



**FCC CFR47 PART 15 SUBPART E  
INDUSTRY CANADA RSS-210 ISSUE 7**

**CERTIFICATION TEST REPORT\***

**FOR**

**802.11A/B/G/N MINI-PCI MODULE**

**MODEL NUMBER: 62009015**

**FCC ID: UDX-62009015  
IC: 6961A-62009015**

**REPORT NUMBER: 09U12366-2**

**ISSUE DATE: MARCH 04, 2009**

*Prepared for*  
**MERAKI INCORPORATED  
99 RHODE ISLAND. 2<sup>ND</sup> FLOOR  
SANTA FRANCISCO, CA 94103, U.S.A**

*Prepared by*  
**COMPLIANCE CERTIFICATION SERVICES  
47173 BENICIA STREET  
FREMONT, CA 94538, U.S.A.  
TEL: (510) 771-1000  
FAX: (510) 661-0888**

***\* This report only covers partial (Radiated) testing; the rest of the testing is contained in a separate report, number 093S015-RF-US-P09V01.***

***This report has conditional passing results for a specific antenna, see section 5.2 for details.***

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	03/04/09	Initial Issue	F. Ibrahim

## TABLE OF CONTENTS

<b>1. ATTESTATION OF TEST RESULTS</b> .....	<b>4</b>
<b>2. TEST METHODOLOGY</b> .....	<b>5</b>
<b>3. FACILITIES AND ACCREDITATION</b> .....	<b>5</b>
<b>4. CALIBRATION AND UNCERTAINTY</b> .....	<b>5</b>
4.1. <i>MEASURING INSTRUMENT CALIBRATION</i> .....	5
4.2. <i>MEASUREMENT UNCERTAINTY</i> .....	5
<b>5. EQUIPMENT UNDER TEST</b> .....	<b>6</b>
5.1. <i>DESCRIPTION OF EUT</i> .....	6
5.2. <i>DESCRIPTION OF ANTENNAS</i> .....	6
5.3. <i>SOFTWARE AND FIRMWARE</i> .....	7
5.4. <i>WORST-CASE CONFIGURATION AND MODE</i> .....	7
5.5. <i>DESCRIPTION OF TEST SETUP</i> .....	7
<b>6. TEST AND MEASUREMENT EQUIPMENT</b> .....	<b>9</b>
<b>7. RADIATED TEST RESULTS</b> .....	<b>10</b>
7.1. <i>LIMITS AND PROCEDURE</i> .....	10
7.2. <i>DUAL BAND OMNI-DIRECTIONAL ANTENNA</i> .....	11
7.2.1. TX ABOVE 1 GHz FOR 802.11a MODE IN THE LOWER 5.2 GHz BAND.....	11
7.2.2. TX BELOW 1 GHz FOR 802.11a MODE IN THE LOWER 5.2 GHz BAND .....	20
7.3. <i>MONOPOLE OMNI LOW GAIN ANTENNA</i> .....	22
7.3.1. TX ABOVE 1 GHz FOR 802.11a MODE IN THE LOWER 5.2 GHz BAND.....	22
7.3.2. TX BELOW 1 GHz FOR 802.11a MODE IN THE LOWER 5.2 GHz BAND .....	31
7.4. <i>DUAL PATCH DIRECTIONAL ANTENNA</i> .....	33
7.4.1. TX ABOVE 1 GHz FOR 802.11a MODE IN THE LOWER 5.2 GHz BAND.....	33
7.4.2. TX BELOW 1 GHz FOR 802.11a MODE IN THE LOWER 5.2 GHz BAND .....	42
7.5. <i>FLAT PANEL ANTENNA</i> .....	44
7.5.1. TX ABOVE 1 GHz FOR 802.11a MODE IN THE LOWER 5.2 GHz BAND.....	44
7.5.2. TX BELOW 1 GHz FOR 802.11a MODE IN THE LOWER 5.2 GHz BAND .....	52
<b>8. SETUP PHOTOS</b> .....	<b>54</b>

# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** MERAKI, INC.  
99 RHODE ISLAND ST.  
SAN FRANCISCO, CA 94103

**EUT DESCRIPTION:** 802.11A/B/G/N MINI-PCI MODULE

**MODEL NUMBER:** 62009015  
**FCC MODULE ID:** UDX-62009015  
**IC MODULE ID:** 6961A-62009015

**SERIAL NUMBER:** Q2AH-4HP3-7FTA

**DATE TESTED:** JANUARY 27 - FEBRUARY 03, 2009

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart E	PASS (see section 5.2)
INDUSTRY CANADA RSS-210 Issue 7 Annex 9	PASS (see section 5.2)
INDUSTRY CANADA RSS-GEN Issue 2	PASS (see section 5.2)

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:



FRANK IBRAHIM  
EMC SUPERVISOR  
COMPLIANCE CERTIFICATION SERVICES

Tested By:



THANH NGUYEN  
EMC ENGINEER  
COMPLIANCE CERTIFICATION SERVICES

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 2, and RSS-210 Issue 7.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Power Line Conducted Emission	+/- 2.3 dB
Radiated Emission	+/- 3.4 dB

Uncertainty figures are valid to a confidence level of 95%.

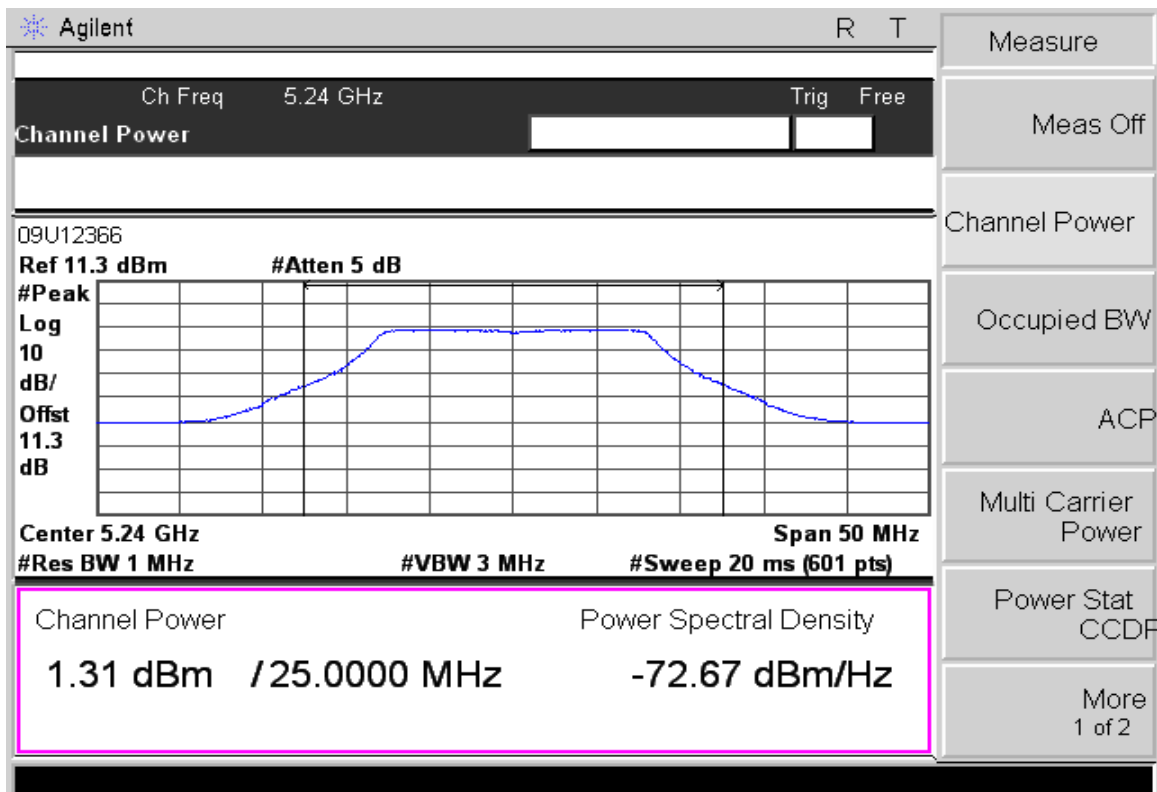
## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is an 802.11A/B/G/N MINI-PCI MODULE, FCC Module ID: UDX-62009015 IC Module ID: 6861A-62009015.

### 5.2. DESCRIPTION OF ANTENNAS

- 1) Dual-Band Omni-Directional Antenna for 5GHz, Manufacturer: Grand-Tek Technology, 5 dBi gain.
- 2) Monopole Omni Low Gain antenna for 5GHz, Manufacturer: Grand-Tek Technology, Model: R-0A-58-04-11, 4dBi gain.
- 3) Dual Patch Directional antenna for 5GHz. Manufacturer: Grand-Tek Technology, Model 50-SE-001, 14.5dBi gain.
- 4) Flat Panel Antenna for 5 GHz, Manuf. Mti Wireless Edge, Model:MT-485025/NVH 23 dBi gain.  
**(Do not use low Channel 5180 MHz for this antenna)**



This is the output power with the 23 dBi antenna for high channel, power was reduced to pass BE. The other Power Levels are mentioned in the Separate Report no: 093S015-RF-US-P09V01.

**5.3. SOFTWARE AND FIRMWARE**

The test utility and driver software used during testing was ART Revision 0.7 Build #30 Art\_11n.

**5.4. WORST-CASE CONFIGURATION AND MODE**

802.11a mode on chain 100 was selected as worst-case, data rate is 6 Mbps.

**5.5. DESCRIPTION OF TEST SETUP**

**SUPPORT EQUIPMENT**

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Dell	Latitude D620	C01091	DoC
AC Adapter	Dell	LA65NS0-00	CN-ODF263-71615-72M2925	DoC

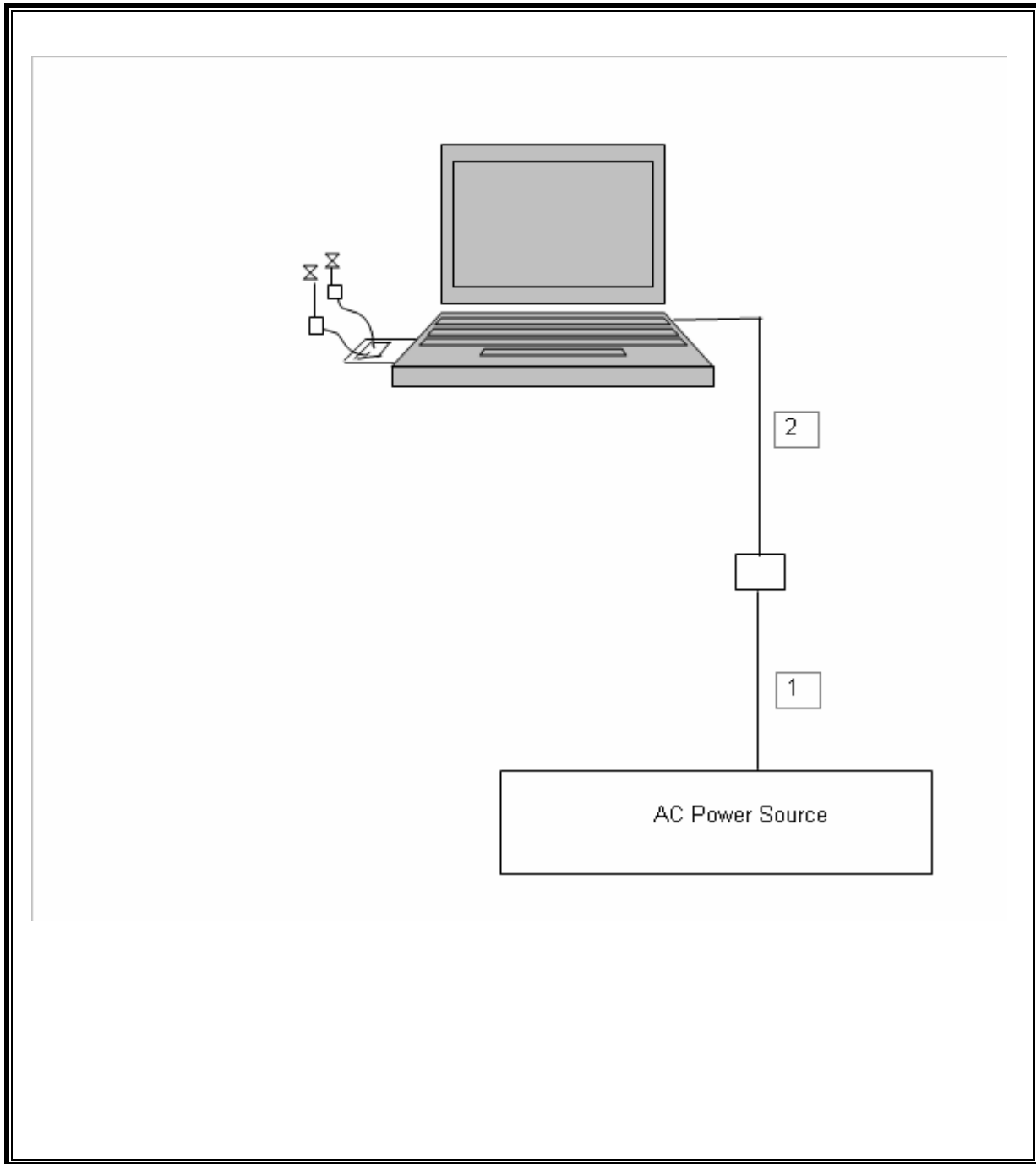
**I/O CABLES**

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	US 115V	Un-shielded	1m	NA
2	DC	1	DC	Un-shielded	2m	NA

**TEST SETUP**

The EUT is installed in an extender card plug in to the host laptop computer during the tests. Test software exercised the radio card.

**SETUP DIAGRAM FOR TESTS**





## 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	Asset	Cal Date	Cal Due
Antenna, Horn, 18 GHz	EMCO	3115	C00945	04/22/08	04/22/09
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	08/05/08	08/05/09
HP Power meter	Agilent / HP	E4416A	C00963	12/04/07	12/04/09
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/07/07	12/07/09
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	10/11/07	10/11/09
Antenna, Horn, 26.5 GHz	ARA	SWH-28	C01015	09/29/07	11/29/09
Spectrum Analyzer, 40 GHz	Agilent / HP	8564E	C00951	12/12/08	06/12/10
EMI Receiver, 2.9 GHz	Agilent / HP	8542E	C00957	06/19/08	09/19/09
RF Filter Section, 2.9 GHz	Agilent / HP	85420E	C00958	06/19/08	09/19/09
Antenna, Bilog, 2 GHz	Sundt Sciences	JB1	C01011	01/14/09	01/14/10
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	02/06/08	08/06/09
Antenna, Horn, 18 GHz	EMCO	3115	C00945	04/22/08	04/22/09
Reject Filter, 5.15-5.35 GHz	Micro-Tronics	BRC13190	N02679	CNR	CNR
Antenna, Horn, 18 GHz	EMCO	3115	C00945	04/22/08	04/22/09

## 7. RADIATED TEST RESULTS

### 7.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

#### TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

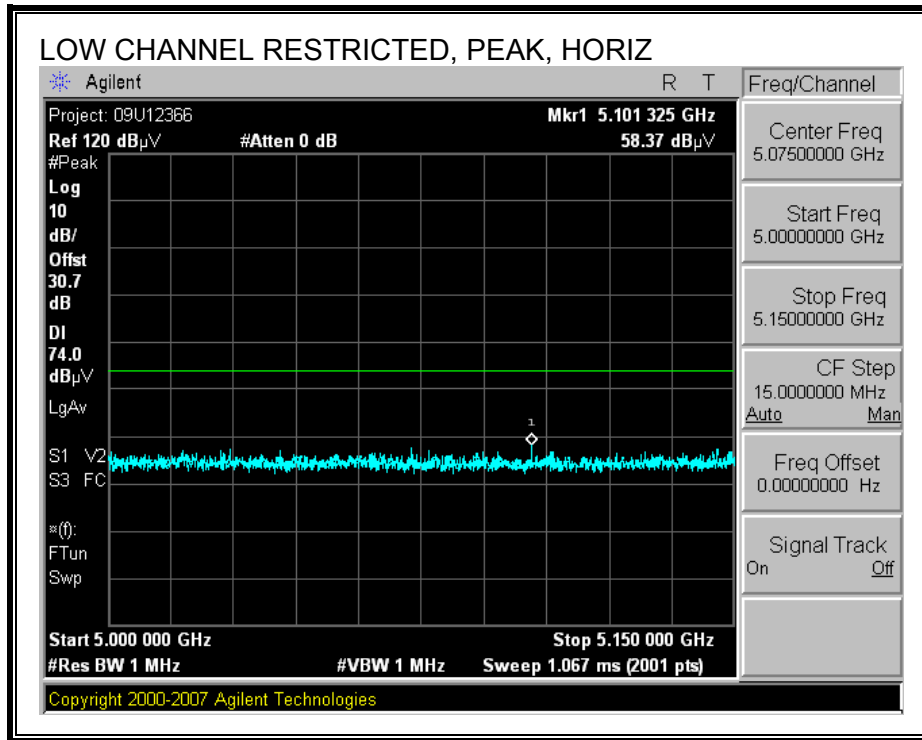
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

