

EWA, Inc. (Electronic Warfare Associates, Inc.)

TEST REPORT FOR

Lock, KRF-B038

Tested To The Following Standards:

FCC Part 15 Subpart C Sections 15.249
and
RSS-210 Issue 7

Report No.: 91071-8

Date of issue: November 23, 2010



TESTING
CERT #803.01, 803.02,
803.05, 803.06

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:

EWA, Inc. (Electronic Warfare Associates, Inc.)
13873 Park Center Rd.
Herndon, VA 20171

Representative: Jason Pizzillo

REPORT PREPARED BY:

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

Project Number: 91071

DATE OF EQUIPMENT RECEIPT:

November 16, 2010

DATE(S) OF TESTING:

November 16-21, 2010

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 that reads 'Steve Behm'. The signature is written in a cursive style and 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.
1120 Fulton Place
Fremont, CA 94539

Site Registration & Accreditation Information

Location	CB #	Japan	Canada	FCC
Fremont	US0082	R-2160, C2332 & T-228	3082B-1	958979

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C and RSS-210 Issue 7

Description	Test Procedure/Method	Results
Conducted Emissions	FCC Part 15 Subpart C Section 15.249(a) / ANSI C63.4 (2003)	NA
RF Power Output	FCC Part 15 Subpart C Section 15.249(a) / ANSI C63.4 (2003)	Pass
Spurious Radiated Emissions	FCC Part 15 Subpart C Section 15.209/15.249(d) / ANSI C63.4 (2003)	Pass
Occupied Bandwidth	FCC Part 15 Subpart C / ANSI C63.4 (2003)	Pass
Bandedge Compliance	FCC Part 15 Subpart C / ANSI C63.4 (2003)	Pass
99% Bandwidth	RSS-210 Version 7	Pass

NA=Not applicable

Conditions During Testing

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

Summary of Conditions
None

EQUIPMENT UNDER TEST (EUT)

EQUIPMENT UNDER TEST

Lock

Manuf: EWA, Inc. (Electronic Warfare Associates, Inc.)

Model: KRF-B038

Serial: None

PERIPHERAL DEVICES

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

DC PS

Manuf: Tektronix

Model: CPS250

Serial: CPS-250TW18988

FCC PART 15 SUBPART C

15.249(a) AC Conducted Emissions

NA= Conducted Emissions is not applicable because the EUT runs on internal batteries.

15.249(a) RF Power Output

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place. • Fremont, CA 94539 • (510) 249-1170

Customer: **EWA, Inc. (Electronic Warfare)**

Specification: **15.249 Carrier and Spurious Emissions (2400-2483.5 MHz Transmitter)**

Work Order #: **91071** Date: 11/16/2010

Test Type: **Maximized Emissions** Time: 14:48:05

Equipment: **Lock** Sequence#: 16

Manufacturer: EWA, Inc. (Electronic Warfare) Tested By: A. Brar

Model: KRF-B038

S/N: None

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	3/9/2009	3/9/2011
T1	ANP04241	Cable	FSJ1-50A	3/2/2010	3/2/2012
T2	ANP05138	Cable	FSJ1P-50A-4	3/19/2010	3/19/2012
T3	ANP05843	Cable	32022-2-29094K-48TC	7/30/2010	7/30/2012
T4	AN03114	Preamp	AMF-7D-00101800-30-10P	9/16/2009	9/16/2011
T5	AN02061	Horn Antenna	DRG-118A	1/19/2009	1/19/2011
T6	ANP05411	Attenuator	54A-10	2/4/2010	2/4/2012
	ANP01211	Attenuator	23-10-34	5/18/2009	5/18/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Lock	EWA, Inc. (Electronic Warfare)	KRF-B038	None

Support Devices:

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

Lock is installed in a wooden fixture standing up vertical on a foam piece. It is powered by fresh batteries. The Lock is set to continuous transmission.
 The device is single channel NB modulation device with low data rate.
 Temperature: 66° F
 Relative Humidity: 40%
 AP: 1029mbar
 2.481GHz Fundamental Readings. RBW 1MHz / VBW 3MHz.
 FCC 15.31e is covered by this data sheet by operating the EUT on a fresh set of batteries.

Ext Attn: 0 dB

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	2480.911M	93.1	+0.5 +28.8	+2.3 +9.3	+0.7	-58.2	+0.0 266	76.5	94.0 Lock	-17.5	Horiz 100
2	2480.977M	90.2	+0.5 +28.8	+2.3 +9.3	+0.7	-58.2	+0.0 177	73.6	94.0 Lock	-20.4	Vert 126

Test Setup Photos



15.249(a) 1-18GHz

15.249(d) Field Strength of Spurious Emissions

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place. • Fremont, CA 94539 • (510) 249-1170

Customer: **EWA, Inc. (Electronic Warfare)**
 Specification: **15.209 Radiated Emissions**
 Work Order #: **91071** Date: 11/16/2010
 Test Type: **Maximized Emissions** Time: 11:47:25 AM
 Equipment: **Lock** Sequence#: 14
 Manufacturer: EWA, Inc. (Electronic Warfare) Tested By: A. Brar
 Model: KRF-B038
 S/N: None

