



Test Report issued under the responsibility of:

ITC ENGINEERING SERVICES, INC.

CFR 47 Part 15 Subpart C §15.247

– Intentional Radiators –

Operation within the Bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz

Industry Canada Radio Standard Specification RSS-Gen Issue 3

General Requirements and Information for the Certification of Radio Apparatus

Industry Canada Radio Standard Specification RSS-210 Issue 8

License-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

Report Reference No.	20110916-01 FCC/IC
Date of Issue	November 16, 2011
Total Number of Pages	78
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Test Specification Standard	CFR 47 Part 15 Subpart C Section 15.247 ANSI C63.4-2009; RSS-Gen & RSS-210
FCC ID.....	YOPGS1500M
IC ID.....	9154A-GS1500M
Judgment	Complies as Tested
Test Item Description	Low Power Wi-Fi Module with 802.11n/b/g
Manufacturer Logo.....	
Manufacturer	GainSpan Corporation
Model/Type Reference.....	GS1500M
RF Operating Frequency.....	2.412- 2.462 GHz



Lab Code 200172-0

ISO 17025 Accredited Laboratory

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1 DOCUMENTATION

1.1 TESTING LOCATION

<input checked="" type="checkbox"/> ITC Testing Laboratory:	:	ITC Engineering Services, Inc.
Testing Location/Address	:	9959 Calaveras Road, PO Box 543, Sunol, CA 94586, USA
Prepared By (Name + Signature)	:	Ellen Schneider
Tested By (Name + Signature)	:	Benjamin Jing
Approved By (Name + Signature)	:	Michael Gbadebo, PE
<input type="checkbox"/> Manufacturer Facility	:	
Testing Location/Address	:	
Tested By (Name + Signature)	:	
Approved By (+ Signature)	:	
<input type="checkbox"/> 3 rd Party Test Facility	:	
Testing Location/Address	:	
Tested By (Name + Signature)	:	
Approved By (+ Signature)	:	

1.2 REVISION HISTORY

#	Revision Date	Old Report Number	New Report Number	Revision
	N/A	N/A	N/A	N/A

1.3 SUMMARY OF TESTS

ITC Engineering Services, Inc. as an independent testing laboratory, declares that the equipment specified above was tested to the requirements of:

Section of CFR 47 Part 15 Subpart C	Section of RSS-Gen & RSS-210	Test Description	Result
15.207	7.2.2	AC Line Conducted Emission	Pass
15.247(a)(2)	A8.2(a), 4.6	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System	Pass
15.247(b)	A8.4(4), 4.8	Maximum Peak Output Power	Pass
15.247(c), 15.209	A8.5, 4.9	Transmitter Radiated Emissions	Pass
-	7.2.3, 2.3	Reciever Radiated Emissions	Pass
15.247(c)	A8.5	Conducted Out-Band Emission Measurement	Pass
15.247(d)	A8.2(b)	Power Spectral Density	Pass

1.4 DECLARATION/DISCLAIMER

It is the manufacturer's responsibility to assure that additional production units of these models are manufactured with identical electrical and mechanical characteristics. This report is the confidential property of the applicant. As a mutual protection to our applicants, the public, and ourselves, extracts from the test report shall not be reproduced except in full without ITC Engineering Service's written approval. The applicant/manufacturer shall not use this report to claim product endorsement by NIST, NVLAP or any US Government agency.

1.5 MEASUREMENT UNCERTAINTY

UNCERTAINTY OF RADIATED EMISSIONS MEASUREMENT – 30MHz THROUGH 1 GHz					
Uncertainty Contribution		Value	Data Source	Prob. Dist.	Divisor
1	Antenna (Biconical/ Log Periodic)	± .82	Cal. Lab	Normal	$k = 2$
2	Cable loss /Attenuator	± 0.5	Historical record	Normal	$k = 1$
3	Receiver/SA Specification	± 2.3	Mfg. Spec.	Rectangular	1.73
4	Mismatch	± 0.5	Historical record	"U"	1.41
5	Site Corrections: Site Imperfections:	± 4.0	Site Atten. Data	Triangular	2.45
6	Separation Distance: at 3m	± 0.2	Site Atten. Data	Rectangular	1.73
7	Combined Standard Uncertainty $u_c(y)$	±2.62		Normal	
8	Expanded Uncertainty U	±4.47		Normal	$k = 2$
Combined Standard Uncertainty Calculation: $u_c(y) = [(0.82/2)^2 + (0.5/1)^2 + (2.3/1.73)^2 + (0.5/1.41)^2 + (4.0/2.45)^2 + (0.2/1.73)^2]^{1/2}$ $= (0.168 + 0.25 + 1.77 + 0.126 + 2.65 + 0.013)^{1/2} = 2.62$ $2(u_c(y)) = U_{lab} = \pm 5.24$					

UNCERTAINTY OF CONDUCTED EMISSIONS MEASUREMENT – 150KHz THROUGH 30MHz					
Uncertainty Contribution		Value	Data Source	Prob. Dist.	Divisor
1	Cable and Attenuator Calibration	± 0.5	Historical Data	Normal	$k = 1$
2	Receiver/SA specification	± 2.0	Mfg. Spec.	Rectangular	1.73
3	Receiver Corrections:				
	Sine Wave Voltage	±0.55	Mfg. Spec.	Normal	$k = 2$
	Pulse Amplitude Response	± 1.5		Rectangular	1.73
	Pulse Repetition Rate Response	± 0.75		Rectangular	1.73
4	LISN coupling specification	± 2.0	Cal. Lab.	Normal	$k = 2$
5	Mismatch	± 0.26	Estimation	"U"	1.41
6	Combined Standard Uncertainty $u_c(y)$	± 1.91		Normal	
7	Expanded Uncertainty U	± 3.82		Normal	$k = 2$
Combined Standard Uncertainty Calculation:					
$u_c(y) = [(0.5/1)^2 + (2.0/1.73)^2 + (0.55/2)^2 + (1.5/1.73)^2 + (0.75/1.73)^2 + (2.0/2)^2 + (0.26/1.41)^2]^{1/2}$ $= (0.25 + 1.34 + .076 + .75 + .19 + 1 + .034)^{1/2} = 1.91$ $2(u_c(y)) = U_{lab} = \pm 3.82$					

1.6 CONDITION OF EUT

Equipment Under Test (EUT) was tested as it was received.

1.7 GENERAL DESCRIPTION OF EUT

Product	Low-Power Wireless System-on-Chip Wi-Fi Module
Model No.	GS1500M
FCC ID	YOPGS1500M
IC ID	9154A-GS1500M
Power Supply	Battery or DC 3.3V from host equipment
Modulation Type	CCK for DSSS BPSK, QPSK and QAM for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: 11 / 5.5 / 2 / 1Mbps 802.11g: 54/ 48/ 36/ 24/ 18/ 12/ 9/ 6 Mbps 802.11n: MCS0-MCS7 @ 72 Mbps max.
Operating Frequency	2.412- 2.484 GHz
Number of Channels	802.11b: 1, 6, 11 802.11g: 1, 6, 11 802.11n: 1, 6, 11
Maximum Output Power	802.11b: 29.5 mW 802.11g: 35.5 mW 802.11n: 38.9 mW
Antenna Type	1 x PCB Antenna 1 x RFA-02-5-F7H1 Antenna 1 x RFA-02-P05-70B-150 Antenna As a policy, FCC no longer requires submittal of Class 1 permissive changes. Hence any such changes made to the modules contained in the report would not require submittal to the FCC.
Data Cable	N/A
I/O Ports	N/A
Associated Devices	N/A

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Product: Low Power WiFi Module

Model: GS1500M

1.8 DESCRIPTION OF ANTENNA WITH FCC 47 CFR PART 15C 15.203 REQUIREMENTS.

There are three different antennas provided with this EUT.

Antenna Model:	RFA - 02 - 5 - F7H1	RFA - 02 - P05 - 150	Printed Circuit
Frequency Range	2.4 GHz – 2.5 GHz	2.4 GHz – 2.5 GHz	2.4 GHz – 2.5 GHz
Impedance	50 ohm	50 ohm	50 ohm
Antenna Gain	5 dBi	2 dBi	1 dBi
Connector Type	I -PEX	I -PEX	Integral with circuit board trace layout.
Cable Length	200 mm	200 mm	N/A

The above specified antenna connector types are not standard type, which cannot be readily purchased by end user. Furthermore, they are pre-installed by radio device manufacturer to sale. Consequently, the three antennas supplied with the EUT comply with 47CFR Part 15 Subpart C Section 15.203.

1.9 LIST OF APPLICANT PERIPHERALS USED DURING TEST

Description	Manufacturer	Model Name	Serial Number
Host board	Gainspan	Custom	N/A

1.10 GENERAL TEST REMARKS

The EUT was operated under the following conditions during the testing:

<input type="checkbox"/>	Standby	<input type="checkbox"/>	Test Program (H - Pattern)
<input type="checkbox"/>	Test Program (Color Bar)	<input type="checkbox"/>	Test Program (Applicant Specific)
<input type="checkbox"/>	TV/VCR Signal Input	<input type="checkbox"/>	Signal Generator Input
<input type="checkbox"/>	Continuous Audio Tone (1kHz)	<input type="checkbox"/>	Cycled Audio Tone (1kHz)
<input type="checkbox"/>	Printer/Parallel Function	<input type="checkbox"/>	Modem/Serial Function
<input type="checkbox"/>	Serpentine Program with I/O	<input type="checkbox"/>	Serpentine Program without I/O
<input type="checkbox"/>	Practice Operation	<input checked="" type="checkbox"/>	Normal Operating Mode
<input type="checkbox"/>	Essential Operation (Functional Safety)	<input type="checkbox"/>	Continuous Unmonitored Operation
<input checked="" type="checkbox"/>	Continuous Monitored Operation	<input type="checkbox"/>	Non-Continuous Operation

The requirements according to the technical regulations are:

<input checked="" type="checkbox"/>	Met	<input type="checkbox"/>	Not Met
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The Equipment Under Test does:

<input checked="" type="checkbox"/>	Fulfill the general approval requirements	<input type="checkbox"/>	Not fulfill the general approval requirements
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2 CONDUCTED EMISSION

2.1 FCC §15.207, RSS-GEN 7.2.2

The EUT was placed in a shielded room 80 cm away from the ground reference plane and 40 cm away from the vertical reference plane. The power input to the EUT was run through a LISN (Line Impedance Stabilization Network) and the excess power cord was looped into figure "8" above the LISN. EUT was powered on and placed in an operational mode. The line conducted tests were performed on hot and neutral lines.

2.1.1 ADMINISTRATIVE AND ENVIRONMENTAL DETAILS

Site Used:	Test Site 1: Semi-Anechoic Chamber
Test Date:	9/26/2011
Test Engineer:	Benjamin Jing
Temperature:	21°C
Humidity:	43%

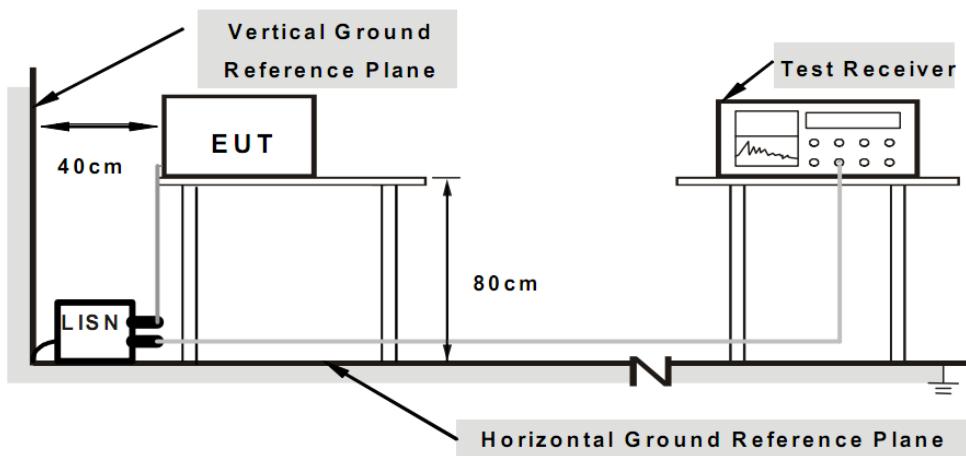
2.1.2 TEST EQUIPMENT

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due Date
EMC Analyzer	HP	8565E	3943A01328	05/02/12
LISN (25 Amp)	EMCO	3825/2	9210-2008	09/13/2012
Coax Cable # 10PLUS30	N/A	N/A	N/A	N/A

2.1.3 TEST RESULTS

The EUT meets the requirements of the test for Radiated Emissions per FCC §15.207, RSS- GEN 7.2.2

2.1.4 TEST SETUP



2.1.5 TEST DATA

FIGURE 1: (60HZ) CONDUCTED EMISSIONS TEST DATA PLOT 150 KHZ – 30MHZ RANGE (HOT)

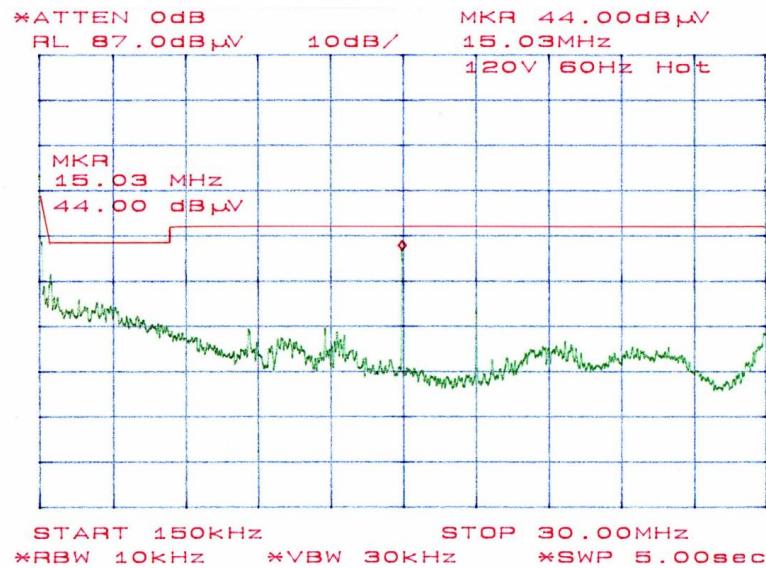
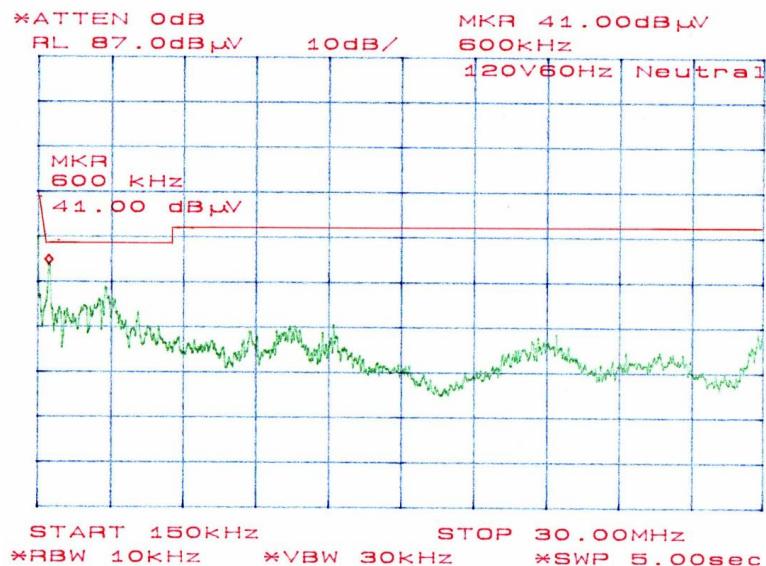


FIGURE 2: (60HZ) CONDUCTED EMISSIONS TEST DATA PLOT 150 KHZ – 30MHZ RANGE (NEUTRAL)



2.1.6 TEST SETUP PICTURES

Prepared By: ITC Engineering Services, Inc.
9959 Calaveras Road, PO Box 543
Sunol, California 94586-0543
Tel: +1(925) 862-2944
Fax: +1(925) 862-9013
Email: itcemc@itcemc.com
Web: www.itcemc.com

Product: Low Power WiFi Module
Model: GS1500M

FIGURE 3: CONDUCTED EMISSION TEST SETUP

3 TRANSMITTER RADIATED EMISSION

3.1 FCC §15.247 (c), RSS-GEN 4.9 & 6, RSS-210 A8.5

The EUT was placed on a wooden turntable 80 cm above a ground reference plane in the semi-anechoic chamber. It was then powered on and placed in an operational mode. Radiated emissions were monitored from 9KHz to 30MHz, 30MHz to 1000MHz, and 1GHz to 25GHz using an antenna placed three meters from the EUT. The antennas were placed in both horizontal and vertical polarities and were elevated from one to four meters while the unit was rotated and monitored. The results were recorded. The test was performed on the PCB and the two external antennas.

EUT was set at three orthogonal planes and the test was performed under the worst case. The antenna data included in the test report was obtained while testing in the three orthogonal planes for each of the antenna configurations. Each antenna used in the testing was the highest gain antenna for that antenna type.

3.1.1 ADMINISTRATIVE AND ENVIRONMENTAL DETAILS

Site Used:	Test Site 1: Semi-Anechoic Chamber
Test Date:	09/19/2011 thru 09/22/2011
Test Engineer:	Benjamin Jing
Temperature:	21°C
Humidity:	43%

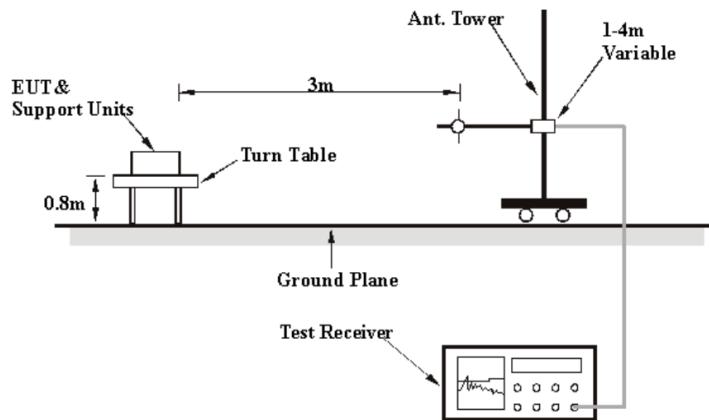
3.1.2 TEST EQUIPMENT

Equipment Description	Manufacturer	Model Name	Serial Number	Freq. Range	Cal. Due Date
Spectrum Analyzer	HP	8565E	3943A01328	100Hz -40GHz	05/02/2012
Horn Antenna	EMCO	3115	8812-3050	1– 18GHz	03/08/2012
Spectrum Analyzer	Agilent	E7402A	MY45112375	100Hz – 3GHz	06/28/2012
Biconical Antenna	EMCO	3104	3159	30 – 200Mhz	03/04/2012
L.P. Antenna	EMCO	3146	1569/1001	200MHz – 1Ghz	03/09/2012
Loop Antenna	EMCO	6511	9010/1093	100Hz -30MHz	11/27/2011
RF Amplifier	HP	87422A	3234A00895	1-24GHz	12/09/2011
RF Amplifier	HP	8447D	2443A04600	100Hz – 1GHz	12/09/2011

3.1.3 TEST RESULTS

The EUT meets the requirements of the test for Radiated Emissions per FCC §15.247 (c), RSS-GEN 4.9 & 6, RSS-210 A8.5.

3.1.4 TEST SETUP



3.1.5 TEST DATA – PCB ANTENNA

Note: Levels of the spurious emissions within 9 KHz – 30 MHz were too low to be measured.

The curve is the ambient level/noise floor.

FIGURE 4: PCB/ 802.11N/ 9 KHZ-30 MHZ

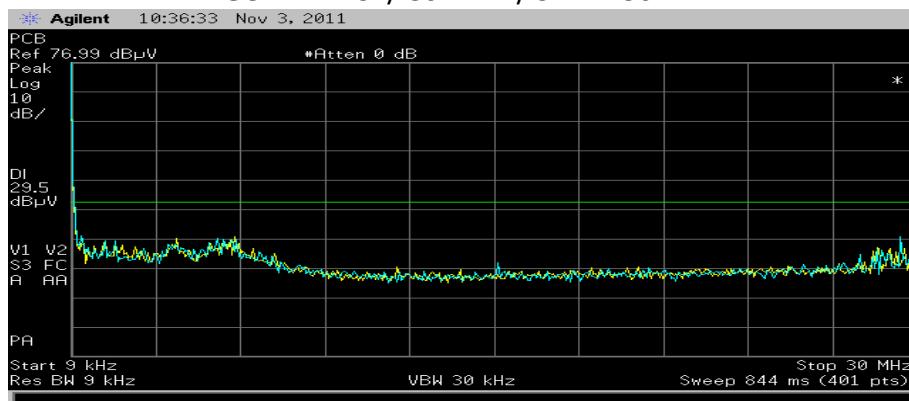


FIGURE 5: PCB/ 802.11B/ 9 KHZ-30 MHZ

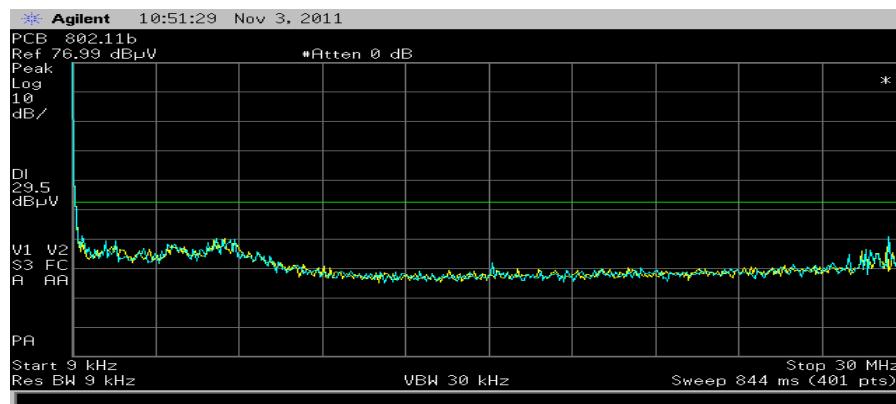


FIGURE 6: PCB/ 802.11G/ 9 KHZ-30 MHZ

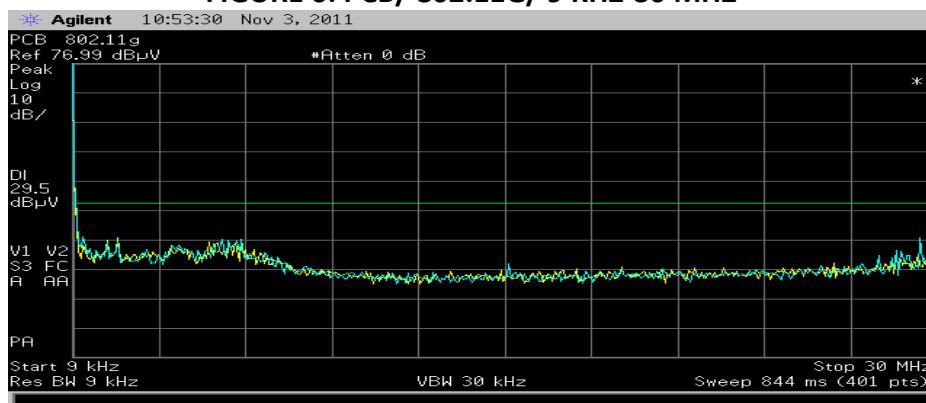


FIGURE 7: PCB/ 802.11n/ 30-200 MHz HORIZONTAL. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.

