EMT

ELECTRO MAGNETIC TEST, INC.

1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

FCC PART 15, SUBPART B CLASS B
and
FCC PART 15, SUBPART C
TEST REPORT

for

the

SONICBOX iM REMOTE TUNER

MODEL: 900

Prepared for

SONICBOX, INC.
241 POLARIS AVENUE
MOUNTAIN VIEW, CALIFORNIA 94041

Prepared by: _____

DOUG MOON

Approved by: _____

KEVIN BOTHMANN

ELECTRO MAGNETIC TEST, INC.
1547 PLYMOUTH STREET
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DATE: MAY 30, 2000

	REPORT BODY	APPENDICES			TOTAL
		A	*B*	*C*	
PAGES	15	16	4	5	**40**

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TABLE OF CONTENTS

EMT *ELECTRO MAGNETIC TEST, INC.*
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LIST OF APPENDICES

APPENDIX	TITLE
A	Radiated and Conducted Emissions Data Sheets Plot of Bandwidth of Fundamental Frequency
B	Test Setup Diagrams
C	Antenna and Effective Gain Factors

LIST OF FIGURES

FIGURE	TITLE
1	Conducted Emissions Test Setup
2	Plot Map And Layout of Test Site
3	Equipment Configuration Block Diagram

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GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Electro Magnetic Test Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Electro Magnetic Test personnel according to the measurement procedure described in the test specification given below and in the "Test Procedures" section of this report.

Associated with the data in this report is a ±2dB measurement uncertainty.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced in any form unless done so in full.

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

Device Tested:	Sonicbox iM Remote Tuner Model: 900 S/N: N/A
Product Description:	The Sonicbox iM Remote Tuner is a personal computer peripheral device consisting of a base unit, a hand held remote unit, and a 3rd party receiver. The base unit is connected to the USB port and stereo output port of a PC. It works in conjunction with the Sonicbox iM Software Tuner to locate and broadcast the audio from the internet sites of internet radio stations. The base unit (EUT) uses its 911.4-914.4 MHz transmitter to transmit the audio from the computer to a 911.4-914.4 MHz receiver (from a 3rd party manufacturer). The hand held remote (transmitting at 433 MHz) communicates with the base unit and is used to change stations, save stations, and control the PC volume. The hand held remote is currently pending approval under FCC ID: OT7-433B.
Modifications:	The EUT was not modified during the testing.
Manufacturer:	Sonicbox, Inc. 241 Polaris Avenue Mountain View, California, 94041
Test Date(s):	May 15, 2000
Test Specifications:	EMI requirements FCC Title 47, Part 15 Subpart B, Class B FCC Title 47, Part 15 Subpart C Test Procedure: ANSI C63.4: 1992.
Test Deviations:	The test procedure was not deviated from during the testing.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 450 kHz - 30 MHz.	Complies with the **Class B** limits of FCC Title 47, Part 15 Subpart B.
2	Radiated RF Emissions, 30 MHz - 1000 MHz.	Complies with the **Class B** limits of FCC Title 47, Part 15 Subpart B.
3	Radiated RF Emissions, 911 MHz - 9114 MHz.	Complies with the limits of FCC Title 47, Part 15 Subpart C. (Section 15.249)

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1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Sonicbox iM Remote Tuner Model: 900. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4: 1992. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the **Class B** specification limits defined in FCC Title 47, Part 15, Subpart B. The EUT was also tested to determine if the electromagnetic emissions were within the limits defined in FCC Title 47, Subpart C, section 15.249.

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2. ADMINISTRATIVE DATA

2.1 Location of Testing

The EMI tests described herein were performed at the test facility of Electro Magnetic Test, 1547 Plymouth Street, Mountain View, California 94043.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The measurement results in this report and the calibration of the test equipment are traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

Sonicbox, Inc.

Sara Fisher	Product Manager

Electro Magnetic Test, Inc.

Doug Moon	Test Technician
Neelesh Raj	Test Technician
Kevin Bothmann	Lab Manager

2.4 Date Test Sample was Received

The test sample was received on May 25, 2000.

2.5 Disposition of the Test Sample

The test sample has not been returned.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network
CISPR	International Special Committee On Radio Interference
FCC	Federal Communications Commission

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3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this EMI Test Report.

SPEC	TITLE
FCC Title 47, Part 15, Subpart B.	FCC Rules - Radio frequency devices (including digital devices).
FCC Title 47, Part 15, Subpart C.	FCC Rules – Radio frequency devices (intentional radiators) (Section 15.249)
ANSI C63.4 1992	Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz.

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4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration - EMI

The EUT (base unit) was connected to the computer and speakers via its USB, audio input and audio output ports, respectively. The hand held remote was located across the table from the receiver. The hand held remote is battery powered. The Recoton receiver was connected to the stereo via its audio output. The computer was connected to the keyboard, mouse, monitor, and printer via its keyboard, mouse, video, and parallel ports, respectively. During the testing process, the EUT was receiving signals from the hand held remote (change stations, save stations, and control PC volume). The EUT was also transmitting its audio output to be received by the Recoton receiver. The stereo played the audio output from the Recoton receiver.

The hand held remote transmits signals at 433 MHz and is currently pending approval under FCC ID: OT7-433B. This unit falls under FCC Title 47, Subpart C, section 15.231.

The EUT has a frequency knob that will change the transmit frequency from 911.4 to 914.4 MHz. The EUT was tested at 911.4 MHz, 913.0 MHz, and 914.4 MHz. The worst case mode was found to be at 911.4 MHz, and the final data was taken in this mode of operation. Complete data for the EUT (base unit) including the receiver portion as well as the transmitter portion can be found in Appendix A. Also, a plot showing the bandwidth of the fundamental frequency can be found in Appendix A.

It was determined that the emissions were at their highest level when the EUT was operating in the above configuration. The cables were moved to maximize the emissions. The final conducted as well as radiated data was taken in this mode of operation. All initial investigations were performed with the EMI receiver in manual mode scanning the frequency range continuously. The cables were bundled and routed as shown in the photographs in Appendix A.

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4.1.1 Cable Construction and Termination

Cable #1

This is a 6 foot braid and foil shielded cable connecting the EUT (base unit) to the computer. It has a metallic USB connector at both ends of the cable. The cable was bundled to a length of 4 feet. The shield of the cable was grounded to the chassis via the connectors.

Cable #2

This is a 7 foot unshielded cable connecting the EUT (base unit) to the computer. It has a metallic 1/8 inch stereo jack connector at both ends of the cable. The cable was bundled to a length of 3.5 feet.

Cable #3

This is a 3 foot unshielded cable connecting the EUT (base unit) to speaker A. It has a metallic 1/8 inch stereo jack connector at the EUT end, and is hardwired into the speaker.

Cable #4

This is a 6 1/2 foot unshielded cable connecting speaker A to speaker B. It is hardwired at both ends of the cable. The cable was bundled to a length of 3 feet.

Cable #5

This is a 6 foot foil shielded cable connecting the computer to the mouse. It has a metallic 6 pin mini DIN connector at the computer end, and is hardwired into the mouse. The shield of the cable was grounded to the chassis via the connector.

Cable #6

This is a 6 foot foil shielded cable connecting the computer to the keyboard. It has a metallic 6 pin mini DIN connector at the computer end, and is hardwired into the keyboard. The shield of the cable was grounded to the chassis via the connector.

Cable #7

This is a 6 foot braid and foil shielded cable connecting the computer to the monitor. It has a metallic high density DB-15 pin connector with a factory installed ferrite bead at the computer end, and is hardwired into the monitor. The cable was bundled to a length of 4 feet. The shield of the cable was grounded to the chassis via the connector.

Cable #8

This is an 18 foot foil shielded cable connecting the computer to the printer. It has a metallic DB-25 pin connector at the computer end, and a metallic 36 pin Centronics connector at the printer end. The cable was bundled to a length of 6 feet. The shield of the cable was grounded to the chassis via the connectors.

Cable #9

This is a 8 foot unshielded cable connecting the receiver to the stereo. It has a metallic 1/8 inch stereo jack connector at the receiver end, and has 2 metallic RCA connectors at the stereo end. The cable was bundled to a length of 6 feet.

