

1 Cover Page

RF Exposure Evaluation Report

Application No.: SHCR2201000169AT
FCC ID: 2AVYF-IPC-FX8FI-V2
Applicant: Hangzhou Huacheng Network Technology Co.,Ltd.
Address of Applicant: No.2930, Nanhuan Road, Binjiang District, Hangzhou, China
Manufacturer: Hangzhou Huacheng Network Technology Co.,Ltd.
Address of Manufacturer: No.2930, Nanhuan Road, Binjiang District, Hangzhou, China
Equipment Under Test (EUT):
EUT Name: CONSUMER CAMERA
Model No.: IPC-F88FIP-V2
Add Model No: IPC-F88FIP-V2-0280B-imou,IPC-F88FIP-V2-0360B-imou,IPC-F88FIP-V2-0280B,IPC-F88FIP-V2-0360B,IPC-F88FIN-V2-0280B-imou,IPC-F88FIN-V2-0360B-imou,IPC-F88FIN-V2-0280B,IPC-F88FIN-V2-0360B,IPC-F88FIN-V2,IPC-F88FI-V2,IPC-F88FI-V2-imou,IPC-F88FI-V2-0280B-LC,IPC-F88FI-V2-0360B-LC,IPC-F88FIP-V2-imou,IPC-F88FIN-V2-imou
Standard(s) : FCC Rules 47 CFR §2.1091
KDB447498 D01 General RF Exposure Guidance v06
Date of Receipt: 2022-01-12
Date of Test: 2022-02-21 to 2022-03-02
Date of Issue: 2022-03-03

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

Parlam Zhan

Parlam Zhan
Laboratory Manager



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Revision Record			
Version	Description	Date	Remark
00	Original	2022-03-03	/

Authorized for issue by:			
			
		<hr/> Micheal Niu / Project Engineer	
			
		<hr/> Parlam Zhan / Reviewer	



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3 General Information

3.1 General Description of E.U.T.

Power supply:	DC 12V ,1A
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3.2 Technical Specifications

2.4G WiFi

Antenna Gain:	Ant 1:2.7dBi (Provided by manufacturer) Ant 2:1dBi (Provided by manufacturer) Directional Gain:4.9dBi
Antenna Type:	Antenna 1: Plug-in shrapnel antenna; Antenna 2: Plug-in shrapnel antenna
Channel Spacing:	5MHz
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels:	802.11b/g/n(HT20):11
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz



5G WiFi

Operation Frequency:	Band	Mode	Frequency Range(MHz)	Number of channels
	UNII Band I	802.11a/n(HT20)/ac(VHT20)	5180-5240	4
		802.11n(HT40)/ac(VHT40)	5190-5230	2
		802.11ac(VHT80)	5210	1
	UNII Band II-A	802.11a/n(HT20)/ac(VHT20)	5260-5320	4
		802.11n(HT40)/ac(VHT40)	5270-5310	2
		802.11ac(VHT80)	5290	1
	UNII Band II-C	802.11a/n(HT20)/ac(VHT20)	5500-5700	11
		802.11n(HT40)/ac(VHT40)	5510-5670	5
		802.11ac(VHT80)	5530~5610	2
	UNII Band III	802.11a/n(HT20)/ac(VHT20)	5745-5825	5
		802.11n(HT40)/ac(VHT40)	5755-5795	2
		802.11ac(VHT80)	5775	1
Modulation Type:	802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)			
Channel Spacing:	802.11a/n(HT20)/ac(VHT20): 20MHz 802.11n(HT40)/ac(VHT40): 40MHz 802.11ac(VHT80): 80MHz			
Data Rate:	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: MCS0-15 802.11ac: MCS0-9			
Antenna Gain:	Ant 1:5.6dBi (Provided by manufacturer) Ant 2:1.1dBi (Provided by manufacturer) Directional Gain:6.65dBi			
Antenna Type:	Antenna 1: Plug-in shrapnel antenna; Antenna 2: Plug-in shrapnel antenna			
DFS Function:	Slave without Radar detection			
TPC Function:	Not Support			



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3.3 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

3.4 Test Facility

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

• **CNAS (No. CNAS L4354)**

CNAS has accredited Compliance Certification Services (Kunshan) Inc. to ISO/IEC 17025:2017 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. 2541.01)**

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

• **FCC (Designation Number: CN1172)**

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory.

