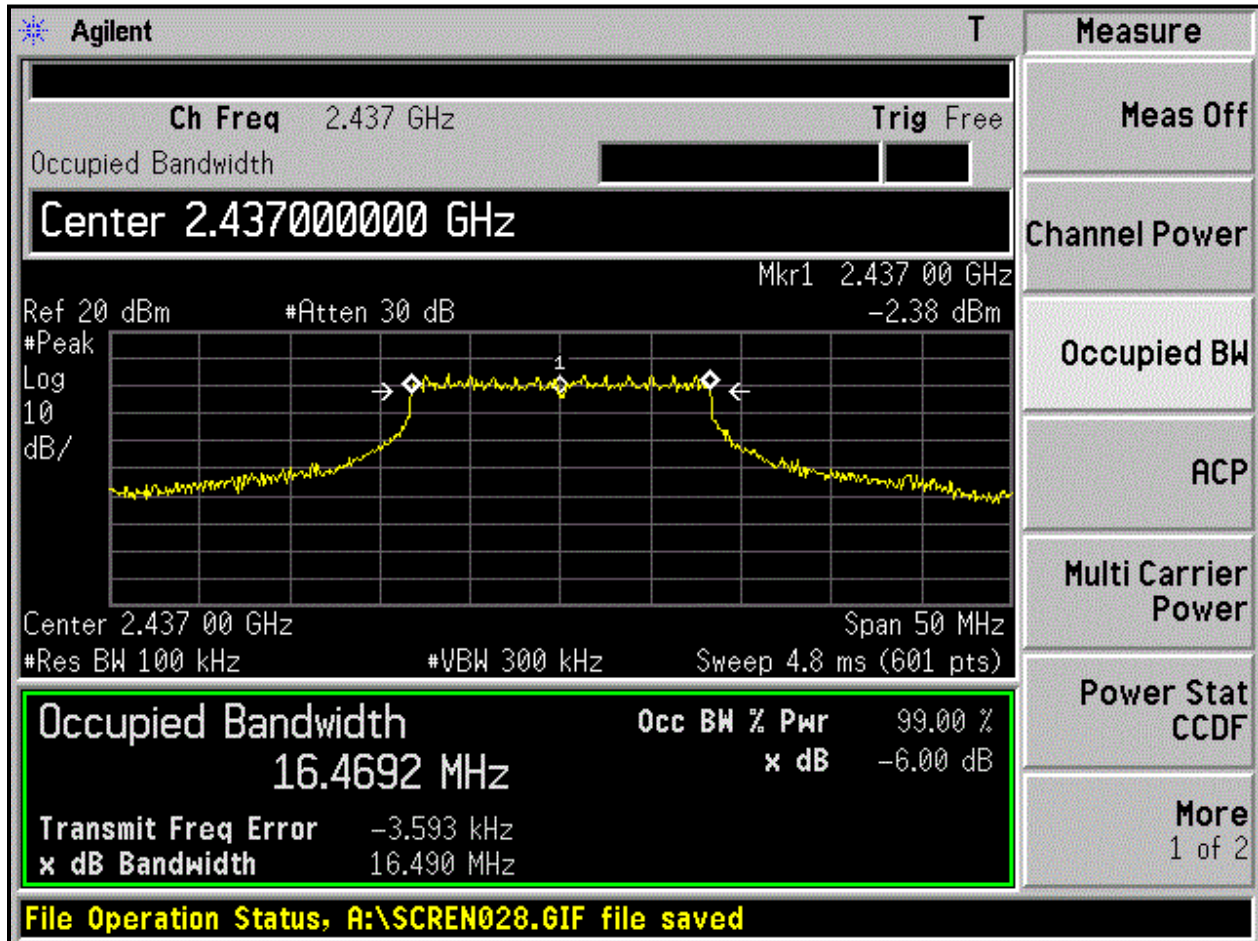
#Res BW 100 kHz #VBW 300 kHz Sweep 4.8 ms (601 pts)

Occupied Bandwidth 16.4648 MHz Occ BW % Pwr 99.00 % x dB -6.00 dB

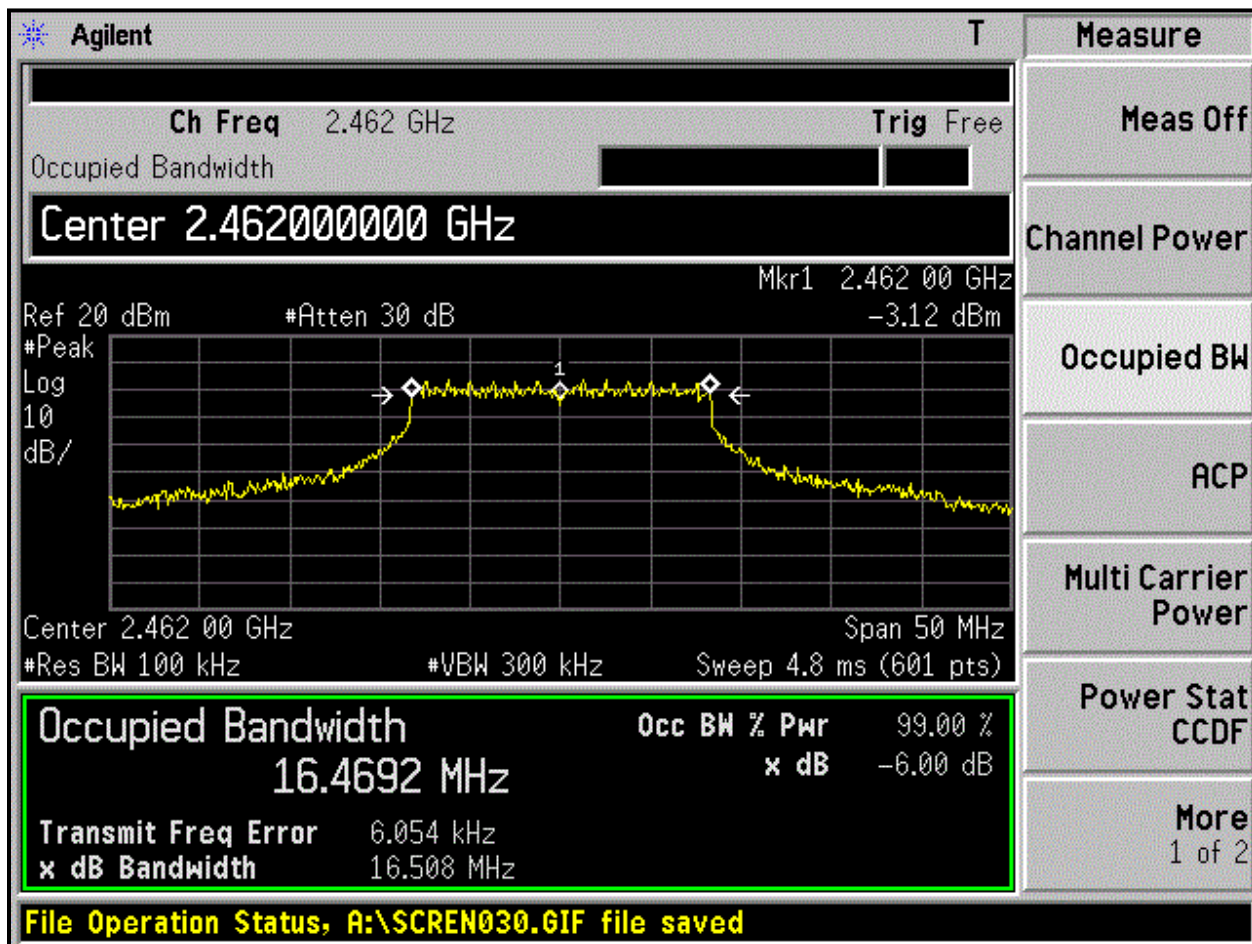
Transmit Freq Error 7.827 kHz x dB Bandwidth 16.502 MHz

File Operation Status, A:\SCREN029.GIF file saved

Plot 6-8: 6 dB Bandwidth Channel 6 (TX Frequency 2437 MHz) - 802.11g



Plot 6-9: 6 dB Bandwidth Channel 11 (TX Frequency 2462 MHz) - 802.11g



Test Personnel:

Daniel W. Baltzell
 Test Engineer

Daniel W. Baltzell

Signature

September 21, 2010
 Date Of Test

7 Power Spectral Density – FCC §15.247(e); RSS-210 §A8.2

7.1 Power Spectral Density Test Procedure

The power spectral density per FCC 15.247(d) was measured using a 50-ohm spectrum analyzer with the resolution bandwidth set at 3 kHz, the video bandwidth set at 30 kHz, and the sweep time set at 500 seconds. The spectral lines were resolved for the modulated carriers at 2412 MHz, 2437 MHz, and 2462 MHz respectively. These levels are below the +8 dBm limit. See the power spectral density table and plots.

