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October 13, 2011

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

#### Dear Ron:

Enclosed is the Wireless Test Report for the Saturn R142-i3RF 915 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. C. If you have any questions, please contact me.

Sincerely,

Jeffrey A. Lenk

President

Enclosure

### Project 12687-10

## RF Code, Inc. Saturn R142-i3RF 915 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 13, 2011 Revised October 19, 2011

Reviewed by

Jeffrey A. Lenk President Written by

Layne Lueckemeyer Product Development Engineer

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# 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.

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

<sup>(3)</sup> 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: P6FPRXRFC Project Number: 12687-10

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

The RF Code, Inc., Saturn R142-i3RF 915 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)					
Saturn R142-i3RF								
915 MHz Transmitter:	3659 MHz: 53.7 dBuV/m @ 3m	54.0 dBuV/m	-0.3					
Radiated Spurious Emissions								
Saturn R142-i3RF								
915 MHz Transmitter:	14.17 dBm	30 dBm	-15.83					
Output Power at 3 meters								
	Occupied Bandwidth							
915 MHz 20 dB								
	1.034 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. C.

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 and KDB Publication No. 558074 were utilized for making all emissions measurements.

### 1.2 EUT Description

The Saturn R142-i3RF 915 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 Saturn R142-i3RF 915 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	Serial Number	FCC ID Number	Description					
5		Saturn R142-i3RF			Saturn R142-i3RF					
EU	RF Code, Inc.	915 MHz	None	P6FPRXRFC	915 MHz					
		Transmitter			Transmitter					
	Oscillator Frequencies									
915 MHz										

The following rules apply to the operation of the EUT:

Guidelines	FCC Rules, 47 CFR, Part 15
Transmitter Characteristics for 915 MHz Transmitter	15.247
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	2009	
47 CFR	Part 15 – Radio Frequency Devices Subpart C – Intentional Radiators	
KDB Publication No. 558074	Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247)	April 16, 2007
RF Code Letter of Attestation	RF Code Letter of Attestation, Rev. C	October 11, 2011

# 1.6 Applicable Tests

Test	Rule		
Output Power	15.247(b)(3)		
Occupied Bandwidth	15.247(a)(2)		
Power Spectral Density	15.247(e)		
Out of Band Spurious Emissions	15.205(a), 15.209(a), 15.247(d)		
Antenna Requirements	15.203		

## 2.0 Output Power

Output power measurements were made on selected fundamental transmit frequencies of the EUT for the lowest, most center, and highest transmit frequencies. Test of the fundamental emissions of the EUT also determined the worst case polarization of the device. The emissions of the device were measured with the EUT in three orthogonal axes.

#### 2.1 Test Procedure

The EUT was placed on a non-conductive table 0.8 meters above the ground plane. The table was centered on a motorized turntable that enables 360-degree rotation. For measurements of the fundamental signal, a measurement antenna was positioned at a distance of 1 meter as measured from the closest point of the EUT. Rotating the EUT maximized the emissions.

A spectrum analyzer with peak detection was used to find the maximum field strength during the variability testing. Resolution bandwidth (RBW) is chosen to encompass the entire 6 dB bandwidth of the fundamental signal, up to 3 times the bandwidth if possible. The RBW that was used was recorded. A calculation was then made to determine the output power at the antenna terminal. A diagram showing the test setup is given as Figure 2.1.1.

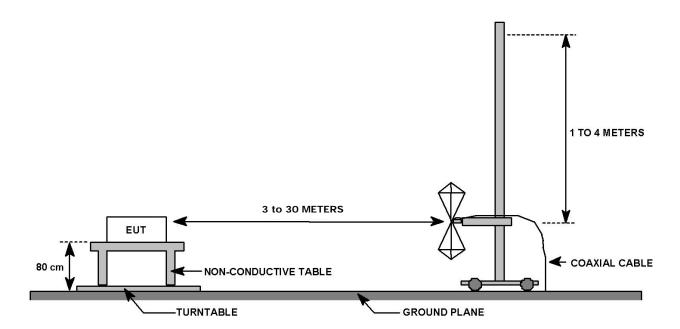


Figure 2.1.1: Radiated Emission Test Setup

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#### 2.2 **Test Criteria**

According to 47 CFR, Part 15.247(b)(3), the maximum output power for systems using digital modulation in the 902-928 MHz frequency range is 1 W.

#### 2.3 **Test Results**

Radiated emission measurements of the output power for the EUT were taken on August 30, 2011, and September 1, 2011, and the EUT was found to be in compliance with applicable requirements.

