RETLIF TESTING LABORATORIES | Put Us To The Test℠
3131 Detwiler Road
Harleysville, PA 19438 USA
Tel: (215) 256-4133 • Fax: (215) 256-4130 • www.retlif.com

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

On

315 MHz Keyfob Transmitter
FCC ID: PQTDORM39
IC: 10735A-DORM39

Customer Name:	Dorman Products, Inc.
Customer P.O:	4200007067
Date of Report:	May 10, 2018
Test Report No:	R-2829P
Test Start Date:	January 12, 2018
Test Finish Date:	April 16, 2018
Test Technician:	D. Fiore, M. Nowak
Approved By:	C. T. Reitz
Report Prepared By:	P. Harris

Our letters, procedures and reports are for the exclusive use of the customer to whom they are addressed and their communication or the use of the name of Retlif Testing Laboratories must receive our prior written approval. Our letters, procedures and reports apply only to the sample tested and are not necessarily indicative of the qualities of apparently identical or similar products. The letters, procedures and reports and the name of Retlif Testing Laboratories or insignia are not to be used under any circumstances in advertising to the general public. This test report shall not be reproduced, except in full, without the written approval of Retlif Testing Laboratories.

Technical Information

Report Number:	R-2829P
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:	99377, 99378
FCC ID:	PQTDORM39
IC:	10735A-DORM39
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 4, November 2014

Test Site:
ANSI C63.4:2014

Test Facility:
Retlif Testing Laboratories
3131 Detwiler Road
Harleysville, PA 19438

FCC Accreditation Designation Number: US5342

IC Test Site Registration Number: 2047B

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
15.231(b)	A1.1.2(1)	N/A	Field Strength of Emissions
15.231(b)(2)	A1.1.2(2)	4.5	Duty Cycle Determination
15.231(b)(3)	A1.1.2(3)	N/A	Field Strength of Spurious Emissions
15.231(c)	A1.1.3	N/A	Bandwidth of Emission

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(c) and IC Section 4.3(c).
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 discrete frequency of 315 MHz.
9. The frequency spectrum was investigated from the lowest frequency generated in the device up to the 10^{th} 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.

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.

David M. Rybicki
EMC Test Engineer
NVLAP Approved Signatory

Colleen T. Reitz
Laboratory Supervisor
NVLAP Approved Signatory

Non-Warranty Provision
The testing services have been performed, findings obtained and reports prepared in accordance with generally accepted laboratory principles and practices. This warranty is in lieu of all others, either expressed or implied.

Non-Endorsement
This test report contains only findings and results arrived at after employing the specific test procedures and standards listed herein. It is not intended to constitute a recommendation, endorsement or certification of the product or material tested. This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

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 (c) 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 for remote keyless vehicle entry.

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.

Requirements and Test Results (con't)

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.

Requirements and Test Results (con't)

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
260 to 470	3,750 to 12,500**	375 to 1,250**
**Linear Interpolations 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)	
	Average	Peak	Average	Peak
315	6,041.8	60,418.0	604.18	6,041.8

- 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

Fundamental Frequency (MHz)	Maximum Fundamental (µV/m)	Maximum Harmonics (µV/m)
315	9,332.54	250.03

Requirements and Test Results (con't)

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).

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

Transmitter On Time = 19.213 milliseconds (maximum per cycle)

Transmitter Cycle Time = 48.45 milliseconds (100 ms maximum)

Transmitter Duty Cycle = 39.66 %

CALCULATION

46 pulses of 0.2375 msec = 10.925 milliseconds

17 Pulses of 0.4875 msec = 8.2875 milliseconds

Duty Cycle (19.213 / 48.45) = 39.66 %

Correction Factor = 20 log (0.3966) = -8.02 dB

Requirements and Test Results (con't)

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.

- Results:
  The 20 dB bandwidth was measured and found to be 49.50 kHz.

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 99% bandwidth was measured and found to be 630.0 kHz.

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:

minimum bandwidth = 1/{minimum pulse width (in seconds) x 1.5} = Hz

Setting pulse desensitization equal to zero and utilizing the minimum observed pulse width of 0.2375 ms yields a minimum required bandwidth of 2,807 Hz. FCC specified bandwidths of 100 kHz and 1 MHz were utilized below and above 1 GHz, respectively.

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.

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
8018	ETS / EMCO	ANTENNA, DOUBLE RIDGED GUIDE	1 - 18 GHz	3115	11/15/2016	5/31/2018
8080	ROHDE & SCHWARZ	RECEIVER, EMI	20 - 1300 MHz	354-3000.56ESVP	9/27/2017	9/30/2018
8300	RETLIF	OPEN AREA TEST SITE, ATTENUATION	3/10 Meter OATS	RPA	3/29/2016	3/31/2018
8300C	UNKNOWN	CABLE, COAXIAL	3/10 METER	3 METER CABLE	10/30/2017	10/31/2018
8317	AGILENT / HP	PRE-AMPLIFIER	1 - 26.5 GHz, 30 dB	8449B	5/18/2017	5/31/2018
8411	SONOMA INSTRUMENT	PRE-AMPLIFIER	9 KHz - 1 GHz	310N	9/19/2017	9/30/2018
8549	EMCO	ANTENNA, LOG PERIODIC	200 MHz - 1 GHz	3146	6/3/2016	6/30/2019
8550	EMCO	ANTENNA, BICONICAL	30 - 300 MHz	3110B	5/31/2016	5/31/2019
8644A	AGILENT / HP	ANALYZER, SPECTRUM	100 Hz - 22.5 GHz	8566B	8/8/2017	8/31/2018
8644B	AGILENT / HP	ANALYZER, RF PRESELECTOR	20 Hz - 2 GHz	85685A	8/11/2017	8/31/2018
8644C	AGILENT / HP	ANALYZER, QUASI-PEAK ADAPTOR	100 Hz - 22 GHz	85650A	8/11/2017	8/31/2018
8686	RETLIF	CABLE, COAXIAL	10 kHz - 18 GHz	5' TYPE N	6/21/2017	6/30/2018

