

**M. Flom Associates, Inc. - Global Compliance Center**

3356 North San Marcos Place, Suite 107, Chandler, Arizona 85225-7176

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Date: May 31, 2000

Federal Communications Commission  
Via: Electronic Filing

Attention: Authorization &amp; Evaluation Division

Applicant: Cisco Systems Inc  
Equipment: AIR-LMC350  
FCC ID: LDK102040  
FCC Rules: 15.247 and Confidentiality

Gentlemen:

On behalf of the Applicant, enclosed please find Application Form 731, Engineering Test Report and all pertinent documentation, the whole for approval of the referenced equipment as shown.

Filing fees are attached.

We trust the same is in order. Should you need any further information, kindly contact the writer who is authorized to act as agent.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'M. Flom P. Eng.', with a horizontal line drawn underneath.

Morton Flom, P. Eng.

enclosure(s)  
cc: Applicant  
MF/cvr

LIST OF EXHIBITS  
(FCC **CERTIFICATION** (TRANSMITTERS) - REVISED 9/28/98)

APPLICANT: Cisco Systems Inc

FCC ID: LDK102040

BY APPLICANT:

1. LETTER OF AUTHORIZATION
2. IDENTIFICATION DRAWINGS
  - \_\_\_ ID LABEL
  - \_\_\_ LOCATION INFO
  - \_\_\_ ATTESTATION STATEMENT(S)
  - \_\_\_ LOCATION OF COMPLIANCE STATEMENT
3. DOCUMENTATION: 2.1033(b)
  - (3) USER MANUAL(S)
  - (4) OPERATIONAL DESCRIPTION
  - (5) BLOCK DIAGRAM
  - (5) SCHEMATIC DIAGRAM
  - (7) EXTERNAL PHOTOGRAPHS
  - INTERNAL PHOTOGRAPHS
  - PARTS LIST
  - ACTIVE DEVICES
4. DRAFT SPECIFICATION INFORMATION
5. PARTS LIST/TUNE UP INFO

BY M.F.A. INC.

- A. TESTIMONIAL & STATEMENT OF CERTIFICATION
- B. STATEMENT OF QUALIFICATIONS



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Sub-part  
2.1033(c):

EQUIPMENT IDENTIFICATION

FCC ID: LDK102040

NAMEPLATE DRAWING

ATTACHED, EXHIBIT 1.

LOCATION

AS PER LABEL DRAWING(S)

DATE OF REPORT

May 31, 2000

SUPERVISED BY:

A handwritten signature in black ink, reading 'Morton Flom, P. Eng.', is written over a horizontal line.

Morton Flom, P. Eng.

THE APPLICANT HAS BEEN CAUTIONED AS TO THE FOLLOWING:

15.21 INFORMATION TO USER.

The users manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

15.27(a) SPECIAL ACCESSORIES.

Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer, without additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

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*Required information per ISO/IEC Guide 25-1990, paragraph 13.2:*

a) TEST REPORT

b) Laboratory: M. Flom Associates, Inc.  
(FCC: 31040/SIT) 3356 N. San Marcos Place, Suite 107  
(Canada: IC 2044) Chandler, AZ 85225

c) Report Number: d0050047

d) Client: Cisco Systems Inc.  
3875 Embassy Parkway  
Akron, OH 44333

e) Identification: AIR-LMC350  
FCC ID: LDK102040  
Description: Unlicensed PCMCIA Direct Sequence Spread  
Spectrum Transceiver

f) EUT Condition: Not required unless specified in individual  
tests.

g) Report Date: May 31, 2000  
EUT Received: April 14, 2000

h, j, k): As indicated in individual tests.

i) Sampling method: No sampling procedure used.

l) Uncertainty: In accordance with MFA internal quality manual.

m) Supervised by:



Morton Flom, P. Eng.

n) Results: The results presented in this report relate  
only to the item tested.

o) Reproduction: This report must not be reproduced, except in  
full, without written permission from this  
laboratory.

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LIST OF GENERAL INFORMATION REQUIRED FOR CERTIFICATIONIN ACCORDANCE WITH FCC RULES AND REGULATIONS,  
VOLUME II, PART 2 AND TO

15.247 and Confidentiality

Sub-part 2.1033

(c)(1): NAME AND ADDRESS OF APPLICANT:Cisco Systems Inc  
170 West Tasman Drive  
San Jose, CA 95134-1706MANUFACTURER:

Applicant

(c)(2): FCC ID: LDK102040MODEL NO: AIR-LMC350(c)(3): INSTRUCTION MANUAL(S):

PLEASE SEE ATTACHED EXHIBITS

(c)(4): TYPE OF EMISSION:(c)(5): FREQUENCY RANGE, MHz: 2412 to 2462(c)(6): POWER RATING, Watts: 0.1 (conducted all  
channels, all bit rates)  
0.355 (EIRP with Yagi)  
0.132 (EIRP with Dipole)  
0.117 (EIRP with Snap)  
     Switchable      Variable   x   N/A(c)(7): MAXIMUM POWER RATING, Watts: 1 Watt Conducted15.203: ANTENNA REQUIREMENT:     The antenna is permanently attached to the EUT  
     The antenna uses a unique coupling  
  x   The EUT must be professionally installed  
     The antenna requirement does not apply

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Subpart 2.1033 (continued)

(c)(8): VOLTAGES & CURRENTS IN ALL ELEMENTS IN FINAL R. F. STAGE,  
INCLUDING FINAL TRANSISTOR OR SOLID STATE DEVICE:

COLLECTOR CURRENT, A = per manual  
COLLECTOR VOLTAGE, Vdc = per manual  
SUPPLY VOLTAGE, Vdc = 5

(c)(9): TUNE-UP PROCEDURE:

PLEASE SEE ATTACHED EXHIBITS

(c)(10): CIRCUIT DIAGRAM/CIRCUIT DESCRIPTION:

Including description of circuitry & devices provided for  
determining and stabilizing frequency, for suppression of  
spurious radiation, for limiting modulation and limiting  
power.

PLEASE SEE ATTACHED EXHIBITS

(c)(11): LABEL INFORMATION:

PLEASE SEE ATTACHED EXHIBITS

(c)(12): PHOTOGRAPHS:

PLEASE SEE ATTACHED EXHIBITS

(c)(13): DIGITAL MODULATION DESCRIPTION:

     ATTACHED EXHIBITS  
  X   N/A

(c)(14): TEST AND MEASUREMENT DATA:

FOLLOWS



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M. Flom Associates, Inc. is accredited by the American Association for Laboratory Accreditation (A2LA) as shown in the scope below.



**THE AMERICAN  
ASSOCIATION  
FOR LABORATORY  
ACCREDITATION**

**ACCREDITED LABORATORY**

A2LA has accredited

**M. FLOM ASSOCIATES, INC.**  
**Chandler, AZ**

for technical competence in the field of

**Electrical (EMC) Testing**

The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO/IEC Guide 25-1990 "General Requirements for the Competence of Calibration and Testing Laboratories" (equivalent to relevant requirements of the ISO 9000 series of standards) and any additional program requirements in the identified field of testing.

Presented this 24<sup>th</sup> day of November, 1998.



*Peter M. Ryan*  
President  
For the Accreditation Council  
Certificate Number 1008.01  
Valid to December 31, 2000

For tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical (EMC) Scope of Accreditation



**American Association for Laboratory Accreditation**

SCOPE OF ACCREDITATION TO ISO/IEC GUIDE 25-1990 AND EN 45001

M. FLOM ASSOCIATES, INC.  
Electronic Testing Laboratory  
3356 North San Marcos Place, Suite 107  
Chandler, AZ 85225  
Morton Flom Phone: 480 926 3100

**ELECTRICAL (EMC)**

Valid to: December 31, 2000 Certificate Number: 1008-01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following electromagnetic compatibility tests:

| Tests                   | Standard(s)                                                                                                                                                                                                                                          |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RF Emissions            | FCC Part 15 (Subparts B and C) using ANSI C63.4-1992; CISPR 11; CISPR 13; CISPR 14; CISPR 22; EN 55011; EN 55013; EN 55014; EN 55022; EN 50081-1; EN 50081-2; FCC Part 18; ICES-003; AS/NZS 1044; AS/NZS 1053; AS/NZS 3548; AS/NZS 4251.1; CNS 13438 |
| RF Immunity             | EN 50082-1; EN 50082-2; AS/NZS 4251.1                                                                                                                                                                                                                |
| Radiated Susceptibility | EN 61000-4-3; ENV 50140; ENV 50204; IEC 1000-4-3; IEC 801-3                                                                                                                                                                                          |
| ESD                     | EN 61000-4-2; IEC 1000-4-2; IEC 801-2                                                                                                                                                                                                                |
| EFT                     | EN 61000-4-4; IEC 1000-4-4; IEC 801-4                                                                                                                                                                                                                |
| Surge                   | EN 61000-4-5; ENV 50142; IEC 1000-4-5; IEC 801-5                                                                                                                                                                                                     |
| 47 CFR (FCC)            | 2, 21, 22, 23, 24, 74, 80, 87, 90, 95, 97                                                                                                                                                                                                            |

Revised 2/2/2000

*Peter M. Ryan*

5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8370 • Phone: 301 644 3248 • Fax: 301 662 2974

"This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this report have been determined in accordance with the laboratory's terms of accreditation unless stated otherwise in the report."

Should this report contain any data for tests for which we are not accredited, or which have been undertaken by a subcontractor that is not A2LA accredited, such data would not covered by this laboratory's A2LA accreditation.

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Sub-part  
2.1033(b):TEST AND MEASUREMENT DATA

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II; Part 2, Sub-part J, Sections 2.1031, 2.1033, 2.1035, 2.1041, 2.1043, 2.1045, and the following individual Parts:

- \_\_\_\_\_ 15.209 Radiated emission limits; general requirements
- \_\_\_\_\_ 15.211 Tunnel radio systems
- \_\_\_\_\_ 15.213 Cable locating equipment
- \_\_\_\_\_ 15.214 Cordless telephones
- \_\_\_\_\_ 15.217 Operation in the band 160-190 kHz
- \_\_\_\_\_ 15.219 Operation in the band 510-1705 kHz
- \_\_\_\_\_ 15.221 Operation in the band 525-1705 kHz (leaky coax)
- \_\_\_\_\_ 15.223 Operation in the band 1.705-10 MHz
- \_\_\_\_\_ 15.225 Operation in the band 13.553-13.567 MHz
- \_\_\_\_\_ 15.227 Operation in the band 26-27.28 MHz (remote control)
- \_\_\_\_\_ 15.229 Operation in the band 40.66-40.70 MHz
- \_\_\_\_\_ 15.231 Periodic operation in the band 40.66-40.70 MHz and above 70 MHz
- \_\_\_\_\_ 15.233 Operation within the bands 43.71-44.49, 46.60-46.98 MHz 48.75-49.51 MHz and 49.66-50.0 MHz
- \_\_\_\_\_ 15.235 Operation within the band 49.82-49.90 MHz
- \_\_\_\_\_ 15.237 Operation within the bands 72.0-73.0 MHz, 74.6-74.8 MHz and 75.2-76.0 MHz (auditory assistance)
- \_\_\_\_\_ 15.239 Operation in band 88-108 MHz
- \_\_\_\_\_ 15.241 Operation in the band 174-216 MHz (biomedical)
- \_\_\_\_\_ 15.243 Operation in the band 890-940 MHz (materials)
- \_\_\_\_\_ 15.245 Operation within the bands 902-928 MHz, 2435-2465 MHz, 5785-5815 MHz, 10500-10550 MHz, and 24075-24175 MHz (filed disturbance sensors)
- x \_\_\_\_\_ 15.247 Operation within bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz (spread spectrum)
- \_\_\_\_\_ 15.249 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz
- \_\_\_\_\_ 15.251 Operation within the bands 2.9-3.26 GHz, 3.267-3.332 GHz, 3.339-3.3458 GHz, and 3.358-3.6 GHz (vehicle identification systems)
- \_\_\_\_\_ 15.321 Specific requirements for asynchronous devices operating in the 1910-1920 MHz and 2390-2400 MHz bands (Unlicensed PCS)
- \_\_\_\_\_ 15.323 Specific requirements for isochronous devices operating in the 1920-1930 MHz sub-band (Unlicensed PCS)

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STANDARD TEST CONDITIONS  
and  
ENGINEERING PRACTICES

Except as noted herein, the following conditions and procedures were observed during the testing:

In accordance with ANSI C63.4-1992, section 6.1.9, and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104 °F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Prior to testing, the EUT was tuned up in accordance with the manufacturer's alignment procedures. All external gain controls were maintained at the position of maximum and/or optimum gain throughout the testing.

Measurement results, unless otherwise noted, are worst case measurements.