Table 2.3.1: Radiated Emissions Measurements of Output Power – Test Equipment									
	Professional Testing, EMI, Inc.								
Test Metho	d: Elect		ctron		asurement of Radio-Noi t in the Range of 9 kHz				
In accordan	nce with: FCC F	art 15.247 –	Code	of Federal F	Regulations Part 47				
Test Date(s)	): 8/30	/2011 & 9/1,	/2011		EUT Serial #:	None			
Customer:	RF Co	ode, Inc.			EUT Part #:	None			
Project Nur	mber: 1268	7-10			Test Technician:	Jesse Banda			
Purchase O	rder #: 8180				Supervisor:	Jason Haley			
Equip. Unde	er Test: Saturn I	R142-i3RF 915	MHz	Transmitter	Witness' Name:	Ron Graczyk			
		Ra	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	ated Emissio	ns_updated_12-16-10.ti	I			
Asset #	Manufacturer	Mode	ı	Equipn	ment Nomenclature Serial Numbe		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	1930 Agilent E4440A PSA Serio		es Spectrum Analyzer	MY45304903	5/20/2012				
1926	1926 ETS-Lingren 3142D Antenna, B		iconilog, 26 MHz-6 GHz	135454	4/5/2012				
C027	N/A	RG214	4	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 2.3.2: Radiated Emissions Measurements of Output Power Bandwidth and Measurement Time Used for Testing – Peak Scan

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 15.247 – Code of Federal	Regulations Part 47					
Test Date(s):	8/30/2011 & 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: S	aturn R142-i3RF 915 MHz Transmitter	Witness' Name:	Ron Graczyk				

Radiated Emissions Bandwidth and Measurement Time Used for Testing – Peak Scan									
Frequency Band Start (MHz)	Frequency Band Stop (MHz)	' '		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:

<sup>1.</sup> The settings above are specifically calculated for the HP856X series of spectrum analyzers, which have 1,000 data points per range.

<sup>2.</sup> The measurement receiver resolution bandwidth setting was 300 Hz for quasi-peak measurements from 9-150 kHz.

<sup>3.</sup> The measurement receiver resolution bandwidth setting was 9 kHz for quasi-peak measurements from 0.15-30 MHz.

<sup>4.</sup> The measurement receiver resolution bandwidth setting was 120 kHz for quasi-peak measurements from 30-1,000 MHz.

<sup>5.</sup> The measurement receiver resolution bandwidth setting was 1 MHz for average measurements from 1-18 GHz.

Table 2.3.3: Radiated Emissions Measurements of Output Power Test Results − Horizontal Antenna Polarity ≤ 1 GHz

Antenna i	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 accorda	nce with:	FCC Part	L5.247 – Co	de of Feder	al Regulatio	ns Part 47				
Test Date(s	s):	8/30/201	1 & 9/1/20:	l1	<b>EUT Serial</b>	#:	None			
Customer:		RF Code,	nc.		EUT Part #	:	None			
Project Nu	mber:	12687-10			Test Technician: Jesse Banda					
Purchase C	Order #:	8180			Supervisor: Jason Haley					
Equip. Unde	er Test: Satu	ırn R142-i3I	RF 915 MHz	Transmitter	Witness' Name: Ron Graczyk					
EUT Li	Radiate ne Voltage		s Test Resu	Its Data Sho		ontal Anten	-			
	EUT M	ode of Op	eration:			Tran	smit Max P	ower		
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	
915	3	0	1	Peak	78.4	109.4	137.0	-27.6	Pass	

Table 2.3.4: Radiated Emissions Measurements of Output Power Test Results − Vertical Antenna Polarity ≤ 1 GHz

Antenna	Antenna Polanty 2 1 Gnz										
	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 Part	15.247	– Cod	e of Federa	al Regulatio	ns Part 47				
Test Date(s	s):	8/30/20	11 & 9/	1/201	1	<b>EUT Serial</b>	#:	None			
<b>Customer:</b>		RF Code	, Inc.			EUT Part #	:	None			
Project Nu	mber:	12687-1	0			Test Techn	ician:	Jesse Band	а		
Purchase C	Order #:	8180				Supervisor: Jason Haley					
Equip. Unde	er Test: Satu	ırn R142-i	3RF 915	MHz T	ransmitter						
	Radiat	ed Emiss	ions Tes	t Res	ults Data S	heet – Vert	ical Antenn	a Polarity :	≤ 1GHz		
EUT Li	ne Voltage	:	3.3		VDC	EUT Lin	e Frequenc	y: N	<b>′</b> A		
	EUT M	ode of O	peratio	n:			Tran	smit Max P	ower		
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degree	n Hei	enna ight ters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBμV/m)	Limit Level (dBμV/m)	Margin (dB)	Test Results	
915	3	0	:	1	Peak	75.1	106.1	137.0	-30.9	Pass	

Table 2.3.5: Radiated Emissions Measurements of Output Power – Calculated Result

Frequency	Field Strength	E.I.	R.P.	Limit	Dolovity	
(MHz)	(dBμV)	dBm	mW	(dBm)	Polarity	
915	109.4	14.17	26.12	30	Н	
915	106.1	10.87	12.22	30	V	

