



FCC Certification Test Report
for
Pelican Accessories, Inc.
FCC ID: 07X-PRED-S1

August 24, 2005

Prepared for:

Pelican Accessories, Inc.
1840 East 27th Street
Vernon, CA 90058

Prepared By:

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FCC Certification Test Report
for the
Pelican Accessories, Inc.
Predator Wireless PS-2 Controller
FCC ID: 07X-PRED-S1

August 24, 2005

WLL JOB# 8829



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Reviewed by: Gregory M. Snyder
President

Abstract

This report has been prepared on behalf of Pelican Accessories, Inc. to support the attached Application for Equipment Authorization. The test report and application are submitted for an Intentional Radiator under Part 15.249 of the FCC Rules and Regulations. This Federal Communication Commission (FCC) Certification Test Report documents the test configuration and test results for a Pelican Accessories, Inc. Predator Wireless PS-2 Controller.

Testing was performed on an Open Area Test Site (OATS) of Washington Laboratories, Ltd, 7560 Lindbergh Drive, Gaithersburg, MD 20879. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. Washington Laboratories, Ltd. has been accepted by the FCC and approved by NIST NVLAP (NVLAP Lab Code: 200066-0) as an independent FCC test laboratory.

The Pelican Accessories, Inc. Predator Wireless PS-2 Controller complies with the limits for an Intentional Radiator device under Part 15.249 of the FCC Rules and Regulations.

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1 Introduction

1.1 Compliance Statement

The Pelican Accessories, Inc. Predator Wireless PS-2 Controller complies with the limits for an Intentional Radiator device under Part 15.249 of the FCC Rules and Regulations.

This test report reflects the testing performed for the certification of the Wireless PS-2 (Playstation) Controller Host. Separate testing was performed for the digital and receiver portion under the DoC process.

1.2 Test Scope

Tests for radiated and conducted emissions were performed. All measurements were performed according to the 2003 version of ANSI C63.4. The measurement equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation.

1.3 Contract Information

Customer: Pelican Accessories, Inc.
1840 East 27th Street
Vernon, CA 90058

WLL Quotation Number: 62459

1.4 Test Dates

Testing was performed from June 22nd to June 24th, 2005.

1.5 Test and Support Personnel

Washington Laboratories, LTD Greg Snyder, James Ritter

2 Equipment Under Test

2.1 EUT Identification & Description

The Pelican Accessories, Inc. Predator Wireless PS-2 Controller is part of the wireless controller system for the PS-2 video game console. It replaces the hard-wired controller, and transmits play commands to the Pelican system interface Host that plugs into the console (separate certification, FCC ID: O7X-PRED-S2). The RF controller pad is battery powered and operates in the 2400M – 2483.5MHz ISM band.

Table 1. Device Summary

ITEM	DESCRIPTION
Manufacturer:	Pelican Accessories, Inc.
FCC ID Number	O7X-PRED-S1
EUT Name:	Predator
Model:	Wireless PS-2 Pad (Controller)
FCC Rule Parts:	§15.249
Frequency Range:	2407M – 2470MHz
Maximum Output Power:	<1mW
Modulation:	FSK
Occupied Bandwidth:	1.297MHz
Keying:	Manual
Type of Information:	Control
Power Output Level	Fixed
Antenna Type	Integral
Interface Cables:	N/A
Power Source & Voltage:	3Vdc via 2 “AA” batteries

2.2 Test Configuration

The Predator controller pad was configured as a stand-alone device. No I/O ports are available on the controller.

2.3 Testing Algorithm

For continuous transmit operation, one of the toggle switches on the Predator controller was taped down to simulate a continuous play. The controller pad was tested in three orthogonal planes.

Worst case emission levels are provided in the test results data.

2.4 Test Location

All measurements herein were performed at Washington Laboratories, Ltd. test center in Gaithersburg, MD. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia,

MD. Washington Laboratories, Ltd. has been accepted by the FCC and approved by NIST NVLAP (NVLAP Lab Code: 200066-0) as an independent FCC test laboratory.