Table 7-1: Power Spectral Density Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	Spectrum Analyzer	US44020346	11/11/10

7.2 Power Spectral Density Test Data – DSSS WLAN

Table 7-2: Power Spectral Density Test Data – 802.11a

Channel	Frequency (MHz)	RF Power Level (dBm)	Maximum Limit +8dBm	Pass/Fail
149	5745	-12.5	8	Pass
157	5785	-15.0	8	Pass
165	5825	-15.5	8	Pass

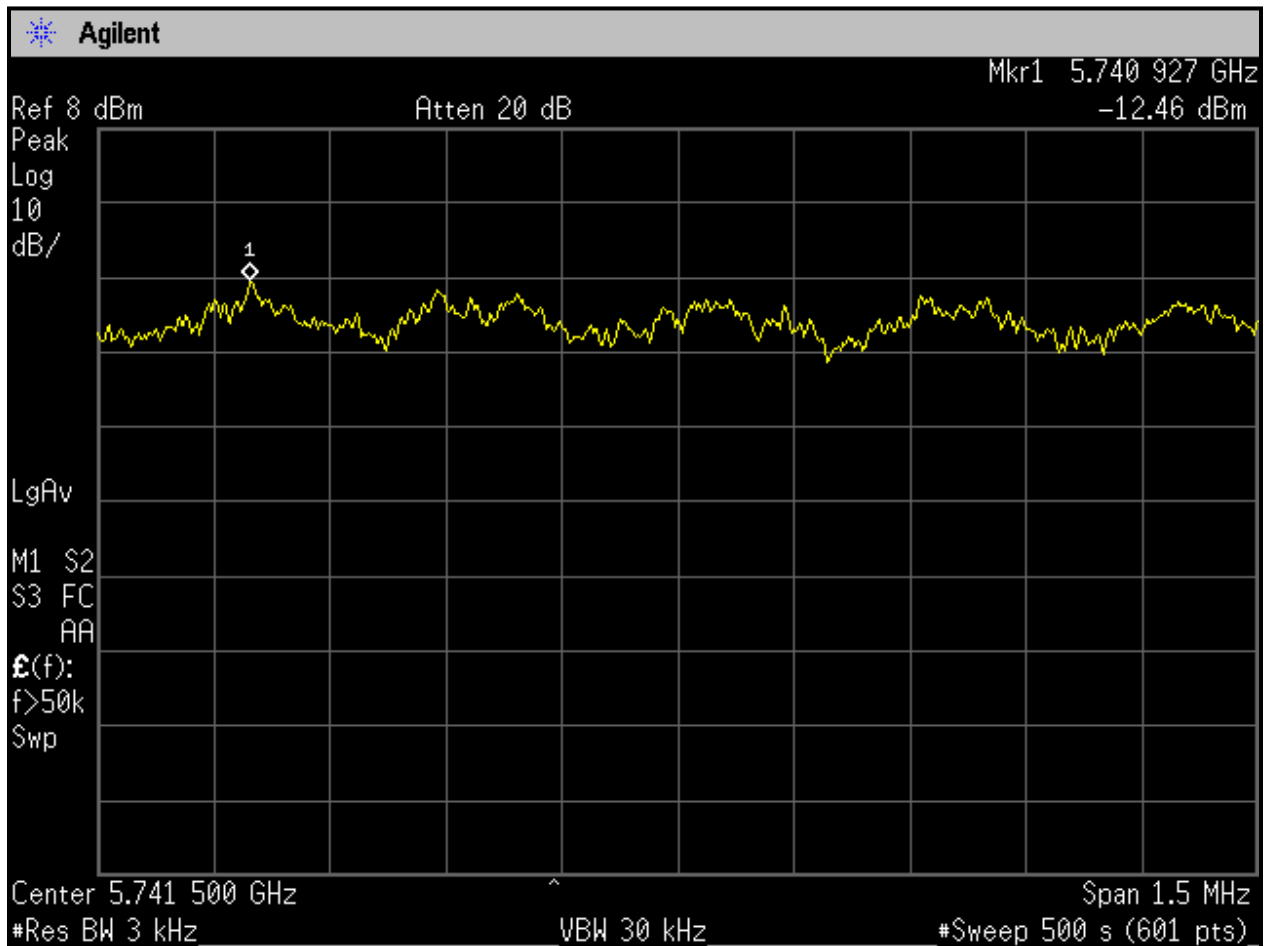
Table 7-3: Power Spectral Density Test Data – 802.11b

Channel	Frequency (MHz)	RF Power Level (dBm)	Maximum Limit +8dBm	Pass/Fail
1	2412	4.9	8	Pass
6	2437	4.7	8	Pass
11	2462	4.0	8	Pass

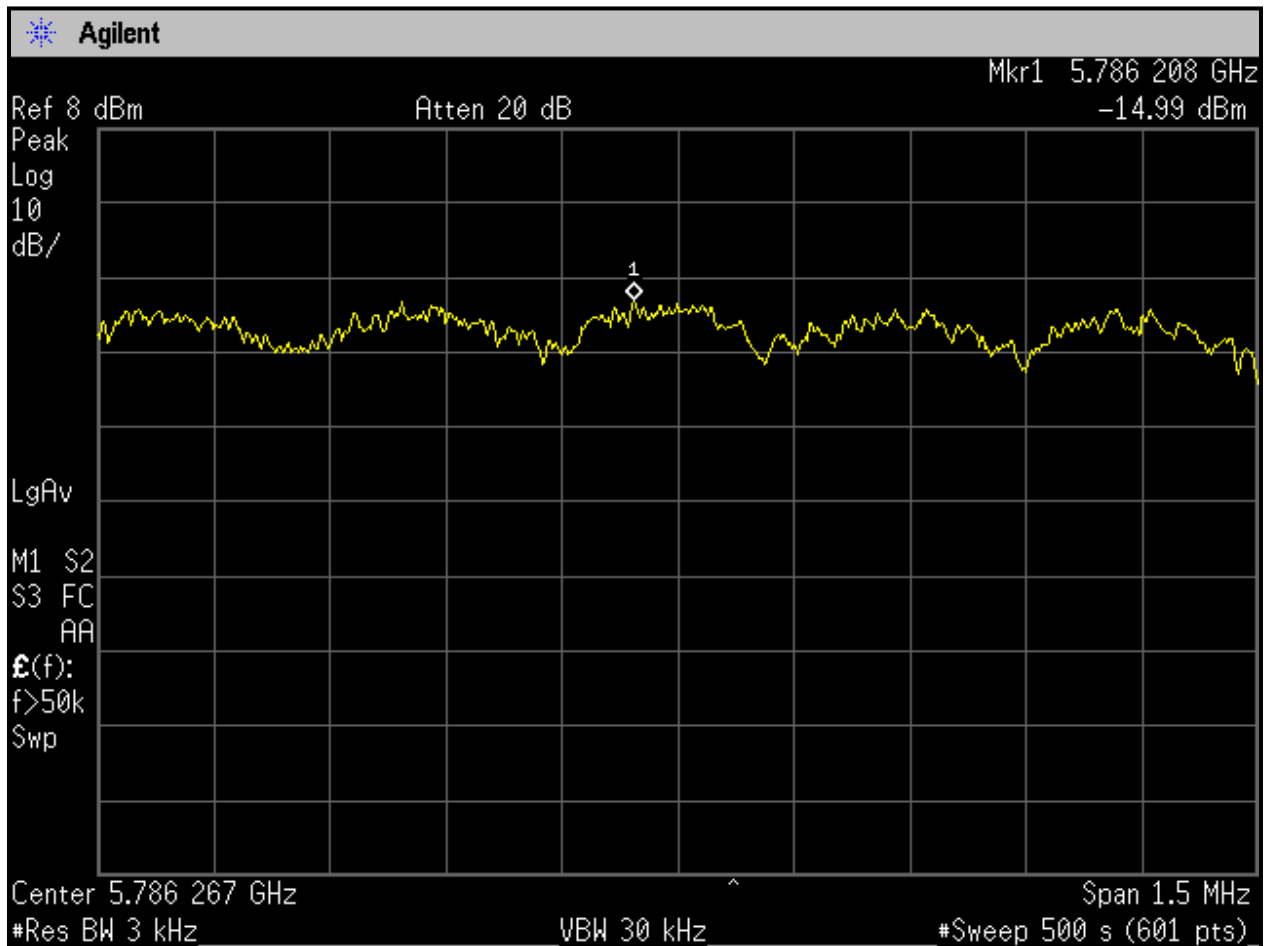
Table 7-4: Power Spectral Density Test Data – 802.11g

