1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

FEDERAL COMMUNICATIONS COMMISSION

Certification

2400-2483.5 MHz FHSS TRANSMITTER

FREQUENCY HOPPING SPREAD SPECTRUM RADIO FREQUENCY DEVICE

CERTIFICATION COMPLIANCE REPORT
ON

Symphony™-HRF Cordless USB Adapter…

MODEL 4230

CFR 47, FCC PART 15, SUBPART C, INTENTIONAL RADIATORS
CFR 47, FCC PART 15, SUBPART C, CLASS B, DIGITAL DEVICES

PREPARED FOR:

proxim INC.
510 DEGUIGNE DRIVE
SUNNYVALE, CA 94086

TESTING PERFORMED BY:

ELECTRONIC COMPLIANCE LABORATORIES, INC.

Testing Date	Report Number
NOVEMBER 12-20 1999	9111501B

IF THIS DOCUMENT IS REPRODUCED, IT MUST BE REPRODUCED IN ITS ENTIRETY.

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

TABLE OF CONTENTS

FEDERAL COMMUNICATIONS COMMISSION **1**
1.0 Verification of Compliance **4**
2.0 General Information **5**
2.1 Radiated Emission Test: 5
2.2 AC Line Conducted Test: 5
2.3 15.247 Operation within the 2400-2483.5 MHz band: 5
3.0 Test Facility **6**
4.0 Test Equipment Settings **7**
4.1 Test Equipment Settings 7
5.0 Antennas **7**
5.1 Antenna Table 7
6.0 Test Equipment **8**
6.1 Test Equipment Table 8
7.0 Data Reporting Format **9**
8.0 Detector Functions **10**
8.1 Frequency Range of Investigation 10
9.0 FCC Class Types **11**
9.1 CLASS A DIGITAL DEVICE 11
9.2 CLASS B DIGITAL DEVICE 11
10.0 FCC Limits **12**
10.1 Radiated Emission Limits 12
10.2 Conducted Emission Limits 12
11.0 Test Methods **13**
11.1 Radiated Emissions Test Procedure 13
11.2 Radiated Emissions Test Example 13
11.3 Line Conducted Emissions Test Procedure 14
11.4 Line Conducted Emissions Test Example 14
12.0 EUT **15**
13.0 SUPPORT EQUIPMENT **15**
14.0 EQUIPMENT CONFIGURATION **15**
15.0 SUMMARY OF TESTS **16**
15.1 15.247(a)(1) FREQUENCY HOPPING SYSTEMS 16
15.2 15.247(a)(1)(ii) CHANNEL UTILIZATION 16
15.3 15.247(b) MAXIMUM PEAK OUTPUT POWER 16
15.4 15.247(c) OUT OF BAND EMISSIONS 17
15.5 15.203 ANTENNA REQUIREMENT 17
15.6 15.205 RESTRICTED BAND RADIATION LIMITS 17
15.7 15.207 AC LINE CONDUCTED EMISSIONS 17
15.8 15.209 RADIATED EMISSIONS 18

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

APPENDIX A **19**

Radiated Emissions Data 19

APPENDIX B **21**

Conducted Emissions Data 21

APPENDIX C **24**

Spread Spectrum Plots 24

APPENDIX D **38**

Restricted Band Data 38

APPENDIX E **41**

Test Set-Up Configurations 41

APPENDIX F **45**

EUT Photographs 45

APPENDIX G **50**

Labeling Requirements 50

EXHIBIT A **53**

Letters of Interest 53

EXHIBIT B **54**

Proprietary Information 54

CONFIDENTIAL INFORMATION 54

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

1.0 VERIFICATION OF COMPLIANCE

EUT Description: ***Symphony™ HRF Cordless USB Adapter*** is a wireless point to point home networking transmitter which is easily adaptable in the USB Port on any computer.

Model Number: 4230
Serial Number: 0020A638FE8D
Applicant: Proxim Inc.

Type of Test: FCC Part 15 Class B ITE Certification Radiated /Conducted Emissions
FCC Part 15.247 Intentional Radiator

FCC ID Number: IMK-HRFUSB

Registration: NVLAP Code: 200089

Date of Test: 11/12-20/99

Tested By: Jook Lee, Suresh Kondapolli

The above equipment was tested by Electronic Compliance Laboratories, Inc. and found to be in compliance with the requirements set forth in the CFR 47, FCC Rules and Regulations applicable to Radio Frequency Devices and Information Technology Equipment. The equipment, in the configuration described in this report, shows that the maximum emission levels emanating from this equipment are within the compliance requirements.

Date: 12/20/99

Chip Matheny
Technical Officer

Date: 12/30/99

Altan Yazar
RF Engineer

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

2.0 GENERAL INFORMATION

Applicant: PROXIM INCORPORATED

Applicant Address: 510 Deguigne Drive
Sunnyvale, CA 94086

Contact Name: Altan Yazar
Contact Telephone: 408/731-2746
Contact Fax: 408/731-2701

EUT Description: ***Symphony™ HRF Cordless USB Adapter*** is a wireless point to point home networking transmitter adapter which is easily installed in the home environment

Model Number: 4230
Serial Number: 0020A638FE8D
Report Number: 9120202B
FCC ID Number: IMK-HRFUSB
Date of Test: 11/12-20/99

Manufacturer: Proxim, Inc.

Type of Test: FCC Part 15 Class B ITE Certification Radiated /Conducted Emissions
FCC Part 15.247 Radiated/Conducted Measurements

Frequency Range: Conducted Emissions-450 kHz to 30 MHz – Radiated Emissions 30 MHz to 1000 MHz - Radiated Emissions 1000 MHz to 24.8 GHz – Part 15.247

SUMMARY

Pass/Fail: PASSED

2.1 RADIATED EMISSION TEST:

The ***Proxim Symphony-HRF™ Cordless USB Adapter*** was placed on a 3-meter open field test site. All emissions observed were below the applicable limit. All emissions observed were below the FCC Class B limit. Test results are in ***Appendix A.***

2.2 AC LINE CONDUCTED TEST:

The ***Proxim Symphony-HRF™ Cordless USB Adapter*** was placed in a screen room and connected to AC power through a LISN. All other associated peripherals and support equipment were connected to a separate power source. All emissions observed were below the FCC Class B limit. Test results are in ***Appendix B.***

2.3 15.247 OPERATION WITHIN THE 2400-2483.5 MHZ BAND:

The ***Proxim Symphony-HRF™ Cordless USB Adapter*** met all the requirements. See data and plots in Appendices.

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

3.0 TEST FACILITY

Name: ***Electronic Compliance Laboratories, Inc.***

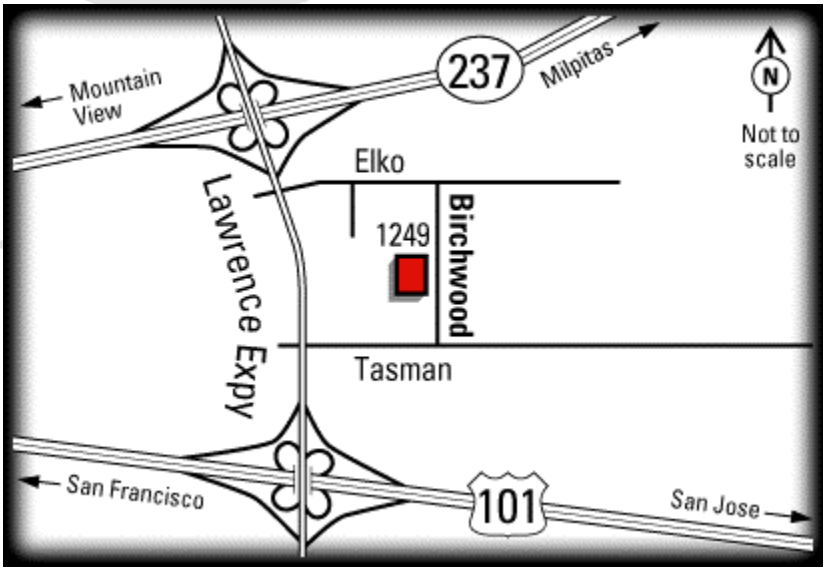
Location: 1249 Birchwood Drive
Sunnyvale, CA 94089

Site Filing: A site description is on file at the;
Federal Communications Commission
P.O. Box 429
Columbia, MD 21045

Types of Sites: Open Field Radiated and Indoor (Screen Room). Line Conducted: All sites are constructed and calibrated to meet ANSI C63.4-1994 requirements. Test facility is recognized by the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations.

NVLAP Code: 20089 effective through: March 31, 2000

LOCATION OF THE SUNNYVALE TEST FACILITY



www.eclabs.com

800/707-LABS

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

4.0 TEST EQUIPMENT SETTINGS

4.1 TEST EQUIPMENT SETTINGS

Parameter	Line Conducted Emissions	Radiated Emissions
Bandwidth	9 kHz	120kHz
*Detector Mode	Peak	Peak

*Unless otherwise specified

Units of Measurement

Measurements of radiated emissions are reported in terms of microvolts per meter or in dBuV/m at a specified distance. The indicated readings on the spectrum analyzer are converted to microvolts per meter or to dBuV/m by the use of appropriate confversion factors. Measurements of conducted interference
are reported in units of microvolts or dBuV.

5.0 ANTENNAS

5.1 ANTENNA TABLE

Antenna Type	Frequency Range
Biconical	25 to 300 MHz
Log Periodic	300 to 1000MHz
Horn Double Ridge	1 to 18GHz
Horn Parabolic	4.9 to 10GHz
Horn Polarad	4.7 to 7.74GHz
Horn Polarad	8.3 to 10GHz

Correction Factors: Programmed into the software
Antenna Height: Varied from 1 to 4 meters above the ground plane
Polarization: Vertical/Horizontal

Note: The antenna used at the time that the data was taken is indicated on each data page in the apppendices. The correction factors and antenna polarization are also noted on each data page.

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

6.0 TEST EQUIPMENT

The following list contains equipment used at EC Laboratories, Inc. for compliance testing. The equipment conforms to the American National Standard Specifications for Electromagnetic Interference and Field Strength Instrumentation from 10 kHz to 1000 MHz.

6.1 TEST EQUIPMENT TABLE

Description	Manufacturer	Serial No.	Model No.
EMI Receiver	HP	3325A00137	8456A
Power Meter	HP	3125U13399	437B
Power Sensor	HP	3318A16275	8481
Spectrum Analyzer	HP	3137A01183	8563A
Pre-amp	HP	3113A05849	8447F
Pre-amp	HP	3008A00527	8449B
LISN	EM	2532	ANS-25/2
Biconical Antenna	EM	677	EM-6912
Log-Periodic Antenna	EM	858	EM-6950
Double Ridge Horn	EM	6231	EM 6961
Filter BP 1.2-4 GHz	FSY	001	HM1160-11SS
Filter BP 4-10 GHz	FSY	001	HM2950-15SS
Filter BP 10-18 GHz	FSY	001	HP8601-7SS

HP = Hewlett Packard
EM = Electro Metrics
FSY = FSY Microwave

Antennas used at the time the data was taken is indicated on each data page.
Antenna height and polarization are also noted on the data pages.

Calibration of the measuring instruments, including any accessories that may effect such calibration, are checked frequently to assure their accuracy. Adjustments are made and correction factors applied in accordance with instructions contained in the manual for the measuring instrument. All equipment is calibrated per EC Labs' Test Equipment Calibration Schedule as required per EN 45001 and NVLAP Accredidations.

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

7.0 DATA REPORTING FORMAT

The measurement results are expressed in accordance with FCC Part 15 Subpart B Class B limits, where applicable, are presented in tabular or graphical form.

7.1 Operating Conditions

The EUT was operated at the specified load conditions (mechanical and/or electrical) for which it was designed.

7.2 Conditions of the EUT

The EUT was operated for a sufficient period of time to approximate normal operating conditions.

7.3 Test Configuration

The equipment under test was configured and operated in a manner that tends to maximize its emission characteristics in a typical application. Power and signal distribution, ground, interconnecting cabling and physical placement of equipment were simulating the typical application and usage in so far as practicable. The EUT was furnished with rated voltage as specified by the manufacturer in the individual equipment's power requirements.

7.4 Test Platform

The EUT was placed on a non-conductive table having a height of 1 meter above the test site ground.

7.5 Maximization of Emissions

The test platform was rotated 360 degrees along with the moving of cabling and/or equipment in order to determine the maximum level of emissions.

7.6 Temperature

The ambient temperature of the testing location was within the range of 10 to 40 degrees Centigrade (50 to 104 Degrees Fahrenheit).

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

8.0 DETECTOR FUNCTIONS

On any frequency or frequencies below or equal to 1000 MHz, the limits shown below are based on measuring equipment employing a CISPR quasi-peak detector function and related measurement bandwidths.

On any frequency or frequencies above 1000 MHz, the radiated limits shown below are based on the use of measuring equipment employing an average detector function.

EC Laboratories uses the Peak detection mode for normal testing and initial screening of the EUT. The Peak detection mode will produce a measurement value that is always greater than, or equal to, the quasi-peak or average detection mode. Whenever the measurement value is 6 dB below the applicable limit or greater, the appropriate detector function will be employed and recorded.

8.1 FREQUENCY RANGE OF INVESTIGATION

The spectrum was investigated up to the frequency specified in the following table according to the highest clock frequency generated in the device.

Highest Frequency Used (Clock)	Upper Limit of Range Measured
Below 1.705 MHz	30 MHz
1.705 to 108 MHz	1000 MHz
108 to 500 MHz	2000 MHz
500 to 1000 MHz	5000 MHz
Above 1000 MHz	10th Harmonic or 40 GHz (Whichever is Lower)

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

9.0 FCC CLASS TYPES

9.1 CLASS A DIGITAL DEVICE

A digital device that is marketed for use in a commercial, industrial or business environment, exclusive of a device which is marketed for use by the general public or is intended to be used in the home.

9.2 CLASS B DIGITAL DEVICE

A digital device that is marketed for use in a residential environment notwithstanding use in commercial, business and industrial environments. Examples of such devices include, but are not limited to, personal computers, calculators, and similar electronic devices that are marketed for use by the general public.

