1601 North A.W. Grimes Blvd., Suite B
Round Rock, TX 78665
e-mail: info@ptitest.com
(512) 244-3371 Fax: (512) 244-1846

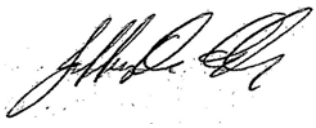
October 13, 2011

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

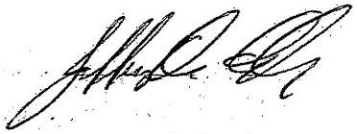
Prepared for:
RF Code, Inc.
9229 Waterford Centre Boulevard, Suite 500
Austin, Texas 78758

By

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

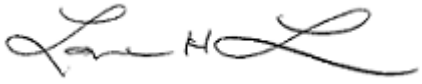
October 13, 2011
Revised October 19, 2011

Reviewed by



Jeffrey A. Lenk
President

Written by



Layne Lueckemeyer
Product Development Engineer

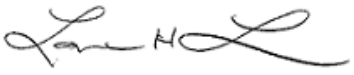
Table of Contents

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: Radiated Spurious Emissions	3659 MHz: 53.7 dBuV/m @ 3m	54.0 dBuV/m	-0.3
Saturn R142-i3RF 915 MHz Transmitter: Output Power at 3 meters	14.17 dBm	30 dBm	-15.83
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
EUT	RF Code, Inc.	Saturn R142-i3RF 915 MHz Transmitter	None	P6FPRXRFC	Saturn R142-i3RF 915 MHz 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	American National Standard for Testing Unlicensed Wireless Devices	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.

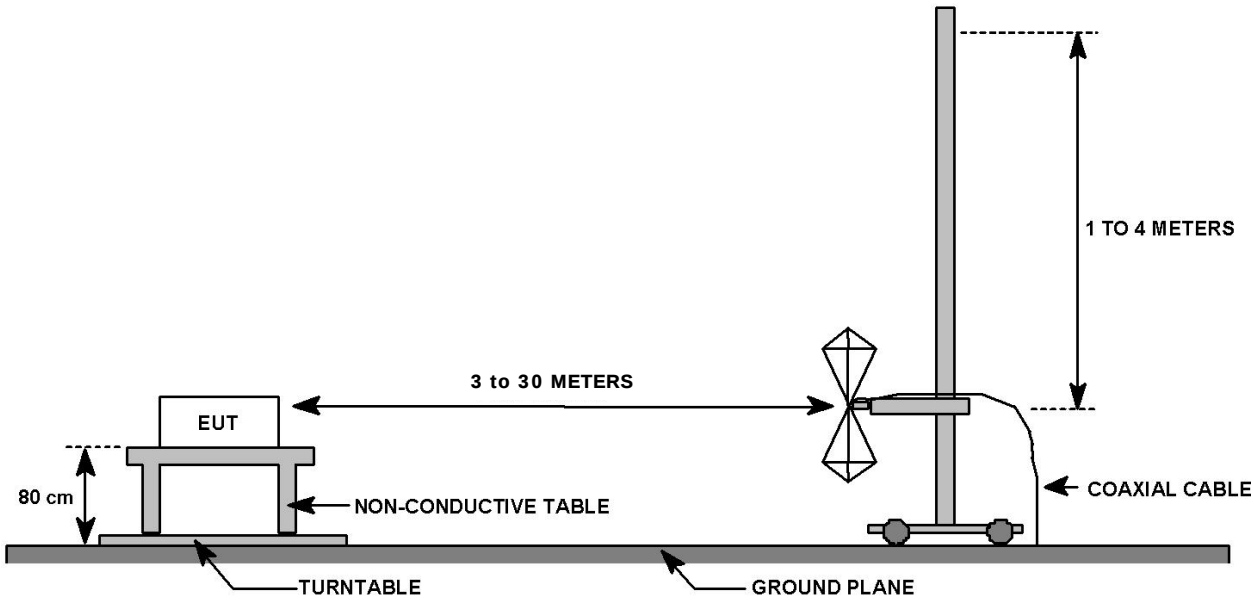


Figure 2.1.1: Radiated Emission Test Setup

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 Method:	**ANSI C63.4 – 2009: 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 15.247 – 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:	**Saturn R142-i3RF 915 MHz Transmitter**	**Witness' Name:**	**Ron Graczyk**

