



# Retlif Testing Laboratories

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## FCC PART 15, SUBPART C & INDUSTRY CANADA, RSS-210 Test Report on

Radiography Triggering Unit (RTU)  
Part Number: 98-08705-00

**Customer Name:** Idexx Laboratories, Inc.

**Customer P.O.:** 4500322557

**Date of Report:** November 20, 2008

**Test Report No.:** R-5057N-1

**Test Start Date:** August 6, 2008

**Test Finish Date:** August 8, 2008

**Test Technician:** Matthew Seamans

**Laboratory Supervisor:** Todd Hannemann

**Branch Manager:** Scott Wentworth

**Results Prepared By:** Jamie Ramsey

**Government Source Inspection:** N/A

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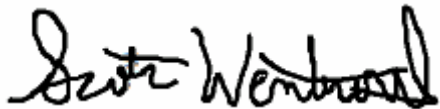
## Certification and Signatures

We certify that these Test Results are true results obtained from the tests of the equipment stated, and relates only to the equipment tested. We further certify that the measurements shown in this Test Results package were made in accordance with the procedures indicated and vouch for the qualifications of all Retlif Testing Laboratories personnel taking them.



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Todd Hannemann  
Laboratory Supervisor



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Scott Wentworth  
Branch Manager  
NVLAP Approved Signatory

### 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 may not be used by the client to claim product endorsement by NVLAP, NIST or any agency of the U.S. Government.



**Retlif Testing Laboratories**

Test Report No. R-5057N-1  
FCC ID: W9M98-08705 IC: 8091A-9808705

## Revision History

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

Revision	Date	Pages Affected
-	November 20, 2008	Original Release



**Retlif Testing Laboratories**

Test Report No. R-5057N-1  
FCC ID: W9M98-08705 IC: 8091A-9808705

## Test Program Summary

**Job Number:** R-5057N-1  
**Customer:** Idexx Laboratories  
**Address:** One Idexx Drive  
Westbrook, ME 04092  
**Test Sample:** Radiography Triggering Unit (RTU)  
**Part Number:** 98-08705-00  
**Model Number:** 01  
**Serial Number:** P-06736R0  
**Power Requirements:** 9 VDC  
**Frequency Operation:** 433.92MHz  
**Modulation:** OOK  
**Type of Transmission:** Remote Control Signal  
**Application:** Radiography – XRay Trigger  
**Frequencies Tested:** 433.92MHz

### Test Specification:

FCC Rules and Regulations Part 15, Subpart C, Paragraph 15.231 RSS 210, Issue 7

### Test Procedure:

ANSI C3.4:2003/RSS-210, Issue 7

### Purpose:

The purpose of this test program was to demonstrate compliance of the Radiography Triggering Unit (RTU) to the requirements of FCC Part 15.231 and RSS 210, Issue 7.

### Test Methods:

The following table depicts the test methods that were performed on the EUT and the corresponding test results:

Testing Date(s)	Test Method	Test Results
8/6/08 to 8/8/08	15.231(b)/RSS-210 Annex 1, Spurious Radiated Emissions (30MHz to 4.4GHz)	Complied
8/6/08 to 8/8/08	15.231(b)/RSS-210 Annex 1, Field Strength of Fundamental	Complied
8/8/08	15.231(c) Occupied Bandwidth, 0.25% of Fundamental Frequency	Complied
8/8/08	RSS-210, Annex 1, A1.1.3, 99% Bandwidth, 0.25% of Center Frequency	Complied
8/6/08	Duty Cycle Determination	N/A



### Retlif Testing Laboratories

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**Test Sample Operation:**

The device is used by a radiography technician who positions the radiography device and then triggers the X-ray with the transmitter. During testing, the EUT was transmitting a signal at 433.92 MHz.

