

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

Where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = 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 mW/cm<sup>2</sup>. 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 <sup>2</sup> )
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 <sup>2</sup> )
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 <sup>2</sup> )
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 <sup>2</sup> )
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 <sup>2</sup> ) (Worst Case of 802.11 a/b/g- External Antenna)	Power Density at R = 20 cm (mW/cm <sup>2</sup> ) (Worst Case of 802.11a-Internal Antenna)	Total Power Density at R = 20 cm (mW/cm <sup>2</sup> )
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/cm<sup>2</sup>.