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5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT TYPE	MANU-FACTURER	MODEL	SERIAL NUMBER	FCC ID
SONICBOX iM REMOTE TUNER (EUT)	SONICBOX, INC.	900	N/A	OT7-900
SONICBOX iM REMOTE TUNER (EUT)	SONICBOX, INC.	433B	N/A	OT7-433B (Approval Pending)
RECEIVER	RECOTON CORP.	1682 K965	9533G1844	CLV-A901R
COMPUTER	DELL	MMP	CTZYF	DoC
MONITOR	DELL	D1025TM	7018745	DoC
KEYBOARD	DELL	SK-1000REW	12710-7B7-009078	GYUR433K
MOUSE	MICROSOFT	INTELLIMOUSE	00613298	C3KKMP5
SPEAKERS (A & B)	JUSTER	AC-69IN	N/A	N/A
STEREO	BOSE	AWR131	018821C00250104AC	N/A
PRINTER	EPSON	P930A	3HR0116695	BKMFBP930A

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5.2 EMI Test Equipment

EQUIPMENT TYPE	MANUFACT-URER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
Spectrum Analyzer	Hewlett Packard	8566B	3013A07296	July 6, 1999	1 Year
RF Preselector	Hewlett Packard	85685A	3010A01157	October 29, 1999	1 Year
Quasi-Peak Adapter	Hewlett Packard	85650	2521A00584	July 20, 1999	1 Year
Preamplifier	Com Power	PA-102	1482	March 1, 2000	1 Year
Preamplifier	Com Power	PA-122	2113	October 7, 1999	1 Year
RF Attenuator	Mini-Circuits	CAT-10	Asset #1000	December 7, 1999	1 Year
LISN	Com Power	LI-200	12012	April 27, 2000	1 Year
LISN	Com Power	LI-200	12214	April 27, 2000	1 Year
LISN	Com Power	LI-200	1767	April 27, 2000	1 Year
LISN	Com Power	LI-200	1768	April 27, 2000	1 Year
Biconical Antenna	Com Power	AB-100	01557	November 13, 1999	1 Year
Log Periodic Antenna	Com Power	AL-100	16037	November 13, 1999	1 Year
Horn Antenna	Com Power	AH-118	10062	N/A	N/A
Antenna Mast	Com Power	AM-400	N/A	N/A	N/A
Turntable	Com Power	TT-100	N/A	N/A	N/A
Computer	Compaq	Series 3284	X637BBS20212	N/A	N/A
Printer	Epson	P930A	3HR1398903	N/A	N/A
Plotter	Hewlett Packard	7470A	2308A96499	N/A	N/A

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6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 7.1.1 and 7.1.2 of this report for EMI test location.

6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The base unit (EUT) was grounded through the computer's chassis.

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7. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests.

7.1 RF Emissions

7.1.1 Conducted Emissions Test

The HP 8566B spectrum analyzer was used as a measuring meter along with the HP 85650A quasi-peak adapter. The data was collected with the spectrum analyzer in the peak detect mode with the "Max Hold" feature activated. The quasi-peak detector was used only where indicated in the data sheets. A 10 dB attenuation pad was used for the protection of the spectrum analyzer input stage, and the spectrum analyzer offset was adjusted accordingly to read the actual data measured. The LISN output was read by the HP 8566B spectrum analyzer. The output of the second LISN was terminated by a 50 ohm termination. The effective measurement bandwidth used for the conducted emissions test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI C63.4: 1992. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The initial test data was taken in manual mode while scanning the frequency ranges of 0.45 MHz to 1.6 MHz, 1.6 MHz to 5 MHz and 5 MHz to 30 MHz. The conducted emissions from the EUT were maximized for operating mode as well as cable and peripheral placement. Once a predominant frequency (within 12 dB of the limit) was found, it was more closely examined with the spectrum analyzer span adjusted to 1 MHz.

The final data was collected under program control by the HP 85869PC software in several overlapping sweeps by running the spectrum analyzer at a minimum scan rate of 10 seconds per octave.

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7.1.2 Radiated Emissions Test

The HP 8566B spectrum analyzer was used as a measuring meter along with the HP 85650A quasi-peak adapter. The Com Power Preamplifier PA-102 and Com Power Preamplifier PA-122 were used to increase the sensitivity of the instrument. The spectrum analyzer was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the spectrum analyzer records the highest measured reading over all the sweeps. The HP 85650A quasi-peak adapter was used only for those readings which are marked accordingly on the data sheets. The effective measurement bandwidth used for the radiated emissions test was 120 kHz from 30 MHz to 1 GHz and 1 MHz from 1 GHz to 9.1 GHz.

Broadband biconical, log periodic and horn antennas were used as transducers during the measurement. The biconical antenna was used from 30 MHz to 300 MHz, the log periodic antenna was used from 300 MHz to 1 GHz, and the horn antenna was used from 1 GHz to 9.1 GHz. The frequency spans were wide (30 MHz to 88 MHz, 88 MHz to 216 MHz, 216 to 300 MHz, 300 MHz to 1 GHz, and 1 GHz to 9.1 GHz) during preliminary investigations. The final data was taken with a frequency span of 1 MHz. Furthermore, the frequency span was reduced during the preliminary investigations as deemed necessary.

The open field test site of Electro Magnetic Test, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4: 1992. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength).

The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT. The EUT was tested at a 3 meter test distance to obtain final test data.

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8. CONCLUSIONS

The Sonicbox iM Remote Tuner Model: 900 meets all of the **Class B** requirements of the FCC Title 47, Part 15, Subpart B and FCC Title 47, Subpart C, section 15.249.

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APPENDIX A

RADIATED AND CONDUCTED EMISSIONS DATA SHEETS

Electro Magnetic Test, Inc.
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Radiated Emissions Test Data

Purpose of Test: [X] QUALIFICATION [] ENGINEERING [] MANUFACTURING AUDIT
FCC Class B Test Date: 05-25-00
Company Name: SONICBOX, INC.
EUT Model Number: 900
EUT Serial Number: N/A
EUT Description: SONICBOX iM REMOTE TUNER

Test Setup Configuration

EUT Clock Speeds: 911.4 MHz

EUT Power Cords: [] SHIELDED [] NOT SHIELDED
EUT tested at: [] LOW SPEED [] HIGH SPEED
EUT is: [X] IN COMPLIANCE [] OUT OF COMPLIANCE with FCC Class B.

EUT Modifications during this test:
[] MODIFIED [] NOT MODIFIED

Modifications: _____

_____

_____

NOTE: A formal report on passing data will be generated when required.
Design, debug and consultation services are available at all times.

Test Engineer: NEELESH RAJ

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FCC Class B Test Date: 05-25-00
Company Name: SONICBOX, INC.
EUT Model Number: 900
EUT Description: SONICBOX iM REMOTE TUNER