2.5 Measurements

2.5.1 References

ANSI C63.2 Specifications for Electromagnetic Noise and Field Strength Instrumentation

ANSI C63.4 American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

Land Mobile FM or PM Communications Equipment Measurement and Performance Standards (ANSI/TIA/EIA-603-93)

2.6 Measurement Uncertainty

All results reported herein relate only to the equipment tested. For the purposes of the measurements performed by Washington Laboratories, the measurement uncertainty is ± 2.3 dB. This has been calculated for a *worst-case situation* (radiated emissions measurements performed on an open area test site).

The following measurement uncertainty calculation is provided:

$$\text{Total Uncertainty} = (A^2 + B^2 + C^2)^{1/2}/(n-1)$$

where:

A = Antenna calibration uncertainty, in dB = 2 dB

B = Spectrum Analyzer uncertainty, in dB = 1 dB

C = Site uncertainty, in dB = 4 dB

n = number of factors in uncertainty calculation = 3

Thus, Total Uncertainty = $0.5 (2^2 + 1^2 + 4^2)^{1/2} = \pm 2.3$ dB.

3 Test Equipment

Table 2 shows a list of the test equipment used for measurements along with the calibration information.

Table 2: Test Equipment List

Equipment	WLL Asset #	Calibration Due
Hewlett-Packard 8568B Spectrum Analyzer	0073	7/08/05
Hewlett-Packard 85650A Quasi-Peak Adapter	0069	7/08/05
Hewlett-Packard 85685A RF Preselector	0071	7/08/05
Hewlett-Packard 8593A Spectrum Analyzer	0074	8/17/05
Hewlett-Packard 8449B Microwave Preamp	0312	9/29/05
ARA LPB-2520 BiconiLog Antenna	0007	9/14/05
ARA DRG118/A Microwave Horn Antenna	0425	6/30/06
Narda V638 Horn Antenna	0210	12/25/08

4 Test Results

4.1 Occupied Bandwidth: (FCC Part §2.1049)

Occupied bandwidth was performed by coupling the output of the EUT to the input of a spectrum analyzer. As the antenna is integral to the device a receive antenna was placed in close proximity of the controller pad.

At full modulation, the occupied bandwidth was measured as shown:

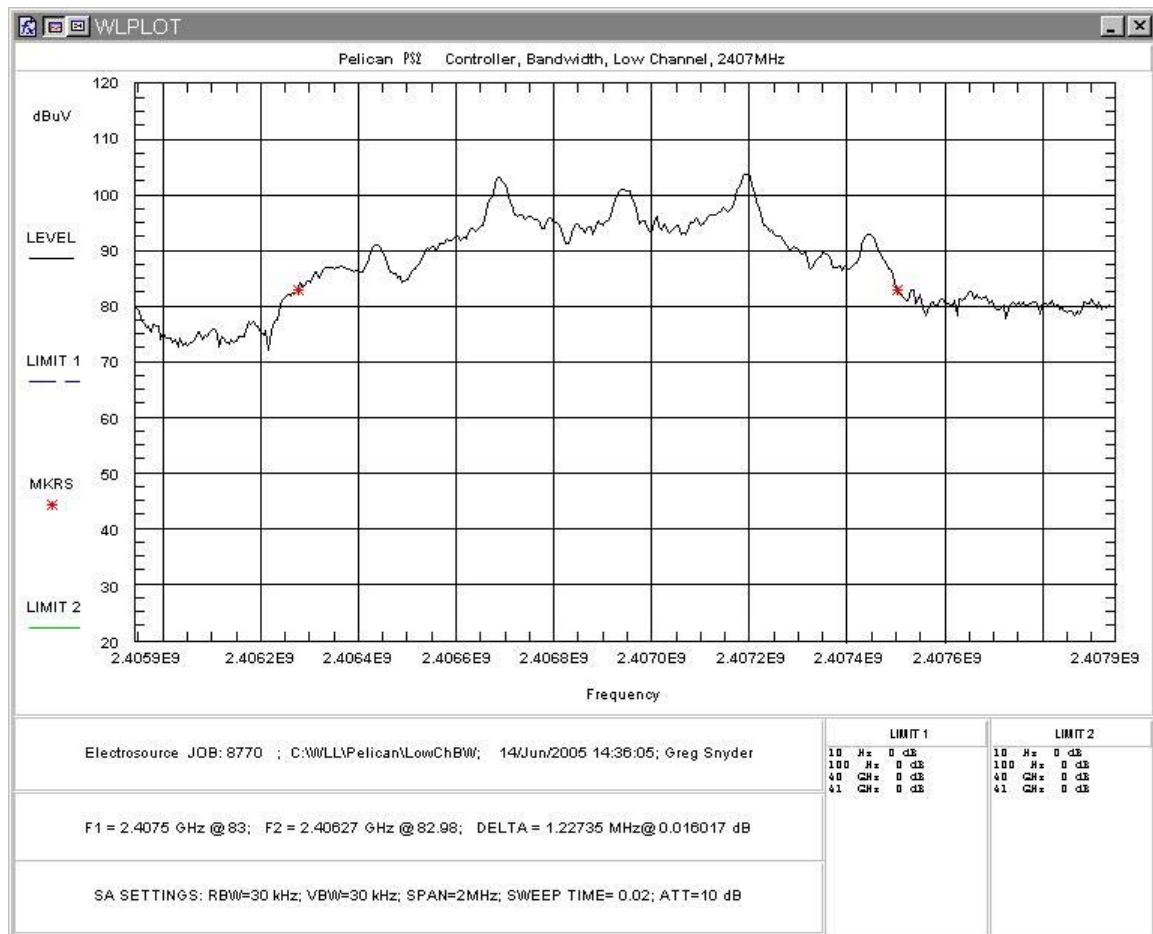


Figure 1. Occupied Bandwidth, Low Channel

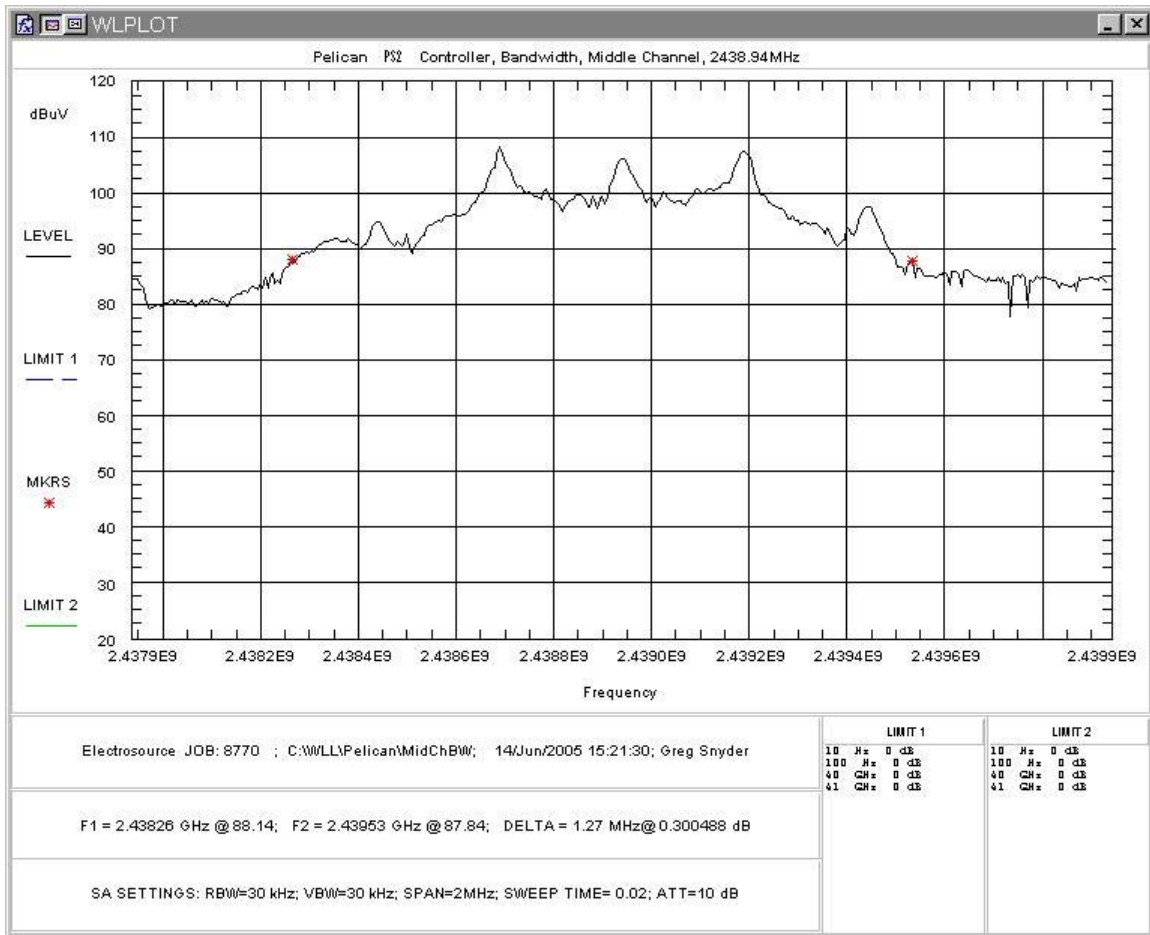


Figure 2. Occupied Bandwidth, Mid Channel

