BEC INCORPORATED

ANTENNA GAIN VALUE CALCULATION REPORT

REFERENCE DOCUMENT:
KDB 789033 D02

Legrand Model 064875
Wireless Motion Sensor

FCC ID: 2AU5D-064875

REPORT# BEC-2188-05

CUSTOMER:
Pass & Seymour/Legrand
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Revision History

Revision #	Description of Changes	Date of Changes	Date Released
0	Test Report Initial Release	N/A	05/18/2022

1.0 Administrative Information

1.1 General Information Table

Project Number	BEC-2188
Manufacturer	Legrand
Model Number Tested	064875
EUT Sample Type	FCC Test Code Radiated Sample
EUT Serial Number	None
EUT Sample Number	2188-01
EUT Firmware Version	testRadio_ntls.bin
Frequency of Operation	2405 – 2480 MHz
Antenna Gain Calculated Value	+ 5.60 dBi
Antenna Type	Inverted F
Modulation	O-QPSK
FCC Classification	Digital Transmission System (DTS)
Date Samples Received	02/27/2022
Sample Type and Condition Received	Production Unit Suitable for Test
EUT Description	Wireless Motion Detector
FCC ID	2AU5D-064875
FCC KDB Guidance Document	KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Section G 2(d)

1.2 Antenna Gain Value Calculation (EIRP Minus Maximum Conducted Output Power)

Antenna Gain Value is calculated as the difference between the Radiated EIRP measurement value of the Highest Peak Corrected Fundamental Tx Frequency Minus the Highest Peak Corrected Maximum Conducted Output Power.

EIRP (dBm): **11.05** dBm
Maximum Conducted Output Power (dBm): - **5.45** dBm
Calculated Antenna Gain **+ 5.60 dBi**

1.3 EIRP (dBm)

"EIRP" is calculated using the following KDB Guidance found in KDB 789033 D02 General UNII Test Procedures New Rules v02r01 Section G 2(d). Highest Peak Corrected Fundamental Tx Frequency converted from dBuV/m to dBm by subtracting 95.2 to get EIRP in (dBm).

d) If *radiated* measurements are performed, field strength is then converted to EIRP as follows:

(i) EIRP = ((E×d)^2) / 30

where:

- E is the field strength in V/m;
- d is the measurement distance in m;
- EIRP is the equivalent isotropically radiated power in W.

(ii) Working in dB units, the preceding equation is equivalent to:

EIRP[dBm] = E[dBµV/m] + 20 log (d[m]) − 104.77

(iii) Or, if d is 3 m:

EIRP[dBm] = E[dBµV/m] − 95.2

The Settings on the Measurement Analyzer for measuring the Fundamental Tx Frequency were:

Zigbee Radio, O-QPSK modulation			
Spec Analyzer Settings			ANSI C63.10 requirement
Span	20	MHz	≥ 3 X RBW
RBW	1	MHz	RBW ≥ DTS BW
VBW	3	MHz	≥ 3 X RBW
Sweep	5	ms	Auto

Highest Peak Corrected Fundamental Tx Frequency=**104.8** dBuV/m

Fundamental Tx Frequency	Peak Level Uncorrected	Axis (EUT)	Ant Polarity	Turntable Angle	Antenna Height	Correction Factor	Peak Corrected Total
GHz	dBuV/m	X/Y/Z	H/V	degrees	cm	dB	dBuV/m
2.405	111.70	Y	V	291	129	-5.45	106.25

106.25 dBuV/m minus 95.2= **11.05 dBm** **(EIRP Final)**

1.4 Maximum Conducted Output Power (dBm)

Maximum Conducted Output Power at the same Highest Tx Fundamental Frequency of 2.440 GHz during Bench testing of the EUT radio.

The Settings on the Measurement Analyzer for measuring the Fundamental Tx Frequency were:

Zigbee Radio, O-QPSK modulation			
Spec Analyzer Settings			ANSI C63.10 requirement
Span	10	MHz	≥ 3 X RBW
RBW	3	MHz	RBW ≥ DTS BW
VBW	10	MHz	≥ 3 X RBW
Sweep	5	ms	Auto

Maximum Conducted Output Power at the same Highest Tx Fundamental Frequency of 2.440 GHz during Bench testing of the EUT radio= **5.45 dBm (Maximum Conducted Output Power Final)**

Channel	Modulation	Frequency (MHz)	Measured Level	Cable # 962 Loss	Total	
					dBm	Watts
11	O-QPSK	2405.0	4.85	0.47	5.32	0.0034
18		2440.0	4.85	0.47	5.32	0.0034
26		2480.0	4.98	0.47	5.45	0.0035