TEST REPORT FOR

FCC PART 15 COMPLIANCE

FOR HydroPoint Data Systems inc.

Prepared by
Daniel C. Swann
April 26, 2003

HydroPoint Data Systems
WeatherTRAK Irrigation Controller

FCC Part 15 receiver
and unintentional radiator

FCC ID Q4LWT0003

GEL Report File HP01-2003

GLEN ELLEN LABORATORIES
1876 London Ranch Road
Glen Ellen, CA 95442

MEASUREMENT/TECHNICAL REPORT

HydroPoint Data Systems inc.

FCC ID Q4LWT0003

This report concerns:	An Original Grant
Equipment type:	FCC Part 15 receiver and unintentional radiator
Deferred grant requested:	no
Transition rules per 15.37:	no

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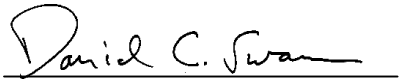
Measurements Certified by: Daniel C. Swann 

Date 04/26/03

GEL Report File: HP01-2003

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1 GENERAL INFORMATION

1.1 Product Description

The HydroPoint Data Systems WeatherTRAK irrigation controller is receiver/controller to receive weather information from a pager signal and control irrigation solenoid valves.

The unit receives pager signals between 928 and 932 MHz through a direct mount 1/4 wave antenna utilizing a TNC connector.

The connection to the irrigation solenoid valves is made with copper wires connected to a terminal strip on the PC board. The product is shipped with either 8, or 12, control circuits loaded on the PC board.

See the User Manual attachment for a description of the available controls on the EUT.

The product is powered by a HydroPoint wall mount 120 VAC to 24 VDC at 600 mA, and 8 VDC at 300 mA transformer, with a shielded cable 94 inches long, Model MA48P1S2168.

The internal construction is single two layer PC board and a piggyback LCD display board. Portions of the receiver circuit are covered by two metal shields.

The housing for the product is aluminum, in two pieces.

1.2 Related Submittal or Grant

There are no related submittals or grants.

1.3 Tested System Details

EUT

HydroPoint Data Systems WeatherTRAK irrigation controller , Serial Number 003192.

Made by:

HydroPoint Data Systems inc.
1726 Corporate Circle
Petaluma, CA 94954

The circuit uses two clock frequencies of 10.240 MHz and 14.400 MHz. See the Block Diagram for more information.

1.4 Test Methodology

The radiated tests were performed in accordance with the ANSI C63.4-1992 standard. See Figure 3.1 and the photographs for details of the test setup. Radiated testing was performed at an antenna to EUT distance of 3 meters.

For conducted measurements, the LISN's (50 uH Artificial Mains Networks) were placed on, and grounded to, the turntable surface.

1.5 Test Facility

The Glen Ellen Laboratories open field test site complies with the requirements specified by VDE 0876/9.78, VDE 0877 Part 1/11.81, VDE 0877 Part 2/2.85, CISPR 16, CISPR 22, and ANSI C63.4-1992. The test site closely follows the theoretical normalized site attenuation specifications for both horizontal and vertical polarizations. The site has been fully described in a report dated November 3, 2002, submitted to the FCC, and accepted in a letter dated November 8, 2002 (Registration Number 90613.)

Test equipment used included:

1. Hewlett Packard 8591EM spectrum analyzer, cal due 06-20-03.
2. Sonoma Instruments 317 preamplifier, 10 kHz to 2.5 GHz, cal due 03-25-04.
3. GEL BIC9414 biconical antenna, 30 MHz to 300 MHz, cal due 06-24-03.
4. GEL LPA-3 log periodic antenna, 275 MHz to 2 GHz, cal due 06-24-03.
5. Hewlett Packard 8566B opt L24 spectrum analyzer, cal due 06-20-03.
6. ETS Horn Antenna, 1 GHz to 18 GHz, cal due 07-29-03.
7. GEL AP2-10 preamplifier, 2 GHz to 10 GHz, cal due 9-08-03.
8. EMCO LISN, model number 3825/2, cal due 06-01-03.

