Certification Application

Radio Systems Corporation
US Code Title 47, Part 15, Subpart C, Section 15.209
MicroLite RIG00-11933 Low Power Transmitter

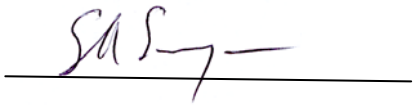
UST Project: 09-0028
Issue Date: March 19, 2009

Total Number of Pages Contained in This Report: 44

3505 Francis Circle Alpharetta, GA 30004
PH: 770-740-0717 Fax: 770-740-1508
www.ustech-lab.com

I certify that I am authorized to sign for the test facility and that all of the statements in this report and in the Exhibits attached hereto are true and correct to the best of my knowledge and belief:

US TECH (AGENT RESPONSIBLE FOR TEST):

By: 

Name: Steve Sawyer

Title: Chief Compliance Engineer

Date: March 19, 2009

3505 Francis Circle Alpharetta, GA 30004
PH: 770-740-0717 Fax: 770-740-1508
www.ustech-lab.com

MEASUREMENT/TECHNICAL REPORT

COMPANY NAME: **Radio Systems Corporation**

MODEL: **MicroLite RIG00-11933**

FCC ID: **KE3-300935**

DATE: **March 19, 2009**

This report concerns (check one): Original grant_X_
Class II change_____

Equipment type: **__Low Power 433.92 MHz Transmitter**

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? yes_____ No_X_

If yes, defer until:_____
date

__N.A.__ agrees to notify the Commission by__N.A.__
date
of the intended date of announcement of the product so that the grant can be issued on that date.

Report prepared by:

US Tech
3505 Francis Circle
Alpharetta, GA 30004

Phone Number: (770) 740-0717
Fax Number: (770) 740-1508

Table Of Contents

Table Of Contents (cont'd.)

Title **Section** **Page**

LIST OF FIGURES AND TABLES

FIGURES

TABLES

1 General Information

1.1 Product Description

The Equipment Under Test (EUT) is an Radio Systems Corporation, MicoLite Model RIG00-11933. The “MicroLite” receiver is an electronic collar worn by the pet, normally used to keep the pet contained within the yard. The collar has 2 different frequencies of operation, 7.5 kHz and 10 KHz. This collar also has a 433.92 MHz transmitter, which can activate an automated pet door and various other products.

1.2 Related Submittal(s)/Grant(s)

The EUT will be used to send data. The Low Frequency Transmitter presented in this report will be used with the 700/800 Series Transmitters and Shields/IFA-12 Indoor units.

The EUT is subject to the following authorizations:

a) Certification as a low power Frequency Transmitter under 15.209

The information contained in this report is presented for the certification & verification authorization(s) for the EUT.

2 Test And Measurements

2.1 Configuration of Tested System

The sample was tested per ANSI C63.4, Methods of Measurement from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (2003). Conducted and radiated emissions data were taken with the test receiver or spectrum analyzer's resolution bandwidth adjusted to 9 kHz and 120 kHz, respectively. All measurements are peak unless stated otherwise. The video filter associated with the spectrum analyzer was off throughout the evaluation process. Block diagrams of the tested systems are shown in Figure 1. Test configuration photographs for spurious and fundamental emissions are shown in Figure 2a -g.

The sample used for testing was received by U.S. Technologies on February 19, 2009 in good condition.

2.2 Test Facility

Testing was performed at US Tech's measurement facility at 3505 Francis Circle, Alpharetta, GA. This site has been fully described and registered with the FCC under designation number US5117. Additionally this site has also been fully described and submitted to Industry Canada (IC), and has been approved under file number 2982A-1.

2.3 Test Equipment

Table 2 describes test equipment used to evaluate this product.

2.4 Modifications

No modifications were made by US Tech to bring the EUT into compliance with FCC Part 15, Class B Limits for the transmitter portion of the EUT or the Class B Digital Device Requirements.