Radiated Emissions Test Equipment List	
Tile! Software Version:	**3.4.K.11, June 7, 2006, 07:49:00 PM**
Test Profile:	**Radiated Emissions_updated_12-16-10.til**

Asset #	Manufacturer	Model	Equipment 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	Amplifier, 1-26.5 GHz, 36 dB	None	7/28/2012
1930	Agilent	E4440A	PSA Series Spectrum Analyzer	MY45304903	5/20/2012
1926	ETS-Lingren	3142D	Antenna, Biconilog, 26 MHz-6 GHz	135454	4/5/2012
C027	N/A	RG214	Cable 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.			
Test Method:	**ANSI C63.4 – 2009: 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 15.247 – 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:	**Saturn 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:

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

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.4 – 2009: 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 15.247 – 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: Saturn R142-i3RF 915 MHz Transmitter		Witness' Name:	Ron Graczyk

Radiated Emissions Test Results Data Sheet – Horizontal Antenna Polarity ≤ 1 GHz				
EUT Line Voltage:	3.3	VDC	EUT Line Frequency:	N/A
EUT Mode of Operation:			Transmit Max Power	

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

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.4 – 2009: 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 15.247 – 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: Saturn R142-i3RF 915 MHz Transmitter		Witness' Name:	Ron Graczyk

Radiated Emissions Test Results Data Sheet – Vertical Antenna Polarity ≤ 1GHz				
EUT Line Voltage:	3.3	VDC	EUT Line Frequency:	N/A
EUT Mode of Operation:			Transmit Max Power	

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	75.1	106.1	137.0	-30.9	Pass

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

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

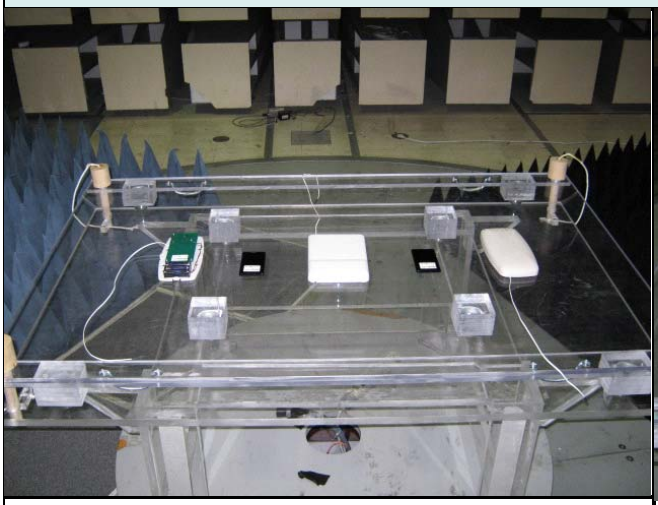
Note: Calculation was performed as follows: $P = \frac{(E*d)^2}{30*G}$

