

## Exhibit 2

### Wireless CDPD Modem

### **Minstrel V**

**FCC ID: NBZNRM-6832**

### **RF Power Output Measurements (ERP) Report (With test Set-up Photographs)**



# **Assessment of Compliance**

for

**Measurement of Effective Radiated Power (ERP) in  
accordance with the FCC Rules & Regulations Part 2.1046**

## **Wireless CDPD Modem Minstrel V**

**Novatel Wireless Technologies Ltd.**



February 2000

NVWB-MINSTREL V - 3379

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## Engineering Report

**Subject:** Measurement of Effective Radiated Power (ERP) in accordance with the FCC Rules & Regulations Part 2.1046

**FCC ID:** NBZNRM-6832

**Equipment:** Wireless CDPD Modem Minstrel V

**Model:** Minstrel V

**Client:** Novatel Wireless Technologies Ltd.,  
Suite 200  
6715-8<sup>th</sup> Street, N.E.  
Calgary, Alberta  
Canada, T2E 7H7

**Project #:** NVWB-MINSTREL V-3379

**Prepared By:** APREL Laboratories,  
Regulatory Compliance Division

**Approved by:**  **Date:** March 6, 2000  
**Jay Sarkar**  
Director, Standards & Certification

**Released by:**  **Date:** March 6, 2000  
**Dr. Jack J. Wojcik, P.Eng.**



"SOLUTIONS FOR THE WIRELESS FUTURE"

FCC ID: NBZNRM-6832  
Applicant: Novatel Wireless Technologies Ltd.  
Equipment: Wireless CDPD Modem  
Model: Minstrel V  
Standard: FCC Rules and Regulations Part 2.1046

## ENGINEERING SUMMARY

This report contains the results of the effective radiated power (ERP) measurement performed on an Novatel Wireless Technologies Ltd. Wireless CDPD Modem, Minstrel V. The measurements were carried out in accordance with the FCC Rules and Regulations Part 2.1046. The product was evaluated for ERP when it was set at the maximum power level.

The DUI was tested for ERP at high, middle, and low frequencies with the maximum ERP obtained at channel (No. 991) with the frequency being 824.00 MHz.. The test data is presented in this report under the section :Test Results.

### Summary of the Results

| Test Description                                     | Page No. | Test Set-up Figure No. | Results Summary |
|------------------------------------------------------|----------|------------------------|-----------------|
| RF Power Output as Radiated<br>Ref. Paragraph 2.1046 | 8        | 1                      | <b>Passed</b>   |

## INTRODUCTION

### General

This report describes the results of the effective radiated power (ERP) measurement conducted on an Novatel Wireless Technologies Ltd. Wireless CDPD Modem, model Minstrel V.

### Test Facility

The tests were performed for Novatel Wireless Technologies Ltd. by APREL Laboratories at APREL's EMI facility located in Nepean, Ontario, Canada. The laboratory operates an (3m and 10m) Open Area Test Site (OATS). The measurement facility is calibrated in accordance with ANSI C63.4-1992.

A description of the measurement facility in accordance with the radiated and AC line conducted test site criteria per ANSI C63.4-1992 is on file with the Federal Communications Commission and is in compliance with the requirements of Section 2.948 of the Commissions rules and regulations.

***APREL's registration number is 31040/SIT (1300F2)***

APREL is accredited by Standard Council of Canada, under PALCAN program (ISO Guide 25). APREL is also accredited by Industry Canada (formerly DOC) and recognised by the Federal Communications Commissions (FCC).

### Standard

The evaluation and analysis were conducted in accordance with FCC Rules and Regulations Parts 2.1046 and the appropriate limits.

### Test Equipment

The test equipment used during the evaluation is listed in Appendix A with calibration due dates.

### Environmental Conditions

Measurements were conducted in open area test site.

