



**Intertek Testing Services**

## **APPLICATION FOR FCC CERTIFICATION**

**Sentrol Incorporated**

**Motion Detector**

**FCC ID: CGGAA2**

**Report # J98018757**

**Number of Pages: 13 pp. + Supporting Data and Documents**

**Date of Report: July 10, 1998**

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This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government.

The results contained in this report were derived from measurements performed on the identified test samples. Any implied performance of other samples on this report is dependent on the representative of the samples tested.



k:\..Afcc\15245.ccr

FCC Part 15 FDS Cert, Ver 5/97

**Intertek Testing Services NA Inc.**

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Telephone 650-463-2900 Fax 650-463-2910 Home Page [www.worldlab.com](http://www.worldlab.com)

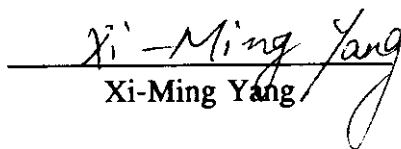
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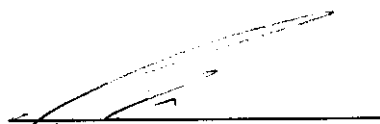
1.0 Summary of Tests**Sentrol - FCC ID: CGGAA2**

| TEST                                | REFERENCE | RESULTS        |
|-------------------------------------|-----------|----------------|
| Radiated Emission                   | 15.245(b) | Pass           |
| Out of Band Radiated Emission       | 15.245(3) | Not Applicable |
| AC Conducted Emission               | 15.207    | Not Tested     |
| Radiated Emission from Digital Part | 15.109    | Not Tested     |
| Antenna Requirement                 | 15.203    | Pass           |

Test Engineer:

  
Xi-Ming YangDate: 8-17-98

Engineering Mgr.:

  
C.K. LiDate: 8-18-98

**2.0 General Description****2.1 Product Description**

The Sentrol Incorporated, FCC ID: CGGAA2, is a motion detector.

For more information, see attached users manual.

A pre-production version of the sample was received on July 2, 1998 in good condition.

**Overview of the EUT**

|                             |                                                                                                                                                                                                                        |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Applicant                   | Sentrol, SLC Technologies Inc.                                                                                                                                                                                         |
| Trade Name & Model No.      | Ranger, RangeGated RADAR                                                                                                                                                                                               |
| FCC Identifier              | CGGAA2                                                                                                                                                                                                                 |
| Use of Product              | <input checked="" type="checkbox"/> Indoor <input type="checkbox"/> Outdoor <input type="checkbox"/> Both<br><input type="checkbox"/> Open building doors<br><input type="checkbox"/> In motor vehicle or/and aircraft |
| Frequency Range (MHz)       | 5725 - 5875                                                                                                                                                                                                            |
| Antenna Requirement         | The EUT uses a permanently connected antenna.                                                                                                                                                                          |
| Manufacturer name & address | Sentrol, SLC Technologies Inc.<br>12345 Leveton Drive<br>Tualatin, Oregon 97062                                                                                                                                        |

**2.2 Related Submittal(s) Grants**

None.

### 2.3 Test Methodology

Radiated emissions measurements was performed according to the procedures in ANSI C63.4 (1992). Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Data Sheet**" of this Application. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

### 2.4 Test Facility

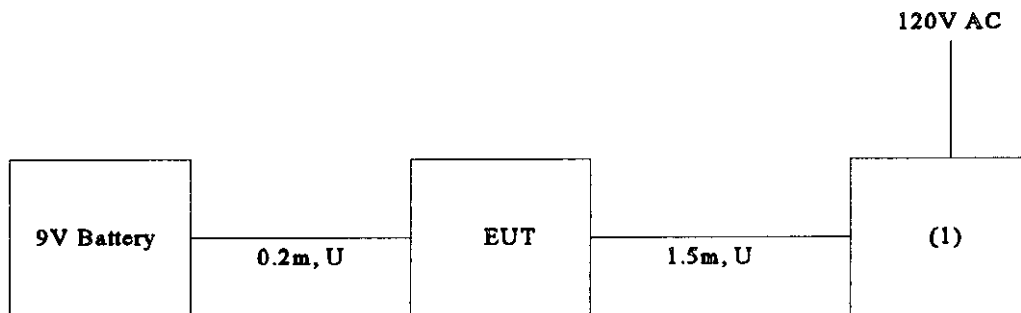
The open area test site and conducted measurement facility used to collect the radiated data is site 1. This test facility and site measurement data have been fully placed on file with the FCC.

### 3.0 System Test Configuration

#### 3.1 Support Equipment

| Item # | Description              | Model No. | Serial No. |
|--------|--------------------------|-----------|------------|
| 1      | Goldstar DC Power Supply | GP-303    | 4081023    |

#### 3.2 Block Diagram of Test Setup



\* = EUT

\*\* = No ferrites on video cable

S = Shielded;

U = Unshielded

F = With Ferrite

### 3.3 Justification

For emission testing, the equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). During testing, all cables were manipulated to produce worst case emissions.

For radiated emission measurements, the EUT is attached to a cardboard box (if necessary) and placed on the wooden turntable. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). The EUT is wired to transmit full power.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Detector function is in peak mode. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

### 3.4 Software Exercise Program

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

For emissions testing, the units were setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing.

### 3.5 Mode of Operation During Test

Continuous transmission

### 3.6 Modifications Required for Compliance

The following modifications were installed during compliance testing in order to bring the product into compliance (Please note that this list does not include changes made specifically by Sentrol prior to compliance testing):

No modifications were installed by Intertek Testing Services.

#### 4.0 Measurement Results

For radiated emission tests, The analyzer setting was as followings unless otherwise stated:

|                   | <u>RES BW</u> | <u>VID BW</u> |                        |
|-------------------|---------------|---------------|------------------------|
| Frequency < 1 GHz | 100 kHz       | 100 kHz       |                        |
| Frequency > 1 GHz | 1 MHz         | 1 MHz         | (Peak measurements)    |
|                   | 1 MHz         | 10 Hz         | (Average measurements) |

#### 4.1 Radiated Emission test results

See attached for details.

# ITS Intertek Testing Services

**Company:** Sentrol  
**Project #:** J98018757  
**Model:** Motion Detector ( CW mode)      Note: Pulse mode is normal operation for this device.  
**Engineer:** Xi-Ming Yang      CW results are not required but are provided FYI.  
**Date of test:** July 2, 1998

## FCC 15.249 Radiated Emissions

| Frequency | Antenna  | Reading | Antenna | Cable | Pre-amp | Duty  | Distance | Corrected | Limit    | Margin |
|-----------|----------|---------|---------|-------|---------|-------|----------|-----------|----------|--------|
|           | Polarity |         | Factor  | Loss  |         | Cyco  | Factor   | Reading   |          |        |
| MHz       | H/V      | dB(uV)  | dB(1/m) | dB    | dB      | dB    | dB       | dB(uV/m)  | dB(uV/m) | dB     |
| 5807.8    | H        | 61.2    | 34.4    | 3.5   | 0.0     | -20.0 | 0.0      | 79.1      | 114.0    | -34.9  |
| 11615.5   | H        | 62.3    | 39.0    | 5.9   | -39.7   | -20.0 | 0.0      | 47.5      | 54.0     | -6.5   |
| 17423.3   | H        | 39.0    | 44.9    | 7.5   | -37.5   | -20.0 | 0.0      | 33.9      | 54.0     | -20.1  |
| 23225.0   | H        | 32.5*   | 40.4    | 9.0   | -24.2   | -20.0 | -9.5     | 28.2      | 54.0     | -25.8  |
| 29038.8   | H        | 41.0*   | 43.5    | 10.5  | -25.9   | -20.0 | -9.5     | 39.6      | 54.0     | -14.4  |

- Note:**
1. All measurement were made at 3 meters
  2. Negative signs (-) in the margin column signify levels below the limit.
  3. Read with \* is made at 1 meters

# ITS Intertek Testing Services

**Company:** Sentrol  
**Project #:** J98018757  
**Model:** Motion Detector ( Modulated mode)  
**Engineer:** Xi-Ming Yang  
**Date of test:** July 2, 1998

## FCC 15.249 Radiated Emissions

| Frequency | Antenna  | Reading | Antenna | Cable | Pre-amp | Duty  | Distance | Corrected | Limit    | Margin |
|-----------|----------|---------|---------|-------|---------|-------|----------|-----------|----------|--------|
|           | Polarity |         | Factor  | Loss  |         | Cyco  | Factor   | Reading   |          |        |
| MHz       | H/V      | dB(uV)  | dB(1/m) | dB    | dB      | dB    | dB       | dB(uV/m)  | dB(uV/m) | dB     |
| 5706.8    | V        | 51.0#   | 34.4    | 3.5   | -28.3   | -20.0 | 0.0      | 40.6      | 54.0     | -13.4  |
| 5875.0    | V        | 48.6#   | 34.4    | 3.5   | -28.3   | -20.0 | 0.0      | 38.2      | 54.0     | -15.8  |
| 11596.8   | H        | 38.6    | 39.0    | 5.9   | -39.7   | -20.0 | 0.0      | 23.8      | 54.0     | -30.2  |
| 17426.0   | H        | 35.5    | 44.9    | 7.5   | -37.5   | -20.0 | 0.0      | 30.4      | 54.0     | -23.6  |
| 23233.8   | H        | 35.4*   | 40.4    | 9.0   | -24.2   | -20.0 | -9.5     | 31.1      | 54.0     | -22.9  |
| 29041.6   | H        | 46.5*   | 43.5    | 10.5  | -25.9   | -20.0 | -9.5     | 45.1      | 54.0     | -8.9   |
| 34961.0   | H        | 46.1*   | 43.6    | 5.0   | -23.8   | -20.0 | -9.5     | 41.4      | 54.0     | -12.6  |
| 40000.0   | H        | 51.5*   | 43.7    | 6.0   | -24.4   | -20.0 | -9.5     | 47.3      | 54.0     | -6.7   |

- Note:**
1. All measurement were made at 3 meters
  2. Negative signs (-) in the margin column signify levels below the limit.
  3. Read with \* is made at 1 meters
  4. Read with # is made at band edge
  5. All readings are made with RBW= 1MHz and VBW=7MHz.

