

# 3D Robotics, Inc.

## ADDENDUM TO EMC TEST REPORT 96782-11A

**Solo Controller  
Model: AT11A**

**Tested To The Following Standards:**

**FCC Part 15 Subpart C Section(s)  
15.207 & 15.247**

**Report No.: 96782-11B**

**Date of issue: May 14, 2015**



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

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**REPORT PREPARED BY:**

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Project Number: 96782

**DATE OF EQUIPMENT RECEIPT:**

March 4, 2015

**DATE(S) OF TESTING:**

March 4 - 10, 2015

### Revision History

**Original:** Testing of Solo Controller, Model: AT11A to FCC Part 15 Subpart C Section 15.207 & 15.247.

**Addendum A:** To correct the antenna description statement and by adding the beam forming and directional gain value in the test conditions in sections 15.247(a)(2), (b)(3), (d) and (e), and removed an incorrect reference to the cross-polarized antenna procedure in CE section (d).

**Addendum B:** To add a manufacturer statement for equivalent models in the Equipment Under Test section.

### 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.  
110 Olinda Place  
Brea, CA 92823

## Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.00.14
Immunity	5.00.07

## Site Registration & Accreditation Information

Location	CB #	TAIWAN	CANADA	FCC	JAPAN
Brea A	US0060	SL2-IN-E-1146R	3082D-1	90473	A-0147

## SUMMARY OF RESULTS

### Standard / Specification: FCC Part 15 Subpart C

Test Procedure	Description	Modifications*	Results
15.31(e)	Voltage Variation	NA	Pass
15.207	Conducted Emissions	NA	Pass
15.247(a)(2)	Bandwidth	NA	Pass
15.247(b)(3)	RF Power Output	NA	Pass
15.247(d)	Conducted Spurious Emissions	NA	Pass
15.247(d)	Radiated Spurious Emissions and Band Edge	MOD #1	Pass
15.247(e)	Power Spectral Density	NA	Pass

### Modifications\* During Testing

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

#### Summary of Conditions

MOD #1: Installing one ferrite (manufacturer: Laird, model: 28B0375-400) on the cable connected from the main board to R2Link board.

\*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)

The following model has been tested by CKC Laboratories: Solo Controller, Model: AT11A

The manufacturer states that the following additional models are identical electrically to the one which was tested, or any differences between them do not affect their EMC characteristics, and therefore they meet the level of testing equivalent to the tested models. AT14A and AT10A.

### EQUIPMENT UNDER TEST

#### **Solo Controller**

Manuf: 3D Robotics, Inc.  
Model: AT11A  
Serial: NA

#### **AC to 8.3VDC 1.5A Power Adapter**

Manuf: 3D Robotics Inc.  
Model: CG15-088150-AU  
Serial: NA

### PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

#### **Cellphone**

Manuf: Samsung  
Model: Galaxy S5  
Serial: NA

#### **Laptop**

Manuf: Dell  
Model: Latitude E6530  
Serial: 6QN6JX1

#### **Video Camera**

Manuf: GoPro  
Model: Hero4  
Serial: NA

## FCC PART 15 SUBPART C

### 15.31(e) Voltage Variations

#### Test Data

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Pl • Brea, CA 92823 • 714-993-6112

Customer: **3D Robotics, Inc.**  
 Specification: **15.31e**  
 Work Order #: **96782** Date: 4/7/2015  
 Test Type: **Maximized Emissions** Time: 15:56:13  
 Equipment: **Solo Controller** Sequence#: 2  
 Manufacturer: 3D Robotics, Inc. Tested By: Don Nguyen  
 Model: AT11A  
 S/N:

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN00314	Loop Antenna	6502	7/2/2014	7/2/2016
T1	AN00309	Preamp	8447D	3/12/2014	3/12/2016
T2	AN01995	Biconilog Antenna	CBL6111C	4/30/2014	4/30/2016
T3	ANP05050	Cable	RG223/U	1/15/2015	1/15/2017
T4	ANP05198	Cable-Amplitude 15 to 45degC (dB)	8268	12/22/2014	12/22/2016
	AN02672	Spectrum Analyzer	E4446A	8/14/2013	8/14/2015
T5	AN00786	Preamp	83017A	4/25/2014	4/25/2016
T6	AN00849	Horn Antenna	3115	3/18/2014	3/18/2016
T7	AN02946	Cable	32022-2-2909K-36TC	7/31/2013	7/31/2015
T8	ANP06661	Cable	LDF1-50	4/15/2014	4/15/2016
T9	AN03385	High Pass Filter	11SH10-3000/T10000-O/O	6/5/2013	6/5/2015
	AN01413	Horn Antenna	84125-80008	11/25/2014	11/25/2016

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
Solo Controller	3D Robotics, Inc.	AT11A	NA
AC to 8.3VDC 1.5A Power Adapter	3D Robotics Inc.	CG15-088150-AU	NA

**Support Devices:**

Function	Manufacturer	Model #	S/N
Video Camera	GoPro	Hero4	NA

***Test Conditions / Notes:***

The equipment under test (EUT) is stand alone on the Styrofoam table top.  
The EUT is powered on and is continuously transmitting at its maximum rated output power.  
Channel 4 (2427MHz), Channel 6 (2437MHz) and Channel 11 (2462MHz) +25dBm both antennas, MCS15.  
The EUT is tested running off a fully charged battery.  
HDMI cable from the EUT is connected to support video camera.

Frequency range scanned and maximized for this data sheet is 0.009MHz to 25000MHz.

0.009MHz to 0.15MHz RBW=VBW=0.2kHz.

0.15MHz to 30MHz RBW=VBW=9kHz.

30MHz to 1000MHz RBW=VBW=120kHz.

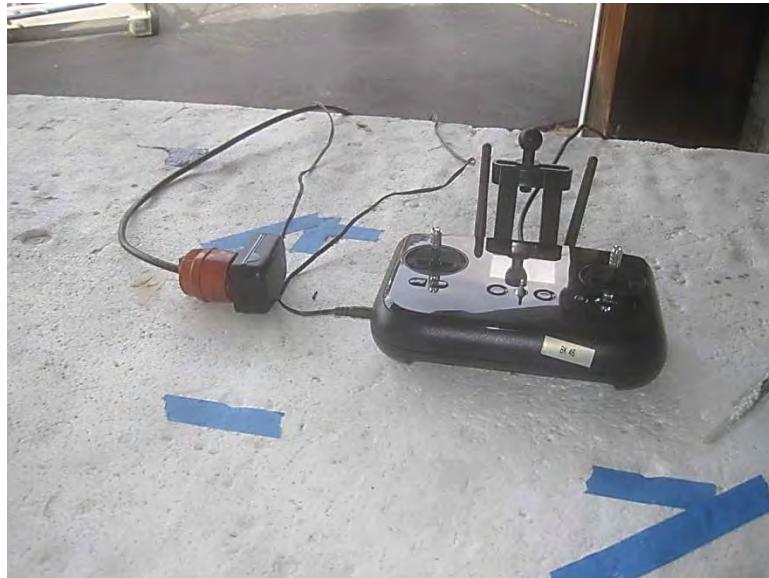
1000MHz to 25000MHz RBW=VBW=1MHz.

Temperature: 17°C, Relative Humidity 30%, Atmospheric Pressure: 100kPa.

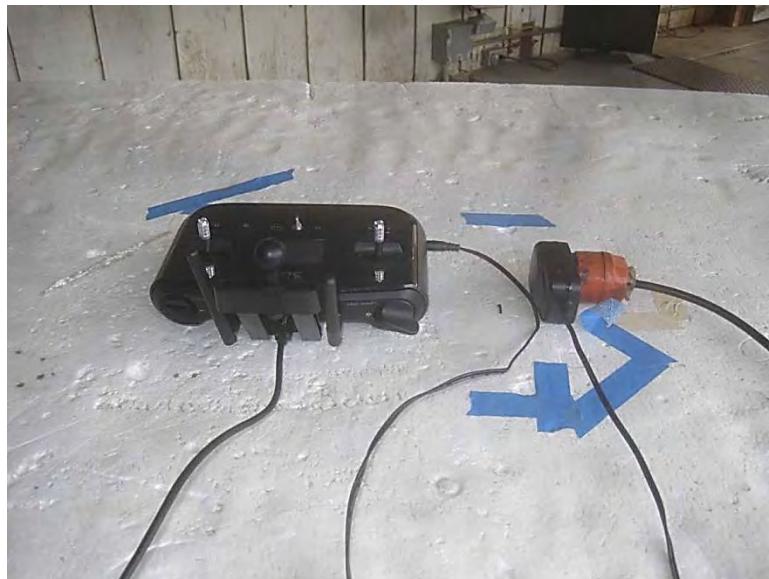
Site A. Test method used, ANSI C63.4 2003.

15.31(e) compliance: the supply voltage was varied between 85% and 115% of the nominal rated supply voltage, no change in the Fundamental signal level was observed.

## Test Setup Photo(s)



X-Axis



X-Axis



Y-Axis



Z-Axis

## 15.207 AC Conducted Emissions

### Test Data

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Pl • Brea, CA 92823 • 714-993-6112

Customer: **3D Robotics, Inc.**  
 Specification: **15.207 AC Mains - Average**  
 Work Order #: **96782** Date: **3/9/2015**  
 Test Type: **Conducted Emissions** Time: **11:26:23**  
 Equipment: **Solo Controller** Sequence#: **1**  
 Manufacturer: **3D Robotics, Inc.** Tested By: **S. Yamamoto**  
 Model: **AT11A** **120V 60Hz**  
 S/N:

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02672	Spectrum Analyzer	E4446A	8/14/2013	8/14/2015
T1	AN02610	High Pass Filter	HE9615-150K-50-720B	9/25/2013	9/25/2015
T2	ANP04358	Cable	RG142	3/12/2014	3/12/2016
T3	ANP06084	Attenuator	SA18N10W-06	12/17/2014	12/17/2016
T4	AN00847.1	50uH LISN-Line 1 (dB)	3816/2NM	6/26/2014	6/26/2015
	AN00847.1	50uH LISN-Line 2 (dB)	3816/2NM	6/26/2014	6/26/2015

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
AC to 8.3 VDC 1.5A Power Adapter	3D Robotics Inc.	CG15-088150-AU	NA
Solo Controller*	3D Robotics, Inc.	AT11A	NA

**Support Devices:**

Function	Manufacturer	Model #	S/N
Cellphone	Samsung	Galaxy S5	NA

**Test Conditions / Notes:**

The equipment under test (EUT) is stand alone on the wooden table top.

The EUT is powered on and is continuously transmitting on its highest measured power channel.

Channel 11, +25dBm both antennas, MCS15.

Frequency range for this data sheet is 0.15MHz to 30MHz. RBW=VBW=9kHz.

Temperature: 22°C, Relative Humidity: 45%, Atmospheric Pressure: 100kPa.

Site A. Test method used, ANSI C63.4 2003.

PSA FW Rev A.11.21 RELEASE. EMITest Ver 5.00.14

Ext Attn: 0 dB

<b>Measurement Data:</b>			Reading listed by margin.					Test Lead: L1(L)			
#	Freq MHz	Rdng dB $\mu$ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB $\mu$ V	Spec dB $\mu$ V	Margin dB	Polar Ant
1	609.594k QP	47.3	+0.3	+0.1	+5.7	+0.0	+0.0	53.4	56.0	-2.6	L1(L)
2	818.302k QP	47.4	+0.2	+0.1	+5.7	+0.0	+0.0	53.4	56.0	-2.6	L1(L)
3	9.058M	41.2	+0.1	+0.3	+5.7	+0.1	+0.0	47.4	50.0	-2.6	L1(L)
4	666.316k QP	47.2	+0.3	+0.1	+5.7	+0.0	+0.0	53.3	56.0	-2.7	L1(L)
5	8.923M	41.1	+0.1	+0.3	+5.7	+0.1	+0.0	47.3	50.0	-2.7	L1(L)
6	2.395M QP	47.2	+0.1	+0.2	+5.7	+0.0	+0.0	53.2	56.0	-2.8	L1(L)
7	7.995M	41.0	+0.1	+0.3	+5.7	+0.1	+0.0	47.2	50.0	-2.8	L1(L)
8	1.570M QP	47.1	+0.1	+0.1	+5.7	+0.0	+0.0	53.0	56.0	-3.0	L1(L)
9	478.697k QP	47.3	+0.3	+0.1	+5.7	+0.0	+0.0	53.4	56.4	-3.0	L1(L)
10	8.679M	40.7	+0.1	+0.3	+5.7	+0.1	+0.0	46.9	50.0	-3.1	L1(L)
11	9.265M	40.4	+0.1	+0.3	+5.7	+0.1	+0.0	46.6	50.0	-3.4	L1(L)
12	9.707M	40.2	+0.1	+0.3	+5.7	+0.2	+0.0	46.5	50.0	-3.5	L1(L)
13	8.968M	40.3	+0.1	+0.3	+5.7	+0.1	+0.0	46.5	50.0	-3.5	L1(L)
14	8.770M	40.2	+0.1	+0.3	+5.7	+0.1	+0.0	46.4	50.0	-3.6	L1(L)
15	9.229M	40.1	+0.1	+0.3	+5.7	+0.1	+0.0	46.3	50.0	-3.7	L1(L)
16	9.571M	40.1	+0.1	+0.3	+5.7	+0.1	+0.0	46.3	50.0	-3.7	L1(L)
17	9.103M	39.9	+0.1	+0.3	+5.7	+0.1	+0.0	46.1	50.0	-3.9	L1(L)
18	9.797M	39.7	+0.1	+0.3	+5.7	+0.2	+0.0	46.0	50.0	-4.0	L1(L)
19	996.281k QP	45.9	+0.2	+0.1	+5.7	+0.0	+0.0	51.9	56.0	-4.1	L1(L)
20	1.736M QP	46.0	+0.1	+0.1	+5.7	+0.0	+0.0	51.9	56.0	-4.1	L1(L)
21	9.337M	39.7	+0.1	+0.3	+5.7	+0.1	+0.0	45.9	50.0	-4.1	L1(L)
22	9.463M	39.6	+0.1	+0.3	+5.7	+0.1	+0.0	45.8	50.0	-4.2	L1(L)
23	9.400M	39.4	+0.1	+0.3	+5.7	+0.1	+0.0	45.6	50.0	-4.4	L1(L)
24	9.833M	39.2	+0.1	+0.3	+5.7	+0.2	+0.0	45.5	50.0	-4.5	L1(L)