> Note: The responsible party may also qualify a device intended to be marketed in a commercial, business, or industrial environment as a Class B device, and in fact is encouraged to do so, provided that the device complies with the technical specifications for a Class B digital device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B digital device, regardless of its intended use.

(Code of Federal Regulations, Part 15, Subpart A, Sect.H&I)
(CFR 47, Parts 0 to 19, Revised as of October 1, 1990)

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

10.0 FCC LIMITS

10.1 RADIATED EMISSION LIMITS

The field strength of radiated emissions for a Class A Digital Device, when measured at a distance of 10 meters, shall not exceed the limits given in the table below. The lower limit applies at the band edge.

The field strength of radiated emissions for a Class B Digital Device, when measured at a distance of 3 meters, shall not exceed the limits given in the table below. The lower limit applies at the band edge.

Frequency (MHz)	Class A (3m) Limit (µV/m)	Class A (3m) Limit (dBµV/m)	Class A (10m) Limit (µV/m)	Class A (10m) Limit (dBµV/m)	Class B (3m) Limit (µV/m)	Class B (3m) Limit (dBµV/m)
30-88	300	49.6	90	39.1	100	40.0
88-216	500	54.0	150	43.5	150	43.5
216-960	700	56.0	210	46.4	200	46.0
Above 960	1000	60.0	300	49.5	500	54.0

10.2 CONDUCTED EMISSION LIMITS

For a digital device that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back into the AC power line on any frequency or frequencies within the band 450kHz to 30MHz shall not exceed the limits in the following table for the appropriate class. Compliance shall be based on the measurement of the Radio Frequency voltage between each power line and ground at the power terminals. The lower limit applies at the band edges.

Frequency (MHz)	Class A Limit (µV)	Class A Limit (dBµV)	Class B Limit (µV)	Class B Limit (dBµV)
0.45 to 1.705	1000	60.0	250	48.0
1.705 to 30.0	3000	69.5	250	48.0

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

11.0 TEST METHODS

11.1 RADIATED EMISSIONS TEST PROCEDURE

(1) EUT and any other equipment and cables used with the EUT are placed on a non-conductive table 1-meter above a ground plane.
(2) The EUT receives the normal AC Power at the base of the table.
(3) All equipment and cables are placed in a manner, which tends to maximize their emission characteristics in a typical application.
(4) The table is rotated 360 degrees to determine the maximum radial emissions.
(5) The antenna height is varied between 1 meter and 4 meters above the ground plane to determine the maximum emissions. Appropriate antennas are used during the test in both the vertical and horizontal polarization.
(6) The Spectrum Analyzer is scanned from 30 MHz to 1000 MHz for emissions. The applicable spectrum analyzer settings are:
   a). Resolution Bandwidth = 100 kHz,
   b). Normal Detector Mode = Peak (The Quasi-Peak is used when the emissions are near, or over the limit).
(7) When an emission is found and maximized, the following actions are performed:
   a). The emission frequency is entered into the computer.
   b). The emission level is read from the spectrum analyzer in dBm and entered into the computer.
   c). The antenna polarization is entered into the computer.
   d). The computer converts the level in dBm to dBµV and uses lookup tables to determine the coax cable loss, antenna factor, and pre-amp gain. A site correction factor is calculated for that particular frequency, and the data is printed out in tabular form.

11.2 RADIATED EMISSIONS TEST EXAMPLE

FREQ	SITE			FCC Limit		EUT Level (L1)	
MHz	Raw (dBm)	CF (dB)	Corr'd (dBµV)	Class A (dBµV)	Class B (dBµV)	A (dB)	B (dB)
65.4	-58	-14.5	34.5	39.1	40.0	-4.6	-5.5

Frequency = Frequency of emission in MHz
Raw dBm = Reading at Spectrum Analyzer(uncorrected)
Site CF = Correction Factor for coax/antenna/preamp for that frequency. Note that a negative CF is the result of the gain of the preamp.
Corr'd dBuV = Corrected emission level in dBuV
FCC Limit A / B = Limit as stated in Part-15, Subpart B
EUT Level A* = Emission relative to the FCC Class A Limit.
EUT Level B* = Emission relative to the FCC Class B Limit.

Note: V/H is the antenna polarization (Vertical or Horizontal)

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

QP indicates the Quasi-Peak value.

*A negative value indicates that the emission is below (or meets) the limit and a positive value indicates that the emission is above (or exceeds) the limit.

11.3 LINE CONDUCTED EMISSIONS TEST PROCEDURE

1. EUT and any other equipment and cables were placed on a non-conductive table one meter above a ground screen.
2. The EUT's Input Power line cord was connected to a Line Impedance Stabilization Network (LISN).
3. All other (Non-EUT) equipment received power from a separate AC Power Source. The LISN assembly has two monitoring points: Line 1 (AC-Hot) and Line 2 (AC-Neutral). Each monitoring point was scanned by the measuring equipment (the other point was terminated in 50 ohms) over the frequency range of 450kHz to 30MHz for conducted emissions
4. When an emission is found, the following takes place:
   a. The emission levels are maximized by equipment/cable placement.
   b. Frequency and emission level data are entered into computer in dBm.
   c. The monitoring point (Line 1 or 2) is entered into the computer.
   d. The computer converts dBm to micro volts and uses a look-up table to find cable losses (in dB) at that frequency, calculates a corrected emission level, and compares the corrected emission level to the appropriate limit. The data is then printed out in tabular form.

   An example of the printout and definitions follows:

11.4 LINE CONDUCTED EMISSIONS TEST EXAMPLE

FREQ	SITE			FCC Limit		EUT Level (L1)	
MHz	Raw (dBm)	CF (dB)	Corr'd (dBµV)	Class A (dBµV)	Class B (dBµV)	A (dB)	B (dB)
1.85	-57	15.0	65.0	69.5	48.0	-4.5	+17

Frequency = Frequency of emission in MHz
Raw dBm = Reading at Spectrum Analyzer(uncorrected)
Site CF = Correction Factor for cable loss
Corr'd dBuV = Corrected emission level in dBuV
FCC Limit A / B = Conducted Emission level limit in dBµV
EUT Level 1* = Emission relative to the FCC Class A Limit
EUT Level 2* = Emission relative to the FCC Class B Limit

Note: L1 is AC-Hot, L2 is AC-Neutral
QP is a Quasi-Peak value
AV is an Average value

*A negative value indicates that the emission is below (or meets) the limit and a positive value indicates that the emission is above (or exceeds) the limit.

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

12.0 EUT

The USB is a point to point, point to multipoint *Wireless Home Network Adapter* operating in the 2.4- 2.5 GHz ISM Band. The unit has an integrated antenna, which operates in a full duplex mode.

13.0 SUPPORT EQUIPMENT

Equipment Type: Compaq Presario Laptop Computer
Model Number: 1275
Serial Number: 1V99CLR792YF
Manufacturer: Compaq Computer Corporation
Comments:

Equipment Type:
Model Number:
Serial Number:
Manufacturer:
Comments:

14.0 EQUIPMENT CONFIGURATION

All of the equipment and cables were placed in worst case positions to maximize emissions.
Interconnecting cables were of the type and length specified in the individual equipment requirements.
Grounding was in accordance with the manufacturers requirements and conditions for intended use.

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

15.0 SUMMARY OF TESTS

The EUT is a USB Cordless LAN Adapter with a low power frequency hopping spread spectrum (FHSS) radio operating in the 2400-2483.5 MHz ISM band. Tests were performed with the integral antenna. An internal test connector was fitted for the conducted measurements. Test firmware resident in the EUT and was used for the test.

15.1 15.247(A)(1) FREQUENCY HOPPING SYSTEMS

The EUT uses 79 channels, each 1 MHz wide. The system hops over one of 15 pseudorandom sequences. On average, each channel is used equally. Please refer to " RangeLAN2 Frequency Hopping Theory of Operation" (confidentiality requested) in ***Appendix J*** for more details.

15.2 15.247(A)(1)(II) CHANNEL UTILIZATION

A spectrum analyzer plots labeled "Channel Utilization". The total number of channels is 79. The channels used have nominal center frequencies of 2402 through 2480 MHz. Three spectrum analyzer MAX HOLD plots labeled "20 dB Bandwidth" show the 20 dB bandwidth of the hopping channel to be < 1 MHz (965 / 955 / 860 kHz) at the low/midband/high frequencies of 2.402 / 2.44 / 2.48 GHz. Test Plots are shown in ***Appendix C*.**

Zero span spectrum analyzer plot labeled "Channel Occupancy" shows worst case transmission time on a given channel:

Occupancy interval:	390ms, <100 % duty
Maximum allowed:	400 msec

Test Data in ***Appendix C.***

15.3 15.247(B) MAXIMUM PEAK OUTPUT POWER

The three spectrum analyzer plots labeled "Power Out" show the maximum measured power of the hopping channel to be **20.17 dBm** or **104 mW**. The EUT was made to transmit uninterrupted random data on each of the low/mid/high channels.
Test Plots are shown in ***Appendix C.***

The output was taken from an internal MMS test connector, through 1 foot of RG 142 cable, to Spectrum Analyzer set on Max Hold with no additional attenuation.

Power = 20.17 dBm (peak reading) +0.3dB cable loss = **+20.47 dBm / 111 mW**

Limit: +30 dBm / 1 W maximum power

Integral Antenna (part of PCB pattern)

EIRP = **+20.47dBm** (peak power) +peak antenna gain (2dBii) = **+22.47 dBm / 177mW**
EIRP Limit: +36 dBm / 4 W maximum EIRP

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

15.4 15.247(c) OUT OF BAND EMISSIONS

The spectrum analyzer plots titled "Out of Band - Band Edges" show the output spectrum of the EUT while hopping one of the pseudorandom sequences and continuously transmitting packetized data. The analyzer was placed in MAX HOLD mode, and individual sweeps were recorded continually for 10 minutes with the same spectrum analyzer connection as was used for peak output power. The resultant plot shows that the EUT emissions remain inside the 2400 - 2483.5 MHz band when measured in >= 100 kHz bandwidth during operation.

The spectrum analyzer plots labeled "Out of Band 30 to 1000 MHz", " Out of Band 1 to 2.75 GHz", and "Out of Band 2.75 to 26.5 GHz" show that emissions measured in >= 100 kHz bandwidth outside of the 2400 - 2483.5 MHz band are more than 20 dB below the highest level of the desired power Test Plots are shown in *Appendix C.*

15.5 15.203 ANTENNA REQUIREMENT

The antenna is an integral part of the EUT. It is part of the printed circuit pattern on the circuit board inside the plastic case of the EUT.

15.6 15.205 RESTRICTED BAND RADIATION LIMITS

The EUT was placed on a wooden table resting on a turntable. The wooden table was approximately 1 meter above the groundplane of the 3 meter test site. The search antenna was moved in to 1 meter when necessary to improve the noise floor, and the appropriate range factor was applied. While the EUT was transmitting uninterrupted random data on each of the low/mid/high channels and with the spectrum analyzer on MAX HOLD, the turntable was rotated, and the search antenna raised and lowered in an attempt to maximize the received radiated emission level. Test results are attached in ***Appendix D*** in tabular form showing that no spurious signals were detected above the 74 dBuV/m peak/54dBuV/m average limits. Peak measurements were made with a RBW and VBW = 1 MHz. Average measurements were made with a RBW = 1 MHz and a VBW = 10 Hz.

15.7 15.207 AC LINE CONDUCTED EMISSIONS

The RF line conducted levels for emissions in the 0.45 - 30 MHz band must not exceed 250 µ V when measured with a LISN. Attached graphs and tabular data show that emissions are below the 250 µV (48 dBµV) maximum allowed level. Test Data are in ***Appendix B****.*

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

15.8 15.209 RADIATED EMISSIONS

The attached table shows that the Class B radiated limits from 30 - 1000 MHz are not exceeded by the EUT. The EUT was operating normally with a combination of transmission and reception and hopping one of the fifteen pseudorandom sequences during this test. The EUT was placed near one edge of a wooden table resting on a turntable. The wooden table was approximately 1 meter above the groundplane of the 3 meter test site. The search antennas were located at 3 meters. Measurements were made in accordance with ANSI C63.4-1994**.**

Test Data are in ***Appendix A.***

ELECTRONIC COMPLIANCE LABORATORIES, INC.

Chip Matheny
Chief Technical Officer
Electronic Compliance Laboratories, Inc.

12/30/99
Date:

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

proxim Symphony-HRF™ cordless Network USB... Adapter

APPENDIX A

RADIATED EMISSIONS DATA

Contents:

Report Information	
Product Name:	Symphony-HRF USB Adapter
Model Number:	4230
Report Number:	9120202B
File Name:	USBappendixA.pdf

Contact Info:

PROXIM, Inc.	510 DeGuigne Drive	Sunnyvale, California 94086	408/731-2700 408/731-2701fax	Website www.proxim.com
Proxim's Contact:	Altan Yazar	Design Engineer	408/731-2746	altan@proxim.com
EC Labs Contact:	Chip Matheny	Chief Technical Officer	408/747-1490	chip@eclabs.com

FREQUENCY HOPPING SPREAD SPECTRUM (FHSS) RF INTENTIONAL RADIATOR
FCC PART 15.247 SUBPART C, CLASS B CERTIFICATION

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

ELECTRONIC COMPLIANCE LABORATORIES, INC.

