MPE Report

Applicant	:	Ring LLC
Product Type	:	Video Doorbell 3 Plus (for model：5UM6E5) Video Doorbell 3 (for model：5AT3S9)
Trade Name	:	Ring
Model Number	:	5UM6E5, 5AT3S9
Test Specification	:	ANSI / IEEE Std.C95.1
		47 CFR § 2.1091
		47 CFR § 1.1310
Received Date	:	Jul. 08, 2020
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Issue by

Approved By : Kris Pan

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Taiwan Accreditation Foundation accreditation number: 1330
Test Firm MRA designation number: TW0010

Note:

1.The test results are valid only for samples provided by customers and under the test conditions described in this report.
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3.The relevant information is provided by customers in this test report. According to the correctness, appropriateness or completeness of the information provided by the customer, if there is any doubt or error in the information which affects the validity of the test results, the laboratory does not take the responsibility.

Revision History

Rev.	Issue Date	Revisions	Revised By
00	Aug. 04, 2020	Initial Issue	Nicole Chu

Contents

1. Reference Testing Standards

Standard	Description	Version
ANSI/IEEE C95.1	American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 300 KHz to 100 GHz, New York.	1992

2. Description of Equipment under Test (EUT)

Applicant	Ring LLC 1523 26th Street, Santa Monica CA 90404, United States
Manufacturer	Ring Inc. 1523 26th Street, Santa Monica CA 90404, United States
Product Type	Video Doorbell 3 Plus (for model：5UM6E5) Video Doorbell 3 (for model：5AT3S9)
Trade Name	Ring
Model Number	5UM6E5, 5AT3S9
Difference description of product type / model number	5UM6E5：With glance 5AT3S9：Without glance
FCC ID	2AEUPBHARG051
Class II Permissive Change	Due to market demand, model number, 5UM6E5 and serial model number, 5AT3S9 have the following change: 1. Increase power saving and safety design 2. Material of camera lens cover changes 3. Increase Fuse and a crystal The changes above don't affect RF characteristics. The rest design, such as circuit, PCB and so on has not changed. Details: 1-1 HW changes (2nd XTAL & Discrete circuit change) for power saving 1-2 Remove Audio DSP TLV320AIC3021 IC, mainly on camera board for power saving 1-3 Camera lens cover changes to HB 1-4 Increase Fuse at input of the product for short circuit protection 1-5 Increase a crystal for BT, the original crystal is used for both WLAN and BT.

Frequency Range	Operate Band	Frequency Range (MHz)
	IEEE 802.11b / 802.11g / 802.11n 2.4 GHz 20 MHz (256QAM)	2412 – 2462
	IEEE 802.11a U-NII Band I	5180 – 5240
	IEEE 802.11a U-NII Band II-A	5260 – 5320
	IEEE 802.11a U-NII Band II-C	5500 – 5720
	IEEE 802.11a U-NII Band III	5720 – 5825
	IEEE 802.11n 5 GHz / 802.11ac 20 MHz U-NII Band I	5180 – 5240
	IEEE 802.11n 5 GHz / 802.11ac 20 MHz U-NII Band II-A	5260 – 5320
	IEEE 802.11n 5 GHz / 802.11ac 20 MHz U-NII Band II-C	5500 – 5720
	IEEE 802.11n 5 GHz / 802.11ac 20 MHz U-NII Band III	5720 – 5825
	IEEE 802.11n 5 GHz / 802.11ac 40 MHz U-NII Band I	5190 – 5230
	IEEE 802.11n 5 GHz / 802.11ac 40 MHz U-NII Band II-A	5270 – 5310
	IEEE 802.11n 5 GHz / 802.11ac 40 MHz U-NII Band II-C	5510 – 5710
	IEEE 802.11n 5 GHz / 802.11ac 40 MHz U-NII Band III	5710 – 5795
	Bluetooth LE	2402 – 2480

