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FCC Part 15, Subpart C, Section 15.247

Test Report

On

VP150 Bluetooth Beacon
FCC ID: 2ALIWVP150

Customer Name:	Vypin LLC
Customer P.O:	3232017
Date of Report:	May 25, 2018
Test Report No:	R-6194N-5
Test Start Date:	April 6, 2017
Test Finish Date:	April 13, 2017
Test Technician:	M. Seamans
Report Approved By:	T. Hannemann
Report Prepared By:	J. Ramsey

Technical Information

Report Number:	R-6194N-5
Customer:	Vypin, LLC
Address:	21 Continental Blvd.
	Merrimack, NH 03054
Manufacturer:	Vypin, LLC
Manufacturer Address:	4080 McGinnis Ferry Road
	Alpharetta, GA 30005
Test Sample:	VP150 Bluetooth Beacon
Model Number:	VP150
Serial Numbers:	4, 11
FCC ID:	2ALIWVP150
Type:	Digital Transmission – Direct Sequence Spread Spectrum Transmitter
Power Requirements:	3.0 VDC via one (1) Lithium battery
Frequency of Operation:	2402.0 to 2480.0 MHz
Equipment Class:	DTS
Antenna Type:	Inverted F, 3.3 dBi Gain
Equipment Use:	Bluetooth Beacon

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
101 New Boston Road
Goffstown, NH 03045

FCC Designation Number: US5327

This test report is for certification of the VP150 family of products consisting of model numbers VP150, VP150NFC, VP151, VP155NFC, VP155 and VP156. Model functions are enabled/disabled through software / firmware.

Table 1 – Tests Performed

FCC Part 15, Subpart C	Test Method
15.247(b)(3)	Power Output
15.247(a)(2)	Occupied Bandwidth
15.247(d)	Antenna Terminal Out of Band/Band Edge Conducted Emissions (30 MHz – 25 GHz)
15.247(d)	Spurious Emissions, 30 MHz to 10 GHz
15.247(e)	Power Density

Support Equipment
No support equipment was required in order to attain the operating mode.

EUT Operation:
The EUT was transmitting a modulating signal at 2.404 GHz, 2.444 GHz and 2.480 GHz (Low, Mid or High Channel).

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.

Scott Wentworth
Branch Manager
NVLAP Approved Signatory

Todd Hannemann
EMC Test Engineer
iNARTE Certified Technician ATL-0255-T

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.

Revision History

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

Revision	Date	Pages Affected
-	May 25, 2018	Original Release

Requirements and Test Results

FCC Section 15.247 (a)(2) – Bandwidth
For systems using digital modulation techniques operating in the 902-928 MHz, 2400-2483.5 MHz, and 5725 – 5850 MHz bands the minimum 6 dB bandwidth shall be at least 500 kHz.

- **Results**: The minimum 6dB bandwidth measured while transmitting was 729.458 kHz. The device was found to meet the requirement of 15.247 (a)(2).

FCC Section 15.247 (b)(3) - Power Output
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 antennas 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 antennas 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 when transmitting was 1.44 mW. The maximum antenna gain of the antenna is 3.3 dBi. The device was found to meet the power output requirements of 15.247 (b)(3) including de facto EIRP.

Requirements and Test Results (con't)

FCC Section 15.247(d) – Unwanted Emissions

Antenna Terminal Out of Band/Band Edge Conducted Emissions
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 Section 15.247, 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 emission limits specified in Section 15.209(a) (see Section 15.205(c)).

- **Results**: All measured out of band/band edge conducted emissions were below the specified limits and the device was found to meet the requirements of 15.247 (d).

FCC Section 15.247(d) – Unwanted Emissions

Radiated Spurious Emissions/Restricted Bands/Band Edge
Emissions which fall into restricted bands, as defined in 15.205(a) must comply with the radiated emissions limits specified in 15.209(a) and shown below in Table 1. Emissions emanating from the EUT cabinet and cables must also comply with the radiated emissions limits. Radiated emissions measurements were also performed at the band edges to ensure band edge compliance.

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**:
  All spurious emissions were measured and found to be in compliance with the limits specified in 15.209(a). Band edge emissions were also found to be in compliance with the limits specified in 15.209(a).

Requirements and Test Results (con't)

FCC Section 15.247(e) – Power Spectral Density

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.

Requirements and Test Results (con't)

Field Strength Calculation/Conversion:

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

CR = MR + CF

Where:
CR = Corrected Reading in dBµV/m
MR = Uncorrected Meter Reading in dBµV
CF = Correction Factor in dB (Antenna Factor, Pre-amp + Cable Loss)

Example:

MR = 15.35 dBµV
CF = 16.85 dB
CR = 15.35 dBuV + 16.85 = 32.2 dBµV/m

dBµV/M is converted to uV/M for comparison to the specified limit using the formula:

invLog dBµV/M/20

32.2 dBuV/m = 40.74 uV/m

RF Power Conversion:

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

InvLog dBm/10

Example: 20dBm = 100mW

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 access 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.

$$S = \frac{PG}{4 \prod Dsq}$$

D = Minimum Separation Distance in cm

S = Max allowed Power Density in mW/cmsq

Per 1.1310 For the Frequency of 2400 MHz S = 1 mW/cmsq

Power = Max Power Input to Antenna = 1.44mW

Gain = Max Power Gain of Antenna = 3.3 dBi = 2.14 numeric

$$1 \text{ mW/cmsq} = \frac{1.44 \times 2.14}{4 \times (3.14) \times D^2} = \frac{3.08}{12.56 \times D^2}$$

$$D^2 = \frac{3.08}{12.56 \times 1}$$

$$D = \sqrt{0.25} = 0.5 \text{ cm}$$

Equipment List

FCC Section 15.247(a)(2)
Occupied Bandwidth

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
5070	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 40 GHz	ESIB40	10/21/2016	10/31/2017

FCC Section 15.247 (d)
Band Edge Conducted Emissions, 30 MHz to 25 GHz

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
5070	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 40 GHz	ESIB40	10/21/2016	10/31/2017

FCC Section 15.247(b)(3)
Power Output

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
5070	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 40 GHz	ESIB40	10/21/2016	10/31/2017

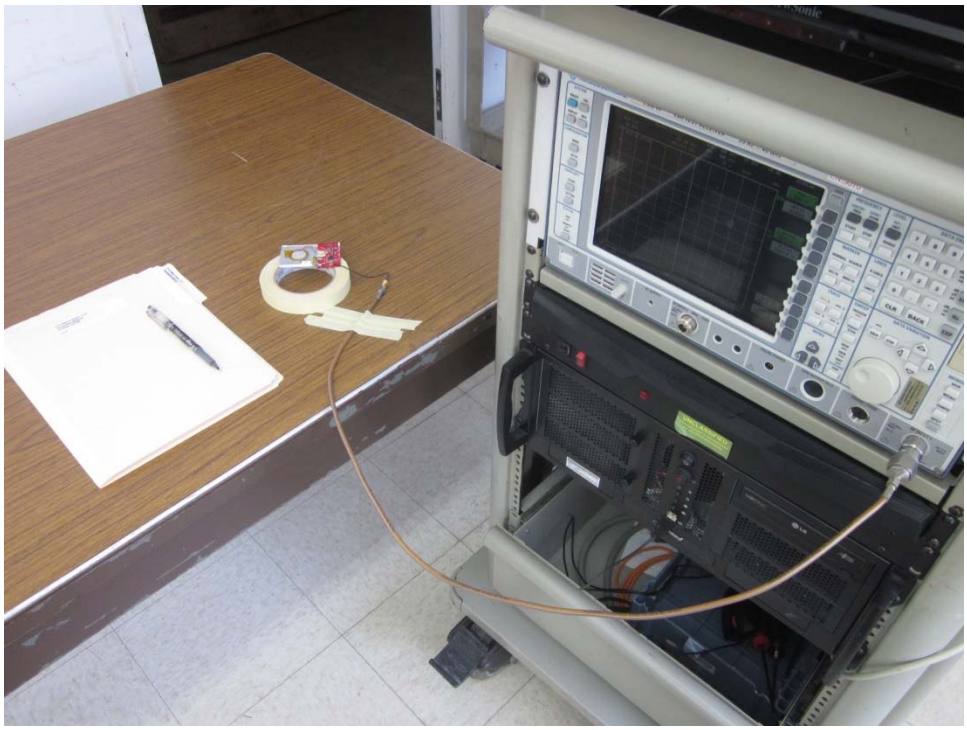
FCC Section 15.247 (d)
Spurious Radiated Emissions, 30 MHz to 25 GHz

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
1232	AGILENT / HP	PRE-AMPLIFIER	1 - 26.5 GHz	8449B	6/16/2016	6/30/2017
3258	ETS / EMCO	ANTENNA, DOUBLE RIDGED GUIDE	1 - 18 GHz	3115	10/13/2016	4/30/2018
3427B	ETS / EMCO	ANTENNA, BICONICAL	20 - 200 MHz	3104	2/5/2016	8/31/2017
3430	MCS	ANTENNA, HORN	18 - 26.5 GHz	K-5039	No Calibration Required	
4029B	RETLIF	OPEN AREA TEST SITE, ATTENUATION	3 / 10 Meters	RNH	4/13/2016	4/30/2018
443	ELECTRO-METRICS	ANTENNA, LOG PERIODIC	200 MHz - 1000 MHz	LPA-25	10/6/2016	4/30/2018
4984G	MICROLAB / FXR	ANTENNA, HIGH GAIN HORN	12.4 - 18 GHz	Y638A	No Calibration Required	
R469	AGILENT / HP	ANALYZER, SPECTRUM	100 Hz - 26.5 GHz	E7405A;A	12/1/2016	12/31/2017

FCC Section 15.247(e)
Power Density

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
5070	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 40 GHz	ESIB40	10/21/2016	10/31/2017

