

Digital Path

TEST REPORT FOR

**5212/5213 Radio
Model: G3RL10 V2**

Tested To The Following Standards:

FCC Part 15 Subpart E Section(s)

**15.207 &15.407
(NII 5.725 – 5.850GHz)**

Report No.: 98485-14

Date of issue: July 22, 2016



This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Digital Path
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Chico, CA 95973

REPORT PREPARED BY:

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REPRESENTATIVE: Brock Eastman
Customer Reference Number: DP-CA-103

Project Number: 98485

DATE OF EQUIPMENT RECEIPT:

May 17, 2016

DATE(S) OF TESTING:

May 17-31, 2016

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.



Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information



Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
1120 Fulton Place
Fremont, CA 94539

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.02

Site Registration & Accreditation Information

Location	CB #	TAIWAN	CANADA	FCC	JAPAN
Mariposa A	US0103	SL2-IN-E-1147R	3082A-2	90477	A-0136

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart E - 15.407 (NII)

Test Procedure	Description	Modifications	Results
15.407(e)	6dB Bandwidth	NA	Pass
15.407(a)	Output Power	NA	Pass
15.407(a)	Power Spectral Density	NA	Pass
15.407(g)	Frequency Stability	NA	Pass
15.407(b)	Radiated Emissions & Band Edge	Mod. #1	Pass
15.207	AC Conducted Emissions	Mod. #1	Pass

NA = Not Applicable

Modifications During Testing

This list is a summary of the modifications made to the equipment during testing.

Summary of Conditions

Modification #1: Added Ferrite Manuf: Steward, Model: 28A2024-0A0 to pass 240MHz on both the LAN and POE Ethernet cables going to the EUT.

Modifications listed above must be incorporated into all production units.

Conditions During Testing

This list is a summary of the conditions noted to the equipment during testing.

Summary of Conditions

None

EQUIPMENT UNDER TEST (EUT)

During testing numerous configurations may have been utilized. The configurations listed below support compliance to the standard(s) listed in the Summary of Results section.

Configuration 1

Equipment Tested:

Device	Manufacturer	Model #	S/N
5212/5213 Radio	Digital Path	G3RL10 V2	00:0D:B9:20:90:CC
POE Power Adapter	HP	FAS24000050-C44	None

Support Equipment:

Device	Manufacturer	Model #	S/N
AC/DC power Adapter	HP	Series PPP012H-S	F12941126327228
Laptop Computer	HP	Probook 6565b	None

Configuration 2

Equipment Tested:

Device	Manufacturer	Model #	S/N
5212/5213 Radio	Digital Path	G3RL10 V2	00:0D:B9:2C:02:5C
11 dBi Integrated Omni Antenna (PTMP)	Digital Path Networks	DP-5G11-360	NA
18 dBi Integrated Panel Antenna (PTP)	Digital Path Networks	DP-5G18-30	NA
17 dBi External Sector Antenna (PTMP)	Ubiquity Networks	AM-5AC17-90	AM5A19587
22 dBi External Sector Antenna (PTMP)	Ubiquity Networks	AM-5AC22-45	AM5K03047
23 dBi External Panel Antenna (PTP)	Arc Wireless	ARC-5G23-10	NA
20dBi External Sector Antenna (PTMP)	Ubiquity Networks	AM-5G20	AM5C40145
21dBi External Sector Antenna (PTMP)	Ubiquity Networks	AM-5G21-60	AM5L13747
19 dBi External Sector Antenna (PTMP)	Ubiquity Networks	AM-5G19	AM5160154
V5 Battery Box	Digital Path Networks	NA	NA
Power Supply	Condor	STD-2472P	NA

Support Equipment:

Device	Manufacturer	Model #	S/N
AC/DC power Adapter	HP	Series PPP012H-S	F12941126327228
Laptop Computer	HP	Probook 6565b	NA

Configuration 3

Equipment Tested:

Device	Manufacturer	Model #	S/N
5212/5213 Radio	Digital Path	G3RL10 V2	00:0D:B9:2C:02:5C
V5 Battery Box	Digital Path Networks	NA	NA
Power Supply	Condor	STD-2472P	NA

Support Equipment:

Device	Manufacturer	Model #	S/N
AC/DC power Adapter	HP	Series PPP012H-S	F12941126327228
Laptop Computer	HP	Probook 6565b	NA

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Wideband System:	802.11a
Operating Frequency Range:	5.725 – 5.85GHz
Modulation Type(s):	OFDM
Maximum Duty Cycle:	100%
Number of TX Chains:	1
Antenna Type(s) and Gain:	Integrated Panel / 18dBi Omni / 11dBi External Diamond Arc Wireless / 23dBi Sector / 22dBi Sector / 17dBi Sector / 20dBi Sector / 21dBi Sector / 19dBi
Beamforming Type:	None
Antenna Connection Type:	Integral PCB Trace (11dBi and 18dBi Antennas) and External Connector (SMA) for 17dBi, 19dBi, 20dBi, 22dBi and 23dBi antennas
Nominal Input Voltage:	24VDC POE
Firmware / Software used for Test:	Web interface on EUT to Atheros TX99 Tool: Aquila 9.2.14.

FCC Part 15 Subpart E

15.407(e) 6dB Bandwidth

Test Setup/Conditions

Test Location:	Mariposa Lab A	Test Engineer:	Randal Clark / Benny Lovan
Test Method:	ANSI C63.10 (2013) KDB 789033 D02 v01r02	Test Date(s):	5/18/2016
Configuration:	1		
Test Setup:	The EUT is setup on a table with its antenna port directly connected to an analyzer through 9dB of attenuation.		

Environmental Conditions

Temperature (°C)	26	Relative Humidity (%):	42
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Test Equipment

Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02668	Spectrum Analyzer	Agilent	E4446A	8/14/2015	8/14/2016
02134	Attenuator	Weinschel	54-3	12/8/2014	12/8/2016
P01949	Attenuator	Weinschel	54A-6	12/8/2014	12/8/2016
03355	Cable	AstroLab	32026-2-29094K-48TC	12/8/2014	12/8/2016

6dB Occupied Bandwidth

Test Data Summary

Frequency (MHz)	Antenna Port	Modulation	Measured (kHz)	Limit (kHz)	Results
5740	0	OFDM	16517	None	NA
5800	0	OFDM	16517		
5835	0	OFDM	16516		

NA = Not Applicable

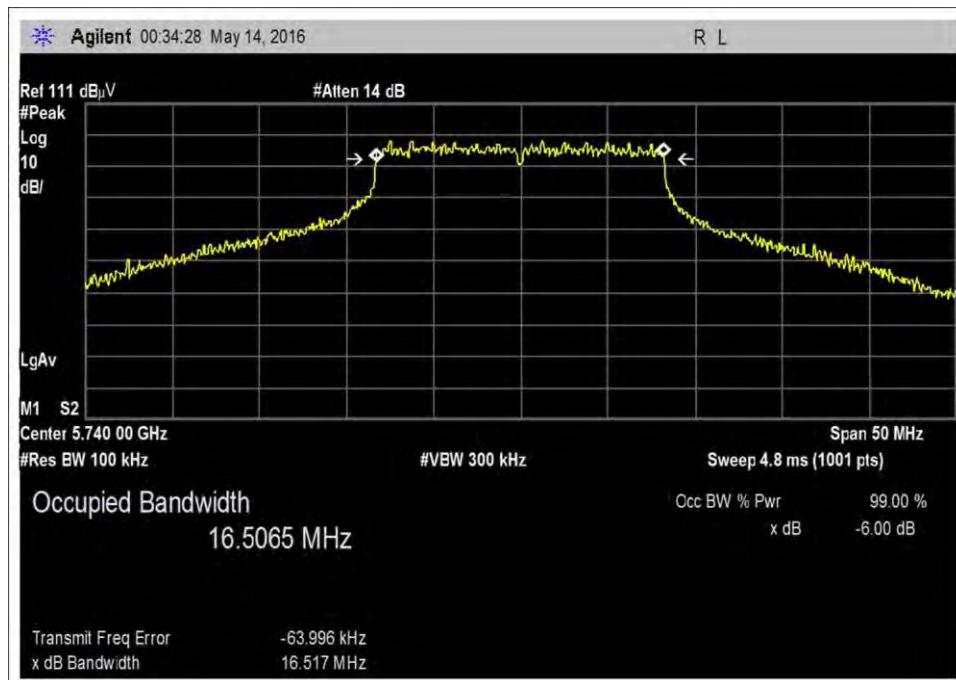
99% Occupied Bandwidth

Test Data Summary

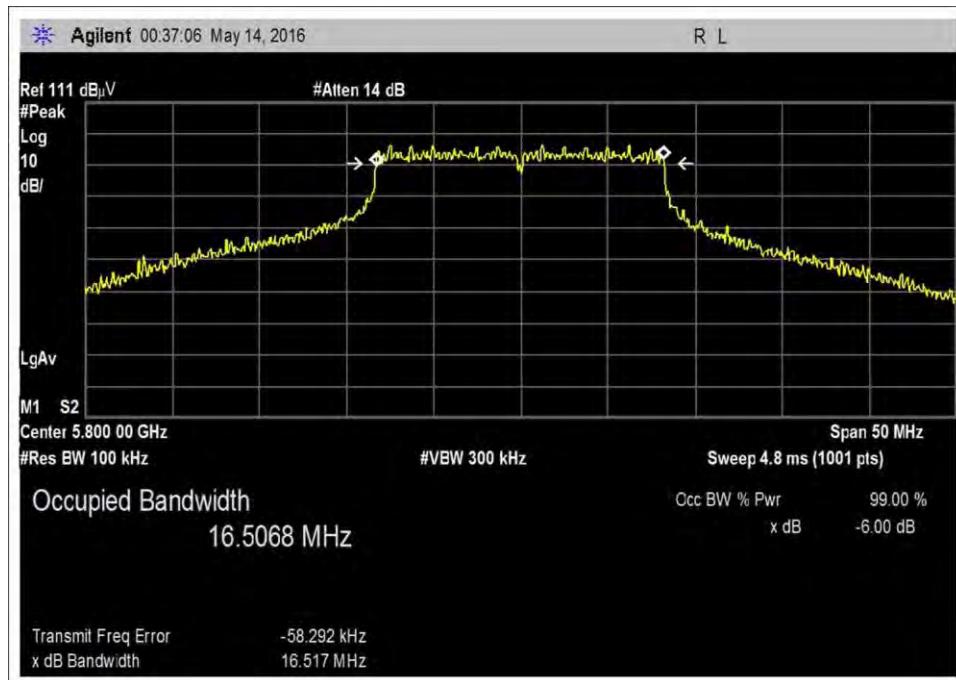
Frequency (MHz)	Antenna Port	Modulation	Measured (kHz)	Limit (kHz)	Results
5740	0	OFDM	16506	None	NA
5800	0	OFDM	16506		
5835	0	OFDM	16548		

NA = Not Applicable

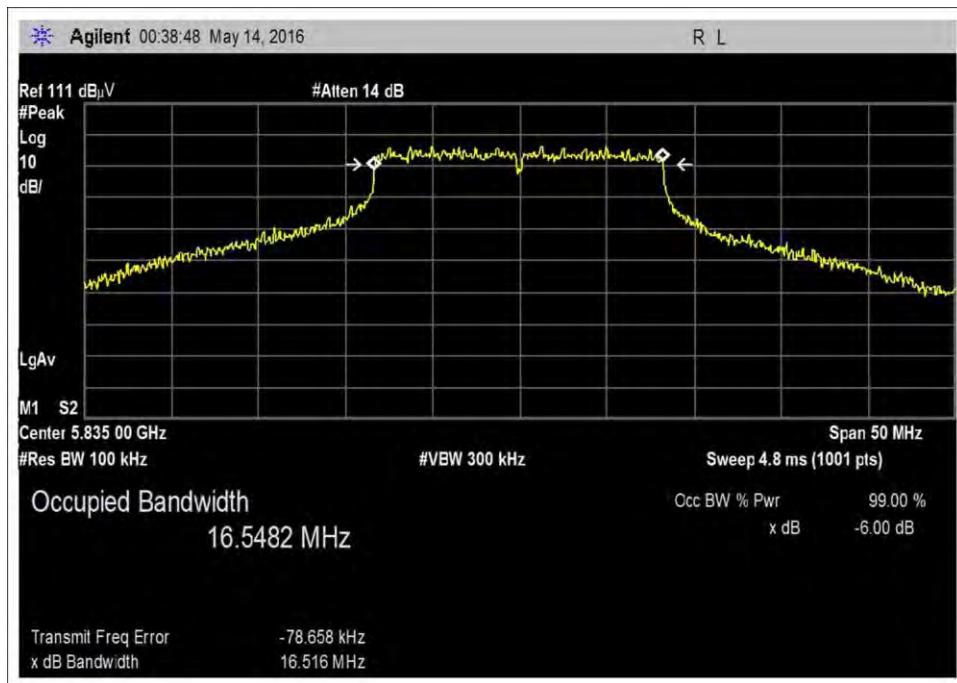
Plots



Low Channel



Middle Channel



High Channel

Test Setup Photo



15.407(a) Output Power

Test Setup/Conditions – RF Conducted Measurement			
Test Location:	Mariposa Lab A	Test Engineer:	Randal Clark and Benny Lovan
Test Method:	ANSI C63.10 (2013) KDB 789033 D02 v01r02	Test Date(s):	5/18/2016 - 05/19/2016
Configuration:	1		
Test Setup:	The EUT is setup on a table with its antenna port directly connected to an analyzer through 9dB of attenuation. The EUT has two antenna ports that are identical. Testing was performed on Port 0.		

