RF EXPOSURE REPORT

Report No.: 16021405-FCC-H1
Supersede Report No.: N/A

Applicant	CAMORAMA(USA)INC
Product Name	Camorama 4K Panoramic Camera
Model No.	CAMO-SP1
Serial No.	CAMO-SP2, CAMO-SP3, CAMO-SP4, CAMO-SP5, CAMO-SP6, CAMO-SP7, CAMO-SP8
Test Standard	FCC 2.1091
Test Date	November 03 to December 21, 2016
Issue Date	December 22, 2016
Test Result	☒ **Pass** ☐ **Fail**
Equipment complied with the specification	☒
Equipment did not comply with the specification	☐

Amos. Xia	Miro Bao	
Amos Xia **Test Engineer**	**Miro Bao** **Checked By**	

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Test result presented in this test report is applicable to the tested sample only

Issued by:
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Laboratories Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.

In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Scope
USA	EMC, RF/Wireless, SAR, Telecom
Canada	EMC, RF/Wireless, SAR, Telecom
Taiwan	EMC, RF, Telecom, SAR, Safety
Hong Kong	RF/Wireless, SAR, Telecom
Australia	EMC, RF, Telecom, SAR, Safety
Korea	EMI, EMS, RF, SAR, Telecom, Safety
Japan	EMI, RF/Wireless, SAR, Telecom
Singapore	EMC, RF, SAR, Telecom
Europe	EMC, RF, SAR, Telecom, Safety

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1. Report Revision History

Report No.	Report Version	Description	Issue Date
16021405-FCC-H1	NONE	Original	December 22, 2016

2. Customer information

Applicant Name	CAMORAMA(USA)INC
Applicant Add	20895 Currier Road Unit B Walnut, CA 91789 Los Angeles, CaliforniaLos Angeles, California
Manufacturer	CAMORAMA(USA)INC
Manufacturer Add	20895 Currier Road Unit B Walnut, CA 91789 Los Angeles, CaliforniaLos Angeles, California

3. Test site information

Lab performing tests	SIEMIC (Nanjing-China) Laboratories
Lab Address	2-1 Longcang Avenue Yuhua Economic and Technology Development Park, Nanjing, China
FCC Test Site No.	986914
IC Test Site No.	4842B-1
Test Software	EZ_EMC

Channel List

Type		Channel No.	Frequency (MHz)	Available (Y/N)
802.11b/g/n20	2412-2462	1	2412	Y
		2	2417	Y
		3	2422	Y
		4	2427	Y
		5	2432	Y
		6	2437	Y
		7	2442	Y
		8	2447	Y
		9	2452	Y
		10	2457	Y
		11	2462	Y
	2467-2472	12	2467	-
		13	2472	-
	2484	14	2484	-
802.11a/ac	5150-5250MHz	36	5180	Y
		40	5200	Y
		44	5220	Y
		48	5240	Y

4. Equipment under Test (EUT) Information

Description of EUT:	Camorama 4K Panoramic Camera
Main Model:	CAMO-SP1
Serial Model:	CAMO-SP2, CAMO-SP3, CAMO-SP4, CAMO-SP5, CAMO-SP6, CAMO-SP7, CAMO-SP8
Date EUT received:	November 01, 2016
Test Date(s):	November 03 to December 21, 2016
Antenna Gain:	WIFI(2.4G): 0dBi WIFI(5G): 3dBi
Antenna Type:	PIFA antenna
Type of Modulation:	802.11b: DSSS 802.11a/g/n20/ac: OFDM
RF Operating Frequency (ies):	802.11b/g: 2412-2462 MHz (TX/RX) 802.11n20M: 2412-2462MHz 802.11 a: 5180-5240 MHz(TX/RX) 802.11ac: 5180-5240 MHz(TX/RX)
Number of Channels:	WIFI :802.11b/g: 11CH WIFI :802.11a: 4CH WIFI :802.11n20M: 11CH(2.4GHz) WIFI :802.11ac: 4CH
Port:	Power Port
Input Power:	DC 5V 2A Battery: 3.7V 1300mAh 4.81Wh
Trade Name :	WIPET Camorama
FCC ID:	2AJ77CAMORAMA

5. FCC §2.1091 - MaximuM Permissible exposure (MPE)

Applicable Standard

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §1.1310 and §2.1091 RF exposure is calculated.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
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

Test Data

Predication of MPE limit at a given distance

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

Where: S = power density (in appropriate units, e.g. mW/cm2)
P = power input to the antenna (in appropriate units, e.g., mW).
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

Note: the device could not operate at 2.4G and 5G band at the same time, so the RF exposure is calculated separately.

