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CERTIFICATION TEST REPORT
PART 15.209
IC RSS-210

For The Avalanche Transceiver
Model: Tracker2

FCC ID: OUNT2
IC: 3561A-T2

PREPARED FOR:

Backcountry Access, Inc
2820 Wilderness Place, Unit H
Boulder, CO 80301

Prepared on: August 25, 2009

Report Number: 2009 06129946 FCC

Project Number: 5456-1

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DOCUMENT HISTORY

| REVISION | DATE | COMMENTS |
|----------|-----------------|-------------------------------|
| - | August 25, 2009 | Prepared By: Alan Laudani |
| - | August 25, 2009 | Initial Release: Alan Laudani |

NOTE: Nemko USA, Inc. hereby makes the following statements so as to conform to Chapter 10 (Test Reports) Requirements of ANSI C63.4 (2003) "Methods and Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz":

- o The unit described in this report was received at Nemko USA, Inc.'s facilities on August 25, 2009.
- o Testing was performed on the unit described in this report on June 11, 2009 to August 25, 2009
- o The Test Results reported herein apply only to the Unit actually tested, and to substantially identical Units.
- o This report does not imply the endorsement of the Federal Communications Commission (FCC), Industry Canada, NVLAP or any other government agency.

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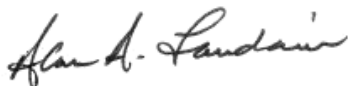
CERTIFICATION

Nemko USA, Inc., an independent Electromagnetic Compatibility (EMC) Test Laboratory, produced this Test Report and performed the Radio Frequency Interference (RFI) testing and data evaluation contained herein.

Nemko USA, Inc.'s measurement facility is currently registered with the United States Federal Communications Commission (FCC) in accordance with the provisions of 47 United States Code (CFR) Part 2, Subpart I, Section 2.948(a). A current description of Nemko USA, Inc.'s measurement facility is on file with the FCC. Nemko USA Inc. has additionally satisfied the FCC that it complies with the requirements set forth in 47 CFR Part 2, Subpart I, Section 2.948(d) regarding the accreditation of EMC laboratories.

The RFI testing, test data collection and test data evaluation were accomplished in accordance with the ANSI C63.4-2003 Standard, and in accordance with the applicable sections of the FCC rules (47 CFR Parts 2 and 15). The testing was also accomplished in accordance with Industry Canada's ICES-003 standard for unintentional radiating device per EMCAB-3, Issue 3 (May 1998). The administrative summary of this test report provides a description of the test sample.

I hereby certify that the test data, test data evaluation, and equipment configurations used to compile this test report are a true and accurate representation of the test sample's radio frequency interference characteristics as of the test date(s), and, for the design of the test sample.



Alan Laudani
EMC Engineer

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1. ADMINISTRATIVE DATA AND TEST SUMMARY

1.1. Administrative Data

CLIENT: Backcountry Access, Inc
2820 Wilderness Place, Unit H
Boulder, CO 80301

CONTACT: Jon Mullen
E-Mail: mullengr@gmail.com

DATE (S) OF TEST: June 11, 2009 to August 25, 2009

EQUIPMENT UNDER TEST (EUT): Avalanche Transceiver

MODEL: Tracker2

SERIAL NUMBER: NA

CONDITION UPON RECEIPT: Suitable for Test

TEST SPECIFICATION: FCC, Part 15.209 Radiated emission limits; general requirements and RSS 210 (Issue 7, June 2007) A2.6 General Section, Operating frequencies: 13.110 – 14.010 MHz

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1.2. Test Summary

The column headed "Required" indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

- N No: not applicable / not relevant
Y Yes: Mandatory i.e. the apparatus shall conform to these test.
N/T Not Tested, mandatory but not assessed. (See section 4.4 Test deleted)

The results contained in this section are representative of the operation of the apparatus as originally submitted.

| <i>FCC Part 15</i> | <i>RSS</i> | <i>Test Description</i> | <i>Compliance Status</i> |
|---------------------------|-------------------|--|---------------------------------|
| 15.207(a) | RSS-GEN | Conducted Emissions | Not Applicable ¹ |
| | RSS GEN 4.4.1 | 20dB Bandwidth | PASS |
| 15.209(a) | RSS-210 Table 3 | General Field Strength Limits for Transmitters at Frequencies below 30 MHz | PASS |
| 15.209(a) | RSS-210 Table 2 | General Field Strength Limits for Transmitters and Receivers at Frequencies above 30 MHz | PASS |
| | RSS-GEN | Receiver Spurious Emissions | PASS |

¹No AC Mains

Refer to the test results section for further details.