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

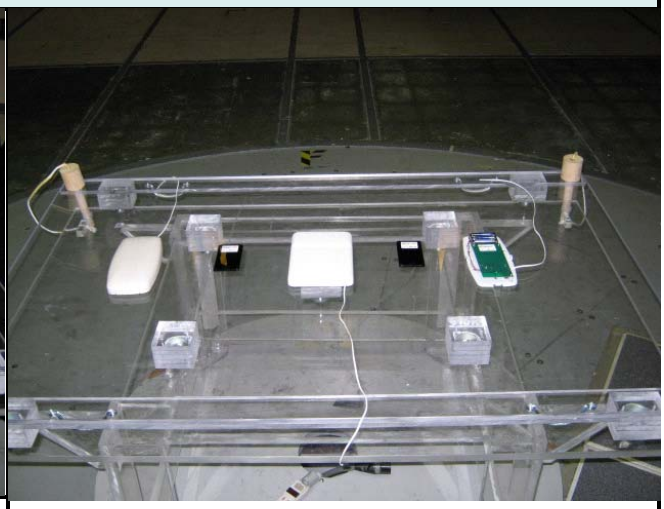
Table 2.3.6: Radiated Emissions Measurements of Output Power Test Setup Photographs

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.4 – 2009: 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 15.247 – 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:	Saturn R142-i3RF 915 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, 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

Professional Testing, EMI, Inc.			
Test Method:	**ANSI C63.4 – 2009: 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 15.247 – 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:	**Saturn R142-i3RF 915 MHz Transmitter**	**Witness' Name:**	**Ron Graczyk**

Radiated Emissions Test Equipment List	
Tile! Software Version:	**3.4.K.11, June 7, 2006, 07:49:00 PM**
Test Profile:	**Radiated Emissions_updated_12-16-10.til**

Asset #	Manufacturer	Model	Equipment 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	Amplifier, 1-26.5 GHz, 36 dB	None	7/28/2012
1930	Agilent	E4440A	PSA Series Spectrum Analyzer	MY45304903	5/20/2012
1926	ETS-Lingren	3142D	Antenna, Biconilog, 26 MHz-6 GHz	135454	4/5/2012
C027	N/A	RG214	Cable 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

Professional Testing, EMI, Inc.			
Test Method:	**ANSI C63.4 – 2009: 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 15.247 – 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:	**Saturn R142-i3RF 915 MHz Transmitter**	**Witness' Name:**	**Ron Graczyk**

Radiated Emissions Test Results Data Sheet – Occupied Bandwidth (6 dB) Test Results

