



**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT  
UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE  
DEVICES CERTIFICATION TO  
FCC PART 15 SUBPART E REQUIREMENT  
TEST REPORT**

*For*

**ACCESS POINT  
UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE  
DEVICES TRANSCEIVER**

**FCC ID: IMK-AP5**

**MODEL NO: PROXIM HARMONY 8570 AP**

**REPORT NO: 01U0973-1**

**SEPTEMBER 26, 2001**

*Prepared for*  
**PROXIM**  
**510 DEGUIGNE DRIVE**  
**SUNNYVALE, CA. 94086 USA**

*Prepared by*  
**COMPLIANCE CERTIFICATION SERVICES**  
**561F MONTEREY ROAD,**  
**MORGAN HILL, CA. 95037, U.S.A.**  
**TEL: (408) 463-0885**  
**FAX: (408) 463-0888**



| TABLE OF CONTENTS   | PAGE |
|---|------|
| 1. VERIFICATION OF COMPLIANCE.....                            | 3    |
| 2. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT).....             | 4    |
| 3. TEST LOCATION.....   | 5    |
| 4. LABORATORY ACCREDITATIONS AND LISTINGS .....               | 6    |
| 5. SUPPORT/ TEST EQUIPMENT .....                              | 7    |
| <i>Support Equipment</i> .....                                | 7    |
| <i>Test Equipment</i> .....                                   | 7    |
| <i>I/O Cable Configuration</i> .....                          | 8    |
| <i>Test Configuration Diagram</i> .....                       | 8    |
| 6. TEST PROCEDURES AND TEST RESULTS .....                     | 9    |
| MODIFICATIONS .....   | 9    |
| RADIATED EMISSIONS TEST REQUIREMENT: 15.209.....              | 10   |
| AC LINE CONDUCTED EMISSIONS TEST REQUIREMENT: 15.207 .....    | 12   |
| RESTRICTED BAND TEST REQUIMENT: 15:205.....                   | 16   |
| BANDEDGE.....   | 21   |
| PEAK POWER FOR UNII TEST REQUIREMENT: 15.407(A)1-2 .....      | 26   |
| PEAK POWER SPECTRAL DENSITY TEST REQUIREMENT: 15.407(A)5..... | 31   |
| PEAK EXCURSION TO AVERAGE RATIO: 15.407(A)6 .....             | 33   |
| OUT OF BAND EMISSION 15.407 (B) 1-2 .....                     | 35   |
| 15.407 SUPPLEMENT TEST .....                                  | 43   |
| 15.407 SUPPLEMENT TEST .....                                  | 44   |
| INTEGRAL ANTENNA (D).....                                     | 45   |
| RF EXPOSUER (F) .....   | 46   |
| 7. TEST SETUP PHOTO .....                                     | 48   |
| RADIATED EMISSSION SETUP PHOTOS .....                         | 48   |
| CONDUCTED EMISSION SETUP PHOTOS .....                         | 49   |
| HI FREQUENCY SETUP PHOTOS .....                               | 50   |
| ANTENNA PORT MEASUREMENT PHOTOS .....                         | 51   |

#### Attachments

- Eut Photographs
- Proposed FCC ID Label
- Agent Authorization
- Request for Confidentiality
- Technical Description
- User's Manual
- Antenna Requirements
- Confidential Package

## 1. VERIFICATION OF COMPLIANCE

COMPANY NAME : PROXIM  
510 DEGUIGNE DRIVE  
SUNNYVALE, CA 94086

INFO CONTACT : KEITH GLOVER

TELEPHONE NO : 408-731-2711/408-731- 2706

TECHNICAL CONTACT: JEFFREY LIEW

TELEPHONE NO : 408-731-2734

EUT DESCRIPTION : 802.11a ACCESS POINT

MODEL NAME : PROXIM HARMONY MODEL 8570 ACCESS POINT

DATE TESTED : SEPTEMBER 26, 2001

| <b>LIMIT APPLY TO: FCC PART 15 SECTION 15.407</b> |                    |
|---|--------------------|
| <b>TECHNICAL LIMITS</b>                           | <b>TEST RESULT</b> |
| Peak Transmit Power @ 5.15-5.25GHz < 17dBm        | Complies           |
| Peak Transmit Power @ 5.25-5..35GHz < 24dBm       | Complies           |
| Power Density @ 5.15-5.25GHz < 4dBm / 1M          | Complies           |
| Power Density @ 5.25-5..35GHz < 11dBm / 1M        | Complies           |
| Peak Excursion to Average Ratio < 13dB            | Complies           |
| Out of Band EIRP < -27 dBm/MHz                    | Complies           |
| <b>LIMIT APPLY TO: FCC PART 15 SECTION 15.205</b> |                    |
| Restricted Band of Operation                      | Complies           |
| <b>LIMIT APPLY TO: FCC PART 15 SECTION 15.209</b> |                    |
| Radiated Emission Limits                          | Complies           |
| <b>LIMIT APPLY TO: FCC PART 15 SECTION 15.207</b> |                    |
| AC Line Conducted Emission                        | Complies           |

The above equipment was tested by Compliance Engineering Services Inc. for compliance with the requirements set forth in CFR 47 PART 15 SUBPART E. This said equipment in the configuration described in this report show that maximum emission levels emanating from equipment are within the compliance requirements.

Tested By:

HUE LY VANG  
ASSOCIATE EMC ENGINEER  
COMPLIANCE CERTIFICATION SERVICES

Approved & Released By:

STEVE CHANG  
EMC ENGINEERING MANAGER  
COMPLIANCE CERTIFICATION SERVICES

**2. DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)**

|                      |  |
|----------------------|--|
| CHASSIS TYPE         | <b>PLASTIC</b>                                 |
| Frequency Range      | <b>5180-5320 MHz</b>                           |
| Channel Spacing      | <b>20 MHz</b>                                  |
| Transmit Power       | <b>50mW(17dBm)</b>                             |
| Modulation Technique | <b>PSK , QAM</b>                               |
| Number of Channels   | <b>8(802.11a mode), 3 (Turbo mode)</b>         |
| Air Data Rate        | <b>108 Mbps to 6 Mbps</b>                      |
| Antenna              | <b>2 Permanently Attached OMNI (6dBi Gain)</b> |
| DC voltage           | <b>12V Power Adaptor / 1Amp</b>                |
| External Interface   | <b>RJ45</b>                                    |

The Product is a WLAN adapter operating in the 5.15-5.35GHz band with a TX output power of 50mW. It is a small desktop box with associated wall plug mount 12VDC power supply, dual external antennas and a 10/100baseT port for connection to standard wired LAN. The peak gain for each antenna is 6dBi. This device either be stand alone connected to an RJ-45 LAN hub port, or be connected to the RJ-45 port of a computer device.

Local clock and Oscillator

| Board               | Frequencies (MHz)                           |
|---------------------|---|
| Processor ASIC      | 33  |
| Ethernet Controller | 25  |
| RF Synthesizer      | 40, 80, 160 derived from a 32MHz Oscillator |

### 3. TEST LOCATION

All emissions tests were performed at:

Compliance Engineering Services, Inc.  
561F Monterey Road  
Morgan Hill, CA 95037

CCS has site descriptions on file with the FCC for 10 and 3 meter site configurations. CCS is a NVLAP accredited facility.

#### Measurement Uncertainty

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

| <b>Radiated Emission</b>             |             |
|--------------------------------------|-------------|
| 30MHz – 200 MHz                      | +/- 3.3dB   |
| 200MHz – 1000MHz                     | +4.5/-2.9dB |
| 1000MHz – 2000MHz                    | +4.6/-2.2dB |
| <b>Power Line Conducted Emission</b> |             |
| 150kHz – 30MHz                       | +/-2.9      |

#### 4. LABORATORY ACCREDITATIONS AND LISTINGS

| Country | Agency          | Scope of Accreditation  | Logo   |
|---------|-----------------|---|--|
| USA     | NVLAP*          | FCC Part 15, CISPR 22, AS/NZS 3548, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, CNS 13438   | <br>200065-0              |
| USA     | FCC             | 3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements  | <br>1300                  |
| Japan   | VCCI            | CISPR 22 Two OATS and one conducted Site  | <br>R-1014, R-619, C-640  |
| Norway  | NEMKO           | EN50081-1, EN50081-2, EN50082-1, EN50082-2, IEC61000-6-1, IEC61000-6-2, EN50083-2, EN50091-2, EN50130-4, EN55011, EN55013, EN55014-1, EN55104, EN55015, EN61547, EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN60945, EN61326-1 | <br>ELA 117               |
| Norway  | NEMKO           | EN60601-1-2 and IEC 60601-1-2, the Collateral Standards for Electro-Medical Products. MDD, 93/42/EEC, AIMD 90/385/EEC   | <br>ELA-171             |
| Taiwan  | BSMI            | CNS 13438   | <br>SL2-IN-E-1012       |
| Canada  | Industry Canada | RSS210 Low Power Transmitter and Receiver   | <br>IC2324 A,B,C, and F |

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

## 5. SUPPORT/ TEST EQUIPMENT

### Support Equipment

No support equipment was used during the test.

### Test Equipment

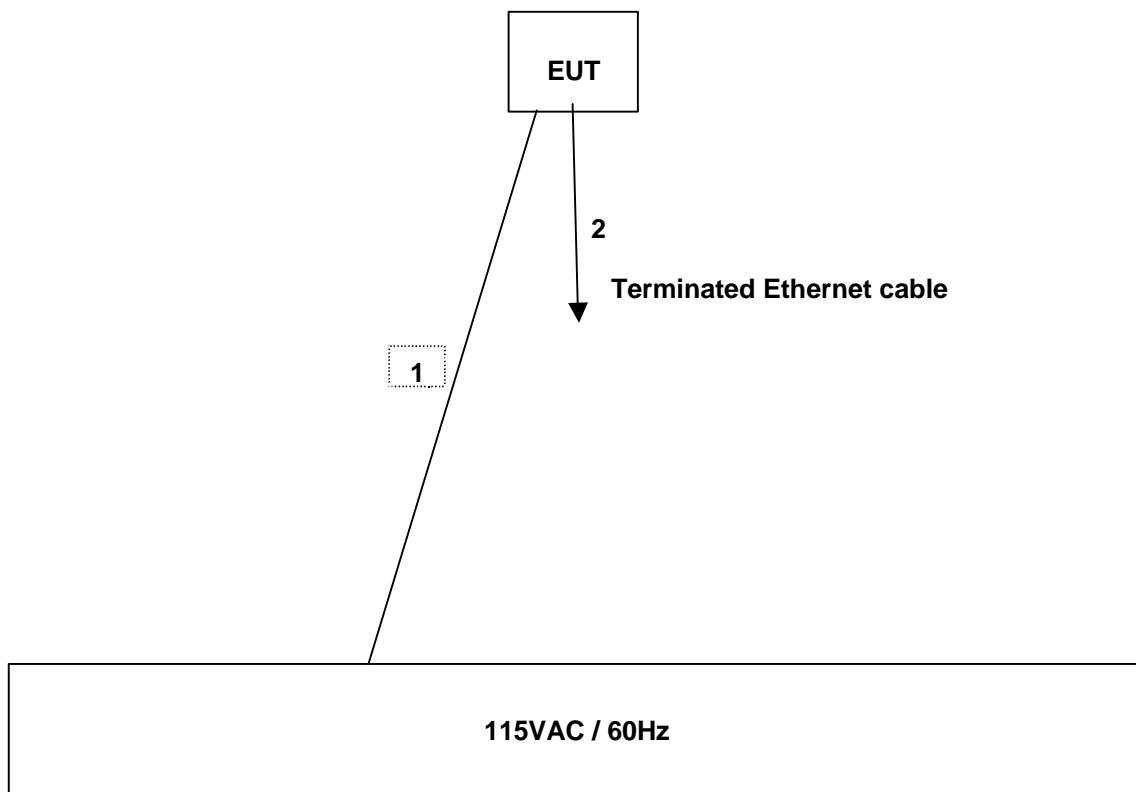
| TEST EQUIPMENTS LIST      |                            |              |             |          |
|---------------------------|----------------------------|--------------|-------------|----------|
| Name of Equipment         | Manufacturer               | Model No.    | Serial No.  | Due Date |
| Spectrum Analyzer         | HP100Hz - 22GHz            | 8566B        | 2140A01296  | 5/4/02   |
| Spectrum Display          | HP                         | 85662A       | 2152A03066  | 5/10/02  |
| Quasi-Peak Detector       | HP9K - 1GHz                | 85650A       | 2811A01155  | 5/4/02   |
| Pre-Amplifier, 25 dB      | HP 0.1 - 1300MHz           | 8447D (P_1M) | 2944A06833  | 11/21/01 |
| Antenna, BiLog            | Chase 30 - 2000MHz         | CBL6112      | 2049        | 12/11/01 |
| EMC Receiver (9K-26.5GHz) | HP                         | 8593EM       | 3710A00205  | 6/20/02  |
| Horn Antenna(1 - 18GHz)   | EMCO                       | 3115         | 2238        | 6/20/02  |
| Horn Antenna,(18 - 26GHz) | Antenna Research Associate | MWH 1826/B   | 1013        | 7/26/02  |
| Pre-Amplifier             | MITEQ1-26GHz               | NSP2600-44   | 646456      | 2/3/02   |
| EMI Test Receiver         | Rohde & Schwarz            | ESHS 20      | 827129/006  | 2/28/02  |
| LISN                      | Fischer                    | 9k - 100MHz  | 50/250-25-2 | 8/5/02   |
| Spectrum Analyzer         | HP 30MHz - 50GHz           | 8565E        | 2162A23127  | 9/29/01  |
| High Pass Filter          | FSY Microwave              | HP-7600-9SS  | 1           | N.C.R.   |
| Horn Antenna              | EMCO (18-40GHz)            | 3116         | 2582        | 9/29/01  |

The measuring equipment which was utilized in performing the tests documented herein has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment which is traceable to recognized national standards.

### I/O Cable Configuration

| TEST I/O CABLES |          |               |                |               |              |              |         |                |  |
|-----------------|----------|---------------|----------------|---------------|--------------|--------------|---------|----------------|--|
| Cable No        | I/O Part | # of I/O Part | Connector Type | Type of Cable | Cable Length | Data Traffic | Bundled | Remark         |  |
| 1               | AC       | 1             | US 115V        | Un-shielded   | 2m           | No           | No      | Yes in LC test |  |
| 2               | Ethernet | 1             | RJ45           | Un-shielded   | 2m           | No           | Yes     | N/A            |  |

### Test Configuration Diagram



## 6. TEST PROCEDURES AND TEST RESULTS

### MODIFICATIONS

While making band edge measurements at the restricted bands of 4.5-5.15GHz and 5.35-5.46GHz, one modification was made onto the board for compliance.

The capacitor of C999 was changed from no load to 100pF.

**RADIATED EMISSIONS TEST REQUIREMENT: 15.209**

Section 15.209 Radiated emission limits, general requirements.

(a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

| Frequency of Emission<br>(MHz) | Field Strength<br>(microvolts/meter) | dB<br>(dBuV/meter) |
|--------------------------------|--------------------------------------|--------------------|
| 30 - 88                        | 100                                  | 40                 |
| 88 - 216                       | 150                                  | 43.5               |
| 216 - 960                      | 200                                  | 46                 |
| Above 960                      | 500                                  | 54                 |

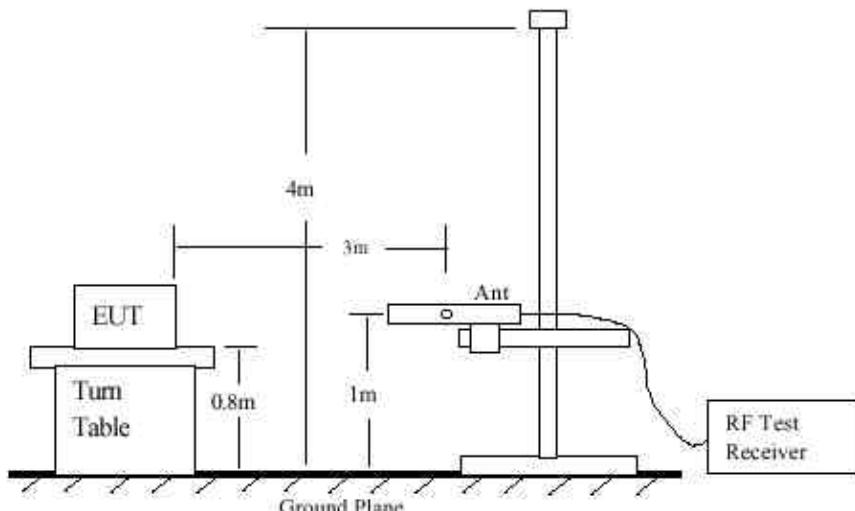
**Test Set-up**

Fig 1: Radiated Emission Measurement 30 to 1000 MHz

The EUT was placed on a turntable at a distance of 3 meters from a BiLog search antenna. The antenna was raised and lowered, the EUT rotated on the turntable, until the EUT azimuth, antenna elevation, and antenna polarity were found which yielded maximum received emission levels on the spectrum analyzer.

