



FCC CFR47 PART 15 SUBPART C

**CLASS II PERMISSIVE CHANGE
TEST REPORT**

FOR

WIRELESS LAN PC CARD

MODEL NUMBER: 1000R

FCC ID: REP-1000R-1

REPORT NUMBER: 04U2598-1

ISSUE DATE: APRIL 23, 2004

Prepared for
**FIRETIDE KS
16795 LARK AVE. SUITE 100
LOS GATOS
CA, 95032, U.S.A.**

Prepared by
**COMPLIANCE CERTIFICATION SERVICES
561F MONTEREY ROAD,
MORGAN HILL, CA 95037, USA
TEL: (408) 463-0885
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1. TEST RESULT CERTIFICATION

COMPANY NAME: Firetide Inc.
16795 Lark Ave.
Los Gatos, CA 95032, U.S.A.

EUT DESCRIPTION: Wireless LAN PC Card

MODEL: 1000R

DATE TESTED: April 13, 2004

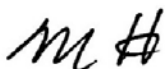
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	NO NON-COMPLIANCE NOTED

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

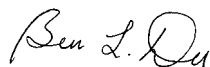
Note: This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document.

Approved & Released For CCS By:

Tested By:



MIKE HECKROTTE
ENGINEERING MANAGER
COMPLIANCE CERTIFICATION SERVICES



BEN DU
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

2.1. DESCRIPTION OF EUT AND CLASS II PERMISSIVE CHANGE

The EUT is an 802.11b transceiver. The purpose of the Class II Permissive Change is to add an additional antenna type.

The transmitter has a maximum peak conducted output power as follows:

Frequency Band (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	12.50	178.00

The radio utilizes an external omni antenna, with a maximum gain of 8.5 dBi.

2.2. LIST OF ANTENNAS

Description	Model	Gain (dBi)
5 inch Omni	T614FL-L	4.0
8 inch Omni	S151TC-2450S	5.0
16 inch Omni	SG102N-2450V2	6.0
24 inch Omni	SG103N-2450	8.5

2.3. DESCRIPTION OF MODIFICATIONS MADE DURING TESTING

Six Ferrite beads were added to achieve compliance with radiated emissions below 1 GHz, in locations as follows:

Ferrite Model Number	Location	Quantity
TFC16-876	Ethernet Cable	2
TFC16-876	Power Cable	1
RFC4	RF Cable	1
RFC8	Large Ground Cable	1
264665802	Small Ground Cable	1

All ferrites are manufactory by Intermark-USA Inc.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4/2001, FCC CFR 47 Part 2 and FCC CFR 47 Part 15.

4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.



No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government.

5. CALIBRATION AND UNCERTAINTY

5.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

5.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radiated Emission, 30 to 200 MHz	+/- 3.3 dB
Radiated Emission, 200 to 1000 MHz	+4.5 / -2.9 dB
Radiated Emission, 1000 to 2000 MHz	+4.5 / -2.9 dB
Power Line Conducted Emission	+/- 2.9 dB

Uncertainty figures are valid to a confidence level of 95%.

5.3. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	Cal Due
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2238	2/4/2005
Spectrum Analyzer	Agilent	E4446A	MY43360112	1/13/2005
Preamplifier, 1 ~ 26 GHz	Miteq	NSP10023988	646456	4/25/2004
30MHz---- 2Ghz	Sunol Sciences	JB1 Antenna	A121003	12/22/2004
EMI Receiver, 9 kHz ~ 2.9 GHz	HP	8542E	3942A00286	11/21/2004
RF Filter Section	HP	85420E	3705A00256	11/21/2004
LISN, 10 kHz ~ 30 MHz	FCC	50/250-25-2	114	10/13/2004
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	8379443	10/13/2004
Site A Line Stabilizer / Conditioner	Tripplite	LC-1800a	A0051681	CNR
EMI Test Receiver	R & S	ESHS 20	827129/006	7/17/2004

6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop PC	Compaq	Presario 900		

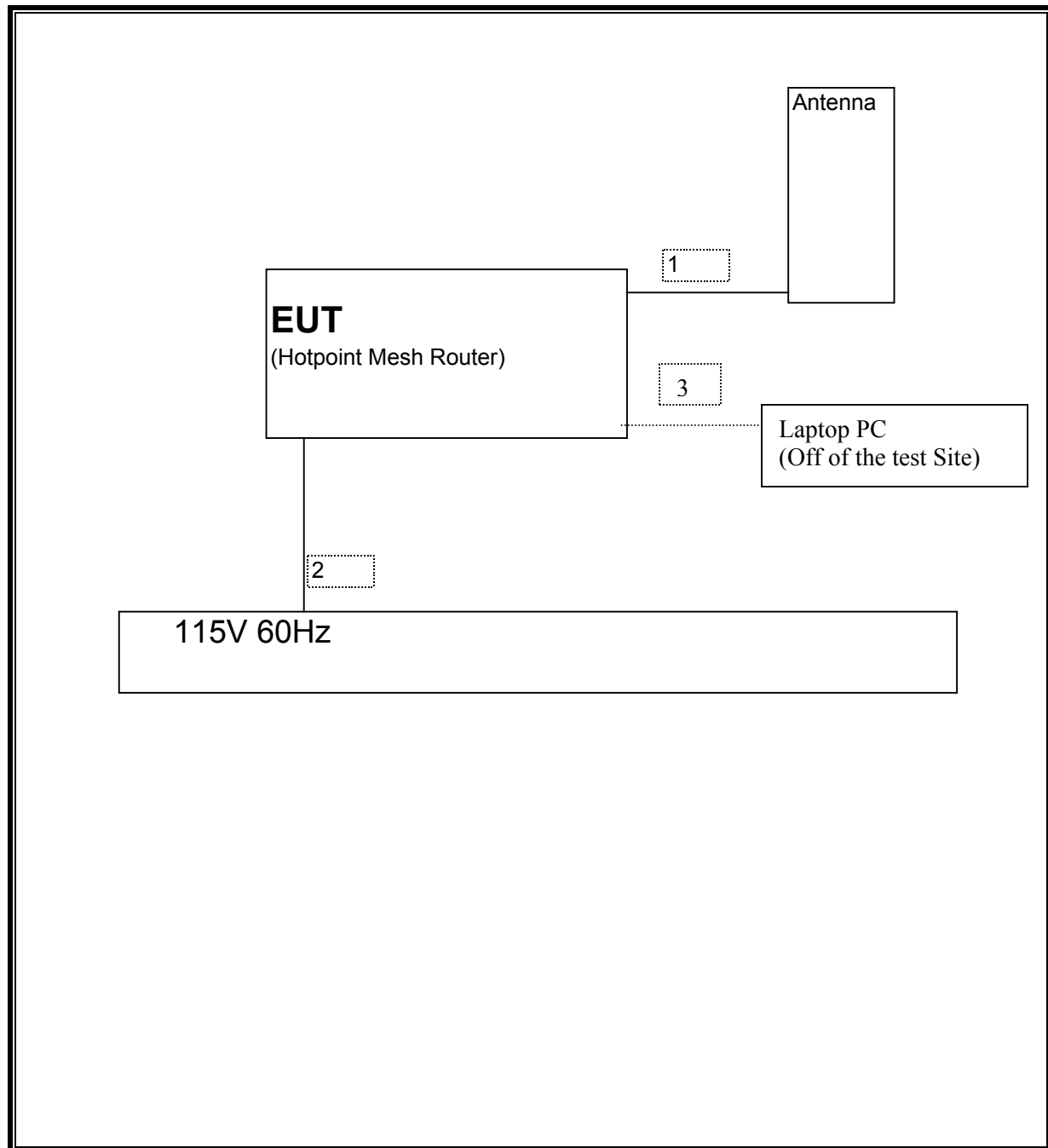
I/O CABLES

Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	Output	1	N-type	N-type Cable	.7 m	
2	I/O	1	RJ45	Ethernat Cable	20 m	To off of the test Site PC
3	AC	1	US 115V	UnShieldel	2m	

TEST SETUP

The EUT is controlled by a laptop computer via ethernet. The computer is located off of the test site. Test software exercised the radio.

