



**FCC Part 15, Subpart C, Section 15.247
Test Report**

On

Ambulatory Electrograph (ECG) Monitor System
HUB
FCC ID: 2AXAK-100006

Customer Name: LifeLens Technologies

Customer P.O: RETL0002

Date of Report Rev: October 12, 2020

Test Report No: R-3287P-4 Rev. B

Test Start Date: August 17, 2020

Test Finish Date: August 25, 2020

Test Technician: S. Charles, M. Nowak

Approved By: D. Rybicki

Report Rev Prepared By: B. Bolton

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Revision History

Revisions to this document are listed below; the latest revised document supersedes all previous issues of this document.

Revision	Date	Pages Affected
-	September 25, 2020	Original Release
A	September 30, 2020	Global
		<ul style="list-style-type: none">• Report Number Changed from R-3287P-4 to R-3287P-4 Rev. A• Date of Report Changed to Date of Report Rev.• Report Prepared by Changed to Report Rev. Prepared by
		Page 11
		<ul style="list-style-type: none">• RF Exposure Calculations Updated
B	October 12, 2020	Global
		<ul style="list-style-type: none">• Report Number Changed from R-3287P-4 Rev. A to R-3287P-4 Rev. B
		Page 12, 13
		<ul style="list-style-type: none">• Added Test Setup Drawings Figure 1 and Figure 2
		Page 13
		<ul style="list-style-type: none">• Added Measurement Uncertainty



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Report No. R-3287P-4 Rev. B

Technical Information

Report Number: R-3287P-4
Customer: LifeLens Technologies
Address: 1 Ivyland Blvd, Suite 115
Ivyland, PA 18974
Test Sample: Ambulatory Electrograph (ECG) Monitor System, Gateway, HUB
Part Number: LL-ECG-HUB-PR01
FCC ID: 2AXAK-100005
Type: Bluetooth Low Energy (BLE)
Power Requirements: 3.6VDC Lithium Ion
Frequency of Operation: 2402 to 2480 MHz
Equipment Class: DTS
Equipment Use: Portable

Test Specification:

FCC Rules and Regulations Part 15, Subpart C, Section 15.247

Test Procedure:

ANSI C63.4:2014

ANSI C63.10:2013

Test Facility:

Retlif Testing Laboratories
3131 Detwiler Road
Harleysville, PA 19438

FCC Accreditation Designation Number: US2321



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Tests Performed

The test methods performed on the Ambulatory Electrograph (ECG) Monitor System, Hub are shown in Table 1 below:

Table 1 – Test Methods

FCC Part 15, Subpart C	Test Method
15.247(a)(2)	Occupied Bandwidth
15.247(b)(3)	Power Output
15.247(d)	Antenna Port, Conducted Emissions
15.247(d)	Out of Band / Band Edge Radiated Emissions, 9kHz to 25 GHz
15.247(e)	Antenna Port, Power Density
15.207(a)	Conducted Limits, 150 kHz to 30 MHz
15.209(a)	Radiated Emissions Limits, 30 MHz to 25 GHz

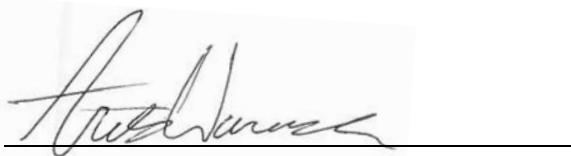


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Certification and Signatures

We certify that this report is a true representation of the results obtained from the tests of the equipment stated. We further certify that the measurements shown in this report were made in accordance with the procedures indicated and vouch for the qualifications of all Retlif Testing Laboratories personnel taking them.



Arik L. Warwick
EMI Test Engineer



David M. Rybicki
Laboratory Supervisor

Non-Warranty Provision

The testing services have been performed, findings obtained and reports prepared in accordance with generally accepted laboratory principles and practices. This warranty is in lieu of all others, either expressed or implied.

Non-Endorsement

This test report contains only findings and results arrived at after employing the specific test procedures and standards listed herein. It is not intended to constitute a recommendation, endorsement or certification of the product or material tested. This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.



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Requirements and Test Results

FCC Section 15.247(a)(2), Occupied Bandwidth

Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz

Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz bands. The minimum 6 dB bandwidths shall be at least 500 kHz.

- **Results:**

The EUT complies with the 6 dB bandwidth requirement. The minimum measured 6 dB bandwidth was 625.25 kHz.

FCC Section 15.247(b)(3), Power Output

Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz

The maximum peak conducted output power of the intentional radiator shall not exceed the following:

For systems using digital modulation in the 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antenna and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antenna and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

- **Results:**

The EUT complies with the Power Output requirement. The device operates in the 2400 – 2483.5 MHz band. The maximum peak output power was measured and was found to be 3.589 mW.



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Requirements and Test Results (con't)

FCC Section 15.247(d), Antenna Port Conducted Emissions

Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) must also comply with the radiated emissions limits specified in Section 15.209(a) (see Section 15.205(c)).

- Results:

In any 100 kHz bandwidth outside the frequency band in which the Spread spectrum intentional radiator was operating, the radio frequency power that was produced by the intentional radiator was at least 20 dB below that in the 100 kHz bandwidth within the band that contained the highest level of the desired power. All emissions, which fell within the restricted bands specified in 15.205(a), were measured and found to be in compliance with the limits specified in 15.209(a).

FCC Section 15.247(e), Antenna Port, Power Density

Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

- Results:

The power spectral density conducted from the intentional radiator to the antenna was not greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density was determined in accordance with Section 15.247(b)(3).



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Requirements and Test Results (con't)

FCC Section 15.209(a), Radiated Emission Limits, General Requirements

Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in Table 2.

Table 2 - Radiated Emission Limits

Frequency of Emission (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 to 88	100	3
88 to 216	150	3
216 to 960	200	3
Above 960	500	3

- Results:

The field strength of spurious radiated emissions did not exceed the limits specified in Table 2.



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Requirements and Test Results (con't)

Field Strength Calculation/Conversion:

The maximized field strength of the emission was obtained as follows:

$$C_R = M_R + C_F$$

Where:

C_R = Corrected Reading in $\text{dB}\mu\text{V}/\text{m}$

M_R = Uncorrected Meter Reading in $\text{dB}\mu\text{V}$

C_F = Correction Factor in dB (Antenna Factor, Pre-amp + Cable Loss)

Example:

$$M_R = 15.35 \text{ dB}\mu\text{V}$$

$$C_F = 16.85 \text{ dB}$$

$$C_R = 15.35 \text{ dB}\mu\text{V} + 16.85 = 32.2 \text{ dB}\mu\text{V}/\text{m}$$

$\text{dB}\mu\text{V}/\text{m}$ is converted to $\mu\text{V}/\text{m}$ for comparison to the specified limit using the formula:

$$\text{invLog dB}\mu\text{V}/\text{m}/20$$

$$32.2 \text{ dB}\mu\text{V}/\text{m} = 40.74 \mu\text{V}/\text{m}$$

RF Power Conversion:

Power readings in dBm may be converted to mW using the formula:

$$\text{InvLog dBm}/10$$

Example: $20\text{dBm} = 100\text{mW}$

Spectrum Analyzer Desensitization Considerations

Due to the nature of the emissions being measured, care was taken to ensure that the resolution bandwidth of the spectrum analyzer was adequate to provide accurate measurements. FCC specified bandwidths of 100 kHz and 1 MHz were utilized below and above 1 GHz, respectively.



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Requirements and Test Results (con't)

FCC Section 15.247 (i), RF Exposure Limits

For 100 MHz to 6 GHz and test separation distances \leq 50 mm, the 1-g SAR test exclusion thresholds were determined by the following:

$$\frac{\text{Max Power of Channel, including tuneup tolerance (mW)}}{\text{Min Separation distance (mm)}} \times \sqrt{f_{GHz}}$$

- When the minimum *test separation distance* is $<$ 5 mm, a distance of 5 mm according to 4.1 f) of KDB 447498 D01 General RF Exposure Guidance is applied to determine SAR test exclusion.
- For proximity to head and body devices (1-g SAR) the test exclusion threshold is \leq 3.0.

Transmit Frequency	2.402 GHz	2.426 GHz	2.480 GHz
Conducted Power	3.589 mW	3.288 mW	3.206 mW
Rounded Power	4 mW	4 mW	4 mW
Minimum Separation	5 mm	5 mm	5 mm

2.402 GHz

$$\text{Test Exclusion Threshold} = \frac{4 \text{ mW}}{5 \text{ mm}} \times \sqrt{2.402}$$

Test Exclusion Threshold = 1.24

Result: 1.24 \leq 3.0 (Pass)

2.426 GHz

$$\text{Test Exclusion Threshold} = \frac{4 \text{ mW}}{5 \text{ mm}} \times \sqrt{2.426}$$

Test Exclusion Threshold = 1.25

Result: 1.25 \leq 3.0 (Pass)

2.480 GHz

$$\text{Test Exclusion Threshold} = \frac{4 \text{ mW}}{5 \text{ mm}} \times \sqrt{2.480}$$

Test Exclusion Threshold = 1.26

Result: 1.26 \leq 3.0 (Pass)

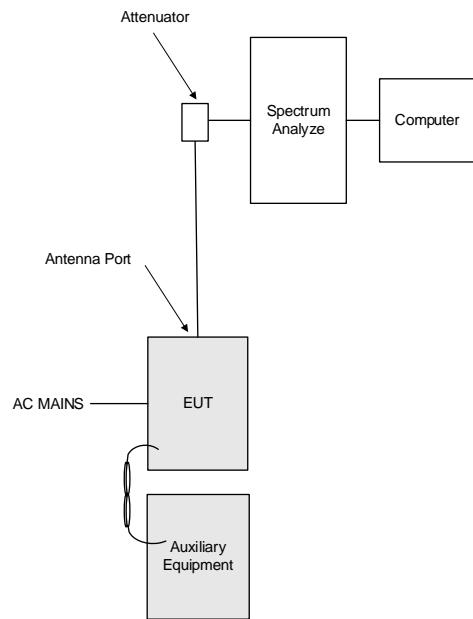


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Test Setup Drawings

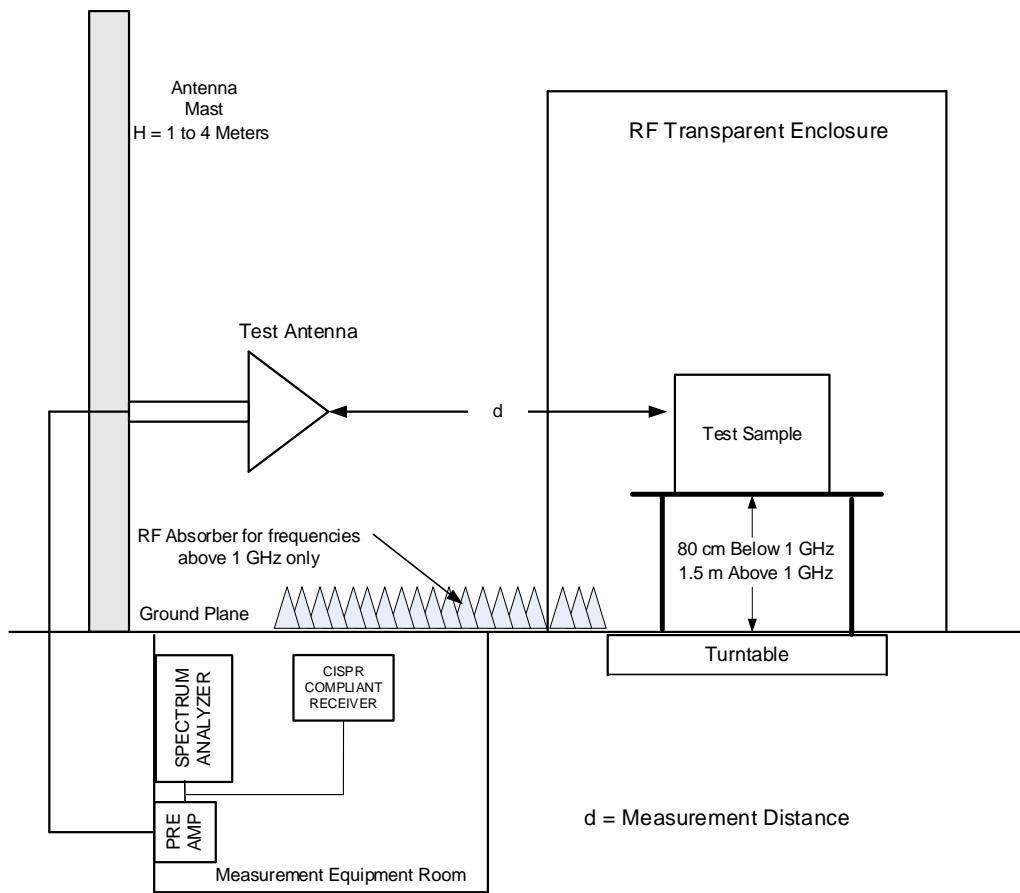
Figure 1 – 15.247 (a),(b),(d), and (e)



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Figure 2 – 15.247 (d), 15.209(a)



Measurement Uncertainty

In accordance with ISO/IEC 17025, Retlif Testing Laboratories has produced an estimate of the uncertainty of its measurements using accepted methods of analysis, through the production and application of suitable uncertainty of measurement procedures. For emissions testing, measurement uncertainty has been calculated in order to provide a confidence level of 95% (K=2.0). The results of these calculations are shown in the table below:

Table 3 - Measurement Uncertainty

Test Method	Confidence Level	Probability Distribution	K	Expanded Uncertainty
Conducted Emissions	95 %	Normal	2.00	3.74 dB
Radiated Emissions	95 %	Normal	2.00	6.08 dB
Antenna Port Tests	95 %	Normal	2.00	1.49 dB



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Equipment List

FCC Section 15.247(a)(2), Occupied Bandwidth

FCC Section 15.247(b)(3), Power Output

FCC Section 15.247(d), Antenna Port, Conducted Emissions

FCC Section 15.247(e), Antenna Port, Power Density

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
713	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 26.5 GHz	ESIB26	3/19/2020	3/31/2021
8457	GENERAL TECHNICS	COMPUTER, CONTROL		N/A	No Calibration Required	
8619	OMEGA	HYGROMETER	-20 to 70 deg. C, 0-99% RH	OM-73	3/16/2020	3/31/2021

FCC Section 15.247(d), Spurious Radiated Emissions

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
127A	ETS / EMCO	ANTENNA, BICONICAL	20 - 200 MHz	3104	5/6/2019	11/30/2020
8016	ETS / EMCO	ANTENNA, LOG PERIODIC	200 MHz - 1 GHz	3146	9/9/2019	3/31/2021
8080	ROHDE & SCHWARZ	RECEIVER, EMI	20 - 1300 MHz	354-3000.56ESVP	11/5/2019	11/30/2020
8300	RETLIF	OPEN AREA TEST SITE, ATTENUATION	3/10 Meter OATS	RPA	5/7/2020	5/31/2022
8300C	UNKNOWN	CABLE, COAXIAL	3/10 METER	3 METER CABLE	2/5/2020	8/31/2020
8644	AGILENT / HP	ANALYZER, SPECTRUM	100 Hz - 22 GHz	85662A	9/23/2019	9/30/2020
8644A	AGILENT / HP	ANALYZER, SPECTRUM	100 Hz - 22.5 GHz	8566B	9/23/2019	9/30/2020
8644B	AGILENT / HP	ANALYZER, RF PRESELECTOR	20 Hz - 2 GHz	85685A	9/23/2019	9/30/2020
8668	DIGI-SENSE	HYGROMETER	0 - 50 deg. C, 10 - 90 % RH	20250-31	3/16/2020	9/30/2020