**Test Sample/Test Program:**

- The transmitter is manually activated and employs a switch that automatically deactivates the transmitter within 5 seconds of being released.
- The transmitter does not perform periodic transmission at regularly predetermined intervals.
- The device can not be employed for RC purposes involving security.
- The device uses an integral permanently attached antenna.
- The fundamental field strength of 433.92MHz did not exceed 10,996uV/M (Average) at a test distance of 3.0 meters.
- The peak value of fundamental emissions did not exceed a peak field strength limit corresponding to 20dB above the maximum permitted average limit.
- The field strength of harmonic and spurious emissions did not exceed 1099 µV/M or 500 µV/M as applicable for a fundamental frequency of 433.92MHz. No harmonic or spurious emissions were observed within 10dB of the specified limit at test distances of 1 or 3 meters.
- Radiated Emissions from the EUT were measured in with the EUT oriented in all 3 axis. The worst case test data is included in this report.
- The device operates at 433.92MHz. The 20dB bandwidth and 99% bandwidth of emissions did not exceed 0.25% of the center operating frequency and were determined as follows:

Fundamental Frequency	=	433.92MHz
0.25% of Center Frequency	=	1.0848Hz
1.0848 divided by 2	=	0.5424MHz
Bandwidth Range	=	Fundamental Frequency + and – .5424MHz
433.92MHz – 0.5424MHz	=	433.37MHz
433.92MHz + 0.5424MHz	=	434.46MHz
<b>Bandwidth Range</b>	=	<b>433.37MHz – 434.46MHz</b>

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## Determination of Field Strength Limits:

### Fundamental Frequency: 433.92MHz

Where F is the frequency in MHz, the formula for calculating the maximum permitted fundamental field strength for the band 260-470MHz,  $\mu\text{V/m}$  at 3 meters is as follows:

$$\begin{aligned} 41.6667(F) - 7083.3333 &= \text{Field Strength Limit } (\mu\text{V/m}) \\ 41.6667 \times 433.92 &= 18080 \\ 18080 - 7083.3333 &= 10,996 \\ \text{Field Strength Limit} &= 10,996\mu\text{V/m} = 80.82\text{dBuV/M} \end{aligned}$$

The maximum permitted unwanted emission level is 20dB below the maximum permitted fundamental level which equals  $1099\mu\text{V/m} = 60.82\text{dBuV/M}$ .

### Determination of Duty Cycle:

100% Duty Cycle - No Duty Cycle Factor was applied. The Peak Emission was in compliance with the average limit.



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## Test Methods:

### 15.231 (b) Fundamental & Spurious Radiated Emissions

The test sample was placed on a 80cm high wooden test stand which was located 3 meters from the test antenna on an FCC listed open area test site. Emissions from the EUT were maximized by rotating the test sample and adjusting the EUT orientation and antenna polarization. The maximized peak field strength of each emission was measured and recorded and compared to the limit specified in 15.35 (b) (peak limit corresponds to 20dB above the maximum permitted average limit).

**Test Results:** The worst case maximized peak field strength of the fundamental frequency at 433.92MHz was 79.69dBuV/M which met both the peak limit of 100.82dBuV and the average limit of 80.82dBuV. No harmonic/spurious frequencies were observed above the noise floor of the test equipment which was a minimum of 10dB below the specified limit.

### 15.231 (c) Occupied Bandwidth

The test sample was placed on a test bench and configured to transmit its normal modulated signal at maximum power. The spectrum analyzers resolution bandwidth, sweep rate and span were adjusted for the frequency being measured. The upper and lower frequency points corresponding to levels 20dB down from the peak of the modulated carrier frequency were used to determine the occupied bandwidth.

**Test Results:** The bandwidth of the emission at 433.92MHz was less than 0.25% of the center frequency and met the requirements of 15.231 (c).

### RSS 210, A1.1.3, 99% Bandwidth

The test sample was placed on a test bench and configured to transmit its normal modulated signal at maximum power. The spectrum analyzers resolution bandwidth, sweep rate and span were adjusted for the frequency being measured. Using the spectrum analyzer 99% bandwidth function the 99% bandwidth of the modulated carrier frequency was measured and recorded.

**Test Results:** The 99% bandwidth of the emission at 433.92MHz was less than 0.25% of the center frequency and met the requirements of RSS-210.