Channel	Frequency (MHz)	RF Power Level (dBm)	Maximum Limit +8dBm	Pass/Fail
1	2412	-15.0	8	Pass
6	2437	-14.4	8	Pass
11	2462	-15.0	8	Pass

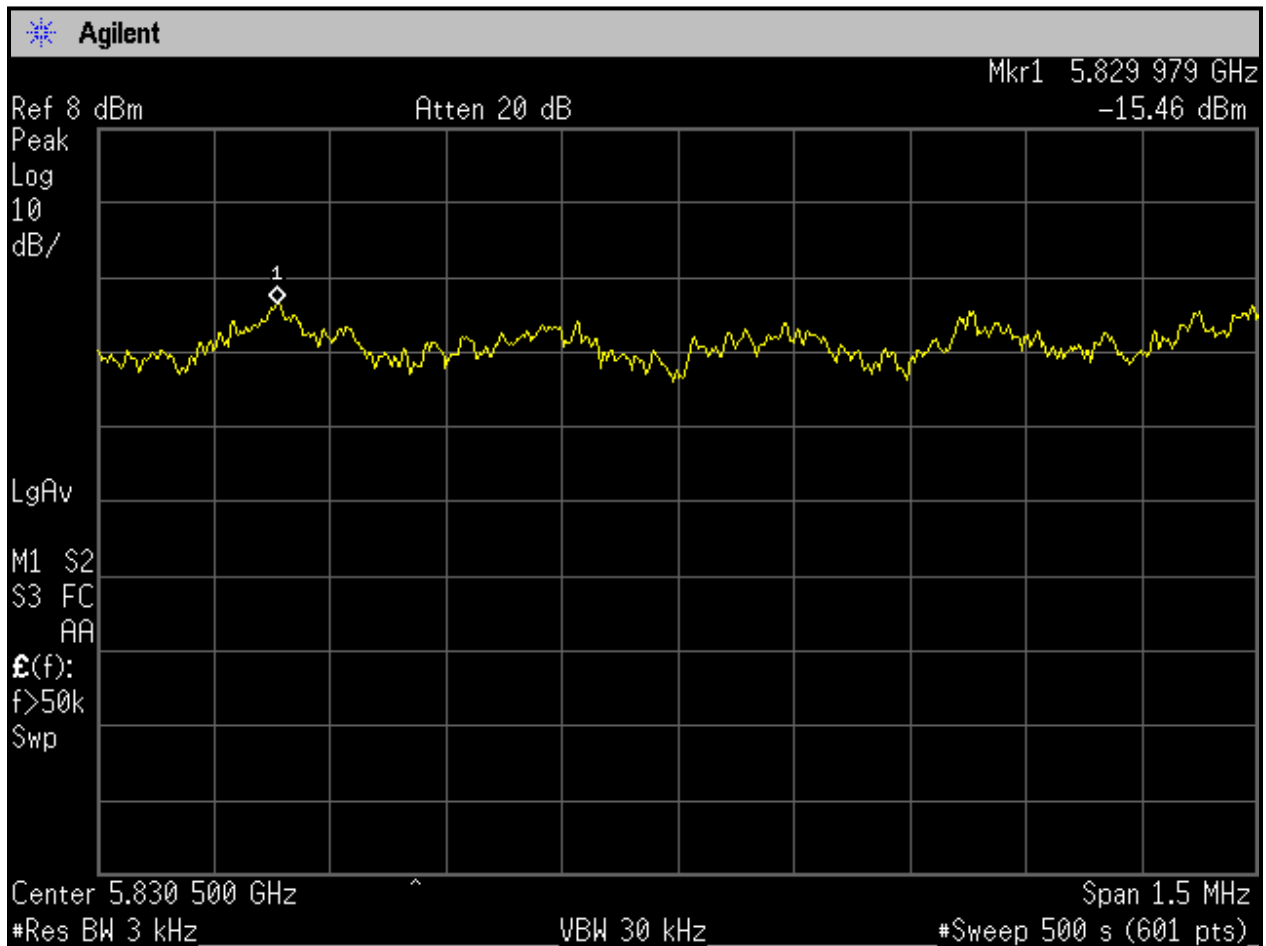
Plot 7-1: Power Spectral Density: Channel 149 (5745 MHz); 802.11a



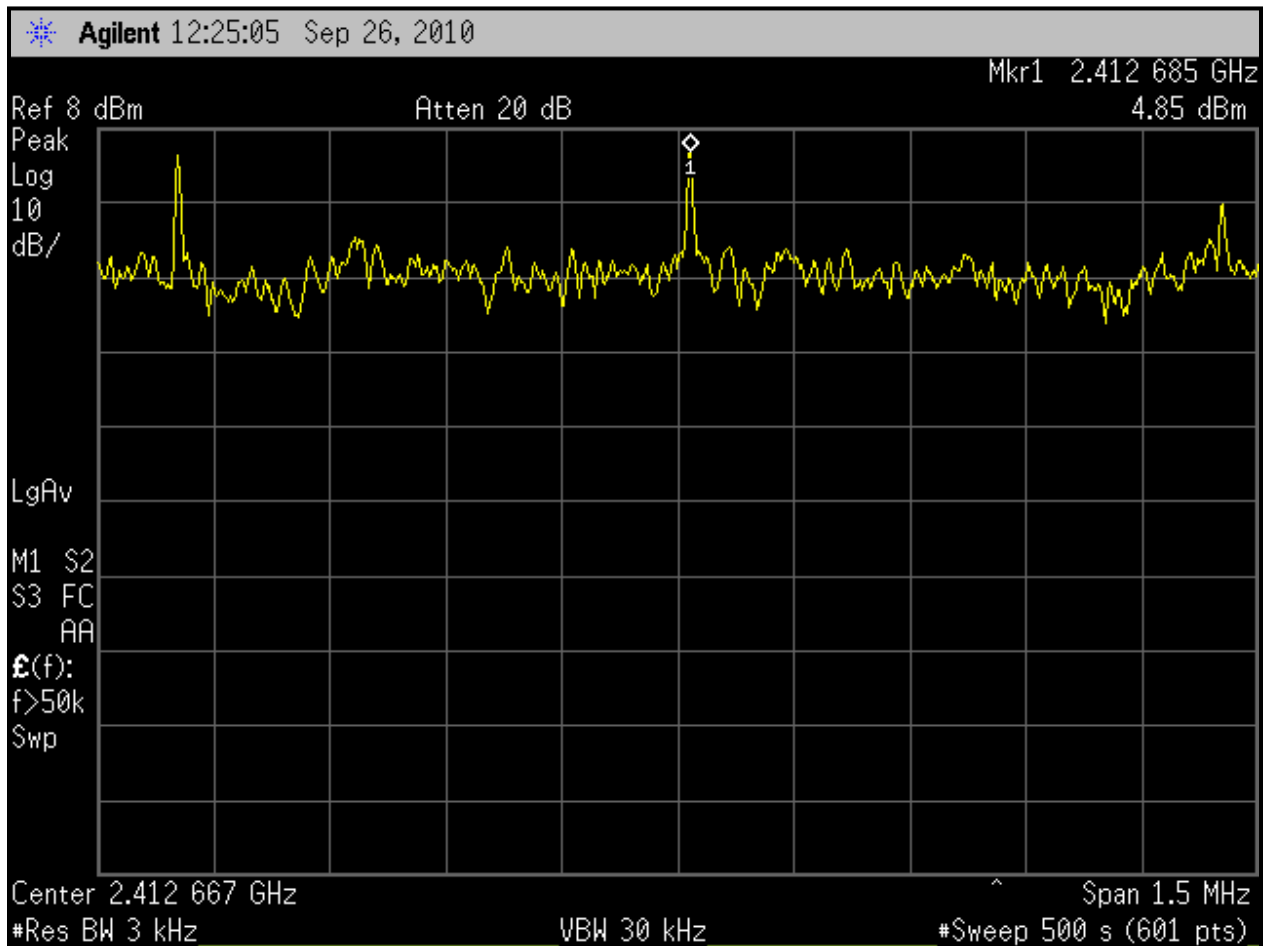
Plot 7-2: Power Spectral Density: Channel 157 (5785 MHz); 802.11a



