



FCC Part 15, Subpart C, Section 15.247
Test Report

On

Battery Powered Vibration Sensor
FCC ID: Z5ISD3

Customer Name: KCF Technologies, Inc.

Customer P.O.: 20181016a

Date of Report Rev.: September 4, 2019

Test Report No.: R-2975P-1, Rev. A

Test Start Date: December 17, 2018

Test Finish Date: December 20, 2018

Test Technicians: M. Nowak, S. Hale

Lead Test Technician: A. Warwick

Approved By: D. Rybicki

Report Rev. Prepared By: P. Harris

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Report No. R-2975P, Rev. A

Technical Information

Report Number: R-2975P-1, Rev. A

Customer: KCF Technologies, Inc.

Address: 336 S. Fraser Street
State College, PA 16801

Manufacturer: KCF Technologies, Inc.

Manufacturer Address: 336 S. Fraser Street
State College, PA 16801

Test Sample: Battery Powered Vibration Sensor

Model Number: SD-VSN-3, SD-VSN-3N, SD-VSN-3E

Serial Number: 000070F2 and 000070B6

FCC ID: Z5ISD3

Type: Digital Spread Spectrum Transmitter

Power Requirements: 3.15 VDC Internal Battery (3.6 VDC Internal Battery Model 3E)

Frequency of Operation: 2.429 GHz to 2.457 GHz

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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Table 1 – Tests Performed

FCC Part 15, Subpart C	Test Method
15.247(a)(2)	Occupied Bandwidth (6dB Bandwidth)
15.247(b)(3)	Power Output
15.247(d)	Antenna Port, Conducted Emissions
15.247(e)	Antenna Port, Power Density
15.247(d)	Out of Band / Band Edge Radiated Emissions, 30 MHz to 25 GHz

Table 2 – Support Equipment

Description	Manufacturer	Model Number	Serial Number
Test PC	Dell	Latitude E6530	HQFSJX1
Transceiver	KCF Technologies, Inc.	SD-PRN-Z	C0001151

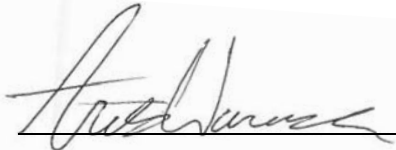


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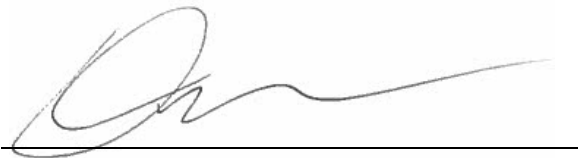
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Certification and Signatures

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
Senior Test Technician



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 report must not be used by the client to claim product endorsement by ANSI ASQ National Accreditation Board (ANAB).



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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
-	August 29, 2019	Original Release
A	September 4, 2019	Global: <ul style="list-style-type: none">• Test Report Number R-2975P changed to R-2975P, Rev. A• Date of Report: August 29, 2019 changed to Date of Report Rev.: September 4, 2019• Report Prepared By: P. Harris changed to Report Rev. Prepared By: P. Harris• Add Power Spectral Density data to report



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Report No. R-2975P, Rev. A

Requirements and Test Results

Requirement:

FCC Section 15.247(a)(2), 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 minimum 6 dB bandwidth measured 886.77 kHz which complies with the requirement that the Bandwidth be no less than 500 kHz.

Requirement:

FCC Sections 15.247(b)(3), 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 maximum measured peak conducted output power was 57.54 mW. The device was found to meet the power output requirements of 15.247 (b)(3) including de facto EIRP.



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Requirements and Test Results (con't)

Requirement:

FCC Section 15.247(d), 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).



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Requirements and Test Results (con't)

Requirement:

FCC Section 15.247(e), 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), herein.

Requirement:

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 3.

Table 3 - 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 3.



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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 dB μ V/m

M_R = Uncorrected Meter Reading in dB μ V

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

Example:

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

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

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

dB μ V/M is converted to uV/M for comparison to the specified limit using the formula:

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

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

RF Power Conversion:

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

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

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



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Requirements and Test Results (con't)

FCC Section 15.247 (i), RF Exposure Limits

Spread Spectrum Transmitters operating under 15.247 must be operated in a manner that ensures the public is not exposed to RF energy levels in excess of the commission's guidelines. Based on the transmitter power and maximum antenna gain (see calculation below) the minimum separation distance was calculated to determine the distance for acceptable MPE power density levels to meet both the Occupational/Controlled Exposure and the General Population/Uncontrolled Exposure requirements of FCC Part 1.1310. The calculation below uses the more stringent General Population MPE Limits.

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

D = Minimum Separation Distance in cm

S = Max allowed Power Density in mW/cm²

Per 1.1310 For the frequency range of 2400 – 2483.5 MHz S = 1mW/cm²

Power (P) = Max power Input to Antenna = 57.54 mW

Gain (G) = Max Power Gain of Antenna = 1.75dBi = 1.5 numeric

$$1\text{mW/cm}^2 = \frac{57.54 \times 1.5}{4\pi \times D^2} = \frac{86.31}{12.57 \times D^2}$$

$$D^2 = 6.87$$

$$D = 2.62 \text{ cm}$$



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Equipment Lists

FCC Section 15.247(a)(2) Occupied Bandwidth (6 dB Bandwidth)

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
713	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 26.5 GHz	ESIB26	2/1/2018	2/28/2019
8557	NARDA MICROWAVE	ATTENUATOR, COAXIAL	10 dB, DC - 11 GHz, 20 W	768-10	6/5/2018	6/30/2019
928	AEROFLEX / WEINSCHEL	ATTENUATOR, COAXIAL	10 dB, DC - 40 GHz	75A-10-12	10/12/2018	10/31/2019

FCC Section 15.247(b)(3) Power Output

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
713	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 26.5 GHz	ESIB26	2/1/2018	2/28/2019
8557	NARDA MICROWAVE	ATTENUATOR, COAXIAL	10 dB, DC - 11 GHz, 20 W	768-10	6/5/2018	6/30/2019
928	AEROFLEX / WEINSCHEL	ATTENUATOR, COAXIAL	10 dB, DC - 40 GHz	75A-10-12	10/12/2018	10/31/2019

FCC Section 15.247(d) Antenna Port, Conducted Emissions

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
713	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 26.5 GHz	ESIB26	2/1/2018	2/28/2019
8557	NARDA MICROWAVE	ATTENUATOR, COAXIAL	10 dB, DC - 11 GHz, 20 W	768-10	6/5/2018	6/30/2019
928	AEROFLEX / WEINSCHEL	ATTENUATOR, COAXIAL	10 dB, DC - 40 GHz	75A-10-12	10/12/2018	10/31/2019

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	2/1/2018	2/28/2019
8557	NARDA MICROWAVE	ATTENUATOR, COAXIAL	10 dB, DC - 11 GHz, 20 W	768-10	6/5/2018	6/30/2019
928	AEROFLEX / WEINSCHEL	ATTENUATOR, COAXIAL	10 dB, DC - 40 GHz	75A-10-12	10/12/2018	10/31/2019



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FCC Section 15.247 (a) / 15.209(a)
Field Strength of Spurious Radiated Emissions

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
10028	AGILENT / HP	ANALYZER, SPECTRUM	9 kHz - 22 GHz	8592L	10/23/2018	10/31/2019
8016	ETS / EMCO	ANTENNA, LOG PERIODIC	200 MHz - 1 GHz	3146	2/7/2018	8/31/2019
8017	ETS / EMCO	ANTENNA, DOUBLE RIDGED GUIDE	1 - 18 GHz	3115	9/26/2017	3/31/2019
8300	RETLIF	OPEN AREA TEST SITE, ATTENUATION	3/10 Meter OATS	RPA	3/28/2018	3/31/2020
8300C	UNKNOWN	CABLE, COAXIAL	3/10 METER	3 METER CABLE	10/30/2018	10/31/2019
8317	AGILENT / HP	PRE-AMPLIFIER	1 - 26.5 GHz, 30 dB	8449B	5/16/2018	5/31/2019
8398	ETS / EMCO	ANTENNA, BICONICAL	20 - 200 MHz	3104C	2/13/2018	8/31/2019
8644	AGILENT / HP	ANALYZER, SPECTRUM	100 Hz - 22 GHz	85662A	9/18/2018	9/30/2019
8644A	AGILENT / HP	ANALYZER, SPECTRUM	100 Hz - 22.5 GHz	8566B	9/18/2018	9/30/2019
8644B	AGILENT / HP	ANALYZER, RF PRESELECTOR	20 Hz - 2 GHz	85685A	9/28/2018	9/30/2019
8644C	AGILENT / HP	ANALYZER, QUASI-PEAK ADAPTOR	100 Hz - 22 GHz	85650A	9/24/2018	9/30/2019
8687	RETLIF	CABLE, COAXIAL	10 kHz - 18 GHz	10' TYPE N	6/14/2018	6/30/2019
8726	RETLIF	CABLE, COAXIAL	10 kHz - 18 GHz	3' TYPE N	5/2/2018	5/31/2019



