COMMUNICATION CERTIFICATION LABORATORY

1940 West Alexander Street
Salt Lake City, UT 84119
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Test Report

Certification

TEST OF: 433TSPW1K

FCC ID: SU7433TSPW1K

To FCC PART 15, Subpart C
Section 15.231

Test Report Serial No: 73-8302

Applicant:

Controlled Entry Distributors, Inc.
DBA Community Controls
2500 South 3850 West, Suite A
Salt Lake City, UT 84120

Date of Test: May 8, 2006

Issue Date: May 11, 2006

Accredited Testing Laboratory By:

NVLAP

NVLAP Lab Code 100272-0

CERTIFICATION OF ENGINEERING REPORT

This report has been prepared by Communication Certification Laboratory to determine compliance of the device described below with the certification requirements of FCC Part 15, Subpart C. This report may be reproduced in full, partial reproduction may only be made with the written consent of the laboratory. The results in this report apply only to the sample tested.

- Applicant: Controlled Entry Distributors, Inc.
  DBA Community Controls
- Manufacturer: Elpro Innotek sri
- Trade Name: Monarch
- Model Number: 433TSPW1K
- FCC ID: SU7433TSPW1K

On this 11th day of May 2006, I, individually, and for Communication Certification Laboratory, certify that the statements made in this engineering report are true, complete, and correct to the best of my knowledge, and are made in good faith.

Although NVLAP has recognized that the Communication Certification Laboratory EMC testing facilities are in good standing, NVLAP does not endorse the product described in this report.

COMMUNICATION CERTIFICATION LABORATORY

Tested by: Norman P. Hansen
EMC Technician

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SECTION 1.0 CLIENT INFORMATION

1.1 Client Information:

Company Name: Controlled Entry Distributors, Inc.
DBA Community Controls
2500 South 3850 West, Suite A
Salt Lake City, UT 84120

Contact Name: Brad Kofford
Title: President

1.2 Manufacturer:

Company Name: Elpro Innotek sri
Via Piave, 23
31020 S. Pietro Di Feletto
Treviso, Italy

Contact Name: Massimo Dalle Carbonare
Title: Engineer

SECTION 2.0 EQUIPMENT UNDER TEST (EUT)

2.1 Identification of EUT:

Trade Name:	Monarch
Model Number:	433TSPW1K
Serial Number:	None
Options Fitted:	N/A
Country of Manufacture:	Italy

2.2 Description of EUT:

The 433TSPW1K is a one-button, pulsed emission, transmitter operating periodically at 433.9 MHz. The 433TSPW1K is for use with automated gates, access control panels, or garage door openers that operate at 433.9 MHz. Power is supplied by two CR2016, 3 Vdc, lithium batteries.

SECTION 3.0 TEST SPECIFICATION, METHODS & PROCEDURES

3.1 Test Specification:

Title: FCC PART 15, Subpart C (47 CFR 15).
Section 15.231

Periodic operation in the band 40.66-40.70 MHz and above 70 MHz.

Purpose of Test: The tests were performed to demonstrate Initial compliance.

3.2 Methods & Procedures:

3.2.1 §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 this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, 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.

3.2.2 §15.231

(a) The provision of this section are restricted to periodic operation within the band 40.66-40.70 MHz and above 70 MHz. Except as Shown in paragraph (e) of this section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Radio control of toys is not permitted. Continuous transmissions, such as voice or video, and data transmissions are not permitted. The prohibition against data transmissions does not preclude the use of recognition codes. Those codes are used to identify the sensor that is activated or to identify the particular component as being part of the system.

The following conditions shall be met to comply with the provisions for this periodic operation:

(1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

(2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

(3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmission to determine system integrity of transmitters used in security or safety applications are allowed if the periodic rate of transmission does not exceed one transmission of not more than one second duration per hour for each transmitter.

(4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.

(b) In addition to the provisions of §15.205, the field strength of emission from intentional radiators operated under this section shall not exceed the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66 - 40.70	2,250	225
70 –130	1,250	125
130 – 174	1,250 to 3,750 **	125 to 375 **
174 – 260	3,750	375
260 – 470	3,750 to 12,500 **	375 to 1,250 **
Above 470	12,500	1,250

** Linear interpolations

(1) the above field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.

