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October 27, 2011

Ron Graczyk RF Code, Inc. 9229Waterford Centre Boulevard Suite 500 Austin, Texas 78758

Dear Ron:

Enclosed is the Wireless Test Report for the Jupiter Series 433.92 MHz Transmitter by RF Code, Inc. This report can be used to demonstrate compliance with FCC requirements for wireless devices in the United States and Canada. This report must be used in conjunction with the accompanying RF Code Letter of Attestation, Rev. D. If you have any questions, please contact me.

Sincerely,

Jeffrey A. Lenk President

Enclosure

Project 12687-10

RF Code, Inc. Jupiter Series 433.92 MHz Transmitter

Wireless Certification Report

Prepared for: RF Code, Inc. 9229 Waterford Centre Boulevard, Suite 500 Austin, Texas 78758

By

Professional Testing (EMI), Inc. 1601 N. A.W. Grimes Blvd., Suite B Round Rock, Texas 78665

October 27, 2011

Reviewed by

Jeffrey A. Lenk President Written by

Layne Lueckemeyer Product Development Engineer

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End	of Report	

$THIS\ REPORT\ SHALL\ NOT\ BE\ REPRODUCED\ EXCEPT\ IN\ FULL,\ WITHOUT\ THE\ WRITTEN\ APPROVAL\ OF\ PROFESSIONAL\ TESTING\ (EMI),\ INC.$

NOTICE: (1) This Report must not be used to claim product endorsement, by NVLAP, NIST, the FCC or any other Agency. This report also does not warrant certification by NVLAP or NIST.

⁽²⁾ This report shall not be reproduced except in full, without the written approval of Professional Testing (EMI), Inc.

⁽³⁾ The significance of this report is dependent on the representative character of the test sample submitted for evaluation and the results apply only in reference to the sample tested. The manufacturer must continuously implement the changes shown herein to attain and maintain the required degree of compliance.



Applicant: RF Code, Inc.

Applicant's Address: 9229 Waterford Centre Boulevard, Suite 500, Austin, Texas 78758

FCC ID: P6FPROXRF Project Number: 12687-10

Test Dates: August 29, 2011, through September 2, 2011

The RF Code, Inc., Jupiter Series 433.92 MHz Transmitter was tested to and found to be in compliance with FCC 47 CFR, Part 15. The highest emissions generated by the above equipment are listed below:

Parameter	Level	Limit	Margin (dB)					
Jupiter Series 433.92 MHz Transmitter: Radiated Spurious Emissions	3472 MHz: 74.0 dBμV/m @ 3 m	80.8 dBμV/m	-6.8					
Jupiter Series 433.92 MHz Transmitter: Output Power at 3 meters	80.3 dBμV/m	80.8 dBμV/m	-0.5					
	Occupied Bandwidth							
433.92 MHz 20 dB = 602.4 kHz								
	15.231 (c) Limit = 1.0848 MHz							

I, Layne Lueckemeyer, for Professional Testing (EMI), Inc., being familiar with the FCC rules and test procedures have reviewed the test setup, measured data, and this report. I believe them to be true and accurate.

Layne Lueckemeyer

Product Development Engineer

This report has been reviewed and accepted by RF Code, Inc. The undersigned is responsible for ensuring that this device will continue to comply with the FCC rules.

Representative of RF Code, Inc.

1.0 Introduction

1.1 Scope

This report describes the extent of the equipment under test (EUT) conformance to the intentional radiator requirements of the United States and Canada. This report must be used in conjunction with the accompanying RF Code Letter of Attestation, Rev. D.

Professional Testing (EMI), Inc. (PTI), follows the guidelines of NIST for all uncertainty calculations, estimates, and expressions thereof for EMC testing. The procedures of ANSI C63.4: 2009 were utilized for making all emissions measurements.

1.2 EUT Description

The Jupiter Series 433.92 MHz Transmitter is a device that combines:

- Active RFID, which delivers data to the wide area network (WAN) via an active RFID reader
- A second radio frequency (RF) communications channel for proximity detection and data exchange
- Proximity decision software

The Jupiter Series 433.92 MHz Transmitter provides the utility of reporting the proximity of assets or people to fixed or mobile locations. For example, the wall unit scans the proximity of a hospital area using a second RF communications channel, and upon detecting one or more assets that are 'listening' for the RF interaction, makes a decision using several metrics about which assets are nearest and which asset most likely triggered the dispenser.

The EUT was tested while in a continuous transmit mode. The EUT was tuned to a fixed channel to perform power, occupied bandwidth, spurious, and harmonic tests. The EUT continuously transmitted at maximum power. The system tested consisted of the following:

	Manufacturer	Model	Model Numbers	FCC ID Number	Description				
EUT	RF Code, Inc.	Jupiter Series 433.92 MHz Transmitter	A760-002 A760-003	P6FPROXRF	Jupiter Series 433.92 MHz Transmitter				
Oscillator Frequencies									
	433 MHz								

The following rules apply to the operation of the EUT:

Guidelines	FCC Rules, 47 CFR, Part 15
Transmitter Characteristics for 433 MHz Transmitter	15.231
Spurious Radiated Power	15.209
Antenna Requirement	15.203

1.3 Modifications

No modifications were made to the EUT during the performance of the test program.