**Test Result:** Refer to attached tabular data sheets.



FCC, VCCI, CISPR, CE, AUSTEL, NZ  
UL, CSA, TUV, BSMI, DHHS, NVLAP

561F MONTEREY ROAD, SAN JOSE, CA 95037-9001  
PHONE: (408) 463-0885 FAX: (408) 463-0888

**Project #:** 01U0973  
**Report #:** 010924a  
**Date & Time:** 09/24/01 2:14 PM  
**Test Engr:** Hue Ly Vang

**Company:** Proxim TC  
**EUT Description:** Access point  
**Test Configuration:** EUT only  
**Type of Test:** FCC Class B  
**Mode of Operation:** Continous transmit

<< Main Sheet

| Freq.<br>(MHz) | Reading<br>(dBuV) | AF<br>(dB) | Closs<br>(dB) | Pre-amp<br>(dB) | Level<br>(dBuV/m) | Limit<br>FCC B | Margin<br>(dB) | Pol<br>(H/V) | Az<br>(Deg) | Height<br>(Meter) | Mark<br>(P/Q/A) |
|----------------|-------------------|------------|---------------|-----------------|-------------------|----------------|----------------|--------------|-------------|-------------------|-----------------|
| 480.00         | 52.00             | 18.34      | 3.18          | 28.28           | 45.24             | 46.00          | -0.76          | 3mV          | 90.00       | 1.00              | QP              |
| 366.60         | 52.80             | 16.22      | 2.69          | 27.56           | 44.15             | 46.00          | -1.85          | 3mH          | 90.00       | 1.00              | QP              |
| 366.60         | 51.30             | 16.46      | 2.69          | 27.56           | 42.88             | 46.00          | -3.12          | 3mV          | 90.00       | 1.00              | P               |
| 433.00         | 50.00             | 17.67      | 2.98          | 28.00           | 42.64             | 46.00          | -3.36          | 3mV          | 90.00       | 1.00              | P               |
| 384.00         | 50.30             | 16.84      | 2.76          | 27.69           | 42.21             | 46.00          | -3.79          | 3mV          | 90.00       | 1.00              | P               |
| 375.00         | 49.90             | 16.64      | 2.72          | 27.62           | 41.64             | 46.00          | -4.36          | 3mV          | 90.00       | 1.00              | P               |
| 6 Worst Data   |                   |            |               |                 |                   |                |                |              |             |                   |                 |

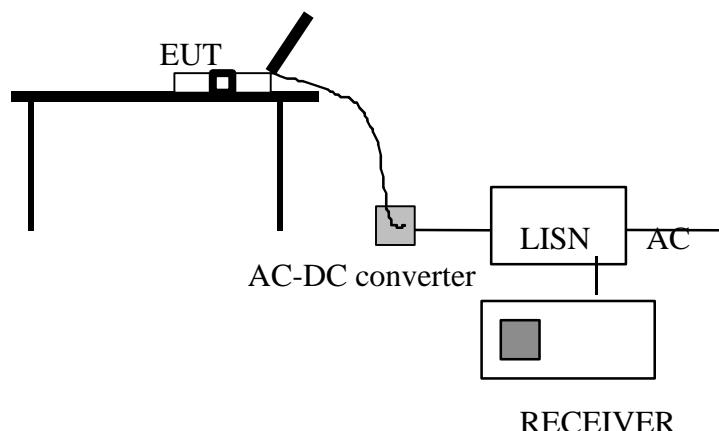
## AC LINE CONDUCTED EMISSIONS TEST REQUIREMENT: 15.207

### Section 15.207 Conducted limits.

(a) For an intentional radiator which 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 450 kHz to 30 MHz shall not exceed 250 microvolts. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

| Conducted Emission Limits |                   |
|---------------------------|-------------------|
| Frequency range(MHz)      | FCC Limits (dBuV) |
| .45-5                     | 48                |
| 5-30                      | 48                |

### Test Set-up



### Test Procedure

1. The EUT was placed on a wooden table 40 cm from a vertical ground plane and approximately 80 cm above the horizontal ground plane on the floor. The EUT was set to transmit in a normal mode.
2. Line conducted data was recorded for both NEUTRAL and HOT lines.

### Test Results

Refer to attached graph

Data from AC/DC adaptor model # P48121000A140G:

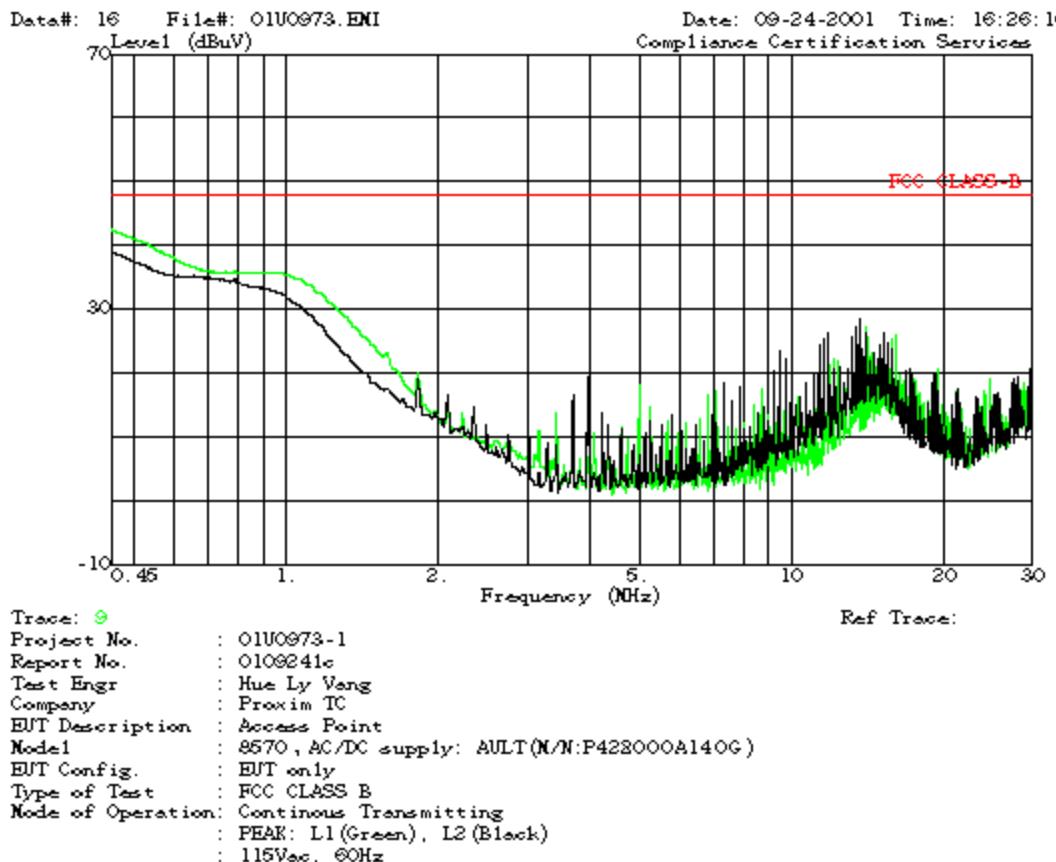
| CONDUCTED EMISSIONS DATA (115VAC 60Hz) |           |           |           |               |             |             |         |         |        |
|--|-----------|-----------|-----------|---------------|-------------|-------------|---------|---------|--------|
| Freq.<br>(MHz)                         | Reading   |           |           | Closs<br>(dB) | Limit<br>OP | FCC_B<br>AV | Margin  |         | Remark |
|  | PK (dBuV) | OP (dBuV) | AV (dBuV) |               |             |             | OP (dB) | AV (dB) |        |
| 0.45                                   | 42.31     | --        | --        | 0.00          | 48.00       | --          | -5.69   | --      | L1     |
| 0.98                                   | 35.61     | --        | --        | 0.00          | 48.00       | --          | -12.39  | --      | L1     |
| 13.85                                  | 28.16     | --        | --        | 0.00          | 48.00       | --          | -19.84  | --      | L1     |
| 0.45                                   | 38.88     | --        | --        | 0.00          | 48.00       | --          | -9.12   | --      | L2     |
| 0.78                                   | 34.61     | --        | --        | 0.00          | 48.00       | --          | -13.39  | --      | L2     |
| 13.85                                  | 29.37     | --        | --        | 0.00          | 48.00       | --          | -18.63  | --      | L2     |
| 6 Worst Data                           |           |           |           |               |             |             |         |         |        |

Data from AC/DC Adaptor model # SC102TA1203F01.

| CONDUCTED EMISSIONS DATA (115VAC 60Hz) |           |           |           |               |             |             |         |         |        |
|--|-----------|-----------|-----------|---------------|-------------|-------------|---------|---------|--------|
| Freq.<br>(MHz)                         | Reading   |           |           | Closs<br>(dB) | Limit<br>QP | FCC_B<br>AV | Margin  |         | Remark |
|  | PK (dBuV) | QP (dBuV) | AV (dBuV) |               |             |             | QP (dB) | AV (dB) |        |
| 0.88                                   | 45.60     | 45.27     | --        | 0.00          | 48.00       | --          | -2.73   | --      | L1     |
| 1.37                                   | 51.20     | 46.75     | --        | 0.00          | 48.00       | --          | -1.25   | --      | L1     |
| 15.52                                  | 46.82     | 46.75     | --        | 0.00          | 48.00       | --          | -1.25   | --      | L1     |
| 0.88                                   | 44.33     | 43.71     | --        | 0.00          | 48.00       | --          | -4.29   | --      | L2     |
| 1.34                                   | 46.58     | 44.21     | --        | 0.00          | 48.00       | --          | -3.79   | --      | L2     |
| 15.54                                  | 46.66     | 43.02     | --        | 0.00          | 48.00       | --          | -4.98   | --      | L2     |
| 6 Worst Data                           |           |           |           |               |             |             |         |         |        |



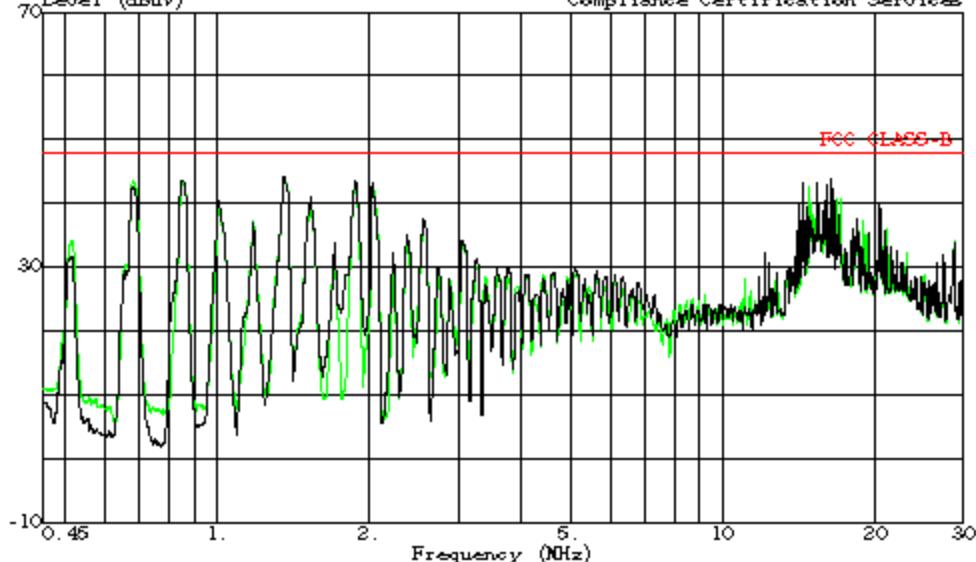
561 F Monterey Road, Route 2  
Morgan Hill, CA 95037-9001 USA  
Tel: (408) 463-0885  
Fax: (408) 463-0888





561 F Monterey Road, Route 2  
Morgan Hill, CA 95037-9001 USA  
Tel: (408) 463-0885  
Fax: (408) 463-0888

Data#: 29 File#: 01U0973.EMI Date: 09-28-2001 Time: 18:11:38  
Level1 (dBuV) Compliance Certification Services



Trace: 22 Ref Trace:  
Project No. : 01U0973-1  
Report No. : 0109241c\_11+12  
Test Engr : Hue Ly Vang  
Company : Proxim TC  
EUT Description : Access Point  
Model : 8570  
EUT Config. : EUT only  
: AC/DC supply: AULT(N/N:SC102TA1203F01)  
Type of Test : FCC CLASS B  
Mode of Operation: Continuous Transmitting  
: Q-Peak: L1(Green), L2(Black)  
: 115Vac, 60Hz

**RESTRICTED BAND TEST REQUIMENT: 15:205**Section 15.205 Restricted bands of operation.

(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       |
| <sup>1</sup> 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 -         | 2483.5 - 2500   | 17.7 - 21.4      |
| 8.37625 - 8.38675          | 156.52525           | 2655 - 2900     | 22.01 - 23.12    |
| 8.41425 - 8.41475          | 156.7 - 156.9       | 3260 - 3267     | 23.6 - 24.0      |
| 12.29 - 12.293             | 162.0125 - 167.17   | 3332 - 3339     | 31.2 - 31.8      |
| 12.51975 - 12.52025        | 167.72 - 173.2      | 3345.8 - 3358   | 36.43 - 36.5     |
| 12.57675 - 12.57725        | 240 - 285           | 3600 - 4400     | ( <sup>2</sup> ) |
| 13.36 - 13.41              | 322 - 335.4         |                 |                  |

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

(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.

### Test Set-up

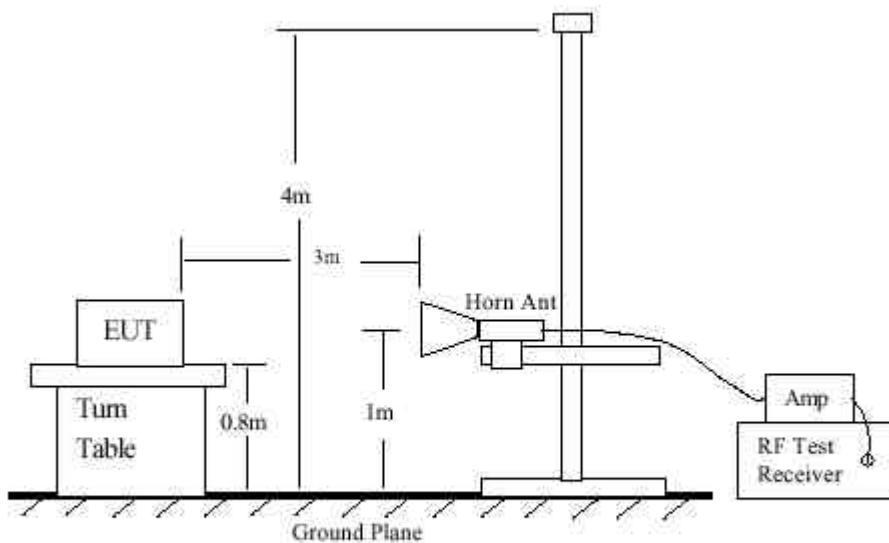


Fig 2: Radiated Emission Above 1000 MHz

### Test Procedures

1. The EUT was placed on a wooden table on the outdoor ground plane. The search antenna was placed 3 ft from the EUT. The EUT antenna was mounted vertically as per normal installation.
2. The turntable was slowly rotated to locate the direction of maximum emission at each emission falling in the restricted bands of 15.205.
3. Once maximum direction was determined, the search antenna was raised and lowered in both vertical and horizontal polarizations. The maximum readings so obtained are recorded in the data listed below.

Radiated emissions from the transmitter were compared against the radiated field strength of the fundamental frequency. The only emissions detected up to the 10th harmonic of the operating frequency were harmonics of the fundamental. All harmonics were at levels less than 54 dBuV/m, as per measurements taken to show compliance with 15.205.

**Test Results:** Refer to attached tabular data sheets

| <b>COMPLIANCE ENGINEERING SERVICES, INC.</b> |                |           |            |            |             |            |              |              |               |            |               |
|--|----------------|-----------|------------|------------|-------------|------------|--------------|--------------|---------------|------------|---------------|
| Harmonic Emissions                           |                |           |            |            |             |            |              |              |               |            |               |
| Proxim 9/27/01                               |                |           |            |            |             |            |              |              |               |            |               |
| Channel 36 : 5.18GHz Hue Vang                |                |           |            |            |             |            |              |              |               |            |               |
| A site (1.0 Meter)                           |                |           |            |            |             |            |              |              |               |            |               |
| <b>F(MHz)</b>                                | <b>READING</b> | <b>AF</b> | <b>CL</b>  | <b>AMP</b> | <b>DIST</b> | <b>HPF</b> | <b>TOTAL</b> | <b>LIMIT</b> | <b>MARGIN</b> | <b>POL</b> |               |
|  | (dBuV)         | (dB)      | (dB)       | (dB)       | (dB)        | (dB)       | (dBuV/m)     | (dBuV/m)     | (dB)          | (H/V)      |               |
|  |                | <b>Pk</b> | <b>Avg</b> |            |             |            |              | <b>Pk</b>    | <b>Avg</b>    | <b>Pk</b>  | <b>Avg</b>    |
| 10360*                                       | 40.9           | 36.5      | 38.1       | 7.28       | 42.5        | 9.5        | 1 35.28      | 30.88        | 68.3          | 68.3       | -33.6 -38 H   |
| 15540  | 50             | 40.2      | 38.2       | 10.2       | 42.5        | 9.5        | 1 47.4       | 37.6         | 74            | 54         | -26.6 -16.4 H |
| 20720  | 49.5           | 38.33     | 32.3       | 12.75      | 41.5        | 9.5        | 1 44.55      | 33.38        | 74            | 54         | -29.5 -20.6 H |
| 25900  | 54.5           | 42.3      | 33.1       | 14.62      | 42.5        | 9.5        | 1 51.22      | 39.02        | 74            | 54         | -22.8 -15 H   |
| 31080  | 20             | 13        | 47         | 13.5       | 20          | 9.5        | 0 51         | 44           | 74            | 54         | -23 -10 H     |
| 36260  | 21             | 14.2      | 46.5       | 13.5       | 20          | 9.5        | 0 51.5       | 44.7         | 74            | 54         | -22.5 -9.3 H  |
| 10360*                                       | 40.8           | 38        | 38.1       | 7.28       | 42.5        | 9.5        | 1 35.18      | 32.38        | 68.3          | 68.3       | -33.7 -36.5 V |
| 15540  | 49             | 40.5      | 38.2       | 10.2       | 42.5        | 9.5        | 1 46.4       | 37.9         | 74            | 54         | -27.6 -16.1 V |
| 20720  | 48.2           | 39.12     | 32.3       | 12.75      | 14.5        | 9.5        | 1 70.25      | 61.17        | 74            | 54         | -3.75 7.17 V  |
| 25900  | 51.4           | 41.9      | 33.1       | 14.62      | 42.5        | 9.5        | 1 48.12      | 38.62        | 74            | 54         | -25.9 -15.4 V |
| 31080  | 21             | 14.2      | 47         | 13.5       | 20          | 9.5        | 0 52         | 45.2         | 74            | 54         | -22 -8.8 V    |
| 36260  | 22             | 15.5      | 46.5       | 13.5       | 20          | 9.5        | 0 52.5       | 46           | 74            | 54         | -21.5 -8 V    |

**NOTE: ALL READINGS MEASURED AT 1 METER.**

**DIST:** Correction to extrapolate reading to 3m specification distance

| <b>ANALYZER SETTINGS</b>                    |                  |        |         |
|---|------------------|--------|---------|
| <b>AF:</b> Antenna Factor                   | <b>PEAK(Pk):</b> | Res bw | Avg. bw |
| <b>AMP:</b> Pre-amp gain                    |                  | 1MHz   | 1MHz    |
| <b>CL:</b> Cable loss                       | <b>AVG(Pk):</b>  | Res bw | Avg. bw |
| <b>HPF:</b> High pass filter insertion loss |                  | 1MHz   | 10Hz    |

