



BEC INCORPORATED

CERTIFICATION APPLICATION TEST REPORT

TEST STANDARDS:

**FCC Part 15 Subpart C, ISED RSS-Gen, ISED RSS-247
DTS Intentional Radiator**

**Lutron Model XXX-MWCL
LED Lighting Controller with 802.15.4 Radio**

**FCC ID: JPZ0155
ISED ID: 2851A-JPZ0155**

REPORT BEC-2328-01

TEST DATES: 07/15/2024 – 08/01/2024

CUSTOMER:

**Lutron Electronics Company Incorporated
7200 Suter Road
Coopersburg, PA 18036**

PREPARED BY:

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REVIEWED and APPROVED BY:

Steve Fanella, Quality Manager

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Notice to Customer

This report and any recommendations it contain represent the result of BEC’s testing and assessment on behalf of your company. Testing has been conducted according to accepted engineering standards and practices. This report reflects testing and assessment of product samples provided by your company and may not reflect the characteristics of other samples, especially those produced at different times. This report and its findings and recommendations, if implemented, should not be construed as an assurance or implied warranty for the continuing electromagnetic compatibility (EMC) of the product. **BEC shall not be liable for incidental or consequential damages, even if advised of the possibility thereof.**

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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	08/15/2024
1	Edited Section 4.5 to reflect the correct Low, Middle and High Transmit Frequencies tested. Added Antenna Conducted Test Cable BEC-962 to Appendix A	09/12/2024	09/12/2024
2	Edited the Appendix A to reflect the current correct Calibration Date and Due Date for Cable BEC-962	9/27/2024	09/27/2024
3	Corrected the RSS-247 from Issue 2 to Issue 3	9/30/2024	09/30/2024



1.0 Administrative Information

1.1 Project Details

Project Number	BEC-2328	
EUT Manufacturer	Lutron Electronics	
EUT Model Number	RRL-MWCL	
EUT Description	LED Lighting Controller with Zigbee Radio	
EUT Sample Types	Antenna Conducted Test Sample	Radiated Emissions Test Sample
EUT Sample Numbers	2328-01	2328-02
EUT Serial Numbers	02F257C5	02F257C4
Power Supply Manufacturer	Lutron Electronics	
Power Supply Model Number	LU-PH3-A	
Power Supply Serial Number	04 184827 07320 6 MC 1660	
Power Supply Sample Number	2328-03	
FCC ID	JPZ0155	
ISED ID	2851A-JPZ0155	
Frequency of Operation	2400 – 2480 MHz	
Frequencies Tested	Low (2405 MHz), Middle (2440 MHz), High (2480 MHz)	
Antenna Gain	+ 4.0 dBi / + 1.85 dBd	
Antenna Type	Planar Inverted-F PCB Trace Antenna (PIFA)	
Modulation	O-QPSK	
FCC Classification	Digital Transmission System (DTS)	
Date Samples Received	07/02/2024	
EUT Firmware Version	2.005.004	
Sample Types	Production Units Suitable for Test	
Applicable FCC Rules	FCC Rules Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz Direct Sequence System	
Applicable ISED Rules	RSS-Gen: General Requirements for Compliance of Radio Apparatus & RSS-247: Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices	



1.2 Preface

This report documents product testing conducted to verify compliance of the specified EUT with applicable standards and requirements as identified herein. EUT, test instrument configurations, test procedures, and recorded data are generally described in this report. The reader is referred to the applicable test standards for detailed procedures. The following table summarizes the test results obtained during this evaluation.

1.3 Laboratory and Customer Information

Test Laboratory Location	BEC Incorporated 970 East High Street Pottstown, PA 19464
BEC Test Personnel	JR Fanella / Steve Fanella
BEC Laboratory Number FCC Registration	US1118
BEC Laboratory Number ISED Registration	7342A-1
Test Performed For	Lutron Electronics Company Incorporated 7200 Suter Road Coopersburg, PA 18036
Customer Technical Contacts	Keith Kennedy
Customer Reference Number	PO # 5332239



1.4 Measurement Uncertainty

Measurement	Measurement Distance	Frequency Range	Measurement Limit	Expanded Uncertainty
Radiated Disturbance	3 Meter	30 MHz – 1 GHz	Class B	4.63
Conducted Disturbance AC Mains	N/A	150 kHz – 30 MHz	Class A or B	2.69

No adjustments to measured data presented in this report are required because all values of uncertainty are less than the CISPR 16-4-2:2018 recommendations. These uncertainties have a coverage factor of $k = 2$, which yields approximately a 95% level of confidence for the near-normal distribution typical of most measurement results.

FCC Registered Test Site Number: US1118
 ISED Registered Test Site Number: 7342A-1

Test Measurement	ETSI TR 100 028 and CISPR 16-4-2 Limits	BEC Value
Radio Frequency	± 0.5 ppm	± 0.027 ppm
RF Power, Conducted	± 1.5 dB	± 1.45 dB
Conducted Spurious Emission of Transmitter, Valid up to 6 GHz	± 3 dB	± 0.9 dB
Radiated Emission of Transmitter, Valid up to 6 GHz	± 5.2 dB	± 4.87 dB
Radiated Emission of Receiver, Valid up to 6 GHz	± 5.2 dB	± 4.87 dB
Radiated Emission of Transmitter, Valid up to 18 GHz	± 5.5 dB	± 4.90 dB
Radiated Emission of Receiver, Valid up to 18 GHz	± 5.5 dB	± 4.90 dB
Occupied Bandwidth	± 5 %	± 2 %
Temperature	± 2.5 °C	± 0.5 °C
Humidity	± 10 %	± 2.5 %

These uncertainties have a coverage factor of $k = 1.96$ or $k = 2$, (which provide confidence levels of respectively 95 % and 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)). Principles for the calculation of measurement uncertainty are contained in ETSI TR 100 028 [i.3], in particular in annex D of ETSI TR 100 028-2 [i.3].



1.5 Test Result Summary Table

The Lutron Model RRL-MWCL LED Lighting Controller was tested and found to be compliant to the sections of the FCC Part 15 Subpart C and ISSED standards listed below:

Report Section	FCC Part 15, Subpart C	RSS-Gen	RSS-247	Test Description	Result
4.1	15.203	Annex A 10(g)		Antenna Requirement	PASS
4.2	15.204	8.3		External RF power amplifiers and antenna modifications	PASS
4.3	ANSI C63.10, Section 11.6			Duty Cycle	Measured
4.4	15.247(d)		5.5	DTS Emissions in non-restricted frequency Bands 30 MHz to 25 GHz Conducted Spurious Emission	PASS
4.5	15.205, 15.209 15.35(b)	8.1, 8.9, 8.10	3.3	DTS Emissions in restricted frequency Bands 30 MHz to 25 GHz Radiated Spurious Emission	PASS
4.6	15.247(a)(2)		5.2 (a)	6 dB Occupied Bandwidth	PASS
4.7	2.1049(h)	6.7		99% Occupied Bandwidth	PASS
4.8	15.247(b)(3)		5.4 (d)	Maximum Conducted Output Power and EIRP	PASS
4.9	15.247(e)		5.2 (b)	Antenna Port, Power Spectral Density	PASS
4.10	15.247(d)		5.5	Band Edge Measurement	PASS
4.11	15.207	8.8		AC Mains Conducted Emissions	PASS

Note: This report is for the Lutron Model XXX-MWCL which represents either the Model RRL-MWCL or Model HWL-MWCL. The Lutron model RRL-MWCL that was tested also covers the model HWL-MWCL. The only differences between the models are that they are marked differently for marketing purposes. They are identical in construction.



1.6 Condition of Received Sample

An evaluation of the EUT was conducted in order to verify test subject identity and condition and to ensure suitability for testing. No evidence of physical damage was noted. The test item condition was deemed acceptable for the performance of the requested test services.

1.7 Climatic Environment

The following were the general environmental conditions inside the laboratory during testing:

Temperature: $22^{\circ}\text{C} \pm 5^{\circ}\text{C}$

Humidity: $50\% \pm 20\%$

Barometric Pressure: $1010 - 1050\text{ mb} \pm 20\%$

1.8 Test Equipment

All test equipment is checked to manufacturer's specifications and, when applicable, have current N.I.S.T. traceable, ISO 9002 conforming certificates of calibration. Test equipment used for the tests described herein is listed in Appendix A.



2.0 Equipment Under Test

Unless otherwise noted in the individual test results sections, testing was performed on the EUT as follows.

2.1 EUT Description

The Lutron Model RRL-MWCL is a LED Lighting Controller. The controller is powered by a Lutron Model LU-PH3-A AC to DC power supply. This report is for the Lutron Model XXX-MWCL which represents either the Model RRL-MWCL or Model HWL-MWCL. The only differences between the models are that they are marked differently for marketing purposes. They are identical in construction.

2.2 Product Category

FCC Part 15, Subpart C (Section 15.247), ISED RSS-Gen, ISED RSS-247

2.3 Product Classification

Intentional Radiator Testing Requirements, DTS Operation within the band of 2400 – 2483.5 MHz.

2.4 Test Configuration

The Lutron Model RRL-MWCL LED Lighting Controller was powered at 24 V DC by a Lutron Model LU-PH3-A AC to DC power supply with an input voltage of 120 VAC / 60 Hz. The Lutron Model RRL-MWCL LED Lighting Controller Sample # 2328-01 with Sample # 2328-03 Supply was tested for all antenna conducted measurements. The Lutron Model RRL-MWCL LED Lighting Controller Sample # 2328-02 with Sample # 2328-03 Supply was tested for all conducted emission tests. The Lutron Model RRL-MWCL LED Lighting Controller Sample # 2328-02 with Sample # 2328-03 Supply was tested for all radiated emissions tests. The radio test software allowed the tester to choose the 802.15.4 transmissions of low Channel 11 (2405 MHz), middle Channel 18 (2440 MHz) or high Channel 26 (2480 MHz). The transmission was tested in maximum output power with the choice of transmitting with O-QPSK Modulation or without Modulation.

2.5 Test Configuration Rationale

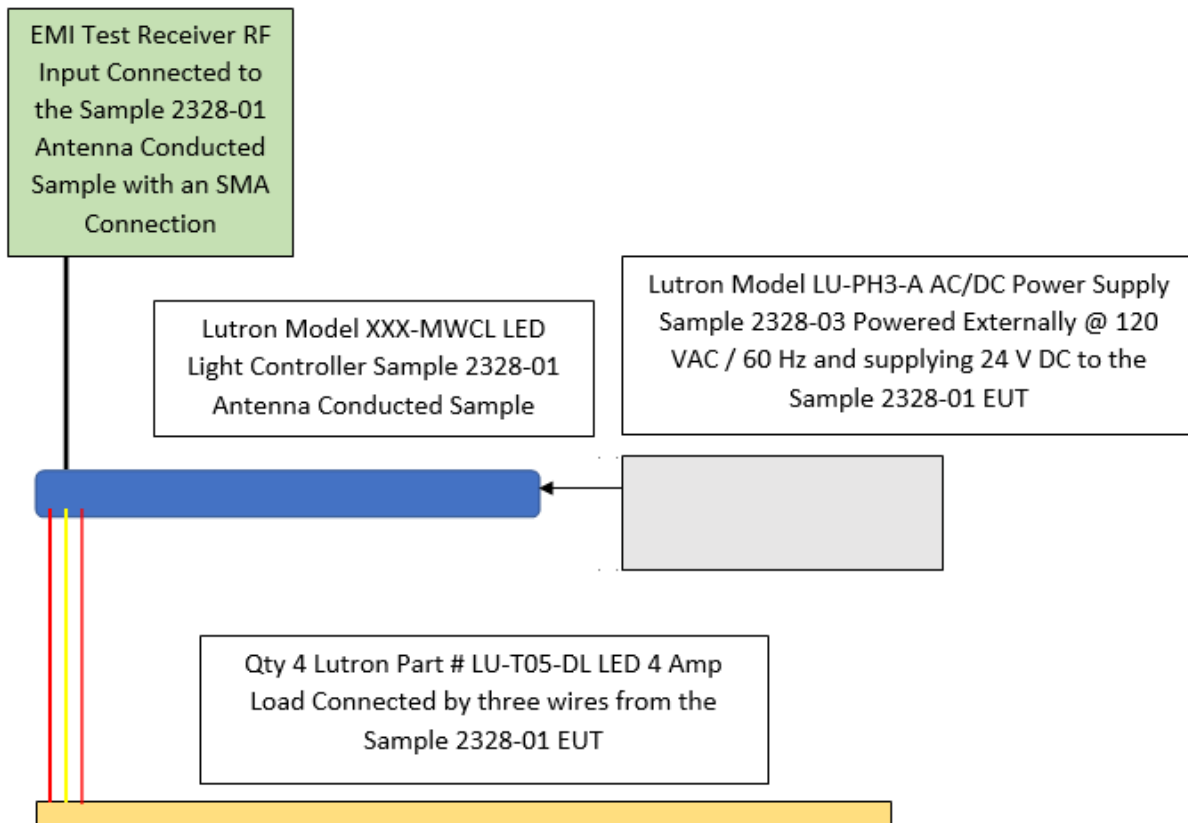
The modified radio of the Lutron Model RRL-MWCL LED Lighting Controller allows direct access to the output of the radio without a transmission antenna. The unmodified unit is factory produced with modified software for EMI test purposes.



2.6 Test Configuration Diagrams

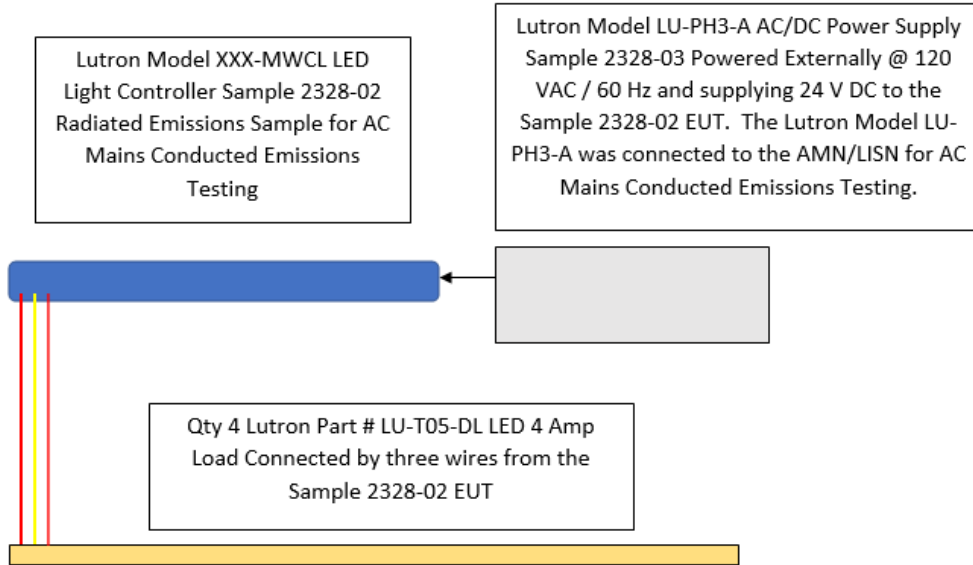
Block diagrams of the EUT configuration showing interconnection cables are illustrated below. The drawing shows the physical hardware layout used for the tests along with I/O cables and AC power distribution.

Antenna Conducted Test Configuration (modified with SMA connector in place of antenna)

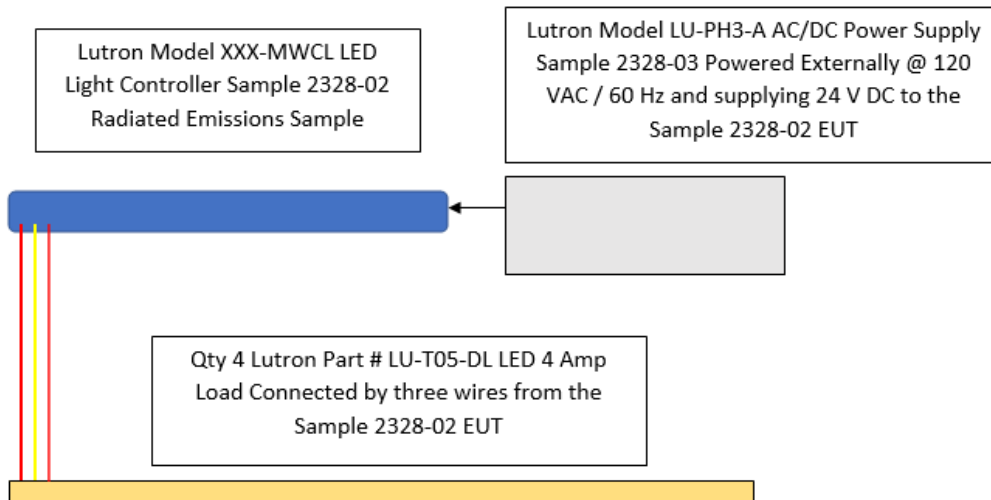




Conducted Emission AC Mains Test Configuration (un-modified EUT)



Radiated Emission Test Configuration (un-modified EUT)





2.7 EUT Information, Interconnection Cabling and Support Equipment

EUT Hardware

Description	Manufacturer	Model	Serial Number	Sample Number
LED Lighting Controller Antenna Conducted Sample	Lutron Electronics	RRL-MWCL	02F257C5	2328-01
LED Lighting Controller Radiated Emissions Sample	Lutron Electronics	RRL-MWCL	02F257C4	2328-02
AC/DC Power Supply	Lutron Electronics	LU-PH3-A	04 184827 07320 6 MC 1660	2328-03

Interconnection Cable List

Manufacturer	Model	Type	Shielding	Length	Description
Unknown	Unknown	Unknown	None	20 cm	Power Control Red Wire From RRL-MWCL to the LED Light Strip
Unknown	Unknown	Unknown	None	20 cm	Power Control Yellow Wire From RRL-MWCL to the LED Light Strip
Unknown	Unknown	Unknown	None	20 cm	Power Control Red/White Wire From RRL-MWCL to the LED Light Strip
Unknown	Unknown	Unknown	None	20 cm	Power Control Red and Black Wires From LU-PH3-A Supply to the Lutron RRL-MWCL Lighting Controller

Support Equipment

Description	Manufacturer	Model	Serial Number
Qty 4-120 Piece LED Strip Light	Lutron Electronics	2835-192D-24V- YWDG-IP20	No Serial Number
Laptop Computer- Programming the EUT Radio Transmitter Software	Dell	Inspiron 15-3567	E4B4B16C-F475-4A3F- 9795-A06C5CB4AB43



2.8 Test Signals and Test Modulation

By design this product does not have an external Modulation input connector, therefore, normal operating modulation was used for all testing reported herein. The only test where modulation was not active was during testing of the Maximum Peak Power Output FCC Section 15.247(b) (3) (Section 4.6 of this report) to ensure that the un-modulated carrier was not higher than the modulated carrier.

The control unit in this product is a digital frequency transmitter. The EUT transmits to a discrete frequency on a specific channel. The Lutron Model RRL-MWCL LED Lighting Controller has 16 Channels available. The 16 Channels and frequencies that can be transmitted by the EUT are as follows:

Zigbee Channel	Frequency (MHz)		Zigbee Channel	Frequency (MHz)
11	2405		19	2445
12	2410		20	2450
13	2415		21	2455
14	2420		22	2460
15	2425		23	2465
16	2430		24	2470
17	2435		25	2475
18	2440		26	2480

For the required testing, the EUT was configured to transmit at low Channel 11 (2405 MHz), middle Channel 18 (2440 MHz) and high Channel 26 (2480 MHz). The EUT operates with a 2.3 MHz Operational Channel Bandwidth. The EUT has the option to be programmed to operate with maximum output power with O-QPSK modulation or with Constant Wave (CW) signal.

2.9 Antenna Gain

The antenna gain was documented by Lutron at + 4.0 dBi or + 1.85 dBd.

2.10 Grounding

The EUT ground is provide by the Lutron Model LU-PH3-A AC/DC Power Supply.

2.11 EUT Modifications

An SMA connector was added to replace the antenna on the PCB of the Lutron Model RRL-MWCL LED Lighting Controller Antenna Conducted Test Sample 2328-01. No other modifications were done on any of the other samples.



3.0 Applicable Requirements, Methods, and Procedures

3.1 Applicable Requirements

The results of the measurement of the radio disturbance characteristics of the EUT described herein may be applied and where appropriate, provide a presumption of compliance to one or more of the following requirements or to other requirements at the discretion of the customer, regulatory agencies, or other entities.

