



M. Flom Associates, Inc. - Global Compliance Center

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

www.mflom.com general@mflom.com (480) 926-3100, FAX: 926-3598

Date: July 20, 1999

Federal Communications Commission
EQUIPMENT APPROVAL SERVICES
P.O. Box 358315
Pittsburgh, PA 15251-5315

Attention: Authorization & Evaluation Division

Applicant: Aironet Wireless Communications, Inc.
Equipment: PC4850
FCC ID: LOZ102038
FCC Rules: 15.247, 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 'William H. Graff'. The signature is fluid and cursive.

William H. Graff

enclosure(s)

CERTIFIED MAIL, R.R.R.

cc: Applicant

WHG/cvr



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Attention: Authorization & Evaluation Division

Applicant: Aironet Wireless Communications, Inc.
FCC ID: LOZ102038
Equipment: PC4850
Subject: Electronically Filed FORM 731
Confirmation:

Gentlemen:

As per instructions received, enclosed herewith please find completed Remittance Advice Form 159 for the referenced equipment, bearing original signature, and the application having been electronically filed.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'William H. Graff'.

William H. Graff

enclosure(s)
CERTIFIED MAIL, R.R.R.
cc: Visa
cc: File

WHG/cvr

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

APPLICANT: Aironet Wireless Communications, Inc.

FCC ID: LOZ102038

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
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: LOZ102038

NAMEPLATE DRAWING

ATTACHED, EXHIBIT 1.

LOCATION

AS PER LABEL DRAWING(S)

DATE OF REPORT

July 20, 1999

SUPERVISED BY:

A handwritten signature in black ink, appearing to read 'William H. Graff'.

William H. Graff

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: d9970040

d) Client: Aironet Wireless Communications, Inc.
P.O. Box 5292
Fairlawn, OH 44334-0292

e) Identification: PC4850
Description: FCC ID: LOZ102038
Direct Sequence Spread Spectrum

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

g) Report Date: July 20, 1999
EUT Received: July 7, 1999

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:

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


William H. Graff

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, Confidentiality

Sub-part 2.1033(c)(1): NAME AND ADDRESS OF APPLICANT:Aironet Wireless Communications, Inc.
3875 Embassy Parkway
Akron, OH 44333MANUFACTURER:

Applicant

(c)(2): FCC ID: LOZ102038MODEL NO: PC4850(c)(3): INSTRUCTION MANUAL(S):

PLEASE SEE ATTACHED EXHIBITS

(c)(4): TYPE OF EMISSION: N/A(c)(5): FREQUENCY RANGE, MHz: 2412 to 2462(c)(6): POWER RATING, Watts: 0.1
____ Switchable ____ Variable N/A(c)(7): MAXIMUM POWER RATING, Watts: 115.203: ANTENNA REQUIREMENT:

- The antenna is permanently attached to the EUT
- The antenna uses a unique coupling
- 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

PAGE NO.

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M. Flom Associates, Inc. is accredited by the American Association for Laboratory Association (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 24th day of November, 1998.



Pete Rhine
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 85224-1571
Morton Flom Phone: 602 926 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
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

Pete Rhine

5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8307 • Phone: 301 644 3200 • 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 be covered by this laboratory's

A2LA

accreditation.

PAGE NO.

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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: = 1 Watt peak (0.25 if <50 Hopping Channels)

TEST EQUIPMENT: Attached

MEASUREMENT DATA

ANTENNA GAIN, dBi =
PEAK OUTPUT POWER, Watts =
WORST CASE FOR
ALL CHANNELS

RADIATED:

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV	CF, dB	uV/m @ 3m	EIRP, dBm	EIRP, Watts
2412.000	2409.40000	70.8	42.7	113.6	18.4	0.007
2442.000	2439.40000	70.0	43.0	113.0	17.8	0.006
2462.000	2464.70000	70.8	43.2	114.0	18.7	0.007

Sample Calculation:

$$P_{ERP} = (E_v \times R_M)^2 / 49.2 = (113.6 \times 3)^2 / 49.2 = 0.007 \text{ Watts}$$

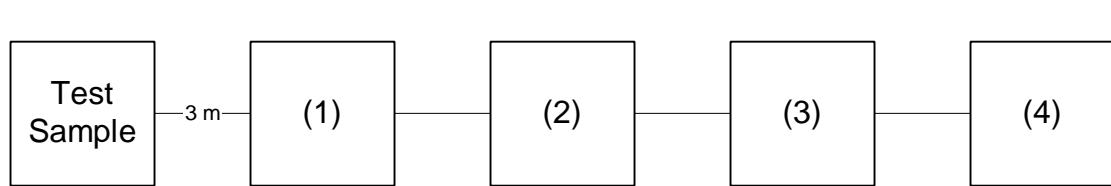
*Correction factor includes a 7dB correction for 2 MHz RBW to Broadband Power Output.

SUPERVISED BY:


William H. Graff

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TRANSMITTER RADIATED MEASUREMENTS

Transmitter Radiated Measurements

Asset	Description	s/n
(1) TRANSDUCER		
<u>x</u> i00091	Emco 3115	001469
<u>x</u> i00089	Aprél Log Periodic	001500
(2) HIGH PASS FILTER		
<u>x</u> i00	Narda μ PAD (In-Band Only)	
<u>x</u> i00	Trilithic (Out-Of-Band Only)	
(3) PREAMP		
<u>x</u> i00028	HP 8449 (+30 dB)	2749A00121
(4) SPECTRUM ANALYZER		
<u>x</u> i00048	HP 8566B	2511A01467
<u> </u> i00043	HP 8558B	2004A02076
<u> </u> i00057	HP 8557A	1531A00191
<u>x</u> i00029	HP 8563E	3213A00104

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TEST SETUP: Radiated Emissions
g9970043: 1999-Jul-08 Thu 16:25:58
STATE: 0:General



TEST SETUP: Radiated Emissions
g9970044: 1999-Jul-08 Thu 16:25:58
STATE: 0:General



PAGE NO. 10 of 45.

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 ₁ T ₂ T ₃
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:

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

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

MEASUREMENT RESULTS: ATTACHED

PAGE NO.

