

Test Report

Verified code: 417170

Report No.: E20240724756701-3

Customer: Shenzhen H&T Intelligent Product Co., Ltd.

Address: 1004,10/F, Building D, Shenzhen Academy of Aerospace Technology, No. 6
Technology South 10th Rd., Hi-Tech Park, South Zone, Nanshan, Shenzhen City,
Guangdong Province, P. R. China

Sample Name: Presence Sensor S1

Sample Model: PS-SP1

Receive Sample Date: Jul.25,2024

Test Date: Aug.01,2024 ~ Oct.23,2024

Reference Document: CFR 47, FCC Part 2.1091 Radio frequency radiation exposure evaluation:
mobile devices

Test Result: Pass

Prepared by: Wen Wenwen
Wen Wenwen

Reviewed by: Wu Haoting
Wu Haoting

Approved by: Xiao Liang
Xiao Liang

GRG METROLOGY & TEST GROUP CO., LTD

Issued Date: 2024-11-04

GRG METROLOGY & TEST GROUP CO., LTD

Address: No.163, Pingyun Road, West of Huangpu Avenue, Guangzhou, Guangdong, China
Tel: (+86) 400-602-0999 FAX: (+86) 020-38698685 Web: <http://www.grgtest.com>



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REPORT ISSUED HISTORY

Report Version	Report No.	Description	Compile Date
1.0	E20240724756701-3	Original Issue	2024-10-25

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1. GENERAL DESCRIPTION OF EUT

1.1. APPLICANT

Name: Shenzhen H&T Intelligent Product Co., Ltd.
Address: 1004,10/F, Building D, Shenzhen Academy of Aerospace Technology, No. 6
Technology South 10th Rd., Hi-Tech Park, South Zone, Nanshan, Shenzhen City,
Guangdong Province, P. R. China

1.2. MANUFACTURER

Name: Shenzhen H&T Intelligent Product Co., Ltd.
Address: 1004,10/F, Building D, Shenzhen Academy of Aerospace Technology, No. 6
Technology South 10th Rd., Hi-Tech Park, South Zone, Nanshan, Shenzhen City,
Guangdong Province, P. R. China

1.3. Factory

Name: Shenzhen H&T Intelligent Product Co., Ltd.
Address: 1004,10/F, Building D, Shenzhen Academy of Aerospace Technology, No. 6
Technology South 10th Rd., Hi-Tech Park, South Zone, Nanshan, Shenzhen City,
Guangdong Province, P. R. China

1.4. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Product Name: Presence Sensor S1
Product Model: PS-SP1
Trade Name: /
Power Supply: DC 5V by USB port
FCC ID: 2BHYS88888888
Frequency Band: 2402MHz-2480MHz for BLE_1M
2412MHz-2462MHz for 802.11b/g/n HT20
2422MHz-2452MHz: 802.11n HT40
Millimeter wave radar: 59.16-61.56GHz
Maximum
conducted output
Power: 2.08dBm for BLE_1M, 21.72dBm for 2.4G WiFi
Modulation type: GFSK for BLE_1M, DSSS for 802.11b mode, OFDM for 802.11g/n HT20/
n HT40 mode
FMCW for 59.16-61.56GHz
Antenna
Specification: For BLE and 2.4G WiFi Internal FPC antenna with 3.24dBi (Max.)
For 59.16-61.56GHz Microstrip antenna with 0dBi(Max.)
Temperature
Range: -10 ℃ ~ +40 ℃
Hardware Version: V01
Software Version: 0.0.3.2
Sample No: E20240724756701-0001, E20240724756701-0002

Note :

The EUT antenna gain is provided by the applicant. This report is made solely on the basis of such data and/or information. We accept no responsibility for the authenticity and completeness of the above data and information and the validity of the results and/or conclusions.

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2. LABORATORY AND ACCREDITATIONS

2.1. LABORATORY

The tests & measurements refer to this report were performed by Shenzhen EMC Laboratory of GRG METROLOGY & TEST GROUP CO., LTD.

Add : Address: No.1301 Guanguang Road Xinlan Community, Guanlan Street, Longhua District Shenzhen, 518110, People's Republic of China

P.C. : 518110

Tel : 0755-61180008

Fax : 0755-61180008

2.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA A2LA(Certificate #2861.01)

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada ISED (Company Number: 24897, CAB identifier:CN0069)

USA FCC (Registration Number: 759402, Designation Number:CN1198)

Copies of granted accreditation certificates are available for downloading from our web site,
<http://www.grgtest.com>

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3. LIMITS FOR GENERAL POPULATION/UNCONTROLLED EXPOSURE

According to the KDB 447498 D04 Interim General RF Exposure Guidance v01, General frequency and separation-distance dependent MPE-based effective radiated power (ERP) thresholds are in Table 4.1 to support an exemption from further evaluation from 300 kHz through 100 GHz.

