



**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 REMOTE TUNER

MODEL: 418

Prepared for

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

Prepared by: *Tom Nguyen*  
TOM NGUYEN

Approved by: *Kevin Bothmann*  
KEVIN BOTHMANN

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DATE: DECEMBER 9, 1999

	REPORT BODY	APPENDICES			TOTAL
		<i>A</i>	<i>B</i>	<i>C</i>	
PAGES	16	13	4	6	39

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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.

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 Remote Tuner  
Model: 418  
S/N: N/A

Product Description: The EUT is a personal computer peripheral device consisting of a base unit and a hand held remote unit. The base unit is connected to the RS232 port and stereo out of a PC. It works in conjunction with the Sonicbox imBand software to locate and broadcast the audio from the webpages of internet radio stations. The hand held remote communicates with the base unit and is used to change stations, save stations, and control the PC volume.

Modifications: The EUT was not modified during the testing.

Manufacturer: Sonicbox, Inc.  
241 Polaris Avenue  
Mountain View, California, 94041

Test Date(s): November 19 and 23, 1999

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**

<b>TEST</b>	<b>DESCRIPTION</b>	<b>RESULTS</b>
1	Conducted RF Emissions, 450 kHz - 30 MHz.	Complies with the <b>Class B</b> limits of FCC Title 47, Part 15 Subpart B.
2	Radiated RF Emissions, 30 MHz - 1000 MHz.	Complies with the <b>Class B</b> limits of FCC Title 47, Part 15 Subpart B.
3	Radiated RF Emissions, 418 MHz – 4180 MHz.	Complies with the limits of FCC Title 47, Part 15 Subpart C. (Section 15.231)

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**1.            PURPOSE**

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Sonicbox Remote Tuner Model: 418. 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 15.231.



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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                      Engineer

#### Electro Magnetic Test, Inc.

Tom Nguyen                      Test Technician  
Neelesh Raj                      Test Technician  
Kevin Bothmann                Lab Manager

### 2.4 Date Test Sample was Received

The test sample was received on November 19, 1999.

### 2.5 Disposition of the Test Sample

The test sample was returned to Sonicbox, Inc. on November 24, 1999.

### 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.

<b>SPEC</b>	<b>TITLE</b>
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 15.231)
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 (receiver) was connected to the computer, speakers, and sound feeder via its serial, PC audio, speaker audio, and xmitter audio, and power ports, respectively. The EUT (transmitter) was located across the table from the receiver. The EUT (transmitter) is battery powered. 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 transmitting and receiving signals by pressing the volume control button on the transmitter unit.

The transmitter portion was tested in all 3 orthogonal positions. The final data was taken in the "X" position.

The transmitter and receiver were tested together for all emissions tests. The radiated emission data for both units is located in Appendix A. The conducted emissions test was done only on the receiver because the transmitter is a battery powered device.

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 3.5 foot unshielded cable connecting the EUT (receiver) to speaker "A". It has a 1/8 inch stereo jack at the EUT end, and is hardwired into the speaker. It has a D-9 pin metallic connector at the EUT end, and a D-25 pin metallic connector at the accessory end.

Cable #2

This is a 3.5 foot unshielded cable connecting speaker "A" to speaker "B". It is hardwired into both speakers. The cable was bundled to a length of 3 feet.

Cable #3

This is a 4 foot unshielded cable connecting the EUT (receiver) to the sound feeder. It has a 1/8 inch round power connector at the EUT end, and is hardwired into the sound feeder.

Cable #4

This is a 1 foot unshielded cable connecting the EUT (receiver) to the sound feeder. It has a 1/8 inch stereo jack at the EUT end, and is hardwired into the sound feeder.

Cable #5

This is a 3 foot foil shielded cable connecting the EUT (receiver) to the computer. It is hardwired into the EUT, and has a DB-9 pin metallic connector at the computer end. 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 EUT (receiver) to the computer. It has a 1/8 inch stereo jack at both ends. The cable was bundled to a length of 4 feet. The shield of the cable was grounded to the chassis via the connectors.

Cable #7

This is a 6 foot foil shielded cable connecting the computer to the keyboard. It has a 6 pin mini DIN metallic 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 #8

This is a 6 foot foil shielded cable connecting the computer to the mouse. It has a 6 pin mini DIN metallic 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 #9

This is a 5 foot braid and foil shielded cable connecting the computer to the monitor. It has a high density DB-15 pin metallic connector 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.

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Cable #10

This is a 9 foot foil shielded cable connecting the computer to the printer. It has a DB-25 pin metallic connector at the computer end, and has a 36 pin Centronics metallic connector at the printer end. The cable was bundled to a length of 7 feet. The shield of the cable was grounded to the chassis via the connectors.

Cable #11

This is a 6 foot unshielded cable connecting the printer to the power pack. It has a 1/8 inch round power connector at the printer end, and is hardwired into the power pack. The cable was bundled to a length of 4 feet.


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**5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT**
**5.1 EUT and Accessory List**

<b>EQUIPMENT TYPE</b>	<b>MANU-FACTURER</b>	<b>MODEL</b>	<b>SERIAL NUMBER</b>	<b>FCC ID</b>
SONIC BOX REMOTE (EUT)	SONICBOX, INC.	418	N/A	OT7418
COMPUTER	DELL	MMP	CTZYF	DoC
MONITOR	DELL	D1025TM	761845	DoC
KEYBOARD	DELL	SK-1000REW	12710-7B7-009078	GYUR433K
MOUSE	MICROSOFT	INTELLIMOUSE	00613298	C3KKMP5
SPEAKERS (A & B)	JUSTER	AC-69IN	N/A	N/A
PRINTER	HEWLETT PACKARD	C4582A	CN798120C2	B94C2164X
PRINTER POWER PACK	HEWLETT PACKARD	C2175A	9100-5124	N/A
SOUND FEEDER	ARKON RESOURCES	FF100	N/A	ME2-FF100


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**5.2 EMI Test Equipment**

EQUIPMENT TYPE	MANUFACTURER	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 2, 1999	1 Year
Preamplifier	Com Power	PA-122	2113	October 7, 1999	1 Year
RF Attenuator	Mini-Circuits	CAT-10	Asset #1000	December 30, 1998	1 Year
LISN	Com Power	LI-200	12012	April 27, 1999	1 Year
LISN	Com Power	LI-200	12214	April 27, 1999	1 Year
LISN	Com Power	LI-200	1767	April 27, 1999	1 Year
LISN	Com Power	LI-200	1768	April 27, 1999	1 Year
Biconical Antenna	Com Power	AB-100	01557	November 13, 1999	1 Year
Log Periodic Antenna	Com Power	AL-100	16004	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 receiver was grounded through the computer's chassis. The transmitter was not grounded.

