TEST REPORT

Applicant:	Hunan Greatwall Computer System Co., Ltd
Address:	Hunan Greatwall Industrial Park, Tianyi Science and Technology City, Xiangyun Middle Road, Tianyuan District, Zhuzhou, Hunan Province
Equipment Type:	Smart Projector
Model Name:	T110 (refer to section 2.3)
Brand Name:	N/A
FCC ID:	2APUQ-T110
Test Standard:	47 CFR Part 2.1091 KDB 447498 D04 v01
Sample Arrival Date:	Apr. 25, 2024
Test Date:	Jun. 23, 2025
Date of Issue:	Jul. 21, 2025

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Xiong Lining **Checked by:** Xu Rui **Approved by:** Tolan Tu

(Testing Director)

Revision History

Version	Issue Date	Revisions Content
Rev. 01	Jul. 21, 2025	Initial Issue

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1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Test Location

Name	Shenzhen BALUN Technology Co., Ltd.
Location	☐ Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	☑ 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Hunan Greatwall Computer System Co., Ltd
Address	Hunan Greatwall Industrial Park, Tianyi Science and Technology City, Xiangyun Middle Road, Tianyuan District, Zhuzhou, Hunan Province

2.2 Manufacturer Information

Manufacturer	Hunan Greatwall Computer System Co., Ltd
Address	Hunan Greatwall Industrial Park, Tianyi Science and Technology City, Xiangyun Middle Road, Tianyuan District, Zhuzhou, Hunan Province

2.3 General Description for Equipment under Test (EUT)

EUT Name	Smart Projector
Model Name Under Test	T110
Series Model Name	T110-001, T110-002, T110-003, T110-004, T110-005, T110-006, T110-007, T110-008, T110-009, T110-010, T110-011, T110-012, W1, W1 Pro, W1 Ultra, W1 Max, W1s, W1-001, W1-002, W1-003, W1-004, W1-005, W1-006, W1-007, W1-008, W1-009, W1-010, W1-011, W1-012, T110L, T110L-001, T110L-002, T110L-003, T110L-004, T110L-005, T110L-006, T110L-007, T110L-008, T110L-009, T110L-010, T110L-011, T110L-012, F7800, F7800s, F7800 Pro, F7800 Ultra, F7800-001, F7800-002, F7800-003, F7800-004, F7800-005, F7800-006, F7800-007, F7800-008, F7800-009, F7800-010, F7800-011, F7800-012, T110D, T110D-001, T110D-002, T110D-003, T110D-004, T110D-005, T110D-006, T110DL, T110DL-001, T110DL-002, T110DL-003, T110DL-004, T110DL-005, T110DL-006
Description of Model name differentiation	a. There are two appearances for the product in total. The main differences lie in the presence or absence of a stand, the body color, and the position of the power port. b. All models have the same electrical parameters and circuit structure. For the two appearances with or without a stand, there is only a slight difference in the length of the internal power connection wire. (this information provided by the applicant)
Hardware Version	N/A
Software Version	N/A
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.4 Technical Information

Network and Wireless connectivity	Bluetooth (BR+EDR+BLE) WIFI 802.11a, 802.11b, 802.11g, 802.11n and 802.11ac

The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	Bluetooth; WLAN	
Frequency Range	802.11b/g	2412 ~ 2462 MHz
	802.11n(HT20/HT40)	2412 ~ 2462 MHz
	802.11a/n(HT20/HT40)/ ac(VHT20/VHT40/VHT80)	5150 ~ 5250 MHz
		5250 ~ 5350 MHz
		5470 ~ 5725 MHz
		5725 ~ 5850 MHz
	Bluetooth	2402 ~ 2480 MHz
Antenna Type	WLAN	Built-in Antenna
	Bluetooth	Built-in Antenna
Exposure Category	General Population/Uncontrolled Exposure	
Product Type	Mobile Device	

3 SUMMARY OF TEST RESULT

3.1 Test Standards

No.	Identity	Document Title
1	KDB 447498 D04 v01	447498 D04 Interim General RF Exposure Guidance v01

3.2 Limit Standards

No.	Identity	Document Title
1	47 CFR Part 2.1091	Radiofrequency radiation exposure evaluation: mobile devices

4 DEVICE CATEGORY AND LEVELS LIMITS

Mobile Devices:

CFR Title 47 §2.1091(b)

For purposes of this section, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.

