

7 March, 2000

Doug Kashuba
Survival On Snow
Box 1, Site 218
RR #2, St. Alberta
Alberta Canada T8N 1M9

Dear Mr. Kashuba,

Enclosed is the report for the Avalanche Beacon, model SLEDBUG. Please check it thoroughly for discrepancies.

This material may be necessary for further verification of compliance. Please be aware that our internal controls require us to keep a historical copy of your report on file for three years only.

Thank you for your business and we look forward to being of service should you require testing services in the future.

Yours Sincerely,

A handwritten signature in dark ink, appearing to read 'Steve Fitzgerald', with a stylized, flowing script.

Steve FitzGerald
President

Enclosure

REPORT OF MEASUREMENTS

DEVICE: AVALANCHE BEACON
MODEL: SLEDBUG
MANUFACTURER: SURVIVAL ON SNOW
ADDRESS: BOX 1, SITE 218
RR #2, ST. ALBERTA
ALBERTA CANADA T8N 1M9

THE DATA CONTAINED IN THIS REPORT WAS
COLLECTED ON 27 NOVEMBER 1999 AND COMPILED BY:

PAUL G. SLAVENS
CHIEF EMC ENGINEER

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1. General

1.1 Purpose

The purpose of this report is to show compliance to the FCC regulations for unlicensed devices operating under section 15.209 (a) of the Code of Federal Regulations title 47.

1.2 Manufacturer

Company Name: Survival On Snow
Contact: Doug Kashuba
Street Address: Box 1, Site 218
RR #2, St. Alberta
City/Province: St. Alberta Alberta
Country/Postal Code: Canada T8N 1M9
Telephone: 780 973-5412
Fax: 780 973-3318

1.3 Test location

Company: Acme Testing Inc.
Street Address: 2002 Valley Highway
Mailing Address: PO Box 3
City/State/Zip: Acme WA 98220-0003
Laboratory: Test Site 2
Telephone: 888 226-3837
Fax: 360 595-2722
E-mail: acmetest@acmetesting.com
Web: www.acmetesting.com
Receipt of EUT: 8 November 1999

1.4 Test Personnel

Paul G. Slavens

2. Test Results Summary

Summary of Test Results
Avalanche Beacon, model SLEDBUG

<u>Test Specification</u>	<u>Test Description</u>	<u>Compliance Criteria</u>	<u>Status</u>
FCC CFR, Part 15C	Antenna Requirement	15.203	Pass
FCC CFR, Part 15C	Radiated Emissions 0.3 MHz - 30 MHz	15.209 (a)	Pass
FCC CFR, Part 15C	Conducted Emissions	*	*

* Not applicable, the EUT is battery powered.

The signed original of this report, supplied to the client, represents the only “official” copy. Retention of any additional copies (electronic or non-electronic media) is at Acme Testing’s discretion to meet internal requirements only. The client has made the determination that EUT Condition, Characterization, and Mode of Operation are representative of production units, and meet the requirements of the specifications referenced herein.

Consistent with Industry practice, measurement and test equipment not directly involved in obtaining measurement results but having an impact on measurements (such as cable loss, antenna factors, etc.) is factored into the “Correction Factor” documented in certain test results. Instrumentation employed for testing meets tolerances consistent with known Industry Standards and Regulations.

The measurements contained in this report were made in accordance with the referenced standards and all applicable Public Notices received prior to the date of testing. Acme Testing assumes responsibility only for the accuracy and completeness of this data as it pertains to the sample tested.

Paul G. Slavens
Chief EMC Engineer

Date of Issuance

3. Description of Equipment and Peripherals

3.1 Equipment Under Test (EUT)

Device:	Avalanche Beacon
Model Number:	SLEDBUG
Serial Number:	None
FCC ID:	M43-SB
Power:	Battery
Grounding:	Local
Antenna Distance:	10 meters

3.2 EUT Peripherals for Emissions

Not applicable, the EUT is a stand-alone device.

3.3 Mode of Operation During Testing

The EUT was in its normal mode of operation constantly transmitting.

3.4 Modifications Required for Compliance

1. None.

4. Antenna requirement

4.1 Regulation

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 Part 15C. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators, which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

4.2 Result

The EUT uses a soldered ferrite slug as an antenna internal to the case.