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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 was 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 4.18 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 4.18 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 4.18 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 Remote Tuner, Model: 418 meets all of the **Class B** requirements of the FCC Title 47, Part 15, Subpart B. The EUT also meets the requirements of the FCC Title 47, Part 15, Subpart C, section 15.231.

**EMT**

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**APPENDIX A**

***RADIATED AND CONDUCTED EMISSIONS  
DATA SHEETS***



Electro Magnetic Test, Inc.  
 1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

FCC Class B Test Date: 11-23-99  
 Company Name: SONICBOX  
 EUT Model Number: 418  
 EUT Description: SONICBOX REMOTE TUNER

RADIATED EMISSION TEST RESULTS

Freq MHz	Ampl dBuV	M	P	A	Ht m	Dist m	Ori deg	Gain dB	ACor dBuV/m	CCor dB	DCor dB	CorAmp dBuV/m	Limit dBuV/m	Margin dB	Flags FH---
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THE FOLLOWING READINGS ARE FOR THE RECEIVER  
 FCC PART 15.109 (30-1000MHz)

Comment: THE FOLLOWING IS FOR POSTION "X", FOUND TO BE THE WORST CASE MODE.

VERTICAL POLARIZATION

110.780	29.6	P	V	B	1.0	3.0	45	21.6	10.3	1.6	0.0	19.9	43.5	-23.6	-----
168.039	29.1	P	V	B	1.0	3.0	0	21.4	13.5	1.9	0.0	23.1	43.5	-20.4	-----
291.905	26.9	P	V	B	1.0	3.0	0	21.3	20.6	2.6	0.0	28.8	46.0	-17.2	-----
303.134	26.9	P	V	L	1.0	3.0	0	21.3	15.6	2.7	0.0	23.9	46.0	-22.1	-----
311.308	27.7	P	V	L	1.0	3.0	0	21.3	15.5	2.7	0.0	24.6	46.0	-21.4	-----
426.484	30.4	P	V	L	1.0	3.0	0	21.1	16.7	3.1	0.0	29.1	46.0	-16.9	-----
515.570	29.4	P	V	L	1.0	3.0	45	21.2	17.6	3.4	0.0	29.2	46.0	-16.8	-----

HORIZONTAL POLARIZATION

110.718	26.6	P	H	B	1.0	3.0	0	21.6	10.3	1.6	0.0	16.9	43.5	-26.6	-----
143.202	25.5	P	H	B	1.0	3.0	0	21.5	11.9	1.8	0.0	17.7	43.5	-25.8	-----
303.122	27.4	P	H	L	1.0	3.0	0	21.3	15.6	2.7	0.0	24.4	46.0	-21.6	-----
311.310	29.1	P	H	L	1.0	3.0	0	21.3	15.5	2.7	0.0	26.0	46.0	-20.0	-----
335.900	27.9	P	H	L	1.0	3.0	0	21.4	15.0	2.8	0.0	24.3	46.0	-21.7	-----
359.216	31.4	P	H	L	1.0	3.0	0	21.3	14.8	2.8	0.0	27.7	46.0	-18.3	-----
364.824	33.8	P	H	L	1.0	3.0	45	21.3	14.9	2.9	0.0	30.3	46.0	-15.7	-----
426.466	35.6	P	H	L	1.5	3.0	0	21.1	16.7	3.1	0.0	34.3	46.0	-11.7	-----
429.690	31.2	P	H	L	1.5	3.0	0	21.1	16.8	3.1	0.0	30.0	46.0	-16.0	-----
445.426	30.7	P	H	L	1.0	3.0	45	21.1	17.5	3.2	0.0	30.3	46.0	-15.7	-----
515.632	32.2	P	H	L	1.0	3.0	45	21.2	17.6	3.4	0.0	32.0	46.0	-14.0	-----

FOLLOWING READINGS ARE FOR THE TRANSMITTER FCC PART 15.231(b)  
 (FIELD STRENGTH OF FUNDAMENTAL AND HARMONICS, AND SPURIOUS EMISSIONS)

Comment: THE FOLLOWING IS FOR POSTION "X", FOUND TO BE THE WORST CASE MODE.

VERTICAL POLARIZATION

Comment: FUNDAMENTAL

418.040	80.5	P	V	L	1.0	3.0	0	21.0	16.3	3.1	0.0	78.9	79.5	-0.6	-----
418.040	61.4	A	V	L	1.0	3.0	0	21.0	16.3	3.1	0.0	59.8	79.5	-19.7	-----

Comment: 2ND HARMONIC

836.088	42.0	P	V	L	2.0	3.0	0	20.0	21.9	4.6	0.0	48.5	61.9	-13.4	-----
836.088	24.0	A	V	L	2.0	3.0	0	20.0	21.9	4.6	0.0	30.5	61.9	-31.4	-----

Comment: 3RD HARMONIC

1254.138	39.4	P	V	H	2.0	3.0	315	33.7	27.5	5.3	0.0	38.5	61.9	-23.4	-----
1254.138	24.2	A	V	H	2.0	3.0	315	33.7	27.5	5.3	0.0	23.3	61.9	-38.6	-----

Comment: 4TH HARMONIC

1672.203	34.6	P	V	H	1.0	3.0	0	33.6	29.0	6.2	0.0	36.2	61.9	-25.7	-----
1672.203	20.1	A	V	H	1.0	3.0	0	33.6	29.0	6.2	0.0	21.7	61.9	-40.2	-----

Comment: 5TH HARMONIC

2090.240	31.0	P	V	H	1.0	3.0	315	33.7	31.3	7.2	0.0	35.8	61.9	-26.1	-----
2090.240	20.4	A	V	H	1.0	3.0	315	33.7	31.3	7.2	0.0	25.2	61.9	-36.7	-----

