

FCC PART 15.407  
TEST AND MEASUREMENT REPORT

For

**Meru Networks, Inc.**

894 Ross Drive,

Sunnyvale, CA 94089, USA

**FCC ID: RE7-AP1020**  
**Model: AP1020e**

<b>Report Type:</b> CIIPC	<b>Product Type:</b> 802.11 a/b/g/n Access Point
<b>Test Engineers:</b> <u>Ning Ma</u>	<i>nm</i>
<b>Report Number:</b> <u>R1110122-407</u>	
<b>Report Date:</b> <u>2012-02-21</u>	
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**Note:** This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP\*, NIST, or any agency of the Federal Government.

\* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "\*" ...

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**DOCUMENT REVISION HISTORY**

<b>Revision Number</b>	<b>Report Number</b>	<b>Description of Revision</b>	<b>Date of Revision</b>
0	R1110253-407(AP1020e)	Original Report	2012-02-21

# 1 General Description

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## 1.1 Product Description for Equipment under Test (EUT)

This test and measurement report was prepared on behalf of *Meru Networks Inc.* and their product model: *AP1020e*, FCC ID: *RE7-AP1020* or the “EUT” as referred to in this report. The EUT is an 802.11 a/b/g/n Access Point with TWO 2x2 802.11 a/b/g/n wireless modules.

## 1.2 Mechanical Description of EUT

The EUT measures approximately 11.2 cm (L) x 15.3 cm (W) x 3.5 cm (H) and weighs 550 g.

*The data gathered are from a sample provided by the manufacturer serial number: 3911A102e0A11B6, provided by manufacturer.*

## 1.3 Objective

This report is prepared on behalf of *Meru Networks, Inc.* in accordance with FCC §15.407.

This is Class II Permissive Change application with adding 3 types external antennas. The objective is to determine compliance with FCC rules for Antenna Requirements, Radiated Spurious Emissions (for 5150-5250 MHz band only) with additional antennas:

**Antenna 1:** 2 dBi (2.4 GHz)/2 dBi (5 GHz) Omni Directional Rubber Duct Dual Band Antenna (ACC-ANT-ABGN230-W)

**Antenna 2:** 3 dBi (2.4 GHz)/4 dBi (5 GHz) Ceiling Mount Omni Dual Band Antenna (ACC-ANT-12ABGN-0304-O)

**Antenna 3:** 6 dBi (2.4 GHz)/7 dBi (5 GHz) Wall Mount Patch Dual Band Antenna (ACC-ANT-O4ABGN-0607-PT)

## 1.4 Related Submittal(s)/Grant(s)

FCC Part 15.407, submission with FCC ID: RE7-AP1020.

## 1.5 Test Methodology

FCC Part 15.407 and RSS-210, Issue 8, Dec 2010, ANSI C63.4-2003 and ANSI C63.10-2009.

## 1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR16-4-2:2003, The Treatment of Uncertainty in EMC Measurements, the values ranging from  $\pm 2.0$  dB for Conducted Emissions tests and  $\pm 4.0$  dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

## 1.7 Test Facility

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997, and Article 8 of the VCCI regulations on December 25, 1997. The test site also complies with the test methods and procedures set forth in CISPR 22:2005 + A1:2005 + A2:2006 §10.4 for measurements below 1 GHz and §10.6 for measurements above 1 GHz. The facility also complies with the test methods and procedures set forth in ANSI C63.4-2003 & TIA/EIA-603.

The Federal Communications Commission and Voluntary Control Council for Interference have the reports on file and they are listed under FCC registration number: 90464 and VCCI Registration No.: R-3729, C-4176, G-469, and T-1206. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL Corp. is a National Institute of Standards and Technology (NIST) accredited laboratory under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at <http://ts.nist.gov/Standards/scopes/2001670.htm>

## 2 EUT Test Configuration

### 2.1 Justification

The EUT was configured for testing according to ANSI C63.4-2003.

The EUT was tested in a testing mode to represent worst-case results during the final qualification test.

### 2.2 EUT Exercise Software

The software used, SCRT5.5.1, was provided by customer and verified by Ning Ma to comply with the standard requirements being tested against.

### 2.3 Equipment Modifications

No modifications were made to the EUT.

### 2.4 Special Accessories

N/A

### 2.5 Local Support Equipment

Manufacturers	Description	Models	Serial Number
DELL	Laptop	1XDRM A00	4SD2LQ1
NETGEAR	Router	GS605 v2	1FE1715K02A42

### 2.6 EUT Internal Configuration

Manufacturers	Description	Models	Series Number
Broadcom	Wi-Fi Module (x2)	LOG-M11	E150630
Meru Network, Inc	Main Board	MVT1.0	40AB103V 8501-6000386-01

### 3 Summary of Test Results

Results reported relate only to the product tested.

FCC Rules	Description of Test	Result
FCC §15.407(f), §2.1091	RF Exposure Information	Compliance
FCC §15.207	AC Line Conducted Emissions	N/A <sup>1</sup>
FCC §15.203	Antenna Requirement	Compliance
FCC §15.209(a), §15.407(b)	Spurious Radiated Emissions	Compliance
FCC §15.407(a)	26 dB and 99% Emission Bandwidth	N/A <sup>1</sup>
FCC §407(a)(1)	Peak Output Power Measurement	N/A <sup>1</sup>
FCC §15.407	Out of Band Emissions	N/A <sup>1</sup>
FCC §15.407(a)(1)	Power Spectral Density	N/A <sup>1</sup>
FCC §15.407(b)	Spurious Emissions at Antenna Terminals	N/A <sup>1</sup>

Note: N/A<sup>1</sup> please refer to original FCC ID: RE7-AP1020



## 4 FCC §15.407(f) & §2.1091 - RF Exposure

### 4.1 Applicable Standards

According to FCC §15.407(f) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

#### Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minutes)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	* (100)	30
1.34-30	824/f	2.19/f	* (180/f <sup>2</sup> )	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

\* = Plane-wave equivalent power density

### 4.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

### 4.3 MPE Results

Antenna with Model Number: ACC-ANT-12ABGN-0607-PT has the highest gain in all three types of antennas

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>15.48</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>35.31</u>
<u>Prediction distance (cm):</u>	<u>20</u>
<u>Prediction frequency (MHz):</u>	<u>5180</u>
<u>Maximum Antenna Gain, typical (dBi):</u>	<u>7.0</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>5.01</u>
<u>MPE for uncontrolled exposure at prediction frequency (mW/cm<sup>2</sup>):</u>	<u>0.0176</u>
<u>MPE limit for uncontrolled exposure at prediction frequency (mW/cm<sup>2</sup>):</u>	<u>1.0</u>

The device is compliant with the requirement MPE limit for uncontrolled exposure at 20 cm distance.

