



# Retlif Testing Laboratories

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## FCC PART 15/INDUSTRY CANADA REPORT of MEASUREMENTS on PocketWizard MiniTT1 Transceiver

**Company Name:** LPA Design

**Customer P.O.:** 15455

**Date of Report:** February 11, 2009

**Test Report No.:** R-5093N-1, Rev. A

**Test Start Date:** November 25, 2008

**Test Finish Date:** February 4, 2009

**Test Technicians:** Michael Hippert, Matthew Seamans

**Laboratory Supervisor:** Todd Hannemann

**Manager:** Scott Wentworth

**Results Prepared By:** Jamie Ramsey

**Government Source Inspection:** N/A

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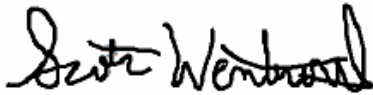
## Certification and Signatures

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

### 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-5093N-1, Rev. A  
FCC ID: KDS-PW3-004 & IC: 2170A-PW3004

## Revision History

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

Revision	Date	Pages Affected
-	February 6, 2009	Original Release
A	February 11, 2009	4, 7, 9, 36



**Retlif Testing Laboratories**

Test Report No. R-5093N-1, Rev. A  
FCC ID: KDS-PW3-004 & IC: 2170A-PW3004

## Test Program Summary

**Job Number:** R-5093N-1  
**Applicant:** LPA Design  
**Address:** 4 IDX Drive, Suite 265  
South Burlington, VT 05403  
**Test Sample:** MiniTT1 Remote Flash Control Transceiver  
**Part Number:** N/A  
**Model Number:** TT1-C-US  
**Brand Name:** PocketWizard MiniTT1  
**Serial Number:** 006  
**Power Requirements:** 3VDC via internal battery  
**Frequency Band of Operation:** 340.0MHz to 354MHz  
**Modulation:** OOK (on/off keying)  
**Type of Transmission:** Control Signal (Pulse Recognition Codes)  
**Application:** Remote Triggering of a Flashpack  
**Frequencies Tested:** 340MHz, 347MHz, 354MHz

### 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 PocketWizard MiniTT1 Remote Flash Control Transceiver 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
11/25/08	15.231(b)/RSS-210 Annex 1, Spurious Radiated Emissions (30MHz to 3.6GHz)	Complied
11/25/08	15.231(b)/RSS-210 Annex 1, Field Strength of Fundamental	Complied
11/25/08	15.231(c) Occupied Bandwidth, 0.25% of Fundamental Frequency	Complied
11/25/08	RSS-210, Annex 1, A1.1.3, 99% Bandwidth, 0.25% of Center Frequency	Complied
11/25/08	RSS Gen, 4.10 Receiver Spurious Emissions	Complied
2/4/09	Duty Cycle Determination	N/A



### Retlif Testing Laboratories

Test Report No. R-5093N-1, Rev. A  
FCC ID: KDS-PW3-004 & IC: 2170A-PW3004

### Test Sample Operation:

The device is normally manually operated and transmits a control signal for remote triggering of a flashpack. Normal operation of the EUT complies with the parameters required in Part 15, Subpart C, Section 15.231 and RSS 210 for momentary operated devices. For testing purposes only, the EUT was configured to continuously transmit.

### 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 internal antenna with no provisions for connection of an external antenna.
- The device is powered by internal battery with no connections to the AC mains.
- The fundamental field strength did not exceed the specified limit 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 the applicable limit. 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 all three axis. The attached Radiated Emissions test data is representative of the worst case orientation.
- The 20dB bandwidth and 99% bandwidth of fundamental emissions did not exceed 0.25% of the center operating frequency and were determined as follows:

Fundamental Frequency = 340.0MHz  
0.25% of Center Frequency = 0.850MHz  
0.850 divided by 2 = 0.425MHz  
Bandwidth Range = Fundamental Frequency + and – 0.425MHz  
340.0MHz – 0.425MHz = 339.5751MHz  
340.0MHz + 0.4250MHz = 340.425Hz  
**Bandwidth Range = 339.575MHz – 340.425MHz**

Fundamental Frequency = 347.0MHz  
0.25% of Center Frequency = 0.868MHz  
0.868 divided by 2 = 0.434MHz  
Bandwidth Range = Fundamental Frequency + and – 0.434MHz  
347.0MHz – 0.434MHz = 346.560MHz  
347.0MHz + 0.434MHz = 347.434MHz  
**Bandwidth Range = 346.560MHz – 347.434MHz**



**Retlif Testing Laboratories**

Test Report No. R-5093N-1, Rev. A  
FCC ID: KDS-PW3-004 & IC: 2170A-PW3004

Fundamental Frequency	=	354.0MHz
0.25% of Center Frequency	=	0.885Hz
0.885 divided by 2	=	0.4425MHz
Bandwidth Range	=	Fundamental Frequency + and – 0.442MHz
354.0MHz – 0.442MHz	=	353.558MHz
354.0MHz + 0.442MHz	=	354.442MHz
<b>Bandwidth Range</b>	=	<b>353.558MHz – 354.442MHz</b>

### Determination of Field Strength Limits:

The field strength limits shown below were calculated as instructed in Section 15.231.

#### Fundamental Frequency: 340.0MHz

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:

$41.6667(F) - 7083.3333$	=	Field Strength Limit ( $\mu\text{V/m}$ )
$41.6667 \times 340.0$	=	14166.68
$14166.68 - 7083.3333$	=	7083
Field Strength Limit	=	$7083\mu\text{V/m} = 77.0\text{dBuV/M}$

The maximum permitted unwanted emission level is 20dB below the maximum permitted fundamental level which equals  $708\mu\text{V/m} = 57.0\text{dBuV/M}$ .

#### Fundamental Frequency: 347.0MHz

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:

$41.6667(F) - 7083.3333$	=	Field Strength Limit ( $\mu\text{V/m}$ )
$41.6667 \times 347.0$	=	14458.35
$14458.35 - 7083.3333$	=	7375
Field Strength Limit	=	$7375\mu\text{V/m} = 77.36\text{dBuV/M}$

The maximum permitted unwanted emission level is 20dB below the maximum permitted fundamental level which equals  $738\mu\text{V/m} = 57.36\text{dBuV/M}$ .



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Test Report No. R-5093N-1, Rev. A  
FCC ID: KDS-PW3-004 & IC: 2170A-PW3004

**Fundamental Frequency: 354.0MHz**

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:

$$\begin{aligned} 41.6667(F) - 7083.3333 &= \text{Field Strength Limit } (\mu\text{V/m}) \\ 41.6667 \times 354.0 &= 14750 \\ 14750 - 7083.3333 &= 7667 \\ \text{Field Strength Limit} &= 7667\mu\text{V/m} = 77.69\text{dBuV/M} \end{aligned}$$

The maximum permitted unwanted emission level is 20dB below the maximum permitted fundamental level which equals  $767\mu\text{V/m} = 57.69\text{dBuV/M}$ .

**Determination of Duty Cycle:**

The transmitter controls were adjusted to maximize the transmitted duty cycle. The analyzer was set for a frequency span of 0Hz. The sweep time was then adjusted in order to display one full pulse train. The transmitter on time was then summed and compared to the time for one full cycle in order to obtain the duty cycle. The pulse train exceeded 100msec so 100msec was used as the cycle time and the period with the "worst case" on time was used to calculate the duty cycle. The on times were determined as follows:

The transmitter pulse train was the same for all 3 frequencies tested. The individual pulses within the pulse train were measured and summed in order to obtain the total "on time". Within the 100msec there were a total of 10 pulses (5 pulses with 541.08usec duration and 5 pulses with 511.02usec duration).

$$\begin{aligned} \text{Transmitter On Time} &= 5.261\text{milliseconds} \\ \text{Transmitter Cycle Time} &= 100\text{milliseconds} \\ \text{Transmitter Duty Cycle} &= 5.261\% \\ \text{On Time divided by Cycle Time} &= \text{Duty Cycle Factor} \\ 5.261 \text{ divided by } 100 &= 0.05261 \\ 0.05261 \text{ converted to dB } (\text{LOG}_{10} .05261)20 &= -25.58 \\ \text{Duty Cycle Factor} &= \textbf{-25.58dB} \end{aligned}$$

Duty Cycle Factor Determination Plots are included with this application as a separate attachment.

**Retlif Testing Laboratories**

Test Report No. R-5093N-1, Rev. A  
FCC ID: KDS-PW3-004 & IC: 2170A-PW3004

## Test Methods:

### 15.231 (b) Transmitter 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/IC listed open area test site. Emissions from the EUT were maximized by rotating the test sample and adjusting the test sample 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). The duty cycle factor was applied to the peak readings in order to determine the average field strength of the emissions for comparison to the specified average limits.

**Test Results:** The worst case maximum peak field strength of the fundamental frequency at 340.0MHz was 89.87dBuV/M which met the peak limit of 97.0dBuV. The maximum average field strength at 340.0MHz was 64.29dBuV which met the specified average limit of 77.0dBuV. The worst case maximum peak field strength of the fundamental frequency at 347.0MHz was 92.24dBuV/M which met the peak limit of 97.36BuV. The maximum average field strength at 347.0MHz was 66.66dBuV which met the specified average limit of 77.360dBuV. The worst case maximum peak field strength of the fundamental frequency at 354.0MHz was 91.28dBuV/M which met the peak limit of 97.69dBuV. The maximum average field strength at 354.0MHz was 65.70dBuV which met the specified average limit of 77.69dBuV. 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 340.0MHz, 347.0MHz and 354.0MHz was less than 0.25% of the center frequency and met the requirements of 15.231 (c).



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Test Report No. R-5093N-1, Rev. A  
FCC ID: KDS-PW3-004 & IC: 2170A-PW3004

#### 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 340.0MHz, 347.0MHz & 354.0MHz was less than 0.25% of the center frequency and met the requirements of RSS-210.

#### RSS GEN, 4.10, Receiver Spurious 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/IC listed open area test site. The EUT was operating in normal receive mode near the mid-point of the operating band. Emissions from the EUT were maximized by rotating the test sample and adjusting the test sample orientation and antenna polarization.

**Test Results:** No spurious emissions were observed above the noise floor of the test equipment which was a minimum of 10dB below the specified limit.