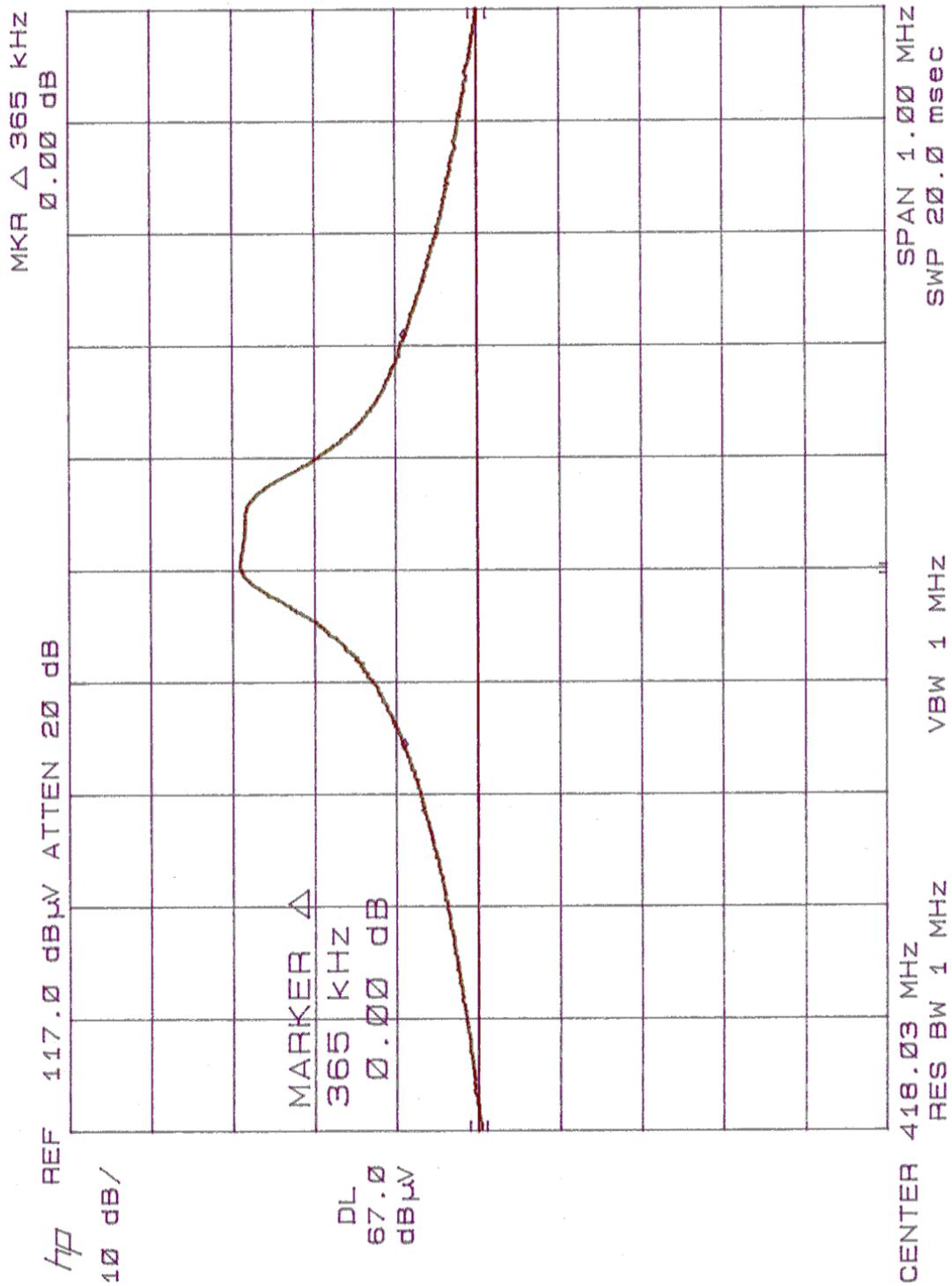
Comment: 6TH HARMONIC

2508.311	27.4	P	V	H	1.0	3.0	0	33.5	29.9	7.4	0.0	31.2	61.9	-30.7	-----
2508.311	19.6	A	V	H	1.0	3.0	0	33.5	29.9	7.4	0.0	23.4	61.9	-38.5	-----

Comment: 7TH HARMONIC

2926.360	27.7	P	V	H	1.0	3.0	0	32.8	31.5	7.7	0.0	34.1	61.9	-27.8	-----
2926.360	18.9	A	V	H	1.0	3.0	0	32.8	31.5	7.7	0.0	25.3	61.9	-36.6	-----

