REPORT No.: SZ19080383S01

RF EXPOSURE

EVALUATION REPORT

APPLICANT	:	Shenzhen ImagineVision Technology Limited
PRODUCT NAME	:	Z CAM E2 Series Camera
MODEL NAME	:	E1701, E1901, E1902, E1511
BRAND NAME	:	Z CAM
FCC ID	:	2AENNE2F
STANDARD(S)	:	47CFR 2.1091 KDB 447498
RECEIPT DATE	:	2019-09-12
TEST DATE	:	2019-09-30 to 2019-10-15
ISSUE DATE	:	2020-01-11

Edited by: Peng Mi (Rapporteur)

Approved by: Peng Huarui (Supervisor)

MORLAB

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DIRECTORY

Change History		
Version	**Date**	**Reason of Changed**
1.0	2020-01-11	Original

1. Technical Information

Note: Provide by applicant.

1.1 Applicant and Manufacturer Information

Applicant:	Shenzhen ImagineVision Technology Limited
Applicant Address:	1A, Block F5, TCL International E City, 1001 Zhong Shan Park Road, Nan Shan, Shenzhen, China
Manufacturer:	Shenzhen ImagineVision Technology Limited
Manufacturer Address:	1A, Block F5, TCL International E City, 1001 Zhong Shan Park Road, Nan Shan, Shenzhen, China

1.2 Equipment under Test (EUT) Description

Product Name:	Z CAM E2 Series Camera
Serial No:	(N/A, marked #1 by test site)
Hardware Version:	ver1
Software Version:	2019086_0.88
Frequency Bands:	WLAN 5GHz: 5.180 GHz- 5.240 GHz; 5.745GHz- 5.825GHz
Modulation Mode:	OFDM
Antenna Type:	Monopole Antenna
Antenna Gain:	2.0dBi

Note 1: According to the certificate holder, they declared that the models: E1701, E1901, E1902, E1511, only different in lens mount of the appearance structure, correspond sensor & sensor's PCBA and the model name, everything else is the same. The main measuring model is E1701, only the results for E1701 were recorded in this report.

1.3 Applied Reference Documents

Leading reference documents for testing:

No.	Identity	Document Title	Method determination /Remark
1	47 CFR§2.1091	Radio Frequency Radiation Exposure Evaluation: mobile devices	No deviation
2	KDB 447498 D01v06	General RF Exposure Guidance	No deviation
Note 1: Additions to, deviation, or exclusions from the method shall be judged in the "method determination" column of add, deviate or exclude from the specific method shall be explained in the "Remark" of the above table.			

2. Device Category and RF Exposure Limit

Per user manual, Based on 47CFR 2.1091, this device belongs to mobile device category with General Population/Uncontrolled exposure.

Mobile Devices:

47CFR 2.1091(b)

For purposes of this section, a mobile device is defined 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 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. In this context, the term “fixed location” means that the device is physically secured at one location and is not able to be easily moved to another location. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.

General Population/Uncontrolled Exposure:

The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity. Warning labels placed on low-power consumer devices such as cellular telephones are not considered sufficient to allow the device to be considered under the occupational/controlled category, and the general population/uncontrolled exposure limits apply to these devices.

Table 1—Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz* = Plane-wave equivalent power density

3. RF Output Power

<WLAN 5GHz>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-up Power	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	CH 36	5180	10.76	11.5	93.31
		CH 44	5220	10.81	11.5	
		CH 48	5240	10.91	11.5	
	802.11n-HT20 MCS0	CH 36	5180	9.44	10.0	92.91
		CH 44	5220	9.30	10.0	
		CH 48	5240	9.73	10.0	
	802.11n-HT40 MCS0	CH 38	5190	12.08	12.5	92.96
		CH 46	5230	11.76	12.5	
	802.11ac-VHT20 MCS0	CH 36	5180	11.86	12.5	92.93
		CH 44	5220	11.44	12.5	
		CH 48	5240	11.73	12.5	
	802.11ac-VHT40 MCS0	CH 38	5190	**12.26**	**12.5**	86.84
		CH 46	5230	12.15	12.5	
	802.11ac-VHT80 MCS0	CH 42	5210	3.93	4.5	76.06

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-up Power	Duty Cycle %
5.8GHz WLAN	802.11a MCS0	CH 149	5745	-4.68	-4.00	93.31
		CH 157	5785	-4.84	-4.00	
		CH 165	5825	-5.10	-4.00	
	802.11n-HT20 MCS0	CH 149	5745	-4.61	-4.00	92.91
		CH 157	5785	-4.89	-4.00	
		CH 165	5825	-5.06	-4.00	
	802.11n-HT40 MCS0	CH 151	5755	-5.01	-4.00	92.96
		CH 159	5795	-5.40	-4.00	
	802.11ac-VHT20 MCS0	CH 149	5745	-4.78	-4.00	92.93
		CH 157	5785	-4.95	-4.00	
		CH 165	5825	-5.09	-4.00	
	802.11ac-VHT40 MCS0	CH 151	5755	-4.98	-4.00	86.84
		CH 159	5795	-5.34	-4.00	
	802.11ac-VHT80 MCS0	CH 155	5775	-5.82	-4.00	76.06

Note 1: According to KDB 447498 Section 4.3, MPE evaluation is based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.

Note 2: The output power refers to report (Report No.: SZ19080383W01).

4. RF Exposure Evaluation

➢ **Standalone Transmission Evaluation:**

Bands	Frequency (MHz)	Maximum Tune-up Power (dBm)	Antenna Gain (dBi)	EIRP (mW)	Power Density (mW/cm²)	Limit for MPE (mW/cm²)
WLAN 5GHz	5190	12.5	2.0	28.18	0.006	1.0

Note:

1. According to KDB 447498, MPE evaluation is based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.
2. MPE calculate method

$$\text{Power Density} = EIRP/4\pi R^2$$

Where: EIRP = P+G

P = Output Power (dBm)

G = Antenna Gain (dBi)

R = Separation Distance (20cm)

➢ **Simultaneous Transmission Evaluation:**

This device only incorporates a WLAN 5G transmitter, Therefore simultaneous SAR evaluation is not required.

➢ **Conclusion:**

According to 47 CFR §2.1091, this device complies with human exposure basic restrictions.

Annex A General Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Laboratory Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
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2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
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END OF REPORT