\* : Not in restrict band

| <b>COMPLIANCE ENGINEERING SERVICES, INC.</b> |                    |            |           |           |            |             |            |              |            |              |               |
|--|--------------------|------------|-----------|-----------|------------|-------------|------------|--------------|------------|--------------|---------------|
| Harmonic Emissions                           |                    |            |           |           |            |             |            |              |            |              |               |
| Proxim                                       | 6/27/01            |            |           |           |            |             |            |              |            |              |               |
| Channel 48 : 5.24 GHz                        | Hue Vang           |            |           |           |            |             |            |              |            |              |               |
|  | A site (1.0 Meter) |            |           |           |            |             |            |              |            |              |               |
| <b>F(MHz)</b>                                | <b>READING</b>     |            | <b>AF</b> | <b>CL</b> | <b>AMP</b> | <b>DIST</b> | <b>HPF</b> | <b>TOTAL</b> |            | <b>LIMIT</b> | <b>MARGIN</b> |
|  | (dBuV)             |            | (dB)      | (dB)      | (dB)       | (dB)        | (dB)       | (dBuV/m)     |            | (dBuV/m)     | (dB)          |
|  | <b>Pk</b>          | <b>Avg</b> |           |           |            |             |            | <b>Pk</b>    | <b>Avg</b> | <b>Pk</b>    | <b>Avg</b>    |
| 10480*                                       | 49                 | 39         | 38.1      | 7.28      | 42.5       | 9.5         | 1          | 43.38        | 33.38      | 68.3         | 68.3          |
| 15720  | 52                 | 44.5       | 38.2      | 10.2      | 42.5       | 9.5         | 1          | 49.4         | 41.9       | 74           | 54            |
| 20960  | 41.2               | 39.1       | 32.3      | 12.75     | 41.5       | 9.5         | 1          | 36.25        | 34.15      | 74           | 54            |
| 26200  | 53                 | 40.8       | 33.1      | 14.62     | 42.5       | 9.5         | 1          | 49.72        | 37.52      | 74           | 54            |
| 31440  | 20                 | 14.9       | 47        | 13.5      | 20         | 9.5         | 0          | 51           | 45.9       | 74           | 54            |
| 36680  | 21                 | 15.2       | 46.5      | 13.5      | 20         | 9.5         | 0          | 51.5         | 45.7       | 74           | 54            |
| 10480*                                       | 45                 | 38.9       | 38.1      | 7.28      | 42.5       | 9.5         | 1          | 39.38        | 33.28      | 68.3         | 68.3          |
| 15720  | 52.5               | 43         | 38.2      | 10.2      | 42.5       | 9.5         | 1          | 49.9         | 40.4       | 74           | 54            |
| 20960  | 43.3               | 38.8       | 32.3      | 12.75     | 14.5       | 9.5         | 1          | 65.35        | 60.85      | 74           | 54            |
| 26200  | 54                 | 41.6       | 33.1      | 14.62     | 42.5       | 9.5         | 1          | 50.72        | 38.32      | 74           | 54            |
| 31440  | 22                 | 15         | 47        | 13.5      | 20         | 9.5         | 0          | 53           | 46         | 74           | 54            |
| 36680  | 21                 | 17         | 46.5      | 13.5      | 20         | 9.5         | 0          | 51.5         | 47.5       | 74           | 54            |

**NOTE: ALL READINGS MEASURED AT 1 METER.**

**DIST**: Correction to extrapolate reading to 3m specification distance

| <b>ANALYZER SETTINGS</b>             |           |        |        |
|--------------------------------------|-----------|--------|--------|
| AF: Antenna Factor                   | PEAK(Pk): | Res_bw | Avg_bw |
| AMP: Pre-amp gain                    |           | 1MHz   | 1MHz   |
| CL: Cable loss                       | AVG(Pk):  | Res_bw | Avg_bw |
| HPF: High pass filter insertion loss |           | 1MHz   | 10Hz   |

\* : Not in restricted bands

| <b>COMPLIANCE ENGINEERING SERVICES, INC.</b>                                |         |       |      |       |      |          |          |                    |        |       |    |       |       |   |
|---|---------|-------|------|-------|------|----------|----------|--------------------|--------|-------|----|-------|-------|---|
| Harmonic Emissions  |         |       |      |       |      |          |          |                    |        |       |    |       |       |   |
| proxim  |         |       |      |       |      |          |          |                    |        |       |    |       |       |   |
|   |         |       |      |       |      |          |          | 6/27/01            |        |       |    |       |       |   |
| Channel 64 : 5.32 GHz   |         |       |      |       |      |          |          | Hue Vang           |        |       |    |       |       |   |
|   |         |       |      |       |      |          |          | A site (1.0 Meter) |        |       |    |       |       |   |
| F(MHz)  | READING | AF    | CL   | AMP   | DIST | HPF      | TOTAL    | LIMIT              | MARGIN | POL   |    |       |       |   |
| (dBuV)  | (dB)    | (dB)  | (dB) | (dB)  | (dB) | (dBuV/m) | (dBuV/m) | (dBuV/m)           | (dB)   | (H/V) |    |       |       |   |
| Pk  | Avg     |       |      |       |      |          | Pk       | Avg                | Pk     | Avg   | Pk |       |       |   |
|   |         |       |      |       |      |          |          |                    |        |       |    |       |       |   |
| 10640   | 50.9    | 40.33 | 38.1 | 7.28  | 42.5 | 9.5      | 1        | 45.28              | 34.71  | 74    | 54 | -28.7 | -19.3 | H |
| 15960   | 52      | 43    | 38.2 | 10.2  | 42.5 | 9.5      | 1        | 49.4               | 40.4   | 74    | 54 | -24.6 | -13.6 | H |
| 21280   | 49.8    | 38    | 32.3 | 12.75 | 41.5 | 9.5      | 1        | 44.85              | 33.05  | 74    | 54 | -29.2 | -21   | H |
| 26600   | 48.5    | 42.8  | 33.1 | 14.62 | 42.5 | 9.5      | 1        | 45.22              | 39.52  | 74    | 54 | -28.8 | -14.5 | H |
| 31920   | 22      | 17    | 47   | 13.5  | 20   | 9.5      | 0        | 53                 | 48     | 74    | 54 | -21   | -6    | H |
| 37240   | 21      | 13    | 46.5 | 13.5  | 20   | 9.5      | 0        | 51.5               | 43.5   | 74    | 54 | -22.5 | -10.5 | H |
| 10640   | 50.83   | 40    | 38.1 | 7.28  | 42.5 | 9.5      | 1        | 45.21              | 34.38  | 74    | 54 | -28.8 | -19.6 | V |
| 15960   | 52.33   | 42.83 | 38.2 | 10.2  | 42.5 | 9.5      | 1        | 49.73              | 40.23  | 74    | 54 | -24.3 | -13.8 | V |
| 21280   | 48.8    | 39.1  | 32.3 | 12.75 | 14.5 | 9.5      | 1        | 70.85              | 61.15  | 74    | 54 | -3.15 | 7.15  | V |
| 26600   | 47.8    | 42.5  | 33.1 | 14.62 | 42.5 | 9.5      | 1        | 44.52              | 39.22  | 74    | 54 | -29.5 | -14.8 | V |
| 31920   | 21      | 15    | 47   | 13.5  | 20   | 9.5      | 0        | 52                 | 46     | 74    | 54 | -22   | -8    | V |
| 37240   | 20      | 14.5  | 46.5 | 13.5  | 20   | 9.5      | 0        | 50.5               | 45     | 74    | 54 | -23.5 | -9    | V |
| <b>NOTE: ALL READINGS MEASURED AT 1 METER.</b>                              |         |       |      |       |      |          |          |                    |        |       |    |       |       |   |
| <b>DIST:</b> Correction to extrapolate reading to 3m specification distance |         |       |      |       |      |          |          |                    |        |       |    |       |       |   |
| <b>ANALYZER SETTINGS</b>  |         |       |      |       |      |          |          |                    |        |       |    |       |       |   |
| <b>PEAK(Pk):</b> Res bw      Avg. bw  |         |       |      |       |      |          |          |                    |        |       |    |       |       |   |
| <b>1MHz</b> <b>1MHz</b>   |         |       |      |       |      |          |          |                    |        |       |    |       |       |   |
| <b>AVG(Pk):</b> Res bw      Avg. bw   |         |       |      |       |      |          |          |                    |        |       |    |       |       |   |
| <b>1MHz</b> <b>10Hz</b>   |         |       |      |       |      |          |          |                    |        |       |    |       |       |   |
| <b>HPF:</b> High pass filter insertion loss                                 |         |       |      |       |      |          |          |                    |        |       |    |       |       |   |

**BANDEDGE**

The band edge emission plot on the following pages shows carrier frequency maximum emission in restrict band 4.5-5.15GHz(lower band edge) and 5.35-5.46GHz(upper band edge).

This method is exactly like the marker delta method. But the delta value will be collected from a conducted measurement to obtain better dynamic range.

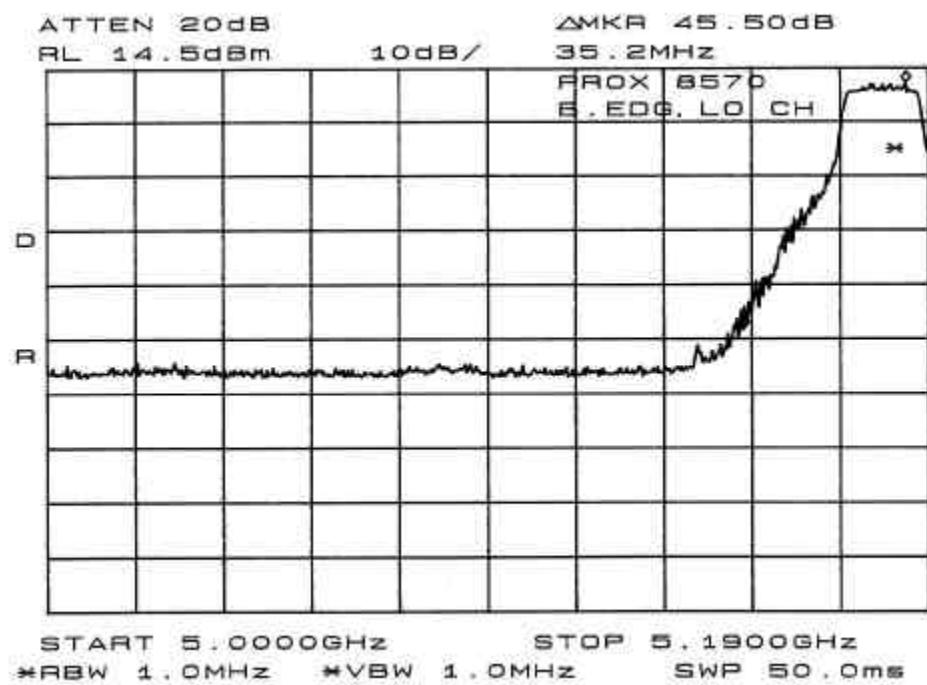
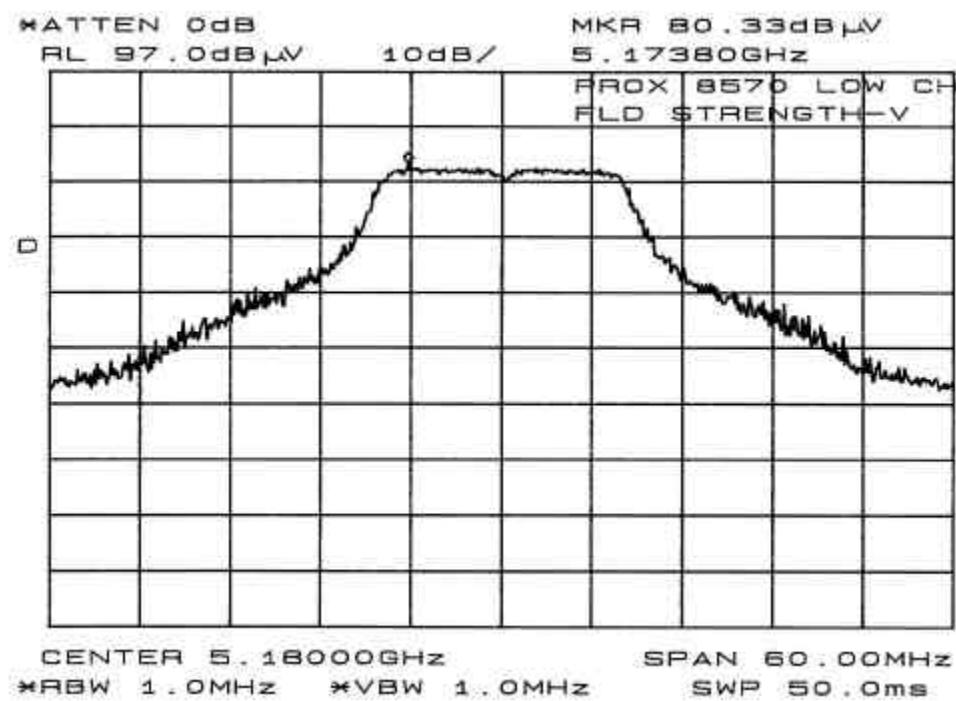
For this method measure the field strength of the fundamental frequencies in dBuV. Once that value is measured, another conducted measurement is made between the highest peak in the nearby restricted band and the fundamental peak in dBc. Then use that delta to subtract from the fundamental reading.

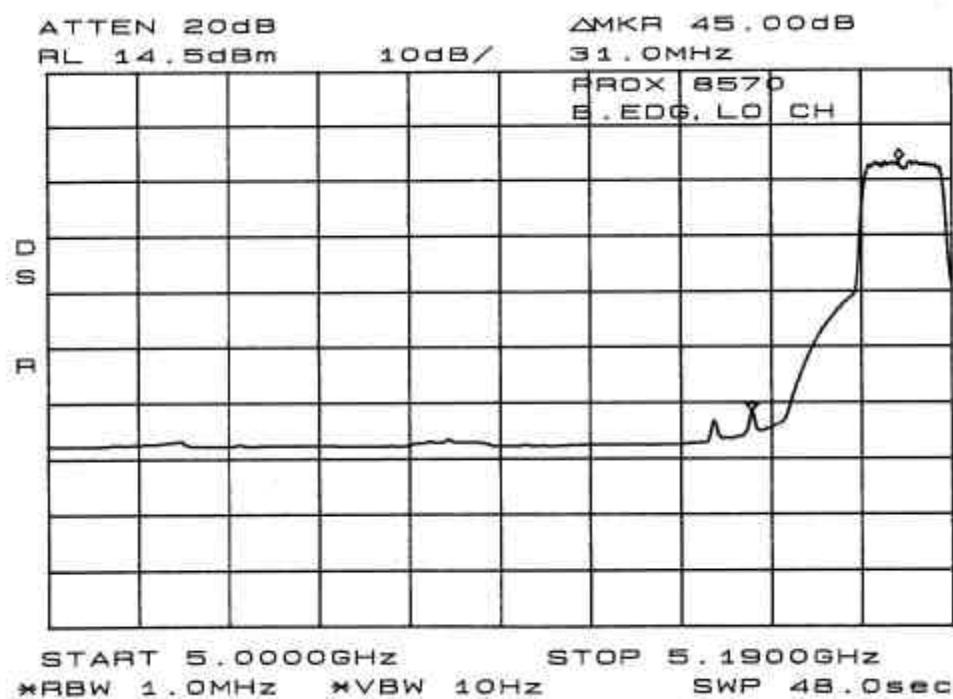
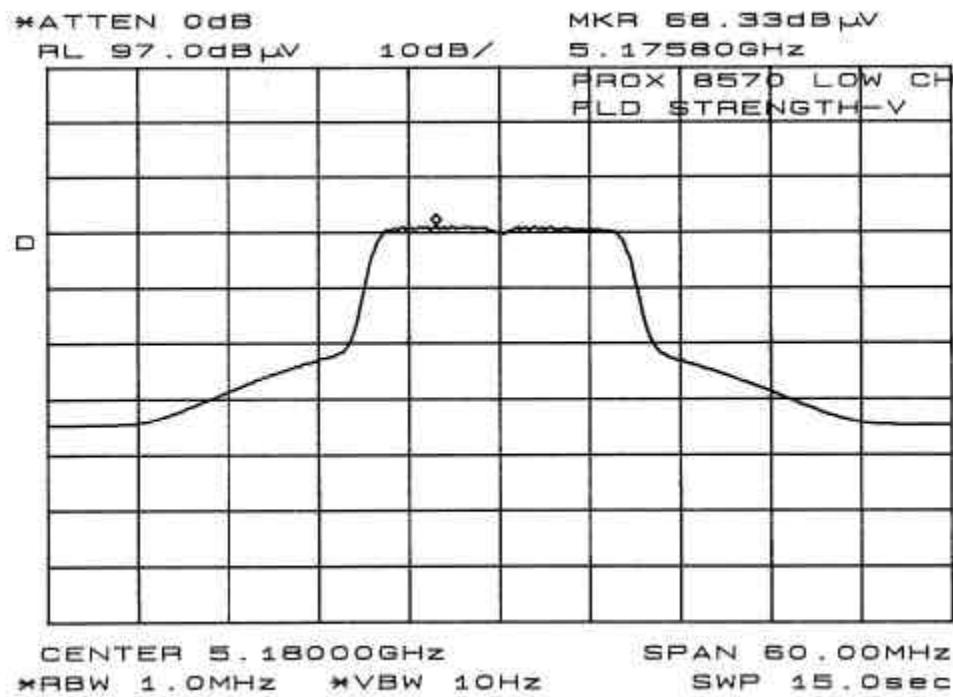
| Band | Peak(dBuV) | AVG(dBuV) | Delta.<br>Peak(dBc) | Delta<br>Avg(dBc) | True<br>Peak | True<br>Avg. |
|------|------------|-----------|---------------------|-------------------|--------------|--------------|
| Low  | 80.33      | 68.33     | 45.5                | 45                | 34.83        | 23.33        |
| High | 79.83      | 68        | 42.83               | 44.5              | 37.00        | 23.5         |