Comment: 8TH HARMONIC													
3344.420	28.5	P V H	1.0	3.0	0	32.4	32.1	8.7	0.0	36.9	61.9	-25.0	-----
3344.420	18.9	A V H	1.0	3.0	0	32.4	32.1	8.7	0.0	27.3	61.9	-34.6	-----
Comment: 9TH HARMONIC													
3762.470	27.0	P V H	1.0	3.0	0	31.5	33.6	9.6	0.0	38.7	61.9	-23.2	-----
3762.470	18.7	A V H	1.0	3.0	0	31.5	33.6	9.6	0.0	30.4	61.9	-31.5	-----
Comment: 10TH HARMONIC													
4180.603	26.5	P V H	1.0	3.0	0	30.8	33.9	10.2	0.0	39.8	61.9	-22.1	-----
4180.603	18.8	A V H	1.0	3.0	0	30.8	33.9	10.2	0.0	32.1	61.9	-29.8	-----
HORIZONTAL POLARIZATION													
Comment: FUNDAMENTAL													
418.031	96.0	P H L	1.0	3.0	0	21.0	16.3	3.1	0.0	94.4	79.5	14.9	-----
418.037	76.7	A H L	1.0	3.0	0	21.0	16.3	3.1	0.0	75.1	79.5	-4.4	-----
Comment: 2ND HARMONIC													
836.084	52.1	P H L	1.0	3.0	0	20.0	21.9	4.6	0.0	58.6	61.9	-3.3	-----
836.084	32.8	A H L	1.0	3.0	0	20.0	21.9	4.6	0.0	39.3	61.9	-22.6	-----
Comment: SPURIOUS EMISSIONS													
889.330	46.8	P H L	1.0	3.0	0	20.3	22.9	4.7	0.0	54.1	61.9	-7.8	-----
889.330	28.5	A H L	1.0	3.0	0	20.3	22.9	4.7	0.0	35.8	61.9	-26.1	-----
893.825	34.7	P H L	1.0	3.0	0	20.3	23.1	4.7	0.0	42.2	61.9	-19.7	-----
893.825	19.2	A H L	1.0	3.0	0	20.3	23.1	4.7	0.0	26.7	61.9	-35.2	-----
Comment: 3RD HARMONIC													
1254.152	41.1	P H H	1.0	3.0	270	33.7	27.5	5.3	0.0	40.2	61.9	-21.7	-----
1254.152	26.3	A H H	1.0	3.0	270	33.7	27.5	5.3	0.0	25.4	61.9	-36.5	-----
Comment: 4TH HARMONIC													
1672.179	30.6	P H H	1.0	3.0	0	33.6	29.0	6.2	0.0	32.2	61.9	-29.7	-----
1672.179	20.5	A H H	1.0	3.0	0	33.6	29.0	6.2	0.0	22.1	61.9	-39.8	-----
Comment: 5TH HARMONIC													
2090.242	32.1	P H H	1.5	3.0	270	33.7	31.3	7.2	0.0	36.9	61.9	-25.0	-----
2090.242	21.1	A H H	1.5	3.0	270	33.7	31.3	7.2	0.0	25.9	61.9	-36.0	-----
Comment: 6TH HARMONIC													
2508.311	28.4	P H H	1.0	3.0	0	33.5	29.9	7.4	0.0	32.2	61.9	-29.7	-----
2508.311	19.5	A H H	1.0	3.0	0	33.5	29.9	7.4	0.0	23.3	61.9	-38.6	-----
Comment: 7TH HARMONIC													
2926.360	28.5	P H H	1.0	3.0	0	32.8	31.5	7.7	0.0	34.9	61.9	-27.0	-----
2926.360	18.8	A H H	1.0	3.0	0	32.8	31.5	7.7	0.0	25.2	61.9	-36.7	-----
Comment: 8TH HARMONIC													
3344.630	27.9	P H H	1.0	3.0	0	32.4	32.1	8.7	0.0	36.3	61.9	-25.6	-----
3344.630	18.7	A H H	1.0	3.0	0	32.4	32.1	8.7	0.0	27.1	61.9	-34.8	-----
Comment: 9TH HARMONIC													
3762.472	26.0	P H H	1.0	3.0	0	31.5	33.6	9.6	0.0	37.7	61.9	-24.2	-----
3762.472	18.6	Q H H	1.0	3.0	0	31.5	33.6	9.6	0.0	30.3	61.9	-31.6	-----
Comment: 10TH HARMONIC													
4180.603	25.8	P H H	1.0	3.0	0	30.8	33.9	10.2	0.0	39.1	61.9	-22.8	-----
4180.603	18.7	A H H	1.0	3.0	0	30.8	33.9	10.2	0.0	32.0	61.9	-29.9	-----



PLOT SHOWING BANDWIDTH OF FUNDAMENTAL FREQUENCY



***ELECTRO MAGNETIC TEST, INC.***

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**FRONT VIEW**

SONICBOX, INC.  
SONICBOX REMOTE TUNER  
MODEL: 418

**CISPR 22 CLASS B/FCC CLASS B - RADIATED EMISSIONS - 11-23-99**

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**



***ELECTRO MAGNETIC TEST, INC.***

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

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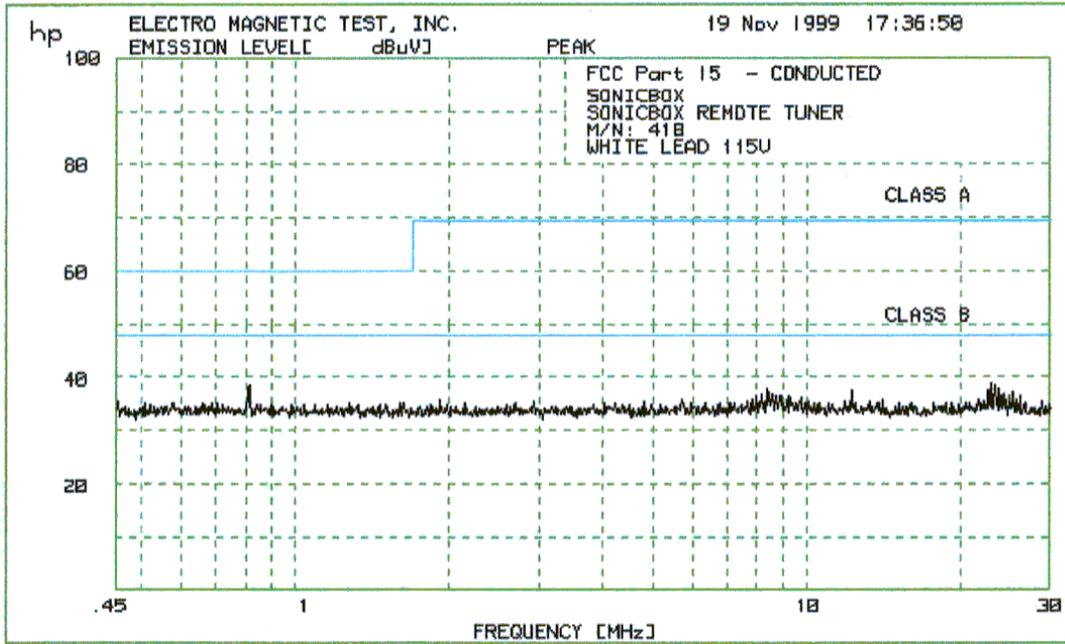


