

FCC CERTIFICATION TEST REPORT

for

Pelican Accessories
1840 East 27th Street
Vernon, CA 90058

FCC ID: 07X-569888

October 11, 2000

WLL PROJECT #: 6031X DON

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STATEMENT OF QUALIFICATIONS

for

Steven Koster

Washington Laboratories, Ltd.

I am a NARTE-Accredited EMC Test Laboratory Engineer with over nineteen years of electronics experience, the last ten years being directly involved in EMI testing. I am qualified to perform EMC testing to the methods described in this test report. The measurements taken within this report are accurate within my ability to perform the tests and within the tolerance of the measuring instrumentation.

By: _____
Steven Koster
Compliance Engineer

Date: October 9, 2000

FCC CERTIFICATION TEST REPORT

for

FCC ID: 07X-569888

1.0 Introduction

This report has been prepared on behalf of Pelican Accessories to support the attached Application for Equipment Authorization. The test and application are submitted for a Intentional Radiator under Part 15.249 of the FCC Rules and Regulations. The Equipment Under Test was the Freedom Shock 2 Interface/Dongle.

All measurements herein were performed according to the 1992 version of ANSI C63.4. The measurement equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and field Strength Instrumentation. Calibration checks are made periodically to verify proper performance of the measuring instrumentation.

All measurements are 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.

All results reported herein relate only to the equipment tested. The measurement uncertainty of the data contained herein is ± 2.3 dB. Refer to Appendix A for Statement of Measurement Uncertainty. This report shall not be used to claim product endorsement by NVLAP or any agency of the US Government.

1.1 Summary

The Pelican Accessories Freedom Shock 2 Interface/Dongle complies with the limits for an Intentional Radiator under Part 15.249 of the FCC Rules and Regulations.

2.0 Description of Equipment Under Test (EUT)

The Pelican Accessories Freedom Shock 2 Interface/Dongle (EUT) is a 900 MHz Wireless RF Interface used to replace existing hard-wired video game system controllers. The Interface/Dongle connects directly to the input of the game system base. Upon activation of the game the unit transmits a "ping" to the hand-held pad controller (Separate certification, FCC ID: 07X-569888) using OOK On-Off Keying at 916.5 MHz. The pad controller responds and data is then transmitted to the Interface/Dongle for game control. The EUT is powered via 5 Vdc supplied by the game system. The EUT will also be available at operating frequencies of 907 MHz and 926 MHz, however, these frequencies have not been tested as of the date indicated on the front of this report.

2.1 On-board Oscillators

The Pelican Accessories Freedom Shock 2 Interface/Dongle contains the following oscillators: 14.3203125 MHz, 7.124 MHz, 14.31818 MHz.

3.0 Test Configuration

To complete the test configuration required by the FCC, the transmitter was tested in a game system. A Sony Play Station 2 was used for the testing. All testing was performed at 120 VAC.

3.1 Testing Algorithm

The transmitter was turned on and constantly transmitting. The unit was used in conjunction with a video game system to verify operation.

Worst case emissions are recorded in the data tables.

3.2 Conducted Emissions Testing

The Freedom Shock 2 Interface/Dongle was tested while installed on a host Sony Playstation 2 game unit.

The EUT was placed on an 80 cm high 1 x 1.5 m non-conductive table above a ground plane. Power to the CPU was provided through a Solar Corporation 50 Ω /50 μ H Line Impedance Stabilization Network bonded to a 3 x 2 meter ground plane. The LISN has its AC input supplied from a filtered AC power source. Power was supplied to the peripherals through a second LISN. The peripherals were placed on the table in accordance with ANSI C63.4-1992. Power and data cables were moved about to obtain maximum emissions.

The 50 Ω output of the LISN was connected to the input of the spectrum analyzer and the emissions in the frequency range of 450 kHz to 30 MHz were measured. The detector function was set to quasi-peak or peak, as appropriate, and the resolution bandwidth during testing was at least 9 kHz, with all post-detector filtering no less than 10 times the resolution bandwidth.

Conducted emissions data is recorded in Table 1. All emissions detected were generated by the game system. Emission levels had no variation with the EUT removed.

3.3 Radiated Emissions Testing

The EUT was placed on an 80 cm high 1 x 1.5 meters non-conductive 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. Biconical and log periodic broadband 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 C63.4-1992. Cables were varied in position to produce maximum emissions. Both the horizontal and vertical field components were measured.