Test Photographs
Occupied Bandwidth

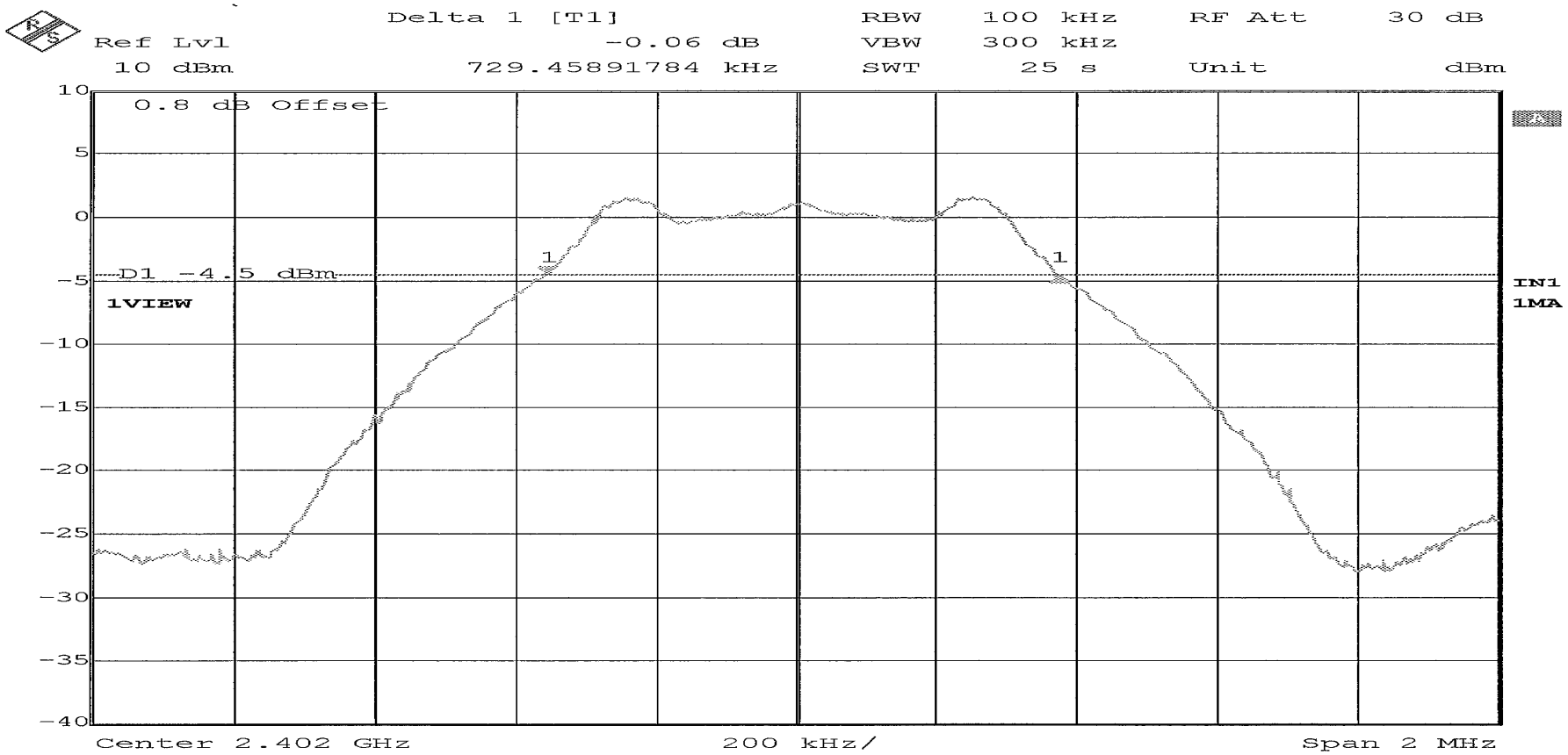


Test Setup

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

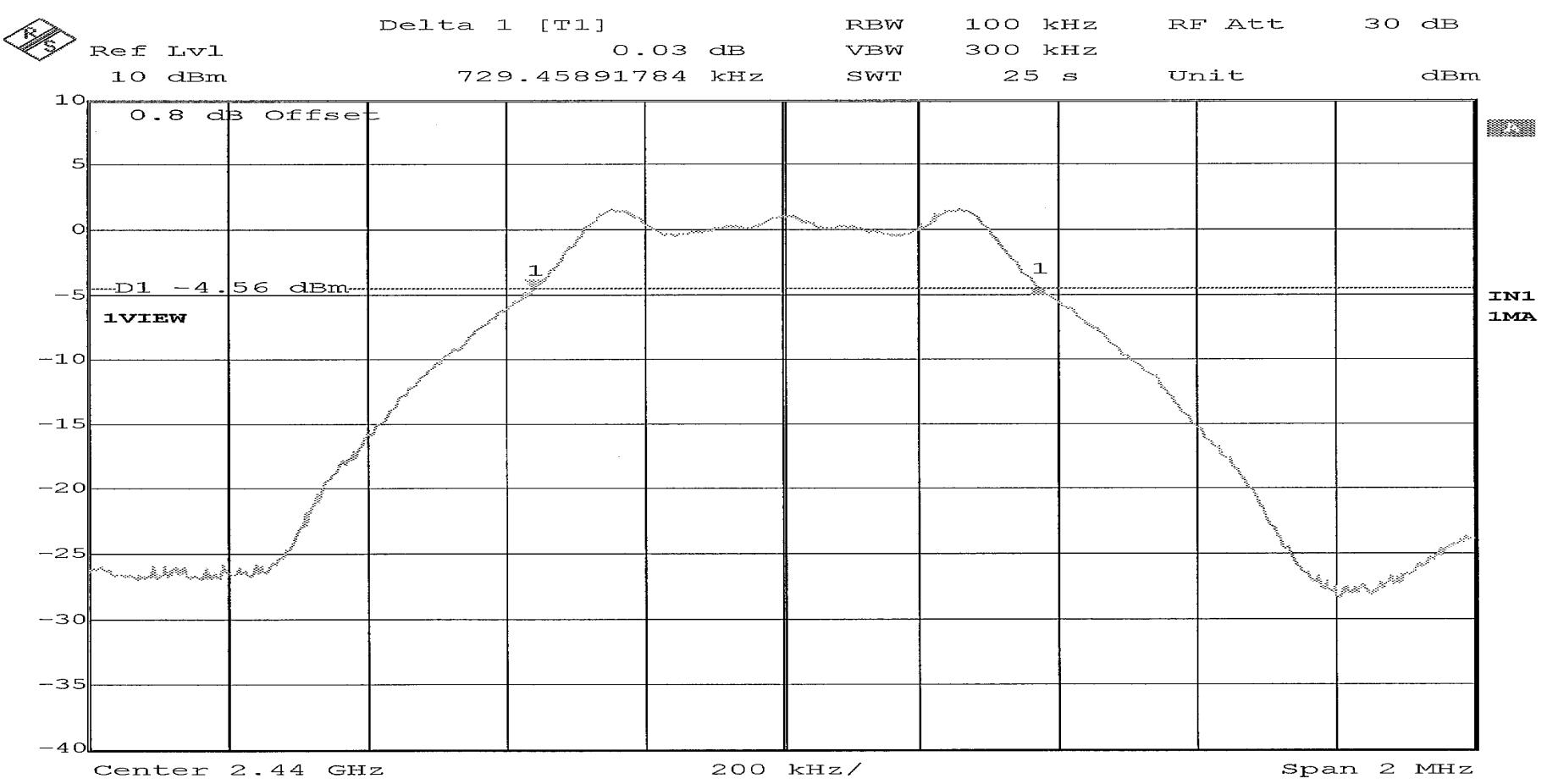
RETLIF TESTING LABORATORIES

Test Method:	6dB Bandwidth		
Customer	Vypin LLC	**Job No.**	R-6194N-5
Test Sample	Bluetooth Beacon		
Model Number	VP150	**Serial No.**	4
Operating Mode	Transmitting modulated signal at 2.402 GHz		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (a)(2)		
Technician	M. Seamans	**Date**	April 10th, 2017
Climatic Conditions	Temp: 19.9 °C Relative Humidity: 28.8 %		
Notes	Occupied Bandwidth: 729.458 kHz		



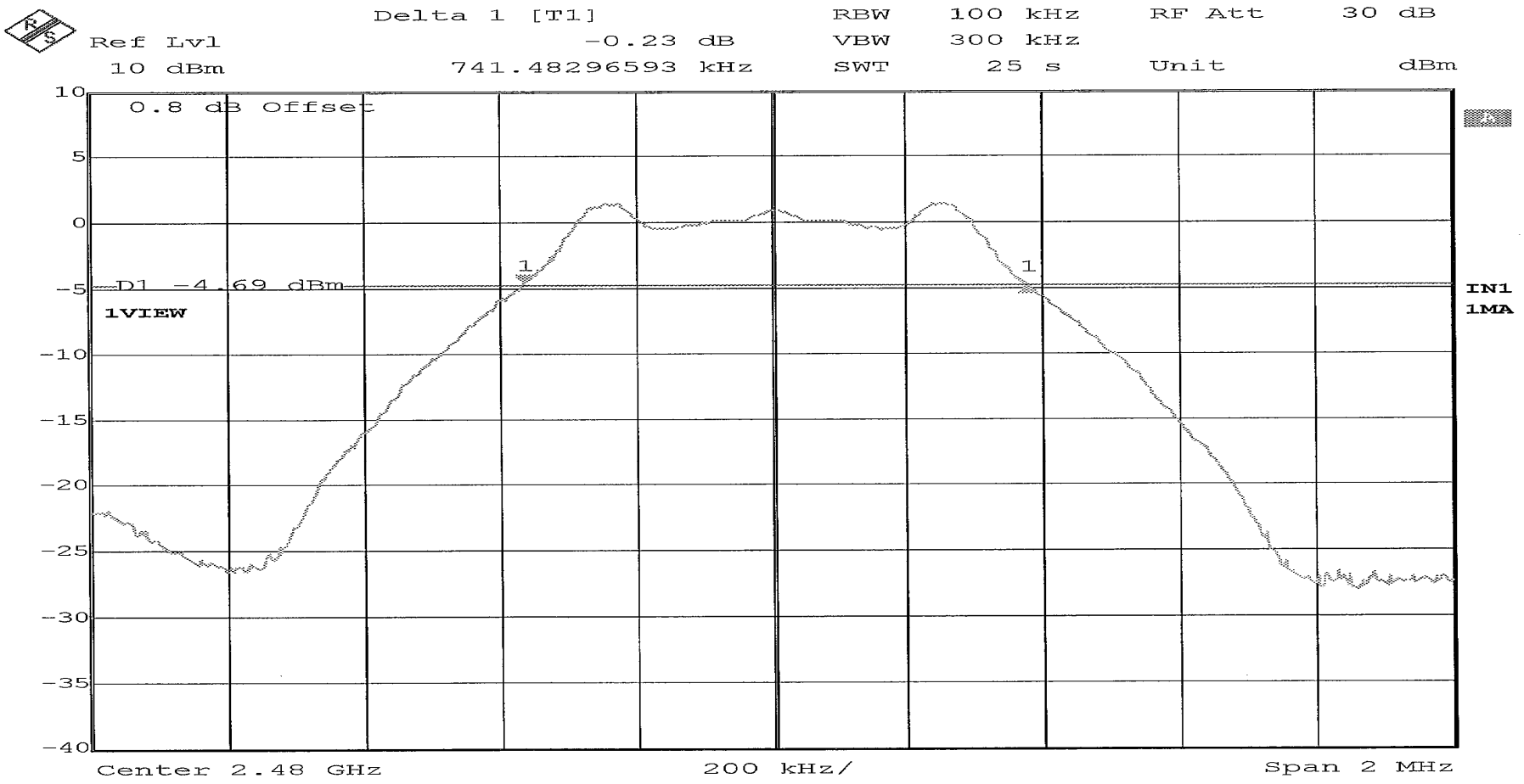
RETLIF TESTING LABORATORIES

Test Method:	6dB Bandwidth		
Customer	Vypin LLC	**Job No.**	R-6194N-5
Test Sample	Bluetooth Beacon		
Model Number	VP150	**Serial No.**	4
Operating Mode	Transmitting modulated signal at 2.440 GHz		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (a)(2)		
Technician	M. Seamans	**Date**	April 10th, 2017
Climatic Conditions	Temp: 19.9 °C Relative Humidity: 28.8 %		
Notes	Occupied Bandwidth: 729.458 kHz		

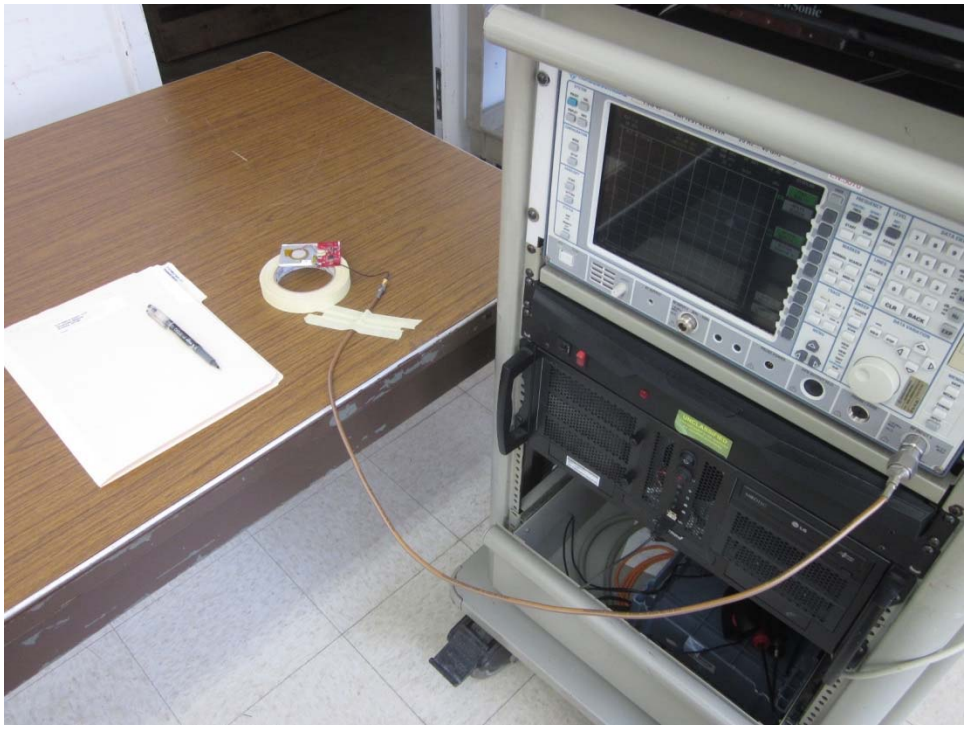


RETLIF TESTING LABORATORIES

Test Method:	6dB Bandwidth		
Customer	Vypin LLC	**Job No.**	R-6194N-5
Test Sample	Bluetooth Beacon		
Model Number	VP150	**Serial No.**	4
Operating Mode	Transmitting modulated signal at 2.480 GHz		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (a)(2)		
Technician	M. Seamans	**Date**	April 10th, 2017
Climatic Conditions	Temp: 19.9 °C Relative Humidity: 28.8 %		
Notes	Occupied Bandwidth: 741.483 kHz		