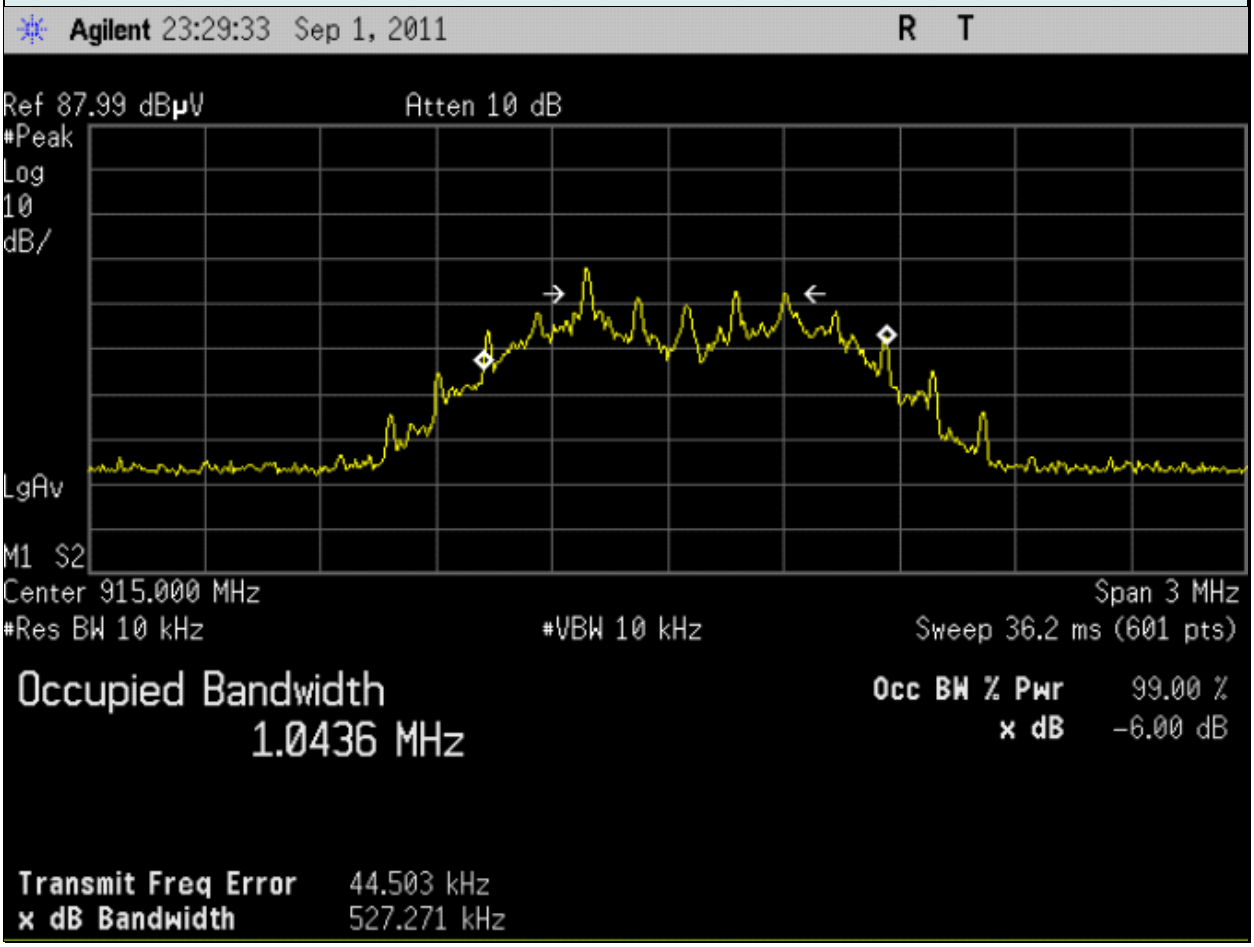


Table 3.3.3: Radiated Emissions Measurements of Occupied Bandwidth for the Saturn R142-i3RF 915 MHz Transmitter Test Results – 20 dB

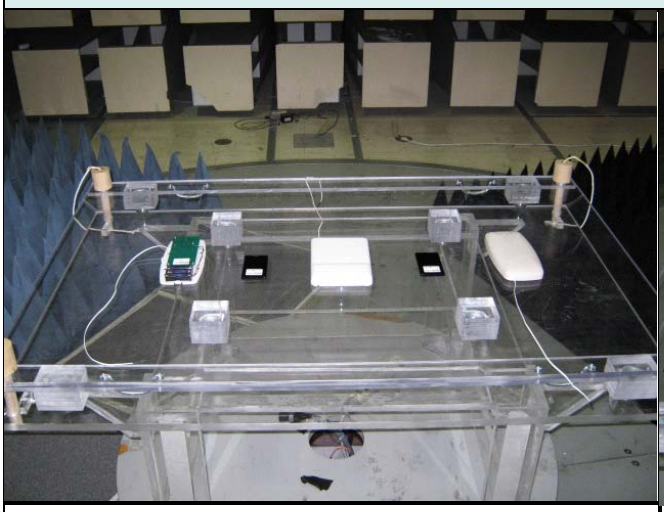
Professional Testing, EMI, Inc.			
Test Method:	**ANSI C63.4 – 2009: Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (incorporated by reference, see §15.38)**		
In accordance with:	**FCC Part 15.247 – Code of Federal 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:	**Saturn R142-i3RF 915 MHz Transmitter**	**Witness' Name:**	**Ron Graczyk**

Radiated Emissions Test Results Data Sheet – Occupied Bandwidth (20 dB) Test Results