Environmental Conditions			
Temperature (°C)	22-26	Relative Humidity (%):	42-51

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02668	Spectrum Analyzer	Agilent	E4446A	8/14/2015	8/14/2016
02134	Attenuator	Weinschel	54-3	12/8/2014	12/8/2016
P01949	Attenuator	Weinschel	54A-6	12/8/2014	12/8/2016
03355	Cable	AstroLab	32026-2-29094K-48TC	12/8/2014	12/8/2016
03338	Multimeter	Extech	MM570A	1/22/2015	1/2/2017

Test Data Summary - Voltage Variations					
Frequency (MHz)	Modulation / Ant Port	V _{Minimum} (dBm)	V _{Nominal} (dBm)	V _{Maximum} (dBm)	Max Deviation from V _{Nominal} (dB)
5735	OFDM / Ant Port 0	13.97	13.73	13.75	0.24
5800	OFDM / Ant Port 0	12.83	12.94	13.16	0.33
5840	OFDM / Ant Port 0	13.28	13.37	13.27	0.10

Test performed using operational mode with the highest output power, representing worst case.

Parameter Definitions:

Measurements performed at input voltage V_{Nominal} ± 15%.

Parameter	Value
V _{Nominal} :	24 VDC
V _{Minimum} :	20.4 VDC
V _{Maximum} :	27.6 VDC

Test Data Summary - RF Conducted Measurement

Measurement Option: AVGSA-1

Frequency (MHz)	Modulation	Ant. Type / Gain (dBi)	Measured (dBm)	Limit (dBm)	Results
5735	OFDM	18 dBi Panel	13.75	≤ 30	Pass
5800	OFDM	18 dBi Panel	12.99	≤ 30	Pass
5840	OFDM	18 dBi Panel	13.03	≤ 30	Pass
5735	OFDM	11 dBi Omni	13.75	≤ 25	Pass
5800	OFDM	11 dBi Omni	12.99	≤ 25	Pass
5840	OFDM	11 dBi Omni	13.03	≤ 25	Pass
5735	OFDM	23dBi Panel	13.75	≤ 30	Pass
5800	OFDM	23dBi Panel	12.99	≤ 30	Pass
5840	OFDM	23dBi Panel	13.03	≤ 30	Pass
5735	OFDM	22dBi Sector	13.75	≤ 14	Pass
5800	OFDM	22dBi Sector	12.99	≤ 14	Pass
5840	OFDM	22dBi Sector	13.03	≤ 14	Pass
5735	OFDM	17dBi Sector	13.75	≤ 19	Pass
5800	OFDM	17dBi Sector	12.99	≤ 19	Pass
5840	OFDM	17dBi Sector	13.03	≤ 19	Pass
5735	OFDM	19dBi Sector	13.75	≤ 17	Pass
5800	OFDM	19dBi Sector	12.99	≤ 17	Pass
5840	OFDM	19dBi Sector	13.03	≤ 17	Pass
5735	OFDM	21dBi Sector	13.75	≤ 15	Pass
5800	OFDM	21dBi Sector	12.99	≤ 15	Pass
5840	OFDM	21dBi Sector	13.03	≤ 15	Pass
5735	OFDM	20dBi Sector	13.75	≤ 16	Pass
5800	OFDM	20dBi Sector	12.99	≤ 16	Pass
5840	OFDM	20dBi Sector	13.03	≤ 16	Pass

Testing was performed on sector antennas, employing the same radio, with gains ranging from 17dBi to 22dBi. Since all antennas produced a passing result, the 19dBi antenna is determined to be covered within these measurements.

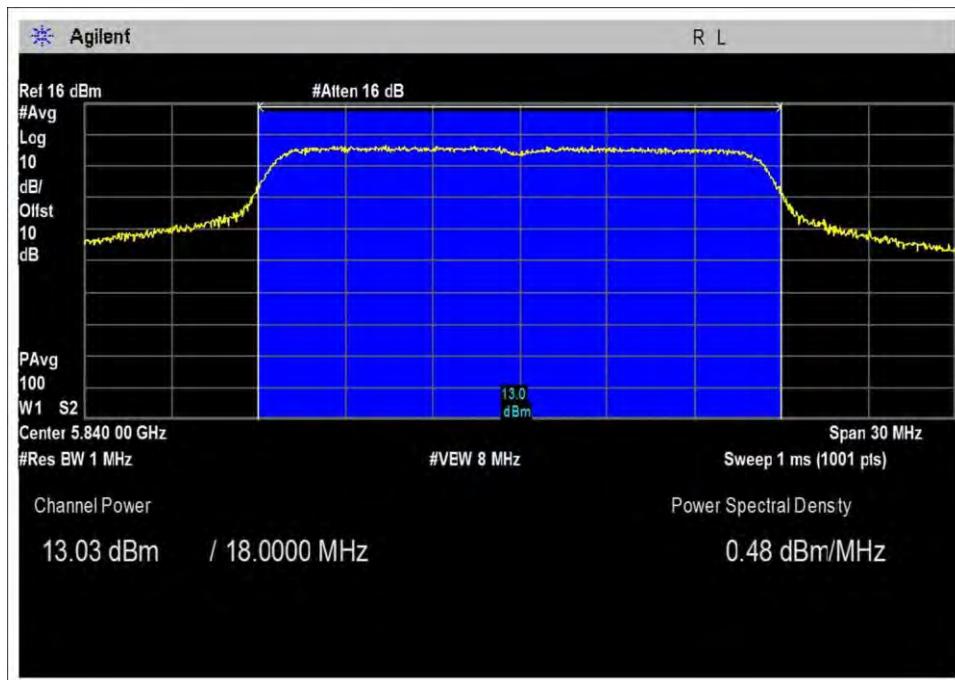
For equipment using antennas other than in fixed point-to-point applications, the limit is calculated in accordance with 15.407(a)(3):

$$\text{Limit} = 30 - \text{Roundup}(G - 6)$$

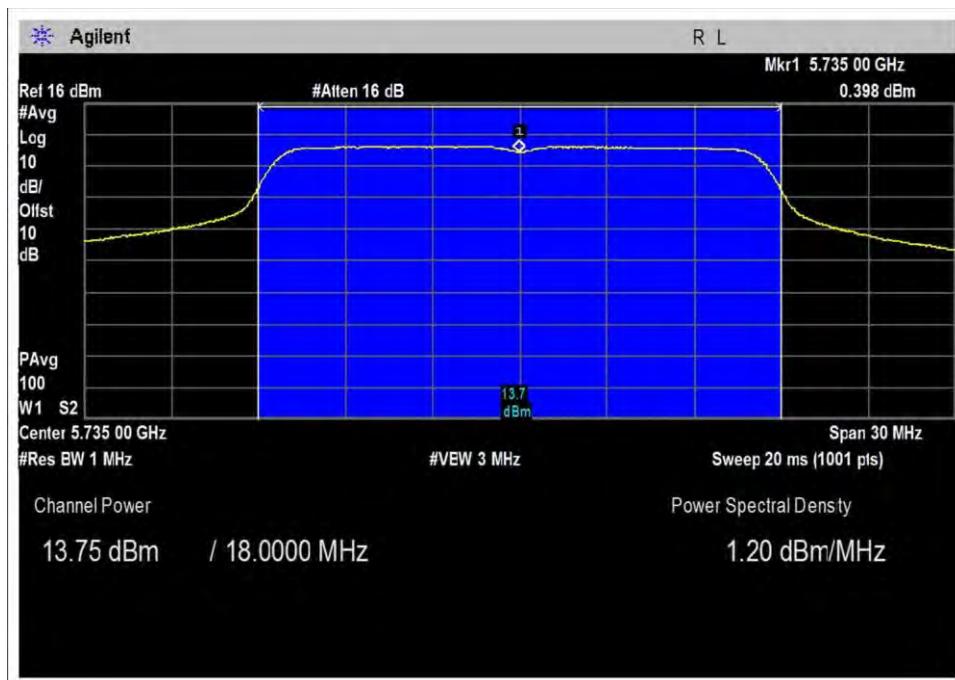
For equipment using antennas in fixed point-to-point applications, the limit is calculated in accordance with 15.407(a)(3):

$$\text{Limit} = 30$$

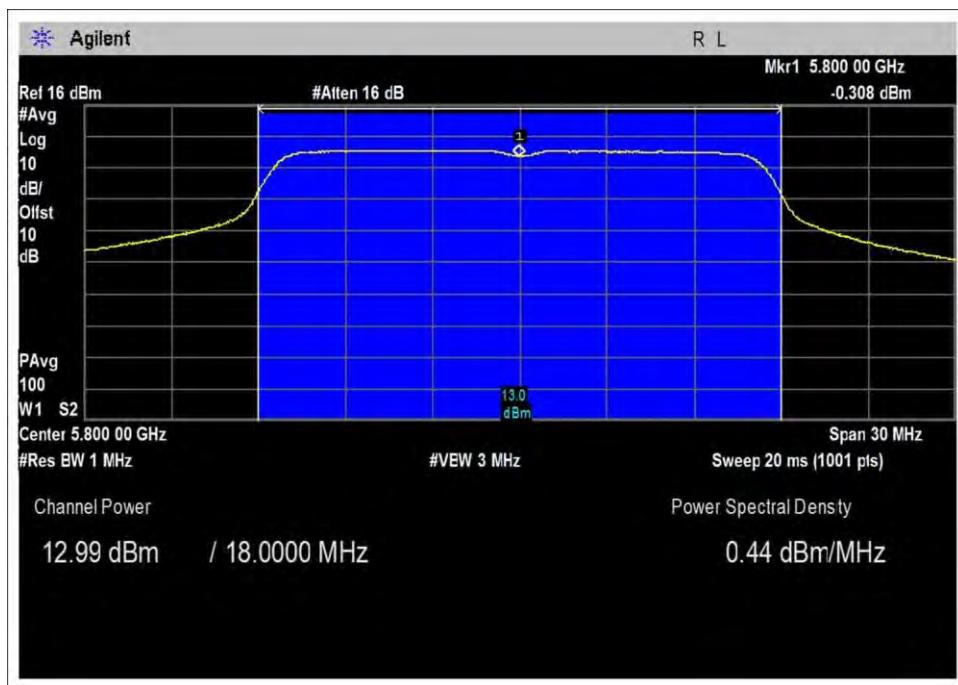
Plots



CHPWR All Ant-HB-5.8-Set23



CHPWR All Ant-LB-5.8-Set23



CHPWR All Ant-MB-5.8-Set23

Test Setup Photo



15.407(a) Power Spectral Density

Test Location:	Mariposa Lab A	Test Engineer:	Randal Clark and Benny Lovan
Test Method:	ANSI C63.10 (2013) KDB 789033 D02 v01r02	Test Date(s):	5/18/2016 – 05/20/16
Configuration:	1		
Test Setup:	The EUT is setup on a table with its antenna port directly connected to an analyzer through 9dB of attenuation. Software setting set to the max setting determined during band edge and channel power measurements.		

Environmental Conditions			
Temperature (°C)	22-26	Relative Humidity (%):	42-51

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02668	Spectrum Analyzer	Agilent	E4446A	8/14/2015	8/14/2016
02134	Attenuator	Weinschel	54-3	12/8/2014	12/8/2016
P01949	Attenuator	Weinschel	54A-6	12/8/2014	12/8/2016
03355	Cable	AstroLab	32026-2-29094K-48TC	12/8/2014	12/8/2016
03338	Multimeter	Extech	MM570A	1/22/2015	1/2/2017

Test Data Summary - RF Conducted Measurement

Measurement Option: AVGSA-1

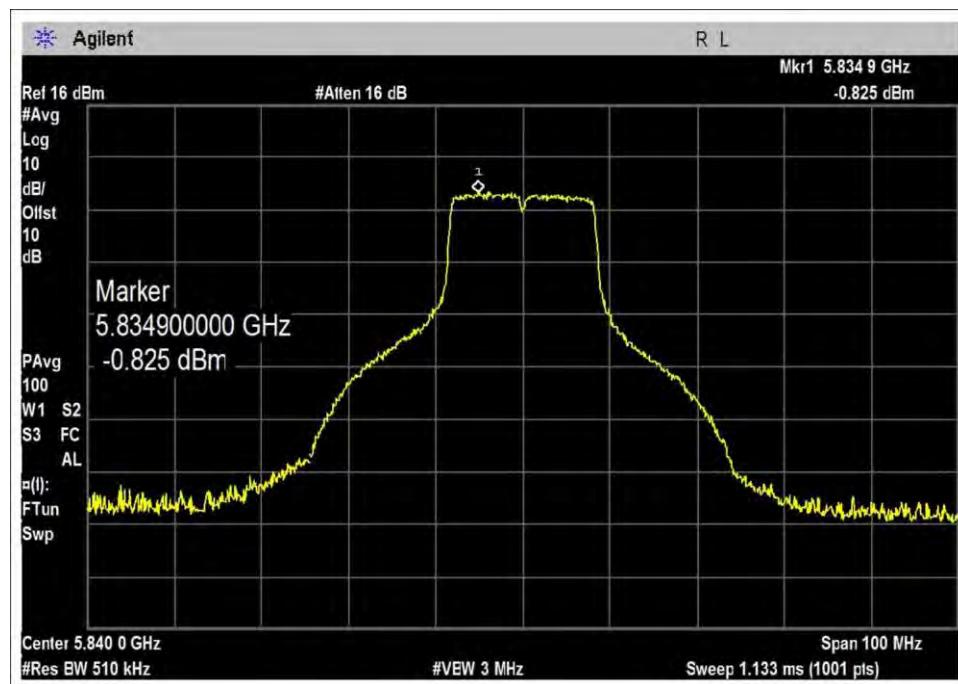
Frequency (MHz)	Modulation	Ant. Type / Gain (dBi)	Measured (dBm/MHz)	Limit (dBm/MHz)	Results
5735	OFDM	18 dBi Panel	-0.224	≤30	Pass
5800	OFDM	18 dBi Panel	-0.897	≤30	Pass
5840	OFDM	18 dBi Panel	-0.825	≤30	Pass
5735	OFDM	11 dBi Omni	-0.224	≤25	Pass
5800	OFDM	11 dBi Omni	-0.897	≤25	Pass
5840	OFDM	11 dBi Omni	-0.825	≤25	Pass
5735	OFDM	23dBi Panel	-0.224	≤30	Pass
5800	OFDM	23dBi Panel	-0.897	≤30	Pass
5840	OFDM	23dBi Panel	-0.825	≤30	Pass
5735	OFDM	22dBi Sector	-0.224	≤14	Pass
5800	OFDM	22dBi Sector	-0.897	≤14	Pass
5840	OFDM	22dBi Sector	-0.825	≤14	Pass
5735	OFDM	17dBi Sector	-0.224	≤19	Pass
5800	OFDM	17dBi Sector	-0.897	≤19	Pass
5840	OFDM	17dBi Sector	-0.825	≤19	Pass
5735	OFDM	19dBi Sector	-0.224	≤ 17	Pass
5800	OFDM	19dBi Sector	-0.897	≤ 17	Pass
5840	OFDM	19dBi Sector	-0.825	≤ 17	Pass
5735	OFDM	21dBi Sector	-0.224	≤15	Pass
5800	OFDM	21dBi Sector	-0.897	≤15	Pass
5840	OFDM	21dBi Sector	-0.825	≤15	Pass
5735	OFDM	20dBi Sector	-0.224	≤16	Pass
5800	OFDM	20dBi Sector	-0.897	≤16	Pass
5840	OFDM	20dBi Sector	-0.825	≤16	Pass

Testing was performed on sector antennas, employing the same radio, with gains ranging from 17dBi to 22dBi. Since all antennas produced a passing result, the 19dBi antenna is determined to be covered within these measurements.

