



RF Exposure Evaluation Report

Application No.: SZEM2008008088CR
Applicant: Shenzhen ImagineVision Technology Limited
Address of Applicant: 1A, F5, TCL International E City, 1001 Zhong Shan Park Road, Nan Shan, Shenzhen, China
Manufacturer: Shenzhen ImagineVision Technology Limited
Address of Manufacturer: 1A, F5, TCL International E City, 1001 Zhong Shan Park Road, Nan Shan, Shenzhen, China
Factory: HUNAN FN-LINK TECHNOLOGY LIMITED
Address of Factory: No.8, LiTong Road, Liuyang Economic and Technological Development Zone, Liuyang City, Changsha City, Hunan Province, P.R. China
Equipment Under Test (EUT):
EUT Name: Z CAM USB WIFI 5G Module
Model No.: WIFIM5G01
Trade Mark: Z CAM
FCC ID: 2AENNWF5G01
Standards: 47 CFR Part 1.1307
47 CFR Part 1.1310
47 CFR Part 2.1091
Date of Receipt: 2020-08-18
Date of Test: 2020-08-24 to 2020-09-08
Date of Issue: 2020-09-08

Test Result :	PASS*
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* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu

Keny Xu
EMC Laboratory Manager



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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2020-09-08		Original

Authorized for issue by:			
			
		Harry Wu/Project Engineer	
			
		Eric Fu/Reviewer	





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4 General Information

4.1 General Description of EUT

Rated voltage:	DC5.0V				
Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels	
	UNII Band 1	IEEE 802.11a	5180-5240	4	
		IEEE 802.11n 20MHz	5180-5240	4	
		IEEE 802.11n 40MHz	5190-5230	2	
	UNII Band 3	IEEE 802.11a	5745-5825	5	
		IEEE 802.11n 20MHz	5745-5825	5	
		IEEE 802.11n 40MHz	5755-5795	2	
Modulation Type:	802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK); 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM);				
Channel Spacing:	802.11a/n(HT20): 20MHz; 802.11n(HT40): 40MHz;				
DFS Function:	Slave without Radar detection				
TPC Function:	Without TPC function				
Antenna Type:	Dipole Antenna				
Antenna Gain:	Antenna 1&2:3.89dBi				





4.2 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

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

4.3 Test Facility

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

- **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.

4.4 Deviation from Standards

None.

4.5 Abnormalities from Standard Conditions

None.

4.6 Other Information Requested by the Customer

None.



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

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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: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

For Uncontrolled Environment, the limit of MPE is 1.0 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

1) Test Results

For 5G WiFi:

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

SISO:

Antenna	Max Antenna Gain (dBi)	Max Antenna Gain (Numeric)	Max tune-up tolerance power (dBm)	Max tune-up Tolerance power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	MPE Ratios	Result
Ant1	3.89	2.45	15.92	39.08	0.019	1	0.019	PASS

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

MIMO:

Antenna	Max Antenna Gain (dBi)	Max Antenna Gain (Numeric)	Max tune-up tolerance power (dBm)	Max tune-up Tolerance power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit (mW/cm ²)	MPE Ratios	Result
Ant1+2	3.89	2.45	18.58	72.11	0.035	1	0.035	PASS

Note: Refer to report No. SZEM200800808801 for EUT test Max Conducted Output Power value.

The distance (6th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

Since the source-based time-averaging conducted output power is well below the SAR low threshold level, so the EUT is considered to comply with SAR requirement without testing.

-End of Report-