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	3/9/2009	3/9/2011
T1	ANP05300	Cable	RG214/U	3/6/2009	3/6/2011
T2	ANP05440	Cable		1/18/2010	1/18/2012
T3	AN00432	Loop Antenna	6502	5/18/2009	5/18/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Lock	EWA, Inc. (Electronic Warfare)	KRF-B038	None

Support Devices:

Function	Manufacturer	Model #	S/N
DC PS	Tektronix	CPS250	CPS-250TW18988

Test Conditions / Notes:

Lock is installed in a wooden fixture standing up vertical on a foam piece. It is powered by fresh batteries. The Lock is set to continuous transmission.
 This device is single channel NB modulation device with low data rate.
 Temperature: 66° F
 Relative Humidity: 40%
 AP: 1029mbar
 0.09-30MHz

Ext Attn: 0 dB

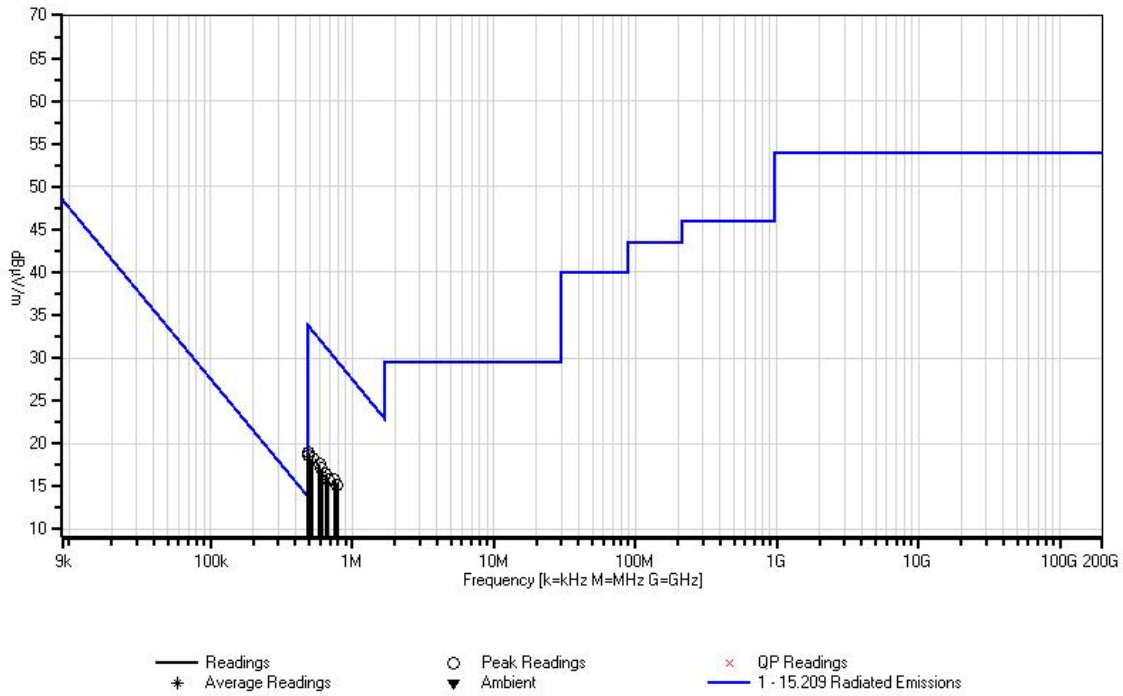
Measurement Data:

Reading listed by margin.

Test Distance: 5 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	752.122k	36.4	+0.1	+0.1	+10.3		-31.1 -5	15.8	30.1	-14.3	Perpe 100
2	787.664k	35.8	+0.1	+0.1	+10.3		-31.1 -5	15.2	29.7	-14.5	Perpe 100
3	586.957k	38.7	+0.1	+0.0	+9.9		-31.1 61	17.6	32.2	-14.6	Paral 100
4	607.864k	38.2	+0.1	+0.0	+9.9		-31.1 -5	17.1	31.9	-14.8	Perpe 100
5	528.417k	39.3	+0.2	+0.0	+9.9		-31.1 -5	18.3	33.1	-14.8	Perpe 100
6	497.057k	39.8	+0.2	+0.1	+9.9		-31.1 -5	18.9	33.7	-14.8	Perpe 100
7	490.784k	40.0	+0.1	+0.0	+9.9		-31.1 61	18.9	33.8	-14.9	Paral 100
8	655.950k	37.2	+0.2	+0.0	+10.1		-31.1 61	16.4	31.3	-14.9	Paral 100
9	494.966k	39.8	+0.1	+0.0	+9.9		-31.1 61	18.7	33.7	-15.0	Paral 100
10	681.038k	36.6	+0.1	+0.0	+10.2		-31.1 61	15.8	30.9	-15.1	Paral 100

CKC Laboratories, Inc. Date: 11/16/2010 Time: 11:47:25 AM EWA, Inc. (Electronic Warfare) WO#: 91071
 Model:KRF-B038 SN:None
 15.209 Radiated Emissions Test Distance: 5 Meters Sequence#: 14 Perpendicular





