

# RF Exposure Evaluation declaration

Product Name : 2G Wireless NPort

Model No. : NPort W2150 Plus, NPort W2250

Plus, NPort W2150 Plus-T, NPort

W2250 Plus-T

FCC ID SLEW2250Plus

Applicant : Moxa Inc.

Address : Fl.4, No. 135, Lane 235, Pao-Chiao Rd., Shing Tien City,  
Taipei, Taiwan, R.O.C.

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Date of Declaration : June. 19, 2008

Report No. : 086111R-RFUSP05V01

The declaration results relate only to the samples calculated.

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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:  $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

$P_d$  = power density in  $\text{mW/cm}^2$

$P_{out}$  = 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,  $1 \text{ mW/cm}^2$ . 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:  $18^\circ\text{C}$  and 78% RH.

### 1.3. Test Result of RF Exposure Evaluation

Product : 2G Wireless NPort  
Test Item : RF Exposure Evaluation  
Test Site : CTR1

#### Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is Ant 1: 1.76dBi(2.4GHz band) and Ant2: 1.73dBi(5GHz band) in logarithm scale.

#### 802.11b (2412~2462MHz)

##### Output Power Into Antenna & RF Exposure Evaluation Distance (1.76dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
1	2412.00	69.6627	0.020784
6	2437.00	81.6582	0.024363
11	2462.00	86.2979	0.025747

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

#### 802.11g (2412~2462MHz)

##### Output Power Into Antenna & RF Exposure Evaluation Distance (1.76dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
1	2412.00	85.7038	0.025570
6	2437.00	147.2313	0.043927
11	2462.00	72.6106	0.021664

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

**802.11a (5180~5240MHz)**
**Output Power Into Antenna & RF Exposure Evaluation Distance (1.73dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
1	5180.00	44.4631	0.013174
3	5220.00	44.0555	0.013054
4	5240.00	43.9542	0.013024

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

**802.11a (5745~5805MHz)**
**Output Power Into Antenna & RF Exposure Evaluation Distance (1.73dBi):**

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
5	5745.00	73.1139	0.021664
7	5785.00	70.3072	0.020832
8	5805.00	72.7780	0.021564

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