RF EXPOSURE REPORT

Report No.: 17071082-FCC-H

Supersede Report No.: N/A

Applicant	Switchmate Home LLC
Product Name	Camera
Model No.	CSM005
Serial No.	N/A
Test Standard	FCC 2.1091:2016
Test Date	October 17 to November 05, 2017
Issue Date	November 06, 2017
Test Result	☑ Pass ☐ Fail
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

Loren Luo	*David Huang*
Loren Luo Test Engineer	David Huang Checked By

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

Issued by:

SIEMIC (SHENZHEN-CHINA) LABORATORIES

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
17071082-FCC-H	NONE	Original	November 06, 2017

2. Customer information

Applicant Name	Switchmate Home LLC
Applicant Add	6601 Owens Drive, Suite 250 Pleasanton, CA 94588
Manufacturer	Switchmate Home LLC
Manufacturer Add	6601 Owens Drive, Suite 250 Pleasanton, CA 94588

3. Test site information

Lab performing tests	SIEMIC (Shenzhen-China) LABORATORIES
Lab Address	Zone A, Floor 1, Building 2 Wan Ye Long Technology Park South Side of Zhoushi Road, Bao'an District, Shenzhen, Guangdong China 518108
FCC Test Site No.	535293
IC Test Site No.	4842E-1
Test Software	Radiated Emission Program-To Shenzhen v2.0

4. Equipment under Test (EUT) Information

Description of EUT: Camera

Main Model: CSM005

Serial Model: N/A

Date EUT received: October 16, 2017

Test Date(s):   October 17 to November 05, 2017

Antenna Gain: BLE: 2.3dBi
                              WIFI: 1.14dBi

Antenna Type: PIFA antenna

Type of Modulation: 802.11b/g/n: DSSS, OFDM
                              BLE: GFSK

RF Operating Frequency (ies): WIFI: 802.11b/g/n(20M): 2412-2462 MHz
                              BLE: 2402-2480 MHz

Number of Channels: WIFI :802.11b/g/n(20M): 11CH
                              BLE: 40CH

Port: USB Port

Input Power: DC power from 6x1.5V Lithium Batteries or 5VDC micro-USB

Trade Name :   N/A

FCC ID: 2AICR-CSM005

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

5.1 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

5.2 Test Result

WIFI Mode:

Type	Test mode	CH	Freq (MHz)	Conducted Power (dBm)	Tune Up Power (dBm)
Output power	802.11b	Low	2412	8.64	8±1
		Mid	2437	8.14	8±1
		High	2462	7.91	8±1
	802.11g	Low	2412	7.90	8±1
		Mid	2437	7.53	8±1
		High	2462	7.34	8±1
	802.11n (20M)	Low	2412	7.11	8±1
		Mid	2437	6.71	8±1
		High	2462	6.77	8±1

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/cm^2)

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)

For the antenna manufacturer provide only used limited to ERP/EIRP or radiated spurious emission test. The MPE evaluation as below:

Maximum output power at antenna input terminal: 9(dBm)

Maximum output power at antenna input terminal: 7.943(mW)

Prediction distance: >20 (cm)

Predication frequency: 2412 (MHz) High frequency

Antenna Gain (typical):1.14 (dBi)

Antenna Gain (typical):1.300 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.002(mW/cm^2)

MPE limit for general population exposure at prediction frequency: 1.0 (mW/cm^2)

0.002(mW/cm^2) < 1.0 (mW/cm^2)

Result: Pass

BLE Mode:

Type	CH	Freq (MHz)	Conducted Power (dBm)	Tune Up Power (dBm)
Output power	Low	2402	1.012	1±1
	Mid	2440	1.053	1±1
	High	2480	1.549	1±1

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/cm^2)

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)

For the antenna manufacturer provide only used limited to ERP/EIRP or radiated spurious emission test. The MPE evaluation as below:

Maximum output power at antenna input terminal: 2(dBm)

Maximum output power at antenna input terminal: 1.585(mW)

Prediction distance: >20 (cm)

Predication frequency: 2402(MHz) Low frequency

Antenna Gain (typical):2.3 (dBi)

Antenna Gain (typical):1.698 (numeric)

The worst case is power density at predication frequency at 20 cm: 0.00005(mW/cm^2)

MPE limit for general population exposure at prediction frequency: 1.0(mW/cm^2)

0.00005(mW/cm^2) < 1 (mW/cm^2)

Result: Pass