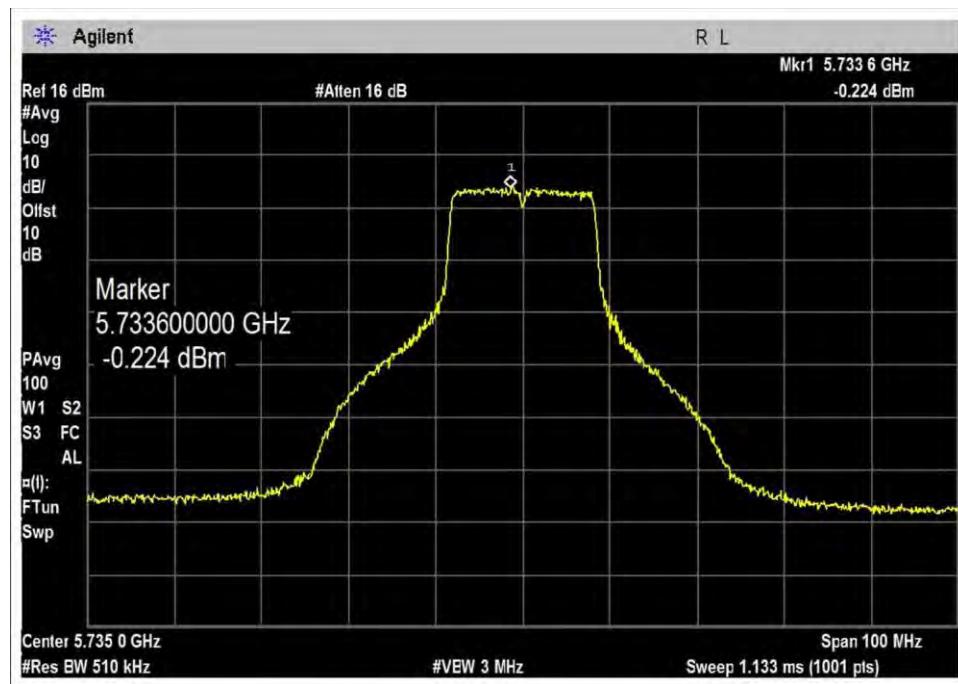
The limit is calculated in accordance with 15.407(a)(3):

$$\text{Limit} = 30 - \text{Roundup}(G - 6)$$

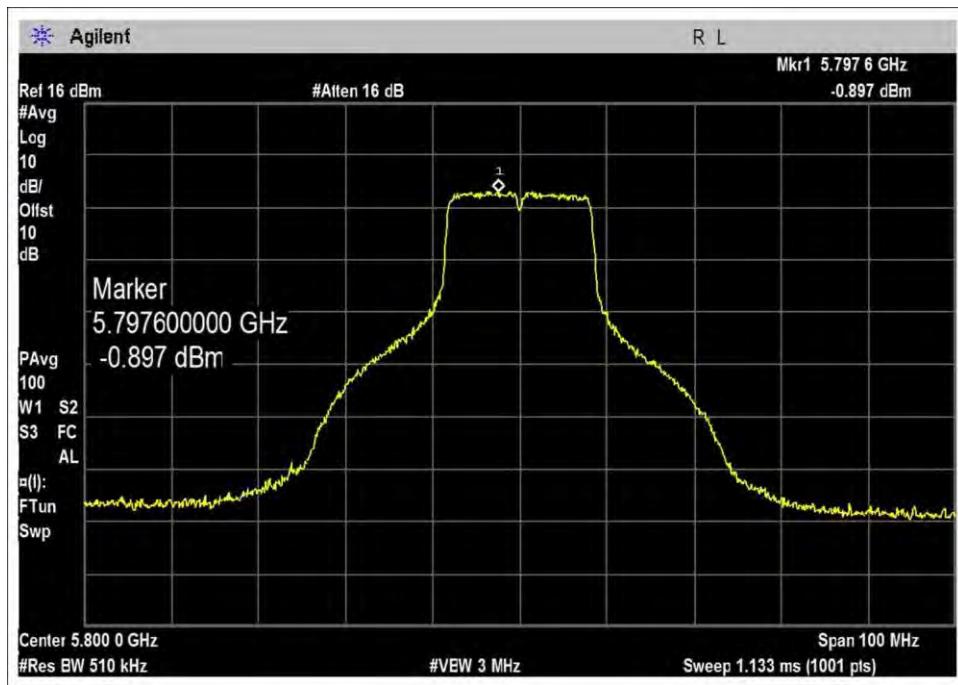
Plots



PSD All ANT-HB-5.8



PSD All ANT-LB-5.8



PSD All ANT-MB-5.8

Test Setup Photo



15.407(g) Frequency Stability

Test Setup/Conditions			
Test Location:	Mariposa Lab A	Test Engineer:	Randal Clark and Benny Lovan
Test Method:	ANSI C63.10 (2013) KDB 789033 D02 v01r02	Test Date(s):	5/31/2016
Configuration:	1		
Test Setup:	The EUT is setup inside of a temperature chamber. A cable is connected to antenna port 0 and it is setup to transmit at the various low and high frequencies. A thermocouple that attaches to a calibrated multimeter verifies the temperature within the chamber. A DC power source is used to do the voltage variation. Output of transmitter set to software setting 23.		

Environmental Conditions			
Temperature (°C)	21	Relative Humidity (%):	39

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02668	Spectrum Analyzer	Agilent	E4446A	8/14/2015	8/14/2016
02134	Attenuator	Weinschel	54-3	12/8/2014	12/8/2016
P01949	Attenuator	Weinschel	54A-6	12/8/2014	12/8/2016
03355	Cable	AstroLab	32026-2-29094K-48TC	12/8/2014	12/8/2016
03338	Multimeter	Extech	MM570A	1/22/2015	1/2/2017
01879	Temperature Chamber	Thermotron	S-1.2 Min.	12/5/2014	12/5/2016

Test Data Summary

Declared Temperature Range: . -20 – 70 °C

Temperature (°C)	Voltage	Low Frequency (MHz)	High Frequency (MHz)	Limit (MHz)	Results
-20	V_{Nominal}	5726.42	5848.50	All emissions remain within 5725-5850	Pass
-10	V_{Nominal}	5726.42	5848.50		
0	V_{Nominal}	5726.42	5848.50		
10	V_{Nominal}	5726.50	5848.58		
20	V_{Minimum}	5726.42	5848.58		
20	V_{Nominal}	5726.42	5848.58		
20	V_{Maximum}	5726.50	5848.58		
30	V_{Nominal}	5726.50	5848.58		
40	V_{Nominal}	5726.50	5848.58		
50	V_{Nominal}	5726.50	5848.58		
60	V_{Nominal}	5726.58	5848.67		
70	V_{Nominal}	5726.50	5848.58		
Nominal Frequency:					

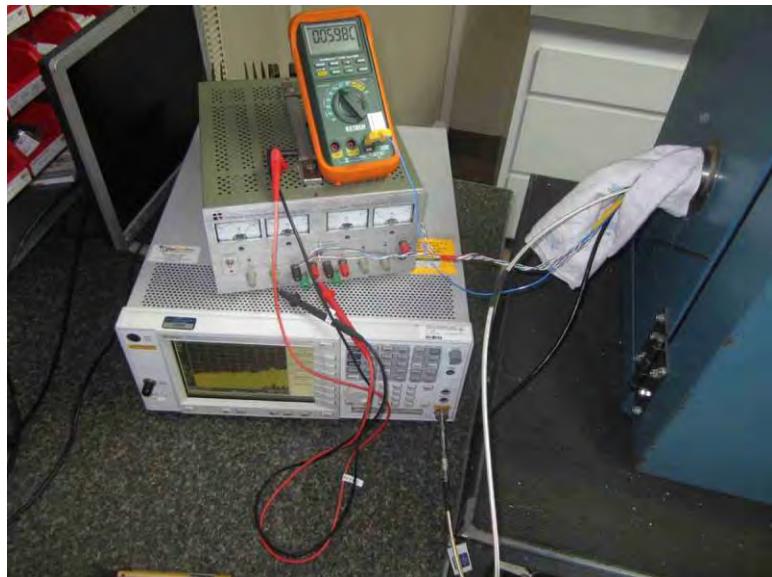
Parameter Definitions:

Measurements performed at input voltage $V_{\text{Nominal}} \pm 15\%$.

Parameter	Value
V_{Nominal} :	24 VDC
V_{Minimum} :	20.4 VDC
V_{Maximum} :	27.6 VDC

Test Setup Photos





15.407(b) Radiated Emissions & Band Edge

Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Dr. • Mariposa, CA 95338 • 1-800-500-4EMC (4362)
 Customer: **Digital Path**
 Specification: **15.407(b) / 15.209 Radiated Spurious Emissions**
 Work Order #: **98485** Date: **5/27/2016**
 Test Type: **Radiated Scan** Time: **11:43:56**
 Tested By: Randal Clark Sequence#: **3**
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Equipment is an outdoor access point for use in both PTP and PTMP applications.

Modulation used: OFDM (802.11a)

Data rate: 54Mbps (representative of worst case)

Antenna: All antennas (11dBi, 17dBi, 18dBi, 22dBi and 23dBi)

Operational Frequency: Low mid and High (5735, 5800, 5840)

Power Output Setting: 23dBm

Frequency Range Investigated: 30-1000MHz

Highest Generated Frequency not related to radio: 500MHz

Temperature: 64°F

Relative Humidity: 49%

Test method: ANSI C63.10 (2013)

The EUT is setup on its antenna mount in the vertical orientation which is representative of normal installation. The unit has two cards within it and we are utilizing both radios for testing. Both radios are identical. A power supply is located on a table next to the mount.

Testing was performed on sector antennas, employing the same radio, with gains ranging from 17dBi to 22dBi. Since all antennas produced a passing result, the 20dBi antenna as well as the 21dBi Antenna are determined to be covered within these measurements.

The Spurious Emissions limits were derived from KDB 789033 D02 v01r02, G, 2, iii

For emissions falling within the restricted bands as defined in 15.205, the limits of 15.209 were used.

For emissions falling outside of the restricted bands as defined in 15.205, the limits defined in 15.407(b) were used as shown in the calculation below:

$$EIRP[dBm] = E[dBuV/m] - 95.2$$

$$E[dBuV/m] = EIRP[dBm] + 95.2$$

$$E[dBuV/m] = -27dBm/MHz + 95.2$$

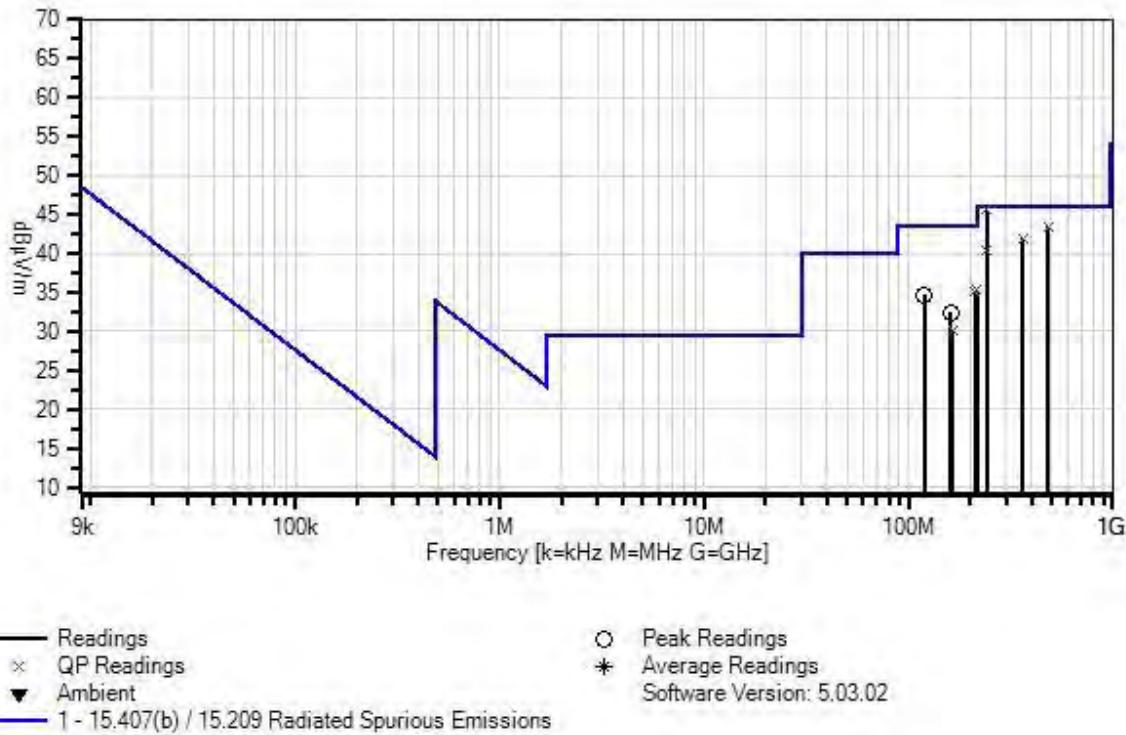
$$E[dBuV/m] = 68.2dBuV/m$$

Testing was performed on sector antennas, employing the same radio, with gains ranging from 17dBi to 22dBi.

