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Report of Measurements on

RF Remote Control
Model: 018-2
FCC ID: PFO018-2
IC: 7655A-0182

Customer Name: Trine Access Technology

Customer P.O.: 4135

Test Report Date: March 6, 2008

Test Report No.: R-4971N

Test Start Date: February 8, 2008

Test Finish Date: February 8, 2008

Test Technician: Matthew Seamans

Test Engineer: Scott Wentworth

Supervisor: Todd Hannemann

Results Prepared By: Jamie Ramsey

Government Source Inspection: N/A

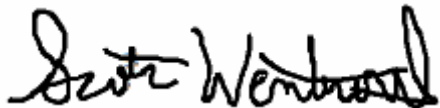
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We certify that these Test Results are true results obtained from the tests of the equipment stated, and relates only to the equipment tested. We further certify that the measurements shown in this Test Results package were made in accordance with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



Todd Hannemann
Laboratory Supervisor



Scott Wentworth
Branch Manager

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Test Report No. R-4971N
FCC ID: PFO018-2 IC: 7655A-0182

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 8, 2008	Original Release



Retlif Testing Laboratories

Test Report No. R-4971N
FCC ID: PFO018-2 IC: 7655A-0182

Test Program Summary

Job Number: R-4971N
Customer: Trine Access Technology
Address: 1440 Ferris Place
Bronx, NY 10461
Test Sample: RF Remote Control
Part Number: N/A
Model Number: 018-2
Serial Number: N/A
Type: RF Remote Control Transmitter
Power Requirements: 12VDC Internal Battery
Frequency Operation: 315.0MHz
Modulation: OOK (On/Off Keying)
Type of Transmission: Control Signal (Pulse Recognition Codes)
Application: Remote Control of Devices
Frequencies Tested: 315.0 MHz

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 018-2 Transmitter with 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
2/8/08	15.231(b)/RSS-210 Annex 1, Spurious Radiated Emissions (30MHz to 3.2GHz)	Complied
2/8/08	15.231(b)/RSS-210 Annex 1, Field Strength of Fundamental	Complied
2/8/08	15.231(c) Occupied Bandwidth, 0.25% of Fundamental Frequency	Complied
2/8/08	RSS-210, Annex 1, A1.1.3, 99% Bandwidth	Complied
2/8/08	Duty Cycle Determination	N/A

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Test Sample Operation:

The device is normally manually operated and transmits a control signal for remote control of another device. 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 uses an internal PCB loop antenna.
- The fundamental field strength of 315.0MHz did not exceed 6042 $\mu\text{V}/\text{M}$ (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 604.2 $\mu\text{V}/\text{M}$ or 500 $\mu\text{V}/\text{M}$ as applicable for a fundamental frequency of 315.0 MHz. No harmonic or spurious emissions were observed above the third harmonic 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 device operates at 315 MHz. The 20dB bandwidth and 99% bandwidth of emissions did not exceed 0.25% of the center operating frequency.



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Determination of Field Strength Limits:

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

Fundamental Frequency: 315.0MHz

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:

$$\begin{aligned} 41.6667(F) - 7083.3333 &= \text{Field Strength Limit } (\mu\text{V/m}) \\ 41.6667 \times 315 &= 13125.011 \\ 13125.011 - 7083.3333 &= 6042 \\ \text{Field Strength Limit} &= 6042\mu\text{V/m} = 75.62\text{dBuV/M} \end{aligned}$$

The maximum permitted unwanted emission level is 20dB below the maximum permitted fundamental level which equals $604.2\mu\text{V/m} = 55.62\text{dBuV/M}$.

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 cycle time exceeded 100msec therefore 100msec was used as the cycle time. The on times were determined as follows:

In the worst case duty cycle there were 40 individual pulses within the 100msec period. Each pulse duration was measured and pulse durations were summed in order to obtain the total "on time".

Fundamental Frequency: 315 MHz

$$\begin{aligned} \text{Transmitter On Time} &= 33.306\text{milliseconds} \\ \text{Transmitter Cycle Time} &= 100\text{milliseconds} \\ \text{Transmitter Duty Cycle} &= 33.306\% \\ \text{On Time divided by Cycle Time} &= \text{Duty Cycle Factor} \\ 33.306 \text{ divided by } 100 &= 0.33306 \\ 0.33306 \text{ converted to dB } (\text{LOG}_{10} .33306)20 &= -9.5 \\ \text{Duty Cycle Factor} &= \text{-9.5dB} \end{aligned}$$

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



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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 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 315 MHz was 83.46dBuV/M which met the peak limit of 95.62dBuV. The maximum average field strength at 315 MHz was 73.91dBuV which met the specified average limit of 75.62dBuV. Harmonic/spurious frequencies did not exceed the specified limit of 500uV or 604uV as applicable.

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 as follows:

Fundamental Frequency	=	315MHz
0.25% of Center Frequency	=	0.788MHz
0.788 divided by 2	=	0.394MHz
Bandwidth Range	=	Fundamental Frequency + and – 0.394MHz
315MHz – 0.394MHz	=	314.606MHz
315MHz + 0.394MHz	=	315.394MHz
Bandwidth Range	=	314.606MHz – 315.394MHz

Test Results: The bandwidth of the emission at 315 MHz was less than 0.25% of the center frequency and met the requirements of 15.231 (c).



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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 315 MHz 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
Radiated Emissions
30MHz to 1GHz**



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Test Report No. R-4971N
FCC ID: PFO018-2 IC: 7655A-0182

