



BEC INCORPORATED

SAR REPORT


**TEST STANDARDS:
FCC Part 15 Subpart C Intentional Radiator
KDB 447498 D01**

**Lutron Electronics Model KL01
Wireless Controlled LED Lamp**

FCC ID: JPZ0125

REPORT BEC-2008-03

**CUSTOMER:
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Revision History

Revision #	Description of Changes	Date of Changes	Date Released
0	Test Report Initial Release	N/A	09/18/2019



1.0 Administrative Information

1.1 General Information Table

Project Number	BEC-2008
Manufacturer	Lutron Electronics Company Incorporated
Model Number	KL01
Serial Number	KLALV001_C01
Sample Number	2008-01
FCC ID	JPZ0125
Radio Chip Manufacturer	Silicon Labs
Radio Chip Model Number	EFR32MG12
Frequency of Operation	2.402 GHz – 2.480 GHz
Wireless Technology Used	BLE and IEEE 802.15.4
FCC Classification	Digital Transmission System (DTS)
Date Samples Received	08/14/2019
Condition Samples Received	Suitable for test
Sample Type	Production unit
EUT Description	Wireless Controlled LED Light Bulb Using BLE and IEEE 802.15.4
Applicable FCC Rules	47 CFR Part 2.1093, KDB 447498 D01



2.0 SAR Test Exclusion Parameters and Justification

From KDB 447498 D01:

4.3. General SAR test exclusion guidance

4.3.1. Standalone SAR test exclusion considerations

The Maximum Antenna Power used for the RF Exposure Threshold calculation is the highest measured output power shown in the following table. The table comes from the FCC Part 15C test report for this product. The Lutron KL01 can operate as or a BLE radio or an IEEE 802.15.4 radio. The SAR Exclusion will be calculated for each of the two radios.

The separation distance used in the calculation is 10 centimeters. This distance is derived from the usage of the product. The Wireless Controlled LED Lamp is normally installed in a light fixture. The proximity of the lamp to a human would likely never be as close as 10 cm. The conservative distance is chosen to ensure a comfortable margin to the SAR exemption limit.

The following tables depict the total Effective Isotropic Radiated Power (EIRP), measured at the antenna. Low, middle and high frequencies were measured for both radios.

BLE with 2FSK modulation

Channel #	Modulation	Frequency (GHz)	Measured Level (dBm)	Cable # 813 Loss (dB)	Antenna Gain dBi	Total EIRP	
						dBm	Watts
37	BLE 2FSK	2.402	18.08	0.36	2.20	20.64	0.116
18		2.442	17.93	0.46	2.20	20.59	0.115
39		2.480	17.78	0.41	2.20	20.39	0.109

IEEE 802.15.4 with OQPSK modulation

Channel #	Modulation	Frequency (GHz)	Measured Level (dBm)	Cable # 813 Loss (dB)	Antenna Gain dBi	Total EIRP	
						dBm	Watts
11	IEEE 802.15.4 OQPSK	2.405	17.42	0.36	2.20	19.98	0.100
18		2.440	17.19	0.45	2.20	19.84	0.096
26		2.480	17.06	0.41	2.20	19.67	0.093



3.0 SAR Test Exclusion Calculation

The following calculation, from paragraph 4.3.1(b) of KDB 447498 D01, was used to determine the SAR Test Exclusion Threshold:

$$\{[\text{Power allowed at numeric threshold for 50 mm in step a)}] + [(\text{test separation distance} - 50 \text{ mm}) \times (f(\text{MHz}) / 150)]\} \text{ mW}$$

The power level used below is the output of the device at the antenna. The measurement distance is therefore 0 cm. The power level will drop as the distance increases. Therefore, compliance at 0 cm is worst case value.

BLE

Channel	Modulation	1 g SAR numeric threshold	Separation Distance	Frequency	SAR Test Exclusion Threshold	Total EIRP	Margin	Pass/Fail
		(mw)	(mm)	(MHz)	(mW)	(mW)	(mW)	
37	2FSK	3	100	2.402	803.7	0.116	-803.6	Pass
18		3	100	2.442	817.0	0.115	-816.9	Pass
39		3	100	2.480	829.7	0.109	-829.6	Pass

IEEE 802.15.4

Channel	Modulation	1 g SAR numeric threshold	Separation Distance	Frequency	SAR Test Exclusion Threshold	Total EIRP	Margin	Pass/Fail
		(mw)	(mm)	(MHz)	(mW)	(mW)	(mW)	
11	OQPSK	3	100	2.405	804.7	0.100	-804.6	Pass
18		3	100	2.440	816.3	0.096	-816.2	Pass
26		3	100	2.480	829.7	0.093	-829.6	Pass

Results: The Lutron KL01, Wireless Controlled LED Lamp, complies with SAR Test Exclusion Thresholds shown in the tables. Therefore, SAR evaluation is not required.



Appendix A – Test Equipment

Equipment	Manufacturer	Model #	Serial #	BEC #	Calibration Date	Calibration Cycle	Calibration Due Date
EMI Receiver (20 Hz – 26.5 GHz)	Rohde & Schwarz	ESIB 26	836119/006	1010	07/02/19	3 Years	07/02/22
Intentional Radiator Testing High Frequency RF Test Cable	Flexco Microwave	FC102494 90293A6B	N/A	813	03/15/17	3 Years	03/15/20