DELTA MKRS

Delta Mkrs

ON off

Swap Ref

Marker

Zoom Delta

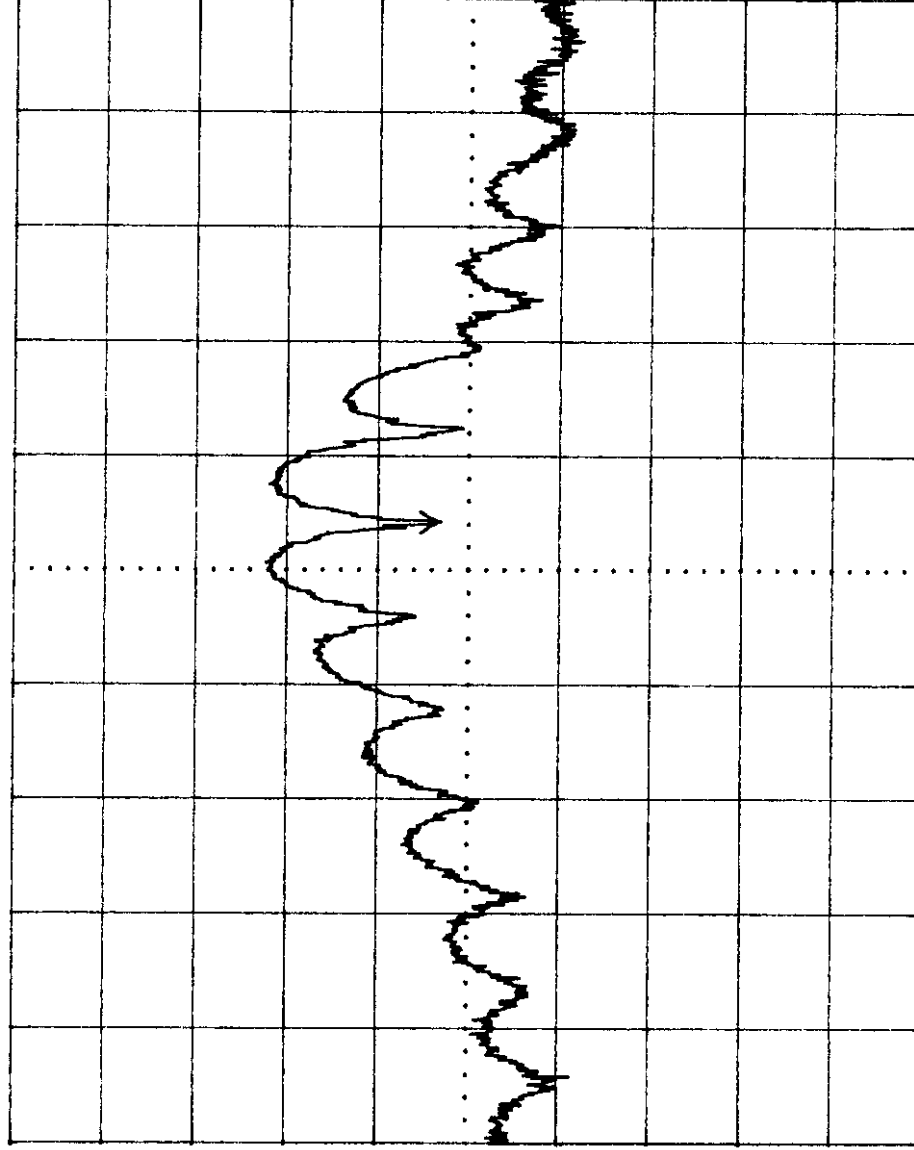
$\Delta -2.20\text{dB}$

Mkr  $\Delta$  41.0MHz

Ref Lvl 97.0dBuV

Atten 0dB

10dB/



Freq 5.784 5GHz

Span 500MHz

ResBW 3MHz

VidBW 7MHz

SWP 20mS

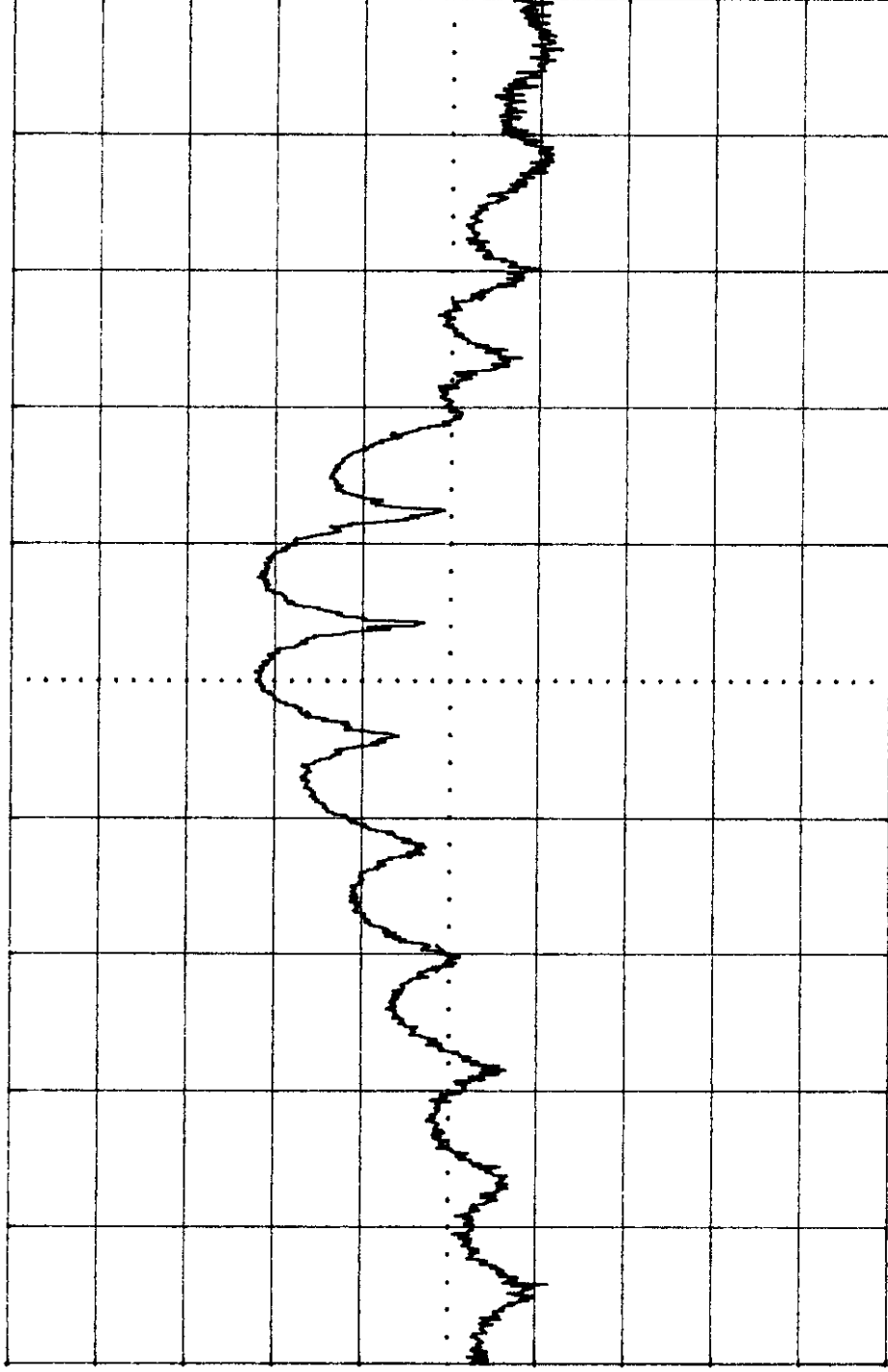
LEVEL

SPAN

Mkr

5.805 5GHz

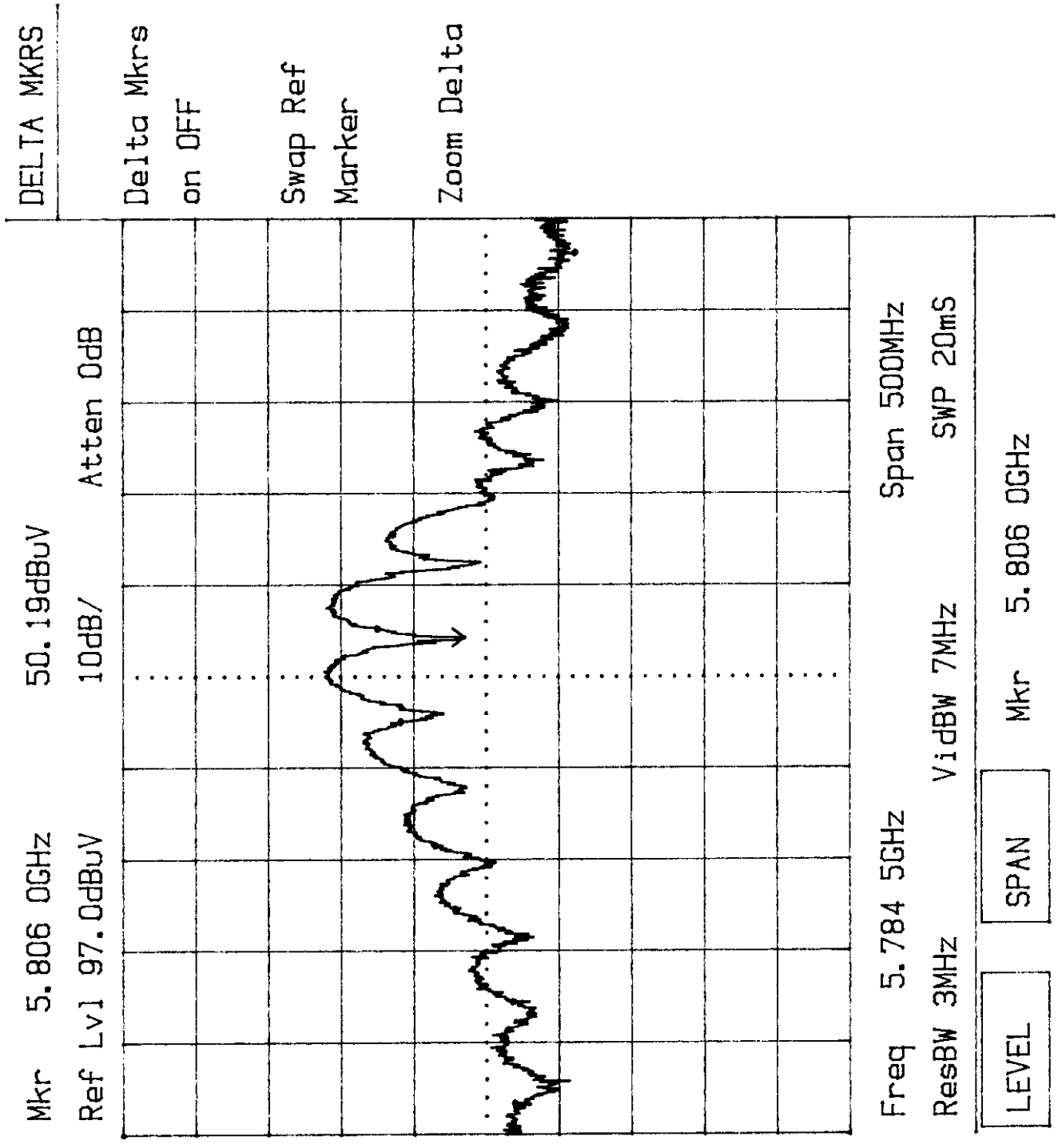
Mkr  $\Delta$  -40.5MHz  $\Delta$ -3.80dB  
Ref Lvl 97.0dBuV 10dB/ Atten 0dB