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NAME OF TEST: Maximum Peak Output Power

SPECIFICATION: 47 CFR 15.247(b)

SPEC. LIMIT:  $\leq 1$  Watt peak (0.25 if <50 Hopping Channels)

TEST EQUIPMENT: Attached

MEASUREMENT DATA

ANTENNA GAIN, dBi = 11.5 Yagi  
 PEAK OUTPUT POWER, Watts = 0.355 EIRP  
 WORST CASE FOR  
 ALL CHANNELS

NAME OF TEST: Radiated Emissions  
 g0040226: 2000-Apr-17 Mon 11:11:00 Snap On Antenna

| FREQUENCY<br>TUNED, MHz | FREQUENCY<br>EMISSION, MHz | METER,<br>dBuV | CF,<br>dB | uV/m<br>@ 3m | EIRP,<br>dBm | EIRP,<br>Watts |
|-------------------------|----------------------------|----------------|-----------|--------------|--------------|----------------|
| 2412.000000             | 2413.300000                | 75.5           | 41.33     | 694224.6     | 21.6         | 0.115          |
| 2442.000000             | 2443.233333                | 74.5           | 41.43     | 625892.86    | 20.7         | 0.117          |
| 2462.000000             | 2463.233333                | 74.17          | 41.5      | 607435.26    | 20.4         | 0.110          |

NAME OF TEST: Out of Band Emissions  
 g0040291: 2000-Apr-19 Wed 11:08:00 Dipole Antenna

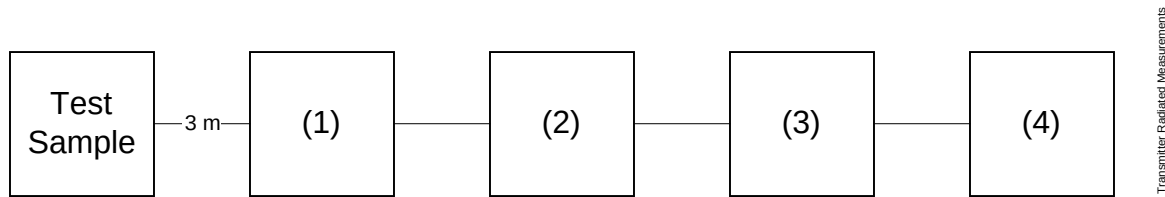
| FREQUENCY<br>TUNED, MHz | FREQUENCY<br>EMISSION, MHz | METER,<br>dBuV | CF,<br>dB | uV/m<br>@ 3m | EIRP,<br>dBm | EIRP,<br>Watts |
|-------------------------|----------------------------|----------------|-----------|--------------|--------------|----------------|
| 2412.000000             | 2413.450000                | 72.17          | 41.33     | 473151.26    | 18.3         | 0.067          |
| 2442.000000             | 2443.800000                | 75             | 41.44     | 663743.07    | 21.2         | 0.132          |
| 2462.000000             | 2463.750000                | 72.67          | 41.5      | 511093.08    | 18.9         | 0.078          |

NAME OF TEST: Radiated Emissions  
 g0040265: 2000-Apr-18 Tue 13:22:00 Yagi Antenna

| FREQUENCY<br>TUNED, MHz | FREQUENCY<br>EMISSION, MHz | METER,<br>dBuV | CF,<br>dB | uV/m<br>@ 3m | EIRP,<br>dBm | EIRP,<br>Watts |
|-------------------------|----------------------------|----------------|-----------|--------------|--------------|----------------|
| 2412.000000             | 2411.350000                | 76.83          | 41.32     | 808164.93    | 22.9         | 0.195          |
| 2442.000000             | 2441.400000                | 79.33          | 41.42     | 1090184.49   | 25.5         | 0.355          |
| 2462.000000             | 2463.800000                | 77.17          | 41.5      | 858025.11    | 23.4         | 0.219          |

SUPERVISED BY:

Morton Flom, P. Eng.

TRANSMITTER RADIATED MEASUREMENTS

| Asset  | Description<br>(as applicable)  | s/n        |
|--------|---------------------------------|------------|
| (1)    | <u>TRANSDUCER</u>               |            |
| i00091 | Emco 3115                       | 001469     |
| i00089 | Apriel Log Periodic             | 001500     |
| i00088 | EMCO 3301-B Biconical           | 2336       |
| (2)    | <u>HIGH PASS FILTER</u>         |            |
| i00    | Narda $\mu$ PAD (In-Band Only)  |            |
| i00    | Trilithic<br>(Out-Of-Band Only) |            |
| (3)    | <u>PREAMP</u>                   |            |
| i00028 | HP 8449 (+30 dB)                | 2749A00121 |
| (4)    | <u>SPECTRUM ANALYZER</u>        |            |
| i00048 | HP 8566B                        | 2511A01467 |
| i00057 | HP 8557A                        | 1531A00191 |
| i00029 | HP 8563E                        | 3213A00104 |

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NAME OF TEST: Out of Band Emissions  
 g0040237: 2000-Apr-18 Tue 08:51:00 Snap On Antenna  
 Transmitter Harmonics

| FREQUENCY<br>TUNED, MHz | FREQUENCY<br>EMISSION, MHz | METER, dBuV | CF, dB | uV/m @ 3m |
|-------------------------|----------------------------|-------------|--------|-----------|
| 2412.000000             | 4823.666666                | 30          | 7.41   | 74.22     |
| 2442.000000             | 4883.833333                | 27.33       | 7.51   | 55.21     |
| 2462.000000             | 4923.666666                | 31.17       | 7.58   | 86.6      |
| 2412.000000             | 7235.749999                | 29.17       | 12.62  | 122.89    |
| 2442.000000             | 7326.083333                | 24.5        | 12.59  | 71.53     |
| 2462.000000             | 7386.416666                | 30.17       | 12.57  | 137.09    |
| 2412.000000             | 9647.333332                | 30.33       | 16.06  | 208.69    |
| 2442.000000             | 9768.000000                | 31          | 16.71  | 242.94    |
| 2462.000000             | 9847.499999                | 32.33       | 17.12  | 296.82    |
| 2412.000000             | 12059.166665               | 28.83       | 14.99  | 155.24    |
| 2442.000000             | 12210.083333               | 29.83       | 15.47  | 184.08    |
| 2462.000000             | 12308.916665               | 30.67       | 15.79  | 210.38    |
| 2412.000000             | 14470.999998               | 29          | 16.34  | 184.93    |
| 2442.000000             | 14651.916667               | 31.17       | 15.87  | 224.91    |
| 2462.000000             | 14770.999998               | 30.5        | 15.57  | 201.14    |
| 2412.000000             | 16882.833331               | 30.33       | 20.29  | 339.63    |
| 2442.000000             | 17093.500000               | 30.83       | 20.85  | 383.71    |
| 2462.000000             | 17232.666665               | 31          | 21.01  | 398.57    |

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NAME OF TEST: Out of Band Emissions  
 g0040298: 2000-Apr-19 Wed 13:20:00 Dipole Antenna  
 Transmitter Harmonics

| FREQUENCY<br>TUNED, MHz | FREQUENCY<br>EMISSION, MHz | METER,<br>dBuV | CF,<br>dB | uV/m<br>@ 3m |
|-------------------------|----------------------------|----------------|-----------|--------------|
| 2412.000000             | 4824.200000                | 36.17          | 7.41      | 151.01       |
| 2442.000000             | 4884.000000                | 37             | 7.51      | 168.07       |
| 2462.000000             | 4924.100000                | 35             | 7.58      | 134.59       |
| 2412.000000             | 7236.300000                | 33.67          | 12.62     | 206.3        |
| 2442.000000             | 7326.000000                | 33.83          | 12.59     | 209.41       |
| 2462.000000             | 7386.150000                | 34.17          | 12.57     | 217.27       |
| 2412.000000             | 9648.400000                | 35.17          | 16.07     | 364.75       |
| 2412.000000             | 9648.400000                | 29.5           | 16.07     | 189.89       |
| 2442.000000             | 9768.000000                | 35             | 16.71     | 385.03       |
| 2442.000000             | 9768.000000                | 30.17          | 16.71     | 220.8        |
| 2462.000000             | 9848.200000                | 35.83          | 17.12     | 444.12       |
| 2462.000000             | 9848.200000                | 30.5           | 17.12     | 240.44       |
| 2412.000000             | 12060.500000               | 34.5           | 14.99     | 298.19       |
| 2412.000000             | 12060.500000               | 29.17          | 14.99     | 161.44       |
| 2442.000000             | 12210.000000               | 34.33          | 15.47     | 309.03       |
| 2442.000000             | 12210.000000               | 29.17          | 15.47     | 170.61       |
| 2462.000000             | 12310.250000               | 36.17          | 15.79     | 396.28       |
| 2462.000000             | 12310.250000               | 29.67          | 15.79     | 187.5        |
| 2442.000000             | 14472.600000               | 35.5           | 16.34     | 390.84       |
| 2442.000000             | 14472.600000               | 29.17          | 16.34     | 188.58       |
| 2412.000000             | 14652.000000               | 34             | 15.87     | 311.53       |
| 2412.000000             | 14652.000000               | 29.33          | 15.87     | 181.97       |
| 2462.000000             | 14772.300000               | 34.33          | 15.57     | 312.61       |
| 2462.000000             | 14772.300000               | 29.17          | 15.57     | 172.58       |
| 2412.000000             | 16884.700000               | 28.83          | 20.29     | 285.76       |
| 2412.000000             | 16884.700000               | 33.5           | 20.29     | 489.22       |
| 2442.000000             | 17094.000000               | 28.67          | 20.85     | 299.23       |
| 2442.000000             | 17094.000000               | 34.33          | 20.85     | 574.12       |
| 2462.000000             | 17234.350000               | 28.83          | 21.01     | 310.46       |
| 2462.000000             | 17234.350000               | 34.33          | 21.01     | 584.79       |

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NAME OF TEST: Out of Band Emissions  
 g0040272: 2000-Apr-19 Wed 08:08:00 Yagi Antenna  
 Transmitter Harmonics

| FREQUENCY<br>TUNED, MHz | FREQUENCY<br>EMISSION, MHz | METER,<br>dBuV | CF,<br>dB | uV/m<br>@ 3m |
|-------------------------|----------------------------|----------------|-----------|--------------|
| 2412.000000             | 4823.350000                | 37.17          | 7.41      | 169.43       |
| 2442.000000             | 4885.900000                | 36.5           | 7.52      | 158.85       |
| 2462.000000             | 4924.050000                | 36.33          | 7.58      | 156.86       |
| 2442.000000             | 6618.910000                | 35.33          | 11.58     | 221.56       |
| 2412.000000             | 7234.950000                | 34             | 12.62     | 214.29       |
| 2462.000000             | 7386.100000                | 36             | 12.57     | 268.23       |
| 2442.000000             | 8706.840000                | 29.83          | 12.47     | 130.32       |
| 2442.000000             | 8707.390000                | 35.5           | 12.47     | 250.32       |
| 2412.000000             | 9646.300000                | 36             | 16.06     | 400.87       |
| 2412.000000             | 9646.300000                | 30.33          | 16.06     | 208.69       |
| 2462.000000             | 9848.200000                | 31.33          | 17.12     | 264.55       |
| 2462.000000             | 9848.200000                | 36             | 17.12     | 452.9        |
| 2442.000000             | 10795.920000               | 31             | 15.26     | 205.59       |
| 2442.000000             | 10795.920000               | 36.83          | 15.26     | 402.25       |
| 2412.000000             | 12057.700000               | 29.83          | 14.99     | 174.18       |
| 2412.000000             | 12057.700000               | 35.67          | 14.99     | 341.19       |
| 2462.000000             | 12310.250000               | 30.5           | 15.79     | 206.3        |
| 2462.000000             | 12310.250000               | 36.33          | 15.79     | 403.65       |
| 2442.000000             | 12883.800000               | 30.17          | 17.56     | 243.5        |
| 2442.000000             | 12883.800000               | 35.83          | 17.56     | 467.2        |
| 2412.000000             | 14469.100000               | 29.83          | 16.34     | 203.47       |
| 2412.000000             | 14469.100000               | 35.5           | 16.34     | 390.84       |
| 2462.000000             | 14772.300000               | 30             | 15.57     | 189.89       |
| 2462.000000             | 14772.300000               | 35.67          | 15.57     | 364.75       |
| 2442.000000             | 14972.280000               | 30             | 15.07     | 179.27       |
| 2442.000000             | 14972.280000               | 35.67          | 15.07     | 344.35       |
| 2412.000000             | 16880.500000               | 30             | 20.28     | 326.59       |
| 2412.000000             | 16880.500000               | 35.5           | 20.28     | 615.18       |
| 2442.000000             | 17060.760000               | 29.67          | 20.81     | 334.2        |
| 2442.000000             | 17060.760000               | 34.83          | 20.81     | 605.34       |
| 2462.000000             | 17234.350000               | 30             | 21.01     | 355.22       |
| 2462.000000             | 17234.350000               | 35.5           | 21.01     | 669.11       |



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TEST SETUP: Radiated Emissions  
g0040221: 2000-Apr-18 Tue 09:52:50  
STATE: 0:General Snap On Antenna



TEST SETUP: Radiated Emissions  
g0040222: 2000-Apr-18 Tue 09:52:50  
STATE: 0:General



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TEST SETUP: Radiated Emissions  
g0040221: 2000-Apr-18 Tue 09:52:50  
STATE: 0:General Dipole Antenna



TEST SETUP: Radiated Emissions  
g0040222: 2000-Apr-18 Tue 09:52:50  
STATE: 0:General



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TEST SETUP: Radiated Emissions  
g0040223: 2000-Apr-19 Wed 10:33:36  
STATE: 0:General Yagi Antenna

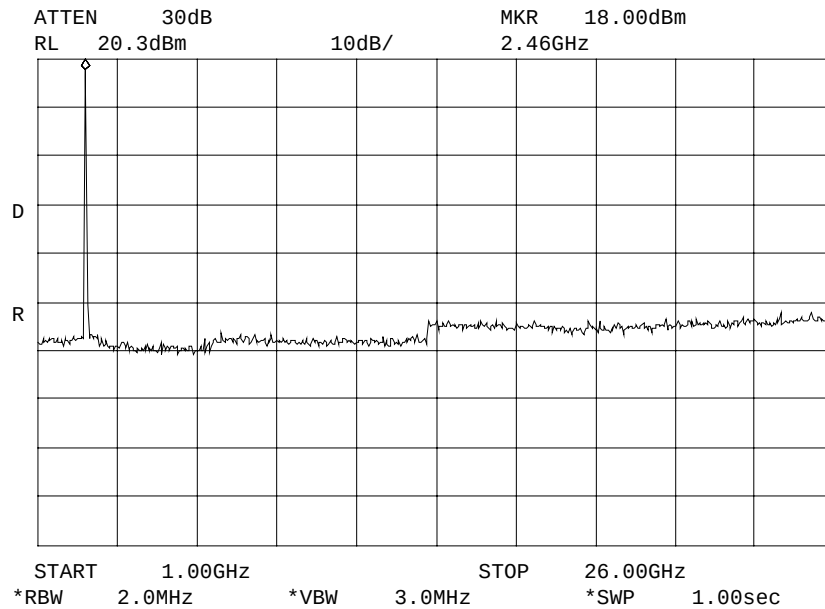


TEST SETUP: Radiated Emissions  
g0040224: 2000-Apr-19 Wed 10:33:36  
STATE: 0:General