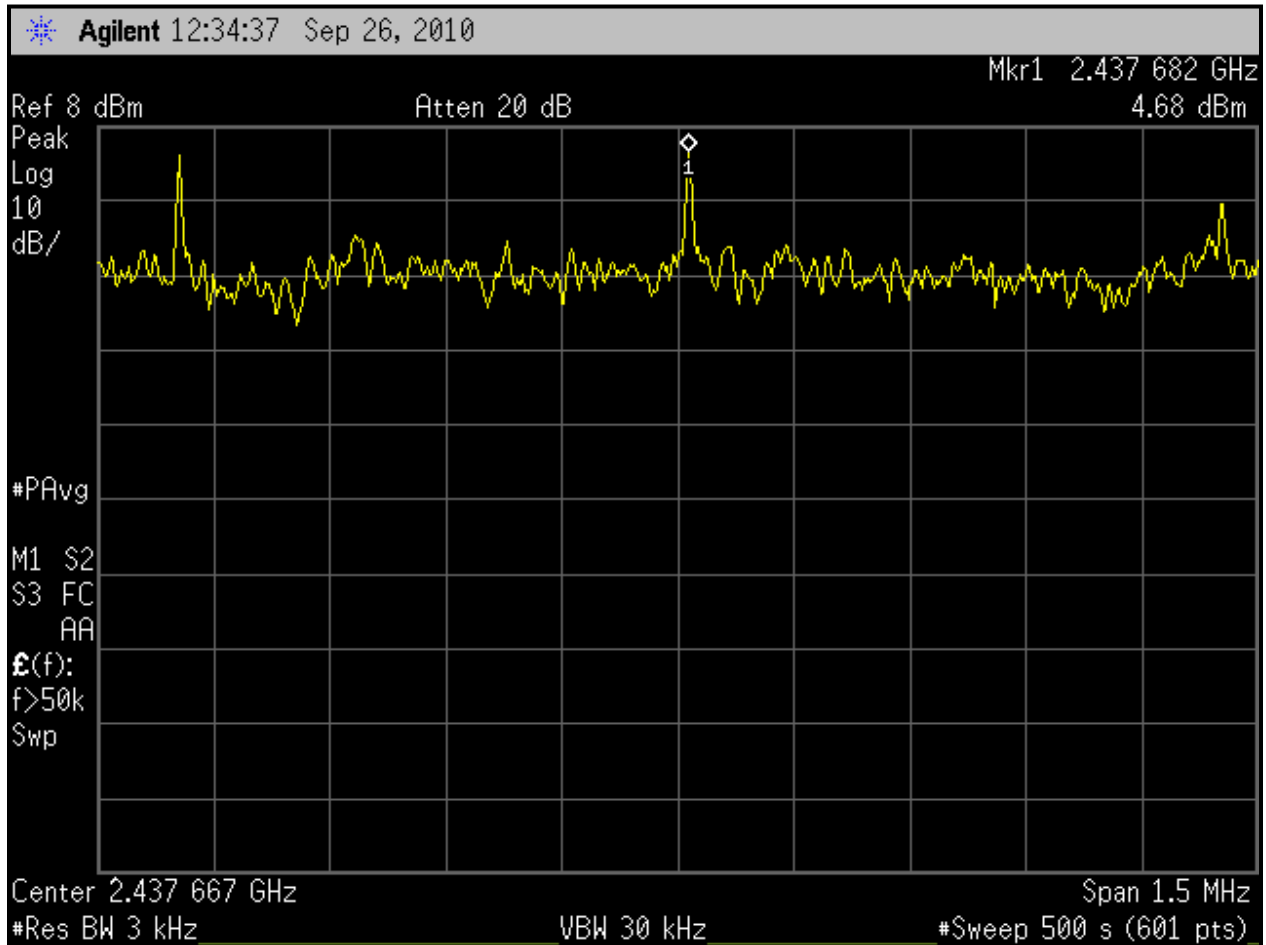
Plot 7-3: Power Spectral Density: Channel 165 (5825 MHz); 802.11a



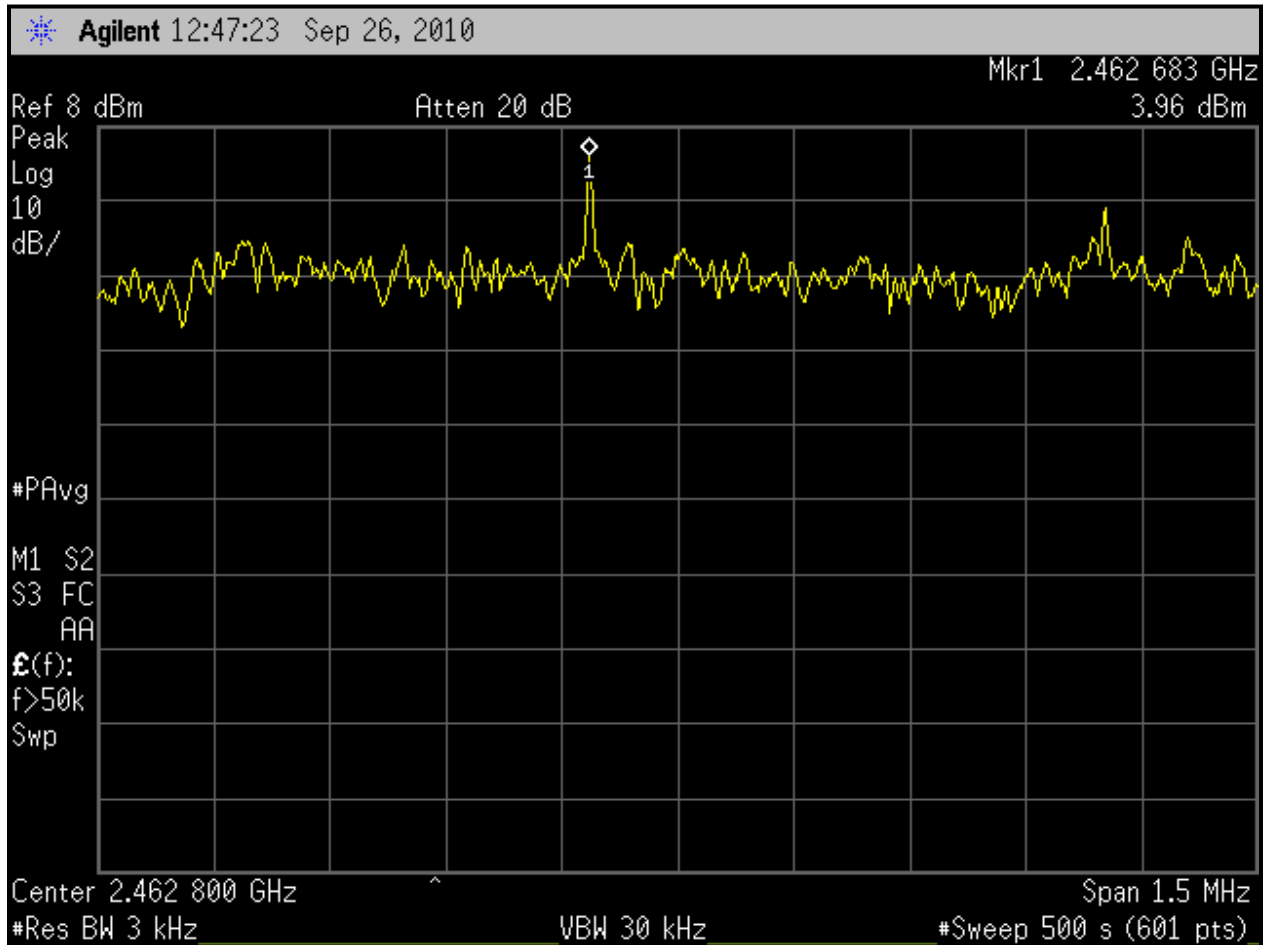
Plot 7-4: Power Spectral Density: Channel 1 (2412 MHz); 802.11b



