



FCC Part 15, Subpart C, Section 15.231
Industry Canada, RSS-210 and RSS-GEN
Test Report

On

315 MHz Keyfob Transmitter
FCC ID: PQTDORM48
IC: 10735A-DORM48

Customer Name: Dorman Products, Inc.

Customer P.O.: 4200010109

Date of Report: May 22, 2020

Test Report No.: R-3086P

Test Start Date: May 21, 2019

Test Finish Date: May 20, 2019

Test Technician: M. Nowak

Test Engineer: A. Warwick

Approved By: D. Rybicki

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Certification and Signatures

We certify that this report is a true representation of the results obtained from the tests of the equipment stated. We further certify that the measurements shown in this report were made in accordance with the procedures indicated and vouch for the qualifications of all Retlif Testing Laboratories personnel taking them.



Arik L. Warwick
Test Engineer



David M. Rybicki
Laboratory Supervisor

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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 report must not be used by the client to claim product endorsement by ANSI National Accreditation Board (ANAB).



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Revision History

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

Revision	Date	Pages Affected
-	May 22, 2020	Original Release



Retlif Testing Laboratories

Report No. R-3086P

Technical Information

Report Number: R-3086P

Customer: Dorman Products, Inc.

Address: 3400 East Walnut Street
Colmar, PA 18915

Manufacturer: Dorman Products, Inc.

Manufacturer Address: 3400 East Walnut Street
Colmar, PA 18915

Test Sample: 315 MHz Keyfob Transmitter

Model Numbers: 13743, 13744, 99484

FCC ID: PQTDORM48

IC: 10735A-DORM48

Type: Security / Remote Control Transmitter

Power Requirements: 3 VDC Derived from a CR2032 Battery

Frequency of Operation: 315 MHz

Equipment Class: DSC

Equipment Use: Portable < 2.5 cm

Test Specification:

FCC Rules and Regulations Part 15, Subpart C, Section 15.231
Radio Standards Specification, RSS-210, Issue 9, August, 2016

Test Procedure:

ANSI C63.10:2013
RSS-GEN, Issue 5, April 2018

Test Site:

ANSI C63.4:2014

Test Facility:

Retlif Testing Laboratories
3131 Detwiler Road
Harleysville, PA 19438

FCC Accreditation Designation Number: US2321
ISED Test Site Registration Number: 2047B



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Tests Performed

The test methods performed on the 315 MHz Keyfob Transmitter are shown below:

FCC Part 15, Subpart C	Industry Canada RSS-210	Industry Canada RSS-GEN	Test Method	Test Results
15.231(b)	A1.1.2(1)	N/A	Field Strength of Emissions	Complied
15.231(b)(2)	A1.1.2(2)	4.5	Duty Cycle Determination	Complied
15.231(b)(3)	A1.1.2(3)	N/A	Field Strength of Spurious Emissions	Complied
15.231(c)	A1.1.3	N/A	Bandwidth of Emission	Complied



All test methods listed above are included in Retlif Testing Laboratories ANSI National Accreditation Board (ANAB), ISO/IEC 17025 Scope of Accreditation.



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General Test Requirements

1. The measurement procedures of ANSI C63.10:2013 were utilized as specified in FCC Part 15, Subpart C, Section 15.31(a)(3) and IC RSS-GEN Section 4.1.
2. All radiated emissions measurements were performed on an Open Area Test Site (OATS), listed with the FCC and IC, in accordance with FCC Section 15.31(d) and IC Section 4.2.
3. The level of the fundamental field strength was recorded with a new battery installed in the EUT, in accordance with FCC Section 15.231(e) and IC Section 4.3(e).
4. All measurements were performed at the specified 3 meter test distance as required by FCC Section 15.31(f) and IC Section 7.25.
5. The EUT was rotated throughout 360 degrees for all radiated emissions measurements as specified in FCC Section 15.31(f)(5) and IC Section 4.3(h).
6. All readily accessible EUT controls were adjusted in such a manner as to maximize the level of emissions in accordance with FCC Section 15.31(g) and IC Section 4.3(h).
7. Appropriate accessories were attached to all EUT ports during the performance of radiated emissions measurements as required by FCC Section 15.31(i) and IC Section 4.3(d).
8. The EUT operated at a frequency of 315 MHz and testing was performed in accordance with FCC Section 15.31(m) and IC Section 4.3(f)(g).
9. The frequency spectrum was investigated from the lowest frequency generated in the device up to the 10th harmonic of the highest fundamental frequency in accordance with FCC Section 15.33(a)(1) and IC Section 4.9.
10. All measurements were taken with a peak detector function as specified in FCC Section 15.35(a) and IC Section 4.4. The duty cycle, calculated in accordance with FCC Section 15.35(c) and IC Section 4.5, was applied to the peak readings in order to obtain the average value of emissions. The peak value of emissions was verified to meet the 20 dB requirement of FCC Section 15.35(b) and IC Section 7.2.1.



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Requirements and Test Results

Requirement:

FCC Section 15.231(a) - Periodic operation in the band 40.66 - 40.7 MHz and above 70 MHz

The provisions of this Section are restricted to periodic operation within the band 40.66-40.7 MHz and above 70 MHz. Except as shown in Paragraph (e) of this Section, the intentional radiator is restricted to the transmissions of a control signal such as those used with alarm systems, door openers, remote switches, etc. Continuous transmissions, voice, video and the radio control of toys are not permitted. Data is permitted to be sent with a control signal.

IC RSS-210, A1.1 - Momentarily Operated Devices

The frequency bands and field strength limits in Tables 4 and 5 are only for the transmission of a control signal such as that used with alarm systems, door openers, remote switches, etc. Radio control of toys or model aircrafts, and continuous transmissions such as voice or video are not permitted except as provided in A1.1.5. Data is permitted to be sent with a control signal.

- Results:
The device was operated at a frequency of 315 MHz and is for the transmission of a control signal used with remote switches. Data is sent with the control signal.

Requirement:

FCC Sections 15.231(a)(1)-(5)

Periodic operation in the band 40.66 - 40.7 MHz and above 70 MHz

The following conditions were met in order to comply with the provisions for momentary operation:

IC RSS-210, A1.1.1(a)-(d) - Types of Momentary Signals

The following conditions were met in order to comply with the provisions for momentary operation:

FCC 15.231(a)(1): A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

IC A1.1.1(a): A manually operated transmitter shall employ a push-to-operate switch and be under manual control at all transmission times. When released, the transmitter shall cease transmission (holdover time of up to 5 seconds of operation).

- Results:
The device is a manually operated, push to operate transmitter under manual control. The device ceased transmission within 5 seconds of deactivation. This was verified by a spectrum analyzer and manual deactivation of the transmitter in accordance with C63.10, 2013, Paragraph 7.4.



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FCC 15.231(a)(2): A transmitter activated automatically shall cease transmission within 5 seconds after activation.

IC A1.1.1(b): A transmitter activated automatically shall cease transmission with 5 seconds after activation, (i.e. maximum 5 seconds of operation).

- Results:
Transmission is not automatically activated.

FCC 15.231(a)(3): Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

IC A1.1.1(c): Periodic transmissions at regular predetermined intervals are not permitted, except as provided in A1.1.5. However, polling or supervision transmissions, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed 2 seconds per hour for each transmitter.

- Results:
The transmitter does not perform periodic transmissions.

FCC 15.231(a)(4): Intentional radiators which are employed for radio control purposes during emergencies involving fire, security and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.

IC A1.1.1(d): Intentional radiators employed for radio control purposes during emergencies involving fire, security of goods (e.g. burglar alarms), and safety-of-life, when activated to signal an alarm, may operate during the interval of the alarm condition.

- Results:
This device is not employed for radio control purposes during emergencies involving fire, security and safety for life.

FCC 15.231(a)(5): Transmission of set-up information for security systems may exceed the transmission duration limits in paragraphs (a)(1) and (a)(2) of this section, provided such transmission are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.

- Results:
The device is not employed for security systems.



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Requirement:

FCC Section 15.231(b) - Field Strength of Emissions

In addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators operated under this Section shall not exceed the limits specified in Table 1.

