

## RF Exposure Evaluation - Maximum Permissible Exposure (MPE)

### 1. Introduction

This document attempts to prove the safety of radiation generated by RF devices to the human body. The limit for Maximum Permissible Exposure (MPE), specified in FCC 1.1210, is listed below. The power generated by this product is measured by a power meter. Through use of the Friis transmission formula and the maximum gain of the antenna, the distance from the product at which compliance with the MPE limit is achieved may be calculated. Alternatively, near field measurements may be performed to demonstrate compliance at a specific measurement distance.

Near field probe: Wandel & Goltermann EMR-20.

### 2. RF Exposure Limit

According to FCC 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)
(A) Limits For Occupational / Control Exposures				
30-300	61.4	.163	1.0	6
300-1500	...	...	F/300	6
1500-100,000	...	...	5	6
(B) Limits For General Population / Uncontrolled Exposure				
30-300	27.5	.073	.2	30
300-1500	...	...	F/1500	30
1500-100,000	...	...	1.0	30

F = Frequency in MHz

### 3. Friis Formula

Friis transmission formula:  $P_d = (P_{out} * G) / (4\pi r^2)$

Where:

$P_d$  = power density in mW/cm<sup>2</sup> (MPE limit)

$P_{out}$  = output power to antenna in mW

G = gain of antenna in linear scale

p = 3.1416

r = distance between observation point and center of the radiator in cm

Ref.: David K. Cheng, Field and Wave Electromagnetics, Second Edition, Page 640, Eq. (11.133)

### 4. EUT Operating Condition

PCTEST MPE REPORT		FCC CERTIFICATION REPORT		REVIEWED BY: QUALITY MANAGER
				
<b>TEST REPORT S/N:</b> 0512120845	<b>TEST DATES:</b> Dec. 14-16, 2005	<b>EUT TYPE:</b> Notebook PC w/ Sierra EVDO, Bluetooth & WLAN	<b>FCC ID:</b> ACJ9TGCF-741	PAGE 1 OF 3



Software provided by the client enabled the EUT to transmit and receive data at lowest, middle, and highest channels individually.

**5. Climate Condition**

The temperature and relative humidity: 22.2°C and 74% RH

**6. Measurement Results**

Frequency (MHz)	Level (dBm)	Measurement Distance	Front MPE reading mW/cm <sup>2</sup>	Rear MPE reading mW/cm <sup>2</sup>	Right MPE reading mW/cm <sup>2</sup>	Left MPE reading mW/cm <sup>2</sup>	Limit
<b>824.70</b>	<b>25.02</b>	<b>20cm</b>	<b>.082</b>	<b>.109</b>	<b>.063</b>	<b>.111</b>	<b>.537</b>
2412	18.50						
2402	12.41						
5260 *	19.6	20cm	.089	.102	.060	.105	

Frequency (MHz)	Level (dBm)	Measurement Distance	Front MPE reading mW/cm <sup>2</sup>	Rear MPE reading mW/cm <sup>2</sup>	Right MPE reading mW/cm <sup>2</sup>	Left MPE reading mW/cm <sup>2</sup>	Limit
<b>835.89</b>	<b>25.5</b>	<b>20cm</b>	<b>.072</b>	<b>.112</b>	<b>.062</b>	<b>.122</b>	<b>.543</b>
2437	18.40						
2441	12.75						
5260 *	19.6	20 cm	.068	.107	.060	.117	

Frequency (MHz)	Level (dBm)	Measurement Distance	Front MPE reading mW/cm <sup>2</sup>	Rear MPE reading mW/cm <sup>2</sup>	Right MPE reading mW/cm <sup>2</sup>	Left MPE reading mW/cm <sup>2</sup>	Limit
<b>848.31</b>	<b>25.1</b>	<b>20cm</b>	<b>.057</b>	<b>.104</b>	<b>.071</b>	<b>.100</b>	<b>.547</b>
2462	18.0						
2480	12.8						
5260*	19.6	20cm	.048	.099	.065	.094	

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Frequency (MHz)	Level (dBm)	Measurement Distance	Front MPE reading mW/cm <sup>2</sup>	Rear MPE reading mW/cm <sup>2</sup>	Right MPE reading mW/cm <sup>2</sup>	Left MPE reading mW/cm <sup>2</sup>	Limit
<b>1851.25</b>	<b>25.8</b>	<b>20cm</b>	<b>.082</b>	<b>.091</b>	<b>.075</b>	<b>.089</b>	<b>1.00</b>
2412	18.50						
2402	12.41						
5260*	19.6	20 cm	.076	.090	.071	.079	

Frequency (MHz)	Level (dBm)	Measurement Distance	Front MPE reading mW/cm <sup>2</sup>	Rear MPE reading mW/cm <sup>2</sup>	Right MPE reading mW/cm <sup>2</sup>	Left MPE reading mW/cm <sup>2</sup>	Limit
<b>1880</b>	<b>26.3</b>	<b>20cm</b>	<b>.072</b>	<b>.089</b>	<b>.071</b>	<b>.093</b>	<b>1.00</b>
2437	18.40						
2441	12.75						
5260*	19.6	20 cm	.070	.082	.066	.089	

Frequency (MHz)	Level (dBm)	Measurement Distance	Front MPE reading mW/cm <sup>2</sup>	Rear MPE reading mW/cm <sup>2</sup>	Right MPE reading mW/cm <sup>2</sup>	Left MPE reading mW/cm <sup>2</sup>	Limit
<b>1908.75</b>	<b>26.3</b>	<b>20cm</b>	<b>.062</b>	<b>.090</b>	<b>.064</b>	<b>.092</b>	<b>1.00</b>
2462	18.0						
2480	12.61						
5260*	19.6	20 cm	.056	.084	.052	.085	

1. Data taken with the BT and the Licensed transmitter operating simultaneously with either the WLAN or the U:NIJ transmitter.
2. \* **All UNII data was taken with a data rate of 6 Mbps for the highest output channel**

## 7. Conclusion

The device meets the mobile 20cm separation distance as specified in Section 2.1091 of the FCC Rules. An appropriate RF exposure compliance statement will be placed in the user's manual.

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