(2) Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions, as shown in the above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed,

the provision in §15.35 for averaging pulsed emission and for limiting peak emissions apply. Further, compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section.

(3) The limits on the field strength of the spurious emission in the above table are based on the fundamental frequency of the intentional radiator. Spurious emission shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

(c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

(d) For devices operating within the frequency band 40.66-40.70 MHz, the bandwidth of the emission shall be confined within the band edges and the frequency tolerance of the carrier shall be ±0.01%. This frequency tolerance shall be maintained for a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation on the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

(e) Intentional radiators may operate at a periodic rate exceeding that specified in paragraph (a) of this section and may be employed for any type of operation, including operation prohibited in paragraph (a) of this section, provided that intentional radiator complies with the provisions of paragraphs (b) through (d) of this section except the field strength table in paragraph (b) of this section is replaced by the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66 - 40.70	1,000	100
70 –130	500	50
130 – 174	500 to 1,500 **	50 to 150 **
174 – 260	1,500	150
260 – 470	1,500 to 5,000 **	150 to 500 **
Above 470	5,000	500

** Linear interpolations

In addition, devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent periods between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

3.2.3 §15.207 Conducted Limits

(a) Except for Class A digital devices, for equipment 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 μH/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 band edges.

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	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.

3.3 Test Procedure

The line conducted and radiated emissions testing was performed according to the procedures in ANSI C63.4 (2003). Testing was performed at CCL's Wanship open area test site #2, located at 550 West Wanship Road, Wanship, UT. This site has been fully described in a report submitted to the FCC, and was accepted in a letter dated August 11, 2003 (90504).

CCL participates in the National Voluntary Laboratory Accreditation Program (NVLAP) and has been accepted under NVLAP Lab Code:100272-0, which is effective until September 30, 2006.

For radiated emissions testing at 30 MHz or above that is performed at distances closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

SECTION 4.0 OPERATION OF EUT DURING TESTING

4.1 Operating Environment:

Power Supply: 6 VDC (2 – CR2016 lithium batteries)

4.2 Operating Modes:

The 433TSPW1K was tested in three orientations, horizontal flat, horizontal edge, and vertical. The worst-case emissions were with the 433TSPW1K button held down so the EUT would constantly transmit and placed vertically on the EUT table. See Photograph 1 through 3 of Appendix 2.

4.3 EUT Exercise Software:

No software was required.

SECTION 5.0 SUMMARY OF TEST RESULTS

5.1 FCC PART 15, Subpart C Section 15.231

5.1.1 Summary of Tests:

Section	Test Performed	Frequency Range (MHz)	Result
15.203	Antenna Requirement	N/A	Complied
15.231 (a)	Periodic Operation	433.9	Complied
15.231 (b)	Radiated Emissions	30 to 4339	Complied
15.231 (c)	Bandwidth	433.9	Complied
15.231 (d)	Frequency Stability	40.66 to 40.70	Not Applicable
15.231 (e)	Radiated Emissions	30 to 4339	Not Applicable
15.207	Line Conducted Emissions	0.15 to 30	Not Applicable

5.2 Result

In the configuration tested, the EUT complied with the requirements of the specification.

SECTION 6.0 MEASUREMENTS, EXAMINATIONS AND DERIVED RESULTS

6.1 General Comments:

This section contains the test results only. Details of the test methods used and a list of the test equipment used during the measurements can be found in Appendix 1 of this report.

6.2 Test Results:

6.2.1 §15.231

Demonstration of Compliance:

The antenna is etched into the PCB.

