RF Exposure Evaluation Report

Application No.:	SZCR2104020343AT
Applicant:	Jwipc Technology Co., Ltd.
Address of Applicant:	13/F, Building B, Haisong Edifice, Tairan 9th Road, Futian District, Shenzhen, China
Manufacturer:	Jwipc Technology Co., Ltd.
Address of Manufacturer:	13/F, Building B, Haisong Edifice, Tairan 9th Road, Futian District, Shenzhen, China
Factory:	Dongguan Scd Technology Co., Ltd.
Address of Factory:	No.1 The 2nd Street, Huihuang Industrial Zone, Xiekeng Village, Qingxi Town, Dongguan, 523000 Guangdong, China
Equipment Under Test (EUT):	
Product Name:	OPS PC MODULE
Model No.:	S096, S0******** (*=A-Z, 0-9, character or blank) ♣
♣	Please refer to section 4.1 of this report which indicates which model was actually tested and which were electrically identical.
FCC ID:	2AYLN-S096
Standards:	47 CFR Part 1.1307
	47 CFR Part 1.1310
	47 CFR Part 2.1091
Date of Receipt:	2021-04-02
Date of Test:	2021-04-14 to 2021-05-10
Date of Issue:	2021-05-11

Test Result :	**PASS***

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

Keny Xu
EMC Laboratory Manager

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2 Version

Revision Record				
Version	***Chapter***	***Date***	***Modifier***	***Remark***
01		*2021-05-11*		*Original*

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

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4 General Information

4.1 General Description of EUT

Rated voltage:	Input:DC19.0V, 3.42A
For BT:	
Bluetooth Version:	V5.0
Operation Frequency:	2402MHz to 2480MHz
Modulation Type:	GFSK, Pi/4DQPSK, 8DPSK
Number of Channels:	79
Channel Spacing:	1MHz
Antenna Type:	Dipole Antenna
Antenna Gain:	Antenna 1: 5.67dBi
For BLE:	
Bluetooth Version:	V5.0
Operation Frequency:	2402MHz to 2480MHz
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Data Rate:	1Mbps, 2Mbps
Antenna Type:	Dipole Antenna
Antenna Gain:	Antenna 1: 5.67dBi
For 2.4G Wifi	
Operation Frequency:	802.11b/g/n/ax(HT20/HE20): 2412MHz to 2462MHz 802.11n/ax(HT40/HE40): 2422MHz to 2452MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11ax: OFDM&OFDMA (1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK)
Number of Channels:	802.11802.11b/g/n(HT20)/ax(HE20): 11 802.11n(HT40)/ax(HE40):7
Channel Spacing:	5MHz
Antenna Type:	Dipole Antenna
Antenna Gain:	Antenna 1&2:5.67dBi Directional gain of antenna 1+2: 8.68dBi
For 5GHz Wifi	
DFS Function:	Slaver

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TPC Function:	Not Support
Antenna Type:	Dipole Antenna
Antenna Gain:	Antenna 1&2:3dBi Directional gain of antenna 1+2: 6.01dBi.

Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	UNII Band I	802.11a/n(HT20)/ac(VHT20)/ax(HE20)	5180-5240	4
		802.11n(HT40)/ac(VHT40)/ax(HE40)	5190-5230	2
		802.11ac(VHT80)/ax(HE80)	5210	1
	UNII Band II-A	802.11a/n(HT20)/ac(VHT20)/ax(HE20)	5260-5320	4
		802.11n(HT40)/ac(VHT40)/ax(HE40)	5270-5310	2
		802.11ac(VHT80)/ax(HE80)	5290	1
		802.11ax(HE160)	5250	1
	UNII Band II-C	802.11a/n(HT20)/ac(VHT20)/ax(HE20)	5500-5700	11
		802.11n(HT40)/ac(VHT40)/ax(HE40)	5510-5670	5
		802.11ac(VHT80)/ax(HE80)	5530-5610	2
		802.11ax(HE160)	5570	1
	UNII Band III	802.11a/n(HT20)/ac(VHT20)/ax(HE20)	5745-5825	5
		802.11n(HT40)/ac(VHT40)/ax(HE40)	5755-5895	2
		802.11ac(VHT80)/ax(HE80)	5775	1
Modulation Type:	802.11a: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) 802.11ax: OFDM&OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)			
Channel Spacing:	802.11a/n(HT20)/ac(VHT20)/ax(HE20) : 20MHz 802.11n(HT40)/ac(VHT40)/ax(HE40) : 40MHz 802.11ac(VHT80)/ax(HE80) : 80MHz 802.11ac(VHT160)/ax(HE160) : 160MHz			

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Declaration of EUT Family Grouping:

Model No.: S096, S0******** (*=A-Z, 0-9, character or blank)

Only the model S096 was tested. According to the declaration from the applicant, the electrical circuit design, layout, components used, internal wiring and functions were identical for the above models, with only difference on model No., memory capacity, hard disk capacity and CPU.

Key Component List	
CPU	i7-10700T, i5-10500T, i5-10400T and G5900T
PCH	H510 and Q570
The configurations have been considered, Configuration (CPU: i7-10700T and PCH: H510) is worst case and recorded in the report.	

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4.2 Test Location

All tests were performed at:

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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.

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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: Pd = (Pout*G)/(4* Pi * 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 id 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.

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4.1.3 EUT RF Exposure Evaluation

For BT:

Antenna Gain: 5.67dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.69in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Antenna	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	EIRP (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)	Result
1	2480	10.20	38.64	0.008	1.0	PASS

Note: Refer to report No. SZCR210402034302 for EUT test Max Conducted Peak Output Power value. The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For BLE:

Antenna Gain: 5.67dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.69 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Antenna	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	EIRP (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)	Result
1	2480	6.30	15.74	0.003	1.0	PASS

Note: Refer to report No. SZCR210402034303 for EUT test Max Conducted Peak Output Power value. The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

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For 2.4G:

For SISO:

Antenna Gain: 5.67dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.69 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Antenna	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	EIRP (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)	Result
2	2462	14.01	92.90	0.018	1.0	PASS

For MIMO:

Antenna Gain: 5.67dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 3.69 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Antenna	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	EIRP (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)	Result
1+2	2437	15.94	144.88	0.029	1.0	PASS

Note: Refer to report No. SZCR210402034304 for EUT test Max Conducted Peak Output Power value.

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

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For 5G:

For SISO:

Antenna Gain: 3dBi

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

Output Power Into Antenna & RF Exposure Evaluation Distance:

Antenna	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	EIRP (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)	Result
1	5600	13.34	43.05	0.009	1.0	PASS

For MIMO:

Antenna Gain: 3dBi

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

Output Power Into Antenna & RF Exposure Evaluation Distance:

Antenna	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	EIRP (mW)	Power Density at R = 20 cm (mW/cm^2)	Limit (mW/cm^2)	Result
1+2	5785	15.65	73.28	0.015	1.0	PASS

Note: Refer to report No. SZCR210402034305 for EUT test Max Conducted Peak Output Power value.

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

- End of the Report -

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