FCC ID: PQS-DWM0001

Exhibit 2a

Engineering Report on

ERP (2.1046)

Assessment of Compliance

for

Measurement of Effective Radiated Power (ERP) in accordance with the FCC Rules & Regulations Part 2.1046 and 90

Wireless Modem
DUALWAVE M

Wavenet Technologies Pty Ltd.

February 2002

APREL Project No.:WVTB-Dual Wave M-3861

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APREL Laboratories

Engineering Report

Subject: **Measurement of Effective Radiated Power (ERP) in accordance with the FCC Rules & Regulations Part 2.1046 and 90**

FCC ID: **PQS-DWM0001**

Equipment: **Wireless Modem attachment for Palm m125/m500/m505/PDA**

Model: **DUALWAVE M**

Client: **Wavenet Technologies Pty Ltd.**
140 Burswood Rd
Burswood, Perth, WA 6100
AUSTRALIA

Project #: WVTB-Dual Wave M-3861

Prepared By: **APREL Laboratories,**
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Approved by: _____ Date: Feb 8, 2002
Jay Sarkar
Technical Director, Standards & Certification

Submitted by: _____ Date: Feb 8, 2002
Jay Sarkar
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Released by: _____ Date: Feb 8/02
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FCC ID: **PQS-DWM0001**
Applicant: Wavenet Technologies Pty Ltd.
Equipment: Wireless Modem attachment for Palm m125/m500/m505/PDA
Model: DUALWAVE M
Standard: FCC Rules and Regulations Part 2.1046 and 90

ENGINEERING SUMMARY

This report contains the results of the effective radiated power (ERP) measurement performed on a **Wavenet Wireless Modem attachment for Palm m125/m500/m505/or equivalent PDA, model DUALWAVE M**.The measurements were carried out in accordance with the FCC Rules and Regulations Part 2.1046 and 90. The product was evaluated for ERP when it was set at the maximum power level.

Wavenet DUALWAVE M was tested for ERP at high, middle, and low frequencies with the maximum ERP obtained at frequency 806.00 MHz. The test data is presented in this report under the section: Test Results. The measured ERP is 1.622 W.

The PDA Wireless Modem is an attachment for a Palm and it can be attached to a PC.

The **DUALWAVE M** was evaluated in three configurations:

1. PDA Wireless Modem attached to Palm,
2. Wireless Modem attached to Palm and connected to PC,
3. Wireless Modem only (Communicating with a PC).

The highest values of ERP were obtained in configuration 1 (Palm and Wireless Modem attached together) placed in vertical position.

(The results presented in this report relate only to the sample tested.)

Summary of the Results

Test Description	Page No.	Test Set-up Figure No.	Results Summary
RF Power Output as Radiated Ref. Paragraph 2.1046 and 90	8	1	**Passed**

INTRODUCTION

General

This report describes the results of the effective radiated power (ERP) measurement conducted on a Wavenet Wireless Modem, model **DUALWAVE M,** and attachment for Palm m125/m500/m505/ PDA

Test Facility

The tests were performed for Wavenet Technologies Pty 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: 90416***

APREL is accredited by Standard Council of Canada. APREL is also accredited by Industry Canada 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 (90).

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: 25 °C ± 2- **Relative Humidity**:30 - 50 % **Air Pressure**:101 kPa ± 3

Personnel: The equipment was tested by Roman Kuleba, EMC Engineer and the report was written by Jay Sarkar, Technical Director, Standards and Certification.