Type	Test mode	CH	Freq (MHz)	Conducted Power (dBm)	Tune Up Power (dBm)
Output power	**802.11b**	Low	2412	14.38	13.5±1
		Mid	2437	14.11	13.5±1
		High	2462	17.30	16.5±1
	802.11g	Low	2412	14.37	13.5±1
		Mid	2437	13.74	13±1
		High	2462	14.42	13.5±1
	802.11n (20M)	Low	2412	12.75	12±1
		Mid	2437	12.81	12±1
		High	2462	13.94	13±1
	820.11a	Low	5180	7.57	7±1
		Middle	5220	7.04	6.5±1
		High	5240	6.92	6±1
	820.11ac	Low	5180	7.65	7±1
		Middle	5220	6.96	6±1
		High	5240	6.83	6±1

For the antenna manufacturer provide only used limited to ERP/EIRP or radiated spurious emission test.

The MPE evaluation as below:

802.11b

The maximum peak output power (turn-up power) in low channel of WIFI(2.4G) is 14.5 dBm
Maximum peak output power (turn-up power) at antenna input terminal: 28.184mW)
Prediction distance: >20 (cm)
Predication frequency: 2412(MHz) lowest frequency
Antenna Gain (typical): 0 (dBi)
Antenna Gain (typical): 1(numeric)
The worst case is power density at predication frequency at 20 cm: 0.0056(mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0056 (mW/cm^2) < 1(mW/cm^2)

The maximum peak output power (turn-up power) in Middle channel of WIFI(2.4G) is 14.5dBm
Maximum peak output power (turn-up power) at antenna input terminal: 28.184 (mW)
Prediction distance: >20 (cm)
Predication frequency: 2437(MHz) lowest frequency
Antenna Gain (typical): 0 (dBi)
Antenna Gain (typical): 1numeric)
The worst case is power density at predication frequency at 20 cm: 0.0056 (mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0056 (mW/cm^2) < 1(mW/cm^2)

The maximum peak output power (turn-up power) in High channel of WIFI(2.4G) is 17.5 dBm
Maximum peak output power (turn-up power) at antenna input terminal: 56.234(mW)
Prediction distance: >20 (cm)
Predication frequency: 2462(MHz) lowest frequency
Antenna Gain (typical): 0(dBi)
Antenna Gain (typical): 1 (numeric)
The worst case is power density at predication frequency at 20 cm: 0.0112(mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0112 (mW/cm^2) < 1(mW/cm^2)

802.11b

The maximum peak output power (turn-up power) in low channel of WIFI(2.4G) is 14.5 dBm
Maximum peak output power (turn-up power) at antenna input terminal: 28.184mW)
Prediction distance: >20 (cm)
Predication frequency: 2412(MHz) lowest frequency
Antenna Gain (typical): 0 (dBi)
Antenna Gain (typical): 1 (numeric)
The worst case is power density at predication frequency at 20 cm: 0.0056(mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0056 (mW/cm^2) < 1(mW/cm^2)

The maximum peak output power (turn-up power) in Middle channel of WIFI(2.4G) is 14.0dBm
Maximum peak output power (turn-up power) at antenna input terminal: 25.119(mW)
Prediction distance: >20 (cm)
Predication frequency: 2437(MHz) lowest frequency
Antenna Gain (typical): 0(dBi)
Antenna Gain (typical): 1numeric)
The worst case is power density at predication frequency at 20 cm: 0.0050 (mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0050 (mW/cm^2) < 1(mW/cm^2)

The maximum peak output power (turn-up power) in High channel of WIFI(2.4G) is 14.5 dBm
Maximum peak output power (turn-up power) at antenna input terminal: 28.184(mW)
Prediction distance: >20 (cm)
Predication frequency: 2462(MHz) lowest frequency
Antenna Gain (typical): 0(dBi)
Antenna Gain (typical): 1 (numeric)
The worst case is power density at predication frequency at 20 cm: 0.0056 (mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0056 (mW/cm^2) < 1(mW/cm^2)

802.11n(20M)

The maximum peak output power (turn-up power) in low channel of WIFI(2.4G) is 13 dBm
Maximum peak output power (turn-up power) at antenna input terminal: 19.953mW)
Prediction distance: >20 (cm)
Predication frequency: 2412(MHz) lowest frequency
Antenna Gain (typical): 0 (dBi)
Antenna Gain (typical): 1numeric)
The worst case is power density at predication frequency at 20 cm: 0.0050(mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0050 (mW/cm^2) < 1(mW/cm^2)