**REAR VIEW**

SONICBOX, INC.  
SONICBOX REMOTE TUNER  
MODEL: 418

**CISPR 22 CLASS B/FCC CLASS B - RADIATED EMISSIONS - 11-23-99**

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**

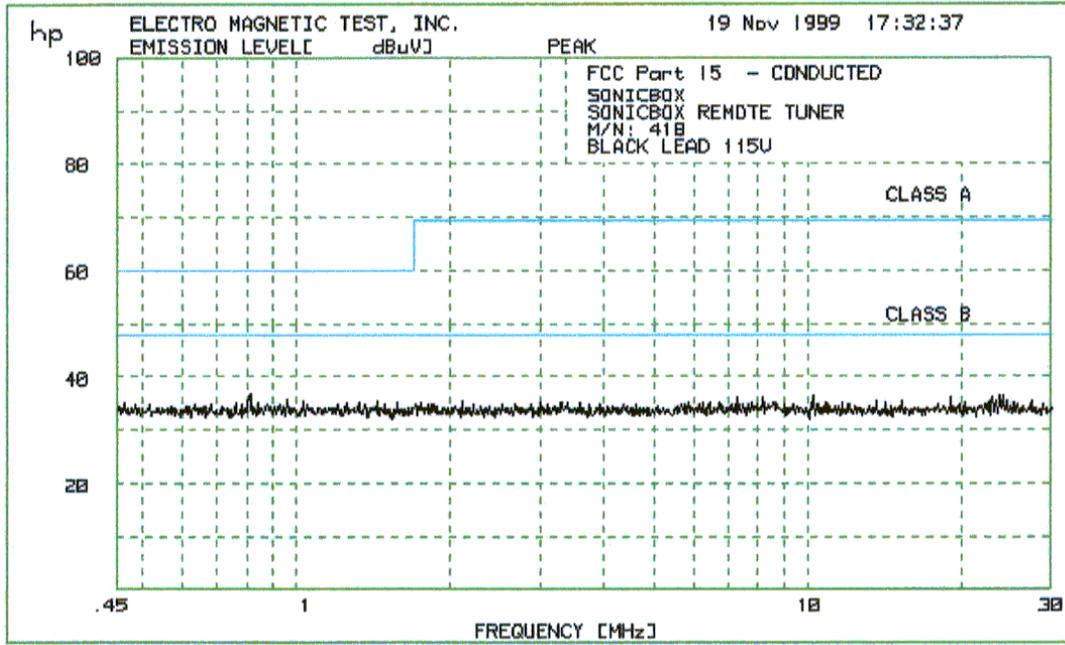


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1. CONDUCTED WITH PRESELECTOR
  1.1 FCC Part 15 - CONDUCTED
=====
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```
45 highest Peaks above -50 dB of Limit Line #2
peak criteria = .1 dB
```

PEAK#	FREQ (MHz)	(dBuV)	DELTA
1	23.03	38.6	-9.4
2	.8165	38.5	-9.5
3	23.32	38.4	-9.6
4	23.72	37.9	-10.1
5	8.379	37.6	-10.4
6	22.65	37.4	-10.6
7	22.84	37.4	-10.6
8	12.27	37.3	-10.7
9	8.485	37	-11.0
10	25.37	37	-11.0
11	8.171	36.8	-11.2
12	8.593	36.7	-11.3
13	24.32	36.7	-11.3
14	8.001	36.5	-11.5
15	23.92	36.5	-11.5
16	8.702	36.4	-11.6
17	8.924	36.4	-11.6
18	24.84	36.4	-11.6
19	8.849	36.3	-11.7
20	9.228	36.3	-11.7
21	24.12	36.3	-11.7
22	26.12	36.3	-11.7
23	9.306	36.2	-11.8
24	9.745	36.2	-11.8
25	7.835	35.8	-12.2
26	21.72	35.8	-12.2
27	14.1	35.7	-12.3
28	1.93	35.6	-12.4
29	5.72	35.6	-12.4
30	24.63	35.6	-12.4
31	25.69	35.6	-12.4
32	2.936	35.5	-12.5
33	4.836	35.5	-12.5
34	8.103	35.5	-12.5
35	10.12	35.5	-12.5
36	13.35	35.5	-12.5
37	22.27	35.5	-12.5
38	7.673	35.4	-12.6
39	11.92	35.3	-12.7
