



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 TEST REPORT*

for


the

FIREWALL/VPN WITH WIRELESS LAN

MODEL: APL11-031

Prepared for

**SONICWALL, INC.
1143 BORREGAS AVENUE
SUNNYVALE, CALIFORNIA 94089-1306**

Prepared by: 
DOUG MOON

Approved by: 
KEVIN BOTHMANN

**ELECTRO MAGNETIC TEST, INC.
1547 PLYMOUTH STREET
MOUNTAIN VIEW, CALIFORNIA 94043
(650) 965-4000**

DATE: APRIL 14, 2003

	REPORT BODY	APPENDICES		TOTAL
		A	B	
PAGES	16	15	3	34

This report shall not be reproduced except in full, without the written approval of Electro Magnetic Test, Inc.


ELECTRO MAGNETIC TEST, INC.

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

TABLE OF CONTENTS

SECTION	TITLE	PAGE
	GENERAL REPORT SUMMARY	04
	SUMMARY OF TEST RESULTS	05
1.	PURPOSE	06
2.	ADMINISTRATIVE DATA	07
2.1	Location of Testing	07
2.2	Traceability Statement	07
2.3	Cognizant Personnel	07
2.4	Date Test Sample was Received	07
2.5	Disposition of the Test Sample	07
2.6	Abbreviations and Acronyms	07
3.	APPLICABLE DOCUMENTS	08
4.	DESCRIPTION OF TEST CONFIGURATIONS	09
4.1	Description of Test Configuration - EMI	09
4.1.1	Cable Construction and Termination	10
5.	LIST OF EUT, ACCESSORIES AND TEST EQUIPMENT	11
5.1	EUT and Accessory List	11
5.2	EMI Test Equipment	12
6.	TEST SITE DESCRIPTION	13
6.1	Test Facility Description	13
6.2	EUT Mounting, Bonding and Grounding	13
7.	TEST PROCEDURES	14
7.1	RF Emissions	14
7.1.1	Conducted Emissions Test	14
7.1.2	Radiated Emissions Test	15
8.	CONCLUSIONS	16

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

LIST OF APPENDICES

APPENDIX	TITLE
A	Radiated and Conducted Emissions Data Sheets
B	Test Setup Diagrams

LIST OF FIGURES

FIGURE	TITLE
1	Conducted Emissions Test Setup
2	Plot Map And Layout of Test Site


ELECTRO MAGNETIC TEST, INC.

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

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 Electro Magnetic Test, Inc. 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.

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

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

Electro Magnetic Test, Inc. is approved to perform EMI/EMC testing by the following agencies:

COUNTRY	AGENCY	LAB APPROVAL #
USA	Federal Communications Commission (FCC)	*
USA	National Voluntary Lab Accreditation Program (NVLAP)	200147-0
Canada	Industry Canada	IC 2804
Japan	Voluntary Control Council For Interference (VCCI)	See Below
	Open Field Test Site Registration Number	R-589
	Conducted Emissions Test Site Registration Number	C-604
Taiwan	Bureau Of Standards, Metrology and Inspection (BSMI)	SL2-IN-E-1024
Australia / New Zealand	Australian Communications Authority (AUSTEL)	*
European Community	TUV Rheinland (EMC for the European Community)	*

*These agencies do not issue a lab approval number to test labs.


ELECTRO MAGNETIC TEST, INC.

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

GENERAL REPORT SUMMARY (CONTINUED)

Device Tested: Firewall/VPN With Wireless LAN
 Model: APL11-031
 S/N: 0109

Product Description: The EUT is a Firewall/VPN appliance with 10/100 Ethernet LAN (secured), Senao 802.11B Wireless LAN, and 10/100 Ethernet WAN (non-secure).

Modifications: The EUT was not modified during the testing.

Manufacturer: Sonicwall, Inc.
 1143 Borregas Avenue
 Sunnyvale, California 94089-1306

Test Date(s): March 19, 2003

Test Specifications: EMI requirements
 Limits: CISPR 22: 1997 Class B
 FCC Title 47, Part 15 Subpart B, Class B
 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, 150 kHz - 30 MHz.	Complies with the Class B limits of CISPR 22: 1997
2	Radiated RF Emissions, 30 MHz - 1000 MHz.	Complies with the Class B limits of CISPR 22: 1997
3	Radiated RF Emissions, 1 GHz - 2 GHz.	Complies with the Class B limits of FCC Title 47, Part 15 Subpart B



ELECTRO MAGNETIC TEST, INC.

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

1. **PURPOSE**

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Firewall/VPN With Wireless LAN Model: APL11-031. 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 by C.I.S.P.R. Publication 22 for Information Technology Equipment from 150 kHz to 1 GHz. Under paragraph G of section 15.109 of the Code of Federal Regulations Title 47, Part 15 of the FCC rules, FCC accepts the international standards set forth in C.I.S.P.R. Publication 22 and if the EUT meets the **Class B** specification limits defined in FCC Title 47, Part 15, Subpart B from 1 GHz to 2 GHz.

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

2. ADMINISTRATIVE DATA

2.1 Location of Testing

The EMI tests described herein were performed at the test facility of Electro Magnetic Test, Inc., 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

Sonicwall, Inc.

Rick Linford Regulatory Compliance Engineer

Electro Magnetic Test, Inc.

Mario Garcia Test Technician
Doug Moon Test Technician
Kevin Bothmann Lab Manager

2.4 Date Test Sample was Received

The test sample was received on March 19, 2003.

2.5 Disposition of the Test Sample

The test sample was returned to Sonicwall, Inc. on March 21, 2003.

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

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

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).
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.
CISPR 22 1997	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement



ELECTRO MAGNETIC TEST, INC.

