



**SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch**

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RF Exposure Evaluation Report

Application No.: SZEM1712012659CR
Applicant: Gree Electric Appliances, Inc. of Zhuhai
Address of Applicant: Jinji West Rd,Qianshan,Zhuhai, 519070, Guangdong P.R.China
Manufacturer: Gree Electric Appliances, Inc. of Zhuhai
Address of Manufacturer: Jinji West Rd,Qianshan,Zhuhai, 519070, Guangdong P.R.China
Factory: Gree Electric Appliances, Inc. of Zhuhai
Address of Factory: Jinji West Rd,Qianshan,Zhuhai, 519070, Guangdong P.R.China

Equipment Under Test (EUT):

EUT Name: LTE DTU
Model No.: IE60-33/CF2
FCC ID: 2ADAP-IE6033CF2
IC: 12478A-IE6033CF2
Standards: 47 CFR Part 1.1307
47 CFR Part 1.1310
RSS-102 Issue 5

Date of Receipt: 2017-12-19
Date of Test: 2017-12-20 to 2018-02-09
Date of Issue: 2018-02-10

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



Keny Xu

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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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2018-02-10		Original

Authorized for issue by:				
				
		<hr/> Jacky Li/Project Engineer		
				
		<hr/> Eric Fu /Reviewer		



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4 General Information

4.1 General Description of EUT

Power supply:	DC 12V
Sample Type:	Fixed production
UMTS information	
UMTS Operation Frequency Band:	UMTS FDD Band II/V
Modulation Type:	QPSK
Supported Channel Bandwidth:	5 MHz
WCDMA Release Version:	R99
HSDPA Release Version:	Release 10
HSUPA Release Version:	Release 6
UMTS Power Class:	Level 3
Designation of Emissions	UMTS band II: 4M19F9W
	UMTS band V: 4M18F9W
Antenna Type:	Detachable Antenna
Antenna Gain:	2.5dBi
LTE information	
LTE Operation Frequency Band:	LTE FDD Band 2, 4, 5, 17
Modulation Type:	QPSK, 16QAM
LTE Release Version:	R8
LTE Power Class:	Level 3
Antenna Type:	Detachable Antenna
Antenna Gain:	2.5dBi



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4.2 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China
518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

4.3 Test Facility

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

• CNAS (No. CNAS L2929)

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 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. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC –Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• Industry Canada (IC)

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.



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4.4 Deviation from Standards

None.

4.5 Abnormalities from Standard Conditions

None.

4.6 Other Information Requested by the Customer

None.



5 RF Exposure Evaluation

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

According to RSS-102 issue 5 Table 4: RF Field Strength Limits for Devices Used by the General Public

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ²¹	83	90	-	Instantaneous*
0.1-10	-	0.73/ f	-	6**
1.1-10	87/ f ^{0.5}	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ f ^{0.25}	0.1540/ f ^{0.25}	8.944/ f ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 f ^{0.3417}	0.008335 f ^{0.3417}	0.02619f ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ f ^{1.2}
150000-300000	0.158 f ^{0.5}	4.21 x 10 ⁻⁴ f ^{0.5}	6.67 x 10 ⁻⁵ f	616000/ f ^{1.2}
<p>Note: f is frequency in MHz. *Based on nerve stimulation (NS). ** Based on specific absorption rate (SAR).</p>				

F= Frequency in MHz

Friis Formula

Friis transmission formula: Pd = (Pout*G)/(4* Pi * R 2)

Where



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P_d = power density in mW/cm^2

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.

FCC limit :

WCDMA band II and LTE FDD band 2: $1mW/cm^2$

WCDMA band V and LTE FDD band 5: $0.558mW/cm^2$

LTE FDD band 4: $1mW/cm^2$

LTE FDD band 17: $0.473mW/cm^2$

IC limit :

WCDMA band II and LTE FDD band 2: $0.453mW/cm^2$

WCDMA band V and LTE FDD band 5: $0.260mW/cm^2$

LTE FDD band 4: $0.428mW/cm^2$

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.

5.1.2 Test Procedure

Enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.



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4.1.3 EUT RF Exposure Evaluation

Antenna Gain: 2.5dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.78 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Test mode	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)	Limit (mW/cm2)		Result
				FCC	IC	
WCDMA II	23	199.5262	0.0707	1.0	0.453	PASS

Test mode	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)	Limit (mW/cm2)		Result
				FCC	IC	
WCDMA V	23	199.5262	0.0707	0.558	0.260	PASS

Test mode	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)	Limit (mW/cm2)		Result
				FCC	IC	
LTE FDD band 2	22	158.4893	0.0561	1.0	0.453	PASS

Test mode	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)	Limit (mW/cm2)		Result
				FCC	IC	
LTE FDD band 4	22	158.4893	0.0561	1.0	0.428	PASS

Test mode	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)	Limit (mW/cm2)		Result
				FCC	IC	
LTE FDD band 5	22	158.4893	0.0561	0.558	0.260	PASS



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Test mode	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm2)	Limit (mW/cm2)		Result
				FCC	IC	
LTE FDD band 17	22	158.4893	0.0561	0.472	/	PASS

Note: The conducted power is refer to tune-up procedure. And we measured with the max conducted power. The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

- End of the Report -