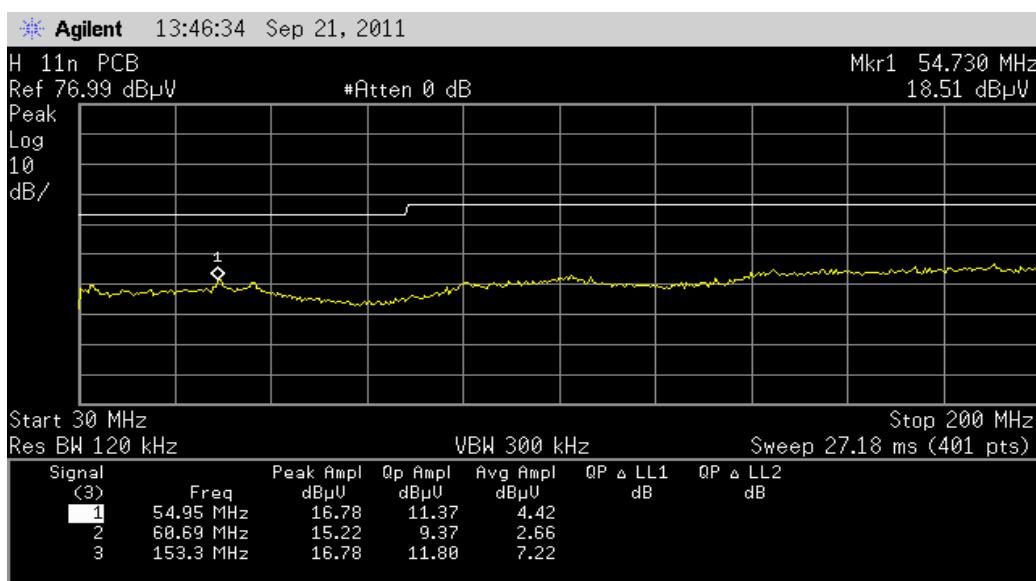


FIGURE 8: PCB/ 802.11n/ 200-1000 MHz VERTICAL. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.

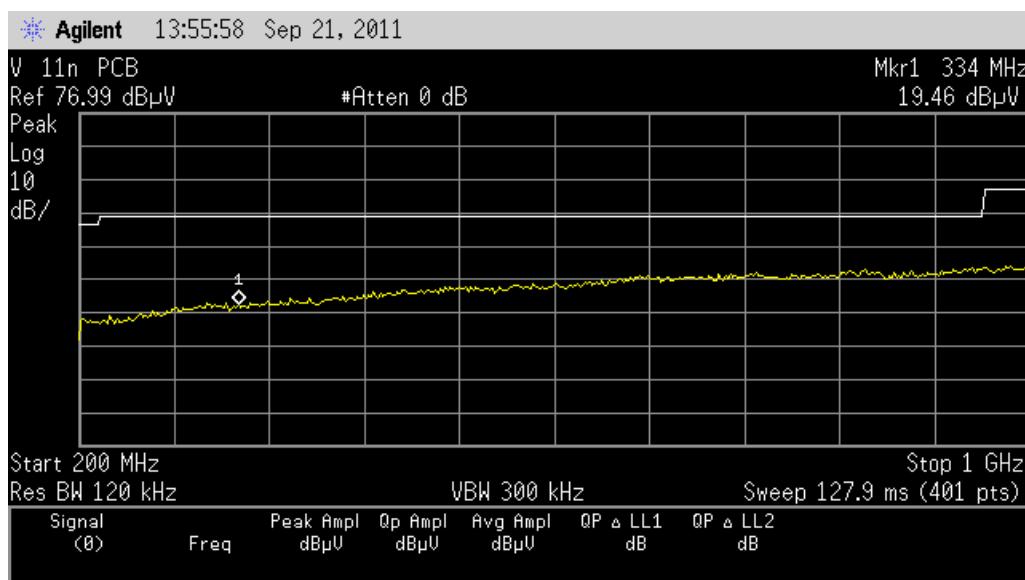


TABLE 1: PCB/ 802.11n/ OFDM/ CH 1/ 2412MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2412	78.5	190	1.6	V	28	16	32	90.5			Peak
2412	80.1	210	1.8	H	29	16	32	93.1			Peak
2412	64.2	190	1.6	V	28	16	32	76.2			Ave.
2412	65.1	210	1.8	H	29	16	32	78.1			Ave.
2390	43.7	190	1.6	V	28	16	32	55.7	74	-18.3	Peak
2390	30.8	190	1.6	V	28	16	32	42.8	54	-11.2	Ave.
2390	45.7	210	1.8	H	28	16	32	57.7	74	-16.3	Peak
2390	31.5	210	1.8	H	28	16	32	43.5	54	-10.5	Ave.
2400	54.4	190	1.6	V	28	16	32	66.4	70.5	-4.1	Peak
2400	55.6	210	1.8	H	29	16	32	68.6	73.1	-4.5	Peak
2483.5	38.6	210	1.8	H	28	16	32	50.6	74	-23.4	Peak
2483.5	26.1	210	1.8	H	28	16	32	38.1	54	-15.9	Ave.
4824	36.1	190	1.6	V	33	23	32	60.1	74	-13.9	Peak
4824	25.3	190	1.6	V	33	23	32	49.3	54	-4.7	Ave.
4824	37.2	210	1.8	H	34	23	32	62.2	74	-11.8	Peak
4824	25.8	210	1.8	H	34	23	32	50.8	54	-3.2	Ave.

TABLE 2: PCB/ 802.11n/ OFDM/ CH 6/ 2437MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	
2437	78.8	250	1.7	V	28	16	32	90.8			Peak
2437	79.8	230	1.6	H	28	16	32	91.8			Peak
2437	64.2	250	1.7	V	28	16	32	76.2			Ave.
2437	65.8	230	1.6	H	28	16	32	77.8			Ave.
2390	36.1	230	1.6	H	28	16	32	48.1	74	-25.9	Peak
2390	25.3	230	1.6	H	28	16	32	37.3	54	-16.7	Ave.
2400	39.7	250	1.7	V	28	16	32	51.7	70.8	-19.1	Peak
2400	40.5	230	1.6	H	28	16	32	52.5	71.8	-19.3	Peak
2483.5	37.2	310	1.5	H	28	16	32	49.2	74	-24.8	Peak
2483.5	26.2	310	1.5	H	28	16	32	38.2	54	-15.8	Ave.
4874	36.9	250	1.7	V	33	23	32	60.9	74	-13.1	Peak
4874	24.8	250	1.7	V	33	23	32	48.8	54	-5.2	Ave.
4874	37.7	230	1.6	H	34	23	32	62.7	74	-11.3	Peak
4874	25.6	230	1.6	H	34	23	32	50.6	54	-3.4	Ave.

TABLE 3: PCB/ 802.11n/ OFDM/ CH 11/ 2462MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2462	79.1	160	1.5	V	28	16	32	91.1			Peak
2462	79.5	230	1.7	H	28	16	32	91.5			Peak
2462	63.7	160	1.5	V	28	16	32	75.7			Ave.
2462	64.3	230	1.7	H	28	16	32	76.3			Ave.
2390	38.8	230	1.7	H	28	16	32	50.8	74	-23.2	Peak
2390	25.3	230	1.7	H	28	16	32	37.3	54	-16.7	Ave.
2400	36.9	160	1.5	V	28	16	32	48.9	71.1	-22.2	Peak
2400	38.5	230	1.7	H	28	16	32	50.5	71.5	-21	Peak
2483.5	37.3	230	1.7	H	28	16	32	49.3	74	-24.7	Peak
2483.5	26.7	230	1.7	H	28	16	32	38.7	54	-15.3	Ave.
4924	36.7	160	1.5	V	33	23	32	60.7	74	-13.3	Peak
4924	25.4	160	1.5	V	33	23	32	49.4	54	-4.6	Ave.
4924	37.9	230	1.7	H	34	23	32	62.9	74	-11.1	Peak
4924	26.2	230	1.7	H	34	23	32	51.2	54	-2.8	Ave.

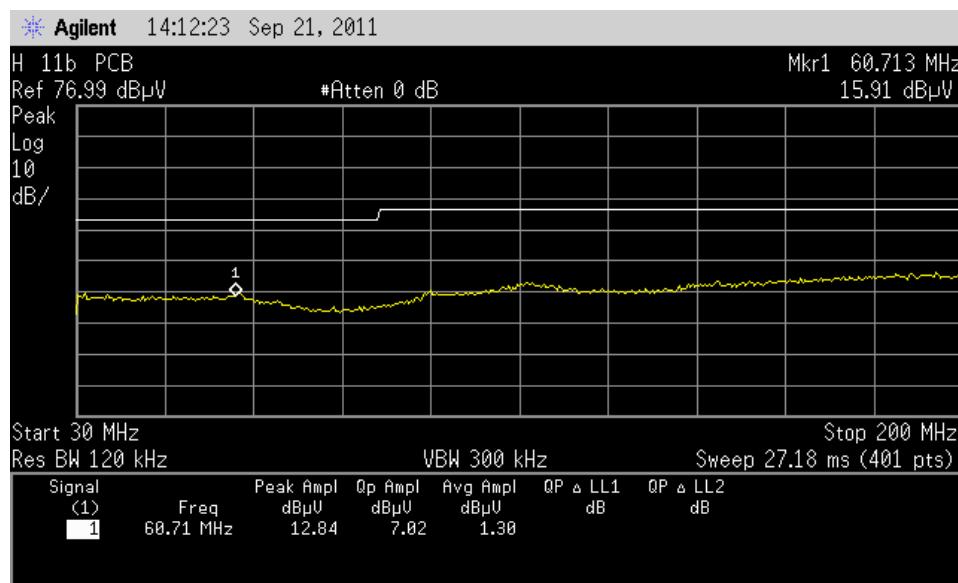
FIGURE 9: PCB/ 802.11b/ 30-200MHz HORIZONTAL. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.

FIGURE 10: PCB/ 802.11b/ 200-1000MHz HORIZONTAL. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.

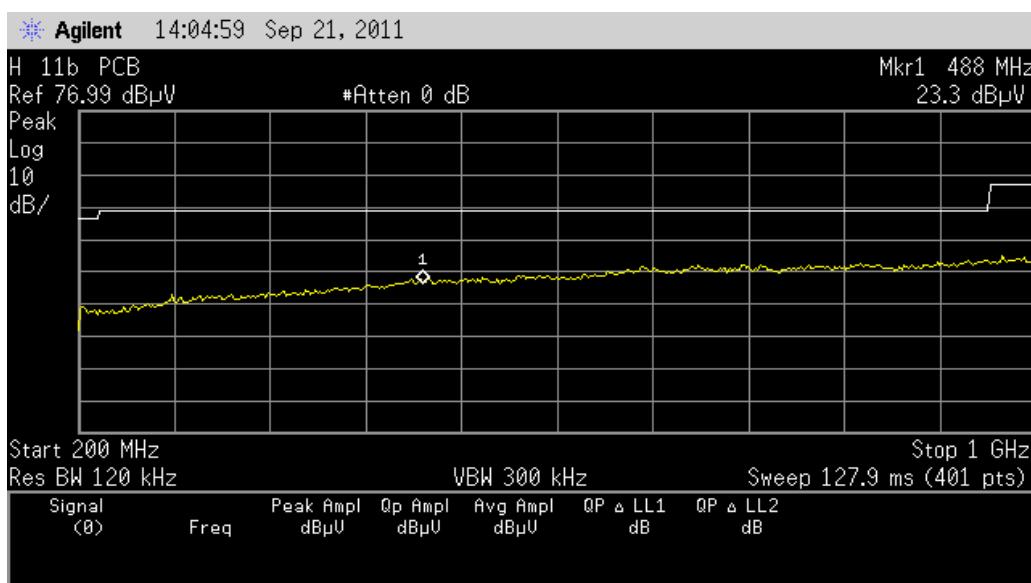


TABLE 4: PCB/ 802.11b/ DSSS / CH 1/ 2412MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dB μ V/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dB μ V/m	Limit dB μ V/m	Margin dB	
2412	79.1	180	1.6	V	28	16	32	91.1			Peak
2412	80.2	210	1.5	H	29	16	32	93.2			Peak
2412	68.5	180	1.6	V	28	16	32	80.5			Ave.
2412	69.7	210	1.5	H	29	16	32	82.7			Ave.
2390	36.1	210	1.5	H	28	16	32	48.1	74	-25.9	Peak
2390	25.2	210	1.5	H	28	16	32	37.2	54	-16.8	Ave.
2398	40.2	180	1.6	V	28	16	32	52.2	71.1	-18.9	Peak
2398	41.3	210	1.5	H	28	16	32	53.3	73.2	-19.9	Peak
2483.5	37.2	210	1.5	H	28	16	32	49.2	74	-24.8	Peak
2483.5	26.3	210	1.5	H	28	16	32	38.3	54	-15.7	Ave.
4824	35.2	180	1.6	V	33	23	32	59.2	74	-14.8	Peak
4824	23.7	180	1.6	V	33	23	32	47.7	54	-6.3	Ave.
4824	36.8	210	1.5	H	34	23	32	61.8	74	-12.2	Peak
4824	25.5	210	1.5	H	34	23	32	50.5	54	-3.5	Ave.

TABLE 5: PCB/ 802.11b/ DSSS/ CH 6/ 2437MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2437	79.7	160	1.5	V	28	16	32	91.7			Peak
2437	78.8	180	1.6	H	28	16	32	90.8			Peak
2437	69.2	160	1.5	V	28	16	32	81.2			Ave.
2437	68.9	180	1.6	H	28	16	32	80.9			Ave.
2390	36.3	160	1.5	V	28	16	32	48.3	74	-25.7	Peak
2390	25.1	160	1.5	V	28	16	32	37.1	54	-16.9	Ave.
2400	36.5	160	1.5	V	28	16	32	48.5	71.7	-23.2	Peak
2400	35.4	180	1.6	H	28	16	32	47.4	70.8	-23.4	Peak
2483.5	37.2	160	1.5	V	28	16	32	49.2	74	-24.8	Peak
2483.5	26.1	160	1.5	V	28	16	32	38.1	54	-15.9	Ave.
4874	36.4	160	1.5	V	33	23	32	60.4	74	-13.6	Peak
4874	25.7	160	1.5	V	33	23	32	49.7	54	-4.3	Ave.
4874	35.2	180	1.6	H	34	23	32	60.2	74	-13.8	Peak
4874	24.6	180	1.6	H	34	23	32	49.6	54	-4.4	Ave.

TABLE 6: PCB/ 802.11b/ DSSS/ CH 11/ 2462MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2462	78.7	180	1.5	V	28	16	32	90.7			Peak
2462	78.1	160	1.7	H	28	16	32	90.1			Peak
2462	69.1	180	1.5	V	28	16	32	81.1			Ave.
2462	68.9	160	1.7	H	28	16	32	80.9			Ave.
2390	40.8	180	1.5	V	28	16	32	52.8	74	-21.2	Peak
2390	29.3	180	1.5	V	28	16	32	41.3	54	-12.7	Ave.
2400	40.3	180	1.5	V	28	16	32	52.3	70.7	-18.4	Peak
2400	39.5	160	1.7	H	28	16	32	51.5	70.1	-18.6	Peak
2483.5	40.2	180	1.5	V	28	16	32	52.2	74	-21.8	Peak
2483.5	29.6	180	1.5	V	28	16	32	41.6	54	-12.4	Ave.
4924	40.5	180	1.5	V	33	23	32	64.5	74	-9.5	Peak
4924	28.6	180	1.5	V	33	23	32	52.6	54	-1.4	Ave.
4924	39.7	160	1.7	H	34	23	32	64.7	74	-9.3	Peak
4924	27.5	160	1.7	H	34	23	32	52.5	54	-1.5	Ave.

FIGURE 11: PCB/ 802.11g/ 30-200MHz VERTICAL. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.

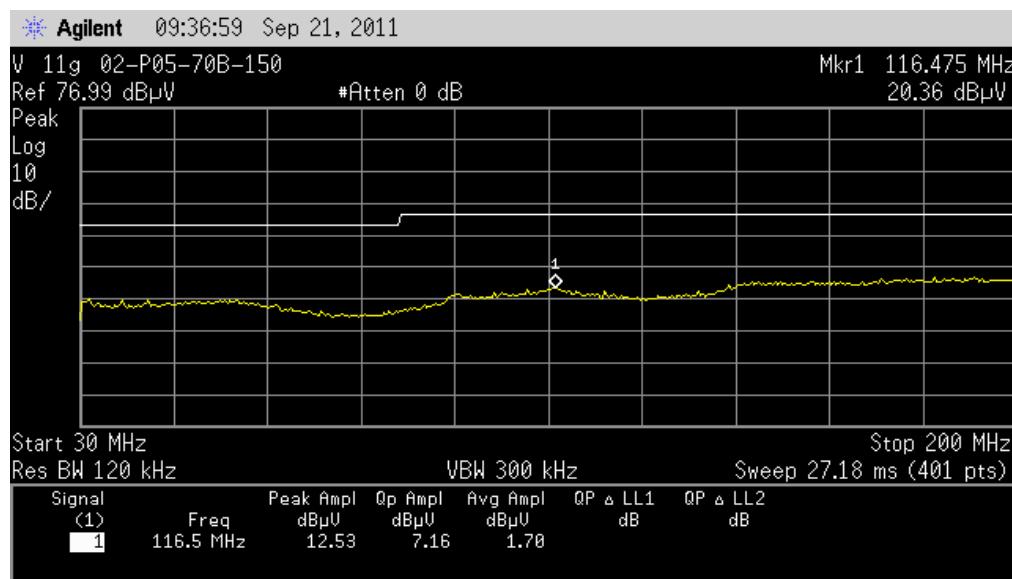


FIGURE 12: PCB/ 802.11g/ 200-1000MHz HORIZONTAL. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.

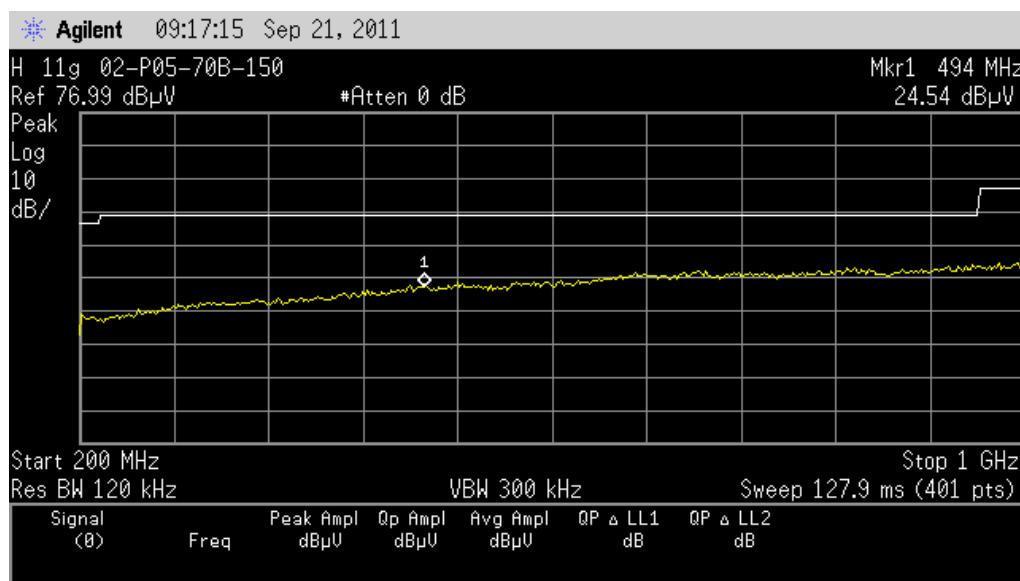


TABLE 7: PCB/ 802.11g/ OFDM/ CH 1/ 2412MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2412	71.8	160	1.7	V	28	16	32	83.8			Peak
2412	70.7	240	1.5	H	29	16	32	83.7			Peak
2412	57.7	160	1.7	V	28	16	32	69.7			Ave.
2412	55.8	240	1.5	H	29	16	32	68.8			Ave.
2390	36.8	160	1.7	V	28	16	32	48.8	74	-25.2	Peak
2390	25.5	160	1.7	V	28	16	32	37.5	54	-16.5	Ave.
2400	44.7	160	1.7	V	28	16	32	56.7	63.8	-7.1	Peak
2400	44.5	240	1.5	H	29	16	32	57.5	63.7	-6.2	Peak
2483.5	38.3	160	1.7	V	28	16	32	50.3	74	-23.7	Peak
2483.5	26.2	160	1.7	V	28	16	32	38.2	54	-15.8	Ave.
4824	36.3	160	1.7	V	33	23	32	60.3	74	-13.7	Peak
4824	25.5	160	1.7	V	33	23	32	49.5	54	-4.5	Ave.
4824	36.1	240	1.5	H	34	23	32	61.1	74	-12.9	Peak
4824	24.9	240	1.5	H	34	23	32	49.9	54	-4.1	Ave.

TABLE 8: PCB/ 802.11g/ OFDM/ CH 6/ 2437MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2437	72.3	160	1.7	V	28	16	32	84.3			Peak
2437	70.9	240	1.5	H	29	16	32	83.9			Peak
2437	58.2	160	1.7	V	28	16	32	70.2			Ave.
2437	56.5	240	1.5	H	29	16	32	69.5			Ave.
2390	36.5	160	1.7	V	28	16	32	48.5	74	-25.5	Peak
2390	25.3	160	1.7	V	28	16	32	37.3	54	-16.7	Ave.
2390	36.2	240	1.5	H	29	16	32	49.2	74	-24.8	Peak
2390	25.1	240	1.5	H	29	16	32	38.1	54	-15.9	Ave.
2400	36.7	160	1.7	V	28	16	32	48.7	64.3	-15.6	Peak
2400	36.4	240	1.5	H	29	16	32	49.4	63.9	-14.5	Peak
2483.5	37.6	160	1.7	V	28	16	32	49.6	74	-24.4	Peak
2483.5	26.2	160	1.7	V	28	16	32	38.2	54	-15.8	Ave.
2483.5	37.3	160	1.7	H	29	16	32	50.3	74	-23.7	Peak
2483.5	25.8	160	1.7	H	29	16	32	38.8	54	-15.2	Ave.
4874	37.8	160	1.7	V	33	23	32	61.8	74	-12.2	Peak
4874	25.7	160	1.7	V	33	23	32	49.7	54	-4.3	Ave.
4874	37.5	240	1.5	H	34	23	32	62.5	74	-11.5	Peak
4874	25.1	240	1.5	H	34	23	32	50.1	54	-3.9	Ave.

TABLE 9: PCB/ 802.11g/ OFDM/ CH 11/ 2462MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2462	73.2	160	1.7	V	28	16	32	85.2			Peak
2462	71.2	240	1.5	H	29	16	32	84.2			Peak
2462	59.2	160	1.7	V	28	16	32	71.2			Ave.
2462	55.4	240	1.5	H	29	16	32	68.4			Ave.
2390	37.3	160	1.7	V	28	16	32	49.3	74	-24.7	Peak
2390	25.4	160	1.7	V	28	16	32	37.4	54	-16.6	Ave.
2400	37.5	160	1.7	V	28	16	32	49.5	65.2	-15.7	Peak
2400	36.7	240	1.5	H	29	16	32	49.7	64.2	-14.5	Peak
2483.5	37.8	160	1.7	V	28	16	32	49.8	74	-24.2	Peak
2483.5	26.1	160	1.7	V	28	16	32	38.1	54	-15.9	Ave.
4924	37.9	160	1.7	V	33	23	32	61.9	74	-12.1	Peak
4924	26.6	160	1.7	V	33	23	32	50.6	54	-3.4	Ave.
4924	37.1	240	1.5	H	34	23	32	62.1	74	-11.9	Peak
4924	25.7	240	1.5	H	34	23	32	50.7	54	-3.3	Ave.