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## Test Setup Photographs



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## Test Photograph Spurious Radiated Emissions



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## Test Photograph Spurious Radiated Emissions



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**Test Photograph**  
**Spurious Radiated Emissions**



**Retlif Testing Laboratories**

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## Test Photograph Spurious Radiated Emissions

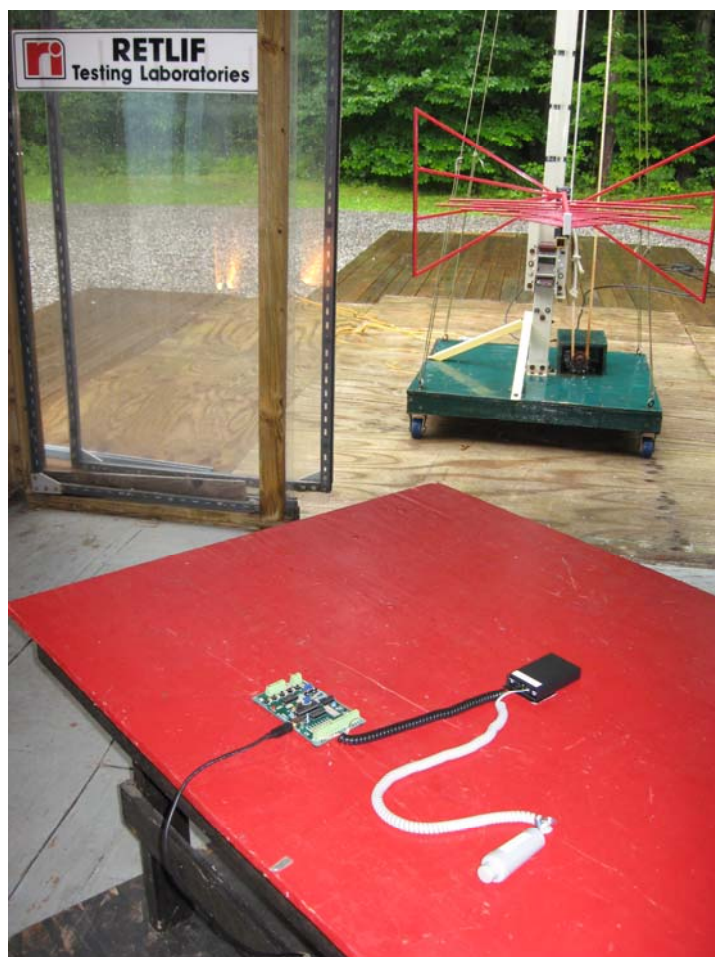


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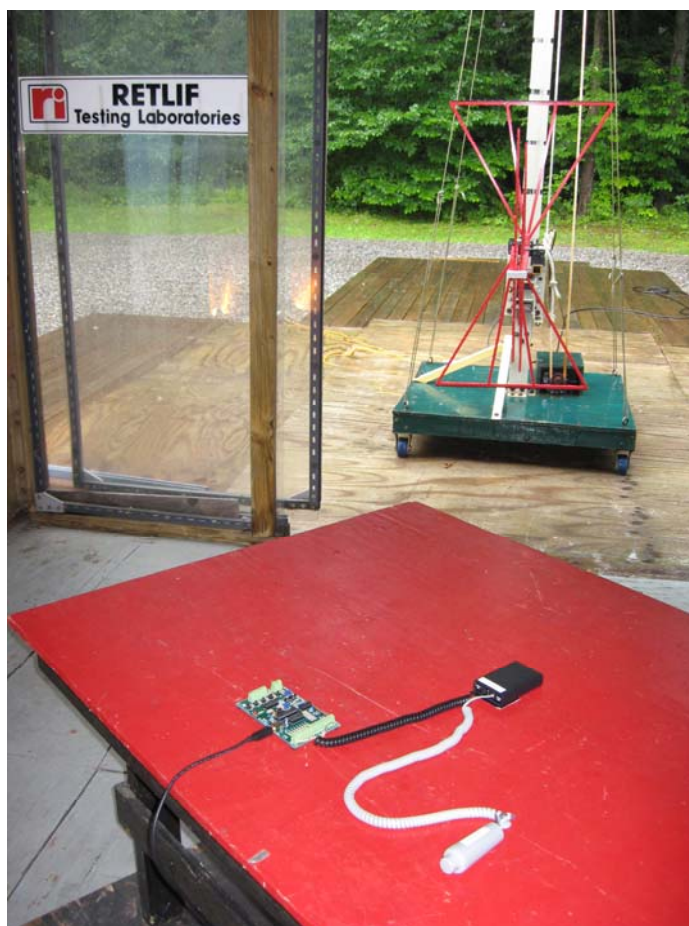
**Test Photograph**  
**Field Strength of Fundamental**



