



Certificate # 2861.01



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# Test Report

Verified code: 910585

Report No.: E202206154388-2

Customer: TowerIQ, Inc.  
Address: 13723 Riverport Drive C/O Potter Electric Signal Company Saint Louis, MO 63043  
Sample Name: Public safety signal booster  
Sample Model: GuardianB1/2W  
Receive Sample Date: Jun.17,2022  
Test Date: Jun.20,2022 ~ Jul.02,2022  
Reference Document: FCC PART 90 § 90.223 RF exposure  
Test Result: Pass  
FCC ID: 2AXVJGUARDBHUL

Prepared by: *Huang lifang* Reviewed by: *Wu Haoming* Approved by: *Xiao liany*

GUANGZHOU GRG METROLOGY & TEST CO., LTD.

Issued Date: 2022-07-17

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## 1. Applicant information

### 1.1. Client information

Name: TowerIQ, Inc.  
Address: 13723 Riverport Drive C/O Potter Electric Signal Company Saint Louis, MO 63043

### 1.2. Manufacturer and Factory

Manufacture Name: TowerIQ, Inc. (Shenzhen Office)  
Address: NO 8403A 4th floor, Xixiang Innovation Park Commercial Building, Qianmu Property, Guxing Community, Xixiang Street, Bao 'an District, Shenzhen  
Factory: TowerIQ, Inc.  
Address: 13723 Riverport Drive C/O Potter Electric Signal Company Saint Louis, MO 63043

## 2. General description of EUT

### 2.1. Basic description of EUT

Product Name: Public safety signal booster  
Product Model: GuardianB1/2W  
Adding Model: /  
Trade Name: TowerIQ  
Power Supply: Typical working voltage: AC 110V, 50/60Hz  
Power cord: AC power cord  
Frequency Band: 700MHz Band:  
Downlink: 758MHz ~ 775MHz, Uplink: 788MHz ~ 805MHz  
800MHz Band:  
Downlink: 851MHz ~ 861MHz, Uplink: 806MHz ~ 816MHz  
Nominal Output Power: Downlink: 27dBm  
Uplink: 27dBm  
Nominal System Gain: Downlink: 80dB  
Uplink: 80dB  
EUT Operating Temperature: -20 °C to +50 °C  
Operating Humidity: 5% to 95%  
Antenna Type: N/A<sup>①</sup>

NOTE 1: This EUT is a Broadband device, which belongs to Class B signal booster.

NOTE 2: <sup>①</sup>It's an indoor device, The EUT does not provide antenna by manufacturer's statement, but it is required that the sum of antenna gain and cable loss shall not exceed 9dBi for downlink and 9dBi for uplink when the project is used by manufacturer's statement.

**3. Assessment result summary**

Item	Assessment Requirement	Assessment Method
RF exposure	FCC PART 90 §90.223	FCC PART 1.1307(b) FCC PART 2.1091 FCC PART 2.1093

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#### 4. Laboratory

##### 4.1. Laboratory

The tests & measurements refer to this report were performed by Shenzhen EMC Laboratory of Guangzhou GRG Metrology & Test Co., Ltd.

<b>Add.:</b>	No.1301 Guanguang Road Xinlan Community, Guanlan Street, Longhua District Shenzhen, 518110, People's Republic of China.
<b>P.C.:</b>	518110
<b>Tel :</b>	0755-61180008
<b>Fax:</b>	0755-61180008

##### 4.2. Accreditations

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

**USA** A2LA(Certificate #2861.01)

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

**Canada** ISED (Company Number: 24897, CAB identifier:CN0069)

**USA** FCC (Registration Number: 759402, Designation Number:CN1198)

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.grgtest.com>

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**5. Radio frequency radiation exposure**

5.1. Applicable Standard

According to the requirements of FCC PART 90 § 90.223, the test method of RF exposure is based on FCC PART 1.1307(b), FCC PART 2.1091 and FCC PART 2.1093, so RF exposure is calculated.

5.2. Limits for Maximum Permissible Exposure (MPE)

The limits are shown in Table 4-1.

