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**

The product evaluation date was started from May 15, 2023 and completed on May 15, 2023. 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.

Si Zhang

Approved by: Si Zhang

ACCREDITED Cert #5145.02

Sporton International Inc. (Kunshan)
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA1O0826-01	Rev. 01	Initial issue of report	May 22, 2023

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, 90250-4801 United States

Manufacturer	
Company Name	Ring LLC
Address	12515 Cerise Ave Hawthorne, CA, 90250-4801 United States

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 WCDMA Band IV: 1710 MHz ~ 1755 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2 : 1850 MHz ~ 1910 MHz LTE Band 4 : 1710 MHz ~ 1755 MHz LTE Band 5 : 824 MHz ~ 849 MHz LTE Band 12 : 699 MHz ~ 716 MHz LTE Band 13 : 777 MHz ~ 787 MHz LTE Band 14: 788 MHz ~ 798 MHz LTE Band 66 : 1710 MHz ~ 1780 MHz LTE Band 71: 663 MHz ~ 698 MHz 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 ~ 5700 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz LoRa: 902 MHz ~ 928 MHz MPS: 5725 MHz ~ 5875 MHz
Mode	RMC 12.2Kbps HSDPA HSUPA LTE: QPSK, 16QAM WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20 Bluetooth LE LoRa: DTS/FHSS/FSK MPS
Antenna Gain	WCDMA Band II: 1.7 dBi WCDMA Band IV: 0.7 dBi WCDMA Band V: 0.1 dBi LTE Band 2 : 1.7 dBi LTE Band 4 : 0.7 dBi LTE Band 5 : 0.1 dBi LTE Band 12 : -1.7 dBi LTE Band 13 : -1.8 dBi LTE Band 14 : -1.8 dBi LTE Band 66: 0.9 dBi LTE Band 71: -1.2 dBi WLAN2.4GHz: 2.4 dBi WLAN5.2GHz: 3.2 dBi WLAN5.3GHz: 3.0 dBi WLAN5.5GHz: 3.9 dBi WLAN5.8GHz: 3.9 dBi Bluetooth: 2.4 dBi LoRa: 0.5 dBi MPS: 0.2 dBi
Antenna Type	WWAN : Loop Antenna WLAN : IFA Antenna Bluetooth : IFA Antenna LoRa : Monopole Antenna MPS : Loop Antenna
EUT Stage	Identical Prototype

Remark:
1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. This is a variant report. The difference between current project and previous project is enabled WLAN5.3GHz/5.5GHz by software. According to the difference, added WLAN5.3GHz/5.5GHz evaluation based on original report, and other Bands leverage from original report which can be referred to Sporton Report Number FA1O0826.

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
5.3GHz	802.11a	16.00
	802.11n-HT20	16.00
5.5GHz	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^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f2)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f2)	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^2)	Limit (mW/cm^2)
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
5.3GHz WLAN	5260.0	3.00	16.00	19.000	79.433	0.016	1.000
5.5GHz WLAN	5500.0	3.90	16.00	19.900	97.724	0.019	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------