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

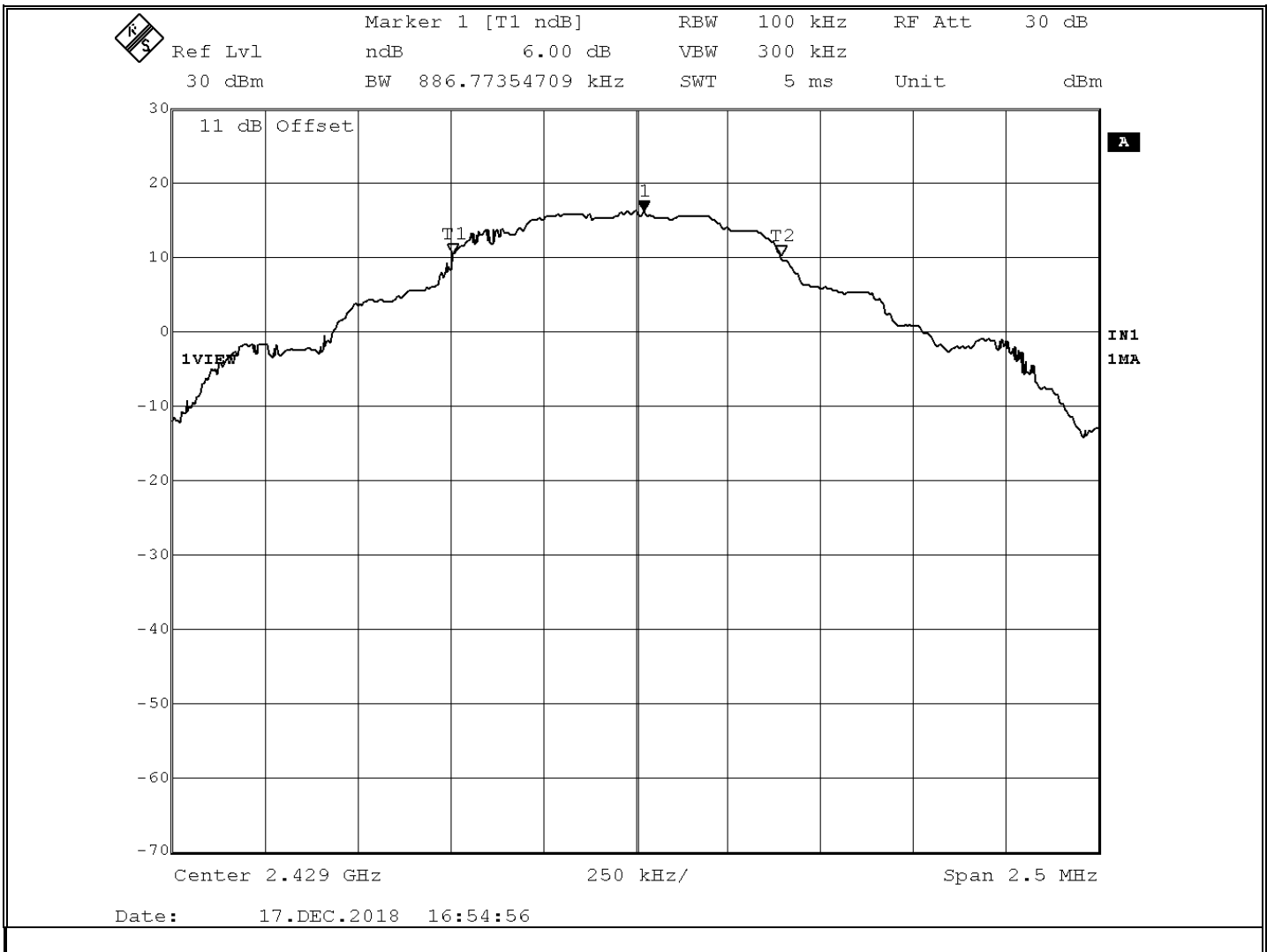


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EMISSIONS TEST DATA SHEET

Method:	Occupied Bandwidth
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (a)(2)
Job Number:	R-2975P-1
Customer:	KCF Technologies, Inc
Test Sample:	Battery Powered Vibration Sensor
Model Number:	SD-VSN-3
Serial Number:	000070F2
Operating Mode:	Continuously transmitting a modulated signal at 2.429 GHz
Technician:	S. Hale
Date(s):	12/17/2018
Temperature:	21.9 °C
Relative Humidity:	33.0 %

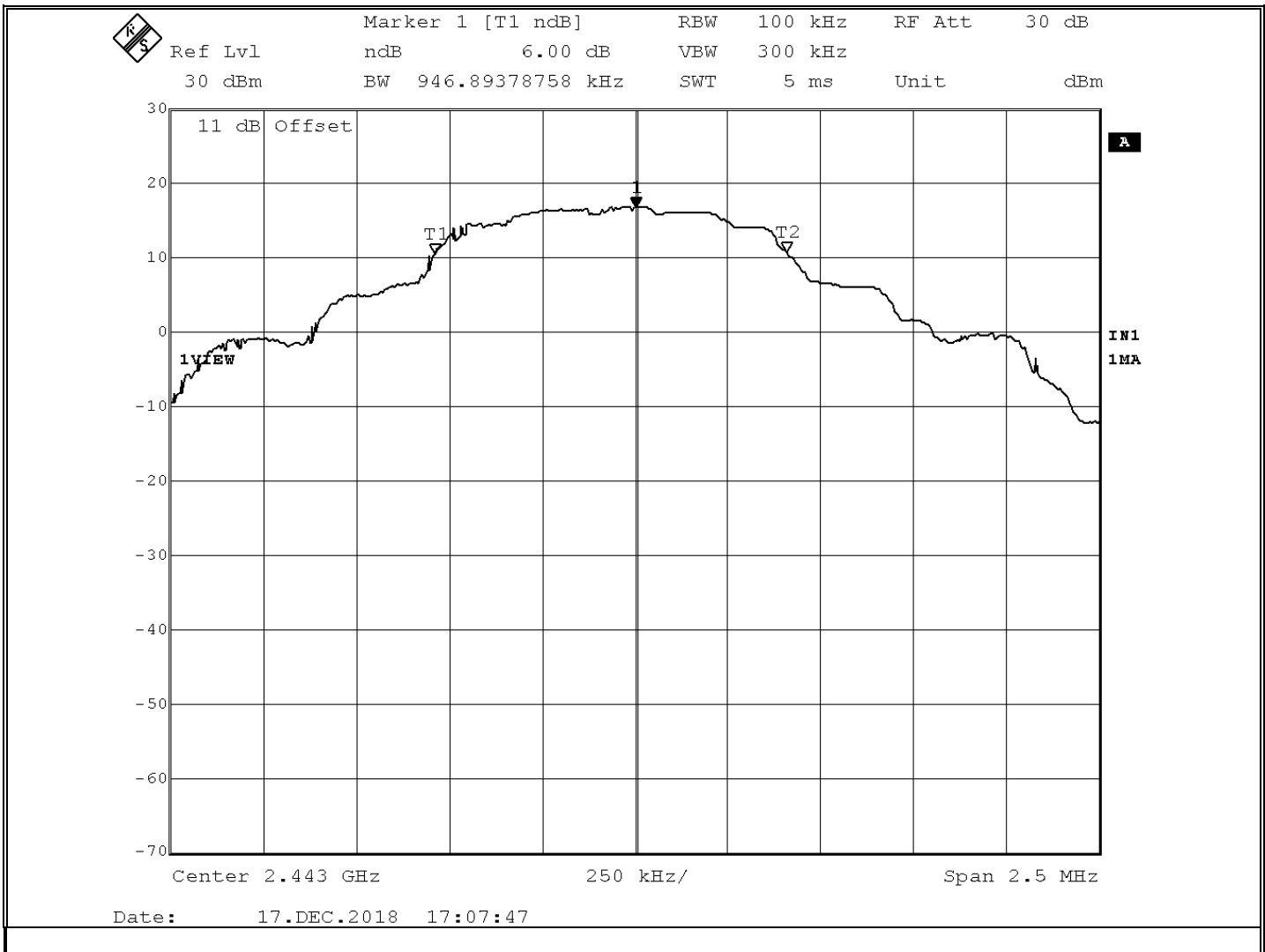


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Report No. R-2975P, Rev. A

EMISSIONS TEST DATA SHEET

Method:	Occupied Bandwidth
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (a)(2)
Job Number:	R-2975P-1
Customer:	KCF Technologies, Inc
Test Sample:	Battery Powered Vibration Sensor
Model Number:	SD-VSN-3
Serial Number:	000070F2
Operating Mode:	Continuously transmitting a modulated signal at 2.443 GHz
Technician:	S. Hale
Date(s):	12/17/2018
Temperature:	21.9 °C
Relative Humidity:	33.0 %