## 5 FCC §15.203 – Antenna Requirements

### 5.1 Applicable Standard

According to FCC §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

And according to FCC §15.407 (a)(1), if transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### 5.2 Antennas List

Antenna Model	2.4 GHz Antenna Gain (dBi)	5 GHz Antenna Gain (dBi)
ACC-ANT-ABGN230-W (Dual Band Omni Directional Antenna)	2.0	2.0
ACC-ANT-12ABGN-0304-O (Dual Band Ceiling Mount Omni Antenna)	3.0	4.0
ACC-ANT-O4ABGN-0607-PT (Dual Band Wall Mount Patch Antenna)	6.0	7.0 (Conducted output limit will be reduced to 22 dBm)

## 6 FCC §15.209 (a) & §15.407(b) - Spurious Radiated Emissions

### 6.1 Applicable Standards

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz.

As per FCC §15.209(a) and RSS-210: Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100 Note 2	3
88 - 216	150 Note 2	3
216 - 960	200 Note 2	3
Above 960	500	3

Note 2: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110	16.42 – 16.423		
0.495 – 0.505	16.69475 – 16.69525	960 – 1240	4.5 – 5.15
2.1735 – 2.1905	25.5 – 25.67	1300 – 1427	5.35 – 5.46
4.125 – 4.128	37.5 – 38.25	1435 – 1626.5	7.25 – 7.75
4.17725 – 4.17775	73 – 74.6	1645.5 – 1646.5	8.025 – 8.5
4.20725 – 4.20775	74.8 – 75.2	1660 – 1710	9.0 – 9.2
6.215 – 6.218	108 – 121.94	1718.8 – 1722.2	9.3 – 9.5
6.26775 – 6.26825	123 – 138	2200 – 2300	10.6 – 12.7
6.31175 – 6.31225	149.9 – 150.05	2310 – 2390	13.25 – 13.4
8.291 – 8.294	156.52475 – 156.52525	2483.5 – 2500	14.47 – 14.5
8.362 – 8.366	156.7 – 156.9	2690 – 2900	15.35 – 16.2
8.37625 – 8.38675	162.0125 – 167.17	3260 – 3267	17.7 – 21.4
8.41425 – 8.41475	167.72 – 173.2	3.332 – 3.339	22.01 – 23.12
12.29 – 12.293	240 – 285	3 3458 – 3 358	23.6 – 24.0
12.51975 – 12.52025	322 – 335.4	3.600 – 4.400	31.2 – 31.8
12.57675 – 12.57725	399.9 – 410		36.43 – 36.5
13.36 – 13.41	608 – 614		Above 38.6

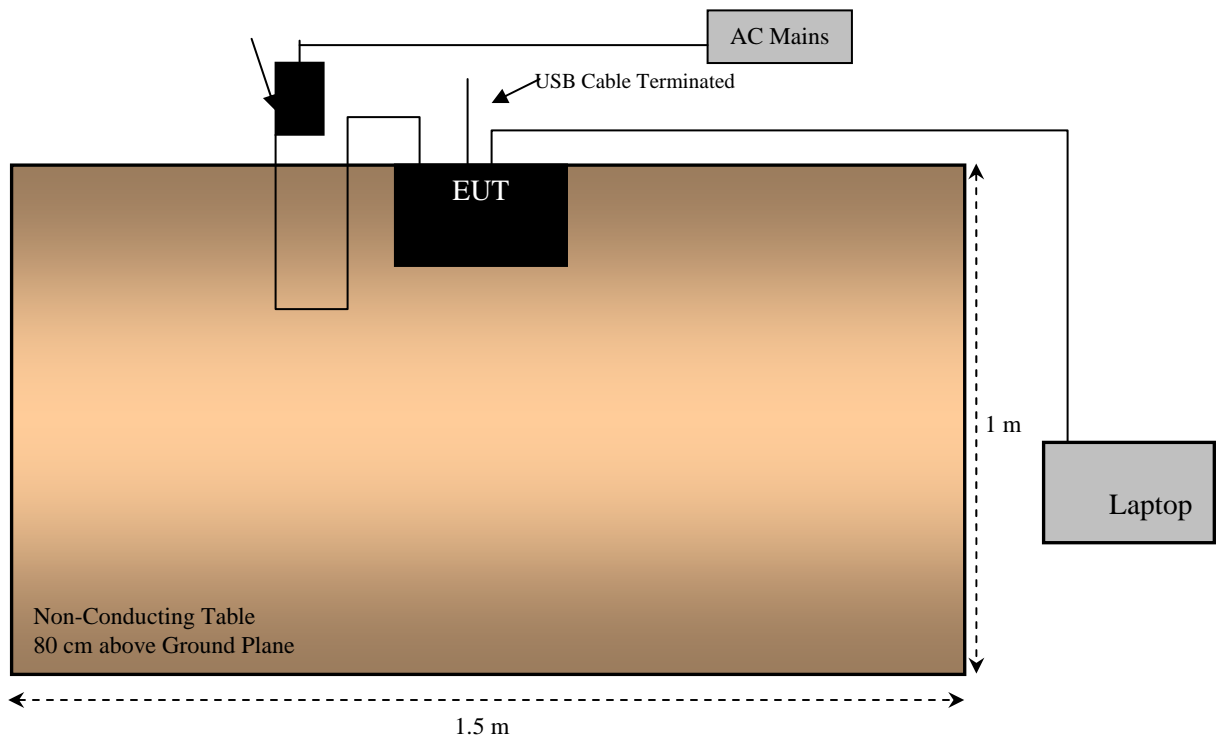
## 6.2 EUT Setup

The radiated emissions tests were performed using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15E limits.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

## 6.3 Test Setup Block Diagram



## 6.4 Test Procedure

For the radiated emissions test, the EUT host, and all support equipment power cords was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

The spectrum analyzer or receiver is set as:

Below 1000 MHz:

RBW = 100 kHz / VBW = 300 kHz / Sweep = Auto

Above 1000 MHz:

(1) Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto

(2) Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

## 6.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude (CA) is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) to indicated Amplitude (Ai) reading. The basic equation is as follows:

$$CA = Ai + AF + CL + Atten - Ga$$

For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 dB)