25	9.860M	39.2	+0.1	+0.3	+5.7	+0.2	+0.0	45.5	50.0	-4.5	L1(L)
26	9.436M	39.1	+0.1	+0.3	+5.7	+0.1	+0.0	45.3	50.0	-4.7	L1(L)
27	9.526M	39.1	+0.1	+0.3	+5.7	+0.1	+0.0	45.3	50.0	-4.7	L1(L)
28	1.817M QP	45.3	+0.1	+0.1	+5.7	+0.0	+0.0	51.2	56.0	-4.8	L1(L)
29	1.664M QP	45.1	+0.1	+0.1	+5.7	+0.0	+0.0	51.0	56.0	-5.0	L1(L)
30	949.501k QP	44.2	+0.2	+0.1	+5.7	+0.0	+0.0	50.2	56.0	-5.8	L1(L)
31	1.413M QP	43.9	+0.2	+0.1	+5.7	+0.0	+0.0	49.9	56.0	-6.1	L1(L)
32	526.693k QP	43.6	+0.3	+0.1	+5.7	+0.0	+0.0	49.7	56.0	-6.3	L1(L)
33	853.935k QP	43.5	+0.2	+0.1	+5.7	+0.0	+0.0	49.5	56.0	-6.5	L1(L)
34	3.420M QP	43.5	+0.1	+0.2	+5.7	+0.0	+0.0	49.5	56.0	-6.5	L1(L)
35	885.710k QP	42.9	+0.2	+0.1	+5.7	+0.0	+0.0	48.9	56.0	-7.1	L1(L)
36	746.309k QP	42.3	+0.2	+0.1	+5.7	+0.0	+0.0	48.3	56.0	-7.7	L1(L)
37	4.241M QP	42.1	+0.1	+0.2	+5.7	+0.0	+0.0	48.1	56.0	-7.9	L1(L)
38	342.710k QP	43.6	+0.3	+0.1	+5.7	+0.0	+0.0	49.7	59.1	-9.4	L1(L)
39	666.316k Ave	30.4	+0.3	+0.1	+5.7	+0.0	+0.0	36.5	46.0	-9.5	L1(L)
^	666.316k	49.9	+0.3	+0.1	+5.7	+0.0	+0.0	56.0	46.0	+10.0	L1(L)
										see average and qp data	
41	1.039M QP	40.4	+0.2	+0.1	+5.7	+0.0	+0.0	46.4	56.0	-9.6	L1(L)
42	1.081M QP	39.7	+0.2	+0.1	+5.7	+0.0	+0.0	45.7	56.0	-10.3	L1(L)
43	412.521k QP	39.7	+0.3	+0.1	+5.7	+0.0	+0.0	45.8	57.6	-11.8	L1(L)
44	526.693k Ave	27.3	+0.3	+0.1	+5.7	+0.0	+0.0	33.4	46.0	-12.6	L1(L)
^	526.693k	49.7	+0.3	+0.1	+5.7	+0.0	+0.0	55.8	46.0	+9.8	L1(L)
										see average and qp data	
46	853.935k Ave	26.7	+0.2	+0.1	+5.7	+0.0	+0.0	32.7	46.0	-13.3	L1(L)
^	853.935k	48.6	+0.2	+0.1	+5.7	+0.0	+0.0	54.6	46.0	+8.6	L1(L)
										see average and qp data	
48	609.594k Ave	26.4	+0.3	+0.1	+5.7	+0.0	+0.0	32.5	46.0	-13.5	L1(L)

^	609.594k	49.5	+0.3	+0.1	+5.7	+0.0	+0.0	55.6	46.0	+9.6	L1(L)
									see average and qp data		
50	2.395M	26.0	+0.1	+0.2	+5.7	+0.0	+0.0	32.0	46.0	-14.0	L1(L)
Ave											
^	2.395M	51.3	+0.1	+0.2	+5.7	+0.0	+0.0	57.3	46.0	+11.3	L1(L)
									see average and qp data		
52	478.697k	26.1	+0.3	+0.1	+5.7	+0.0	+0.0	32.2	46.4	-14.2	L1(L)
Ave											
^	478.697k	50.4	+0.3	+0.1	+5.7	+0.0	+0.0	56.5	46.4	+10.1	L1(L)
									see average and qp data		
54	1.570M	25.6	+0.1	+0.1	+5.7	+0.0	+0.0	31.5	46.0	-14.5	L1(L)
Ave											
^	1.570M	50.4	+0.1	+0.1	+5.7	+0.0	+0.0	56.3	46.0	+10.3	L1(L)
									see average and qp data		
56	1.817M	25.0	+0.1	+0.1	+5.7	+0.0	+0.0	30.9	46.0	-15.1	L1(L)
Ave											
^	1.817M	49.1	+0.1	+0.1	+5.7	+0.0	+0.0	55.0	46.0	+9.0	L1(L)
									see average and qp data		
58	996.281k	24.3	+0.2	+0.1	+5.7	+0.0	+0.0	30.3	46.0	-15.7	L1(L)
Ave											
^	996.281k	49.1	+0.2	+0.1	+5.7	+0.0	+0.0	55.1	46.0	+9.1	L1(L)
									see average and qp data		
60	818.302k	24.1	+0.2	+0.1	+5.7	+0.0	+0.0	30.1	46.0	-15.9	L1(L)
Ave											
^	818.302k	50.3	+0.2	+0.1	+5.7	+0.0	+0.0	56.3	46.0	+10.3	L1(L)
									see average and qp data		
62	4.977M	23.9	+0.1	+0.2	+5.7	+0.0	+0.0	29.9	46.0	-16.1	L1(L)
Ave											
^	4.977M	47.2	+0.1	+0.2	+5.7	+0.0	+0.0	53.2	46.0	+7.2	L1(L)
									see average data		
64	746.309k	23.4	+0.2	+0.1	+5.7	+0.0	+0.0	29.4	46.0	-16.6	L1(L)
Ave											
^	746.309k	49.9	+0.2	+0.1	+5.7	+0.0	+0.0	55.9	46.0	+9.9	L1(L)
									see average and qp data		
66	1.664M	23.5	+0.1	+0.1	+5.7	+0.0	+0.0	29.4	46.0	-16.6	L1(L)
Ave											
^	1.664M	49.1	+0.1	+0.1	+5.7	+0.0	+0.0	55.0	46.0	+9.0	L1(L)
									see average and qp data		
68	3.420M	23.4	+0.1	+0.2	+5.7	+0.0	+0.0	29.4	46.0	-16.6	L1(L)
Ave											
^	3.420M	48.9	+0.1	+0.2	+5.7	+0.0	+0.0	54.9	46.0	+8.9	L1(L)
									see average and qp data		

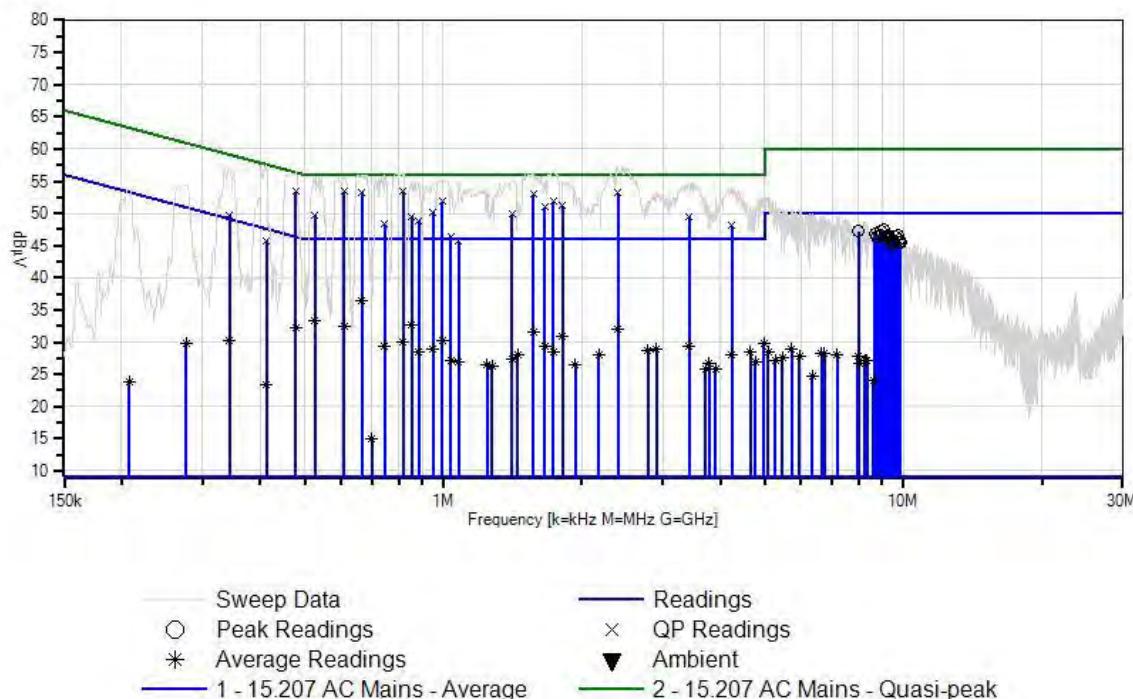
70	2.910M	22.9	+0.1	+0.2	+5.7	+0.0	+0.0	28.9	46.0	-17.1	L1(L)
Ave											
^	2.910M	47.5	+0.1	+0.2	+5.7	+0.0	+0.0	53.5	46.0	+7.5	L1(L)
											see average data
72	949.501k	22.9	+0.2	+0.1	+5.7	+0.0	+0.0	28.9	46.0	-17.1	L1(L)
Ave											
^	949.501k	48.8	+0.2	+0.1	+5.7	+0.0	+0.0	54.8	46.0	+8.8	L1(L)
											see average and qp data
74	2.782M	22.6	+0.1	+0.2	+5.7	+0.0	+0.0	28.6	46.0	-17.4	L1(L)
Ave											
^	2.782M	45.7	+0.1	+0.2	+5.7	+0.0	+0.0	51.7	46.0	+5.7	L1(L)
											see average data
76	4.649M	22.5	+0.1	+0.2	+5.7	+0.0	+0.0	28.5	46.0	-17.5	L1(L)
Ave											
^	4.649M	44.8	+0.1	+0.2	+5.7	+0.0	+0.0	50.8	46.0	+4.8	L1(L)
											see average data
78	1.736M	22.6	+0.1	+0.1	+5.7	+0.0	+0.0	28.5	46.0	-17.5	L1(L)
Ave											
^	1.736M	50.5	+0.1	+0.1	+5.7	+0.0	+0.0	56.4	46.0	+10.4	L1(L)
											see average and qp data
80	885.710k	22.4	+0.2	+0.1	+5.7	+0.0	+0.0	28.4	46.0	-17.6	L1(L)
Ave											
^	885.710k	48.9	+0.2	+0.1	+5.7	+0.0	+0.0	54.9	46.0	+8.9	L1(L)
											see average and qp data
82	1.451M	22.2	+0.1	+0.1	+5.7	+0.0	+0.0	28.1	46.0	-17.9	L1(L)
Ave											
^	1.451M	45.6	+0.1	+0.1	+5.7	+0.0	+0.0	51.5	46.0	+5.5	L1(L)
											see average data
84	4.241M	22.1	+0.1	+0.2	+5.7	+0.0	+0.0	28.1	46.0	-17.9	L1(L)
Ave											
^	4.241M	48.2	+0.1	+0.2	+5.7	+0.0	+0.0	54.2	46.0	+8.2	L1(L)
											see average and qp data
86	2.179M	22.1	+0.1	+0.1	+5.7	+0.0	+0.0	28.0	46.0	-18.0	L1(L)
Ave											
^	2.179M	46.9	+0.1	+0.1	+5.7	+0.0	+0.0	52.8	46.0	+6.8	L1(L)
											see average data
88	1.413M	21.4	+0.2	+0.1	+5.7	+0.0	+0.0	27.4	46.0	-18.6	L1(L)
Ave											
^	1.413M	49.2	+0.2	+0.1	+5.7	+0.0	+0.0	55.2	46.0	+9.2	L1(L)
											see average and qp data

90	1.039M	21.2	+0.2	+0.1	+5.7	+0.0	+0.0	27.2	46.0	-18.8	L1(L)
Ave											
^	1.039M	48.0	+0.2	+0.1	+5.7	+0.0	+0.0	54.0	46.0	+8.0	L1(L)
									see average and qp data		
92	342.710k	24.2	+0.3	+0.1	+5.7	+0.0	+0.0	30.3	49.1	-18.8	L1(L)
Ave											
^	342.710k	51.0	+0.3	+0.1	+5.7	+0.0	+0.0	57.1	49.1	+8.0	L1(L)
									see average and qp data		
94	1.081M	20.9	+0.2	+0.1	+5.7	+0.0	+0.0	26.9	46.0	-19.1	L1(L)
Ave											
^	1.081M	48.9	+0.2	+0.1	+5.7	+0.0	+0.0	54.9	46.0	+8.9	L1(L)
									see average and qp data		
96	4.768M	20.9	+0.1	+0.2	+5.7	+0.0	+0.0	26.9	46.0	-19.1	L1(L)
Ave											
^	4.768M	45.2	+0.1	+0.2	+5.7	+0.0	+0.0	51.2	46.0	+5.2	L1(L)
									see average data		
98	3.786M	20.6	+0.1	+0.2	+5.7	+0.0	+0.0	26.6	46.0	-19.4	L1(L)
Ave											
^	3.786M	44.3	+0.1	+0.2	+5.7	+0.0	+0.0	50.3	46.0	+4.3	L1(L)
									see average data		
100	1.936M	20.6	+0.1	+0.1	+5.7	+0.0	+0.0	26.5	46.0	-19.5	L1(L)
Ave											
^	1.936M	47.9	+0.1	+0.1	+5.7	+0.0	+0.0	53.8	46.0	+7.8	L1(L)
									see average data		
102	1.247M	20.4	+0.2	+0.1	+5.7	+0.0	+0.0	26.4	46.0	-19.6	L1(L)
Ave											
^	1.247M	47.1	+0.2	+0.1	+5.7	+0.0	+0.0	53.1	46.0	+7.1	L1(L)
									see average data		
104	1.277M	20.3	+0.2	+0.1	+5.7	+0.0	+0.0	26.3	46.0	-19.7	L1(L)
Ave											
^	1.277M	46.6	+0.2	+0.1	+5.7	+0.0	+0.0	52.6	46.0	+6.6	L1(L)
									see average data		
106	3.914M	19.8	+0.1	+0.2	+5.7	+0.0	+0.0	25.8	46.0	-20.2	L1(L)
Ave											
^	3.914M	46.5	+0.1	+0.2	+5.7	+0.0	+0.0	52.5	46.0	+6.5	L1(L)
									see average data		
108	3.722M	19.8	+0.1	+0.2	+5.7	+0.0	+0.0	25.8	46.0	-20.2	L1(L)
Ave											
^	3.722M	45.9	+0.1	+0.2	+5.7	+0.0	+0.0	51.9	46.0	+5.9	L1(L)
									see average data		
110	275.807k	23.9	+0.2	+0.1	+5.7	+0.0	+0.0	29.9	50.9	-21.0	L1(L)
Ave											
^	275.807k	48.4	+0.2	+0.1	+5.7	+0.0	+0.0	54.4	50.9	+3.5	L1(L)
									see average data		
112	5.716M	22.9	+0.1	+0.2	+5.7	+0.1	+0.0	29.0	50.0	-21.0	L1(L)
Ave											
^	5.716M	44.5	+0.1	+0.2	+5.7	+0.1	+0.0	50.6	50.0	+0.6	L1(L)
									see average data		