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NAME OF TEST: Out of Band Emissions
 g9970265: 1999-Jul-07 Wed 12:41:00
 STATE: 2:High Power Spurious Emissions

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV	CF, dB	uV/m @ 3m	EIRP, dBm	MARGIN, dB
2412.000000	4823.750000	30.67	A	7.41	80.17	-61.4
2412.000000	4824.000000	41.67	P	7.41	284.45	-50.4
2442.000000	4884.000000	40.5	P	7.51	251.48	-51.5
2442.000000	4884.000000	29.33	A	7.51	69.5	-62.7
2462.000000	4924.000000	30.83	A	7.58	83.27	-61.1
2462.000000	4924.000000	40.67	P	7.58	258.52	-51.3
2412.000000	7235.750000	27.67	A	12.62	103.4	-59.2
2412.000000	7235.750000	37.67	P	12.62	326.96	-51.3
2442.000000	7326.000000	28.17	A	12.59	109.14	-58.8
2442.000000	7326.000000	40	P	12.59	426.09	-46.9
2462.000000	7386.000000	29	A	12.57	119.81	-58.0
2462.000000	7386.000000	39.83	P	12.57	416.87	-47.1
2412.000000	9647.750000	29.33	A	16.07	186.21	-54.1
2412.000000	9647.750000	40.17	P	16.07	648.63	-43.3
2442.000000	9768.000000	40.5	P	16.71	725.27	-42.3
2442.000000	9768.000000	29.67	A	16.71	208.45	-52.1
2462.000000	9848.000000	42.33	P	17.12	938.64	-40.1
2462.000000	9848.000000	30.17	A	17.12	231.47	-52.3
2412.000000	12059.750000	28.5	A	14.99	149.45	-56.0
2412.000000	12059.750000	39.33	P	14.99	520	-45.2
2442.000000	12210.000000	28.67	A	15.47	161.06	-55.4
2442.000000	12210.000000	39.5	P	15.47	560.4	-43.6
2462.000000	12310.000000	29.33	A	15.79	180.3	-54.4
2462.000000	12310.000000	38.33	P	15.79	508.16	-45.4
2412.000000	14471.750000	40	P	16.34	656.15	-43.2
2412.000000	14471.750000	28.83	A	16.34	181.34	-52.3
2442.000000	14652.000000	39.17	P	15.87	564.94	-44.5
2442.000000	14652.000000	29	A	15.87	175.19	-54.7
2462.000000	14772.000000	39.5	P	15.57	566.89	-44.5
2462.000000	14772.000000	29.17	A	15.57	172.58	-54.8
2412.000000	16883.750000	28.67	A	20.29	280.54	-50.6
2412.000000	16883.750000	39.83	P	20.29	1013.91	-39.4
2442.000000	17094.000000	28	A	20.85	277.01	-50.7
2442.000000	17094.000000	36.67	P	20.85	751.62	-42.0
2462.000000	17234.000000	29.17	A	21.01	322.85	-49.3
2462.000000	17234.000000	38.17	P	21.01	909.91	-40.3

(P: Peak reading, A: Average reading)

PAGE NO. 12 of 45.

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 μ V
1 MHz RBW, 1 MHz VBW	=	12 dB μ V
1 MHz RBW, 10 Hz VBW	=	3 dB μ V

Above 2 GHz:

1 MHz RBW, 1 MHz VBW	=	33 dB μ V
1 MHz RBW, 10 Hz VBW	=	22 dB μ V

Sensitivity of system with preamps:

Below 2 GHz:

Preamps are not used in this range.

Above 2 GHz:

Peak	=	3 dB μ V
Average	=	-8 dB μ V

Cable Loss:

915 MHz	=	-0.8 dB μ V
2450 MHz	=	-3 dB μ V

Note:

dB loss vs. frequency included in programmed software.

Reference Level Offset:

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

SUPERVISED BY:



William H. Graff

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NAME OF TEST: Out of Band Emissions
 g9970267: 1999-Jul-07 Wed 15:04:00
 STATE: 2:High Power Upper Restricted Band

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV	CF, dB	uV/m @ 3m	EIRP, dBm	MARGIN dB
2462.000000	2483.480000	23.99	P	43.68	2418.24	-31.9
2462.000000	2483.480000	8.29	A	43.68	396.73	-47.6
2462.000000	2488.600000	7.04	A	43.72	345.14	-48.8
2462.000000	2488.600000	21.81	P	43.72	1890.17	-34.0
2462.000000	2490.100000	23.13	P	43.73	2202.93	-32.7
2462.000000	2490.100000	8.84	A	43.73	425.11	-47.0
2462.000000	2493.600000	21.19	P	43.76	1768.07	-34.6
2462.000000	2493.600000	5.43	A	43.76	288.07	-50.3
2462.000000	2498.600000	4.18	A	43.79	250.32	-51.6
2462.000000	2498.600000	19.77	P	43.79	1506.61	-33.9
2462.000000	2503.600000	18.8	P	43.81	1350.52	-36.0
2462.000000	2503.600000	3.65	A	43.81	236.05	-52.1
2462.000000	2508.600000	2.78	A	43.84	214.29	-52.9
2462.000000	2508.600000	19.82	P	43.84	1524.05	-35.9

(P: Peak reading, A: Average reading)

NAME OF TEST: Out of Band Emissions
 g9970264: 1999-Jul-07 Wed 11:33:00
 STATE: 2:High Power Lower Restricted Band

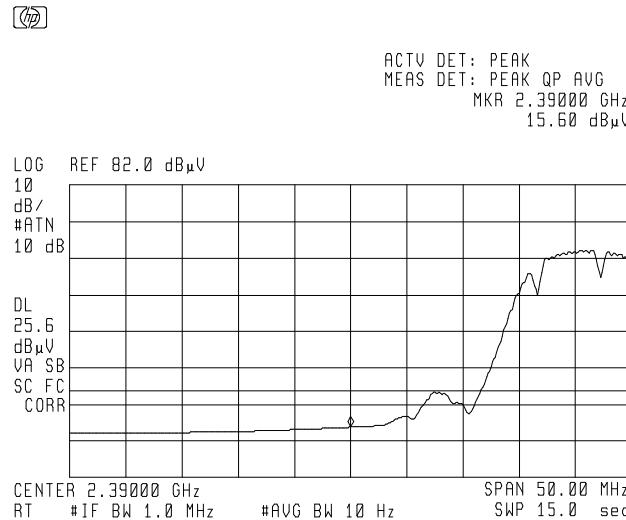
FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV	CF, dB	uV/m @ 3m	EIRP, dBm	MARGIN dB
2412.000000	2365.000000	14.03	A	35.55	301.3	-49.9
2412.000000	2365.000000	25.73	P	35.55	1158.78	-38.2
2412.000000	2370.000000	14.03	A	35.56	301.65	-49.9
2412.000000	2370.000000	26.72	P	35.56	1300.17	-36.2
2412.000000	2375.000000	14.17	A	35.58	307.26	-49.8
2412.000000	2375.000000	26.12	P	35.58	1216.19	-37.8
2412.000000	2380.000000	26.33	P	35.6	1248.82	-37.6
2412.000000	2380.000000	14.4	A	35.6	316.23	-49.5
2412.000000	2385.000000	27.03	P	35.62	1356.75	-36.9
2412.000000	2385.000000	14.84	A	35.62	333.43	-49.1
2412.000000	2390.000000	15.33	A	35.63	353.18	-48.6
2412.000000	2390.000000	27.07	P	35.63	1364.58	-36.8

(P: Peak reading, A: Average reading)

PAGE NO.

