

RF EXPOSURE

Test Report

Report No. : MTi250319007-0104E5

Date of Issue : 2025-09-03

Applicant : Guangzhou Havit Technology Co., Ltd.

Product : Projector

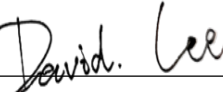
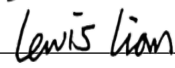
Model(s) : PJ209APlus

FCC ID : 2A16I-PJ209APLUS

Shenzhen Microtest Co., Ltd.

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Test Result Certification		
Applicant	Guangzhou Havit Technology Co., Ltd.	
Applicant Address	ROOM 1307, 13F, PHASE 2 B, C BUILDING OF POLY WORLD TRADE CENTER, NO.1000, XINGANG EAST ROAD, HAIZHU GUANGDONG China	
Manufacturer	Guangzhou Havit Technology Co., Ltd.	
Manufacturer Address	ROOM 1307, 13F, PHASE 2 B, C BUILDING OF POLY WORLD TRADE CENTER, NO.1000, XINGANG EAST ROAD, HAIZHU GUANGDONG China	
Product description		
Product name	Projector	
Trademark	HAVIT	
Model name	PJ209APlus	
Series Model(s)	N/A	
Standards	47 CFR Part 2.1091	
Test method	KDB 447498 D01 v06	
Testing Information		
Date of test	2025-07-23 to 2025-08-31	
Test Result	Pass	
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Reviewed by:	David Lee	
Approved by:	Lewis Lian	

1 RF EXPOSURE EVALUATION

According to FCC 1.1310: 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 §1.1307(b)

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 Exposure				
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
300-1,500			f/300	6
1,500-100,000			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
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz * = Plane-wave equivalent power density

MPE Calculation Method

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 = Numeric gain of the antenna relative to isotropic antenna

π = 3.1415926

R = distance between observation point and center of the radiator in cm(20cm)

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

2 Measurement Result

BT:

Operation Frequency: 2402-2480MHz,
Power density limited: 1mW/ cm²

2.4GWiFi:

Operation Frequency: WIFI 802.11b/g/n HT20: 2412-2462MHz, n HT40: 2422-2452
Power density limited: 1mW/ cm²

5GWiFi:

802.11a: 20 MHz
802.11n: 20 MHz, 40 MHz
802.11ac: 20 MHz, 40 MHz, 80MHz

Antenna Type: FPC antenna

Antenna gain:

Bluetooth: 4.01dBi

2.4G WIFI: Ant0: 4.01dBi; Ant1: 4.01dBi; Ant0+Ant1=7.02dBi

5G U-NII 1: Ant0: 2.3dBi, Ant1: 2.3dBi, Ant0+Ant1=5.31dBi;

5G U-NII 3: Ant0: 3.41dBi, Ant1: 3.41dBi; Ant0+Ant1=6.42dBi

R=20cm

$mW=10^{(dBi/10)}$

BT: antenna gain Numeric= $10^{(dBi/10)}=10^{(4.01/10)}=2.52$

2.4G WIFI: Ant0&Ant1 antenna gain Numeric= $10^{(dBi/10)}=10^{(4.01/10)}=2.52$;

ANT0+ANT1 antenna gain Numeric= $10^{(dBi/10)}=10^{(7.02/10)}=5.04$;

5G WIFI U-NII 1: Ant0&Ant1 antenna gain Numeric= $10^{(dBi/10)}=10^{(2.3/10)}=1.7$;

ANT0+ANT1 antenna gain Numeric= $10^{(dBi/10)}=10^{(5.31/10)}=3.04$;

5G WIFI U-NII 3: Ant0&Ant1 antenna gain Numeric= $10^{(dBi/10)}=10^{(3.41/10)}=2.19$;

ANT0+ANT1 antenna gain Numeric= $10^{(dBi/10)}=10^{(6.42/10)}=4.39$

BR&EDR:

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result	Power density Limits
		(dBm)		tune-up power		Gain		(mW/cm ²)	(mW/cm ²)
				(dBm)	(mW)	(dBi)	Numeric		
2402	GFSK	5.55	5±1	6	3.981	4.01	2.52	0.0020	1
2441		5.6	5±1	6	3.981	4.01	2.52	0.0020	1
2480		5.78	5±1	6	3.981	4.01	2.52	0.0020	1
2402	π/4-DQPSK	8.01	8±1	9	7.943	4.01	2.52	0.0040	1
2441		7.88	7±1	8	6.310	4.01	2.52	0.0032	1
2480		8.34	8±1	9	7.943	4.01	2.52	0.0040	1
2402	8DPSK	8.38	8±1	9	7.943	4.01	2.52	0.0040	1
2441		8.19	8±1	9	7.943	4.01	2.52	0.0040	1
2480		8.67	8±1	9	7.943	4.01	2.52	0.0040	1

TEST REPORT

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BLE:

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna		Evaluation result (mW/cm ²)	Power density Limits (mW/cm ²)
		(dBm)		tune-up power (dBm)	(mW)	Gain (dBi)	Numeric		
2402	GFSK-1M	0.32	0±1	1	1.259	4.01	2.52	0.0006	1
2440		0.39	0±1	1	1.259	4.01	2.52	0.0006	1
2480		0.22	0±1	1	1.259	4.01	2.52	0.0006	1
2402	GFSK-2M	-0.38	0±1	1	1.259	4.01	2.52	0.0006	1
2440		0.31	0±1	1	1.259	4.01	2.52	0.0006	1
2480		0.12	0±1	1	1.259	4.01	2.52	0.0006	1

2.4GWiFi:

SISO:

Channel Freq. (MHz)	modulation	conducted power		Tune-up power		Max				Antenna		Evaluation result at 20cm			Power density Limits
		(dBm)		(dBm)		tune-up power				Gain		Power density(mW/cm2)			(mW/cm2)
						(dBm)		(mW)		Numeric					
		Ant 0	Ant 1	Ant 0	Ant 1	Ant 0	Ant 1	Ant 0	Ant 1	Ant 0	Ant 1	Ant 0	Ant 1	Sum	
2412	802.11b	12.46	12.75	12±1	12±1	13	13	19.95	19.95	2.518	2.518	0.010	0.010	/	
2437		13.08	13.34	13±1	13±1	14	14	25.12	25.12	2.518	2.518	0.013	0.013	/	1
2462		12.28	12.55	12±1	12±1	13	13	19.95	19.95	2.518	2.518	0.010	0.010	/	1
2412	802.11g	11.35	11.48	11±1	11±1	12	12	15.85	15.85	2.518	2.518	0.008	0.008	/	1
2437		11.58	11.51	11±1	11±1	12	12	15.85	15.85	2.518	2.518	0.008	0.008	/	1
2462		11.07	10.97	11±1	11±1	12	12	15.85	15.85	2.518	2.518	0.008	0.008	/	1
2412	802.11n H20	11.05	11.16	11±1	11±1	12	12	15.85	15.85	2.518	2.518	0.008	0.008	/	1
2437		11.51	11.49	11±1	11±1	12	12	15.85	15.85	2.518	2.518	0.008	0.008	/	1
2462		11.09	11.27	11±1	11±1	12	12	15.85	15.85	2.518	2.518	0.008	0.008	/	1
2422	802.11n H40	11.56	11.75	11±1	11±1	12	12	15.85	15.85	2.518	2.518	0.008	0.008	/	1
2437		11.56	11.81	11±1	11±1	12	12	15.85	15.85	2.518	2.518	0.008	0.008	/	1
2452		10.99	11.1	11±1	11±1	12	12	15.85	15.85	2.518	2.518	0.008	0.008	/	1

MIMO:

Channel Freq. (MHz)	modulation	conducted power	Tune-up power (dBm)	Max		Antenna	Evaluation result at 20cm	Power density Limits (mW/cm ²)
		(dBm)		tune-up power (dBm)	(mW)			
2412	802.11n H20	14.81	14±1	15	31.623	5.04	0.03168	1
2437		14.9	14±1	15	31.623	5.04	0.03168	1
2462		14.67	14±1	15	31.623	5.04	0.03168	1
2422	802.11n H40	15.1	15±1	16	39.811	5.04	0.03988	1
2437		15.05	15±1	16	39.811	5.04	0.03988	1
2452		14.39	14±1	15	31.623	5.04	0.03168	1

5G WIFI: UNII-1

SISO:

Channel Freq. (MHz)	modulation	conducted power		Tune-up power		Max				Antenna		Evaluation result at 20cm			Power density Limits
		(dBm)		(dBm)		tune-up power				Gain		Power density(mW/cm2)			(mW/cm2)
						(dBm)		(mW)		Numeric					
		Ant 0	Ant 1	Ant 0	Ant 1	Ant 0	Ant 1	Ant 0	Ant 1	Ant 0	Ant 1	Ant 0	Ant 1	Sum	
5180	802.11a	11.06	15.34	11±1	15±1	12	16	15.85	39.81	1.70	1.70	0.005	0.013	/	1
5200		16	14.85	16±1	14±1	17	15	50.12	31.62	1.70	1.70	0.017	0.011	/	1
5240		15.87	14.7	15±1	14±1	16	15	39.81	31.62	1.70	1.70	0.013	0.011	/	1
5180	802.11n 20	14.83	14.08	14±1	14±1	15	15	31.62	31.62	1.70	1.70	0.011	0.011	/	1
5200		14.84	13.75	14±1	13±1	15	14	31.62	25.12	1.70	1.70	0.011	0.008	/	1
5240		14.9	13.56	14±1	13±1	15	14	31.62	25.12	1.70	1.70	0.011	0.008	/	1
5190	802.11n 40	14.77	13.81	14±1	13±1	15	14	31.62	25.12	1.70	1.70	0.011	0.008	/	1
5230		15.41	14.07	15±1	14±1	16	15	39.81	31.62	1.70	1.70	0.013	0.011	/	1
5180	802.11a c 20	14.94	14.19	14±1	14±1	15	15	31.62	31.62	1.70	1.70	0.011	0.011	/	1
5200		14.84	13.74	14±1	13±1	15	14	31.62	25.12	1.70	1.70	0.011	0.008	/	1
5240		14.83	13.57	14±1	13±1	15	14	31.62	25.12	1.70	1.70	0.011	0.008	/	1
5190	802.11a c 40	14.81	13.82	14±1	13±1	15	14	31.62	25.12	1.70	1.70	0.011	0.008	/	1
5230		15.37	14.08	15±1	14±1	16	15	39.81	15.85	1.70	1.70	0.013	0.005	/	1
5210	802.11a c 80	15.12	14	15±1	14±1	16	15	39.81	10.00	1.70	1.70	0.013	0.003	/	1

MIMO:

Channel Freq. (MHz)	modulation	conducted power	Tune-up power	Max		Antenna	Evaluation result at 20cm	Power density Limits
		(dBm)	(dBm)	tune-up power		Gain	Power density(mW/cm ²)	(mW/cm ²)
				(dBm)	(mW)	Numeric		
5180	802.11n 20	17.82	17±1	18	63.096	3.40	0.0426	1
5200		17.75	17±1	18	63.096	3.40	0.0426	1
5240		17.61	17±1	18	63.096	3.40	0.0426	1
5190	802.11n 40	17.6	17±1	18	63.096	3.40	0.0426	1
5230		18.06	18±1	19	79.433	3.40	0.0537	1
5180	802.11ac 20	17.87	17±1	18	63.096	3.40	0.0426	1
5200		17.75	17±1	18	63.096	3.40	0.0426	1
5240		17.57	17±1	18	63.096	3.40	0.0426	1
5190	802.11ac 40	17.54	17±1	18	63.096	3.40	0.0426	1
5230		18.01	18±1	19	79.433	3.40	0.0537	1
5210	802.11ac 80	17.89	17±1	18	63.096	3.40	0.0426	1

5G WIFI: UNII-3

SISO:

Channel Freq. (MHz)	modulation	conducted power		Tune-up power		Max				Antenna		Evaluation result at 20cm			Power density Limits
		(dBm)		(dBm)		tune-up power				Gain		Power density(mW/cm2)			(mW/cm2)
						(dBm)		(mW)		Numeric					
		Ant 0	Ant 1	Ant 0	Ant 1	Ant 0	Ant 1	Ant 0	Ant 1	Ant 0	Ant 1	Ant 0	Ant 1	Sum	
5745	802.11a	16.05	11.89	16±1	11±1	17	12	50.12	15.85	2.19	2.19	0.0219	0.0069	/	1
5785		15.64	11.64	15±1	11±1	16	12	39.81	15.85	2.19	2.19	0.0174	0.0069	/	1
5825		15.84	12.06	15±1	12±1	16	13	39.81	19.95	2.19	2.19	0.0174	0.0087	/	1
5745	802.11n20	14.96	10.85	15±1	10±1	16	11	39.81	12.59	2.19	2.19	0.0174	0.0055	/	1
5785		14.59	10.57	14±1	10±1	15	11	31.62	12.59	2.19	2.19	0.0138	0.0055	/	1
5825		14.72	10.93	14±1	10±1	15	11	31.62	12.59	2.19	2.19	0.0138	0.0055	/	1
5755	802.11n 40	15.21	10.96	15±1	11±1	16	12	39.81	15.85	2.19	2.19	0.0174	0.0069	/	1
5795		15.15	10.97	15±1	11±1	16	12	39.81	15.85	2.19	2.19	0.0174	0.0069	/	1
5745		15.03	10.81	15±1	10±1	16	11	39.81	12.59	2.19	2.19	0.0174	0.0055	/	1
5785	802.11ac 20	14.56	10.62	14±1	10±1	15	11	31.62	12.59	2.19	2.19	0.0138	0.0055	/	1
5825		14.8	11.01	14±1	11±1	15	12	31.62	15.85	2.19	2.19	0.0138	0.0069	/	1
5755	802.11ac 40	15.25	10.95	15±1	10±1	16	11	39.81	12.59	2.19	2.19	0.0174	0.0055	/	1
5795		14.98	11.04	15±1	11±1	16	12	39.81	15.85	2.19	2.19	0.0174	0.0069	/	1
5775	802.11ac 80	14.68	10.81	14±1	10±1	15	11	31.62	10.00	2.19	2.19	0.0138	0.0044	/	1

MIMO:

Channel Freq. (MHz)	modulation n	conducted power	Tune-up power	Max		Antenna	Evaluation result at 20cm	Power density Limits
		(dBm)	(dBm)	tune-up power		Gain	Power density(mW/cm ²)	(mW/cm ²)
				(dBm)	(mW)	Numeri c		
5745	802.11n 20	16.73	16±1	17	50.12	4.39	0.0437	1
5785		16.4	16±1	17	50.12	4.39	0.0437	1
5825		16.65	16±1	17	50.12	4.39	0.0437	1
5755	802.11n 40	16.87	16±1	17	50.12	4.39	0.0437	1
5795		16.82	16±1	17	50.12	4.39	0.0437	1
5745	802.11ac 20	16.67	16±1	17	50.119	4.39	0.0437	1
5785		16.34	16±1	17	50.119	4.39	0.0437	1
5825		16.68	16±1	17	50.119	4.39	0.0437	1
5755	802.11ac 40	16.91	16±1	17	50.12	4.39	0.0437	1
5795		16.78	16±1	17	50.12	4.39	0.0437	1
5775	802.11ac 80	16.35	16±1	17	50.12	4.39	0.0437	1

SIMULTANEOUS TRANSMISSIONS

When a number of sources at different frequencies, and/or broadband sources, contribute to the total exposure, it becomes necessary to weigh each contribution relative to the MPE. To comply with the MPE, the fraction of the MPE in terms of E2, H2 (or power density) incurred within each frequency interval should be determined and the sum of all such fractions should not exceed unity. In order to ensure compliance with the MPE for a controlled environment, the sum of the ratios of the power density to the corresponding MPE should not exceed unity. That is

$$\sum_{i=1}^n \frac{S_i}{MPE_i} \leq 1$$

Simultaneous transmit:

Operating Band	The MPE ratio
Bluetooth	0.0040
2.4G WIFI	0.0399
5G WIFI	0.0550

Bluetooth+2.4G WIFI=0.0040+0.0399=0.0439

Bluetooth+5G WIFI =0.0040+0.0550=0.059

Conclusion:

Note: 2.4GWIFI and 5GWIFI cannot work at the same time

For the max result: $0.059 \leq 1.0$ test exclusion threshold, No SAR is required.

Statement

1. This report is invalid without the seal and signature of the laboratory.
2. The test results of this report are only responsible for the samples submitted. Client shall be responsible for representativeness of the sample and authenticity of the material.
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***** END OF REPORT *****