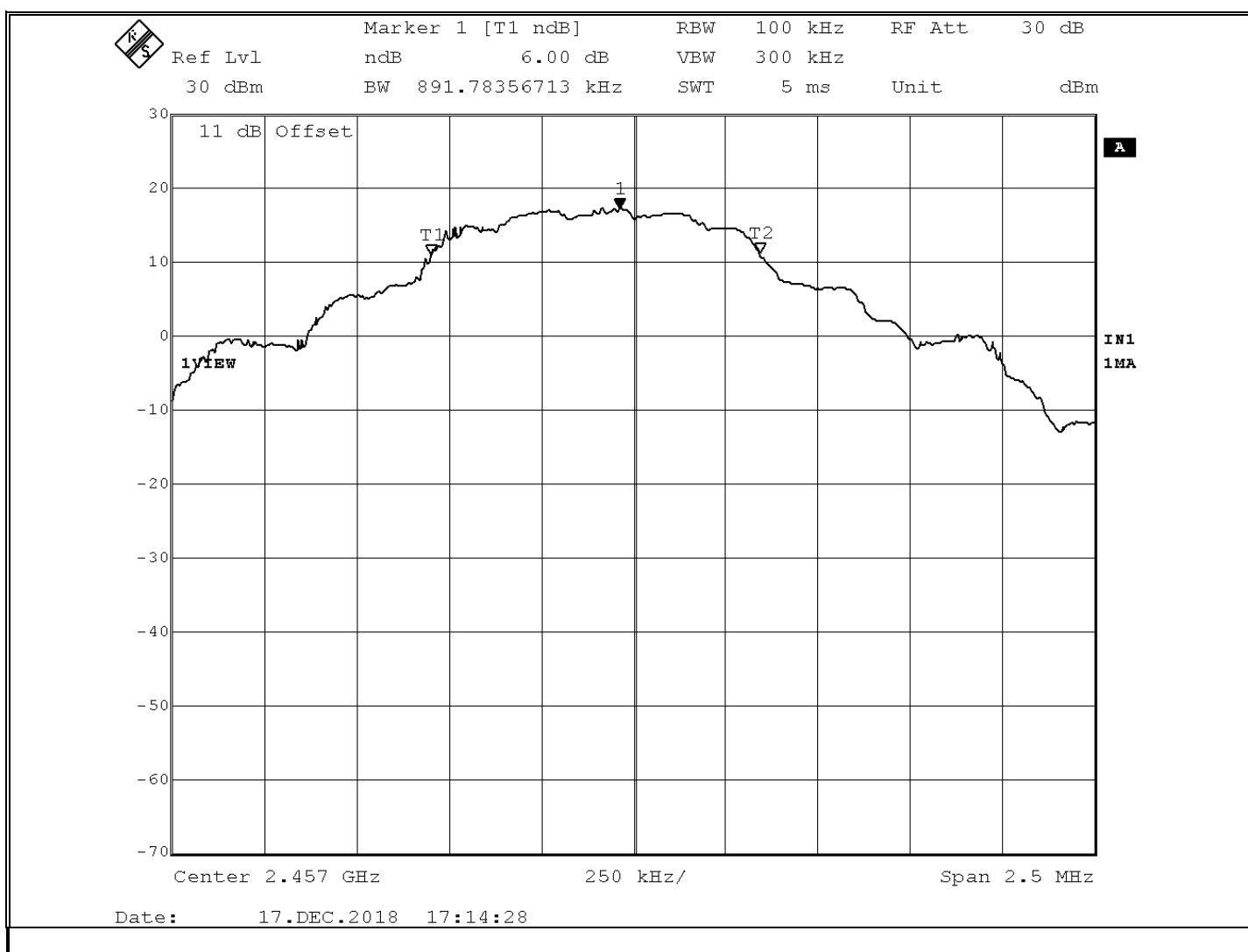


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EMISSIONS TEST DATA SHEET

Method:	Occupied Bandwidth
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (a)(2)
Job Number:	R-2975P-1
Customer:	KCF Technologies, Inc
Test Sample:	Battery Powered Vibration Sensor
Model Number:	SD-VSN-3
Serial Number:	000070F2
Operating Mode:	Continuously transmitting a modulated signal at 2.457 GHz
Technician:	S. Hale
Date(s):	12/17/2018
Temperature:	21.9 °C
Relative Humidity:	33.0 %



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

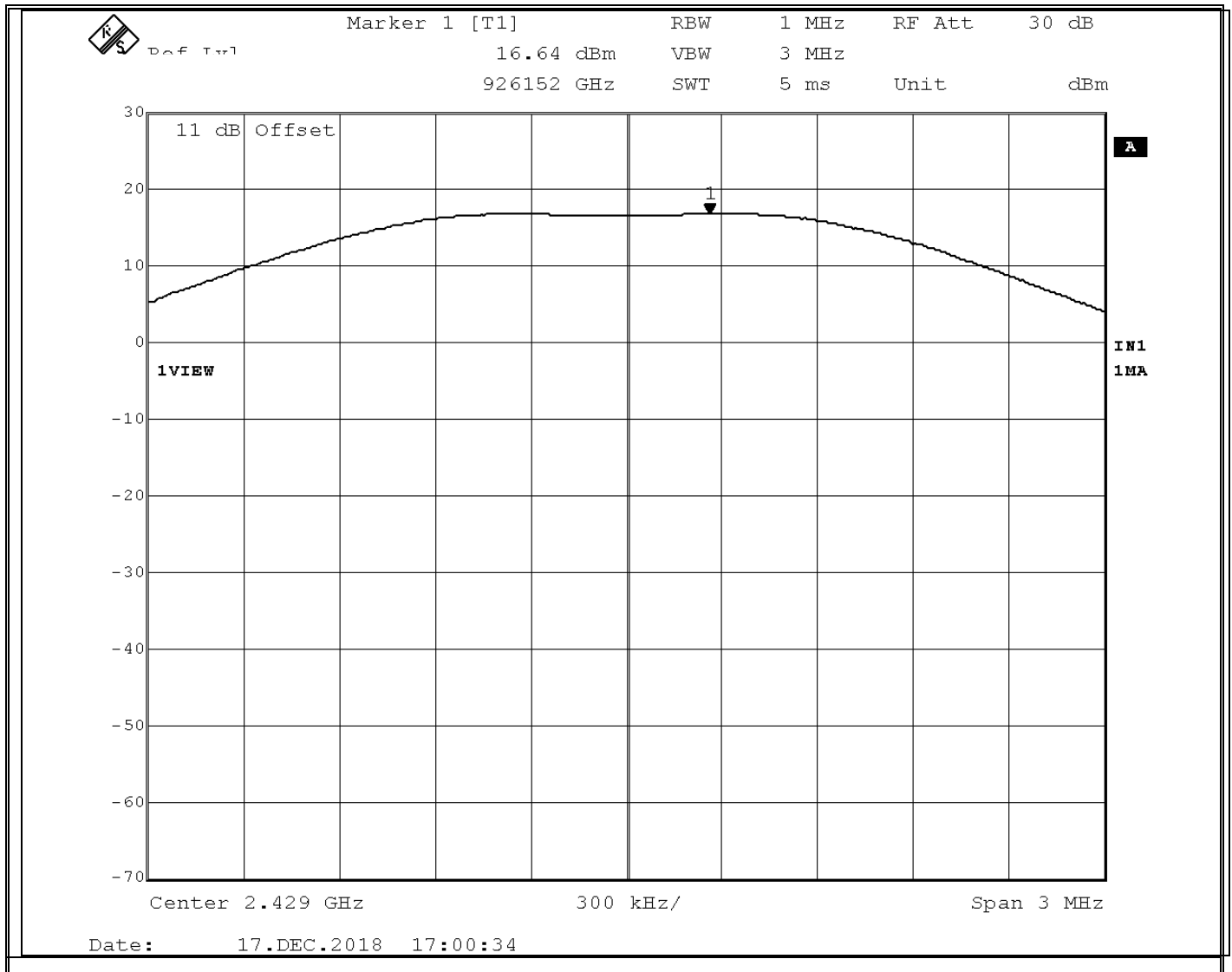


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EMISSIONS TEST DATA SHEET

Method:	Power Output
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (b)(3)
Job Number:	R-2975P-1
Customer:	KCF Technologies, Inc
Test Sample:	Battery Powered Vibration Sensor
Model Number:	SD-VSN-3
Serial Number:	000070F2
Operating Mode:	Continuously transmitting a modulated signal at 2.429 GHz
Technician:	S. Hale
Date(s):	12/17/2018
Temperature:	21.9 °C
Relative Humidity:	33.0 %

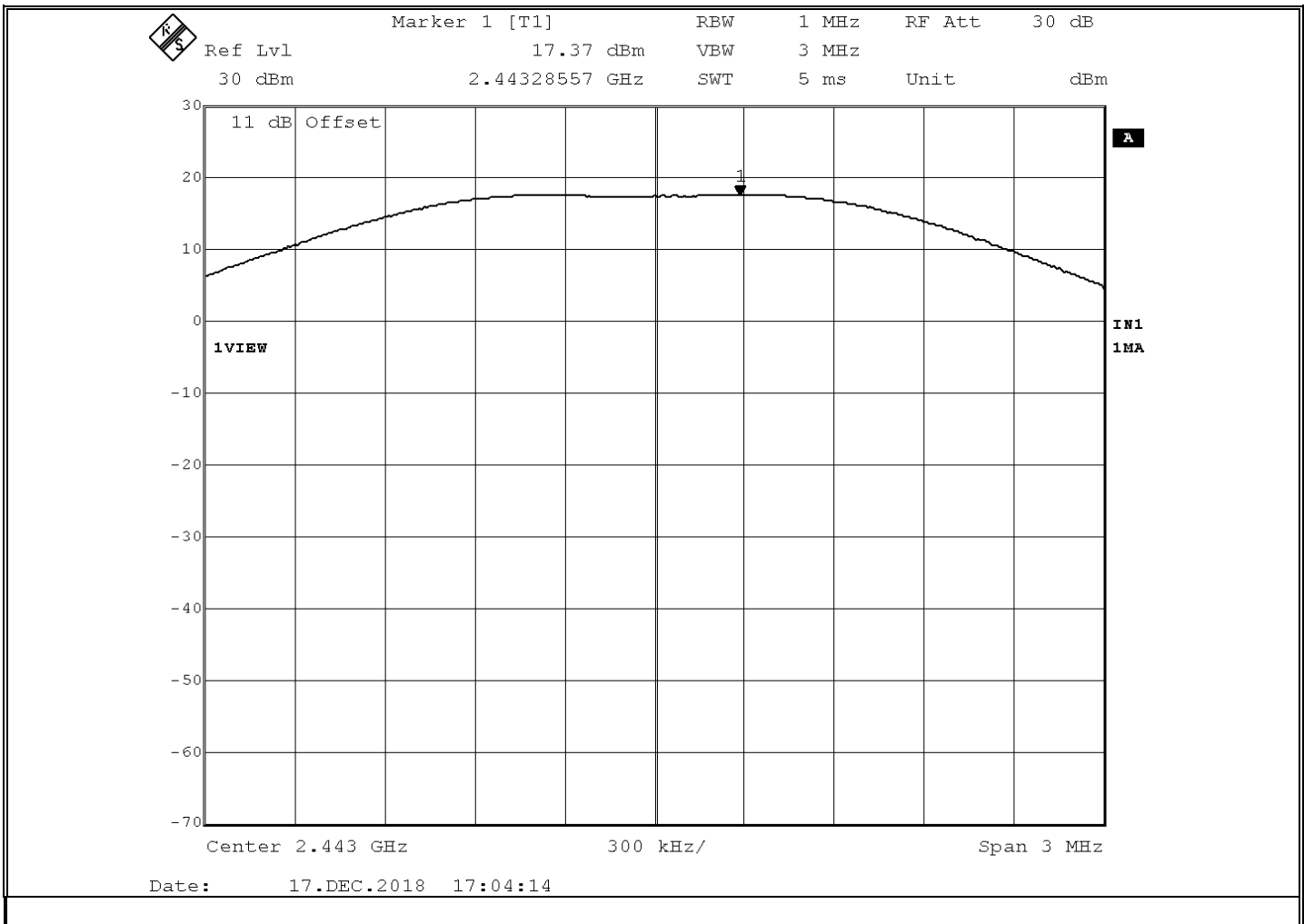


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EMISSIONS TEST DATA SHEET

Method:	Peak Power Output
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (b)(3)
Job Number:	R-2975P-1
Customer:	KCF Technologies, Inc
Test Sample:	Battery Powered Vibration Sensor
Model Number:	SD-VSN-3
Serial Number:	000070F2
Operating Mode:	Continuously transmitting a modulated signal at 2.443 GHz
Technician:	S. Hale
Date(s):	12/17/2018
Temperature:	21.9 °C
Relative Humidity:	33.0 %