2 FCC Statement in User Manual

The following statement appears in a prominent location in the text of the user manual:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
--Reorient or relocate the receiving antenna.
--Increase the separation between the equipment and receiver.
--Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
--Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance may void the user's authority to operate the equipment.

3 SYSTEM TEST CONFIGURATION

3.1 Justification

The EUT was tested in accordance with the standard ANSI C63.4-1992, and 47 CFR Part 15.

3.2 EUT Exercise Equipment and Software

The unit was tested in the Run mode, in the condition of receiving a signal from a remote pager service. Seven foot long unterminated wires were connected to valve positions 1 through 5 of the terminal block, to simulate connection to passive solenoid valves.

3.3 Special Accessories

No special accessories were used.

3.4 Equipment Modifications

A ground was made with copper tape between the two receiver shield covers. This modification will be made on all of the units. The internal photographs attachment shows the modification.

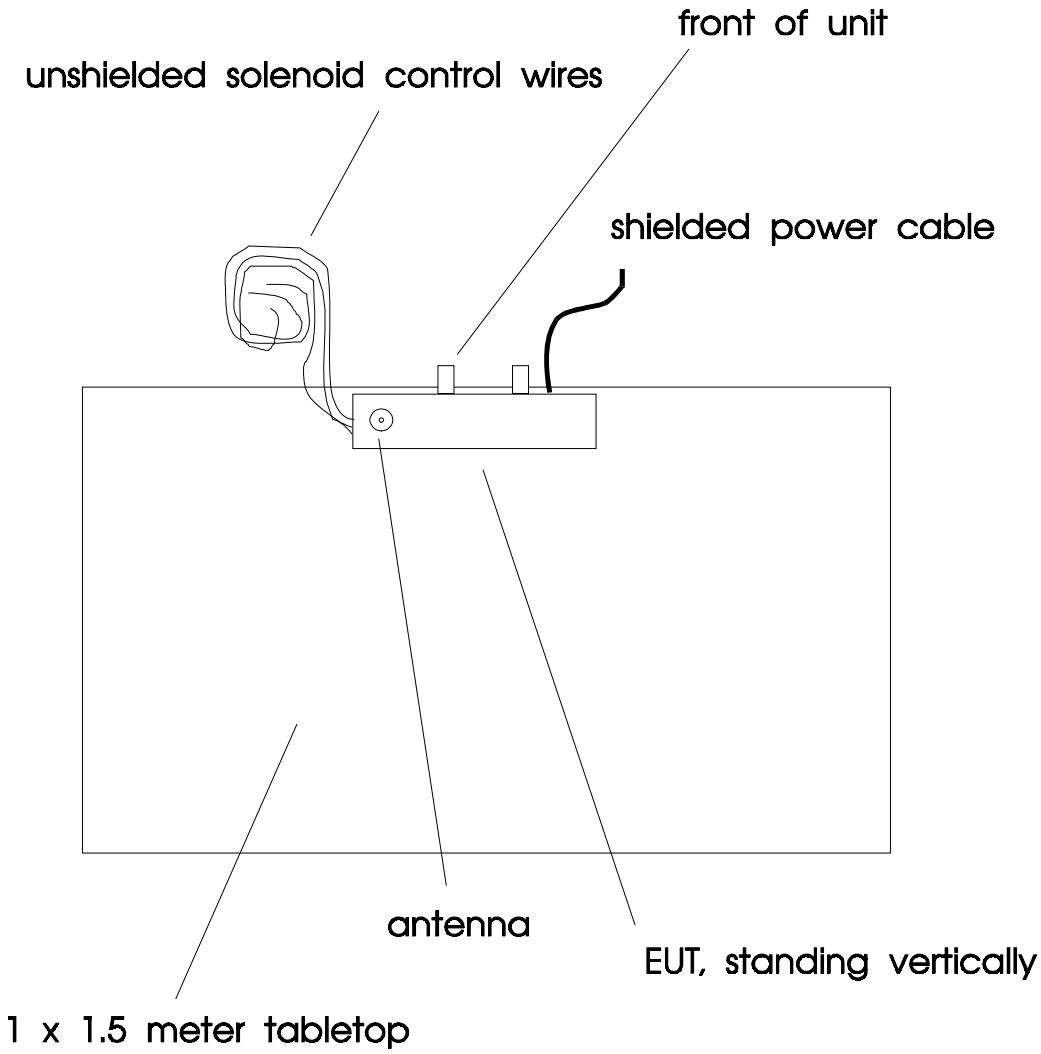
3.5 Configuration of Tested System

The system was configured with the unit on a stand on the tabletop surface, with the power cable and solenoid wires draped over the rear edge of the tabletop to the turntable surface. The power transformer was connected to a LISN filtered 120VAC outlet on the turntable surface.

This condition put the EUT in the highest emissions state.

See Figure 3.1 and the test setup photographs attachment for the configuration of the tested system.

