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

On

## 315 MHz Keyfob Transmitter
## FCC ID: PQTDORM06
## IC: 10735A-DORM06

| | |
|---|---|
| **Customer Name:** | Dorman Products, Inc. |
| **Customer P.O:** | PCN2568 |
| **Date of Report:** | June 12, 2013 |
| **Test Report No:** | R-1975P-5 |
| **Test Start Date:** | April 23, 2013 |
| **Test Finish Date:** | April 25, 2013 |
| **Test Technician:** | M. Seamans |
| **Approved By:** | R.J. Reitz |
| **Report Prepared By:** | C. Reitz |

## Technical Information

| | |
|---|---|
| **Report Number:** | R-1975P-5 |
| **Customer:** | Dorman Products, Inc. |
| **Address:** | 3400 East Walnut Street |
| | Colmar, PA 18915 |
| **Manufacturer:** | Global Technical Software Services |
| **Manufacturer Address:** | 3705 Quakerbridge Road<br>Hamilton, New Jersey 08619 |
| **Test Sample:** | 315 MHz Keyfob Transmitter |
| **Model Numbers:** | 13735, 13758 |
| **FCC ID:** | PQTDORM06 |
| **IC:** | 10735A-DORM06 |
| **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 8, June, 2010

**Test Procedure**:
ANSI C63.4:2003
RSS-GEN, Issue 3, December 2010

## 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 C63.4:2003 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 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.

Dean Landers
EMC Test Engineer

Richard J. Reitz
Corporate Laboratory Manager
iNARTE Certified Engineer ATL-0036-E

**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 (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 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.

**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<br>For 260-470 MHz: FS (microvolts/m) = (41.67 x F) - 7,083<br>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 | 6042 | 60416 | 605 | 6042 |

- 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 | 1325.71 | 311.13 |

**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 int eh 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.

Transmitter On Time = 100 milliseconds (maximum per cycle)

Transmitter Cycle Time = 22.69 milliseconds (100 ms maximum)

Transmitter Duty Cycle = 22.69 %

**CALCULATION**

1 pulse of 32.0 µsec = 0.032 milliseconds

38 pulses of 184.0 µsec = 6.99 milliseconds

1 pulse of 2072 µsec = 2.072 milliseconds

34 pulses of 400.0 µsec = 13.60 milliseconds

0.32 + 6.99 + 2.072 + 13.60 = 22.69 milliseconds

Duty Cycle (22.69/100) = 22.69 %

Correction Factor =20 log (0.2269) = -12.88 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.

**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 20 dB bandwidth was measured and found to be 53.7 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 32 µs yields a minimum required bandwidth of 20833 Hz. FCC specified bandwidths of 100 kHz and 1 MHz were utilized below and above 1 GHz, respectively.

## 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 |
|---|---|---|---|---|---|---|
| 1232 | AGILENT / HP | PRE-AMPLIFIER | 1 - 26.5GHz | 8449B | 5/30/2012 | 5/31/2013 |
| 3207 | EMCO | ACTIVE LOOP | 10 KHZ - 30 MHZ | 6502 | 9/17/2012 | 9/30/2013 |
| 3258 | EMCO ANTENNA | DOUBLE RIDGED GUIDE | 1 GHZ - 18GHZ | 3115 | 2/24/2012 | 8/31/2013 |
| 4029 | RETLIF | OPEN AREA TEST SITE | 3 / 10 Meters | RNH | 7/24/2012 | 7/24/2015 |
| 5053 | EMCO | BICONILOG ANTENNA | 26 MHz - 3 GHz | 3142C | 11/14/2011 | 5/30/2013 |
| R444 | AGILENT / HP | SPECTRUM ANALYZER | 100 Hz - 26.5 GHz | E7405A;A | 7/6/2012 | 7/6/2013 |

### 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 |
|---|---|---|---|---|---|---|
| R444 | AGILENT / HP | SPECTRUM ANALYZER | 100 Hz - 26.5 GHz | E7405A;A | 7/6/2012 | 7/6/2013 |

### 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 |
|---|---|---|---|---|---|---|
| 1232 | AGILENT / HP | PRE-AMPLIFIER | 1 - 26.5GHz | 8449B | 5/30/2012 | 5/31/2013 |
| 3207 | EMCO | ACTIVE LOOP | 10 KHZ - 30 MHZ | 6502 | 9/17/2012 | 9/30/2013 |
| 3258 | EMCO ANTENNA | DOUBLE RIDGED GUIDE | 1 GHZ - 18GHZ | 3115 | 2/24/2012 | 8/31/2013 |
| 4029 | RETLIF | OPEN AREA TEST SITE | 3 / 10 Meters | RNH | 7/24/2012 | 7/24/2015 |
| 5053 | EMCO | BICONILOG ANTENNA | 26 MHz - 3 GHz | 3142C | 11/14/2011 | 5/30/2013 |
| R444 | AGILENT / HP | SPECTRUM ANALYZER | 100 Hz - 26.5 GHz | E7405A;A | 7/6/2012 | 7/6/2013 |

### 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 |
|---|---|---|---|---|---|---|
| R444 | AGILENT / HP | SPECTRUM ANALYZER | 100 Hz - 26.5 GHz | E7405A;A | 7/6/2012 | 7/6/2013 |