FCC KDB 447498 D04 General RF Exposure Guidance v01 Limit

Evaluation of compliance with the exposure limits in § 1.1310 is necessary if the ERP of the device is greater than ERP20cm in Formula (B.1) [repeated from § 2.1091(c)(1) and § 1.1307(b)(1)(i)(B)].

$$P_{\text{th}}\ (\text{mW}) = ERP_{20\,\text{cm}}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases} \qquad (\text{B.1})$$

If the ERP is not easily obtained, then the available maximum time-averaged power may be used (i. e., without consideration of ERP only if the physical dimensions of the radiating structure(s) do not exceed the electrical length of λ/4 or if the antenna gain is less than that of a half-wave dipole.

SAR-based exemptions are constant at separation distances between 20 cm and 40 cm to avoid discontinuities in the threshold when transitioning between SAR-based and MPE-based exemption criteria at 40 cm, considering the importance of reflections.

The SAR-based exemption formula of § 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold Pth (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). Pth is given by Formula (B.2).

$$P_{\text{th}}\,(\text{mW}) = \begin{cases} ERP_{20\,\text{cm}}(d/20\ \text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\,\text{cm}} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases} \qquad \text{(B.2)}$$

where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\,\text{cm}}\sqrt{f}}\right)$$

and f is in GHz, d is the separation distance (cm), and $ERP_{20\text{cm}}$ is per Formula (B.1).
The example values shown in Table B.2 are for illustration only.

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)									
	5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217
450	22	44	67	89	112	135	158	180	203	226
835	9	25	44	66	90	116	145	175	207	240
1900	3	12	26	44	66	92	122	157	195	236
2450	3	10	22	38	59	83	111	143	179	219
3600	2	8	18	32	49	71	96	125	158	195
5800	1	6	14	25	40	58	80	106	136	169

5 ASSESSMENT RESULT

5.1 Output Power

Mode	Bluetooth
Conducted Power (dBm)	5.31
Antenna Gain (dBi)	3.21
EIRP (dBm)	8.52
Note: This report listed the worst case conducted power value, please refer to BL-SZ2541696-601 & BL-SZ2541696-602 report for more details.	

Mode	2.4G WIFI		
	SISO-Antenna 1	SISO-Antenna 2	MIMO
Conducted Power (dBm)	14.62	14.82	14.56
Antenna Gain (dBi)	2.75	3.21	5.99
EIRP (dBm)	17.37	18.03	20.55
Note: This report listed the worst case conducted power value, please refer to BL-SZ2541696-603 report for more details.			

Mode	5.2G WIFI		
	SISO-Antenna 1	SISO-Antenna 2	MIMO
Conducted Power (dBm)	14.79	14.70	15.00
Antenna Gain (dBi)	2.72	2.88	5.81
EIRP (dBm)	17.51	17.58	20.81
Mode	5.3G WIFI		
	SISO-Antenna 1	SISO-Antenna 2	MIMO
Conducted Power (dBm)	14.60	14.64	14.54
Antenna Gain (dBi)	2.44	2.34	5.40
EIRP (dBm)	17.04	16.98	19.94
Mode	5.6G WIFI		
	SISO-Antenna 1	SISO-Antenna 2	MIMO
Conducted Power (dBm)	14.87	15.07	14.63
Antenna Gain (dBi)	2.64	3.13	5.90
EIRP (dBm)	17.51	18.20	20.53
Mode	5.8G WIFI		
	SISO-Antenna 1	SISO-Antenna 2	MIMO
Conducted Power (dBm)	14.85	15.00	14.99
Antenna Gain (dBi)	3.23	3.13	6.19
EIRP (dBm)	18.08	18.13	21.18
Note: This report listed the worst case conducted power value, please refer to BL-SZ2541696-604 report for more details.			