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Test Report No. R-5093N-1, Rev. A  
FCC ID: KDS-PW3-004 & IC: 2170A-PW3004

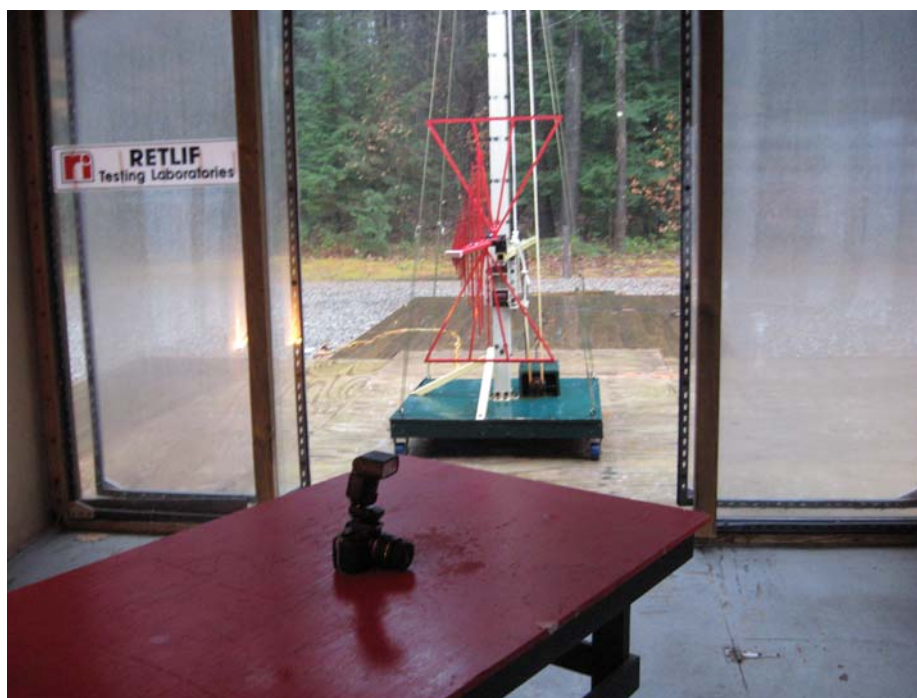
## Test Setup Photographs



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Test Report No. R-5093N-1, Rev. A  
FCC ID: KDS-PW3-004 & IC: 2170A-PW3004

## Test Photographs Spurious Radiated Emissions



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FCC ID: KDS-PW3-004 & IC: 2170A-PW3004

**Test Photograph  
Field Strength of Fundamental**



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## Test Photograph Occupied Bandwidth & Duty Cycle



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FCC ID: KDS-PW3-004 & IC: 2170A-PW3004

## Equipment Lists

### Fundamental & Spurious Radiated Emissions

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
3116	Pre-Amplifier	Miteq	0.1 GHz - 18 GHz	AFS42-35	8/31/2007	12/31/2008
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	8/20/2008	8/20/2009
4029B	Open Area Test Site	Retlif	3 / 10 Meters	RNH	7/21/2008	7/21/2009
5053	Biconilog	EMCO	26 MHz - 3 GHz	3142C	10/4/2008	12/4/2008
5070	EMI Test Receiver	Rohde & Schwarz	20 Hz - 40 GHz	ESIB40	12/7/2007	12/7/2008

### Occupied Bandwidth/99% Bandwidth

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
5070	EMI Test Receiver	Rohde & Schwarz	20 Hz - 40 GHz	ESIB40	12/7/2007	12/7/2008

### Duty Cycle


EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
5070	EMI Test Receiver	Rohde & Schwarz	20 Hz - 40 GHz	ESIB40	1/14/2009	1/14/2010



**Retlif Testing Laboratories**

Test Report No. R-5093N-1, Rev. A  
FCC ID: KDS-PW3-004 & IC: 2170A-PW3004

**Test Data**

	<b>Retlif Testing Laboratories</b>
	Test Report No. R-5093N-1, Rev. A FCC ID: KDS-PW3-004 & IC: 2170A-PW3004

# RETLIF TESTING LABORATORIES

## TABULAR DATA SHEET

<b>Test Method:</b>	Fundamental Field Strength		
<b>Customer:</b>	LPA Design	<b>Job No:</b>	R-5093N-1
<b>Test Sample:</b>	PocketWizard MiniTT1 Transceiver		
<b>Model No:</b>	TT1-C-US	<b>Serial No:</b>	006
<b>Test Specification:</b>	FCC Part 15, Subpart C Paragraph: 15.231(b)		
<b>Operating Mode:</b>	Continuously Transmitting		
<b>Technician:</b>	M. Hippert	<b>Date:</b>	November 25, 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 3.6GHz		
<b>Customer:</b>	LPA Design	<b>Job No:</b>	R-5093N-1
<b>Test Sample:</b>	PocketWizard MiniTT1 Transceiver		
<b>Model No:</b>	TT1-C-US	<b>Serial No:</b>	006
<b>Test Specification:</b>	FCC Part 15, Subpart C Paragraph: 15.231(b)		
<b>Operating Mode:</b>	Continuously Transmitting		
<b>Technician:</b>	M. Hippert	<b>Date:</b>	11/25/2008
<b>Notes:</b>	Fundamental Frequency: 340 MHz		

[illegible]

# RETLIF TESTING LABORATORIES

## TABULAR DATA SHEET

<b>Test Method:</b>	Spurious Emissions 30MHz to 3.6GHz		
<b>Customer:</b>	LPA Design	<b>Job No:</b>	R-5093N-1
<b>Test Sample:</b>	PocketWizard MiniTT1 Transceiver		
<b>Model No:</b>	TT1-C-US	<b>Serial No:</b>	006
<b>Test Specification:</b>	FCC Part 15, Subpart C Paragraph: 15.231(b)		
<b>Operating Mode:</b>	Continuously Transmitting		
<b>Technician:</b>	M. Hippert	<b>Date:</b>	11/25/2008
<b>Notes:</b>	Fundamental Frequency: 347 MHz		

[illegible]

# RETLIF TESTING LABORATORIES

## TABULAR DATA SHEET

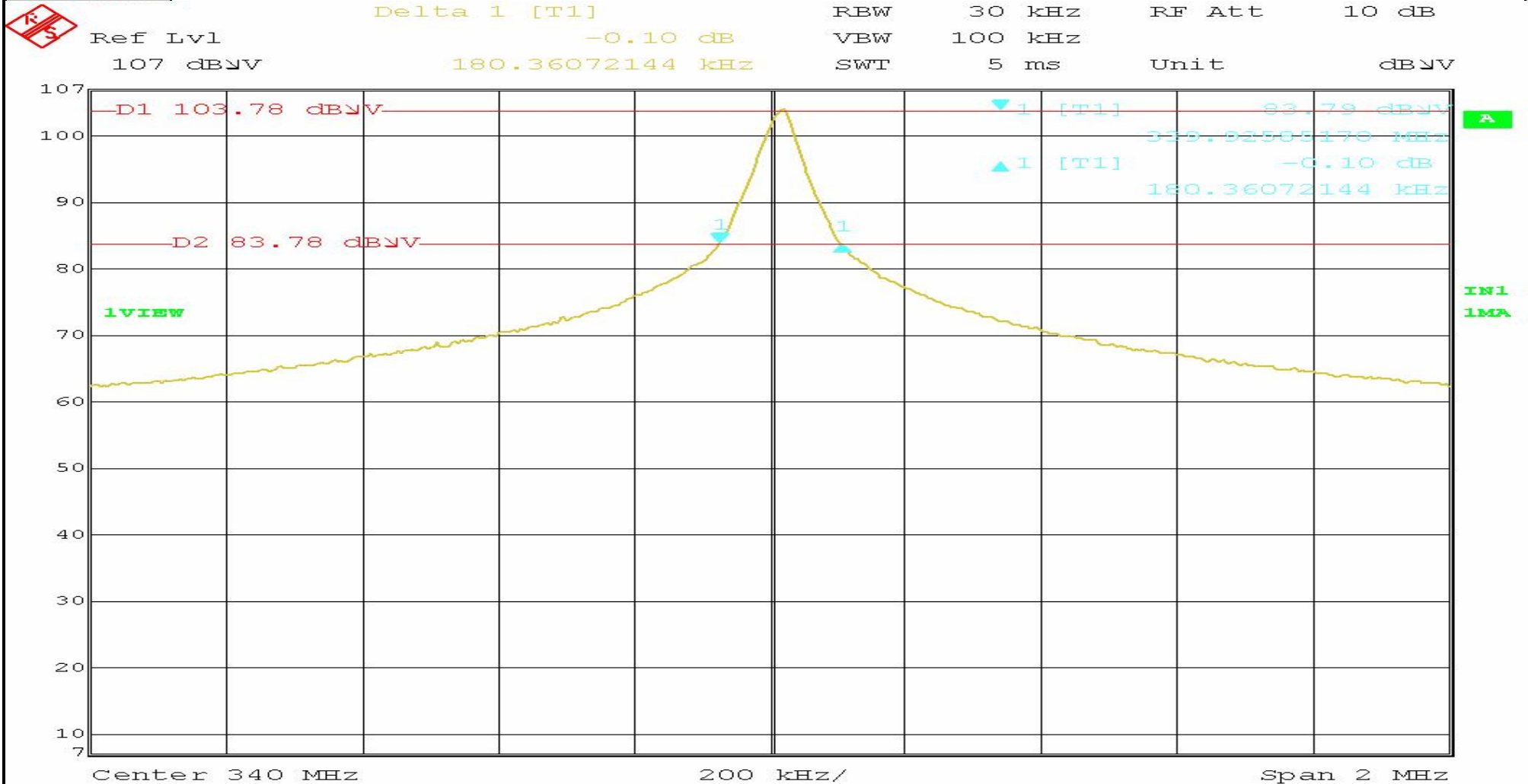
<b>Test Method:</b>	Spurious Emissions 30MHz to 3.6GHz		
<b>Customer:</b>	LPA Design	<b>Job No:</b>	R-5093N-1
<b>Test Sample:</b>	PocketWizard MiniTT1 Transceiver		
<b>Model No:</b>	TT1-C-US	<b>Serial No:</b>	006
<b>Test Specification:</b>	FCC Part 15, Subpart C Paragraph: 15.231(b)		
<b>Operating Mode:</b>	Continuously Transmitting		
<b>Technician:</b>	M. Hippert	<b>Date:</b>	11/25/2008
<b>Notes:</b>	Fundamental Frequency: 354 MHz		

[illegible]

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	LPA Design	Test Sample:	PocketWizard MiniTT1 Transceiver
Model No:	TT1-C-US	Serial No:	006
Test Specification:	FCC Part 15, Subpart C	15.231(c)	Job No: R-5093N-1
Operating Mode:	Continuously Transmitting		Technician: M. Seamans
Notes:	Transmit Frequency 340 MHz Occupied Bandwidth: 339.925 kHz		
	Date:	11/26/2008	

