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 TEST REPORT

for

the

FIREWALL/VPN WITH WIRELESS LAN

MODEL: APL11-027

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
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DATE: APRIL 14, 2003

	REPORT BODY	APPENDICES		TOTAL
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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 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 ±2dB 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.

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GENERAL REPORT SUMMARY (CONTINUED)

Device Tested:	Firewall/VPN With Wireless LAN Model: APL11-027 S/N: 0109
Product Description:	The EUT is a Firewall/VPN appliance with 10/100 Ethernet LAN (secured), Actiontec 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 3 and 4, 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

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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: APL11-027. 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.

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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, 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 3, 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

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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).
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

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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 Actiontec 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.

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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.

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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.	APL11-027	0109	QWU-027
AC POWER ADAPTER (EUT)	SINO-AMERICAN	SA120A-0530V-C	N/A	N/A
WIRELESS LAN MINI-PCI ADAPTER (EUT)	ACTIONTEC	802MIP	3H9244022701537	LNQ-802MIP
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

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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	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

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

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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 0.150 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.

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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 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

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8. CONCLUSIONS

The Firewall/VPN With Wireless LAN Model: APL11-027 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.

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APPENDIX A

RADIATED AND CONDUCTED EMISSIONS DATA SHEETS

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Radiated Emissions Test Data

Purpose of Test: [X] QUALIFICATION [] ENGINEERING [] MANUFACTURING AUDIT
CISPR 22 Class B Test Date: 03-03-03
Company Name: SONICWALL, INC.
EUT Model Number: APL11-027
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 [X] NOT SHIELDED
EUT tested at: [] LOW SPEED [] HIGH SPEED
EUT is: [X] IN COMPLIANCE [] OUT OF COMPLIANCE with CISPR 22 Class B.

EUT Modifications during this test:
[] MODIFIED [X] 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)
(KEVIN BOTHMANN FOR MARIO GARCIA)

