

# Radio Frequency Exposure Report

On Behalf of

## ShenZhen Weistek Co., Ltd

Room2301, 29 Nan Huan Gao Xin Road, Shenzhen Overseas Chinese High-Tech Venture  
Park, Shenzhen, P. R. China

|                 |                                                                                                                                                                                                                                                                                     |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Name:   | <b>3D Printer</b>                                                                                                                                                                                                                                                                   |
| Model/Type No.: | <b>WT800M, MiniToy</b>                                                                                                                                                                                                                                                              |
| Trade Name:     | <b>WEISTEK</b>                                                                                                                                                                                                                                                                      |
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| Report Number:  | HCT16ER102E-2                                                                                                                                                                                                                                                                       |
| Tested Date:    | June 20~July 1, 2016                                                                                                                                                                                                                                                                |
| Issued Date:    | July 1, 2016                                                                                                                                                                                                                                                                        |
| Tested By:      | Haiqing.Zhao/ <i>Haiqing Zhao</i>                                                                                                                                                                                                                                                   |

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## 1 - GENERAL INFORMATION

### 1.1 Product Description for Equipment Under Test (EUT)

|                          |                                                                                                             |
|--------------------------|-------------------------------------------------------------------------------------------------------------|
| Applicant:               | <b>ShenZhen Weistek Co., Ltd</b>                                                                            |
| Address of Applicant:    | Room2301, 29 Nan Huan Gao Xin Road, Shenzhen Overseas Chinese High-Tech Venture Park, Shenzhen, P. R. China |
| Manufacturer 1:          | <b>ShenZhen Weistek Co., Ltd</b>                                                                            |
| Address of manufacturer: | Room2301, 29 Nan Huan Gao Xin Road, Shenzhen Overseas Chinese High-Tech Venture Park, Shenzhen, P. R. China |

### General Description of E.U.T

| Items                | Description                                                                 |
|----------------------|-----------------------------------------------------------------------------|
| EUT Description:     | 3D Printer                                                                  |
| Model No.:           | WT800M                                                                      |
| Supplementary Model: | MiniToy                                                                     |
| Trade Name:          | WEISTEK                                                                     |
| Frequency Band:      | IEEE 802.11b : 2412MHz~2462MHz;<br>IEEE 802.11g : 2412MHz~2462MHz;          |
| Number of Channels:  | IEEE 802.11b :11 Channels;<br>IEEE 802.11g :11 Channels;                    |
| Type of Modulation:  | IEEE 802.11b: CCK<br>IEEE 802.11g: OFDM                                     |
| Antenna Gain:        | 2dBi(Numeric gain:1.58)                                                     |
| Antenna Type:        | Internal antenna                                                            |
| Power Rating:        | DC 24V from adapter                                                         |
| Adapter :            | Model:FSP120-AAAN2<br>Input: AC100-240V, 1.8A, 50-60Hz<br>Output:DC 24V, 5A |

Remark: \* The test data gathered are from the production sample provided by the manufacturer.

\* Supplementary models have the same circuit, but with different name, WT800M is Production of naming, MiniToy is Sales of naming.

## 1.2 Objective

The objective of the following report is used to demonstrate that EUT operated in a manner that ensures the public is not exposed to radio frequency energy levels in excess of the relative provisions of FCC 47CFR Part 1.1307

