

TEST NUMBER - 268-99

**FEDERAL COMMUNICATIONS COMMISSION**

**PART 15.249 CERTIFICATION TESTING 902 - 928 MHz**

**Subpart C - Intentional Radiators**

for

Safety 1ST, Inc.  
210 Boylston Street  
Chestnut Hill, MA 02167  
800-962-7233

of

GROW WITH ME

49240T

FCCID#: MNJ49240T

on

October 27, 1999

by

**Larry K. Stillings**

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Larry K. Stillings



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#### TEST DESCRIPTION

##### 1. TEST OBJECTIVE

**To test the GROW WITH ME 49240T to FCC Part 15.239, Subpart C limits and write a report.**

##### 2. E.U.T. DESCRIPTION

#### GENERAL

**The GROW WITH ME 49240T is a 2 way baby monitor that operates in the 902 to 928 MHz band and contains 40 channels. Pre-programmed software allows four of the forty channels to be selected between 925.30 MHz and 927.25 MHz in 50 kHz steps.**

**Currently, the four channels used are 926.1 MHz, 926.3 MHz, 926.5 MHz and 926.7 MHz. The GROW WITH ME 49240T is a transceiver that typically is in transmit mode until it receives a signal from a second transceiver that places it into receive mode.**

#### SERIAL NUMBERS:

**Pre-production prototype**



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#### TEST RESULTS AND CONCLUSIONS

PRODUCT TESTED - GROW WITH ME

MODEL NUMBER - 49240T

#### RADIATED TEST RESULTS

The test results show that the emissions radiated from this equipment are in compliance with FCC Rules, Part 15, Subpart C, Section 15.209.

#### OCCUPIED BANDWIDTH & OUTPUT POWER

The test results show that the output power and occupied bandwidth of this equipment are in compliance with FCC Rules, Part 15, Subpart C, Section 15.239.

#### CONDUCTED TEST RESULTS

The test results show that the emissions conducted through the power line from this equipment are in compliance with FCC Rules, Part 15, Subpart C, Section 15.207.

#### ANALYSIS AND CONCLUSIONS

Based upon the radiated and conducted measurements we find that this equipment is within the limits of the FCC Rules, Part 15, Subpart C.

#### NOTES (Special conditions unique to this test)

None



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## TEST PROCEDURES

### 1. TEST EQUIPMENT

- A. HP 8546A (9 kHz - 6.5 GHz) EMI Receiver w/ RF Filter Section, S/N 3704A00323 / 3650A00360. Calibration Date 3-25-1999, calibrated annually.
- B. HP 8593E (9 kHz - 26.5 GHz) Spectrum Analyzer, S/N 3829A03887. Calibration Date 9-3-1999, calibrated annually.
- C. Electro-Metrics BiConical Antenna, Model EM6912A, S/N 149. Calibration Date 9-19-1999, calibrated annually.
- D. Electro-Metrics Log Periodic Antenna, Model EM-6950, S/N 1017. Calibration Date: 3-31-1999, calibrated annually.
- E. Electro-Metrics Double Ridged Guide Antenna, Model EM-6961, S/N 6337. Calibration Date: 7-14-1999, calibrated annually.
- F. HP 1 - 26.5 GHz Preamplifier, Model 08449B, S/N 3008A01323. Calibration Date: 9-29-1999, calibrated annually.
- G. LISN, Compliance Worldwide, Model 50  $\mu$ H / 50 ohm, S/N 100. Calibration Date 7-13-1999, calibrated annually.

### 2. FREQUENCY RANGE TO BE SCANNED.

- A. Radiated Test from 30 MHz to 40 GHz (or the 10<sup>th</sup> harmonic of the highest frequency whichever is lower).
- B. Conducted Test from 450 kHz to 30 MHz.



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### 3. TEST PROCEDURES.

#### **Radiated test procedure:**

The EUT, associated cables and peripheral devices are placed on the supporting table and any support equipment is placed off the site. The EUT is turned on and any necessary operating or test software installed and allowed to warm up. The frequency band from 30 MHz to 40 GHz is scanned. When an emission is found the emission is maximized by varying the bundle position of the connecting cables, the antenna height, the antenna polarization (vertical and horizontal) and the table orientation (360 degrees). The maximum reading is recorded and the next signal is searched for.

#### **Conducted test procedure:**

The power line of the EUT is connected to the LISN (Line Impedance Stabilization Network). Measurements of the emissions are made from the power line for both phase and neutral on the analyzer in the frequency range from 450 kHz to 30 MHz. The maximum readings are recorded for each phase.

All measurements are made according to the procedures defined in: "ANSI C63.4-1992 Standard Methods of Measurement of Radio Noise Emissions from Low-Voltage Electrical and Electronics Equipment in the Range of 9 kHz to 40 GHz, American National Standard for (ISBN 1-55937-215-5).



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## PART 15 SUBPART C TEST LIMITS

### 1. 15.209, 15.235 & 15.249 Radiation Limits (Quasi-Peak):

| Frequency<br>MHz | Distance<br>meters | Limit<br>dB $\mu$ V/m | Limit<br>$\mu$ V/m |
|------------------|--------------------|-----------------------|--------------------|
| 1.705 - 30       | 30                 | 29.5*                 | 30*                |
| 30 - 88          | 3                  | 40.0                  | 100                |
| 49.82 - 49.90    | 3                  | 80.0*                 | 10,000*            |
| 88 - 216         | 3                  | 43.5                  | 150                |
| 216 - 960        | 3                  | 46.0                  | 200                |
| 902 - 928        | 3                  | 94.0*                 | 50,000*            |
| 960 - 1000       | 3                  | 54.0                  | 500                |
| 1000 - 9280      | 3                  | 54.0*                 | 500*               |

\*NOTE: Average Limits

### 2. 15.207 Conduction Limits (Quasi-Peak):

| Frequency<br>MHz | Limit<br>dB $\mu$ V/m | Limit<br>$\mu$ V/m |
|------------------|-----------------------|--------------------|
| 0.450 - 30.0     | 48.0                  | 250                |



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### MEASUREMENT UNCERTAINTY BUDGET AND CALCULATIONS

These measurement uncertainties were calculated in accordance with the requirements of the NAMAS Document Draft NIS63 with a confidence level of 95%.

