



**BEC INCORPORATED**

**CERTIFICATION APPLICATION TEST REPORT**

**TEST STANDARDS:**

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

**EUT:**

**Legrand Model 064875  
Wireless Motion Sensor**

**FCC ID: 2AU5D-064875**

**ISED ID: 25764-064875**

**REPORT#: BEC-2188-01**

**TEST DATES: 02/22/2022 – 03/08/2022**

**CUSTOMER:**

**Pass & Seymour/Legrand  
50 Boyd Avenue  
Syracuse, NY 13209**

**PREPARED BY:**

**Paul Banker, Test Engineer**

**REVIEWED and APPROVED BY:**

**Steve Fanella, Quality Manager**

The results described in this report relate only to the item(s) tested. This document shall not be reproduced except in full without prior written permission of BEC Incorporated





## TABLE OF CONTENTS

<b>Notice to Customer .....</b>	<b>4</b>
<b>Revision History .....</b>	<b>4</b>
<b>1.0 Administrative Information.....</b>	<b>5</b>
1.1 Project General Information.....	5
1.2 Preface.....	6
1.3 Laboratory and Customer Information.....	6
1.4 Measurement Uncertainty .....	7
1.5 Test Result Summary Table .....	8
1.6 Condition of Received Sample.....	9
1.7 Climatic Environment .....	9
1.8 Test Equipment .....	9
<b>2.0 Equipment Under Test .....</b>	<b>10</b>
2.1 EUT Description .....	10
2.2 Product Category.....	10
2.3 Product Classification .....	10
2.4 Test Configuration.....	10
2.5 Test Configuration Rationale .....	10
2.6 Test Configuration Diagrams – Zigbee Radio .....	10
2.6.1 Zigbee Configuration – Antenna Conducted Measurement.....	11
2.6.2 Zigbee Configuration – Radiated Measurement.....	11
2.7 EUT Information, Interconnection Cabling and Support Equipment .....	12
2.8 Test Signals and Test Modulation.....	13
2.8.1 Zigbee Radio - Test Signals and Modulation .....	13
2.9 Grounding.....	13
2.10 EUT Modifications .....	13
<b>3.0 Applicable Requirements, Methods, and Procedures .....</b>	<b>14</b>
3.1 Applicable Requirements .....	14
3.1.1 FCC Requirements .....	14
3.1.2 Industry Canada Requirements.....	14
3.1.3 Basic Test Methods and Test Procedures .....	14
3.2 Deviations or Exclusions from the Requirements.....	14
<b>4.0 Test Results.....</b>	<b>15</b>
4.1 Antenna Requirement (47 CFR 15.203)(RSS-GEN ANNEX A (10)(g)).....	15
4.2 External RF power amps/antenna modifications (47 CFR 15.204)(RSS-GEN 8.3).....	15
4.3 Conducted Emissions AC Power Port (47 CFR 15.207)(RSS-GEN 7.2) .....	15
4.4 Emissions in Non-Restricted and Restricted Frequency Bands, 30 MHz - 25 GHz (47 CFR 15.205, 15.209)(RSS-GEN 8.9, 8.10) .....	15
4.4.1 Radiated Spurious Emissions Test Facility .....	16
4.4.2 Emissions in Non-Restricted and Restricted Frequency Bands Test Procedure .....	17
4.4.3 Emissions in Frequency Bands 30 MHz – 1000 MHz Test Results Legrand Model 064875 with Zigbee Radio (02/28/2022 to 03/01/2022).....	18
4.4.4 Emissions in Frequency Bands 1 GHz - 18 GHz Test Results Legrand Model 064875 with Zigbee Radio (02/23/2022).....	20
4.4.5 Emissions in Frequency Bands 18 GHz - 25 GHz Test Results Legrand Model 064875 with Zigbee Radio (02/24/2022).....	22



4.5	Operating Bandwidth (FCC Section 15.247(a)(2) RSS-247 5.2(a))	23
4.5.1	DTS Bandwidth – Test Procedure	23
4.5.1.1	DTS Bandwidth Test Results Legrand Model 064875 with Zigbee Radio (02/28/2022)	23
4.6	99% Occupied Bandwidth (RSS-247 5.2(a))	26
4.6.1	99% Occupied Bandwidth Test Procedure	26
4.6.1.1	99% Occupied Bandwidth Test Results Legrand Model 064875 with Zigbee Radio (02/28/2022)	27
4.7	Maximum Conducted (Average) Output Power and EIRP (FCC Part 15.247(b)(3), RSS-247 Section 5.4(d))	30
4.7.1	Maximum Conducted (Average) Output Power Test Procedure	30
4.7.1.1	Maximum Conducted (Average) Output Power Test Results Legrand Model 064875 with Zigbee Radio (03/08/2022)	31
4.7.2	EIRP Level Test Procedure (RSS-247 5.4(d))	33
4.7.2.1	EIRP Level Test Results Legrand Model 064875 with Zigbee Radio (03/08/2022)	33
4.8	Emissions in Non-restricted Frequency Bands 30 MHz – 25 GHz (FCC Section 15.247(d), RSS-247 Sec.5)	34
4.8.1	Emissions in Non-restricted Frequency Bands 30 MHz – 25 GHz Test Procedure	34
4.8.2	Emissions in Non-restricted Frequency Bands 30 MHz – 25 GHz 30 dB Reference Measurement	35
4.8.2.1	Legrand Model 064875 with Zigbee Radio Reference Measurement, Channel 26 2480 MHz (03/01/2022)	35
4.8.2.2	Emissions in Non-restricted Frequency Bands Test Results Legrand Model 064875 with Zigbee Radio (03/01/2022)	36
4.9	Power Spectral Density (FCC 15.247(e), RSS-247 5.2(b))	41
4.9.1	Power Spectral Density Test Procedure	41
4.9.1.1	Power Spectral Density (Average) Test Results Legrand Model 064875 with Zigbee Radio (02/28/2022)	41
4.10	Band-Edge Measurement (FCC Part 15.247(d), RSS-247 5.5)	44
4.10.1	Band-Edge Measurement Test Procedure	44
4.10.1.1	Lower Authorized-Band Band-Edge Test Results Legrand Model 064875 with Zigbee Radio (03/02/2022)	45
4.10.1.2	Upper Restricted-Band Band-Edge Test Results Legrand Model 064875 with	48
<b>Appendix A – Legrand 064875 with Zigbee Radio Test Setup Pictures</b>		<b>51</b>
<b>Appendix B – Test Equipment</b>		<b>51</b>



## 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.**

BEC will not disseminate this report to other parties without your express permission. You may reproduce this report in its entirety including this notice and the entireties of any supplemental test reports on the same product (e.g. reports on additional testing following modification). However 'you may not reproduce portions of the report (except for the entirety of the summary section) or quote from it for any purpose without specific prior written permission from BEC'.

## 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 Project General Information

<b>Project Number</b>	BEC-2188	
<b>Manufacturer</b>	Legrand	
<b>EUT Description</b>	Legrand Model 064875 Wireless Motion Sensor	
<b>EUT Test Models</b>	064875	064875
<b>EUT Sample Test Types</b>	Standard antenna and radio test software	SMA connector at antenna port and radio test software
<b>EUT Serial Numbers</b>	None	None
<b>EUT Sample Numbers</b>	2188-01	2188-02
<b>FCC ID</b>	2AU5D-064875	
<b>ISED ID</b>	25764-064875	
<b>Zigbee Radio Chip Manufacturer</b>	Atmel	
<b>Zigbee Radio Chip Model</b>	SAMR21E	
<b>Radio Type</b>	Zigbee	
<b>Frequency of Operation</b>	2405 – 2480 MHz	
<b>Modulation Type</b>	O-QPSK	
<b>Antenna Gain</b>	+ 5.60 dBi	
<b>FCC Classification</b>	Digital Transmission System (DTS)	
<b>Samples Received</b>	02/07/2022	
<b>Condition Received</b>	Suitable for test	
<b>Sample Type</b>	Production units	
<b>Firmware Versions</b>	testRadio_ntls.bin	
<b>Applicable FCC Rules</b>	FCC Rules Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz Direct Sequence System	
<b>Applicable ISED Rules</b>	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

<b>Test Laboratory Location</b>	BEC Incorporated 970 East High Street Pottstown, PA 19464
<b>Test Personnel</b>	Paul Banker / Steve Fanella / JR Fanella
<b>BEC Laboratory Number FCC Registration</b>	US1118
<b>BEC Laboratory Number ISED Registration</b>	7342A-1
<b>Test Performed For</b>	Pass & Seymour/Legrand 50 Boyd Avenue Syracuse, NY 13209
<b>Customer Technical Contacts</b>	Collin Richards
<b>Customer Reference Number</b>	PO # SP118148-802



## 1.4 Measurement Uncertainty

Measurement	Measurement Distance	Range	Measurement Limit	Expanded Uncertainty
Radiated Disturbance Open Area Test Site	3 Meter	30 MHz – 1 GHz	Class A or B	4.27
Radio Frequency*	N/A	1 MHz – 6 GHz	N/A	±0.027 ppm
RF power, conducted*	N/A	1 MHz – 6 GHz	N/A	±0.91 dB
Conducted spurious* emission of transmitter, valid up to 6 GHz	N/A	150 kHz – 6 GHz	N/A	±2.41 dB
Temperature*	N/A	15 – 35° C	N/A	±0.5 °C
Humidity*	N/A	20 – 95 %	N/A	±2.5%

\*Uncertainties, required by European Union, presented as information only.

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.



## 1.5 Test Result Summary Table

The Legrand Model 064875 was tested and found to be compliant to the sections of the FCC Part 15 Subpart C and RSS-Gen RSS-247 standards listed below:

Report Section	FCC Part 15, Subpart C	RSS-Gen	RSS-247	Test Description	Result
<a href="#">4.1</a>	15.203(b)	Annex A 10(g)		Antenna Requirement	<b>PASS</b>
<a href="#">4.2</a>	15.204	8.3		External RF power amplifiers and antenna modifications	<b>PASS</b>
<a href="#">4.3</a>	15.207	7.2		Conducted Limits (AC Power) 150 kHz – 30 MHz	<b>N/A*</b>
<a href="#">4.4</a>	15.205(a) 15.209	8.9, 8.10	3.3	Emissions in Non-Restricted and Restricted Frequency Band 30 MHz – 25 GHz	<b>PASS</b>
<a href="#">4.5</a>	15.247(a)(2)		5.2 (a)	6 dB Occupied Bandwidth	<b>PASS</b>
<a href="#">4.6</a>		6.7		99% Occupied Bandwidth	<b>PASS</b>
<a href="#">4.7</a>	15.247(b)(3)		5.4 (d)	Maximum Conducted (Average) Power Output and EIRP	<b>PASS</b>
<a href="#">4.8</a>	15.247(d)		5.5	Emissions in Restricted Frequency Bands 500 kHz – 25 GHz	<b>PASS</b>
<a href="#">4.9</a>	15.247(e)		5.2 (b)	DTS maximum power spectral density level in the fundamental emission	<b>PASS</b>
<a href="#">4.10</a>	15.247(d)		5.5	DTS band-edge emission measurements	<b>PASS</b>

\* EUT is battery powered, there is no AC mains connection.

**Rationale for EUT operation:** The EUT was tested using a Zigbee radio which contained test software that utilized O-QPSK modulation used in normal operation.





## **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 Legrand Model 064875 is a wireless infrared motion detector with adjustable time delay and detection range up to 8 meters. Powered by 2 AA 1.5V batteries. Broadcasts Zigbee RF signal in an IOT network for smart lighting/electrical device control.

### **2.2 Product Category**

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

### **2.3 Product Classification**

47 CFR Part 15, Subpart C, Section 15.247 “DTS Operation within the band of 900 – 928 MHz, 2400 – 2483.5 MHz, and 5725 – 5850 MHz.”