5.2 Tune-up power

Mode	Conducted Power Range (dBm)	EIRP Range (dBm)	ERP Range (dBm)
Bluetooth	[4.00, 6.00]	[7.00, 9.00]	[4.85, 6.85]
2.4G WIFI-SISO-Antenna 1	[13.00, 15.00]	[16.00, 18.00]	[13.85, 15.85]
2.4G WIFI-SISO-Antenna 2	[13.00, 15.00]	[17.00, 19.00]	[14.85, 16.85]
2.4G WIFI-MIMO	[13.00, 15.00]	[19.00, 21.00]	[16.85, 18.85]
5.2G WIFI-SISO-Antenna 1	[13.00, 15.00]	[16.00, 18.00]	[13.85, 15.85]
5.2G WIFI-SISO-Antenna 2	[13.00, 15.00]	[16.00, 18.00]	[13.85, 15.85]
5.2G WIFI-MIMO	[14.00, 16.00]	[19.00, 21.00]	[16.85, 18.85]
5.3G WIFI-SISO-Antenna 1	[13.00, 15.00]	[16.00, 18.00]	[13.85, 15.85]
5.3G WIFI-SISO-Antenna 2	[13.00, 15.00]	[15.00, 17.00]	[12.85, 14.85]
5.3G WIFI-MIMO	[13.00, 15.00]	[18.00, 20.00]	[15.85, 17.85]
5.6G WIFI-SISO-Antenna 1	[13.00, 15.00]	[16.00, 18.00]	[13.85, 15.85]
5.6G WIFI-SISO-Antenna 2	[14.00, 16.00]	[17.00, 19.00]	[14.85, 16.85]
5.6G WIFI-MIMO	[13.00, 15.00]	[19.00, 21.00]	[16.85, 18.85]
5.8G WIFI-SISO-Antenna 1	[13.00, 15.00]	[17.00, 19.00]	[14.85, 16.85]
5.8G WIFI-SISO-Antenna 2	[14.00, 16.00]	[17.00, 19.00]	[14.85, 16.85]
5.8G WIFI-MIMO	[13.00, 15.00]	[20.00, 22.00]	[17.85, 19.85]
Note1: ERP= EIRP -2.15dB. Note2: According KDB 447498 D04, used the greater of maximum conducted power and ERP to compare with the threshold value Pth.			

5.3 RF Exposure Evaluation Result

Evolution Mode	Frequency (GHz)	Maximum power (dBm)	Maximum power (mw)	Distance (mm)	Threshold Power (mW)	Power / Limit	Verdict
Bluetooth	2.480	6.85	4.84	200	3060.00	0.002	Pass
2.4G WIFI-SISO-Antenna 1	2.462	15.85	38.46	200	3060.00	0.013	Pass
2.4G WIFI-SISO-Antenna 2	2.462	16.85	48.42	200	3060.00	0.016	Pass
2.4G WIFI-MIMO	2.462	18.85	76.74	200	3060.00	0.025	Pass
5.2G WIFI-SISO-Antenna 1	5.250	15.85	38.46	200	3060.00	0.013	Pass
5.2G WIFI-SISO-Antenna 2	5.250	15.85	38.46	200	3060.00	0.013	Pass
5.2G WIFI-MIMO	5.250	18.85	76.74	200	3060.00	0.025	Pass
5.3G WIFI-SISO-Antenna 1	5.350	15.85	38.46	200	3060.00	0.013	Pass
5.3G WIFI-SISO-Antenna 2	5.350	14.85	30.55	200	3060.00	0.010	Pass
5.3G WIFI-MIMO	5.350	17.85	60.95	200	3060.00	0.020	Pass
5.6G WIFI-SISO-Antenna 1	5.725	15.85	38.46	200	3060.00	0.013	Pass
5.6G WIFI-SISO-Antenna 2	5.725	16.85	48.42	200	3060.00	0.016	Pass
5.6G WIFI-MIMO	5.725	18.85	76.74	200	3060.00	0.025	Pass
5.8G WIFI-SISO-Antenna 1	5.850	16.85	48.42	200	3060.00	0.016	Pass
5.8G WIFI-SISO-Antenna 2	5.850	16.85	48.42	200	3060.00	0.016	Pass
5.8G WIFI-MIMO	5.850	19.85	96.61	200	3060.00	0.032	Pass