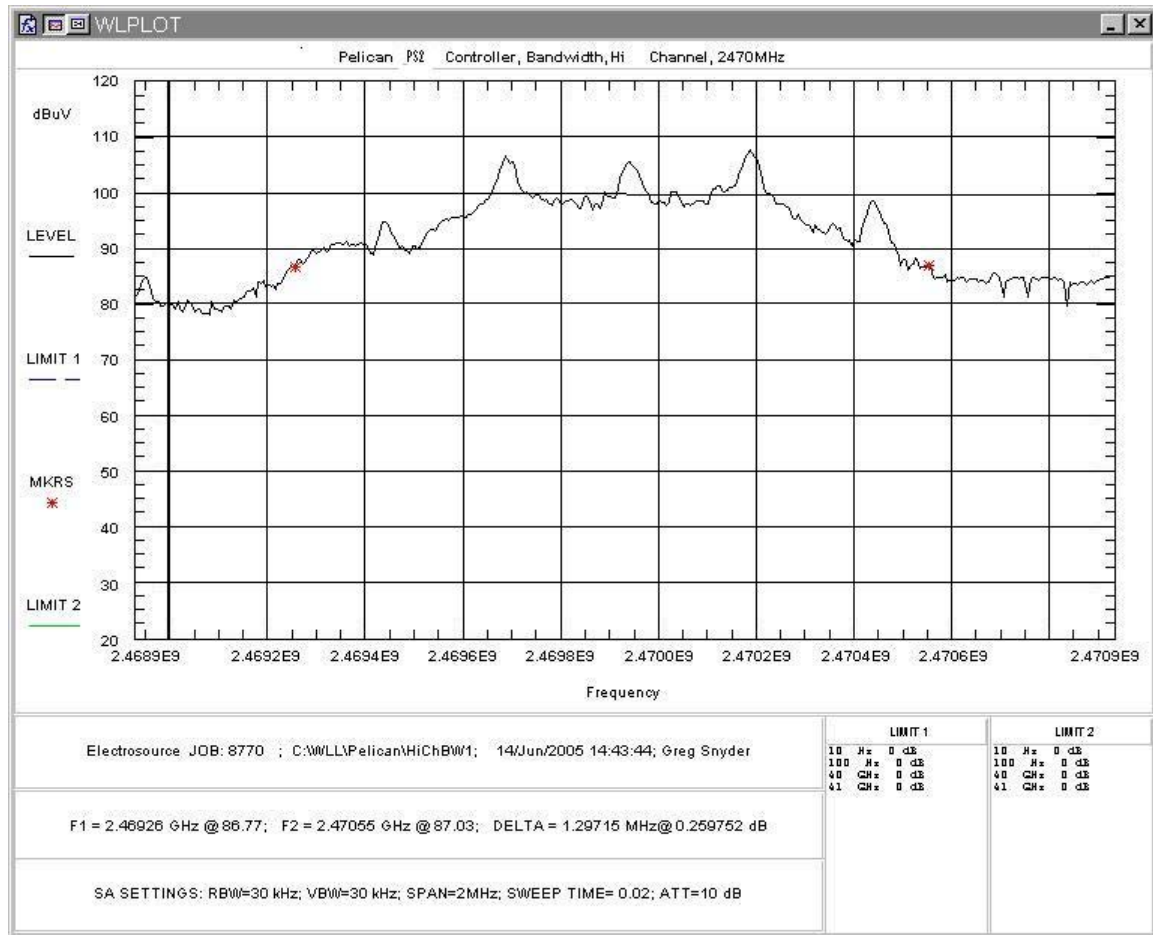


Figure 3. Occupied Bandwidth, High Channel

Table 3 provides a summary of the Occupied Bandwidth Results.

