

# Export Management System, Inc.

## TEST REPORT FOR

**Garage Transmitter, EZ Code-R300**

**Tested To The Following Standards:**

**FCC Part 15 Part 15.231**

**Report No.: 92145-3**

**Date of issue: July 19, 2011**



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:**

Export Management System, Inc.  
13532 Hawthorne Blvd.  
Hawthorne, CA 90250

Representative: Calvin Joo  
Customer Reference Number: 91

**DATE OF EQUIPMENT RECEIPT:****DATE(S) OF TESTING:****REPORT PREPARED BY:**

Dianne Dudley  
CKC Laboratories, Inc.  
5046 Sierra Pines Drive  
Mariposa, CA 95338

Project Number: 92145

July 1, 2011

July 1-5, 2011

### 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.

A handwritten signature in black ink, reading "Steve Behm", is positioned above a horizontal line.

**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

## Site Registration & Accreditation Information

Location	CB #	JAPAN	CANADA	FCC
Brea A	US0060	R-2945, C-3248 & T-1572	3082D-1	90473

## SUMMARY OF RESULTS

### Standard / Specification: FCC Part 15.231

Description	Test Procedure/Method	Results
Voltage Variations	FCC 15.31(e)	Pass
Release time	FCC Part 15 .231(a)(1) / 2.1055(a)	Pass
Fundamental Field Strength	FCC Part 15 .231(b) / 2.1046	Pass
Radiated Spurious Field Strength	FCC Part 15 .231(b) / 2.1053	Pass
-20dBc Occupied Bandwidth	FCC Part 15 .231(c) / 2.1049	Pass

## Conditions During Testing

This list is a summary of the conditions noted for or modifications made to the equipment during testing.

Summary of Conditions
The EUT was tested with a fresh battery.

## **EQUIPMENT UNDER TEST (EUT)**

### **EQUIPMENT UNDER TEST**

#### **Garage Transmitter**

Manuf: Export Management System, Inc.

Model: EZ Code-R300

Serial: NA

### **PERIPHERAL DEVICES**

The EUT was not tested with peripheral devices.

## FCC PART 15.231

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) 47 CFR 15C requirements for Unlicensed Radio Frequency Devices, Subpart C - Intentional Radiators.

### 15.31(e) Voltage Variations

#### Test Conditions / Setup

EUT is placed on Styrofoam table and operates in continuous transmitting mode. Emission profile in three orthogonal orientations have been evaluated

Operating frequency: 299.839 MHz

Rated Power Output: -37dBm

Frequency range: 30-1000MHz, RBW: 120kHz, VBW: 120kHz,

Temperature: 71°F, Relative Humidity: 45%

15.31(e) testing performed using a new battery.

Engineer Name: D. Nguyen

Test Equipment					
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
AN02672	Spectrum Analyzer	E4446A	Agilent	8/9/2010	8/9/2012
AN00309	Preamp	8447D	HP	5/7/2010	5/7/2012
ANP05050	Cable	RG223/U	Pasternack	3/21/2011	3/21/2013
ANP05198	Cable	8268	Belden	12/21/2010	12/21/2012
AN01995	Biconilog Antenna	CBL6111C	Chase	3/8/2010	3/8/2012
AN00849	Horn Antenna	3115	ETS	4/23/2010	4/23/2012
AN00786	Preamp	83017A	HP	8/5/2010	8/5/2012
AN02948	Cable	32022-2-2909K-24TC	AstroLab, Inc.	8/9/2010	8/9/2012
ANP05421	Cable	Sucoflex 104A	Huber & Suhner	5/7/2010	5/7/2012
ANP05563	Cable	E4446A	Andrews	3/21/2011	3/21/2013