Table 4-1 Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f <sub>2</sub> )*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

Note: f=frequency in MHz; \*=Plane-wave equivalent power density

Prediction of MPE limit at given distance, equations from OET Bulletin 65, Edition 97 - 01:

$$S = (P * G) / (4 * \pi * R^2) \text{ (where } PG = \text{EIRP) Where:}$$

S = power density

P= power input to antenna

G= numeric gain of the antenna

R= distance to the center of radiation of the antenna

5.3. Test results

Devices that operate under CFR47 Part 90 are subject to routine environmental evaluation for RF exposure prior to equipment authorization or use if they operate at frequencies of 1.5 GHz or below and limit for power density for general population/uncontrolled exposure is f/1500 W/m<sup>2</sup>. The nominal output power by manufacturer statement is 27dBm for Downlink and 27dBm for Uplink, the sum of antenna gain and cable loss shall not exceed 9dBi for downlink and 9dBi for uplink by manufacturer's statement, therefore, in this report, MPE adopts the maximum output power evaluation,so it has the following assessment:

5.3.1. 700MHz Band:

5.3.1.1. Frequency range: 758MHz~768MHz/788MHz ~798MHz

5.3.1.1.1. Downlink(758MHz~768MHz)

Prediction frequency (MHz):	760.5
Maximum peak output power at antenna input terminal (dBm):	27.4
Maximum peak output power at antenna input terminal (W):	0.549
Maximum antenna gain (dBi):	9.0
Maximum RF output power (W):	4.365
MPE limit for uncontrolled exposure at predication frequency (W/ m <sup>2</sup> ):	0.507
S= f/1500=760.5/1500	

$$R1 = \sqrt{\frac{PG}{4\pi S}} = \sqrt{\frac{4.365}{0.507 * 4 * 3.14}} \approx 0.828m$$

$$\text{Conversely, when } R > 0.828\text{m, and } S < \frac{PG}{4\pi R^2} = \frac{4.365}{4 * 3.14 * 0.828^2} \approx 0.507 (\text{W/m}^2)$$

## 5.3.1.1.2. Uplink (788MHz ~798MHz)

Prediction frequency (MHz):	795.5
Maximum peak output power at antenna input terminal (dBm):	27.7
Maximum peak output power at antenna input terminal (W):	0.589
Maximum antenna gain (dBi):	9.0
Maximum RF output power (W):	4.677
MPE limit for uncontrolled exposure at predication frequency (W/ m <sup>2</sup> ):	0.530
$S = f/1500 = 795.5/1500$	

$$R1 = \sqrt{\frac{PG}{4\pi S}} = \sqrt{\frac{4.677}{0.530 * 4 * 3.14}} \approx 0.838\text{m}$$

$$\text{Conversely, when } R > 0.838\text{m, and } S < \frac{PG}{4\pi R^2} = \frac{4.677}{4 * 3.14 * 0.838^2} \approx 0.53 (\text{W/m}^2)$$

## 5.3.1.2. Frequency range: 768MHz~775MHz/798MHz ~805MHz

## 5.3.1.2.1. Downlink (768MHz~775MHz)

Prediction frequency (MHz):	771.5
Maximum peak output power at antenna input terminal (dBm):	27.7
Maximum peak output power at antenna input terminal (W):	0.589
Maximum antenna gain (dBi):	9.0
Maximum RF output power (W):	4.677
MPE limit for uncontrolled exposure at predication frequency (W/ m <sup>2</sup> ):	0.514
$S = f/1500 = 771.5/1500$	

$$R1 = \sqrt{\frac{PG}{4\pi S}} = \sqrt{\frac{4.677}{0.514 * 4 * 3.14}} \approx 0.851\text{m}$$

$$\text{Conversely, when } R > 0.851\text{m, and } S < \frac{PG}{4\pi R^2} = \frac{4.677}{4 * 3.14 * 0.851^2} \approx 0.514 (\text{W/m}^2)$$

## 5.3.1.2.2. Uplink (798MHz ~805MHz)

Prediction frequency (MHz):	801.5
Maximum peak output power at antenna input terminal (dBm):	26.9
Maximum peak output power at antenna input terminal (W):	0.490
Maximum antenna gain (dBi):	9.0
Maximum RF output power (W):	3.890



MPE limit for uncontrolled exposure at predication frequency (W/ m<sup>2</sup>): 0.535  
 $S = f/1500 = 801.5/1500$

$$R1 = \sqrt{\frac{PG}{4\pi S}} = \sqrt{\frac{3.890}{0.535 \times 4 \times 3.14}} \approx 0.761\text{m}$$

Conversely, when  $R > 0.761\text{m}$ , and  $S < \frac{PG}{4\pi R^2} = \frac{3.890}{4 \times 3.14 \times 0.761^2} \approx 0.535(\text{W}/\text{m}^2)$

