



L.S. Compliance, Inc.
W66 N220 Commerce Court
Cedarburg, WI 53012
262.375.4400 FAX: 262.375.4248

Compliance Testing of:

Joystick Transmitter

Prepared For:

Sno-Way International, Inc.
Attn.: Mr. Lynn Schultz
120 North Grand Avenue
Hartford, WI 53027

Test Report Number:

304175

Test Date(s):

March 15, 2004

All results of this report relate only to the items that were tested. This report may not be reproduced, except in full, without written approval of L.S. Compliance, Inc.

Table of Contents

Section	Description	Page
Index		2
1	L.S. Compliance in Review	3
2	A2LA Certificate of Accreditation	4
3	A2LA Scope of Accreditation	5
4	Validation Letter-U.S. Competent Body for EMC Directive 89/336/EEC	6
5	Signature Page	7
6	Product and General Information	8
7	Introduction	8
8	Product Description	8
9	Test Requirements	9
10	Summary of Test Report	9
11	Radiated Emissions Test	10-19
12	Conducted Emissions Test (AC Line)	20
Appendices		
A	Calculations	21
B	Duty Cycle Correction	22
C	Test Equipment List	23

1. L.S. Compliance in Review

L.S. Compliance - Accreditations and Listing's

As an EMC Testing Laboratory, our Accreditation and Assessments are recognized through the following:

A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025 : 1999
with Electrical (EMC) Scope of Accreditation
A2LA Certificate Number: **1255.01**

Federal Communications Commission (FCC) – USA

Listing of 3 Meter Semi-Anechoic Chamber based on Title 47 CFR – Part 2.948
FCC Registration Number: **90756**

Listing of 3 and 10 meter OATS based on Title 47CFR – Part 2.948
FCC Registration Number: **90757**

Industry Canada

On file, 3 Meter Semi-Anechoic Chamber based on RSS-212 – Issue 1
File Number: **IC 3088-A**

On file, 3 and 10 Meter OATS based on RSS-212 – Issue 1
File Number: **IC 3088**

U. S. Conformity Assessment Body (CAB) Validation

Validated by the European Commission as a **U. S. Competent Body** operating under the U. S. /EU, Mutual Recognition Agreement (MRA) operating under the European Union Electromagnetic Compatibility –Council Directive 89/336/EEC, Article 10.2.

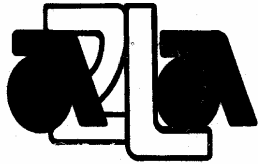
Date of Validation: **January 16, 2001**

Validated by the European Commission as a **U.S. Notified Body** operating under the U.S./EU, Mutual Recognition Agreement (MRA) operating under the European Union Telecommunication Equipment – Council Directive 99/5/EC, Annex V.

Date of Validation: **November 20, 2002**

Notified Body Identification Number: **1243**

2. A2LA Certificate of Accreditation



THE AMERICAN
ASSOCIATION
FOR LABORATORY
ACCREDITATION

ACCREDITED LABORATORY

A2LA has accredited

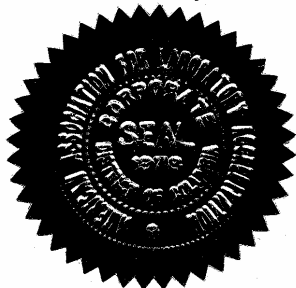
L.S. COMPLIANCE, INC.
Cedarburg, WI

for technical competence in the field of

Electrical Testing

The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration Laboratories" and any additional program requirements in the identified field of testing. Testing and calibration laboratories that comply with this International Standard also operate in accordance with ISO 9001 or ISO 9002 (1994).

Presented this 26th day of March 2003.



A handwritten signature in black ink, appearing to read 'Peter Rhyne'.

President
For the Accreditation Council
Certificate Number 1255.01
Valid to January 31, 2005

For tests or types of tests to which this accreditation applies,
please refer to the laboratory's Electrical Scope of Accreditation.

3. A2LA Scope of Accreditation



American Association for Laboratory Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025-1999

L.S. COMPLIANCE, INC.
W66 N220 Commerce Court
Cedarburg, WI 53012
James Blaha Phone: 262 375 4400

ELECTRICAL (EMC)

Valid to: January 31, 2005

Certificate Number: 1255-01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following tests:

<u>Test</u>	<u>Test Method(s)</u>
Emissions	
Conducted	
Continuous/Discontinuous	Code of Federal Regulations (CFR) 47, FCC Method Parts 15, 18 using ANSI C63.4; EN: 55011, 55022, 50081-1, 50081-2; CISPR: 11, 12, 14-1, 22; CNS 13438
Radiated	Code of Federal Regulations (CFR) 47, FCC Method Parts 15, 18 using ANSI C63.4; EN: 55011, 55022, 50081-1, 50081-2; CISPR: 11, 12, 14-1, 22; CNS 13438
Current Harmonics	IEC 61000-3-2; EN 61000-3-2
Voltage Fluctuations & Flicker	IEC 61000-3-3; EN 61000-3-3
Immunity	EN: 50082-1, 50082-2 EN 61000-6-2 CISPR: 14-2, 24
Conducted Immunity	
Fast Transients/Burst	IEC 61000-4-4; EN 61000-4-4
Surge	IEC: 61000-4-5; ENV 50142; EN 61000-4-5
RF Fields	IEC: 61000-4-6; ENV 50141; EN 61000-4-6
Voltage Dips/Interruptions	IEC 61000-4-11; EN 61000-4-11



(A2LA Cert. No. 1255-01) 05/13/03

Page 1 of 2

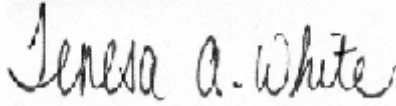
5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8373 • Phone: 301-644 3248 • Fax: 301-662 2974