RADIATED EMISSION TEST RESULTS

Freq	Ampl	M	P	A	Ht	Dist	Ori	Gain	ACor	CCor	DCor	CorAmp	Limit	Margin	Flags
MHz	dBuV	-	-	-	m	m	deg	dB	dBuV/m	dB	dB	dBuV/m	dBuV/m	dB	FH---
THE FOLLOWING READINGS ARE FOR THE RECEIVER PORTION OF THE EUT															
FCC PART 15.109 (30-1000MHz)															
-VERTICAL POLARIZATION															
36.011	33.1	P	V	B	1.0	3.0	0	21.8	11.8	1.0	0.0	24.1	40.0	-15.9	-----
48.582	51.9	P	V	B	1.0	3.0	315	21.9	11.2	1.1	0.0	42.3	40.0	2.3	-----
48.582	48.5	Q	V	B	1.0	3.0	315	21.9	11.2	1.1	0.0	38.9	40.0	-1.1	-----
57.285	44.1	P	V	B	1.0	3.0	0	21.7	10.4	1.1	0.0	33.9	40.0	-6.1	-----
67.741	40.5	P	V	B	1.0	3.0	0	21.4	10.1	1.3	0.0	30.5	40.0	-9.5	-----
79.850	40.2	P	V	B	1.0	3.0	315	21.7	8.8	1.3	0.0	28.6	40.0	-11.4	-----
80.477	39.5	P	V	B	1.0	3.0	45	21.7	8.8	1.3	0.0	27.9	40.0	-12.1	-----
84.669	39.0	P	V	B	1.0	3.0	45	21.7	8.8	1.3	0.0	27.4	40.0	-12.6	-----
84.941	36.2	P	V	B	1.0	3.0	90	21.7	8.8	1.3	0.0	24.6	40.0	-15.4	-----
109.237	39.3	P	V	B	1.0	3.0	90	21.7	10.3	1.6	0.0	29.5	43.5	-14.0	-----
115.304	33.2	P	V	B	1.0	3.0	45	21.8	10.5	1.7	0.0	23.6	43.5	-19.9	-----
121.378	32.9	P	V	B	1.0	3.0	90	21.8	10.8	1.7	0.0	23.6	43.5	-19.9	-----
144.031	43.2	P	V	B	1.0	3.0	180	21.8	12.0	1.8	0.0	35.2	43.5	-8.3	-----
168.045	32.9	P	V	B	1.0	3.0	180	21.8	13.5	1.9	0.0	26.5	43.5	-17.0	-----
272.033	24.9	P	V	B	1.0	3.0	0	21.5	18.7	2.4	0.0	24.5	46.0	-21.5	-----
366.001	29.7	P	V	L	1.0	3.0	0	21.6	14.4	2.9	0.0	25.4	46.0	-20.6	-----
420.001	24.2	P	V	L	1.5	3.0	0	21.4	15.8	3.1	0.0	21.7	46.0	-24.3	-----
636.003	22.9	P	V	L	1.0	3.0	315	21.1	20.7	3.8	0.0	26.3	46.0	-19.7	-----
996.003	23.0	P	V	L	1.0	3.0	0	19.8	22.8	4.9	0.0	30.9	54.0	-23.1	-----
-HORIZONTAL POLARIZATION															
35.994	34.0	P	H	B	1.0	3.0	0	21.8	11.8	1.0	0.0	25.0	40.0	-15.0	-----
48.552	47.1	P	H	B	2.0	3.0	270	21.9	11.2	1.1	0.0	37.5	40.0	-2.5	-----
48.552	46.3	Q	H	B	2.0	3.0	270	21.9	11.2	1.1	0.0	36.8	40.0	-3.2	-----
57.286	36.3	P	H	B	3.0	3.0	270	21.7	10.4	1.1	0.0	26.1	40.0	-13.9	-----
67.739	40.7	P	H	B	3.0	3.0	45	21.4	10.1	1.3	0.0	30.7	40.0	-9.3	-----
79.851	32.5	P	H	B	3.0	3.0	225	21.7	8.8	1.3	0.0	20.9	40.0	-19.1	-----
80.478	27.9	P	H	B	1.0	3.0	225	21.7	8.8	1.3	0.0	16.3	40.0	-23.7	-----
84.670	34.9	P	H	B	2.0	3.0	180	21.7	8.8	1.3	0.0	23.3	40.0	-16.7	-----
84.942	31.9	P	H	B	1.0	3.0	90	21.7	8.8	1.3	0.0	20.3	40.0	-19.7	-----
109.238	36.3	P	H	B	2.0	3.0	135	21.7	10.3	1.6	0.0	26.5	43.5	-17.0	-----
115.305	26.0	P	H	B	1.0	3.0	0	21.8	10.5	1.7	0.0	16.4	43.5	-27.1	-----
121.379	25.9	P	H	B	2.0	3.0	315	21.8	10.8	1.7	0.0	16.6	43.5	-26.9	-----
144.031	39.7	P	H	B	3.0	3.0	45	21.8	12.0	1.8	0.0	31.7	43.5	-11.8	-----
168.049	28.6	P	H	B	2.5	3.0	0	21.8	13.5	1.9	0.0	22.2	43.5	-21.3	-----
272.001	23.4	P	H	B	1.0	3.0	0	21.5	18.7	2.4	0.0	23.0	46.0	-23.0	-----
366.001	29.4	P	H	L	1.0	3.0	45	21.6	14.4	2.9	0.0	25.1	46.0	-20.9	-----
420.001	25.6	P	H	L	1.0	3.0	0	21.4	15.8	3.1	0.0	23.1	46.0	-22.9	-----
636.001	26.2	P	H	L	1.0	3.0	0	21.1	20.7	3.8	0.0	29.6	46.0	-16.4	-----
996.001	23.4	P	H	L	1.0	3.0	0	19.8	22.8	4.9	0.0	31.3	54.0	-22.7	-----

THE FOLLOWING READINGS ARE FOR THE TRANSMITTER PORTION OF THE EUT (FCC PART 15.249)
(FIELD STRENGTH OF FUNDAMENTAL, HARMONICS AND SPURIOUS EMISSIONS)