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FCC 15.247(a)(2)
Test Data, Occupied Bandwidth

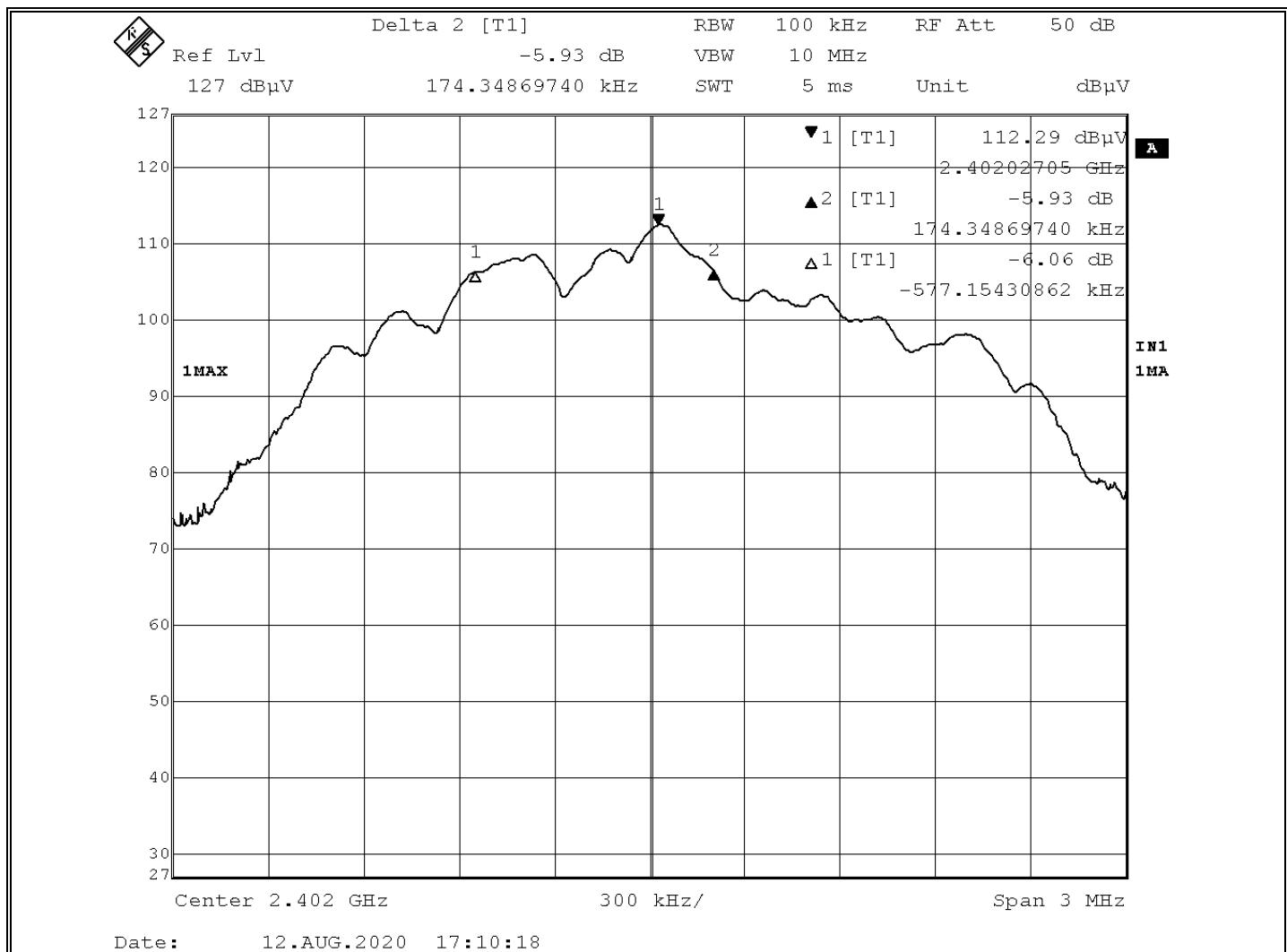


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EMISSIONS TEST DATA SHEET

Test Specification:	FCC Part 15, Subpart C, Section 15.247(a)(2), Occupied Bandwidth
Method:	ANSI C63.10, Section 6.9, Occupied Bandwidth Tests
Job Number/Customer:	R-3287P-4 / LifeLens Technologies, LLC
Test Sample:	HUB
Part Number:	LL-ECG-HUB-PR01
Serial Number:	01000414
Operating Mode:	Continuously searching for host
Technician:	S. Macdonald
Date(s):	8/12/20
Temperature:	22.8 °C
Relative Humidity:	47 %
Notes:	Channel 1 6 dB Bandwidth = 751.50 kHz

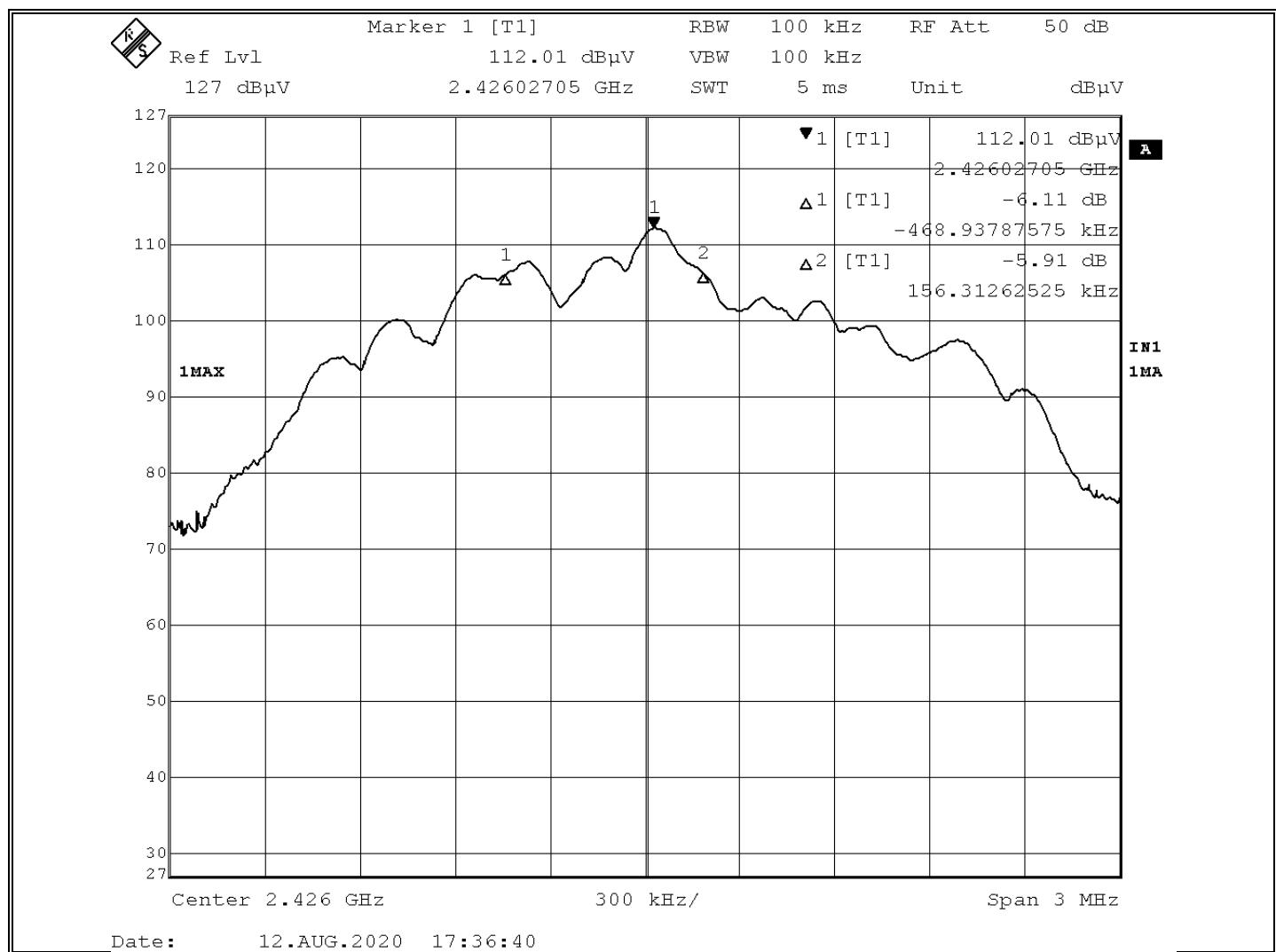


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EMISSIONS TEST DATA SHEET

Test Specification:	FCC Part 15, Subpart C, Section 15.247(a)(2), Occupied Bandwidth
Method:	ANSI C63.10, Section 6.9, Occupied Bandwidth Tests
Job Number/Customer:	R-3287P-4 / LifeLens Technologies, LLC
Test Sample:	HUB
Part Number:	LL-ECG-HUB-PR01
Serial Number:	01000414
Operating Mode:	Continuously searching for host
Technician:	S. Macdonald
Date(s):	8/12/20
Temperature:	22.8 °C
Relative Humidity:	47 %
Notes:	Channel 13 6 dB Bandwidth = 625.25 kHz

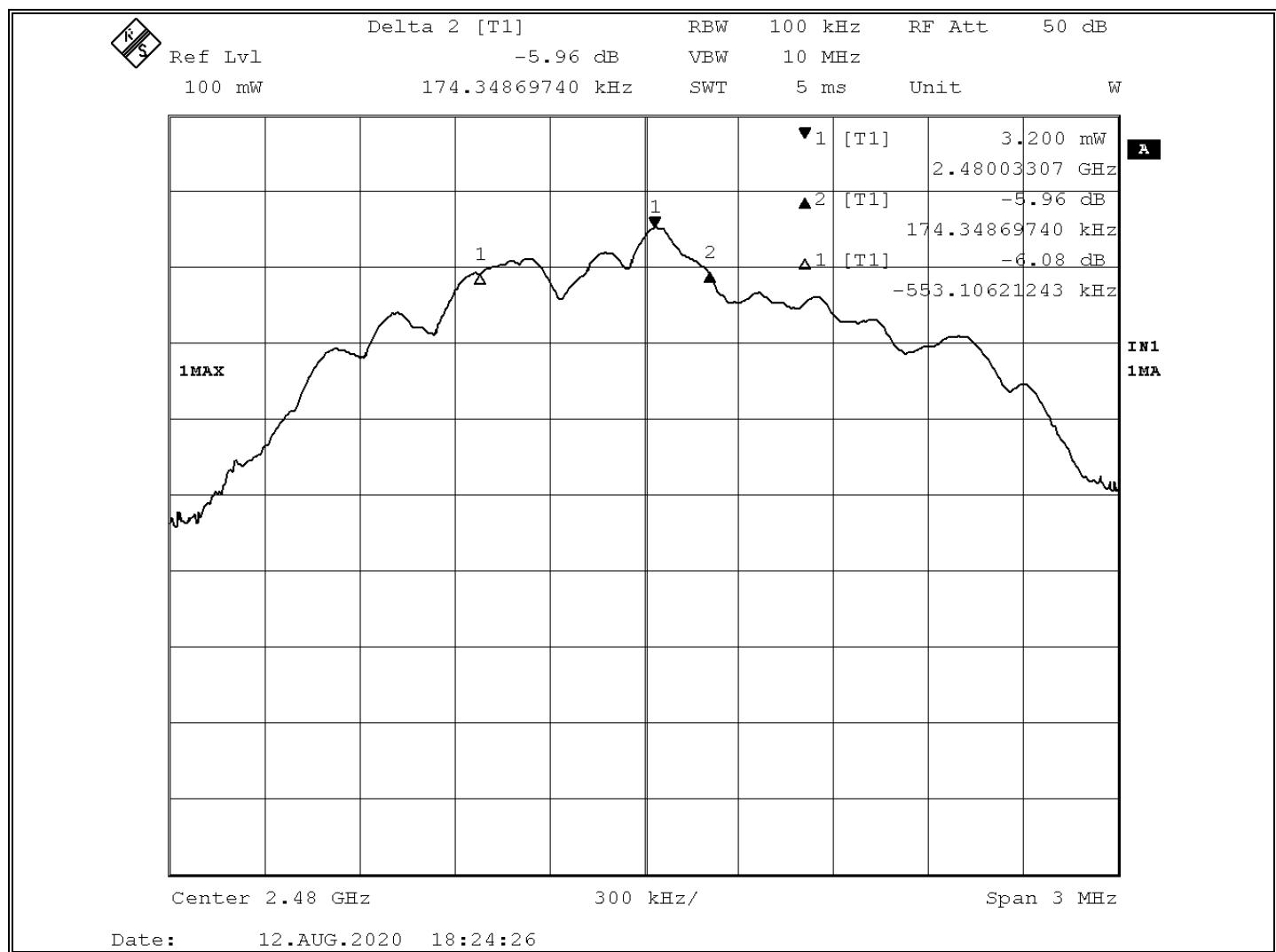


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EMISSIONS TEST DATA SHEET

Test Specification:	FCC Part 15, Subpart C, Section 15.247(a)(2), Occupied Bandwidth
Method:	ANSI C63.10, Section 6.9, Occupied Bandwidth Tests
Job Number/Customer:	R-3287P-4 / LifeLens Technologies, LLC
Test Sample:	HUB
Part Number:	LL-ECG-HUB-PR01
Serial Number:	01000414
Operating Mode:	Continuously searching for host
Technician:	S. Macdonald
Date(s):	8/12/20
Temperature:	22.8 °C
Relative Humidity:	47 %
Notes:	Channel 40 6 dB Bandwidth = 727.46 kHz



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FCC 15.247(b)(3)
Test Data, Power Output