4. Validation Letter – U. S. Competent Body for EMC Directive 89/336/EEC

 <p>1901-2001 NIST CENTENNIAL</p>	 <p>DEPARTMENT OF COMMERCE UNITED STATES OF AMERICA</p>	<p>UNITED STATES DEPARTMENT OF COMMERCE National Institute of Standards and Technology Gaithersburg, Maryland 20899</p>
<p>January 16, 2001</p>		
<p>Mr. James J. Blaha L.S. Compliance Inc. W66 N220 Commerce Court Cedarburg, WI 53012-2636</p>		
<p>Dear Mr. Blaha:</p>		
<p>I am pleased to inform you that the European Commission has validated your organization's nomination as a U.S. Conformity Assessment Body (CAB) for the following checked (✓) sectoral annex(es) of the U.S.-EU Mutual Recognition Agreement (MRA).</p>		
<p>(✓) Electromagnetic Compatibility-Council Directive 89/336/EEC, Article 10(2) () Telecommunication Equipment-Council Directive 98/13/EC, Annex III () Telecommunication Equipment-Council Directive 98/13/EC, Annex III and IV Identification Number: () Telecommunication Equipment-Council Directive 98/13/EC, Annex V Identification Number:</p>		
<p>This validation is only for the location noted in the address block, unless otherwise indicated below.</p>		
<p>(✓) Only the facility noted in the address block above has been approved. () Additional EMC facilities: () Additional R&TTE facilities:</p>		
<p>Please note that an organization's validations for various sectors of the MRA are listed on our web site at http://ts.nist.gov/mra. You may now participate in the conformity assessment activities for the operational period of the MRA as described in the relevant sectoral annex or annexes of the U.S.-EU MRA document.</p>		
<p>NIST will continue to work with you throughout the operational period. All CABs validated for the operational phase of the Agreement must sign and return the enclosed CAB declaration form, which states that each CAB is responsible for notifying NIST of any relevant changes such as accreditation status, liability insurance, and key staff involved with projects under the MRA. Please be sure that you fully understand the terms under which you are obligated to operate as a condition of designation as a CAB. As a designating authority, NIST is responsible for monitoring CAB performance to ensure continued competence under the terms of the MRA.</p>		
<p>NIST</p>		

5. Signature Page



Prepared By:

March 30, 2004

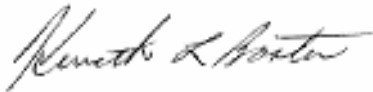
Teresa A. White, Document Coordinator Date



Tested By:

March 30, 2004

Abtin Spantman, EMC Engineer Date



Approved By:

March 30, 2004

Kenneth L. Boston, EMC Lab Manager Date
PE # 31926 Licensed Professional Engineer
Registered in the State of Wisconsin, United States

6. Product and General Information

Manufacturer:	Sno-Way International, Inc.				
Date(s) of Test:	March 15 th , 2004				
Test Engineer(s):		Tom Smith	√	Abtin Spantman	Ken Boston
Model #:	96106472				
Serial #:	100.000; Engineering Units #SWX01 and SWX02				
Test Frequency and Voltage:	434 MHz; 3.0 VDC				

Environmental Conditions in the Test Lab:

Temperature:	20-25° C
Atmospheric Pressure:	86 kPa - 106 kPa
Humidity:	30-60%

7. Introduction

On March 15th, 2004, a series of Radiated Emissions tests were performed on two samples of the Snow-Way International Joystick Wireless Controller for straight plows Model Number 96106472, Serial Numbers 100.000-SWX01 (configured for continuous cw), and 100.000-SWX02 (configured for normal operation), here forth referred to as the "Equipment Under Test" or "EUT".

These tests were performed using the test procedure outlined in ANSI C63.4, 2001 for intentional radiators, and in accordance with the limits set forth in FCC Part 15.231 for a periodic operation of a low power transmitter.

All Conducted and Radiated Emission tests were performed to measure the emissions in the frequency bands described later in this report, and to determine whether said emissions are below the limits established by the aforementioned standards.

These tests were performed in accordance with the procedures described in the American National Standard for methods of measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (ANSI C63.4, 2001).

Also used as a reference for the EMI Receiver specification is the International Special Committee on Radio Interference – CISPR 16-1, 2002.

8. Product Description

The 'Predator' wireless plow-controller is a transmitter that enables the user to control and set the position and orientation of the plow, remotely from inside the automobile, during plowing operations. The Predator wireless plow-controller operates at 434 MHz, with FM/FSK modulation characteristics. When activated, the plow-controller transmitter issues a series of packet commands, containing PWM encoded binary data, for a simplex link with the receiving plow mechanism.

Detailed Description:

The Predator wireless plow-controller is designed to eliminate the need for wire routing from inside the vehicle, through the fire-wall, to the plow mechanism, for control of the plow mechanism. Instead, the wireless system simply uses a portable, hand-held transmitter to transmit the commands to move and control the plow by activating and de-activating a hydraulic pump motor and valve system. The plow mechanism would only need to be connected to the power source. This particular snow plow control system was conceived for straight plows.

When a command button is pressed on the transmitter, two data packets are transmitted at minimum and more if the button is continuously held down. When the transmitter button is released, three termination packets are sent, after which the transmitter goes into standby mode. The packet repetition rate is approximately 130 ms, and during that 130 ms cycle, the transmitter is power managed through the transmit IC, such that the power amplifier is gated on only for approximately 57 ms, to allow for the 45 ms packet to be transmitted, plus 12 ms of guard time around the packet. Other than the 57 ms of transmission per packet, the transmitter is in standby mode at all other times, with the transmit IC gated off. The transmitter uses two standard "AA" type batteries, which are replaceable.

9. Test Requirements

The EUT was tested for Conducted and Radiated Emissions, and for compliance with the limits set forth by Title 47 CFR, FCC Parts 15.35, 15.205, 15.209, 15.231(a), 15.231(b) and 15.231(c) for manually operated periodic transmitters, as well as for compliance with Industry Canada RSS-210, for low power license-exempt radio-communication devices.

10. Summary of Test Report

The Equipment Under Test (EUT) was found to MEET the requirements as described within the specifications of Title 47 CFR, FCC Part 15.231 and Industry Canada RSS-210, Section 6.1 for a low power transmitter.