**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 | **Job No.:** | R-1975P-5 |
| **Test Sample:** | 315 MHz Remote Keyless Transmitter | | |
| **Model No.:** | 13735 | | |
| **Operating Mode:** | Continuously transmitting a RF signal at 315 MHz | | |
| **Technician:** | M. Seamans | **Date:** | 4-25-13 |
| **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 | V / 2.0 | X | 55.85 | 17.3 | 73.15 | 4544.65 | 60416 |
| 315 | V / 2.0 | Y | 56.28 | 17.3 | 73.58 | 4775.29 | \| |
| 315 | V / 1.0 | Z | 44.06 | 17.3 | 61.36 | 1169.50 | \| |
| 315 | H / 1.0 | X | 56.78 | 17.3 | 74.08 | 5058.25 | \| |
| 315 | H / 1.0 | Y | 53.42 | 17.3 | 70.72 | 3435.58 | \| |
| 315 | H / 1.0 | Z | 58.03 | 17.3 | 75.33 | 5841.17 | 60416 |
| | | | | | | | |
| 630 | V / 1.0 | X | 16.73 | 24.66 | 41.39 | 117.35 | 6042 |
| 630 | V / 1.8 | Y | 16.25 | 24.66 | 40.91 | 111.05 | \| |
| 630 | V / 1.0 | Z | 15.88 | 24.66 | 40.54 | 106.41 | \| |
| 630 | H / 1.0 | X | 7.56 | 24.66 | 32.22 | 40.83 | \| |
| 630 | H / 1.0 | Y | 14.13 | 24.66 | 38.79 | 87.00 | \| |
| 630 | H / 1.0 | Z | 11.91 | 24.66 | 36.57 | 67.38 | 6042 |
| | | | | | | | |
| 945 | V / 1.0 | X | 15.44 | 31.00 | 46.44 | 209.89 | 6042 |
| 945 | V / 1.0 | Y | 17.97 | 31.00 | 48.97 | 280.87 | \| |
| 945 | V / 1.0 | Z | 11.71 | 31.00 | 42.71 | 136.62 | \| |
| 945 | H / 1.0 | X | 18.41 | 31.00 | 49.41 | 295.46 | \| |
| 945 | H / 1.0 | Y | 14.27 | 31.00 | 45.27 | 183.44 | \| |
| 945 | H / 1.0 | Z | 3.82 | 31.00 | 34.82 | 55.08 | 6042 |
| | | | | | | | |
| 1260.00 | V / 1.0 | X | 50.51 | -2.90 | 47.61 | 240.16 | 6042 |
| 1260.00 | V / 1.0 | Y | 57.56 | -2.90 | 54.66 | 540.75 | \| |
| 1260.00 | V / 1.0 | Z | 51.81 | -2.90 | 48.91 | 278.93 | \| |
| 1260.00 | H / 1.0 | X | 51.39 | -2.90 | 48.49 | 265.77 | \| |
| 1260.00 | H / 1.0 | Y | 48.64 | -2.90 | 45.74 | 193.64 | \| |
| 1260.00 | H / 1.0 | Z | 47.77 | -2.90 | 44.87 | 175.19 | 6042 |
| | | | | | | | |
| 1575.00 | V / 1.0 | X | 54.79 | -2.00 | 52.79 | 436.01 | 5000 |
| 1575.00 | V / 1.0 | Y | 56.33 | -2.00 | 54.33 | 520.60 | \| |
| 1575.00 | V / 1.0 | Z | 52.73 | -2.00 | 50.73 | 343.95 | \| |
| 1575.00 | H / 1.0 | X | 64.74 | -2.00 | 62.74 | 1370.88 | \| |
| 1575.00 | H / 1.0 | Y | 58.20 | -2.00 | 56.20 | 645.65 | \| |
| 1575.00 | H / 1.0 | Z | 45.49 | -2.00 | 43.49 | 149.45 | 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 | **Job No.:** | R-1975P-5 |
| **Test Sample:** | 315 MHz Remote Keyless Transmitter | | |
| **Model No.:** | 13735 | | |
| **Operating Mode:** | Continuously transmitting a RF signal at 315 MHz | | |