Freq 5.784 5GHz Span 500MHz  
ResBW 3MHz VidBW 7MHz SWP 20mS

LEVEL SPAN

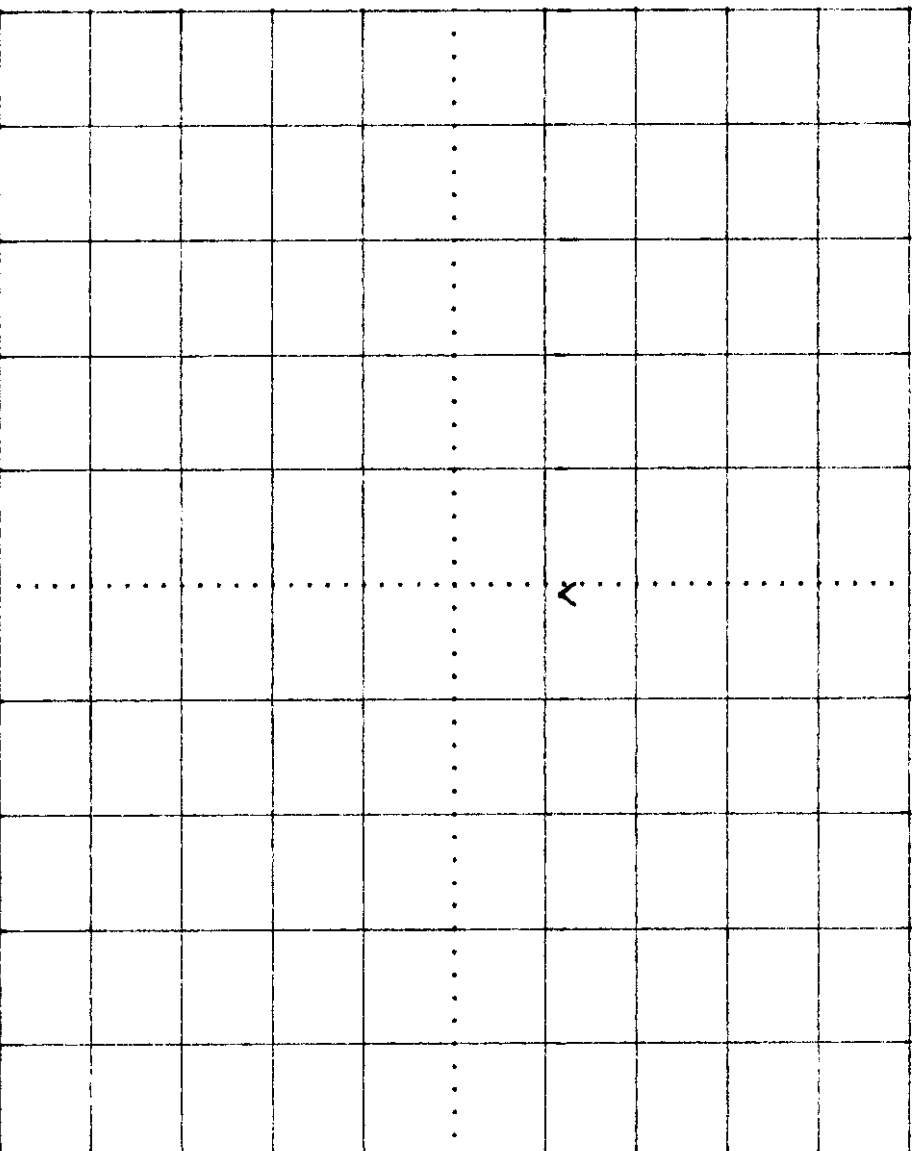
Mkr 5.683 0GHz



Mkr 11.596 8GHz 38.59dBuV

Ref Lvl 77.0dBuV 10dB/ Atten 0dB

WF VIEW



Normal

grn rd OFF

Max Hold

RD grn off

Average

rd grn OFF

Math

rd grn OFF

A = Normal

rd grn OFF

Freq 11.592 3GHz Span 500MHz

ResBW 1MHz VidBW 7MHz SWP 20ms

B = Reg# 1

rd grn OFF

LEVEL

SPAN

VidBW 7MHz

Mkr 17.426 0GHz

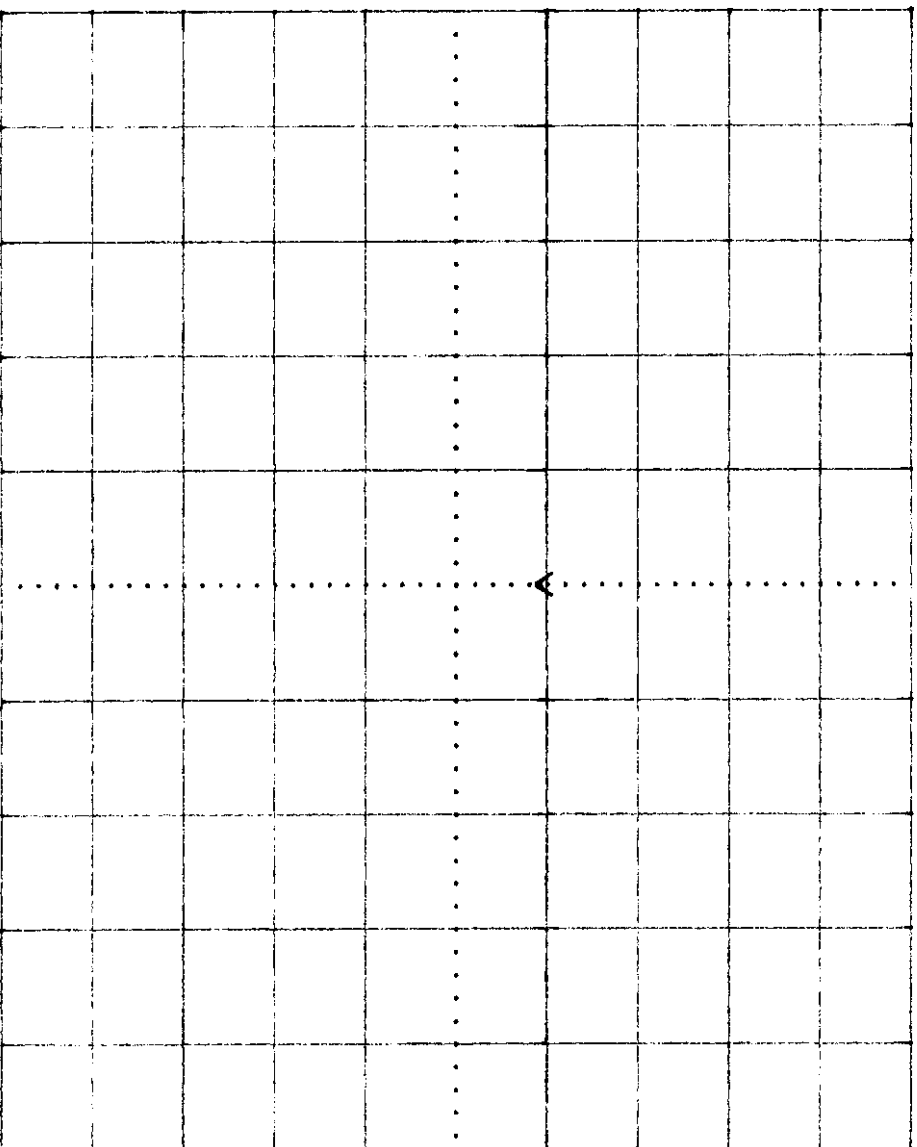
35.49dBuV

Ref Lvl 77.0dBuV

10dB/

Atten 0dB

WF VIEW



Freq 17.426 0GHz

Span 500MHz

ResBW 1MHz

ViBW 7MHz

SWP 20ms

LEVEL

SPAN

ViBW 7MHz

Normal

grn rd OFF

Max Hold

RD grn off

Average

rd grn OFF

Math

rd grn OFF

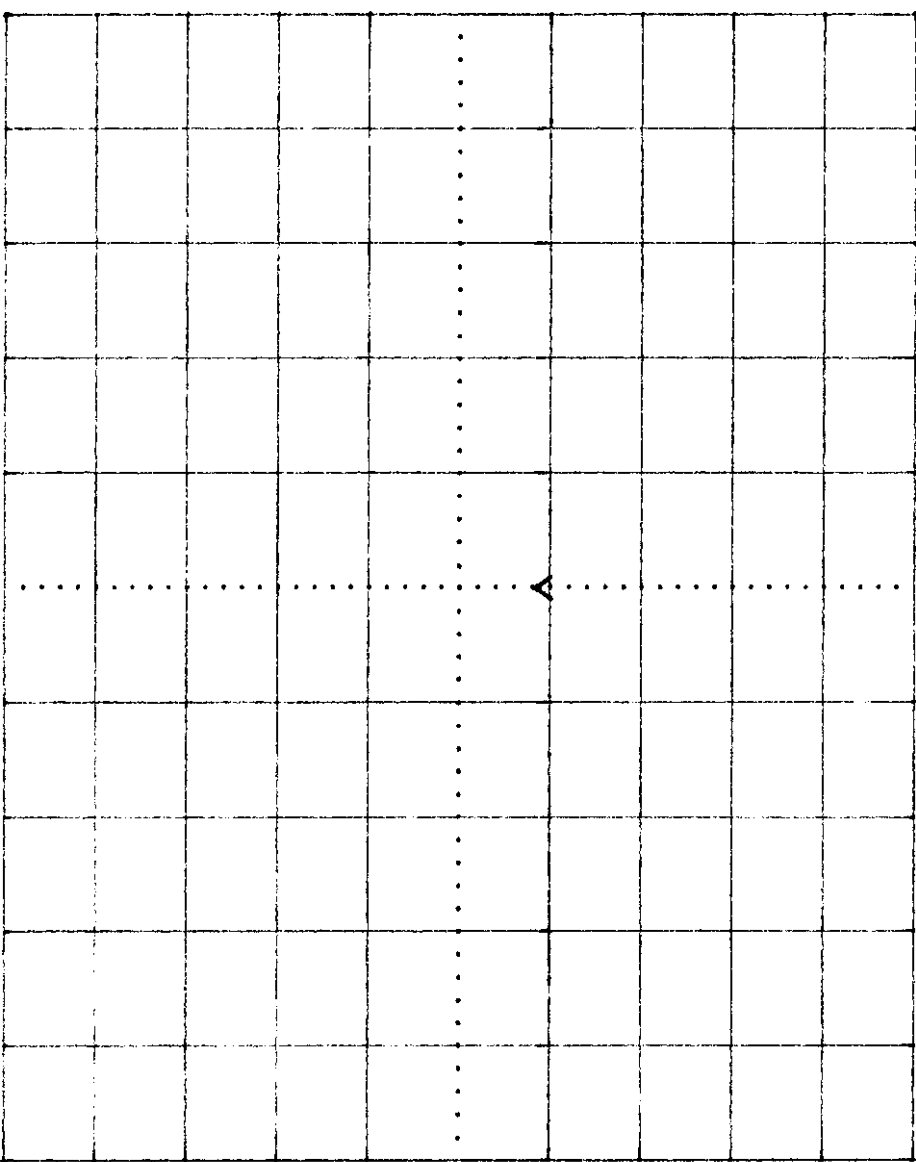
A = Normal

rd grn OFF

B = Reg# 1

rd grn OFF

Mkr 23.233 8GHz 35.39dBuV  
Ref Lvl 77.0dBuV 10dB/ Atten 0dB



Freq 23.233 8GHz Span 500MHz  
ResBW 1MHz VidBW 7MHz SWP 20ms

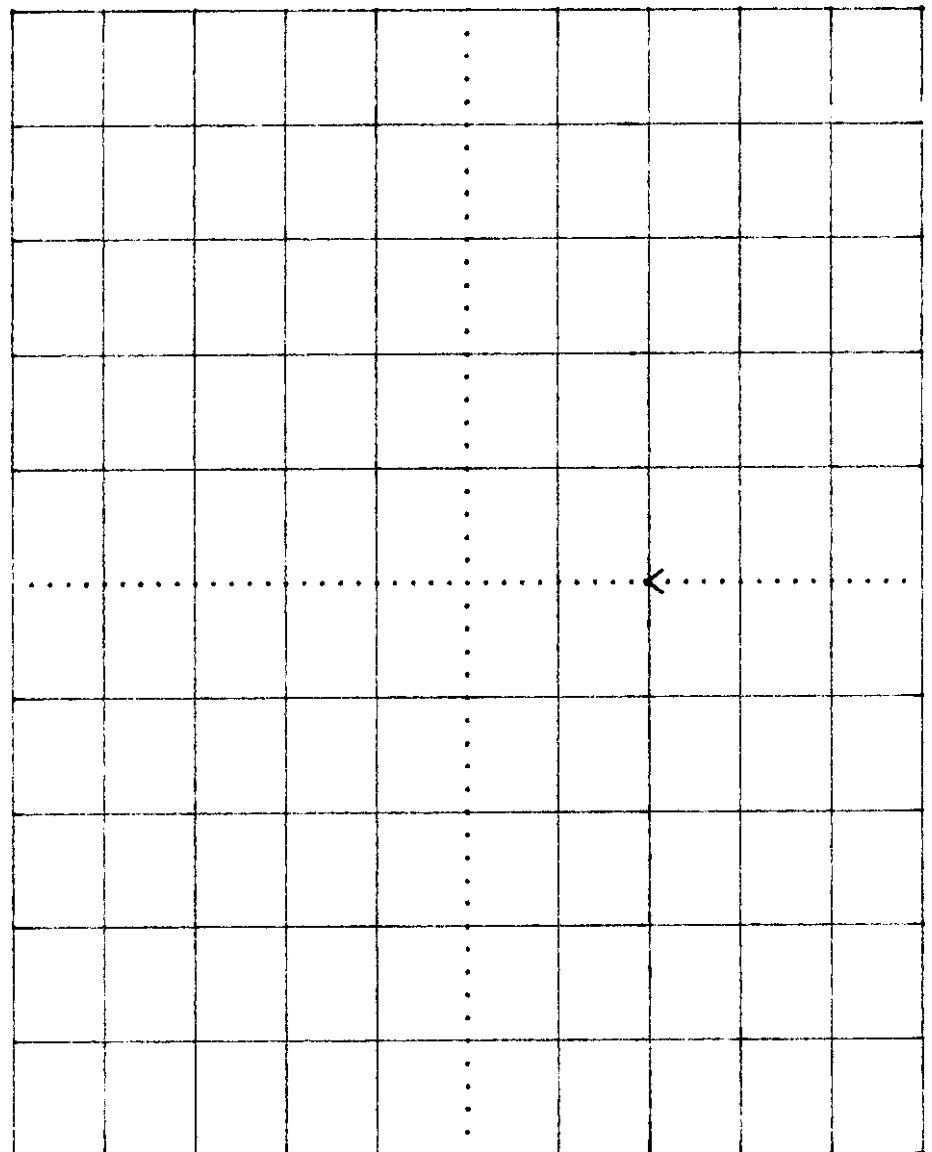
LEVEL SPAN Freq 23.233 8GHz

WF VIEW

Normal  
grn rd OFF  
Max Hold  
RD grn off  
Average  
rd grn OFF  
Math  
rd grn OFF  
A = Normal  
rd grn OFF  
B = Reg# 1  
rd grn OFF