Test Photographs
Power Output

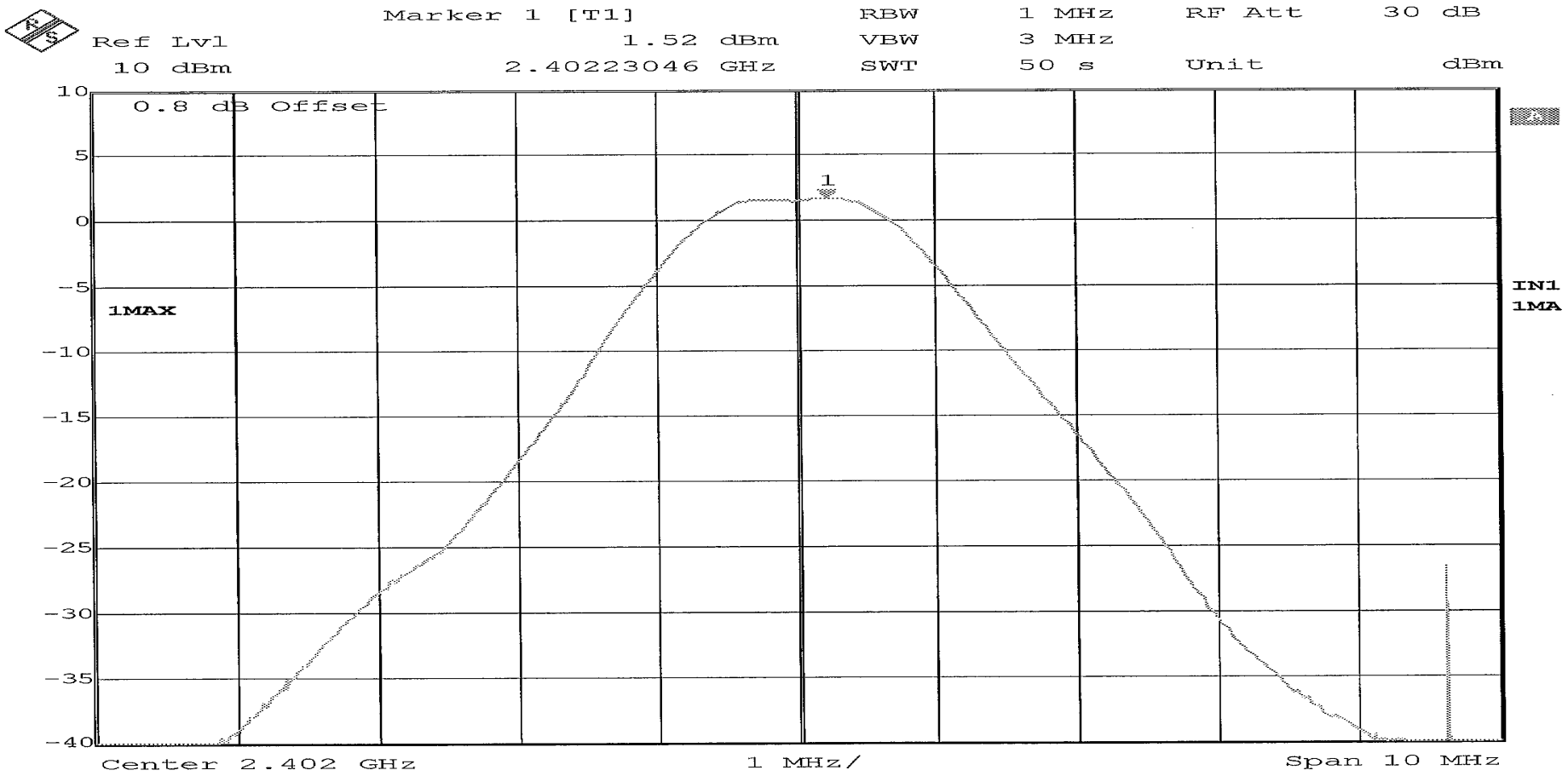


Test Setup

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

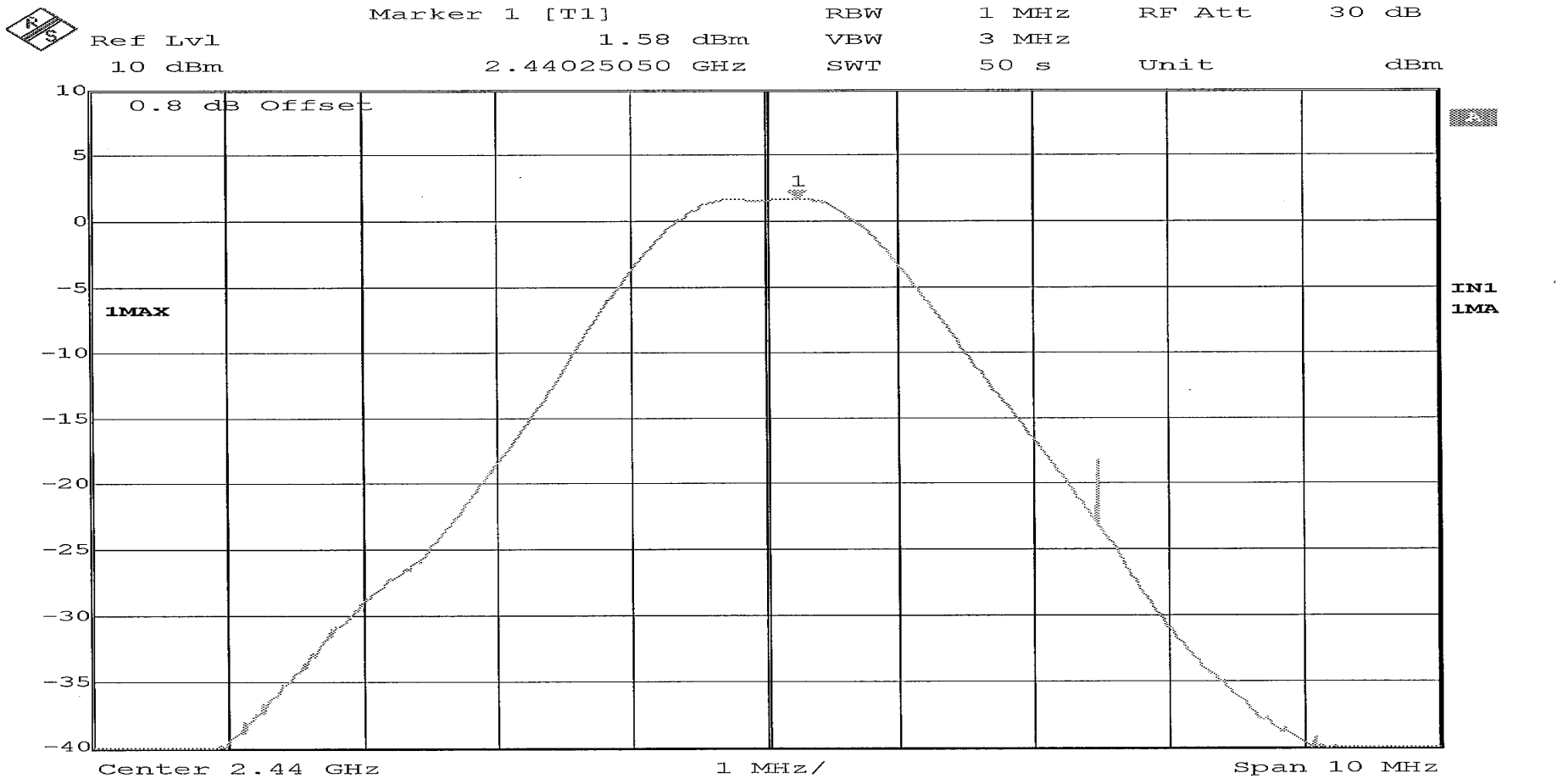
RETLIF TESTING LABORATORIES

Test Method:	Conducted Peak Power Output		
Customer	Vypin LLC	**Job No.**	R-6194N-5
Test Sample	Bluetooth Beacon		
Model Number	VP150	**Serial No.**	4
Operating Mode	Transmitting modulated signal at 2.402 GHz		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (b)(3)		
Technician	M. Seamans	**Date**	April 10th, 2017
Climatic Conditions	Temp: 19.7 °C Relative Humidity: 28.2 %		
Notes	Peak Power Output: 1.52 dBm		



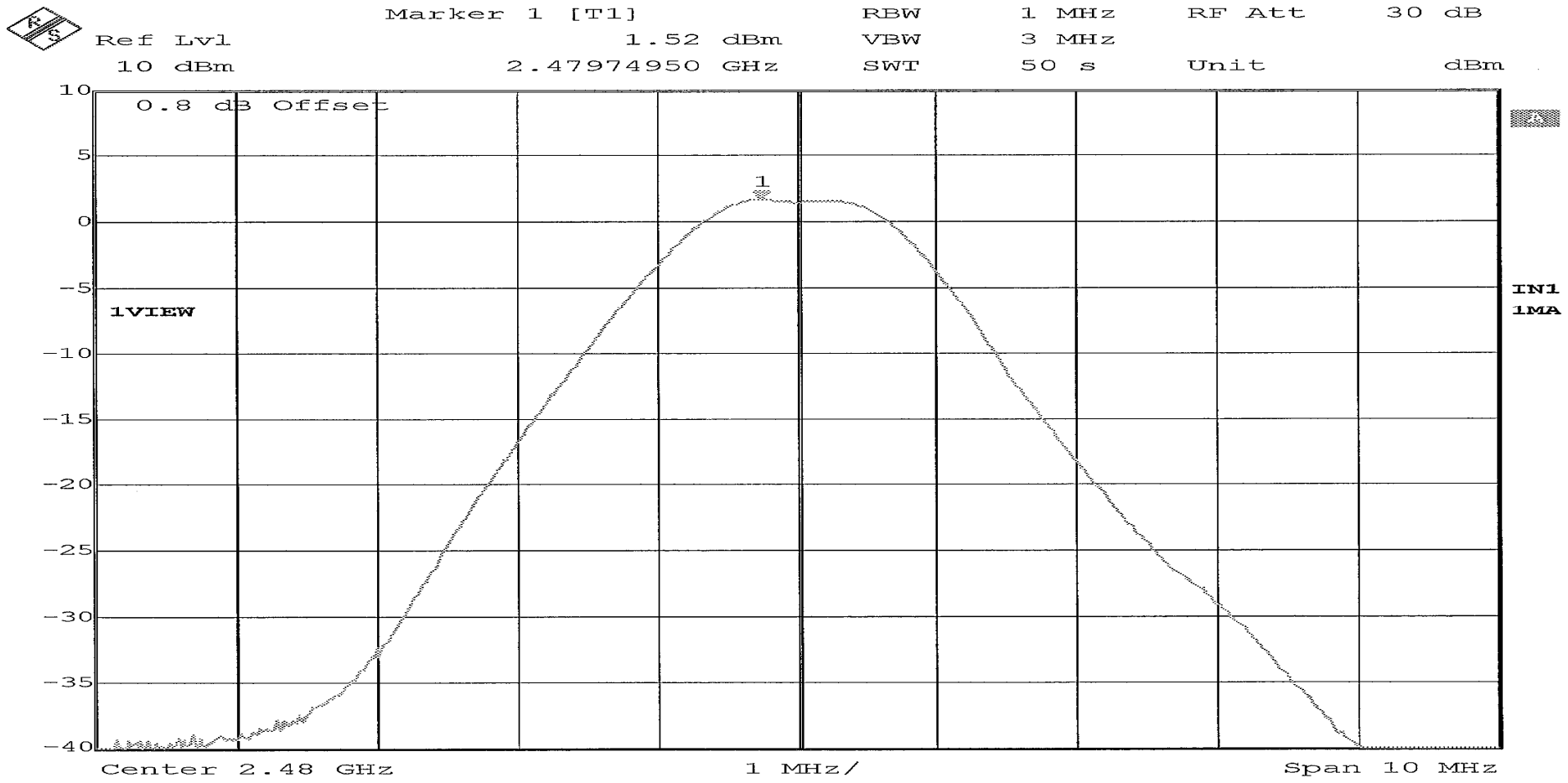
RETLIF TESTING LABORATORIES

Test Method:	Conducted Peak Power Output		
Customer	Vypin LLC	**Job No.**	R-6194N-5
Test Sample	Bluetooth Beacon		
Model Number	VP150	**Serial No.**	4
Operating Mode	Transmitting modulated signal at 2.440 GHz		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (b)(3)		
Technician	M. Seamans	**Date**	April 10th, 2017
Climatic Conditions	Temp: 19.7 °C Relative Humidity: 28.2 %		
Notes	Peak Power Output: 1.58 dBm		