Antenna Information	Model	Type	Antenna	Max. Gain (dBi)	
	RFPCA491914EMLB303	PCB Antenna	ANT-1	2.4 GHz	0.61
				5 GHz	5.26
			ANT-0	Bluetooth LE	0.61
	RFPCA491914EMLB301	PCB Antenna	ANT-0	2.4 GHz	0.72
				5 GHz	5.22
			ANT-1	Bluetooth LE	0.72
Antenna Delivery	IEEE 802.11b / g / n 2.4 GHz 20 MHz: 1TX(Diversity) IEEE 802.11a: 1TX(Diversity) IEEE 802.11n 5 GHz 20 MHz / 40 MHz: 1TX(Diversity) Bluetooth LE: 1TX(Diversity)				
RF Evaluation	0.034 mW/cm^2				
Operate Temp. Range	-20 ~ +50°C				

Note: The changes above don't affect RF characteristics. The rest design, such as circuit, PCB and so on has not changed.

The above equipment was tested by A Test Lab Techno Corp. For compliance with the requirements set forth in 47 CFR § 2.1091 / 47 CFR § 1.1310. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties

3. Human Exposure Assessment

Due to the design and installation of this product, it is not possible to conduct SAR evaluation. This is because client either manufactures or supplies the antenna(s) that will be used in the installation of this product. Therefore, this product will be evaluated as a mobile device per 47 CFR § 1.1310 titled “Radiofrequency radiation exposure limits”, generally referred to as MPE limits.

In 47 CFR § 2.1091, paragraph (b) defines a mobile device as “a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 cm is normally maintained between the transmitter’s radiating structure(s) and the body of the user or nearby persons. ” This product is intended to be installed into a vehicle such that the unit is physically secured at one location. In the installation guide supplied with the product,

Client has made the following statement: “IMPORTANT: To meet the FCC’s RF Exposure Guidelines, the antenna should be installed so there is at least 20 cm of separation between the body of the user and nearby persons and the antenna”. Based on the installation of the transceiver and the antenna, the transmitters radiating structure is more than 20 cm from the user. Thus, this product is a “mobile device” as defined in section § 2.1091 paragraph (b).

Exposure evaluation
$$S = \frac{PG}{4\pi R^2}$$
Where S: power density P: power input to the antenna G: power gain of the antenna in the direction of interest relative to an isotropic radiator. R: distance to the center of radiation of the antenna.

4. RF Output Power

The conducted power turn-up tolerance reference manufacturer specification.

Band	Date Rate (Mbps)	Frequency (MHz)	Average Conducted power (dBm)	
			ANT-0	ANT-1
IEEE 802.11b	1	2412.0	17.14	17.58
	6	2437.0	**17.28**	**17.64**
	11	2462.0	17.12	17.48
IEEE 802.11g	1	2412.0	14.17	14.56
	6	2437.0	**17.17**	**17.65**
	11	2462.0	15.13	15.46
IEEE 802.11n 2.4 GHz 20 MHz	1	2412.0	13.63	13.82
	6	2437.0	**16.64**	**16.66**
	11	2462.0	14.23	14.42

Note: The relevant measured result has the offset with cable loss already.

Band	Date Rate (Mbps)	Frequency (MHz)	Average Conducted power (dBm)	
			ANT-0	ANT-1
IEEE 802.11a	6	5180.0	**12.91**	13.63
		5200.0	12.87	**13.65**
		5220.0	12.52	13.31
		5240.0	12.71	13.32
		5260.0	12.52	13.09
		5280.0	12.61	13.16
		5300.0	12.73	13.39
		5320.0	**12.89**	**13.42**
		5500.0	13.49	13.74
		5520.0	13.49	13.59
		5540.0	13.80	13.88
		5560.0	13.75	13.79
		5580.0	13.86	13.88
		5600.0	13.66	13.70
		5620.0	13.82	13.84
		5640.0	**13.90**	**13.94**
		5660.0	13.86	13.93
		5680.0	13.73	13.87
		5700.0	13.62	13.77
		5720.0	12.53	13.06
		5720.0	6.12	6.63
		5745.0	**13.38**	13.78
		5765.0	13.23	**13.90**
		5785.0	13.06	13.76
		5805.0	13.03	13.66
		5825.0	12.94	13.61

Note: The relevant measured result has the offset with cable loss already.