Alan Laudani
RF/EMC Engineer

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2. SYSTEM CONFIGURATION

2.1. Description and Method of Exercising the EUT

The Tracker2 is an Avalanche Transceiver. Its function is to help find lost hiking or skiing partners during an emergency. The EUT was exercised by turning on the transmit function or the receive function by external switch.

The EUT's performance during test was evaluated against the performance criterion specified by applicable test standards. Performance results are detailed in the test results section of this report.

2.2. System Components and Power Cables

| DEVICE | MANUFACTURER MODEL # SERIAL # | POWER CABLE |
|-----------------------------|--|-------------|
| EUT - Avalanche Transceiver | Backcountry Access, Inc Model: Tracker2 Serial #: NA | |

2.3. Device Interconnection and I/O Cables

| Connection | I/O Cable |
|-------------------------|-----------|
| No external connections | No cables |

2.4. Design Modifications for Compliance

The following design modifications were made to the EUT during testing.

No design modifications were made to the EUT during testing.

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2.5. Technical Specifications of the EUT

Manufacturer: Backcountry Access, Inc

Operating Frequency: 457 kHz

Measured Field Strength: 4.2 dB μ V/m @ 300m

Modulation: A1A

Antenna Connector: None

Power Source: Battery AAA (3)

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3. DESCRIPTION OF TEST SITE AND ENVIRONMENT

3.1. Description of Test Site

The test site is located at 11696 Sorrento Valley Road, Suite F, San Diego, CA 92121. The site is physically located 18 miles Northwest of downtown San Diego. The general area is a valley 1.5 miles east of the Pacific Ocean. This particular part of the valley tends to minimize ambient levels, i.e. radio and TV broadcast stations and land mobile communications. The three and ten-meter Open Area Test Site (OATS) is located behind the office/lab building. It conforms to the normalized site attenuation limits and construction specifications as set in the EN 55022 (1987), CISPR 16 and 22 (1985) and ANSI C63.4-2001 documents. The OATS normalized site attenuation characteristics are verified for compliance every year, and registered with the Federal Communications Commission under Registration Number 90579 and Industry Canada under 2040B-1 and 2040B-2.

3.2. Test Environment

All tests were performed under the following environmental conditions:

| | |
|-------------------|--------------|
| Temperature range | 17 – 22 °C |
| Humidity range | 29 - 30% |
| Pressure range | 87 - 105 kPa |

| | | | |
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4. DESCRIPTION OF TESTING METHODS

4.1. Introduction

As required in 47 CFR, Parts 2 and 15, the methods employed to test the radiated and conducted emissions (as applicable) of the EUT are those contained within the American National Standards Institute (ANSI) document ANSI C63.4-2003, titled "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz." All applicable FCC Rule Sections that provide further guidance for performance of such testing are also observed.

For General Test Configuration please refer to Figure 1 on the following page.

Digital devices sold in Canada are required to comply with the Interference Causing Equipment Standard for Digital Apparatus, ICES-003. These test methods and limits are specified in the Canadian Standards Association's (CSA) Standard C108.8-M1983 (1-1-94 version) and are "essentially equivalent" with FCC, Part 15 and CISPR 22 (EN55022) rules for unintentional radiators per EMCAB-3, Issue 3 (May 1998). No further testing is required for compliance to ICES-003.