| **Technician:** | M. Seamans | **Date:** | 4-25-13 |
| **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 / 1.0 | X | 50.35 | -0.30 | 50.05 | 318.05 | 6042 |
| 1890.00 | V / 1.0 | Y | 44.43 | -0.30 | 44.13 | 160.88 | \| |
| 1890.00 | V / 1.0 | Z | 46.48 | -0.30 | 46.18 | 203.70 | \| |
| 1890.00 | H / 1.0 | X | 49.44 | -0.30 | 49.14 | 286.42 | \| |
| 1890.00 | H / 1.0 | Y | 42.97 | -0.30 | 42.67 | 135.99 | \| |
| 1890.00 | H / 1.0 | Z | 44.38 | -0.30 | 44.08 | 159.96 | 6042 |
| | | | | | | | |
| 2205.00 | V / 1.0 | X | 43.42 | 0.90 | 44.32 | 164.44 | 5000 |
| 2205.00 | V / 1.0 | Y | 47.69 | 0.90 | 48.59 | 268.84 | \| |
| 2205.00 | V / 1.0 | Z | 48.23 | 0.90 | 49.13 | 286.09 | \| |
| 2205.00 | H / 1.0 | X | 43.11 | 0.90 | 44.01 | 158.67 | \| |
| 2205.00 | H / 1.0 | Y | 44.06 | 0.90 | 44.96 | 177.01 | \| |
| 2205.00 | H / 1.0 | Z | 43.85 | 0.90 | 44.75 | 172.78 | 5000 |
| | | | | | | | |
| 2520.00 | V / 1.0 | X | 47.39 | 2.20 | 49.59 | 301.65 | 6042 |
| 2520.00 | V / 1.0 | Y | 54.14 | 2.20 | 56.34 | 656.15 | \| |
| 2520.00 | V / 1.0 | Z | 52.47 | 2.20 | 54.67 | 541.38 | \| |
| 2520.00 | H / 1.0 | X | 54.00 | 2.20 | 56.20 | 645.65 | \| |
| 2520.00 | H / 1.0 | Y | 49.06 | 2.20 | 51.26 | 365.59 | \| |
| 2520.00 | H / 1.0 | Z | 43.63 | 2.20 | 45.83 | 195.66 | 6042 |
| | | | | | | | |
| 2835.00 | V / 1.0 | X | 42.45 | 5.10 | 47.55 | 238.51 | 5000 |
| 2835.00 | V / 1.0 | Y | 43.68 | 5.10 | 48.78 | 274.79 | \| |
| 2835.00 | V / 1.0 | Z | 41.13 | 5.10 | 46.23 | 204.88 | \| |
| 2835.00 | H / 1.0 | X | 43.04 | 5.10 | 48.14 | 255.27 | \| |
| 2835.00 | H / 1.0 | Y | 44.68 | 5.10 | 49.78 | 308.32 | \| |
| 2835.00 | H / 1.0 | Z | 45.07 | 5.10 | 50.17 | 322.48 | 5000 |
| | | | | | | | |
| 3150.00 | V / 1.0 | X | 46.72 | 6.00 | 52.72 | 432.51 | 6042 |
| 3150.00 | V / 1.0 | Y | 46.19 | 6.00 | 52.19 | 406.91 | \| |
| 3150.00 | V / 1.0 | Z | 43.98 | 6.00 | 49.98 | 315.50 | \| |
| 3150.00 | H / 1.0 | X | 44.08 | 6.00 | 50.08 | 319.15 | \| |
| 3150.00 | H / 1.0 | Y | 44.18 | 6.00 | 50.18 | 322.85 | \| |
| 3150.00 | H / 1.0 | Z | 43.87 | 6.00 | 49.87 | 311.53 | 6042 |
| | 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. | | | | | | |
| | *Noise Floor Measurements ( 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 | **Job No.:** | R-1975P-5 |
| **Test Sample:** | 315 MHz Remote Keyless Transmitter | | |
| **Model No.:** | 13735 | | |
| **Operating Mode:** | Continuously transmitting a RF signal at 315 MHz | | |
| **Technician:** | M. Seamans | **Date:** | 4-25-13 |