3.1.6 TEST DATA - RFA-02-5-F7H1 ANTENNA

Note: Levels of spurious emissions within 9 KHz – 30MHz were too low to be measured. The curve is the ambient.

FIGURE 13: RFA-02-5-F7H1/ 802.11n/ 9 KHZ-30 MHz

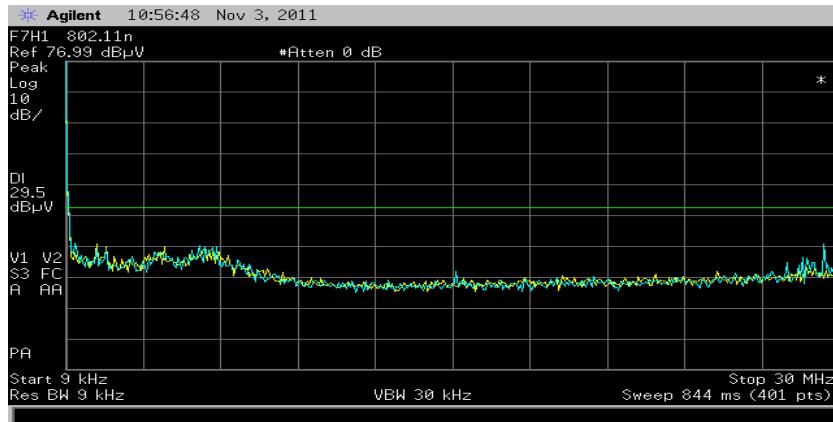


FIGURE 14: RFA-02-5-F7H1/ 802.11b/9 KHZ 30 MHz

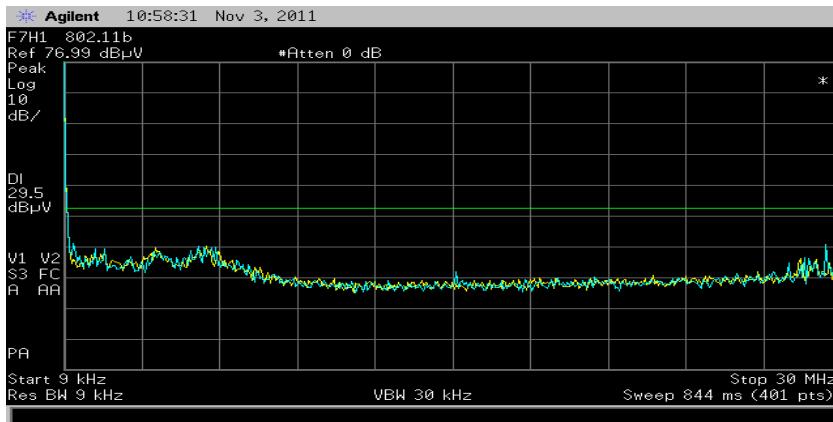


Figure 15 RFA-02-5-F7H1/ 802.11g/9 KHz 30 MHz

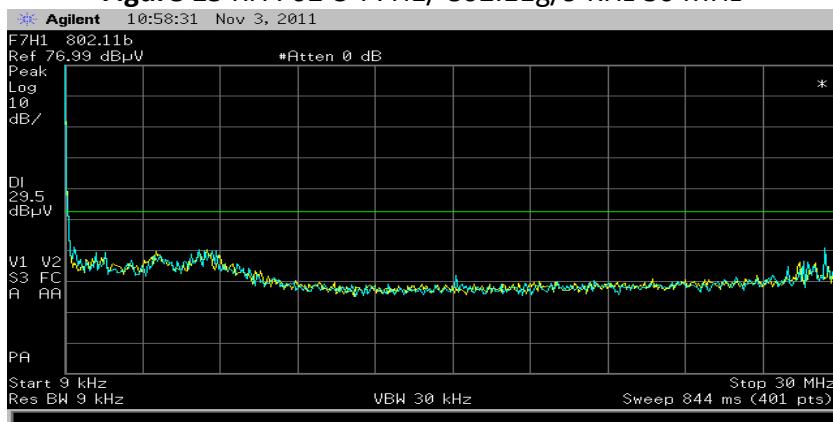


FIGURE 16: RFA-02-5-F7H1/ 802.11n/ 30-200MHz VERTICAL. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.

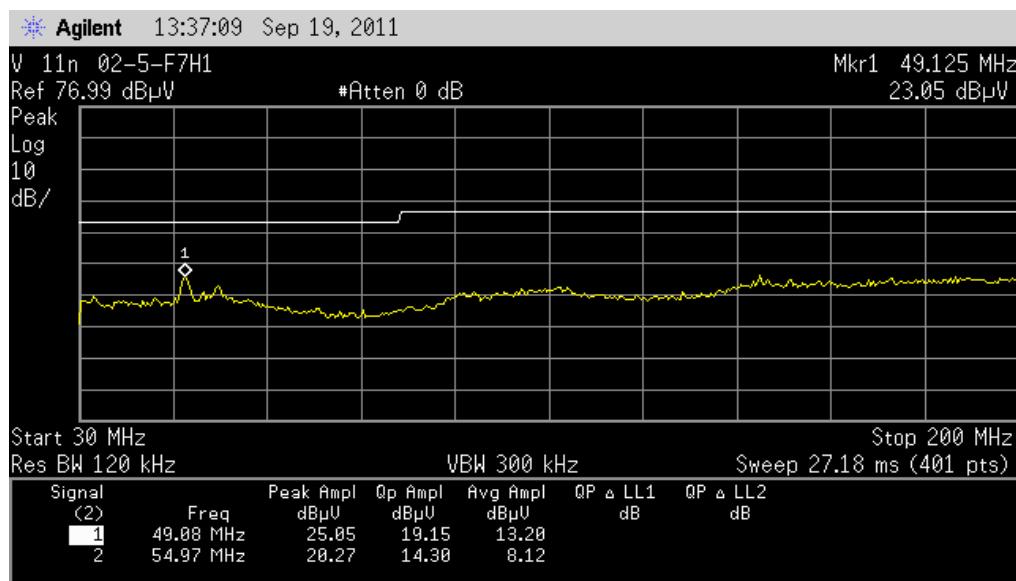


FIGURE 17: RFA-02-5-F7H1/ 802.11n/ 200-1000MHz HORIZONTAL. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.

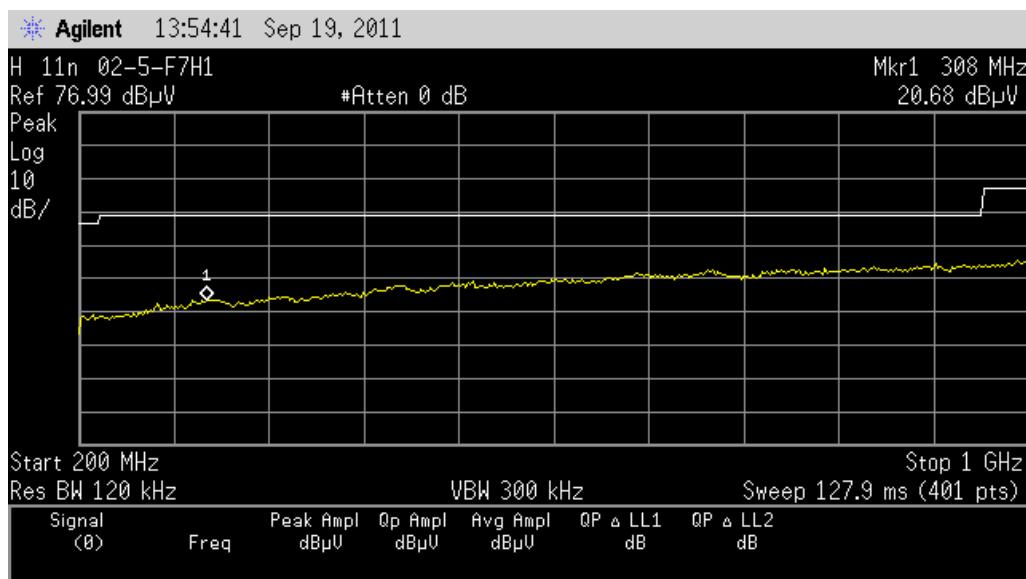


TABLE 10: RFA-02-5-F7H1/ 802.11n/ OFDM/ CH 1/ 2412MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2412	87.8	0	1.7	V	28	16	32	99.8			Peak
2412	75.7	30	1.8	H	29	16	32	88.7			Peak
2412	74.9	0	1.7	V	28	16	32	86.9			Ave.
2412	61	30	1.8	H	29	16	32	74			Ave.
2390	53.8	0	1.7	V	28	16	32	65.8	74	-8.2	Peak
2390	37.3	0	1.7	V	28	16	32	49.3	54	-4.7	Ave.
2400	62.5	0	1.7	V	28	16	32	74.5	79.8	-5.3	Peak
2400	44.5	30	1.8	H	28	16	32	56.5	68.7	-12.2	Peak
2483.5	46.8	0	1.7	V	28	16	32	58.8	74	-15.2	Peak
2483.5	27.3	0	1.7	V	28	16	32	39.3	54	-14.7	Ave.
4824	37.5	0	1.7	V	33	23	32	61.5	74	-12.5	Peak
4824	25.8	0	1.7	V	33	23	32	49.8	54	-4.2	Ave.
4824	36.2	30	1.8	H	34	23	32	61.2	74	-12.8	Peak
4824	25.7	30	1.8	H	34	23	32	50.7	54	-3.3	Ave.

TABLE 11: RFA-02-5-F7H1/ 802.11n/ OFDM/ CH 6/ 2437MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2437	84.3	310	1.5	V	28	16	32	96.3			Peak
2437	73	60	1.7	H	28	16	32	85			Peak
2437	69.8	310	1.5	V	28	16	32	81.8			Ave.
2437	58.5	60	1.7	H	28	16	32	70.5			Ave.
2390	41	310	1.5	V	28	16	32	53	74	-21	Peak
2390	25.5	310	1.5	V	28	16	32	37.5	54	-16.5	Ave.
2400	43.3	310	1.5	V	28	16	32	55.3	76.3	-21	Peak
2400	37.3	60	1.7	H	28	16	32	49.3	65	-15.7	Peak
2483.5	37.3	310	1.5	V	28	16	32	49.3	74	-24.7	Peak
2483.5	26.2	310	1.5	V	28	16	32	38.2	54	-15.8	Ave.
4874	36.1	310	1.5	V	33	23	32	60.1	74	-13.9	Peak
4874	25.5	310	1.5	V	33	23	32	49.5	54	-4.5	Ave.
4874	35.6	60	1.7	H	34	23	32	60.6	74	-13.4	Peak
4874	24.2	60	1.7	H	34	23	32	49.2	54	-4.8	Ave.

TABLE 12: RFA-02-5-F7H1/ 802.11n/ OFDM/ CH 11/ 2462MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2462	83.5	290	1.5	V	28	16	32	95.5			Peak
2462	71.2	210	1.6	H	28	16	32	83.2			Peak
2462	69.3	290	1.5	V	28	16	32	81.3			Ave.
2462	57.3	210	1.6	H	28	16	32	69.3			Ave.
2390	36.5	290	1.5	V	28	16	32	48.5	74	-25.5	Peak
2390	25.3	290	1.5	V	28	16	32	37.3	54	-16.7	Ave.
2400	37.7	290	1.5	V	28	16	32	49.7	75.5	-25.8	Peak
2400	37.2	210	1.6	H	28	16	32	49.2	63.2	-14	Peak
2483.5	41.5	290	1.5	V	28	16	32	53.5	74	-20.5	Peak
2483.5	27.5	290	1.5	V	28	16	32	39.5	54	-14.5	Ave.
4924	36.1	290	1.5	V	33	23	32	60.1	74	-13.9	Peak
4924	26.2	210	1.6	V	33	23	32	50.2	54	-3.8	Ave.
4924	35.7	290	1.5	H	34	23	32	60.7	74	-13.3	Peak
4924	24.9	210	1.6	H	34	23	32	49.9	54	-4.1	Ave.

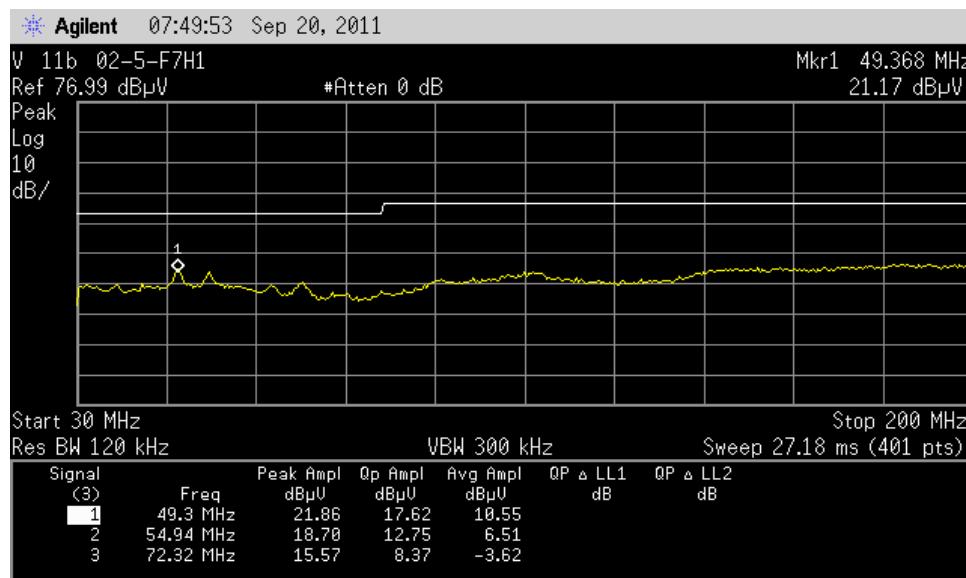
FIGURE 18: RFA-02-5-F7H1/ 802.11b/ 30-200MHz VERTICAL. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS,
THIS SHOWS THE WORST DATA.

FIGURE 19: RFA-02-5-F7H1/ 802.11b/ 200-1000MHz VERTICAL. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.

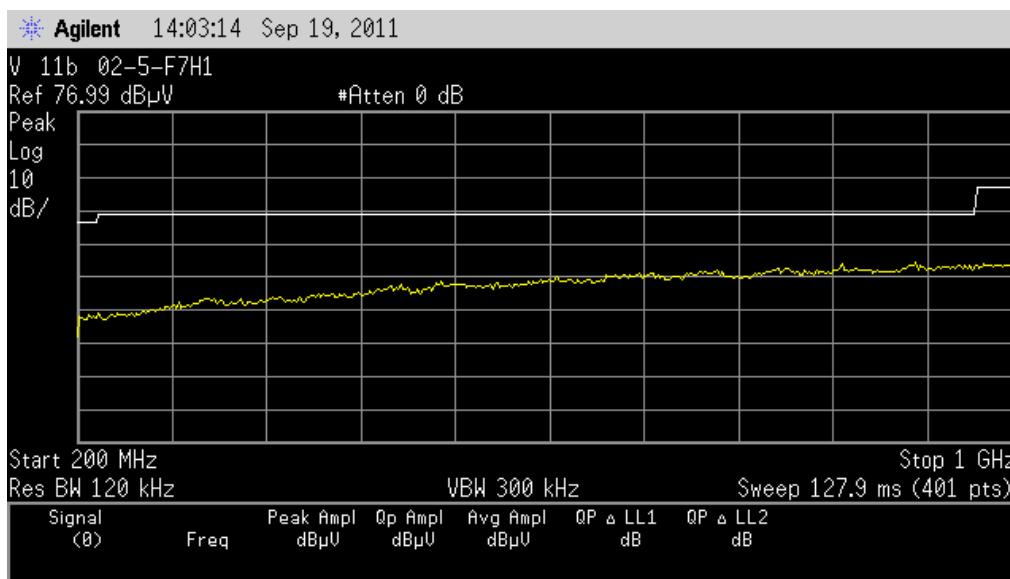


TABLE 13: RFA-02-5-F7H1/ 802.11b/ DSSS/ CH 1/ 2412MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBµV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBµV/m	Limit dBµV/m	Margin dB	
2412	84.8	0	1.7	V	28	16	32	96.8			Peak
2412	73.8	60	1.5	H	29	16	32	86.8			Peak
2412	75.7	0	1.7	V	28	16	32	87.7			Ave.
2412	60.3	60	1.5	H	29	16	32	73.3			Ave.
2390	37.3	0	1.7	V	28	16	32	49.3	74	-24.7	Peak
2390	25.7	0	1.7	V	28	16	32	37.7	54	-16.3	Ave.
2398	47.1	0	1.7	V	28	16	32	59.1	76.8	-17.7	Peak
2398	38.7	60	1.5	H	28	16	32	50.7	66.8	-16.1	Peak
2483.5	37.5	0	1.7	V	28	16	32	49.5	74	-24.5	Peak
2483.5	26.3	0	1.7	V	28	16	32	38.3	54	-15.7	Ave.
4824	37.6	0	1.7	V	33	23	32	61.6	74	-12.4	Peak
4824	25.5	0	1.7	V	33	23	32	49.5	54	-4.5	Ave.
4824	36.1	60	1.5	H	34	23	32	61.1	74	-12.9	Peak
4824	25.7	60	1.5	H	34	23	32	50.7	54	-3.3	Ave.

TABLE 14: RFA-02-5-F7H1/ 802.11b/ DSSS/ CH 6/ 2437MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2437	86.1	310	1.6	V	28	16	32	98.1			Peak
2437	72.8	0	1.5	H	28	16	32	84.8			Peak
2437	76.7	310	1.6	V	28	16	32	88.7			Ave.
2437	64.1	0	1.5	H	28	16	32	76.1			Ave.
2390	37.6	310	1.6	V	28	16	32	49.6	74	-24.4	Peak
2390	25.5	310	1.6	V	28	16	32	37.5	54	-16.5	Ave.
2400	37.6	310	1.6	V	28	16	32	49.6	78.1	-28.5	Peak
2400	37.2	0	1.5	H	28	16	32	49.2	64.8	-15.6	Peak
2483.5	38.2	310	1.6	V	28	16	32	50.2	74	-23.8	Peak
2483.5	26.3	310	1.6	V	28	16	32	38.3	54	-15.7	Ave.
4874	36.3	310	1.6	V	33	23	32	60.3	74	-13.7	Peak
4874	25.2	310	1.6	V	33	23	32	49.2	54	-4.8	Ave.
4874	35.7	0	1.5	H	34	23	32	60.7	74	-13.3	Peak
4874	24.6	0	1.5	H	34	23	32	49.6	54	-4.4	Ave.

TABLE 15: RFA-02-5-F7H1/ 802.11b/ DSSS/ CH 11/ 2462MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2462	84.8	310	1.6	V	28	16	32	96.8			Peak
2462	74.3	270	1.5	H	28	16	32	86.3			Peak
2462	75.8	310	1.6	V	28	16	32	87.8			Ave.
2462	64.4	270	1.5	H	28	16	32	76.4			Ave.
2390	37.6	310	1.6	V	28	16	32	49.6	74	-24.4	Peak
2390	25.5	310	1.6	V	28	16	32	37.5	54	-16.5	Ave.
2400	37.6	310	1.6	V	28	16	32	49.6	76.8	-27.2	Peak
2400	37.3	270	1.5	H	28	16	32	49.3	66.3	-17	Peak
2483.5	38.1	310	1.6	V	28	16	32	50.1	74	-23.9	Peak
2483.5	26.3	310	1.6	V	28	16	32	38.3	54	-15.7	Ave.
4924	36.3	310	1.6	V	33	23	32	60.3	74	-13.7	Peak
4924	26.1	310	1.6	V	33	23	32	50.1	54	-3.9	Ave.
4924	35.2	270	1.5	H	34	23	32	60.2	74	-13.8	Peak
4924	24.7	270	1.5	H	34	23	32	49.7	54	-4.3	Ave.

FIGURE 20: RFA-02-5-F7H1/ 802.11g/ 30-200MHz VERTICAL. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.

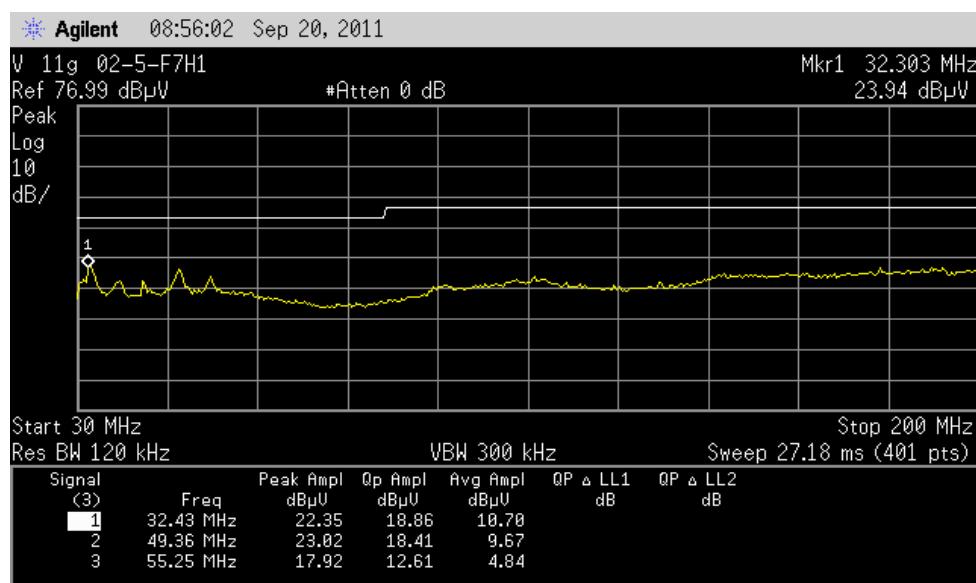


FIGURE 21: RFA-02-5-F7H1/ 802.11g/ 200-1000MHz VERTICAL. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.

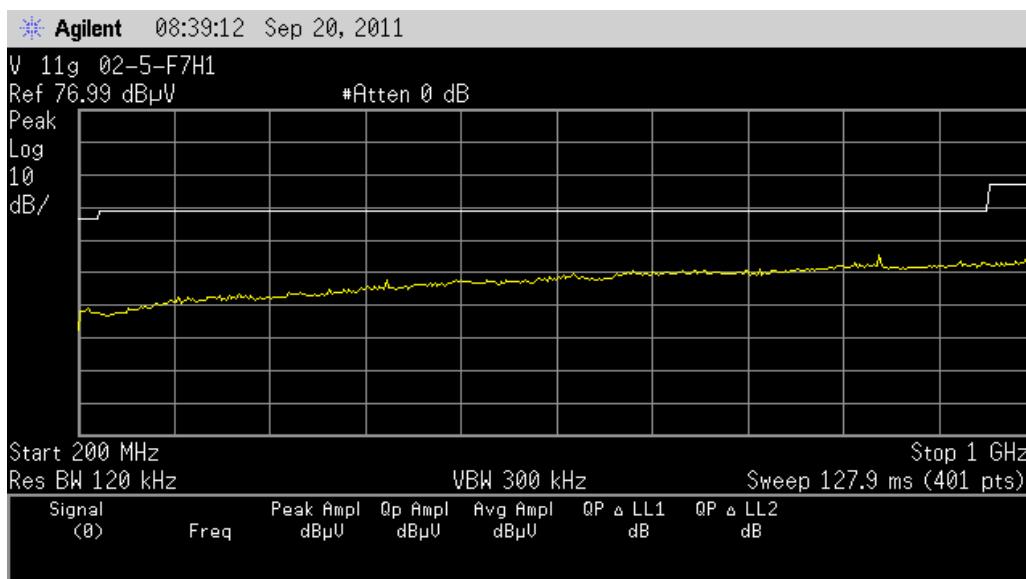


TABLE 16: RFA-02-5-F7H1/ 802.11g/ OFDM/ CH 1/ 2412MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2412	82.8	45	1.5	V	28	16	32	94.8			Peak
2412	68.8	310	1.7	H	29	16	32	81.8			Peak
2412	68.1	45	1.5	V	28	16	32	80.1			Ave.
2412	53.7	310	1.7	H	29	16	32	66.7			Ave.
2390	45.6	45	1.5	V	28	16	32	57.6	74	-16.4	Peak
2390	30.3	45	1.5	V	28	16	32	42.3	54	-11.7	Ave.
2400	56.7	45	1.5	V	28	16	32	68.7	74.8	-6.1	Peak
2400	45.5	310	1.7	H	28	16	32	57.5	61.8	-4.3	Peak
2483.5	41.3	45	1.5	V	28	16	32	53.3	74	-20.7	Peak
2483.5	26.2	45	1.5	V	28	16	32	38.2	54	-15.8	Ave.
4824	37.5	45	1.5	V	33	23	32	61.5	74	-12.5	Peak
4824	25.8	45	1.5	V	33	23	32	49.8	54	-4.2	Ave.
4824	36.2	310	1.7	H	34	23	32	61.2	74	-12.8	Peak
4824	25.7	310	1.7	H	34	23	32	50.7	54	-3.3	Ave.