Figure 3.1 Configuration of Tested System

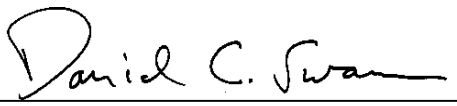


4 CONDUCTED EMISSIONS DATA

The following data lists the significant emissions frequencies, measured quasi-peak levels and FCC Class B margins, using 9 kHz RBW at 6 dB. Average measurements were not required since all the margins were over 10 dB. These measurements were made on April 23, 2003, by Daniel Swann and Mike Marian.

Frequency MHz	Measured Amplitude dBuV	Corrected Measured Amplitude dBuV	FCC B Limit dBuV	FCC B Margin dB
Line				
0.224	37.8	47.8	63.6	-15.8
2.403	11.8	22.4	56.0	-33.6
5.134	13.8	24.5	60.0	-35.5
10.240	15.2	26.2	60.0	-33.8
14.400	15.4	26.5	60.0	-33.5
17.953	16.1	27.2	60.0	-32.8
21.611	11.8	23.1	60.0	-36.9
28.247	11.8	23.3	60.0	-36.7
Neutral				
0.228	27.3	37.3	62.6	-25.4
2.400	18.1	28.6	56.0	-27.4
5.134	15.8	26.5	60.0	-33.5
10.240	14.7	25.7	60.0	-34.3
14.400	16.5	27.7	60.0	-32.3
17.953	14.4	25.5	60.0	-34.5
21.600	16.5	27.8	60.0	-32.2
28.400	13.6	25.1	60.0	-34.9
29.400	19.1	30.6	60.0	-29.4

Test Personnel:

Tester Signature  Date 04/26/03

Tester Name Daniel C. Swann

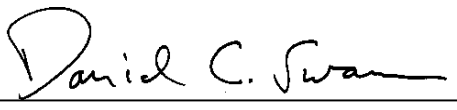
5 RADIATED EMISSIONS DATA

5.1 Data

The following data lists the significant emissions frequencies, measured signal levels and FCC Class B margins. Measurements below 1 GHz were made in an 120 kHz RBW at 6 dB and a quasi-peak detector, and measurements above 1 GHz were made using an 1 MHz RBW and an average detector. The spectrum analyzer was placed on the groundscreen behind the horn antenna for the measurements at 2 GHz and above. These measurements were made on April 23, 2003, by Daniel Swann and Mike Marian.