40	28.77	35.3	-12.7
41	.662	35.2	-12.8
42	5.965	35.2	-12.8
43	7.115	35.2	-12.8
44	10.04	35.2	-12.8
45	.5125	35.1	-12.9



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ELECTRO MAGNETIC TEST, INC. 19 Nov 1999 17:32:37

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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	.8165	36.6	-11.4
2	10.25	36.4	-11.6
3	23.82	36.4	-11.6
4	24.12	36.4	-11.6
5	22.94	36.1	-11.9
6	7.296	35.9	-12.1
7	8.205	35.9	-12.1
8	19.07	35.9	-12.1
9	.9657	35.7	-12.3
10	2.116	35.5	-12.5
11	23.32	35.5	-12.5
12	24.53	35.5	-12.5
13	1.037	35.4	-12.6
14	15.27	35.4	-12.6
15	1.445	35.3	-12.7
16	13.63	35.3	-12.7
17	27.59	35.3	-12.7
18	.7667	35.2	-12.8
19	1.328	35.2	-12.8
20	7.802	35.2	-12.8
21	8.557	35.2	-12.8
22	10.87	35.2	-12.8
23	14.28	35.2	-12.8
24	25.37	35.2	-12.8
25	.4615	35.1	-12.9
26	.8479	35.1	-12.9
27	1.584	35.1	-12.9
28	2.998	35.1	-12.9
29	3.606	35.1	-12.9
30	6.737	35.1	-12.9
31	1.263	35	-13.0
32	3.288	35	-13.0
33	5.866	35	-13.0
34	20.31	35	-13.0
35	22.65	35	-13.0
36	1.76	34.9	-13.1
37	3.315	34.9	-13.1
38	3.386	34.9	-13.1
39	6.247	34.9	-13.1
40	6.46	34.9	-13.1
41	11.67	34.9	-13.1
42	.5168	34.8	-13.2
43	.6817	34.8	-13.2
44	.9299	34.8	-13.2
45	1.05	34.8	-13.2