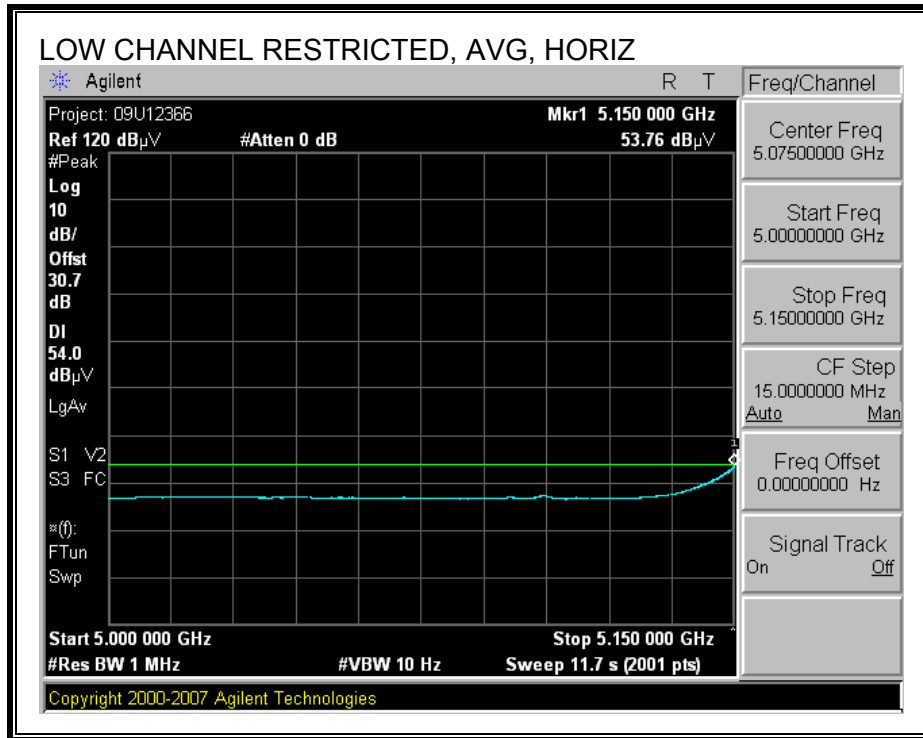
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

## 7.2. DUAL BAND OMNI-DIRECTIONAL ANTENNA

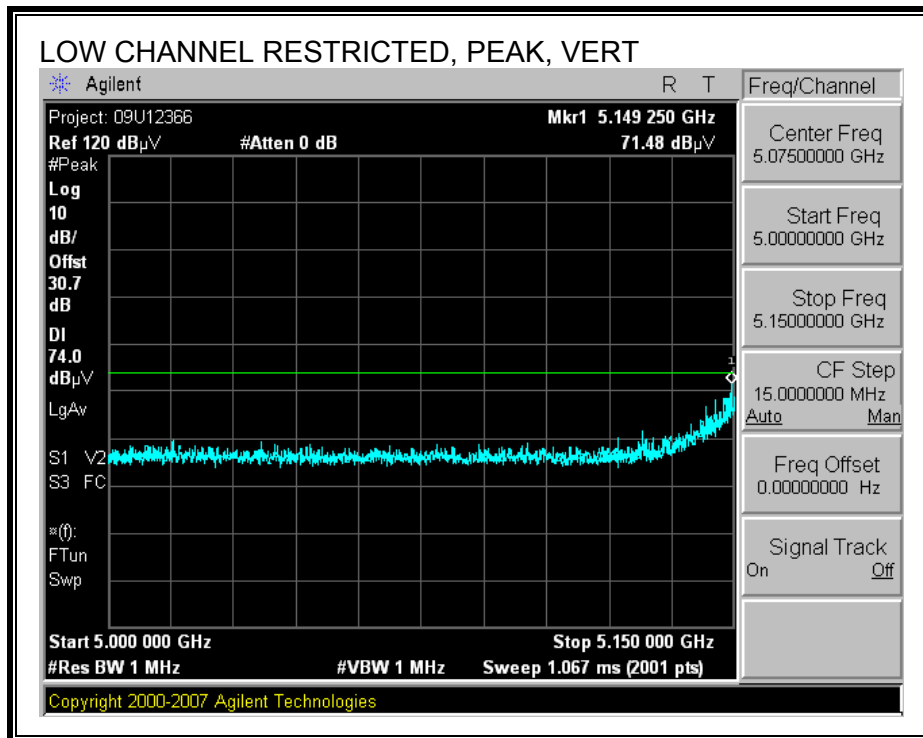
### 7.2.1. TX ABOVE 1 GHz FOR 802.11a MODE IN THE LOWER 5.2 GHz BAND

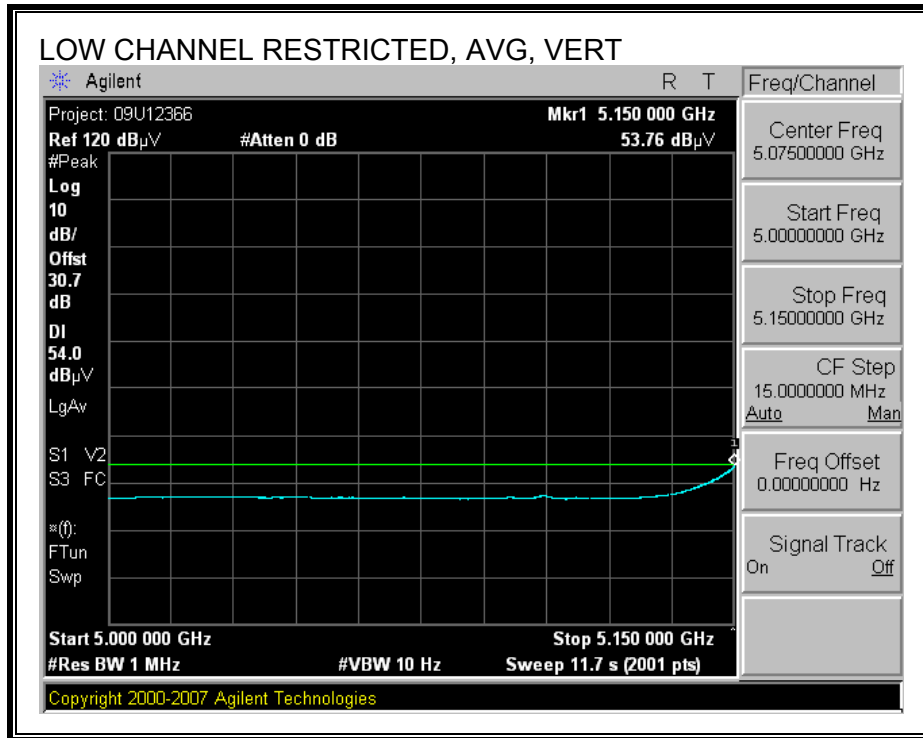
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



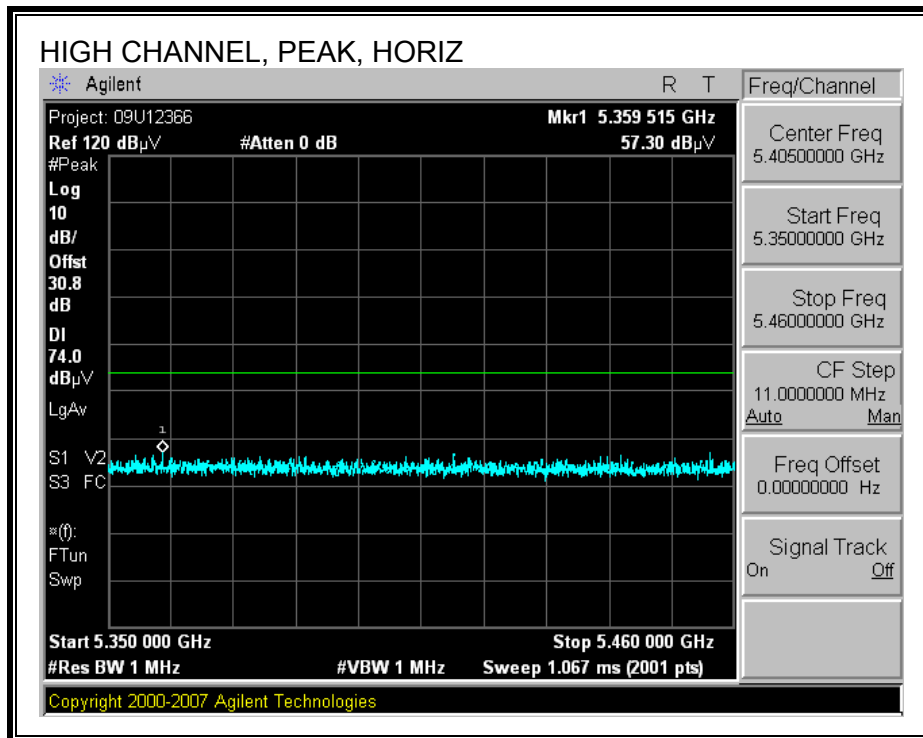


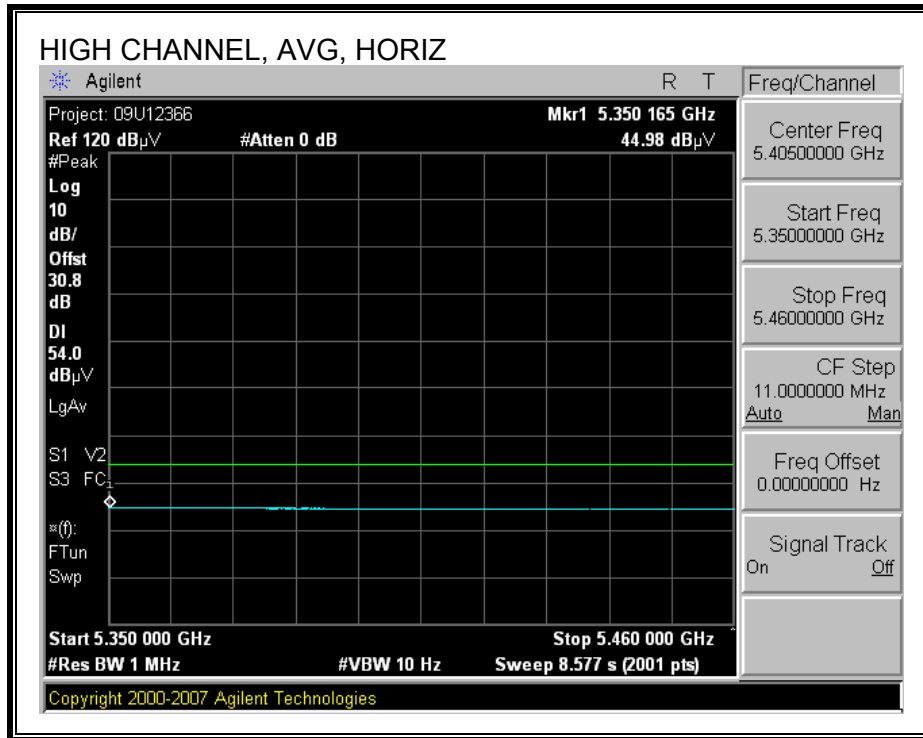
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**





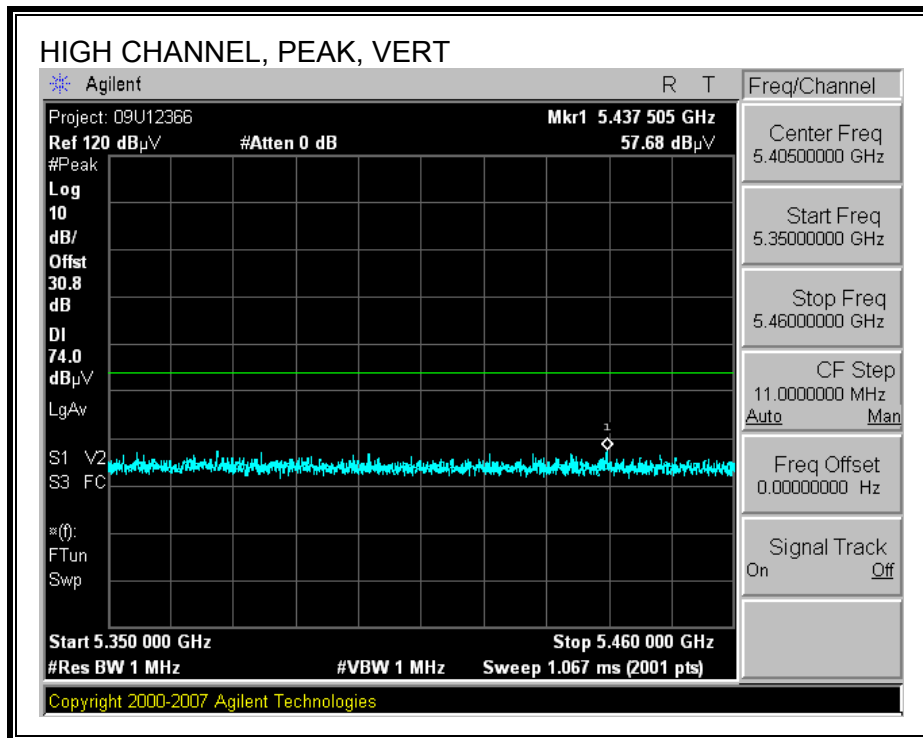
**AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**

