

RF Exposure Evaluation Report

Application No.: SZEM1906014805CR
Applicant: KanDao Technology Co., Ltd
Address of Applicant: 5th Floor, M7 Steel Building, the second way in Technology Road, Nanshan District, Shenzhen, China
Manufacturer: KanDao Technology Co., Ltd
Address of Manufacturer: 5th Floor, M7 Steel Building, the second way in Technology Road, Nanshan District, Shenzhen, China
Factory: Sky Light Electronic (Shenzhen) Limited
Address of Factory: No.8 Workshop 1F-5F and NO.9 Workshop 1F-5F, AnTuoShan Gao science and technology Industrial Park, Shaer community, Shajing Street, BaoAn district, Shenzhen city, Guangdong province, China
EUT Name: Intelligent360 degree panoramic camera
Model No.: WL0308
Trade Mark:  
FCC ID: 2ATPV-KDWL
Standards: 47 CFR Part 1.1307 (2016)
47 CFR Part 1.1310 (2016)
Date of Receipt: 2019-06-04
Date of Test: 2019-06-20 to 2019-06-27
Date of Issue: 2019-07-01

Test Result :	PASS*
----------------------	--------------

* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu
EMC Laboratory Manager



2 Version

<i>Revision Record</i>				
<i>Version</i>	<i>Chapter</i>	<i>Date</i>	<i>Modifier</i>	<i>Remark</i>
01		2019-07-01		Original

Authorized for issue by:			
			
		<hr/> Edison Li /Project Engineer	
			
		<hr/> Eric Fu /Reviewer	



3 Contents

	Page
1 COVER PAGE	1
2 VERSION	2
3 CONTENTS	3
4 GENERAL DESCRIPTION OF EUT	4
4.1 TEST LOCATION	6
4.2 TEST FACILITY	6
4.3 DEVIATION FROM STANDARDS	6
4.4 ABNORMALITIES FROM STANDARD CONDITIONS	6
4.5 OTHER INFORMATION REQUESTED BY THE CUSTOMER	6
5 RF EXPOSURE EVALUATION	7
5.1 RF EXPOSURE COMPLIANCE REQUIREMENT	7
5.1.1 Limits	7
5.1.2 Test Procedure	7
5.1.3 EUT RF Exposure Evaluation	8-9



4 General Description of EUT

Power supply:	AC Adapter Model: S042-1A120350HU Input: AC 100-240V, 50/60Hz, 1.0A Output: DC 12.0V, 3.5A			
Sample Type:	Fixed device			
For BT:				
Operation Frequency:	2402MHz~2480MHz			
Bluetooth Version:	V 4.1			
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)			
Modulation Type:	GFSK, $\pi/4$ DQPSK, 8DPSK			
Number of Channel:	79			
Hopping Channel Type:	Adaptive Frequency Hopping systems			
Antenna Type:	FPCB Antenna			
Antenna Gain:	3dBi			
For BLE:				
Operation Frequency:	2402MHz~2480MHz			
Bluetooth Version:	V 4.1			
Modulation Type:	GFSK			
Number of Channel:	40			
Antenna Type:	FPCB Antenna			
Antenna Gain:	3dBi			
For 2.4G wifi:				
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz			
Channel Numbers:	802.11b/g/n(HT20): 11 Channels			
Channel Separation:	5MHz			
Type of Modulation:	802.11b: DSSS(CCK,DQPSK,DBPSK) 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) 802.11n(HT20): OFDM (64QAM, 16QAM, QPSK, BPSK)			
Antenna Type:	FPCB Antenna			
Antenna Gain:	3dBi			
For 5G wifi:				
Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	UNII Band I	802.11a/n/ac 20MHz	5180-5240	4
		802.11n/ac 40MHz	5190-5230	2
		802.11ac 80MHz	5210	1





Type of Modulation:	802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Antenna type:	FPCB Antenna
Antenna gain	4dBi



4.1 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.3 Deviation from Standards

None.

4.4 Abnormalities from Standard Conditions

None.

4.5 Other Information Requested by the Customer

None.



5 RF Exposure Evaluation

5.1 RF Exposure Compliance Requirement

5.1.1 Limits

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

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)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	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/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

Friis Formula

Friis transmission formula: $Pd = (Pout \cdot G) / (4 \cdot \pi \cdot R^2)$

Where

Pd = power density in mW/cm²

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

5.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.



5.1.3 EUT RF Exposure Evaluation

Remark: The Bluetooth and Wifi function can't synchronous transmission at the same time.

For BT

Antenna: 3dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.995, in linear scale.

The max tune-up tolerance power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max tune-up tolerance power(dBm)	Max tune-up Tolerance power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	MPE Ratio	Result
Lowest	2402MHz	7	5.01	0.0020	1.0	0.0020	PASS

Note: Refer to report No. SZEM190601480502 for EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For BLE

Antenna: 3dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.995 in linear scale.

The max tune-up tolerance power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max tune-up tolerance power(dBm)	Max tune-up Tolerance power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	MPE Ratio	Result
Middle	2440MHz	4.5	2.82	0.0011	1.0	0.0011	PASS

Note: Refer to report No. SZEM190601480503 for EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.



For 2.4G WIFI

Antenna: 3dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.995 in linear scale.

The max tune-up tolerance power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max tune-up tolerance power(dBm)	Max tune-up Tolerance power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	MPE Ratio	Result
Middle	2437MHz	16.50	44.67	0.0177	1.0	0.0177	PASS

Note: Refer to report No. SZEM190601480504 for EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For 5GHz

Antenna :4dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.512 in linear scale.

The max tune-up tolerance power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max tune-up tolerance power(dBm)	Max tune-up Tolerance power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	MPE Ratio	Result
Highest	5240MHz	14.5	28.18	0.0141	1.0	0.0141	PASS

Note: Refer to report No. SZEM190601480505 for EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

- End of the Report -

