TEST NUMBER - 269-99

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

49240R

FCCID#: MNJ49240R

on

October 28, 1999

by

Larry K. Stillings

_____

Larry K. Stillings

TEST NUMBER - 269-99
Safety 1ST, Inc.
GROW WITH ME - 49240R

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

TEST DESCRIPTION

1. TEST OBJECTIVE

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

2. E.U.T. DESCRIPTION

GENERAL

The GROW WITH ME 49240R is a 2 way baby monitor that operates in the 902 - 928 MHz band and contains 40 channels. Pre-programmed software allows four of the forty channes to be selected between 902.8 MHz and 904.75 MHz in 50 kHz steps.

The GROW WITH ME 49240R is a transceiver that is typically operated in receiver mode with 4 channels. The 49240R goes into transmit mode when push to talk is pressed. Currently the four channels used are 903.6 MHz, 903.8 MHz, 904.0 MHz and 904.2 MHz.

SERIAL NUMBERS:

Pre production unit

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GROW WITH ME - 49240R

TEST RESULTS AND CONCLUSIONS

PRODUCT TESTED - GROW WITH ME

MODEL NUMBER - 49240R

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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GROW WITH ME - 49240R

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 µH / 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^{th} harmonic of the highest frequency whichever is lower).

   B. Conducted Test from 450 kHz to 30 MHz.

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 is 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 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 MHz	Distance meters	Limit dBμV/m	Limit μV/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 MHz	Limit dBμV/m	Limit μV/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 3m-10m	Log-Periodic Antenna 3m-10m
Antenna factor calibration	Gaussian (2s)	± 1.0	± 1.0
Cable loss calibration	Gaussian (2s)	± 0.5	± 0.5
EMI receiver specification	Rectangular	± 0.5	± 0.5
Antenna factor variation with height	Rectangular	± 2.0	± 0.5
Antenna directivity	Rectangular	± 0.5	± 3.0/± 0.5
Antenna phase center variation	Rectangular	± 0.0	± 1.0/± 0.2
Antenna factor frequency interpolation	Rectangular	± 0.2	± 0.2
Measurement distance variation	Rectangular	± 0.5	± 0.5
Site imperfections	Rectangular	± 1.0	± 1.0
Mismatch	U-shaped	± 1.2	± 0.5
Random	Gaussian (1s)	± 0.7	± 0.7
Total uncertainty at 95% min confidence probability		± 4.1/4.2	± 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

$$U = 2\sqrt{S^2_{s1} + S^2_{s2} \ldots\ldots\ldots + S^2_{sm} + S^2_{r}}$$

Total Uncertainty for Biconical Antenna at 3 meters

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

Total Uncertainty for Biconical Antenna at 10 meters

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

Total Uncertainty for Log-Periodic Antenna at 3 meters

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

Total Uncertainty for Log-Periodic Antenna at 10 meters

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

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Measurement Uncertainty for Conducted Emissions Measurements
0.450 - 30 MHz

Contribution	Distribution	Uncertainty 0.45 MHz - 30MHz
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-

$$U = 2\sqrt{S^2_{s1} + S^2_{s2} \ldots\ldots\ldots + S^2_{sm} + S^2_{r}}$$

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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http://www.cw-inc.com

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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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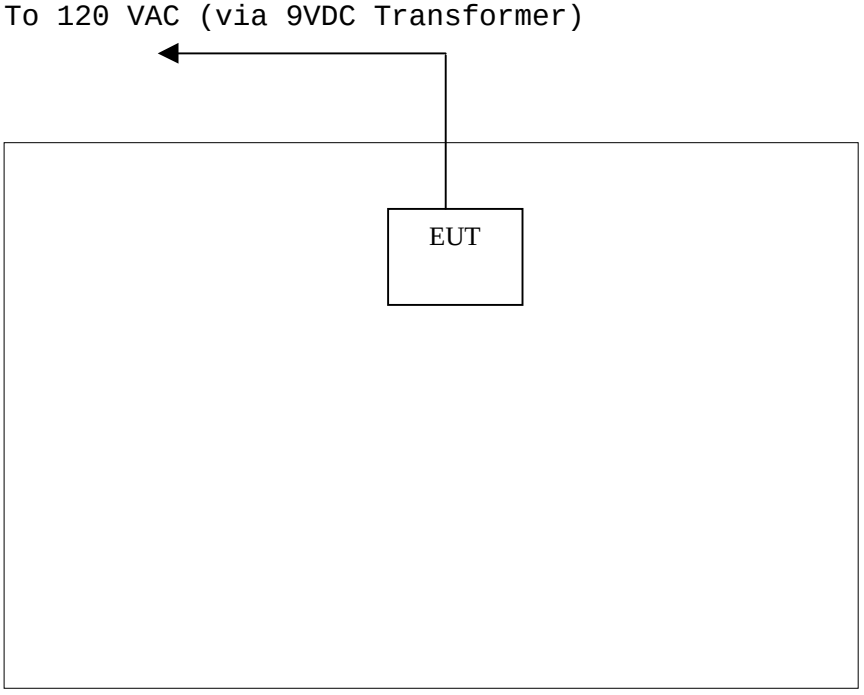
TEST SET UP
AND
PERIPHERAL CONNECTION INFORMATION