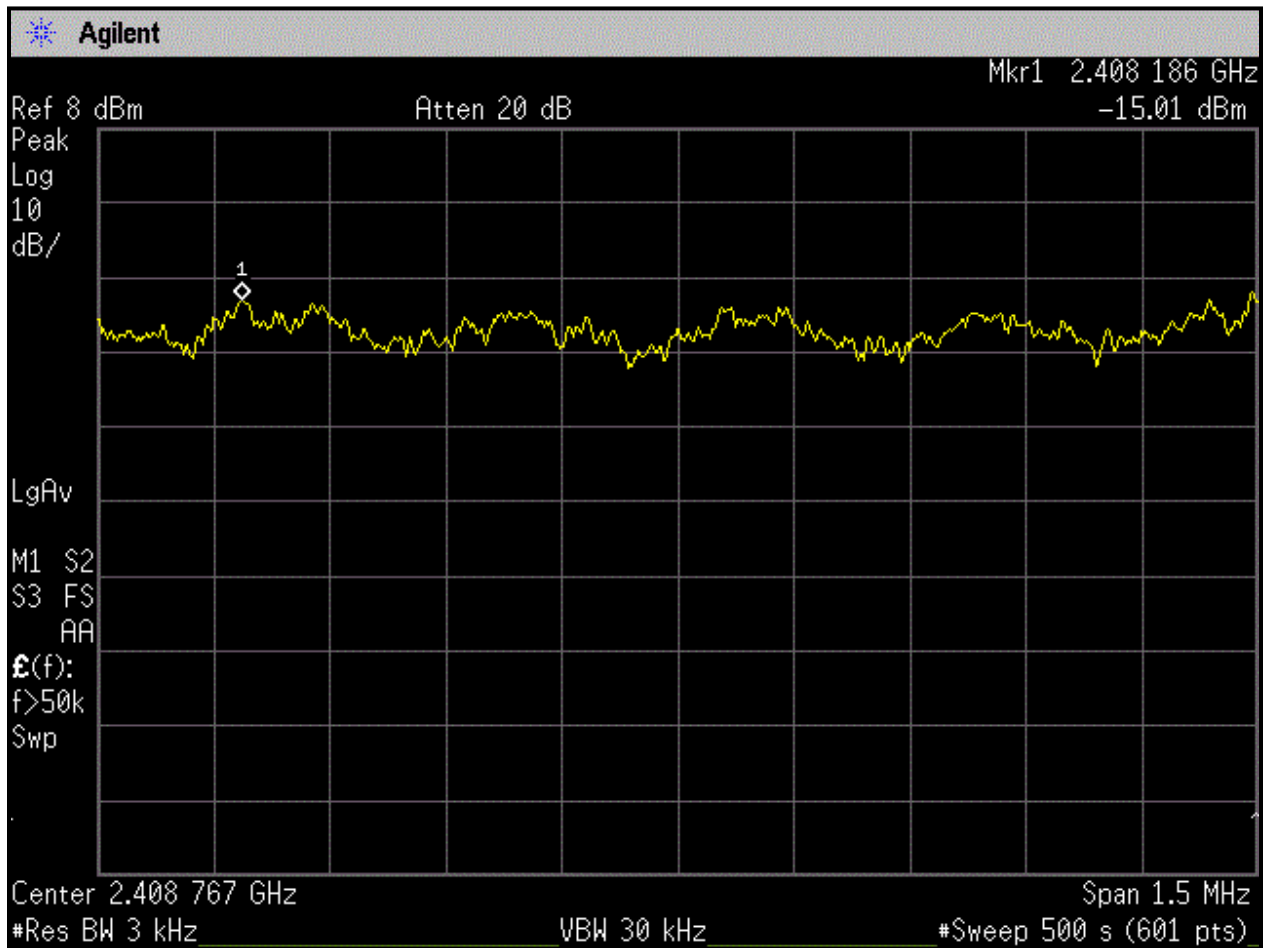
Plot 7-5: Power Spectral Density: Channel 6 (2437 MHz); 802.11b



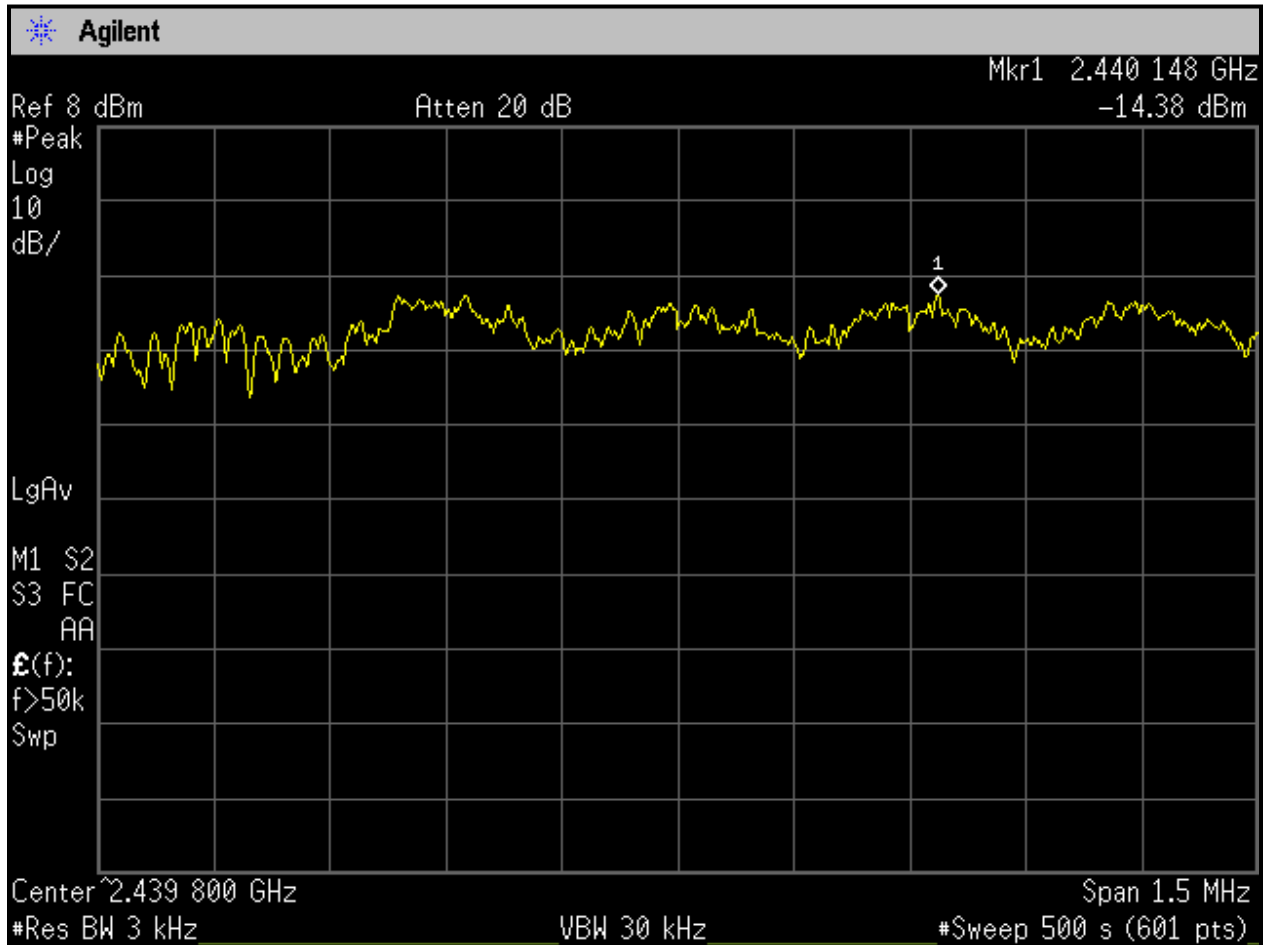
Plot 7-6: Power Spectral Density: Channel 11 (2462 MHz); 802.11b