3.1.1 FCC Requirements

Code of Federal Regulations: Title 47 – Telecommunication
Chapter I - Federal Communications Commission
Sub-chapter A – General
Part 15 – Radio Frequency Devices
Subpart C - Intentional Radiators
15.247 Operation within the bands 902-928 MHz,
2400-2483.5 MHz, and 5725-5850 MHz.

3.1.2 Innovation, Science and Economic Development Canada (ISED)

RSS-Gen Issue 5 March 2019 Amendment 1: General Requirements for Compliance of Radio Apparatus

RSS-247 Issue 3 August 2023: Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

3.1.3 Basic Test Methods and Test Procedures

KDB Document 558074 D01 15.247 Meas Guidance v05r02, Guidance for Performing Compliance Measurements on Digital Transmission Systems, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating under Section 15.247 of the FCC Rules.

ANSI C63.10-2020, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

3.1.4 Deviations or Exclusions from the Requirements

No deviations or exclusions were made.



4.0 Test Results

4.1 Antenna Requirement (47 CFR 15.203)(RSS-GEN ANNEX A (10)(g))

The antenna used by the Lutron Model RRL-MWCL LED Lighting Controller is a Planar Inverted-F PCB Trace Antenna (PIFA). There are no detachable parts of the antenna. The antenna is not replaceable, nor changeable, and therefore complies with the requirements of this section.

4.2 External RF power amps/antenna modifications (47 CFR 15.204)(RSS-GEN 8.3)

There are no RF power amplifier kits available to be used with the Lutron Model RRL-MWCL LED Lighting Controller. There are no detachable parts of the antenna. The antenna is not replaceable, nor changeable, and therefore complies with the requirements of this section.

4.3 Duty Cycle of the DTS Fundamental Transmission

The duty cycle of the DTS transmission shall be greater than or equal to 98%. This ensures that the various emissions measured for this certification test will be made with the transmitter fully active. Duty cycles less than 98% can be used and a duty cycle correction factor can be calculated to reduce the peak level of the emission for radiated emission tests. The procedure of ANSI C63.10, Section 11.6 can be used to evaluate the duty cycle of this device.

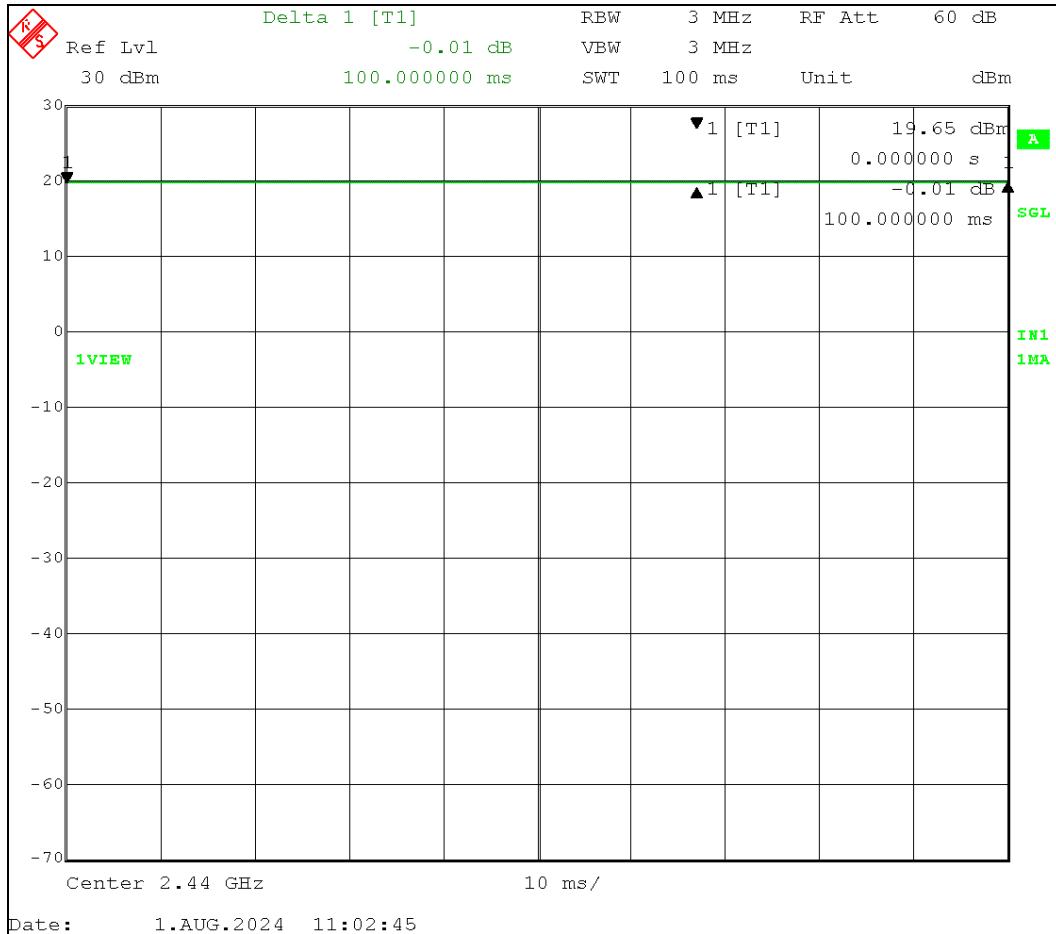
Spectrum Analyzer Settings

OBW	2.3	MHz
RBW	3	MHz
VBW	3	MHz
Span	Zero	MHz
Sweep Time	100	us
Attenuation	60	dB
Reference Level	30	dBm



4.3.1 Duty Cycle Measurement Results (08/01/2024)

BEC Incorporated tested the duty cycle of the 802.15.4 Radio from the Lutron Model RRL-MWCL LED Lighting Controller. Transmission was set to maximum output at middle channel of 2440 MHz with O-QPSK modulation using the radio control test software. The Duty Cycle of the transmitter was measured to be 100%.





4.4 DTS Antenna Conducted Spurious Emissions in Non-restricted Frequency Bands (FCC Section 15.247(d), RSS-247 Sec.5)

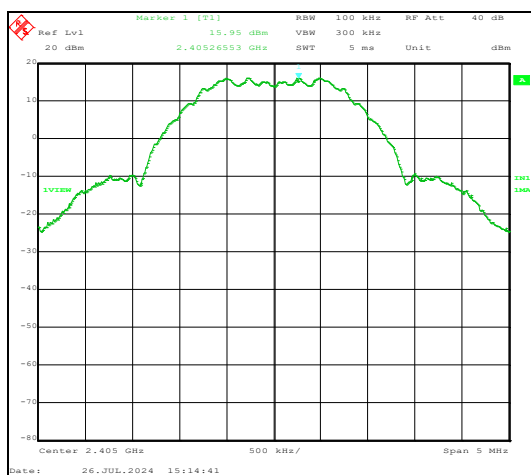
4.4.1 DTS Antenna Conducted Spurious Emissions in Non-restricted Frequency Bands Test Procedure

A measurement of the emissions in non-restricted frequency bands was made at the low Frequency 2405.0 MHz (Channel 11), middle Frequency 2440.0 MHz (Channel 18) and high Frequency 2480.0 MHz (Channel 26). The EUT was set to transmit a signal at maximum output power with O-QPSK modulation. The procedure for the test is ANSI C63.10, Section 11.11. The frequency spectrum from 30 MHz to 25 GHz was divided into three bands: 30-1000 MHz, 1 – 10 GHz and 10 – 25 GHz. Each of the three fundamental test frequencies was measured for the reference value to determine the -20 dBc value.

Spectrum Analyzer Settings

Emission Level: Zigbee Radio, O-QPSK modulation			
Spectrum Analyzer Settings		ANSI C63.10 requirement	
Span	Varies	-	Encompass spectrum divided into bands
RBW	100 kHz		47 CFR Part 15.247 (d)
VBW	300 kHz		$\geq 3 \times \text{RBW}$
Sweep	Varies		Auto

4.4.2 DTS Antenna Conducted Spurious Emissions in Non-restricted Frequency Bands Reference Measurement Channel 11 (07/26/2024)

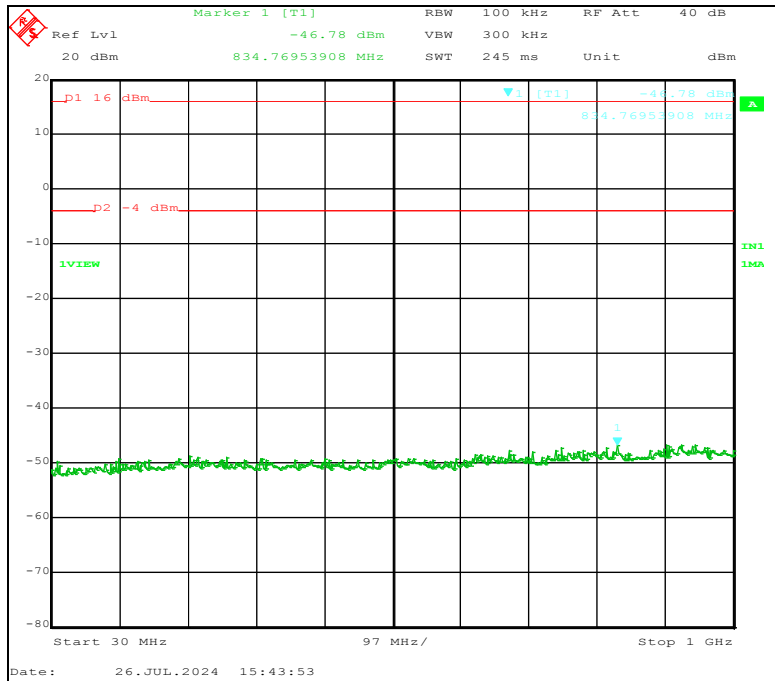


The peak level of 16 dBm is the maximum peak output of the Lutron Model RRL-MWCL LED Lighting Controller. The conducted spurious emissions from the antenna port must be 20 dB down from this peak. The resultant limit is therefore -4.0 dBm and is displayed on the plots below.

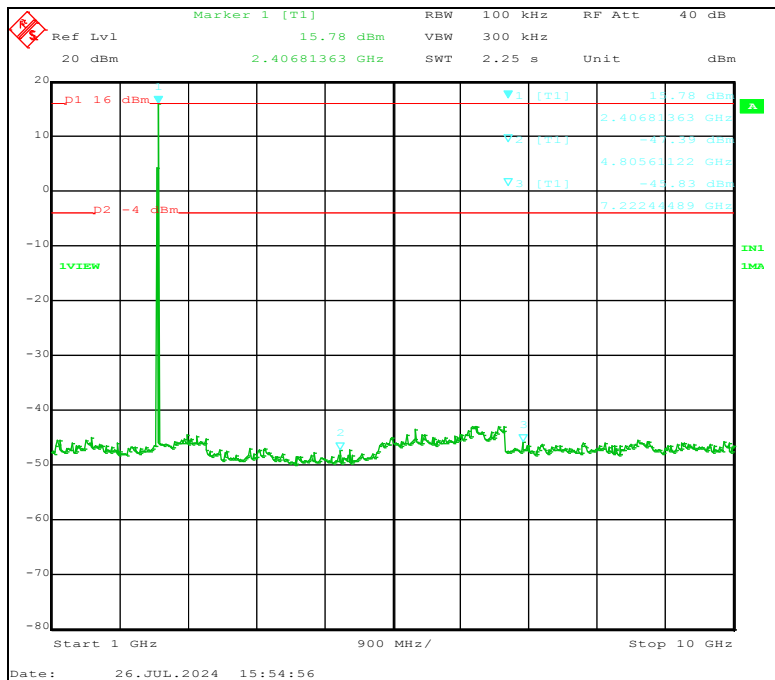


4.4.3 DTS Antenna Conducted Spurious Emissions in Non-restricted Frequency Bands Channel 11 Test Results (07/26/2024)

30 MHz – 1000 MHz

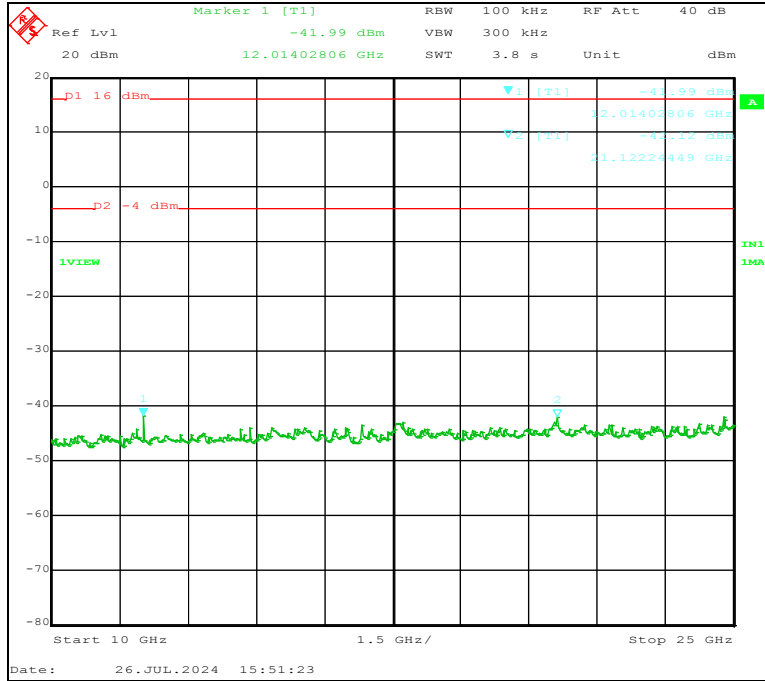


1 GHz – 10 GHz





10 GHz – 25 GHz

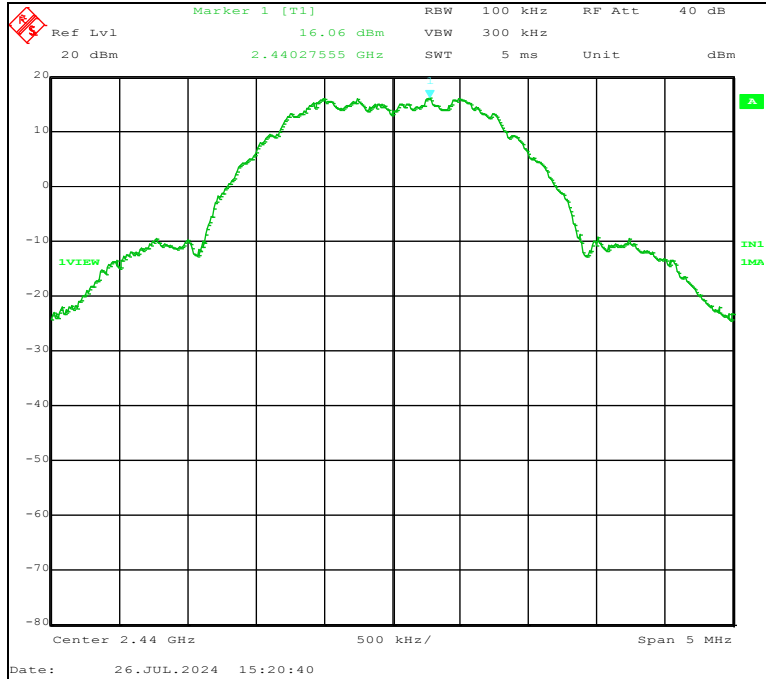


Test Results of Highest Emissions: Channel 11 (Frequency 2405.0 MHz)

Channel Frequency	Frequency	Peak	20 dB below Max Peak Reference - 20 dBc	Margin	Result
MHz	MHz	dBm	dBc	dB	
2405.0	834.770	-46.78	-4.00	-42.78	Pass
	4805.611	-47.39	-4.00	-43.39	Pass
	7222.445	-45.83	-4.00	-41.83	Pass
	21122.245	-42.12	-4.00	-38.12	Pass



4.4.4 DTS Antenna Conducted Spurious Emissions in Non-restricted Frequency Bands Reference Measurement Channel 18 (07/26/2024)

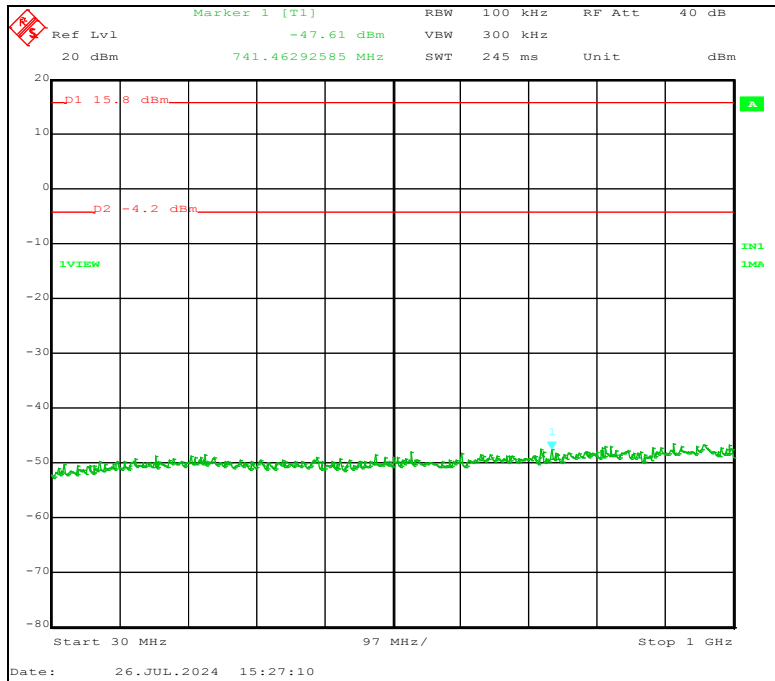


The peak level of 16.1 dBm is the maximum peak output of the Lutron Model RRL-MWCL LED Lighting Controller. The conducted spurious emissions from the antenna port must be 20 dB down from this peak. The resultant limit is therefore -3.9 dBm and is displayed on the plots below.

