



Measurement of RF Emissions from a  
Model No. GL2T Key-Fob Door Opener Transmitter

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|                    |                                                                                                                       |
|--------------------|-----------------------------------------------------------------------------------------------------------------------|
| For                | Genie Company<br>One Door Drive<br>Mount Hope, OH 44660                                                               |
| P.O. Number        | 913341                                                                                                                |
| Date Tested        | July 10, 2017                                                                                                         |
| Test Personnel     | Tylar Jozefczyk                                                                                                       |
| Test Specification | FCC "Code of Federal Regulations" Title 47<br>Part15, Subpart C<br>Industry Canada RSS-Gen<br>Industry Canada RSS-210 |

Test Report By:

Tylar Jozefczyk  
EMC Engineer

Requested By:

Mike Whitley  
Genie Company

Approved By:

Raymond J. Klouda  
Registered Professional  
Engineer of Illinois - 44894

**Elite Electronic Engineering Inc.**

1516 CENTRE CIRCLE  
DOWNERS GROVE, IL 60515

TEL: 630 - 495 - 9770

FAX: 630 - 495 - 9785

[www.elltetest.com](http://www.elltetest.com)

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**REVISION HISTORY**

| Revision | Date         | Description     |
|----------|--------------|-----------------|
| —        | 25 July 2017 | Initial release |
|          |              |                 |

## Measurement of RF Emissions from a Model No. GL2T Key-Fob Door Opener Transmitter

### 1. INTRODUCTION

#### 1.1. Scope of Tests

This report presents the results of the RF emissions measurements performed on a Key-Fob Door Opener, Model No. GL2T (hereinafter referred to as the Equipment Under Test (EUT)). The EUT was designed to transmit at approximately 315MHz and 390MHz using an internal antenna. The EUT was manufactured and submitted for testing by Genie Company, located in Mount Hope, OH.

#### 1.2. Purpose

The test series was performed to determine if the EUT meets the conducted and radiated RF emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Section 15.231 for Intentional Radiators and the Innovation, Science and Economic Development (ISED) Canada, Radio Standards Specification RSS-210. Testing was performed in accordance with ANSI C63.4-2014.

#### 1.3. Deviations, Additions and Exclusions

There were no deviations, additions to, or exclusions from the test specification during this test series.

#### 1.4. EMC Laboratory Identification

This series of tests was performed by Elite Electronic Engineering Incorporated of Downers Grove, Illinois. The laboratory is accredited by The American Association for Laboratory Accreditation (A2LA). A2LA Certificate Number: 1786.01.

#### 1.5. Laboratory Conditions

The temperature at the time of the test was 24.9°C and the relative humidity was 42%.

### 2. APPLICABLE DOCUMENTS

The following documents of the exact issue designated form part of this document to the extent specified herein:

- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 15, Subpart C, dated 1 October 2017
- ANSI C63.4-2014, "American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"
- Innovation, Science and Economic Development (ISED) Canada Radio Standards Specification, RSS-Gen, "General Requirements for Compliance of Radio Apparatus", Issue 4, November 2014
- Innovation, Science and Economic Development (ISED) Canada Radio Standards Specification, RSS-210, "License-Exempt Radio Apparatus: Category I Equipment", Issue 9, August 2016

### 3. EUT SETUP AND OPERATION

#### 3.1. General Description

The EUT is a Genie Company Key-Fob Door Opener, Model No. GL2T. A block diagram of the EUT setup is shown as Figure 1.

##### 3.1.1. Power Input

The EUT was battery operated.

### 3.1.2. Peripheral Equipment

There was no peripheral equipment submitted with the EUT.

### 3.1.3. Signal Input/Output Leads

There were no interconnect cables submitted with the EUT.

### 3.1.4. Grounding

The EUT was ungrounded during the tests.

## 3.2. Operational Mode

For all tests the EUT and all peripheral equipment were placed on an 80cm high non-conductive stand. The EUT and all peripheral equipment were energized.

The EUT was programmed to continuously transmit two frequencies: 315MHz and 390MHz, where switching between them required the press of a different button corresponding to the different frequency.

## 3.3. EUT Modifications

No modifications were required for compliance.

# 4. TEST FACILITY AND TEST INSTRUMENTATION

## 4.1. Shielded Enclosure

All tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. With the exception of the floor, the reflective surfaces of the shielded chamber are lined with ferrite tiles on the walls and ceiling. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2014 for site attenuation.

## 4.2. Test Instrumentation

The test instrumentation and auxiliary equipment used during the tests are listed in Table 9-1.

Conducted and radiated emission measurements were performed with a spectrum analyzer. This receiver allows measurements with the bandwidths and detector functions specified by the FCC. The receiver bandwidth was 120kHz for the 30MHz to 1000MHz radiated emissions data and 1MHz for the 1000MHz to 5000MHz radiated emissions data.

## 4.3. Calibration Traceability

Test equipment is maintained and calibrated on a regular basis with a calibration interval not greater than two years. All calibrations are traceable to the National Institute of Standards and Technology (NIST).

## 4.4. Measurement Uncertainty

All measurements are an estimate of their true value. The measurement uncertainty characterizes, with a specified confidence level, the spread of values which may be possible for a given measurement system.

The measurement uncertainty for these tests is presented below:

| Conducted Emissions Measurements      |      |       |
|---------------------------------------|------|-------|
| Combined Standard Uncertainty         | 1.06 | -1.06 |
| Expanded Uncertainty (95% confidence) | 2.12 | -2.12 |

| Radiated Emissions Measurements       |      |       |
|---------------------------------------|------|-------|
| Combined Standard Uncertainty         | 2.09 | -2.09 |
| Expanded Uncertainty (95% confidence) | 4.19 | -4.19 |

## 5. TEST PROCEDURES

### 5.1. Duty Cycle Factor Measurements

#### 5.1.1.Procedures

The duty cycle factor is used to convert peak detected readings to average readings. This factor is computed from the time domain trace of the pulse modulation signal.

With the transmitter set up to transmit for maximum pulse density, the time domain trace is displayed on the spectrum analyzer. This trace is obtained by tuning center frequency to the transmitter frequency and then setting a zero span width with 10msec/div. The amplitude settings are adjusted so that the on/off transitions clear the 4th division from the bottom of the display. The markers are set at the beginning and end of a word period. If the word period exceeds 100msec the word period is set to 100msec. The on-time and off-time are then measured. The on-time is total time signal level exceeds the 4th division. Off-time is time under for the word period. The duty cycle is then computed as the (On-time/ word period) where the word period = (On-time + Off-time). The duty cycle correction factor is calculated using the following formula:

$$\text{Duty Cycle Correction Factor (dB)} = 20 * \log (\text{On-Time}/100\text{msec})$$

#### 5.1.2.Results

The plot of the duty cycle for 315MHz is shown on data pages 16 through 19. The duty cycle factor was computed to be -12.9dB.

The plot of the duty cycle for 390MHz is shown on data pages 20 through 23. The duty cycle factor was computed to be -13.1dB.

### 5.2. Radiated Measurements

#### 5.2.1.Requirements

The EUT must comply with the requirements of FCC "Code of Federal Regulations Title 47", Part 15, Subpart C, Section 15.231 et seq.

| Fundamental Frequency<br>MHz | Field Intensity<br>uV/m @ 3 meters | Field Strength Harmonics and<br>Spurious @ 3 meters |
|------------------------------|------------------------------------|-----------------------------------------------------|
| 260 to 470                   | 3,750 to 12,500*                   | 375 to 1,250*                                       |

\* - Linear Interpolation

In addition, emissions appearing in the Restricted Bands of Operation listed in paragraph 15.231(b) shall not exceed the general requirements shown in paragraph 15.231.

#### 5.2.2.Procedures

All tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. The walls and ceiling of the shielded chamber are lined with ferrite tiles. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4-2014 for site attenuation.

The shielded enclosure prevents emissions from other sources, such as radio and TV stations from interfering with the measurements. All powerlines and signal lines entering the enclosure pass through filters on the enclosure wall. The powerline filters prevent extraneous signals from entering the enclosure on these leads.

A preliminary radiated emissions test was performed to determine the emission characteristics of the EUT. For the preliminary test, a broadband measuring antenna was positioned at a 3 meter distance from the EUT. The entire frequency range from 30MHz to 5.0GHz was investigated using a peak detector function. The data was then processed by the computer to calculate equivalent field intensity.

The final open field emission tests were then manually performed over the frequency range of 30MHz to 4000MHz. Between 30MHz and 1000MHz, a tuned dipole antenna was used as the pick-up device. A broadband double ridged waveguide antenna was used as the pick-up device for all frequencies above 1GHz. All significant broadband and narrowband signals were measured and recorded. The peak detected levels were converted to average levels using a duty cycle factor which was computed from the pulse train.

To ensure that maximum or worst case, emission levels were measured, the following steps were taken:

- 1) The EUT was set to transmit at 315MHz.
- 2) The EUT was rotated so that all of its sides were exposed to the receiving antenna.
- 3) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
- 4) The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization to maximize the readings.
- 5) Steps (1) through (4) were repeated with the EUT set to transmit at 390MHz.

#### 5.2.3.Results

The preliminary plots, with the EUT transmitting at 315MHz and 390MHz, are presented on data pages 24 through 31. The plots are presented for a reference only, and are not used to determine compliance.

The final open area radiated levels, with the EUT transmitting at 315MHz and 390MHz, are presented on data pages 32 and 33. As can be seen from the data, all emissions measured from the EUT were within the specification limits. The emissions levels closest to the limit (worst case) occurred at 945MHz for 315MHz and 1170MHz for 390MHz. The emissions levels at these frequencies were -0.3dB and -3.3dB within the limit respectively. Photographs of the test configuration which yielded the highest (or worst case) radiated emission levels are shown on Figures 2 and 3.

### 5.3. Occupied Bandwidth Measurements

#### 5.3.1.Requirement

In accordance with paragraph 15.231(c), all emissions within 20dB of the peak amplitude level of the center frequency are required to be within a band less than 0.25% of the center frequency wide.

#### 5.3.2.Procedures

The EUT was placed on an 80cm high non-conductive stand. The unit was set to transmit continuously. With an antenna positioned nearby, occupied bandwidth emissions were displayed on the spectrum analyzer. The resolution bandwidth was set to 30kHz and span was set to 4MHz. The frequency spectrum near the fundamental was plotted.

#### 5.3.3.Results

The plots of the emissions near the fundamental frequency are presented on data pages 34 through 36. As can be seen from this data page, the transmitter met the occupied bandwidth requirements. The 99% bandwidth was measured to be 128.3kHz.

## **6. OTHER TEST CONDITIONS**

### **6.1. Test Personnel and Witnesses**

All tests were performed by qualified personnel from Elite Electronic Engineering Incorporated.

### **6.2. Disposition of the EUT**

The EUT and all associated equipment were returned to Genie Company upon completion of the tests.

## **7. CONCLUSIONS**

It was determined that the Genie Company Key-Fob Door Opener Model No. GL2T did fully meet the radiated emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Section 15.231 et seq. for Intentional Radiators, when tested per ANSI C63.4-2014.

It was determined that the Genie Company Key-Fob Door Opener Model No. GL2T did fully meet the technical requirements of the Innovation, Science and Economic Development (ISED) Canada, Radio Standards Specification RSS-210 for transmitters, when tested per ANSI C63.4-2014.

## **8. CERTIFICATION**

Elite Electronic Engineering Incorporated certifies that the information contained in this report was obtained under conditions which meet or exceed those specified in the test specifications.

The data presented in this test report pertains to the EUT at the test date. Any electrical or mechanical modification made to the EUT subsequent to the specified test date will serve to invalidate the data and void this certification.

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the Federal Government.