The output from the antenna was connected, via a preselector or a preamplifier, to the input of the spectrum analyzer. The detector function was set to quasi-peak, peak, or average as appropriate. The measurement bandwidth on the spectrum analyzer system was set to at least 120 kHz (1 MHz for measurements above 1 GHz), with all post-detector filtering no less than 10 times the measurement bandwidth.

3.3.1 Radiated Data Reduction and Reporting

To convert the raw spectrum analyzer radiated data into a form that can be compared with the FCC limits, it is necessary to account for various calibration factors that are supplied with the antennas and other measurement accessories. These factors are grouped into a composite antenna factor (AFc) and are supplied in the AFc column of Table 1. The AFc in dB/m is algebraically added to the Spectrum Analyzer Voltage in dBμV to obtain the Radiated Electric Field in dBμV/m. This level is then compared with the FCC limit.

Example:

Spectrum Analyzer Voltage:	VdBμV
Composite Antenna Factor:	AFcdB/m
Electric Field:	$E_{dB\mu V/m} = V_{dB\mu V} + AF_{dB/m}$
To convert to linear units:	$E_{\mu V/m} = \text{antilog}(E_{dB\mu V/m}/20)$

Data is recorded in Table 2.

Table 1: FCC 15.249 Conducted Emissions Data

CLIENT: Pelican
MODEL: Freedom Shock 2 Interface/Dongle
DATE: 10/5/00
VOLTAGE: 120VAC
BY: Steve Koster
JOB #: 6031X
CONFIGURATION: Emissions are from the Play Station 2. The dongle has no effect on the emissions.

LINE 1 - NEUTRAL

Frequency	Level	Voltage	FCC	Margin
	(QP)		Limit	
MHz	dBuV	uV	uV	dB
0.45	36.7	68.4	250	-11.3
2.93	46.5	211.3	250	-1.5
7.75	39.0	89.1	250	-9.0
13.81	43.9	156.7	250	-4.1
14.84	43.6	151.4	250	-4.4
19.10	38.1	80.4	250	-9.9

LINE 2 – PHASE

Frequency	Level	Voltage	FCC	Margin
	(QP)		Limit	
MHz	dBuV	uV	uV	dB
0.54	32.9	44.2	250	-15.1
2.52	43.1	142.9	250	-4.9
7.72	40.2	102.3	250	-7.8
13.39	39.9	98.9	250	-8.1
14.52	41.9	124.5	250	-6.1
19.24	36.3	65.3	250	-11.7

Table 2: FCC 15.249 3M Radiated Emissions Data

CLIENT: Pelican
 MODEL NO: Freedom Shock 2 Dongle
 TYPE/PART: Type/Part
 DATE: 18 Aug 00
 BY: Chad M. Beattie
 JOB #: 6031X
 Tx Frequency: 916.59 MHz

Frequency	Polarity	Azimuth	Antenna	SA Level	AFc	E-Field	E-Field	Limit	Margin
MHz	H/V	Degree	Height m	(QP) dBuV	dB/m	dBuV/m	uV/m	uV/m	dB
916.59	H	45.00	1.0	46.4	28.3	74.7	5459.6	50000.0	-19.2
916.59	V	0.00	1.0	43.1	28.3	71.4	3733.9	50000.0	-22.5

Average Measurements Above 1 GHz

Frequency	Polarity	Azimuth	Antenna	SA Level	AFc	E-Field	E-Field	Limit	Margin	
MHz	H/V	Degree	Height m	(AVG) dBuV	dB/m	dBuV/m	uV/m	uV/m	dB	
1833.18	H	45.00	1.0	44.9	-7.0	37.9	78.4	500.0	-16.1	
1833.18	V	315.00	1.0	46.0	-7.0	39.0	89.0	500.0	-15.0	
2752.27	H	180.00	1.0	50.0	-4.8	45.2	181.3	500.0	-8.8	
2752.27	V	225.00	1.0	54.0	-4.8	49.2	287.3	500.0	-4.8	
3666.36	H	0.00	1.0	47.5	-3.6	43.9	155.8	500.0	-10.1	ambient
3666.36	V	0.00	1.0	38.2	-3.6	34.6	53.4	500.0	-19.4	ambient
4582.95	H	0.00	1.0	48.0	-2.7	45.3	183.5	500.0	-8.7	ambient
4582.95	V	0.00	1.0	38.0	-2.7	35.3	58.0	500.0	-18.7	ambient
5499.54	H	0.00	1.0	47.2	-2.0	45.2	182.5	500.0	-8.8	ambient
5499.54	V	0.00	1.0	37.4	-2.0	35.4	59.0	500.0	-18.6	ambient
6441.61	H	0.00	1.0	43.6	0.2	43.8	154.2	500.0	-10.2	ambient
6441.61	V	0.00	1.0	43.7	0.2	43.9	156.0	500.0	-10.1	ambient
7332.70	H	0.00	1.0	44.5	2.2	46.7	216.3	500.0	-7.3	ambient
7332.70	V	0.00	1.0	44.5	2.2	46.7	216.3	500.0	-7.3	ambient
8249.30	H	0.00	1.0	45.5	2.2	47.7	242.7	500.0	-6.3	ambient
8249.30	V	0.00	1.0	45.5	2.2	47.7	242.7	500.0	-6.3	ambient
9165.90	H	0.00	1.0	44.2	2.4	46.6	214.0	500.0	-7.4	ambient
9165.90	V	0.00	1.0	44.3	2.4	46.7	216.5	500.0	-7.3	ambient