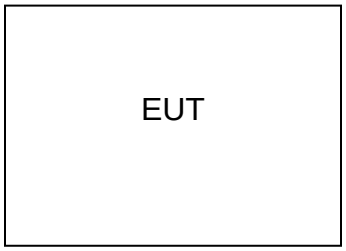


Figure 1 Test Configuration

Table 1

Test Date: **February 20, & 24, 2009**
UST Project: **09-0028**
Customer: **Radio Systems Corporation**
Model: **MicroLite Model RIG00-11933**

EUT and Peripherals

PERIPHERAL MANU.	MODEL NUMBER	SERIAL NUMBER	FCC ID:	CABLES P/D
Radio Systems Corporation (EUT)	MicroLite RIG00-11933	None	None	None

Table 2
Test Instruments

EQUIPMENT	MODEL NUMBER	MANUFACTURER	SERIAL NUMBER	DATE OF LAST CALIBRATION
SPECTRUM ANALYZER	8593E	HEWLETT-PACKARD	3205A00124	9/9/08
RF PREAMP	8447D	HEWLETT-PACKARD	2944A06291	9/12/08
BICONILOG ANTENNA	EM-6917A-1	ELECTRO-METRICS	124104	Calibration Not Required
LOG PERIODIC	3146	EMCO	3110-3236	11/21/07 2 Yr.
HORN ANTENNA	3115	EMCO	9107-3723	11/4/08
PREAMP	8449B	HEWLETT PACKARD	3008A00480	9/2/08
CALCULATION PROGRAM	N/A	N/A	Ver. 6.0	N/A

Note: The calibration interval of the above test instruments is 12 months unless stated otherwise and all calibrations are traceable to NIST/USA.

2.5 Antenna Description (Paragraph 15.203)

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

Radio Systems Corporation will sell the MicroLite Model RIG00-11933 with a trace antenna integrally mounted on the pwb.

2.6 Fundamental, Peak, and Average Radiated Spurious Emissions in the Frequency Range 30 -25000 MHz (FCC Section 15.209)

The EUT was placed into a continuous transmit mode of operation. A preliminary scan was performed on the EUT to determine frequencies that were caused by the transmitter portion of the product. Significant emissions that fell within restricted bands were then measured on an OATS site. Radiated measurements below 1 GHz were tested with a RBW = 120 kHz. Radiated measurements above 1 GHz were measured using a RBW = VBW = 1 MHz. The results of peak radiated fundamental frequencies and spurious emissions falling within restricted bands are given in Table 3, & 4 and Figure 3a – 3b.

Average values were not calculated since peak values met average limits

Table 3. Peak Fundamental Emissions

Radiated Emissions								
					Client:	Radio Systems Corporation		
D.A.	**Project:**	09-0028	**Class:**		**Model:**	MicroLite Model RIG00-11933		
Frequency (MHz)		Test Data Peak (dBuV)	AF+CL-PA (dB)	Corrected Results (dBuV/m)	Limits Average (dBuV/m)	Application Test Distance/ Polarization	Margin (dB)	Detector Used
433.9400		25.54	20.03	45.57	46.0	3m./VERT	**0.4**	**PK**