Note: Calculation was performed as follows:  $P = \frac{(E*d)^2}{30*G}$ 

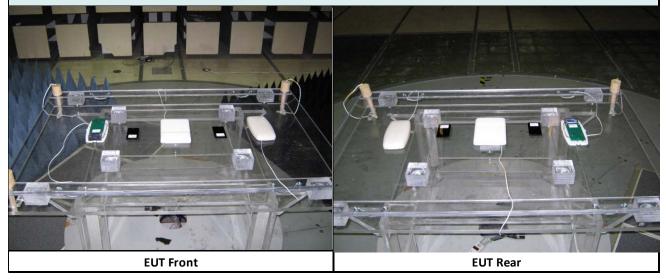
P = Power in watts, E = measured maximum field strength in V/m, d = distance in meters,

G = numeric gain of transmitting antenna, Distance = 3 meters, Gain = 0 dBi

Table 2.3.6: Radiated Emissions Measurements of Output Power Test Setup Photographs

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 15.247 – Code of Federal	Regulations Part 47						
Test Date(s):	8/30/2011 & 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: Sa	turn R142-i3RF 915 MHz Transmitter	Witness' Name:	Ron Graczyk					

## **Radiated Emissions Photographs**



## 3.0 Occupied Bandwidth

Occupied bandwidth measurements were performed on the EUT to determine compliance with 47 CFR, 15.247(a)(2).

#### 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 15.247(a)(2), systems using digital modulation techniques may operate in the 902-928 MHz frequency range, provided the minimum 6 dB bandwidth is at least 500 kHz.

#### 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.

Table 3.3.1: Radiated Emissions Measurements of Occupied Bandwidth for the Saturn R142-i3RF 915 MHz Transmitter – Test Equipment

i3RF 915 I	MHz Transmitt	er – Test E	quip	ment				
		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 accorda	nce with: FCC I	Part 15.247 –	Code	of Federal F	Regulations Part 47			
Test Date(s	): 8/30	/2011 & 9/1,	/2011		EUT Serial #:	None		
Customer:	RF Co	ode, Inc.			EUT Part #:	None		
Project Nu	mber: 1268	787-10 Test Technician:				Jesse Banda		
Purchase Order #: 8180 Supervisor: Jason Haley								
Equip. Und	er Test: Saturn R1	.42-i3RF 915 N	∕IHz Tra	ansmitter	Witness' Name:	Ron Graczyk		
			_		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	l		
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 Series Spectrum Analyzer		MY45304903	5/20/2012	
1926	ETS-Lingren	31420	)	Antenna, Biconilog, 26 MHz-6 GHz 135454 4/5			4/5/2012	
C027	N/A	RG214	1	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 Saturn R142-i3RF 915 MHz Transmitter Test Results – 6 dB

i3RF 915 MHz Tran	smitter Test R	esults – 6 dB					
	Pro	fessional Te	esting, EMI	, Inc.			
	ANSI C63.4 – 20	09: Methods of N	Measurement o	f Radio-Noise Emissions	from Low-		
Test Method:	Voltage Electric	al and Electronic	Equipment in	the Range of 9 kHz to 40	GHz		
	(incorporated b	y reference, see	§15.38)	_			
In accordance with:	· · · · · · · · · · · · · · · · · · ·	<u> </u>	<u>-</u>	Part 47			
Test Date(s):	8/30/2011 & 9/2		EUT Serial #:	None			
Customer:	RF Code, Inc.	-,	EUT Part #:	None			
Project Number:	12687-10		Test Technicia				
Purchase Order #:	8180		Supervisor:	Jason Haley			
Equip. Under Test: Sat	urn R142-i3RF 915	MHz Transmitter	Witness' Name				
			•				
Radiated	Emissions Test Ro	esults Data Shee	t – Occupied Ba	andwidth (6 dB) Test Res	ults		
* Agilent 23:29:3	33 Sep 1, 201	1		R T			
Ref 87.99 dB <b>µ</b> V	At	ten 10 dB					
#Peak							
Log							
10							
dB/							
		<b>.</b> ∧		4			
		A Why	1 1 1 A 1	\alpha \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \			
		A William	n My Pay ma	V"IV			
		المسما		W\(			
	l.~	•		Y 1			
	m And W'			Way Land	A chat . a a		
LgAv	Company of the p			4447.444			
M1 S2							
Center 915.000 MH:					Span 3 MHz		
#Res BW 10 kHz		#VBW 1	.0 kHz	Sweep 36.2	ms (601 pts)		
Occupied Ba	ndwidth			Occ BW % Pwr	99.00 %		
				x dB	-6.00 dB		
1.0436 MHz × dB -6.00 dB							
Transmit Freq Er	ror 44.503	kHz					
x dB Bandwidth	527.27	1 kHz					