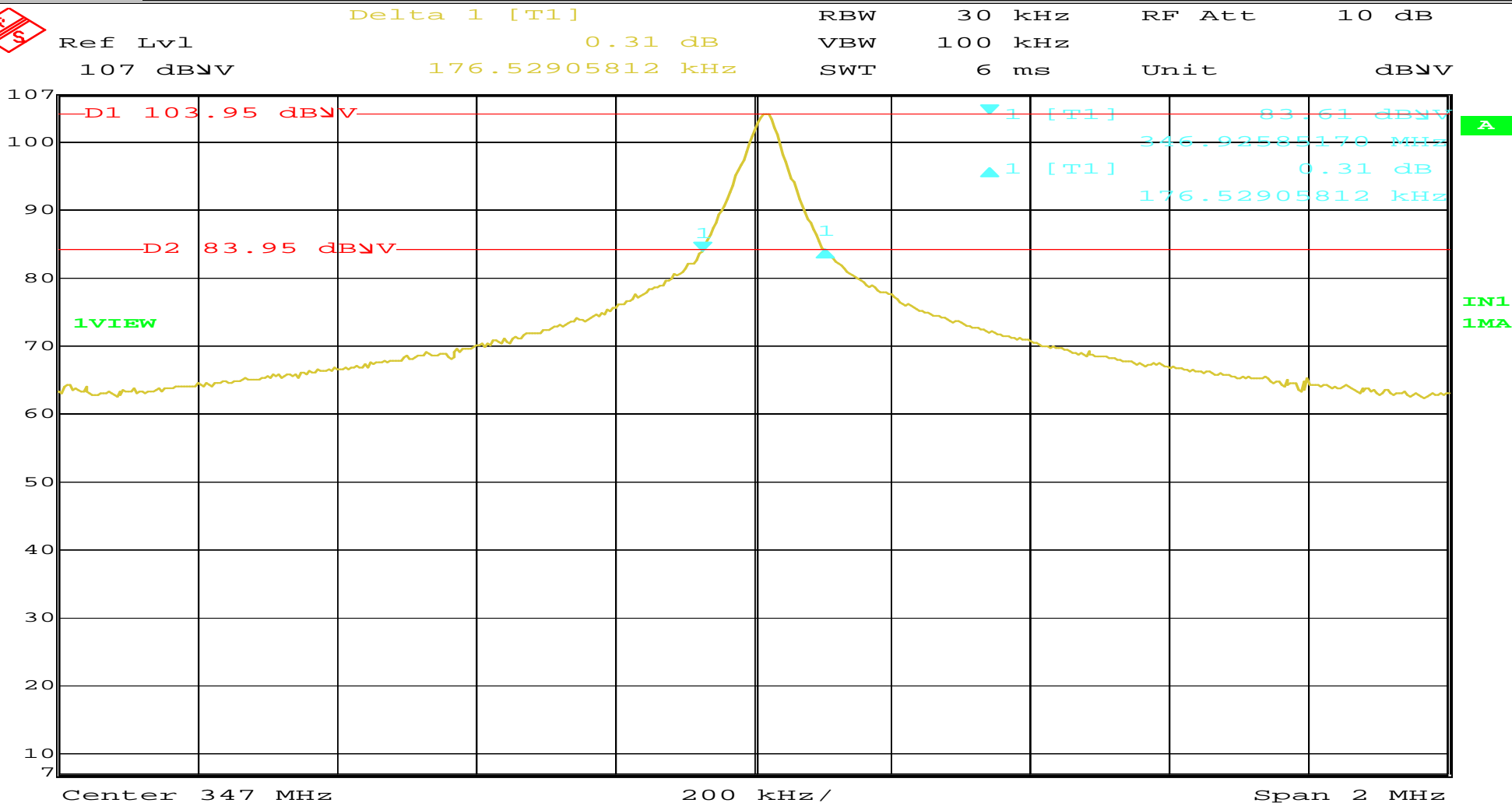


Date: 26.NOV.2008 09:51:48

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	LPA Design	Test Sample:	PocketWizard MiniTT1 Transceiver
Model No:	TT1-C-US	Serial No:	006
Test Specification:	FCC Part 15, Subpart C	15.231(c)	Job No: R-5093N-1
Operating Mode:	Continuously Transmitting		Technician: M. Seamans
Notes:	Transmit Frequency 347 MHz Occupied Bandwidth: 346.325kHz		
Date:	11/26/2008		



Date: 25.NOV.2008 16:30:08

Data Sheet 2 of 3

R-5093N-1

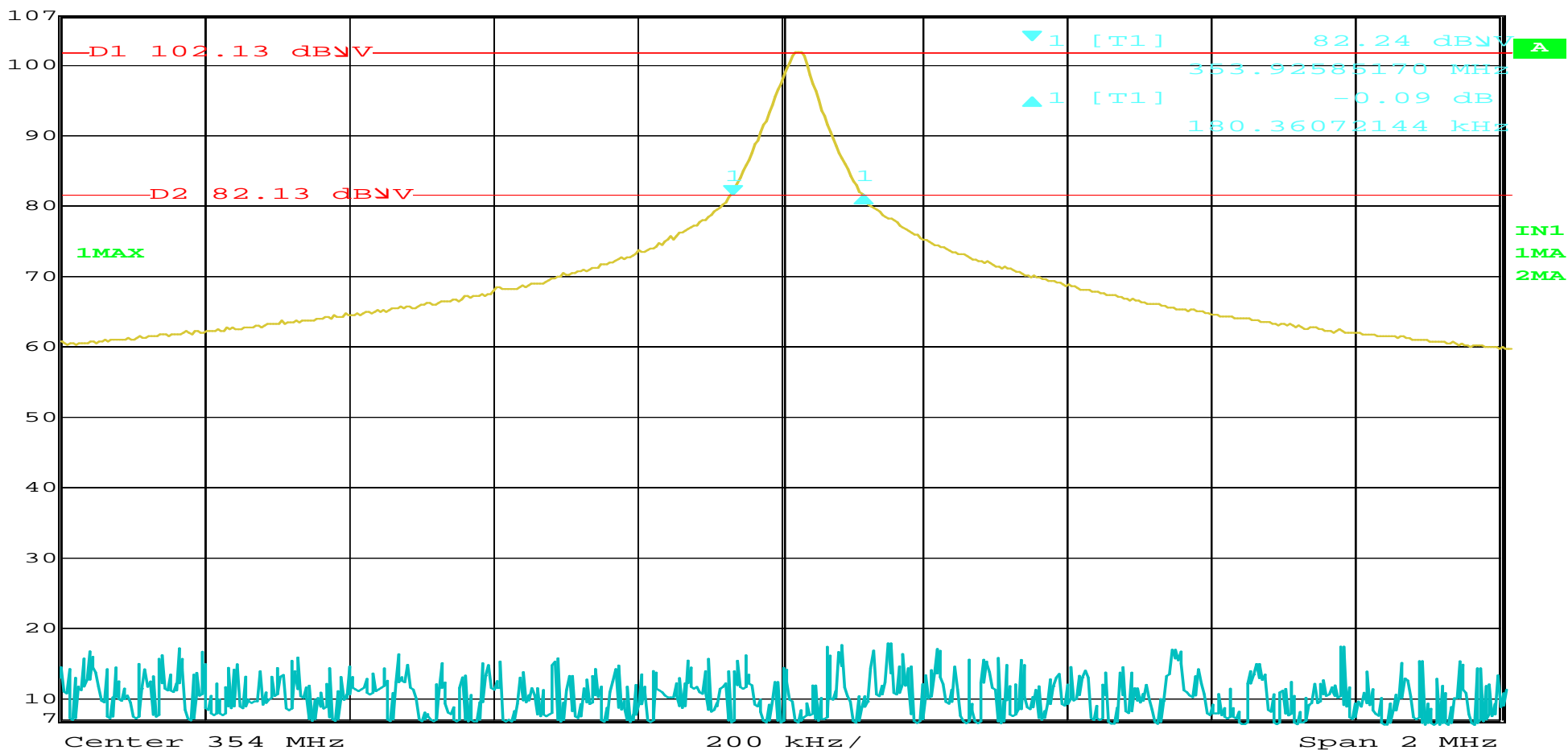
# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Occupied Bandwidth		
Customer:	LPA Design	Test Sample:	PocketWizard MiniTT1 Transceiver
Model No:	TT1-C-US	Serial No:	006
Test Specification:	FCC Part 15, Subpart C	15.231(c)	Date:
Operating Mode:	Continuously Transmitting		
Notes:	Transmit Frequency 354 MHz Occupied Bandwidth: 353.925kHz		



Delta 1 [T1] RBW 30 kHz RF Att 10 dB  
 Ref Lvl -0.09 dB VBW 100 kHz  
 107 dBμV 180.36072144 kHz SWT 6 ms Unit dBμV



Date: 25 NOV 2008 14:54:43

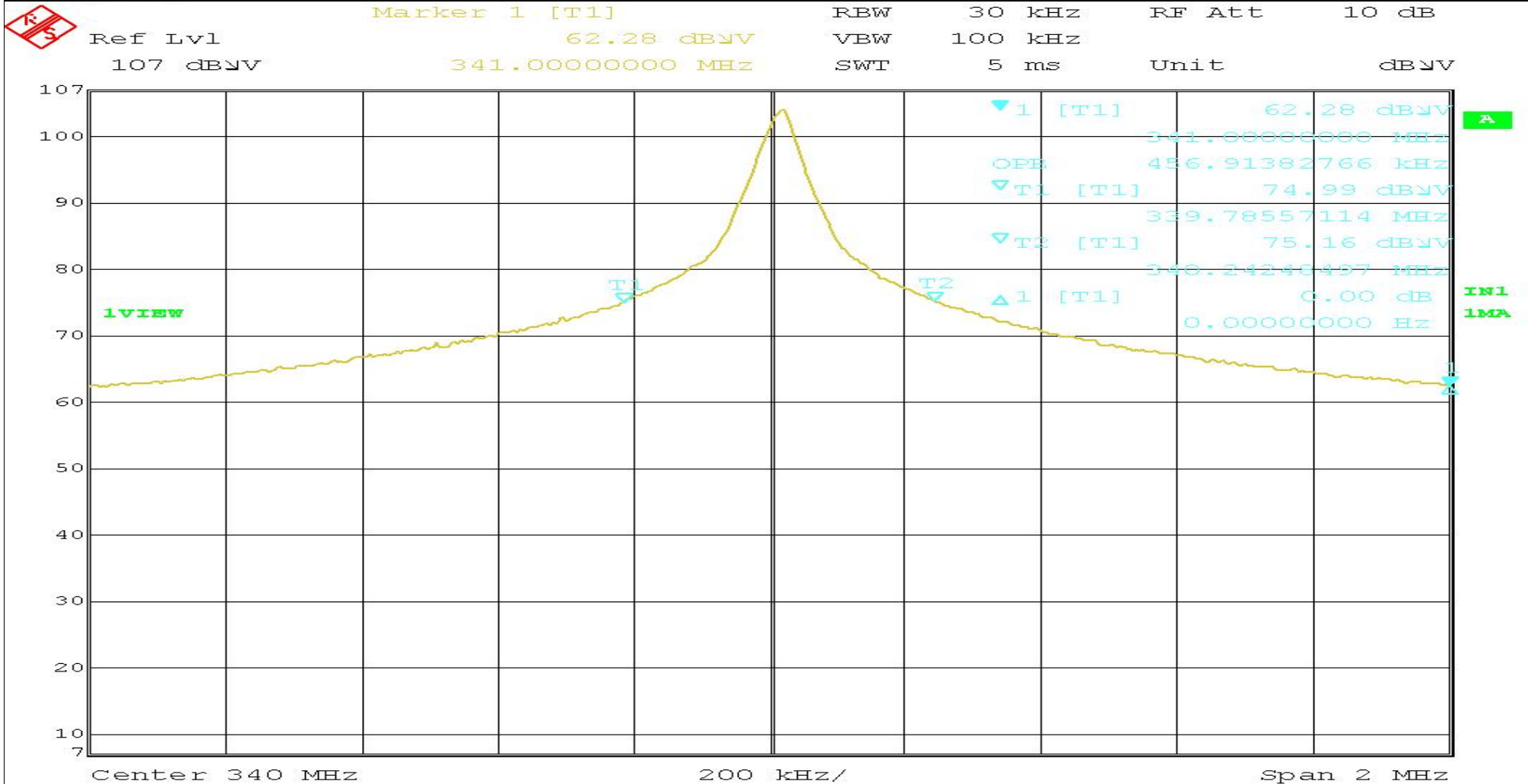
Data Sheet 3 of 3

R-5093N-1

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	99% Bandwidth		
Customer:	LPA Design	Test Sample:	PocketWizard MiniTT1 Transceiver
Model No:	TT1-C-US	Serial No:	006
Test Specification:	RSS-210		Job No:
Operating Mode:	Continuously Transmitting		Technician:
Notes:	Transmit Frequency 340.0 MHz, 99% BW 456.91382 kHz		Date:



Date: 26.NOV.2008 09:50:58

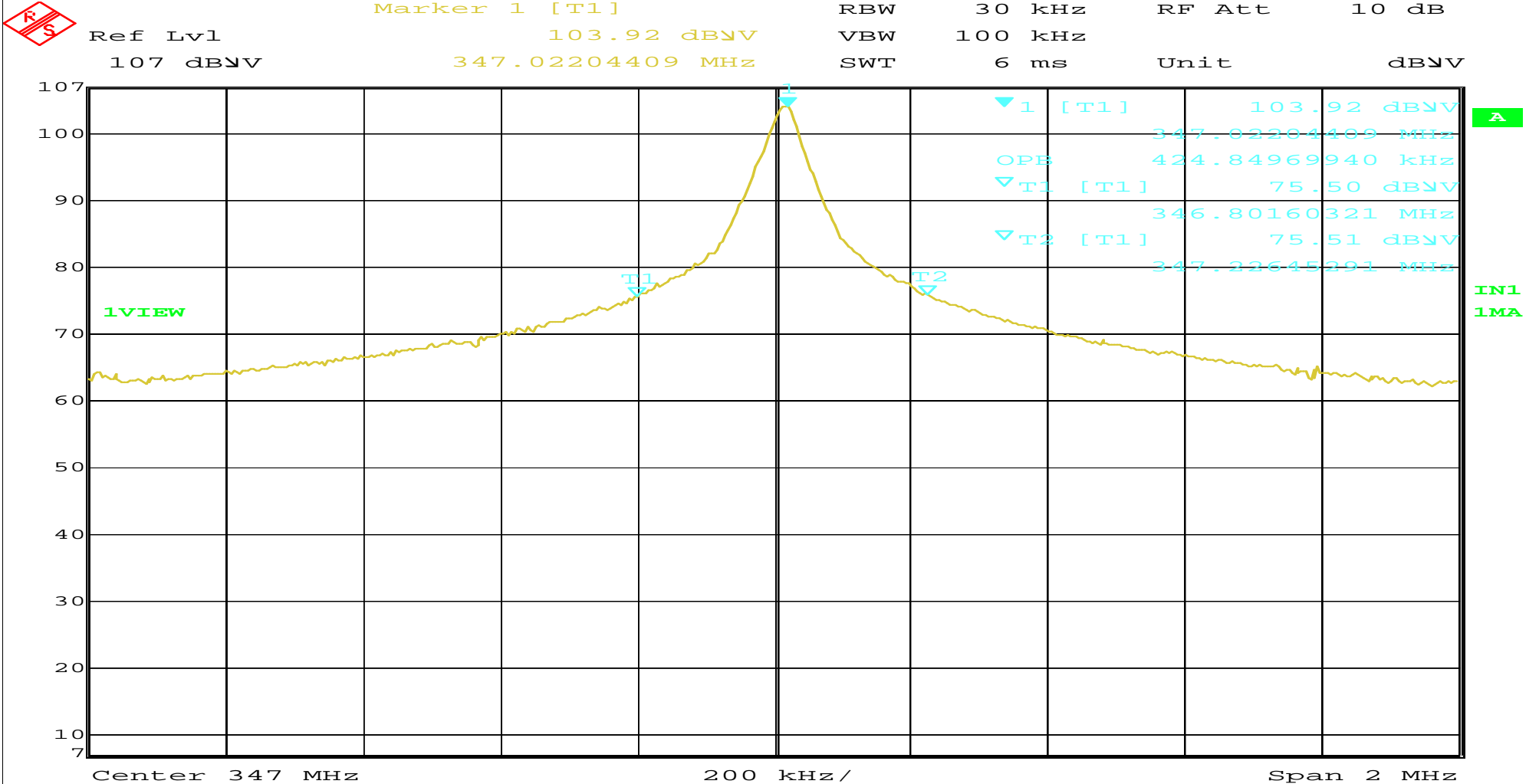
Data Sheet 1 of 3

R-5093N-1

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	99% Bandwidth		
Customer:	LPA Design	Test Sample:	PocketWizard MiniTT1 Transceiver
Model No:	TT1-C-US	Serial No:	006
Test Specification:	RSS-210		Job No:
Operating Mode:	Continuously Transmitting		Technician:
Notes:	Transmit Frequency 347.0 MHz, 99% BW 424.849 kHz		Date:



Date: 25.NOV.2008 16:27:52

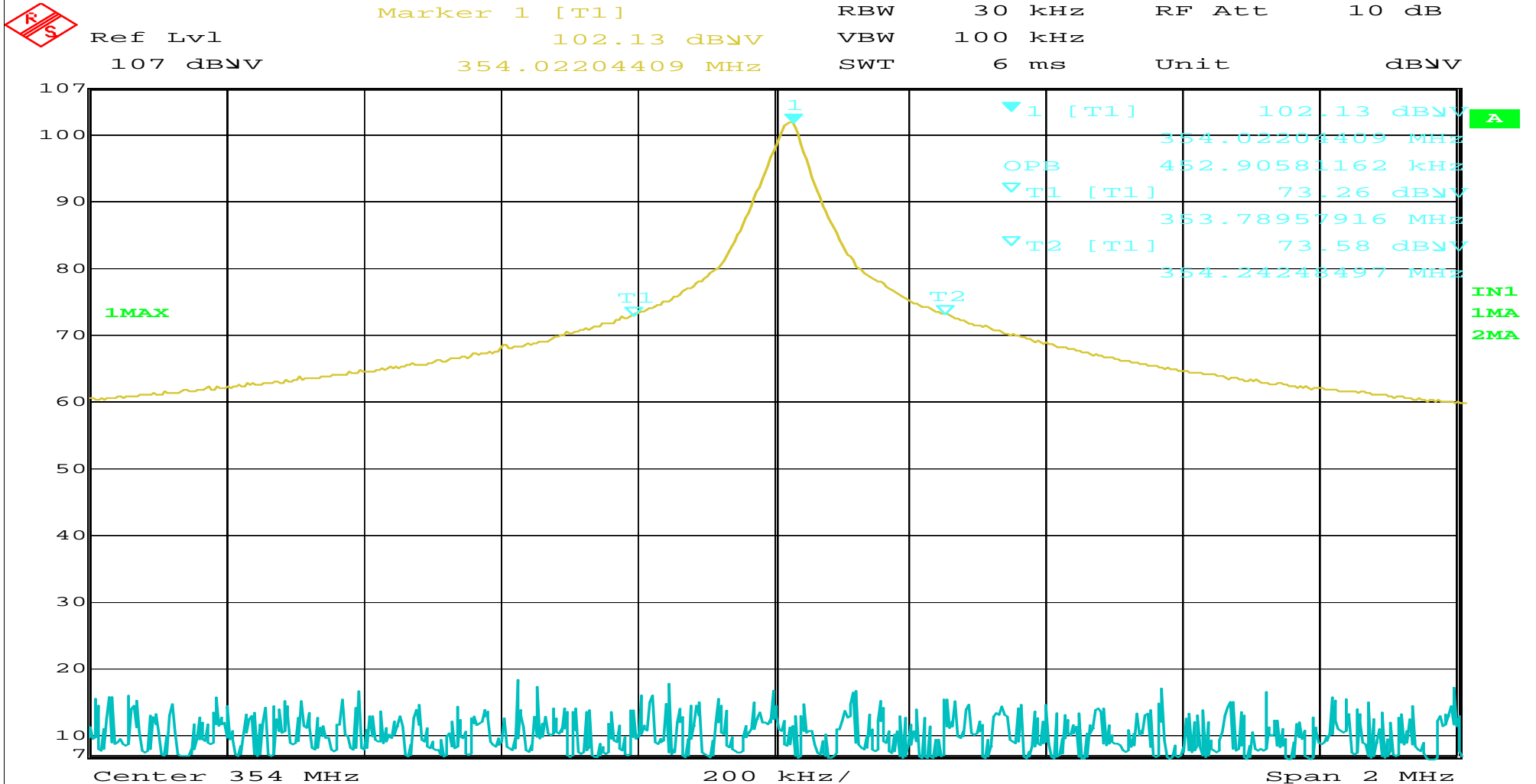
Data Sheet 2 of 3

R-5093N-1

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	99% Bandwidth		
Customer:	LPA Design	Test Sample:	PocketWizard MiniTT1 Transceiver
Model No:	TT1-C-US	Serial No:	006
Test Specification:	RSS-210		Job No:
Operating Mode:	Continuously Transmitting		Technician:
Notes:	Transmit Frequency 354.0 MHz, 99% BW 452.9058 kHz		Date:



Date: 25.NOV.2008 14:51:58

Data Sheet 3 of 3

R-5093N-1

# RETLIF TESTING LABORATORIES

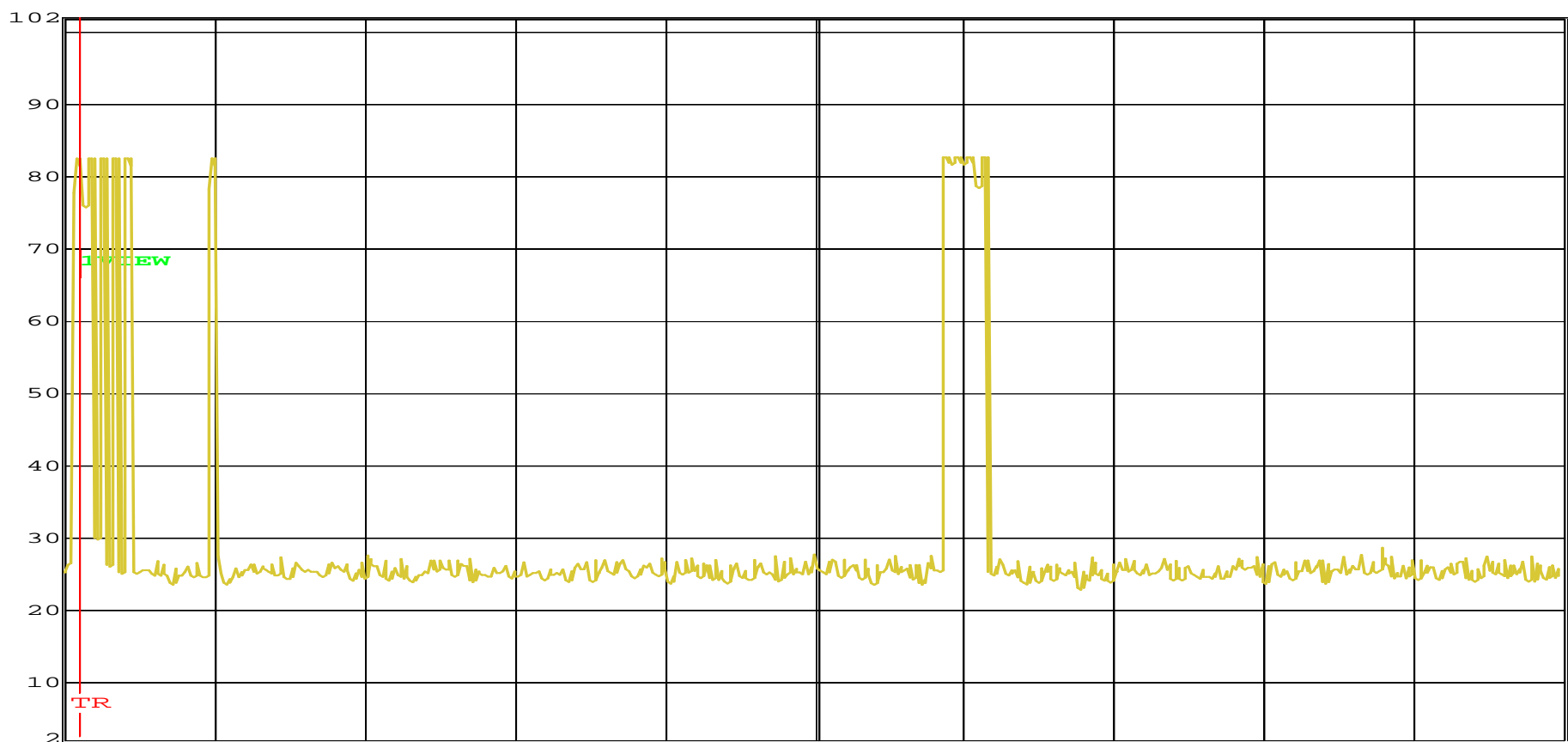
## EMISSIONS DATA SHEET

Test Method:	Duty Cycle Plots		
Customer:	LPA Design	Test Sample:	PocketWizard MiniTT1 Transceiver
Model No:	TT1-C-US	Serial No:	006
Test Specification:	FCC Part 15, Subpart C	15.231(b)	Date: 2/4/2009
Operating Mode:	Continuously Transmitting		
Notes:	Maximum Duty Cycle measured		



Ref Lvl  
102 dBμV

RBW 100 kHz RF Att 10 dB  
VBW 100 kHz  
SWT 100 ms Unit dBμV



A  
TRG  
IN1  
1MA

Center 340 MHz

10 ms/

Date: 4.FEB.2009 18:13:44

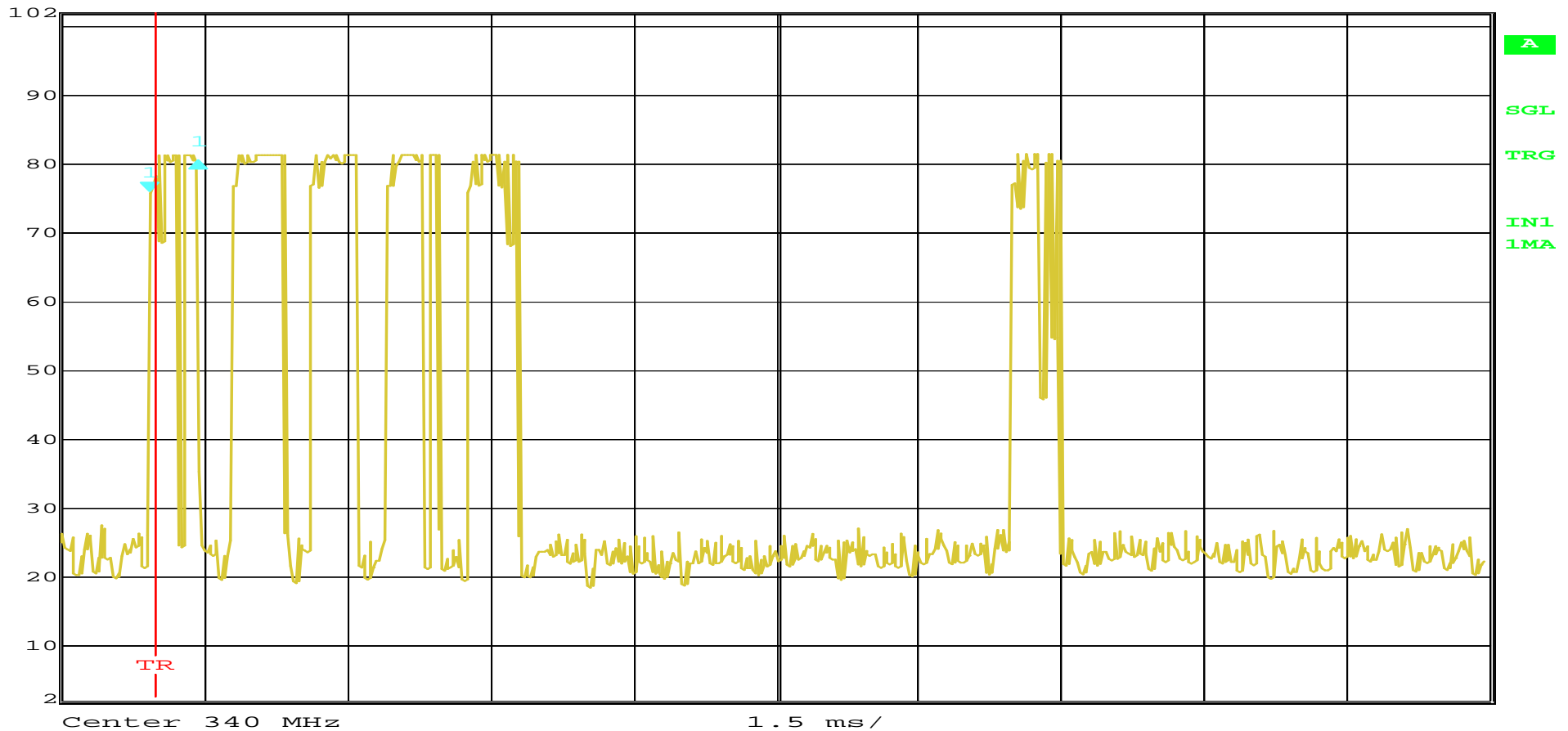
# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Duty Cycle Plots		
Customer:	LPA Design	Test Sample:	PocketWizard MiniTT1 Transceiver
Model No:	TT1-C-US	Serial No:	006
Test Specification:	FCC Part 15, Subpart C	15.231(b)	Job No: R-5093N-1
Operating Mode:	Continuously Transmitting		Technician: T. Hannemann
Notes:	Maximum Duty Cycle measured		Date: 2/4/2009



Ref Lvl 102 dBμV  
 Delta 1 [T1] 4.39 dB  
 511.022044 μs  
 RBW 100 kHz  
 VBW 100 kHz  
 SWT 15 ms  
 RF Att 10 dB  
 Unit dBμV



Date: 4.FEB.2009 18:14:52

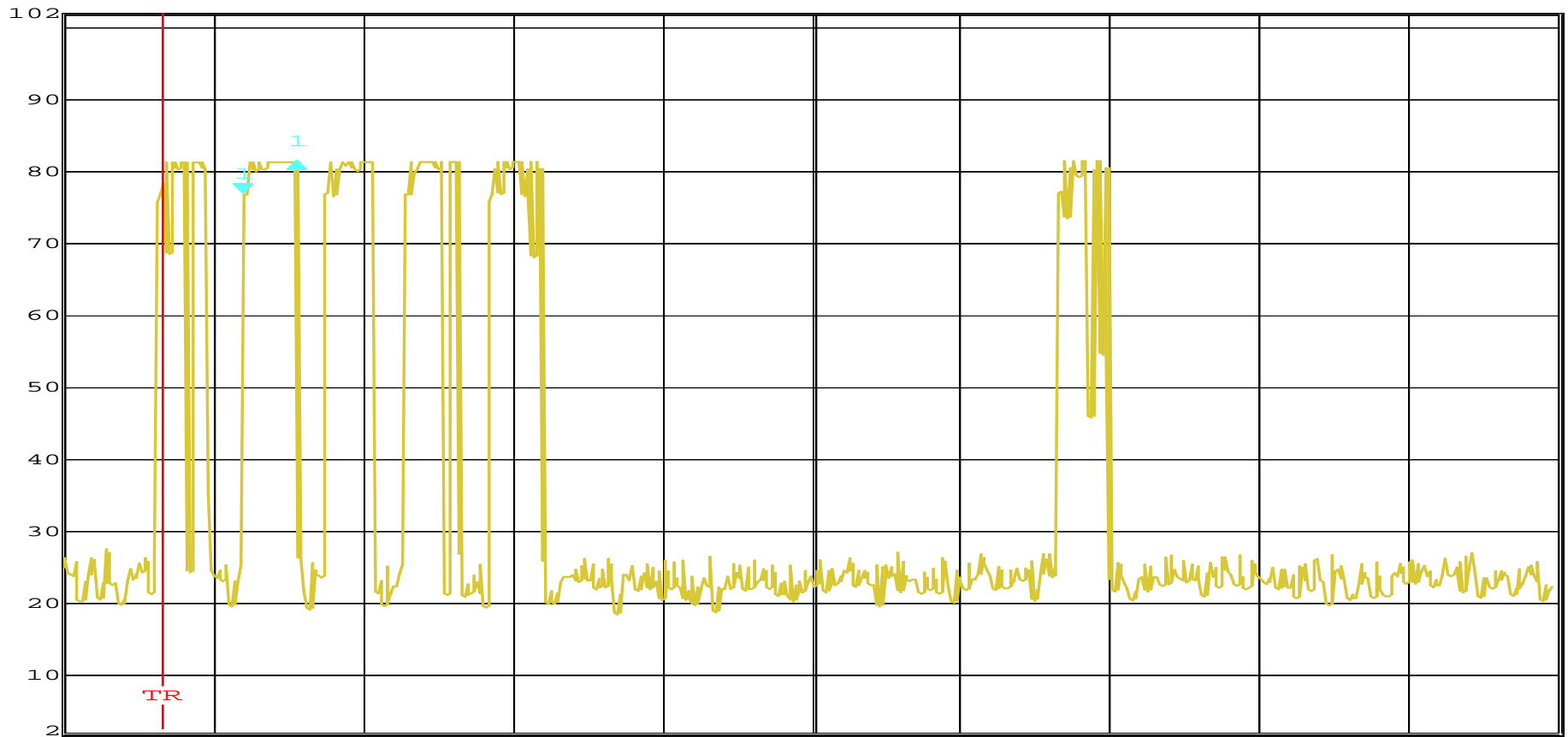
# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Duty Cycle Plots		
Customer:	LPA Design	Test Sample:	PocketWizard MiniTT1 Transceiver
Model No:	TT1-C-US	Serial No:	006
Test Specification:	FCC Part 15, Subpart C	15.231(b)	Job No: R-5093N-1
Operating Mode:	Continuously Transmitting		Technician: T. Hannemann
Notes:	Maximum Duty Cycle measured		Date: 2/4/2009



Ref Lvl 102 dBV  
 Delta 1 [T1] 4.64 dB  
 541.082164 us  
 RBW 100 kHz  
 VBW 100 kHz  
 SWT 15 ms  
 RF Att 10 dB  
 Unit dBV