The “**Margin**” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corrected Amplitude} - \text{Limit}$$

## 6.6 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2011-03-21
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10
Sunol Science Corp	System Controller	SC99V	122303-1	N/R
Sunol Science Corp	Combination Antenna	JB3	A0020106-3	2011-06-29
A.R.A Inc	Horn antenna	DRG-1181A	1132	2011-11-29
Hewlett Packard	Pre-amplifier	8447D	2944A06639	2011-06-09
Mini-Circuits	Pre-amplifier	ZVA-183-S	570400946	2011-05-09

**Statement of Traceability:** BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

## 6.7 Test Environmental Conditions

<b>Temperature:</b>	18~21 °C
<b>Relative Humidity:</b>	30~35 %
<b>ATM Pressure:</b>	101.2-102.2kPa

*The testing was performed by Ning Ma from 2012-01-28 to 2012-01-29 in 5 meter chamber 2.*

## 6.8 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Part 15.407, 15.205, 15.209 and IC RSS-210, RSS-Gen standard's radiated emissions limits, and had the worst margin of:

### 30-1000 MHz:

Mode: Transmitting			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Channel, Range
-2.66	40.90025	Vertical	30 MHz - 1 GHz

### Above 1 GHz:

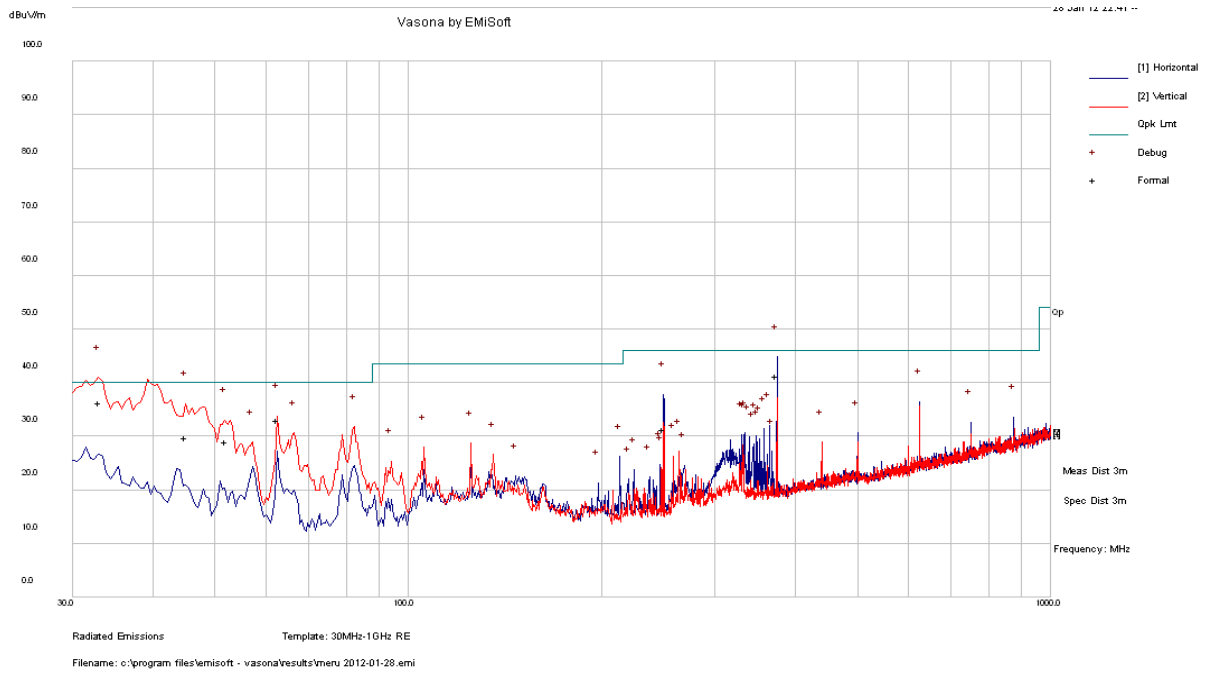
Mode: Transmitting			
Margin (dB)	Frequency (MHz)	Polarization (Horizontal/Vertical)	Channel, Range
-1.43	10400	Horizontal	Above 1 GHz

*Please refer to the following table and plots for specific test result details*

## 6.9 Radiated Emissions Test Result Data

### (1) Radiated Emission at 3 meters, 30 MHz – 1 GHz

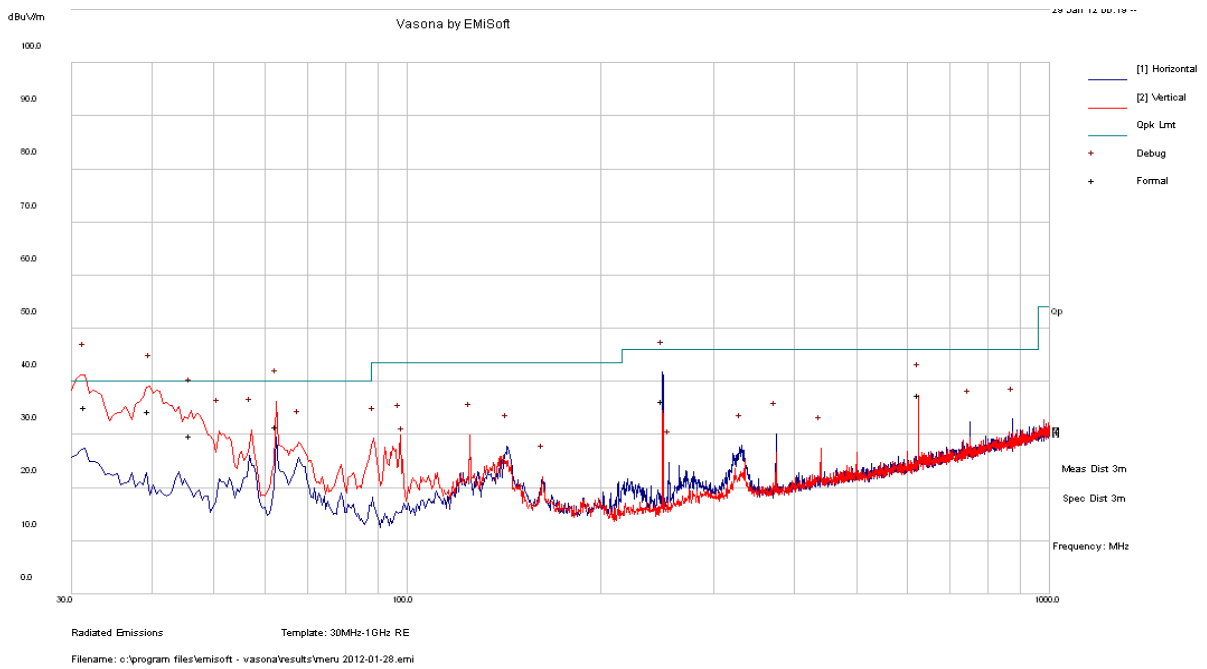
#### 5.2 GHz Band, 4 dBi Antenna @ ACC-ANT-12ABGN-0304-O – Worst mode 802.11a Middle Channel