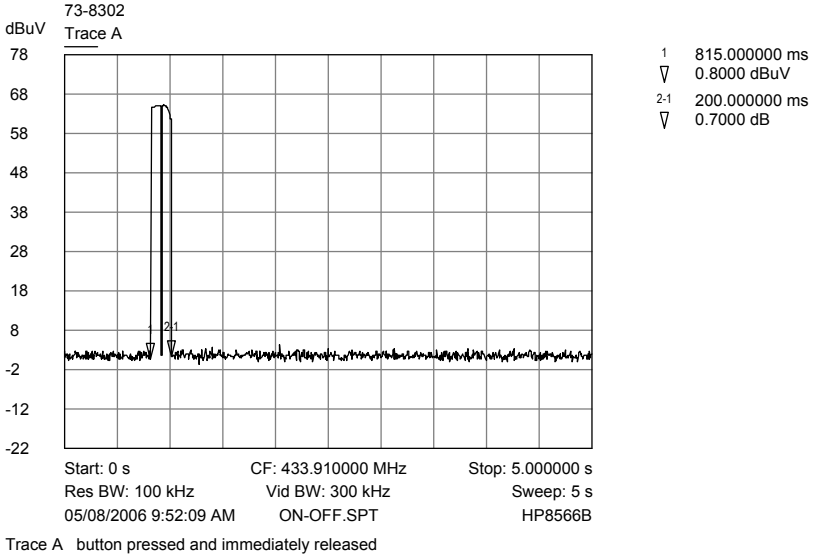
RESULT

In the configuration tested, the EUT complied with the requirements of this section.

6.2.2 §15.231(a)

Demonstration of Compliance:

1. A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released. The plot below shows the transmitter button depressed to activate the transmitter and then immediately released.



Trace A button pressed and immediately released

2. The 433TSPW1K cannot be automatically activated. The 433TSPW1K only transmits if manually activated.

3. The 433TSPW1K does not transmit at regular predetermined intervals. The 433TSPW1K only transmits if manually activated.

RESULT

In the configuration tested, the EUT complied with the requirements of this section.

6.2.3 §15.231(b) Radiated Emissions

Demonstration of Compliance:

The 433TSPW1K operates at 433.9 MHz, therefore; the field strength of the fundamental must be less than 10995.85 μV/m (80.8 dBμV/m) at 3 meters and the field strength of the unwanted emissions must be attenuated 20 dB below the maximum permitted fundamental strength or 60.8 dBμV/m at 3 meters.

The limits for a distance of 3 meters are determined using the formula:

Limit in the 260 – 470 MHz band = 41.6667(F) – 7083.3333

Where F is the frequency in MHz

Emissions in the restricted bands of §15.205 must meet the limits specified in §15.209.

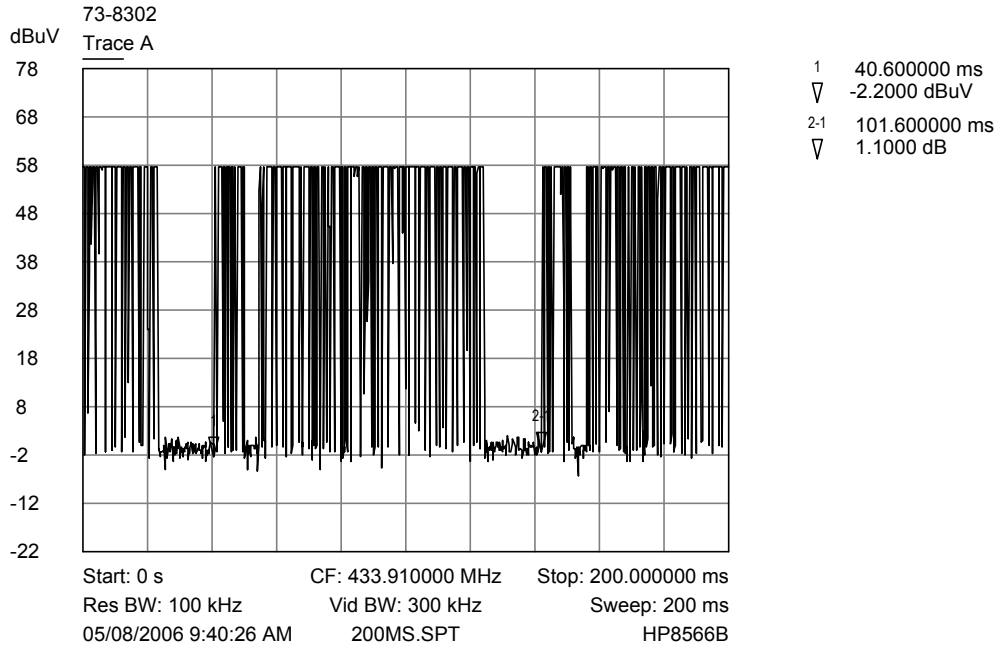
Measurement Data Fundamental and Harmonic Emissions:

The frequency range from 30 MHz to the tenth harmonic of the highest fundamental frequency was investigated to measure any radiated emissions.