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CISPR 22 Class B Test Date: 03-03-03
Company Name: SONICWALL, INC.
EUT Model Number: APL11-027
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															
33.304	37.2	P	V	B	1.5	10.0	0	22.8	12.5	1.3	0.0	28.2	30.0	-1.8	-----
33.304	35.2	Q	V	B	1.5	10.0	0	22.8	12.5	1.3	0.0	26.2	30.0	-3.8	-----
48.020	36.1	P	V	B	2.0	10.0	180	22.8	11.2	1.6	0.0	26.1	30.0	-3.9	-----
48.020	33.6	Q	V	B	2.0	10.0	180	22.8	11.2	1.6	0.0	23.6	30.0	-6.4	-----
126.202	32.9	P	V	B	3.0	10.0	225	22.7	11.2	2.1	0.0	23.5	30.0	-6.5	-----
133.137	35.6	P	V	B	3.5	10.0	225	22.7	11.6	2.1	0.0	26.6	30.0	-3.4	-----
133.139	33.6	Q	V	B	3.5	10.0	225	22.7	11.6	2.1	0.0	24.6	30.0	-5.4	-----
150.022	31.4	P	V	B	2.0	10.0	45	22.6	12.7	2.2	0.0	23.7	30.0	-6.3	-----
229.394	30.7	P	V	B	1.0	10.0	135	22.5	17.4	2.8	0.0	28.4	30.0	-1.6	-----
229.394	27.5	Q	V	B	1.0	10.0	135	22.5	17.4	2.8	0.0	25.2	30.0	-4.8	-----
250.030	31.2	P	V	B	2.0	10.0	45	22.5	18.1	2.9	0.0	29.7	37.0	-7.3	-----
300.004	30.9	P	V	L	2.5	10.0	135	22.5	14.3	3.3	0.0	26.0	37.0	-11.0	-----
327.692	34.5	P	V	L	1.5	10.0	315	22.6	14.7	3.4	0.0	30.0	37.0	-7.0	-----
352.004	30.2	P	V	L	1.5	10.0	270	22.7	15.0	3.5	0.0	26.0	37.0	-11.0	-----
360.456	28.7	P	V	L	1.5	10.0	45	22.6	14.8	3.6	0.0	24.5	37.0	-12.5	-----
390.016	31.3	P	V	L	2.0	10.0	315	22.4	14.3	3.7	0.0	26.9	37.0	-10.1	-----
396.017	30.6	P	V	L	1.0	10.0	315	22.3	14.2	3.8	0.0	26.3	37.0	-10.7	-----
453.769	29.4	P	V	L	2.0	10.0	135	22.4	16.8	4.1	0.0	27.9	37.0	-9.1	-----
455.967	31.4	P	V	L	3.0	10.0	90	22.4	16.8	4.1	0.0	29.9	37.0	-7.1	-----
488.071	32.4	P	V	L	2.0	10.0	180	22.3	16.5	4.3	0.0	30.9	37.0	-6.1	-----
648.260	29.0	P	V	L	2.5	10.0	315	21.9	19.9	5.2	0.0	32.2	37.0	-4.8	-----
688.152	28.0	P	V	L	2.5	10.0	270	21.9	20.4	5.2	0.0	31.7	37.0	-5.3	-----
750.163	24.2	P	V	L	1.0	10.0	0	21.9	20.1	5.5	0.0	27.9	37.0	-9.1	-----
900.011	21.5	P	V	L	1.0	10.0	0	21.6	23.1	6.2	0.0	29.2	37.0	-7.8	-----
HORIZONTAL POLARIZATION															
33.297	36.9	P	H	B	3.0	10.0	315	22.8	12.5	1.3	0.0	27.9	30.0	-2.1	-----
33.297	35.3	Q	H	B	3.0	10.0	315	22.8	12.5	1.3	0.0	26.3	30.0	-3.7	-----
48.018	34.9	P	H	B	3.0	10.0	180	22.8	11.2	1.6	0.0	24.9	30.0	-5.1	-----
126.197	29.8	P	H	B	4.0	10.0	180	22.7	11.2	2.1	0.0	20.4	30.0	-9.6	-----
133.163	32.7	P	H	B	3.5	10.0	225	22.7	11.6	2.1	0.0	23.7	30.0	-6.3	-----
150.008	29.2	P	H	B	3.0	10.0	270	22.6	12.7	2.2	0.0	21.5	30.0	-8.5	-----
229.399	28.4	P	H	B	3.0	10.0	225	22.5	17.4	2.8	0.0	26.1	30.0	-3.9	-----
229.399	27.5	Q	H	B	3.0	10.0	225	22.5	17.4	2.8	0.0	25.2	30.0	-4.8	-----
250.094	29.9	P	H	B	2.5	10.0	225	22.5	18.1	2.9	0.0	28.4	37.0	-8.6	-----
300.012	33.6	P	H	L	3.5	10.0	135	22.5	14.3	3.3	0.0	28.7	37.0	-8.3	-----
327.692	35.8	P	H	L	3.5	10.0	90	22.6	14.7	3.4	0.0	31.3	37.0	-5.7	-----
352.015	31.8	P	H	L	3.5	10.0	180	22.7	15.0	3.5	0.0	27.6	37.0	-9.4	-----
360.454	30.3	P	H	L	3.0	10.0	180	22.6	14.8	3.6	0.0	26.1	37.0	-10.9	-----
390.004	32.4	P	H	L	1.5	10.0	225	22.4	14.3	3.7	0.0	28.0	37.0	-9.0	-----
396.009	30.5	P	H	L	2.0	10.0	270	22.3	14.2	3.8	0.0	26.2	37.0	-10.8	-----
453.768	28.1	P	H	L	3.0	10.0	180	22.4	16.8	4.1	0.0	26.6	37.0	-10.4	-----
455.979	28.3	P	H	L	2.5	10.0	315	22.4	16.8	4.1	0.0	26.8	37.0	-10.2	-----
488.065	28.8	P	H	L	3.0	10.0	0	22.3	16.5	4.3	0.0	27.3	37.0	-9.7	-----
648.251	29.7	P	H	L	3.0	10.0	315	21.9	19.9	5.2	0.0	32.9	37.0	-4.1	-----
688.120	28.0	P	H	L	4.0	10.0	0	21.9	20.4	5.2	0.0	31.7	37.0	-5.3	-----
750.182	25.0	P	H	L	1.0	10.0	0	21.9	20.1	5.5	0.0	28.7	37.0	-8.3	-----
900.077	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: [X] QUALIFICATION [] ENGINEERING [] MANUFACTURING AUDIT
FCC Class B Test Date: 03-03-03
Company Name: SONICWALL, INC.
EUT Model Number: APL11-027
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 [X] 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 [X] 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: K. 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: 03-03-03
Company Name: SONICWALL, INC.
EUT Model Number: APL11-027
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															
1015.836	40.0	P	V	H	1.0	3.0	225	34.1	25.2	5.1	0.0	36.2	54.0	-17.8	-----
1056.040	39.3	P	V	H	1.0	3.0	270	34.1	25.6	5.2	0.0	36.0	54.0	-18.0	-----
1081.368	39.1	P	V	H	1.0	3.0	90	34.0	25.8	5.3	0.0	36.2	54.0	-17.8	-----
1188.024	39.8	P	V	H	1.0	3.0	225	33.9	26.9	5.6	0.0	38.4	54.0	-15.6	-----
1320.050	38.7	P	V	H	1.5	3.0	0	33.7	27.9	5.8	0.0	38.7	54.0	-15.3	-----
1343.532	38.8	P	V	H	1.5	3.0	0	33.7	28.0	5.8	0.0	38.9	54.0	-15.1	-----
1408.027	39.2	P	V	H	1.0	3.0	225	33.5	28.4	6.0	0.0	40.1	54.0	-13.9	-----
1875.277	37.2	P	V	H	1.0	3.0	180	33.5	30.3	6.4	0.0	40.4	54.0	-13.6	-----
HORIZONTAL POLARIZATION															
1015.840	39.7	P	H	H	1.0	3.0	315	34.1	25.2	5.1	0.0	35.9	54.0	-18.1	-----
1056.036	37.5	P	H	H	2.0	3.0	315	34.1	25.6	5.2	0.0	34.2	54.0	-19.8	-----
1081.397	38.9	P	H	H	1.0	3.0	0	34.0	25.8	5.3	0.0	36.0	54.0	-18.0	-----
1188.038	39.5	P	H	H	1.5	3.0	225	33.9	26.9	5.6	0.0	38.1	54.0	-15.9	-----
1320.012	37.5	P	H	H	1.5	3.0	180	33.7	27.9	5.8	0.0	37.5	54.0	-16.5	-----
1343.541	37.7	P	H	H	1.0	3.0	135	33.7	28.0	5.8	0.0	37.8	54.0	-16.2	-----
1408.033	36.9	P	H	H	1.5	3.0	135	33.5	28.4	6.0	0.0	37.8	54.0	-16.2	-----
1875.300	37.7	P	H	H	1.0	3.0	225	33.5	30.3	6.4	0.0	40.9	54.0	-13.1	-----