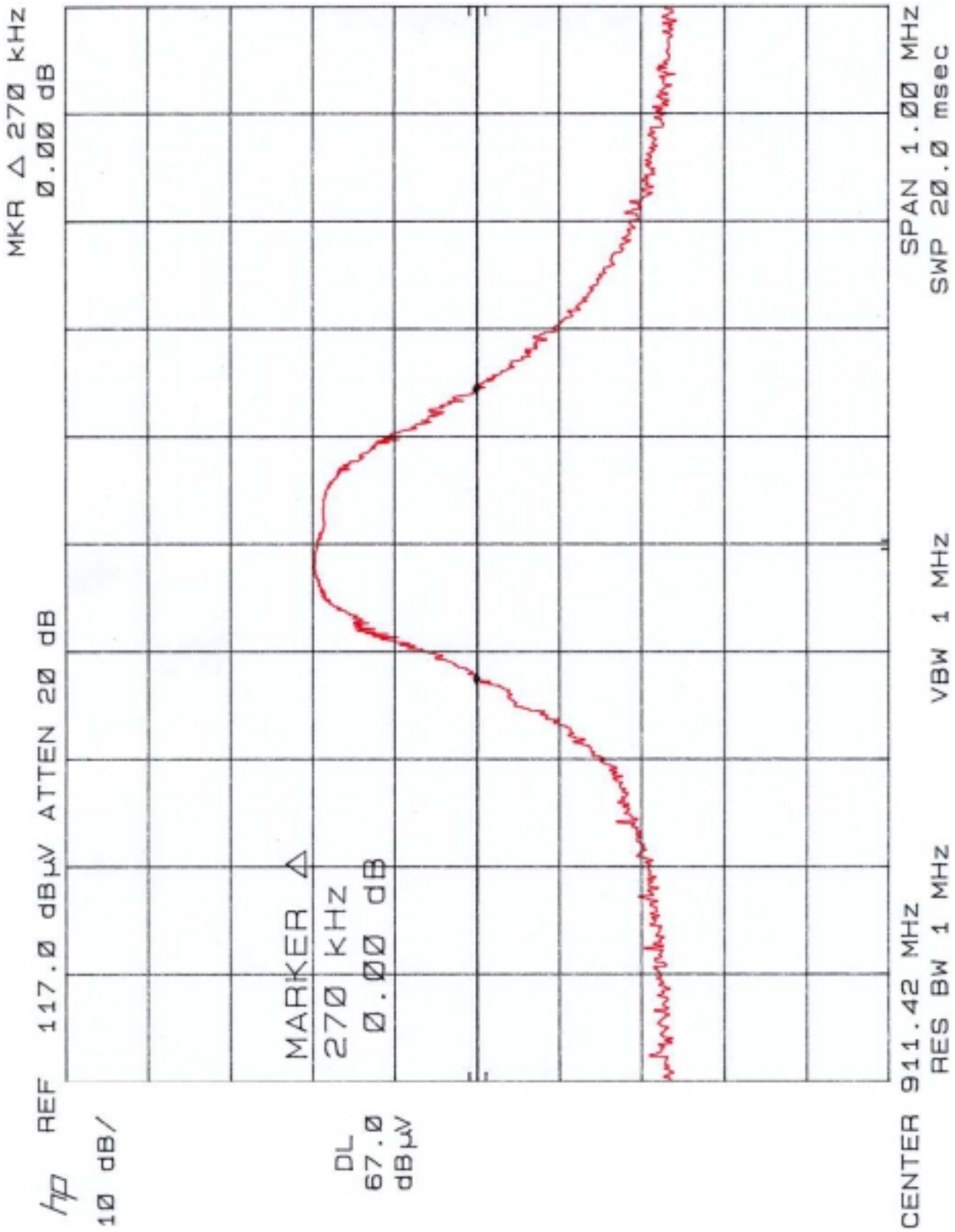
-VERTICAL POLARIZATION

Comment: 1ST HARMONIC											
911.401	84.0 P V L 1.0	3.0	315	20.8	22.6	4.7	0.0	90.5	94.0	-3.5	-----
911.401	81.2 A V L 1.0	3.0	315	20.8	22.6	4.7	0.0	87.7	94.0	-6.3	-----
Comment: 2ND HARMONIC											
1822.832	22.2 P V H 1.0	3.0	0	33.7	29.8	6.6	0.0	24.9	54.0	-29.1	-----
1822.832	15.0 A V H 1.0	3.0	0	33.7	29.8	6.6	0.0	17.7	54.0	-36.3	-----
Comment: 3RD HARMONIC											
2734.250	20.8 P V H 1.0	3.0	0	33.1	30.8	7.5	0.0	26.0	54.0	-28.0	-----
2734.248	13.3 A V H 1.0	3.0	0	33.1	30.8	7.5	0.0	18.5	54.0	-35.5	-----
Comment: 4TH HARMONIC											
3645.664	21.6 P V H 1.0	3.0	0	31.8	33.0	9.4	0.0	32.2	54.0	-21.8	-----
3645.664	12.9 A V H 1.0	3.0	0	31.8	33.0	9.4	0.0	23.5	54.0	-30.5	-----
Comment: 5TH HARMONIC											
4557.115	21.1 P V H 1.0	3.0	0	30.8	32.8	10.6	0.0	33.7	54.0	-20.3	-----
4557.115	13.5 A V H 1.0	3.0	0	30.8	32.8	10.6	0.0	26.1	54.0	-27.9	-----
Comment: 6TH HARMONIC											
5468.491	21.6 P V H 1.0	3.0	0	32.0	36.4	11.5	0.0	37.5	54.0	-16.5	-----
5468.491	14.2 A V H 1.0	3.0	0	32.0	36.4	11.5	0.0	30.2	54.0	-23.8	-----
Comment: 7TH HARMONIC											
6379.912	22.9 P V H 1.0	3.0	0	33.2	36.7	12.9	0.0	39.3	54.0	-14.7	-----
6379.912	16.5 A V H 1.0	3.0	0	33.2	36.7	12.9	0.0	32.9	54.0	-21.1	-----
Comment: 8TH HARMONIC											
7291.328	22.8 P V H 1.0	3.0	0	33.1	37.0	14.2	0.0	40.9	54.0	-13.1	-----
7291.328	16.4 A V H 1.0	3.0	0	33.1	37.0	14.2	0.0	34.5	54.0	-19.5	-----
Comment: 9TH HARMONIC											
8202.739	22.4 P V H 1.0	3.0	0	31.8	38.1	15.6	0.0	44.3	54.0	-9.7	-----
8202.739	15.3 A V H 1.0	3.0	0	31.8	38.1	15.6	0.0	37.2	54.0	-16.8	-----
Comment: 10TH HARMONIC											
9114.145	20.6 P V H 1.0	3.0	0	30.7	40.7	15.9	0.0	46.5	54.0	-7.5	-----
9114.145	16.3 A V H 1.0	3.0	0	30.7	40.7	15.9	0.0	42.2	54.0	-11.8	-----

-HORIZONTAL POLARIZATION

Comment: 1ST HARMONIC											
911.412	86.8 P H L 1.0	3.0	45	20.8	22.6	4.7	0.0	93.3	94.0	-0.7	-----
911.412	84.8 A H L 1.0	3.0	45	20.8	22.6	4.7	0.0	91.3	94.0	-2.7	-----
Comment: 2ND HARMONIC											
1822.832	21.1 P H H 1.0	3.0	0	33.7	29.8	6.6	0.0	23.8	54.0	-30.2	-----
1822.832	14.0 A H H 1.0	3.0	0	33.7	29.8	6.6	0.0	16.7	54.0	-37.3	-----
Comment: 3RD HARMONIC											
2734.250	22.1 P H H 1.0	3.0	0	33.1	30.8	7.5	0.0	27.3	54.0	-26.7	-----
2734.250	13.2 A H H 1.0	3.0	0	33.1	30.8	7.5	0.0	18.4	54.0	-35.6	-----
Comment: 4TH HARMONIC											
3645.664	20.8 P H H 1.0	3.0	0	31.8	33.0	9.4	0.0	31.4	54.0	-22.6	-----
3645.664	12.9 A H H 1.0	3.0	0	31.8	33.0	9.4	0.0	23.5	54.0	-30.5	-----
Comment: 5TH HARMONIC											
4557.115	21.8 P H H 1.0	3.0	0	30.8	32.8	10.6	0.0	34.4	54.0	-19.6	-----
4557.115	13.6 A H H 1.0	3.0	0	30.8	32.8	10.6	0.0	26.2	54.0	-27.8	-----
Comment: 6TH HARMONIC											
5468.491	21.7 P H H 1.0	3.0	0	32.0	36.4	11.5	0.0	37.6	54.0	-16.4	-----
5468.491	14.3 A H H 1.0	3.0	0	32.0	36.4	11.5	0.0	30.2	54.0	-23.8	-----
Comment: 7TH HARMONIC											
6379.912	23.8 P H H 1.0	3.0	0	33.2	36.7	12.9	0.0	40.2	54.0	-13.8	-----
6379.912	16.4 A H H 1.0	3.0	0	33.2	36.7	12.9	0.0	32.8	54.0	-21.2	-----

```
 Comment: 8TH HARMONIC
 7291.328  24.5 P H H 1.0   3.0   0  33.1   37.0  14.2   0.0   42.6   54.0  -11.4 -----
 7291.328  16.4 A H H 1.0   3.0   0  33.1   37.0  14.2   0.0   34.5   54.0  -19.5 -----
Comment: 9TH HARMONIC
 8202.739  20.8 P H H 1.0   3.0   0  31.8   38.1  15.6   0.0   42.7   54.0  -11.3 -----
 8202.739  14.8 A H H 1.0   3.0   0  31.8   38.1  15.6   0.0   36.7   54.0  -17.3 -----
Comment: 10TH HARMONIC
 9114.150  22.2 P H H 1.0   3.0   0  30.7   40.7  15.9   0.0   48.1   54.0   -5.9 -----
 9114.150  16.3 A H H 1.0   3.0   0  30.7   40.7  15.9   0.0   42.2   54.0  -11.8 -----
```



PLOT SHOWING BANDWIDTH OF FUNDAMENTAL FREQUENCY

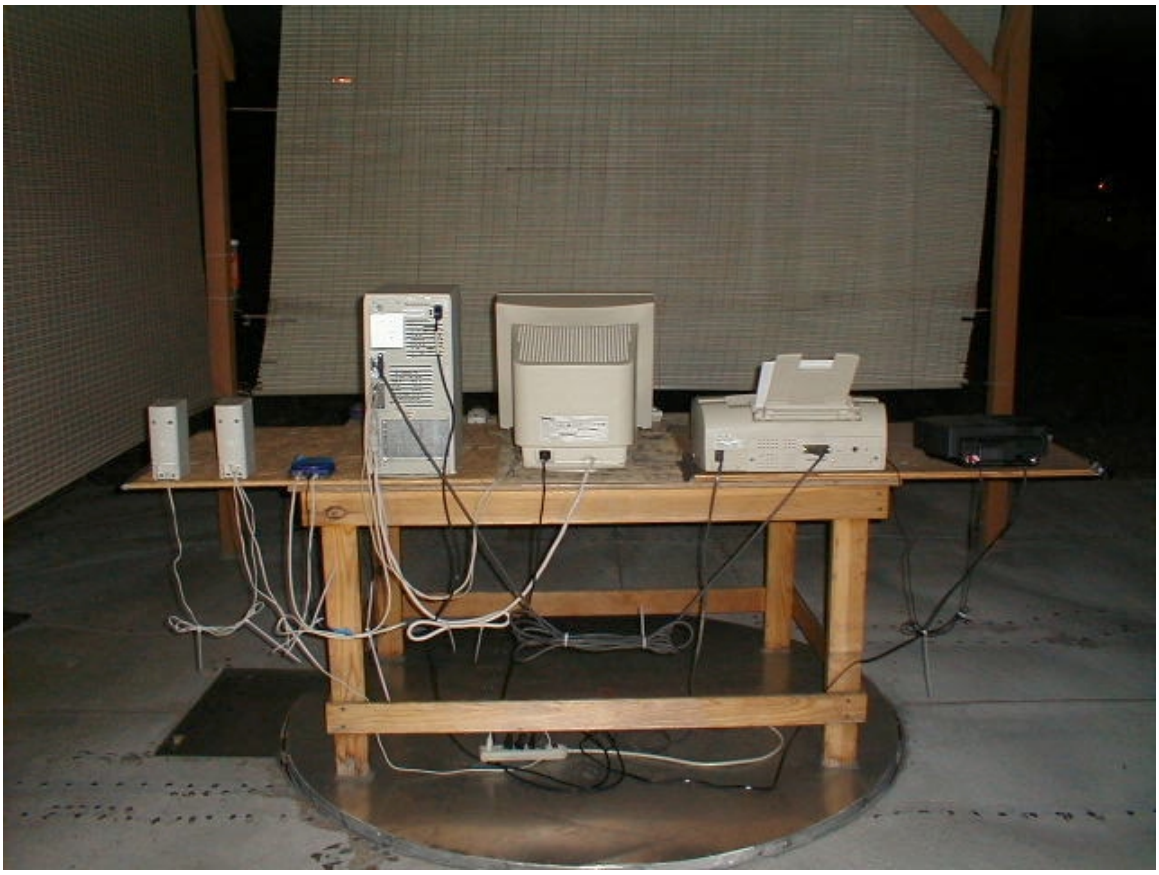
EMT *ELECTRO MAGNETIC TEST, INC.*
1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

