

# RF Exposure Evaluation Report

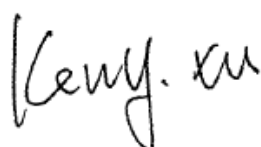
**Application No.:** SZEM1908017944CR  
**Applicant:** GE Lighting  
**Address of Applicant:** 1975 Noble Road, Cleveland, Ohio, 44112, United States  
**Manufacturer:** GE Lighting  
**Address of Manufacturer:** 1975 Noble Road, Cleveland, Ohio, 44112, United States  
**Factory:** TCL Technoly Electronics (Huizhou) Co., Ltd.  
**Address of Factory:** Section 37, Zhongkai High-tech Development Zone, Huizhou City, Guang Dong Province, P.R. China

**Equipment Under Test (EUT):**  
**Product Name:** CbyGE no neutral smart switch  
**Model No.:** CSWONBLTWF1NN, CSWONBLPWF1NN (Models may be provided with suffixes of any additional symbols/letters/numbers sequence meaning body color, packaging) ♣  
 ♣ Please refer to section 4.1 of this report which indicates which model was actually tested and which were electrically identical.

**Trade mark:** GE  
**FCC ID:** PUU-CSWONBLXWF1NN  
**Standards:** 47 CFR Part 1.1310  
 47 CFR Part 2.1091  
**Date of Receipt:** 2019-08-28  
**Date of Test:** 2019-08-30 to 2019-10-15  
**Date of Issue:** 2019-10-17

<b>Test Result :</b>	<b>PASS*</b>
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\* In the configuration tested, the EUT complied with the standards specified above.



Keny Xu  
 EMC Laboratory Manager



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## 2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2019-10-17		Original

Authorized for issue by:			
			
		<hr/> <b>Calvin Weng /Project Engineer</b>	
			
		<hr/> <b>Eric Fu /Reviewer</b>	



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## 4 General Information

### 4.1 General Description of EUT

Power supply:	AC120V, 60Hz
For BLE:	
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	4.2
Modulation Type:	GFSK
Channel Spacing:	2MHz
Number of Channels:	40
Antenna Type:	PCB Antenna
Antenna Gain:	2.55dBi
For 2.4G wifi:	
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz 802.11n(HT40): 2422MHz to 2452MHz
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
Channel Spacing:	5MHz
Antenna Type:	PCB Antenna
Antenna Gain:	2.73dBi

#### Declaration of EUT Family Grouping:

Model No.: CSWONBLTWF1NN, CSWONBLPWF1NN (Models may be provided with suffixes of any additional symbols/letters/numbers sequence meaning body color, packaging)

Only the model CSWONBLTWF1NN was tested, since the electrical circuit design, layout, components used, internal wiring and functions were identical for the above models, with only difference on the appearance and Control key



## 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.

- **Innovation, Science and Economic Development Canada**

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

CAB identifier: CN0006.

IC#: 4620C.



#### 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 <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
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
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
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
300–1500 .....	.....	.....	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/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

G = gain of antenna in linear scale

$\pi$  = 3.1416

R = distance between observation point and center of the radiator in cm

$P_d$  is the limit of MPE, 1 mW/cm<sup>2</sup>. 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

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



### 4.1.3 EUT RF Exposure Evaluation

**For BLE:**

Antenna Gain: 2.55dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.80 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
Highest	2480	3.74	2.37	0.0008	1.0	PASS

Note: Refer to report No. SZEM190801794401 for EUT test Max Conducted Peak Output Power value. The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

**For 2.4G wifi:**

Antenna Gain: 2.73dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.87 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
Highest	2462	20.91	123.31	0.046	1.0	PASS

Note: Refer to report No. SZEM190801794402 for EUT test Max Conducted Peak Output Power value. The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

- End of the Report -



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