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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 9 VDC 200 mA / batteries)

_____

(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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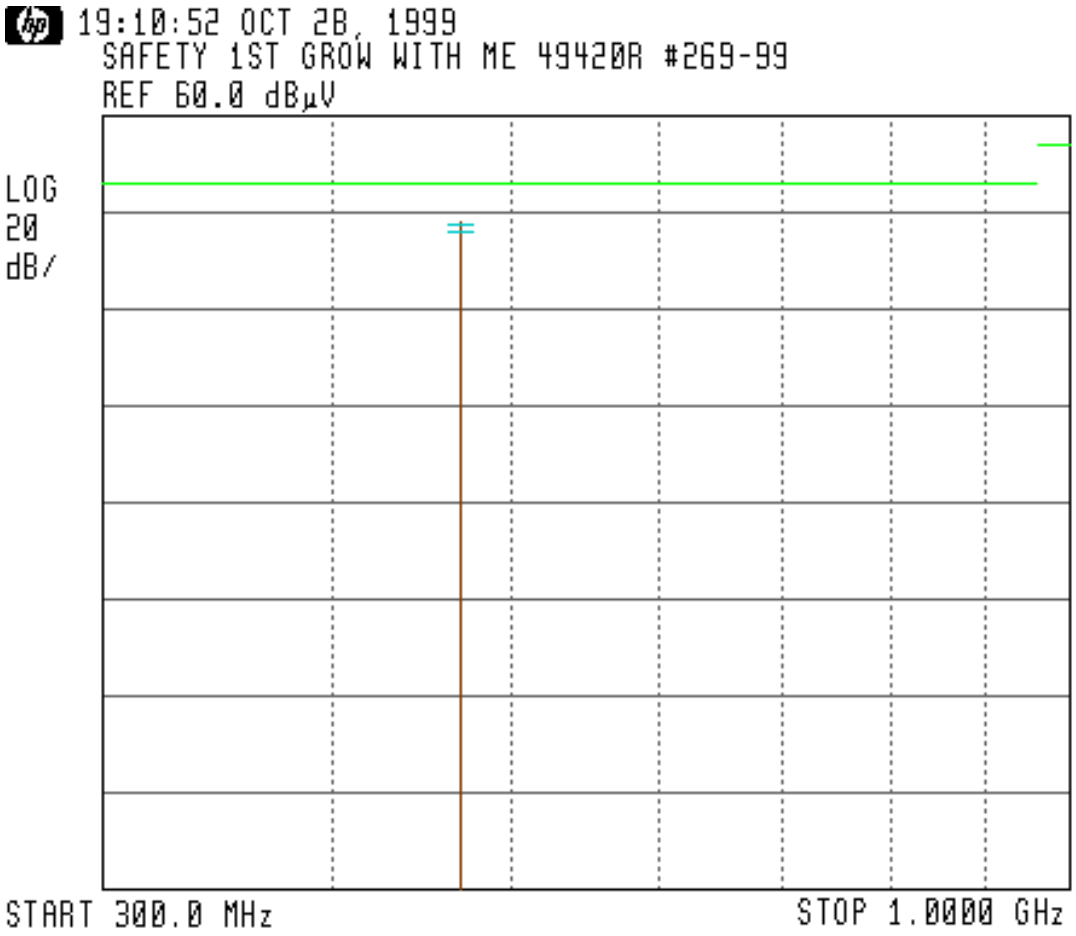