TABLE 4.1—THRESHOLDS FOR SINGLE RF SOURCES SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION

RF Source Frequency			Minimum Distance			Threshold ERP
f_L MHz		f_H MHz	$\lambda_L / 2\pi$		$\lambda_H / 2\pi$	W
0.3	–	1.34	159 m	–	35.6 m	$1,920 R^2$
1.34	–	30	35.6 m	–	1.6 m	$3,450 R^2/f^2$
30	–	300	1.6 m	–	159 mm	$3.83 R^2$
300	–	1,500	159 mm	–	31.8 mm	$0.0128 R^2 f$
1,500	–	100,000	31.8 mm	–	0.5 mm	$19.2 R^2$
Subscripts L and H are low and high; λ is wavelength. From § 1.1307(b)(3)(i)(C), modified by adding Minimum Distance columns.						

For mobile devices that are not exempt per Table 4.1 at distances from 20 cm to 40 cm and in 0.3 GHz to 6 GHz, evaluation of compliance with the exposure limits in §1.1310 is necessary if the ERP of the device is greater than $ERP_{20\text{cm}}$ in Formula (4.1).

Formula (4.1):

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

4. CALCULATION METHOD

Predication of MPE limit at a given distance

$EIRP(dBm) = \text{Maximum Tune-up Output power (dBm)} + \text{Maximum antenna gain(dBi)}$

$ERP(dBm) = EIRP(dBm) - 2.15$

R=minimum distance to the center of radiation of the antenna

From the EUT RF output power, the minimum mobile separation distance, d=20cm, as well as the maximum gain of the used as following information, the RF power ERP can be obtained.

Table 1 Antenna Specification

Mode	Antenna type	Maximum antenna gain
BLE	Internal antenna	3.24dBi
2.4G WiFi	Internal antenna	3.24dBi
Millimeter wave radar	Microstrip antenna	0dBi

Table 2 Transmit Power

Mode	Peak Conducted Output Power (dBm)	Target (dBm)	Tolerance ±(dB)
BLE_1M	2.08	2.0	1.0
2.4G WiFi	21.72	21.0	1.0

Mode	EIRP (dBm)	Target (dBm)	Tolerance ±(dB)
Millimeter wave radar	12.28	12.0	1.0

5. ESTIMATION RESULT

5.1 MEASUREMENT RESULTS

STANDALONE MPE

Mode	Frequency (MHz)	Maximum Tune-up Output power (dBm)	Antenna Gain (dBi)	Maximum Tune-up EIRP (dBm)	Maximum Tune-up ERP (dBm)	Maximum Tune-up ERP (W)	Threshold ERP(W)
BLE_1M	2402- 2480	3.0	3.24	6.24	4.09	0.0026	0.768
2.4G WiFi	2412- 2462	22.0	3.24	25.24	23.09	0.2037	0.768

Mode	Frequency (MHz)	Maximum Tune-up EIRP (dBm)	Maximum Tune-up ERP (dBm)	Maximum Tune-up ERP (W)	Threshold ERP(W)
Millimeter wave radar	59.16-61.56GHz	13.0	10.85	0.012	0.768

Remark:

1. RF Exposure use distance is 20cm from manufacturer declaration of user manual.
2. Threshold $ERP(W) = 19.2R^2(W) = 19.2 \times 0.2^2(W) = 0.768(W)$.
3. $ERP(dBm) = EIRP(dBm) - 2.15$.
4. The BLE and 2.4G WiFi can't simultaneously transmit. BLE & Millimeter wave radar can simultaneously transmit. 2.4G WiFi & Millimeter wave radar can simultaneously transmit.
5. For Millimeter wave radar EIRP refer to report 2402W88632E-RF-00A Rev 1.0 by Bay Area Compliance Laboratories Corp. (Dongguan) report date is 2024-09-18. For BLE & 2.4G WiFi refer to report E20240724756701-1 & E20240724756701-2.

Maximum Simultaneous transmission MPE Ratio for 2.4G WiFi, BLE, Millimeter wave radar:

Maximum MPE ratio 2.4G WiFi	Maximum MPE ratio Millimeter wave radar	Σ MPEratios	Limit	Results
0.265	0.016	0.281	1.000	Pass

Maximum MPE ratio BLE	Maximum MPE ratio Millimeter wave radar	Σ MPEratios	Limit	Results
0.003	0.016	0.019	1.000	Pass

Remark:

According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations;

Σ of MPE ratios ≤ 1.0

6. CONCLUSION

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

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