

TEST REPORT

Applicant: Heilongjiang Huida Technology Co., Ltd
Address: Building 1. Science and Technology Innovation
Headquarters, Shenzhen(Harbin)industrial Park,
No.288 Zhigu Street, Songbei District, Harbin,
China
Equipment Type: Terminal
Model Name: HD501B
Brand Name: HUIDA TECH
FCC ID: 2BBNT- HD501B
Test Standard: 47 CFR Part 2.1091
KDB 447498 D04 v01
Sample Arrival Date: Nov. 27, 2024
Test Date: Dec. 04, 2024 - Dec. 20, 2024
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ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Xiong Lining



Checked by: Xu Rui



Approved by: Tolan Tu

(Testing Director)



Revision History

<u>Version</u>	<u>Issue Date</u>	<u>Revisions Content</u>
<u>Rev. 01</u>	<u>Feb. 14, 2025</u>	<u>Initial Issue</u>

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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	Heilongjiang Huida Technology Co., Ltd
Address	Building 1. Science and Technology Innovation Headquarters, Shenzhen(Harbin)industrial Park, No.288 Zhigu Street, Songbei District, Harbin, China

2.2 Manufacturer Information

Manufacturer	Heilongjiang Huida Technology Co., Ltd
Address	Building 1. Science and Technology Innovation Headquarters, Shenzhen(Harbin)industrial Park, No.288 Zhigu Street, Songbei District, Harbin, China

2.3 General Description for Equipment under Test (EUT)

EUT Name	Terminal
Model Name Under Test	HD501B
Series Model Name	HD408MBDS-2.5GD, HD408BD-2.5GD, HD501, HD501E, HD408
Description of Model name differentiation	All models are same with electrical parameters and internal circuit structure, but only differ in model name. (this information provided by the applicant)
Hardware Version	408_SC200R_P1_2
Software Version	hd501_international_v3
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.4 Technical Information

Network and Wireless connectivity	3G Network WCDMA/HSDPA/HSUPA Band 2/4/5 4G Network LTE FDD Band 2/4/5/7/12/13/14/17/25/26/66/71 LTE TDD Band 41 WIFI 802.11a, 802.11b, 802.11g and 802.11n GPS, GLONASS, Galileo, IRNSS, BDS, QZSS, Radio RX
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The requirement for the following technical information of the EUT was tested in this report:

Operating Mode	WWAN; WLAN		
Frequency Range	WCDMA Band 2	TX: 1850 ~ 1910 MHz	RX: 1930 ~ 1990 MHz
	WCDMA Band 4	TX: 1710 ~ 1755 MHz	RX: 2110 ~ 2155 MHz
	WCDMA Band 5	TX: 824 ~ 849 MHz	RX: 869 ~ 894 MHz
	LTE Band 2	TX: 1850 ~ 1910 MHz	RX: 1930 ~ 1990 MHz
	LTE Band 4	TX: 1710 ~ 1755 MHz	RX: 2110 ~ 2155 MHz
	LTE Band 5	TX: 824 ~ 849 MHz	RX: 869 ~ 894 MHz
	LTE Band 7	TX: 2500 ~ 2570 MHz	RX: 2620 ~ 2690 MHz
	LTE Band 12	TX: 699 ~ 716 MHz	RX: 729 ~ 746 MHz
	LTE Band 13	TX: 777 ~ 787 MHz	RX: 746 ~ 756 MHz
	LTE Band 14	TX: 788 ~ 798 MHz	RX: 758 ~ 768 MHz
	LTE Band 17	TX: 704 ~ 716 MHz	RX: 734 ~ 746 MHz
	LTE Band 25	TX: 1850 ~ 1915 MHz	RX: 1930 ~ 1995 MHz
	LTE Band 26	TX: 814 ~ 824 MHz	RX: 859 ~ 869 MHz
		TX: 824 ~ 849 MHz	RX: 869 ~ 894 MHz
	LTE Band 41	TX: 2535 ~ 2655 MHz	RX: 2535 ~ 2655 MHz
	LTE Band 66	TX: 1710 ~ 1780 MHz	RX: 2110 ~ 2180 MHz
	LTE Band 71	TX: 663 ~ 698 MHz	RX: 617 ~ 652 MHz
	802.11b/g /n(HT20/HT40)	2412 ~ 2462 MHz	
	802.11a /n(HT20/HT40)	5150 ~ 5250 MHz	
		5725 ~ 5850 MHz	
Antenna Type	WWAN: FPC Antenna WLAN: PCB 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 ERP_{20cm} in Formula (B.1) [repeated from § 2.1091(c)(1) and § 1.1307(b)(1)(i)(B)].