1249 BIRCHWOOD DRIVE, SUNNYVALE, CALIFORNIA 94089
408/747-1490 – WWW.ECLABS,COM

RADIATED EMISSIONS AGENCY/LIMITS: FCC PART 15 DIGITAL DEVICES FCC CLASS B
FREQUENCY RANGE: 30MHz-1000MHz

EUT/CLIENT INFORMATION

Client Name: Proxim, Inc.
E.U.T Name: Symphony-HRF(4230) Cordless USB Adapter
Serial Number: 0020A638FE8D
FCC ID: IMK-HRFUSB

TEST INFORMATION

Support Device(s): Lap-Top
Serial Number(s): 1V99CLR92YF
Exercise Program: Internal
Modifications: N/A

Operator: Jook
Date: 10:38:46
Start Time: 10:38:00
Report File Name: 9111201
Site: 10 Meter Open Site
Site Cal Date: March 1999

ANTENNA: Bi-con **NOTES:** CHANGED TO LOG PERIODIC AFTER 200 MHZ

TEST FREQ	TEST dBuV	ACTUAL dBuV /M	CLASS B LIMIT	VERSUS B LIMIT	TABLE DEGREES	ANTENNA HEIGHT	POLAR-IZATION	DETECTOR TYPE*
64.000	32.7	15.8	40.0	-24.2	0	1.5	V	PK
126.750	37.8	27.5	43.5	-16.0	0	1.5	V	PK
192.950	32.3	23.9	43.5	-19.6	90	1.5	V	PK
224.000	29.7	22.0	46.0	-24.0	180	1.5	V	PK
256.000	30.1	22.7	46.0	-23.3	0	1.5	V	PK
288.000	27.9	23.8	46.0	-22.2	180	1.5	V	PK
144.000	33.7	24.1	43.5	-19.4	0	1.5	V	PK
192.000	32.3	23.9	43.5	-19.6	0	1.5	V	PK
240.000	34.6	27.1	46.0	-18.9	0	1.5	V	PK
288.000	28.2	24.0	46.0	-22.0	0	1.5	H	PK
32.000	24.6	17.5	40.0	-22.5	0	1.5	H	PK
48.000	27.0	13.9	40.0	-26.1	0	1.5	H	PK
320.000	31.4	22.3	46.0	-23.7	180	1.5	V	PK
368.000	52.9	44.6	46.0	-1.4	0	1.5	V	PK
336.000	35.5	26.5	46.0	-19.5	90	1.5	V	PK
432.000	33.9	26.8	46.0	-19.2	0	1.5	V	PK
480.000	38.7	33.0	46.0	-13.0	90	1.5	V	PK
528.000	32.9	28.1	46.0	-17.9	0	1.5	V	PK
576.000	33.5	29.5	46.0	-16.5	0	1.5	V	PK
624.000	30.5	27.2	46.0	-18.8	180	1.5	V	PK

NOTES:
*QP= QUASI PEAK P= PEAK

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

proxim Symphony-HRF™ cordless Network USB... Adapter

APPENDIX B

CONDUCTED EMISSIONS DATA

Contents:

Report Information	
Product Name:	Symphony-HRF USB Adapter
Model Number:	4230
Report Number:	9120202B
File Name:	USBappendixB.pdf

Contact Info:

PROXIM, Inc.	510 DeGuigne Drive	Sunnyvale, California 94086	408/731-2700 408/731-2701fax	Website www.proxim.com
Proxim's Contact:	Altan Yazar	Design Engineer	408/731-2746	altan@proxim.com
EC Labs Contact:	Chip Matheny	Chief Technical Officer	408/747-1490	chip@eclabs.com

FREQUENCY HOPPING SPREAD SPECTRUM (FHSS) RF INTENTIONAL RADIATOR
FCC PART 15.247 SUBPART C, CLASS B CERTIFICATION

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

Conducted Emissions /15.209 450kHz – 30 MHz Range

ELECTRONIC COMPLIANCE LABORATORIES, INC.
1249 BIRCHWOOD DRIVE, SUNNYVALE, CALIFORNIA 94089
408/747-1490 - WWW.ECLABS.COM - 800/707-1490

Conducted Emissions FCC PART 15.207
Agency/Limits: FCC CLASS B
Frequency Range: 450KHz-30MHz

EUT/CLIENT INFORMATION

Client Name: Proxim, Inc.
E.U.T Name: Symphony-HRF(4230) Cordless USB Adapter
Serial Number: 0020A638FE8D
FCC ID: IMK-HRFUSB
Notes: N/A

TEST INFORMATION

Support Device(s): Lap-Top
Serial Number(s): 1V99CLR92YF
Exercise Program: Internal
Modifications: N/A

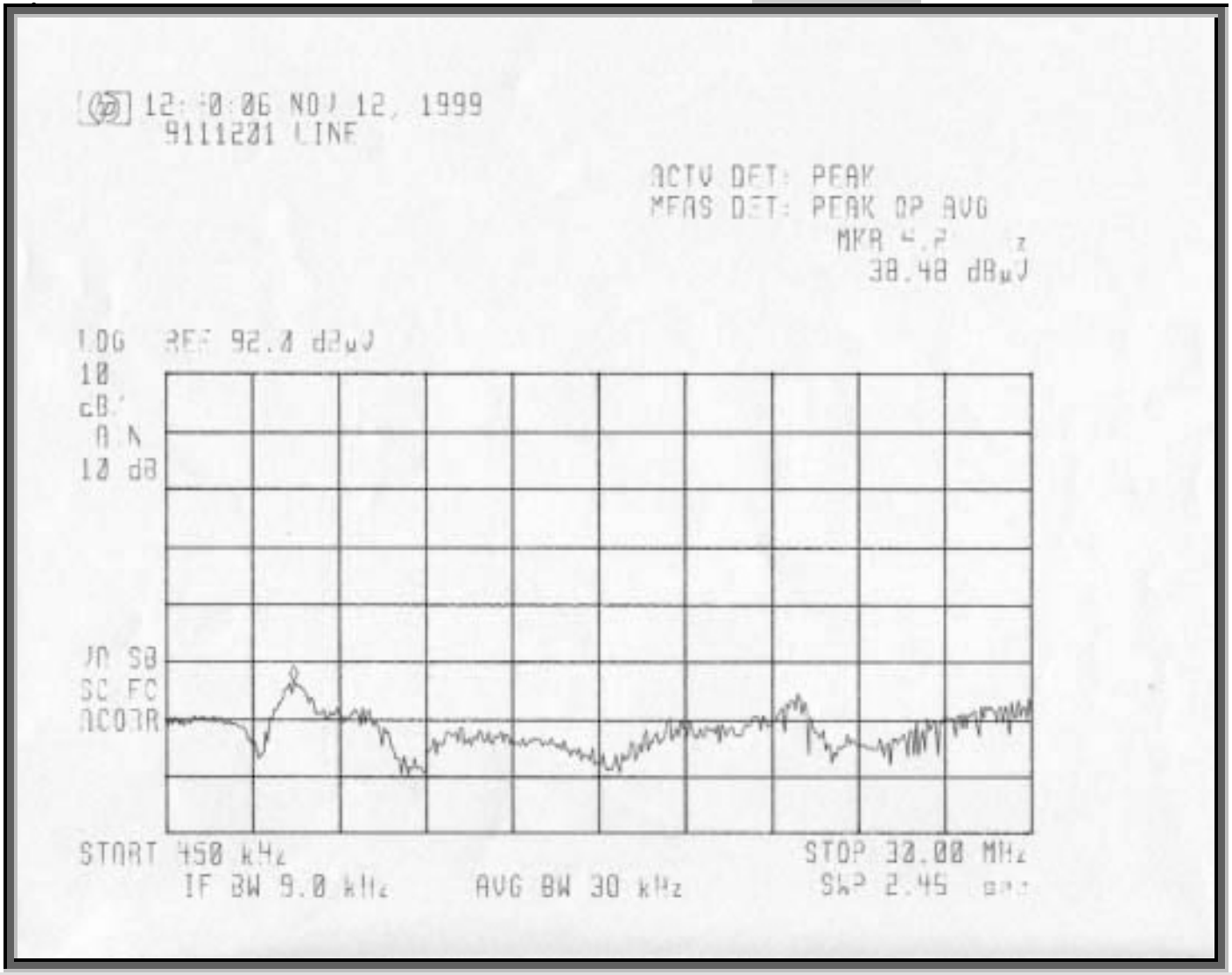
Operator: Jook
Date: 11/12/99
Start Time: 12:07
Report File Name: 9111201
Site: Screen Room
Site Cal Date: **March 1999**

NOTES:

TEST FREQ	TEST dBuV	CLASS B LIMIT	VERSUS B LIMIT	CONDUCTOR	DETECTOR TYPE*
4810.00	38.48	47.96	-9.48	Line	PK
10570.00	30.27	47.96	-17.69	Line	PK
22020.00	36.34	47.96	-11.62	Line	PK
29560.00	35.25	47.96	-12.71	Line	PK
26450.00	31.94	47.96	-16.02	Line	PK
17590.00	31.74	47.96	-16.22	Line	PK
4730.00	34.56	47.96	-13.40	Neutral	PK
11460.00	24.58	47.96	-23.38	Neutral	PK
18250.00	30.24	47.96	-17.72	Neutral	PK
21580.00	34.64	47.96	-13.32	Neutral	PK
26600.00	34.11	47.96	-13.85	Neutral	PK
29700.00	37.10	47.96	-10.86	Neutral	PK

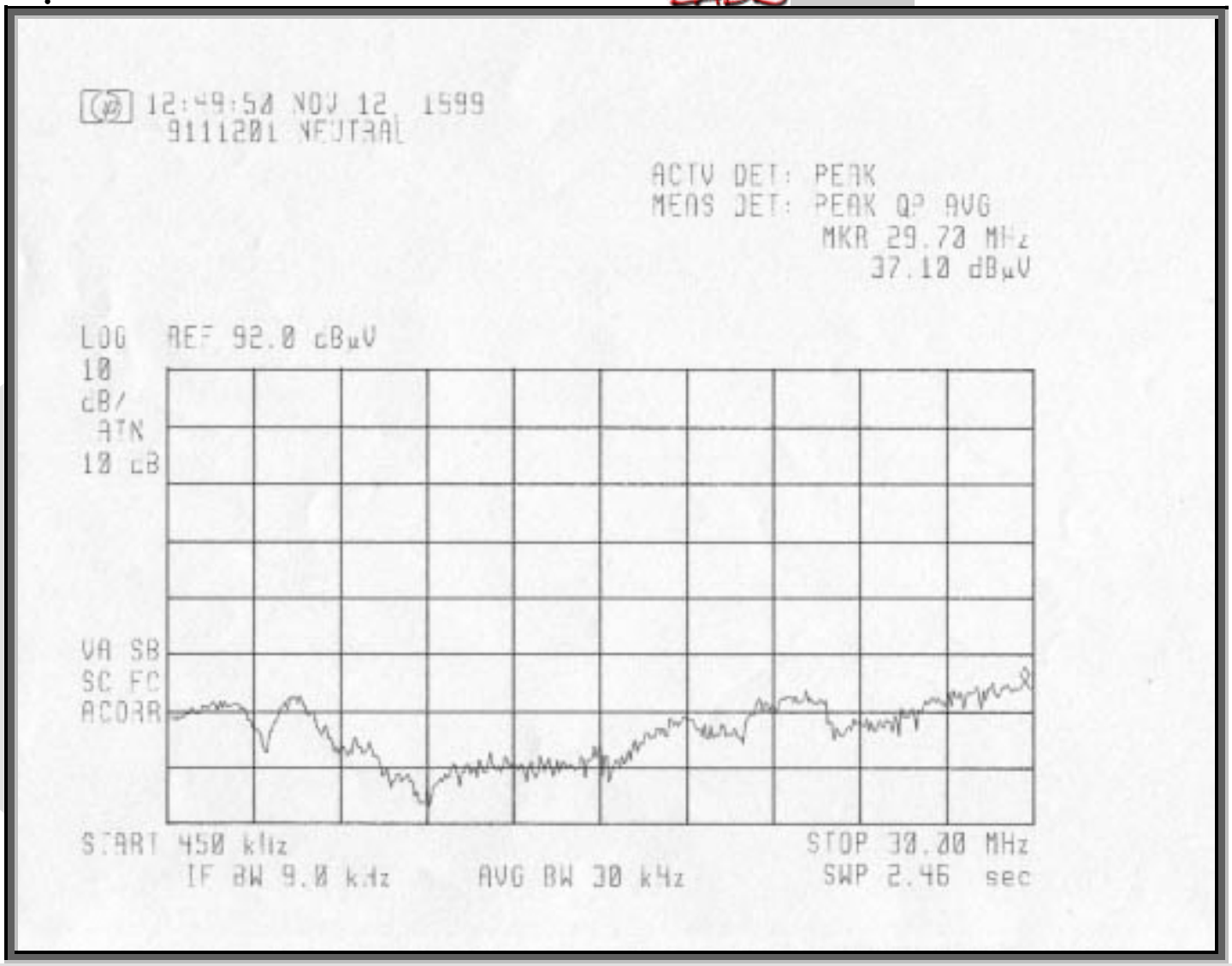
*QP= QUASI-PEAK P= PEAK

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM



LINE CONDUCTED PLOT

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM



NEUTRAL CONDUCTED PLOT

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490

proxim Symphony-HRF™ cordless Network USB... Adapter

APPENDIX C

SPREAD SPECTRUM PLOTS

Contents:

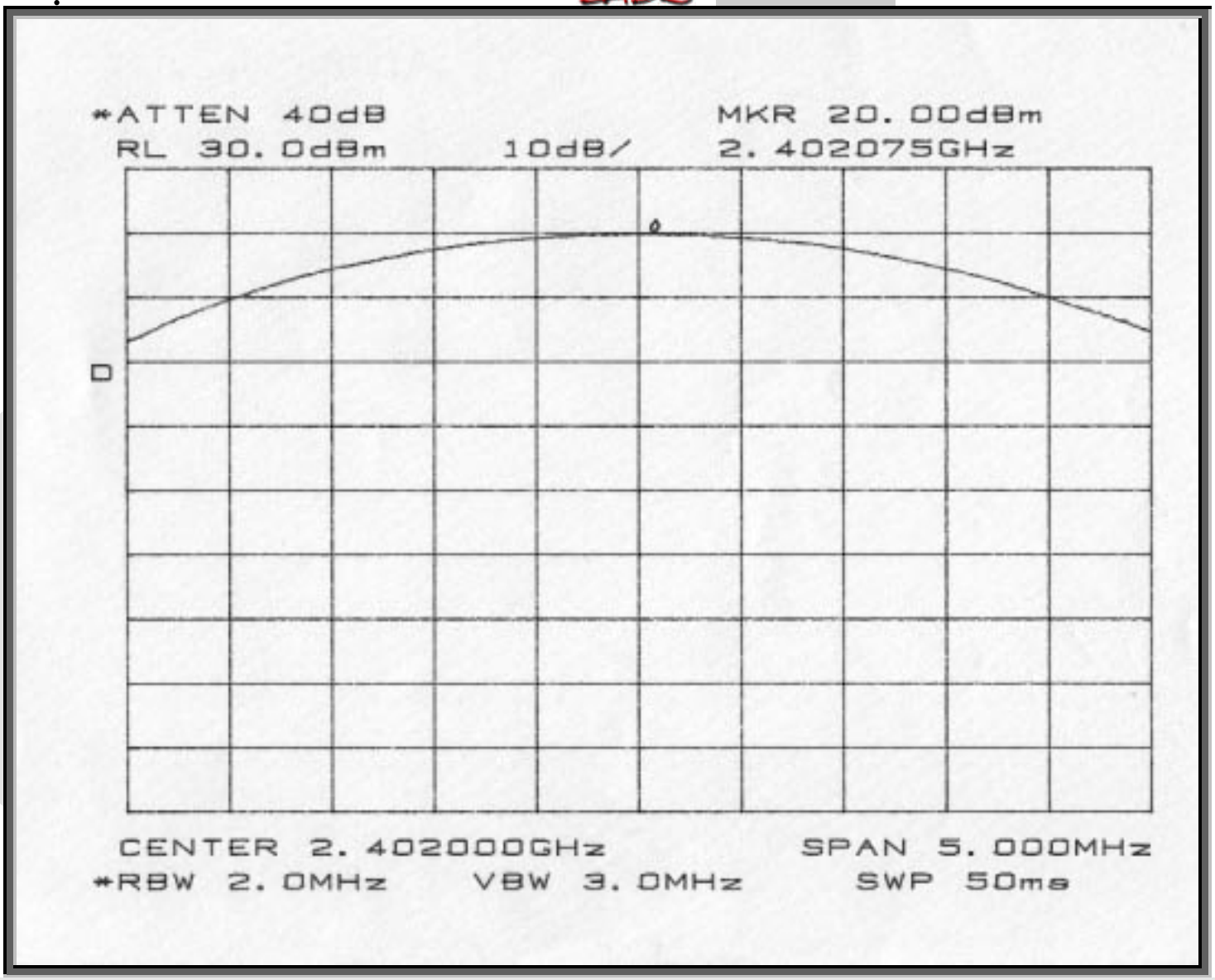
Report Information	
Product Name:	Symphony-HRF USB Adapter
Model Number:	4230
Report Number:	9120202B
File Name:	USBappendixC.pdf

Contact Info:

PROXIM, Inc.	510 DeGuigne Drive	Sunnyvale, California 94086	408/731-2700 408/731-2701fax	Website www.proxim.com
Proxim's Contact:	Altan Yazar	Design Engineer	408/731-2746	altan@proxim.com
EC Labs Contact:	Chip Matheny	Chief Technical Officer	408/747-1490	chip@eclabs.com

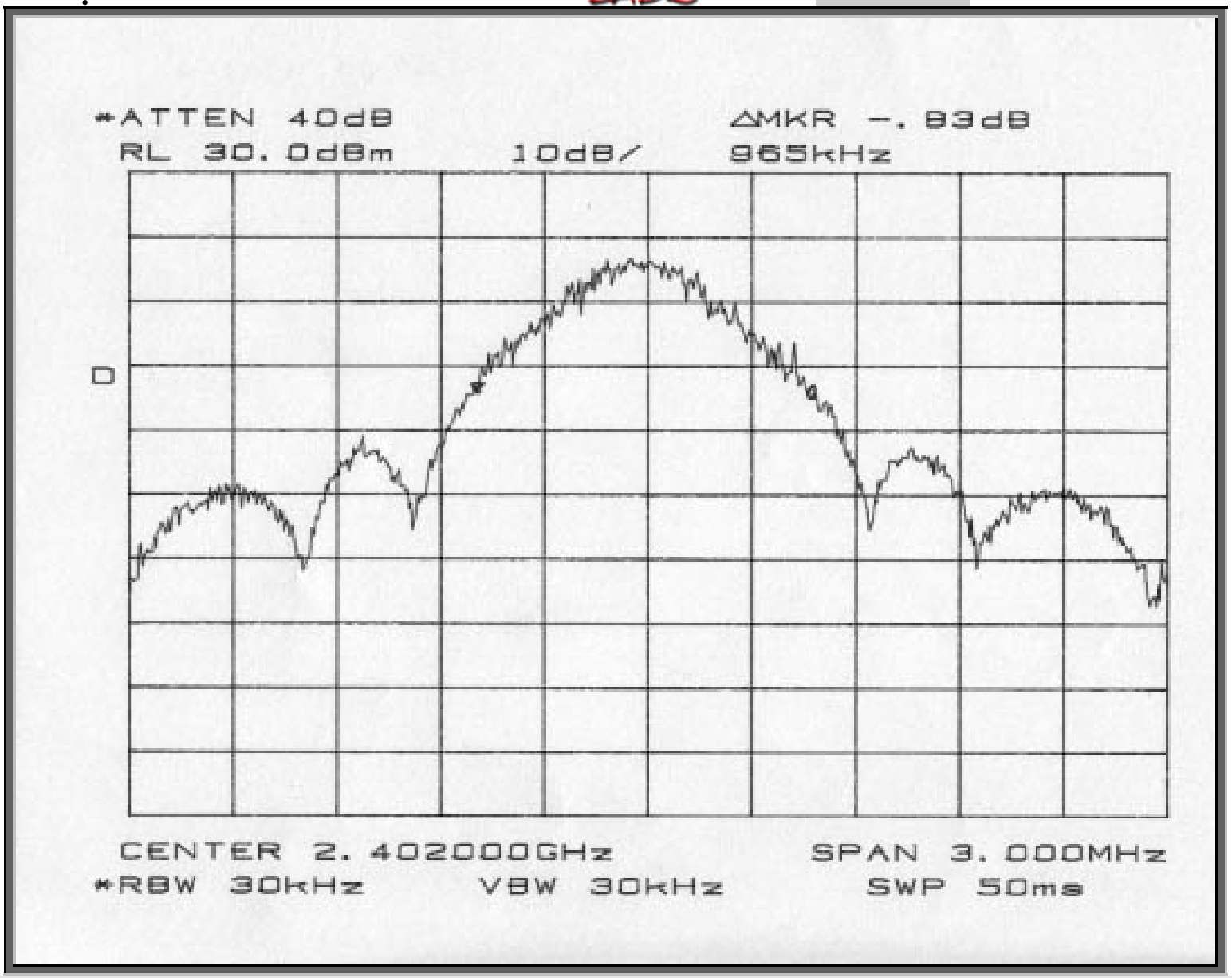
FREQUENCY HOPPING SPREAD SPECTRUM (FHSS) RF INTENTIONAL RADIATOR
FCC PART 15.247 SUBPART C, CLASS B CERTIFICATION