IC RSS-210, A1.1.2(1) - Field Strengths and Frequency Bands

The field strength of emissions from momentarily operated intentional radiators shall not exceed the limits specified in Table 1:

Table 1 - Test Limits, Field Strength of Emissions

Fundamental Frequency (MHz)	Field Strength of Fundamental microvolts/meter @3 meters (watts, e.i.r.p.) Quasi Peak or Average	Field Strength of Spurious Emissions microvolts/meter @3 meters Quasi Peak or Average
40.66 to 40.70	2,250	225
70 to 130	1,250 (470 nW)	125
130 to 174	1,250 to 3,750**	125 to 375**
174 to 260	3,750 (4.2 μW)	375
260 to 470	3,750 to 12,500**	375 to 1,250**
Above 470	12,500 (47 μW)	1,250

**Linear Interpolations
 For 130-174 MHz: FS (microvolts/m) = (56.82 x F) - 6,136
 For 260-470 MHz: FS (microvolts/m) = (41.67 x F) - 7,083
 The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

The Fundamental and Harmonic Emissions limits for a device operating at 315 MHz are listed in Table 2.

Table 2 - Fundamental and Harmonic Limits

Frequency of Operation MHz	Fundamental (μV/m)		Harmonics (μV/m)	
	Peak	Average	Peak	Average
315.0	60,418.0	6,041.8	6,041.8	604.1

- Results:
 The Fundamental and Harmonics field strengths did not exceed the limits specified in Table 2 at a test distance of 3 meters, taken with an Average Detector. See Table 3 for the Fundamental and Harmonic emissions test results.

Table 3 - Fundamental and Harmonics Test Results

Frequency of Operation MHz	Fundamental (μV/m)		Harmonics (μV/m)	
	Peak	Average	Peak	Average
315.0	4,466.84	2,220.76	367.29	182.60



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Requirement:

FCC Section 15.231(b)(2) - Duty Cycle Determination-Pulsed Operation

Intentional radiators operating under the provisions of the Section shall demonstrate compliance with the limits on the field strength emissions, as shown in Table 1, based on the average value of the measured emissions. As an alternative, compliance with the limits in the Table 1 may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization. If average emission measurements are employed, the provisions in Section 15.35 for averaging pulsed emissions and for limiting peak emissions apply. Further, compliance with the provisions of Section 15.205 shall be demonstrated using the measurement instrumentation specified in that Section.

IC RSS-GEN, Paragraph 4.5, Pulsed Operation

When the field strength (or envelope power) is not constant or when it is in pulses, and an average detector is specified to be used, the value of field strength or power shall be determined by averaging over one complete pulse train, including blanking intervals within the pulse train, as long as the pulse train does not exceed 0.1 seconds. In cases where the pulse train exceeds 0.1 seconds, the average value (of field strength or output power) shall be determined during a 0.1 second interval during which the field strength or power is at its maximum value.

The unit's RF output was directly coupled to the input of the spectrum analyzer. The analyzer was set for a frequency span of 0 Hz. 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. (See plots for additional information).

- Results:
The emissions did not exceed the limits specified in Table 1. See below for the exact method of calculating the average field strength.

$$\begin{aligned} \text{Transmitter On Time} &= \underline{49.73} \text{ milliseconds (maximum per cycle)} \\ \text{Transmitter Cycle Time} &= \underline{100} \text{ milliseconds (100 ms maximum)} \\ \text{Transmitter Duty Cycle} &= \underline{49.73} \% \end{aligned}$$

CALCULATION

$$\begin{aligned} 0 \text{ pulses} \times 156 \mu\text{s} &= 0 \text{ ms} \\ 44 \text{ pulses} \times 688 \mu\text{s} &= 30.27 \text{ ms} \\ 14 \text{ pulses} \times 1.39 \text{ ms} &= 19.46 \text{ ms} \\ 0 \text{ ms} + 30.27 \text{ ms} + 19.46 \text{ ms} &= 49.73 \text{ ms} \\ \text{Duty Cycle (49.73/100)} &= 49.73 \% \\ \text{Correction Factor} = 20\text{Log}(0.4973) &= -6.07 \text{ dB} \end{aligned}$$



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Requirement:

FCC Section 15.231(b)(3) - Field Strength of Spurious Emissions

The limits on the field strength of the spurious emissions specified in Table 1 are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in Table 1 or to the general limits shown in Section 15.209, whichever limit permits a higher field strength.

IC RSS-210, A1.1.2(3) - Field Strength of Unwanted Emissions

The limits on the field strength of unwanted emissions in Table 4 of RSS-210 are based on the fundamental frequency of the intentional radiator. Unwanted emissions shall be attenuated to the limits shown in Table 2 of RSS-210 or to the limits shown in Table 4 of RSS-210, whichever is less stringent.

- Results:
No spurious emissions were observed within 20 dB of the specified limit.

Requirement:

FCC Section 15.231(c) - Bandwidth of Emissions

The bandwidth of the emissions shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

IC RSS-210, A1.1.3 - Bandwidth of Momentary Signals

For the purpose of Section A1.1, the 99% bandwidth shall be no wider than 0.25% of the center frequency for devices operating between 70-900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency.

- Results:

The 20dB bandwidth was measured and found to be 40.17 kHz.

The 99% bandwidth was measured and found to be 8.92 kHz.



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General Requirements FCC and IC

Spectrum Analyzer Desensitization Considerations

Due to the nature of the emissions being measured, care was taken to ensure that the resolution bandwidth of the spectrum analyzer was adequate to provide accurate measurements. The following formula was utilized:

$$\text{minimum bandwidth} = 1/\{\text{minimum pulse width (in seconds)} \times 1.5\} = \text{Hz}$$

Setting pulse desensitization equal to zero and utilizing the minimum observed pulse width of 156 μs yields a minimum required bandwidth of 4273.5 Hz. FCC specified bandwidths of 100 kHz and 1 MHz were utilized below and above 1GHz, respectively.



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Open Area Test Site

For testing radiated measurements from 1 GHz to 40 GHz, a test site must satisfy either option in Section 5.5 of ANSI C63.4:2014.

First Option: Section 5.5.1 a) 1) of ANSI C63.4:2014, requires compliance with the site validation criterion called out in CISPR 16-1-4: 2010-04, which is the site validation by means of SVSWR measurements.

Second Option: Section 5.5.1 a) 2) of ANSI C63.4:2014, alternative site validation without SVSWR measurements – test site shall have a minimum area of the ground plane covered with RF absorbing material as specified in this clause and as shown in Figure 6 of ANSI C63.4:2014.

The Open Area Test Site used within this test program utilized the second option, with the RF Absorber placed directly on the ground plane. The RF Absorber had a maximum thickness of 30 cm and a minimum rated attenuation of 20 dB at all frequencies from 1 GHz to 18 GHz.



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Equipment Lists

FCC Section 15.231(b) - Field Strength of Emissions IC RSS-210, A1.1.2(1) - Field Strength and Frequency Bands

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
3207	ETS / EMCO	ANTENNA, ACTIVE LOOP	9 kHz - 30 MHz	6502	5/13/2019	5/31/2020
8016	ETS / EMCO	ANTENNA, LOG PERIODIC	200 MHz - 1 GHz	3146	2/7/2018	8/31/2019
8018	ETS / EMCO	ANTENNA, DOUBLE RIDGED GUIDE	1 - 18 GHz	3115	5/11/2018	11/30/2019
8300	RETLIF	OPEN AREA TEST SITE, ATTENUATION	3/10 Meter OATS	RPA	3/28/2018	3/31/2020
8300C	UNKNOWN	CABLE, COAXIAL	3/10 METER	3 METER CABLE	10/30/2018	10/31/2019
8317	AGILENT / HP	PRE-AMPLIFIER	1 - 26.5 GHz, 30 dB	8449B	5/28/2019	5/31/2020
8398	ETS / EMCO	ANTENNA, BICONICAL	20 - 200 MHz	3104C	2/13/2018	8/31/2019
8411	SONOMA INSTRUMENT	PRE-AMPLIFIER	9 KHz - 1 GHz	310N	9/14/2018	9/30/2019
8575	RIGOL	ANALYZER, SPECTRUM	9 kHz - 1.5 GHz	DSA815-TG	1/30/2019	1/31/2020
8644	AGILENT / HP	ANALYZER, SPECTRUM	100 Hz - 22 GHz	85662A	9/18/2018	9/30/2019
8644A	AGILENT / HP	ANALYZER, SPECTRUM	100 Hz - 22.5 GHz	8566B	9/18/2018	9/30/2019
8644B	AGILENT / HP	ANALYZER, RF PRESELECTOR	20 Hz - 2 GHz	85685A	9/28/2018	9/30/2019
8644C	AGILENT / HP	ANALYZER, QUASI-PEAK ADAPTOR	100 Hz - 22 GHz	85650A	9/24/2018	9/30/2019
8685	RETLIF	CABLE, COAXIAL	10 kHz - 18 GHz	3' TYPE N	2/15/2019	2/29/2020

FCC Section 15.231(b)(2) - Duty Cycle Determination - Pulsed Operation IC RSS-210, A1.1.2(2), RSS-GEN, 4.5 - Pulsed Operation