SAMPLE CALCULATIONS: at 433.94 MHz (25.54 dBuV + 20.03 dB) = 45.57 dBuV/m

Test Date: February 24, 2009

Tester Signature: Daniel Aparaschivei **Name: Daniel Aparaschivei**

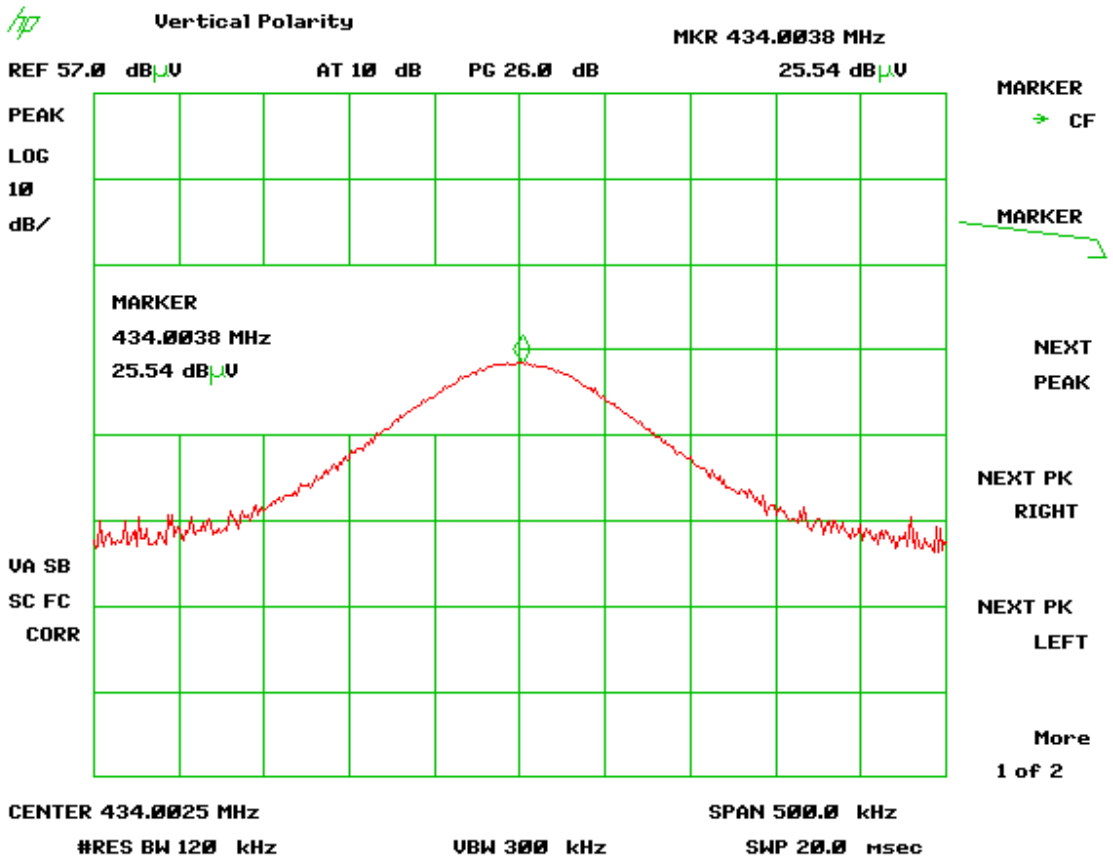


Figure 2
Peak Radiated Emission 15.209 Fundamental

Table 4. Peak Radiated Spurious Emissions

Radiated Emissions							
				Client:	Radio Systems Corporation		
D.A..	**Project:** 09-0028	**Class:**		**Model:**	MicroLite Model RIG0011933		
Frequency (MHz)	Test Data Peak (dBuV)	AF+CL-PA (dB/m)	Corrected Results (dBuV/m)	Limits Average (dBuV/m)	Application Test Distance/ Polarization	Margin (dB)	Detector Used
1301.9300	53.79	-11.48	42.31	54.0	3m./VERT	11.7	**PK**
1735.7900	54.18	-8.83	45.35	54.0	3m./VERT	8.6	**PK**
2169.9100	48.97	-6.76	42.21	54.0	3m./VERT	11.8	**PK**
2603.6100	48.10	-5.65	42.45	54.0	3m./VERT	11.5	**PK**
No emissions were detected beyond the above frequencies							