4.2. Configuration and Methods of Measurements for Conducted Emissions

Section 7 of ANSI C63.4 determines the general configuration of the EUT and associated equipment, as well as the test platform for conducted emissions testing. Tabletop devices are placed on a non-conducting surface 80 centimeters above the ground plane floor and 40 centimeters from the ground plane wall. The EUT and associated system are configured to operate continuously, representing a "normally operating" mode. The EUT is powered via a Line Impedance Stabilization Network (LISN). The emissions are recorded using the required bandwidth of 9 kHz in the quasi-peak mode. The average amplitude is also observed employing a 10 kHz bandwidth to determine the presence of broadband RFI. When such interference is caused by broadband sources (as defined by the FCC and ANSI Rules), the deviation guidelines contained in Section 11.3.1 of ANSI C63.4 are employed, which allows a correction factor of 13 dB to be subtracted from the quasi-peak reading. The emission levels are then compared to the applicable FCC limits to determine compliance.

4.3. Configuration and Methods of Measurements for Frequency Identification

When performing all testing of equipment, the actual emissions of the EUT are segregated from ambient signals present within the laboratory or the open-field test range. Preliminary testing is performed to ensure that ambient signals are sufficiently low to allow for proper observation of the emissions from the EUT. Incoming power lines are filtered using a 120 dB, 30-ampere; 115/208-volt filter to assist in reducing ambient signals for tests of levels of conducted emissions. Ambients within the laboratory are compared to those noted at the nearby open-field site to discriminate between signals produced from the EUT and ambient signals. In the event that a significant emission is produced by the EUT at a frequency which is also demonstrating significant ambient signals, the spectrum analyzer is placed in the peak mode, the bandwidth is narrowed, the EUT's signal is centered on the analyzer, the scan width is expanded to 50 kHz while monitoring the audio to ensure that only the EUT signal is present, the analyzer is switched to quasi-peak mode, and the level of the EUT signal is recorded.

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4.4. Configuration and Methods of Measurements for Radiated Emissions

Section 8 of ANSI C63.4 determines the general configuration and procedures for measuring the radiated emissions of equipment under test. Initially, the primary emission frequencies are identified inside the test lab by positioning a broadband receive antenna one meter from the EUT to locate frequencies of significant radiation. Next, the EUT and associated system are placed on a turntable on a ten meter open area test site (registered with the FCC in accord with its Rules and ANSI C63.4) and the receive antenna is located at a distance of ten meters from the EUT.

The EUT and associated system are configured to operate continuously, representing a “normally operating” mode. All significant radiated emissions are recorded when maximum radiation on each frequency is observed, in accordance with part 8 of ANSI C63.4–2003 and Section 15.33 of the FCC Rules. To ensure that the maximum emission at each discrete frequency of interest is observed, the receive antenna is varied in height from one to four meters and rotated to horizontal and vertical polarities, and the turntable is also rotated to determine the worst emitting configuration. The numerical results of the test are included herein to demonstrate compliance.

The numerical results that are applied to the emissions limits are arrived as demonstrated by the example below:

| A | B | C | D | E | F | G | H | I | J | K |
|-------------------|------------------------|--------------------------|------|------------------|---------------|---------------------------|----------------------------------|----------------------------|------------------|-----------|
| Meas. Freq. (MHz) | Meter Reading Vertical | Meter Reading Horizontal | Det. | EUT Side F/L/R/B | Ant. Height m | Max. Reading (dB μ V) | Corrected Reading (dB μ V/m) | Spec. limit (dB μ V/m) | CR/SL Diff. (dB) | Pass Fail |
| 47.2 | 44.5 | 44.6 | Q | - | 1.0 | 44.6 | 24.2 | 30.0 | -5.8 | Pass |

- A. Frequency Measured in MHz.
- B. Meter Reading: Emission Amplitude as measured with the antenna in Vertical polarity in dB μ V, this is from the EMI receiver or Spectrum Analyzer.
- C. Meter Reading: Emission Amplitude as measured with the antenna in Horizontal polarity in dB μ V, this is from the EMI receiver or Spectrum Analyzer.
- D. Detector used: Q for Quasi-Peak, A for average, P for peak.
- E. EUT Side F/L/R/B: Side of EUT facing the receiving antenna. Front, Left, Right, Back. If not noted, emission did not peak in a significant manner to discriminate which side of the EUT emitted the emission.
- F. Ant. Height m: Antenna height in meters of strongest emission when the antenna was raised from 1 to 4 meters, vertical or horizontal.
- G. Max Reading: Max meter reading of B vertical and C horizontal in dB μ V.
- H. Corrected Reading: Corrected Reading in dB μ V/m; Max Reading corrected for cable loss (dB), antenna factor (dBV/m) and preamplifier gain (dB).
- I. Spec limit: Specification Limit at the measured frequency in dB μ V/m.
- J. CR/SL Diff.: Difference in dB of Corrected Reading and Specification Limit, negative result is pass margin.
- K. Pass Fail: Result; EUT does or does not comply at this frequency.

