Elliott Laboratories Inc.
www.elliottlabs.com
684 West Maude Avenue
Sunnyvale, CA 94086-3518
408-245-7800 Phone
408-245-3499 Fax

June 21, 2000

Semyon Grozman
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA. 95134-1706

Subject: FCC Emissions Report, VP1900BX

Dear Mr. Grozman:

A report has been created detailing the results of the FCC Class B electromagnetic emissions testing performed on the VP1900BX. Please find this report enclosed.

Per Federal Communication Commission regulations, the signature of an official of the company responsible for marketing the VP1900BX is required for this report to be acceptable for determining compliance. We understand Semyon Grozman would be this official. We recommend filing this report in a safe place for future reference.

Once Semyon Grozman has signed page 3 of this report, you may begin shipping the VP1900BX, making sure each unit is manufactured with any modifications described in the report, the proper FCC label is attached to each unit and the appropriate FCC statement is included in the operator's manual.

If you have any questions, please don't hesitate to call us at 408-245-7800.

Sincerely,

David W. Bare
Principal Engineer

DWB/bab
Enclosure: Emissions Report

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Electromagnetic Emissions Test Report and Verification of Compliance per FCC Part 15, Subpart B Specifications for a Class B Digital Device on the Cisco Systems, Inc. Model: VP1900BX

MANUFACTURER:	Cisco Systems, Inc. 170 West Tasman Drive San Jose, CA. 95134-1706
TEST SITE:	Elliott Laboratories, Inc. 684 W. Maude Avenue Sunnyvale, CA 94086
REPORT DATE:	June 21,2000
FINAL TEST DATE:	June 16, 2000
AUTHORIZED SIGNATORY:	David W. Bare Principal Engineer

TABLE OF CONTENTS

SCOPE

The Federal Communications Commission (FCC) establishes rules and regulations regarding the electromagnetic emissions of all electronic devices. An electromagnetic emissions test has been performed on the Cisco Systems, Inc. model VP1900BX pursuant to Subpart B of Part 15 of FCC Rules for digital devices. Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in ANSI C63.4-1992 as outlined in Elliott Laboratories test procedures. The test data has been provided as an appendix to this report for reference.

The digital device above has been tested in a simulated typical installation to demonstrate compliance with the relevant FCC performance and procedural standards.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

The test results recorded herein are based on a single type test of the Cisco Systems, Inc. model VP1900BX and therefore apply only to the tested sample. The sample was selected and prepared by Semyon Grozman of Cisco Systems, Inc.

VALIDATING SIGNATURES

The tested sample of the Class B digital device submitted to and tested by Elliott Laboratories complied with the requirements of subpart B of Part 15 of the Federal Communications Commissions Rules as specified in this report.

David W. Bare
Principal Engineer
Elliott Laboratories, Inc.

The official of the company responsible for marketing the device tested.

Semyon Grozman
Manager, Regulatory Compliance
Cisco Systems, Inc.

OBJECTIVE

The primary objective of the manufacturer is compliance with Subpart B of Part 15 of FCC Rules for the radiated and conducted emissions of digital devices. Since the subject device is intended for operation in a commercial or business environment, equipment verification to Class B emissions limits is required.

Equipment verification is a procedure where the manufacturer or a contracted laboratory makes measurements and takes necessary steps to ensure that the equipment complies with the appropriate technical standards. Submittal of a sample unit or test data to the FCC is not required unless specifically requested by the Commission. Once equipment verification has been obtained, a label indicating compliance must be attached to all identical units which are subsequently manufactured. Specific cautionary information must also be included in the operator's manual. These FCC labeling requirements are included as an appendix to this report.

Maintenance of FCC compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing and/or I/O cable changes, etc.).

EMISSION TEST RESULTS

The following emissions tests were performed on the Cisco Systems, Inc. model VP1900BX. The actual test results are contained in an appendix of this report.

LIMITS OF CONDUCTED INTERFERENCE VOLTAGE

The EUT tested complied with the limits detailed in FCC Rules Part 15 Section 15.107(a).

The following measurement was extracted from the data recorded during the conducted emissions scan and represents the highest amplitude emission relative to the specification limit. The actual test data and any correction factors are contained in an appendix of this report.