**Test Setup Photos**



**X AXIS FRONT VIEW**



**X AXIS BACK VIEW**





**Y AXIS FRONT VIEW**



**Y AXIS BACK VIEW**



**Z AXIS FRONT VIEW**



**Z AXIS BACK VIEW**

## 15.231(a)(1) Release Time

### Test Conditions / Setup

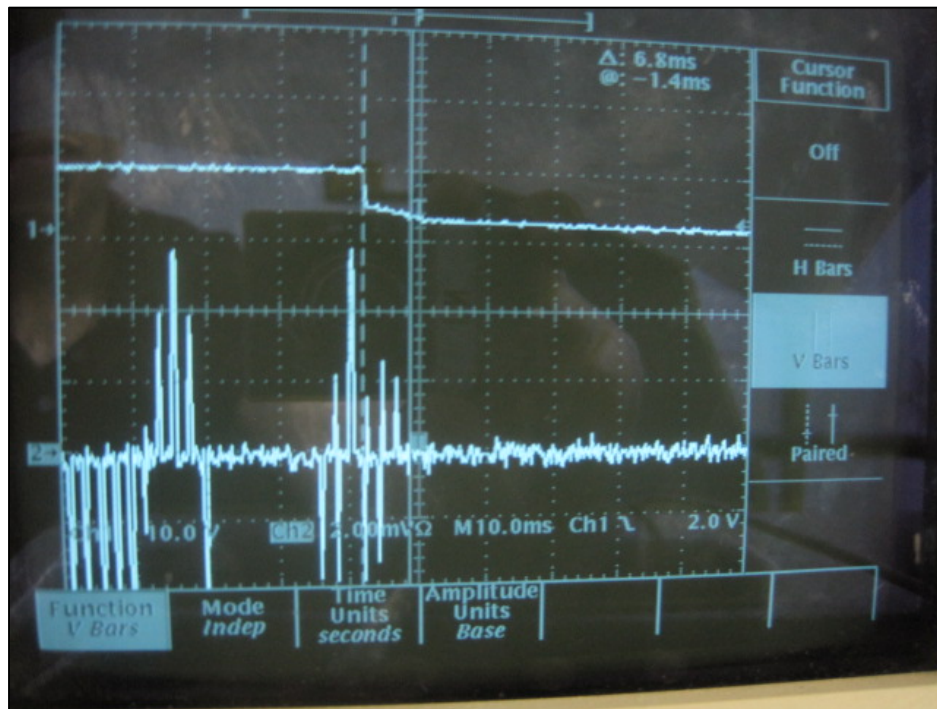
The EUT is placed on the test bench, in close proximity, Ch1 of an Oscilloscope is connected to trigger lead of the RF switch, a RF receiving wire element is connected to the CH2. With the Oscilloscope set to trigger on negative edge of the RF switch, a single sweep was captured with the RF switch of the EUT being released. The captured time between the RF witch being released and RF cessation of RF power is measured.

Measured capture time = 6.8 msec, meets requirement.

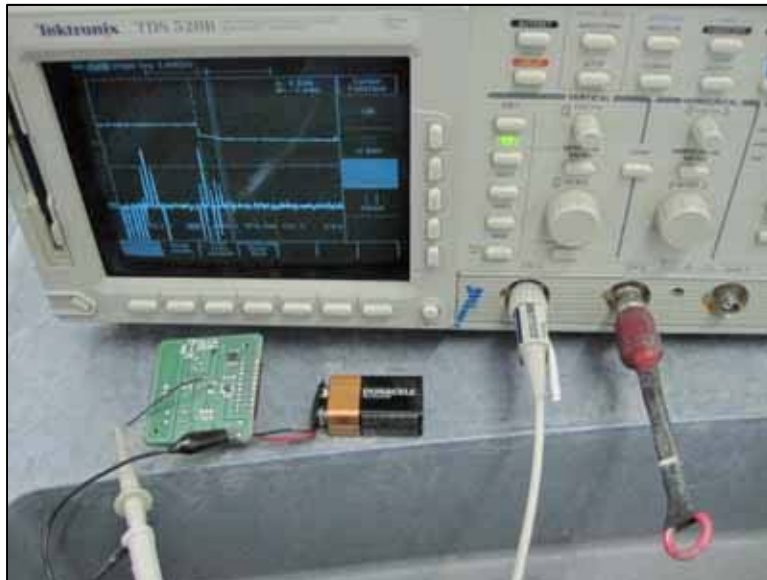
Engineer Name: D. Nguyen

Test Equipment					
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
02847	Oscilloscope	TDS 520B	Tektronix	3/23/2011	3/23/2013

### Test Data



**Test Setup Photos**



## 15.231(b) Fundamental Field Strength

### Test Data Sheets

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

Customer: **Export Management System, Inc.**  
 Specification: **15.231(b) Fundamental Field Strength**  
 Work Order #: **92145** Date: 7/1/2011  
 Test Type: **Radiated Scan** Time: 09:21:57  
 Equipment: **Garage Transmitter** Sequence#: 1  
 Manufacturer: Export Management System, Inc. Tested By: Don Nguyen  
 Model: EZ Code-R300  
 S/N: NA

#### Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02672	Spectrum Analyzer	E4446A	8/9/2010	8/9/2012
T2	AN00309	Preamp	8447D	5/7/2010	5/7/2012
T3	ANP05050	Cable	RG223/U	3/21/2011	3/21/2013
T4	ANP05198	Cable	8268	12/21/2010	12/21/2012
T5	AN01995	Biconilog Antenna	CBL6111C	3/8/2010	3/8/2012

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

Function	Manufacturer	Model #	S/N
Garage Transmitter	Export Management System, Inc.	EZ Code-R300	NA

#### Support Devices:

Function	Manufacturer	Model #	S/N
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#### Test Conditions / Notes:

EUT is placed on Styrofoam table and operates in continuous transmitting mode.  
 Tested with fresh battery installed in EUT.  
 Emission profiles in three orthogonal orientations have been evaluated  
 Operating frequency: 299.839 MHz  
 Rated Power Output: -37dBm  
 Frequency range: 30-1000MHz, RBW: 120kHz, VBW:120kHz,  
 Temperature: 71°F, Relative Humidity: 45%