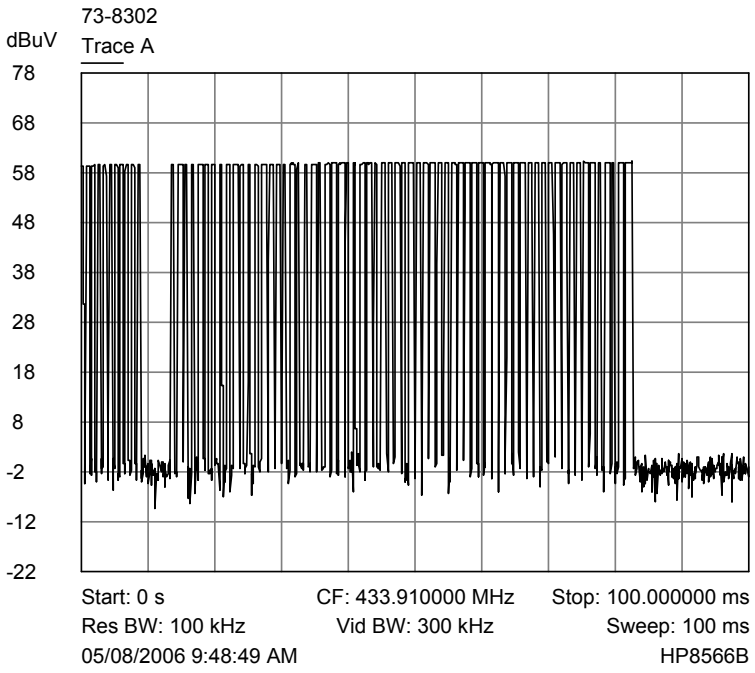
A diagram of the test configuration and test equipment used is enclosed in Appendix 1.

Pulsed Emission Averaging Factor:

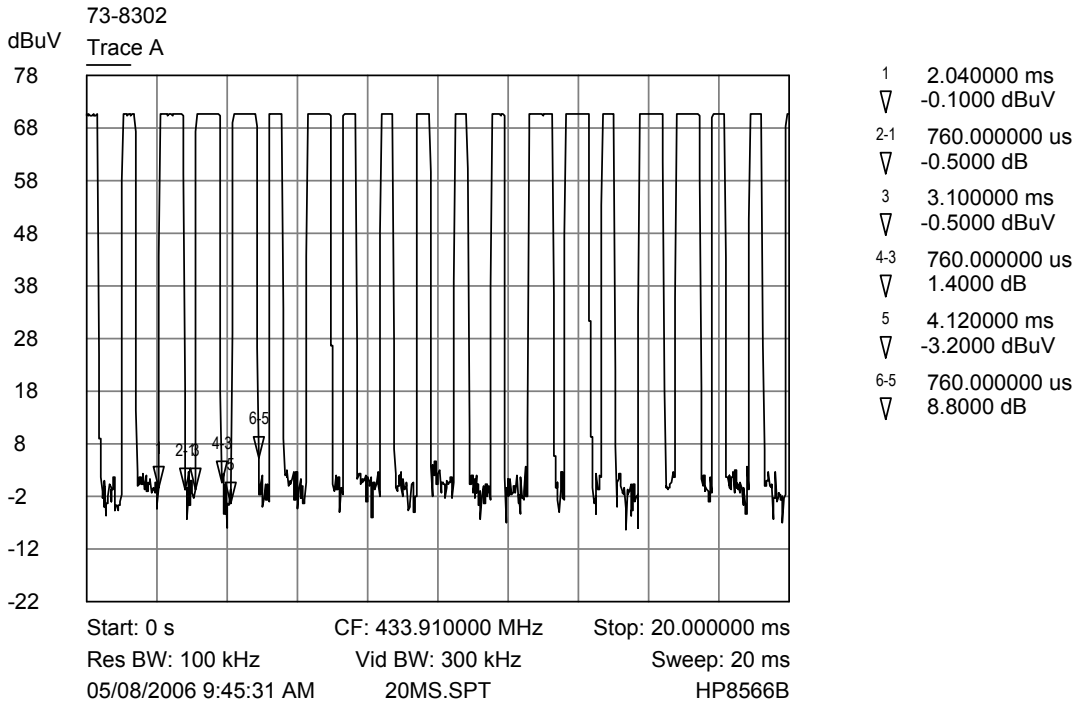
The 433TSPW1K transmitter is a pulsed emission device; therefore, the method of §15.35 for averaging a pulsed emission may be used. The plot of the pulse train and the average factor calculations are shown below:



Trace A 200 ms pulse train plot



Trace A 100ms pulse train plot - 64 pulses in pulse train



Trace A 20 ms pulse train plot

Average factor calculation

From the above plots, there are 64 pulses that have a possible on time of 760 µsec each in the pulse train for a total on time of 48.64 msec. The pulse train is 101.6 msec in duration; therefore, the average factor will be calculated over a period of 100 msec as specified in §15.35. The Average Factor calculation is shown below:

Average Factor = 20 log (on time/ 100 msec)
= 20 log (48.64 msec/100 msec)
= -6.3 dB

The peak measurements were adjusted using –6.3 dB as the average factor.

Radiated Interference Level Data – (Vertical Polarity)

Frequency MHz	Detector	Receiver Reading dBμV	Average Factor dB	Correction Factor dB	Field Strength dBμV/m	Limit dBμV/m	Delta dB
433.9	Peak	51.3	-6.3	20.2	65.2	80.8	-15.6
867.8	Peak	26.5	-6.3	27.7	47.9	60.8	-12.9
1301.7*	Peak	28.1	-6.3	28.7	50.5	54.0	-3.5
1735.6	Peak	11.7	-6.3	31.0	36.4	60.8	-24.4
2169.5	Peak	8.6	-6.3	32.5	34.8	60.8	-26.0
2603.4	Peak	9.4	-6.3	33.6	36.7	60.8	-24.1
3037.3	Peak	13.7	-6.3	34.6	42.0	60.8	-18.8
3471.2	Peak	12.4	-6.3	35.9	42.0	60.8	-18.8
3905.1*	Peak	11.1	-6.3	37.5	42.3	54.0	-11.7
4339.0*	Peak	6.2	-6.3	38.4	38.3	54.0	-15.7
* Emissions within restricted bands							

Radiated Interference Level Data - (Horizontal Polarity)

Frequency MHz	Detector	Receiver Reading dBμV	Average Factor dB	Correction Factor dB	Field Strength dBμV/m	Limit dBμV/m	Delta dB
433.9	Peak	51.4	-6.3	20.2	65.3	80.8	-15.5
867.8	Peak	25.6	-6.3	27.7	47.0	60.8	-13.8
1301.7*	Peak	23.8	-6.3	28.7	46.2	54.0	-7.8
1735.6	Peak	11.3	-6.3	31.0	36.0	60.8	-24.8
2169.5	Peak	7.8	-6.3	32.5	34.0	60.8	-26.8
2603.4	Peak	9.2	-6.3	33.6	36.5	60.8	-24.3
3037.3	Peak	12.2	-6.3	34.6	40.5	60.8	-20.3
3471.2	Peak	12.2	-6.3	35.9	41.8	60.8	-19.0
3905.1*	Peak	10.3	-6.3	37.5	41.5	54.0	-12.5
4339.0*	Peak	6.4	-6.3	38.4	38.5	54.0	-15.5
* Emissions within restricted bands							

Sample Field Strength Calculation:

The field strength is calculated by adding the Correction Factor (Antenna Factor + Cable Factor) and the Average Factor to the measured level of the receiver. The receiver amplitude reading is compensated for any amplifier gain.

The basic equation with a sample calculation is shown below:

FS = RA + CF + AV Where

FS = Field Strength
RA = Receiver Amplitude Reading
CF = Correction Factor (Antenna Factor + Cable Factor)
AV = Averaging Factor

Assume a receiver reading of 44.2 dBμV is obtained from the receiver, with an average factor of -8.6 dB and a correction factor of 17.5 dB. The field strength is calculated by adding the correction factor and the average factor, giving a field strength of 53.1 dBμV/m, FS = 44.2 + 17.5 + (-8.6) = 53.1 dBμV/m