#### Measurement Uncertainty for Radiated Emissions Measurements 30 MHz - 1000 MHz

| Contribution                                        | Distribution  | Uncertainty (dB)            |                                |
|-----------------------------------------------------|---------------|-----------------------------|--------------------------------|
|                                                     |               | Biconical Antenna<br>3m-10m | Log-Periodic Antenna<br>3m-10m |
| Antenna factor calibration                          | Gaussian (2s) | $\pm 1.0$                   | $\pm 1.0$                      |
| Cable loss calibration                              | Gaussian (2s) | $\pm 0.5$                   | $\pm 0.5$                      |
| EMI receiver specification                          | Rectangular   | $\pm 0.5$                   | $\pm 0.5$                      |
| Antenna factor variation with height                | Rectangular   | $\pm 2.0$                   | $\pm 0.5$                      |
| Antenna directivity                                 | Rectangular   | $\pm 0.5$                   | $\pm 3.0/\pm 0.5$              |
| Antenna phase center variation                      | Rectangular   | $\pm 0.0$                   | $\pm 1.0/\pm 0.2$              |
| Antenna factor frequency interpolation              | Rectangular   | $\pm 0.2$                   | $\pm 0.2$                      |
| Measurement distance variation                      | Rectangular   | $\pm 0.5$                   | $\pm 0.5$                      |
| Site imperfections                                  | Rectangular   | $\pm 1.0$                   | $\pm 1.0$                      |
| Mismatch                                            | U-shaped      | $\pm 1.2$                   | $\pm 0.5$                      |
| Random                                              | Gaussian (1s) | $\pm 0.7$                   | $\pm 0.7$                      |
| Total uncertainty at 95% min confidence probability |               | $\pm 4.1/4.2$               | $\pm 4.7/3.0$                  |

#### References:

1. *ANSI C63.6-1988* - American National Standard Guide for the computation of errors in open area test sites.
2. *ANSI C63.5-1988* - American National Standard for the calibration for antennae used for radiated emission measurements in Electromagnetic Interference control.
3. *Draft NIS63* - The treatment of uncertainty in EMC measurements.



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### ***Measurement Uncertainty Calculation***

#### **Total Uncertainty**

$$U = 2\sqrt{S_{s1}^2 + S_{s2}^2 + \dots + S_{sm}^2 + S_r^2}$$

#### **Total Uncertainty for Biconical Antenna at 3 meters**

$$U = 2\sqrt{\frac{1.0^2}{2} + \frac{0.5^2}{2} + \frac{1.5^2 + 2.0^2 + 0.5^2 + 0.2^2 + 0.5^2 + 1.0^2}{3} + \frac{1.2^2}{2} + 0.7^2} = 4.06\text{dB}$$

#### **Total Uncertainty for Biconical Antenna at 10 meters**

$$U = 2\sqrt{\frac{1.0^2}{2} + \frac{0.5^2}{2} + \frac{1.5^2 + 2.0^2 + 0.5^2 + 0.2^2 + 0.5^2 + 1.0^2}{3} + \frac{1.2^2}{2} + 0.7^2} = 4.15\text{dB}$$

#### **Total Uncertainty for Log-Periodic Antenna at 3 meters**

$$U = 2\sqrt{\frac{1.0^2}{2} + \frac{0.5^2}{2} + \frac{1.5^2 + 0.5^2 + 3.0^2 + 1.0^2 + 0.2^2 + 0.5^2 + 1.0^2}{3} + \frac{0.5^2}{2} + 0.7^2} = 4.70\text{dB}$$

#### **Total Uncertainty for Log-Periodic Antenna at 10 meters**

$$U = 2\sqrt{\frac{1.0^2}{2} + \frac{0.5^2}{2} + \frac{1.5^2 + 0.5^2 + 0.5^2 + 0.2^2 + 0.2^2 + 0.5^2 + 1.0^2}{3} + \frac{0.5^2}{2} + 0.7^2} = 3.03\text{dB}$$



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**Measurement Uncertainty for Conducted Emissions Measurements  
0.450 - 30 MHz**

| <b>Contribution</b>                                 | <b>Distribution</b> | <b>Uncertainty<br/>0.45 MHz - 30MHz</b> |
|-----------------------------------------------------|---------------------|-----------------------------------------|
| EMI Receiver Specification                          | Rectangular         | ± 1.5                                   |
| LISN Specification                                  | Rectangular         | ± 1.5                                   |
| Cable Calibration                                   | Gaussian (2s)       | ± 0.2                                   |
| Mismatch                                            | U-Shaped            | ± 0.6                                   |
| Random                                              | Gaussian (1s)       | ± 0.8                                   |
| Total uncertainty at 95% min confidence probability |                     | ± 3.1                                   |

**References:**

1. ANSI C63.6-1988 American National Standard Guide for the computation of errors in open area test sites.
2. Draft NIS63 The treatment of uncertainty in EMC measurements.