Example:

44.6 dB μ V (Meter reading—Max.)
+0.8 dB (cable loss @ frequency)
45.4 dB μ V
+11.5 dB/m (antenna factor @ frequency)
56.9 dB μ V/m
-32.7 dB (preamplifier gain @ frequency)
24.2 dB μ V/m --Final Corrected Reading
30.0 dB μ V/m Specification Limit @ frequency
-5.8 dB CR/SL Difference.
Pass as difference is negative (below limit).

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5. Test Results

5.1. Conducted Emissions– Transmit Mode

Part 15.207(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

7.2.2 The purpose of this test is to measure unwanted radio frequency currents induced in any AC conductor external to the equipment which could conduct interference to other equipment via the AC electrical network. Except when the requirements applicable to a given device state otherwise, for any license-exempt radio-communication device equipped to operate from the public utility AC power supply, either directly or indirectly, the radio frequency voltage that is conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown below. The tighter limit applies at the frequency range boundaries. The conducted emissions shall be measured with a 50 ohm/50 micro-henry line impedance stabilization network

| Frequency Range (MHz) | Conducted Limit (dBuV) | |
|-----------------------|------------------------|-----------|
| | Quasi-Peak | Average |
| 0.15-0.5 | 66 to 56* | 56 to 46* |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

*Decreases with the logarithm of the frequency.

Test Results: Testing was not applicable

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5.2. Conducted Emissions Test Data – Receive mode

Test Results:

Testing was not applicable as the EUT has no AC Mains.

5.3. Radiated Emissions –Receive Mode

RSS-Gen 6. Receiver Spurious Emission Standard

(a) If a radiated measurement is made, all spurious emissions shall comply with the limits of Table 1.

Table 1 - Spurious Emission Limits for Receivers

| Spurious Frequency (MHz) | Field Strength (microvolt/m at 3 metres) |
|-------------------------------------|---|
| 30-88 | 100 |
| 88-216 | 150 |
| 216-960 | 200 |
| Above 960 | 500 |

Test Notes:

- As the EUT is hand held, testing occurred with the EUT set at all three axes.
- Testing began with fresh batteries.
- No emissions attributed to the EUT were found within 20 dB of the limits.
- Emissions were searched for from 9 kHz to 1000 MHz.

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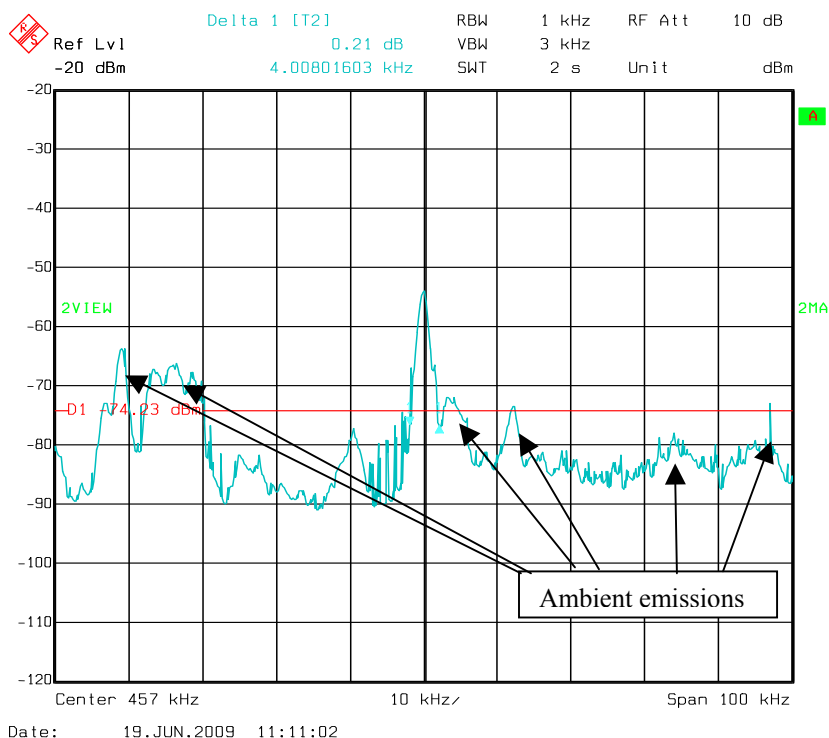
5.4. Bandwidth