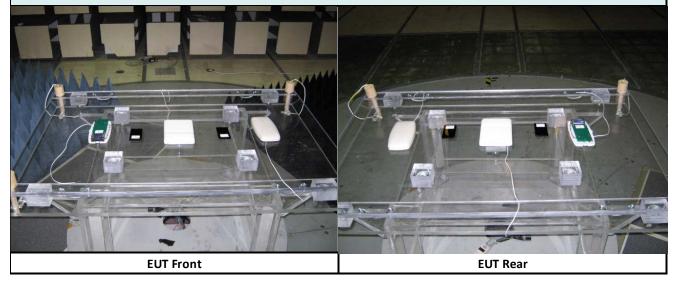
Table 3.3.3: Radiated Emissions Measurements of Occupied Bandwidth for the Saturn R142-i3RF 915 MHz Transmitter Test Results – 20 dB

13RF 915 MHz Transmit	ter Test Results – 20 dE	<u> </u>		
	Professional T	esting, EMI, Ir	nc.	
ANS	I C63.4 – 2009: Methods of	Measurement of Ra	dio-Noise Emissions fro	m Low-
Test Method: Volt	age Electrical and Electron	ic Equipment in the	Range of 9 kHz to 40 G	Hz
	orporated by reference, see	• •		
•	Part 15.247 – Code of Feder	· · · · · · · · · · · · · · · · · · ·	47	
	)/2011 & 9/1/2011	EUT Serial #:	None	
	ode, Inc.	EUT Part #:	None	
	37-10	Test Technician:	Jesse Banda	
Purchase Order #: 8180	)	Supervisor:	Jason Haley	
Equip. Under Test: Saturn F	R142-i3RF 915 MHz Transmitter	Witness' Name:	Ron Graczyk	
Radiated Emiss	ions Test Results Data Shee	t – Occupied Bandw	ridth (20 dB) Test Resul	ts
* Agilent 23:54:20 F	lug 30, 2011		R T	
Mental Philadelphia			2020 27	
Ref 94.99 dB <b>µ</b> V	Atten 10 dB			
#Peak				
Log				
10				
dB/		↑ System, A	lignments, Align All No	ow, Needed
	Mark		М	
	→ <b>A</b>		<b>♦</b> ←	
	~~		- Vost	
			"\	
	N		~\n\	
	Sun		had	
LgAv manuficut				Markey
M1 S2				
Center 915.000 MHz				Span 3 MHz
#Res BW 10 kHz	#VBW	10 kHz	Sweep 36.2 ms	
Occupied Bandy	ridth		Occ BW % Pwr	99.00 %
	5.7243 kHz		× dB	-20.00 dB
57.	JIT LTJ KIIZ			
Transmit Freq Error	39.346 kHz			
x dB Bandwidth	1.034 MHz			
A GD Ballamiath	1.034 PINZ			

Table 3.3.4: Radiated Emissions Measurements of Occupied Bandwidth for the Saturn R142-i3RF 915 MHz Transmitter Test Setup Photographs

Professional Testing, EMI, Inc.									
	Fiolessional results, Livil, IIIC.								
	ANSI C63.4 – 2009: Methods of Measurement of Radio-Noise Emissions from Low-Voltage								
Test Method:	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 15.247 – Code of Federal I	Regulations Part 47							
Test Date(s):	8/30/2011 & 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						
quip. Under Test: Saturn R142-i3RF 915 MHz Transmitter   Witness' Name: Ron Graczyk									

## **Radiated Emissions Photographs**



## 4.0 Power Spectral Density

Power spectral density measurements were performed on the EUT to determine compliance with 47 CFR, Section 15.247(e).

#### 4.1 Test Procedure

The fundamental emission of the EUT is maximized and the spectrum analyzer is tuned to the highest point as measured in max-hold with peak detection. The analyzer is then centered on the maximum peak and set with the following parameters: RBW = 3 kHz, VBW > RBW, span = 300 kHz, and sweep time = 100s. The peak level is obtained after the sweep completes. The test setup is included in Appendix A.

#### 4.2 Test Criteria

According to section 47 CFR, Sections 15.247(e), the maximum power spectral density is +8 dBm in any 3 kHz bandwidth.

#### 4.3 Test Results

Power spectral density measurements were taken on September 2, 2011, and the EUT was found to be in compliance with applicable requirements.