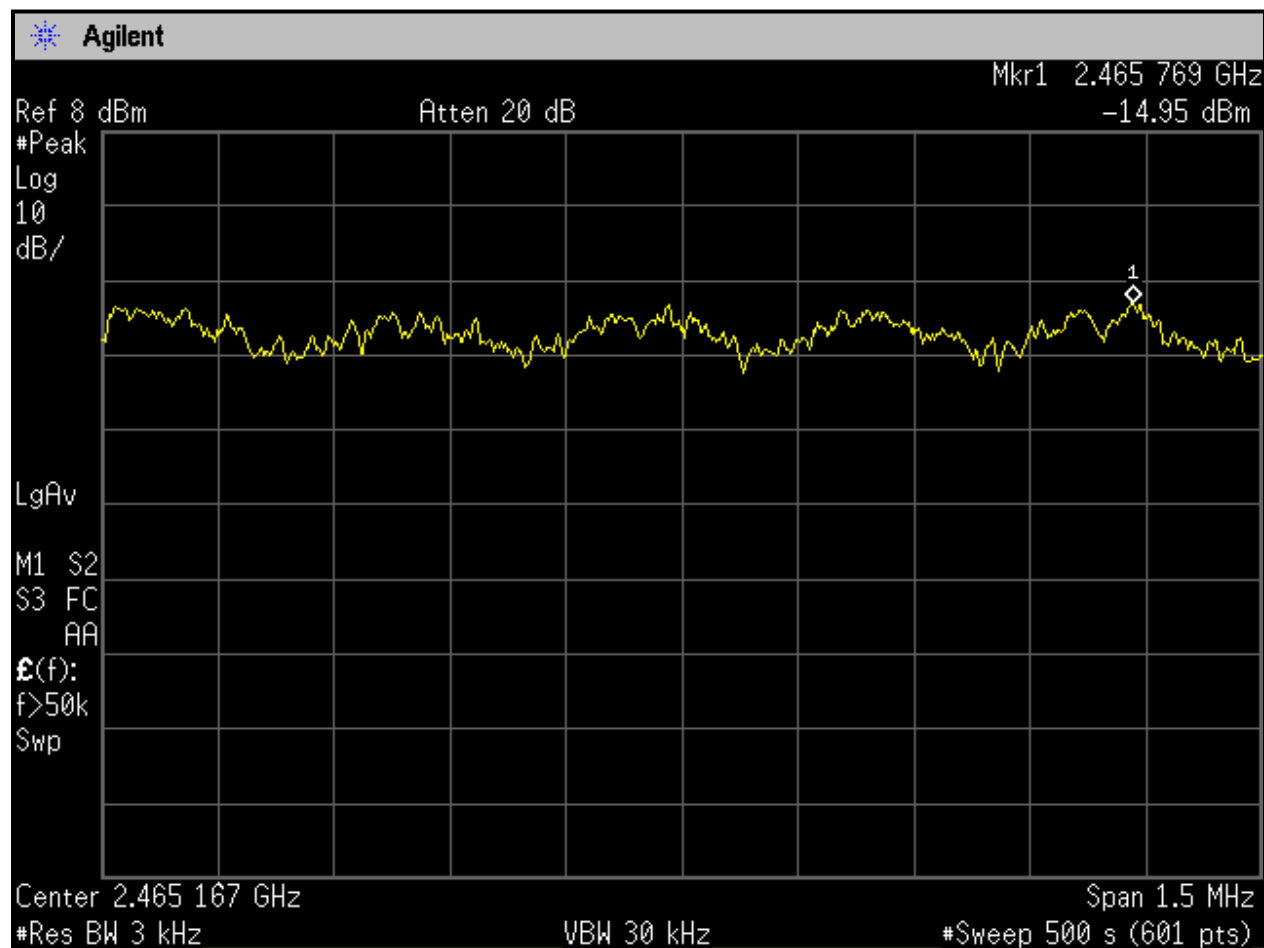
Plot 7-7: Power Spectral Density: Channel 1 (2412 MHz); 802.11g



Plot 7-8: Power Spectral Density: Channel 6 (2437 MHz); 802.11g



Plot 7-9: Power Spectral Density: Channel 11 (2462 MHz); 802.11g



Test Personnel:

Daniel W. Baltzell
Test Engineer

Signature

September 22&26, 2010
Dates Of Test

8 Conducted Emissions Measurement Limits – FCC §15.207; RSS-Gen

8.1 Limits of Conducted Emissions Measurement

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	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 conducted emissions measurements were performed in a Series 81 type shielded enclosure manufactured by Rayproof. The EUT was assembled on a wooden table 0.8 meters high. Power was fed to the EUT through a 50-ohm/50 μ H Line Impedance Stabilization Network (LISN). The EUT LISN was fed power through an AC filter box on the outside of 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 test peripherals. This peripheral LISN was also fed AC power. A metal power outlet box, which is bonded to the ground plane and electrically connected to the peripheral LISN, powers the EUT host peripherals.

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 7 kHz high-pass filter. The filter was used to prevent overload of the spectrum analyzer from noise below 7 kHz. Conducted emission levels were measured on each current-carrying line with the spectrum analyzer operating in the CISPR quasi-peak mode (or average mode if applicable). The analyzer's 6 dB bandwidth was set to 9 kHz. No video filter less than 10 times the resolution bandwidth was used. Average measurements were performed in a linear mode using a 10 kHz resolution bandwidth, a 1 Hz video bandwidth, and by decreasing the sweep time in order to obtain a calibrated measurement. The highest emissions amplitudes relative to the appropriate limits were measured and have been recorded in this report.

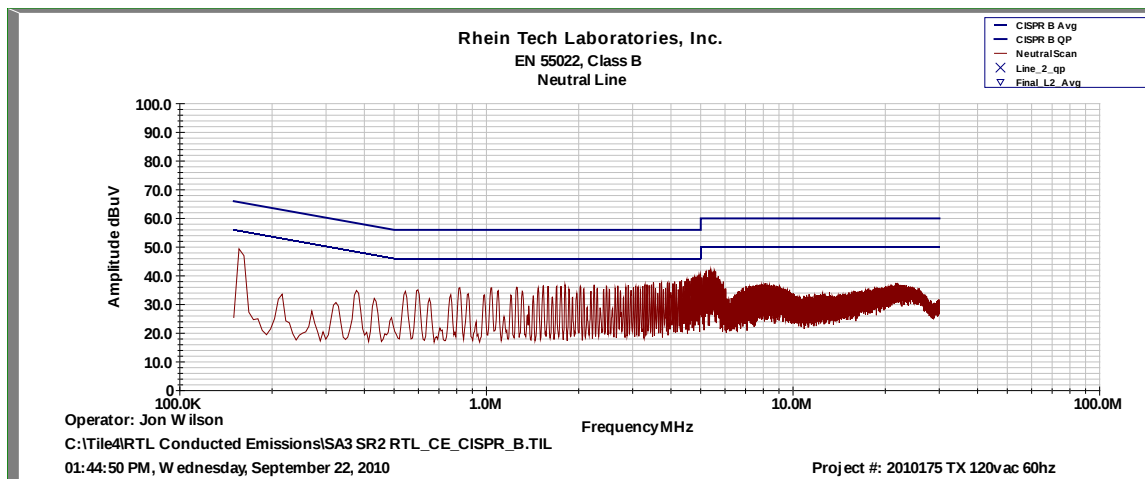
Table 8-1: Conducted Emissions Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900968	Hewlett Packard	8567A	Spectrum Analyzer (10 kHz - 1.5 GHz)	2602A00160	10/26/10
900969	Hewlett Packard	85650A	Quasi-Peak Adapter	2412A00414	10/26/10
900970	Hewlett Packard	85662A	Spectrum Analyzer Display	2542A11239	10/26/10
901083	AFJ International	LS16	16A LISN (110 V)	16010020080	11/4/10
N/A	Rhein Tech Laboratories, Inc.	Automated Emission Tester	Emissions testing software Rev. 14.0.2	N/A	N/A