EMT *ELECTRO MAGNETIC TEST, INC.*
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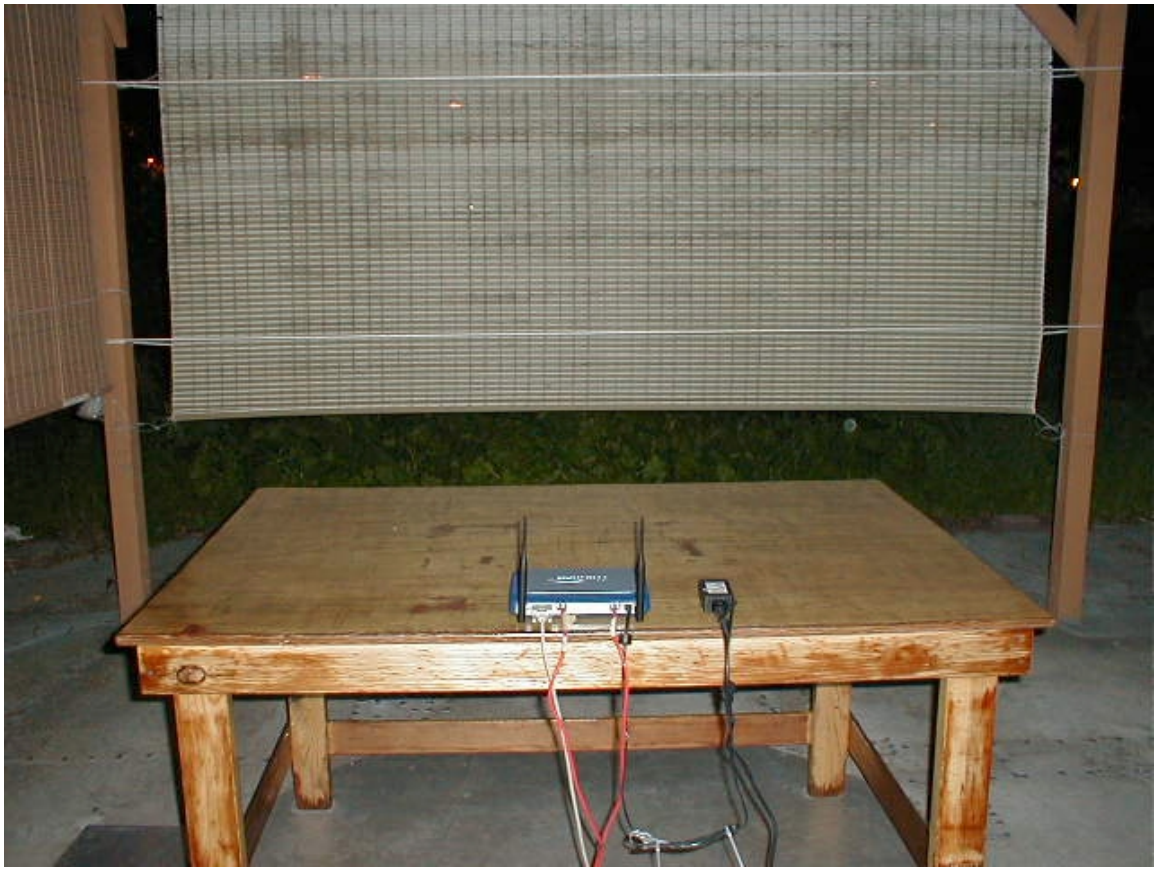
FRONT VIEW

