



BEC INCORPORATED

MAXIMUM PERMISSABLE EXPOSURE (MPE) REPORT

TEST STANDARDS:

U.S. Title 47 Chapter 1 Subchapter A Part 2 Subpart J

Equipment Under Test (EUT):

**Lutron Models HWL-RD4WH-TW, HWL-RD6WH-TW,
HWL-CD4WH-TW and HWL-CD6WH-TW LED Downlights
with 802.15.4 Radio**

FCC ID: JPZ0157

REPORT#: BEC-2412-05

REPORT DATE: 03/06/2026

CUSTOMER:

**Lutron Electronics Company Incorporated
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The BEC Decision Rule: Measurement Uncertainty is not applied to any testing measurements or test results provided to the customer by BEC Incorporated at this time.

Revision History

Revision #	Description of Changes	Date of Changes	Date Released
0	Test Report Initial Release	N/A	03/06/2026



1.0 Administrative Information

1.1 General Information Table

Project Number	BEC-2412
Manufacturer	Lutron Electronics
EUT Model Number	HWL-RD4WH-TW
EUT Description	HWL Series LED Downlight with 802.15.4 Radio
Sample Type	Antenna Conducted Test Sample
Sample Number	2412-05
Serial Number	09C52326
ISED ID	2851A-JPZ0157
Radio Type	802.15.4
Frequency of Operation	2400 – 2480 MHz
Frequencies Tested	Low (2405 MHz), Middle (2440 MHz), High (2480 MHz)
Antenna Gain	+ 1.14 dBi / - 1.36 dBd
Tune Up Tolerance	+/- 1.0 dBm
Antenna Type	Monopole
Modulation	O-QPSK
FCC Classification	Digital Transmission System (DTS)
Date Samples Received	11/26/2025
EUT Firmware Version	3.14.9
Applicable FCC Rules	47 CFR Part 2.1091, OET Bulletin 65
Separation Distance	The separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm.
RF Exposure Environment	General Public. Uncontrolled Use



1.2 Maximum Permissible Exposure Limits and Calculation

§1.1307 Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared.

(b)(1) *Requirements.* (i) With respect to the limits on human exposure to RF provided in §1.1310 of this chapter, applicants to the Commission for the grant or modification of construction permits, licenses or renewals thereof, temporary authorities, equipment authorizations, or any other authorizations for radiofrequency sources must either:

(A) Determine that they qualify for an exemption pursuant to §1.1307(b)(3);

(B) Prepare an evaluation of the human exposure to RF radiation pursuant to §1.1310 and include in the application a statement confirming compliance with the limits in §1.1310; or

(C) Prepare an Environmental Assessment if those RF sources would cause human exposure to levels of RF radiation in excess of the limits in §1.1310

TABLE 1 TO § 1.1310(E)(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)
(ii) 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
300-1,500			f/1500	<30
1,500-100,000			1.0	<30

The use of OET Bulletin 65 was used to calculate the Power Density based upon EIRP levels of the Lutron HWL Series LED Downlight device measured and reported by this laboratory during testing for compliance to 47 CFR Part 15C.

$$S = \frac{PG}{4\pi R^2} \quad (3)$$

where: S = Power Density (in appropriate units, e.g., mW/cm²)
P = Power input to the antenna (in appropriate units, e.g., mW)
G = Power Gain of the antenna in the direction of interest to an isotropic radiator
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

or:
$$S = \frac{\text{EIRP}}{4\pi R^2} \quad (4)$$

where: EIRP = equivalent (or effective) isotropically radiated power (mw)



1.3 Maximum Permissible Exposure (MPE)

Antenna power is the highest measured level among the low and high frequencies of the transmitter contained in each model identified above. The measurements below were taken from a test sample of the Lutron HWL Series LED Downlight. The table below identifies the transmitter output level to achieve the EIRP level. The tune up tolerance of +/- 1 dBm was added to the Antenna Conducted Maximum Output Power for the transmitter measurements. The Power Density is then calculated using Formula (4) of OET Bulletin 65.

Antenna Conducted Maximum Output Power Measurement (12/09/2025):

Radio Transmit Channel	Modulation	Tx Frequency (MHz)	Measured Peak Output Power Level (dBm)	Cable # 962 Loss (dB)	Tune Up Tolerance (+/-1 dBm)	Corrected Peak Output Power		Limit		Margin	
						dBm	Watts	dBm	Watts	dBm	Watts
11	O-QPSK Modulation	2405.0	19.29	0.377	1.000	20.67	0.117	30.00	1.000	-9.33	-0.883
18		2440.0	19.78	0.375	1.000	21.16	0.130	30.00	1.000	-8.85	-0.870
26		2480.0	19.91	0.377	1.000	21.29	0.134	30.00	1.000	-8.71	-0.866
Radio Transmit Channel	Modulation	Tx Frequency (MHz)	Measured Peak Output Power Level (dBm)	Cable # 962 Loss (dB)	Tune Up Tolerance (+/-1 dBm)	Corrected Peak Output Power		Limit		Margin	
						dBm	Watts	dBm	Watts	dBm	Watts
11	None (CW)	2405.0	19.62	0.377	1.000	21.00	0.126	30.00	1.000	-9.00	-0.874
18		2440.0	19.78	0.375	1.000	21.16	0.130	30.00	1.000	-8.85	-0.870
26		2480.0	19.78	0.377	1.000	21.16	0.131	30.00	1.000	-8.84	-0.869

Power Density Calculation Results

Channel	Modulation	Frequency	Antenna Max Output Power With Tune Up Tolerance of 1 dBm	Antenna Gain	EIRP	Calculated Power Density @ 20 cm	1.1310 Limit	Margin
		MHz	dBW	dBi	dBW	mW/cm ²	mW/cm ²	
11	O-QPSK	2405	20.667	1.14	21.807	0.0302	1.00	-0.9698
18		2440	21.155	1.14	22.295	0.0338	1.00	-0.9662
26		2480	21.287	1.14	22.427	0.0348	1.00	-0.9652
Channel	Modulation	Frequency	Antenna Max Output Power With Tune Up Tolerance of 1 dBm	Antenna Gain	EIRP	Calculated Power Density @ 20 cm	1.1310 Limit	Margin
		MHz	dBW	dBi	dBW	mW/cm ²	mW/cm ²	
11	None	2405	20.997	1.14	22.137	0.0326	1.00	-0.9674
18		2440	21.155	1.14	22.295	0.0338	1.00	-0.9662
26		2480	21.157	1.14	22.30	0.0338	1.00	-0.9662

Results: The highest calculated Power Density, 0.0348 mW/cm², is based upon the EIRP measurements for the Lutron HWL Series LED Downlight. This level complies with the limit Table 1(ii) of 47 CFR Part 1.1310 at a separation distance of 20 cm.