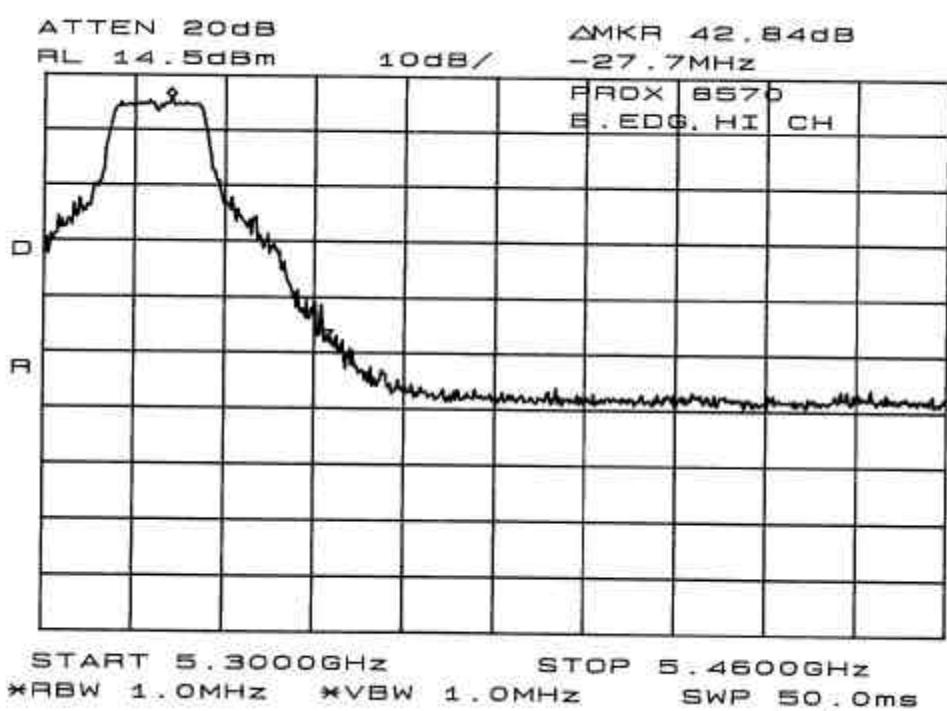
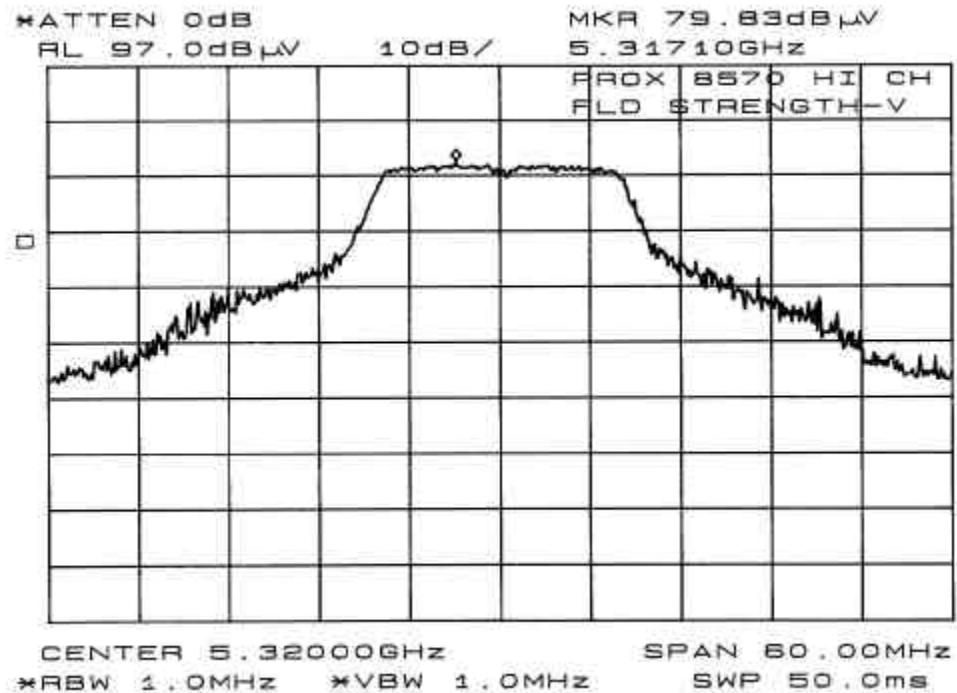
Band edge readings:

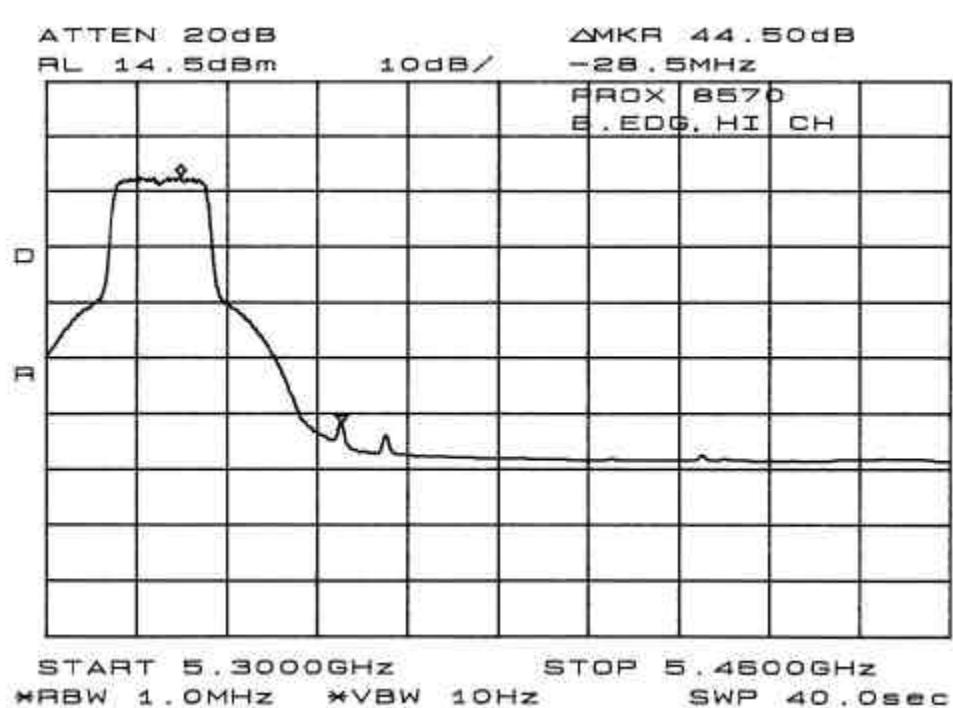
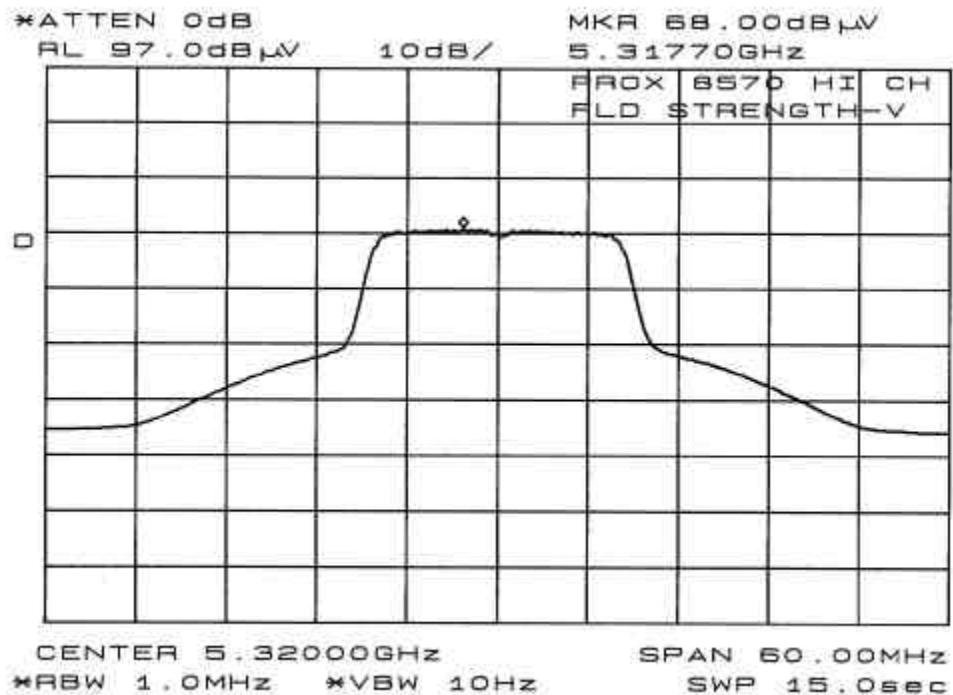
| Freq.<br>(MHz) | Reading<br>(dBuV) | AF<br>(dB) | Closs<br>(dB) | Pre-amp<br>(dB) | Dist<br>dB | Other<br>dB | Level<br>(dBuV/m) | Limit<br>FCC_B | Margin<br>(dB) | Pol<br>(P/A) |
|----------------|-------------------|------------|---------------|-----------------|------------|-------------|-------------------|----------------|----------------|--------------|
| 5180           | 34.83             | 34.20      | 4.80          | 0.00            | 9.50       | 0.00        | 64.33             | 74.0           | -9.67          | P            |
| 5180           | 23.33             | 34.20      | 4.80          | 0.00            | 9.50       | 0.00        | 52.83             | 54.0           | -1.17          | A            |
| 5320           | 37.00             | 34.60      | 4.80          | 0.00            | 9.50       | 0.00        | 66.90             | 74.0           | -7.10          | P            |
| 5320           | 23.50             | 34.60      | 4.80          | 0.00            | 9.50       | 0.00        | 53.40             | 54.0           | -0.60          | A            |

Remark: Measurements were made by using 802.11a mode of operation. There are three channels used by Turbo mode. They are channel [42@5210](#) MHz, channel [50@5250](#) MHz and channel [58@5290](#) MHz. Since during 802.11a mode, the channel usages and closer to restricted band, bandedge compliance measurements only performed at 802.11a mode.









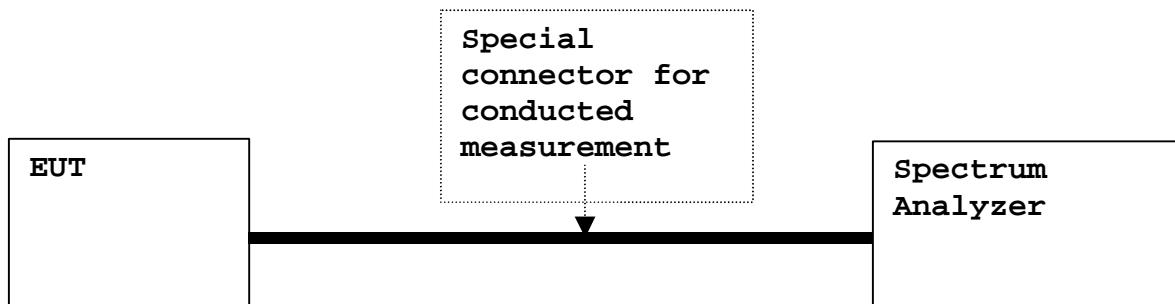
## PEAK POWER FOR UNII TEST REQUIREMENT: 15.407(A)1-2

### (a) Power limits:

(1) For the band 5.15-5.25 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 50 mW or  $4 \text{ dBm} + 10\log B$ , where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For the band 5.25-5.35 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10\log B$ , where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### Test Set-up



## Test Procedure

For this test, the EUT's antenna was removed and replaced with a SMA jack to UMP2.0 plug test cable, so output power levels were calculated from conducted emission levels

The analyzer center frequency was set to the EUT carrier frequency. The resolution bandwidth were set to 1MHz and the video bandwidth were set to 30khz. Use the MAX HOLD function capture the display. Use PEAK SEARCH to take the signal.

Because the Spectrum Analyzer bandwidth were less then the Emission bandwidth. The 26 dB Emission bandwidth correction factor was used.

To take the emission bandwidth set the resolution bandwidth to 1% of the emission bandwidth. The video band must be greater then the resolution bandwidth.

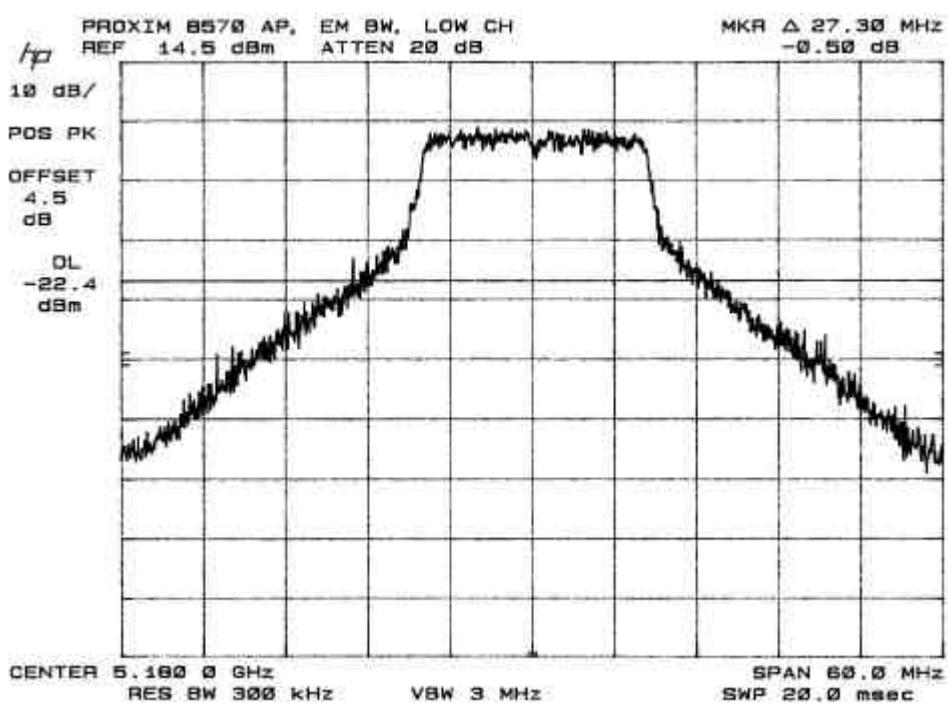
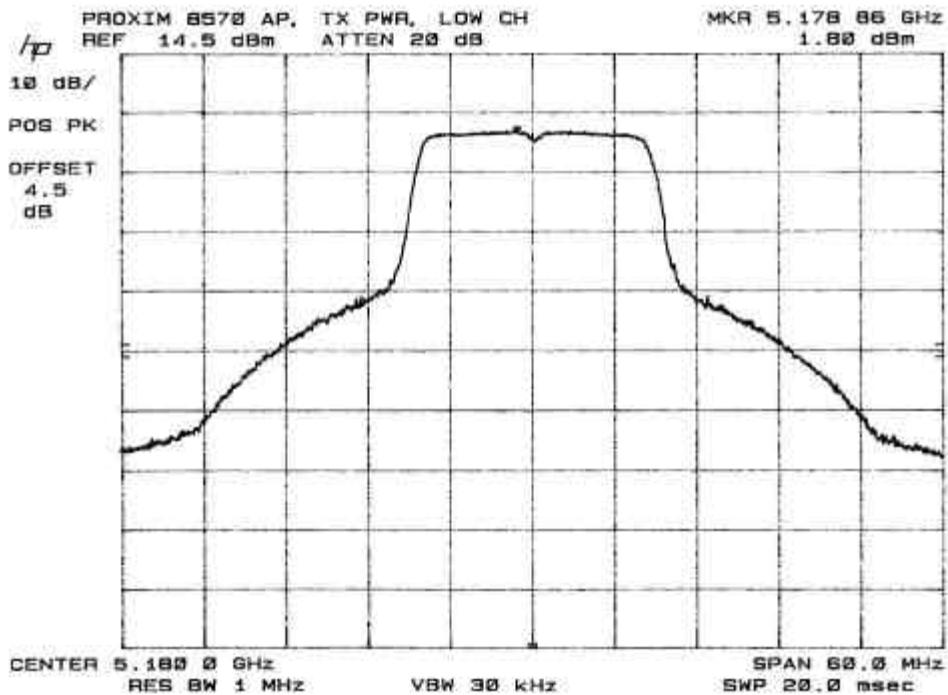
26dB Correction Factor :  $10 \log (\text{emission bandwidth} / \text{emission bandwidth unit})$

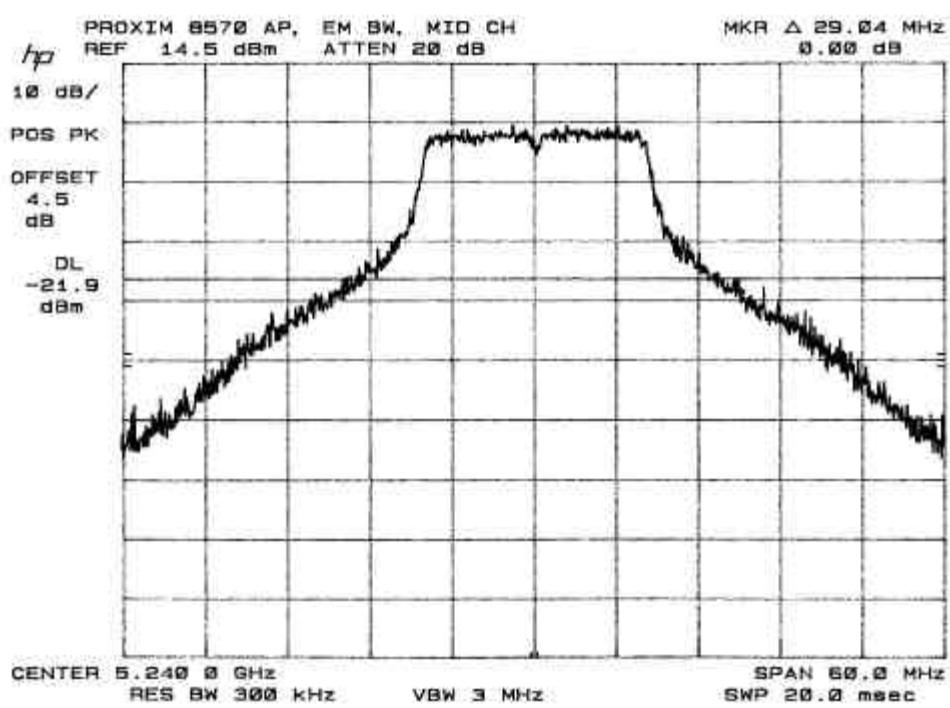
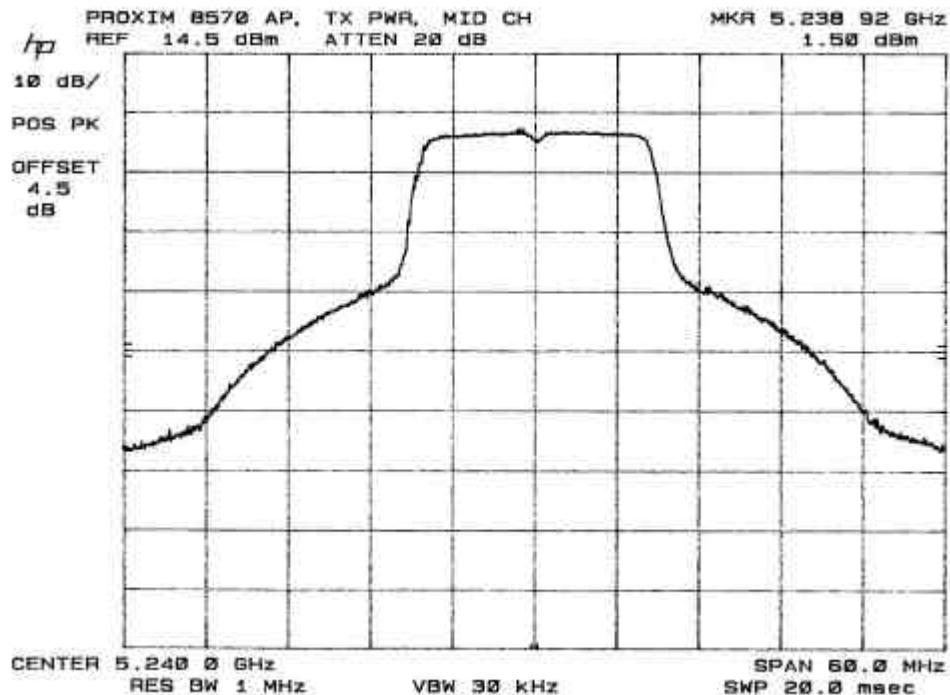
Once the 26 dB correction factor is attained add that number to the peak output power reading from the spectrum analyzer.