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

4. **DESCRIPTION OF TEST CONFIGURATION**

4.1 **Description of Test Configuration - EMI**

The EUT was connected to the AC power adapter, remote laptop computer, and remote Ethernet switch via its power input, serial, and Ethernet ports, respectively. The EUT had an Senao Wireless LAN Mini PCI adapter card installed inside the unit. The remote laptop computer and Ethernet switch were located approximately 10 meters outside the test site. During the testing process, the EUT was receiving a ping signal to the LAN port from the remote laptop computer through the wireless LAN port, continuously. The EUT was also sending Crypto simulation status through the serial port to the remote laptop computer, continuously. The remote laptop computer was running cryptProcVecs for Cryptographic ASIC exercise.

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.



ELECTRO MAGNETIC TEST, INC.

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

4.1.1 **Cable Construction and Termination**

Cable #1

This is a 6 foot unshielded cable connecting the EUT to the AC power adapter. It has a 5mm round metallic connector with a factory installed ferrite bead at the EUT end, and is hardwired into the power supply. The cable was bundled to a length of 4 feet.

Cable #2

This is a 50 foot foil shielded cable connecting the EUT to the remote laptop computer. It has a DB-9 pin metallic connector at both ends of the cable. The shield of the cable was grounded to the chassis via the connectors.

Cable #3

This is a 50 foot unshielded CAT5 Ethernet cable connecting the EUT to the remote Ethernet switch. It has an RJ45 plastic connector at both ends of the cable.

Cable #4

This is a 50 foot unshielded CAT5 Ethernet cable connecting the EUT to the remote Ethernet switch. It has an RJ45 plastic connector at both ends of the cable.


ELECTRO MAGNETIC TEST, INC.

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

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

EQUIPMENT TYPE	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID
FIREWALL/VPN WITH WIRELESS LAN (EUT)	SONICWALL, INC.	APL11-031	0109	QWU-031
AC POWER ADAPTER (EUT)	SINO-AMERICAN	SA120A-0530V-C	N/A	N/A
WIRELESS LAN MINI-PCI ADAPTER (EUT)	SENAO	SL-2511MP	032018653	N/A
THE FOLLOWING WERE LOCATED OUTSIDE THE TEST SITE				
REMOTE LAPTOP COMPUTER	DELL COMPUTER CORPORATION	PP01L	CN-06P823-48155-27J-1904	DoC
REMOTE LAPTOP AC POWER ADAPTER	DELL COMPUTER CORPORATION	ADP-70EB	TH-09364U-17971-26H-FJTS	N/A
BROADBAND NETWORKING WIRELESS NOTEBOOK ADAPTER	MICROSOFT	MN-520	68692-168-0453027-00236	HEDACC3501D68
REMOTE FAST ETHERNET SWITCH	NETGEAR	FS108	FS18F17211205	N/A


ELECTRO MAGNETIC TEST, INC.

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

5.2 EMI Test Equipment

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. CYCLE
Spectrum Analyzer	Hewlett Packard	8566B	3013A07296	August 7, 2002	1 Year
RF Preselector	Hewlett Packard	85685A	3010A01157	August 7, 2002	1 Year
Quasi-Peak Adapter	Hewlett Packard	85650A	2521A00584	August 7, 2002	1 Year
Preamplifier	Com Power	PA-102	1482	March 1, 2003	1 Year
Preamplifier	Com Power	PA-122	2113	October 4, 2002	1 Year
RF Attenuator	Mini-Circuits	CAT-10	Asset #1000	December 6, 2002	1 Year
LISN	Com Power	LI-200	12012	April 20, 2002	1 Year
LISN	Com Power	LI-200	12214	April 20, 2002	1 Year
LISN	Com Power	LI-200	1767	April 20, 2002	1 Year
LISN	Com Power	LI-200	1768	April 20, 2002	1 Year
Biconical Antenna	Com Power	AB-100	01557	November 9, 2002	1 Year
Log Periodic Antenna	Com Power	AL-100	16037	November 9, 2002	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



ELECTRO MAGNETIC TEST, INC.

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

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 EUT was grounded only through the safety ground in its power cord.



ELECTRO MAGNETIC TEST, INC.

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

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 0.150 MHz to 0.450 MHz, 0.450 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.

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

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 2 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 2 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 2 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 10 meter test distance from 30 MHz to 1 GHz and at a distance of 3 meters from 1 GHz to 2 GHz to obtain final test data.

Calculation Of Radiated Emission Test Data:

Amplitude - Gain + Antenna Factor + Cable Loss = Corrected Amplitude

Corrected Amplitude - Limit = Margin



ELECTRO MAGNETIC TEST, INC.

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

8.

CONCLUSIONS

The Firewall/VPN With Wireless LAN Model: APL11-031 meets all of the Class B specification limits defined by C.I.S.P.R. Publication 22 for Information Technology Equipment from 150 kHz to 1 GHz. Under paragraph G of section 15.109 of the Code of Federal Regulations Title 47, Part 15 of the FCC rules, FCC accepts the international standards set forth in C.I.S.P.R. Publication 22. The EUT also meets the **Class B** specification limits defined in FCC Title 47, Part 15, Subpart B from 1 GHz to 2 GHz.



ELECTRO MAGNETIC TEST, INC.