Since all antennas produced a passing result, the 19dBi antenna is determined to be covered within these measurements.

Modification #1 was in place during testing.

Digital Path Networks WO#: 98485 Sequence#: 3 Date: 5/27/2016
15.407(b) / 15.209 Radiated Spurious Emissions Test Distance: 10 Meters Horiz



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05656	Attenuator	PE7004-6	12/22/2015	12/22/2017
T2	AN01993	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018
T3	ANP06847	Cable	LMR195-FR-6	7/9/2015	7/9/2017
T4	ANMA10M	Cable		8/26/2014	8/26/2016
T5	ANP06883	Cable	LMR195-FR-3	10/27/2015	10/27/2017
T6	AN00449	Preamp-Top Amp (dB)	8447F	2/18/2016	2/18/2018
T7	ANP06230	Cable	CXTA04A-50	3/3/2016	3/3/2018
	AN02111	Spectrum Analyzer	8593EM	6/4/2015	6/4/2016

Measurement Data:

Reading listed by margin.

Test Distance: 10 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz		T5	T6	T7		Table	dB μ V/m	dB μ V/m		
1	240.023M	36.6	+6.0	+12.2	+0.4	+4.3	+10.5	45.6	46.0	-0.4	Vert
	QP		+0.2	-26.4	+1.8						
^	240.023M	38.3	+6.0	+12.2	+0.4	+4.3	+10.5	47.3	46.0	+1.3	Vert
			+0.2	-26.4	+1.8						
3	479.995M	26.7	+6.0	+18.2	+0.5	+6.3	+10.5	43.5	46.0	-2.5	Horiz
	QP		+0.3	-27.6	+2.6						
^	479.995M	29.9	+6.0	+18.2	+0.5	+6.3	+10.5	46.7	46.0	+0.7	Horiz
			+0.3	-27.6	+2.6						
5	361.723M	28.4	+6.0	+15.3	+0.5	+5.4	+10.5	42.0	46.0	-4.0	Vert
	QP		+0.3	-26.7	+2.3						
^	361.723M	31.3	+6.0	+15.3	+0.5	+5.4	+10.5	44.9	46.0	-1.1	Vert
			+0.3	-26.7	+2.3						
7	240.008M	31.4	+6.0	+12.2	+0.4	+4.3	+10.5	40.4	46.0	-5.6	Horiz
	QP		+0.2	-26.4	+1.8						
^	240.008M	32.5	+6.0	+12.2	+0.4	+4.3	+10.5	41.5	46.0	-4.5	Horiz
			+0.2	-26.4	+1.8						
9	211.996M	28.4	+6.0	+10.2	+0.4	+4.0	+10.5	35.0	43.5	-8.5	Vert
	QP		+0.2	-26.4	+1.7						
^	211.996M	32.7	+6.0	+10.2	+0.4	+4.0	+10.5	39.3	43.5	-4.2	Vert
			+0.2	-26.4	+1.7						
11	119.988M	28.9	+6.0	+11.6	+0.3	+2.9	+10.5	34.7	43.5	-8.8	Horiz
			+0.2	-27.0	+1.3						
12	216.381M	28.5	+6.0	+10.5	+0.4	+4.0	+10.5	35.3	46.0	-10.7	Vert
	QP		+0.2	-26.5	+1.7						
^	216.381M	34.5	+6.0	+10.5	+0.4	+4.0	+10.5	41.3	46.0	-4.7	Vert
			+0.2	-26.5	+1.7						
14	160.002M	26.8	+6.0	+10.5	+0.3	+3.4	+10.5	32.4	43.5	-11.1	Horiz
			+0.2	-26.8	+1.5						
15	163.902M	24.7	+6.0	+10.2	+0.3	+3.4	+10.5	30.1	43.5	-13.4	Vert
	QP		+0.2	-26.7	+1.5						
^	163.902M	33.3	+6.0	+10.2	+0.3	+3.4	+10.5	38.7	43.5	-4.8	Vert
			+0.2	-26.7	+1.5						

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Dr. • Mariposa, CA 95338 • 1-800-500-4EMC (4362)
 Customer: **Digital Path**
 Specification: **15.407(b)(1) / 15.209 Radiated Spurious Emissions - AP / PTMP Devices**
 Work Order #: **98485** Date: 5/26/2016
 Test Type: **Radiated Scan** Time: 15:38:42
 Tested By: Randal Clark Sequence#: 3
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Equipment is an outdoor access point for use in both PTP and PTMP applications.

Modulation used: OFDM (802.11a)

Data rate: 54MBps (representative of worst case)

Antenna: 22dBi Sector, 17dBi Sector, 23dBi External Diamond, 11dBi Omni, 18dBi Integrated panel.

Operational Frequency: 5735, 5800, and 5840 (Low, mid and high)

Power Output Setting: 23dBm

Frequency Range Investigated: 1-40GHz

Highest Generated Frequency not related to radio: 500MHz

Temperature: 15°C

Relative Humidity: 74%

Test method: ANSI C63.10 (2013)

The EUT is setup on its antenna mount in the vertical orientation which is representative of normal installation. The unit has two cards within it and we are utilizing both radios for testing. Both radios are identical. A power supply is located on a table next to the mount.

Testing was performed on sector antennas, employing the same radio, with gains ranging from 17dBi to 22dBi. Since all antennas produced a passing result, the 20dBi antenna as well as the 21dBi Antenna are determined to be covered within these measurements.

The Spurious Emissions limits were derived from KDB 789033 D02 v01r02, G, 2, iii

For emissions falling within the restricted bands as defined in 15.205, the limits of 15.209 were used.

For emissions falling outside of the restricted bands as defined in 15.205, the limits defined in 15.407(b) were used as shown in the calculation below:

$$EIRP[dBm] = E[dBuV/m] - 95.2$$

$$E[dBuV/m] = EIRP[dBm] + 95.2$$

$$E[dBuV/m] = -27dBm/MHz + 95.2$$

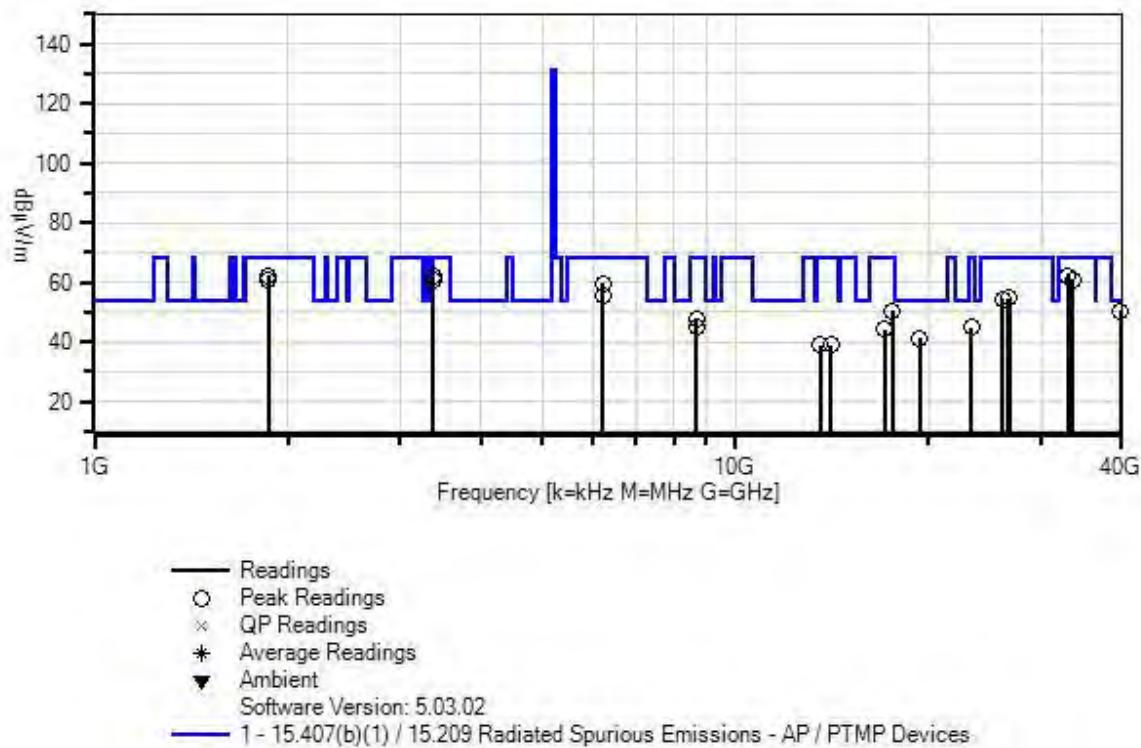
$$E[dBuV/m] = 68.2dBuV/m$$

Testing was performed on sector antennas, employing the same radio, with gains ranging from 17dBi to 22dBi. Since all antennas produced a passing result, the 19dBi antenna is determined to be covered within these measurements.

Modification #1 was in place during testing.

All signals in this data sheet are noise floor. No EUT emissions were observed.

Digital Path Networks WO#: 98485 Sequence#: 3 Date: 5/26/2016
15.407(b)(1) / 15.209 Radiated Spurious Emissions - AP / PTMP Devices Test Distance: 3 Meters Horiz



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	8/14/2015	8/14/2016
T1	ANP05904	Cable	32022-2-29094K-144TC	12/8/2014	12/8/2016
T2	ANP01403	Cable	58758-23	12/8/2014	12/8/2016
	AN02045	Horn Antenna-ANSI C63.5 Calibration	MWH-2640/B	5/7/2015	5/7/2017
	AN03361	Cable	32022-2-29094-48TC	12/8/2014	12/8/2016
	AN02115	Preamp	83051A	12/9/2014	12/9/2016
	AN02118	High Pass Filter	84300-80039	12/9/2014	12/9/2016
T3	AN01273	Horn Antenna	3115	2/3/2015	2/3/2017
	AN03366	Horn Antenna-ANSI C63.5 Calibration	GH-62-25	2/9/2016	2/9/2018
	AN02694	Horn Antenna-ANSI C63.5 3m	AMFW-5F-18002650-20-10P	5/7/2015	5/7/2017

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	39787.500 M	13.6	+12.9	+16.2	+0.0	+0.0	50.5	54.0	-3.5	Horiz
										Noisefloor
2	39787.500 M	13.6	+12.9	+16.2	+0.0	+0.0	50.5	54.0	-3.5	Vert
										Noisefloor
3	1866.000M	33.4	+2.1	+2.0	+0.0	+0.0	62.2	68.2	-6.0	Vert
										Noisefloor
4	32936.000 M	32.9	+9.6	+12.5	+0.0	+0.0	62.2	68.2	-6.0	Vert
										Noisefloor
5	3371.113M	27.4	+2.8	+2.8	+0.0	+0.0	61.8	68.2	-6.4	Vert
										Noisefloor
6	33505.000 M	31.3	+9.8	+12.7	+0.0	+0.0	61.1	68.2	-7.1	Horiz
										Noisefloor
7	3371.000M	26.5	+2.8	+2.8	+0.0	+0.0	60.9	68.2	-7.3	Horiz
										Noisefloor
8	1866.000M	32.0	+2.1	+2.0	+0.0	+0.0	60.8	68.2	-7.4	Horiz
										Noisefloor
9	6210.000M	20.2	+3.9	+3.9	+31.5	+0.0	59.5	68.2	-8.7	Horiz
										Noisefloor
10	6210.000M	16.3	+3.9	+3.9	+0.0	+0.0	55.6	68.2	-12.6	Vert
										Noisefloor
11	19318.000 M	42.7	+7.2	+7.8	+0.0	+0.0	41.3	54.0	-12.7	Horiz
										Noisefloor

12	26681.000	33.4	+8.7	+10.3	+0.0	+0.0	54.8	68.2	-13.4	Vert
M										
13	26633.000	33.5	+8.7	+10.2	+0.0	+0.0	54.8	68.2	-13.4	Horiz
M										
14	26058.000	51.3	+8.6	+10.0	+0.0	+0.0	54.3	68.2	-13.9	Horiz
M										
15	17526.000	36.3	+7.1	+7.4	+0.0	+0.0	50.5	68.2	-17.7	Horiz
M										
16	8674.000M	33.5	+4.7	+4.8	+34.1	+0.0	47.9	68.2	-20.3	Vert
Noisefloor										
17	8673.500M	30.7	+4.7	+4.8	+34.1	+0.0	45.1	68.2	-23.1	Horiz
Noisefloor										
18	23318.000	45.3	+8.1	+9.1	+0.0	+0.0	45.0	68.2	-23.2	Horiz
M										
19	17061.000	30.6	+7.0	+7.3	+0.0	+0.0	44.3	68.2	-23.9	Vert
M										
20	14061.000	29.9	+6.2	+6.5	+0.0	+0.0	39.0	68.2	-29.2	Vert
M										
21	13526.000	30.1	+6.1	+6.3	+0.0	+0.0	38.9	68.2	-29.3	Horiz
M										
Noisefloor										

Band Edge

Band Edge Summary

Frequency (MHz)	Modulation	Ant. Type	Field Strength (dBuV/m @3m)	Limit (dBuV/m @3m)	Results
5725	OFDM	11dBi Omni	82.5	< 122.2	Pass
5850	OFDM	11dBi Omni	81.5	< 122.2	Pass
5725	OFDM	18dBi Panel	93.4	< 122.2	Pass
5850	OFDM	18dBi Panel	90.5	< 122.2	Pass
5725	OFDM	17dBi Sector	90.1	< 122.2	Pass
5850	OFDM	17dBi Sector	87.6	< 122.2	Pass
5725	OFDM	22dBi Sector	90.5	< 122.2	Pass
5850	OFDM	22dBi Sector	88.6	< 122.2	Pass
5725	OFDM	23dBi Panel	96.2	< 122.2	Pass
5850	OFDM	23dBi Panel	92.3	< 122.2	Pass

Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Dr. • Mariposa, CA 95338 • 1-800-500-4EMC (4362)
 Customer: **Digital Path**
 Specification: **15.407(b)(4) / 15.209 Radiated Spurious Emissions**
 Work Order #: **98485** Date: 5/19/2016
 Test Type: **Radiated Scan** Time: 16:08:26
 Tested By: Randal Clark Sequence#: 3
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Equipment is an outdoor access point for use in both PTP and PTMP applications.

