

RF Exposure Evaluation declaration

Product Name	MOXA IEEE 802.11a/n/ac 4*4 module
Model No.	WAPC002
FCC ID	SLE-WAPC002

Applicant	MOXA Inc.
Address	FL.4, NO. 135. LANE 235, BAOQIAO RD. XINDIAN DIST., NEW TAIPEI CITY, TAIWAN

Date of Receipt	Apr. 20, 2018
Date of Declaration	Sep. 14, 2018
Report No.	1840253R-RFUSP50V00-A

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

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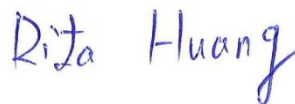
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Product Name	MOXA IEEE 802.11a/n/ac 4*4 module
Applicant	MOXA Inc.
Address	FL.4, NO. 135. LANE 235, BAOQIAO RD. XINDIAN DIST., NEW TAIPEI CITY, TAIWAN
Manufacturer	MOXA Inc.
Model No.	WAPC002
FCC ID.	SLE-WAPC002
EUT Rated Voltage	DC 3.3V
EUT Test Voltage	AC 120V/60Hz
Trade Name	MOXA
Applicable Standard	FCC 47 CFR 1.1310
Test Result	Complied

Documented By :



(Senior Adm. Specialist / Rita Huang)

Tested By :



(Engineer / Sam Hsu)

Approved By :



(Director / Vincent Lin)

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 IEEE 802.11a/n/ac 4*4 module
Test Item : RF Exposure Evaluation
Test Site : No.3 OATS
Test Mode : Antenna No.1

For 5GHz:

Operation Frequency Range	5180-5240MHz, 5260-5320MHz, 5500-5700MHz, 5745-5825MHz, 5190-5230MHz, 5270-5310MHz, 5510-5670MHz, 5755-5795MHz, 5720 MHz, 5710MHz, 5210-5290MHz, 5530-5690MHz, 5775MHz
Maximum Conducted output power	26.67dBm
Antenna gain	8.18dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
464.5152752	0.6078

Power density is lower than the limit (1 mW/cm²).

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : RF Exposure Evaluation
Test Site : No.3 OATS
Test Mode : Antenna No.2

For 5GHz:

Operation Frequency Range	5180-5240MHz, 5260-5320MHz, 5500-5700MHz, 5745-5825MHz, 5190-5230MHz, 5270-5310MHz, 5510-5670MHz, 5755-5795MHz, 5720 MHz, 5710MHz, 5210-5290MHz, 5530-5690MHz, 5775MHz
Maximum Conducted output power	22.65dBm
Antenna gain	23dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Output Power to Antenna (mW)	Power Density at R = 60 cm (mW/cm ²)
184.0772001	0.8119

Power density is lower than the limit (1 mW/cm²).

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : RF Exposure Evaluation
Test Site : No.3 OATS
Test Mode : Antenna No.3

For 5GHz:

Operation Frequency Range	5180-5240MHz, 5260-5320MHz, 5500-5700MHz, 5745-5825MHz, 5190-5230MHz, 5270-5310MHz, 5510-5670MHz, 5755-5795MHz, 5720 MHz, 5710MHz, 5210-5290MHz, 5530-5690MHz, 5775MHz
Maximum Conducted output power	26.63dBm
Antenna gain	12dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Output Power to Antenna (mW)	Power Density at R = 30 cm (mW/cm ²)
460.2565736	0.6450

Power density is lower than the limit (1 mW/cm²).

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : RF Exposure Evaluation
Test Site : No.3 OATS
Test Mode : Antenna No.4

For 5GHz:

Operation Frequency Range	5180-5240MHz, 5260-5320MHz, 5500-5700MHz, 5745-5825MHz, 5190-5230MHz, 5270-5310MHz, 5510-5670MHz, 5755-5795MHz, 5720 MHz, 5710MHz, 5210-5290MHz, 5530-5690MHz, 5775MHz
Maximum Conducted output power	26.66dBm
Antenna gain	10.5dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Output Power to Antenna (mW)	Power Density at R = 30 cm (mW/cm ²)
463.4469197	0.4598

Power density is lower than the limit (1 mW/cm²).

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : RF Exposure Evaluation
Test Site : No.3 OATS
Test Mode : Antenna No.5

For 5GHz:

Operation Frequency Range	5180-5240MHz, 5260-5320MHz, 5500-5700MHz, 5745-5825MHz, 5190-5230MHz, 5270-5310MHz, 5510-5670MHz, 5755-5795MHz, 5720 MHz, 5710MHz, 5210-5290MHz, 5530-5690MHz, 5775MHz
Maximum Conducted output power	25.66dBm
Antenna gain	18dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Output Power to Antenna (mW)	Power Density at R = 50 cm (mW/cm ²)
368.1289736	0.7394

Power density is lower than the limit (1 mW/cm²).