114	5.092M	22.4	+0.1	+0.2	+5.7	+0.0	+0.0	28.4	50.0	-21.6	L1(L)
Ave											
^	5.092M	46.6	+0.1	+0.2	+5.7	+0.0	+0.0	52.6	50.0	+2.6	L1(L)
										see average data	
116	6.643M	22.1	+0.1	+0.2	+5.7	+0.1	+0.0	28.2	50.0	-21.8	L1(L)
Ave											
^	6.643M	43.7	+0.1	+0.2	+5.7	+0.1	+0.0	49.8	50.0	-0.2	L1(L)
										see average data	
118	6.743M	22.1	+0.1	+0.2	+5.7	+0.1	+0.0	28.2	50.0	-21.8	L1(L)
Ave											
^	6.743M	43.5	+0.1	+0.2	+5.7	+0.1	+0.0	49.6	50.0	-0.4	L1(L)
										see average data	
120	7.184M	21.9	+0.1	+0.3	+5.7	+0.1	+0.0	28.1	50.0	-21.9	L1(L)
Ave											
^	7.184M	43.3	+0.1	+0.3	+5.7	+0.1	+0.0	49.5	50.0	-0.5	L1(L)
										see average data	
122	5.950M	21.8	+0.1	+0.2	+5.7	+0.1	+0.0	27.9	50.0	-22.1	L1(L)
Ave											
^	5.950M	44.4	+0.1	+0.2	+5.7	+0.1	+0.0	50.5	50.0	+0.5	L1(L)
										see average data	
124	7.968M	21.5	+0.1	+0.3	+5.7	+0.1	+0.0	27.7	50.0	-22.3	L1(L)
Ave											
^	7.968M	41.3	+0.1	+0.3	+5.7	+0.1	+0.0	47.5	50.0	-2.5	L1(L)
										see average data	
126	5.463M	21.5	+0.1	+0.2	+5.7	+0.1	+0.0	27.6	50.0	-22.4	L1(L)
Ave											
^	5.463M	44.6	+0.1	+0.2	+5.7	+0.1	+0.0	50.7	50.0	+0.7	L1(L)
										see average data	
128	8.238M	21.0	+0.1	+0.3	+5.7	+0.1	+0.0	27.2	50.0	-22.8	L1(L)
Ave											
^	8.238M	42.5	+0.1	+0.3	+5.7	+0.1	+0.0	48.7	50.0	-1.3	L1(L)
										see average data	
130	5.265M	21.1	+0.1	+0.2	+5.7	+0.1	+0.0	27.2	50.0	-22.8	L1(L)
Ave											
^	5.265M	45.9	+0.1	+0.2	+5.7	+0.1	+0.0	52.0	50.0	+2.0	L1(L)
										see average data	
132	8.355M	20.9	+0.1	+0.3	+5.7	+0.1	+0.0	27.1	50.0	-22.9	L1(L)
Ave											
^	8.355M	41.8	+0.1	+0.3	+5.7	+0.1	+0.0	48.0	50.0	-2.0	L1(L)
										see average data	
134	8.022M	20.4	+0.1	+0.3	+5.7	+0.1	+0.0	26.6	50.0	-23.4	L1(L)
Ave											
^	8.022M	41.8	+0.1	+0.3	+5.7	+0.1	+0.0	48.0	50.0	-2.0	L1(L)
										see average data	

136	412.521k	17.2	+0.3	+0.1	+5.7	+0.0	+0.0	23.3	47.6	-24.3	L1(L)
Ave											
^	412.521k	51.4	+0.3	+0.1	+5.7	+0.0	+0.0	57.5	47.6	+9.9	L1(L)
										see average and qp data	
138	6.337M	18.6	+0.1	+0.2	+5.7	+0.1	+0.0	24.7	50.0	-25.3	L1(L)
Ave											
^	6.337M	43.9	+0.1	+0.2	+5.7	+0.1	+0.0	50.0	50.0	+0.0	L1(L)
										see average data	
140	8.598M	17.9	+0.1	+0.3	+5.7	+0.1	+0.0	24.1	50.0	-25.9	L1(L)
Ave											
^	8.598M	41.4	+0.1	+0.3	+5.7	+0.1	+0.0	47.6	50.0	-2.4	L1(L)
										see average data	
142	207.449k	17.8	+0.2	+0.1	+5.7	+0.0	+0.0	23.8	53.3	-29.5	L1(L)
Ave											
^	207.449k	47.8	+0.2	+0.1	+5.7	+0.0	+0.0	53.8	53.3	+0.5	L1(L)
										see average data	
144	699.041k	8.9	+0.3	+0.1	+5.7	+0.0	+0.0	15.0	46.0	-31.0	L1(L)
Ave											
^	699.041k	37.8	+0.3	+0.1	+5.7	+0.0	+0.0	43.9	46.0	-2.1	L1(L)
										see average data	

CKC Laboratories, Inc. 15.207 AC Mains - Average 3/9/2015 11:26:23 Test Lead: L1(L) Site: A  
 3D Robotics, Inc., WO#: 96782  
 Sequence #1 Solo Controller



Test Location: CKC Laboratories, Inc. • 110 N. Olinda Pl • Brea, CA 92823 • 714-993-6112

Customer: **3D Robotics, Inc.**  
 Specification: **15.207 AC Mains - Average**  
 Work Order #: **96782** Date: 3/9/2015  
 Test Type: **Conducted Emissions** Time: 11:54:03  
 Equipment: **Solo Controller** Sequence#: 2  
 Manufacturer: 3D Robotics, Inc. Tested By: S. Yamamoto  
 Model: AT11A 120V 60Hz  
 S/N:

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02672	Spectrum Analyzer	E4446A	8/14/2013	8/14/2015
T1	AN02610	High Pass Filter	HE9615-150K-50-720B	9/25/2013	9/25/2015
T2	ANP04358	Cable	RG142	3/12/2014	3/12/2016
T3	ANP06084	Attenuator	SA18N10W-06	12/17/2014	12/17/2016
	AN00847.1	50uH LISN-Line 1 (dB)	3816/2NM	6/26/2014	6/26/2015
T4	AN00847.1	50uH LISN-Line 2 (dB)	3816/2NM	6/26/2014	6/26/2015

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
AC to 8.3VDC 1.5A Power Adapter	3D Robotics Inc.	CG15-088150-AU	NA
Solo Controller*	3D Robotics, Inc.	AT11A	NA

**Support Devices:**

Function	Manufacturer	Model #	S/N
Cellphone	Samsung	Galaxy S5	NA

**Test Conditions / Notes:**

The equipment under test (EUT) is stand alone on the wooden table top.  
 The EUT is powered on and is continuously transmitting on its highest measured power channel.

Channel 11, +25dBm both antennas, MCS15.  
 Frequency range for this data sheet is 0.15MHz to 30MHz. RBW=VBW=9kHz.

Temperature: 22°C, Relative Humidity: 45%, Atmospheric Pressure: 100kPa.  
 Site A. Test method used, ANSI C63.4 2003.

PSA FW Rev A.11.21 RELEASE. EMITest Ver 5.00.14

Ext Attn: 0 dB

#	Freq MHz	Reading listed by margin.				Dist Table	Corr dB $\mu$ V	Spec dB $\mu$ V	Margin dB	Polar Ant
		Rdng dB $\mu$ V	T1 dB	T2 dB	T3 dB					
1	6.878M	41.2	+0.1	+0.2	+5.7	+0.1	+0.0	47.3	50.0	-2.7 (N)L2
2	6.977M	41.2	+0.1	+0.2	+5.7	+0.1	+0.0	47.3	50.0	-2.7 (N)L2
3	6.301M	40.6	+0.1	+0.2	+5.7	+0.1	+0.0	46.7	50.0	-3.3 (N)L2

4	6.707M	40.4	+0.1	+0.2	+5.7	+0.1	+0.0	46.5	50.0	-3.5	(N)L2
5	6.085M	40.3	+0.1	+0.2	+5.7	+0.1	+0.0	46.4	50.0	-3.6	(N)L2
6	7.688M	40.1	+0.1	+0.3	+5.7	+0.1	+0.0	46.3	50.0	-3.7	(N)L2
7	8.067M	39.8	+0.1	+0.3	+5.7	+0.1	+0.0	46.0	50.0	-4.0	(N)L2
8	7.716M	39.7	+0.1	+0.3	+5.7	+0.1	+0.0	45.9	50.0	-4.1	(N)L2
9	6.283M	39.8	+0.1	+0.2	+5.7	+0.1	+0.0	45.9	50.0	-4.1	(N)L2
10	7.977M	39.7	+0.1	+0.3	+5.7	+0.1	+0.0	45.9	50.0	-4.1	(N)L2
11	7.860M	39.7	+0.1	+0.3	+5.7	+0.1	+0.0	45.9	50.0	-4.1	(N)L2
12	8.310M	39.5	+0.1	+0.3	+5.7	+0.1	+0.0	45.7	50.0	-4.3	(N)L2
13	7.571M	39.4	+0.1	+0.3	+5.7	+0.1	+0.0	45.6	50.0	-4.4	(N)L2
14	8.752M	39.3	+0.1	+0.3	+5.7	+0.1	+0.0	45.5	50.0	-4.5	(N)L2
15	7.806M	39.2	+0.1	+0.3	+5.7	+0.1	+0.0	45.4	50.0	-4.6	(N)L2
16	8.211M	39.2	+0.1	+0.3	+5.7	+0.1	+0.0	45.4	50.0	-4.6	(N)L2
17	207.448k	42.4	+0.2	+0.1	+5.7	+0.0	+0.0	48.4	53.3	-4.9	(N)L2
18	9.022M	38.5	+0.1	+0.3	+5.7	+0.2	+0.0	44.8	50.0	-5.2	(N)L2
19	9.526M	38.3	+0.1	+0.3	+5.7	+0.2	+0.0	44.6	50.0	-5.4	(N)L2
20	7.535M	38.4	+0.1	+0.3	+5.7	+0.1	+0.0	44.6	50.0	-5.4	(N)L2
21	8.445M	38.2	+0.1	+0.3	+5.7	+0.1	+0.0	44.4	50.0	-5.6	(N)L2
22	9.220M	38.0	+0.1	+0.3	+5.7	+0.2	+0.0	44.3	50.0	-5.7	(N)L2
23	9.085M	37.9	+0.1	+0.3	+5.7	+0.2	+0.0	44.2	50.0	-5.8	(N)L2
24	9.292M	37.8	+0.1	+0.3	+5.7	+0.2	+0.0	44.1	50.0	-5.9	(N)L2
25	9.625M	37.8	+0.1	+0.3	+5.7	+0.2	+0.0	44.1	50.0	-5.9	(N)L2
26	9.652M	37.7	+0.1	+0.3	+5.7	+0.2	+0.0	44.0	50.0	-6.0	(N)L2
27	9.418M	37.6	+0.1	+0.3	+5.7	+0.2	+0.0	43.9	50.0	-6.1	(N)L2
28	9.319M	37.5	+0.1	+0.3	+5.7	+0.2	+0.0	43.8	50.0	-6.2	(N)L2
29	9.265M	37.5	+0.1	+0.3	+5.7	+0.2	+0.0	43.8	50.0	-6.2	(N)L2

30	9.454M	37.5	+0.1	+0.3	+5.7	+0.2	+0.0	43.8	50.0	-6.2	(N)L2
31	9.860M	37.5	+0.1	+0.3	+5.7	+0.2	+0.0	43.8	50.0	-6.2	(N)L2
32	9.743M	37.5	+0.1	+0.3	+5.7	+0.2	+0.0	43.8	50.0	-6.2	(N)L2
33	9.355M	37.2	+0.1	+0.3	+5.7	+0.2	+0.0	43.5	50.0	-6.5	(N)L2
34	9.589M	37.2	+0.1	+0.3	+5.7	+0.2	+0.0	43.5	50.0	-6.5	(N)L2
35	9.121M	36.4	+0.1	+0.3	+5.7	+0.2	+0.0	42.7	50.0	-7.3	(N)L2
36	9.815M	36.4	+0.1	+0.3	+5.7	+0.2	+0.0	42.7	50.0	-7.3	(N)L2
37	11.328M	36.3	+0.1	+0.3	+5.7	+0.2	+0.0	42.6	50.0	-7.4	(N)L2
38	659.043k Ave	25.9	+0.3	+0.1	+5.7	+0.0	+0.0	32.0	46.0	-14.0	(N)L2
^	659.043k	45.8	+0.3	+0.1	+5.7	+0.0	+0.0	51.9	46.0	+5.9	(N)L2 see average data
40	474.333k Ave	26.2	+0.3	+0.1	+5.7	+0.0	+0.0	32.3	46.4	-14.1	(N)L2
^	474.333k	45.0	+0.3	+0.1	+5.7	+0.0	+0.0	51.1	46.4	+4.7	(N)L2 see average data
42	4.743M Ave	25.5	+0.1	+0.2	+5.7	+0.1	+0.0	31.6	46.0	-14.4	(N)L2
^	4.743M	47.2	+0.1	+0.2	+5.7	+0.1	+0.0	53.3	46.0	+7.3	(N)L2 see average data
44	4.828M Ave	25.4	+0.1	+0.2	+5.7	+0.1	+0.0	31.5	46.0	-14.5	(N)L2
^	4.828M	47.4	+0.1	+0.2	+5.7	+0.1	+0.0	53.5	46.0	+7.5	(N)L2 see average data
46	4.777M Ave	25.3	+0.1	+0.2	+5.7	+0.1	+0.0	31.4	46.0	-14.6	(N)L2
^	4.777M	47.4	+0.1	+0.2	+5.7	+0.1	+0.0	53.5	46.0	+7.5	(N)L2 see average data
48	4.862M Ave	24.5	+0.1	+0.2	+5.7	+0.1	+0.0	30.6	46.0	-15.4	(N)L2
^	4.862M	47.6	+0.1	+0.2	+5.7	+0.1	+0.0	53.7	46.0	+7.7	(N)L2 see average data
50	4.679M Ave	24.1	+0.1	+0.2	+5.7	+0.1	+0.0	30.2	46.0	-15.8	(N)L2
^	4.679M	46.0	+0.1	+0.2	+5.7	+0.1	+0.0	52.1	46.0	+6.1	(N)L2 see average data
52	4.611M Ave	24.0	+0.1	+0.2	+5.7	+0.1	+0.0	30.1	46.0	-15.9	(N)L2
^	4.611M	45.8	+0.1	+0.2	+5.7	+0.1	+0.0	51.9	46.0	+5.9	(N)L2 see average data
54	4.645M Ave	23.8	+0.1	+0.2	+5.7	+0.1	+0.0	29.9	46.0	-16.1	(N)L2
^	4.645M	45.4	+0.1	+0.2	+5.7	+0.1	+0.0	51.5	46.0	+5.5	(N)L2 see average data