SONICWALL, INC.
FIREWALL/VPN WITH WIRELESS LAN
MODEL: APL11-027
CISPR 22/FCC CLASS B - RADIATED EMISSIONS - 3-03-03

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

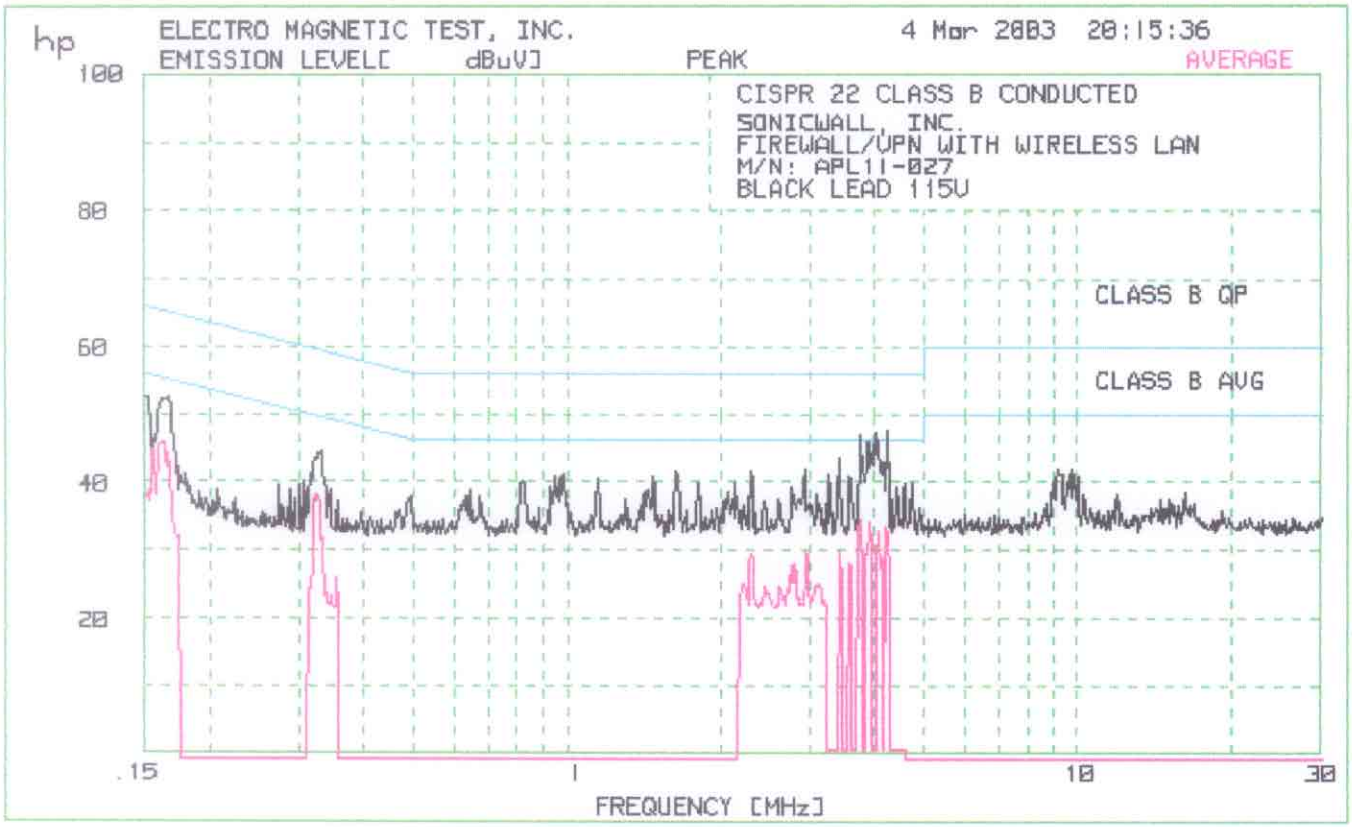
EMT *ELECTRO MAGNETIC TEST, INC.*
1547 Plymouth Street, Mountain View, CA 94043 Tel: (650) 965-4000 Fax: (650) 965-3000