120V, 60Hz

Frequency MHz	Level dBuV	Power Lead	Class B Limit	Class B Margin	Detector QP/Ave	Comments
0.584	42.5	Line 1	48.0	-5.5	QP	

LIMITS OF RADIATED INTERFERENCE FIELD STRENGTH

The EUT tested complied with the limits detailed in FCC Rules Part 15 Section 15.109(a).

The following measurement was extracted from the data recorded during the radiated electric field emissions scan and represents the highest amplitude emission relative to the specification limit. The actual test data and any correction factors are contained in an appendix of this report.

Frequency MHz	Level dBuV/m	Pol v/h	Class B Limit	Class B Margin	Detector Pk/QP/Avg	Azimuth degrees	Height meters	Comments
400.00	35.4	H	46.0	-10.6	QP	60	1.0	

MEASUREMENT UNCERTAINTIES

ISO Guide 25 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level and were calculated in accordance with NAMAS document NIS 81.

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	30 to 1000	± 3.2

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Cisco Systems, Inc. is a 1900 MHz dual transceiver designed to send packet data over the link. The sample was received on June 7, 2000 and tested through June 16, 2000. The EUT consisted of the following component(s):

Manufacturer/Model/Description	Serial Number
Cisco Systems, VP1900BX, Transceiver	168
Cincon Electronics, TR70A12, Power supply	A-70-0000122

ENCLOSURE

The EUT enclosure is primarily constructed of fabricated sheet steel.

SUPPORT EQUIPMENT

The following equipment was used as remote support equipment for emissions testing:

Manufacturer/Model/Description	Serial Number	FCC ID Number
Toshiba, Tecra 8100, laptop	40552164U	DoC

EXTERNAL I/O CABLING

The I/O cabling configuration during emissions testing was as follows:

Cable Description	Length (m)	From Unit/Port	To Unit/Port
Unshielded	30	EUT Ethernet	Laptop ethernet

TEST SOFTWARE

The EUT was configured using the ethernet port for continuous transmission of GSMK modulated data. A Rohde & Schwarz CMD 57 was connected to the transmitter during setup only to verify transmission properties.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on June 16, 2000 at the Elliott Laboratories Open Area Test Site #3 located at 684 West Maude Avenue, Sunnyvale, California. The test site contains separate areas for radiated and conducted emissions testing. Pursuant to section 2.948 of the Rules, construction, calibration, and equipment data has been filed with the Commission.

The FCC recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement with the exception of predictable local TV, radio, and mobile communications traffic. The test site contains separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent FCC requirements.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.4-1992. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

RADIATED EMISSIONS CONSIDERATIONS

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment. The test site is maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4 guidelines.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz.

INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde and Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurments made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer run automated data collection programs which control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

ANTENNAS

A biconical antenna is used to cover the range from 30 MHz to 300 MHz and a log periodic antenna is utilized from 300 MHz to 1000 MHz. Narrowband tuned dipole antennas are used over the entire 30 to 1000 MHz range for precision measurements of field strength. Above 1000 MHz, a horn antenna is used. The antenna calibration factors are included in site factors which are programmed into the test receivers.

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height.

ANSI C63.4 specifies that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An appendix of this report contains the list of test equipment used and calibration information.

TEST PROCEDURES

EUT AND CABLE PLACEMENT

The FCC requires that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.4, and the worst case orientation is used for final measurements.

CONDUCTED EMISSIONS

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.

RADIATED EMISSIONS

Radiated emissions measurements are performed in two phases as well. A preliminary scan of emissions is conducted in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed from 30 MHz up to the frequency required by the regulation specified on page 1. One or more of these is with the antenna polarized vertically while the one or more of these is with the antenna polarized horizontally. During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit.

A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth which results in the highest emission is then maintained while varying the antenna height from one to four meters. The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain. Emissions which have values close to the specification limit may also be measured with a tuned dipole antenna to determine compliance.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted emissions are given in units of microvolts, and the limits for radiated emissions are given in units of microvolts per meter at a specified test distance. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m).