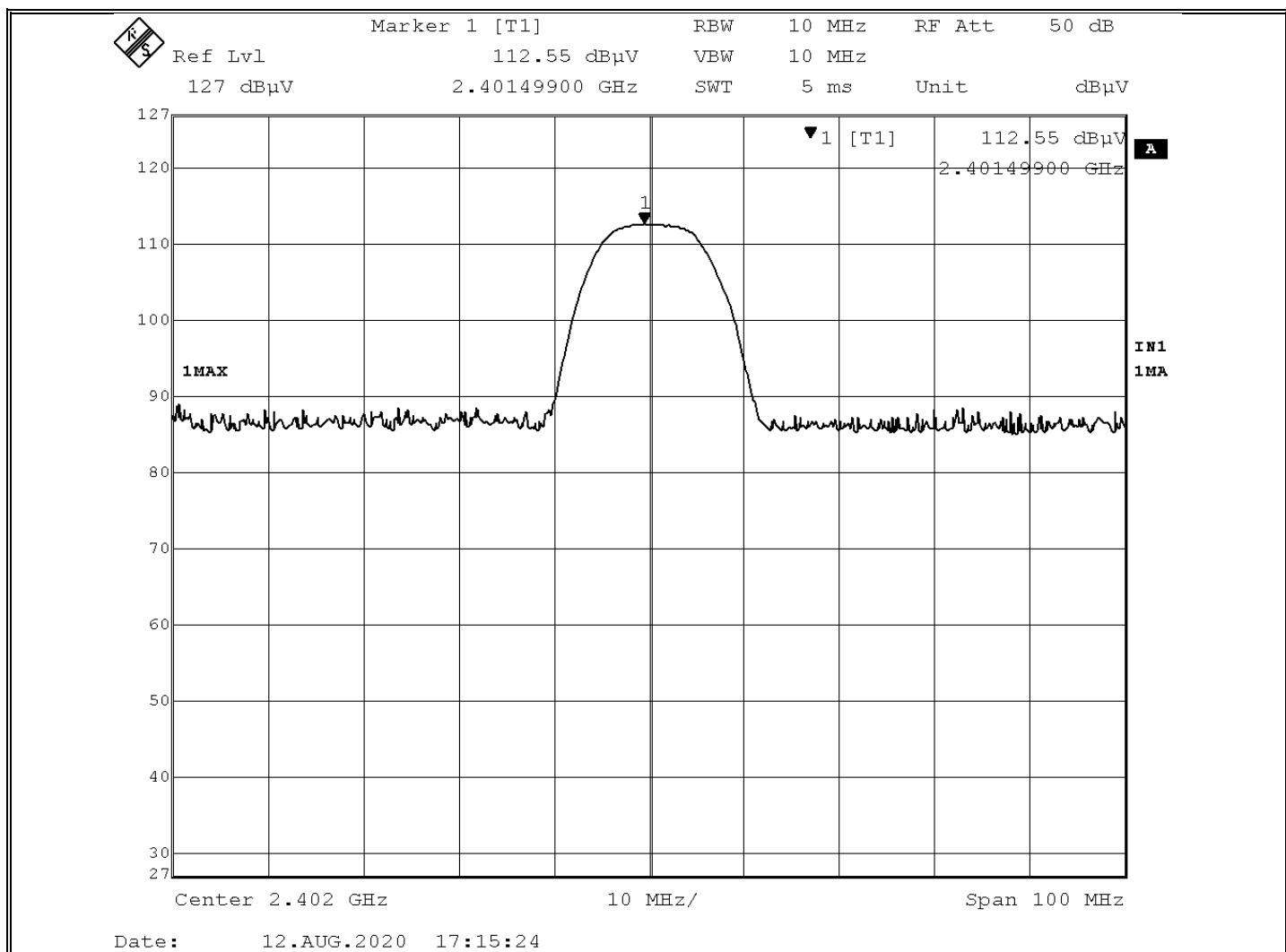


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EMISSIONS TEST DATA SHEET

Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (b)(3)
Method:	ANSI C63.10, Section 11.9.1 Maximum peak conducted output power
Job Number/Customer:	R-3287P-4 / LifeLens Technologies, LLC
Test Sample:	HUB
Part Number:	LL-ECG-HUB-PR01
Serial Number:	01000414
Operating Mode:	Transmitting modulated signal at 2.402 GHz (Channel 1)
Technician:	S. Macdonald
Date(s):	8/12/20
Temperature:	23.2 °C
Relative Humidity:	54.1 %
Notes:	Peak Power Output = 3.589 mW

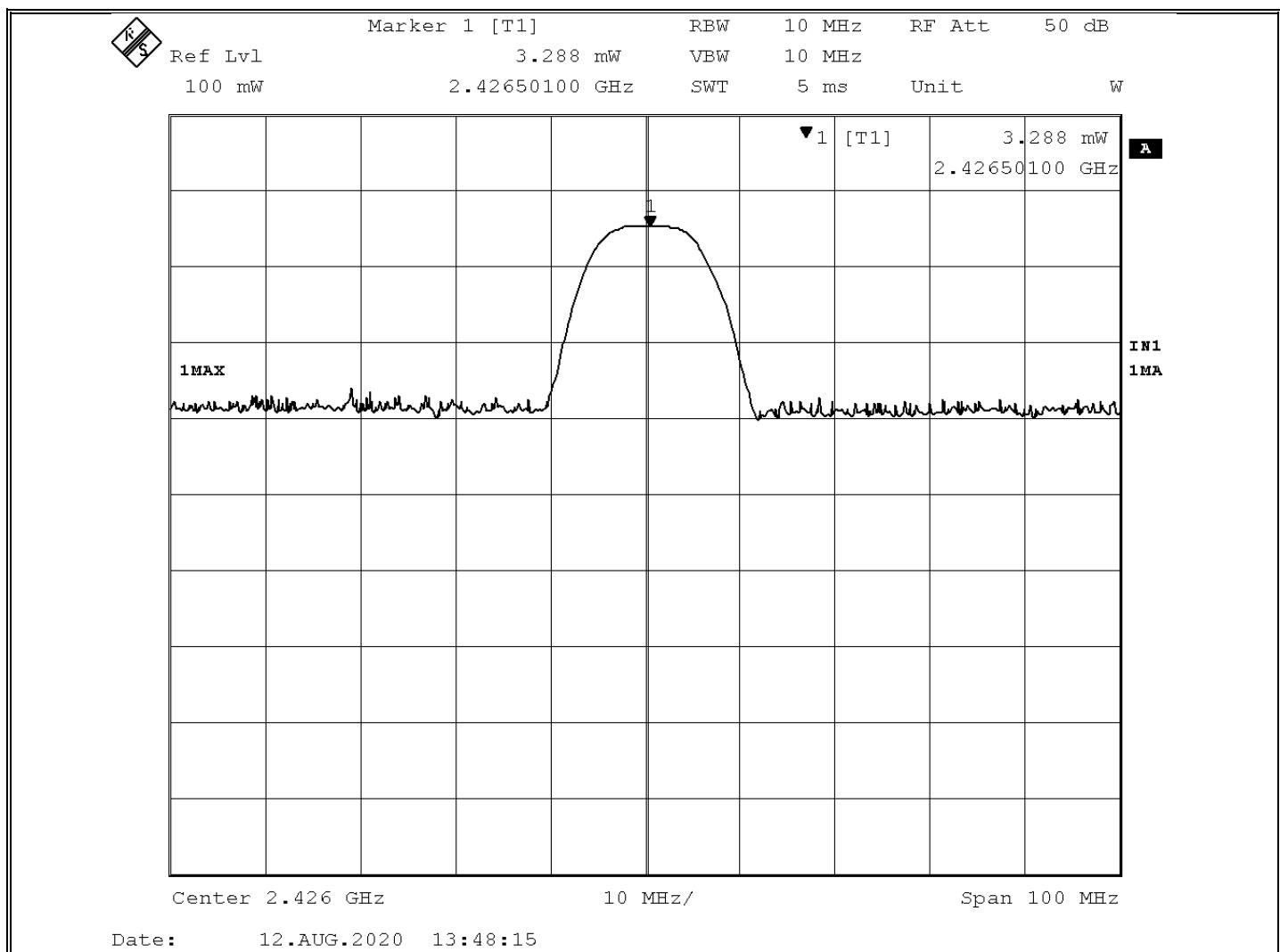


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EMISSIONS TEST DATA SHEET

Test Specification:	FCC Part 15, Subpart C	Paragraph: 15.247 (b)(3)
Method:	ANSI C63.10, Section 11.9.1	Maximum peak conducted output power
Job Number/Customer:	R-3287P-4 / LifeLens Technologies, LLC	
Test Sample:	HUB	
Part Number:	LL-ECG-HUB-PR01	
Serial Number:	01000414	
Operating Mode:	Transmitting modulated signal at 2.426 GHz (Channel 13)	
Technician:	S. Macdonald	
Date(s):	8/12/20	
Temperature:	23.2 °C	
Relative Humidity:	54.1 %	
Notes:	Power Output = 3.288 mW	

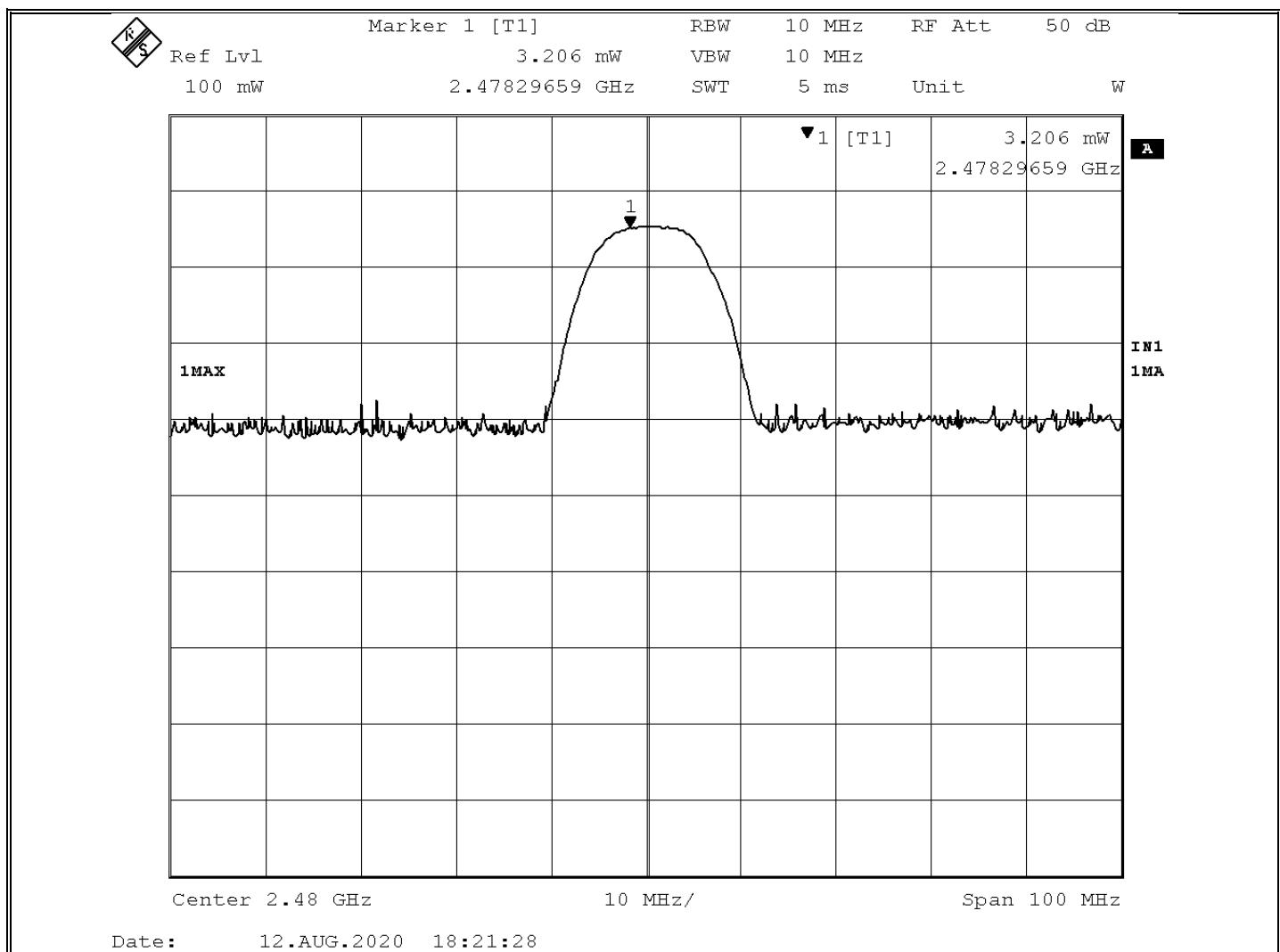


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EMISSIONS TEST DATA SHEET

Test Specification:	FCC Part 15, Subpart C	Paragraph: 15.247 (b)(3)
Method:	ANSI C63.10, Section 11.9.1	Maximum peak conducted output power
Job Number/Customer:	R-3287P-4 / LifeLens Technologies, LLC	
Test Sample:	HUB	
Part Number:	LL-ECG-HUB-PR01	
Serial Number:	01000414	
Operating Mode:	Transmitting modulated signal at 2.480 GHz (Channel 40)	
Technician:	S. Macdonald	
Date(s):	8/12/20	
Temperature:	23.2 °C	
Relative Humidity:	54.1 %	
Notes:	Power Output = 3.206 mW	



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**FCC Part 15.247, Paragraph (d)
Test Data, Out of Band Emissions**