### **2.4 Test Configuration**

Samples of the Legrand Model 064875 Wireless Motion Detector with Zigbee, were tested at the Low Channel 11 at 2405 MHz, Middle Channel 18 at 2440 MHz and High Channel 26 at 2480 MHz. The Legrand Model 064875 with Zigbee radio samples contained control software that can utilize the O-QPSK modulation used in normal operation. The control software also allowed the tester to select an un-modulated transmit signal for the radio of the unit under test or to place the radio in a receive mode. The highest amplitude was determined to be when the radio transmitted without O-QPSK modulation.

### **2.5 Test Configuration Rationale**

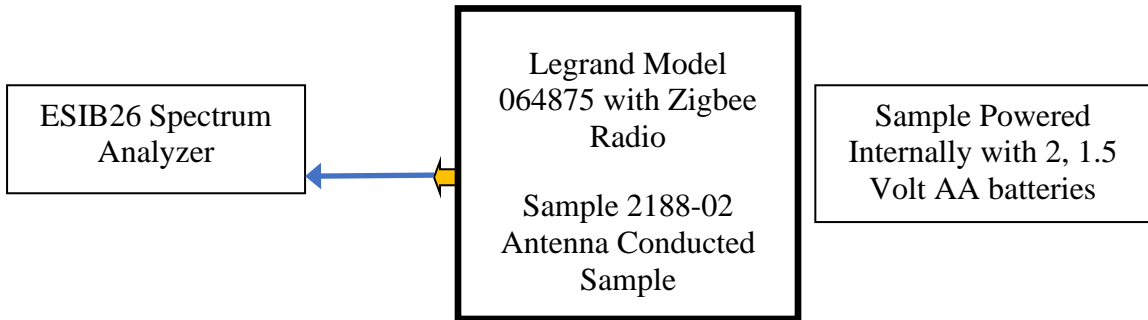
Samples of the Legrand Model 064875, with Zigbee radio, were supplied with battery power and software which controlled the operation of the Zigbee radio in a manner consistent with normal use and typical modulation. This control is necessary in order to perform all required radio testing.

### **2.6 Test Configuration Diagrams – Zigbee Radio**

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. Diagrams show the Conducted Measurement configuration connection and Radiated Measurement configuration connection when testing the Zigbee Radio.



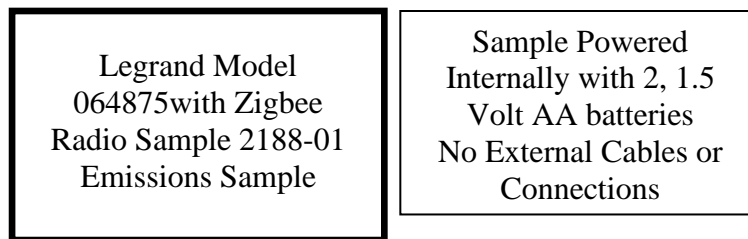
### 2.6.1 Zigbee Configuration – Antenna Conducted Measurement



← BEC-926, 1 Meter SMA Cable Connecting the SMA Connection from the Zigbee Radio Output to the Input of the Rohde and Schwarz ESIB26 Measurement Analyzer

↖ SMA Adapter Connected from the Zigbee Radio for connection to the SMA Cable

### 2.6.2 Zigbee Configuration – Radiated Measurement





## 2.7 EUT Information, Interconnection Cabling and Support Equipment

### EUT Hardware

Description	Manufacturer	Model	Serial Number	Sample Number
Wireless Motion Detector - Radiated Emissions Sample	Legrand	064875	No Serial Number	2188-01
Wireless Motion Detector - Antenna Conducted Sample		064875	No Serial Number	2188-02

### Interconnection Cable List (Antenna Conducted Measurement Test Setup)

Manufacturer	Model	Type	Shielding	Length	Description
Suhner	S04272B	High Frequency RF Cable: 1 to 40 GHz	Double Braid	1 Meter	Measurement Cable from the Antenna SMA Connector to the R&S ESIB26 Receiver. Asset # BEC-962

### Support Equipment

Description	Manufacturer	Model #	Serial #
Qty. 2: 1.5 Volt AA Batteries	Duracell	MN1500	No Serial Number



## 2.8 Test Signals and Test Modulation

By design this product does not have an external modulation input connector, therefore, normal internally generated modulation was used. When evaluating the type of signal that would generate the highest output amplitude, it was determined that un-modulated carrier was slightly higher than the modulated carrier. Therefore, the radiated emissions testing was performed transmitting un-modulated signals.

### 2.8.1 Zigbee Radio - Test Signals and Modulation

The EUT transmits to a discrete frequency on a specific channel. The Legrand 064875 with Zigbee radio 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 Zigbee radio utilizes one modulation of O-QPSK modulation.

## 2.9 Grounding

There is no ground connection to the Legrand Model 064875.

## 2.10 EUT Modifications

With the exception for the attachment of an SMA connector directly to the antenna output on the main board of the Legrand Model 064875, no modifications were made to the test 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

#### **3.1.2 Industry Canada Requirements**

RSS-Gen Issue 5: General Requirements for Compliance of Radio Apparatus

RSS-247 Issue 2: 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**

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

ANSI C63.10-2013, American National Standard for Compliance Testing of Unlicensed Wireless Devices.

### **3.2 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 Legrand Model 064875 is a quarter-wave, inverted F wire antenna. The antenna is a trace on the PCB inside the enclosure. 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 Legrand Model 064875. 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 Conducted Emissions AC Power Port (47 CFR 15.207)(RSS-GEN 7.2)**

The Legrand Model 064875 with Zigbee radio is a battery powered unit and therefore does not require the Conducted Emissions AC Power Port testing.

### **4.4 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 Legrand Model 064875 with Zigbee Radio, which fall in the restricted bands of operation, detailed in this section, comply with the limits of 15.209. The Legrand Model 064875 was tested at three frequencies: Low (2405 MHz), Middle (2440 MHz) and High (2480 MHz). The transmit carrier was un-modulated.

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 designated in the tables below.



#### **4.4.1 Radiated Spurious Emissions 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 attenuation measurements specified in ANSI C63.4.

##### **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. This 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.





## 4.4.2 Emissions in Non-Restricted and Restricted Frequency Bands 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 1GHz with the appropriate CISPR bandwidths were employed.

Three orthogonal positions of the EUTs were evaluated for maximum emissions. The position of the EUT placed face up with the buttons facing the measurement antenna on the surface of the 80-cm table was determined to be the axis that produced the highest emissions for the Legrand Model 064875.

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:

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

The EUT was tested in the 30 to 1000 MHz, 1 to 18 GHz and then 18 to 25 GHz frequency ranges. The Legrand Model 064875 with Zigbee radio sample was tested with the radio transmitting at low, middle and high frequencies and while in receive mode (non-transmission). The Zigbee radio was tested with and without O-QPSK modulated transmission signals. Standard resolution and video bandwidths applied to measurements. The highest transmissions amplitude was determined to be without modulation.

The following tables are the highest emissions recorded and summarized. The use of the 15.209 limit table for restricted band emissions is not required but ensures compliance to 15.205 and 15.209. The signals in the tables that fall into the restricted bands, described in 15.205, are marked with an asterisk.

Photographs of the radiated emissions test setups are in Appendix A of this radio grant submission.



### 4.4.3 Emissions in Frequency Bands 30 MHz – 1000 MHz Test Results Legrand Model 064875 with Zigbee Radio (02/28/2022 to 03/01/2022)

Radiated emissions scans of 30 – 1000 MHz were taken for the EUT configured in the low, middle and high transmission frequencies and in Rx mode. The transmission signals were set for maximum output without modulation.

#### Legrand Model 064875 with Zigbee Radio Tx Low Channel 11, 2405 MHz Unmodulated

Frequency MHz	Peak dBuV/m	QP dBuV/m	Polarity H/V	TT angle degrees	Ant Height cm	Correction Factors dB	FCC 15.205/209 & RSS-247		Result
							3M QP Limit dBuV/m	Margin dB	
* 125.126	16.13	13.54	H	047	198	-6.53	43.52	-29.98	PASS
* 132.384	16.81	13.37	V	314	255	-6.71	43.52	-30.15	PASS
158.198	14.73	12.87	H	115	135	-7.23	43.52	-30.65	PASS
199.975	12.56	13.07	V	177	115	-6.95	43.52	-30.45	PASS
* 264.111	15.58	13.83	V	163	119	-6.03	46.02	-32.19	PASS
380.973	17.78	16.42	H	220	245	-4.12	46.02	-29.60	PASS
490.272	20.73	19.24	V	174	240	-1.90	46.02	-26.78	PASS
640.983	23.22	21.55	H	004	188	0.24	46.02	-24.47	PASS
642.453	22.69	21.48	V	126	183	0.26	46.02	-24.54	PASS
724.088	24.78	22.27	H	299	245	1.47	46.02	-23.75	PASS
853.510	24.58	24.46	V	138	176	3.41	46.02	-21.56	PASS
924.126	26.38	24.99	H	279	111	4.27	46.02	-21.03	PASS

\*Restricted Band Signal

#### Legrand Model 064875 with Zigbee Radio Tx Mid Channel 18, 2440 MHz Unmodulated

Frequency MHz	Peak dBuV/m	QP dBuV/m	Polarity H/V	TT angle degrees	Ant Height cm	Correction Factors dB	FCC 15.205/209 & RSS-247		Result
							3M QP Limit dBuV/m	Margin dB	
* 116.193	16.15	13.09	V	020	208	-6.87	43.52	-30.43	PASS
* 124.781	15.51	13.51	H	113	192	-6.53	43.52	-30.01	PASS
145.224	15.73	12.72	H	134	100	-7.27	43.52	-30.80	PASS
158.456	13.28	12.61	V	299	151	-7.23	43.52	-30.91	PASS
* 334.985	17.54	14.78	V	202	162	-4.78	46.02	-31.24	PASS
353.890	16.80	15.40	H	168	225	-4.49	46.02	-30.62	PASS
424.258	20.35	17.40	H	192	188	-3.19	46.02	-28.62	PASS
475.000	19.95	18.82	V	012	130	-2.16	46.02	-27.20	PASS
590.948	21.56	20.40	V	164	141	-0.60	46.02	-25.62	PASS
630.383	22.98	21.04	H	298	101	-0.11	46.02	-24.98	PASS
791.557	23.87	23.35	H	151	245	2.57	46.02	-22.67	PASS
802.689	27.32	23.67	V	254	221	2.77	46.02	-22.35	PASS

\*Restricted Band Signal



**Legrand Model 064875 with Zigbee Radio Tx High Channel 26, 2480 MHz Unmodulated**

Frequency	Peak	QP	Polarity	TT angle	Ant Height	Correction Factors	FCC 15.205/209 & RSS-247		Result
							3M QP Limit	Margin	
MHz	dBuV/m	dBuV/m	H/V	degrees	cm	dB	dBuV/m	dB	
* 120.355	12.91	13.41	V	063	183	-6.57	43.52	-30.11	PASS
* 124.407	14.18	13.22	H	018	204	-6.53	43.52	-30.30	PASS
173.298	13.80	11.70	H	000	115	-8.03	43.52	-31.82	PASS
379.101	17.57	16.26	V	008	104	-4.10	46.02	-29.76	PASS
425.820	18.32	17.23	H	132	140	-3.20	46.02	-28.79	PASS
482.397	20.88	18.96	V	145	151	-2.07	46.02	-27.06	PASS
518.263	20.64	19.48	V	001	156	-1.61	46.02	-26.54	PASS
618.982	24.71	20.16	V	339	220	-0.53	46.02	-25.86	PASS
635.089	22.12	21.17	H	185	130	0.14	46.02	-24.85	PASS
808.015	23.94	23.73	H	071	245	2.92	46.02	-22.29	PASS
860.940	24.60	24.32	V	060	209	3.46	46.02	-21.70	PASS
901.590	24.96	24.48	H	038	241	3.91	46.02	-21.54	PASS