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
8410A	ETS / EMCO	Field Probe, 6 cm Loop	790 MHz	7405-901	No Calibration Required	
R718	AGILENT / HP	ANALYZER, SPECTRUM	100 Hz - 26.5 GHz	E7405A;A	10/5/2017	10/31/2018

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
8016	ETS / EMCO	ANTENNA, LOG PERIODIC	200 MHz - 1 GHz	3146	2/7/2018	8/31/2019
8080	ROHDE & SCHWARZ	RECEIVER, EMI	20 - 1300 MHz	354-3000.56ESVP	9/27/2017	9/30/2018
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	10/30/2017	10/31/2018
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	9/19/2017	9/30/2018
8644	AGILENT / HP	ANALYZER, SPECTRUM	100 Hz - 22 GHz	85662A	8/8/2017	8/31/2018
8644A	AGILENT / HP	ANALYZER, SPECTRUM	100 Hz - 22.5 GHz	8566B	8/8/2017	8/31/2018
8644B	AGILENT / HP	ANALYZER, RF PRESELECTOR	20 Hz - 2 GHz	85685A	8/11/2017	8/31/2018
8644C	AGILENT / HP	ANALYZER, QUASI-PEAK ADAPTOR	100 Hz - 22 GHz	85650A	8/11/2017	8/31/2018

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

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	
R718	AGILENT / HP	ANALYZER, SPECTRUM	100 Hz - 26.5 GHz	E7405A;A	10/5/2017	10/31/2018

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

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-2829P-1
Test Sample:	315.00 MHz Remote Keyless Transmitter		
Model No.:	PQTDORM39		
Operating Mode:	Continuously Transmitting a RF Signal at 315 MHz		
Technician:	M. Nowak / D. Fiore	**Date:**	03/13/2018 & 03/19/2018
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	uV/m	uV/m
315.00	V / 2.12	X / 70.4	57.50	17.80	75.30	5821.03	60418
315.00	V / 2.14	Y / 253.1	57.30	17.80	75.10	5688.53	|
315.00	V / 1.03	Z / 86.2	42.30	17.80	60.10	1011.58	|
315.00	H / 2.60	X / 343.2	54.30	17.80	72.10	4027.17	|
315.00	H / 1.93	Y / 21.6	53.10	17.80	70.90	3507.52	|
315.00	H / 1.00	Z / 243.0	61.60	17.80	79.40	9332.54	60418
630.00	V / 2.27	X / 311.0	19.80	24.56	44.36	165.20	6041
630.00	V / 1.85	Y / 266.1	16.50	24.56	41.06	112.98	|
630.00	V / 1.00	Z / 82.1	15.40	24.56	39.96	99.54	|
630.00	H / 1.49	X / 244.9	15.20	24.56	39.76	97.27	|
630.00	H / 1.40	Y / 0.0	23.40	24.56	47.96	250.03	|
630.00	H / 1.59	Z / 319.8	21.80	24.56	46.36	207.94	6041
945.00	V / 2.17	X / 102.7	11.90	29.47	41.37	117.08	6041
945.00	V / 1.00	Y / 33.1	12.30	29.47	41.77	122.60	|
945.00	V / 1.00	Z / 13.6	12.20	29.47	41.67	121.20	|
945.00	H / 1.72	X / 140.9	11.90	29.47	41.37	117.08	|
945.00	H / 1.00	Y / 196.0	14.30	29.47	43.77	154.35	|
945.00	H / 1.00	Z / 134.6	13.90	29.47	43.37	147.40	6041
*1260.00	V / 1.00	X / 180.0	46.14	-0.41	45.73	193.42	6041
*1260.00	V / 1.00	Y / 180.0	46.14	-0.41	45.73	193.42	|
*1260.00	V / 1.00	Z / 180.0	46.14	-0.41	45.73	193.42	|
*1260.00	H / 1.00	X / 180.0	43.69	-0.41	43.28	145.88	|
*1260.00	H / 1.00	Y / 180.0	43.69	-0.41	43.28	145.88	|
1260.00	H / 1.00	Z / 180.0	43.69	-0.41	43.28	145.88	6041
*1575.00	V / 1.00	X / 180.0	45.75	1.55	47.30	231.74	5000
*1575.00	V / 1.00	Y / 180.0	45.75	1.55	47.30	231.74	|
*1575.00	V / 1.00	Z / 180.0	45.75	1.55	47.30	231.74	|
*1575.00	H / 1.00	X / 180.0	46.65	1.55	48.20	257.04	|
*1575.00	H / 1.00	Y / 180.0	46.65	1.55	48.20	257.04	|
*1575.00	H / 1.00	Z / 180.0	46.65	1.55	48.20	257.04	5000