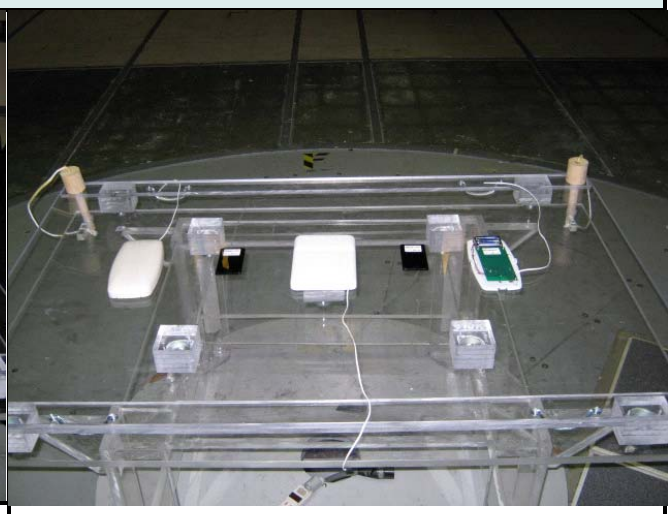
Table 3.3.4: Radiated Emissions Measurements of Occupied Bandwidth for the Saturn R142-i3RF 915 MHz Transmitter Test Setup Photographs

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.4 – 2009: 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 15.247 – 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:	Saturn R142-i3RF 915 MHz Transmitter	Witness' Name:	Ron Graczyk

Radiated Emissions Photographs



EUT Front



EUT Rear

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

Professional Testing, EMI, Inc.			
Test Method:	**ANSI C63.4 – 2009: 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 15.247 – Code of Federal 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:	**Saturn R142-i3RF 915 MHz Transmitter**	**Witness' Name:**	**Ron Graczyk**

Radiated Emissions Test Equipment List	
Tile! Software Version:	**3.4.K.11, June 7, 2006, 07:49:00 PM**
Test Profile:	**Radiated Emissions_updated_12-16-10.til**

Asset #	Manufacturer	Model	Equipment 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	Amplifier, 1-26.5 GHz, 36 dB	None	7/28/2012
1930	Agilent	E4440A	PSA Series Spectrum Analyzer	MY45304903	5/20/2012
1926	ETS-Lingren	3142D	Antenna, Biconilog, 26 MHz-6 GHz	135454	4/5/2012
C027	N/A	RG214	Cable 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

Professional Testing, EMI, Inc.			
Test Method:	**ANSI C63.4 – 2009: 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 15.247 – Code of Federal 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:	**Saturn R142-i3RF 915 MHz Transmitter**	**Witness' Name:**	**Ron Graczyk**