***Measurement Uncertainty Calculation***

**Total Uncertainty-**

$$U = 2\sqrt{S_{s1}^2 + S_{s2}^2 + \dots + S_{sm}^2 + S_r^2}$$

**Total Uncertainty for Conducted Emissions**

$$U = 2\sqrt{\frac{1.5^2 + 1.5^2}{3} + \frac{0.2^2}{2} + \frac{0.6^2}{2} + 0.8^2} = 3.05\text{dB}$$



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### **TEST FACILITY DESCRIPTION**

In keeping with the requirements of Section 2.948 of the Federal Communications Commission's Rules, Compliance Worldwide has filed a Test Facility Description with the F.C.C.

Anyone wishing to review this Test Facility Description is referred to file number 31040/SIT, 1300F2. This is currently on file at the FCC's Authorization and Evaluation Lab in Columbia, Maryland, U.S.A.

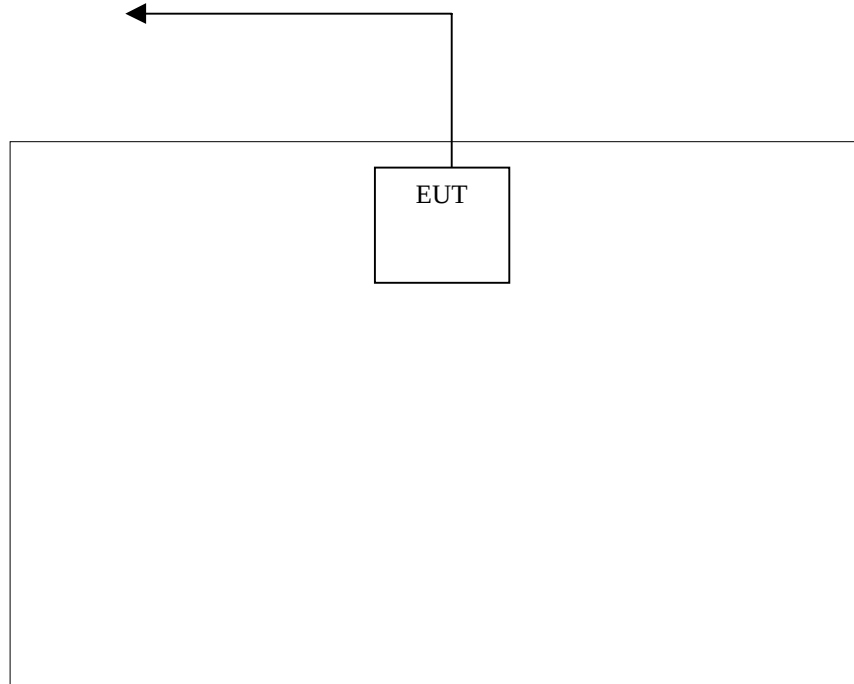
**DATE ON FILE: May 7, 1997**



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**TEST SET UP  
AND  
PERIPHERAL CONNECTION INFORMATION**

To 120 VAC (via 9VDC Transformer)





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PLEASE NOTE - EUT (equipment under test) is GROW WITH ME.

The cables directly connected to this equipment are listed below.  
Please see below for a complete list of FCC ID's etc. on the  
supporting equipment.

#### Connection Descriptions

1.

##### **Power Cable**

---

(description)

##### **EUT**

---

(from device)

**120 VAC via 9VDC 200mA transformer / batteries**

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(to device)

CABLE LENGTH 1 meter (S) SHIELDED or (U) UNSHIELDED \_\_U\_\_



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### **RADIATED TEST RESULTS**

Frequency Range: 30 - 9280 MHz.  
Measurement Distance: 3.0 Meters.  
Bandwidth: 120 kHz, Per ANSI C63.4-1992.\*  
Detector Functions: Peak, Quasi Peak, Average  
Video Filter: 300 kHz  
Table Height: 0.8 meters  
Antenna Height Variation: 1 - 4 Meters.  
Horizontal and Vertical Polarization Measurements Taken.