11. Radiated Emissions Test

Test Setup

The EUT was operated within the 3 Meter FCC listed Semi-Anechoic Chamber, located at L.S. Compliance, Inc., in Cedarburg, Wisconsin. The EUT was placed on an 80cm high, non-conductive pedestal, which was centered on a flush-mounted 2m diameter metal turntable. The EUT with serial number SWX01 was configured to run in a continuous C.W. (Carrier Wave) transmit mode during the 15.231(a) and 15.231(b) measurements. The EUT with serial number SWX02 was configured for and tested in normal operation for measurements of the data packet length and occupied bandwidth.

Test Procedure

The fundamental and spurious (harmonic) emissions of the transmitter were tested for compliance to Title 47 CFR, FCC Part 15.231(b) limits for manually operated periodic devices.

The EUT was tested from the lowest frequency generated by the transmitter (without going below 9 kHz) to the 10th harmonic of the fundamental frequency generated by the device. The appropriate limits were also observed when the fundamental or spurious signals were located within any of the restricted bands as described in FCC Part 15.205(a).

The EUT was placed on an 80cm high non-conductive pedestal, with the Antenna Mast placed 3 m from the EUT. A Biconical Antenna was used to measure emissions from 30 MHz to 300 MHz, a Log Periodic Antenna was used to measure emissions from 300 MHz to 1000 MHz, and a Double Ridged Waveguide Horn Antenna was used to measure emissions above 1 GHz.

The EUT SWX01 was configured to operate in a continuous C. W. transmit mode. The resultant signals from the fundamental harmonics and spurious signals were maximized by rotating the turntable 360 degrees, and by raising and lowering the Antenna between 1 and 4 meters. The EUT was also given different orientations (tested on 3 axis) to determine the maximum signal levels, using both horizontal and vertical antenna polarities.

Batteries were checked and replaced as necessary to ensure proper minimum voltage was maintained at all times.

Test Results

No significant emissions were found, aside from the transmitter fundamental and harmonics. The unit was scanned for emissions over the range of 30 MHz to 5000 MHz to establish compliance with FCC Parts 15.231 and 15.205 while in a continuous transmit mode. At frequencies below the fundamental, no spurious signals, other than the noise floor of the system, could be found within 20 dB of the limits. A numeric list of measured emissions appears in the Data Chart(s) of this report.

Occupied Bandwidth

In addition to measuring the levels of Radiated Emissions, the Occupied Bandwidth of the transmitter was measured. In accordance with FCC Part 15.231(c), the 20 dB bandwidth of the transmitted signal should be within a window of 0.25% of the center carrier frequency. The resolution bandwidth was set to the closest available filter setting on the HP 8546A EMI Receiver, then corresponded to 5% of the allowable bandwidth determined in the calculation mentioned above, without going below the resolution bandwidth of 10 kHz, as dictated in ANSI C63.4, 2001, Section 13.1.7.

The EUT sample serial number SWX02 was activated to transmit continuously in normal operation mode and was placed on the aforementioned test configuration within the 3 Meter Chamber. The transmitted signal was received on a Log Periodic Antenna and provided to the HP 8546A EMI Receiver, where the fundamental frequency was displayed, and a plot of the Occupied Bandwidth was produced. The measured Occupied Bandwidth of 142.5 kHz is less than the allowed limit of 1.08 MHz. Results can be seen in the Occupied Bandwidth scans in this report.

Test Equipment Utilized

A list of the test equipment used for the Radiated Emissions tests can be found in Appendix C of this report. All equipment is calibrated and used according to the operation manuals supplied by the manufacturers. All antenna calibrations were performed at a N.I.S.T. traceable site, and the resultant correction factors were entered into the HP 8546A EMI Receiver software database.

The connecting cables used were also measured for loss using a calibrated Signal Generator and the HP 8546A EMI Receiver. The resulting loss factors were entered into the HP 8546A EMI Receiver database. This allowed for automatic change in the antenna correction factor. The resulting data taken from the HP 8546A EMI Receiver is an actual reading and can be entered into the database as a corrected meter reading.

When a reading is taken using the Peak Detector, a duty cycle correction factor can be applied for conversion to an average reading. This operation can be used when measuring short-duration bursts of data transmission, under FCC Part 15.231.

The resultant average reading can then be compared to the appropriate limit in order to determine compliance with the limits. The HP 8546A EMI Receiver was operated with a bandwidth of 120 kHz when receiving signals below 1 GHz, and with a bandwidth of 1 MHz when receiving signals above 1 GHz, in accordance with CISPR 16.

Radiated Emissions Data Chart
3 Meter Measurements of Electromagnetic Radiated Emissions
Within the 3 Meter FCC Listed Semi-Anechoic Chamber
Test Standard: FCC Parts 15.205, 15.209 and 15.231(b)
Frequency Range Inspected: 30 MHz to 5000 MHz

Manufacturer:	Snow-Way International, Inc.						
Date(s) of Test:	March 15, 2004						
Test Engineer:	√	Abtin Spantman		Tom Smith		Ken Boston	
Model #:	96106472						
Serial #:	100-000-SWX01						
Voltage:	3.0 VDC						
Distance:	3.0 m						
Configuration:	Continuous C. W. transmission						
Detectors Used:		√	Peak	√	Quasi-Peak		Average

Environmental Conditions in the Lab:

Temperature: 20 – 25°C
Atmospheric Pressure: 86 kPa – 106 kPa
Relative Humidity: 30 – 60 %

Test Equipment Used:

EMI Measurement Instrument: HP8546A
Biconical Antenna: EMCO #93110B
Log Periodic Antenna: EMCO #93146
Horn Antenna: EMCO #3115
Spectrum Analyzer: Agilent E4407B

The table depicts the level of significant radiated emissions found:

Frequency (MHz)	Antenna Polarity	Height (m)	Azimuth (Degree)	EMI Meter Reading (dBμ V/m)	Duty Cycle Allowance (dB)	Corrected Reading (dBμV/m)	15.231(b) Limit (dBμV/m)	Margin (dB)
434.2	V	1.30	185	71.7	3.5	68.2	80.8	12.6
868.5	V	1.15	250	53.3	3.5	49.8	60.8	11.0
1302	V	1.30	165	56.8	3.5	53.3	54.0	0.7
1737	V	1.00	160	53.0	3.5	49.5	60.8	11.3
2171	V	1.00	0	47.7	3.5	44.2	60.8	16.6
2605	V	1.10	135	61.1	3.5	57.6	60.8	3.2
3039	V	1.20	95	50.3	3.5	46.8	60.8	14.0
3474	V	1.00	125	56.6	3.5	53.1	60.8	7.7
3908	V	1.00	170	50.8	3.5	47.3	54.0	6.7
4342	V	1.00	215	46.3	3.5	42.8	54.0	11.2

Note: A Quasi-Peak Detector was used in measurements below 1 GHz and a Peak Detector was used in measurements above 1 GHz. No other significant emissions were noted. All other emissions observed were better than 20 dB below the limit.

