

1 Cover Page

RF MPE REPORT

Application No.: SHEM2108009897CR
FCC ID: 2AVYF-IPC-FX8FI
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
Add Model No.: IPC-F88FIP-0280B-imou;IPC-F88FIP-0360B-imou;IPC-F88FIP-0280B;IPC-F88FIP-0360B;IPC-F88FIN;IPC-F88FIN-0280B-imou;IPC-F88FIN-0360B-imou;IPC-F88FIN-0280B;IPC-F88FIN-0360B;IPC-F88FIN-0280B-CAN;IPC-F88FIN-0360B-CAN;IPC-F88FIN-0280B-imou-CAN;IPC-F88FIN-0360B-imou-CAN;LC-K38FI-4K;IPC-F88FI-0280B-LC;IPC-F88FI-0360B-LC;IPC-F88FIP-V2-0280B-imou;IPC-F88FIP-V2-0360B-imou;IPC-F88FIN-V2-0280B-imou;IPC-F88FIN-V2-0360B-imou;IPC-F88FIP-V2-0280B;IPC-F88FIP-V2-0360B;IPC-F88FIN-V2-0280B;IPC-F88FIN-V2-0360B;IPC-F88FIP-V2;IPC-F88FIN-V2;LC-K38Fi-4K-V2;IPC-F88FI-V2-0280B-LC;IPC-F88FI-V2-0360B-LC

Standard(s) : FCC Rules 47 CFR §2.1091
KDB447498 D01 General RF Exposure Guidance v06

Date of Receipt: 2021-08-26
Date of Test: 2021-11-01 to 2021-11-12
Date of Issue: 2021-11-15

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

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.



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Revision Record			
Version	Description	Date	Remark
00	Original	2021-11-15	/

Authorized for issue by:			
		<i>Michael Niu</i>	

		Micheal Niu / Project Engineer	
		<i>Parlam Zhan</i>	

		Parlam Zhan / Reviewer	



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3 General Information

3.1 General Description of E.U.T.

Power supply:	DC 12V by adapter Adapter Model: S018BYU1200150 Input: 100-240V,50/60Hz,600mA Output: 5V/9V/12V,3A/2A/1.5A
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3.2 Technical Specifications

2.4G WiFi

Antenna Gain:	Ant 1:2.7dBi; (Provided by manufacturer) Ant 2:2.7dBi(Provided by manufacturer) Directional gain:5.71dBi
Antenna Type:	Antenna 1: PIFA Antenna Antenna 2: PIFA Antenna
Channel Spacing:	5MHz
Data Rate:	802.11b: 1~11Mbps 802.11g: 6~54Mbps 802.11n: MCS0~15
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



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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:	Antenna 1:4.9dBi; (Provided by manufacturer) Antenna 2:4.9dBi; (Provided by manufacturer) Directional Gain:7.91dBi			
Antenna Type:	Antenna 1: PIFA antenna; Antenna 2: PIFA 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 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



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5 Measurement and Calculation

5.1 Maximum transmit power

2.4GHz for FCC

The Power Data is based on the RF Test Report SHEM210800989701-2.4GHz

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	2412	16.73	16.27	NA	47.10	42.36	N/A
11B	2437	16.46	16.62	NA	44.26	45.92	N/A
11B	2462	16.83	16.43	NA	48.19	43.95	N/A
11G	2412	17.75	17.23	NA	59.57	52.84	N/A
11G	2437	17.20	17.15	NA	52.48	51.88	N/A
11G	2462	17.24	16.82	NA	52.97	48.08	N/A
11N20MIMO	2412	14.92	14.34	17.65	31.05	27.16	58.21
11N20MIMO	2437	14.47	14.42	17.46	27.99	27.67	55.72
11N20MIMO	2462	14.63	14.17	17.42	29.04	26.12	55.21