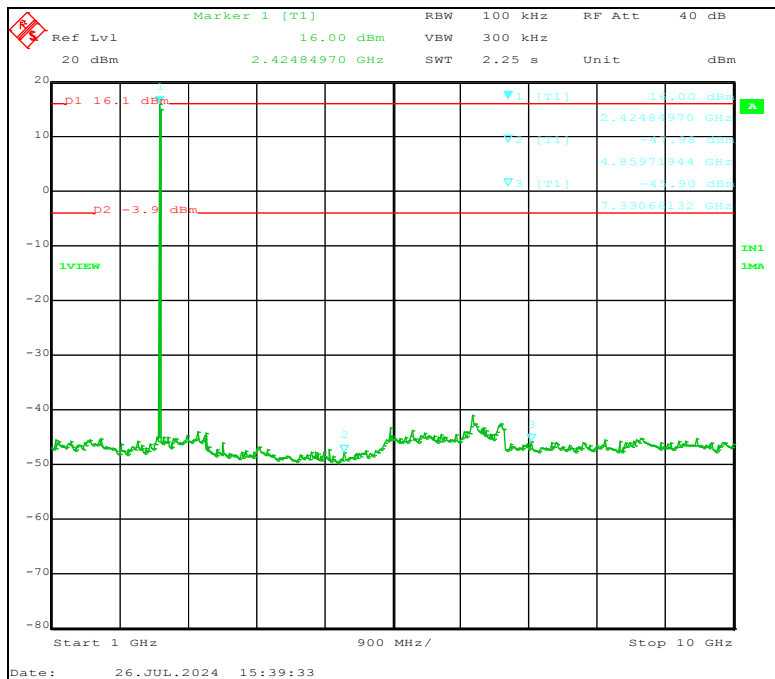


4.4.5 DTS Antenna Conducted Spurious Emissions in Non-restricted Frequency Bands Channel 18 Test Results (07/26/2024)

30 MHz – 1000 MHz

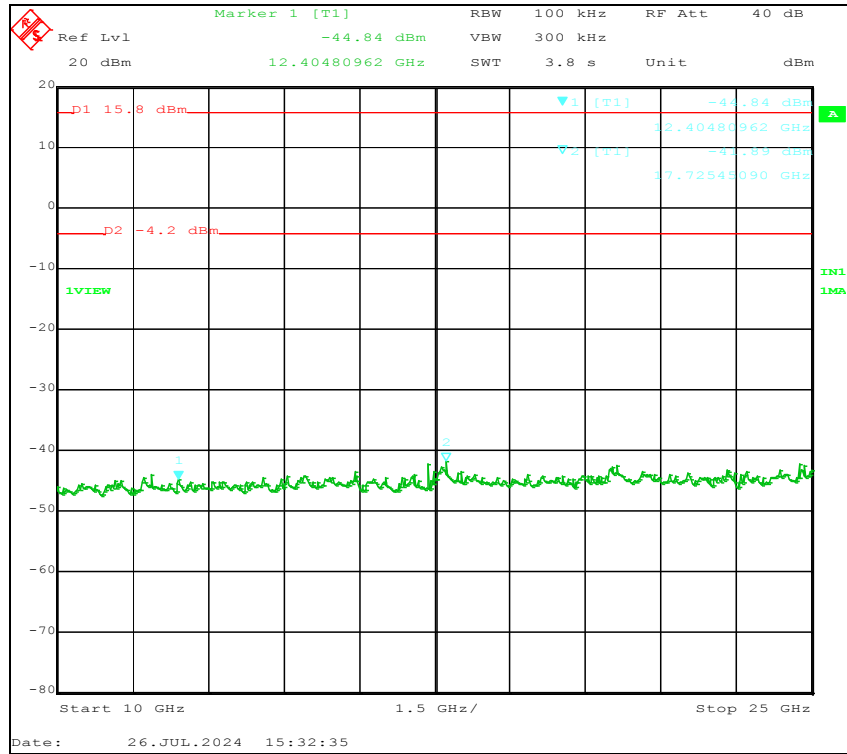


1 GHz – 10 GHz





10 GHz – 25 GHz

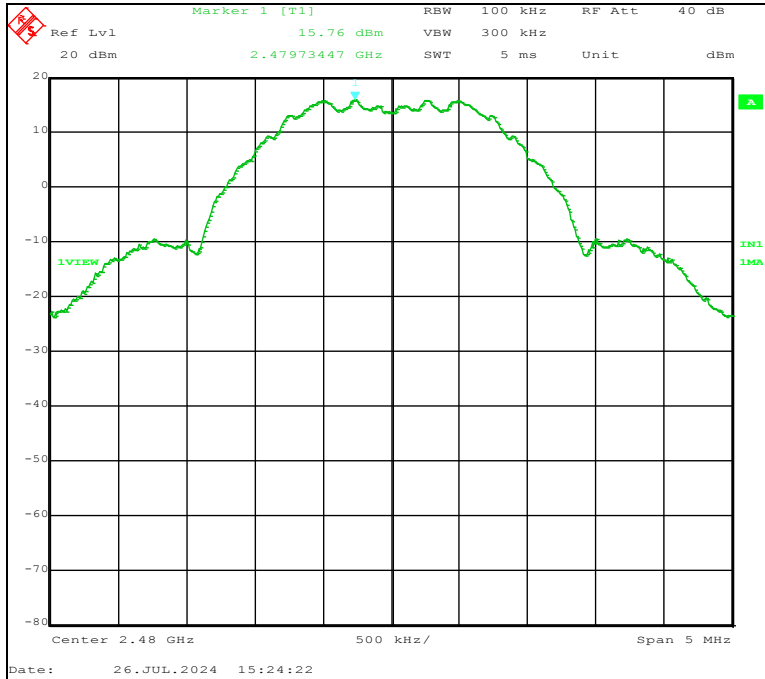


Test Results Table Highest Emissions: Channel 18 (2440.0 MHz)

Channel Frequency	Frequency	Peak	20 dB below Max Peak Reference - 20 dBc	Margin	Result
MHz	MHz	dBm	dBc	dB	
2440.0	741.463	-47.61	-3.90	-43.71	Pass
	4805.972	-45.90	-3.90	-42.00	Pass
	12404.809	-44.84	-3.90	-40.94	Pass
	17725.451	-41.89	-3.90	-37.99	Pass



4.4.6 DTS Antenna Conducted Spurious Emissions in Non-restricted Frequency Bands Reference Measurement Channel 26 (07/26/2024)

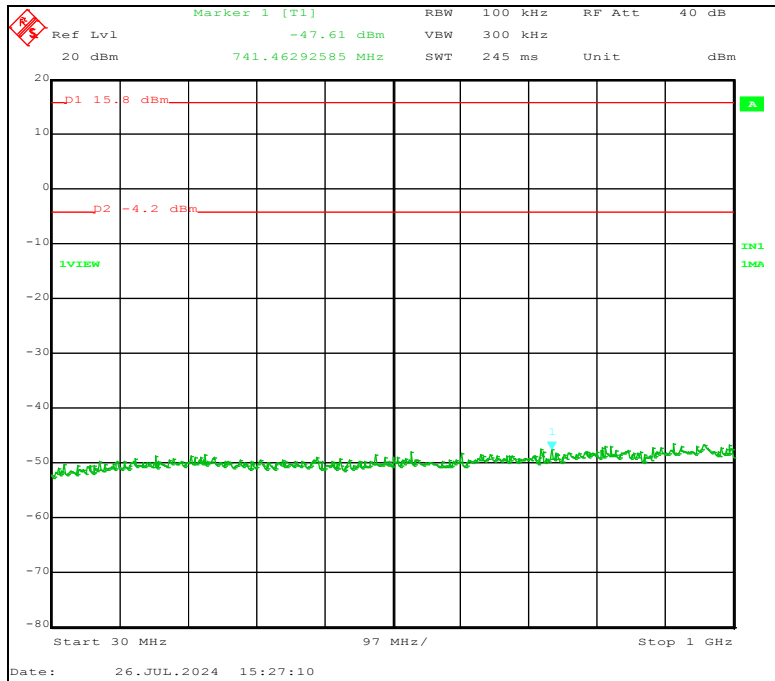


The peak level of 15.8 dBm is the maximum peak output of the Lutron Model RRL-MWCL LED Lighting Controller. The conducted spurious emissions from the antenna port must be 20 dB down from this peak. The resultant limit is therefore -4.2 dBm and is displayed on the plots below.

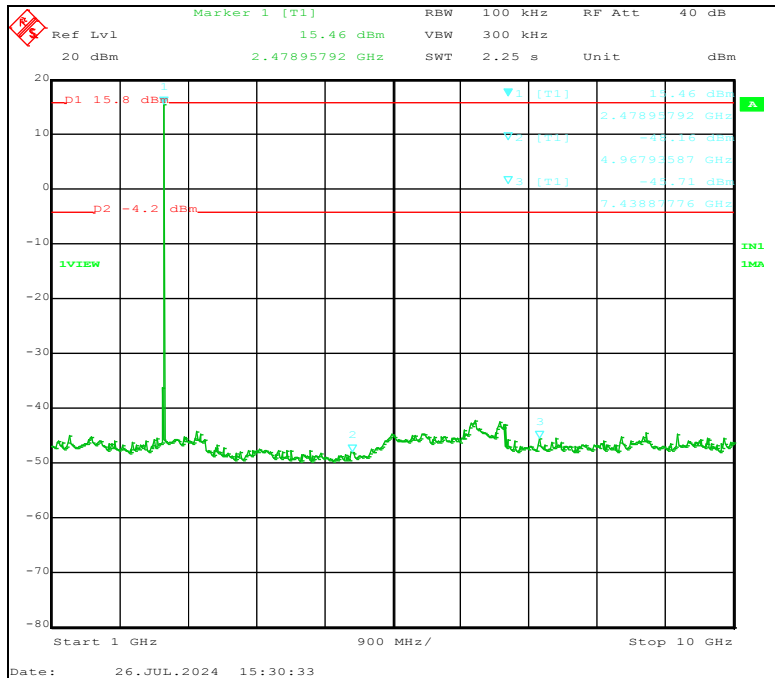


4.4.7 DTS Antenna Conducted Spurious Emissions in Non-restricted Frequency Bands Channel 26 Test Results (07/26/2024)

30 MHz – 1000 MHz

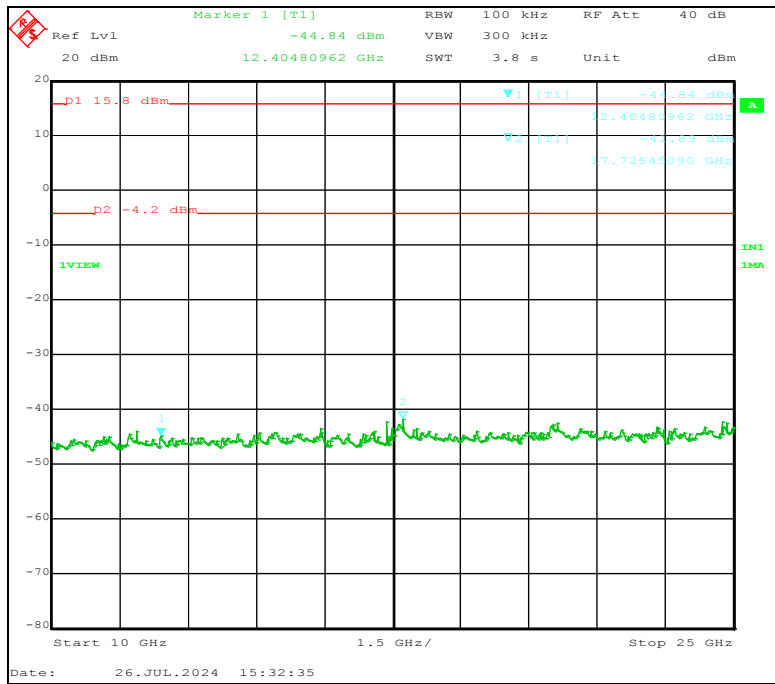


1 GHz – 10 GHz





10 GHz – 25 GHz



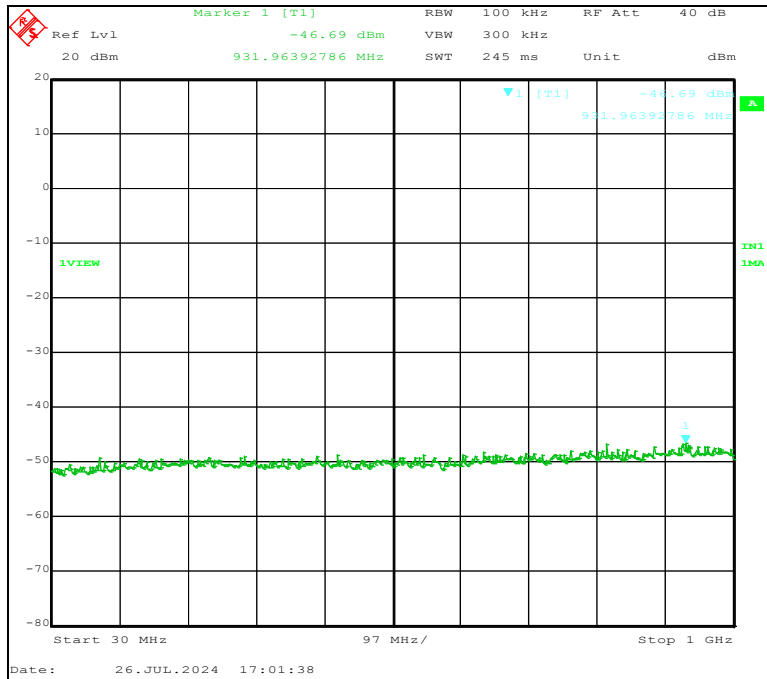
Test Results of Highest Emissions: Channel 26 (Frequency 2480.0 MHz)

Channel Frequency	Frequency	Peak	20 dB below Max Peak Reference - 20 dBc	Margin	Result
MHz	MHz	dBm	dBc	dB	
2480.0	741.463	-47.61	-4.20	-43.41	Pass
	4967.936	-48.16	-4.20	-43.96	Pass
	7438.878	-45.71	-4.20	-41.51	Pass
	12404.810	-44.84	-4.20	-40.64	Pass

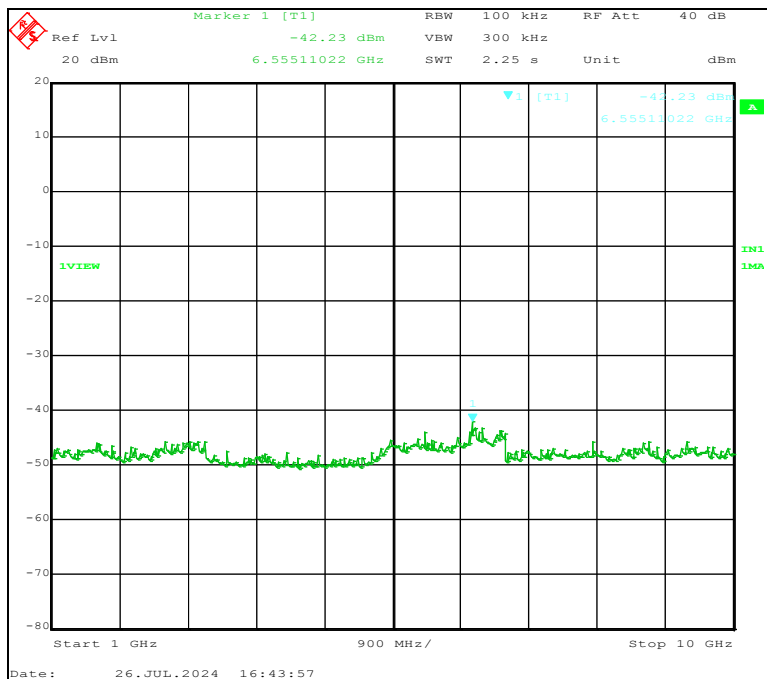


4.4.8 DTS Antenna Conducted Spurious Emissions in Non-restricted Frequency Bands Rx Mode Test Results (07/26/2024)

30 MHz – 1000 MHz

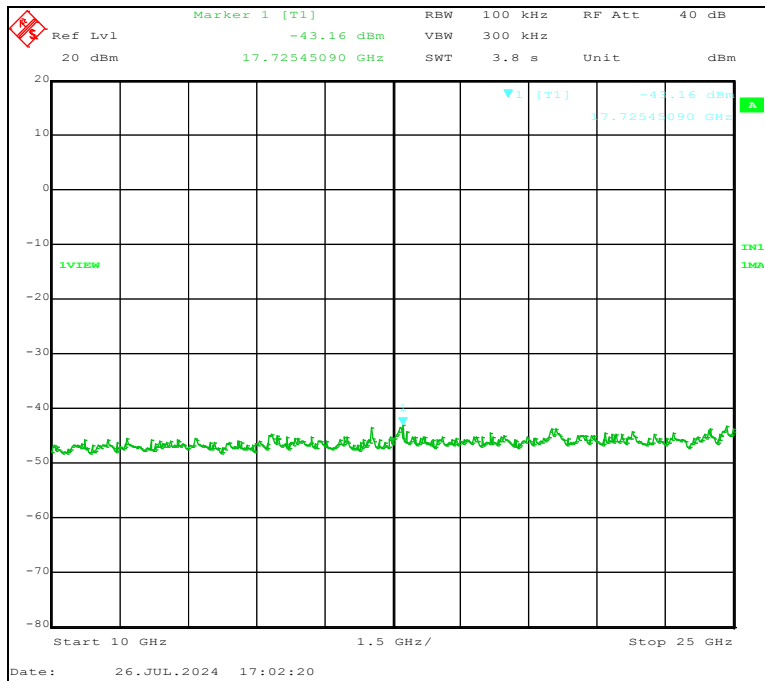


1 GHz – 10 GHz





10 GHz – 25 GHz



Test Results: The Antenna Conducted Spurious Emissions of the Lutron Model RRL-MWCL LED Lighting Controller, at Low, Middle and High Frequencies, are below the carrier 20 dBc limit and therefore compliant with the limits specified in FCC Section 15.247(d).



4.5 DTS Radiated Spurious Emissions in Non-restricted and Restricted Frequency Bands, 30 MHz – 25 GHz (47 CFR 15.205 & 15.209)(RSS-GEN 8.9 & 8.10)

The emissions from the Lutron Model RRL-MWCL LED Lighting Controller, which fall in the restricted bands of operation and unrestricted bands of operation, detailed in this section, comply with the limits of 15.209. The Lutron Model RRL-MWCL LED Lighting Controller was tested at three frequencies: low Frequency 2405.0 MHz (Channel 11), middle Frequency 2440.0 MHz (Channel 18) and high Frequency 2480.0 MHz (Channel 26).

Measurement of the signals was performed with the EUT on a turntable and a variable height antenna mast at 3 meters distance. The signals residing in restricted bands of operation are indicated in the tables below.

4.5.1 Non-Restricted and Restricted Bands Test Facility

OATS

The Open Area Test Site (OATS) is an all-weather facility with a wooden enclosure that contains a ground level 4-foot diameter turntable capable of rotating equipment 360 degrees. The enclosure is free of reflective metallic objects and extraneous electromagnetic signals. This non-metallic enclosure and the 3 meter and 10 meter test range existing outside the enclosure rest upon a protective insulating material, which in turn covers a flat, metal, continuous ground plane.

Instrumentation for remote control of the antenna mast, turntable, and other equipment are controlled by personnel indoors. The EUT and support peripherals required for EUT operation were placed on a table 80 cm high for tabletop equipment or directly on the turntable surface for floor standing equipment. The test site complies with the requirements of ANSI C63.4 and ANSI C63.10.

SR#1

The Semi-Anechoic Shielded Room (SR#1) is a ferrite and absorber lined chamber which houses a 5-foot diameter turntable capable of rotating equipment 360 degrees and antenna mast for Horizontal and Vertical polarity measurements. The enclosure is free of reflective metallic objects and extraneous electromagnetic signals. The 3 meter shielded enclosure has a raised computer floor with metal tile bottoms providing a continuous ground plane.

Instrumentation for remote control of the antenna mast, turntable, and other equipment are controlled by personnel outside the chamber. The EUT and support peripherals required for EUT operation were placed on a table 80 cm high for tabletop equipment or directly on the turntable surface for floor standing equipment.

The chamber complies with the requirements of ANSI C63.4 and ANSI C63.10.



4.5.2 Non-restricted and Restricted Bands Radiated Spurious Emissions Test Procedure

Radiated Emissions 30 MHz – 40 GHz

The EMI receiver was set to quasi-peak mode for frequencies from 30 MHz to 1 GHz and the appropriate CISPR bandwidths were employed. The receiver was set to average mode for frequencies above 1 GHz with the appropriate CISPR bandwidths were employed.

Three orthogonal positions of the EUT were evaluated for maximum emissions. The position of the EUT, with the base of the trap placed on the horizontal surface of the 80-cm table, was determined to be the axis that produced the highest emissions.

Significant emissions found during the preliminary scans were maximized by rotating the turntable and varying the antenna height. Both horizontal and vertical antenna polarities were also investigated for suspect emissions. The signals are maximized and measured using the in house generated RADE or off the shelf TILE software. The support equipment and test item(s) were powered off in turn to determine the source of the emissions where appropriate.

Field strengths were calculated as follows:

$$\text{Field Strength (dB}\mu\text{V/m)} = \text{Meter Reading (dB}\mu\text{V)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \text{Amplifier Gain (dB)}$$

Measurements were made with the Lutron Model RRL-MWCL LED Lighting Controller transmitting at the low Frequency 2405.0 MHz (Channel 11), middle Frequency 2440.0 MHz (Channel 18) and high Frequency 2480.0 MHz (Channel 26). The EUT was configured to transmit a signal at its maximum output power in the Constant Stream mode. During the testing process, it was determined that the Y-axis was the worst-case orientation for the EUT. Therefore, all the tests were carried out with the EUT positioned in the Y-axis. The following tables are the highest emissions recorded and summarized. Restricted band signals are marked with an asterisk. Other spurious emissions are shown to demonstrate compliance of the EUT to 15.209 limits.

