

RF Exposure Evaluation declaration

Product Name : MOXA IEEE802.11a/b/g mini PCI module

Model No. : WAPA003

FCC ID : SLE-WAPA003-1

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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Report No. : 124286R-RFUSP42V01

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 ²)	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/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d is the limit of MPE, 1 mW/cm². 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°C and 78% RH.

1.3. Test Result of RF Exposure Evaluation

Product : MOXA IEEE802.11a/b/g mini PCI module
 Test Item : RF Exposure Evaluation
 Test Site : No.3 OATS

(802.11b) Output Power Into Antenna & RF Exposure Evaluation Distance (4.62dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
01	2412.00	67.1429	0.038702
06	2437.00	55.3350	0.031896
11	2462.00	33.2660	0.019175

Power density in column 4 is much lower than the limit (1 mW/cm²).

(802.11g) Output Power Into Antenna & RF Exposure Evaluation Distance (4.62dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
01	2412.00	123.3105	0.071077
06	2437.00	164.0590	0.094565
11	2462.00	119.1242	0.068664

Power density in column 4 is much lower than the limit (1 mW/cm²).

(802.11a) Output Power Into Antenna & RF Exposure Evaluation Distance (2.34dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
149	5745	87.7001	0.029904
157	5785	74.9894	0.025570
165	5825	66.6807	0.022737

Power density in column 4 is much lower than the limit (1 mW/cm²).

(Turbo Mode_2.4G) Output Power Into Antenna & RF Exposure Evaluation Distance (4.62dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
06	2437	121.6186	0.070102

Power density in column 4 is much lower than the limit (1 mW/cm²).

(Turbo Mode_5G) Output Power Into Antenna & RF Exposure Evaluation Distance (2.34dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
152	5760	81.8465	0.027908
160	5800	70.9578	0.024195

Power density in column 4 is much lower than the limit (1 mW/cm²).

(802.11a) Output Power Into Antenna & RF Exposure Evaluation Distance (2.34dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
36	5180.00	9.8175	0.003348
44	5220.00	9.0157	0.003074
48	5240.00	9.2897	0.003168
52	5260.00	86.2979	0.029426
60	5300.00	86.8960	0.029630
64	5320.00	35.8922	0.012239
100	5500.00	23.8781	0.008142
120	5600.00	17.6604	0.006022
140	5700.00	17.8238	0.006078

Power density in column 4 is much lower than the limit (1 mW/cm²).

(Turbo Mode_5G) Output Power Into Antenna & RF Exposure Evaluation Distance (2.34dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
42	5210	10.2565	0.003497
58	5290	79.0679	0.026961

Power density in column 4 is much lower than the limit (1 mW/cm²).

(4.9GHz) Output Power Into Antenna & RF Exposure Evaluation Distance (2.34dBi):

Channel	Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
1	4960	7.0307	0.002397
2	4980	8.1846	0.002791

Power density in column 4 is much lower than the limit (1 mW/cm²).