Ext Attn: 0 dB

#### Measurement Data:

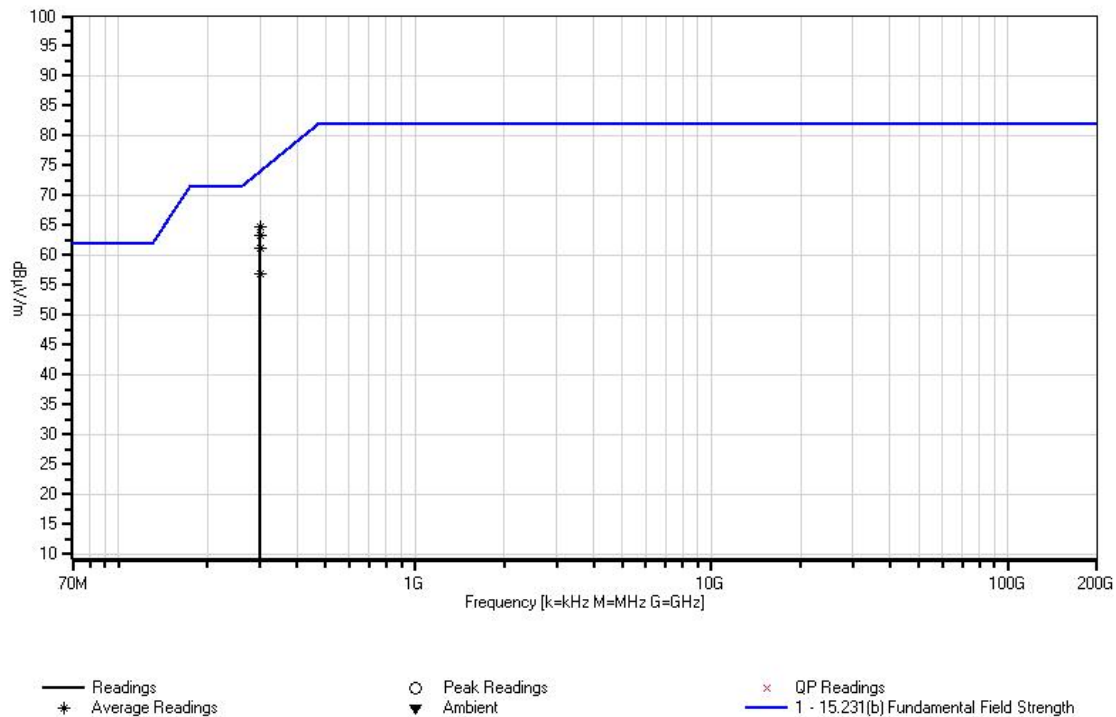
Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	dB	dB	dB	dB	Table	dBμV/m	dBμV/m	dB	Ant
1	299.841M	75.9	+0.0	-27.8	+0.2	+3.1	+0.0	64.7	74.0	-9.3	Horiz
	Ave		+13.3						X axis		
2	299.839M	74.4	+0.0	-27.8	+0.2	+3.1	+0.0	63.2	74.0	-10.8	Horiz
	Ave		+13.3						Y axis		
^	299.839M	93.6	+0.0	-27.8	+0.2	+3.1	+0.0	82.4	74.0	+8.4	Horiz
			+13.3						X axis		
^	299.838M	91.5	+0.0	-27.8	+0.2	+3.1	+0.0	80.3	74.0	+6.3	Horiz
			+13.3						Y axis		

^	299.838M	74.5	+0.0	-27.8	+0.2	+3.1	+0.0	63.3	74.0	-10.7	Horiz
			+13.3						Z axis		
6	299.839M	72.3	+0.0	-27.8	+0.2	+3.1	+0.0	61.1	74.0	-12.9	Vert
	Ave		+13.3						Z axis		
7	299.838M	68.1	+0.0	-27.8	+0.2	+3.1	+0.0	56.9	74.0	-17.1	Vert
	Ave		+13.3						X axis		
^	299.839M	90.5	+0.0	-27.8	+0.2	+3.1	+0.0	79.3	74.0	+5.3	Vert
			+13.3						Z axis		
^	299.838M	85.7	+0.0	-27.8	+0.2	+3.1	+0.0	74.5	74.0	+0.5	Vert
			+13.3						Y axis		
^	299.841M	77.2	+0.0	-27.8	+0.2	+3.1	+0.0	66.0	74.0	-8.0	Vert
			+13.3						X axis		

CKC Laboratories, Inc. Date: 7/1/2011 Time: 09:21:57 Export Management System, Inc. WO#: 92145  
15.231(b) Fundamental Field Strength Test Distance: 3 Meters Sequence#: 1 Ext ATTN: 0 dB





**Test Setup Photos**



**X AXIS FRONT VIEW**



**X AXIS BACK VIEW**



**Y AXIS FRONT VIEW**



**Y AXIS BACK VIEW**





**Z AXIS FRONT VIEW**



**Z AXIS BACK VIEW**

## 15.231(b) Radiated Spurious Field Strength

### Test Data Sheets

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

Customer: **Export Management System, Inc.**  
 Specification: **15.231(b) Spurious Field Strength (300 MHz Transmitter)**  
 Work Order #: **92145** Date: 7/5/2011  
 Test Type: **Radiated Scan** Time: 09:29:09  
 Equipment: **Garage Transmitter** Sequence#: 4  
 Manufacturer: Export Management System, Inc. Tested By: Don Nguyen  
 Model: EZ Code-R300  
 S/N: NA

#### Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02672	Spectrum Analyzer	E4446A	8/9/2010	8/9/2012
T2	AN00309	Preamp	8447D	5/7/2010	5/7/2012
T3	ANP05050	Cable	RG223/U	3/21/2011	3/21/2013
T4	ANP05198	Cable	8268	12/21/2010	12/21/2012
T5	AN01995	Biconilog Antenna	CBL6111C	3/8/2010	3/8/2012
T6	AN00849	Horn Antenna	3115	4/23/2010	4/23/2012
T7	AN00786	Preamp	83017A	8/5/2010	8/5/2012
T8	AN02948	Cable	32022-2-2909K-24TC	9/21/2009	9/21/2011
T9	ANP05421	Cable	Sucoflex 104A	2/12/2010	2/12/2012
T10	ANP05563	Cable	ANDL-1-PNMN-48	9/3/2010	9/3/2012
T11	AN02752	High Pass Filter	6IH40-500/T3000-O/O	3/5/2010	3/5/2012
	AN00314	Loop Antenna	6502	6/30/2010	6/30/2012

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

Function	Manufacturer	Model #	S/N
Garage Transmitter	Export Management System, Inc.	EZ Code-R300	NA

#### Support Devices:

Function	Manufacturer	Model #	S/N
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#### Test Conditions / Notes:

EUT is placed on Styrofoam table and operates in continuous transmitting mode. Tested with fresh battery installed in EUT. Emission profile in three orthogonal orientations have been evaluated  
 Operating frequency: 299.839 MHz  
 Rated Power Output: -37dBm  
 Frequency range: 9kHz-3GHz  
 9kHz-30MHz, RBW: 9kHz, VBW:9kHz,  
 30-1000MHz, RBW: 120kHz, VBW:120kHz,  
 1000-3000MHz, RBW: 1MHz, VBW: 1MHz.  
 Temperature: 71°F, Relative Humidity: 45%

Ext Attn: 0 dB

**Measurement Data:**

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5 T9	T2 T6 T10	T3 T7 T11	T4 T8	Dist	Corr	Spec	Margin	Polar
	MHz	dB $\mu$ V	dB	dB	dB	dB	Table	dB $\mu$ V/m	dB $\mu$ V/m	dB	Ant
1	599.687M Ave	55.6	+0.0 +19.9 +0.0	-27.3 +0.0 +0.0	+0.4 +0.0 +0.0	+4.6 +0.0	+0.0	53.2	54.0 Z axis	-0.8	Vert
2	599.685M Ave	54.9	+0.0 +19.9 +0.0	-27.3 +0.0 +0.0	+0.4 +0.0 +0.0	+4.6 +0.0	+0.0	52.5	54.0 X axis	-1.5	Horiz
3	599.667M Ave	53.8	+0.0 +19.9 +0.0	-27.3 +0.0 +0.0	+0.4 +0.0 +0.0	+4.6 +0.0	+0.0	51.4	54.0 Y axis	-2.6	Horiz
4	1799.025M	57.6	+0.0 +0.0 +1.0	+0.0 +27.0 +2.6	+0.0 -38.2 +0.2	+0.0 +0.4	+0.0	50.6	54.0 Y axis	-3.4	Vert
5	899.519M Ave	46.6	+0.0 +23.3 +0.0	-27.1 +0.0 +0.0	+0.5 +0.0 +0.0	+5.8 +0.0	+0.0	49.1	54.0 Y axis	-4.9	Horiz
6	899.510M Ave	46.4	+0.0 +23.3 +0.0	-27.1 +0.0 +0.0	+0.5 +0.0 +0.0	+5.8 +0.0	+0.0	48.9	54.0 X axis	-5.1	Vert
7	899.523M Ave	46.3	+0.0 +23.3 +0.0	-27.1 +0.0 +0.0	+0.5 +0.0 +0.0	+5.8 +0.0	+0.0	48.8	54.0 Z axis	-5.2	Vert
8	1499.150M	57.9	+0.0 +0.0 +0.9	+0.0 +25.3 +2.4	+0.0 -38.4 +0.2	+0.0 +0.4	+0.0	48.7	54.0 Y axis	-5.3	Vert
9	599.685M Ave	50.2	+0.0 +19.9 +0.0	-27.3 +0.0 +0.0	+0.4 +0.0 +0.0	+4.6 +0.0	+0.0	47.8	54.0 Y axis	-6.2	Vert
10	1799.050M	54.8	+0.0 +0.0 +1.0	+0.0 +27.0 +2.6	+0.0 -38.2 +0.2	+0.0 +0.4	+0.0	47.8	54.0 Z axis	-6.2	Horiz
11	1199.383M Ave	57.8	+0.0 +0.0 +0.8	+0.0 +24.7 +2.1	+0.0 -39.3 +0.2	+0.0 +0.3	+0.0	46.6	54.0 Z axis	-7.4	Vert
^	1199.427M	64.7	+0.0 +0.0 +0.8	+0.0 +24.7 +2.1	+0.0 -39.3 +0.2	+0.0 +0.3	+0.0	53.5	54.0 X axis	-0.5	Vert
13	1499.200M	54.9	+0.0 +0.0 +0.9	+0.0 +25.3 +2.4	+0.0 -38.4 +0.2	+0.0 +0.4	+0.0	45.7	54.0 Y axis	-8.3	Horiz
14	2698.575M	48.8	+0.0 +0.0 +1.4	+0.0 +29.1 +3.3	+0.0 -37.9 +0.4	+0.0 +0.5	+0.0	45.6	54.0 Z axis	-8.4	Horiz
15	1499.233M	54.5	+0.0 +0.0 +0.9	+0.0 +25.3 +2.4	+0.0 -38.4 +0.2	+0.0 +0.4	+0.0	45.3	54.0 Z axis	-8.7	Vert