SAMPLE CALCULATIONS: at 1301.93 MHz (53.79 dBuV + -11.48 dB/m) = 42.31 dBuV/m

Test Date: February 24, 2009

Tester Signature: Daniel Aparaschivei **Name: Daniel Aparaschivei**

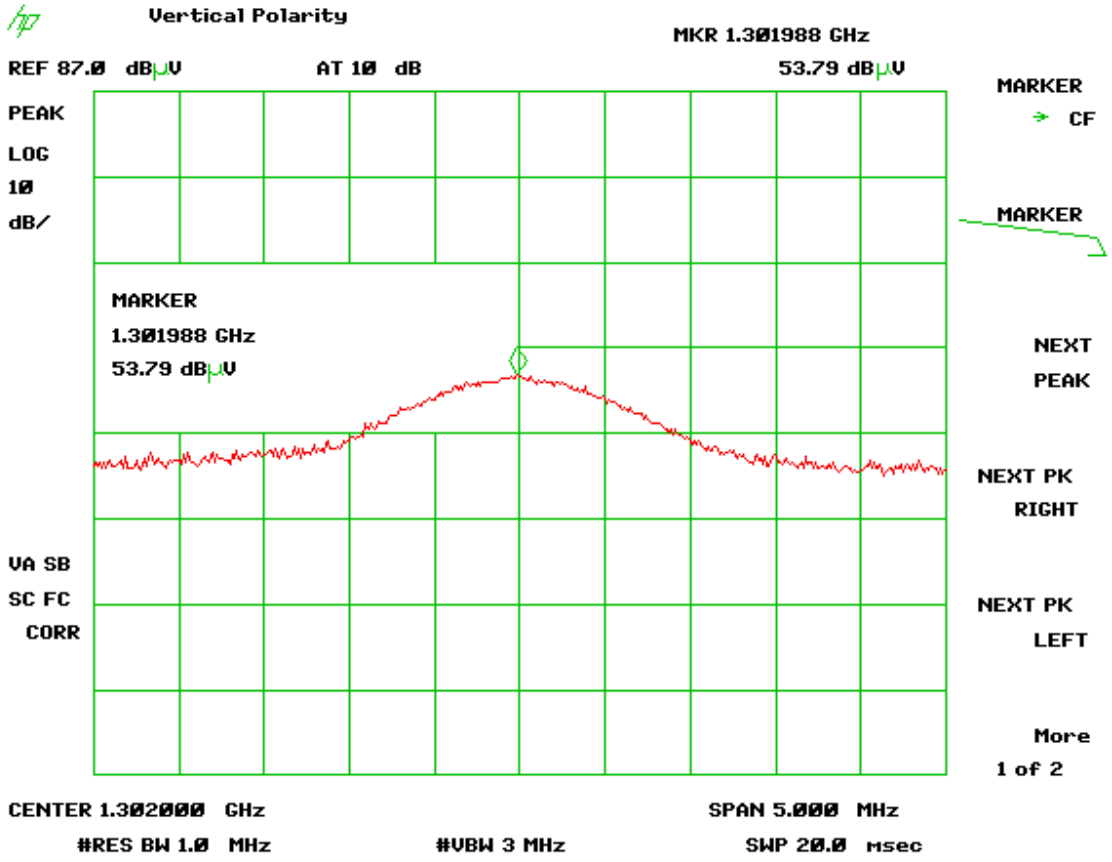


Figure 3
Peak Radiated Spurious Emission 15.209
3rd Harmonic