Table 4.3.1: Radiated Emissions Measurements of Power Spectral Density – Test Equipment

Table 4.3.1: Radiated Emissions Measurements of Power Spectral Density – 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 accordance wi	ith: FCC Pa	art 15.247 –	Code	of Federal F	Regulations Part 47					
Test Date(s):	9/2/2	011			EUT Serial #:	None				
Customer:	RF Co	de, Inc.			EUT Part #:	None				
Project Number:	12687	<u>'-10</u>			Test Technician:	Jesse Banda				
Purchase Order #					Supervisor:	Jason Haley				
Equip. Under Tes	t: Saturn R1	42-i3RF 915	MHz T	ransmitter	Witness' Name:	Ron Graczyk				
		Ra	diate	d Emissions	Test Equipment List					
Tile! Sof	ftware Version	n:	3.4.K.	11, June 7, 2	2006, 07:49:00 PM					
Te	st Profile:		Radia	ted Emissio	ns_updated_12-16-10.ti	I				
Asset # Mai	nufacturer	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 Seri	es Spectrum Analyzer	MY45304903	5/20/2012			
1926 ET	S-Lingren	3142D	١	Antenna, B	iconilog, 26 MHz-6 GHz	135454	4/5/2012			
C027	N/A	RG214	1	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 4.3.2: Radiated Emissions Measurements of Power Spectral Density Test Results

Table 4.3.2: Radia	ited Em	issions N	vieasurer	nents	of Pow	er Spe	ctral D	ensity Te	est Kesult	.S
		Pro	fession	al Te	esting,	EMI,	Inc.			
	ANSI C	63.4 – 200	09: Metho	ds of N	/leasurer	nent of	Radio-N	oise Emis	sions from	Low-
Test Method:	Voltage	e Electrica	al and Elec	tronic	Equipm	ent in t	he Rang	e of 9 kHz	to 40 GHz	
	(incorp	orated b	y referenc	e, see	§15.38)					
In accordance with:	FCC Par	rt 15.247	– Code of	Federa	ıl Regula	tions Pa	art 47			
Test Date(s):	9/2/20				EUT Seri			one		
Customer:	RF Cod	e, Inc.			<b>EUT</b> Par	t #:	N	one		
Project Number:	12687-	10			Test Tec	hnician	: Je	sse Banda	1	
Purchase Order #:	8180				Supervi			son Haley	•	
Equip. Under Test: S	aturn R14	2-i3RF 915	MHz Transr	nitter	Witness	' Name:	Ro	on Graczy	k	
Radiat	ed Emiss	ions Test	Results Da	ta She	et – Pov	ver Spe	ctral Der	nsity Test	Results	
* Agilent 00:48	:03 Sep	2, 201	1					R T		
								Mk	r1 914.9	21 4 MHz
Ref 97.99 dB <b>µ</b> V		#At	ten 10 dE	3					65.	79 dB <b>µ</b> V
#Peak										
Log										
10										
dB/										
	+	<u></u>			_	-			-	
		Λ								
		۸ 4			_	-+	/Vu		-	
W. L. M. W.	Mah/\n√	W	Mund r.			- July	1, J	1.		100 person 1/20
LgAv YYY	177 - 17		A. M. A.	Jan Hallander	ለለለሌላ	Variation III		Y MA	~\^\^\	γγ. γ
								* 1		
V1 S2										
S3 FC										
£(f):										
f>50k										
#Swp										
Center 915.000 0	MHz								Span	300 kHz
#Res BW 3 kHz			*1	/BW 3	00 kHz_			*Sween	100 ms (	
DN 0 NIIE				n	0 0 NIIE_			- voob	700 III0 (	001 P(0)

Table 4.3.3: Radiated Emissions Measurements of Power Spectral Density Calculated Result

Frequency	Field Strength	E.I.R.P	Limit
(MHz)	(dBμV / 3 kHz)	(dBm / 3 kHz)	(dBm / 3 kHz)
915	65.8	-29.42	8

Note: Calculation was performed as follows:  $P = \frac{(E * d)^2}{30 * G}$ 

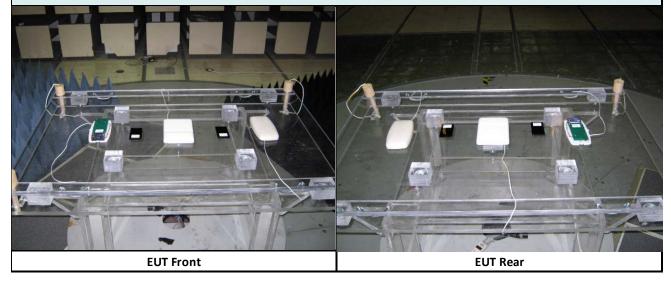
P = Power in watts, E = measured maximum field strength in V/m, d = distance in meters,

G = numeric gain of transmitting antenna, Distance = 3 meters, Gain = 0 dBi

Table 4.3.4: Radiated Emissions Measurements of Power Spectral Density Test Setup Photographs

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 15.247 – Code of Federal F	Regulations Part 47						
Test Date(s):	9/2/2011	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: S	aturn R142-i3RF 915 MHz Transmitter	Witness' Name:	Ron Graczyk					

#### **Radiated Emissions Photographs**



## **5.0** Out of Band Spurious Emissions

Out of band spurious/harmonic emissions measurements were performed on the EUT to determine compliance to 47 CFR, Parts 15.205(a), 15.209(a) and 15.247(d).