Test Location: CKC Laboratories, Inc. • 1120 Fulton Place. • Fremont, CA 94539 • (510) 249-1170

Customer: **EWA, Inc. (Electronic Warfare)**
 Specification: **15.209 Radiated Emissions**
 Work Order #: **91071** Date: 11/16/2010
 Test Type: **Maximized Emissions** Time: 9:51:23 AM
 Equipment: **Lock** Sequence#: 8
 Manufacturer: EWA, Inc. (Electronic Warfare) Tested By: A. Brar
 Model: KRF-B038
 S/N: None

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	3/9/2009	3/9/2011
T1	AN00730	Preamp	8447D	2/9/2009	2/9/2011
T2	ANP05299	Cable	RG214	3/6/2009	3/6/2011
T3	ANP05300	Cable	RG214/U	3/6/2009	3/6/2011
T4	ANP05440	Cable		1/18/2010	1/18/2012
T5	AN02395	Biconilog Antenna	3142	12/24/2008	12/24/2010

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Lock	EWA, Inc. (Electronic Warfare)	KRF-B038	None

Support Devices:

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

Lock is installed in a wooden fixture standing up vertical on a foam piece. It is powered by fresh batteries. The Lock is set to continuous transmission.
 This device is single channel NB modulation device with low data rate.
 Temperature: 66°F
 Relative Humidity: 40%
 AP: 1029mbar
 30-1000MHz

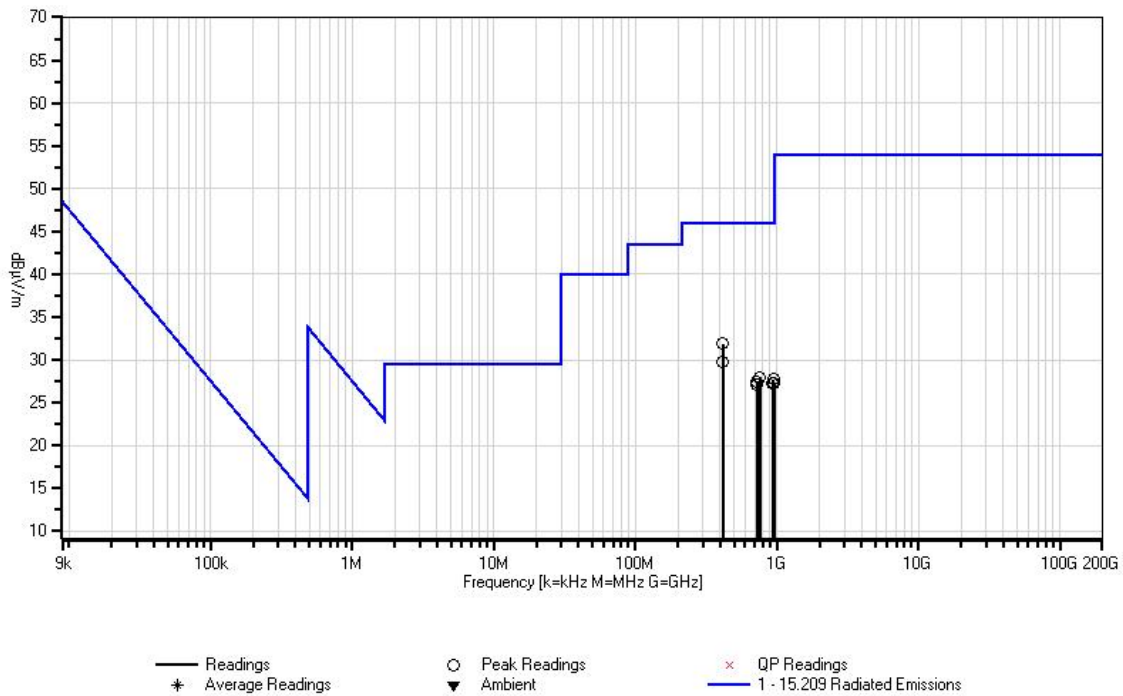
Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	T5				Table	dBμV/m	dBμV/m	dB	Ant
1	415.948M	40.6	-27.2 +16.4	+0.2	+0.8	+1.1	+0.0 365	31.9	46.0	-14.1	Horiz 130
2	415.948M	38.5	-27.2 +16.4	+0.2	+0.8	+1.1	+0.0 370	29.8	46.0	-16.2	Vert 140
3	760.572M	30.1	-27.1 +21.8	+0.3	+1.0	+1.8	+0.0 365	27.9	46.0	-18.1	Horiz 130
4	948.722M	27.9	-27.5 +23.7	+0.4	+1.1	+2.1	+0.0 370	27.7	46.0	-18.3	Vert 140
5	728.020M	30.0	-27.1 +21.6	+0.3	+1.0	+1.7	+0.0 365	27.5	46.0	-18.5	Horiz 130
6	932.224M	27.6	-27.5 +23.6	+0.4	+1.1	+2.1	+0.0 370	27.3	46.0	-18.7	Vert 140