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
8388	TEKTRONIX	OSCILLOSCOPE	350 MHz	DPO 4032	7/10/2018	7/31/2019
8410A	ETS / EMCO	Field Probe, 6 cm Loop	790 MHz	7405-901	No Calibration Required	
8637	AGILENT/HP	ANALYZER, SPECTRUM	30 Hz - 26.5 GHz	8563E	6/21/2018	6/30/2019

FCC Section 15.231(b)(3) - Field Strength of Spurious Emissions IC RSS-210, A1.1.2(3) - Field Strength of Unwanted Emissions

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
3207	ETS / EMCO	ANTENNA, ACTIVE LOOP	9 kHz - 30 MHz	6502	5/13/2019	5/31/2020
8016	ETS / EMCO	ANTENNA, LOG PERIODIC	200 MHz - 1 GHz	3146	2/7/2018	8/31/2019
8018	ETS / EMCO	ANTENNA, DOUBLE RIDGED GUIDE	1 - 18 GHz	3115	5/11/2018	11/30/2019
8300	RETLIF	OPEN AREA TEST SITE, ATTENUATION	3/10 Meter OATS	RPA	3/28/2018	3/31/2020
8300C	UNKNOWN	CABLE, COAXIAL	3/10 METER	3 METER CABLE	10/30/2018	10/31/2019
8317	AGILENT / HP	PRE-AMPLIFIER	1 - 26.5 GHz, 30 dB	8449B	5/28/2019	5/31/2020
8398	ETS / EMCO	ANTENNA, BICONICAL	20 - 200 MHz	3104C	2/13/2018	8/31/2019
8411	SONOMA INSTRUMENT	PRE-AMPLIFIER	9 KHz - 1 GHz	310N	9/14/2018	9/30/2019
8575	RIGOL	ANALYZER, SPECTRUM	9 kHz - 1.5 GHz	DSA815-TG	1/30/2019	1/31/2020
8644	AGILENT / HP	ANALYZER, SPECTRUM	100 Hz - 22 GHz	85662A	9/18/2018	9/30/2019
8644A	AGILENT / HP	ANALYZER, SPECTRUM	100 Hz - 22.5 GHz	8566B	9/18/2018	9/30/2019
8644B	AGILENT / HP	ANALYZER, RF PRESELECTOR	20 Hz - 2 GHz	85685A	9/28/2018	9/30/2019
8644C	AGILENT / HP	ANALYZER, QUASI-PEAK ADAPTOR	100 Hz - 22 GHz	85650A	9/24/2018	9/30/2019
8685	RETLIF	CABLE, COAXIAL	10 kHz - 18 GHz	3' TYPE N	2/15/2019	2/29/2020



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FCC Section 15.231(c) - Bandwidth of Emission

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
8410A	ETS / EMCO	Field Probe, 6 cm Loop	790 MHz	7405-901	No Calibration Required	
8575	RIGOL	ANALYZER, SPECTRUM	9 kHz - 1.5 GHz	DSA815-TG	1/30/2019	1/31/2020

IC RSS-GEN, 6.7, 99% Bandwidth

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
713	ROHDE & SCHWARZ	RECEIVER, EMI	20 Hz - 26.5 GHz	ESIB26	3/19/2020	3/31/2021
8410A	ETS / EMCO	Field Probe, 6 cm Loop	790 MHz	7405-901	No Calibration Required	



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Test Data



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**FCC Section 15.231(b) - Field Strength of Emissions
IC RSS-210, A1.1.2(1) - Field Strength and Frequency Bands
Test Data**



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Test Method:	FCC Part 15 Subpart C, Field Strength of Emissions, Paragraph 15.231(b)						
	IC RSS-210, A1.1.2 (1) Field Strengths and Frequency Bands						
Customer:	Dorman Products, Inc				Job No.:	R-3086P-1	
Test Sample:	315.00 MHz Remote Keyless Transmitter						
Model No.:	PQTDORM48						
Operating Mode:	Continuously Transmitting a RF Signal at 315 MHz						
Technician:	M. Nowak				Date:	05/21/19, 05/28/19	
Notes:	Detector: Peak, Unless otherwise specified			Test Distance: 3 Meters			
Test Freq.	Antenna Pol./Height	EUT Orientation	Meter Reading	Correction Factor	Corrected Reading	Converted Reading	Peak Limit
MHz	(V/H)/Meters	X / Y / Z	dB μ V	dB	dB μ V/m	μ V/m	μ V/m
314.35	V / 2.40	X / 79.3	51.6	17.1	68.7	2722.71	60146
314.35	V / 1.91	Y / 267.3	50.6	17.1	67.7	2426.62	
314.35	V / 1.19	Z / 154.2	38.5	17.1	55.6	602.56	
314.35	H / 2.82	X / 177.5	48.5	17.1	66.8	1905.47	
314.35	H / 2.53	Y / 344.2	47.6	17.1	64.7	1717.91	
314.35	H / 1.00	Z / 243.3	55.9	17.1	73.0	4466.84	60146
628.70	V / 1.00	X / 298.3	20.6	23.4	44.0	158.49	6015
628.70	V / 2.21	Y / 239.6	15.8	23.4	39.2	91.21	
628.70	V / 1.46	Z / 193.3	11.5	23.4	34.9	55.60	
628.70	H / 2.73	X / 41.0	13.5	23.4	36.9	69.99	
628.70	H / 2.28	Y / 154.2	14.4	23.4	37.8	77.63	
628.70	H / 1.69	Z / 85.2	18.8	23.4	42.2	128.83	6015
943.05	V / 1.28	X / 90.3	14.9	27.8	42.7	136.46	6015
943.05	V / 2.19	Y / 311.3	11.5	27.8	39.3	92.26	
943.05	V / 1.59	Z / 28.8	4.7	27.8	32.5	42.17	
943.05	H / 2.04	X / 230.3	9.2	27.8	37.0	70.80	
943.05	H / 1.89	Y / 12.0	14.4	27.8	42.2	128.83	
943.05	H / 1.00	Z / 175.5	15.5	27.8	43.3	146.22	6015
1257.40	V / 1.54	X / 275.5	39.3	-2.2	37.1	71.62	6015
1257.40	V / 1.54	Y / 270.4	36.0	-2.2	33.8	48.98	
*1257.40	V / 1.00	Z / 180.0	34.8	-2.2	32.6	42.66	
*1257.40	H / 1.00	X / 180.0	34.8	-2.2	32.6	42.66	
1257.40	H / 1.00	Y / 343.0	37.9	-2.2	35.7	60.96	
*1257.40	H / 1.00	Z / 180.0	34.8	-2.2	32.6	42.66	6015
1571.75	V / 1.52	X / 296.2	48.6	-0.6	48.0	251.19	5000
1571.75	V / 1.28	Y / 285.0	42.2	-0.6	41.6	120.23	
1571.75	V / 1.70	Z / 233.8	36.1	-0.6	35.5	59.57	
1571.75	H / 1.79	X / 332.6	40.0	-0.6	39.4	93.33	
1571.75	H / 1.77	Y / 358.0	44.8	-0.6	44.2	162.19	
1571.75	H / 1.76	Z / 291.7	43.7	-0.6	43.1	142.89	5000



