

# RF Exposure Evaluation Report

APPLICANT : Ring LLC  
EQUIPMENT : Ring Car Cam  
BRAND NAME : Ring  
MODEL NAME : 5B28S9  
FCC ID : 2AEUPBHACC001  
STANDARD : 47 CFR Part 2.1091  
FCC KDB 447498 D01 v06

We, Sporton International Inc. (Kunshan), would like to declare that the device has been evaluated in accordance with 47 CFR Part 2.1091 and FCC KDB 447498 D01 v06, and pass the limit. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

*Tony Zhang*

Reviewed by: Tony Zhang / Supervisor

*Kat Yin*

Approved by: Kat Yin / Manager



**Sporton International Inc. (Kunshan)**

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People's Republic of China



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**Revision History**

| REPORT NO. | VERSION | DESCRIPTION                                                      | ISSUED DATE   |
|------------|---------|------------------------------------------------------------------|---------------|
| FA1O0826   | Rev. 01 | Initial issue of report                                          | Mar. 15, 2022 |
| FA1O0826   | Rev. 02 | Updated antenna gain value for WCMA B4/B5 and LTE B4/B5/B12/B66. | May 25, 2022  |
|            |         |                                                                  |               |
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## **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<br>Jiangsu Province 215300 People's Republic of China<br>TEL : +86-512-57900158<br>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      | 1523 26th Street, Santa Monica, CA 90404 USA |

| Manufacturer |                                              |
|--------------|----------------------------------------------|
| Company Name | Ring LLC                                     |
| Address      | 1523 26th Street, Santa Monica, CA 90404 USA |

## 2. Description of Equipment Under Test (EUT)

| Product Feature & Specification                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EUT Type                                                                                                                                                          | Ring Car Cam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Brand Name                                                                                                                                                        | Ring                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Model Name                                                                                                                                                        | 5B28S9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| FCC ID                                                                                                                                                            | 2AEUPBHACC001                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Wireless Technology and Frequency Range                                                                                                                           | WCDMA Band II: 1850 MHz ~ 1910 MHz<br>WCDMA Band IV: 1710 MHz ~ 1755 MHz<br>WCDMA Band V: 824 MHz ~ 849 MHz<br>LTE Band 2 : 1850 MHz ~ 1910 MHz<br>LTE Band 4 : 1710 MHz ~ 1755 MHz<br>LTE Band 5 : 824 MHz ~ 849 MHz<br>LTE Band 12 : 699 MHz ~ 716 MHz<br>LTE Band 13 : 777 MHz ~ 787 MHz<br>LTE Band 14: 788 MHz ~ 798 MHz<br>LTE Band 66 : 1710 MHz ~ 1780 MHz<br>LTE Band 71: 663 MHz ~ 698 MHz<br>WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz<br>WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz<br>WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz<br>Bluetooth: 2402 MHz ~ 2480 MHz<br>LoRa: 902 MHz ~ 928 MHz<br>MPS: 5725 MHz ~ 5875 MHz |
| Mode                                                                                                                                                              | RMC 12.2Kbps<br>HSDPA<br>HSUPA<br>LTE: QPSK, 16QAM<br>WLAN 2.4GHz 802.11b/g/n HT20<br>WLAN 5GHz 802.11a/n HT20<br>Bluetooth LE<br>LoRa: DTS/FHSS/FSK<br>MPS                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Antenna Gain                                                                                                                                                      | WCDMA Band II: 1.7 dBi<br>WCDMA Band IV: 0.7 dBi<br>WCDMA Band V: 0.1 dBi<br>LTE Band 2 : 1.7 dBi<br>LTE Band 4 : 0.7 dBi<br>LTE Band 5 : 0.1 dBi<br>LTE Band 12 : -1.7 dBi<br>LTE Band 13 : -1.8 dBi<br>LTE Band 14 : -1.8 dBi<br>LTE Band 66: 0.9 dBi<br>LTE Band 71: -1.2 dBi<br>WLAN2.4GHz: 2.4 dBi<br>WLAN5.2GHz: 3.2 dBi<br>WLAN5.8GHz: 3.9 dBi<br>Bluetooth: 2.4 dBi<br>LoRa: 0.5 dBi<br>MPS: 0.2 dBi                                                                                                                                                                                                             |
| Antenna Type                                                                                                                                                      | WWAN : Loop Antenna<br>WLAN : IFA Antenna<br>Bluetooth : IFA Antenna<br>LoRa : Monopole Antenna<br>MPS : Loop Antenna                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| EUT Stage                                                                                                                                                         | Identical Prototype                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Remark:</b><br>1. 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.

### **3. Maximum RF average output tune up power among production units**

**<WCDMA>**

| Mode  |         | Maximum Average power(dBm) |
|-------|---------|----------------------------|
| WCDMA | Band II | 24.00                      |
|       | Band IV | 24.00                      |
|       | Band II | 24.00                      |

**<LTE>**

| Mode |         | Maximum Average power(dBm) |
|------|---------|----------------------------|
| LTE  | Band 2  | 25.00                      |
|      | Band 4  | 24.00                      |
|      | Band 5  | 24.00                      |
|      | Band 12 | 24.00                      |
|      | Band 13 | 24.00                      |
|      | Band 14 | 24.00                      |
|      | Band 66 | 25.00                      |
|      | Band 71 | 24.00                      |

**<2.4GHz WLAN>**

| Frequency   | Mode         | Maximum Average Power (dBm) |
|-------------|--------------|-----------------------------|
| WLAN 2.4GHz | 802.11b      | 18.00                       |
|             | 802.11g      | 16.00                       |
|             | 802.11n-HT20 | 16.00                       |