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
*10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	31.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			



4.5.3 DTS Radiated Spurious Emissions in Non-restricted and Restricted Bands of Operation, 30 MHz – 1000 MHz Test Results (07/22/2024 and 07/23/2024)

Low Channel 11 (2405.0 MHz)

Frequency	Corrected		Antenna Polarity	Turntable Angle	Antenna Height	Correction Factor	FCC Part15.205/209 RSS-GEN/247				Result
	Peak Level	QP Level					Peak Limit	Peak Margin	QP Limit	QP Margin	
MHz	dBuV/m	dBuV/m	H/V	degrees	cm	dB	dBuV/m	dB	dBuV/m	dB	
* 133.823	22.73	15.06	H	258	126	-6.77	63.52	-40.79	43.52	-28.46	Pass
141.697	21.43	20.34	H	076	114	-7.12	63.52	-42.09	43.52	-23.18	Pass
* 266.443	16.87	14.79	H	338	146	-5.71	66.02	-49.15	46.02	-31.23	Pass
705.905	25.32	21.86	H	085	109	1.27	66.02	-40.70	46.02	-24.16	Pass
855.563	24.51	24.26	H	105	177	3.49	66.02	-41.51	46.02	-21.76	Pass
33.735	30.93	29.08	V	161	131	-2.61	60.00	-29.07	40.00	-10.92	Pass
67.480	27.97	27.07	V	016	101	-12.64	60.00	-32.03	40.00	-12.93	Pass
103.456	25.03	24.08	V	001	121	-8.92	63.52	-38.49	43.52	-19.44	Pass
579.157	22.72	20.09	V	286	141	-0.72	66.02	-43.30	46.02	-25.93	Pass
805.463	27.46	23.83	V	050	218	3.01	66.02	-38.56	46.02	-22.19	Pass
* 980.439	26.65	25.01	V	060	250	4.82	73.98	-47.33	53.98	-28.97	Pass
*Restricted Band Signal											

Middle Channel 18 (2440.0 MHz)

Frequency	Corrected		Antenna Polarity	Turntable Angle	Antenna Height	Correction Factor	FCC Part15.205/209 RSS-GEN/247				Result
	Peak Level	QP Level					Peak Limit	Peak Margin	QP Limit	QP Margin	
MHz	dBuV/m	dBuV/m	H/V	degrees	cm	dB	dBuV/m	dB	dBuV/m	dB	
67.465	17.46	15.06	H	110	204	-12.64	60.00	-42.54	40.00	-24.94	Pass
139.429	25.09	22.72	H	091	109	-7.03	63.52	-38.43	43.52	-20.80	Pass
* 273.184	16.16	15.34	H	153	144	-5.44	66.02	-49.86	46.02	-30.68	Pass
372.580	18.69	16.04	H	262	176	-4.21	66.02	-47.33	46.02	-29.98	Pass
729.770	23.71	22.33	H	234	250	1.60	66.02	-42.31	46.02	-23.69	Pass
861.030	24.85	24.30	H	203	241	3.53	66.02	-41.17	46.02	-21.72	Pass
33.745	30.28	29.32	V	182	141	-2.62	60.00	-29.72	40.00	-10.68	Pass
68.615	27.75	27.55	V	359	119	-12.62	60.00	-32.25	40.00	-12.45	Pass
78.725	24.14	23.47	V	292	130	-12.85	60.00	-35.86	40.00	-16.53	Pass
103.473	25.65	23.96	V	351	152	-8.92	63.52	-37.87	43.52	-19.56	Pass
203.567	13.49	13.94	V	302	209	-7.88	63.52	-50.03	43.52	-29.58	Pass
589.008	23.19	20.49	V	359	161	-0.52	66.02	-42.83	46.02	-25.53	Pass
805.458	24.44	23.87	V	107	130	3.01	66.02	-41.58	46.02	-22.15	Pass
959.413	24.58	25.32	V	201	214	4.74	66.02	-41.44	46.02	-20.70	Pass
*Restricted Band Signal											



High Channel 26 (2480.0 MHz)

Frequency	Corrected		Antenna Polarity	Turntable Angle	Antenna Height	Correction Factor	FCC Part15.205/209 RSS-GEN/247				Result
	Peak Level	QP Level					Peak Limit	Peak Margin	QP Limit	QP Margin	
MHz	dBuV/m	dBuV/m	H/V	degrees	cm	dB	dBuV/m	dB	dBuV/m	dB	
33.739	21.19	18.69	H	041	106	-2.61	60.00	-38.81	40.00	-21.31	Pass
68.608	13.99	11.16	H	054	234	-12.62	60.00	-46.01	40.00	-28.84	Pass
138.374	22.32	22.34	H	105	120	-6.98	63.52	-41.20	43.52	-21.18	Pass
484.058	21.79	19.06	H	118	250	-1.98	66.02	-44.23	46.02	-26.96	Pass
707.390	23.34	22.09	H	296	125	1.28	66.02	-42.68	46.02	-23.93	Pass
727.462	25.77	22.35	H	178	224	1.60	66.02	-40.25	46.02	-23.67	Pass
959.494	27.35	25.30	H	115	101	4.73	66.02	-38.67	46.02	-20.72	Pass
33.730	30.30	29.32	V	099	106	-2.60	60.00	-29.70	40.00	-10.68	Pass
68.580	28.89	27.88	V	328	104	-12.62	60.00	-31.11	40.00	-12.12	Pass
78.720	19.86	18.19	V	245	109	-12.85	60.00	-40.14	40.00	-21.81	Pass
105.664	23.77	13.90	V	010	178	-8.40	63.52	-39.75	43.52	-29.62	Pass
436.193	19.97	17.58	V	094	145	-2.74	66.02	-46.05	46.02	-28.44	Pass
640.146	24.49	21.61	V	299	140	0.37	66.02	-41.53	46.02	-24.41	Pass
762.821	26.13	22.47	V	050	156	1.91	66.02	-39.89	46.02	-23.55	Pass
926.731	26.40	24.77	V	222	250	4.41	66.02	-39.62	46.02	-21.25	Pass
*Restricted Band Signal											

Receive Mode

Frequency	Corrected		Antenna Polarity	Turntable Angle	Antenna Height	Correction Factor	FCC Part15.205/209 RSS-GEN/247				Result
	Peak Level	QP Level					Peak Limit	Peak Margin	QP Limit	QP Margin	
MHz	dBuV/m	dBuV/m	H/V	degrees	cm	dB	dBuV/m	dB	dBuV/m	dB	
31.468	22.20	18.93	H	200	136	-1.13	60.00	-37.80	40.00	-21.07	Pass
* 124.752	20.56	18.71	H	096	255	-6.47	63.52	-42.96	43.52	-24.81	Pass
318.186	15.46	14.72	H	262	203	-4.83	66.02	-50.56	46.02	-31.30	Pass
595.383	22.68	20.38	H	143	156	-0.41	66.02	-43.34	46.02	-25.64	Pass
680.886	21.84	21.28	H	339	151	0.69	66.02	-44.18	46.02	-24.74	Pass
823.675	25.55	23.54	H	297	255	3.12	66.02	-40.47	46.02	-22.48	Pass
917.307	26.92	24.86	H	143	220	4.28	66.02	-39.10	46.02	-21.16	Pass
34.815	29.22	26.24	V	271	136	-3.32	60.00	-30.78	40.00	-13.76	Pass
67.425	27.43	25.96	V	023	101	-12.64	60.00	-32.57	40.00	-14.04	Pass
82.040	27.50	26.34	V	325	121	-13.04	60.00	-32.50	40.00	-13.66	Pass
107.864	25.22	23.64	V	359	135	-7.94	63.52	-38.30	43.52	-19.88	Pass
524.931	20.71	19.67	V	064	136	-1.42	66.02	-45.31	46.02	-26.35	Pass
737.512	25.11	22.83	V	219	240	1.61	66.02	-40.91	46.02	-23.19	Pass
810.674	24.80	23.90	V	266	203	3.13	66.02	-41.22	46.02	-22.12	Pass
956.883	26.29	25.07	V	327	203	4.66	66.02	-39.73	46.02	-20.95	Pass
* Restricted Band Signal											

Test Results: The Lutron Model RRL-MWCL LED Lighting Controller, operating in DTS mode and receive mode, comply with the requirements of 47 CFR Part 15.205 and RSS-Gen Section 8.10 for restricted bands of operation with a margin of 10.68 dB.



4.5.4.1 DTS Radiated Spurious Emissions in Non-Restricted and Restricted Bands of Operation, 1 GHz – 18 GHz Peak and Average Detector Test Results (07/16/2024 and 07/17/2024)

Low Channel 11 (2405.0 MHz)

Frequency	Peak Level	Average Measured	Polarity	Turntable Angle	Antenna Height	Correction Factor	FCC 15.205/209: RSS-GEN/RSS-247 Average Limit	FCC 15.205/209: RSS-GEN/RSS-247 Average Margin	FCC 15.205/209: RSS-GEN/RSS-247 Peak Limit	FCC 15.205/209: RSS-GEN/RSS-247 Peak Margin	Result
GHz	dBuV/m	dBuV/m		degrees	cm	dB	dBuV/m	dB	dBuV/m	dB	
* 4.82634	34.63	24.75	H	085	101	1.74	53.98	-29.23	73.98	-39.351	PASS
9.6279	45.52	35.22	H	355	211	6.28	53.98	-18.76	73.98	-28.462	PASS
* 4.81045	38.67	29.59	V	196	139	1.68	53.98	-24.39	73.98	-35.312	PASS
7.2133	46.69	37.08	V	303	232	4.19	53.98	-16.90	73.98	-27.289	PASS
* 12.0221	58.09	48.47	V	343	237	7.74	53.98	-5.51	73.98	-15.891	PASS
14.6425	55.46	45.26	V	053	145	12.33	53.98	-8.72	73.98	-18.52	PASS
16.9852	56.65	45.73	V	341	179	12.73	53.98	-8.25	73.98	-17.33	PASS
* Restricted Band Signal											

Middle Channel 18 (2440.0 MHz)

Frequency	Peak Level	Average Measured	Polarity	Turntable Angle	Antenna Height	Correction Factor	FCC 15.205/209: RSS-GEN/RSS-247 Average Limit	FCC 15.205/209: RSS-GEN/RSS-247 Average Margin	FCC 15.205/209: RSS-GEN/RSS-247 Peak Limit	FCC 15.205/209: RSS-GEN/RSS-247 Peak Margin	Result
GHz	dBuV/m	dBuV/m		degrees	cm	dB	dBuV/m	dB	dBuV/m	dB	
9.6265	45.25	35.74	H	093	100	6.28	53.98	-18.24	73.98	-28.729	PASS
17.3417	58.43	48.06	H	355	222	14.30	53.98	-5.92	73.98	-15.552	PASS
* 4.87766	36.19	26.00	V	259	137	1.88	53.98	-27.98	73.98	-37.79	PASS
* 7.32174	52.59	43.38	V	359	244	4.74	53.98	-10.60	73.98	-21.385	PASS
* 12.2027	60.78	51.78	V	338	243	7.82	53.98	-2.20	73.98	-13.203	PASS
* Restricted Band Signal											



High Channel 26 (2480.0 MHz)

Frequency	Peak Level	Average Measured	Polarity	Turntable Angle	Antenna Height	Correction Factor	FCC 15.205/209: RSS-GEN/RSS-247 Average Limit	FCC 15.205/209: RSS-GEN/RSS-247 Average Margin	FCC 15.205/209: RSS-GEN/RSS-247 Peak Limit	FCC 15.205/209: RSS-GEN/RSS-247 Peak Margin	Result
GHz	dBuV/m	dBuV/m		degrees	cm	dB	dBuV/m	dB	dBuV/m	dB	
* 4.8977	35.71	26.29	H	328	162	1.92	53.98	-27.69	73.98	-38.273	PASS
9.9069	46.49	35.77	H	242	196	6.30	53.98	-18.21	73.98	-27.485	PASS
* 12.3972	60.50	51.47	H	127	208	7.64	53.98	-2.51	73.98	-13.477	PASS
* 4.95896	37.38	27.91	V	225	153	1.83	53.98	-26.07	73.98	-36.6	PASS
* 7.4389	45.85	35.64	V	194	217	4.75	53.98	-18.34	73.98	-28.126	PASS
* 12.3974	56.66	48.13	V	336	248	7.64	53.98	-5.85	73.98	-17.318	PASS
17.093	57.07	46.93	V	171	218	13.33	53.98	-7.05	73.98	-16.909	PASS

* Restricted Band Signal

Receive Mode

Frequency	Peak Level	Average Measured	Polarity	Turntable Angle	Antenna Height	Correction Factor	FCC 15.205/209: RSS-GEN/RSS-247 Average Limit	FCC 15.205/209: RSS-GEN/RSS-247 Average Margin	FCC 15.205/209: RSS-GEN/RSS-247 Peak Limit	FCC 15.205/209: RSS-GEN/RSS-247 Peak Margin	Result
GHz	dBuV/m	dBuV/m		degrees	cm	dB	dBuV/m	dB	dBuV/m	dB	
* 7.68816	42.28	33.66	H	037	101	4.63	53.98	-20.32	73.98	-31.705	PASS
13.0271	51.22	40.79	H	008	170	9.10	53.98	-13.19	73.98	-22.756	PASS
* 15.8115	50.46	40.59	H	023	228	8.09	53.98	-13.39	73.98	-23.516	PASS
6.5801	40.73	31.14	V	314	211	3.11	53.98	-22.84	73.98	-33.246	PASS
* 8.07512	44.69	34.83	V	215	170	5.29	53.98	-19.15	73.98	-29.286	PASS
15.1036	53.70	43.37	V	181	104	10.33	53.98	-10.61	73.98	-20.275	PASS

* Restricted Band Signal

Test Results: The Lutron Model RRL-MWCL LED Lighting Controller, operating in DTS and receive modes, comply with the requirements of 47 CFR Part 15.205 and RSS-Gen Section 8.10 with a margin of 2.20 dB.



4.5.4.2 DTS Radiated Spurious Emissions in Non-Restricted and Restricted Bands of Operation, 1 GHz – 18 GHz Peak RMS Average Detector Test Results (07/25/2024)

The Spurious Emissions at around 12 GHz were tested using the test methods called out for in KDB 558074 D01 15.247 Meas Guidance v05r02. This KDB references measurement method found in ANSI C63.10; Section 11.12.2.5.1 Trace Average with Continuous EUT transmission at full power and 100% Duty Cycle. The duty cycle meets all requirements as outlined in the KDB 558074 D01 15.247 Meas Guidance v05r02 to allow this measurement.

Low Channel 11 (2405.0 MHz)

Frequency	Peak Level Corrected-Peak Detector Max Hold	RMS Average-Max Hold Measurement Corrected with Duty Cycle Correction Factor	Antenna Polarity	Turntable Angle	Antenna Height	Cables, Amplifier, Antenna Correction Factor	FCC 15.205/209: RSS-GENRSS-247 Average Limit	FCC 15.205/209: RSS-GENRSS-247 Average Margin	FCC 15.205/209: RSS-GENRSS-247 Peak Limit	FCC 15.205/209: RSS-GENRSS-247 Peak Margin	Result	Duty Cycle Correction Factor
GHz	dBuV/m	dBuV/m		degrees	cm	dB	dBuV/m	dB	dBuV/m	dB		dB
12.0222	69.59	52.56	H	1.3	230	23.21	53.98	-1.42	73.98	-4.39	PASS	9.9
Manual Measurements	46.38	39.25										

Frequency	Peak Level Corrected-Peak Detector Max Hold	RMS Average-Max Hold Measurement Corrected with Duty Cycle Correction Factor	Antenna Polarity	Turntable Angle	Antenna Height	Cables, Amplifier, Antenna Correction Factor	FCC 15.205/209: RSS-GENRSS-247 Average Limit	FCC 15.205/209: RSS-GENRSS-247 Average Margin	FCC 15.205/209: RSS-GENRSS-247 Peak Limit	FCC 15.205/209: RSS-GENRSS-247 Peak Margin	Result	Duty Cycle Correction Factor
GHz	dBuV/m	dBuV/m		degrees	cm	dB	dBuV/m	dB	dBuV/m	dB		dB
12.0221	65.94	47.97	V	360	255	23.21	53.98	-6.01	73.98	-8.04	PASS	9.9
Manual Measurements	42.73	34.66										

Middle Channel 18 (2440.0 MHz)

Frequency	Peak Level Corrected-Peak Detector Max Hold	RMS Average-Max Hold Measurement Corrected with Duty Cycle Correction Factor	Antenna Polarity	Turntable Angle	Antenna Height	Cables, Amplifier, Antenna Correction Factor	FCC 15.205/209: RSS-GENRSS-247 Average Limit	FCC 15.205/209: RSS-GENRSS-247 Average Margin	FCC 15.205/209: RSS-GENRSS-247 Peak Limit	FCC 15.205/209: RSS-GENRSS-247 Peak Margin	Result	Duty Cycle Correction Factor
GHz	dBuV/m	dBuV/m		degrees	cm	dB	dBuV/m	dB	dBuV/m	dB		dB
12.2026	70.84	53.19	H	0	236	23.28	53.98	-0.79	73.98	-3.14	PASS	9.9
Manual Measurements	47.56	39.81										

Frequency	Peak Level Corrected-Peak Detector Max Hold	RMS Average-Max Hold Measurement Corrected with Duty Cycle Correction Factor	Antenna Polarity	Turntable Angle	Antenna Height	Cables, Amplifier, Antenna Correction Factor	FCC 15.205/209: RSS-GENRSS-247 Average Limit	FCC 15.205/209: RSS-GENRSS-247 Average Margin	FCC 15.205/209: RSS-GENRSS-247 Peak Limit	FCC 15.205/209: RSS-GENRSS-247 Peak Margin	Result	Duty Cycle Correction Factor
GHz	dBuV/m	dBuV/m		degrees	cm	dB	dBuV/m	dB	dBuV/m	dB		dB
12.2026	68.08	49.8	V	343.8	254	23.28	53.98	-4.18	73.98	-5.90	PASS	9.9
Manual Measurements	44.8	36.42										

High Channel 26 (2480.0 MHz)

Frequency	Peak Level Corrected-Peak Detector Max Hold	RMS Average-Max Hold Measurement Corrected with Duty Cycle Correction Factor	Antenna Polarity	Turntable Angle	Antenna Height	Cables, Amplifier, Antenna Correction Factor	FCC 15.205/209: RSS-GENRSS-247 Average Limit	FCC 15.205/209: RSS-GENRSS-247 Average Margin	FCC 15.205/209: RSS-GENRSS-247 Peak Limit	FCC 15.205/209: RSS-GENRSS-247 Peak Margin	Result	Duty Cycle Correction Factor
GHz	dBuV/m	dBuV/m		degrees	cm	dB	dBuV/m	dB	dBuV/m	dB		dB
12.3973	68.25	49.75	H	46.1	211	23.11	53.98	-4.22	73.98	-5.72	PASS	9.9
Manual Measurements	45.15	36.55										

Frequency	Peak Level Corrected-Peak Detector Max Hold	RMS Average-Max Hold Measurement Corrected with Duty Cycle Correction Factor	Antenna Polarity	Turntable Angle	Antenna Height	Cables, Amplifier, Antenna Correction Factor	FCC 15.205/209: RSS-GENRSS-247 Average Limit	FCC 15.205/209: RSS-GENRSS-247 Average Margin	FCC 15.205/209: RSS-GENRSS-247 Peak Limit	FCC 15.205/209: RSS-GENRSS-247 Peak Margin	Result	Duty Cycle Correction Factor
GHz	dBuV/m	dBuV/m		degrees	cm	dB	dBuV/m	dB	dBuV/m	dB		dB
12.3969	64.56	44.97	V	355.1	258	23.11	53.98	-9.01	73.98	-9.42	PASS	9.9
Manual Measurements	41.45	31.78										

Test Results: The Lutron Model RRL-MWCL LED Lighting Controller, operating in DTS and receive modes, comply with the requirements of 47 CFR Part 15.205 and RSS-Gen Section 8.10 with a margin of 0.79 dB.



4.5.5 DTS Radiated Spurious Emissions in Non-Restricted and Restricted Bands of Operation, 18 GHz – 25 GHz Test Results (07/17/2024)

Measurements were made in the frequency range of 18 GHz to 25 GHz for the Lutron Model RRL-MWCL LED Lighting Controller. The sample was programmed to transmit at the low Frequency 2405.0 MHz (Channel 11), middle Frequency 2440.0 MHz (Channel 18) and high Frequency 2480.0 MHz (Channel 26) and in the Rx Mode. There were no significant signals found when testing the EUT in this frequency range. Test results for all configurations tested are available upon request.



4.6 DTS 6 dB Occupied Bandwidth (FCC Section 15.247(a)(2) RSS-247 5.2(a))

4.6.1 DTS 6 dB Occupied Bandwidth – Test Procedure

The minimum DTS (6 dB) bandwidth, specified in FCC Section 15.247(a) (2) was measured using a Spectrum Analyzer with 100 kHz resolution bandwidth and 300 kHz video bandwidth. Transmission frequencies at low (Channel 11, Frequency 2405.0 MHz), middle (Channel 18, Frequency 2440.0 MHz) and high (Channel 26, Frequency 2480.0 MHz) were measured while using maximum output and O-QPSK modulation. The test procedure of ANSI C63.10, Section 11.8, Option 1, was used.