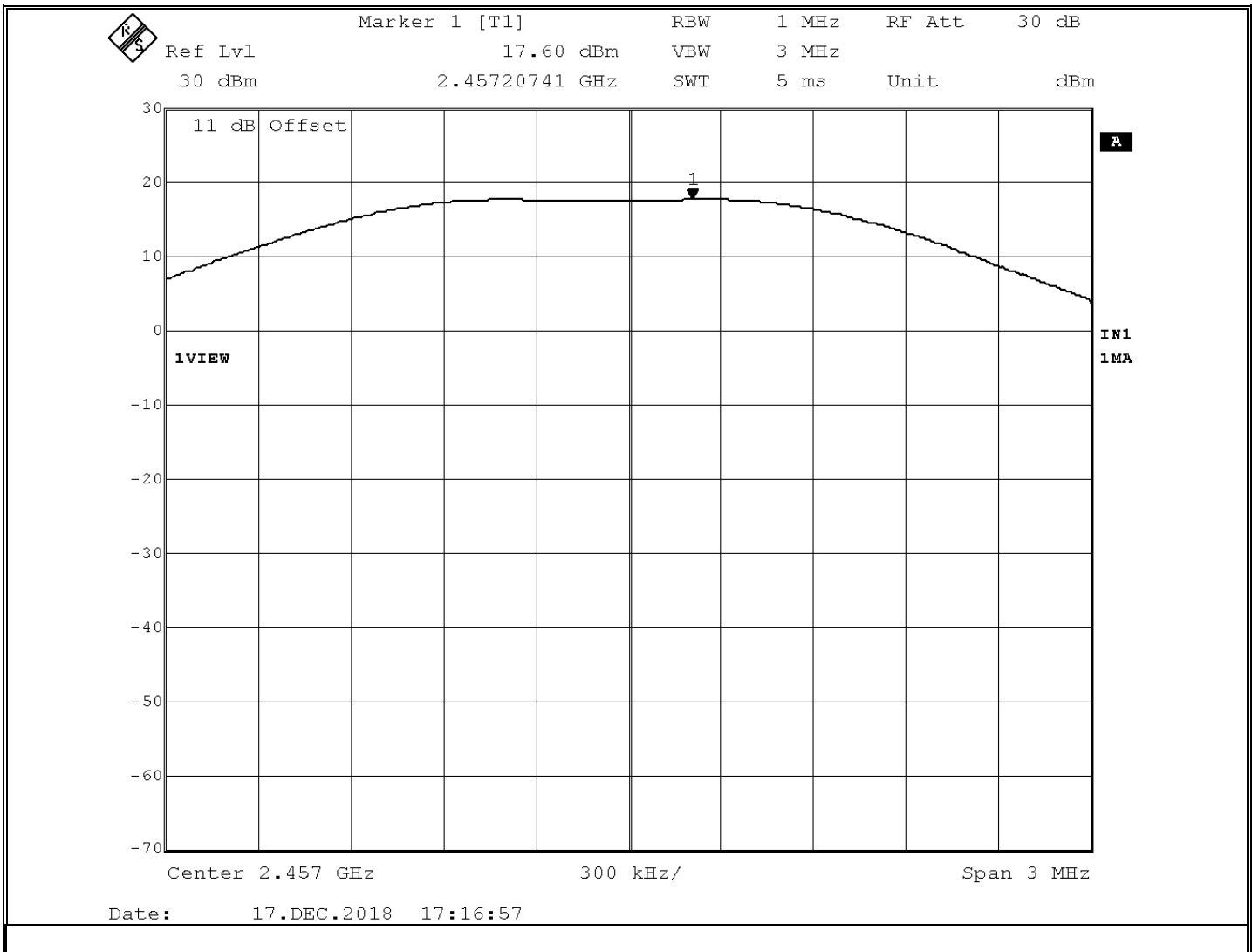


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EMISSIONS TEST DATA SHEET

Method:	Peak Power Output
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (b)(3)
Job Number:	R-2975P-1
Customer:	KCF Technologies, Inc
Test Sample:	Battery Powered Vibration Sensor
Model Number:	SD-VSN-3
Serial Number:	000070F2
Operating Mode:	Continuously transmitting a modulated signal at 2.457 GHz
Technician:	S. Hale
Date(s):	12/17/2018
Temperature:	21.9 °C
Relative Humidity:	33.0 %



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FCC Section 15.247(d)
Test Data, Conducted Band Edge

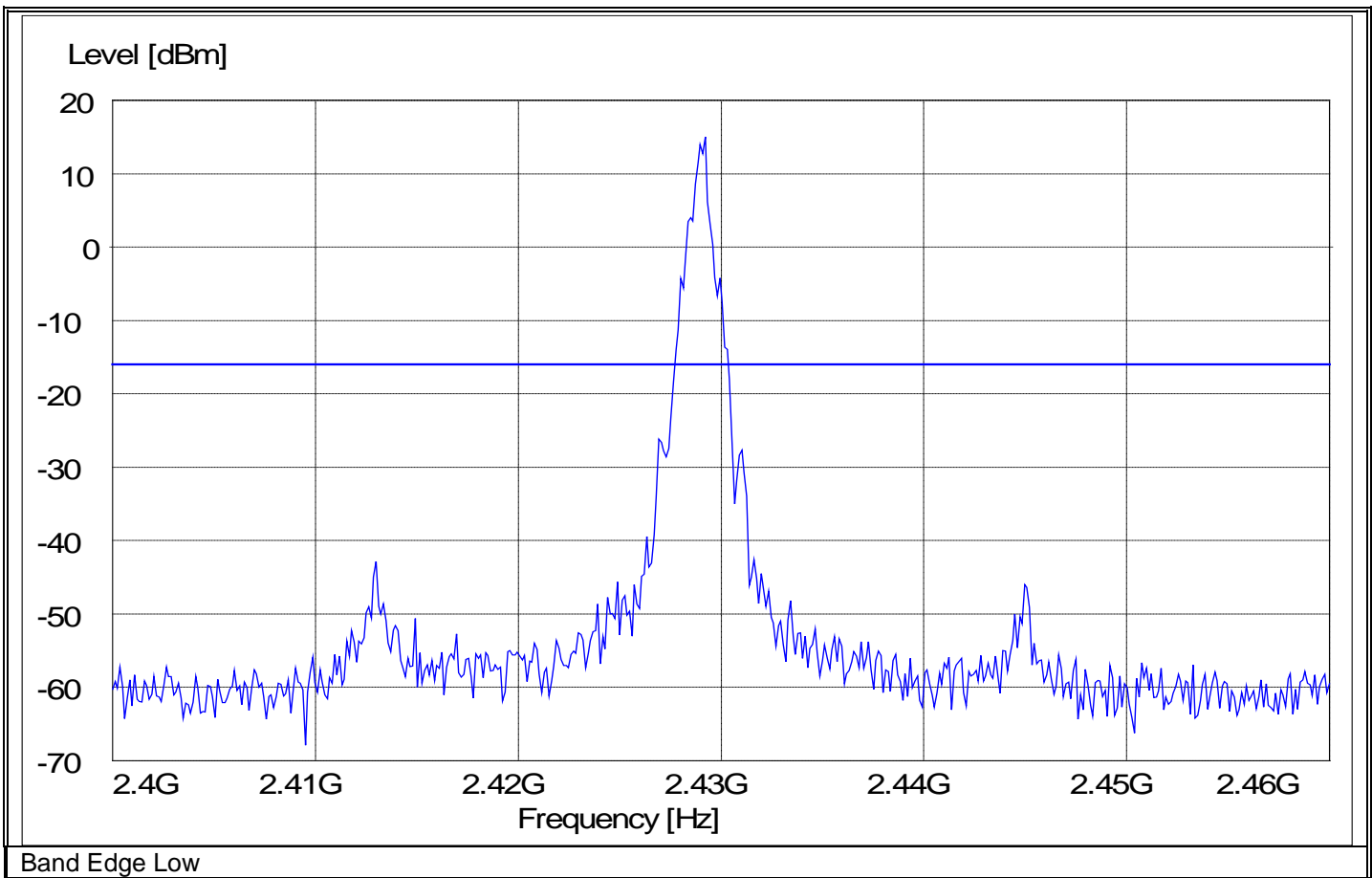


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Report No. R-2975P, Rev. A

EMISSIONS TEST DATA SHEET

Method:	Band Edge
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-2975P-1
Customer:	KCF Technologies, Inc
Test Sample:	Battery Powered Vibration Sensor
Model Number:	SD-VSN-3
Serial Number:	000070F2
Operating Mode:	Continuously transmitting a modulated signal at 2.429 GHz
Technician:	S. Hale
Date(s):	12/18/2018
Temperature:	21.9 °C
Relative Humidity:	33.0 %

