

# RF Exposure Evaluation declaration

Product Name : Mini PCI Card

Model No.: MS-6833

FCC ID: I4L-MS6833

Applicant : MICRO-STAR INT'L Co., LTD

Address : No 69, Li-De st., Jung-He City, Taipei Hsien, Taiwan, R.O.C

Date of Receipt : Feb. 18. 2004

Date of Declaration : Feb. 27. 2004

Report No. : 042L121FI

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## 1. RF Exposure Evaluation

### 1.1. Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment 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				
300-1500	--	--	F/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	F/1500	6
1500-100,000	--	--	1	30

F= Frequency in MHz

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>

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

G = gain of antenna in linear scale

$\pi$  = 3.1416

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

$P_d$  is the limit of MPE, 1 mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

### 1.2. Test Procedure

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

The temperature and related humidity: 18 and 78% RH.

**1.3. Test Result of RF Exposure Evaluation**

Product : Mini PCI Card  
 Test Item : RF Exposure Evaluation  
 Test Site : No.3 OATS

**Antenna Gain**

Antenna Gain: The maximum Gain measured in fully anechoic chamber in linear scale.

**(802.11b FIC Antenna)**

**Output Power Into Antenna & RF Exposure Evaluation Distance (1.56 dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 2.5 cm (mW/cm <sup>2</sup> )
1	2412.00	9.8628	0.1799
6	2437.00	9.0573	0.1652
11	2462.00	10.1625	0.1853

**(802.11g FIC Antenna)**

**Output Power Into Antenna & RF Exposure Evaluation Distance (1.56 dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 2.5 cm (mW/cm <sup>2</sup> )
1	2412.00	21.3304	0.3890
6	2437.00	19.4536	0.3547
11	2462.00	21.8273	0.3980

**(802.11b M300N Antenna)**

**Output Power Into Antenna & RF Exposure Evaluation Distance (-2.42 dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 2.5 cm (mW/cm <sup>2</sup> )
1	2412.00	9.8628	0.0719
6	2437.00	9.0573	0.0661
11	2462.00	10.1625	0.0741

**(802.11g M300N Antenna)**
**Output Power Into Antenna & RF Exposure Evaluation Distance (-2.42 dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 2.5 cm (mW/cm <sup>2</sup> )
1	2412.00	21.3304	0.1556
6	2437.00	19.4536	0.1419
11	2462.00	21.8273	0.1592

**(802.11b CLEVO 5600 Antenna)**
**Output Power Into Antenna & RF Exposure Evaluation Distance (-0.45dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 2.5 cm (mW/cm <sup>2</sup> )
1	2412.00	9.8628	0.1132
6	2437.00	9.0573	0.1040
11	2462.00	10.1625	0.1167

**(802.11g CLEVO 5600 Antenna)**
**Output Power Into Antenna & RF Exposure Evaluation Distance (-0.45dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 2.5 cm (mW/cm <sup>2</sup> )
1	2412.00	21.3304	0.2449
6	2437.00	19.4536	0.2233
11	2462.00	21.8273	0.2506

**(802.11b MS-1002 Antenna)**
**Output Power Into Antenna & RF Exposure Evaluation Distance (2.99 dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 2.5 cm (mW/cm <sup>2</sup> )
1	2412.00	9.8628	0.2500
6	2437.00	9.0573	0.2296
11	2462.00	10.1625	0.2576

**(802.11g MS-1002 Antenna)**

**Output Power Into Antenna & RF Exposure Evaluation Distance (2.99 dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 2.5 cm (mW/cm <sup>2</sup> )
1	2412.00	21.3304	0.5406
6	2437.00	19.4536	0.4931
11	2462.00	21.8273	0.5532

**(802.11b 258KA0 Antenna)**

**Output Power Into Antenna & RF Exposure Evaluation Distance (0.13 dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 2.5 cm (mW/cm <sup>2</sup> )
1	2412.00	9.8628	0.1294
6	2437.00	9.0573	0.1188
11	2462.00	10.1625	0.1333

**(802.11g 258KA0 Antenna)**

**Output Power Into Antenna & RF Exposure Evaluation Distance (0.13 dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 2.5 cm (mW/cm <sup>2</sup> )
1	2412.00	21.3304	0.2798
6	2437.00	19.4536	0.2552
11	2462.00	21.8273	0.2864

**(802.11b ADA3P-713K601 Antenna)**

**Output Power Into Antenna & RF Exposure Evaluation Distance (2 dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 2.5 cm (mW/cm <sup>2</sup> )
1	2412.00	9.8628	0.1990
6	2437.00	9.0573	0.1828
11	2462.00	10.1625	0.2051

**(802.11g ADA3P-713K601 Antenna)**
**Output Power Into Antenna & RF Exposure Evaluation Distance (2 dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 2.5 cm (mW/cm <sup>2</sup> )
1	2412.00	21.3304	0.4304
6	2437.00	19.4536	0.3926
11	2462.00	21.8273	0.4405

**(802.11b CLEVO 285P Antenna)**
**Output Power Into Antenna & RF Exposure Evaluation Distance (0.47 dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 2.5 cm (mW/cm <sup>2</sup> )
1	2412.00	9.8628	0.1399
6	2437.00	9.0573	0.1285
11	2462.00	10.1625	0.1442

**(802.11g CLEVO 285P Antenna)**
**Output Power Into Antenna & RF Exposure Evaluation Distance (0.47 dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 2.5 cm (mW/cm <sup>2</sup> )
1	2412.00	21.3304	0.3026
6	2437.00	19.4536	0.2760
11	2462.00	21.8273	0.3097

**(802.11b E12B Antenna)**
**Output Power Into Antenna & RF Exposure Evaluation Distance (1.92 dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 2.5 cm (mW/cm <sup>2</sup> )
1	2412.00	9.8628	0.1954
6	2437.00	9.0573	0.1794
11	2462.00	10.1625	0.2013

**(802.11g E12B Antenna)**

**Output Power Into Antenna & RF Exposure Evaluation Distance (1.92 dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 2.5 cm (mW/cm <sup>2</sup> )
1	2412.00	21.3304	0.4226
6	2437.00	19.4536	0.3854
11	2462.00	21.8273	0.4324

**(802.11b CLEVO 888E Antenna)**

**Output Power Into Antenna & RF Exposure Evaluation Distance (3.12 dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 2.5 cm (mW/cm <sup>2</sup> )
1	2412.00	9.8628	0.2576
6	2437.00	9.0573	0.2365
11	2462.00	10.1625	0.2654

**(802.11g CLEVO 888E Antenna)**

**Output Power Into Antenna & RF Exposure Evaluation Distance (3.12 dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 2.5 cm (mW/cm <sup>2</sup> )
1	2412.00	21.3304	0.5571
6	2437.00	19.4536	0.5081
11	2462.00	21.8273	0.5700

The distance r (4<sup>th</sup> column) calculated from the Friis transmission formula is far shorter than 2.5 cm separation requirement.