1.4 Test Site

Measurements were made at the PTI semi-anechoic facility designated Site 45 (FCC 459644) in Austin, Texas. This site is registered with the FCC under Section 2.948, and is subsequently confirmed by laboratory accreditation (NVLAP). The test site is located at 11400 Burnet Road, Austin, Texas, 78758, while the main office is located at 1601 N. A.W. Grimes Blvd., Suite B, Round Rock, Texas, 78665.

1.5 Applicable Documents

Document	Title	Release
ANSI C63.4	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment	2009
ANSI 63.10	American National Standard for Testing Unlicensed Wireless Devices	2009
47 CFR	Part 15 – Radio Frequency Devices Subpart C – Intentional Radiators	
RF Code Letter of Attestation	RF Code Letter of Attestation, Rev. D	October 20, 2011

1.6 Applicable Tests

Test	Rule
Fundamental Field Strength	15.231(b)
Occupied Bandwidth	15.231(c)
Out of Band Spurious Emissions	15.205(a), 15.209(a), 15.231(b)
Antenna Requirements	15.203

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2.0 Fundamental Field Strength Measurements

Fundamental field strength measurements were made on the selected fundamental transmit frequency of the EUT. Tests of the fundamental field strength of the EUT also determined the worse case polarization of the device. The emissions of the device were measured with the EUT in three orthogonal axes.

2.1 Test Procedure

Radiated emission measurements were made of the fundamental field strength level for the EUT. The EUT was placed on a non-conductive table 0.8 meters above the ground plane. The table was centered on a motorized turntable that enables 360-degree rotation. For measurements of the fundamental signal, a measurement antenna was positioned at a distance of 3 meters, as measured from the closest point of the EUT. The field strength emissions were maximized by rotating the EUT. A diagram showing the test setup is given as Figure 2.1.1.

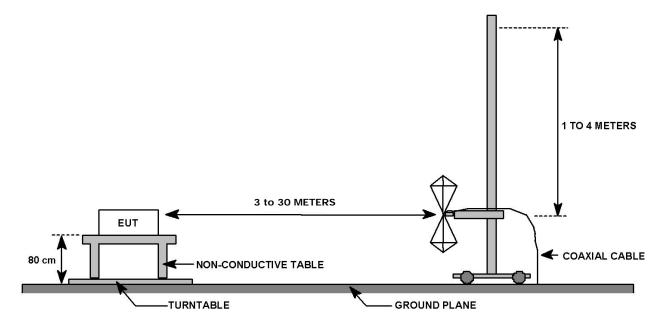


Figure 2.1.1: Radiated Emission Test Setup

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2.2 Test Criteria

According to 47 CFR, 15.231(b), the field strength of emissions from intentional radiators operated under this section should not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (Microvolts/Meter)	Field Strength of Spurious Emissions (Microvolts/Meter)
40.66 – 40.70	2,250	225
70 – 130	1,250	125
130 – 174	1,250 to 3,750 ¹	125 to 375 ¹
174 – 260	3,750	375
260 – 470	3,750 to 12,500 ¹	375 to 1,250 ¹
Above 470	12,500	1,250

¹Linear interpolations

2.3 Test Results

Radiated emission measurements of the fundamental field strength level for the EUT were taken on August 30, 2011, and the EUT was found to be in compliance with applicable requirements.

Table 2.3.1: Radiated Emissions Measurements of the Fundamental Field Strength Level – Test Equipment

Professional Testing, EMI, Inc.									
ANSI C63.4 – 2009: Methods of Measurement of Radio-Noise Emissions from Low-Voltage Test Method: Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (incorporated by reference, see §15.38)									
In accordan	ice with: FCC P	art 15.231 –	Code	of Federal F	Regulations Part 47				
Test Date(s)): 8/30/	2011			EUT Serial #:	None			
Customer:		de, Inc.			EUT Part #:	None			
Project Nur		7-10			Test Technician:	Jesse Banda			
Purchase O				• • •	Supervisor:	Jason Haley			
Equip. Unde	er Test: Jupiter Se	eries 433.92 N	1Hz Tra	nsmitter	Witness' Name:	Ron Graczyk			
		Ra	adiate	d Emissions	Test Equipment List				
Tile	e! Software Version	n:	3.4.K.	.11, June 7, 2	2006, 07:49:00 PM				
	Test Profile:		Radia	ited Emissio	ns_updated_12-16-10.ti	l			
Asset #	Manufacturer	Mode	l	Equipn	nent Nomenclature	Serial Number	Calibration Due Date		
1509A	Braden	N/A		TDK 10 m	Chamber, NSA < 1 GHz	DAC-012915-005	8/10/2012		
1529	Miteq	AFS4-0100	1800	Amplific	er, 1-26.5 GHz, 36 dB	None	7/28/2012		
1930	1930 Agilent E4440A PSA Series Spectrum Analy				es Spectrum Analyzer	MY45304903	5/20/2012		
1926	ETS-Lingren	31420)	Antenna, B	Biconilog, 26 MHz-6 GHz	135454	4/5/2012		
C027	N/A	RG214	1	Cabl	e Coax, N-N, 25 m	None	5/27/2012		
1486	EMCO	3147		Antenna,	Log Periodic, .2-5 GHz	9112-1052	9/4/2011		

