CERTIFICATE OF COMPLIANCE
MPE EVALUATION

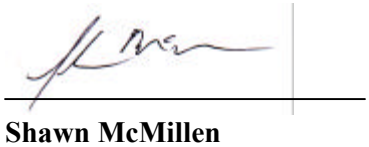
Test Lab:	**Applicant Name:**
CELLTECH RESEARCH INC. Testing and Engineering Lab 1955 Moss Court Kelowna, B.C. Canada V1Y 9L3 Phone: 250 - 860-3130 Fax: 250 - 860-3110 Toll Free: 1-877-545-6287 e-mail: celltech@globuswireless.com web site: www.globuswireless.com	**ITRONIX CORPORATION** 801 South Stevens Street Spokane, WA 99204 Attn: Fred Phillips, Certification Engineer Phone: 509-742-1506 Fax: 509-626-4204

FCC ID:	**KBCT5200RIM801D**
Model(s):	**T5200**
Equipment Type:	**Rugged Laptop PC with RIM 801D ARDIS Radio Modem, Vehicle Cradle, & Unity Gain Magnetic Mount Antenna**
Tx Frequency Range:	**806 - 825 MHz**
Rx Frequency Range:	**851 - 870 MHz**
Max. RF Output Power:	**1.2 Watts**
FCC Rule Part(s):	**2.1091; 1.1310; ET Docket 93-62**

This wireless device has been shown to be compliant for localized maximum permissible exposure (MPE) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE Std. C95.1-1992 and had been tested in accordance with the measurement procedures specified in ANSI/IEEE Std. C95.3-1999.

I attest to the accuracy of data. All measurements were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Celltech Research Inc. certifies that no party to this application has been denied FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 853(a).



Shawn McMillen
General Manager
Celltech Research Inc.

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TABLE OF CONTENTS

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SCOPE

Environmental evaluation measurements of Maximum Permissible Exposure (MPE) to radio frequency (RF) radiation from transmitting devices for compliance with the technical rules and regulations of the U.S. Federal Communications Commission (1).

1.0 INTRODUCTION

This measurement report describes the Maximum Permissible Exposure (MPE) tests of Itronix Model: T5200 Rugged Laptop PC with RIM 801D ARDIS Radio Modem (FCC ID: KBCT5200RIM801D) and vehicle cradle loaded with a unity gain vehicle rooftop magnetic mount antenna. The test procedures described in FCC CFR47 2.1091, 1.1310, American National Standards Institute C95.1-1992 (2), C95.3-1992 (3), and OET Bulletin 65 (Edition 97-01)(4) were employed. A description of the product and operating configuration, detailed summary of the test results, methodology and procedures used in the evaluation, equipment used, and the various provisions of the rules are included within this test report.

2.0 DESCRIPTION of Equipment Under Test (EUT)

EUT Type	Rugged Laptop PC with RIM 801D ARDIS Radio Modem, Vehicle Cradle, & Unity Gain Mag-Mount Antenna	**Equipment Class**	Licensed Non-Broadcast Station Transmitter (TNB)
Radio Type	RIM 801D (ARDIS Network)	**FCC ID**	KBCT5200RIM801D
Max. RF Output Power	1.2 Watts	**Model No.(s)**	T5200
Tx Frequency Range (MHz)	806 - 825	**Signal Modulation(s)**	FSK
Rx Frequency Range (MHz)	851 - 870	**Antenna Type**	Unity Gain Vehicle Rooftop Magnetic Mount

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3.0 MPE MEASUREMENT GUIDELINES

The Federal Communications Commission (FCC) has adopted the guidelines for evaluating the environmental effects of radio frequency radiation in ET Docket 93-62 on August 6, 1996 to protect the public from the potential hazards of RF emissions (1). The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized MPE in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz (2). The measurement procedure described in IEEE/ANSI C95.3-1992 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave (3) is used for guidance in measuring MPE due to RF exposure from the particular transmitting device. The new guidelines incorporate limits for MPE in terms of electric and magnetic field strength, and power density for transmitters operating at frequencies between 300 kHz and 100 GHz. This criteria for MPE evaluation is also described in OET Bulletin 65 (Edition 97-01), Evaluation Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields (4).

4.0 DEFINITION

MPE is the rms and peak electric and magnetic field strength, their squares, or the plane-wave equivalent power densities associated with these fields to which a person may be exposed without harmful effect, and with an acceptable safety factor.