Modulation used: OFDM (802.11a)
 Data rate: 54Mbps (representative of worst case)
 Antenna: 23 dBi PTP Panel
 Power Output Setting: 23dBm
 Frequency Range Investigated: Band Edge.

Temperature: 64°F
 Relative Humidity: 49%

Test method: ANSI C63.10 (2013)
 The Band Edge limit is 27dBm/MHz and the limit was converted using the calculation derived from KDB 789033 D02 v01r02, G, 2, iii

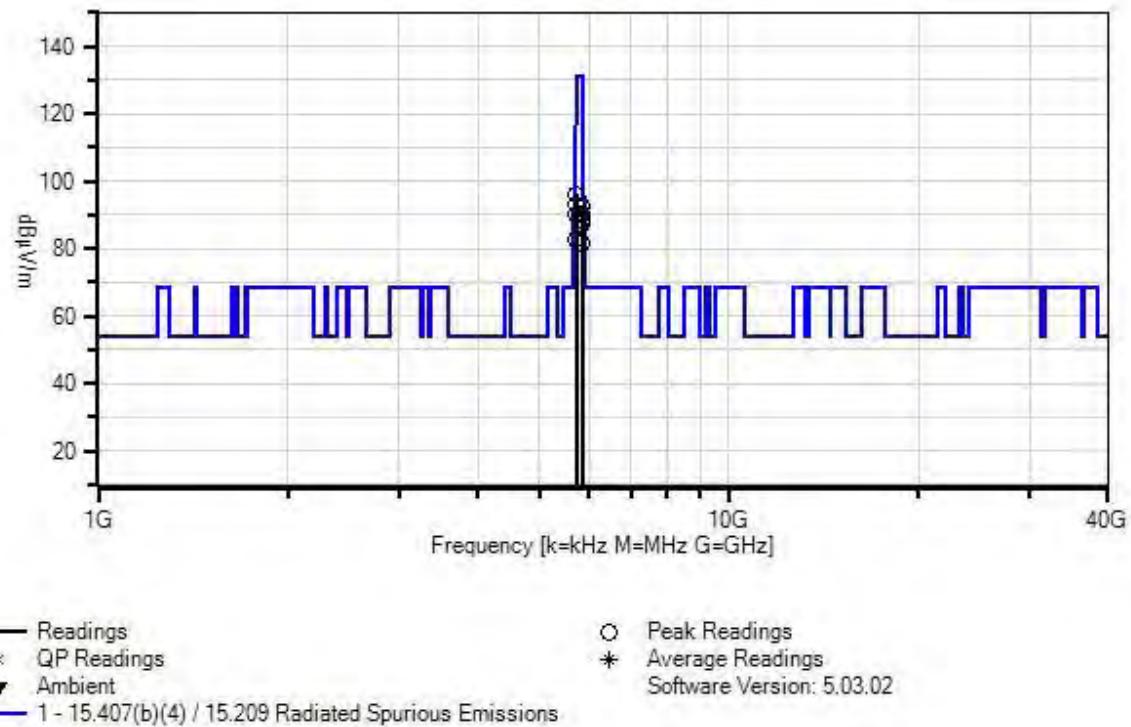
$EIRP[dBm] = E[dBuV/m] - 95.2$
 $E[dBuV/m] = EIRP[dBm] + 95.2$
 $E[dBuV/m] = 27dBm/MHz + 95.2$
 $E[dBuV/m] = 122.2dBuV/m$

Testing was performed on sector antennas, employing the same radio, with gains ranging from 17dBi to 22dBi. Since all antennas produced a passing result, the 19dBi antenna is determined to be covered within these measurements.

Antenna 2 (22dBi Sector Ant) is only being measured on the vertical port only. The manufacturer declares that the Horizontal port is not used.

Antenna 3 (17dBi Sector Ant) is only being measured on the vertical port only. The manufacturer declares that the Horizontal port is not used.

Digital Path Networks WO#: 98485 Sequence#: 3 Date: 5/19/2016
15.407(b)(4) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN01273	Horn Antenna	3115	2/3/2015	2/3/2017
T2	ANP01403	Cable	58758-23	12/8/2014	12/8/2016
T3	ANP05904	Cable	32022-2- 29094K-144TC	12/8/2014	12/8/2016

Measurement Data:

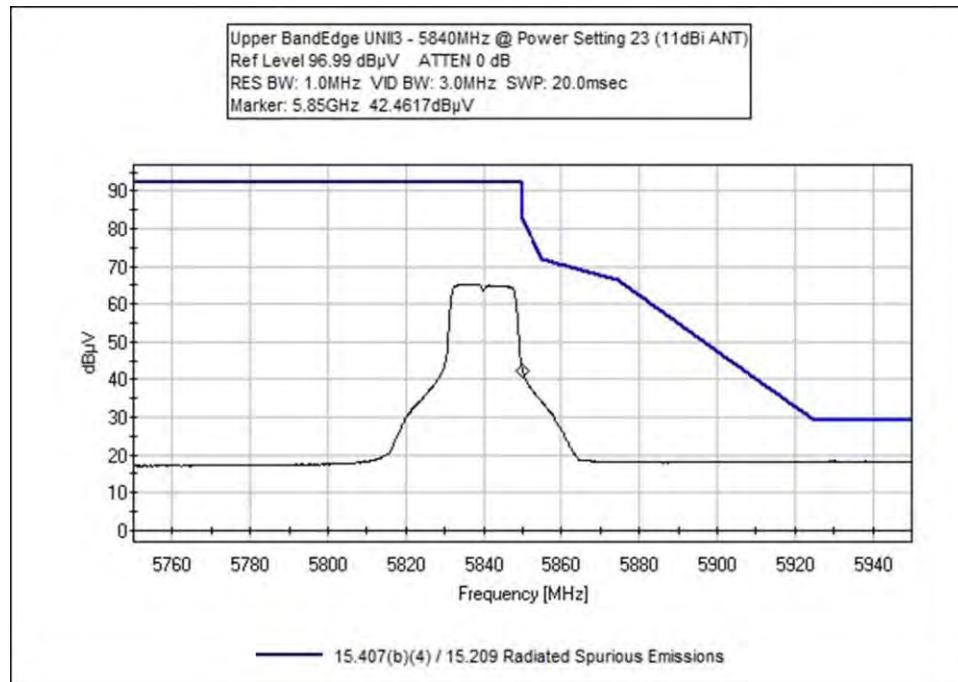
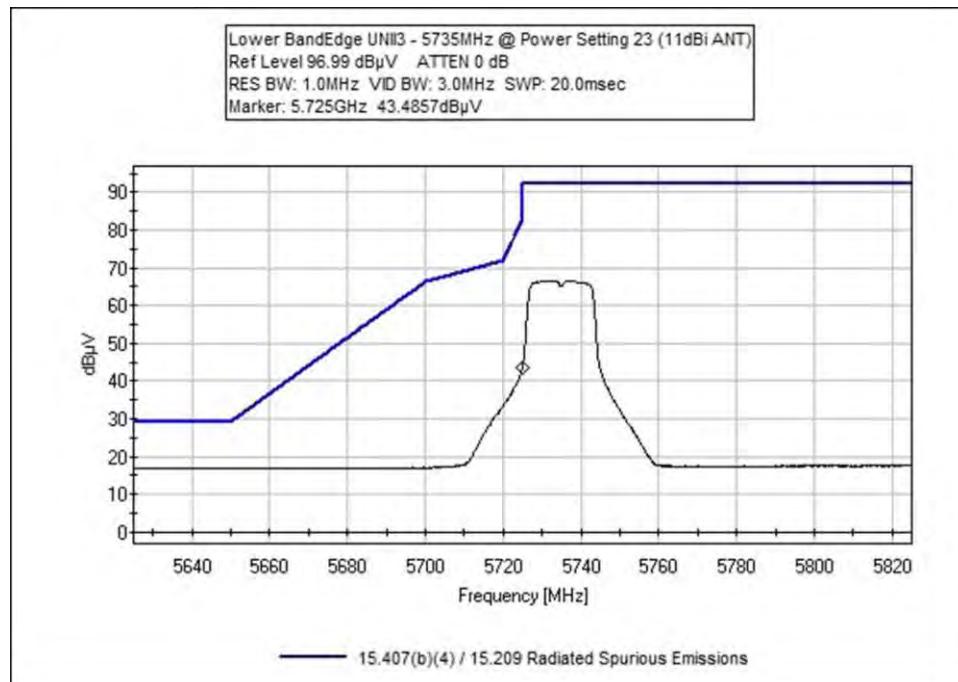
Reading listed by margin.

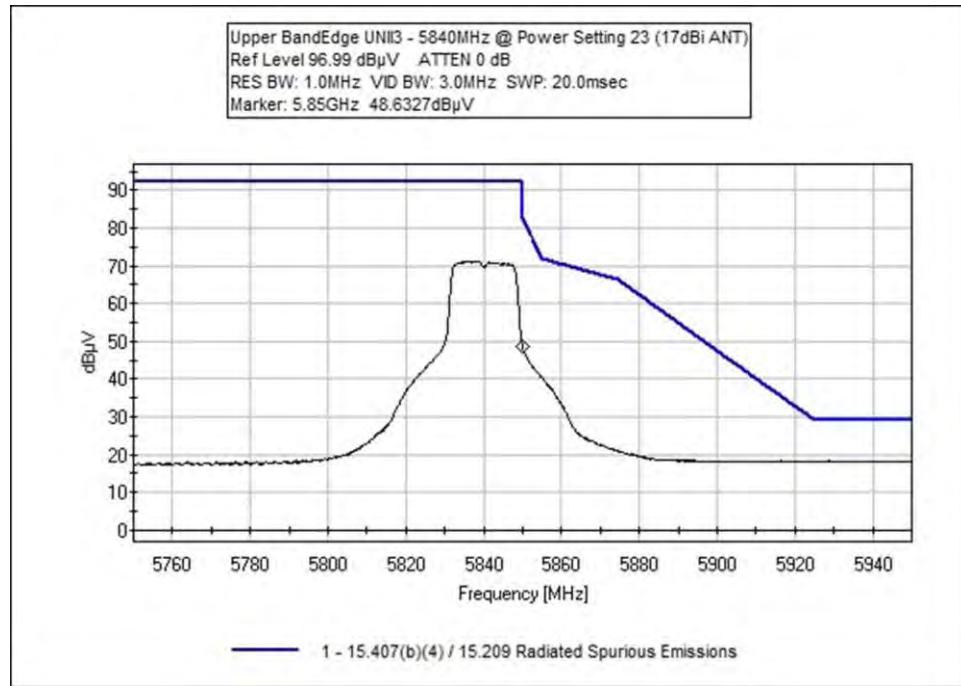
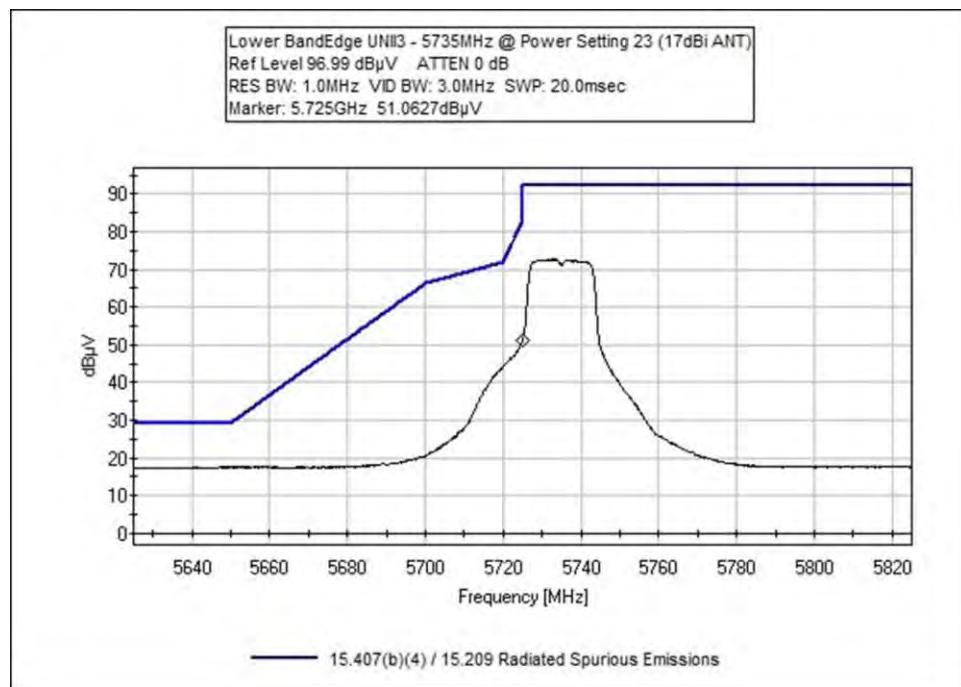
Test Distance: 3 Meters