Designation Number: CN1172.

• **ISED (CAB identifier: CN0072)**

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

Company Number: 2324E

• **VCCI (Member No.: 1938)**

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.



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4 Test Standards and Limits

4.1 FCC Radiofrequency radiation exposure limits:

According to §1.1310, the limit for general population/uncontrolled exposures

Frequency	Power density(mW/cm ²)	Averaging time(minutes)
300MHz~1.5GHz	f/1500	30
1.5GHz~100GHz	1.0	30



5 Measurement and Calculation

5.1 Maximum transmit power

2.4GHz for FCC

The Power Data is based on the RF Test Report SHCR220100016901-2.4GHz

Test Mode	Channel	Antenna 1 Power[dBm]	Antenna 2 Power[dBm]	MIMO Power[dBm]	Antenna 1 Power[mW]	Antenna 2 Power[mW]	MIMO Power[mW]
11B SISO	2412	13.99	14.29	NA	25.06	26.85	N/A
11B SISO	2437	14.06	14.30	NA	25.47	26.92	N/A
11B SISO	2462	14.31	14.53	NA	26.98	28.38	N/A
11G SISO	2412	14.11	14.20	NA	25.76	26.30	N/A
11G SISO	2437	14.55	14.50	NA	28.51	28.18	N/A
11G SISO	2462	14.41	14.53	NA	27.61	28.38	N/A
11N20 MIMO	2412	10.77	10.92	13.86	11.94	12.36	24.32
11N20 MIMO	2437	10.77	11.11	13.95	11.94	12.91	24.83
11N20 MIMO	2462	10.84	11.31	14.09	12.13	13.52	25.64



5GHz for FCC

The Power Data is based on the RF Test Report SHCR220100016902-5GHz

Test Mode	Test Channel	Antenna 1 Power[dBm]	Antenna 2 Power[dBm]	MIMO Power[dBm]	Antenna 1 Power[mW]	Antenna 2 Power[mW]	MIMO Power[mW]
802.11a	5180	14.48	13.40	/	28.05	21.88	NA
	5200	14.64	13.79	/	29.11	23.93	NA
	5240	14.06	13.37	/	25.47	21.73	NA
	5260	14.84	14.52	/	30.48	28.31	NA
	5300	14.74	14.53	/	29.79	28.38	NA
	5320	14.80	14.58	/	30.20	28.71	NA
	5500	11.89	11.78	/	15.45	15.07	NA
	5580	11.25	10.92	/	13.34	12.36	NA
	5700	11.77	11.79	/	15.03	15.10	NA
	5745	9.46	9.03	/	8.83	8.00	NA
	5785	9.95	9.60	/	9.89	9.12	NA
	5825	9.48	9.05	/	8.87	8.04	NA
802.11n(HT20)	5180	12.84	11.03	15.04	19.23	12.68	31.92
	5200	12.65	10.61	14.76	18.41	11.51	29.92
	5240	12.41	9.63	14.25	17.42	9.18	26.61
	5260	12.40	10.16	14.43	17.38	10.38	27.73
	5300	12.64	10.02	14.53	18.37	10.05	28.38
	5320	12.74	10.17	14.65	18.79	10.40	29.17
	5500	8.94	6.91	11.05	7.83	4.91	12.74
	5580	9.73	7.47	11.76	9.40	5.58	15.00
	5700	10.63	7.59	12.38	11.56	5.74	17.30
	5745	7.52	4.46	9.26	5.65	2.79	8.43
	5785	9.12	0.64	9.70	8.17	1.16	9.33
	5825	9.57	0.91	10.12	9.06	1.23	10.28
802.11n(HT40)	5190	12.61	10.35	14.64	18.24	10.84	29.11
	5230	13.03	10.49	14.95	20.09	11.19	31.26
	5270	13.11	11.03	15.20	20.46	12.68	33.11
	5310	13.24	10.88	15.23	21.09	12.25	33.34
	5510	8.99	7.43	11.29	7.93	5.53	13.46
	5550	9.65	7.85	11.85	9.23	6.10	15.31
	5670	10.22	8.01	12.26	10.52	6.32	16.83
	5755	8.03	4.50	9.62	6.35	2.82	9.16
	5795	7.96	2.97	9.16	6.25	1.98	8.24
802.11ac(VHT20)	5180	12.95	11.23	15.18	19.72	13.27	32.96
	5200	12.83	10.85	14.96	19.19	12.16	31.33