#### Quasi - Peak Measurements

Frequency (MHz)	Corrected Amplitude (dB $\mu$ V/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dB $\mu$ V/m)	Margin (dB)
33.045	36.3	99	V	122	40	-3.70
375.0188	41.25	202	H	360	46	-4.75
62.47525	33.01	105	V	197	40	-6.99
44.96525	29.7	100	V	146	40	-10.30
51.98925	29.01	126	V	23	40	-10.99
250.012	31.32	100	V	208	46	-14.68

**5.2 GHz Band, 7 dBi Antenna @ ACC-ANT-O4ABGN-0607-PT – Worst mode 802.11a Middle Channel**

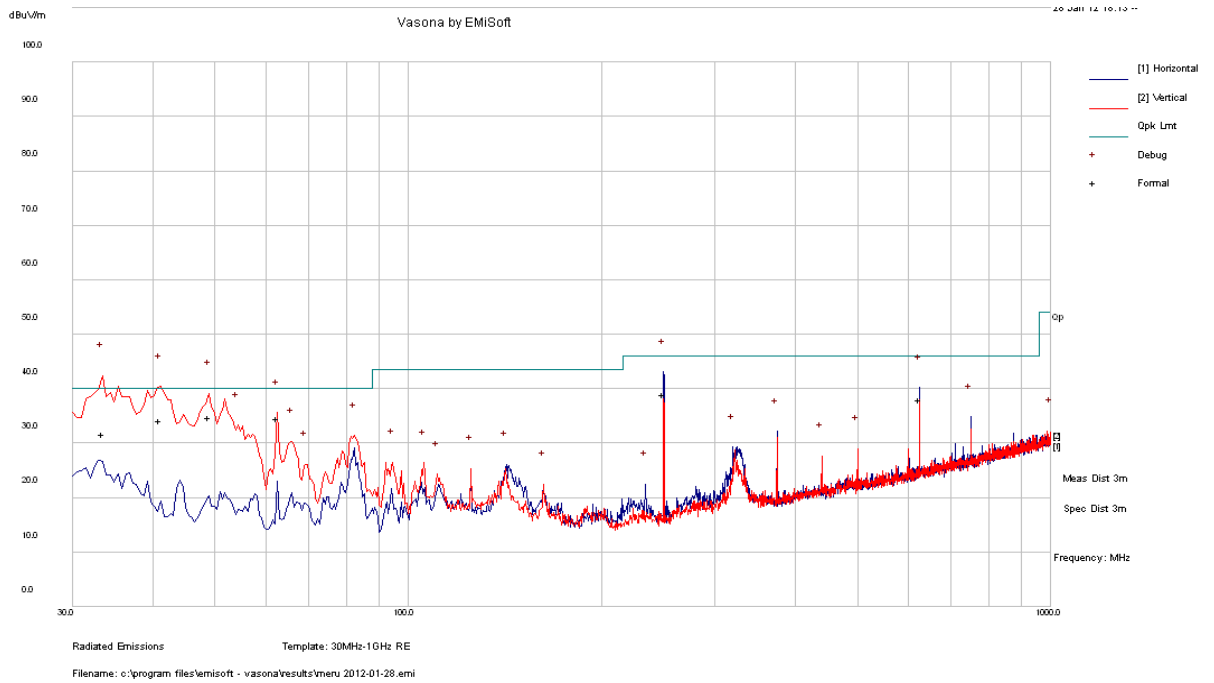


**Quasi - Peak Measurements**

Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBμV/m)	Margin (dB)
31.48025	35.14	173	V	101	40	-4.86
39.667	34.32	119	V	33	40	-5.68
624.9835	37.52	100	V	131	46	-8.48
62.5515	31.47	191	H	128	40	-8.53
250.005	36.36	116	H	33	46	-9.64
45.9075	29.83	132	V	14	40	-10.17