#### **5.1** 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.

#### 5.2 Test Criteria

The radiated limits of 47 CFR, Part 15.209(a), are shown below. The limits specified are at 3 meters. The limits are quasi-peak for emissions below 1 GHz and average for emissions above 1 GHz. Also above 1 GHz, the peak limit is 20 dB above the average limit. These limits apply to the Saturn R142-i3RF 915 MHz Transmitter.

Frequency MHz	Specification Distance (Meters)	Field Strength (dBuV/m)	Test Distance (Meters)	Field Strength (dBuV/m)
30 to 88	3	40.0	10	29.5
88 to 216	3	43.5	10	33
216 to 960	3	46.0	10	35.5
Above 960	3	54.0	1	63.5

Note: Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

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
<sup>1</sup> 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	( <sup>2</sup> )
13.36–13.41			

<sup>&</sup>lt;sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

### 5.3 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.

<sup>&</sup>lt;sup>2</sup> Above 38.6

Table 5.3.1: Out of Band Spurious Emissions Measurements for the Saturn R142-i3RF 915 MHz Transmitter – Test Equipment

i i alisiilitt	er – Test Equip	ment					
		Profess	sional Te	esting, EMI, Inc.			
ANSI C63.4 – 2003: 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	ce with:	art 15.109 – Code ated Emissions Lim		Regulations Part 47, Sub	part B – Unintenti	onal Radiators,	
Section:	15.10			ı			
Test Date(s)		/2011		EUT Serial #:	None		
Customer:		de, Inc.		EUT Part #:	None		
Project Nun Purchase Oi		7-10		Test Technician:	Jesse Banda		
		142-i3RF 915 MHz T	Fransmitter	Supervisor: Witness' Name:	Jason Haley		
Equip. Onuc	r lest. Jatain it.	.42°IJNI J1J WILL I	Tansinice.	Witness Name.	Ron Graczyk		
		Radiate	d Emissions	Test Equipment List			
Tile	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	l		
Asset #	Manufacturer	Model	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	AFS4-01001800	Amplifie	er, 1-26. 5GHz, 36 dB	None	7/28/2012	
1930	Agilent	E4440A	PSA Seri	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	Cable	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	AFS4-01001800	Amplifie	er, 1-26.5 GHz, 42 dB	None	1/28/2012	
1529	Miteq	AFS4-01001800	Amplifie	er, 1-26.5 GHz, 36 dB	None	7/28/2012	
C030	N/A	0	Cable	e Coax, N-N, 30 m	None	5/27/2012	
1780	ETS-Lindgren	3117	1	, DRG Horn, 1-18 GHz	1110313	1/14/2012	

Table 5.3.2: Bandwidth and Measurement Time Used for Out of Band Spurious Emissions Testing – Peak Scan, Saturn R142-i3RF 915 MHz Transmitter

Professional Testing, EMI, Inc.							
Test Method:	ANSI C63.4 – 2003: Methods of Methods of Methods and Electronic Equipme reference, see §15.38)		Noise Emissions from Low-Voltage Hz to 40 GHz (incorporated by				
In accordance with:	accordance with: FCC Part 15.109 – Code of Federal Regulations Part 47, Subpart B – Unintentional Radiators, Radiated Emissions Limits						
Section:	15.109						
Test Date(s):	8/29/2011	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: S	aturn R142-i3RF 915 MHz Transmitter	Witness' Name:	Ron Graczyk				

#### Radiated Emissions Bandwidth and Measurement Time Used for Testing – Peak Scan

Frequency Band Start (MHz)	Frequency Band Stop (MHz)	6 dB Bandwidth (kHz)	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:

<sup>1.</sup> The settings above are specifically calculated for the HP856X series of spectrum analyzers, which have 1,000 data points per range.

<sup>2.</sup> The measurement receiver resolution bandwidth setting was 300 Hz for quasi-peak measurements from 9-150 kHz.

<sup>3.</sup> The measurement receiver resolution bandwidth setting was 9 kHz for quasi-peak measurements from 0.15-30 MHz.

<sup>4.</sup> The measurement receiver resolution bandwidth setting was 120 kHz for quasi-peak measurements from 30-1,000 MHz.

 $<sup>5.\</sup>$ The measurement receiver resolution bandwidth setting was  $1\$ MHz for average measurements from  $1-18\$ GHz.