For reference, converting the specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. These limits in both linear and logarithmic form are as follows:

CONDUCTED EMISSIONS SPECIFICATION LIMITS,

Frequency Range (MHz)	Class B Limit (uV)	Class B Limit (dBuV)
0.450 to 30.000	250	48

RADIATED EMISSIONS SPECIFICATION LIMITS

Frequency Range (MHz)	Class B Limit (uV/m @ 3m)	Class B Limit (dBuV/m @ 3m)
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

RADIATED EMISSIONS SPECIFICATION LIMITS

Note: The limits for radiated emissions above 1000 MHz are based on the use of an average detector. In addition, limits based on the use of a peak detector are specifed as 20 dB above the limits based on the use of an average detector.

Frequency (MHz)	Average Limit (uV/m @ 3m)	Average Limit (dBuV/m @ 3m)
above 1000	500	54.0

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

Receiver readings are compared directly to the conducted emissions specification limit (decibel form). The calculation is as follows:

$$R_r - S = M$$

where:

R_r = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements. A distance factor, when used for electric field measurements, is calculated by using the following formula:

$$F_d = 20*LOG_{10} (D_m/D_s)$$

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The antenna factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

The margin of a given emission peak relative to the limit is calculated as follows:

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

APPENDIX A: Test Equipment Calibration Data

Conducted and Radiated Emissions, 16-Jun-00 05:38 PM
Engineer: Vishal

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
Elliott Laboratories	300-1000 MHz Log Periodic Antenna	EL300.1000	55	11	11/03/1999	10/03/2000
Elliott Laboratories	Biconical Antenna, 30-300 MHz	EL30.300	54	12	12/21/1999	12/21/2000
Fischer Custom Comm.	LISN, 50A	FCC-LISN-50/250-50-2	810	12	02/28/2000	02/28/2001
Rohde& Schwarz	Pulse Limiter	ESH3 Z2	812	12	12/06/1999	12/06/2000
Rohde & Schwarz	Test Receiver, 0.009-30 MHz	ESH3	215, (F197)	12	02/17/2000	02/17/2001
Rohde & Schwarz	Test Receiver, 20-1300MHz	ESVP	273	12	09/09/1999	09/09/2000

APPENDIX B: Test Data Log Sheets

ELECTROMAGNETIC EMISSIONS

TEST LOG SHEETS

AND

MEASUREMENT DATA

T37895 10 Pages

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EMC Test Data

Client:	Cisco Systems	Job Number:	J37867
Model:	VP1900BX	T-Log Number:	T37895
		Proj Eng:	David W. Bare
Contact:	Phillip Carranco		
Emissions Spec:	FCC Part 24 E	Class:	-
Immunity Spec:	-	Environment:	-

EMC Test Data

For The

Cisco Systems

Model

VP1900BX

Client:	Cisco Systems	Job Number:	J37867
Model:	VP1900BX and VP1800BX	T-Log Number:	T37895
		Proj Eng:	David W. Bare
Contact:	Phillip Carranco		
Emissions Spec:	FCC Part 24 E	Class:	-
Immunity Spec:	-	Environment:	-

EUT INFORMATION

General Description

The EUT is a 1900 MHz dual transceiver which is designed to send packet data over the link. It employs GSMK modulation. Normally, the EUT would be placed on a table top during operation. The EUT was, therefore, placed in this position during emissions testing to simulate the end user environment.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Cisco Systems	VP1900BX	Transceiver	168	-
Cisco Systems	VP1800BX	Transceiver	170	-
Cincon Electronics	TR70A12	Power supply input 100 ~240 V 1.5A 50/50Hz output 12VDC	A-70-0000122	-

Other EUT Details

EUT Enclosure

The EUT enclosure is primarily constructed of fabricated sheet steel.