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

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

Radiated Emissions Test Data

Purpose of Test: QUALIFICATION ENGINEERING MANUFACTURING AUDIT
CISPR 22 Class B Test Date: 03-19-03
Company Name: SONICWALL, INC.
EUT Model Number: APL11-031
EUT Serial Number: 0109
EUT Description: FIREWALL/VPN WITH WIRELESS LAN

Test Setup Configuration

EUT Clock Speeds: 8.192 MHz, 24.578 MHz, 25 MHz, 33.3 MHz, 44 MHz, 66 MHz, 133 MHz

EUT Power Cords: SHIELDED NOT SHIELDED
EUT tested at: LOW SPEED HIGH SPEED
EUT is: IN COMPLIANCE OUT OF COMPLIANCE with CISPR 22 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: *Mario Garcia* (MARIO GARCIA)
(KEVIN BOTHMANN FOR MARIO GARCIA)

CISPR 22 Class B Test Date: 03-19-03
Company Name: SONICWALL, INC.
EUT Model Number: APL11-031
EUT Description: FIREWALL/VPN WITH WIRELESS LAN

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---
VERTICAL POLARIZATION															
33.284	35.5	P	V	B	1.0	10.0	270	22.8	12.5	1.3	0.0	26.5	30.0	-3.5	-----
33.284	33.1	Q	V	B	1.0	10.0	270	22.8	12.5	1.3	0.0	24.1	30.0	-5.9	-----
48.007	37.1	P	V	B	2.0	10.0	45	22.8	11.2	1.6	0.0	27.1	30.0	-2.9	-----
48.008	36.4	Q	V	B	2.0	10.0	45	22.8	11.2	1.6	0.0	26.4	30.0	-3.6	-----
73.710	34.2	P	V	B	2.0	10.0	315	22.7	9.9	1.7	0.0	23.1	30.0	-6.9	-----
126.210	31.3	P	V	B	3.0	10.0	225	22.7	11.2	2.1	0.0	21.9	30.0	-8.1	-----
133.125	33.6	P	V	B	2.0	10.0	0	22.7	11.6	2.1	0.0	24.6	30.0	-5.4	-----
150.336	30.8	P	V	B	3.0	10.0	270	22.6	12.7	2.2	0.0	23.1	30.0	-6.9	-----
229.396	30.3	P	V	B	1.5	10.0	135	22.5	17.4	2.8	0.0	28.0	30.0	-2.0	-----
229.396	25.0	Q	V	B	1.5	10.0	135	22.5	17.4	2.8	0.0	22.7	30.0	-7.3	-----
250.016	30.5	P	V	B	2.5	10.0	45	22.5	18.1	2.9	0.0	29.0	37.0	-8.0	-----
264.011	30.0	P	V	B	1.0	10.0	90	22.6	19.2	3.0	0.0	29.6	37.0	-7.4	-----
300.010	32.3	P	V	L	2.5	10.0	225	22.5	14.3	3.3	0.0	27.4	37.0	-9.6	-----
327.697	32.9	P	V	L	1.0	10.0	180	22.6	14.7	3.4	0.0	28.4	37.0	-8.6	-----
351.990	33.3	P	V	L	1.5	10.0	270	22.7	15.0	3.5	0.0	29.1	37.0	-7.9	-----
360.475	31.0	P	V	L	1.0	10.0	135	22.6	14.8	3.6	0.0	26.8	37.0	-10.2	-----
375.037	32.9	P	V	L	1.0	10.0	225	22.5	14.5	3.7	0.0	28.6	37.0	-8.4	-----
390.009	31.5	P	V	L	2.0	10.0	315	22.4	14.3	3.7	0.0	27.1	37.0	-9.9	-----
456.013	31.9	P	V	L	3.0	10.0	135	22.4	16.8	4.1	0.0	30.4	37.0	-6.6	-----
488.056	32.5	P	V	L	2.0	10.0	180	22.3	16.5	4.3	0.0	31.0	37.0	-6.0	-----
525.226	30.6	P	V	L	2.0	10.0	135	22.2	17.0	4.5	0.0	29.9	37.0	-7.1	-----
648.268	31.6	P	V	L	2.5	10.0	315	21.9	19.9	5.2	0.0	34.8	37.0	-2.2	-----
648.271	25.7	Q	V	L	2.5	10.0	315	21.9	19.9	5.2	0.0	28.9	37.0	-8.1	-----
750.116	25.4	P	V	L	1.0	10.0	315	21.9	20.1	5.5	0.0	29.1	37.0	-7.9	-----
900.069	22.8	P	V	L	1.0	10.0	0	21.6	23.1	6.2	0.0	30.5	37.0	-6.5	-----
HORIZONTAL POLARIZATION															
33.292	36.0	P	H	B	3.5	10.0	90	22.8	12.5	1.3	0.0	27.0	30.0	-3.0	-----
33.294	34.7	Q	H	B	3.5	10.0	90	22.8	12.5	1.3	0.0	25.7	30.0	-4.3	-----
48.016	35.9	P	H	B	3.5	10.0	180	22.8	11.2	1.6	0.0	25.9	30.0	-4.1	-----
73.757	32.8	P	H	B	3.0	10.0	315	22.7	9.9	1.7	0.0	21.7	30.0	-8.3	-----
126.185	29.2	P	H	B	4.0	10.0	180	22.7	11.2	2.1	0.0	19.8	30.0	-10.2	-----
133.152	33.6	P	H	B	3.0	10.0	135	22.7	11.6	2.1	0.0	24.6	30.0	-5.4	-----
150.333	30.3	P	H	B	3.5	10.0	270	22.6	12.7	2.2	0.0	22.6	30.0	-7.4	-----
229.395	28.1	P	H	B	3.0	10.0	135	22.5	17.4	2.8	0.0	25.8	30.0	-4.2	-----
250.053	28.5	P	H	B	3.0	10.0	315	22.5	18.1	2.9	0.0	27.0	37.0	-10.0	-----
264.020	30.4	P	H	B	3.5	10.0	45	22.6	19.2	3.0	0.0	30.0	37.0	-7.0	-----
300.023	33.5	P	H	L	3.5	10.0	135	22.5	14.3	3.3	0.0	28.6	37.0	-8.4	-----
327.681	37.8	P	H	L	3.0	10.0	45	22.6	14.7	3.4	0.0	33.3	37.0	-3.7	-----
327.682	36.2	Q	H	L	3.0	10.0	45	22.6	14.7	3.4	0.0	31.7	37.0	-5.3	-----
351.982	34.4	P	H	L	3.0	10.0	180	22.7	15.0	3.5	0.0	30.2	37.0	-6.8	-----
360.461	33.0	P	H	L	3.0	10.0	225	22.6	14.8	3.6	0.0	28.8	37.0	-8.2	-----
375.032	31.4	P	H	L	3.0	10.0	0	22.5	14.5	3.7	0.0	27.1	37.0	-9.9	-----
389.996	32.7	P	H	L	2.0	10.0	315	22.4	14.3	3.7	0.0	28.3	37.0	-8.7	-----
455.989	30.0	P	H	L	3.0	10.0	45	22.4	16.8	4.1	0.0	28.5	37.0	-8.5	-----
488.066	31.5	P	H	L	1.0	10.0	45	22.3	16.5	4.3	0.0	30.0	37.0	-7.0	-----
525.204	29.8	P	H	L	3.0	10.0	45	22.2	17.0	4.5	0.0	29.1	37.0	-7.9	-----
648.253	30.5	P	H	L	3.0	10.0	270	21.9	19.9	5.2	0.0	33.7	37.0	-3.3	-----
648.255	24.5	Q	H	L	3.0	10.0	270	21.9	19.9	5.2	0.0	27.7	37.0	-9.3	-----
750.054	25.6	P	H	L	1.0	10.0	0	21.9	20.1	5.5	0.0	29.3	37.0	-7.7	-----
900.064	21.9	P	H	L	1.0	10.0	0	21.6	23.1	6.2	0.0	29.6	37.0	-7.4	-----