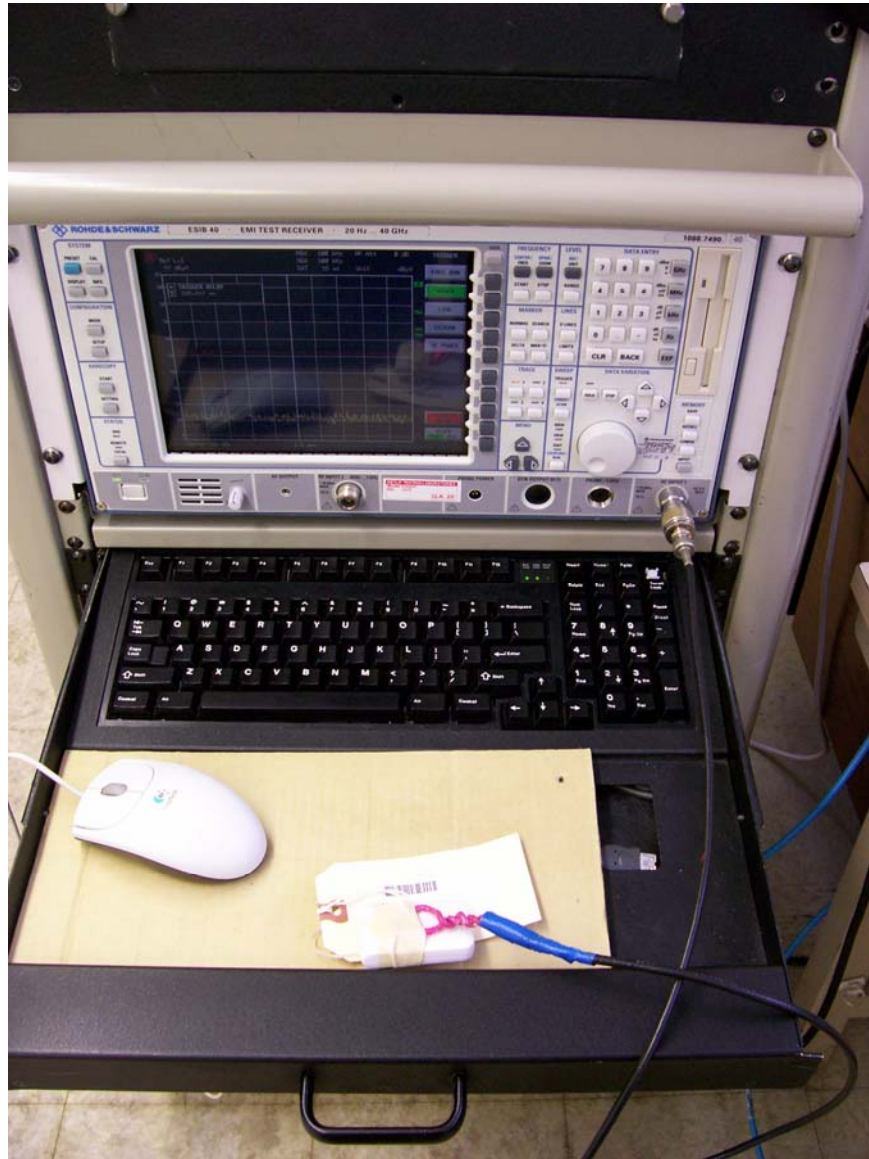
**Test Photograph
Radiated Emissions
1GHz to 3.2GHz**



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Test Report No. R-4971N
FCC ID: PFO018-2 IC: 7655A-0182

Test Photograph
Occupied Bandwidth/99% Bandwidth/Duty Cycle



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Equipment Lists

Fundamental & Spurious Radiated Emissions

FCC/IC Testing

EN	Type	Manufacturer	Description	Model No.	Cal Date	Due Date
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
4029B	Test Site Attenuation	Retlif	3 / 10 Meters	RNH	6/20/2007	6/20/2008
5053	Biconilog	EMCO	26 MHz - 3 GHz	3142C	10/4/2007	10/4/2008
5070	EMI Test Receiver	Rohde & Schwarz	20Hz - 40GHz	ESIB40	12/7/2007	12/7/2008

Occupied Bandwidth/99% Bandwidth & Duty Cycle

FCC/IC Testing

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



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Test Data



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Test Report No. R-4971N
FCC ID: PFO018-2 IC: 7655A-0182

RETLIF TESTING LABORATORIES

TABULAR DATA SHEET

Test Method:	Fundamental Field Strength		
Customer:	Trine Access Technology	Job No:	R-4971N
Test Sample:	RF Remote Control		
Model No:	018-2	Serial No:	A
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.231(b)		
Operating Mode:	Transmitting Signal		
Technician:	M.Seamans	Date:	February 8, 2008
Notes:	Corrected peak readings meet peak limit (20dB above average limit) per 15.35		

[illegible]

RETLIF TESTING LABORATORIES

TABULAR DATA SHEET

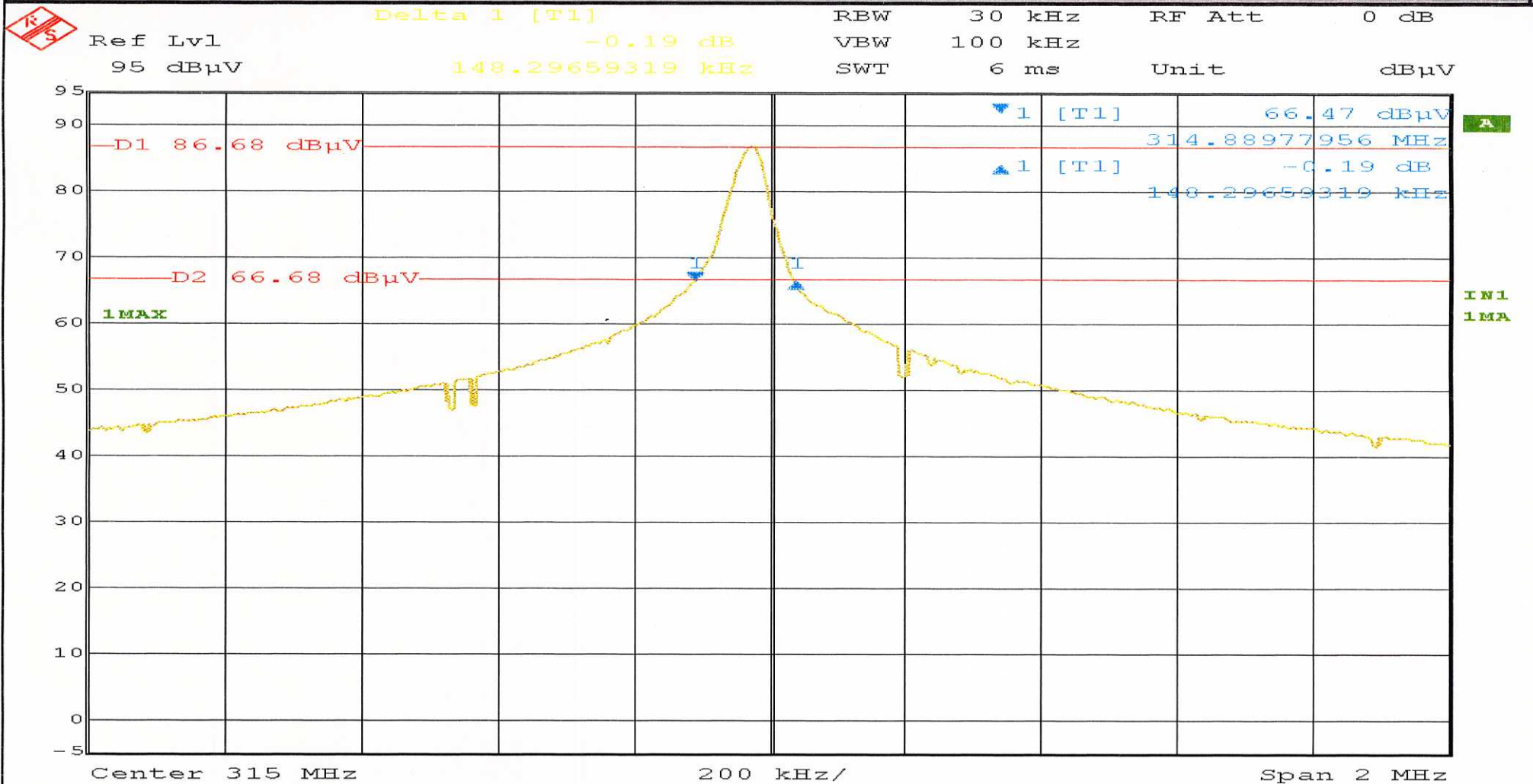
Test Method:	Spurious Emissions 30MHz to 3.2GHz		
Customer:	Trine Access Technology	Job No:	R-4971N
Test Sample:	RF Remote Control		
Model No:	018-2	Serial No:	A
Test Specification:	FCC Part 15, Subpart C Paragraph: 15.231(b)		
Operating Mode:	Transmitting Signal		
Technician:	M.Seamans	Date:	2/8/2008
Notes:	Fundamental Frequency: 315 MHz		