7	955.233M	27.4	-27.5	+0.4	+1.2	+2.1	+0.0	27.3	46.0	-18.7	Vert
			+23.7				370				140
8	954.482M	27.4	-27.5	+0.4	+1.2	+2.1	+0.0	27.3	46.0	-18.7	Vert
			+23.7				370				140
9	728.020M	29.7	-27.1	+0.3	+1.0	+1.7	+0.0	27.2	46.0	-18.8	Vert
			+21.6				370				140

CKC Laboratories, Inc. Date: 11/16/2010 Time: 9:51:23 AM EWA, Inc. (Electronic Warfare) WO#: 91071
 Model:KRF-B038 SN:None
 15.209 Radiated Emissions Test Distance: 3 Meters Sequence#: 8 Horiz





Test Location: CKC Laboratories, Inc. • 1120 Fulton Place. • Fremont, CA 94539 • (510) 249-1170

Customer: **EWA, Inc. (Electronic Warfare)**
 Specification: **15.209 Radiated Emissions**
 Work Order #: **91071** Date: 11/17/2010
 Test Type: **Maximized Emissions** Time: 14:49:36
 Equipment: **Lock** Sequence#: 19
 Manufacturer: EWA, Inc. (Electronic Warfare) Tested By: A. Brar
 Model: KRF-B038
 S/N: None

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	3/9/2009	3/9/2011
T1	ANP04241	Cable	FSJ1-50A	3/2/2010	3/2/2012
T2	ANP05138	Cable	FSJ1P-50A-4	3/19/2010	3/19/2012
T3	ANP05843	Cable	32022-2-29094K-48TC	7/30/2010	7/30/2012
T4	AN03114	Preamp	AMF-7D-00101800-30-10P	9/16/2009	9/16/2011
T5	AN02061	Horn Antenna	DRG-118A	1/19/2009	1/19/2011
T6	AN01416	High Pass Filter	84300-80038	2/23/2010	2/23/2012

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Lock	EWA, Inc. (Electronic Warfare)	KRF-B038	None

Support Devices:

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

Lock is installed in a wooden fixture standing up vertical on a foam piece. It is powered by fresh batteries. The Lock is set to continuous transmission.
 The device is single channel NB modulation device with low data rate.
 Temperature: 72°F
 Relative Humidity: 38%
 AP: 1029mbar
 1-18GHz.

Ext Attn: 0 dB

Measurement Data:

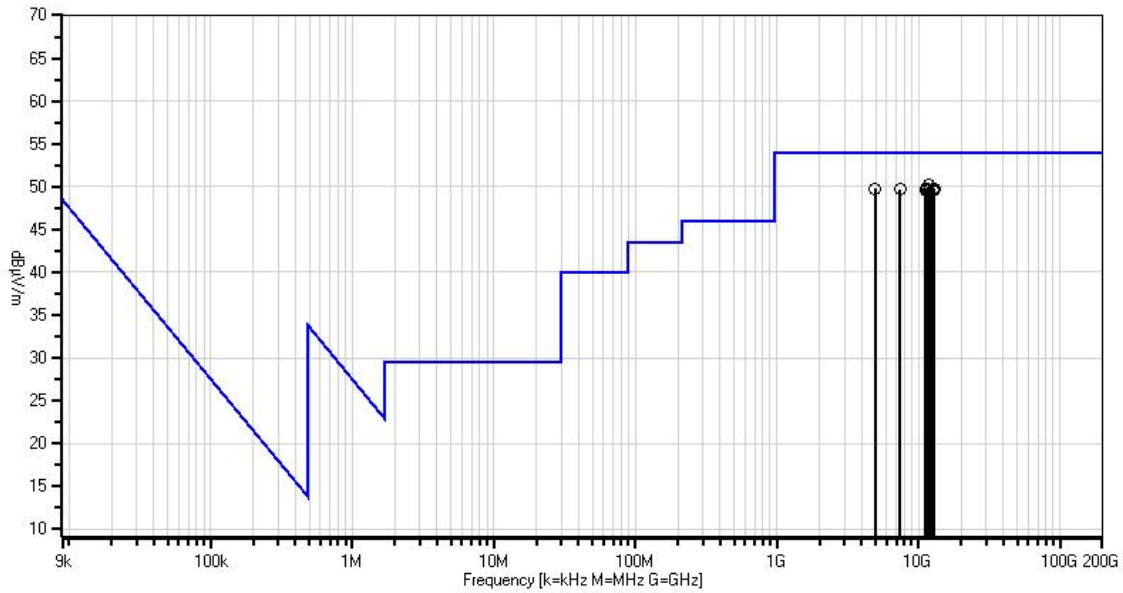
Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	11956.953 M	56.9	+1.9 +40.5	+5.9 +0.0	+1.8	-56.7	+0.0	50.3	54.0	-3.7	Vert 130
2	11336.333 M	56.7	+1.6 +40.2	+6.0 +0.0	+1.6	-56.3	+0.0	49.8	54.0	-4.2	Horiz 130
3	11654.651 M	56.5	+1.9 +40.6	+5.7 +0.0	+1.6	-56.5	+0.0	49.8	54.0	-4.2	Vert 130
4	12891.887 M	57.4	+2.0 +40.8	+6.0 +0.0	+1.8	-58.2	+0.0	49.8	54.0	-4.2	Vert 130

