

**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: January 11, 2000

Mailing: Novatel Wireless Technologies Ltd.  
6715 - 8th St., N.E., Suite 200  
Calgary, AB T2E 7H7 Canada

Attention of: (403) 295-4813; FAX: -4801, -4888  
Sherry Smilar, Engineering Manager  
ssmilar@novatelwireless.com

Equipment: VIKING NRM-3800  
FCC ID: NBZNRM-3800  
P.O. Number: NWC 00486  
FCC Rules: 22.901(d), Confidentiality

Gentlemen:

Enclosed please find your copy of the Supplemental Test Data Report, the whole for Environmental Assessment (MPE) of the referenced equipment as shown.

Please allow from 6-8 weeks to hear from the Commission, who may request additional data or information, and even a sample for pre-grant audit testing.

Should you need any clarification, just fax or phone. Thank you again for this order - it has been a pleasure to be of service.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'William H. Graff', written in a cursive style.

William H. Graff, Director  
of Engineering

enclosure(s)  
WHG/cvr

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Date: January 11, 2000

Federal Communications Commission  
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: Novatel Wireless Technologies Ltd.  
Equipment: VIKING NRM-3800  
FCC ID: NBZNRM-3800  
FCC Rules: 22.901(d), Confidentiality  
and 47 CFR 1.1307, Environmental Assesment

Gentlemen:

On behalf of the Applicant, enclosed please find the Supplemental Test Data Report, the whole for Environmental Assessment (MPE) of the referenced equipment as shown.

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,



William H. Graff, Director  
of Engineering

enclosure(s)  
cc: Applicant  
WHG/cvr

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Sub-part  
1.1307:

SUPPLEMENTAL REPORT

ENVIRONMENTAL ASSESSMENT

General Population / Uncontrolled Exposure,  
Maximum Permissible Exposure  
and Specific Absorption Rate

EQUIPMENT IDENTIFICATION

Novatel Wireless Technologies Ltd.  
FCC ID: NBZNRM-3800

DATE OF REPORT

January 11, 2000

SUPERVISED BY:




William H. Graff, Director  
of Engineering

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*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: d0010023
- d) Client: Novatel Wireless Technologies Ltd.  
6715 - 8th St., N.E., Suite 200  
Calgary, AB T2E 7H7 Canada
- e) Identification: VIKING NRM-3800  
FCC ID: NBZNRM-3800  
Description: UHF-FM Mobile CDPD Data Transceiver
- f) EUT Condition: Not required unless specified in individual tests.
- g) Report Date: January 11, 2000  
EUT Received: January 3, 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:   
William H. Graff, Director  
of Engineering
- 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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IDENTIFICATION OF THE EQUIPMENT UNDER TEST (EUT)

NAME AND ADDRESS OF APPLICANT:

Novatel Wireless Technologies Ltd.  
 6715 - 8th St., N.E., Suite 200  
 Calgary, AB T2E 7H7 Canada

MANUFACTURER:

Applicant

FCC ID: NBZNRM-3800

MODEL NO: VIKING NRM-3800

DESCRIPTION: UHF-FM Mobile CDPD Data Transceiver

TYPE OF EMISSION: 30K0DXW

FREQUENCY RANGE, MHz: 824 to 849

POWER RATING, Watts: 3  
 \_\_\_ Switchable \_\_\_ x Variable \_\_\_ N/A

MODULATION:  
 \_\_\_ AMPS  
 \_\_\_ TDMA  
 \_\_\_ CDMA  
 \_\_\_ x OTHER

ANTENNA:  
 \_\_\_ HELICAL  
 \_\_\_ x MONOPOLE  
 \_\_\_ OTHER

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



*Peter Almy*  
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

*Peter Almy*

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 covered by this laboratory's A2LA accreditation.

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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: 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  $\text{Power Density} = \text{EIRP} / 4\pi R^2$  (Peak Watts/m<sup>2</sup>). 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° to 360°.
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.

PAGE NO. 6 of 8.  
Name of test: Environmental Assessment

Tested Distance: = 0.3 m (11.8 in.)

Rated Probe Power Density: Narda 8761D Probe = 10  $\mu\text{W}/\text{cm}^2$  to 20  $\text{mW}/\text{cm}^2$   
 Error Margin: Narda 8717 Meter = 1%

EUT Description: See Page 2.  
 Power<sub>[W ERP]</sub> = 3  
 Test Frequency, MHz = 824.04  
 Ant. Model As shipped  
 Ant. Gain<sub>[dBi]</sub> = 2.15  
 Power<sub>[W EIRP]</sub> =  $P_{[W ERP]} \times 10^{(2.15/10)}$ , Watts EIRP = 6.2

MPE Limit <sub>[mW/cm<sup>2</sup>]</sub> = f/1500 (formula for test frequency)  
 MPE Limit <sub>[mW/cm<sup>2</sup>]</sub> = 0.549 (calculated result)  
 MPE Limit <sub>[W/m<sup>2</sup>]</sub> = 5.49 (final units)

Theoretical safe distance:  $R_{[m]} = [(P_{[W EIRP]}) / (4\pi \times \text{Limit}_{[W/m^2]})]^{1/2}$   
 $R_{[m]} = 0.3$   
 $R_{[inches]} = 11.8$

Results: at tested distance	Probe Height, m	Power Density, mW/cm <sup>2</sup>
	2.0	0.32
	1.8	0.23
	1.6	0.19
	1.4	0.42
	1.2	0.52
	1.0	0.70
	0.8	0.45
	0.6	0.30
	0.4	0.21
	0.2	0.16

Calculations: The measured power density readings were summed and the results divided by the number of readings to calculate the average.  
 For whole body: Average of 0.2 to 2.0 m,  $\text{mW}/\text{cm}^2 = 0.350$   
 For lower body: Average of 0.2 to 0.8 m,  $\text{mW}/\text{cm}^2 = 0.280$   
 For upper body: Average of 1.0 to 2.0 m,  $\text{mW}/\text{cm}^2 = 0.397$

SUPERVISED BY:   
 William H. Graff, Director  
 of Engineering

PAGE NO. 7 of 8.  
Name of test: Environmental Assessment

Tested Distance: = 0.267 m (10.5 in.)