The MPE prescribed by the standard are set in terms of different parameters of effects, depending on the frequency generated by the device. The MPE levels are set in terms of power density, whose definition and relationship to electric and magnetic field strengths are described by the following equation:

$$S(mW/cm^2) = \frac{E^2}{3770} = 37.7H^2$$

where:

S = Power density (mW/cm^2)
Power per unit area normal to the direction of propagation usually expressed in units of watts per square meter (W/m^2), or units of milliwatts per square centimeter (mW/cm^2). For plane waves, power density, electric field strength (E), and magnetic field strength (H) are related by the impedence of free space (377 Ω).

E = Electric field strength (V/m)

H = Magnetic field strength (A/m)

5.0 MPE LIMITS

(A) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

(B) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz *Plane-wave equivalent power density

NOTE 1: ***Occupational/controlled*** limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2: ***General population/uncontrolled*** exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

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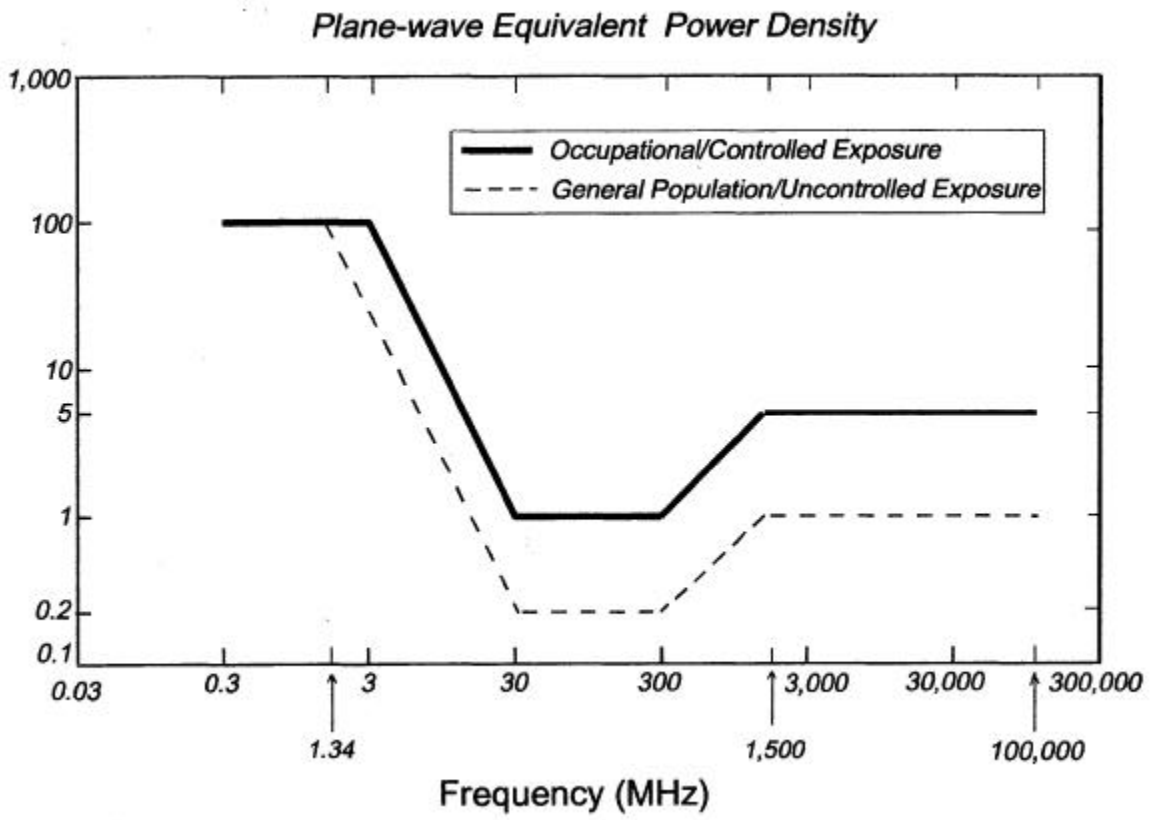
Plane-wave Equivalent Power Density
1,000
100
10
5
1
0.2
0.1
0.03
0.3
3
30
300
3,000
30,000
300,000
1.34
1,500
100,000
Occupational/Controlled Exposure
General Population/Uncontrolled Exposure
Frequency (MHz)