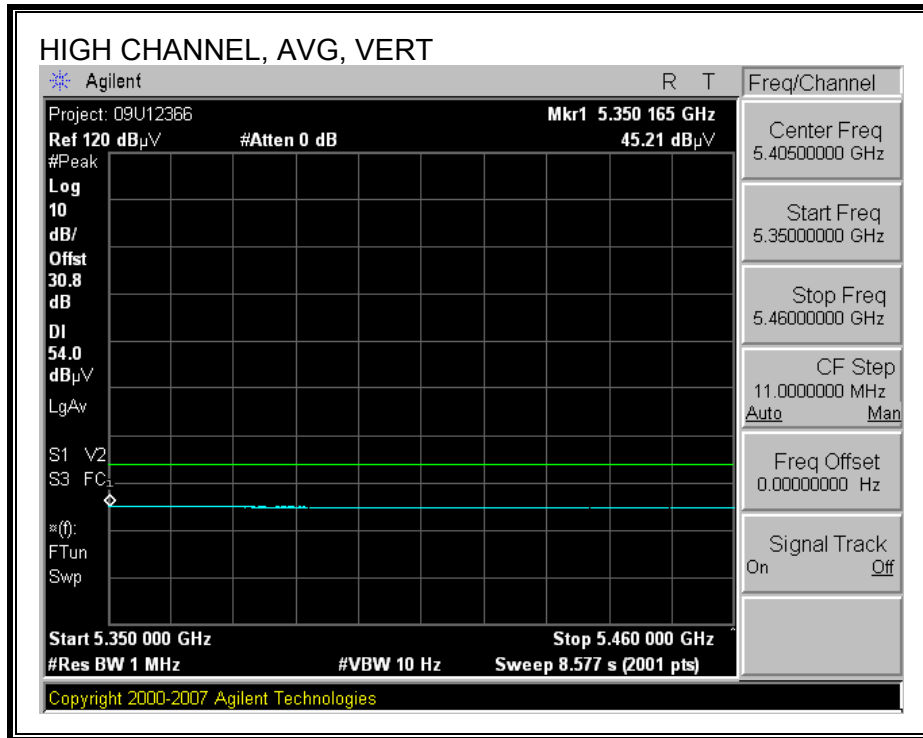






**AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)**



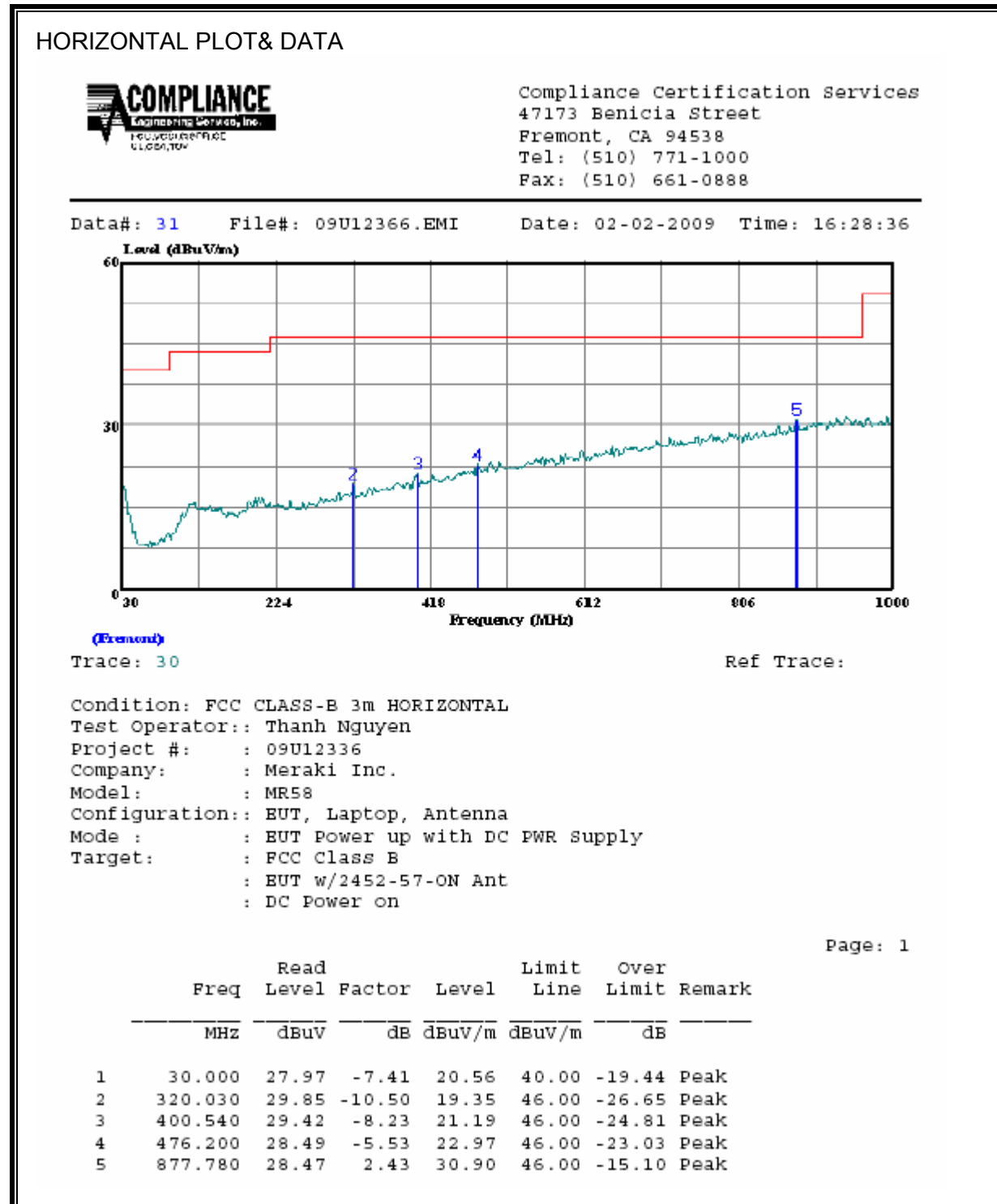


**HARMONICS AND SPURIOUS EMISSIONS**

High Frequency Measurement																	
Compliance Certification Services, Fremont 5m Chamber																	
Company:		Meraki Inc.															
Project #:		09U12366															
Date:		02/02/09															
Test Engineer:		Thanh Nguyen															
Configuration:		EUT with Antenna-2452-57-ON															
Mode:		Transmit Worst case a mode Art=16.5															
<b>Test Equipment:</b>																	
Horn 1-18GHz			Pre-amplifer 1-26GHz			Pre-amplifer 26-40GHz			Horn > 18GHz			Limit					
T73; S/N: 6717 @3m			T34 HP 8449B						T125; ARA 18-26GHz; S/N:1007			FCC 15.209					
Hi Frequency Cables																	
3' cable 22807700			12' cable 22807600			20' cable 22807500			HPF		Reject Filter		Peak Measurements RBW=VBW=1MHz				
3' cable 22807700			12' cable 22807600			20' cable 22807500					R_002		Average Measurements RBW=1MHz ; VBW=10Hz				
f	Dist	Read Pk	Read Avg.	AF	CL	Amp	D Corr	Filt	Peak	Avg	Pk Lim	Avg Lim	Pk Mar	Avg Mar	Notes		
GHz	(m)	dBuV	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	(V/H)		
<b>LOW CHANNEL, 5180 MHz</b>																	
11.490	3.0	41.2	28.3	38.6	9.5	-32.5	0.0	0.0	56.8	43.9	74	54	-17.2	-10.1	V, Noise Floor		
11.490	3.0	40.9	28.4	38.6	9.5	-32.5	0.0	0.0	56.5	43.9	74	54	-17.5	-10.1	H, Noise floor		
<b>MID CHANNEL, 5220 MHz</b>																	
11.570	3.0	41.3	28.1	38.7	9.5	-32.5	0.0	0.0	56.9	43.8	74	54	-17.1	-10.2	V, Noise Floor		
11.570	3.0	40.2	28.2	38.7	9.5	-32.5	0.0	0.0	55.9	43.9	74	54	-18.1	-10.1	H, Noise floor		
<b>HI CHANNEL, 5240 MHz</b>																	
11.650	3.0	40.9	27.9	38.7	9.6	-32.5	0.0	0.0	56.6	43.6	74	54	-17.4	-10.4	V, Noise Floor		
11.650	3.0	41.2	28.2	38.7	9.6	-32.5	0.0	0.0	57.0	44.0	74	54	-17.0	-10.0	H, Noise floor		
<b>No other emissions were detected above noise floor.</b>																	
Rev. 10.15.08																	
f	Measurement Frequency					Amp	Preamp Gain					Avg Lim	Average Field Strength Limit				
Dist	Distance to Antenna					D Corr	Distance Correct to 3 meters					Pk Lim	Peak Field Strength Limit				
Read	Analyzer Reading					Avg	Average Field Strength @ 3 m					Avg Mar	Margin vs. Average Limit				
AF	Antenna Factor					Peak	Calculated Peak Field Strength					Pk Mar	Margin vs. Peak Limit				
CL	Cable Loss					HPF	High Pass Filter										

**7.2.2. TX BELOW 1 GHz FOR 802.11a MODE IN THE LOWER 5.2 GHz BAND**

**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)**



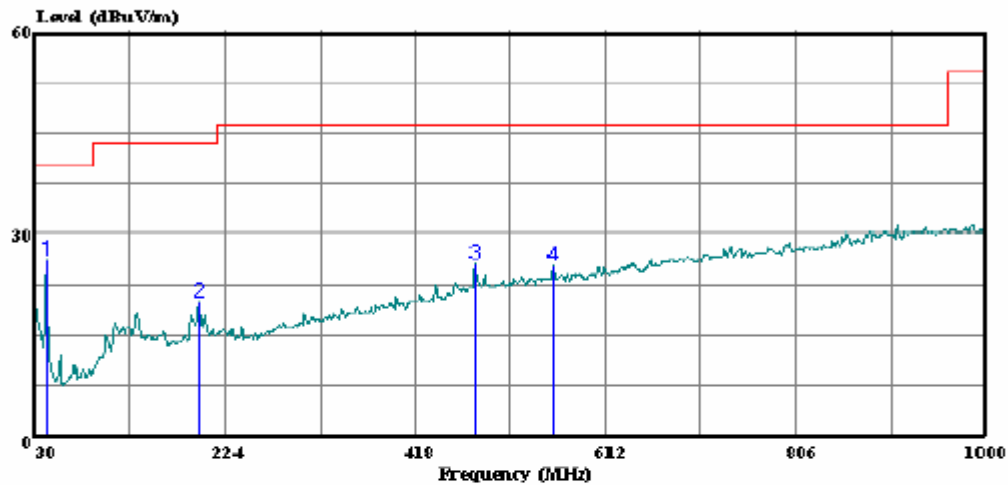
**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)**

VERTICAL PLOT & DATA



Compliance Certification Services  
 47173 Benicia Street  
 Fremont, CA 94538  
 Tel: (510) 771-1000  
 Fax: (510) 661-0888

Data#: 29 File#: 09U12366.EMI Date: 02-02-2009 Time: 16:25:02



(Fremont)

Trace: 28

Ref Trace:

Condition: FCC CLASS-B 3m VERTICAL  
 Test Operator:: Thanh Nguyen  
 Project #: : 09U12336  
 Company: : Meraki Inc.  
 Model: : MR58  
 Configuration:: BUT, Laptop, Antenna  
 Mode : : BUT Power up with DC PWR supply  
 Target: : FCC Class B  
 : BUT w/2452-57-ON Ant  
 : DC Power on

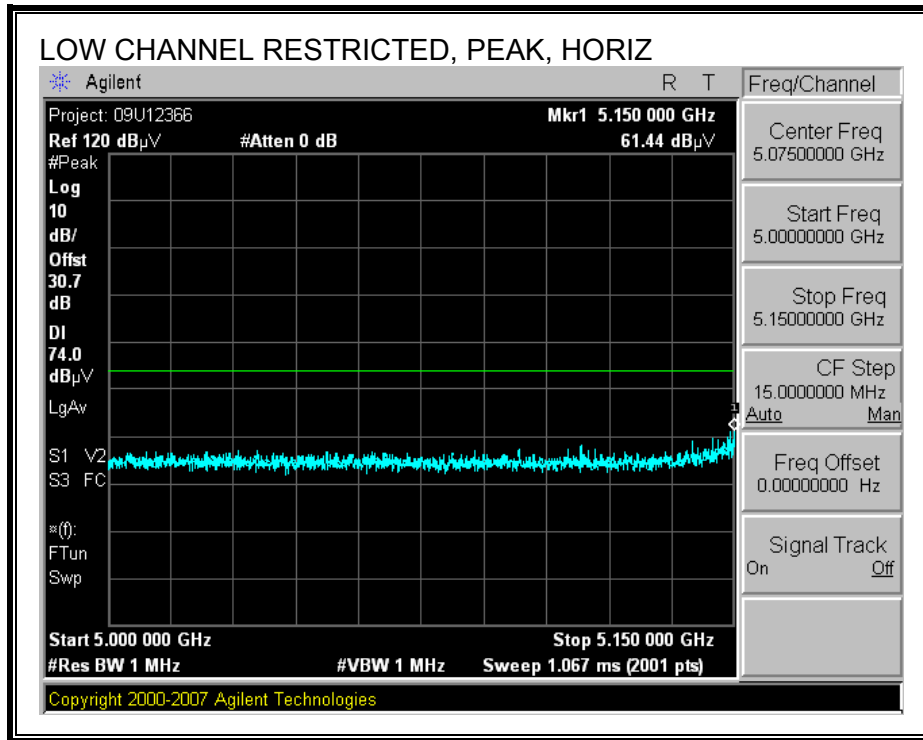
Page: 1

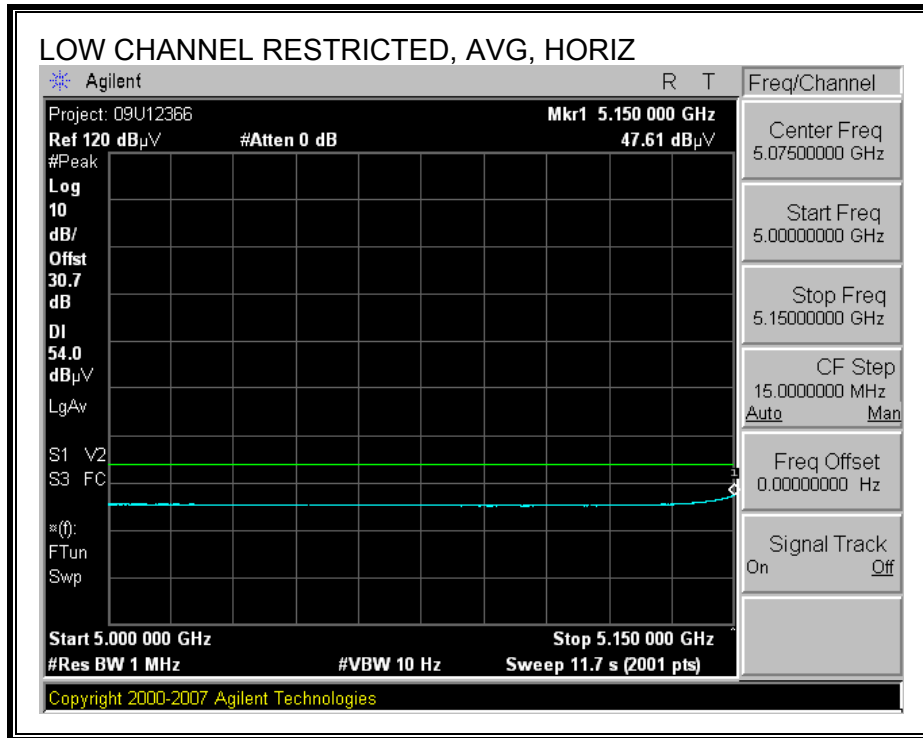
	Freq	Read Level	Factor	Level	Limit	Over	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	41.640	42.10	-15.74	26.36	40.00	-13.64	Peak
2	196.840	32.75	-12.71	20.04	43.50	-23.46	Peak
3	478.140	31.31	-5.48	25.83	46.00	-20.17	Peak
4	557.680	29.11	-3.65	25.46	46.00	-20.54	Peak

### 7.3. MONOPOLE OMNI LOW GAIN ANTENNA

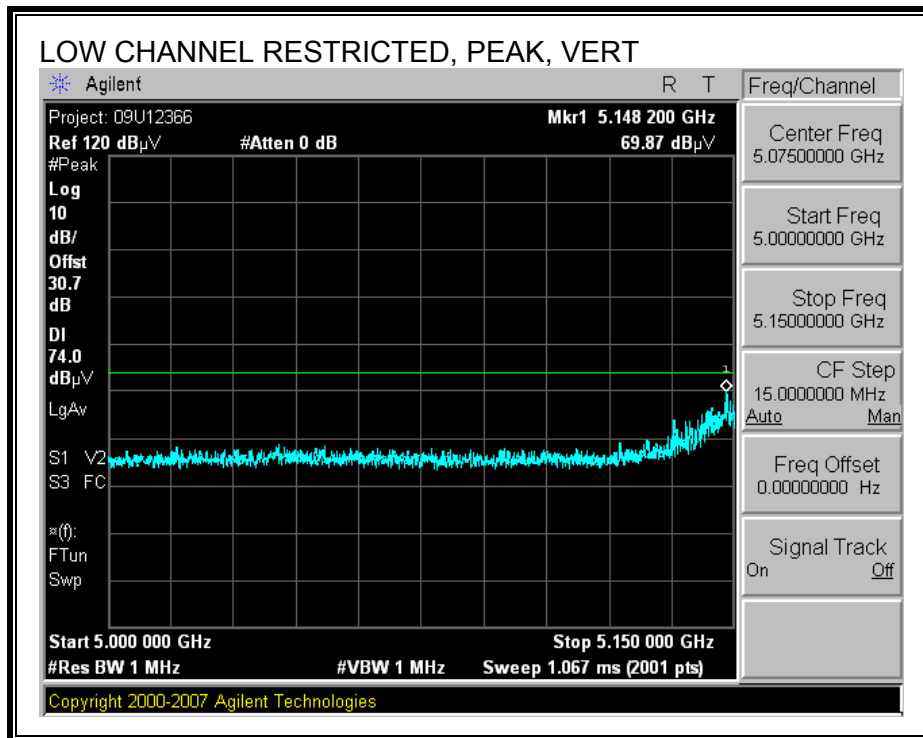
#### 7.3.1. TX ABOVE 1 GHz FOR 802.11a MODE IN THE LOWER 5.2 GHz BAND

##### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

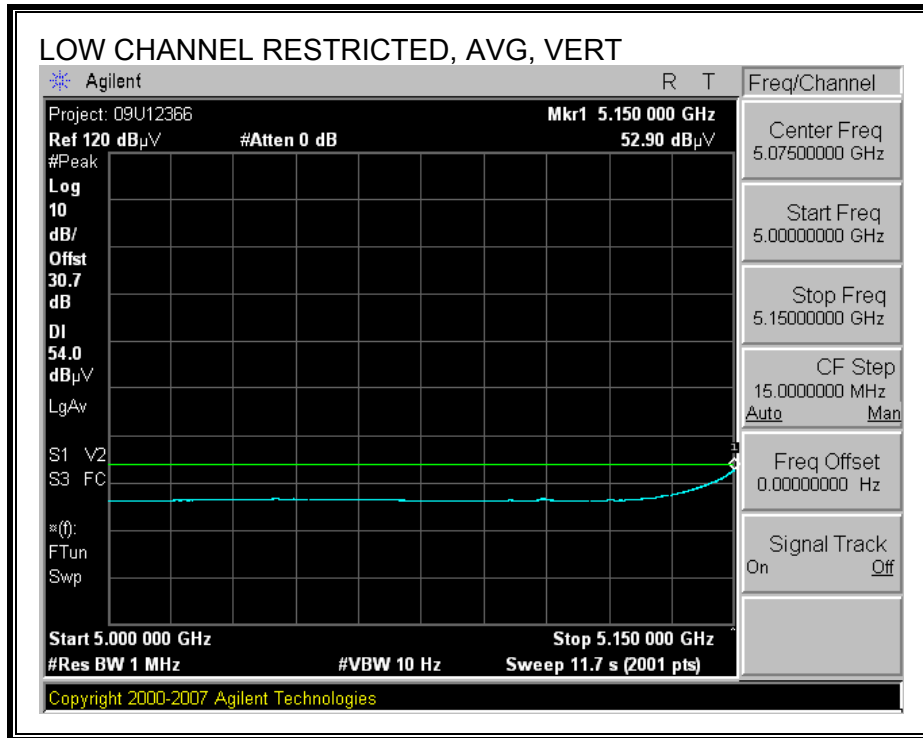




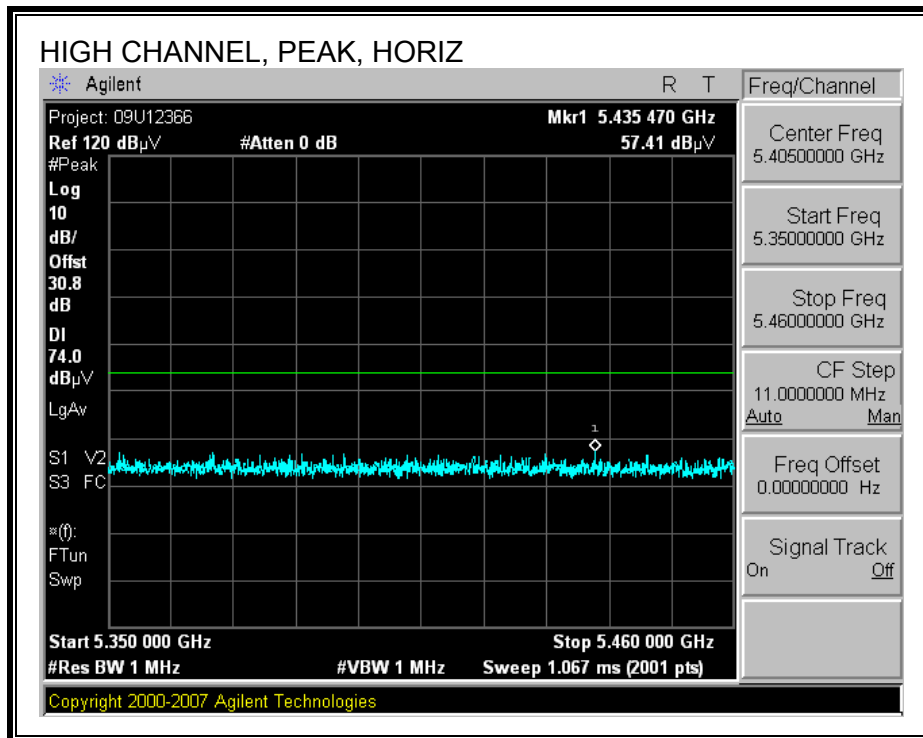
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**