Radiated Emissions Test Results Data Sheet – Power Spectral Density Test Results

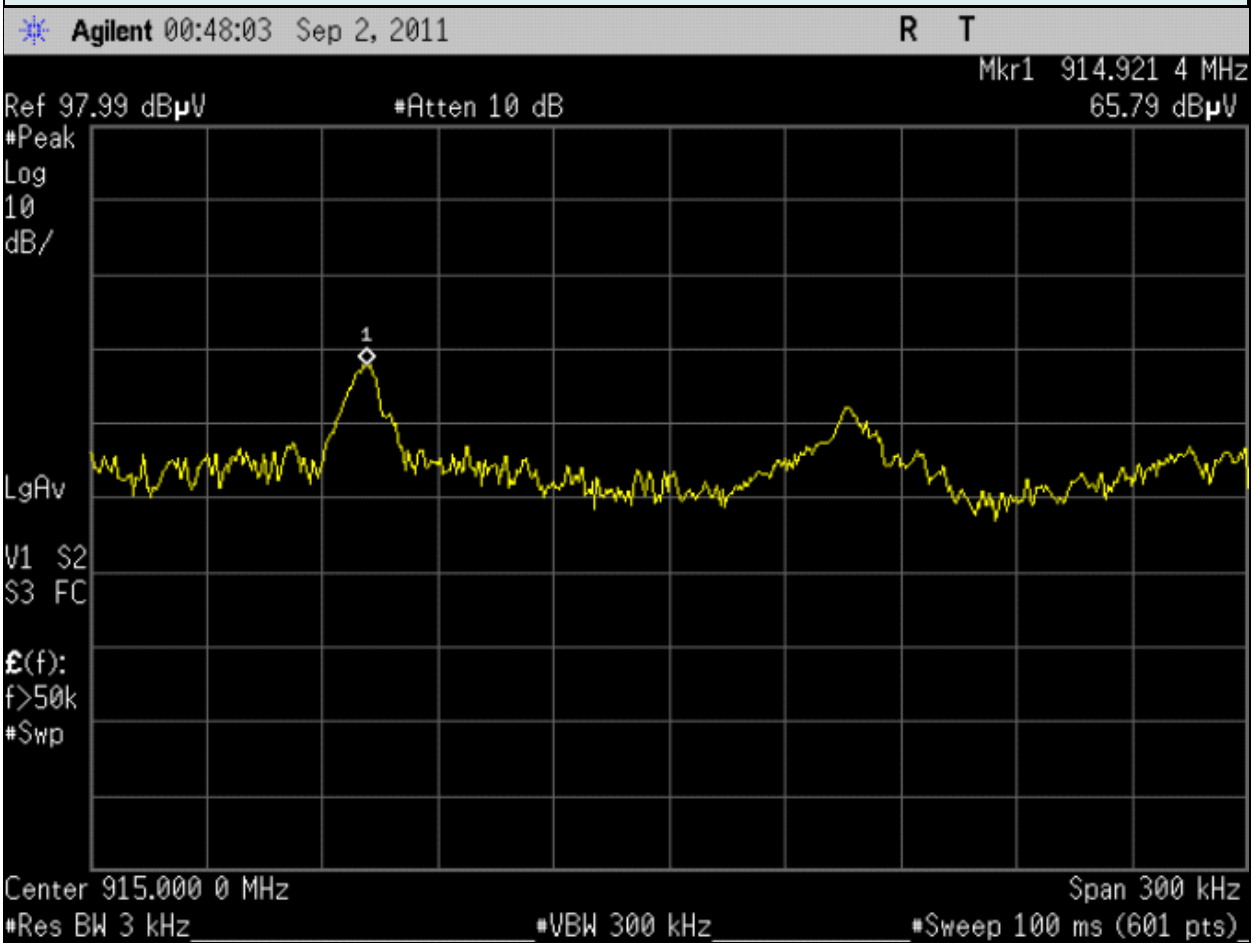


Table 4.3.3: Radiated Emissions Measurements of Power Spectral Density Calculated Result

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

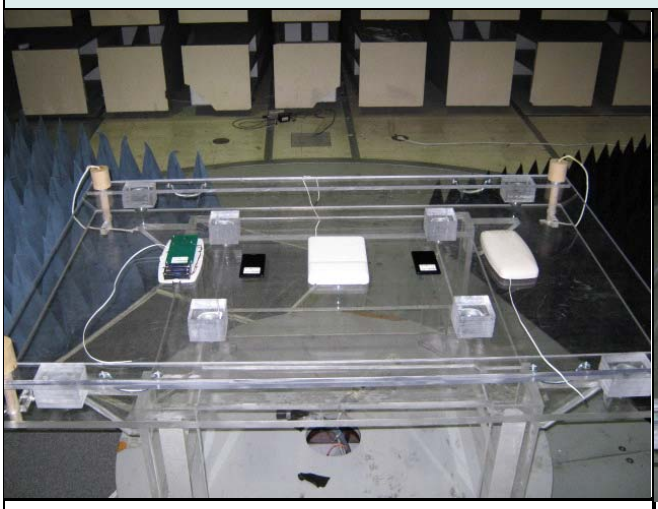
Note: Calculation was performed as follows: $P = \frac{(E*d)^2}{30*G}$