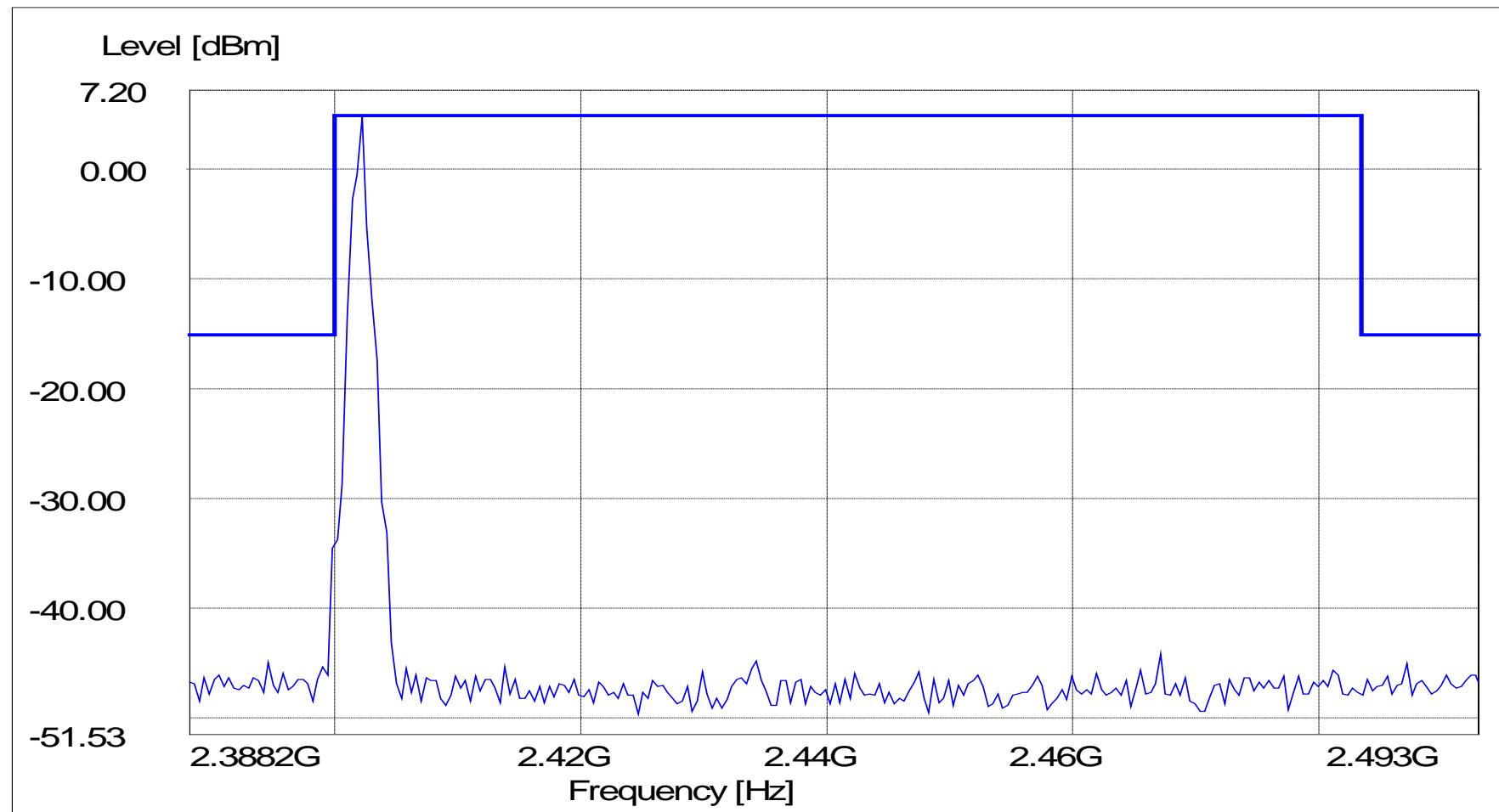


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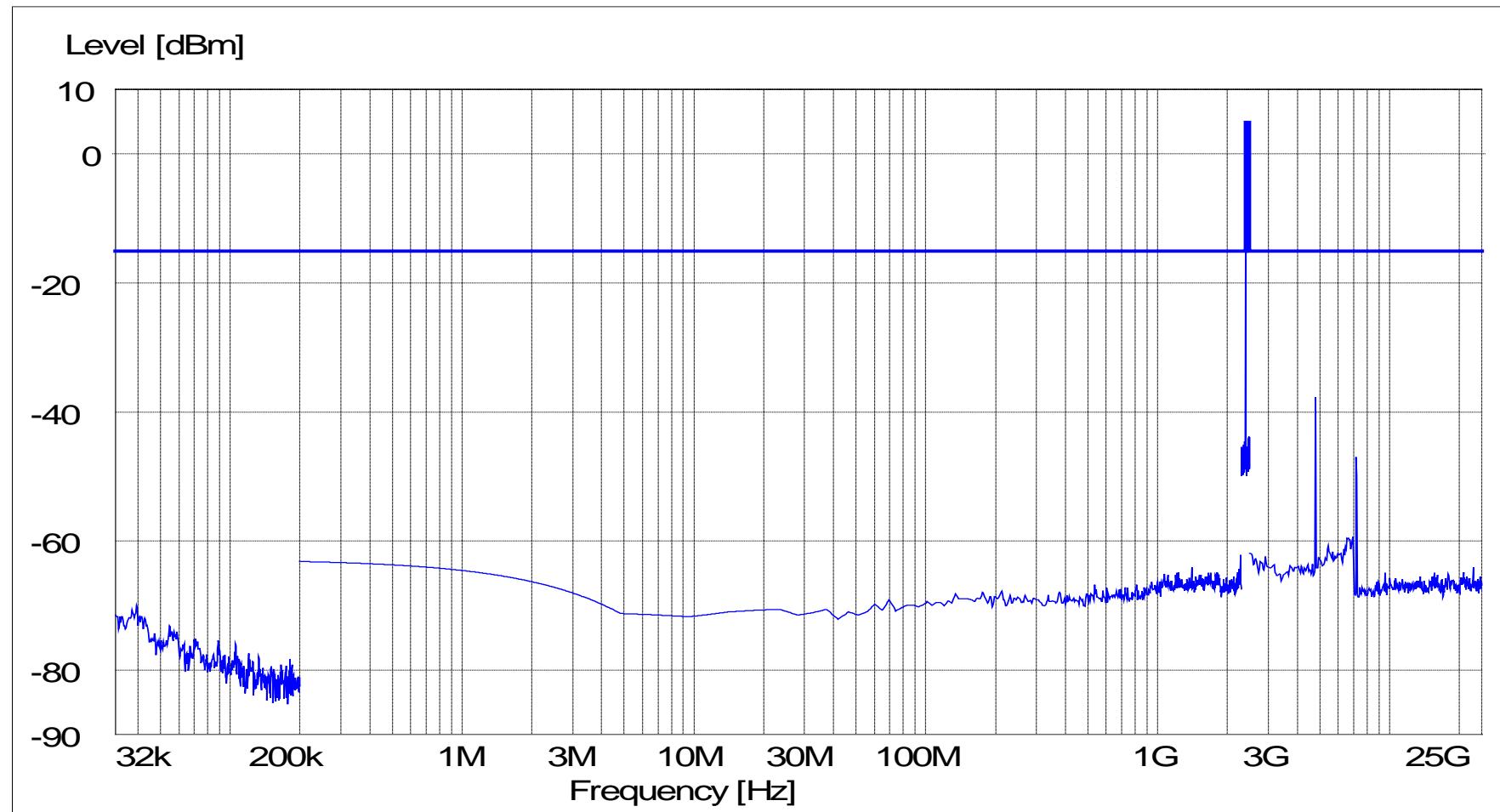
FCC Part 15.247 (d) Out of Band Emissions

Customer: LifeLens Technologies, LLC
Test Sample: HUB
Part/Serial Number: LL-ECG-HUB-PR01 / 01000414
Test Specification: FCC Part 15, Subpart C
Mode of Operation: Continuously transmitting a modulated 2.402 GHz signal
Technician/Date: S. Macdonald / 8/13/20
Port Tested: Antenna
Notes: Zoomed in to show peak level and band edge



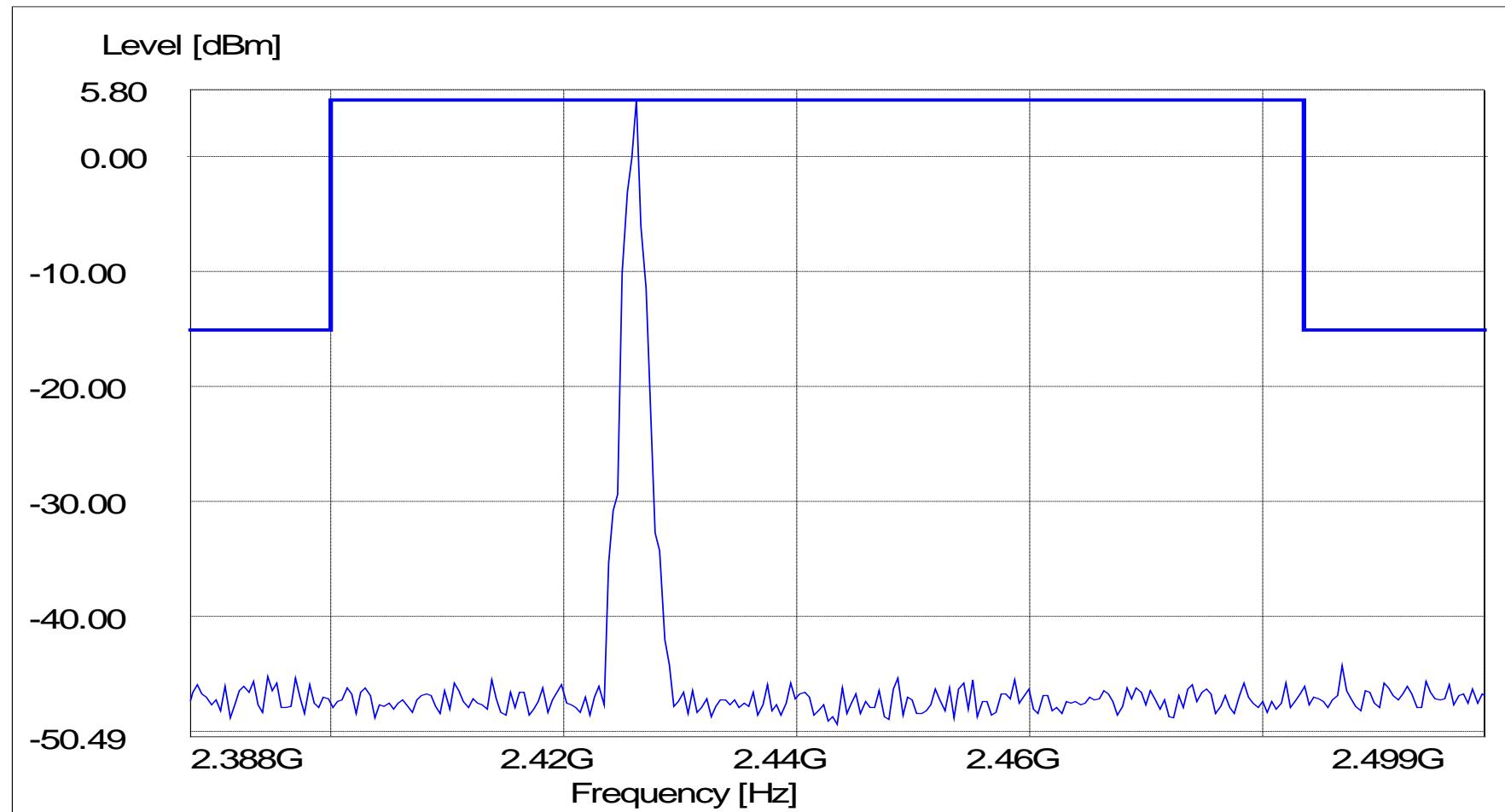
FCC Part 15.247 (d) Out of Band Emissions

Customer: LifeLens Technologies, LLC
Test Sample: HUB
Part/Serial Number: LL-ECG-HUB-PR01 / 01000414
Test Specification: FCC Part 15, Subpart C
Mode of Operation: Continuously transmitting a modulated 2.402 GHz signal
Technician/Date: S. Macdonald / 8/13/20
Port Tested: Antenna
Notes:



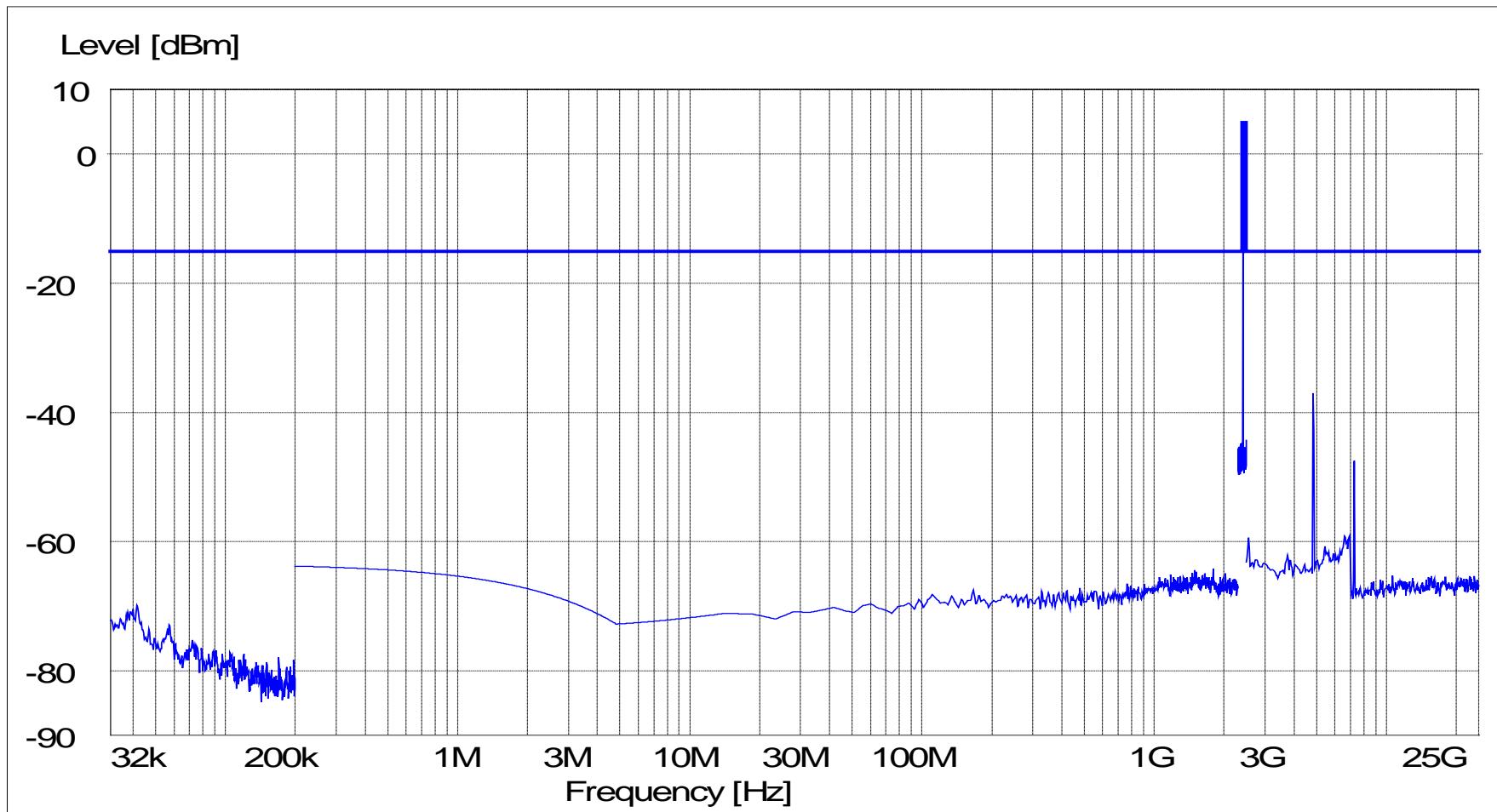
FCC Part 15.247 (d) Out of Band Emissions

Customer: LifeLens Technologies, LLC
Test Sample: HUB
Part/Serial Number: LL-ECG-HUB-PR01 / 01000414
Test Specification: FCC Part 15, Subpart C
Mode of Operation: Continuously transmitting a modulated 2.426 GHz signal
Technician/Date: S. Macdonald / 8/13/20
Port Tested: Antenna
Notes: Zoomed in to show peak level and band edge



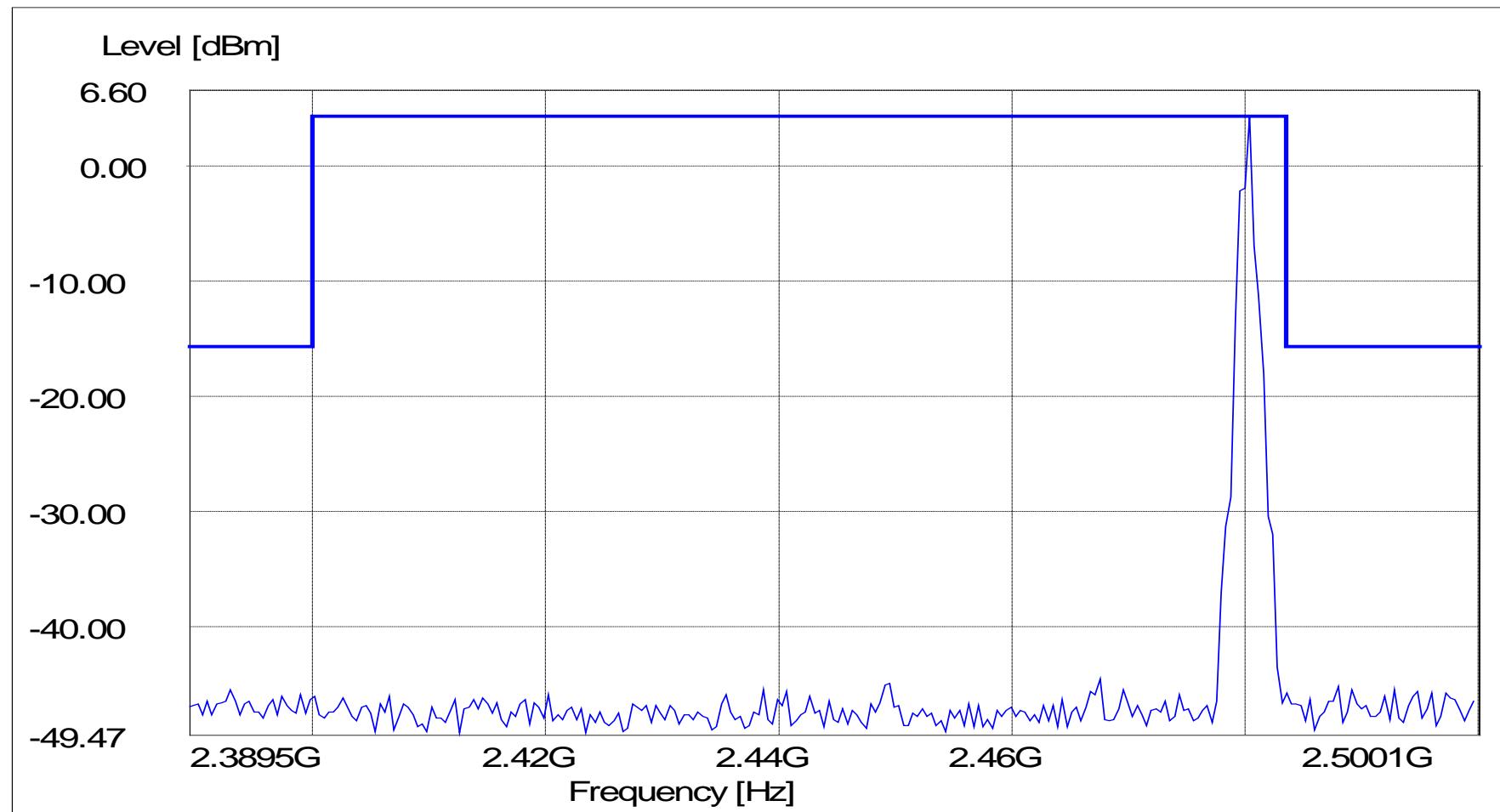
FCC Part 15.247 (d) Out of Band Emissions