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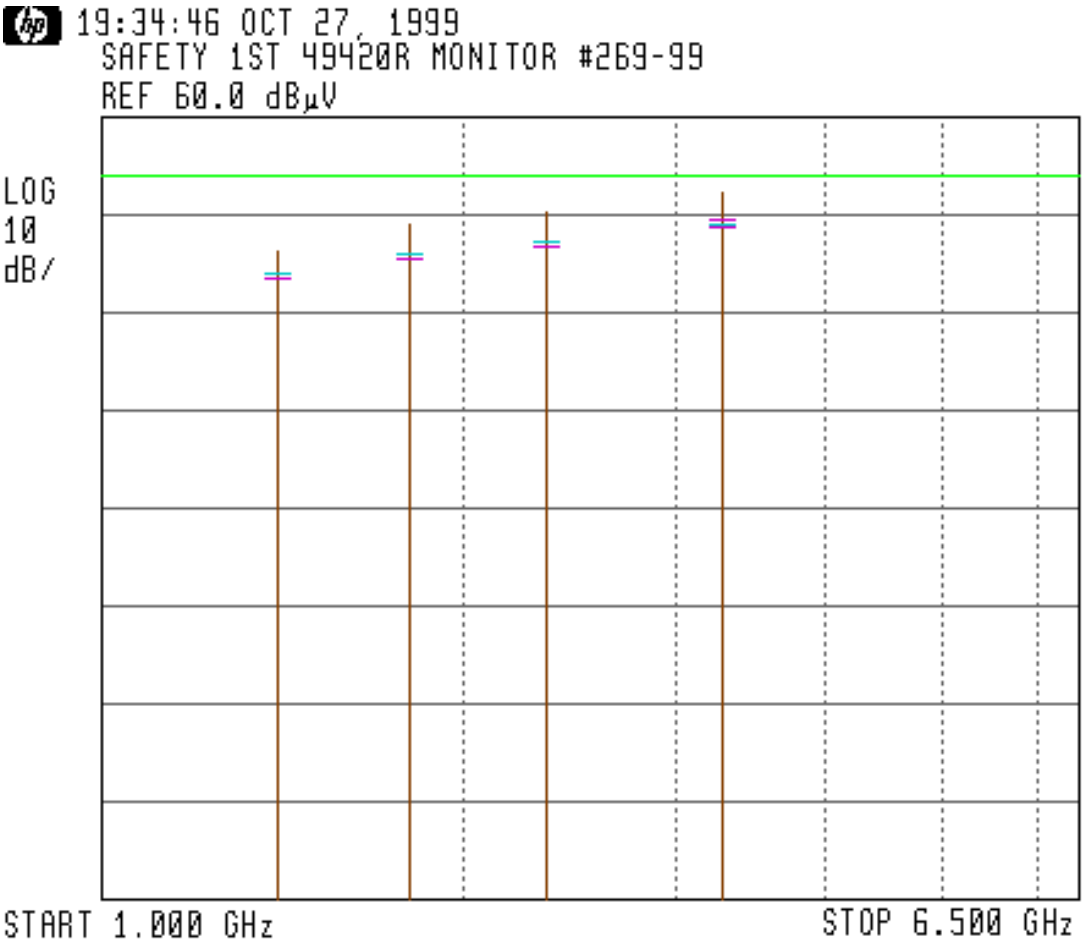

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Radiated Results @ 3 Meters

30 - 1000 MHz

Frequency MHz	Polarization H/V	Height m	Table degrees	Peak Amplitude dBµV	QP Amplitude dBµV	Limit dBµV	Margin dB
468.39	V	1.5	0	37.0	36.1	46.0	10.0
468.39	H	1.25	45	38.5	37.7	46.0	8.3

Radiated Results @ 3 Meters

1000 - 9280 MHz

Frequency MHz	Polarization H/V	Height m	Table degrees	Average Amplitude dBµV	Limit dBµV	Margin dB
1405.13	V	1	75	43.6	54.0	10.4
1807.18	V	1.25	330	45.6	54.0	8.4
2341.92	V	1.5	315	46.9	54.0	7.1
3278.71	V	1.25	75	49.5	54.0	4.5
3278.81	H	1	0	48.8	54.0	5.2