Photo(s) of Radiated Emission Test Setup



View of the EUT in Vertical Orientation
This orientation had the highest measured emissions.



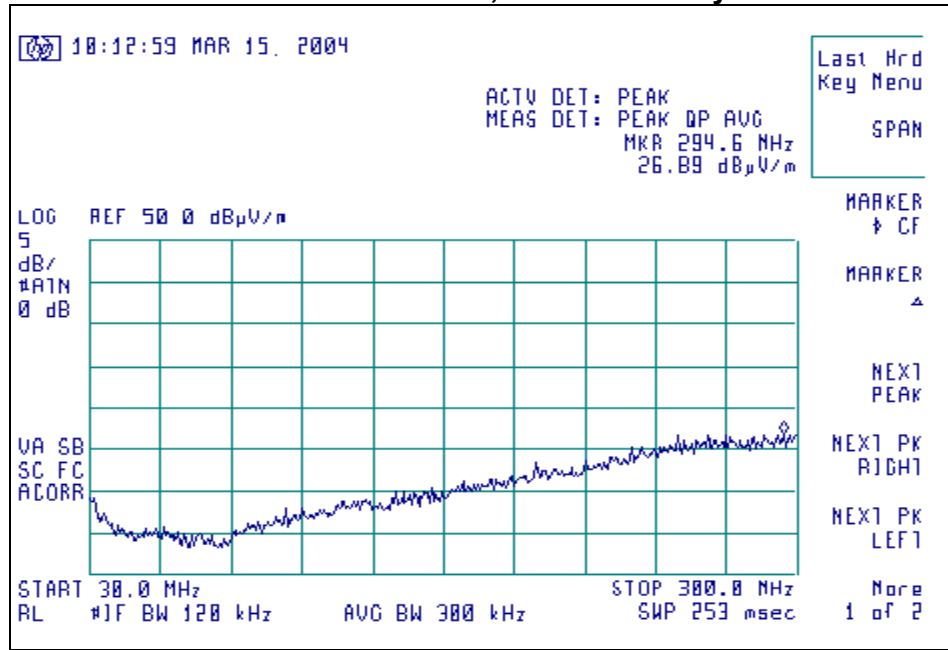
View of the EUT in Horizontal Orientation