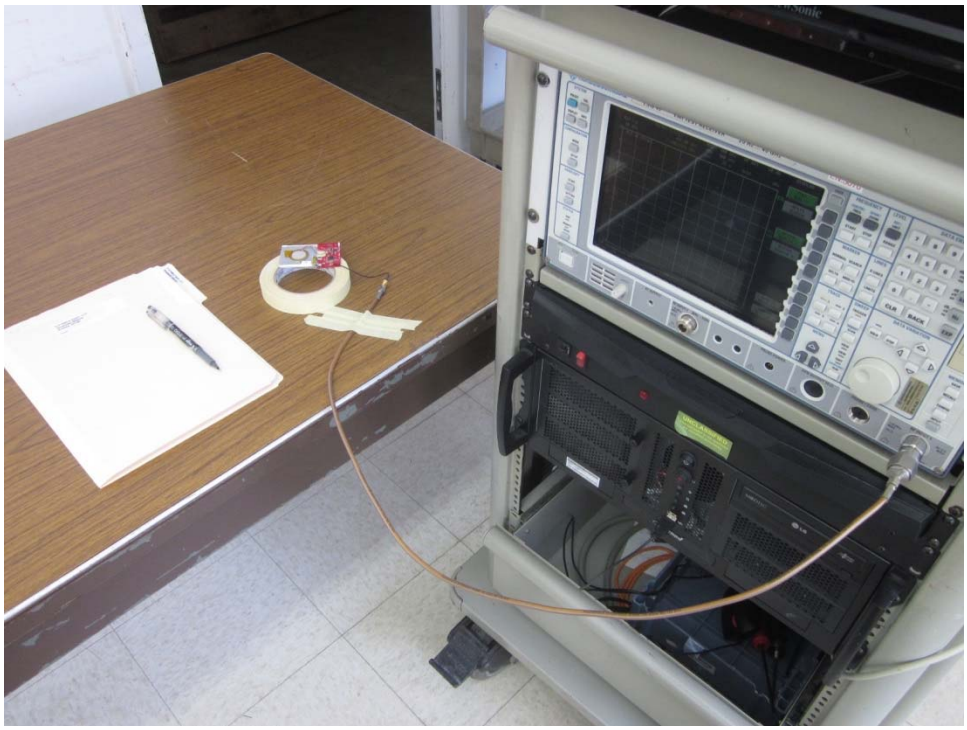


RETLIF TESTING LABORATORIES

Test Method:	Conducted Peak Power Output		
Customer	Vypin LLC	**Job No.**	R-6194N-5
Test Sample	Bluetooth Beacon		
Model Number	VP150	**Serial No.**	4
Operating Mode	Transmitting modulated signal at 2.480 GHz		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (b)(3)		
Technician	M. Seamans	**Date**	April 10th, 2017
Climatic Conditions	Temp: 19.7 °C Relative Humidity: 28.2 %		
Notes	Peak Power Output: 1.52 dBm		



Test Photographs
Antenna Terminal Out of Band/Band Edge Conducted Emissions (30 MHz to 25 GHz)



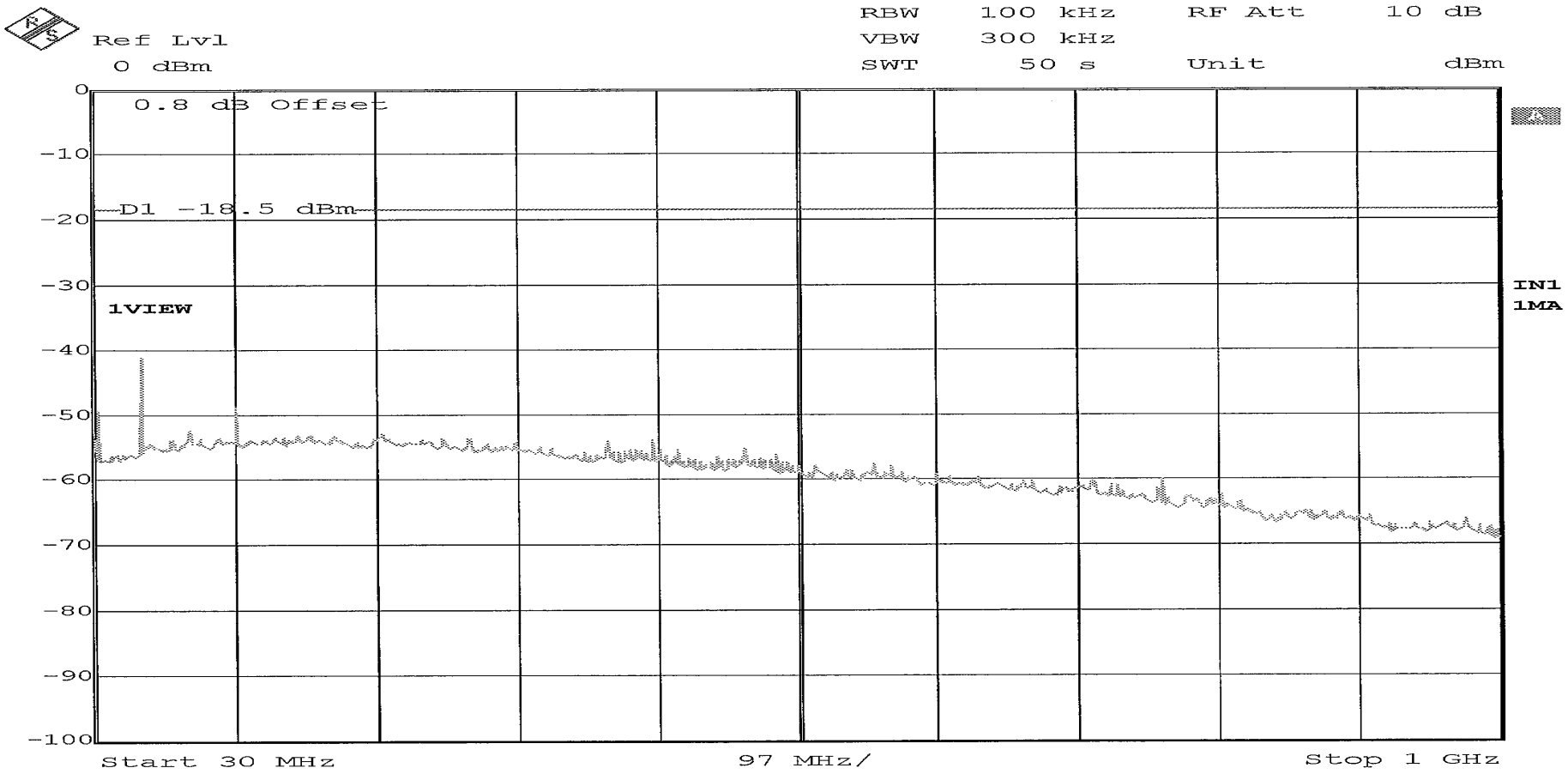
Test Setup

FCC Section 15.247 (d)
Antenna Terminal Out of Band/Band Edge Conducted Emissions (30 MHz to 25 GHz)
Test Data

Out of Band Conducted Emissions
Test Data

RETLIF TESTING LABORATORIES

Test Method:	Out of Band Conducted Emissions 30 MHz to 25 GHz		
Customer	Vypin LLC	**Job No.**	R-6194N-5
Test Sample	Bluetooth Beacon		
Model Number	VP150	**Serial No.**	4
Operating Mode	Transmitting modulated signal at 2.402 GHz		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (d)		
Technician	M. Seamans	**Date**	April 10th, 2017
Climatic Conditions	Temp: 19.8 °C Relative Humidity: 28.4 %		
Notes	Limit: -18.5dBm		



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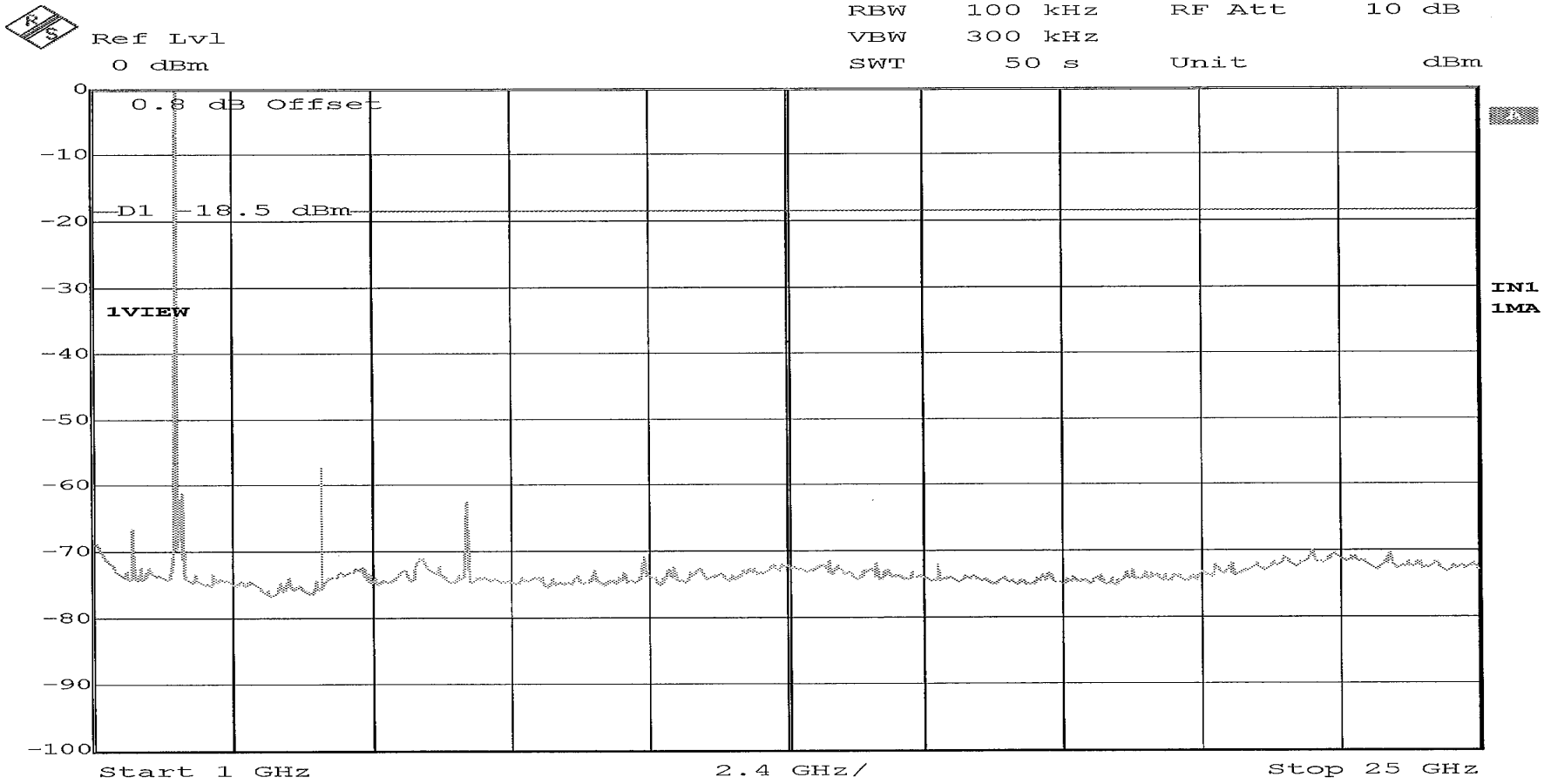
RETLIF TESTING LABORATORIES

Test Method:	Out of Band Conducted Emissions 30 MHz to 25 GHz		
Customer	Vypin LLC	**Job No.**	R-6194N-5
Test Sample	Bluetooth Beacon		
Model Number	VP150	**Serial No.**	4
Operating Mode	Transmitting modulated signal at 2.402 GHz		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (d)		
Technician	M. Seamans	**Date**	April 10th, 2017
Climatic Conditions	Temp: 19.8 °C Relative Humidity: 28.4 %		
Notes	Limit: -18.5dBm		