5	4961.958M	70.0	+0.8 +33.2	+3.5 +0.0	+1.1	-58.8	+0.0 -5	49.8	54.0	-4.2	Horiz 130
6	12786.782 M	56.9	+1.9 +40.7	+6.0 +0.0	+1.8	-57.6	+0.0 -5	49.7	54.0	-4.3	Vert 130
7	7442.964M	63.4	+1.1 +37.2	+4.6 +0.3	+1.3	-58.2	+0.0 193	49.7	54.0	-4.3	Horiz 164 Taken with HP Filter inline.
8	12717.713 M	56.7	+1.9 +40.6	+6.0 +0.0	+1.8	-57.4	+0.0 -5	49.6	54.0	-4.4	Vert 130
9	11331.328 M	56.6	+1.6 +40.2	+6.0 +0.0	+1.6	-56.4	+0.0 -5	49.6	54.0	-4.4	Vert 130
10	11953.950 M	56.1	+1.9 +40.5	+5.9 +0.0	+1.8	-56.7	+0.0 -5	49.5	54.0	-4.5	Horiz 130

CKC Laboratories, Inc. Date: 11/17/2010 Time: 14:49:36 EWA, Inc. (Electronic Warfare) WO#: 91071 Model:KRF-B038 SN:None
15.209 Radiated Emissions Test Distance: 3 Meters Sequence#: 19 Horiz



— Readings
* Average Readings
○ Peak Readings
▼ Ambient
x QP Readings
— 1 - 15.209 Radiated Emissions



Test Location: CKC Laboratories, Inc. • 1120 Fulton Place. • Fremont, CA 94539 • (510) 249-1170

Customer: **EWA, Inc. (Electronic Warfare)**
 Specification: **15.209 Radiated Emissions**
 Work Order #: **91071** Date: 11/18/2010
 Test Type: **Maximized Emissions** Time: 4:41:06 PM
 Equipment: **Lock** Sequence#: 22
 Manufacturer: EWA, Inc. (Electronic Warfare) Tested By: A. Brar
 Model: KRF-B038
 S/N: None

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02668	Spectrum Analyzer	E4446A	3/9/2009	3/9/2011
T1	AN03143	Cable	32022-29094K-144TC	9/10/2009	9/10/2011
T2	ANP05913	Cable	32022-29094K-65TC	9/10/2009	9/10/2011
T3	ANP00929	Cable	various	3/29/2010	3/29/2012
T4	AN02694	Active Horn Antenna-ANSI C63.5 Antenna Factors (dB)	AMFW-5F-18002650-20-10P	11/10/2010	11/10/2012

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Lock	EWA, Inc. (Electronic Warfare)	KRF-B038	None

Support Devices:

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

Lock is installed in a wooden fixture standing up vertical on a foam piece. It is powered by fresh batteries. The Lock is set to continuous transmission.
 The device is single channel NB modulation device with low data rate.
 Temperature: 70.8°F
 Relative Humidity: 40%
 AP: 1028mbar
 18-26.5GHz.
 Highest generated frequency is 2.4GHz.

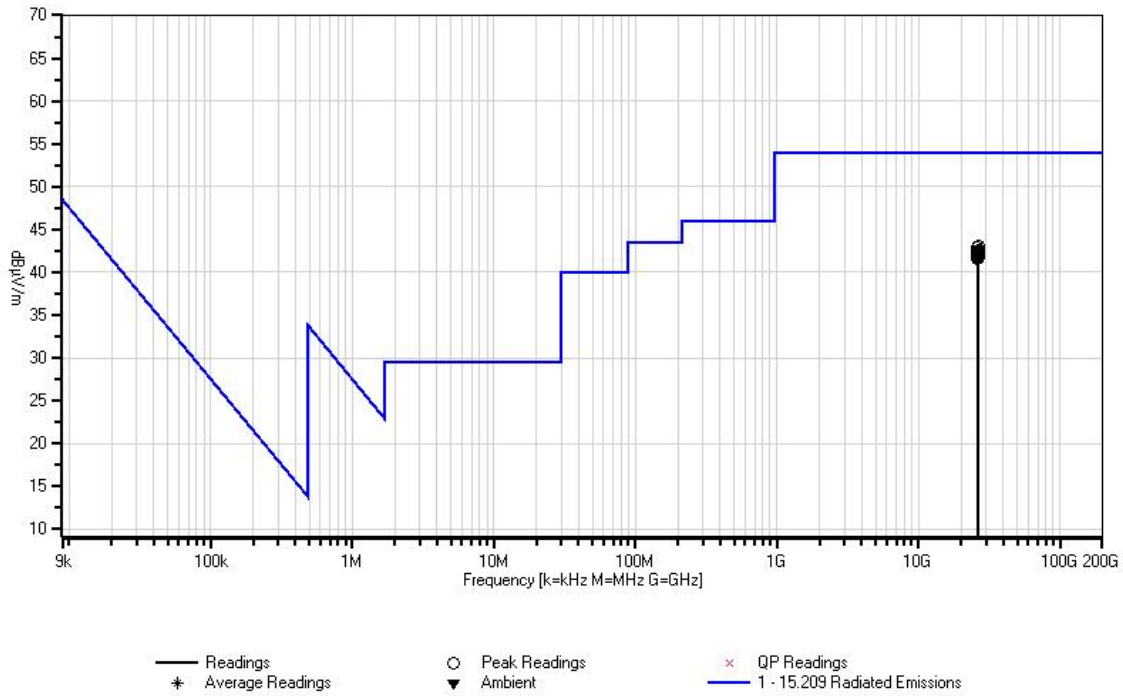
Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