**5.2 GHz Band, 2 dBi Antenna @ACC-ANT-ABGN230-W – Worst mode 802.11a Middle Channel**

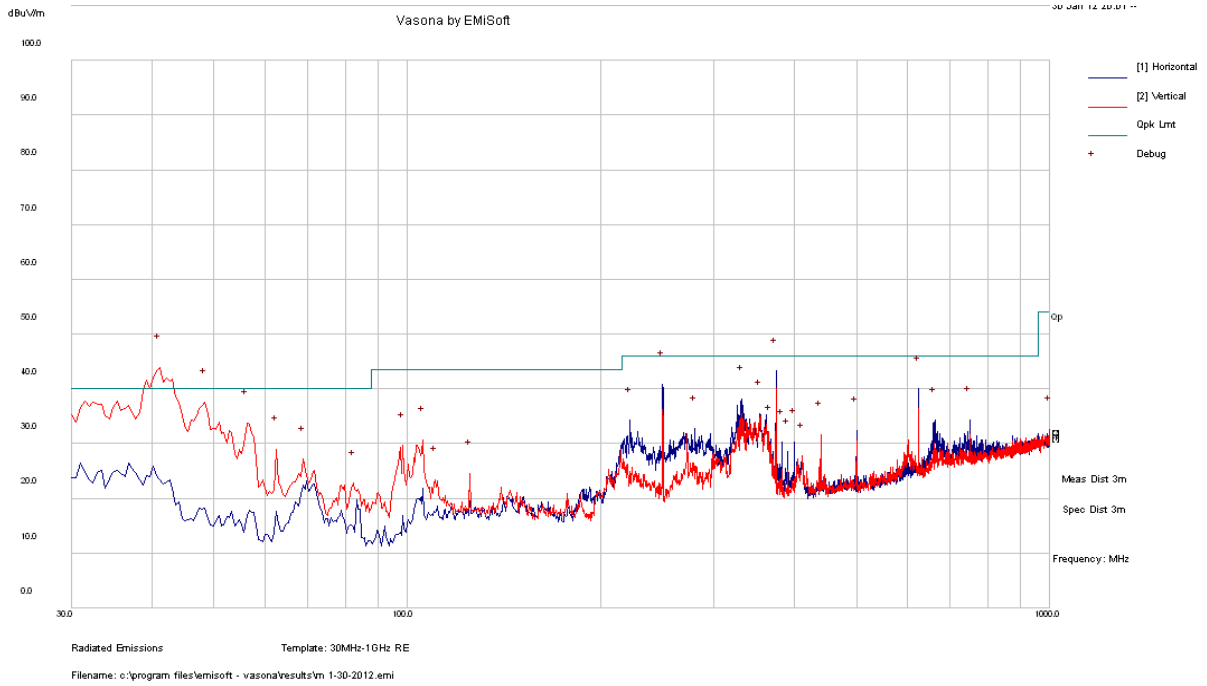


Quasi - Peak Measurements

Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBμV/m)	Margin (dB)
48.94125	34.85	99	V	78	40	-5.15
62.503	34.57	104	V	171	40	-5.43
41.07875	34.11	99	V	97	40	-5.89
250.0083	39.02	115	H	220	46	-6.98
625.0135	38.07	99	V	256	46	-7.93
33.503	31.76	231	V	155	40	-8.24

**Co-location**

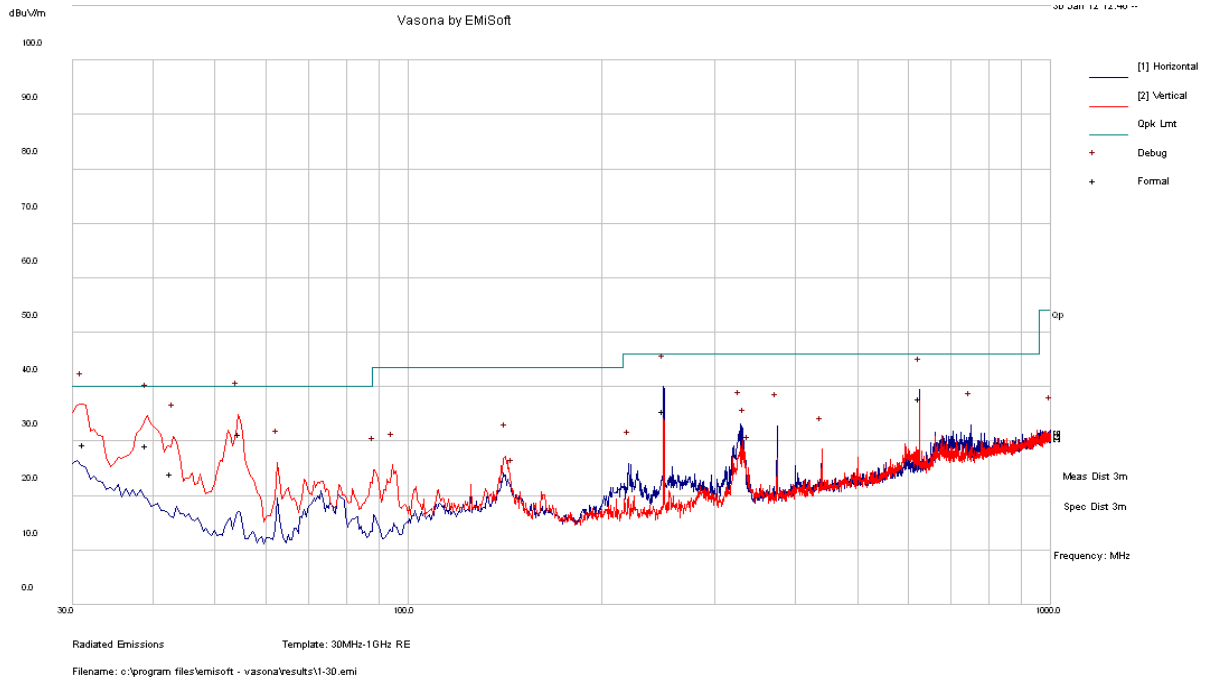
**Antenna @ ACC-ANT-ABGN230-W & ACC-ANT-12ABGN-0304-O**



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
40.90025	37.34	121	V	233	40	-2.66
374.835	43.29	100	H	339	46	-4.41
48.43	37.66	100	V	31	40	-4.82
249.705	40.84	100	H	63	46	-8.87
56.19	33.74	100	V	70	40	-9.42
625.095	39.99	100	H	177	46	-9.88

**Co-location**

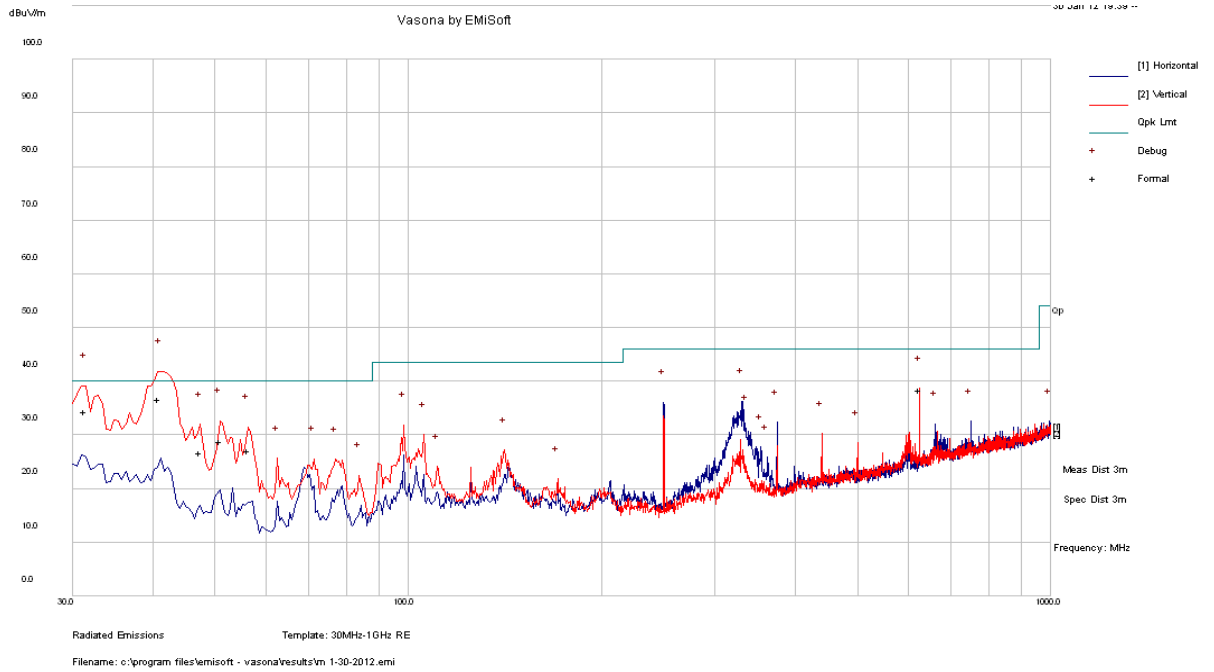
**Antenna @ ACC-ANT-ABGN230-W & ACC-ANT-O4ABGN-0607-PT**



Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBμV/m)	Margin (dB)
624.9918	37.82	109	V	319	46	-8.18
54.5125	31.28	109	V	98	40	-8.72
250.0115	35.47	115	H	219	46	-10.53
31.24475	29.42	202	V	41	40	-10.58
39.21475	29.25	106	V	294	40	-10.75
42.8115	24.14	100	V	52	40	-15.86

**Co-location**

**Antenna @ ACC-ANT-04ABGN-0607-PT & ACC-ANT-12ABGN-0304-O**



Frequency (MHz)	Corrected Amplitude (dBμV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBμV/m)	Margin (dB)
40.9765	36.77	99	V	129	40	-3.23
31.43425	34.36	118	V	81	40	-5.64
625.0118	38.38	99	V	126	46	-7.62
51.022	28.76	185	V	62	40	-11.24
56.45325	27.12	127	V	354	40	-12.88
47.48325	26.77	101	V	299	40	-13.23

**(2) Radiated Emission at 3 meters, above 1 GHz****5.2 GHz Band, 4 dBi Antenna @ACC-ANT-12ABGN-0304-O****802.11a Mode**

Low Channel 5180 MHz, measured at 3 meters

Frequency (MHz)	S.A. Reading (dB $\mu$ V)	Test Antenna		Cord. Reading (dB $\mu$ V/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dB $\mu$ V/m)	Margin (dB)	
10360	38.32	H	27.81	66.13	74	-7.87	Peak
10360	22.29	H	27.81	50.10	54	-3.90	Average
10360	37.43	V	27.81	65.24	74	-8.76	Peak
10360	21.36	V	27.81	49.17	54	-4.83	Average
5148	29.87	H	29.03	58.90	74	-15.10	Peak
5148	20.25	H	29.03	49.28	54	-4.72	Average
5148	30.03	V	29.03	59.06	74	-14.94	Peak
5148	19.24	V	29.03	48.27	54	-5.73	Average

Middle Channel 5200 MHz measured at 3 meters

Frequency (MHz)	S.A. Reading (dB $\mu$ V)	Test Antenna		Cord. Reading (dB $\mu$ V/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dB $\mu$ V/m)	Margin (dB)	
10400	36.57	H	28.45	65.02	74	-8.98	Peak
10400	21.86	H	28.45	50.31	54	-3.69	Average
10400	37.25	V	28.45	65.70	74	-8.30	Peak
10400	22.05	V	28.45	50.50	54	-3.50	Average

High Channel 5240 MHz measured at 3 meters

Frequency (MHz)	S.A. Reading (dB $\mu$ V)	Test Antenna		Cord. Reading (dB $\mu$ V/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dB $\mu$ V/m)	Margin (dB)	
10480	37.19	H	28.82	66.01	74	-7.99	Peak
10480	21.34	H	28.82	50.16	54	-3.84	Average
10480	38.05	V	28.82	66.87	74	-7.13	Peak
10480	22.63	V	28.82	51.45	54	-2.55	Average
5354	27.65	H	29.18	56.83	74	-17.17	Peak
5354	21.22	H	29.18	50.40	54	-3.60	Average
5354	28.69	V	29.18	57.87	74	-16.13	Peak
5354	19.36	V	29.18	48.54	54	-5.46	Average

**802.11 n20 Mode**

Low Channel 5180 MHz, measured at 3 meters

Frequency (MHz)	S.A. Reading (dBµV)	Test Antenna		Cord. Reading (dBµV/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dBµV/m)	Margin (dB)	
10360	37.02	H	27.48	64.50	74	-9.50	Peak
10360	23.02	H	27.48	50.50	54	-3.50	Average
10360	37.86	V	27.48	65.34	74	-8.66	Peak
10360	22.63	V	27.48	50.11	54	-3.89	Average
5146	29.62	H	29.03	58.65	74	-15.35	Peak
5146	20.66	H	29.03	49.69	54	-4.31	Average
5146	38.76	V	29.03	67.79	74	-6.21	Peak
5146	22.03	V	29.03	51.06	54	-2.94	Average

Middle Channel 5200 MHz measured at 3 meters

Frequency (MHz)	S.A. Reading (dBµV)	Test Antenna		Cord. Reading (dBµV/m)	FCC/IC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dBµV/m)	Margin (dB)	
10440	36.36	H	28.45	64.81	74	-9.19	Peak
10440	22.36	H	28.45	50.81	54	-3.19	Average
10440	34.86	V	28.45	63.31	74	-10.69	Peak
10440	21.99	V	28.45	50.44	54	-3.56	Average

High Channel 5240 MHz measured at 3 meters

Frequency (MHz)	S.A. Reading (dBµV)	Test Antenna		Cord. Reading (dBµV/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dBµV/m)	Margin (dB)	
10480	37.64	H	28.82	66.46	74	-7.54	Peak
10480	22.01	H	28.82	50.83	54	-3.17	Average
10480	36.84	V	28.82	65.66	74	-8.34	Peak
10480	21.68	V	28.82	50.50	54	-3.50	Average
5354	28.16	H	29.18	57.34	74	-16.66	Peak
5354	21.65	H	29.18	50.83	54	-3.17	Average
5354	28.61	V	29.18	57.79	74	-16.21	Peak
5354	21.35	V	29.18	50.53	54	-3.47	Average