Table 2 (Cont'd): FCC 15.249 3M Radiated Emissions Data

CLIENT: Pelican
 MODEL NO: Freedom Shock 2 Dongle
 TYPE/PART: Type/Part
 DATE: 18 Aug 00
 BY: Chad M. Beattie
 JOB #: 6031X
 Tx Frequency: 916.59 MHz

Peak Measurements Above 1 GHz

Frequency	Polarity	Azimuth	Antenna	SA Level	AFc	E-Field	E-Field	Limit	Margin	
MHz	H/V	Degree	Height m	(PEAK) dBuV	dB/m	dBuV/m	uV/m	uV/m	dB	
1833.18	H	45.00	1.0	56.0	-7.0	49.0	281.5	5000.0	-25.0	
1833.18	V	0.00	1.0	57.9	-7.0	50.9	350.4	5000.0	-23.1	
2752.27	H	180.00	1.0	52.7	-4.8	47.9	247.4	5000.0	-26.1	
2752.27	V	225.00	1.0	54.0	-4.8	49.2	287.3	5000.0	-24.8	
3666.36	H	0.00	1.0	47.5	-3.6	43.9	155.8	5000.0	-30.1	ambient
3666.36	V	0.00	1.0	47.1	-3.6	43.5	148.8	5000.0	-30.5	ambient
4582.95	H	0.00	1.0	48.0	-2.7	45.3	183.5	5000.0	-28.7	ambient
4582.95	V	0.00	1.0	47.6	-2.7	44.9	175.2	5000.0	-29.1	ambient
5499.54	H	0.00	1.0	47.2	-2.0	45.2	182.5	5000.0	-28.8	ambient
5499.54	V	0.00	1.0	48.4	-2.0	46.4	209.5	5000.0	-27.6	ambient
6441.61	H	0.00	1.0	54.6	0.2	54.8	547.3	5000.0	-19.2	ambient
6441.61	V	0.00	1.0	47.5	0.2	47.7	241.7	5000.0	-26.3	ambient
7332.70	H	0.00	1.0	50.6	2.2	52.8	436.5	5000.0	-21.2	ambient
7332.70	V	0.00	1.0	54.4	2.2	56.6	676.1	5000.0	-17.4	ambient
8249.30	H	0.00	1.0	54.6	2.2	56.8	691.8	5000.0	-17.2	ambient
8249.30	V	0.00	1.0	54.6	2.2	56.8	691.8	5000.0	-17.2	ambient
9165.90	H	0.00	1.0	53.5	2.4	55.9	624.5	5000.0	-18.1	ambient
9165.90	V	0.00	1.0	53.6	2.4	56.0	631.7	5000.0	-18.0	ambient