Mkr 29.041 GHz 46.49dBuV  
Ref Lvl 77.0dBuV 10dB/ Atten 0dB

WF VIEW



Freq 29.041 GHz Span 500MHz  
ResBW 1MHz VidBW 7MHz SWP 20ms

LEVEL

SPAN

TRIG 0 %

Normal  
grn rd OFF  
Max Hold  
RD grn off  
Average  
rd grn OFF  
Math  
rd grn OFF  
A = Normal  
rd grn OFF  
B = Reg# 1  
rd grn OFF

Mkr 34.961GHz

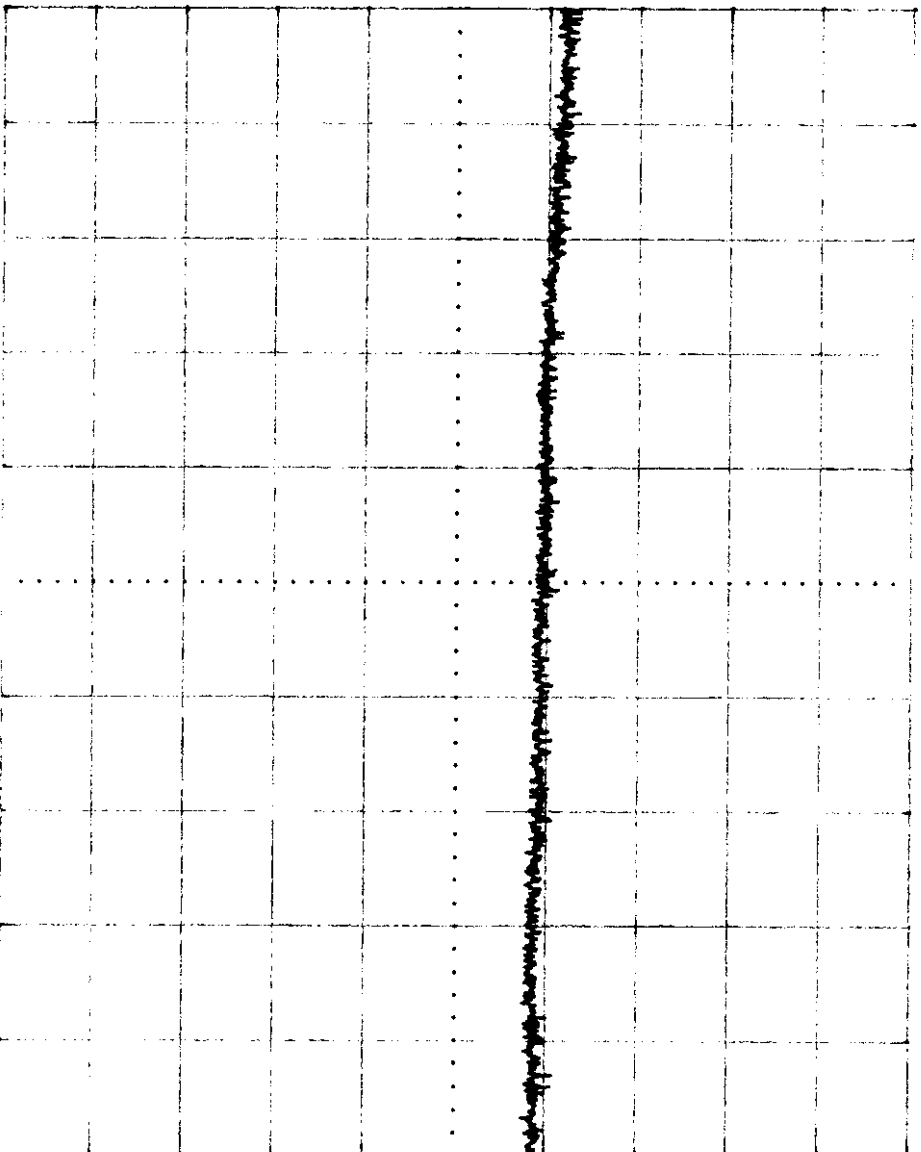
46.09dBuV

WF VIEW

Ref Lvl 87.0dBuV

10dB/

Atten 0dB



Freq 34.962GHz

Span 1.0GHz

ResBW 1MHz

VideoBW 7MHz

Sweep 20ms

LEVEL

SPAN

Span 1.0GHz

Normal

grn rd OFF

Max Hold

rd GRN off

Average

rd grn OFF

Math

rd grn OFF

A = Normal

rd grn OFF

B = Reg# 1

rd grn OFF

Mkr 39.991GHz

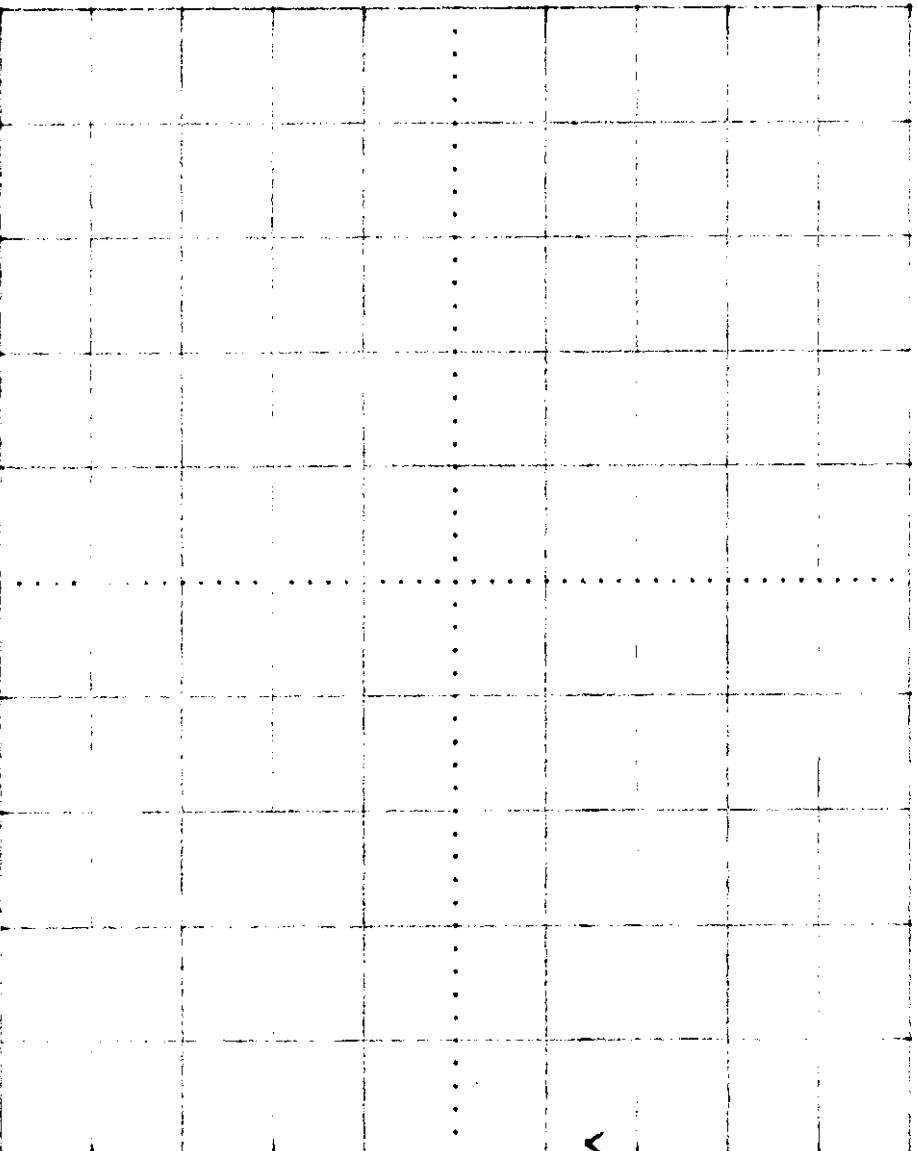
51.49dBuV

TRIGGER

Ref Lvl 87.0dBuV

10dB/

Atten 0dB



Trig Level  
to Knob 1

Trig Level  
to Knob 2

Source

Menu

HF Reject  
on OFF

Slope

POS neg

39.000GHz

to

40.000GHz

ResBW 1MHz

Video 7MHz

SWP 2Cms

Step Size

Menu

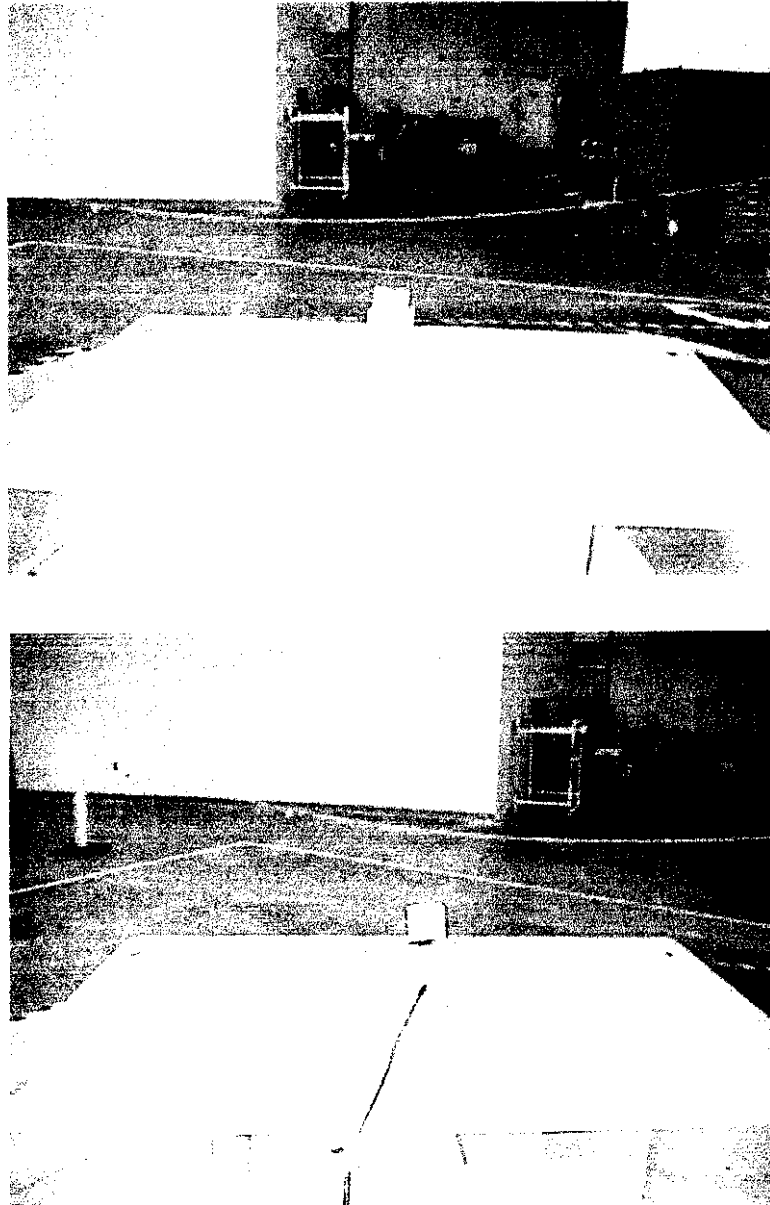
LEVEL

SPAN

TRIG 0 %

4.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission



**4.3 AC Line Conducted Emission, FCC Rule 15.207:**

Not requested by client.