**Notes:** Average values calculated from Peak readings Duty Cycle: 22.69% Correction: -12.88dB

| 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 | V / 2.0 | X | 73.15 | -12.88 | 60.269 | 1031.454 | 6042 |
| 315 | V / 2.0 | Y | 73.58 | -12.88 | 60.699 | 1083.802 | \| |
| 315 | V / 1.0 | Z | 61.36 | -12.88 | 48.479 | 265.43 | \| |
| 315 | H / 1.0 | X | 74.08 | -12.88 | 61.199 | 1148.021 | \| |
| 315 | H / 1.0 | Y | 70.72 | -12.88 | 57.839 | 779.7403 | \| |
| 315 | H / 1.0 | Z | 75.33 | -12.88 | 62.449 | 1325.714 | 6042 |
| | | | | | | | |
| 630 | V / 1.0 | X | 41.39 | -12.88 | 28.509 | 26.63483 | 605 |
| 630 | V / 1.8 | Y | 40.91 | -12.88 | 28.029 | 25.20287 | \| |
| 630 | V / 1.0 | Z | 40.54 | -12.88 | 27.659 | 24.15183 | \| |
| 630 | H / 1.0 | X | 32.22 | -12.88 | 19.339 | 9.267231 | \| |
| 630 | H / 1.0 | Y | 38.79 | -12.88 | 25.909 | 19.74468 | \| |
| 630 | H / 1.0 | Z | 36.57 | -12.88 | 23.689 | 15.2915 | 605 |
| | | | | | | | |
| 945 | V / 1.0 | X | 46.44 | -12.88 | 33.559 | 47.63761 | 605 |
| 945 | V / 1.7 | Y | 48.97 | -12.88 | 36.089 | 63.74557 | \| |
| 945 | V / 1.3 | Z | 42.71 | -12.88 | 29.829 | 31.0063 | \| |
| 945 | H / 1.8 | X | 49.41 | -12.88 | 36.529 | 67.05791 | \| |
| 945 | H / 1.0 | Y | 45.27 | -12.88 | 32.389 | 41.63418 | \| |
| 945 | H / 1.0 | Z | 34.82 | -12.88 | 21.939 | 12.50115 | 605 |
| | | | | | | | |
| 1260 | V / 1.0 | X | 47.61 | -12.88 | 34.839 | 55.201 | 605 |
| 1260 | V / 1.0 | Y | 54.66 | -12.88 | 41.889 | 124.294 | \| |
| 1260 | V / 1.0 | Z | 48.91 | -12.88 | 36.139 | 64.113 | \| |
| 1260 | H / 1.0 | X | 48.49 | -12.88 | 35.719 | 61.087 | \| |
| 1260 | H / 1.0 | Y | 45.74 | -12.88 | 32.969 | 44.509 | \| |
| 1260 | H / 1.0 | Z | 44.87 | -12.88 | 32.099 | 40.267 | 605 |
| | | | | | | | |
| 1575 | V / 1.0 | X | 52.79 | -12.88 | 39.909 | 98.95779 | 500 |
| 1575 | V / 1.0 | Y | 54.33 | -12.88 | 41.449 | 118.1544 | \| |
| 1575 | V / 1.0 | Z | 50.73 | -12.88 | 37.849 | 78.06386 | \| |
| 1575 | H / 1.0 | X | 62.74 | -12.88 | 49.859 | 311.1358 | \| |
| 1575 | H / 1.0 | Y | 56.20 | -12.88 | 43.319 | 146.5379 | \| |
| 1575 | H / 1.0 | Z | 43.49 | -12.88 | 30.609 | 33.91954 | 500 |
| | | | | | | | |
| | | | | | | | |