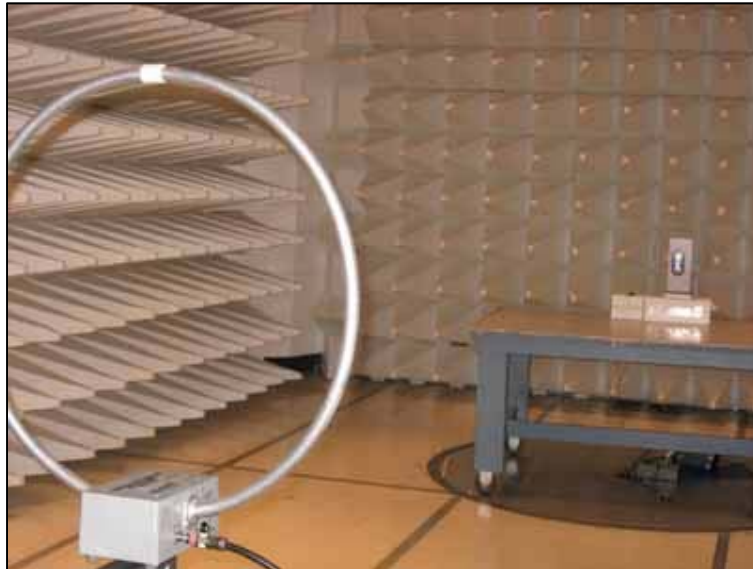
#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	26499.016 M	41.4	+7.4	+3.5	+3.4	-12.6	+0.0	43.1	54.0	-10.9	Vert
											121
2	26415.868 M	41.7	+7.4	+3.5	+3.4	-13.0	+0.0	43.0	54.0	-11.0	Vert
											121
3	26379.952 M	41.7	+7.4	+3.5	+3.4	-13.1	+0.0	42.9	54.0	-11.1	Horiz
											100
4	26461.132 M	41.0	+7.4	+3.5	+3.4	-12.8	+0.0	42.5	54.0	-11.5	Vert
											121

5	26364.700 M	41.3	+7.4	+3.5	+3.4	-13.2	+0.0	42.4	54.0	-11.6	Horiz
							-6				100
6	26474.908 M	40.8	+7.4	+3.5	+3.4	-12.7	+0.0	42.4	54.0	-11.6	Horiz
							-6				100
7	26242.192 M	41.6	+7.4	+3.5	+3.3	-13.7	+0.0	42.1	54.0	-11.9	Vert
							-5				121
8	26482.288 M	40.5	+7.4	+3.5	+3.4	-12.7	+0.0	42.1	54.0	-11.9	Horiz
							-6				100
9	26316.976 M	41.2	+7.4	+3.5	+3.3	-13.4	+0.0	42.0	54.0	-12.0	Horiz
							-6				100
10	26162.980 M	41.7	+7.4	+3.5	+3.3	-14.1	+0.0	41.8	54.0	-12.2	Vert
							-5				121
11	26208.736 M	41.5	+7.4	+3.5	+3.3	-13.9	+0.0	41.8	54.0	-12.2	Horiz
							-6				100
12	26375.524 M	40.5	+7.4	+3.5	+3.4	-13.1	+0.0	41.7	54.0	-12.3	Horiz
							-6				100
13	26202.832 M	41.4	+7.4	+3.5	+3.3	-13.9	+0.0	41.7	54.0	-12.3	Vert
							-5				121
14	26493.112 M	40.0	+7.4	+3.5	+3.4	-12.6	+0.0	41.7	54.0	-12.3	Horiz
							-6				100
15	26184.136 M	41.4	+7.4	+3.5	+3.3	-14.0	+0.0	41.6	54.0	-12.4	Horiz
							-6				100
16	26251.540 M	41.1	+7.4	+3.5	+3.3	-13.7	+0.0	41.6	54.0	-12.4	Horiz
							-6				100

CKC Laboratories, Inc. Date: 11/18/2010 Time: 4:41:06 PM EWA, Inc. (Electronic Warfare) WO#: 91071
 Model:KRF-B038 SN:None
 15.209 Radiated Emissions Test Distance: 3 Meters Sequence#: 22 Vert



Test Setup Photos



15.249(d) 0.09-30MHz



15.249(d) 30-1000MHz



15.249(d) 18-26.5GHz



15.249(d) 1-18GHz

Occupied Bandwidth

Test Conditions

Lock is installed in a wooden fixture standing up vertical on a foam piece. It is powered by fresh batteries. The Lock is set to continuous transmission.

The device is single channel NB modulation device with low data rate.