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

Radiated Emissions Test Data

Purpose of Test: QUALIFICATION ENGINEERING MANUFACTURING AUDIT
FCC Class B Test Date: 03-19-03
Company Name: SONICWALL, INC.
EUT Model Number: APL11-031
EUT Serial Number: 0109
EUT Description: FIREWALL/VPN WITH WIRELESS LAN

Test Setup Configuration

EUT Clock Speeds: 8.192 MHz, 24.578 MHz, 25 MHz, 33.3 MHz, 44 MHz, 66 MHz, 133 MHz

EUT Power Cords: SHIELDED NOT SHIELDED
EUT tested at: LOW SPEED HIGH SPEED
EUT is: 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: Kevin Bothmann (MARIO GARCIA)
(KEVIN BOTHMANN FOR MARIO GARCIA)

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

FCC Class B Test Date: 03-19-03
 Company Name: SONICWALL, INC.
 EUT Model Number: APL11-031
 EUT Description: FIREWALL/VPN WITH WIRELESS LAN

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---
VERTICAL POLARIZATION															
1015.841	40.0	P	V	H	1.0	3.0	0	34.1	25.2	5.1	0.0	36.2	54.0	-17.8	-----
1048.597	38.5	P	V	H	1.5	3.0	315	34.1	25.5	5.2	0.0	35.1	54.0	-18.9	-----
1081.377	41.4	P	V	H	1.0	3.0	315	34.0	25.8	5.3	0.0	38.5	54.0	-15.5	-----
1114.151	38.1	P	V	H	1.0	3.0	0	34.0	26.1	5.4	0.0	35.6	54.0	-18.4	-----
1122.016	40.0	P	V	H	1.0	3.0	180	34.0	26.2	5.4	0.0	37.6	54.0	-16.4	-----
1212.459	38.1	P	V	H	1.0	3.0	0	33.9	27.1	5.6	0.0	36.9	54.0	-17.1	-----
1441.804	37.9	P	V	H	1.0	3.0	225	33.4	28.6	6.0	0.0	39.1	54.0	-14.9	-----
1995.241	35.3	P	V	H	1.0	3.0	0	33.5	31.6	6.4	0.0	39.8	54.0	-14.2	-----
HORIZONTAL POLARIZATION															
1015.828	40.4	P	H	H	1.0	3.0	270	34.1	25.2	5.1	0.0	36.6	54.0	-17.4	-----
1048.610	37.7	P	H	H	1.5	3.0	135	34.1	25.5	5.2	0.0	34.3	54.0	-19.7	-----
1081.377	39.5	P	H	H	1.0	3.0	315	34.0	25.8	5.3	0.0	36.6	54.0	-17.4	-----
1114.111	38.5	P	H	H	1.0	3.0	90	34.0	26.1	5.4	0.0	36.0	54.0	-18.0	-----
1122.009	40.2	P	H	H	1.0	3.0	180	34.0	26.2	5.4	0.0	37.8	54.0	-16.2	-----
1212.469	37.6	P	H	H	1.0	3.0	45	33.9	27.1	5.6	0.0	36.4	54.0	-17.6	-----
1441.828	36.9	P	H	H	1.0	3.0	270	33.4	28.6	6.0	0.0	38.1	54.0	-15.9	-----
1995.147	34.4	P	H	H	1.0	3.0	0	33.5	31.5	6.4	0.0	38.8	54.0	-15.2	-----



ELECTRO MAGNETIC TEST, INC.

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



FRONT VIEW

SONICWALL, INC.