**Retlif Testing Laboratories**

Test Report No. R-5057N-1  
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**Test Photograph**  
**Field Strength of Fundamental**



**Retlif Testing Laboratories**

Test Report No. R-5057N-1  
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**Test Photograph  
Occupied Bandwidth**



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## Equipment Lists

### Fundamental & Spurious Radiated Emissions

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
4029B	Test Site Attenuation	Retlif	3 / 10 Meters	RNH	7/21/2008	7/21/2009
5053	Biconilog	EMCO	26 MHz - 3 GHz	3142C	10/4/2007	10/4/2008
R425B	Spectrum Analyzer	Agilent	100Hz - 26.5GHz	E7405A;A	4/11/2008	4/24/2009
3116	Pre-Amplifier	Miteq	0.1 GHz - 18 GHz	AFS42-35	8/27/2007	8/27/2008
3117	Power Supply	B&K Precision	0-30 Vdc, 3.0 A	1630	1/31/2008	1/31/2009
3258	Double Ridge Guide	EMCO	1 - 18 GHz	3115	11/14/2007	11/14/2008

### Occupied Bandwidth/99% Bandwidth

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
R425B	Spectrum Analyzer	Agilent	100Hz - 26.5GHz	E7405A;A	4/11/2008	4/24/2009



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**Test Data**



**Retlif Testing Laboratories**

Test Report No. R-5057N-1  
FCC ID: W9M98-08705 IC: 8091A-9808705

# RETLIF TESTING LABORATORIES

## TABULAR DATA SHEET

<b>Test Method:</b>	Fundamental Field Strength		
<b>Customer:</b>	Idexx Labs	<b>Job No:</b>	R-5057N-1
<b>Test Sample:</b>	Radiography Triggering Unit (RTU)		
<b>Part No.</b>	98-08705-00	<b>Serial No:</b>	P-06736R0
<b>Test Specification:</b>	FCC Part 15, Subpart C Paragraph: 15.231(b)		
<b>Operating Mode:</b>	Continuously Transmitting		
<b>Technician:</b>	M.Seamans	<b>Date:</b>	August 8, 2008
<b>Notes:</b>	Corrected peak readings meet peak limit (20dB above average limit) per 15.35		

[illegible]

# RETLIF TESTING LABORATORIES

## TABULAR DATA SHEET

<b>Test Method:</b>	Spurious Emissions 30MHz to 4.4GHz		
<b>Customer:</b>	Idexx Labs	<b>Job No:</b>	R-5057N-1
<b>Test Sample:</b>	Radiography Triggering Unit (RTU)		
<b>Part No:</b>	98-08705-00	<b>Serial No:</b>	P-06736R0
<b>Test Specification:</b>	FCC Part 15, Subpart C Paragraph: 15.231(b)		
<b>Operating Mode:</b>	Continuously Transmitting		
<b>Technician:</b>	M.Seamans	<b>Date:</b>	August 8, 2008
<b>Notes:</b>	Fundamental Frequency: 433.92MHz		

[illegible]

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	Idexx Labs	Test Sample:	Radiography Triggering Unit (RTU)
Part No:	98-08705-00	Serial No:	P-06736R0
Test Specification:	FCC Part 15, Subpart C	15.231(c)	Job No: R-5057N-1
Operating Mode:	Transmitting Signal		Technician: M. Seamans
Notes:	Transmit Frequency 433.92MHz Occupied Bandwidth: 180.362kHz		
Date:	8/8/2008		



