APREL Laboratories

Report on

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

Itronix Corporation

Handheld PC

T5200 with a Research in Motion R900M-2-0 Transmitter

Date: October, 1999

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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: **KBCT5200RIM**

Equipment: **Handheld PC**

Model: **T5200 with a Research in Motion R900M-2-0 transmitter**

Client: **Itronix Corporation**
801 South Stevens Street
Spokane, WA 99204
U.S.A.

Project #: ITRB-T5200 R900M20-3303

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

Approved by: _____ Date: Oct. 5, 1999

Jay Sarkar
Director, Standards & Certification

Released by: _____ Date: Oct. 5/99

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FCC ID: KBCT5200RIM
Applicant: Itronix Corporation
Equipment: Handheld PC
Model: T5200 with a Research in Motion R900M-2-0 transmitter
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 Itronix T5200 handheld PC operating with a built-in Research in Motion R900M-2-0 Mobitex radio transmitter. The measurements were carried out in accordance with the FCC Rules and Regulations Part 2.1046. The handheld PC was evaluated for ERP when it was set at the maximum power level of 2W (33dBm).

The Mobitex version of the T5200 was tested for ERP at high, middle, and low frequencies with the maximum ERP obtained at high channel (No. 960) with the frequency being 901 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 Ref. Paragraph 2.1046	7	1	**Passed**

FCC SUBMISSION INFORMATION

FCC ID:	**KBCT5200RIM**
Electronic Serial Number:	N/A
Equipment:	Handheld PC
Model:	T5200 with a Research in Motion R900M-2-0 transmitter
For:	Certification
Applicant:	Itronix Corporation 801 South Stevens Street Spokane, WA 99204 U.S.A.
Manufacturer:	Itronix Corporation 801 South Stevens Street Spokane, WA 99204 U.S.A.
Evaluated by:	APREL Laboratories 51 Spectrum Way Nepean, Ontario Canada K2R 1E6

INTRODUCTION

General

This report describes the results of the effective radiated power (ERP) measurement conducted on an Itronix T5200 handheld PC operating with a built in Research in Motion R900M-2-0 Mobitex radio transmitter.

Test Facility

The tests were performed for Itronix Corporation 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 NAPTO 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. Calibration of all test equipment's are performed at 12 months intervals. All equipment used is calibrated or verified in accordance with the intent of AQAP-6/MIL-STD-45662.

Environmental Conditions

Measurements were conducted in open area test site.

- Temperature: 18 °C ± 2
- Relative Humidity: 30 - 50 %
- Air Pressure: 101 kPa ± 3

TEST RESULTS

FOR

Effective Radiated Power (ERP)
of
Handheld PC
T5200 with a Research in
Motion R900M-2-0 transmitter

Itronix Corporation

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 handheld PC was configured to operate at maximum power with carrier unmodulated.. The equipment under test was placed on a turntable positioned 3 meters 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 handheld PC was replaced by a half-wave vertically polarised antenna, RF power amplifier and signal generator. The center of the dipole antenna was placed in the same location as the handheld PC. The signal generator level was adjusted until the reading on the spectrum analyzer was identical to that obtained when the handheld PC was on the turntable. The output of power amplifier was disconnected from the dipole and connected to an RF power meter. **The effective radiated power was read directly form the power meter**.

The process was repeated for two more channels.