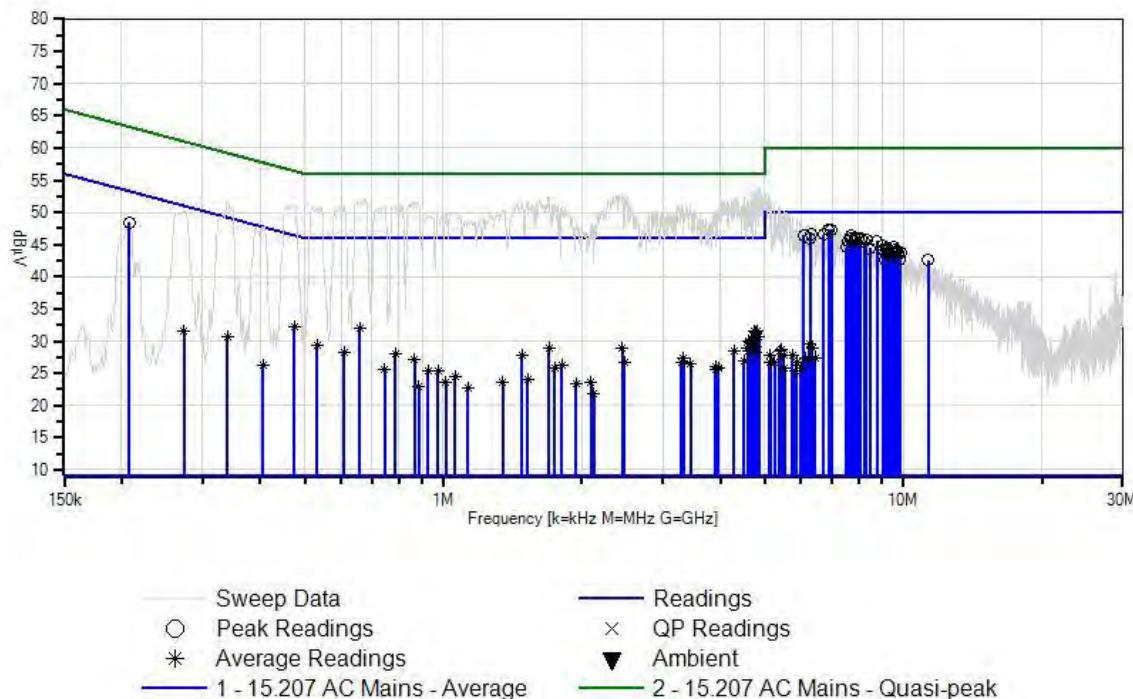
56	4.696M	23.4	+0.1	+0.2	+5.7	+0.1	+0.0	29.5	46.0	-16.5	(N)L2
Ave											
^	4.696M	45.9	+0.1	+0.2	+5.7	+0.1	+0.0	52.0	46.0	+6.0	(N)L2
										see average data	
58	531.055k	23.2	+0.3	+0.1	+5.7	+0.0	+0.0	29.3	46.0	-16.7	(N)L2
Ave											
^	531.055k	44.7	+0.3	+0.1	+5.7	+0.0	+0.0	50.8	46.0	+4.8	(N)L2
										see average data	
60	4.764M	23.0	+0.1	+0.2	+5.7	+0.1	+0.0	29.1	46.0	-16.9	(N)L2
Ave											
^	4.764M	47.3	+0.1	+0.2	+5.7	+0.1	+0.0	53.4	46.0	+7.4	(N)L2
										see average data	
62	2.451M	23.0	+0.1	+0.2	+5.7	+0.0	+0.0	29.0	46.0	-17.0	(N)L2
Ave											
^	2.451M	47.0	+0.1	+0.2	+5.7	+0.0	+0.0	53.0	46.0	+7.0	(N)L2
										see average data	
64	4.581M	22.7	+0.1	+0.2	+5.7	+0.1	+0.0	28.8	46.0	-17.2	(N)L2
Ave											
^	4.581M	45.7	+0.1	+0.2	+5.7	+0.1	+0.0	51.8	46.0	+5.8	(N)L2
										see average data	
66	1.698M	22.9	+0.1	+0.1	+5.7	+0.0	+0.0	28.8	46.0	-17.2	(N)L2
Ave											
^	1.698M	46.7	+0.1	+0.1	+5.7	+0.0	+0.0	52.6	46.0	+6.6	(N)L2
										see average data	
68	4.598M	22.4	+0.1	+0.2	+5.7	+0.1	+0.0	28.5	46.0	-17.5	(N)L2
Ave											
^	4.598M	45.0	+0.1	+0.2	+5.7	+0.1	+0.0	51.1	46.0	+5.1	(N)L2
										see average data	
70	4.288M	22.4	+0.1	+0.2	+5.7	+0.1	+0.0	28.5	46.0	-17.5	(N)L2
Ave											
^	4.288M	46.2	+0.1	+0.2	+5.7	+0.1	+0.0	52.3	46.0	+6.3	(N)L2
										see average data	
72	608.139k	22.1	+0.3	+0.1	+5.7	+0.0	+0.0	28.2	46.0	-17.8	(N)L2
Ave											
^	608.139k	44.9	+0.3	+0.1	+5.7	+0.0	+0.0	51.0	46.0	+5.0	(N)L2
										see average data	
74	4.790M	22.1	+0.1	+0.2	+5.7	+0.1	+0.0	28.2	46.0	-17.8	(N)L2
Ave											
^	4.790M	46.8	+0.1	+0.2	+5.7	+0.1	+0.0	52.9	46.0	+6.9	(N)L2
										see average data	
76	785.577k	22.1	+0.2	+0.1	+5.7	+0.0	+0.0	28.1	46.0	-17.9	(N)L2
Ave											
^	785.577k	45.1	+0.2	+0.1	+5.7	+0.0	+0.0	51.1	46.0	+5.1	(N)L2
										see average data	
78	1.485M	22.0	+0.1	+0.1	+5.7	+0.0	+0.0	27.9	46.0	-18.1	(N)L2
Ave											
^	1.485M	45.8	+0.1	+0.1	+5.7	+0.0	+0.0	51.7	46.0	+5.7	(N)L2
										see average data	
80	3.327M	21.3	+0.1	+0.2	+5.7	+0.1	+0.0	27.4	46.0	-18.6	(N)L2
Ave											
^	3.327M	44.8	+0.1	+0.2	+5.7	+0.1	+0.0	50.9	46.0	+4.9	(N)L2
										see average data	

82	339.073k	24.5	+0.3	+0.1	+5.7	+0.0	+0.0	30.6	49.2	-18.6	(N)L2
Ave											
^	339.073k	45.6	+0.3	+0.1	+5.7	+0.0	+0.0	51.7	49.2	+2.5	(N)L2
										see average data	
84	864.842k	21.1	+0.2	+0.1	+5.7	+0.0	+0.0	27.1	46.0	-18.9	(N)L2
Ave											
^	864.842k	45.7	+0.2	+0.1	+5.7	+0.0	+0.0	51.7	46.0	+5.7	(N)L2
										see average data	
86	4.509M	20.9	+0.1	+0.2	+5.7	+0.1	+0.0	27.0	46.0	-19.0	(N)L2
Ave											
^	4.509M	46.3	+0.1	+0.2	+5.7	+0.1	+0.0	52.4	46.0	+6.4	(N)L2
										see average data	
88	3.297M	20.7	+0.1	+0.2	+5.7	+0.1	+0.0	26.8	46.0	-19.2	(N)L2
Ave											
^	3.297M	45.1	+0.1	+0.2	+5.7	+0.1	+0.0	51.2	46.0	+5.2	(N)L2
										see average data	
90	2.480M	20.8	+0.1	+0.2	+5.7	+0.0	+0.0	26.8	46.0	-19.2	(N)L2
Ave											
^	2.480M	46.4	+0.1	+0.2	+5.7	+0.0	+0.0	52.4	46.0	+6.4	(N)L2
										see average data	
92	272.897k	25.6	+0.2	+0.1	+5.7	+0.0	+0.0	31.6	51.0	-19.4	(N)L2
Ave											
^	272.897k	44.1	+0.2	+0.1	+5.7	+0.0	+0.0	50.1	51.0	-0.9	(N)L2
										see average data	
94	3.446M	20.3	+0.1	+0.2	+5.7	+0.1	+0.0	26.4	46.0	-19.6	(N)L2
Ave											
^	3.446M	45.4	+0.1	+0.2	+5.7	+0.1	+0.0	51.5	46.0	+5.5	(N)L2
										see average data	
96	1.809M	20.3	+0.1	+0.1	+5.7	+0.0	+0.0	26.2	46.0	-19.8	(N)L2
Ave											
^	1.809M	44.9	+0.1	+0.1	+5.7	+0.0	+0.0	50.8	46.0	+4.8	(N)L2
										see average data	
98	3.914M	19.9	+0.1	+0.2	+5.7	+0.1	+0.0	26.0	46.0	-20.0	(N)L2
Ave											
^	3.914M	44.5	+0.1	+0.2	+5.7	+0.1	+0.0	50.6	46.0	+4.6	(N)L2
										see average data	
100	3.969M	19.8	+0.1	+0.2	+5.7	+0.1	+0.0	25.9	46.0	-20.1	(N)L2
Ave											
^	3.969M	44.3	+0.1	+0.2	+5.7	+0.1	+0.0	50.4	46.0	+4.4	(N)L2
										see average data	
102	1.745M	20.0	+0.1	+0.1	+5.7	+0.0	+0.0	25.9	46.0	-20.1	(N)L2
Ave											
^	1.745M	45.5	+0.1	+0.1	+5.7	+0.0	+0.0	51.4	46.0	+5.4	(N)L2
										see average data	
104	744.854k	19.6	+0.2	+0.1	+5.7	+0.0	+0.0	25.6	46.0	-20.4	(N)L2
Ave											
^	744.854k	45.1	+0.2	+0.1	+5.7	+0.0	+0.0	51.1	46.0	+5.1	(N)L2
										see average data	
106	3.901M	19.4	+0.1	+0.2	+5.7	+0.1	+0.0	25.5	46.0	-20.5	(N)L2
Ave											
^	3.901M	44.1	+0.1	+0.2	+5.7	+0.1	+0.0	50.2	46.0	+4.2	(N)L2
										see average data	

108	6.256M	23.4	+0.1	+0.2	+5.7	+0.1	+0.0	29.5	50.0	-20.5	(N)L2
Ave											
^	6.256M	41.7	+0.1	+0.2	+5.7	+0.1	+0.0	47.8	50.0	-2.2	(N)L2
											see average data
110	928.238k	19.3	+0.2	+0.1	+5.7	+0.0	+0.0	25.3	46.0	-20.7	(N)L2
Ave											
^	928.238k	43.5	+0.2	+0.1	+5.7	+0.0	+0.0	49.5	46.0	+3.5	(N)L2
											see average data
112	975.018k	19.3	+0.2	+0.1	+5.7	+0.0	+0.0	25.3	46.0	-20.7	(N)L2
Ave											
^	975.018k	44.0	+0.2	+0.1	+5.7	+0.0	+0.0	50.0	46.0	+4.0	(N)L2
											see average data
114	6.346M	22.7	+0.1	+0.2	+5.7	+0.1	+0.0	28.8	50.0	-21.2	(N)L2
Ave											
^	6.346M	41.3	+0.1	+0.2	+5.7	+0.1	+0.0	47.4	50.0	-2.6	(N)L2
											see average data
116	405.248k	20.2	+0.3	+0.1	+5.7	+0.0	+0.0	26.3	47.7	-21.4	(N)L2
Ave											
^	405.248k	41.7	+0.3	+0.1	+5.7	+0.0	+0.0	47.8	47.7	+0.1	(N)L2
											see average data
118	5.418M	22.5	+0.1	+0.2	+5.7	+0.1	+0.0	28.6	50.0	-21.4	(N)L2
Ave											
^	5.418M	43.6	+0.1	+0.2	+5.7	+0.1	+0.0	49.7	50.0	-0.3	(N)L2
											see average data
120	1.060M	18.4	+0.2	+0.1	+5.7	+0.0	+0.0	24.4	46.0	-21.6	(N)L2
Ave											
^	1.060M	44.0	+0.2	+0.1	+5.7	+0.0	+0.0	50.0	46.0	+4.0	(N)L2
											see average data
122	5.373M	22.3	+0.1	+0.2	+5.7	+0.1	+0.0	28.4	50.0	-21.6	(N)L2
Ave											
^	5.373M	45.1	+0.1	+0.2	+5.7	+0.1	+0.0	51.2	50.0	+1.2	(N)L2
											see average data
124	1.524M	18.2	+0.1	+0.1	+5.7	+0.0	+0.0	24.1	46.0	-21.9	(N)L2
Ave											
^	1.524M	45.6	+0.1	+0.1	+5.7	+0.0	+0.0	51.5	46.0	+5.5	(N)L2
											see average data
126	5.148M	21.8	+0.1	+0.2	+5.7	+0.1	+0.0	27.9	50.0	-22.1	(N)L2
Ave											
^	5.148M	45.6	+0.1	+0.2	+5.7	+0.1	+0.0	51.7	50.0	+1.7	(N)L2
											see average data
128	5.490M	21.8	+0.1	+0.2	+5.7	+0.1	+0.0	27.9	50.0	-22.1	(N)L2
Ave											
^	5.490M	43.4	+0.1	+0.2	+5.7	+0.1	+0.0	49.5	50.0	-0.5	(N)L2
											see average data
130	5.743M	21.7	+0.1	+0.2	+5.7	+0.1	+0.0	27.8	50.0	-22.2	(N)L2
Ave											
^	5.743M	43.1	+0.1	+0.2	+5.7	+0.1	+0.0	49.2	50.0	-0.8	(N)L2
											see average data
132	1.013M	17.7	+0.2	+0.1	+5.7	+0.0	+0.0	23.7	46.0	-22.3	(N)L2
Ave											
^	1.013M	43.9	+0.2	+0.1	+5.7	+0.0	+0.0	49.9	46.0	+3.9	(N)L2
											see average data