Center 340 MHz 1.5 ms/

Date: 4.FEB.2009 18:15:18

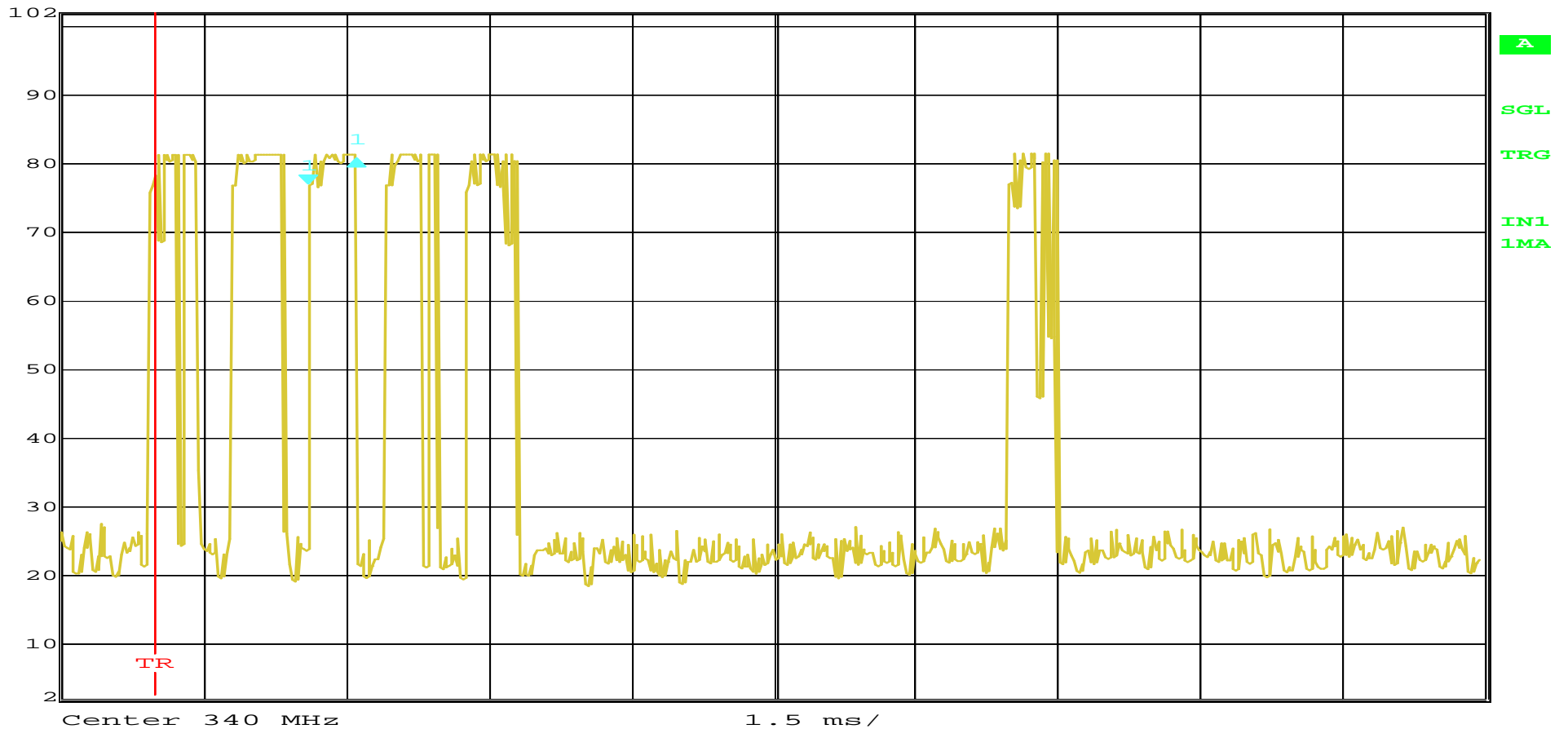
# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Duty Cycle Plots		
Customer:	LPA Design	Test Sample:	PocketWizard MiniTT1 Transceiver
Model No:	TT1-C-US	Serial No:	006
Test Specification:	FCC Part 15, Subpart C	15.231(b)	Date: 2/4/2009
Operating Mode:	Continuously Transmitting		
Notes:	Maximum Duty Cycle measured		



Ref Lvl 102 dBμV  
 Delta 1 [T1] 3.95 dB  
 511.022044 μs  
 RBW 100 kHz  
 VBW 100 kHz  
 SWT 15 ms  
 RF Att 10 dB  
 Unit dBμV



Date: 4.FEB.2009 18:19:39

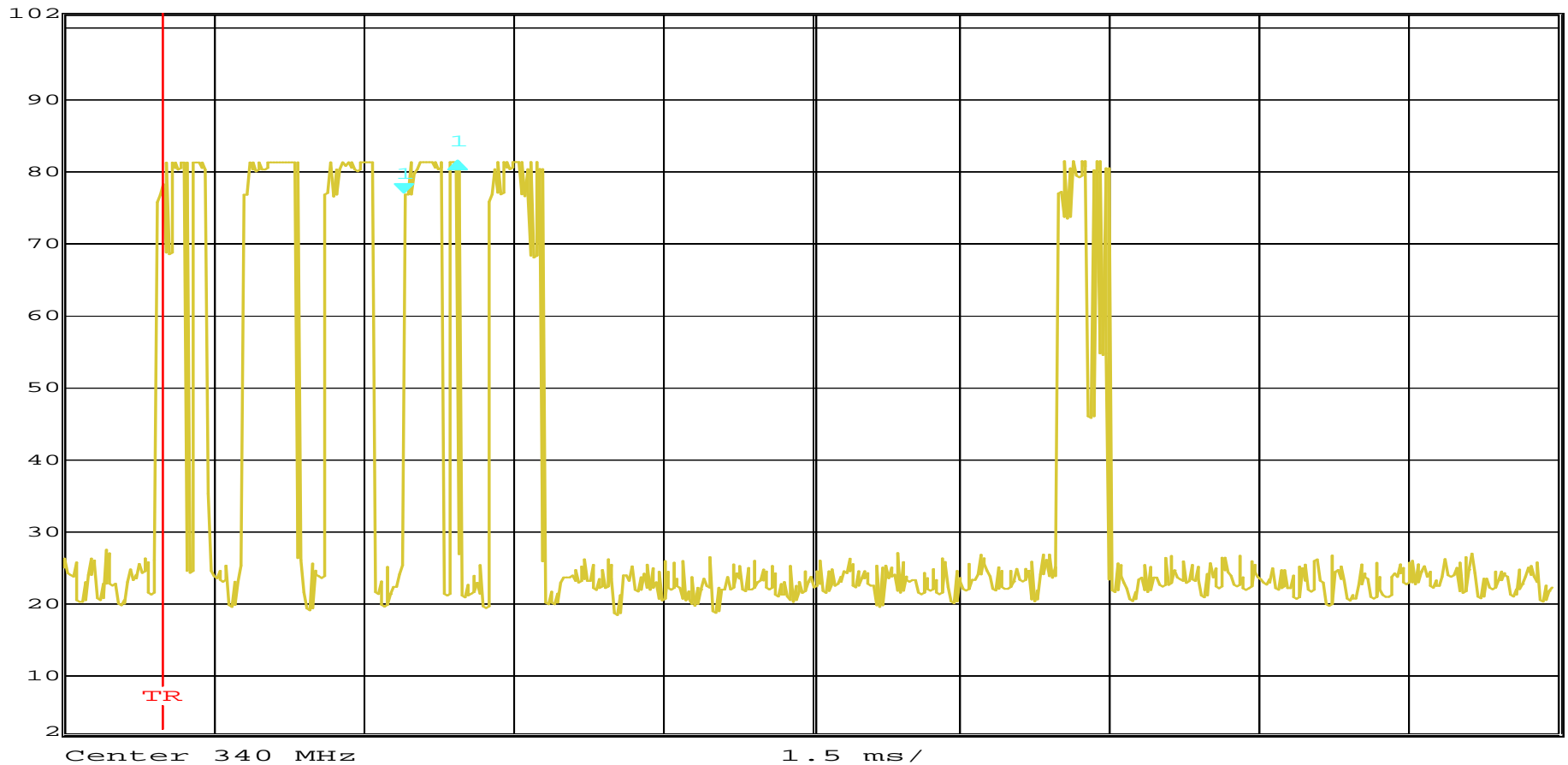
# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Duty Cycle Plots		
Customer:	LPA Design	Test Sample:	PocketWizard MiniTT1 Transceiver
Model No:	TT1-C-US	Serial No:	006
Test Specification:	FCC Part 15, Subpart C	15.231(b)	Job No: R-5093N-1
Operating Mode:	Continuously Transmitting		Technician: T. Hannemann
Notes:	Maximum Duty Cycle measured		Date: 2/4/2009



Ref Lvl 102 dBμV  
 Delta 1 [T1] 4.67 dB  
 541.082164 μs  
 RBW 100 kHz  
 VBW 100 kHz  
 SWT 15 ms  
 RF Att 10 dB  
 Unit dBμV



Date: 4.FEB.2009 18:20:12

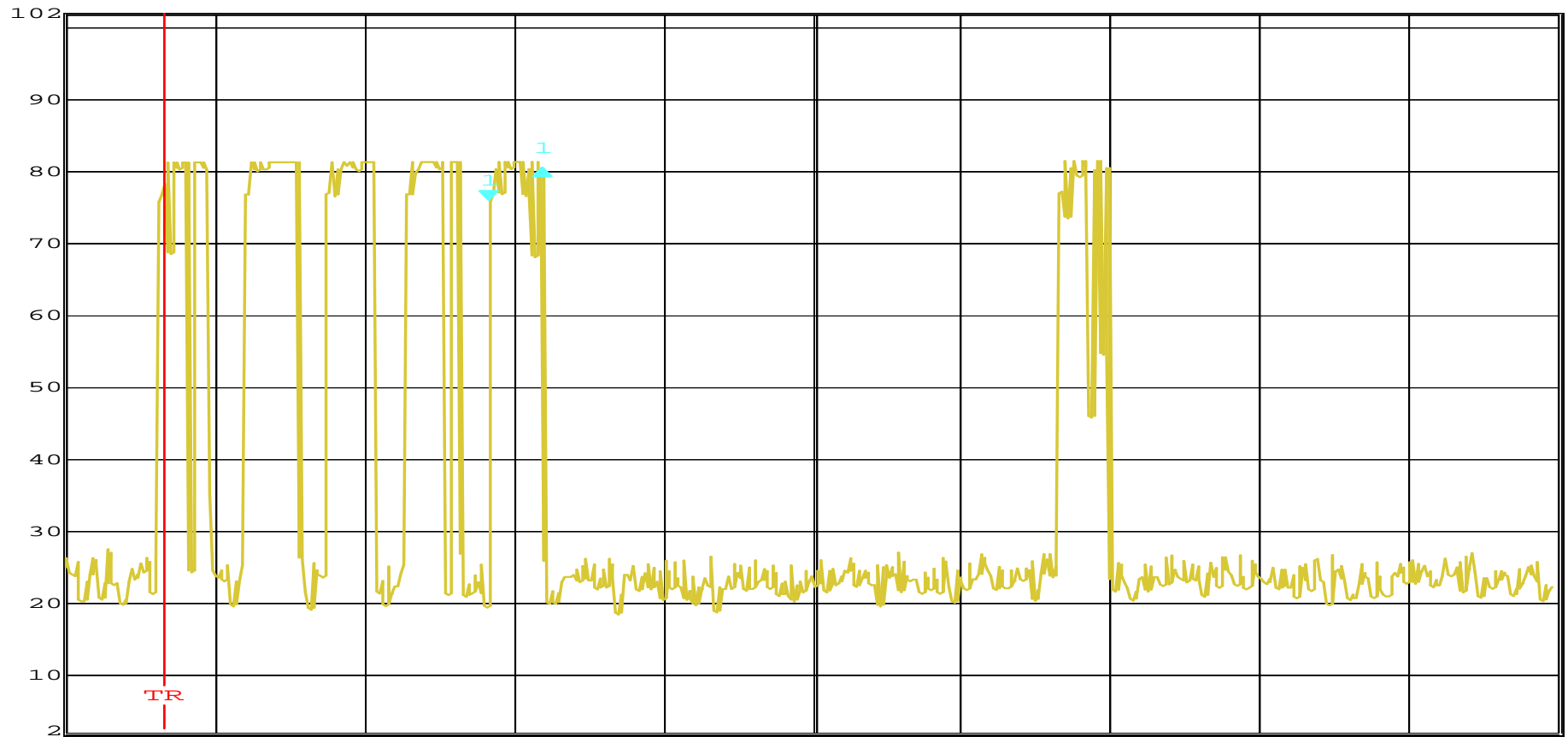
# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Duty Cycle Plots		
Customer:	LPA Design	Test Sample:	PocketWizard MiniTT1 Transceiver
Model No:	TT1-C-US	Serial No:	006
Test Specification:	FCC Part 15, Subpart C	15.231(b)	Job No: R-5093N-1
Operating Mode:	Continuously Transmitting		Technician: T. Hannemann
Notes:	Maximum Duty Cycle measured		Date: 2/4/2009