RESULT

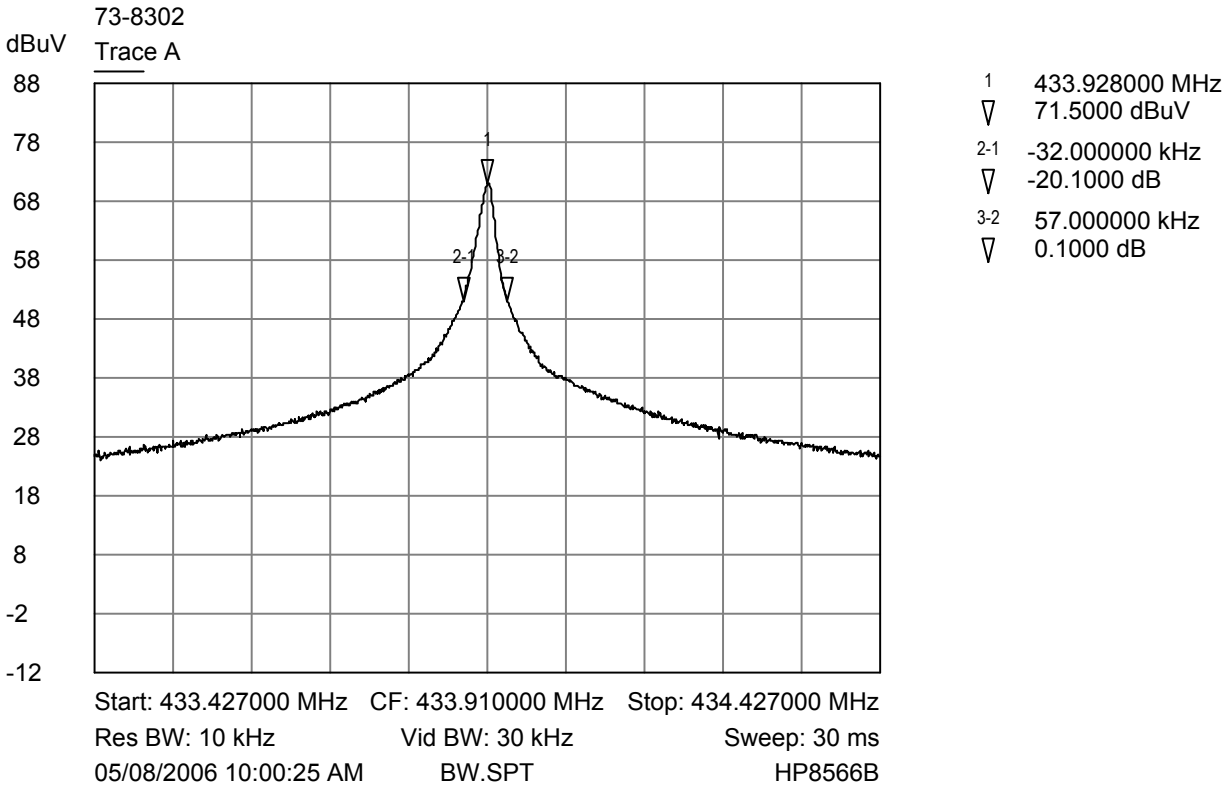
In the configuration tested, the EUT complied with the requirements of this section.

6.2.4 §15.231(c) Bandwidth

Demonstration of Compliance:

The bandwidth of the emission must not be wider than 0.25% of the center frequency. The center frequency is 433.9 MHz, therefore the bandwidth must not be wider than 1.08475 MHz. The 433TSPW1K bandwidth was 57.0 kHz; therefore, it meets the bandwidth requirements. See spectrum analyzer plot below.

Bandwidth Plot



Trace A bandwidth plot

RESULT

In the configuration tested, the EUT complied with the requirements of this section.

6.2.5 §15.231(d) Frequency Stability

The EUT does not operate in the frequency band 40.66 to 40.70 MHz; therefore this test is not applicable.

6.2.6 §15.231(e) Reduced Field Strengths

The EUT does not exceed the periodic rate of operation specified in paragraph (a); therefore, this test is not applicable.

6.2.7 §15.207 Line Conducted Emissions

The 433TSPW1K is powered from two 3 VDC batteries; therefore, the line conducted emission tests are not applicable.