## 9. EQUIPMENT LIST

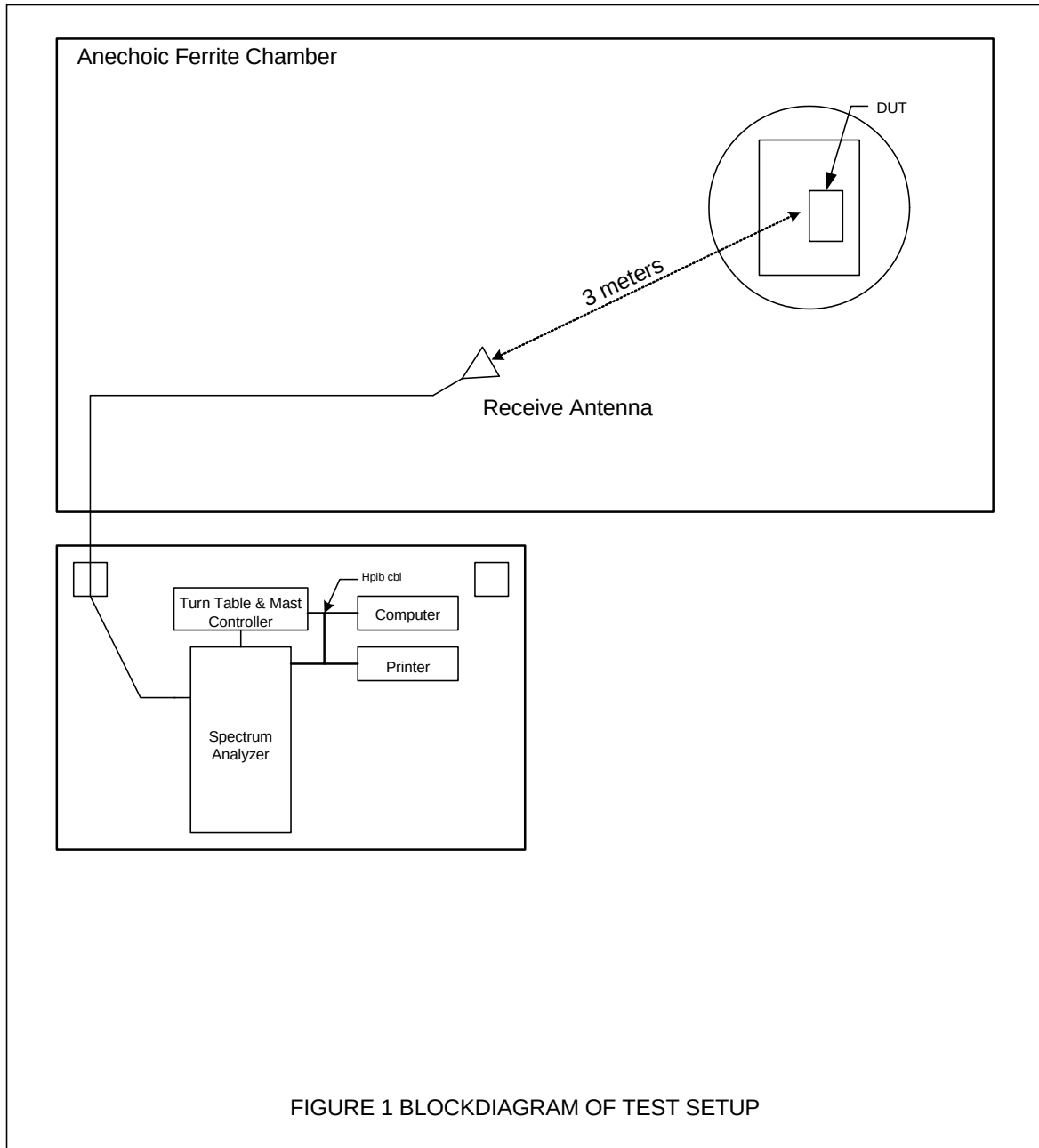
Table 9-1 Equipment List

| Eq ID | Equipment Description                | Manufacturer    | Model No.    | Serial No. | Frequency Range | Cal Date   | Due Date   |
|-------|--------------------------------------|-----------------|--------------|------------|-----------------|------------|------------|
| CDY0  | WORKSTATION                          | ELITE           | WORKSTATION  |            | WINDOWS 7       | N/A        |            |
| NTA3  | BILOG ANTENNA                        | TESEQ           | 6112D        | 32853      | 25-1000MHz      | 3/23/2016  | 8/23/2017  |
| NWQ2  | DOUBLE RIDGED<br>WAVEGUIDE ANTENNA   | ETS LINDGREN    | 3117         | 66659      | 1GHZ-18GHZ      | 3/2/2016   | 3/2/2018   |
| PHA0  | MAGNETIC FIELD PROBE                 | ELECTRO-METRICS | EM-6882      | 134        | 22-230MHZ       | NOTE 1     |            |
| RBB0  | EMI TEST RECEIVER 20HZ<br>TO 40 GHZ. | ROHDE & SCHWARZ | ESIB40       | 100250     | 20 HZ TO 40GHZ  | 2/16/2016  | 3/16/2017  |
| RBG0  | EMI ANALYZER                         | ROHDE & SCHWARZ | ESW500       | 101533     | 10HZ-44GHZ      | 11/10/2016 | 11/10/2017 |
| WKA1  | SOFTWARE, UNIVERSAL<br>RCV EMI       | ELITE           | UNIV_RCV_EMI | 1          | ---             | I/O        |            |

I/O: Initial Only

N/A: Not Applicable

Note 1: For the purpose of this test, the equipment was calibrated over the specified frequency range, pulse rate, or modulation prior to the test or monitored by a calibrated instrument.



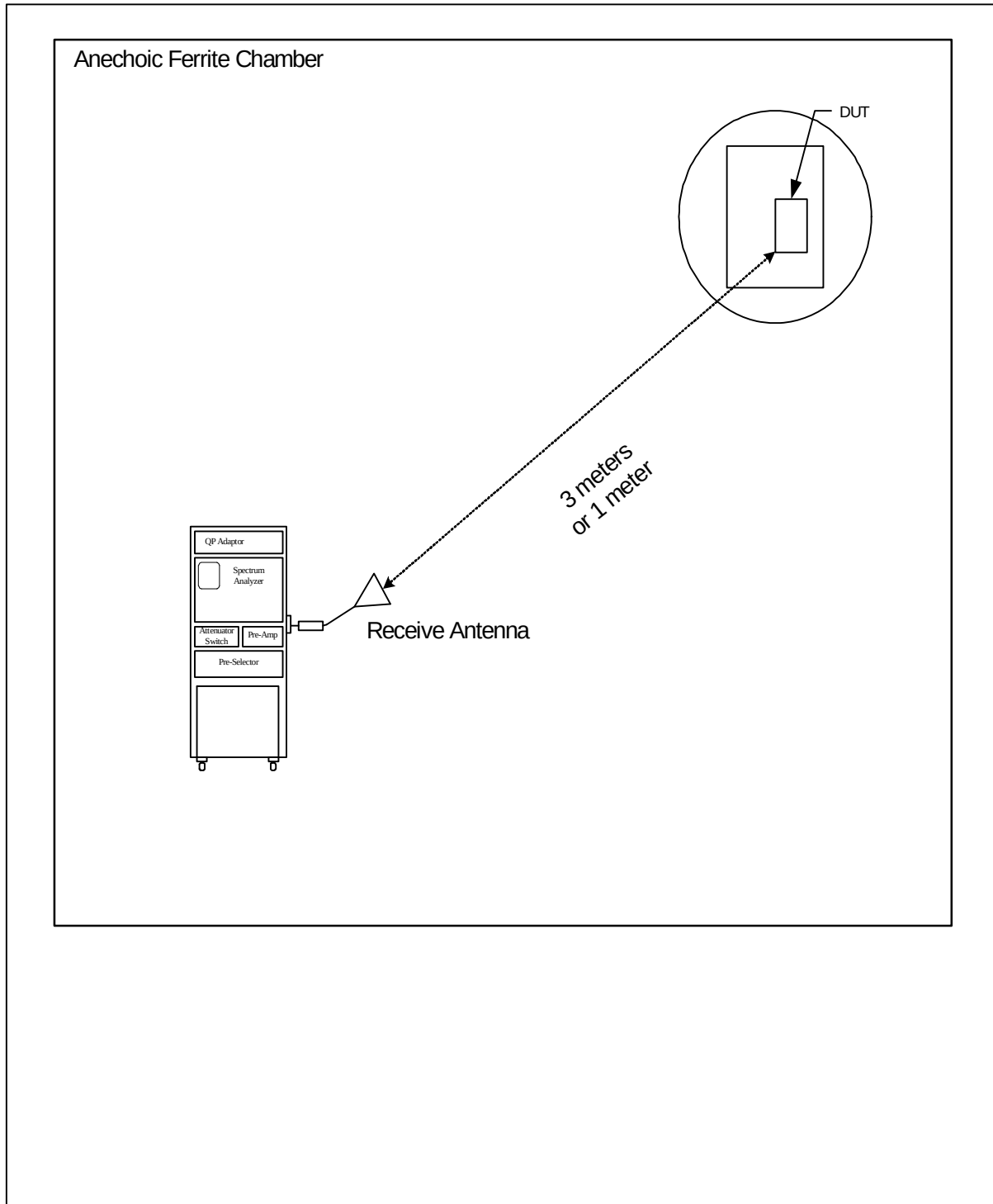


Figure 2



Test Setup for Radiated Emissions, 30MHz to 1GHz – Horizontal Polarization



Test Setup for Radiated Emissions, 30MHz to 1GHz – Vertical Polarization

Figure 3



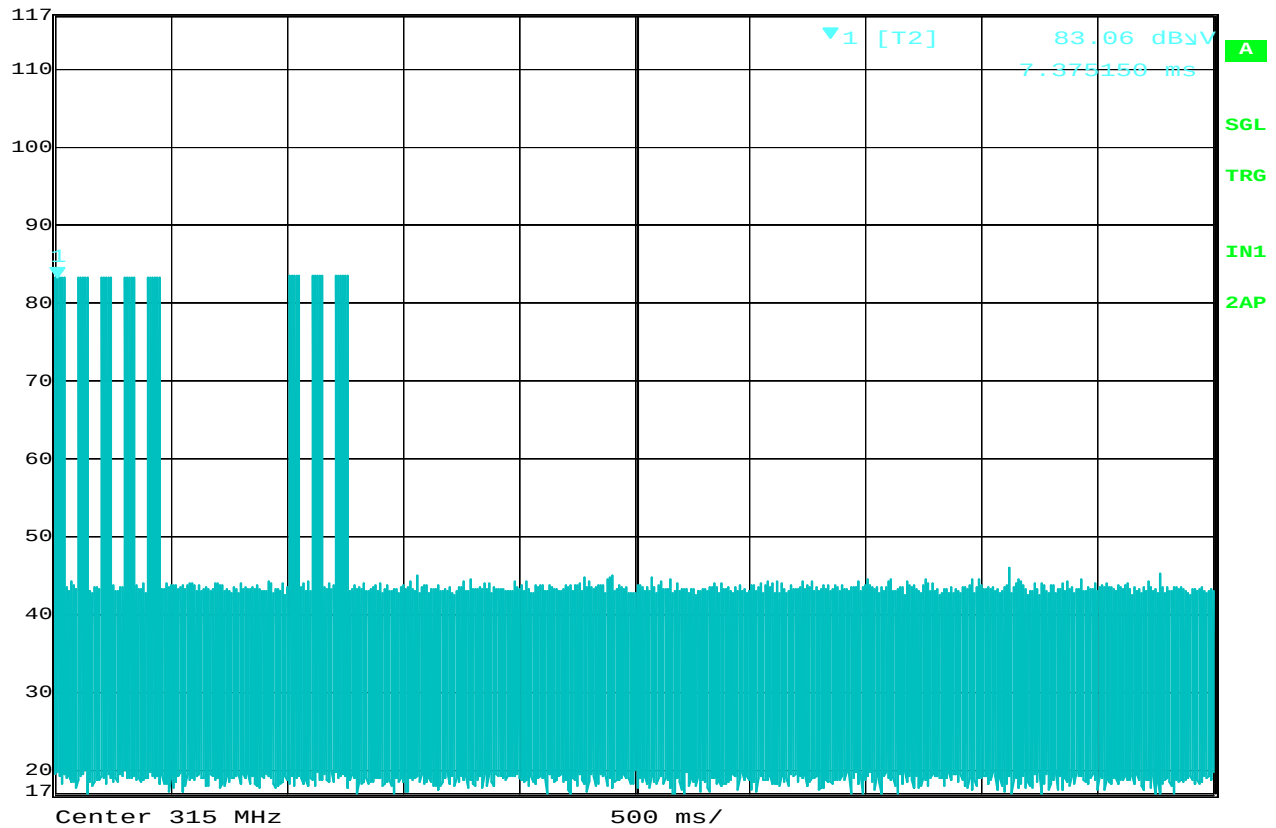
Test Setup for Radiated Emissions, 1-4GHz – Horizontal Polarization



Test Setup for Radiated Emissions, 1-4GHz – Vertical Polarization



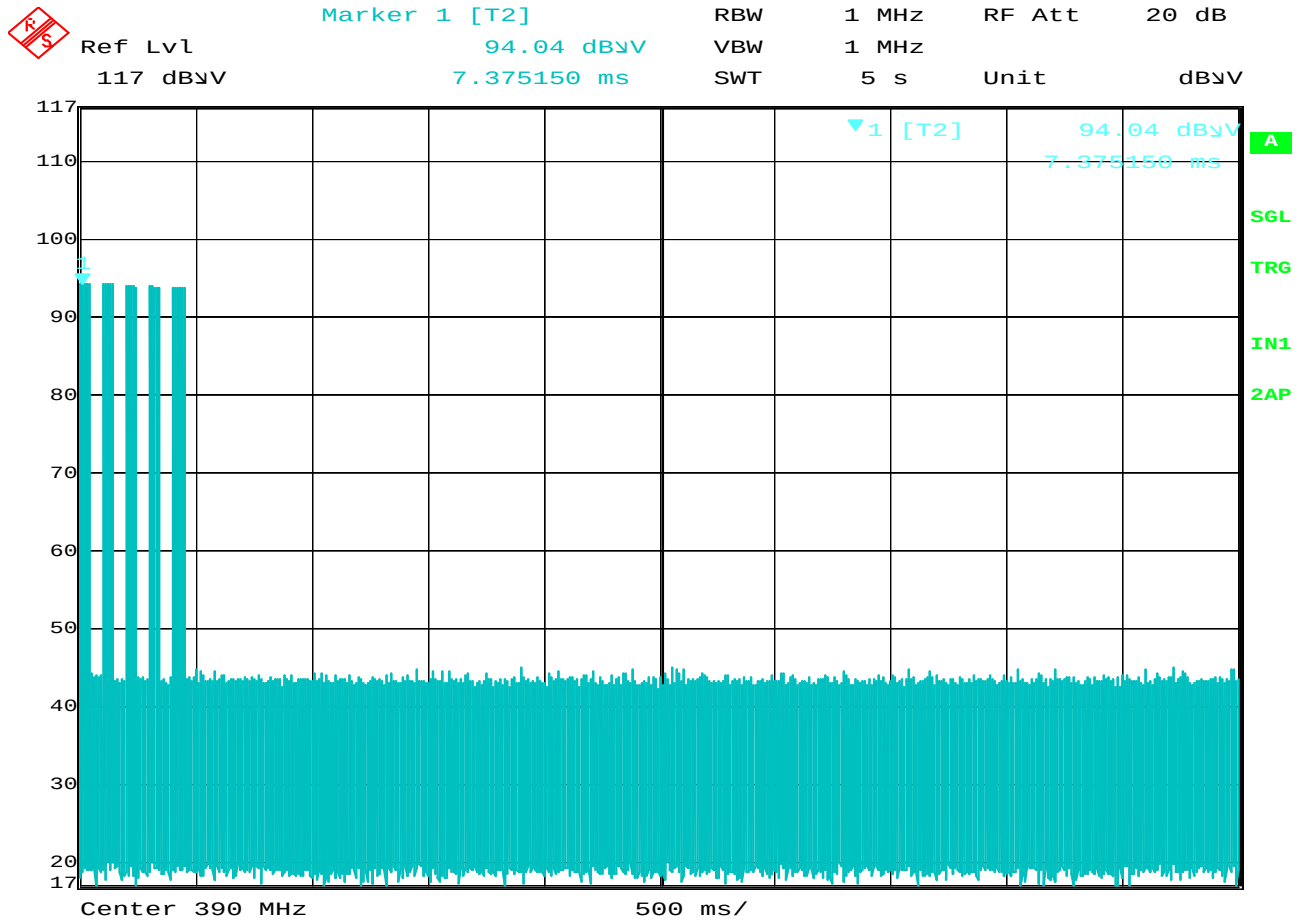
Ref Lvl 117 dBμV  
Marker 1 [T2] 83.06 dBμV  
7.375150 ms  
RBW 1 MHz  
VBW 1 MHz  
SWT 5 s  
RF Att 20 dB  
Unit dBμV