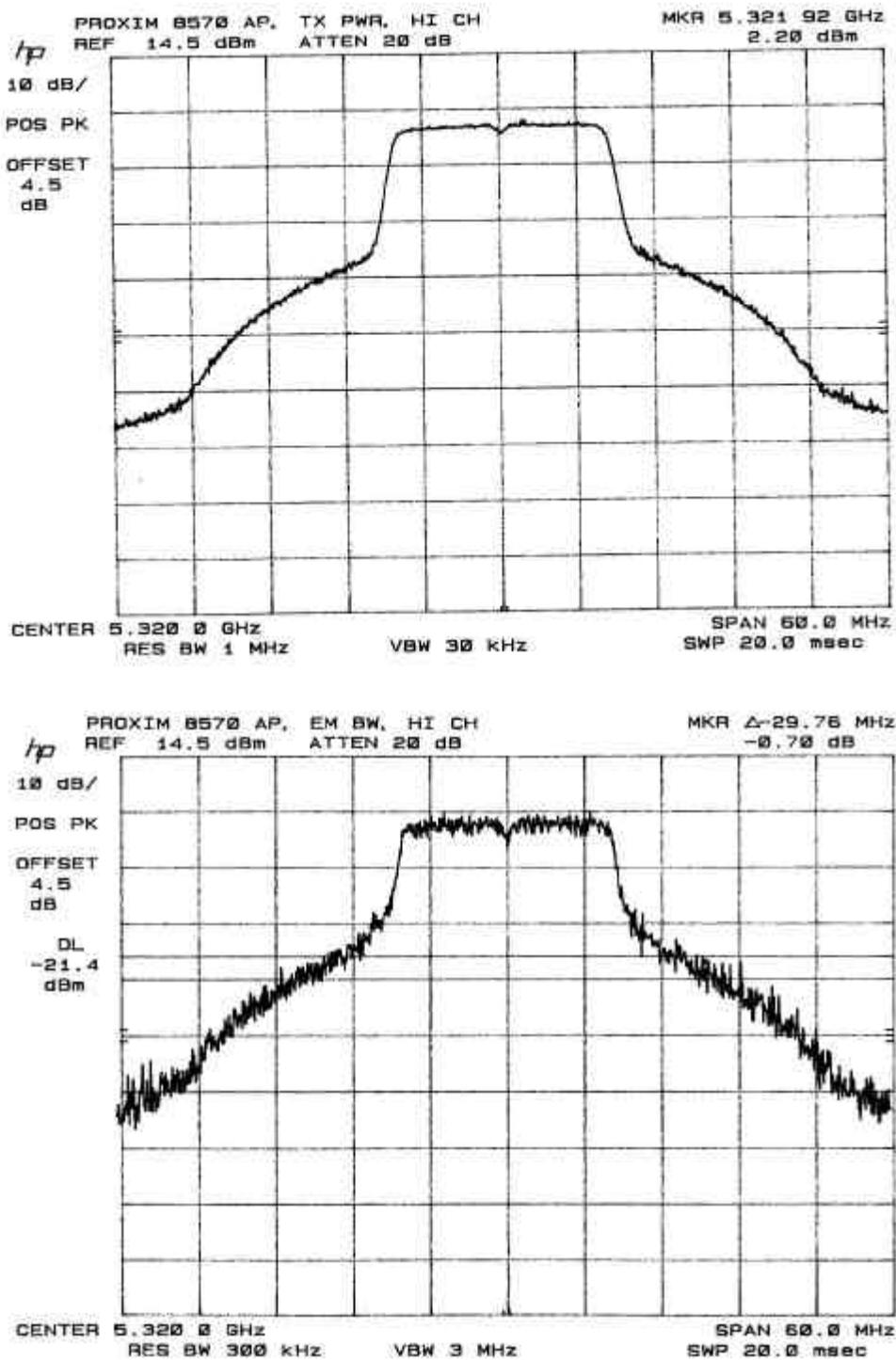
| Channel | Frequency (MHz) | Peak Power (dBm) | Emission Bandwidth (MHz) | True Power (dBm) | Limit (dBm) |
|---------|-----------------|------------------|--------------------------|------------------|-------------|
| 36      | 5180            | 1.8              | 27.3                     | 16.16            | 16.99       |
| 48      | 5240            | 1.5              | 29.04                    | 16.13            | 16.99       |
| 64      | 5320            | 2.2              | 29.76                    | 16.94            | 23.98       |

**Test Results:** Refer to attached spectrum analyzer data chart.

Measurements were made by using 802.11a mode of operation. Unit produces the highest power during Lower data rate.





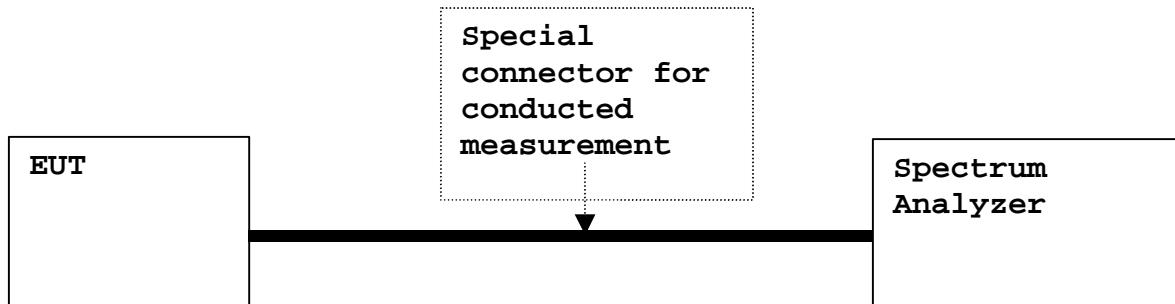


**PEAK POWER SPECTRAL DENSITY TEST REQUIREMENT: 15.407(A)5**

(1) For the band 5.15-5.25 GHz, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band.

(2) For the band 5.25-5.35 GHz, the peak power spectral density shall not exceed 11 dBm in any 1-MHz band.

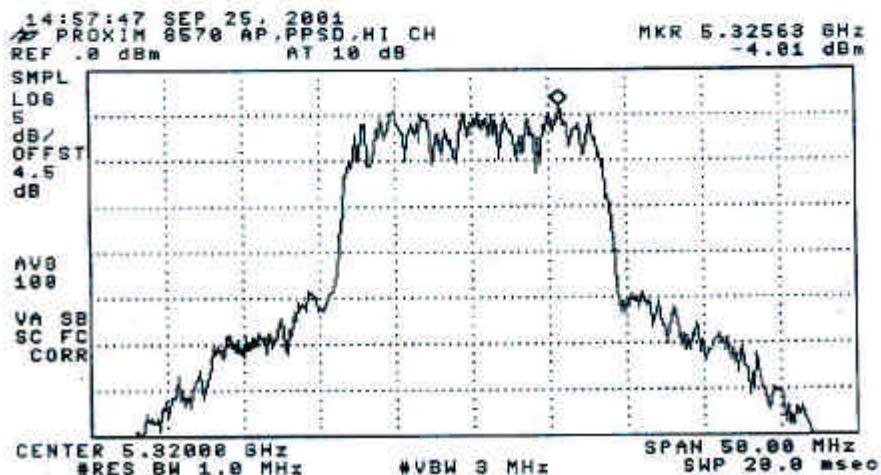
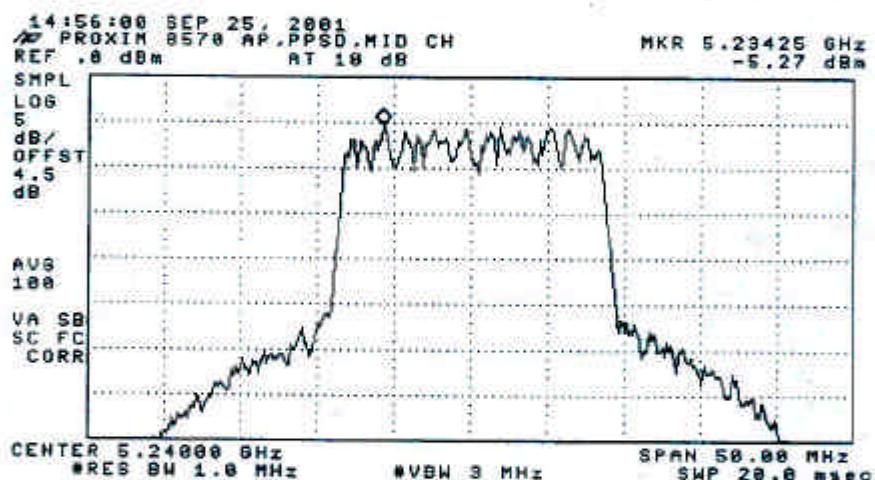
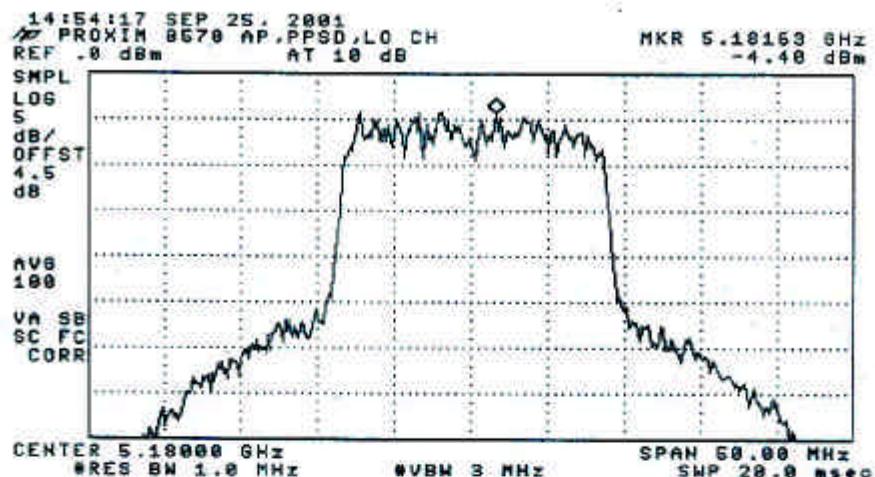
(5) The peak power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A resolution bandwidth less than the measurement bandwidth can be used, provided that the measured power is integrated to show total power over the measurement bandwidth. If the resolution bandwidth is approximately equal to the measurement bandwidth, and much less than the emission bandwidth of the equipment under test, the measured results shall be corrected to account for any difference between the resolution bandwidth of the test instrument and its actual noise bandwidth.

**Test Set-up****Test Procedure**

For this test, the EUT's antenna was removed and replaced with a SMA jack to UMP2.0 plug test cable, so output power levels were calculated from conducted emission levels.

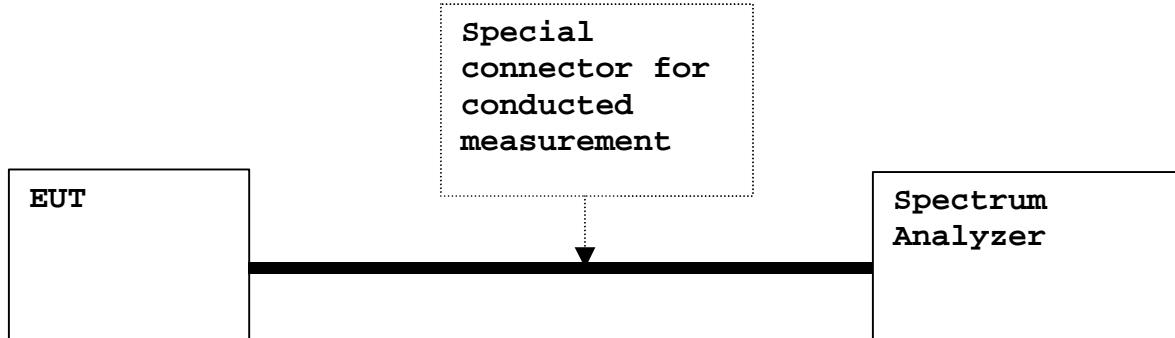
The analyzer center frequency was set to the EUT carrier frequency. The analyzer resolution bandwidth were set to 1MHz and the video bandwidth were set to 3MHz. After 100 sweep of video averaging, PEAK SEARCH for the wanted signal.

| Channel(MHZ) | Reading(dBm) | Margin(dBm) |
|--------------|--------------|-------------|
| 36           | -4.40        | -8.4        |
| 48           | -5.27        | -16.27      |
| 64           | -4.01        | -15.01      |



**PEAK EXCURSION TO AVERAGE RATIO: 15.407(A)6**

(6) The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

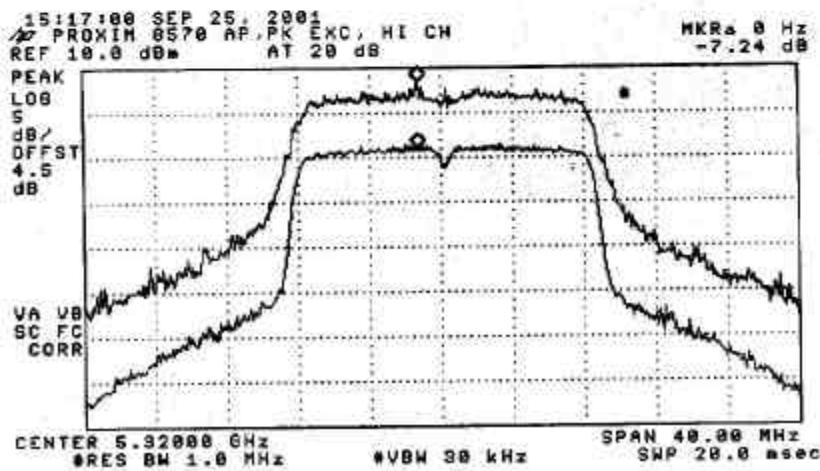
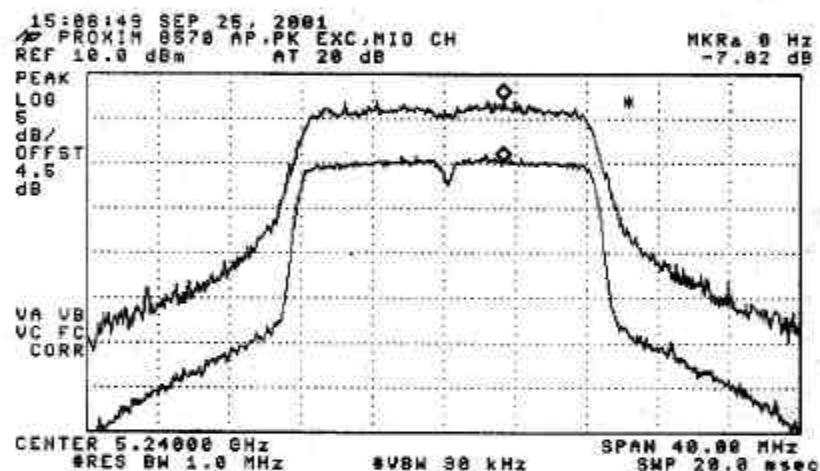
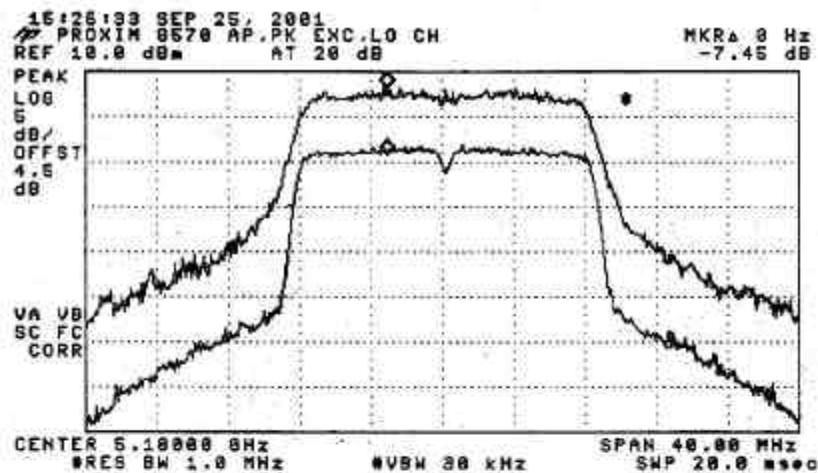
**Test Set-up****Test Procedure**

For this test, the EUT's antenna was removed and replaced with a SMA jack to UMP2.0 plug test cable, so output power levels were calculated from conducted emission levels.