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

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 $\lambda/4$ 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 P_{th} (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). P_{th} is given by Formula (B.2).

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

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

WCDMA

Mode	Band2	Band4	Band5
Conducted Power (dBm)	28.37	26.48	23.22
Antenna Gain (dBi)	5.18	3.14	2.68
ERP/EIRP (dBm)	33.55	29.62	23.75

Note: This table listed the worst case power value, please refer to BL-SZ24B1326-501 report for more details.

LTE

Mode	Band2	Band4	Band5	Band7	Band12	Band13	Band14
Conducted Power (dBm)	29.04	26.34	23.74	27.24	23.99	23.64	23.61
Antenna Gain (dBi)	5.18	3.14	2.68	3.12	2.98	2.57	2.68
ERP/EIRP (dBm)	34.22	29.48	24.27	30.36	24.82	24.06	24.14
Mode	Band17	Band25	Band26 (Part22)	Band26 (Part90)	Band41	Band66	Band71
Conducted Power (dBm)	24.19	28.93	23.67	23.60	25.30	26.30	24.01
Antenna Gain (dBi)	2.98	5.18	2.68	2.68	1.59	3.21	2.98
ERP/EIRP (dBm)	25.02	34.11	24.20	24.13	26.89	29.51	24.84

Note: This table listed the worst case power value, please refer to BL-SZ24B1326-501 report for more details.

2.4G WIFI

Mode	2.4G WIFI
Conducted Power (dBm)	15.99
Antenna Gain (dBi)	2.86
EIRP (dBm)	18.85

Note: This table listed the worst case power value, please refer to BL-SZ24B1326-601 report for more details.

5.2G WIFI

5.8G WIFI

Mode	5.2G WIFI	5.8G WIFI
Conducted Power (dBm)	14.99	15.05
Antenna Gain (dBi)	3.18	3.74
EIRP (dBm)	18.17	18.79

Note: This table listed the worst case power value, please refer to BL-SZ24B1326-602 report for more details.