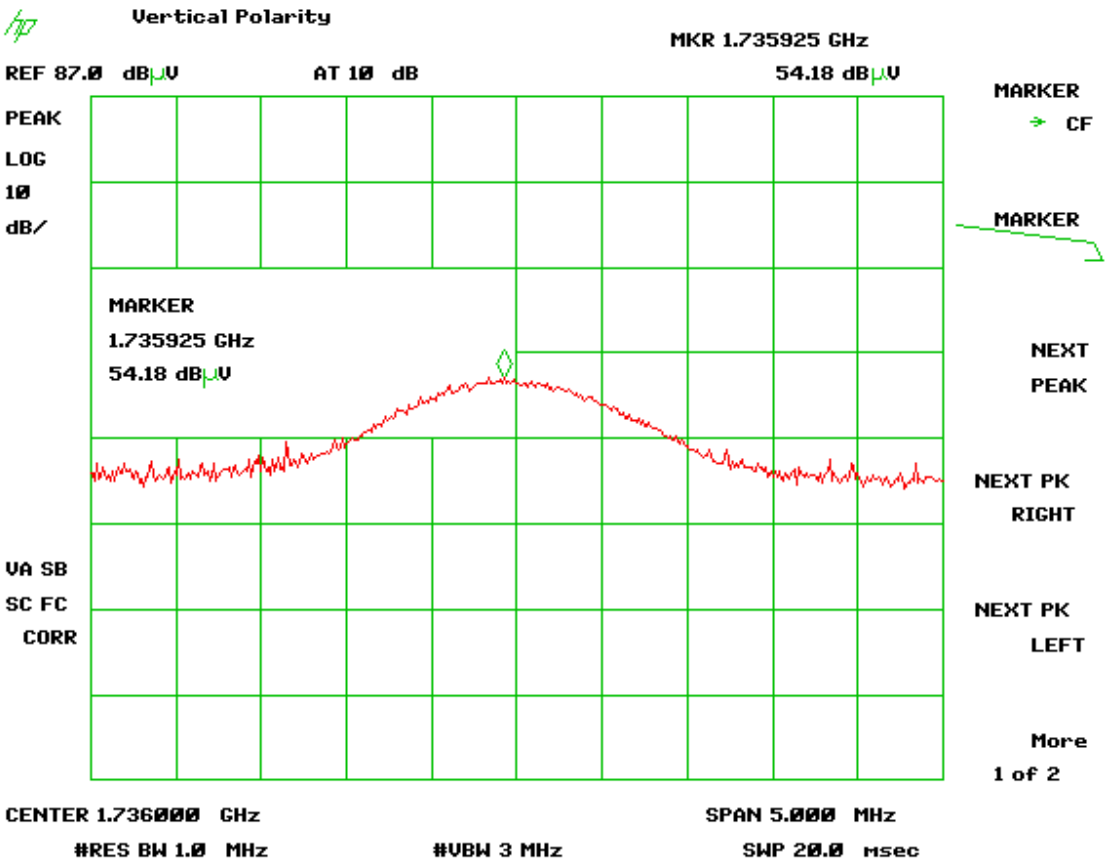


Figure 4
Peak Radiated Spurious Emission 15.209
4th Harmonic

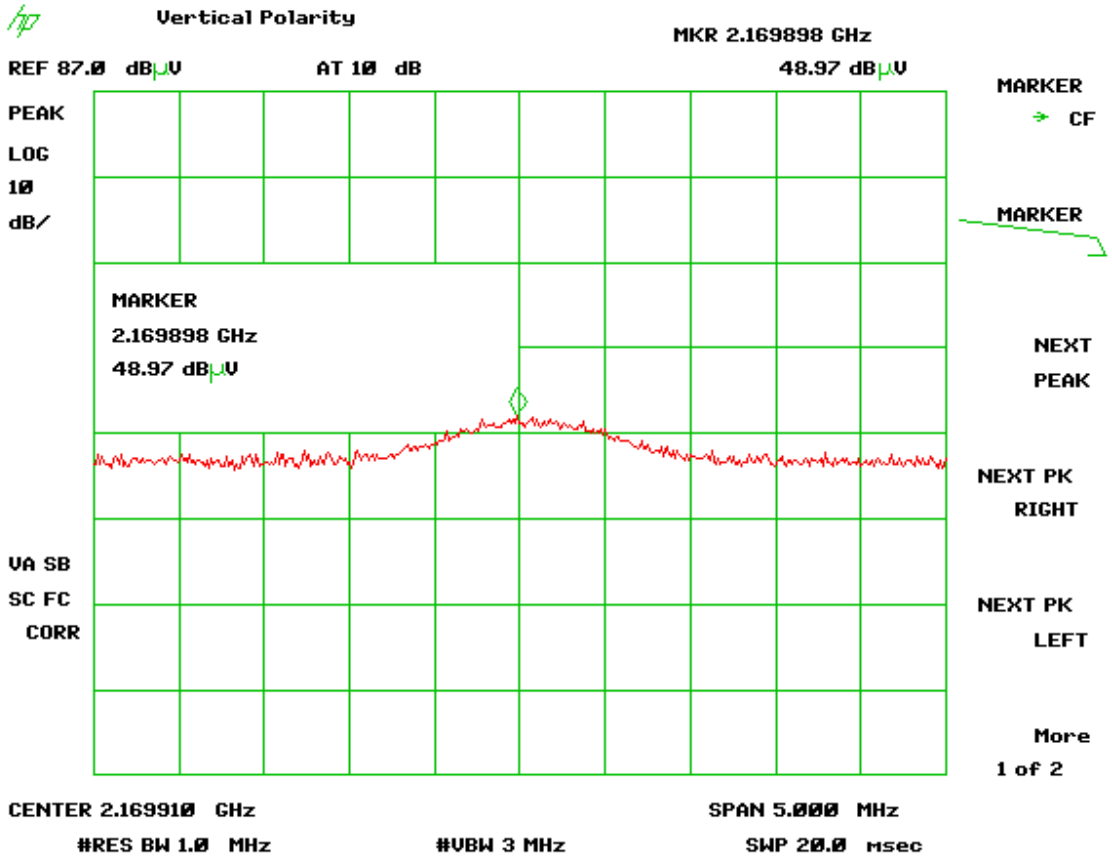


Figure 5
Peak Radiated Spurious Emission 15.209
5th Harmonic

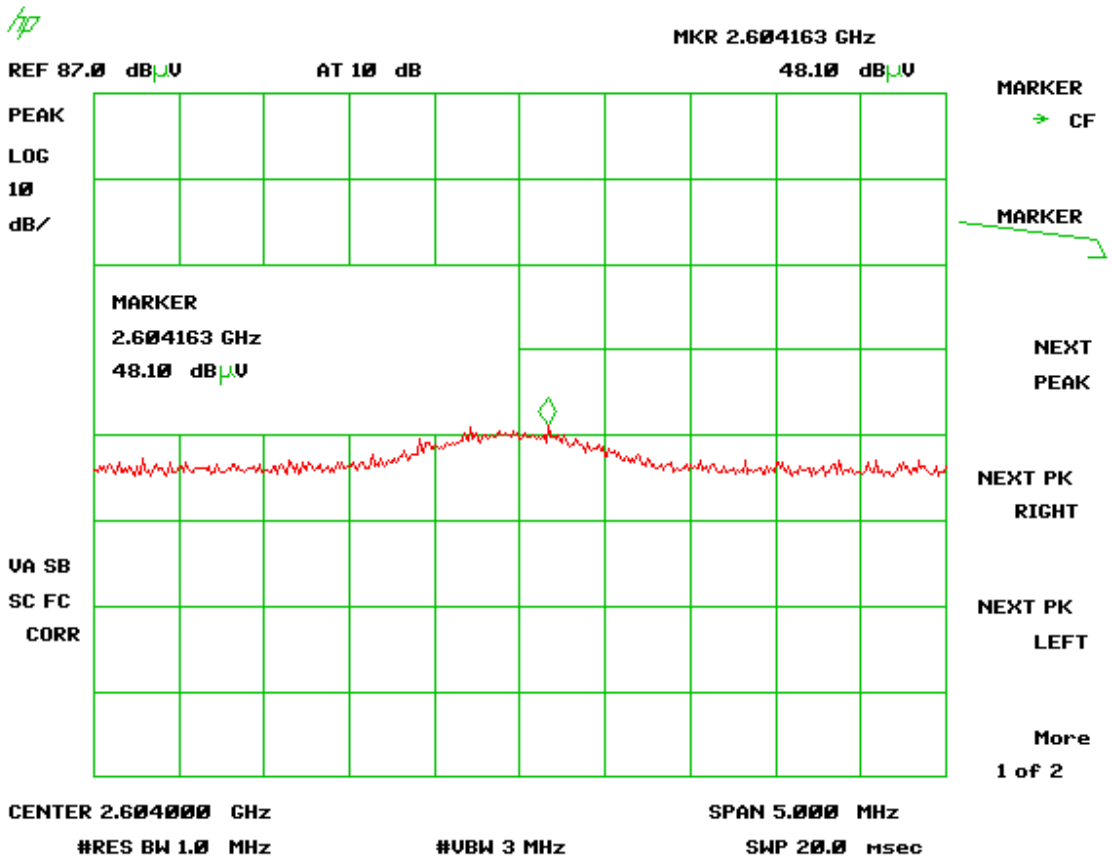


Figure 6
Peak Radiated Spurious Emission 15.209
6th Harmonic

2.7 20 dB Bandwidth per FCC

The antenna port was connected to a spectrum analyzer that was set for a 50 Ω impedance with the RBW > approximately 1/100 of the manufacturers claimed RBW & VBW > RBW. The results of this test are given in Table 5 and Figure 7.