Frequency MHz	Measured Amplitude dBuV	Antenna Factor dB/m	Cable Loss dB	Amplifier Gain dB	Field Strength dBuV/m	FCC B 3 m Limit dBuV/m	FCC B 3 m Margin dB
Vertical Polarization							
112.640	46.5	12.3	2.7	38.6	22.9	43.5	-20.6
122.880	45.9	13.4	2.8	38.5	23.5	43.5	-20.0
129.606	45.2	14.2	2.8	38.5	23.7	43.5	-19.8
172.800	54.2	16.1	3.2	38.5	35.0	43.5	-8.5
201.600	49.1	17.3	3.4	38.6	31.2	43.5	-12.3
225.280	49.6	17.2	3.6	38.6	31.7	46.0	-14.3
266.240	42.9	18.1	4.0	38.6	26.3	46.0	-19.7
276.480	57.6	13.8	4.0	38.6	36.8	46.0	-9.2
522.240	47.4	18.7	5.6	38.5	33.2	46.0	-12.8
583.680	45.3	19.8	5.9	38.5	32.5	46.0	-13.5
737.280	46.3	21.5	6.7	38.5	35.8	46.0	-10.2
798.720	46.7	22.9	7.0	38.4	38.1	46.0	-7.9
1000.018	45.9	26.0	7.8	38.6	41.1	54.0	-12.9
2000.036	31.1	27.7	0.2	18.4	40.6	54.0	-13.4
3000.053	40.4	30.8	0.3	19.0	52.5	54.0	-1.5
4000.071	28.5	33.2	0.4	19.0	43.2	54.0	-10.8
5000.089	24.8	34.2	0.6	18.3	41.2	54.0	-12.8

Test Personnel:

Tester Signature  Date 04/26/03

Tester Name Daniel C. Swann

5.1 Data (continued)

Frequency MHz	Measured Amplitude dBuV	Antenna Factor dB/m	Cable Loss dB	Amplifier Gain dB	Field Strength dBuV/m	FCC B 3 m Limit dBuV/m	FCC B 3 m Margin dB
Horizontal Polarization							
112.640	39.4	12.3	2.7	38.6	15.8	43.5	-27.7
153.600	44.8	15.1	3.0	38.5	24.4	43.5	-19.1
172.800	54.9	16.1	3.2	38.5	35.7	43.5	-7.8
225.280	51.8	17.2	3.6	38.6	33.9	46.0	-12.1
245.760	47.8	17.3	3.8	38.7	30.2	46.0	-15.8
276.480	58.2	13.8	4.0	38.6	37.4	46.0	-8.6
296.960	56.2	14.7	4.2	38.6	36.5	46.0	-9.5
1000.014	52.0	26.0	7.8	38.6	47.2	54.0	-6.8
2000.029	23.5	27.7	0.2	18.4	33.0	54.0	-21.0
3000.043	38.7	30.8	0.3	19.0	50.8	54.0	-3.2
4000.057	21.5	33.2	0.4	19.0	36.2	54.0	-17.8
5000.071	23.5	34.2	0.6	18.3	39.9	54.0	-14.1

Test Personnel:

Tester Signature Daniel C. Swann Date 04/26/03

Tester Name Daniel C. Swann

5.2 Field Strength Calculations

The field strength was calculated from the following formula:

FS = MEASURED SIGNAL + AF + CF - GAIN

Where FS = field strength, in dBuV/m

MEASURED SIGNAL = Spectrum Analyzer signal amplitude

AF = antenna factor

CF = cable attenuation factor

GAIN = pre-amplifier gain

FS (uV/m) = antilog[10] FS (dBuV/m)

For example, for the AC configuration, at 172.800 MHz in horizontal polarization a quasi-peak reading of 54.9 dBuV was measured. The antenna factor is 16.1 dB, the cable loss is 3.2 dB, and the pre-amplifier gain is 38.5 dB.

FS (dBuV/m) = 54.9 + 16.1 + 3.2 - 38.5

FS (dBuV/m) = 35.7 dBuV/m

FCC B 3 meter limit = 43.5 dBuV/m

FCC B 3 meter margin = - 7.8 dB