MFA **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

Environmental Assessment

for

Mobiles

for

FCC ID: FCC ID: FRW2000-UHF2
Model:P2000-UHF2

to

Federal Communications Commission

47 Cfr 1.1310 (MPE)
Radiofrequency Radiation Exposure Limits

Date Of Report: September 30, 2003

On the Behalf of the Applicant:

Wulfsberg Electronics Division

At the Request of: P.O. Part of 13188

Wulfsberg Electronics Division
6400 Wilkinson Drive
Prescott, AZ 86301-6164

Attention of: Main: (928) 708-1550; Fax: (928) 541-7627
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Supervised By: Morton Flom, P. Eng.

Table of Contents

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

a) **Test Report (Supplemental)**

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: d0390097

d) Client: Wulfsberg Electronics Division
6400 Wilkinson Drive
Prescott, AZ 86301-6164

e) Identification: P2000-UHF2
FCC ID: FRW2000-UHF2
Description: UHF 450-512MHz Transceiver

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

g) Report Date: September 30, 2003
EUT Received: August 11, 2003

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.

Identification of the Equipment Under Test (EUT)

Name and Address of Applicant:

Wulfsberg Electronics Division
6400 Wilkinson Drive
Prescott, AZ 86301-6164

Manufacturer:

Applicant

FCC ID:	FRW2000-UHF2
Model Number:	P2000-UHF2
Description:	UHF 450-512MHz Transceiver
Type of Emission:	16K0F3E, 11K0F3E, 8K10F1E, 8K10F1D, 20K0F1E
Frequency Range, MHz:	450 to 512
Power Rating, Watts:	1 to 10
x Switchable ____ Variable ____ N/A	
Modulation:	____ AMPS ____ TDMA ____ CDMA x OTHER
Antenna:	____ Helical ____ Monopole ____ Whip x Other

Note: For RF Safety test antenna gain taken at the upper range of expected gain (i.e. 0 dBd) and RF Power set to highest nominal power across all channels.

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

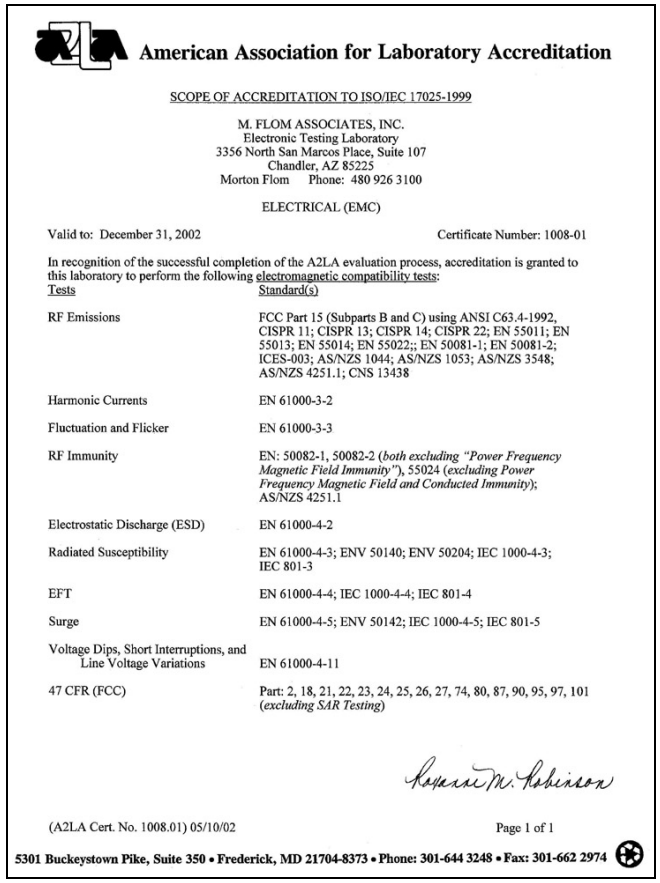
Electrical (EMC) Testing

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 17025 - 1999 "General Requirements for the Competence of Testing and Calibration Laboratories" and any additional program requirements in the identified field of testing. Testing and calibration laboratories that comply with this International Standard also operate in accordance with ISO 9001 or ISO 9002.

Presented this 2nd day of March, 2001.