[illegible]

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

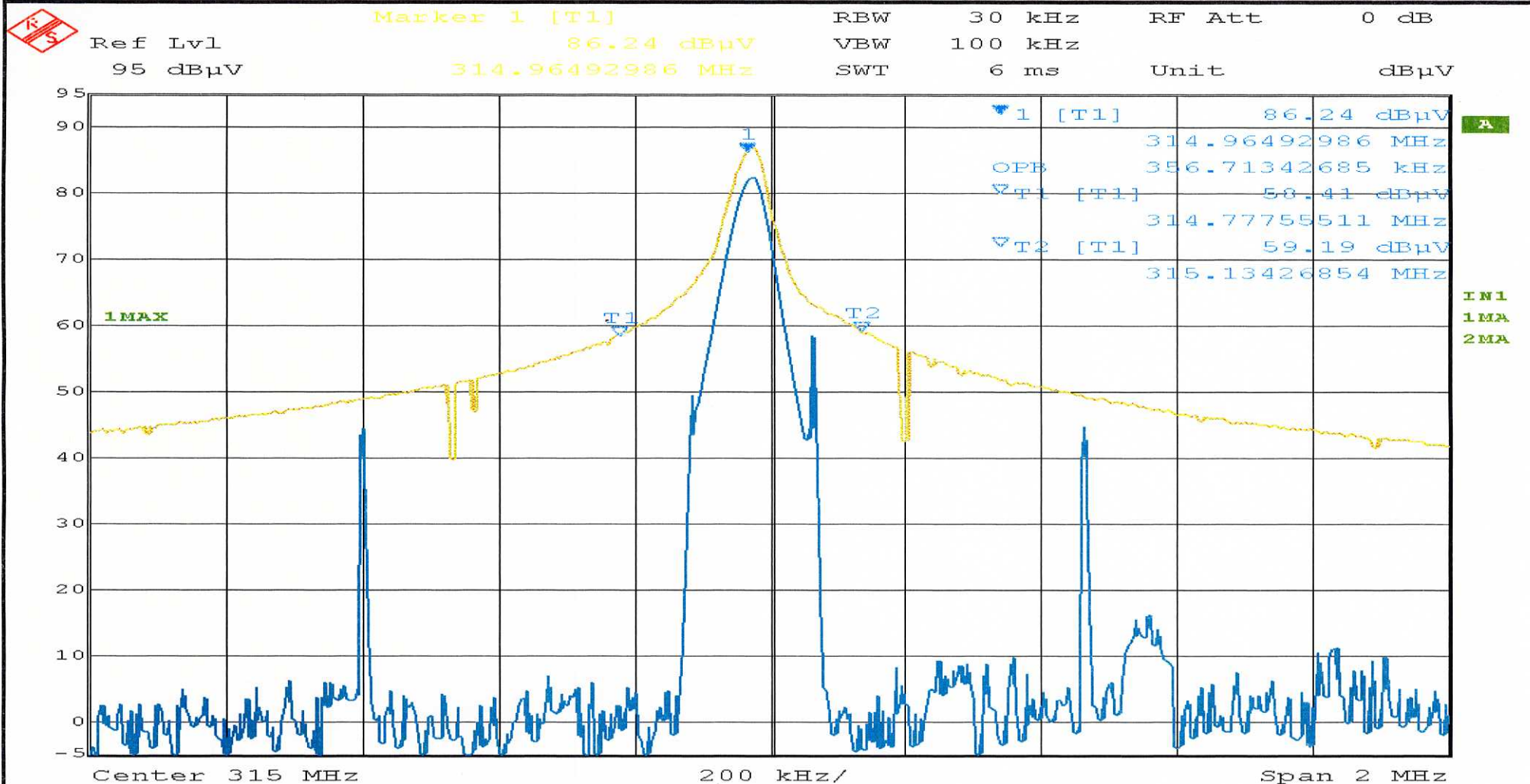
Test Method:	Occupied Bandwidth		
Customer:	Trine Access Technology	Test Sample:	RF Remote Control
Model No:	018-2	Serial No:	A
Test Specification:	FCC Part 15, Subpart C	15.231(c)	Job No: R-4971N
Operating Mode:	Transmitting Signal		Technician: M. Seamans
Notes:	Transmit Frequency 315 MHz Occupied Bandwidth: 148.29kHz		Date: 2/8/2008



RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	99% Bandwidth		
Customer:	Trine Access Technology	Test Sample:	RF Remote Control
Model No:	018-2	Serial No:	A
Test Specification:	RSS-210		Job No:
Operating Mode:	Transmitting Signal		Technician:
Notes:	Transmit Frequency 315 MHz, 99% Occupied Bandwidth: 356.71 kHz		Date:



RETLIF TESTING LABORATORIES

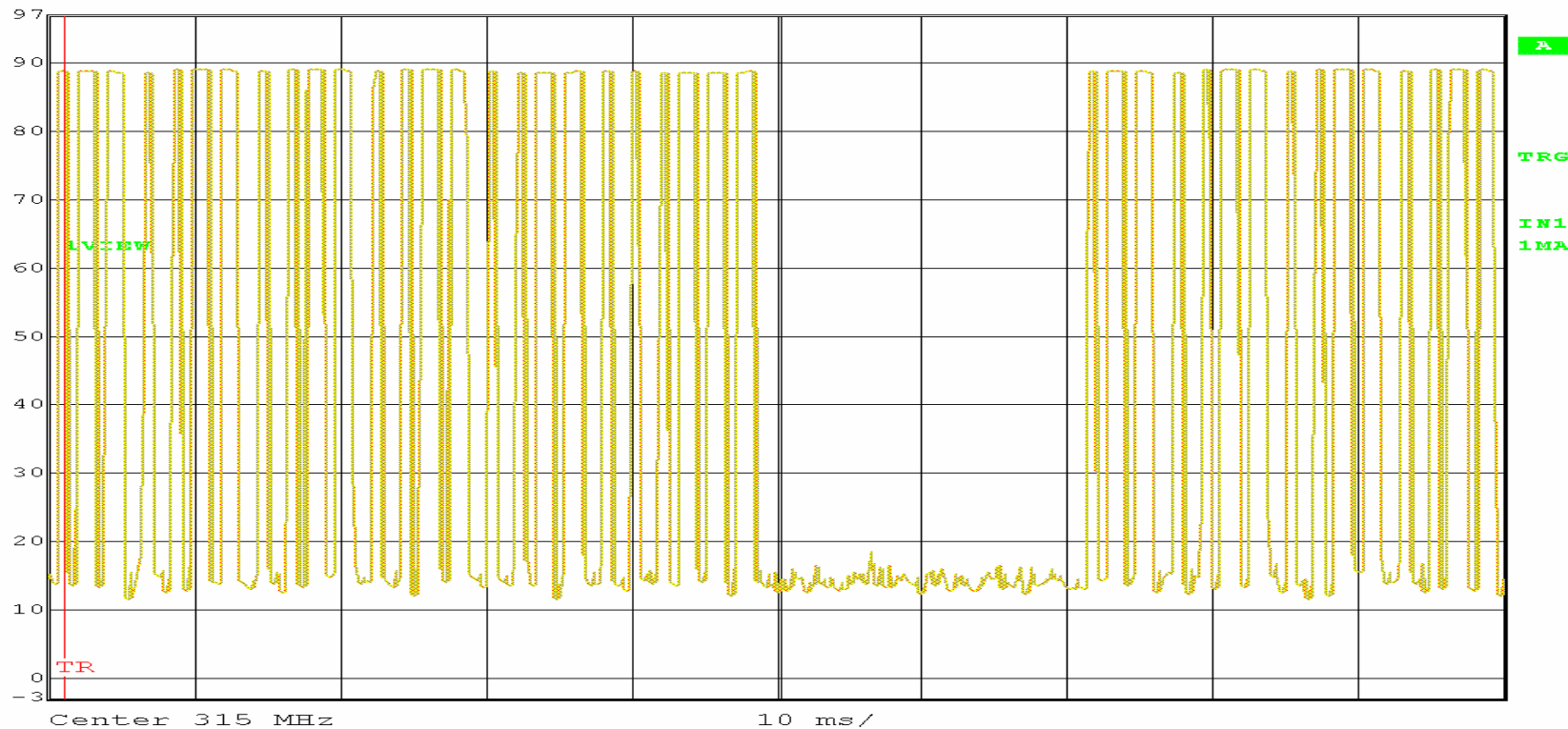
EMISSIONS DATA SHEET

Test Method:	Duty Cycle Plots		
Customer:	Trine Access Technology	Test Sample:	RF Remote Control
Model No:	018-2	Serial No:	A
Test Specification:	FCC Part 15, Subpart C	15.231(b)	Date:
Operating Mode:	Transmitting Signal		
Notes:	Fundamental Frequency: 315 MHz		