14 of 45.

NAME OF TEST: Emissions At Band Edges
g9970263: 1999-Jul-07 Wed 12:00:00
STATE: 0:General Data Rate = 1 MB Per SEC.



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William H. Graff

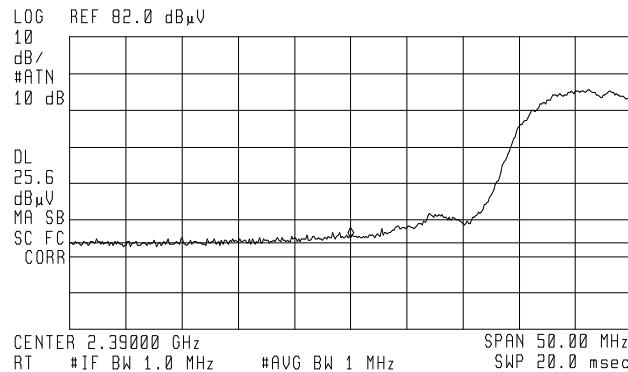
PAGE NO.

15 of 45.

NAME OF TEST: Emissions At Band Edges
g9970262: 1999-Jul-07 Wed 11:58:00
STATE: 0:General Data Rate = 1 MB Per SEC.



ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.39000 GHz
27.07 dB μ V



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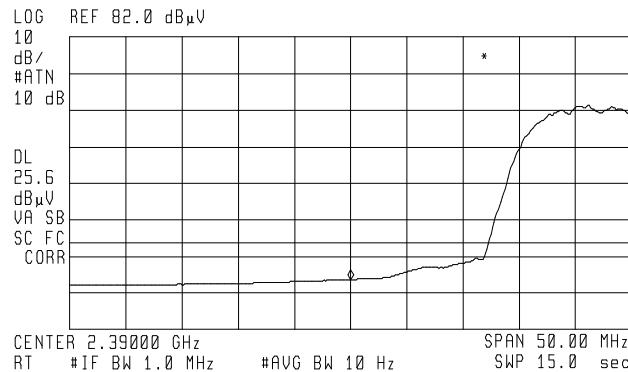
PAGE NO.

16 of 45.

NAME OF TEST: Emissions At Band Edges
 g9970260: 1999-Jul-07 Wed 11:55:00
 STATE: 0:General Data Rate = 2 MB Per SEC.



ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 2.39000 GHz
 15.54 dB μ V



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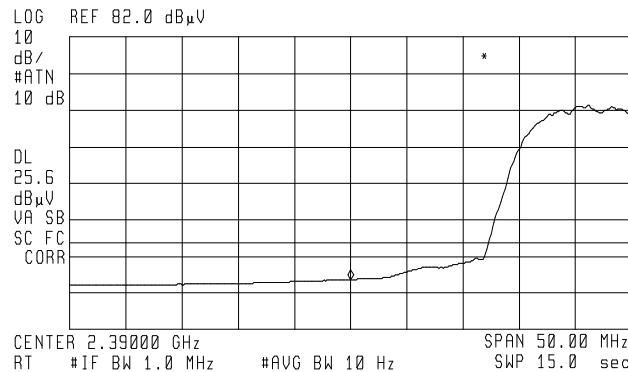
PAGE NO.

17 of 45.

NAME OF TEST: Emissions At Band Edges
 g9970260: 1999-Jul-07 Wed 11:54:00
 STATE: 0:General Data Rate = 2 MB Per SEC.



ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 2.39000 GHz
 15.54 dB μ V



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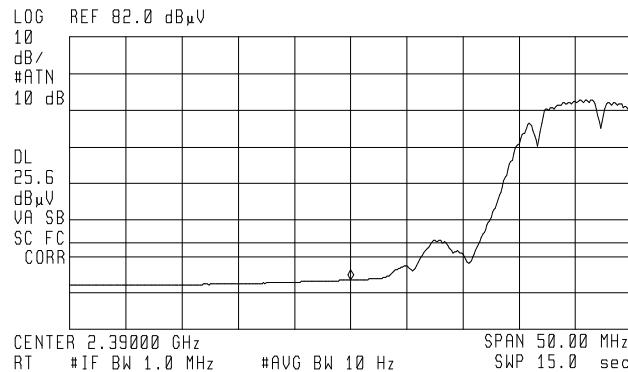
PAGE NO.

18 of 45.

NAME OF TEST: Emissions At Band Edges
 g9970259: 1999-Jul-07 Wed 11:52:00
 STATE: 0:General Data Rate = 5.5 MB Per SEC.



ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 2.39000 GHz
 15.35 dB μ V



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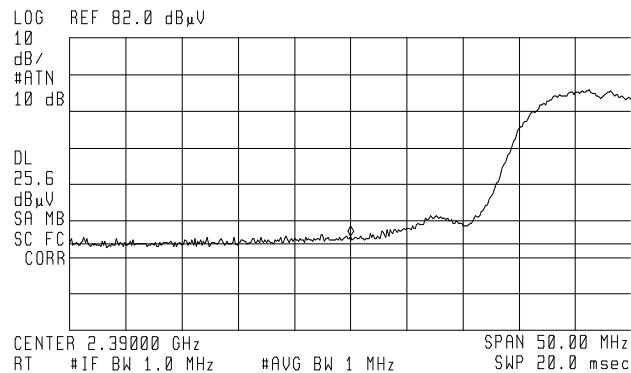
PAGE NO.

19 of 45.

NAME OF TEST: Emissions At Band Edges
 g9970258: 1999-Jul-07 Wed 11:51:00
 STATE: 0:General Data Rate = 5.5 MB Per SEC.

