

RF Exposure Evaluation Report

Product : RGB Speaker PAR38 Lamp
Trade mark : N/A
Model/Type reference : LED+14DPA38M/WWRGBSPK
LED+14DPA38M/DLRGBSPK
Serial Number : N/A
Report Number : EED32N81004703
FCC ID : PUU-LEDX14DPA38M
Date of Issue : Dec. 02, 2021
: 47 CFR Part 1.1307
Test Standards : 47 CFR Part 1.1310
KDB447498D01 General RF Exposure Guidance v06
Test result : PASS

Prepared for:

Savant Technologies LLC dba GE Lighting, a Savant company
1975 Noble Road Cleveland Ohio United States 44112

Prepared by:

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2 Version

Version No.	Date	Description
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4 General Information

4.1 Client Information

Applicant:	Savant Technologies LLC dba GE Lighting, a Savant company
Address of Applicant:	1975 Noble Road Cleveland Ohio United States 44112
Manufacturer:	Savant Technologies LLC dba GE Lighting, a Savant company
Address of Manufacturer:	1975 Noble Road Cleveland Ohio United States 44112
Factory:	Shenzhen H&T Intelligent Control Co., Ltd.
Address of Factory:	H&T Industrial Park, Tian Liao Community, Guangming New District, Shenzhen, Guangdong, China. P.R.C 518106

4.2 General Description of EUT

Product Name:	RGB Speaker PAR38 Lamp
Model No.(EUT):	LED+14DPA38M/WWRGBSPK ,LED+14DPA38M/DLRGBSPK
Test Model No.:	LED+14DPA38M/WWRGBSPK
Trade mark:	N/A
Product Type:	☐ Mobile ☐ Portable ☒ Fix Location
Power Supply:	120V 60Hz 130mA
Test Voltage:	120V 60Hz 130mA
Sample Received Date:	Oct. 15, 2021
Sample tested Date:	Oct. 15, 2021 to Nov. 05, 2021
Remark:	Company Name and Address shown on Report, the sample(s) and sample Information were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified. Model/Type reference:LED+14DPA38M/WWRGBSPK,LED+14DPA38M/DLRGBSPK Only the model LED+14DPA38M/WWRGBSPK was tested,the difference between each model is only for the model name is different, the color temperature is different, the rest circuit principle, the internal structure, the PCB Layout and the safety key parts are the same, does not affect the EMC and RF test.

4.3 General Description of 5.8G

Operation Frequency:	5731MHz to 5795MHz
Modulation Type:	GFSK
Number of Channel:	33
Test Power Grade:	Default
Software Version:	N/A
Antenna Type and Gain:	Type: FPC Antenna Gain: 3.91dBi

4.4 General Description of BT Classic

Operation Frequency:	2402MHz~2480MHz
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, $\pi/4$ DQPSK, 8DPSK
Number of Channel:	79
Hopping Channel Type:	Adaptive Frequency Hopping systems
Antenna Type:	PCB Antenna
Antenna Gain:	0dBi

4.5 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd

Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China

Telephone: +86 (0) 755 33683668 Fax: +86 (0) 755 33683385

No tests were sub-contracted.

FCC Designation No.: CN1164

4.6 Deviation from Standards

None.

4.7 Abnormalities from Standard Conditions

None.

4.8 Other Information Requested by the Customer

None.

5 SAR 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: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

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.

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

For BT Classic

Antenna Gain: 0dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.0 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

1) For BT Classic

Measurement Data

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	-0.93	-0.5±0.5	0	1
Middle(2441MHz)	-1.02	-1.5±0.5	-1	0.749
Highest(2480MHz)	-1.21	-1.5±0.5	-1	0.749
π/4DQPSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	1.22	1.5±0.5	2	1.585
Middle(2441MHz)	1.06	1.5±0.5	2	1.585
Highest(2480MHz)	0.9	0.5±0.5	1	1.259
8DPSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	1.59	1.5±0.5	2	1.585
Middle(2441MHz)	1.38	1.5±0.5	2	1.585
Highest(2480MHz)	1.3	1.5±0.5	2	1.585

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
1.585	0	0.0003	1.0	PASS

Note: 1) Refer to report No. EED32N81004701 for EUT test Max Conducted Peak Output Power value.

2) $P_d = (P_{out} * G) / (4 * \pi * R^2) = (1.585 * 1) / (4 * 3.1416 * 20^2) = 0.0003$

For 5.8G

Antenna Gain: 3.91dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2.46 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

2) For 5.8G

5.8G mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(5731MHz)	6.23	6.0±1.0	7	5.01
Middle(5767MHz)	6.02	6.0±1.0	7	5.01
Highest(5795MHz)	5.71	6.0±1.0	7	5.01

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
5.01	3.91	0.0025	1.0	PASS

Note: 1) Refer to report No. EED32N81004702 for EUT test Max Conducted Peak Output Power value.

2) $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2) = (5.01 \cdot 2.46) / (4 \cdot 3.1416 \cdot 20^2) = 0.0025$

3) For BT Classic and 5.8G

The product also has multiple transmitters The Simultaneous Transmission Possibilities are as below:

Simultaneous Tx Combination	Configuration
1	BT Classic+5.8G

BT Classic+5.8G

Band	S _{BT Classic} (mW/cm ²)	MPE Ratios _{BT Classic}	S _{5.8G} (mW/cm ²)	MPE Ratios _{5.8G}	R (cm)	MPE Ratios _{SUM}	Limit	Result
BT Classic+5.8G	0.0003	0.0003	0.0025	0.0025	20	0.0028	1	Pass

PHOTOGRAPHS OF EUT Constructional Details

Refer to Report No. EED32N81004701 for EUT external and internal photos.

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*** End of Report ***