Band	Date Rate (Mbps)	Frequency (MHz)	Average Conducted power (dBm)	
			ANT-0	ANT-1
IEEE 802.11ac 20 MHz	6.5	5180.0	12.48	13.25
		5200.0	**12.60**	**13.41**
		5220.0	12.36	13.02
		5240.0	12.30	13.14
		5260.0	12.43	13.04
		5280.0	12.44	13.07
		5300.0	12.41	13.12
		5320.0	**12.84**	**13.26**
		5500.0	13.27	13.51
		5520.0	13.34	13.35
		5540.0	13.63	13.65
		5560.0	13.37	13.41
		5580.0	13.58	13.63
		5600.0	13.41	13.45
		5620.0	13.51	13.63
		5640.0	13.73	13.76
		5660.0	**13.76**	**13.82**
		5680.0	13.67	13.78
		5700.0	13.54	13.80
		5720.0	12.86	13.44
		5720.0	6.84	7.39
		5745.0	**13.30**	**13.87**
		5765.0	13.11	13.81
		5785.0	12.99	13.59
		5805.0	13.04	13.82
		5825.0	12.83	13.69
IEEE 802.11ac 40 MHz	13.5	5190.0	9.79	9.93
		5230.0	**11.86**	**12.46**
		5270.0	11.70	12.19
		5310.0	**12.02**	**12.37**
		5510.0	12.75	12.81
		5550.0	12.78	12.88
		5590.0	12.71	12.92
		5630.0	13.05	13.25
		5670.0	**12.92**	**13.44**
		5710.0	11.52	11.53
		5710.0	-1.60	-1.53
		5755.0	12.71	**12.98**
		5795.0	**12.75**	12.94

Note: The relevant measured result has the offset with cable loss already.

Operate Band	Frequency (MHz)	Packet Type	Average Conducted power (dBm)	
			ANT-0	ANT-1
Bluetooth LE	2402.0	---	0.33	0.70
	2440.0		0.41	0.74
	2480.0		**0.61**	**0.81**
Bluetooth 2LE	2402.0	---	**0.62**	0.69
	2440.0		0.42	0.74
	2480.0		0.61	**0.80**

5. Test Result

Antenna	Band	Frequency (MHz)	Limit (w)/m^2	Distance (m) [R]	Avg. burst tune-up Power (upper limit) [P] (dBm)	ANT Gain (dBi)	Numeric Gain [G]	Duty Cycle	Power with Duty cycle [TP] (W)	Power Density [S] (w)/m^2
Bluetooth Antenna	Bluetooth LE	2402-2480	1	20	1.31	0.72	1.18	1	1.60	0.000
Wi-Fi Antenna	2.4 GHz	2412-2462	1	20	18.15	0.72	1.18	1	77.07	0.015
	5 GHz	5150-5250	1	20	14.15	5.26	3.36	1	87.37	0.017
		5250-5350	1	20	13.92	5.26	3.36	1	82.86	0.016
		5470-5725	1	20	14.44	5.26	3.36	1	93.40	0.019
		5725-5850	1	20	14.40	5.26	3.36	1	92.54	0.018

Note:

1. Mobile or fixed location transmitters, minimum separation distance is 20 cm, even if calculations indicate MPE distance is less.
2. We used the maximum power and gain to provide MPE results.
3. The Numeric Gain calculated by 10^(ant. Gain(dBi) /10).
4. The MPE results are evaluated by lowest data rate for WLAN.

Simultaneous Transmitting：

Total MPE = 2.4GHz MPE + 5GHz MPE + Bluetooth MPE = 0.015 + 0.019 + 0.000 = 0.034 (mw)/cm^2 < 1 (mw)/cm^2

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