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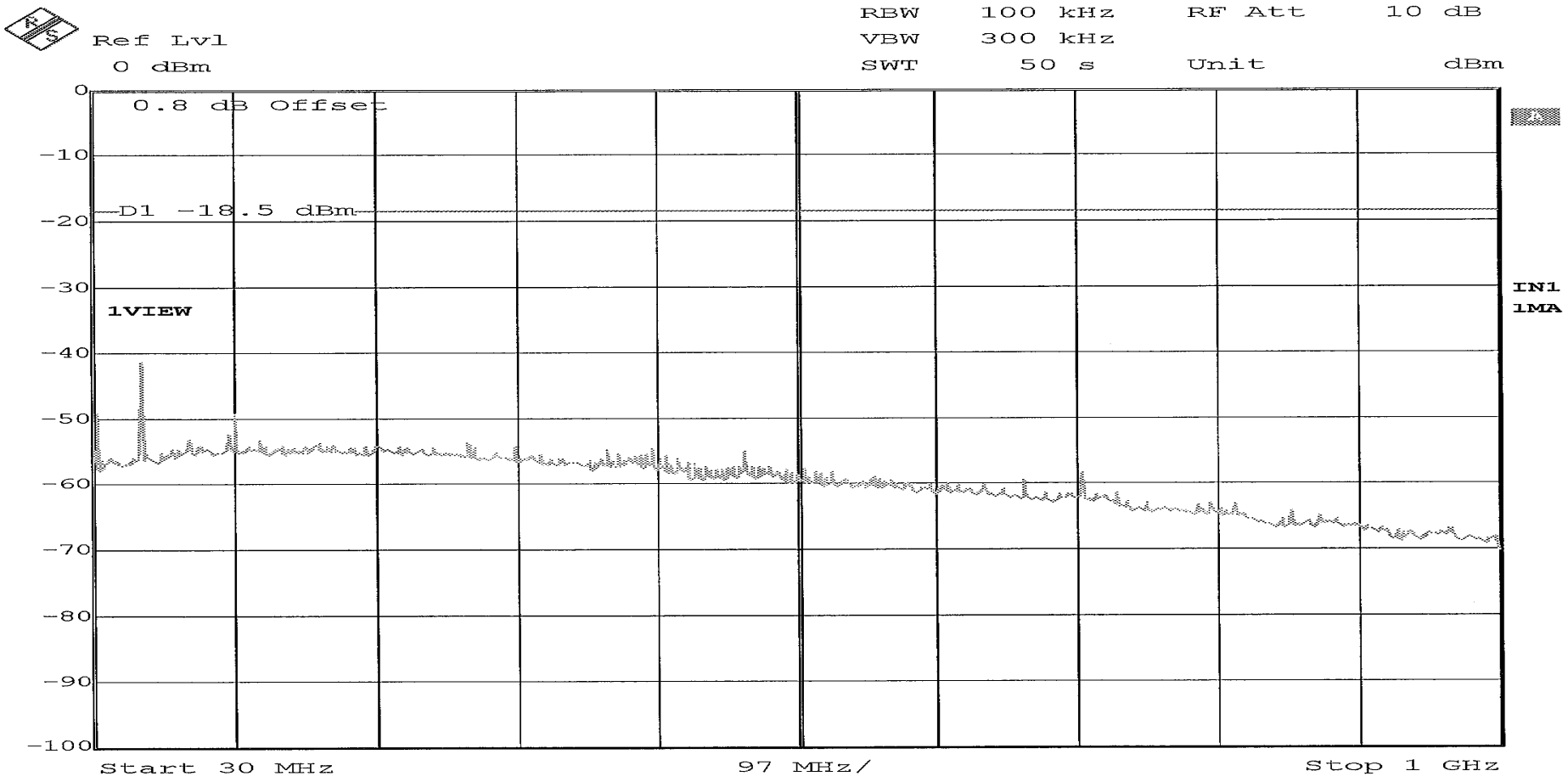
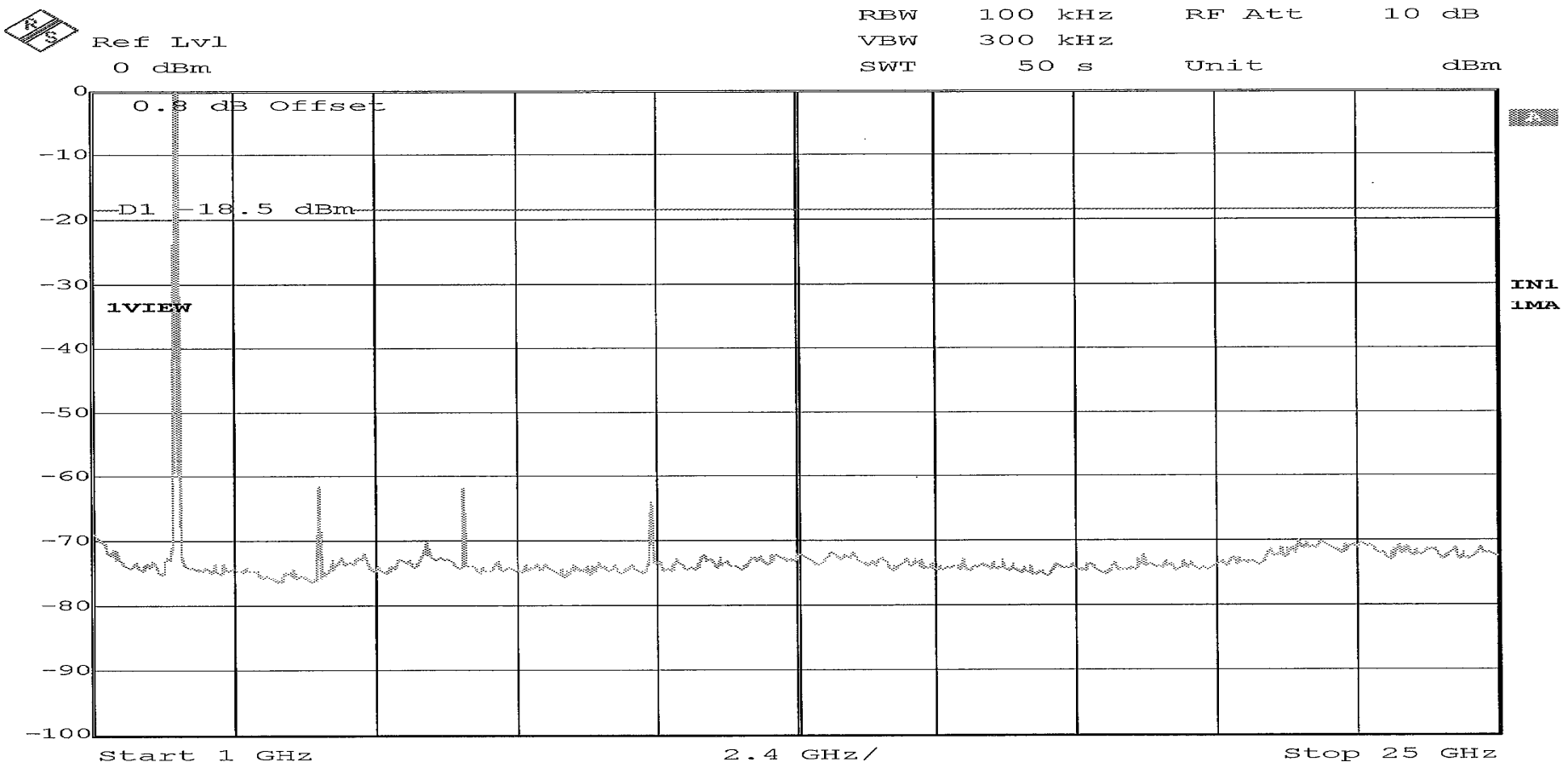
RETLIF TESTING LABORATORIES

Test Method:	Out of Band Conducted Emissions 30 MHz to 25 GHz		
Customer	Vypin LLC	**Job No.**	R-6194N-5
Test Sample	Bluetooth Beacon		
Model Number	VP150	**Serial No.**	4
Operating Mode	Transmitting modulated signal at 2.440 GHz		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (d)		
Technician	M. Seamans	**Date**	April 10th, 2017
Climatic Conditions	Temp: 19.8 °C Relative Humidity: 28.4 %		
Notes	Limit: -18.5dBm		



RETLIF TESTING LABORATORIES

Test Method:	Out of Band Conducted Emissions 30 MHz to 25 GHz		
Customer	Vypin LLC	**Job No.**	R-6194N-5
Test Sample	Bluetooth Beacon		
Model Number	VP150	**Serial No.**	4
Operating Mode	Transmitting modulated signal at 2.440 GHz		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (d)		
Technician	M. Seamans	**Date**	April 10th, 2017
Climatic Conditions	Temp: 19.8 °C Relative Humidity: 28.4 %		
Notes	Limit: -18.5dBm		



