

## DECLARATION OF COMPLIANCE MPE EVALUATION REPORT

### Test Lab

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### Applicant Information

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<b>FCC Rule Part(s):</b>	<b>47 CFR §90; 15.247; §2.1091; §1.1310</b>
<b>IC Rule Part(s):</b>	<b>RSS-119 Issue 6; RSS-210 Issue 5; RSS-102 Issue 1 (Provisional)</b>
<b>FCC Classification:</b>	<b>Licensed Non-Broadcast Station Transmitter (TNB)</b>
<b>IC Classification:</b>	<b>Land Mobile Radio Transmitter</b>
<b>Device Type:</b>	<b>Rugged Laptop PC with RIM 902 Mobitex Radio Modem (co-located with Cisco MPI-350 Mini-PCI 2.4GHz DSSS WLAN Card) with Vehicle Cradle, &amp; (3) Mobile Vehicle-Mount Antennas</b>
<b>FCC ID:</b>	<b>KBCIX260MPIRIM902</b>
<b>Model(s):</b>	<b>IX260</b>
<b>Tx Frequency Range:</b>	<b>896.0 - 901.0 MHz (Mobitex) 2412 - 2462 MHz (WLAN)</b>
<b>Max. RF Conducted Power:</b>	<b>33.1 dBm Peak (Mobitex) / 21.2 dBm Peak (WLAN)</b>
<b>Source Based Time Av. Power:</b>	<b>27.1 dBm Conducted (Mobitex - 25% Duty Cycle)</b>
<b>Antenna Type(s):</b>	<b>Itronix IX260 External Swivel Dipole (Mobitex) Rangestar 802.11b Surface-Mount P/N: 100929 (WLAN) MaxRad Model: Z563 Mobile Vehicle-Mount - Unity Gain (Mobitex only) MaxRad Model: Z567 Mobile Vehicle-Mount - 5 dB Gain (Mobitex only) MaxRad Model: Z573 Mobile Vehicle-Mount - 5 dB Gain (Mobitex only)</b>

This mobile device with co-located transmitters has been shown to be compliant for localized Maximum Permissible Exposure (MPE) for Uncontrolled Exposure / General Population limits specified in FCC 47 CFR §1.1310 & RSS-102 Issue 1 (Provisional) of Industry Canada, and has been evaluated in accordance with the procedures specified in FCC OET Bulletin 65, Edition 97-01, Health Canada's Safety Code 6, ANSI / IEEE C95.1-1992, and ANSI / IEEE C95.3-1992.

I attest to the accuracy of data. All measurements and/or calculations 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.

This evaluation report shall not be reproduced partially, or in full, without the prior written approval of Celltech Labs Inc. The results and statements contained in this report pertain only to the device(s) evaluated.



**Russell Pipe**  
 Senior Compliance Technologist  
 Celltech Labs Inc.



## 1.1 MPE Calculation Data

### 1. Itronix IX260 Swivel Dipole Antenna

Tx Frequency: **900.00** (MHz)  
 Source Based Time Averaged Power at Antenna Input Terminal: **27.10** (dBm)  
 Antenna gain (typical)+9dB for 8-element array: **2.60** (dBi)

S= **0.60** (mW/cm<sup>2</sup>)  
 P= **512.8614** (mW)  
 G= **1.82** (numeric)

**R = 11.13 (cm)**

Field Density @ 20 cm = 0.186 (mW/cm<sup>2</sup>)



Itronix IX260 Swivel Dipole Antenna

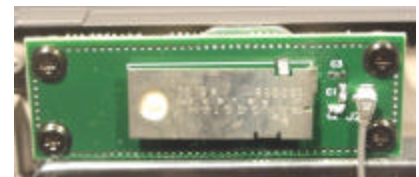
### 2. Rangestar 802.11b Internal Antenna

Tx Frequency: **2450.00** (MHz)  
 Maximum Peak Power at Antenna Input Terminal: **21.20** (dBm)  
 Antenna gain (typical)+9dB for 8-element array: **4.50** (dBi)

S= **1.00** (mW/cm<sup>2</sup>)  
 P= **131.8257** (mW)  
 G= **2.82** (numeric)

**R = 5.44 (cm)**

Field Density @ 20 cm = 0.074 (mW/cm<sup>2</sup>)



Rangestar 802.11b Internal Antenna

According to FCC training materials (May 2003):

Multiple frequency exposure criteria, the ratio of field strength or power density to the applicable exposure limit at the exposure location should be determined for each transmitter and the sum of these ratios must not exceed 1.0.

Ratio 1	Ratio 2	Limit
0.186/0.6	0.074/1.0	< 1.0
= 0.31	= 0.074	< 1.0
Sum = 0.384 (mW/cm <sup>2</sup> )		< 1.0

### 3. MaxRad Z563 Unity Gain Antenna

Tx Frequency: **900.00** (MHz)  
 Source Based Time Averaged Power at Antenna Input Terminal: **27.10** (dBm)  
 Antenna gain (typical)+9dB for 8-element array: **2.14** (dBi)

S= **0.60** (mW/cm<sup>2</sup>)  
 P= **512.8614** (mW)  
 G= **1.64** (numeric)

**R = 10.55 (cm)**



Z563

### 4. MaxRad Z567 & Z573 5 dBd Gain Antennas

Tx Frequency: **900.00** (MHz)  
 Source Based Time Averaged Power at Antenna Input Terminal: **27.10** (dBm)  
 Antenna gain (typical)+9dB for 8-element array: **7.14** (dBi)

S= **0.60** (mW/cm<sup>2</sup>)  
 P= **512.8614** (mW)  
 G= **5.18** (numeric)

**R = 18.76 (cm)**



Z567

Z573

#### 2.1 Calculation to determine MPE

$$S = \frac{PG}{4\pi R^2}$$

$$R = \sqrt{\frac{PG}{4\pi S}}$$

**S=** power density  
**P=** power input to the antenna  
**G=** power gain of the antenna in the direction of interest relative to an isotropic radiator  
**R=** distance to the center of radiation of the antenna

### 3.1 MPE Limits

According to FCC 47 CFR 1.1310: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b).

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Average Time (minutes)
<b>(A)Limits For Occupational / Control Exposures</b>				
30-300	61.4	0.163	1.0	6
300-1500	...	...	F/300	6
1500-100,000	...	...	5	6
<b>(B)Limits For General Population / Uncontrolled Exposure</b>				
30-300	27.5	0.073	0.2	30
300-1500	...	...	F/1500	30
1500-100,000	...	...	1.0	30

F = Frequency in MHz

### 4.1 Summary

The Maximum Permissible Exposure (MPE) limit for the frequency range in the Mobitex band (900MHz) is 0.6 mW/cm<sup>2</sup> (F/1500), and 1.0 mW/cm<sup>2</sup> in the 2450MHz frequency range for the General Population / Uncontrolled Exposure environment. The data in this report demonstrates that the Itronix Corporation Model: IX260 Rugged Laptop PC FCC ID: KBCIX260MPIRIM902 with RIM 902 Mobitex Radio Modem, external dipole antenna, and (3) mobile vehicle-mount antennas, co-located with Cisco MPI-350 Mini-PCI DSSS WLAN Card and internal surface-mount antenna, complies with the Maximum Permissible Exposure (MPE) requirements specified in FCC §2.1091, §1.1310, OET Bulletin 65 (Edition 97-01), and Health Canada's Safety Code 6 for the General Population / Uncontrolled Exposure environment.