Results: . See Table 1

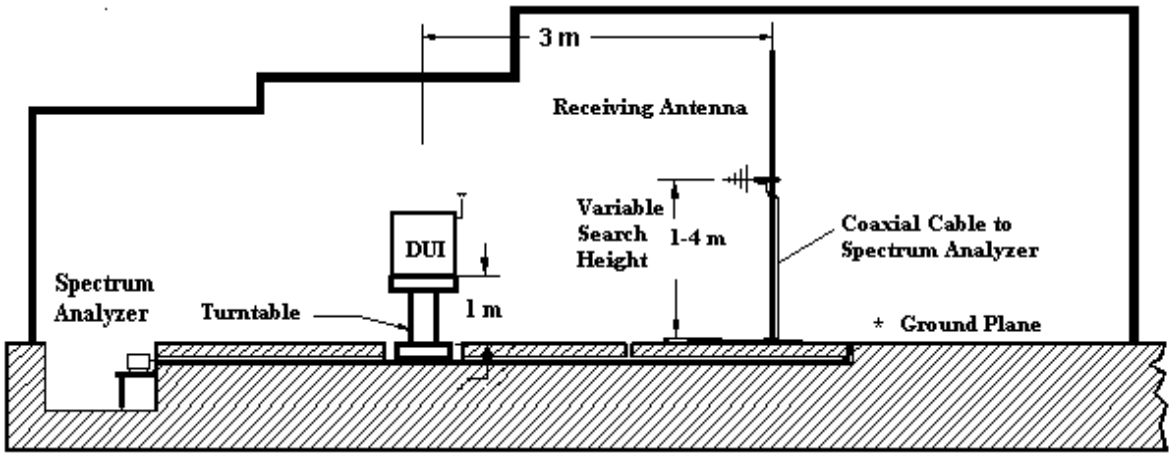


Figure 1.a Test Set Up for the Radiated Power (ERP) Measurement in OATS (not to scale)

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

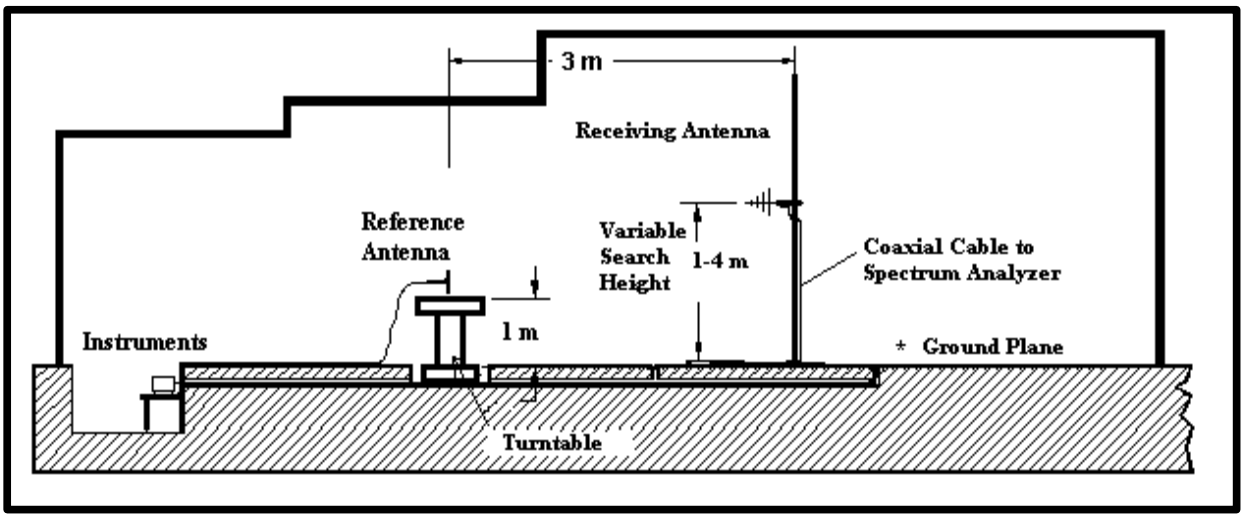


Figure 1.c Test Set Up for the Radiated Power (ERP) Measurement in OATS (not to scale)
The Handheld PC is replaced by Reference Dipole Antenna.