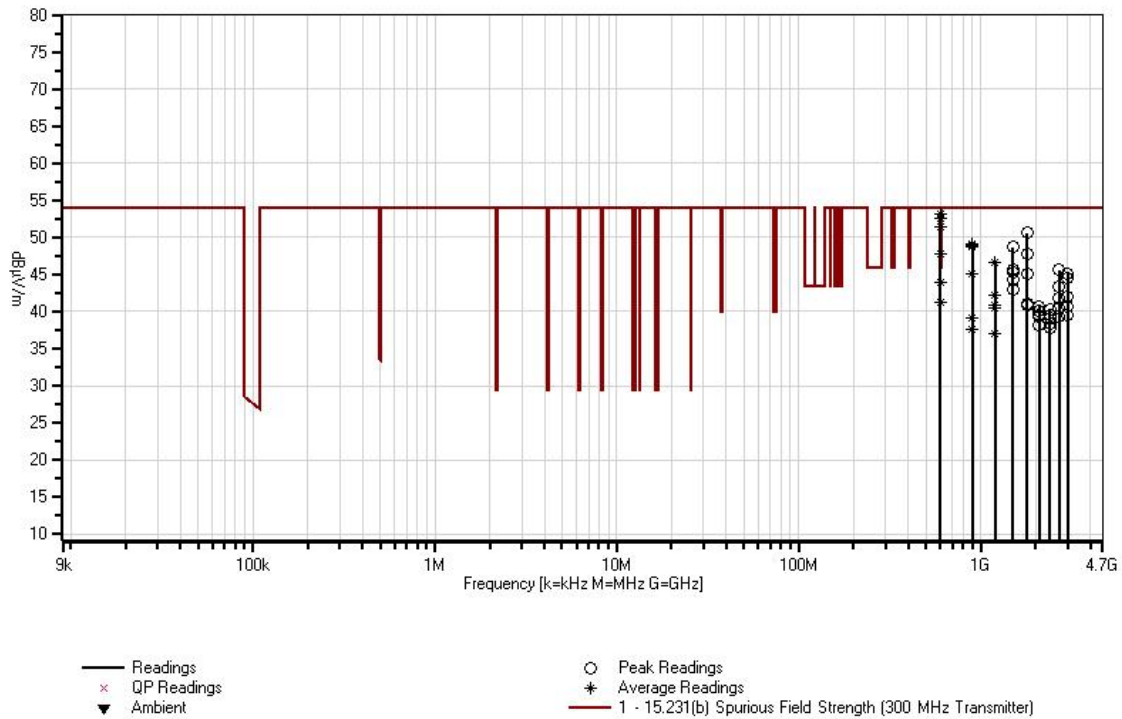
16	1499.275M	54.4	+0.0 +0.0 +0.9	+0.0 +25.3 +2.4	+0.0 -38.4 +0.2	+0.0 +0.4	+0.0	45.2	54.0 X axis	-8.8	Vert
17	1799.050M	52.1	+0.0 +0.0 +1.0	+0.0 +27.0 +2.6	+0.0 -38.2 +0.2	+0.0 +0.4	+0.0	45.1	54.0 X axis	-8.9	Horiz
18	2998.425M	46.9	+0.0 +0.0 +1.6	+0.0 +30.0 +3.5	+0.0 -37.8 +0.4	+0.0 +0.5	+0.0	45.1	54.0 Z axis	-8.9	Horiz
19	899.525M Ave	42.5	+0.0 +23.3 +0.0	-27.1 +0.0 +0.0	+0.5 +0.0 +0.0	+5.8 +0.0	+0.0	45.0	54.0 X axis	-9.0	Horiz
20	2998.375M	46.3	+0.0 +0.0 +1.6	+0.0 +30.0 +3.5	+0.0 -37.8 +0.4	+0.0 +0.5	+0.0	44.5	54.0 Y axis	-9.5	Vert
21	1499.225M	53.6	+0.0 +0.0 +0.9	+0.0 +25.3 +2.4	+0.0 -38.4 +0.2	+0.0 +0.4	+0.0	44.4	54.0 Z axis	-9.6	Horiz
22	599.684M Ave	46.3	+0.0 +19.9 +0.0	-27.3 +0.0 +0.0	+0.4 +0.0 +0.0	+4.6 +0.0	+0.0	43.9	54.0 Z axis	-10.1	Horiz
^	599.678M	72.2	+0.0 +19.9 +0.0	-27.3 +0.0 +0.0	+0.4 +0.0 +0.0	+4.6 +0.0	+0.0	69.8	54.0 X axis	+15.8	Horiz
^	599.667M	71.2	+0.0 +19.9 +0.0	-27.3 +0.0 +0.0	+0.4 +0.0 +0.0	+4.6 +0.0	+0.0	68.8	54.0 Y axis	+14.8	Horiz
^	599.680M	63.5	+0.0 +19.9 +0.0	-27.3 +0.0 +0.0	+0.4 +0.0 +0.0	+4.6 +0.0	+0.0	61.1	54.0 Z axis	+7.1	Horiz
26	2698.550M	46.6	+0.0 +0.0 +1.4	+0.0 +29.1 +3.3	+0.0 -37.9 +0.4	+0.0 +0.5	+0.0	43.4	54.0 Y axis	-10.6	Vert
27	1499.200M	52.2	+0.0 +0.0 +0.9	+0.0 +25.3 +2.4	+0.0 -38.4 +0.2	+0.0 +0.4	+0.0	43.0	54.0 X axis	-11.0	Horiz
28	1199.233M Ave	53.4	+0.0 +0.0 +0.8	+0.0 +24.7 +2.1	+0.0 -39.3 +0.2	+0.0 +0.3	+0.0	42.2	54.0 X axis	-11.8	Horiz
29	2998.450M	43.8	+0.0 +0.0 +1.6	+0.0 +30.0 +3.5	+0.0 -37.8 +0.4	+0.0 +0.5	+0.0	42.0	54.0 X axis	-12.0	Horiz
30	2698.550M	45.1	+0.0 +0.0 +1.4	+0.0 +29.1 +3.3	+0.0 -37.9 +0.4	+0.0 +0.5	+0.0	41.9	54.0 X axis	-12.1	Horiz
31	599.699M Ave	43.7	+0.0 +19.9 +0.0	-27.3 +0.0 +0.0	+0.4 +0.0 +0.0	+4.6 +0.0	+0.0	41.3	54.0 X axis	-12.7	Vert
^	599.673M	72.8	+0.0 +19.9 +0.0	-27.3 +0.0 +0.0	+0.4 +0.0 +0.0	+4.6 +0.0	+0.0	70.4	54.0 Z axis	+16.4	Vert