Retlif Testing Laboratories

Report No. R-3086P

Test Method:	FCC Part 15 Subpart C, Field Strength of Emissions, Paragraph 15.231(b)						
	IC RSS-210, A1.1.2 (1) Field Strengths and Frequency Bands						
Customer:	Dorman Products, Inc				Job No.:	R-3086P-1	
Test Sample:	315.00 MHz Remote Keyless Transmitter						
Model No.:	PQTDORM48						
Operating Mode:	Continuously Transmitting a RF Signal at 315 MHz						
Technician:	M. Nowak				Date:	05/21/19, 05/28/19	
Notes:	Detector: Peak, unless otherwise specified			Test Distance: 3 Meters			
Test Freq.	Antenna Pol./Height	EUT Orientation	Meter Reading	Correction Factor	Corrected Reading	Converted Reading	Peak Limit
MHz	(V/H)-Meters	X / Y / Z	dBµV	dB	dBµV/m	µV/m	µV/m
1886.10	V / 1.68	X / 318.7	48.8	2.5	51.3	367.29	6015
1886.10	V / 1.76	Y / 265.4	39.6	2.5	42.1	127.36	
1886.10	V / 1.75	Z / 274.3	39.7	2.5	42.2	128.83	
1886.10	H / 1.52	X / 349.0	37.8	2.5	40.3	103.52	
1886.10	H / 1.61	Y / 358.0	45.1	2.5	47.6	239.89	
1886.10	H / 1.77	Z / 339.7	46.5	2.5	49.0	281.84	6015
2200.45	V / 1.00	X / 195.9	36.5	3.5	40.0	100.00	5000
2200.45	V / 1.73	Y / 253.0	37.6	3.5	41.1	113.51	
2200.45	V / 1.76	Z / 262.1	35.8	3.5	39.3	92.26	
2200.45	H / 1.50	X / 358.0	37.8	3.5	41.3	116.15	
2200.45	H / 1.55	Y / 358.0	39.3	3.5	42.8	138.04	
2200.45	H / 1.30	Z / 296.8	35.2	3.5	38.7	86.10	5000
2514.80	V / 1.80	X / 358.0	36.1	5.6	41.7	121.62	6015
*2514.80	V / 1.00	Y / 180.0	35.1	5.6	40.7	108.40	
*2514.80	V / 1.00	Z / 180.0	35.1	5.6	40.7	108.40	
*2514.80	H / 1.00	X / 180.0	35.1	5.6	40.7	108.40	
2514.80	H / 1.00	Y / 358.0	35.4	5.6	41.0	112.21	
*2514.80	H / 1.00	Z / 180.0	35.1	5.6	40.7	108.40	6015
2829.15	V / 1.77	X / 216.1	36.0	6.9	42.9	139.64	5000
2829.15	V / 1.47	Y / 290.6	35.9	6.9	42.8	138.04	
*2829.15	V / 1.00	Z / 180.0	32.2	6.9	39.1	90.16	
2829.15	H / 1.59	X / 358.0	35.5	6.9	42.4	131.83	
2829.15	H / 1.56	Y / 235.5	36.7	6.9	43.6	151.36	
*2829.15	H / 1.00	Z / 180.0	32.2	6.9	39.1	90.16	5000
*3143.50	V / 1.00	X / 180.0	33.7	9.5	43.2	144.55	6015
3143.50	V / 1.55	Y / 299.8	35.6	9.5	45.1	179.89	
*3143.50	V / 1.00	Z / 180.0	33.7	9.5	43.2	144.55	
*3143.50	H / 1.00	X / 180.0	33.7	9.5	43.2	144.55	
*3143.50	H / 1.00	Y / 180.0	33.7	9.5	43.2	144.55	
*3143.50	H / 1.00	Z / 180.0	33.7	9.5	43.2	144.55	6015

The frequency range was scanned from 9 kHz to 3.2 GHz.
Emissions from the EUT do not exceed the specified limits.
*Noise floor measurement, minimum sensitivity of measurement system.



Retlif Testing Laboratories

Report No. R-3086P

Test Method:	FCC Part 15 Subpart C, Field Strength of Emissions, Paragraph 15.231(b)						
	IC RSS-210, A1.1.2 (1) Field Strengths and Frequency Bands						
Customer:	Dorman Products, Inc				Job No.:	R-3086P-1	
Test Sample:	315.00 MHz Remote Keyless Transmitter						
Model No.:	PQTDORM48						
Operating Mode:	Continuously Transmitting a RF Signal at 315 MHz						
Technician:	M. Nowak				Date:	05/21/19, 05/28/19	
Notes:	Average values calculated from Peak readings Duty Cycle: 49.7% Correction -6.07 dB						
Test Freq.	Antenna Pol./Height	EUT Orientation	Peak Reading	Duty Cycle Correction	Corrected Reading	Converted Reading	Avg. Limit
MHz	(V/H)-Meters	X / Y / Z	dB μ V/m	dB	dB μ V/m	uV/m	uV/m
314.35	V / 2.40	X / 79.3	68.7	-6.07	62.63	1353.64	6015
314.35	V / 1.91	Y / 267.3	67.7	-6.07	61.63	1206.43	
314.35	V / 1.19	Z / 154.2	55.6	-6.07	49.53	299.58	
314.35	H / 2.82	X / 177.5	66.8	-6.07	59.53	947.33	
314.35	H / 2.53	Y / 344.2	64.7	-6.07	58.63	854.09	
314.35	H / 1.00	Z / 243.3	73.0	-6.07	66.93	2220.76	6015
628.70	V / 1.00	X / 298.3	44.0	-6.07	37.93	78.80	601.5
628.70	V / 2.21	Y / 239.6	39.2	-6.07	33.13	45.35	
628.70	V / 1.46	Z / 193.3	34.9	-6.07	28.83	27.64	
628.70	H / 2.73	X / 41.0	36.9	-6.07	30.83	34.80	
628.70	H / 2.28	Y / 154.2	37.8	-6.07	31.73	38.60	
628.70	H / 1.69	Z / 85.2	42.2	-6.07	36.13	64.05	601.5
943.05	V / 1.28	X / 90.3	42.7	-6.07	36.63	67.85	601.5
943.05	V / 2.19	Y / 311.3	39.3	-6.07	33.23	45.87	
943.05	V / 1.59	Z / 28.8	32.5	-6.07	26.43	20.97	
943.05	H / 2.04	X / 230.3	37.0	-6.07	30.93	35.20	
943.05	H / 1.89	Y / 12.0	42.2	-6.07	36.13	64.05	
943.05	H / 1.00	Z / 175.5	43.3	-6.07	37.23	72.70	601.5
1257.40	V / 1.54	X / 275.5	37.1	-6.07	31.03	35.61	601.5
1257.40	V / 1.54	Y / 270.4	33.8	-6.07	27.73	24.36	
*1257.40	V / 1.00	Z / 180.0	32.6	-	32.60	42.66	
*1257.40	H / 1.00	X / 180.0	32.6	-	32.60	42.66	
1257.40	H / 1.00	Y / 343.0	35.7	-6.07	29.63	30.31	
*1257.40	H / 1.00	Z / 180.0	32.6	-	32.60	42.66	601.5
1571.75	V / 1.52	X / 296.2	48.0	-6.07	41.93	124.89	500
1571.75	V / 1.28	Y / 285.0	41.6	-6.07	35.53	59.78	
1571.75	V / 1.70	Z / 233.8	35.5	-6.07	29.43	29.62	
1571.75	H / 1.79	X / 332.6	39.4	-6.07	33.33	46.40	
1571.75	H / 1.77	Y / 358.0	44.2	-6.07	38.13	80.64	
1571.75	H / 1.76	Z / 291.7	43.1	-6.07	37.03	71.04	500



Retlif Testing Laboratories

Report No. R-3086P

Test Method:	FCC Part 15 Subpart C, Field Strength of Emissions, Paragraph 15.231(b)		
	IC RSS-210, A1.1.2 (1) Field Strengths and Frequency Bands		
Customer:	Dorman Products, Inc	Job No.:	R-3086P-1
Test Sample:	315.00 MHz Remote Keyless Transmitter		
Model No.:	PQTDORM48		
Operating Mode:	Continuously Transmitting a RF Signal at 315 MHz		
Technician:	M. Nowak	Date:	05/21/19, 05/28/19

Notes: Average values calculated from Peak readings Duty Cycle: 49.7% Correction -6.07 dB

Test Freq.	Antenna Pol./Height	EUT Orientation	Peak Reading	Duty Cycle Correction	Corrected Reading	Converted Reading	Avg. Limit
MHz	(V/H)-Meters	X / Y / Z	dBµV/m	dB	dBµV/m	uV/m	uV/m
1886.10	V / 1.68	X / 318.7	51.3	-6.07	45.23	182.60	601.5
1886.10	V / 1.76	Y / 265.4	42.1	-6.07	36.03	63.32	
1886.10	V / 1.75	Z / 274.3	42.2	-6.07	36.13	64.05	
1886.10	H / 1.52	X / 349.0	40.3	-6.07	34.23	51.47	
1886.10	H / 1.61	Y / 358.0	47.6	-6.07	41.53	119.27	
1886.10	H / 1.77	Z / 339.7	49.0	-6.07	42.93	140.12	601.5
2200.45	V / 1.00	X / 195.9	40.0	-6.07	33.93	49.72	500
2200.45	V / 1.73	Y / 253.0	41.1	-6.07	35.03	56.43	
2200.45	V / 1.76	Z / 262.1	39.3	-6.07	33.23	45.87	
2200.45	H / 1.50	X / 358.0	41.3	-6.07	35.23	57.75	
2200.45	H / 1.55	Y / 358.0	42.8	-6.07	36.73	68.63	
2200.45	H / 1.30	Z / 296.8	38.7	-6.07	32.63	42.81	500
2514.80	V / 1.80	X / 358.0	41.7	-6.07	35.63	60.47	601.5
*2514.80	V / 1.00	Y / 180.0	40.7	-	40.70	108.40	
*2514.80	V / 1.00	Z / 180.0	40.7	-	40.70	108.40	
*2514.80	H / 1.00	X / 180.0	40.7	-	40.70	108.40	
2514.80	H / 1.00	Y / 358.0	41.0	-6.07	34.93	55.79	
*2514.80	H / 1.00	Z / 180.0	40.7	-	40.70	108.40	601.5
2829.15	V / 1.77	X / 216.1	42.9	-6.07	36.83	69.43	500
2829.15	V / 1.47	Y / 290.6	42.8	-6.07	36.73	68.63	
*2829.15	V / 1.00	Z / 180.0	39.1	-	39.10	90.16	
2829.15	H / 1.59	X / 358.0	42.4	-6.07	36.33	65.54	
2829.15	H / 1.56	Y / 235.5	43.6	-6.07	37.53	75.25	
*2829.15	H / 1.00	Z / 180.0	39.1	-	39.10	90.16	500
*3143.50	V / 1.00	X / 180.0	43.2	-	43.20	144.55	601.5
3143.50	V / 1.55	Y / 299.8	45.1	-6.07	39.03	89.44	
*3143.50	V / 1.00	Z / 180.0	43.2	-	43.20	144.55	
*3143.50	H / 1.00	X / 180.0	43.2	-	43.20	144.55	
*3143.50	H / 1.00	Y / 180.0	43.2	-	43.20	144.55	
*3143.50	H / 1.00	Z / 180.0	43.2	-	43.20	144.55	601.5

