



RF EXPOSURE EVALUATION REPORT

Application No.: GZCR2111021432AT
Applicant: Winegard Company
Address of Applicant: 3000 Kirkwood Street, Burlington, Iowa, 52601 United States
Manufacturer: Winegard Company
Address of Manufacturer: 3000 Kirkwood Street, Burlington, IA 52601, USA
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: Basic Gateway 2x2
Model No.: WG06
Trade Mark: Winegard
Standard(s) : 47 CFR Part 2.1091
47 CFR Part 1.1310,
47 CFR Part 1.1307
Date of Receipt: 2021-11-15
Date of Evaluation: 2021-11-16 to 2021-11-22
Date of Issue: 2021-11-26

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.

Kobe Jian
EMC Laboratory Manager



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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2021-11-26		Original

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



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2 Evaluation Summary

Radio Spectrum Technical Requirement				
Item	Standard	Requirement	Method	Result
RF Exposure	47 CFR Part 2.1091 47 CFR Part 1.1310 47 CFR Part 1.1307	47 CFR Part 1.1310	47 CFR Part 1.1310	PASS

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-AZ1000022, Granted on 07/08/2021.

Review this report and original report, this report just adding channel 12(2467MHz), channel13(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.

Power supply:	DC 12V
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: 3.2dBi Note: MIMO for 802.11n

4.2 Details of WCDMA/LTE module*:

Operation Frequency Band:	WCDMA Band II,IV,V; LTE FDD Band 2,4,5,12,13,14,66,71
Modulation Type:	WCDMA: QPSK LTE: QPSK, 16QAM
HSDPA UE Category:	24
HSUPA UE Category:	6
LTE Category:	4
Antenna Type:	PCB Antenna
Antenna Ports:	Tx & Rx Port 1 Rx-only Port 1
Antenna Gain:	2dBi

*: The WCDMA/LTE single module approval by TCB(FCC ID:C3D-201808EC25AF), Grant at 05/18/2021.

4.3 Description of Support Units

The EUT has been tested as an independent unit.



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4.4 Test 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

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4.5 Test Facility

The test 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 C-Tick mark as a result of our NVLAP accreditation.

- **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 2.948 Listed Test Firm(Registration No.: 282399)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399, May 31, 2002.

- **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, Jul 13, 2017.

- **Industry Canada (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-10449 and T-11179)**

The 10m Semi-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-10449 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 17025:2005, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.



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4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



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5 Radio Spectrum Technical Requirement

5.1 RF Exposure

5.1.1 Requirement

In accordance with 47 CFR FCC Part 2.1091, this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

According to 47 CFR FCC Part 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 TO §1.1310(E)(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)
(i) Limits for Occupational/Controlled Exposure				
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
300-1,500			f/300	<6
1,500-100,000			5	<6
(ii) 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
300-1,500			f/1500	<30
1,500-100,000			1.0	<30

f = frequency in MHz. * = Plane-wave equivalent power density



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5.1.2 Method

According to IEEE C95.3:2002 section 5.5.1.1, the power density S at a point on the axis at a distance d from a transmitting antenna is given by the Friis free-space transmission formula:

$$S = \frac{PG}{4\pi d^2}$$

S = power density (mW/cm²)

P = the net power delivered to the antenna (mW)

G = gain of the antenna in linear scale

d = distance between observation point and center of the radiator (cm)

From the maximum EUT RF output power, as well as the gain of the used antenna, according to the RF power density limit stated in above table, the minimum distance between the antenna and human body will be calculated.



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5.1.3 Conclusion

For 2.4G WiFi(Channel 1~11)

1. According to the the test report SZCR210502121202, the tested maximum conducted power for 2x2 MIMO is 25.30dBm = 0.33884W = 338.84mW.
2. According to the declaration from the applicant, the permitted maximum antenna gain is 3.2dBi for single antenna, the Directional gain is 6.21dBi.
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	338.84	1	0.1408

For 2.4G WiFi(Channel 11~13)

1. According to the the test report GZCR211102143201, the tested maximum conducted power for 2x2 MIMO is 21.61dBm = 0.14488W = 144.88mW.
2. According to the declaration from the applicant, the permitted maximum antenna gain is 3.2dBi for single antenna, the Directional gain is 6.21dBi.
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	144.88	1	0.0602



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For WCDMA/LTE module:

The max tune-up tolerance power Into Antenna & RF Exposure Evaluation Distance:

Type	Test Freq. (MHz)	Max Antenna Gain (dBi)	Max Antenna Gain (Numeric)	Max tune-up tolerance power (dBm)	Max tune-up Tolerance power to Antenna (mW)	Power Density at R =20cm (mW/cm ²)	Limit (mW/cm ²)	MPE Ratios	Result
WCDMA Band II	1852.4	2	1.58	25	316.23	0.0997	1	0.0997	PASS
WCDMA Band IV	1712.4	2	1.58	25	316.23	0.0997	1	0.0997	PASS
WCDMA Band V	826.4	2	1.58	25	316.23	0.0997	0.5509	0.1810	PASS
LTE Band2	1850.7	2	1.58	25	316.23	0.0997	1	0.0997	PASS
LTE Band4	1710.7	2	1.58	25	316.23	0.0997	1	0.0997	PASS
LTE Band5	824.7	2	1.58	25	316.23	0.0997	0.5498	0.1814	PASS
LTE Band12	699.7	2	1.58	25	316.23	0.0997	0.4665	0.2138	PASS
LTE Band13	779.5	2	1.58	25	316.23	0.0997	0.5197	0.1919	PASS
LTE Band14	790.5	2	1.58	25	316.23	0.0997	0.5270	0.1892	PASS
LTE Band66	1710.7	2	1.58	25	316.23	0.0997	1.0000	0.0997	PASS
LTE Band71	665.5	2	1.58	25	316.23	0.0997	0.4437	0.2247	PASS

Note: Refer to report No. R1806A0301 or EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement, the MPE limit of 300MHz to 1500MHz is $f/1500$ mW/cm², the MPE limit of 1500MHz to 100000MHz is 1.0 mW/cm².

Note: the 2.4G's antenna and WCDMA/LTE's antenna can synchronous transmission at the same time.

The simultaneous transmission result between of WLAN and WCDMA/LTE module:

The SAR Exclusion Threshold Level:

$$= \text{CPD1} / \text{LPD1} + \text{CPD2} / \text{LPD2}$$

(CPD = Calculation power density, LPD = Limit of power density)

$$= (0.1408/1) + (0.0997/0.4437) = 0.3655 < 1$$

Since the SAR Exclusion Threshold Level is well below the SAR low threshold level, so the EUT is considered to comply with SAR requirement without testing.



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5.2 EUT Constructional Details

Refer to Appendix - external and internal photos for GZCR2111021432AT.

- End of the Report -



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