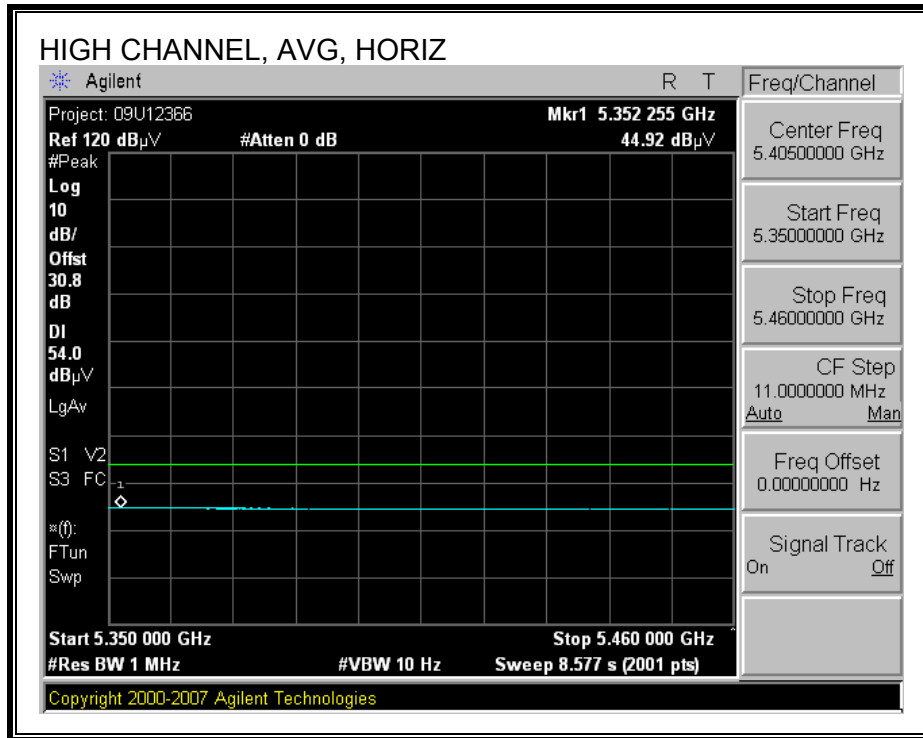




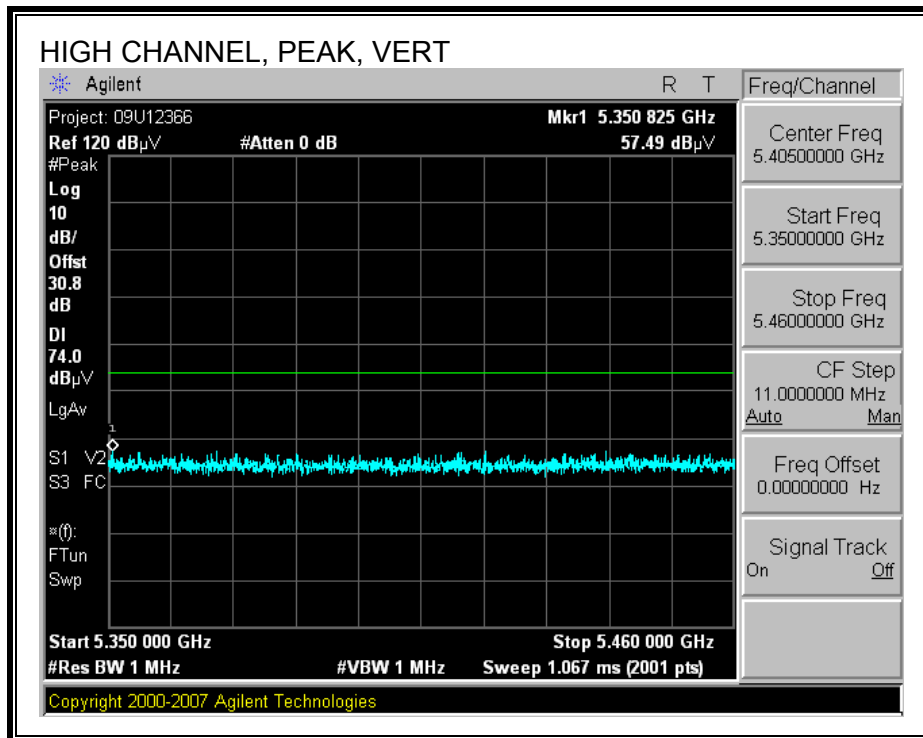


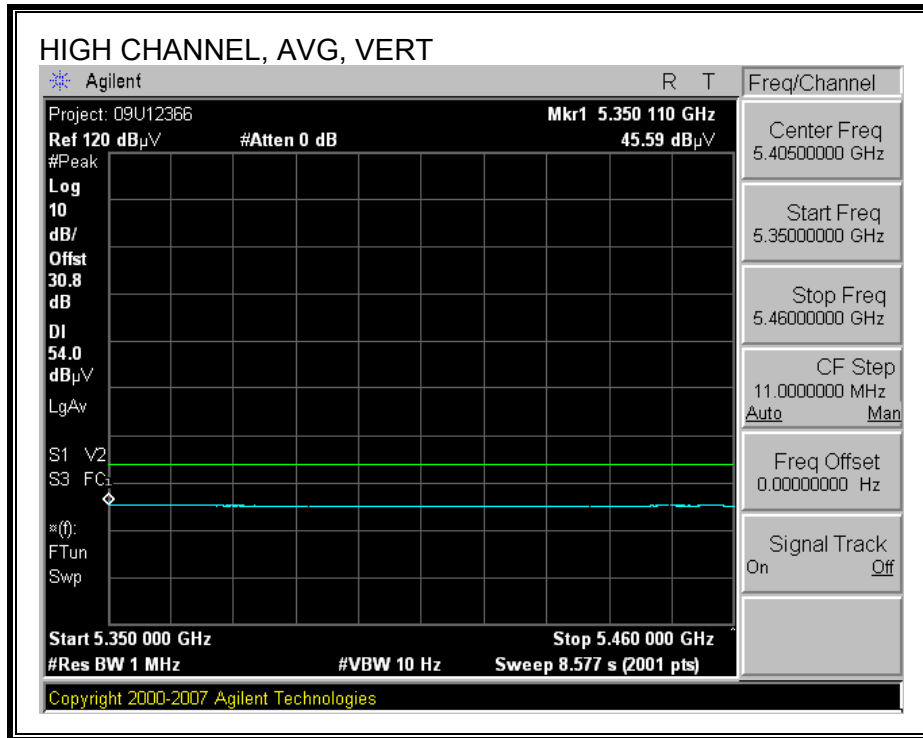
**AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**





**AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)**



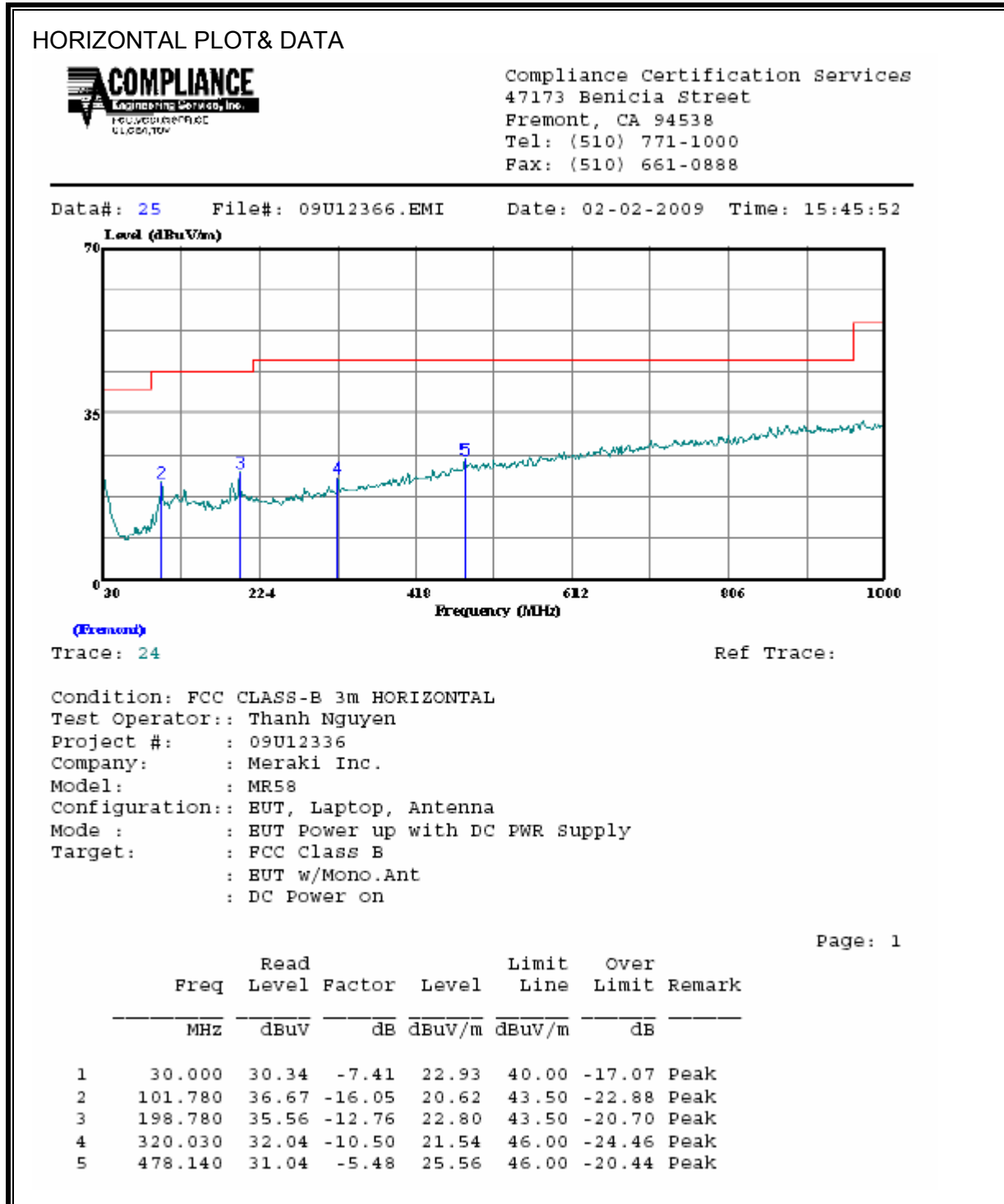


**HARMONICS AND SPURIOUS EMISSIONS**

High Frequency Measurement																	
Compliance Certification Services, Fremont 5m Chamber																	
Company:		Meraki Inc.															
Project #:		09U12366															
Date:		02/02/09															
Test Engineer:		Thanh Nguyen															
Configuration:		EUT with 4dBi gain Monopole Antenna.															
Mode:		Transmit Worst case a mode Art=16.5															
<b>Test Equipment:</b>																	
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz			Limit					
T73; S/N: 6717 @3m			T34 HP 8449B						T125; ARA 18-26GHz; S/N:1007			FCC 15.209					
Hi Frequency Cables																	
3' cable 22807700			12' cable 22807600			20' cable 22807500			HPF		Reject Filter		Peak Measurements RBW=VBW=1MHz				
3' cable 22807700			12' cable 22807600			20' cable 22807500					R_002		Average Measurements RBW=1MHz; VBW=10Hz				
f	Dist	Read Pk	Read Avg.	AF	CL	Amp	D Corr	Filt	Peak	Avg	Pk Lim	Avg Lim	Pk Mar	Avg Mar	Notes		
GHz	(m)	dBuV	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	(V/H)		
<b>LOW CHANNEL, 5180 MHz</b>																	
10.360	3.0	41.6	27.9	38.2	8.9	-32.6	0.0	0.0	56.0	42.3	74	54	-18.0	-11.7	V, Noise Floor		
10.360	3.0	40.3	27.7	38.2	8.9	-32.6	0.0	0.0	54.7	42.1	74	54	-19.3	-11.9	H, Noise floor		
<b>MID CHANNEL, 5220 MHz</b>																	
10.440	3.0	41.3	27.5	38.2	9.0	-32.6	0.0	0.0	55.8	42.0	74	54	-18.2	-12.0	V, Noise Floor		
10.440	3.0	40.3	27.7	38.2	9.0	-32.6	0.0	0.0	54.8	42.2	74	54	-19.2	-11.8	H, Noise floor		
<b>HI CHANNEL, 5240 MHz</b>																	
10.480	3.0	39.4	27.4	38.2	9.0	-32.6	0.0	0.0	54.0	42.0	74	54	-20.0	-12.0	V, Noise Floor		
10.480	3.0	40.9	27.3	38.2	9.0	-32.6	0.0	0.0	55.4	41.9	74	54	-18.6	-12.1	H, Noise floor		
No other emissions were detected above noise floor.																	
Rev. 10.15.08																	
f	Measurement Frequency					Amp	Preamp Gain					Avg Lim	Average Field Strength Limit				
Dist	Distance to Antenna					D Corr	Distance Correct to 3 meters					Pk Lim	Peak Field Strength Limit				
Read	Analyzer Reading					Avg	Average Field Strength @ 3 m					Avg Mar	Margin vs. Average Limit				
AF	Antenna Factor					Peak	Calculated Peak Field Strength					Pk Mar	Margin vs. Peak Limit				
CL	Cable Loss					HPF	High Pass Filter										

### 7.3.2. TX BELOW 1 GHz FOR 802.11a MODE IN THE LOWER 5.2 GHz BAND

#### SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)



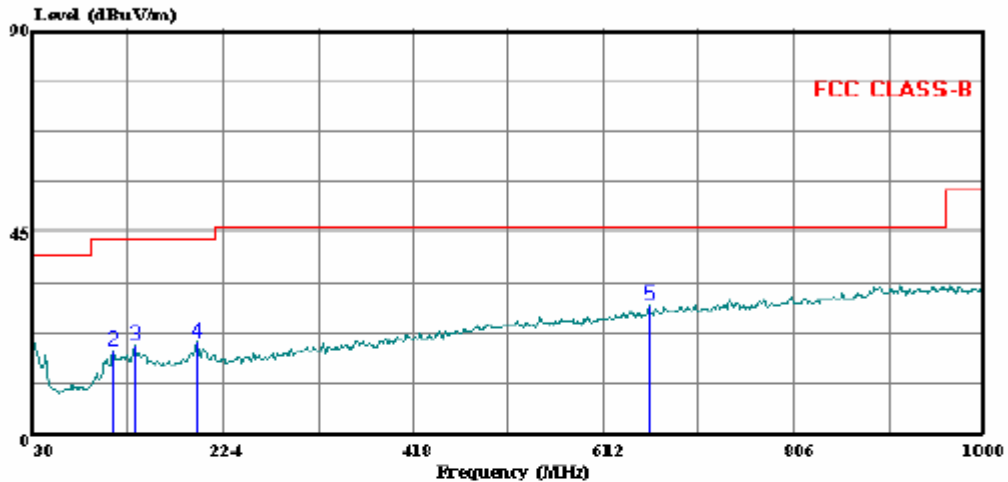
**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)**

VERTICAL PLOT& DATA



Compliance Certification Services  
 47173 Benicia Street  
 Fremont, CA 94538  
 Tel: (510) 771-1000  
 Fax: (510) 661-0888

Data#: 27 File#: 09U12366.EMI Date: 02-02-2009 Time: 15:50:40



(Fremont)

Trace: 26

Ref Trace:

Condition: FCC CLASS-B 3m VERTICAL  
 Test Operator:: Thanh Nguyen  
 Project #: : 09U12336  
 Company: : Meraki Inc.  
 Model: : MR58  
 Configuration:: BUT, Laptop, Antenna  
 Mode : : BUT Power up with DC PWR Supply  
 Target: : FCC Class B  
 : BUT w/Mono.Ant  
 : DC Power on