Table 5
20 dB Bandwidth

Frequency (GHz)	20 dB Bandwidth (MHz)	MAXIMUM FCC LIMIT (MHz)
433.910	0.490	NA

Test Date: February 24, 2009

Tester Signature: Daniel Aparaschvei **Name: Daniel Aparaschvei**

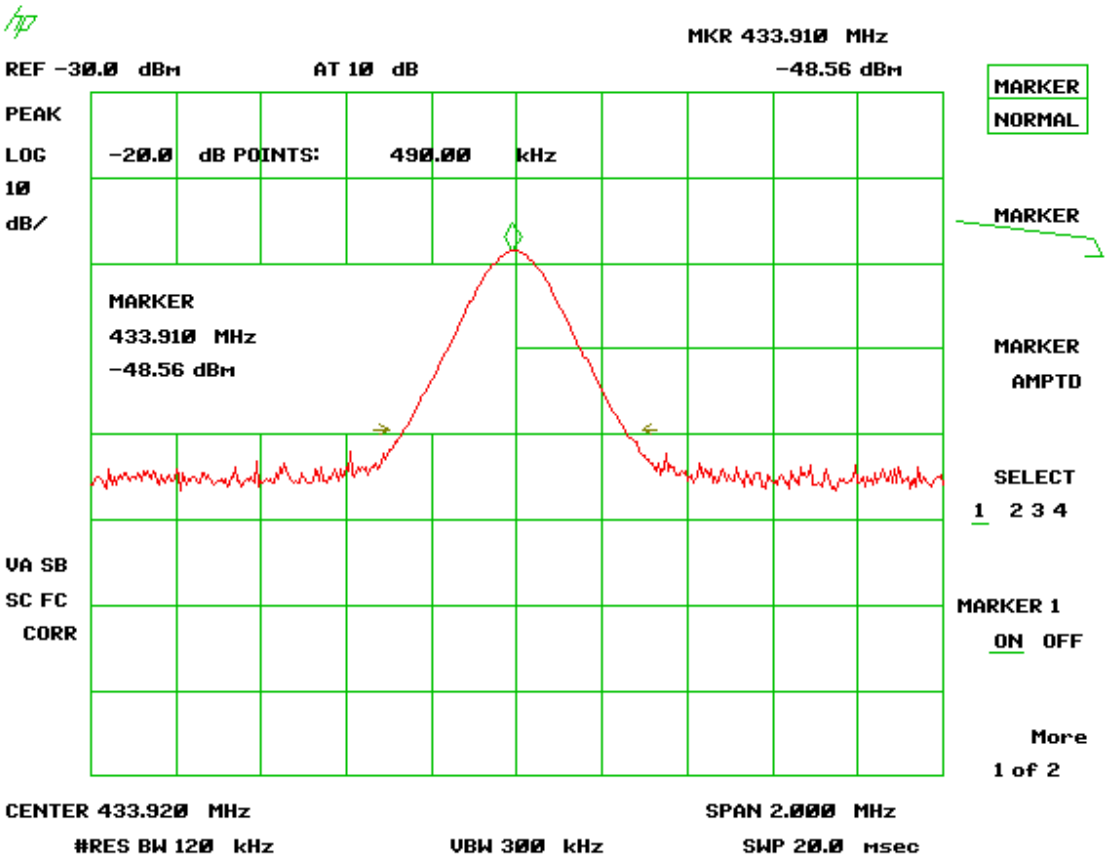


Figure 7
20 dB Bandwidth per FCC

2.8 Power Line Conducted Emissions for Transmitter FCC Section 15.207

The conducted voltage measurements have been carried out in accordance with FCC Section 15.207, with a spectrum analyzer connected to a LISN and the EUT placed into a continuous mode of transmit. The results are given in Table 6.

Table 6 Conducted Emissions Data

Class B

Conducted Emissions								
Test By:	**Test:**	FCC Part 15B			**Client:**	Radio Systems Corporation		
D.A.	**Project:**	09-0028	**Class:**	**B**	**Model:**	MicroLite Model RIG00-11933		
Frequency	**Test Data**	**AF**	**Test Data**	**AF+CA-AMP**	**Results**	**Limits**	**Margin**	**PK = n**
(MHz)	**(dBm)**	**Table**	**(dBuV)**	**(dB)**	**(dBuV)**	**(dBuV)**	**(dB)**	**/ QP**
Not Applicable EUT is Battery Powered								

Test Date: February 24, 2009

Tester Signature: Daniel Aparaschivei **Name: Daniel Aparaschivei**

2.9 Radiated Emissions for Digital Device & Receiver (47 CFR 15.109a)

Radiated emissions were evaluated from 30 to 14500 MHz while the EUT was placed into a Receive mode of operation. Measurements were made with the analyzer's bandwidth set to 120 kHz measurements made less than 1 GHz and 1 MHz for measurements made greater than or equal to 1 GHz. The results for less than 1 GHz are shown in Table 7.