RETLIF TESTING LABORATORIES

Test Method:	Out of Band Conducted Emissions 30 MHz to 25 GHz		
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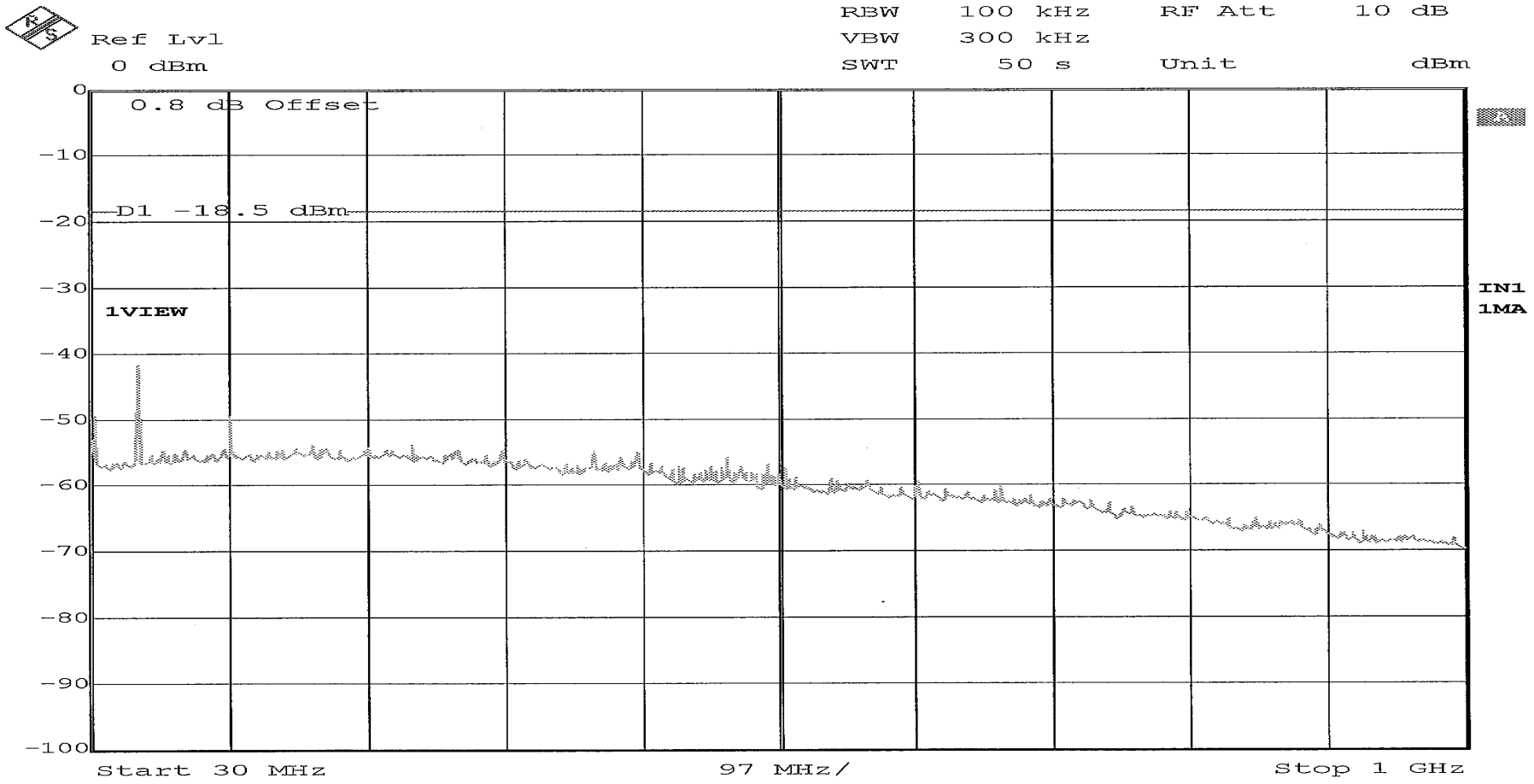
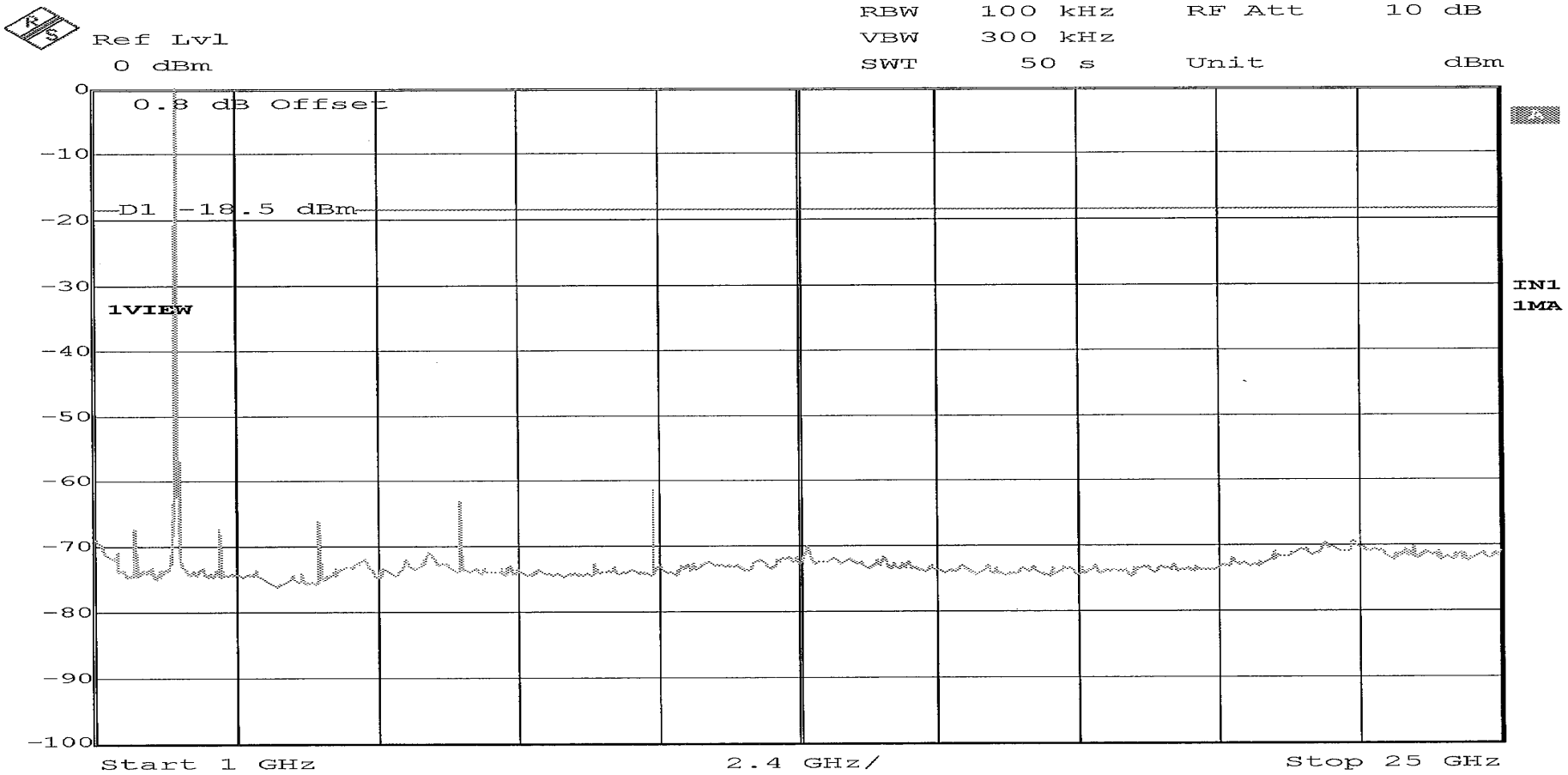
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (d)		
Technician	M. Seamans	**Date**	April 10th, 2017
Climatic Conditions	Temp: 19.8 °C Relative Humidity: 28.4 %		
Notes	Limit: -18.5dBm		



RETLIF TESTING LABORATORIES

Test Method:	Out of Band Conducted Emissions 30 MHz to 25 GHz		
Customer	Vypin LLC	**Job No.**	R-6194N-5
Test Sample	Bluetooth Beacon		
Model Number	VP150	**Serial No.**	4
Operating Mode	Transmitting modulated signal at 2.480 GHz		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (d)		
Technician	M. Seamans	**Date**	April 10th, 2017
Climatic Conditions	Temp: 19.8 °C Relative Humidity: 28.4 %		
Notes	Limit: -18.5dBm		



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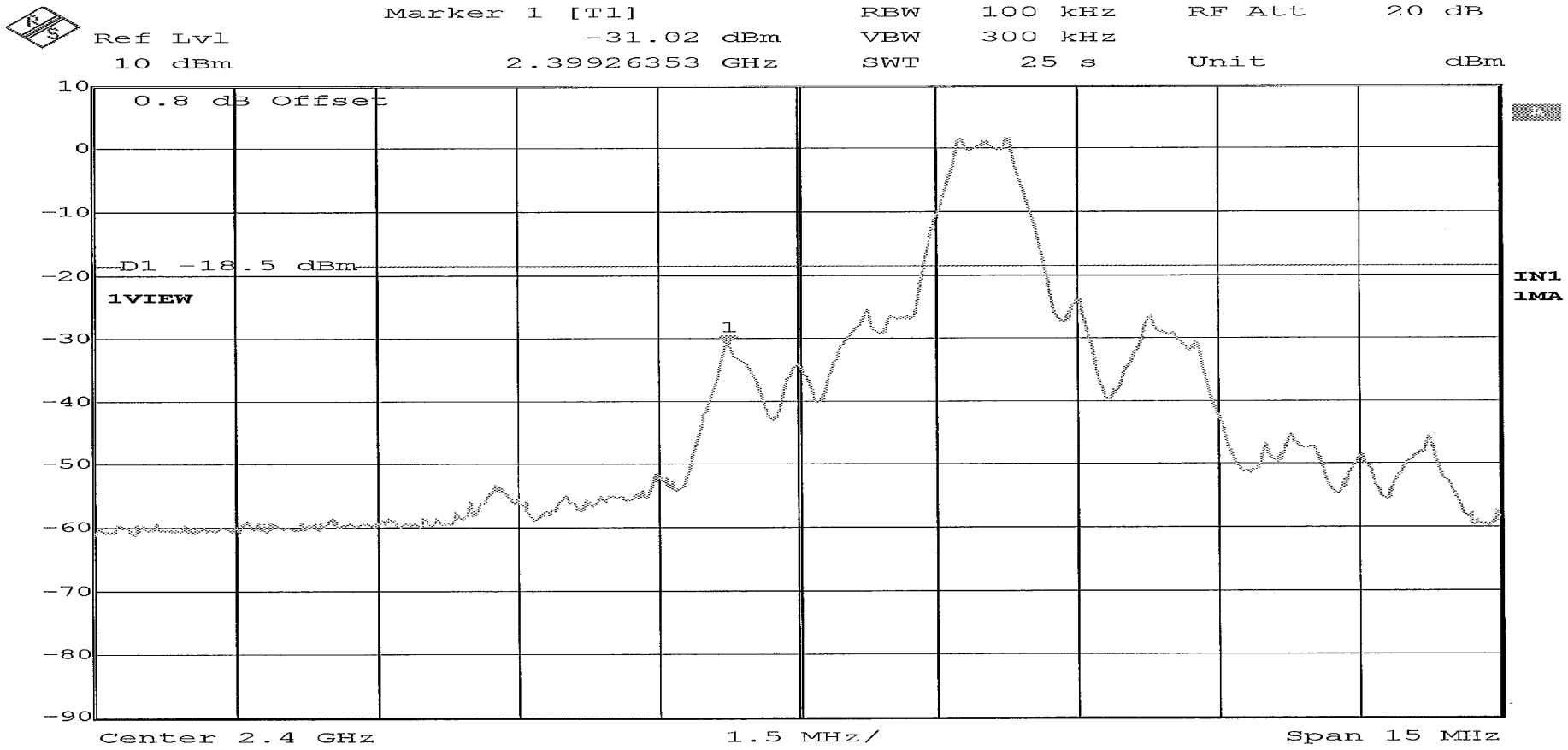
Band Edge Conducted
Test Data

RETLIF TESTING LABORATORIES

Test Method:	Band Edge Conducted		
Customer	Vypin LLC	**Job No.**	R-6194N-5
Test Sample	Bluetooth Beacon		
Model Number	VP150	**Serial No.**	4
Operating Mode	Transmitting modulated signal at 2.402 GHz		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (d)		
Technician	M. Seamans	**Date**	April 10th, 2017
Climatic Conditions	Temp: 19.8 °C Relative Humidity: 28.4 %		
Notes	Limit: -18.5dBm		



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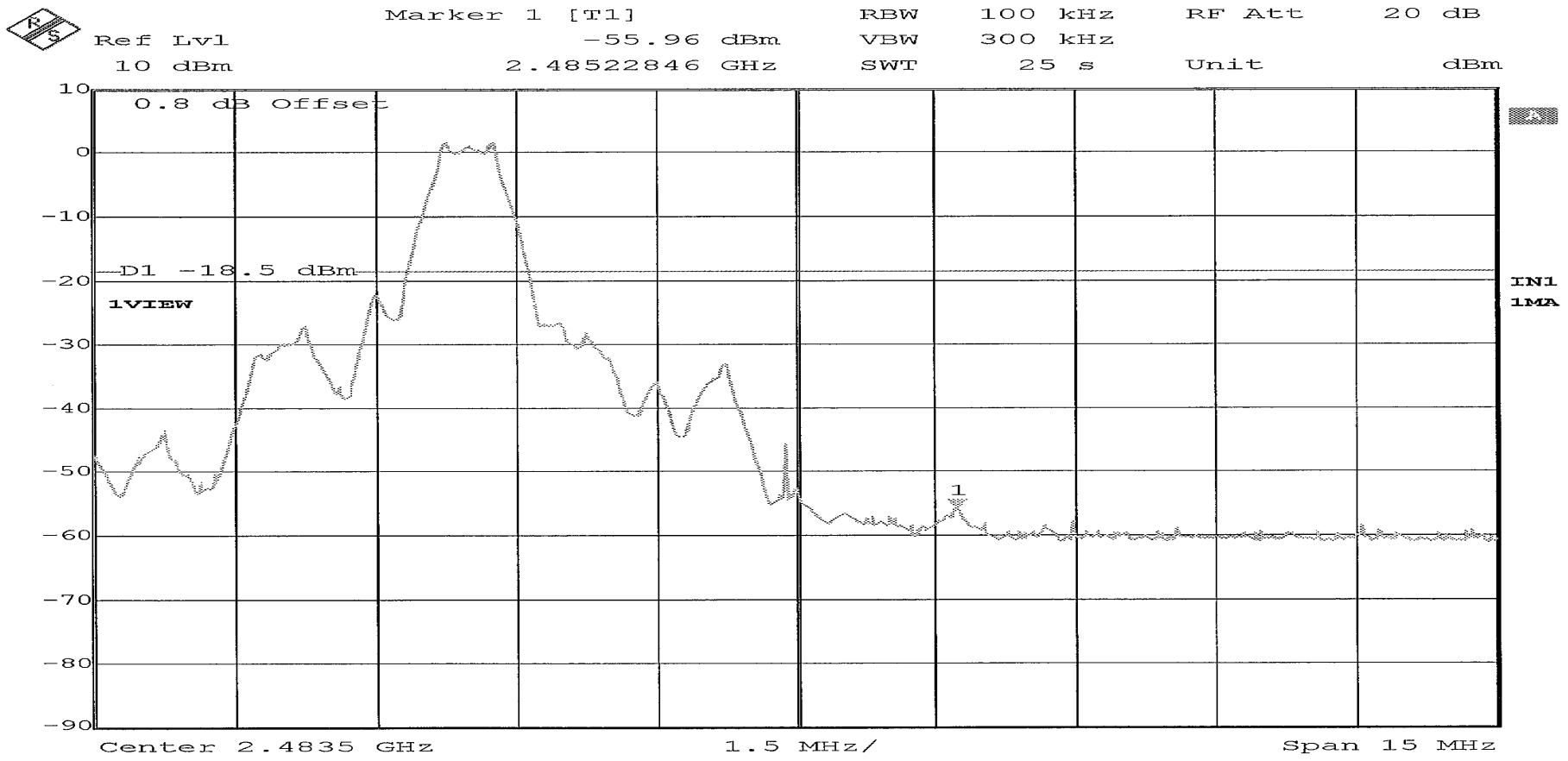
RETLIF TESTING LABORATORIES