REAR VIEW

SONICWALL, INC.
FIREWALL/VPN WITH WIRELESS LAN
MODEL: APL11-027
CISPR 22/FCC CLASS B - RADIATED EMISSIONS - 3-03-03

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS


hp
ELECTRO MAGNETIC TEST, INC.
4 Mar 2003 20:15:36
EMISSION LEVEL[dBuV]
PEAK
AVERAGE
CISPR 22 CLASS B CONDUCTED
SONICWALL, INC.
FIREWALL/VPN WITH WIRELESS LAN
M/N: APL11-027
BLACK LEAD 115V
CLASS B QP
CLASS B AVG
100
80
60
40
20
.15
1
10
30
FREQUENCY [MHz]

ELECTRO MAGNETIC TEST, INC. 4 Mar 2003 20:15:36

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

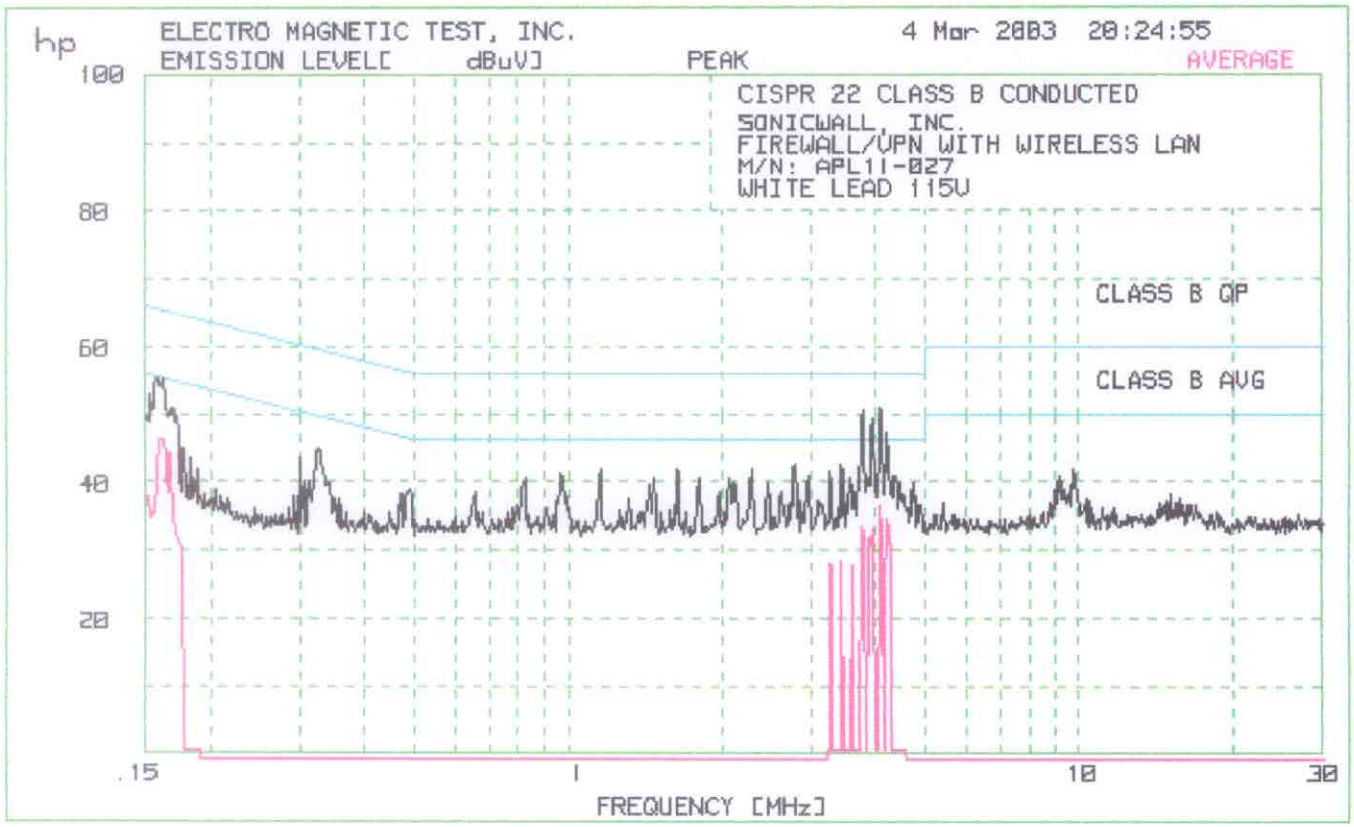
PEAK#	FREQ (MHz)	(dBuV)	DELTA
1	4.255	47.6	1.6
2	4.014	47	1.0
3	3.747	46.9	.9
4	4.057	46.1	.1
5	3.868	45.8	-.2
6	3.951	44.3	-1.7
7	.1676	52.4	-2.6
8	3.407	43.3	-2.7
9	.1615	52.3	-3.0
10	.165	52.2	-3.0
11	3.787	42.9	-3.1
12	4.166	42.9	-3.1
13	2.922	41.8	-4.2
14	1.632	41.4	-4.6
15	2.291	41.4	-4.6
16	.3318	44.6	-4.8
17	3.248	41.2	-4.8
18	.9821	41	-5.0
19	1.65	41	-5.0
20	1.476	40.8	-5.2
21	.9514	40.7	-5.3
22	3.573	40.7	-5.3
23	.9615	40.3	-5.7
24	1.145	40.3	-5.7
25	.816	40.1	-5.9
26	1.815	39.9	-6.1
27	4.582	39.9	-6.1
28	2.138	39.7	-6.3
29	4.73	39.6	-6.4
30	.9314	39.2	-6.8
31	2.757	39.1	-6.9
32	4.416	39	-7.0
33	.6465	38.6	-7.4
34	1.445	38.6	-7.4
35	1.422	38.3	-7.7
36	2.06	38.3	-7.7
37	3.097	38.1	-7.9
38	1.408	38	-8.0
39	9.768	41.9	-8.1
40	.678	37.8	-8.2
41	.6329	37.7	-8.3
42	9.167	41.7	-8.3
43	.4935	37.8	-8.3
44	2.161	37.6	-8.4
45	2.601	37.5	-8.5