Customer: LifeLens Technologies, LLC
Test Sample: HUB
Part/Serial Number: LL-ECG-HUB-PR01 / 01000414
Test Specification: FCC Part 15, Subpart C
Mode of Operation: Continuously transmitting a modulated 2.426 GHz signal
Technician/Date: S. Macdonald / 8/13/20
Port Tested: Antenna
Notes:



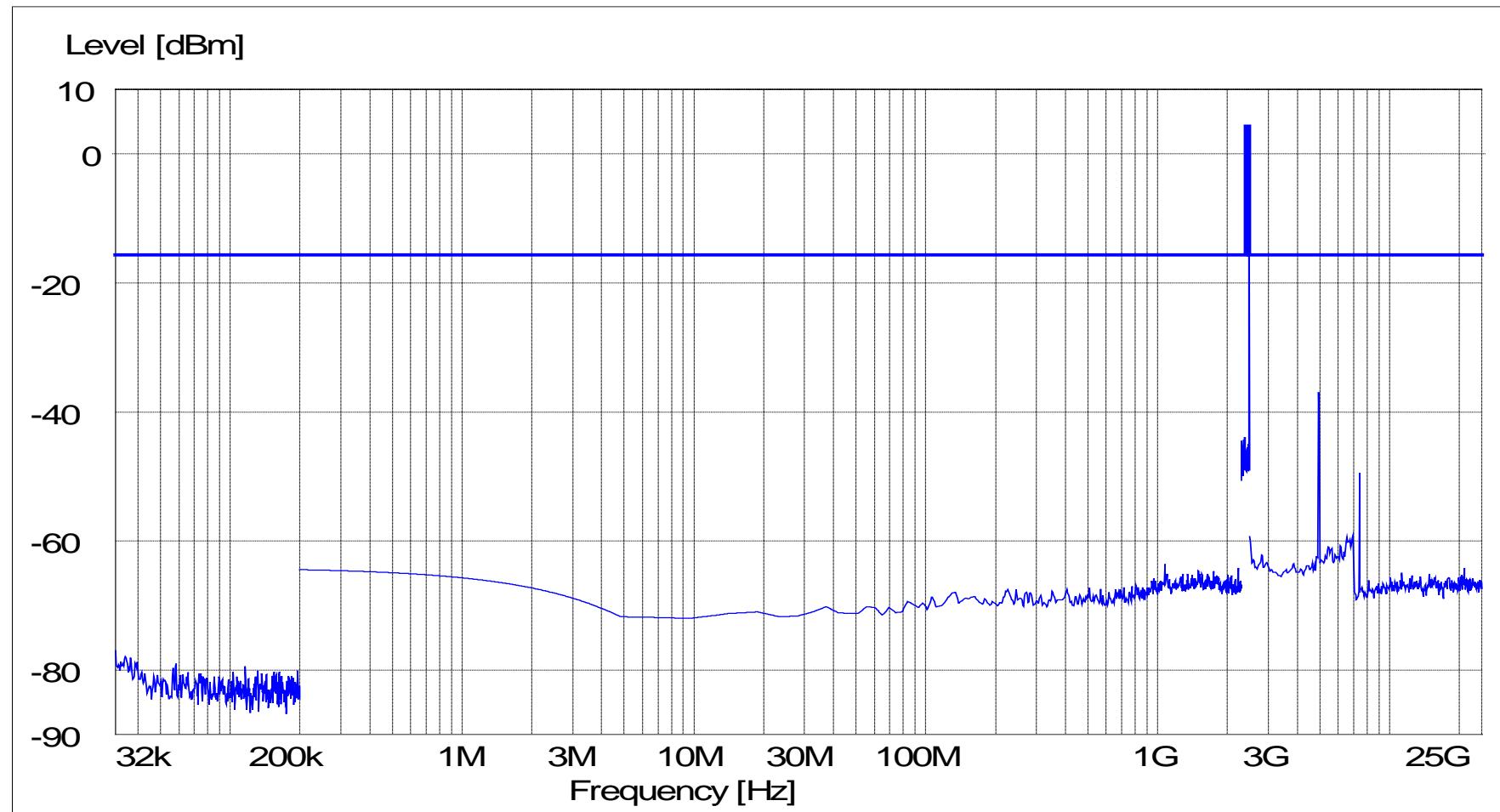
FCC Part 15.247 (d) Out of Band Emissions

Customer: LifeLens Technologies, LLC
Test Sample: HUB
Part/Serial Number: LL-ECG-HUB-PR01 / 01000414
Test Specification: FCC Part 15, Subpart C
Mode of Operation: Continuously transmitting a modulated 2.48 GHz signal
Technician/Date: S. Macdonald / 8/13/20
Port Tested: Antenna
Notes: Zoomed in to see peak level and band edge



FCC Part 15.247 (d) Out of Band Emissions

Customer: LifeLens Technologies, LLC
Test Sample: HUB
Part/Serial Number: LL-ECG-HUB-PR01 / 01000414
Test Specification: FCC Part 15, Subpart C
Mode of Operation: Continuously transmitting a modulated 2.48 GHz signal
Technician/Date: S. Macdonald / 8/13/20
Port Tested: Antenna
Notes:



FCC Part 15.247, Paragraph (d)
Test Data, Out of Band Emissions in Restricted Band

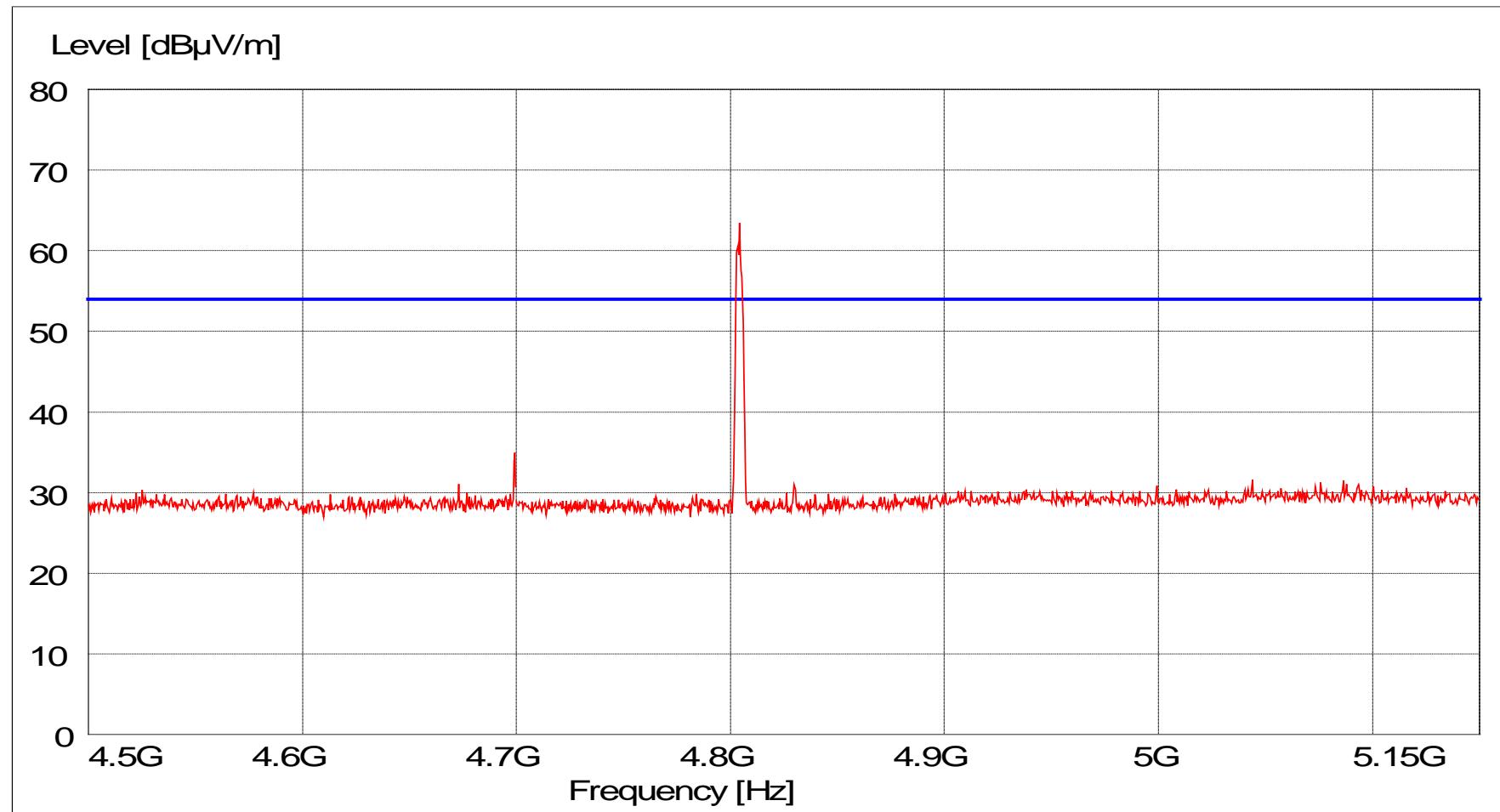


Retlif Testing Laboratories

Report No. R-3287P-4 Rev. B

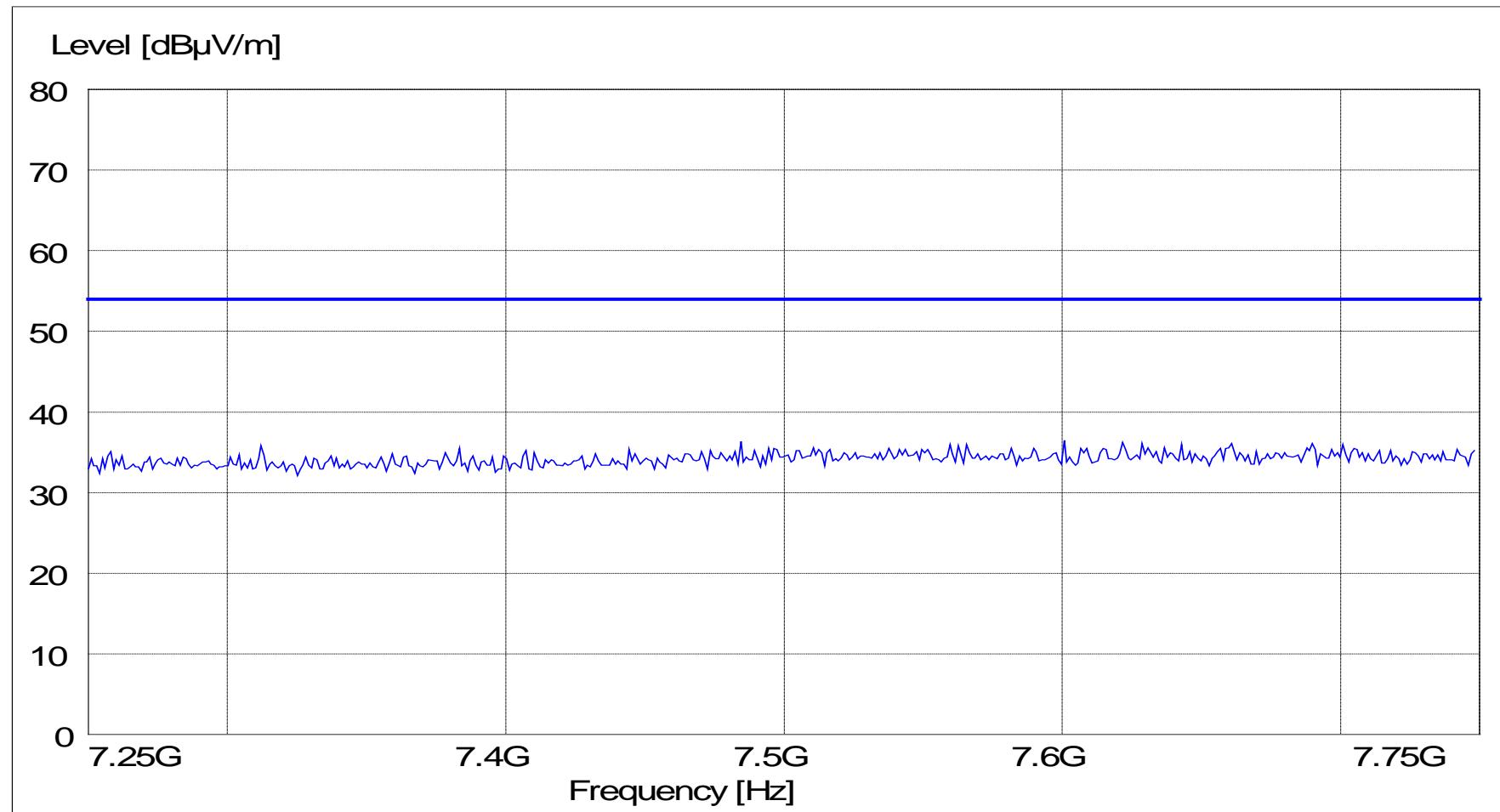
FCC Part 15.247 (d) Out of Band Emissions in Restricted Band

Customer: LifeLens Technologies, LLC
Test Sample: HUB
Part/Serial Number: LL-ECG-HUB-PR01 / 01000414
Test Specification: FCC Part 15, Subpart C
Mode of Operation: Continuously transmitting a modulated 2.402 GHz signal
Technician/Date: S. Macdonald / 8/13/20
Port Tested: Antenna
Notes: Measurement averaged using RMS detector, >100 sweeps max hold