134	2.093M	17.7	+0.1	+0.1	+5.7	+0.0	+0.0	23.6	46.0	-22.4	(N)L2
	Ave										
^	2.093M	42.3	+0.1	+0.1	+5.7	+0.0	+0.0	48.2	46.0	+2.2	(N)L2
									see average data		
136	1.349M	17.6	+0.2	+0.1	+5.7	+0.0	+0.0	23.6	46.0	-22.4	(N)L2
	Ave										
^	1.349M	44.4	+0.2	+0.1	+5.7	+0.0	+0.0	50.4	46.0	+4.4	(N)L2
									see average data		
138	1.945M	17.5	+0.1	+0.1	+5.7	+0.0	+0.0	23.4	46.0	-22.6	(N)L2
	Ave										
^	1.945M	42.3	+0.1	+0.1	+5.7	+0.0	+0.0	48.2	46.0	+2.2	(N)L2
									see average data		
140	6.148M	21.3	+0.1	+0.2	+5.7	+0.1	+0.0	27.4	50.0	-22.6	(N)L2
	Ave										
^	6.148M	41.8	+0.1	+0.2	+5.7	+0.1	+0.0	47.9	50.0	-2.1	(N)L2
									see average data		
142	6.436M	21.3	+0.1	+0.2	+5.7	+0.1	+0.0	27.4	50.0	-22.6	(N)L2
	Ave										
^	6.436M	41.8	+0.1	+0.2	+5.7	+0.1	+0.0	47.9	50.0	-2.1	(N)L2
									see average data		
144	6.238M	21.0	+0.1	+0.2	+5.7	+0.1	+0.0	27.1	50.0	-22.9	(N)L2
	Ave										
^	6.238M	42.0	+0.1	+0.2	+5.7	+0.1	+0.0	48.1	50.0	-1.9	(N)L2
									see average data		
146	885.710k	16.9	+0.2	+0.1	+5.7	+0.0	+0.0	22.9	46.0	-23.1	(N)L2
	Ave										
^	885.710k	45.5	+0.2	+0.1	+5.7	+0.0	+0.0	51.5	46.0	+5.5	(N)L2
									see average data		
148	5.869M	20.6	+0.1	+0.2	+5.7	+0.1	+0.0	26.7	50.0	-23.3	(N)L2
	Ave										
^	5.869M	42.9	+0.1	+0.2	+5.7	+0.1	+0.0	49.0	50.0	-1.0	(N)L2
									see average data		
150	1.132M	16.7	+0.2	+0.1	+5.7	+0.0	+0.0	22.7	46.0	-23.3	(N)L2
	Ave										
^	1.132M	42.8	+0.2	+0.1	+5.7	+0.0	+0.0	48.8	46.0	+2.8	(N)L2
									see average data		
152	5.126M	20.6	+0.1	+0.2	+5.7	+0.1	+0.0	26.7	50.0	-23.3	(N)L2
	Ave										
^	5.126M	45.9	+0.1	+0.2	+5.7	+0.1	+0.0	52.0	50.0	+2.0	(N)L2
									see average data		
154	5.256M	20.5	+0.1	+0.2	+5.7	+0.1	+0.0	26.6	50.0	-23.4	(N)L2
	Ave										
^	5.256M	45.2	+0.1	+0.2	+5.7	+0.1	+0.0	51.3	50.0	+1.3	(N)L2
									see average data		

156	5.986M	19.7	+0.1	+0.2	+5.7	+0.1	+0.0	25.8	50.0	-24.2	(N)L2
Ave											
^	5.986M	42.8	+0.1	+0.2	+5.7	+0.1	+0.0	48.9	50.0	-1.1	(N)L2
										see average data	
158	2.128M	15.9	+0.1	+0.1	+5.7	+0.0	+0.0	21.8	46.0	-24.2	(N)L2
Ave											
^	2.128M	42.2	+0.1	+0.1	+5.7	+0.0	+0.0	48.1	46.0	+2.1	(N)L2
										see average data	
160	5.526M	19.6	+0.1	+0.2	+5.7	+0.1	+0.0	25.7	50.0	-24.3	(N)L2
Ave											
^	5.526M	44.1	+0.1	+0.2	+5.7	+0.1	+0.0	50.2	50.0	+0.2	(N)L2
										see average data	
162	5.815M	19.3	+0.1	+0.2	+5.7	+0.1	+0.0	25.4	50.0	-24.6	(N)L2
Ave											
^	5.815M	41.5	+0.1	+0.2	+5.7	+0.1	+0.0	47.6	50.0	-2.4	(N)L2
										see average data	

CKC Laboratories, Inc. 15.207 AC Mains - Average 3/9/2015 11:54:03 Test Lead: (N)L2 Site: A  
3D Robotics, Inc., WO#: 96782  
Sequence #2 Solo Controller


## Test Setup Photo(s)



## 15.247(a)(2) Bandwidth

### Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92821 • 714-993-6112

Customer: **3D Robotics, Inc.**  
 Specification: **15.247(a)(2) 6dB Bandwidth**  
 Work Order #: **96782** Date: **3/4/2015**  
 Test Type: **Conducted Emissions** Time: **08:27:06**  
 Equipment: **Solo Controller** Sequence#: **1**  
 Manufacturer: **3D Robotics, Inc.** Tested By: **E. Wong**  
 Model: **AT11A** **8.3V**  
 S/N: **NA**

#### Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	7/10/2014	7/10/2015
	AN02946	Cable	32022-2-2909K-36TC	7/31/2013	7/31/2015

#### Equipment Under Test (\* = EUT):

Function	Manufacturer	Model #	S/N
Solo Controller	3D Robotics, Inc.	AT11A	NA
AC to 8.3VDC 1.5A Power Adapter	3D Robotics Inc.	CG15-088150-AU	NA

#### Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	Latitude E6530	6QN6JX1

#### Test Conditions / Notes:

The EUT is placed on the test bench. The EUT is set in test mode via support laptop.

##### Protocol:

802.11n20 ( program code :TX99)

Freq 2400-2483.5MHz

2427MHz, 2437MHz, 2462MHz ( channel 4,6,11)

Power Command: 25,25,25

MIMO, Correlated, vertically polarized dipole antenna, gain=2.3dBi, beam forming, directional gain =3dB

Test environment conditions: Temperature: 21.1°C, Relative Humidity: 40%, Atmospheric Pressure: 100kPa

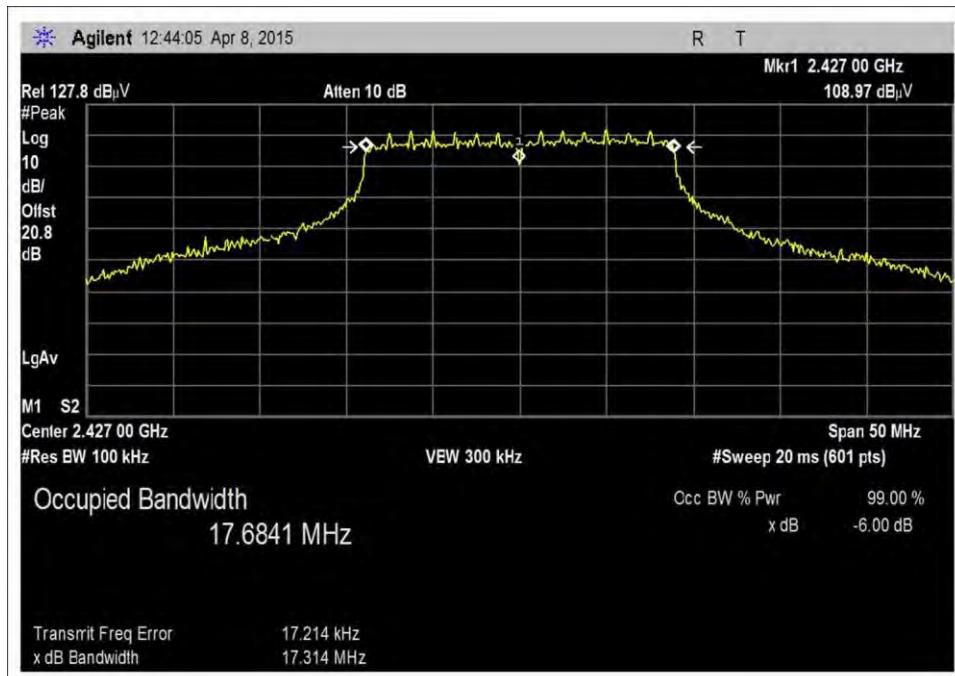
RF parameter is measured at the antenna ports of WiFi card PN: PCE3202AH

Test performed in accordance with 8.2 DTS Bandwidth 8.2 Option2 of

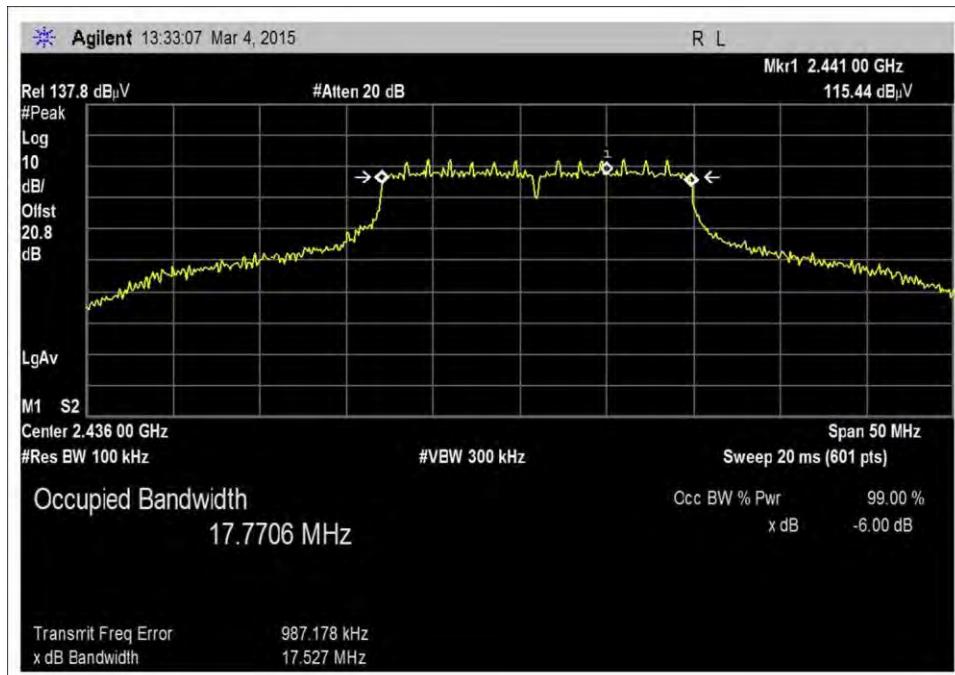
Test Procedure: 558074 D01 DTS Meas Guidance V03r02, June 5, 2014

Reported Bandwidth measured at antenna port 1, same measurement at antenna port 2 was verified. No deviation in emission signature.

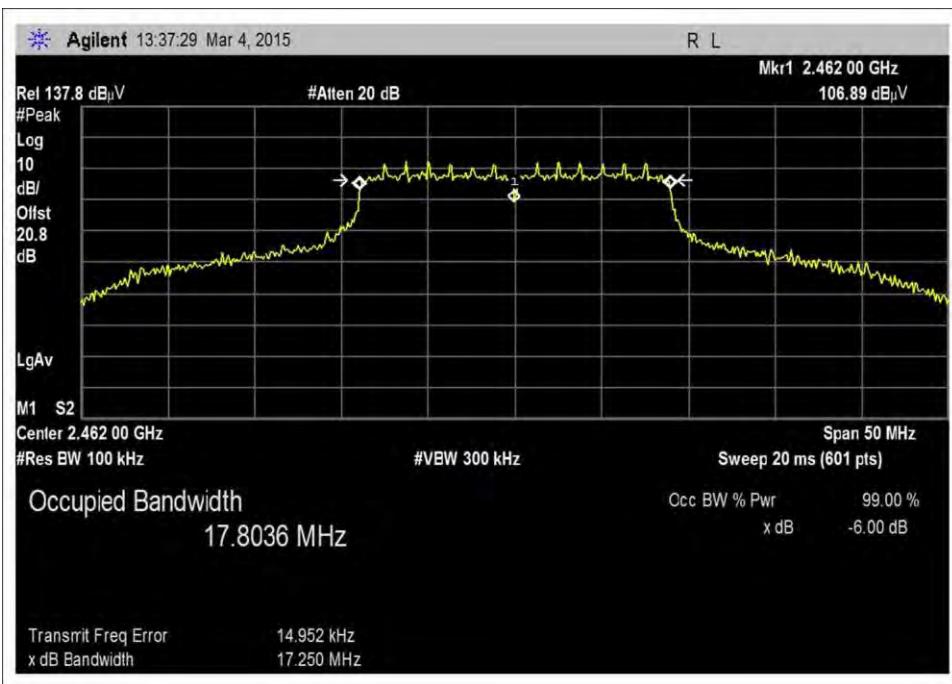
## Test Data



2427MHz



2437MHz



2462MHz

### Test Setup Photo



## 15.247(b)(3) RF Power Output

### Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92821 • 714-993-6112

Customer: **3D Robotics, Inc.**  
 Specification: **15.247(b)(3) RF Output Power**  
 Work Order #: **96782** Date: **3/4/2015**  
 Test Type: **Conducted Emissions** Time: **08:27:06**  
 Equipment: **Solo Controller** Sequence#: **1**  
 Manufacturer: **3D Robotics, Inc.** Tested By: **E. Wong**  
 Model: **AT11A** **8.3V**  
 S/N: **NA**

***Test Equipment:***

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	03494	RF Powerhead	ETS Lindgren	11/20/2014	11/20/2016
	03495	RF Powerhead	ETS Lindgren	11/20/2014	11/20/2016

***Equipment Under Test (\* = EUT):***

Function	Manufacturer	Model #	S/N
Solo Controller	3D Robotics, Inc.	AT11A	NA
AC to 8.3VDC 1.5A Power Adapter	3D Robotics Inc.	CG15-088150-AU	NA

***Support Devices:***

Function	Manufacturer	Model #	S/N
Laptop	Dell	Latitude E6530	6QN6JX1

**Test Conditions / Notes:**

The EUT is placed on the test bench. The EUT is set in test mode via support laptop.

**Protocol:**

802.11n20 ( program code :TX99)

Freq 2400-2483.5MHz

2427MHz, 2437MHz, 2462MHz ( channel 4,6,11)

Power Command: 25,25,25

MIMO, Correlated, vertically polarized dipole antenna, gain=2.3dBi, beam forming, directional gain =3dB

Test environment conditions: Temperature: 21.1°C, Relative Humidity: 40 %, Atmospheric Pressure: 100kPa

RF parameter is measured at the antenna ports of WiFi card PN: PCE3202AH

The controller capable of battery power or charger powered is powered by a dedicated battery charger during the test.