\*Restricted Band Signal

**Legrand Model 064875 with Zigbee Radio, Rx Mode (No Modulation)**

Frequency	Peak	QP	Polarity	TT angle	Ant Height	Correction Factors	FCC 15.205/209 & RSS-247		Result
							3M QP Limit	Margin	
MHz	dBuV/m	dBuV/m	H/V	degrees	cm	dB	dBuV/m	dB	
* 126.267	15.84	13.44	H	062	172	-6.52	43.52	-30.08	PASS
* 126.849	15.41	13.41	V	306	218	-6.52	43.52	-30.11	PASS
* 271.701	13.64	13.95	H	299	144	-5.61	46.02	-32.07	PASS
344.534	17.90	14.96	V	268	243	-4.65	46.02	-31.06	PASS
364.234	16.86	15.82	H	008	178	-4.32	46.02	-30.20	PASS
493.147	19.81	18.96	H	041	156	-1.97	46.02	-27.06	PASS
521.262	21.44	19.49	V	082	244	-1.60	46.02	-26.53	PASS
577.945	20.40	20.15	H	156	209	-0.74	46.02	-25.87	PASS
695.285	23.96	21.87	V	204	166	0.96	46.02	-24.15	PASS
805.709	25.51	23.74	V	068	188	2.85	46.02	-22.28	PASS
808.229	24.35	23.85	H	204	177	2.93	46.02	-22.17	PASS
* 976.926	25.73	25.20	V	191	126	4.75	53.98	-28.78	PASS

\*Restricted Band Signal

**Test Results:** The Legrand Model 064875 with Zigbee Radio complies with the requirements of 47 CFR Part 15.205, 15.209 and RSS-Gen Section 8.10 for non-restricted and restricted bands of operation between 30 MHz – 1000 MHz with a margin of 21.03 dB.



#### 4.4.4 Emissions in Frequency Bands 1 GHz - 18 GHz Test Results Legrand Model 064875 with Zigbee Radio (02/23/2022)

Radiated emissions scans of 1 GHz – 18 GHz were taken for the EUT configured in the low, middle and high transmission frequencies and in Rx mode. The transmission signal was set for maximum output with no modulation.

#### Legrand Model 064875 with Zigbee Radio Tx Low Channel 11, 2405 MHz Unmodulated

Frequency	Peak Level	Average Level	Antenna Polarity	Turntable Angle	Antenna Height	Correction Factor	FCC 15.205/209 & RSS-GEN/RSS-247				Result
							3 Meter Peak Limit	Peak Margin	3 Meter Average Limit	Average Margin	
GHz	dBuV/m	dBuV/m	H/V	degrees	cm	dB	dBuV/m	dB	dBuV/m	dB	
*1.02647	31.82	22.66	H	037	126	-13.41	73.98	-42.16	53.98	-31.32	Pass
*1.37737	32.84	23.04	H	152	190	-11.19	73.98	-41.14	53.98	-30.94	Pass
*4.81000	47.11	41.41	H	188	167	1.51	73.98	-26.87	53.98	-12.57	Pass
*4.81000	52.61	50.01	V	268	176	1.51	73.98	-21.37	53.98	-3.97	Pass
7.21500	49.15	39.65	H	016	218	4.15	73.98	-24.83	53.98	-14.33	Pass
7.21500	50.35	41.45	V	126	257	4.15	73.98	-23.63	53.98	-12.53	Pass
9.62000	51.51	39.91	H	354	165	7.21	73.98	-22.47	53.98	-14.07	Pass
9.62000	51.51	40.81	V	217	191	7.21	73.98	-22.47	53.98	-13.17	Pass

\*Restricted Band Signal

#### Legrand Model 064875 with Zigbee Radio Tx Middle Channel 18, 2440 MHz Unmodulated

Frequency	Peak Level	Average Level	Antenna Polarity	Turntable Angle	Antenna Height	Correction Factor	FCC 15.205/209 & RSS-GEN/RSS-247				Result
							3 Meter Peak Limit	Peak Margin	3 Meter Average Limit	Average Margin	
GHz	dBuV/m	dBuV/m	H/V	degrees	cm	dB	dBuV/m	dB	dBuV/m	dB	
*4.88000	47.71	41.71	H	315	274	1.51	73.98	-26.27	53.98	-12.27	Pass
*4.88000	51.61	48.81	V	112	192	1.51	73.98	-22.37	53.98	-5.17	Pass
*7.30725	43.82	34.32	H	009	108	4.61	73.98	-30.16	53.98	-19.66	Pass
*7.31372	44.13	34.33	V	114	182	4.64	73.98	-29.86	53.98	-19.65	Pass
9.74480	47.41	37.37	V	100	204	6.92	73.98	-26.58	53.98	-16.61	Pass
9.75291	47.46	37.31	H	177	161	6.90	73.98	-26.52	53.98	-16.67	Pass

\*Restricted Band Signal



**Legrand Model 064875 with Zigbee Radio Tx High Channel 26, 2480 MHz Unmodulated**

Frequency	Peak Level	Average Level	Antenna Polarity	Turntable Angle	Antenna Height	Correction Factor	FCC 15.205/209 & RSS-GEN/RSS-247				Result
							3 Meter Peak Limit	Peak Margin	3 Meter Average Limit	Average Margin	
GHz	dBuV/m	dBuV/m	H/V	degrees	cm	dB	dBuV/m	dB	dBuV/m	dB	
*4.96000	48.61	44.31	H	136	235	1.51	73.98	-25.37	53.98	-9.67	Pass
*4.96000	54.61	52.61	V	267	253	1.51	73.98	-19.37	53.98	-1.37	Pass
*7.43647	44.16	34.40	H	330	207	4.73	73.98	-29.82	53.98	-19.58	Pass
*7.43854	47.68	41.09	V	093	223	4.73	73.98	-26.30	53.98	-12.89	Pass
9.91212	47.01	36.51	V	203	207	6.67	73.98	-26.97	53.98	-17.47	Pass
9.91396	46.27	36.88	H	172	182	6.67	73.98	-27.71	53.98	-17.10	Pass

\*Restricted Band Signal

**Legrand Model 064875 with Zigbee Radio, Rx Mode (No Modulation)**

Frequency	Peak Level	Average Level	Antenna Polarity	Turntable Angle	Antenna Height	Correction Factor	FCC 15.205/209 & RSS-GEN/RSS-247				Result
							3 Meter Peak Limit	Peak Margin	3 Meter Average Limit	Average Margin	
GHz	dBuV/m	dBuV/m	H/V	degrees	cm	dB	dBuV/m	dB	dBuV/m	dB	
*1.00534	31.51	20.83	H	342	228	-13.49	73.98	-42.47	53.98	-33.15	Pass
14.16040	56.57	47.04	H	043	100	12.80	73.98	-17.41	53.98	-6.94	Pass
14.39750	56.00	46.96	V	094	245	12.78	73.98	-17.98	53.98	-7.02	Pass
14.53860	55.07	46.97	V	067	218	12.75	73.98	-18.91	53.98	-7.01	Pass
14.96380	55.76	45.30	H	001	231	11.32	73.98	-18.22	53.98	-8.68	Pass
15.26710	53.93	43.87	H	258	145	9.96	73.98	-20.05	53.98	-10.11	Pass
*15.3836	52.93	43.38	H	160	102	9.43	73.98	-21.05	53.98	-10.60	Pass
*15.4434	54.28	43.36	V	163	215	9.19	73.98	-19.70	53.98	-10.62	Pass

\*Restricted Band Signal

**Test Results:** The Legrand Model 064875 with Zigbee Radio complies with the requirements of 47 CFR Part 15.205, 15.209 and RSS-Gen Section 8.10 for non-restricted and restricted bands of operation between 1 GHz – 18 GHz with an Average Margin of 1.37 dB.



#### **4.4.5 Emissions in Frequency Bands 18 GHz - 25 GHz Test Results Legrand Model 064875 with Zigbee Radio (02/24/2022)**

Radiated emissions scans of 18 GHz – 25 GHz were taken for the EUT configured in the low, middle and high transmission frequencies and in Rx mode. The transmission signal was set for maximum output without modulation.

The result of the emissions scans showed no measurable signals between 18 GHz and 25 GHz while the 064875 transmitted on low, middle, high channels and in Receive Mode. All graphs and data for each measurement have been saved and are available upon request.

**Test Results:** The Legrand Model 064875 with Zigbee Radio complies with the requirements of 47 CFR Part 15.205 and RSS-Gen Section 8.10 for non-restricted and restricted bands of operation between 18 GHz and 25 GHz.



## 4.5 Operating Bandwidth (FCC Section 15.247(a)(2) RSS-247 5.2(a))

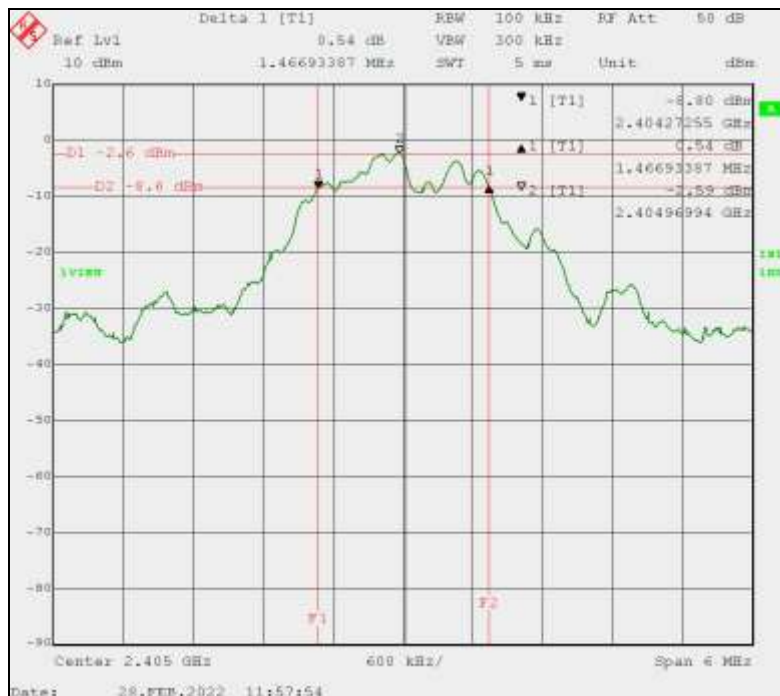
### 4.5.1 DTS Bandwidth – Test Procedure

The EUT transmits a wide-band noise-like signal. The preferred methodology of KDB 558074 is to use an integrated average power measurement as described in 8.3.2. When this option is exercised, the measured power is to be referenced to the OBW rather than the DTS Bandwidth. The parameters dictated by ANSI C63.10 Section 9.6.2 are listed in the following table.