- Temperature: 10 °C ± 2
- Relative Humidity: 30 - 50 %
- Air Pressure: 101 kPa ± 3

## FCC SUBMISSION INFORMATION

**FCC ID:** NBZNRM-6832

**Equipment:** Wireless CDPD Modem

**Model:** Minstrel V

**For:** Certification

**Applicant:** Novatel Wireless Technologies Ltd.  
Suite 200  
6715-8<sup>th</sup> Street, N.E.  
Calgary, Alberta  
Canada, T2E 7H7

**Manufacturer:** Novatel Wireless Technologies Ltd.  
Suite 200  
6715-8<sup>th</sup> Street, N.E.  
Calgary, Alberta  
Canada, T2E 7H7

**Evaluated by:** APREL Laboratories  
51 Spectrum Way  
Nepean, Ontario  
Canada K2R 1E6

## MANUFACTURER'S DATA

**FCC ID No:** NBZNRM-6832

**Equipment Type:** Wireless CDPD Modem

**Model:** Minstrel V

**Reference:** FCC Rules and Regulations Parts 2 and Part 22

**Manufacturer:** Novatel Wireless Technologies Ltd.

**Power Source:** DC Battery

**Development Stage of Unit:** Production

## GENERAL SPECIFICATIONS

1. Frequency Range: 824 to 849 MHz (Transmitter)
2. Rated Transmitted Output Power: 600 mW
3. Frequency Tolerance: 2.5 ppm
4. Type of Modulation: GMSK
5. Emission Designators(See 47 CFR § 2.201 and §2.202) 28K8FXW
6. Antenna Impedance: 50 Ohms

## CHANNELS TESTED

|         |          |             |
|---------|----------|-------------|
| Channel | 991 (Lo) | 824.000 MHz |
| Channel | 383 (M)  | 836.490 MHz |
| Channel | 799 (M)  | 849.000 MHz |

**TEST RESULTS**

**FOR**

**Effective Radiated Power (ERP)**

**of**

**Wireless CDPD Modem**

**Minstrel V**

**Novatel Wireless Technologies Ltd.**

**Test:** RF Power Output as Radiated (ERP)

**Ref.:** FCC Part 2 paragraph 2.1046

**Criteria:** N/A

**Set-up:** See Figure No. 1.

**Equipment:** See Appendix A.

**Procedure:** RF Power Measurement by Radiated Method (ERP):

Test site: The radiated RF power measurement was taken at APREL Laboratory's open area test site (OATS). This open area test site is calibrated to ANSI C63.4 document and a description of the measurement facility is on file with the Federal Communications Commission and is in compliance with the requirement of Section 2.948 of the Commissions rules and regulations.(FCC File No.: 31040/SIT)

The test was set-up as illustrated in Fig.1. The Wireless CDPD Modem Minstrel V was configured to operate at maximum power with carrier **unmodulated**. The equipment under test was placed on a turntable positioned 3 m away from the calibrated receiving antenna, which in turn was connected to the spectrum analyzer.

For each transmitter frequency, the received signal was **maximised** by rotating the turntable and adjusting the height of the receiving antenna. To obtain the actual ERP, the Wireless CDPD Modem Minstrel V was replaced by a vertically polarised half-wave dipole antenna fed by an RF power amplifier and signal generator. The center of the dipole antenna was placed in the same location as the Wireless CDPD Modem Minstrel V. The signal generator level was adjusted until the reading on the spectrum analyzer was identical to that obtained when the Wireless CDPD Modem Minstrel V was on the turntable. The output of power amplifier was disconnected from the substitute dipole and connected to an RF power meter. **The effective radiated power was read directly from the power meter.**

**The process was repeated for two more channels.**

**Results:** See Table 1

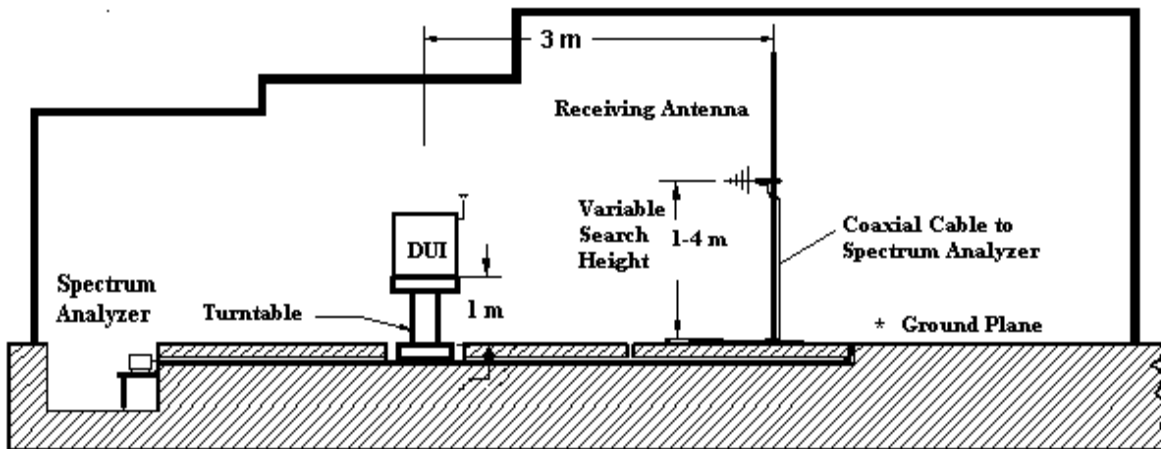


Figure 1.a Test set up for the Radiated Power (ERP) Measurement in OATS (not to scale)