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-2829P-1
Test Sample:	315.00 MHz Remote Keyless Transmitter		
Model No.:	PQTDORM39		
Operating Mode:	Continuously Transmitting a RF Signal at 315 MHz		
Technician:	M. Nowak / D.Fiore	**Date:**	03/13/2018 & 03/19/2018
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	uV/m	uV/m
*1890.00	V /1.00	X / 180.0	44.50	5.36	49.86	311.17	6041
*1890.00	V / 1.00	Y / 180.0	44.50	5.36	49.86	311.17	|
*1890.00	V / 1.00	Z / 180.0	45.00	5.36	50.36	329.61	|
*1890.00	H / 1.00	X / 180.0	45.00	5.36	50.36	329.61	|
*1890.00	H / 1.00	Y / 180.0	45.00	5.36	50.36	329.61	|
1890.00	H / 1.55	Z / 294.1	45.80	5.36	51.16	361.41	6041
*2205.00	V /1.00	X / 180.0	44.80	7.85	52.65	429.04	5000
*2205.00	V / 1.00	Y / 180.0	44.80	7.85	52.65	429.04	|
*2205.00	V / 1.00	Z / 180.0	44.80	7.85	52.65	429.04	|
*2205.00	H / 1.00	X / 180.0	44.40	7.85	52.25	409.73	|
*2205.00	H / 1.00	Y / 180.0	44.40	7.85	52.25	409.73	|
*2205.00	H / 1.00	Z / 180.0	44.40	7.85	52.25	409.73	5000
*2520.00	V /1.00	X / 180.0	45.40	8.21	53.61	479.18	6041
*2520.00	V / 1.00	Y / 180.0	45.40	8.21	53.61	479.18	|
*2520.00	V / 1.00	Z / 180.0	45.40	8.21	53.61	479.18	|
*2520.00	H / 1.00	X / 180.0	43.80	8.21	52.01	398.57	|
*2520.00	H / 1.00	Y / 180.0	43.80	8.21	52.01	398.57	|
*2520.00	H / 1.00	Z / 180.0	43.80	8.21	52.01	398.57	6041
*2835.00	H / 1.00	X / 180.0	43.60	10.04	53.64	480.84	5000
*2835.00	V / 1.00	Y / 180.0	43.60	10.04	53.64	480.84	|
*2835.00	V / 1.00	Z / 180.0	43.60	10.04	53.64	480.84	|
*2835.00	H / 1.00	X / 180.0	43.60	10.04	53.64	480.84	|
*2835.00	H / 1.00	Y / 180.0	43.60	10.04	53.64	480.84	|
*2835.00	H / 1.00	Z / 180.0	43.60	10.04	53.64	480.84	5000
*3150.00	V / 1.00	X / 180.0	40.50	13.49	53.99	500.61	6041
*3150.00	V / 1.00	Y / 180.0	40.50	13.49	53.99	500.61	|
*3150.00	V / 1.00	Z / 180.0	40.50	13.49	53.99	500.61	|
*3150.00	H / 1.00	X / 180.0	41.00	13.49	54.49	530.27	|
*3150.00	H / 1.00	Y / 180.0	41.00	13.49	54.49	530.27	|
*3150.00	H / 1.00	Z / 180.0	41.00	13.49	54.49	530.27	6041

The frequency range was scanned from 30 MHz to 3.2 GHz. All emissions not recorded were more than 20 dB below the specified limit. Emissions from the EUT do not exceed the specified limits.
