

RF Exposure Evaluation declaration

Product Name : Industrial IEEE 802.11a/b/g wireless Access Point/Bridge/Client
Model No. : AWK-3121-US, AWK-3121-US-T
FCC ID : SLE-AWK-3121

Applicant : Moxa Technologies Co., Ltd

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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 : Industrial IEEE 802.11a/b/g wireless Access Point/Bridge/Client
 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 (2412~2462MHz)

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 ²)
1	2412.00	54.8277	0.017287
6	2437.00	98.4011	0.031026
11	2462.00	39.8107	0.012553

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

802.11g (2412~2462MHz)

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 ²)
1	2412.00	42.3643	0.013358
6	2437.00	199.5262	0.062912
11	2462.00	36.4754	0.011501

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

802.11a (5180~5240MHz)
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 ²)
1	5180.00	17.4582	0.005505
3	5220.00	28.4446	0.008969
4	5240.00	16.3682	0.005161

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

802.11a (5745~5825MHz)
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 ²)
5	5745.00	183.2314	0.057774
7	5785.00	194.5360	0.061338
8	5825.00	210.3778	0.066333

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