RF Exposure Evaluation Report

Application No.:	SZEM1911020381CR
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, Guangdong Province, P.R. China
EUT Name:	CbyGE Dimmer Switch
Model No.:	CSWDMOCBWF1NN, CSWDMBLBWF1NN ♣ Please refer to section 4 of this report which indicates which model was actually tested and which were electrically identical.
Trade mark:	GE
FCC ID:	PUU-CSWDMXXBWF1NN
Standards:	47 CFR Part 1.1307 47 CFR Part 1.1310
Date of Receipt:	2019-11-20
Date of Test:	2019-11-21 to 2019-12-16
Date of Issue:	2019-12-19
Test Result :	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu
EMC Laboratory Manager

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch 检验检测专用章 Inspection & Testing Services

2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2019-12-19		Original

Authorized for issue by:				
				
		Damon Su /Project Engineer		
				
		Eric Fu /Reviewer		

3 Contents

4 General Description of EUT

Power Supply:	Input: AC 120V, 60Hz, 450W
For BLE:	
Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	V4.2
Modulation Type:	GFSK
Number of Channel:	40
Antenna Type:	PCB Antenna
Antenna Gain:	2.27dBi
For 2.4G wifi:	
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz 802.11n(HT40): 2422MHz to 2452MHz
Channel Numbers:	802.11b/g/n(HT20):11 802.11n(HT40):7
Channel Separation:	5MHz
Type of Modulation:	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Antenna Type:	PCB Antenna
Antenna Gain:	2.73dBi

Remark:

Model No.: CSWDMOCBWF1NN, CSWDMBLBWF1NN

Only the model CSWDMOCBWF1NN was tested, these two models are identical on all circuitry design, PCB layout, electrical components used, internal wiring except that CSWDMOCBWF1NN have PIR sensor,light sensor and related components,But CSWDMBLBWF1NN do not have PIR sensor,light sensor and related components.

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4.1 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.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.2 Test Facility

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

• **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.

4.3 Deviation from Standards

None.

4.4 Abnormalities from Standard Conditions

None.

4.5 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

F= Frequency in MHz

Friis Formula

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

Where

Pd = power density in mW/cm2

Pout = 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

Pd id 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.

5.1.2 Test Procedure

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

5.1.3 EUT RF Exposure Evaluation

Remark: The Bluetooth and Wifi function can synchronous transmission at the same time.

For BLE

Antenna:2.27dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.69 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/cm2)	Limit (mW/cm2)	Result
Lowest	2402MHz	2.87	1.94	0.00065	1.0	PASS

Note: Refer to report No. SZEM191102038101 for 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.

For 2.4G WIFI

Antenna: 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/cm2)	Limit (mW/cm2)	Result
Middle	2437MHz	19.97	99.31	0.03695	1.0	PASS

Note: Refer to report No. SZEM191102038101&SZEM191102038102 for 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.

exposure conditions for simultaneous transmission operations

Simultaneous transmission MPE test is not required, because the Max. sum of the MPE ratios for BLE, WIFI is 0.00065+0.03695=0.0376 < 1

- End of the Report -

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