Table 2.3.2: Radiated Emissions Measurements of the Fundamental Field Strength Level Bandwidth and Measurement Time Used for Testing – Peak Scan

	icasarciniciti fillic Osca for festi	ing reak seam					
Professional Testing, EMI, Inc.							
ANSI C63.4 – 2009: Methods of Measurement of Radio-Noise Emissions from Low-Voltage Test Method: Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (incorporated by reference, see §15.38)							
In accordance with:	FCC Part 15.231 – Code of Federal I	Regulations Part 47					
Test Date(s):	8/30/2011	EUT Serial #:	None				
Customer:	RF Code, Inc.	EUT Part #:	None				
Project Number:	12687-10	Test Technician:	Jesse Banda				
Purchase Order #:	8180	Supervisor:	Jason Haley				
Equip. Under Test:	Jupiter Series 433.92 MHz Transmitter	Witness' Name:	Ron Graczyk				

Radiated Emissions Bandwidth and Measurement Time Used for Testing – Peak Scan										
Frequency Band Start (MHz)			Number of ranges used	Measurement Time per Range						
0.009	0.15	0.3	2	Multiple Sweeps						
0.15	30	9	6	Multiple Sweeps						
30	200	120	1	Multiple 800 mS Sweeps						
200	1000	120	1	Multiple 800 mS Sweeps						
1000	18000	1000	17	Multiple Sweeps						

*Notes:

- 1. The settings above are specifically calculated for the HP856X series of spectrum analyzers, which have 1,000 data points per range.
- 2. The measurement receiver resolution bandwidth setting was 300 Hz for Qquasi-peak measurements from 9-150 kHz.
- 3. The measurement receiver resolution bandwidth setting was 9 kHz for quasi-peak measurements from 0.15-30 MHz.
- 4. The measurement receiver resolution bandwidth setting was 120 kHz for quasi-peak measurements from 30-1,000 MHz.
- 5. The measurement receiver resolution bandwidth setting was 1 MHz for average measurements from 1-18 GHz.

Table 2.3.3: Radiated Emissions Measurements of the Fundamental Field Strength Level Test Results – Horizontal Antenna Polarity ≤ 1 GHz

Results – Horizontal Antenna Polarity S 1 GHz										
Professional Testing, EMI, Inc.										
ANSI C63.4 – 2009: Methods of Measurement of Radio-Noise Emissions from Low- Test Method: Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (incorporated by reference, see §15.38)										
In accordance with:	FCC Part 1	5.231 – Co	de of Federa	al Regulatio	ns Part 47					
Test Date(s):	8/30/2011	•		EUT Serial	#:	None				
Customer:	RF Code, I	nc.		EUT Part #	:	None				
Project Number:	12687-10			Test Techn	ician:	Jesse Band	а			
Purchase Order #:	8180			Supervisor	r:	Jason Hale	У			
Equip. Under Test: Jup	iter Series 43	3.92 MHz Tr	ansmitter	Witness' N	Vitness' Name: Ron Graczyk					
Radiate	d Emission	s Test Resi	ults Data She	eet – Horizo	ontal Anten	na Polarity	['] ≤ 1 GHz			
EUT Line Voltage	: 3	.3	VDC	EUT Lin	e Frequenc	cy: N	/A			
EUT M	ode of Ope	eration:			Tran	smit Max P	ower			
Frequency Test Measured Distance (MHz) (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector	Recorded Amplitude (dBµV)	Corrected Level (dBμV/m)	Limit Level (dBμV/m)	Margin (dB)	Test Results		
433 3	90	1	Peak	62.5	84.6	100.8	-16.2	Pass		
433 3	90	1	Average	58.2	80.3	80.8	-0.5	Pass		

Table 2.3.4: Radiated Emissions Measurements of the Fundamental Field Strength Level Test Results – Vertical Antenna Polarity ≤ 1 GHz

Nesults – Vertical Antenna Folanty 3 1 GHZ										
Professional Testing, EMI, Inc.										
ANSI C63.4 – 2009: Methods of Measurement of Radio-Noise Emissions from Low- Test Method: Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (incorporated by reference, see §15.38)										
In accorda	nce with:	FCC P	art 15	5.231 – Coc	le of Federa	al Regulatio	ns Part 47			
Test Date(s	s):	8/30/	2011			EUT Serial	#:	None		
Customer:		RF Co	de, In	c.		EUT Part #	:	None		
Project Nu	mber:	12687	'-10			Test Techn	ician:	Jesse Band	а	
Purchase C	Order #:	8180				Supervisor: Jason Haley				
Equip. Unde	r Test: Jupit	er Serie	es 433.	.92 MHz Tra	nsmitter	Witness' N	lame:	Ron Graczy	/k	
	Radiat	ed Em	ission	s Test Res	ults Data Sl	neet – Verti	cal Antenn	a Polarity ≤	1 GHz	
EUT Li	ne Voltage	:	3.3	3	VDC	EUT Line Frequency: N/A				
	EUT M	ode of	Oper	ration:			Tran	smit Max P	ower	
Frequency Measured (MHz)	Test Distance (Meters)	EU Direc (Degr	tion	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBμV/m)	Limit Level (dBμV/m)	Margin (dB)	Test Results
433	3	90)	1	Peak	56.9	79.0	100.8	-21.8	Pass
433	3	90)	1	Average	50.3	72.4	80.8	-8.4	Pass