Modification History

Mod. #	Test	Date	Modificaiton
1			
2			
3			

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EMC Test Data

Client:	Cisco Systems	Job Number:	J37867
Model:	VP1900BX	T-Log Number:	T37895
		Proj Eng:	David W. Bare
Contact:	Phillip Carranco		
Emissions Spec:	FCC Part 24 E	Class:	-
Immunity Spec:	-	Environment:	-

Test Configuration Information (1)

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
Toshiba	Tecra 8100	Laptop	40552164U	DoC

EUT Interface Ports

		Cable(s)		
EUT Port	Connected To	Description	Shielded or Unshielded	Length(m)
Tx	Load	Direct	-	-
Rx	Load	Direct	-	-
Ethernet	Laptop	Twisted pair	Unshielded	30

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EMC Test Data

Client:	Cisco Systems	Job Number:	J37867
Model:	VP1900BX	T-Log Number:	T37895
		Proj Eng:	David W. Bare
Contact:	Phillip Carranco		
Emissions Spec:	FCC Part 24 E	Class:	-
Immunity Spec:	-	Environment:	-

EUT Operation During Emissions

The EUT was configured using the ethernet port for continuous transmssion of GSMK modulated data. A R&S CMD 57 was connected to the transmitter during setup only.

EUT Operation During Immunity

Performance Criteria for Immunity

Criterion A:

Criterion B:

Criterion C:

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EMC Test Data

Client:	Cisco Systems	Job Number:	J37867
Model:	VP1900BX	T-Log Number:	T37895
		Proj Eng:	David W. Bare
Contact:	Phillip Carranco		
Spec:	FCC Part 24 E	Class:	-

Conducted Emissions

Test Specifics

Objective: The objective of this test session is to perform final qualification testing the EUT relative to the specification(s) defined above.

Date of Test: 06/16/2000
Test Engineer: Vishal Narayan
Test Location: SVOATS #3

Config. Used: 1
Config Change: None
EUT Voltage: 230V/50 Hz and 120V/60Hz

General Test Configuration

For tabletop equipment, the EUT was located on a wooden table, 40 cm from a vertical coupling plane. The LISN was located 80 cm from the EUT .

Ambient Conditions:

Temperature: 25°C
Rel. Humidity: 59%

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power 120V/60Hz	FCC B	Pass	-5.5dB @ .5835MHz

Modifications Made During Testing: None

Elliott

EMC Test Data

Client:	Cisco Systems	Job Number:	J37867
Model:	VP1900BX	T-Log Number:	T37895
		Proj Eng:	David W. Bare
Contact:	Phillip Carranco		
Spec:	FCC Part 24 E	Class:	-

Run #1: AC Power Port Conducted Emissions, 0.15 - 30 MHz 120 V / 60 Hz

Frequency	Level	Power	FCC-B		Detector	Comments
MHz	dBuV	Lead	Limit	Margin	Function	
0.584	42.5	Line 1	48.0	-5.5	QP	
0.477	42.2	Line 1	48.0	-5.8	QP	
0.477	39.9	Neutral	48.0	-8.1	QP	
0.902	39.7	Line 1	48.0	-8.3	QP	
0.743	39.5	Line 1	48.0	-8.5	QP	
0.530	37.7	Neutral	48.0	-10.3	QP	
0.900	35.7	Neutral	48.0	-12.3	QP	
0.636	32.4	Neutral	48.0	-15.6	QP	
5.667	31.3	Neutral	48.0	-16.7	QP	
15.515	29.5	Neutral	48.0	-18.5	QP	
13.791	22.9	Line 1	48.0	-25.1	QP	

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EMC Test Data

Client:	Cisco Systems	Job Number:	J37867
Model:	VP1900BX	T-Log Number:	T37895
		Proj Eng:	David W. Bare
Contact:	Phillip Carranco		
Spec:	FCC Part 24 E	Class:	-

Radiated Emissions

Test Specifics

Objective: The objective of this test session is to perform final qualification testing the EUT relative to the specification(s) defined above.

Date of Test: 06/16/2000
Test Engineer: Vishal Narayan
Test Location: SVOATS #3

Config. Used: 1
Config Change: None
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT was located on the turntable for radiated emissions testing.

For radiated emissions testing between 30 and 1000 MHz, the measurement antenna was located at 3 meters distance from the EUT, unless otherwise noted. For testing above 1 GHz, the measurement antenna was located 3 meters from the EUT.