FCC SUBMISSION INFORMATION

FCC ID:	**PQS-DWM0001**
Equipment (type): As Marketed	**Wireless Modem attachment for Palm m125/m500/m505/PDA**
Model:	**DUALWAVE M**
For:	Certification
Applicant:	**Wavenet Technologies Pty Ltd.** 140 Burswood Rd Burswood, Perth, WA 6100 AUSTRALIA
Manufacturer:	**Wavenet Technologies Pty Ltd.** 140 Burswood Rd Burswood, Perth, WA 6100 AUSTRALIA
Evaluated by:	**APREL Laboratories** 51 Spectrum Way Nepean, Ontario Canada K2R 1E6

MANUFACTURER'S DATA

FCC ID No:	**PQS-DWM0001**
Equipment Type:	Wireless Modem attachment for Palm m125/m500/m505/PDA
Model:	**DUALWAVE M**
Reference:	FCC Rules and Regulations Parts 2 and Part 90
Manufacturer:	Wavenet Technologies Pty Ltd
Power Source:	3.6 (nominal) VDC, Lithium Battery
Development Stage of Unit:	Production

GENERAL SPECIFICATIONS

1. Frequency Range: 806.00 to 821.00 MHz (Transmitter)
2. Measured ERP **1.622 W** (32.1 dBm)
3. Emission Designators (See 47 CFR § 2.201 and §2.202): 20K0F1D
4. Antenna Impedance: 50

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

Ref.: **FCC Part 2 paragraph 2.1046 and 90**

Criteria: N/A

Set-up: See Figure No. 1.

Equipment: See Appendix A.

Methodology: RF Power Measurement by Substitution Method:

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.: 90416)

The test was set-up as illustrated in Fig.1. The DUI was configured to operate at maximum power. 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 DUI was replaced by a vertically polarised half-wave dipole antenna resonant to that frequency and fed by a RF power amplifier and signal generator. The center of the dipole antenna was placed precisely in the same location as the DUI. It was ensured that the orientation of the rotating table and the height of the receiving antenna were unmoved. The signal generator level was adjusted until the peak reading on the spectrum analyzer was identical to that obtained when the DUI was on the turntable. The two signals were matched by superimposing one signal to the other on the spectrum analyzer screen. The output of power amplifier was disconnected from the substitute dipole antenna and connected to a 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

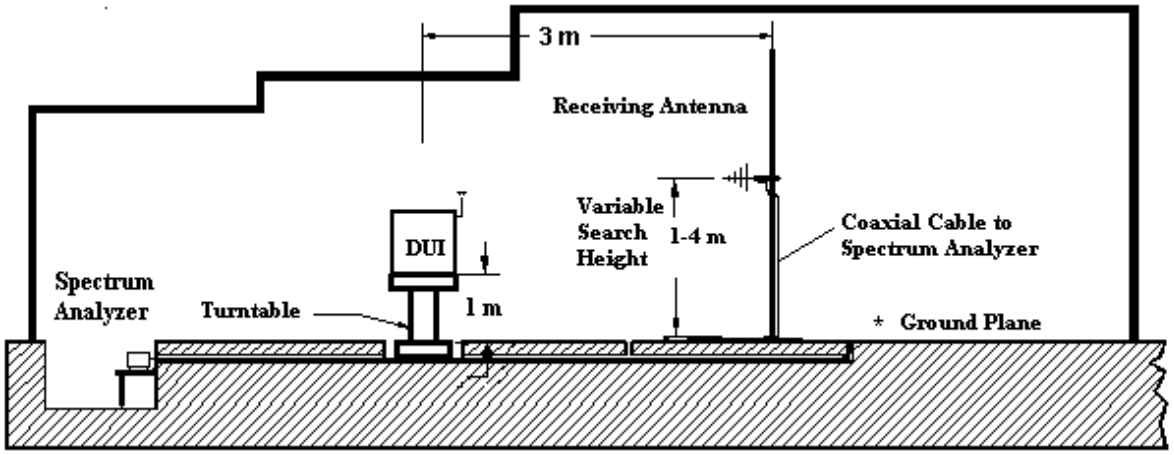


Figure 1.a Test set up for the Radiated Power (ERP) Measurement in OATS (not to scale)