Table 2.3.5: Radiated Emissions Measurements of the Fundamental Field Strength Level Test Setup Photographs

	Professional 1	Testing, EMI, Inc	C.					
ANSI C63.4 – 2009: Methods of Measurement of Radio-Noise Emissions from Low-Voltage Test Method: Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (incorporated by reference, see §15.38)								
In accordance with:	FCC Part 15.231 – Code of Federal Regulations Part 47							
Test Date(s):	8/30/2011	EUT Serial #:	None					
Customer:	RF Code, Inc.	EUT Part #:	None					
Project Number:	12687-10	Test Technician:	Jesse Banda					
Purchase Order #:	8180	Supervisor:	Jason Haley					
Fauin Under Test·Ju	piter Series 433.92 MHz Transmitter	Witness' Name:	Ron Graczyk					

Radiated Emissions Photographs EUT Front EUT Rear

3.0 Occupied Bandwidth

Occupied bandwidth measurements were performed on the EUT to determine compliance with 47 CFR, Part 15.231(c).

3.1 Test Procedure

The occupied bandwidth was measured with a spectrum analyzer connected to a double-ridged guide horn while the EUT was operating in continuous transmit mode at the appropriate center frequency. The analyzer center frequency was set to the EUT carrier frequency. Display line and marker delta functions were used to measure the occupied bandwidth of the EUT. However, the 20 dB bandwidth is referenced to a peak power measurement taken at the entire bandwidth or more for RBW, then using 1% RBW for the 20 dB bandwidth. A diagram showing the test setup is given as Figure 2.1.1.

3.2 Test Criteria

According to 47 CFR, Part 15.231(c), the bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

3.3 Test Results

Occupied bandwidth measurements were taken on August 30, and September 1, 2011, and the EUT was found to be in compliance with applicable requirements.

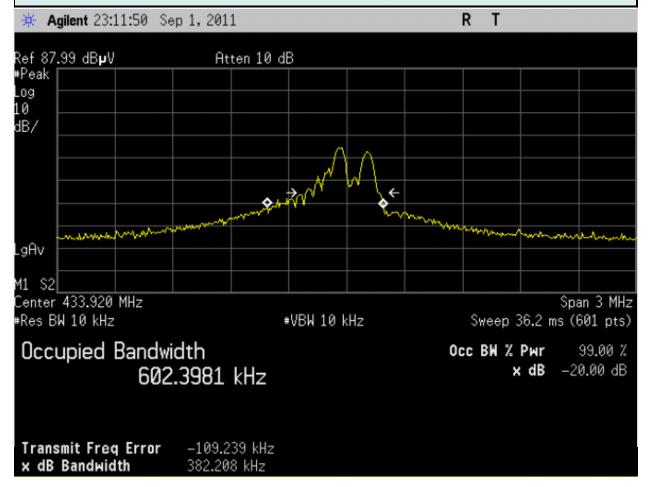
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Table 3.3.1: Radiated Emissions Measurements of Occupied Bandwidth for the Jupiter Series 433.92 MHz Transmitter – Test Equipment

433.92 MF	- Iz Transmitter	· Test Equi	pmer	1t				
		Pro	ofes	sional Te	esting, EMI, Inc.			
ANSI C63.4 – 2009: Methods of Measurement of Radio-Noise Emissions from Low-Voltage Test Method: Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (incorporated by reference, see §15.38)								
In accordar		<u> </u>		of Federal R	Regulations Part 47			
Test Date(s): 9/1/2	2011			EUT Serial #:	None		
Customer:		de, Inc.			EUT Part #:	None		
Project Nur					Test Technician:	Jesse Banda		
Purchase Order #: 8180 Supervisor: Jason Haley								
Equip. Under Test: Jupiter Series 433.92 MHz Transmitter Witness' Name: Ron Graczyk								
		Ra	diate	d Emissions	Test Equipment List			
Til	e! Software Version	on:	3.4.K.	.11, June 7, 2	2006, 07:49:00 PM			
	Test Profile:		Radia	ted Emissio	ns_updated_12-16-10.ti	I		
Asset #	Manufacturer	Mode		Equipn	nent Nomenclature	Serial Number	Calibration Due Date	
1509A	Braden	N/A		TDK 10 m	Chamber, NSA < 1 GHz	DAC-012915-005	8/10/2012	
1529	Miteq	AFS4-0100	1800	Amplifie	er, 1-26.5 GHz, 36 dB	None	7/28/2012	
1930	Agilent	E4440/	4	PSA Serio	es Spectrum Analyzer	MY45304903	5/20/2012	
1926	ETS-Lingren	3142D)	Antenna, B	iconilog, 26 MHz-6 GHz	135454	4/5/2012	
C027	N/A	RG214	ļ	Cable	e Coax, N-N, 25 m	None	5/27/2012	
1486	EMCO	3147		Antenna,	Log Periodic, .2-5 GHz	9112-1052	9/4/2011	