SA Settings			Requirement
Span	6	MHz	2 to 5 times OBW
RBW	100	kHz	1 - 5 % of OBW
VBW	300	kHz	≈3 times RBW
Sweep Time	5	ms	Auto

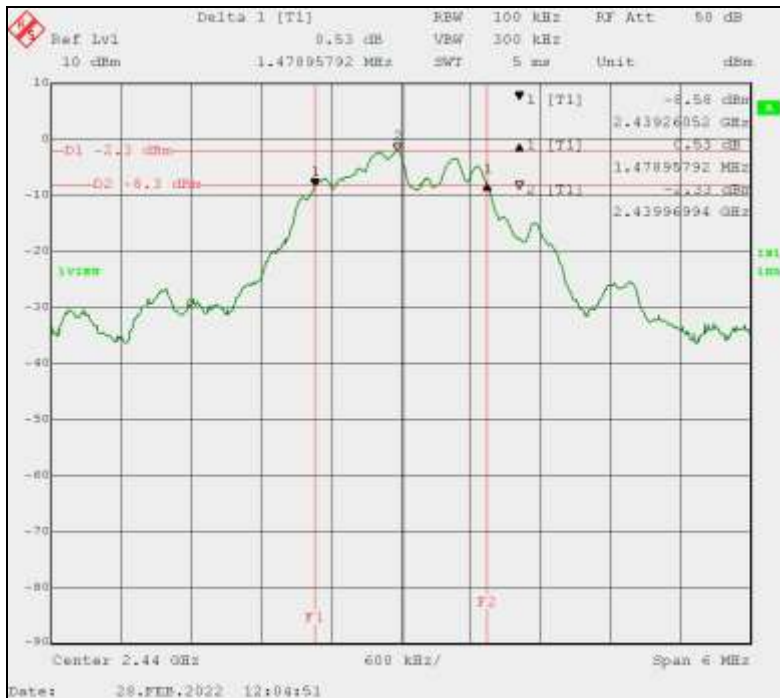
#### 4.5.1.1 DTS Bandwidth Test Results Legrand Model 064875 with Zigbee Radio (02/28/2022)

**Legrand Model 064875 with Zigbee Radio Tx Low Channel 11, 2405 MHz, O-QPSK Modulated**

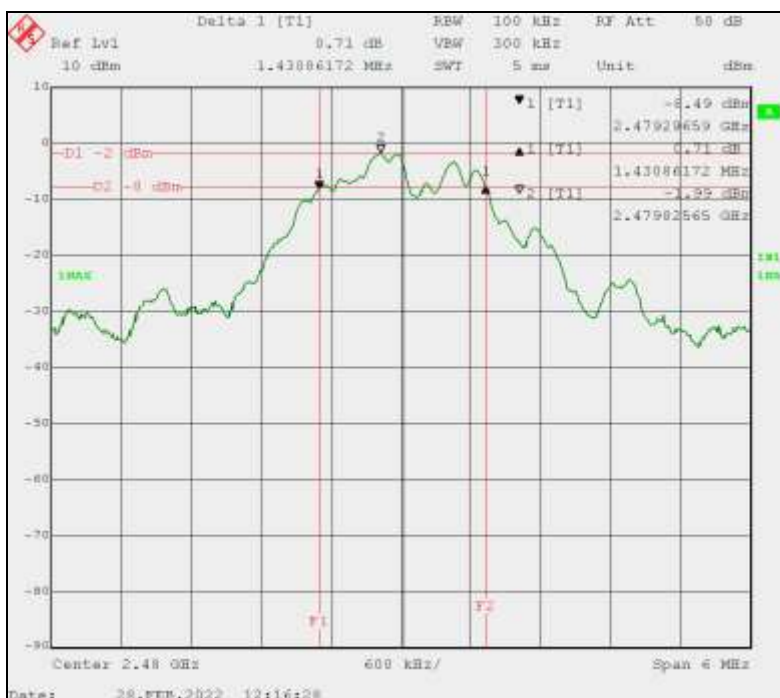




### Legrand Model 064875 with Zigbee Radio Tx Middle Channel 18, 2440 MHz, O-QPSK Modulated



### Legrand Model 064875 with Zigbee Radio Tx High Channel 26, 2480 MHz, O-QPSK Modulated







### Legrand Model 064875 with Zigbee Radio DTS Bandwidth Summary Table

Tx Channel	Tx 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	1466.93	500	966.9	Pass
18	2440.0	1478.96	500	979.0	Pass
26	2480.0	1430.86	500	930.9	Pass

**Test Results:** The 6 dB Occupied Bandwidth measurements for the Legrand Model 064875 with Zigbee Radio were measured and are compliant to the minimum bandwidth requirements. The results are also used to select bandwidths and frequency spans for other radio measurements.



## 4.6 99% Occupied Bandwidth (RSS-247 5.2(a))

### 4.6.1 99% Occupied Bandwidth Test Procedure

RSS-GEN requires the measurement of the 99% bandwidth of the transmitter. The Zigbee radio utilizes only O-QPSK modulation.

ANSI C63.10, Section 6.9.3 permits the use of the automated, bandwidth measurement utility of the spectrum analyzer was used to measure the 99% bandwidth at each of the low, middle and high operating frequencies. The SA settings are listed in the table below.

Spectrum Analyzer Settings for 99% Occupied Bandwidth measurements:

SA Settings			ANSI C63.10 Requirements
Span	5	MHz	(1.5 to 5 times OBW)
RBW	30	kHz	(1 to 5% of OBW)
VBW	100	kHz	(3 X RBW)
Sweep Time	14	ms	Auto
Detector	Peak		Peak
Trace Mode	Max Hold		Max Hold



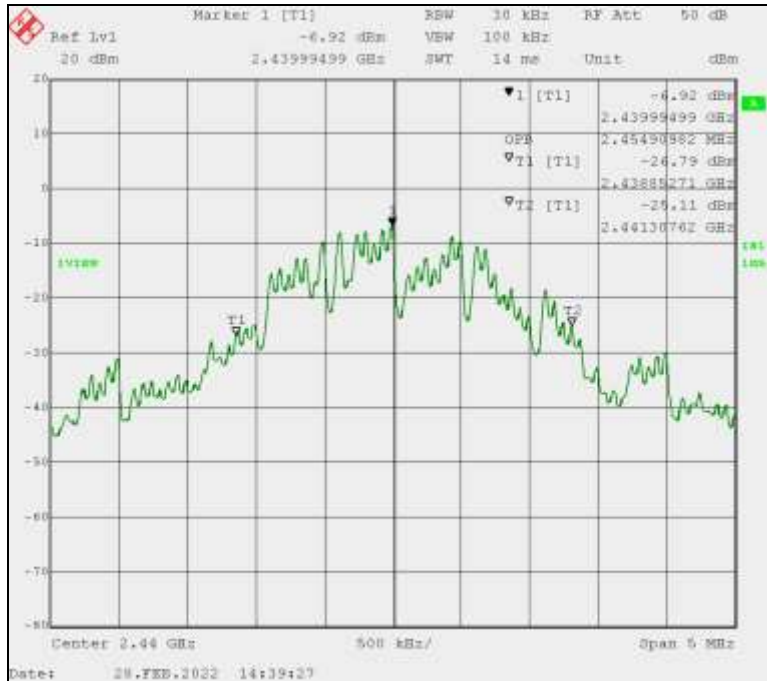
### 4.6.1.1 99% Occupied Bandwidth Test Results Legrand Model 064875 with Zigbee Radio (02/28/2022)

Legrand Model 064875 with Zigbee Radio Tx Low Channel 11, 2405 MHz, O-QPSK Modulated

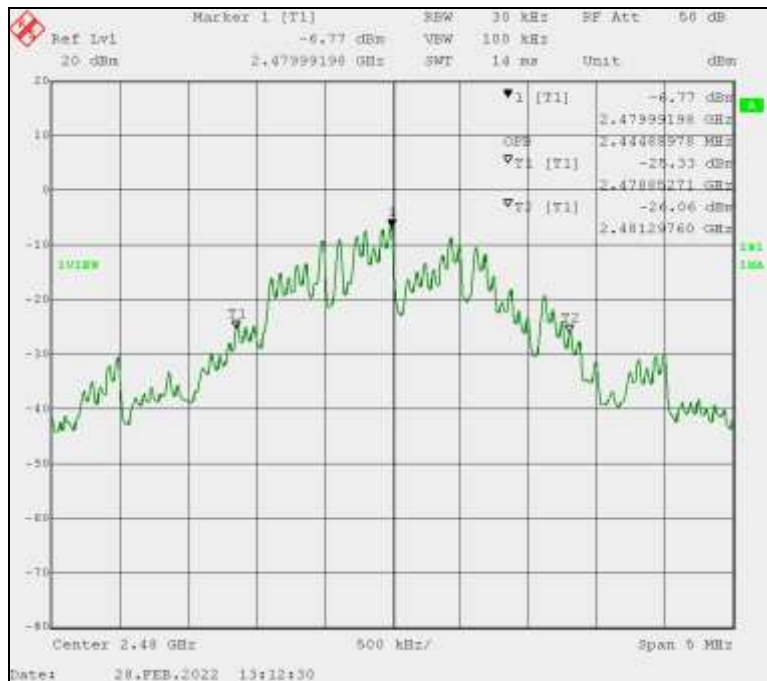




### Legrand Model 064875 with Zigbee Radio Tx Middle Channel 18, 2440 MHz, O-QPSK Modulated



### Legrand Model 064875 with Zigbee Radio Tx High Channel 26, 2480 MHz, O-QPSK Modulated





**Legrand Model 064875 with Zigbee Radio 99% Occupied Bandwidth Summary Table**

Tx Channel	Tx Frequency (MHz)	99% Occupied BW (MHz)
11	2405.0	2.38477
18	2440.0	2.45491
26	2480.0	2.44489

**Test Results:** The 99% Occupied Bandwidth measurements for the Legrand Model 064875 with Zigbee Radio are displayed above and included in the ISED Un-licensed Radio application.



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

### 4.7.1 Maximum Conducted (Average) Output Power Test Procedure

A conducted power measurement of the output frequency of the Zigbee radio was measured according to the guidance of KDB 550874 D01, Section 8.1.c.2). The modulated, transmitter output signal is wide-band and noise-like. The preferred methodology is to use integrated average power measurements. Further guidance from the KDB document identified ANSI C63.10, Section 11.9.2.2.2., (Method AVGSA-1), as the measurement procedure. Spectrum analyzer parameters are listed for the Zigbee radio maximum conducted (average) output power. The channel width for channel power measurement was derived from the 99% OBW test.

Spectrum Analyzer Settings for Zigbee Radio Measurements Maximum Conducted Output Power

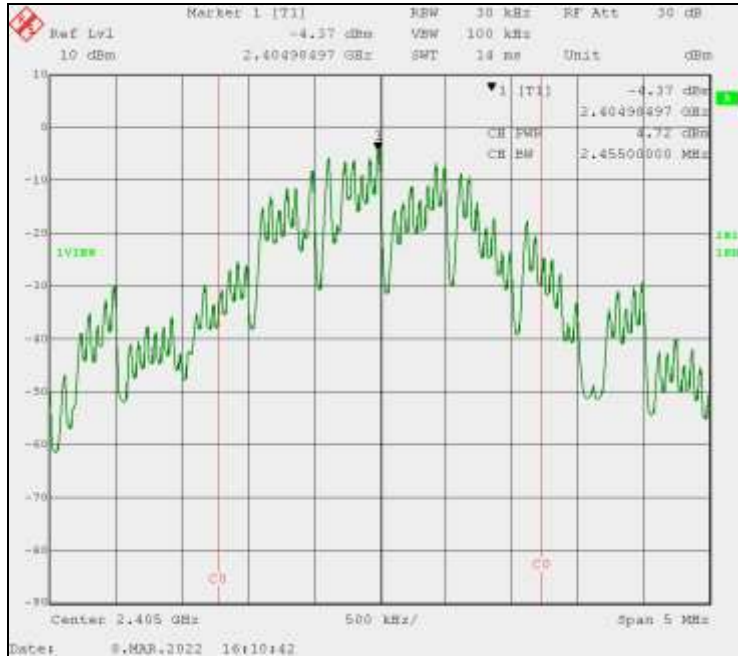
Zigbee Radio, CW & O-QPSK modulation			
Spec Analyzer Settings			ANSI C63.10 requirement
Span	5	MHz	$\geq 1.5$ times OBW
RBW	30	kHz	1% to 5% OBW (Max 1 MHz)
VBW	100	kHz	$\geq 3 \times$ RBW
Sweep	14	ms	Auto

The spectrum analyzer utilized RMS Detection for measurement.