NOTE: * Indicates minimum system sensitivity.

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-2829P-1
Test Sample:	315.00 MHz Remote Keyless Transmitter		
Model No.:	PQTDORM39		
Operating Mode:	Continuously Transmitting a RF Signal at 315 MHz		
Technician:	M. Nowak / D.Fiore	**Date:**	03/13/2018 & 03/19/2018
Notes:	Average values calculated from Peak readings Duty Cycle: 39.7% Correction -8.02 dB		

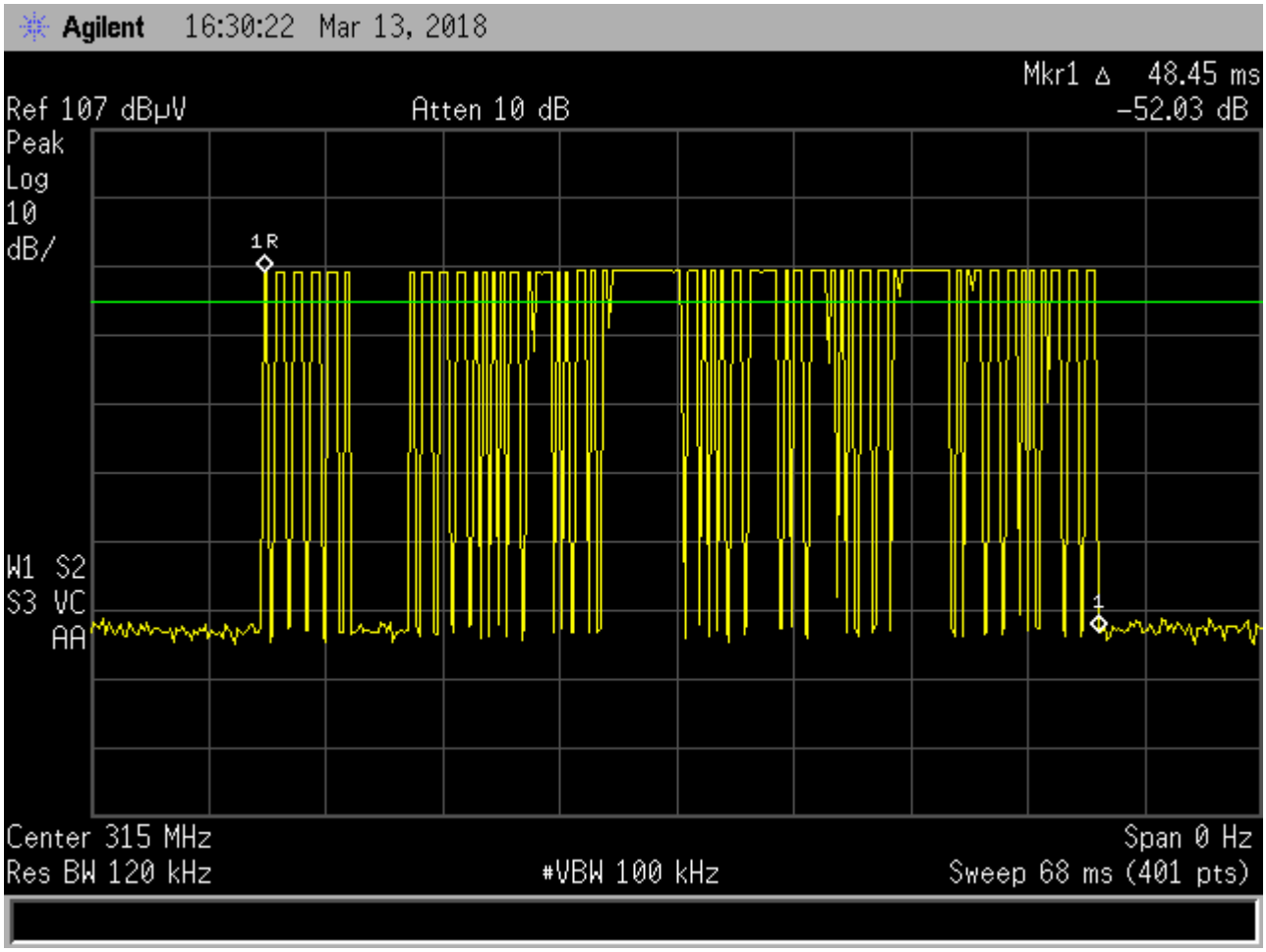
Test Freq.	Antenna Pol./Height	EUT Orientation	Peak Reading	Duty Cycle Correction	Corrected Reading	Converted Reading	Avg. Limit
MHz	(V/H)-Meters	X / Y / Z	dBµV/m	dB	dBµV/m	uV/m	uV/m
315.00	V / 2.12	X / 70.4	75.30	-8.02	67.28	2312.06	6041
315.00	V / 2.14	Y / 253.1	75.10	-8.02	67.08	2259.44	|
315.00	V / 1.03	Z / 86.2	60.10	-8.02	52.08	401.79	|
315.00	H / 2.60	X / 343.2	72.10	-8.02	64.08	1599.56	|
315.00	H / 1.93	Y / 21.6	70.90	-8.02	62.88	1393.16	|
315.00	H / 1.00	Z / 243.0	79.40	-8.02	71.38	3706.81	6041
630.00	V / 2.27	X / 311.0	44.36	-8.02	36.34	65.61	604.1
630.00	V / 1.85	Y / 266.1	41.06	-8.02	33.04	44.87	|
630.00	V / 1.00	Z / 82.1	39.96	-8.02	31.94	39.54	|
630.00	H / 1.49	X / 244.9	39.76	-8.02	31.74	38.64	|
630.00	H / 1.40	Y / 0.0	47.96	-8.02	39.94	99.31	|
630.00	H / 1.59	Z / 319.8	46.36	-8.02	38.34	82.60	604.1
945.00	V / 2.17	X / 102.7	41.37	-8.02	33.35	46.51	604.1
945.00	V / 1.00	Y / 33.1	41.77	-8.02	33.75	48.70	|
945.00	V / 1.00	Z / 13.6	41.67	-8.02	33.65	48.14	|
945.00	H / 1.72	X / 140.9	41.37	-8.02	33.35	46.51	|
945.00	H / 1.00	Y / 196.0	43.77	-8.02	35.75	61.31	|
945.00	H / 1.00	Z / 134.6	43.37	-8.02	35.35	58.55	604.1
*1260.00	V / 1.00	X / 180.0	45.73	0	45.73	193.42	604.1
*1260.00	V / 1.00	Y / 180.0	45.73	0	45.73	193.42	|
*1260.00	V / 1.00	Z / 180.0	45.73	0	45.73	193.42	|
*1260.00	H / 1.00	X / 180.0	43.28	0	43.28	145.88	|
*1260.00	H / 1.00	Y / 180.0	43.28	0	43.28	145.88	|
*1260.00	H / 1.00	Z / 180.0	43.28	0	43.28	145.88	604.1
*1575.00	V / 1.00	X / 180.0	47.30	0	47.30	231.74	500
*1575.00	V / 1.00	Y / 180.0	47.30	0	47.30	231.74	|
*1575.00	V / 1.00	Z / 180.0	47.30	0	47.30	231.74	|
*1575.00	H / 1.00	X / 180.0	48.20	0	48.20	257.04	|
*1575.00	H / 1.00	Y / 180.0	48.20	0	48.20	257.04	|
*1575.00	H / 1.00	Z / 180.0	48.20	0	48.20	257.04	500