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NAME OF TEST: Transmitter Conducted Spurious Emissions  
 g0040264: 2000-Apr-21 Fri 08:20:00  
 STATE: 2:High Power



POWER:  
 MODULATION:

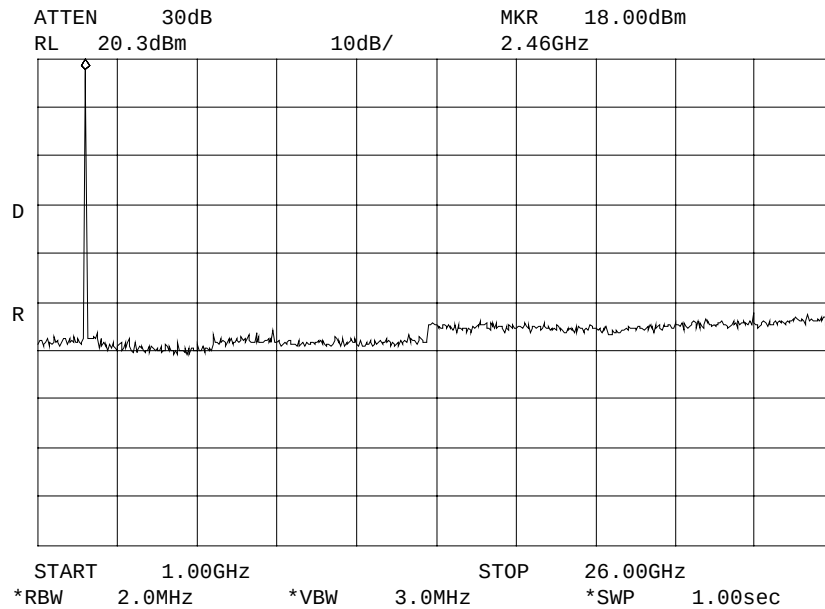
HIGH  
 1 MB/SEC PSEUDO RANDOM DATA  
 15.247(C) SPURIOUS  
 EMISSIONS

SUPERVISED BY:

*Morton Flom P. Eng.*  
 Morton Flom, P. Eng.

PAGE NO. 16 of 53.

NAME OF TEST: Transmitter Conducted Spurious Emissions  
g0040263: 2000-Apr-21 Fri 08:19:00  
STATE: 2:High Power



POWER: HIGH  
MODULATION: 2 MB/SEC PSEUDO RANDOM DATA  
15.247(C) SPURIOUS EMISSIONS

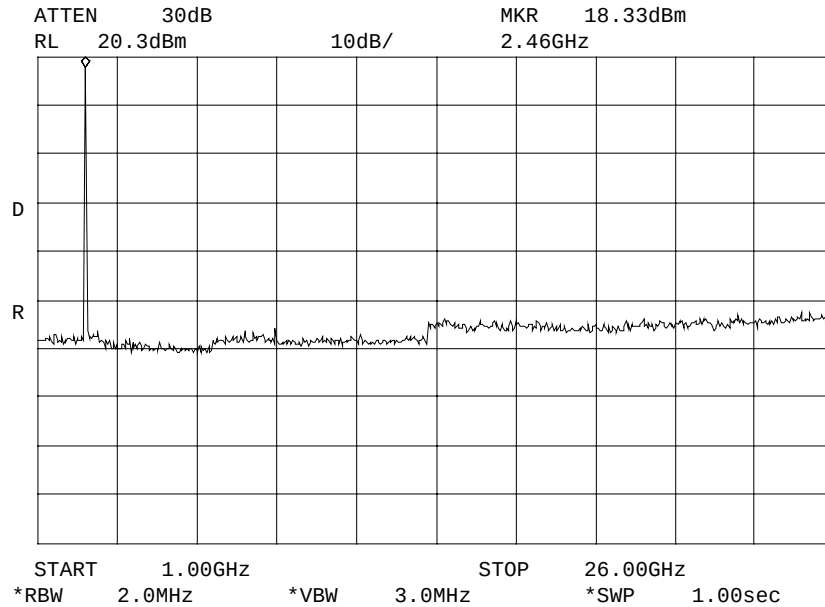
SUPERVISED BY:

*Morton Flom P. Eng.*  
Morton Flom, P. Eng.

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NAME OF TEST: Transmitter Conducted Spurious Emissions  
 g0040262: 2000-Apr-21 Fri 08:18:00  
 STATE: 2:High Power



POWER:  
 MODULATION:

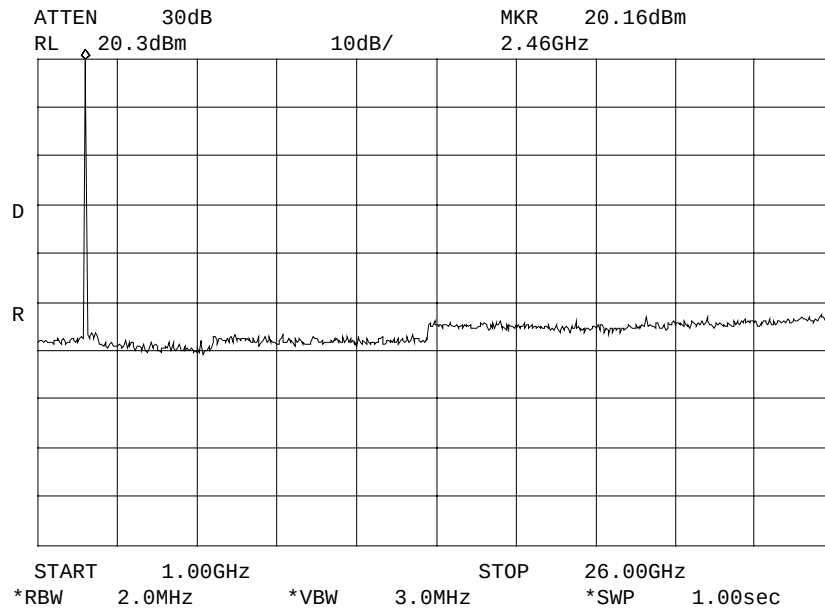
HIGH  
 5.5 MB/SEC PSEUDO RANDOM  
 DATA  
 15.247(C) SPURIOUS  
 EMISSIONS

SUPERVISED BY:

Morton Flom, P. Eng.

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NAME OF TEST: Transmitter Conducted Spurious Emissions  
 g0040261: 2000-Apr-21 Fri 08:17:00  
 STATE: 2:High Power



POWER:  
 MODULATION:

HIGH  
 11 MB/SEC PSEUDO RANDOM  
 DATA  
 15.247(C) SPURIOUS  
 EMISSIONS

SUPERVISED BY:

*M. Flom P. Eng.*

Morton Flom, P. Eng.

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NAME OF TEST: Out of Band Emissions  
SPECIFICATION: 47 CFR 15.247(c), 15.209(a)  
SPEC. LIMIT: See Below  
TEST EQUIPMENT: As per previous page  
SEARCH ANTENNAS: 10 kHz - 32 MHz: LOOP 94598-1  
 32 MHz - 1 GHz: SINGER DM105, T<sub>1</sub>T<sub>2</sub>T<sub>3</sub>  
 1 GHz - 18 GHz: EMCO 3115

### LIMIT

In any 100 kHz bandwidth outside these frequency bands, radio frequency power that is produced by the modulation products of the spreading sequence, information sequence, and the carrier frequency shall be either:

at least 20 dB below that in any 100 kHz bandwidth within the band that contains the highest level of the desired power

or

shall not exceed the general levels specified in 15.209(a),

whichever results in the lesser attenuation.

All other emissions outside these bands shall not exceed the general radiated emission limits specified in 15.209(a).

### MEASUREMENTS PROCEDURE:

At first, bench tests were performed to locate the emissions at the antenna terminals.

In the field, tests were conducted over the range shown. The test sample was set up on a wooden turntable above ground, and at a distance of three meters from the antenna connected to the spectrum analyzer.

In order to obtain the maximum response at each frequency, the turntable was rotated, and the search antenna was raised and lowered. The EUT was also adjusted for maximum response.

The field strength was calculated from:

$$E \text{ } \mu\text{V/m @ 3 m} = \text{LOG}_{10}^{-1}(\text{dBm} + 107 + \text{A.F.} + \text{C.L.})$$

The following results are worst case conditions. Tests were conducted in Horizontal and Vertical polarization modes.

MEASUREMENT RESULTS: ATTACHED



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NAME OF TEST: Band Edge Emissions

g0040231: 2000-Apr-17 Mon 16:04:00 Snap On Antenna

Lower Band Edge

| FREQUENCY<br>TUNED, MHz | FREQUENCY<br>EMISSION, MHz | METER,<br>dBuV | CF, dB | uV/m @<br>3m | PEAK (P) OR<br>AVERAGE (A) |
|-------------------------|----------------------------|----------------|--------|--------------|----------------------------|
| 2412.000000             | 2375.200000                | 31.67          | 41.2   | 4400.48      | P                          |
| 2412.000000             | 2375.300000                | 9.5            | 41.2   | 342.77       | A                          |
| 2412.000000             | 2376.500000                | 9.5            | 41.21  | 343.16       | A                          |
| 2412.000000             | 2376.850000                | 31.83          | 41.21  | 4487.45      | P                          |
| 2412.000000             | 2378.000000                | 9.5            | 41.21  | 343.16       | A                          |
| 2412.000000             | 2378.400000                | 31.5           | 41.21  | 4320.16      | P                          |
| 2412.000000             | 2378.950000                | 9.5            | 41.21  | 343.16       | A                          |
| 2412.000000             | 2380.700000                | 31.67          | 41.22  | 4410.62      | P                          |
| 2412.000000             | 2380.950000                | 9.67           | 41.22  | 350.35       | A                          |
| 2412.000000             | 2382.100000                | 9.5            | 41.22  | 343.56       | A                          |
| 2412.000000             | 2382.950000                | 32.5           | 41.22  | 4852.89      | P                          |
| 2412.000000             | 2383.300000                | 9.5            | 41.22  | 343.56       | A                          |
| 2412.000000             | 2384.350000                | 32.5           | 41.23  | 4858.48      | P                          |
| 2412.000000             | 2384.650000                | 9.5            | 41.23  | 343.95       | A                          |
| 2412.000000             | 2385.550000                | 9.67           | 41.23  | 350.75       | A                          |
| 2412.000000             | 2385.800000                | 32.83          | 41.24  | 5052.43      | P                          |
| 2412.000000             | 2386.250000                | 9.5            | 41.24  | 344.35       | A                          |
| 2412.000000             | 2386.750000                | 32.33          | 41.24  | 4769.8       | P                          |
| 2412.000000             | 2387.100000                | 9.5            | 41.25  | 344.75       | A                          |
| 2412.000000             | 2387.950000                | 9.5            | 41.25  | 344.75       | A                          |
| 2412.000000             | 2388.000000                | 32.33          | 41.25  | 4775.29      | P                          |
| 2412.000000             | 2388.450000                | 9.5            | 41.25  | 344.75       | A                          |
| 2412.000000             | 2388.900000                | 31.67          | 41.25  | 4425.88      | P                          |
| 2412.000000             | 2389.150000                | 9.5            | 41.25  | 344.75       | A                          |
| 2412.000000             | 2390.000000                | 9.67           | 41.25  | 351.56       | A                          |
| 2412.000000             | 2390.000000                | 31.33          | 41.25  | 4255.98      | P                          |

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NAME OF TEST: Band Edge Emissions

g0040292: 2000-Apr-19 Wed 11:57:00 Dipole Antenna

Lower Band Edge

| FREQUENCY<br>TUNED, MHz | FREQUENCY<br>EMISSION, MHz | METER,<br>dBuV | CF, dB | uV/m @<br>3m | PEAK (P) OR<br>AVERAGE (A) |
|-------------------------|----------------------------|----------------|--------|--------------|----------------------------|
| 2412.000000             | 2375.000000                | 20             | 41.2   | 1148.15      | P                          |
| 2412.000000             | 2375.000000                | 9.17           | 41.2   | 329.99       | A                          |
| 2412.000000             | 2376.500000                | 21.33          | 41.21  | 1339.68      | P                          |
| 2412.000000             | 2377.300000                | 9              | 41.21  | 323.97       | A                          |
| 2412.000000             | 2377.650000                | 19.83          | 41.21  | 1127.2       | P                          |
| 2412.000000             | 2378.700000                | 9.17           | 41.21  | 330.37       | A                          |
| 2412.000000             | 2379.200000                | 19.83          | 41.21  | 1127.2       | P                          |
| 2412.000000             | 2380.350000                | 20.17          | 41.22  | 1173.55      | P                          |
| 2412.000000             | 2380.400000                | 9.17           | 41.22  | 330.75       | A                          |
| 2412.000000             | 2381.600000                | 20.17          | 41.22  | 1173.55      | P                          |
| 2412.000000             | 2381.650000                | 9.17           | 41.22  | 330.75       | A                          |
| 2412.000000             | 2382.850000                | 9              | 41.22  | 324.34       | A                          |
| 2412.000000             | 2383.100000                | 20.33          | 41.22  | 1195.36      | P                          |
| 2412.000000             | 2384.250000                | 9.17           | 41.23  | 331.13       | A                          |
| 2412.000000             | 2384.300000                | 20             | 41.23  | 1152.13      | P                          |
| 2412.000000             | 2385.450000                | 9.33           | 41.23  | 337.29       | A                          |
| 2412.000000             | 2385.950000                | 20.67          | 41.24  | 1245.95      | P                          |
| 2412.000000             | 2386.300000                | 9.17           | 41.24  | 331.51       | A                          |
| 2412.000000             | 2387.350000                | 20.5           | 41.25  | 1223.21      | P                          |
| 2412.000000             | 2387.400000                | 9.33           | 41.25  | 338.06       | A                          |
| 2412.000000             | 2388.550000                | 9              | 41.25  | 325.46       | A                          |
| 2412.000000             | 2388.850000                | 20.33          | 41.25  | 1199.5       | P                          |
| 2412.000000             | 2390.000000                | 9.33           | 41.25  | 338.06       | A                          |
| 2412.000000             | 2390.000000                | 20.5           | 41.25  | 1223.21      | P                          |