Spectrum Analyzer Settings:

RBW	100	kHz
VBW	300	kHz
Span	5	MHz
Sweep Time (Auto)	5	ms

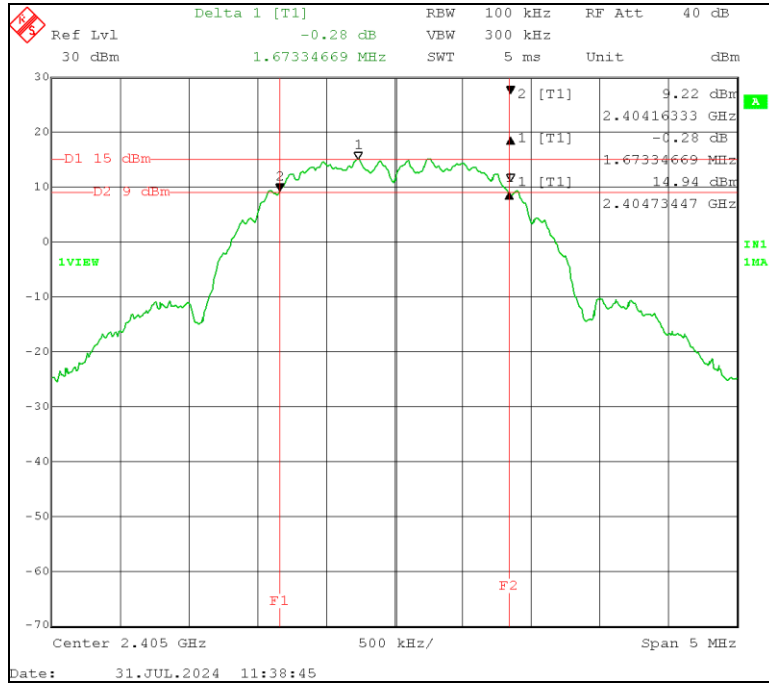
4.6.2 DTS 6 dB Occupied Bandwidth Test Results (07/31/2024)

Channel	Frequency	Measured 6 dB BW	47 CFR 15.247(a)(2) & RSS-247 5.2 Minimum Limit	Margin	Result
	MHz	kHz	kHz	kHz	
11	2405.0	1673	500.00	1173.00	PASS
18	2440.0	1703	500.00	1203.00	PASS
26	2480.0	1693	500.00	1193.00	PASS

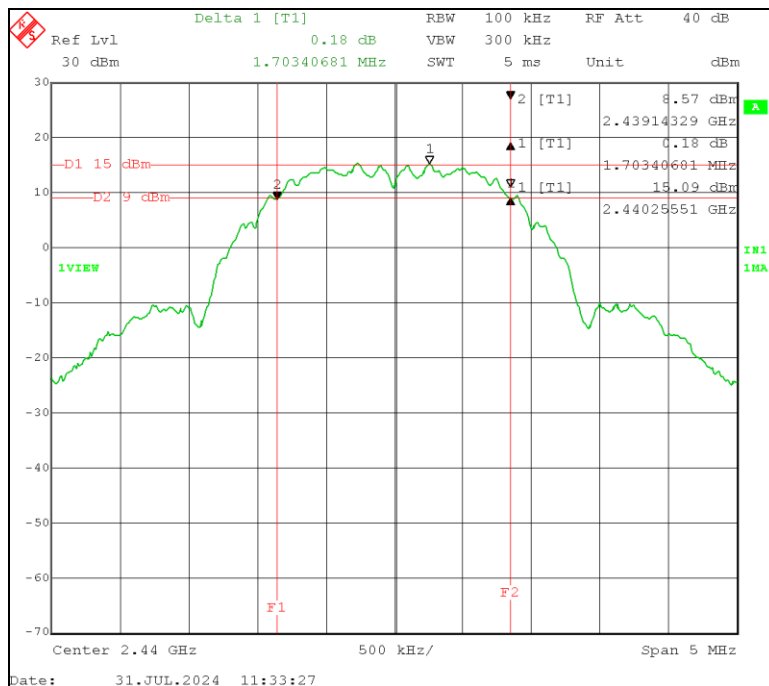


4.6.3 DTS 6 dB Occupied Bandwidth Analyzer Screen Captures

Channel 11: 2405.0 MHz

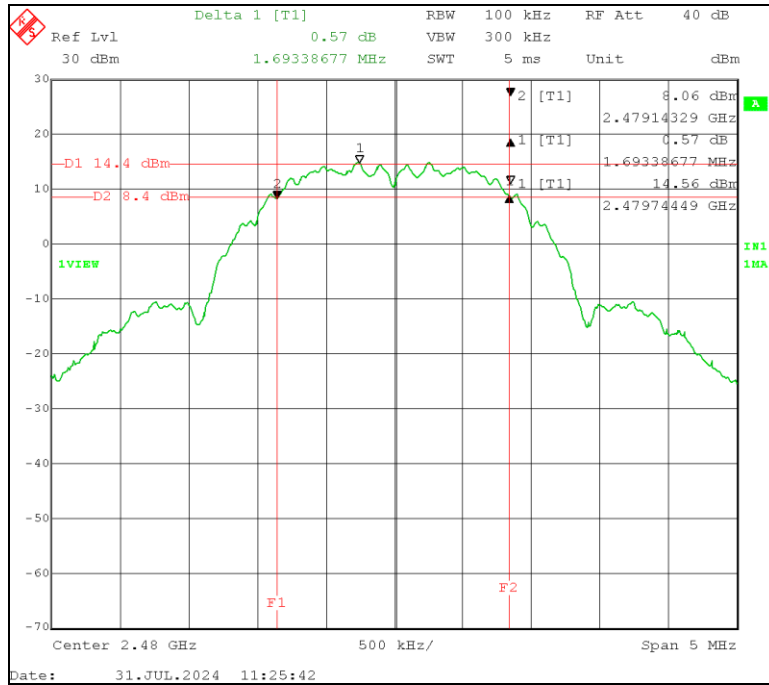


Channel 18: 2440.0 MHz





Channel 26: 2480.0 MHz



Test Results: The DTS 6 dB Occupied Bandwidth measurements for the Lutron Model RRL-MWCL LED Lighting Controller were measured and are compliant to FCC and ISED requirements.



4.7 DTS 99% Occupied Bandwidth RSS-Gen 6.7

4.7.1 DTS 99% Occupied Bandwidth – Test Procedure

The 99% Occupied Bandwidth measurement per RSS-Gen Section 6.7 was measured using a Spectrum Analyzer with 100 kHz resolution bandwidth and 300 kHz video bandwidth. Transmission frequencies at low (Channel 11, Frequency 2405.0 MHz), middle (Channel 18, Frequency 2440.0 MHz) and high (Channel 26, Frequency 2480.0 MHz) were measured while using maximum output and O-QPSK modulation. The test procedure of ANSI C63.10, Section 6.9.3 was used.

Spectrum Analyzer Settings:

RBW	100	kHz
VBW	300	kHz
Span	10	MHz
Sweep Time (Auto)	5	ms
Attenuation	40	dB
Reference Level	20	dBm

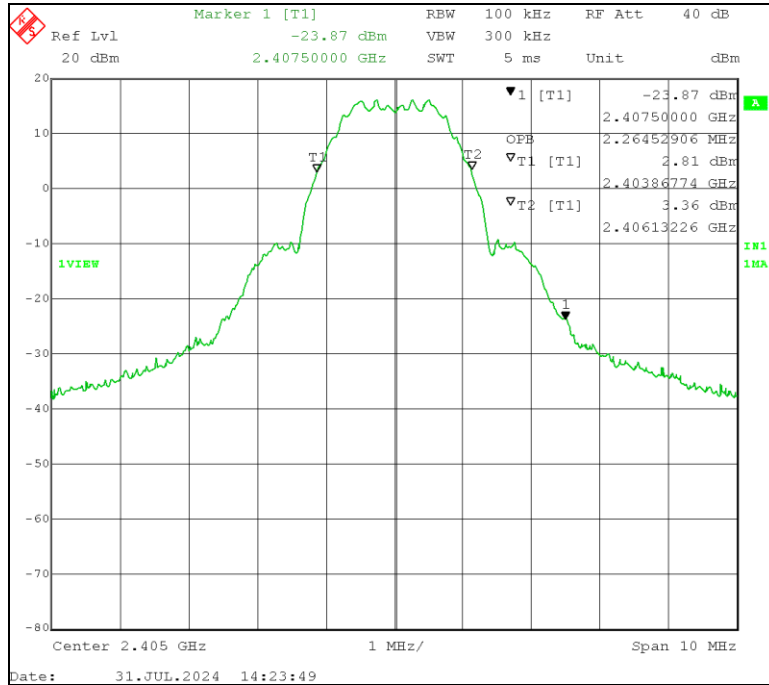
4.7.2 DTS 99% Occupied Bandwidth Test Results (07/31/2024)

Channel	Frequency (MHz)	99% Occupied BW (MHz)
11	2405.0	2.265
18	2440.0	2.265
26	2480.0	2.265

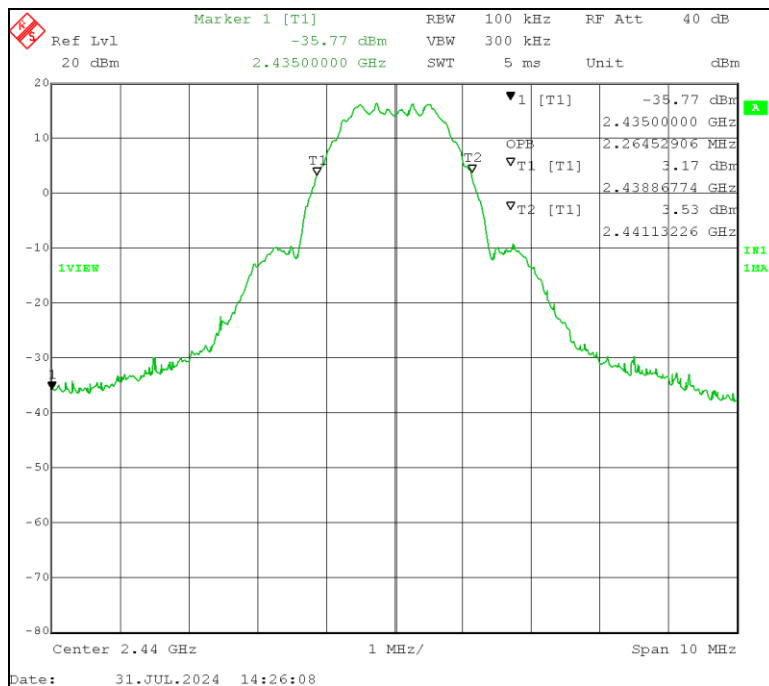


4.7.3 DTS 99% Occupied Bandwidth Analyzer Screen Captures

Channel 11: 2405.0 MHz

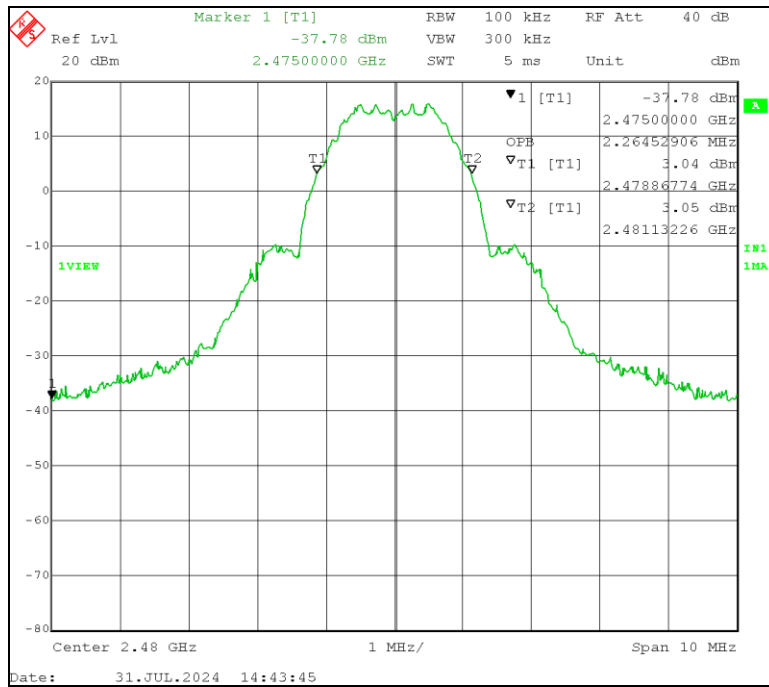


Channel 18: 2440.0 MHz





Channel 26: 2480.0 MHz



Test Results: The DTS 99% Occupied Bandwidth measurements for the Lutron Model RRL-MWCL LED Lighting Controller were measured for RSS-Gen Section 6.7 requirement.



4.8 Maximum Conducted Output Power and EIRP (FCC Part 15.247(b)(3), RSS-247 Section 5.4(d))

4.8.1 Maximum Conducted Output Power Test Procedure

A conducted power measurement of the output frequency was measured according to ANSI C63.10, Section 11.9.1.1. Spectrum Analyzer Resolution Bandwidth and Frequency Span were based upon the Operating Bandwidth (OBW) measured in the previous section. Transmission frequencies at low (Channel 11, Frequency 2405.0 MHz), middle (Channel 18, Frequency 2440.0 MHz) and high (Channel 26, Frequency 2480.0 MHz) were measured with no modulation and with O-QPSK modulation.

Spectrum Analyzer Settings:

Measurement Analyzer Settings	
Span	10 MHz
RBW	3 MHz
VBW	10 MHz
Sweep Time	5 ms
Attenuation	40 dB
Ref Level	30 dBm

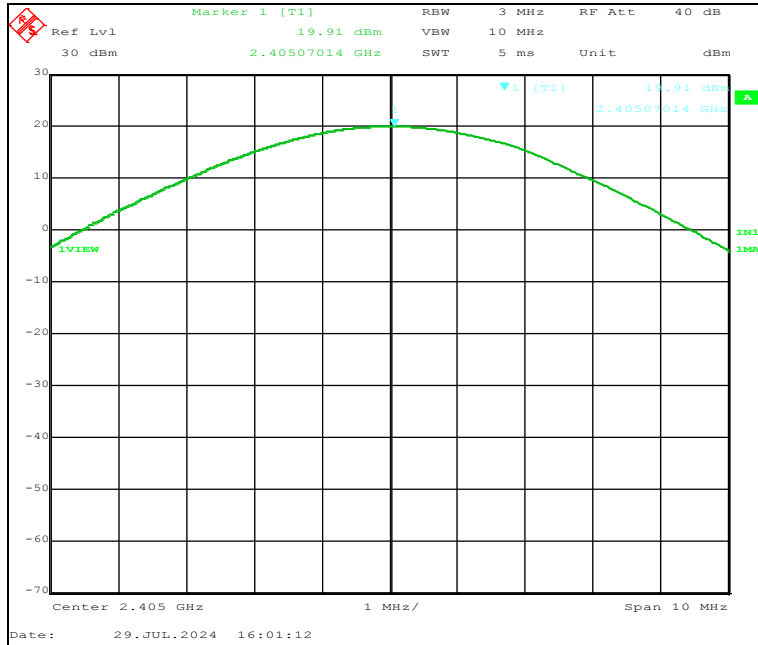
4.8.2 Maximum Conducted Output Power Test Results (07/29/2024)

802.15.4 Tx Channel	Modulation	Frequency (MHz)	Measured Level (dBm)	Cable # 962 Loss (dB)	Corrected Measured Level		Limit		Margin	
					dBm	Watts	dBm	Watts	dBm	Watts
11	None	2405.0	19.91	0.377	20.29	0.107	30.00	1.000	-9.71	-0.893
18		2440.0	19.91	0.375	20.29	0.107	30.00	1.000	-9.72	-0.893
26		2480.0	19.55	0.377	19.93	0.098	30.00	1.000	-10.07	-0.902
11	O-QPSK	2405.0	19.66	0.377	20.04	0.101	30.00	1.000	-9.96	-0.899
18		2440.0	19.91	0.375	20.29	0.107	30.00	1.000	-9.72	-0.893
26		2480.0	19.66	0.377	20.04	0.101	30.00	1.000	-9.96	-0.899

