Test Report # 318065C

Equipment Under Test:	Lumina 0-10VDC RF Wall Dimmer Lumina RF Wireless Load Control 0-10V Dimmer
Test Date(s):	12/17/18
Prepared for:	Dmitriy Moskovkin Leviton Manufacturing Co., Inc. Energy Management, Controls and Automation (EMC&A) 20497 SW Teton Avenue Tualatin, OR 97062

Report Issued by: Shane Dock, EMC Engineer

Signature:

Date: 3/24/2020

Report Reviewed by: Adam Alger, Quality Manager

Signature:

Date: 3/6/2020

Report Constructed by: Shane Dock, EMC Engineer

Signature:

Date: 3/21/2019

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Laird Technologies Test Services in Review

The Laird Technologies, Inc. laboratory located at W66 N220 Commerce Court Cedarburg, Wisconsin, 53012 USA is recognized through the following organizations:

TESTING CERT #1255.01

A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025: 2005 with Electrical (EMC) Scope
A2LA Certificate Number: 1255.01
Scope of accreditation includes all test methods listed herein, unless otherwise noted.

Federal Communications Commission (FCC) – USA

Accredited recognition of two 3 meter Semi-Anechoic Chambers

Accredited Test Firm Registration Number: 953492

Government of Canada

Innovation, Science and Economic Development Canada

ISED Site listing of two 3 meter Semi-Anechoic Chambers based on RSS-GEN – Issue 4
File Number: IC 3088A-2
File Number: IC 3088A-3

1 Test Report Summary

During **12/17/18** the Equipment Under Test (EUT), **Various EUT's (See Section 2)**, as provided by **Leviton Manufacturing Co., Inc.** was tested to the following requirements:

Requirement	Description	Specification	Method	Result
FCC Part 1.1307, 2.1091, 2.1093	RF Exposure and equipment authorization requirements	Reported	FCC KDB 447498	Reported
ISED Canada RSS-102	Radiofrequency Radiation Exposure Evaluation: Portable	Reported	RSS-102 Section 2.5.2	Reported

Notice:

The results relate only to the item tested and described in this report. Any modifications made to the equipment under test after the specified test date(s) may invalidate the data herein.

If the resulting measurement margin is seen to be within the uncertainty value, as listed in this report, the possibility exists that this unit may not meet the required limit specification if subsequently tested.

2 CLIENT INFORMATION

Company Name	Leviton Manufacturing Co., Inc.
Contact Person	Dmitriy Moskovkin
Address	20497 SW Teton Ave Tualatin, OR 97062

2.1 Equipment Under Test (EUT) Information

The following information has been supplied by the client

Product Name	Lumina 0-10VDC RF Wall Dimmer Lumina RF Wireless Load Control 0-10V Dimmer
Model Number	ZS057-D0Z ZS057-30Z LU107-DNW
Serial Number	Engineering Sample
FCC/IC Number	FCC: QGH-B167601 IC: 2473A-B167601

2.2 Product Description

ZS057-D0Z, ZS057-30Z: Zigbee 2.4GHz Decora Digital Wall Station with switch and raise/lower control. 50/60Hz, 5A Load, 0-10V Sinking, 50mA .

Load Controller 0-10VDC Dimmer. 50/60Hz, 4-10A Load, 0-10V Sinking, 50mA

2.3 Modifications Incorporated for Compliance

None noted at time of test

2.4 Deviations and Exclusions from Test Specifications

None noted at time of test

2.5 Additional Information – ZS057-D0Z, ZS057-30Z, LU107-DNW

Radios for the D0Z, 30Z are identical. Channels tested are 11, 18, and 26, all at the maximum power setting of 20. EUT programmed with Simplicity Studio through a serial connection. Unit 30Z uses 347 VAC, while D0Z uses 277 VAC. In addition, a load controller (LU107-DNW) was also tested, which features a different enclosure.

Low – Channel 11 – 2405 MHz

Mid – Channel 18 – 2440 MHz

High – Channel 25 – 2475 MHz

3 REFERENCES

Publication	Edition	Date
CFR 47 Part 15	-	2018
ANSI C63.10	-	2013
RSS-247	2	2017
RSS GEN	5	2014
RSS-102	5	2015
CFR 47 Part 1 and 2	-	2018
FCC KDB 447498	6	2015

4 UNCERTAINTY SUMMARY

Using the guidance of the following publications the calculated measurement uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level, using a coverage factor of k = 2.

References	Version / Date
CISPR 16-4-1	Ed. 2 (2009-02)
CISPR 16-4-2	Ed. 2 (2011-06)
CISPR 32	Ed. 1 (2012-01)
ANSI C63.23	2012
A2LA P103	February 4, 2016
A2LA P103c	August 10, 2015
ETSI TR 100-028	V1.3.1 (2001-03)

Measurement Type	Configuration	Uncertainty ±
Radiated Emissions	Biconical Antenna	5.0 dB
Radiated Emissions	Log Periodic Antenna	5.3 dB
Radiated Emissions	Horn Antenna	4.7 dB
AC Line Conducted Emissions	Artificial Mains Network	3.4 dB
Telecom Conducted Emissions	Asymmetric Artificial Network	4.9 dB
Disturbance Power Emissions	Absorbing Clamp	4.1 dB
Radiated Immunity	3 Volts/meter	2.2 dB
Conducted Immunity	CDN/EM/BCI	2.4/3.5/3.4 dB
EFT Burst/Surge	Peak pulse voltage	164 volts
ESD Immunity	15 kV level	1377 Volts