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-2829P-1
Test Sample:	315.00 MHz Remote Keyless Transmitter		
Model No.:	PQTDORM39		
Operating Mode:	Continuously Transmitting a RF Signal at 315 MHz		
Technician:	M. Nowak / D.Fiore	**Date:**	03/13/2018 & 03/19/2018
Notes:	Average values calculated from Peak readings Duty Cycle: 39.7% Correction -8.02 dB		

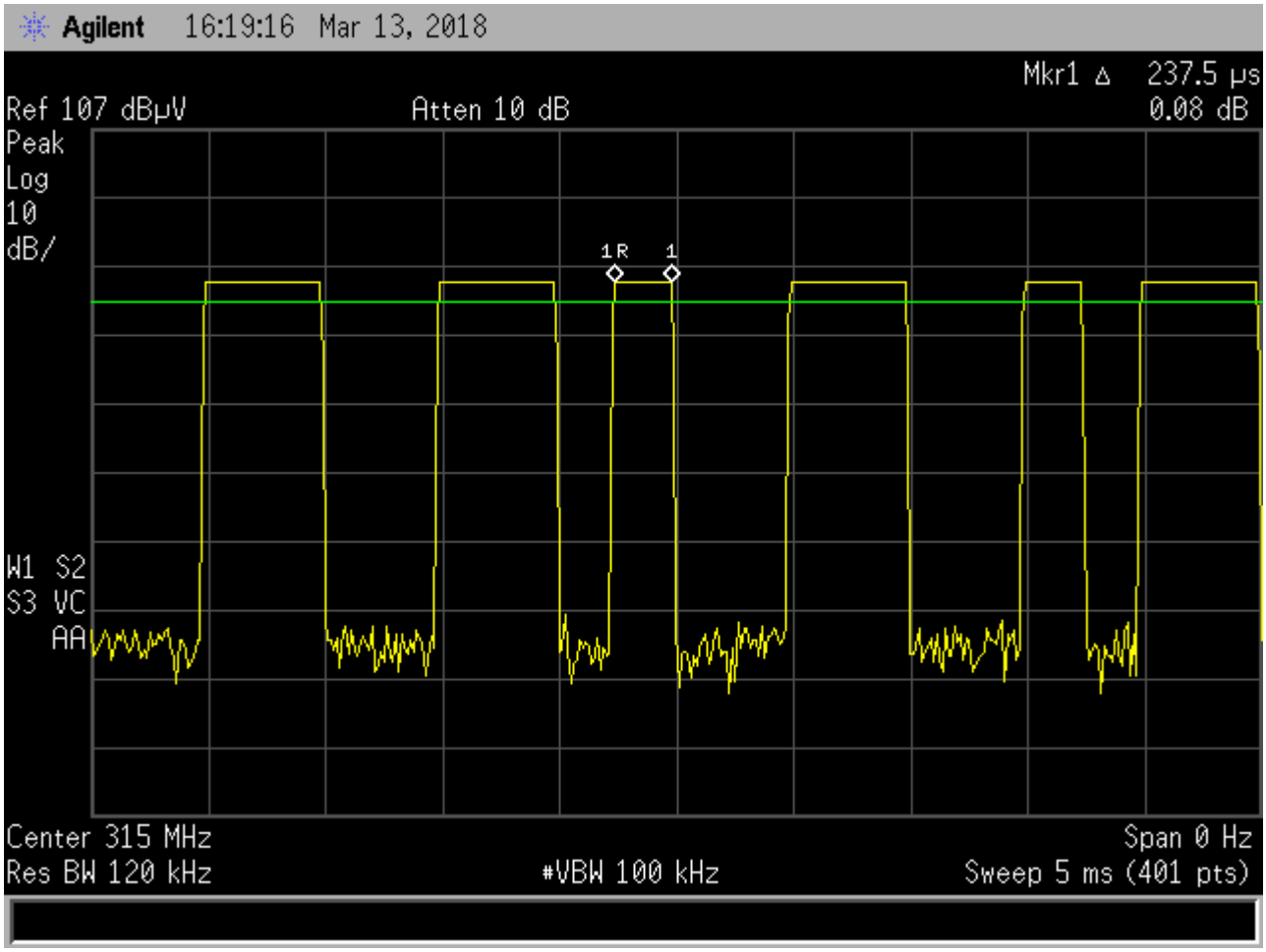
Test Freq.	Antenna Pol./Height	EUT Orientation	Peak Reading	Duty Cycle Correction	Corrected Reading	Converted Reading	Avg. Limit
MHz	(V/H)-Meters	X / Y / Z	dBµV/m	dB	dBµV/m	uV/m	uV/m
*1890.00	V / 1.00	X / 180.0	49.86	0	49.86	311.17	604.1
*1890.00	V / 1.00	Y / 180.0	49.86	0	49.86	311.17	|
*1890.00	V / 1.00	Z / 180.0	49.86	0	49.86	311.17	|
*1890.00	H / 1.00	X / 180.0	50.36	0	50.36	329.61	|
*1890.00	H / 1.00	Y / 180.0	50.36	0	50.36	329.61	|
*1890.00	H / 1.00	Z / 180.0	50.36	0	50.36	329.61	604.1
*2205.00	V / 1.00	X / 180.0	52.65	0	52.65	429.04	500
*2205.00	V / 1.00	Y / 180.0	52.65	0	52.65	429.04	|
*2205.00	V / 1.00	Z / 180.0	52.65	0	52.65	429.04	|
*2205.00	H / 1.00	X / 180.0	52.25	0	52.25	409.73	|
*2205.00	H / 1.00	Y / 180.0	52.25	0	52.25	409.73	|
*2205.00	H / 1.00	Z / 180.0	52.25	0	52.25	409.73	500
*2520.00	V / 1.00	X / 180.0	53.61	0	53.61	479.18	604.1
*2520.00	V / 1.00	Y / 180.0	53.61	0	53.61	479.18	|
*2520.00	V / 1.00	Z / 180.0	53.61	0	53.61	479.18	|
*2520.00	H / 1.00	X / 180.0	52.01	0	52.01	398.57	|
*2520.00	H / 1.00	Y / 180.0	52.01	0	52.01	398.57	|
*2520.00	H / 1.00	Z / 180.0	52.01	0	52.01	398.57	604.1
*2835.00	V / 1.00	X / 180.0	53.64	0	53.64	480.84	500
*2835.00	V / 1.00	Y / 180.0	53.64	0	53.64	480.84	|
*2835.00	V / 1.00	Z / 180.0	53.64	0	53.64	480.84	|
*2835.00	H / 1.00	X / 180.0	53.64	0	53.64	480.84	|
*2835.00	H / 1.00	Y / 180.0	53.64	0	53.64	480.84	|
*2835.00	H / 1.00	Z / 180.0	53.64	0	53.64	480.84	500
*3150.00	V / 1.00	X / 180.0	53.99	0	53.99	500.61	604.1
*3150.00	V / 1.00	Y / 180.0	53.99	0	53.99	500.61	|
*3150.00	V / 1.00	Z / 180.0	53.99	0	53.99	500.61	|
*3150.00	H / 1.00	X / 180.0	54.49	0	54.49	530.27	|
*3150.00	H / 1.00	Y / 180.0	54.49	0	54.49	530.27	|
*3150.00	H / 1.00	Z / 180.0	54.49	0	54.49	530.27	604.1

The frequency range was scanned from 30 MHz to 3.2 GHz. All emissions not recorded were more than 20dB below the specified limit. Emissions from the EUT do not exceed the specified limits.
NOTE: * Indicates minimum system sensitivity.