6.0 DETAILS OF MPE EVALUATION

The Itronix T5200 Rugged Laptop PC with RIM 801D ARDIS Radio Modem (FCC ID: KBCT5200RIM801D) and vehicle cradle loaded with a unity gain vehicle rooftop magnetic mount antenna was found to be compliant for MPE based on the following test provisions and conditions:

1) The probe was positioned above a simulated metal vehicle rooftop at a separation distance of 20.0cm from the radiating antenna and at a starting height of 5.0cm to the center of the probe.
2) The turntable was positioned so that the initial start angle was 0 degrees.
3) The EUT was turned on to allow for sufficient time for stabilization. The EUT was operated at full power on a desired frequency.
4) The Survey Meter was set for maximum hold and on the appropriate power range.
5) The turntable was rotated about 360 degrees and the maximum reading was obtained for that elevation.
6) The EUT was then turned off and the probe raised by 5.0cm. This process was repeated to a sufficient distance past the tip of the antenna or where the maximum radiation was reduced by a significant factor to warrant no further measurement. The data was then tabulated and graphed in the charts and tables shown on next pages.

MPE Test Setup

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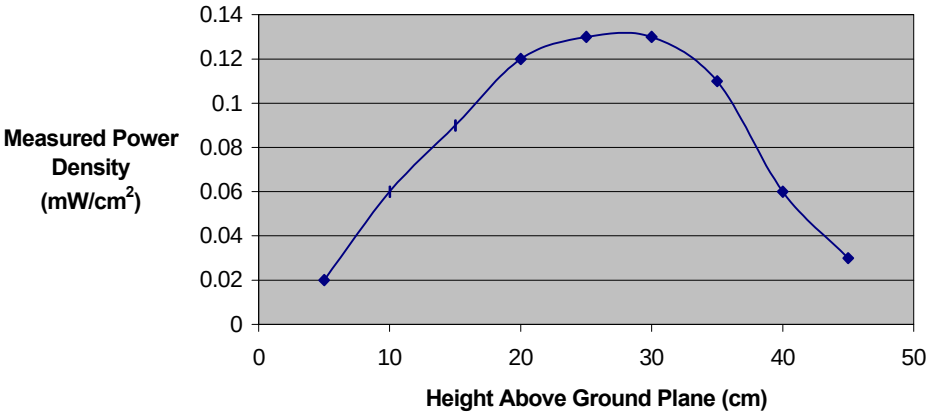
7.0 MPE MEASUREMENT SUMMARY

The measurement results were obtained with the EUT tested in the conditions described in this report.

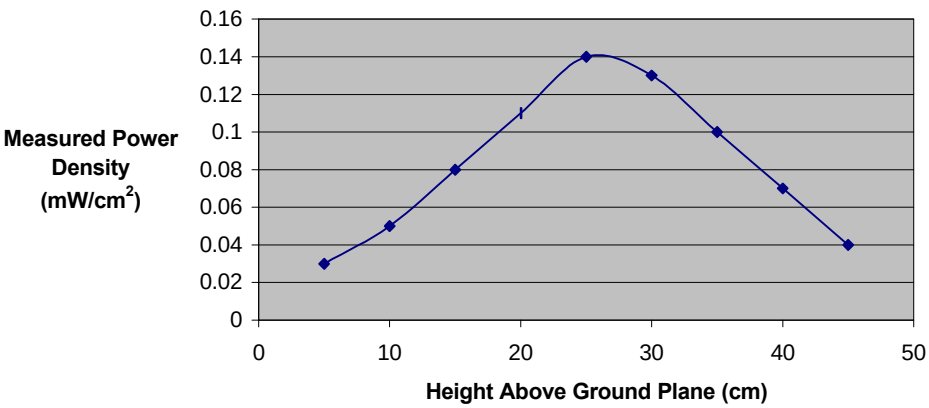
806MHz

Height Above Ground Plane (cm)	Measured Power Density at 20cm (mW/cm^2)	Correction Factor to Obtain Actual mW/cm^2	Total E-Field Equivalent Power Density	MPE Limit (mW/cm^2)
5	0.02	1.06	0.0212	f/1500
10	0.06	1.06	0.0636	f/1500
15	0.09	1.06	0.0954	f/1500
20	0.12	1.06	0.1272	f/1500
25	0.13	1.06	0.1378	f/1500
30	0.13	1.06	0.1378	f/1500
35	0.11	1.06	0.1166	f/1500
40	0.06	1.06	0.636	f/1500
45	0.03	1.06	0.0318	f/1500