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

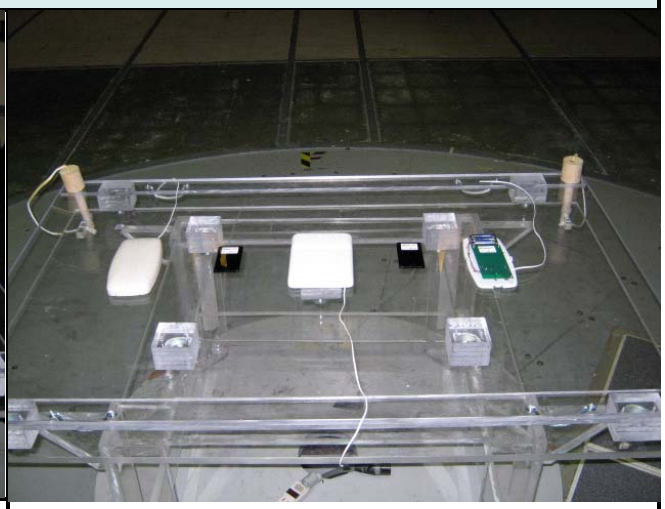
Table 4.3.4: Radiated Emissions Measurements of Power Spectral Density Test Setup Photographs

Professional Testing, EMI, Inc.			
Test Method:	**ANSI C63.4 – 2009: 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 15.247 – Code of Federal 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:	**Saturn R142-i3RF 915 MHz Transmitter**	**Witness' Name:**	**Ron Graczyk**

Radiated Emissions Photographs



EUT Front



EUT Rear

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
[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

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.

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

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 15.109 – 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:	**Saturn R142-i3RF 915 MHz Transmitter**	**Witness' Name:**	**Ron Graczyk**

Radiated Emissions Test Equipment List	
Tile! Software Version:	**3.4.K.11, June 7, 2006, 07:49:00 PM**
Test Profile:	**Radiated Emissions_updated_12-16-10.til**

Asset #	Manufacturer	Model	Equipment 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	Amplifier, 1-26. 5GHz, 36 dB	None	7/28/2012
1930	Agilent	E4440A	PSA Series Spectrum Analyzer	MY45304903	5/20/2012
1926	ETS-Lingren	3142D	Antenna, Biconilog, 26 MHz-6 GHz	135454	4/5/2012
C027	N/A	RG214	Cable 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	Amplifier, 1-26.5 GHz, 42 dB	None	1/28/2012
1529	Miteq	AFS4-01001800	Amplifier, 1-26.5 GHz, 36 dB	None	7/28/2012
C030	N/A	0	Cable Coax, N-N, 30 m	None	5/27/2012
1780	ETS-Lindgren	3117	Antenna, 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 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 15.109 – 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:	**Saturn 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:
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 5.3.3: Out of Band Spurious Emissions Measurements for the Saturn R142-i3RF 915 MHz Transmitter Test Results – Horizontal Antenna Polarity ≤ 1 GHz

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 – 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:	Saturn R142-i3RF 915 MHz Transmitter	Witness' Name:	Ron Graczyk

Radiated Emissions Test Results Data Sheet – Horizontal Antenna Polarity ≤ 1GHz			
EUT Line Voltage:	3.3 VDC	EUT Line Frequency:	N/A
EUT Mode of Operation:		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
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	35.6	-0.7	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 5.3.4: Out of Band Spurious Emissions Measurements for the Saturn R142-i3RF 915 MHz Transmitter Test Results – Vertical Antenna Polarity ≤ 1 GHz

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 – 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:	Saturn R142-i3RF 915 MHz Transmitter	Witness' Name:	Ron Graczyk

Radiated Emissions Test Results Data Sheet – Vertical Antenna Polarity ≤ 1GHz			
EUT Line Voltage:	3.3 VDC	EUT Line Frequency:	N/A
EUT Mode of Operation:		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
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