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NAME OF TEST: Band Edge Emissions  
 g0040266: 2000-Apr-18 Tue 15:10:00 Yagi Antenna  
 Lower Band Edge

| FREQUENCY<br>TUNED, MHz | FREQUENCY<br>EMISSION, MHz | METER,<br>dBuV | CF, dB | uV/m @<br>3m | PEAK (P) OR<br>AVERAGE (A) |
|-------------------------|----------------------------|----------------|--------|--------------|----------------------------|
| 2412.000000             | 2375.000000                | 18.67          | 41.2   | 985.14       | P                          |
| 2412.000000             | 2375.000000                | 9.67           | 41.2   | 349.54       | A                          |
| 2412.000000             | 2375.750000                | 19             | 41.2   | 1023.29      | P                          |
| 2412.000000             | 2375.900000                | 10.33          | 41.2   | 377.14       | A                          |
| 2412.000000             | 2376.950000                | 22.33          | 41.21  | 1503.14      | P                          |
| 2412.000000             | 2377.150000                | 9.5            | 41.21  | 343.16       | A                          |
| 2412.000000             | 2378.000000                | 20.33          | 41.21  | 1193.99      | P                          |
| 2412.000000             | 2378.400000                | 9.33           | 41.21  | 336.51       | A                          |
| 2412.000000             | 2379.200000                | 20.5           | 41.21  | 1217.59      | P                          |
| 2412.000000             | 2379.600000                | 9.67           | 41.21  | 349.95       | A                          |
| 2412.000000             | 2381.100000                | 19.67          | 41.22  | 1107.9       | P                          |
| 2412.000000             | 2381.200000                | 9.67           | 41.22  | 350.35       | A                          |
| 2412.000000             | 2382.550000                | 21.17          | 41.22  | 1316.74      | P                          |
| 2412.000000             | 2382.650000                | 9.33           | 41.22  | 336.9        | A                          |
| 2412.000000             | 2383.850000                | 21             | 41.23  | 1292.71      | P                          |
| 2412.000000             | 2384.050000                | 9.33           | 41.23  | 337.29       | A                          |
| 2412.000000             | 2385.000000                | 19.83          | 41.23  | 1129.8       | P                          |
| 2412.000000             | 2385.450000                | 9.83           | 41.23  | 357.27       | A                          |
| 2412.000000             | 2385.900000                | 19.5           | 41.24  | 1088.93      | P                          |
| 2412.000000             | 2386.200000                | 9.67           | 41.24  | 351.16       | A                          |
| 2412.000000             | 2386.800000                | 9.67           | 41.24  | 351.16       | A                          |
| 2412.000000             | 2387.000000                | 20.5           | 41.24  | 1221.8       | P                          |
| 2412.000000             | 2388.050000                | 9.33           | 41.25  | 338.06       | A                          |
| 2412.000000             | 2389.000000                | 9.67           | 41.25  | 351.56       | A                          |
| 2412.000000             | 2389.000000                | 20.33          | 41.25  | 1199.5       | P                          |

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NAME OF TEST: Band Edge Emissions  
 g0040235:2000-Apr-18 Tue 08:17:00 Snap On Antenna  
 Upper Band Edge

| FREQUENCY<br>TUNED, MHz | FREQUENCY<br>EMISSION, MHz | METER,<br>dBuV | CF, dB | uV/m @<br>3m | PEAK (P) OR<br>AVERAGE (A) |
|-------------------------|----------------------------|----------------|--------|--------------|----------------------------|
| 2462.000000             | 2483.500000                | 20.5           | 40.56  | 1129.8       | A                          |
| 2462.000000             | 2483.500000                | 9.5            | 40.56  | 318.42       | P                          |
| 2462.000000             | 2484.950000                | 9.33           | 40.57  | 312.61       | P                          |
| 2462.000000             | 2485.200000                | 21.67          | 40.57  | 1294.2       | A                          |
| 2462.000000             | 2486.400000                | 9.33           | 40.58  | 312.97       | P                          |
| 2462.000000             | 2486.500000                | 20.83          | 40.58  | 1176.25      | A                          |
| 2462.000000             | 2487.950000                | 21.83          | 40.58  | 1319.78      | P                          |
| 2462.000000             | 2488.100000                | 9.33           | 40.58  | 312.97       | A                          |
| 2462.000000             | 2489.450000                | 9.33           | 40.58  | 312.97       | A                          |
| 2462.000000             | 2489.600000                | 21             | 40.58  | 1199.5       | P                          |
| 2462.000000             | 2490.900000                | 9.17           | 40.59  | 307.61       | A                          |
| 2462.000000             | 2491.100000                | 21.67          | 40.59  | 1297.18      | P                          |
| 2462.000000             | 2492.500000                | 21.5           | 40.59  | 1272.04      | A                          |
| 2462.000000             | 2492.500000                | 9.33           | 40.59  | 313.33       | P                          |
| 2462.000000             | 2493.800000                | 21.67          | 40.6   | 1298.67      | A                          |
| 2462.000000             | 2494.150000                | 9.5            | 40.6   | 319.89       | P                          |
| 2462.000000             | 2495.550000                | 21             | 40.6   | 1202.26      | A                          |
| 2462.000000             | 2495.600000                | 9.33           | 40.6   | 313.69       | P                          |
| 2462.000000             | 2496.750000                | 10.17          | 40.6   | 345.54       | A                          |
| 2462.000000             | 2497.350000                | 23.17          | 40.6   | 1543.48      | P                          |
| 2462.000000             | 2498.500000                | 21             | 40.61  | 1203.65      | P                          |
| 2462.000000             | 2498.500000                | 9.33           | 40.61  | 314.05       | A                          |

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NAME OF TEST: Band Edge Emissions  
 g0040295:2000-Apr-19 Wed 12:20:00 Dipole Antenna  
 Upper Band Edge

| FREQUENCY<br>TUNED, MHz | FREQUENCY<br>EMISSION, MHz | METER,<br>dBuV | CF, dB | uV/m @<br>3m | PEAK (P) OR<br>AVERAGE (A) |
|-------------------------|----------------------------|----------------|--------|--------------|----------------------------|
| 2462.000000             | 2483.500000                | 20.67          | 41.56  | 1292.71      | P                          |
| 2462.000000             | 2483.500000                | 10             | 41.56  | 378.44       | A                          |
| 2462.000000             | 2484.400000                | 9.83           | 41.56  | 371.11       | A                          |
| 2462.000000             | 2484.650000                | 21.17          | 41.57  | 1370.88      | P                          |
| 2462.000000             | 2485.650000                | 21             | 41.57  | 1344.31      | P                          |
| 2462.000000             | 2485.850000                | 10.17          | 41.57  | 386.37       | A                          |
| 2462.000000             | 2487.050000                | 20.33          | 41.58  | 1245.95      | P                          |
| 2462.000000             | 2487.250000                | 10             | 41.58  | 379.31       | A                          |
| 2462.000000             | 2488.150000                | 10             | 41.58  | 379.31       | A                          |
| 2462.000000             | 2488.200000                | 21.5           | 41.58  | 1425.61      | P                          |
| 2462.000000             | 2489.200000                | 22             | 41.58  | 1510.08      | P                          |
| 2462.000000             | 2489.500000                | 9.83           | 41.58  | 371.96       | A                          |
| 2462.000000             | 2490.550000                | 20.67          | 41.59  | 1297.18      | P                          |
| 2462.000000             | 2490.950000                | 9.67           | 41.59  | 365.59       | A                          |
| 2462.000000             | 2491.950000                | 20.5           | 41.59  | 1272.04      | P                          |
| 2462.000000             | 2492.200000                | 9.67           | 41.59  | 365.59       | A                          |
| 2462.000000             | 2493.200000                | 21.83          | 41.59  | 1482.52      | P                          |
| 2462.000000             | 2493.800000                | 9.5            | 41.6   | 358.92       | A                          |
| 2462.000000             | 2494.500000                | 21.5           | 41.6   | 1428.89      | P                          |
| 2462.000000             | 2495.050000                | 9.5            | 41.6   | 358.92       | A                          |
| 2462.000000             | 2495.700000                | 21.5           | 41.6   | 1428.89      | P                          |
| 2462.000000             | 2496.450000                | 9.5            | 41.6   | 358.92       | A                          |
| 2462.000000             | 2497.300000                | 21             | 41.6   | 1348.96      | P                          |
| 2462.000000             | 2498.500000                | 20.17          | 41.61  | 1227.44      | P                          |
| 2462.000000             | 2498.500000                | 9.5            | 41.61  | 359.34       | A                          |

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NAME OF TEST: Band Edge Emissions  
 g0040271:2000-Apr-18 Tue 15:44:00 Yagi Antenna  
 Upper Band Edge

| FREQUENCY<br>TUNED, MHz | FREQUENCY<br>EMISSION, MHz | METER,<br>dBuV | CF, dB | uV/m @<br>3m | PEAK (P) OR<br>AVERAGE (A) |
|-------------------------|----------------------------|----------------|--------|--------------|----------------------------|
| 2462.000000             | 2483.500000                | 11.67          | 41.56  | 458.67       | A                          |
| 2462.000000             | 2483.500000                | 19.5           | 41.56  | 1129.8       | P                          |
| 2462.000000             | 2484.700000                | 20.5           | 41.57  | 1269.11      | P                          |
| 2462.000000             | 2484.950000                | 10.83          | 41.57  | 416.87       | A                          |
| 2462.000000             | 2485.850000                | 20.33          | 41.57  | 1244.51      | P                          |
| 2462.000000             | 2486.300000                | 11.17          | 41.58  | 434.01       | A                          |
| 2462.000000             | 2487.250000                | 20.67          | 41.58  | 1295.69      | P                          |
| 2462.000000             | 2487.800000                | 10.83          | 41.58  | 417.35       | A                          |
| 2462.000000             | 2488.850000                | 11.5           | 41.58  | 450.82       | A                          |
| 2462.000000             | 2488.900000                | 20.67          | 41.58  | 1295.69      | P                          |
| 2462.000000             | 2490.000000                | 10.83          | 41.59  | 417.83       | A                          |
| 2462.000000             | 2490.100000                | 20.83          | 41.59  | 1321.3       | P                          |
| 2462.000000             | 2491.100000                | 10.67          | 41.59  | 410.2        | A                          |
| 2462.000000             | 2491.800000                | 19             | 41.59  | 1070.29      | P                          |
| 2462.000000             | 2492.300000                | 10.17          | 41.59  | 387.26       | A                          |
| 2462.000000             | 2493.200000                | 19.5           | 41.59  | 1133.7       | P                          |
| 2462.000000             | 2493.600000                | 9.83           | 41.59  | 372.39       | A                          |
| 2462.000000             | 2494.500000                | 18.83          | 41.6   | 1050.75      | P                          |
| 2462.000000             | 2495.150000                | 9.83           | 41.6   | 372.82       | A                          |
| 2462.000000             | 2495.900000                | 18.5           | 41.6   | 1011.58      | P                          |
| 2462.000000             | 2497.050000                | 9.83           | 41.6   | 372.82       | A                          |
| 2462.000000             | 2497.200000                | 19.83          | 41.6   | 1178.96      | P                          |
| 2462.000000             | 2498.500000                | 20.67          | 41.61  | 1300.17      | P                          |
| 2462.000000             | 2498.500000                | 9.83           | 41.61  | 373.25       | A                          |

PAGE NO. 26 of 53.  
NAME OF TEST: Restricted Bands of Operation  
SPECIFICATION: 47 CFR 15.205  
TEST EQUIPMENT: As per attached page

### MEASUREMENT PROCEDURE

The EUT was set up on a three meter open field site according to the procedure on ANSI C63.4.

Sensitivity of system was measured:

Below 2 GHz:

|                      |                 |
|----------------------|-----------------|
| CISPR Bandwidths     | = 8 dB $\mu$ V  |
| 1 MHz RBW, 1 MHz VBW | = 12 dB $\mu$ V |
| 1 MHz RBW, 10 Hz VBW | = 3 dB $\mu$ V  |

Above 2 GHz:

|                      |                 |
|----------------------|-----------------|
| 1 MHz RBW, 1 MHz VBW | = 33 dB $\mu$ V |
| 1 MHz RBW, 10 Hz VBW | = 22 dB $\mu$ V |

Sensitivity of system with preamps:

Below 2 GHz:

Preamps are not used in this range.

Above 2 GHz:

|         |                 |
|---------|-----------------|
| Peak    | = 3 dB $\mu$ V  |
| Average | = -8 dB $\mu$ V |

Cable Loss:

|          |           |
|----------|-----------|
| 915 MHz  | = -0.8 dB |
| 2450 MHz | = -3 dB   |

Note:

dB loss vs. frequency included in programmed software.

Reference Level Offset:

set @ 1 dB, accounts for cable and connector loss.

TEST RESULTS: No harmonic or spurious emissions were detected in the restricted bands in excess of the limits of 15.205. System measurement sensitivity was -130 dBm.