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM



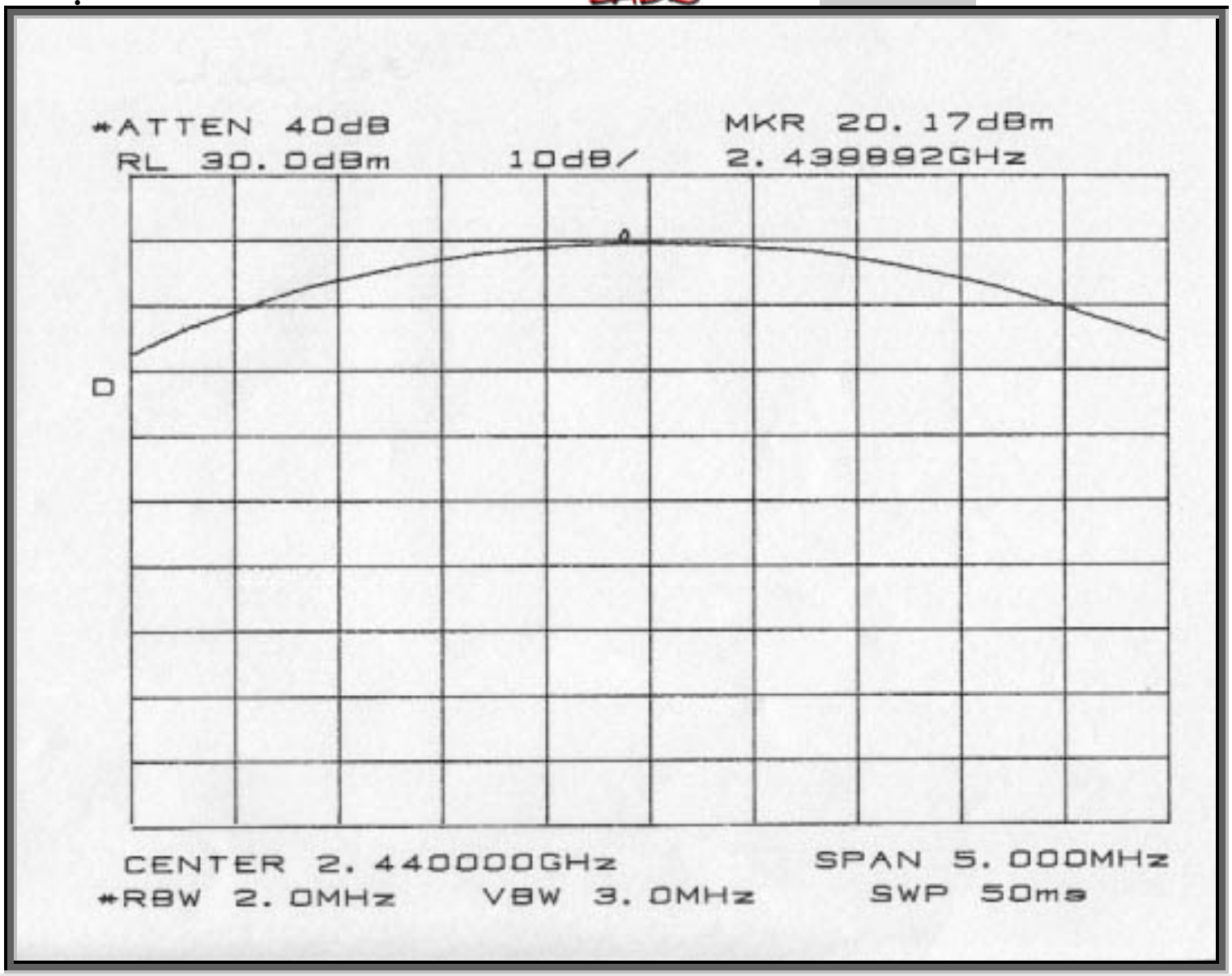
Power Out Channel 1

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM



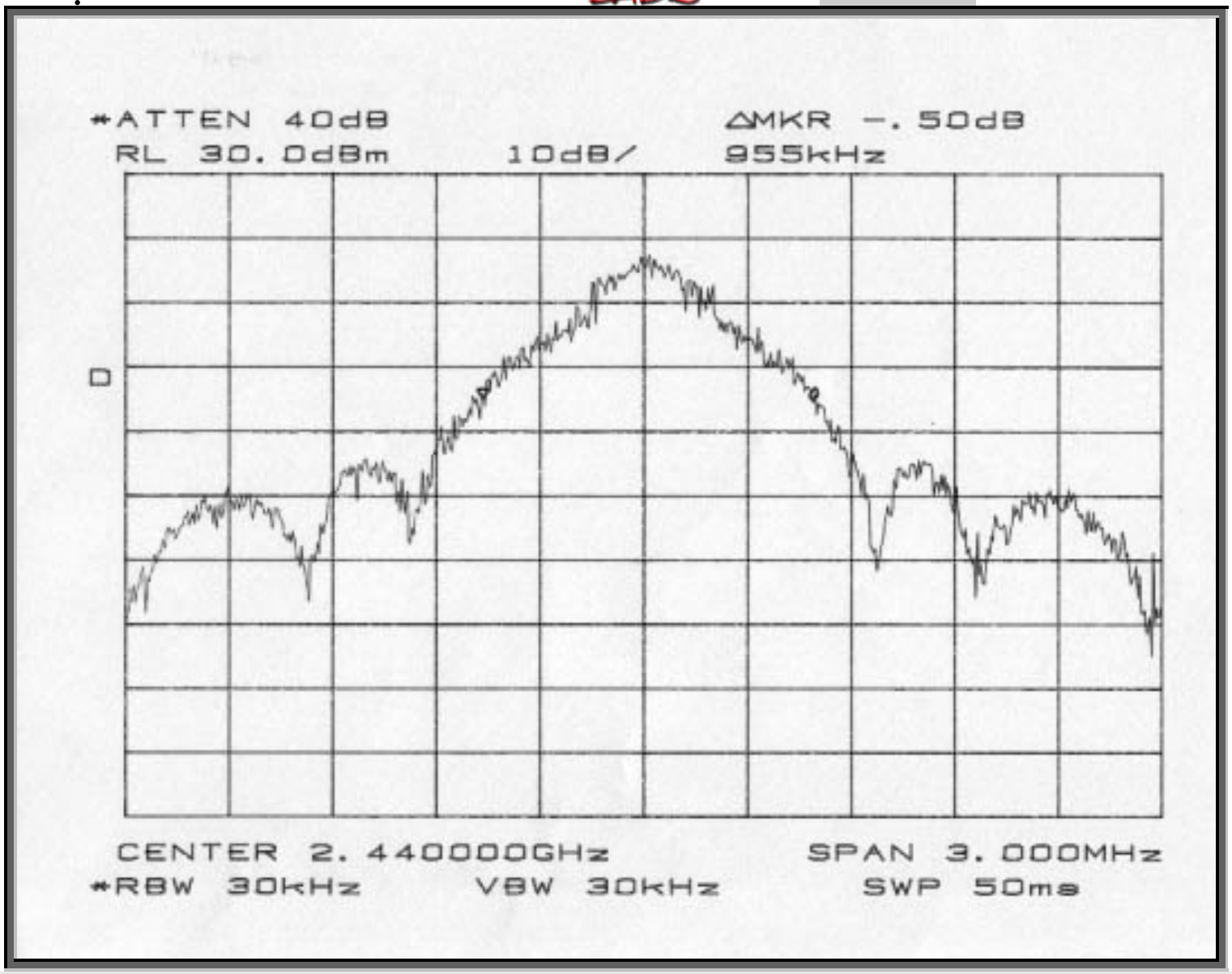
20dB Band Width Channel 1

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM



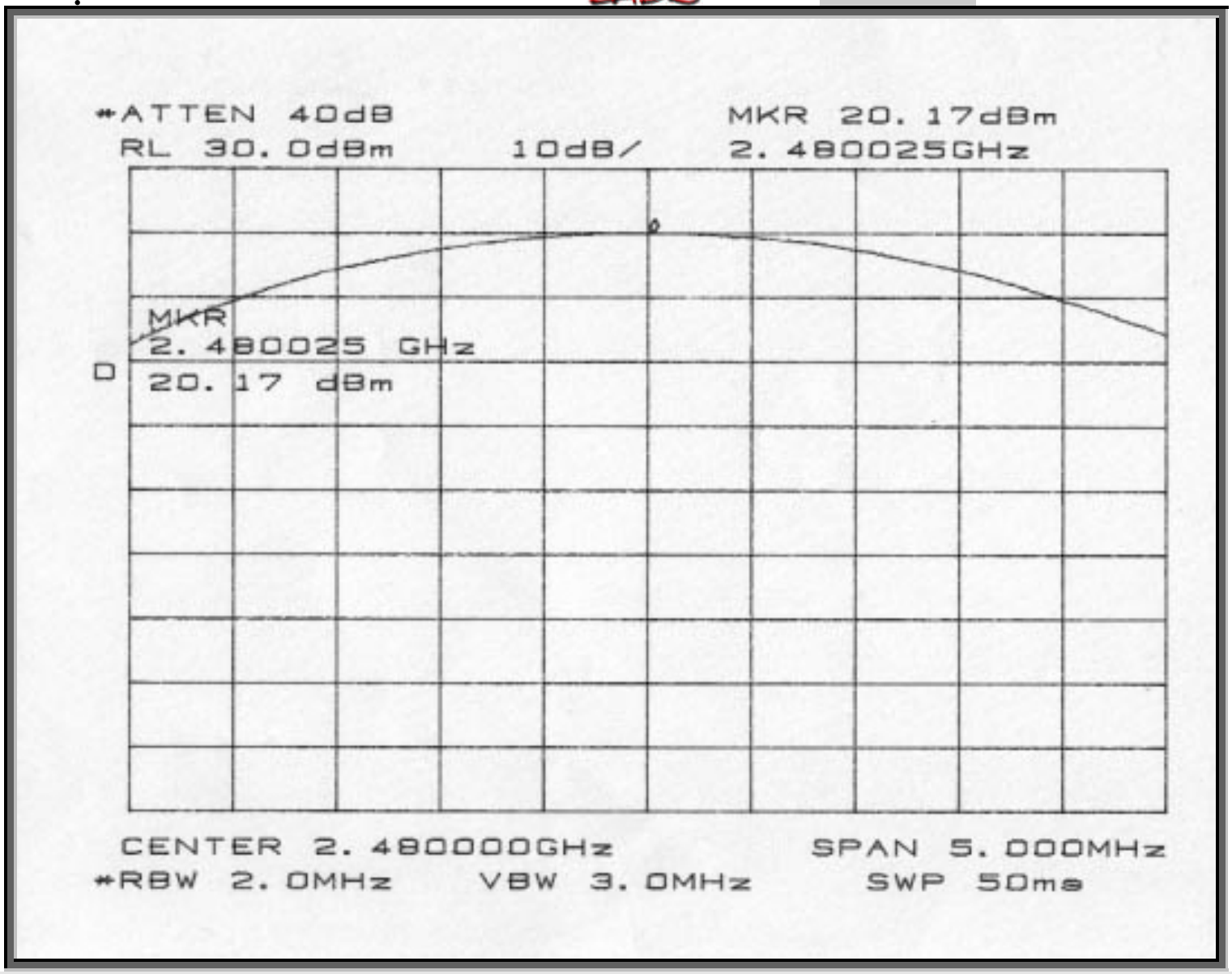
Power Out Channel 39

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM



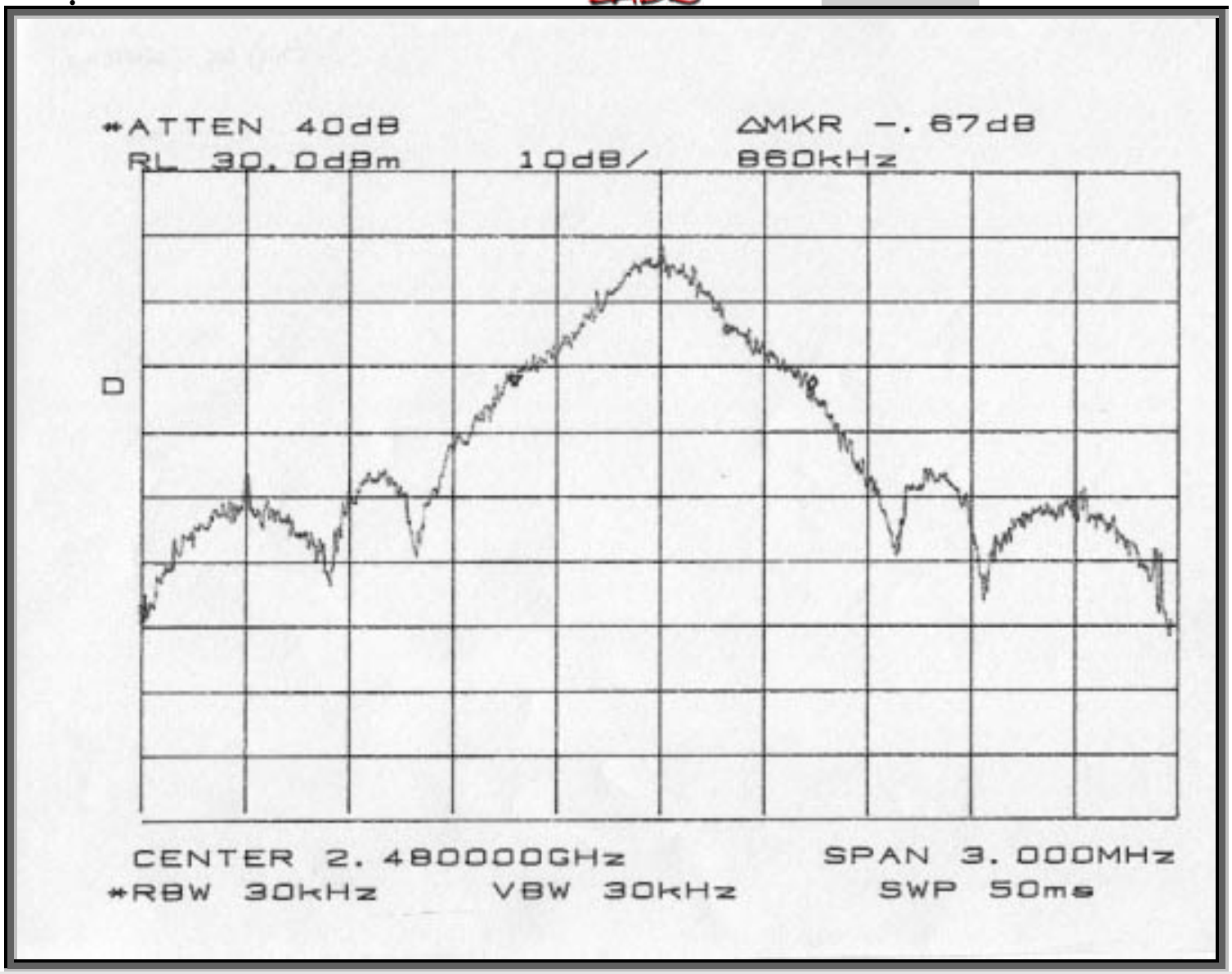
20 dB Bandwidth Channel 39

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM



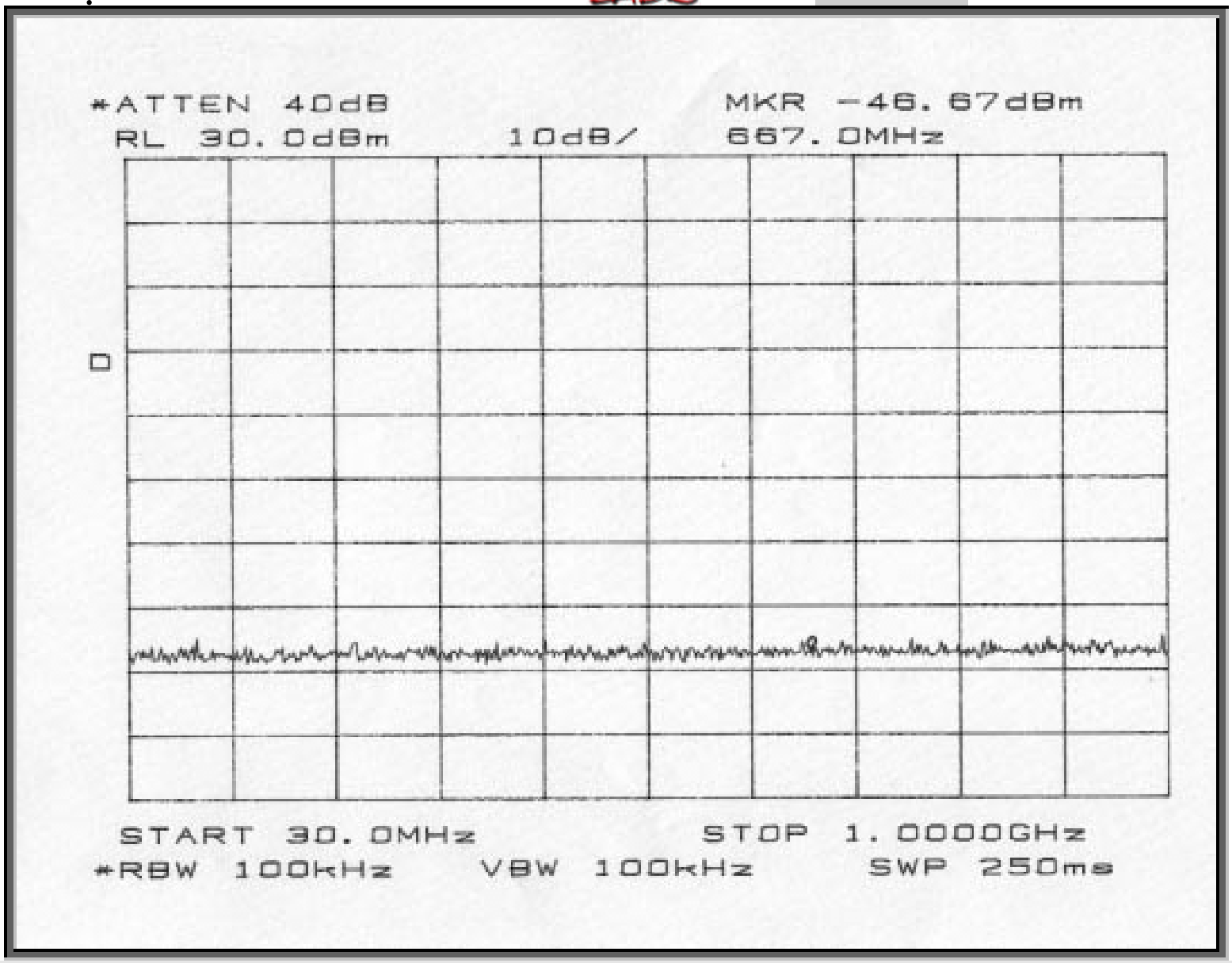
Power Out Channel 79

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM



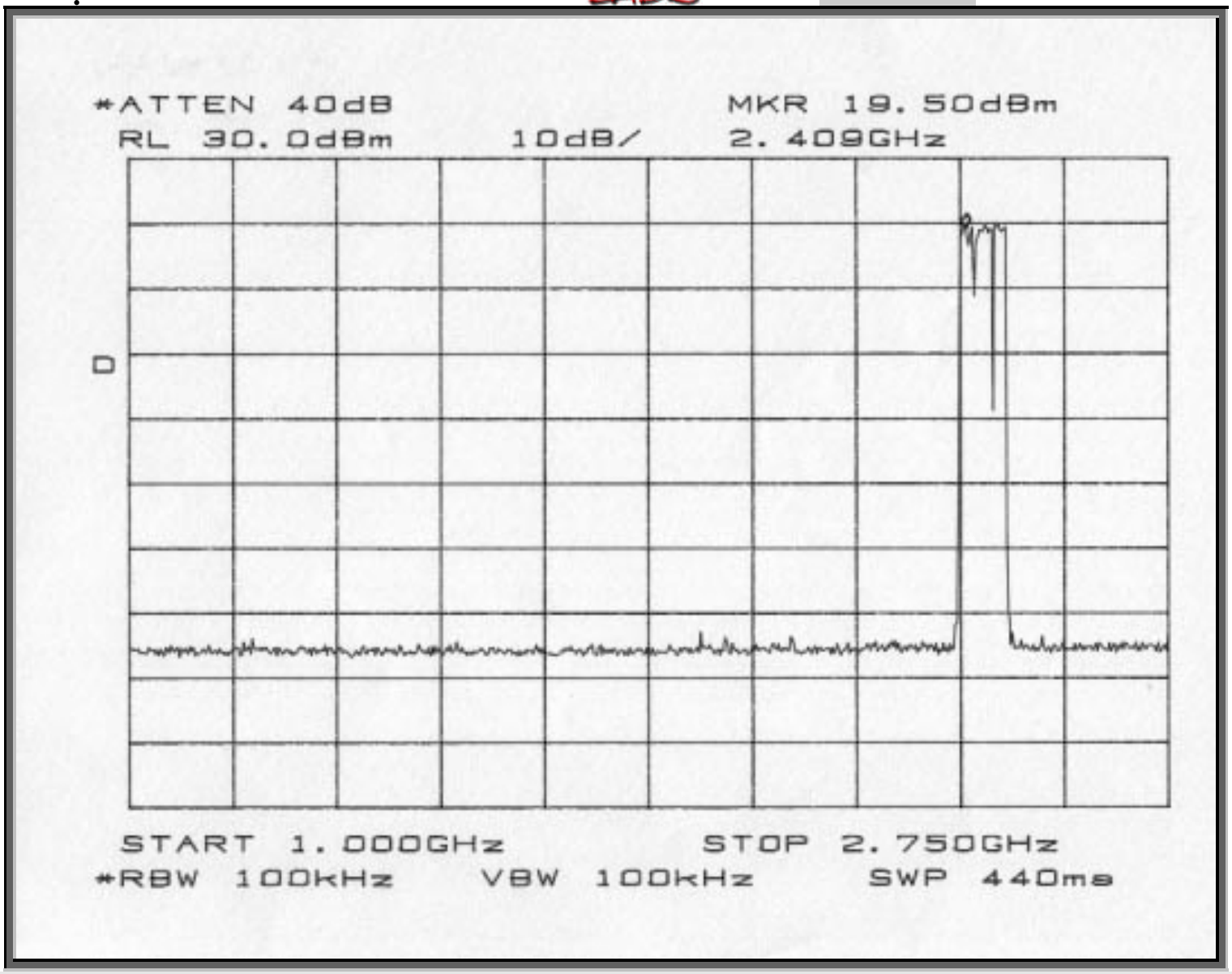
20dB Band Width Channel 79

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM



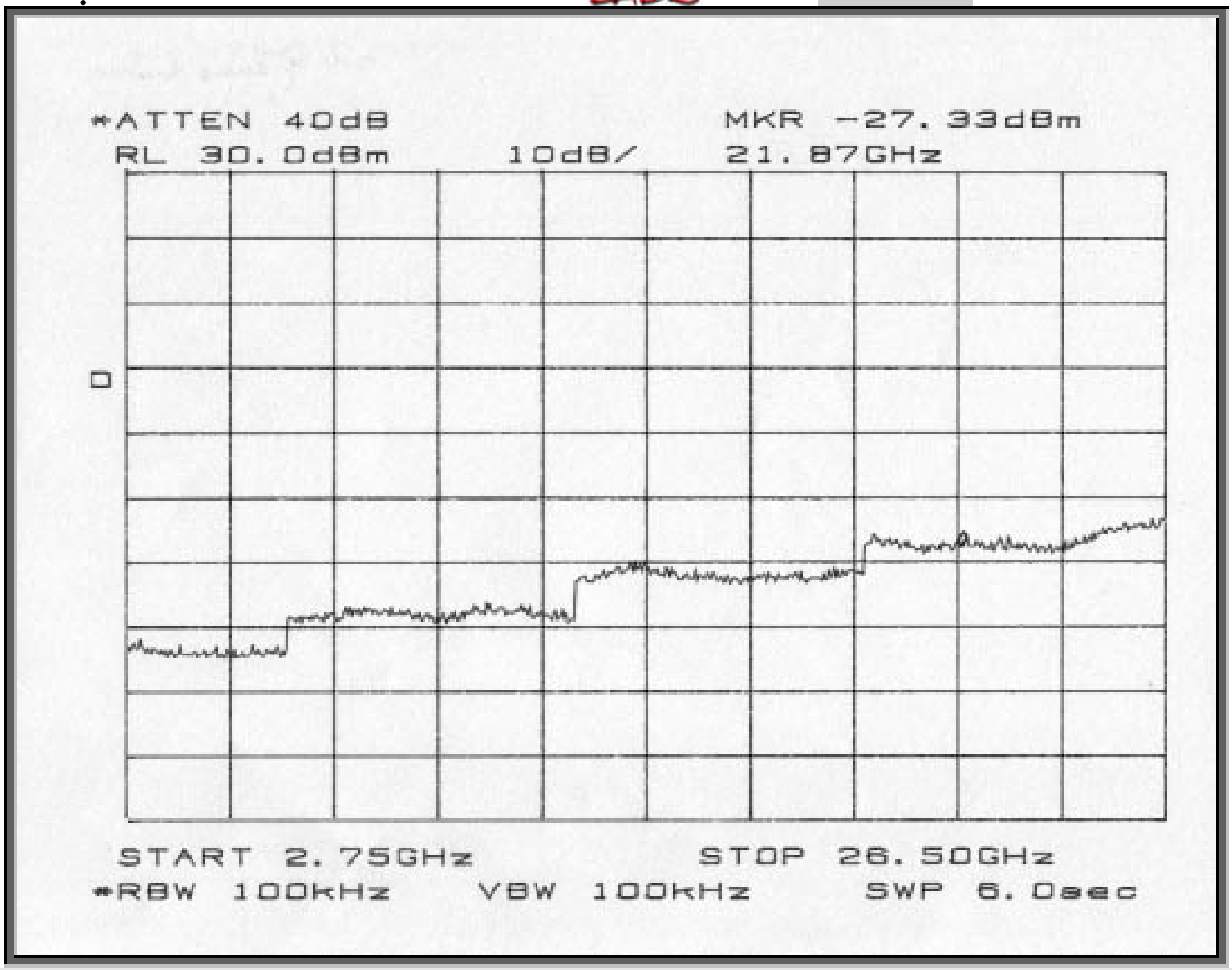
Out of Band (1)

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM



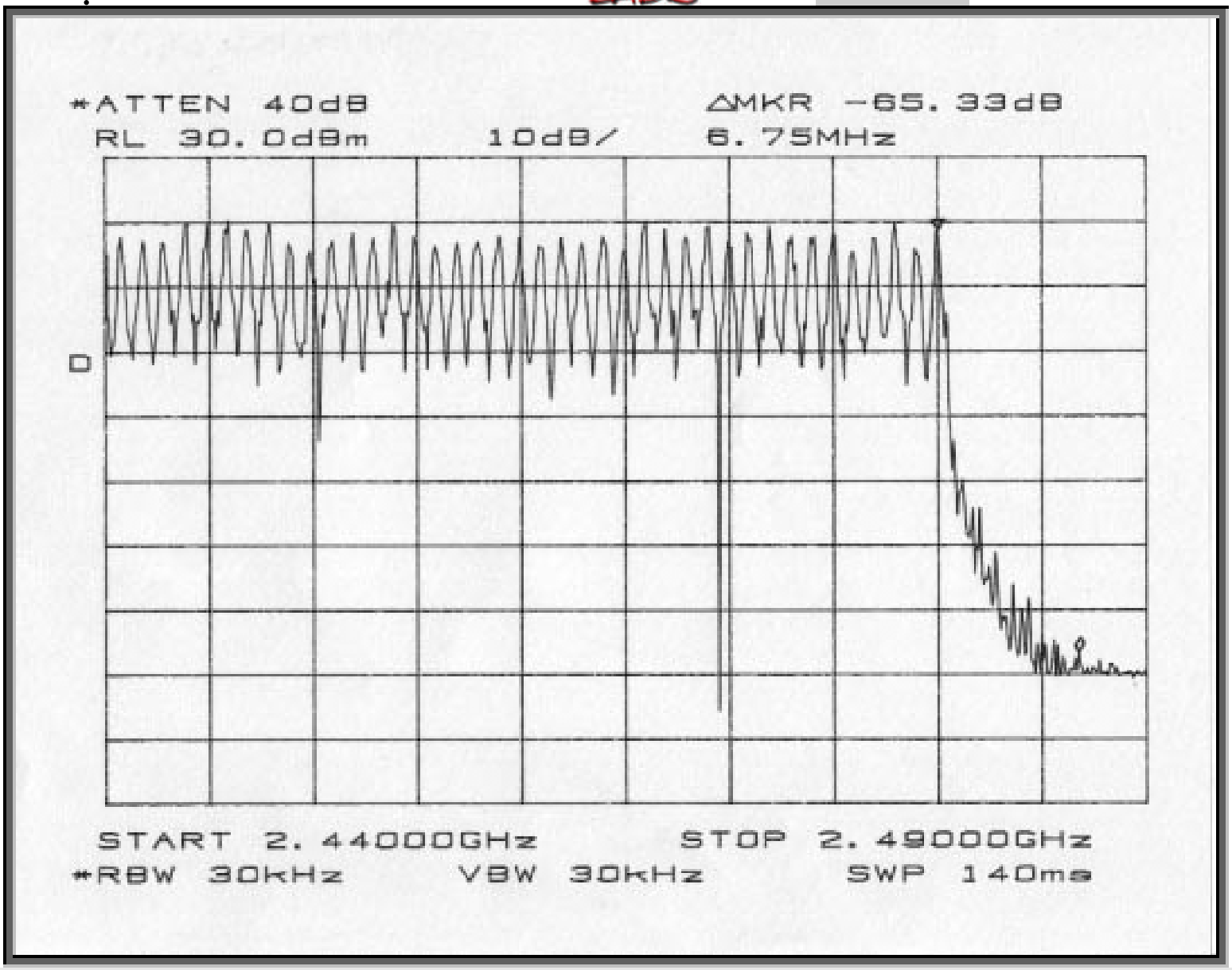
Out of Band (2)

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM



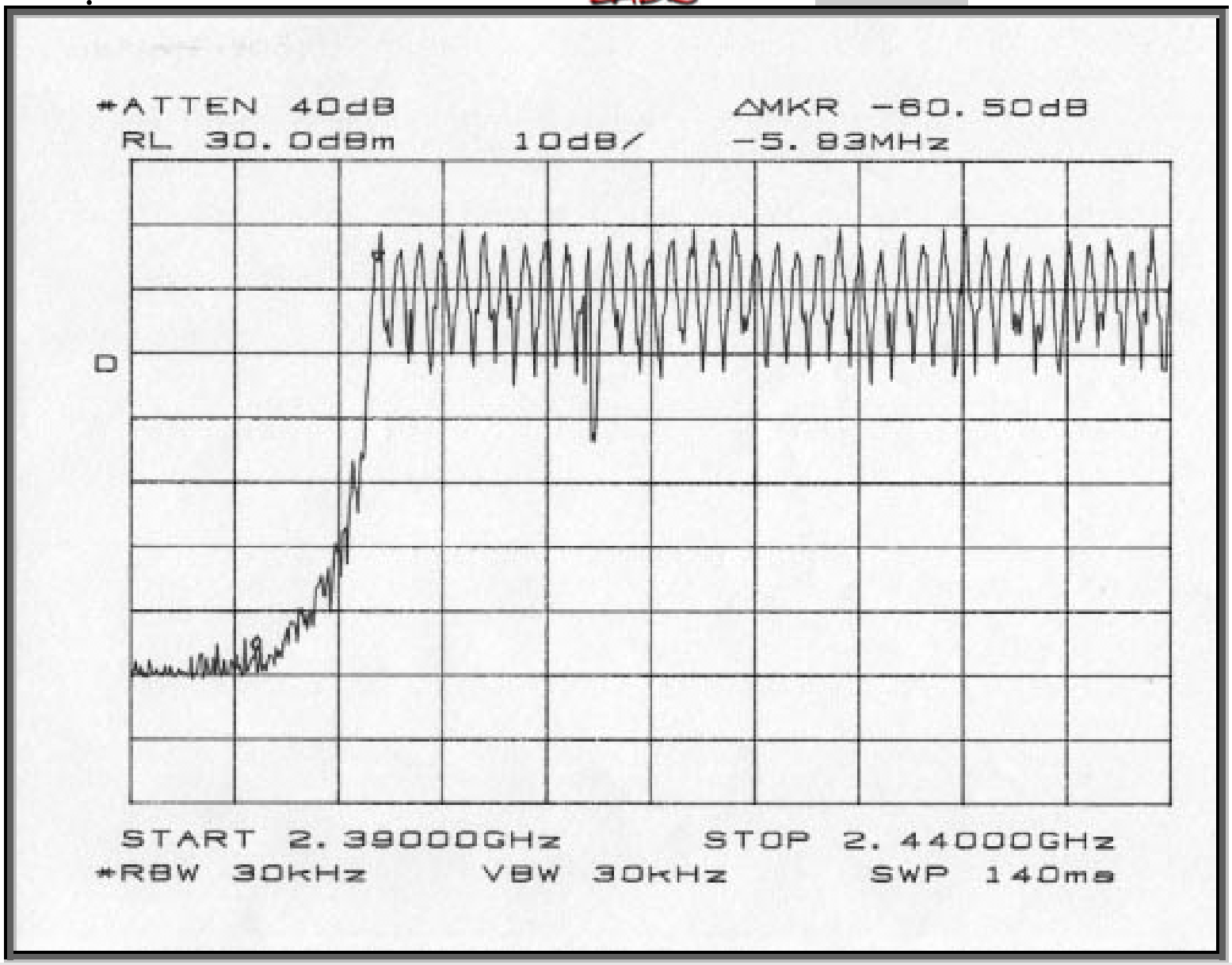
Out of Band (3)