Ambient Conditions:

Temperature: 25°C
Rel. Humidity: 59%

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, Preliminary Scan 30 - 1000 MHz	FCC B	Pass	-10.7dB @ 400MHz
2	RE, 30 - 1000MHz - Maximized Emissions	FCC B	Pass	-10.7dB @ 400MHz

Modifications Made During Testing: None

Elliott

EMC Test Data

Client:	Cisco Systems	Job Number:	J37867
Model:	VP1900BX	T-Log Number:	T37895
		Proj Eng:	David W. Bare
Contact:	Phillip Carranco		
Spec:	FCC Part 24 E	Class:	-

Run #1: Preliminary radiated emissions, 30-1000 MHz

Frequency	Level	Pol	FCC B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
400.000	35.4	H	46.0	-10.6	QP	60	1.0	
600.000	35.0	V	46.0	-11.0	QP	130	1.0	
665.000	32.6	V	46.0	-13.4	QP	170	3.2	
416.000	30.5	H	46.0	-15.5	QP	80	1.0	
400.000	30.0	V	46.0	-16.0	QP	180	1.2	
211.000	26.5	H	43.5	-17.0	QP	70	1.0	
300.000	28.5	H	46.0	-17.5	QP	30	1.2	
442.000	28.5	H	46.0	-17.5	QP	100	1.5	
195.000	25.5	V	43.5	-18.0	QP	130	1.0	
312.000	27.7	H	46.0	-18.3	QP	60	1.0	
43.000	21.0	V	40.0	-19.0	QP	330	1.8	
325.000	26.9	H	46.0	-19.1	QP	100	1.0	
215.000	23.6	V	43.5	-19.9	QP	0	1.0	
320.000	25.6	H	46.0	-20.4	QP	50	1.0	
196.600	22.6	H	43.5	-20.9	QP	130	1.0	
429.000	24.6	H	46.0	-21.4	QP	0	1.0	
169.000	21.0	V	43.5	-22.5	QP	60	1.0	
143.000	19.3	V	43.5	-24.2	QP	360	1.0	
273.000	21.6	V	46.0	-24.4	QP	100	1.0	
300.000	21.1	V	46.0	-24.9	QP	200	1.0	
156.000	18.5	V	43.5	-25.0	QP	360	1.0	
225.000	21.0	V	46.0	-25.0	QP	360	1.0	
247.000	20.0	H	46.0	-26.0	QP	0	2.2	Signal Sub

Run #2: Maximized readings from run #1

Frequency	Level	Pol	FCC B		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
400.000	35.4	H	46.0	-10.6	QP	60	1.0	
600.000	35.0	V	46.0	-11.0	QP	130	1.0	
665.000	32.6	V	46.0	-13.4	QP	170	3.2	
416.000	30.5	H	46.0	-15.5	QP	80	1.0	
400.000	30.0	V	46.0	-16.0	QP	180	1.2	
211.000	26.5	H	43.5	-17.0	QP	70	1.0	