President
For the Accreditation Council
Certificate Number 1008.01
Valid to December 31, 2002

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 17025-1999

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, 2002 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; ICES-003; AS/NZS 1044; AS/NZS 1053; AS/NZS 3548; AS/NZS 4251.1; CNS 13438
Harmonic Currents	EN 61000-3-2
Fluctuation and Flicker	EN 61000-3-3
RF Immunity	EN: 50082-1, 50082-2 (*both excluding "Power Frequency Magnetic Field Immunity"*), 55024 (*excluding Power Frequency Magnetic Field and Conducted Immunity*); AS/NZS 4251.1
Electrostatic Discharge (ESD)	EN 61000-4-2
Radiated Susceptibility	EN 61000-4-3; ENV 50140; ENV 50204; IEC 1000-4-3; IEC 801-3
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
Voltage Dips, Short Interruptions, and Line Voltage Variations	EN 61000-4-11
47 CFR (FCC)	Part: 2, 18, 21, 22, 23, 24, 25, 26, 27, 74, 80, 87, 90, 95, 97, 101 (*excluding SAR Testing*)

(A2LA Cert. No. 1008.01) 05/10/02 Page 1 of 1

5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8373 • 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.

Standard Test Conditions
and
Engineering Practices

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

In accordance with ANSI C63.4-1992/2000, 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.

Page Number	5 of 13.
Name of Test:	Environmental Assessment
Specification:	FCC: 47 CFR 1.1310
Measurement Guide:	ANSI/IEEE C95.1 1992
Test Equipment:	Maximum Permissible Exposure (MPE) measurement system, consisting of: Narda 8717-1174R, Radiation meter Narda 8761D, E-field probe (300 kHz – 3 GHz) (Calibrated Nov-98)
Measurement Procedure:	1. The following measurements were performed with a Narda probe using ANSI/IEEE C95.1 as a guide. 2. Prior to making any measurements, the measurements system was calibrated in accordance with the manufacturer's procedures. 3. The EUT's radiating element (antenna) was placed on a 1 m tall table for ease of testing. For equipment normally operated on a metal surface, a ground plane was used. 4. The remaining equipment necessary to operate the EUT was maintained at a distance from the measurement arrangement suitable to minimize interference with the measurements. 5. The minimum safe distance was calculated from the formula Power Density = EIRP / $4\pi R^2$ (Peak Watts/m^2). The calculation is shown with the measurement data. 6. With the EUT operating at maximum power, a search was initiated for worst case emissions with the probe raised and lowered over a range of 0.2 to 2 meters in height and over a horizontal plane of 0^o to 360^o. 7. Average values were calculated for the whole body (0.2-2.0m), lower body (0.2-0.8m) and upper body (1.0-2.0m).
Results:	Attached.

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Name of Test: R.F. Radiation Exposure

FCC Rules: 1.1307, 1.1310, 1.1311, 2.1091
Description, EUT: See page 2 of Test Report

Equipment under test: P2000-UHF2
Frequencies tested, MHz 450.025 485.025 511.975
Antenna Gain = 3 dB
Antenna Model AT-462 (Manufactured by Comant)

Instruments Narda 8717-1174R, Radiation Meter
Narda 8760B, E-field probe (300 kHz – 1 GHz)
Narda 8761D, E-field probe (300 kHz – 3 GHz)

Limits: Uncontrolled Exposure 47 CFR 1.1310 Table 1, (B)	0.3-1.234 MHz:	Limit [mW/cm^2] = 100
	1.34-30 MHz:	Limit [mW/cm^2] = ($180/f^2$)
	30-300 MHz:	Limit [mW/cm^2] = 0.2
	300-1500 MHz	Limit [mW/cm^2] = f/1500
	1500-100,000 MHz:	Limit [mW/cm^2] = 1.0

Power, Conducted, W = 10 W
Power + Ant. Gain, W = 10 W, 50% Duty Cycle
Limita: Uncontrolled Exposure = 0.300 mW/cm^2 0.323 mW/cm^2 0.341 mW/cm^2

Results at tested distance

	Power Density, mW/cm^2		
Probe Height, m	Freq. 450 MHz Distance 26 cm	Freq. 485 MHz Distance 25 cm	Freq. 512 MHz Distance 24 cm
2.0	0.057	0.053	0.054
1.8	0.143	0.142	0.135
1.6	0.148	0.145	0.143
1.4	0.212	0.214	0.206
1.2	0.213	0.213	0.217
1.0	0.185	0.177	0.190
0.8	0.116	0.114	0.111
0.6	0.081	0.080	0.082
0.4	0.065	0.060	0.063
0.2	0.057	0.058	0.059

Power Density Calculations: The measured power density readings were summed and the results divided by the number of readings to calculate the average.