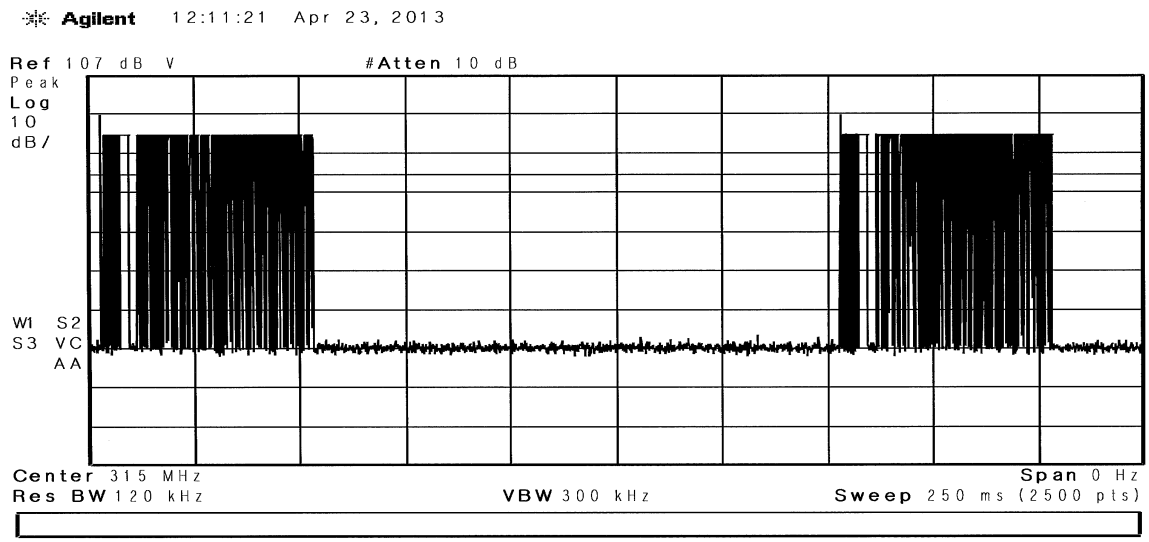
| | | | |
|---|---|---|---|
| **Test Method:** | FCC Part 15 Subpart C, Field Strength of Emissions, Paragraph 15.231(b) | | |
| | IC RSS-210, A1.1.2 (1) Field Strengths and Frequency Bands | | |
| **Customer:** | Dorman Products | **Job No.:** | R-1975P-5 |
| **Test Sample:** | 315 MHz Remote Keyless Transmitter | | |
| **Model No.:** | 13735 | | |
| **Operating Mode:** | Continuously transmitting a RF signal at 315 MHz | | |
| **Technician:** | M. Seamans | **Date:** | 4-25-13 |

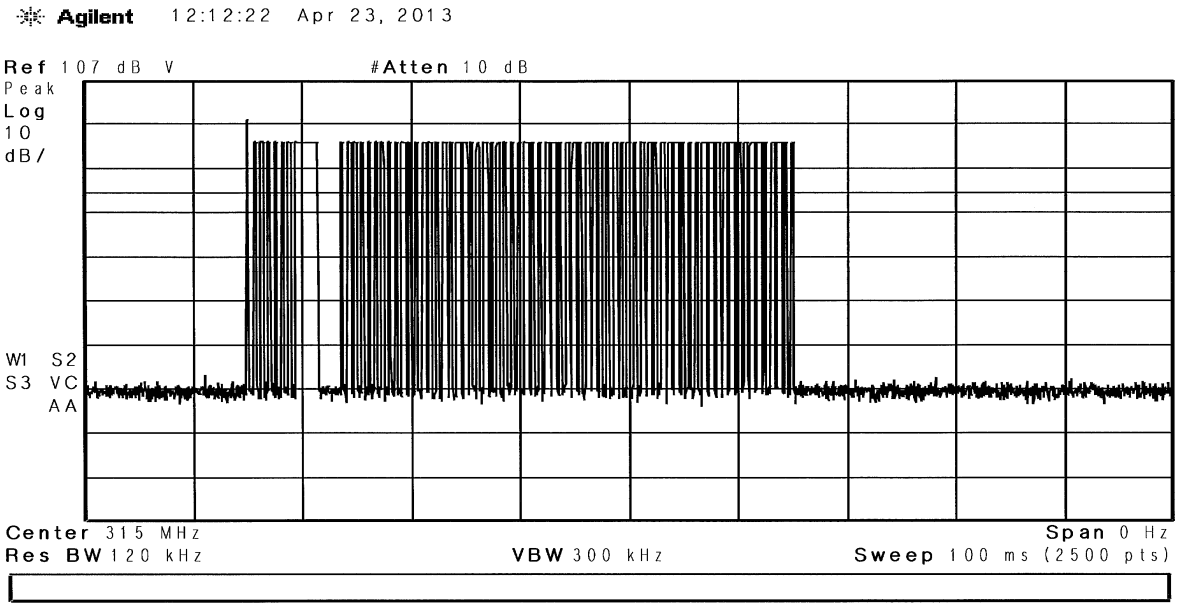
**Notes:** Average values calculated from Peak readings Duty Cycle: 22.69% Correction: -12.88dB