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM



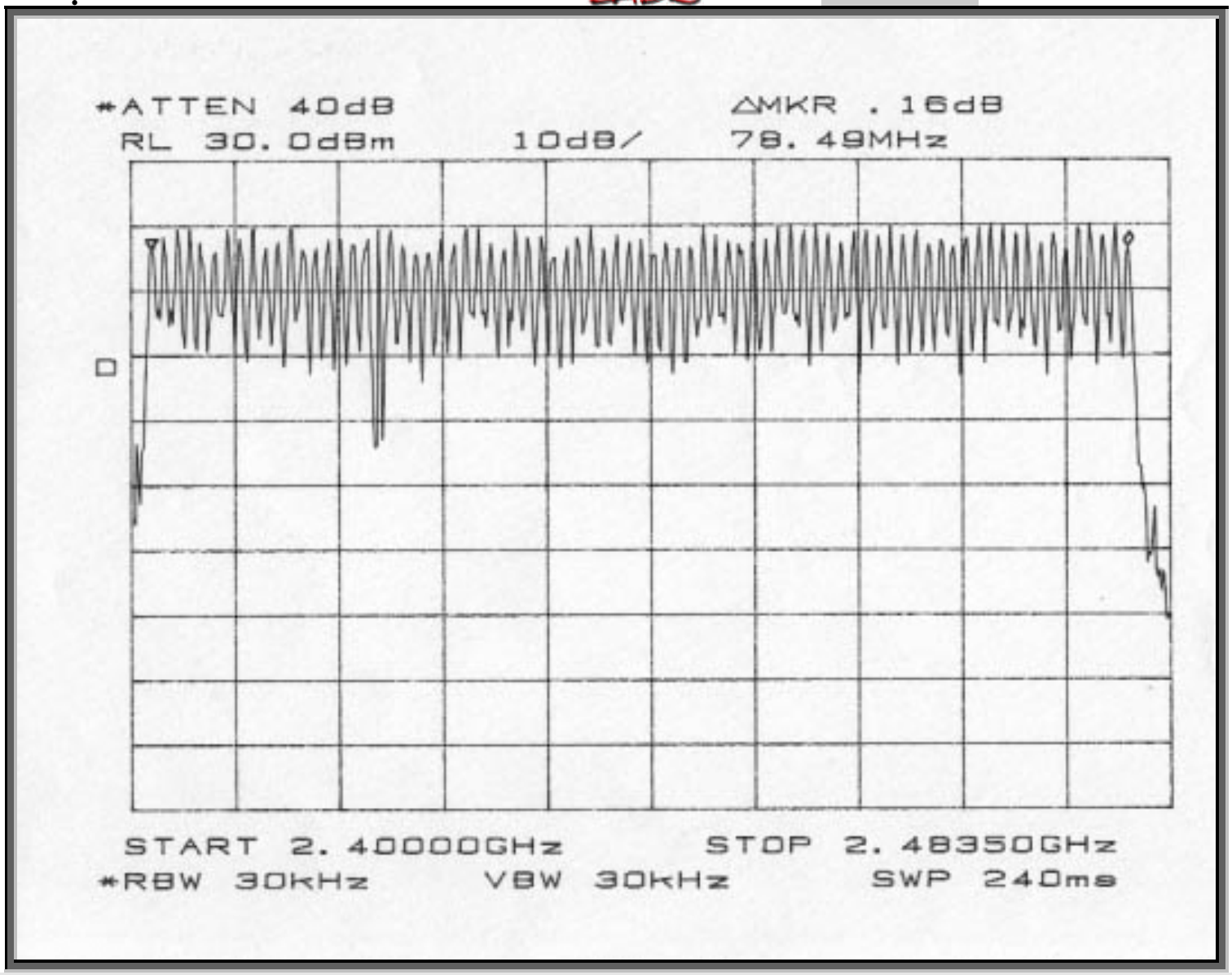
Upper Band Edge

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM



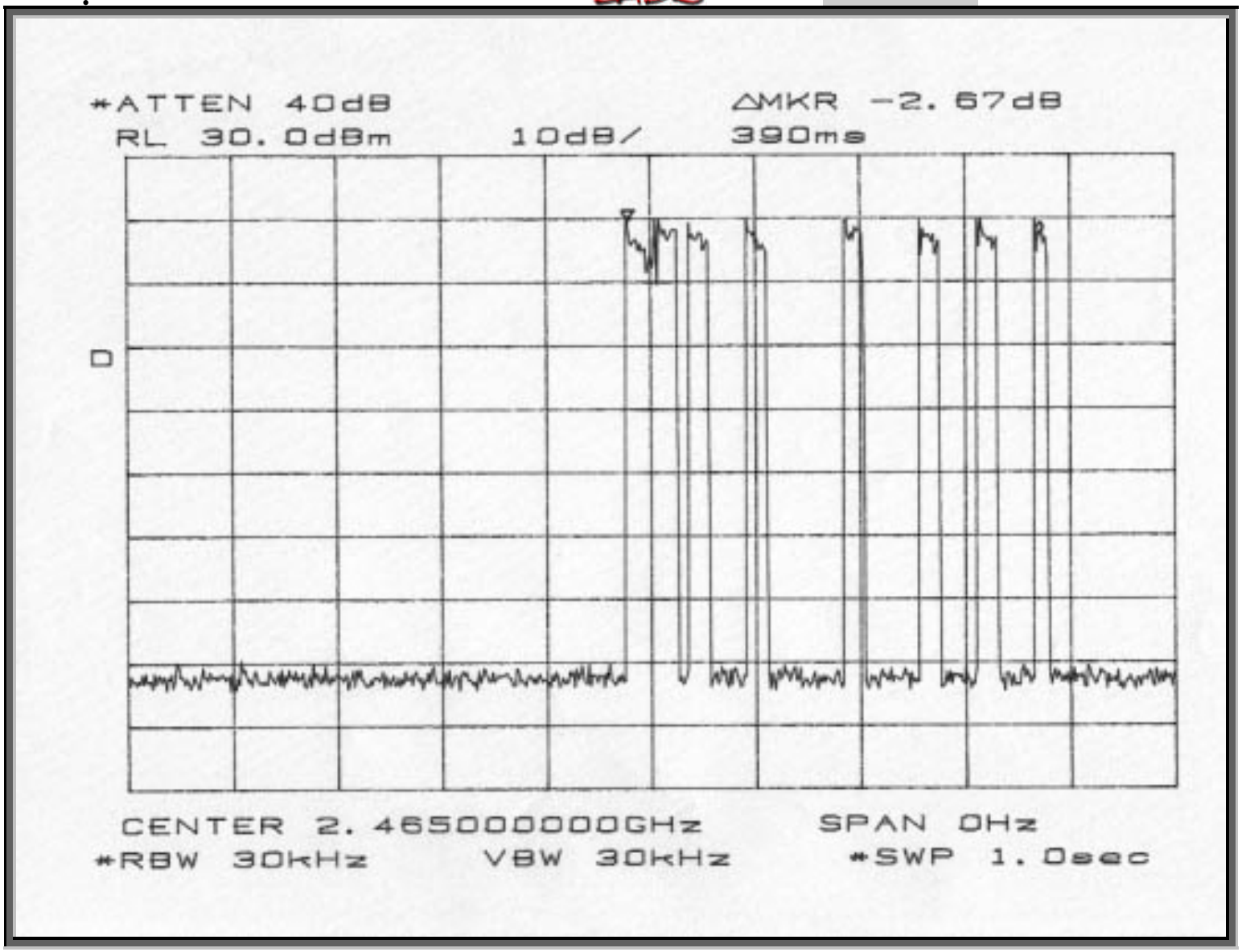
Lower Band Edge

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM



Channel Utilization

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM



Channel Occupancy

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
ECLABS.COM

proxim Symphony - HRF™ cordless Network USB... Adapter

APPENDIX D

RESTRICTED BAND DATA

Contents:

Report Information	
Product Name:	Symphony-HRF USB Adapter
Model Number:	4230
Report Number:	9120202B
File Name:	USBappendixD.pdf

Contact Info:

PROXIM, Inc.	510 DeGuigne Drive	Sunnyvale, California 94086	408/731-2700 408/731-2701fax	Website www.proxim.com
Proxim's Contact:	Altan Yazar	Design Engineer	408/731-2746	altan@proxim.com
EC Labs Contact:	Chip Matheny	Chief Technical Officer	408/747-1490	chip@eclabs.com

FREQUENCY HOPPING SPREAD SPECTRUM (FHSS) RF INTENTIONAL RADIATOR
FCC PART 15.247 SUBPART C, CLASS B CERTIFICATION

1249 Birchwood Drive
Sunnyvale, CA 94089
408/747-1490
www.eclabs.com

Electronic Compliance Laboratories, Inc.

1249 Birchwood Drive, Sunnyvale, California 94089
408/747-1490 – www.eclabs,com

Radiated Emissions Agency/Limits: Restricted Band Measurements
FCC Part 15.205
Frequency Range: 1000MHz-24GHz

EUT/Client Information

Client Name: Proxim, Inc.
E.U.T Name: Symphony-HRF (APRW1USB) Cordless USB Adapter
Serial Number: A30589437
FCC ID: IMK-HRFUSB
Notes: N/A

Test Information

Support Device(s): Lap-Top
Operator: Jook
Date: 11/12/99
Serial Number(s): 1V99CLR92YF
Start Time: N/A
Report File Name: 9111201
Exercise Program: Internal
Site: 10 meter OATS
Modifications: N/A
Site Cal Date: March 1999
NOTES: Both Polarizations were tested the following data was recorded in the vertical position (worst case)

FREQ MHZ	READING dBuV		PK. or AVG.	A.F dB	CABLE dB	FILTER dB	AMP dB	TOTAL dBuV/m	LIMIT dBuV/m	DELTA dB
Fund =	**2402.0**									
4804	53.2		Pk	34.2	11.8	35.0	10.0	54.1	74.0	-19.9
4804	39.2		Avg	34.2	11.8	35.0	10.0	40.1	54.0	-13.9
7206	51.0		Pk	36.8	16.9	35.0	10.0	59.7	74.0	-14.3
7206	38.2		Avg	36.8	16.9	35.0	10.0	46.9	54.0	-7.1
9608	38.3		Pk	38.0	20.0	35.0	10.0	51.3	74.0	-22.7
9608	26.5		Avg	38.0	20.0	35.0	10.0	39.5	54.0	-14.5
12010	31.3		Pk	42.6	25.7	35.0	10.0	54.6	74.0	-19.4
12010	21.7		Avg	42.6	25.7	35.0	10.0	44.9	54.0	-9.1
14412	38.5		Pk	40.9	29.6	35.0	10.0	64.0	74.0	-10.0
14412	23.2		Avg	40.9	29.6	35.0	10.0	48.7	54.0	-5.3
Fund =	**2440.0**									
4880	49.5		Pk	34.2	12.0	35.0	10.0	50.7	74.0	-23.3
4880	41.7		Avg	34.2	12.0	35.0	10.0	42.9	54.0	-11.1
7320	49.5		Pk	36.8	17.3	35.0	10.0	58.6	74.0	-15.4
7320	37.2		Avg	36.8	17.3	35.0	10.0	46.2	54.0	-7.8

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

FREQ MHZ	READING dBuV		PK. or AVG.	A.F dB	CABLE dB	FILTER dB	AMP dB	TOTAL dBuV/m	LIMIT dBuV/m	DELTA dB
9760	37.7		Pk	38.0	20.3	35.0	10.0	50.9	74.0	-23.1
9760	21.0		Avg	38.0	20.3	35.0	10.0	34.3	54.0	-19.8
12200	26.0		Pk	42.6	26.2	35.0	10.0	49.8	74.0	-24.2
12200	16.7		Avg	42.6	26.2	35.0	10.0	40.5	54.0	-13.5
14640	33.5		Pk	41.3	29.7	35.0	10.0	59.5	74.0	-14.5
14640	22.8		Avg	41.3	29.7	35.0	10.0	48.8	54.0	-5.2
Fund =	**2480.0**									
4960	51.5		Pk	34.2	11.8	35.0	10.0	52.5	74.0	-21.5
4960	39.2		Avg	34.2	11.8	35.0	10.0	40.2	54.0	-13.8
7440	41.7		Pk	36.8	17.2	35.0	10.0	50.7	74.0	-23.3
7440	28.3		Avg	36.8	17.2	35.0	10.0	37.3	54.0	-16.7
9920	39.5		Pk	38.0	20.4	35.0	10.0	52.9	74.0	-21.1
9920	26.2		Avg	38.0	20.4	35.0	10.0	39.6	54.0	-14.4
12400	38.5		Pk	42.6	26.8	35.0	10.0	62.9	74.0	-11.1
12400	25.8		Avg	42.6	26.8	35.0	10.0	50.2	54.0	-3.8
14880	30.8		Pk	41.3	30.9	35.0	10.0	58.0	74.0	-16.0
14880	21.3		Avg	41.3	30.9	35.0	10.0	48.5	54.0	-5.5

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

proxim Symphony-HRF™ cordless Network USB... Adapter

APPENDIX E

TEST SET-UP CONFIGURATIONS

Contents:

Report Information	
Product Name:	Symphony-HRF USB Adapter
Model Number:	4230
Report Number:	9120202B
File Name:	USBappendixE.pdf

Contact Info:

PROXIM, Inc.	510 DeGuigne Drive	Sunnyvale, California 94086	408/731-2700 408/731-2701fax	Website www.proxim.com
Proxim's Contact:	Altan Yazar	Design Engineer	408/731-2746	altan@proxim.com
EC Labs Contact:	Chip Matheny	Chief Technical Officer	408/747-1490	chip@eclabs.com

FREQUENCY HOPPING SPREAD SPECTRUM (FHSS) RF INTENTIONAL RADIATOR
FCC PART 15.247 SUBPART C, CLASS B CERTIFICATION

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

proxim Symphony-HRF™ cordless Network USB... Adapter

FCC PART 15.209
RADIATED EMISSIONS

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

FCC PART 15.207
CONDUCTED EMISSIONS

RESTRICTED BAND MEASUREMENTS

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

FCC PART 15.247
CONDUCTED RF AT ANTENNA TERMINALS

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

proxim Symphony-HRF™ cordless Network USB... Adapter

APPENDIX F

EUT PHOTOGRAPHS

Contents:

Report Information	
Product Name:	Symphony-HRF USB Adapter
Model Number:	4230
Report Number:	9120202B
File Name:	USBappendixF.pdf

Contact Info:

PROXIM, Inc.	510 DeGuigne Drive	Sunnyvale, California 94086	408/731-2700 408/731-2701fax	Website www.proxim.com
Proxim's Contact:	Altan Yazar	Design Engineer	408/731-2746	altan@proxim.com
EC Labs Contact:	Chip Matheny	Chief Technical Officer	408/747-1490	chip@eclabs.com