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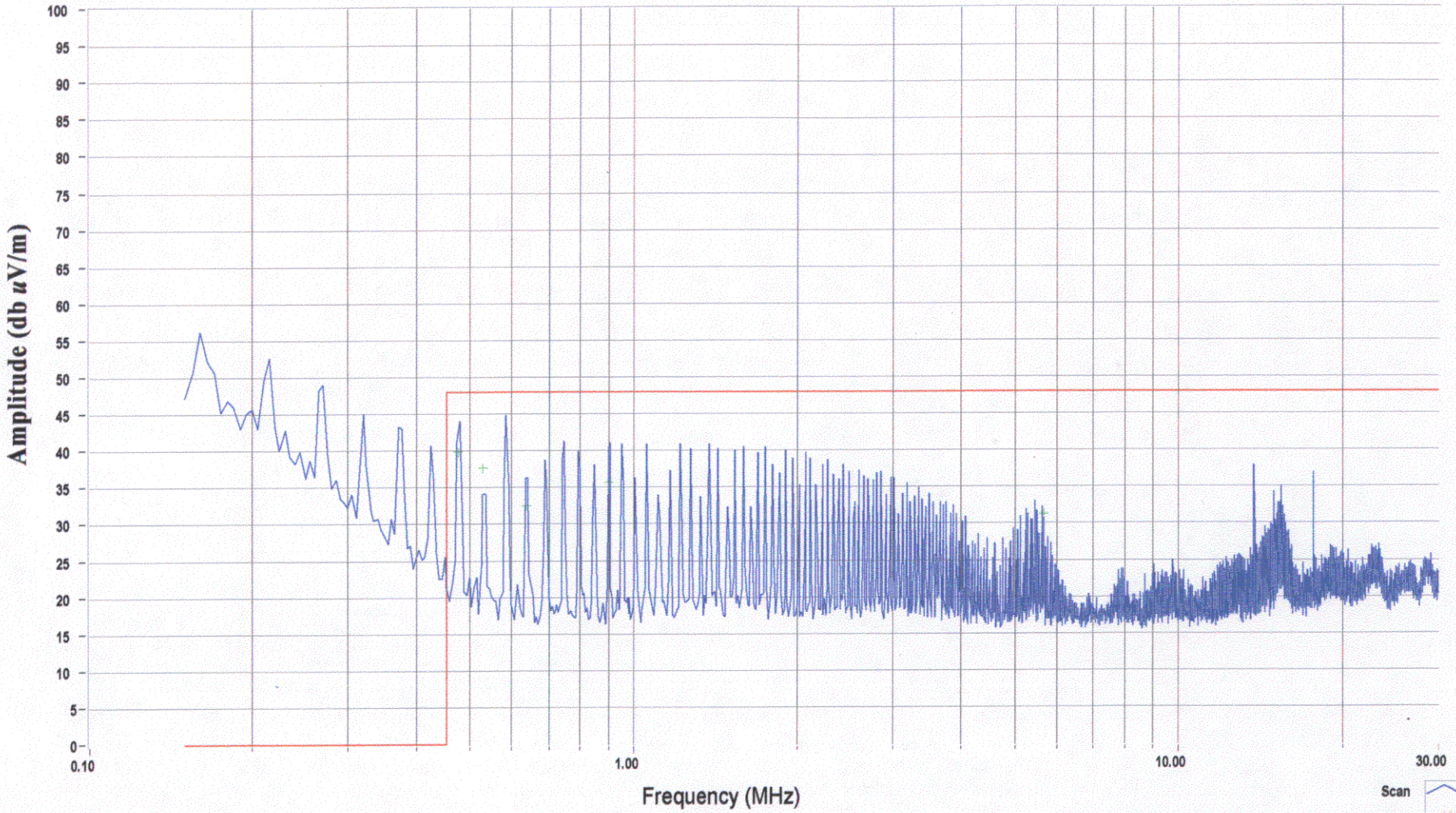
SVOATS #3: Cisco VP 1900 Run 1

