

# RF Exposure Evaluation Declaration

Product Name : Outdoor 5G MIMO-OFDM Radio  
Trade Name : IO-Power  
Model No. : EL-N-1, EL-N-2, EL-N-3, ML-N-1, ML-N-2, ML-N-3  
FCC ID. : 2ANBN-IOP-EL-N

Applicant : IO-Power Technology Co., Ltd.

Address : 1F., No.100, Jinzhu Rd., North Dist., Hsinchu  
City 30055, Taiwan

Date of Receipt : Feb. 23, 2017  
Issued Date : Aug. 23, 2017  
Report No. : 1750005R-RF-US-Exp  
Report Version : V1.0



The declaration results relate only to the samples calculated.

The declaration shall not be reproduced except in full without the written approval of DEKRA Testing and Certification Co., Ltd.

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

Where

$P_d$  = power density in  $\text{mW/cm}^2$

$P_{out}$  = 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  $\text{mW/cm}^2$ . 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	Outdoor 5G MIMO-OFDM Radio
Test Mode	Transmit
Test Condition	RF Exposure Evaluation

#### Antenna Gain

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

IEEE 802.11a			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
149	5745	45.5932	0.01433
153	5785	38.8061	0.01220
165	5825	35.3590	0.01111

IEEE 802.11n 20MHz (ANT 0+1+2+3+4+5)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
149	5745	34.3479	0.01080
153	5785	21.8575	0.00687
165	5825	15.1356	0.00476

IEEE 802.11n 40MHz (ANT 0+1+2+3+4+5)			
WLAN Function			
Channel	Channel Frequency (MHz)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )
151	5755	68.3282	0.02148
159	5795	27.3968	0.00861

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>.