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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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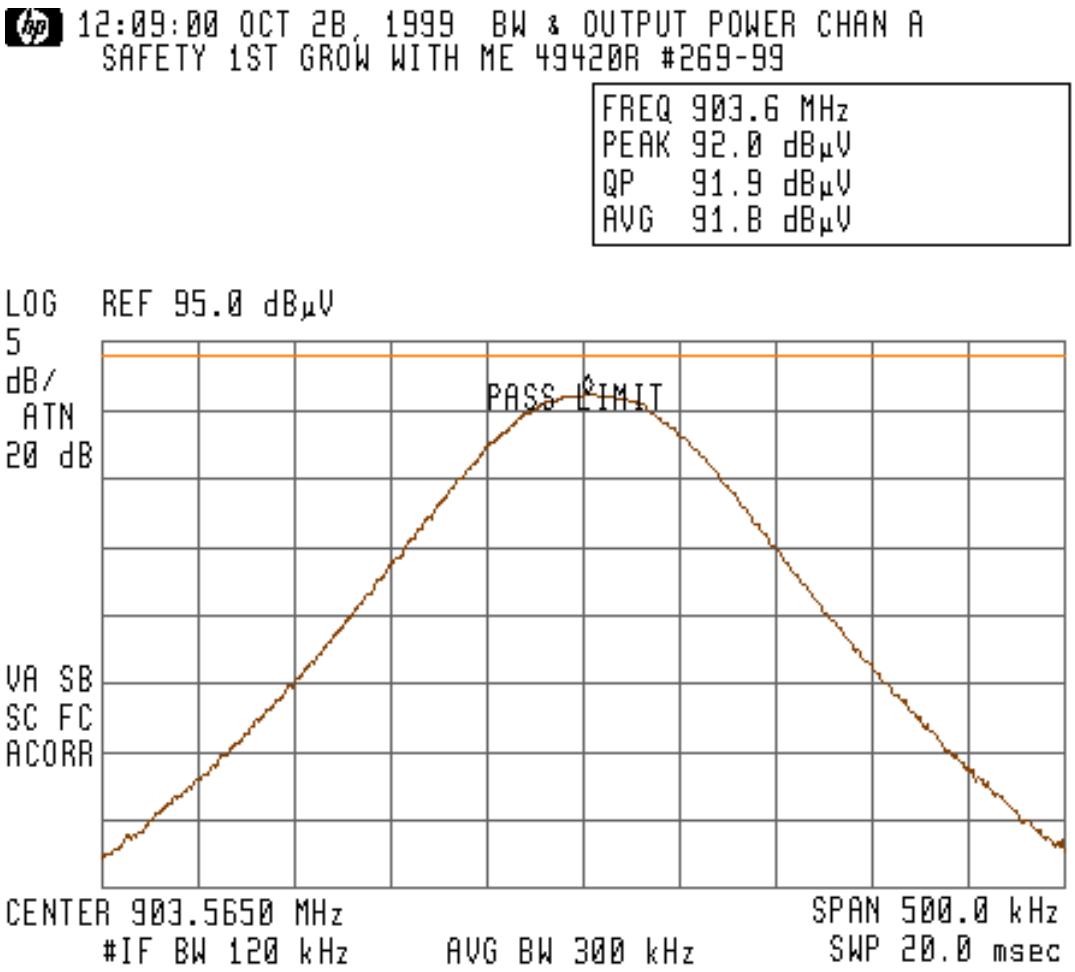