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

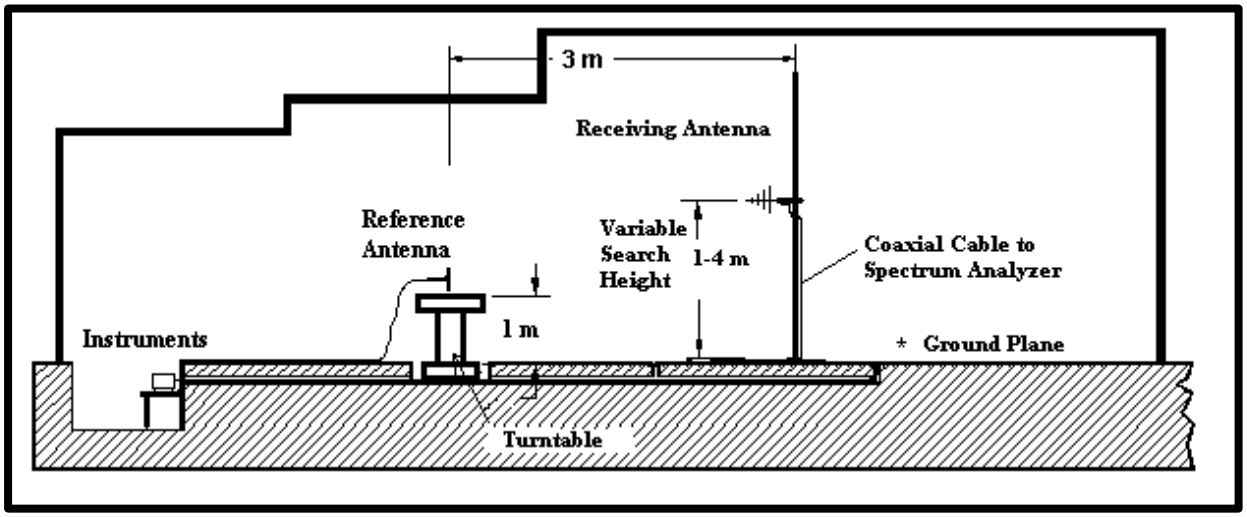


Figure 1.c Test set up for the Radiated Power (ERP) Measurement in OATS (not to scale)
The DUI is replaced by Reference Dipole Antenna.

Table 1.
RF Output Power Measurement
Maximum ERP tested by the Substitution Method

Frequency (MHz)	Conducted RF Power @ Antenna Port (dBm)	Effective Radiated Power ERP (dBm)	Effective Radiated Power ERP (W)
806.00	32.0	32.1	1.622
815.00	32.0	31.5	1.413
821.00	32.0	31.7	1.479

The highest values of ERP were measured with Palm m500 and Wavenet Wireless Modem attached together and placed in vertical position.

Test performed by: Kenneth Robinson **Date:** Jan 2002

APPENDIX A

List of Test Equipment

List of Equipment used

Description	Manufacturer	Model #	Asset #	Calibration Due Data
Spectrum Analyzer	Anritsu	MS2661C	301330	Dec 10, 2002
Power Meter	Rhode & Schwarz	NRVS	100851	July 21, 2002
20 dB Attenuator	Pasternack	PE7002-20	301370	May 18, 2002
Signal Generator	Hewlett-Packard	HP 8340B	100955	Oct 5, 2002
RF Power Amplifier	Amplifier Research	25W100M	100735	CBT
Reference Half wave Dipole	APREL Inc.	D-8355	N/A	June 16, 2002
Log Periodic Antenna	Eaton	ALP-1	100553	July 21, 2002
Turntable with Controller	EMCO	1060-1.241	100506	CNR
Computer Controlled Antenna Position Mast	EMCO	1051-12	100507	CNR
OATS	APREL Inc.	3m & 10m	N/A	N/A

