

RF Exposure Evaluation Report

APPLICANT : Ring LLC
EQUIPMENT : Spotlight Cam Pro
BRAND NAME : Ring
MODEL NAME : 5E62E9
FCC ID : 2AEUPBHASP001
STANDARD : 47 CFR Part 2.1091

The product evaluation date was started from Jul. 13, 2022 and completed on Jul. 13, 2022. We, Sporton International Inc. (Kunshan), would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091, and pass the limit. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.



Approved by: Si Zhang

Sporton International Inc. (Kunshan)

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**Revision History**

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA1D0812	Rev. 01	Initial issue of report.	Aug. 16, 2022



1. Administration Data

1.1. Testing Laboratory

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Testing Laboratory			
Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	SAR01-KS	CN1257	314309

Applicant	
Company Name	Ring LLC
Address	12515 Cerise Ave, Hawthorne, CA 90250 USA

Manufacturer	
Company Name	Goertek Inc.
Address	No.268 Dongfang Road High-Tech Industrial Development District, Weifang Shandong, China

2. Guidance Applied

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC 47 CFR Part 2.1091
- KDB 447498 D04 Interim General RF Exposure Guidance v01
- FCC 47 CFR Part 1.1307

3. Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Spotlight Cam Pro
Model Name	5E62E9
Brand Name	Ring
FCC ID	2AEUPBHASP001
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5720 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz LoRa DTS: 902.5 MHz ~ 926.5 MHz LoRa FHSS: 902.2 MHz ~ 927.8 MHz FSK FHSS: 902.2 MHz ~ 927.8 MHz Radar: 24050 MHz ~ 24250 MHz
Mode	WLAN 2.4GHz : 802.11b/g/n/ HT20 WLAN 5GHz : 802.11a/n HT20 Bluetooth LE LoRa DTS/LoRa FHSS/FSK FHSS Radar
Antenna Type	WLAN : Stamping antenna Bluetooth : PIFA Antenna LoRa : PIFA Antenna Radar: patch Antenna
Antenna Gain	WLAN2.4G: 1.36 dBi WLAN5.2G: 4.52 dBi WLAN5.3G: 4.43 dBi WLAN5.5G: 4.21 dBi WLAN5.8G: 4.51 dBi Bluetooth : 2.89 dBi LoRa: gain 0.95 dBi Radar: gain 2.00 dBi
HW Version	DVT2
SW Version	1.5.17
EUT Stage	Identical Prototype

Remark:

1. WLAN2.4GHz n-HT40MHz is not supported.
2. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

Comments and Explanations:

1. The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.
2. The maximum RF output tune up power, antenna gain also the safe distance used for evaluate RF exposure were declared by manufacturer.

**4. Maximum RF average output tune up power among production units****<2.4GHz WLAN/Bluetooth >**

Mode		Maximum Average Power (dBm)
2.4GHz	802.11b	19.00
	802.11g	19.00
	802.11n-HT20	19.00
Bluetooth	LE	3.00

<5GHz WLAN >

Mode		Maximum Average Power (dBm)
5.2GHz	802.11a	16.00
	802.11n-HT20	16.00
5.3GHz	802.11a	16.00
	802.11n-HT20	16.00
5.5GHz	802.11a	16.00
	802.11n-HT20	16.00
5.8GHz	802.11a	16.00
	802.11n-HT20	16.00

<LoRa>

Mode	Maximum Average Power (dBm)
DTS	23.00
FHSS	23.00
FSK FHSS	23.00

5. RF Exposure Limit Introduction

1. Per 1.1307(b)(3), (i) For single RF sources (i.e., any single fixed RF source, mobile device, or portable device, as defined in paragraph (b)(2) of this section): A single RF source is exempt if:

- (A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);
- (B) Or the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases} \quad [1]$$

$$\text{Where } x = -\log_{10}\left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}}\right) \text{ and } f \text{ is in GHz} \quad [2]$$

$$\text{and } ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} < f \leq 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} < f \leq 6 \text{ GHz} \end{cases} \quad [3]$$

- (C) Or using Table 1 and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value)

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	$1,920 R^2$
1.34-30	$3,450 R^2 / f^2$
30-300	$3.83 R^2$
300-1,500	$0.0128 R^2 f$
1,500-100,000	$19.2 R^2$

2. For multiple RF sources: Multiple RF sources are exempt if:

- (A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(i)(A).
- (B) In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