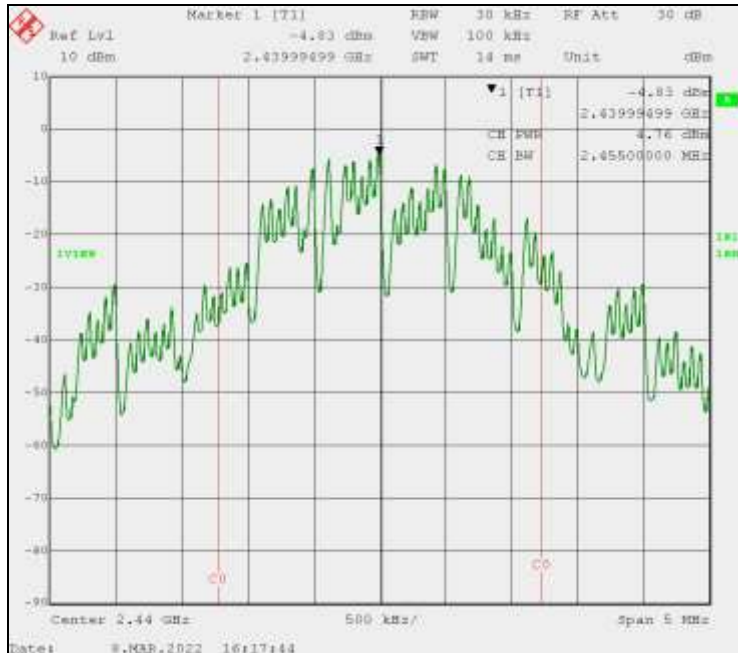


### 4.7.1.1 Maximum Conducted (Average) Output Power Test Results Legrand Model 064875 with Zigbee Radio (03/08/2022)

#### Legrand Model 064875 with Zigbee Radio Tx Low Channel 11, 2405 MHz, O-QPSK Modulated

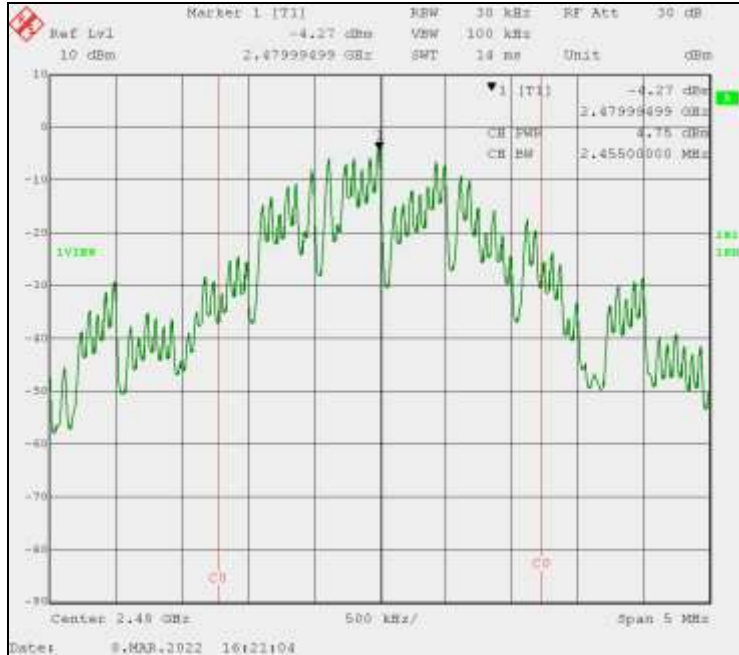


#### Legrand Model 064875 with Zigbee Radio Tx Middle Channel 18, 2440 MHz, O-QPSK Modulated





**Legrand Model 064875 with Zigbee Radio Tx High Channel 26, 2480 MHz, O-QPSK Modulated**



**Legrand Model 064875 with Zigbee Radio Maximum Conducted Average Output Power Summary Table with Modulation**

Tx Channel	Modulation	Tx Frequency (MHz)	Measured Level (dBm)	Cable # 962 Loss (dB)	Total		Limit		Margin		Result
					dBm	Watts	dBm	Watts	dBm	Watts	
11	O-QPSK	2405.0	4.72	0.47	5.19	0.0033	30.00	1.000	-24.81	-0.9967	Pass
18		2440.0	4.77	0.47	5.24	0.0033	30.00	1.000	-24.76	-0.9967	Pass
26		2480.0	4.75	0.47	5.22	0.0033	30.00	1.000	-24.78	-0.9967	Pass

**Test Results:** The Maximum Conducted (Average) Power Output measurements for the Legrand Model 064875 with Zigbee Radio, modulated with O-QPSK and un-modulated, are compliant to the requirements of 47 CFR Part 15.247(b)(3) and ISED, RSS-247 Section 5.4(d).





## 4.7.2 EIRP Level Test Procedure (RSS-247 5.4(d))

The Innovation, Science and Economic Development Canada (ISED), RSS-247 requires the calculation of the Effective Isotropic Radiated Power (EIRP) for the Legrand Model 064875 with Zigbee Radio. Below is the tabular data, using measured power levels from the previous section.

### 4.7.2.1 EIRP Level Test Results Legrand Model 064875 with Zigbee Radio (03/08/2022)

#### Legrand Model 064875 with Zigbee Radio EIRP Level Summary Table with Modulation

Tx Channel	Modulation	Tx Frequency (MHz)	Transmitter Output Total		Antenna Gain		EIRP				Result
			dBm	Watts	Isotropic	Numeric	Total		Limit	Margin	
							dBm	Watts	Watts	Watts	
11	O-QPSK	2405.0	5.19	0.0033	5.60	3.6308	10.79	0.0120	4.00	-3.9880	Pass
18		2440.0	5.23	0.0033	5.60	3.6308	10.83	0.0121	4.00	-3.9879	Pass
26		2480.0	5.22	0.0033	5.60	3.6308	10.82	0.0121	4.00	-3.9879	Pass

**Test Results:** The Effective Isotropic Radiated Power measurements for the Legrand Model 064875 with Zigbee Radio, modulated with O-QPSK and un-modulated, are compliant to the requirements of ISED, RSS-247 Section 5.4(d).



## 4.8 Emissions in Non-restricted Frequency Bands 30 MHz – 25 GHz (FCC Section 15.247(d), RSS-247 Sec.5)

### 4.8.1 Emissions in Non-restricted Frequency Bands 30 MHz – 25 GHz Test Procedure

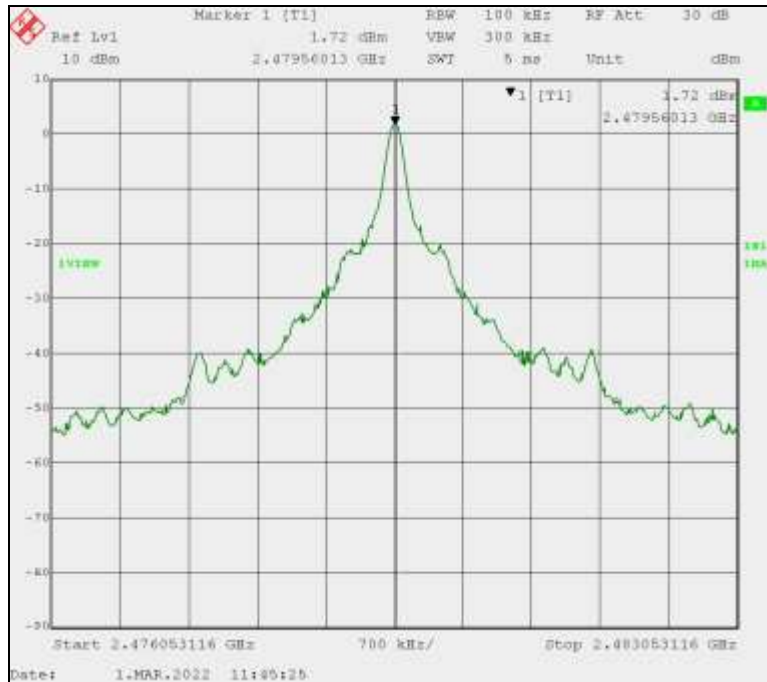
The results in this section, for the Legrand Model 064875 with Zigbee Radio depict the highest emissions while transmitting with no modulation on **Channel 11**. The channels not presented and Receive modes were measured and showed similar but lower emissions. Spectrum Analyzer screens for low, middle, high channels and Receive Mode were recorded and are available upon request. Spectrum Analyzer settings:

Zigbee Radio With No Modulation			
Spectrum Analyzer Settings			ANSI C63.10 requirement
RBW	100	kHz	Required RBW
VBW	300	kHz	Required VBW
Span	Varies	MHz	Encompasses Frequency Range
Sweep	Varies	s	Auto



## 4.8.2 Emissions in Non-restricted Frequency Bands 30 MHz – 25 GHz 30 dB Reference Measurement.

### 4.8.2.1 Legrand Model 064875 with Zigbee Radio Reference Measurement, Channel 26 2480 MHz (03/01/2022)

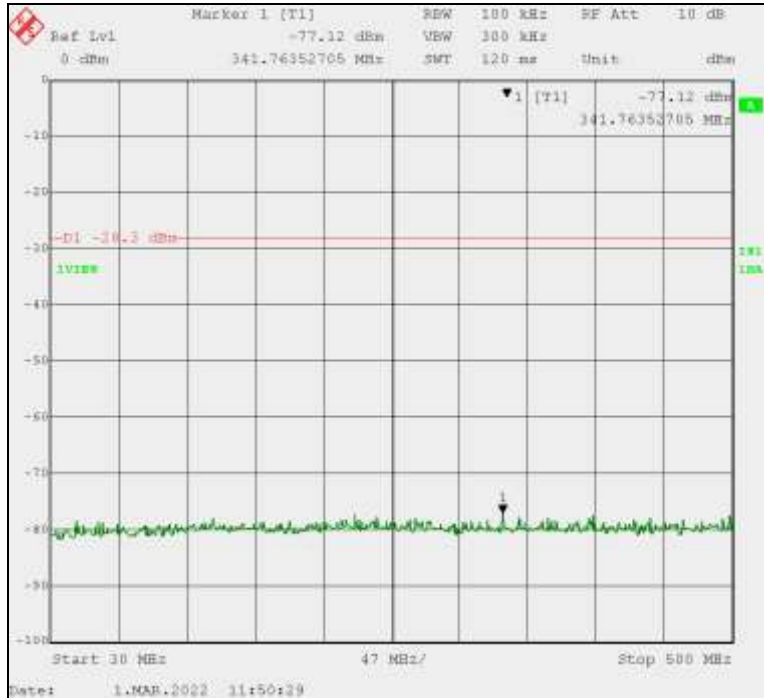


The peak level of 1.7 dBm is the maximum peak output of the Legrand Model 064875 with Zigbee Radio transmitting with no modulation on Channel 26 at full power. The conducted spurious emissions from the antenna port must be 30 dB down from this peak. The resultant limit is therefore -28.3 dBm. This limit is displayed on the plots below.