Fig. 1.b APREL's OATS (Open Area Test Site)

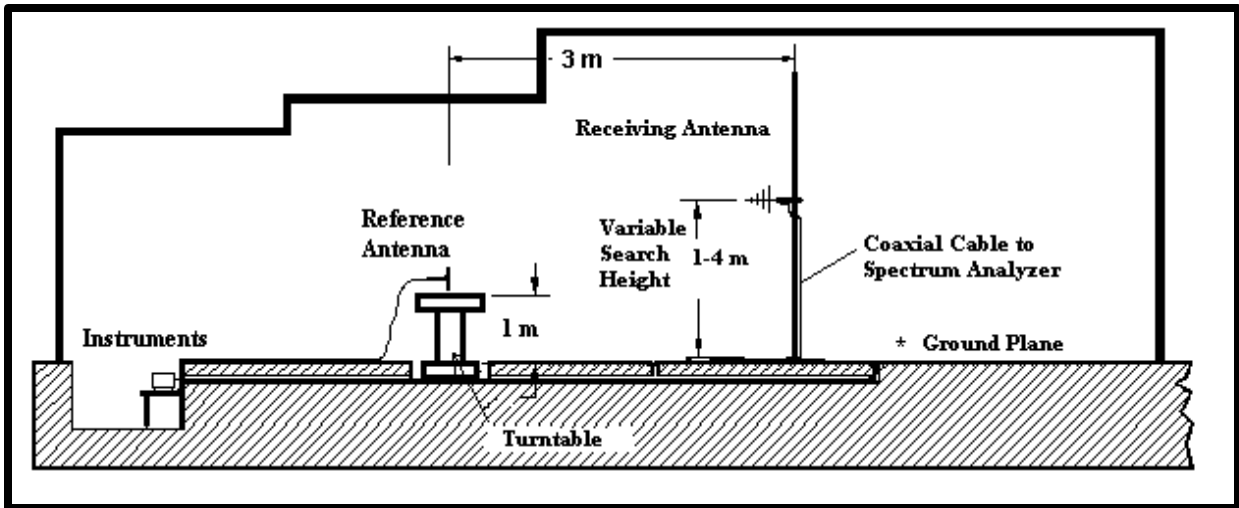


Figure 1.c Test set up for the Radiated Power (ERP) Measurement in OATS (not to scale)  
The Handheld wireless modem is replaced by Reference Dipole Antenna.

**Table 1.**  
**RF Output Power Measurement**  
**ERP**  
**Power Level : 0**

| Channel No. | Nominal Transmit Frequency | Manufacturer's Rated Output Power | Measured Output Power (ERP)<br>(power level: 0) | (ERP)<br>(power level: 0) |
|-------------|----------------------------|-----------------------------------|-------------------------------------------------|---------------------------|
|             | (MHz)                      | (W)                               | (dBm)                                           | (W)                       |
| 991         | 824.000                    | 0.6                               | 28.3                                            | 0.676                     |
| 383         | 836.490                    | 0.6                               | 27.6                                            | 0.575                     |
| 799         | 849.000                    | 0.6                               | 28.0                                            | 0.631                     |