Table 3. Occupied Bandwidth Results

Frequency	Bandwidth
Low Channel 2407MHz	1.227MHz
Mid Channel 2438MHz	1.27MHz
High Channel 2470MHz	1.297MHz

4.2 Radiated Emissions: (FCC Part §2.1053)

The EUT must comply with the radiated emission limits of 15.249(a). The limits are as shown in the following table.

Table 4. Radiated Emissions Limits

Fundamental Frequency	Field Strength of Fundamental (μV/m)	Field Strength of Harmonics (μV/m)
902 – 928 MHz	50,000	500
2400 – 2483.5 MHz	50,000	500
5725 – 5875 MHz	50,000	500
24.00 – 24.25 GHz	250,000	2500

4.2.1 Test Procedure

The EUT was placed on motorized turntable for radiated testing on a 3-meter open field test site. The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. Receiving antennas were mounted on an antenna mast to determine the height of maximum emissions. The height of the antenna was varied between 1 and 4 meters. The peripherals were placed on the table in accordance with ANSI C63.4-2003. Cables were varied in position to produce maximum emissions. Both the horizontal and vertical field components were measured.

The emissions were measured using the following resolution bandwidths:

Frequency Range	Resolution Bandwidth	Video Bandwidth
30MHz-1000 MHz	100kHz	>100kHz
>1000 MHz	1 MHz	1MHz (peak)

Emissions were measured to the 10th harmonic of the transmit frequency. Worst case emission levels are reported.

The following is a sample calculation used in the data tables for calculating the final field strength of spurious emissions and comparing these levels to the specified limits.

Sample Calculation:

Spectrum Analyzer Voltage (SA Level):	V dBμV
Antenna Factor (Ant Corr):	AFdB/m
Cable Loss Correction (Cable Corr):	CCdB
Duty Cycle Correction (Average)	DCCdB (if applicable)
Amplifier Gain:	GdB
Electric Field (Corr Level):	EdBμV/m = VdBμV + AFdB/m + CCdB + DCCdB - GdB

Table 5. Radiated Emissions Test Data, Low Frequency

CLIENT: Electrosorce
TESTER: Greg Snyder

DATE: 6/24/2005
JOB #: 8829

EUT Information:

EUT: Predator Controller
CONFIGURATION: PS-2
CLOCKS: 16M, 6M,

Test Requirements:

TEST STANDARD: FCC Part 15
DISTANCE: 3m
CLASS: B

Test Equipment/Limit:

ANTENNA: A_00007
CABLE: CSITE2_3m

LIMIT: LFCC_3m_Class_B
AMPLIFIER (dB) None

Frequency (MHz)	Pol. H/V	Az Deg	Ant. Hght (m)	SA Level (QP) (dBµV)	Ant. Corr. (dB/m)	Cable Corr. (dB)	Corr. Level (µV/m)	Limit (µV/m)	Margin dB
48.000	V	0.0	1.0	10.9	14.3	1.6	26.8	100.0	-13.2
112.000	V	90.0	1.0	7.5	10.4	2.2	20.0	150.0	-23.5
130.940	V	180.0	1.0	9.2	9.8	2.3	21.3	150.0	-22.2
144.000	V	180.0	1.0	9.6	8.1	2.4	20.1	150.0	-23.4
160.000	V	180.0	1.0	9.3	8.8	2.5	20.6	150.0	-22.9
208.000	V	225.0	1.5	5.2	10.1	2.8	18.1	150.0	-25.4
224.000	V	270.0	2.0	5.6	11.3	2.9	19.9	200.0	-26.2
48.000	H	45.0	2.0	6.8	14.3	1.6	22.7	100.0	-17.3
112.000	H	180.0	2.0	6.2	10.4	2.2	18.7	150.0	-24.8
125.340	H	270.0	2.5	5.3	10.5	2.3	18.0	150.0	-25.5
143.970	H	135.0	2.5	10.5	8.1	2.4	21.0	150.0	-22.5
157.090	H	0.0	2.5	8.9	8.5	2.5	19.9	150.0	-23.6
168.000	H	315.0	2.0	11.8	9.5	2.6	23.8	150.0	-19.7
160.000	H	180.0	2.0	10.0	8.8	2.5	21.3	150.0	-22.2