**5.0 Equipment Photographs**

Photographs of the EUT are attached. Total 4 Pages.

**Sentrol, SLC Technologies, Inc.**

**Ranger RangeGated Radar**

**FCC ID: CGGAA2**

**FCC Part 15, Class B  
Verification Report**

**Report Prepared By:**

**Northwest EMC, Inc.  
120 South Elliott Road, Suite 300  
Newberg, OR 97132**

**(503) 537-0728  
Fax: 537-0735**

**July 31, 1998**

**Report No. SENT0121**

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## 1.0 General Information

### 1.1 Scope

This Test Report documents the results of the electromagnetic compatibility (EMC) testing performed by Northwest EMC, Inc. Details and results of testing performed on July 30, 1998 through July 31, 1998 are contained within.

### 1.2 Purpose

Testing was performed to evaluate the electromagnetic compatibility (EMC) performance of the EUT (Equipment Under Test).

### 1.3 Product Information

Manufactured By..... Sentrol, SCL Technologies, Inc.  
Address..... 12345 SW Leveton Drive Tualatin, OR 97062  
Test Requested By: ..... Steven McCoy  
Model..... Ranger RangeGated Radar  
Serial Number..... Prototype  
Date of Test..... July 30, 1998 through July 31, 1998  
Receipt Date of Test Samples..... July 30, 1998  
Job Number..... SENT0121

### 1.4 Summary

| Description         | Specified Requirement | Results |
|---------------------|-----------------------|---------|
| Conducted Emissions | FCC Part 15, Class B  | Pass    |
| Radiated Emissions  | FCC Part 15, Class B  | Pass    |

Reviewed By:



Donald Facteau, EMC Engineer

Approved By:



Dean Ghizzone, President

This Report may only be duplicated in its entirety. The results of this test pertain only to the sample tested.

## 1.5 Hardware Description

The EUT (Equipment Under Test) is the Sentrol, SLC Technologies, Inc., Ranger RangeGated Radar four-cell RangeGated field disturbance sensor with the primary function of detecting motion to a 35' distance.

**Clocks/Oscillators:** 5.8 GHz, 10 MHz Clock

**EUT I/O Ports:** Input, 12 VDC, Output, Relay, NO (Normally Open), NC (Normally Closed), Tamper and Microcontroller Test and L/F Pins.

**CPU Speeds:** 10 MHz

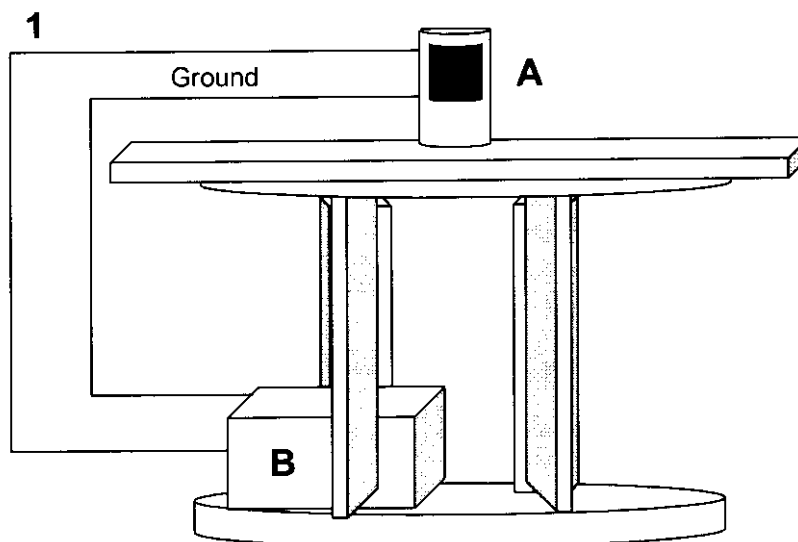
## 1.6 Tested System Details

### 1.6.1 EUT and Peripherals

| Diagram No. | Description     | Manufacturer                    | Model/Part Number       | Serial Number |
|-------------|-----------------|---------------------------------|-------------------------|---------------|
| A           | EUT             | Sentrol, SLC Technologies, Inc. | Ranger RangeGated Radar | Prototype     |
| B           | DC Power Supply | LG Precision                    | LG-43030                | 8011010       |

### 1.6.2 Cables

| Diagram No. | Cable Type | Shield | Length (meters) | Ferrite | Connector | Connection Point 1 | Connection Point 2 |
|-------------|------------|--------|-----------------|---------|-----------|--------------------|--------------------|
| 1           | DC Power   | N/A    | 1 Meter         | N/A     | Metal     | EUT                | Power Supply       |

**Figure 1.6 Configuration of Tested System (Block Diagram)**

## 1.7 Test Methodology

| Description         | Test Method | Year Issued |
|---------------------|-------------|-------------|
| Conducted Emissions | ANSI C63.4  | 1992        |
| Radiated Emissions  | ANSI C63.4  | 1992        |

## 1.8 Test Facilities

**Elliott Facility:** 120 South Elliott Road (503) 537-0728  
Suite 300 Fax: 537-0735  
Newberg, OR 97132

**Trails End Facility:** 30475 NE Trails End Lane (503) 648-0275  
Newberg, OR 97132 Fax: 537-5562

**Hillsboro Facility:** 5289 NE Elam Young Pkwy (503) 648-0275  
Suite G-800 Fax: 648-3269  
Hillsboro, OR 97124

**Bothell Facility:** 19102 North Creek Pkwy (425) 485-0960  
Suite 106 Fax: 485-3965  
Bothell, WA 98011

**Sultan Facility:** 14128 339<sup>th</sup> Ave. SE (360) 793-8675  
Sultan, WA 98294 Fax: 793-2536

## 1.9 Accreditations and Authorizations

### NVLAP

Northwest EMC, Inc. is recognized under the United States Department of Commerce, National Institute of Standards and Technology, National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC Guide 25 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. NVLAP Lab Code: 200059-0.

### FCC

The Open Area Test Sites, and conducted measurement facilities are located in Newberg, OR,. These sites have been fully described in reports filed with the FCC (Federal Communications Commission), and accepted by the FCC in letters maintained in our files.

### TÜV Product Service

Northwest EMC, Inc. is included by TÜV Product Service Group in its Listing of Recognized Laboratories. It qualifies in connection with the TÜV Certification after Recognition of Agent's Testing Program for the product categories and/or standards shown in TÜV's current Listing of CARAT Laboratories available from TÜV. A certificate was issued to represent that this laboratory continues to meet TÜV's CARAT Program requirements, (Certificate No. USA9601C).

### TÜV Rheinland

Northwest EMC, Inc. has been authorized to carryout EMC tests by order and under supervision of TÜV Rheinland. This authorization is based on "Conditions for EMC-Subcontractors" of November 1992.

### NEMKO

Northwest EMC, Inc. has been assessed and accredited by NEMKO (Norwegian testing and certification body) for European emissions and immunity testing. As a result of NEMKO's laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification (Authorization No. ELA 119).

### ITI

Northwest EMC, Inc. has been assessed in accordance with ISO Guide 25 defining the general international requirements for the competence of calibration and testing laboratories and with ITI assessment criteria LAC0196. Based upon that assessment Interference Technology International, Ltd., has granted approval for specifications implementing the EU Directive on EMC (89/336/EEC and amendments). The scope of the approval was provided on a Schedule of Assessment supplied with the certificate and is available upon request.

### AUSTEL

Northwest EMC, Inc., has been accredited by AUSTEL (Australian Telecommunications Authority) as an approved third party test house. This approval is a part of the Technical Approvals Guide No. 3 (TAG3) issue 6.1, Telecommunications Equipment, Standards and Labeling.

### New Zealand Ministry of Commerce

Northwest EMC, Inc., is an approved Testing Laboratory for the New Zealand Ministry of Commerce, Communications Division - Radio Operations.

### VCCI

Northwest EMC, Inc. has been accepted as an Associate Member to the VCCI, Acceptance No. 564. The conducted and radiated measurement facilities located at 120 S. Elliott Road, Suite 300, Newberg, OR have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. Registration No. R-165 and C-160. The conducted and radiated measurement facilities located at 30475 NE Trails End Lane, Newberg, OR have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. Registration No. R-677 and C-694.

### BCIQ

Northwest EMC, Inc., has been accredited by BCIQ (Bureau of Commodity Inspection and Quarantine) in Taiwan. As an accredited EMC Laboratory, our test data will be accepted for commodity EMC type approval in Taiwan. License No. SL2-IN-E-38T.

## **2.0 System Test Configuration**

### **2.1 Justification**

The EUT was configured to simulate typical use. Cables were attached to each of the available I/O Ports. Where applicable, peripherals were attached to the I/O Cables. The mode of operation utilized for testing was selected in order to best simulate typical EUT use.

### **2.2 EUT Exercise Software**

Application-specific software was utilized to exercise the EUT for each of the tests.

### **2.3 Special Accessories**

No special accessories are sold with the EUT.

### **2.4 Equipment Modifications**

The following modifications were made in order achieve EMI compliance:

- Added R151, 100 Ohm, and C152 and 33 pf to clock circuit output
- Added L3; 49 nH and C151; .001  $\mu$ f to Vcc of U8 (forming pi-filler network)
- Added series L1 and L2; .16  $\mu$ H to 12 VDC Input and C153; .001  $\mu$ f shunt cap from 12 VDC to ground.

### 3.0 Conducted Emissions Data

#### 3.1 Test Description

The EUT shall meet the average limit and the quasipeak limit when using, respectively, an average detector and a quasipeak detector. If the average limit is met when using a peak or quasipeak detector, the EUT shall be deemed to meet both limits, making additional measurements unnecessary.

EUT Input Power for Test ..... 115 VAC, 60 Hz  
Test Method ..... ANSI C63.4  
Specification Limits ..... FCC Part 15, Class B

#### 3.2 Test Procedure

The hot (high) and neutral (low) AC power leads of the EUT were scanned with a spectrum analyzer utilizing a peak detector throughout the specified frequency range. The results were plotted in graphical form with the peak emission levels compared to the average limits. All peak measurements with less than a 2 dB margin when compared to the average limit are re-measured using a quasipeak and/or average detector. Complete graphs and data sheets may be referenced on the following pages.

#### 3.3 Laboratory/Measurement Equipment

Test Location: ..... EL01

| Instrument        | Model             | Serial No. | Freq. Range      | Last Cal | Cal Due  |
|-------------------|-------------------|------------|------------------|----------|----------|
| LISN              | Solar 9252-50-R24 | 971602     | 10 kHz - 50 MHz  | 04/09/98 | 04/09/99 |
| LISN              | Solar 9252-50-R24 | 971603     | 10 kHz - 50 MHz  | 04/09/98 | 04/09/99 |
| Spectrum Analyzer | HP 8568B          | 2601A02125 | 100 Hz - 1.5 GHz | 07/22/97 | 07/22/98 |

#### 3.4 Test Results

- \* Positive (+) Margins = measured levels less than specification limit.
- \* Negative (-) Margins = measured levels greater than specification limit.

**Judgment:** Passed, minimum margin is 17.7dB.

# Northwest EMC, Inc.

Ver 5.4a, Jan 1997

Equipment Tested: RGR

Serial Number: prototype

Manufacturer: Sentrol, Inc.