FRONT VIEW

SONICBOX, INC.
SONICBOX iM REMOTE TUNER
MODEL: 900
FCC CLASS B - RADIATED EMISSIONS - 5-25-00

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

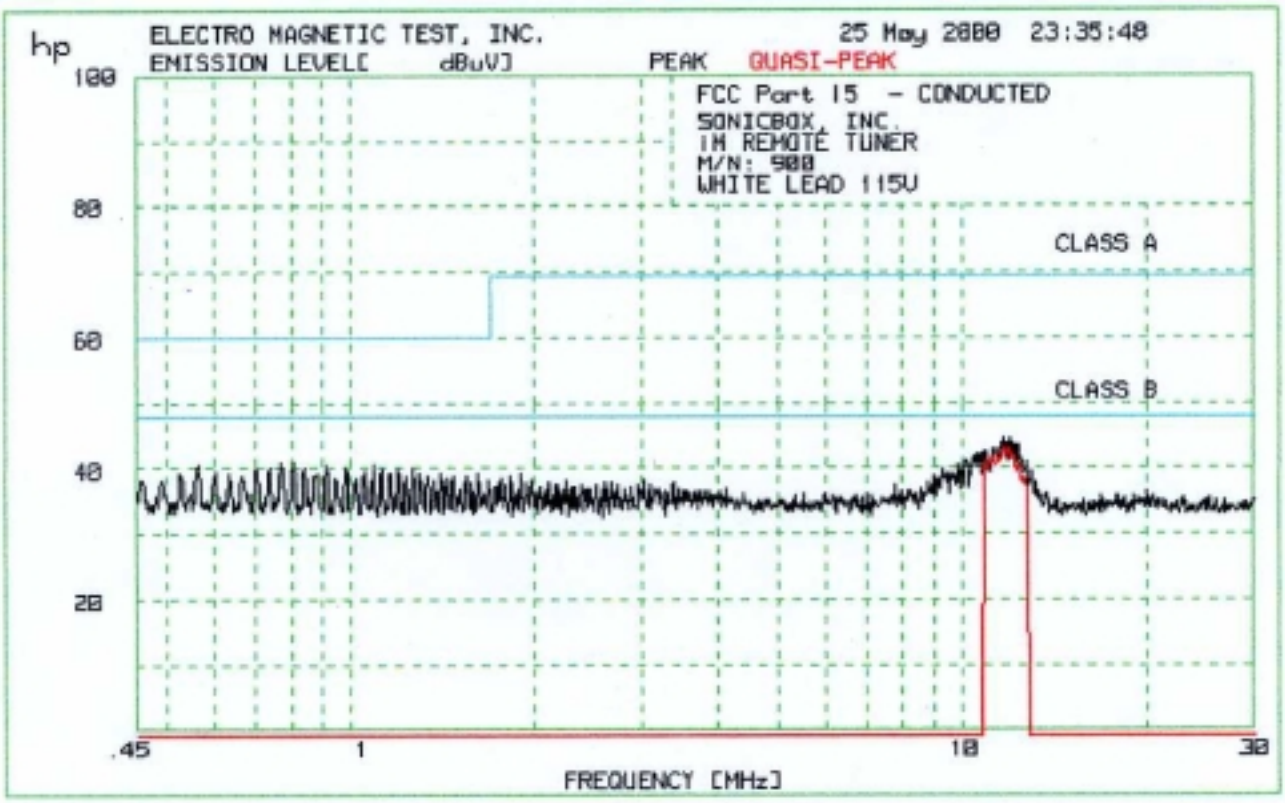
EMT *ELECTRO MAGNETIC TEST, INC.*
1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000



REAR VIEW

SONICBOX, INC.
SONICBOX iM REMOTE TUNER
MODEL: 900
FCC CLASS B - RADIATED EMISSIONS - 5-25-00

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

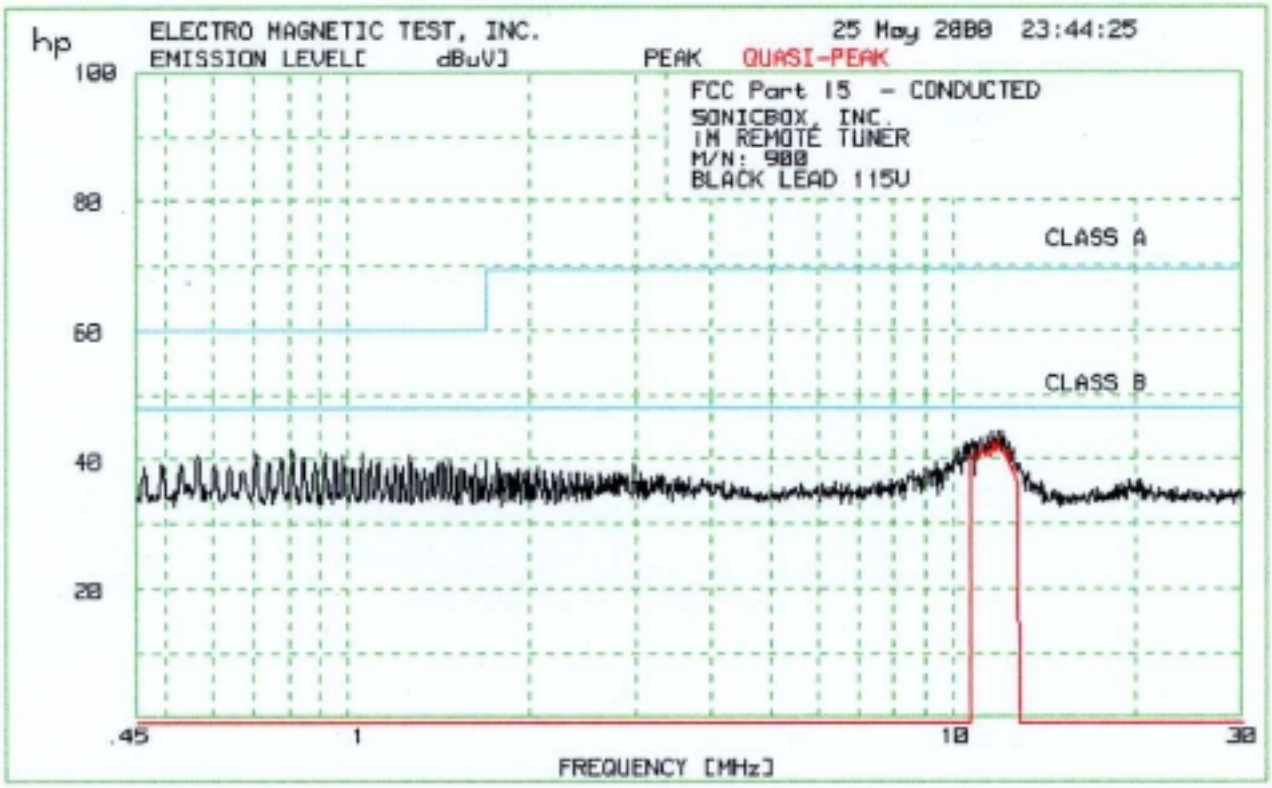

hp
ELECTRO MAGNETIC TEST, INC.
25 May 2000 23:35:48
EMISSION LEVEL[dBuV]
PEAK QUASI-PEAK
FCC Part 15 - CONDUCTED
SONICBOX, INC.
IM REMOTE TUNER
M/N: 900
WHITE LEAD 115V
CLASS A
CLASS B
100
80
60
40
20
.45
1
10
30
FREQUENCY [MHz]

```
=====================================================
ELECTRO MAGNETIC TEST, INC.      25 May 2000  23:35:48
=====================================================
 1. CONDUCTED WITH PRESELECTOR
    1.1  FCC Part 15  - CONDUCTED
=====================================================
45 highest Peaks above -50 dB of Limit Line #2
  peak criteria = .1 dB
```