Table 6. Radiated Emissions Data, Low Channel Emmissions

CLIENT: Electrosorce

DATE: 6/22/2005

TESTER: Greg Snyder

JOB #: 8829

EUT Information:

Test Requirements:

EUT: Predator
CONFIGURATION: Controller
Tx Frequency: 2407M

TEST STANDARD: FCC Part 15.249
DISTANCE: 3m
CLASS: B

Test Equipment/Limit:

ANTENNA: A_00004
CABLE: CSITE1_HF

LIMIT: §15.249
AMPLIFIER (dB) A_00066

Frequency (MHz)	Pol H/V	Az Deg	Ant. Hght (m)	SA Level Peak (dBµV)	Ant. Corr. (dB/m)	Cable Corr. (dB)	Amp Gain (dB)	Corr. Level (dBµV/m)	Corr. Level (µV/m)	Limit (µV/m)	Margin dB	Notes
Fundamental												
2407.000	H	0.0	1.0	82.3	28.9	2.9	35.5	78.6	8516.4	50000.0	-15.4	Flat
2407.000	V	0.0	1.0	83.7	28.9	2.9	35.5	80.0	10005.9	50000.0	-14.0	Flat
2407.000	H	0.0	1.0	83.4	28.9	2.9	35.5	79.7	9666.2	50000.0	-14.3	Upright
2407.000	V	0.0	1.0	82.7	28.9	2.9	35.5	79.0	8917.8	50000.0	-15.0	Upright
2407.000	H	0.0	1.0	82.7	28.9	2.9	35.5	79.0	8917.8	50000.0	-15.0	Side
2407.000	V	0.0	1.0	84.0	28.9	2.9	35.5	80.3	10357.5	50000.0	-13.7	Side
Harmonics and spurious												
1179.550	V	45.0	1.0	52.8	25.4	2.3	36.1	44.4	165.6	500.0	-9.6	Upright
1769.400	V	212.5	1.0	56.2	27.4	2.4	35.6	50.4	332.3	500.0	-3.5	Flat
1179.550	H	90.0	1.0	51.9	25.4	2.3	36.1	43.5	149.3	500.0	-10.5	Flat
1769.400	H	90.0	1.0	54.7	27.4	2.4	35.6	48.9	279.6	500.0	-5.0	Flat
4821.800	V	45.0	1.0	43.5	32.5	4.1	35.9	44.2	162.0	500.0	-9.8	Flat
4821.000	H	0.0	1.0	42.8	32.5	4.1	35.9	43.5	149.5	500.0	-10.5	Side
7221.800	V	0.0	1.0	34.8	37.1	5.0	35.7	41.2	114.2	500.0	-12.8	NF Avg
7221.800	H	0.0	1.0	34.8	37.1	5.0	35.7	41.2	114.2	500.0	-12.8	NF Avg
9628.000	H	0.0	1.0	34.5	38.6	5.7	36.3	42.5	132.8	500.0	-11.5	NF Avg
9628.000	V	0.0	1.0	34.6	38.6	5.7	36.3	42.6	134.3	500.0	-11.4	NF Avg
12035.000	H	0.0	1.0	36.5	40.0	6.6	35.7	47.4	234.9	500.0	-6.6	NF Avg
12035.000	V	0.0	1.0	36.5	40.0	6.6	35.7	47.4	234.9	500.0	-6.6	NF Avg
14442.000	H	0.0	1.0	33.7	41.4	7.5	34.6	48.0	251.6	500.0	-6.0	NF Avg
14442.000	V	0.0	1.0	33.7	41.4	7.5	34.6	48.0	251.6	500.0	-6.0	NF Avg
16849.000	H	0.0	1.0	32.8	42.5	8.0	34.9	48.3	260.2	500.0	-5.7	NF Avg
16849.000	V	0.0	1.0	32.8	42.5	8.0	34.9	48.3	260.2	500.0	-5.7	NF Avg

Note: NF = Noise floor/no detectable emissions.
All emissions are peak unless noted in notes column.