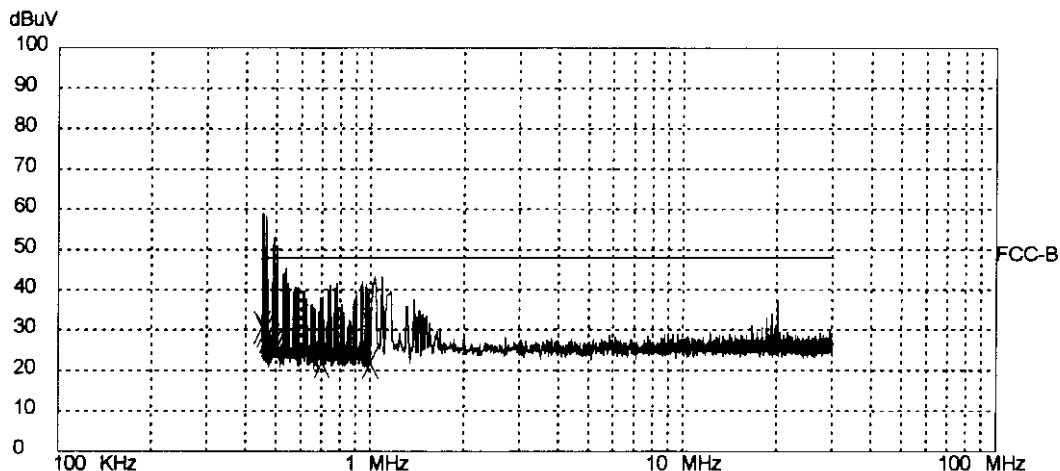
Job Number: SENT0121

Date/Time: 07-31-1998 08:12:38

Tested By: Greg Klemel, EL01

Comments: 33pF shunt C & 100 ohm series resistor on 10MHz clock output. PI filter on VCC of oscillator.  
Run #8 120V, 60Hz mains

## FCC Part 15 Class B Conducted Emissions Limits High



| Frequency<br>(MHz) | Meter<br>Reading<br>(dBuV) | Detector<br>Function | Correction<br>Factor<br>(dB) | Line<br>Tested | Adjusted<br>Level<br>(dBuV) | Spec.<br>Limit<br>(dBuV) | Compared<br>To Limit<br>(dB) |
|--------------------|----------------------------|----------------------|------------------------------|----------------|-----------------------------|--------------------------|------------------------------|
| 0.470              | 8.5                        | QP                   | 20.0                         | High           | 28.5                        | 56.5                     | -28.0                        |
| 0.450              | 10.7                       | QP                   | 20.0                         | High           | 30.7                        | 56.9                     | -26.2                        |
| 0.460              | 9.8                        | QP                   | 20.0                         | High           | 29.8                        | 56.7                     | -26.9                        |
| 0.480              | 7.5                        | QP                   | 20.0                         | High           | 27.5                        | 56.3                     | -28.8                        |
| 0.500              | 5.5                        | QP                   | 20.0                         | High           | 25.5                        | 56.0                     | -30.5                        |
| 0.490              | 6.0                        | QP                   | 20.0                         | High           | 26.0                        | 56.2                     | -30.2                        |
| 0.700              | 2.1                        | QP                   | 20.0                         | High           | 22.1                        | 56.0                     | -33.9                        |
| 1.000              | 2.0                        | QP                   | 20.0                         | High           | 22.0                        | 56.0                     | -34.0                        |

*Greg Klemel*

# Northwest EMC, Inc.

Ver 5.4a, Jan 1997

Equipment Tested: RGR

Serial Number: prototype

Manufacturer: Sentrol, Inc.

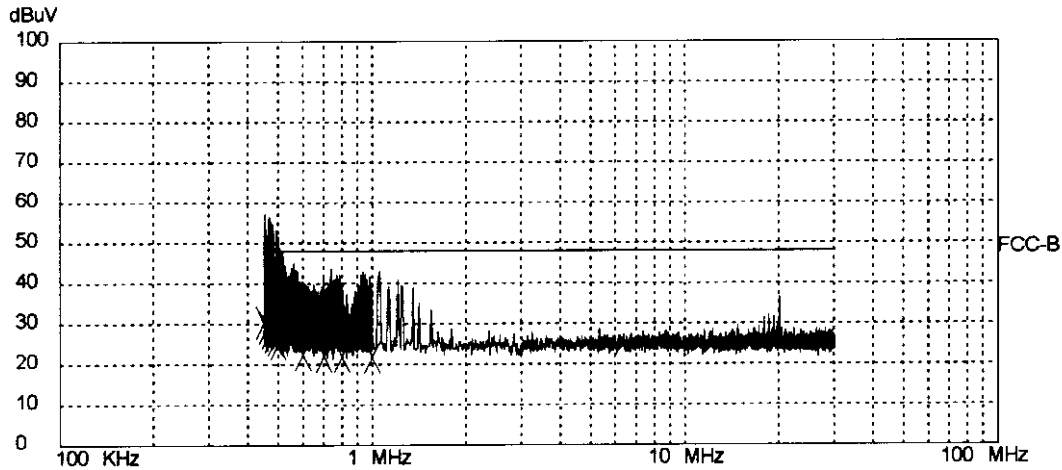
Job Number: SENT0121

Date/Time: 07-31-1998 08:37

Tested By: Greg Klemel, EL01

Comments: 33pF shunt C & 100 ohm series resistor on 10MHZ clock output. PI filter on VCC of oscillator.  
Run #8 120V, 60Hz mains

## FCC Part 15 Class B Conducted Emissions Limits Low



| Frequency<br>(MHz) | Meter<br>Reading<br>(dBuV) | Detector<br>Function | Correction<br>Factor<br>(dB) | Line<br>Tested | Adjusted<br>Level<br>(dBuV) | Spec.<br>Limit<br>(dBuV) | Compared<br>To Limit<br>(dB) |
|--------------------|----------------------------|----------------------|------------------------------|----------------|-----------------------------|--------------------------|------------------------------|
| 0.450              | 10.3                       | QP                   | 20.0                         | Low            | 30.3                        | 56.9                     | -26.6                        |
| 0.460              | 9.3                        | QP                   | 20.0                         | Low            | 29.3                        | 56.7                     | -27.4                        |
| 0.470              | 8.1                        | QP                   | 20.0                         | Low            | 28.1                        | 56.5                     | -28.4                        |
| 0.480              | 7.0                        | QP                   | 20.0                         | Low            | 27.0                        | 56.3                     | -29.3                        |
| 0.490              | 6.1                        | QP                   | 20.0                         | Low            | 26.1                        | 56.2                     | -30.1                        |
| 0.500              | 5.3                        | QP                   | 20.0                         | Low            | 25.3                        | 56.0                     | -30.7                        |
| 0.600              | 2.6                        | QP                   | 20.0                         | Low            | 22.6                        | 56.0                     | -33.4                        |
| 0.700              | 2.1                        | QP                   | 20.0                         | Low            | 22.1                        | 56.0                     | -33.9                        |
| 0.800              | 2.0                        | QP                   | 20.0                         | Low            | 22.0                        | 56.0                     | -34.0                        |
| 1.000              | 1.9                        | QP                   | 20.0                         | Low            | 21.9                        | 56.0                     | -34.1                        |

*Greg Klemel*

## 4.0 Radiated Emissions Data

### 4.1 Test Description

Radiated emissions measurements are made in the frequency range of 30 MHz - 1000 MHz, using instrumentation that incorporates a quasipeak detector. Measurement distances are specified by the test specification.

Test Method ..... ANSI C63.4  
Specification Limits ..... FCC Part 15, Class B

### 4.2 Test Procedure

Emission frequencies, total (corrected) levels, specification margins, correction factors, antenna height, table azimuth, etc., are contained in the graphs and tables on the following pages. Explanation of the correction factors is provided in this report.

Test Distance (Antenna to EUT) ..... 3 meters

### 4.3 Laboratory/Measurement Equipment

Test Location ..... EL02

| Instrument           | Model         | Serial No. | Freq. Range        | Last Cal | Cal Due  |
|----------------------|---------------|------------|--------------------|----------|----------|
| Bicon Antenna        | ARA BCD-235/B | 1042       | 30 MHz - 200 MHz   | 01/31/98 | 01/31/99 |
| Log Periodic Antenna | EMCO 3146     | 9006-2809  | 200 MHz - 1000 MHz | 01/31/98 | 01/31/99 |
| Pre-Amplifier        | LN1000AM3     | 21913      | 10 kHz - 1000 MHz  | 10/03/97 | 10/03/98 |
| Quasi-Peak Adapter   | HP 85650A     | 2043A00214 | 10 kHz - 1000 MHz  | 07/22/97 | 07/22/98 |
| Spectrum Analyzer    | HP 8568B      | 2601A02125 | 100 Hz - 1.5 GHz   | 07/22/97 | 07/22/98 |

### 4.4 Test Results

- \* Positive (+) Margins = measured levels less than specification limit.
- \* Negative (-) Margins = measured levels greater than specification limit.

**Judgment:** Passed, minimum margin of 2.7 dB.

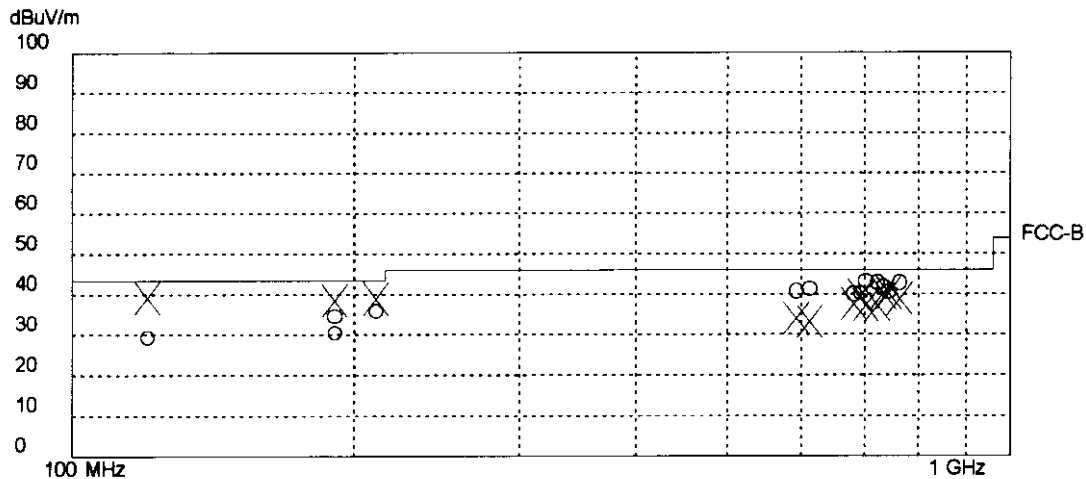
# Northwest EMC, Inc.

Version 5.2, Jan. 1998

EUT Name: RGR  
 Serial Number: prototype  
 Manufacturer: Sentrol, Inc.  
 Job Number: SENT0121  
 Test Date: 07-30-1998  
 Tested By: Greg Kiemel, EL01  
 Test Distance: 3 meters.  
 Comments: 33pF shunt C & 100 ohm series resistor on 10MHz clock output. PI filter on VCC of oscillator.  
 Run #8 Added 1000pF on DC input. Series ferrites on short DC cables.