Table 3.3.2: Radiated Emissions Measurements of Occupied Bandwidth for the Jupiter Series 433.92 MHz Transmitter Test Results

	Professional 1	esting, EMI, In	C.				
	ANSI C63.4 – 2009: Methods of	Measurement of Rac	dio-Noise Emissions from Low-				
Test Method:	st Method: Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz						
	(incorporated by reference, see §15.38)						
In accordance with:	FCC Part 15.231 – Code of Fede	CC Part 15.231 – Code of Federal Regulations Part 47					
Test Date(s):	9/1/2011	EUT Serial #:	None				
Customer:	RF Code, Inc.	EUT Part #:	None				
Project Number:	12687-10	Test Technician:	Jesse Banda				
Purchase Order #:	8180	Supervisor:	Jason Haley				
Equip. Under Test: Jup	iter Series 433.92 MHz Transmitter	Witness' Name:	Ron Graczyk				



EUT Rear

Table 3.3.3: Radiated Emissions Measurements of Occupied Bandwidth for the Jupiter Series 433.92 MHz Transmitter Test Setup Photographs

mitter Test Setup Photograph	s	
Professional T	esting, EMI, Inc.	
		_
reference, see §15.38)	nt in the Kange of 9 km	iz to 40 GHz (incorporated by
FCC Part 15.231 – Code of Federal	Regulations Part 47	
9/1/2011	EUT Serial #:	None
RF Code, Inc.	EUT Part #:	None
12687-10	Test Technician:	Jesse Banda
8180	Supervisor:	Jason Haley
piter Series 433.92 MHz Transmitter	Witness' Name:	Ron Graczyk
	Professional T ANSI C63.4 – 2009: Methods of Methods of Methods and Electronic Equipmereference, see §15.38) FCC Part 15.231 – Code of Federal 9/1/2011 RF Code, Inc. 12687-10 8180 Diter Series 433.92 MHz Transmitter Radiated Emiss	FCC Part 15.231 – Code of Federal Regulations Part 47 9/1/2011 EUT Serial #: RF Code, Inc. EUT Part #: 12687-10 Test Technician: 8180 Supervisor: with ress' Name: Radiated Emissions Photographs

EUT Front

4.0 Out of Band Spurious Emissions

Out of band spurious/harmonic emissions measurements were performed on the EUT to determine compliance to 47 CFR, Parts 15.231(b), and 15.209.

4.1 Test Procedure

The EUT was placed on a non-conductive table 0.8 meters above the ground plane. The table was centered on a rotating turntable at a distance of 10 meters from the measurement antenna.

For spurious emissions below 1 GHz, quasi-peak detection was used with a resolution bandwidth of 120 kHz. All measurements below 1 GHz were normalized to 3 meters using a 20 dB/decade distance extrapolation. The emissions were maximized by rotating the EUT and raising and lowering the measurement antenna from 1 to 4 meters.

Spurious/harmonic emissions above 1 GHz peak were measured with average and peak detection with a resolution bandwidth of 1 MHz and measured at a distance of 1 meter. Average detection was used to determine compliance of the EUT if the peak did not meet the average limit. Non-harmonic emissions must satisfy the average limit and the peak limit (20 dB above average). A diagram showing the test setup is given as Figure 2.1.1. Above 1 GHz, testing was completed at the transmit frequency to determine compliance.

4.2 Test Criteria

According to 47 CFR, Part 15.231, field strength of emissions from intentional radiators operated under this section shall not exceed the limits in the table below. The limits specified are at 3 meters.

Fundamental Frequency (MHz)	Field Strength of Fundamental (Microvolts/Meter)	Field Strength of Spurious Emissions (Microvolts/Meter)
40.66 – 40.70	2,250	255
70 – 130	1,250	125
130 – 174	1,250 to 3,750 ¹	125 to 375 ¹
174 – 260	3,750	375
260 – 470	3,750 to 12,500 ¹	375 to 1,250 ¹
Above 470	12,500	1,250

¹Linear interpolations

Restricted bands of operation per 15.205(a) are shown below.

MHz	MHz	MHz	GHz
0.090-0.110	16.42–16.423	399.9–410	4.5-5.15
¹ 0.495–0.505	16.69475–16.69525	608–614	5.35-5.46
2.1735–2.1905	16.80425-16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362-8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625-8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425-8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	(²)
13.36–13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz. ² Above 38.6

4.3 **Test Results**

Out of band spurious emissions measurements were taken on August 29, 2011, and the EUT was found to be in compliance with applicable requirements.