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	5240	13.48	11.24	15.51	22.28	13.30	35.56
	5260	12.76	10.49	14.78	18.88	11.19	30.06
	5300	13.17	10.46	15.03	20.75	11.12	31.84
	5320	13.27	10.60	15.15	21.23	11.48	32.73
	5500	9.79	7.78	11.91	9.53	6.00	15.52
	5580	8.98	6.96	11.10	7.91	4.97	12.88
	5700	10.02	7.03	11.79	10.05	5.05	15.10
	5745	9.03	1.17	9.69	8.00	1.31	9.31
	5785	9.10	1.00	9.73	8.13	1.26	9.40
	5825	9.80	1.20	10.36	9.55	1.32	10.86
802.11ac(VHT40)	5190	12.77	10.83	14.92	18.92	12.11	31.05
	5230	13.13	10.81	15.13	20.56	12.05	32.58
	5270	12.32	10.20	14.40	17.06	10.47	27.54
	5310	12.56	10.12	14.52	18.03	10.28	28.31
	5510	10.02	8.49	12.33	10.05	7.06	17.10
	5550	9.46	7.68	11.67	8.83	5.86	14.69
	5670	9.98	7.67	11.99	9.95	5.85	15.81
	5755	8.90	2.07	9.72	7.76	1.61	9.38
802.11ac(VHT80)	5795	8.53	0.83	9.21	7.13	1.21	8.34
	5210	12.68	10.59	14.77	18.54	11.46	29.99
	5290	12.79	10.78	14.91	19.01	11.97	30.97
	5530	9.80	7.78	11.92	9.55	6.00	15.56
	5610	9.85	7.82	11.96	9.66	6.05	15.70
	5775	9.56	2.15	10.28	9.04	1.64	10.67



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5.2 MPE Calculation

According to the formula $S = P / 4\pi R^2$, we can calculate S which is MPE.

Note:

- 1) P (mW)
- 2) R = distance to the center of radiation of antenna (in meter) = 20cm
- 3) MPE limit = 1mW/cm²

For 2.4G WiFi - Antenna1:

The max. antenna gain is 2.7 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
28.51	1.862	20	0.01056	1	Pass

For 2.4G WiFi - Antenna2:

The max. antenna gain is 1 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
28.38	1.259	20	0.00711	1	Pass

In MIMO mode:

The max. antenna gain is 4.9 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
25.64	3.090	20	0.01576	1	Pass



For 5G WiFi - Antenna1:

The max. antenna gain is 5.6 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
30.48	3.631	20	0.02202	1	Pass

For 5G WiFi - Antenna2:

The max. antenna gain is 1.1 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
28.71	1.288	20	0.00736	1	Pass

In MIMO mode:

The max. antenna gain is 6.65 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
35.56	4.624	20	0.03271	1	Pass

2.4G WiFi and 5G WiFi modules can simultaneous transmitting, so the maximum rate of MPE is $0.01576/1.0+0.03271/1.0=0.048\leq 1.0$. according to the KDB447498 section 7.2 determine the device is exclusion from SAR test

--End of the Report--