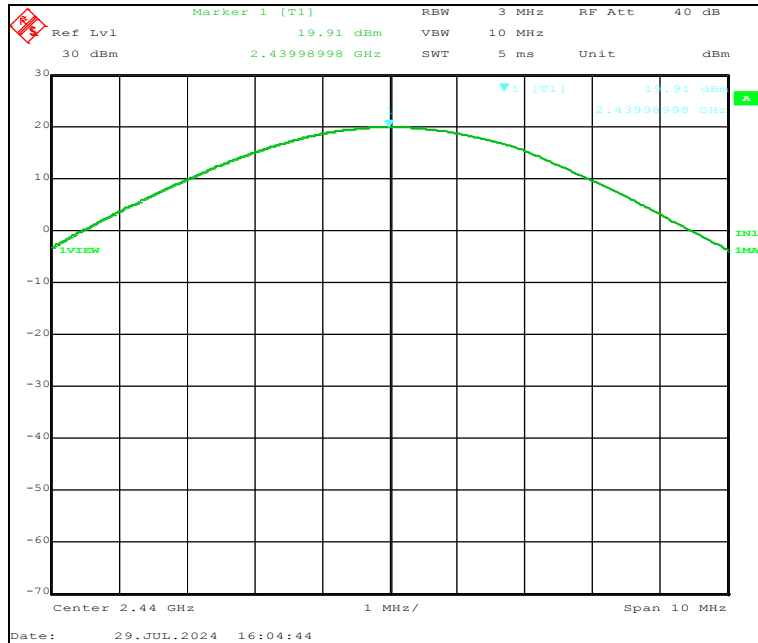


4.8.3 Maximum Conducted Output Power Analyzer Screen Captures

Channel 11: 2405.0 MHz No Modulation

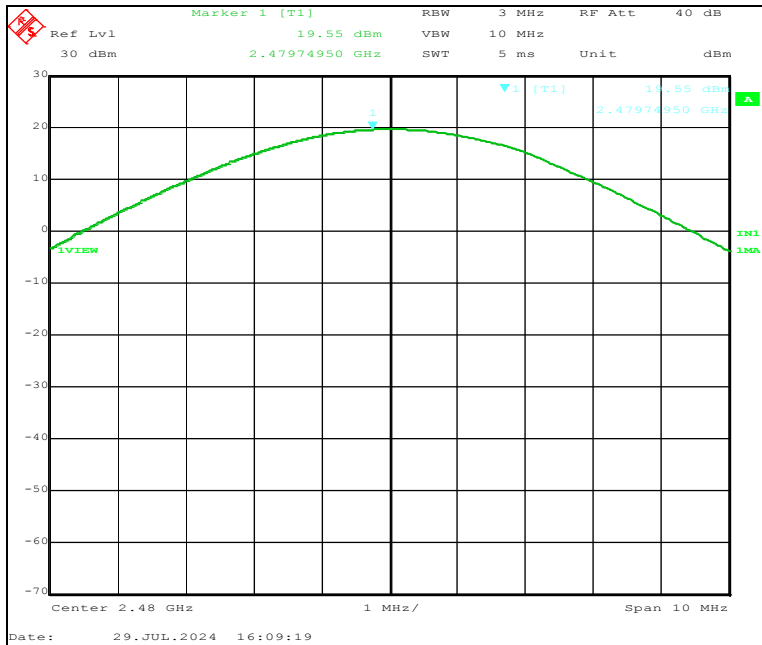


Channel 18: 2440.0 MHz No Modulation

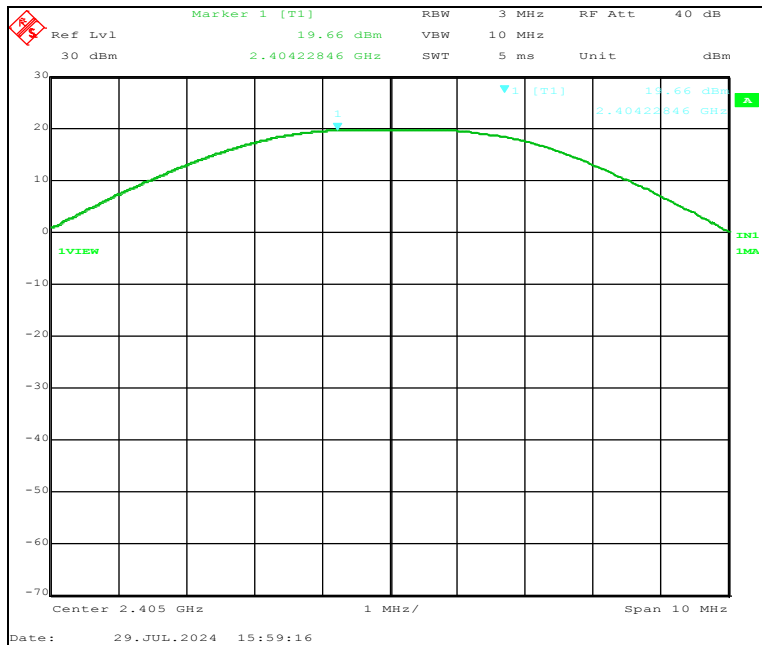




Channel 26: 2480.0 MHz No Modulation

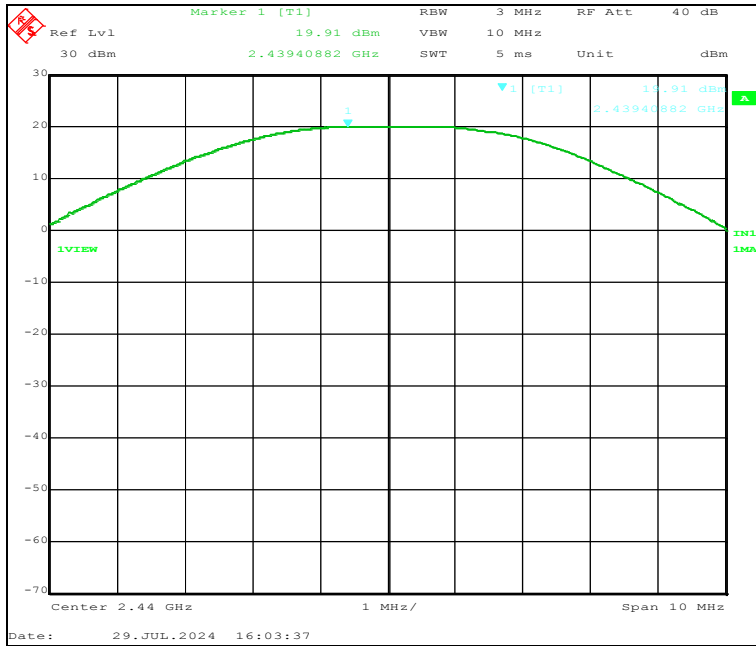


Channel 11: 2405.0 MHz O-QPSK Modulation

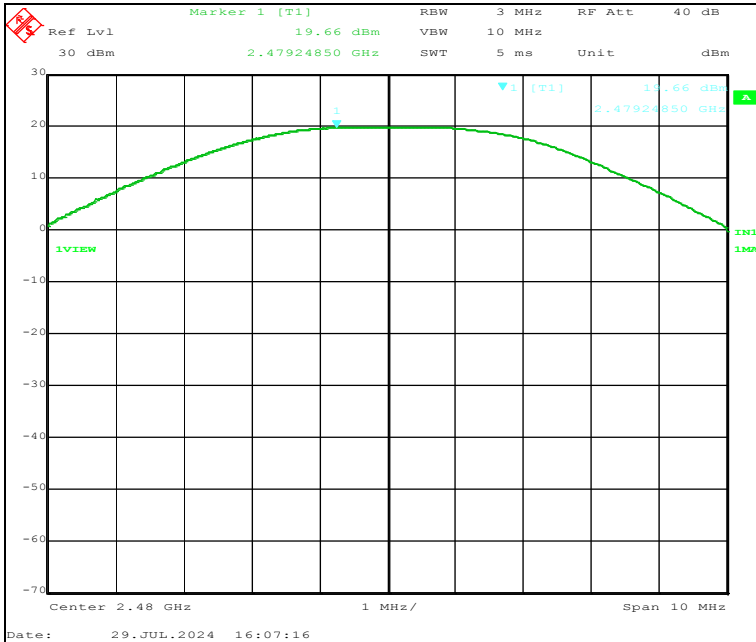




Channel 18: 2440.0 MHz O-QPSK Modulation



Channel 26: 2480.0 MHz O-QPSK Modulation



Test Results: The Maximum Conducted Output Power peak measurements for the Lutron Model RRL-MWCL LED Lighting Controller, with and without modulation, are compliant with the limits specified in FCC Section 15.247(b)(3).



4.8.4 EIRP Calculation RSS-247 (07/29/2024)

The gain of the antenna used in the Lutron Model RRL-MWCL LED Lighting Controller is + 4.0 dBi. Applying the antenna gain to the maximum peak transmitter output produces the following values of EIRP.

802.15.4 Tx Channel	Modulation	Frequency (MHz)	Corrected Measured Level		Antenna Gain		EIRP				Result
			dBm	Watts	Isotropic (dBi)	Numeric	Total		Limit	Margin	
							dBm	Watts			
11	None	2405.0	20.29	0.1068	4.00	2.512	24.29	0.268	4.00	-3.732	Pass
18		2440.0	20.29	0.1068			24.29	0.268		-3.732	Pass
26		2480.0	19.93	0.0983			23.93	0.247		-3.753	Pass
11	O-QPSK	2405.0	20.04	0.1009			24.04	0.253		-3.747	Pass
18		2440.0	20.29	0.1068			24.29	0.268		-3.732	Pass
26		2480.0	20.04	0.1009			24.04	0.253		-3.747	Pass

Test Results: The results in the above table show compliance to the ISED requirements for EIRP limits of RSS-247.



4.9 Power Spectral Density (FCC Section 15.247(e), RSS-247 Section 5.2(b))

4.9.1 Power Spectral Density Test Procedure

A conducted power measurement of the output frequency was measured using a peak detector for the Lutron Model RRL-MWCL LED Lighting Controller for each of the low (Channel 11, Frequency 2405.0 MHz), middle (Channel 18, Frequency 2440.0 MHz) and high (Channel 26, Frequency 2480.0 MHz) channel frequencies. The EUT was set to transmit a signal at maximum output power with O-QPSK modulation. The test procedure of ANSI C63.10, Section 11.10.2 (PKPSD) was used.

Spectrum Analyzer Settings:

Measurement Analyzer Settings		
RBW (Between 3 kHz and 100 kHz)	3	kHz
VBW (3 X RBW)	10	kHz
Span (>1.5 X the DTS Bandwidth)	4	MHz
Sweep (Auto)	1.15	sec
Attenuation	30	dB
Ref Level	20	dBm

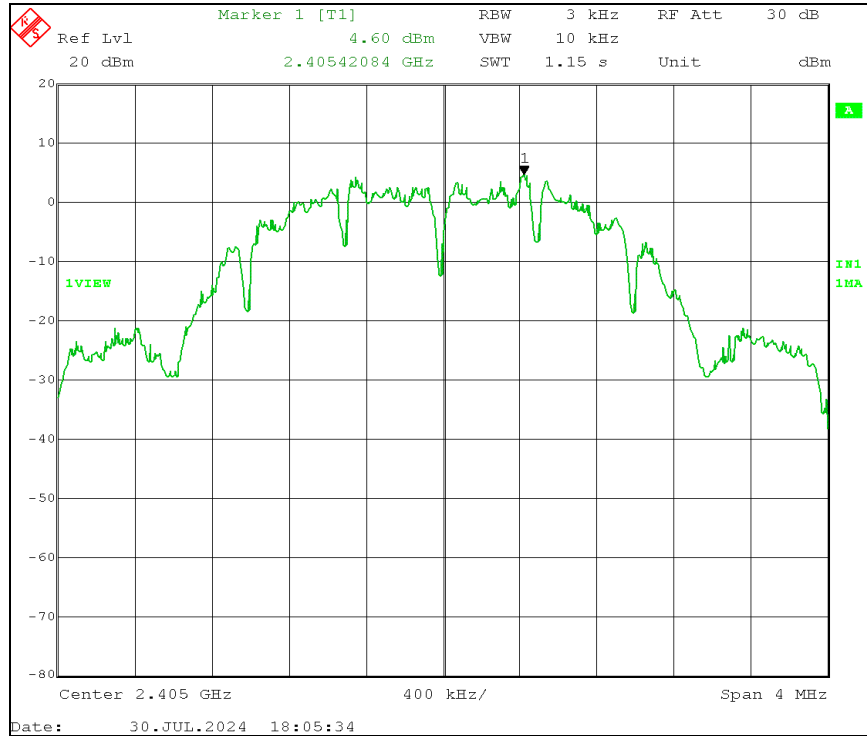
4.9.2 Power Spectral Density Test Results (07/30/2024)

Channel	Modulation Information	Frequency (MHz)	Measured Level	Cable #BEC-962 Correction Factor	Total	Limit	Margin
			dBm	dB	dBm	dBm	dBm
11	O-QPSK	2405.0	3.97	0.377	4.35	8.00	-3.65
18		2440.0	4.33	0.375	4.71	8.00	-3.30
26		2480.0	4.60	0.377	4.98	8.00	-3.02

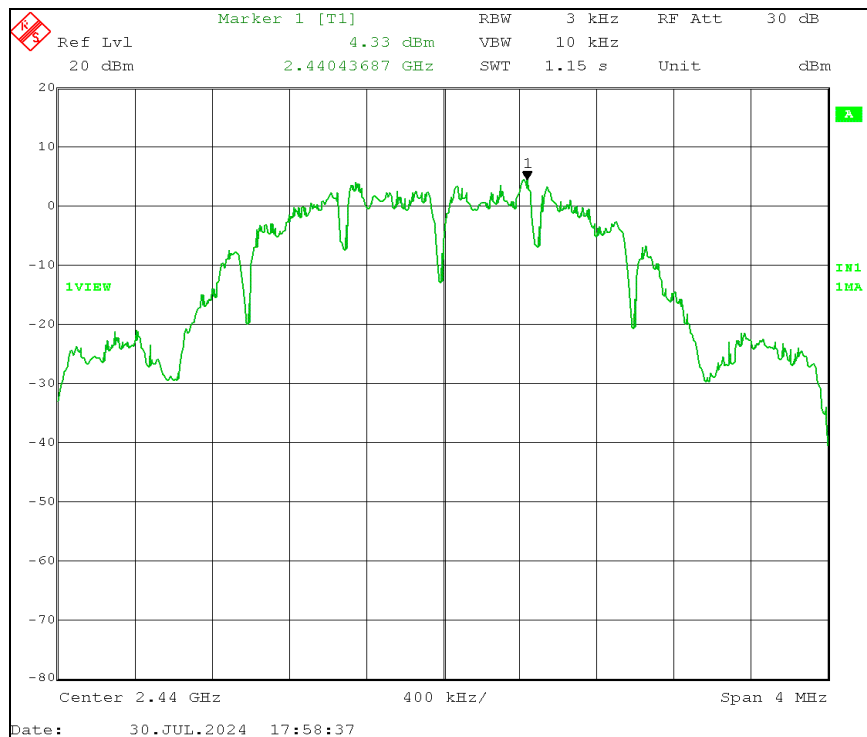


4.9.3 Power Spectral Density Analyzer Screen Captures

Channel 11, 2405.0 MHz, O-QPSK Modulation

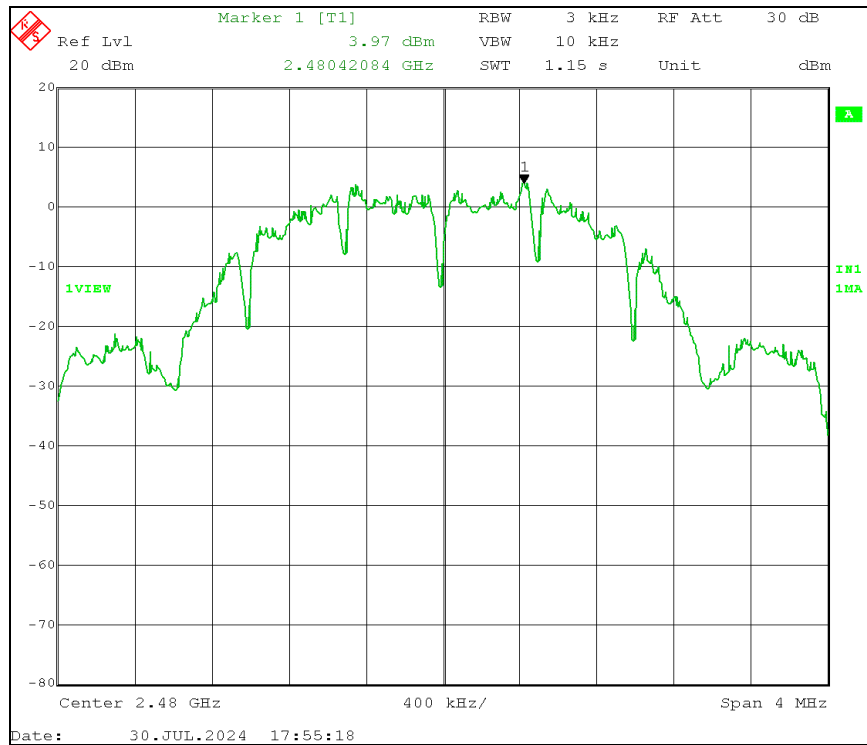


Channel 18, 2440.0 MHz, O-QPSK Modulation





Channel 26, 2480.0 MHz, O-QPSK Modulation



Test Results: The Power Spectral Density measurements of the Lutron Model RRL-MWCL LED Lighting Controller are compliant with the limits specified in FCC Section 15.247(e) and RSS-247.



4.10 Band Edge Measurement (FCC Part 15.247(d), RSS-247 5.5)

4.10.1 Band Edge Measurement Test Procedure

Band edge measurements were recorded on the EUT while operating with a modulated carrier at 2405.0 MHz (Channel 11) and 2480.0 MHz (Channel 26). The Authorized Band Edge measurements were made using the Relative Method of Section 6.10.4 of ANSI C63.10. The Spectrum Analyzer Screens below show emissions between the modulated carrier, at low and high frequencies and the lower and upper band edges.

Spectrum Analyzer Settings:

Measurement Analyzer Settings	
RBW	100 kHz
VBW	300 kHz
Sweep	5.5 ms Low Tx and 7.0 ms High Tx

	Lower Edge	Upper Edge
Authorized Band:	2400 MHz	2483.5 MHz
Nearest Restricted Bands:	2310-2390 MHz	2483.5-2500 MHz

4.10.2 Band Edge Measurement Test Results (07/31/2024)

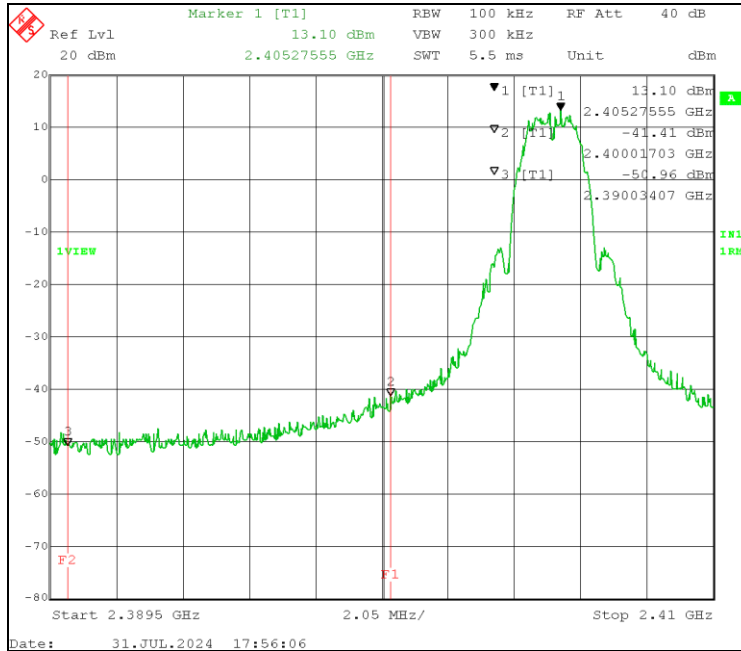
Test Mode	Frequency (MHz)	Peak Transmit	Band Edge Measurement			Result
			Peak Level @ Lower Band 2.4 GHz Lower Band & Peak Level @ 2.4835 GHz Higher Band	Limit (dB) 20 dB Below the Tx Peak Amplitude (-20 dBc)	Margin	
Tx at Maximum Output Power	2405.0	13.10	-41.41	-6.90	-34.51	PASS
Tx at Maximum Output Power	2480.0	11.95	-38.30	-8.05	-30.25	PASS



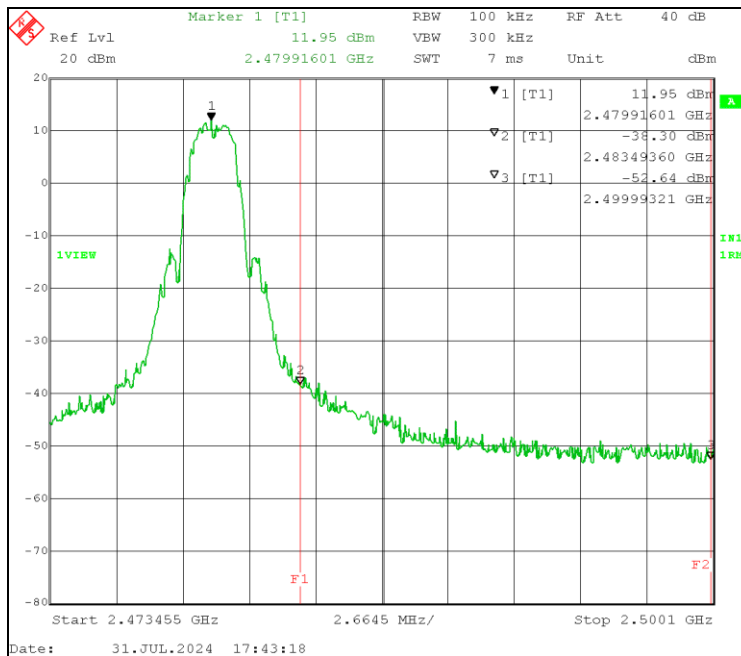
4.10.3

Band Edge Measurement Analyzer Screen Captures

Low Channel 11, 2405.0 MHz



High Channel 26, 2480.0 MHz



Test Results: The Band Edge measurements of the Lutron Model RRL-MWCL LED Lighting Controller show that emissions at the band edges of the Operating Frequency Bandwidth are below the Carrier Peak Level – 20 dBc required by 47 CFR Part 15.247(d) and ISED RSS-247, Section 5.5.



4.11 Conducted Emissions

4.11.1 Conducted Emissions AC Power Port Test Procedure

AC Power Line

Conducted emissions at the power line input of the EUT were measured with an EMI receiver set to the appropriate detector and CISPR bandwidth, which was connected to the RF output of a 50 Ω , 50 μ H Line Impedance Stabilization Network (LISN) installed in each power line. Measurements were made over the frequency range of 150 kHz to 30 MHz while the EUT was operating as described in the EUT section of this report. The significant amplitudes of emissions measured on the AC power lines of the EUT were recorded as follows:

$$\text{Emission (dB}\mu\text{V)} = \text{Meter Reading (dB}\mu\text{v)} + \text{Cable Loss (dB)} + \text{LISN Factor (dB)} + \text{Limiter Loss (dB)}$$

The Lutron RRL-MWCL Sample 2328-02 was powered by the Lutron Model LU-PH3-A Sample 2328-03 at 120 Vac / 60 Hz. The Test Sample 2328-02 actively transmitted on the low channel of 2405 MHz, middle channel of 2440 MHz and high channel of 2480 MHz using Constant Stream Mode at Max Output With O-QPSK Modulation for Zigbee Radio and tested while operated in Receive Mode (Rx).

Fundamental Frequencies	Tx Low, Middle and High Channels at 2405 MHz, 2440 MHz and 2480 MHz	Receive Mode (Rx)
Test Standards / Limits	47 CFR 15.207 and RSS-Gen, 8.8	
EUT Type	Radiated Sample transmitting in Constant Stream Mode	Radiated Sample in Receive Mode
Manufacturer	Lutron Electronics	
Model	LU-PH3-A	
Sample Number	2328-03	
EUT Power	120 Vac / 60 Hz	
Test Date	07/15/2024	
Temperature / Humidity	24°C / 54% RH	
Test Configuration	Lutron Model RRL-MWCL Sample 2328-02 was powered by the Lutron Model LU-PH3-A AC/DC Power Supply. EUT was configured to be either in a transmit continuous constant stream mode or the receive mode during testing.	