[SP]

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 2.39000 GHz
 27.90 dB μ V



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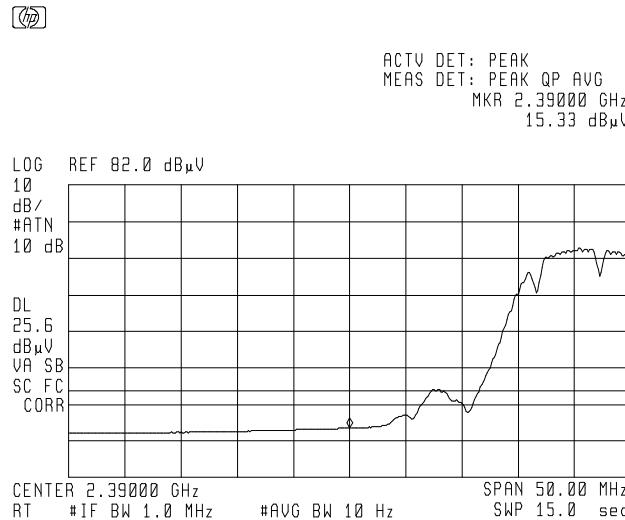


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NAME OF TEST: Emissions At Band Edges
 g9970255: 1999-Jul-07 Wed 11:30:00
 STATE: 0:General Data Rate = 11 MB Per SEC.



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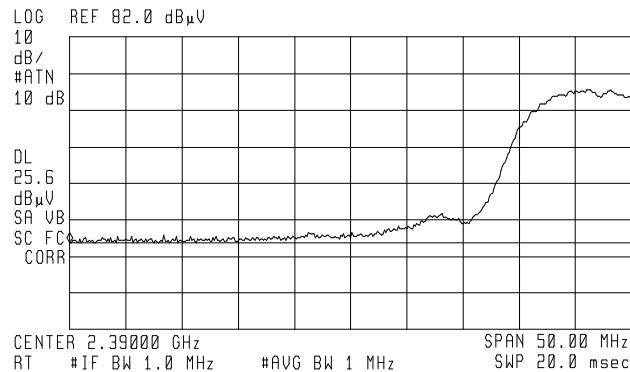
PAGE NO.

21 of 45.

NAME OF TEST: Emissions At Band Edges
 g9970257: 1999-Jul-07 Wed 11:48:00
 STATE: 0:General Data Rate = 11 MB Per SEC.



ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 2.36500 GHz
 25.73 dB μ V



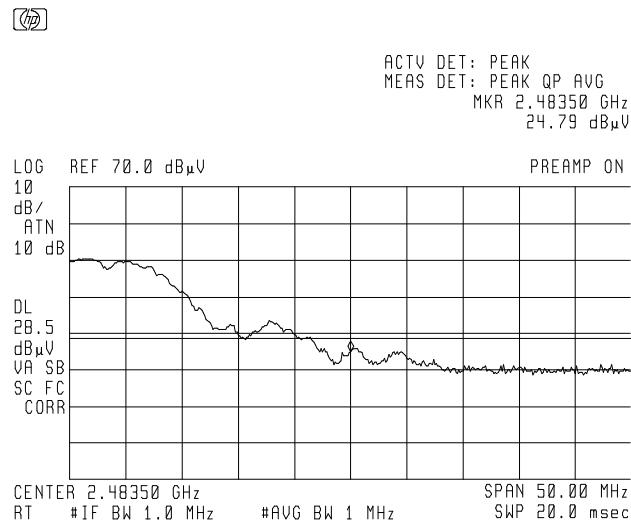
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PAGE NO.

22 of 45.

NAME OF TEST: Emissions At Band Edges
g9970275: 1999-Jul-08 Thu 09:21:00
STATE: 0:General Data Rate = 1 MB Per SEC.



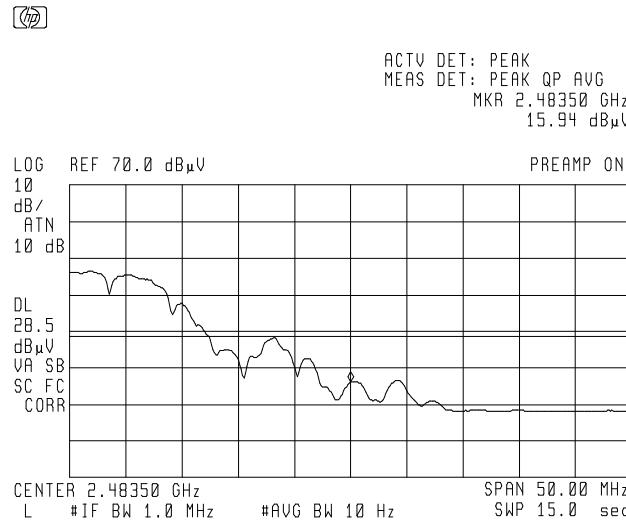
SUPERVISED BY:

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23 of 45.

NAME OF TEST: Emissions At Band Edges
 g9970276: 1999-Jul-08 Thu 09:22:00
 STATE: 0:General Data Rate = 1 MB Per SEC.



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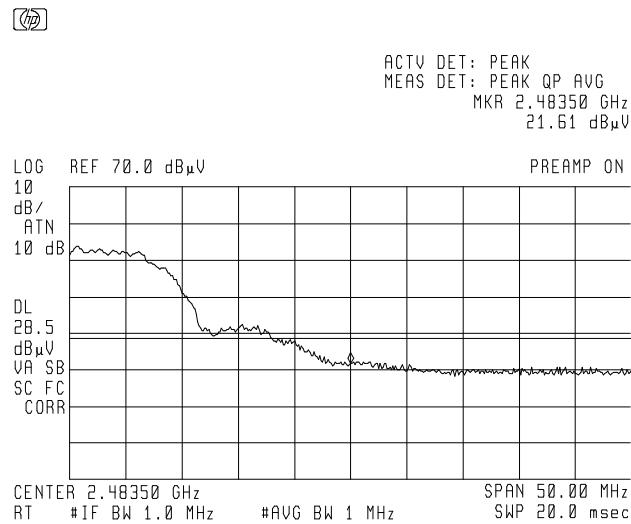


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NAME OF TEST: Emissions At Band Edges
g9970273: 1999-Jul-08 Thu 09:18:00
STATE: 0:General Data Rate = 2 MB Per SEC.



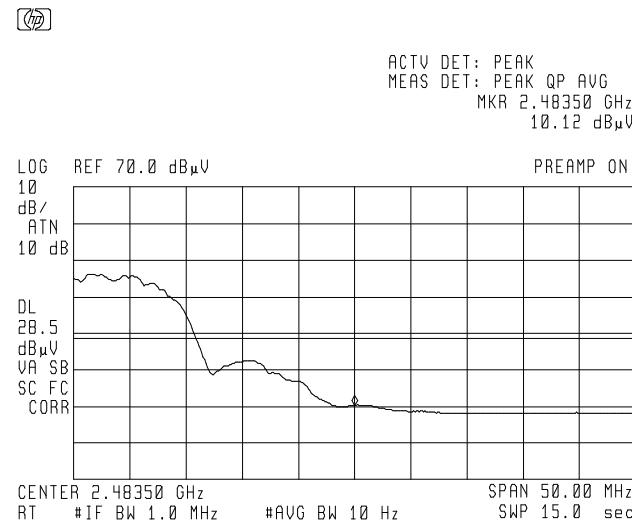
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25 of 45.