Test Method:	Band Edge Conducted		
Customer	Vypin LLC	**Job No.**	R-6194N-5
Test Sample	Bluetooth Beacon		
Model Number	VP150	**Serial No.**	4
Operating Mode	Transmitting modulated signal at 2.480 GHz		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (d)		
Technician	M. Seamans	**Date**	April 10th, 2017
Climatic Conditions	Temp: 19.8 °C Relative Humidity: 28.4 %		
Notes	Limit: -18.5dBm		



Test Photographs
Spurious Radiated Emissions (30 MHz to 25 GHz)

Test Configuration

Test Photographs
Spurious Radiated Emissions (30 MHz to 25 GHz)

Horizontal Antenna Polarization, 30 MHz to 200 MHz, Biconical Antenna

Vertical Antenna Polarization, 30 MHz to 200 MHz, Biconical Antenna

Test Photographs
Spurious Radiated Emissions (30 MHz to 25 GHz)

Horizontal Antenna Polarization, 200 MHz to 1 GHz, Log Periodic Antenna

Vertical Antenna Polarization, 200 MHz to 1 GHz, Log Periodic Antenna

Test Photographs
Spurious Radiated Emissions (30 MHz to 25 GHz)

Horizontal Antenna Polarization, 1 GHz to 12 GHz, Double Ridge Guide

Vertical Antenna Polarization, 1 GHz to 12 GHz, Double Ridge Guide

Test Photographs
Spurious Radiated Emissions (30 MHz to 25 GHz)

Horizontal Antenna Polarization, 12 GHz to 18 GHz, High Gain Horn

Vertical Antenna Polarization, 12 GHz to 18 GHz, High Gain Horn

Test Photographs
Spurious Radiated Emissions (30 MHz to 25 GHz)

Horizontal Antenna Polarization, 18 GHz to 25 GHz, High Gain Horn

Vertical Antenna Polarization, 18 GHz to 25 GHz, High Gain Horn

FCC Section 15.247 (d)
Spurious Radiated Emissions, 30 MHz to 25 GHz
Test Data

RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	Unwanted Emissions into Restricted Frequency Bands	
Customer	Vypin LLC	
Job Number	R-6194N-5	
Test Sample	Bluetooth Beacon	
Model Number	VP150	
Serial Number	11	
Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting modulated signal at 2402 MHz, 2440 MHz and 2480 MHz consecutively.	
Technician	M. Seamans	
Date	April 13th, 2017	

Notes: Antenna Test Distance: 3 meters Detector: Quasi-Peak <1GHz, Average >1GHz

TEST PARAMETERS

Restricted Band	Measured Frequency	Meter Reading	Correction Factor	Corrected Reading			Converted Reading	Limit at 3M
MHz	MHz	dBuV	dB	dBuV/m			uV/m	uV/m
37.50	-	-	-	-			-	100.00
|	38.00	-0.88	14.20	13.32	*		4.63	I
38.25	-	-	-	-			-	100.00
73.00	-	-	-	-			-	100.00
|	74.00	12.22	8.36	20.58	*		10.69	I
74.60	-	-	-	-			-	100.00
74.80	-	-	-	-			-	100.00
|	75.00	6.06	8.36	14.42	*		5.26	|
75.20	-	-	-	-			-	100.00
108.00	-	-	-	-			-	150.00
|	115.00	5.10	10.02	15.12	*		5.70	|
|	-	-	-	-			-	|
121.94	-	-	-	-			-	150.00
123.00	-	-	-	-			-	150.00
|	130.00	4.40	9.44	13.84	*		4.92	|
|	-	-	-	-			-	|
138.00	-	-	-	-			-	150.00

No EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum.
* This emission is not from the EUT. It is a measurement of minimum measurement system sensitivity (Noise Floor).

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EMISSIONS TEST DATA SHEET

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Technician	M. Seamans	
Date	April 13th, 2017	

Notes: Antenna Test Distance: 3 meters Detector: Quasi-Peak <1GHz, Average >1GHz

TEST PARAMETERS

Restricted Band	Measured Frequency	Meter Reading	Correction Factor	Corrected Reading			Converted Reading	Limit at 3M
MHz	MHz	dBuV	dB	dBuV/m			uV/m	uV/m
149.90	-	-	-	-			-	150.00
|	150.00	3.77	11.17	14.94	*		5.58	|
150.05	-	-	-	-			-	150.00
156.52	-	-	-	-			-	150.00
|	156.52	4.06	12.08	16.14	*		6.41	|
156.52	-	-	-	-			-	150.00
156.70	-	-	-	-			-	150.00
|	156.80	4.22	12.12	16.34	*		6.56	|
156.90	-	-	-	-			-	150.00
162.01	-	-	-	-			-	150.00
|	165.00	5.38	12.68	18.06	*		8.00	|
167.17	-	-	-	-				150.00
							-	
167.72	-	-	-	-			-	150.00
|	170.00	5.07	12.80	17.87	*		7.83	|
173.20	-	-	-	-			-	150.00

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RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

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Model Number	VP150	
Serial Number	11	
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Operating Mode	Transmitting modulated signal at 2402 MHz, 2440 MHz and 2480 MHz consecutively.	
Technician	M. Seamans	
Date	April 13th, 2017	

Notes: Antenna Test Distance: 3 meters Detector: Quasi-Peak <1GHz, Average >1GHz

TEST PARAMETERS

Restricted Band	Measured Frequency	Meter Reading	Correction Factor	Corrected Reading			Converted Reading	Limit at 3M
MHz	MHz	dBuV	dB	dBuV/m			uV/m	uV/m
240.00	-	-	-	-			-	200.00
|	260.00	1.27	16.85	18.12	*		8.05	|
285.00	-	-	-	-			-	200.00
322.80	-	-	-	-			-	200.00
|	330.00	1.59	18.91	20.50	*		10.59	|
335.40	-	-	-	-				200.00
							-	
399.90	-	-	-	-			-	200.00
|	405.00	-0.70	21.49	20.79	*		10.95	|
410.00	-	-	-	-			-	200.00
608.00	-	-	-	-			-	200.00
|	611.00	-1.59	27.34	25.75	*		19.39	|
614.00	-	-	-	-			-	200.00
960.00	-	-	-	-			-	500.00
|	975.00	1.009	32.10	33.19	*		45.66	|
1240.00	-	-	-	-			-	500.00
1300.00	-	-	-	-			-	500.00
|	1350.00	24.63	-5.55	19.08	*		8.99	|
1427.00	-	-	-	-			-	500.00

No EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum.
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RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

Test Method	Unwanted Emissions into Restricted Frequency Bands	
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Model Number	VP150	
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Test Specification	FCC Part 15 Subpart C	Paragraph: 15.247(d)
Operating Mode	Transmitting modulated signal at 2402 MHz, 2440 MHz and 2480 MHz consecutively.	
Technician	M. Seamans	
Date	April 13th, 2017	

Notes: Antenna Test Distance: 3 meters Detector: Quasi-Peak <1GHz, Average >1GHz

TEST PARAMETERS

Restricted Band	Measured Frequency	Meter Reading	Correction Factor	Corrected Reading			Converted Reading	Limit at 3M
MHz	MHz	dBuV	dB	dBuV/m			uV/m	uV/m
1435.00	-	-	-	-			-	500.00
|	1500.00	24.19	-4.81	19.38	*		9.31	|
1646.50	-	-	-	-			-	500.00
1660.00	-	-	-	-			-	500.00
|	1680.00	24.35	-4.01	20.34	*		10.40	|
1710.00	-	-	-	-			-	500.00
1718.80	-	-	-	-			-	500.00
|	1720.00	24.52	-3.84	20.68	*		10.81	|
1722.20	-	-	-	-			-	500.00
2200.00	-	-	-	-			-	500.00
|	2250.00	24.52	-2.07	22.45	*		13.36	|
2300.00	-	-	-	-			-	500.00
2310.00	-	-	-	-			-	500.00
|	2360.00	24.61	-1.79	22.82	*		13.84	|
2390.00	-	-	-	-			-	500.00
2483.50	-	-	-	-			-	500.00
|	2490.00	24.13	-1.47	22.66	*		13.58	|
2500.00	-	-	-	-			-	500.00

No EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum.
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RETLIF TESTING LABORATORIES

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Technician	M. Seamans	
Date	April 13th, 2017	

Notes: Antenna Test Distance: 3 meters Detector: Quasi-Peak <1GHz, Average >1GHz

TEST PARAMETERS

Restricted Band	Measured Frequency	Meter Reading	Correction Factor	Corrected Reading			Converted Reading	Limit at 3M
MHz	MHz	dBuV	dB	dBuV/m			uV/m	uV/m
2690.00	-	-	-	-			-	500.00
|	-	-	-	-			-	|
|	2750.00	24.05	-0.88	23.17	*		14.40	|
|	-	-	-	-			-	|
2900.00	-	-	-	-			-	500.00
3260.00	-	-	-	-			-	500.00
|	3263.00	24.32	0.11	24.43	*		16.65	|
3267.00	-	-	-	-			-	500.00
3332.00	-	-	-	-			-	500.00
|	3336.00	25.02	0.23	25.25	*		18.30	|
3339.00	-	-	-	-			-	500.00
3345.00	-	-	-	-			-	500.00
|	3350.00	23.80	0.26	24.06	*		15.96	|
3358.00	-	-	-	-			-	500.00
3600.00	-	-	-	-			-	500.00
|	-	-	-	-			-	|
|	3700.00	24.02	0.81	24.83	*		17.44	|
|	-	-	-	-			-	|

No EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum.
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RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

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Technician	M. Seamans	
Date	April 13th, 2017	

Notes: Antenna Test Distance: 3 meters Detector: Quasi-Peak <1GHz, Average >1GHz

TEST PARAMETERS

Restricted Band	Measured Frequency	Meter Reading	Correction Factor	Corrected Reading			Converted Reading	Limit at 3M
MHz	MHz	dBuV	dB	dBuV/m			uV/m	uV/m
|	-	-	-	-			-	|
4400.00	-	-	-	-			-	500.00
4500.00	-	-	-	-			-	500.00
|	-	-	-	-			-	|
|	4880.00	24.62	2.15	26.77	*		21.80	|
|	-	-	-	-			-	|
5150.00	-	-	-	-			-	500.00
5350.00	-	-	-	-			-	500.00
|	5400.00	24.57	2.70	27.27	*		23.09	|
5460.00	-	-	-	-			-	500.00
7250.00	-	-	-	-			-	500.00
|	7440.00	23.99	3.46	27.45	*		23.58	|
7750.00	-	-	-	-			-	500.00
8025.00	-	-	-	-			-	500.00
|	8300.00	24.15	4.45	28.60	*		26.92	|
8500.00	-	-	-	-			-	500.00
9000.00	-	-	-	-			-	500.00
|	9100.00	23.89	4.85	28.74	*		27.35	|
9200.00	-	-	-	-			-	500.00

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RETLIF TESTING LABORATORIES

EMISSIONS TEST DATA SHEET

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Customer	Vypin LLC	
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Date	April 13th, 2017	

Notes: Antenna Test Distance: 3 meters Detector: Quasi-Peak <1GHz, Average >1GHz

TEST PARAMETERS

Restricted Band	Measured Frequency	Meter Reading	Correction Factor	Corrected Reading			Converted Reading	Limit at 3M
MHz	MHz	dBuV	dB	dBuV/m			uV/m	uV/m
9300.00	-	-	-	-			-	500.00
|	9400.00	23.81	5.12	28.93	*		27.96	|
9500.00	-	-	-				-	500.00
10600.00	-	-	-	-			-	500.00
|	12200.00	24.03	7.45	31.48	*		37.50	|
12700.00	-	-	-	-			-	500.00
13250.00	-	-	-	-			-	500.00
|	15800.00	24.70	9.56	34.26	*		51.64	|
16200.00	-	-	-	-			-	500.00
17700.00	-	-	-	-			-	500.00
|	19240.00	24.35	-6.50	17.85	*		7.81	|
21400.00	-	-	-	-			-	500.00
22010.00	-	-	-	-			-	500.00
|	22320.00	24.35	-6.00	18.35	*		8.27	|
23120.00	-	-	-	-			-	500.00
23000.00	-	-	-	-			-	500.00
|	23800.00	24.33	-4.40	19.93	*		9.92	|
25000.00	-	-	-	-			-	500.00