\*Measurement Bandwidth is 1 MHz above 1 GHz

**PLEASE SEE NEXT PAGE FOR RADIATED TEST DATA**

### **Measurement Uncertainties**

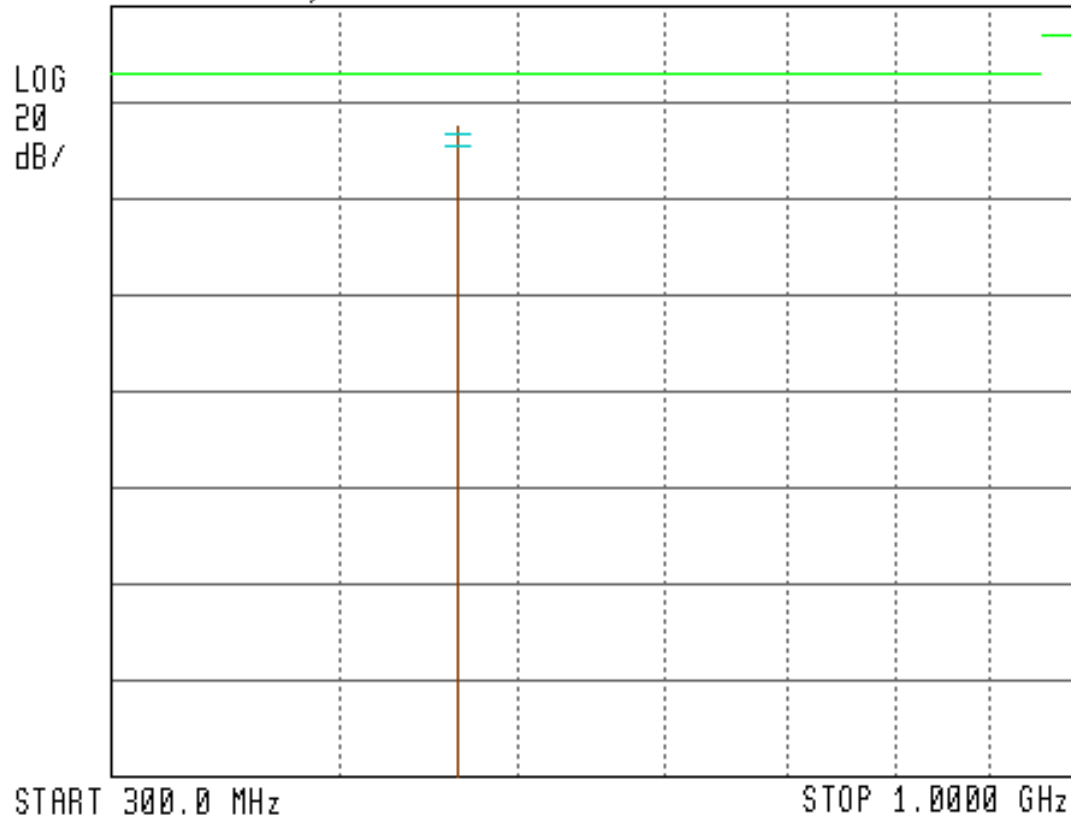
The measurement uncertainties stated were calculated in accordance with the requirements of NAMAS Document NIS63 with a confidence level of 95%. The complete measurement uncertainty budget and calculations are located in the Measurement Uncertainty section of this report.

| Tests Performed                                                                 | Total Uncertainty |
|---------------------------------------------------------------------------------|-------------------|
| Radiated Emissions with Biconical Antenna at 3 Meters -- 30 MHz - 200 MHz       | ±4.06             |
| Radiated Emissions with Biconical Antenna at 10 Meters -- 30 MHz - 200 MHz      | ±4.15             |
| Radiated Emissions with Log-Periodic Antenna at 3 Meters -- 200 MHz - 1000 MHz  | ±4.70             |
| Radiated Emissions with Log-Periodic Antenna at 10 Meters -- 200 MHz - 1000 MHz | ±3.03             |



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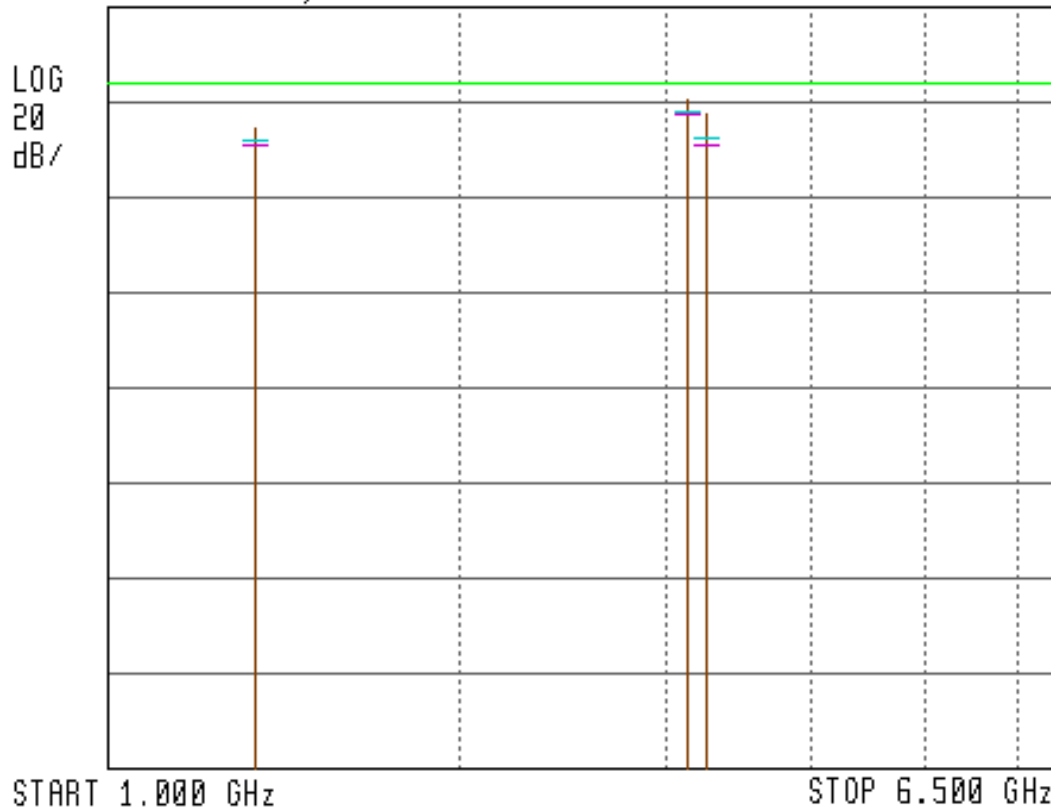
19:43:52 OCT 28, 1999  
SAFETY 1ST GROW WITH ME 49420T #269-99  
REF 60.0 dB $\mu$ V





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Safety 1ST, Inc.  
GROW WITH ME - 49240T

10:24:35 OCT 28, 1999  
SAFETY 1ST 49420T GROW WITH ME #268-99  
REF 70.0 dB $\mu$ V





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### **Radiated Test Results @ 3 meters**