SETUP DIAGRAM FOR TESTS



6.1. RADIATED EMISSIONS

6.1.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS

LIMITS

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

RESULTS

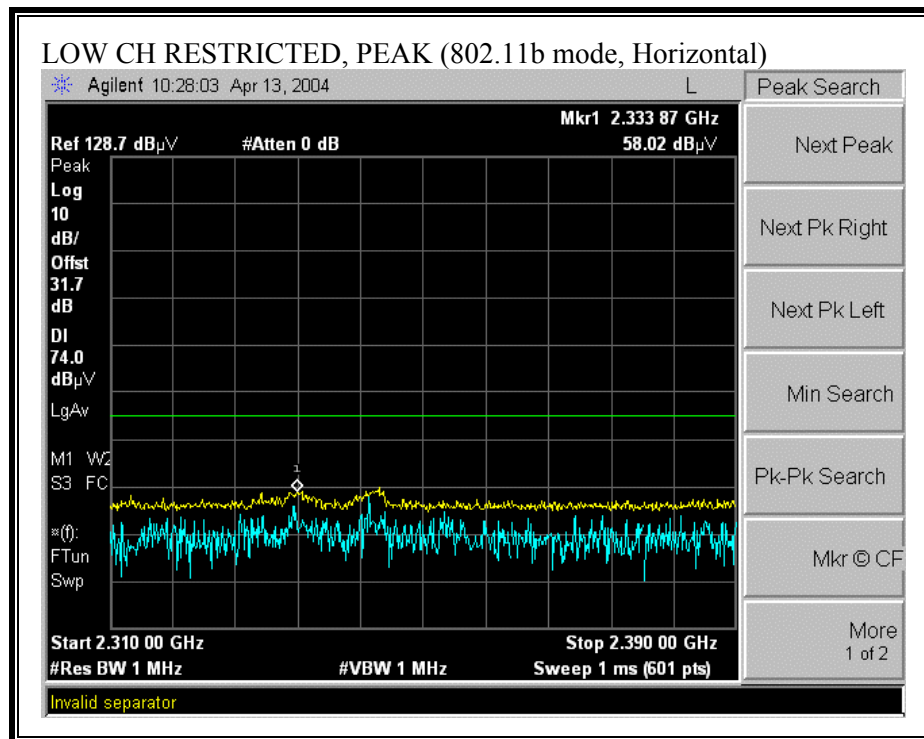
No non-compliance noted:

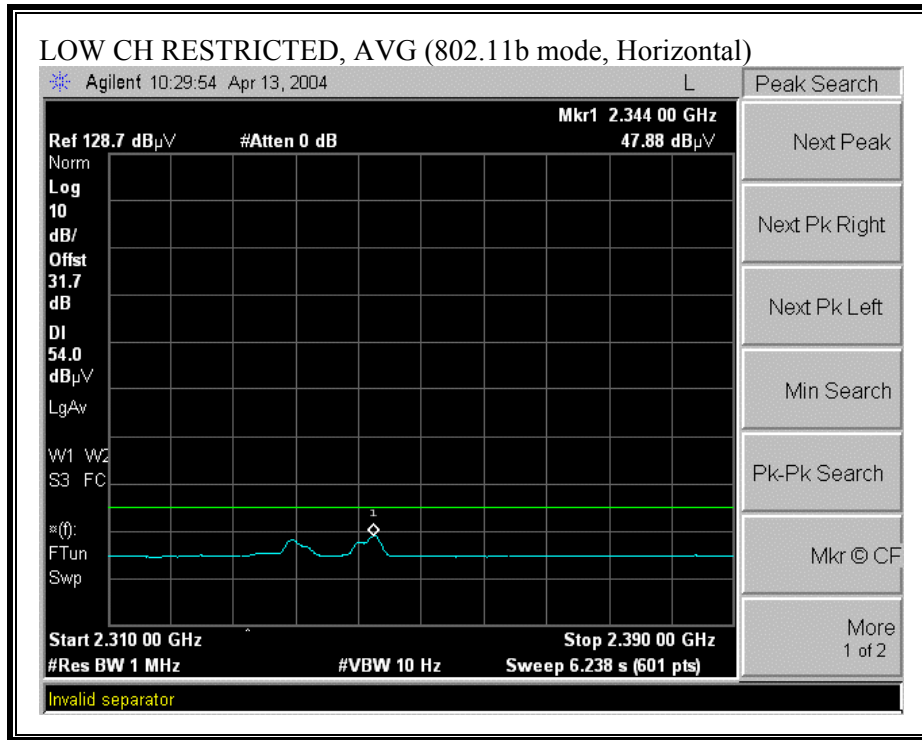
6.1.2. TRANSMITTER RADIATED EMISSIONS ABOVE 1 GHZ

CORRECTION FACTOR FOR RESTRICTED BANDEDGE MEASUREMENTS

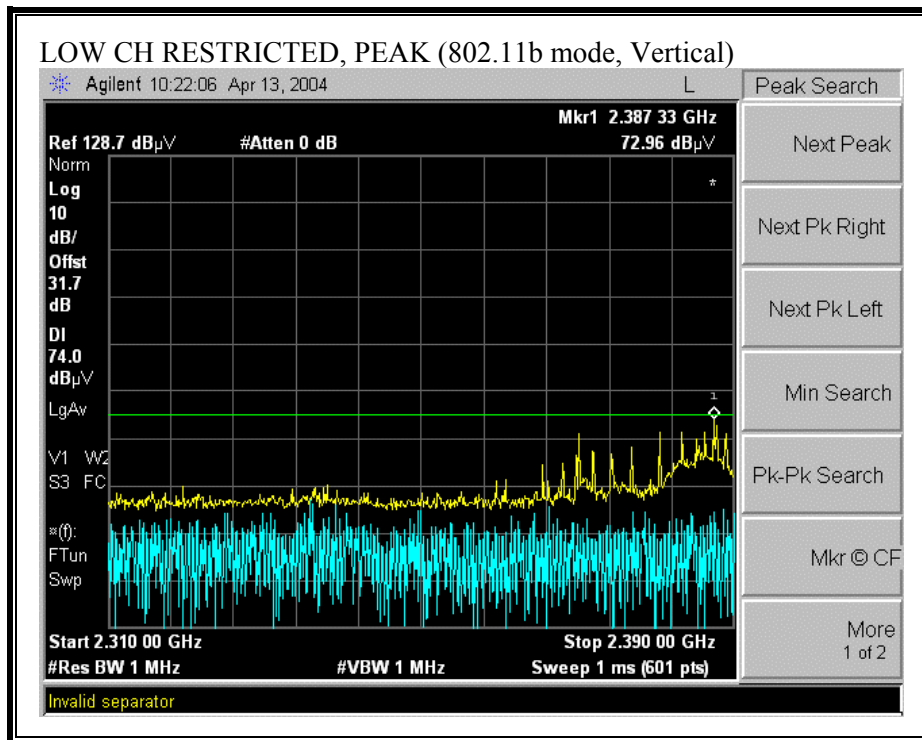
The reference level offset is equal to the test antenna gain + the test cable loss (29.6 dBi + 2.1 dB)