**EMT**

***ELECTRO MAGNETIC TEST, INC.***

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**FRONT VIEW**

SONICBOX, INC.

SONICBOX REMOTE TUNER

MODEL: 418

CISPR 22 CLASS B - CONDUCTED EMISSIONS - 11-19-99

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION  
FOR MAXIMUM EMISSIONS**



***ELECTRO MAGNETIC TEST, INC.***

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

---



**REAR VIEW**

SONICBOX, INC.

SONICBOX REMOTE TUNER

MODEL: 418

CISPR 22 CLASS B - CONDUCTED EMISSIONS - 11-19-99

**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

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**APPENDIX B**

***TEST SETUP DIAGRAMS***



**ELECTRO MAGNETIC TEST, INC.**

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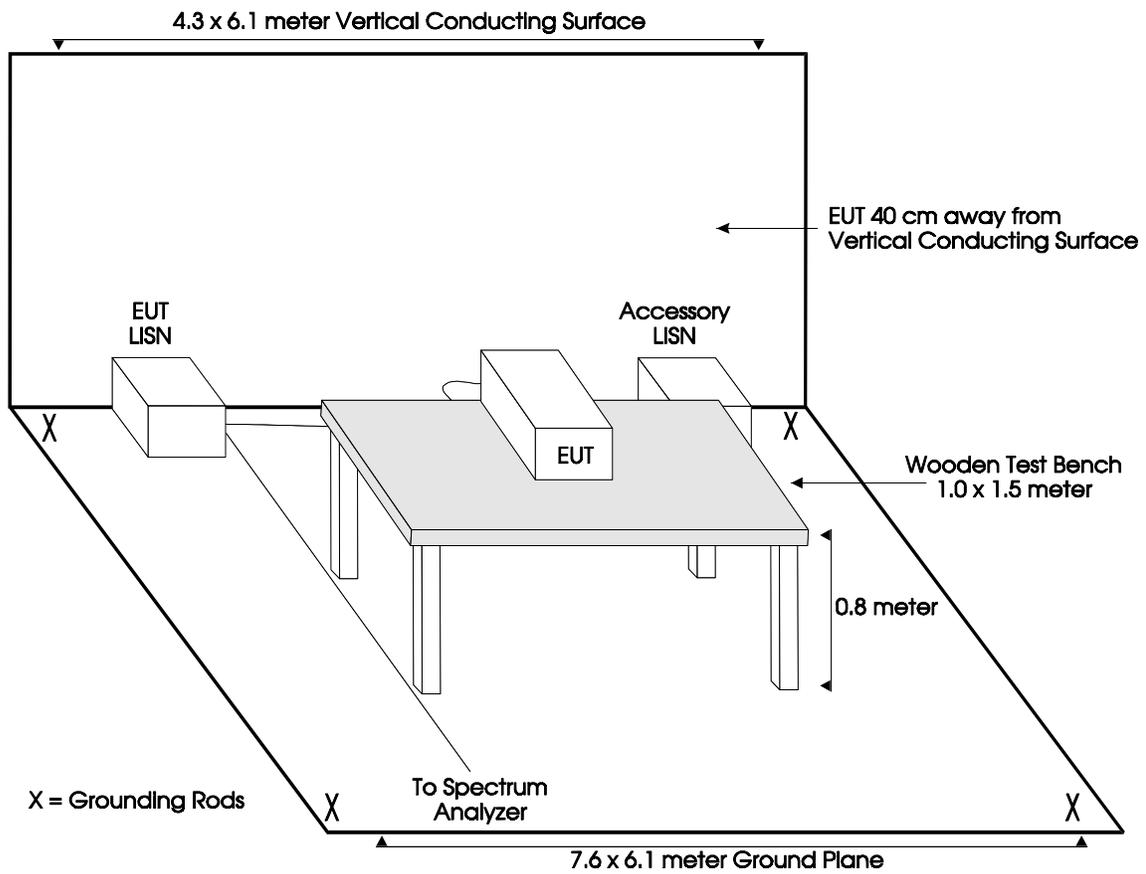
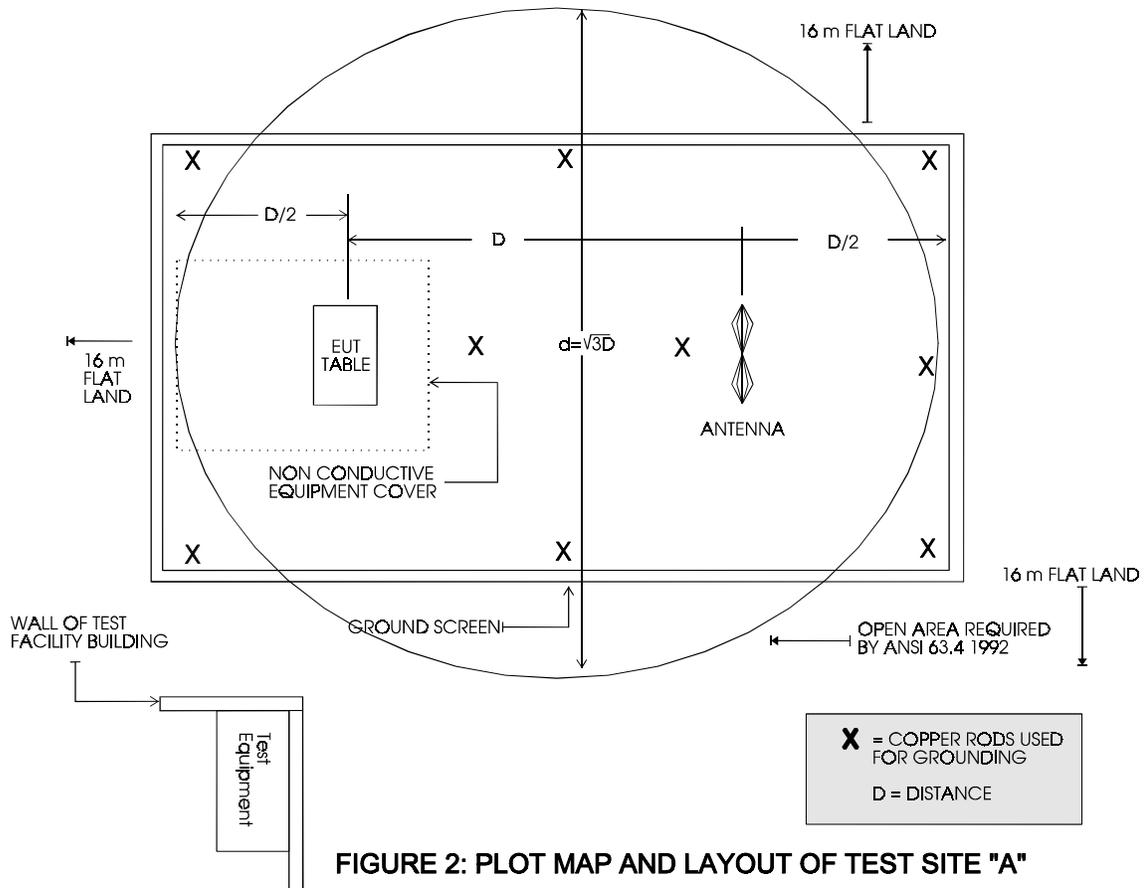


FIGURE 1 - CONDUCTED EMISSIONS TEST SETUP SITE A



**ELECTRO MAGNETIC TEST, INC.**

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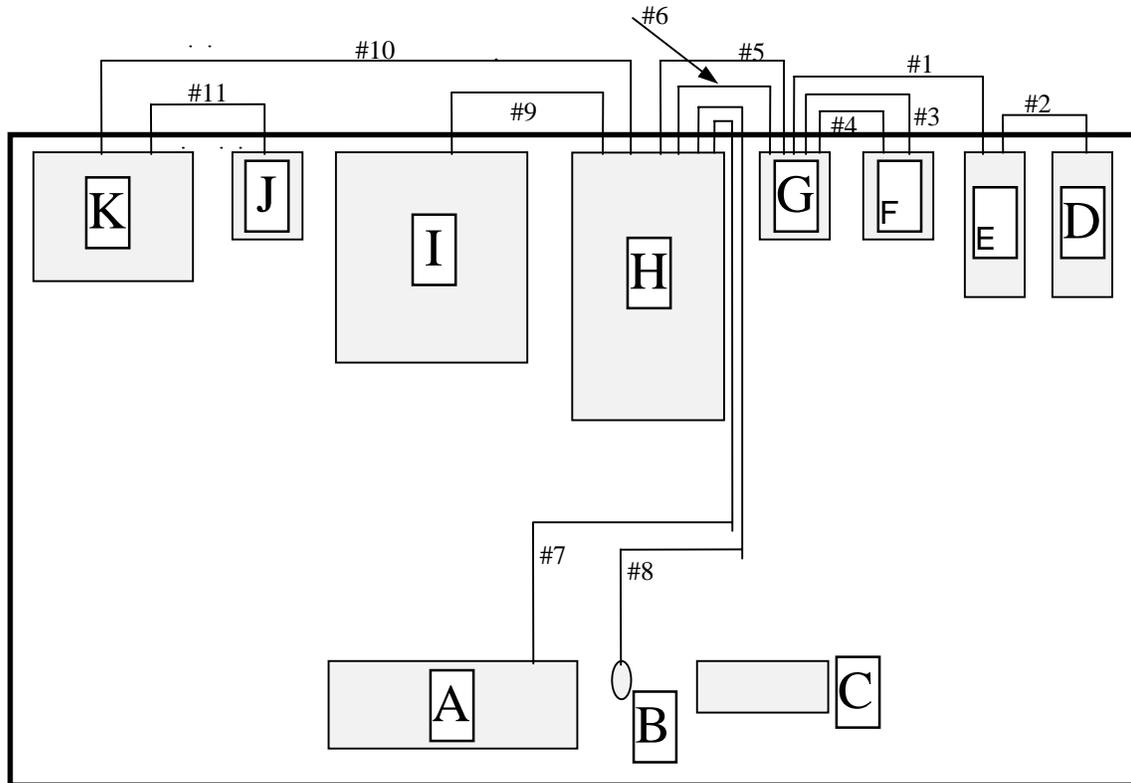


**FIGURE 2: PLOT MAP AND LAYOUT OF TEST SITE "A"**



**ELECTRO MAGNETIC TEST, INC.**

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Wooden Test Table ↗

A. Keyboard	G. EUT (Receiver)
B. Mouse	H. Computer
C. EUT (Transmitter)	I. Monitor
D. Speaker B	J. AC Adapter
E. Speaker A	K. Printer