#### **30 - 1000 MHz**

| Frequency<br>MHz | Polarization<br>H/V | Height<br>m | Table<br>degrees | Peak Amplitude<br>dBμV | QP Amplitude<br>dBμV | Limit<br>dBμV | Margin<br>dB |
|------------------|---------------------|-------------|------------------|------------------------|----------------------|---------------|--------------|
| 463.34           | V                   | 1.25        | 270              | 33.0                   | 31.7                 | 46.0          | 14.4         |
| 463.33           | H                   | 1           | 225              | 35.3                   | 34.2                 | 46.0          | 11.9         |

### **Radiated Test Results @ 3 meters**

#### **1000 - 9280 MHz**

| Frequency<br>MHz | Polarization<br>H/V | Height<br>m | Table<br>degrees | Average Amplitude<br>dBμV | Limit<br>dBμV | Margin<br>dB |
|------------------|---------------------|-------------|------------------|---------------------------|---------------|--------------|
| 1340.12          | V                   | 1           | 100              | 41.8                      | 54.0          | 12.2         |
| 3127.14          | H                   | 1.25        | 90               | 47.6                      | 54.0          | 6.4          |
| 3243.37          | H                   | 1.5         | 90               | 41.5                      | 54.0          | 12.6         |



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### **RADIATED OUTPUT POWER & OCCUPIED BANDWIDTH TEST RESULTS**

Frequency Range: 902 - 928 MHz.  
Measurement Distance: 3.0 Meters.  
Bandwidth: 120 kHz, Per ANSI C63.4-1992.  
Detector Functions: Peak, Quasi Peak, Average.  
Video Filter: 300 kHz  
Table Height: 0.8 meters  
Antenna Height Variation: 1 - 4 Meters.  
Horizontal and Vertical Polarization Measurements Taken.

**PLEASE SEE NEXT PAGE(S) FOR OCCUPIED BANDWIDTH RADIATED TEST DATA**

#### **Measurement Uncertainties**

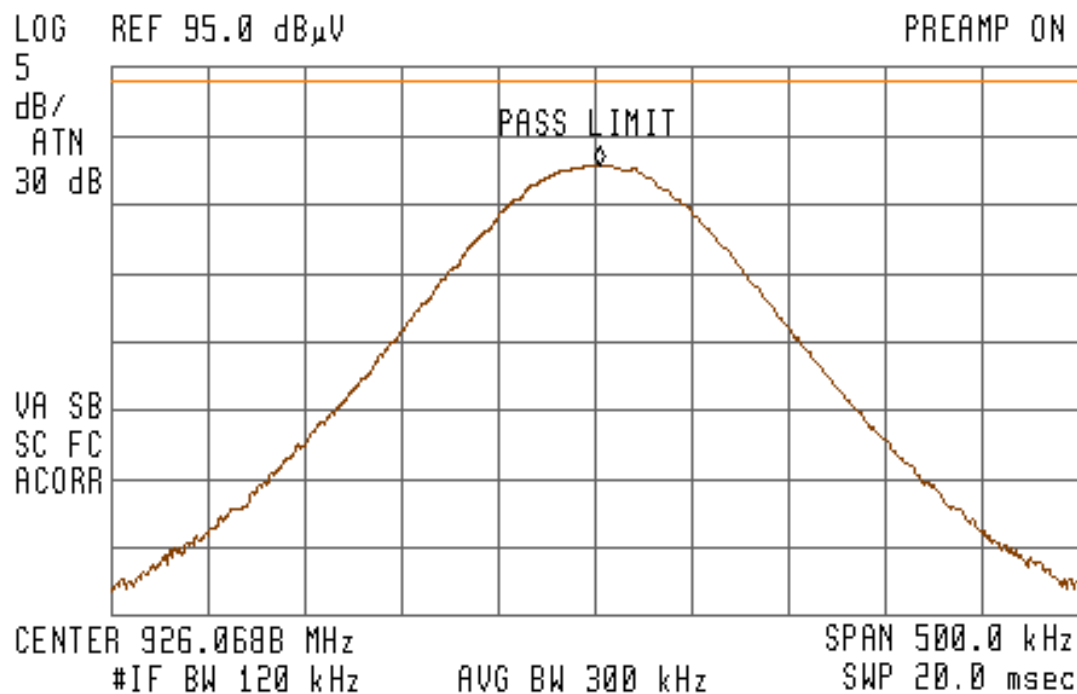
The measurement uncertainties stated were calculated in accordance with the requirements of NAMAS Document NIS63 with a confidence level of 95%. The complete measurement uncertainty budget and calculations are located in the Measurement Uncertainty section of this report.

| Tests Performed                                                                | Total Uncertainty |
|--------------------------------------------------------------------------------|-------------------|
| Radiated Emissions with Biconical Antenna at 3 Meters -- 30 MHz - 200 MHz      | ±4.06             |
| Radiated Emissions with Log-Periodic Antenna at 3 Meters -- 200 MHz - 1000 MHz | ±4.70             |

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11:03:11 OCT 28, 1999 BW & OUTPUT POWER CHAN A  
SAFETY 1ST 49420T GROW WITH ME #268-99