The frequency range was scanned from 9 kHz to 3.2 GHz.
Emissions from the EUT do not exceed the specified limits.
*Noise floor measurement, minimum sensitivity of measurement system.



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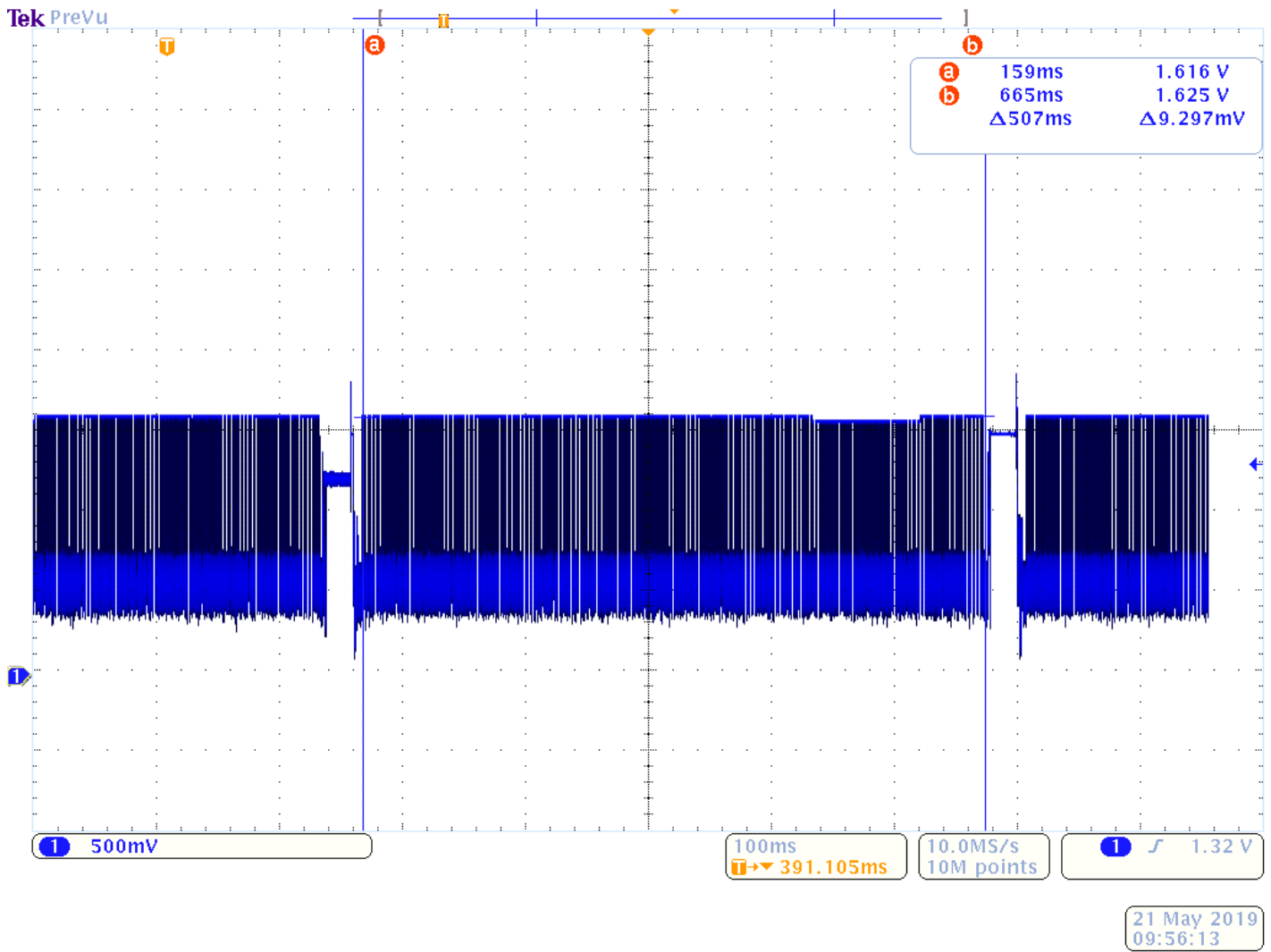
Report No. R-3086P

**FCC Section 15.231(b)(2) - Duty Cycle Determination - Pulsed Operation
IC RSS-210, A1.1.2(2), RSS-GEN, 4.5 - Pulsed Operation
Test Data**



Retlif Testing Laboratories

Report No. R-3086P



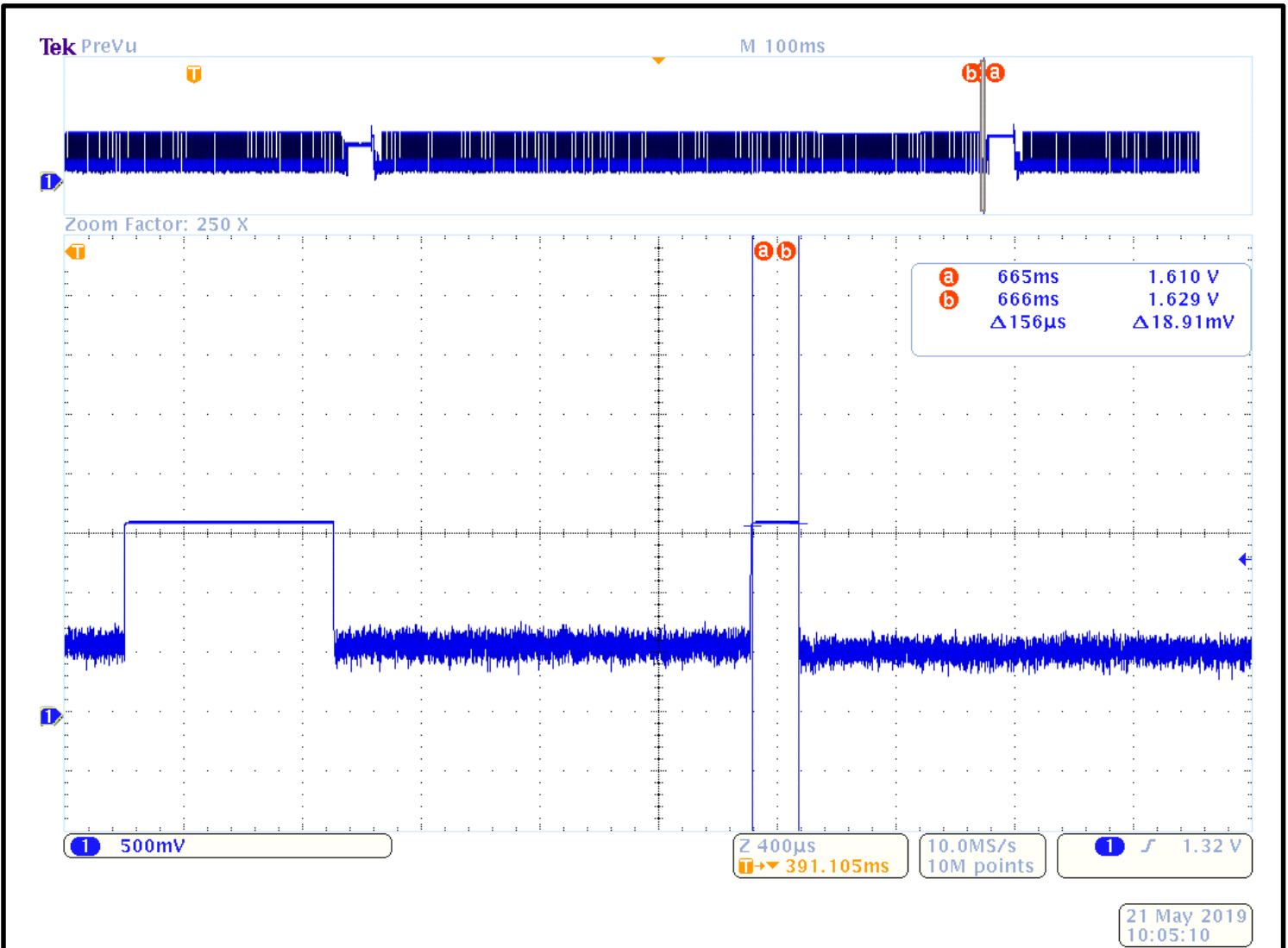
Test Method: FCC Part 15.231(b)(2), Duty Cycle Determination