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : RF Exposure Evaluation
Test Site : No.3 OATS
Test Mode : Antenna No.6

For 5GHz:

Operation Frequency Range	5180-5240MHz, 5260-5320MHz, 5500-5700MHz, 5745-5825MHz, 5190-5230MHz, 5270-5310MHz, 5510-5670MHz, 5755-5795MHz, 5720 MHz, 5710MHz, 5210-5290MHz, 5530-5690MHz, 5775MHz
Maximum Conducted output power	25.66dBm
Antenna gain	18dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Output Power to Antenna (mW)	Power Density at R = 50 cm (mW/cm ²)
368.1289736	0.7394

Power density is lower than the limit (1 mW/cm²).

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : RF Exposure Evaluation
Test Site : No.3 OATS
Test Mode : Antenna No.7

For 5GHz:

Operation Frequency Range	5180-5240MHz, 5260-5320MHz, 5500-5700MHz, 5745-5825MHz, 5190-5230MHz, 5270-5310MHz, 5510-5670MHz, 5755-5795MHz, 5720 MHz, 5710MHz, 5210-5290MHz, 5530-5690MHz, 5775MHz
Maximum Conducted output power	26.66dBm
Antenna gain	0.81dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
463.4469197	0.1111

Power density is lower than the limit (1 mW/cm²).

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : RF Exposure Evaluation
Test Site : No.3 OATS
Test Mode : Antenna No.8

For 5GHz:

Operation Frequency Range	5180-5240MHz, 5260-5320MHz, 5500-5700MHz, 5745-5825MHz, 5190-5230MHz, 5270-5310MHz, 5510-5670MHz, 5755-5795MHz, 5720 MHz, 5710MHz, 5210-5290MHz, 5530-5690MHz, 5775MHz
Maximum Conducted output power	23.87dBm
Antenna gain	12dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
243.7810818	0.7687

Power density is lower than the limit (1 mW/cm²).

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : RF Exposure Evaluation
Test Site : No.3 OATS
Test Mode : Antenna No.9

For 5GHz:

Operation Frequency Range	5180-5240MHz, 5260-5320MHz, 5500-5700MHz, 5745-5825MHz, 5190-5230MHz, 5270-5310MHz, 5510-5670MHz, 5755-5795MHz, 5720 MHz, 5710MHz, 5210-5290MHz, 5530-5690MHz, 5775MHz
Maximum Conducted output power	26.64dBm
Antenna gain	5.2dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
461.3175746	0.3039

Power density is lower than the limit (1 mW/cm²).

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : RF Exposure Evaluation
Test Site : No.3 OATS
Test Mode : Antenna No.10

For 5GHz:

Operation Frequency Range	5180-5240MHz, 5260-5320MHz, 5500-5700MHz, 5745-5825MHz, 5190-5230MHz, 5270-5310MHz, 5510-5670MHz, 5755-5795MHz, 5720 MHz, 5710MHz, 5210-5290MHz, 5530-5690MHz, 5775MHz
Maximum Conducted output power	26.66dBm
Antenna gain	2.34dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
463.4469197	0.1580

Power density is lower than the limit (1 mW/cm²).

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : RF Exposure Evaluation
Test Site : No.3 OATS
Test Mode : Antenna No.11

For 5GHz:

Operation Frequency Range	5180-5240MHz, 5260-5320MHz, 5500-5700MHz, 5745-5825MHz, 5190-5230MHz, 5270-5310MHz, 5510-5670MHz, 5755-5795MHz, 5720 MHz, 5710MHz, 5210-5290MHz, 5530-5690MHz, 5775MHz
Maximum Conducted output power	26.62dBm
Antenna gain	6.3dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
459.1980128	0.3897

Power density is lower than the limit (1 mW/cm²).

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : RF Exposure Evaluation
Test Site : No.3 OATS
Test Mode : Antenna No.12

For 5GHz:

Operation Frequency Range	5180-5240MHz, 5260-5320MHz, 5500-5700MHz, 5745-5825MHz, 5190-5230MHz, 5270-5310MHz, 5510-5670MHz, 5755-5795MHz, 5720 MHz, 5710MHz, 5210-5290MHz, 5530-5690MHz, 5775MHz
Maximum Conducted output power	22.65dBm
Antenna gain	1.8dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
184.0772001	0.0554

Power density is lower than the limit (1 mW/cm²).