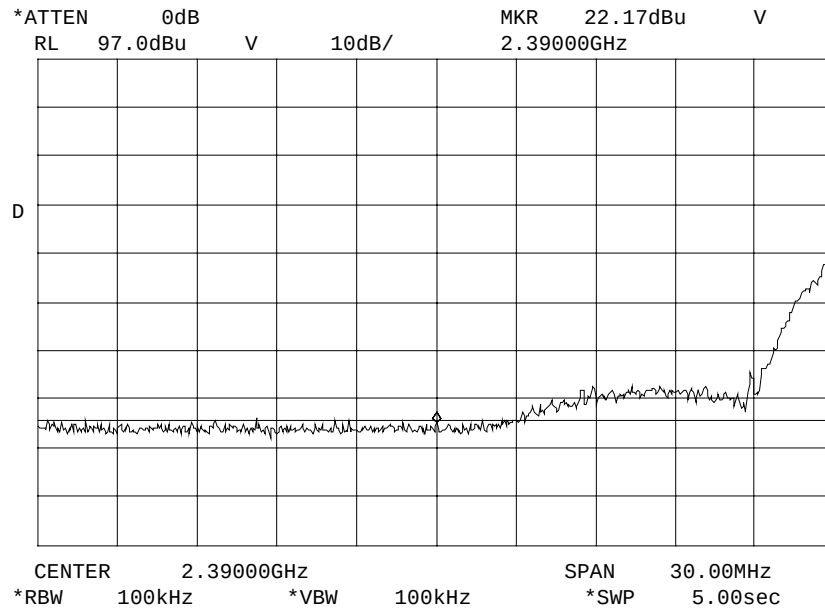
SUPERVISED BY:

Morton Flom, P. Eng.

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NAME OF TEST: Radiated Band Edge  
 g0040233: 2000-Apr-17 Mon 16:27:00  
 Snap On Antenna



POWER: HIGH  
 MODULATION: DIRECT SEQUENCE (Worst Case)  
 LOWER BANDEDGE FREQ. 2412/PEAK

SUPERVISED BY:

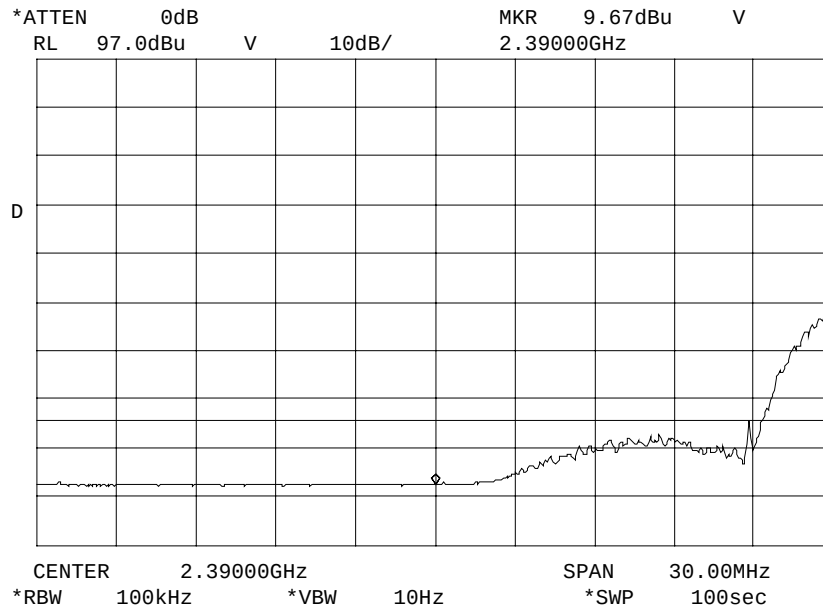
*M. Flom P. Eng.*  
 Morton Flom, P. Eng.



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NAME OF TEST: Radiated Band Edge  
g0040232: 2000-Apr-17 Mon 16:26:00  
Snap On Antenna



POWER:  
MODULATION:

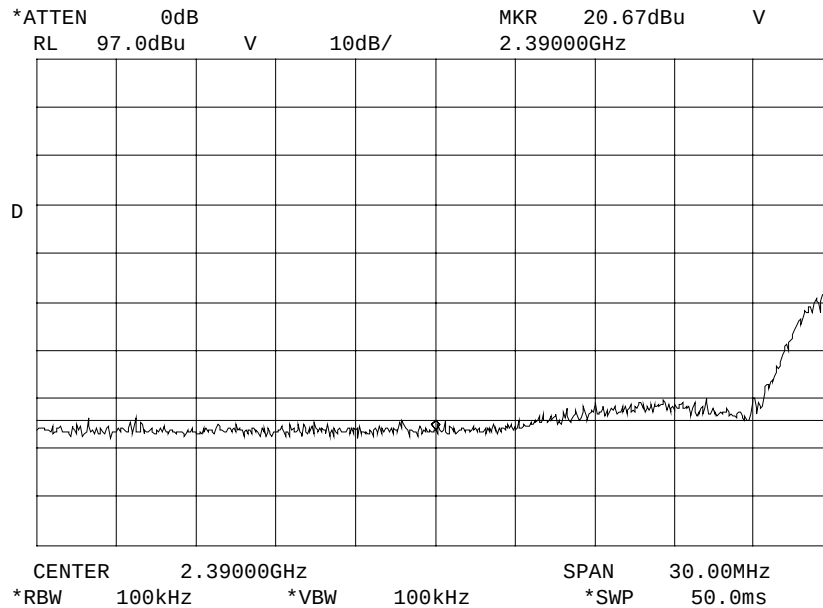
HIGH  
DIRECT SEQUENCE (Worst Case)  
LOWER BANDEDGE FREQ. 2412/AVG

SUPERVISED BY:

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PAGE NO. 29 of 53.

NAME OF TEST: Radiated Band Edge  
 g0040293: 2000-Apr-19 Wed 12:04:00  
 Dipole Antenna



POWER:  
 MODULATION:

HIGH  
 DIRECT SEQUENCE (Worst Case)  
 LOWER BANDEDGE FREQ. 2442/PEAK

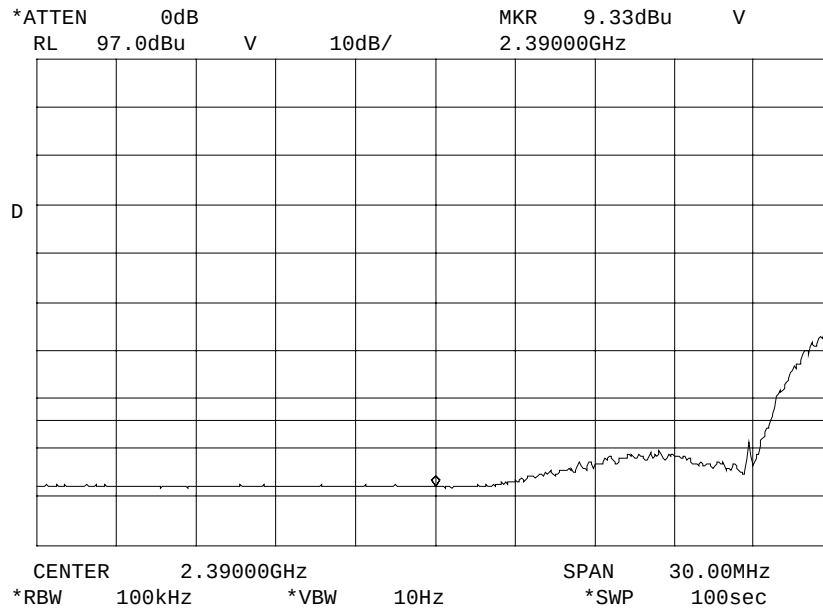
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NAME OF TEST: Radiated Band Edge  
g0040294: 2000-Apr-19 Wed 12:08:00  
Dipole Antenna



POWER:  
MODULATION:

HIGH  
DIRECT SEQUENCE (Worst Case)  
LOWER BANDEDGE FREQ. 2442/AVG

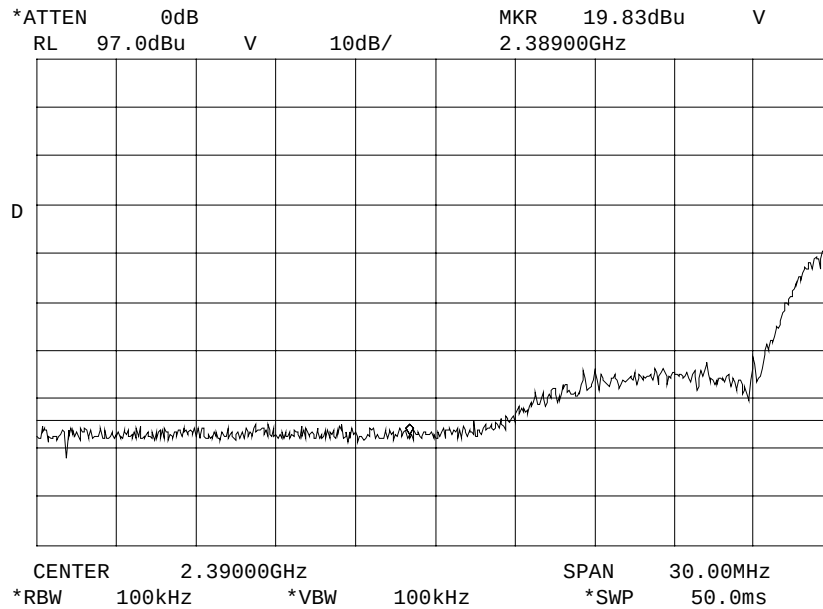
SUPERVISED BY:

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PAGE NO.

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NAME OF TEST: Radiated Band Edge  
 g0040267: 2000-Apr-18 Tue 15:19:00  
 Yagi Antenna



POWER: HIGH  
 MODULATION: DIRECT SEQUENCE (Worst Case)  
 LOWER BANDEDGE FREQ. 2412/PEAK

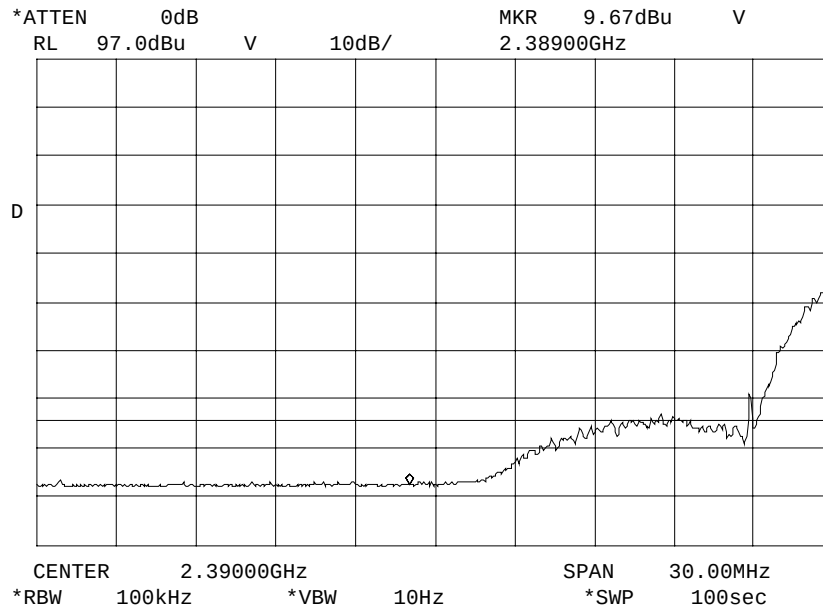
SUPERVISED BY:

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NAME OF TEST: Radiated Band Edge  
g0040268: 2000-Apr-18 Tue 15:23:00  
Yagi Antenna



POWER: HIGH  
MODULATION: DIRECT SEQUENCE (Worst Case)  
LOWER BANDEDGE FREQ. 2412/AVG

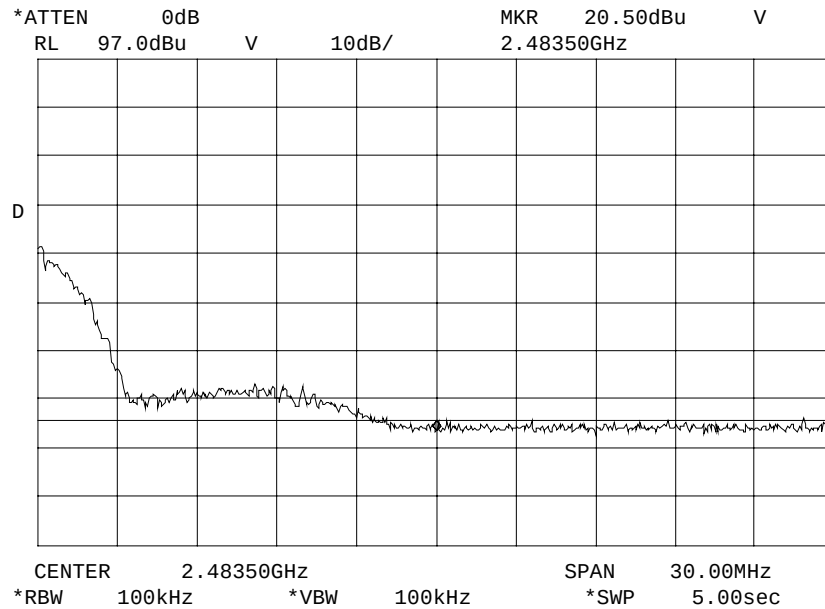
SUPERVISED BY:

*Morton Flom P. Eng.*  
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NAME OF TEST: Radiated Band Edge  
 g0040236: 2000-Apr-18 Tue 08:28:00  
 Snap On Antenna



POWER: HIGH  
 MODULATION: DIRECT SEQUENCE (Worst Case)  
 UPPER BANDEDGE FREQ. 2462/PEAK

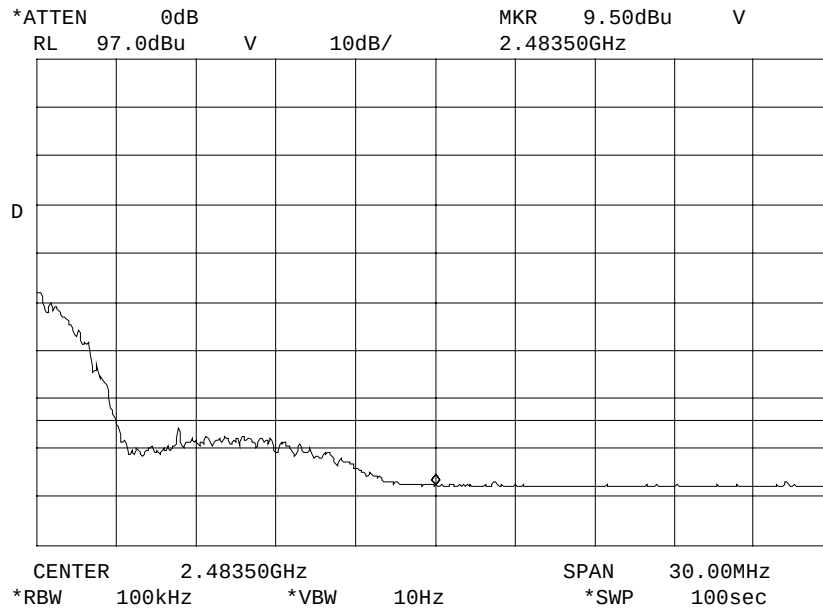
SUPERVISED BY:

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PAGE NO.