	450 MHz	485 MHz	512 MHz
Whole body average (0.2 – 2.0 m, mW/cm^2) =	0.1277	0.1256	0.126
Lower body average (0.2 - 0.8 m, mW/cm^2) =	0.07972	0.078	0.07875
Upper body average (1.0 - 2.0 m, mW/cm^2) =	0.15967	0.15733	0.1575

Performed By: David Lee

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Test Setup: Maximum Permissible Exposure (MPE)

State: UHF2

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Name of Test: R.F. Radiation Exposure

FCC Rules: 1.1307, 1.1310, 1.1311, 2.1091
Description, EUT: See page 2 of Test Report

Equipment under test: P2000-UHF1 with P2000-UHF2
Frequencies tested, MHz 155.025 485.025
Antenna Gain = 3 dB + 3 dB nominal
Antenna Models AT-462 (Manufactured by Comant)

Instruments Narda 8717-1174R, Radiation Meter
Narda 8760B, E-field probe (300 kHz – 1 GHz)
Narda 8761D, E-field probe (300 kHz – 3 GHz)

Limits: Uncontrolled Exposure 47 CFR 1.1310 Table 1, (B)	0.3-1.234 MHz:	Limit [mW/cm^2] = 100
	1.34-30 MHz:	Limit [mW/cm^2] = ($180/f^2$)
	30-300 MHz:	Limit [mW/cm^2] = 0.2
	300-1500 MHz	Limit [mW/cm^2] = f/1500
	1500-100,000 MHz:	Limit [mW/cm^2] = 1.0

Power, Conducted, W = 10 W + 10 W
Power + Ant. Gain, W = 10 W + 10 W, 50% Duty Cycle
Limit: Uncontrolled Exposure = 0.291 and 0.323 mW/cm^2

Results at tested distance

Power Density, mW/cm^2

Probe Height, m	Freq. 437 MHz Distance 100 cm	Freq. 485 MHz Distance 100 cm	Both Frequencies Distance 100 cm
2.0	0.165	0.113	0.236
1.8	0.223	0.158	0.346
1.6	0.242	0.158	0.359
1.4	0.161	0.156	0.274
1.2	0.164	0.193	0.314
1.0	0.163	0.168	0.257
0.8	0.082	0.119	0.153
0.6	0.083	0.118	0.153
0.4	0.151	0.128	0.223
0.2	0.089	0.086	0.128

Power Density Calculations: The measured power density readings were summed and the results divided by the number of readings to calculate the average.

	437 MHz	485 MHz	Both
Whole body average (0.2 – 2.0 m, mW/cm^2) =	0.1523	0.1397	0.2443
Lower body average (0.2 - 0.8 m, mW/cm^2) =	0.10125	0.11275	0.16425
Upper body average (1.0 - 2.0 m, mW/cm^2) =	0.18633	0.15767	0.29767