RSS-Gen 4.4.1 When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

| | | | |
|----------------------------|-----------|---------------------|--------------|
| Sample Number: | Tracker2 | Temperature: | 16°C |
| Date: | 2/25/08 | Humidity: | 67% |
| Modification State: | Modulated | Tester: | Alan Laudani |
| | | Laboratory: | SOATS |

- Radiated measurements were made at a distance selected to provide a representative emission.
- Analyzer Span was set to 100 kHz
- Analyzer RES BW was set to 1 % of 100 kHz
- A PEAK output reading was noted, a DISPLAY line was drawn 20 dB lower than PEAK level. The bandwidth was determined from where the channel output spectrum intersected the display line.
- Max peak hold.

Test Results: 20 dB Bandwidth Bandwidth: 4.0 kHz



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5.5. Radiated emissions

15.209(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
|-----------------|-----------------------------------|-------------------------------|
| 0.009–0.490 | 2400/F(kHz) | 300 |

At 457 kHz this results in 5.25 microvolts per meter which is $20 \times \log(5.25) = 14.4$ dB μ V/m

A2.6 (a) The field strength of any emissions shall not exceed 15,848 microvolts/meter at 30 meters within the band 13.553-13.567 MHz

Test Notes:

- The EUT was placed 10m from the receiving loop antenna.
- The EUT is a single channel transceiver at 457 kHz.
- The Spectrum Analyzer RES BW was set to 9 kHz, the VBW was set to 9 kHz.
- 3 Fresh AAA batteries were installed.
- Measurements were made along three orthogonal axes.
- The loop antenna was turned 90 degrees to the plane defined between the antenna mast and the EUT vertically and horizontally.
- Max Hold Peak detector used. Emission corrected for Duty Cycle Factor.
- Emissions searched for from 9 kHz to 1000 MHz.
- 15.209 (e) The provisions in §§15.31, 15.33, and 15.35 for measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this part.
- 15.31 (2) At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade).

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Test Results:

| Frequency of Emission (kHz) | Emission Level Measured (dBμV) at 10m | Antenna Factor + Cable Loss (dB) | Corrected Emission Level @ 10m (dBμV/m) | Extrapolation Factor* (10 to 300m) (dB) | Field Strength (dBμV/m @ 300m) Peak | Field Strength (dBμV/m @ 300m) Average | Limit (dBμV/m @300m) | Margin (dB) |
|-----------------------------|---------------------------------------|----------------------------------|---|---|-------------------------------------|--|----------------------|-------------|
| 457.0 | 13.4 | +51.1 | 64.5 | -59.1 | 5.4 | 3.7 | 14.4 | -10.7 |