| 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 / 1.0 | X | 50.05 | -12.88 | 37.169 | 72.18551 | 605 |
| 1890.00 | V / 1.0 | Y | 44.13 | -12.88 | 31.249 | 36.51321 | \| |
| 1890.00 | V / 1.0 | Z | 46.18 | -12.88 | 33.299 | 46.23278 | \| |
| 1890.00 | H / 1.0 | X | 49.14 | -12.88 | 36.259 | 65.00548 | \| |
| 1890.00 | H / 1.0 | Y | 42.67 | -12.88 | 29.789 | 30.86384 | \| |
| 1890.00 | H / 1.0 | Z | 44.08 | -12.88 | 31.199 | 36.30363 | 605 |
| | | | | | | | |
| 2205.00 | V / 1.0 | X | 44.32 | -12.88 | 31.439 | 37.32072 | 500 |
| 2205.00 | V / 1.0 | Y | 48.59 | -12.88 | 35.709 | 61.01688 | \| |
| 2205.00 | V / 1.0 | Z | 49.13 | -12.88 | 36.249 | 64.93069 | \| |
| 2205.00 | H / 1.0 | X | 44.01 | -12.88 | 31.129 | 36.01223 | \| |
| 2205.00 | H / 1.0 | Y | 44.96 | -12.88 | 32.079 | 40.17446 | \| |
| 2205.00 | H / 1.0 | Z | 44.75 | -12.88 | 31.869 | 39.2148 | 500 |
| | | | | | | | |
| 2520.00 | V / 1.0 | X | 49.59 | -12.88 | 36.709 | 68.46207 | 605 |
| 2520.00 | V / 1.0 | Y | 56.34 | -12.88 | 43.459 | 148.919 | \| |
| 2520.00 | V / 1.0 | Z | 54.67 | -12.88 | 41.789 | 122.8712 | \| |
| 2520.00 | H / 1.0 | X | 56.20 | -12.88 | 43.319 | 146.5379 | \| |
| 2520.00 | H / 1.0 | Y | 51.26 | -12.88 | 38.379 | 82.97552 | \| |
| 2520.00 | H / 1.0 | Z | 45.83 | -12.88 | 32.949 | 44.40685 | 605 |
| | | | | | | | |
| 2835.00 | V / 1.0 | X | 47.55 | -12.88 | 34.669 | 54.13149 | 500 |
| 2835.00 | V / 1.0 | Y | 48.78 | -12.88 | 35.899 | 62.3663 | \| |
| 2835.00 | V / 1.0 | Z | 46.23 | -12.88 | 33.349 | 46.49968 | \| |
| 2835.00 | H / 1.0 | X | 48.14 | -12.88 | 35.259 | 57.9362 | \| |
| 2835.00 | H / 1.0 | Y | 49.78 | -12.88 | 36.899 | 69.97614 | \| |
| 2835.00 | H / 1.0 | Z | 50.17 | -12.88 | 37.289 | 73.18971 | 500 |
| | | | | | | | |
| 3150.00 | V / 1.0 | X | 52.72 | -12.88 | 39.839 | 98.16349 | 605 |
| 3150.00 | V / 1.0 | Y | 52.19 | -12.88 | 39.309 | 92.35279 | \| |
| 3150.00 | V / 1.0 | Z | 49.98 | -12.88 | 37.099 | 71.6061 | \| |
| 3150.00 | H / 1.0 | X | 50.08 | -12.88 | 37.199 | 72.43526 | \| |
| 3150.00 | H / 1.0 | Y | 50.18 | -12.88 | 37.299 | 73.27402 | \| |
| 3150.00 | H / 1.0 | Z | 49.87 | -12.88 | 36.989 | 70.70498 | 605 |
| | | | | | | | |

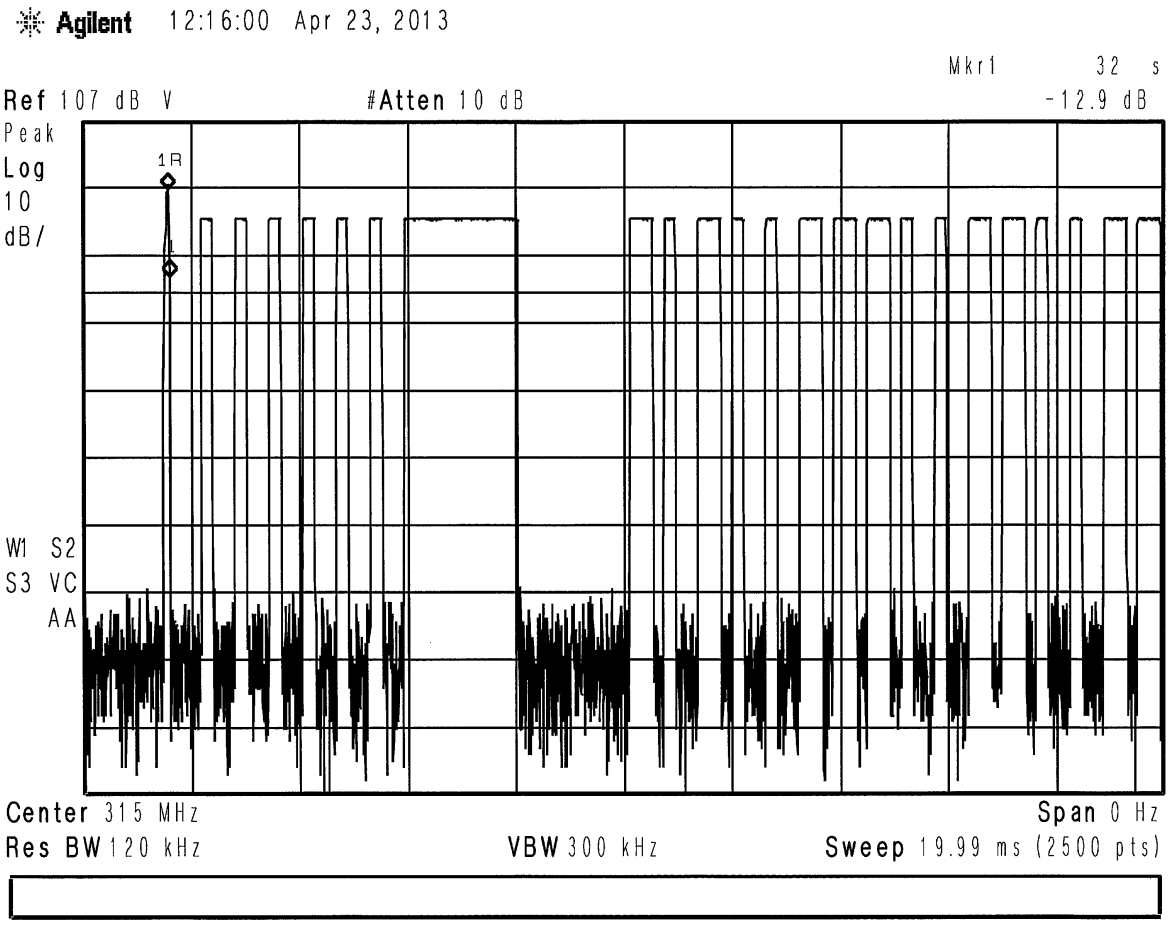
**FCC Section 15.231(b)(2) - Duty Cycle Determination - Pulsed Operation**
**IC RSS-210, A1.1.2(2), RSS-GEN, 4.5 - Pulsed Operation**