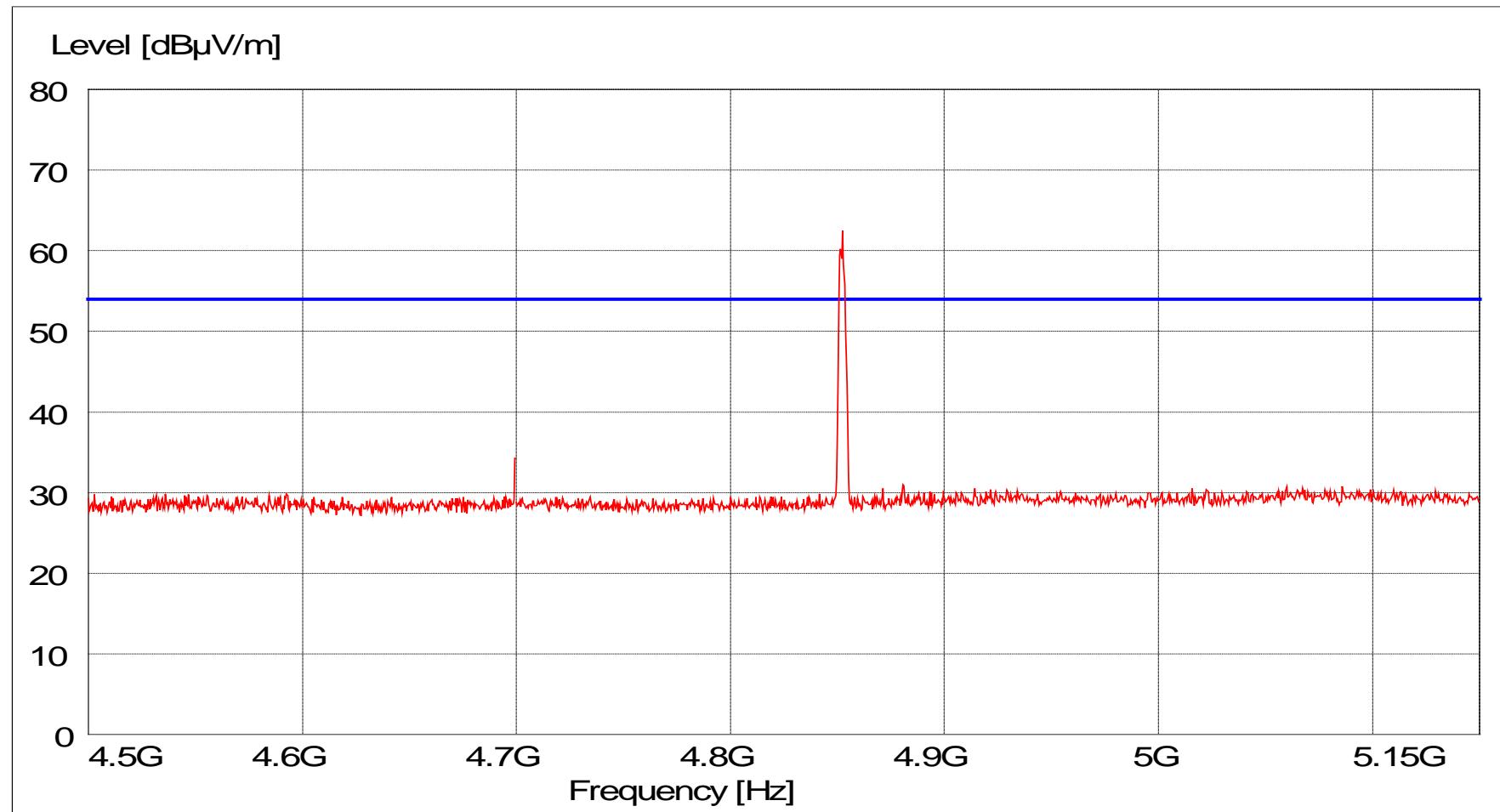
FCC Part 15.247 (d) Out of Band Emissions in Restricted Band

Customer: LifeLens Technologies, LLC
Test Sample: HUB
Part/Serial Number: LL-ECG-HUB-PR01 / 01000414
Test Specification: FCC Part 15, Subpart C
Mode of Operation: Continuously transmitting a modulated 2.402 GHz signal
Technician/Date: S. Macdonald / 8/13/20
Port Tested: Antenna
Notes: Peak detector



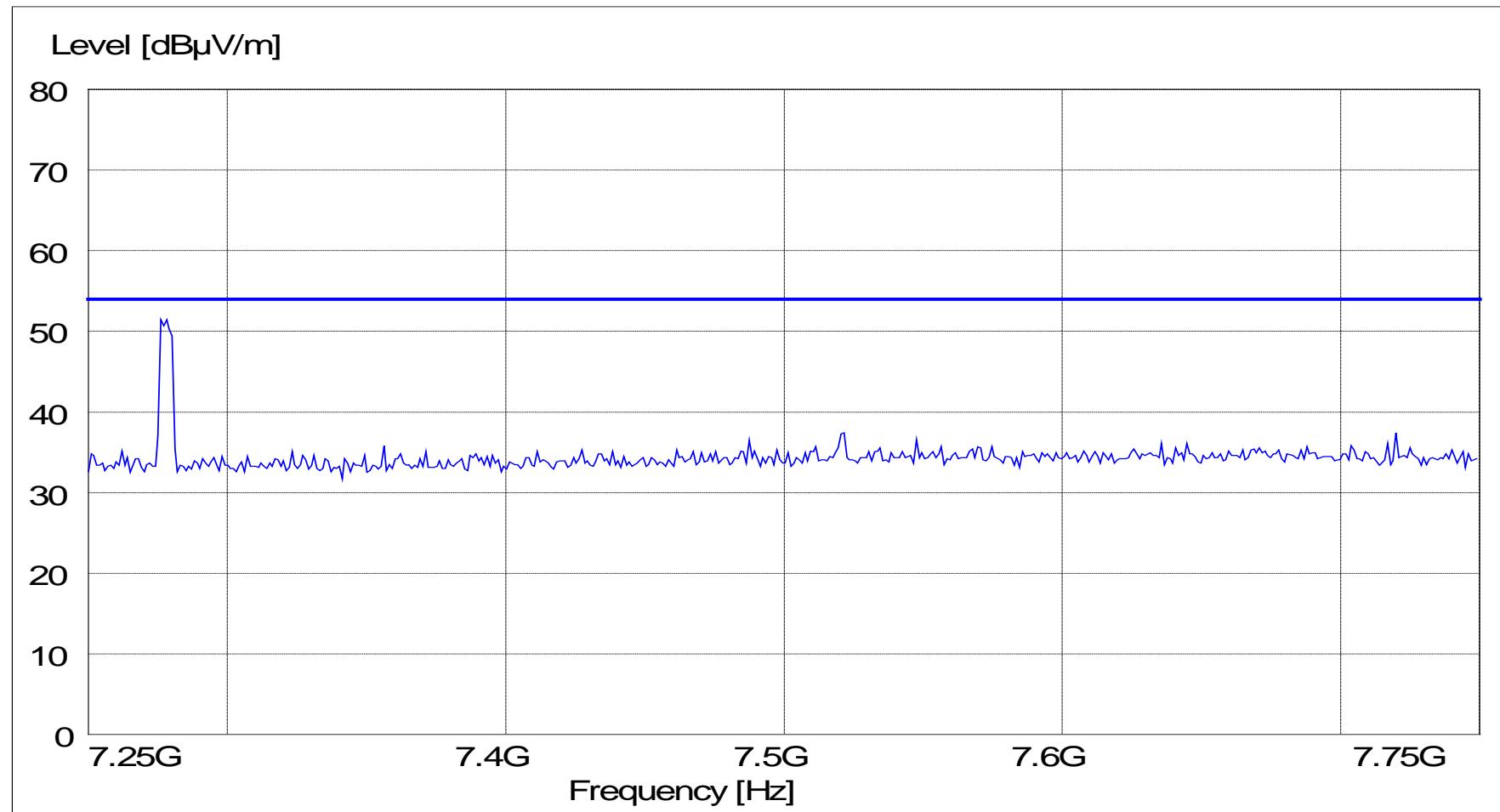
FCC Part 15.247 (d) Out of Band Emissions in Restricted Band

Customer: LifeLens Technologies, LLC
Test Sample: HUB
Part/Serial Number: LL-ECG-HUB-PR01 / 01000414
Test Specification: FCC Part 15, Subpart C
Mode of Operation: Continuously transmitting a modulated 2.426 GHz signal
Technician/Date: S. Macdonald / 8/13/20
Port Tested: Antenna
Notes: Measurement averaged using RMS detector, >100 sweeps max hold



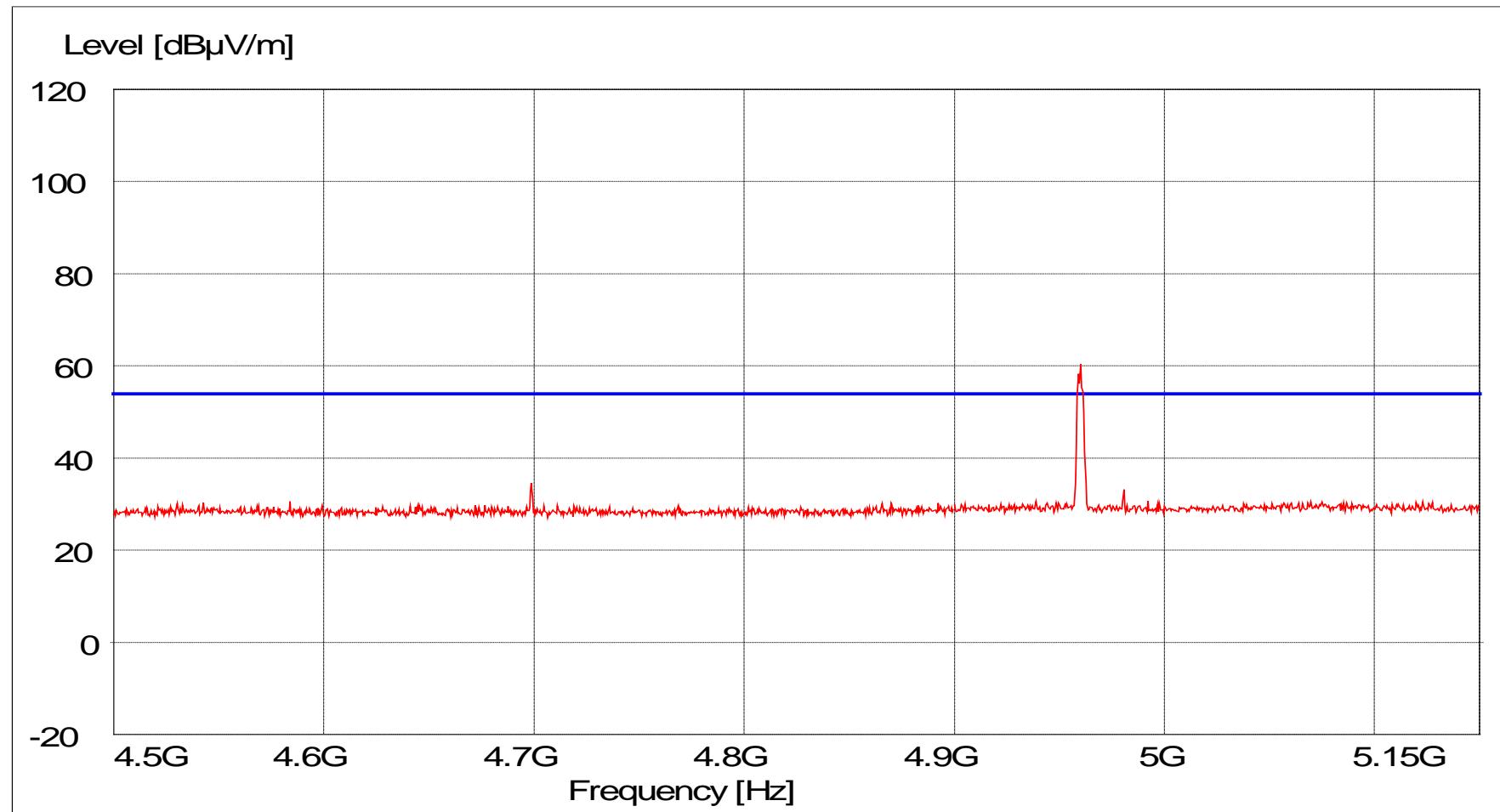
FCC Part 15.247 (d) Out of Band Emissions in Restricted Band

Customer: LifeLens Technologies, LLC
Test Sample: HUB
Part/Serial Number: LL-ECG-HUB-PR01 / 01000414
Test Specification: FCC Part 15, Subpart C
Mode of Operation: Continuously transmitting a modulated 2.426 GHz signal
Technician/Date: S. Macdonald / 8/13/20
Port Tested: Antenna
Notes: Peak detector



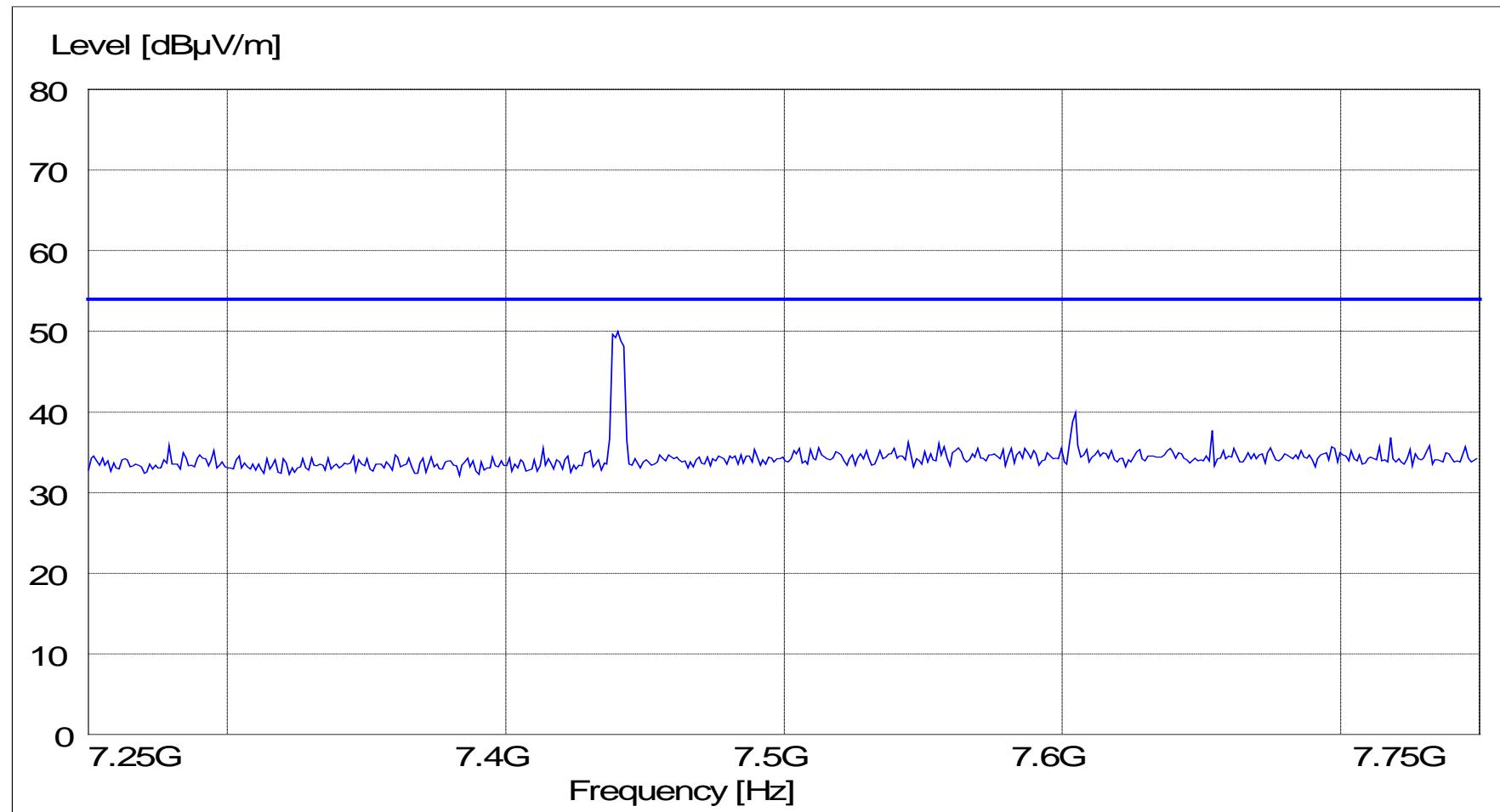
FCC Part 15.247 (d) Out of Band Emissions in Restricted Band