Temperature: 66° F

Relative Humidity: 40%

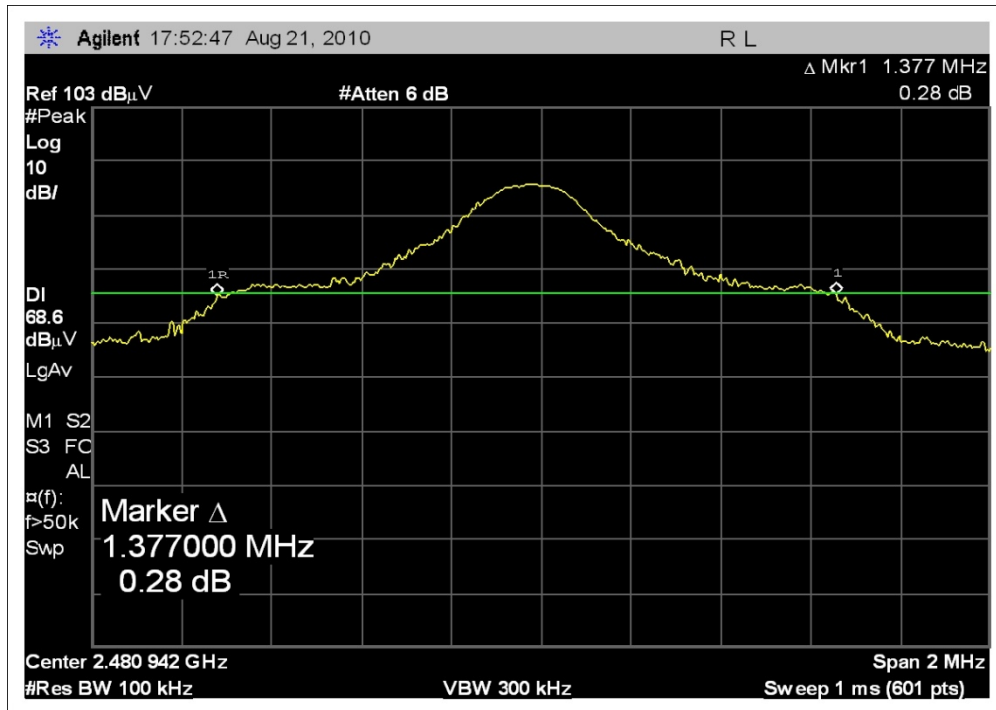
AP: 1029mbar

2.481GHz Fundamental Readings. RBW 100kHz / VBW 300kHz.

Engineer Name: A. Brar

Test Equipment					
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
AN02668	Spectrum Analyzer	E4446A	Agilent	3/9/2009	3/9/2011
ANP04241	Cable	FSJ1-50A	Andrews	3/2/2010	3/2/2012
ANP05138	Cable	FSJ1P-50A-4	Andrews	3/19/2010	3/19/2012
ANP05843	Cable	32022-2-29094K-48TC	AstroLab	7/30/2010	7/30/2012
AN03114	Preamp	AMF-7D-00101800-30-10P	Miteq	9/16/2009	9/16/2011
AN02061	Horn Antenna	DRG-118A	ARA	1/19/2009	1/19/2011
ANP05411	Attenuator	54A-10	Weinschel	2/4/2010	2/4/2012

Test Plots



Test Setup Photos



Occupied Bandwidth 1-18GHz

BandEdge

Test Conditions

Lock is installed in a wooden fixture standing up vertical on a foam piece. It is powered by fresh batteries. The Lock is set to continuous transmission.

The device is single channel NB modulation device with low data rate.

Temperature: 66° F

Relative Humidity: 40%

AP: 1029mbar

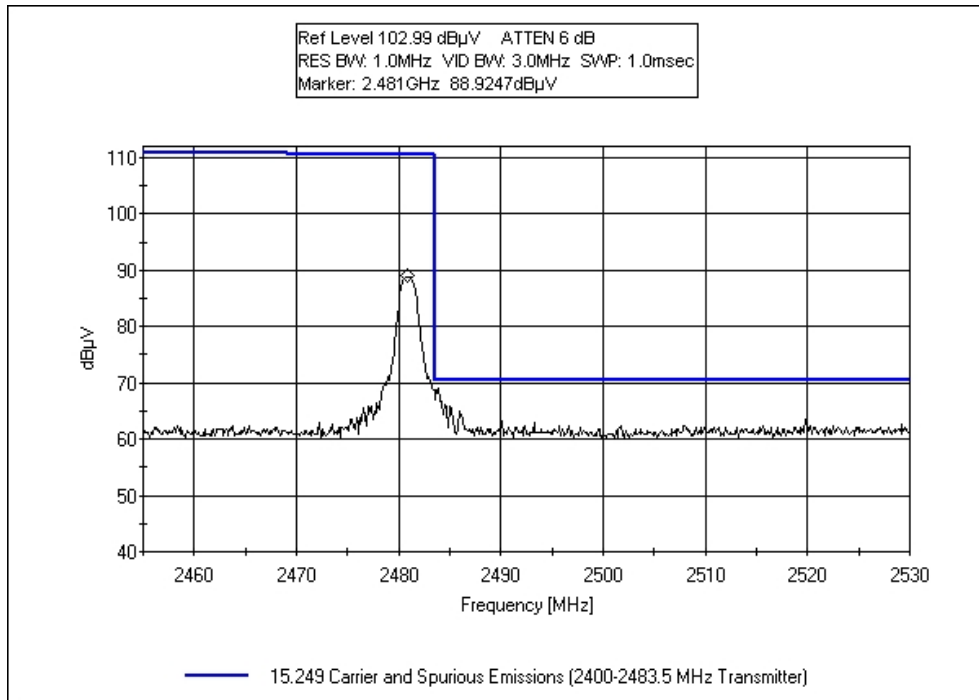
2.481GHz Fundamental Readings. RBW 1MHz / VBW 3MHz.