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 15.247 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 #:	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 Emissions Test Results Data Sheet – Horizontal Antenna Polarity ≥ 1GHz			
EUT Line Voltage:	3.3 VDC	EUT Line Frequency:	N/A
EUT Mode of Operation:		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
6403	3	150	1	Peak	72.5	47.7	109.4	-61.7	Pass
6403	3	150	1	Average	67.2	42.4	89.4	-47.0	Pass
7323	3	230	1	Peak	79.98	56.4	74.0	-17.6	Pass
7323	3	230	1	Average	68.38	44.8	54.0	-9.2	Pass
8233	3	140	1	Peak	76.7	54.4	74.0	-19.6	Pass
8233	3	140	1	Average	64.33	42.1	54.0	-11.9	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

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 15.247 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 #:	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

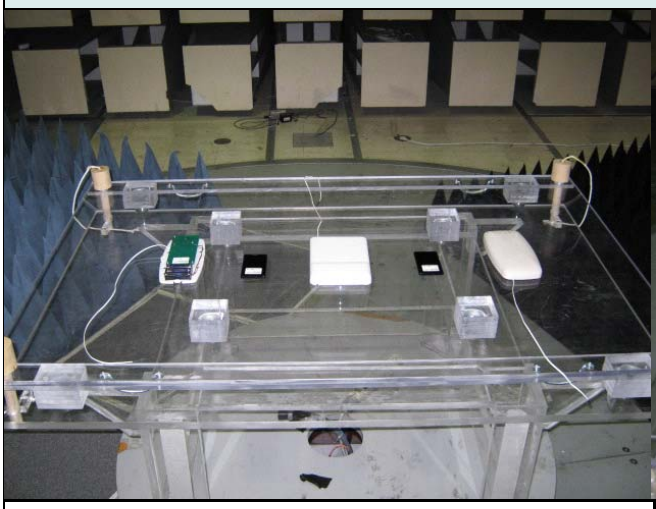
Radiated Emissions Test Results Data Sheet – Vertical Antenna Polarity ≥ 1GHz				
EUT Line Voltage:	3.3	VDC	EUT Line Frequency:	N/A
EUT Mode of Operation:			Transmit Normal Mode	

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
8233	3	250	1	Average	64.9	42.6	54.0	-11.4	Pass

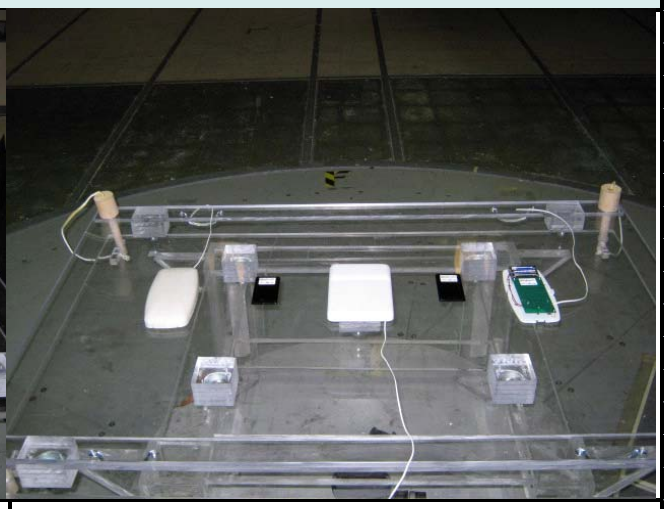
Table 5.3.7: Out of Band Spurious Emissions Measurements for the Saturn R142-i3RF 915 MHz Transmitter Test Setup Photographs

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 15.109 – 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:	Saturn R142-i3RF 915 MHz Transmitter	Witness' Name:	Ron Graczyk

Radiated Emissions Photographs



EUT Front



EUT Rear

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 Report

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