T37895

Spec:
FCC-B

Mains Lead
Line 1



120V Line

Scan
Peak
Quasi-peak
Average
QuasiPeak Limit
QuasiPeak Limit

6/16/00

Vishal Narayan

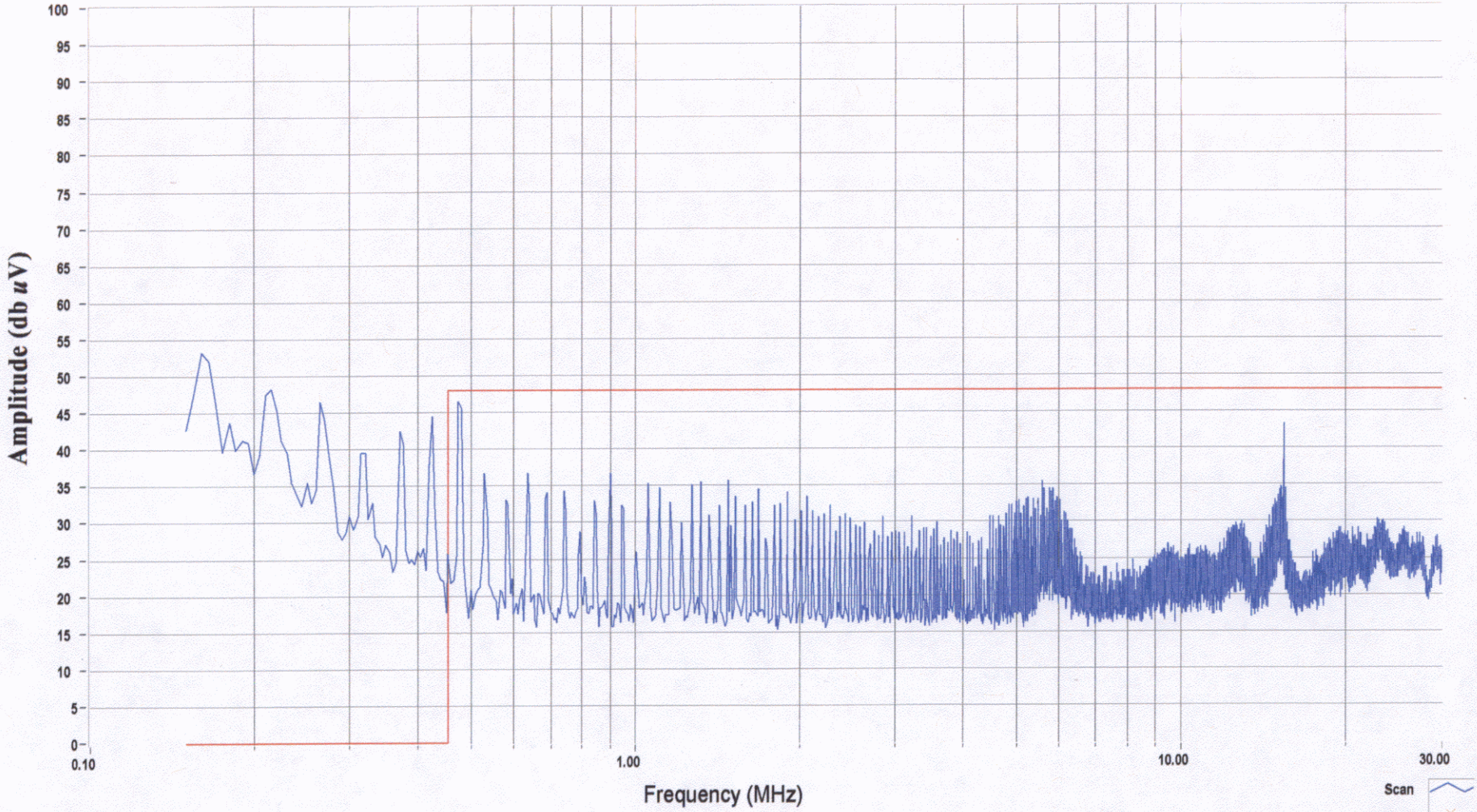
Elliott

SVOATS #3: Cisco VP 1900 Run 1

T37895

Spec:
FCC-B

Mains Lead
Neutral



120V Neutral

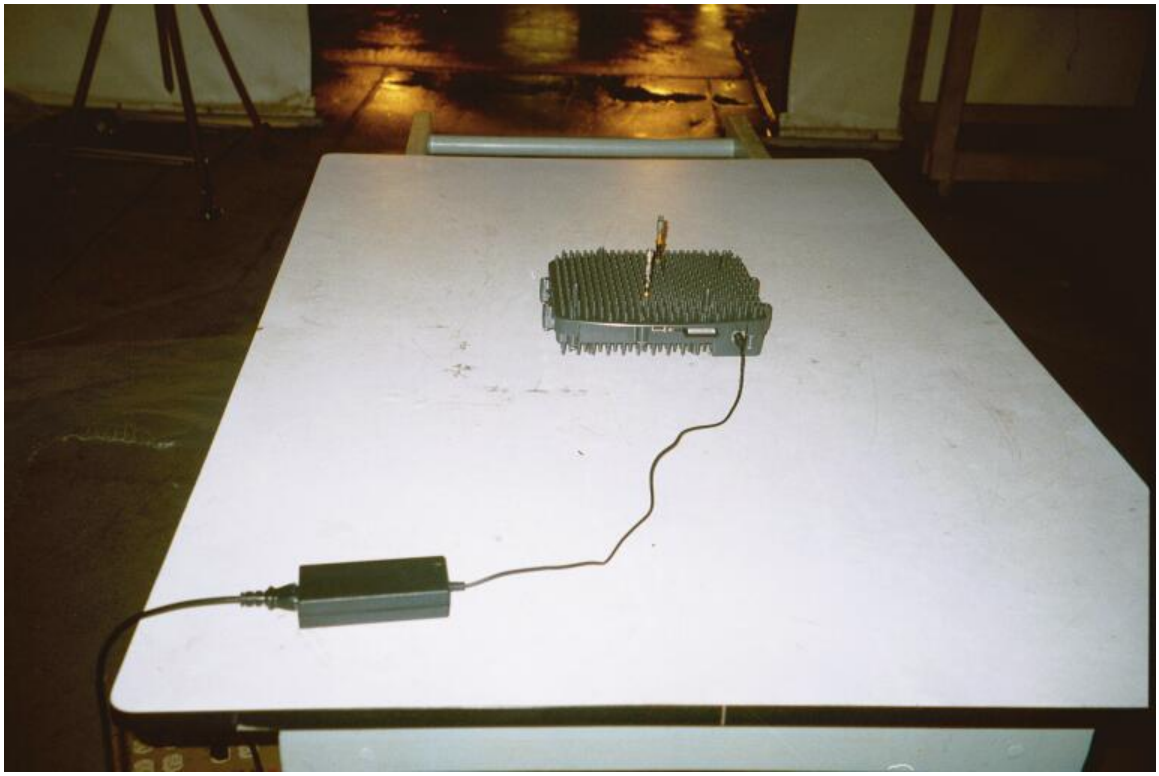
Scan
Peak
Quasi-peak
Average
QuasiPeak Limit
QuasiPeak Limit