**802.11 n40 Mode**

Low Channel 5190 MHz, measured at 3 meters

Frequency (MHz)	S.A. Reading (dB $\mu$ V)	Test Antenna		Cord. Reading (dB $\mu$ V/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dB $\mu$ V/m)	Margin (dB)	
10380	38.12	H	27.48	65.60	74	-8.40	Peak
10380	23.05	H	27.48	50.53	54	-3.47	Average
10380	37.41	V	27.48	64.89	74	-9.11	Peak
10380	23.33	V	27.48	50.81	54	-3.19	Average
5150	28.72	H	29.03	57.75	74	-16.25	Peak
5150	20.34	H	29.03	49.37	54	-4.70	Average
5150	29.25	V	29.03	58.28	74	-15.72	Peak
5150	21.33	V	29.03	50.36	54	-3.64	Average

High Channel 5230 MHz measured at 3 meters

Frequency (MHz)	S.A. Reading (dB $\mu$ V)	Test Antenna		Cord. Reading (dB $\mu$ V/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dB $\mu$ V/m)	Margin (dB)	
10460	36.56	H	29	65.56	74	-8.44	Peak
10460	21.45	H	29	50.45	54	-3.55	Average
10460	36.23	V	29	65.23	74	-8.77	Peak
10460	21.86	V	29	50.86	54	-3.14	Average
5250	29.02	H	29.18	58.20	74	-15.80	Peak
5250	20.33	H	29.18	49.51	54	-4.49	Average
5250	29.87	V	29.18	59.05	74	-14.95	Peak
5250	20.01	V	29.18	49.19	54	-4.81	Average

**5.2 GHz Band, 7 dBi Antenna @ACC-ANT-O4ABGN-0607-PT****802.11a Mode**

Low Channel 5180 MHz, measured at 3 meters

Frequency (MHz)	S.A. Reading (dB $\mu$ V)	Test Antenna		Cord. Reading (dB $\mu$ V/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dB $\mu$ V/m)	Margin (dB)	
10360	37.30	H	27.81	65.11	74	-8.89	Peak
10360	23.29	H	27.81	51.10	54	-3.90	Average
10360	36.43	V	27.81	64.24	74	-9.76	Peak
10360	22.67	V	27.81	50.48	54	-3.52	Average
5148	30.28	H	29.03	59.31	74	-14.69	Peak
5148	21.25	H	29.03	50.28	54	-3.72	Average
5148	33.00	V	29.03	62.03	74	-11.97	Peak
5148	12.84	V	29.03	41.87	54	-12.13	Average

Middle Channel 5200 MHz measured at 3 meters

Frequency (MHz)	S.A. Reading (dB $\mu$ V)	Test Antenna		Cord. Reading (dB $\mu$ V/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dB $\mu$ V/m)	Margin (dB)	
10400	36.92	H	28.45	65.37	74	-8.63	Peak
10400	22.01	H	28.45	50.46	54	-3.54	Average
10400	37.17	V	28.45	65.62	74	-8.38	Peak
10400	20.36	V	28.45	48.81	54	-5.19	Average

High Channel 5240 MHz measured at 3 meters

Frequency (MHz)	S.A. Reading (dB $\mu$ V)	Test Antenna		Cord. Reading (dB $\mu$ V/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dB $\mu$ V/m)	Margin (dB)	
10480	37.19	H	28.82	66.01	74	-7.99	Peak
10480	22.43	H	28.82	51.25	54	-2.75	Average
10480	37.58	V	28.82	66.40	74	-7.60	Peak
10480	22.84	V	28.82	51.66	54	-2.34	Average
5354	30.82	H	29.18	60.00	74	-14.00	Peak
5354	21.55	H	29.18	50.73	54	-3.27	Average
5354	32.56	V	29.18	61.74	74	-12.26	Peak
5354	21.33	V	29.18	50.51	54	-3.49	Average



**802.11 n20 Mode**

Low Channel 5180 MHz, measured at 3 meters

Frequency (MHz)	S.A. Reading (dBµV)	Test Antenna		Cord. Reading (dBµV/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dBµV/m)	Margin (dB)	
10360	37.12	H	27.48	64.60	74	-9.40	Peak
10360	23.24	H	27.48	50.72	54	-3.28	Average
10360	37.70	V	27.48	65.18	74	-8.82	Peak
10360	23.65	V	27.48	51.13	54	-2.87	Average
5146	30.18	H	29.03	59.21	74	-14.79	Peak
5146	21.97	H	29.03	51.00	54	-3.00	Average
5146	30.88	V	29.03	59.91	74	-14.09	Peak
5146	21.65	V	29.03	50.68	54	-3.32	Average

Middle Channel 5200 MHz measured at 3 meters

Frequency (MHz)	S.A. Reading (dBµV)	Test Antenna		Cord. Reading (dBµV/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dBµV/m)	Margin (dB)	
10400	35.78	H	28.45	64.23	74	-9.77	Peak
10400	22.31	H	28.45	50.76	54	-3.24	Average
10400	35.88	V	28.45	64.33	74	-9.67	Peak
10400	22.87	V	28.45	51.32	54	-2.68	Average

High Channel 5240 MHz measured at 3 meters

Frequency (MHz)	S.A. Reading (dBµV)	Test Antenna		Cord. Reading (dBµV/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dBµV/m)	Margin (dB)	
10480	36.65	H	28.82	65.47	74	-8.53	Peak
10480	22.04	H	28.82	50.86	54	-3.14	Average
10480	36.51	V	28.82	65.33	74	-8.67	Peak
10480	22.21	V	28.82	51.03	54	-2.97	Average
5354	29.27	H	29.18	58.45	74	-15.55	Peak
5354	22.68	H	29.18	51.86	54	-2.14	Average
5354	30.60	V	29.18	59.78	74	-14.22	Peak
5354	21.77	V	29.18	50.95	54	-3.05	Average

**802.11 n40 Mode**

Low Channel 5190 MHz, measured at 3 meters

Frequency (MHz)	S.A. Reading (dB $\mu$ V)	Test Antenna		Cord. Reading (dB $\mu$ V/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dB $\mu$ V/m)	Margin (dB)	
10380	37.19	H	27.48	64.67	74	-9.33	Peak
10380	23.59	H	27.48	51.07	54	-2.93	Average
10380	37.41	V	27.48	64.89	74	-9.11	Peak
10380	23.68	V	27.48	51.16	54	-2.84	Average
5150	30.83	H	29.03	59.86	74	-14.14	Peak
5150	20.96	H	29.03	49.99	54	-4.01	Average
5150	29.66	V	29.03	58.69	74	-15.31	Peak
5150	21.34	V	29.03	50.37	54	-3.63	Average