Performed By: David Lee

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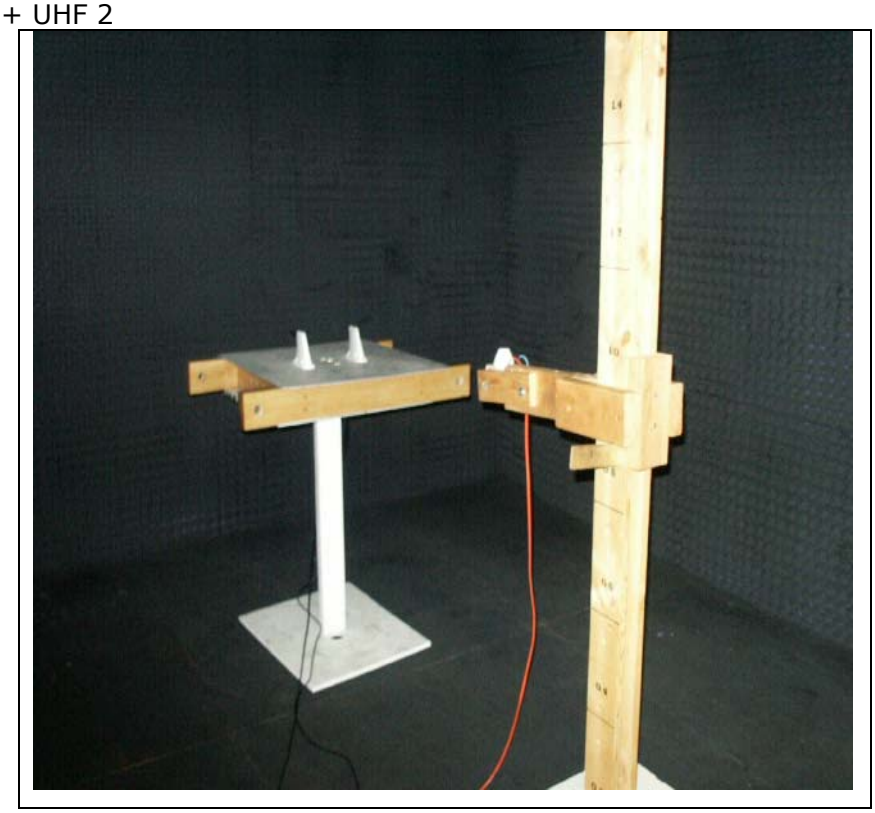
Test Setup: Maximum Permissible Exposure (MPE)

State: UHF1 + UHF 2



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Name of Test: R.F. Radiation Exposure

FCC Rules: 1.1307, 1.1310, 1.1311, 2.1091
Description, EUT: See page 2 of Test Report

Equipment under test: P2000-VHF with P2000-UHF2
Frequencies tested, MHz 155.025 485.025
Antenna Gain = 0 dB + 3 dB nominal
Antenna Model AT-695 and AT-462 (Manufactured by Comant)

Instruments Narda 8717-1174R, Radiation Meter
Narda 8760B, E-field probe (300 kHz – 1 GHz)
Narda 8761D, E-field probe (300 kHz – 3 GHz)

Limits: Uncontrolled Exposure 47 CFR 1.1310 Table 1, (B)	0.3-1.234 MHz:	Limit [mW/cm^2] = 100
	1.34-30 MHz:	Limit [mW/cm^2] = ($180/f^2$)
	30-300 MHz:	Limit [mW/cm^2] = 0.2
	300-1500 MHz	Limit [mW/cm^2] = f/1500
	1500-100,000 MHz:	Limit [mW/cm^2] = 1.0

Power, Conducted, W = 10 W + 10 W
Power + Ant. Gain, W = 5 W + 10 W, 50% Duty Cycle
Limit: Uncontrolled Exposure = 0.200 and 0.323 mW/cm^2

Results at tested distance

	Power Density, mW/cm^2		
Probe Height, m	Freq. 155 MHz Distance 100 cm	Freq. 485 MHz Distance 100 cm	Both Frequencies Distance 100 cm
2.0	0.126	0.182	0.241
1.8	0.116	0.243	0.301
1.6	0.094	0.236	0.272
1.4	0.070	0.223	0.242
1.2	0.070	0.283	0.299
1.0	0.084	0.204	0.239
0.8	0.094	0.181	0.223
0.6	0.102	0.173	0.220
0.4	0.105	0.186	0.235
0.2	0.105	0.108	0.153

Power Density Calculations: The measured power density readings were summed and the results divided by the number of readings to calculate the average.

	155 MHz	485 MHz	Both
Whole body average (0.2 – 2.0 m, mW/cm^2) =	0.0966	0.2019	0.2425
Lower body average (0.2 - 0.8 m, mW/cm^2) =	0.1015	0.162	0.20775
Upper body average (1.0 - 2.0 m, mW/cm^2) =	0.0933	0.2285	0.265667