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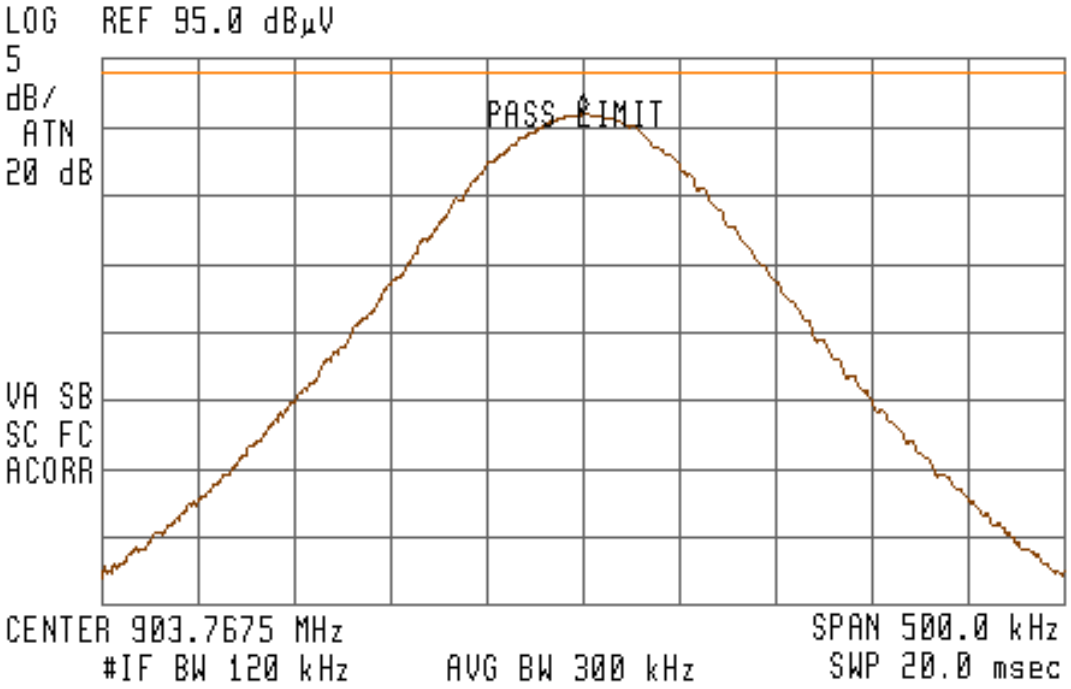
12:15:56 OCT 28, 1999 BW & OUTPUT POWER CHAN B
SAFETY 1ST GROW WITH ME 49420R #269-99

FREQ	903.8 MHz
PEAK	91.2 dBµV
QP	91.2 dBµV
AVG	91.2 dBµV



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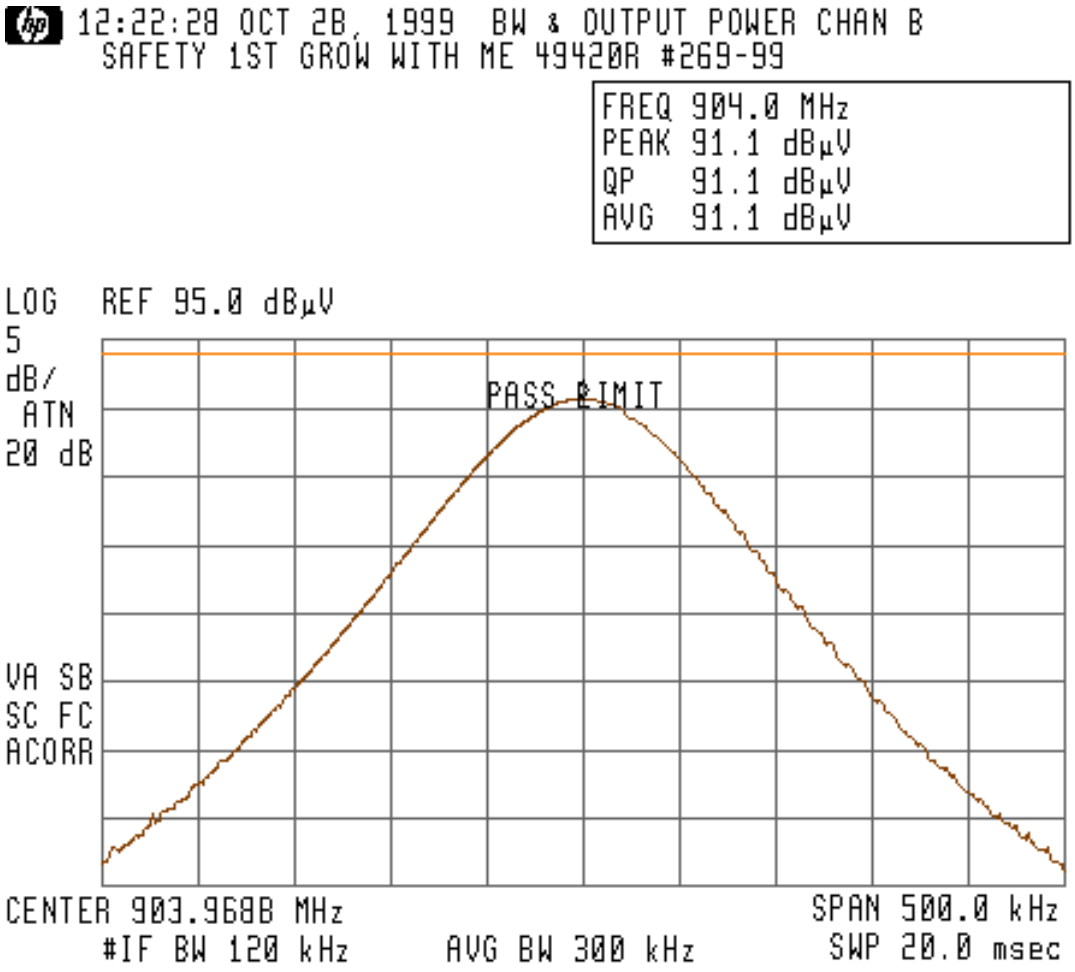
Channel C