Table 7. Radiated Emissions Data, Mid Channel Spurious

CLIENT: Electrosorce
TESTER: Greg Snyder

DATE: 6/22/2005
JOB #:

EUT Information:

EUT: Predator
CONFIGURATION: Controller
Tx Frequency: 2438.6M

Test Requirements:

TEST STANDARD: FCC Part 15.249
DISTANCE: 3m
CLASS: B

Test Equipment/Limit:

ANTENNA: A_00004
CABLE: CSITE1_HF

LIMIT: §15.249
AMPLIFIER (dB) A_00066

Frequency (MHz)	Pol H/V	Az Deg	Ant. Hght (m)	SA Level Peak (dBµV)	Ant. Corr. (dB/m)	Cable Corr. (dB)	Amp Gain (dB)	Corr. Level (dBµV/m)	Corr. Level (µV/m)	Limit (µV/m)	Margin dB	Notes
Fundamental												
2438.600	H	0.0	1.0	82.3	29.0	3.0	35.5	78.7	8624.3	50000.0	-15.3	Flat
2438.600	V	270.0	1.0	83.5	29.0	3.0	35.5	79.9	9867.9	50000.0	-14.1	Flat
2438.600	H	0.0	1.0	82.9	29.0	3.0	35.5	79.3	9209.2	50000.0	-14.7	Upright
2438.600	V	0.0	1.0	83.1	29.0	3.0	35.5	79.5	9423.7	50000.0	-14.5	Upright
2438.600	H	0.0	1.0	81.4	29.0	3.0	35.5	77.8	7748.6	50000.0	-16.2	Side
2438.600	V	90.0	1.0	82.6	29.0	3.0	35.5	79.0	8896.6	50000.0	-15.0	Side
Harmonics and spurious												
4846.000	V	0.0	1.0	42.0	32.6	4.1	35.9	42.7	136.8	500.0	-11.3	Flat
4846.000	H	0.0	1.0	43.8	32.6	4.1	35.9	44.5	168.3	500.0	-9.5	Side
7252.940	H	0.0	1.0	35.8	37.1	5.0	35.7	42.2	128.2	500.0	-11.8	NF Avg
7252.940	V	0.0	1.0	35.8	37.1	5.0	35.7	42.2	128.2	500.0	-11.8	NF Avg
9660.000	V	0.0	1.0	36.7	38.6	5.7	36.3	44.7	171.7	500.0	-9.3	NF Avg
9660.000	H	0.0	1.0	36.7	38.6	5.7	36.3	44.7	171.7	500.0	-9.3	NF Avg
12067.000	V	0.0	1.0	36.7	40.0	6.6	35.6	47.7	241.5	500.0	-6.3	NF Avg
12067.000	H	0.0	1.0	36.7	40.0	6.6	35.6	47.7	241.5	500.0	-6.3	NF Avg
14474.000	V	0.0	1.0	33.7	41.3	7.5	34.6	48.0	249.8	500.0	-6.0	NF Avg
14474.000	H	0.0	1.0	33.7	41.3	7.5	34.6	48.0	249.8	500.0	-6.0	NF Avg
16881.000	V	0.0	1.0	33.5	42.4	8.0	34.9	49.0	281.2	500.0	-5.0	NF Avg
16881.000	H	0.0	1.0	33.5	42.4	8.0	34.9	49.0	281.2	500.0	-5.0	NF Avg
19256.000	H	0.0	1.0	36.8	40.0	1.9	34.3	44.4	165.8	500.0	-9.6	NF Avg
21663.000	H	0.0	1.0	36.8	40.3	2.2	34.5	44.8	174.5	500.0	-9.1	NF Avg
24070.000	H	0.0	1.0	35.8	40.5	2.4	33.7	45.0	176.8	500.0	-9.0	NF Avg
19256.000	V	0.0	1.0	36.8	40.0	1.9	34.3	44.4	165.8	500.0	-9.6	NF Avg
21663.000	V	0.0	1.0	36.8	40.3	2.2	34.5	44.8	174.5	500.0	-9.1	NF Avg

Note: NF = Noise floor/no detectable emissions.
All emissions are peak unless noted in notes column.