Notes: Measurement of cycle time = 507 ms



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Report No. R-3086P

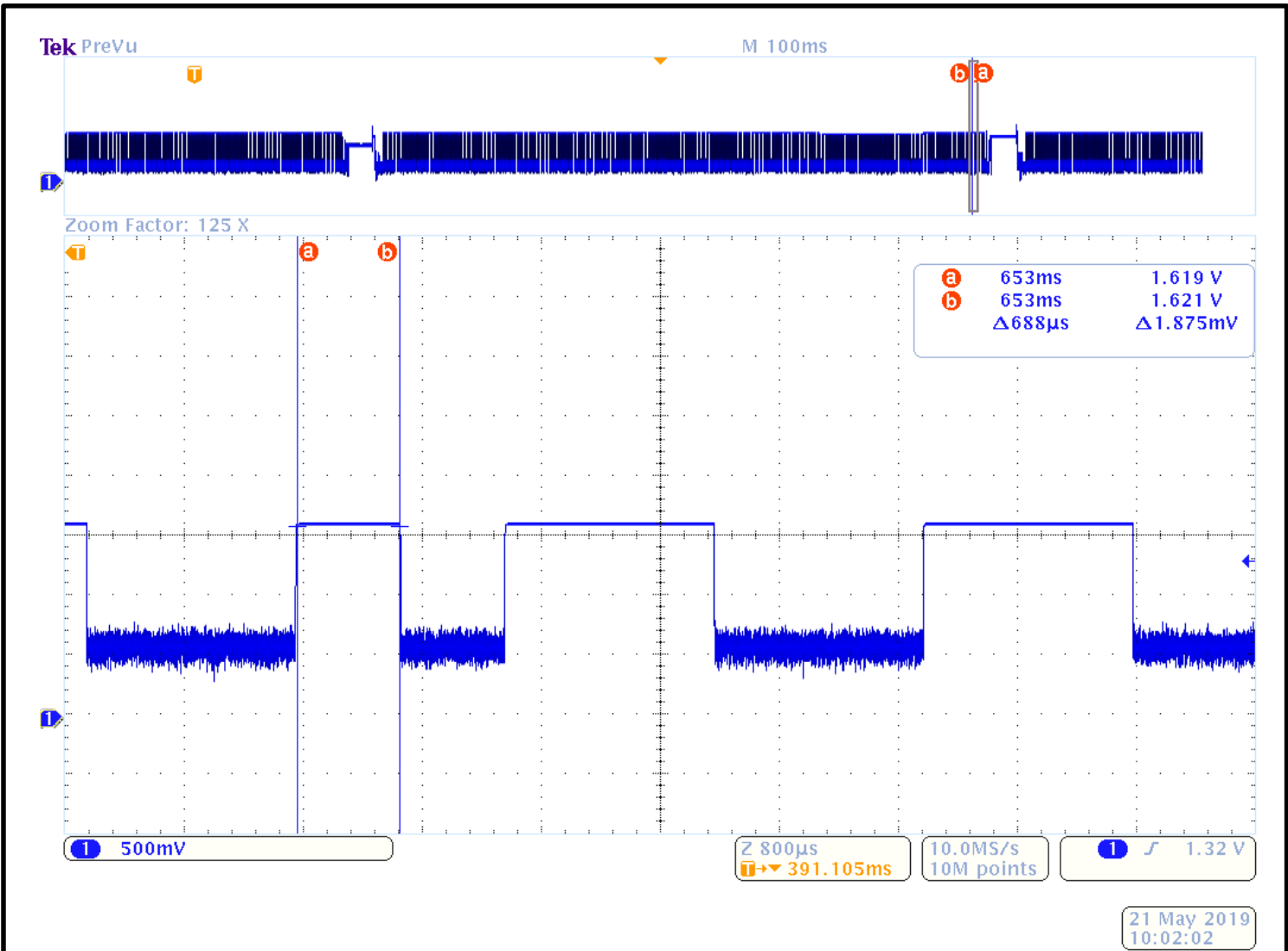


Test Method: FCC Part 15.231(b)(2), Duty Cycle Determination IC RSS-210 A1.1.2(2) Pulsed Operation
 Notes: Pulse width 1 = 0.156 ms



Retlif Testing Laboratories

Report No. R-3086P

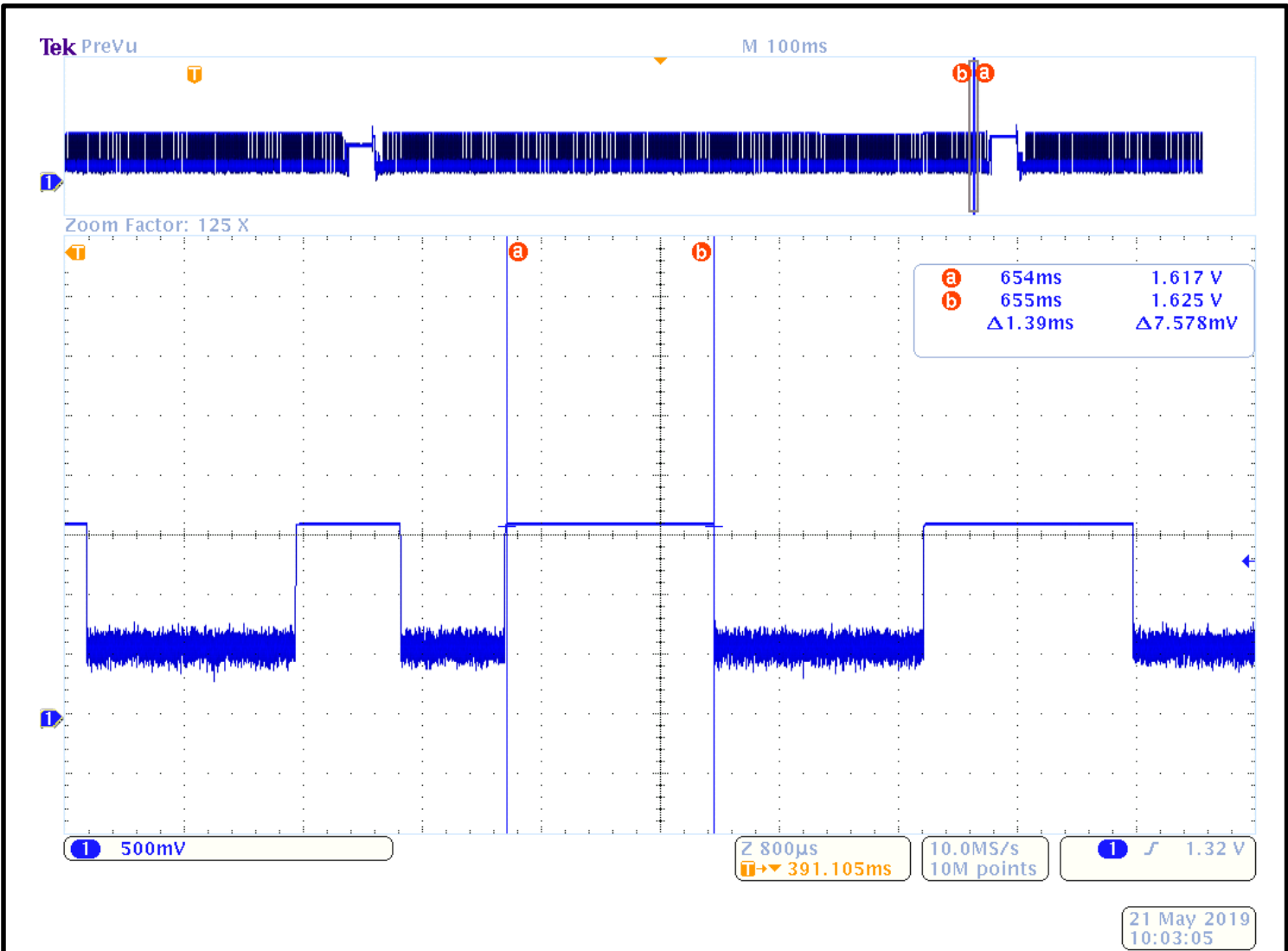


Test Method: FCC Part 15.231(b)(2), Duty Cycle Determination IC RSS-210 A1.1.2(2) Pulsed Operation
 Notes: Pulse width 2 = 0.688 ms