Customer: LifeLens Technologies, LLC
Test Sample: HUB
Part/Serial Number: LL-ECG-HUB-PR01 / 01000414
Test Specification: FCC Part 15, Subpart C
Mode of Operation: Continuously transmitting a modulated 2.48 GHz signal
Technician/Date: S. Macdonald / 8/13/20
Port Tested: Antenna
Notes: Measurement averaged using RMS detector, >100 sweeps max hold



FCC Part 15.247 (d) Out of Band Emissions in Restricted Band

Customer: LifeLens Technologies, LLC
Test Sample: HUB
Part/Serial Number: LL-ECG-HUB-PR01 / 01000414
Test Specification: FCC Part 15, Subpart C
Mode of Operation: Continuously transmitting a modulated 2.48 GHz signal
Technician/Date: S. Macdonald / 8/13/20
Port Tested: Antenna
Notes: Peak detector



**FCC Part 15.247, Paragraph (d)
Out of Band Emissions
Sweep Table
32 kHz to 25 GHz, 20 dB Below Fundamental**



Retlif Testing Laboratories

Report No. R-3287P-4 Rev. B

SWEET TABLE: "R-3287P-4 OoB CE"

Unit: dBm

Detector: Mode:

Curve 1: MaxPeak MaxHold

Subrange 1:

Start Frequency: 32.0 kHz
Stop Frequency: 200.0 kHz
Measure Time: Coupled
IF Bandwidth: 10 kHz

Receiver: ESIX Transducer: dBuV to dBm
Signal Path: None System Transducer: None
Meas. Mode: Lin Add. Transd. 1: None
Tracking Gen.: -- Add. Transd. 2: None
Input: 1 Add. Transd. 3: None

Preamplifier: Off Op. Range: --
RF Att.: 20 dB Preselection: Off
Ref. Level: -10.0 dBm Rep. by Device: --
Min. RF Att.: -- Option: --
IF Att.: -- Video Bandwidth: 10 MHz

Curve 1: On Repetition: 10
Curve 2: Off Stop Mark: Off
Curve 3: Off Stop Message: Off
Curve 4: Off Stop Message:



Retlif Testing Laboratories

Report No. R-3287P-4 Rev. B

Subrange 2:

Start Frequency:	200.0	kHz		
Stop Frequency:	2.3	GHz		
Measure Time:	Coupled			
IF Bandwidth:	100	kHz		
Receiver:	ESIX	Transducer:	dBuV to dBm	
Signal Path:	None	System Transducer:	None	
Meas. Mode:	Lin	Add. Transd. 1:	None	
Tracking Gen.:	--	Add. Transd. 2:	None	
Input:	1	Add. Transd. 3:	None	
Preamplifier:	Off	Op. Range:	--	
RF Att.:	20	dB	Preselection:	Off
Ref. Level:	-10.0	dBm	Rep. by Device:	--
Min. RF Att.:	--		Option:	--
IF Att.:	--		Video Bandwidth:	10 MHz
Curve 1:	On	Repetition:	10	
Curve 2:	Off	Stop Mark:	Off	
Curve 3:	Off	Stop Message:	Off	
Curve 4:	Off	Stop Message:		

Subrange 3:

Start Frequency:	2.3	GHz		
Stop Frequency:	2.5	GHz		
Measure Time:	Coupled			
IF Bandwidth:	100	kHz		
Receiver:	ESIX	Transducer:	dBuV to dBm	
Signal Path:	None	System Transducer:	None	
Meas. Mode:	Lin	Add. Transd. 1:	None	
Tracking Gen.:	--	Add. Transd. 2:	None	
Input:	1	Add. Transd. 3:	None	
Preamplifier:	Off	Op. Range:	--	
RF Att.:	Normal	Preselection:	Off	
Ref. Level:	10.0	dBm	Rep. by Device:	--
Min. RF Att.:	--		Option:	--
IF Att.:	--		Video Bandwidth:	10 MHz
Curve 1:	On	Repetition:	10	
Curve 2:	Off	Stop Mark:	Off	
Curve 3:	Off	Stop Message:	Off	
Curve 4:	Off	Stop Message:		



Retlif Testing Laboratories

Report No. R-3287P-4 Rev. B

Subrange 4:

Start Frequency:	2.5 GHz		
Stop Frequency:	25.0 GHz		
Measure Time:	Coupled		
IF Bandwidth:	100 kHz		
Receiver:	ESIX	Transducer:	dBuV to dBm
Signal Path:	None	System Transducer:	None
Meas. Mode:	Lin	Add. Transd. 1:	None
Tracking Gen.:	--	Add. Transd. 2:	None
Input:	1	Add. Transd. 3:	None
Preamplifier:	Off	Op. Range:	--
RF Att.:	20 dB	Preselection:	Off
Ref. Level:	-10.0 dBm	Rep. by Device:	--
Min. RF Att.:	--	Option:	--
IF Att.:	--	Video Bandwidth:	10 MHz
Curve 1:	On	Repetition:	10
Curve 2:	Off	Stop Mark:	Off
Curve 3:	Off	Stop Message:	Off
Curve 4:	Off	Stop Message:	



Retlif Testing Laboratories

Report No. R-3287P-4 Rev. B

**FCC Part 15.247, Paragraph (d)
Out of Band Emissions
Sweep Table
Restricted Band (Antenna Conducted)**



Retlif Testing Laboratories

Report No. R-3287P-4 Rev. B

SWEET TABLE: "R-3287P-4 CE restric"

Unit: dB μ V/m

Detector: Mode:

Curve 1: MaxPeak MaxHold

Subrange 1:

Start Frequency: 4.5 GHz
Stop Frequency: 5.2 GHz
Measure Time: Coupled
IF Bandwidth: 1 MHz

Receiver: ESIX Transducer: FCC Rest Band 3m2dBi
Signal Path: None System Transducer: None
Meas. Mode: Lin Add. Transd. 1: None
Tracking Gen.: -- Add. Transd. 2: None
Input: 1 Add. Transd. 3: None

Preamplifier: Off Op. Range: --
RF Att.: 20 dB Preselection: Off
Ref. Level: -10.0 dBm Rep. by Device: --
Min. RF Att.: -- Option: --
IF Att.: -- Video Bandwidth: 10 MHz

Curve 1: On Repetition: Continuous
Stop Mark: Off
Curve 3: Off Stop Message: Off
Curve 4: Off Stop Message:



Retlif Testing Laboratories

Report No. R-3287P-4 Rev. B

Subrange 2:

Start Frequency:	7.3 GHz			
Stop Frequency:	7.8 GHz			
Measure Time:	Coupled			
IF Bandwidth:	1 MHz			
Receiver:	ESIX	Transducer:	FCC	Rest Band 3m2dBi
Signal Path:	None	System Transducer:	None	
Meas. Mode:	Lin	Add. Transd. 1:	None	
Tracking Gen.:	--	Add. Transd. 2:	None	
Input:	1	Add. Transd. 3:	None	
Preamplifier:	Off	Op. Range:	--	
RF Att.:	20 dB	Preselection:	Off	
Ref. Level:	-10.0 dBm	Rep. by Device:	--	
Min. RF Att.:	--	Option:	--	
IF Att.:	--	Video Bandwidth:	10 MHz	
Curve 1:	On	Repetition:	Continuous	
		Stop Mark:	Off	
Curve 3:	Off	Stop Message:	Off	
Curve 4:	Off	Stop Message:		



Retlif Testing Laboratories

Report No. R-3287P-4 Rev. B

SWEET TABLE: "R-3287P-4 CE RB ave"

Unit: dB μ V/m

Detector: Mode:

Curve 1: RMS MaxHold

Subrange 1:

Start Frequency: 4.5 GHz
Stop Frequency: 4.7 GHz
Measure Time: Coupled
IF Bandwidth: 1 MHz

Receiver: ESIX Transducer: FCC Rest Band 3m2dBi
Signal Path: None System Transducer: None
Meas. Mode: Lin Add. Transd. 1: None
Tracking Gen.: -- Add. Transd. 2: None
Input: 1 Add. Transd. 3: None

Preamplifier: Off Op. Range: --
RF Att.: 20 dB Preselection: Off
Ref. Level: -10.0 dBm Rep. by Device: --
Min. RF Att.: -- Option: --
IF Att.: -- Video Bandwidth: 10 MHz

Curve 1: On Repetition: Continuous
Stop Mark: Off
Curve 3: Off Stop Message: Off
Curve 4: Off Stop Message:



Retlif Testing Laboratories

Report No. R-3287P-4 Rev. B

Subrange 2:

Start Frequency:	4.7 GHz			
Stop Frequency:	4.9 GHz			
Measure Time:	Coupled			
IF Bandwidth:	1 MHz			
Receiver:	ESIX	Transducer:	FCC	Rest Band 3m2dBi
Signal Path:	None	System Transducer:	None	
Meas. Mode:	Lin	Add. Transd. 1:	None	
Tracking Gen.:	--	Add. Transd. 2:	None	
Input:	1	Add. Transd. 3:	None	
Preamplifier:	Off	Op. Range:	--	
RF Att.:	20 dB	Preselection:	Off	
Ref. Level:	-10.0 dBm	Rep. by Device:	--	
Min. RF Att.:	--	Option:	--	
IF Att.:	--	Video Bandwidth:	10 MHz	
Curve 1:	On	Repetition:	Continuous	
		Stop Mark:	Off	
Curve 3:	Off	Stop Message:	Off	
Curve 4:	Off	Stop Message:		

Subrange 3:

Start Frequency:	4.9 GHz			
Stop Frequency:	5.2 GHz			
Measure Time:	Coupled			
IF Bandwidth:	1 MHz			
Receiver:	ESIX	Transducer:	FCC	Rest Band 3m2dBi
Signal Path:	None	System Transducer:	None	
Meas. Mode:	Lin	Add. Transd. 1:	None	
Tracking Gen.:	--	Add. Transd. 2:	None	
Input:	1	Add. Transd. 3:	None	
Preamplifier:	Off	Op. Range:	--	
RF Att.:	20 dB	Preselection:	Off	
Ref. Level:	-10.0 dBm	Rep. by Device:	--	
Min. RF Att.:	--	Option:	--	
IF Att.:	--	Video Bandwidth:	10 MHz	
Curve 1:	On	Repetition:	Continuous	
		Stop Mark:	Off	
Curve 3:	Off	Stop Message:	Off	
Curve 4:	Off	Stop Message:		



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Report No. R-3287P-4 Rev. B

Subrange 4:

Start Frequency:	7.3 GHz	Transducer:	FCC Rest Band 3m2dBi
Stop Frequency:	7.4 GHz	System Transducer:	None
Measure Time:	Coupled	Add. Transd. 1:	None
IF Bandwidth:	1 MHz	Add. Transd. 2:	None
Receiver:	ESIX	Add. Transd. 3:	None
Signal Path:	None	Op. Range:	--
Meas. Mode:	Lin	Preselection:	Off
Tracking Gen.:	--	Rep. by Device:	--
Input:	1	Option:	--
Preamplifier:	Off	Video Bandwidth:	10 MHz
RF Att.:	20 dB		
Ref. Level:	-10.0 dBm		
Min. RF Att.:	--		
IF Att.:	--		
Curve 1:	On	Repetition:	Continuous
		Stop Mark:	Off
Curve 3:	Off	Stop Message:	Off
Curve 4:	Off	Stop Message:	

Subrange 5:

Start Frequency:	7.4 GHz	Transducer:	FCC Rest Band 3m2dBi
Stop Frequency:	7.6 GHz	System Transducer:	None
Measure Time:	Coupled	Add. Transd. 1:	None
IF Bandwidth:	1 MHz	Add. Transd. 2:	None
Receiver:	ESIX	Add. Transd. 3:	None
Signal Path:	None	Op. Range:	--
Meas. Mode:	Lin	Preselection:	Off
Tracking Gen.:	--	Rep. by Device:	--
Input:	1	Option:	--
Preamplifier:	Off	Video Bandwidth:	10 MHz
RF Att.:	20 dB		
Ref. Level:	-10.0 dBm		
Min. RF Att.:	--		
IF Att.:	--		
Curve 1:	On	Repetition:	Continuous
		Stop Mark:	Off
Curve 3:	Off	Stop Message:	Off
Curve 4:	Off	Stop Message:	



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Report No. R-3287P-4 Rev. B

Subrange 6:

Start Frequency:	7.6 GHz			
Stop Frequency:	7.8 GHz			
Measure Time:	Coupled			
IF Bandwidth:	1 MHz			
Receiver:	ESIX	Transducer:	FCC	Rest Band 3m2dBi
Signal Path:	None	System Transducer:	None	
Meas. Mode:	Lin	Add. Transd. 1:	None	
Tracking Gen.:	--	Add. Transd. 2:	None	
Input:	1	Add. Transd. 3:	None	
Preamplifier:	Off	Op. Range:	--	
RF Att.:	20 dB	Preselection:	Off	
Ref. Level:	-10.0 dBm	Rep. by Device:	--	
Min. RF Att.:	--	Option:	--	
IF Att.:	--	Video Bandwidth:	10 MHz	
Curve 1:	On	Repetition:	Continuous	
		Stop Mark:	Off	
Curve 3:	Off	Stop Message:	Off	
Curve 4:	Off	Stop Message:		



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FCC 15.247(e)
Test Data, Antenna Port, Power Density