Table 4.3.1: Out of Band Spurious Emissions Measurements for the Jupiter Series 433.92 MHz Transmitter – Test Equipment

433.92 MI	Hz Transmitter	– Test Equ	iipme	nt			
		Pro	ofes	sional Te	esting, EMI, Inc.		
Test Metho	od: Elect		ctroni		asurement of Radio-Noi at in the Range of 9 kHz		_
In accordar	nce with:	art 15.209 – ral Requirer		of Federal F	Regulations Part 47, Sub	part B – Radiated	Emission Limits;
Section:	15.10	9					
Test Date(s	• -, -,				EUT Serial #:	N/A	
Customer:		de, Inc.			EUT Part #:	N/A	
Project Nu		7-10			Test Technician:	Jesse Banda	
Purchase O			411- T		Supervisor:	Jason Haley	
Equip. Und	er Test: Jupiter Se	eries 433.92 N	/IHZ I ra	insmitter	Witness' Name:	Ron Graczyk	
		R	adiate	d Emissions	Test Equipment List		
Til	e! Software Versi	on:	3.4.K.	.11, June 7, 2	2006, 07:49:00 PM		
	Test Profile:		Radia	ted Emissio	ns_updated_12-16-10.ti	I	
Asset #	Manufacturer	Mode	ı	Equipn	nent Nomenclature	Serial Number	Calibration Due Date
1509A	Braden	N/A		TDK 10 m	Chamber, NSA < 1 GHz	DAC-012915-005	8/10/2012
1529	Miteq	AFS4-0100	1800	Amplifie	er, 1-26.5 GHz, 36 dB	None	7/28/2012
1930	Agilent	E4440	A	PSA Seri	es Spectrum Analyzer	MY45304903	5/20/2012
1926	ETS-Lingren	31420)	Antenna, B	Biconilog, 26 MHz-6 GHz	135454	4/5/2012
C027	N/A	RG214	4	Cabl	e Coax, N-N, 25 m	None	5/27/2012
1509B	Braden	N/A		TDK 10 m (Chamber, VSWR > 1 GHz	DAC-012915-005	4/7/2012
1594	Miteq	AFS4-0100	1800	Amplific	er, 1-26.5 GHz, 42 dB	None	1/28/2012
1529	Miteq	AFS4-0100	1800	Amplific	er, 1-26.5 GHz, 36 dB	None	7/28/2012
C030	N/A	0		Cabl	e Coax, N-N, 30 m	None	5/27/2012
1780	ETS-Lindgren	3117		Antenna	, DRG Horn, 1-18 GHz	1110313	1/14/2012

Table 4.3.2: Bandwidth and Measurement Time Used for Out of Band Spurious Emissions Testing – Peak Scan, Jupiter Series 433.92 MHz Transmitter

County Team Seattly Supremental Series 435.52 IVIII2 Transmitter								
Professional Testing, EMI, Inc.								
Test Method:	ANSI C63.4 – 2003: Methods of Me Electrical and Electronic Equipmer see §15.38)		oise Emissions from Low-Voltage Iz to 40 GHz (incorporated by reference,					
In accordance with	In accordance with: FCC Part 15.209 – Code of Federal Regulations Part 47, Subpart B – Radiated Emission Limits; General Requirements							
Section:	15.109							
Test Date(s):	8/29/2011	EUT Serial #:	N/A					
Customer:	RF Code, Inc.	EUT Part #:	N/A					
Project Number:	12687-10	Test Technician:	Jesse Banda					
Purchase Order #:	8180	Supervisor:	Jason Haley					
Equip. Under Test:	Jupiter Series 433.92 MHz Transmitter	Witness' Name:	Ron Graczyk					

Radiated Emissions Bandwidth and Measurement Time Used for Testing - Peak Scan **Frequency Band** 6 dB Bandwidth Measurement Time per **Frequency Band** Number of Start (MHz) Stop (MHz) (kHz) ranges used Range 0.009 0.15 0.3 2 Multiple Sweeps 6 0.15 30 9 Multiple Sweeps 30 200 120 1 Multiple 800 mS Sweeps 200 1000 1 120 Multiple 800 mS Sweeps 1000 18000 17 1000 Multiple Sweeps

*Notes:

^{1.} The settings above are specifically calculated for the HP856X series of spectrum analyzers, which have 1,000 data points per range.

^{2.} The measurement receiver resolution bandwidth setting was 300 Hz for quasi-peak measurements from 9-150 kHz.

^{3.} The measurement receiver resolution bandwidth setting was 9 kHz for quasi-peak measurements from 0.15-30 MHz.

^{4.} The measurement receiver resolution bandwidth setting was 120 kHz for quasi-peak measurements from 30-1,000 MHz.

^{5.} The measurement receiver resolution bandwidth setting was 1 MHz for average measurements from 1-18 GHz.

Table 4.3.3: Out of Band Spurious Emissions Measurements for the Jupiter Series 433.92 MHz Transmitter Test Results – Horizontal Antenna Polarity ≤ 1 GHz

