

# RF Exposure Evaluation declaration

Product Name : Wireless to Serial Module

Model No. : WE-2100T

FCC ID SLEWE2100T

Applicant : Moxa Technologies Co., Ltd

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Date of Receipt : March 21, 2007

Date of Declaration : June 13, 2007

Report No. : 075L129-RFUSP05V01

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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

The EUT can be only operated within 2.4G band or 5GHz band.

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 : Wireless to Serial Module  
 Test Item : RF Exposure Evaluation  
 Test Site : CTR1

#### Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.0dBi in logarithm scale.

#### 802.11b (2412~2462)

##### Output Power Into Antenna & RF Exposure Evaluation Distance (2.0dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
1	2412.00	60.9537	0.0192
6	2437.00	54.7016	0.0172
11	2462.00	51.9996	0.0164

The distance r (4<sup>th</sup> column) calculated from the Friis transmission formula is far shorter than 20 cm separation requirement.

#### 802.11g (2412~2462)

##### Output Power Into Antenna & RF Exposure Evaluation Distance (2.0dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
1	2412.00	47.2063	0.0149
6	2437.00	43.3511	0.0137
11	2462.00	38.1944	0.0120

The distance r (4<sup>th</sup> column) calculated from the Friis transmission formula is far shorter than 20 cm separation requirement.

**802.11a (5150~5250)**
**Output Power Into Antenna & RF Exposure Evaluation Distance (2.0dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
1	5180.00	30.3389	0.0096
3	5220.00	27.7971	0.0088
4	5240.00	29.9226	0.0094

The distance r (4<sup>th</sup> column) calculated from the Fries transmission formula is far shorter than 20 cm separation requirement.

**802.11a (5725~5825)**
**Output Power Into Antenna & RF Exposure Evaluation Distance (2.0dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
5	5745.00	30.3389	0.0096
7	5785.00	27.7971	0.0088
8	5805.00	27.6694	0.0230

The distance r (4<sup>th</sup> column) calculated from the Fries transmission formula is far shorter than 20 cm separation requirement.