15.31(e) compliance: the supply voltage was varied between 85% and 115% of the nominal rated supply voltage, no change in the Fundamental signal level was observed.

Test performed in accordance with, Power meas:9.2.3.1 Method AVGPM-G ( measurement using a gated RF average power meter)

And MIMO summation in accordance with, E(1) and 2(C)(i)

Test Procedure: 558074 D01 DTS Meas Guidance V03r02, June 5, 2014

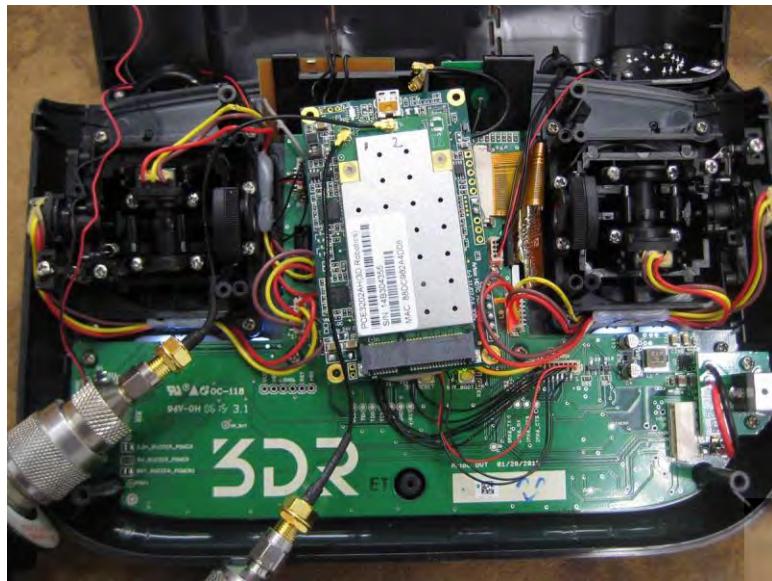
Test Procedure: 662911 D01 Multiple Transmitter Output v02r01, October 31, 2013

Test software: EMPower ETSI Burst Measurement System. V1.0.2.11

## Test Data

<b>802.11n 20</b>	<b>Peak Power1</b>	<b>Peak Power 2</b>	<b>Peak Power 1</b>	<b>Peak Power2</b>	<b>Total Peak Power</b>
	<b>dBm</b>	<b>dBm</b>	<b>w</b>	<b>w</b>	<b>W</b>
2427	23.73	23.83	0.236048	0.241546	0.4776
2437	24.58	24.62	0.287078058	0.289734359	0.5768
2462	24.79	24.59	0.301300602	0.287739841	<b>0.5890</b>

### Test Setup Photo(s)



## 15.247(d) Conducted Spurious Emissions

### Test Data

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92821 • 714 993 6112

Customer: **3D Robotics, Inc.**  
 Specification: **15.247(d) Conducted Spurious Emissions**  
 Work Order #: **96782** Date: **3/4/2015**  
 Test Type: **Conducted Emissions** Time: **16:21:59**  
 Equipment: **Solo Controller** Sequence#: **1**  
 Manufacturer: **3D Robotics, Inc.** Tested By: **E. Wong**  
 Model: **AT11A** **8.3V**  
 S/N: **NA**

***Test Equipment:***

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	7/10/2014	7/10/2015
T2	AN02946	Cable	32022-2-2909K-36TC	7/31/2013	7/31/2015

***Equipment Under Test (\* = EUT):***

Function	Manufacturer	Model #	S/N
AC to 8.3VDC 1.5A Power Adapter	3D Robotics Inc.	CG15-088150-AU	NA
Solo Controller*	3D Robotics, Inc.	AT11A	NA

***Support Devices:***

Function	Manufacturer	Model #	S/N
Laptop	Dell	Latitude E6530	6QN6JX1

**Test Conditions / Notes:**

The EUT is placed on the test bench. The EUT is set in test mode via support laptop.

**Protocol:**

802.11n20 ( program code :TX99)

Freq 2400-2483.5MHz

2427MHz, 2437MHz, 2462MHz ( channel 4,6,11)

Power Command: 25,25,25

MIMO, Correlated, vertically polarized dipole antenna, gain=2.3dBi, beam forming, directional gain =3dB

Frequency range of measurement = 9 kHz- 25 GHz. RBW=VBW=100kHz.

Test environment conditions: 21.1°C, 40 % Relative Humidity, 100kPa

RF parameter is measured at the antenna ports of WiFi card PN: PCE3202AH

The battery powered controller is powered by dedicated battery Charger during the test.

15.31(e) To simulate a fully charge battery, a support power supply is used for providing DC power to the Drone. The drone is designed not to transmit in charging mode.

Cond spur em: limit = 113dBuV/100kHz (max measured) - 30= 83dBuV/100kHz.

**No emissions found, recorded emission represents noise floor level.**

Test Procedure: 558074 D01 DTS Meas Guidance V03r02, June 5, 2014

Test Procedure: 662911 D01 Multiple Transmitter Output v02r01, October 31, 2013

3) Out-of-Band and Spurious Emission Measurements b) Relative Limits: Without 10Log N applied. Relative limit reference to conducted power at individual antenna port.

(iii) Measure and add 10 log(NANT) dB, where NANT is the number of outputs, as described in section E)2)c).

Where conducted measurements are used for compliance with conducted limits, the measured conducted output power or PSD must be summed across the outputs, as described in Attachment 662911 D01 of this publication.

Ext Attn: 0 dB

**Measurement Data:** Reading listed by margin. **Test Lead:** Ant Port

#	Freq MHz	Rdng dB $\mu$ V	T1 dB	T2 dB	dB	Dist Table	Corr dB $\mu$ V	Spec dB $\mu$ V	Margin dB	Polar Ant
1	4821.000M	47.8	+0.0	+1.2		+0.0	49.0	83.0	-34.0	Ant P ant1
2	4915.700M	47.1	+0.0	+1.2		+0.0	48.3	83.0	-34.7	Ant P ant2
3	4819.000M	46.3	+0.0	+1.2		+0.0	47.5	83.0	-35.5	Ant P ant2
4	4874.000M	44.2	+0.0	+1.2		+0.0	45.4	83.0	-37.6	Ant P ant2
5	4917.000M	43.2	+0.0	+1.2		+0.0	44.4	83.0	-38.6	Ant P ant1
6	4891.000M	42.7	+0.0	+1.2		+0.0	43.9	83.0	-39.1	Ant P ant1

## Test Setup Photo



## 15.247(d) Radiated Spurious Emissions and Band Edge

### Test Data

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Pl • Brea, CA 92823 • 714-993-6112

Customer: **3D Robotics, Inc.**  
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**  
 Work Order #: **96782** Date: **4/10/2015**  
 Test Type: **Maximized Emissions** Time: **11:25:01**  
 Equipment: **Solo Controller** Sequence#: **5**  
 Manufacturer: **3D Robotics, Inc.** Tested By: **Don Nguyen**  
 Model: **AT11A**  
 S/N:

#### ***Test Equipment:***

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN00314	Loop Antenna	6502	7/2/2014	7/2/2016
T1	AN00309	Preamp	8447D	3/12/2014	3/12/2016
T2	AN01995	Biconilog Antenna	CBL6111C	4/30/2014	4/30/2016
T3	ANP05050	Cable	RG223/U	1/15/2015	1/15/2017
T4	ANP05198	Cable-Amplitude 15 to 45degC (dB)	8268	12/22/2014	12/22/2016
	AN02672	Spectrum Analyzer	E4446A	8/14/2013	8/14/2015
T5	AN00786	Preamp	83017A	4/25/2014	4/25/2016
T6	AN00849	Horn Antenna	3115	3/18/2014	3/18/2016
T7	AN02946	Cable	32022-2-2909K-36TC	7/31/2013	7/31/2015
T8	ANP06661	Cable	LDF1-50	4/15/2014	4/15/2016
T9	AN03385	High Pass Filter	11SH10-3000/T10000-O/O	6/5/2013	6/5/2015
	AN01413	Horn Antenna	84125-80008	11/25/2014	11/25/2016

#### ***Equipment Under Test (\* = EUT):***

Function	Manufacturer	Model #	S/N
Solo Controller*	3D Robotics, Inc.	AT11A	NA
AC to 8.3VDC 1.5A Power Adapter	3D Robotics Inc.	CG15-088150-AU	NA

#### ***Support Devices:***

Function	Manufacturer	Model #	S/N
Cellphone	Samsung	Galaxy S5	NA
Solo	3D Robotics, Inc.	S111A	NA
Video Camera	GoPro	Hero4	NA

**Test Conditions / Notes:**

The equipment under test (EUT) is stand alone on the Styrofoam table top.  
 The EUT is powered on and is continuously transmitting at its maximum rated output power.  
 Channel 4 (2427MHz), Channel 6 (2437MHz) and Channel 11 (2462MHz) +25dBm both antennas, MCS15.  
 The EUT is powered from ACDC adapter. HDMI port is connected to unterminated HDMI cable.  
 Data signal received from remotely located Solo copter is streamed from the EUT to support cellphone located remotely.  
 The EUT is tested in each of three axis systems.

Frequency range scanned and maximized for this data sheet is 0.009MHz to 25000MHz.

0.009MHz to 0.15MHz RBW=VBW=0.2kHz.

0.15MHz to 30MHz RBW=VBW=9kHz.

30MHz to 1000MHz RBW=VBW=120kHz.

1000MHz to 25000MHz RBW=VBW=1MHz.

Temperature: 17°C, Relative Humidity 30%, Atmospheric Pressure: 100kPa.

Site A. Test method used, ANSI C63.4 2003.

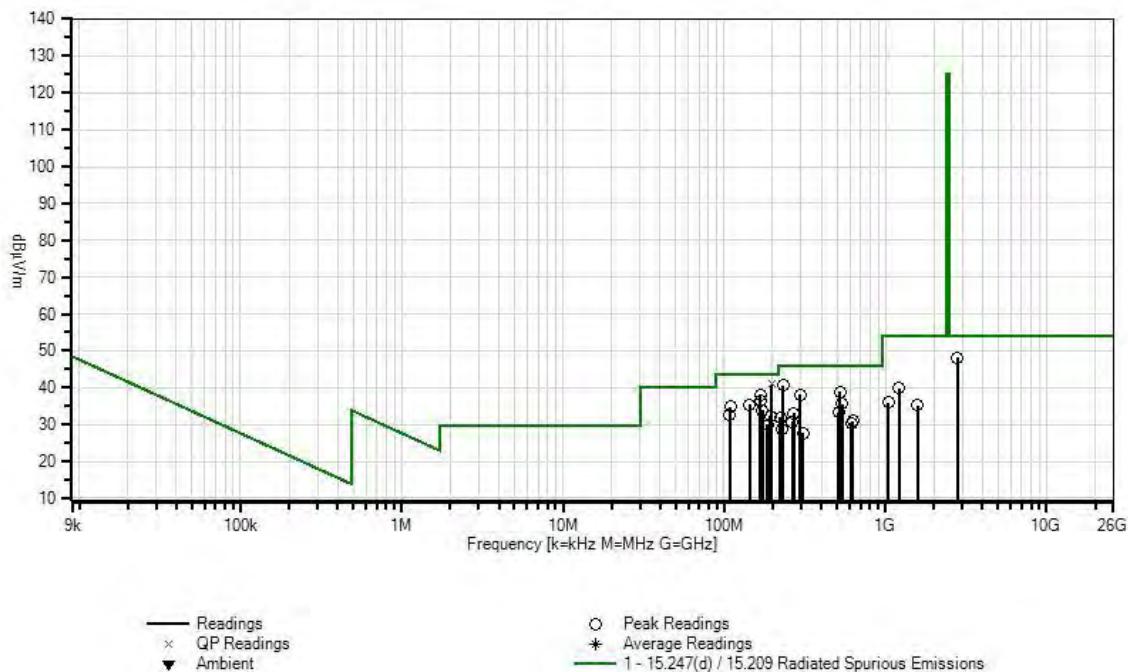
**Modification: Installing one ferrite (manufacturer: Laird, model: 28B0375-400) on the cable connected from the main board to R2Link board.**

Ext Attn: 0 dB											
Measurement Data:			Reading listed by margin.				Test Distance: 3 Meters				
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8	Table	dB $\mu$ V/m	dB $\mu$ V/m		
			T9								
	MHz	dB $\mu$ V	dB	dB	dB	dB	Table	dB $\mu$ V/m	dB $\mu$ V/m	dB	Ant
1	197.980M	57.4	-28.0	+9.1	+0.1	+2.4	+0.0	41.0	43.5	-2.5	Horiz
	QP		+0.0	+0.0	+0.0	+0.0					
			+0.0								
^	197.980M	61.1	-28.0	+9.1	+0.1	+2.4	+0.0	44.7	43.5	+1.2	Horiz
			+0.0	+0.0	+0.0	+0.0					
			+0.0								
3	167.780M	54.1	-28.0	+9.8	+0.1	+2.1	+0.0	38.1	43.5	-5.4	Horiz
			+0.0	+0.0	+0.0	+0.0					
			+0.0								
4	231.080M	54.3	-28.0	+11.4	+0.2	+2.6	+0.0	40.5	46.0	-5.5	Horiz
			+0.0	+0.0	+0.0	+0.0					
			+0.0								
5	2807.000M	50.2	+0.0	+0.0	+0.0	+0.0	+0.0	48.2	54.0	-5.8	Horiz
			-38.9	+26.7	+0.8	+4.5					
			+4.9								
6	167.880M	52.4	-28.0	+9.8	+0.1	+2.1	+0.0	36.4	43.5	-7.1	Vert
			+0.0	+0.0	+0.0	+0.0					
			+0.0								
7	523.680M	43.6	-27.8	+18.6	+0.3	+4.1	+0.0	38.8	46.0	-7.2	Horiz
			+0.0	+0.0	+0.0	+0.0					
			+0.0								
8	296.950M	49.3	-27.9	+13.4	+0.2	+3.0	+0.0	38.0	46.0	-8.0	Horiz
			+0.0	+0.0	+0.0	+0.0					
			+0.0								