Ref Lvl
97 dBμV

RBW 100 kHz RF Att 0 dB
VBW 100 kHz
SWT 100 ms Unit dBμV

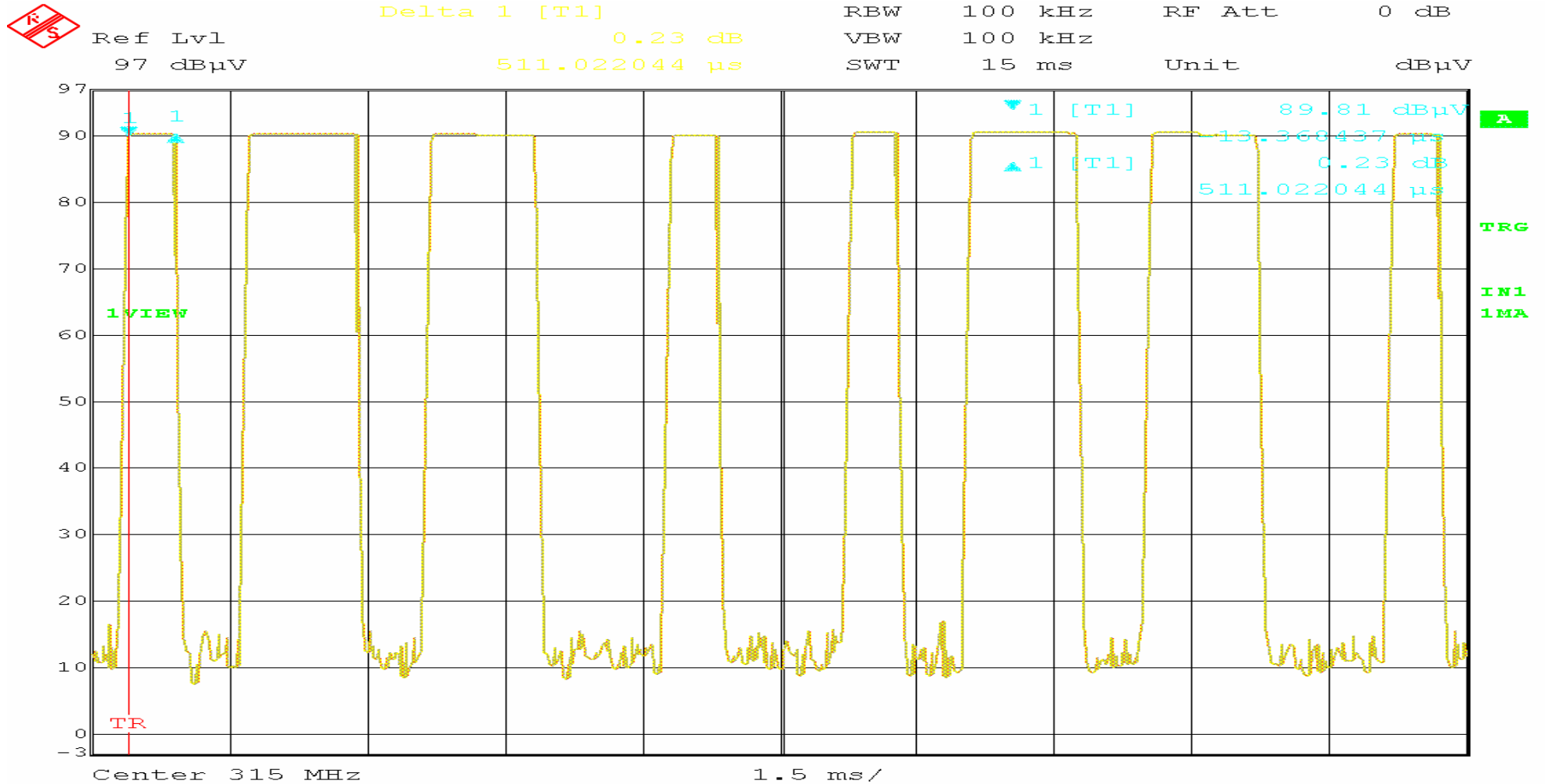


Date: 8.FEB.2008 14:21:36

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Duty Cycle Plots		
Customer:	Trine Access Technology	Test Sample:	RF Remote Control
Model No:	018-2	Serial No:	A
Test Specification:	FCC Part 15, Subpart C	15.231(b)	Job No: R-4971N
Operating Mode:	Transmitting Signal		Technician: M. Seamans
Notes:	Fundamental Frequency: 315 MHz		Date: 2/8/2008

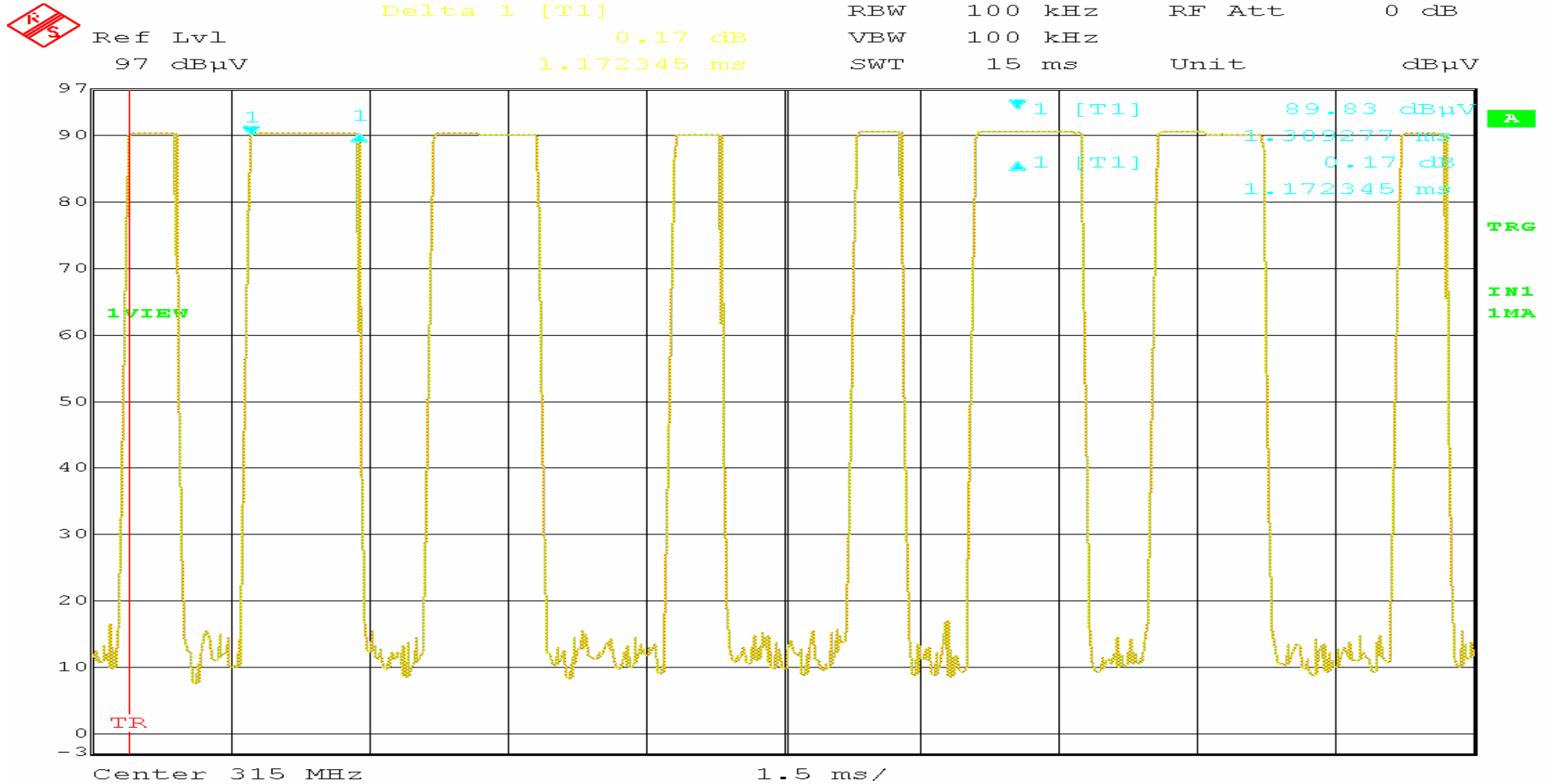


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RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Duty Cycle Plots		
Customer:	Trine Access Technology	Test Sample:	RF Remote Control
Model No:	018-2	Serial No:	A
Test Specification:	FCC Part 15, Subpart C	15.231(b)	Job No: R-4971N
Operating Mode:	Transmitting Signal		Technician: M. Seamans
Notes:	Fundamental Frequency: 315 MHz		Date: 2/8/2008