**<5GHz WLAN >**

| Mode   |              | Maximum Average Power (dBm) |
|--------|--------------|-----------------------------|
| 5.2GHz | 802.11a      | 16.00                       |
|        | 802.11n-HT20 | 15.00                       |
| 5.8GHz | 802.11a      | 15.00                       |
|        | 802.11n-HT20 | 15.00                       |

**<Bluetooth>**

| Frequency | Mode | Maximum Average Power (dBm) |
|-----------|------|-----------------------------|
| Bluetooth | LE   | 10.00                       |

**<LoRa>**

| Frequency | Mode | Maximum Average Power (dBm) |
|-----------|------|-----------------------------|
| LoRa      | DTS  | 27.00                       |
|           | FHSS | 27.00                       |
|           | FSK  | 27.00                       |

**<MPS>**

| Frequency | Mode | Maximum Average Power (dBm) |
|-----------|------|-----------------------------|
| 5.8GHz    | MPS  | 15.00                       |



#### **4. RF Exposure Limit Introduction**

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

| Frequency range (MHz)                                          | Electric field strength (V/m) | Magnetic field strength (A/m) | Power density (mW/cm <sup>2</sup> ) | Averaging time (minutes) |
|----------------------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| <b>(A) Limits for Occupational/Controlled Exposures</b>        |                               |                               |                                     |                          |
| 0.3-3.0                                                        | 614                           | 1.63                          | *(100)                              | 6                        |
| 3.0-30                                                         | 1842/f                        | 4.89/f                        | *(900/f <sup>2</sup> )              | 6                        |
| 30-300                                                         | 61.4                          | 0.163                         | 1.0                                 | 6                        |
| 300-1500                                                       |                               |                               | f/300                               | 6                        |
| 1500-100,000                                                   |                               |                               | 5                                   | 6                        |
| <b>(B) Limits for General Population/Uncontrolled Exposure</b> |                               |                               |                                     |                          |
| 0.3-1.34                                                       | 614                           | 1.63                          | *(100)                              | 30                       |
| 1.34-30                                                        | 824/f                         | 2.19/f                        | *(180/f <sup>2</sup> )              | 30                       |
| 30-300                                                         | 27.5                          | 0.073                         | 0.2                                 | 30                       |
| 300-1500                                                       |                               |                               | f/1500                              | 30                       |
| 1500-100,000                                                   |                               |                               | 1.0                                 | 30                       |

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = \frac{PG}{4\pi R^2}$$

Where:

S = Power Density

P = Output Power at Antenna Terminals

G = Gain of Transmit Antenna (linear gain)

R = Distance from Transmitting Antenna



## 5. Radio Frequency Radiation Exposure Evaluation

### 5.1. Standalone Power Density Calculation

| Band         | Frequency (MHz) | Antenna Gain (dBi) | Maximum Power (dBm) | Maximum EIRP (dBm) | Average EIRP (mW) | Power Density at 20cm (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) |
|--------------|-----------------|--------------------|---------------------|--------------------|-------------------|---------------------------------------------|-----------------------------|
| WCDMA Band 2 | 1852.4          | 1.70               | 24.00               | 25.700             | 371.535           | 0.074                                       | 1.000                       |
| WCDMA Band 4 | 1712.4          | 0.70               | 24.00               | 24.700             | 295.121           | 0.059                                       | 1.000                       |
| WCDMA Band 5 | 826.4           | 0.10               | 24.00               | 24.100             | 257.040           | 0.051                                       | 0.551                       |
| LTE Band 2   | 1850.7          | 1.70               | 25.00               | 26.700             | 467.735           | 0.093                                       | 1.000                       |
| LTE Band 4   | 1710.7          | 0.70               | 24.00               | 24.700             | 295.121           | 0.059                                       | 1.000                       |
| LTE Band 5   | 824.7           | 0.10               | 24.00               | 24.100             | 257.040           | 0.051                                       | 0.550                       |
| LTE Band 12  | 699.7           | -1.70              | 24.00               | 22.300             | 169.824           | 0.034                                       | 0.466                       |
| LTE Band 13  | 779.5           | -1.80              | 24.00               | 22.200             | 165.959           | 0.033                                       | 0.520                       |
| LTE Band 14  | 790.5           | -1.80              | 24.00               | 22.200             | 165.959           | 0.033                                       | 0.527                       |
| LTE Band 66  | 1710.7          | 0.90               | 25.00               | 25.900             | 389.045           | 0.077                                       | 1.000                       |
| LTE Band 71  | 665.5           | -1.20              | 24.00               | 22.800             | 190.546           | 0.038                                       | 0.444                       |
| Bluetooth    | 2402.0          | 2.40               | 10.00               | 12.400             | 17.378            | 0.003                                       | 1.000                       |
| 2.4GHz WLAN  | 2412.0          | 2.40               | 18.00               | 20.400             | 109.648           | 0.022                                       | 1.000                       |
| 5.2GHz WLAN  | 5180.0          | 3.20               | 16.00               | 19.200             | 83.176            | 0.017                                       | 1.000                       |
| 5.8GHz WLAN  | 5745.0          | 3.90               | 15.00               | 18.900             | 77.625            | 0.015                                       | 1.000                       |
| LoRa         | 902.0           | 0.50               | 27.00               | 27.500             | 562.341           | 0.112                                       | 0.601                       |
| MPS          | 5725.0          | 0.20               | 15.00               | 15.200             | 33.113            | 0.007                                       | 1.000                       |

**Note:**

1. For conservativeness, the lowest frequency of each band is used to determine the MPE limit of that band.
2. WWAN, WLAN2.4GHz, WLAN5GHz, BT, LoRa, MPS all cannot transmit simultaneously with each other.

### Conclusion:

According to 47 CFR §2.1091, the RF exposure analysis concludes that the RF Exposure is FCC compliant.

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