The analyzer center frequency was set to the EUT carrier frequency. For the peak value trace A, the analyzer resolution and video bandwidth were set to 1MHz. Do a MAX HOLD, then VIEW. For the average value trace B, the analyzer resolution bandwidth were set to 1MHz, the video bandwidth were set to 30kHz. MAX HOLD then VIEW trace B also.

The delta from the peak value trace and the Average should not exceed 13dBm across any 1MHz bandwidth.

| Channel | Reading (dBm) | Margin (dBm) |
|---------|---------------|--------------|
| 36      | -7.45         | -20.45       |
| 48      | -7.02         | -20.02       |
| 64      | -7.24         | -20.24       |



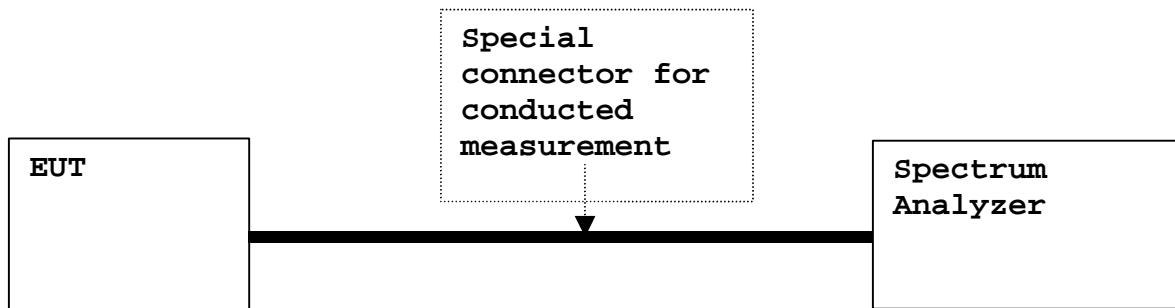
## OUT OF BAND EMISSION 15.407 (B) 1-2

(b) Undesirable Emission Limits: Except as shown in Paragraph (b)(6) of this Section, the peak emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3 dBuV/M@3meter).

(2) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.

### Test Set-up



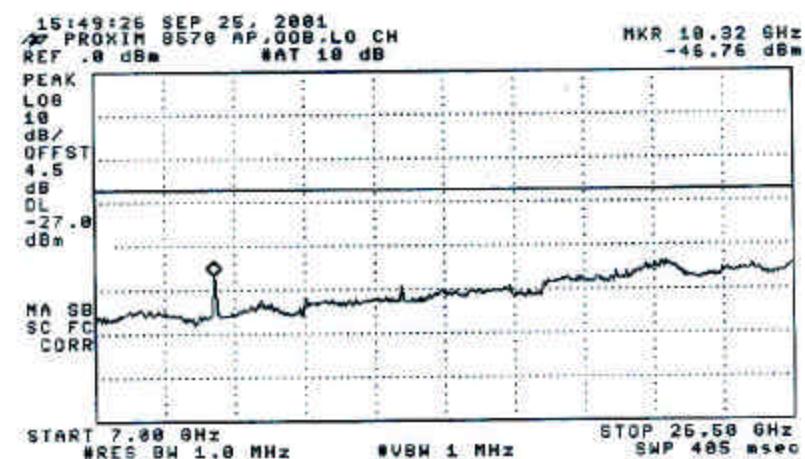
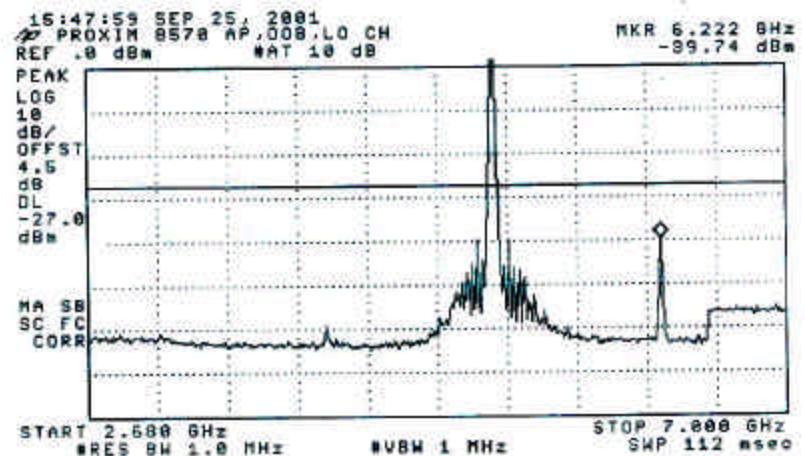
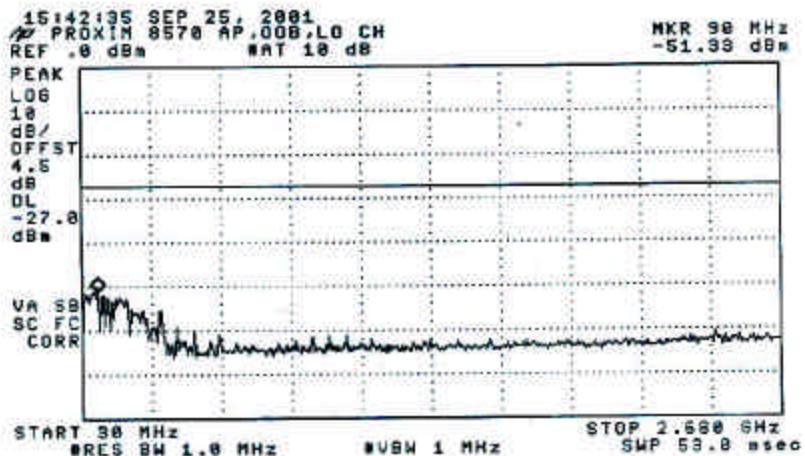
### Test Procedure

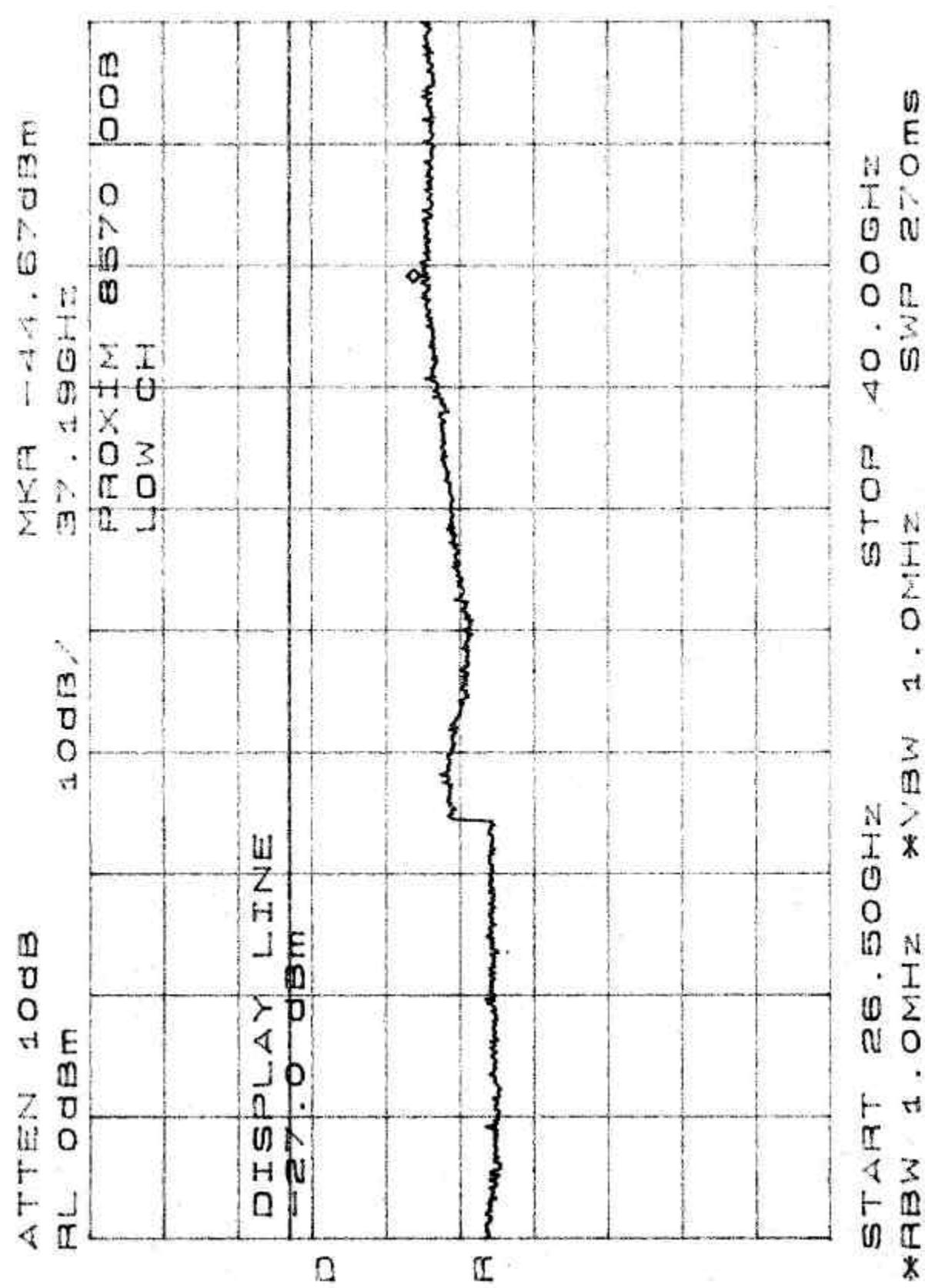
For this test, the EUT's antenna was removed and replaced with a SMA jack to UMA2.0 plug test cable, so output power levels were calculated from conducted emission levels.

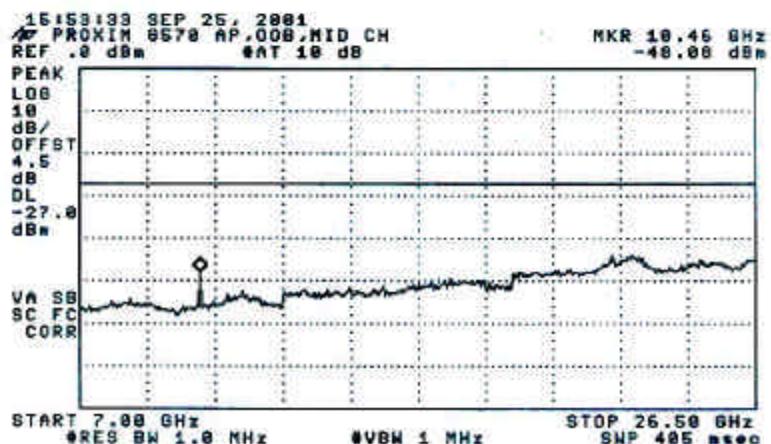
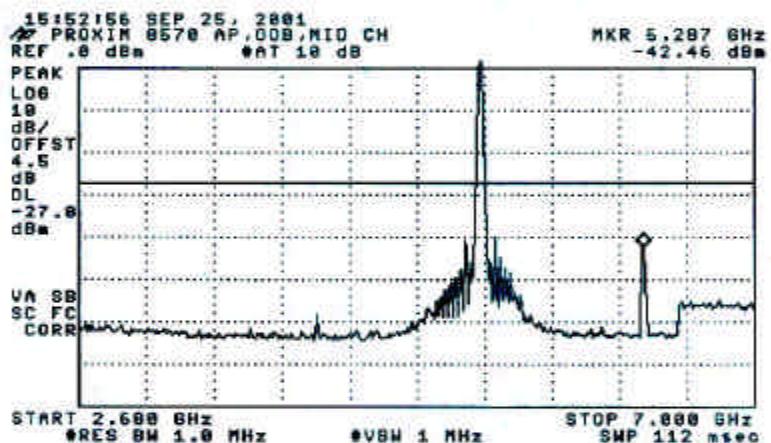
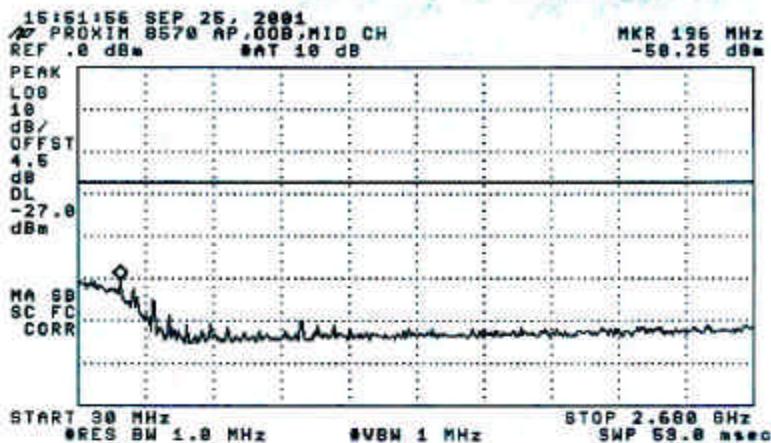
The analyzer center frequency was set to the EUT carrier frequency. The analyzer resolution and video bandwidth were set to 1MHz. The entire band from 30MHz to 40GHz was investigated

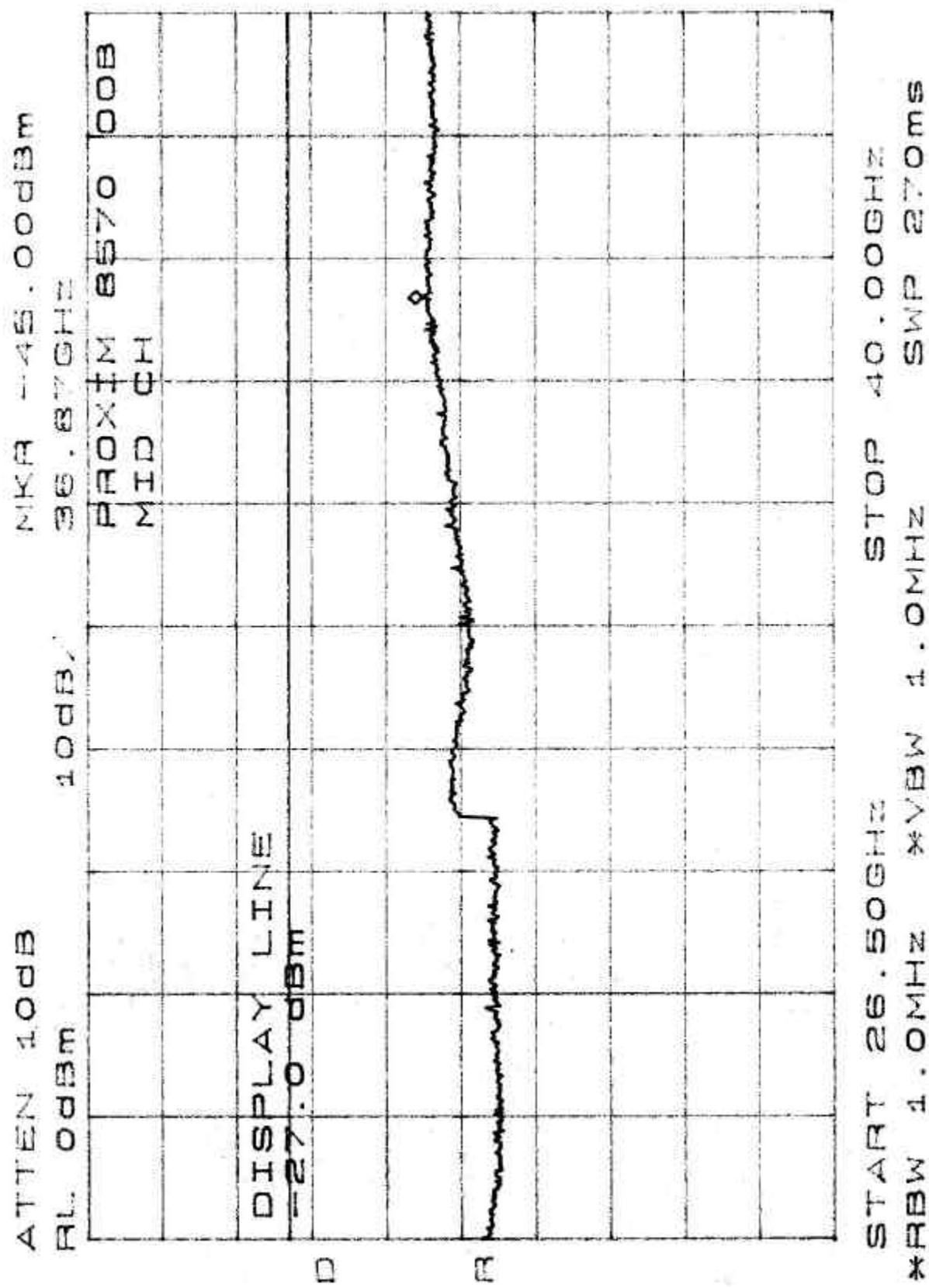
Every suspected signal was also investigated through radiated emission, refer to section 15.205 Restricted bands of operation for test setup.