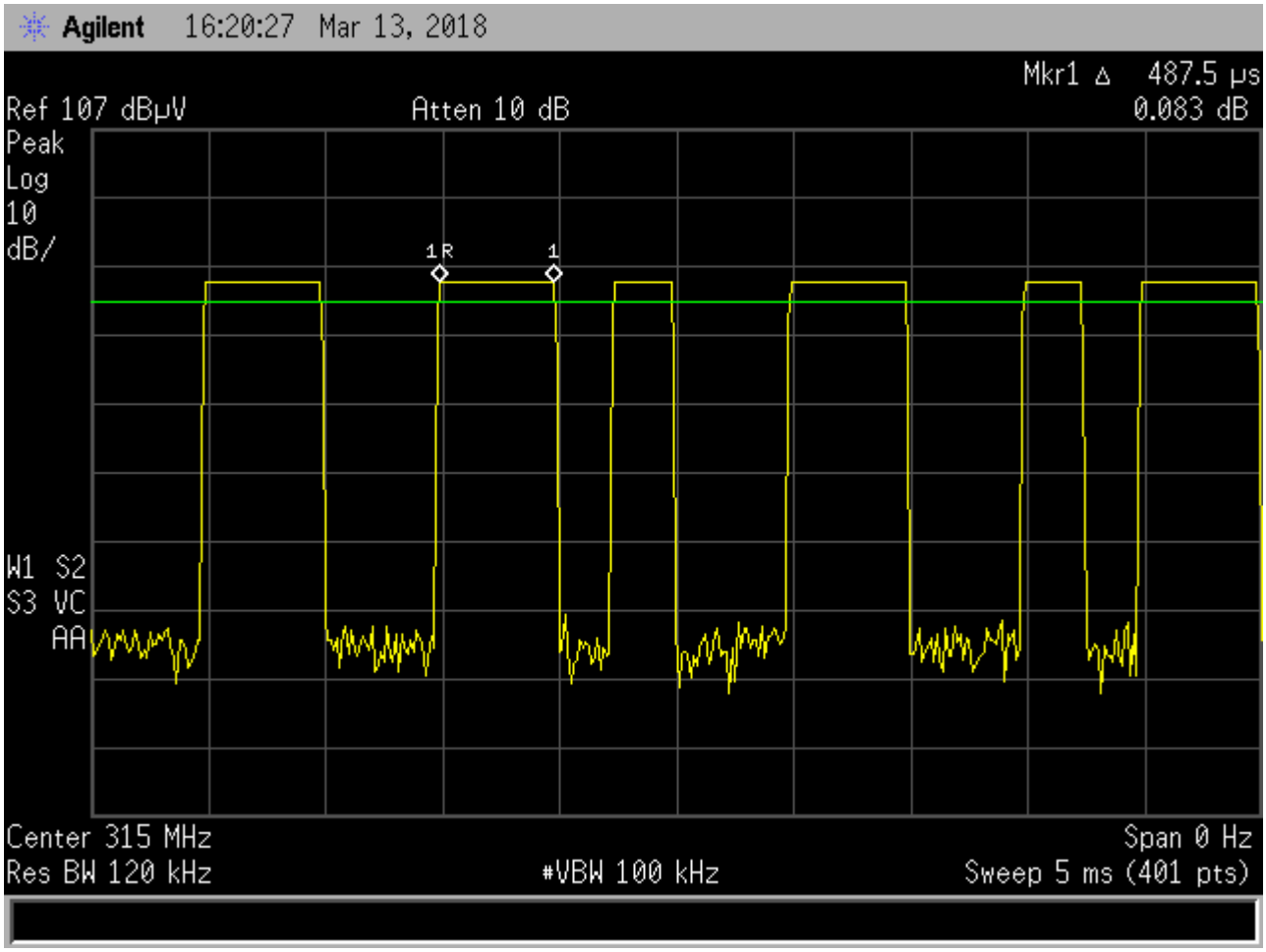
FCC Part 15, Subpart C, Section 15.231(b), Duty Cycle Determination
IC RSS-210 A1.1.2(2), Pulsed Operation
Test Data



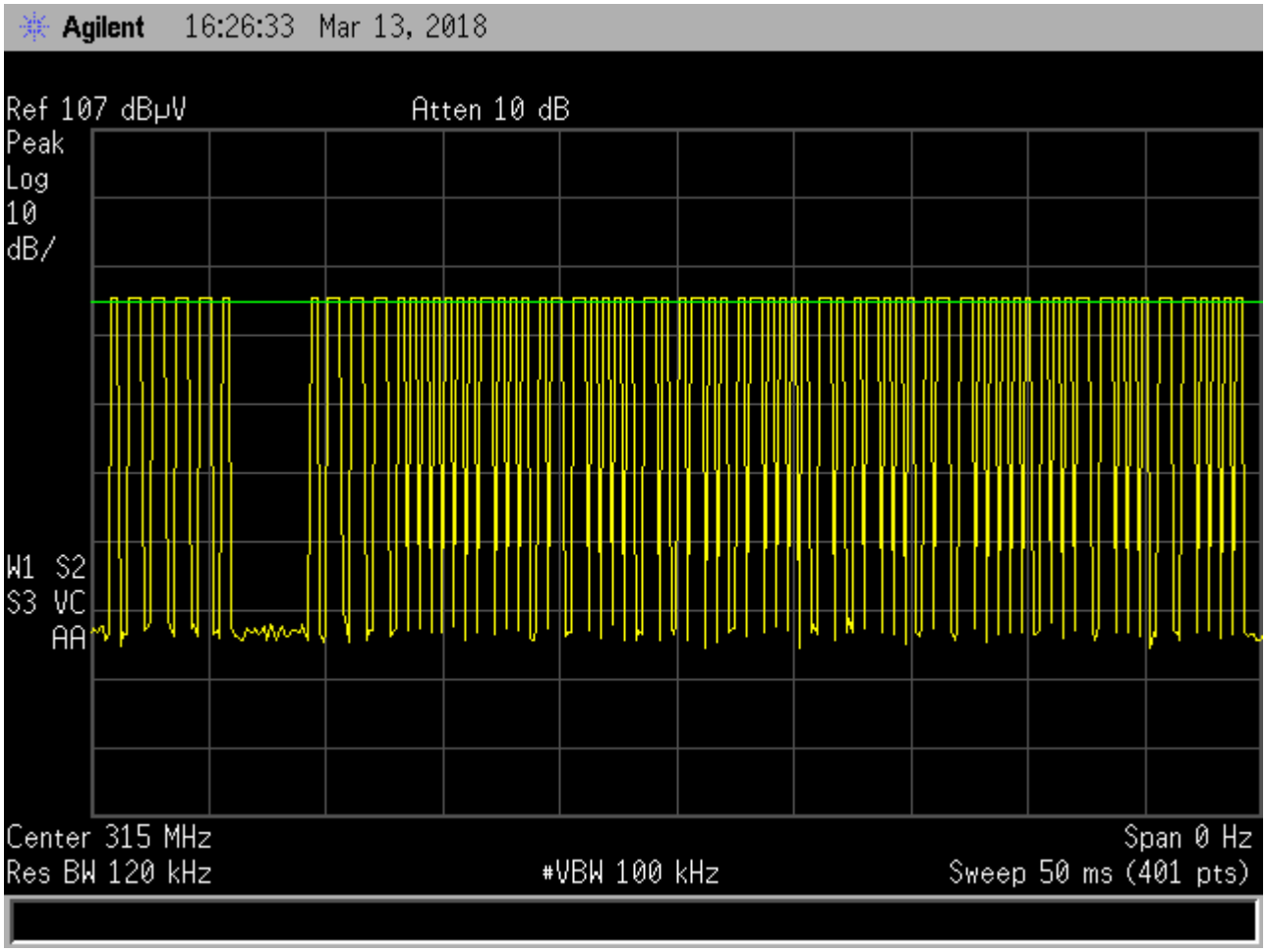
Test Method: **FCC Part 15.231(b), Duty Cycle Determination**
Notes: Measurement of cycle time = 48.45 ms