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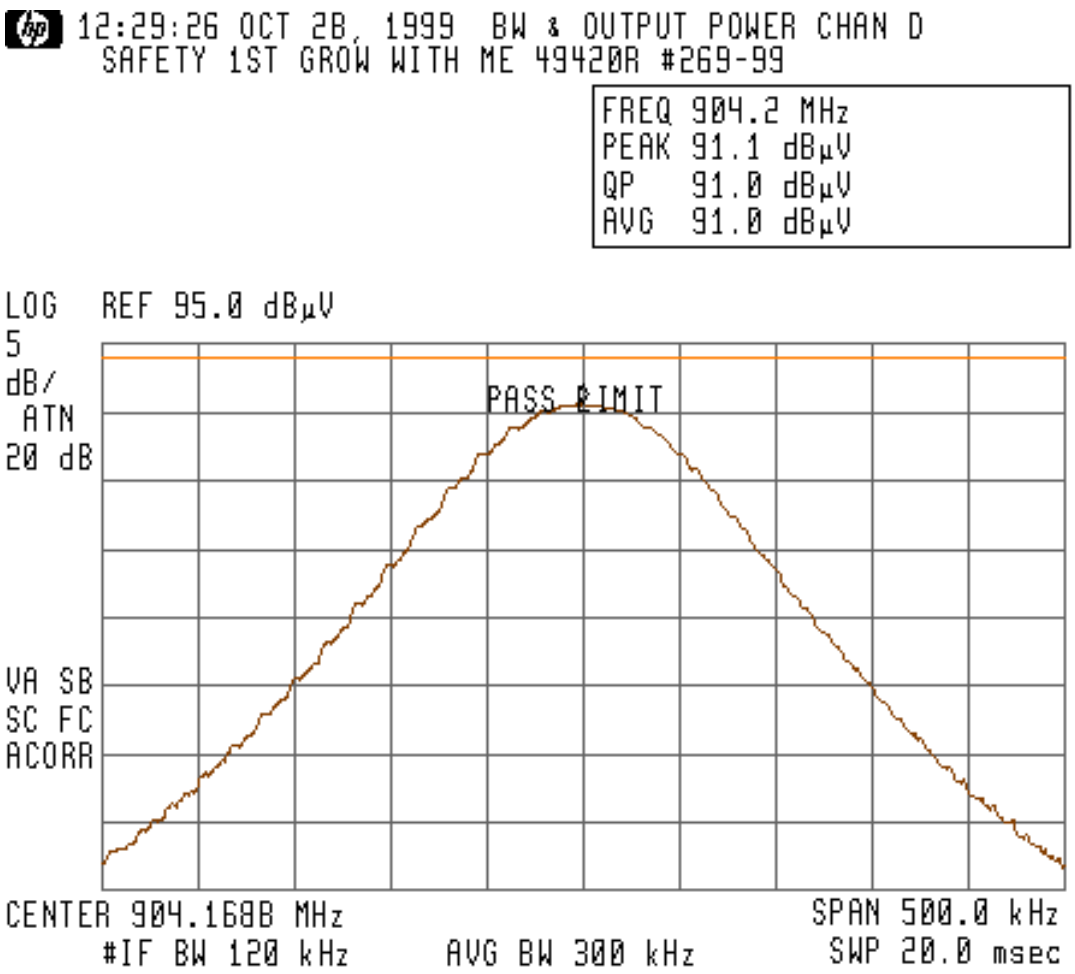