PEAK#	FREQ (MHz)	(dBuV)	DELTA
1	11.72	44.5	-3.5
2	11.97	44.4	-3.6
3	11.57	43.8	-4.2
4	12.12	43.8	-4.2
5	11.82	43.7	-4.3
6	12.27	43.6	-4.4
7	12.38	43.4	-4.6
8	11.29	42.9	-5.1
9	11.48	42.9	-5.1
10	10.96	42.5	-5.5
11	10.6	42.1	-5.9
12	10.82	42	-6.0
13	10.69	41.7	-6.3
14	10.42	41.4	-6.6
15	10.21	41	-7.0
16	.7731	40.8	-7.2
17	.8097	40.8	-7.2
18	12.59	40.8	-7.2
19	12.75	40.8	-7.2
20	10.04	40.6	-7.4
21	.9183	40.5	-7.5
22	11.1	40.5	-7.5
23	1.095	40.4	-7.6
24	9.828	40.4	-7.6
25	.5692	40.3	-7.7
26	.7414	40.1	-7.9
27	1.274	40.1	-7.9
28	.8444	40	-8.0
29	.9903	40	-8.0
30	9.345	39.9	-8.1
31	.705	39.8	-8.2
32	1.201	39.8	-8.2
33	1.133	39.6	-8.4
34	12.96	39.5	-8.5
35	.6036	39.3	-8.7
36	1.059	39.3	-8.7
37	.8842	39.2	-8.8
38	1.161	39.2	-8.8
39	1.906	39.2	-8.8
40	9.503	39.2	-8.8
41	9.664	39.2	-8.8
42	.5278	39.1	-8.9
43	1.306	39.1	-8.9
44	1.625	39.1	-8.9
45	.6374	39	-9.0

```
======================================================
ELECTRO MAGNETIC TEST, INC.      25 May 2000  23:35:48
======================================================
 1. CONDUCTED WITH PRESELECTOR
    1.1  FCC Part 15  - CONDUCTED
======================================================
Quasi-Peaks above -50 dB of Limit Line #2
  peak criteria = .1 dB

PEAK#    FREQ (MHz)       (dBuV)        DELTA
  1       11.72            43            -5.0
  2       11.92            42.9          -5.1
  3       12.12            42.2          -5.8
  4       11.43            41.5          -6.5
  5       11.15            41.4          -6.6
  6       10.96            41            -7.0
  7       12.38            40.6          -7.4
  8       12.64            38.3          -9.7
```


hp
ELECTRO MAGNETIC TEST, INC.
25 May 2000 23:44:25
EMISSION LEVEL[dBuV]
PEAK QUASI-PEAK
FCC Part 15 - CONDUCTED
SONICBOX, INC.
IM REMOTE TUNER
M/N: 900
BLACK LEAD 115U
CLASS A
CLASS B
100
80
60
40
20
.45
1
10
30
FREQUENCY [MHz]

```
=====================================================
ELECTRO MAGNETIC TEST, INC.      25 May 2000  23:44:25
=====================================================
 1. CONDUCTED WITH PRESELECTOR
    1.1  FCC Part 15  - CONDUCTED
=====================================================
45 highest Peaks above -50 dB of Limit Line #2
  peak criteria = .1 dB

PEAK#    FREQ (MHz)       (dBuV)        DELTA
  1       11.87            44.2          -3.8
  2       11.57            44            -4.0
  3       12.12            44            -4.0
  4       11.38            43.3          -4.7
  5       11.77            43.1          -4.9
  6       11.15            43            -5.0
  7       10.78            42.8          -5.2
  8       10.96            42.6          -5.4
  9       10.87            42.4          -5.6
 10       12.38            42.4          -5.6
 11       10.55            42.3          -5.7
 12       10.42            41.7          -6.3
 13       10.21            41.6          -6.4
 14       12.59            41.6          -6.4
 15         .8131          41.5          -6.5
 16         .705           40.8          -7.2
 17        1.064           40.8          -7.2
 18         .9221          40.7          -7.3
 19         .7109          40.6          -7.4
 20         .9903          40.4          -7.6
 21       10.12            40.4          -7.6
 22         .5692          40.3          -7.7
 23        1.274           40.3          -7.7
 24         .8515          40.1          -7.9
 25         .7797          40            -8.0
 26       10.34            39.8          -8.2
 27        1.488           39.7          -8.3
 28         .9576          39.6          -8.4
 29        1.095           39.6          -8.4
 30        1.701           39.6          -8.4
 31         .7445          39.5          -8.5
 32         .8842          39.5          -8.5
 33        1.421           39.5          -8.5
 34        1.451           39.5          -8.5
 35        9.384           39.5          -8.5
 36        1.774           39.4          -8.6
 37        1.133           39.3          -8.7
 38         .6062          39.2          -8.8
 39        9.745           39.2          -8.8
 40       12.75            39.2          -8.8
 41        1.632           39.1          -8.9
 42         .4956          39            -9.0
 43         .5322          39            -9.0
 44        1.201           39            -9.0
 45        2.973           39            -9.0
```

```
=====================================================
ELECTRO MAGNETIC TEST, INC.      25 May 2000  23:44:25
=====================================================
 1. CONDUCTED WITH PRESELECTOR
    1.1  FCC Part 15  - CONDUCTED
=====================================================
Quasi-Peaks above -50 dB of Limit Line #2
  peak criteria = .1 dB

PEAK#    FREQ (MHz)       (dBuV)        DELTA
  1       11.87            42.8          -5.2
  2       11.67            42.7          -5.3
  3       12.12            42            -6.0
  4       11.38            41.8          -6.2
  5       11.1             41.6          -6.4
  6       11.19            41.2          -6.8
  7       12.33            41            -7.0
  8       10.78            40.5          -7.5
  9       12.59            38.9          -9.1
```

EMT *ELECTRO MAGNETIC TEST, INC.*
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FRONT VIEW

SONICBOX, INC.
SONICBOX iM REMOTE TUNER
MODEL: 900
FCC CLASS B - CONDUCTED EMISSIONS - 5-25-00

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

EMT *ELECTRO MAGNETIC TEST, INC.*
1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

REAR VIEW

SONICBOX, INC.
SONICBOX iM REMOTE TUNER
MODEL: 900
FCC CLASS B - CONDUCTED EMISSIONS - 5-25-00

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

EMT *ELECTRO MAGNETIC TEST, INC.*
1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

APPENDIX B

TEST SETUP DIAGRAMS

EMT *ELECTRO MAGNETIC TEST, INC.*
1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

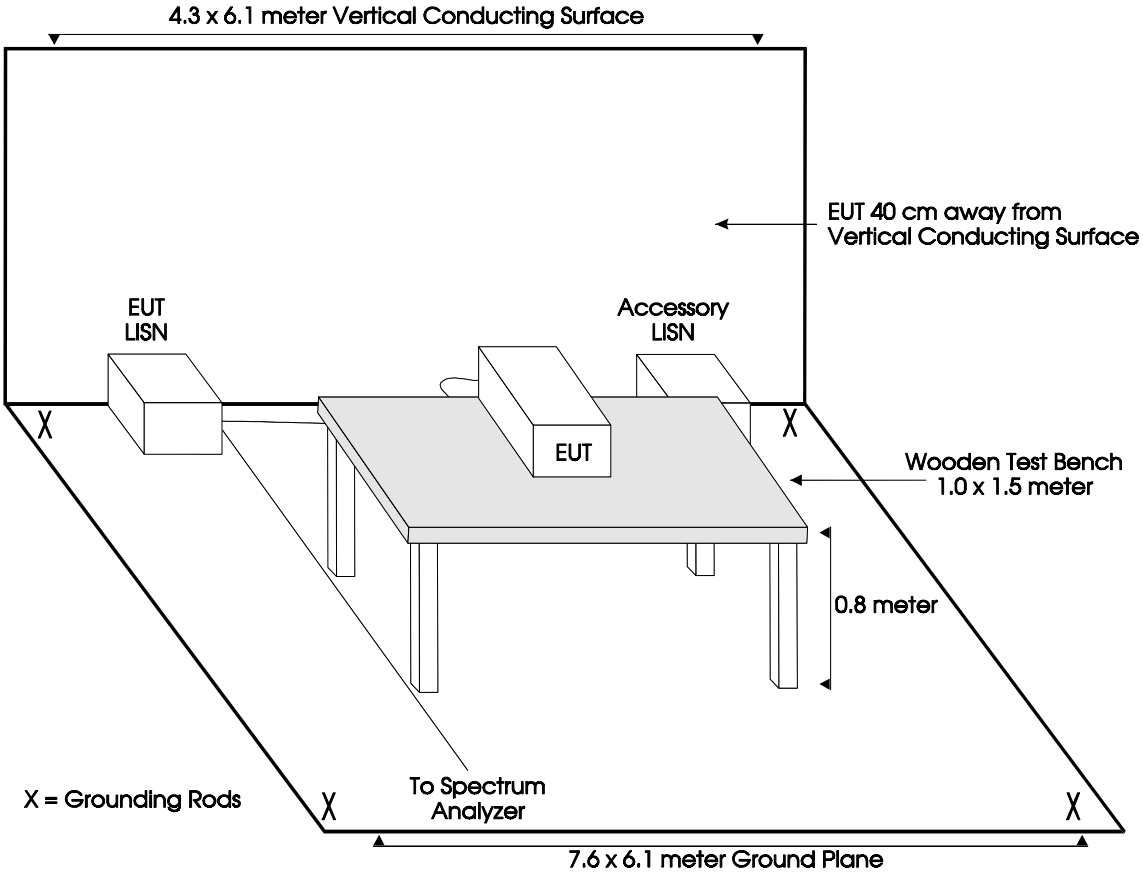


FIGURE 1 - CONDUCTED EMISSIONS TEST SETUP SITE A

EMT
ELECTRO MAGNETIC TEST, INC.
1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