NAME OF TEST: Emissions At Band Edges
g9970274: 1999-Jul-08 Thu 09:19:00
STATE: 0:General Data Rate = 2 MB Per SEC.



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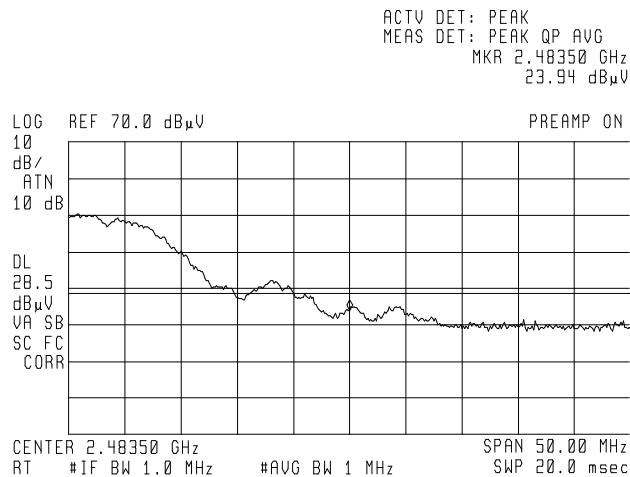
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NAME OF TEST: Emissions At Band Edges
 g9970271: 1999-Jul-08 Thu 09:14:00
 STATE: 0:General Data Rate = 5.5 MB Per SEC.

[WP]



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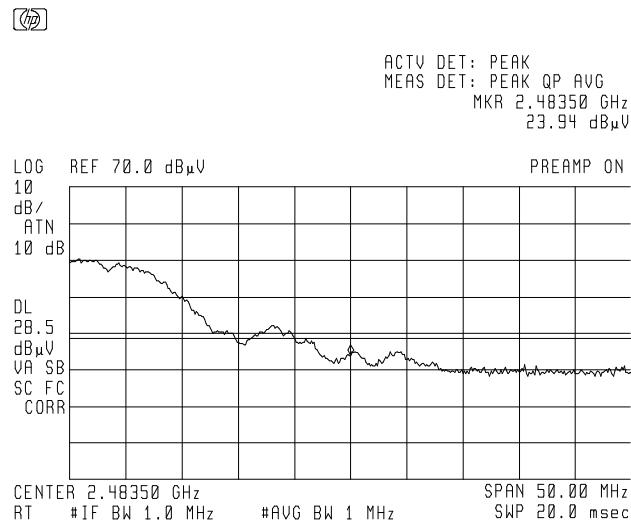


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27 of 45.

NAME OF TEST: Emissions At Band Edges
g9970271: 1999-Jul-08 Thu 09:13:00
STATE: 0:General Data Rate = 5.5 MB Per SEC.



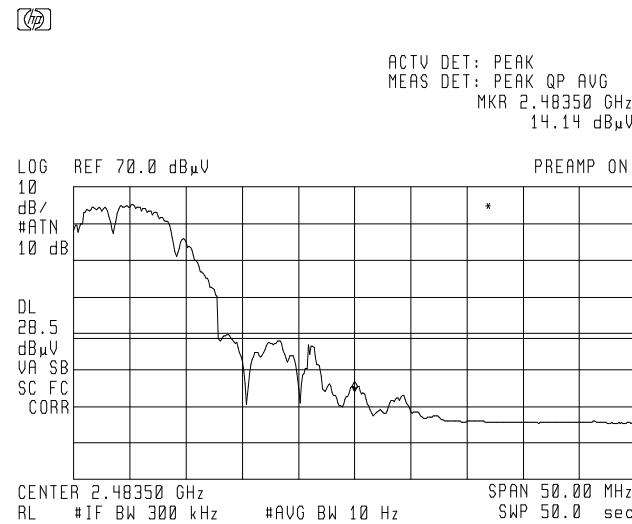
SUPERVISED BY:

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PAGE NO.

28 of 45.

NAME OF TEST: Emissions At Band Edges
g9970281: 1999-Jul-08 Thu 14:31:00
STATE: 0:General Data Rate = 11 MB Per SEC.



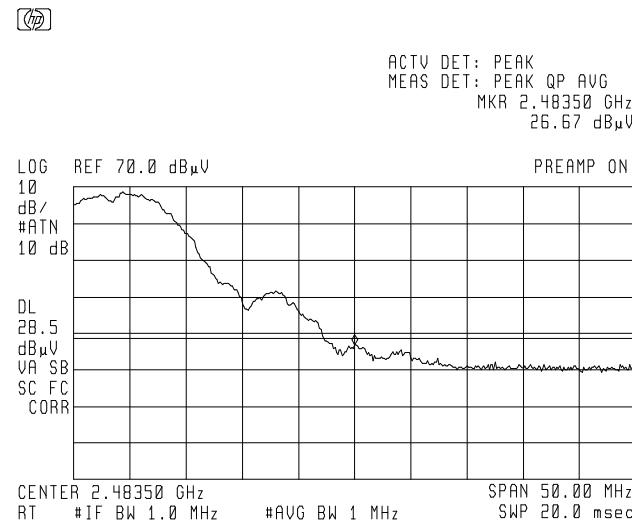
SUPERVISED BY:

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29 of 45.

NAME OF TEST: Emissions At Band Edges
g9970279: 1999-Jul-08 Thu 14:27:00
STATE: 0:General Data Rate = 11 MB Per SEC.



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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 = 500
15.247(a)(1)(ii)	F.H.	2400-2483.5, 5725-5850	20 dB BW = 1000
15.247(a)(2)	D.S.	ALL	6 dB BW = 500

MEASUREMENT DATA

*MEASURED BANDWIDTH = 17.3 MHz

RESULTS = ATTACHED

NOTE: MEASURED BANDWIDTH STAYS APPROXIMATELY CONSTANT OVER ALL DATA RATES

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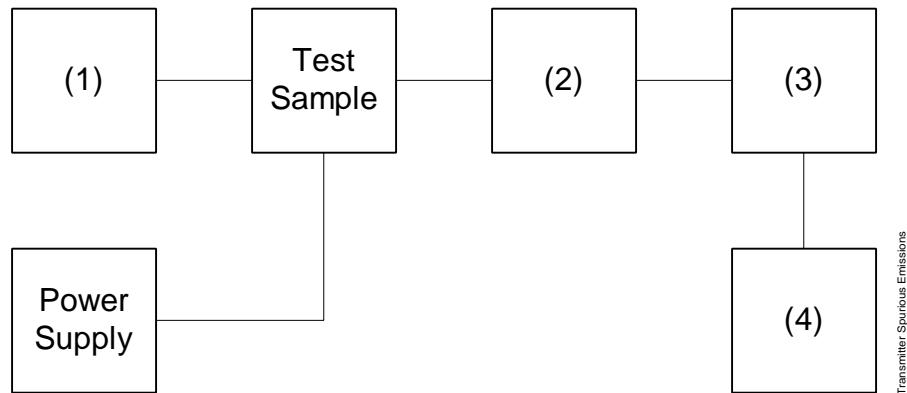
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TRANSMITTER SPURIOUS EMISSION