APPENDIX 1 TEST PROCEDURES AND TEST EQUIPMENT

Radiated Interference Emissions:

The radiated emission from the intentional radiator was measured using a spectrum analyzer. The resolution bandwidth was set at 100 kHz and the video bandwidth was set at 300 kHz. For peak emissions above 1000 MHz the spectrum analyzer's resolution bandwidth was set to 1 MHz and the video bandwidth was set to 3 MHz.

A biconilog antenna was used to measure the frequency range of 30 to 1000 MHz and a Double Ridge Guide Horn antenna was used to measure the frequency range 1 GHz to 3.18 GHz, at a distance of 3 meters from the EUT. The readings obtained by these antennas are correlated to the levels obtained with a tuned dipole antenna by adding antenna factors.

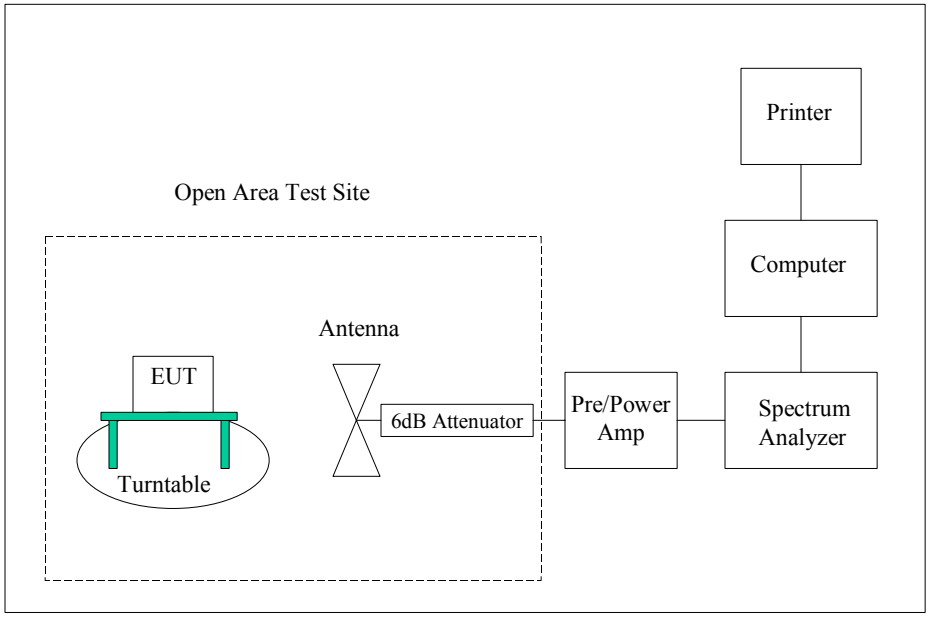
The configuration of the intentional radiator was varied to find the maximum radiated emission. The intentional radiator was rotated 360 degrees, and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Desktop intentional radiators are measured on a non-conducting table 0.8 meter above the ground plane. The table is placed on a turntable which is level with the ground plane.

Type of Equipment	Manufacturer	Model Number	Serial Number	Date of Last Calibration
Wanship Open Area Test Site #2	CCL	N/A	N/A	10/28/2005
Test Software	CCL	Radiated Emissions	Revision 1.3	N/A
Spectrum Analyzer	Hewlett Packard	8566B	2230A01711	10/10/2005
Biconilog Antenna	EMCO	3142	9601-1009	12/28/2005
Double Ridged Guide Antenna	EMCO	3115	9604-4779	05/26/2005
High Frequency Amplifier	Hewlett Packard	8449B	3008A00990	05/25/2005
3 Meter Radiated Emissions Cable Wanship Site #2	CCL	Cable K	N/A	12/12/2005
Pre/Power-Amplifier	Hewlett Packard	8447F	3113A05161	09/19/2005
6 dB Attenuator	Hewlett Packard	8491A	32835	12/12/2005

An independent calibration laboratory or CCL personnel calibrates all the equipment listed above at intervals defined in ANSI C63.4:2003 Section 4.4 following outlined calibration procedures. All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to tractability is on file and is available for examination upon request.