TABLE 17: RFA-02-5-F7H1/ 802.11g/ OFDM/ CH 6/ 2437MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2437	83.7	130	1.6	V	28	16	32	95.7			Peak
2437	72.5	90	1.5	H	28	16	32	84.5			Peak
2437	68.5	130	1.6	V	28	16	32	80.5			Ave.
2437	57.6	90	1.5	H	28	16	32	69.6			Ave.
2390	36.8	130	1.6	V	28	16	32	48.8	74	-25.2	Peak
2390	25.2	130	1.6	V	28	16	32	37.2	54	-16.8	Ave.
2400	36.5	130	1.6	V	28	16	32	48.5	75.7	-27.2	Peak
2400	35.9	90	1.5	H	28	16	32	47.9	64.5	-16.6	Peak
2483.5	37.1	130	1.6	V	28	16	32	49.1	74	-24.9	Peak
2483.5	26.4	130	1.6	V	28	16	32	38.4	54	-15.6	Ave.
4874	36.5	130	1.6	V	33	23	32	60.5	74	-13.5	Peak
4874	25.7	130	1.6	V	33	23	32	49.7	54	-4.3	Ave.
4874	35.9	90	1.5	H	34	23	32	60.9	74	-13.1	Peak
4874	24.8	90	1.5	H	34	23	32	49.8	54	-4.2	Ave.

TABLE 18: RFA-02-5-F7H1/ 802.11g/ OFDM/ CH 11/ 2462MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2462	84.3	45	1.7	V	28	16	32	96.3			Peak
2462	72.8	60	1.8	H	28	16	32	84.8			Peak
2462	68.5	45	1.7	V	28	16	32	80.5			Ave.
2462	58.2	60	1.8	H	28	16	32	70.2			Ave.
2390	35.3	45	1.7	V	28	16	32	47.3	74	-26.7	Peak
2390	25.2	45	1.7	V	28	16	32	37.2	54	-16.8	Ave.
2400	37.1	45	1.7	V	28	16	32	49.1	76.3	-27.2	Peak
2400	36.5	60	1.8	H	28	16	32	48.5	64.8	-16.3	Peak
2483.5	39.2	45	1.7	V	28	16	32	51.2	74	-22.8	Peak
2483.5	26.7	45	1.7	V	28	16	32	38.7	54	-15.3	Ave.
4924	36.3	45	1.7	V	33	23	32	60.3	74	-13.7	Peak
4924	26.2	45	1.7	V	33	23	32	50.2	54	-3.8	Ave.
4924	35.8	60	1.8	H	34	23	32	60.8	74	-13.2	Peak
4924	24.9	60	1.8	H	34	23	32	49.9	54	-4.1	Ave.

3.1.7 TEST DATA- RFA-02-P05-70B-150 ANTENNA

Note: Levels of spurious emissions within 9 KHz – 30MHz were too low to be measured. The curve is the ambient.

FIGURE 22: RFA-02-P05-70B-150/ 802.11n/ 9 KHZ-30MHz

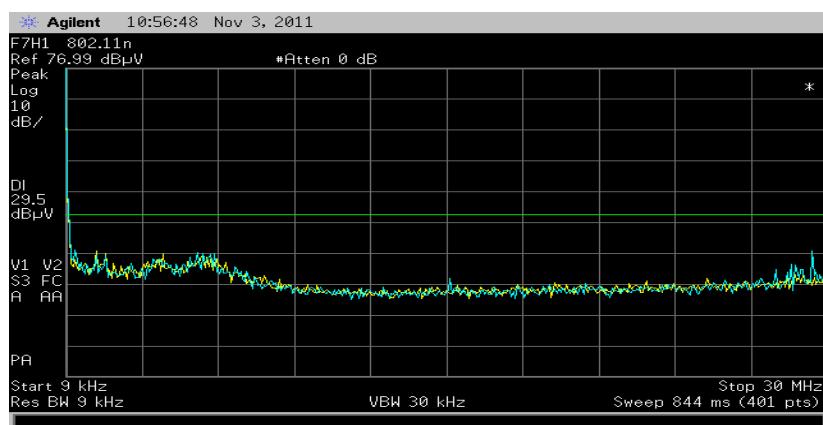


Figure 23: RFA-02-P05-70B-150/ 802.11B/ 9 KHz-30MHz

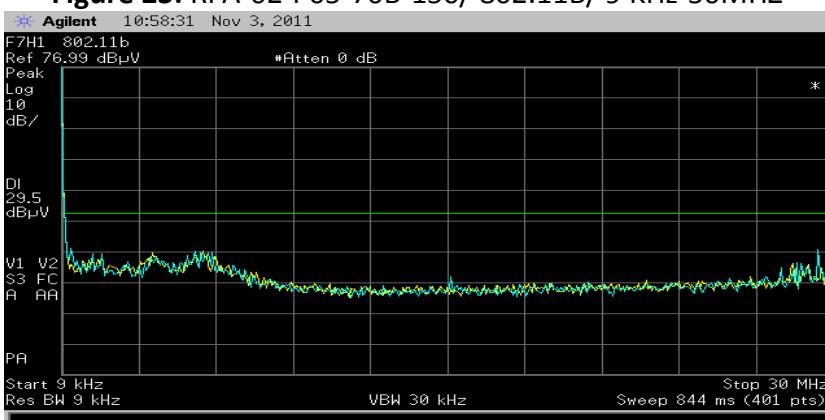


Figure 24: RFA-02-P05-70B-150/ 802.11n/ 9 KHz-30MHz

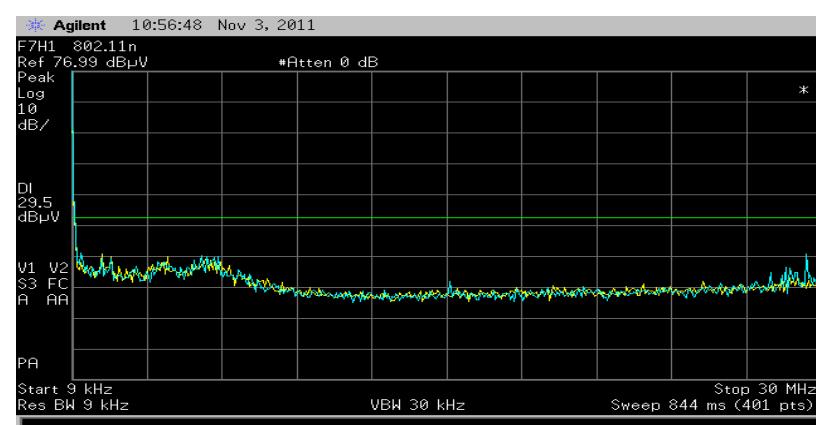


FIGURE 25: RFA-02-P05-70B-150/ 802.11n/ 30-200MHz VERTICAL. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.

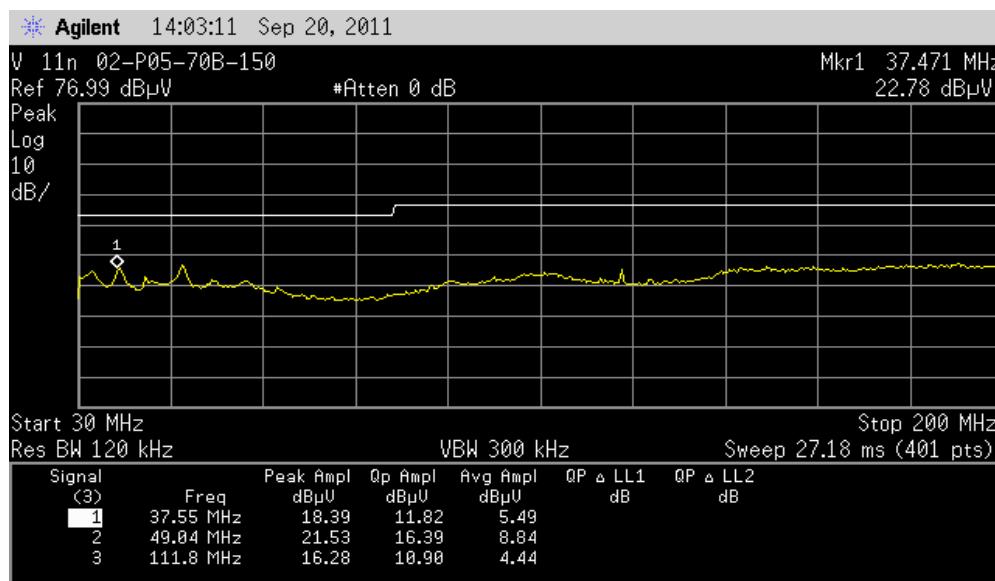


FIGURE 26: RFA-02-P05-70B-150/ 802.11n/ 200-1000MHz HORIZONTAL. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.

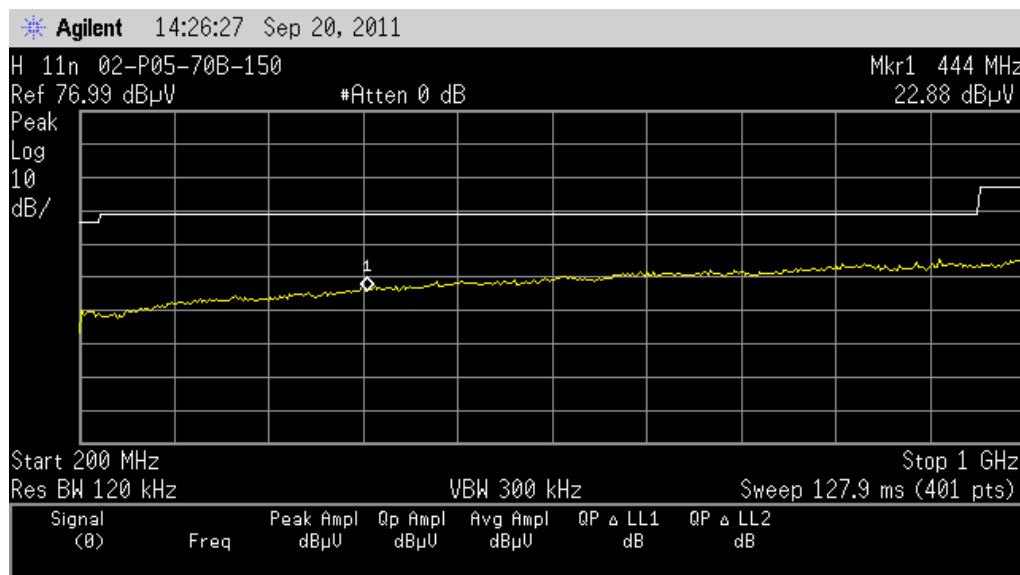


TABLE 19: RFA-02-P05-70B-150/ 802.11n/ OFDM/ CH 1/ 2412MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2412	83.1	0	1.6	V	28	16	32	95.1			Peak
2412	74.7	10	1.5	H	29	16	32	87.7			Peak
2412	69.1	0	1.6	V	28	16	32	81.1			Ave.
2412	61.2	10	1.5	H	29	16	32	74.2			Ave.
2390	52.2	0	1.6	V	28	16	32	64.2	74	-9.8	Peak
2390	33.8	0	1.6	V	28	16	32	45.8	54	-8.2	Ave.
2400	59.6	0	1.6	V	28	16	32	71.6	75.1	-3.5	Peak
2400	52.5	10	1.5	H	28	16	32	64.5	67.7	-3.2	Peak
2483.5	37.7	0	1.6	V	28	16	32	49.7	74	-24.3	Peak
2483.5	26.1	0	1.6	V	28	16	32	38.1	54	-15.9	Ave.
4824	36.5	0	1.6	V	33	23	32	60.5	74	-13.5	Peak
4824	26.3	0	1.6	V	33	23	32	50.3	54	-3.7	Ave.
4824	35.7	10	1.5	H	34	23	32	60.7	74	-13.3	Peak
4824	25.4	10	1.5	H	34	23	32	50.4	54	-3.6	Ave.

TABLE 20: RFA-02-P05-70B-150/ 802.11n/ OFDM/ CH 6/ 2437MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2437	82.8	190	1.6	V	28	16	32	94.8			Peak
2437	74.5	210	1.7	H	28	16	32	86.5			Peak
2437	68.5	190	1.6	V	28	16	32	80.5			Ave.
2437	61.1	210	1.7	H	28	16	32	73.1			Ave.
2390	36.7	190	1.6	V	28	16	32	48.7	74	-25.3	Peak
2390	25.5	190	1.6	V	28	16	32	37.5	54	-16.5	Ave.
2400	39.1	190	1.6	V	28	16	32	51.1	74.8	-23.7	Peak
2400	36.8	210	1.7	H	28	16	32	48.8	66.5	-17.7	Peak
2483.5	36.2	190	1.6	V	28	16	32	48.2	74	-25.8	Peak
2483.5	26.1	190	1.6	V	28	16	32	38.1	54	-15.9	Ave.
4874	36.3	190	1.6	V	33	23	32	60.3	74	-13.7	Peak
4874	25.8	190	1.6	V	33	23	32	49.8	54	-4.2	Ave.
4874	35.7	210	1.7	H	34	23	32	60.7	74	-13.3	Peak
4874	24.2	210	1.7	H	34	23	32	49.2	54	-4.8	Ave.

TABLE 21: RFA-02-P05-70B-150/ 802.11n/ OFDM/ CH 11/ 2462MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2462	81.8	310	1.6	V	28	16	32	93.8			Peak
2462	75.3	180	1.5	H	28	16	32	87.3			Peak
2462	67.1	310	1.6	V	28	16	32	79.1			Ave.
2462	61.2	180	1.5	H	28	16	32	73.2			Ave.
2390	36.8	310	1.6	V	28	16	32	48.8	74	-25.2	Peak
2390	25.3	310	1.6	V	28	16	32	37.3	54	-16.7	Ave.
2400	35.7	310	1.6	V	28	16	32	47.7	73.8	-26.1	Peak
2400	36.5	180	1.5	H	28	16	32	48.5	67.3	-18.8	Peak
2483.5	37.3	310	1.6	V	28	16	32	49.3	74	-24.7	Peak
2483.5	26.5	310	1.6	V	28	16	32	38.5	54	-15.5	Ave.
4924	37.2	310	1.6	V	33	23	32	61.2	74	-12.8	Peak
4924	26.3	310	1.6	V	33	23	32	50.3	54	-3.7	Ave.
4924	36.5	180	1.5	H	34	23	32	61.5	74	-12.5	Peak
4924	25.2	180	1.5	H	34	23	32	50.2	54	-3.8	Ave.

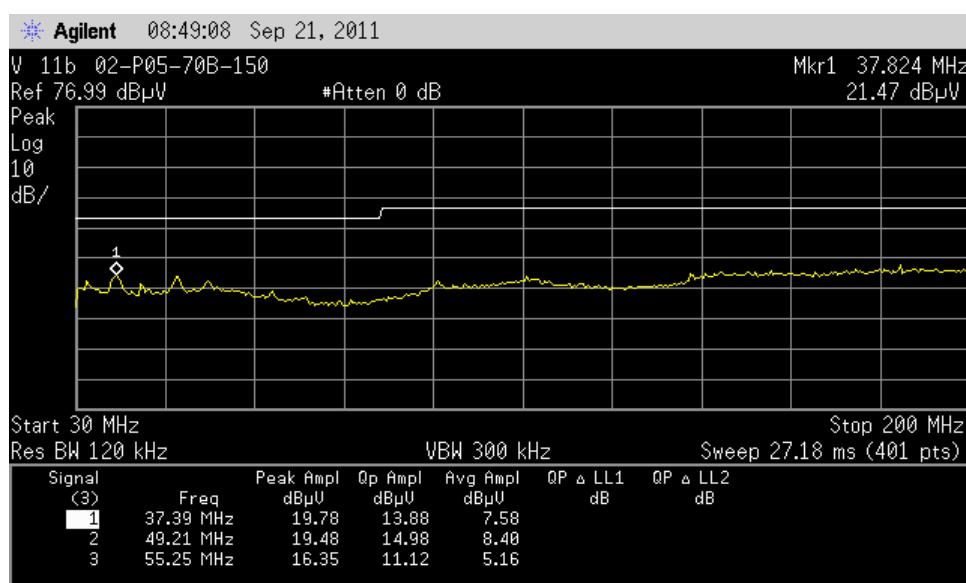
FIGURE 27: RFA-02-P05-70B-150/ 802.11b/ 30-200MHz VERTICAL. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.

FIGURE 28: RFA-02-P05-70B-150/ 802.11b/ 200-1000MHz HORIZONTAL. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.

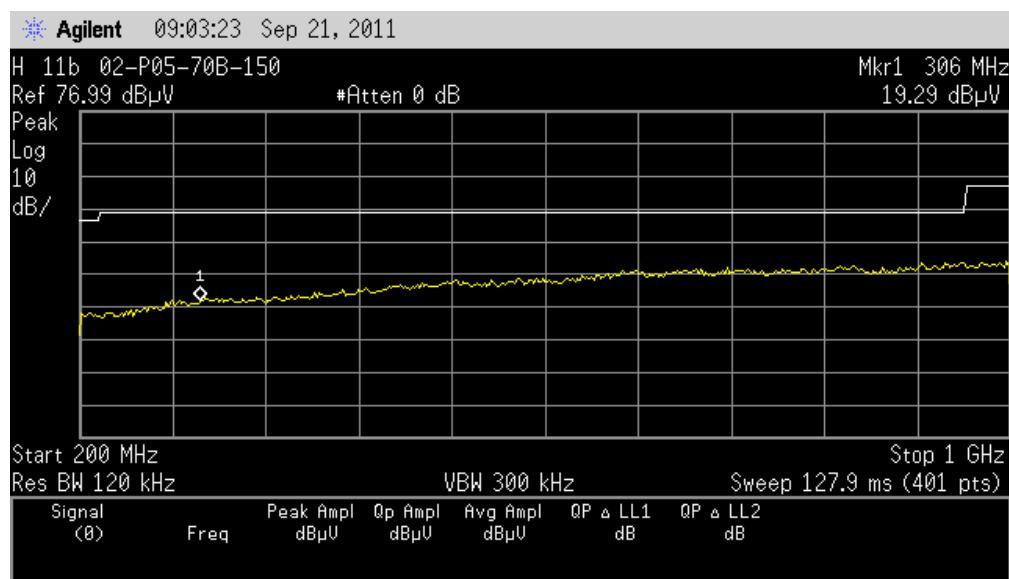


TABLE 22: RFA-02-P05-70B-150/ 802.11b/ DSSS/ CH 1/ 2412MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dB μ V/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dB μ V/m	Limit dB μ V/m	Margin dB	
2412	83.7	330	1.5	V	28	16	32	95.7			Peak
2412	75.8	190	1.6	H	29	16	32	88.8			Peak
2412	74.7	330	1.5	V	28	16	32	86.7			Ave.
2412	65.3	190	1.6	H	29	16	32	78.3			Ave.
2390	37.7	330	1.5	V	28	16	32	49.7	74	-24.3	Peak
2390	25.7	330	1.5	V	28	16	32	37.7	54	-16.3	Ave.
2398	50.2	330	1.5	V	28	16	32	75.7	76.8	-1.1	Peak
2398	41.5	190	1.6	H	28	16	32	53.5	68.8	-15.3	Peak
2483.5	37.6	330	1.5	V	28	16	32	49.6	74	-24.4	Peak
2483.5	26.3	330	1.5	V	28	16	32	38.3	54	-15.7	Ave.
4824	39.5	330	1.5	V	33	23	32	63.5	74	-10.5	Peak
4824	26.3	330	1.5	V	33	23	32	50.3	54	-3.7	Ave.
4824	37.6	190	1.6	H	34	23	32	62.6	74	-11.4	Peak
4824	25.1	190	1.6	H	34	23	32	50.1	54	-3.9	Ave.

TABLE 23: RFA-02-P05-70B-150/ 802.11b/ DSSS/ CH 6/ 2437MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2437	83.2	310	1.5	V	28	16	32	95.2			Peak
2437	74.7	190	1.7	H	28	16	32	86.7			Peak
2437	74.5	310	1.5	V	28	16	32	86.5			Ave.
2437	64.3	190	1.7	H	28	16	32	76.3			Ave.
2390	36.3	310	1.5	V	28	16	32	48.3	74	-25.7	Peak
2390	25.3	310	1.5	V	28	16	32	37.3	54	-16.7	Ave.
2400	37.1	310	1.5	V	28	16	32	49.1	75.2	-26.1	Peak
2400	36.6	190	1.7	H	28	16	32	48.6	66.7	-18.1	Peak
2483.5	37.7	310	1.5	V	28	16	32	49.7	74	-24.3	Peak
2483.5	26.3	310	1.5	V	28	16	32	38.3	54	-15.7	Ave.
4874	38.8	310	1.5	V	33	23	32	62.8	74	-11.2	Peak
4874	26.2	310	1.5	V	33	23	32	50.2	54	-3.8	Ave.
4874	37.5	190	1.7	H	34	23	32	62.5	74	-11.5	Peak
4874	25.4	190	1.7	H	34	23	32	50.4	54	-3.6	Ave.

TABLE 24: RFA-02-P05-70B-150/ 802.11b/ DSSS/ CH 11/ 2462MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2462	82.2	330	1.5	V	28	16	32	94.2			Peak
2462	76.1	190	1.6	H	28	16	32	88.1			Peak
2462	72.3	330	1.5	V	28	16	32	84.3			Ave.
2462	66.2	190	1.6	H	28	16	32	78.2			Ave.
2390	35.5	330	1.5	V	28	16	32	47.5	74	-26.5	Peak
2390	25.3	330	1.5	V	28	16	32	37.3	54	-16.7	Ave.
2400	38.1	330	1.5	V	28	16	32	50.1	74.2	-24.1	Peak
2400	37.5	190	1.6	H	28	16	32	49.5	68.1	-18.6	Peak
2483.5	37.7	330	1.5	V	28	16	32	49.7	74	-24.3	Peak
2483.5	26.3	330	1.5	V	28	16	32	38.3	54	-15.7	Ave.
4924	37.1	330	1.5	V	33	23	32	61.1	74	-12.9	Peak
4924	26.4	330	1.5	V	33	23	32	50.4	54	-3.6	Ave.
4924	36.4	190	1.6	H	34	23	32	61.4	74	-12.6	Peak
4924	25.1	190	1.6	H	34	23	32	50.1	54	-3.9	Ave.