Table 5.3.3: Out of Band Spurious Emissions Measurements for the Saturn R142-i3RF 915 MHz Transmitter Test Results – Horizontal Antenna Polarity ≤ 1 GHz

Transmitter rest results – nonzontal America Polanty 2 1 Grz										
Professional Testing, EMI, Inc.										
		ANSI C63.4	– 2003: Me	thods of Mea	surement o	f Radio-Noi	se Emissions	from Low-	/oltage	
Test Metho			lectrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (incorporated by							
		reference,								
In accordan	ce with:			of Federal R	egulations P	art 47, Sub	oart B – Unir	ntentional R	adiators,	
			missions Lin	nits						
Section:		15.109								
Test Date(s	):	8/29/2011			EUT Serial #		None			
Customer:		RF Code, In	c.		EUT Part #:		None			
Project Nur		12687-10			Test Techni		Jesse Banda	-		
	rchase Order #: 8180 Supervisor: Jason Haley uip. Under Test: Saturn R142-i3RF 915 MHz Transmitter Witness' Name: Ron Graczyk									
Equip. Una	er rest: Sati	urn R142-i3	RF 915 MHz	Transmitter	Witness' Na	ame:	Ron Graczy	<b>(</b>		
	Radia	ated Emissi	ons Test Res	ults Data She	et – Horizor	ntal Antenn	a Polarity ≤ :	<b>LGHz</b>		
EUT Li	ine Voltage:	3	.3	VDC	EUT Lin	e Frequenc	y: N/	<b>′</b> A		
	EUT N	Node of Ope	eration:			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	
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		34.9	35.6	-0.7	Pass	
480.866	10	250	1.2	Quasi-peak		24.5	35.6	-11.1	Pass	
900	10	0	1	Quasi-peak	24.9	25.3	35.6	-10.3	Pass	

Table 5.3.4: Out of Band Spurious Emissions Measurements for the Saturn R142-i3RF 915 MHz Transmitter Test Results – Vertical Antenna Polarity ≤ 1 GHz

STO IAILIT	11 alisiilit	ter rest n	esuits – v	ertical Ani	terria Por	arity 2 1 C	J11Z		
			Profes	sional Te	sting, El	MI, Inc.			
Test Metho	d:		nd Electroni	thods of Mea c Equipment					_
In accordan	ice with:	FCC Part 15.209 – Code of Federal Regulations Part 47, Subpart B – Unintentional Radiators, Radiated Emissions Limits							
Section:		15.109							
Test Date(s	):	8/29/2011			EUT Serial #	<b>‡</b> :	None		
Customer:		RF Code, In	c.		EUT Part #:		None		
Project Nur		12687-10			Test Techni	cian:	Jesse Banda	1	
Purchase O		8180		Supervisor: Jason Haley					
Equip. Und	er Test: Sati	urn R142-i3R	F 915 MHz T	ransmitter	Witness' Na	ame:	Ron Graczy	k	
				esults Data Sh	ı				
EUT L	ine Voltage:	3	.3	VDC	EUT Lin	e Frequenc	y: N/	<b>/</b> A	
	EUT N	Node of Ope	eration:			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
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	Quasi-peak	27.1	17.6	35.6	-18.0	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 5.3.5: Out of Band Spurious Emissions Measurements for the Saturn R142-i3RF 915 MHz Transmitter Test Results – Horizontal Antenna Polarity ≥ 1 GHz

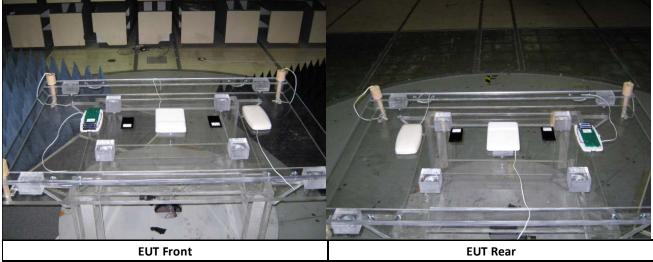
915 MHZ	ı ransmıtı	er Test Re	esuits – H	orizontal	Antenna	Polarity ≥	1 GHZ		
					esting, E				
ANSI C63.4 – 2003: Methods of Measurement of Radio-Noise Emissions from Low-Voltage  Test Method: Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (incorporated by reference, see §15.38)									
In accordan	ce with:	FCC Part 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz							
Section:		15.247							
Test Date(s)	):	8/29/2011			EUT Serial #	<b>#</b> :	None		
Customer:		RF Code, In	с.		EUT Part #:		None		
Project Nun		12687-10			Test Techni	ician:	Jesse Banda	1	
Purchase O	rder #:	8180			Supervisor:		Jason Haley		
Equip. Unde	er Test: Sat	urn R142-i3F	RF 915 MHz T	ransmitter	Witness' Na	ame:	Ron Graczy	k	
	Radia	ted Emissio	ns Test Resu	ults Data Sh	eet – Horizo	ntal Antenn	a Polarity ≥	1GHz	
EUT Li	ine Voltage:	3	.3	VDC	EUT Lin	e Frequenc	y: N/	<b>/</b> A	
	EUT N	lode of Ope	ration:		Transmit 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
1829.5	3	330	1	Peak	90.9	56.7	109.4	-52.7	Pass
1829.5	3	330	1	Average	80.27	46.0	89.4	-43.4	Pass
2744	3	300	1	Peak	89.32	58.0	74.0	-16.0	Pass
2744	3	300	1	Average	84.7	53.4	54.0	-0.6	Pass
3659	3	345	1	Peak	95.6	66.3	74.0	-7.7	Pass
3659	3	345	1	Average	83	53.7	54.0	-0.3	Pass
4574	3	130	1	Peak	82.9	55.5	74.0	-18.5	Pass
4574	3	130	1	Average	76.32	48.9	54.0	-5.1	Pass
5488	3	100	1	Peak	85.3	57.9	109.4	-51.5	Pass
5488	3	100	1	Average	77.9	50.5	89.4	-38.9	Pass
	3	100	_				400.4		Pass
6403	3	150	1	Peak	72.5	47.7	109.4	-61.7	1 033
6403 6403				Peak Average	72.5 67.2	47.7 42.4	89.4	-61.7 -47.0	Pass
	3	150	1						
6403	3	150 150	1 1	Average	67.2	42.4	89.4	-47.0	Pass
6403 7323	3 3 3	150 150 230	1 1 1	Average Peak	67.2 79.98	42.4 56.4	89.4 74.0	-47.0 -17.6	Pass Pass