**Test Data**

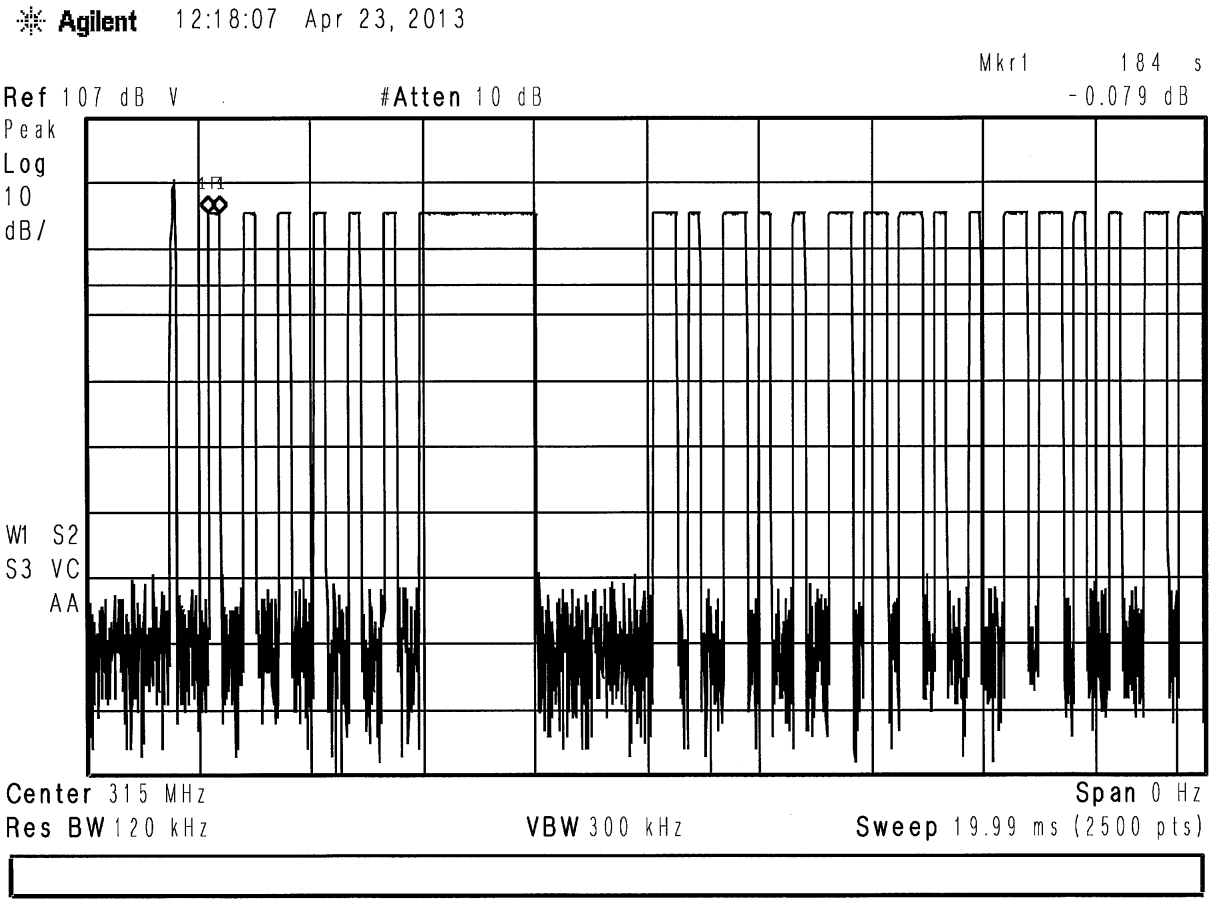


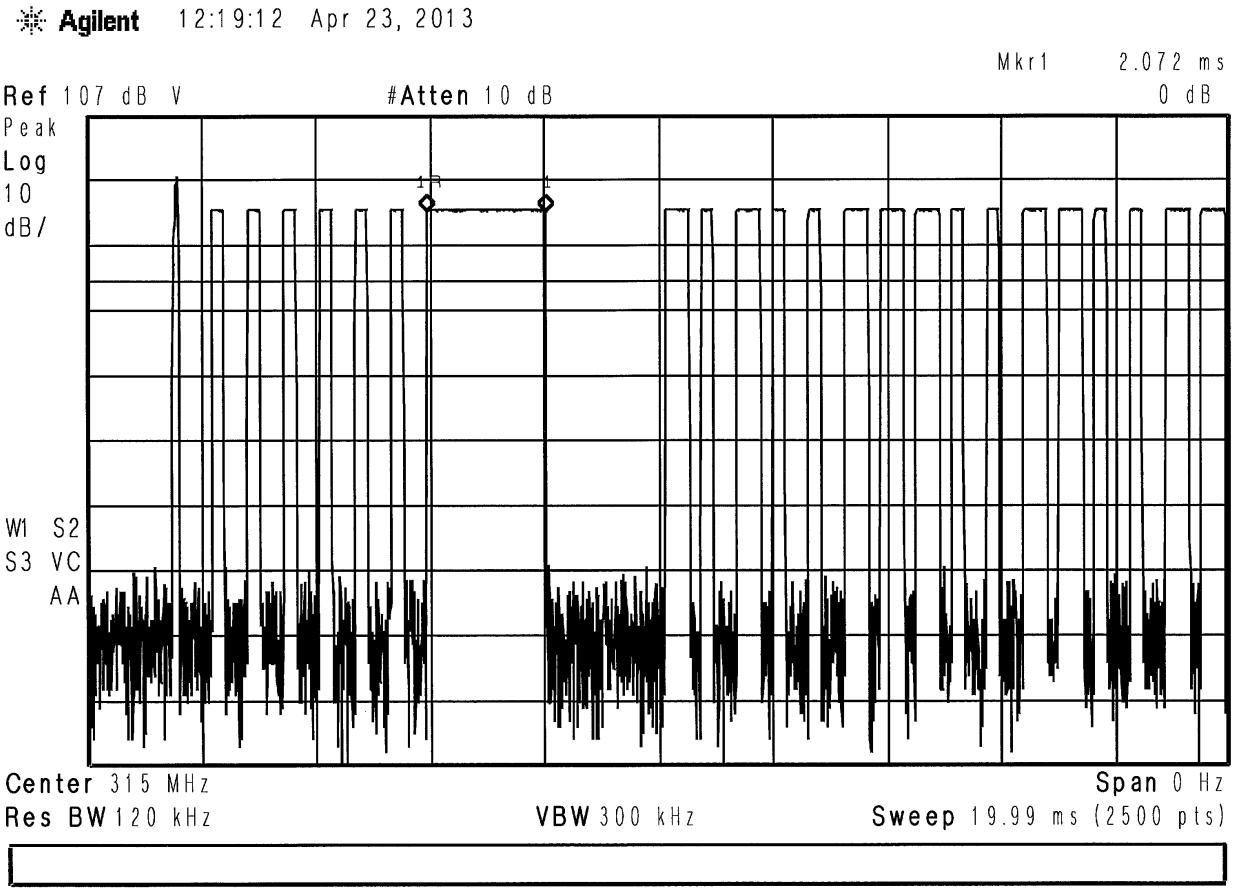

**Test Method**: **FCC Part 15.231(b), Duty Cycle Determination IC RSS-210 A1.1.2(2) Pulsed Operation**
**Notes**: Measurement of cycle time = 22.69mSec.