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

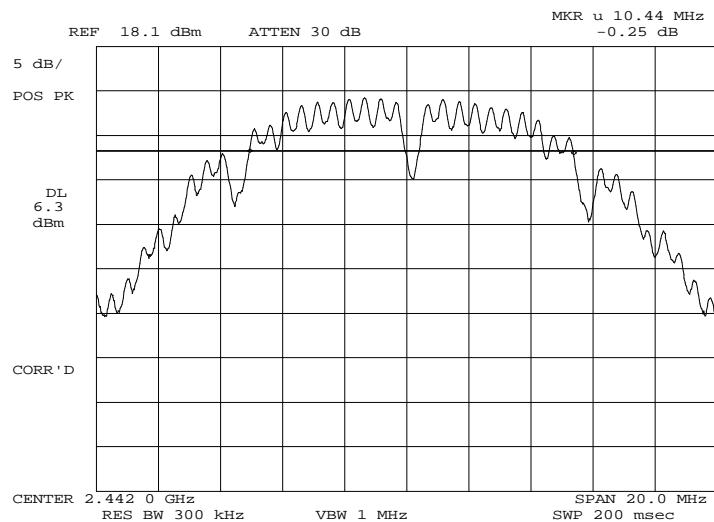


Asset	Description	s/n
(2) COAXIAL ATTENUATOR		
i00122	Narda 766-10	7802
i00123	Narda 766-10	7802A
i00069	Bird 8329 (30 dB)	1006
i00113	Sierra 661A-3D	1059
(3) HIGH PASS FILTER		
x i00	Narda µPAD (In-Band Only)	
x i00	Trilithic (Out-Of-Band Only)	
(4) SPECTRUM ANALYZER		
x i00048	HP 8566B	2511A01467
i00029	HP 8563E	3213A00104

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NAME OF TEST: Emission Masks (Occupied Bandwidth)
g9970287: 1999-Jul-08 Thu 15:34:00
STATE: 2:High Power

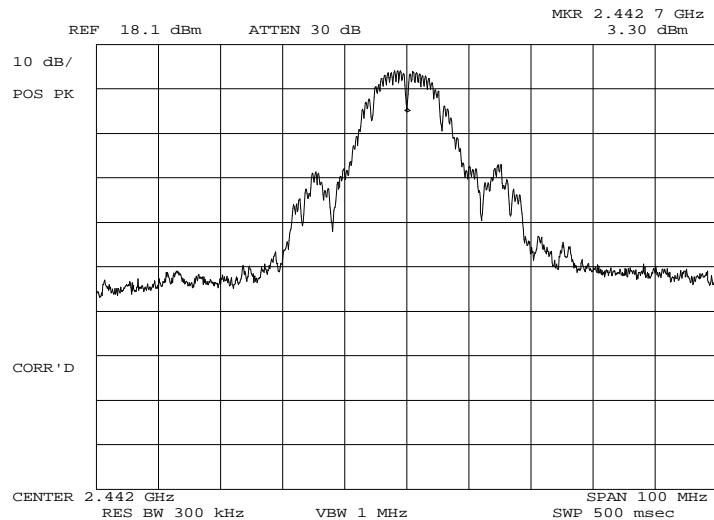


POWER: HIGH
MODULATION: 11 MB/S CCK
6 DB POWER BANDWIDTH

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NAME OF TEST: Emission Masks (Occupied Bandwidth)
g9970288: 1999-Jul-08 Thu 15:37:00
STATE: 2:High Power

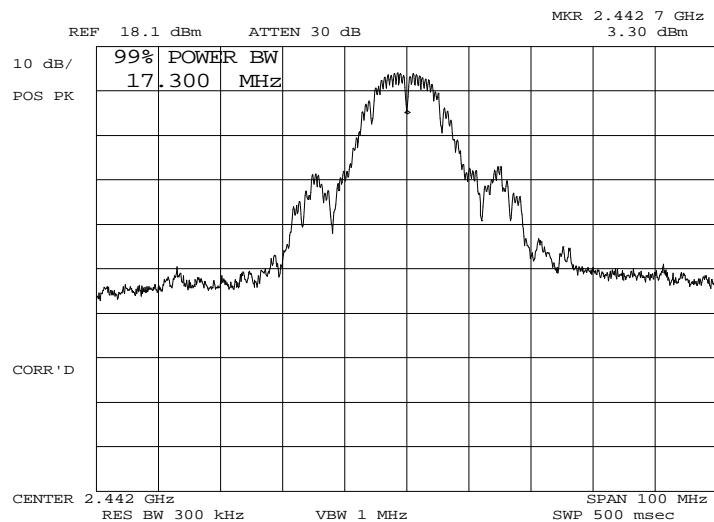


POWER: HIGH
MODULATION: 11 MB/S CCK

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NAME OF TEST: Emission Masks (Occupied Bandwidth)
g9970289: 1999-Jul-08 Thu 15:38:00
STATE: 2:High Power

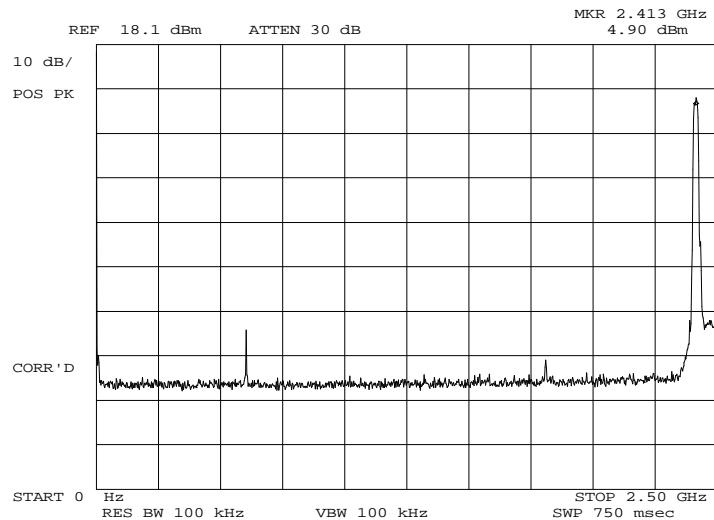


POWER: HIGH
MODULATION: 11 MB/S CCK
99% POWER BANDWIDTH

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NAME OF TEST: Emission Masks (Occupied Bandwidth)
g9970291: 1999-Jul-10 Sat 08:34:00
STATE: 2:High Power