4.11.2 Conducted Emissions AC Power Port Test Results (07/15/2024)

Tx @ Low Channel, 2405 MHz, Neutral Line

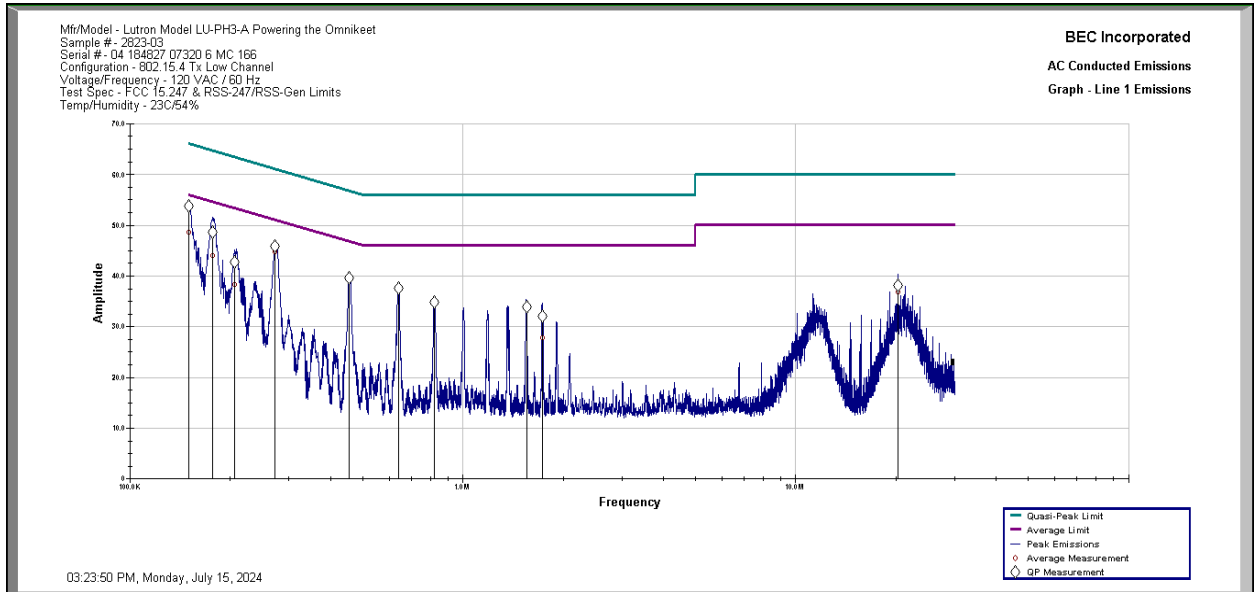
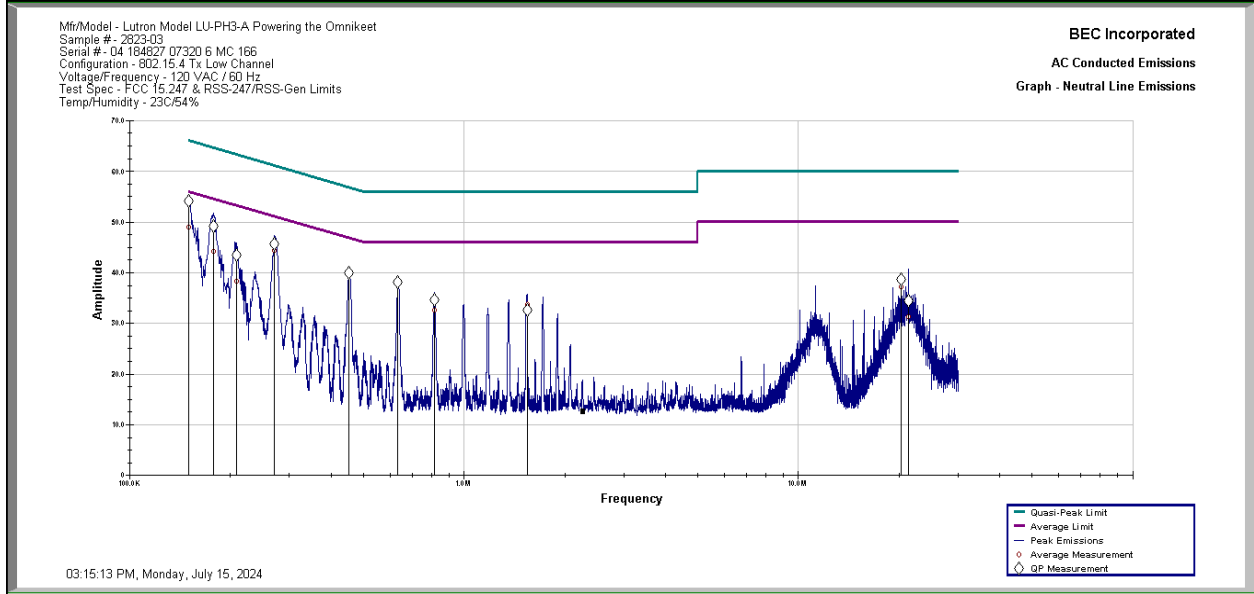
BEC Incorporated Neutral Line Conducted Emissions 03:10:39 PM, Monday, July 15, 2024							
	1	2	3	4	5	6	7
Frequency	AVG	AVG	AVG	QP	QP	QP	Corr
MHz	dBuV	Limit	Margin	dBuV	Limit	Margin	Factor
150.005 KHz	49.00	56.00	-7.00	54.07	66.00	-11.93	10.120
178.029 KHz	44.25	55.20	-10.95	49.19	65.20	-16.01	10.120
207.801 KHz	38.30	54.35	-16.05	43.38	64.35	-20.97	10.118
270.402 KHz	44.34	52.56	-8.22	45.65	62.56	-16.91	10.110
452.394 KHz	39.51	47.36	-7.85	40.02	57.36	-17.34	10.120
633.947 KHz	37.79	46.00	-8.21	38.04	56.00	-17.96	10.130
813.270 KHz	32.58	46.00	-13.42	34.59	56.00	-21.41	10.140
1.542 MHz	33.64	46.00	-12.36	32.66	56.00	-23.34	10.161
20.241 MHz	37.19	50.00	-12.81	38.74	60.00	-21.26	10.522
21.360 MHz	31.34	50.00	-18.66	34.39	60.00	-25.61	10.527
Mfr/Model - Lutron Model LU-PH3-A Powering the Omnikeet							
Sample # - 2823-03							
Serial # - 04 184827 07320 6 MC 166							
Configuration - 802.15.4 Tx Low Channel							
Voltage/Frequency - 120 VAC / 60 Hz							
Test Spec - FCC 15.247 & RSS-247/RSS-Gen Limits							
Temp/Humidity - 23C/54%							

Tx @ Low Channel, 2405 MHz, Phase Line

BEC Incorporated Line 1 Conducted Emissions 03:19:08 PM, Monday, July 15, 2024							
	1	2	3	4	5	6	7
Frequency	AVG	AVG	AVG	QP	QP	QP	Corr
MHz	dBuV	Limit	Margin	dBuV	Limit	Margin	Factor
150.089 KHz	48.63	56.00	-7.37	53.68	66.00	-12.32	10.140
176.587 KHz	44.03	55.24	-11.21	48.68	65.24	-16.56	10.133
206.210 KHz	38.28	54.39	-16.11	42.64	64.39	-21.75	10.130
272.645 KHz	44.72	52.50	-7.78	45.76	62.50	-16.74	10.130
455.215 KHz	39.17	47.28	-8.11	39.67	57.28	-17.61	10.139
639.846 KHz	37.25	46.00	-8.75	37.52	56.00	-18.48	10.150
821.910 KHz	34.45	46.00	-11.55	34.82	56.00	-21.18	10.160
1.552 MHz	33.25	46.00	-12.75	33.85	56.00	-22.15	10.181
1.727 MHz	27.74	46.00	-18.26	32.04	56.00	-23.96	10.185
20.241 MHz	36.74	50.00	-13.26	38.14	60.00	-21.86	10.470
Mfr/Model - Lutron Model LU-PH3-A Powering the Omnikeet							
Sample # - 2823-03							
Serial # - 04 184827 07320 6 MC 166							
Configuration - 802.15.4 Tx Low Channel							
Voltage/Frequency - 120 VAC / 60 Hz							
Test Spec - FCC 15.247 & RSS-247/RSS-Gen Limits							
Temp/Humidity - 23C/54%							



Graphs Tx @ Low Channel, 2405 MHz, Neutral & Phase Lines





Tx @ Middle Channel, 2440 MHz, Neutral Line

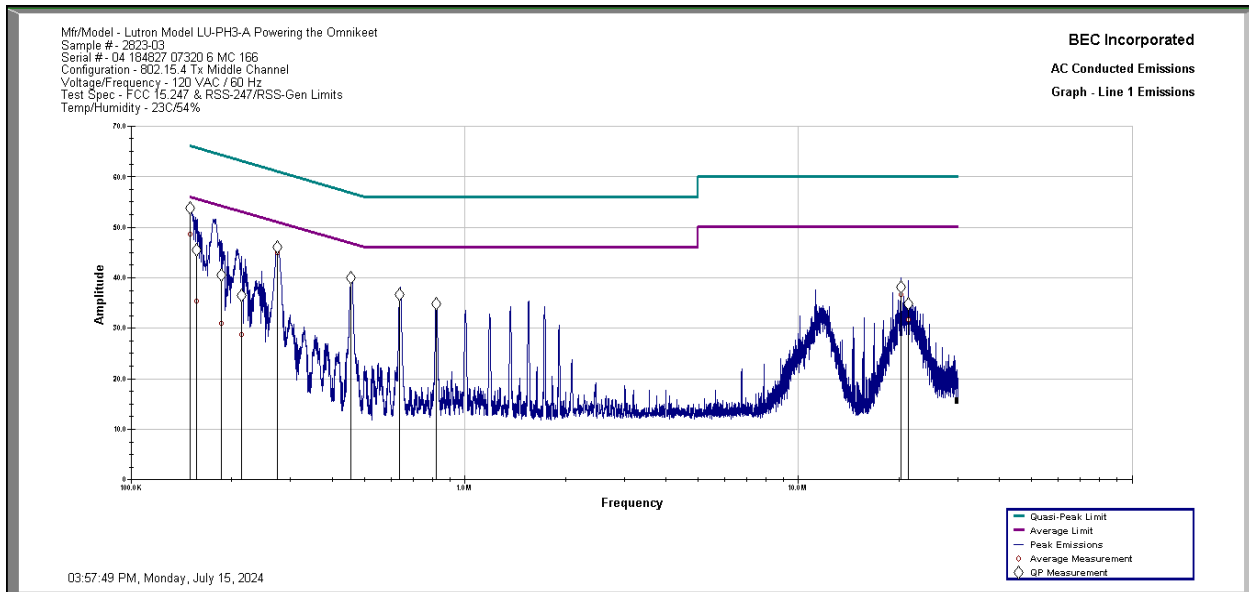
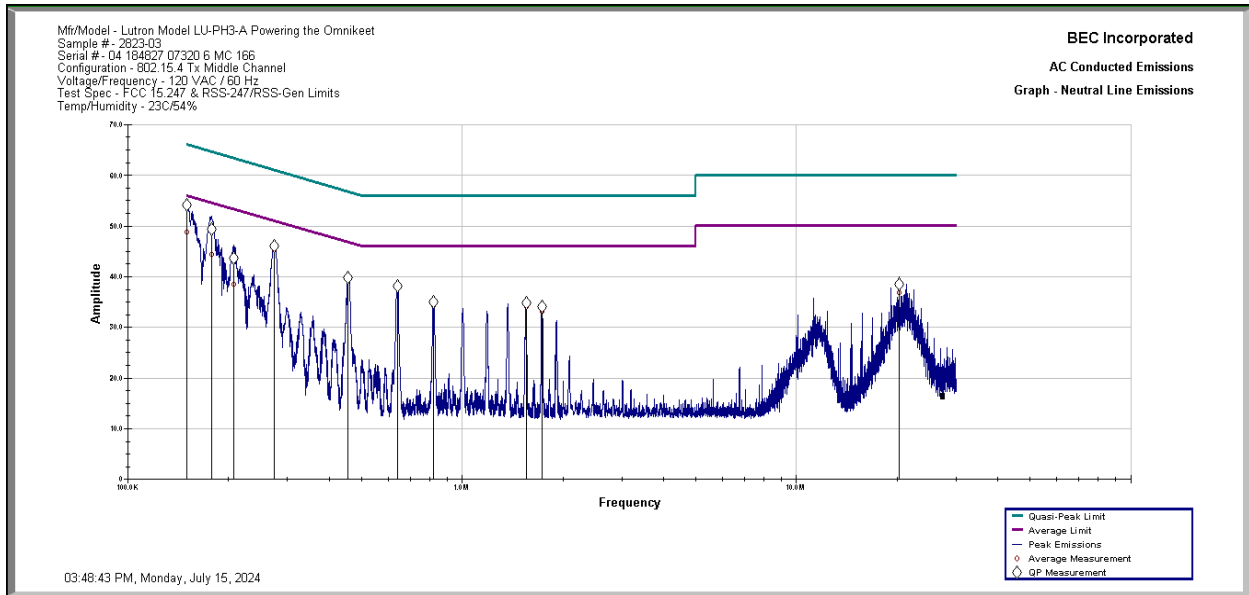
BEC Incorporated							
Neutral Line Conducted Emissions							
03:44:09 PM, Monday, July 15, 2024							
	1	2	3	4	5	6	7
Frequency	AVG	AVG	AVG	QP	QP	QP	Corr
MHz	dBuV	Limit	Margin	dBuV	Limit	Margin	Factor
150.076 KHz	48.88	56.00	-7.12	54.05	66.00	-11.95	10.120
177.527 KHz	44.44	55.21	-10.78	49.38	65.21	-15.83	10.120
207.467 KHz	38.45	54.36	-15.91	43.61	64.36	-20.75	10.119
273.598 KHz	45.24	52.47	-7.23	46.13	62.47	-16.34	10.110
455.114 KHz	39.48	47.28	-7.80	39.83	57.28	-17.45	10.120
638.539 KHz	37.86	46.00	-8.14	38.07	56.00	-17.93	10.130
819.050 KHz	34.25	46.00	-11.75	35.02	56.00	-20.98	10.140
1.552 MHz	34.01	46.00	-11.99	34.83	56.00	-21.17	10.161
1.734 MHz	33.10	46.00	-12.90	34.02	56.00	-21.98	10.165
20.243 MHz	36.87	50.00	-13.13	38.44	60.00	-21.56	10.522
Mfr/Model - Lutron Model LU-PH3-A Powering the Omnikeet							
Sample # - 2823-03							
Serial # - 04 184827 07320 6 MC 166							
Configuration - 802.15.4 Tx Middle Channel							
Voltage/Frequency - 120 VAC / 60 Hz							
Test Spec - FCC 15.247 & RSS-247/RSS-Gen Limits							
Temp/Humidity - 23C/54%							

Tx @ Middle Channel, 2440 MHz, Phase Line

BEC Incorporated							
Line 1 Conducted Emissions							
03:53:01 PM, Monday, July 15, 2024							
	1	2	3	4	5	6	7
Frequency	AVG	AVG	AVG	QP	QP	QP	Corr
MHz	dBuV	Limit	Margin	dBuV	Limit	Margin	Factor
150.092 KHz	48.68	56.00	-7.32	53.77	66.00	-12.23	10.140
156.218 KHz	35.36	55.82	-20.47	45.55	65.82	-20.27	10.140
185.525 KHz	31.01	54.99	-23.97	40.45	64.99	-24.54	10.130
213.252 KHz	28.69	54.19	-25.51	36.44	64.19	-27.75	10.130
273.281 KHz	44.99	52.48	-7.49	45.98	62.48	-16.50	10.130
455.987 KHz	39.40	47.26	-7.86	39.90	57.26	-17.36	10.139
636.787 KHz	36.66	46.00	-9.34	36.70	56.00	-19.30	10.150
822.230 KHz	34.51	46.00	-11.49	34.83	56.00	-21.17	10.160
20.244 MHz	36.63	50.00	-13.37	38.10	60.00	-21.90	10.470
21.372 MHz	31.68	50.00	-18.32	34.90	60.00	-25.10	10.467
Mfr/Model - Lutron Model LU-PH3-A Powering the Omnikeet							
Sample # - 2823-03							
Serial # - 04 184827 07320 6 MC 166							
Configuration - 802.15.4 Tx Middle Channel							
Voltage/Frequency - 120 VAC / 60 Hz							
Test Spec - FCC 15.247 & RSS-247/RSS-Gen Limits							
Temp/Humidity - 23C/54%							



Graphs Tx @ Middle Channel, 2440 MHz, Neutral & Phase Lines





Tx @ High Channel, 2480 MHz, Neutral Line

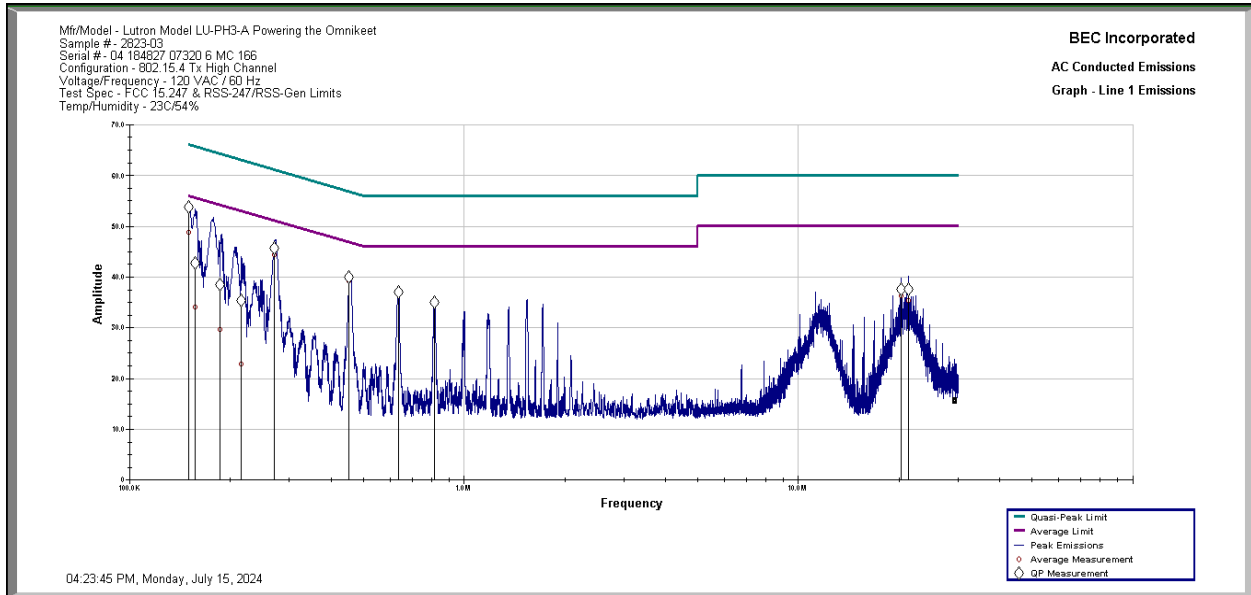
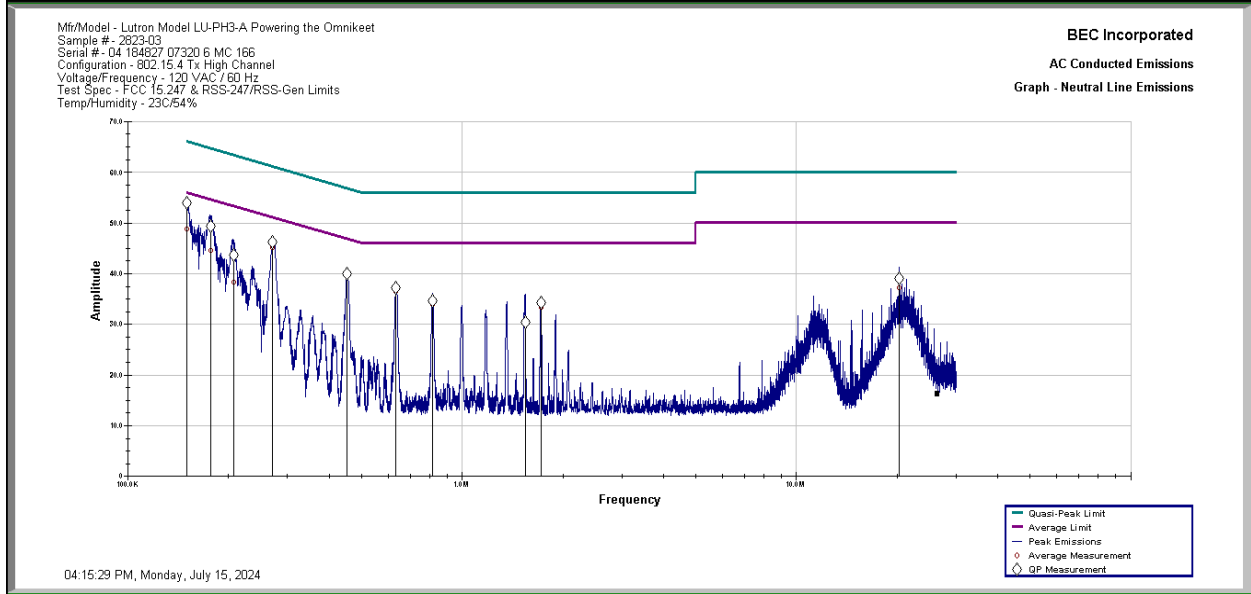
BEC Incorporated Neutral Line Conducted Emissions 04:10:49 PM, Monday, July 15, 2024							
	1	2	3	4	5	6	7
Frequency	AVG	AVG	AVG	QP	QP	QP	Corr
MHz	dBuV	Limit	Margin	dBuV	Limit	Margin	Factor
150.079 KHz	48.83	56.00	-7.17	53.95	66.00	-12.05	10.120
177.097 KHz	44.62	55.23	-10.61	49.41	65.23	-15.82	10.120
207.649 KHz	38.34	54.35	-16.01	43.57	64.35	-20.78	10.118
271.004 KHz	45.16	52.54	-7.39	46.21	62.54	-16.33	10.110
451.767 KHz	39.47	47.38	-7.91	39.95	57.38	-17.43	10.120
632.027 KHz	36.49	46.00	-9.51	37.15	56.00	-18.85	10.130
813.030 KHz	33.88	46.00	-12.12	34.67	56.00	-21.33	10.140
1.544 MHz	30.06	46.00	-15.94	30.42	56.00	-25.58	10.161
1.721 MHz	33.30	46.00	-12.70	34.28	56.00	-21.72	10.164
20.241 MHz	37.23	50.00	-12.77	38.94	60.00	-21.06	10.522
Mfr/Model - Lutron Model LU-PH3-A Powering the Omniket							
Sample # - 2823-03							
Serial # - 04 184827 07320 6 MC 166							
Configuration - 802.15.4 Tx High Channel							
Voltage/Frequency - 120 VAC / 60 Hz							
Test Spec - FCC 15.247 & RSS-247/RSS-Gen Limits							
Temp/Humidity - 23C/54%							