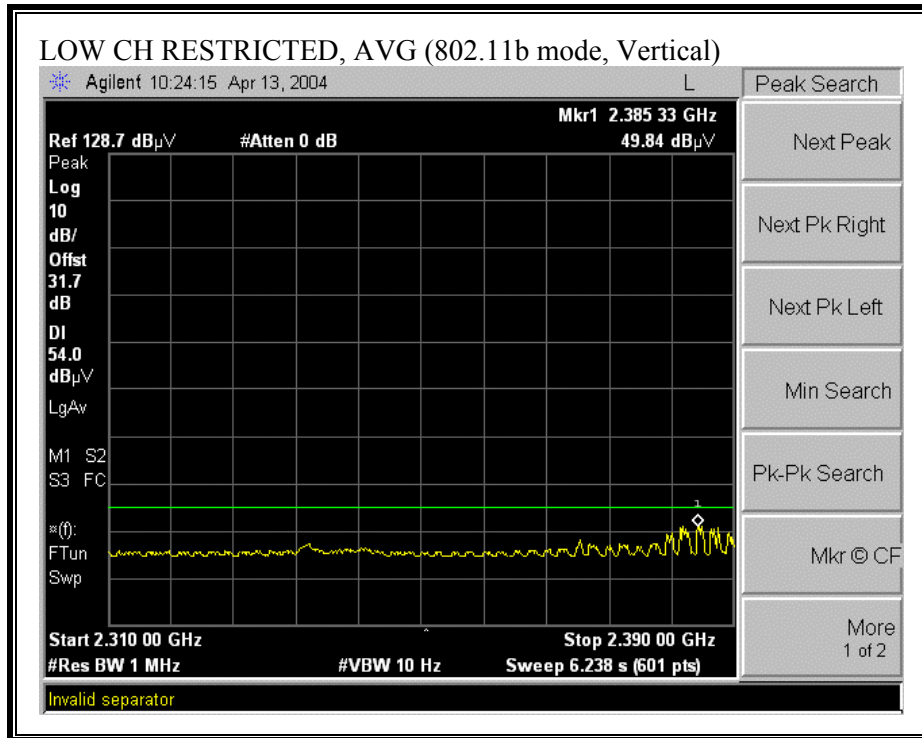
RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)



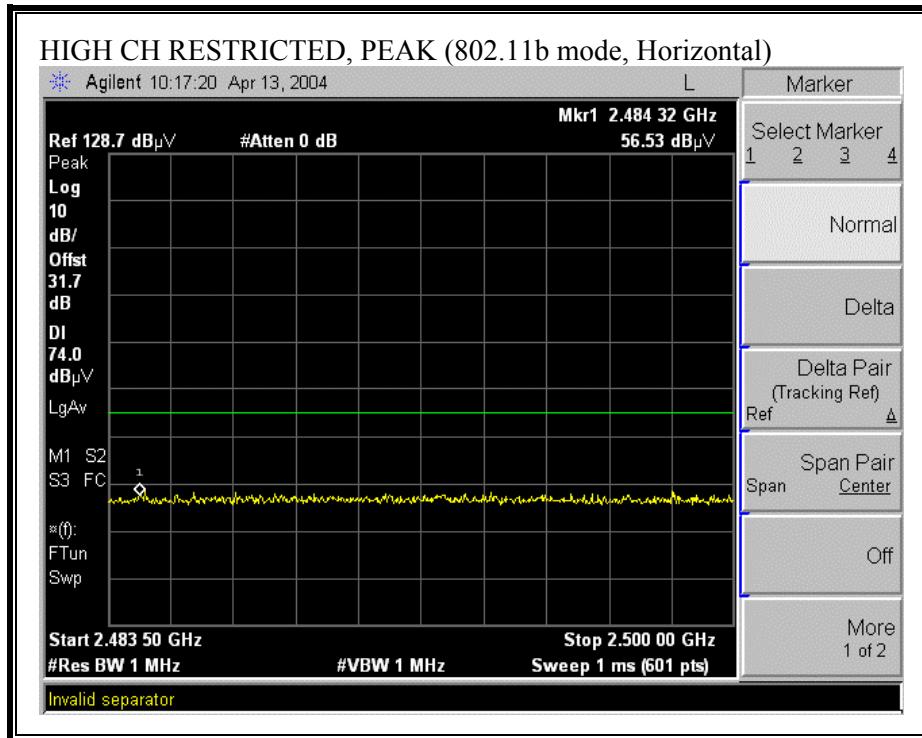


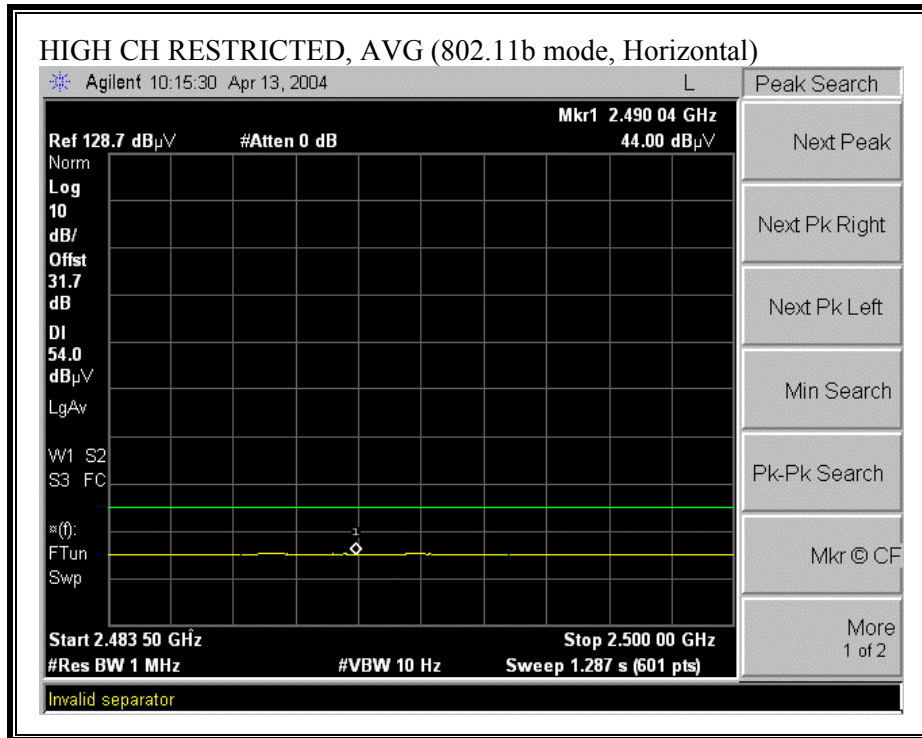
RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)