FIREWALL/VPN WITH WIRELESS LAN

MODEL: APL11-031

CISPR 22/FCC CLASS B - RADIATED EMISSIONS - 3-19-03

**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

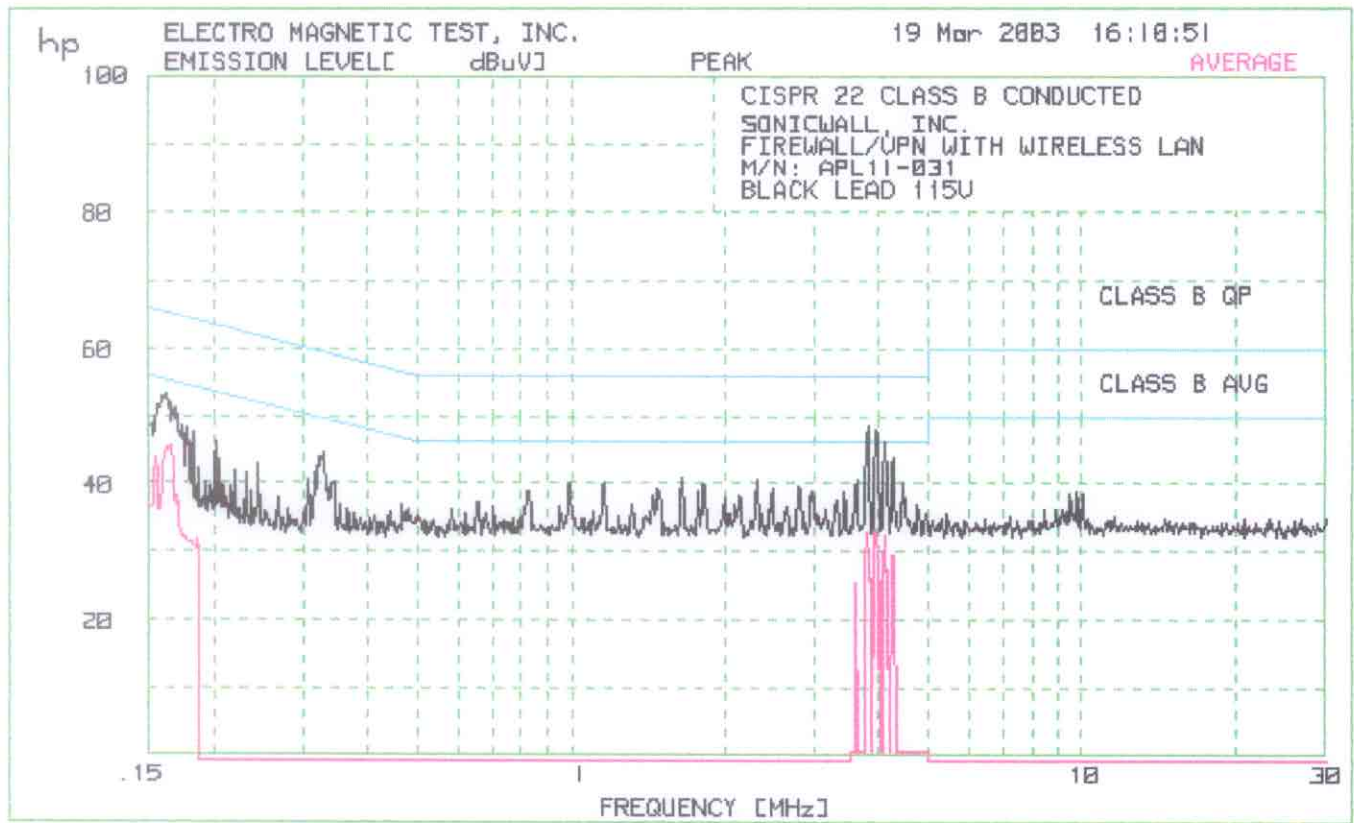
SONICWALL, INC.