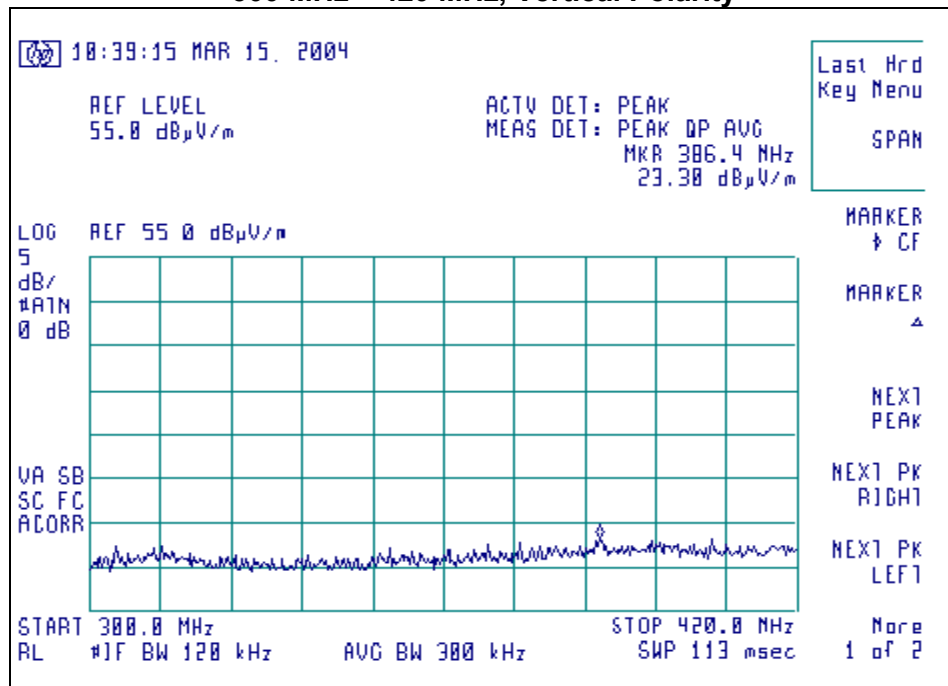
View of the EUT in Side Orientation

Signature Scans of Radiated Emissions

Signature Scan 30 MHz – 300 MHz, Vertical Polarity

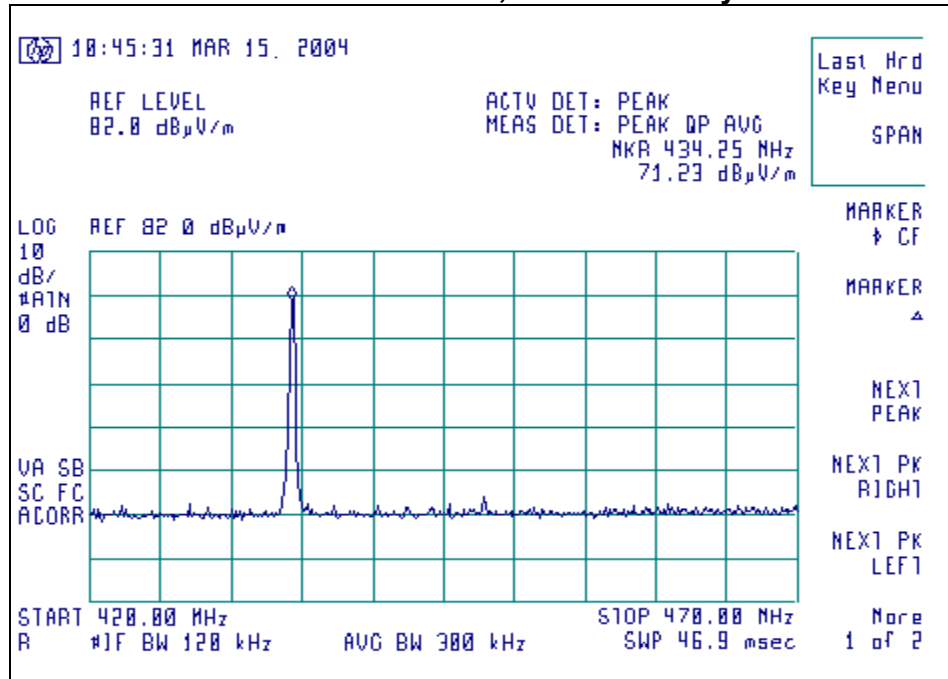


Signature Scan 300 MHz – 420 MHz, Vertical Polarity

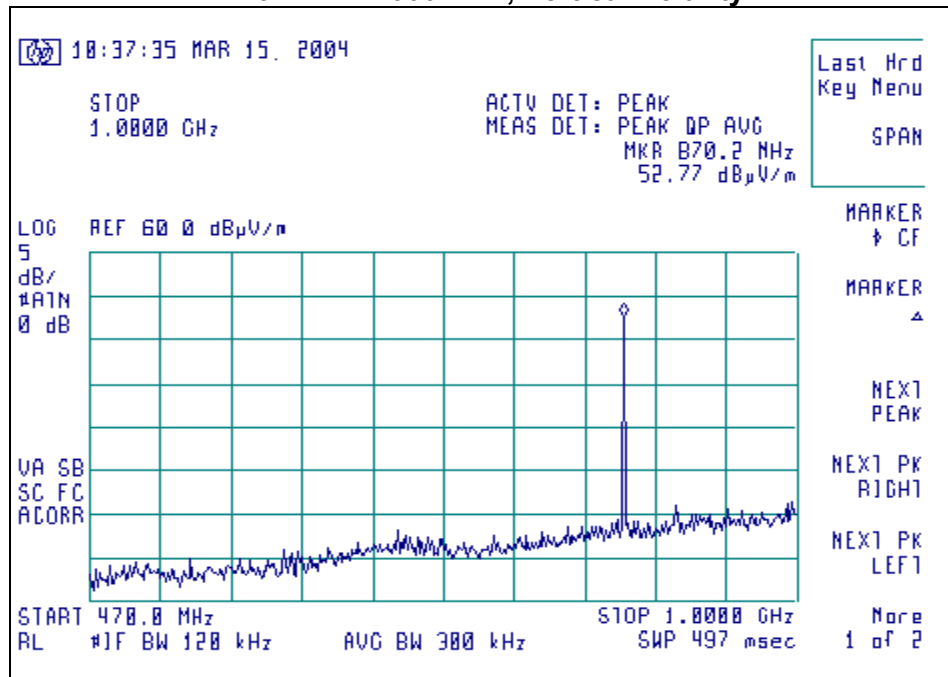


Signature Scans of Radiated Emissions (continued)