ELECTRO MAGNETIC TEST, INC. 4 Mar 2003 20:15:36

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	.1624	45.9	-9.4
2	.154	44.9	-10.8
3	.1659	44.2	-10.9
4	.3214	38	-11.6
5	.3249	37.9	-11.6
6	3.747	34.4	-11.6
7	3.909	34	-12.0
8	3.708	33.7	-12.3
9	4.21	33.4	-12.6
10	4.057	32.7	-13.3
11	2.938	29.7	-16.3
12	3.425	29.6	-16.4
13	3.827	29.5	-16.5
14	2.291	29.4	-16.6
15	4.122	29	-17.0
16	.1524	38.6	-17.2
17	.3318	31.7	-17.7
18	3.573	28	-18.0
19	2.786	27.9	-18.1
20	2.757	27.8	-18.2
21	2.728	26.4	-19.6
22	2.207	25.1	-20.9
23	3.114	25.1	-20.9
24	2.441	24.8	-21.2
25	2.601	24.8	-21.2
26	2.685	24.2	-21.8
27	2.493	23.8	-22.2
28	.174	32.1	-22.6
29	.3536	25.9	-22.9
30	3.18	22.5	-23.5
31	2.377	22.4	-23.6
32	2.891	22.1	-23.9
33	2.56	21.9	-24.1
34	.3114	24.2	-25.7
35	.3462	23.3	-25.7
36	.3389	23.5	-25.7


hp
ELECTRO MAGNETIC TEST, INC.
4 Mar 2003 20:24:55
EMISSION LEVEL[dBuV]
PEAK
AVERAGE
CISPR 22 CLASS B CONDUCTED
SONICWALL, INC.
FIREWALL/VPN WITH WIRELESS LAN
M/N: APL11-027
WHITE LEAD 115V
CLASS B QP
CLASS B AVG
100
80
60
40
20
.15
1
10
30
FREQUENCY [MHz]