TABLE 1.
RF OUTPUT POWER MEASUREMENT
EFFECTIVE RADIATED POWER
ERP

Channel No.	Nominal Transmit Frequency	Manufacturer's Rated Output Power	Measured Output Power ERP	ERP
	(MHz)	(W)	(dBm)	(W)
480 L	896	2.0	31.7	1.5
720 M	899	2.0	32.5	1.8
960 H	901	2.0	33.5	2.2

Tested by: ***HY*** Test Date: ***Sep 29, 1999***

APPENDIX A

List of Test Equipment

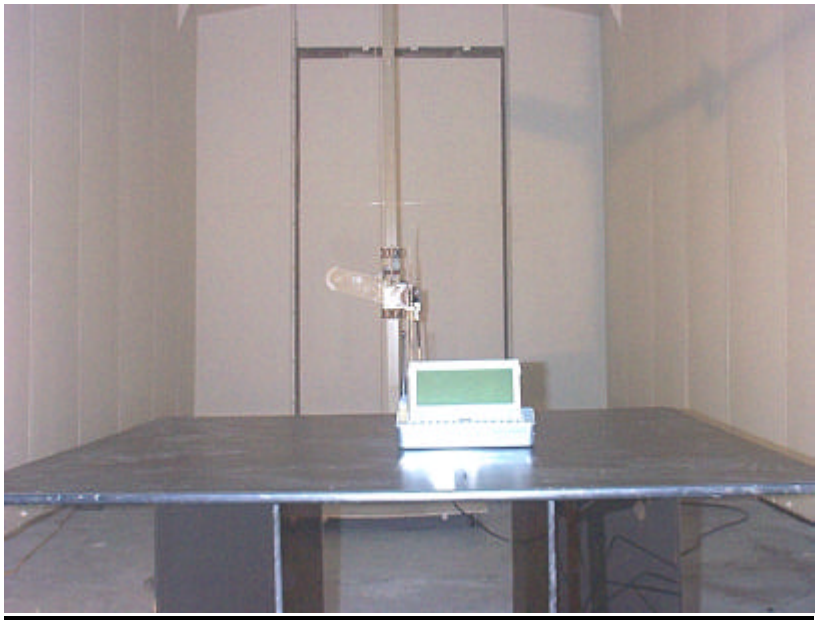
List of Equipment

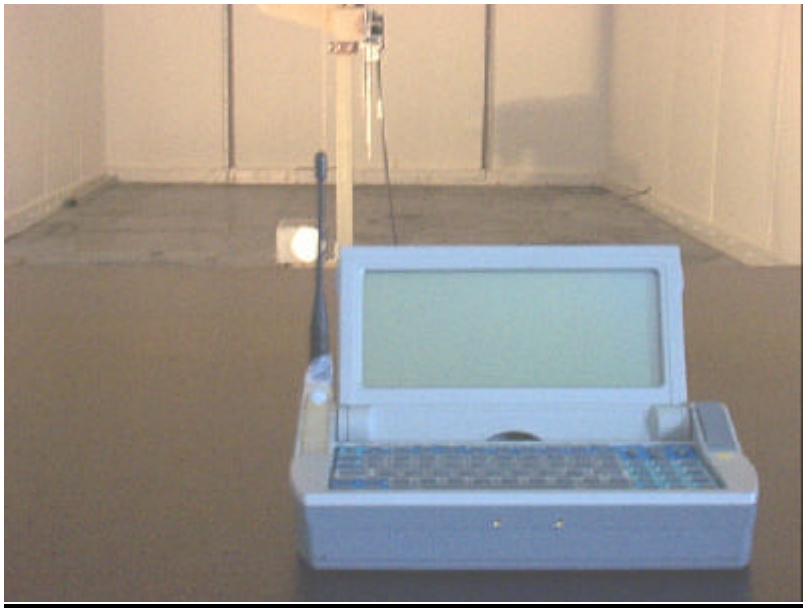
Description	Manufacturer	Model #	Asset #	Cal . Due Data
Spectrum Analyzer	Anritsu	MS2661C	N/A	Aug 20, 2000
20 dB Attenuator	Narda	4779-20	301370	May 18, 2000
Signal Generator	Hewlett-Packard	HP 8662A	100456	Jun 28, 2000
RF Power Amplifier	Amplifier Research	25W100M	100735	Oct 2, 2000
800MHz Dipole	APREL Inc.	D-8355	N/A	Jun 16, 2000
Log-Periodic Antenna	APREL Inc.	ALP1	100761	July 21, 2000
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