## **APPENDIX A**

### **List of Test Equipment**

### List of Equipment

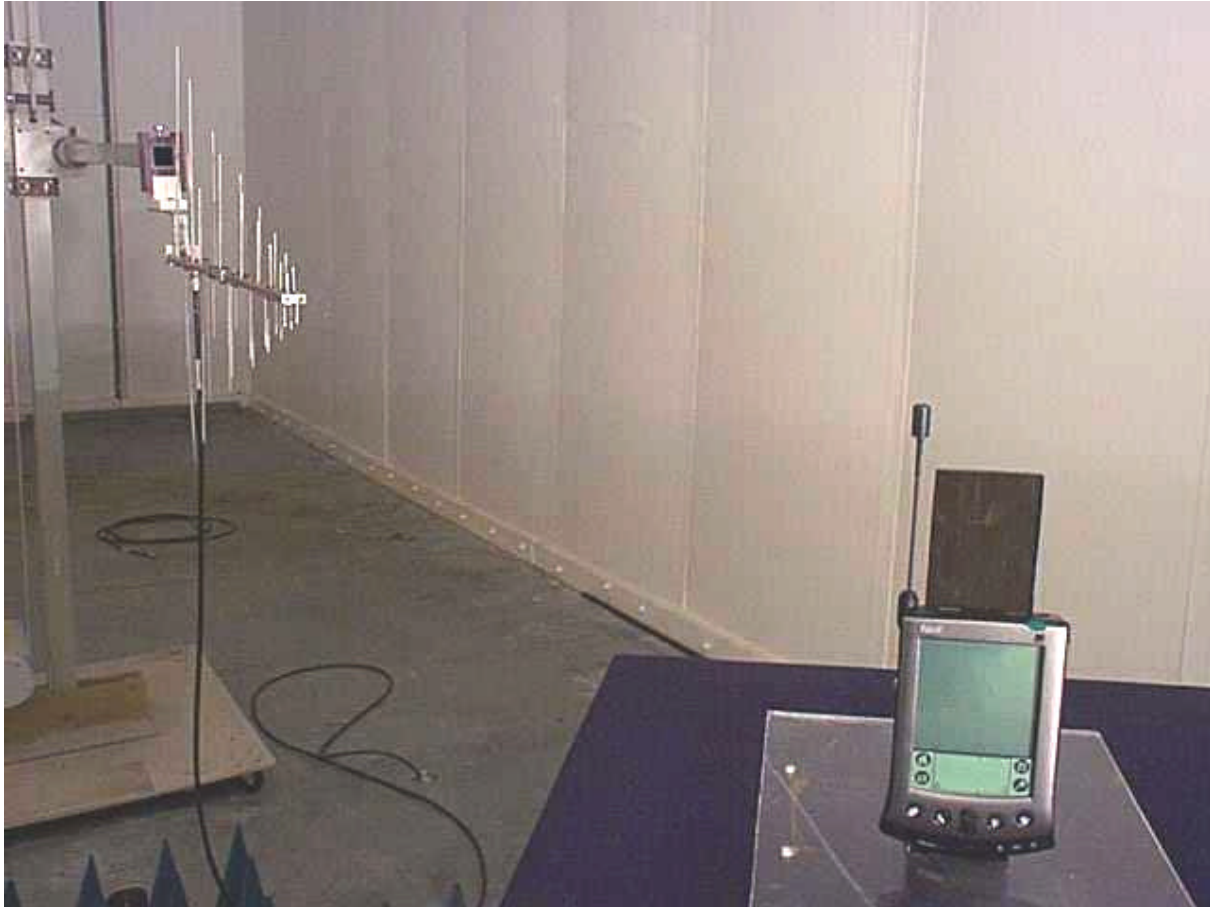
| Description                                  | Manufacturer       | Model #    | Asset # | Cal .<br>Due Data |
|----------------------------------------------|--------------------|------------|---------|-------------------|
| Spectrum Analyzer                            | Anritsu            | MS2661C    | 301330  | Dec 10, 2000      |
| 20 dB Attenuator                             | Narda              | 4779-20    | 301370  | May 18, 2000      |
| Signal Generator                             | Hewlett-Packard    | HP 8662A   | 100456  | Nov 1, 2000       |
| RF Power Amplifier                           | Amplifier Research | 25W100M    | 100735  | Sep 16, 2000      |
| Substitute Reference Dipole                  | APREL Inc.         | D-8355     | N/A     | June 16, 2000     |
| Log-Periodic Antenna                         | APREL Inc.         | ALP-1      | 100761  | July 21, 2000     |
| Turntable with Controller                    | EMCO               | 1060-1.241 | 100506  | CNR               |
| Computer Controlled Antenna<br>Position Mast | EMCO               | 1051-12    | 100507  | CNR               |
| OATS                                         | APREL Inc.         | 3m & 10m   | N/A     | N/A               |

## **APPENDIX B**

### **Photographs**



**Novatel Minstrel V**



### ERP measurement in OATS



**Substitute Reference Dipole Antenna Used for ERP Measurement**