Ref Lvl 102 dBV  
 Delta 1 [T1] 4.44 dB  
 541.082164 us  
 RBW 100 kHz  
 VBW 100 kHz  
 SWT 15 ms  
 RF Att 10 dB  
 Unit dBV



Center 340 MHz 1.5 ms/

Date: 4.FEB.2009 18:20:36

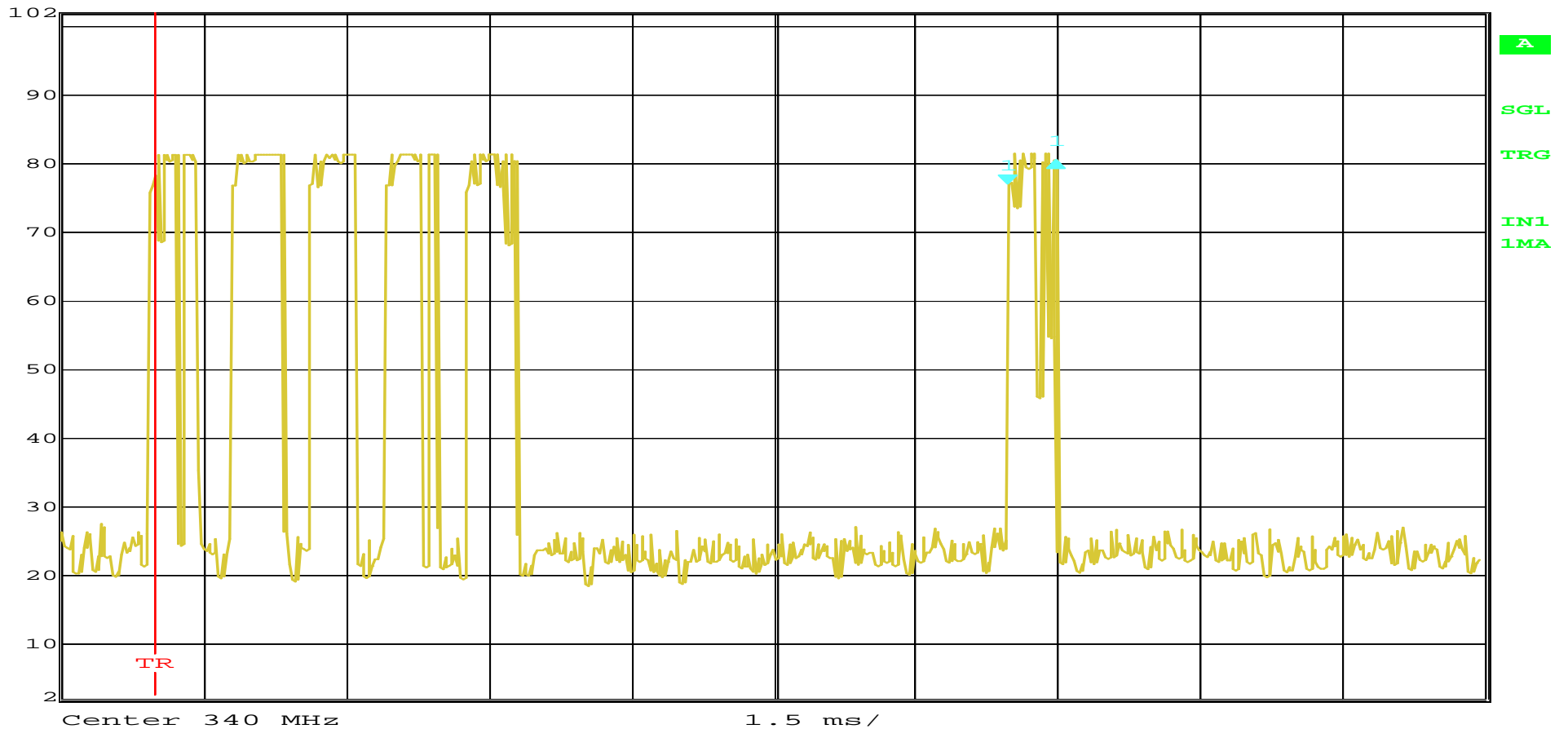
# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Duty Cycle Plots		
Customer:	LPA Design	Test Sample:	PocketWizard MiniTT1 Transceiver
Model No:	TT1-C-US	Serial No:	006
Test Specification:	FCC Part 15, Subpart C	15.231(b)	Date: 2/4/2009
Operating Mode:	Continuously Transmitting		
Notes:	Maximum Duty Cycle measured		



Ref Lvl 102 dBμV  
 Delta 1 [T1] 3.39 dB  
 511.022044 μs  
 RBW 100 kHz  
 VBW 100 kHz  
 SWT 15 ms  
 RF Att 10 dB  
 Unit dBμV



Date: 4.FEB.2009 18:21:14

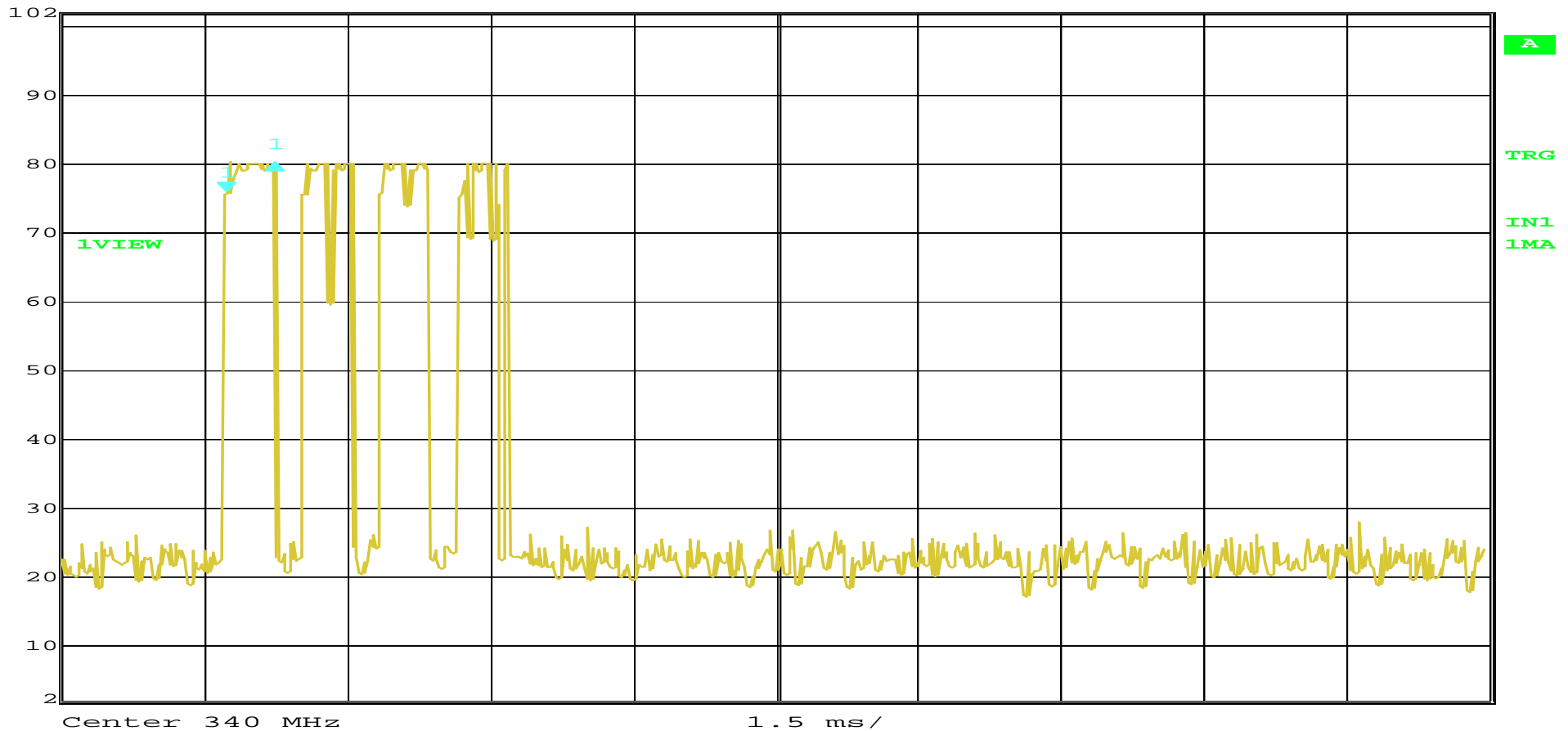
# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Duty Cycle Plots		
Customer:	LPA Design	Test Sample:	PocketWizard MiniTT1 Transceiver
Model No:	TT1-C-US	Serial No:	006
Test Specification:	FCC Part 15, Subpart C	15.231(b)	Date: 2/4/2009
Operating Mode:	Continuously Transmitting		
Notes:	Maximum Duty Cycle measured		



Ref Lvl 102 dBV  
 Delta 1 [T1] 4.07 dB  
 511.022044 us  
 RBW 100 kHz  
 VBW 100 kHz  
 SWT 15 ms  
 RF Att 10 dB  
 Unit dBV