Date: 3.NOV.2016 15:50:31

### Momentary Operation

MANUFACTURER : Genie Company  
MODEL NUMBER : Flashlight Transmitter GL2T/OLT2  
SERIAL NUMBER : None Assigned  
TEST MODE : Transmit at 315MHz  
TEST PARAMETERS : Wide Pulse Width  
EQUIPMENT USED : RBB0  
NOTES : A manually operated transmitter shall be equipped with a push-to-operate switch  
: and be under manual control at all times during transmission. When released, the  
: transmitter shall cease transmission within no more than 5 seconds of being  
: released



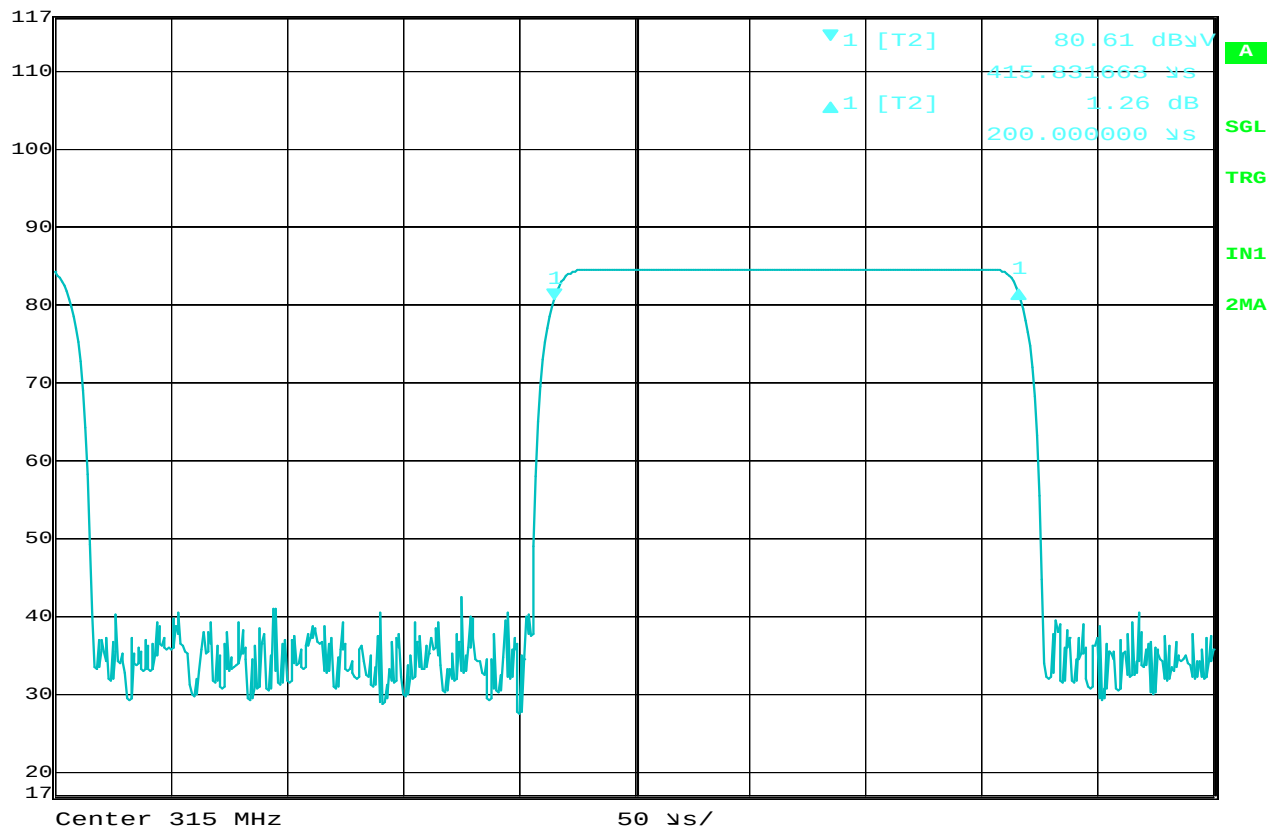
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**Momentary Operation**

MANUFACTURER : Genie Company  
MODEL NUMBER : Flashlight Transmitter GL2T/OLT2  
SERIAL NUMBER : None Assigned  
TEST MODE : Transmit at 390MHz  
TEST PARAMETERS : Wide Pulse Width  
EQUIPMENT USED : RBB0  
NOTES : A manually operated transmitter shall be equipped with a push-to-operate switch  
: and be under manual control at all times during transmission. When released, the  
: transmitter shall cease transmission within no more than 5 seconds of being  
: released



Delta 1 [T2] RBW 1 MHz RF Att 20 dB  
Ref Lvl 1.26 dB VBW 1 MHz  
117 dBμV 200.000000 μs SWT 500 μs Unit dBμV



Date: 3.NOV.2016 15:13:19

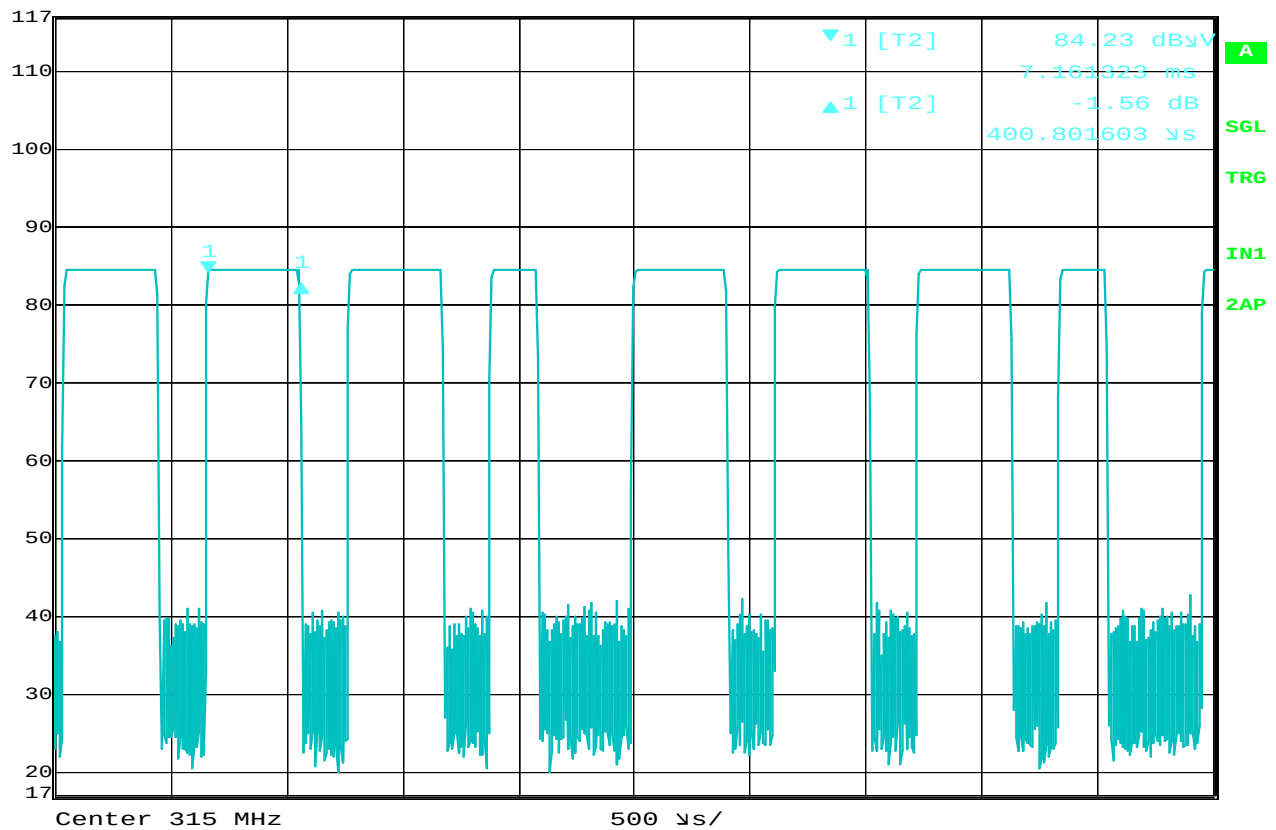
### Duty Cycle Correction Factor

MANUFACTURER : Genie Company  
MODEL NUMBER : Flashlight Transmitter GL2T/OLT2  
SERIAL NUMBER : None Assigned  
TEST MODE : Transmit at 315MHz  
TEST PARAMETERS : Narrow Pulse Width  
EQUIPMENT USED : RBB0  
NOTES : Narrow Pulse Width = 200usec





Delta 1 [T2] RBW 1 MHz RF Att 20 dB  
Ref Lvl -1.56 dB VBW 1 MHz  
117 dBμV 400.801603 μs SWT 5 ms Unit dBμV



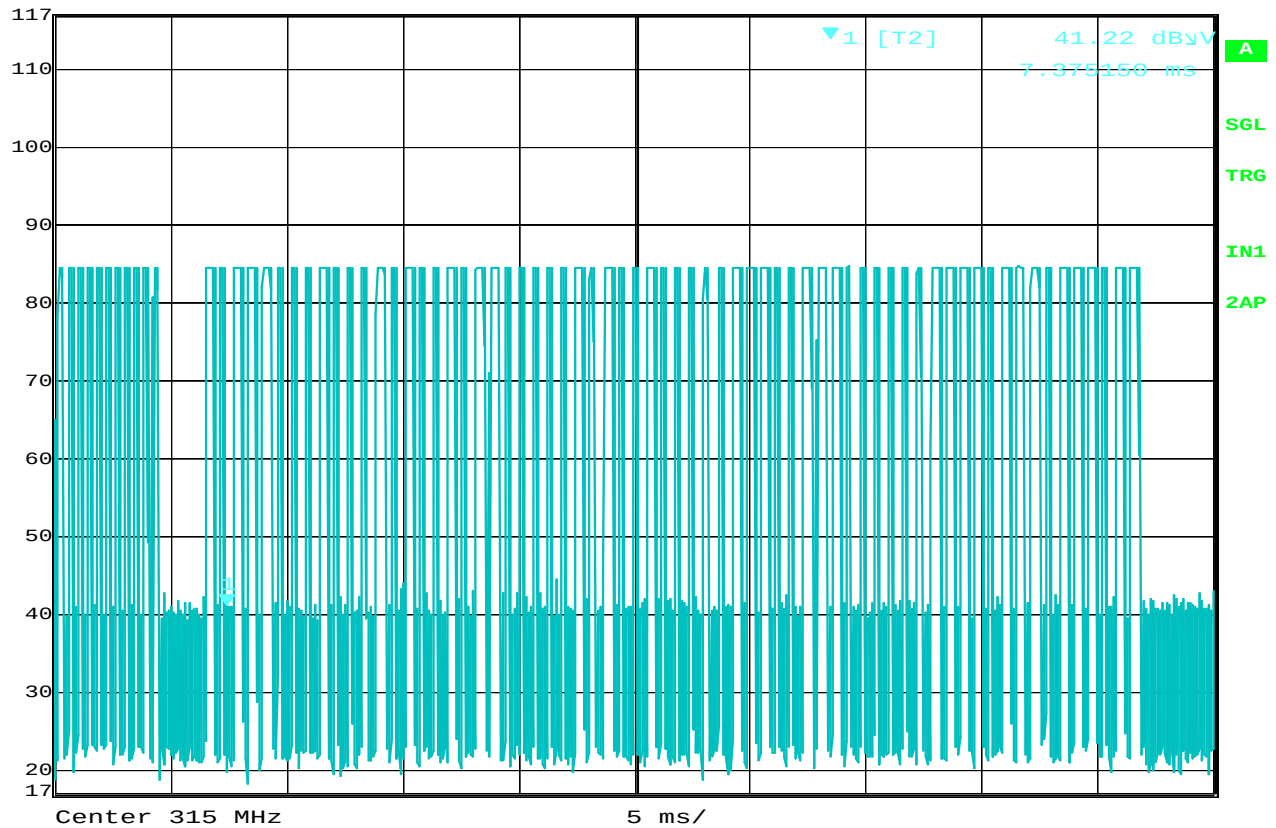
Date: 3.NOV.2016 15:16:40

### Duty Cycle Correction Factor

MANUFACTURER : Genie Company  
MODEL NUMBER : Flashlight Transmitter GL2T/OLT2  
SERIAL NUMBER : None Assigned  
TEST MODE : Transmit at 315MHz  
TEST PARAMETERS : Wide Pulse Width  
EQUIPMENT USED : RBB0  
NOTES : Wide Pulse Width = 400.8μsec



Marker 1 [T2] RBW 1 MHz RF Att 20 dB  
41.22 dBμV VBW 1 MHz  
117 dBμV 7.375150 ms SWT 50 ms Unit dBμV