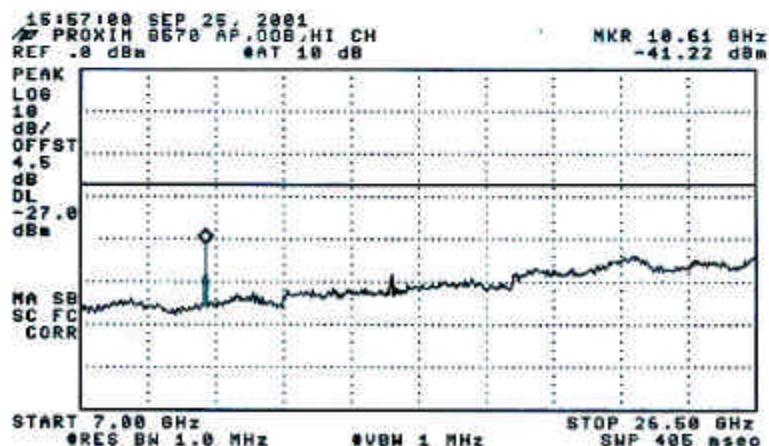
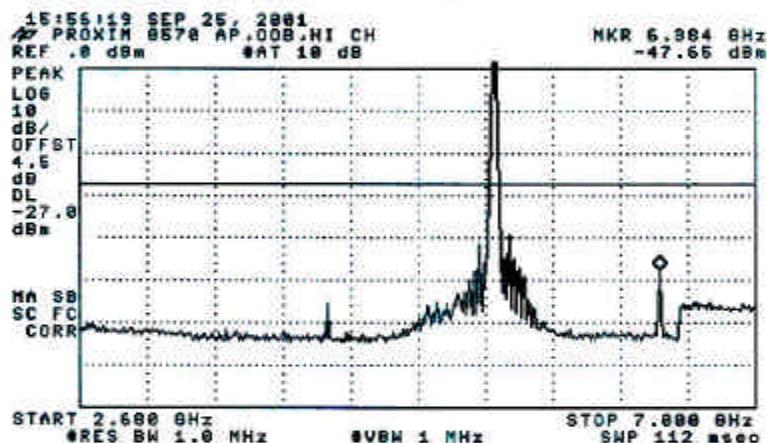
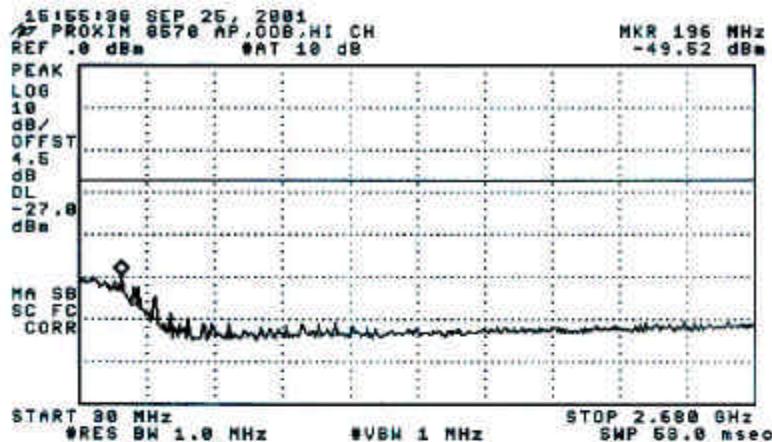
|  |                   |   |               |                              |            |                              |                   |              |                |              |  |
|--|-------------------|---|---------------|------------------------------|------------|------------------------------|-------------------|--------------|----------------|--------------|--|
| <b>COMPLIANCE</b><br>Certification Services  |                   | <p><b>Project #:</b> 01U973-1<br/><b>Report #:</b> 010924a<br/><b>Date &amp; Time:</b> 10/04/01 8:40 AM<br/><b>Test Engr:</b> Hue Ly Vang</p> |               |                              |            |                              |                   |              |                |              |  |
| <p>FCC, VCCI, CISPR, CE, AUSTEL, NZ<br/>UL, CSA, TUV, BSMI, DHHS, NVLAP<br/>561 F MONTEREY ROAD, MORGAN HILL CA 95037<br/>PHONE: (408) 463-0885 FAX: (408) 463-0888</p>  |                   |   |               |                              |            |                              |                   |              |                |              |  |
| <p><b>Company:</b> Proxim<br/><b>EUT Description:</b> Access Point<br/><b>Test Configuration :</b> Eut only<br/><b>Type of Test:</b> FCC 15.407, above 1GHz<br/><b>Mode of Operation:</b> Continous transmit</p> |                   |   |               |                              |            |                              |                   |              |                |              |  |
| <input checked="" type="radio"/> A-Site  |                   | <input type="radio"/> B-Site  |               | <input type="radio"/> C-Site |            | <input type="radio"/> F-Site |                   | 6 Worst Data |                | Descending   |  |
| Freq.<br>(MHz)   | Reading<br>(dBuV) | AF<br>(dB)  | Closs<br>(dB) | Pre-amp<br>(dB)              | Dist<br>dB | Other<br>dB                  | Level<br>(dBuV/m) | Limit<br>FCC | Margin<br>(dB) | Pol<br>(H/V) |  |
| 4149   | 54.40             | 24.90   | 6.00          | 42.50                        | 9.50       | 0.00                         | 33.30             | 68.30        | -35.00         | V            |  |
| 6222   | 56.90             | 32.40   | 6.00          | 42.50                        | 9.50       | 0.00                         | 43.30             | 68.30        | -25.00         | V            |  |
| 4192   | 58.00             | 36.20   | 6.00          | 41.50                        | 9.50       | 0.00                         | 49.20             | 68.30        | -19.10         | V            |  |
| 6287   | 53.00             | 24.90   | 6.00          | 42.50                        | 9.50       | 0.00                         | 31.90             | 68.30        | -36.40         | H            |  |
| 4257   | 55.00             | 32.40   | 6.00          | 42.50                        | 9.50       | 0.00                         | 41.40             | 68.30        | -26.90         | H            |  |
| 6384   | 51.30             | 37.50   | 6.00          | 41.00                        | 9.50       | 0.00                         | 44.30             | 68.30        | -24.00         | H            |  |
| 6 Worst Data   |                   |   |               |                              |            |                              |                   |              |                |              |  |

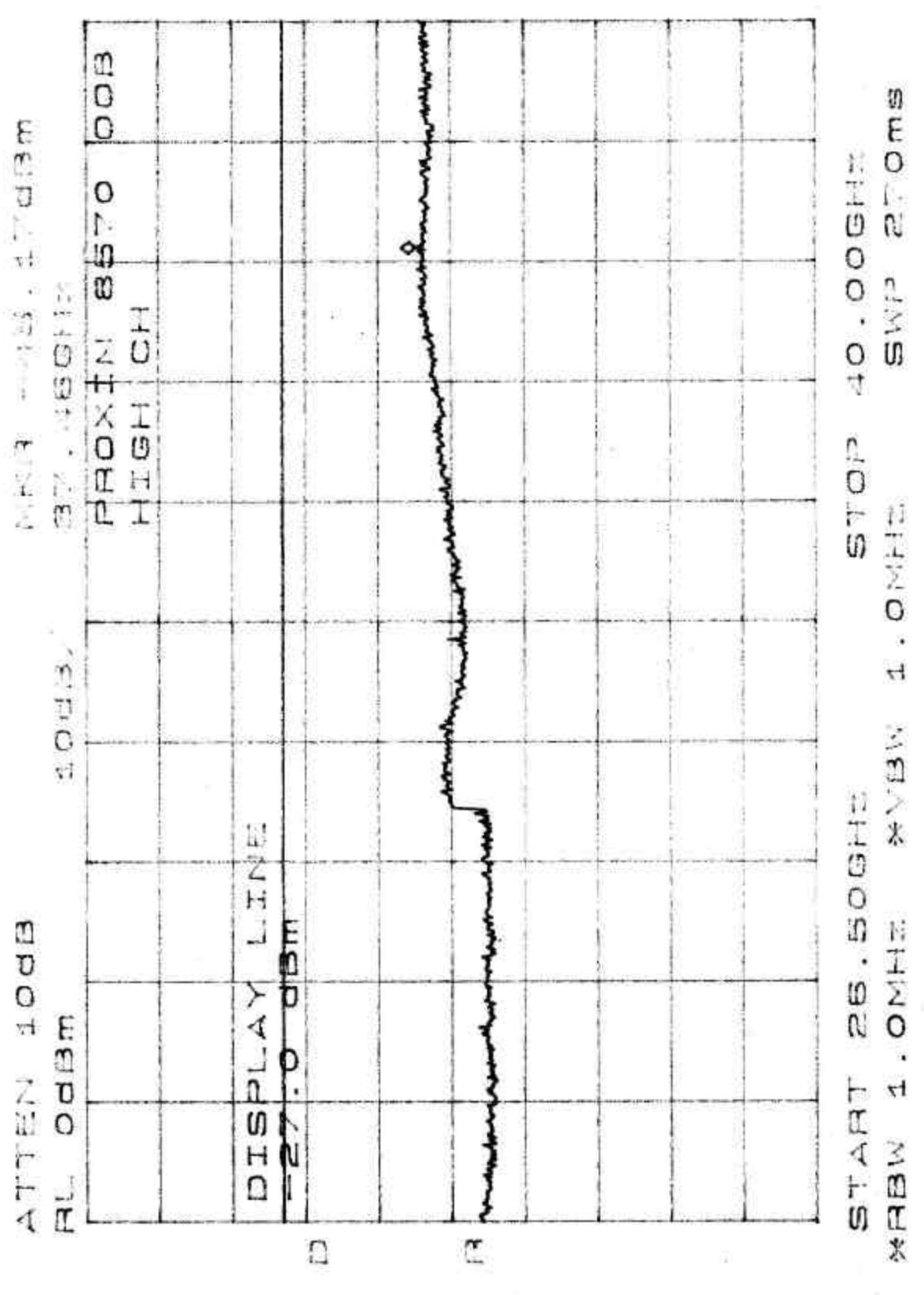












## **15.407 SUPPLEMENT TEST**

### **FREQUENCY STABILITY 15.407(g)**

(g) Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

**Refer to Theory of Operations for compliance.**

#### **Theory of Operations**

The Proxim Harmony 8570 Access Point device uses 8 channels between 5.18 GHz and 5.32 GHz. The carrier is 20 MHz wide centered at these frequencies. IE: Channel 36 (5.18 GHz) would have the Fc centered at 5.18 GHz with a band width of 20 MHz or 5.17 to 5.19 GHz.

The Proxim Harmony 8570 Access Point device also requires a +/- 20 ppm XTAL over temperature and with aging. This required per the 802.11a specification. Based on the tolerance of the XTAL and the 20 MHz guard band between 5.15 GHz and 5.35 GHz the device will maintain emissions within the UNII 1 and 2 bands under normal operating conditions specified in the user manual.

### **DISCONTINUE TRANSMITTING WITH ABSENCE OF DATA OR OPERATIONAL FAILURE 15.407 (C)**

(c) The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signalling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

**Refer to Theory of Operations for compliance.**

#### **Theory of Operations**

Data transmission is always initiated by software, which is then passed down through the MAC, through the digital and analog baseband, and finally to the RF chip. Several special packets (ACKs, CTS, PSPoll, etc...) are initiated by the MAC. These are the only ways the digital baseband portion will turn on the RF transmitter, which it then turns off at the end of the packet. Therefore, the transmitter will be on only while one of the aforementioned packets is being transmitted.

## **15.407 SUPPLEMENT TEST**

### **INSURING INDOOR USE IN 5.15-5.25 GHZ BAND 15.407 (E)**

(e) Within the 5.15-5.25 GHz band, U-NII devices will be restricted to indoor operations to reduce any potential for harmful interference to co-channel MSS operations.

The Proxim Harmony 8570 user manual includes the following statement:

"Radio Frequency interference requirements The Harmony 802.11a Access Point Model 8570 operates in the frequency range of 5.15 to 5.35 GHz; it is restricted to indoor use due to its operation in the 5.15 to 5.25 GHz frequency range. FCC 15.407(e) requires the device be used indoors in the frequency range of 5.15 to 5.25 GHz to reduce the potential or harmful interference to co-channel Mobile Satellite systems. Therefore the device should be used indoor only for channel 36, 40, 44, 48 and when 2XTM mode is enabled, channel 42 and 50. High power radars are allocated as primary users of the 5.25 to 5.35 GHz and 5.65 to 5.85 GHz band. These radar stations can cause interference with and/or damage the Harmony 802.11a Access Point."

### **INTEGRAL ANTENNA (D)**

(d) Any U-NII device that operates in the 5.15-5.25 GHz band shall use a transmitting antenna that is an integral part of the device.

#### **Refer to statement below for compliance**

"As the device is intended to operate in the 5.15 - 5.35 GHz band an integral antenna as detailed in 15.407 (d) is required. The antenna for the device is an integral antenna that the end user cannot access. Further, the device is restricted to indoor-use only as detailed in the User's Manual and Theory of Operations, which are included with this application."

**RF EXPOSUER (F)**

(f) U-NII devices are subject to the radio frequency radiation exposure requirements specified in § 1.1307(b), § 2.1091 and § 2.1093 of this chapter, as appropriate. All equipment shall be considered to operate in a "general population/uncontrolled" environment. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

**§ 1.1310 Radio Frequency Radiation Exposure****TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

| Frequency range<br>Averaging time<br>(MHz)<br>(minutes)        | Electric field<br>Strength<br>(V/m) | Magnetic field<br>Strength<br>(A/m) | Power density<br>(mW/cm <sup>2</sup> ) |
|--|-------------------------------------|-------------------------------------|--|
| <b>(B) Limits for General Population/Uncontrolled Exposure</b> |                                     |                                     |  |
| 0.3–1.34 .....   | 614                                 | 1.63                                | *(100)                                 |
| 1.34–30 .....  | 824/f                               | 2.19/f                              | *(180/f <sup>2</sup> )                 |
| 30–300 .....   | 27.5                                | 0.073                               | 0.2                                    |
| 300–1500 .....   |                                     |                                     | f/1500                                 |
| 1500–100,000 .....   |                                     |                                     | 1.0                                    |

**Test result:**

TABLE 1 (B) LIMITS FOR GENERAL POPULATION/UNCONTROLLED EXPOSURE

| <b><u>F(MHz)</u></b> | <b><u>POWER DENSITY (mW/cm<sup>2</sup>)</u></b> |
|----------------------|---|
| 1500 - 100,000       | 1   |

Transmitter Output power is **0.049 Watts** and will be used with a **1 dBi (3.98 numerically)** antenna

**Computation method:**

$$P = E^2 / 3770$$

$$\sqrt{E^2} = \sqrt{1 \text{ mW/cm}^2 * 3770}$$

$$E = 61.4 \text{ V/m}$$

$$E = \frac{\sqrt{30 * P * G}}{D}$$

$$D = \frac{\sqrt{30 * 0.049 * 3.98}}{61.4 \text{ V/m}}$$

$$D = 3.93 \text{ cm}$$

$$3.93 / 2.54 = 1.55 \text{ inch}$$

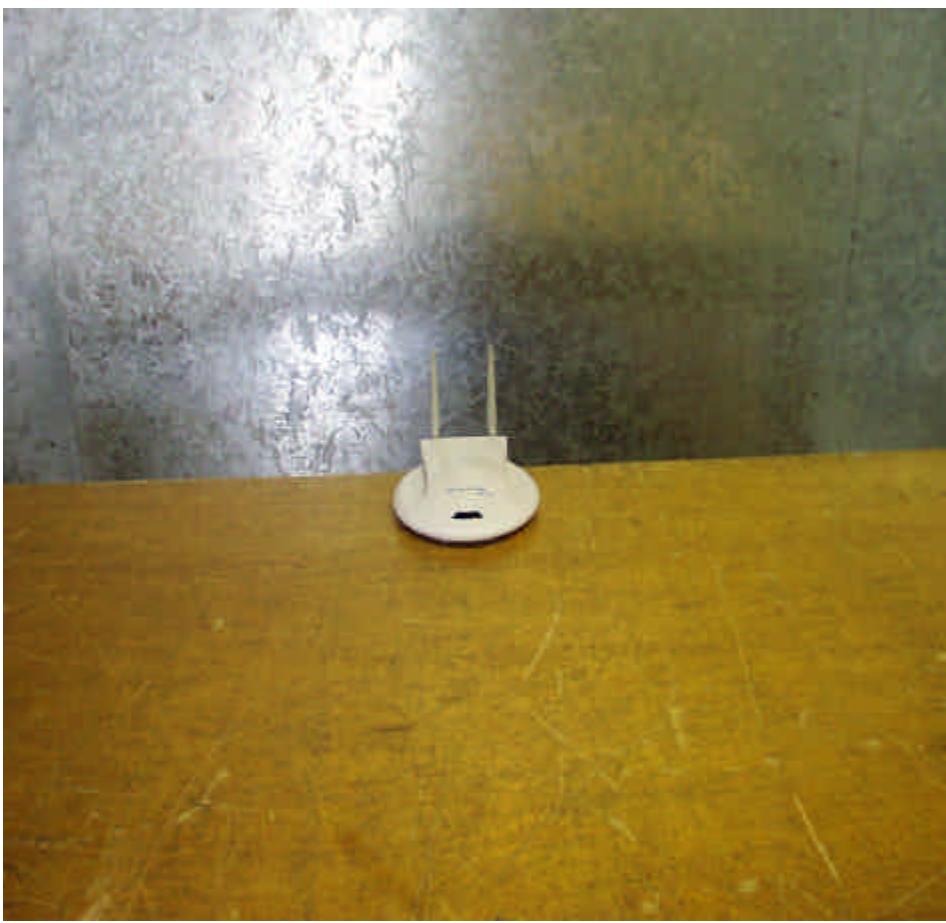
**MPE DISTANCE REQUIREMENT IS 1.55 INCH. A WARNING STATEMENT WITH A MPE DISTANCE REQUIREMENT OF 20CM IS PLACED IN THE MANUAL.**