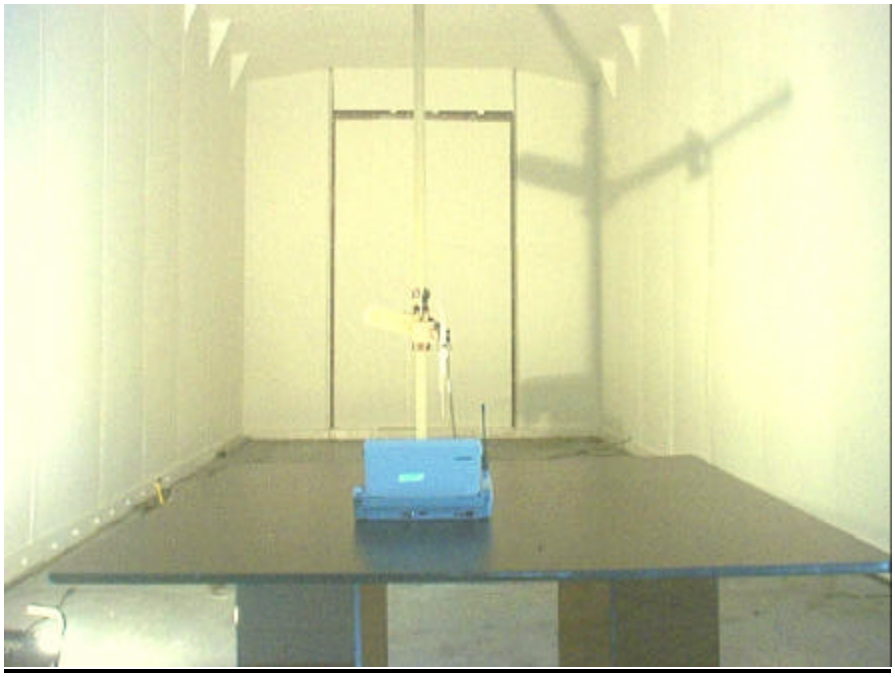
Photographs

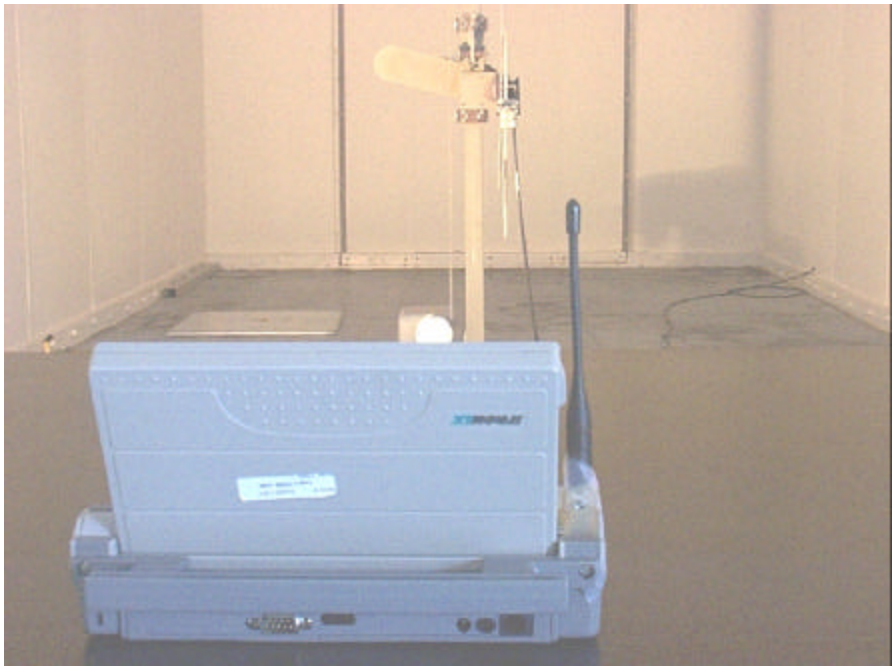
Handheld PC – T5200 - R900M-2-0



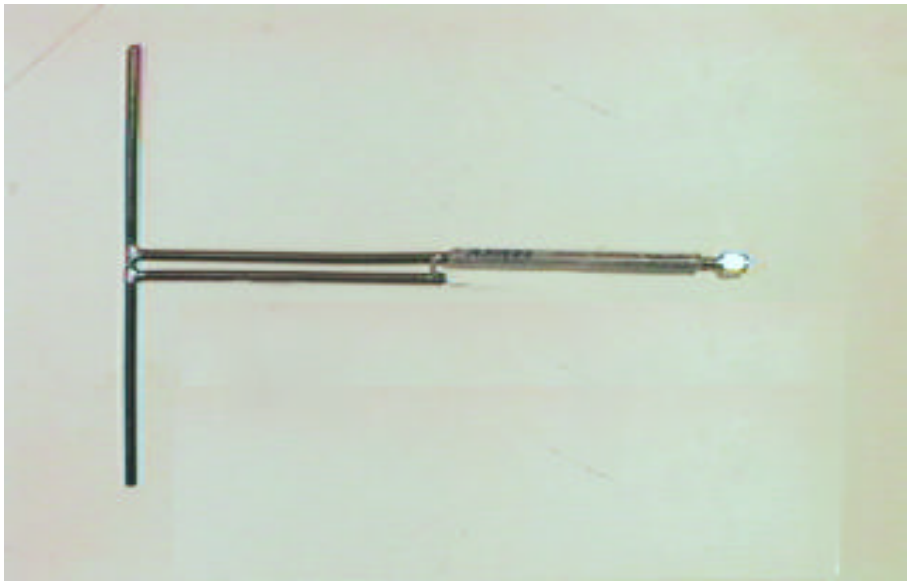


Handheld PC – T5200 R900M-2-0



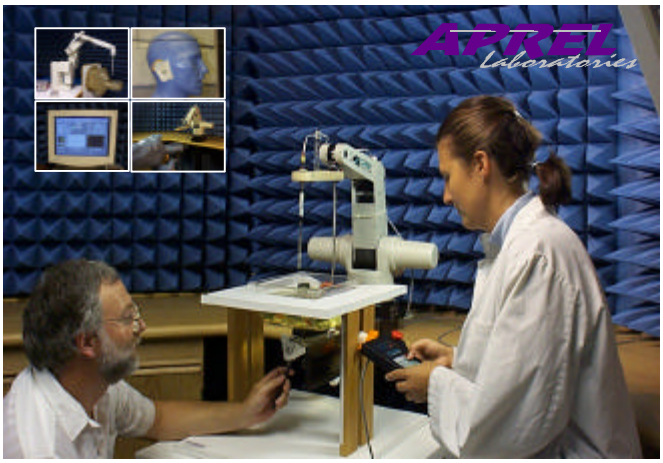


Handheld PC – T5200 - R900M-2-0



Reference Dipole Antenna Used for ERP Measurement

APREL's "10 M" Open Area Test Site is fully protected for climatic changes. This enables studies on electromagnetic radiation and antenna calibration, and is the most advanced structure of this type in North America. All laboratory instruments, a turntable and cables are located below a perforated metal ground plane, while the building itself is constructed with fibreglass modules.



Shown is one of two complete SAR (Specific Absorption Rate) labs at APREL. These are used for dosimetry measurements as well as for near-field antenna design studies. APREL was one of the first fully independent (And ISO Guide 25 accredited) organizations to offer SAR expertise.

Spectrum Sciences™ Institute is a 30,000 sq. ft facility nestled in 18 acres of treed land known as Spectrum Sciences™ Park, located in Ottawa- Canada's high-tech hot-spot. The current building consists of:

- **the Technology Gallery and Conference facility**
- **APREL Laboratories and NCL Calibration Labs**
- **Spectrum Sciences™ Institute offices**

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