			Profes	sional Te			,		
Test Metho	d:	Electrical	.4 – 2003: Me and Electroni , see §15.38)						-
In accordan	FCC Part 15.209 – Code of Federal Regulations Part 47, Subpart B – Radiated Emission Limits; General Requirements								on Limits;
	١.	15.109	1		FUT Cariel 4	1.	NI/A		
Test Date(s Customer:	j.	8/29/201 RF Code,			EUT Serial #	t.	N/A N/A		
Project Nur	nhor:	12687-10			Test Techni	cion	Jesse Banda		
Purchase O		8180			Supervisor:		Jason Haley		
			433.92 MHz Tr	ansmittar	Witness' Na		Ron Graczy		
Equip. Ona	ci icst. jup	iter series	433.32 WINZ 11	ansimitei	With C33 140	anne.	Roll Graczy	N	
	Radi	ated Emis	sions Test Res	ults Data She	et – Horizon	ital Antenna	Polarity ≤ 1	. GHz	
EUT L	ine Voltage		3.3	VDC	EUT Lin	e Frequenc	y: N,	′ A	
	EUT I	Mode of C	peration:		Transmit Normal Mode				
Frequency Measured (MHz)	Test Distance (Meters)	EUT Directio (Degrees	- 0	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBμV/m)	Limit Level (dBμV/m)	Margin (dB)	Test Results
43.3	10	0	4	Quasi-peak	24.1	8.8	29.5	-20.7	Pass
38.6	10	0	4	Quasi-peak	24	11.0	29.5	-18.5	Pass
44.9	10	40	4	Quasi-peak	25.4	9.4	29.5	-20.1	Pass
452.812	10	64	1.5	Quasi-peak	44.4	34.9	81.4	-46.5	Pass
452.812	10	64	1.5	Average	55.2	45.7	81.4	-35.7	Pass
480.866	10	250	1.2	Quasi-peak	32.21	24.5	35.6	-11.1	Pass
900	10	0	1	Quasi-peak	24.9	25.3	35.6	-10.3	Pass

Table 4.3.4: Out of Band Spurious Emissions Measurements for the Jupiter Series 433.92 MHz Transmitter Test Results – Vertical Antenna Polarity ≤ 1 GHz

433.92 IVI	HZ Transi	nitter i	est Results	– verticai	Antenna	Polarity ≤	1 GHZ		
			Profes	sional Te	sting, El	MI, Inc.			
Test Metho	d:	ANSI C63.4 – 2003: Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (incorporated by reference, see §15.38)							
In accordan	ce with:		15.209 – Code Requirements		egulations P	art 47, Subp	oart B – Radi	ated Emissi	on Limits;
Section:		15.109							
Test Date(s):	8/29/20	l1		EUT Serial #	‡ :	N/A		
Customer:		RF Code	Inc.		EUT Part #:		N/A		
Project Nur		12687-1)		Test Techni	cian:	Jesse Banda)	
Purchase O		8180			Supervisor:		Jason Haley	1	
Equip. Und	er Test: Jupi	ter Series	433.92 MHz Tr	ansmitter	Witness' Na	ame:	Ron Graczy	k	
	Rad	liated Em	issions Test Re	esults Data Sh	eet – Vertic	al Antenna	Polarity ≤ 1	GHz	
EUT L	ne Voltage:		3.3	VDC	EUT Lin	e Frequenc	y: N	/ A	
	EUT N	/lode of C	peration:			Trans	mit Normal	Mode	
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degree	-0 -	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBμV/m)	Limit Level (dBμV/m)	Margin (dB)	Test Results
50	10	0	1	Quasi-peak	24.1	5.9	29.5	-23.6	Pass
100	10	0	1	Quasi-peak	24	4.8	33.1	-28.3	Pass
180	10	0	1	Quasi-peak	24.4	6.9	33.1	-26.2	Pass
452.8	10	300	1	Average	27.1	17.6	81.4	-63.8	Pass
600	10	0	1	Quasi-peak	24.9	19.8	35.6	-15.8	Pass
800	10	0	1	Quasi-peak	25	22.8	35.6	-12.8	Pass

Table 4.3.5: Out of Band Spurious Emissions Measurements for the Jupiter Series 433.92 MHz Transmitter Test Results – Horizontal Antenna Polarity ≥ 1 GHz

	33.32 WITZ Transmitter Test Results - Horizontal Antenna Polarity 2 1 GHz										
	Professional Testing, EMI, Inc.										
Test Metho	d:	Electr	NSI C63.4 – 2003: Methods of Measurement of Radio-Noise Emissions from Low-Voltage ectrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (incorporated by ference, see §15.38)								
In accordan	ce with:			.109 – Code nissions Lim		Regulations	Part 47, Su	bpart B - Un	intentional	Radiators,	
Section:		15.10	9								
Test Date(s)	:	8/29/	2011			EUT Serial #	t:	N/A			
Customer:		RF Co	de, In	c.		EUT Part #:		N/A			
Project Nun	nber:	12687	7-10			Test Technician: Jesse Banda					
Purchase O	rder #:	8180				Supervisor: Jason Haley					
Equip. Unde	er Test Jupit	er Seri	es 433	.92 MHz Tra	nsmitter	Witness' Na	ame:	Ron Graczy	k		
	Radia	ted En	nissio	ns Test Resu	ılts Data Sho	eet – Horizo	ntal Antenn	a Polarity ≥	1 GHz		
EUT Li	ne Voltage:		3.	.3	VDC	EUT Lin	e Frequenc	y: N	/ A		
	EUT N	lode o	f Ope	ration:			Trans	mit Normal	Mode		
Frequency Measured (MHz)	Test Distance (Meters)	EU Direc (Degr	ction	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results	
2603.52	3	()	1	Peak	97.97	66.2	80.8	-14.6	Pass	
2603.52	3	()	1	Average	69.69	37.9	60.8	-22.9	Pass	
3906.3	3	6	0	1	Peak	94.11	65.2	74.0	-8.8	Pass	
3906.3	3	6	0	1	Average	63.8	34.9	54.0	-19.1	Pass	