^	599.676M	66.8	+0.0 +19.9 +0.0	-27.3 +0.0 +0.0	+0.4 +0.0 +0.0	+4.6 +0.0 +0.0	+0.0	64.4	54.0 Y axis	+10.4	Vert
^	599.699M	62.2	+0.0 +19.9 +0.0	-27.3 +0.0 +0.0	+0.4 +0.0 +0.0	+4.6 +0.0 +0.0	+0.0	59.8	54.0 X axis	+5.8	Vert
35	1799.033M	48.1	+0.0 +0.0 +1.0	+0.0 +27.0 +2.6	+0.0 -38.2 +0.2	+0.0 +0.4 +0.4	+0.0	41.1	54.0 Z axis	-12.9	Vert
36	1799.275M	48.1	+0.0 +0.0 +1.0	+0.0 +27.0 +2.6	+0.0 -38.2 +0.2	+0.0 +0.4 +0.4	+0.0	41.1	54.0 X axis	-12.9	Vert
37	1799.050M	47.8	+0.0 +0.0 +1.0	+0.0 +27.0 +2.6	+0.0 -38.2 +0.2	+0.0 +0.4 +0.4	+0.0	40.8	54.0 Y axis	-13.2	Horiz
38	1199.358M Ave	52.0	+0.0 +0.0 +0.8	+0.0 +24.7 +2.1	+0.0 -39.3 +0.2	+0.0 +0.3 +0.3	+0.0	40.8	54.0 Y axis	-13.2	Horiz
^	1199.375M	71.9	+0.0 +0.0 +0.8	+0.0 +24.7 +2.1	+0.0 -39.3 +0.2	+0.0 +0.3 +0.3	+0.0	60.7	54.0 X axis	+6.7	Horiz
^	1199.358M	68.9	+0.0 +0.0 +0.8	+0.0 +24.7 +2.1	+0.0 -39.3 +0.2	+0.0 +0.3 +0.3	+0.0	57.7	54.0 Y axis	+3.7	Horiz
^	1199.350M	62.0	+0.0 +0.0 +0.8	+0.0 +24.7 +2.1	+0.0 -39.3 +0.2	+0.0 +0.3 +0.3	+0.0	50.8	54.0 Z axis	-3.2	Horiz
42	2098.925M	45.9	+0.0 +0.0 +1.1	+0.0 +28.1 +2.9	+0.0 -37.9 +0.2	+0.0 +0.4 +0.4	+0.0	40.7	54.0 Y axis	-13.3	Vert
43	2998.533M	42.4	+0.0 +0.0 +1.6	+0.0 +30.0 +3.5	+0.0 -37.8 +0.4	+0.0 +0.5 +0.5	+0.0	40.6	54.0 Z axis	-13.4	Vert
44	2698.533M	43.7	+0.0 +0.0 +1.4	+0.0 +29.1 +3.3	+0.0 -37.9 +0.4	+0.0 +0.5 +0.5	+0.0	40.5	54.0 Z axis	-13.5	Vert
45	1199.317M Ave	51.6	+0.0 +0.0 +0.8	+0.0 +24.7 +2.1	+0.0 -39.3 +0.2	+0.0 +0.3 +0.3	+0.0	40.4	54.0 Y axis	-13.6	Vert
46	2399.100M	44.7	+0.0 +0.0 +1.2	+0.0 +28.4 +3.1	+0.0 -38.0 +0.3	+0.0 +0.5 +0.5	+0.0	40.2	54.0 Y axis	-13.8	Vert
47	2098.925M	45.3	+0.0 +0.0 +1.1	+0.0 +28.1 +2.9	+0.0 -37.9 +0.2	+0.0 +0.4 +0.4	+0.0	40.1	54.0 Z axis	-13.9	Horiz
48	3001.040M	41.4	+0.0 +0.0 +1.6	+0.0 +30.0 +3.5	+0.0 -37.8 +0.4	+0.0 +0.5 +0.5	+0.0	39.6	54.0 Y axis	-14.4	Horiz
49	2398.725M	44.1	+0.0 +0.0 +1.2	+0.0 +28.4 +3.1	+0.0 -38.0 +0.3	+0.0 +0.5 +0.5	+0.0	39.6	54.0 Z axis	-14.4	Horiz