6/16/00

Vishal Narayan

APPENDIX C: Radiated Emissions Test Configuration Photographs

APPENDIX C: Radiated Emissions Test Configuration Photographs



APPENDIX D: Conducted Emissions Test Configuration Photographs

APPENDIX D: Conducted Emissions Test Configuration Photographs

APPENDIX E: Reference Documents

Title 47 CFR, Part 2, Subpart I	"Marketing of Radiofrequency Devices"
Title 47 CFR, Part 2, Subpart J	"Equipment Authorization Procedures"
Title 47 CFR, Part 2, Subpart K	"Importation of Devices Capable of Causing Harmful Interference"
Title 47 CFR, Part 15, Subpart B	"Unintentional Radiators"
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"
FCC/OST Bulletin # 61 (1993)	"The FCC Equipment Authorization Program for Radio Frequency Devices"
FCC/OST Bulletin # 62 (1993)	"Understanding the FCC Regulations Concerning Computing Devices"
Title 47 USC, Sections 501-504	Penalties for Non-compliance with FCC Rules
CISPR Pub. 22 (1985)	"Limits and Methods of Measurements of Radio Interference Characteristics of Information Technology Equipment"

APPENDIX F: FCC Labeling and User Information

The following information has been provided to clarify equipment labeling requirements and the information which must be included in the operator's manual. These requirements are found in the FCC Rules for radio frequency devices, Part 15.

LABEL

Digital Device Label

Each digital device which has been verified as complying with the Class B limits shall have permanently attached in a conspicuous location for the user to observe, a label with the following statement:

> This device complies with Part 15 of FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Label Location

The FCC has defined *conspicuous location* as any location readily visible to the user of the device without the use of tools.

Label Attachment

The FCC has defined *permanently attached* as a label that can normally be expected to remain fastened to the equipment during the equipment's expected useful life. A paper gum label will generally not meet this condition.

OPERATOR'S MANUAL

The following warning or similar statement shall be provided in a conspicuous location in the operator's manual such that the user of the equipment is aware of its interference potential. Additional information about corrective measures may also be provided to the user at the manufacturer's option.

> **NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
>
> -- Reorient or relocate the receiving antenna.
>
> -- Increase the separation between the equipment and receiver.
>
> -- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
>
> -- Consult the dealer or an experienced radio/TV technician for help.

Accessories

Where special accessories, such as shielded cables, are required in order to meet FCC emission limits, appropriate instructions regarding the need to use such accessories must be contained on the first page of text concerned with the installation of the device in the operator's manual.

Modifications

The operator's manual must caution the user that changes or modifications not expressly approved by you, the manufacturer, could void their right to operate the equipment.

Binding

The FCC has indicated that the radio interference statement be bound in the same manner as the operator's manual. Thus, a loose-leaf insert page in a bound or center-spine stapled manual would not meet this condition.