FIREWALL/VPN WITH WIRELESS LAN

MODEL: APL11-031

CISPR 22/FCC CLASS B - RADIATED EMISSIONS - 3-19-03

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



=====

ELECTRO MAGNETIC TEST, INC. 19 Mar 2003 16:10:51

=====

1. CONDUCTED WITH PRESELECTOR
 1.2 CISPR 22 CLASS B CONDUCTED

=====

45 highest Peaks above -50 dB of Limit Line #2
 peak criteria = .1 dB

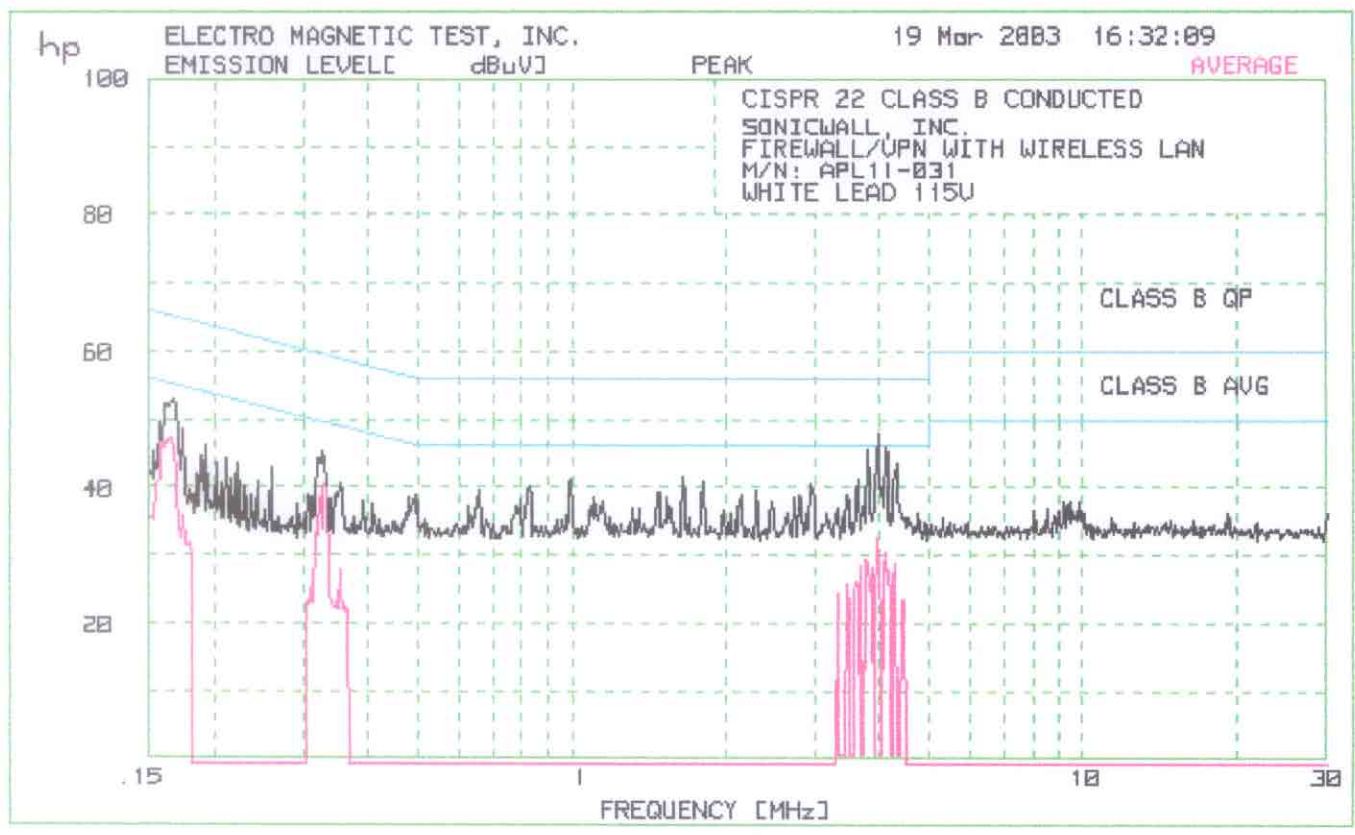
PEAK#	FREQ (MHz)	(dBuV)	DELTA
1	3.807	48.4	2.4
2	3.93	47.7	1.7
3	3.972	47.6	1.6
4	3.767	47.5	1.5
5	4.1	46.3	.3
6	.1615	53.2	-2.1
7	4.277	43.8	-2.2
8	.159	52.9	-2.6
9	.165	51.8	-3.4
10	.1694	51.3	-3.6
11	.1557	51.5	-4.1
12	.1668	51	-4.1
13	.3283	44.4	-5.0
14	1.641	40.9	-5.1
15	.3232	43.9	-5.7
16	2.303	40.3	-5.7
17	3.63	40.3	-5.7
18	4.462	40.2	-5.8
19	.9925	40.1	-5.9
20	1.157	40.1	-5.9
21	.1749	48.6	-6.1
22	1.824	39.9	-6.1
23	.1777	48	-6.5
24	2.771	39.3	-6.7
25	.1825	47.5	-6.8
26	2.48	39.1	-6.9
27	.1516	48.9	-7.0
28	1.476	39	-7.0
29	.2028	46.3	-7.1
30	.3197	42.6	-7.1
31	.8247	38.9	-7.1
32	1.777	38.9	-7.1
33	2.969	38.9	-7.1
34	3.425	38.8	-7.2
35	.173	47.5	-7.3
36	1.492	38.6	-7.4
37	1.445	38.1	-7.9
38	2.138	38.1	-7.9
39	2.938	38.1	-7.9
40	1.996	37.8	-8.2
41	.3147	41.3	-8.5
42	.1805	45.8	-8.6
43	3.3	37.3	-8.7
44	.6603	37.2	-8.8
45	4.416	37.2	-8.8

```
=====
ELECTRO MAGNETIC TEST, INC.      19 Mar 2003  16:10:51
=====
```

- ```
1. CONDUCTED WITH PRESELECTOR
 1.2 CISPR 22 CLASS B CONDUCTED
=====
```

```
Avg Peaks above -50 dB of Limit Line #2
peak criteria = .1 dB
```

| PEAK# | FREQ (MHz) | (dBuV) | DELTA |
|-------|------------|--------|-------|
| 1     | .1659      | 45.4   | -9.7  |
| 2     | .1532      | 43.8   | -12.0 |
| 3     | 3.909      | 33.2   | -12.8 |
| 4     | 3.767      | 32.6   | -13.4 |
| 5     | 4.1        | 32.4   | -13.6 |
| 6     | 4.255      | 29.4   | -16.6 |
| 7     | .1694      | 38.1   | -16.8 |
| 8     | 4.144      | 27.3   | -18.7 |
| 9     | 3.848      | 26     | -20.0 |
| 10    | 4.036      | 25.7   | -20.3 |
| 11    | 3.611      | 25.3   | -20.7 |
| 12    | .1854      | 31.8   | -22.4 |