The maximum peak output power (turn-up power) in Middle channel of WIFI(2.4G) is 13.0dBm
Maximum peak output power (turn-up power) at antenna input terminal: 19.953(mW)
Prediction distance: >20 (cm)
Predication frequency: 2437(MHz) lowest frequency
Antenna Gain (typical): 1 (dBi)
Antenna Gain (typical): 1.259numeric)
The worst case is power density at predication frequency at 20 cm: 0.0040 (mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0040 (mW/cm^2) < 1(mW/cm^2)

The maximum peak output power (turn-up power) in High channel of WIFI(2.4G) is 14 dBm
Maximum peak output power (turn-up power) at antenna input terminal: 25.119(mW)
Prediction distance: >20 (cm)
Predication frequency: 2462(MHz) lowest frequency
Antenna Gain (typical): 0(dBi)
Antenna Gain (typical): 1 (numeric)
The worst case is power density at predication frequency at 20 cm: 0.0050 (mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0050(mW/cm^2) < 1(mW/cm^2)

802.11a

The maximum peak output power (turn-up power) in low channel of WIFI(5G) is 8 dBm
Maximum peak output power (turn-up power) at antenna input terminal: 6.310mW)
Prediction distance: >20 (cm)
Predication frequency: 2518(MHz) lowest frequency
Antenna Gain (typical): 3 (dBi)
Antenna Gain (typical): 1.995 (numeric)
The worst case is power density at predication frequency at 20 cm: 0.0025(mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0025 (mW/cm^2) < 1(mW/cm^2)

The maximum peak output power (turn-up power) in Middle channel of 5G is 7.5dBm
Maximum peak output power (turn-up power) at antenna input terminal: 5.623(mW)
Prediction distance: >20 (cm)
Predication frequency: 2522(MHz) lowest frequency
Antenna Gain (typical): 3 (dBi)
Antenna Gain (typical): 1.995(numeric)
The worst case is power density at predication frequency at 20 cm: 0.0022 (mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0022 (mW/cm^2) < 1(mW/cm^2)

The maximum peak output power (turn-up power) in High channel of BT is 7 dBm
Maximum peak output power (turn-up power) at antenna input terminal: 5.012(mW)
Prediction distance: >20 (cm)
Predication frequency: 2524(MHz) lowest frequency
Antenna Gain (typical): 3(dBi)
Antenna Gain (typical): 1.995 (numeric)
The worst case is power density at predication frequency at 20 cm: 0.0020 (mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0020(mW/cm^2) < 1(mW/cm^2)

802.11ac

The maximum peak output power (turn-up power) in low channel of WIFI(5G) is 8 dBm
Maximum peak output power (turn-up power) at antenna input terminal: 6.310mW)
Prediction distance: >20 (cm)
Predication frequency: 2518(MHz) lowest frequency
Antenna Gain (typical): 3 (dBi)
Antenna Gain (typical): 1.995 (numeric)
The worst case is power density at predication frequency at 20 cm: 0.0025(mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0025 (mW/cm^2) < 1(mW/cm^2)

The maximum peak output power (turn-up power) in Middle channel of 5G is 7dBm
Maximum peak output power (turn-up power) at antenna input terminal: 5.012(mW)
Prediction distance: >20 (cm)
Predication frequency: 2522(MHz) lowest frequency
Antenna Gain (typical): 3 (dBi)
Antenna Gain (typical): 1.995 (numeric)
The worst case is power density at predication frequency at 20 cm: 0.0020 (mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0020 (mW/cm^2) < 1(mW/cm^2)

The maximum peak output power (turn-up power) in High channel of BT is 7 dBm
Maximum peak output power (turn-up power) at antenna input terminal: 5.012(mW)
Prediction distance: >20 (cm)
Predication frequency: 2524(MHz) lowest frequency
Antenna Gain (typical): 3(dBi)
Antenna Gain (typical): 1.995 (numeric)
The worst case is power density at predication frequency at 20 cm: 0.0020 (mW/cm^2)
MPE limit for general population exposure at prediction frequency: 1 (mW/cm^2)

0.0020(mW/cm^2) < 1(mW/cm^2)

Result: Pass

CAMORAMA(USA)INC

20895 Currier Road Unit B Walnut, CA 91789 Los Angeles, California

Statement

CAMORAMA(USA)INC

Product: Camorama 4K Panoramic Camera

FCC ID: 2AJ77CAMORAMA

Model: CAMO-SP1, CAMO-SP2,CAMO-SP3,CAMO-SP4,CAMO-SP5,CAMO-SP6, CAMO-SP7,CAMO-SP8 All models are all identical in interior structure, electrical circuits and components, and just model names and color are different for the marketing requirement. Your assistance on this matter is highly appreciated.

Yours sincerely,

signature : Winston Zhang

name / title : Winston Zhang/Manager

Contact information / address: 20895 Currier Road Unit B Walnut, CA 91789 Los Angeles, California