## 1.3 General Description of Test

| Items                                                                                                                                                                                                                                                                                                                              | Description                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EUT Frequency band                                                                                                                                                                                                                                                                                                                 | <input type="checkbox"/> FHSS: 2.400GHz ~ 2.483GHz<br><input checked="" type="checkbox"/> WLAN: 2.400GHz ~ 2.483GHz<br><input type="checkbox"/> WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz<br><input type="checkbox"/> WLAN: 5.745GHz ~ 5825GHz<br><input type="checkbox"/> Others: _____ |
| Device category                                                                                                                                                                                                                                                                                                                    | <input type="checkbox"/> Portable (<20cm separation)<br><input checked="" type="checkbox"/> Mobile (>20cm separation)<br><input type="checkbox"/> Others _____                                                                                                                             |
| Exposure classification                                                                                                                                                                                                                                                                                                            | <input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm <sup>2</sup> )<br><input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm <sup>2</sup> )<br><input type="checkbox"/> Others: _____                                                    |
| Antenna diversity                                                                                                                                                                                                                                                                                                                  | <input checked="" type="checkbox"/> Single antenna<br><input type="checkbox"/> Multiple antennas: <div style="margin-left: 40px;"> <input type="checkbox"/> Tx diversity<br/> <input type="checkbox"/> Rx diversity<br/> <input type="checkbox"/> Tx/Rx diversity           </div>         |
| Max. output power                                                                                                                                                                                                                                                                                                                  | 18.62dBm (0.0727W)                                                                                                                                                                                                                                                                         |
| Antenna gain (Max)                                                                                                                                                                                                                                                                                                                 | 2dBi (Numeric gain:1.58)                                                                                                                                                                                                                                                                   |
| Evaluation applied                                                                                                                                                                                                                                                                                                                 | <input checked="" type="checkbox"/> MPE Evaluation<br><input type="checkbox"/> SAR Evaluation                                                                                                                                                                                              |
| <b>Note:</b><br>1. The maximum output power is 18.62dBm (0.0727W) at 2462MHz (with 1.58 numeric antenna gain.)<br>2. For mobile or fixed location transmitters, no SAR consideration applied. The minimum separation generally be used is at least 20 cm, even if the calculations indicate that the MPE distance would be lesser. |                                                                                                                                                                                                                                                                                            |

## 1.4 Human Exposure Assessment Results

### Calculation

Given  $E = \frac{\sqrt{30 \times P \times G}}{d}$  &  $S = \frac{E^2}{3770}$

Where  $E$  = Field Strength in Volts / meter

$P$  = Power in Watts

$G$  = Numeric antenna gain

$d$  = Distance in meters

$S$  = Power Density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{3770 d^2}$$

Changing to units of mW and cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = 100 * d \text{ (m)}$$

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2}$$

**Equation 1**

Where  $d$  = distance in cm

$P$  = Power in mW

$G$  = Numeric antenna gain

$S$  = Power Density in mW / cm<sup>2</sup>

| <b>EUT parameter (data from the separate report)</b>                                     |                                                                                                                                             |
|------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Given<br>$E = \frac{\sqrt{30 \times P \times G}}{d} \text{ \& \& } S = \frac{E^2}{3770}$ | Where<br>G: numerical gain of transmitting antenna;<br>TP: Transmitted power in watt;<br>d: distance from the transmitting antenna in meter |
| Max average output power in Watt (TP)                                                    | 18.62dBm (0.0727W)                                                                                                                          |
| Antenna gain (G)                                                                         | 2 dBi (Numeric gain: 1.58)                                                                                                                  |
| Exposure classification                                                                  | S=1mW/cm <sup>2</sup>                                                                                                                       |
| Minimum distance in meter (d)<br>(from transmitting structure to the human body)         | 20cm (0.2m)                                                                                                                                 |

Yields

$$S = \frac{30 \times P \times G}{3770 d^2}, \quad P=0.0727W, G=1.58, d=0.2$$

$$S=0.0229\text{mW/cm}^2$$

Or

$$d = \sqrt{\frac{30 \times P \times G}{3770 S}}, \quad S=1, P=0.0727W, G=1.58$$

$$d=0.0302\text{m}$$

Conclusion:

$S=0.0229\text{mW/cm}^2$  is significant lower than the General Population Exposure Power Density Limit  $1\text{mW/cm}^2$  or except the distance when human body proximity to the antenna is less than 2.25cm then will reach the General Population Exposure Power Density Limit

(For mobile or fixed location transmitters, the maximum power density is  $1.0 \text{ mW / cm}^2$  even if the calculation indicates that the power density would be larger.)