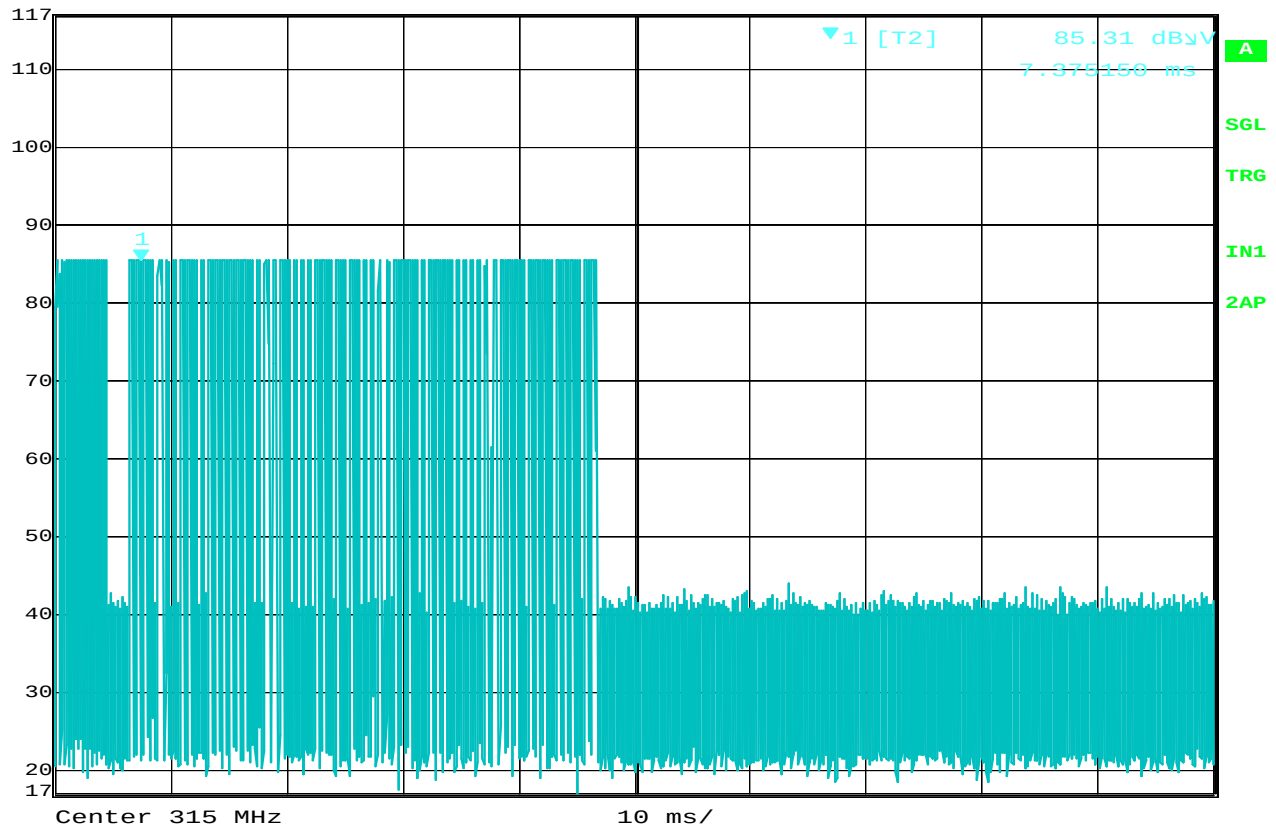
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### Duty Cycle Correction Factor

MANUFACTURER : Genie Company  
MODEL NUMBER : Flashlight Transmitter GL2T/OLT2  
SERIAL NUMBER : None Assigned  
TEST MODE : Transmit at 315MHz  
TEST PARAMETERS : Number of Pulses  
EQUIPMENT USED : RBB0  
NOTES : 11 short pulses in preamble, 28 short pulses in word, 37 long pulses in word  
: (39 short pulses and 37 long pulses)



Marker 1 [T2] RBW 1 MHz RF Att 20 dB  
85.31 dBμV VBW 1 MHz  
117 dBμV Ref Lvl 7.375150 ms SWT 100 ms Unit dBμV



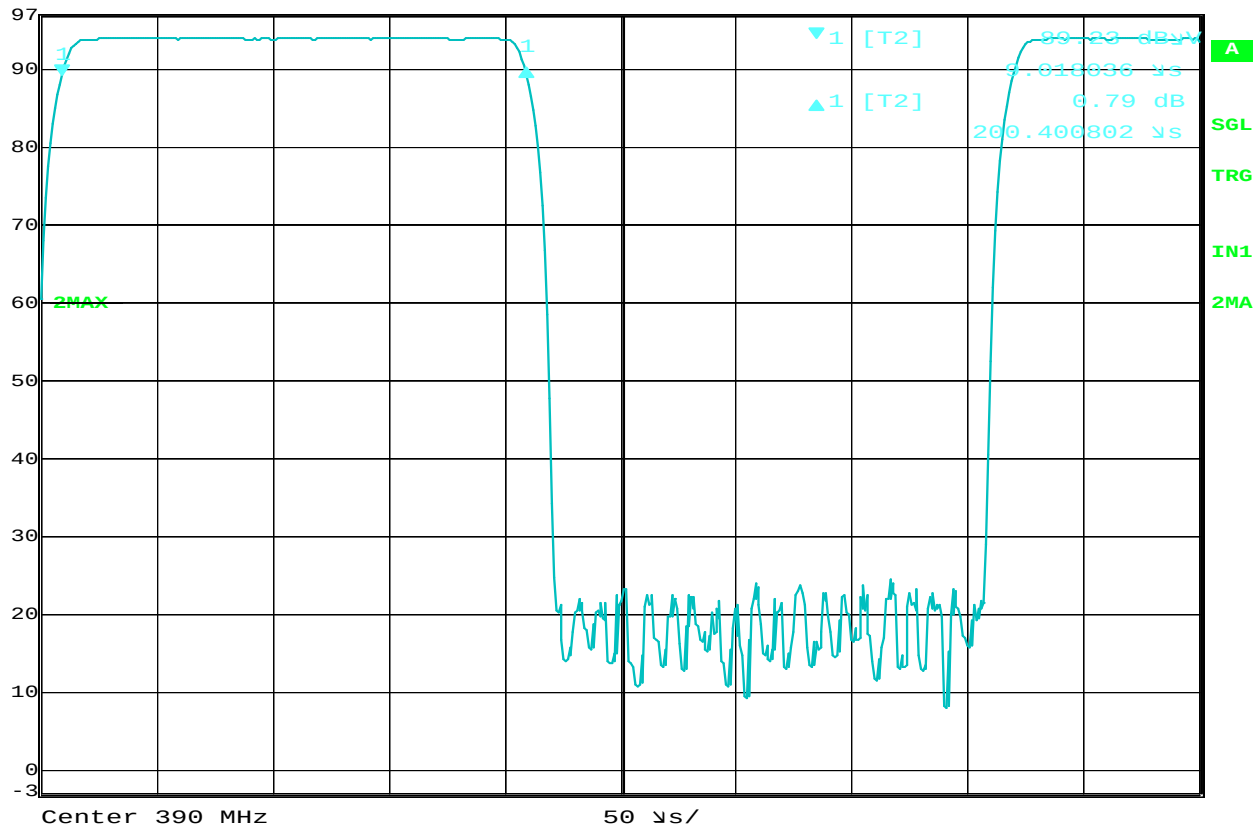
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### Duty Cycle Correction Factor

MANUFACTURER : Genie Company  
MODEL NUMBER : Flashlight Transmitter GL2T/OLT2  
SERIAL NUMBER : None Assigned  
TEST MODE : Transmit at 315MHz  
TEST PARAMETERS : Wide Pulse Width  
EQUIPMENT USED : RBB0  
NOTES : 11 short pulses in preamble, 28 short pulses in word, 37 long pulses in word  
: (39 short pulses and 37 long pulses)  
: Duty Cycle Correction Factor =  $20 \times \log((\# \text{short pulses}) \times (\text{short pulse length}) + (\# \text{long pulses}) \times (\text{long pulse length})) / 100$   
: Duty Cycle Correction Factor =  $20 \times \log(((39) \times (200 \text{ usec}) + (37) \times (400.8 \text{ usec})) / 100)$   
: Duty Cycle Correction Factor =  $20 \times \log((7.8 \text{ msec}) + (14.8 \text{ msec})) / 100 \text{ msec}$   
: Duty Cycle Correction Factor = -12.9dB



Delta 1 [T2] RBW 1 MHz RF Att 0 dB  
Ref Lvl 0.79 dB VBW 300 kHz  
97 dBμV 200.400802 μs SWT 500 μs Unit dBμV



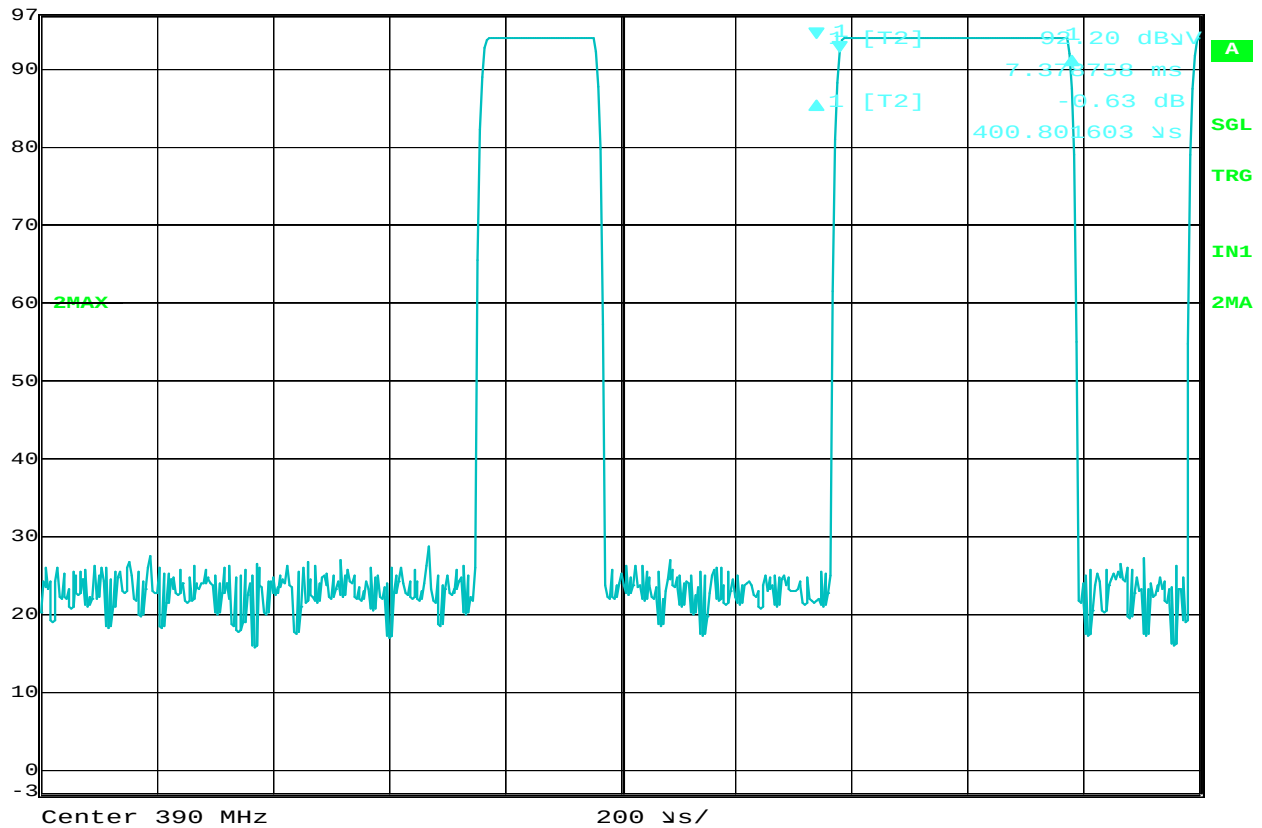
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### Duty Cycle Correction Factor

MANUFACTURER : Genie Company  
MODEL NUMBER : Flashlight Transmitter GL2T/OLT2  
SERIAL NUMBER : None Assigned  
TEST MODE : Transmit at 390MHz  
TEST PARAMETERS : Narrow Pulse Width  
EQUIPMENT USED : RBB0  
NOTES : Narrow Pulse Width = 200.4usec



Delta 1 [T2] RBW 1 MHz RF Att 0 dB  
Ref Lvl -0.63 dB VBW 1 MHz  
97 dBμV 400.801603 μs SWT 2 ms Unit dBμV



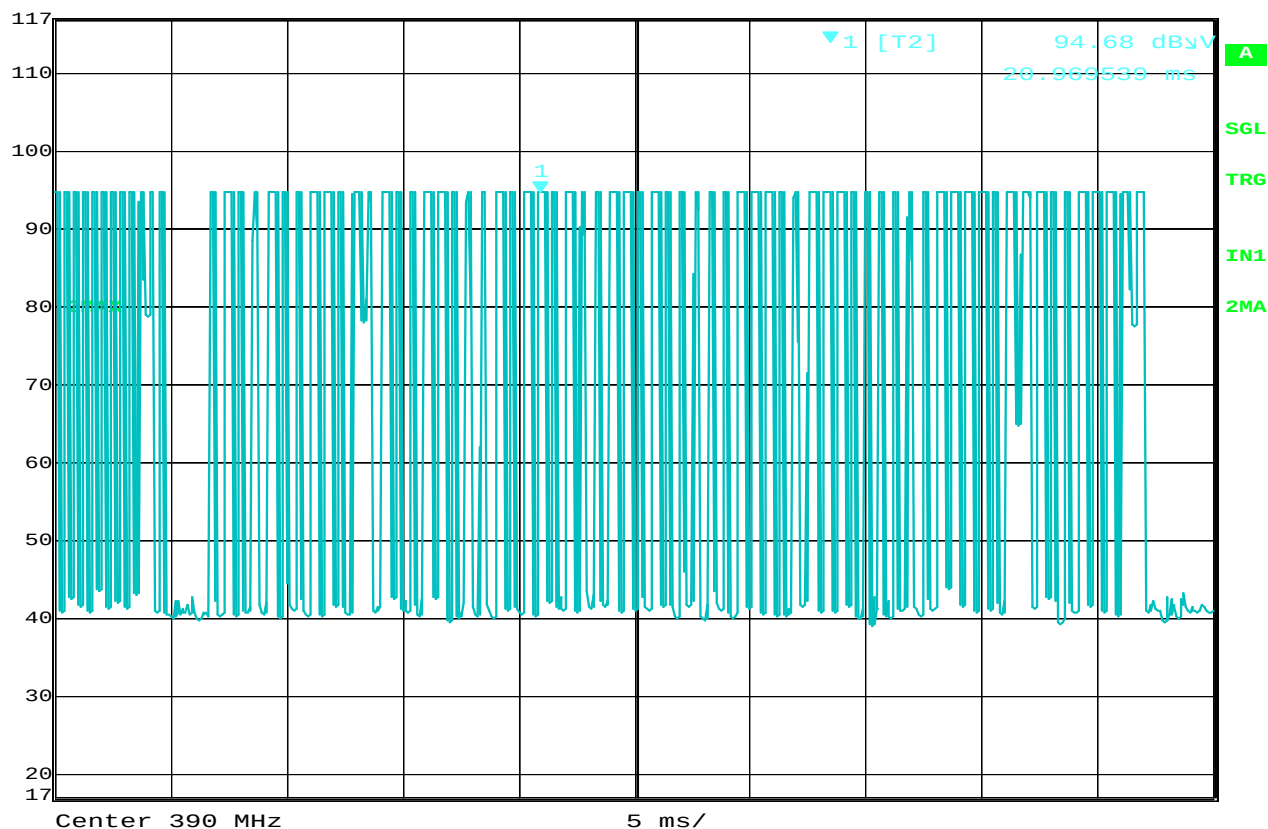
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### Duty Cycle Correction Factor