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5GHz for FCC

The Power Data is based on the RF Test Report SHEM210800989702-5GHz

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	12.67	13.89	/	18.49	24.49	NA
	5200	13.45	13.70	/	22.13	23.44	NA
	5240	13.47	13.78	/	22.23	23.88	NA
	5260	12.75	13.24	/	18.84	21.09	NA
	5300	13.23	13.40	/	21.04	21.88	NA
	5320	13.22	13.35	/	20.99	21.63	NA
	5500	13.71	13.84	/	23.50	24.21	NA
	5580	13.59	13.26	/	22.86	21.18	NA
	5700	14.23	12.13	/	26.49	16.33	NA
	5745	14.26	10.52	/	26.67	11.27	NA
	5785	14.36	10.11	/	27.29	10.26	NA
	5825	14.30	10.79	/	26.92	11.99	NA
802.11n(HT20)	5180	12.43	11.92	15.19	17.50	15.56	33.04
	5200	12.38	11.91	15.16	17.30	15.52	32.81
	5240	12.42	11.66	15.07	17.46	14.66	32.14
	5260	11.71	10.97	14.37	14.83	12.50	27.35
	5300	12.16	11.27	14.75	16.44	13.40	29.85
	5320	12.22	11.22	14.76	16.67	13.24	29.92
	5500	12.63	11.86	15.27	18.32	15.35	33.65
	5580	12.46	11.31	14.93	17.62	13.52	31.12
	5700	12.84	10.03	14.67	19.23	10.07	29.31
	5745	12.77	8.51	14.15	18.92	7.10	26.00
	5785	13.18	8.16	14.37	20.80	6.55	27.35
5825	13.04	8.70	14.40	20.14	7.41	27.54	
802.11n(HT40)	5190	11.41	10.40	13.94	13.84	10.96	24.77
	5230	11.21	10.14	13.72	13.21	10.33	23.55
	5270	10.22	9.50	12.89	10.52	8.91	19.45
	5310	10.55	9.54	13.08	11.35	8.99	20.32
	5510	11.41	10.87	14.16	13.84	12.22	26.06
	5550	11.17	10.58	13.90	13.09	11.43	24.55
	5670	11.47	9.46	13.59	14.03	8.83	22.86
	5755	11.48	6.88	12.77	14.06	4.88	18.92
	5795	11.72	6.90	12.96	14.86	4.90	19.77
802.11ac(VHT20)	5180	12.67	11.93	15.33	18.49	15.60	34.12



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	5200	12.53	11.93	15.25	17.91	15.60	33.50
	5240	12.54	11.78	15.19	17.95	15.07	33.04
	5260	11.67	10.98	14.35	14.69	12.53	27.23
	5300	12.14	11.36	14.78	16.37	13.68	30.06
	5320	12.24	11.30	14.81	16.75	13.49	30.27
	5500	12.73	11.89	15.34	18.75	15.45	34.20
	5580	12.59	11.11	14.92	18.16	12.91	31.05
	5700	12.95	10.36	14.86	19.72	10.86	30.62
	5745	13.01	8.53	14.33	20.00	7.13	27.10
	5785	13.41	8.23	14.56	21.93	6.65	28.58
	5825	13.16	8.90	14.54	20.70	7.76	28.44
802.11ac(VHT40)	5190	11.50	10.54	14.06	14.13	11.32	25.47
	5230	11.30	10.23	13.81	13.49	10.54	24.04
	5270	10.17	9.46	12.84	10.40	8.83	19.23
	5310	10.66	9.66	13.20	11.64	9.25	20.89
	5510	11.48	10.95	14.23	14.06	12.45	26.49
	5550	11.22	10.63	13.95	13.24	11.56	24.83
	5670	11.70	9.59	13.78	14.79	9.10	23.88
	5755	11.79	7.03	13.04	15.10	5.05	20.14
	5795	11.80	7.10	13.07	15.14	5.13	20.28
802.11ac(VHT80)	5210	11.28	10.57	13.95	13.43	11.40	24.83
	5290	10.07	9.35	12.74	10.16	8.61	18.79
	5530	12.16	10.95	14.61	16.44	12.45	28.91
	5610	11.92	9.79	13.99	15.56	9.53	25.06
	5775	12.11	6.90	13.25	16.26	4.90	21.13



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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
59.57	1.862	20	0.02207	1	Pass

For 2.4G WiFi - Antenna2:

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
52.84	1.862	20	0.01957	1	Pass

In MIMO mode:

The max. antenna gain is 5.71 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
58.21	3.724	20	0.04312	1	Pass



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For 5G WiFi - Antenna1:

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
27.29	3.090	20	0.01678	1	Pass

For 5G WiFi - Antenna2:

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
24.49	3.090	20	0.01506	1	Pass

In MIMO mode:

The max. antenna gain is 7.91 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
34.2	6.180	20	0.04205	1	Pass

2.4G WiFi and 5G WiFi modules can simultaneous transmitting, so the maximum rate of MPE is $0.04312/1.0+0.04205/1.0=0.085\leq 1.0$. according to the KDB447498 section 7.2 determine the device is exclusion from SAR test

--End of the Report--



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