Horizontal = X  
 Vertical = O

## FCC Class B (3 Meter Limit)



| Frequency (MHz) | Meter Reading (dBuV) | Detector | Antenna Factor (dB/m) | Antenna Horizontal Vertical | Preamplifier Gain (dB) | Cable Loss (dB) | Adjusted Level (dBuV/m) | Spec Limit (dBuV/m) | Table Azimuth (degree) | Antenna Height (meters) | Compared (To Limit) (dB) |
|-----------------|----------------------|----------|-----------------------|-----------------------------|------------------------|-----------------|-------------------------|---------------------|------------------------|-------------------------|--------------------------|
| 702.530         | 48.3                 | QP       | 21.4                  | VLPA                        | 32.1                   | 5.7             | 43.3                    | 46.0                | 80.0                   | 1.5                     | -2.7                     |
| 763.003         | 47.1                 | QP       | 21.7                  | VLPA                        | 32.1                   | 6.1             | 42.8                    | 46.0                | 20.0                   | 1.5                     | -3.2                     |
| 722.653         | 47.3                 | QP       | 21.8                  | VLPA                        | 32.1                   | 5.8             | 42.8                    | 46.0                | 90.0                   | 1.7                     | -3.2                     |
| 120.414         | 58.0                 | QP       | 11.5                  | HBIC                        | 32.2                   | 2.0             | 39.3                    | 43.5                | 0.0                    | 1.5                     | -4.2                     |
| 732.884         | 46.1                 | QP       | 21.8                  | VLPA                        | 32.1                   | 5.9             | 41.7                    | 46.0                | 0.0                    | 1.0                     | -4.3                     |
| 210.829         | 56.9                 | QP       | 11.5                  | HLPA                        | 32.0                   | 2.6             | 39.0                    | 43.5                | 350.0                  | 1.5                     | -4.5                     |
| 612.188         | 49.0                 | QP       | 19.1                  | VLPA                        | 32.0                   | 5.3             | 41.4                    | 46.0                | 75.0                   | 1.0                     | -4.6                     |
| 190.657         | 54.3                 | QP       | 13.8                  | HBIC                        | 32.0                   | 2.5             | 38.6                    | 43.5                | 180.0                  | 1.0                     | -4.9                     |
| 592.103         | 48.8                 | QP       | 18.8                  | VLPA                        | 32.0                   | 5.2             | 40.8                    | 46.0                | 75.0                   | 1.0                     | -5.2                     |
| 742.924         | 45.1                 | QP       | 21.8                  | VLPA                        | 32.1                   | 6.0             | 40.8                    | 46.0                | 170.0                  | 1.0                     | -5.2                     |
| 692.726         | 45.6                 | QP       | 21.2                  | VLPA                        | 32.1                   | 5.7             | 40.4                    | 46.0                | 200.0                  | 1.0                     | -5.6                     |
| 732.885         | 44.7                 | QP       | 21.8                  | HLPA                        | 32.1                   | 5.9             | 40.3                    | 46.0                | 90.0                   | 1.5                     | -5.7                     |
| 742.920         | 44.6                 | QP       | 21.8                  | HLPA                        | 32.1                   | 6.0             | 40.3                    | 46.0                | 100.0                  | 1.4                     | -5.7                     |
| 682.405         | 45.5                 | QP       | 21.1                  | VLPA                        | 32.1                   | 5.6             | 40.1                    | 46.0                | 180.0                  | 1.0                     | -5.9                     |
| 692.727         | 44.8                 | QP       | 21.2                  | HLPA                        | 32.1                   | 5.7             | 39.6                    | 46.0                | 0.0                    | 1.5                     | -6.4                     |
| 763.001         | 43.2                 | QP       | 21.7                  | HLPA                        | 32.1                   | 6.1             | 38.9                    | 46.0                | 20.0                   | 1.4                     | -7.1                     |
| 210.835         | 54.0                 | QP       | 11.5                  | VLPA                        | 32.0                   | 2.6             | 36.0                    | 43.5                | 180.0                  | 1.0                     | -7.4                     |
| 682.359         | 43.0                 | QP       | 21.1                  | HLPA                        | 32.1                   | 5.6             | 37.6                    | 46.0                | 80.0                   | 1.4                     | -8.4                     |
| 702.447         | 42.3                 | QP       | 21.4                  | HLPA                        | 32.1                   | 5.7             | 37.3                    | 46.0                | 200.0                  | 1.4                     | -8.7                     |
| 722.524         | 41.8                 | QP       | 21.8                  | HLPA                        | 32.1                   | 5.8             | 37.3                    | 46.0                | 200.0                  | 1.4                     | -8.7                     |

Temperature 70F 60% Humidity

*Handwritten signature: U.K.P.*

## 4.5 Field Strength Calculations

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured level. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

where : FS = Field Strength

RA = Measured Level

AF = Antenna Factor

CF = Cable Attenuation Factor

AG = Amplifier Gain

Assume a receiver reading of 52.5 dBuV is obtained. The Antenna Factor of 7.4 and a Cable Factor of 1.1 is added. The Amplifier Gain of 29 dB is subtracted, giving a field strength of 32 dBuV/meter.

$$FS = 52.5 + 7.4 + 1.1 - 29 = 32 \text{ dBuV/meter}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32 \text{ dBuV/m})/20] = 39.8 \text{ } \mu\text{V/m}$$

## 4.6 Measurement Uncertainty

When a measurement is made the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. The following statement of measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" value.

Uncertainty (dB)

| Test Distance                                                     | Probability Distribution | Uncertainty (dB) |                       |                  |                          |                  |                    |
|-------------------------------------------------------------------|--------------------------|------------------|-----------------------|------------------|--------------------------|------------------|--------------------|
|                                                                   |                          | 3m               | Biconical Antenna 10m | 3m               | Log Periodic Antenna 10m | 3m               | Dipole Antenna 10m |
| Combined standard uncertainty $u_c(y)$                            | normal                   | + 1.86<br>- 1.88 | + 1.82<br>- 1.87      | + 2.23<br>- 1.41 | + 1.29<br>- 1.26         | + 1.31<br>- 1.27 | + 1.25<br>- 1.25   |
| Expanded uncertainty $U$<br>(level of confidence $\approx 95\%$ ) | normal (k=2)             | + 3.72<br>- 3.77 | + 3.82<br>- 3.73      | + 4.46<br>- 2.81 | + 2.59<br>- 2.52         | + 2.61<br>- 2.55 | + 2.49<br>- 2.49   |

$u_c(y)$  = square root of the sum of squares of the individual standard uncertainties

$U$  = combined standard uncertainty multiplied by the coverage factor:  $k$ . This defines an interval about the measured result that will encompass the true value with a confidence level of approximately 95%. If a higher level of confidence is required, then  $k=3$  (CL of 99.7%) can be used. Please note that with a coverage factor of one,  $u_c(y)$  yields a confidence level of only 68%.

"ISO Guide to the Expression of Uncertainty in Measurements" and "NIS81: The Treatment of Uncertainty in EMC Measurements" were the basis for determining the uncertainty levels of our measurements. Details of those calculations are available upon request.

## 4.7 Measurement Bandwidths

### Peak Data

|                         |         |
|-------------------------|---------|
| 150 kHz - 30 MHz .....  | 10 kHz  |
| 30 MHz - 1000 MHz ..... | 100 kHz |

### Quasi-peak Data

|                         |         |
|-------------------------|---------|
| 150 kHz - 30 MHz .....  | 9 kHz   |
| 30 MHz - 1000 MHz ..... | 120 kHz |

Measurements were made using the Bandwidths and detectors specified. No video filter was used.



ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT  
INTENTIONAL RADIATOR CERTIFICATION TO  
FCC PART 15 SUBPART C REQUIREMENT

OF

FCC ID : CGGAA2

PRESENCE SENSOR (6.25 GHz TRANSMITTER)

MODEL NO.:DOLPHIN PRESENCE SENSOR

S/N: N/A

REPORT NO: 97E5794

FEBRUARY 18,1997

Prepared for  
**SENTROL ,INC.**  
12345 SW LEVETON DRIVE  
TUALATIN, OR 97062

Prepared by  
**COMPLIANCE ENGINEERING SERVICES, INC.**  
1366 BORDEAUX DRIVE  
SUNNYVALE CA 94089



1366 BORDEAUX DRIVE, SUNNYVALE, CA 94089

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Attachment #1 EUT Photographs

Attachment #2 Proposed FCC ID Label Format

Attachment #3 Agent Authorization Letter

Attachment #4 Theory of Operation

Attachment #5 Block Diagram

Attachment #6 Schematic Diagram

**1. VERIFICATION OF COMPLIANCE**

COMPANY NAME : SENTROL, INC.  
12345 SW LEVETON DRIVE  
TUALATIN, OR 97062

CONTACT PERSON : MR. KEVIN McDONALD

TELEPHONE NO : (503) 692-4052

EUT DESCRIPTION: PRESENCE SENSOR (6.25GHz TRANSMITTER)

MODEM NAME : DOLPHIN PRESENCE SENSOR

DATE TESTED : FEBRUARY 18, 1997

| LIMIT APPLY TO :FCC PART 15 SECTION 15.205/SECTION 15.209                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| TECHNICAL LIMITS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | TEST RESULT |
| Restricted Band of Operation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Passed      |
| LIMIT APPLY TO :FCC PART 15 SECTION 15.207                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |
| AC Line Conducted Emission                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Passed      |
| <p>The above equipment was tested by Compliance Engineering Services Inc. for compliance with the requirement set forth in the requirements of CFR 47 PART 15 SUBPART C. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.</p> <p></p> <p>THOMAS N. COKENIAS/ EMC DIRECTOR<br/>COMPLIANCE ENGINEERING SERVICES, INC.</p> |             |

---

**2. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)**

|                                  |                                             |
|----------------------------------|---------------------------------------------|
| CHASSIS TYPE                     | METAL                                       |
| Central Frequency                | 6.25 GHz                                    |
| Local Osc./Location              | Y1:4MHz                                     |
| Modulation Technique             | HOMODYNE                                    |
| Transmitted Pulse Width          | 4 nanoseconds w/ a half-sine envelope shape |
| Pulse Repetition Frequency (PRF) | 125kHz                                      |

EUT is designed to detect the presence of moving human sized objects within a certain range. Moving objects beyond the calibrated range are not sensed. Stationary objects are not sensed because the system is AC coupled.

**3. TEST LOCATION**

All emissions tests were performed at:

Compliance Consulting Services  
561F Monterey Road  
Morgan Hill, CA 95087

CCS has site descriptions on file with the FCC for 10m and 3m site configurations. CCS is a NVLAP accredited facility.

Radiated emissions from the digital portion of the EUT were performed on site B, one of the 10 m sites.

#### 4. TEST PROCEDURES AND TEST RESULTS

##### Radiated Emissions ( General Requirements )

Test Requirement: 15.205/15.209

##### Measurement Equipment Used:

HP 8563E Spectrum Analyzer

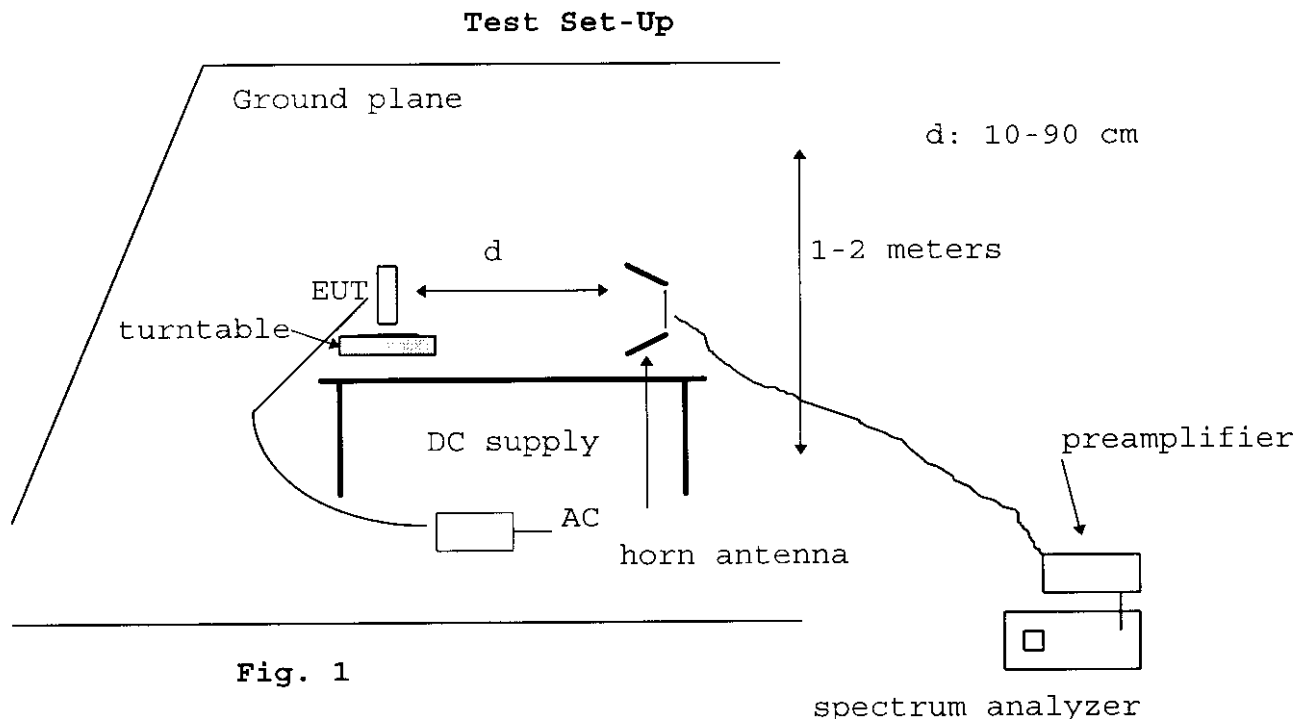
HP 8449 B Preamplifier, 1-26 GHz

ARA DRG-118/A Double Ridged Horn antenna, 1 - 18 Ghz

ARA MWH 1826/B Horn Antenna, 18-26 GHz

QIM "The Workhorse" low loss cable, 9ft (loss: 0.85 dB/ft@ 26 GHz)

HP 11970A Harmonic Mixer, 26.5 - 40GHz



##### Test Procedures

1. The EUT was placed on a wooden table on the outdoor ground plane. The search antenna was placed 3 ft from the EUT. The EUT antenna was mounted vertically as per normal installation.
2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205. The EUT was moved throughout the XY, XZ, and YZ planes to maximize emissions received by the horn antenna.