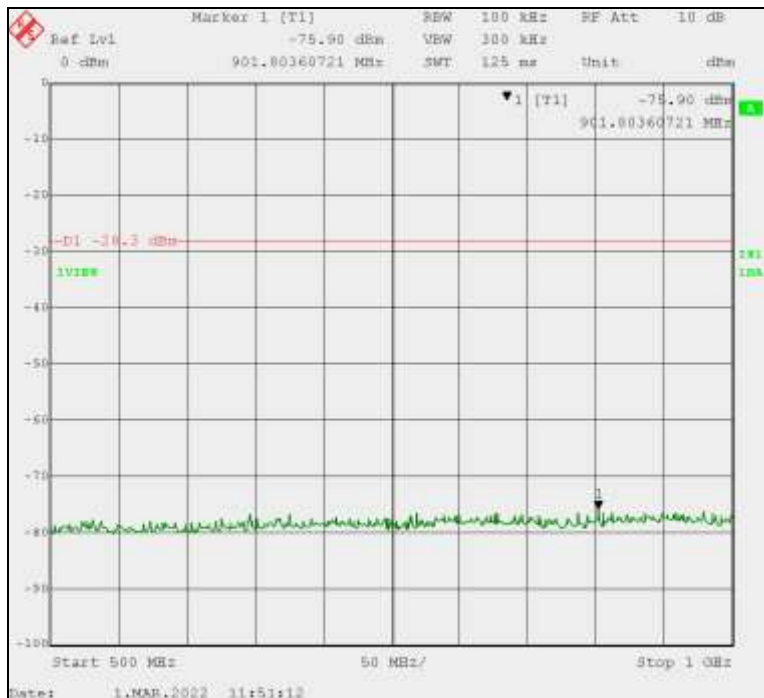


### 4.8.2.2 Emissions in Non-restricted Frequency Bands Test Results Legrand Model 064875 with Zigbee Radio (03/01/2022)

Legrand Model 064875 Zigbee Radio Transmitting Ch.26: 30 MHz – 500 MHz

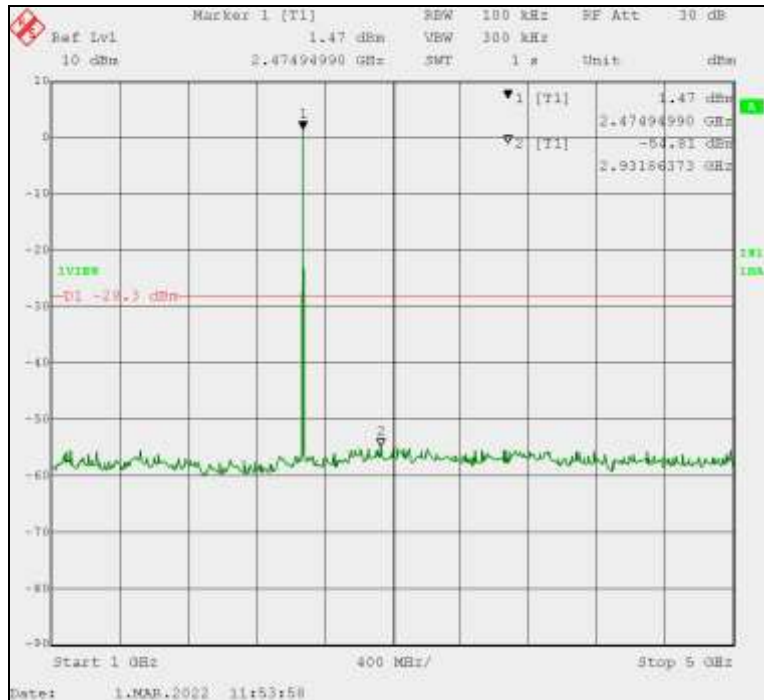


Legrand Model 064875 Zigbee Radio Transmitting Ch.26: 500 MHz – 1 GHz

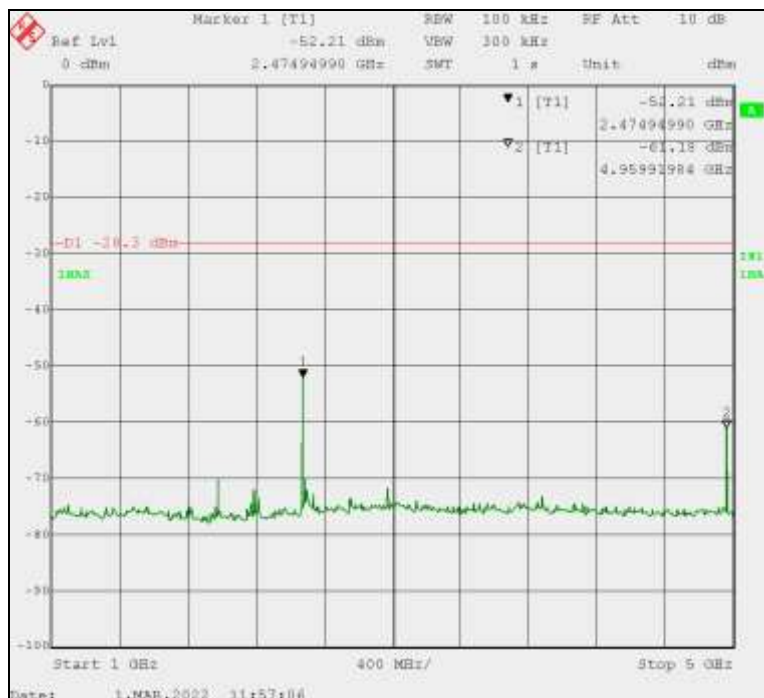




Legrand Model 064875 Zigbee Radio Transmitting Ch.26  
(Without High Pass Filter): 1 GHz – 5 GHz

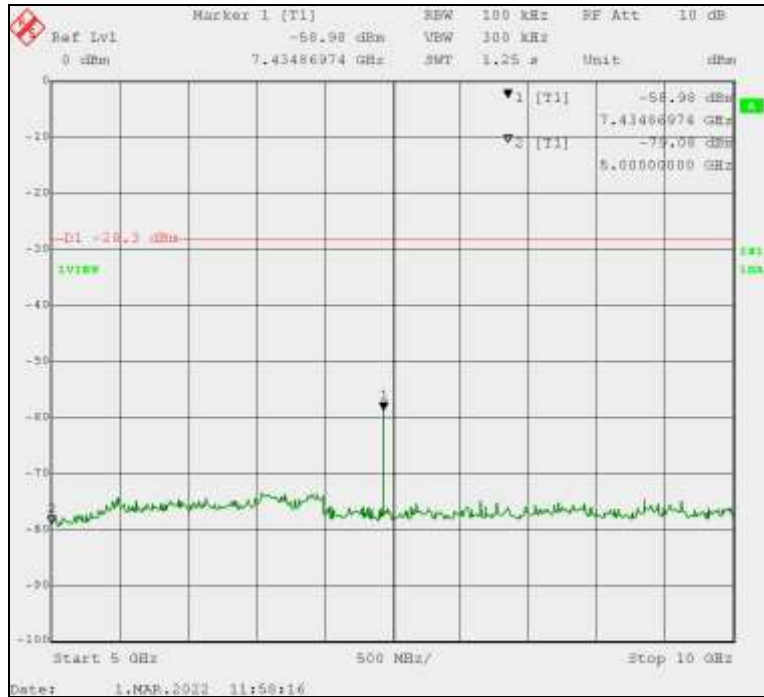


Legrand Model 064875 Zigbee Radio Transmitting Ch.26  
(With High Pass Filter): 1 GHz – 5 GHz

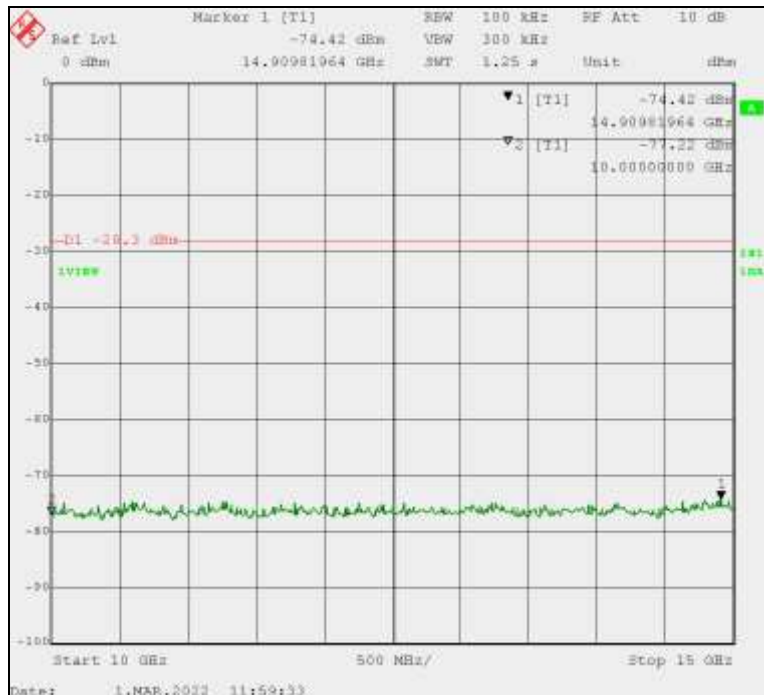




Legrand Model 064875 Zigbee Radio Transmitting Ch.26  
(With High Pass Filter): 5 GHz – 10 GHz

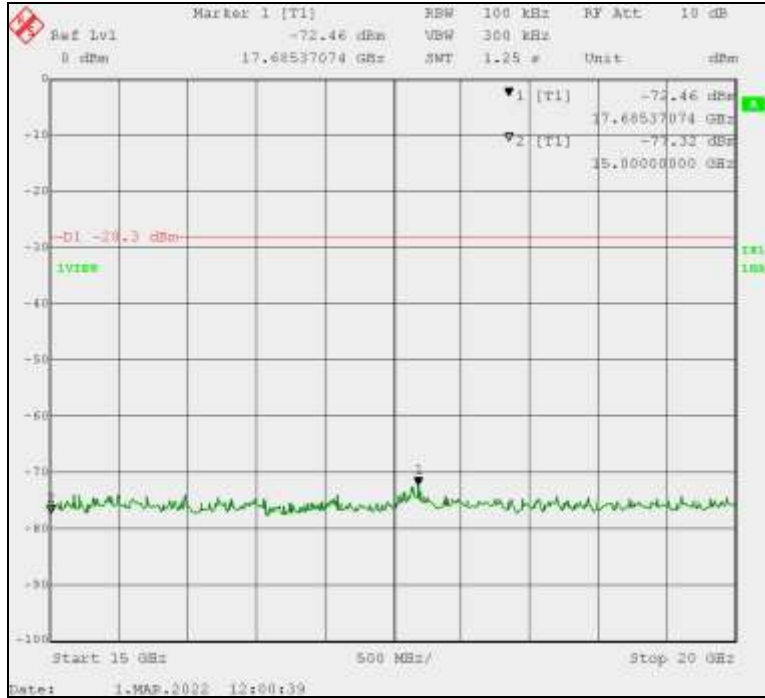


Legrand Model 064875 Zigbee Radio Transmitting Ch.26  
(With High Pass Filter): 10 GHz – 15 GHz

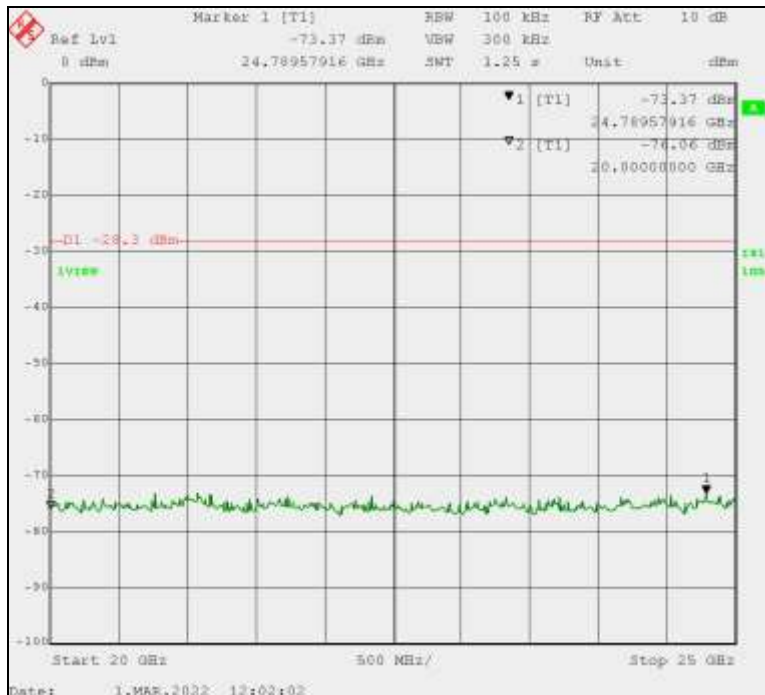




Legrand Model 064875 Zigbee Radio Transmitting Ch.26  
(With High Pass Filter): 15 GHz – 20 GHz



Legrand Model 064875 Zigbee Radio Transmitting Ch.26  
(With High Pass Filter): 20 GHz – 25 GHz





### Peak Emissions Summary Table

Frequency	Peak Level	Correction Factor	Corrected Level	Spurious Limit	Margin	Result
GHz	dBm	dB	dBm	dBm	dB	
0.34176	-77.12	0.14	-76.98	-28.90	-48.08	Pass
0.9018	-75.90	0.27	-75.63	-28.90	-46.73	Pass
2.475	-52.21	0.78	-51.43	-28.90	-22.53	Pass
7.4349	-58.98	0.95	-58.03	-28.90	-29.13	Pass
14.9098	-74.42	1.90	-72.52	-28.90	-43.62	Pass
17.6854	-72.46	2.10	-70.36	-28.90	-41.46	Pass
24.7896	-73.37	3.20	-70.17	-28.90	-41.27	Pass

**Test Results:** Emissions in Non-Restricted Frequency Bands, measured from the Legrand Model 064875 Zigbee Radio, transmitting with modulation on Channel 26 (2480 MHz) comply with the requirements of 47 CFR Part 15.247 (d) and RSS-247 Section 5 with margin of 22.53 dB.