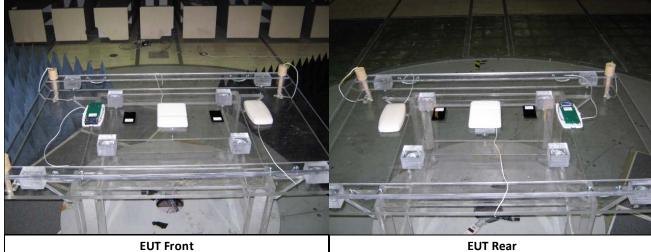
Table 4.3.6: Out of Band Spurious Emissions Measurements for the Jupiter Series 433.92 MHz Transmitter Test Results – Vertical Antenna Polarity ≥ 1 GHz

23.32 Will Transmitter rest Results Vertical Antenna Foldrity 2 1 GHz										
			Profess	sional Te	esting, E	MI, Inc.				
Test Metho	d:	Electrical a	nd Electroni		easurement It in the Ran				_	
		reference,								
In accordan	ce with:		C Part 15.109 – Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, diated Emissions Limits							
Section:		15.109								
Test Date(s)):	8/29/2011			EUT Serial #	‡ :	N/A			
Customer:		RF Code, In	c.		EUT Part #:		N/A			
Project Nun	nber:	12687-10			Test Techni	ician:	Jesse Banda)		
Purchase O		8180			Supervisor:		Jason Haley	1		
Equip. Unde	er Test:Jupit	er Series 433	3.92 MHz Tra	nsmitter	Witness' Na	ame:	Ron Graczy	k		
	Rad	iated Emissi	ons Test Re	sults Data S	heet – Verti	cal Antenna	Polarity ≥ 1	GHz		
EUT Li	ine Voltage	: 3	.3	VDC	EUT Lin	e Frequenc	y: N	/A		
	EUT N	lode of Ope	ration:			Trans	mit Normal	Mode		
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results	
1736	3	220	1	Peak	103.81	69.0	80.8	-11.8	Pass	
1736	3	220	1	Average	69.8	35.0	60.8	-25.8	Pass	
2170	3	0	1	Peak	86.1	53.4	74.0	-20.6	Pass	
2170	3	0	1	Average	63	30.3	54.0	-23.7	Pass	
2603	3	0	1	Peak	100.21	68.5	80.8	-12.3	Pass	
2603	3	0	1	Average	68.02	36.3	60.8	-24.5	Pass	
3472	3	90	1	Peak	104.12	74.0	80.8	-6.8	Pass	
3472	3	90	1	Average	69.4	39.3	60.8	-21.5	Pass	

Table 4.3.7: Out of Band Spurious Emissions Measurements for the Jupiter Series 433.92 MHz Transmitter Test Setup Photographs

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.4 – 2003: Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (incorporated by reference, see §15.38)		
In accordance with:	FCC Part 15.209 – Code of Federal Regulations Part 47, Subpart B – Radiated Emission Limits; General Requirements		
Section:	15.109		
Test Date(s):	8/29/2011	EUT Serial #:	N/A
Customer:	RF Code, Inc.	EUT Part #:	N/A
Project Number:	12687-10	Test Technician:	Jesse Banda
Purchase Order #:	8180	Supervisor:	Jason Haley
Equip. Under Test: Jupiter Series 433.92 MHz Transmitter		Witness' Name:	Ron Graczyk

Radiated Emissions Photographs



5.0 Antenna Requirements

An antenna evaluation was performed on the EUT to determine compliance with 47 CFR, Part 15.203.

5.1 Evaluation Procedure

The design of the EUT antenna was evaluated for conformance to engineering requirements for gain and to prevent substitution of unapproved antennae. Gain of the antenna was assessed by reviewing the antenna manufacturer's data sheet.

5.2 Evaluation Criteria

The antenna design must meet at least one of the following criteria:

- a) Antenna is permanently attached to the unit.
- b) Antenna must use a unique type of connector to attach to the EUT.
- c) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

5.3 Evaluation Results

The Jupiter Series 433.92 MHz Transmitter met the criteria of this rule by virtue of having an internal antenna inaccessible to the user. Therefore, the EUT is compliant.

6.0 Compliance with FCC 15.231(a)(2) and FCC 15.231(a)(3)

The RF Code Jupiter Series is compliant with FCC 15.231(a)(2) per RF Code Inc. Letter of Attestation Rev D. The Letter of Attestation Rev D is referenced in the Operational Description.

15.231(a) (2) Statement:

The 433 MHz Jupiter Series ceases transmission within 5 seconds after activation per 15.231(a)(2).

15.231(a)(3) Statement:

For the purpose of determining system integrity, specifically for security and safety applications, the 433Mhz transmitter emits supervisory and polling transmissions, including data. However, the total duration of these transmissions are limited such that they do not exceed more than 2 seconds per hour.

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End of Report

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