Page: 1

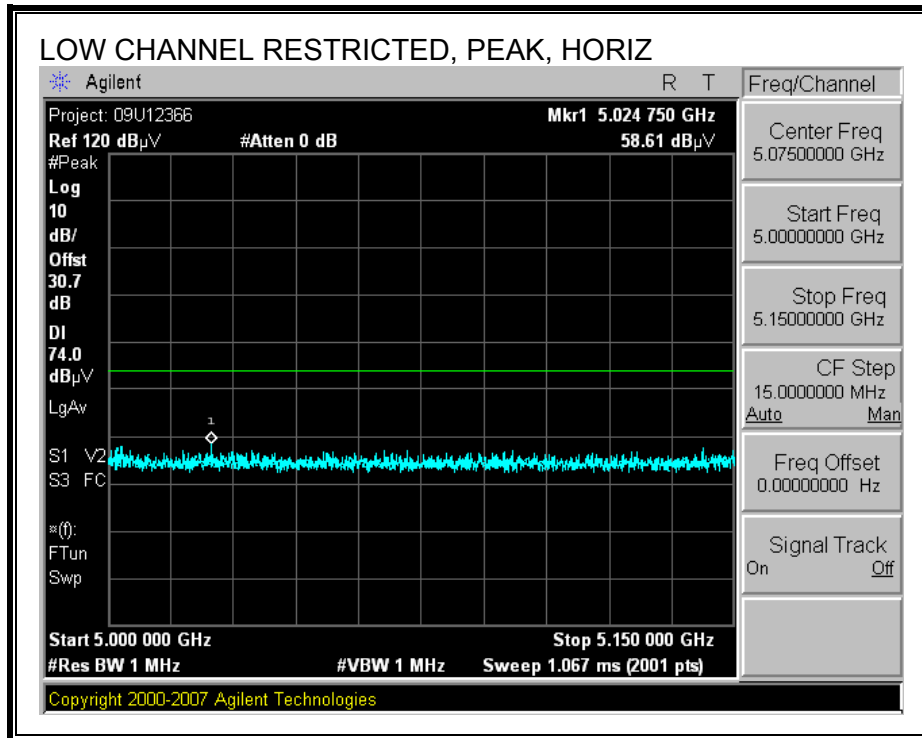
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	30.000	28.72	-7.41	21.31	40.00	-18.69	Peak
2	111.480	32.81	-14.13	18.68	43.50	-24.82	Peak
3	133.790	33.10	-13.31	19.79	43.50	-23.71	Peak
4	196.840	33.35	-12.71	20.64	43.50	-22.86	Peak
5	657.590	30.19	-1.48	28.71	46.00	-17.29	Peak

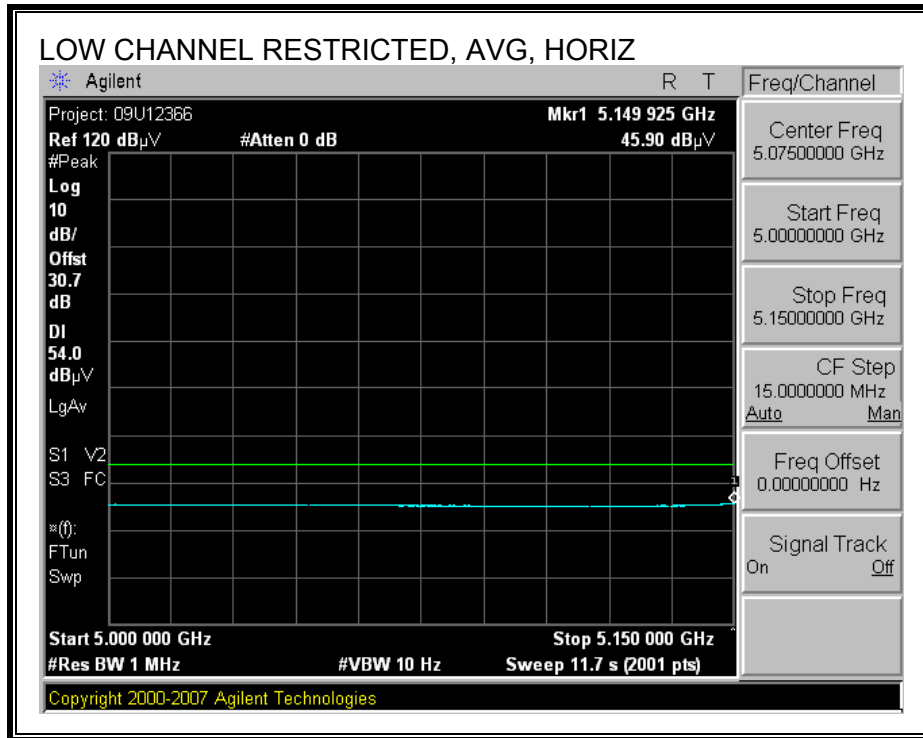


## 7.4. DUAL PATCH DIRECTIONAL ANTENNA

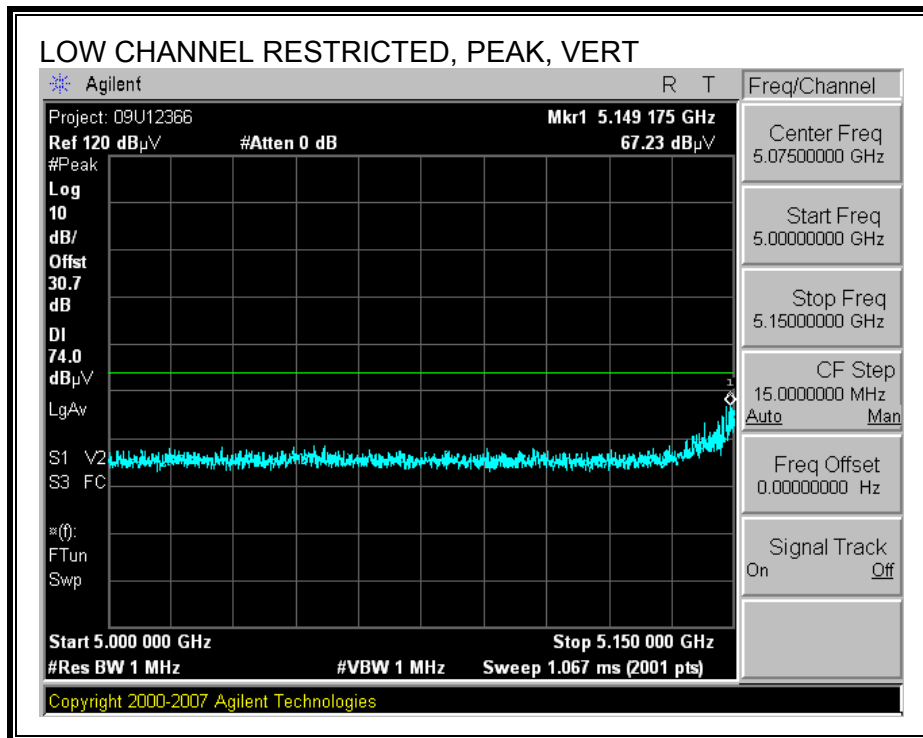
### 7.4.1. TX ABOVE 1 GHz FOR 802.11a MODE IN THE LOWER 5.2 GHz BAND

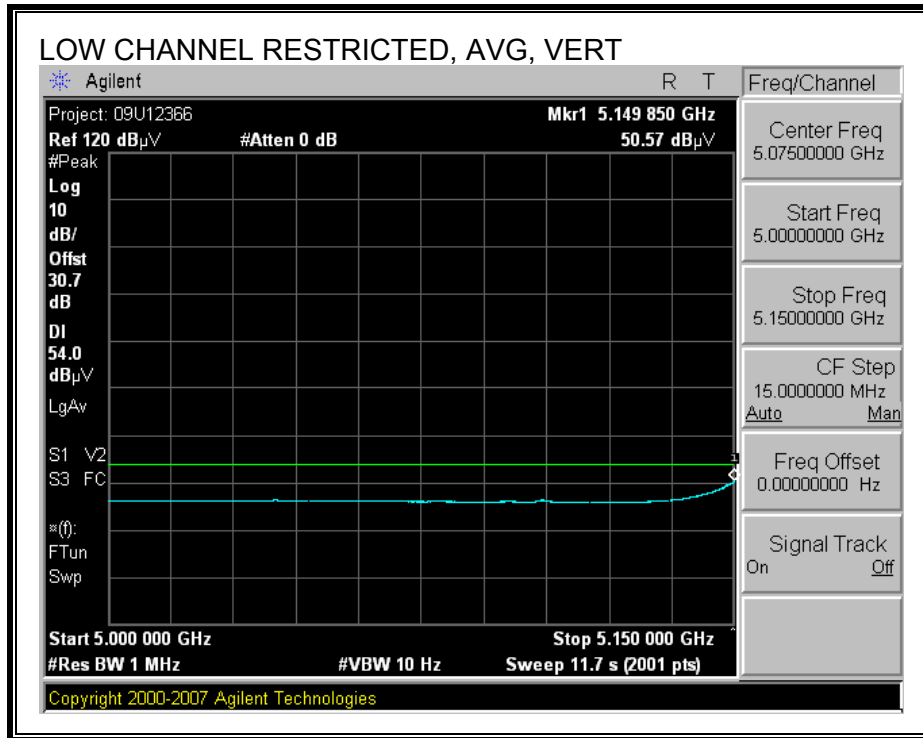
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



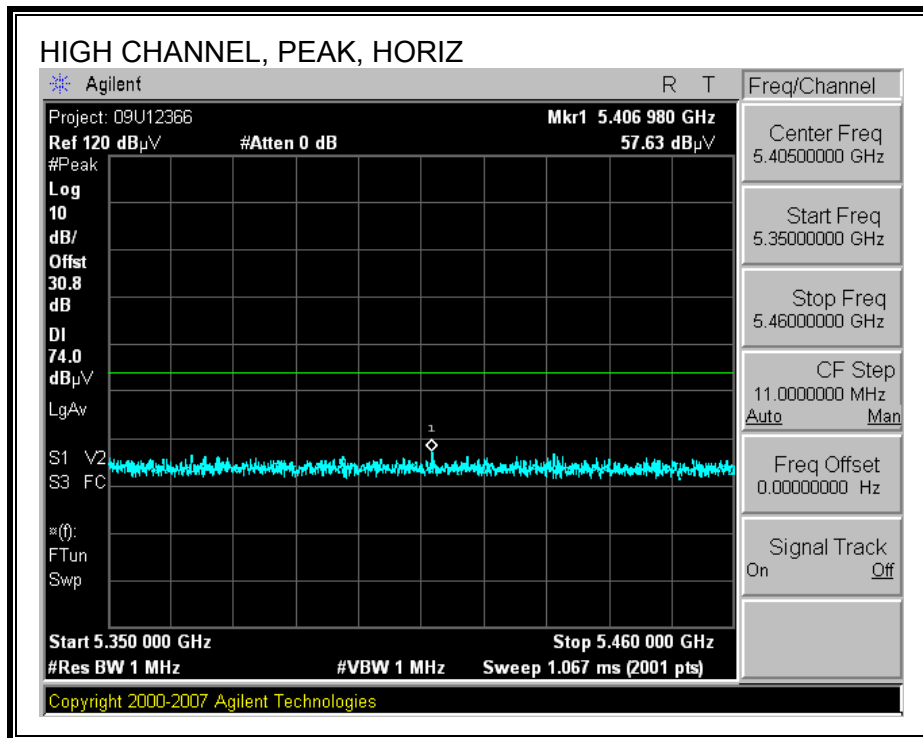


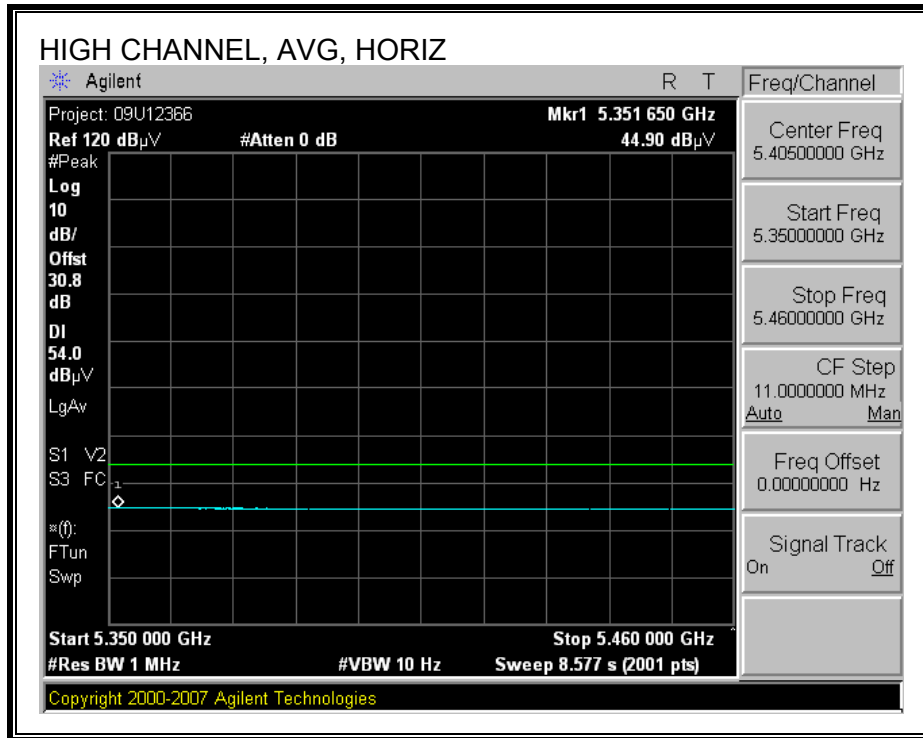
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



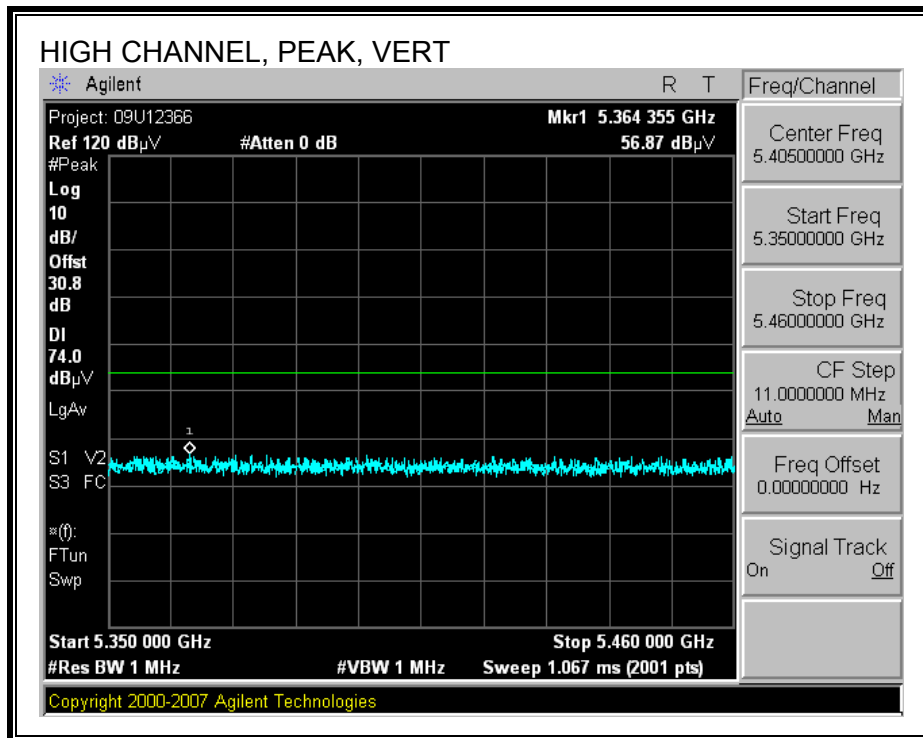


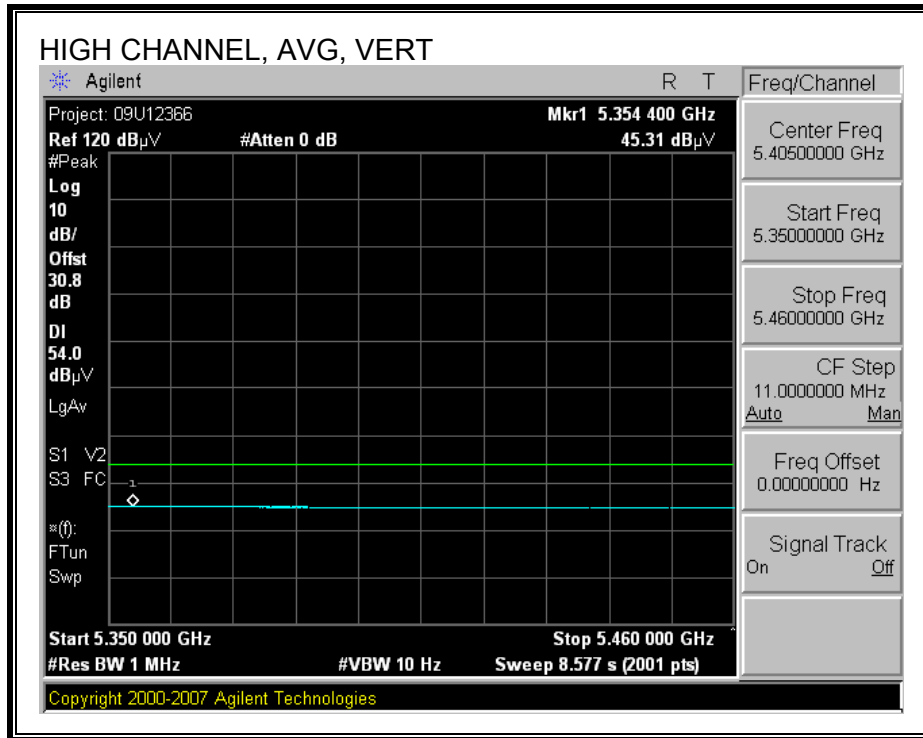
**AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**





**AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)**





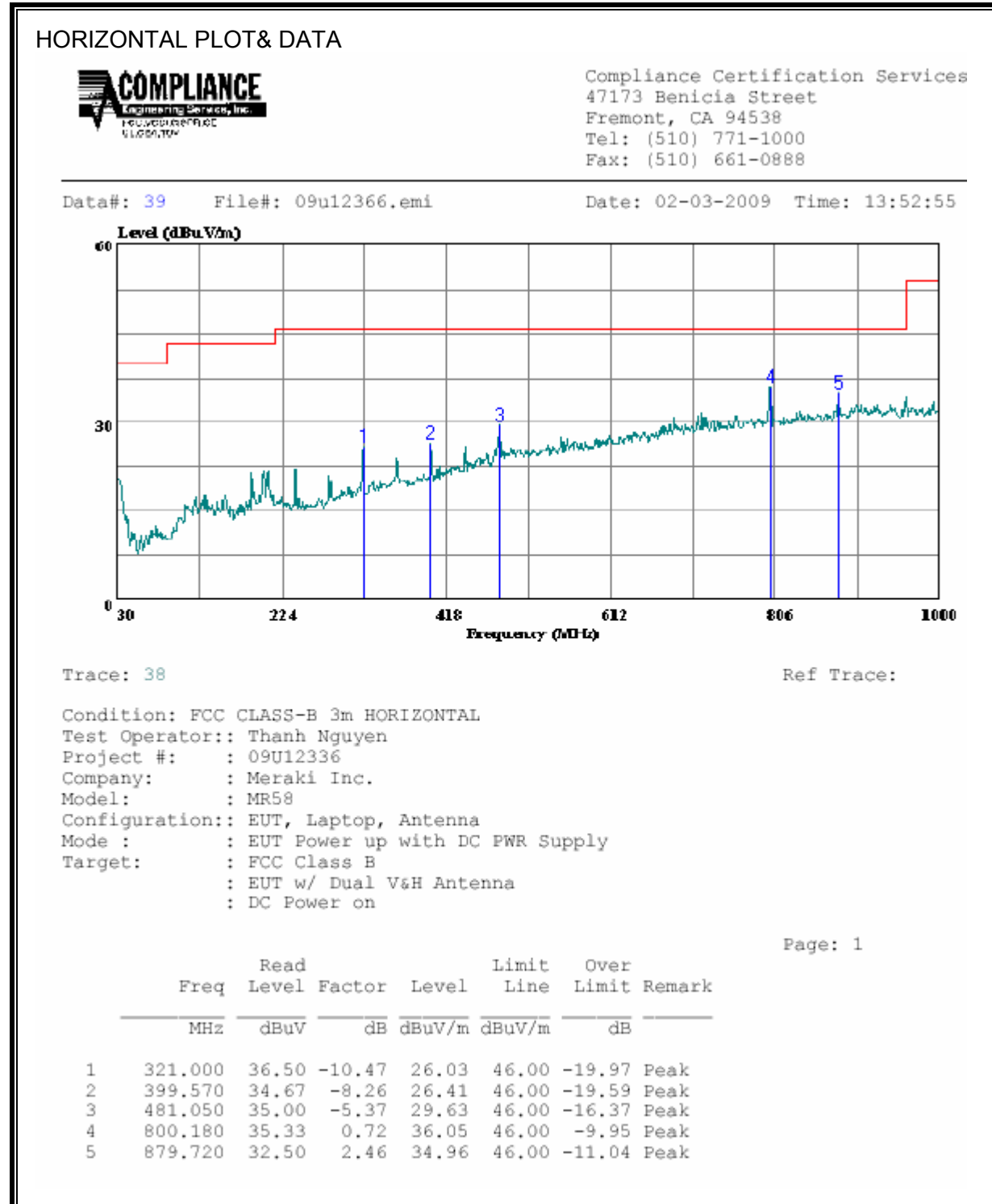


**HARMONICS AND SPURIOUS EMISSIONS**

High Frequency Measurement																	
Compliance Certification Services, Fremont 5m Chamber																	
Company:		Meraki Inc.															
Project #:		09U12366															
Date:		02/02/09															
Test Engineer:		Thanh Nguyen															
Configuration:		EUT with Dual V&H Patch 14.5dBi Antenna															
Mode:		Transmit Worst case a mode Art=16.5															
<b>Test Equipment:</b>																	
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz			Limit					
T73; S/N: 6717 @3m			T34 HP 8449B						T125; ARA 18-26GHz; S/N:1007			FCC 15.209					
Hi Frequency Cables																	
3' cable 22807700			12' cable 22807600			20' cable 22807500			HPF		Reject Filter		Peak Measurements RBW=VBW=1MHz				
3' cable 22807700			12' cable 22807600			20' cable 22807500					R_002		Average Measurements RBW=1MHz; VBW=10Hz				
f	Dist	Read Pk	Read Avg.	AF	CL	Amp	D Corr	Filt	Peak	Avg	Pk Lim	Avg Lim	Pk Mar	Avg Mar	Notes		
GHz	(m)	dBuV	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	(V/H)		
<b>LOW CHANNEL, 5180 MHz</b>																	
11.490	3.0	41.6	28.2	38.6	9.5	-32.5	0.0	0.0	57.1	43.8	74	54	-16.9	-10.2	V, Noise Floor		
11.490	3.0	41.3	28.4	38.6	9.5	-32.5	0.0	0.0	56.9	43.9	74	54	-17.1	-10.1	H, Noise floor		
<b>MID CHANNEL, 5220 MHz</b>																	
11.570	3.0	41.2	28.4	38.7	9.5	-32.5	0.0	0.0	56.9	44.0	74	54	-17.1	-10.0	V, Noise Floor		
11.570	3.0	40.6	28.3	38.7	9.5	-32.5	0.0	0.0	56.2	44.0	74	54	-17.8	-10.0	H, Noise floor		
<b>HI CHANNEL, 5240 MHz</b>																	
11.650	3.0	41.4	28.2	38.7	9.6	-32.5	0.0	0.0	57.1	44.0	74	54	-16.9	-10.0	V, Noise Floor		
11.650	3.0	41.3	28.3	38.7	9.6	-32.5	0.0	0.0	57.1	44.1	74	54	-16.9	-9.9	H, Noise floor		
No other emissions were detected above noise floor.																	
Rev. 10.15.08																	
f	Measurement Frequency					Amp	Preamp Gain					Avg Lim	Average Field Strength Limit				
Dist	Distance to Antenna					D Corr	Distance Correct to 3 meters					Pk Lim	Peak Field Strength Limit				
Read	Analyzer Reading					Avg	Average Field Strength @ 3 m					Avg Mar	Margin vs. Average Limit				
AF	Antenna Factor					Peak	Calculated Peak Field Strength					Pk Mar	Margin vs. Peak Limit				
CL	Cable Loss					HPF	High Pass Filter										

**7.4.2. TX BELOW 1 GHz FOR 802.11a MODE IN THE LOWER 5.2 GHz BAND**

**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)**



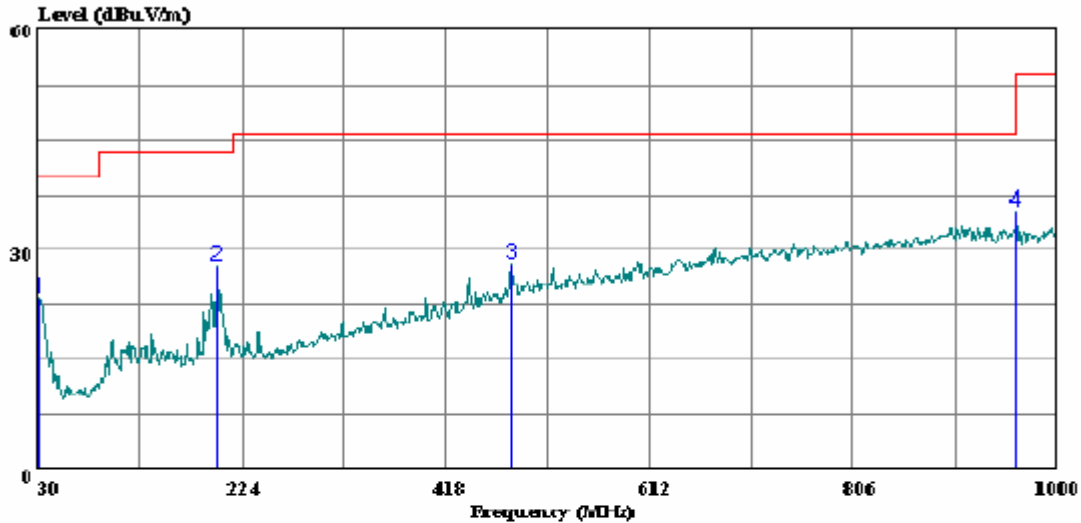
**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)**

VERTICAL PLOT& DATA



Compliance Certification Services  
 47173 Benicia Street  
 Fremont, CA 94538  
 Tel: (510) 771-1000  
 Fax: (510) 661-0888

Data#: 37 File#: 09u12366.emi Date: 02-03-2009 Time: 13:49:11



Trace: 36

Ref Trace:

Condition: FCC CLASS-B 3m VERTICAL  
 Test Operator:: Thanh Nguyen  
 Project #: : 09U12336  
 Company: : Meraki Inc.  
 Model: : MR58  
 Configuration:: EUT, Laptop, Antenna  
 Mode : : EUT Power up with DC PWR Supply  
 Target: : FCC Class B  
 : EUT w/ Dual V&H Antenna  
 : DC Power on

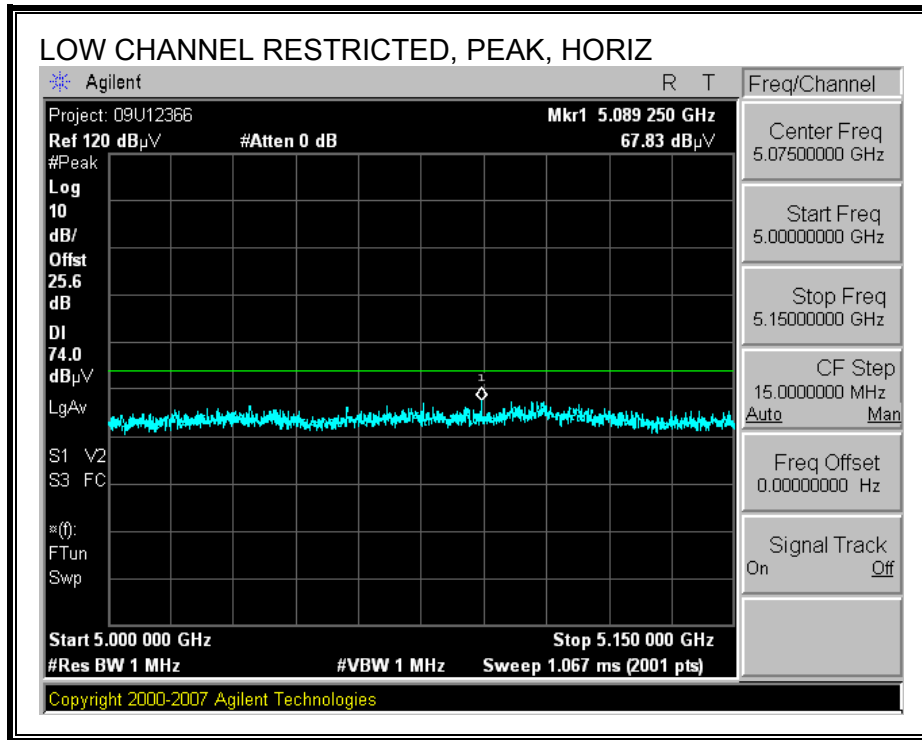
Page: 1

	Read		Limit	Over			
Freq	Level	Factor	Level	Line	Limit		
MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	30.970	30.70	-7.41	23.29	40.00	-16.71	Peak
2	199.750	40.50	-12.77	27.73	43.50	-15.77	Peak
3	481.050	33.50	-5.37	28.13	46.00	-17.87	Peak
4	961.200	31.83	3.39	35.22	54.00	-18.78	Peak

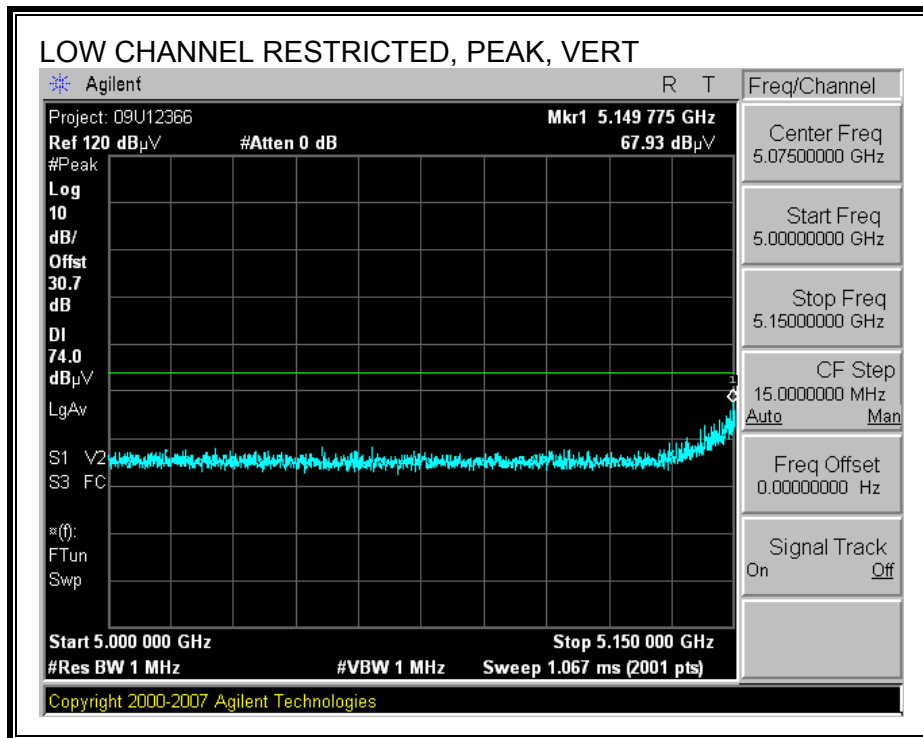
## 7.5. FLAT PANEL ANTENNA

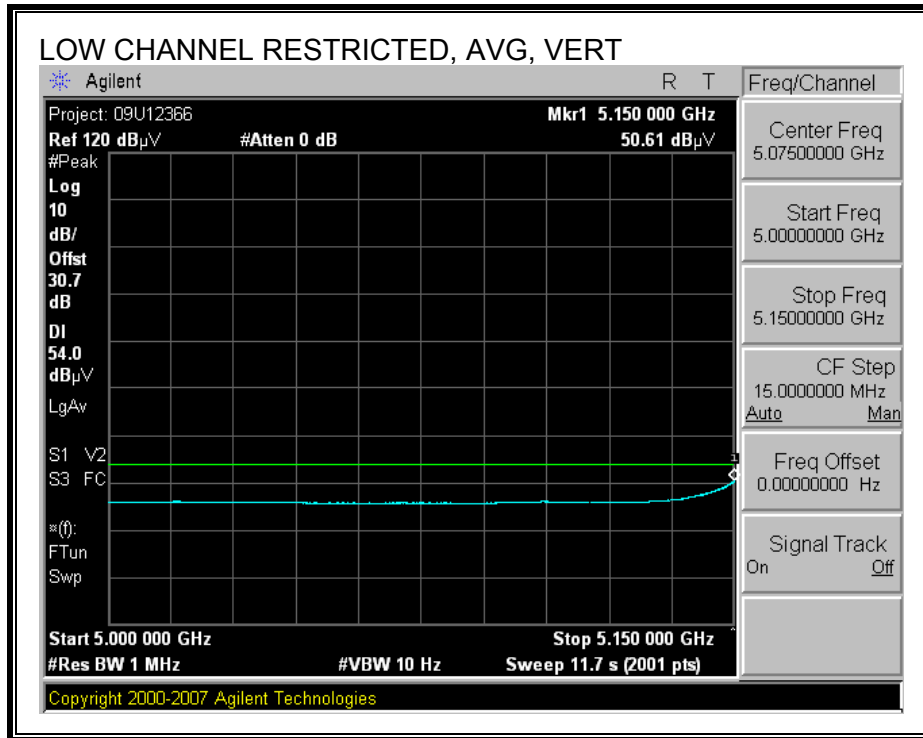
### 7.5.1. TX ABOVE 1 GHz FOR 802.11a MODE IN THE LOWER 5.2 GHz BAND

**RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)(ART=0, 3M distance, FAILED)**

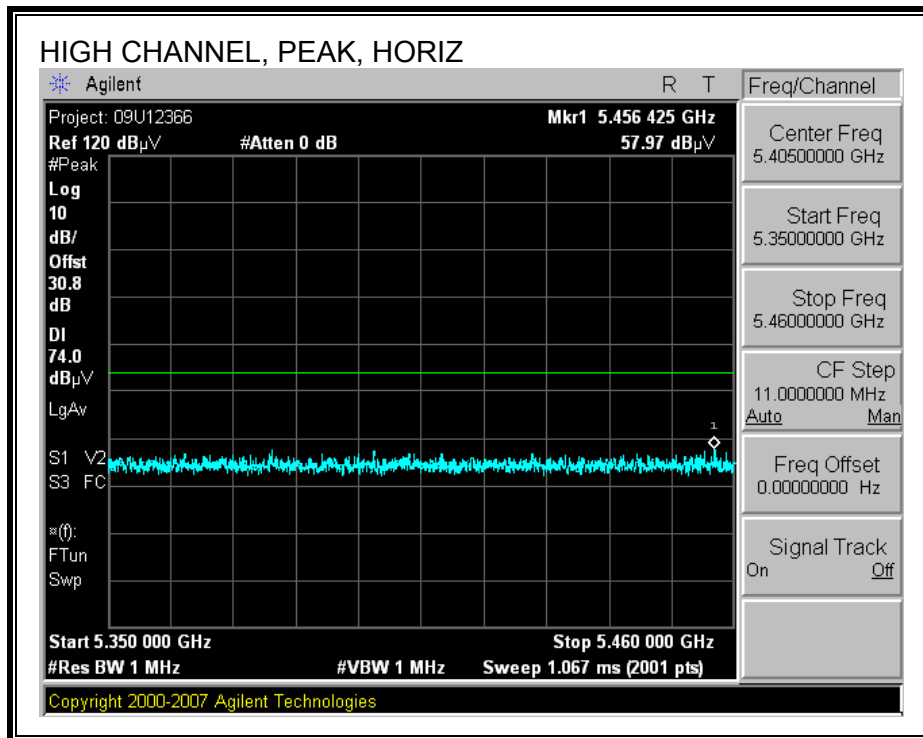


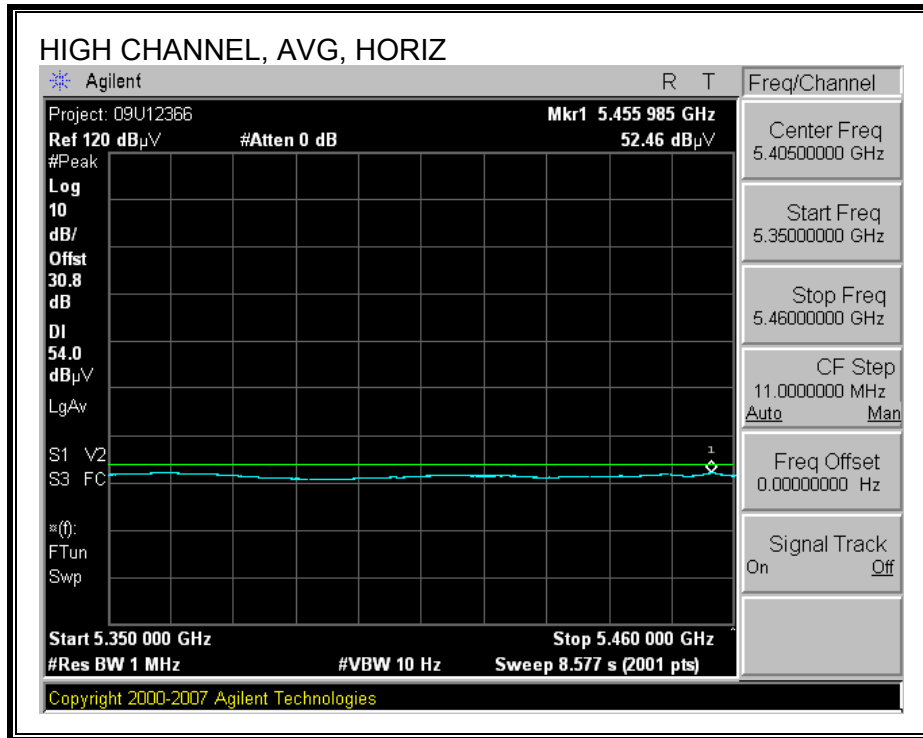
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**





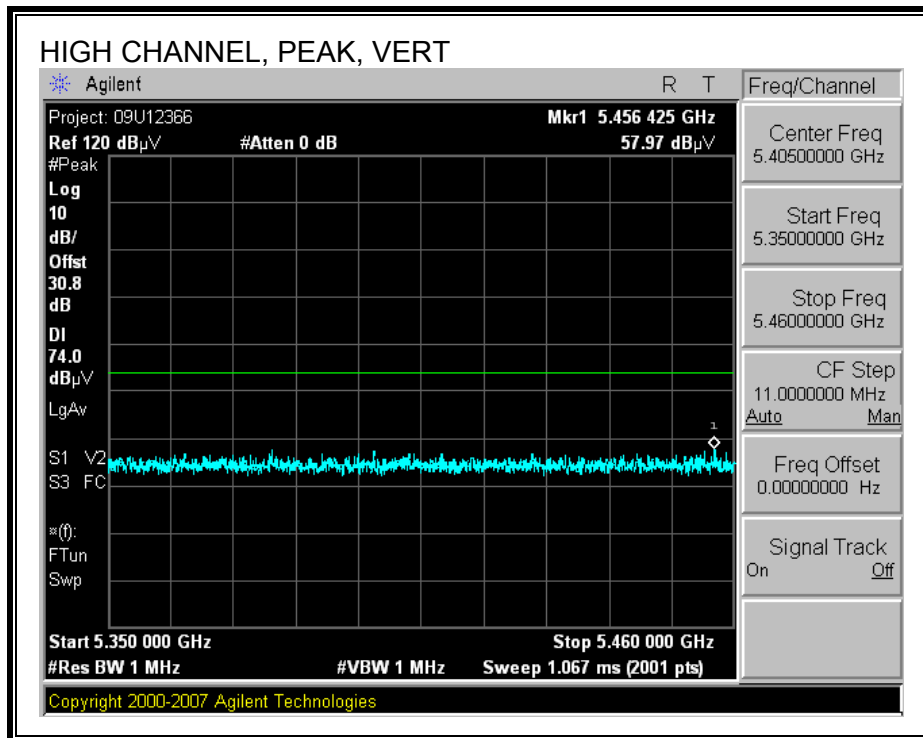
**AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**

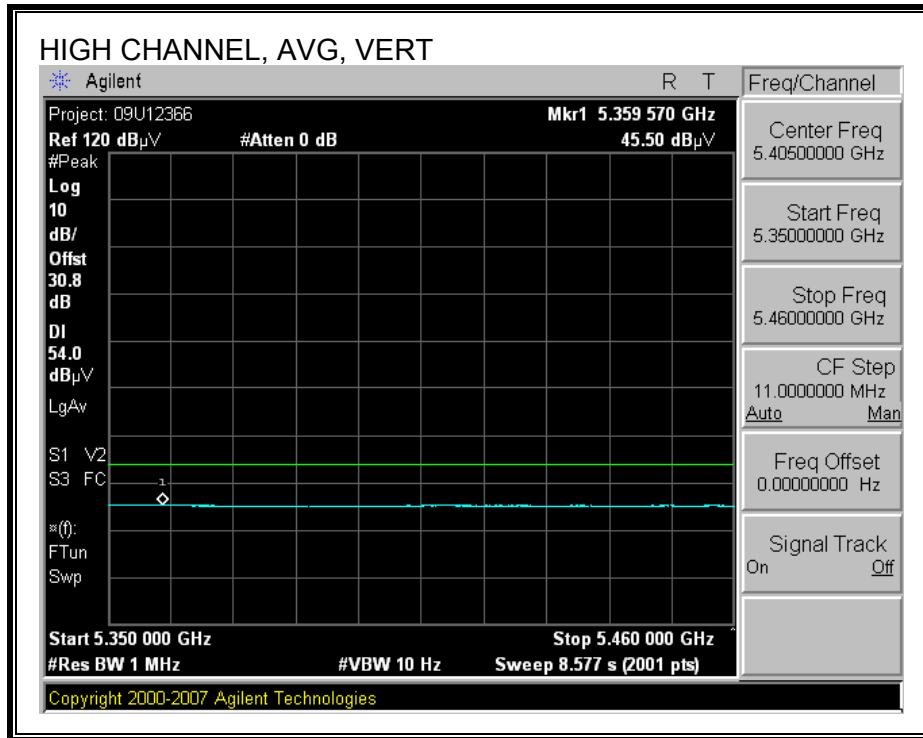






**AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)**



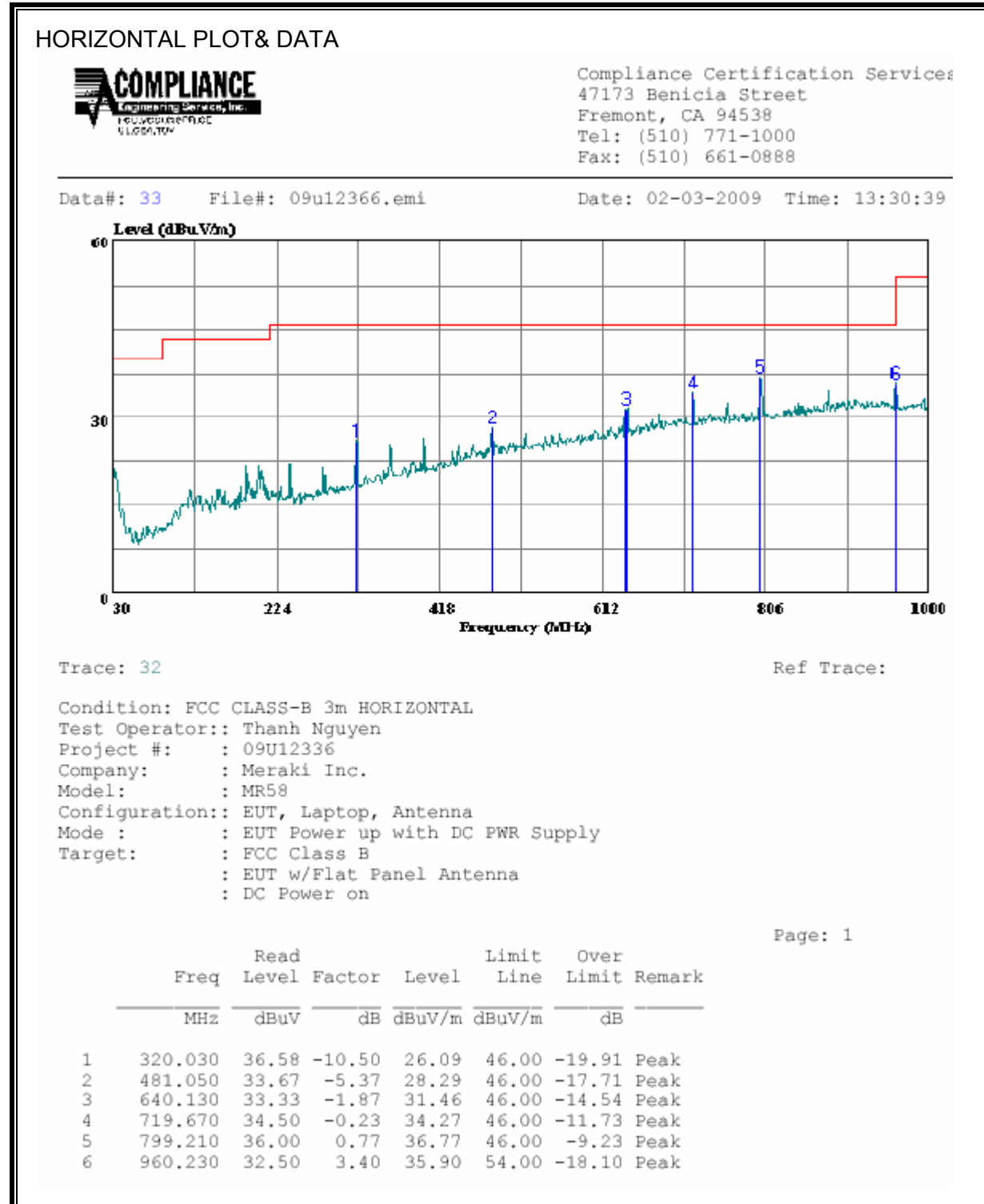


**HARMONICS AND SPURIOUS EMISSIONS**

High Frequency Measurement																	
Compliance Certification Services, Fremont 5m Chamber																	
Company:		Meraki Inc.															
Project #:		09U12366															
Date:		02/02/09															
Test Engineer:		Thanh Nguyen															
Configuration:		EUT with Large flat pannel antenna 23dBi Gain															
Mode:		Transmit Worst case a mode Art=0															
<b>Test Equipment:</b>																	
Horn 1-18GHz			Pre-amplifer 1-26GHz			Pre-amplifer 26-40GHz			Horn > 18GHz			Limit					
T73; S/N: 6717 @3m			T34 HP 8449B						T125; ARA 18-26GHz; S/N:1007			FCC 15.209					
Hi Frequency Cables																	
3' cable 22807700			12' cable 22807600			20' cable 22807500			HPF		Reject Filter		Peak Measurements RBW=VBW=1MHz				
3' cable 22807700			12' cable 22807600			20' cable 22807500					R_002		Average Measurements RBW=1MHz ; VBW=10Hz				
f	Dist	Read Pk	Read Avg.	AF	CL	Amp	D Corr	Fltr	Peak	Avg	Pk Lim	Avg Lim	Pk Mar	Avg Mar	Notes		
GHz	(m)	dBuV	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	(V/H)		
<b>LOW CHANNEL, 5180 MHz</b>																	
10.360	3.0	41.8	28.0	38.2	8.9	-32.6	0.0	0.0	56.2	42.5	74	54	-17.8	-11.5	V, Noise Floor		
10.360	3.0	40.4	28.1	38.2	8.9	-32.6	0.0	0.0	54.8	42.5	74	54	-19.2	-11.5	H, Noise floor		
<b>MID CHANNEL, 5220 MHz</b>																	
10.440	3.0	41.1	27.6	38.2	9.0	-32.6	0.0	0.0	55.6	42.1	74	54	-18.4	-11.9	V, Noise Floor		
10.440	3.0	40.2	27.6	38.2	9.0	-32.6	0.0	0.0	54.7	42.1	74	54	-19.3	-11.9	H, Noise floor		
<b>HI CHANNEL, 5240 MHz</b>																	
10.480	3.0	40.2	27.4	38.2	9.0	-32.6	0.0	0.0	54.7	42.0	74	54	-19.3	-12.0	V, Noise Floor		
10.480	3.0	41.3	27.4	38.2	9.0	-32.6	0.0	0.0	55.9	42.0	74	54	-18.1	-12.0	H, Noise floor		
No other emissions were detected above noise floor.																	
Rev. 10.15.08																	
f	Measurement Frequency					Amp	Preamp Gain					Avg Lim	Average Field Strength Limit				
Dist	Distance to Antenna					D Corr	Distance Correct to 3 meters					Pk Lim	Peak Field Strength Limit				
Read	Analyzer Reading					Avg	Average Field Strength @ 3 m					Avg Mar	Margin vs. Average Limit				
AF	Antenna Factor					Peak	Calculated Peak Field Strength					Pk Mar	Margin vs. Peak Limit				
CL	Cable Loss					HPF	High Pass Filter										

**7.5.2. TX BELOW 1 GHz FOR 802.11a MODE IN THE LOWER 5.2 GHz BAND**

**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)**



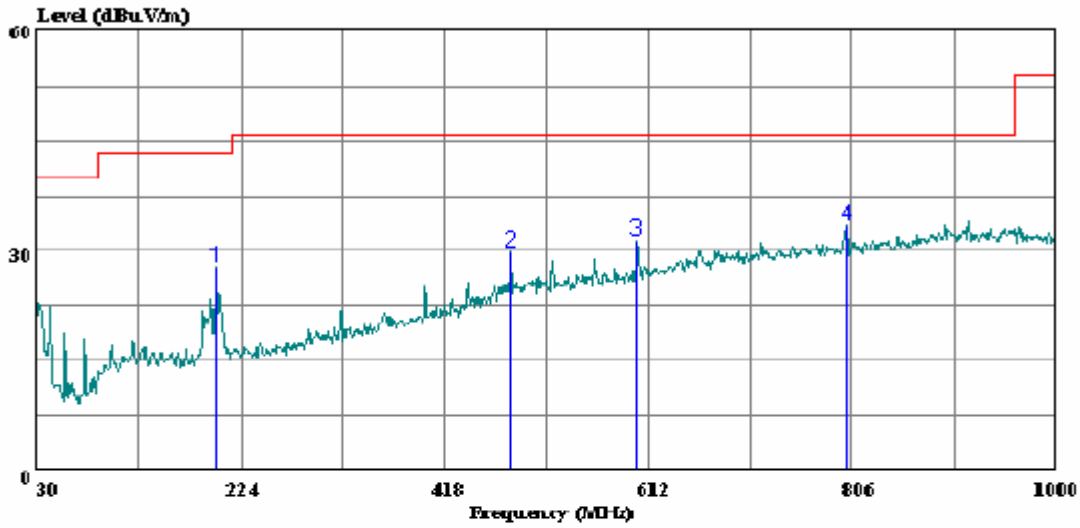
**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)**