MANUFACTURER : Genie Company  
MODEL NUMBER : Flashlight Transmitter GL2T/OLT2  
SERIAL NUMBER : None Assigned  
TEST MODE : Transmit at 390MHz  
TEST PARAMETERS : Wide Pulse Width  
EQUIPMENT USED : RBB0  
NOTES : Wide Pulse Width = 400.8usec



Marker 1 [T2] RBW 1 MHz RF Att 20 dB  
94.68 dBμV VBW 1 MHz  
20.969539 ms SWT 50 ms Unit dBμV  
Ref Lvl 117 dBμV



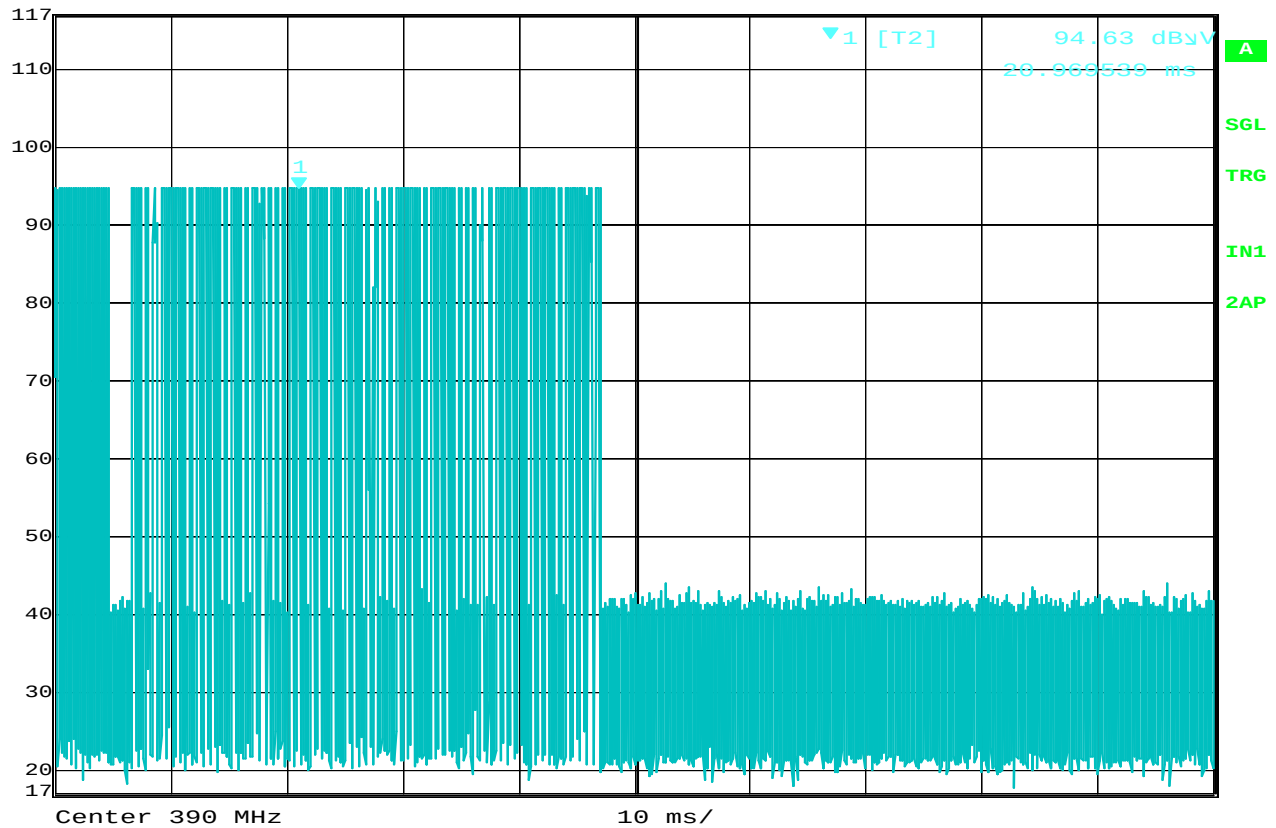
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### Duty Cycle Correction Factor

MANUFACTURER : Genie Company  
MODEL NUMBER : Flashlight Transmitter GL2T/OLT2  
SERIAL NUMBER : None Assigned  
TEST MODE : Transmit at 390MHz  
TEST PARAMETERS : Number of Pulses  
EQUIPMENT USED : RBB0  
NOTES : 11 short pulses in preamble, 30 short pulses in word, 35 long pulses in word  
          : (41 short pulses and 35 long pulses)



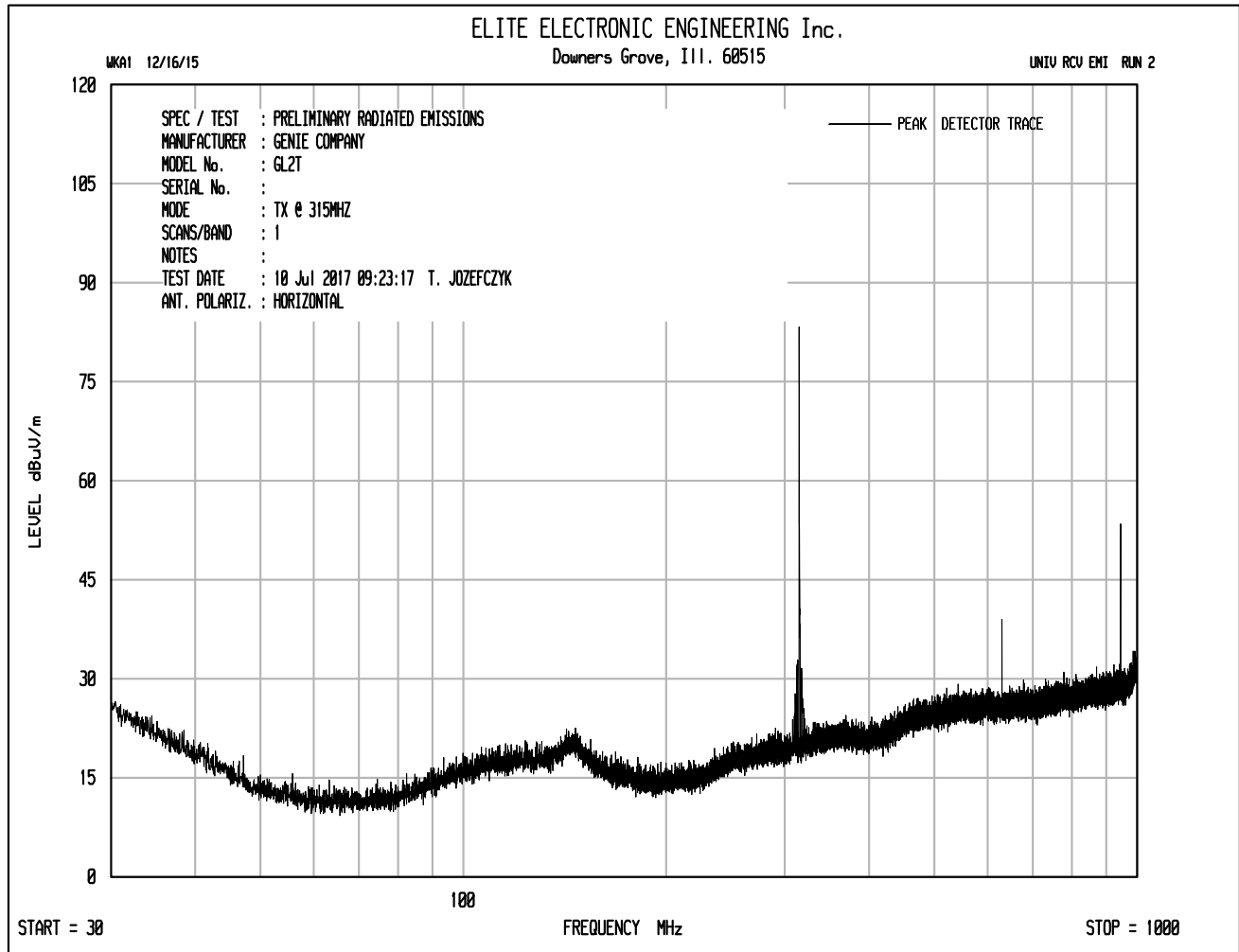
Marker 1 [T2] RBW 1 MHz RF Att 20 dB  
94.63 dBμV VBW 1 MHz  
117 dBμV Ref Lvl 20.969539 ms SWT 100 ms Unit dBμV



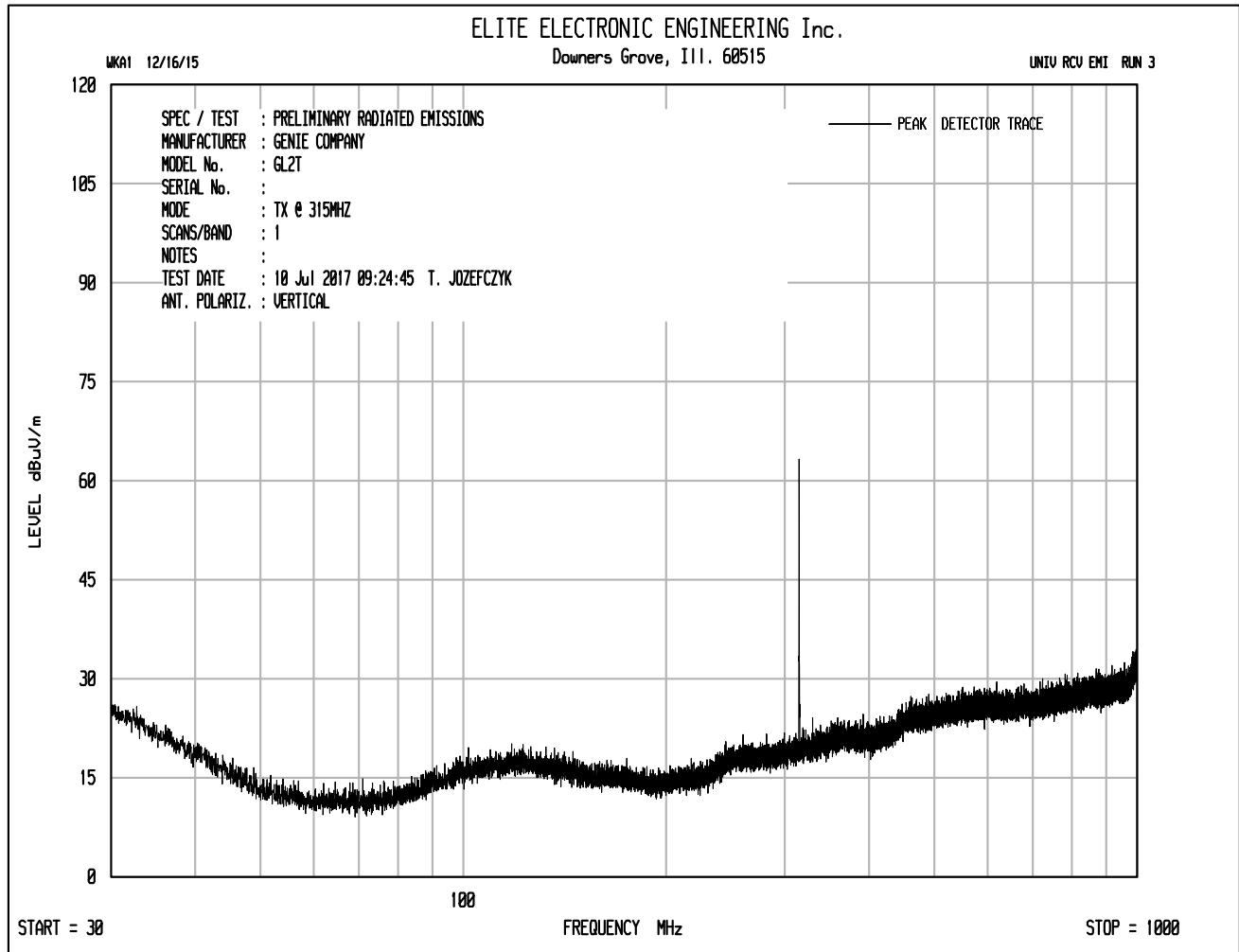
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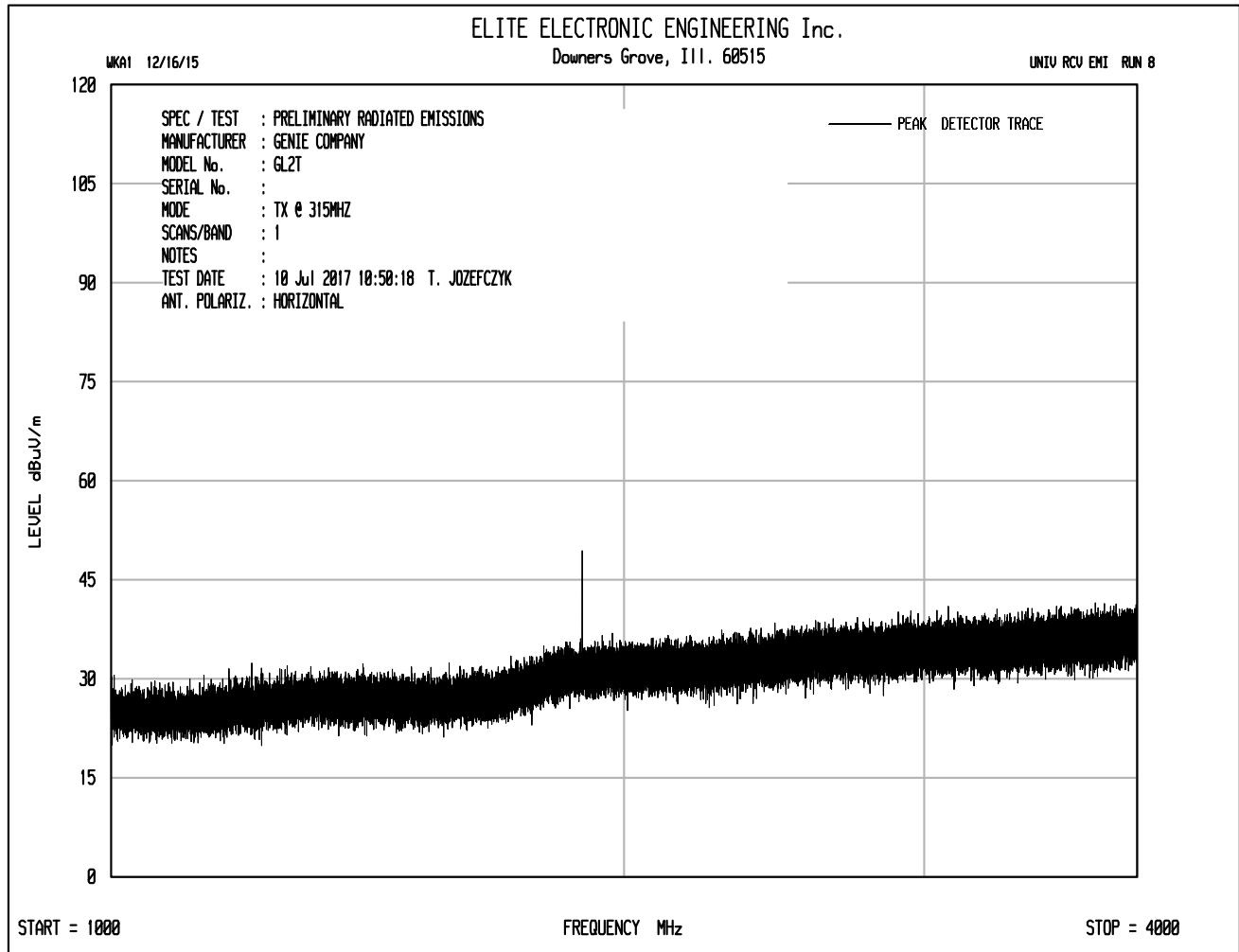
### Duty Cycle Correction Factor