FIGURE 29: RFA-02-P05-70B-150/ 802.11g/ 30-200MHz VERTICAL. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.

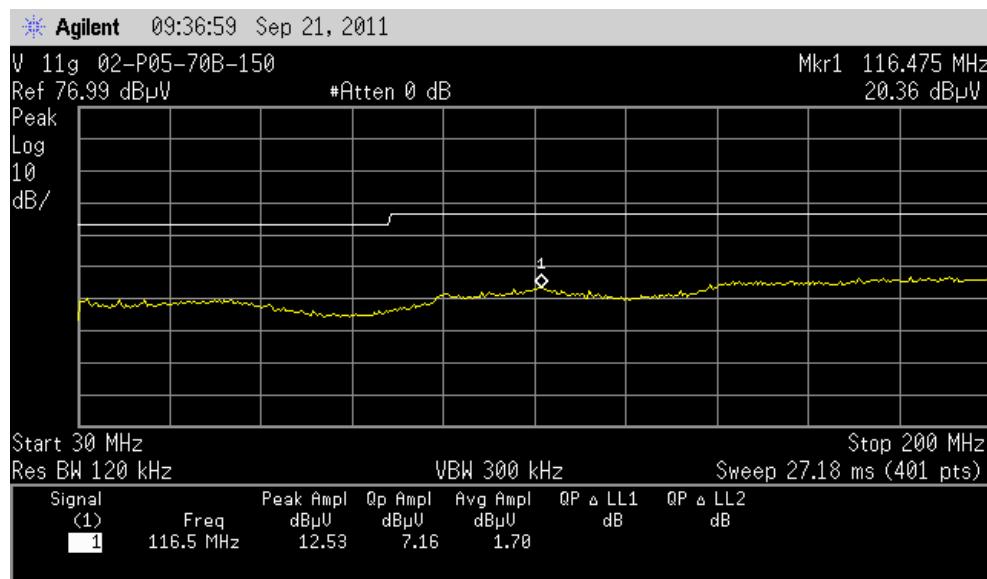


FIGURE 30: RFA-02-P05-70B-150/ 802.11g/ 200-1000MHz HORIZONTAL. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.

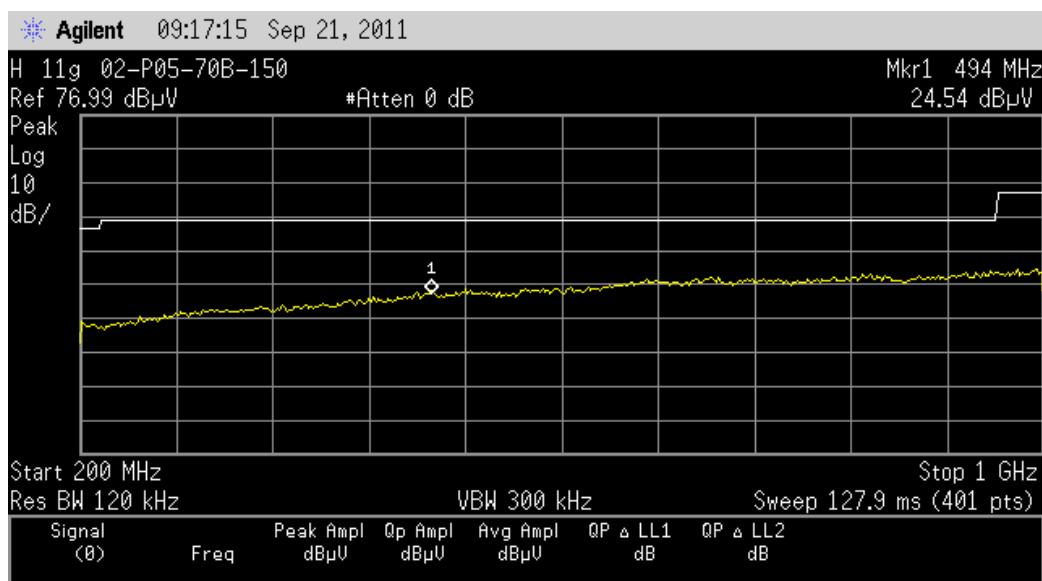


TABLE 25: RFA-02-P05-70B-150/ 802.11g/ OFDM/ CH 1/ 2412MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2412	78.2	0	1.6	V	28	16	32	90.2			Peak
2412	73.5	30	1.5	H	29	16	32	86.5			Peak
2412	61.7	0	1.6	V	28	16	32	73.7			Ave.
2412	58.8	30	1.5	H	29	16	32	71.8			Ave.
2390	41.3	0	1.6	V	28	16	32	53.3	74	-20.7	Peak
2390	28.1	0	1.6	V	28	16	32	40.1	54	-13.9	Ave.
2400	52.5	0	1.6	V	28	16	32	64.5	70.2	-5.7	Peak
2400	48.7	30	1.5	H	28	16	32	60.7	66.5	-5.8	Peak
2483.5	37.3	0	1.6	V	28	16	32	49.3	74	-24.7	Peak
2483.5	26.2	0	1.6	V	28	16	32	38.2	54	-15.8	Ave.
4824	37.1	0	1.6	V	33	23	32	61.1	74	-12.9	Peak
4824	25.6	0	1.6	V	33	23	32	49.6	54	-4.4	Ave.
4824	36.2	30	1.5	H	34	23	32	61.2	74	-12.8	Peak
4824	24.5	30	1.5	H	34	23	32	49.5	54	-4.5	Ave.

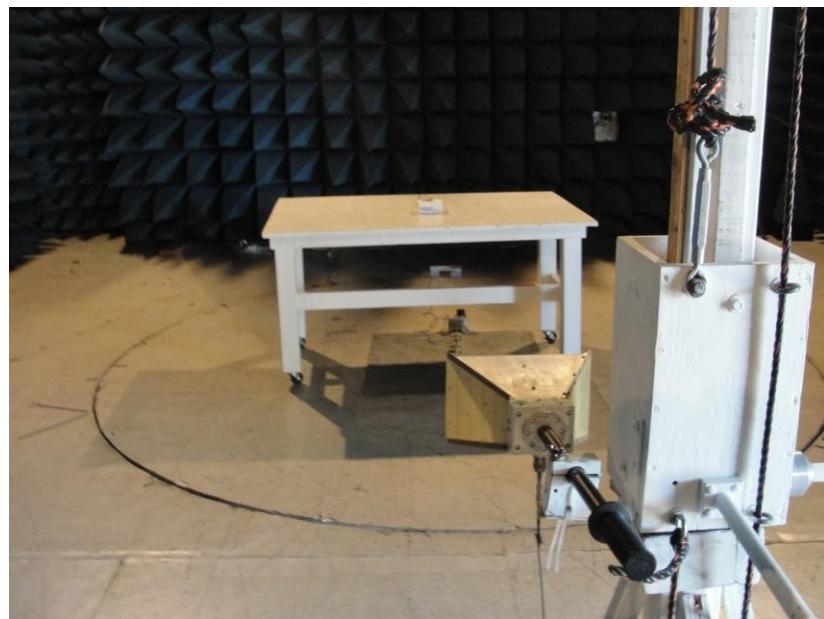
TABLE 26: RFA-02-P05-70B-150/ 802.11g/ OFDM/ CH 6/ 2437MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2437	76.5	0	1.5	V	28	16	32	88.5			PEAK
2437	72.3	110	1.7	H	28	16	32	84.3			PEAK
2437	61.7	0	1.5	V	28	16	32	73.7			AVE.
2437	58.2	110	1.7	H	28	16	32	70.2			AVE.
2390	36.7	0	1.5	V	28	16	32	48.7	74	-25.3	PEAK
2390	25.1	0	1.5	V	28	16	32	37.1	54	-16.9	AVE.
2400	36.4	0	1.5	V	28	16	32	48.4	68.5	-20.1	PEAK
2400	35.9	110	1.7	H	28	16	32	47.9	64.3	-16.4	PEAK
2483.5	37.2	0	1.5	V	28	16	32	49.2	74	-24.8	PEAK
2483.5	26.1	0	1.5	V	28	16	32	38.1	54	-15.9	AVE.
4874	36.4	0	1.5	V	33	23	32	60.4	74	-13.6	PEAK
4874	25.7	0	1.5	V	33	23	32	49.7	54	-4.3	AVE.
4874	35.2	110	1.7	H	34	23	32	60.2	74	-13.8	PEAK
4874	24.3	110	1.7	H	34	23	32	49.3	54	-4.7	AVE.

TABLE 27: RFA-02-P05-70B-150/ 802.11g/ OFDM/ CH 11/ 2462MHz

Indicated		Table	Antenna		Correction Factor			Corrected	FCC 15.247		Note
Freq. MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amplifier dB	Ampl. dBuV/m	Limit dBuV/m	Margin dB	
2462	75.3	10	1.7	V	28	16	32	87.3			Peak
2462	72.7	180	1.5	H	28	16	32	84.7			Peak
2462	59.8	10	1.7	V	28	16	32	71.8			Ave.
2462	57.1	190	1.5	H	28	16	32	69.1			Ave.
2390	36.1	10	1.7	V	28	16	32	48.1	74	-25.9	Peak
2390	25.2	10	1.7	V	28	16	32	37.2	54	-16.8	Ave.
2400	36.9	10	1.7	V	28	16	32	48.9	67.3	-18.4	Peak
2400	35.8	190	1.5	H	28	16	32	47.8	64.7	-16.9	Peak
2483.5	36.2	10	1.7	V	28	16	32	48.2	74	-25.8	Peak
2483.5	27.3	10	1.7	V	28	16	32	39.3	54	-14.7	Ave.
4924	37.7	10	1.7	V	33	23	32	61.7	74	-12.3	Peak
4924	26.2	10	1.7	V	33	23	32	50.2	54	-3.8	Ave.
4924	36.5	190	1.5	H	34	23	32	61.5	74	-12.5	Peak
4924	24.9	190	1.5	H	34	23	32	49.9	54	-4.1	Ave.

3.2 TEST SETUP PICTURES

FIGURE 31: RADIATED EMISSION TEST SETUP

4 RADIATED BAND EDGE EMISSIONS

4.1 FCC §15.247 (C), RSS-GEN 4.9 & 6, RSS-210 A8.5

The EUT was placed on a wooden turntable 80 cm above a ground reference plane in the semi-anechoic chamber. It was then powered on and placed in an operational mode. Radiated emissions were monitored for band edge using an antenna placed three meters from the EUT. The antennas were placed in both horizontal and vertical polarities and were elevated from one to four meters while the unit was rotated and monitored. The results were recorded. Test was initially performed on all three antennas including the PCB and the two external antennas. However the data contained includes that of antenna with highest gain. **EUT was set at three orthogonal planes and the test was performed under the worst case. The antenna used in the test was the worst among all antennas provided with the EUT.** The antenna data included in the test report was the highest of all three antennas obtained while tested in the three orthogonal planes for each of the antenna configurations.

4.1.1 ADMINISTRATIVE AND ENVIRONMENTAL DETAILS

Site Used:	Test Site 1: Semi-Anechoic Chamber
Test Date:	09/19/2011 thru 09/22/2011
Test Engineer:	Benjamin Jing
Temperature:	21°C
Humidity:	43%

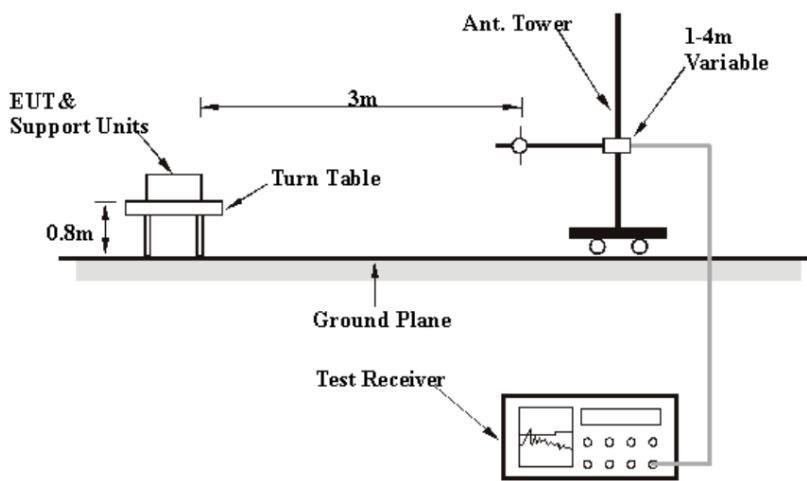
4.1.2 TEST EQUIPMENT

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due Date
Spectrum Analyzer	HP	8565E	3943A01328	05/02/2012
Horn Antenna	EMCO	3115	8812-3050	03/08/2012
RF Amplifier	HP	87422A	3234A00895	12/9/2011

4.1.3 TEST RESULTS

The EUT meets the requirements of the test for Radiated Emissions per FCC §15.247 (c), RSS-GEN 4.9 & 6, RSS-210 A8.5.

4.1.4 TEST SETUP



4.1.5 TEST DATA

Band Edge Data : 802.11n Channel 1

Antenna Pole	Fundamental Level (dBuV/m)	Band Edge Test Freq. (MHz)	Band Edge Level (dBuV/m)	FCC15.209 Limit (dBuV/m)	Detector
Vertical	99.8	2390.1	61	74	Peak
Vertical	86.9	2390.1	45.1	54	Average
Horizontal	88.7	2390.1	53	74	Peak
Horizontal	74	2390.1	39.6	54	Average

FIGURE 32: 802.11N CHANNEL 1 VERTICAL PEAK. BETWEEN HORIZONTAL AND VERTICAL MEASUREMENTS, THIS PLOT SHOWS THE WORST DATA.

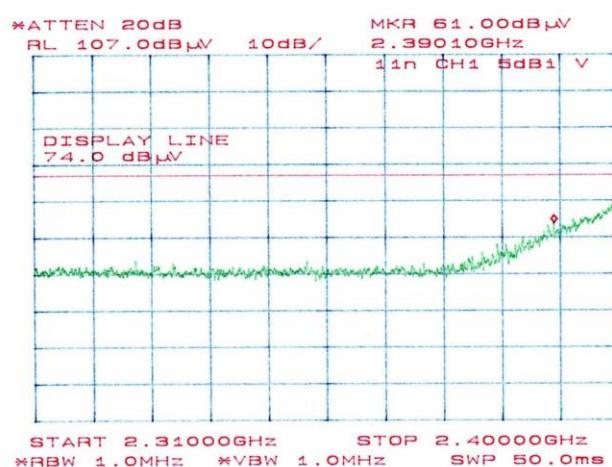
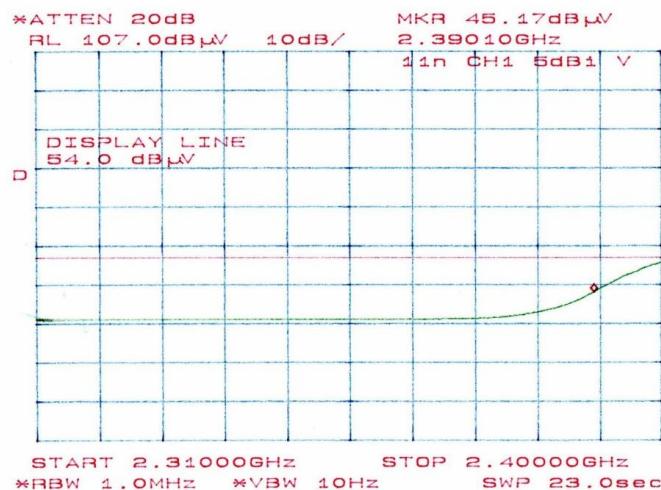


FIGURE 33: 802.11N CHANNEL 1 VERTICAL AVERAGE. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.



Band Edge Data : 802.11n Channel 11

Antenna Pole	Fundamental Level dB μ V/m	Band Edge Test Freq. MHz	Band Edge Level dB μ V/m	FCC15.209 Limit dB μ V/m	Detector
Vertical	95.5	2483.7	60.6	74	Peak
Vertical	81.3	2483.5	41.8	54	Average
Horizontal	83.2	2483.8	51.5	74	Peak
Horizontal	69.3	2483.5	38.8	54	Average

Figure 34: 802.11N Channel 11 Vertical Peak

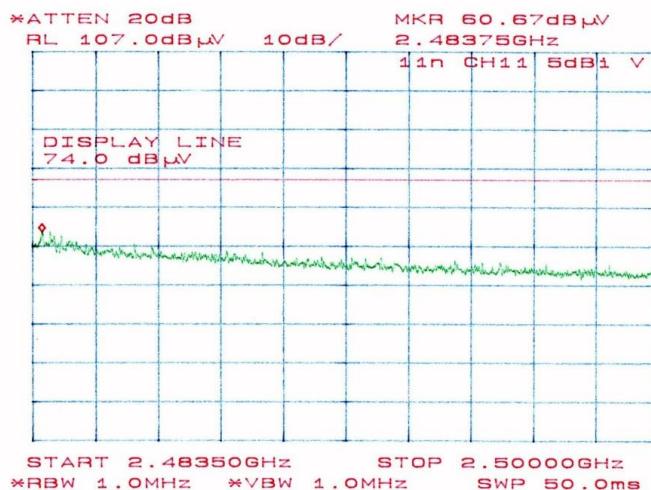
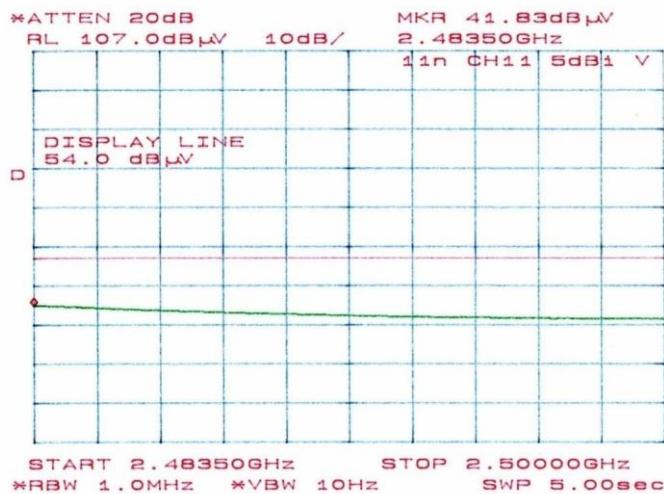


FIGURE 35: 802.11N CHANNEL 11 VERTICAL AVERAGE. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.



Band Edge Data : 802.11b Channel 1

Antenna Pole	Fundamental Level dBuV/m	Band Edge Test Freq. MHz	Band Edge Level dBuV/m	FCC15.209 Limit dBuV/m	Detector
Vertical	96.8	2390.1	47.6	74	Peak
Vertical	87.7	2390.1	38.1	54	Average
Horizontal	86.8	2390.1	49.1	74	Peak
Horizontal	73.3	2390.1	38.1	54	Average

FIGURE 36: 802.11B CHANNEL 1 HORIZONTAL PEAK. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.

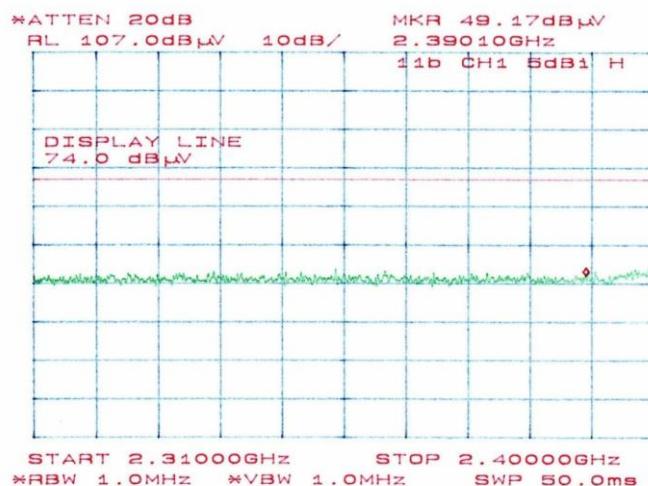
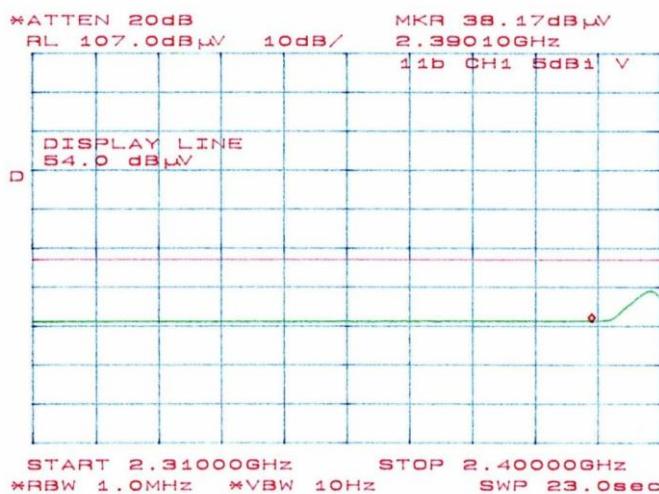


FIGURE 37: 802.11B CHANNEL 1 VERTICAL AVERAGE. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.



Band Edge Data : 802.11b Channel 11

Antenna Pole	Fundamental Level dB μ V/m	Band Edge Test Freq. MHz	Band Edge Level dB μ V/m	FCC15.209 Limit dB μ V/m	Detector
Vertical	96.8	2483.5	49.3	74	Peak
Vertical	87.8	2483.5	38.3	54	Average
Horizontal	86.3	2483.5	48.6	74	Peak
Horizontal	76.4	2483.5	38.1	54	Average

Figure 38: 802.11b Channel 11 Vertical Peak. Between Horizontal/Vertical measurements, this shows the worst data.

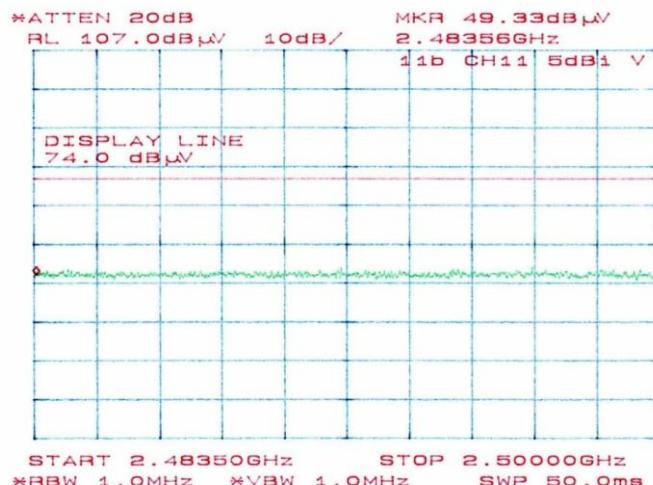
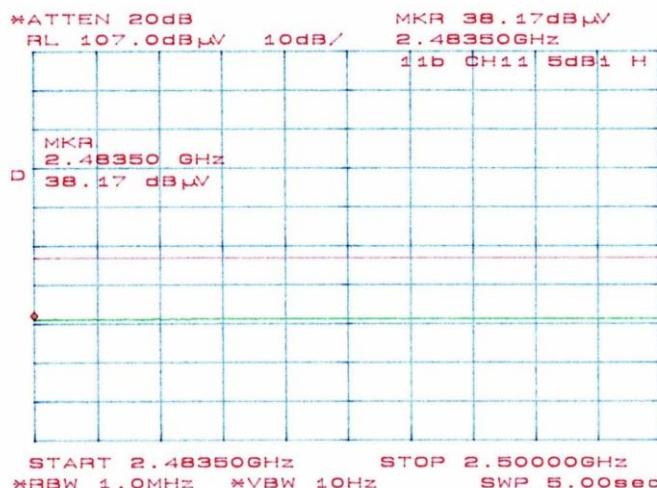


FIGURE 39: 802.11B CHANNEL 11 HORIZONTAL AVERAGE. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.