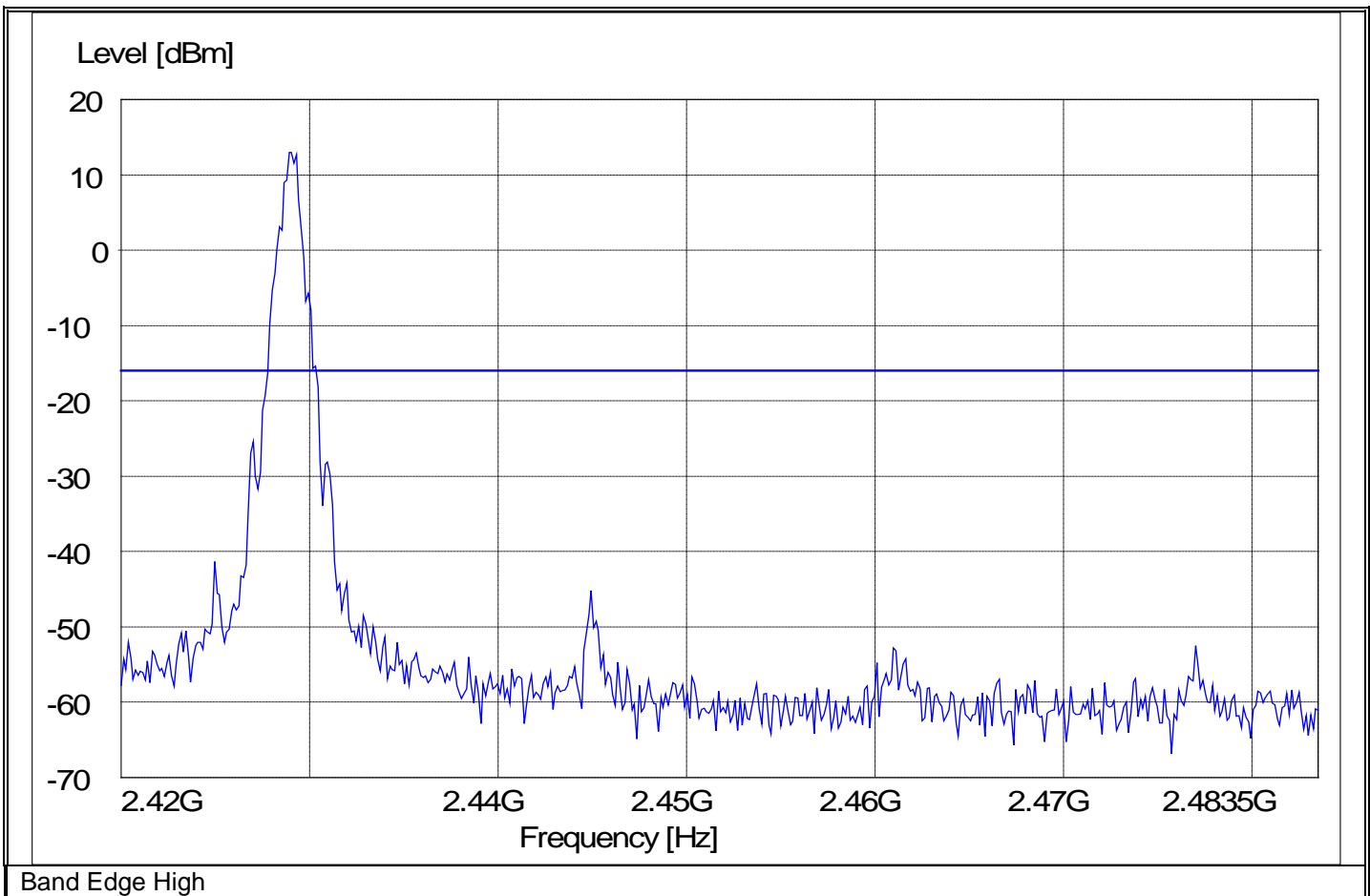


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EMISSIONS TEST DATA SHEET

Method:	Band Edge
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-2975P-1
Customer:	KCF Technologies, Inc
Test Sample:	Battery Powered Vibration Sensor
Model Number:	SD-VSN-3
Serial Number:	000070F2
Operating Mode:	Continuously transmitting a modulated signal at 2.429 GHz
Technician:	S. Hale
Date(s):	12/18/2018
Temperature:	21.9 °C
Relative Humidity:	33.0 %

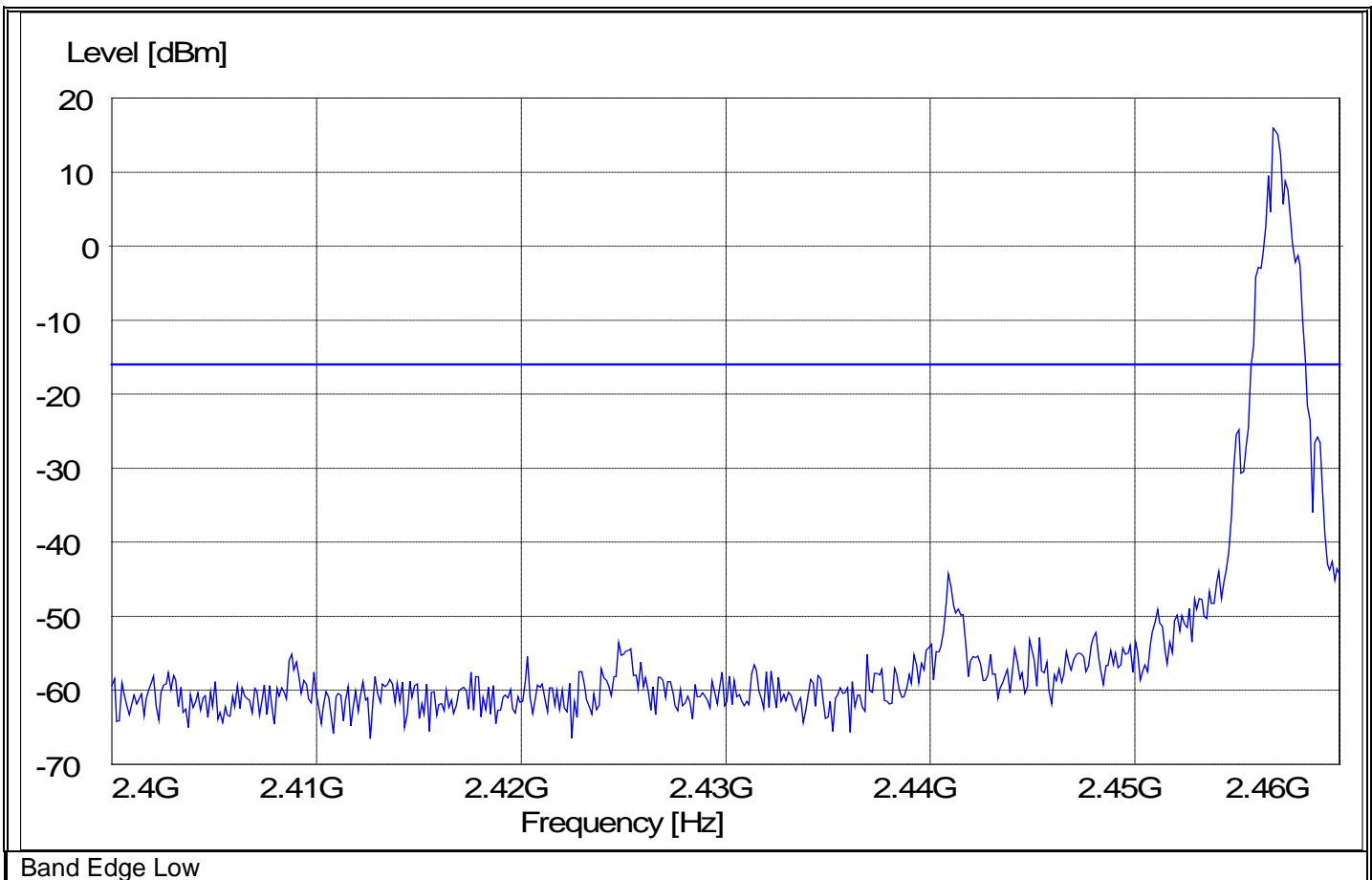


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Report No. R-2975P, Rev. A

EMISSIONS TEST DATA SHEET

Method:	Band Edge
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-2975P-1
Customer:	KCF Technologies, Inc
Test Sample:	Battery Powered Vibration Sensor
Model Number:	SD-VSN-3
Serial Number:	000070F2
Operating Mode:	Continuously transmitting a modulated signal at 2.457 GHz
Technician:	S. Hale
Date(s):	12/18/2018
Temperature:	21.9 °C
Relative Humidity:	33.0 %

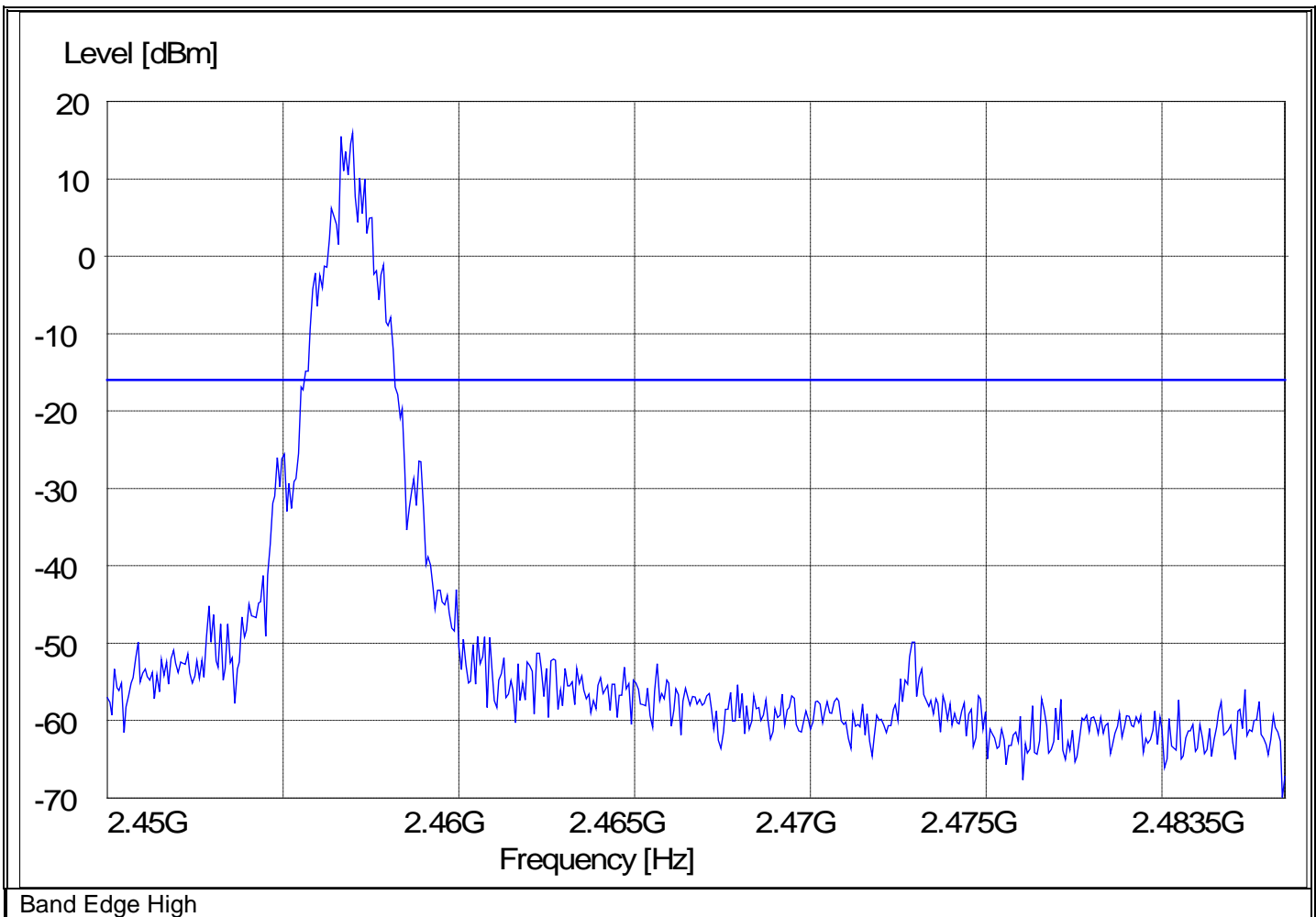


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EMISSIONS TEST DATA SHEET

Method:	Band Edge
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-2975P-1
Customer:	KCF Technologies, Inc
Test Sample:	Battery Powered Vibration Sensor
Model Number:	SD-VSN-3
Serial Number:	000070F2
Operating Mode:	Continuously transmitting a modulated signal at 2.457 GHz
Technician:	S. Hale
Date(s):	12/18/2018
Temperature:	21.9 °C
Relative Humidity:	33.0 %