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CONDUCTED TEST RESULTS

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 is 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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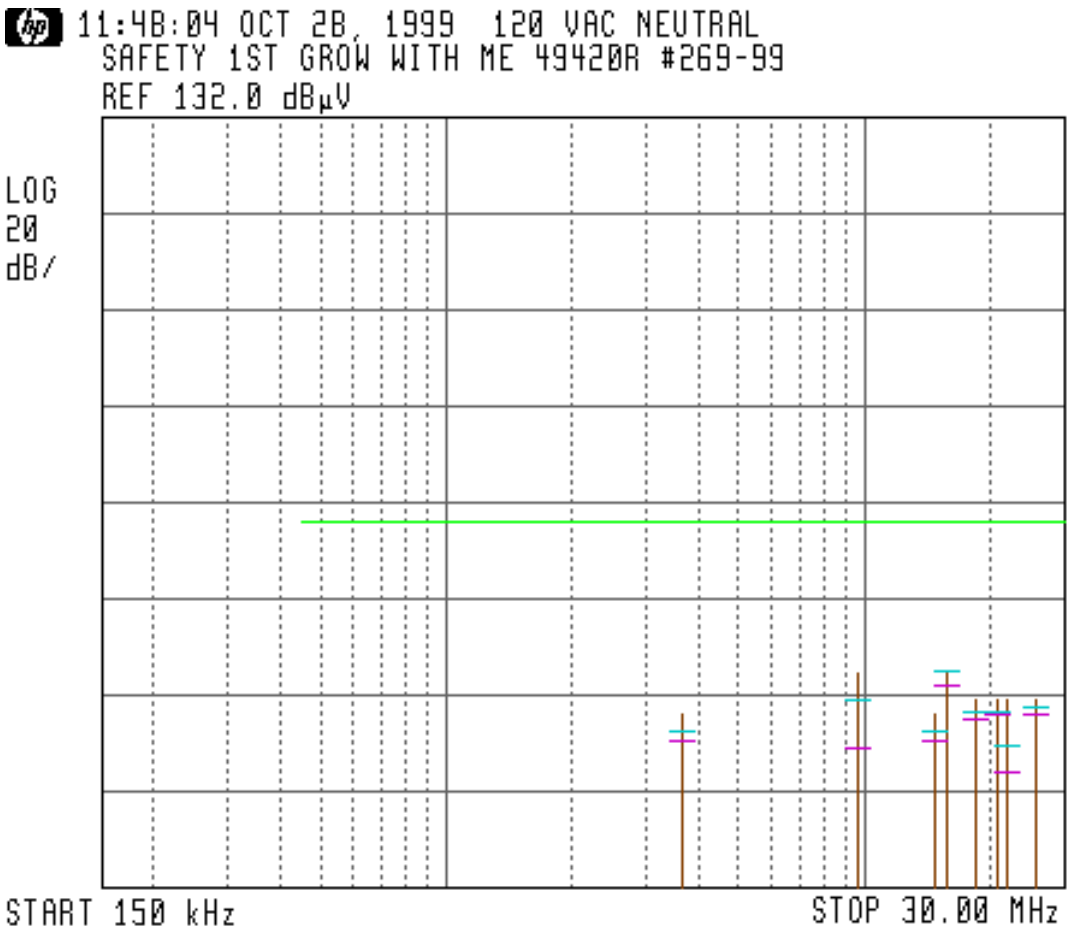

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CONDUCTED TEST RESULTS

Phase 120 VAC

Frequency MHz	Peak Amplitude dBµV	QP Amplitude dBµV	Limit dBµV	Margin dB
9.52	18.6	13.6	48.0	34.4
15.75	16.8	14.6	48.0	33.4
18.19	10.2	8.1	48.0	39.9
19.88	1.3	-3.5	48.0	51.5
20.50	10.8	8.9	48.0	39.1
21.70	14.1	9.3	48.0	38.7
25.46	9.9	7.7	48.0	40.3

Neutral 120 VAC

Frequency MHz	Peak Amplitude dBµV	QP Amplitude dBµV	Limit dBµV	Margin dB
3.64	8.2	5.3	48.0	42.7
9.52	16.7	11.1	48.0	36.9
14.55	8.1	5.3	48.0	42.7
15.69	16.6	17.6	48.0	30.5
18.19	11.7	9.0	48.0	39.0
20.50	11.5	9.4	48.0	38.6
21.70	11.0	1.7	48.0	46.3
25.46	11.8	9.7	48.0	38.3