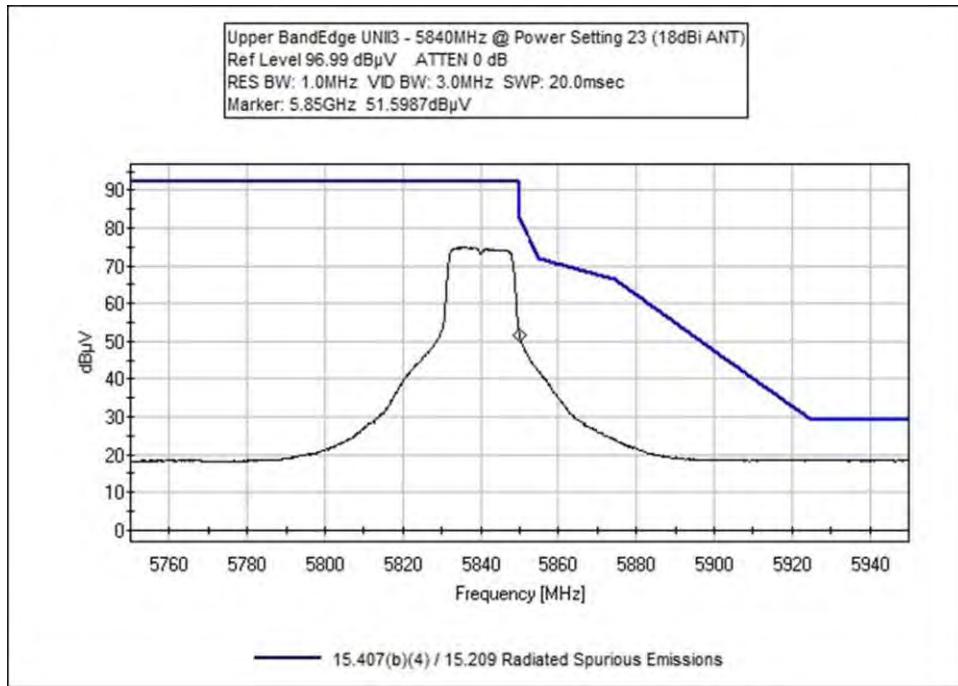
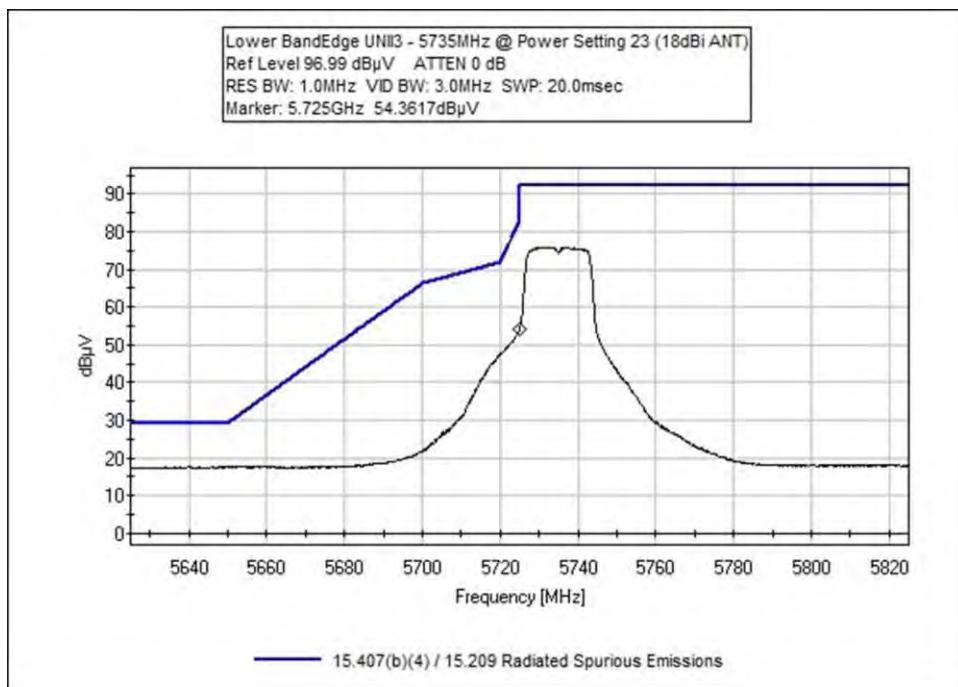
#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	5725.000M	57.2	+31.6	+3.7	+3.7	+0.0	96.2	122.2	-26.0	Vert
								Lower Band Edge		
								UNII3 - 5735MHz		
								@ Power Setting 23		
								(23dBi ANT)		
2	5725.000M	54.4	+31.6	+3.7	+3.7	+0.0	93.4	122.2	-28.8	Vert
								Lower Band Edge		
								UNII3 - 5735MHz		
								@ Power Setting 23		
								(18dBi ANT)		
3	5850.000M	53.3	+31.5	+3.8	+3.7	+0.0	92.3	122.2	-29.9	Vert
								Upper Band Edge		
								UNII3 - 5840MHz		
								@ Power Setting 23		
								(23dBi ANT)		
4	5850.000M	51.5	+31.5	+3.8	+3.7	+0.0	90.5	122.2	-31.7	Vert
								Upper Band Edge		
								UNII3 - 5840MHz		
								@ Power Setting 23		
								(18dBi ANT)		
5	5725.000M	51.5	+31.6	+3.7	+3.7	+0.0	90.5	122.2	-31.7	Vert
								Lower Band Edge		
								UNII3 - 5735MHz		
								@ Power Setting 23		
								(22dBi ANT)		

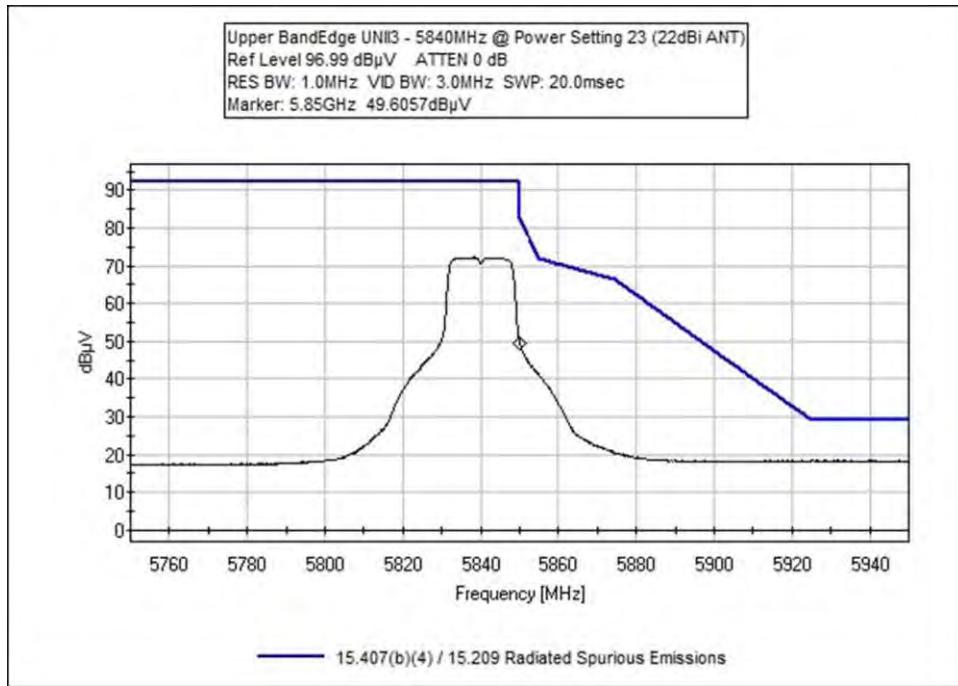
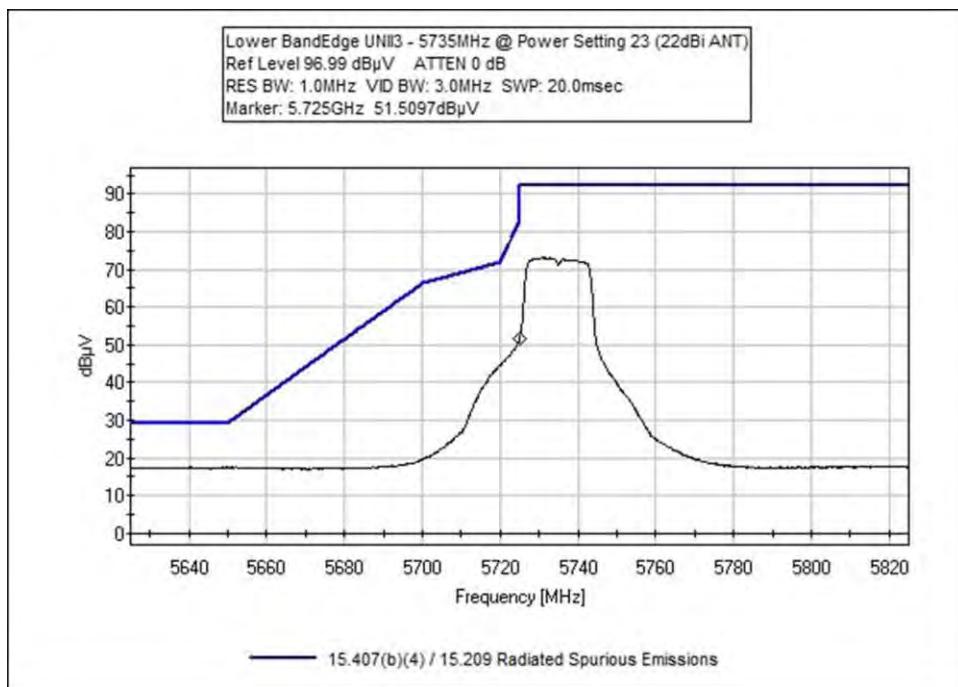
6	5725.000M	51.1	+31.6	+3.7	+3.7	+0.0	90.1	122.2	-32.1	Vert
Lower Band Edge UNII3 - 5735MHz @ Power Setting 23 (17dBi ANT)										
7	5850.000M	49.6	+31.5	+3.8	+3.7	+0.0	88.6	122.2	-33.6	Vert
Upper Band Edge UNII3 - 5840MHz @ Power Setting 23 (22dBi ANT)										
8	5850.000M	48.6	+31.5	+3.8	+3.7	+0.0	87.6	122.2	-34.6	Vert
Upper Band Edge UNII3 - 5840MHz @ Power Setting 23 (17dBi ANT)										
9	5725.000M	43.5	+31.6	+3.7	+3.7	+0.0	82.5	122.2	-39.7	Vert
Lower Band Edge UNII3 - 5735MHz @ Power Setting 23 (11dBi ANT)										
10	5850.000M	42.5	+31.5	+3.8	+3.7	+0.0	81.5	122.2	-40.7	Vert
Upper Band Edge UNII3 - 5840MHz @ Power Setting 23 (11dBi ANT)										

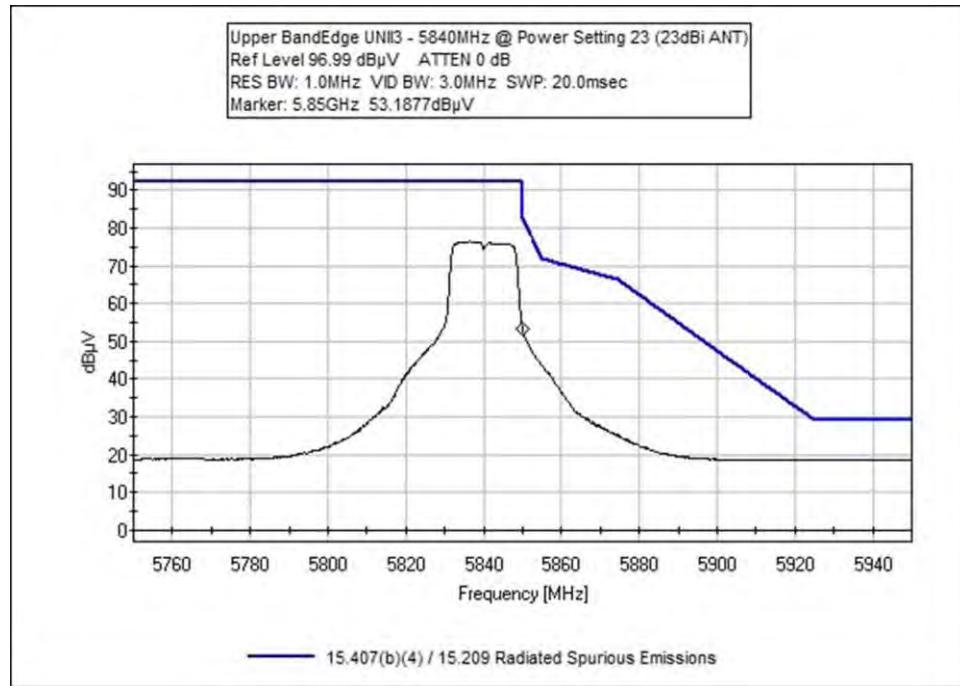
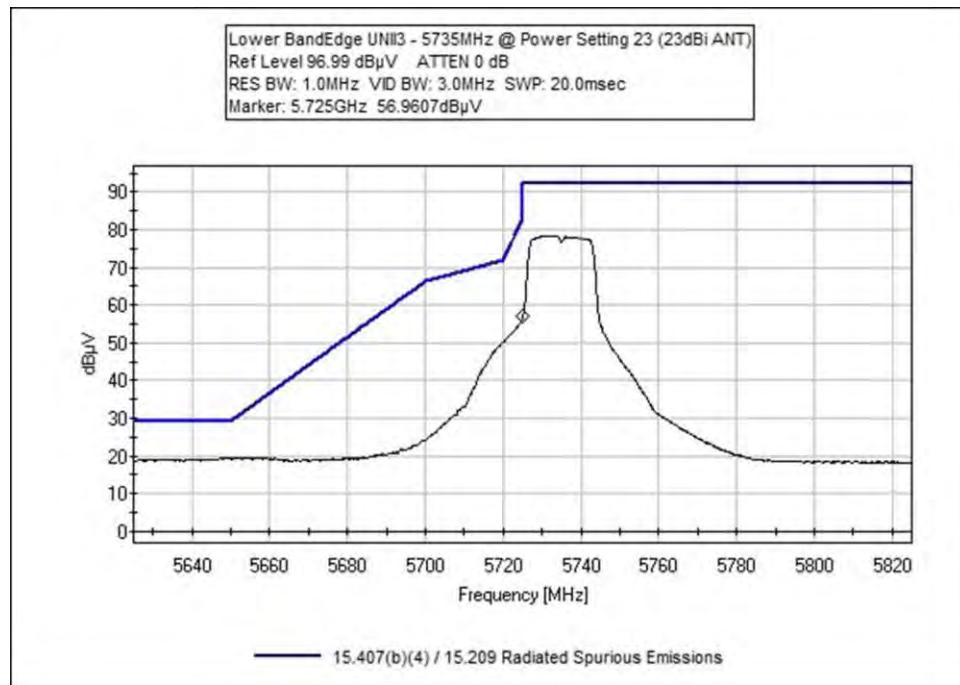
Band Edge Plots



