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Report No.: GZEM181200012803
Page: 1 of 8
FCC ID: PUU-CSWONBLXWF1

RF Exposure Evaluation Report

Application No.: GZEM1812000128CR
Applicant: GE Lighting
Address of Applicant: Nele park, Cleveland, OH 44112
Manufacturer: GE Lighting
Address of Manufacturer: Nele park, Cleveland, OH 44112
Factory: Nanchang Innotech Technology Co., Ltd
Address of Factory: No.399, Rule Lake Avenue, Nanchang Airport Economic Zone, Nanchang, China

Equipment Under Test (EUT):
FCC ID: PUU-CSWONBLXWF1
EUT Name: Smart Switch
Model No.: CSWONBLPW1, CSWONBLTW1
Please refer to section 4.1.3 of this report which indicates which model was actually tested and which were electrically identical.

Trade Mark: GE
Standard(s) : 47 CFR Part 1, Subpart I 1.1310
Date of Receipt: 2018-12-26
Date of Test: 2019-01-14 to 2019-01-16
Date of Issue: 2019-03-01

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



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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Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2019-03-01		Original

Authorized for issue by:			
Tested By			
		Kevin_Zhang /Project Engineer	2019-01-14 to 2019-01-16 Date
Checked By			
		Ricky Liu /Reviewer	2019-01-18 Date



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3 General Information

3.1 General Description of EUT

Power Supply: AC 120V 60Hz

Test Voltage: AC 120V 60Hz

Cable: NA

WIFI:

Antenna Gain 0.2dBi

Antenna Type Integrated 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

BT:

Antenna Gain -0.06dBi

Antenna Type Integrated PCB antenna

Channel Spacing 2MHz

Modulation Type GFSK

Number of Channels 40

Operation Frequency 2402MHz to 2480MHz

3.2 Test Location

All tests were performed at:

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3.3 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-CL01:2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 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-1)**

The 3m/10m Alternate Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Certification and Engineering of Industry Canada for radio equipment testing with Registration No. 4620B-1.

- **VCCI (Registration No.: R-2460, C-2584, G-449 and T-1179)**

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-2460, C-2584, G-449 and T-1179 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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3.4 Deviation from Standards

None.

3.5 Abnormalities from Standard Conditions

None.

3.6 Other Information Requested by the Customer

None.



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4 RF Exposure Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 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.

4.1.2 Test Procedure

Software provided by client 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

For WIFI

Antenna Gain: 0.2dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.047 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
2442MHz	23.05	201.837	0.04205	1.0	PASS

For Bluetooth

Antenna Gain: -0.06dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 0.986 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
2442MHz	6.74	4.721	0.00093	1.0	PASS

Note:

1. Refer to report No. GZEM181200012801 & GZEM181200012802 for EUT test Max Peak Output Power value. The distance r calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

2. 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 button and LED indicator.

The model CSWONBLPWF1 has one button and two white LED. The model CSWONBLTWF1 has two buttons and one white LED. Model CSWONBLPWF1 and CSWONBLTWF1 have the same Wi-Fi and Bluetooth modules.

Therefore only one model CSWONBLTWF1 was tested in this report.

3. The Bluetooth and WIFI will not simultaneous transmission at same channel.



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