## 7. TEST SETUP PHOTO

### RADIATED EMISSION SETUP PHOTOS



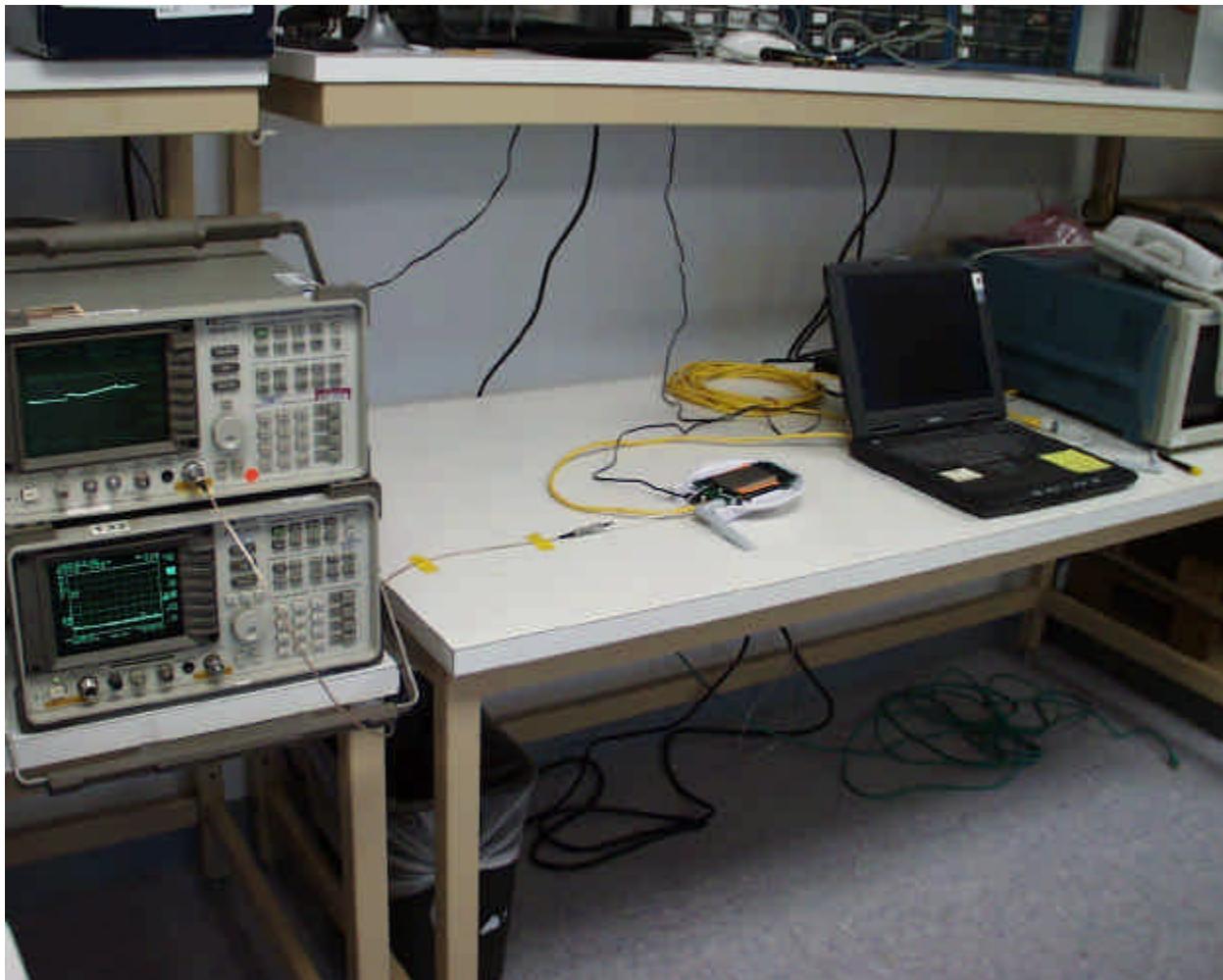
**CONDUCTED EMISSION SETUP PHOTOS**



**HI FREQUENCY SETUP PHOTOS**



**ANTENNA PORT MEASUREMENT PHOTOS**

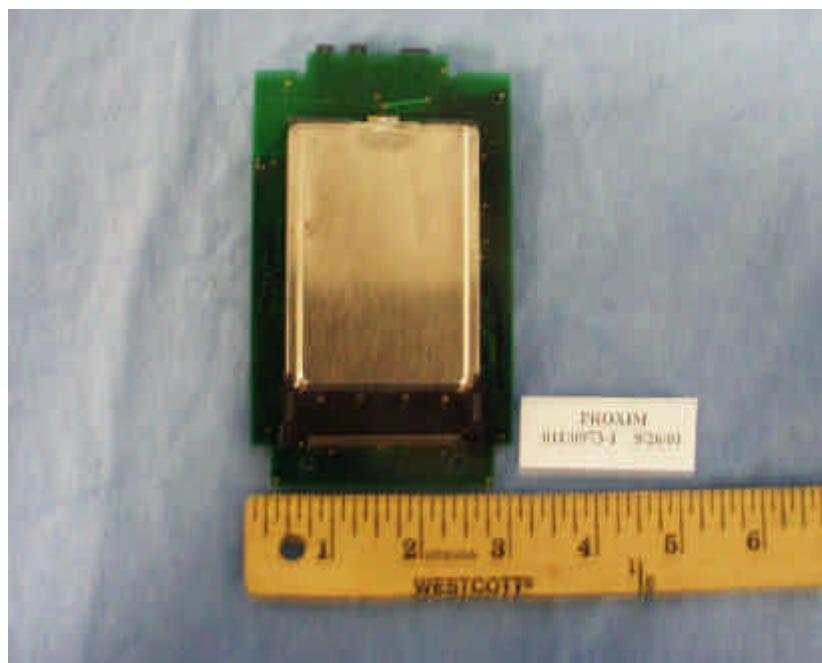


## ATTACHMENTS

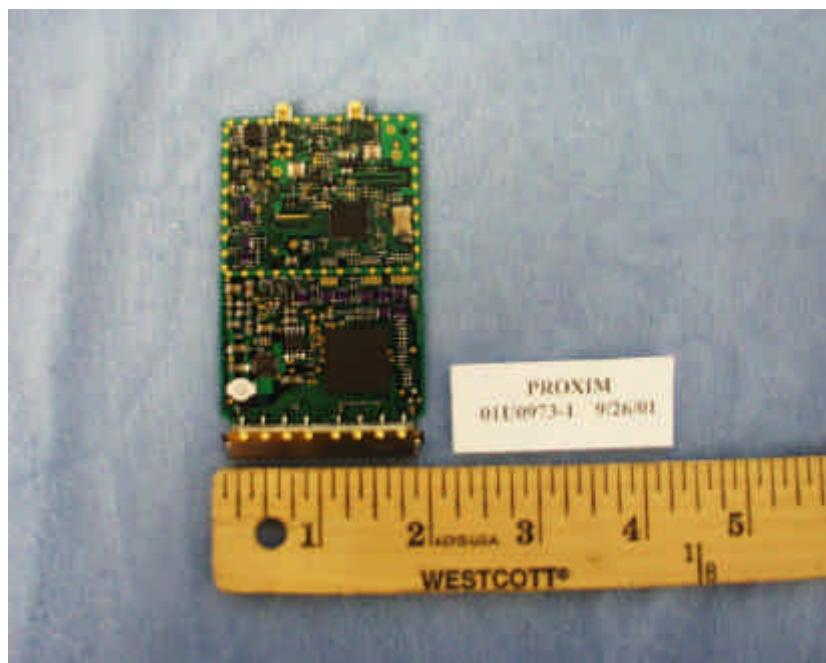
**EUT PHOTOGRAPHS**





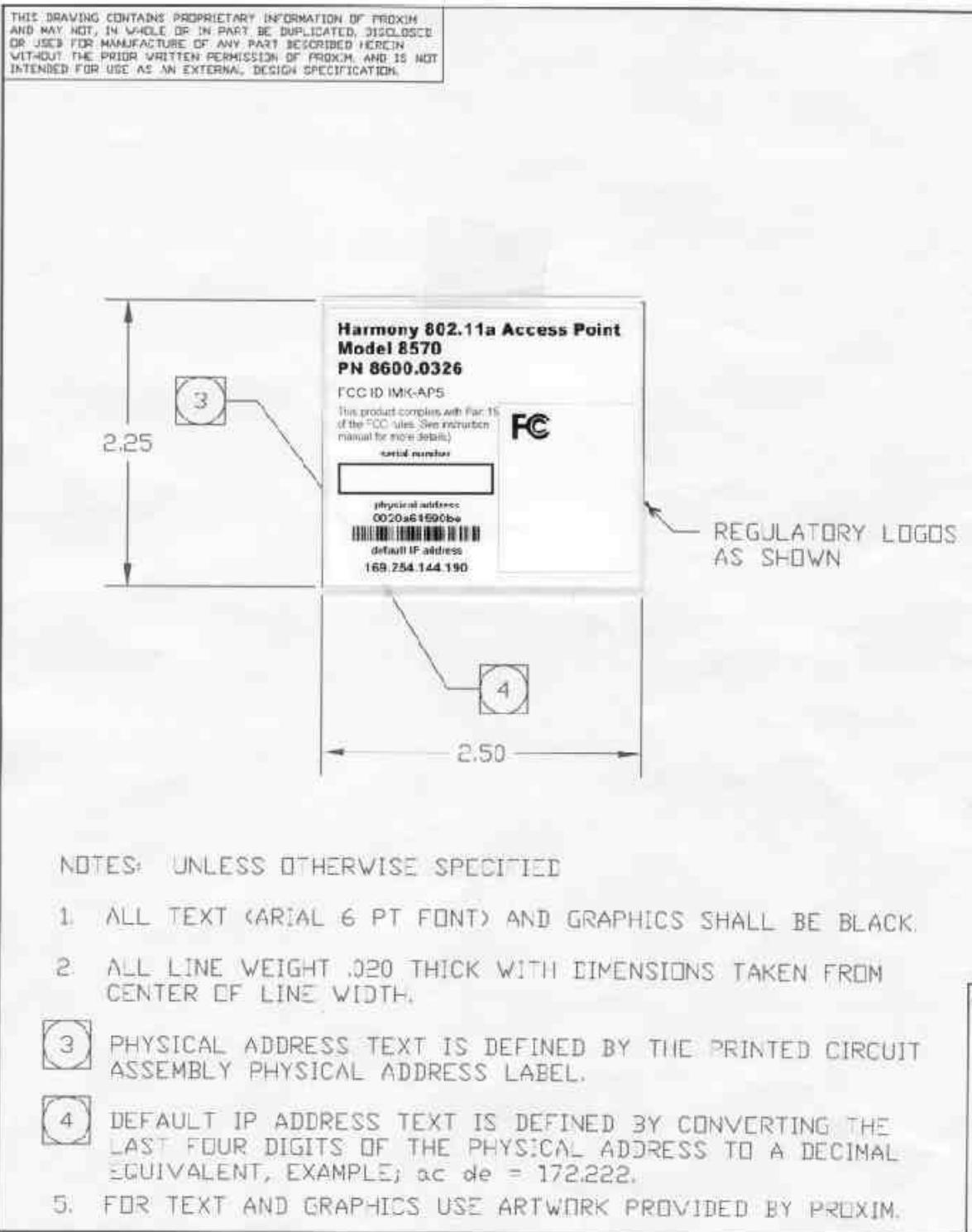


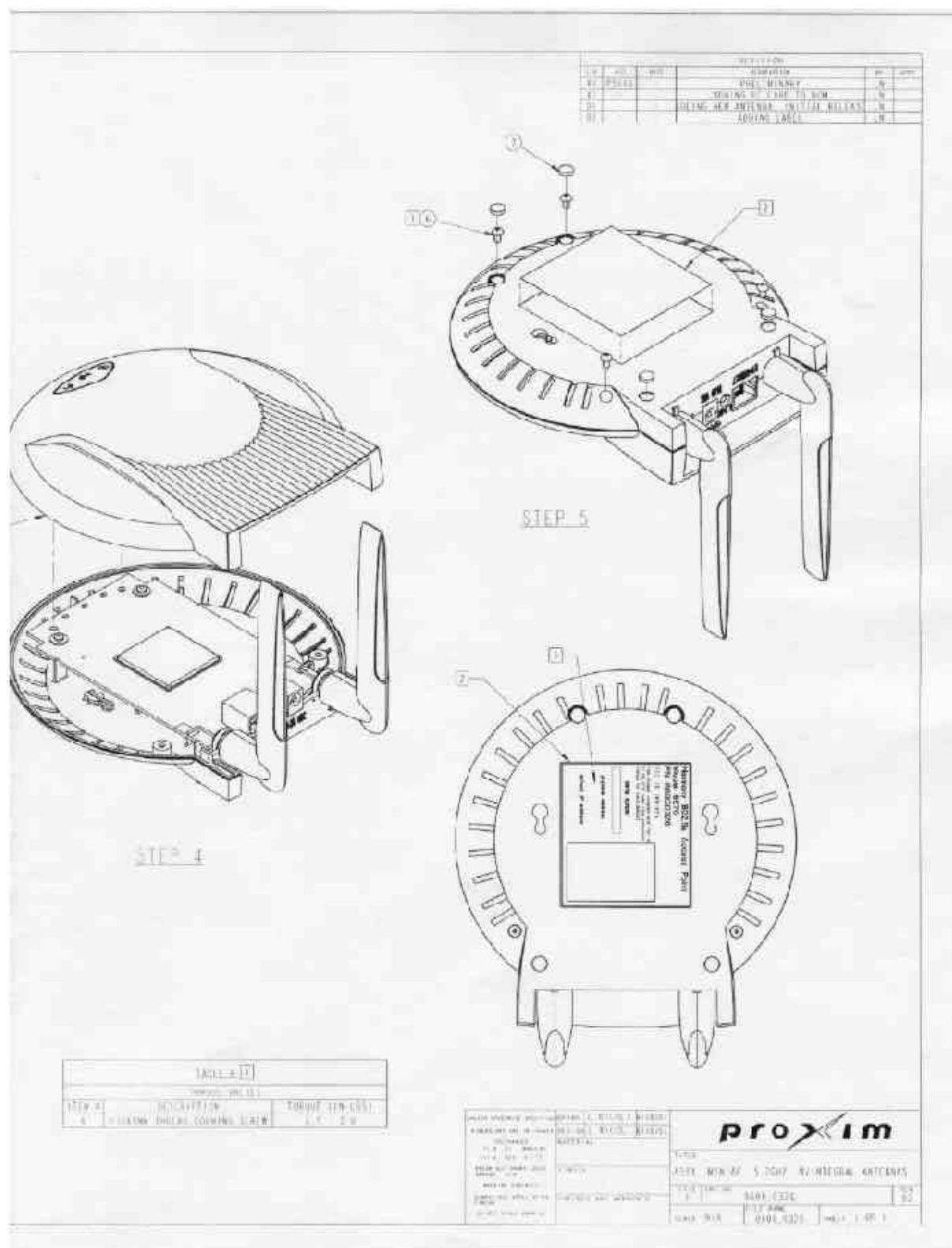






### PROPOSED FCC ID LABEL





## AGENT AUTHORIZATION

*proxim*

August 17, 2001

FCC  
7435 Oakland Mill Road  
Columbia, MA 21046

Dear FCC Examiner,

We the undersigned, hereby authorize Compliance Consulting Services (CCS) to act on our behalf in all matters relating to applications for FCC equipment authorization under part 15 of the code, including the signing of all documents relating to these matters. Any and all acts carried out by Compliance Consulting Services (CCS), in the above mentioned capacity, on our behalf shall have the same effect as acts of our own.

We also hereby certify that no party to the applications authorized here under is subject to a denial of benefits, that include FCC benefits, pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 853(a).

The above authorization expires on December 31, 2001

Sincerely,

*Keith E. Glover*  
Keith Glover  
Chief Financial Officer

## REQUEST FOR CONFIDENTIALITY

*proxim*

October 2, 2001

FCC  
7435 Oakland Mill Road  
Columbia, MA 21046

FCC ID # IMK-AP5

Dear FCC Examiner:

We hereby respectfully request under the provision of Section 0.457d of the Code that the following documents attached be provided with confidential status:

- Proxim 8570, Schematic (Mother board & Radio)
- Proxim 8570, Antenna Data Sheet
- Proxim 8570, Theory of Operation
- Proxim 8570, Radio Block Diagram
- Proxim 8570, AP Block Diagram

Sincerely,



Russ Reynolds  
Vice President of Engineering

## TECHNICAL DESCRIPTION

### Harmony 8570 Access Point Technical Description

Document # 610.00xx

#### PRODUCT:

The product is a WLAN adapter operating in the 5.15 – 5.35 GHz band with a maximum TX output power of 50mW. It is a small desktop box with associated wall plug mounted 12VDC power supply, dual external antennas and a 10/100baseT port for connection to standard wired LAN. The peak gain for each antenna is 6dBi. Refer to the manual for MPE statement. This device can either be stand alone connected to an RJ-45 LAN hub port, or be connected to the RJ-45 port of a computing device.

#### USER CONNECTIONS:

There is a single RJ-45 connector supplied for the single 10/100baseT port. The LED next to the RJ-45 changes colors to indicate the different connection speeds and blinks to indicate Ethernet activity.

The 12VDC power is connected via a 2.5mm coaxial power connector.

#### TEST CONNECTIONS:

There are two 50 ohm RF ports on the PCA, one for each of the two antenna connections. Each antenna is terminated with a Radiall UMP2.0 snap-on plug. A slide-on version of the plug can be used during FCC certification for conducted measurements.

#### ACCESSORIES:

Proxim P/N 4000.0007 wall mounted unregulated power supply, 100-120V/50-60Hz input, 12V 1A nominal output. Proxim P/N 4000.0030 universal power supply, 100-240V/47-63Hz, 0.8A input, 12V, 1.5A nominal output.

Proxim P/N 6001.0124 unshielded twisted pair RJ-45 cable assembly.

#### INTERNAL CLOCK AND RF OSCILLATOR FREQUENCIES:

|                       |   |
|-----------------------|---|
| Processor ASIC        | 33MHz   |
| Ethernet controller   | 25MHz   |
| RF synthesizer        | PLL frequencies of 40, 80, or 160MHz derived from a 32 MHz oscillator |
| TX and RX frequencies | 5180-5320MHz, 20MHz steps   |
| LO Leakage            | 4144-4256MHz  |
| Mixer Product         | 6216-6384MHz  |
| Baseband bandwidth    | 20MHz   |

#### SIGNAL FLOW:

The memory and Ethernet controller communicate with the processor IC. The MAC/baseband processor integrates the media access control (MAC), the baseband radio functions, A/D and D/A converters, transceiver control functions and a PCI/Cardbus interface.

The Ethernet controller and processor ASIC each support their own on board clock oscillators at 25 and multiples of 33MHz to include 100MHz and 200MHz.

In transmit, the synthesizer tunes to one of the TX frequencies listed above. Data is initiated at the Ethernet interface. The Ethernet controller processes serial data to the SDRAM which is then processed by the internal PCI controller within the processor IC to the MAC/baseband processor. Current outputs from the DAC of the MAC/baseband processor are low-pass filtered through the external reconstruction filter. The I and Q signals are converted to RF thru a dual-conversion architecture, from baseband to IF and from IF to RF signals. These signals are driven off-chip through a power amplifier, through the antenna switch, and to the antenna connector.

---

## USER'S MANUAL

## ANTENNA REQUIREMENTS

**ANTENNA DATA SHEET IS TO BE UPLOADED SEPARATELY AS PART OF  
CONFIDENTIAL PACKAGE.**

**CONFIDENTIAL PACKAGE**

**THIS IS TO BE UPLOADED SEPARATELY.**