POWER:

HIGH

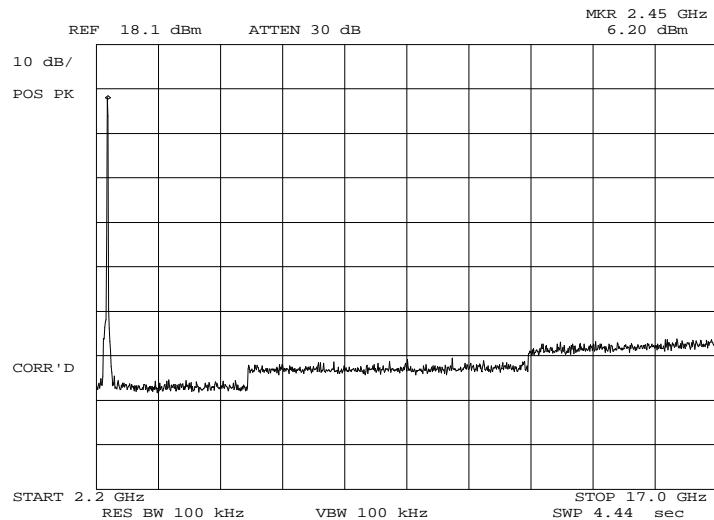
MODULATION:

11 MB/S CCK
15.247 (C)

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NAME OF TEST: Emission Masks (Occupied Bandwidth)
g9970292: 1999-Jul-10 Sat 08:37:00
STATE: 2:High Power



POWER:

HIGH

MODULATION:

11 MB/S CCK
15.247 (C)

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NAME OF TEST:Spread Spectrum Technology
Direct Sequence Systems15.247(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 = -8.7 dB
See attached data page

15.247(e) Processing Gain

LIMIT: The processing gain shall be = 10 dB

RESULTS: See Applicant's statement

Processing Gain, dB	1 MB/sec = 11.0 db
	2 MB/sec = 11.1 db
	5.5 MB/sec = 10.4 db
	11 MB/sec = 10.7

Pseudorandom Sequence Description

RESULTS: See Applicant's statement

Chip Rate

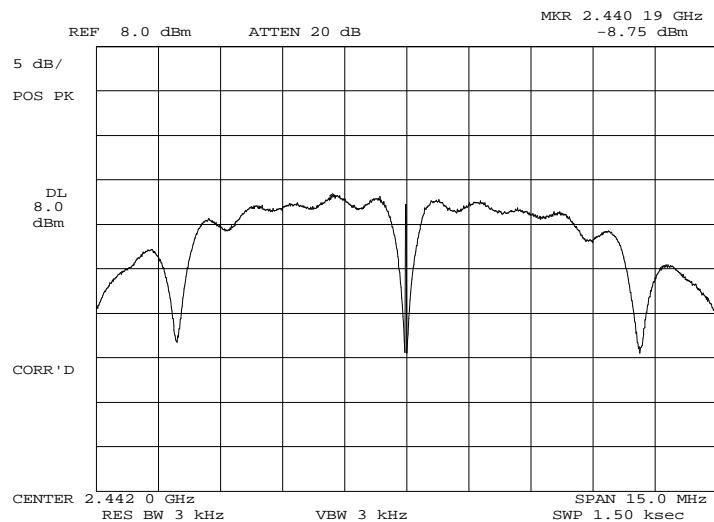
RESULTS: See Applicant's statement

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NAME OF TEST: Emission Masks (Occupied Bandwidth)
g9970286: 1999-Jul-08 Thu 15:31:00
STATE: 2:High Power WORST CASE OF ALL DATA RATES



POWER: HIGH
MODULATION: 11 MB/S CCK
SPECTRAL POWER DENSITY

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NAME OF TEST: A/C Powerline Conducted Emissions

SPECIFICATION: FCC: 47 CFR 15.207

TEST CONDITIONS: S. T. & H.

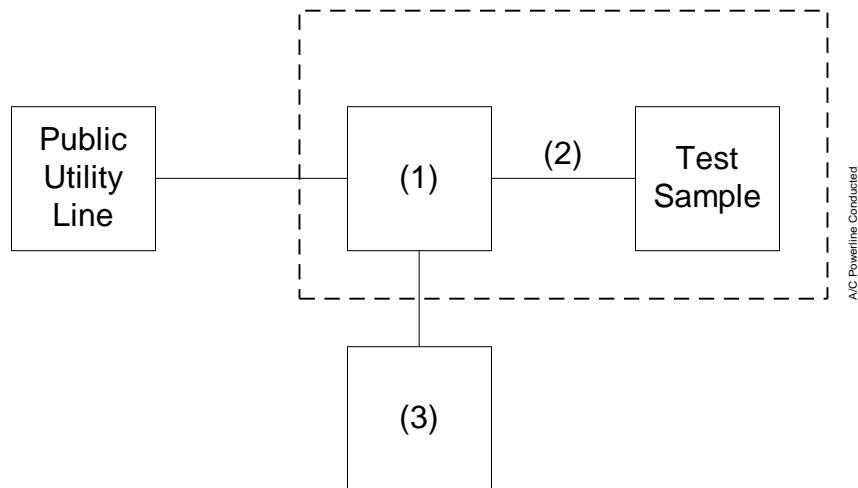
TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

1. A test sample was connected to the Public Utility lines through a LISN Ailtech Model 94641-1 (50 μ H).
2. A reference level of 250 μ V was set on the Spectrum Analyzer. The spectrum was searched over the range of 450 kHz to 30 MHz.
3. All other emissions were 20 dB or more below limit.
4. The test sample used a charger.
x The test sample does not use a charger.
*Equipment tested in PCMCIA port of host laptop computer.
5. Measurement Results: Attached.