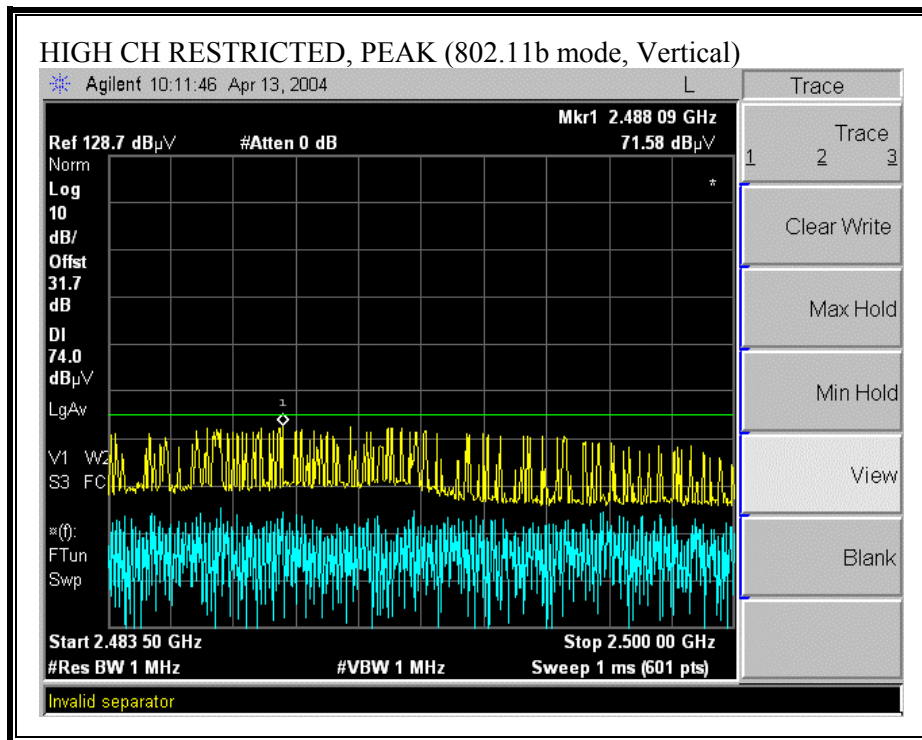


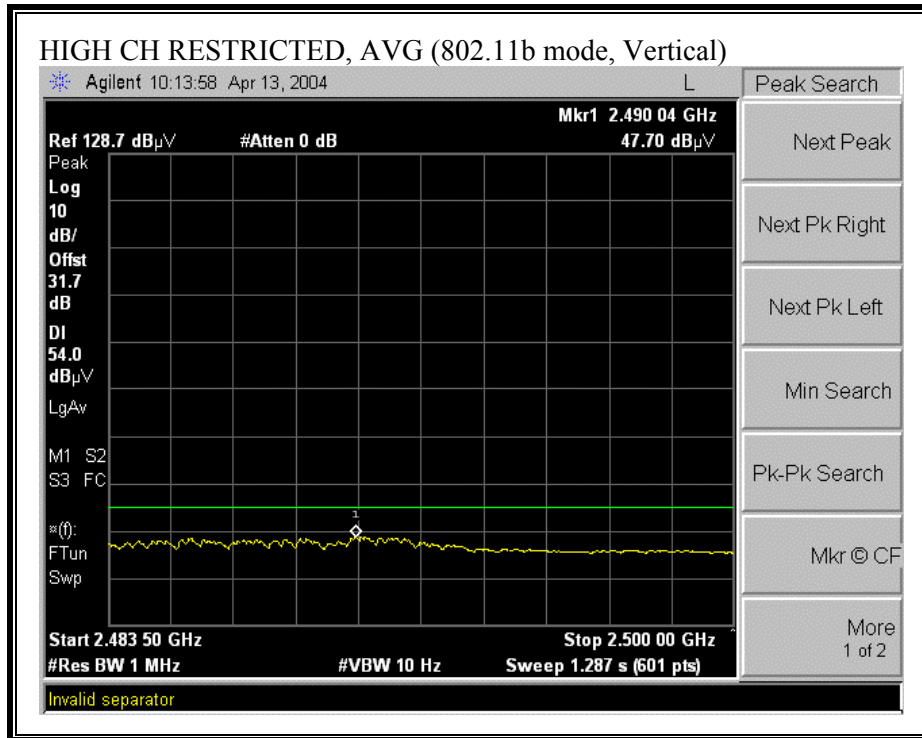
RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)





04/13/04 High Frequency Measurement
Compliance Certification Services, Morgan Hill 5m chamber

Test Engr: Ben
Project #:04U2598
Company:Firetide
EUT Descrip.:Out door Networking Sevice Point
EUT M/N:HotPoint 1000R
Test Target:FCC B
Mode Oper:Tx

Test Equipment:

EMCO Horn 1-18GHz	Spectrum Analyzer	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz
T60; S/N: 2238 @3m	Agilent E4464A Analyzer	T63 Miteq 646456		
<div> <div> Hi Frequency Cables <div> <input type="checkbox"/> (2 ft) <input type="checkbox"/> (2 ~ 3 ft) <input checked="" type="checkbox"/> (4 ~ 6 ft) <input checked="" type="checkbox"/> (12 ft) </div> </div> <div> Peak Measurements: 1 MHz Resolution Bandwidth 1MHz Video Bandwidth </div> <div> Average Measurements: 1 MHz Resolution Bandwidth 10Hz Video Bandwidth </div> </div>				

[illegible]

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

6.1.3. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

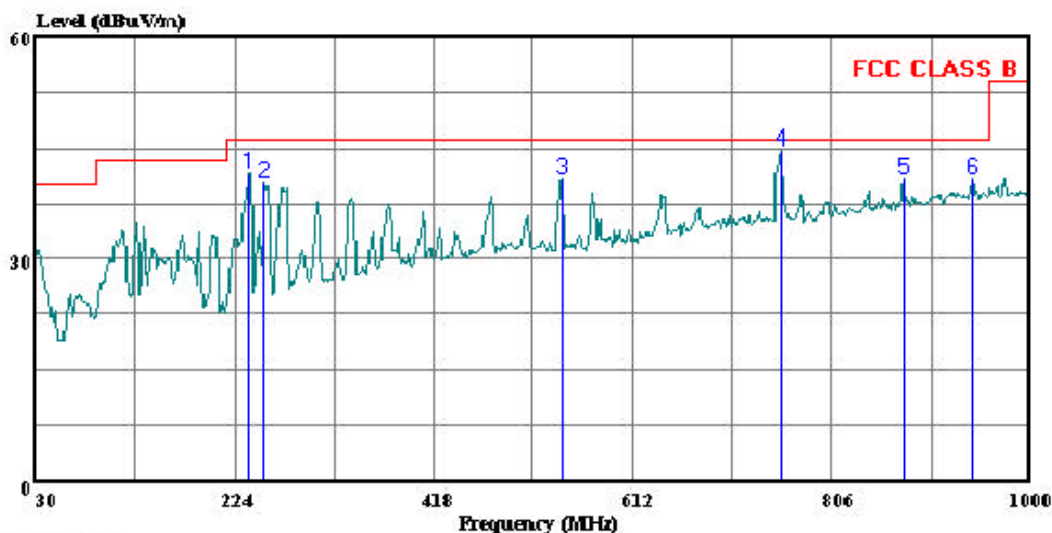
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



561F Monterey Road
San Jose, CA 95131
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 17 File#: 04U2598.EMI Date: 04-14-2004 Time: 16:01:19



(Auxiliary ATC)

Trace: 16

Ref Trace:

Condition: FCC CLASS B HORIZONTAL

Test Operator: : Ben Du
Project #: : 04U2598
Company: : Firetide
EUT: : Mesh Networking Service 802.11b
Model No: : HOTPOINT 1000R
Configuration: : EUT W/ Hi Gain Antenna
Target of Test: : PccClass B
Mode of Operation: TX Ch. 11 2462 MHz

HORIZONTAL DATA

	Freq	Remark	Read Level	Factor	Level	Limit Line	Over Limit
	MHz		dBuV	dB	dBuV/m	dBuV/m	dB
1	237.580	Peak	28.03	13.57	41.60	46.00	-4.40
2	252.130	Peak	26.19	14.14	40.33	46.00	-5.67
3	543.130	Peak	19.77	20.92	40.69	46.00	-5.31
4	756.530	Peak	20.34	24.36	44.70	46.00	-1.30
5	875.840	Peak	14.99	25.73	40.72	46.00	-5.28
6	943.740	Peak	13.81	26.88	40.69	46.00	-5.31

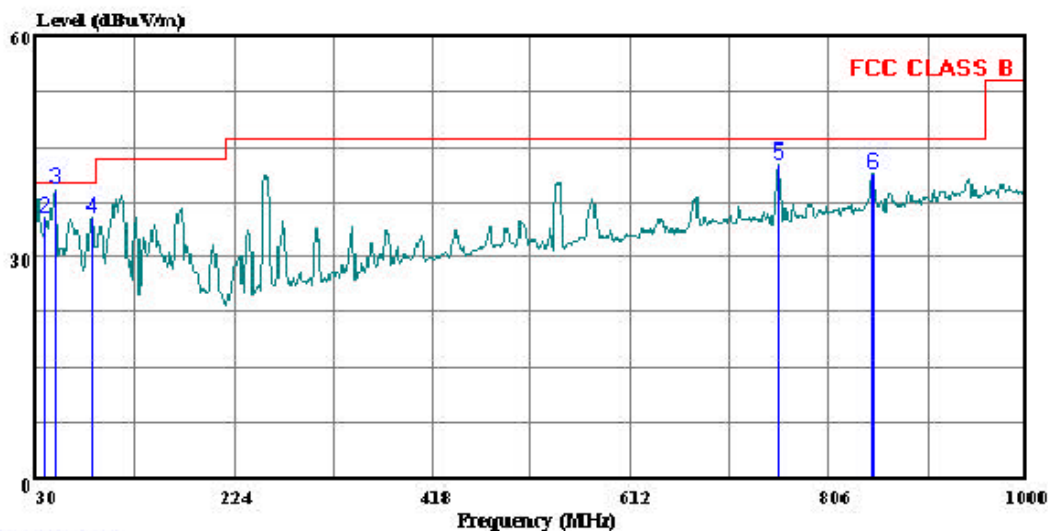
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT



561F Monterey Road
San Jose, CA 95131
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 11 File#: 04U2598.EMI Date: 04-14-2004 Time: 15:46:24



(Auxiliary ATC)

Trace: 10

Ref Trace:

Condition: FCC CLASS B VERTICAL
Test Operator: : Ben Du
Project #: : 04U2598
Company: : Firetide
EUT: : Mesh Networking Service 802.11b
Model No: : HOTPOINT 1000R
Configuration: : EUT W/ Hi Gain Antenna
Target of Test: : FccClass B
Mode of Operation: TX Ch. 1

VERTICAL DATA

	Freq	Remark	Read Level	Factor	Level	Limit Line	Over Limit
	MHz		dBuV	dB	dBuV/m	dBuV/m	dB
1	30.970	Peak	15.47	22.95	38.42	40.00	-1.58
2	38.730	Peak	18.22	17.09	35.31	40.00	-4.69
3	48.430	Peak	28.74	10.60	39.34	40.00	-0.66
4	85.290	Peak	26.23	9.08	35.31	40.00	-4.69
5	756.530	Peak	18.33	24.36	42.69	46.00	-3.31
6	848.680	Peak	15.71	25.51	41.22	46.00	-4.78

6.2. POWERLINE CONDUCTED EMISSIONS

LIMIT

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The resolution bandwidth is set to 9 kHz for both peak detection and quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

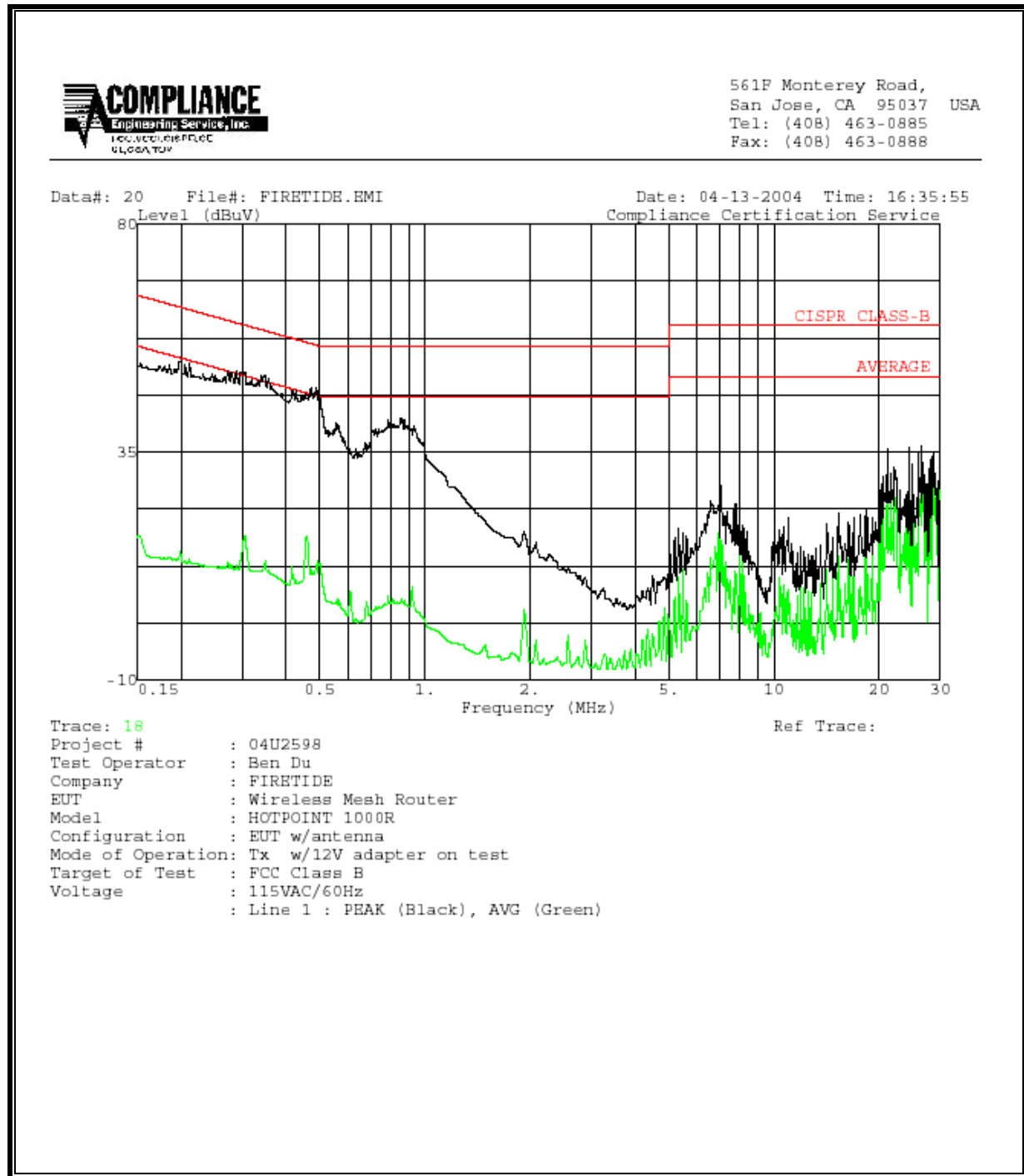
No non-compliance noted:

6.2.1. POWERLINE CONDUCTED EMISSIONS WITH 12V ADAPTER

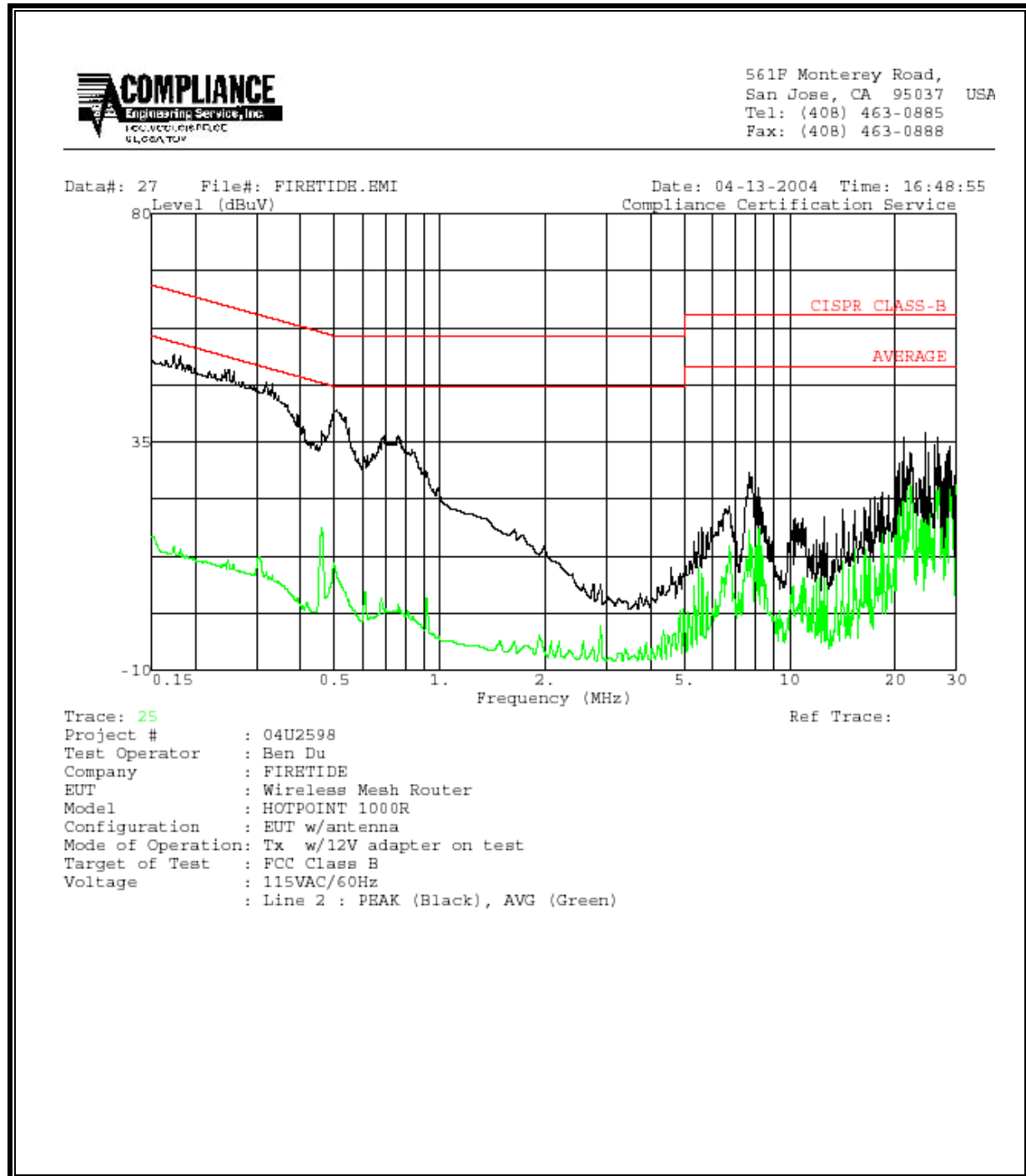
6 WORST EMISSIONS

Freq.	Reading			Closs	Limit	EN B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.31	50.88	--	18.41	0.00	61.51	51.51	-10.63	-33.10	L1
0.47	47.82	--	18.03	0.00	56.83	46.83	-9.01	-28.80	L1
0.88	41.44	--	8.35	0.00	56.00	46.00	-14.56	-37.65	L1
0.18	52.02	--	13.68	0.00	65.09	55.09	-13.07	-41.41	L2
0.32	46.86	--	18.16	0.00	61.14	51.14	-14.28	-32.98	L2
0.51	41.21	--	10.77	0.00	56.00	46.00	-14.79	-35.23	L2
6 Worst Data									