Band Edge Data : 802.11g Channel 1

Antenna Pole	Fundamental Level dBuV/m	Band Edge Test Freq. MHz	Band Edge Level dBuV/m	FCC15.209 Limit dBuV/m	Detector
Vertical	94.8	2390.1	56.5	74	Peak
Vertical	80.1	2390.1	43.1	54	Average
Horizontal	81.8	2390.1	51.8	74	Peak
Horizontal	66.7	2390.1	40.5	54	Average

FIGURE 40: 802.11G CHANNEL 1 VERTICAL PEAK. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.

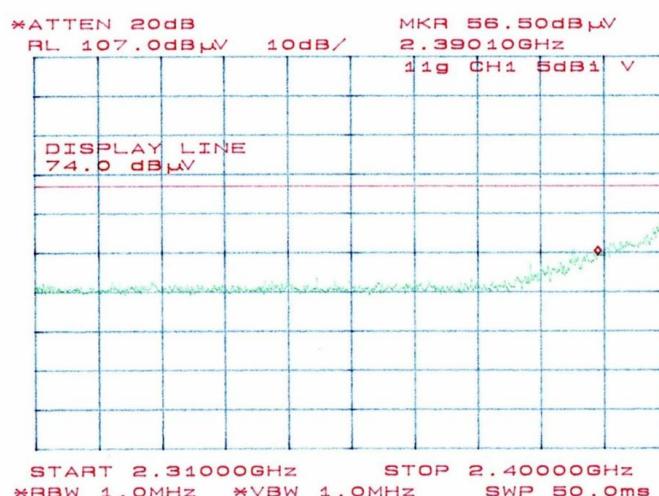
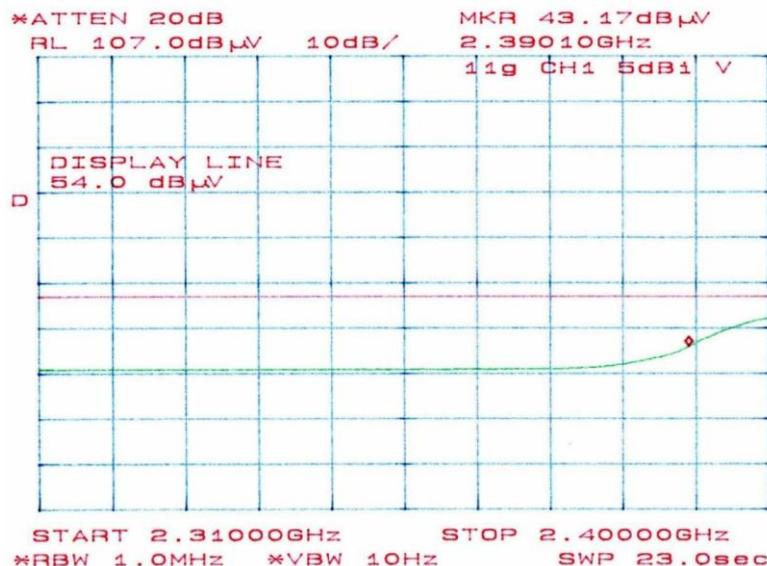


FIGURE 41: 802.11G CHANNEL 1 VERTICAL AVERAGE

Band Edge Data : 802.11g Channel 11

Antenna Pole	Fundamental Level dB μ V/m	Band Edge Test Freq. MHz	Band Edge Level dB μ V/m	FCC15.209 Limit dB μ V/m	Detector
Vertical	96.3	2483.6	57.3	74	Peak
Vertical	80.5	2483.5	41.3	54	Average
Horizontal	84.8	2483.6	52.8	74	Peak
Horizontal	70.2	2483.5	39.3	54	Average

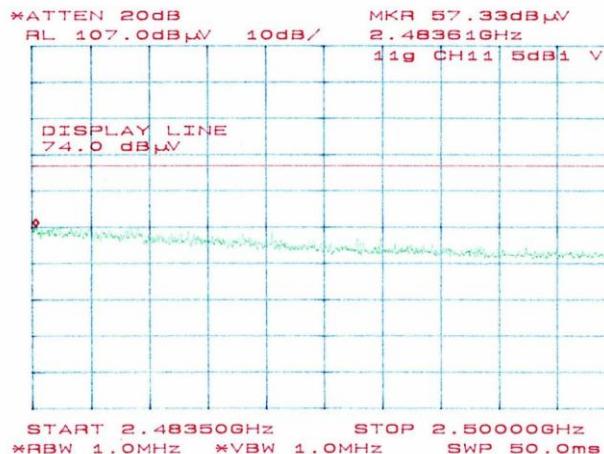
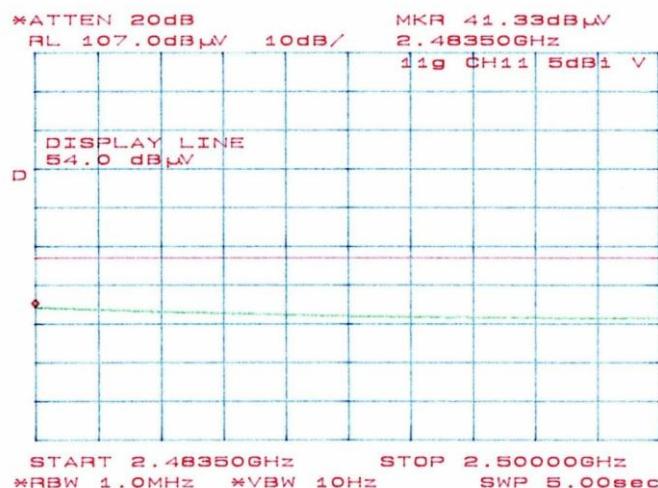
FIGURE 42: 802.11G CHANNEL 11 VERTICAL PEAK. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.

FIGURE 43: 802.11G CHANNEL 11 VERTICAL AVERAGE. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.



5 RECIEVER RADIATED EMISSION

5.1 RSS-GEN 7.2.3, RSS-210 2.3

The EUT was placed on a wooden turntable 80 cm above a ground reference plane in the semi-anechoic chamber. It was then powered on and placed in an operational mode. Radiated emissions were monitored from 30MHz to 1000MHz and 2412MHz to 4924MHz using an antenna placed three meters from the EUT. The antennas were placed in both horizontal and vertical polarities and were elevated from one to four meters while the unit was rotated and monitored. The results were recorded. The test was performed on the PCB and the two external antennas. **EUT was set at three orthogonal planes and the test was performed under the worst case. The antenna used in the test was the worst among all antennas provided with the EUT.** The antenna data included in the test report was the highest of all three antennas obtained while tested in the three orthogonal planes for each of the antenna configurations.

5.1.1 5.1.1 ADMINISTRATIVE AND ENVIRONMENTAL DETAILS

Site Used:	Test Site 1: Semi-Anechoic Chamber			
Test Date:	09/19/2011 thru 09/22/2011			
Test Engineer:	Benjamin Jing			
Temperature:	21°C			
Humidity:	43%			

5.1.2 TEST EQUIPMENT

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due Date
Spectrum Analyzer	HP	8565E	3943A01328	05/02/2012
Horn Antenna	EMCO	3115	8812-3050	03/08/2012
Biconical Antenna	EMCO	3104	3159	03/04/2012
L.P. Antenna	EMCO	3146	1569/1001	03/09/2012
RF Amplifier	HP	8447D	2443A04600	12/09/2011

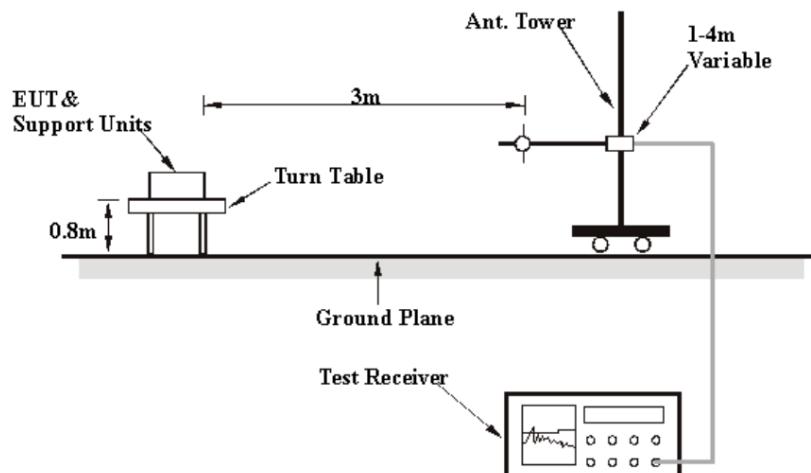
5.1.3 TEST RESULTS

The EUT meets the requirements of the test for Radiated Emissions per RSS-GEN 7.2.3 and RSS-210 2.3

Prepared By: ITC Engineering Services, Inc.
 9959 Calaveras Road, PO Box 543
 Sunol, California 94586-0543
 Tel: +1(925) 862-2944
 Fax: +1(925) 862-9013
 Email: itcemc@itcemc.com
 Web: www.itcemc.com

Product: Low Power WiFi Module
 Model: GS1500M

5.1.4 TEST SETUP



5.2 TEST DATA- PCB ANTENNA

FIGURE 44: PCB/ 802.11N/ 30-200 MHZ HORIZONTAL. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.

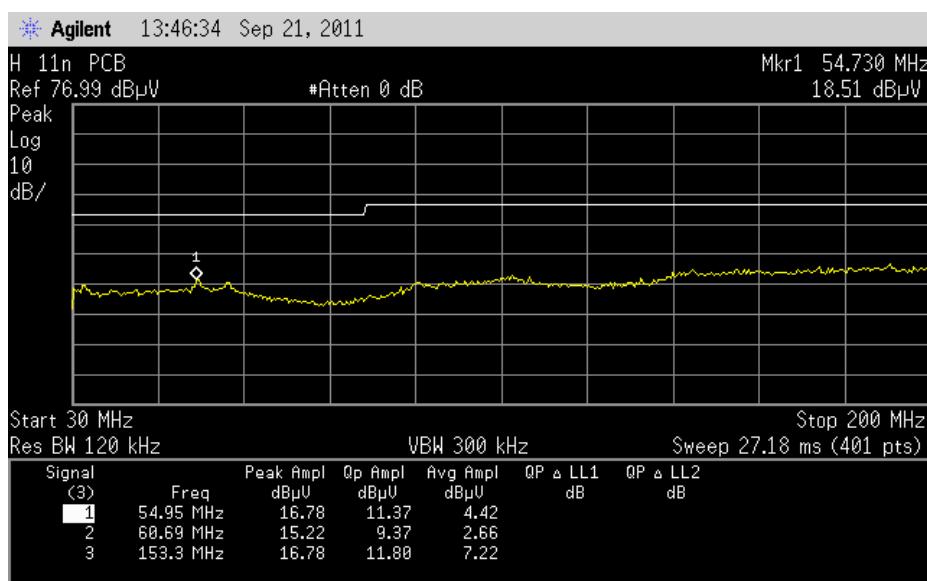
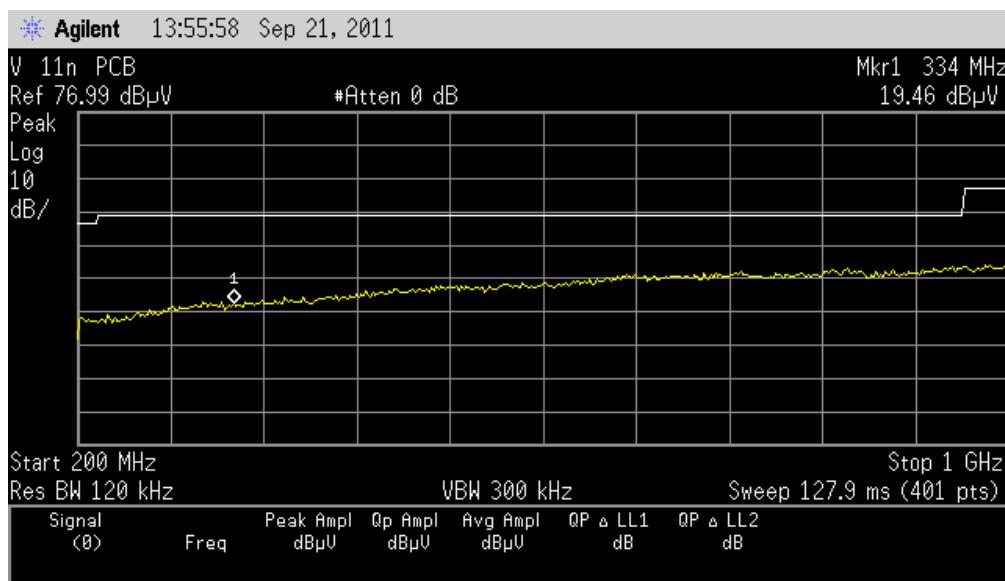


FIGURE 45: PCB/ 802.11n/ 200-1000 MHz VERTICAL. BETWEEN HORIZONTAL/VERTICAL MEASUREMENTS, THIS SHOWS THE WORST DATA.



6 6DB BANDWIDTH MEASUREMENT

6.1 FCC §15.247(a) (2), RSS-GEN 4.6, RSS-210 A8.2 (a)

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured via the spectrum analyzer with 100kHz RBW and 100kHz VBW.

The minimum 6dB bandwidth was met.

6.1.1 ADMINISTRATIVE AND ENVIRONMENTAL DETAILS

Site Used:	Test Site 1: Semi-Anechoic Chamber			
Test Date:	9/19/2011			
Test Engineer:	Benjamin Jing			
Temperature:	21°C			
Humidity:	43%			

6.1.2 TEST EQUIPMENT

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due Date
Spectrum Analyzer	HP	8565E	3943A01328	5/2/2012

6.1.3 TEST RESULTS

The EUT meets the requirements per FCC§15.247(a)(2), RSS-Gen 4.6, RSS-210 A8.2(a)

6.1.4 TEST SETUP



6.1.5 TEST DATA

TABLE 28: 6dB BANDWIDTH/ 802.11n/ OFDM MODULATION

Channel	Frequency MHz	6dB Bandwidth MHz	Limit MHz	Result
1	2412	18.08	> 0.5	Pass
6	2437	18.00	> 0.5	Pass
11	2462	18.00	> 0.5	Pass

FIGURE 46: 802.11n/ CHANNEL 1/ 2412MHz

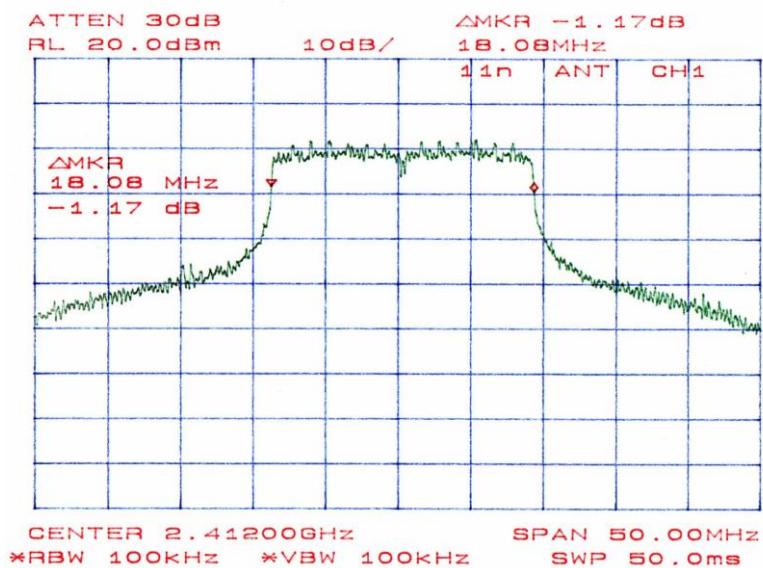
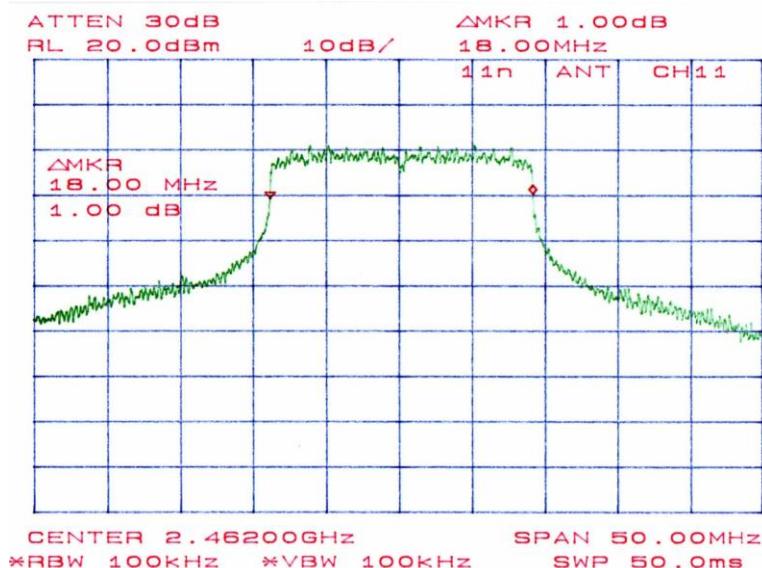
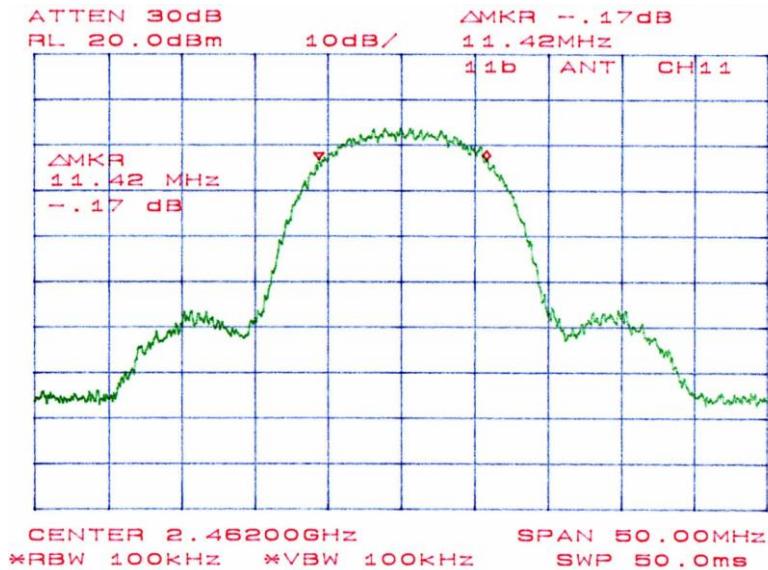


FIGURE 47: 802.11N/ CHANNEL 6/ 2437MHz**FIGURE 48: 802.11n/ CHANNEL 11/ 2462MHz****TABLE 29: 6dB BANDWIDTH/ 802.11b/ DSSS MODULATION**

Channel	Frequency MHz	6dB Bandwidth MHz	Limit MHz	Result
1	2412	11.25	> 0.5	Pass
6	2437	11.58	> 0.5	Pass
11	2462	11.42	> 0.5	Pass

FIGURE 49: 802.11b/ CHANNEL 1/ 2412MHz**FIGURE 50: 802.11b/ CHANNEL 6/ 2437MHz**

FIGURE 51: 802.11b/ CHANNEL 11/ 2462MHz**TABLE 30: 6dB BANDWIDTH/ 802.11g/ OFDM MODULATION**

Channel	Freq. MHz	6dB Bandwidth MHz	Limit MHz	Result
1	2412	16.83	> 0.5	Pass
6	2437	16.83	> 0.5	Pass
11	2462	16.75	> 0.5	Pass

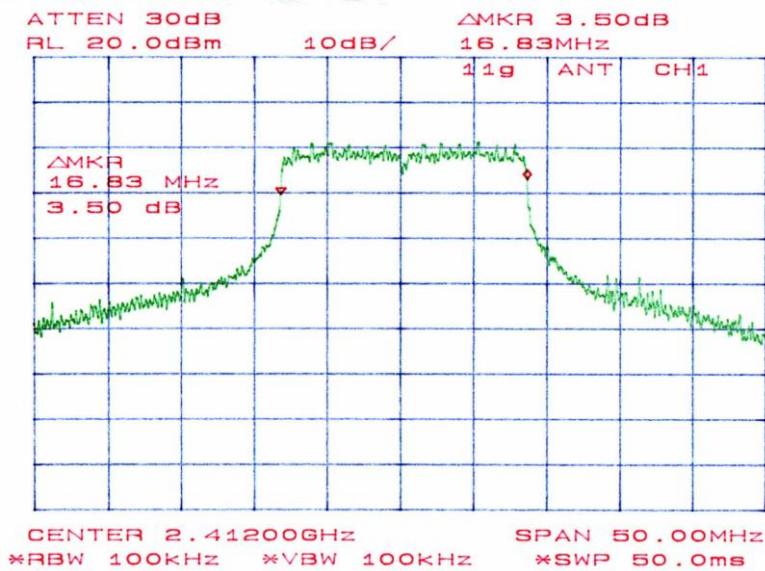
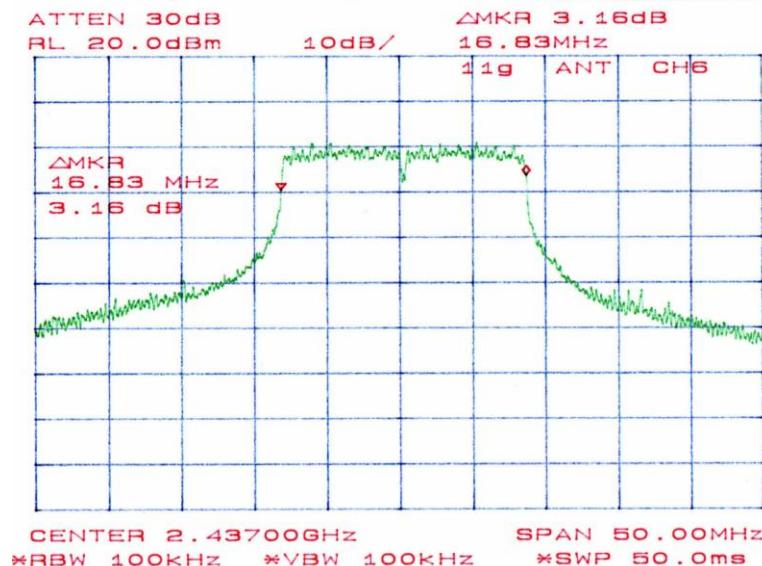
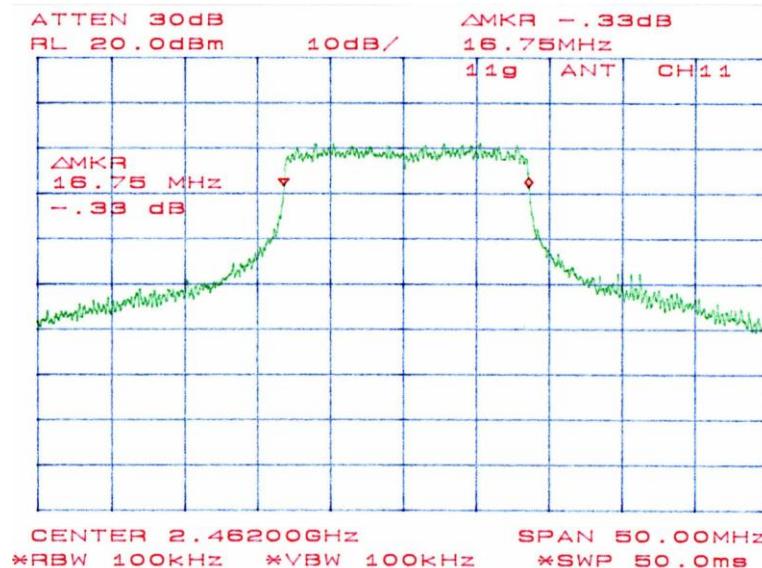
FIGURE 52: 802.11g/ CHANNEL 1/ 2412MHz

FIGURE 53: 802.11g/ CHANNEL 6/ 2437MHz**FIGURE 54: 802.11g/ CHANNEL 11/ 2462MHz**

7 99% BANDWIDTH MEASUREMENT

7.1 RSS-GEN, RSS-210 A8.2 (A)

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured via a spectrum analyzer with 100kHz RBW and 100kHz VBW.