PAGE NO: 3

In the 26.5 - 40 GHZ range, the horn antenna was replaced by a standard gain horn attached to the HP11970 external harmonic mixer.

3. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recored in the data listed below.

**Test Results:** Refer to attached tabular data sheets

| Radiated Emissions                                                                   |                 |             |                   |            |                             |                 |                 |                 |
|--------------------------------------------------------------------------------------|-----------------|-------------|-------------------|------------|-----------------------------|-----------------|-----------------|-----------------|
|                                                                                      |                 |             |                   |            |                             |                 | 18-Feb-97       |                 |
| Sentrol, Inc.                                                                        |                 |             |                   |            |                             |                 |                 |                 |
| Dolphin Presence Sensor                                                              |                 |             |                   |            |                             |                 | T.N. Cokenias   |                 |
| FCC Rule Part: 15.209                                                                |                 |             |                   |            |                             |                 | Site F 1 meter  |                 |
| Measurements below 19 GHz:                                                           |                 |             |                   |            |                             |                 |                 |                 |
| F(MHz)                                                                               | Reading<br>dBuV | AF<br>dB    | Amplifier<br>dB   | CL<br>dB   | DIST<br>dB                  | Other<br>dB     | Total<br>dBuV/m | Limit<br>dBuV/m |
| 6305Pk                                                                               | 69.5            | 37.8        | -35.5             | 3.2        | -10.45                      | 0.0             | 64.55           | 74.0            |
| 6305Av                                                                               | 36.7            | 37.8        | -35.5             | 3.2        | -10.45                      | 0.0             | 31.75           | 54.0            |
| 12633Pk                                                                              | 45.8            | 43.3        | -35.5             | 4.7        | -20.0                       | 0.0             | 38.3            | 74.0            |
| 12633Av                                                                              | 27.8            | 43.3        | -35.5             | 4.7        | -20.0                       | 0.0             | 20.3            | 54.0            |
| 8812PkN                                                                              | 37.3            | 57.1        | -35.5             | 6.2        | -20.0                       | 0.0             | 45.1            | 74.0            |
| 8812AvN                                                                              | 27.7            | 57.1        | -35.5             | 6.2        | -20.0                       | 0.0             | 35.5            | 54.0            |
| Note: Duty cycle = 20 log(50nsec/8000 nsec) = -44.1 dB                               |                 |             |                   |            |                             |                 |                 |                 |
| Duty cycle correction was <b>not</b> added to peak reading to obtain average reading |                 |             |                   |            |                             |                 |                 |                 |
| Measurements Above 19 GHz:                                                           |                 |             |                   |            |                             |                 |                 |                 |
| F(MHz)                                                                               | Reading<br>dBm  | Gain<br>dBi | E@10 cm<br>dBuV/m | DIST<br>dB | E@3m<br>dBuV/m              | Limit<br>dBuV/m | Margin<br>dB    |                 |
| 25149NF                                                                              | -65.0           | 24.8        | 76.9              | -29.5      | 47.0                        | 54.0            | -7.0            |                 |
| 31250NF                                                                              | -72.3           | 15.7        | 78.8              | -29.5      | 49.3                        | 54.0            | -4.7            |                 |
| 37750NF                                                                              | -74.8           | 17.0        | 76.9              | -29.5      | 47.0                        | 54.0            | -7.0            |                 |
| Duty cycle correction was <b>not</b> added to peak reading to obtain average reading |                 |             |                   |            |                             |                 |                 |                 |
| Effective Area of antenna = $A = (L)^2 \cdot G / 4 \cdot \pi$                        |                 |             |                   |            | G = gain isotropic, numeric |                 |                 |                 |
| Pant = $SA = E \cdot H \cdot A = (E)^2 / (120 \cdot \pi) \cdot A$ , watts/           |                 |             |                   |            | L= wavelength, meters       |                 |                 |                 |
| $E, v/m = (\pi/L) \cdot 21.9 \cdot (P/G)^{(0.5)}$                                    |                 |             |                   |            |                             |                 |                 |                 |

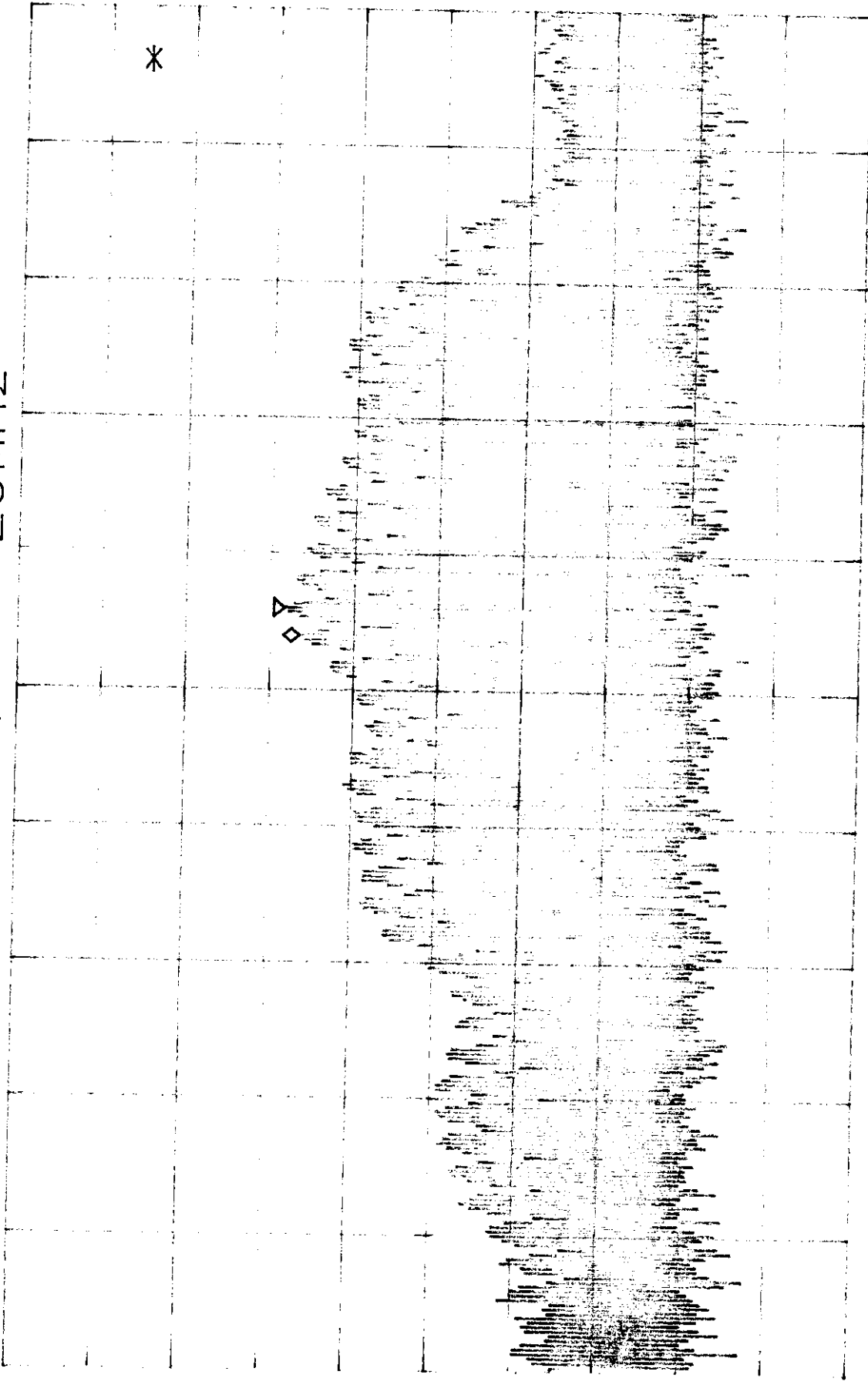
\*ATTEN 0dB

RL -14.2dBm

10dB/

ΔMKR -1.84dB

-20MHz



CENTER 6.250GHz

\*RBW 1.0MHz

\*VBW 1.0MHz

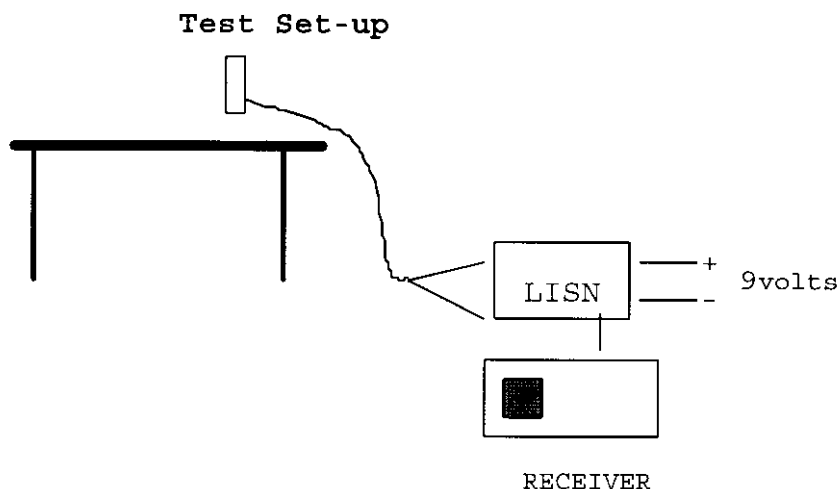
SPAN 1.000GHz

SWP 50.0ms

**AC Line Conducted Emissions****Test Requirement: 15.207****Measurement Equipment Used:**

Rohde &amp; Schwarz EMI Receiver ESHS-20

Fischer Custom Communication LISN, FCC-LISN-50/250-25-2

**Fig. 2****Test Procedure**

The EUT operates on DC power only. The DC is supplied by a non-specific AC to DC converter. The DC supply used for the radiated test was not designed for EMI suppression and introduced noise into the test set-up. To determine the RF noise (if any) coming from the EUT, the equipment was set up as shown in Figure 2, and DC was supplied to the EUT through a LISN. Any emissions produced by the EUT in the .45 - 30 Mhz region could then be measured without ambiguity.

1. The EUT was placed on a wooden table 40 cm from a vertical ground plane and approximately 80 cm above the horizontal ground plane on the floor. The EUT was set to transmit in a normal hopping mode.
2. Line conducted data was recorded for both NEUTRAL and HOT lines.

**Test Results**

Refer to attached graph.

# COMPLIANCE ENGINEERING SERVICES INC.

## RFI VOLTAGE

EUT: DOLPHIN MOTION SENSOR  
 Manuf: SENTROL  
 Op Cond: 6.25GHZ CENTER FREQUENCY  
 Operator: MIKE ZHU  
 Test Spec: FCC CLASS B  
 Comment: Line hot black, neutral blue  
 BVdc

### Fast Scan Settings (2 Ranges)

| Frequencies |      |      | Receiver Settings |          |        |        |        |       |  |
|-------------|------|------|-------------------|----------|--------|--------|--------|-------|--|
| Start       | Stop | Step | IF BW             | Detector | M-Time | Atten  | Preamp | OpRge |  |
| 450k        | 500k | 3k   | 10k               | PK       | 0.05ms | 10dBLN | OFF    | 60dB  |  |
| 500k        | 30M  | 3k   | 10k               | PK       | 0.05ms | 10dBLN | OFF    | 60dB  |  |

Final Measurement: x QP Transducer No. Start Stop Name  
 Meas Time: 1 s 1 10k 30M FISCHER  
 Subranges: 25  
 Acc Margin: 6dB