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NAME OF TEST: Radiated Band Edge  
g0040234: 2000-Apr-18 Tue 08:15:00  
Snap On Antenna



POWER:  
MODULATION:

HIGH  
DIRECT SEQUENCE (Worst Case)  
UPPER BANDEDGE FREQ. 2462/AVG

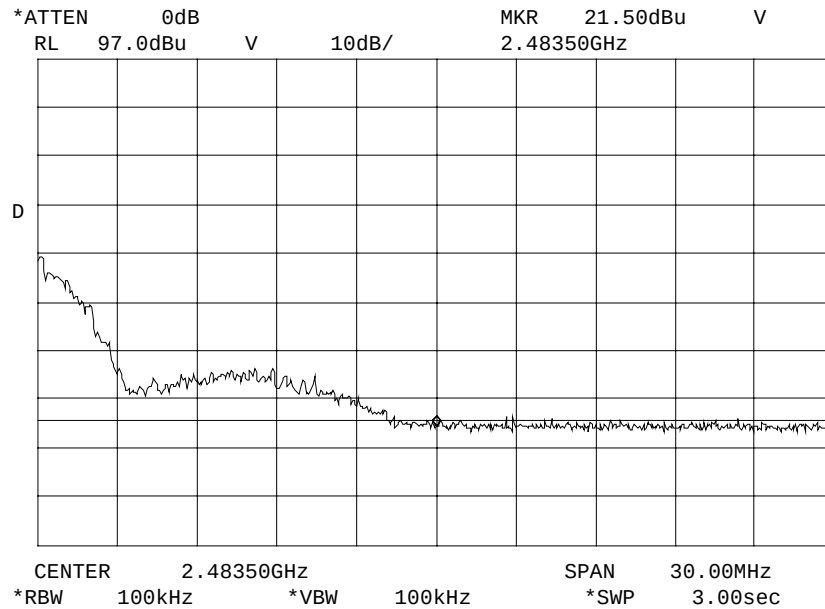
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PAGE NO.

35 of 53.

NAME OF TEST: Radiated Band Edge  
g0040296: 2000-Apr-19 Wed 12:24:00  
Dipole Antenna



POWER: HIGH  
MODULATION: DIRECT SEQUENCE (Worst Case)  
UPPER BANDEDGE FREQ. 2462/PEAK

SUPERVISED BY:

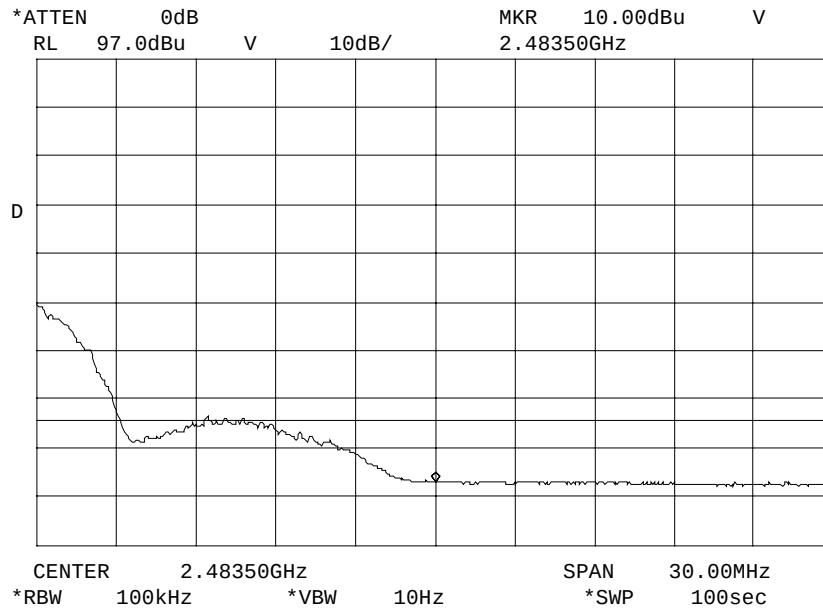
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PAGE NO.

36 of 53.

NAME OF TEST: Radiated Band Edge  
 g0040297: 2000-Apr-19 Wed 12:30:00  
 Dipole Antenna



POWER: HIGH  
 MODULATION: DIRECT SEQUENCE (Worst Case)  
 UPPER BANDEDGE FREQ. 2462/AVG

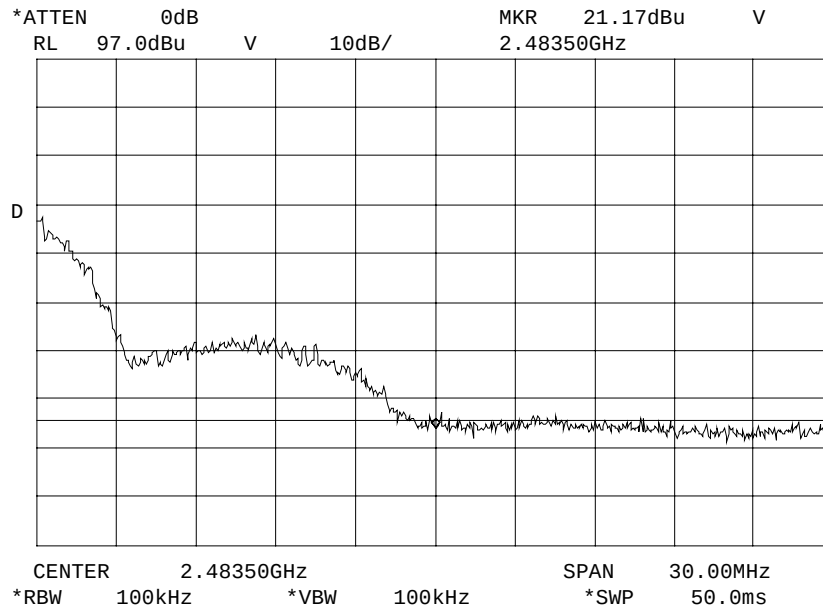
SUPERVISED BY:

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PAGE NO.

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NAME OF TEST: Radiated Band Edge  
 g0040269: 2000-Apr-18 Tue 15:40:00  
 Yagi Antenna



POWER: HIGH  
 MODULATION: DIRECT SEQUENCE (Worst Case)  
 UPPER BANDEDGE FREQ. 2462/PEAK

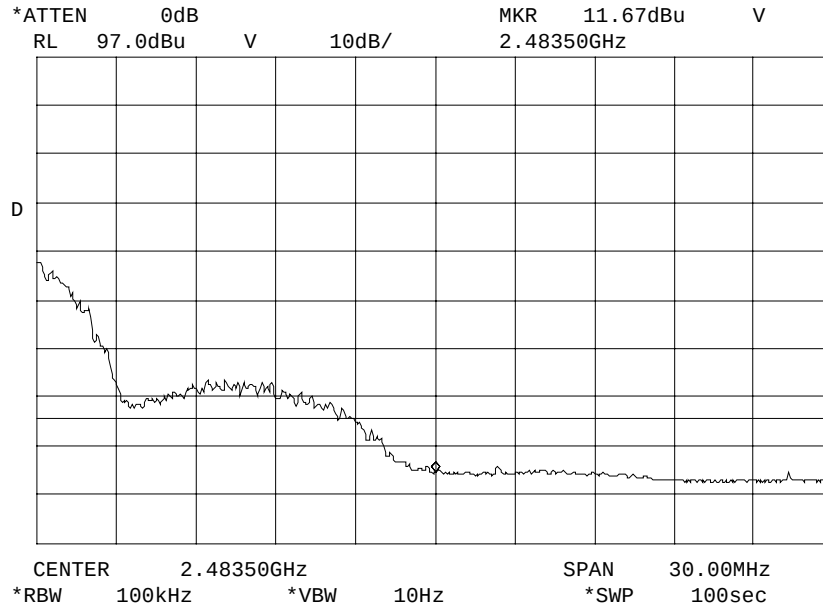
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PAGE NO.

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NAME OF TEST: Radiated Band Edge  
 g0040270: 2000-Apr-18 Tue 15:44:00  
 Yagi Antenna



POWER: HIGH  
 MODULATION: DIRECT SEQUENCE (Worst Case)  
 UPPER BANDEDGE FREQ. 2462/AVG

SUPERVISED BY:

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NAME OF TEST: Allowed Occupied Bandwidth

SPECIFICATION: 47 CFR 15.247(a)(2)

TEST EQUIPMENT: As per attached page

LIMITS

| <u>RULE</u>      | <u>TYPE</u> | <u>BANDS (MHz)</u>     | <u>LIMIT (kHz)</u>   |
|------------------|-------------|------------------------|----------------------|
| 15.247(a)(1)(i)  | F.H.        | 902-928                | 20 dB BW $\leq$ 500  |
| 15.247(a)(1)(ii) | F.H.        | 2400-2483.5, 5725-5850 | 20 dB BW $\leq$ 1000 |
| 15.247(a)(2)     | D.S.        | ALL                    | 6 dB BW $\geq$ 500   |

MEASUREMENT DATA

RESULTS

= ATTACHED

SUPERVISED BY:

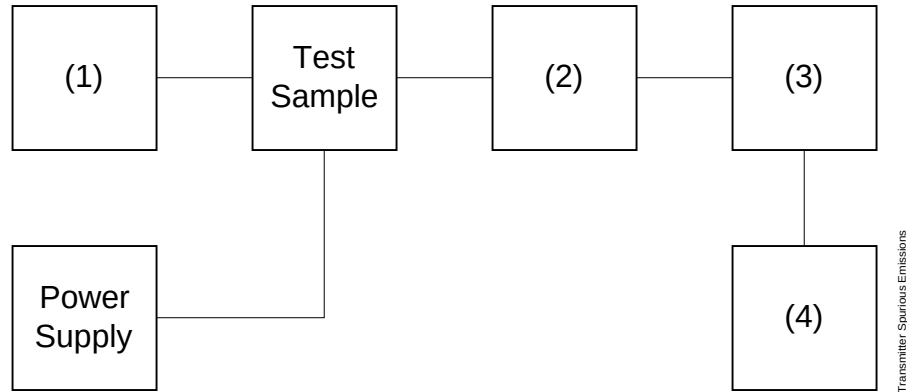
  
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TRANSMITTER SPURIOUS EMISSION

TEST A. OCCUPIED BANDWIDTH (IN-BAND SPURIOUS)  
 TEST B. OUT-OF-BAND SPURIOUS

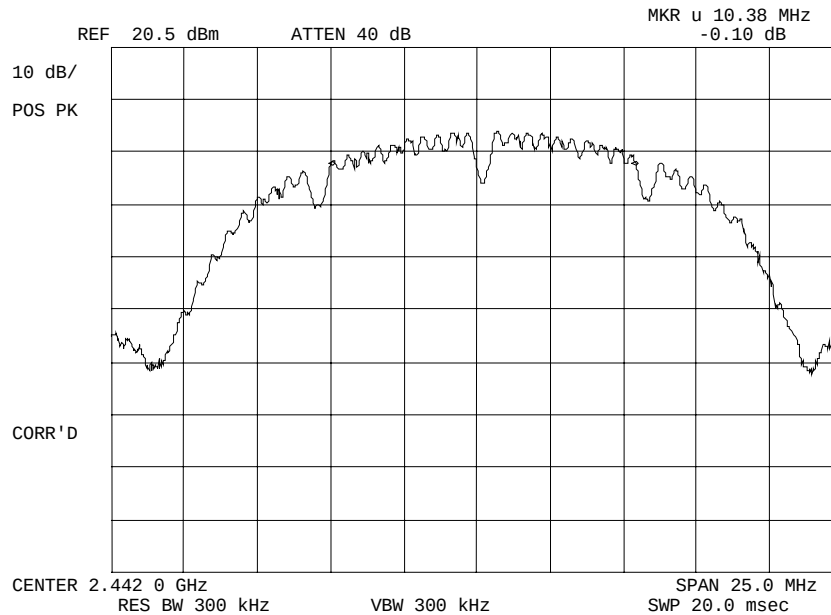


| Asset Description<br>(as applicable)  | s/n        |
|---------------------------------------|------------|
| (1) <u>AUDIO OSCILLATOR/GENERATOR</u> |            |
| i00010 HP 204D                        | 1105A04683 |
| i00017 HP 8903A                       | 2216A01753 |
| i00012 HP 3312A                       | 1432A11250 |
| (2) <u>COAXIAL ATTENUATOR</u>         |            |
| i00122 Narda 766-10                   | 7802       |
| i00123 Narda 766-10                   | 7802A      |
| i00069 Bird 8329 (30 dB)              | 1006       |
| i00113 Sierra 661A-3D                 | 1059       |
| (3) <u>FILTERS; NOTCH, HP, LP, BP</u> |            |
| i00126 Eagle TNF-1                    | 100-250    |
| i00125 Eagle TNF-1                    | 50-60      |
| i00124 Eagle TNF-1                    | 250-850    |
| (4) <u>SPECTRUM ANALYZER</u>          |            |
| i00048 HP 8566B                       | 2511A01467 |
| i00029 HP 8563E                       | 3213A00104 |

