

Exhibit B – Test Report
Tensleep Technologies
SST121 StepSaverTransmitter

Project Number: 04198-10

Prepared for:
TENSLEEP TECHNOLOGIES
6620 Manor Road, Suite A
Austin, TX

By

Professional Testing (EMI), Inc.
1601 FM 1460, Suite B
Round Rock, Texas 78664

November 2003

CERTIFICATION
Electromagnetic Interference
Test Report

TENSLEEP TECHNOLOGIES
SST121 STEPSAVERTRANSMITTER
(Transmitter)

Table of Contents

Title Page 1

Table of Contents 2

Certificate of Compliance 3

1.0 EUT Description 4

1.1 EUT Operation 4

2.0 Electromagnetic Emissions Testing 4

 2.1 Conducted Emissions Measurements 4

 2.2 Radiated Emissions Measurements 5

 2.2.1 Test Procedure 5

 2.2.2 Test Criteria 6

 2.2.3 Test Results 6

3.0 Antenna Requirement 7

 3.1 Evaluation Procedure 7

 3.2 Evaluation Criteria 7

 3.3 Evaluation 7

4.0 RF Safety 7

5.0 Modifications to Equipment 7

6.0 List of Test Equipment 8

Figures

FIGURE 1: Radiated Emissions Test Setup 9

Appendices

Appendix A: Emissions Data Sheets 10

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF PROFESSIONAL TESTING (EMI), INC.



Certificate of Compliance

Applicant: Tensleep Technologies
 Applicant's Address: 6620 Manor Road, Suite A
 Austin, TX
 Model: SST121 StepSaverTransmitter
 FCC ID: RMB-SST
 Project Number: 04198-10

The **Tensleep Technologies SST121 StepSaverTransmitter** was tested to and found to be in compliance with FCC Part 15.203, 15.205, 15.209, and 15.249 for Intentional Radiators.

The highest average emissions generated by the above equipments are listed below:

	<u>Frequency (MHz)</u>	<u>Level (dBμV/m)</u>	<u>Limit (dBμV/m)</u>	<u>Margin (dB)</u>
Peak Fundamental	914.02	91.9	94	-2.1
Harmonics	1828	54.5	63.5	-9.0

I, Jeffrey A. Lenk, for Professional Testing (EMI), Inc., being familiar with the FCC rules and test procedures have reviewed the test setup, measured data and this report. I believe them to be true and accurate.

Jeffrey A. Lenk
President

1.0 EUT Description

The RF-150 Mouse is a handheld, transmitter used in the StepSaver system that allows the control of an appliance from a remote location. The EUT is battery operated and works in conjunction with a receiver. The EUT transmits on 914 MHz using frequency shift keying. The StepSaver system is designed to be used to control food dispensed from a deer feeding station. Each time the Send button on the transmitter is pushed, the EUT sends a coded message to the receiver and the receiver initiates an output to the feeder.

The EUT operates on a frequency of 914 MHz and is designed for compliance with 47 CFR 15.249 of the FCC rules. Specific test requirements for the devices include the following:

47 CFR 15.249	Fundamental and Harmonic Radiated Power
47 CFR 15.209	General Radiated Emission Limits
47 CFR 15.203	Antenna Requirements
47 CFR 15.205	Restricted Bands of Operation

With the StepSaver, we can select any frequency between 914.1 and 914.9 MHz with a channel spacing of 100 kHz

The system tested consisted of the following:

<u>Manufacturer & Model</u>	<u>Serial #</u>	<u>FCC ID #</u>	<u>Description</u>
Tensleep Technologies SST121 StepSaverTransmitter	None	RMB-SST	Transmitter

System Peripherals

None.

Remote Peripherals

None

1.1 EUT Operation

The EUT was tested while in a transmitting mode. The EUT has a single “Push” button.

2.0 Electromagnetic Emissions Testing

Professional Testing (EMI), Inc. (PTI), follows the guidelines of NIST for all uncertainty calculations, estimates and expressions thereof for EMC testing.

2.1 Conducted Emissions Measurements

Conducted emissions were not measured. The EUT operates strictly from battery power (Two AA batteries). This test is not required.

2.2 Radiated Emissions Measurements

Radiated emission measurements were made on the transmitter Fundamental and Spurious/Harmonic Emission levels for the **Tensleep Technologies, SST121 StepSaverTransmitter**.

Measurements of the maximum emission levels for the fundamental and the spurious/harmonic emissions of the transmitter were made at the Professional Testing "Open Field" Site 1, located in Marble Falls, Texas. A "Description of Measurement Facilities" has been submitted to the FCC and approved pursuant to Section 2.948 of CFR 47 of the FCC rules.

Tests of the fundamental for the device were performed to determine the worst case orientation and polarization of the device.

2.2.1 Test Procedure

The following testing procedure was applied to the EUT mentioned above.