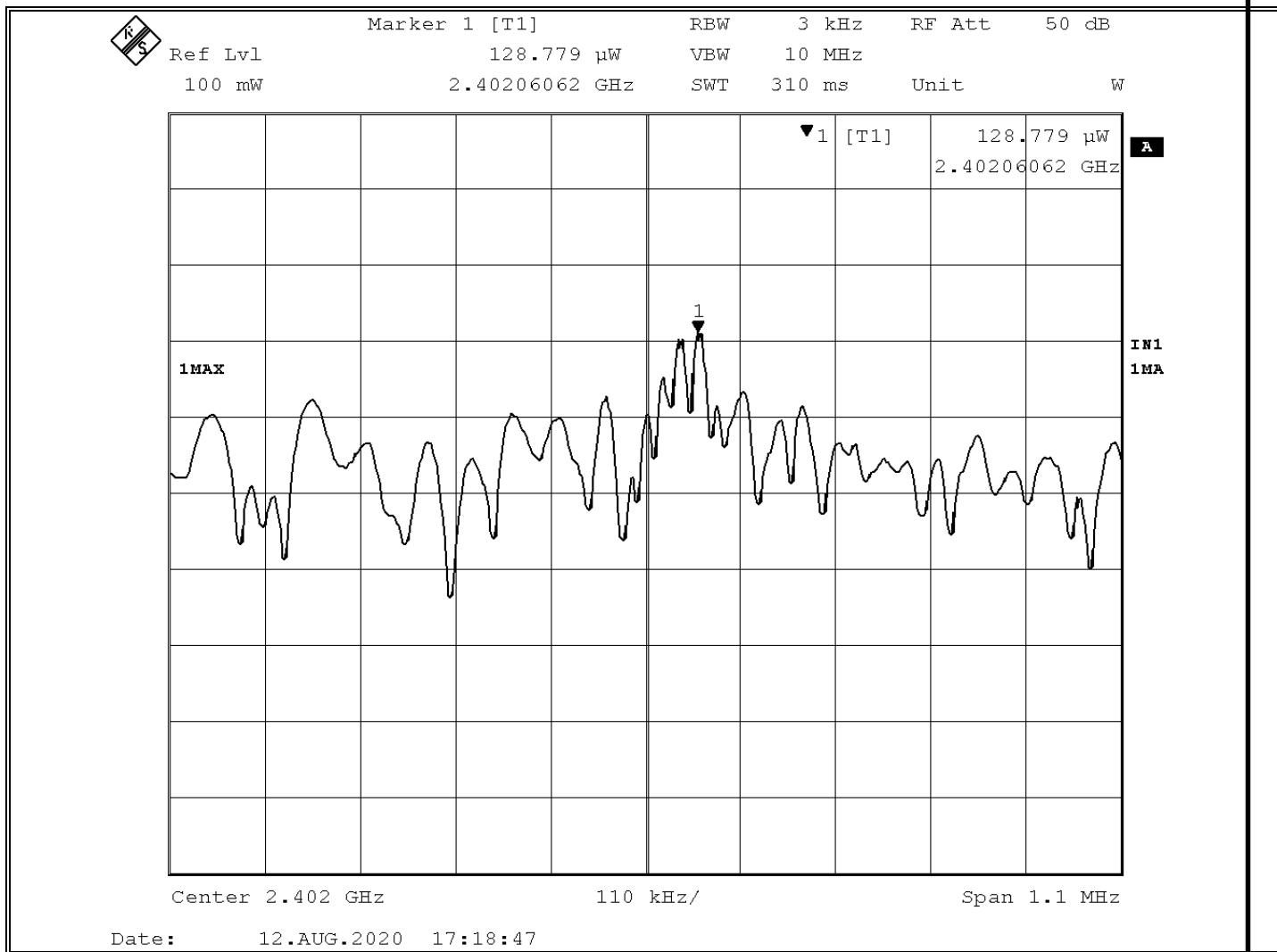


Retlif Testing Laboratories

Report No. R-3287P-4 Rev. B

EMISSIONS TEST DATA SHEET

Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (e)
Method:	ANSI C63.10, Section 11.10.2 Maximum power spectral density level in the fundamental emission
Job Number/Customer:	R-3287P-4 / LifeLens Technologies, LLC
Test Sample:	HUB
Part Number:	LL-ECG-HUB-PR01
Serial Number:	01000414
Operating Mode:	Transmitting modulated signal at 2.402 GHz (Channel 1)
Technician:	S. Macdonald
Date(s):	8/12/20
Temperature:	23.2 °C
Relative Humidity:	54.1 %
Notes:	Power Density = 0.129 mW

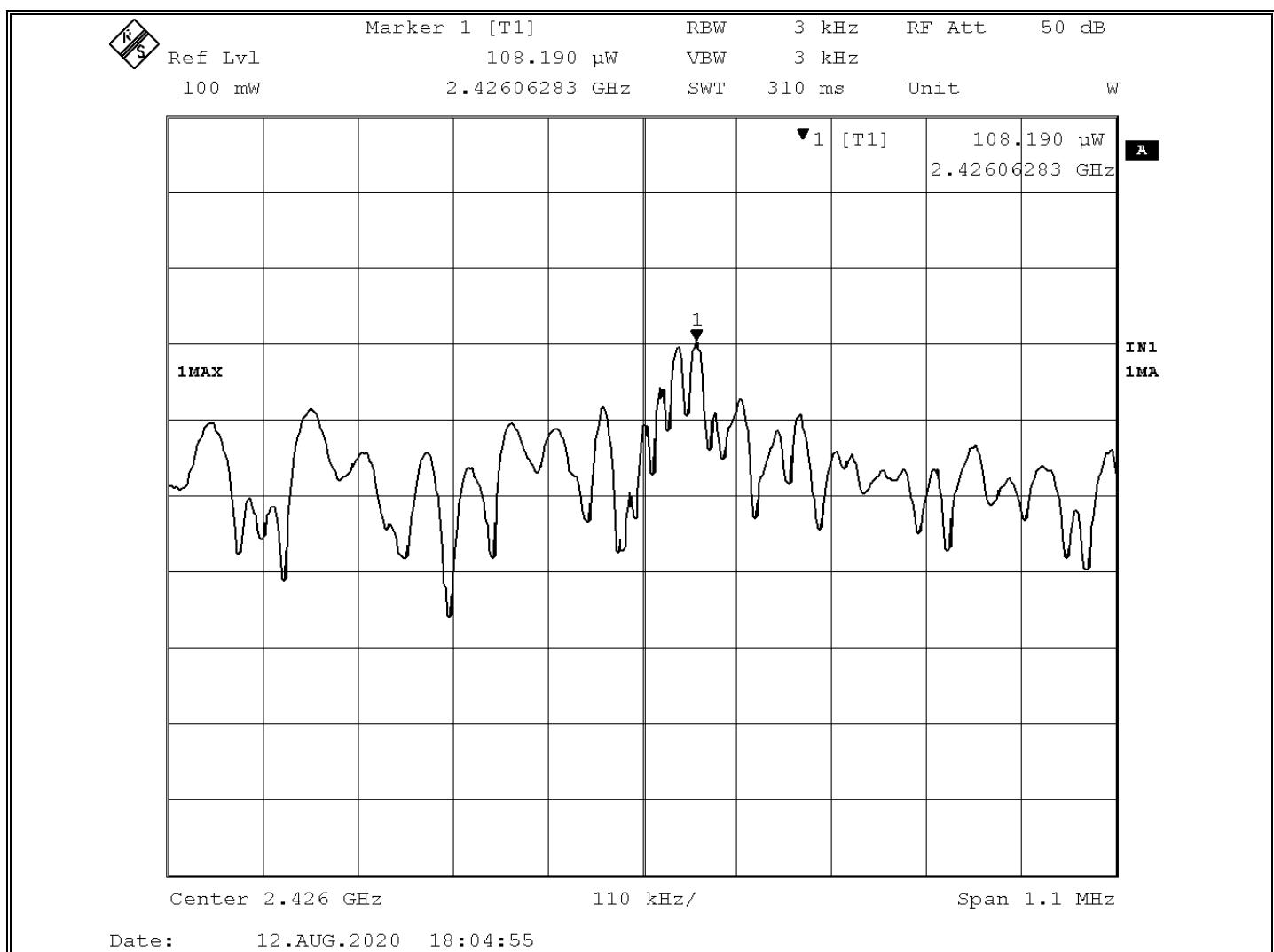


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Report No. R-3287P-4 Rev. B

EMISSIONS TEST DATA SHEET

Test Specification:	FCC Part 15, Subpart C	Paragraph: 15.247 (e)
Method:	ANSI C63.10, Section 11.10.2 Maximum power spectral density level in the fundamental emission	
Job Number/Customer:	R-3287P-4 / LifeLens Technologies, LLC	
Test Sample:	HUB	
Part Number:	LL-ECG-HUB-PR01	
Serial Number:	01000414	
Operating Mode:	Transmitting modulated signal at 2.426 GHz (Channel 13)	
Technician:	S. Macdonald	
Date(s):	8/12/20	
Temperature:	23.2 °C	
Relative Humidity:	54.1 %	
Notes:	Power Density = 0.108 mW	

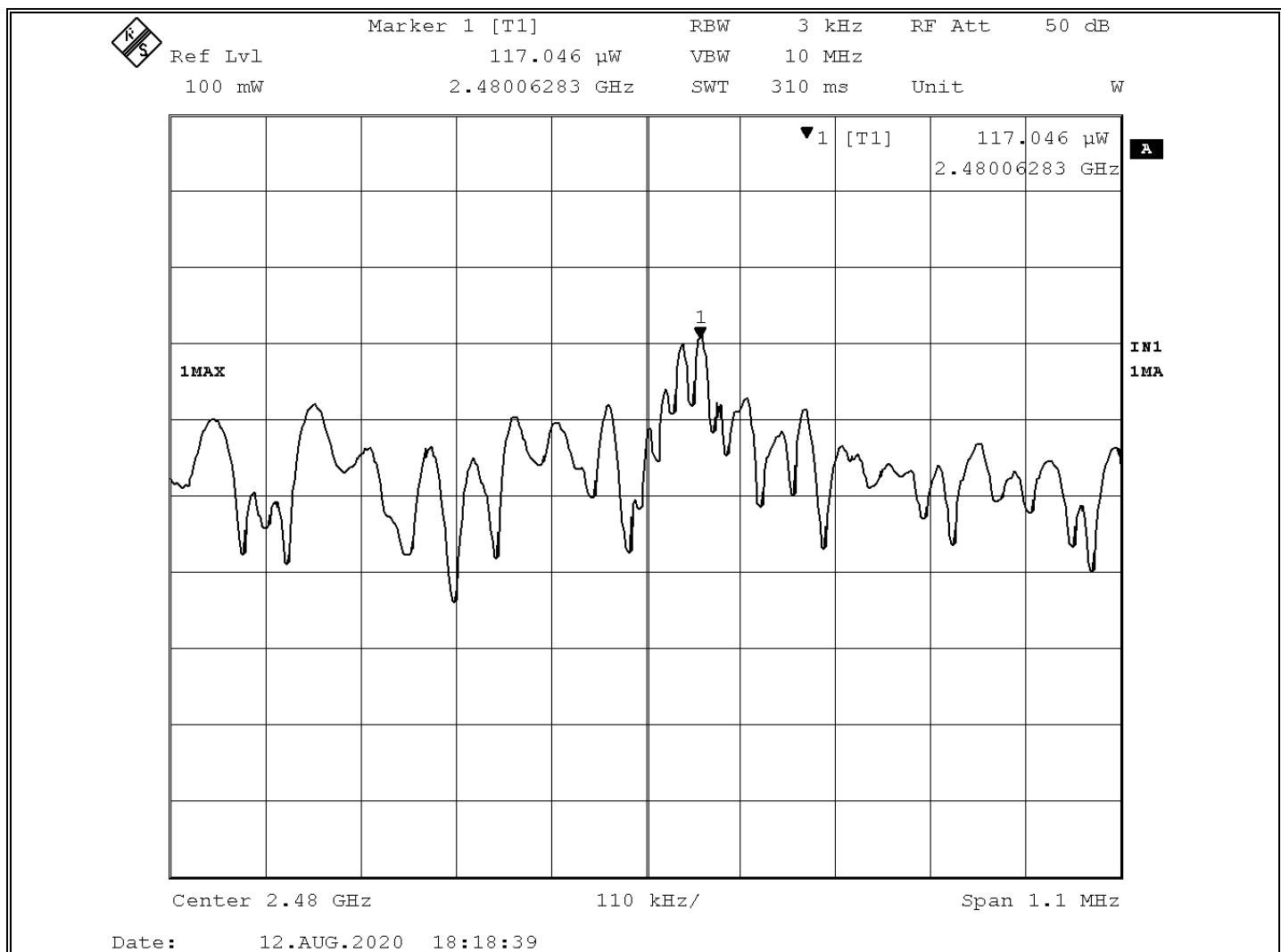


Retlif Testing Laboratories

Report No. R-3287P-4 Rev. B

EMISSIONS TEST DATA SHEET

Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (e)
Method:	ANSI C63.10, Section 11.10.2 Maximum power spectral density level in the fundamental emission
Job Number/Customer:	R-3287P-4 / LifeLens Technologies, LLC
Test Sample:	HUB
Part Number:	LL-ECG-HUB-PR01
Serial Number:	01000414
Operating Mode:	Transmitting modulated signal at 2.480 GHz (Channel 40)
Technician:	S. Macdonald
Date(s):	8/12/20
Temperature:	23.2 °C
Relative Humidity:	54.1 %
Notes:	Power Density = 0.117 mW



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Report No. R-3287P-4 Rev. B

FCC 15.209(a)
Test Data, Radiated Emissions Limits, General Requirements



Retlif Testing Laboratories

Report No. R-3287P-4 Rev. B

EMISSIONS TEST DATA SHEET

Test Specification:	FCC Part 15, Subpart C, Paragraph: 15.209(a)
Method:	ANSI C63.4, Section 8, Radiated Emission Measurements, 30MHz to 1GHz
Job Number/Customer:	R-3287P-4 / LifeLens Technologies, LLC
Test Sample:	HUB
Part Number:	LL-ECG-HUB-PR01
Serial Number:	01000410
Operating Mode:	Continuously communicating via BLE
Technician:	M. Nowak
Date(s):	8/18/20
Temperature:	24.1 °C
Relative Humidity:	57 %
Detector:	Quasi-Peak
Test Distance:	3m

Notes: The frequency range was scanned from 30 MHz to 1 GHz

The emissions observed from the EUT do not exceed the specified limits. The six highest readings relative to the limit are presented.

*Noise floor measurements, minimum sensitivity of measurement system

Frequency	Antenna Pol /Height	EUT Orientation	Meter Reading	Correction Factor	Corrected Reading	Converted Reading	Limit
MHz	(V/H) / (m)	Degrees	dBuV	dB	dBuV/m	uV/m	uV/m
30.00							100
*33.00	H / 1.00	180.0	1.4	12.3	13.7	4.85	
88.00							100
88.00							150
*110.00	H / 1.00	180.0	6.2	13.3	19.5	9.45	
*195.00	H / 1.00	180.0	1.5	18.9	20.4	10.48	
216.00							150
216.00							200
*217.00	H / 1.00	180.0	4.4	13.3	17.7	7.68	
*605.00	H / 1.00	180.0	3.9	23.1	27.0	22.39	
960.00							200
960.00							500
*995.00	H / 1.00	180.0	3.7	30.1	33.8	48.98	
1000.00							500



Retlif Testing Laboratories

Report No. R-3287P-4 Rev. B

EMISSIONS TEST DATA SHEET

Test Specification:	FCC Part 15, Subpart C, Paragraph: 15.209(a)
Method:	ANSI C63.4, Section 8, Radiated Emission Measurements, 30MHz to 1GHz
Job Number/Customer:	R-3287P-4 / LifeLens Technologies, LLC
Test Sample:	HUB
Part Number:	LL-ECG-HUB-PR01
Serial Number:	01000410
Operating Mode:	Continuously communicating via BLE
Technician:	M. Nowak
Date(s):	8/18/20
Temperature:	24.1 °C
Relative Humidity:	57 %
Detector:	Peak
Test Distance:	3m

Notes: The frequency range was scanned from 1 GHz to 25 GHz

The emissions observed from the EUT do not exceed the specified limits. The five highest readings relative to the limit are presented.

*Noise floor measurements, minimum sensitivity of measurement system

Frequency	Antenna Pol /Height	EUT Orientation	Meter Reading	Correction Factor	Corrected Reading	Converted Reading	Average Detector
GHz	(V/H) / (m)	Degrees	dBuV	dB	dBuV/m	uV/m	uV/m
1.00							500
*1.05	H / 1.00	180.0	51.2	-8.2	43.0	141.26	
*2.95	H / 1.00	180.0	43.1	-3.2	39.9	98.86	
*4.05	H / 1.00	180.0	42.2	0.0	42.2	128.83	
*10.00	H / 1.00	180.0	42.5	5.7	48.2	257.04	
*12.00	H / 1.00	180.0	40.9	7.5	48.4	263.03	
25.00							500



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Report No. R-3287P-4 Rev. B