Extrapolation factor : $40 \times \log(10/300) = -59.1\text{dB}$

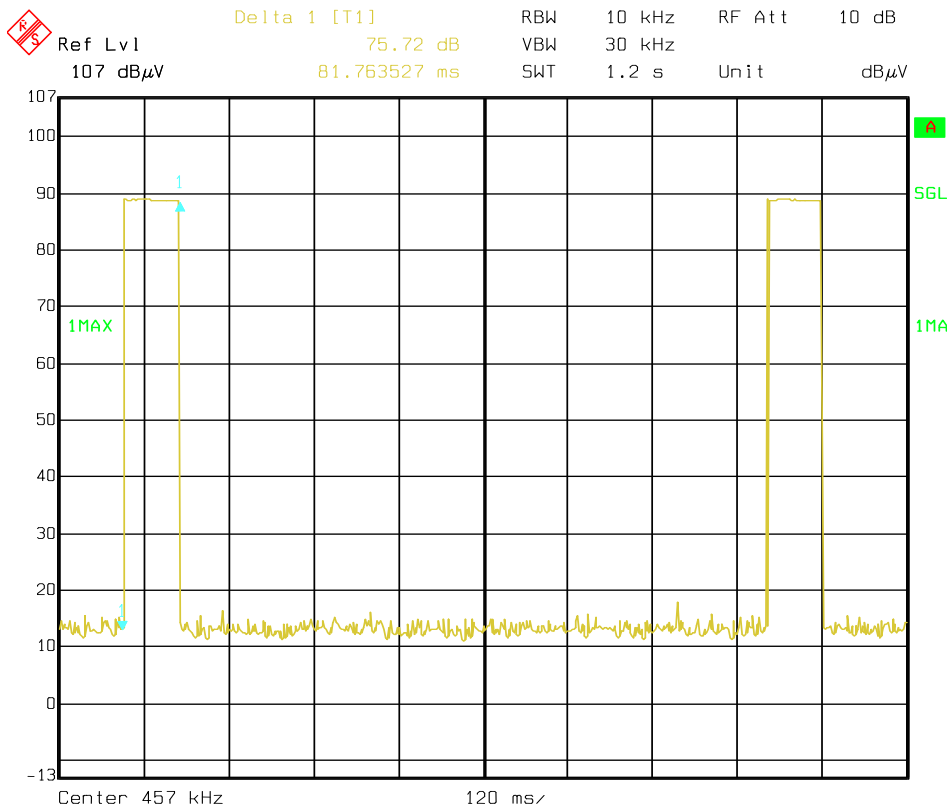
Emission measured at 10m + correction factors + extrapolation factor = field strength @ 300m (above)

Emission measured at 10m + correction factors - extrapolation factor = field strength @ 10m (below)

Duty cycle Factor:

1 pulse in 100 ms, 81.76 ms

Duty Cycle Factor $20 \times \log(0.8176) = -1.75\text{ dB}$



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5.6. Out-of-band Emissions

15.209(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field Strength (uV/meter) | Measurement Distance (meter) |
|-----------------|---------------------------|------------------------------|
| 0.009-0.490 | 2400/F (kHz) | 300 |
| 0.490-1.705 | 24000/F (kHz) | 30 |
| 1.705-30.0 | 30 | 3 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

Test Notes:

- The Spectrum was searched from 9 kHz to 1000 MHz.
- The EUT was measured on three orthogonal axes. Worst case emissions shown below.
- 3 Fresh AAA batteries were installed.
- No emissions observed were attributed to the Tracker2 other than the fundamental.

| | | | |
|------------------------|--|---|-------------|
| Nemko USA, Inc. | | 11696 Sorrento Valley Road, Suite F, San Diego, CA 92121 Phone (858) 755-5525 Fax (858) 452-1810 | |
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5.7. Test Equipment

| Nemko ID | Device | Manufacturer | Model | Serial Number | Cal Date | Cal Due Date |
|----------|-------------------|-----------------|---------|---------------|-----------|--------------|
| 110 | Antenna, LPA | EMCO | 3146 | 1217 | 10-Jan-09 | 10-Feb-11 |
| 128 | Antenna, Bicon | EMCO | 3104 | 2882 | 09-Feb-09 | 09-Feb-11 |
| 552 | Antenna, Loop | EMCO | ALR-30M | 820 | 23-Sep-08 | 23-Sep-09 |
| 752 | Antenna, DRWG | EMCO | 3115 | 4943 | 12-Nov-08 | 12-Nov-10 |
| 897 | Spectrum Analyzer | Rohde & Schwarz | FSP7 | 837620/009 | 18-Sep-08 | 18-Sep-09 |
| 902 | pre amp | Sonoma | 310 N | 185803 | 17-Jul-08 | 17-Jul-09 |

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| Open Area Test Site Industry Canada Number: | 2040B-1 OATS |
| Open Area Test Site FCC Number: | RN 90579 |