FREQUENCY HOPPING SPREAD SPECTRUM (FHSS) RF INTENTIONAL RADIATOR
FCC PART 15.247 SUBPART C, CLASS B CERTIFICATION

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

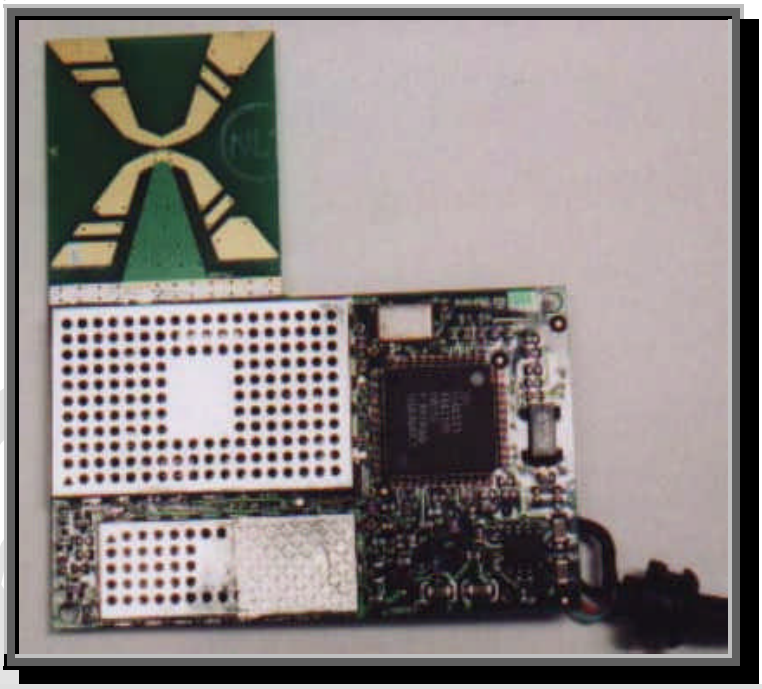
USB COVER AND CABLES

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

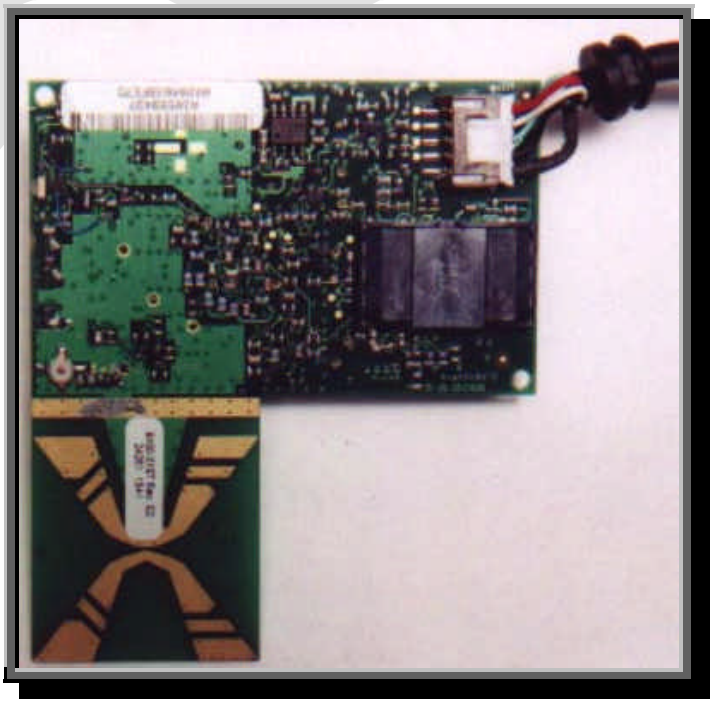
USB **Side View with Light Indicator**

USB **PC Board Installed**

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

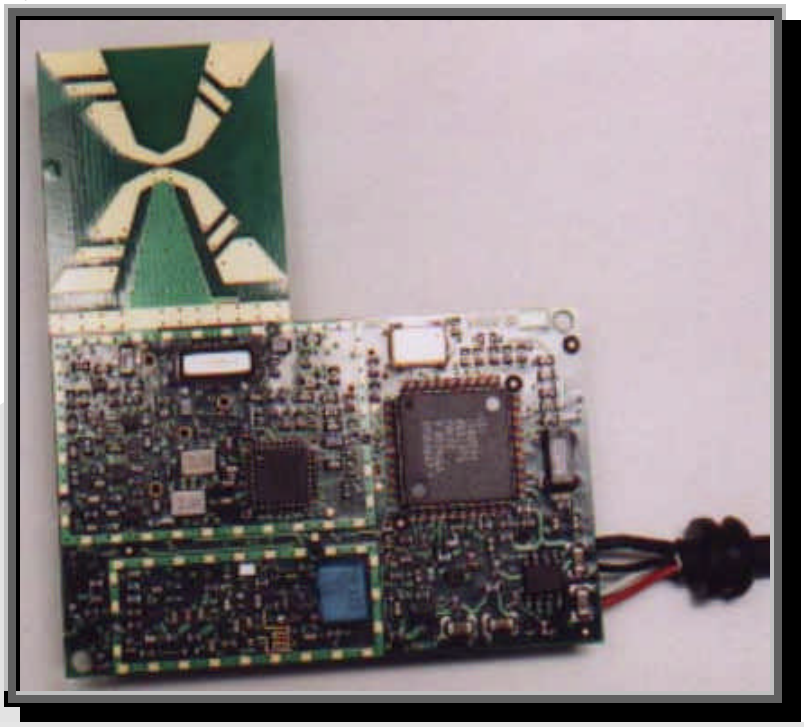


USB **Module Close up (FRONT)**

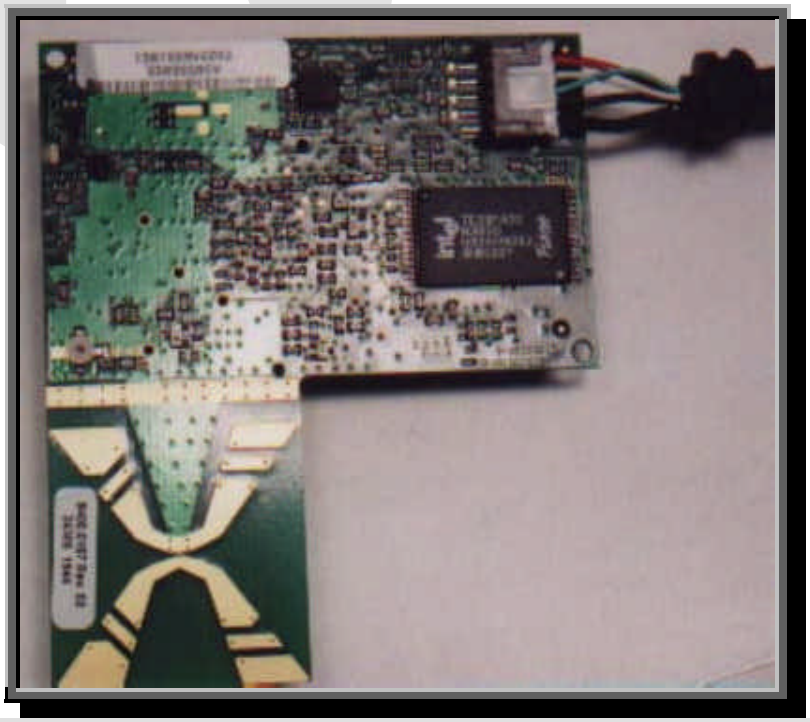


USB **Module Close-up (BACK)**

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM



USB **Module Front Without Shield (FRONT)**



Module Backside Without Shield (BACK)

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

proxim Symphony-HRF™ cordless Network USB... Adapter

APPENDIX G

LABELING REQUIREMENTS

Contents:

Report Information	
Product Name:	Symphony-HRF USB Adapter
Model Number:	4230
Report Number:	9120202B
File Name:	USBappendixG.pdf

Contact Info:

PROXIM, Inc.	510 DeGuigne Drive	Sunnyvale, California 94086	408/731-2700 408/731-2701fax	Website www.proxim.com
Proxim's Contact:	Altan Yazar	Design Engineer	408/731-2746	altan@proxim.com
EC Labs Contact:	Chip Matheny	Chief Technical Officer	408/747-1490	chip@eclabs.com

FREQUENCY HOPPING SPREAD SPECTRUM (FHSS) RF INTENTIONAL RADIATOR
FCC PART 15.247 SUBPART C, CLASS B CERTIFICATION

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

LABELING REQUIREMENTS

LABEL REQUIREMENTS, Class B Certified Digital Device

A CLASS B Digital Device subject to Certification by the FCC shall bear the following statement in conspicuous location on the device.

(Name of Grantee)
FCC ID:
The device complies with Part 15 of the 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.

The label is to be located in a "conspicuous location". This is any location readily visible to the user of the device without the use of tools.

The label is to be permanently attached to the equipment in such a manner that the label can normally be expected to remain fastened and legible during the equipment's expected useful life.

Where the device is constructed in tow or more sections connected by wires and marketed together, the statement specified in this section is required to be affixed only to the main control unit.

When the device is so small or for such use that it is not practicable to place the statement specified above on it, this required information shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier must be displayed on the device.

USER INFORMATION

For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statements, placed in a prominent location in the user's operation manual.

NOTE: This equipment has been tested and found to comply with the limits for Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

against harmful interference when the equipment is operated 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 and 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:

- •Re-orient 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 which the receiver is connected.
- •Consult the dealer or an experienced radio/TV technician for help.
- •For systems incorporating several digital devices, the statement shown above, needs to be contained only in the instruction manual for the main control unit.
- •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 in the operator's manual.
- •The operators manual must caution the user that changes or modifications not expressly approved by the manufacturer could void their right to operate the equipment.

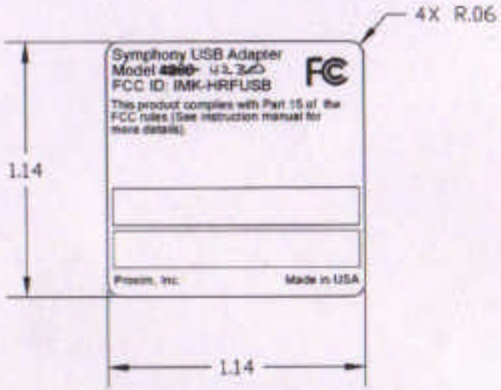
The above radio interference statement is to be bound in the same manner as the operators manual. A loose-leaf insert page in a bound manual would not meet this requirement.

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

THIS DRAWING CONTAINS PROPRIETARY INFORMATION OF PROXIM AND MAY NOT, IN WHOLE OR IN PART BE DUPLICATED, DISCLOSED OR USED FOR MANUFACTURE OF ANY PART DESCRIBED HEREIN WITHOUT THE PRIOR WRITTEN PERMISSION OF PROXIM AND IS NOT INTENDED FOR USE AS AN EXTERNAL DESIGN SPECIFICATION.

REVISION

LTR	ECO	DATE		BY	APPR
01	P1726	--	INITIAL RELEASE	WF	



NOTES: UNLESS OTHERWISE SPECIFIED

1. MATERIAL: 2 MIL MATTE WHITE COMPUTER IMPRINTABLE POLYESTER WHITH PERMANENT ADHESIVE BACK.
2. BLACK TEXT ON WHITE BACKGROUND.

NOTES UNLESS SPECIFIED	DRAWN	Vm FOSTER	11/8/99
TOLERANCES .XX+/-.01 ANGULAR .XXX+/-.005 +/-1/2°	DESIGN		
	MATERIAL	SEE NOTES	
BREAK ALL SHARP EDGES APPROX. .XXX	FINISH	SEE NOTES	
MACH. SURFACES	CHECKED AND APPROVED		
DIMENSIONS APPLY AFTER FINISH.			

proxim

TITLE LABEL, SYMPHONY-HRF (4230) CORDLESS USB ADAPTER

SIZE	DWG NO.	REV.
B	2460.0902	01

SCALE	FILE NAME	SHEET
2:1	24600902	1 OF 1

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

proxim Symphony - HRF™ cordless Network USB... Adapter

2.4 GHz TRANSMITTER

FREQUENCY HOPPING SPREAD SPECTRUM

INTENTIONAL RADIATOR...

RF DEVICE...

EXHIBIT A

LETTERS OF INTEREST

LETTER TYPE	WORD FILE	ACROBAT FILE
Intro Letter	SubmittalLET.doc	IntroLET.pdf
Agent Authorization	AgentAuth.doc	Agentautho.pdf
Confidential Request	ConfidLET.doc	Confidential.pdf
Change of Address	Addresschange.doc	changeaddress.pdf
Form731 change Letter	IDchangeLET.doc	IDchangeLET.pdf

CONTACT INFORMATION-

PROXIM, INC.	ALTAN YAZAR	408/731-2746	altan@proxim.com
EC LABS, INC.	CHIP MATHENY	408/747-1490	chip@eclabs.com

4777035 PGS

1249 BIRCHWOOD DRIVE
SUNNYVALE, CA 94089
408/747-1490
WWW.ECLABS.COM

proxim Symphony-HRF™ cordless Network USB... Adapter

EXHIBIT B

PROPRIETARY INFORMATION

CONFIDENTIAL INFORMATION

	DESCRIPTION	CONTENTS	FILE NAME
PROTOCOL DESCRIPTION	Duty Cycle Analysis	PROTOCOL	Duty Cycle1.pdf
	Cycle Timing Conditions	PROTOCOL	Duty Cycle1.pdf
	Duty Cycle Plots	PROTOCOL	Duty Cycle1.pdf
THEORY OF OPERATION	RangeLAN2 Description	PROTOCOL	TheoryOpp1.pdf
	RangeLAN2 Description	PROTOCOL	TheoryOpp2.pdf
	RangeLAN2 Description	PROTOCOL	TheoryOpp3.pdf
	RangeLAN2 Description	PROTOCOL	TheoryOpp4.pdf
	Hopping Pattern	PROTOCOL	RL2Fhthop5.pdf

-CONTACT INFORMATION-

PROXIM, INC.	ALTAN YAZAR	408/731-2746	altan@proxim.com
EC LABS, INC.	CHIP MATHENY	408/747-1490	chip@eclabs.com

CONFIDENTIAL INFORMATION