

RF EXPOSURE EVALUATION REPORT

Application No.: GZCR2404000421LM
Applicant: Gardyn Inc
Address of Applicant: 8120 Woodmont Avenue, Suite #640, Bethesda, MD 20814, U.S.A.
Manufacturer: Gardyn Inc
Address of Manufacturer: 8120 Woodmont Avenue, Suite #640, Bethesda, MD 20814, U.S.A.
Factory: VS Industry Berhad
Address of Factory: PTD 90370 (Lot 76803 PLO 161 & 162), Jalan Murni 12, Kawasan Perindustrian Murni, 81400 Senai, Johor Darul Takzim, Malaysia
Product Name: Gardyn Home, Gardyn Studio
Model No.: Gardyn Home: GH-A02, GH A02,
 Gardyn Studio: GS A02 ♣
 ♣ Please refer to section 2 of this report which indicates which item was actually tested and which were electrically identical.
Trade Mark: Gardyn
Standard(s) : 47 CFR Part 1.1310
 KDB447498D01 General RF Exposure Guidance v06
Date of Receipt: 2024-04-25
Date of Evaluation: 2024-05-08
Date of Issue: 2024-06-06

Evaluation Result:	Pass*
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* In the configuration evaluated, the EUT complied with the standards specified above.



Ricky Liu
Manager



SGS-CSTC Standards Technical Services Co., Ltd.
Guangzhou Branch Testing Center EEC Laboratory

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Revision Record			
Version	Report No.	Date	Remark
01	GZCR220600084703	2022-09-08	Original
02	GZCR220600084706	2023-12-18	Copy report: Updated manufacturer's information, factory's information; Added trademark; Alternative seals, new version (Rev 1.5) of control PCB, pump and updated LED stripe.
03	GZCR220600084709	2024-06-06	Amendment report: Updated manufacturer's information; added new product name and model.

Authorized for issue by:			
		Kevin Zhang	
		Kevin Zhang/Project Engineer	
		Vico Cui	
		Vico Cui/Reviewer	



2 Evaluation Summary

Note:

E.U.T./EUT means Equipment Under Test.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.

Remark for original report GZCR220600084703:

✦ Declaration of EUT Family Grouping:

Model No.: GH-A02, GH A02

According to the declaration from the applicant, the electrical circuit design, layout, components used and internal wiring were identical for all models, with only difference on model name and outer decoration.

Therefore only one model GH-A02 was tested in this report.

Remark for report GZCR220600084706:

This report GZCR220600084706 is based on original report GZCR220600084703, with the follow changes:

1. Updated manufacturer's information, factory's information.
2. Added trademark to Gardyn.
3. Alternative a new version (Rev 1.5) of Control PCB without any change in RF module;
4. Added a seal between the modules;
5. Added a seal between the first column module and the LID;
6. Updated the LED stripe from GH3.0(140 LEDs) to GH4.0(32 LEDs);
7. Alternative a new pump (B0001-01-01).

Considering to above changes, all evaluation was redone in this report GZCR220600084706.



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Guangzhou Branch, EMC Testing Center EEC Laboratory

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Remark for the report GZCR220600084709:

This test report GZCR220600084709 based on and only valid with the previous test report GZCR220600084806, just with the following changes:

1. Updated manufacturer's information
2. Added new model: GS A02 with new PCBA, LED strip and 96W supply

According to the declaration of the applicant, the Model GS A02 supplemented in this report GZCR220600084709 is different from the Model in the previous report GZCR220600084806, with only the same RF module (including antenna). There are two options of control PCBA as below:

PCBA 1 = Original BOM "2Col PCBA Rev 1.1"

PCBA 2 = Using 3 alternate components:

1. Chip C Cap 0.1uF 50V 10% 0603 X7R, 0603B104K500CT, Walsin
2. MOSFET N-CH 30V 39A 8HSMT, RQ3E180GNTB, Rohm
3. IC CURRENT MONITOR VSSOP-10, INA220AIDGST, Texas Instruments.

Considering to the same RF module (including antenna) above, there is no need to further evaluation for the model GS A02 and all the evaluation data was kept in this report **GZCR220600084709**.