9	143.880M	50.0	-28.0 +0.0 +0.0	+11.3 +0.0 +0.0	+0.1 +0.0 +0.0	+2.0 +0.0 +0.0	+0.0 35.4 43.5	43.5	-8.1	Vert
10	108.880M	50.0	-28.1 +0.0 +0.0	+11.0 +0.0 +0.0	+0.1 +0.0 +0.0	+1.7 +0.0 +0.0	+0.0 34.7 43.5	43.5	-8.8	Horiz
11	171.880M	50.2	-28.0 +0.0 +0.0	+9.4 +0.0 +0.0	+0.1 +0.0 +0.0	+2.2 +0.0 +0.0	+0.0 33.9 43.5	43.5	-9.6	Vert
12	541.330M	39.8	-27.7 +0.0 +0.0	+18.9 +0.0 +0.0	+0.3 +0.0 +0.0	+4.2 +0.0 +0.0	+0.0 35.5 46.0	46.0	-10.5	Horiz
13	108.420M	47.8	-28.1 +0.0 +0.0	+10.9 +0.0 +0.0	+0.1 +0.0 +0.0	+1.7 +0.0 +0.0	+0.0 32.4 43.5	43.5	-11.1	Vert
14	192.880M	48.7	-28.0 +0.0 +0.0	+9.1 +0.0 +0.0	+0.1 +0.0 +0.0	+2.3 +0.0 +0.0	+0.0 32.2 43.5	43.5	-11.3	Vert
15	512.600M	38.3	-27.8 +0.0 +0.0	+18.3 +0.0 +0.0	+0.3 +0.0 +0.0	+4.1 +0.0 +0.0	+0.0 33.2 46.0	46.0	-12.8	Vert
16	269.580M	45.0	-28.0 +0.0 +0.0	+13.0 +0.0 +0.0	+0.2 +0.0 +0.0	+2.8 +0.0 +0.0	+0.0 33.0 46.0	46.0	-13.0	Horiz
17	184.780M	46.5	-28.0 +0.0 +0.0	+9.0 +0.0 +0.0	+0.1 +0.0 +0.0	+2.3 +0.0 +0.0	+0.0 29.9 43.5	43.5	-13.6	Vert
18	1218.750M	53.8	+0.0 -39.4 +0.0	+0.0 +22.2 +0.0	+0.0 +0.5 +0.0	+0.0 +2.8 +0.0	+0.0 39.9 54.0	54.0	-14.1	Horiz
19	222.830M	46.4	-28.0 +0.0 +0.0	+10.8 +0.0 +0.0	+0.2 +0.0 +0.0	+2.5 +0.0 +0.0	+0.0 31.9 46.0	46.0	-14.1	Horiz
20	628.080M	33.2	-27.4 +0.0 +0.0	+20.3 +0.0 +0.0	+0.3 +0.0 +0.0	+4.5 +0.0 +0.0	+0.0 30.9 46.0	46.0	-15.1	Horiz
21	264.920M	42.8	-28.0 +0.0 +0.0	+12.9 +0.0 +0.0	+0.2 +0.0 +0.0	+2.8 +0.0 +0.0	+0.0 30.7 46.0	46.0	-15.3	Vert

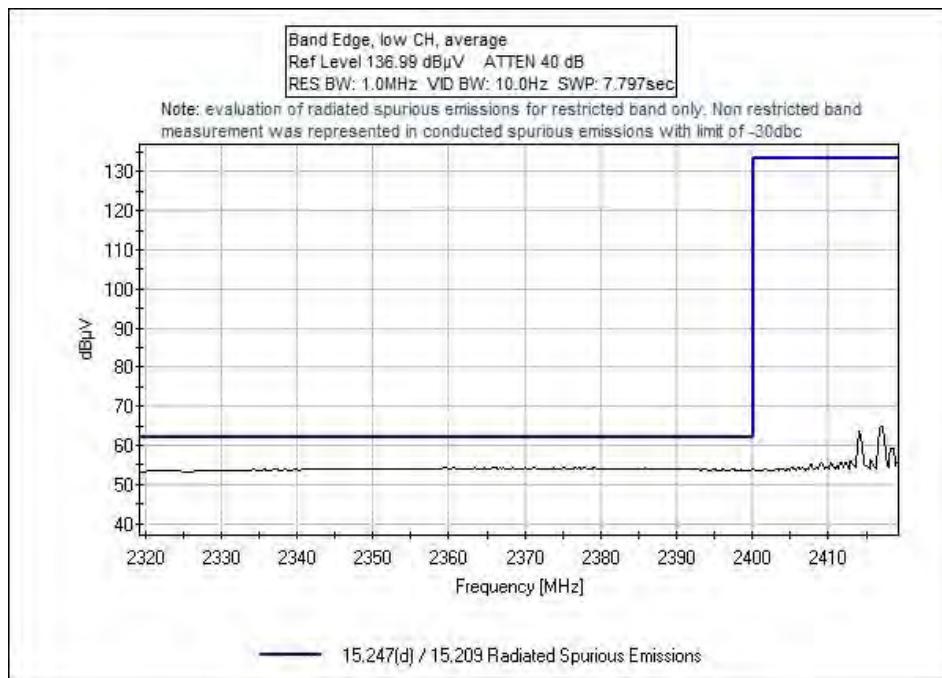
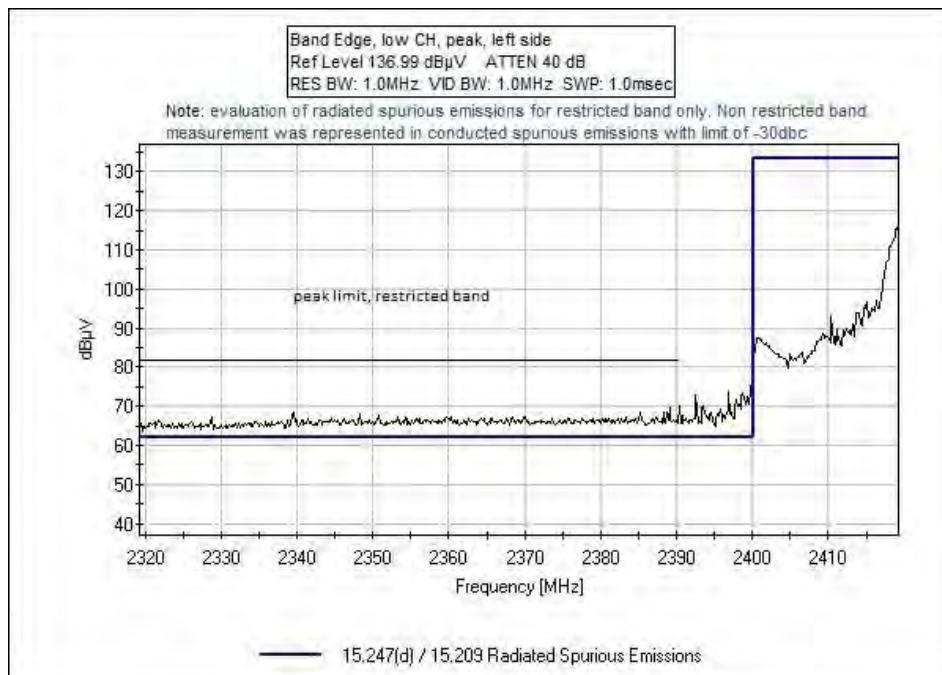
22	612.280M	33.0	-27.5 +0.0 +0.0	+20.1 +0.0 +0.0	+0.3 +0.0 +0.0	+4.5 +0.0 +0.0	+0.0 +0.0 +0.0	30.4	46.0	-15.6	Horiz
23	229.180M	42.9	-28.0 +0.0 +0.0	+11.3 +0.0 +0.0	+0.2 +0.0 +0.0	+2.5 +0.0 +0.0	+0.0 +0.0 +0.0	28.9	46.0	-17.1	Vert
24	1040.000M	51.4	+0.0 -40.3 +0.0	+0.0 +21.7 +0.5	+0.0 +0.5 +2.6	+0.0 +0.0 +0.0	+0.0 +0.0 +0.0	35.9	54.0	-18.1	Horiz
25	306.580M	38.8	-27.9 +0.0 +0.0	+13.6 +0.0 +0.0	+0.2 +0.0 +0.0	+3.0 +0.0 +0.0	+0.0 +0.0 +0.0	27.7	46.0	-18.3	Horiz
26	1583.500M	46.5	+0.0 -38.4 +0.0	+0.0 +23.2 +0.5	+0.0 +0.5 +3.3	+0.0 +0.0 +0.0	+0.0 +0.0 +0.0	35.1	54.0	-18.9	Vert

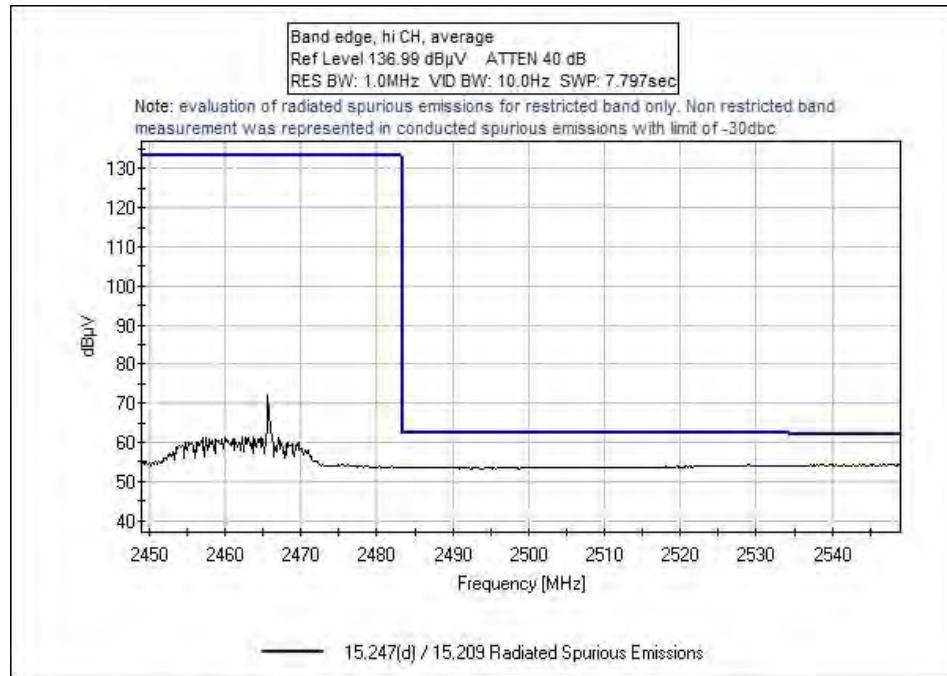
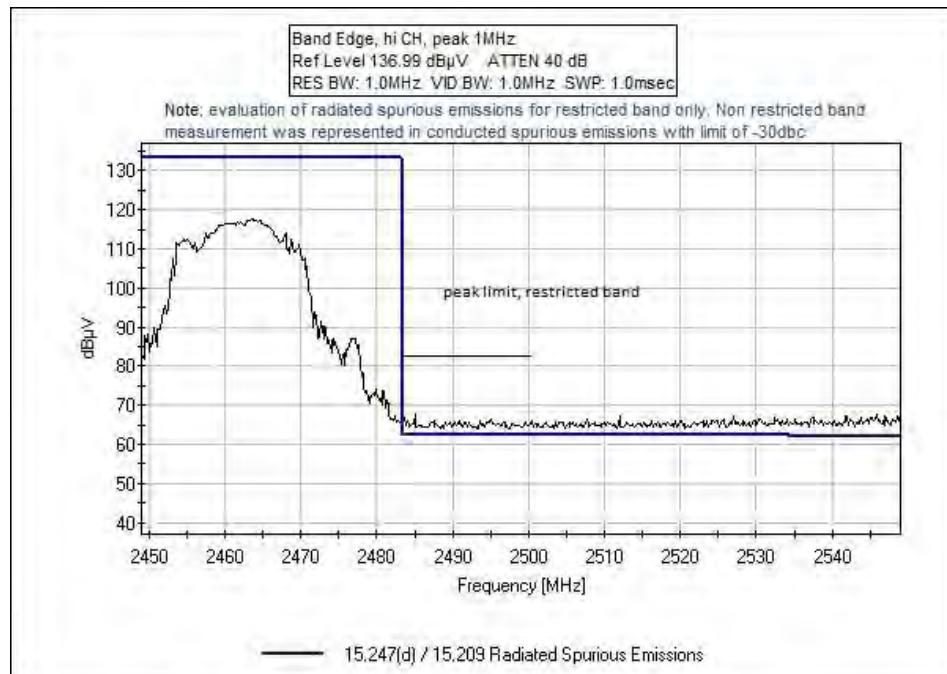
CKC Laboratories, Inc. 15.247(d) / 15.209 Radiated Spurious Emissions 4/10/2015 11:25:01 Test Distance: 3  
 Meters Site: A  
 3D Robotics, Inc., WO#: 96782  
 Sequence #5



## Band Edge

### Test Data

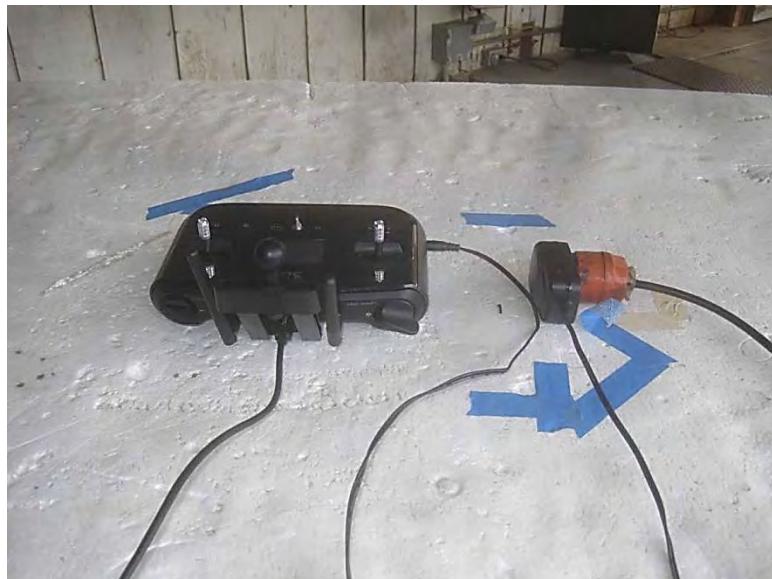




### Test Setup Photo(s)



X-Axis



X-Axis



Y-Axis



Z-Axis

## 15.247(e) Power Spectral Density

### Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92821 • 714-993-6112

Customer: **3D Robotics, Inc.**  
 Specification: **15.247(e) Power Spectral Density**  
 Work Order #: **96782** Date: **3/4/2015**  
 Test Type: **Conducted Emissions** Time: **08:27:06**  
 Equipment: Solo Controller Sequence#: **1**  
 Manufacturer: 3D Robotics, Inc. Tested By: **E. Wong**  
 Model: AT11A **8.3V**  
 S/N: NA

#### Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	7/10/2014	7/10/2015
	AN02946	Cable	32022-2-2909K-36TC	7/31/2013	7/31/2015

#### Equipment Under Test (\* = EUT):

Function	Manufacturer	Model #	S/N
Solo Controller	3D Robotics, Inc.	AT11A	NA
AC to 8.3VDC 1.5A Power Adapter	3D Robotics Inc.	CG15-088150-AU	NA

#### Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	Latitude E6530	6QN6JX1

#### Test Conditions / Notes:

The EUT is placed on the test bench. The EUT is set in test mode via support laptop.