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Report No. R-2975P, Rev. A

FCC Section 15.247(e)
Test Data, Power Spectral Density

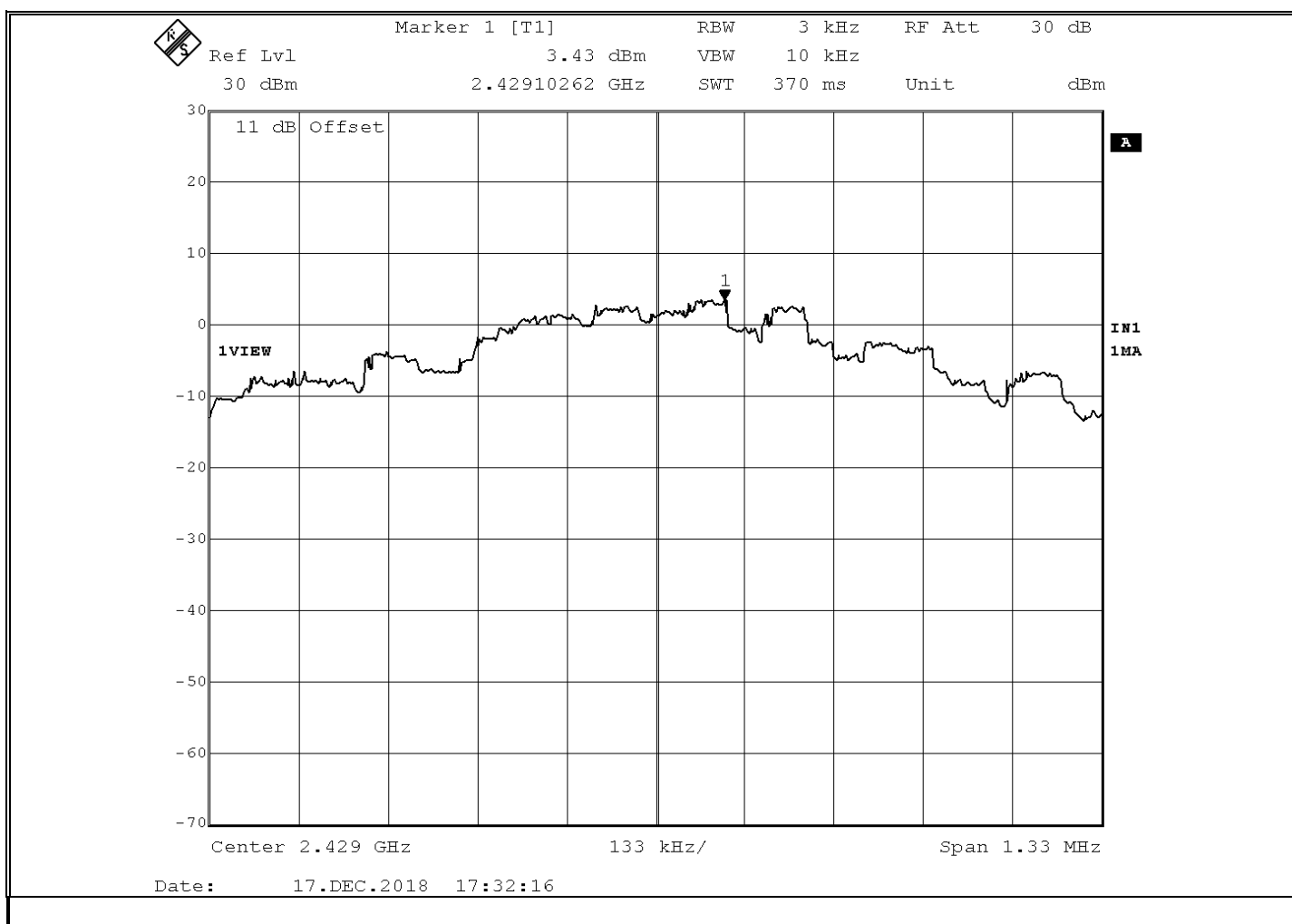


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Report No. R-2975P, Rev. A

EMISSIONS TEST DATA SHEET

Method:	Power Spectral Density
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (e)
Job Number:	R-2975P-1
Customer:	KCF Technologies, Inc
Test Sample:	Battery Powered Vibration Sensor
Model Number:	SD-VSN-3
Serial Number:	000070F2
Operating Mode:	Continuously transmitting a modulated signal at 2.429 GHz
Technician:	S. Hale
Date(s):	12/17/2018
Temperature:	21.9 °C
Relative Humidity:	33.0 %

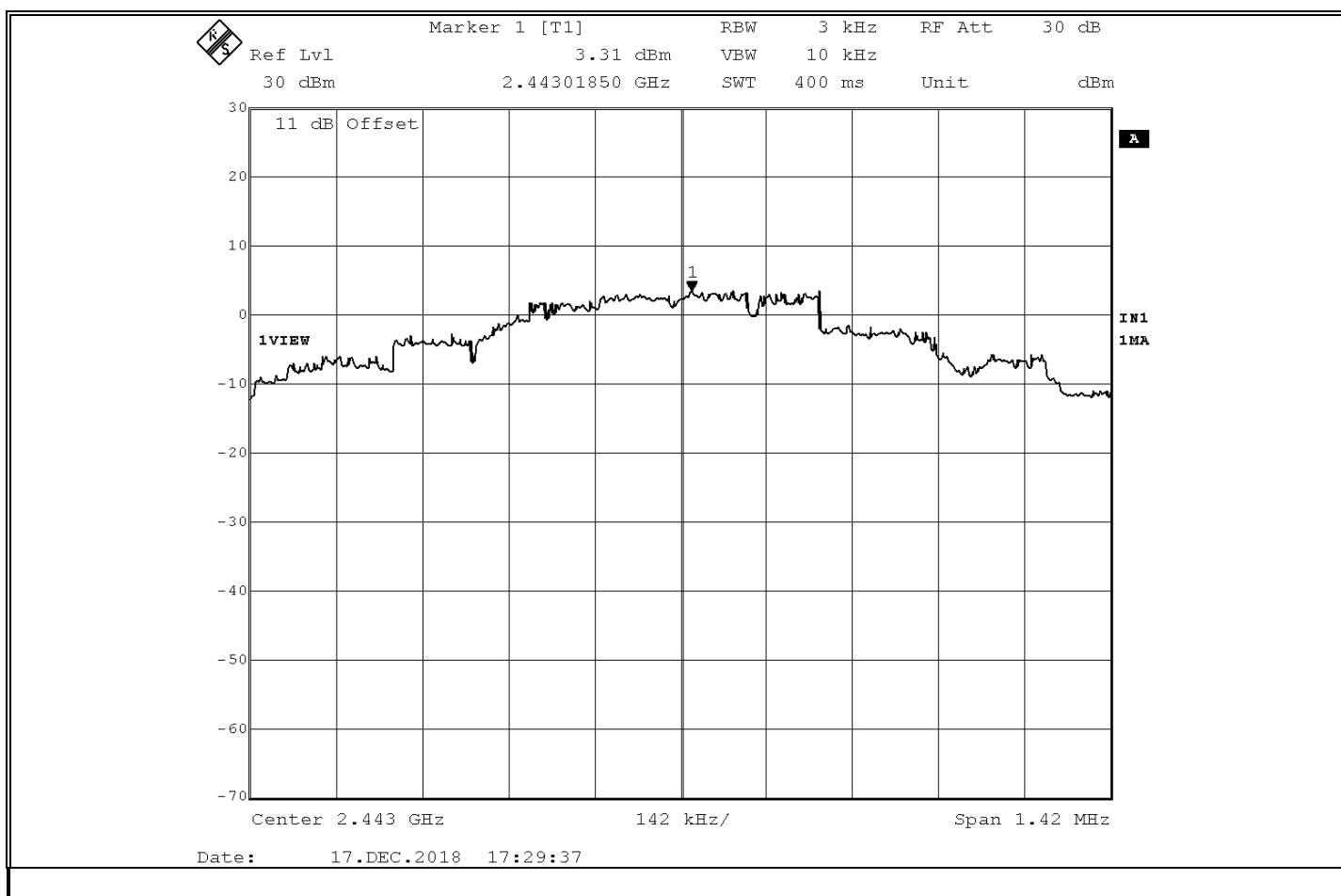


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Report No. R-2975P, Rev. A

EMISSIONS TEST DATA SHEET

Method:	Power Spectral Density
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (e)
Job Number:	R-2975P-1
Customer:	KCF Technologies, Inc
Test Sample:	Battery Powered Vibration Sensor
Model Number:	SD-VSN-3
Serial Number:	000070F2
Operating Mode:	Continuously transmitting a modulated signal at 2.443 GHz
Technician:	S. Hale
Date(s):	12/17/2018
Temperature:	21.9 °C
Relative Humidity:	33.0 %

