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Development District, Guangzhou, China 510663

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### TEST REPORT

Application No.: GZEM1907014154CR

**Applicant:** GREE Electric Appliances, Inc. of Zhuhai

Address of Applicant: West Jinji Rd, Qianshan, Zhuhai, Guangdong, China 519070

Manufacturer: GREE Electric Appliances, Inc. of Zhuhai

Address of Manufacturer: West Jinji Rd, Qianshan, Zhuhai, Guangdong, China 519070

Factory: GREE Electric Appliances, Inc. of Zhuhai

Address of Factory: West Jinji Rd, Qianshan, Zhuhai, Guangdong, China 519070

**Equipment Under Test (EUT):** 

**EUT Name:** wifi module

Model No.: CS532AE, CS532AH, GRJ532-J14. ¤

Please refer to section 2 of this report which indicates which model was

actually tested and which were electrically identical.

**Standard(s):** 47 CFR Part 1.1307, Part 1.1310

**Date of Receipt:** 2019-07-09

**Date of Test:** 2019-08-13 to 2019-08-29

**Date of Issue:** 2019-08-30

Test Result: Pass\*

Kuhe . Jian

Kobe Jian

**EMC 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 connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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<sup>\*</sup> In the configuration tested, the EUT complied with the standards specified above.



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Revision Record						
Version	Chapter	Date	Modifier	Remark		
01		2019-08-30		Original		

Authorized for issue by:		
Tested By	Curry Wu /Project Engineer	2019-08-13 to 2019-08-29  Date
	curry_rrayr reject Engineer	
Checked By	Riday Liu	2019-08-30
	Ricky_Liu /Reviewer	Date



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### 2 Test Summary

Radio Spectrum Technical Requirement							
Item Standard Method Requirement Result							
RF Exposure	47 CFR Part 1.1307, Part 1.1310	CFR 47 Part 1.1310	CFR 47 Part 1.1310	Pass			

#### **¤** Declaration of EUT Family Grouping:

Model No.: CS532AE, CS532AH, GRJ532-J14

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 the model name.

Therefore only one model GRJ532-J14 was tested in this report.



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### 4 General Information

#### 4.1 Details of E.U.T.

Power Supply: DC 5V

Test Voltage: AC 120V 60Hz

Antenna Gain 1dBi

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

802.11n(HT40):7

Operation Frequency 802.11b/g/n(HT20): 2412MHz to 2462MHz

802.11n(HT40): 2422MHz to 2452MHz

### 4.2 Description of Support Units

The EUT has been tested as an independent unit.

### 4.3 Measurement Uncertainty

RF

No.	Item	Measurement Uncertainty
1	Radio Frequency	±5.5 x 10 <sup>-8</sup>
2	Duty cycle	±0.57%
3	Occupied Bandwidth	±3%
4	RF Conducted power	±0.68dB
5	RF Power Density	±1.50dB
6	Conducted Spurious Emissions	±1.04dB
7	RF Radiated Power	±4.5dB (below 1GHz)
/	hr hadialed fower	±4.8dB (above 1GHz)
8	Padiated Spurious Emission Test	±4.5dB (30MHz-1GHz)
0	Radiated Spurious Emission Test	±4.8dB (1GHz-18GHz)
9	Temperature	±0.4℃
10	Humidity	±1.3%
11	Supply Voltages	±1.5%
12	Time	±3%



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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, Scientech Park, Guangzhou Economic & Technology Development District, Guangzhou, China 510663

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

No tests were sub-contracted.



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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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#### **Equipment List** 5

Conducted Peak Output Power							
Equipment	Manufacturer	Model No	<b>Inventory No</b>	Cal Date	Cal Due Date		
EXA Signal Analzer	AgilentTechnologies	N9010A	EMC2138	2018-11-19	2019-11-18		
6dB Attenuator	HP	8491A	EMC2062	2018-04-04	2020-04-03		
Test Software JS1120-3	HangTianXing	V2.6	GZE100-69	N/A	N/A		
MI CABLE	SGS	0.8M	EMC2136	2017-11-02	2019-11-01		
MI CABLE	SGS	0.8M	EMC2137	2017-11-02	2019-11-01		



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### 6 Radio Spectrum Technical Requirement

### 6.1 RF Exposure

#### 6.1.1 Test Requirement:

CFR 47 Part 1.1310

Limit:

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/cm²)	Averaging time (minutes)
	(A) Limits for Oc	cupational/Controll	ed Exposure	
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f <sup>2</sup>	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
	(B) Limits for Genera	al Population/Uncon	trolled Exposure	
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f <sup>2</sup>	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
1,500-100,000			1.0	30
300-1,500	21.3	0.073	f/1500	30

<sup>|</sup>f = frequency in MHz

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

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

 $S = power density (mW/cm^2)$ 

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)



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<sup>\* =</sup> Plane-wave equivalent power density



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#### 6.1.2 Conclusion

(1)802.11b

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
2412	1.259	18.92	77.983	0.01953	1	Complies
2442	1.259	19.23	83.753	0.02098	1	Complies
2462	1.259	19.19	82.985	0.02078	1	Complies

(2) 802.11g

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
2412	1.259	18.16	65.464	0.01640	1	Complies
2442	1.259	18.26	66.988	0.01678	1	Complies
2462	1.259	18.44	69.823	0.01749	1	Complies



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(3)802.11n HT20

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
2412	1.259	17.99	62.951	0.01577	1	Complies
2442	1.259	18.1	64.565	0.01617	1	Complies
2462	1.259	18.24	66.681	0.01670	1	Complies

### (4) 802.11n HT40

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
2422	1.259	18.33	68.077	0.01705	1	Complies
2442	1.259	18.35	68.391	0.01713	1	Complies
2452	1.259	18.43	69.663	0.01745	1	Complies



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### 7 Photographs

#### 7.1 EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for GZEM1907014154CR.

--End of Report--



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