Signature Scan 420 MHz – 470 MHz, Vertical Polarity

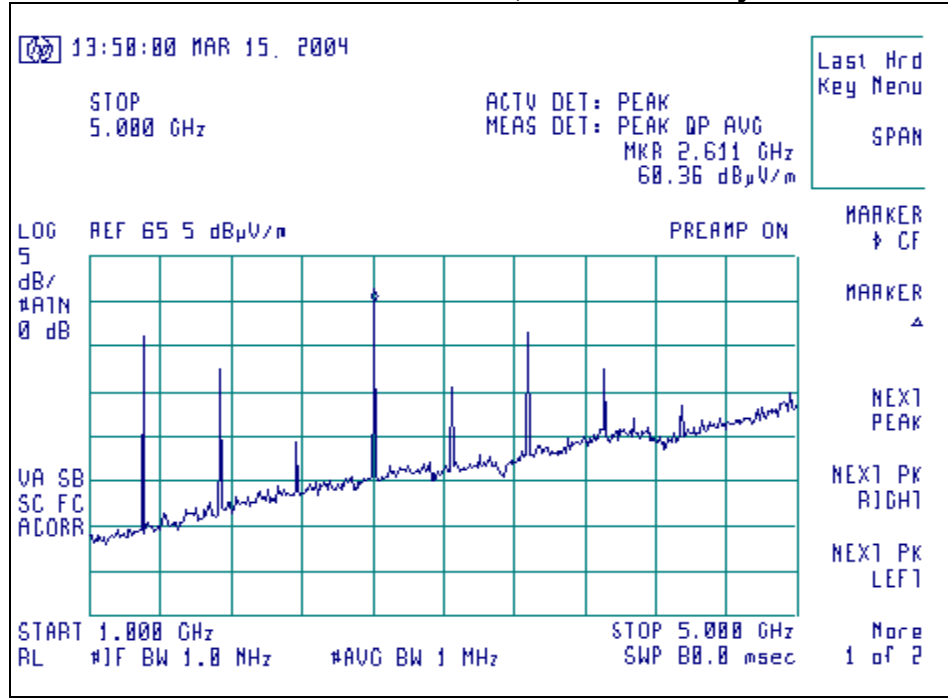


Signature Scan 470 MHz – 1000 MHz, Vertical Polarity

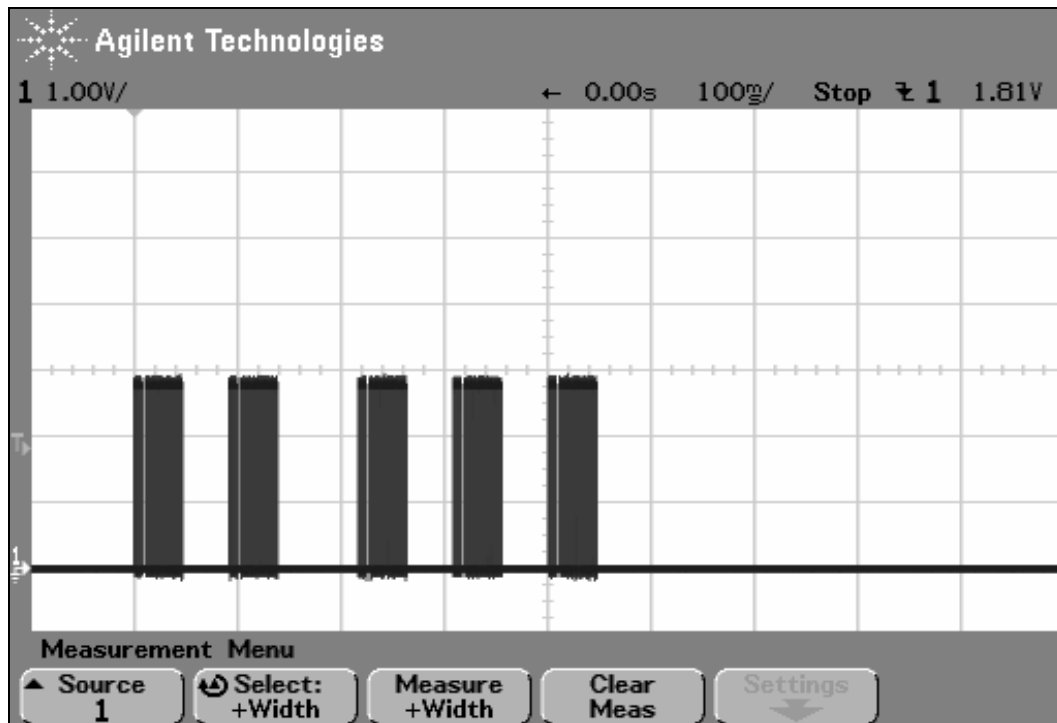


Signature Scans of Radiated Emissions (continued)

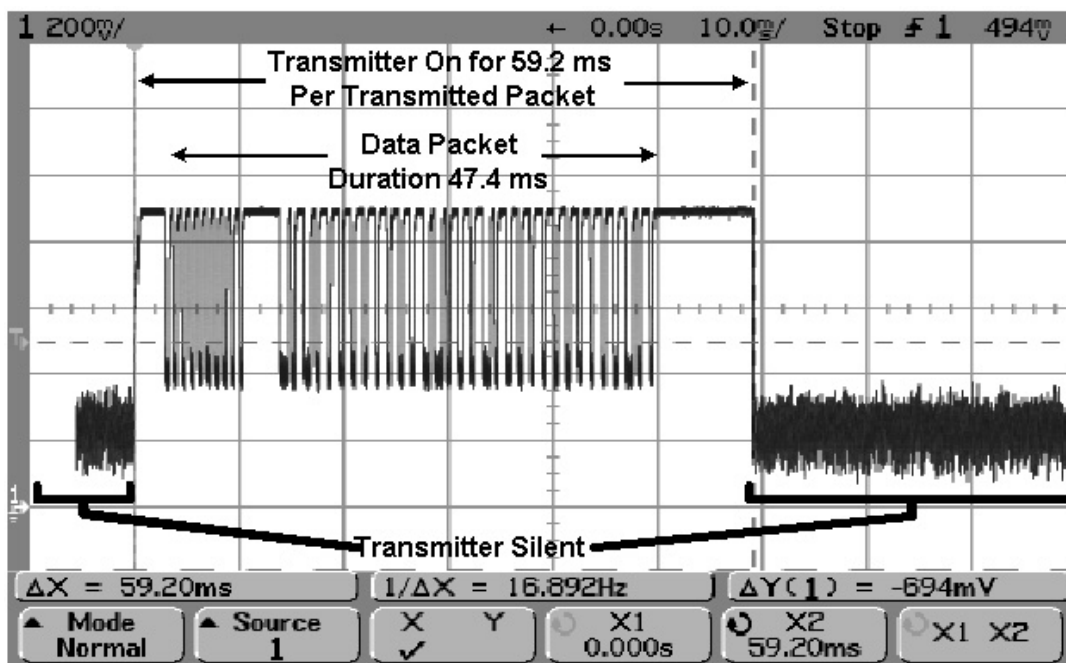
Signature Scan 1000 MHz – 5000 MHz, Vertical Polarity