Performed By: David Lee

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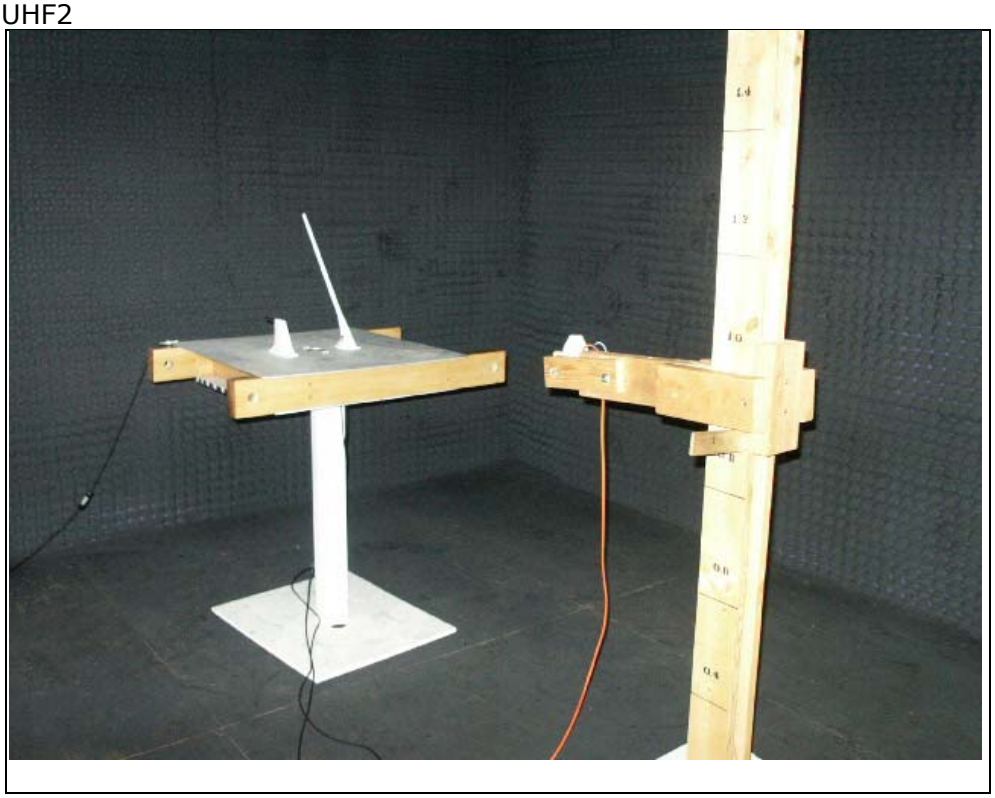
Test Setup: Maximum Permissible Exposure (MPE)

State: VHF + UHF2



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Name of Test: R.F. Radiation Exposure

FCC Rules: 1.1307, 1.1310, 1.1311, 2.1091
Description, EUT: See page 2 of Test Report

Equipment under test: P2000-UHF2 with P2000-800
Frequencies tested, MHz 485.025 837.025
Antenna Gain = 3 dB + 3 dB nominal
Antenna Model AT-462 and CI 310 (Manufactured by Comant)

Equipment under test: P2000-VHF with P2000-UHF1
Instruments Narda 8717-1174R, Radiation Meter
Narda 8760B, E-field probe (300 kHz – 1 GHz)
Narda 8761D, E-field probe (300 kHz – 3 GHz)

Limits: Uncontrolled Exposure 47 CFR 1.1310 Table 1, (B)	0.3-1.234 MHz:	Limit [mW/cm^2] = 100
	1.34-30 MHz:	Limit [mW/cm^2] = ($180/f^2$)
	30-300 MHz:	Limit [mW/cm^2] = 0.2
	300-1500 MHz	Limit [mW/cm^2] = f/1500
	1500-100,000 MHz:	Limit [mW/cm^2] = 1.0

Power, Conducted, W = 10 W + 5 W
Power + Ant. Gain, W = 10 W + 5 W, 50% Duty Cycle
Limits: Uncontrolled Exposure = 0.323 and 0.558 mW/cm^2

Results at tested distance

Probe Height, m	**Power Density, mW/cm^2** Freq. 485 MHz Distance 80 cm	Freq. 837 MHz Distance 80 cm	Both Frequencies Distance 80 cm
2.0	0.178	0.146	0.264
1.8	0.227	0.153	0.316
1.6	0.136	0.112	0.197
1.4	0.150	0.144	0.239
1.2	0.148	0.203	0.278
1.0	0.140	0.172	0.252
0.8	0.112	0.173	0.217
0.6	0.094	0.110	0.143
0.4	0.114	0.071	0.143
0.2	0.089	0.067	0.117

Power Density Calculations: The measured power density readings were summed and the results divided by the number of readings to calculate the average.