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NAME OF TEST: Emission Masks (Occupied Bandwidth)  
 g0040278: 2000-Apr-21 Fri 09:20:00  
 STATE: 2:High Power



POWER:  
 MODULATION:

HIGH  
 1 MB/SEC PSEUDO RANDOM DATA  
 15.247(a)(2) 6 DB BANDWIDTH

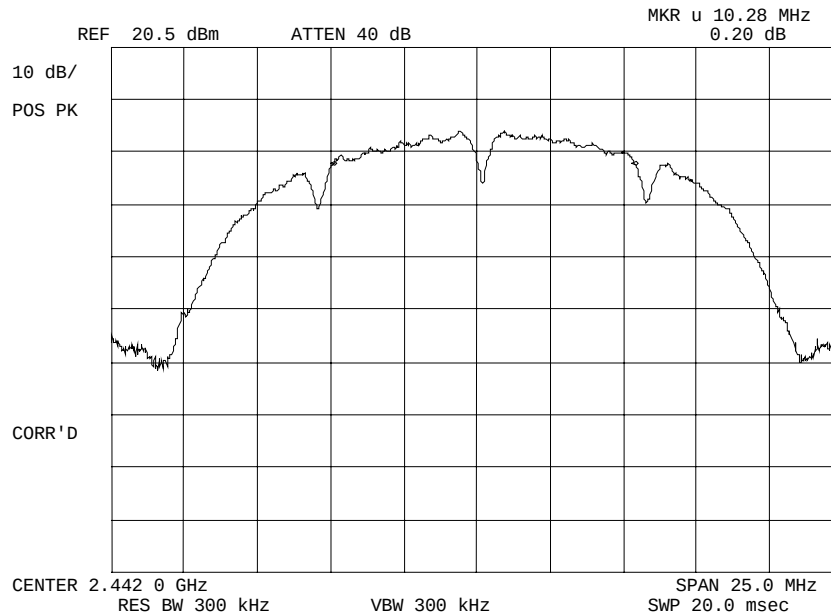
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PAGE NO.

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NAME OF TEST: Emission Masks (Occupied Bandwidth)  
 g0040279: 2000-Apr-21 Fri 09:21:00  
 STATE: 2:High Power



POWER:  
MODULATION:

HIGH  
2 MB/SEC PSEUDO RANDOM DATA  
15.247(a)(2) 6 DB BANDWIDTH

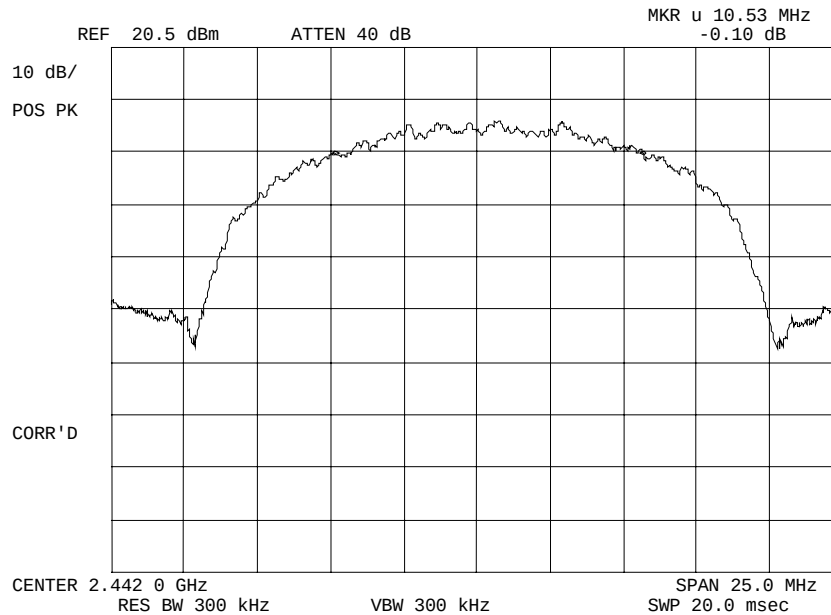
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NAME OF TEST: Emission Masks (Occupied Bandwidth)  
 g0040280: 2000-Apr-21 Fri 09:23:00  
 STATE: 2:High Power



POWER:  
MODULATION:

HIGH  
5.5 MB/SEC PSEUDO RANDOM  
DATA  
15.247(a)(2) 6 DB BANDWIDTH

SUPERVISED BY:

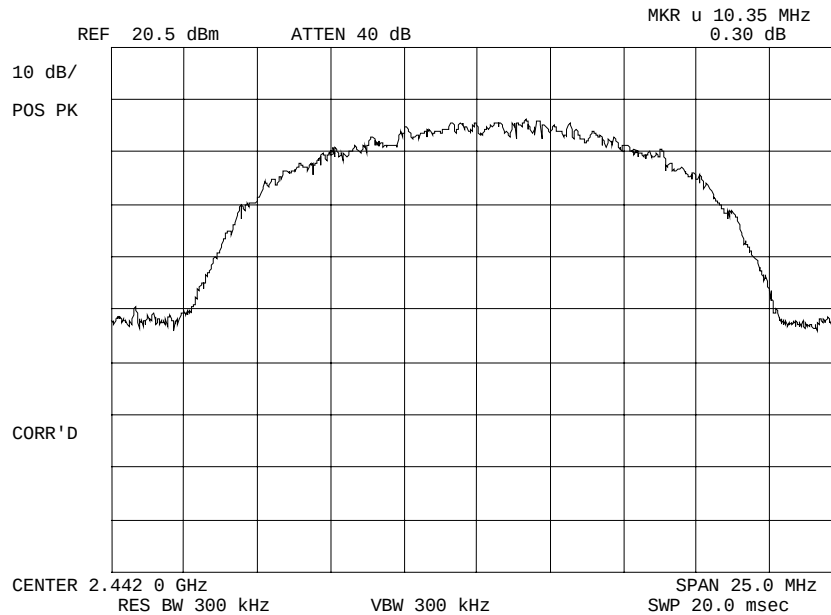
*M. Flom P. Eng.*  
Morton Flom, P. Eng.



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NAME OF TEST: Emission Masks (Occupied Bandwidth)  
 g0040281: 2000-Apr-21 Fri 09:24:00  
 STATE: 2:High Power



POWER:  
 MODULATION:

HIGH  
 11 MB/SEC PSEUDO RANDOM  
 DATA  
 15.247(a)(2) 6 DB BANDWIDTH

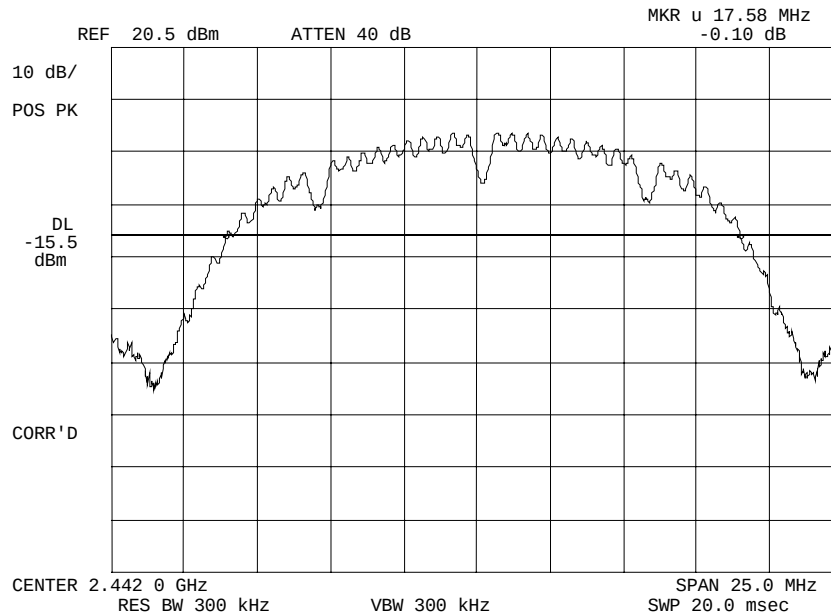
SUPERVISED BY:

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NAME OF TEST: Emission Masks (Occupied Bandwidth)  
 g0040277: 2000-Apr-21 Fri 09:08:00  
 STATE: 2:High Power



POWER:  
MODULATION:

HIGH  
1 MB/SEC PSEUDO RANDOM DATA  
15.247(a)(1)(I) 20 DB  
BANDWIDTH

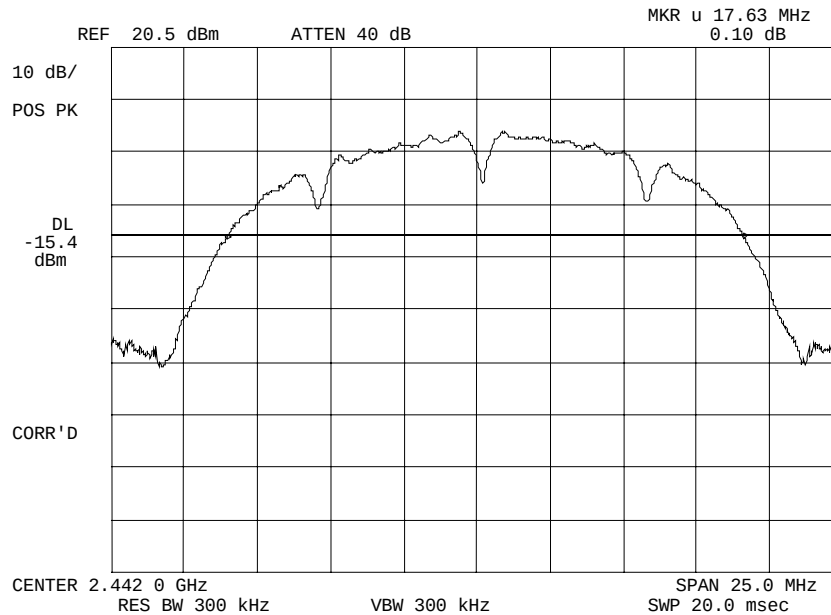
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PAGE NO.

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NAME OF TEST: Emission Masks (Occupied Bandwidth)  
 g0040276: 2000-Apr-21 Fri 09:06:00  
 STATE: 2:High Power



POWER: HIGH  
 MODULATION: 2 MB/SEC PSEUDO RANDOM DATA  
 15.247(a)(1)(i) 20 DB BANDWIDTH

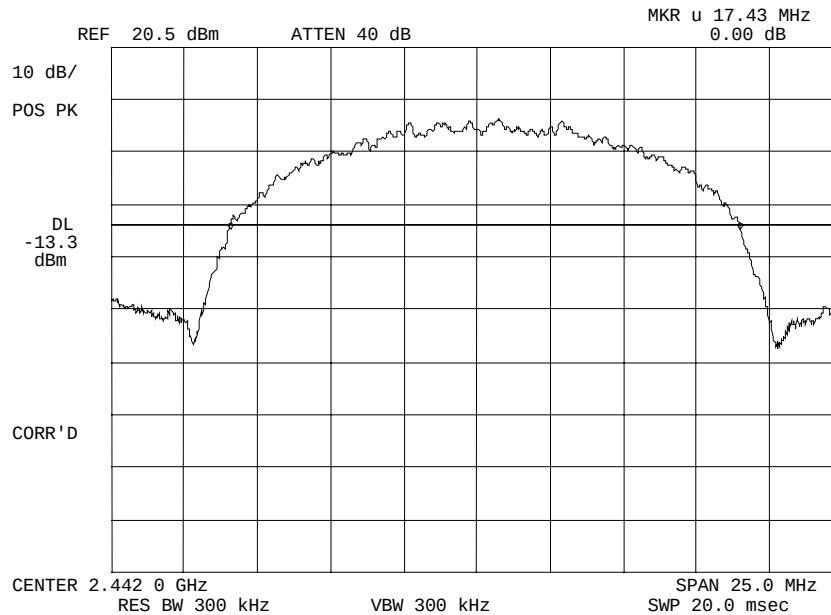
SUPERVISED BY:

*M. Flom P. Eng.*  
 Morton Flom, P. Eng.

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NAME OF TEST: Emission Masks (Occupied Bandwidth)  
 g0040275: 2000-Apr-21 Fri 09:04:00  
 STATE: 2:High Power



POWER: HIGH  
 MODULATION: 5.5 MB/SEC PSEUDO RANDOM DATA  
 15.247(a)(1)(i) 20 DB BANDWIDTH

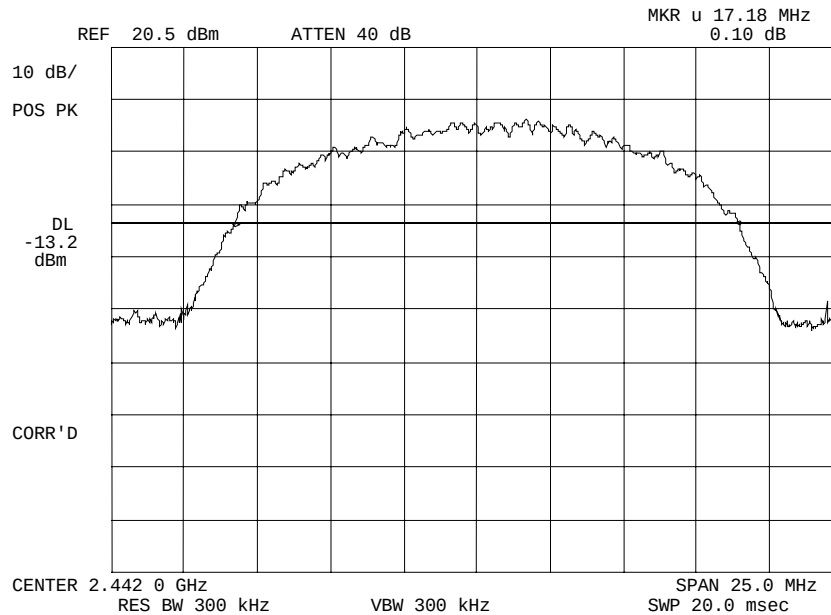
SUPERVISED BY:

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PAGE NO.