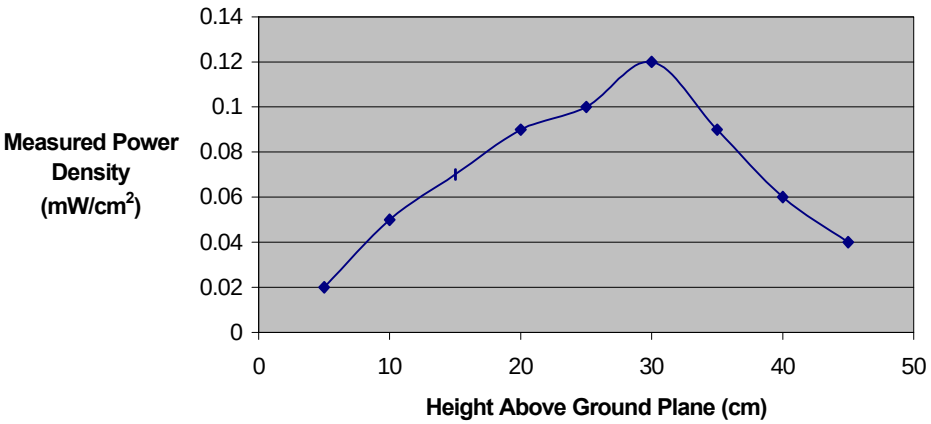
815MHz

Height Above Ground Plane (cm)	Measured Power Density at 20cm (mW/cm^2)	Correction Factor to Obtain Actual mW/cm^2	Total E-Field Equivalent Power Density	MPE Limit (mW/cm^2)
5	0.03	1.055	0.03165	f/1500
10	0.05	1.055	0.05275	f/1500
15	0.08	1.055	0.0844	f/1500
20	0.11	1.055	0.11605	f/1500
25	0.14	1.055	0.1477	f/1500
30	0.13	1.055	0.13715	f/1500
35	0.10	1.055	0.1055	f/1500
40	0.07	1.055	0.07385	f/1500
45	0.04	1.055	0.0422	f/1500



821MHz

Height Above Ground Plane (cm)	Measured Power Density at 20cm (mW/cm^2)	Correction Factor to Obtain Actual mW/cm^2	Total E-Field Equivalent Power Density	MPE Limit (mW/cm^2)
5	0.02	1.05	0.021	f/1500
10	0.05	1.05	0.0525	f/1500
15	0.07	1.05	0.0735	f/1500
20	0.09	1.05	0.0945	f/1500
25	0.10	1.05	0.105	f/1500
30	0.12	1.05	0.126	f/1500
35	0.09	1.05	0.0945	f/1500
40	0.06	1.05	0.063	f/1500
45	0.04	1.05	0.042	f/1500



8.0 SYSTEM CALIBRATION

Prior to the assessment for MPE, the Electromagnetic Radiation Survey Meter and probe was calibrated as per the operating instructions in the operations manual. The unit was placed into the units electrically sealed storage case and allowed sufficient time for both units to acquire the same temperature. The system was then calibrated by a built in software routine and zeroed in an electromagnetic free environment

9.0 MPE SYSTEM SPECIFICATIONS

Radiation Detection Specifications

Electromagnetic Radiation Survey Meter:	Narda Model 8712
Isotropic Electric Field Probe:	Model 8761D
Frequency Range:	300 kHz - 3 GHz

Positioning System

Multi-Device Controller	EMCO 2090	S/N: 9912-1484
Mini-Mast	EMCO 2075	S/N: 0001-2277
Turntable	EMCO 2080-1.2/1.5	S/N: 0002-1002

10.0 REFERENCES

(1) Federal Communications Commission, ET Docket 93-62, Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation, Aug. 1996.

(2) ANSI/IEEE C95.1-1992, IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300GHz.

(3) ANSI/IEEE C95.3-1992, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave.

(4) OET Bulletin 65 (Edition 97-01), Evaluation Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields.