Radiated Emissions Test Setup



APPENDIX 2 PHOTOGRAPHS

Photograph 1 - View of the Radiated Emission Test Setup
(Vertical Alignment)

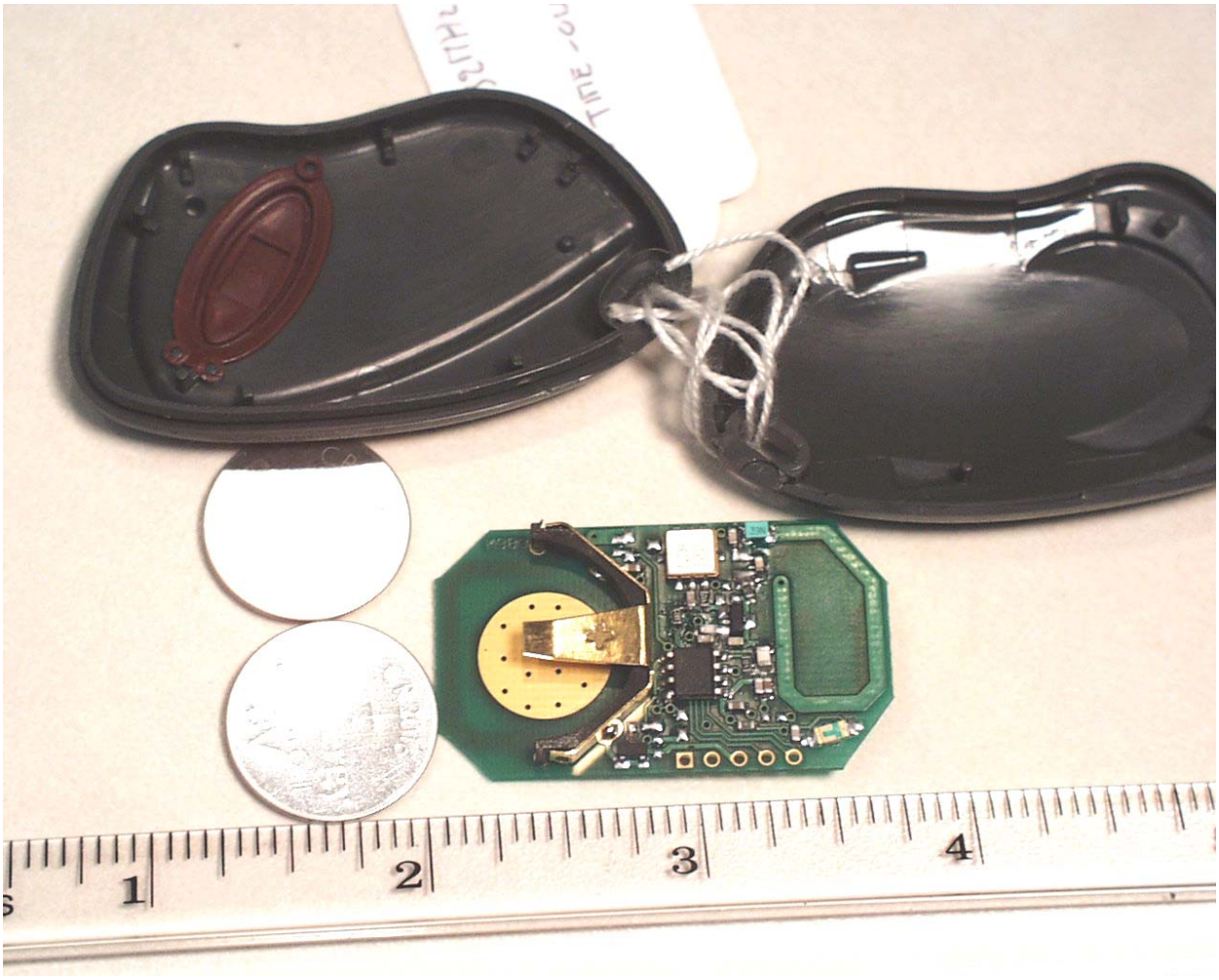
Photograph 2 - View of the Radiated Emission Test Setup
(Horizontal Face Alignment)

Photograph 3 - View of the Radiated Emission Test Setup
(Horizontal Flat Alignment)

Photograph 4 - Front View of the EUT

Photograph 5 - Back View of the EUT

Photograph 6 - View of the Component Side of the PCB



Photograph 7 - View of the Trace Side of the PCB