Table 5.3.6: Out of Band Spurious Emissions Measurements for the Saturn R142-i3RF 915 MHz Transmitter Test Results – Vertical Antenna Polarity ≥ 1 GHz

912 MHZ	ı ransmıtt	er Test Re	esuits – V	erticai An	tenna Pol	arity ≥ 1	UHZ		
					esting, E				
ANSI C63.4 – 2003: 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	FCC Part 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-585 MHz								5725-5850
Section:		15.247							
Test Date(s)	:	8/29/2011			EUT Serial #	<b>#</b> :	None		
Customer:		RF Code, Inc	с.		EUT Part #:		None		
Project Nun	nber:	12687-10			Test Techni	ician:	Jesse Banda		
Purchase O	rder #:	8180			Supervisor:		Jason Haley		
Equip. Unde	er Test: Sa	turn R142-i3	RF 915 MHz	Transmitter	Witness' Na	ame:	Ron Graczy	k	
	Rad	iated Emissi	ons Test Re	sults Data S	heet – Verti	cal Antenna	Polarity ≥ 1	GHz	
EUT Li	ne Voltage:	3.	.3	VDC	EUT Lin	e Frequenc	y: N	<b>/</b> A	
	EUT N	lode of Ope	ration:		Transmit 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
1829.5	3	70	1	Peak	103.81	69.6	109.4	-39.8	Pass
1829.5	3	70	1	Average	69.8	35.6	89.4	-53.8	Pass
2744	3	320	1	Peak	86.1	54.8	74.0	-19.2	Pass
2744	3	320	1	Average	63	31.7	54.0	-22.3	Pass
3659	3	270	1	Peak	100.21	70.9	74.0	-3.1	Pass
3659	3	270	1	Average	68.02	38.7	54.0	-15.3	Pass
4574	3	170	1	Peak	87.4	60.0	74.0	-14.0	Pass
4574	3	170	1	Average	69.4	42.0	54.0	-12.0	Pass
5488	3	250	1	Peak	94.7	67.3	109.4	-42.1	Pass
5488	3	250	1	Average	81.44	54.1	89.4	-35.3	Pass
6403	3	120	1	Peak	73.2	48.4	109.4	-61.0	Pass
6403	3	120	1	Average	69.67	44.8	89.4	-44.6	Pass
7323	3	250	1	Peak	81.5	57.9	74.0	-16.1	Pass
7323	3	250	1	Average	72.4	48.8	54.0	-5.2	Pass
8233	3	250	1	Peak	75.7	53.4	74.0	-20.6	Pass
0233	3	250	_		,				

Table 5.3.7: Out of Band Spurious Emissions Measurements for the Saturn R142-i3RF 915 MHz Transmitter Test Setup Photographs

	Professional To	esting, EMI, Inc	с.
Test Method:	ANSI C63.4 – 2003: Methods of Me Electrical and Electronic Equipmer reference, see §15.38)		Noise Emissions from Low-Voltage Hz to 40 GHz (incorporated by
In accordance with:	FCC Part 15.109 – Code of Federal Radiated Emissions Limits	Regulations Part 47,	Subpart B – Unintentional Radiators,
Section:	15.109		
Test Date(s):	8/29/2011	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:	Saturn R142-i3RF 915 MHz Transmitter	Witness' Name:	Ron Graczyk
	Radiated Emissi	ons Photographs	
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## **6.0** Antenna Requirements

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

#### **6.1** 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.

#### **6.2** 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.

#### **6.3** Evaluation Results

The Saturn R142-i3RF 915 MHz Transmitter met the criteria of this rule by virtue of having an internal antenna inaccessible to the user. Therefore, the EUT is compliant.

End	of	Rei	D	0	rt

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