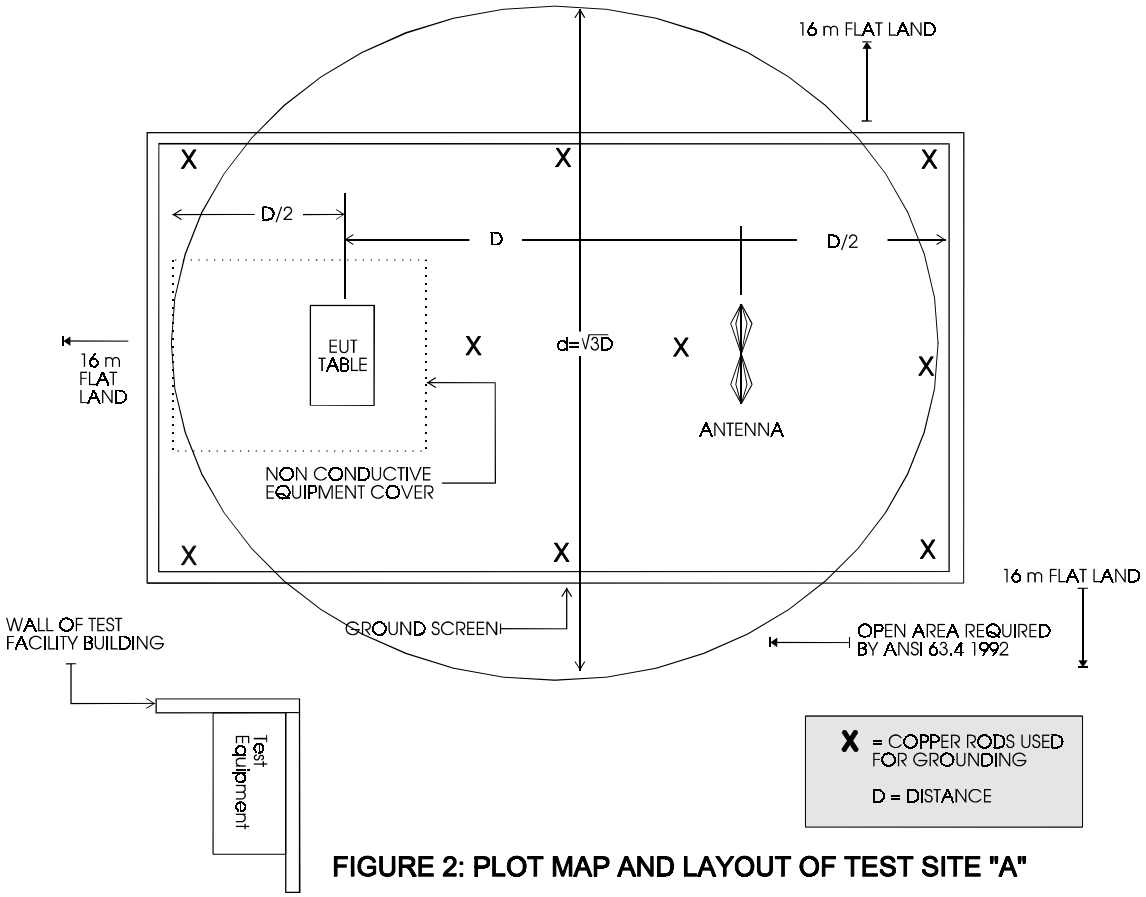
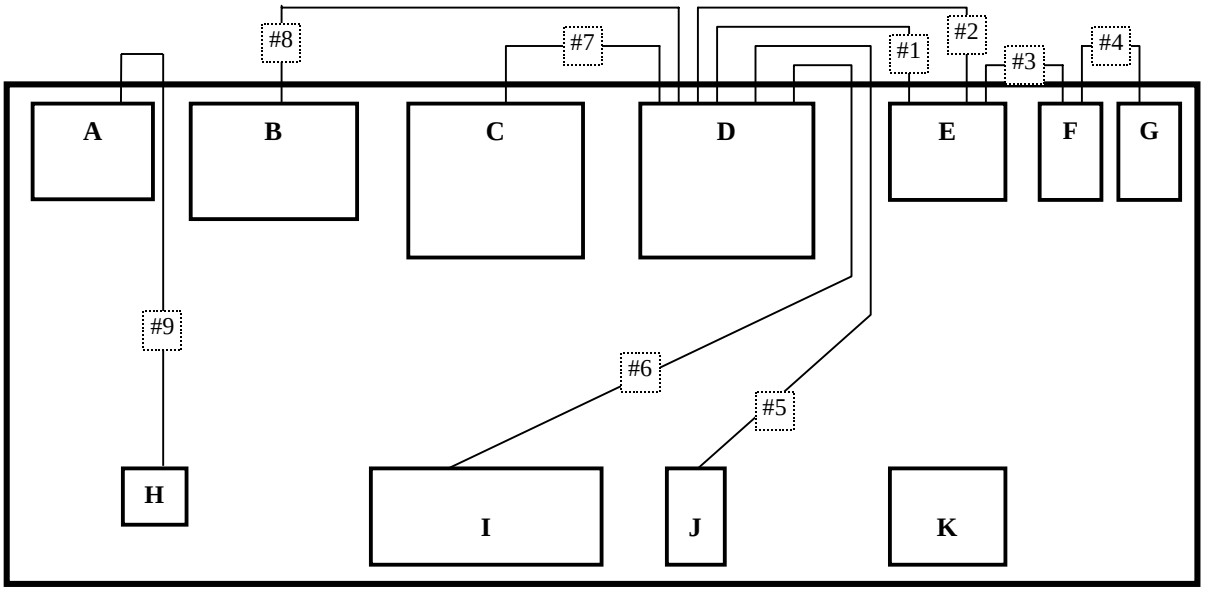


FIGURE 2: PLOT MAP AND LAYOUT OF TEST SITE "A"

EMT *ELECTRO MAGNETIC TEST, INC.*
1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000



Wooden Test Table↗

A. STEREO	**G.** SPEAKER B
B. PRINTER	**H.** RECEIVER
C. MONITOR	**I.** KEYBOARD
D. COMPUTER	**J.** MOUSE
E. BASE UNIT (EUT)	**K.** HAND HELD REMOTE
F. SPEAKER A	

FIGURE 3: EQUIPMENT CONFIGURATION BLOCK DIAGRAM

EMT *ELECTRO MAGNETIC TEST, INC.*
1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

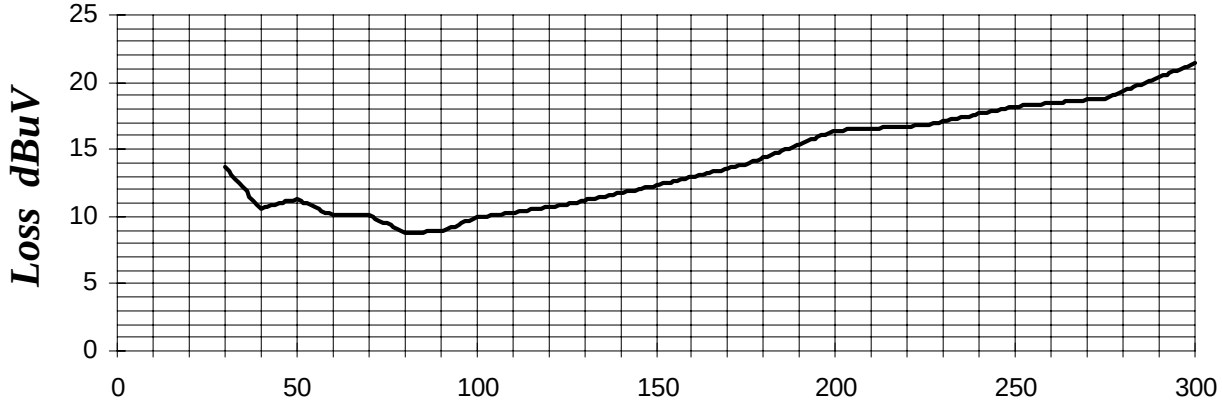
APPENDIX C

ANTENNA FACTORS AND EFFECTIVE GAIN FACTORS

EMT
ELECTRO MAGNETIC TEST, INC.
1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