5.2 Tune-up power

Mode	Conducted Power Range (dBm)	EIRP Range (dBm)	ERP Range (dBm)
WCDMA Band2	[27.00, 29.00]	[32.00, 34.00]	[29.85, 31.85]
WCDMA Band4	[25.00, 27.00]	[28.00, 30.00]	[25.85, 27.85]
WCDMA Band5	[22.00, 24.00]	/	[22.00, 24.00]
LTE Band2	[28.00, 30.00]	[33.00, 35.00]	[30.85, 32.85]
LTE Band4	[25.00, 27.00]	[28.00, 30.00]	[25.85, 27.85]
LTE Band5	[22.00, 24.00]	/	[23.00, 25.00]
LTE Band7	[26.00, 28.00]	[29.00, 31.00]	[26.85, 28.85]
LTE Band12	[22.00, 24.00]	/	[23.00, 25.00]
LTE Band13	[22.00, 24.00]	/	[23.00, 25.00]
LTE Band14	[22.00, 24.00]	/	[23.00, 25.00]
LTE Band17	[23.00, 25.00]	/	[24.00, 26.00]
LTE Band25	[27.00, 29.00]	[33.00, 35.00]	[30.85, 32.85]
LTE Band26(Part22)	[22.00, 24.00]	/	[23.00, 25.00]
LTE Band26(Part90)	[22.00, 24.00]	/	[23.00, 25.00]
LTE Band41	[24.00, 26.00]	[25.00, 27.00]	[22.85, 24.85]
LTE Band66	[25.00, 27.00]	[28.00, 30.00]	[25.85, 27.85]
LTE Band71	[23.00, 25.00]	/	[23.00, 25.00]
2.4G WIFI	[14.00, 16.00]	[17.00, 19.00]	[14.85, 16.85]
5.2G WIFI	[13.00, 15.00]	[17.00, 19.00]	[14.85, 16.85]
5.8G WIFI	[14.00, 16.00]	[17.00, 19.00]	[14.85, 16.85]
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	Maximum Power (dBm)	Maximum Power (mw)	Distance (mm)	Threshold Power (mW)	Power / Limit	Verdict
WCDMA Band2	31.85	1531.09	200	3060.00	0.5004	Pass
WCDMA Band4	27.85	609.54	200	3060.00	0.1992	Pass
WCDMA Band5	24.00	251.19	200	1731.96	0.1450	Pass
LTE Band2	32.85	1927.52	200	3060.00	0.6299	Pass
LTE Band4	27.85	609.54	200	3060.00	0.1992	Pass
LTE Band5	25.00	316.23	200	1731.96	0.1826	Pass
LTE Band7	28.85	767.36	200	3060.00	0.2508	Pass
LTE Band12	25.00	316.23	200	1460.64	0.2165	Pass
LTE Band13	25.00	316.23	200	1605.48	0.1970	Pass
LTE Band14	25.00	316.23	200	1627.92	0.1943	Pass
LTE Band17	26.00	398.11	200	1460.64	0.2726	Pass
LTE Band25	32.85	1927.52	200	3060.00	0.6299	Pass
LTE Band26(Part22)	25.00	316.23	200	1680.96	0.1881	Pass
LTE Band26(Part90)	25.00	316.23	200	1731.96	0.1826	Pass
LTE Band41	24.85	305.49	200	3060.00	0.0998	Pass
LTE Band66	27.85	609.54	200	3060.00	0.1992	Pass
LTE Band71	25.00	316.23	200	1423.92	0.2221	Pass
2.4G WIFI	16.85	48.42	200	3060.00	0.0158	Pass
5.2G WIFI	16.85	48.42	200	3060.00	0.0158	Pass
5.8G WIFI	16.85	48.42	200	3060.00	0.0158	Pass

5.4 Collocated Power Calculation

Evolution mode	Frequency (GHz)	Power / Limit	$\Sigma(\text{Power} / \text{Limit})$ of WWAN + WLAN 2.4G + WLAN 5G	Verdict
LTE Band2	1.910	0.6299	0.6615	Pass
2.4G WIFI	2.462	0.0158		
Max.5G WIFI	5.250	0.0158		

Note:

1. $\Sigma(\text{Power} / \text{Limit})$: This is a summation of [(power for each transmitter/ antenna included in the simultaneous transmission)/ (corresponding Power limit)], for WWAN + WLAN 2.4G + WLAN 5G.
2. Both of the WWAN/WLAN can transmit simultaneously, the formula of calculated the Power is

$$\text{CP1} / \text{LP1} + \text{CP2} / \text{LP2} + \dots \text{etc.} < 1$$

CP = Calculation power
LP = Limit of power
3. The worst-case situation is 0.6615, which is less than “1”. This confirmed that the device comply with FCC KDB 447498 D04 Power limit.
4. The DUT work frequency range used is 1850 MHz ~ 1910 MHz, 2412 MHz ~ 2462 MHz and 5150 MHz ~ 5250 MHz the result close to the limit by the above formula, so we select worst case power to calculate the exclusion power threshold.

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

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--END OF REPORT--