50	2098.900M	44.7	+0.0 +0.0 +1.1	+0.0 +28.1 +2.9	+0.0 -37.9 +0.2	+0.0 +0.4	+0.0	39.5	54.0 X axis	-14.5	Horiz
51	2098.992M	44.6	+0.0 +0.0 +1.1	+0.0 +28.1 +2.9	+0.0 -37.9 +0.2	+0.0 +0.4	+0.0	39.4	54.0 Y axis	-14.6	Horiz
52	2698.770M	42.5	+0.0 +0.0 +1.4	+0.0 +29.1 +3.3	+0.0 -37.9 +0.4	+0.0 +0.5	+0.0	39.3	54.0 Y axis	-14.7	Horiz
53	2399.275M	43.7	+0.0 +0.0 +1.2	+0.0 +28.4 +3.1	+0.0 -38.0 +0.3	+0.0 +0.5	+0.0	39.2	54.0 X axis	-14.8	Vert
54	899.515M Ave	36.6	+0.0 +23.3 +0.0	-27.1 +0.0 +0.0	+0.5 +0.0 +0.0	+5.8 +0.0	+0.0	39.1	54.0 Y axis	-14.9	Vert
^	899.515M	63.9	+0.0 +23.3 +0.0	-27.1 +0.0 +0.0	+0.5 +0.0 +0.0	+5.8 +0.0	+0.0	66.4	54.0 X axis	+12.4	Vert
^	899.517M	63.4	+0.0 +23.3 +0.0	-27.1 +0.0 +0.0	+0.5 +0.0 +0.0	+5.8 +0.0	+0.0	65.9	54.0 Z axis	+11.9	Vert
^	899.515M	55.1	+0.0 +23.3 +0.0	-27.1 +0.0 +0.0	+0.5 +0.0 +0.0	+5.8 +0.0	+0.0	57.6	54.0 Y axis	+3.6	Vert
58	2398.992M	42.9	+0.0 +0.0 +1.2	+0.0 +28.4 +3.1	+0.0 -38.0 +0.3	+0.0 +0.5	+0.0	38.4	54.0 Y axis	-15.6	Horiz
59	2398.900M	42.9	+0.0 +0.0 +1.2	+0.0 +28.4 +3.1	+0.0 -38.0 +0.3	+0.0 +0.5	+0.0	38.4	54.0 X axis	-15.6	Horiz
60	2099.033M	43.3	+0.0 +0.0 +1.1	+0.0 +28.1 +2.9	+0.0 -37.9 +0.2	+0.0 +0.4	+0.0	38.1	54.0 Z axis	-15.9	Vert
61	2399.033M	42.3	+0.0 +0.0 +1.2	+0.0 +28.4 +3.1	+0.0 -38.0 +0.3	+0.0 +0.5	+0.0	37.8	54.0 Z axis	-16.2	Vert
62	899.518M Ave	35.1	+0.0 +23.3 +0.0	-27.1 +0.0 +0.0	+0.5 +0.0 +0.0	+5.8 +0.0	+0.0	37.6	54.0 Z axis	-16.4	Horiz
^	899.518M	64.1	+0.0 +23.3 +0.0	-27.1 +0.0 +0.0	+0.5 +0.0 +0.0	+5.8 +0.0	+0.0	66.6	54.0 Y axis	+12.6	Horiz
^	899.520M	60.0	+0.0 +23.3 +0.0	-27.1 +0.0 +0.0	+0.5 +0.0 +0.0	+5.8 +0.0	+0.0	62.5	54.0 X axis	+8.5	Horiz
^	899.514M	53.4	+0.0 +23.3 +0.0	-27.1 +0.0 +0.0	+0.5 +0.0 +0.0	+5.8 +0.0	+0.0	55.9	54.0 Z axis	+1.9	Horiz