ELECTRO MAGNETIC TEST, INC. 4 Mar 2003 20:24:55

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	4.078	50.8	4.8
2	3.767	50.6	4.6
3	3.93	49.1	3.1
4	4.21	47.1	1.1
5	.1615	55.1	-.2
6	.1582	55.3	-.2
7	.1598	54.3	-1.1
8	.1524	52.9	-2.9
9	2.771	42.4	-3.6
10	3.425	42.3	-3.7
11	.1685	50.9	-4.1
12	1.632	41.9	-4.1
13	2.278	41.9	-4.1
14	1.157	41.7	-4.3
15	.1712	50.5	-4.4
16	3.248	41.5	-4.5
17	.3249	44.9	-4.6
18	.9666	41.1	-4.9
19	.3214	44.5	-5.1
20	2.953	40.9	-5.1
21	4.346	40.7	-5.3
22	.173	49.4	-5.4
23	.8247	40.6	-5.4
24	2.06	40.6	-5.4
25	3.848	40.6	-5.4
26	1.468	40.5	-5.5
27	1.805	40.4	-5.6
28	3.573	40.4	-5.6
29	.816	40.1	-5.9
30	2.116	39.9	-6.1
31	2.467	39.9	-6.1
32	4.755	39.9	-6.1
33	4.462	39.8	-6.2
34	3.611	39.5	-6.5
35	1.445	39.3	-6.7
36	.2985	43.3	-6.9
37	4.68	38.7	-7.3
38	.4909	38.7	-7.4
39	.3336	41.8	-7.5
40	1.975	38.5	-7.5
41	2.615	38.5	-7.5
42	.6603	38.4	-7.6
43	.9873	38.3	-7.7
44	.4756	38.2	-8.2
45	4.534	37.8	-8.2

ELECTRO MAGNETIC TEST, INC. 4 Mar 2003 20:24:55

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	.1607	46.2	-9.2
2	4.078	36.5	-9.5
3	.1659	44.2	-10.9
4	4.21	34.3	-11.7
5	3.728	33.4	-12.6
6	3.93	33	-13.0
7	3.868	31.6	-14.4
8	3.425	28.4	-17.6
9	3.248	28.1	-17.9
10	3.592	27.5	-18.5
11	.1524	35.6	-20.2

EMT *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: APL11-027
CISPR 22 CLASS B - CONDUCTED EMISSIONS - 3-04-03