F. Sound Feeder	

**FIGURE 3: EQUIPMENT CONFIGURATION BLOCK DIAGRAM**



***ELECTRO MAGNETIC TEST, INC.***  
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**APPENDIX D**

***ANTENNA FACTORS AND  
EFFECTIVE GAIN FACTORS***



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

Cat: 11/13/99

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

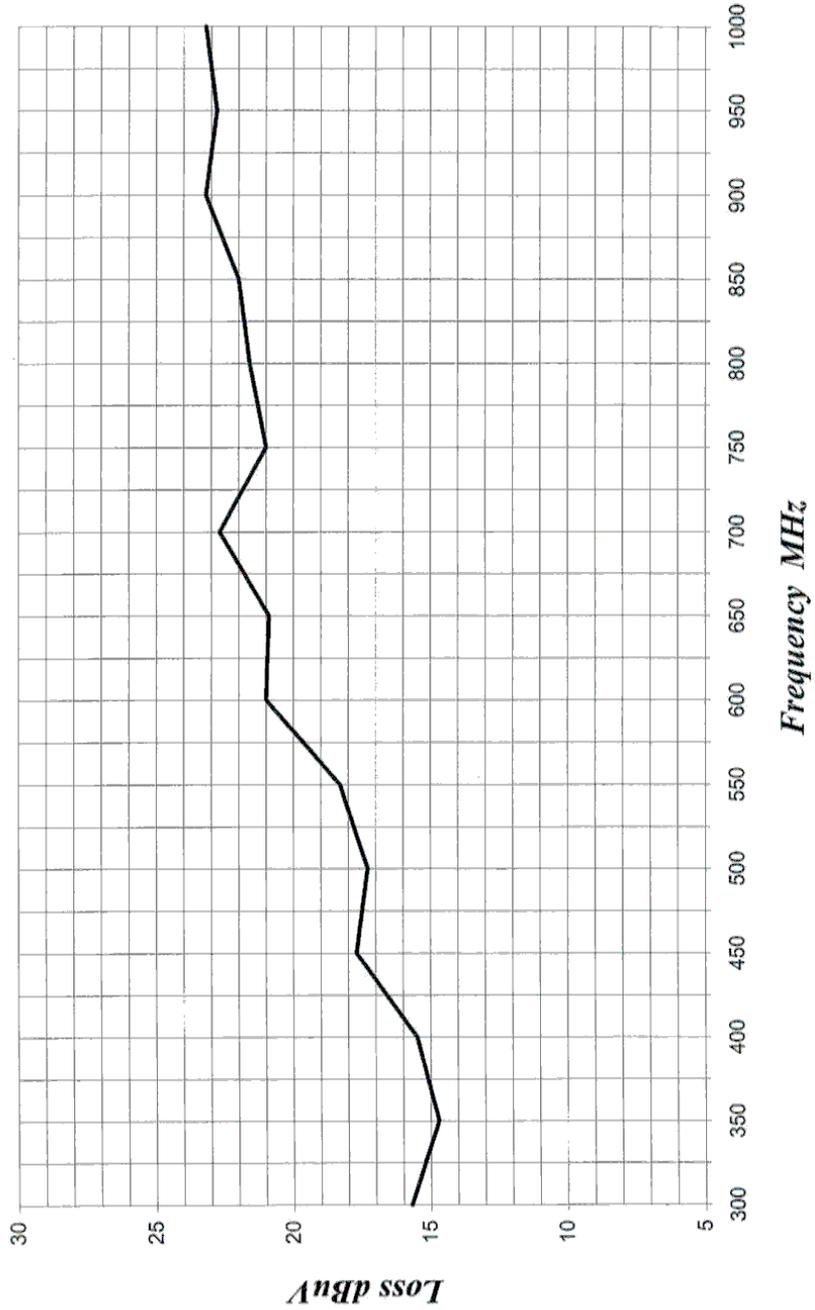




**ELECTRO MAGNETIC TEST, INC.**  
1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000

Cal: 11/13/99

**LAB "A" LOG PERIODIC ANTENNA AL-100 S/N: 16004**




**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**

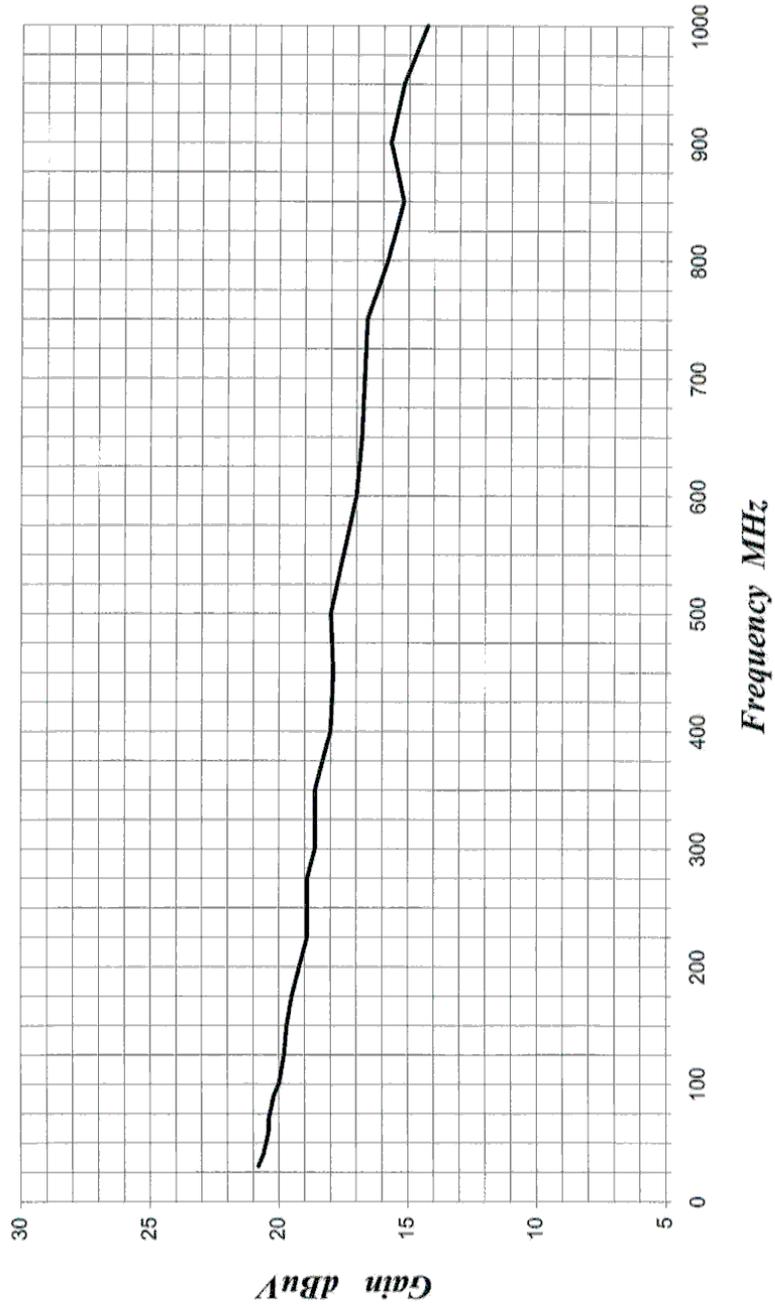
FREQUENCY MHz	GAIN dBi	FACTOR dB
1000	5.2	25.0
1250	4.6	27.5
1500	4.8	28.9
1750	6.1	29.0
2000	4.6	31.6
2500	8.3	29.9
3000	8.0	31.8
3500	8.9	32.2
4000	7.5	34.8
4500	10.9	32.4
5000	8.1	36.1
6000	9.1	36.7
7000	10.3	36.8
8000	10.9	37.4
9000	8.4	40.9
10000	11.4	38.8
11000	15.0	36.0
12000	13.2	38.6
13000	12.9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



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

Lab "A" Effective: 11/13/99 Effective Gain = Preamplifier Gain - Cable Loss

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




**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