The EUT was placed on a non-conductive table 0.8 meters above the ground plane. The table was centered on a motorized turntable, which allows 360-degree rotation. For measurements of the fundamental signal, a measurement antenna was positioned at a distance of 3 meters as measured from the closest point of the EUT. For spurious/harmonic measurements above 1 GHz, the measurement antenna was placed at a distance of 1 meter from the EUT. The radiated emissions were maximized by energizing the EUT and by rotating the EUT.

A Spectrum Analyzer with peak detection was used to find the maximums of the radiated emissions during the variability testing. A drawing showing the test setup is given as Figure 1.

2.2.2 Test Criteria

The table below shows FCC 15.249 radiated limits for an intentional radiator operating at 902 to 928 MHz. In addition to these requirements, the EUT must meet the restricted emission band requirements of §15.205 and §15.209. The measurements of the harmonics and spurious emissions were performed to the 10th harmonic of the fundamental.

<u>Signal Type</u>	<u>Frequency (MHz)</u>	<u>3 m Limit Per §15.249 or §15.209</u>	<u>Field Strength (dB uV/m)</u>
Fundamental	914.041	50 mV/m	94
2 nd Harmonic	1828	500 µV/m	63.5
3 rd Harmonic	2742	500 µV/m	63.5
4 th Harmonic	3656	500 µV/m	63.5
5 th Harmonic	4570	500 µV/m	63.5
6 th Harmonic	5484	500 µV/m	63.5
7 th Harmonic	6398	500 µV/m	63.5
8 th Harmonic	7312	500 µV/m	63.5
9 th Harmonic	8226	500 µV/m	63.5
10 th Harmonic	9140	500 µV/m	63.5

Note: Radiated emissions above 1000 MHz were measured at 1 meter and the limit was increased to 63.5 dBuV/m.

2.2.3 Test Results

The radiated test data for the fundamental is included in Appendix A. The emissions were maximized at each frequency and the highest emissions identified were measured using peak detection. The radiated emissions test data for the harmonics is included in Appendix A.

The radiated emissions generated by the Tensleep Technologies SST121 StepSaverTransmitter are below the FCC Part 15 maximum emission criteria.

2.3 Occupied Bandwidth Measurements

As per §15.249 measurements of occupied bandwidth for the fundamental signals of the EUT are not required. To prevent out of band emissions, the operating frequencies have been selected the center of the band.

3.0 Antenna Requirement

An analysis of the **Tensleep Technologies SST121 StepSaverTransmitter** was performed to determine compliance with Section 15.203 of the Rules. This section requires specific handling and control of antennas used for devices subject to regulations under the Intentional Radiator portions of Part 15.

3.1 Evaluation Procedure

The structure and application of the **Tensleep Technologies SST121 StepSaverTransmitter** were analyzed with respect to the rules. The antenna for this unit is an internal antenna. An auxiliary antenna port is not present.

3.2 Evaluation Criteria

Section 15.203 of the rules states that the subject device must meet at least one of the following criteria:

- (a) Antenna be permanently attached to the unit.
- (b) Antenna must use a unique type of connector to attach to the EUT.
- (c) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

3.3 Evaluation Results

The **Tensleep Technologies SST121 StepSaverTransmitter** meets the criteria of this rule by virtue of having an internal antenna located inside the enclosure. The antenna is held in place by a screw with a “round off” head. The head of the screw prevents removal of the antenna using common tools.

4.0 RF Safety

The FCC safety criteria that invokes measurement of specific absorption rate (SAR), from OET Bulletin 65 Supplement C, is 300 mW for 915 MHz operating frequency. The power output of this transmitter is thus 1/100th of the threshold for RF safety concern, and therefore meets the requirements of FCC rules 2.1091 & 2.1093.

5.0 Modifications to Equipment

No modifications were made to the **Tensleep Technologies SST121 StepSaverTransmitter** during the testing process.