LINE 1 RESULTS



LINE 2 RESULTS

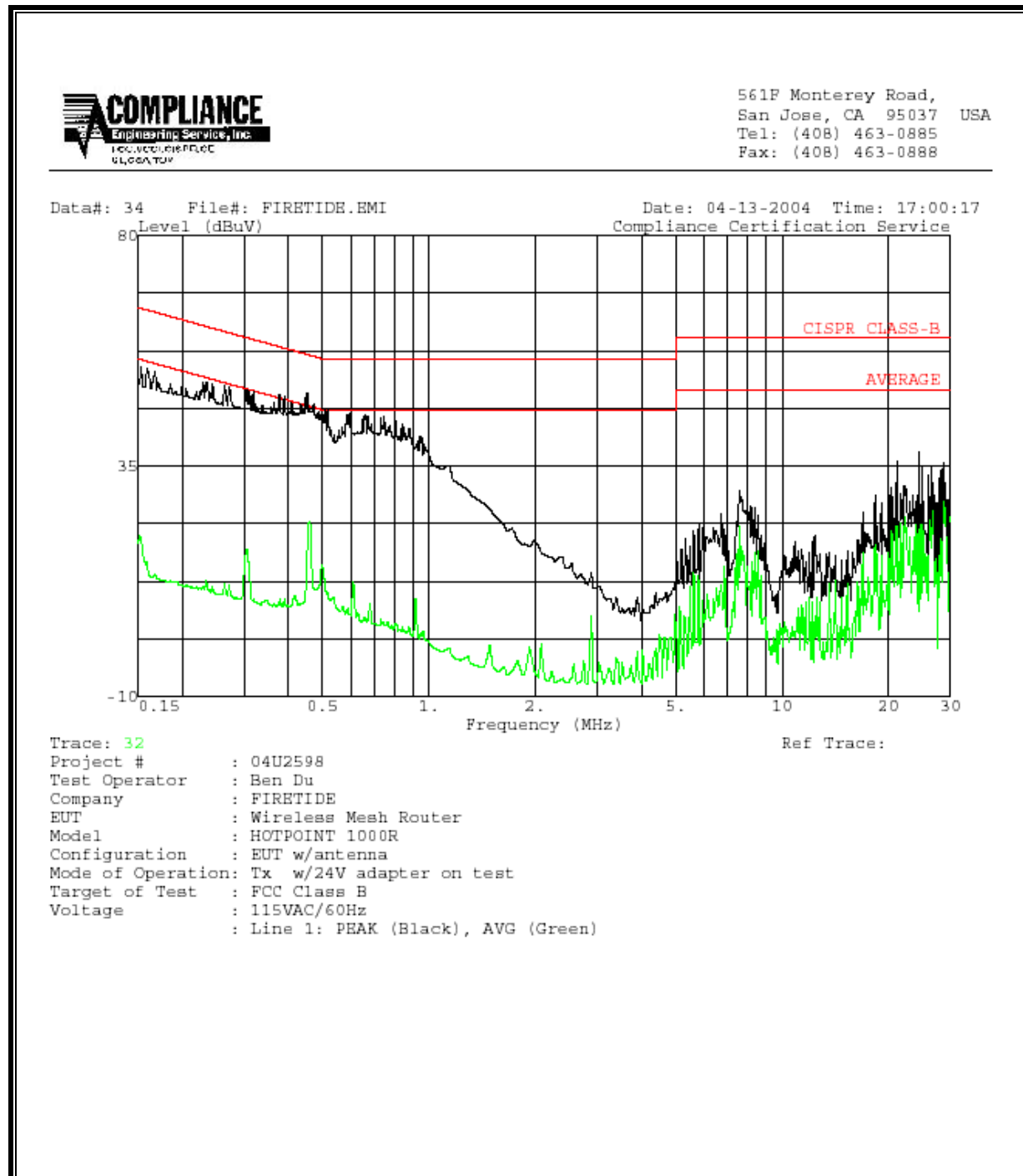


6.2.2. POWERLINE CONDUCTED EMISSIONS WITH 24V ADAPTER

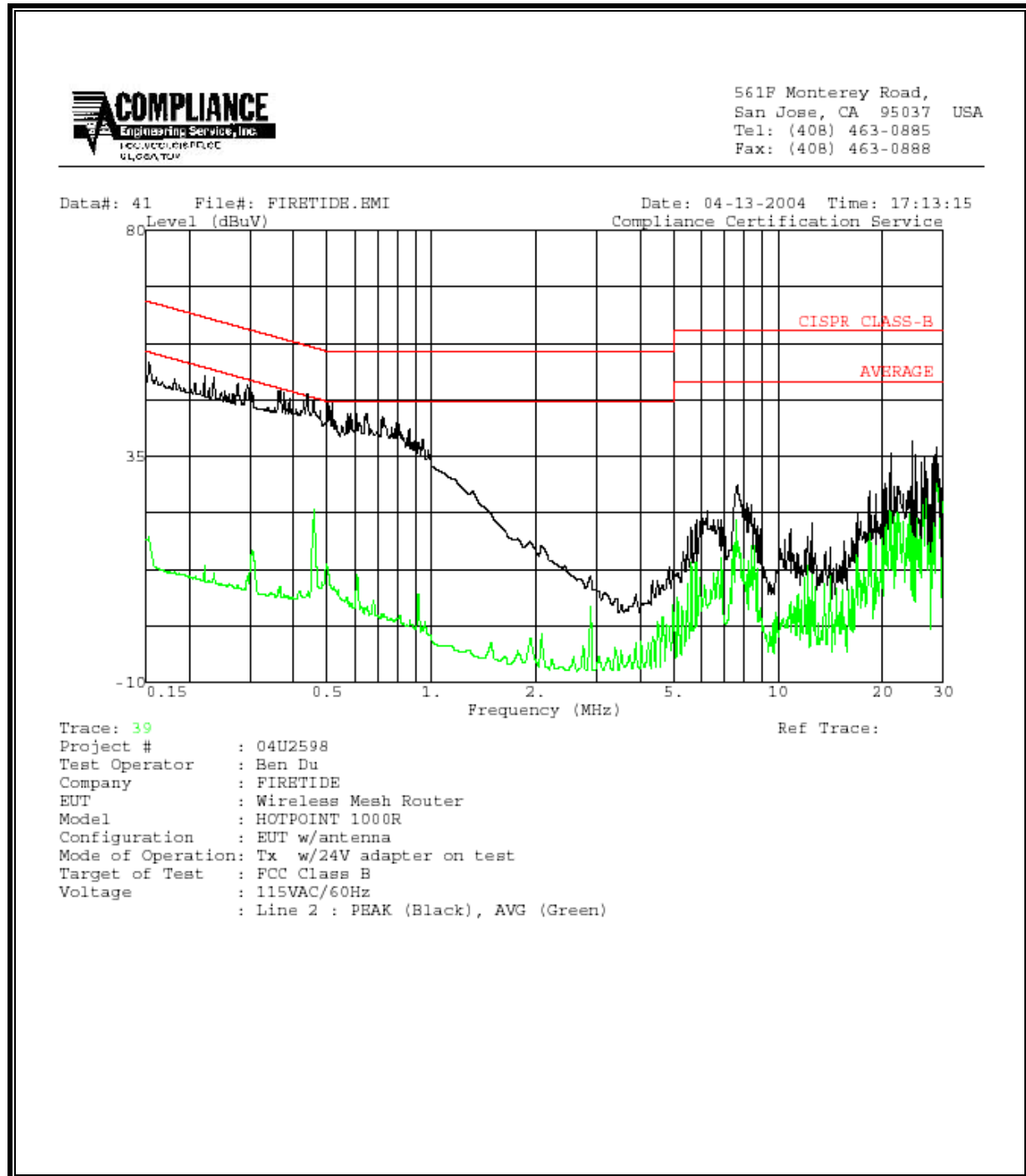
6 WORST EMISSIONS

Freq.	Reading			Closs	Limit	EN B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.17	53.58	--	21.39	0.00	65.49	55.49	-11.91	-34.10	L1
0.45	49.40	--	18.71	0.00	57.46	47.46	-8.06	-28.75	L1
0.66	45.04	--	24.20	0.00	56.00	46.00	-10.96	-21.80	L1
0.15	53.94	--	18.97	0.00	65.91	55.91	-11.97	-36.94	L2
0.44	47.56	--	24.41	0.00	57.71	47.71	-10.15	-23.30	L2
0.36	48.00	--	15.98	0.00	59.97	49.97	-11.97	-33.99	L2
6 Worst Data									