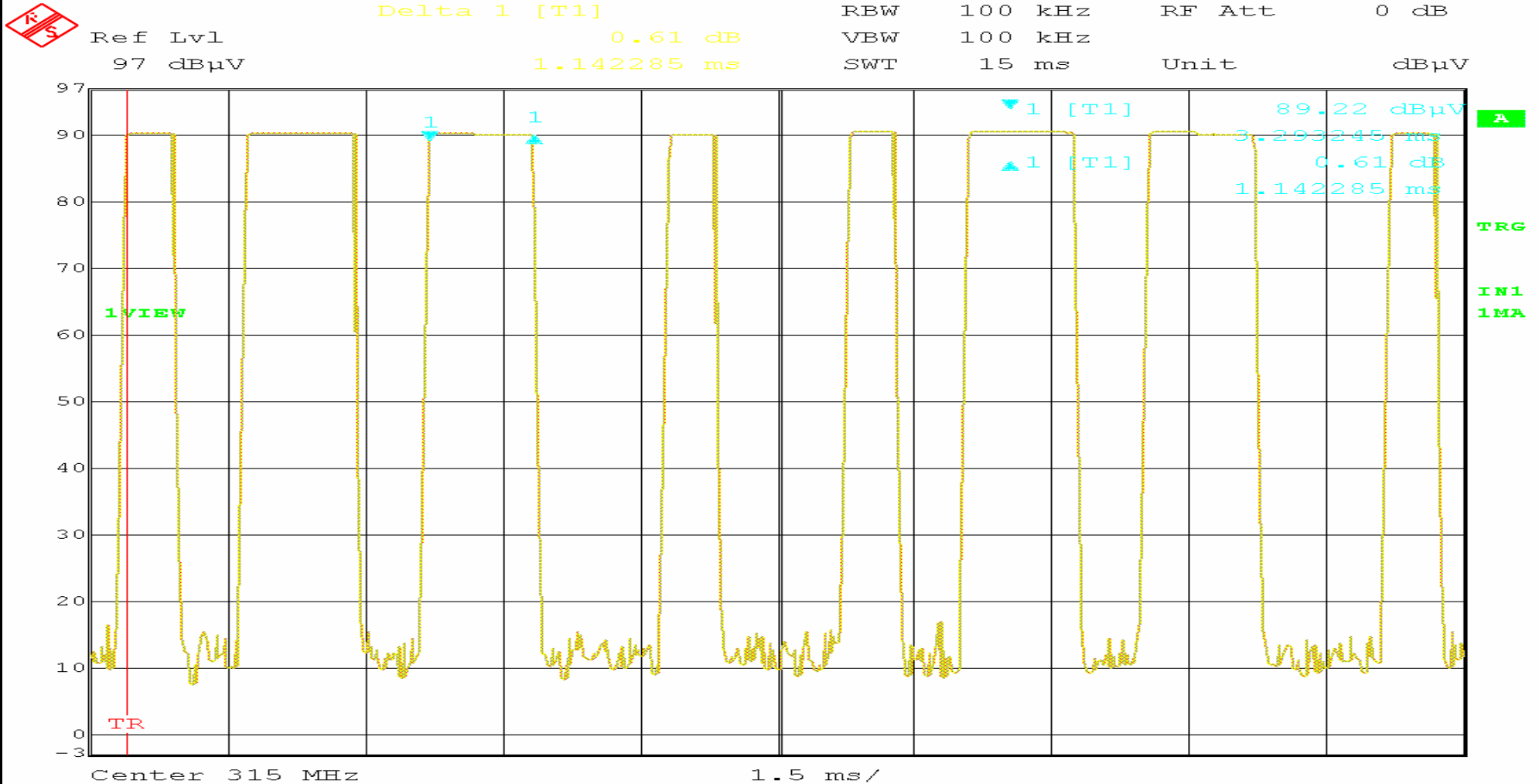


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RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Duty Cycle Plots		
Customer:	Trine Access Technology	Test Sample:	RF Remote Control
Model No:	018-2	Serial No:	A
Test Specification:	FCC Part 15, Subpart C	15.231(b)	Job No: R-4971N
Operating Mode:	Transmitting Signal 0.5 & 1.0		Technician: M. Seamans
Notes:	Fundamental Frequency: 315 MHz		Date: 2/8/2008