FCC 15.31e is covered by this data sheet.

Engineer Name: A. Brar

Test Equipment					
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
AN02668	Spectrum Analyzer	E4446A	Agilent	3/9/2009	3/9/2011
ANP04241	Cable	FSJ1-50A	Andrews	3/2/2010	3/2/2012
ANP05138	Cable	FSJ1P-50A-4	Andrews	3/19/2010	3/19/2012
ANP05843	Cable	32022-2-29094K-48TC	AstroLab	7/30/2010	7/30/2012
AN03114	Preamplifier	AMF-7D-00101800-30-10P	Miteq	9/16/2009	9/16/2011
AN02061	Horn Antenna	DRG-118A	ARA	1/19/2009	1/19/2011
ANP05411	Attenuator	54A-10	Weinschel	2/4/2010	2/4/2012

Test Plots



Test Setup Photos



Band Edge 1-18GHz

RSS 210

99% Bandwidth

Test Conditions

Lock is installed in a wooden fixture standing up vertical on a foam piece. It is powered by fresh batteries. The Lock is set to continuous transmission.

The device is single channel NB modulation device with low data rate.

Temperature: 66°F

Relative Humidity: 40%

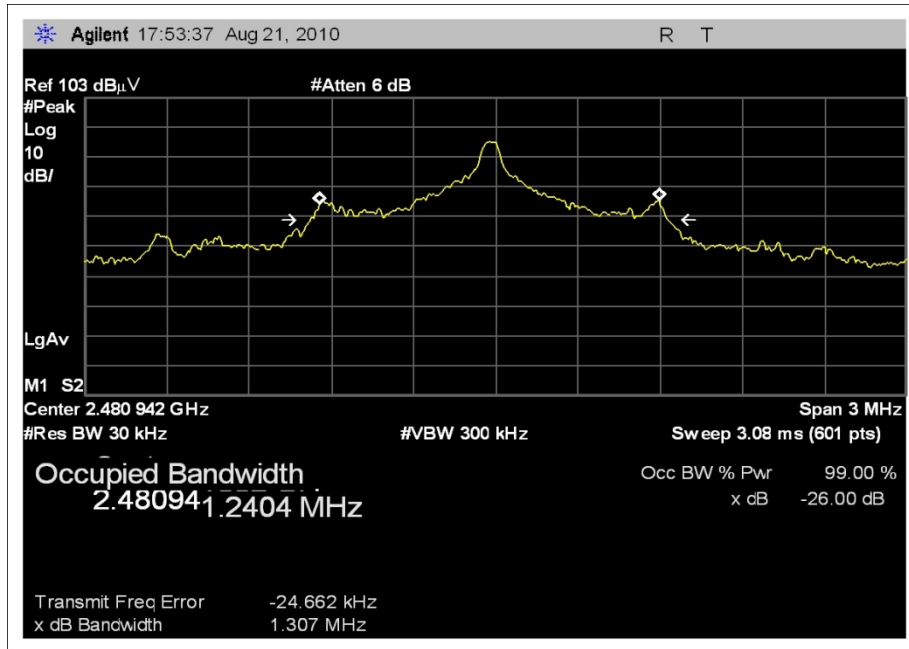
AP: 1029mbar

2.481GHz Fundamental Readings. RBW 30kHz / VBW 300kHz.

Engineer Name: A. Brar

Test Equipment					
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
AN02668	Spectrum Analyzer	E4446A	Agilent	3/9/2009	3/9/2011
ANP04241	Cable	FSJ1-50A	Andrews	3/2/2010	3/2/2012
ANP05138	Cable	FSJ1P-50A-4	Andrews	3/19/2010	3/19/2012
ANP05843	Cable	32022-2-29094K-48TC	AstroLab	7/30/2010	7/30/2012
AN03114	Preamp	AMF-7D-00101800-30-10P	Miteq	9/16/2009	9/16/2011
AN02061	Horn Antenna	DRG-118A	ARA	1/19/2009	1/19/2011
ANP05411	Attenuator	54A-10	Weinschel	2/4/2010	2/4/2012

Test Data



Test Setup Photos



RSS 210 1-18GHz

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 dBμV/m, the spectrum analyzer reading in dBμV was corrected by using the following formula. This reading was then compared to the applicable specification limit.

SAMPLE CALCULATIONS		
	Meter reading	(dB μ V)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dB μ 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. 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	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 "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.