

FCC ID: PP9P2000MOBITEX

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

Point of Sale Terminal
P2000 with a Research In Motion
R902-M-2-0 radio transmitter
Descartes Corp.



July 2001

DESB-P2000 w. 902Dmobitex-3681

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Engineering Report

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

FCC ID: PP9P2000MOBITEX

Equipment: Point of Sale Terminal

Model: P2000

Client: Descartes Corp.
Colonial Lake Drive
Lawrenceville, NJ 08648
U.S.A.

Project #: DESB-P2000 w. 902Dmobitex-3681

Prepared by: APREL Laboratories,
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51 Spectrum Way
Nepean, Ontario
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Approved by: Jay Sarkar Date: July 31, 2001
Jay Sarkar
Technical Director, Standards & Certification

Submitted by: Jay Sarkar Date: July 31, 2001
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Released by: Dr. Jack J. Wojcik, P.Eng. Date: July 31/01
Dr. Jack J. Wojcik, P.Eng.



THE LABORATORY FOR WIRELESS

FCC ID: **PP9P2000MOBITEX**
Applicant: Descartes Corp.
Equipment: Point of Sale Terminal
Model: P2000
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 Descartes Corp. Wireless **Point of Sale Terminal** operating with a built-in Research in Motion MOBITEX radio transmitter. 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.

Descartes Corp. **P2000** was tested for ERP at high, middle, and low frequencies with the maximum ERP obtained at channel No.: 720 with the frequency being 901.00 MHz. The test data is presented in this report under the section: Test Results. **The measured ERP is 0.363 W.** (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 Descartes **Point of Sale Terminal** model: **P2000** operating with a built-in Research in Motion MOBITEX radio transmitter.

Test Facility

The tests were performed for **Descartes** 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.

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

FCC SUBMISSION INFORMATION

FCC ID: **PP9P2000MOBITEX**

Equipment: **Point of Sale Terminal**

Model: **P2000**

For: Certification

Applicant: **Descartes Corp..**
Colonial Lake Drive
Lawrenceville, NJ 08648
U.S.A.

Manufacturer: **Descartes Corp..**
Colonial Lake Drive
Lawrenceville, NJ 08648
U.S.A.

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

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 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.: 90416)

The test was set-up as illustrated in Fig.1. The DUI 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 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 Hand Held Computer 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

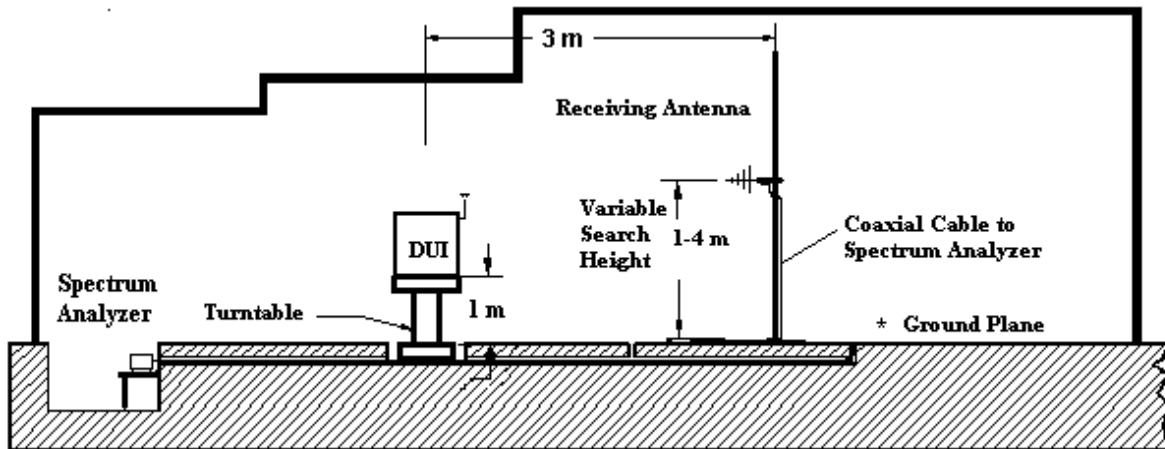


Figure 1.a Test set up for the Radiated Power (ERP) Measurement in OATS (not to scale)