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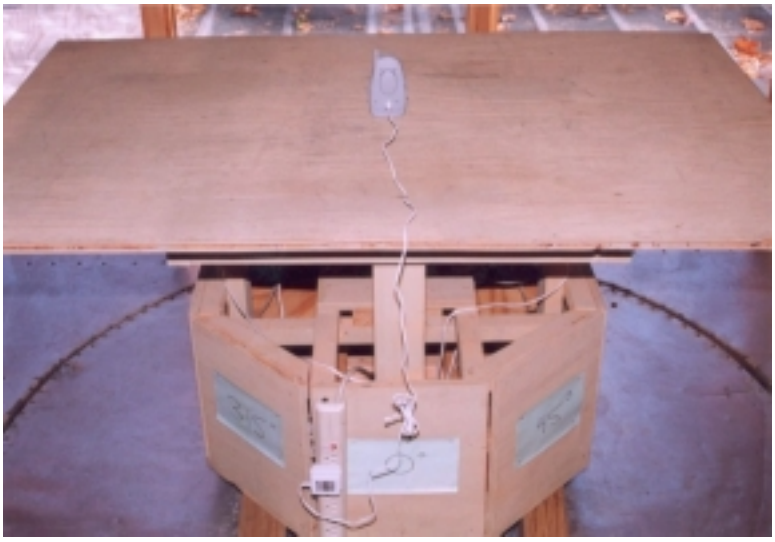
PHOTOGRAPHS

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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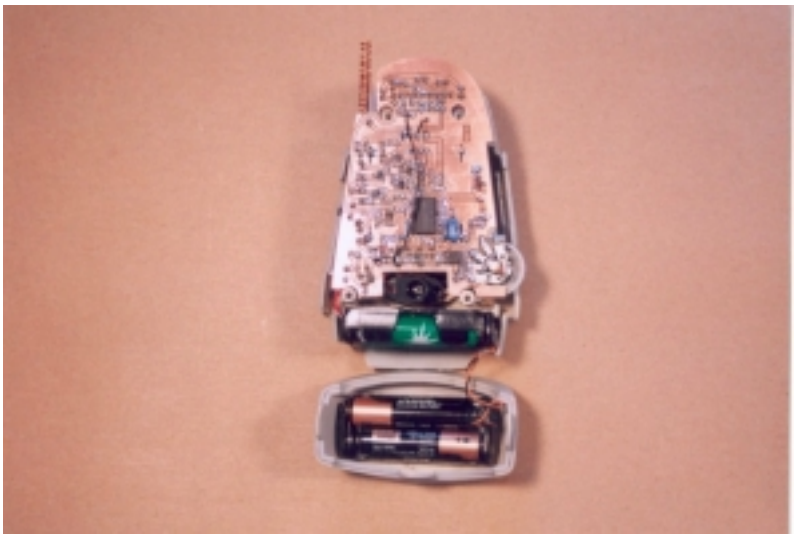
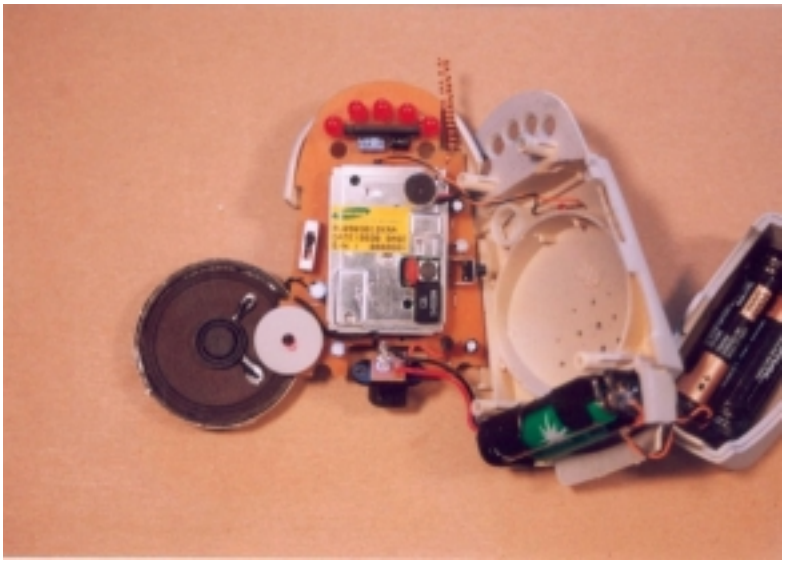
PHOTOGRAPHS

Interior Circuit Board Photographs (Top & Bottom)





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