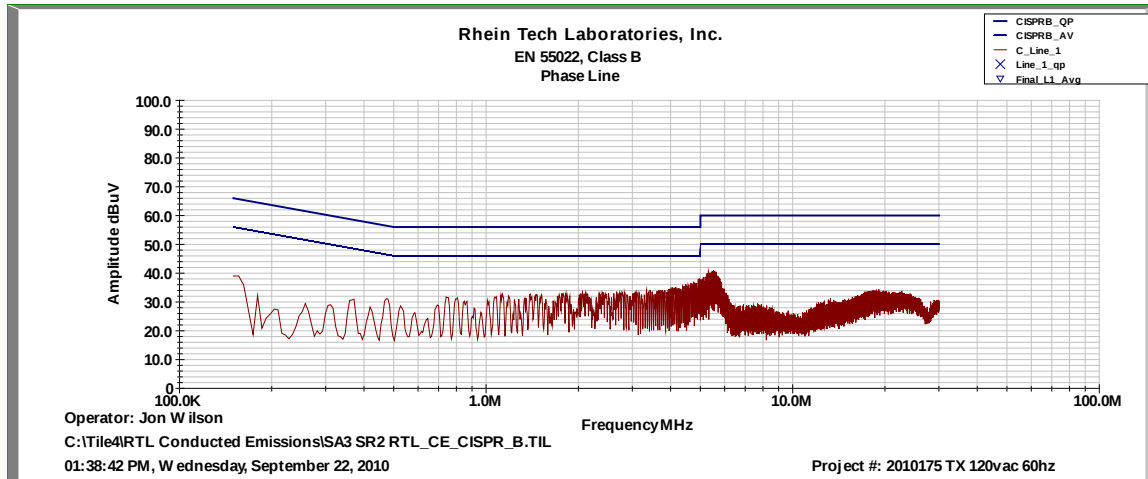
8.3 Conducted Emissions Test Results

8.3.1 Conducted Emissions Transmit Center Channel FHSS/DSSS

Plot 8-1: Conducted Emissions Transmit Center Channel FHSS/DSSS Neutral Side

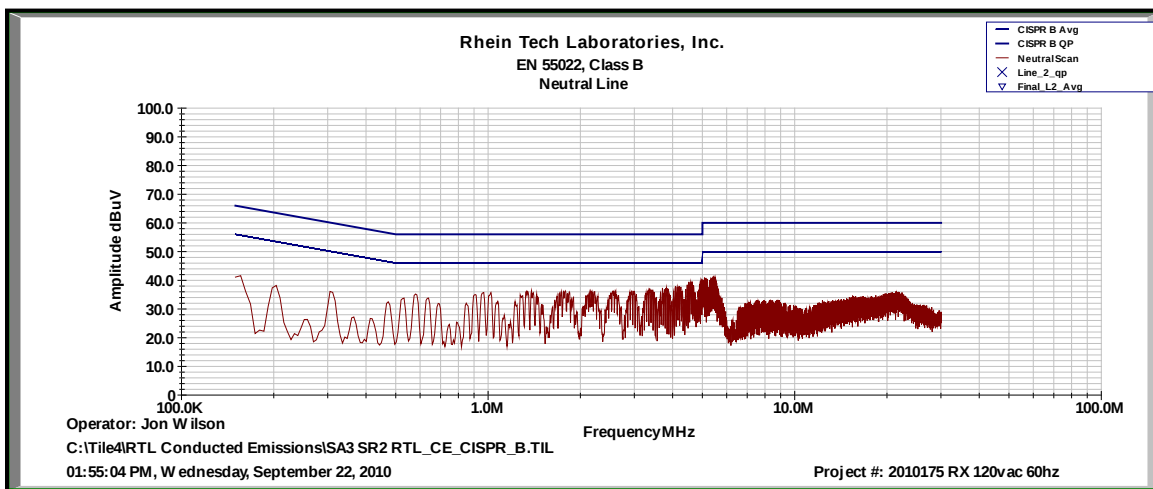


Plot 8-2: Conducted Emissions Transmit Center Channel FHSS/DSSS Hot Side

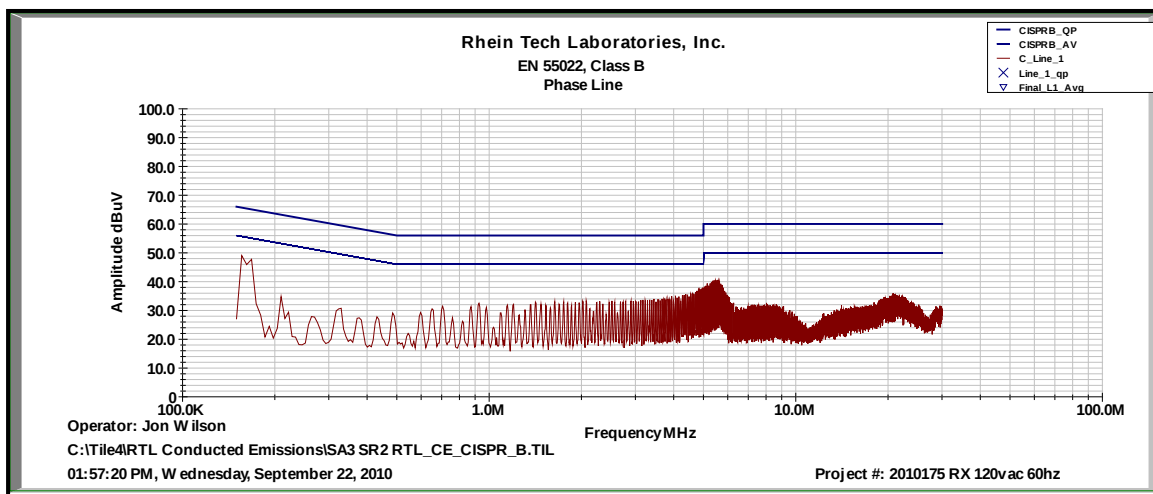


8.3.2 Conducted Emissions Receive Channel 6 DSSS

Plot 8-3: Conducted Emissions Receive Channel 6 DSSS Neutral Side

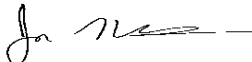


Plot 8-4: Conducted Emissions Receive Channel 6 FHSS/DSSS Hot Side



Test Personnel:

Jonathan Wilson
Test Engineer


Signature

September 22, 2010
Date Of Test

9 Radiated Emissions – FCC §15.209; RSS-210 §A8.5 and RSS-Gen

9.1 Limits of Radiated Emissions Measurement

Frequency (MHz)	Field Strength (uV/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 9-1: Radiated Emissions Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900151	Rohde and Schwarz	HFH2-Z2	Antenna (Loop, 9 kHz - 30 MHz)	827525/019	10/1/12
900932	Hewlett Packard	8449B OPT H02	Preamplifier (1 - 26.5 GHz)	3008A00505	2/22/11
901413	Agilent	E4448A	Spectrum Analyzer	US44020346	11/11/10
900905	Rhein Tech Laboratories	PR-1040	OATS 1 Preamplifier 40 dB (30 MHz – 2 GHz)	1006	4/10/11
900878	Rhein Tech Laboratories	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	Not Required
901516	Insulated Wire, Inc.	KPS-1503-2400-KPS-09302008	RF cable, 20'	NA	10/19/10
901517	Insulated Wire Inc.	KPS-1503-360-KPS-09302008	RF cable 36"	NA	10/19/10
901242	Rhein Tech Laboratories	WRT-000-0003	Wood rotating table	N/A	Not Required
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	6/14/11
900321	EMCO	3161-03	Horn Antennas (4 - 8,2GHz)	9508-1020	6/14/11
900323	EMCO	3160-7	Horn Antennas (8,2 - 12,4 GHz)	9605-1054	6/14/11
900356	EMCO	3160-08	Horn Antenna (12.4 - 18 GHz)	9607-1044	6/14/11
900325	EMCO	3160-9	Horn Antennas (18 - 26.5 GHz)	9605-1051	6/14/11
900392	Hewlett Packard	1197OK	Harmonic Mixer (18 – 26.5 GHz)	3525A00159	6/14/11
900791	Chase	CBL6111B	Bilog Antenna (30 MHz – 2000 MHz)	N/A	12/12/10