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

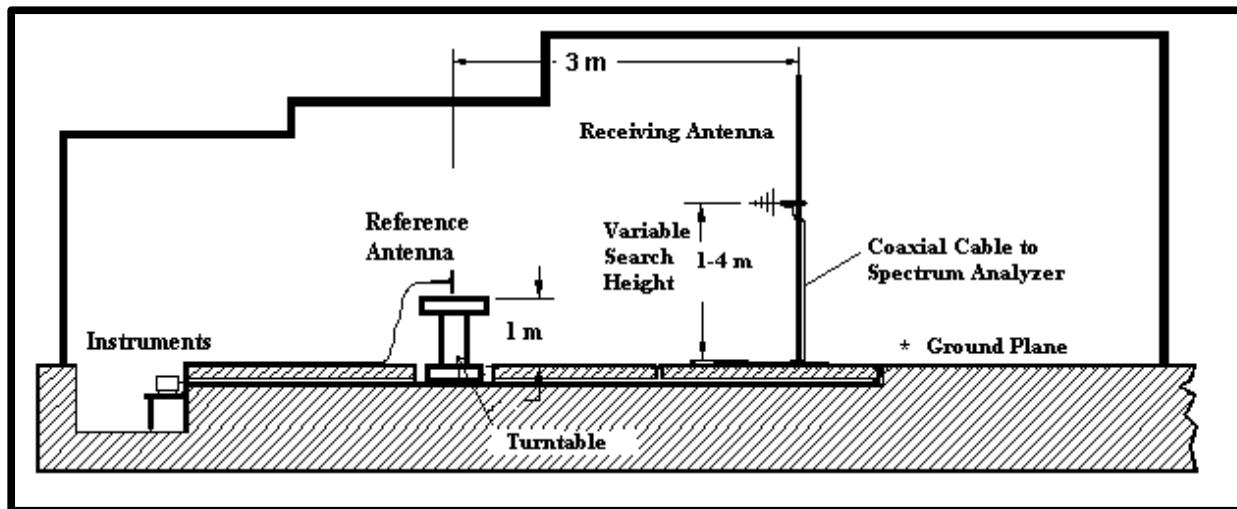


Figure 1.c Test set up for the Radiated Power (ERP) Measurement in OATS (not to scale)
The DUI is replaced by Reference Dipole Antenna.

Table 1.
RF Output Power Measurement
ERP

Channel No.	Nominal Transmit Frequency	Measured Output Power ERP	ERP
	(MHz)	(dBm)	
480	896.00	23.95	0.248
720	899.00	24.72	0.296
880	901.00	25.60	0.363

Test performed by: Karen Roush Date: July, 2001

APPENDIX A

List of Test Equipment

List of Equipment used

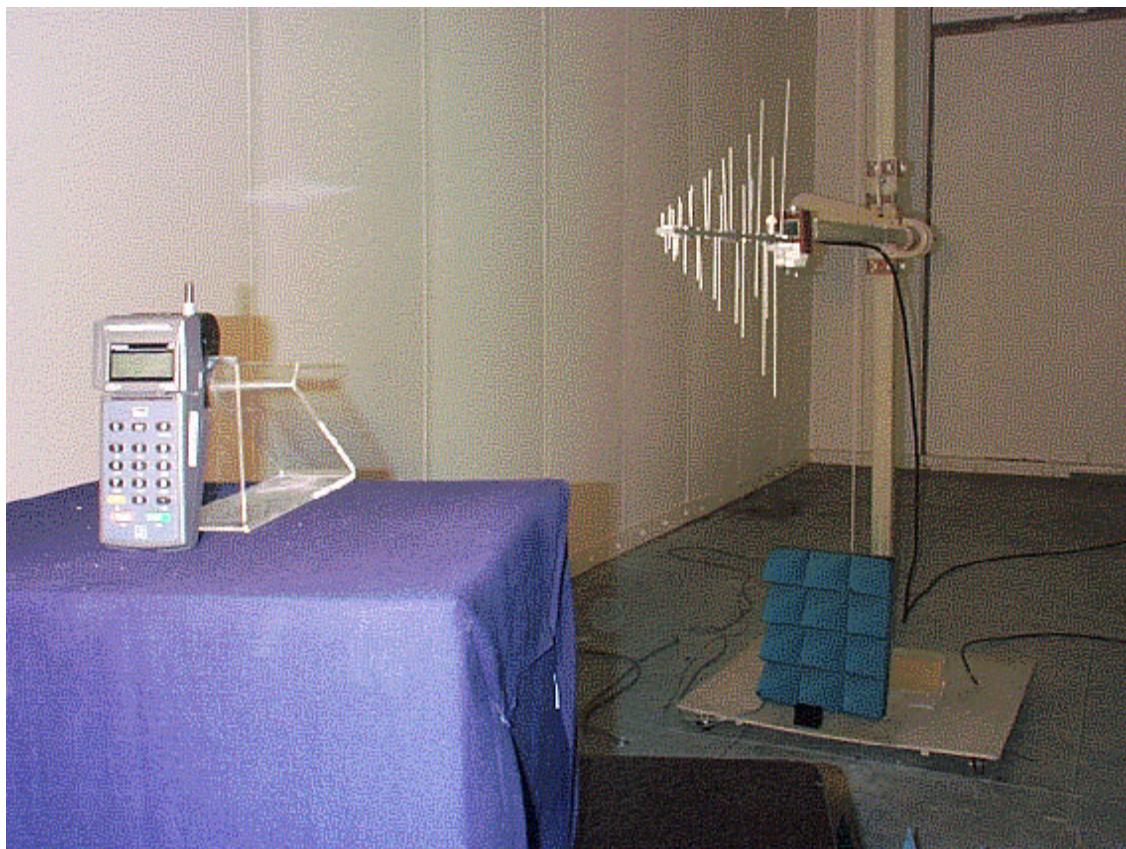
Description	Manufacturer	Model #	Asset #	Calibration Due Data
Spectrum Analyzer	Anritsu	MS2661C	301330	Dec 10, 2001
Power Meter	Rhode & Schwarz	NRVS	100851	July 21, 2002
20 dB Attenuator	Pasternack	PE7002-20	301370	CBT
Signal Generator	Hewlett-Packard	HP 8340B	100955	Oct 5, 2001
RF Power Amplifier	Amplifier 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



**Descartes P2000
With Mobitex R902**



P2000 Tested for ERP at the OATS



Reference Dipole Antenna Used for ERP Measurement