Parameter	ETSI U.C. ±	U.C. ±
Radio Frequency, from F0	$1x10^{-7}$	$0.55x10^{-7}$
Occupied Channel Bandwidth	5 %	2 %
RF conducted Power (Power Meter)	1.5 dB	1.2 dB
RF conducted emissions (Spectrum Analyzer)	3.0 dB	1.7 dB
All emissions, radiated	6.0 dB	5.3 dB
Temperature	1° C	0.65° C
Humidity	5 %	2.9 %
Supply voltages	3 %	1 %

5 TEST DATA

5.1 Fundamental Emission – ZS057-D0Z, ZS057-30Z, LU107-DNW

Operator	Shane Dock
Test Date	3/13/18 – 3/14/18
Location	Conducted RF Area
Temp. / R.H.	72 deg F/29% RH
Requirement	FCC: 15.247 (b)(3) IC: RSS-247 5.4 (d)
Method	KDB 558074 Section 9.1.1

Limits: (Measured as Average)

Maximum Conducted Output Power (dBm)	Maximum Conducted Output Power (watts)
30	1

Test Parameters

Frequency	2405-2480 MHz
Settings	Low, Mid, and High Channels Measured
Settings	Unit measured at full power

Table

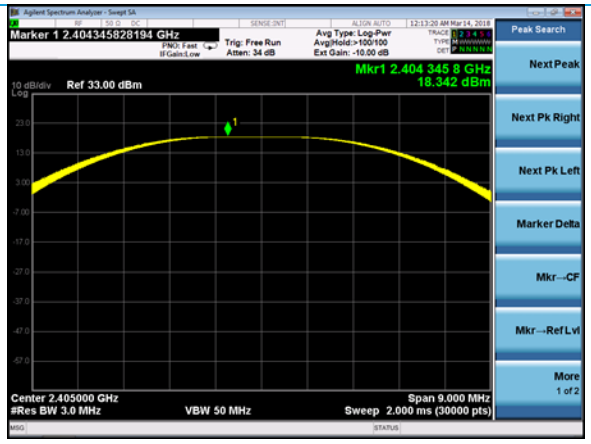
Max Power (dBm)

Channel	Low	Mid	High
Output Power (dBm)	18.342	18.145	18.153

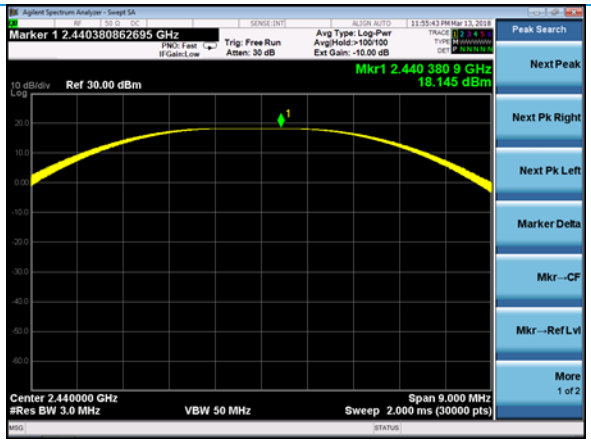
Worst Case Margin = Limit - Closest Measurement = 30.0 dBm – 18.342 dBm = 11.658 dB

Plots

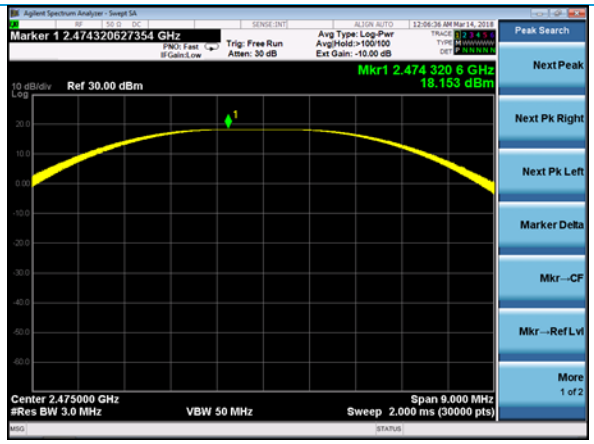
Maximum Power



Low Channel



Mid Channel



High Channel

6 EXCLUSION CALCULATION

6.1 FCC

Compliance to 2.1091 is to be demonstrated via MPE calculations at a customer-provided 20 cm separation distance. Unit ZS10S-D0Z is worst-case.

Output Power (dBm) = Measured Value (dBm) + Antenna Gain (dBi) + Tune-up Tolerance (dB)

Output Power = 18.3 dBm + 1.5 dBi + 0.4 dB = 20.2 dBm = 104.7 mW

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{PG}{4\pi R^2}$$

where: S = power density
P = power input to the antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal:	18.70	(dBm)
Maximum peak output power at antenna input terminal:	74.131	(mW)
Antenna gain(peak):	1.5	(dBi)
Maximum antenna gain:	1.413	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2405	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	1	(mW/cm^2)
Power density at prediction frequency:	0.020832	(mW/cm^2)
Maximum allowable antenna gain:	18.3	(dBi)

As the power density value meets the MPE limit at the prediction frequency, the unit complies.

6.2 Industry Canada

Per RSS-102 Section 2.52:

- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;

For 2437 MHz, the Exemption Limit is .0131* f(MHz)^.6834 = 2.7 W

Since 104.7 mW < 2.7 W, the EUT is exempt from routine evaluation.

7 Revision History

Version	Date	Notes	Person
V0	12/18/18	First Draft	Shane Dock
V1	1/20/19	Further Updates	Shane Dock
V2	1/24/19	More Revisions	Shane Dock
V3	3/21/19	Final Draft	Shane Dock
V4	12/2/19	Added Load Controllers	Shane Dock
V5	3/5/20	Split out EUT's	Shane Dock

END OF REPORT