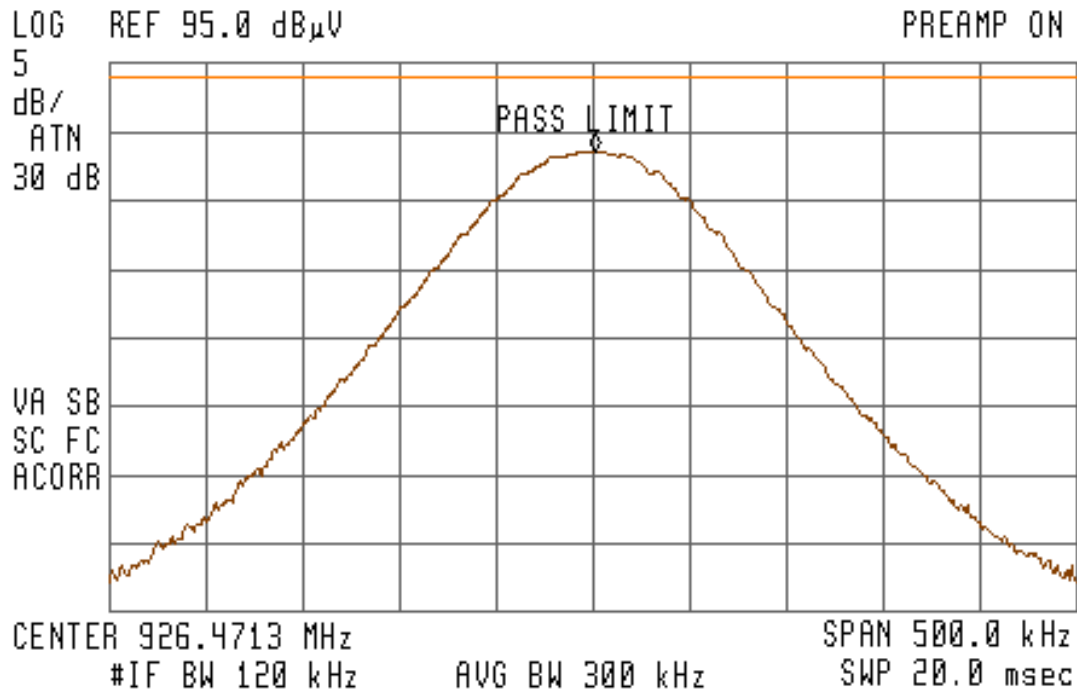
|      |                 |
|------|-----------------|
| FREQ | 926.1 MHz       |
| PEAK | 88.4 dB $\mu$ V |
| QP   | 88.3 dB $\mu$ V |
| AVG  | 88.3 dB $\mu$ V |



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Safety 1ST, Inc.  
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10:55:49 OCT 28, 1999 BW & OUTPUT POWER CHAN B  
SAFETY 1ST 49420T GROW WITH ME #268-99

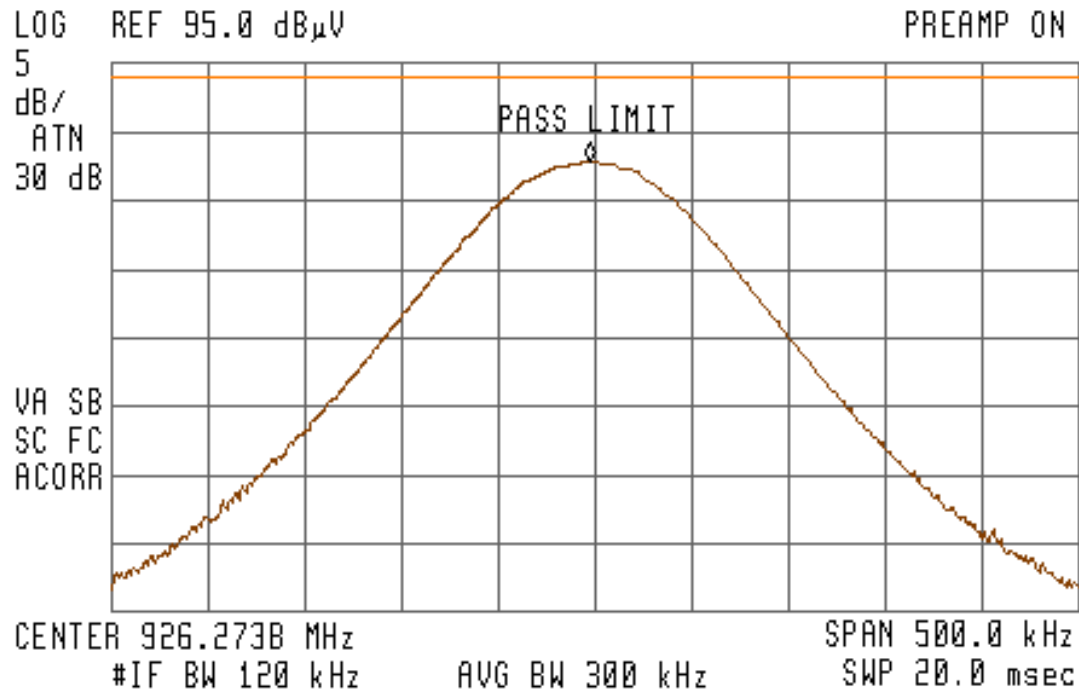
|      |                 |
|------|-----------------|
| FREQ | 926.5 MHz       |
| PEAK | 89.0 dB $\mu$ V |
| QP   | 88.8 dB $\mu$ V |
| AVG  | 88.8 dB $\mu$ V |



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10:48:51 OCT 28, 1999 BW & OUTPUT POWER CHAN C  
SAFETY 1ST 49420T GROW WITH ME #268-99