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Report No. R-3086P

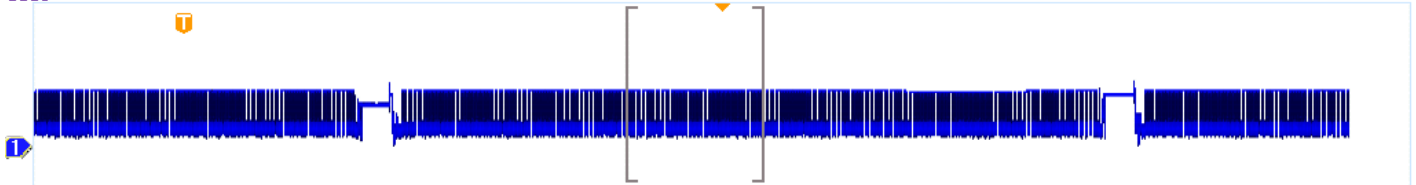


Test Method: FCC Part 15.231(b)(2), Duty Cycle Determination IC RSS-210 A1.1.2(2) Pulsed Operation
 Notes: Pulse width 3 = 1.39 ms

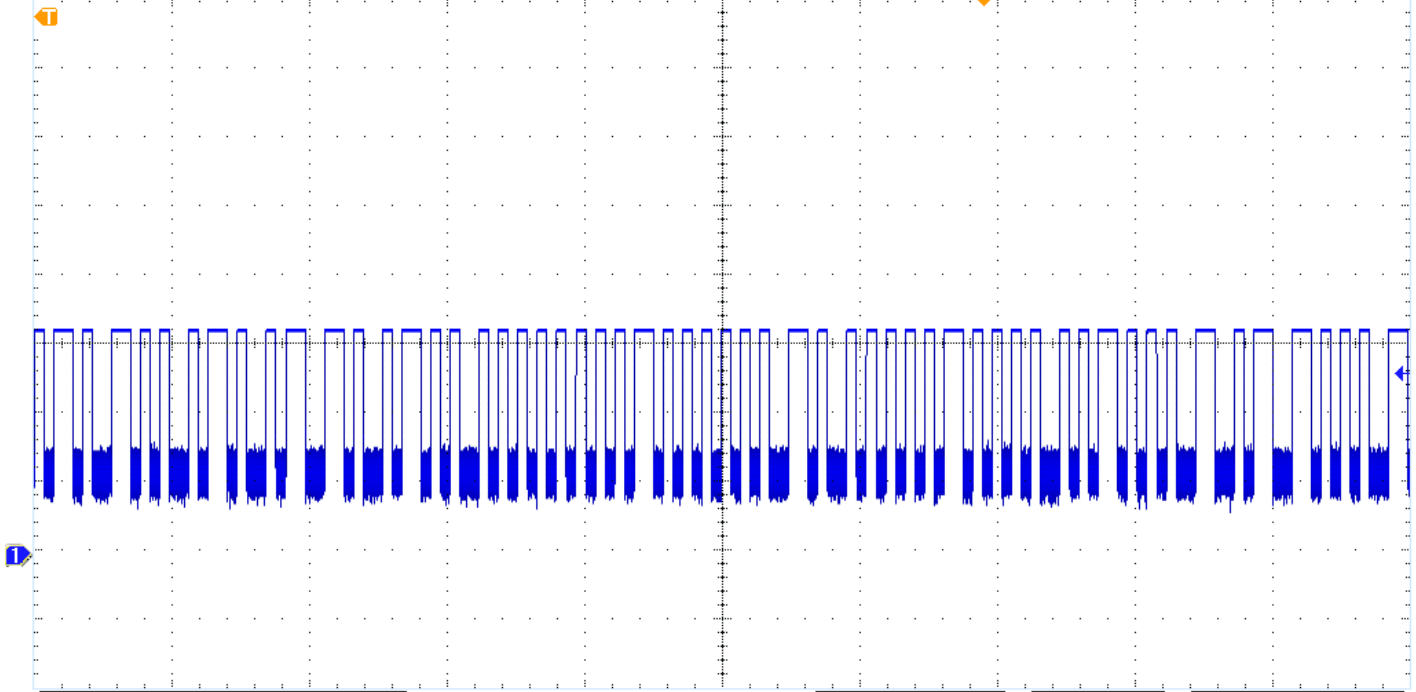


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Report No. R-3086P



Zoom Factor: 10 X



1 500mV

Z 10.0ms
391.105ms

10.0MS/s
10M points

1 1.32 V

21 May 2019
10:16:27

Test Method: FCC Part 15.231(b)(2), Duty Cycle Determination IC RSS-210 A1.1.2(2) Pulsed Operation

Notes: Number of Pulses = 0 @ 0.156 ms; 44 @ 0.688 ms; 14 @ 1.39 ms

Averaging Interval = 100 ms; Duty Cycle = 49.7%



Retlif Testing Laboratories

Report No. R-3086P

**FCC Section 15.231(b)(3) - Field Strength of Spurious Emissions
IC RSS-210, A1.1.2(3) - Field Strength of Unwanted Emissions
Test Data**



Retlif Testing Laboratories

Report No. R-3086P

Test Method:	FCC Part 15 Subpart C, Field Strength of Spurious Emissions, Paragraph 15.231(b)(3)		
	IC RSS-210, A1.1.2 (3) Field Strength of Unwanted Emissions		
Customer:	Dorman Products, Inc	Job No.:	R-2994P-1
Test Sample:	315.00 MHz Remote Keyless Transmitter		
Model No.:	PQTDORM48		
Operating Mode:	Continuously Transmitting a RF Signal at 315 MHz		
Technician:	M. Nowak	Date:	05/29/19

Notes: No Spurious Emissions were observed from the EUT.

Test Frequency	Antenna Pol /Height	EUT Orientation	Meter Reading	Correction Factor	Corrected Reading	Converted Reading	Limit At 3 Meters
MHz	(V/H) / (m)	Degrees	dBuV	dB	dBuV/m	uV/m	uV/m
30.00							100.00
88.00							100.00
88.00							150.00
216.00							150.00
216.00							200.00
960.00							200.00
960.00							500.00
1000.00							500.00

The frequency range was scanned from 9 kHz to 1 GHz.
No Spurious Emissions were observed from the EUT.