#### Protocol:

802.11n20 ( program code :TX99)

Freq 2400-2483.5MHz

2427MHz, 2437MHz, 2462MHz ( channel 4,6,11)

Power Command: 25,25,25

MIMO, Correlated, vertically polarized dipole antenna, gain=2.3dBi, beam forming, directional gain =3dB

Test environment conditions: Temperature: 21.1°C, Relative Humidity: 40 %, Atmospheric Pressure: 100kPa

RF parameter is measured at the antenna ports of WiFi card PN: PCE3202AH

15.31(e) The controller capable of battery power or charger powered is powered by dedicated battery Charger during the test.

Test performed in accordance with, PSD measurement 10.3 Method AVGPSD-1 ( Trace Averaging with EUT transmitting at full power thought out each sweep) and MIMO summation in accordance with, E(1) and 2(c)(i)

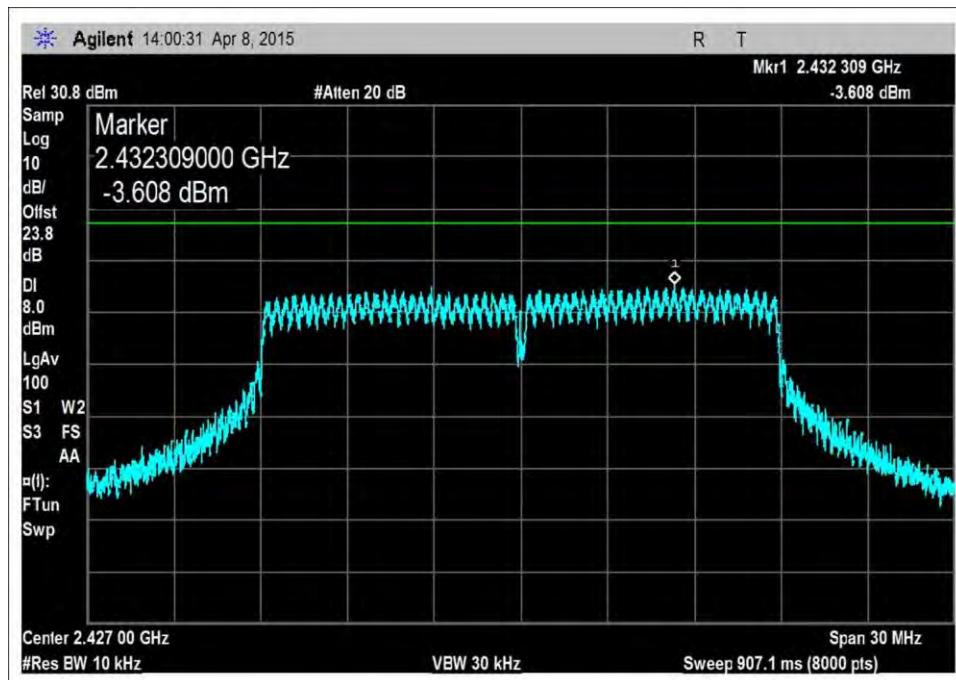
Test Procedure: 558074 D01 DTS Meas Guidance V03r02, June 5, 2014

Test Procedure: 662911 D01 Multiple Transmitter Output v02r01, October 31, 2013

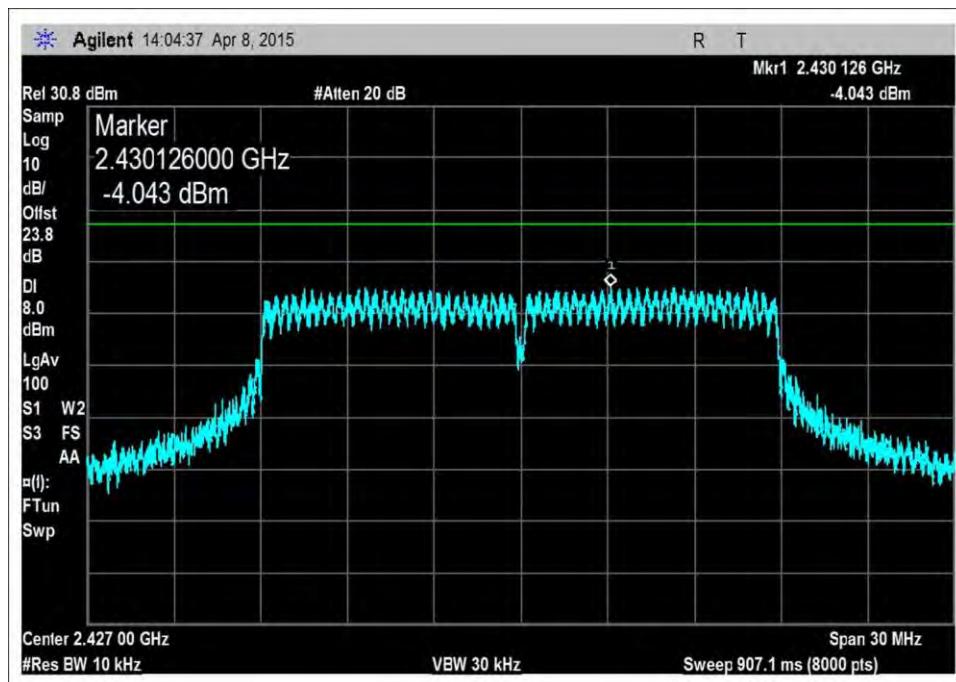
3dB amplitude offset added to the measurement. (10 Log 2=3dB)

Note To expedite test time, the RBW is set at 10kHz, which the result is under the limit of 8dBm/3kHz.

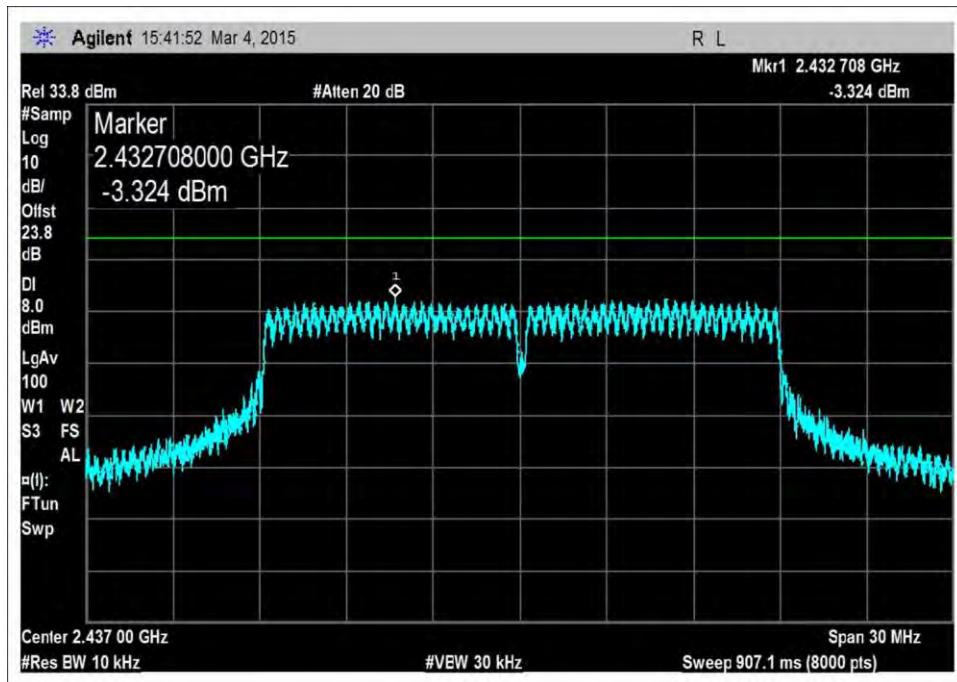
## Test Data



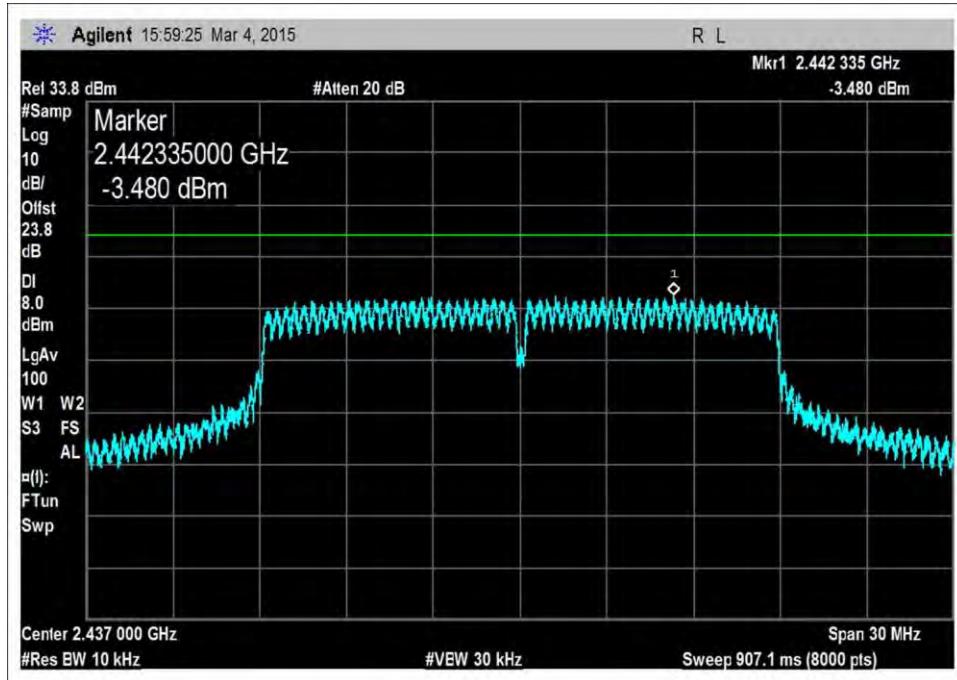
2427MHz



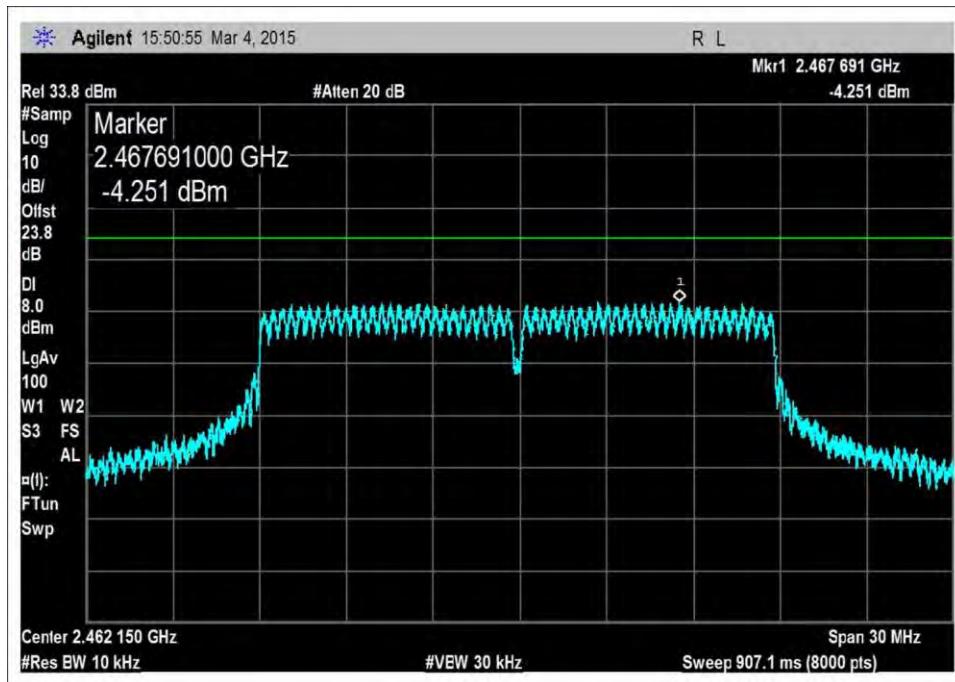
2427MHz



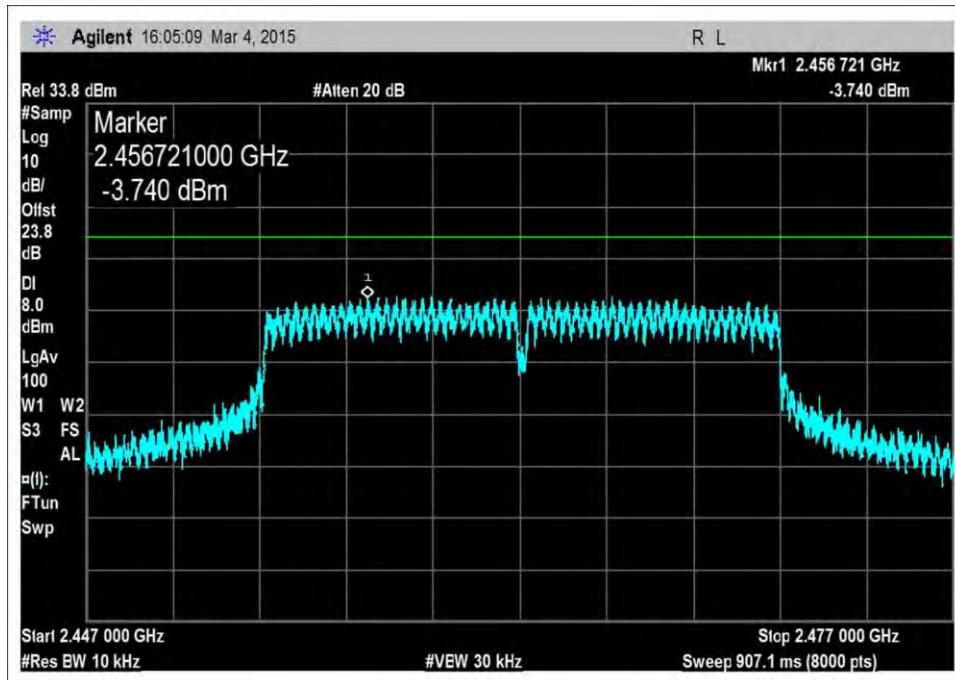
2437MHz



2437MHz



2462MHz



2462MHz

### Test Setup Photo



## 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.

### 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 dB $\mu$ V/m, the spectrum analyzer reading in dB $\mu$ V was corrected by using the following formula. This reading was then compared to the applicable specification limit.

<b>SAMPLE CALCULATIONS</b>	
Meter reading	(dB $\mu$ V)
+ Antenna Factor	(dB)
+ Cable Loss	(dB)
- Distance Correction	(dB)
- Preamplifier Gain	(dB)
= Corrected Reading	(dB $\mu$ V/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.

<b>MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE</b>			
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 carrot ("") 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.