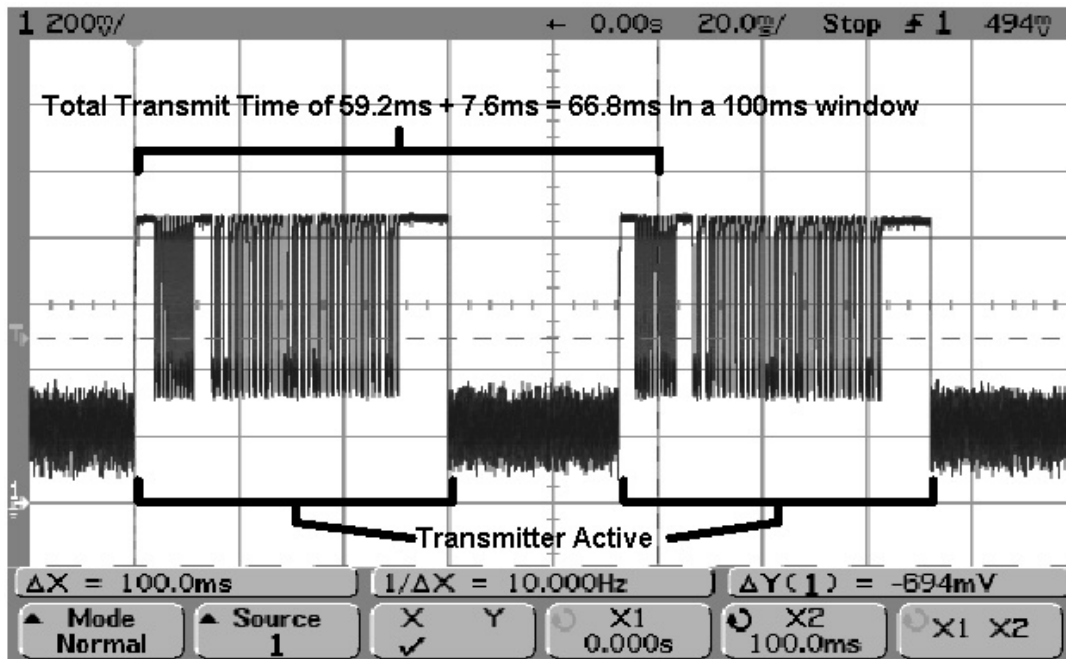
Data Packet Detail



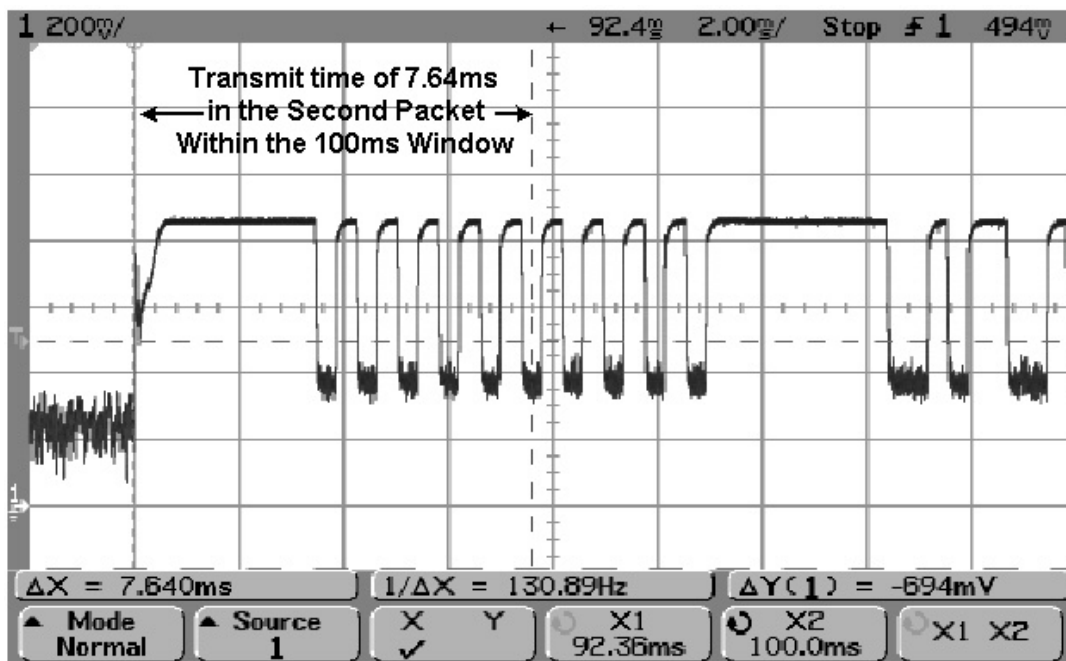
Data Train showing two redundant command packets and three stop packets as the minimum transmit sequence upon each activation.



Demodulated data from receiver, showing power management scheme, turning transmitter on just prior to packet transmission, then turning transmitter off just after packet transmission.

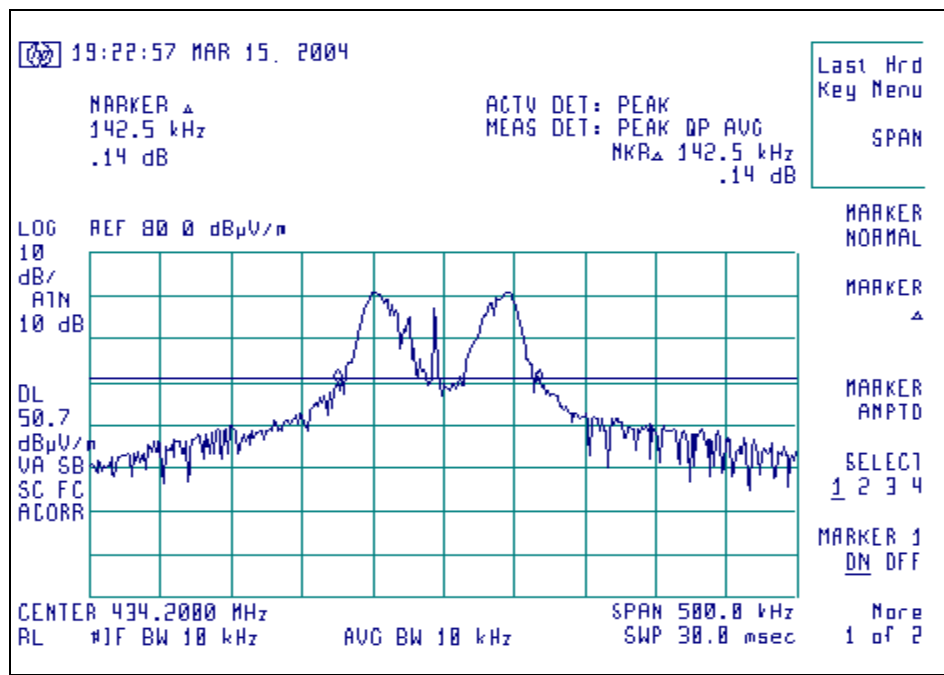


Demodulated data from receiver, detail showing actual on-air times within 100ms window. As used in relaxation factor calculations.



Demodulated data from receiver, showing portion of second packet that falls within the 100ms window, for worst case calculations.

Occupied Bandwidth



12. Conducted Emissions Test (AC Line)

This product only uses two standard type “AA” batteries. Therefore, emissions tests on the AC line do not apply to this product.