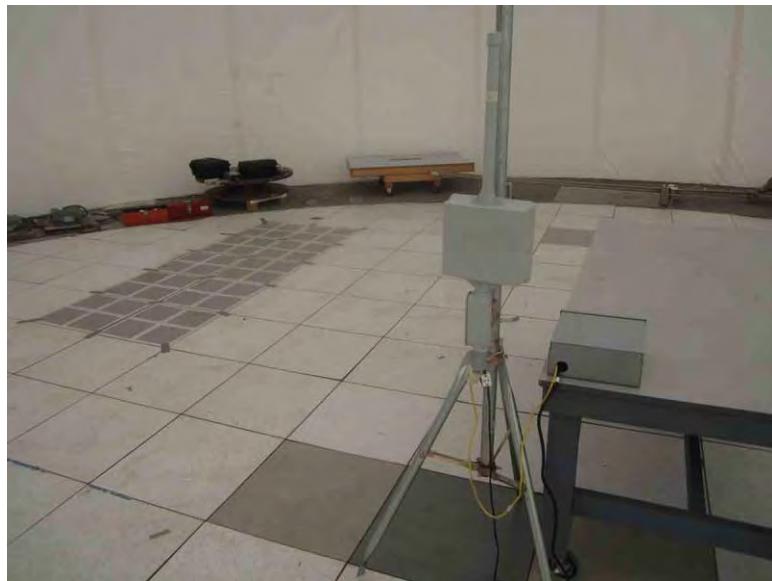








Test Setup Photos



11dBi and 18dBi, 30MHz – 1GHz



11dBi and 18dBi, 1 – 40GHz



17dBi, 30MHz – 1GHz



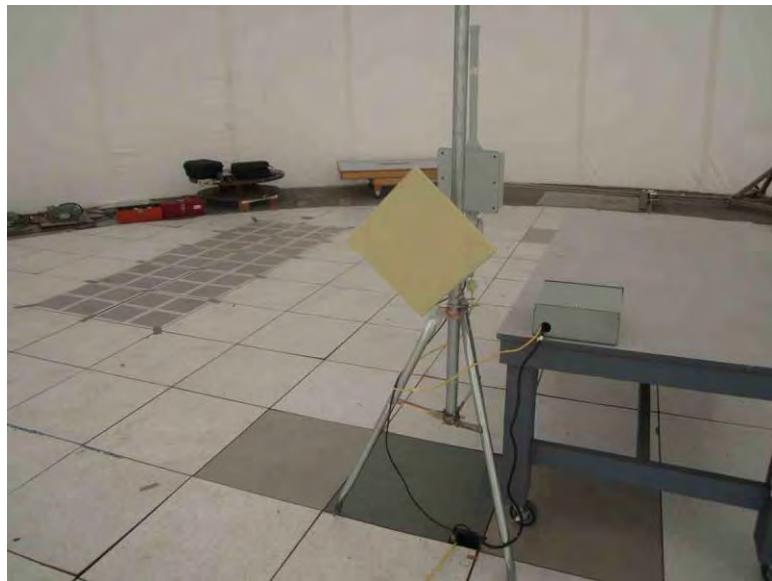
17dBi, 1 – 40GHz



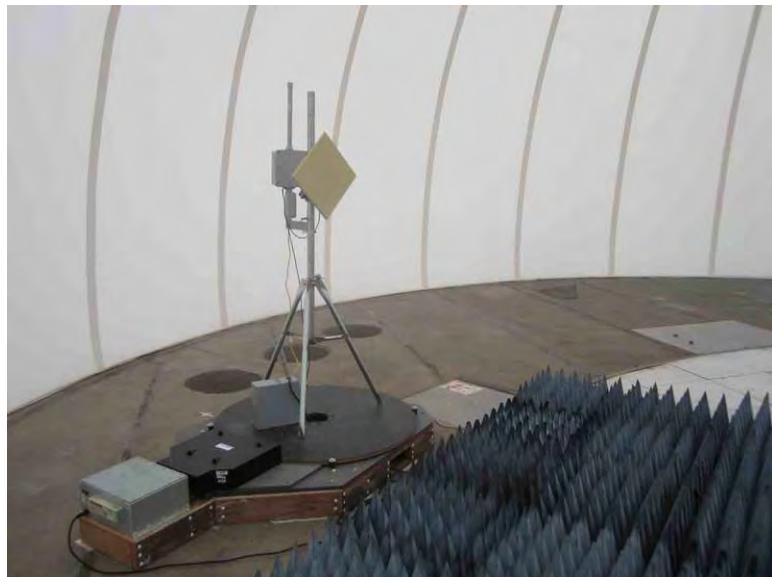
22dBi, 30MHz – 1GHz



22dBi, 1 – 40GHz



23dBi, 30MHz - 1GHz



23dBi, 1 – 40GHz

15.207 AC Conducted Emissions

Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Dr. • Mariposa, CA 95338 • 1-800-500-4EMC (4362)
 Customer: **Digital Path**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **98485** Date: 5/17/2016
 Test Type: **Conducted Emissions** Time: 16:23:46
 Tested By: Randal Clark Sequence#: 4
 Software: EMITest 5.03.02 120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

Test Conditions / Notes:

Equipment is an outdoor access point for use in both PTP and PTMP applications.

Modulation used: OFDM (802.11a)
 Data rate: 54Mbps (representative of worst case)
 Antenna: 5.1 OMNI and 5.8 Panel
 Operational Frequency: 5220MHz (5.1 Omni) and 5790MHz (Panel)
 Power Output Setting: 23dBm

Frequency Range Investigated: 150kHz - 30MHz
 Highest Generated Frequency not related to radio: 500MHz

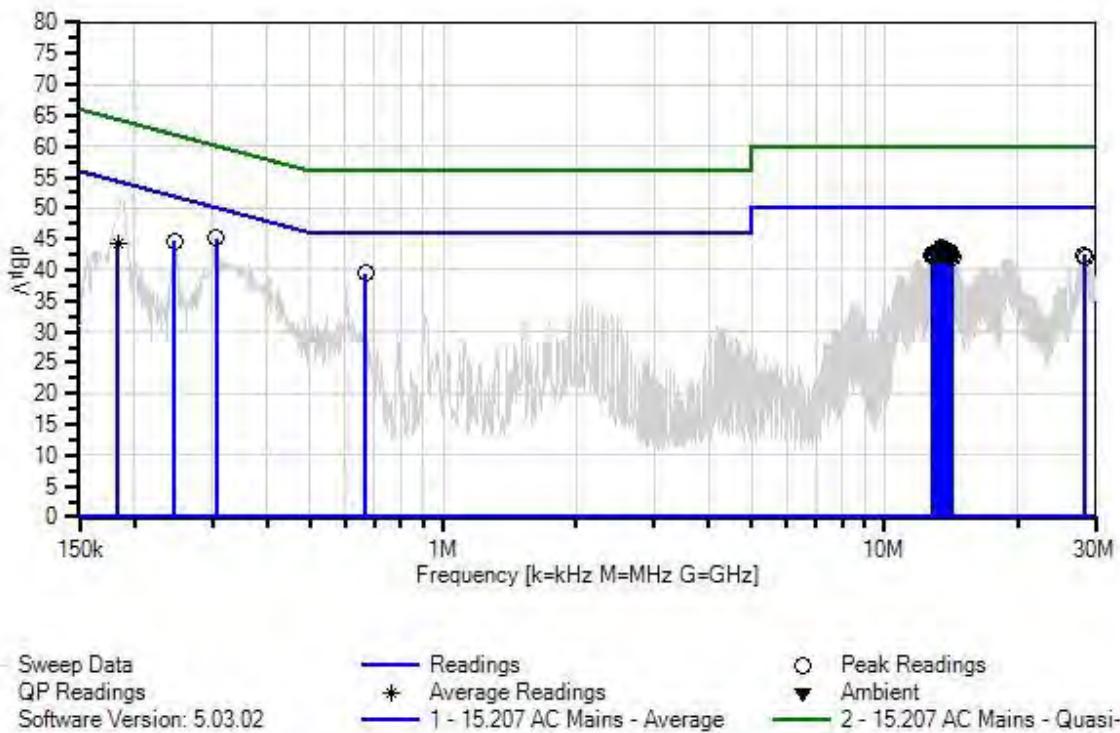
Temperature: 64°F
 Relative Humidity: 49%

Test method: ANSI C63.10 (2013)

The EUT is setup on its antenna mount in the vertical orientation which is representative of normal installation. The unit has two cards within it and we are utilizing both radios for testing. Both radios are identical. A power supply is located on a table next to the mount.

Modification #1 was in place during testing.

Digital Path Networks WO#: 98485 Sequence#: 4 Date: 5/17/2016
 15.207 AC Mains - Average Test Lead: 120V 60Hz Line



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06232	Cable	CXTA04A-35	3/3/2016	3/3/2018
T2	ANP05624	Attenuator	PE7010-10	1/15/2015	1/15/2017
T3	AN02609	High Pass Filter	HE9615-150K-50-720B	2/18/2016	2/18/2018
T4	ANP06847	Cable	LMR195-FR-6	7/9/2015	7/9/2017
T5	ANP06231	Cable	CXTA04A-70	3/3/2016	3/3/2018
	AN00374	50uH LISN-Return (dB)	8028-TS-50-BNC	1/4/2016	1/4/2017
T6	AN00374	50uH LISN-Line (dB)	8028-TS-50-BNC	1/4/2016	1/4/2017

Measurement Data: Reading listed by margin.

Test Lead: Line

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar
1	307.076k	34.9	+0.0 +0.1	+9.9 +0.1	+0.2	+0.0	+0.0	45.2	50.0	-4.8	Line
2	13.391M	32.4	+0.2 +0.5	+9.9 +0.2	+0.2	+0.1	+0.0	43.5	50.0	-6.5	Line
3	665.589k	29.0	+0.0 +0.1	+9.9 +0.1	+0.3	+0.0	+0.0	39.4	46.0	-6.6	Line
4	13.454M	32.1	+0.2 +0.5	+9.9 +0.2	+0.2	+0.1	+0.0	43.2	50.0	-6.8	Line
5	13.202M	32.0	+0.2 +0.5	+9.9 +0.2	+0.2	+0.1	+0.0	43.1	50.0	-6.9	Line
6	13.508M	32.0	+0.2 +0.5	+9.9 +0.2	+0.2	+0.1	+0.0	43.1	50.0	-6.9	Line
7	13.941M	31.9	+0.2 +0.5	+9.9 +0.3	+0.2	+0.1	+0.0	43.1	50.0	-6.9	Line
8	13.265M	31.8	+0.2 +0.5	+9.9 +0.2	+0.2	+0.1	+0.0	42.9	50.0	-7.1	Line
9	13.139M	31.7	+0.2 +0.5	+9.9 +0.2	+0.2	+0.1	+0.0	42.8	50.0	-7.2	Line
10	12.959M	31.6	+0.2 +0.5	+9.9 +0.2	+0.2	+0.1	+0.0	42.7	50.0	-7.3	Line
11	246.718k	34.4	+0.0 +0.0	+9.9 +0.1	+0.2	+0.0	+0.0	44.6	51.9	-7.3	Line
12	14.175M	31.5	+0.2 +0.5	+9.9 +0.3	+0.2	+0.1	+0.0	42.7	50.0	-7.3	Line
13	14.049M	31.5	+0.2 +0.5	+9.9 +0.3	+0.2	+0.1	+0.0	42.7	50.0	-7.3	Line
14	13.869M	31.5	+0.2 +0.5	+9.9 +0.2	+0.2	+0.1	+0.0	42.6	50.0	-7.4	Line
15	13.995M	31.4	+0.2 +0.5	+9.9 +0.3	+0.2	+0.1	+0.0	42.6	50.0	-7.4	Line
16	13.571M	31.5	+0.2 +0.5	+9.9 +0.2	+0.2	+0.1	+0.0	42.6	50.0	-7.4	Line
17	13.328M	31.5	+0.2 +0.5	+9.9 +0.2	+0.2	+0.1	+0.0	42.6	50.0	-7.4	Line