5.4 Collocated Power Calculation

Evolution Mode	Frequency (MHz)	Power /Limit	Σ(Power / Limit) of 2.4G WIFI-SISO-Antenna 1 + 2.4G WIFI-SISO-Antenna 2	Verdict
2.4G WIFI-SISO-Antenna 1	2462	0.013	0.029	Pass
2.4G WIFI-SISO-Antenna 2	2462	0.016		
Evolution Mode	Frequency (MHz)	Power /Limit	Σ(Power / Limit) of 2.4G WIFI-SISO-Antenna 1 + 5.2G WIFI-SISO-Antenna 2 + Bluetooth	Verdict
2.4G WIFI-SISO-Antenna 1	2462	0.013	0.031	Pass
5.8G WIFI-SISO-Antenna 2	5850	0.016		
Bluetooth	2480	0.002		
Evolution Mode	Frequency (MHz)	Power /Limit	Σ(Power / Limit) of 2.4G WIFI-SISO-Antenna 2 + 5.2G WIFI-SISO-Antenna 1	Verdict
2.4G WIFI-SISO-Antenna 2	2462	0.016	0.032	Pass
5.8G WIFI-SISO-Antenna 1	5850	0.016		
Evolution Mode	Frequency (MHz)	Power /Limit	Σ(Power / Limit) of 5.2G WIFI-SISO-Antenna 1 + 5.2G WIFI-SISO-Antenna 2 + Bluetooth	Verdict
5.8G WIFI-SISO-Antenna 1	5850	0.016	**0.034**	Pass
5.8G WIFI-SISO-Antenna 2	5850	0.016		
Bluetooth	2480	0.002		

Note:

1. Σ(Power / Limit): This is a summation of [(power for each transmitter/ antenna included in the simultaneous transmission)/ (corresponding Power limit)], for 2.4G WIFI-SISO-Antenna 1 + 2.4G WIFI-SISO-Antenna 2, 2.4G WIFI-SISO-Antenna 1 + 5.2G WIFI-SISO-Antenna 2 + Bluetooth, 2.4G WIFI-SISO-Antenna 2 + 5.2G WIFI-SISO-Antenna 1, 5.2G WIFI-SISO-Antenna 1 + 5.2G WIFI-SISO-Antenna 2 + Bluetooth.
2. Both of the 2.4GHz/5GHz can transmit simultaneously, the formula of calculated the Power is
   CP1 / LP1 + CP2 / LP2 + ……etc. < 1
   CP = Calculation power
   LP = Limit of power
3. WIFI 2.4GHz and Bluetooth will not be transmitting from the Antenna 2 at same time.
4. The worst-case situation is 0.034, which is less than “1”. This confirmed that the device comply with FCC KDB 447498 D04 Power limit.
5. The DUT work frequency range used is 2402 MHz ~ 2480 MHz, 2412 MHz ~ 2462 MHz and 5725 MHz ~ 5850 MHz the result close to the limit by the above formula, so we select worst case power to calculate the exclusion power threshold.
6. More power list please refer to RF test report.

5.5 Conclusion

This EUT is deemed to comply with the reference level limits, therefore the basic restrictions are compliant with human exposure limits.

Statement

1. The laboratory guarantees the scientificity, accuracy and impartiality of the test, and is responsible for all the information in the report, except the information provided by the customer. The customer is responsible for the impact of the information provided on the validity of the results.
2. The report without China inspection body and laboratory Mandatory Approval (CMA) mark has no effect of proving to the society.
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--END OF REPORT--