Rated Probe Power Density: Narda 8761D Probe = 10  $\mu\text{W}/\text{cm}^2$  to 20  $\text{mW}/\text{cm}^2$   
 Error Margin: Narda 8717 Meter = 1%

EUT Description: See Page 2.  
 Power<sub>[W ERP]</sub> = 3  
 Test Frequency, MHz = 836.4  
 Ant. Model As shipped  
 Ant. Gain<sub>[dBi]</sub> = 2.15  
 Power<sub>[W EIRP]</sub> =  $P_{[W ERP]} \times 10^{(2.15/10)}$ , Watts EIRP = 5.01

MPE Limit <sub>[mW/cm<sup>2</sup>]</sub> = f/1500 (formula for test frequency)  
 MPE Limit <sub>[mW/cm<sup>2</sup>]</sub> = 0.558 (calculated result)  
 MPE Limit <sub>[W/m<sup>2</sup>]</sub> = 5.58 (final units)

Theoretical safe distance:  $R_{[m]} = [(P_{[W EIRP]}) / (4\pi \times \text{Limit}_{[W/m^2]})]^{1/2}$   
 $R_{[m]} = 0.267$   
 $R_{[inches]} = 10.5$

Results: at tested distance	Probe Height, m	Power Density, mW/cm <sup>2</sup>
	2.0	0.30
	1.8	0.19
	1.6	0.27
	1.4	0.38
	1.2	0.48
	1.0	0.68
	0.8	0.29
	0.6	0.17
	0.4	0.24
	0.2	0.20

Calculations: The measured power density readings were summed and the results divided by the number of readings to calculate the average.  
 For whole body: Average of 0.2 to 2.0 m,  $\text{mW}/\text{cm}^2 = 0.321$   
 For lower body: Average of 0.2 to 0.8 m,  $\text{mW}/\text{cm}^2 = 0.225$   
 For upper body: Average of 1.0 to 2.0 m,  $\text{mW}/\text{cm}^2 = 0.385$

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 William H. Graff, Director  
 of Engineering

PAGE NO. 8 of 8.

Name of test: Environmental Assessment

Tested Distance: = 0.298 m (11.7 in.)

Rated Probe Power Density: Narda 8761D Probe = 10  $\mu\text{W}/\text{cm}^2$  to 20  $\text{mW}/\text{cm}^2$

Error Margin: Narda 8717 Meter = 1%

EUT Description: See Page 2.

Power<sub>[W ERP]</sub> = 3

Test Frequency, MHz = 848.97

Ant. Model As shipped

Ant. Gain<sub>[dBi]</sub> = 2.15

Power<sub>[W EIRP]</sub> =  $P_{[W ERP]} \times 10^{(2.15/10)}$ , Watts EIRP = 6.31

MPE Limit <sub>[mW/cm<sup>2</sup>]</sub> = f/1500 (formula for test frequency)

MPE Limit <sub>[mW/cm<sup>2</sup>]</sub> = 0.566 (calculated result)

MPE Limit <sub>[W/m<sup>2</sup>]</sub> = 5.66 (final units)

Theoretical safe distance:  $R_{[m]} = [(P_{[W EIRP]}) / (4\pi \times \text{Limit}_{[W/m^2]})]^{1/2}$

$R_{[m]} = 0.298$

$R_{[inches]} = 11.7$

Results:  
at tested distance

Probe Height, m	Power Density, mW/cm <sup>2</sup>
2.0	0.15
1.8	0.19
1.6	0.26
1.4	0.21
1.2	0.44
1.0	0.57
0.8	0.48
0.6	0.37
0.4	0.28
0.2	0.13

Calculations:

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

For whole body: Average of 0.2 to 2.0 m,  $\text{mW}/\text{cm}^2 = 0.308$

For lower body: Average of 0.2 to 0.8 m,  $\text{mW}/\text{cm}^2 = 0.315$

For upper body: Average of 1.0 to 2.0 m,  $\text{mW}/\text{cm}^2 = 0.303$

SUPERVISED BY:



William H. Graff, Director  
of Engineering

Addendum:

(THE FOLLOWING WILL BE PLACED IN INSTRUCTION MANUAL)

INSTRUCTIONS TO INSTALLERS & USERS

Minimum Safe Distance: 0.267 m (10.5 in.)

Antenna Mounting

Antenna as supplied by manufacturer must not be mounted at a location such that any person or persons can come closer than the above-indicated minimum safe distance to the antenna...i.e. 0.267 m (10.5 in.)

To comply with FCC RF Exposure Limits, antenna must be installed @ or exceeding minimum safe distance shown above. Antenna can be mounted on fenders, roof, trunk or other location, PROVIDED that the minimum safe distance is observed.

Antenna

Substitution

Do not substitute any antenna for the one supplied by manufacturer. You may be exposing person(s) to harmful radiation. Contact supplier or manufacturer for further instructions.

WARNING:

**MAINTAIN SEPARATION DISTANCE FROM ANTENNA OF 0.267 m.**

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, Director  
of Engineering