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4 General Information

4.1 Details of E.U.T.

Power Supply:	DC 24 V powered by AC/DC adapter as below: Model: FY1802404000 Input: AC 100-240 V, 50/60 Hz, 1.5 A, 130VA Output: DC 24 V, 4.0A, 96 W
Cable:	DC input ports for main unit For AC/DC adapter: AC mains (unshielded, 0.8 m) DC output cables (unshielded, 1.5m)
For BT	
Antenna Gain	1 dBi
Antenna Type	PCB Antenna
Channel Spacing	2MHz
Modulation Type	GFSK
Number of Channels	40
Operation Frequency	2402MHz to 2480MHz
For Wi-Fi	
Antenna Gain	1 dBi
Antenna Type	PCB Antenna
Channel Spacing	5MHz
Modulation Type	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels	802.11b/g/n(HT20):11
Operation Frequency	802.11b/g/n(HT20): 2412MHz to 2462MHz

4.2 Evaluating Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,
No.198, Kezhu Road, Science City, Economic & Technological Development Area, Guangzhou,
Guangdong, China 510663

Tel: +86 20 82155555

No tests were sub-contracted.



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4.3 Facility

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

● ACMA

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian/New Zealand Regulatory Compliance Mark (RCM).

● SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

● FCC Recognized Accredited Test Firm(Registration No.: 486818)

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818.

● ISED (Registration No.: 4620B, CAB identifier: CN0052)

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

● VCCI (Registration No.: R-12460, C-12584, G-20107 and T-11179)

The 10m Semi-anechoic chamber, 966 Anechoic Chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-20107 and T-11179 respectively.

● CBTL (Lab Code: TL129)

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2017, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.

4.4 Deviation from Standards

None

4.5 Abnormalities from Standard Conditions

None



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Guangzhou Branch EMC Laboratory

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中国·广东·广州高新技术产业开发区科学城科珠路198号 邮编: 510663

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5 Technical Requirements Specification

5.1 General Description of Applied Standards

KDB447498D01 General RF Exposure Guidance v06

4.3.1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

5.2 RF Exposure Evaluation

5.2.1 Limit & Test Method

According to FCC Part1.1310: 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 part1.1307(b)

TABLE 1—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 Exposures				
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
300–1500			f/300	6
1500–100,000			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
300–1500			f/1500	30
1500–100,000			1.0	30

F= Frequency in MHz

Friis Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4 * P_i * R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

$P_i = 3.1416$

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

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



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Guangzhou Branch, EMC Laboratory

No.198, Kezhu Road, Science City, Economic & Technological Development Area, Guangzhou, Guangdong, China 510663
中国·广东·广州高新技术产业开发区科学城科珠路198号 邮编: 510663

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5.2.2 Conclusion

Normal use condition
for Distance between antenna and body: > 20cm declared by applicant

Antenna Gain: 1dBi

For Bluetooth BLE

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
2402	1.259	6.85	4.842	0.00121	1	Complies
2440	1.259	7.2	5.248	0.00131	1	Complies
2480	1.259	6.95	4.955	0.00124	1	Complies

For 2.4 GHz Wi-Fi

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
11B						
2412	1.259	15.26	33.574	0.00841	1	Complies
2437	1.259	15.59	36.224	0.00907	1	Complies
2462	1.259	15.71	37.239	0.00933	1	Complies
11G						
2412	1.259	17.09	51.168	0.01282	1	Complies
2437	1.259	17.51	56.364	0.01412	1	Complies
2462	1.259	17.62	57.810	0.01448	1	Complies
11N20						
2412	1.259	17.05	50.699	0.01270	1	Complies
2437	1.259	17.49	56.105	0.01405	1	Complies
2462	1.259	17.6	57.544	0.01441	1	Complies

The Bluetooth and Wi-Fi can be transmitted together, the result is

$$0.00131/1+0.01448=0.01579 < 1.0$$

So SAR report is not required.

Note: Refer to report No. GZCR220600084702 for EUT test Max Conducted Peak Output Power value.



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6 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for GZCR2404000421LM

- End of the Report -