5. Radiated Emissions Tests

Test Requirement: FCC CFR47, Part 15C (15.209a)

Test Procedure: ANSI C63.4:1992

5.1 Test Equipment

- ⇒ Spectrum Analyzer: Hewlett-Packard 8566B, Serial Number 2410A-00168, Calibrated: 12 March 1999, Calibration due Date: 12 March 2000
- ⇒ RF Preselector: Hewlett-Packard 85685, Serial Number 2648A-00519, Calibrated: 12 March 1999, Calibration due Date: 12 March 2000
- ⇒ Quasi Peak Adapter: Hewlett-Packard 85650A, Serial Number 2043A-00327, Calibrated: 17 March 1999, Calibration due Date: 17 March 2000
- ⇒ Low Frequency Loop Antenna: EMCO 6502, Serial Number 2016, Calibrated: 28 December 1998, Calibration due Date: 28 December 1999
- ⇒ EUT Turntable Position Controller: EMCO 1061-3M, Serial Number 9003-1441, No Calibration Required
- ⇒ Antenna Mast: EMCO 1051, Serial Number 9002-1457, No Calibration Required

5.2 Purpose

The purpose of this test is to evaluate the radiated electromagnetic interference characteristics of the EUT.

5.3 Test Procedures

Radiated Emissions Test Characteristics	
Frequency range	0.3 MHz - 30 MHz
Test distance	10 m
Test instrumentation resolution bandwidth	9 kHz
Receive antenna scan height	1 m - 4 m
Receive antenna polarization	Parallel/Perpendicular

For tabletop equipment, the EUT is placed on a 1 meter by 1.5 meters wide and 0.8 meter high nonconductive table that sits on a flush mounted metal turntable. Floor standing equipment is placed directly on the flush mounted metal turntable. The EUT is connected to its associated peripherals with any excess I/O cabling bundled to approximately 1 meter.

Preview tests are performed to determine the “worst case” mode of operation. With the EUT operating in “worst case” mode, emissions from the unit are maximized by adjusting the polarization and height of the receive antenna and rotating the EUT on the turntable. Manipulating the system cables also maximizes EUT emissions.

5.4 Calculation of Limit

The emissions from the EUT were measured on a 30 meter site. The emissions from the product were not detectable at 30 meters as they were underneath the noise floor of the active loop antenna used for measurement. There fore the signal from the EUT was measured at 10 and 5 meters to determine the correct correction factor for the part 15.209 limit.

The measured field strength at 10 meters was:
54.9 dBuV/m.

The measured field strength at 5 meters was:
43.6 dBuV/m.

This corresponds to a correction factor of 37.5 dB per decade.

The limit @ 300 meters for 397 kHz is 6.04 uV/m or 15.6 dBuV/m @ 300 meters.

Using a 37.5 dB per decade correction ($37.5 \log 300 - 37.5 * \log 10$) the limit @ 10 meters is $= 55.4 + 15.6 = 71.0$ dBuV/m.

5.5 Test Results

PRODUCT EMISSIONS

No	EMISSION	SPEC		SITE		AZM
	FREQUENCY MHz	LIMIT dBuV/m	ABS	DELTA to Limit (dB)	HGT cm	
1	0.397	71.0	54.9	-16.1	100	320

6. Conducted Emissions Tests

Test Requirement: FCC CFR, Part 15C, 15.207

Test Procedure: ANSI C63.4, 1992

6.1 Test Equipment

- ⇒ Spectrum Analyzer: Hewlett-Packard 8566B, Serial Number 2410A-00168, Calibrated: 12 March 1999, Calibration due Date: 12 March 2000
- ⇒ RF Preselector: Hewlett-Packard 85685, Serial Number 2648A-00519, Calibrated: 12 March 1999, Calibration due Date: 12 March 2000
- ⇒ Quasi Peak Adapter: Hewlett-Packard 85650A, Serial Number 2043A-00327, Calibrated: 17 March 1999, Calibration due Date: 17 March 2000
- ⇒ Line Impedance Stabilization Network: Rhode & Schwarz ESH2-Z5, Serial Number ACMERS1, Calibrated: 1 September 1999, Calibration due Date: 01 September 2000

6.2 Purpose

The purpose of this test is to evaluate the level of conducted noise the EUT imposes on the AC mains.

6.3 Test Procedures

For tabletop equipment, the EUT is placed on a 1 meter by 1.5 meters wide and 0.8 meter high nonconductive table that is placed above the groundplane. Floor standing equipment is placed directly on the groundplane. Any supplemental grounding mechanisms are connected, if appropriate. The EUT is connected to its associated peripherals, with any excess I/O cabling bundled to approximately 1 meter. The EUT is connected to a dedicated LISN and all peripherals are connected to a second separate LISN circuit. The LISNs are bonded to the groundplane.

Preview tests are performed to determine the “worst case” mode of operation. With the EUT operating in “worst case” mode, final conducted measurements are taken. Conducted measurements are made on each current carrying conductor with respect to ground.

Conducted Emissions Test Characteristics

Frequency range	0.15 MHz - 30.0 MHz
Test instrumentation resolution bandwidth	9 kHz
Lines Tested	Line 1/Line 2

6.4 Test Results

Not applicable, the EUT is battery powered.

7. Miscellaneous Comments and Notes

1. None.

8. List of Attachments

1. Photographs of test set-ups. (1)