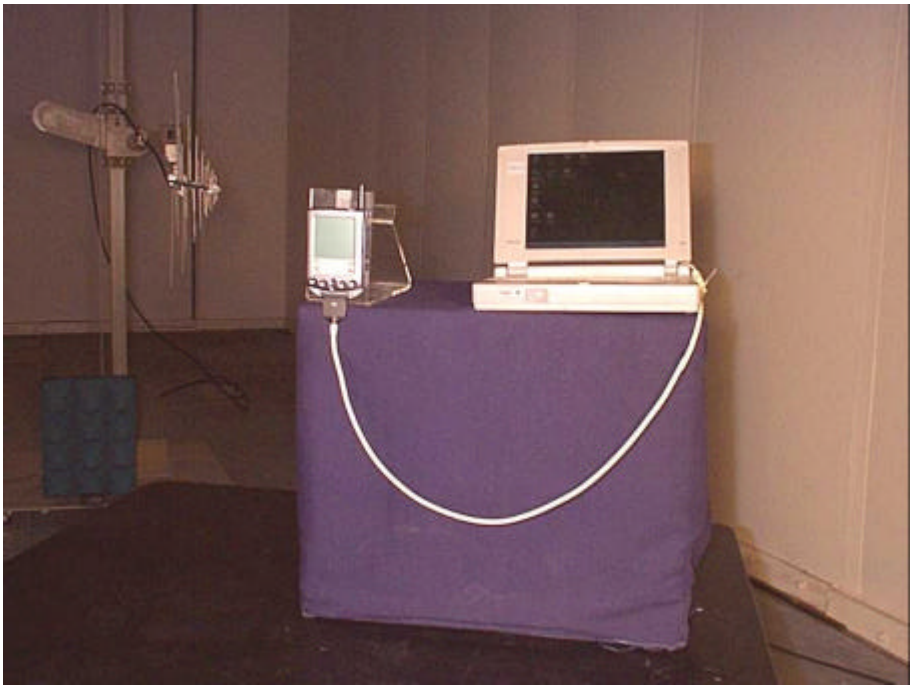
APPENDIX B

PHOTOGRAPHS OF TESTING SETUPS

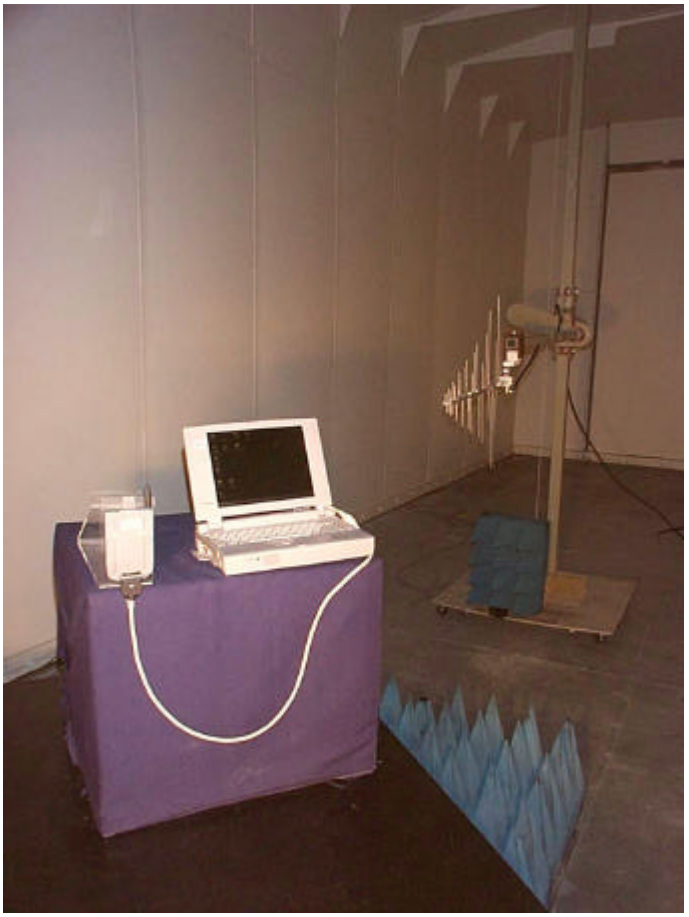
Wireless DUALWAVE M Wireless Modem and Palm

ERP Testing – Vertical Position
Wireless Modem attached to Palm

ERP Testing - 45º Tilt
Wireless Modem attached to Palm



ERP Testing – Vertical Position
Wireless Modem attached to Palm and connected to PC



ERP Testing – Vertical Position
Wireless Modem (without Palm)
communicating with PC

Reference Dipole Antenna Used for ERP Measurement