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : RF Exposure Evaluation
Test Site : No.3 OATS
Test Mode : Antenna No.13

For 5GHz:

Operation Frequency Range	5180-5240MHz, 5260-5320MHz, 5500-5700MHz, 5745-5825MHz, 5190-5230MHz, 5270-5310MHz, 5510-5670MHz, 5755-5795MHz, 5720 MHz, 5710MHz, 5210-5290MHz, 5530-5690MHz, 5775MHz
Maximum Conducted output power	22.65dBm
Antenna gain	2dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
184.0772001	0.0580

Power density is lower than the limit (1 mW/cm²).

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : RF Exposure Evaluation
Test Site : No.3 OATS
Test Mode : Antenna No.14

For 5GHz:

Operation Frequency Range	5180-5240MHz, 5260-5320MHz, 5500-5700MHz, 5745-5825MHz, 5190-5230MHz, 5270-5310MHz, 5510-5670MHz, 5755-5795MHz, 5720 MHz, 5710MHz, 5210-5290MHz, 5530-5690MHz, 5775MHz
Maximum Conducted output power	26.64dBm
Antenna gain	7dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
461.3175746	0.4600

Power density is lower than the limit (1 mW/cm²).

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : RF Exposure Evaluation
Test Site : No.3 OATS
Test Mode : Antenna No.15

For 5GHz:

Operation Frequency Range	5180-5240MHz, 5260-5320MHz, 5500-5700MHz, 5745-5825MHz, 5190-5230MHz, 5270-5310MHz, 5510-5670MHz, 5755-5795MHz, 5720 MHz, 5710MHz, 5210-5290MHz, 5530-5690MHz, 5775MHz
Maximum Conducted output power	25.97dBm
Antenna gain	9dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
395.3666201	0.6248

Power density is lower than the limit (1 mW/cm²).

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : RF Exposure Evaluation
Test Site : No.3 OATS
Test Mode : Antenna No.16

For 5GHz:

Operation Frequency Range	5180-5240MHz, 5260-5320MHz, 5500-5700MHz, 5745-5825MHz, 5190-5230MHz, 5270-5310MHz, 5510-5670MHz, 5755-5795MHz, 5720 MHz, 5710MHz, 5210-5290MHz, 5530-5690MHz, 5775MHz
Maximum Conducted output power	26dBm
Antenna gain	9dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
398.1071706	0.6291

Power density is lower than the limit (1 mW/cm²).

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : RF Exposure Evaluation
Test Site : No.3 OATS
Test Mode : Antenna No.17

For 5GHz:

Operation Frequency Range	5180-5240MHz, 5260-5320MHz, 5500-5700MHz, 5745-5825MHz, 5190-5230MHz, 5270-5310MHz, 5510-5670MHz, 5755-5795MHz, 5720 MHz, 5710MHz, 5210-5290MHz, 5530-5690MHz, 5775MHz
Maximum Conducted output power	25.43dBm
Antenna gain	8dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
439.5416154	0.5517

Power density is lower than the limit (1 mW/cm²).

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : RF Exposure Evaluation
Test Site : No.3 OATS
Test Mode : Antenna No.18

For 5GHz:

Operation Frequency Range	5180-5240MHz, 5260-5320MHz, 5500-5700MHz, 5745-5825MHz, 5190-5230MHz, 5270-5310MHz, 5510-5670MHz, 5755-5795MHz, 5720 MHz, 5710MHz, 5210-5290MHz, 5530-5690MHz, 5775MHz
Maximum Conducted output power	25.63dBm
Antenna gain	15dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Output Power to Antenna (mW)	Power Density at R = 40 cm (mW/cm ²)
365.5947916	0.5750

Power density is lower than the limit (1 mW/cm²).

Product : MOXA IEEE 802.11a/n/ac 4*4 module
Test Item : RF Exposure Evaluation
Test Site : No.3 OATS
Test Mode : Antenna No.19

For 5GHz:

Operation Frequency Range	5180-5240MHz, 5260-5320MHz, 5500-5700MHz, 5745-5825MHz, 5190-5230MHz, 5270-5310MHz, 5510-5670MHz, 5755-5795MHz, 5720 MHz, 5710MHz, 5210-5290MHz, 5530-5690MHz, 5775MHz
Maximum Conducted output power	25.64dBm
Antenna gain	8.5dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
366.4375746	0.5161

Power density is lower than the limit (1 mW/cm²).