APPENDIX A
CALCULATIONS

Manufacturer: Sno-Way International, Inc.
Model: 96106472

**CALCULATION OF RADIATED EMISSIONS LIMITS
FOR FCC PARTS 15.209, and 15.231(b) (260-470 MHz)**

FIELD STRENGTH OF FUNDAMENTAL FREQUENCIES:

The calculation involves a linear interpolation of 3750 to 12500 $\mu\text{V/m}$ over 260-470 MHz, where field strength of the fundamental frequency (f_0) when $260 \leq f_0 \leq 470$ MHz, can be found by: $3750 + 41.6667 (f_0 - 260)$, where f_0 is in MHz.

FIELD STRENGTH OF SPURIOUS/HARMONIC FREQUENCIES:

The spurious and harmonic emissions are subject to the limits expressed in FCC Parts 15.205 and 15.209, if within the restricted bands and dictated by the following calculation elsewhere.

The calculation involves a linear interpolation of 375 to 1250 $\mu\text{V/m}$ over 260 to 470 MHz, where field strength of the harmonic frequencies ($2f_0, 3f_0, \dots$) when $260 \leq f_0 \leq 470$ MHz, can be found by: $375 + 4.1667(f_0 - 260)$, where f_0 is in MHz.

At fundamental frequency $f_0 = 434.2$ MHz

Fundamental Limit: $3750 + 41.6667 (434.2 - 260) = 11008.3 \mu\text{V/m @ 3m}$

Harmonic Limit: $375 + 4.1667 (434.2 - 260) = 1100.8 \mu\text{V/m @ 3m}$

Frequency (MHz)	Fundamental Limit ($\mu\text{V/m @ 3m}$)	Fundamental Limit (dB $\mu\text{V/m @ 3m}$)	Harmonic Limit ($\mu\text{V/m @ 3m}$)	Harmonic Limit (dB $\mu\text{V/m @ 3m}$)
434.2	11008.3	80.83	1100.8	60.83

APPENDIX B

DUTY CYCLE CORRECTION

For a graphical presentation of the data packets from the transmitter, refer to the Data Packet Detail – Radiated Emissions in this report. Some images were captured on an oscilloscope, while probing the data line, going into the transmitter RF section, while others were captured by monitoring the demodulated output from the E.M.I. receiver. The transmitter was functioning in normal operating mode, and activated by pressing one of the transmit buttons.

Average (Relaxation) Factor

Average Factor = $20 * \text{Log}_{10}$ (Worst Case EUT On-time over 100 ms time window)

In this particular case, since the transmitter uses FM/FSK techniques, along with power management, the transmit packet envelope is used to calculate the relaxation factor, based on when the transmitter actually transmits before being silenced by the power management algorithm.

The worst case occupancy occurs during the first two packets of transmission and the last three packets of stop commands. In both cases, the entire first packet falls within the 100ms window, plus portions of the second packet. The transmit envelopes are measured at 59.2ms for the first packet and 7.6ms for the second packet. The total worst-case occupancy is then 66.8ms of time, within any 100 ms window. Therefore, the relaxation factor allowance is calculated as:

$$\text{Average Factor} = 20 * \text{Log}_{10} (66.8 / 100 \text{ ms}) = -3.5 \text{ dB}$$

A relaxation factor of 3.5 dB would be allowable for this product.

OCCUPIED BANDWIDTH CALCULATIONS

FCC Part 15.231(c) states that the bandwidth of a manually operated device shall be no wider than 0.25% of the center frequency for devices operating between 70 MHz and 900 MHz.

Said bandwidth is determined at the -20 dB reference to peak carrier points.

Refer to the set of screen captures in this report, which show the actual Occupied Bandwidth of the transmitters as measured.

For this device, operating at a center frequency of 434.2 MHz, the allowed Occupied Bandwidth is calculated to be:

$$434.2 \text{ MHz} \times 0.0025 = 1.08 \text{ MHz}$$

APPENDIX C - Test Equipment List

Asset #	Manufacturer	Model #	Serial #	Description	Date	Due
AA960008	EMCO	3816/2NM	9701-1057	Line Impedance Stabilization Network	9/03/03	9/03/04
AA960031	HP	119474A	3107A01708	Transient Limiter	Note 1	Note 1
AA960077	EMCO	93110B	9702-2918	Biconical Antenna	9/02/03	9/02/04
AA960078	EMCO	93146	9701-4855	Log-Periodic Antenna	9/02/03	9/02/04
AA960081	EMCO	3115	6907	Double Ridge Horn Antenna	11/14/03	11/14/04
CC00221C	Agilent	E4407B	US39160256	Spectrum Analyzer	11/04/03	11/04/04
CC000267C	Agilent	54624A	US40020305	Oscilloscope	9/03/03	9/03/04
EE960004	EMCO	2090	9607-1164	Device Controller	N/A	N/A
EE960013	HP	8546A	3617A00320	Receiver RF Section	9/04/03	9/04/04
EE960014	HP	85460A	3448A00296	Receiver Pre-Selector	9/04/03	9/04/04
N/A	LSC	Cable	0011	3 Meter ½" Armored Cable	6/07/03	6/07/04
N/A	LSC	Cable	0038	1 Meter RG 214 Cable	6/07/03	6/07/04
N/A	LSC	Cable	0050	10 Meter RG 214 Cable	6/07/03	6/07/04
N/A	Pasternack	Attenuator	N/A	10 dB Attenuator	Note 1	Note 1

Note 1 - Equipment calibrated within a traceable system.

Table of Expanded Uncertainty Values, (K=2) for Specified Measurements

Measurement Type	Particular Configuration	Uncertainty Values
Radiated Emissions	3 – Meter chamber, Biconical Antenna	4.24 dB
Radiated Emissions	3-Meter Chamber, Log Periodic Antenna	4.8 dB
Radiated Emissions	10-Meter OATS, Biconical Antenna	4.18 dB
Radiated Emissions	10-Meter OATS, Log Periodic Antenna	3.92 dB
Conducted Emissions	Shielded Room/EMCO LISN	1.60 dB
Radiated Immunity	3 Volts/Meter in 3-Meter Chamber	1.128 Volts/Meter
Conducted Immunity	3 Volts level	1.0 V