Table 7. Radiated Emissions Data
(Digital Device & Receiver)

Class B

Radiated Emissions								
					Client:	Radio Systems Corporation		
D.A.	**Project:**	09-0028		**Class:**	**B**	**Model:**	MicroLite Model RIG00-11933	
Frequency	**Test Data**	**AF**	**Test Data**	**AF+CA-AMP**	**Results**	**Limits**	**Margin**	**PK = n**
(MHz)	**(dBm)**	**Table**	**(dBuV)**	**(dB)**	**(uV/m)**	**(uV/m)**	**(dB)**	**/ QP**
No emissions seen within 20 dB of the FCC Limit.								

Test Date: February 24, 2009

Tester Signature: Daniel Aparaschivei **Name: Daniel Aparaschivei**

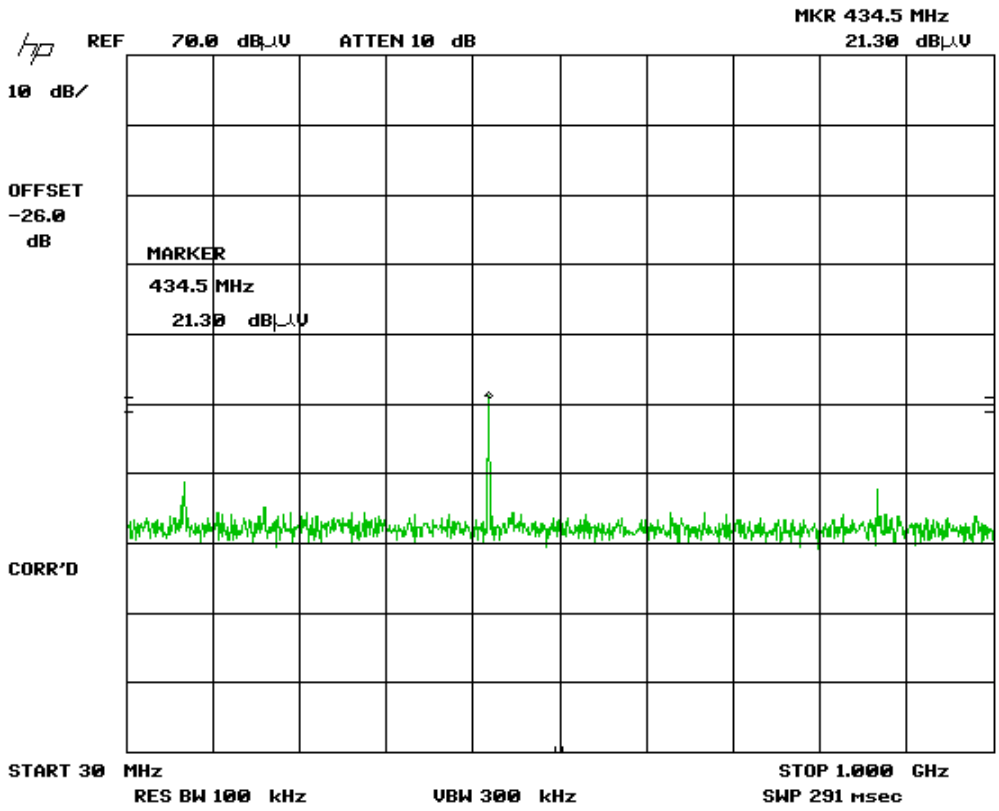


Figure 8. Radiated Emissions Representative Plot

2.10 Power Line Conducted Emissions for Digital Device and Receiver FCC Section 15.107

The conducted voltage measurements have been carried out in accordance with FCC Section 15.107, with a spectrum analyzer connected to a LISN and the EUT placed into an idle condition or a continuous mode of receive. Similar results were seen as compared to the EUT in a transmit mode of operation.

Therefore, please refer to the results as shown in Table 6.