### 5.3.2. 800MHz Band:

#### 5.3.2.1. Downlink (851MHz~861MHz)

Prediction frequency (MHz): 856  
 Maximum peak output power at antenna input terminal (dBm): 27.8  
 Maximum peak output power at antenna input terminal (W): 0.602  
 Maximum antenna gain (dBi): 9.0  
 Maximum RF output power (W): 4.786  
 MPE limit for uncontrolled exposure at predication frequency (W/ m<sup>2</sup>): 0.571  
 $S = f/1500 = 856/1500$

$$R1 = \sqrt{\frac{PG}{4\pi S}} = \sqrt{\frac{4.786}{0.571 \times 4 \times 3.14}} \approx 0.817\text{m}$$

Conversely, when  $R > 0.817\text{m}$ , and  $S < \frac{PG}{4\pi R^2} = \frac{4.786}{4 \times 3.14 \times 0.817^2} \approx 0.571(\text{W}/\text{m}^2)$

#### 5.3.2.2. Uplink (806MHz~816MHz)

Prediction frequency (MHz): 816  
 Maximum peak output power at antenna input terminal (dBm): 26.4  
 Maximum peak output power at antenna input terminal (W): 0.436  
 Maximum antenna gain (dBi): 9.0  
 Maximum RF output power (W): 3.467  
 MPE limit for uncontrolled exposure at predication frequency (W/ m<sup>2</sup>): 0.544  
 $S = f/1500 = 816/1500$

$$R1 = \sqrt{\frac{PG}{4\pi S}} = \sqrt{\frac{3.467}{0.544 \times 4 \times 3.14}} \approx 0.712\text{m}$$

Conversely, when  $R > 0.712\text{m}$ , and  $S < \frac{PG}{4\pi R^2} = \frac{3.467}{4 \times 3.14 \times 0.712^2} \approx 0.544(\text{W}/\text{m}^2)$

### 5.4. Test Results

The above all, when the Maximum antenna gain is 8dB for downlink and the shortest distance from the human specific is 0.851m, the device is compliant with the requirement MPE limit for uncontrolled exposure.

## APPENDIX A. PHOTOGRAPHS OF EUT

### A.1 External photos



Top surface



Front surface-1



Front surface-2



Side surface-1

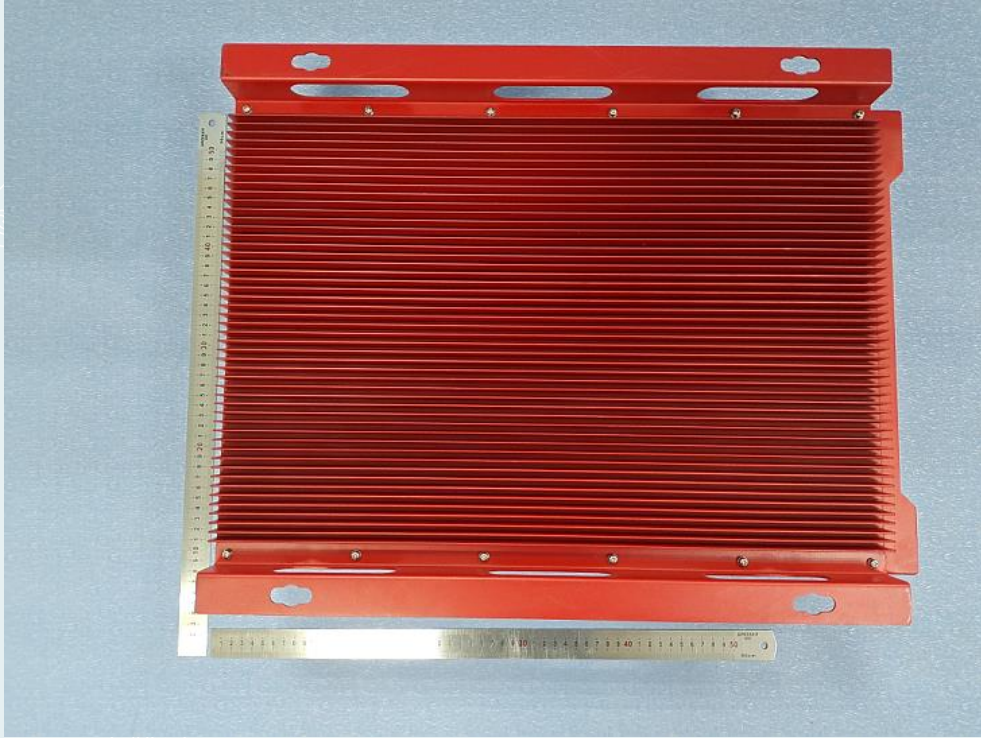




Side surface-2



Behind surface



Bottom surface

----- End of Report -----