

RF Exposure Evaluation declaration

Product Name : Wireless Outdoor Bridge

Model No. : ZA-5000-D

FCC ID. : UDKZA5000D

Applicant : Nanjing Z-COM Wireless Co., Ltd.

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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 : Wireless Outdoor Bridge (ZA-5000-D)
 Test Item : RF Exposure Evaluation
 Test Site : AC-3
 Test Mode : Transmitter

For 802.11b:

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2dBi or 1.58 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
01	2412.00	147.9108	0.0466
06	2437.00	123.8797	0.0391
11	2462.00	108.3927	0.0342

For 802.11g:

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2dBi or 1.58 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
01	2412.00	151.0080	0.0476
06	2437.00	270.3958	0.0853
11	2462.00	130.3167	0.0411

For 802.11a (External Antenna):

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2dBi or 1.58 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
149	5745.00	34.2768	0.0108
157	5785.00	31.0456	0.0098
161	5805.00	35.3997	0.0112

For 802.11a (Internal Antenna):

Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 6dBi or 3.98 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)
149	5745.00	34.2768	0.0271
157	5785.00	31.0456	0.0246
161	5805.00	35.3997	0.0280

Total RF Exposure Evaluation of Both Transmitting Tx:

Power Density at R = 20 cm (mW/cm ²) (Worst Case of 802.11 a/b/g-External Antenna)	Power Density at R = 20 cm (mW/cm ²) (Worst Case of 802.11a-Internal Antenna)	Total Power Density at R = 20 cm (mW/cm ²)
0.0853	0.0280	0.1133

Note:

The power density Pd (4th column) at a distance of 20 cm calculated from the Friis transmission formula is far below the limit of 1 mW/cm².