=====

ELECTRO MAGNETIC TEST, INC.      19 Mar 2003   16:32:09

=====

1. CONDUCTED WITH PRESELECTOR  
 1.2 CISPR 22 CLASS B CONDUCTED

=====

45 highest Peaks above -50 dB of Limit Line #2  
 peak criteria = .1 dB

| PEAK# | FREQ (MHz) | (dBuV) | DELTA |
|-------|------------|--------|-------|
| 1     | 3.972      | 47.9   | 1.9   |
| 2     | 4.122      | 45.7   | -.3   |
| 3     | 3.787      | 45.6   | -.4   |
| 4     | 3.93       | 45.5   | -.5   |
| 5     | .1676      | 52.8   | -2.2  |
| 6     | .165       | 52.7   | -2.5  |
| 7     | 4.323      | 43.4   | -2.6  |
| 8     | .1607      | 52.2   | -3.2  |
| 9     | .1624      | 52.1   | -3.2  |
| 10    | .3266      | 45.2   | -4.3  |
| 11    | 1.65       | 41.3   | -4.7  |
| 12    | .9925      | 41.2   | -4.8  |
| 13    | 3.63       | 41.1   | -4.9  |
| 14    | .3301      | 44.3   | -5.1  |
| 15    | 1.805      | 40.8   | -5.2  |
| 16    | .3214      | 44.2   | -5.4  |
| 17    | .3181      | 44.3   | -5.4  |
| 18    | 2.938      | 40.3   | -5.7  |
| 19    | .8247      | 40.2   | -5.8  |
| 20    | 4.036      | 40.2   | -5.8  |
| 21    | .1565      | 49.5   | -6.1  |
| 22    | .174       | 48.6   | -6.1  |
| 23    | .6603      | 39.4   | -6.6  |
| 24    | 2.291      | 39.4   | -6.6  |
| 25    | 1.468      | 39.2   | -6.8  |
| 26    | 1.484      | 39.2   | -6.8  |
| 27    | 2.771      | 38.9   | -7.1  |
| 28    | 2.15       | 38.8   | -7.2  |
| 29    | 3.461      | 38.8   | -7.2  |
| 30    | .4935      | 38.8   | -7.3  |
| 31    | 1.109      | 38.5   | -7.5  |
| 32    | 2.728      | 38.4   | -7.6  |
| 33    | .1924      | 46.2   | -7.7  |
| 34    | 1.54       | 38.3   | -7.7  |
| 35    | .7947      | 38.2   | -7.8  |
| 36    | .4832      | 38.4   | -7.8  |
| 37    | 2.454      | 37.9   | -8.1  |
| 38    | .3536      | 40.6   | -8.2  |
| 39    | 1.145      | 37.7   | -8.3  |
| 40    | .4988      | 37.6   | -8.4  |
| 41    | .2587      | 42.9   | -8.5  |
| 42    | .6296      | 37.2   | -8.8  |
| 43    | 1.092      | 37.1   | -8.9  |
| 44    | .7822      | 37     | -9.0  |
| 45    | 3.708      | 37     | -9.0  |

=====

ELECTRO MAGNETIC TEST, INC.      19 Mar 2003   16:32:09

=====

1. CONDUCTED WITH PRESELECTOR  
1.2 CISPR 22 CLASS B CONDUCTED
- =====

Avg Peaks above -50 dB of Limit Line #2  
peak criteria = .1 dB

| PEAK# | FREQ (MHz) | (dBuV) | DELTA |
|-------|------------|--------|-------|
| 1     | .1641      | 47.2   | -8.0  |
| 2     | .1573      | 46.5   | -9.1  |
| 3     | .3283      | 40.3   | -9.1  |
| 4     | .3232      | 38.4   | -11.2 |
| 5     | 3.951      | 32.3   | -13.7 |
| 6     | 4.1        | 30.3   | -15.7 |
| 7     | 3.747      | 29.4   | -16.6 |
| 8     | .3147      | 33.1   | -16.7 |
| 9     | 3.787      | 29.1   | -16.9 |
| 10    | 4.277      | 28.8   | -17.2 |
| 11    | 3.688      | 28.2   | -17.8 |
| 12    | 3.848      | 27.9   | -18.1 |
| 13    | .174       | 35.8   | -18.9 |
| 14    | 3.611      | 26.1   | -19.9 |
| 15    | 3.443      | 25.6   | -20.4 |
| 16    | .3517      | 27.7   | -21.2 |
| 17    | 3.3        | 24.3   | -21.7 |
| 18    | .1786      | 31.8   | -22.7 |
| 19    | 4.462      | 23.3   | -22.7 |
| 20    | 4.392      | 23.2   | -22.8 |
| 21    | .3098      | 25     | -24.9 |
| 22    | .348       | 23.1   | -25.9 |
| 23    | .3592      | 22.4   | -26.3 |
| 24    | .3065      | 23.2   | -26.8 |
| 25    | .3033      | 22.8   | -27.3 |



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

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

---



**FRONT VIEW**

SONICWALL, INC.

FIREWALL/VPN WITH WIRELESS LAN

MODEL: APL11-031

CISPR 22 CLASS B - CONDUCTED EMISSIONS - 3-19-03

**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**

SONICWALL, INC.