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NAME OF TEST: Emission Masks (Occupied Bandwidth)  
 g0040274: 2000-Apr-21 Fri 09:02:00  
 STATE: 2:High Power



POWER:  
MODULATION:

HIGH  
11 MB/SEC PSEUDO RANDOM DATA  
15.247(a)(1)(i) 20 DB BANDWIDTH

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NAME OF TEST: Spread Spectrum Technology  
Direct Sequence Systems

15.247(a)(2) Minimum 6 dB Bandwidth

RESULTS: Please see results for "Allowed Occupied Bandwidth"

15.247(d) Transmitter Power Density

LIMIT: The transmitter power density peak over any 1 second interval shall not be greater than 8 dBm in any 3 kHz Bandwidth within these bands.

RESULTS: Please see attached plots.  
Transmitter Power Density, dBm = Attached

15.247(e) Processing Gain

LIMIT: The processing gain shall be  $\geq 10$  dB

RESULTS: See Applicant's statement  
Processing Gain, dB = Attached

Pseudorandom Sequence Description

RESULTS: Not Applicable to Direct Sequence Systems

Chip Rate

RESULTS: See Applicant's statement

SUPERVISED BY:

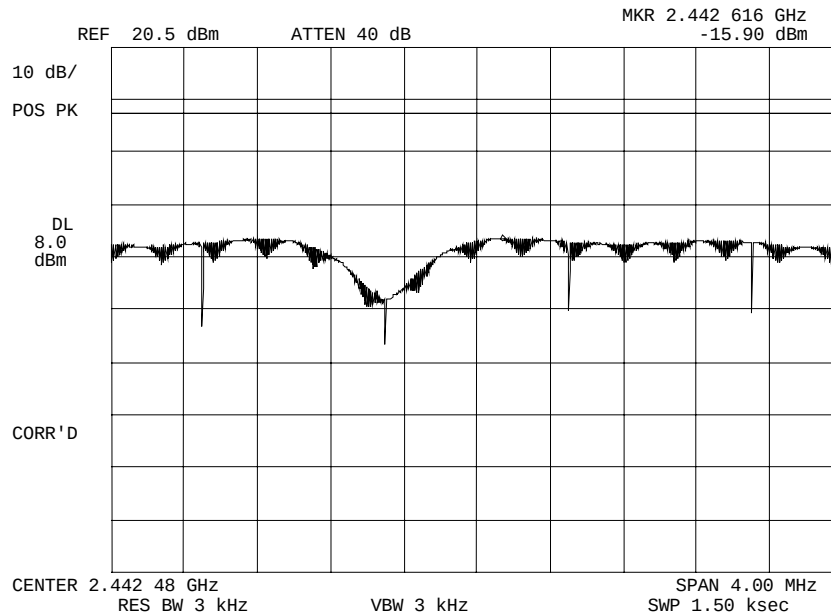


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NAME OF TEST: Spectral Power Density  
 g0040287: 2000-Apr-21 Fri 10:42:00  
 Yagi Antenna



POWER:

HIGH

MODULATION:

1 MB/SEC PSEUDO RANDOM DATA

15.247(D) SPECTRAL POWER DENSITY

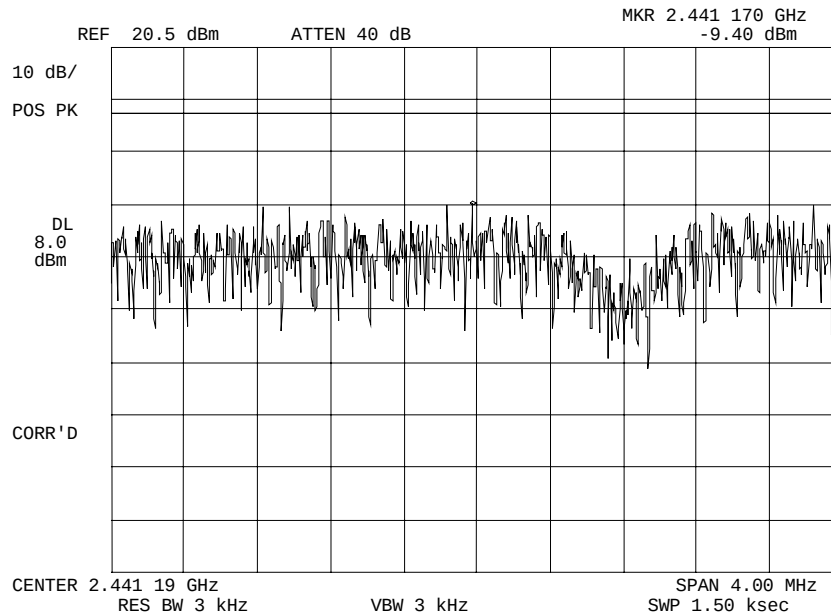
SUPERVISED BY:

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NAME OF TEST: Spectral Power Density  
 g0040288: 2000-Apr-21 Fri 11:11:00  
 Yagi Antenna



POWER: HIGH  
 MODULATION: 2 MB/SEC PSEUDO RANDOM DATA  
 15.247(D) SPECTRAL POWER DENSITY

SUPERVISED BY:

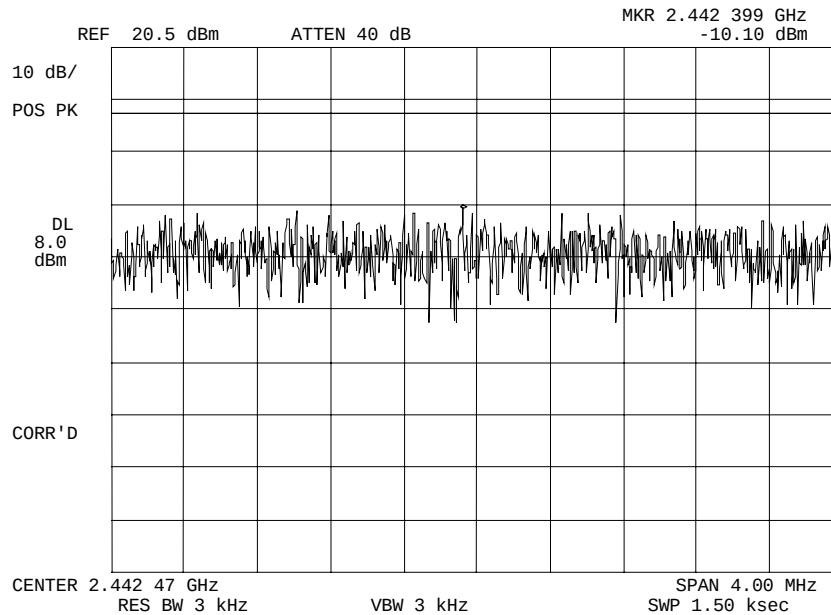
*Morton Flom P. Eng.*  
 Morton Flom, P. Eng.



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NAME OF TEST: Spectral Power Density  
 g0040289: 2000-Apr-21 Fri 11:44:00  
 Yagi Antenna



POWER: HIGH  
 MODULATION: 5.5 MB/SEC PSEUDO RANDOM DATA  
 15.247(D) SPECTRAL POWER DENSITY

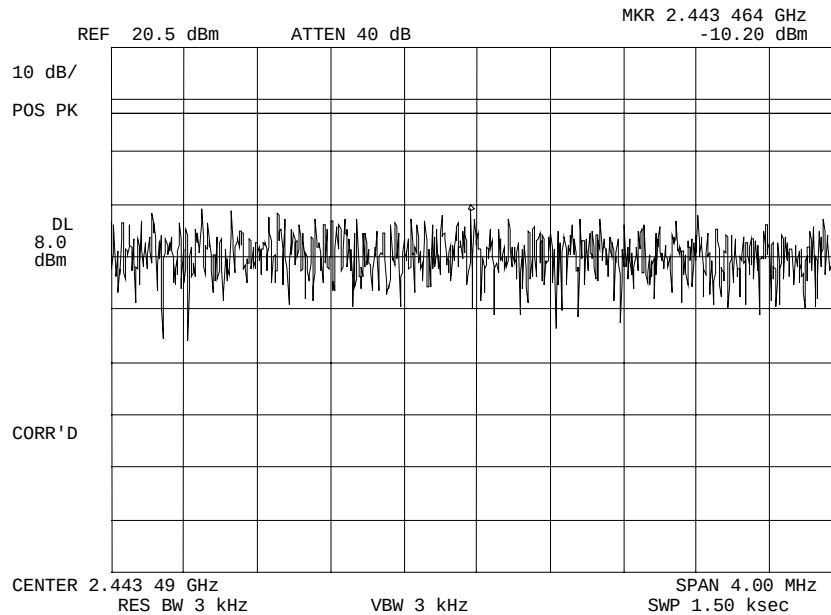
SUPERVISED BY:

*M. Flom P. Eng.*  
 Morton Flom, P. Eng.

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NAME OF TEST: Spectral Power Density  
g0040290: 2000-Apr-21 Fri 12:23:00  
Yagi Antenna



POWER: HIGH  
MODULATION: 11 MB/SEC PSEUDO RANDOM DATA  
15.247(D) SPECTRAL POWER DENSITY

SUPERVISED BY:

*M. Flom P. Eng.*  
Morton Flom, P. Eng.

RADIATED MEASUREMENTS  
FOR PART 15 TRANSMITTERS (INTENTIONAL RADIATORS)

Radiated Measurements

| <u>RANGE OF MEASUREMENT</u> | <u>SPECIFICATION</u> | <u>RESOLUTION B/W</u> | <u>VIDEO B/A</u> |
|-----------------------------|----------------------|-----------------------|------------------|
| 30 to 1000 MHz              | CISPR                | $\geq 100$ kHz        | $\geq 100$ kHz   |
| >1000 MHz                   | FCC, 15.37(b)        | 1 MHz                 | $\geq 1$ MHz     |
| (if averaging)              | FCC, 15.37(b)        | 1 MHz                 | 10 Hz            |

Measuring Equipment

a. ANTENNAS:

|                |                |
|----------------|----------------|
| EMCO 3109      | 20 - 300 MHz   |
| APREL AALP2001 | 200 - 1000 MHz |
| APREL AAB20200 | 20 - 200 MHz   |
| APREL AAH118   | 1 - 18 GHz     |

b. INSTRUMENTS:

|          |                                    |
|----------|------------------------------------|
| HP8566B  | Spectrum Analyzer                  |
| HP85685A | Preselector, w/ preamp below 2 GHz |
| HP85650A | Quasi Peak Adapter                 |
| HP8449   | Preamp, above 2 GHz                |
| HP8563E  | Spectrum Analyzer, above 2 GHz     |

All test instrumentation is calibrated every January and every July. In addition, all test instrumentation is calibrated daily, or as required by the manufacturer. A Calibration Agreement is maintained with Hewlett Packard.

Occupied Bandwidth

Occupied Bandwidth is measured as a radiated signal without attenuators and/or filter. RBW, VBW and scan settings as shown were set to produce a meaningful result in accordance with ANSI C63.4, Section 13.1.7.

Part 15.21, Information to User

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly avoided by the party responsible for compliance could void the user's authority to operate the equipment.

## § 15.205 Restricted Bands of Operation

(a) Except as shown in paragraph (b) 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     | 4.5-5.25    |
| 0.495-0.505       | 16.69475-16.69625   | 608-614       | 5.35-5.46   |
| 2.1735-2.1905     | 16.80425-16.80475   | 960-1240      | 7.25-7.75   |
| 4.125-4.128       | 25.5-25.67          | 1300-1427     | 8.025-8.5   |
| 4.17725-4.17775   | 37.5-38.25          | 1435-1626.5   | 9.0-9.2     |
| 4.20725-4.20775   | 73-74.6             | 1645.5-1646.5 | 9.3-9.5     |
| 6.215-6.218       | 74.8-75.2           | 1660-1710     | 10.6-12.7   |
| 6.26775-6.26825   | 108-121.94          | 1718.8-1722.2 | 13.25-13.4  |
| 6.31175-6.31225   | 123-138             | 2200-2300     | 14.47-14.5  |
| 8.291-8.294       | 149.9-150.05        | 2310-2390     | 15.35-16.2  |
| 8.362-8.366       | 156.52475-156.52525 | 2483.5-2500   | 17.7-21.4   |
| 8.37625-8.38675   | 156.7-156.9         | 2655-2900     | 22.01-23.12 |
| 8.41425-8.41475   | 162.0125-167.17     | 3260-3267     | 23.6-24.0   |
| 12.29-12.293      | 167.72-173.2        | 3332-3339     | 31.2-31.8   |
| 12.51975-12.52025 | 240-285             | 3345.8-3358   | 36.43-36.5  |
| 12.57675-12.57725 | 322-339.4           | 3600-4400     | (2)         |
| 13.36-13.41       |                     |               |             |

Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz. Above 38.6

TESTIMONIAL  
AND  
STATEMENT OF CERTIFICATION

THIS IS TO CERTIFY THAT:

1. THAT the application was prepared either by, or under the direct supervision of, the undersigned.
2. THAT the technical data supplied with the application was taken under my direction and supervision.
3. THAT the data was obtained on representative units, randomly selected.
4. THAT, to the best of my knowledge and belief, the facts set forth in the application and accompanying technical data are true and correct.

CERTIFYING ENGINEER:

  
Morton Flom, P. Eng.