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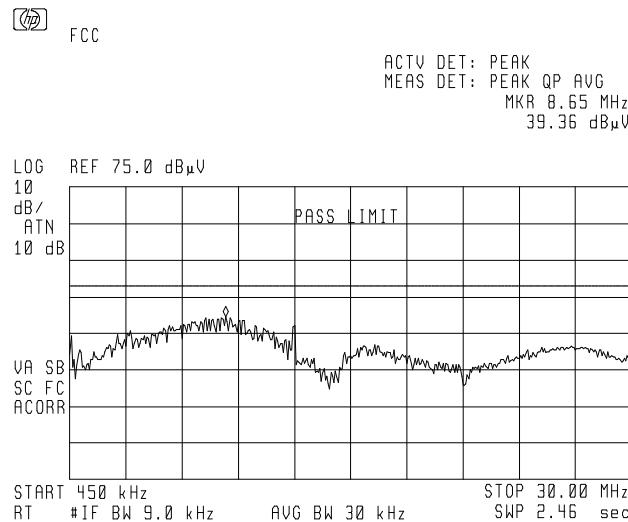
AC POWERLINE CONDUCTED MEASUREMENTS

Asset	Description	s/n	Cycle	Last Cal
Per ANSI C63.4-1992, 10.1.4				
(1) LINE IMPEDANCE STABILIZATION NETWORK				
i00077	Singer 91221-1 (5 μ H)	0396	12 mo.	
i00155	Eaton 94641-1 (50 μ H)	178	12 mo.	Sep-98
x i00167	Ailtech 94641-1 (50 μ H)	0103	12 mo.	
(2) SCREEN ROOM				
x i00169	Lindgren 22-2/2-0	3861	N/A	none
i00170	Lindgren LG170	4999		
(3) SPECTRUM ANALYZER				
i00029	HP 8563E	3213A00104	12 mo.	
i00033	HP 85462A	3625A00357	12 mo.	Dec-98
x i00048	HP 8566B	2511AD1467	6 mo.	Mar-99

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NAME OF TEST: A/C Powerline Conducted Emissions
 g9970282: 1999-Jul-08 Thu 15:54:00
 STATE: 0:General



NEUTRAL SIDE, UNGROUNDED

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PAGE NO.

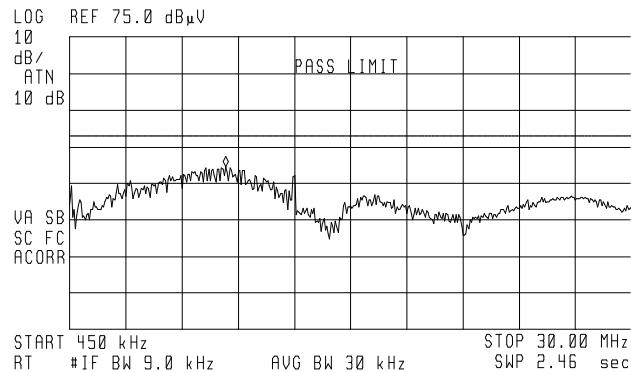
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NAME OF TEST: A/C Powerline Conducted Emissions
 g9970282: 1999-Jul-08 Thu 15:54:00
 STATE: 0:General



FCC

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 8.65 MHz
 39.36 dB μ V



LINE SIDE, UNGROUNDED

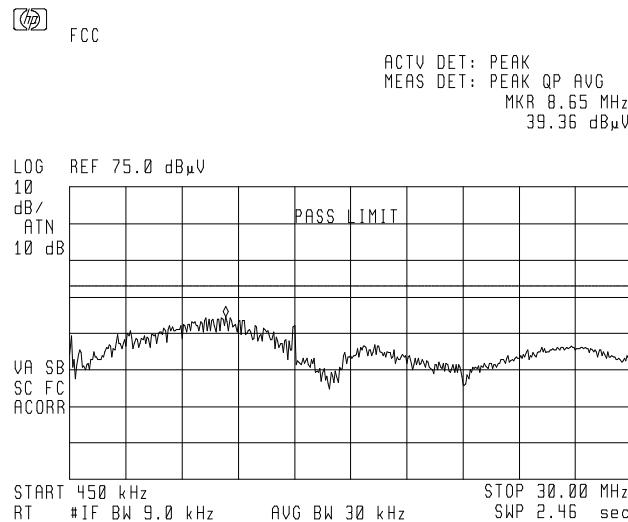
SUPERVISED BY:

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NAME OF TEST: A/C Powerline Conducted Emissions
 g9970282: 1999-Jul-08 Thu 15:54:00
 STATE: 0:General



NEUTRAL SIDE, GROUNDED

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PAGE NO.

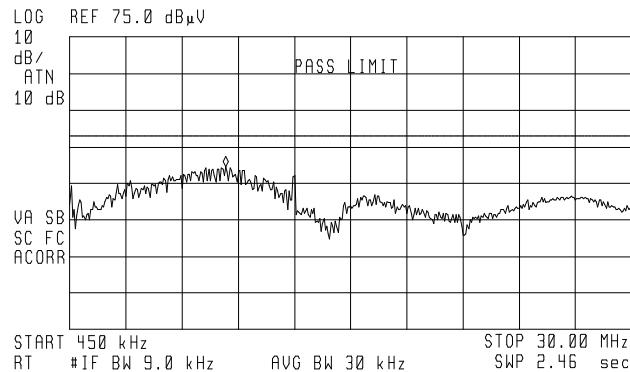
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NAME OF TEST: A/C Powerline Conducted Emissions
 g9970282: 1999-Jul-08 Thu 15:54:00
 STATE: 0:General



FCC

ACTV DET: PEAK
 MEAS DET: PEAK QP AVG
 MKR 8.65 MHz
 39.36 dB μ V



LINE SIDE, GROUNDED

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William H. Graff

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NAME OF TEST: Maximum Permissible Exposure

SPECIFICATION: FCC: 47 CFR 1.1310

TEST CONDITIONS: S. T. & H.

SPEC. LIMIT: = 1.6 mW/cm²

GUIDE: IEEE C95.1-1991
IEEE Standard for Safety Levels with respect to
Human Exposure to Radio Frequency
Electromagnetic Field, 3 kHz to 300 GHz.

Ref: Reference Data for Radio Engineers, Fifth Ed., p. 25-7

$$P = P_t / 4\pi R^2$$

Where P = Power Density (in W/m²) at a distance R
 P_t = Power radiated by an isotropic radiator (Watts)
 P_t = (Transmitter Power)%(Duty Cycle)%(Antenna Gain)
 R = Distance of measurement from source (meters)

ARRANGM' T	POWER Watts	DUTY CYCLE (FACTOR)	ANTENNA GAIN (FACTOR)	P_t w	P w/m	P mw/cm ²
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RADIATED MEASUREMENTS
FOR PART 15 TRANSMITTERS W/ INTEGRAL ANTENNAS

Radiated Measurements

RANGE OF MEASUREMENT	SPECIFICATION	RESOLUTION B/W	VIDEO B/A
30 to 1000 MHz	CISPR	=100 kHz	=100 kHz
>1000 MHz (if averaging)	FCC, 15.37(b)	1 MHz	=1 MHz
	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

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.

§ 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:



William H. Graff