Test Method: **FCC Part 15.231(b), Duty Cycle Determination**
Notes: Pulse width on time = 237.5 µS



Test Method: **FCC Part 15.231(b), Duty Cycle Determination**
Notes: Pulse width on time = 487.5 µS



Test Method: **FCC Part 15.231(b), Duty Cycle Determination**
Notes: Number of Pulses = 46 @ 0.2375 ms; 17 @ 0.4875 ms

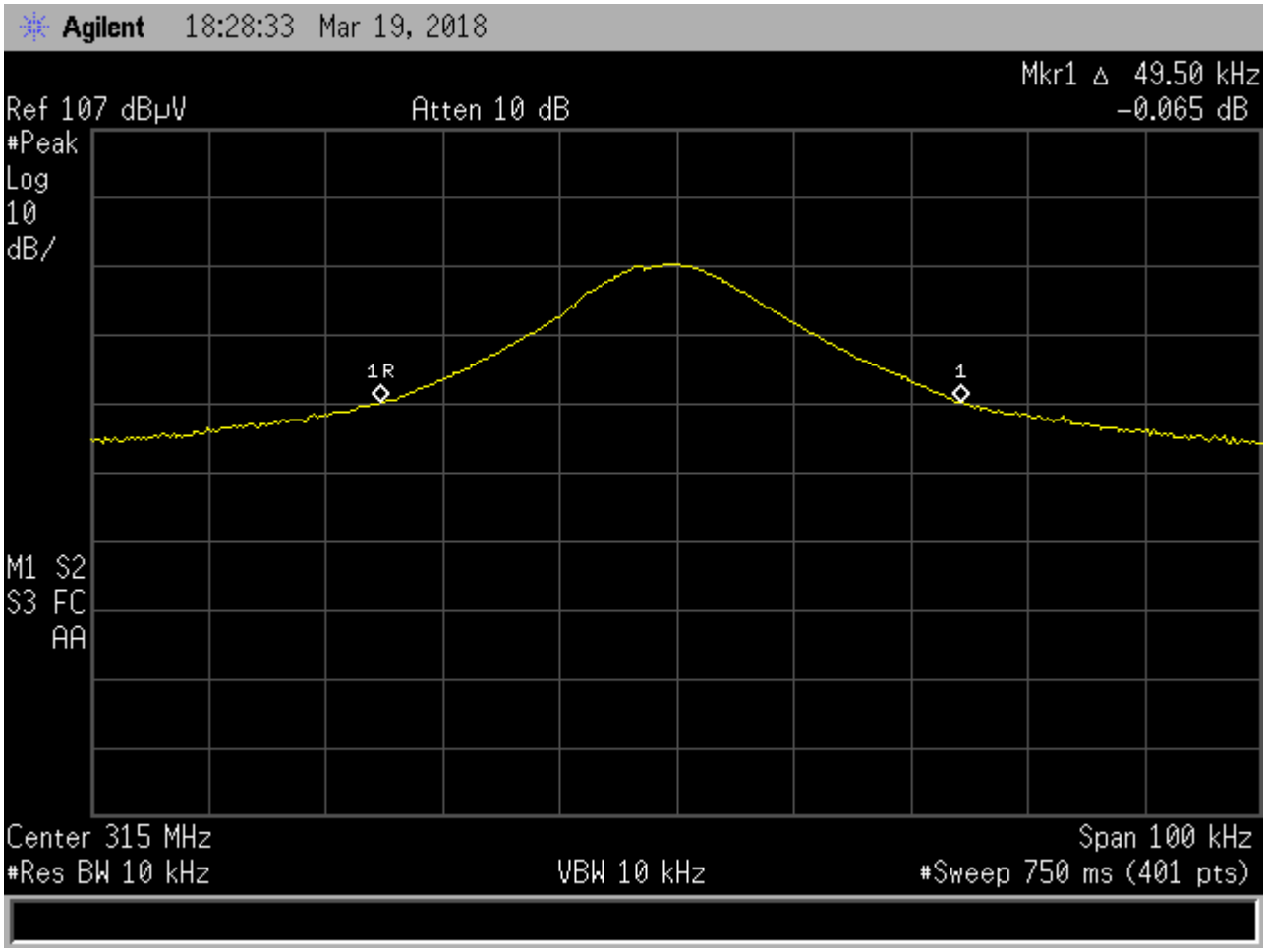
Field Strength of Spurious Emissions
FCC Part 15, Subpart C, Section 15.231(b)
Field Strength of Unwanted Emissions
IC RSS-210 A1.1.2 (3)
Test Data

Test Method:	**FCC Part 15 Subpart C, Field Strength of Spurious Emissions, Section 15.231(b).**		
	IC RSS-210, A1.1.2 (3) Field Strength of Unwanted Emissions		
Customer:	Dorman Products, Inc.	**Job No.:**	R-2829P-1
Test Sample:	315.00 MHz Remote Keyless Transmitter		
Model No.:	DORM39	**Serial No.:**	N/A
Operating Mode:	Continuously Transmitting an RF Signal at 315.00 MHz		
Technician:	D.Fiore	**Date:**	04/16/2018