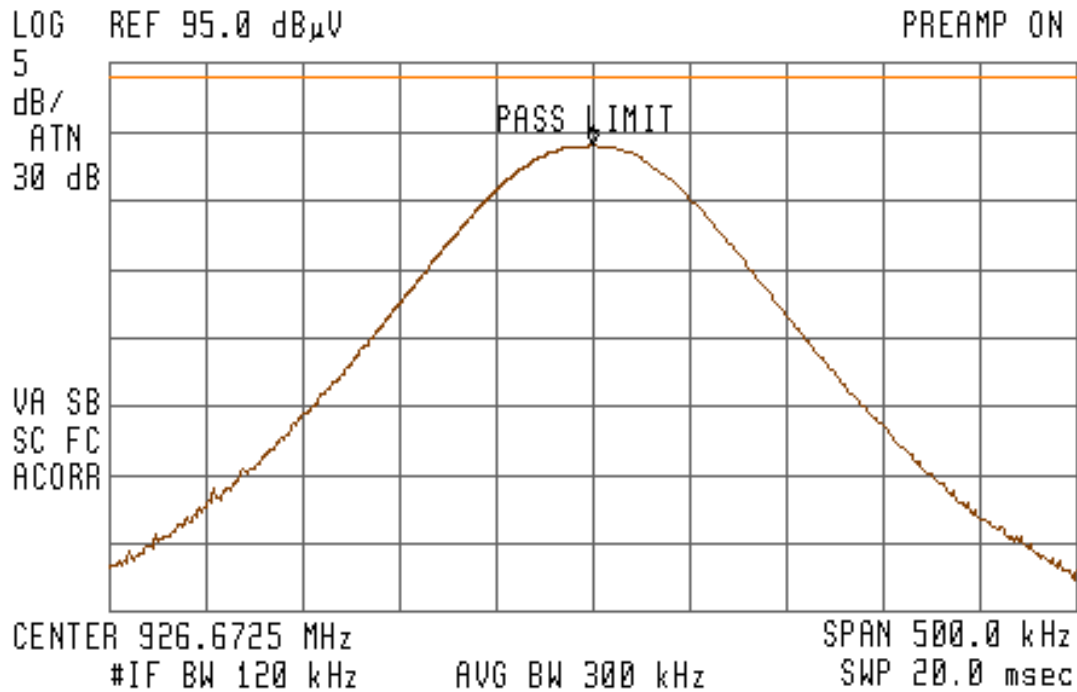
|      |                 |
|------|-----------------|
| FREQ | 926.3 MHz       |
| PEAK | 88.2 dB $\mu$ V |
| QP   | 88.5 dB $\mu$ V |
| AVG  | 88.4 dB $\mu$ V |



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10:41:18 OCT 28, 1999 BW & OUTPUT POWER CHAN D  
SAFETY 1ST 49420T GROW WITH ME #268-99

|      |                 |
|------|-----------------|
| FREQ | 926.7 MHz       |
| PEAK | 89.8 dB $\mu$ V |
| QP   | 89.6 dB $\mu$ V |
| AVG  | 89.6 dB $\mu$ V |





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### CONDUCTED TEST RESULTS

Frequency Range: 450 kHz to 30.0 MHz.  
Bandwidth: 9 kHz per ANSI C63.4-1992.  
Detector Functions: Peak, Quasi-Peak, Average  
Table Height: 0.8 meters  
Video Bandwidth: 30 kHz.

Phase and Neutral Measurements Taken.

**PLEASE SEE NEXT PAGE FOR CONDUCTED TEST DATA**

### Measurement Uncertainties

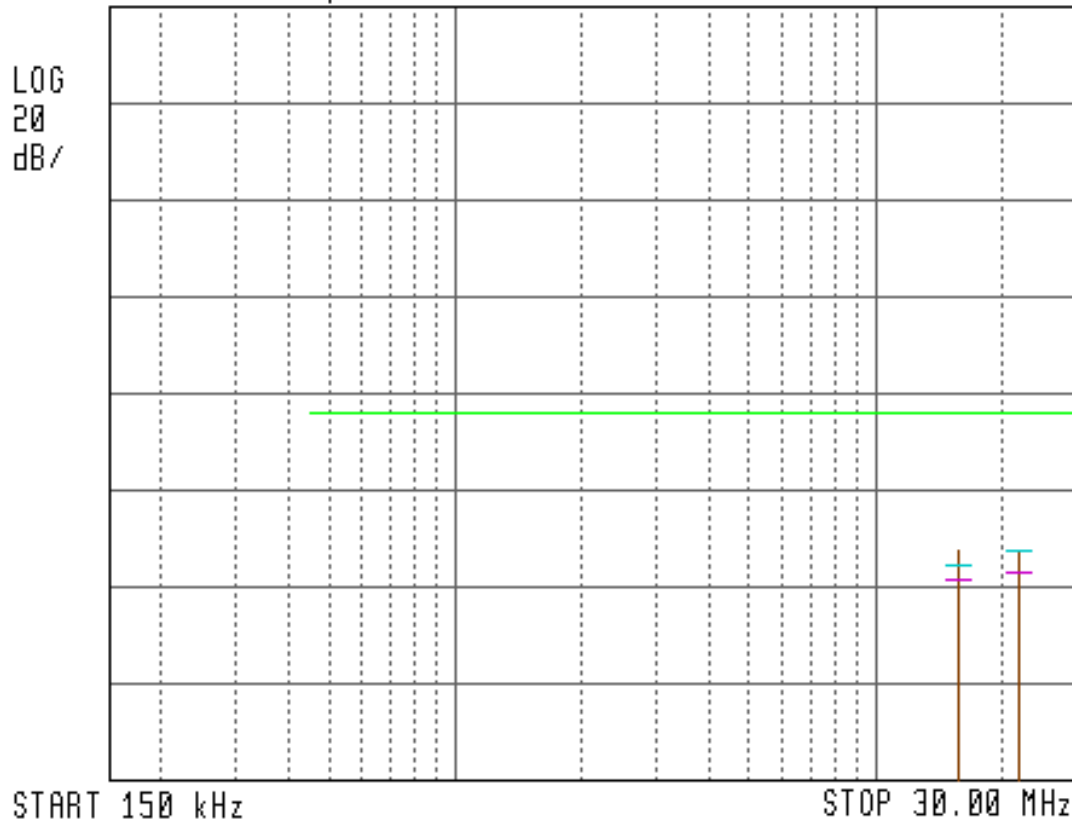
The measurement uncertainties stated were calculated in accordance with the requirements of NAMAS Document NIS63 with a confidence level of 95%. The complete measurement uncertainty budget and calculations are located in the Measurement Uncertainty section of this report.