9.3 Radiated Emissions Test Results

9.3.1 Radiated Emissions Digital/Receiver Test Data

Table 9-2: Digital/Receiver Radiated Emissions

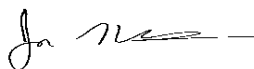
Temperature: 71°F						Humidity: 71%				
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pass/Fail
57.650	Qp	H	160	3.0	44.2	-23.9	20.3	40.0	-19.7	Pass
72.670	Qp	H	80	1.5	41.2	-24.4	16.8	40.0	-23.2	Pass
92.060	Qp	V	355	2.0	44.7	-20.8	23.9	43.5	-19.6	Pass
102.805	Qp	V	35	1.0	37.5	-18.5	19.0	43.5	-24.5	Pass
151.110	Qp	H	70	1.0	40.2	-18.4	21.8	43.5	-21.7	Pass

Table 9-3: Digital/Receiver Radiated Emissions with Headset

Temperature: 71°F						Humidity: 71%				
Emission Frequency (MHz)	Test Detector	Antenna Polarity (H/V)	Turntable Azimuth (deg)	Antenna Height (m)	Analyzer Reading (dBuV)	Site Correction Factor (dB/m)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pass/Fail
98.130	Qp	H	90	2.5	34.6	-19.3	15.3	43.5	-28.2	Pass
143.600	Qp	H	5	1.0	38.1	-18.2	19.9	43.5	-23.6	Pass
156.390	Qp	H	180	2.8	39.4	-18.2	21.2	43.5	-22.3	Pass
159.000	Qp	H	355	2.2	37.2	-18.3	18.9	43.5	-24.6	Pass
213.980	Qp	V	290	1.0	36.5	-18.9	17.6	43.5	-25.9	Pass
311.955	Qp	V	230	2.0	37.3	-14.5	22.8	46.0	-23.2	Pass
433.935	Qp	H	75	1.8	36.6	-11.0	25.6	46.0	-20.4	Pass

Test Personnel:

Jonathan Wilson
Test Engineer



Signature

September 23, 2010
Date Of Test

9.3.2 Radiated Emissions Harmonics/Spurious Test Data - WLAN DSSS (802.11b)

Table 9-4: Radiated Emissions Harmonics/Spurious Channel 1 (TX Frequency: 2412 MHz)

Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV) (1 MHz RBW/ 10 Hz VBW)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
4824.0	47.4	32.9	14.6	47.5	54.0	-6.5
12060.0	37.3	29.2	17.1	46.3	54.0	-7.7
14472.0	37.1	27.5	13.1	40.6	54.0	-13.4
19296.0	36.6	29.4	10.8	40.2	54.0	-13.8

Table 9-5: Radiated Emissions Harmonics/Spurious Channel 6 (TX Frequency: 2437 MHz)

Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV) (1 MHz RBW/ 10 Hz VBW)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
4874.0	46.8	33.0	12.1	45.1	54.0	-8.9
7311.0	50.5	34.7	11.0	45.7	54.0	-8.3
12185.0	42.6	29.4	15.8	45.2	54.0	-8.8
19496.0	39.7	29.5	23.2	52.7	54.0	-1.3

Table 9-6: Radiated Emissions Harmonics/Spurious Channel 11 (TX Frequency: 2462 MHz)

Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV) (1 MHz RBW/ 10 Hz VBW)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
4924.0	49.3	33.3	12.1	45.4	54.0	-8.6
7386.0	51.5	35.0	12.9	47.9	54.0	-6.1
12310.0	41.4	29.3	17.8	47.1	54.0	-6.9
19696.0	14.5	1.1	33.6	34.7	54.0	-19.3
22158.0	11.4	1.0	34.5	35.5	54.0	-18.5
24620.0	12.2	1.0	38.5	39.5	54.0	-14.5

9.3.3 Radiated Emissions Harmonics/Spurious Test Data - WLAN DSSS (802.11g)

Table 9-7: Radiated Emissions Harmonics/Spurious Channel 1 (TX Frequency: 2412 MHz)

Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV) (1 MHz RBW/ 10 Hz VBW)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
4824.0	44.8	31.1	14.6	45.7	54.0	-8.3
12060.0	42.9	29.3	17.1	46.4	54.0	-7.6
14472.0	38.0	28.2	13.1	41.3	54.0	-12.7
19296.0	38.3	29.2	22.8	52.0	54.0	-2.0

Table 9-8: Radiated Emissions Harmonics/Spurious Channel 6 (TX Frequency: 2437 MHz)

Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV) (1 MHz RBW/ 10 Hz VBW)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
4874.0	43.4	31.8	12.1	43.9	54.0	-10.1
7311.0	50.6	32.3	11.0	43.3	54.0	-10.7
12185.0	42.7	28.9	15.8	44.7	54.0	-9.3
19496.0	39.0	29.4	23.2	52.6	54.0	-1.4

Table 9-9: Radiated Emissions Harmonics/Spurious Channel 11 (TX Frequency: 2462 MHz)

Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV) (1 MHz RBW/ 10 Hz VBW)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
4924.0	46.1	30.6	12.1	42.7	54.0	-11.3
7386.0	46.1	31.1	12.9	44.0	54.0	-10.0
12310.0	42.0	28.7	17.8	46.5	54.0	-7.5
19696.0	12.2	1.0	33.6	34.6	54.0	-19.4
22158.0	12.0	1.0	34.5	35.5	54.0	-18.5
24620.0	11.6	1.0	38.5	39.5	54.0	-14.5

9.3.4 Radiated Emissions Harmonics/Spurious Test Data - WLAN DSSS (802.11a)

Table 9-10: Radiated Emissions Harmonics/Spurious Channel 149 (TX Frequency: 5745 MHz)

Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV) (1 MHz RBW/ 10 Hz VBW)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
11490.0	56.7	30.9	15.1	46.0	54.0	-8.0
22980.0	11.8	1.0	44.9	45.9	54.0	-8.1

Table 9-11: Radiated Emissions Harmonics/Spurious Channel 157 (TX Frequency: 5785 MHz)

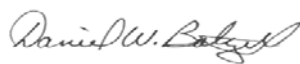
Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV) (1 MHz RBW/ 10 Hz VBW)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
11570.0	51.7	29.7	16.1	45.8	54.0	-8.2

Table 9-12: Radiated Emissions Harmonics/Spurious Channel 165 (TX Frequency: 5825 MHz)

Emission Frequency (MHz)	Peak Analyzer Reading (dBuV) (1 MHz RBW/VBW)	Average Analyzer Reading (dBuV) (1 MHz RBW/ 10 Hz VBW)	Site Correction Factor (dB/m)	Average Emission Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)
11650.0	47.4	30.0	14.5	44.5	54.0	-9.5

Test Personnel:

Daniel W. Baltzell
Test Engineer



Signature

September 26, 2010
Date Of Test

10 Conclusion

The data in this measurement report shows that the EUT as tested, Vocollect, Inc. Model Name A500, Model # TT-800-1-1, FCC ID: MQO-TT-800-1-1, IC: 2570A-TT80011, complies with all the applicable requirements of Parts 2 and 15 of the FCC Rules and Regulations, and Industry Canada RSS-210.