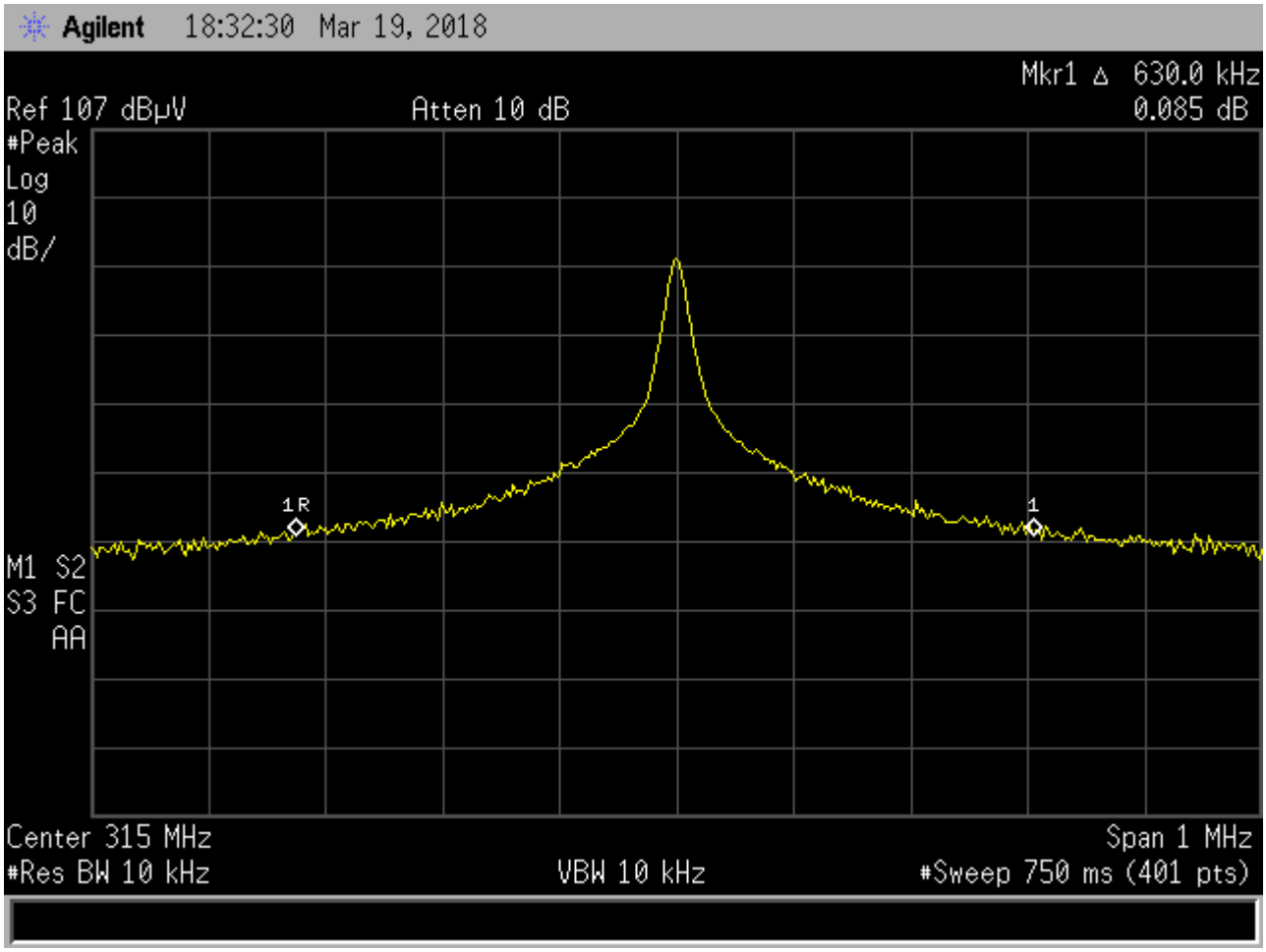
Notes: Test Distance: 3 Meters
Detector: Quasi-Peak from 30 MHz to 1 GHz

Transmit Frequency	Test Frequency	Antenna/ EUT Orientation	Meter Reading	Correction Factor	Corrected Reading	Converted Reading	Limit At 3 Meters
MHz	MHz	Polarization/ Axis	dBuV	dB	dBuV/m	uV/m	uV/m
315.00	30.00	-	-	-	-	-	100.00
|	|	-	-	-	-	-	|
|	*36.00	H/1.00	2.80	12.26	15.06	5.66	|
|	|	-	-	-	-	-	|
|	88.00	-	-	-	-	-	100.00
|	88.00	-	-	-	-	-	150.00
|	|	-	-	-	-	-	|
|	*110.00	H/1.00	1.1	14.63	15.73	6.12	|
|	*195.00	H/1.00	0.5	20.69	21.19	11.47	|
|	*202.00	H/1.00	4.70	14.00	18.70	8.61	|
|	|	-	-	-	-	-	|
|	216.00	-	-	-	-	-	150.00
|	216.00	-	-	-	-	-	200.00
|	|	-	-	-	-	-	|
|	*610.00	H/1.00	2.50	23.85	26.35	20.77	|
|	|	-	-	-	-	-	|
|	960.00	-	-	-	-	-	200.00
|	960.00	-	-	-	-	-	500.00
|	|	-					|
|	*995.00	H/1.00	4.20	31.35	35.55	59.91	|
|	|	-	-	-	-	-	|
315.00	1000.00	-	-	-	-	-	500.00
	The frequency range was scanned from 9 kHz to 1.0 GHz.						
	The emissions observed from the EUT do not exceed the specified limits.						
	Emissions not recorded were more than 20dB under the specified limit.						
	*Noise Floor Measurements (minimum sensitivity of the receiver system).						

FCC Part 15, Subpart C, Section 15.231 (c), Bandwidth of Emission
IC RSS-210, A1.1.3, Bandwidth of Momentary Signals
Test Data



20 dB Bandwidth, 49.50 kHz



40 dB Bandwidth, 630.0 kHz