High Channel 5230 MHz measured at 3 meters

Frequency (MHz)	S.A. Reading (dB $\mu$ V)	Test Antenna		Cord. Reading (dB $\mu$ V/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dB $\mu$ V/m)	Margin (dB)	
10460	36.16	H	29	65.16	74	-8.84	Peak
10460	22.10	H	29	51.10	54	-2.90	Average
10460	36.23	V	29	65.23	74	-8.77	Peak
10460	22.21	V	29	51.21	54	-2.79	Average
5250	29.27	H	29.18	58.45	74	-15.55	Peak
5250	21.22	H	29.18	50.40	54	-3.60	Average
5250	30.32	V	29.18	59.50	74	-14.50	Peak
5250	19.87	V	29.18	49.05	54	-4.95	Average

**5.2 GHz Band, 2 dBi Antenna @ ACC-ANT-ABGN230-W****802.11a Mode**

Low Channel 5180 MHz, measured at 3 meters

Frequency (MHz)	S.A. Reading (dBµV)	Test Antenna		Cord. Reading (dBµV/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dBµV/m)	Margin (dB)	
10360	37.30	H	27.81	65.11	74	-8.89	Peak
10360	23.29	H	27.81	51.10	54	-2.90	Average
10360	36.43	V	27.81	64.24	74	-9.76	Peak
10360	22.67	V	27.81	50.48	54	-3.52	Average
5148	30.28	H	29.03	59.31	74	-14.69	Peak
5148	21.25	H	29.03	50.28	54	-3.72	Average
5148	33.00	V	29.03	62.03	74	-11.97	Peak
5148	12.84	V	29.03	41.87	54	-12.13	Average

Middle Channel 5200 MHz measured at 3 meters

Frequency (MHz)	S.A. Reading (dBµV)	Test Antenna		Cord. Reading (dBµV/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dBµV/m)	Margin (dB)	
10400	36.92	H	28.45	65.37	74	-8.63	Peak
10400	22.01	H	28.45	50.46	54	-3.54	Average
10400	37.17	V	28.45	65.62	74	-8.38	Peak
10400	20.36	V	28.45	48.81	54	-5.19	Average

High Channel 5240 MHz measured at 3 meters

Frequency (MHz)	S.A. Reading (dBµV)	Test Antenna		Cord. Reading (dBµV/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dBµV/m)	Margin (dB)	
10480	37.19	H	28.82	66.01	74	-7.99	Peak
10480	22.43	H	28.82	51.25	54	-2.75	Average
10480	37.58	V	28.82	66.40	74	-7.60	Peak
10480	22.84	V	28.82	51.66	54	-2.34	Average
5354	30.82	H	29.18	60.00	74	-14.00	Peak
5354	21.55	H	29.18	50.73	54	-3.27	Average
5354	32.56	V	29.18	61.74	74	-12.26	Peak
5354	13.33	V	29.18	42.51	54	-11.49	Average

**802.11 n20 Mode**

Low Channel 5180 MHz, measured at 3 meters

Frequency (MHz)	S.A. Reading (dB $\mu$ V)	Test Antenna		Cord. Reading (dB $\mu$ V/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dB $\mu$ V/m)	Margin (dB)	
10360	37.12	H	27.48	64.60	74	-9.40	Peak
10360	23.24	H	27.48	50.72	54	-3.28	Average
10360	37.70	V	27.48	65.18	74	-8.82	Peak
10360	23.65	V	27.48	51.13	54	-2.87	Average
5146	30.18	H	29.03	59.21	74	-14.79	Peak
5146	21.97	H	29.03	51.00	54	-3.00	Average
5146	29.88	V	29.03	58.91	74	-15.09	Peak
5146	21.65	V	29.03	50.68	54	-3.32	Average

Middle Channel 5200 MHz measured at 3 meters

Frequency (MHz)	S.A. Reading (dB $\mu$ V)	Test Antenna		Cord. Reading (dB $\mu$ V/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dB $\mu$ V/m)	Margin (dB)	
10400	35.78	H	28.45	64.23	74	-9.77	Peak
10400	22.31	H	28.45	50.76	54	-3.24	Average
10400	35.88	V	28.45	64.33	74	-9.67	Peak
10400	22.87	V	28.45	51.32	54	-2.68	Average

High Channel 5240 MHz measured at 3 meters

Frequency (MHz)	S.A. Reading (dB $\mu$ V)	Test Antenna		Cord. Reading (dB $\mu$ V/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dB $\mu$ V/m)	Margin (dB)	
10480	36.65	H	28.82	65.47	74	-8.53	Peak
10480	22.04	H	28.82	50.86	54	-3.14	Average
10480	36.51	V	28.82	65.33	74	-8.67	Peak
10480	22.21	V	28.82	51.03	54	-2.70	Average
5354	31.27	H	29.18	60.45	74	-13.55	Peak
5354	22.68	H	29.18	51.86	54	-2.14	Average
5354	30.60	V	29.18	59.78	74	-14.22	Peak
5354	21.77	V	29.18	50.95	54	-3.05	Average

**802.11 n40 Mode**

Low Channel 5190 MHz, measured at 3 meters

Frequency (MHz)	S.A. Reading (dBµV)	Test Antenna		Cord. Reading (dBµV/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dBµV/m)	Margin (dB)	
10380	37.19	H	27.48	64.67	74	-9.33	Peak
10380	23.59	H	27.48	51.07	54	-2.93	Average
10380	37.41	V	27.48	64.89	74	-9.11	Peak
10380	23.68	V	27.48	51.16	54	-2.84	Average
5150	30.83	H	29.03	59.86	74	-14.14	Peak
5150	20.96	H	29.03	49.99	54	-4.01	Average
5150	29.66	V	29.03	58.69	74	-15.31	Peak
5150	21.34	V	29.03	50.37	54	-3.63	Average

High Channel 5230 MHz measured at 3 meters

Frequency (MHz)	S.A. Reading (dBµV)	Test Antenna		Cord. Reading (dBµV/m)	FCC		Comments
		Polarity (H/V)	Factor (dB/m)		Limit (dBµV/m)	Margin (dB)	
10460	36.16	H	29	65.16	74	-8.84	Peak
10460	22.10	H	29	51.10	54	-2.90	Average
10460	36.23	V	29	65.23	74	-8.77	Peak
10460	22.21	V	29	51.21	54	-2.79	Average
5350	31.27	H	29.18	60.45	74	-13.55	Peak
5350	21.22	H	29.18	50.40	54	-3.60	Average
5350	30.32	V	29.18	59.50	74	-14.50	Peak
5350	19.87	V	29.18	49.05	54	-4.95	Average