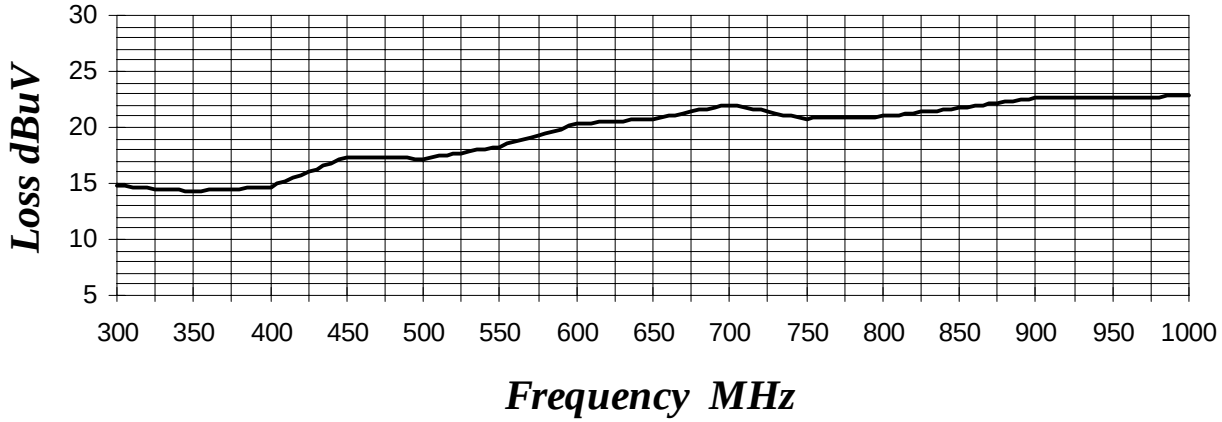
EFFECTIVE 11-13-99

LAB "A" BICONICAL ANTENNA
AB-100 S/N: 1557



EFFECTIVE 5-8-00

LAB "A" LOG PERIODIC ANTENNA
AL-100 S/N: 16037



EMT *ELECTRO MAGNETIC TEST, INC.*
1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

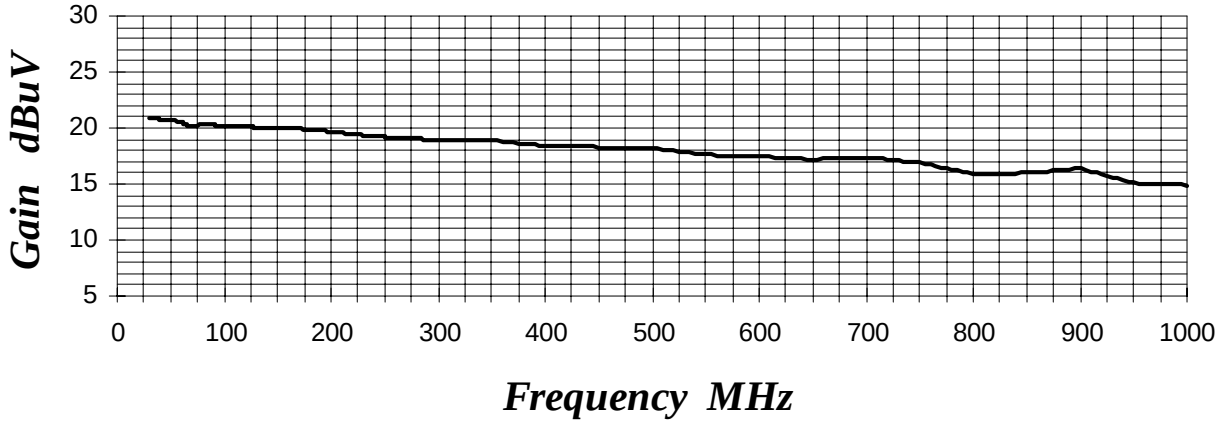
COM-POWER HORN ANTENNA MODEL: AH-118, S/N: 10062

FREQUENCY MHz	GAIN dBi	FACTOR dB
1000	5.2	25.0
1250	4.6	27.5
1500	4.8	28.9
1750	6.1	29.0
2000	4.6	31.6
2500	8.3	29.9
3000	8.0	31.8
3500	8.9	32.2
4000	7.5	34.8
4500	10.9	32.4
5000	8.1	36.1
6000	9.1	36.7
7000	10.3	36.8
8000	10.9	37.4
9000	8.4	40.9
10000	11.4	38.8
11000	15.0	36.0
12000	13.2	38.6
13000	12.9	39.6
14000	10.5	42.6
15000	9.2	44.5
16000	9.2	45.1
17000	10.1	44.7
18000	10.8	44.5

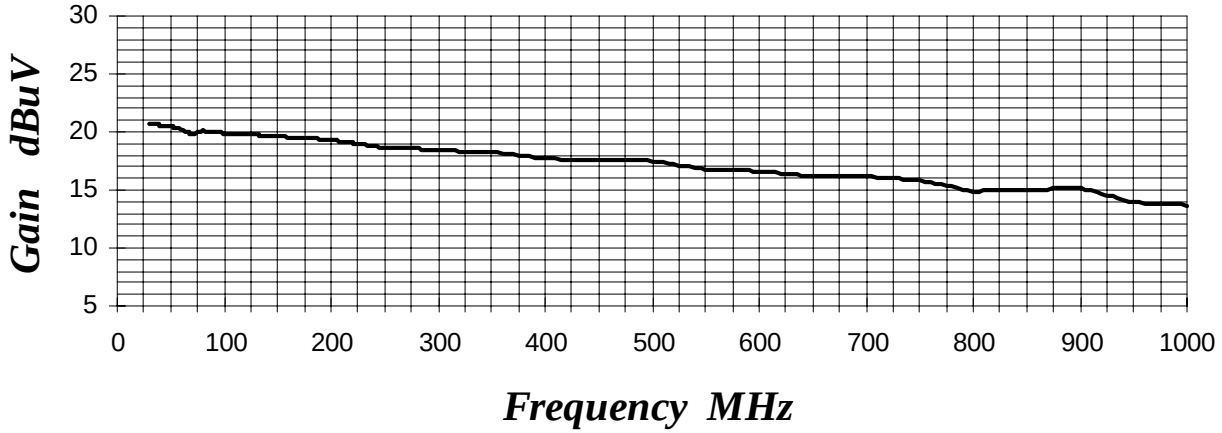
EMT *ELECTRO MAGNETIC TEST, INC.*
1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

LAB "A" EFFECTIVE 3-1-00

PREAMPLIFIER M/N: PA-102 S/N: 1482
EFFECTIVE GAIN AT 3 METERS



PREAMPLIFIER M/N: PA-102 S/N: 1482
EFFECTIVE GAIN AT 10 METERS



EMT *ELECTRO MAGNETIC TEST, INC.*
1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

LAB "A" EFFECTIVE: 10/7/99

COM-POWER PREAMPLIFIER MODEL: PA-122, S/N: 2113

EFFECTIVE GAIN AT 3 METERS

Effective Gain = Preamplifier Gain - Cable Loss

FREQUENCY MHz	PREAMPLIFIER GAIN dB	CABLE LOSS dB	EFFECTIVE GAIN dB
1000	34.3	4.8	29.5
1250	33.7	5.3	28.4
1500	33.5	5.7	27.8
1750	33.6	6.4	27.2
2000	33.8	7.1	26.7
2500	33.5	7.4	26.1
3000	32.7	7.7	25.0
3500	32.2	9.1	23.1
4000	30.8	10.0	20.8
4500	30.8	10.6	20.2
5000	31.1	10.7	20.4
6000	33.0	12.4	20.6
7000	33.5	13.7	19.8
8000	32.1	15.5	16.6
9000	30.8	15.8	15.0
10000	29.9	16.5	13.4
11000	32.3	17.8	14.5
12000	32.5	18.6	13.9
13000	33.7	19.8	13.9
14000	33.0	20.8	12.2
15000	30.5	21.2	9.3
16000	31.0	21.3	9.7
17000	33.4	22.3	11.1
18000	32.2	23.6	8.6