ADMINISTRATIVE AND ENVIRONMENTAL DETAILS

Site Used:	Test Site 1: Semi-Anechoic Chamber
Test Date:	9/19/2011
Test Engineer:	Benjamin Jing
Temperature:	21°C
Humidity:	43%

7.1.1 TEST EQUIPMENT

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due Date
Spectrum Analyzer	HP	8565E	3943A01328	5/2/2012

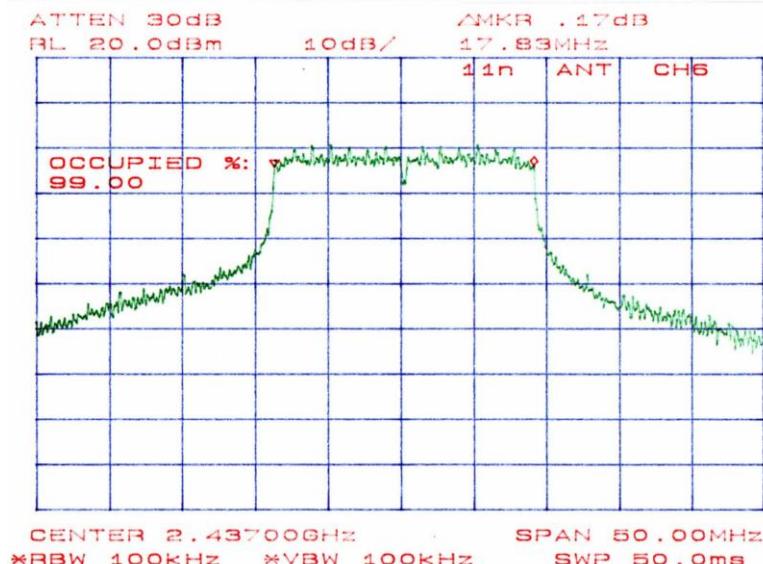
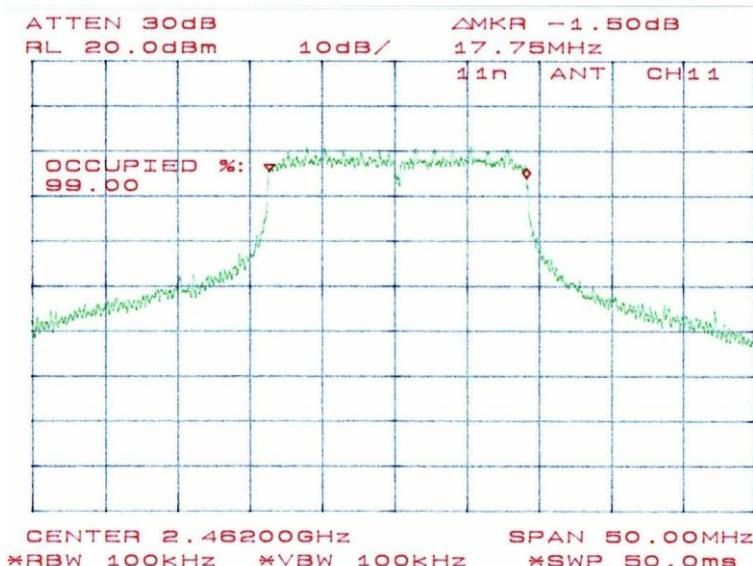
7.1.2 TEST RESULTS

The EUT meets the requirements per RSS-GEN, RSS-210 A8.2 (A).

7.1.3 TEST SETUP**7.1.4 TEST DATA****TABLE 31: 99% BANDWIDTH/ 802.11n/ OFDM MODULATION**

Channel	Frequency MHz	99% Bandwidth MHz
1	2412	17.92
6	2437	17.83
11	2462	17.75

FIGURE 55: 802.11n/ CHANNEL 1/ 2412MHz

Figure 56: 802.11N/ channel 6/ 2437mHz**FIGURE 57: 802.11n/ CHANNEL 11/ 2462MHz****TABLE 32: 99% BANDWIDTH/ 802.11b/ DSSS MODULATION**

Channel	Frequency MHz	99% Bandwidth MHz
1	2412	13.83
6	2437	13.83
11	2462	13.75

FIGURE 58: 802.11b/ CHANNEL 1/ 2412MHz**Figure 59: 802.11B/ channel 6/ 2437mhZ**

FIGURE 60: 802.11b/ CHANNEL 11/ 2462MHz**TABLE 33: 99% BANDWIDTH/ 802.11g/ OFDM MODULATION**

Channel	Frequency MHz	99% Bandwidth MHz
1	2412	16.67
6	2437	16.67
11	2462	16.50

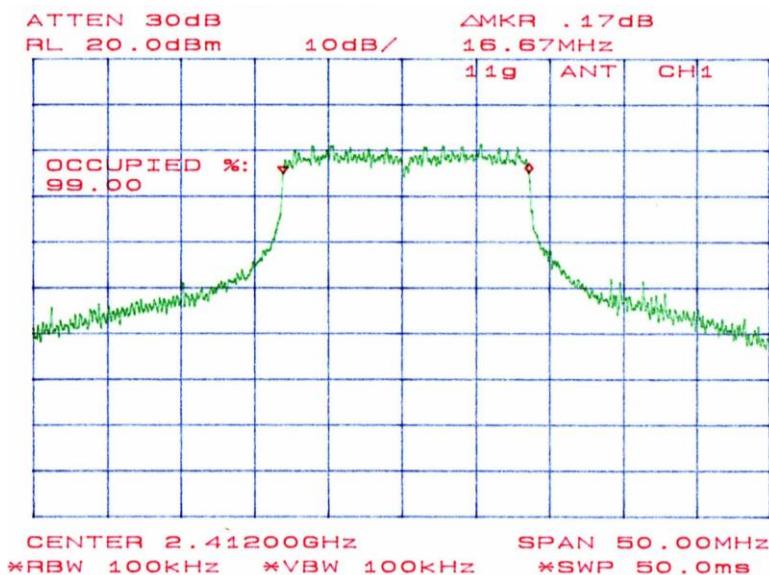
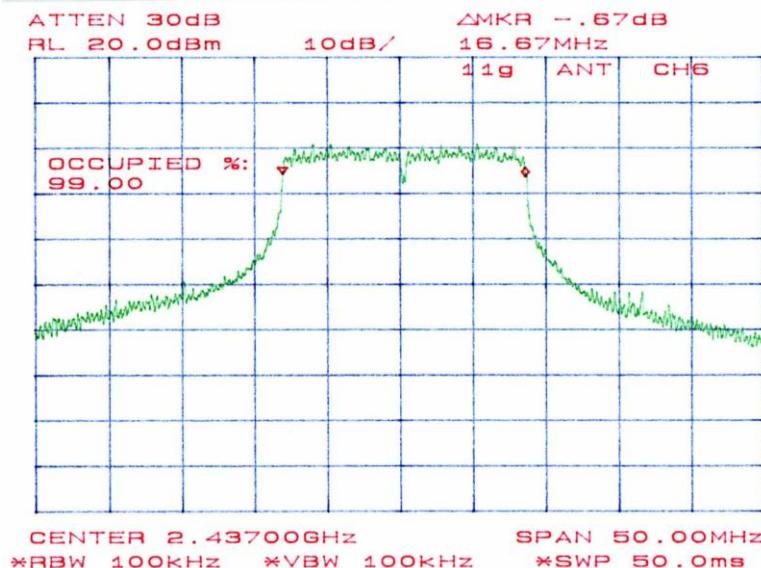
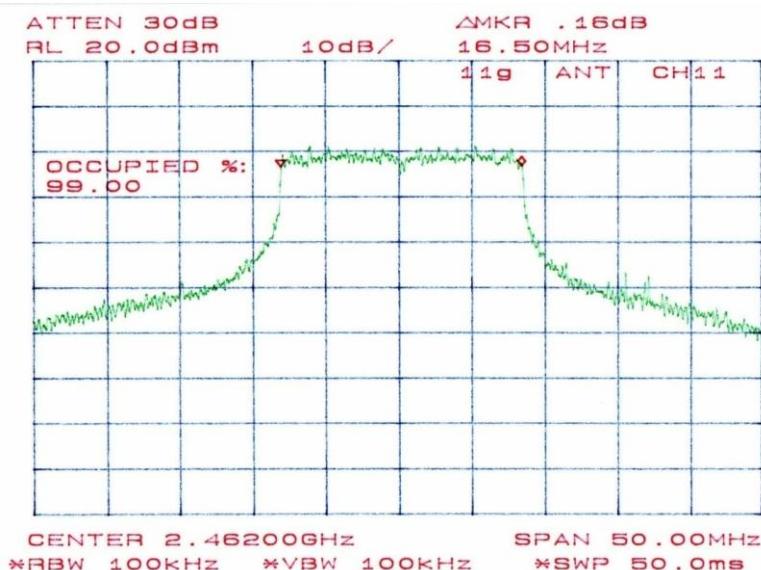
FIGURE 61: 802.11g/ CHANNEL 1/ 2412MHz

FIGURE 62: 802.11g/ CHANNEL 6/ 2437MHz**FIGURE 63: 802.11g/ CHANNEL 11/ 2462MHz**

8 MAXIMUM PEAK OUTPUT POWER

8.1 FCC §15.247(b), RSS-GEN 4.8, RSS-210 A8.4 (4)

The transmitter output was connected to the power meter with an attenuator. The maximum peak output power was measured and recorded with the power meter.

The Maximum Peak Output Power was below 30dBm.

8.1.1 ADMINISTRATIVE AND ENVIRONMENTAL DETAILS

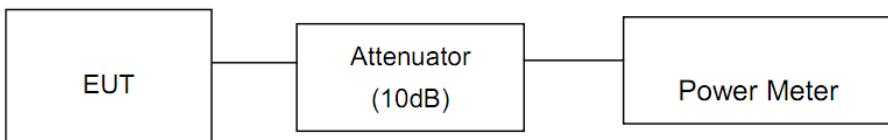
Site Used:	Test Site 1: Semi-Anechoic Chamber
Test Date:	9/21/2011
Test Engineer:	Benjamin Jing
Temperature:	21°C
Humidity:	43%

8.1.2 TEST EQUIPMENT

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due Date
Power Meter	Agilent	E4416A	GB41292470	2/9/2012
Power Meter Sensor	Agilent	E9320	3318A07149	2/9/2012

8.1.3 TEST RESULTS

The EUT meets the requirements per FCC §15.247(b), RSS-GEN 4.8, RSS-210 A8.4 (4)

8.1.4 TEST SETUP**8.1.5 TEST DATA****TABLE 34: PEAK OUTPUT POWER/ 800.11n/ OFDM MODULATION**

Channel	Frequency MHz	Peak Power dBm	Peak Power mW	Limit dBm	Results
1	2412	15.9	38.9	30	Pass
6	2437	15.9	38.9	30	Pass
11	2462	15.2	33.1	30	Pass

TABLE 35: PEAK OUTPUT POWER/ 802.11b/ DSSS MODULATION

Channel	Frequency MHz	Peak Power dBm	Peak Power mW	Limit dBm	Results
1	2412	14.5	28.2	30	Pass
6	2437	14.7	29.5	30	Pass
11	2462	14.2	26.3	30	Pass

TABLE 36: PEAK OUTPUT POWER/ 802.11g/ OFDM MODULATION

Channel	Frequency MHz	Peak Power dBm	Peak Power mW	Limit dBm	Results
1	2412	15.3	33.9	30	Pass
6	2437	14.8	30.2	30	Pass
11	2462	15.5	35.5	30	Pass

9 POWER SPECTRAL DENSITY MEASUREMENT

9.1 FCC§15.247(d), RSS-210 A8.2 (b)

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 3kHz VBW, set sweep time= span/3kHz (Note: The sweep time is allowed to be longer than span/3kHz to achieve a full response of the spectrum analyzer mixer). The power spectral density was measured and recorded.

The Maximum Power Spectral Density is 8dBm.

9.1.1 ADMINISTRATIVE AND ENVIRONMENTAL DETAILS

Site Used:	Test Site 1: Semi-Anechoic Chamber
Test Date:	9/20/2011
Test Engineer:	Benjamin Jing
Temperature:	21°C
Humidity:	43%

9.1.2 TEST EQUIPMENT

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due Date
Spectrum Analyzer	HP	8565E	3943A01328	5/2/2012

9.1.3 TEST RESULTS

The EUT meets the requirements per FCC§15.247(d), RSS-210 A8.2(b).

9.1.4 TEST SETUP



9.1.5 TEST DATA

TABLE 37: POWER SPECTRUM DENSITY/ 802.11n/ OFDM MODULATION

Channel	Frequency MHz	Level dBm	Limit dBm	Result
1	2412	-5.00	8	Pass
6	2437	-4.83	8	Pass
11	2462	-6.33	8	Pass

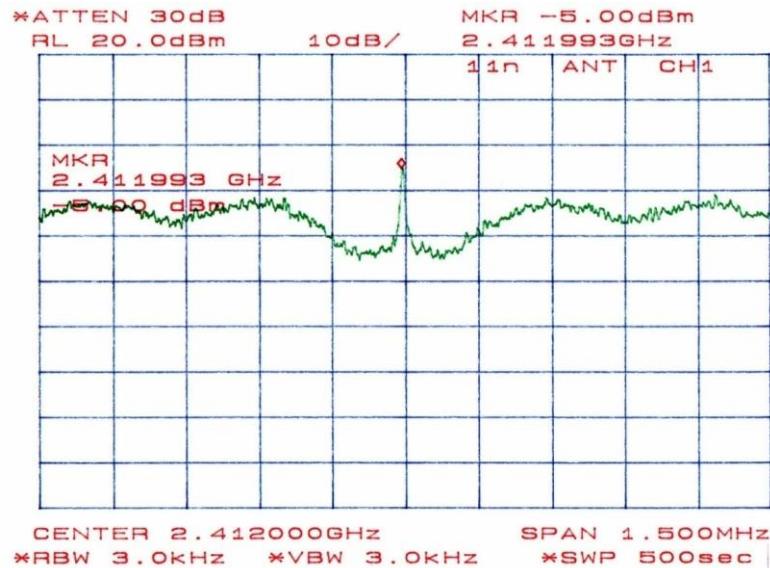
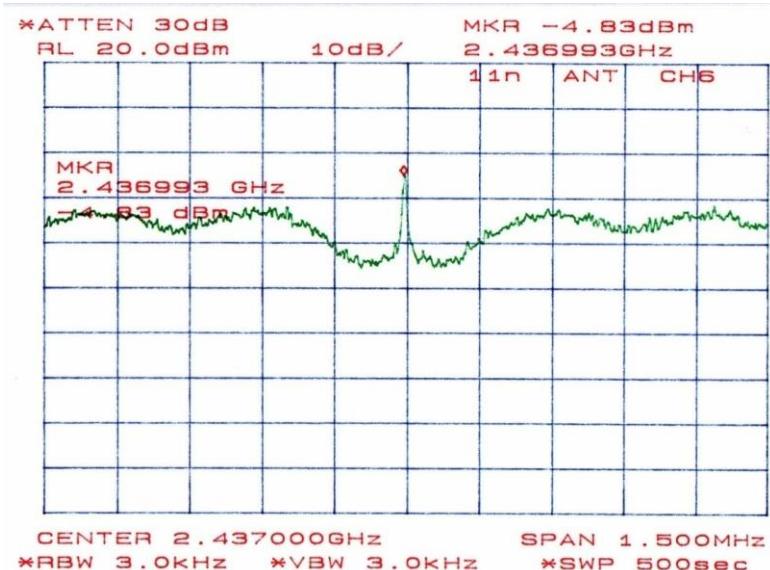
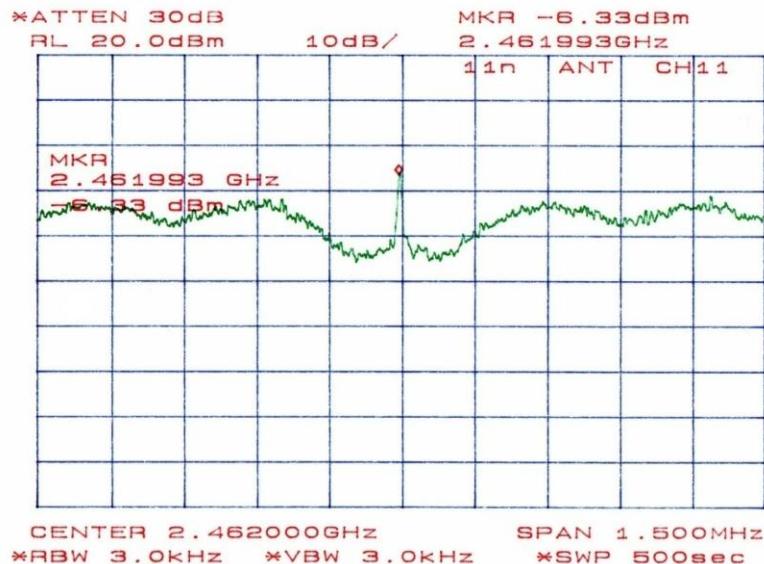
FIGURE 64: 802.11n/ CHANNEL 1/ 2412MHz**FIGURE 65: 802.11n/ CHANNEL 6/ 2437MHz**

FIGURE 66: 802.11n/ CHANNEL 11/ 2462MHz**TABLE 38: POWER SPECTRUM DENSITY/ 802.11b/ DSSS MODULATION**

Channel	Frequency MHz	Level dBm	Limit dBm	Result
1	2412	-15.17	8	Pass
6	2437	-10.67	8	Pass
11	2462	-10.83	8	Pass

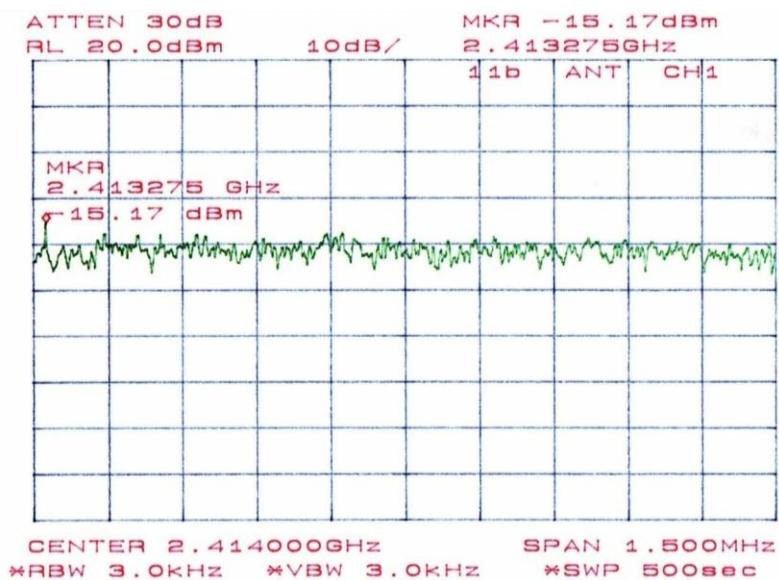
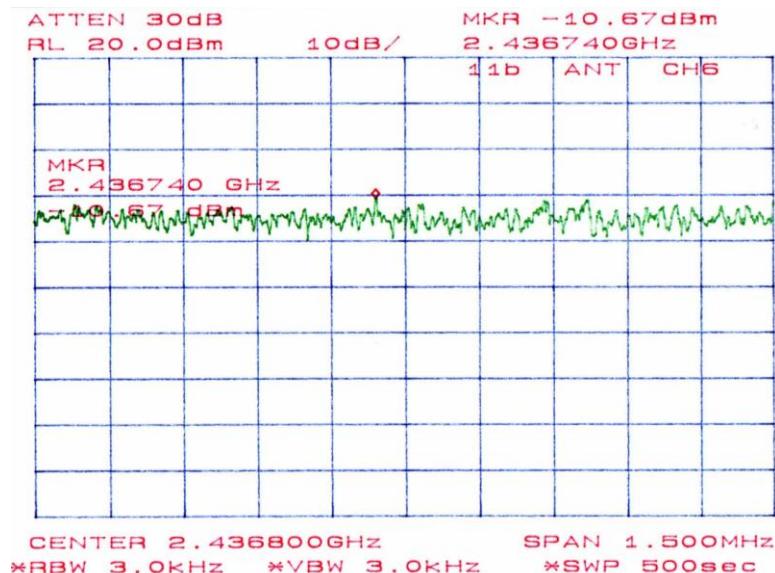
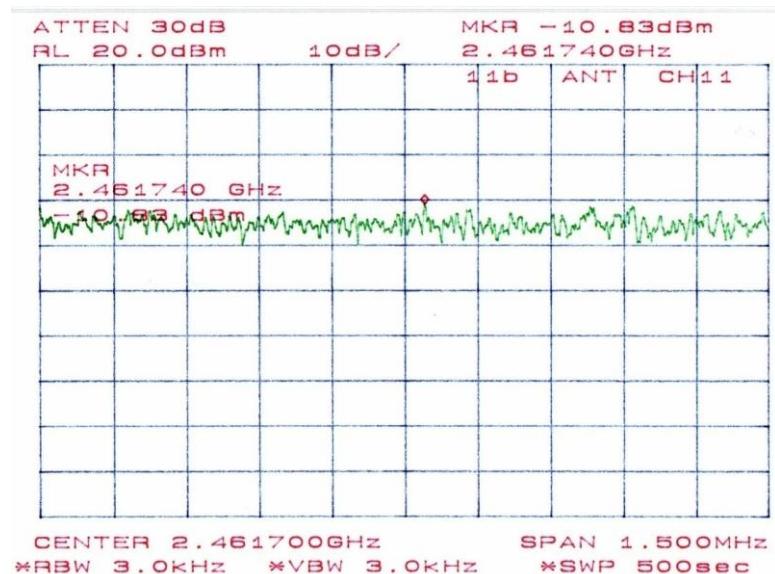
Figure 67: 802.11B/ channel 1/2412mhZ

FIGURE 68: 802.11n/ CHANNEL 6/ 2437MHz**FIGURE 69: 802.11b/ CHANNEL 11/ 2462MHz****TABLE 39: POWER SPECTRUM DENSITY/ 802.11g/ OFDM MODULATION**

Channel	Frequency MHz	Level dBm	Limit dBm	Result
1	2412	-6.83	8	Pass
6	2437	-12.5	8	Pass
11	2462	-5	8	Pass