Bandwidth Plot 916.5 MHz

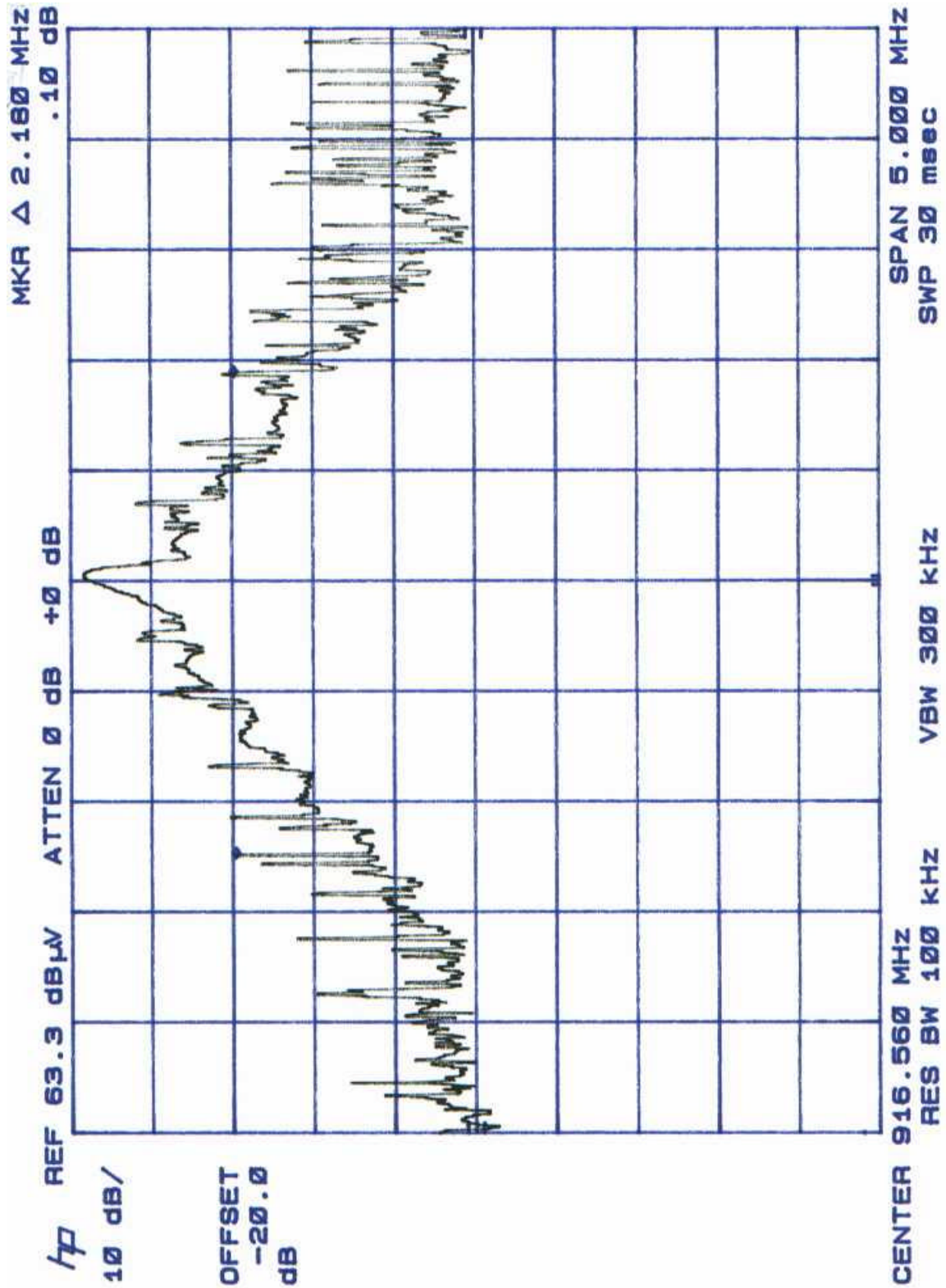


Table 3: System Under Test

FCC ID: 07X-569888

EUT:	Pelican Accessories Freedom Shock 2 Interface/Dongle
	FCC ID: 07X-569888
Tested with:	Sony Playstation 2 Video Game System

Table 4: Interface Cables Used

The Freedom Shock 2 Dongle connects directly to the game system and contains no interface cables.

Table 5: Measurement Equipment Used

The following equipment is used to perform measurements:

Hewlett-Packard Spectrum Analyzer: HP8564E

Hewlett-Packard Spectrum Analyzer: HP8568B

Hewlett-Packard Spectrum Analyzer: HP8593A

Hewlett-Packard Quasi-Peak Adapter: HP85650A

Hewlett-Packard Preselector: HP85685A

Hewlett-Packard Preamplifier: HP8449B

Antenna Research Associates, Inc. Biconical Log Periodic Antenna: LPB-2520A (Site 2)

Antenna Research Associates, Inc. Horn Antenna: DRG-118/A

Solar 50 Ω /50 μ H Line Impedance Stabilization Network: 8012-50-R-24-BNC

Solar 50 Ω /50 μ H Line Impedance Stabilization Network: 8028-50-TS-24-BNC

AH Systems, Inc. Portable Antenna Mast: AMS-4 (Site 2)

AH Systems, Inc. Motorized Turntable (Site 2)

RG-214 semi-rigid coaxial cable

RG-223 double-shielded coaxial cable

Appendix A

Statement of Measurement Uncertainty

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.