Date: 4.FEB.2009 18:22:38

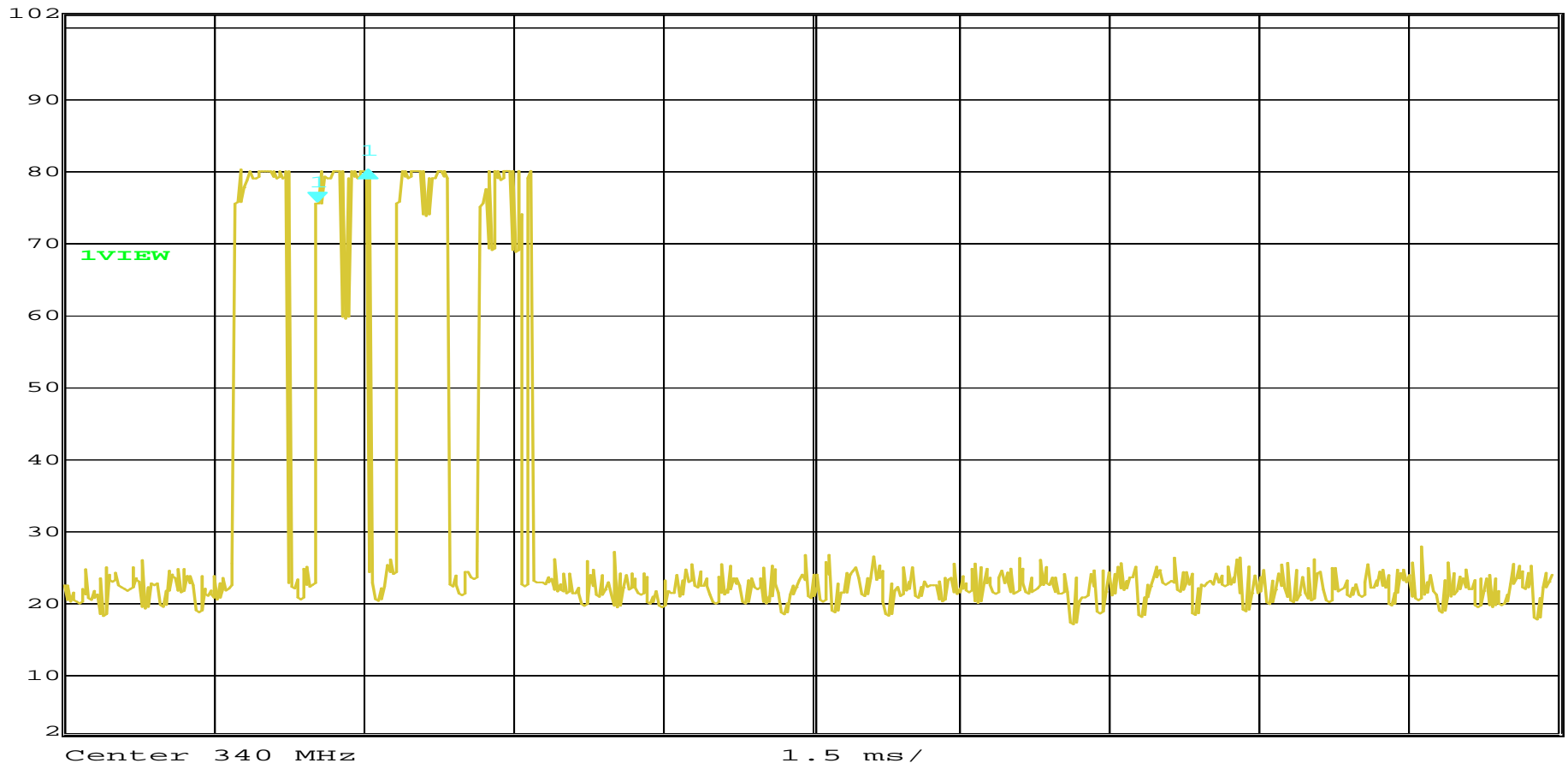
# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Duty Cycle Plots		
Customer:	LPA Design	Test Sample:	PocketWizard MiniTT1 Transceiver
Model No:	TT1-C-US	Serial No:	006
Test Specification:	FCC Part 15, Subpart C	15.231(b)	Date: 2/4/2009
Operating Mode:	Continuously Transmitting		
Notes:	Maximum Duty Cycle measured		



Ref Lvl 102 dBμV  
 Delta 1 [T1] 4.43 dB  
 511.022044 μs  
 RBW 100 kHz  
 VBW 100 kHz  
 SWT 15 ms  
 RF Att 10 dB  
 Unit dBμV



Date: 4.FEB.2009 18:23:06

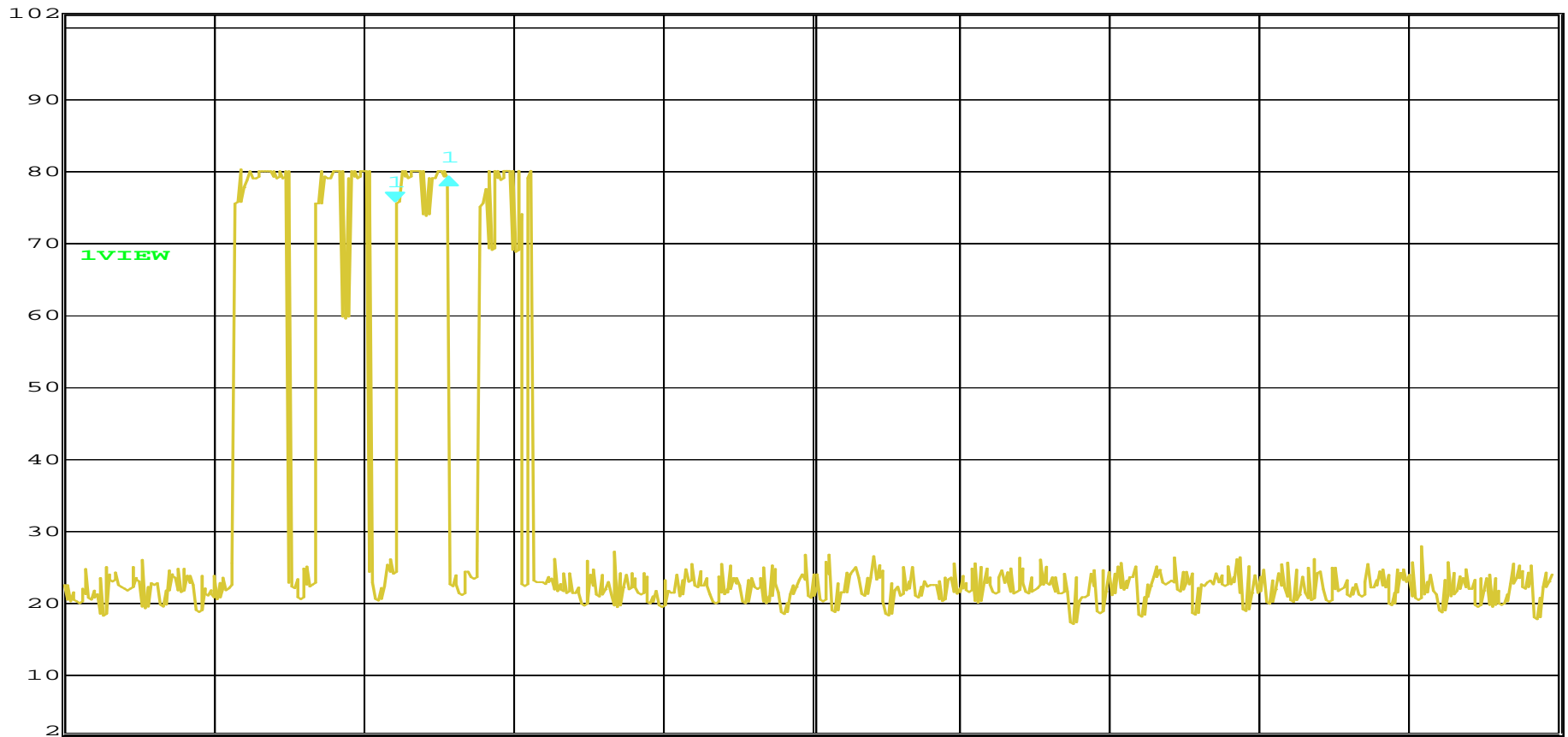
# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

Test Method:	Duty Cycle Plots		
Customer:	LPA Design	Test Sample:	PocketWizard MiniTT1 Transceiver
Model No:	TT1-C-US	Serial No:	006
Test Specification:	FCC Part 15, Subpart C	15.231(b)	Date: 2/4/2009
Operating Mode:	Continuously Transmitting		
Notes:	Maximum Duty Cycle measured		



Ref Lvl 102 dBμV  
 Delta 1 [T1] 3.52 dB  
 541.082164 μs  
 RBW 100 kHz  
 VBW 100 kHz  
 SWT 15 ms  
 RF Att 10 dB  
 Unit dBμV



Center 340 MHz 1.5 ms/

Date: 4.FEB.2009 18:23:33

## EMISSIONS DATA SHEET

Ref Lvl 102 dBV

Delta 1 [T1] 4.01 dB

RBW 100 kHz

VBW 100 kHz

SWT 15 ms

RF Att 10 dB

Unit dBV

1VIEW

1

1

Center 340 MHz

1.5 ms/

**R-5093N-1**

# RETLIF TESTING LABORATORIES

## EMISSIONS DATA SHEET

<b>Test Method:</b>	Radiated Emissions 30 MHz to 2 GHz		
<b>Customer</b>	LPA Design, Inc.	<b>Job No.</b>	R-5093N-2
<b>Test Sample</b>	PocketWizard MiniTT1 Transceiver		
<b>Model No.</b>	TT1-C-US	<b>Serial No.</b>	006
<b>Test Specification:</b>	FCC Part 15, Subpart B, Class B/RSS Gen n/a		
<b>Operating Mode:</b>	Receiving Signal at 347MHz		
<b>Technician:</b>	T. Hannemann	<b>Date:</b>	November 25, 2008
<b>Notes:</b>	Test Distance: 3 Meters Detector: Quasi-Peak<1000 MHz      Average>1000 MHz		

Test Frequency	Antenna Position	Turntable Position	Uncorrected Reading	Correction Factor	Corrected Reading					Limit at 3 Meters
MHz	(H/V) - Height	Degrees	dBuV	dB	dBuV/m					dBuV/m
30.00	-	-	-	-	-					40.0
	-	-	-	-	-					
35.00	H-1m	0.0	2.47	16.44	18.91	*				
35.00	V-1m	0.0	2.31	16.44	18.75	*				
	-	-	-	-	-					
88.00	-	-	-	-	-					40.0
88.00	-	-	-	-	-					43.5
	-	-	-	-	-					
110.00	H-1m	0.0	11.99	10.13	22.12	*				
110.00	V-1m	0.0	13.41	10.13	23.54	*				
195.00	H-1m	0.0	14.69	12.20	26.89	*				
195.00	V-1m	0.0	13.54	12.20	25.74	*				
205.00	H-1m	0.0	10.79	12.46	23.25	*				
205.00	V-1m	0.0	11.69	12.46	24.15	*				
	-	-	-	-	-					
216.00	-	-	-	-	-					43.5
216.00	-	-	-	-	-					46.0
	-	-	-	-	-					
600.00	H-1m	0.0	8.27	23.78	32.05	*				
600.00	V-1m	0.0	8.21	23.78	31.99	*				
	-	-	-	-	-					
960.00	-	-	-	-	-					46.0
960.00	-	-	-	-	-					54.0
	-	-	-	-	-					
995.00	H-1m	0.0	9.89	29.59	39.48	*				
995.00	V-1m	0.0	9.19	29.59	38.78	*				
	-	-	-	-	-					
2000.00	-	-	-	-	-					54.0

All EUT emissions observed and recorded were more than 10 db below the specified limit throughout the given frequency spectrum. \* This emission is not from the EUT. It is a measurement of minimum measurement system sensitivity (Noise Floor).