Tx @ High Channel, 2480 MHz, Phase Line

BEC Incorporated Line 1 Conducted Emissions 04:19:06 PM, Monday, July 15, 2024							
	1	2	3	4	5	6	7
Frequency	AVG	AVG	AVG	QP	QP	QP	Corr
MHz	dBuV	Limit	Margin	dBuV	Limit	Margin	Factor
150.000 KHz	48.72	56.00	-7.28	53.75	66.00	-12.25	10.140
156.590 KHz	34.10	55.81	-21.71	42.73	65.81	-23.08	10.140
185.922 KHz	29.58	54.97	-25.39	38.49	64.97	-26.48	10.130
215.615 KHz	22.75	54.13	-31.37	35.45	64.13	-28.68	10.130
270.258 KHz	44.36	52.56	-8.20	45.67	62.56	-16.89	10.130
452.721 KHz	39.18	47.35	-8.17	39.94	57.35	-17.41	10.139
635.039 KHz	36.86	46.00	-9.14	36.93	56.00	-19.07	10.150
814.630 KHz	34.70	46.00	-11.30	34.94	56.00	-21.06	10.160
20.244 MHz	36.24	50.00	-13.76	37.54	60.00	-22.46	10.470
21.367 MHz	35.33	50.00	-14.67	37.53	60.00	-22.47	10.467
Mfr/Model - Lutron Model LU-PH3-A Powering the Omniket							
Sample # - 2823-03							
Serial # - 04 184827 07320 6 MC 166							
Configuration - 802.15.4 Tx High Channel							
Voltage/Frequency - 120 VAC / 60 Hz							
Test Spec - FCC 15.247 & RSS-247/RSS-Gen Limits							
Temp/Humidity - 23C/54%							



Graphs Tx @ High Channel, 2480 MHz, Neutral & Phase Lines





Rx Mode Neutral Line

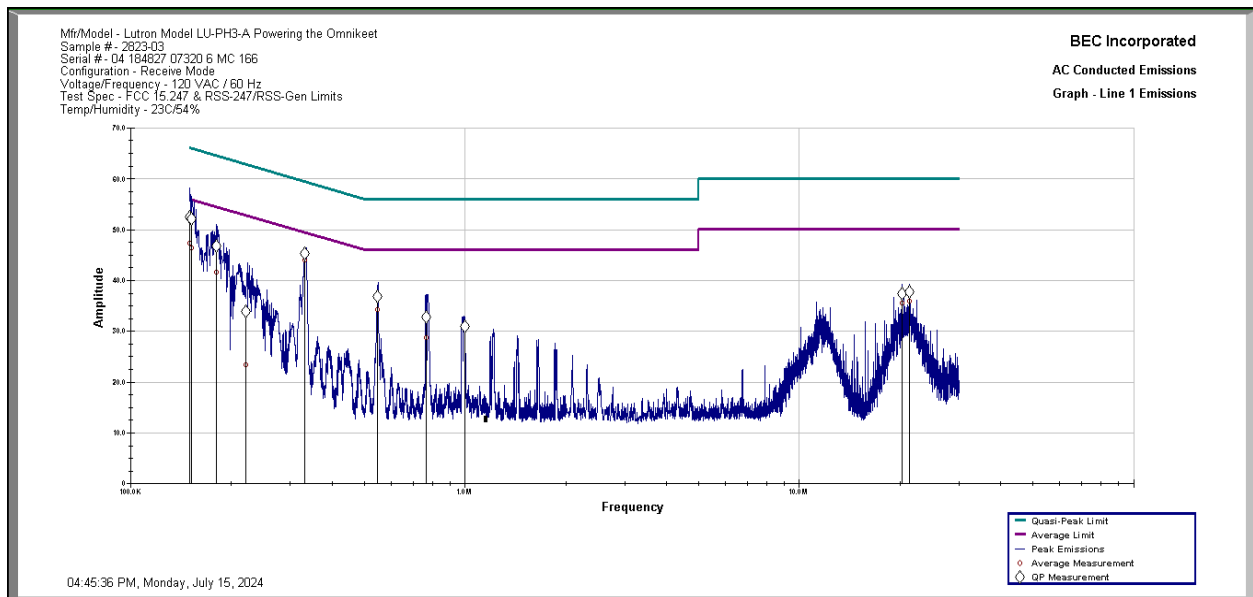
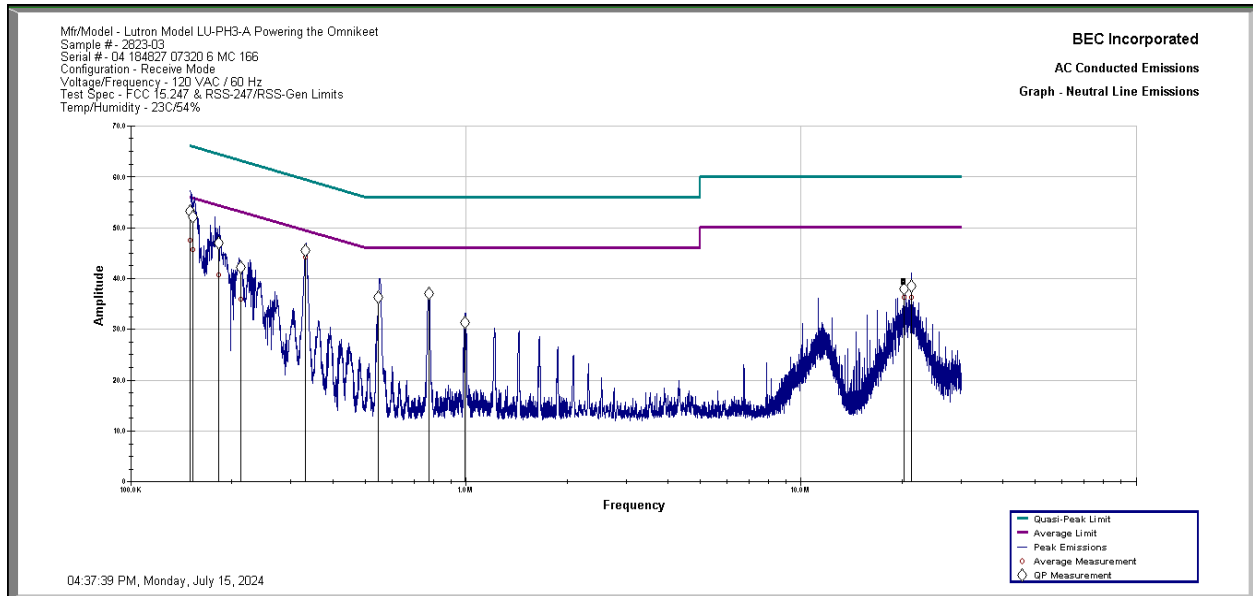
BEC Incorporated Neutral Line Conducted Emissions 04:32:56 PM, Monday, July 15, 2024							
	1	2	3	4	5	6	7
Frequency	AVG	AVG	AVG	QP	QP	QP	Corr
MHz	dBuV	Limit	Margin	dBuV	Limit	Margin	Factor
150.027 KHz	47.43	56.00	-8.56	53.25	66.00	-12.75	10.120
152.788 KHz	45.74	55.92	-10.18	52.05	65.92	-13.87	10.120
182.220 KHz	40.77	55.08	-14.31	46.98	65.08	-18.10	10.120
211.859 KHz	35.97	54.23	-18.27	42.14	64.23	-22.09	10.118
331.722 KHz	44.26	50.81	-6.54	45.50	60.81	-15.31	10.110
547.802 KHz	35.71	46.00	-10.29	36.17	56.00	-19.83	10.125
772.930 KHz	36.81	46.00	-9.19	37.03	56.00	-18.97	10.137
992.010 KHz	30.74	46.00	-15.26	31.37	56.00	-24.63	10.140
20.235 MHz	36.35	50.00	-13.65	38.00	60.00	-22.00	10.522
21.357 MHz	36.31	50.00	-13.69	38.43	60.00	-21.57	10.527
Mfr/Model - Lutron Model LU-PH3-A Powering the Omniket							
Sample # - 2823-03							
Serial # - 04 184827 07320 6 MC 166							
Configuration - Receive Mode							
Voltage/Frequency - 120 VAC / 60 Hz							
Test Spec - FCC 15.247 & RSS-247/RSS-Gen Limits							
Temp/Humidity - 23C/54%							

Rx Mode Phase Line

BEC Incorporated Line 1 Conducted Emissions 04:40:52 PM, Monday, July 15, 2024							
	1	2	3	4	5	6	7
Frequency	AVG	AVG	AVG	QP	QP	QP	Corr
MHz	dBuV	Limit	Margin	dBuV	Limit	Margin	Factor
150.094 KHz	47.26	56.00	-8.73	52.44	66.00	-13.56	10.140
151.965 KHz	46.47	55.94	-9.47	52.16	65.94	-13.78	10.140
179.692 KHz	41.58	55.15	-13.57	46.72	65.15	-18.43	10.130
220.996 KHz	23.47	53.97	-30.50	33.93	63.97	-30.04	10.130
331.733 KHz	43.96	50.81	-6.85	45.33	60.81	-15.48	10.130
545.994 KHz	34.17	46.00	-11.83	36.80	56.00	-19.20	10.144
763.060 KHz	28.66	46.00	-17.34	32.81	56.00	-23.19	10.156
995.430 KHz	30.97	46.00	-15.03	30.86	56.00	-25.14	10.160
20.235 MHz	35.62	50.00	-14.38	37.36	60.00	-22.64	10.470
21.355 MHz	35.99	50.00	-14.01	37.79	60.00	-22.21	10.467
Mfr/Model - Lutron Model LU-PH3-A Powering the Omniket							
Sample # - 2823-03							
Serial # - 04 184827 07320 6 MC 166							
Configuration - Receive Mode							
Voltage/Frequency - 120 VAC / 60 Hz							
Test Spec - FCC 15.247 & RSS-247/RSS-Gen Limits							
Temp/Humidity - 23C/54%							



Graphs Rx Mode Neutral and Phase Lines



Results: The Lutron Model RRL-MWCL Sample 2328-02 powered by the Lutron Model LU-PH3-A Sample 2328-03 supply complies with the requirements of FCC Part 15.207 and RSS-Gen Section 8.8. The margin is 6.54 dB @ 331.722 kHz with Sample 2328-02 transmitting Low Channel, 2405 MHz, Phase Line.



Appendix A – Test Equipment

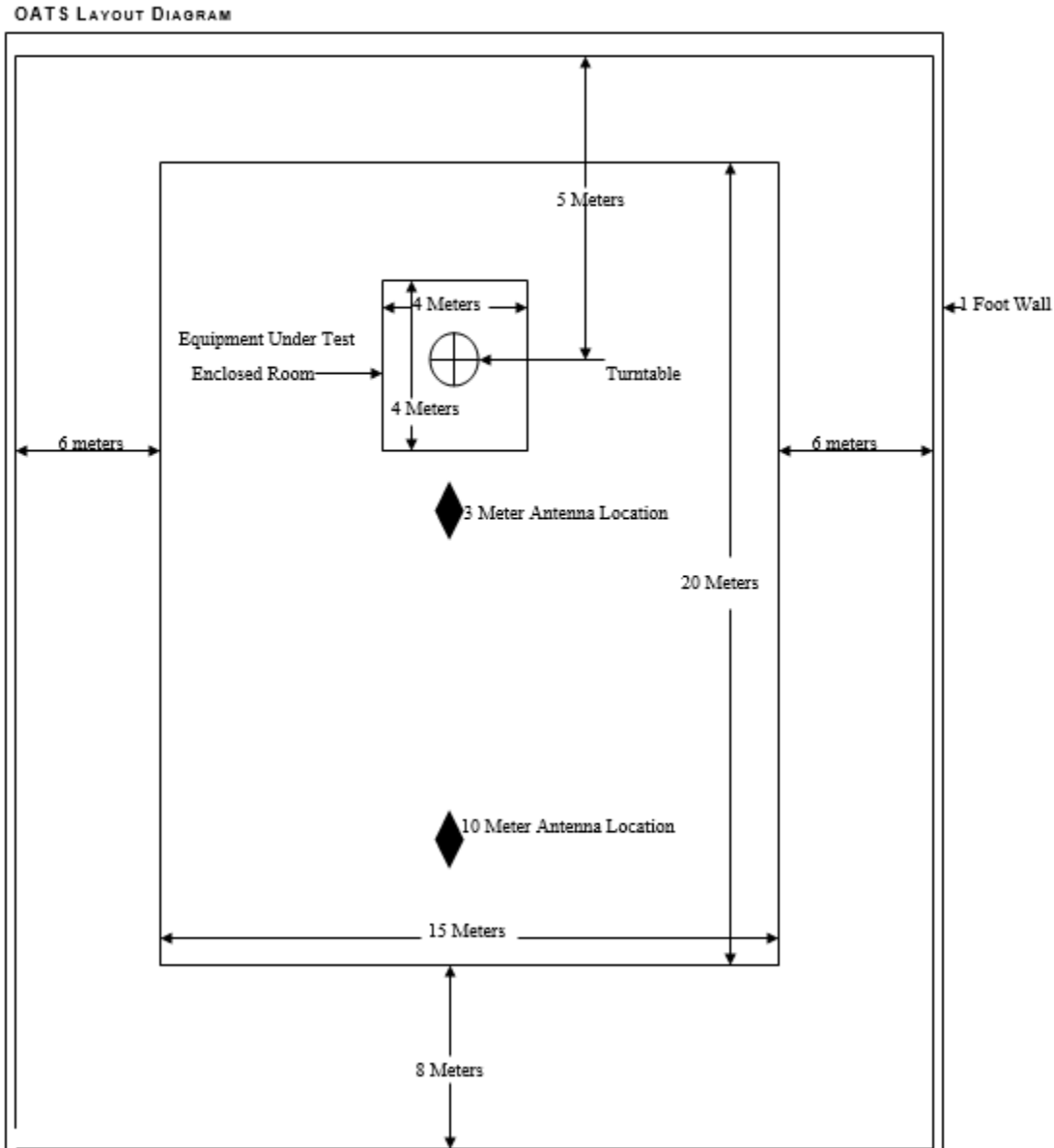
Equipment	Manufacturer	Model #	Serial #	BEC #	Calibration Date	Calibration Cycle	Calibration Due Date
EMI Receiver (20 Hz – 26.5 GHz)	Rohde & Schwarz	ESIB 26	836119/006	1010	12/09/22	3 Years	12/09/25
Antenna (30 MHz - 6 GHz)	Sunol Sciences	JB6	A022108	712	06/27/24	3 Years	06/27/27
9kHz-3GHz EMC Analyzer	Agilent	E7402A	US39440162	883	06/21/21	5 Years	06/21/26
Antenna (30 MHz - 6 GHz)	Sunol Sciences	JB6	A020714	882	05/16/24	3 Years	05/16/27
Amplifier (.09 – 1300 MHz)	Hewlett Packard	8447F	3313A06658	807	01/13/21	5 Years	01/13/26
EMC Analyzer (9 kHz - 26.5 GHz)	Hewlett Packard	8593EM	3710A00214	1026	03/23/20	5 Years	03/23/25
Amplifier System (0.5 – 50 GHz)	Hewlett Packard	83015A 83017A	3123A00360 & 3332A00219	1027	06/16/21	5 Years	06/16/26
Double Ridged Horn Antenna (1 - 18 GHz)	EMCO	3115	9705-5225	1028	11/24/21	3 Years	11/21/24
Antenna (18 - 26.5 GHz)	Hewlett Packard	84125- 80008	N/A	1056	01/18/22	3 Years	01/18/25
OATS Site (30 MHz – 1 GHz)	BEC	N/A	N/A	705	10/06/23	1 Year	10/06/24
Temp/Humidity Meter	Control Company	4096	151872672	780	07/21/22	3 Years	07/21/25



3.5GHz High Pass Filter	Hewlett Packard	84300-80038	005	779	08/04/22	3 Years	08/04/25
EMI Receiver (9 kHz - 6.5 GHz)	Hewlett Packard	8546A	3325A00158	761	03/15/23	3 Years	03/15/26
Four Line V-LISN	TESEQ	NNB 52	253551	950	12/08/22	3 Years	12/08/25
Software (Tile Instrument Control System)	Quantum Change/EMC Systems	Version 3	N/A	N/A	No Cal. Required	No Cal. Required	No Cal. Required
Radiated Emissions Test Software	BEC	RADE	2.2	N/A	No Cal. Required	No Cal. Required	No Cal. Required
Screen Room	ETS Lindgren	26W-2/2-0	6065	880	No Cal. Required	No Cal. Required	No Cal. Required
SMA RF Cable-Antenna Conducted Test Setup	Suhner	04272	None	962	07/14/23	3 Years	07/14/26



Appendix B – Open Area Test Site Layout Diagram





Appendix C – Emissions Shielded Room Layout Diagram

SITE DESCRIPTION

The chamber is a 3 Meter semi-anechoic chamber with the ferrite absorbers on all walls and ceiling and is re-categorized as a Fully anechoic chamber when absorbers are added in between the test area and measurement antenna. The turn-table and mast are controlled externally by the ETS Lindgren 2090 Controller. The metal computer floor provides the ground plane for the site. Inside room dimensions are 22' Long by 13' Wide by 11'5" High. Outside room dimensions are 22'8" Long by 14' Wide by 12'9" High.