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

### 4.9.1 Power Spectral Density Test Procedure

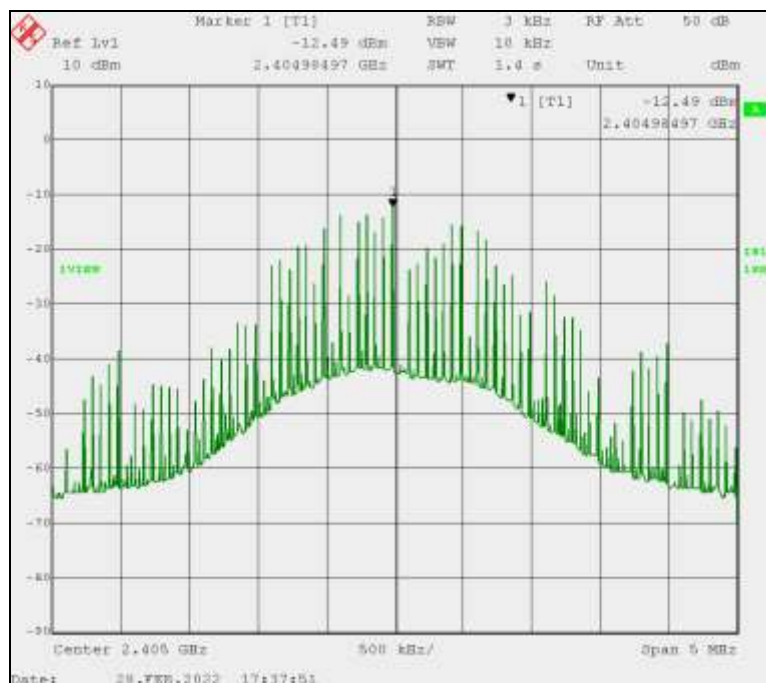
Conducted average power measurement of the output frequency was measured for the Legrand Model 064875 with Zigbee Radio for each of the low, middle and high operating frequencies with O-QPSK modulation. The average conducted output power was measured as directed by KDB 558074 Section 8.1.c.2. Specifically, Method AVGPSD-1, Section 11.10.3, with 3 kHz bandwidth, was used to measure Power Spectral Density.

Spectrum Analyzer Settings for Zigbee Radio Measurements Power Spectral Density

Zigbee Radio, CW & O-QPSK modulation			
Spec Analyzer Settings			Using KDB 558074, 8.4: ANSI C63.10, Method 11.10.3, AVGPSD-1 (average PSD)
Span	5	MHz	
RBW	3	kHz	
VBW	10	kHz	
Sweep	1.4	s	

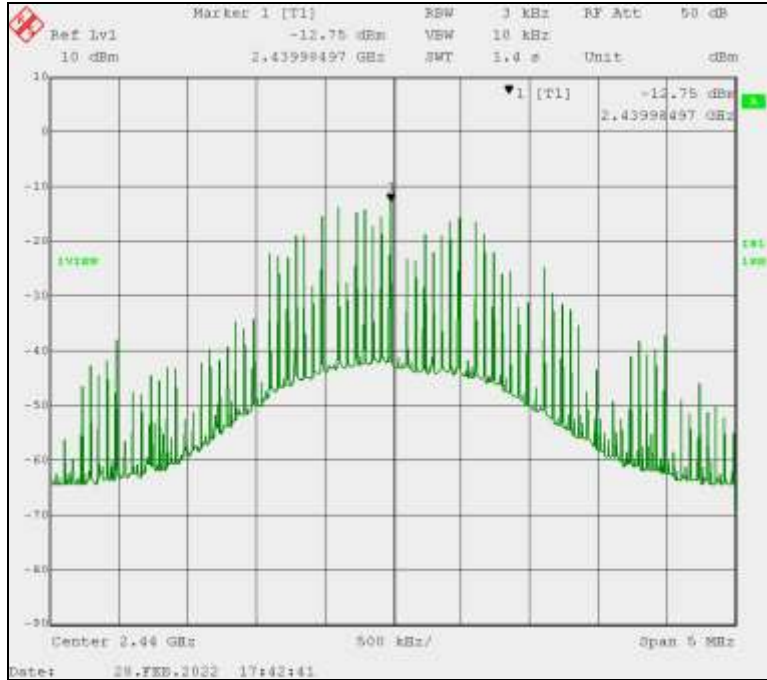
### 4.9.1.1 Power Spectral Density (Average) Test Results Legrand Model 064875 with Zigbee Radio (02/28/2022)

#### Legrand Model 064875 with Zigbee Radio Tx Low Channel 11, 2405 MHz, O-QPSK Modulated

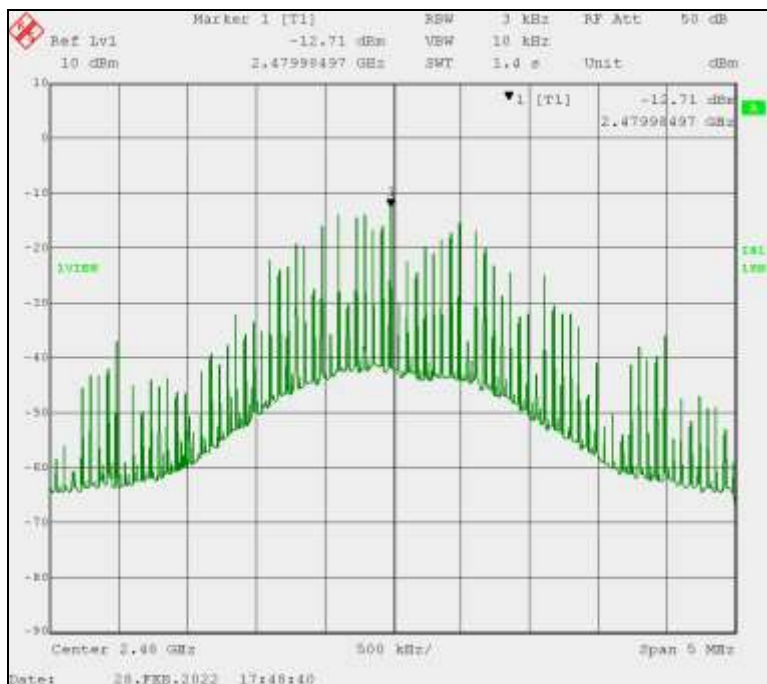




### Legrand Model 064875 with Zigbee Radio Tx Middle Channel 18, 2440 MHz, O-QPSK Modulated



### Legrand Model 064875 with Zigbee Radio Tx High Channel 26, 2480 MHz, O-QPSK Modulated





## Legrand Model 064875 with Zigbee Radio Power Spectral Density Summary Table with Modulation

Tx Channel	Modulation	Tx Frequency (MHz)	Measured Level (dBm)	Cable # 814 Loss (dB)	Total	Limit	Margin	Result
					dBm	dBm	dBm	
11	O-QPSK	2405.0	-12.49	0.47	-12.02	8.00	-20.02	Pass
18		2440.0	-12.75	0.47	-12.28	8.00	-20.28	Pass
26		2480.0	-12.71	0.47	-12.24	8.00	-20.24	Pass

**Test Results:** The Power Spectral Density measurements of the Legrand Model 064875 with Zigbee Radio are compliant with the limits specified in FCC Section 15.247(e) with margin of 20.02 dB.



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

### 4.10.1 Band-Edge Measurement Test Procedure

The band edges of concern for the EUT are the authorized-band band edge at 2.40 GHz and the Restricted-band band edge at 2.4835 GHz. Separate methods of test are required for the two band-edges.

The test method of Section 6.10.4 of ANSI C63.10 is used to demonstrate compliance at the lower, authorized-band band-edge at 2.40 GHz. Radiated emission measurements were made, at the lower band-edge of 2.4 GHz, while the EUT transmitted the modulated signal on low channel frequency of 2.405 GHz. The following photos depict the maximized, channel 11 signal including the lower authorized band-edge. The MKRA displays the level difference between the highest level at or below the band-edge and the peak channel transmission. Horizontal and vertical polarized antenna measurements were made.

The test method of Section 6.10.5 of ANSI C63.10 is used to demonstrate compliance at the upper, restricted-band band-edge at 2.4835 GHz. Radiated emission measurements were made, at the upper band-edge of 2.4835 GHz, while the EUT transmitted the modulated signal on high channel frequency of 2.48 GHz. The photos depict the maximized, horizontal and vertical channel 26 signal including the upper restricted-band band-edge.

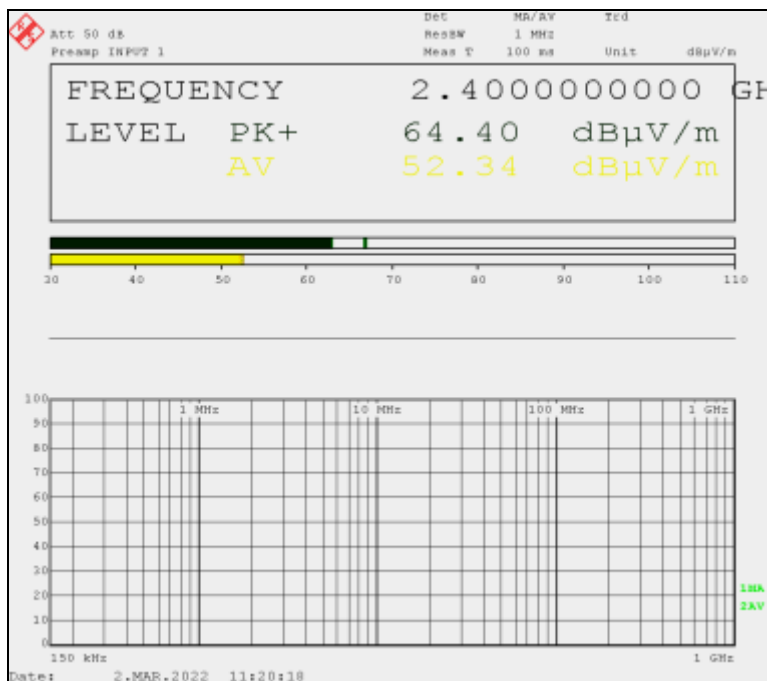
#### Spectrum Analyzer Settings for Zigbee Radio Measurements Band-Edge