- a. a = number of fixed, mobile, or portable RF sources claiming exemption using the § 1.1307(b)(3)(i)(B) formula for P_{th} , including existing exempt transmitters and those being added.
- b. b = number of fixed, mobile, or portable RF sources claiming exemption using the applicable § 1.1307(b)(3)(i)(C) Table 1 formula for Threshold ERP, including existing exempt transmitters and those being added.
- c. c = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance.
- d. P_i , the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm (inclusive)
- e. $P_{th,i}$ the exemption threshold power (P_{th}) according to the § 1.1307(b)(3)(i)(B) formula for fixed, mobile, or portable RF source i .
- f. ERP_j the available maximum time-averaged power or the ERP, whichever is greater, of fixed, mobile, or portable RF source j .
- g. $ERP_{th,j}$ exemption threshold ERP for fixed, mobile, or portable RF source j , at a distance of at least $\lambda/2\pi$, according to the applicable § 1.1307(b)(3)(i)(C) Table 1 formula at the location in question.
- h. $Evaluated_k$ the maximum reported SAR or MPE of fixed, mobile, or portable RF source k either in the device or at the transmitter site from an existing evaluation.
- i. $Exposure Limit_k$ either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable sources RF source k , as applicable from § 1.1310 of this chapter.
- j. The relationship between EIRP and ERP is: $ERP \text{ (dBm)} = EIRP - 2.15$, Where EIRP is the sum of the conducted power (dBm) and the antenna gain (dBi)

The sum of the ratios of the applicable terms for SAR-based, MPE-based and measured SAR or MPE shall be less than 1, to determine simultaneous transmission exposure compliance



6. Radio Frequency Radiation Exposure Evaluation

6.1. Standalone assessment

Band	Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Maximum EIRP (dBm)	Maximum ERP (dBm)	Maximum ERP (mW)	Separation Distance (cm)	Part1.1307 option(b) Threshold (mW)	Part1.1307 option(b) P/Pth
WLAN2.4GHz Band	1.36	19.00	20.36	18.21	66.22	20	3060.000	0.026
WLAN5.2GHz Band	4.52	16.00	20.52	18.37	68.71	20	3060.000	0.022
WLAN5.3GHz Band	4.43	16.00	20.43	18.28	67.30	20	3060.000	0.022
WLAN5.5GHz Band	4.21	16.00	20.21	18.06	63.97	20	3060.000	0.020
WLAN5.5GHz Band	4.51	16.00	20.51	18.36	68.55	20	3060.000	0.022
Bluetooth	2.89	3.00	5.89	3.74	2.37	20	3060.000	0.001
LoRa	0.95	23	23.95	21.80	151.36	20	1840.488	0.108

Band	Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Maximum EIRP (dBm)	Maximum ERP (dBm)	Maximum ERP (mW)	Separation Distance (cm)	Part1.1307 option(c) Threshold (mW)	Part1.1307 option(c) ERP/ERPth
Radar			3.17	1.02	1.26	20	768.000	0.002

Note:

- Chose the maximum power to do MPE analysis.
- 24G Radar maximum EIRP power calculate from 24G Radar E-Field level from RF test report which Sporton No: FR1D1004.
- This device maximum E-Field level is 98.4 dBuV/m at 3m, so the EIRP power is 3.17dBm (2.07mW).
- Pout EIRP (dBm) = Field Strength of Fundamental (dBuV/m) - 95.23 (dB)

6.2. Simultaneous Transmission MPE Test Exemption

Maximum WLAN 2.4GHz P/Pth Ratio	Maximum Bluetooth P/Pth Ratio	Maximum LoRa P/Pth Ratio	Maximum Radar P/Pth Ratio	Sum of the Ratio WLAN 2.4GHz + Bluetooth + LoRa + Radar
0.026	0.001	0.108	0.002	0.137
Maximum WLAN 5GHz P/Pth Ratio	Maximum Bluetooth P/Pth Ratio	Maximum LoRa P/Pth Ratio	Maximum Radar P/Pth Ratio	Sum of the Ratio WLAN 5GHz + Bluetooth + LoRa + Radar
0.022	0.001	0.108	0.002	0.133

Note:

- According Part1.1307 (b)(3)(i)(B) and Part1.1307((b)(3)(i)(c), the P/Pth and ERP/ERPth Ratio is using for Sim-Tx analysis, above table was showing summation ratio is smaller than 1.

Conclusion:

According to 47 CFR §1.1307(b)(3)(i), the RF exposure analysis concludes that the RF Exposure is FCC compliant.

-----THE END-----