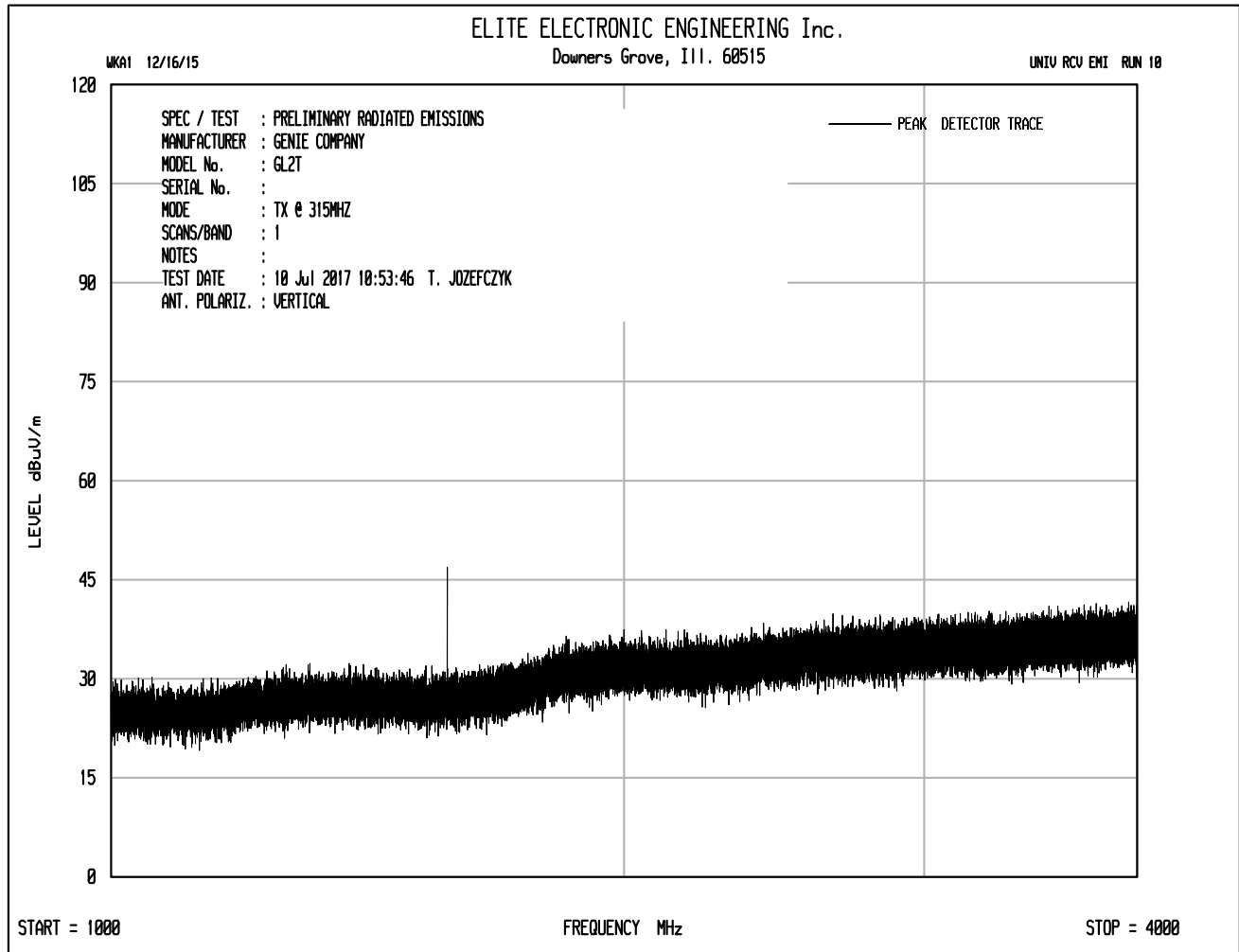
MANUFACTURER : Genie Company  
MODEL NUMBER : Flashlight Transmitter GL2T/OLT2  
SERIAL NUMBER : None Assigned  
TEST MODE : Transmit at 390MHz  
TEST PARAMETERS : Number of Pulses  
EQUIPMENT USED : RBB0  
NOTES : 11 short pulses in preamble, 30 short pulses in word, 35 long pulses in word  
: (41 short pulses and 35 long pulses)  
: Duty Cycle Correction Factor =  $20 \times \log((\# \text{short pulses}) \times (\text{short pulse length}) + (\# \text{long pulses}) \times (\text{long pulse length})) / 100$   
: Duty Cycle Correction Factor =  $20 \times \log(((41) \times (200.4 \mu\text{sec}) + (35) \times (400.8 \mu\text{sec})) / 100)$   
: Duty Cycle Correction Factor =  $20 \times \log(((8.2 \text{ msec}) + (14.0 \text{ msec})) / 100 \text{ msec})$   
: Duty Cycle Correction Factor = -13.1dB