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

SONICWALL, INC.
FIREWALL/VPN WITH WIRELESS LAN
MODEL: APL11-027
CISPR 22 CLASS B - CONDUCTED EMISSIONS - 3-04-03

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

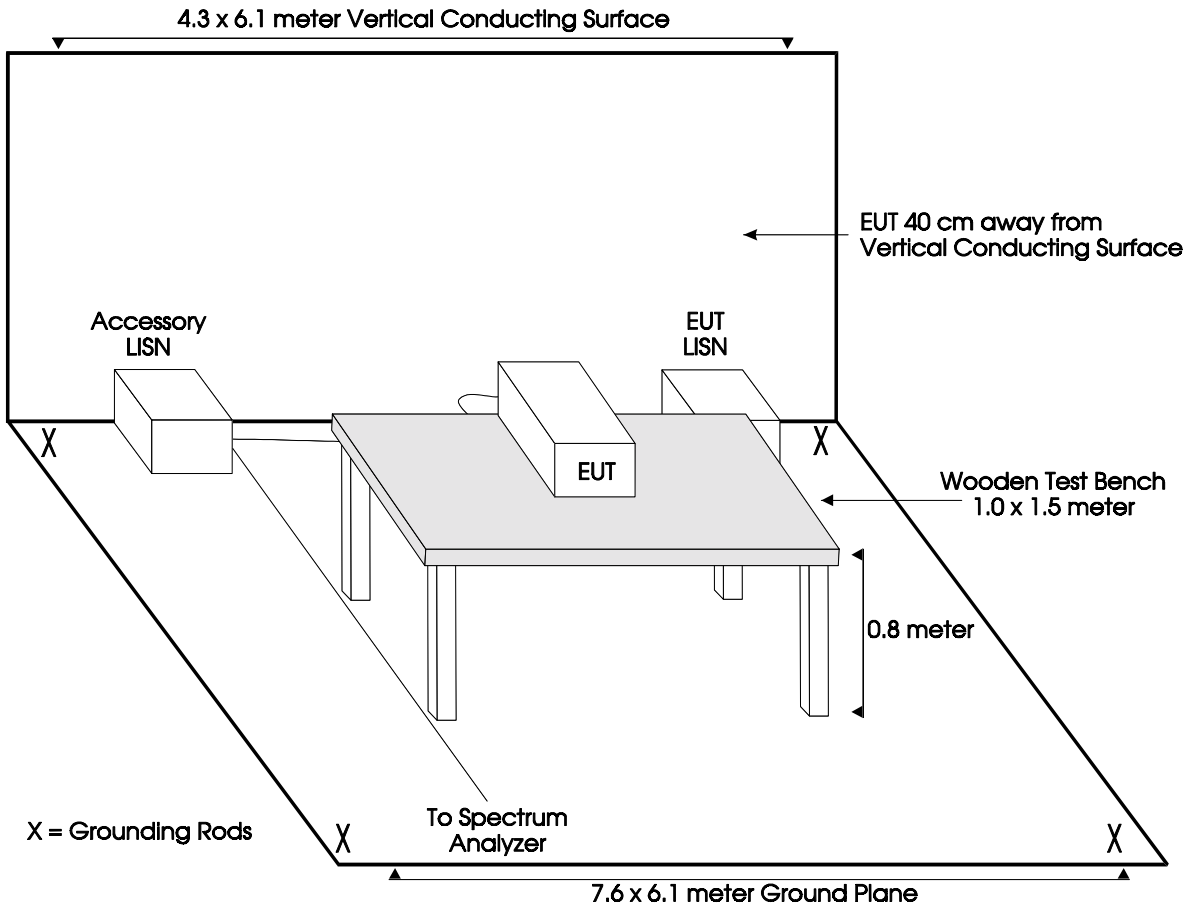


FIGURE 1

CONDUCTED EMISSIONS TEST SETUP – SITE "A"

EMT **ELECTRO MAGNETIC TEST, INC.**
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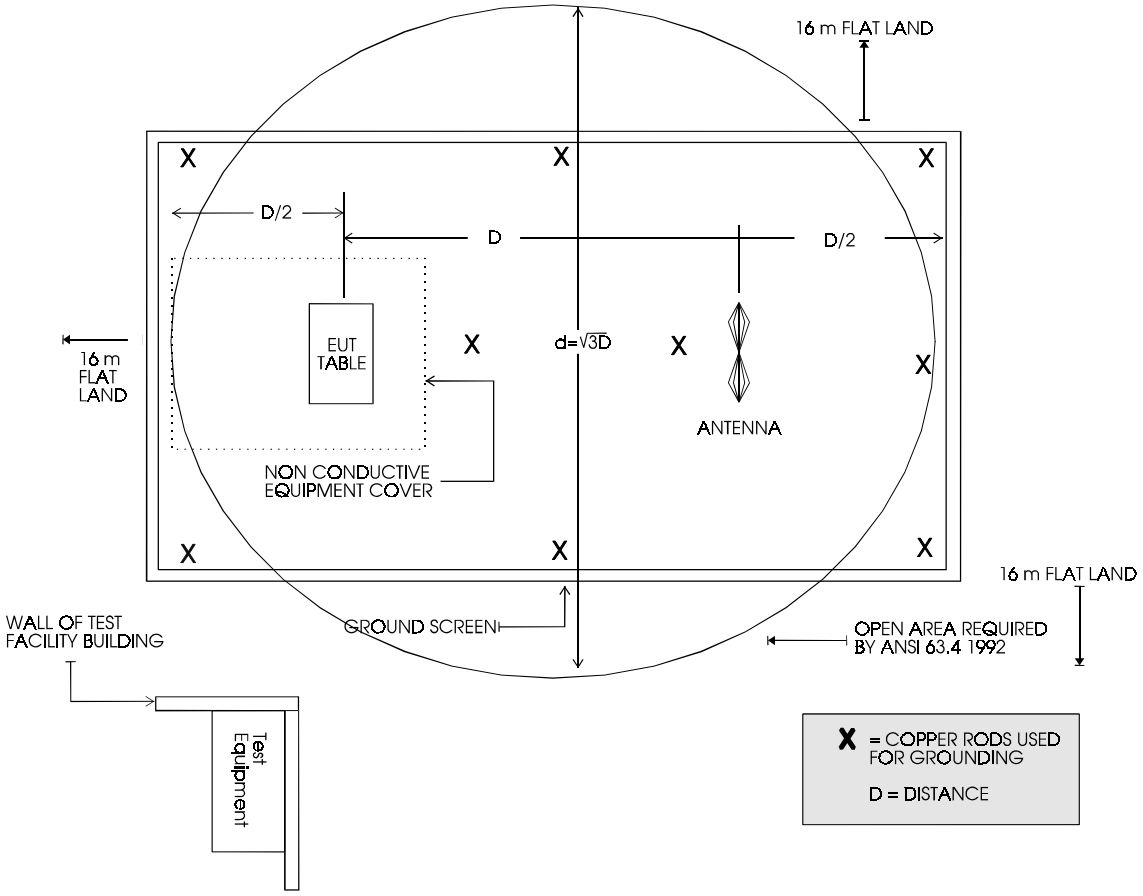

FIGURE 2

PLOT MAP AND LAYOUT OF TEST SITE "A"