Date: 8.FEB.2008 14:41:43

Data Sheet 4 of 9

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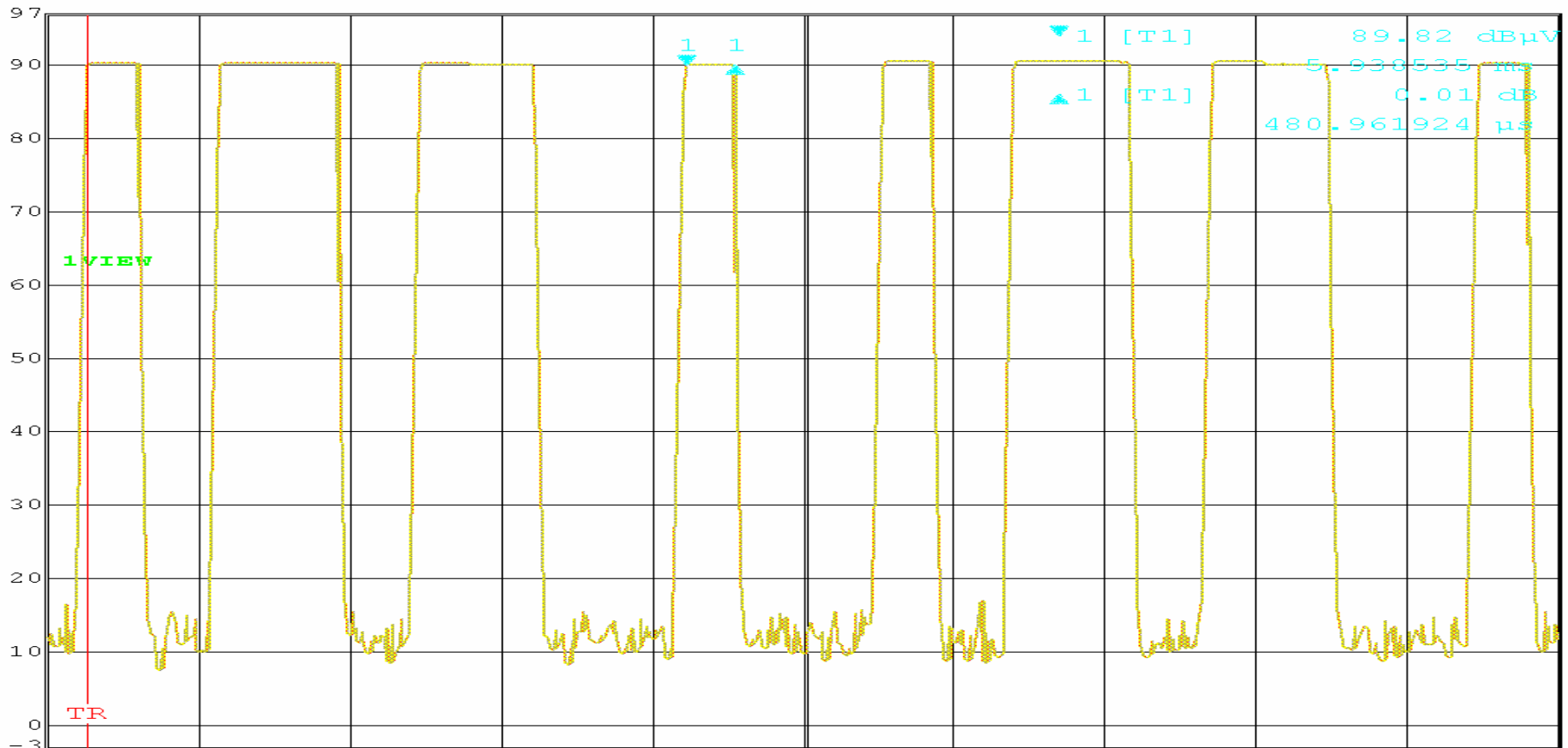
RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Duty Cycle Plots		
Customer:	Trine Access Technology	Test Sample:	RF Remote Control
Model No:	018-2	Serial No:	A
Test Specification:	FCC Part 15, Subpart C	15.231(b)	Job No: R-4971N
Operating Mode:	Transmitting Signal		Technician: M. Seamans
Notes:	Fundamental Frequency: 315 MHz		Date: 2/8/2008



Delta 1 [T1] RBW 100 kHz RF Att 0 dB
 Ref Lvl 97 dBμV 0.01 dB VBW 100 kHz
 480.961924 μs SWT 15 ms Unit dBμV



Center 315 MHz

1.5 ms/

Date: 8.FEB.2008 14:43:27

EMISSIONS DATA SHEET

Ref Lvl 97 dBμV Delta 1 [T1] 0.57 dB RBW 100 kHz RF Att 0 dB
 97 dBμV 450.901804 μs VBW 100 kHz SWT 15 ms Unit dBμV

