

RF EXPOSURE EVALUATION REPORT

Application No.: GZCR2112021504AT
Applicant: Winegard Company
Address of Applicant: 3000 Kirkwood Street, Burlington, Iowa 52601, United States
Manufacturer: Winegard Company
Address of Manufacturer: 3000 Kirkwood Street, Burlington, Iowa 52601, United States
Factory:
 1. Aztech Communication Device (DG) Ltd
 2. IOT Manufacturing SDN.BHD.
Address of Factory:
 1. Jiu Jiang Shui Village, Chang Ping Town, Dong Guan City, Guang Dong Province, China
 2. No. 8 & 10, Setia Business Park, Jalan Laman Setia 7/4, Taman Laman Setia, 81550 Gelang Patah, Johor Bahru, Malaysia

Equipment Under Test (EUT):

EUT Name: Outdoor Wifi Access Point/Extender with Bridge Mode 2.4/5Ghz
Model No.: WG02
Trade Mark: Winegard
Standard(s) :
 47 CFR Part 1.1307
 47 CFR Part 1.1310
 47 CFR Part 2.1091
Date of Receipt: 2021-11-24
Date of Evaluation: 2021-12-02 to 2021-12-20
Date of Issue: 2021-12-21

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



Kobe Jian
 EMC Laboratory Manager



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 中国·广州·经济技术开发区科学城科珠路198号 邮编: 510663 t (86-20) 82155555 f (86-20) 82075058 sgs.china@sgs.com

<i>Revision Record</i>				
<i>Version</i>	<i>Chapter</i>	<i>Date</i>	<i>Modifier</i>	<i>Remark</i>
01		2021-12-21		Original

Authorized for issue by:			
			
		<hr/> Curry Wu/Project Engineer	
			
		<hr/> Ricky Liu/Reviewer	



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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.

This report is prepared for FCC class II permissive change.

The Original grant approval by TCB, FCC ID: C3D-AZ1333300, Granted on 06/24/2021.

Review this report and original report, this report just adding channel 12(2467MHz), channel 13(2472MHz) of 802.11b/g/n HT20, adding channel 10(2457MHz), channel 12(2462MHz) of 802.11n HT40 via software.

According to the declaration from the applicant, the model in this report and the model in original report is identical in electrical circuit design, layout, components used, antenna type, antenna gain and internal wiring, with only difference on channel number of 802.11b/g/n.



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4 General Information

4.1 Details of E.U.T. for WG02

Power supply:	POE Adapter Model: WM024SP-240-A REV 1MM Input: AC 100-240V, 50/60Hz, 0.8A Output: DC 24V, 1.0A 10/100/1000Mbps
Internal source:	More than 108MHz
Type of Modulation:	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) 802.11n (HT20/HT40): OFDM (64QAM, 16QAM, QPSK, BPSK)
Operating Frequency:	802.11b/g/n(HT20): 2412MHz to 2472MHz 802.11n(HT40): 2422MHz to 2462MHz
Channel Number:	802.11b/g/11n(HT20): 13 Channels 802.11n(HT40): 9 Channels
Channels Step:	Channels with 5MHz step
Sample Type:	Fixed devices
Antenna Type:	PCB antenna
Antenna Gain:	Antenna1/Antenna2/Antenna3: 3.2dBi Note: Three antennas can simultaneous transmission.



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4.2 Evaluating Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,
 198 Kezhu Road, Sciencetech Park, Guangzhou Economic & Technology Development District,
 Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.

4.3 Facility

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

- **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

- **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.

- **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

- **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



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4.5 Abnormalities from Standard Conditions

None



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5 Radio Spectrum Technical Requirement

5.1 RF Exposure Compliance Requirement

5.1.1 Limits

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: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 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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5.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

5.1.3 EUT RF Exposure Evaluation

For 2.4G WiFi(Channel 1~11)

1. According to the the test report SZCR210200203802, the tested maximum conducted power for 3x3 MIMO is 26.24dBm = 0.42073W = 420.73mW.
2. According to the declaration from the applicant, the permitted maximum antenna gain is 3.2dBi for single antenna, the Directional gain is 7.97dBi.
3. The limit of Power Density (S)(mW/cm²) = 1mW/cm²

Maximum Antenna Gain (Numeric)	Total conducted power (mW)	Limit of Power Density (S) (mW/cm ²)	Power Density at R=20cm (mW/cm ²)
2.09	420.73	1	0.1749

For 2.4G WiFi(Channel 11~13)

1. According to the the test report GZCR211202150401, the tested maximum conducted power for 3x3 MIMO is 24.91dBm = 0.30974W = 309.74mW.
2. According to the declaration from the applicant, the permitted maximum antenna gain is 3.2dBi for single antenna, the Directional gain is 7.97dBi.
3. The limit of Power Density (S)(mW/cm²) = 1mW/cm²

Maximum Antenna Gain (Numeric)	Total conducted power (mW)	Limit of Power Density (S) (mW/cm ²)	Power Density at R=20cm (mW/cm ²)
2.09	309.74	1	0.1287



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For 5G WiFi

1. According to the the test report SZEM210200203803, the tested maximum conducted power for 3x3 MIMO is 23.14dBm = 0.20606W = 206.06mW.
2. According to the declaration from the applicant, the permitted maximum antenna gain is 4.6dBi for single antenna, the Directional gain is 9.37dBi.
3. The limit of Power Density (S)(mW/cm²) = 1mW/cm²

Maximum Antenna Gain (Numeric)	Total conducted power (mW)	Limit of Power Density (S) (mW/cm ²)	Power Density at R=20cm (mW/cm ²)
2.88	206.06	1	0.1182

Note: the 2.4G WLAN antenna and 5G WLAN antenna cannot synchronous transmission at the same time for the model WG02

- End of the Report -



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