LINE 1 RESULTS



LINE 2 RESULTS

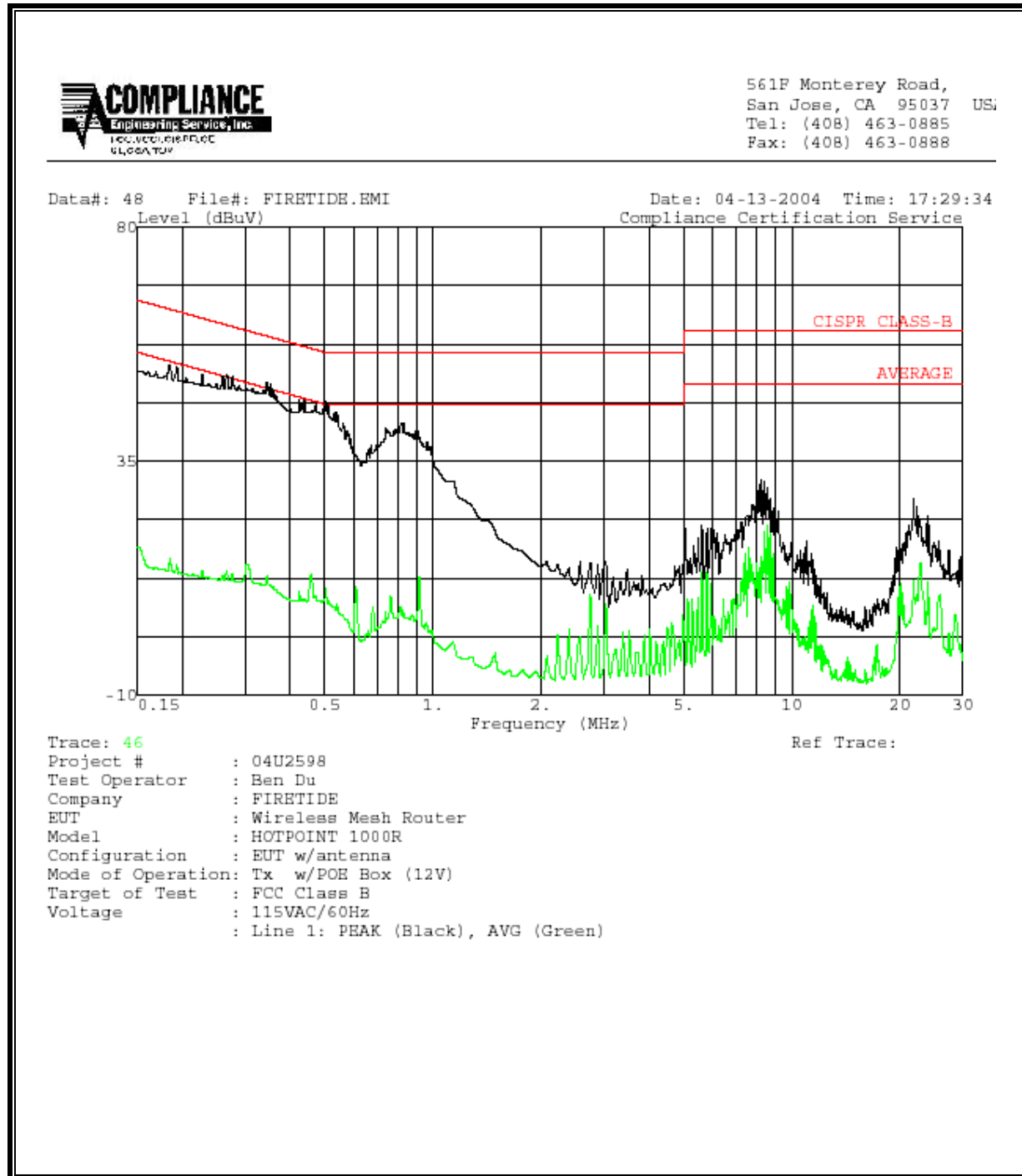


6.2.3. POWERLINE CONDUCTED EMISSIONS WITH POWER OVER ETHERNET

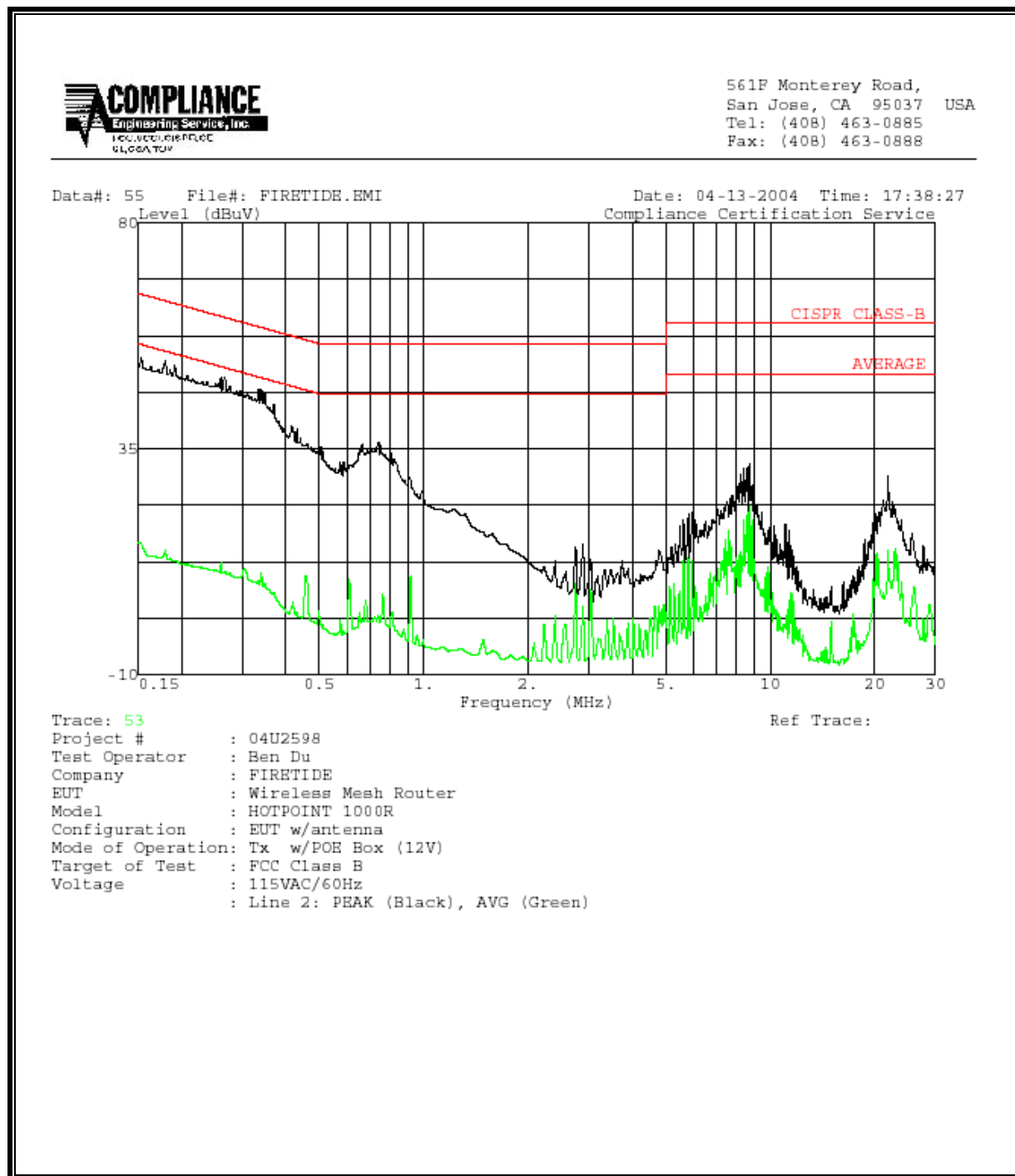
6 WORST EMISSIONS

Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.19	53.18	--	15.56	0.00	64.77	54.77	-11.59	-39.21	L1
0.35	49.99	--	13.12	0.00	60.40	50.40	-10.41	-37.28	L1
0.50	46.48	--	12.72	0.00	56.00	46.00	-9.52	-33.28	L1
0.18	52.56	--	14.79	0.00	65.14	55.14	-12.58	-40.35	L2
0.20	49.38	--	12.45	0.00	64.57	54.57	-15.19	-42.12	L2
0.74	36.29	--	9.46	0.00	56.00	46.00	-19.71	-36.54	L2
6 Worst Data									

LINE 1 RESULTS

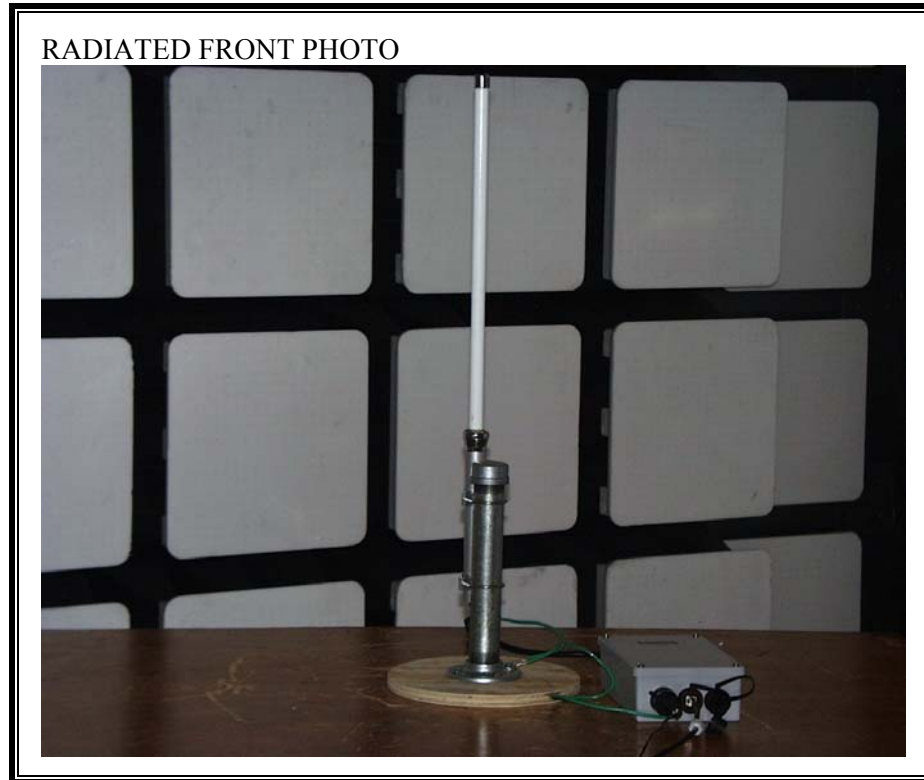


LINE 2 RESULTS



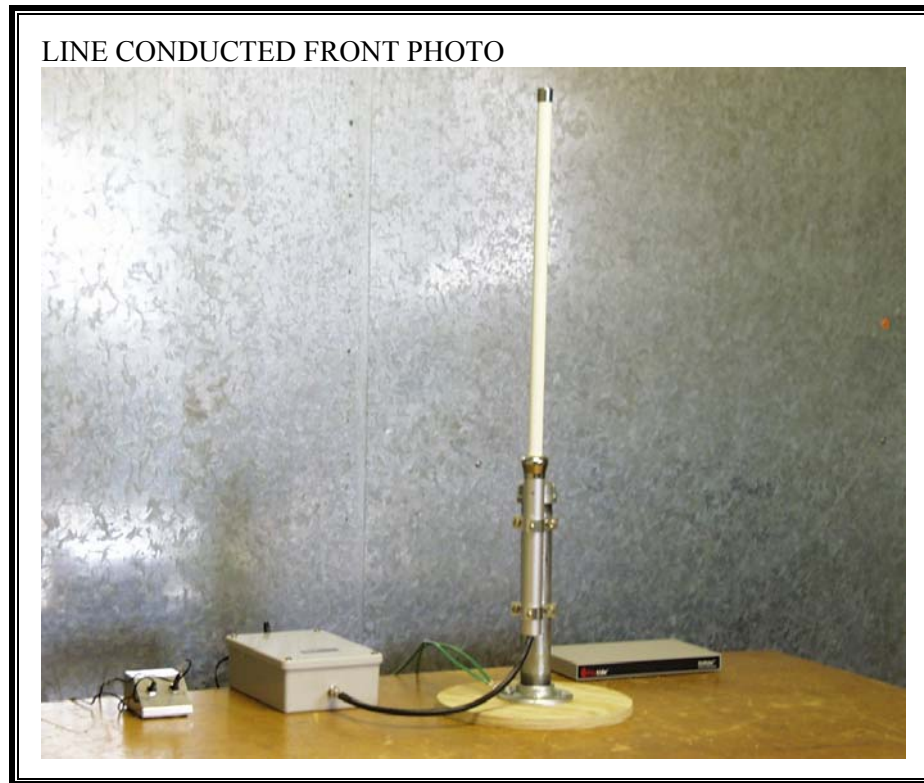
7. SETUP PHOTOS

RADIATED RF MEASUREMENT SETUP





POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP FOR 12V AND 24 V ADAPTERS



LINE CONDUCTED BACK PHOTO



POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP FOR POE



LINE CONDUCTED BACK PHOTO



END OF REPORT