97
 90
 80
 70
 60
 50
 40
 30
 20
 10
 0
 -3

1VIEW

TR

1 1
 1 [T1] 89.71 dBμV
 7.992443 ms
 0.57 dB
 450.901804 μs

A
 TRG
 IN1
 1MA

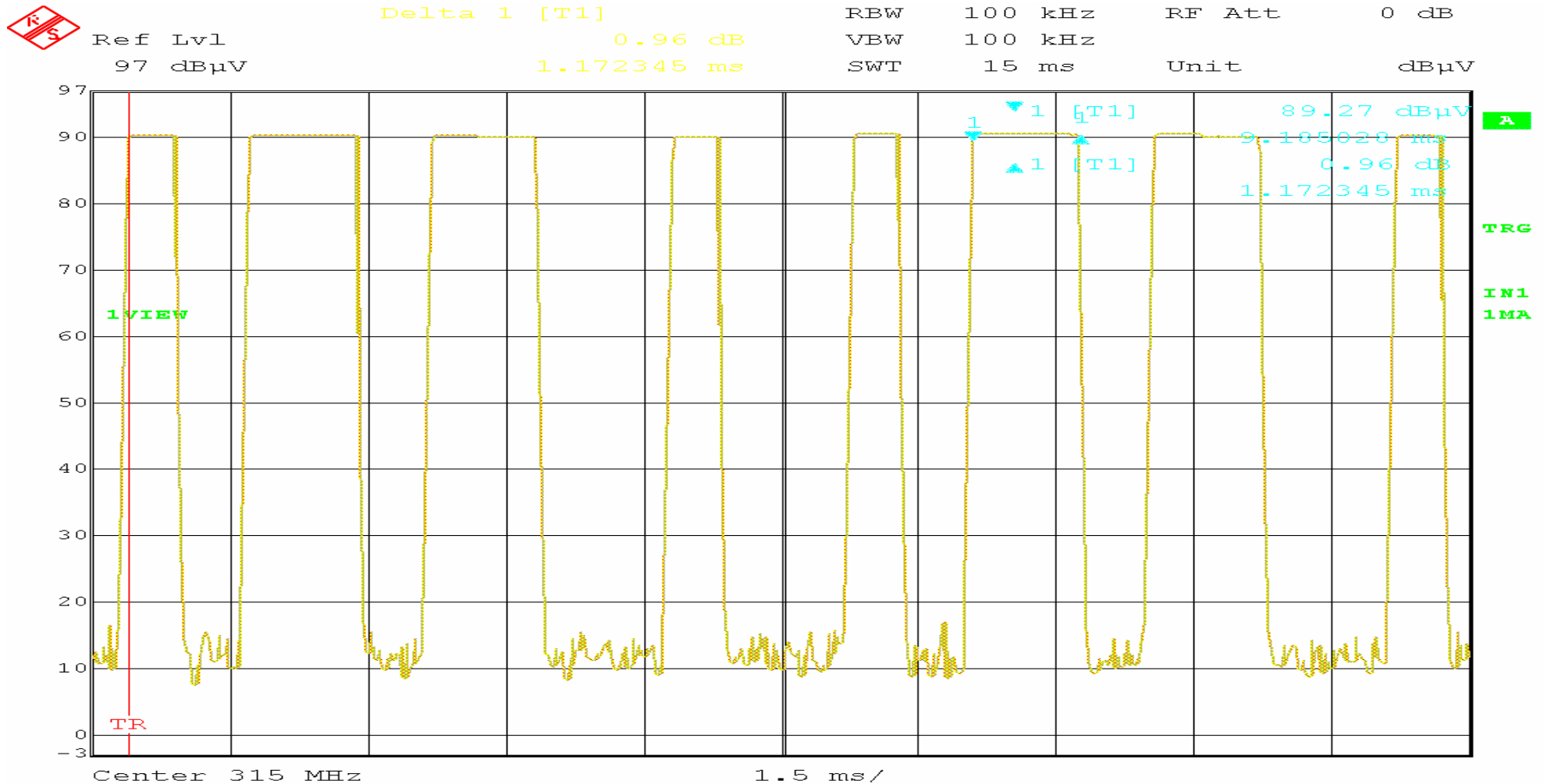
Center 315 MHz 1.5 ms/

R-4971N

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Duty Cycle Plots		
Customer:	Trine Access Technology	Test Sample:	RF Remote Control
Model No:	018-2	Serial No:	A
Test Specification:	FCC Part 15, Subpart C	15.231(b)	Job No: R-4971N
Operating Mode:	Transmitting Signal		Technician: M. Seamans
Notes:	Fundamental Frequency: 315 MHz		Date: 2/8/2008



Date: 8.FEB.2008 14:52:34

Data Sheet 7 of 9

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EMISSIONS DATA SHEET

Ref Lvl 97 dBμV

Delta 1 [T1] -0.10 dB

1.142285 ms

RBW 100 kHz

VBW 100 kHz

RF Att 0 dB

SWT 15 ms

Unit dBμV

1 [T1] 1

1 90.08 dBμV

1 169996 ms

-0.10 dB

1.142285 ms

Center 315 MHz

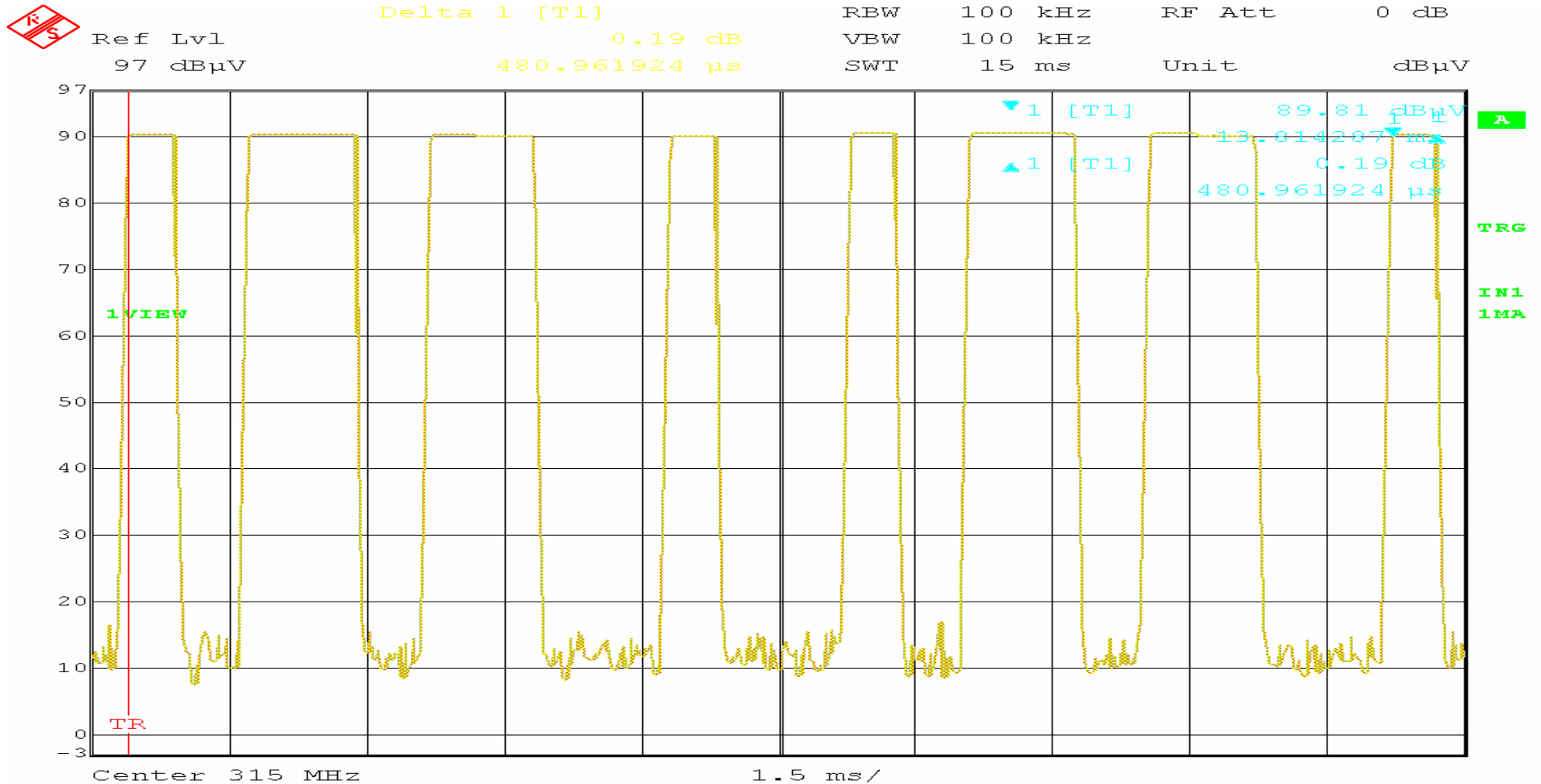
1.5 ms/

R-4971N

RETLIF TESTING LABORATORIES

EMISSIONS DATA SHEET

Test Method:	Duty Cycle Plots		
Customer:	Trine Access Technology	Test Sample:	RF Remote Control
Model No:	018-2	Serial No:	A
Test Specification:	FCC Part 15, Subpart C	15.231(b)	Job No: R-4971N
Operating Mode:	Transmitting Signal		Technician: M. Seamans
Notes:	Fundamental Frequency: 315 MHz		Date: 2/8/2008



Date: 8.FEB.2008 14:54:24