Retlif Testing Laboratories

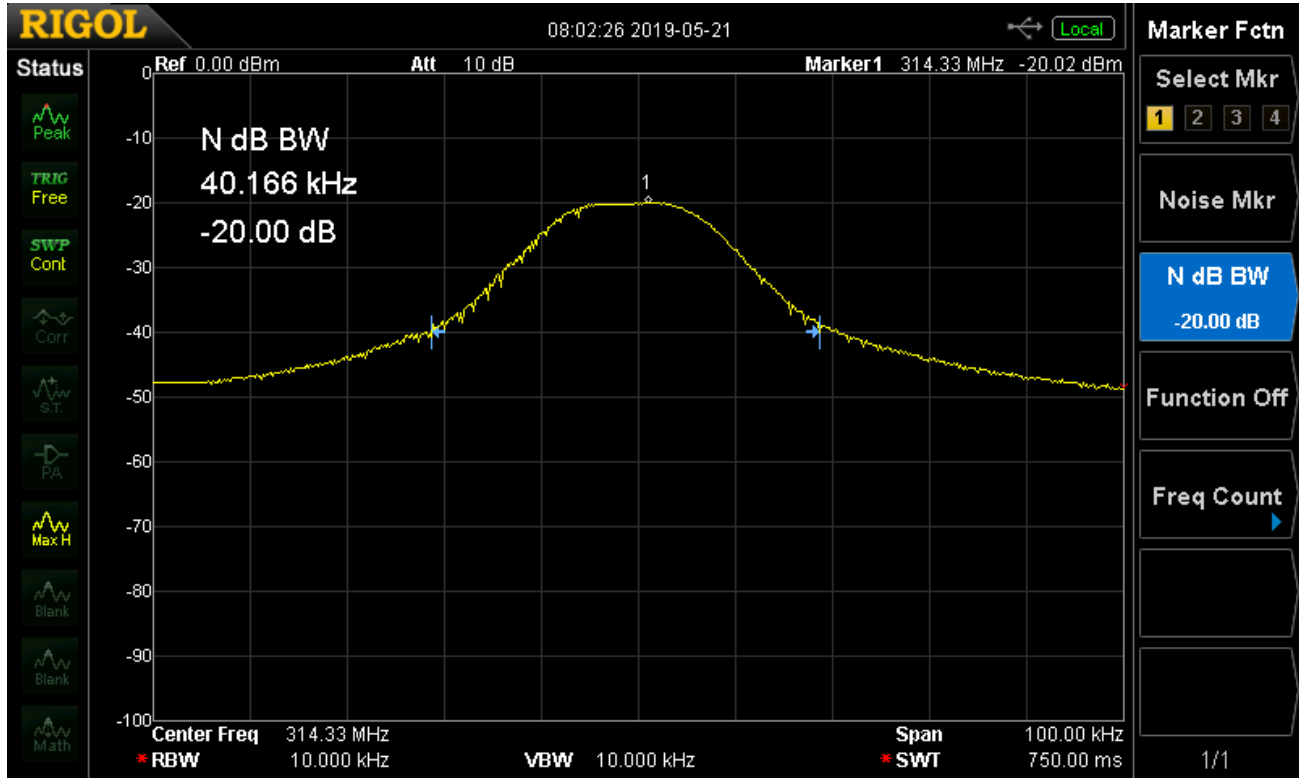
Report No. R-3086P

**FCC Section 15.231(c) - Bandwidth of Emission
IC RSS-210, A1.1.3 - Bandwidth of Momentary Signals
Test Data**



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Report No. R-3086P



20 dB Bandwidth, 40.17 kHz

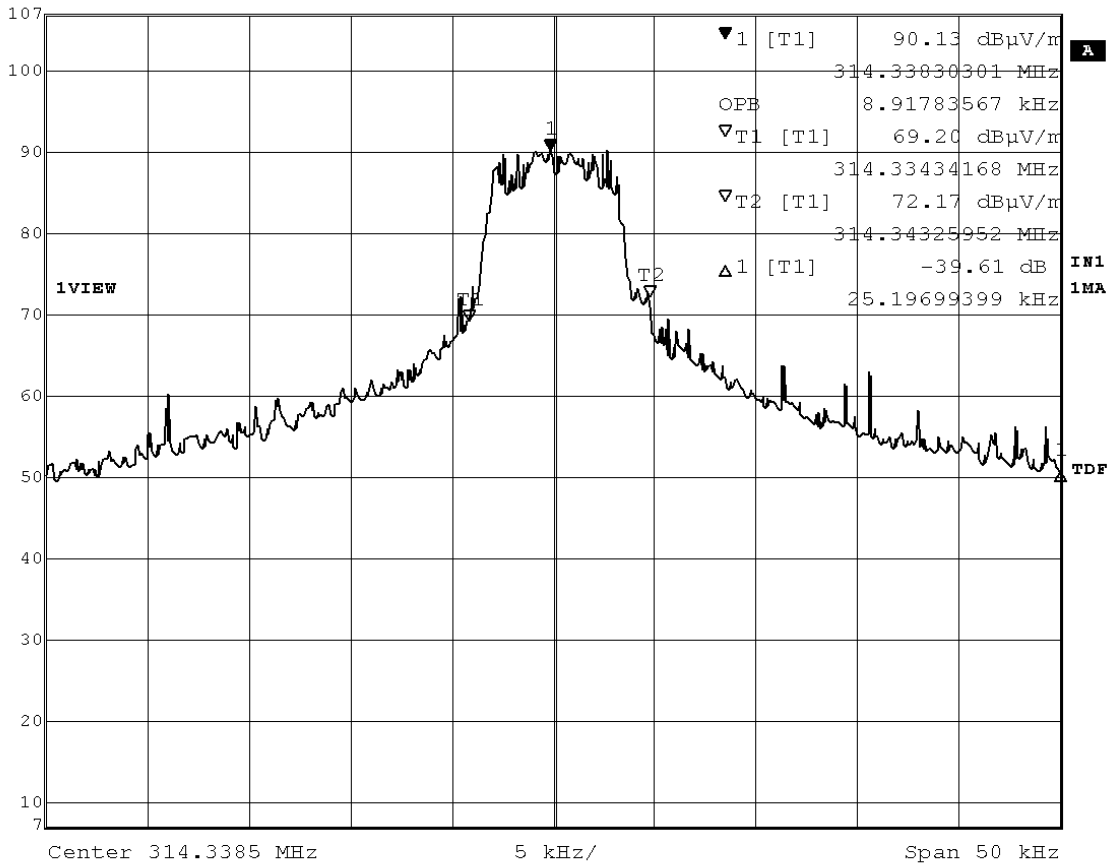


Retlif Testing Laboratories

Report No. R-3086P



Marker 1 [T1] RBW 500 Hz RF Att 40 dB
 Ref Lvl 90.13 dBμV/m VBW 3 kHz
 107 dB* 314.33830301 MHz SWT 1 s Unit dBμV/m



Date: 21.MAY.2020 13:53:10
 99% Bandwidth, 8.92 kHz



Retlif Testing Laboratories

Report No. R-3086P

**FCC Part 15, Subpart C, Section 15.231(a)(1), Timing Requirements
IC RSS-210 A1.1.1(a), Types Of Momentary Signals
Test Data**

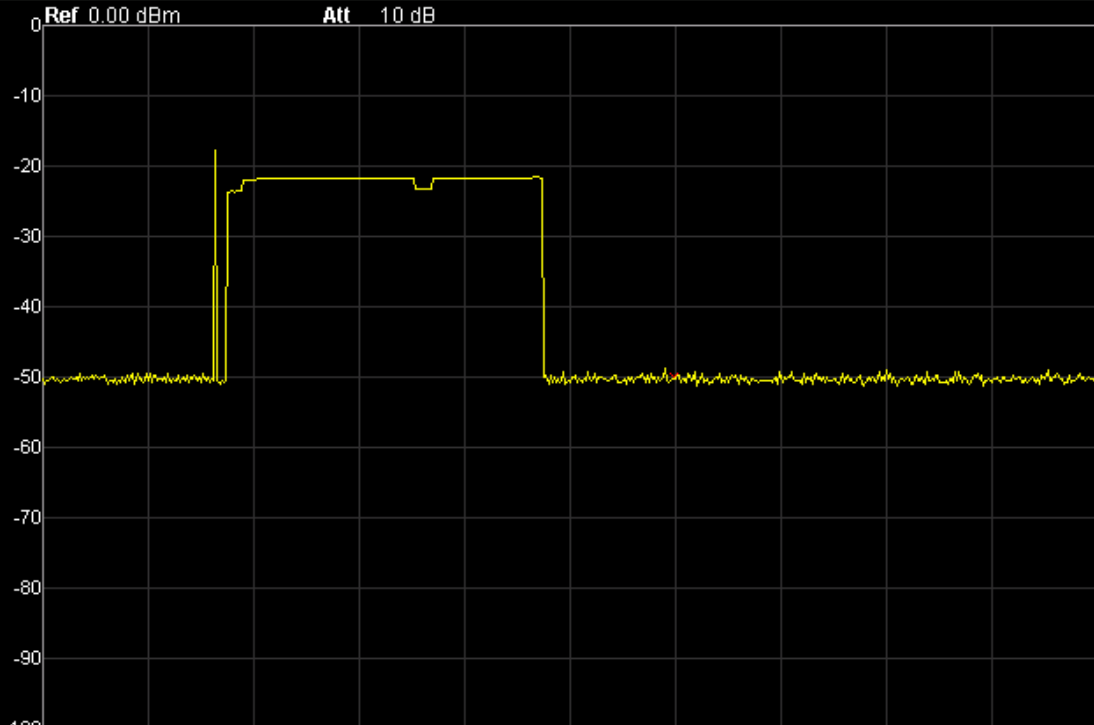


Retlif Testing Laboratories

Report No. R-3086P

Status

- Peak
- TRIG Free
- SWP Cont
- Corr
- ST
- PA
- Max H
- Blank
- Blank
- Math



Trace/PF

Select Trace

1 2 3

Trace Type

Max Hold

Avg Times

100

Trace Math

Clear All

Pass/Fail

1/1

Test Method: FCC Part 15.231(a)(1), Transmitter Deactivation Time

Notes: The transmitter was verified to cease transmitting within 5 seconds of manual deactivation.



Retlif Testing Laboratories

Report No. R-3086P