66	1199.302M	48.3	+0.0	+0.0	+0.0	+0.0	+0.0	37.1	54.0	-16.9	Vert
	Ave		+0.0	+24.7	-39.3	+0.3			X axis		
			+0.8	+2.1	+0.2						
^	1199.383M	74.8	+0.0	+0.0	+0.0	+0.0	+0.0	63.6	54.0	+9.6	Vert
			+0.0	+24.7	-39.3	+0.3			Z axis		
			+0.8	+2.1	+0.2						
^	1199.317M	68.6	+0.0	+0.0	+0.0	+0.0	+0.0	57.4	54.0	+3.4	Vert
			+0.0	+24.7	-39.3	+0.3			Y axis		
			+0.8	+2.1	+0.2						

CKC Laboratories, Inc. Date: 7/5/2011 Time: 09:29:09 Export Management System, Inc. WO#: 92145  
15.231(b) Spurious Field Strength (300 MHz Transmitter) Test Distance: 3 Meters Sequence#: 4 Ext ATTN: 0 dB



**Test Setup Photos**



**X AXIS FRONT VIEW**



**X AXIS BACK VIEW**





**Y AXIS FRONT VIEW**



**Y AXIS BACK VIEW**



**Z AXIS FRONT VIEW**



**Z AXIS BACK VIEW**

## 15.231(c) -20dBc Occupied Bandwidth

### Test Conditions / Setup

EUT is placed on Styrofoam table and operates in continuous transmitting mode. Emission profiles in three orthogonal orientations have been evaluated

Operating frequency: 299.839 MHz

Rated Power Output: -37dBm

Frequency range: 30-1000MHz, RBW: 120kHz, VBW:120kHz

Temperature: 71°F, Relative Humidity: 45%

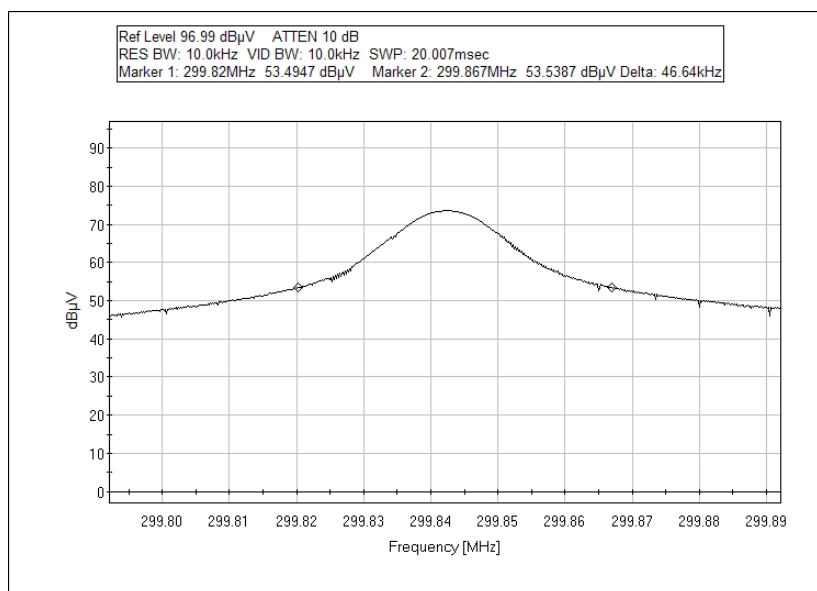
The EUT was tested with a fresh battery.

Measured -20dB BW=46.64kHz, < 0.25% of 299.839 MHz

Engineer Name: D. Nguyen

Test Equipment					
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
AN02672	Spectrum Analyzer	E4446A	Agilent	8/9/2010	8/9/2012
AN00309	Preamplifier	8447D	HP	5/7/2010	5/7/2012
ANP05050	Cable	RG223/U	Pasternack	3/21/2011	3/21/2013
ANP05198	Cable	8268	Belden	12/21/2010	12/21/2012
AN01995	Biconilog Antenna	CBL6111C	Chase	3/8/2010	3/8/2012

### Test Data



**Test Setup Photos**



**X AXIS FRONT VIEW**



**X AXIS BACK VIEW**



**Y AXIS FRONT VIEW**



**Y AXIS BACK VIEW**



**Z AXIS FRONT VIEW**



**Z AXIS BACK VIEW**

## SUPPLEMENTAL INFORMATION

### Measurement Uncertainty

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

The reported measurement uncertainties are calculated based on the worst case of all laboratory environments from CKC Laboratories, Inc. test sites. Only those parameters which require estimation of measurement uncertainty are reported. The reported worst case measurement uncertainty is less than the maximum values derived in CISPR 16-4-2. 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

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.



SAMPLE CALCULATIONS		
	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. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

### 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 "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the highest readings, this is indicated as a "QP" or an "Ave" on the appropriate rows of the data sheets. 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/receiver readings recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the measuring device called "peak hold," the measuring device had the ability to measure transients 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

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the quasi-peak detector.

#### Average

For certain frequencies, average measurements may be made using the spectrum analyzer/receiver. 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.