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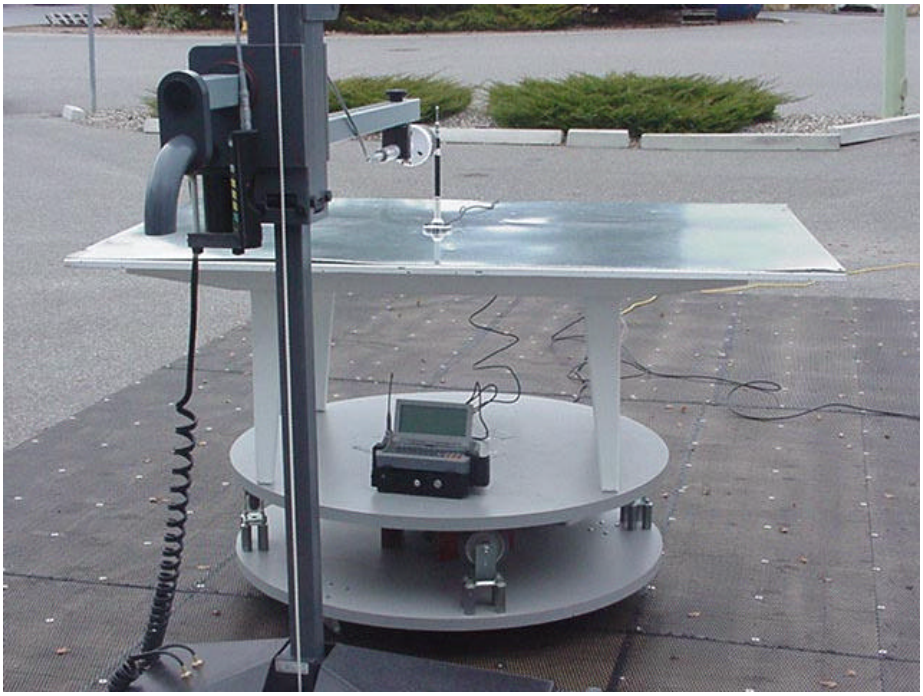
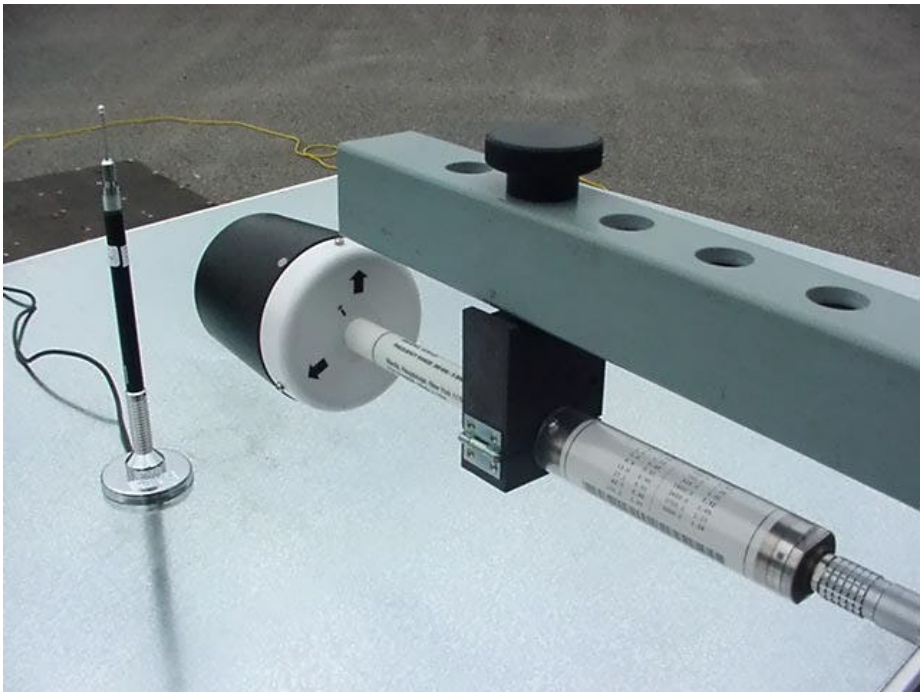
APPENDIX A - MPE TEST SETUP PHOTOGRAPHS

MPE TEST SETUP PHOTOGRAPHS
UNITY GAIN MAG-MOUNT ANTENNA





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MPE TEST SETUP PHOTOGRAPHS
UNITY GAIN MAG-MOUNT ANTENNA

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