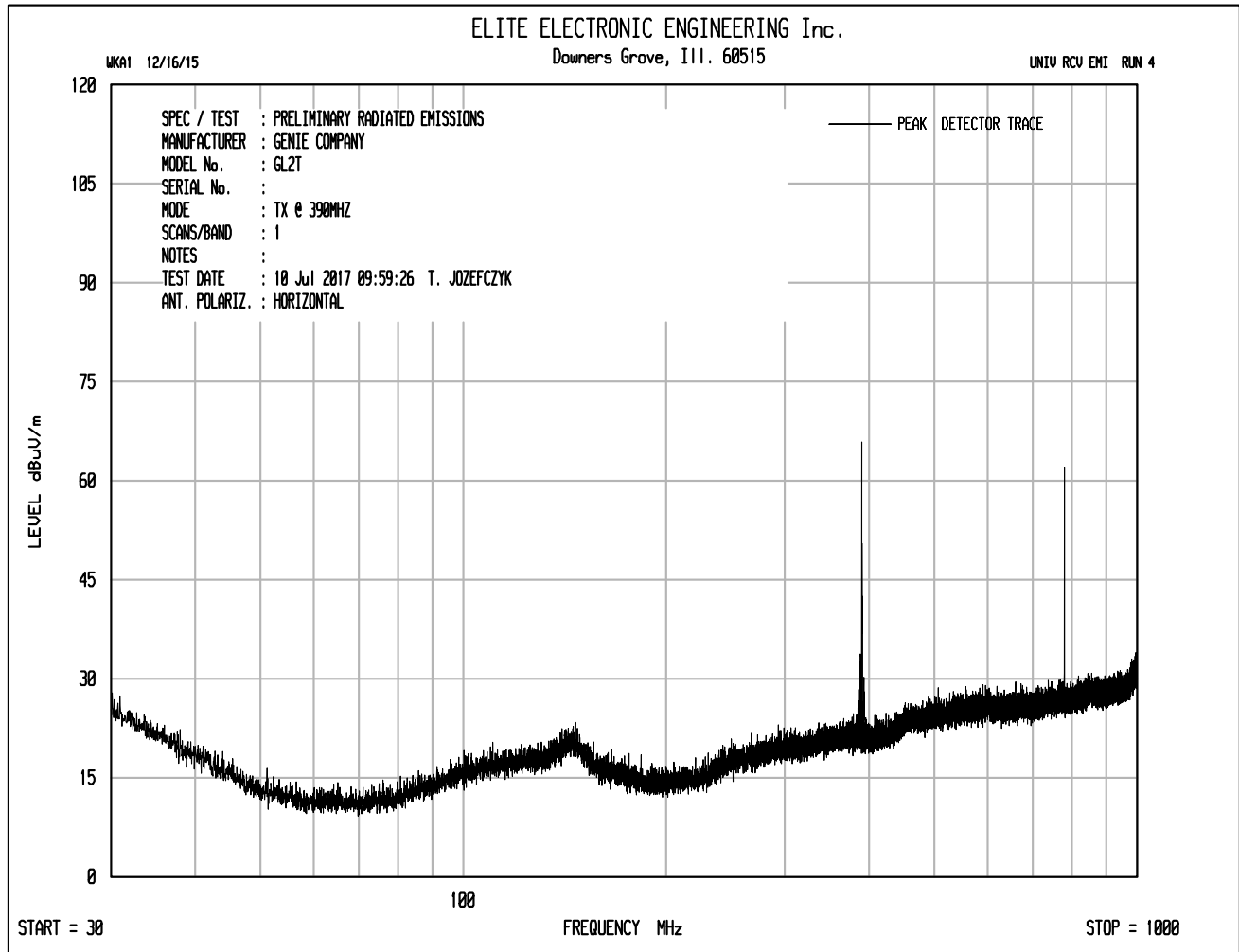


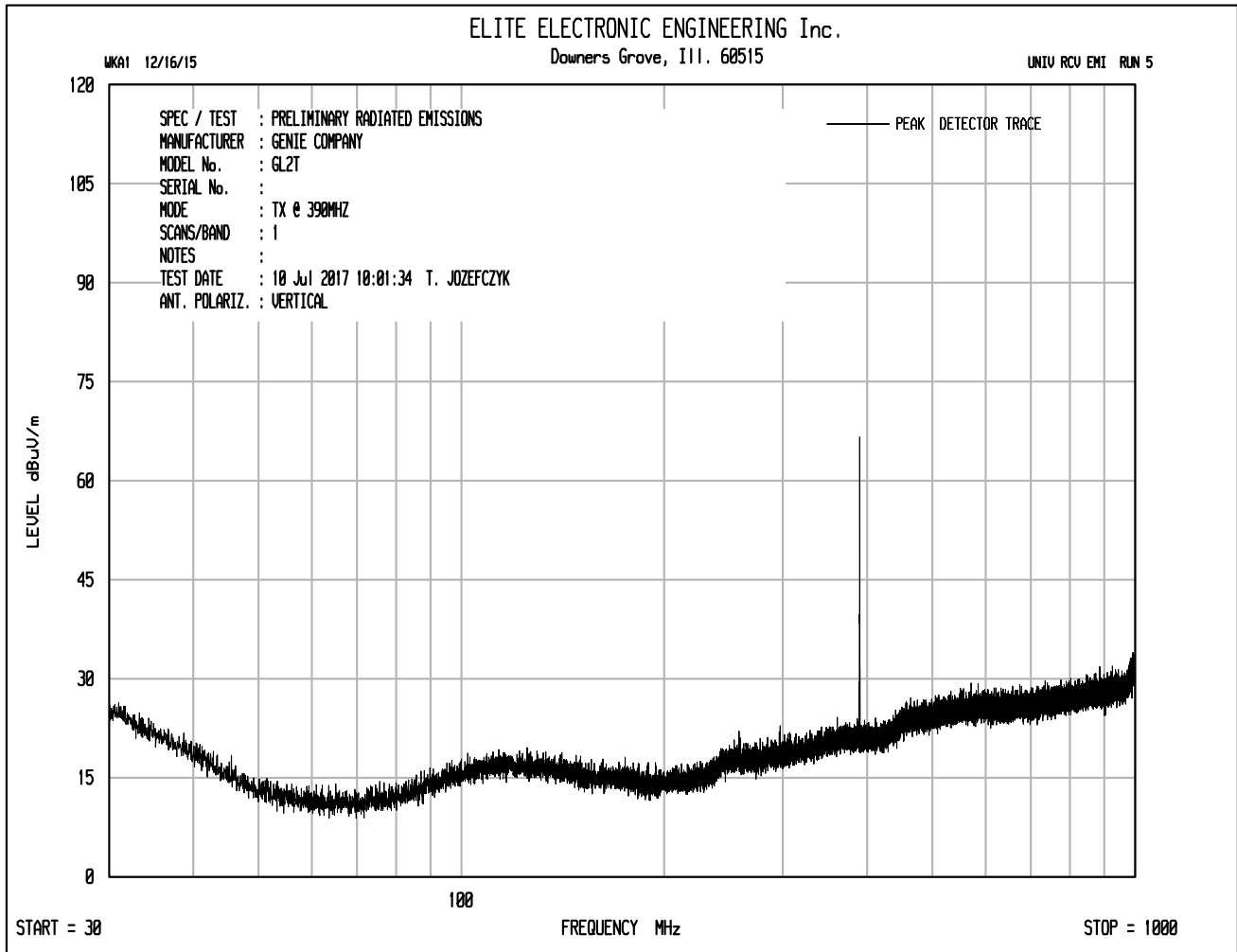


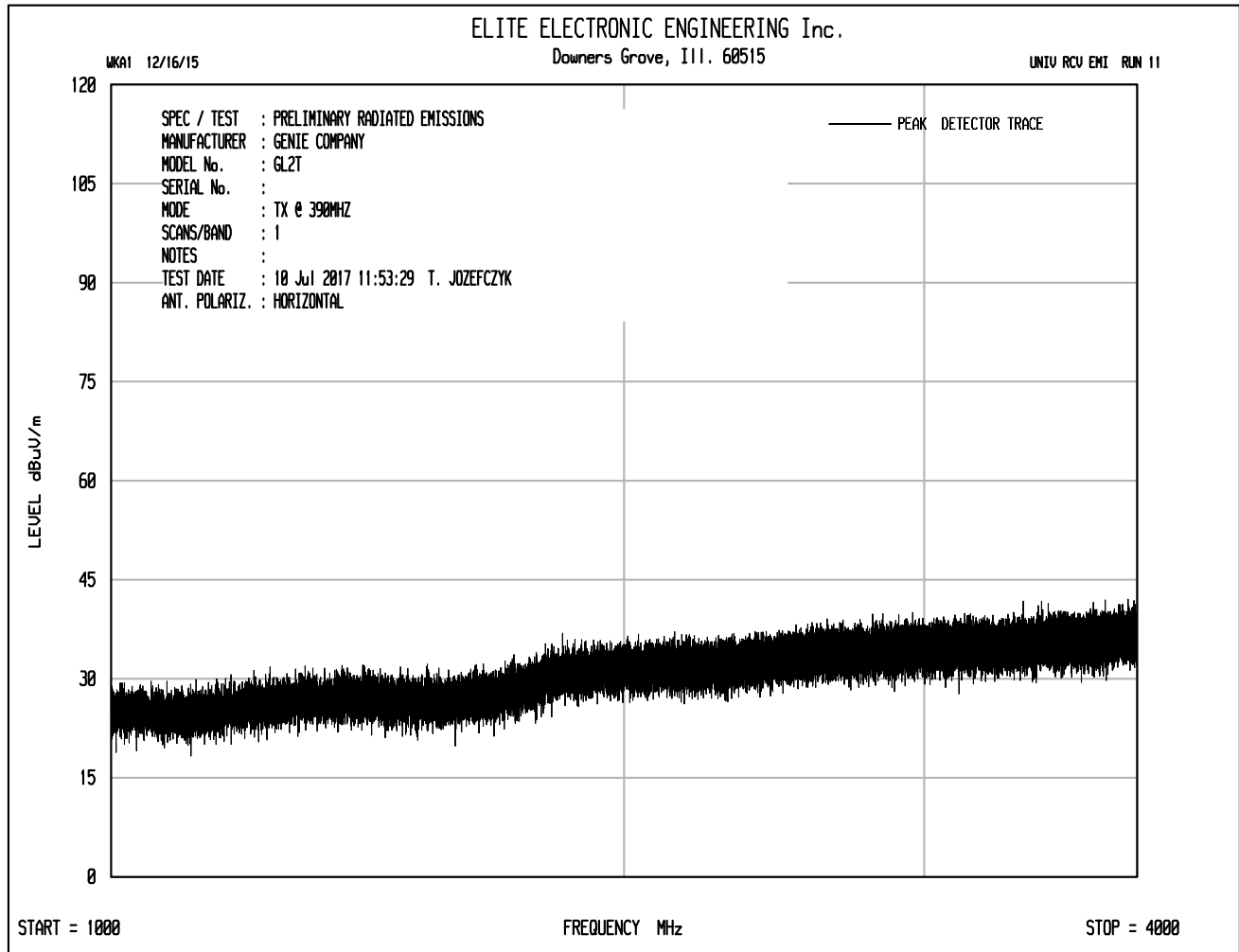


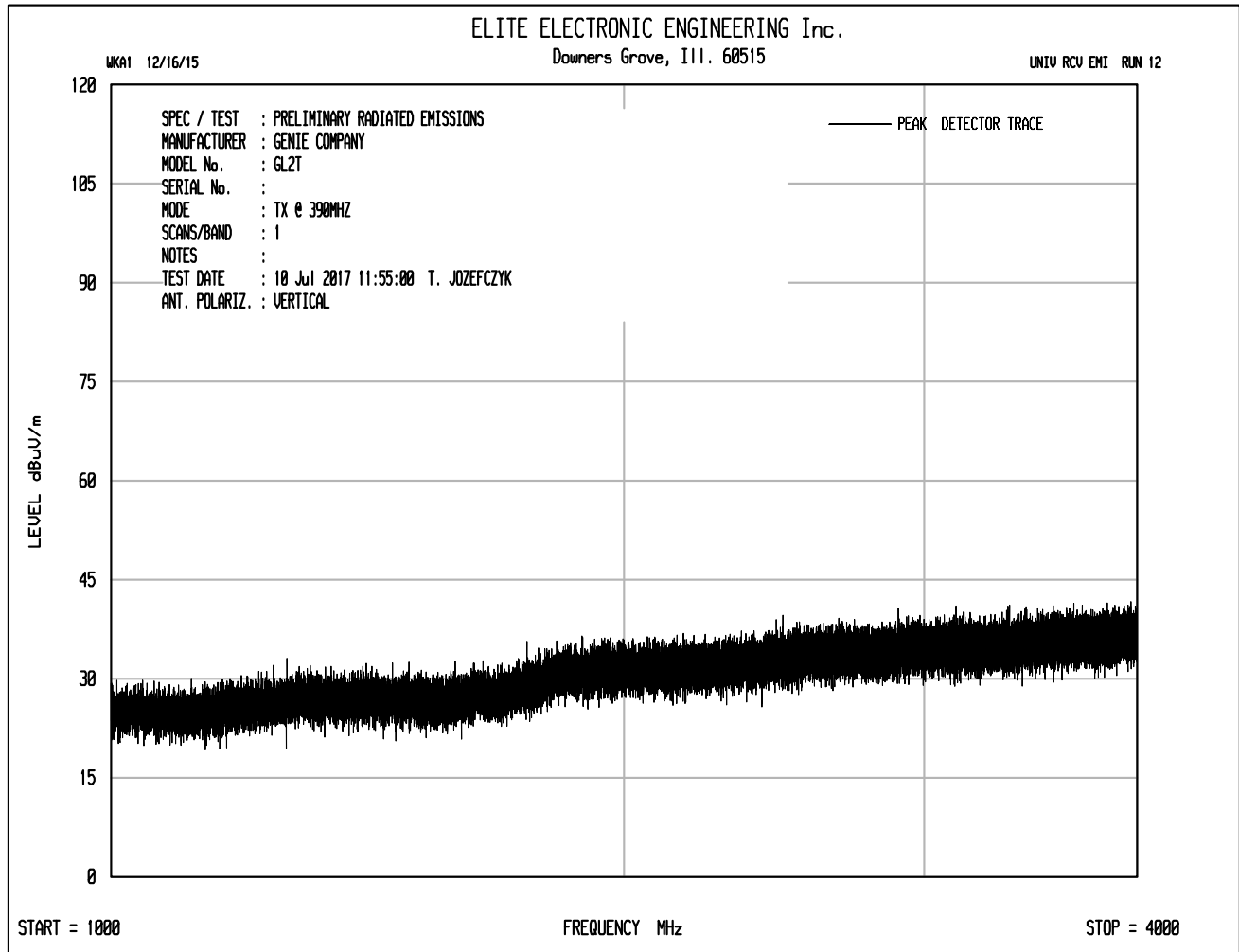












### DATA SHEET

MANUFACTURER Genie Company  
EUT Key-Fob Door Opener  
SPECIFICATION FCC 15 C, Section 15.231  
TEST Final Radiated Emissions  
MODE Tx – 315MHz  
DATE TESTED 07/10/2017

| Freq.<br>(MHz) | Ant<br>Pol | Meter<br>Reading<br>(dBuV) | Ambient | CBL<br>Fac<br>(dB) | Ant<br>Fac<br>(dB) | Pre<br>Amp<br>(dB) | Duty<br>Cycle<br>(dB) | Total<br>(dBuV/m) | Total<br>(uV/m) | Limit<br>(uV/m) | Margin<br>(dB) |
|----------------|------------|----------------------------|---------|--------------------|--------------------|--------------------|-----------------------|-------------------|-----------------|-----------------|----------------|
| 315.000        | H          | 63.7                       |         | 1.2                | 19.3               | 0.0                | -12.9                 | 71.4              | 3712.9          | 6041.7          | -4.2           |
| 315.000        | V          | 53.7                       |         | 1.2                | 19.3               | 0.0                | -12.9                 | 61.4              | 1174.1          | 6041.7          | -14.2          |
| 630.000        | H          | 28.3                       |         | 1.7                | 24.7               | 0.0                | -12.9                 | 41.9              | 123.8           | 604.2           | -13.8          |
| 630.000        | V          | 24.6                       |         | 1.7                | 24.7               | 0.0                | -12.9                 | 38.2              | 80.9            | 604.2           | -17.5          |
| 945.000        | H          | 39.6                       |         | 2.1                | 26.5               | 0.0                | -12.9                 | 55.3              | 582.6           | 604.2           | -0.3           |
| 945.000        | V          | 35.6                       |         | 2.1                | 26.5               | 0.0                | -12.9                 | 51.3              | 368.4           | 604.2           | -4.3           |
| 1260.000       | H          | 25.4                       |         | 2.5                | 29.0               | 0.0                | -12.9                 | 44.0              | 158.9           | 604.2           | -11.6          |
| 1260.000       | V          | 23.5                       |         | 2.5                | 29.0               | 0.0                | -12.9                 | 42.1              | 126.9           | 604.2           | -13.6          |
| 1575.000       | H          | 27.9                       |         | 2.7                | 28.3               | 0.0                | -12.9                 | 46.0              | 200.2           | 500.0           | -7.9           |
| 1575.000       | V          | 25.6                       |         | 2.7                | 28.3               | 0.0                | -12.9                 | 43.8              | 154.4           | 500.0           | -10.2          |
| 1890.000       | H          | 28.4                       |         | 3.0                | 30.9               | 0.0                | -12.9                 | 49.4              | 293.8           | 604.2           | -6.3           |
| 1890.000       | V          | 25.5                       | Ambient | 3.0                | 30.9               | 0.0                | -12.9                 | 46.5              | 210.6           | 604.2           | -9.2           |
| 2205.000       | H          | 24.2                       | Ambient | 3.3                | 31.6               | 0.0                | -12.9                 | 46.2              | 204.1           | 500.0           | -7.8           |
| 2205.000       | V          | 24.1                       | Ambient | 3.3                | 31.6               | 0.0                | -12.9                 | 46.1              | 202.5           | 500.0           | -7.9           |
| 2520.000       | H          | 24.3                       | Ambient | 3.5                | 32.2               | 0.0                | -12.9                 | 47.2              | 229.0           | 604.2           | -8.4           |
| 2520.000       | V          | 24.1                       | Ambient | 3.5                | 32.2               | 0.0                | -12.9                 | 46.9              | 222.0           | 604.2           | -8.7           |
| 2835.000       | H          | 25.1                       | Ambient | 3.8                | 32.6               | 0.0                | -12.9                 | 48.5              | 266.4           | 500.0           | -5.5           |
| 2835.000       | V          | 25.2                       | Ambient | 3.8                | 32.6               | 0.0                | -12.9                 | 48.7              | 271.4           | 500.0           | -5.3           |
| 3150.000       | H          | 24.3                       | Ambient | 4.0                | 32.9               | 0.0                | -12.9                 | 48.3              | 260.9           | 604.2           | -7.3           |
| 3150.000       | V          | 24.0                       | Ambient | 4.0                | 32.9               | 0.0                | -12.9                 | 48.0              | 250.9           | 604.2           | -7.6           |