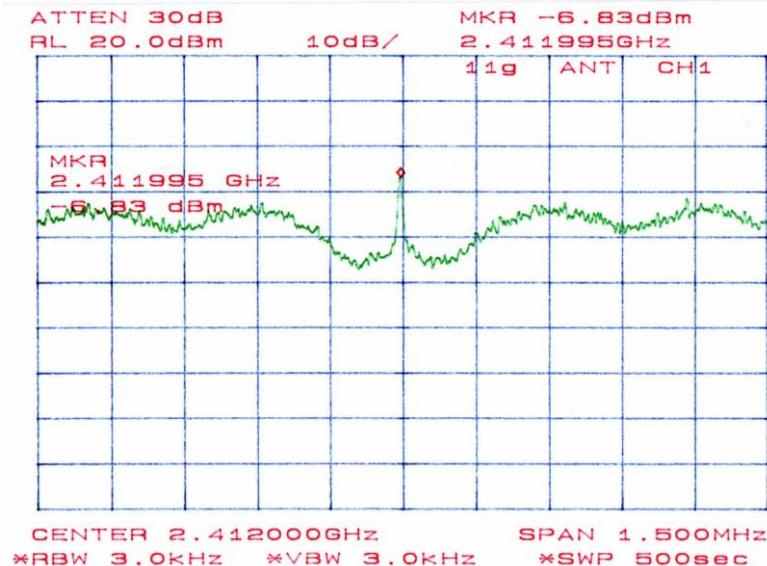
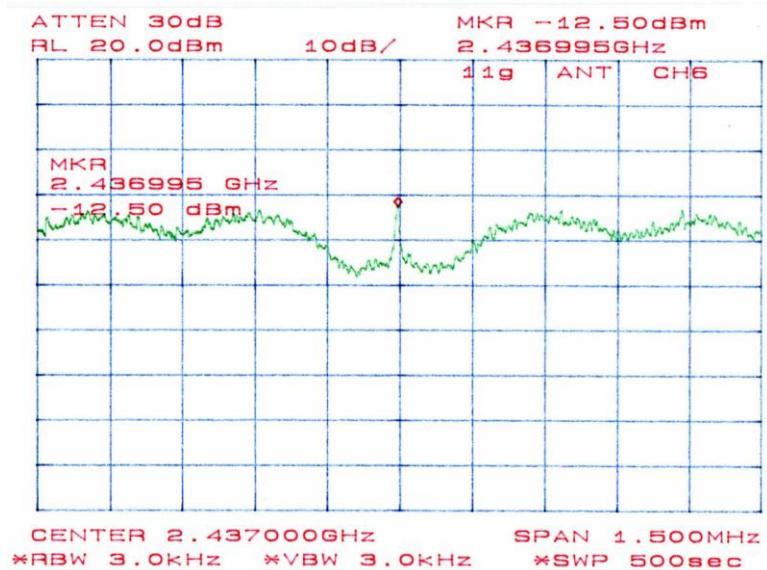
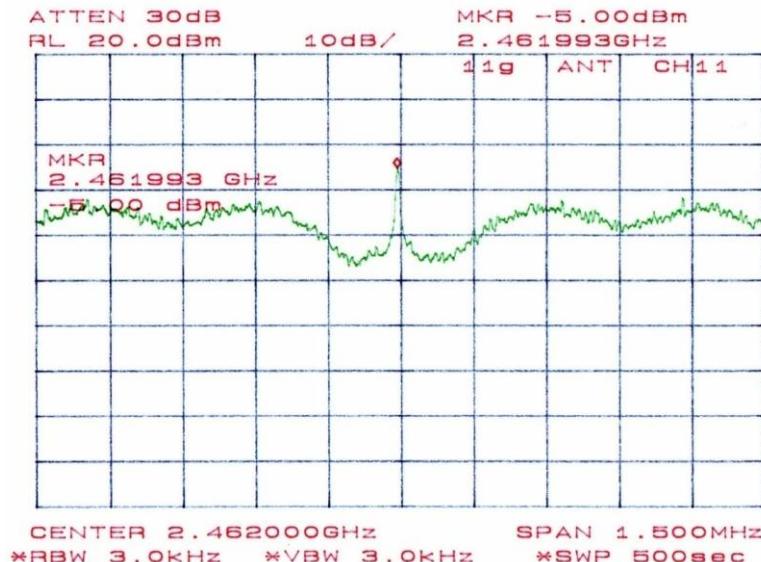
FIGURE 70: 802.11g/ CHANNEL 1/ 2412MHz**FIGURE 71: 802.11g/ CHANNEL 6/ 2437MHz**

FIGURE 72: 802.11g/ CHANNEL 11/ 2462MHz

10 CONDUCTED OUT-BAND EMISSION MEASUREMENT

10.1 FCC §15.247(c), RSS-210 A8.5

The transmitter output was connected to the spectrum analyzer via a low-loss cable. The RBW of the spectrum analyzer was set to 100 kHz with a suitable frequency span including 100 MHz bandwidth from the band edge. The band edges were measured and recorded.

The conducted out-band emission was below –20dB of the operating band's highest emission level (100 kHz Resolution Bandwidth).

10.1.1 ADMINISTRATIVE AND ENVIRONMENTAL DETAILS

Site Used:	Test Site 1: Semi-Anechoic Chamber
Test Date:	9/22/2011
Test Engineer:	Benjamin Jing
Temperature:	21°C
Humidity:	43%

10.1.2 TEST EQUIPMENT

Equipment Description	Manufacturer	Model Name	Serial Number	Calibration Due Date
Spectrum Analyzer	HP	8565E	3943A01328	5/2/2012

10.1.3 TEST RESULTS

The EUT meets the requirements per FCC §15.247(c), RSS-210 A8.5

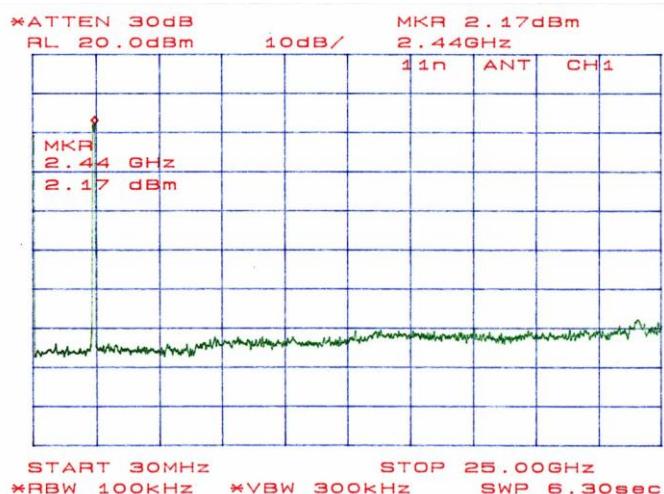
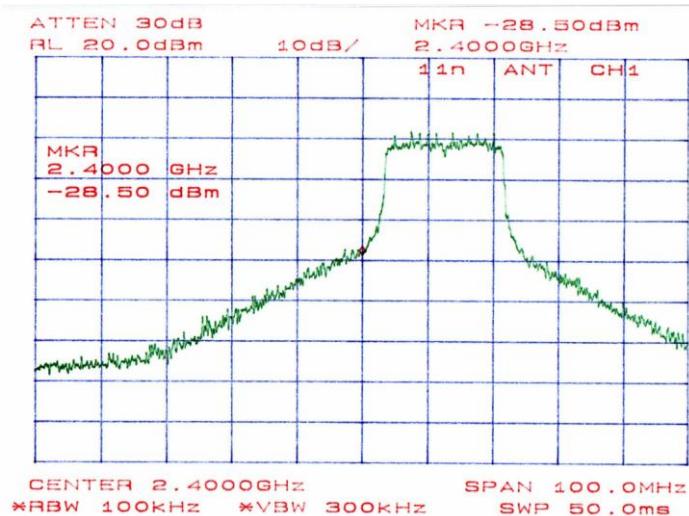
10.1.4 TEST DATA**FIGURE 73: 802.11n/ OFDM/ CHANNEL 1****FIGURE 74: 802.11n/ OFDM/ CHANNEL 1**

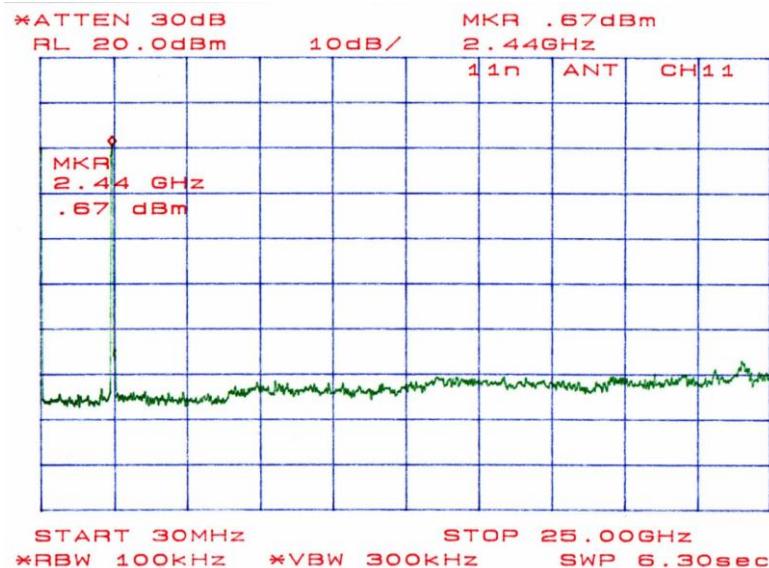
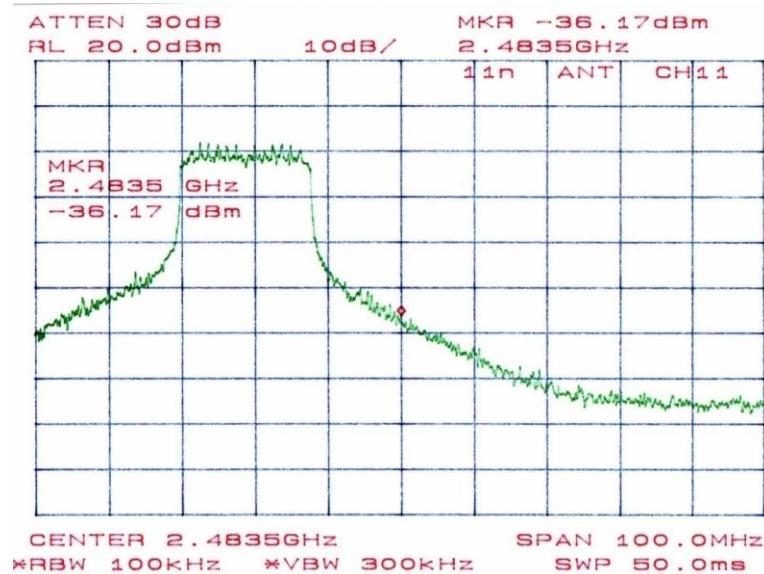
FIGURE 75: 802.11n/ OFDM/ CHANNEL 11**FIGURE 76: 802.11n/ OFDM/ CHANNEL 11**

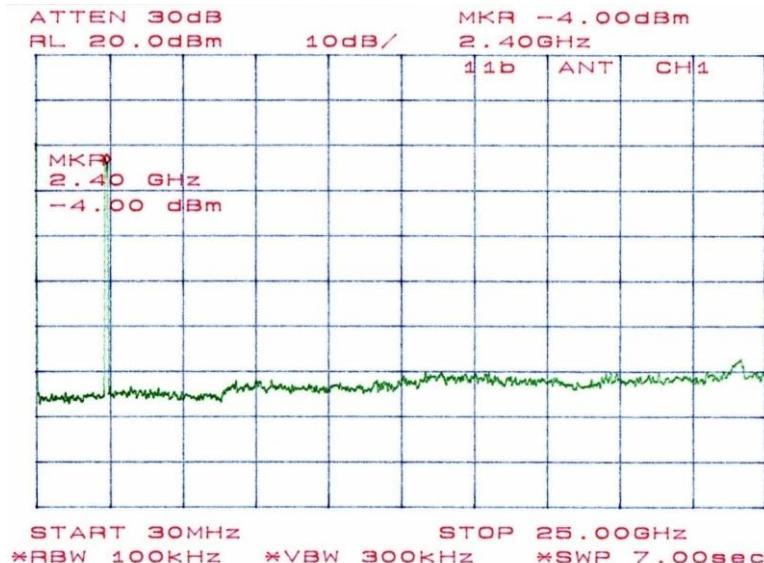
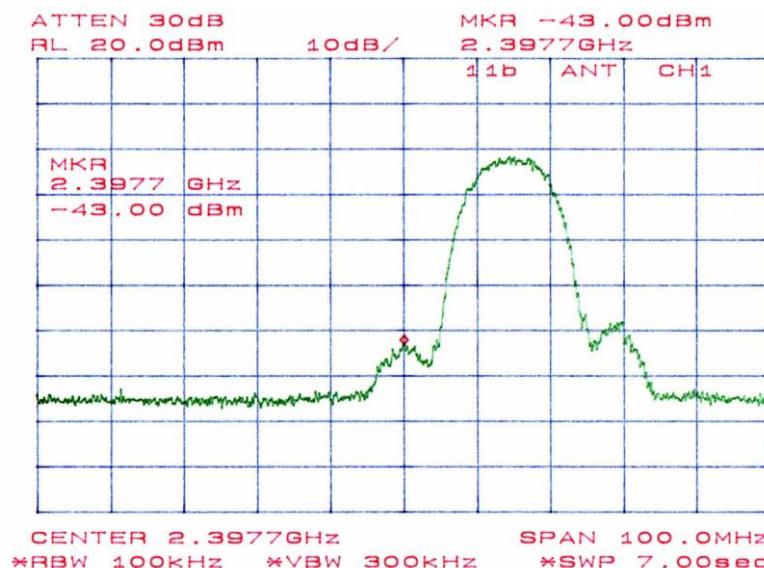
FIGURE 77: 802.11b/ DSSS/ CHANNEL 1**FIGURE 78: 802.11b/ DSSS/ CHANNEL 1**

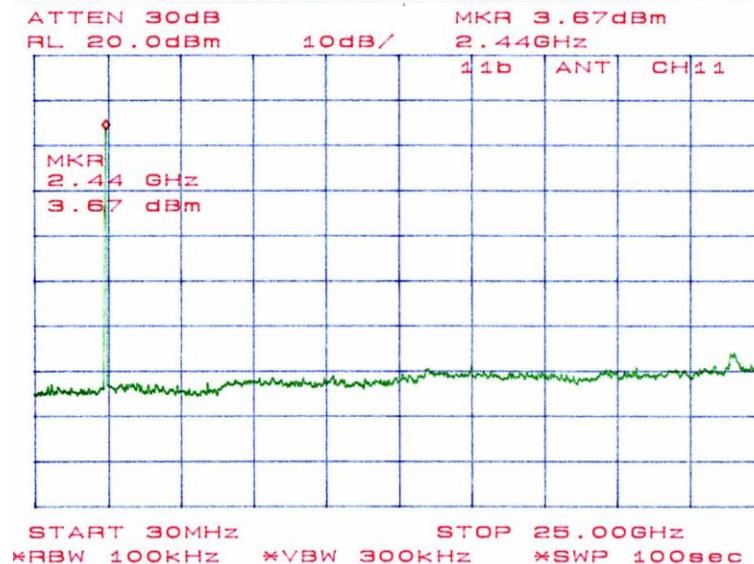
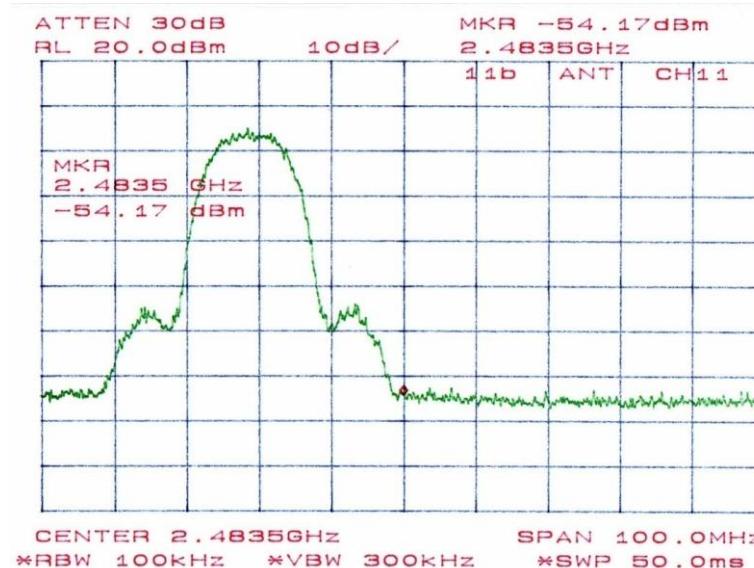
FIGURE 79: 802.11b/ DSSS/ CHANNEL 11**FIGURE 80: 802.11b/ DSSS/ CHANNEL 11**

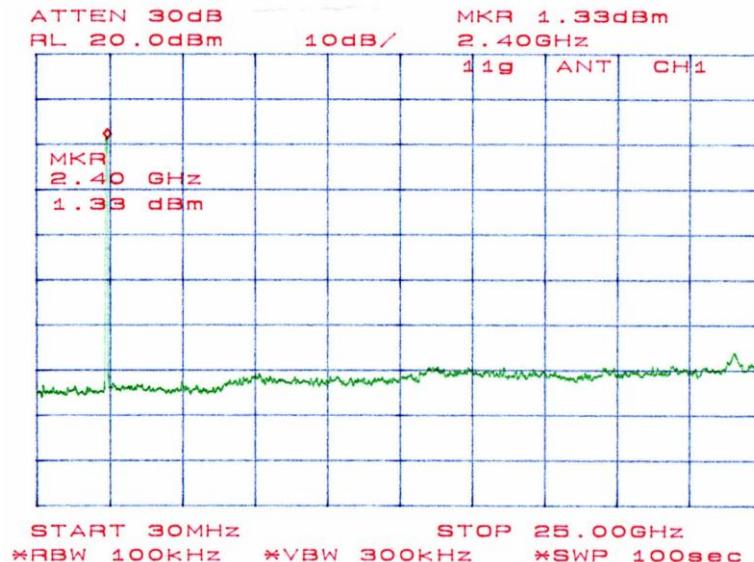
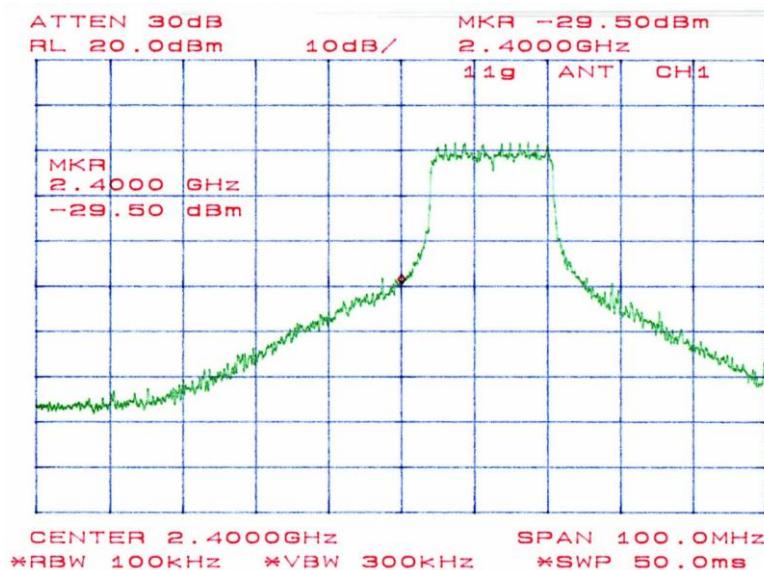
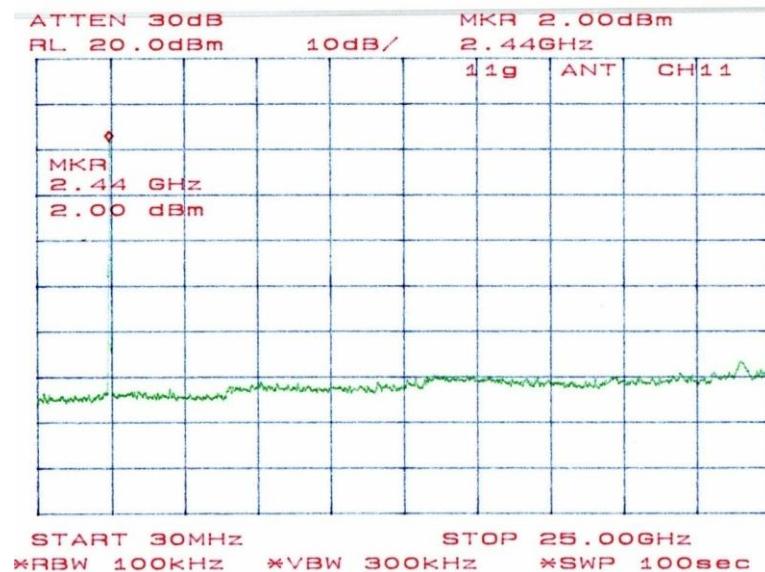
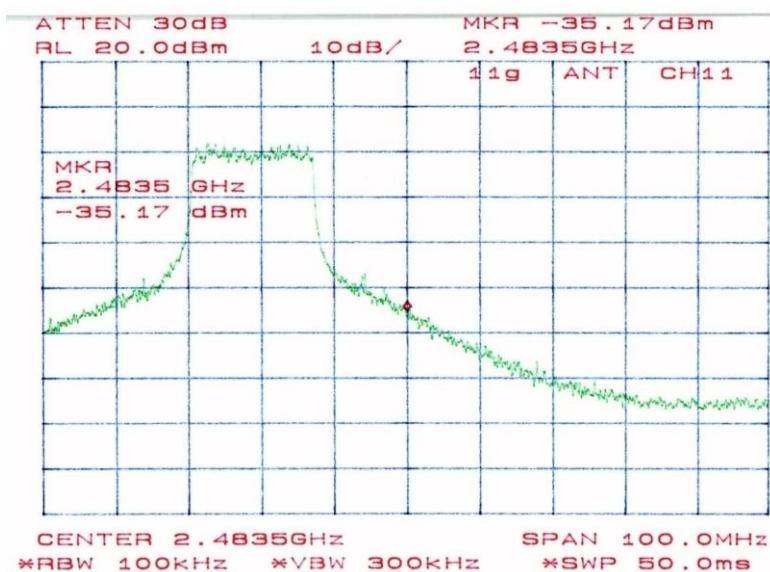
FIGURE 81: 802.11g/ OFDM/ CHANNEL 1**FIGURE 82: 802.11g/ OFDM/ CHANNEL 1**

FIGURE 83: 802.11g/ OFDM/ CHANNEL 11**FIGURE 84: 802.11g/ OFDM/ CHANNEL 11**

11 APPENDIX

11.1 EUT TECHNICAL SPECIFICATIONS

Manufacturer:	GainSpan Corporation		
General Description:	The GS1500M module is an integrated ultra low power Wi-Fi system-on-chip (SOC) that contains a highly integrated IEEE 802.11b/g/n WLAN chip and a GS1011 Chip. The module carries an 802.11b/g/n radio with onboard 32 KHz, 26 MHz & 44 MHz crystal circuitries, RF, and certified PCB antenna or external antenna options.		
EUT Name:	Low-Power Wireless System-on-Chip Wi-Fi Module	Model:	GS1500M
Dimensions:	1.450"(L) x 0.900"(W) x 0.143"(H)	Serial Number:	001DC9002411
Operating Frequency:	2412 thru 2484MHz	Power Cord Type:	<input type="checkbox"/> Shielded <input checked="" type="checkbox"/> Un-Shielded

11.2 EUT PHOTOS

FIGURE 85: EUT FRONT VIEW



FIGURE 86: EUT REAR VIEW**EUT LABEL****FIGURE 87: RFA-02-5-F7H1 ANTENNA****RFA-02-P05-70B-150 ANTENNA****FIGURE 88: PCB ANTENNA**