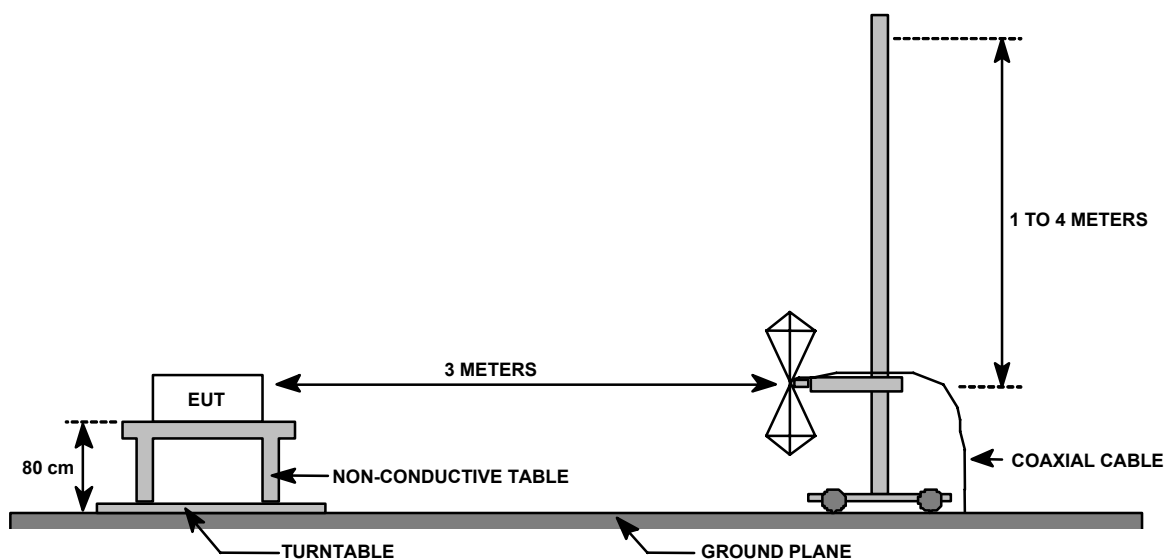
6.0 List of Test Equipment

A list of the test equipment utilized to perform the testing is given below. The date of calibration is given for each.

Electromagnetic Emissions Test Equipment

Electromagnetic Emissions Test Equipment

EMCO 3146	Log Periodic Antenna	November 2003
HP 85662A	Display unit	November 2003
HP 8447F	Preamplifier	November 2003
HP 8568B	Spectrum Analyzer	November 2003
HP 85650A	Quasi-Peak Adapter	November 2003
EMCO 3108	Biconical Antenna	September 2004
HP 8566B	Spectrum Analyzer	November 2003
EMCO 3115	Ridge Guide Antenna	June 2004
MITEQ	18GHz 20dB Preamplifier	December 2003

FIGURE 1: Radiated Emissions Test Setup

Appendix A

Emissions Data Sheets

Fundamental Radiated Data Sheet
Tensleep Technologies
SST121 StepSaverTransmitter

DATE: October 14, 2003
 PROJECT #: 04198-10

DETECTOR FUNCTION: Quasi-Peak
 MEASUREMENT DISTANCE (m): 3

Antenna Polarization: Horizontal

Freq. (MHz)	EUT Dir (Deg.)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
914.041	248	100	80.6	26.2	24.3	12.5	91.3	94	-2.7

Antenna Polarization: Vertical

Freq. (MHz)	EUT Dir (Deg.)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
914.042	158	1.5	81.27	26.2	24.3	12.5	91.9	94	-2.1

$$\text{Corrected Level} = \text{Recorded Level} - \text{Amplifier Gain} + \text{Antenna Factor} + \text{Cable Loss}$$

Comment: Test Type FCC 15.249
 No other signals detectable, 30 MHz to 1 GHz

Test Engineer: Mike Royer

Harmonics Radiated Data Sheet **Tensleep Technologies** **SST121 StepSaverTransmitter**

DATE: October 14, 2003
 PROJECT #: 04198-10

DETECTOR FUNCTION: Average
 MEASUREMENT DISTANCE (m): 1

Antenna Polarization: Horizontal

Freq. (MHz)	EUT Dir (Deg.)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/M)	Cable Loss (dB)	Corrected Level (dBuV/M)	Limit (dBuV/M)	Margin (dB)
1828	80	1	50.4	22.9	26.8	0.2	54.5	63.5	-9.0
2742	280	1	46	22.6	29.5	0.3	53.1	63.5	-10.4
3656	180	1	32	22.9	32.1	0.4	41.6	63.5	-21.9
4570	0	1	29	23.2	33.5	0.4	39.7	63.5	-23.8
5484	90	1	32	23.0	35.0	0.4	44.4	63.5	-19.1
6398	100	1	30	22.2	35.1	0.5	43.5	63.5	-20.0
7312	noise	floor	18	21.3	36.9	0.5	34.1	63.5	-29.4
8226	noise	floor	19	21.2	37.5	0.5	35.9	63.5	-27.6
9140	noise	floor	20	21.1	37.4	0.6	36.9	63.5	-26.6

Antenna Polarization: Vertical

Freq. (MHz)	EUT Dir (Deg.)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/M)	Cable Loss (dB)	Corrected Level (dBuV/M)	Limit (dBuV/M)	Margin (dB)
1828	180	1	49	22.9	26.8	0.2	53.1	63.5	-10.4
2742	0	1	41.7	22.6	29.5	0.3	48.8	63.5	-14.7
3656	270	1	29	22.9	32.1	0.4	38.6	63.5	-24.9
4570	210	1	29	23.2	33.5	0.4	39.7	63.5	-23.8
5484	330	1	31	23.0	35.0	0.4	43.4	63.5	-20.1
6398	30	1	30	22.2	35.1	0.5	43.5	63.5	-20.0
7312	noise	floor	20	21.3	36.9	0.5	36.1	63.5	-27.4
8226	noise	floor	21	21.2	37.5	0.5	37.9	63.5	-25.6
9140	noise	floor	22	21.1	37.4	0.6	38.9	63.5	-24.6

Corrected Level = Recorded Level - Amplifier Gain + Antenna Factor + Cable Loss

Test Engineer: Mike Royer