1 Cover Page

RF Exposure Evaluation Report

Application No.:	SHEM2107007213CR
FCC ID:	2AVJ8-CB1542
IC:	25804-CB1542
Applicant:	DewertOkin Technology Group Co., Ltd.
Address of Applicant:	Room 247, Floor 6, Jiaxing Photovoltaic Science and Innovation Park, No.1288, Kanghe Road, Xiuzhou District, Jiaxing City, Zhejiang Province, China
Manufacturer:	DewertOkin Technology Group Co., Ltd.
Address of Manufacturer:	No.465, Xinnanyang Road, Wangjiangjing Development Zone, Xiuzhou District, Jiaxing City, Zhejiang Province.
Factory:	DewertOkin Technology Group Co., Ltd.
Address of Factory:	No.465, Xinnanyang Road, Wangjiangjing Development Zone, Xiuzhou District, Jiaxing City, Zhejiang Province.
Equipment Under Test (EUT):	
EUT Name:	CONTROL BOX
Model No.:	CB1542
Standard(s) :	FCC Rules 47 CFR §2.1093 KDB447498 D01 General RF Exposure Guidance v06 RSS-102 Issue 5 Amendment 1 (February 2, 2021)
Date of Receipt:	2021-07-01
Date of Test:	2021-07-04 to 2021-08-10
Date of Issue:	2021-08-18
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

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 writing.

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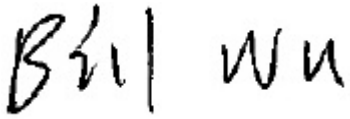
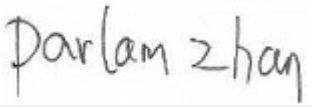
Revision Record			
Version	**Description**	**Date**	**Remark**
00	Original	2021-08-18	/

Authorized for issue by:				
				
		Bill Wu / Project Engineer		
				
		Parlam Zhan / Reviewer		

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3 General Information

3.1 General Description of E.U.T.

Power supply:	DC 29V

3.2 Details of E.U.T.

2.4G:

Modulation Type	GFSK
Number of Channels	78
Operation Frequency	2403MHz~2480MHz
Channel Spacing	1MHz
Antenna Type	PCB Antenna
Antenna Gain:	1dBi (Provided by the manufacturer)
S/N:	CB154203X17915010001
Firmware version:	V1.1

BLE:

Modulation Type:	GFSK
Number of Channels:	40
Operation Frequency:	2402MHz~2480MHz
Channel Spacing:	2MHz
Data Rate:	1Mbps
Antenna Type:	PCB Antenna
Antenna Gain:	2dBi (Provided by the manufacturer)
Bluetooth Version:	V4.0 LE
S/N:	CB154203X17915010001
Firmware version:	V1.1

3.3 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China.

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

3.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. 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. 6332.01)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the American Association for Laboratory Accreditation(A2LA).

- **FCC (Designation Number: CN1301)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized by Federal Communications Commission (FCC) as an accredited testing laboratory.

- **ISED (CAB Identifier: CN0020)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

ISED#: 8617A.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

- **GAC (No. ATL 0031)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the GCC Accreditation Center (GAC) in accordance with the recognised International standard ISO/IEC 17025: 2017.

4 Test Standards and Limits

4.1 FCC Radiofrequency radiation exposure limits

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max power of channel)/(min test separation distance)]*[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

• f(GHz) is the RF channel transmit frequency in GHz

• Power and distance are rounded to the nearest mW and mm

• The result is rounded to one decimal place for comparison

• 3.0 and 7.5 are referred to as the numeric thresholds

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.

For 2.4G band device, the limit of worse case is

$P_{max} \leq 3*D_{min})/\sqrt{f} = 3*5/\sqrt{2.480} = 9.525mW$

4.2 IC Radiofrequency radiation exposure limits

According to RSS-102 section 2.5.1, SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance

MHz	5	10	15	20	25	30	35	40	45	50	mm
≤300	71	101	132	162	193	223	254	284	315	345	
450	52	70	88	106	123	141	159	177	195	213	
835	17	30	42	55	67	80	92	105	117	130	
1900	7	10	18	34	60	99	153	225	316	431	mW
2450	4	7	15	30	52	83	123	173	235	309	
3500	2	6	16	32	55	86	124	170	225	290	
5800	1	6	15	27	41	56	71	85	97	106	

Output power level shall be the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time-averaged output power. For controlled use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation are multiplied by a factor of 5. For limb-worn devices where the 10 gram value applies, the exemption limits for routine evaluation in Table 1 are multiplied by a factor of 2.5. If the operating frequency of the device is between two frequencies located in Table 1, linear interpolation shall be applied for the applicable separation distance. For test separation distance less than 5 mm, the exemption limits for a separation distance of 5 mm can be applied to determine if a routine evaluation is required.

The practical use condition for this device is as a Body accessories. So the applicable limit is 1-g SAR.

For 2.4G band device, the limit is Pmax≤4mW

5 Measurement and Calculation

5.1 Maximum transmit power

The Power Data is based on the RF Test Report SHEM210700721302.

Test Data:

Test Mode	Test Channel	Power[dBm]	Peak Power (mW)
BLE	2402	-5.13	0.31
BLE	2440	-5.15	0.31
BLE	2480	-6.21	0.24

5.2 MPE Calculation

So the device is exclusion from SAR test.

For FCC

BLE

The Max Conducted Peak Output Power is 0.31mW.

According to the formula. calculate the Max Conducted Peak Output Power test result:

The Max Conducted Peak Output Power= 0.31 mW

So the SAR report is not required.

2.4GHz

The Power Data is based on the RF Test Report SHEM210700721301

the max power is 82.79 dBuV/m≈0.06mW

The BLE and 2.4GHz can simultaneous transmitting,But the maximum rate of MPE is 0.31/9.525 +0.06/9.525≈0.039 <1. So the device is exclusion from SAR test.

For IC

BLE

The Max Conducted Peak Output Power is 0.31mW. The best case gain of the antenna is 2dBi. 2dBi logarithmic terms convert to numeric result is nearly 1.58

According to the formula. calculate the EIRP test result:

EIRP= P x G = 0.31 mW x 1.58 = 0.49mW

2.4GHz

The Power Data is based on the RF Test Report SHEM210700721301

the max power is 82.79 dBuV/m≈0.06mW
The BLE and 2.4GHz can simultaneous transmitting,But the maximum rate of MPE is 0.49 /4 +0.06 /4 ≈0.138 <1. So the device is exclusion from SAR test.

--End of the Report--

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