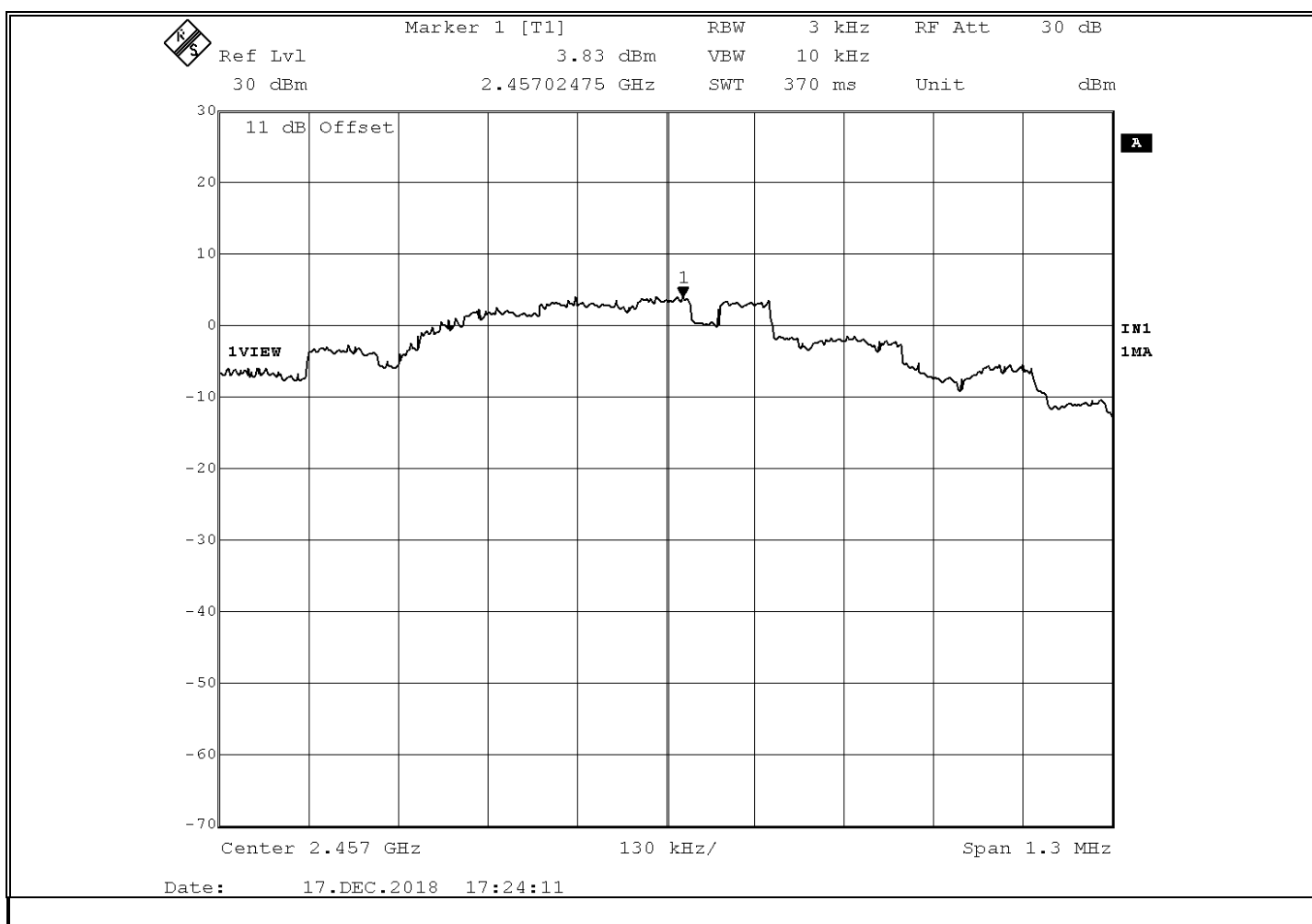


Retlif Testing Laboratories

Report No. R-2975P, Rev. A

EMISSIONS TEST DATA SHEET

Method:	Power Spectral Density
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (e)
Job Number:	R-2975P-1
Customer:	KCF Technologies, Inc
Test Sample:	Battery Powered Vibration Sensor
Model Number:	SD-VSN-3
Serial Number:	000070F2
Operating Mode:	Continuously transmitting a modulated signal at 2.457 GHz
Technician:	S. Hale
Date(s):	12/17/2018
Temperature:	21.9 °C
Relative Humidity:	33.0 %



Retlif Testing Laboratories

Report No. R-2975P, Rev. A

**FCC Section 15.247(d)
Test Data, Conducted Out of Band**

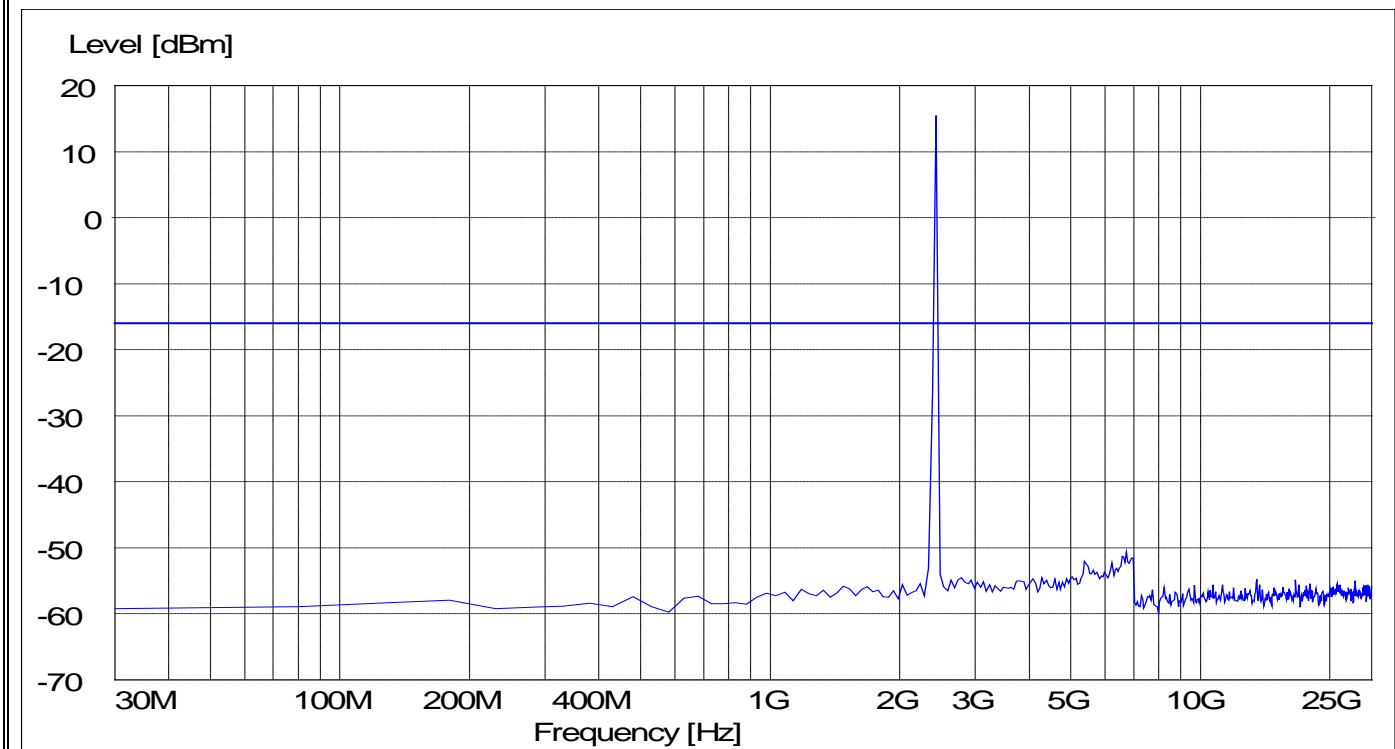


Retlif Testing Laboratories

Report No. R-2975P, Rev. A

EMISSIONS TEST DATA SHEET

Method:	Conducted Out of Band
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-2975P-1
Customer:	KCF Technologies, Inc
Test Sample:	Battery Powered Vibration Sensor
Model Number:	SD-VSN-3
Serial Number:	000070F2
Operating Mode:	Continuously transmitting a modulated signal at 2.429 GHz
Technician:	S. Hale
Date(s):	12/18/2018
Temperature:	22.3 °C
Relative Humidity:	38.0 %