	485 MHz	837 MHz	Both
Whole body average (0.2 – 2.0 m, mW/cm^2) =	0.1388	0.1351	0.2166
Lower body average (0.2 - 0.8 m, mW/cm^2) =	0.10225	0.10525	0.155
Upper body average (1.0 - 2.0 m, mW/cm^2) =	0.136167	0.155	0.25767

Performed By: David Lee

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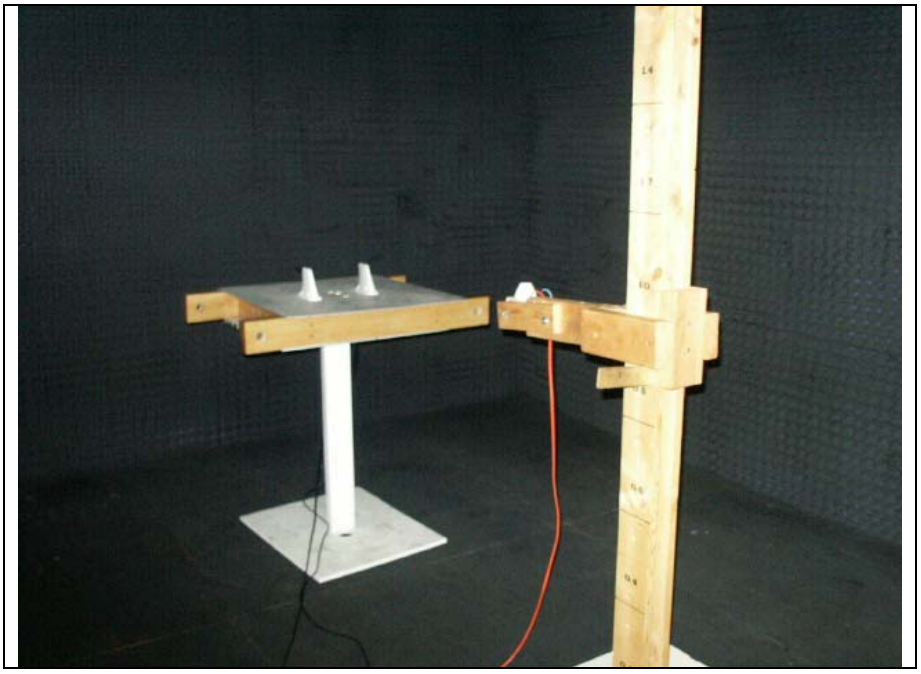
Test Setup: Maximum Permissible Exposure (MPE)

State: UHF2 + 800



(The following will be placed in the Instruction Manual)

Mandatory Safety Instructions to Installers & Users

Use only manufacturer or dealer supplied antenna.

Antenna Minimum Safe Distance: ≥ 100 cm**.**

Antenna Gain: 3 dBd referenced to a dipole.

The Federal Communications Commission has adopted a safety standard for human exposure to RF (Radio Frequency) energy which is below the OSHA (Occupational Safety and Health Act) limits.

Antenna Mounting: The antenna supplied by the manufacturer or radio dealer must not be mounted at a location such that during radio transmission, any person or persons can come closer than the above indicated minimum safe distance to the antenna i.e. ≥ 100 cm.

To comply with current FCC RF Exposure limits, the antenna must be installed at or exceeding the minimum safe distance shown above, and in accordance with the requirements of the antenna manufacturer or supplier.

Base Station Installation: The antenna should be fixed-mounted on an outdoor permanent structure. RF Exposure compliance must be addressed at the time of installation.

Antenna Substitution: Do not substitute any antenna for the one supplied or recommended by the manufacturer or radio dealer. You may be exposing person or persons to excess radio frequency radiation. You may contact your radio dealer or the manufacturer for further instructions.

Warning: Maintain a separation distance from the antenna to a person(s) of ≥ 100 cm.

You, as the qualified end-user of this radio device must control the exposure conditions of bystanders to ensure the minimum separation distance (above) is maintained between the antenna and nearby persons for satisfying RF Exposure compliance. The operation of this transmitter must satisfy the requirements of Occupational/Controlled Exposure Environment, for work-related use. Transmit only when person(s) are at least the minimum distance from the properly installed, externally mounted antenna.

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.