18	13.625M	31.5	+0.2 +0.5	+9.9 +0.2	+0.2	+0.1	+0.0	42.6	50.0	-7.4	Line
19	13.752M	31.5	+0.2 +0.5	+9.9 +0.2	+0.2	+0.1	+0.0	42.6	50.0	-7.4	Line
20	13.688M	31.5	+0.2 +0.5	+9.9 +0.2	+0.2	+0.1	+0.0	42.6	50.0	-7.4	Line
21	13.022M	31.4	+0.2 +0.5	+9.9 +0.2	+0.2	+0.1	+0.0	42.5	50.0	-7.5	Line
22	12.788M	31.4	+0.2 +0.5	+9.9 +0.2	+0.2	+0.1	+0.0	42.5	50.0	-7.5	Line
23	13.085M	31.4	+0.2 +0.5	+9.9 +0.2	+0.2	+0.1	+0.0	42.5	50.0	-7.5	Line
24	28.287M	30.5	+0.4 +0.7	+9.9 +0.6	+0.3	+0.1	+0.0	42.5	50.0	-7.5	Line
25	14.112M	31.3	+0.2 +0.5	+9.9 +0.3	+0.2	+0.1	+0.0	42.5	50.0	-7.5	Line
26	12.842M	31.3	+0.2 +0.5	+9.9 +0.2	+0.2	+0.1	+0.0	42.4	50.0	-7.6	Line
27	13.815M	31.3	+0.2 +0.5	+9.9 +0.2	+0.2	+0.1	+0.0	42.4	50.0	-7.6	Line
28	14.238M	31.0	+0.2 +0.5	+9.9 +0.3	+0.2	+0.1	+0.0	42.2	50.0	-7.8	Line
29	28.465M	30.2	+0.4 +0.7	+9.9 +0.6	+0.3	+0.1	+0.0	42.2	50.0	-7.8	Line
30	183.447k	34.0	+0.0 Ave	+9.9 +0.0	+0.3 +0.1	+0.0	+0.0	44.3	54.3	-10.0	Line
^	183.447k	40.5	+0.0 +0.0	+9.9 +0.1	+0.3 +0.1	+0.0	+0.0	50.8	54.3	-3.5	Line

Test Location: CKC Laboratories, Inc. • 5046 Sierra Pines Dr. • Mariposa, CA 95338 • 1-800-500-4EMC (4362)
 Customer: **Digital Path**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **98485** Date: 5/17/2016
 Test Type: **Conducted Emissions** Time: 16:27:43
 Tested By: Randal Clark Sequence#: 5
 Software: EMITest 5.03.02 120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

Test Conditions / Notes:

Equipment is an outdoor access point for use in both PTP and PTMP applications.

Modulation used: OFDM (802.11a)
 Data rate: 54MBps (representative of worst case)
 Antenna: 5.1 OMNI and 5.8 Panel
 Operational Frequency: 5220MHz (5.1 Omni) and 5790MHz (Panel)
 Power Output Setting: 23dBm

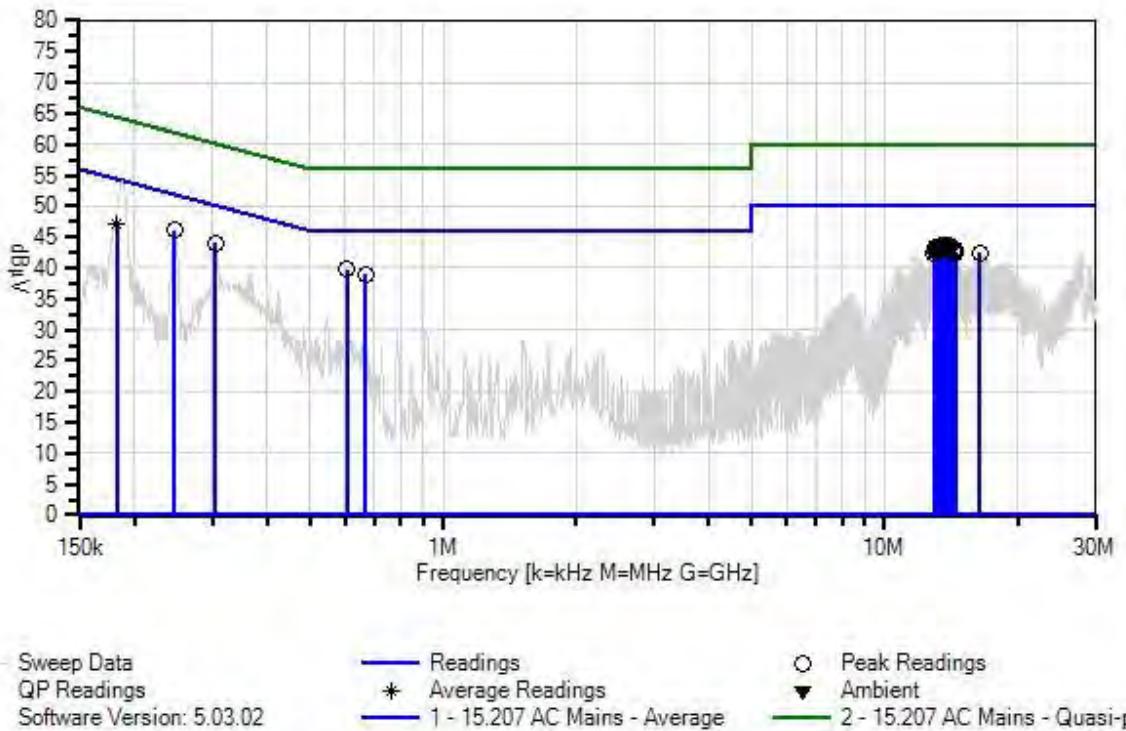
Frequency Range Investigated: 150kHz - 30MHz
 Highest Generated Frequency not related to radio: 500MHz

Temperature: 64°F
 Relative Humidity: 49%

Test method: ANSI C63.10 (2013)

The EUT is setup on its antenna mount in the vertical orientation which is representative of normal installation. The unit has two cards within it and we are utilizing both radios for testing. Both radios are identical. A power supply is located on a table next to the mount.

Modification #1 was in place during testing.

Digital Path Networks WO#: 98485 Sequence#: 5 Date: 5/17/2016
 15.207 AC Mains - Average Test Lead: 120V 60Hz Return

Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06232	Cable	CXTA04A-35	3/3/2016	3/3/2018
T2	ANP05624	Attenuator	PE7010-10	1/15/2015	1/15/2017
T3	AN02609	High Pass Filter	HE9615-150K-50-720B	2/18/2016	2/18/2018
T4	ANP06847	Cable	LMR195-FR-6	7/9/2015	7/9/2017
T5	ANP06231	Cable	CXTA04A-70	3/3/2016	3/3/2018
T6	AN00374	50uH LISN-Return (dB)	8028-TS-50-BNC	1/4/2016	1/4/2017
	AN00374	50uH LISN-Line (dB)	8028-TS-50-BNC	1/4/2016	1/4/2017

Measurement Data:

Reading listed by margin.

Test Lead: Return

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6							
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V	dB μ V	dB	Ant
1	245.990k	35.8	+0.0	+9.9	+0.2	+0.0	+0.0	46.1	51.9	-5.8	Retur
			+0.0	+0.2							

2	305.621k	33.8	+0.0 +0.1	+9.9 +0.1	+0.2	+0.0	+0.0	44.1	50.1	-6.0	Retur
3	605.229k	29.4	+0.0 +0.1	+9.9 +0.1	+0.3	+0.0	+0.0	39.8	46.0	-6.2	Retur
4	13.995M	32.3	+0.2 +0.5	+9.9 +0.4	+0.2	+0.1	+0.0	43.6	50.0	-6.4	Retur
5	14.058M	32.3	+0.2 +0.5	+9.9 +0.4	+0.2	+0.1	+0.0	43.6	50.0	-6.4	Retur
6	13.391M	32.2	+0.2 +0.5	+9.9 +0.4	+0.2	+0.1	+0.0	43.5	50.0	-6.5	Retur
7	13.697M	32.2	+0.2 +0.5	+9.9 +0.4	+0.2	+0.1	+0.0	43.5	50.0	-6.5	Retur
8	13.752M	32.1	+0.2 +0.5	+9.9 +0.4	+0.2	+0.1	+0.0	43.4	50.0	-6.6	Retur
9	13.878M	32.1	+0.2 +0.5	+9.9 +0.4	+0.2	+0.1	+0.0	43.4	50.0	-6.6	Retur
10	13.932M	32.1	+0.2 +0.5	+9.9 +0.4	+0.2	+0.1	+0.0	43.4	50.0	-6.6	Retur
11	13.328M	32.0	+0.2 +0.5	+9.9 +0.4	+0.2	+0.1	+0.0	43.3	50.0	-6.7	Retur
12	13.508M	32.0	+0.2 +0.5	+9.9 +0.4	+0.2	+0.1	+0.0	43.3	50.0	-6.7	Retur
13	13.571M	32.0	+0.2 +0.5	+9.9 +0.4	+0.2	+0.1	+0.0	43.3	50.0	-6.7	Retur
14	13.634M	31.9	+0.2 +0.5	+9.9 +0.4	+0.2	+0.1	+0.0	43.2	50.0	-6.8	Retur
15	13.815M	31.9	+0.2 +0.5	+9.9 +0.4	+0.2	+0.1	+0.0	43.2	50.0	-6.8	Retur
16	12.968M	31.9	+0.2 +0.5	+9.9 +0.4	+0.2	+0.1	+0.0	43.2	50.0	-6.8	Retur
17	13.031M	31.9	+0.2 +0.5	+9.9 +0.4	+0.2	+0.1	+0.0	43.2	50.0	-6.8	Retur
18	13.265M	31.8	+0.2 +0.5	+9.9 +0.4	+0.2	+0.1	+0.0	43.1	50.0	-6.9	Retur
19	14.355M	31.8	+0.2 +0.5	+9.9 +0.4	+0.2	+0.1	+0.0	43.1	50.0	-6.9	Retur
20	13.445M	31.7	+0.2 +0.5	+9.9 +0.4	+0.2	+0.1	+0.0	43.0	50.0	-7.0	Retur
21	665.588k	28.5	+0.0 +0.1	+9.9 +0.1	+0.3	+0.0	+0.0	38.9	46.0	-7.1	Retur
22	13.139M	31.6	+0.2 +0.5	+9.9 +0.4	+0.2	+0.1	+0.0	42.9	50.0	-7.1	Retur
23	13.085M	31.5	+0.2 +0.5	+9.9 +0.4	+0.2	+0.1	+0.0	42.8	50.0	-7.2	Retur
24	14.418M	31.5	+0.2 +0.5	+9.9 +0.4	+0.2	+0.1	+0.0	42.8	50.0	-7.2	Retur
25	13.202M	31.4	+0.2 +0.5	+9.9 +0.4	+0.2	+0.1	+0.0	42.7	50.0	-7.3	Retur
26	14.301M	31.3	+0.2 +0.5	+9.9 +0.4	+0.2	+0.1	+0.0	42.6	50.0	-7.4	Retur

27	182.625k	36.6	+0.0	+9.9	+0.3	+0.0	+0.0	47.0	54.4	-7.4	Retur
	Ave		+0.0	+0.2							
^	182.625k	43.5	+0.0	+9.9	+0.3	+0.0	+0.0	53.9	54.4	-0.5	Retur
			+0.0	+0.2							
29	16.418M	30.9	+0.3	+9.9	+0.2	+0.1	+0.0	42.5	50.0	-7.5	Retur
			+0.6	+0.5							
30	12.905M	31.3	+0.2	+9.9	+0.2	+0.1	+0.0	42.5	50.0	-7.5	Retur
			+0.5	+0.3							
31	14.481M	31.1	+0.2	+9.9	+0.2	+0.1	+0.0	42.4	50.0	-7.6	Retur
			+0.5	+0.4							

Test Setup Photo



Appendix A: Software Settings Information

		LOW		MID		HIGH	
Antenna	Notes	Channel	Power	Channel	Power	Channel	Power
UNII 1 band							
DP-5G18-30	18 dbi integrated panel	5735	23	5800	23	5840	23
DP-5G11-360	11dbi omni	5735	23	5800	23	5840	23
ARC-5G23-10	23 dbi external diamond arc wireless	5735	23	5800	23	5840	23
AM-5AC22-45	Ubnt 22dbi sector	5735	23	5800	23	5840	23
AM-5G17-90	Ubnt 17dbi sector	5735	23	5800	23	5840	23
Note: Testing was performed on sector antennas, employing the same radio, with gains ranging from 17dBi to 22dBi. Since all antennas produced a passing result, the 19dBi, 20dBi and 21dBi antenna are determined to be covered within these measurements.							

SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k=2$. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in $\text{dB}\mu\text{V}/\text{m}$, the spectrum analyzer reading in $\text{dB}\mu\text{V}$ was corrected by using the following formula. This reading was then compared to the applicable specification limit. Individual measurements were compared with the displayed limit value in the margin column. The margin was calculated based on subtracting the limit value from the corrected measurement value; a positive margin represents a measurement exceeding the limit, while a negative margin represents a measurement less than the limit.

SAMPLE CALCULATIONS	
Meter reading	($\text{dB}\mu\text{V}$)
+ Antenna Factor	(dB/m)
+ Cable Loss	(dB)
- Distance Correction	(dB)
- Preamplifier Gain	(dB)
= Corrected Reading	($\text{dB}\mu\text{V}/\text{m}$)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or caret ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.