No EUT emissions within 10 dB of the specified test limit were observed at the specified test distance throughout the given frequency spectrum.
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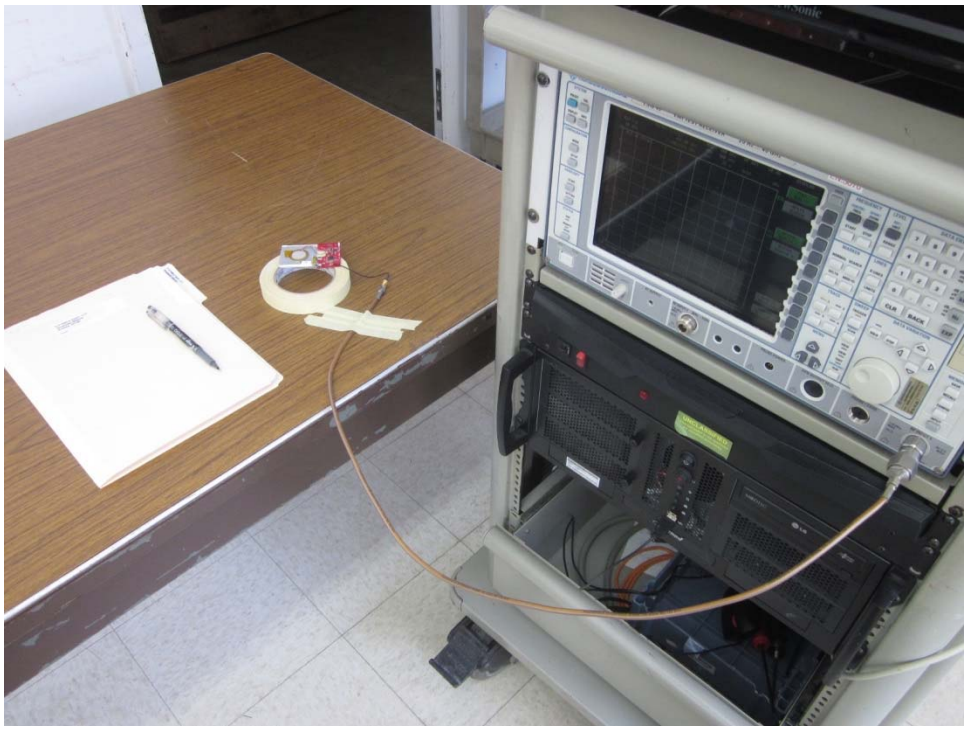
Test Photographs
Power Density

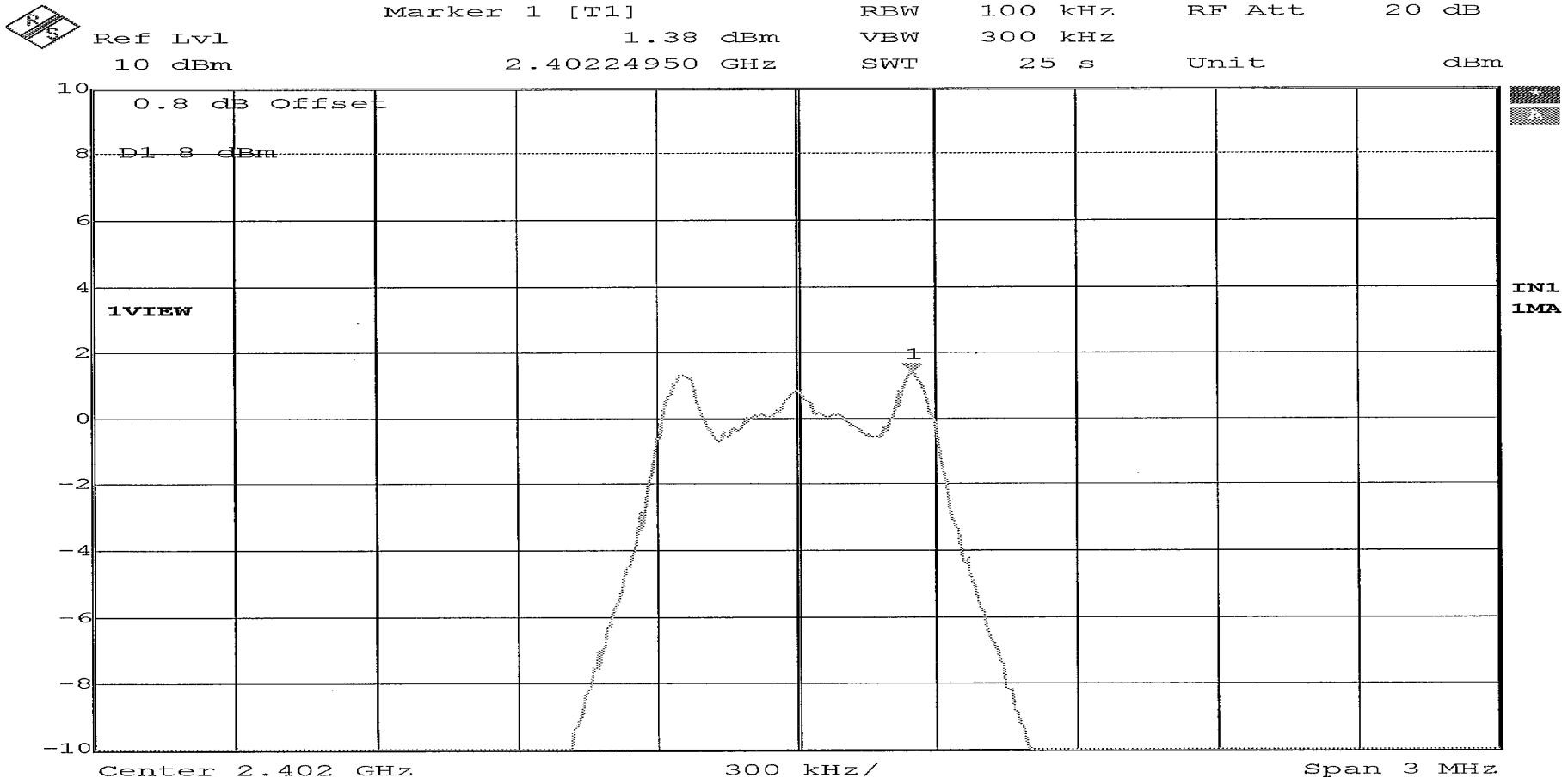


Test Configuration

FCC Section 15.247(e)
Power Density
Test Data

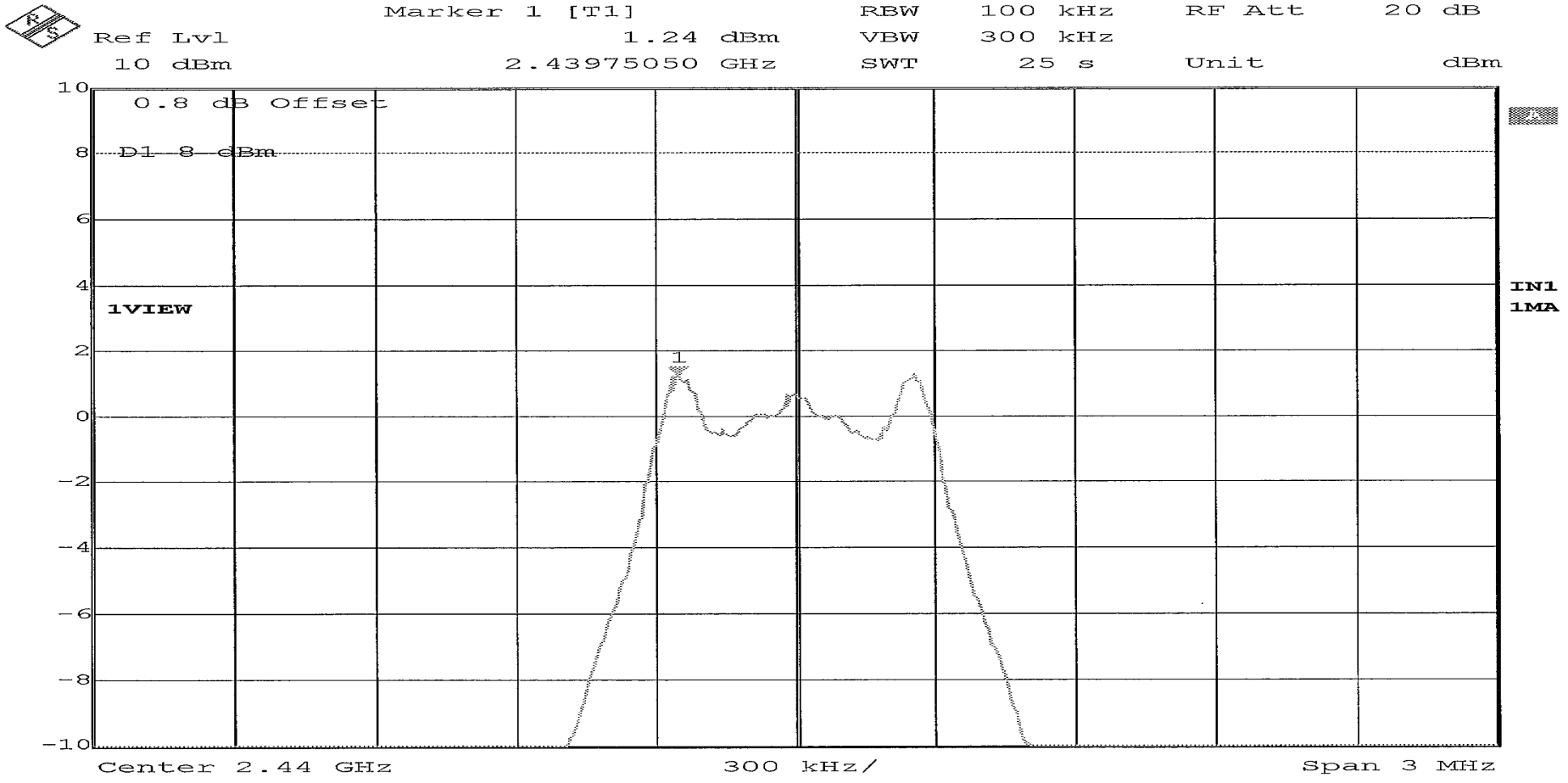
RETLIF TESTING LABORATORIES

Test Method:	Power Spectral Density		
Customer	Vypin LLC	**Job No.**	R-6194N-5
Test Sample	Bluetooth Beacon		
Model Number	VP150	**Serial No.**	4
Operating Mode	Transmitting modulated signal at 2.402 GHz		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (e)		
Technician	M. Seamans	**Date**	April 10th, 2017
Climatic Conditions	Temp: 19.9 °C Relative Humidity: 28.5 %		
Notes	Power Spectral Density: 1.38 dBm Limit: 8 dBm		



RETLIF TESTING LABORATORIES

Test Method:	Power Spectral Density		
Customer	Vypin LLC	**Job No.**	R-6194N-5
Test Sample	Bluetooth Beacon		
Model Number	VP150	**Serial No.**	4
Operating Mode	Transmitting modulated signal at 2.440 GHz		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (e)		
Technician	M. Seamans	**Date**	April 10th, 2017
Climatic Conditions	Temp: 19.9 °C Relative Humidity: 28.5 %		
Notes	Power Spectral Density: 1.24 dBm Limit: 8 dBm		



RETLIF TESTING LABORATORIES

Test Method:	Power Spectral Density		
Customer	Vypin LLC	**Job No.**	R-6194N-5
Test Sample	Bluetooth Beacon		
Model Number	VP150	**Serial No.**	4
Operating Mode	Transmitting modulated signal at 2.480 GHz		
Test Specification	FCC Part 15, Subpart C Paragraph: 15.247 (e)		
Technician	M. Seamans	**Date**	April 10th, 2017
Climatic Conditions	Temp: 19.9 °C Relative Humidity: 28.5 %		
Notes	Power Spectral Density: 1.29 dBm Limit: 8 dBm