30MHz to 25GHz

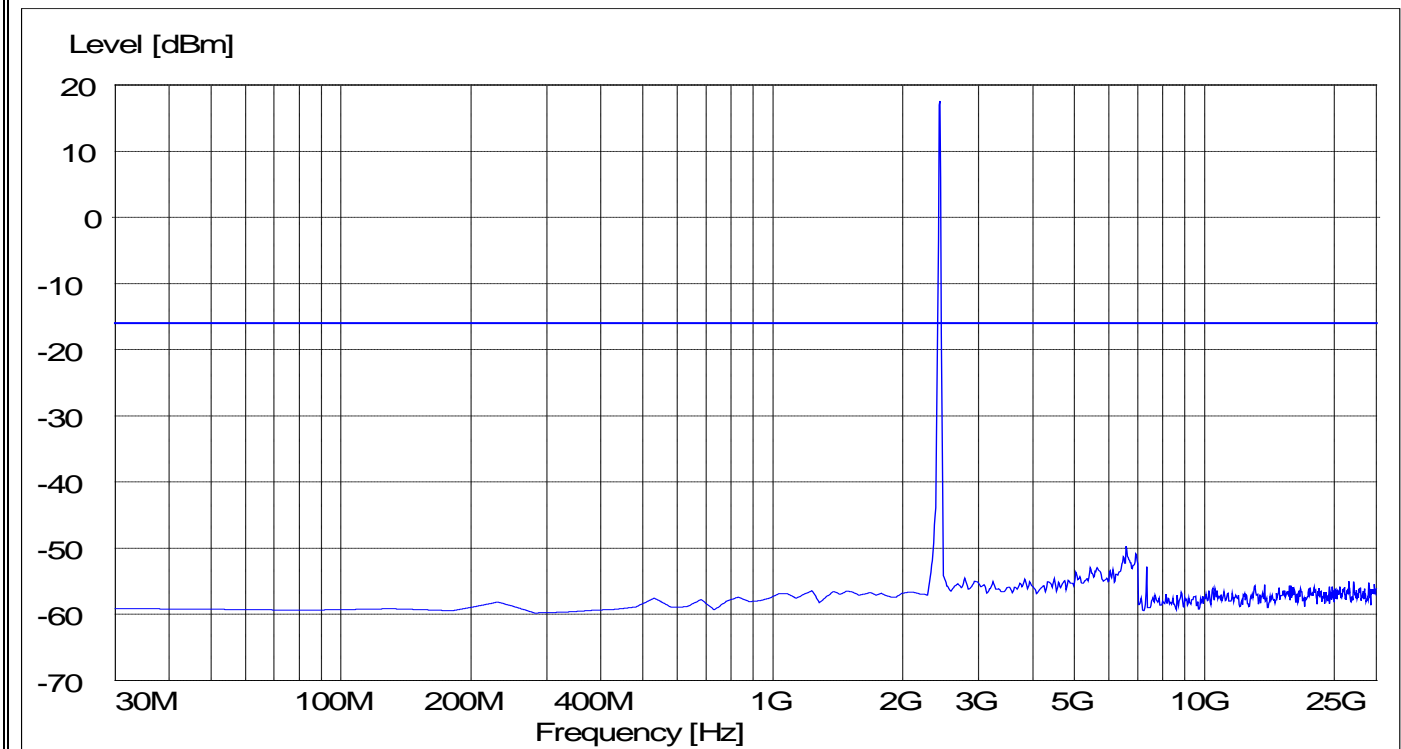


Retlif Testing Laboratories

Report No. R-2975P, Rev. A

EMISSIONS TEST DATA SHEET

Method:	Conducted Out of Band
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-2975P-1
Customer:	KCF Technologies, Inc
Test Sample:	Battery Powered Vibration Sensor
Model Number:	SD-VSN-3
Serial Number:	000070F2
Operating Mode:	Continuously transmitting a modulated signal at 2.443 GHz
Technician:	S. Hale
Date(s):	12/18/2018
Temperature:	22.3 °C
Relative Humidity:	38.0 %



30 MHz to 25 GHz

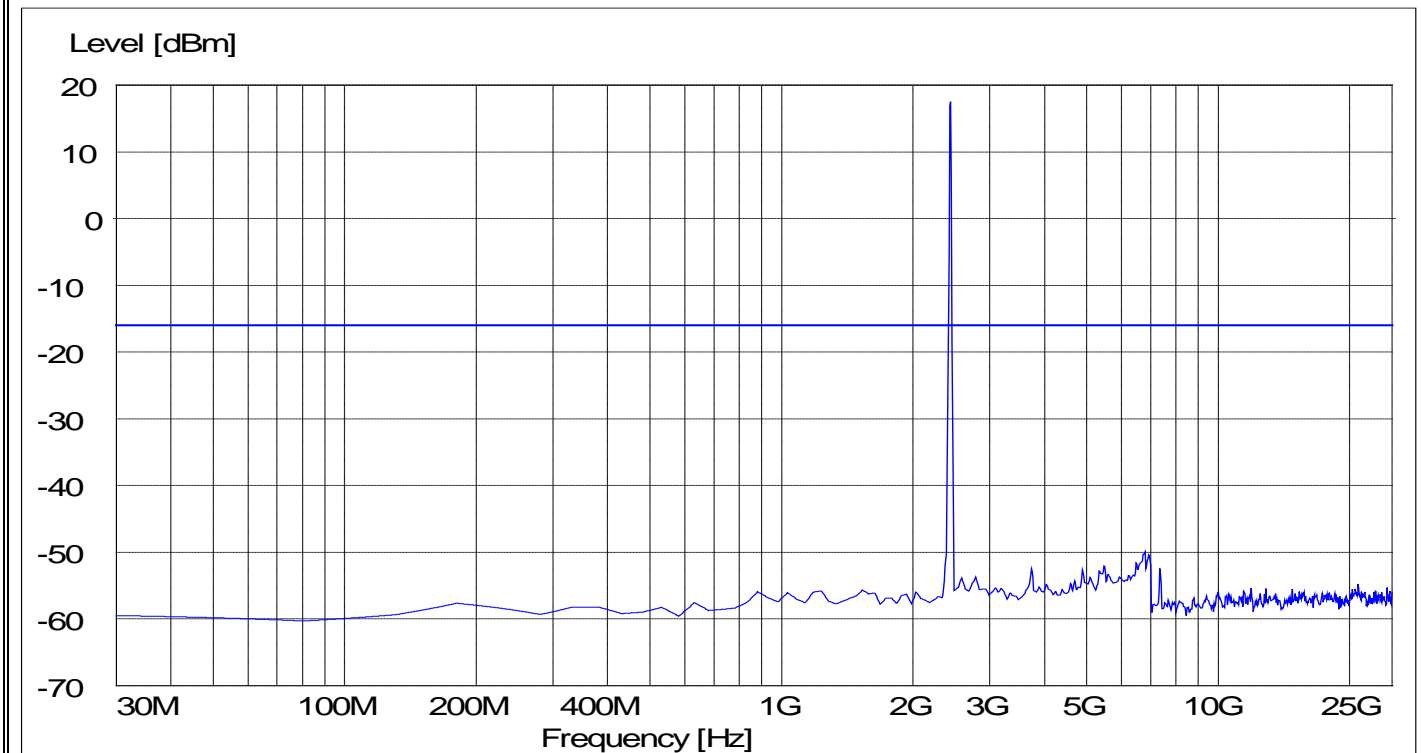


Retlif Testing Laboratories

Report No. R-2975P, Rev. A

EMISSIONS TEST DATA SHEET

Method:	Conducted Out of Band
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.247 (d)
Job Number:	R-2975P-1
Customer:	KCF Technologies, Inc
Test Sample:	Battery Powered Vibration Sensor
Model Number:	SD-VSN-3
Serial Number:	000070F2
Operating Mode:	Continuously transmitting a modulated signal at 2,457 GHz
Technician:	S. Hale
Date(s):	12/18/2018
Temperature:	22.3 °C
Relative Humidity:	38.0 %



30MHz to 25GHz



Retlif Testing Laboratories

Report No. R-2975P, Rev. A

**FCC Section 15.247(d) – Out of Band / Band Edge
Test Data, Radiated Emissions (Restricted Bands)
25 MHz to 25 GHz**



Retlif Testing Laboratories

Report No. R-2975P, Rev. A

EMISSIONS TEST DATA SHEET

Test Specification:	FCC Part 15 Subpart C, Out of Band / Band Edge Radiated Emissions (Restricted Bands), Paragraph 15.247(d)
Method:	Radiated Emission Measurements, 25 MHz to 25 GHz
Job Number/Customer:	R-2975P-1 / KCF Technologies, Inc.
Test Sample:	Battery Powered Vibration Sensor
Model Number:	SD-VSN-3
Serial Number:	000070B6
Operating Mode:	Continuously Transmitting a RF Signal
Technician:	M. Nowak
Date(s):	12/18/2018 -12/19/2018
Temperature:	3.5 °C
Relative Humidity:	30 %
Detector:	Peak, Unless otherwise specified
Test Distance:	3m

Notes: The frequency range was scanned from 25 MHz to 25 GHz. The emissions observed from the EUT do not exceed the specified limits. *Noise floor measurement, minimum sensitivity of measuring 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
25.0							30
*25.6	Par / 1.00	X / 180.0	12.2	8.3	20.5	10.6	
30							30
30							100
*38.0	H / 1.00	X / 180.0	3.6	12.2	15.8	6.17	
*73.8	H / 1.00	X / 180.0	10.5	8.4	18.9	8.82	
*75.0	H / 1.00	X / 180.0	11.0	8.2	19.2	9.13	
88.00							100
88.00							150
*115.0	H / 1.00	X / 180.0	9.0	14.4	25.4	18.63	
*130.0	H / 1.00	X / 180.0	12.8	14.6	27.4	23.45	
*149.98	H / 1.00	X / 180.0	9.3	13.9	23.2	14.46	
*156.525	H / 1.00	X / 180.0	8.4	14.8	23.2	14.46	
*156.8	H / 1.00	X / 180.0	6.7	14.8	21.5	11.89	
*164.6	H / 1.00	X / 180.0	4.7	16.0	20.7	10.84	
*170.5	H / 1.00	X / 180.0	4.1	16.9	21.0	11.23	
216.00							150
216.00							200



Retlif Testing Laboratories

Report No. R-2975P, Rev. A

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
*262.0	H / 1.00	X / 180.0	4.6	14.9	19.5	9.45	200
*328.7	H / 1.00	X / 180.0	3.6	16.9	20.5	10.6	200
*405.0	H / 1.00	X / 180.0	10.8	18.4	29.2	28.85	
*611.0	H / 1.00	X / 180.0	1.2	22.8	24.0	15.85	
960.00							200
960.00							500
*995.00	H / 1.00	X / 180.0	3.0	29.6	35.9	62.37	
*4858.00	H / 1.00	X / 180.0	24.7	2.8	28.3	26.01	
*4886.00	H / 1.00	X / 180.0	27.0	2.9	29.9	31.27	
*4914.00	H / 1.00	X / 180.0	25.5	3.0	28.5	26.61	
*7287.00	H / 1.00	X / 180.0	29.7	7.7	37.4	74.14	
*7329.00	H / 1.00	X / 180.0	26.8	7.8	34.6	53.71	
*7371.00	H / 1.00	X / 180.0	24.5	7.9	32.4	41.69	
*12145.00	H / 1.00	X / 180.0	23.7	15.4	39.1	90.16	
*12215.00	H / 1.00	X / 180.0	24.5	15.5	40.	100.00	
*12285.00	H / 1.00	X / 180.0	22.7	15.7	38.4	83.18	
*19432.00	H / 1.00	X / 180.0	24.8	13.3	38.1	80.35	
*19544.00	H / 1.00	X / 180.0	28.2	13.0	41.2	114.82	
*19656.00	H / 1.00	X / 180.0	26.2	12.9	39.1	90.16	
*22113.00	H / 1.00	X / 180.0	28.5	12.5	41.0	112.20	
25000.00							500



Retlif Testing Laboratories

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