Tested By:   
Tylar Jozefczyk

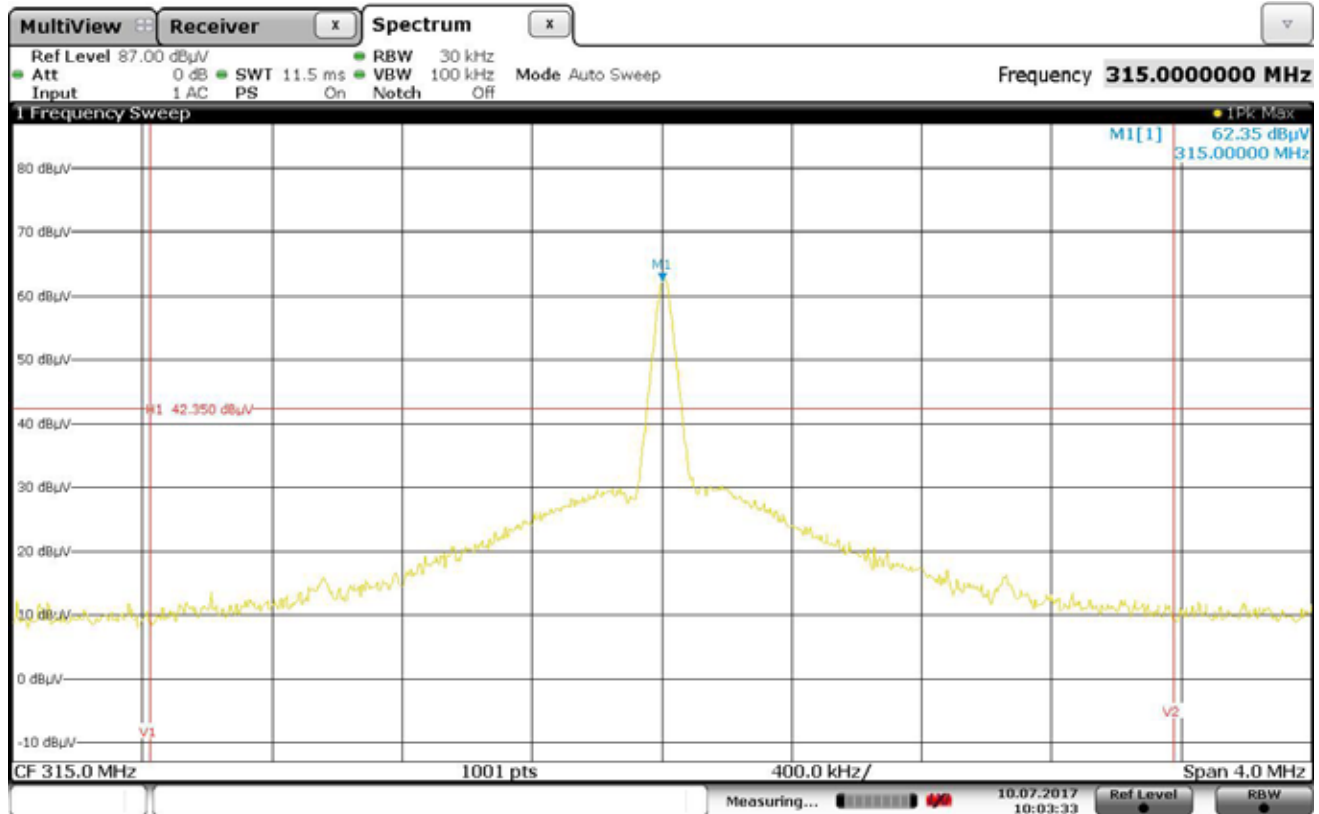


### DATA SHEET

MANUFACTURER Genie Company  
EUT Key-Fob Door Opener  
SPECIFICATION FCC 15 C, Section 15.231  
TEST Final Radiated Emissions  
MODE Tx – 390MHz  
DATE TESTED 07/10/2017

| Freq.<br>(MHz) | Ant<br>Pol | Meter<br>Reading<br>(dBuV) | Ambient | CBL<br>Fac<br>(dB) | Ant<br>Fac<br>(dB) | Pre<br>Amp<br>(dB) | Duty<br>Cycle<br>(dB) | Total<br>(dBuV/m) | Total<br>(uV/m) | Limit<br>(uV/m) | Margin<br>(dB) |
|----------------|------------|----------------------------|---------|--------------------|--------------------|--------------------|-----------------------|-------------------|-----------------|-----------------|----------------|
| 390.000        | H          | 67.1                       |         | 1.3                | 21.1               | 0.0                | -13.1                 | 76.4              | 6621.8          | 9166.7          | -2.8           |
| 390.000        | V          | 54.3                       |         | 1.3                | 21.1               | 0.0                | -13.1                 | 63.6              | 1522.2          | 9166.7          | -15.6          |
| 780.000        | H          | 34.9                       |         | 1.9                | 25.9               | 0.0                | -13.1                 | 49.6              | 301.8           | 916.7           | -9.7           |
| 780.000        | V          | 24.7                       |         | 1.9                | 25.9               | 0.0                | -13.1                 | 39.4              | 93.4            | 916.7           | -19.8          |
| 1170.000       | H          | 32.5                       |         | 2.4                | 28.9               | 0.0                | -13.1                 | 50.7              | 342.2           | 500.0           | -3.3           |
| 1170.000       | V          | 28.8                       |         | 2.4                | 28.9               | 0.0                | -13.1                 | 47.0              | 223.2           | 500.0           | -7.0           |
| 1560.000       | H          | 25.8                       |         | 2.7                | 28.2               | 0.0                | -13.1                 | 43.7              | 152.7           | 500.0           | -10.3          |
| 1560.000       | V          | 24.9                       |         | 2.7                | 28.2               | 0.0                | -13.1                 | 42.8              | 137.5           | 500.0           | -11.2          |
| 1950.000       | H          | 26.4                       |         | 3.0                | 31.4               | 0.0                | -13.1                 | 47.7              | 242.5           | 916.7           | -11.6          |
| 1950.000       | V          | 25.2                       |         | 3.0                | 31.4               | 0.0                | -13.1                 | 46.5              | 210.9           | 916.7           | -12.8          |
| 2340.000       | H          | 24.0                       | Ambient | 3.4                | 31.8               | 0.0                | -13.1                 | 46.1              | 201.5           | 500.0           | -7.9           |
| 2340.000       | V          | 24.3                       | Ambient | 3.4                | 31.8               | 0.0                | -13.1                 | 46.4              | 209.8           | 500.0           | -7.5           |
| 2730.000       | H          | 24.6                       | Ambient | 3.7                | 32.5               | 0.0                | -13.1                 | 47.6              | 241.0           | 500.0           | -6.3           |
| 2730.000       | V          | 25.1                       | Ambient | 3.7                | 32.5               | 0.0                | -13.1                 | 48.2              | 255.9           | 500.0           | -5.8           |
| 3120.000       | H          | 24.6                       | Ambient | 4.0                | 32.9               | 0.0                | -13.1                 | 48.4              | 261.6           | 916.7           | -10.9          |
| 3120.000       | V          | 24.3                       | Ambient | 4.0                | 32.9               | 0.0                | -13.1                 | 48.0              | 251.8           | 916.7           | -11.2          |
| 3510.000       | H          | 24.7                       | Ambient | 4.2                | 32.9               | 0.0                | -13.1                 | 48.7              | 273.0           | 916.7           | -10.5          |
| 3510.000       | V          | 24.2                       | Ambient | 4.2                | 32.9               | 0.0                | -13.1                 | 48.2              | 257.1           | 916.7           | -11.0          |
| 3900.000       | H          | 25.2                       | Ambient | 4.4                | 33.3               | 0.0                | -13.1                 | 49.8              | 309.4           | 500.0           | -4.2           |
| 3900.000       | V          | 25.4                       | Ambient | 4.4                | 33.3               | 0.0                | -13.1                 | 50.0              | 315.5           | 500.0           | -4.0           |

Tested By:   
Tylar Jozefczyk

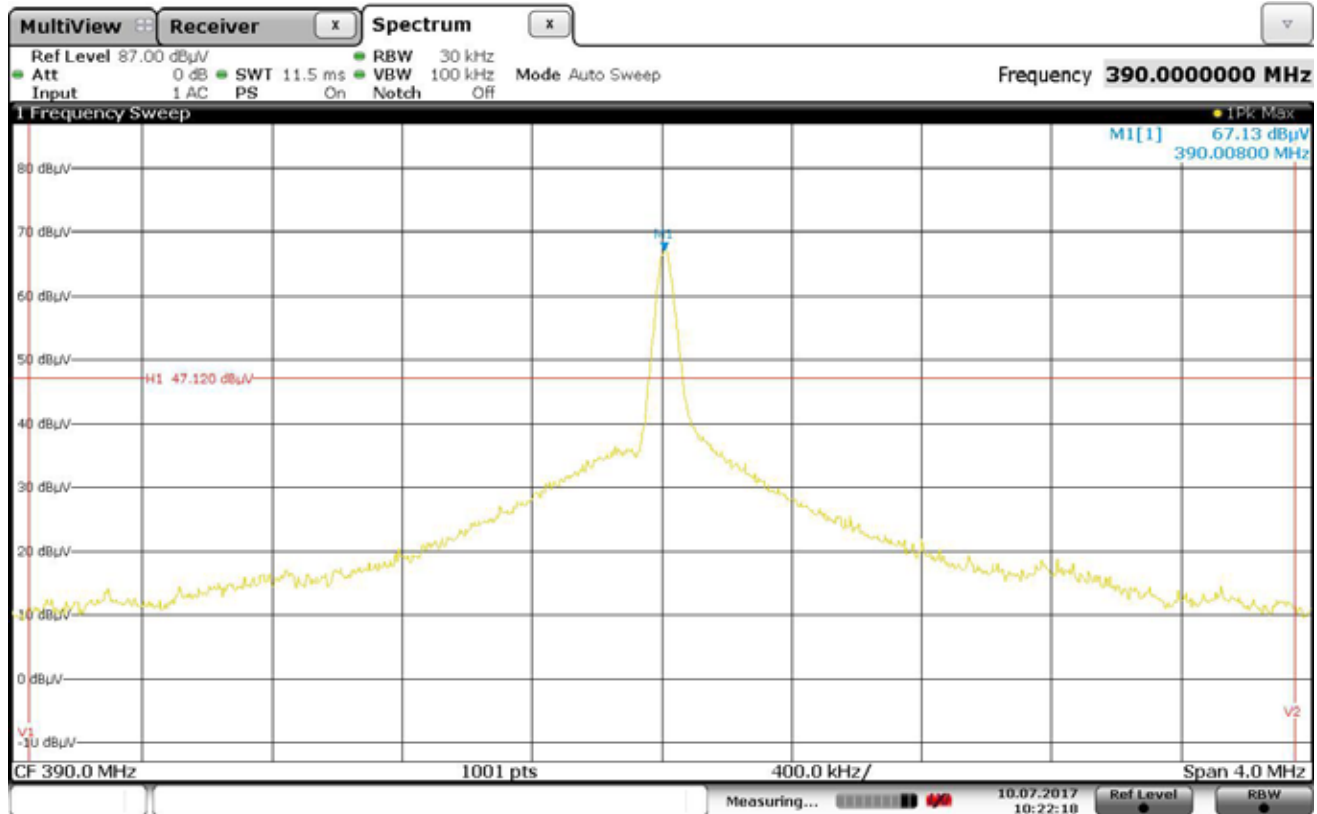


Date: 10.JUL.2017 10:03:33

## OCCUPIED BANDWIDTH

MANUFACTURER : Genie Company  
TEST ITEM : Key-Fob Door Opener  
TEST MODE : Tx – 315MHz

## NOTES



Date: 10 JUL 2017 10:22:19

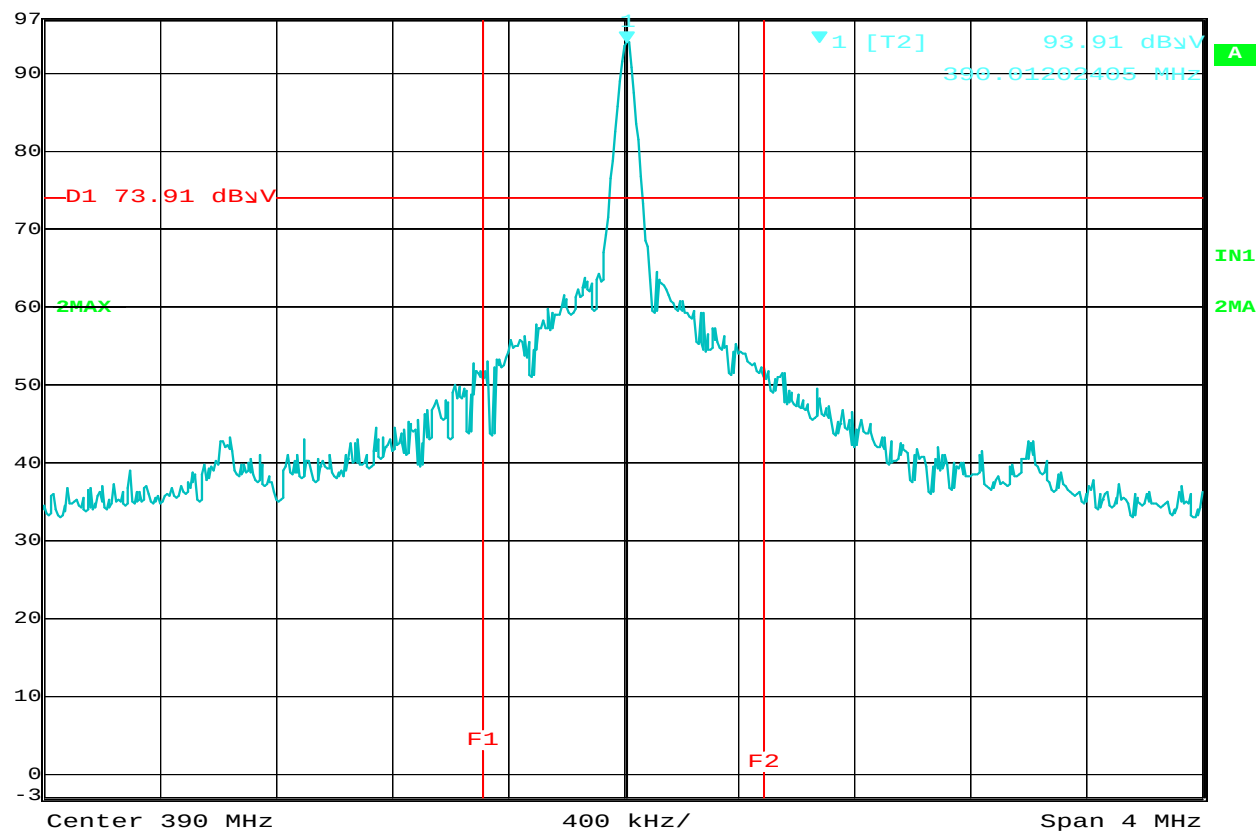
## OCCUPIED BANDWIDTH

MANUFACTURER : Genie Company  
TEST ITEM : Key-Fob Door Opener  
TEST MODE : Tx – 390MHz

## NOTES



Marker 1 [T2]  
Ref Lvl 97 dBμV  
93.91 dBμV  
390.01202405 MHz  
RBW 30 kHz  
VBW 300 kHz  
SWT 11.5 ms  
RF Att 0 dB  
Unit dBμV



Date: 3.NOV.2016 14:40:45

## 20dB Bandwidth

MANUFACTURER : Genie Company  
MODEL NUMBER : Flashlight Transmitter GL2T/OLT2  
SERIAL NUMBER : None Assigned  
TEST MODE : Transmit at 390MHz  
TEST PARAMETERS : 99% Bandwidth  
EQUIPMENT USED : RBB0  
NOTES : 99% bandwidth = 128.26kHz