VERTICAL PLOT & DATA



Compliance Certification Services  
 47173 Benicia Street  
 Fremont, CA 94538  
 Tel: (510) 771-1000  
 Fax: (510) 661-0888

Data#: 35 File#: 09u12366.emi Date: 02-03-2009 Time: 13:38:01



Trace: 34

Ref Trace:

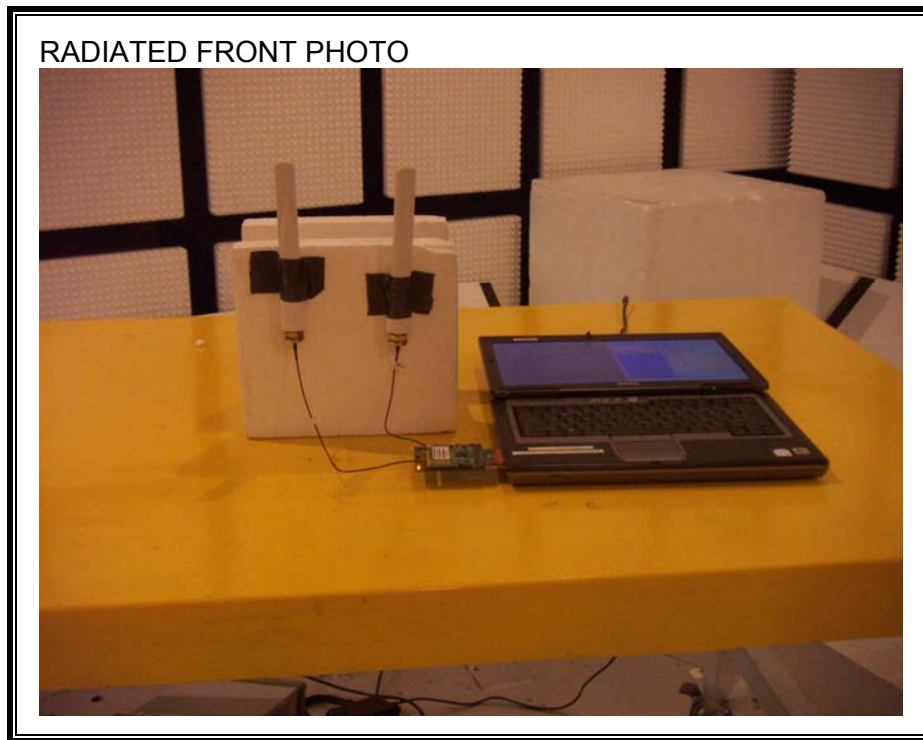
Condition: FCC CLASS-B 3m VERTICAL  
 Test Operator:: Thanh Nguyen  
 Project #: : 09U12336  
 Company: : Meraki Inc.  
 Model: : MR58  
 Configuration: EUT, Laptop, Antenna  
 Mode : : EUT Power up with DC PWR Supply  
 Target: : FCC Class B  
 : EUT w/Flat Panel Antenna  
 : DC Power on

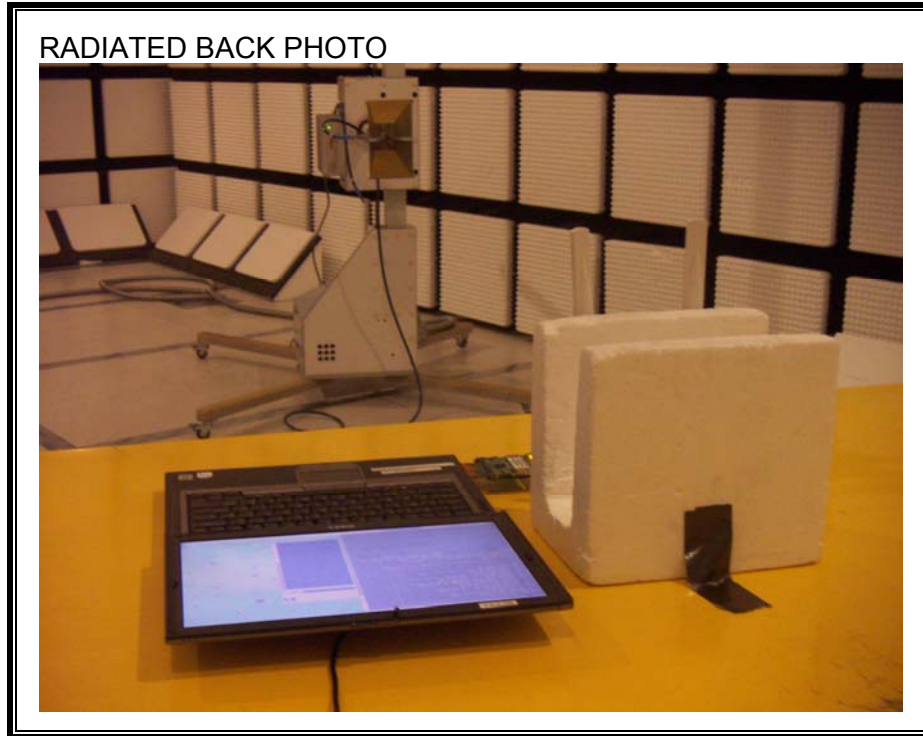
Page: 1

	Read Freq	Read Level	Factor	Level	Limit	Over	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	199.750	40.50	-12.77	27.73	43.50	-15.77	Peak
2	481.050	35.33	-5.37	29.96	46.00	-16.04	Peak
3	600.360	34.33	-2.83	31.50	46.00	-14.50	Peak
4	801.150	32.67	0.73	33.40	46.00	-12.60	Peak

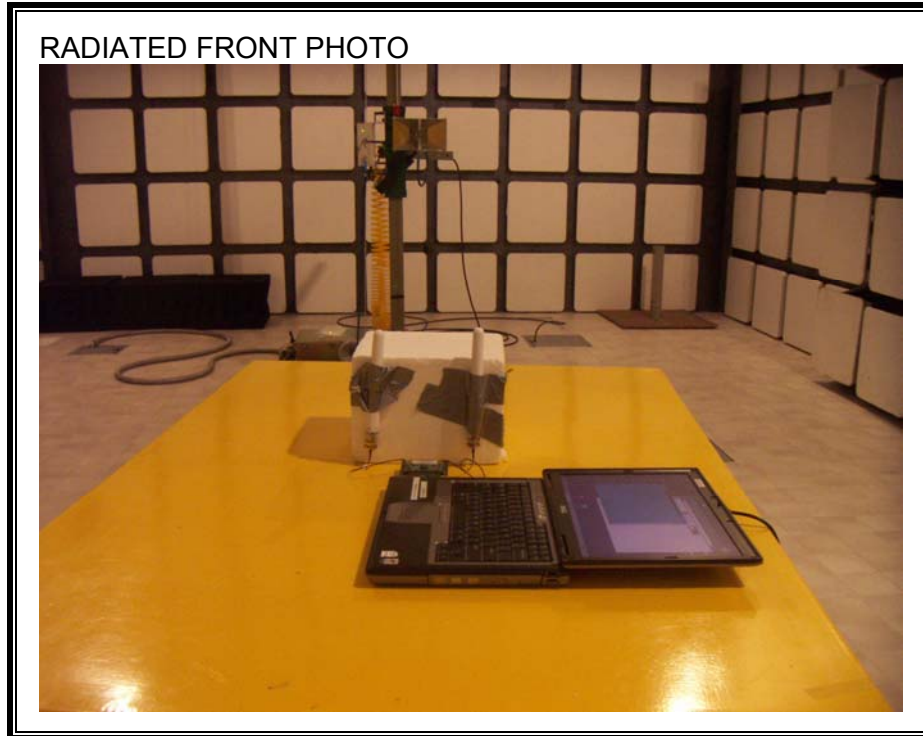
## 8. SETUP PHOTOS

### 1) Dual band Omni-Directional Antenna (2452-57-ON)





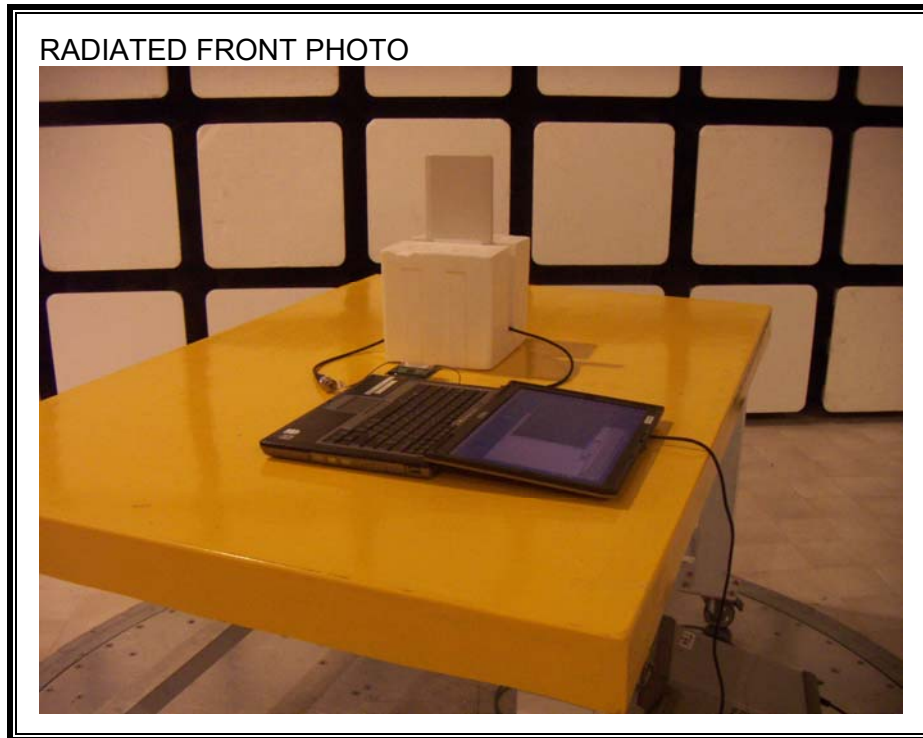
**2) OMNI- DIRECTIONAL LOW GAIN ANTENNA**

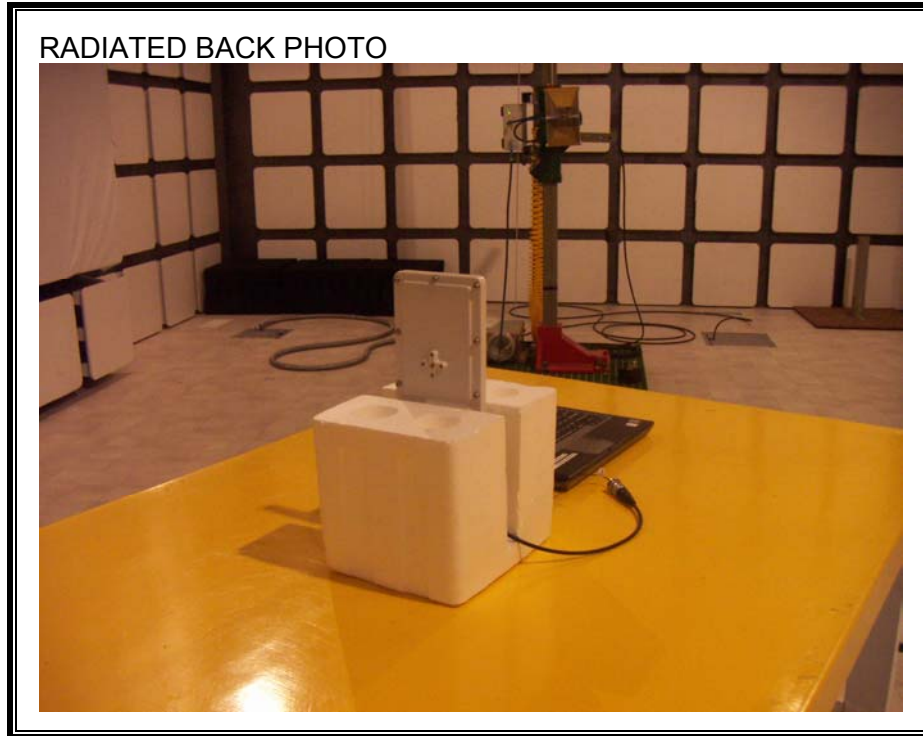




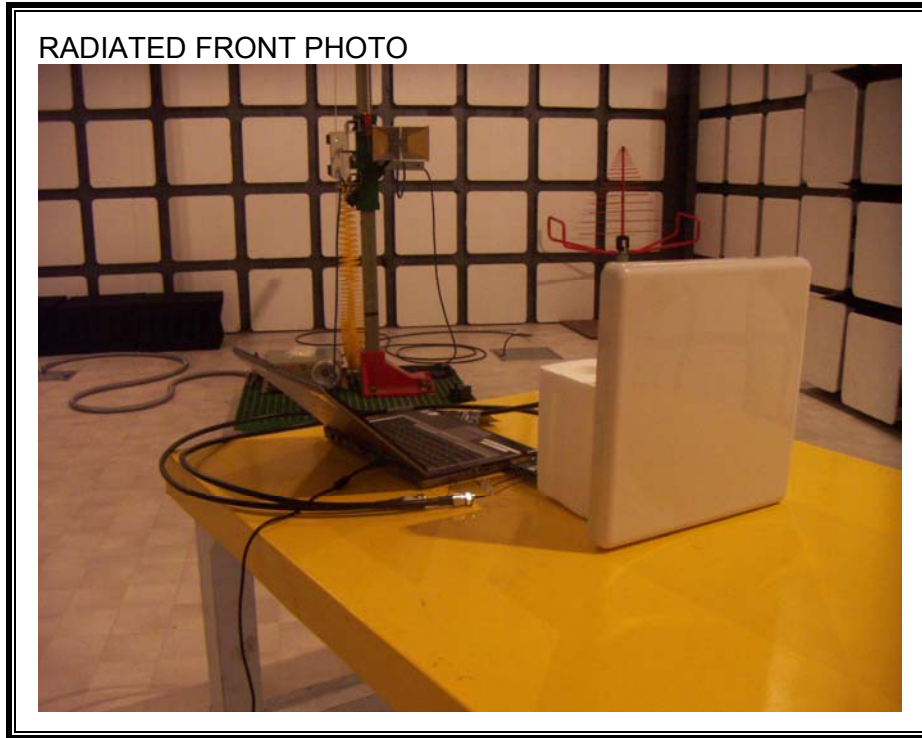


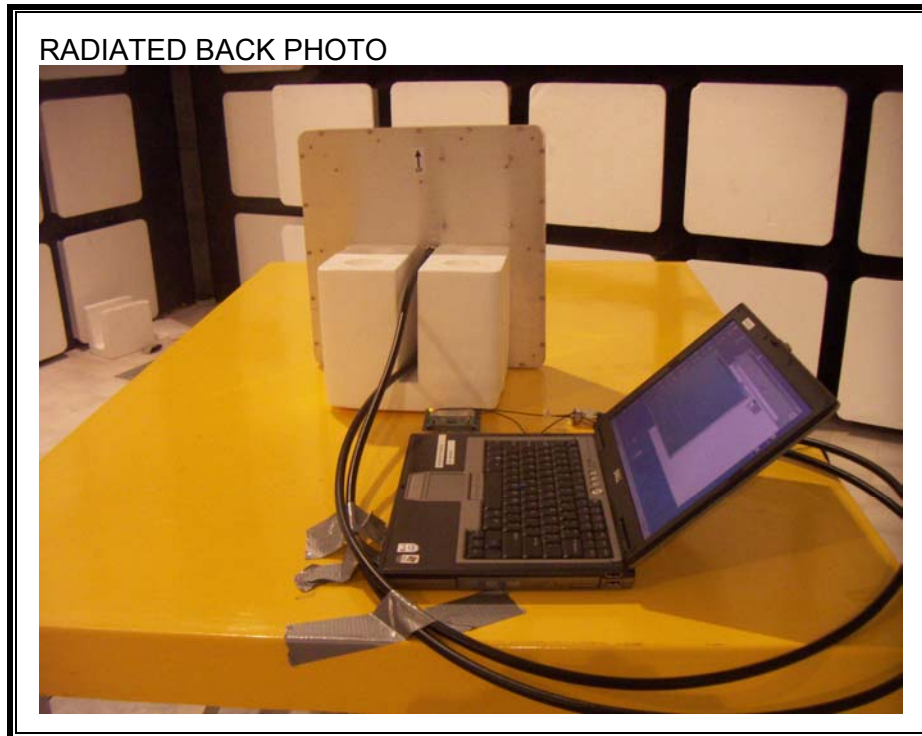
### 3) DUAL PATCH ANTENNA





**4) FLAT PANEL ANTENNA**





**END OF REPORT**