14:05:36 Aug 8, 2008

Ref 86.99 dB  $\mu$ V

#Atten 10 dB

Mkr1  $\Delta$  180.362 kHz

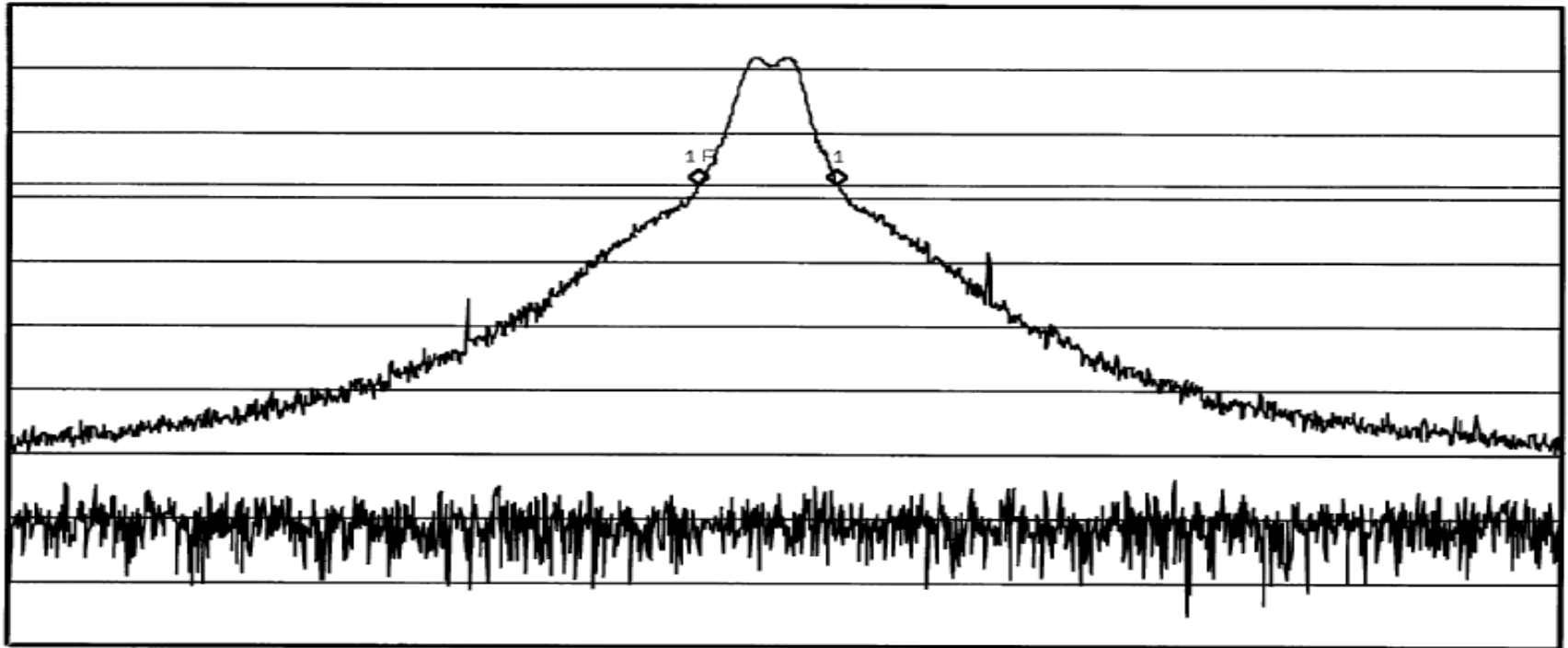
-0.115 dB

Peak  
Log  
10  
dB /

DI  
58.9  
dB  $\mu$ V

V1 V2  
S3 FC  
A AA

PA



Start 432.9 MHz

#Res BW 30 kHz

#VBW 100 kHz

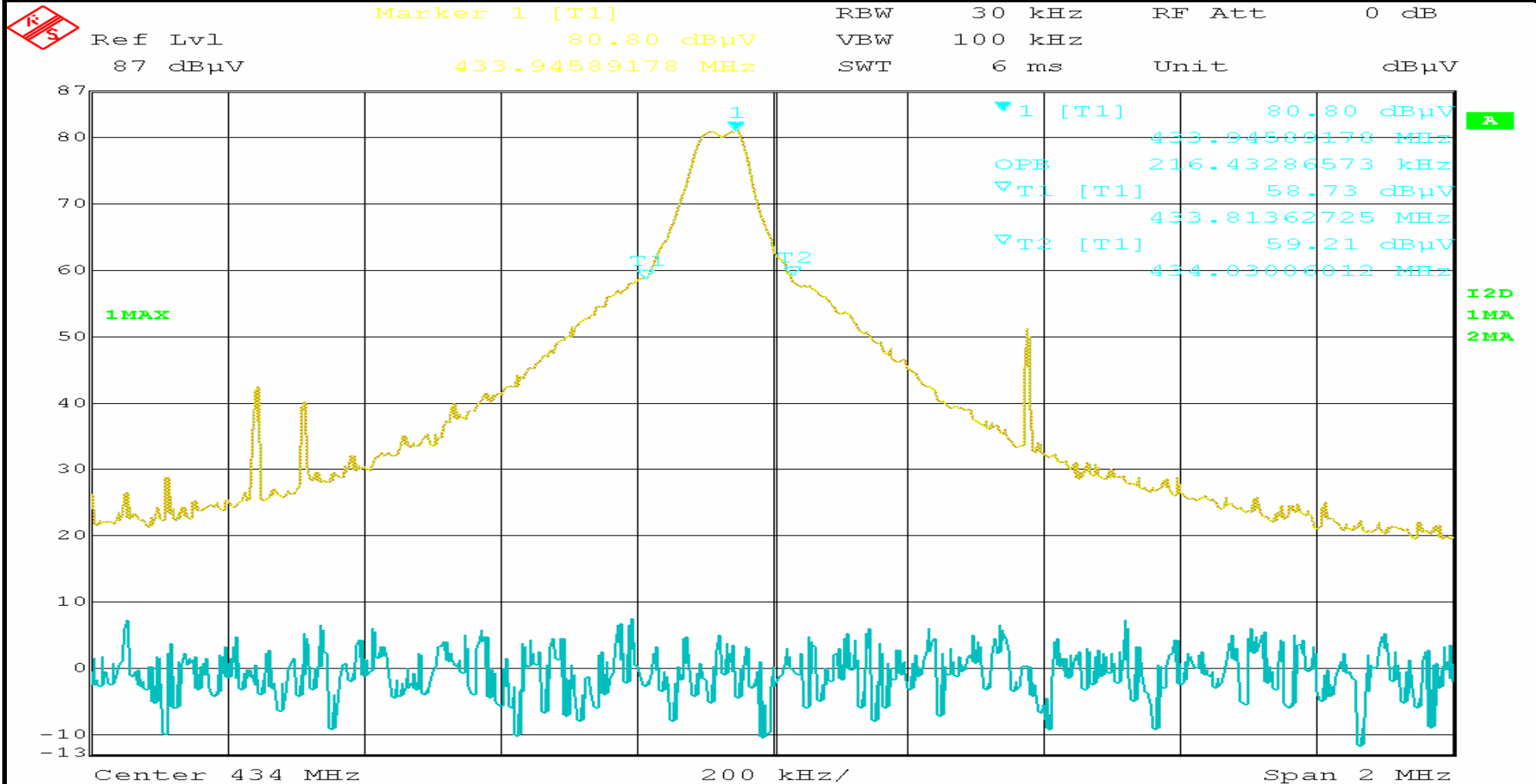
Stop 434.9 MHz

Sweep 15.08 ms (1509 pts)

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	99% Bandwidth		
Customer:	Idexx Labs	Test Sample:	Radiography Triggering Unit (RTU)
Model No:	98-08705-00	Serial No:	P-06736R0
Test Specification:	RSS-210		Job No:
Operating Mode:	Transmitting Signal		Technician:
Notes:	Transmit Frequency 433.92 MHz, 99% Occupied Bandwidth: 216.432 kHz		Date:



Date: 8.AUG.2008 15:34:14

Data Sheet 1 of 1

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