FIREWALL/VPN WITH WIRELESS LAN

MODEL: APL11-031

CISPR 22 CLASS B - CONDUCTED EMISSIONS - 3-19-03

**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

---

## **APPENDIX B**

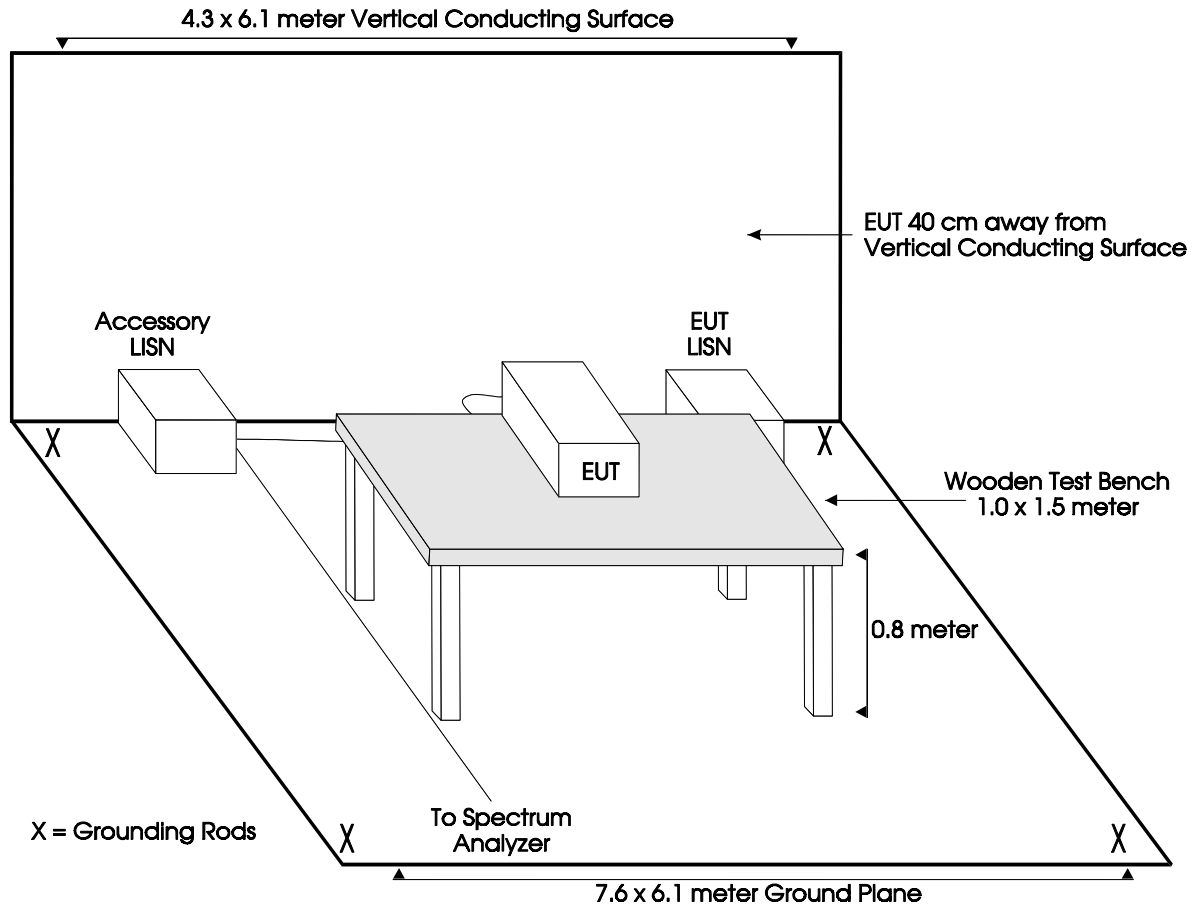
### ***TEST SETUP DIAGRAMS***





**ELECTRO MAGNETIC TEST, INC.**

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



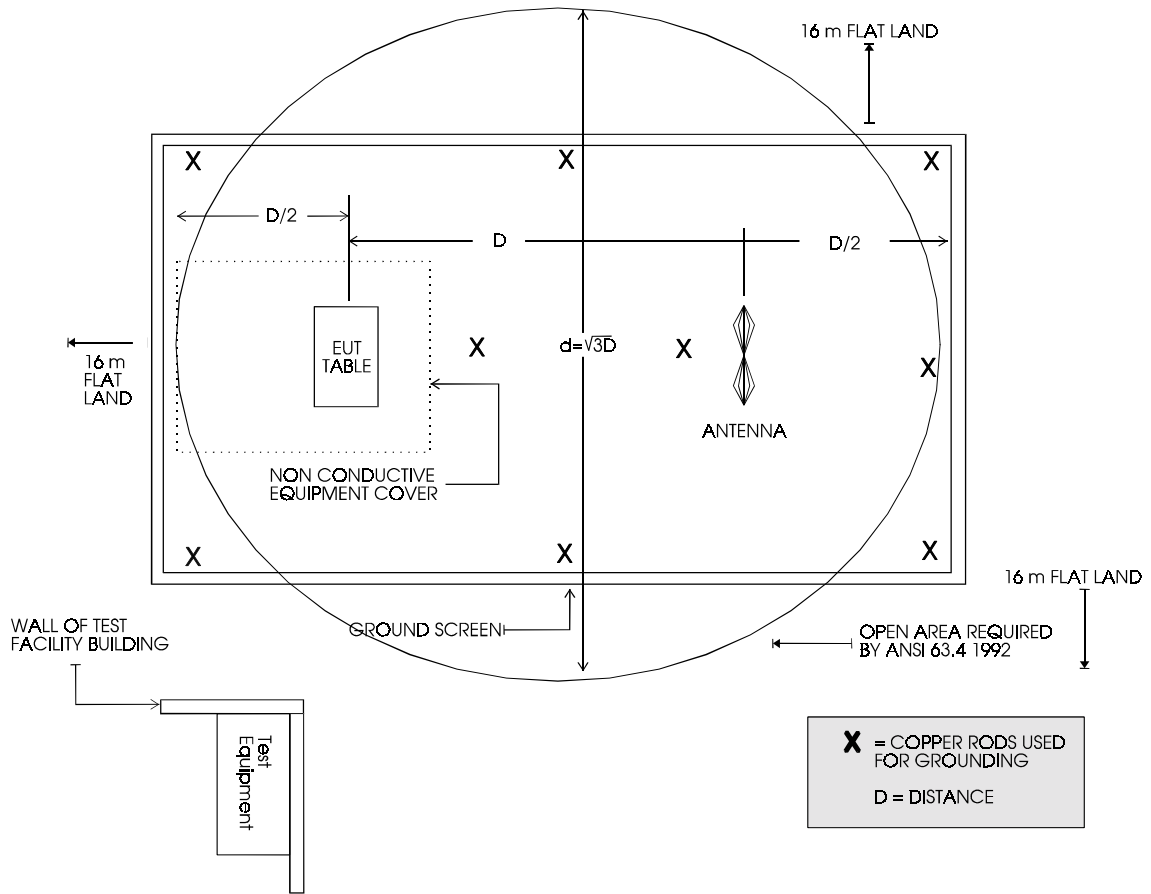
**FIGURE 1**

CONDUCTED EMISSIONS TEST SETUP – SITE “A”



**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"