| Tests Performed                           | Total Uncertainty |
|-------------------------------------------|-------------------|
| Conducted Emissions -- 0.450 MHz - 30 MHz | ±3.05             |



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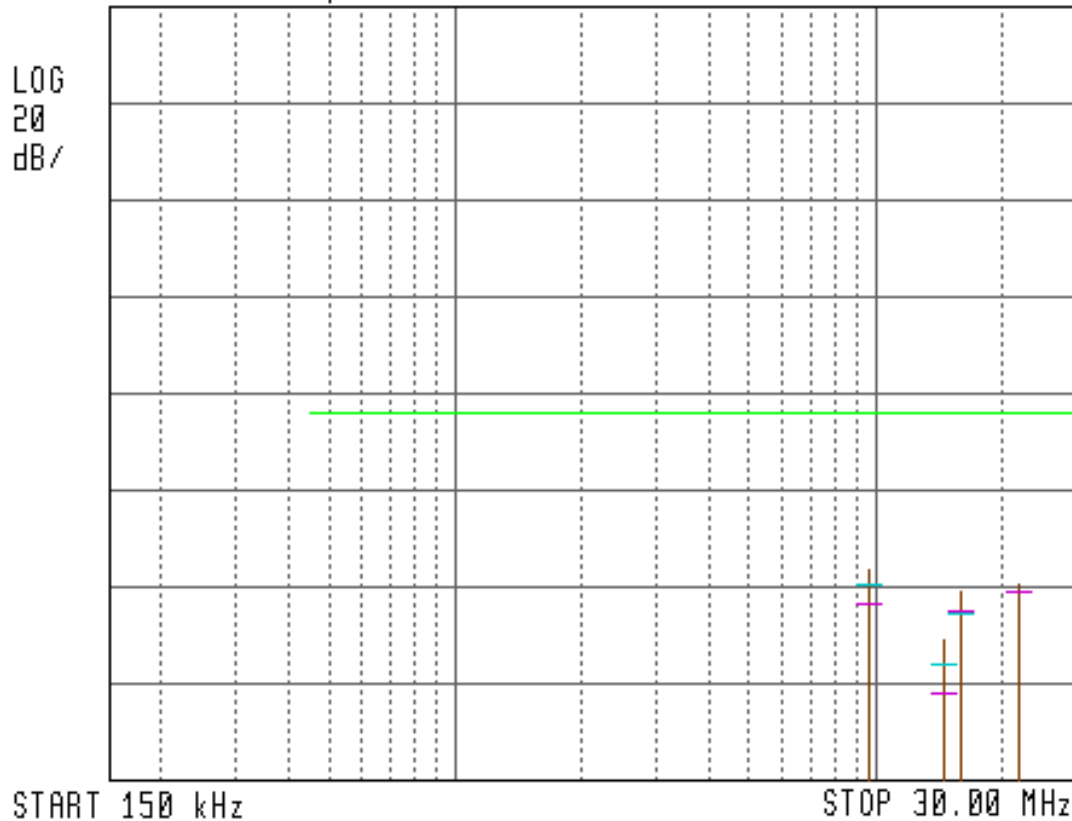
 11:21:05 OCT 28, 1999 120 VAC PHASE  
SAFETY 1ST 49420T GROW WITH ME #268-99  
REF 132.0 dB $\mu$ V





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Safety 1ST, Inc.  
GROW WITH ME - 49240T

 11:29:04 OCT 28, 1999 120 VAC NEUTRAL  
SAFETY 1ST 49420T GROW WITH ME #268-99  
REF 132.0 dB $\mu$ V





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## Conducted Test Results

### Phase 120 VAC

| Frequency<br>MHz | Peak Amplitude<br>dB $\mu$ V | QP Amplitude<br>dB $\mu$ V | Limit<br>dB $\mu$ V | Margin<br>dB |
|------------------|------------------------------|----------------------------|---------------------|--------------|
| 15.69            | 20.2                         | 16.9                       | 48.0                | 31.1         |
| 21.70            | 20.0                         | 19.8                       | 48.0                | 28.3         |

### Neutral 120 VAC

| Frequency<br>MHz | Peak Amplitude<br>dB $\mu$ V | QP Amplitude<br>dB $\mu$ V | Limit<br>dB $\mu$ V | Margin<br>dB |
|------------------|------------------------------|----------------------------|---------------------|--------------|
| 9.51             | 16.2                         | 13.0                       | 48.0                | 35.0         |
| 14.50            | 1.1                          | -3.4                       | 48.0                | 51.4         |
| 15.75            | 11.5                         | 6.6                        | 48.0                | 41.4         |
| 21.70            | 12.9                         | 11.4                       | 48.0                | 36.6         |

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### PHOTOGRAPHS

Radiated Test Setup (Front & Rear)





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## PHOTOGRAPHS

Conducted Test Setup (Front & Rear)



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### **PHOTOGRAPHS**

Exterior Product Photographs (Top & Bottom)



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### PHOTOGRAPHS

Interior Circuit Board Photographs (Top & Bottom)