Table 8. Radiated Emissions Data, High Channel Emissions

CLIENT: Electrosorce
TESTER: Greg Snyder

DATE: 6/22/2005
JOB #: 8770

EUT Information:

EUT: Predator
CONFIGURATION: Controller
Tx Frequency: 2470M

Test Requirements:

TEST STANDARD: FCC Part 15.249
DISTANCE: 3m
CLASS: B

Test Equipment/Limit:

ANTENNA: A_00004
CABLE: CSITE1_HF

LIMIT: §15.249
AMPLIFIER (dB) A_00066

Frequency (MHz)	Pol H/V	Az Deg	Ant. Hght (m)	SA Level Peak (dBµV)	Ant. Corr. (dB/m)	Cable Corr. (dB)	Amp Gain (dB)	Corr. Level (dBµV/m)	Corr. Level (µV/m)	Limit (µV/m)	Margin dB	Notes
Fundamental												
2470.000	H	0.0	1.0	80.5	29.0	3.0	35.6	77.0	7048.8	50000.0	-17.0	Flat
2470.000	V	0.0	1.0	84.8	29.0	3.0	35.6	81.3	11564.2	50000.0	-12.7	Flat
2470.000	H	0.0	1.0	82.4	29.0	3.0	35.6	78.9	8772.3	50000.0	-15.1	Upright
2470.000	V	0.0	1.0	82.0	29.0	3.0	35.6	78.5	8377.5	50000.0	-15.5	Upright
2470.000	H	0.0	1.0	80.9	29.0	3.0	35.6	77.4	7381.0	50000.0	-16.6	Side
2470.000	V	0.0	1.0	82.4	29.0	3.0	35.6	78.9	8772.3	50000.0	-15.1	Side
Harmonics and spurious												
2483.500	V	0.0	1.0	43.5	29.1	3.0	35.6	40.0	99.9	500.0	-14.0	Amb
2483.500	H	0.0	1.0	43.5	29.1	3.0	35.6	40.0	99.9	500.0	-14.0	Amb
4877.000	V	0.0	1.0	41.8	32.6	4.1	35.9	42.6	134.2	500.0	-11.4	Flat
4877.000	H	0.0	1.0	42.3	32.6	4.1	35.9	43.1	142.2	500.0	-10.9	Side
4935.000	V	0.0	1.0	42.5	32.7	4.1	36.0	43.3	146.6	500.0	-10.7	Flat
4940.000	H	270.0	1.0	46.0	32.7	4.1	36.0	46.8	219.6	500.0	-7.1	Side
7284.000	H	0.0	1.0	35.7	37.1	5.0	35.7	42.1	126.8	500.0	-11.9	NF Avg
7284.000	V	0.0	1.0	35.7	37.1	5.0	35.7	42.1	126.8	500.0	-11.9	NF Avg
9691.000	V	0.0	1.0	36.5	38.6	5.7	36.3	44.5	168.4	500.0	-9.5	NF Avg
9691.000	H	0.0	1.0	36.5	38.6	5.7	36.3	44.5	168.4	500.0	-9.5	NF Avg
12098.000	V	0.0	1.0	35.5	40.0	6.6	35.6	46.5	211.3	500.0	-7.5	NF Avg
12098.000	H	0.0	1.0	35.5	40.0	6.6	35.6	46.5	211.3	500.0	-7.5	NF Avg
14505.000	V	0.0	1.0	33.5	41.3	7.5	34.6	47.7	242.4	500.0	-6.3	NF Avg
14505.000	H	0.0	1.0	33.5	41.3	7.5	34.6	47.7	242.4	500.0	-6.3	NF Avg
16912.000	V	0.0	1.0	33.3	42.3	8.0	34.9	48.8	274.1	500.0	-5.2	NF Avg
16912.000	H	0.0	1.0	33.3	42.3	8.0	34.9	48.8	274.1	500.0	-5.2	NF Avg

Note: NF = Noise floor/no detectable emissions.
All emissions are peak unless noted in notes column.