Zigbee Radio With O-QPSK Modulation			
Spectrum Analyzer Settings			ANSI C63.10 requirement
RBW	1	MHz	Required RBW
VBW	3	MHz	Required VBW
Span	Varies	MHz	Encompasses Low End of the Tx Band and Low Tx Frequency and Encompasses High End of the Tx Band and High Tx Frequency
Sweep	200	ms	Auto



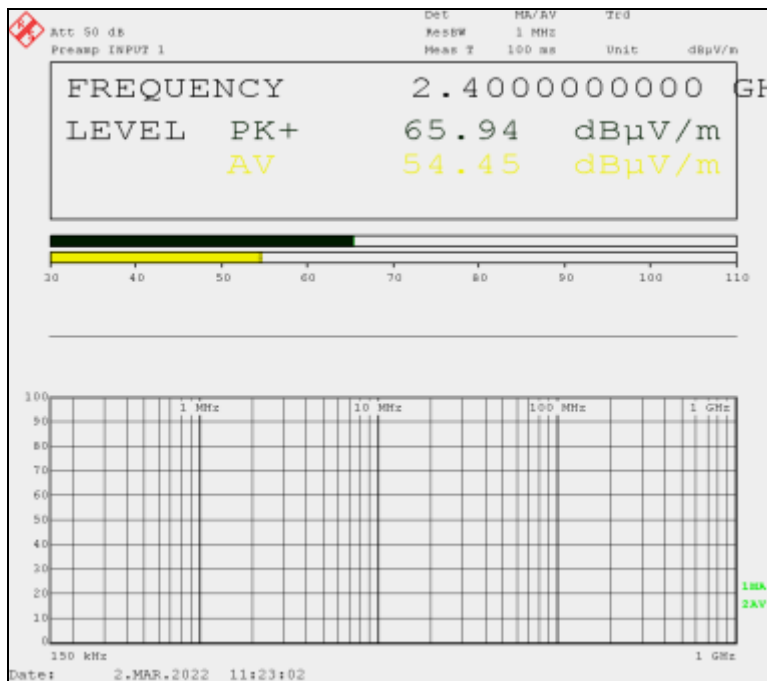
### 4.10.1.1 Lower Authorized-Band Band-Edge Test Results Legrand Model 064875 with Zigbee Radio (03/02/2022)

#### Legrand Model 064875 with Zigbee Radio Tx Low Channel 11, 2405 MHz, O-QPSK Modulated Horizontal Polarity





# Legrand Model 064875 with Zigbee Radio Tx Low Channel 11, 2405 MHz, O-QPSK Modulated Vertical Polarity





**Legrand Model 064875 with Zigbee Radio Lower Authorized-Band Band Edge Summary Table**

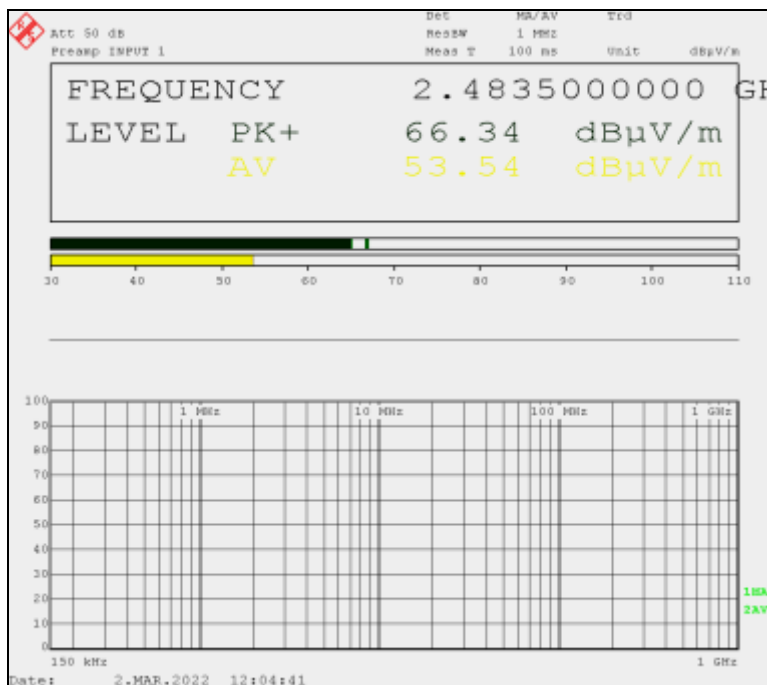
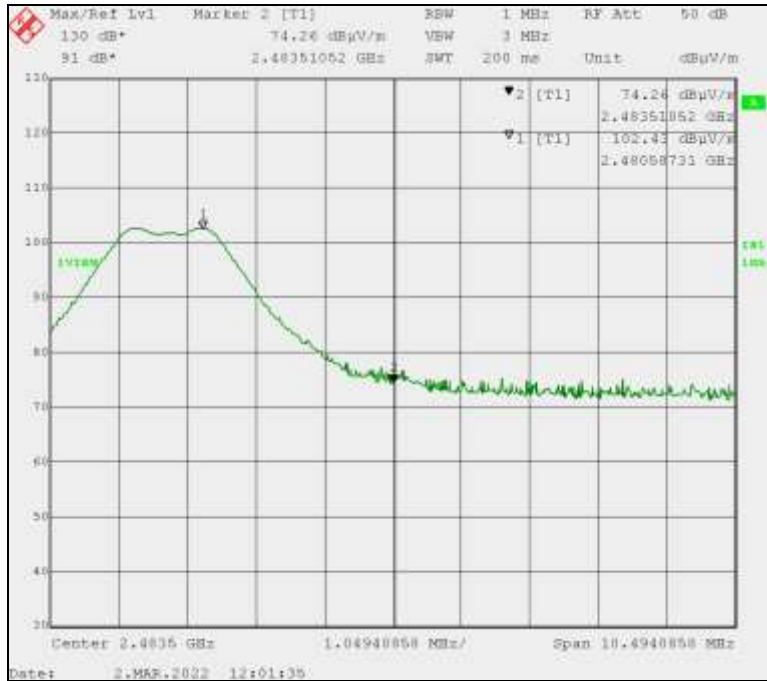
Frequency	Peak Level Corrected	Average Level Corrected	Antenna Polarity	Turntable Angle	Antenna Height	Correction Factor	FCC 15.205/209: RSS-GEN/RSS-247 Peak Limit	FCC 15.205/209: RSS-GEN/RSS-247 Peak Margin	FCC 15.205/209: RSS-GEN/RSS-247 Average Limit	FCC 15.205/209: RSS-GEN/RSS-247 Average Margin	Result
GHz	dBuV/m	dBuV/m	H/V	degrees	cm	dB	dBuV/m	dB	dBuV/m	dB	
2.4000	62.80	50.74	H	087	150	-1.60	73.98	-11.18	53.98	-3.24	Pass
2.4000	64.34	52.85	V	117	147	-1.60	73.98	-9.64	53.98	-1.13	Pass

**Test Results:** Authorized-band band-edge measurement of the Legrand Model 064875 with Zigbee Radio, transmitting with O-QPSK modulation, is compliant to the FCC and ISED limits with margin of 1.13 dB.



### 4.10.1.2 Upper Restricted-Band Band-Edge Test Results Legrand Model 064875 with Zigbee Radio (03/02/2022)

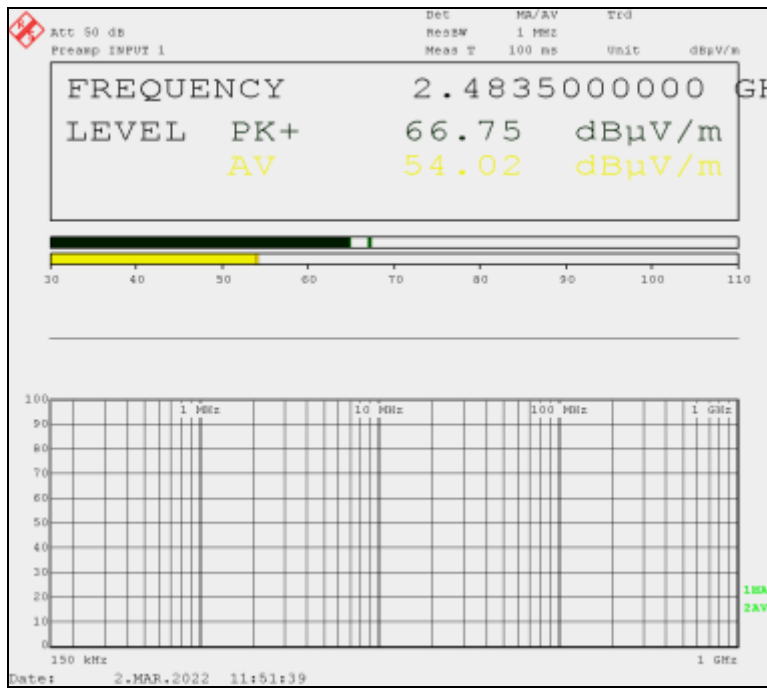
#### Legrand Model 064875 with Zigbee Radio Tx High Channel 26, 2480 MHz, O-QPSK Modulated Horizontal Polarity







## Legrand Model 064875 with Zigbee Radio Tx High Channel 26, 2480 MHz, O-QPSK Modulated Vertical Polarity





**Legrand Model 064875 with Zigbee Radio Upper Restricted-Band Band Edge Summary Table**

Frequency	Peak Level Corrected	Average Level Corrected	Antenna Polarity	Turntable Angle	Antenna Height	Correction Factor	FCC 15.205/209: RSS-GEN/RSS-247 Peak Limit	FCC 15.205/209: RSS-GEN/RSS-247 Peak Margin	FCC 15.205/209: RSS-GEN/RSS-247 Average Limit	FCC 15.205/209: RSS-GEN/RSS-247 Average Margin	Result
GHz	dBuV/m	dBuV/m	H/V	degrees	cm	dB	dBuV/m	dB	dBuV/m	dB	
2.4835	64.87	52.07	H	103	259	-1.47	73.98	-9.11	53.98	-1.91	PASS
2.4835	65.28	52.55	V	340	136	-1.47	73.98	-8.70	53.98	-1.43	PASS

**Test Results:** Authorized-band band-edge measurement of the Legrand Model 064875 with Zigbee Radio, transmitting with O-QPSK modulation, is compliant to the FCC and ISSED limits with margin of 1.43 dB.



## Appendix A – Legrand 064875 with Zigbee Radio Test Setup Pictures

SEE APPENDIX A titled “Appendix A Legrand 064875 with Zigbee Radio Test Setup Pictures”

## Appendix B – 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
Antenna (30 MHz - 6 GHz)	Sunol Sciences	JB6	A022108	712	06/26/18	3 Years	06/21/24
Amplifier (.09 – 1300 MHz)	Hewlett Packard	8447F	3313A06658	807	01/13/21	2 Years	01/13/23
EMC Analyzer (9 kHz - 1.8 GHz)	Hewlett Packard	8593EM	3710A00214	1026	03/23/20	3 Years	03/23/23
Amplifier System (0.5 – 50 GHz)	Hewlett Packard	83015A 83017A	3123A00360 & 3332A00219	1027	10/13/20	2 Years	10/13/22
Double Ridged Horn Antenna (1 - 18 GHz)	Eaton	3115	2113	836	01/08/19	3 Years	11/24/24
Shielded Room #1	ETS Lindgren	12-2/2-0	4078	859	05/17/18	3 Years	08/17/22
OATS Site (30 MHz – 1 GHz)	BEC	N/A	N/A	705	09/30/21	1 Year	09/30/22
Intentional Radiator Testing High Frequency RF Test Cable	Suhner	S04272B	N/A	962	08/03/20	1 Year	08/03/22
Temp/Humidity Meter	Control Company	4096	151872672	780	04/08/19	2 Years	10/13/22
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