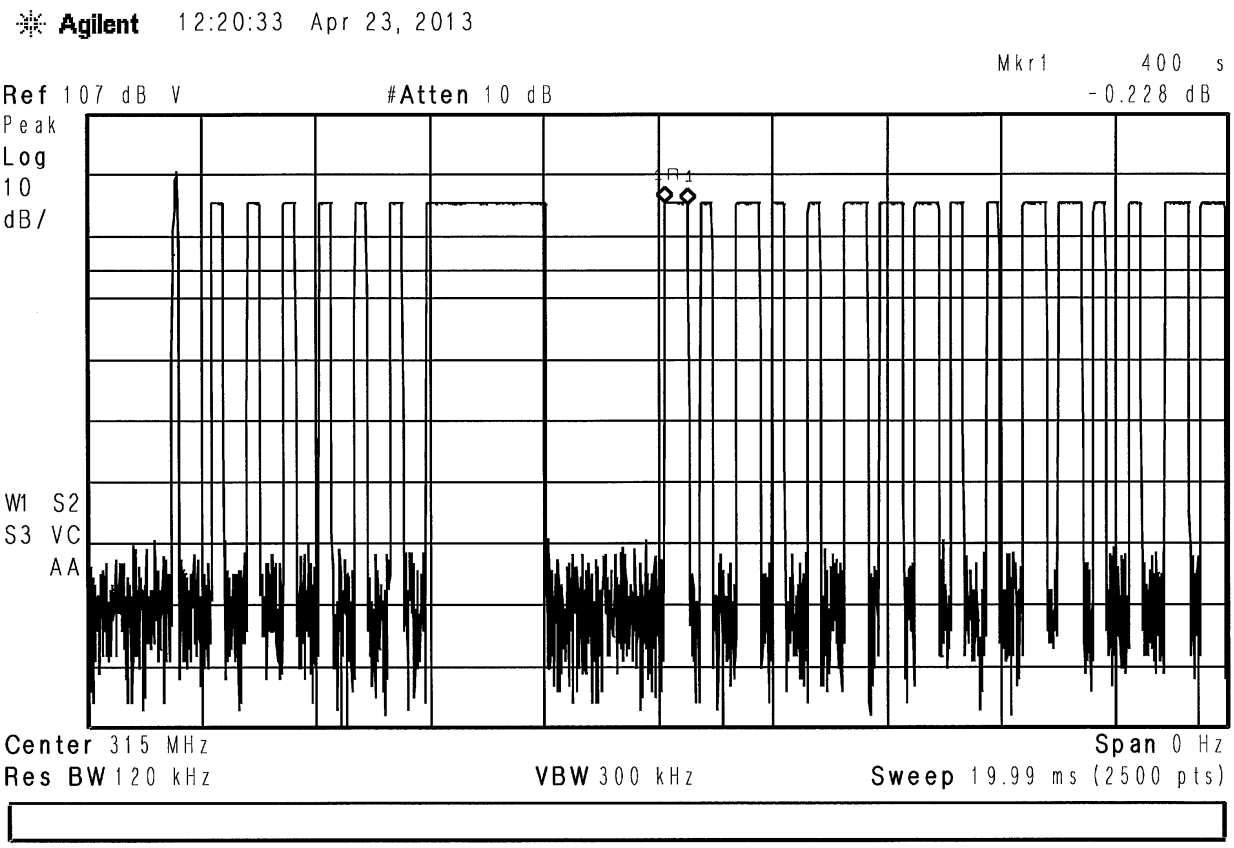

**Test Method**: **FCC Part 15.231(b), Duty Cycle Determination IC RSS-210 A1.1.2(2) Pulsed Operation**
**Notes**: Pulse width 1 = 0.032ms; 1 pulse




**Test Method**: **FCC Part 15.231(b), Duty Cycle Determination IC RSS-210 A1.1.2(2) Pulsed Operation**
**Notes**: Pulse width 2 = 184us; 38 pulses




**Test Method**: **FCC Part 15.231(b), Duty Cycle Determination IC RSS-210 A1.1.2(2) Pulsed Operation**
**Notes**: Pulse width 3 = 2.07020ms; 1 pulse




**Test Method**: **FCC Part 15.231(b), Duty Cycle Determination IC RSS-210 A1.1.2(2) Pulsed Operation**
**Notes**: Pulse width 4 = 400.00us; 34 pulses

**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**

| | | | |
|---|---|---|---|
| **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 | **Job No.:** | R-1975P-5 |
| **Test Sample:** | 315 MHz Remote Keyless Transmitter | | |
| **Model No.:** | 13735 | **Serial No.:** | N/A |
| **Operating Mode:** | Continuously transmitting a RF signal at 315.MHz | | |
| **Technician:** | M. Seamans | **Date:** | 4-25-13 |

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

| Transmit Frequency | Test Frequency | Antenna/ EUT Orientation | Meter Reading | Correction Factor | Corrected Reading | Converted Reading | Limit At 300 Meters |
|---|---|---|---|---|---|---|---|
| MHz | MHz | Polarization/ | dBuV | dB | dBuV/m | uV/m | uV/m |
| 315.00 | 0.009 | - | - | - | - | - | 2400/F(kHz) |
| \| | \| | - | - | - | - | - | \| |
| 315.00 | 0.490 | - | - | - | - | - | 2400/F(kHz) |

| Transmit Frequency | Test Frequency | Antenna/ EUT Orientation | Meter Reading | Correction Factor | Corrected Reading | Converted Reading | Limit At 30 Meters |
|---|---|---|---|---|---|---|---|
| MHz | MHz | Polarization/ Axis | dBuV | dB | dBuV/m | uV/m | uV/m |
| 315.00 | 0.490 | - | - | - | - | - | 24000/F(kHz) |
| \| | \| | - | - | - | - | - | \| |
| \| | 1.705 | - | - | - | - | - | 24000/F(kHz) |
| \| | 1.705 | - | - | - | - | - | 30.00 |
| \| | \| | - | - | - | - | - | \| |
| 315.00 | 30.00 | - | - | - | - | - | 30.00 |

| Transmit Frequency | Test Frequency | Antenna/ EUT Orientation | Meter Reading | Correction Factor | Corrected Reading | Converted Reading | Limit At 3 Meters |
|---|---|---|---|---|---|---|---|
| MHz | MHz | Polarization/ | dBuV | dB | dBuV/m | uV/m | uV/m |
| 315.00 | 30.00 | - | - | - | - | - | 100.00 |
| \| | \| | - | - | - | - | - | \| |
| \| | *35.00 | H | 6.25 | 16.24 | 22.49 | 13.32 | \| |
| \| | \| | - | - | - | - | - | \| |
| \| | 88.00 | - | - | - | - | - | 100.00 |
| \| | 88.00 | - | - | - | - | - | 150.00 |
| \| | \| | - | - | - | - | - | \| |
| \| | *110.00 | V | 7.22 | 10.03 | 17.25 | 7.29 | \| |
| \| | *195.00 | H | 15.14 | 12.40 | 27.54 | 23.82 | \| |
| \| | *205.00 | H | 3.91 | 12.32 | 16.23 | 6.48 | \| |
| \| | \| | - | - | - | - | - | \| |
| \| | 216.00 | - | - | - | - | - | 150.00 |
| \| | 216.00 | - | - | - | - | - | 200.00 |
| \| | \| | - | - | - | - | - | \| |
| \| | *600.00 | H | -2.51 | 24.18 | 21.67 | 12.12 | \| |
| \| | \| | - | - | - | - | - | \| |
| \| | 960.00 | - | - | - | - | - | 200.00 |
| \| | 960.00 | - | - | - | - | - | 500.00 |
| \| | \| | - | - | - | - | - | \| |
| \| | *995.00 | H | -4.58 | 29.15 | 24.57 | 16.92 | \| |
| 315.00 | 3200.00 | - | - | - | - | - | 500.00 |
| | The frequency range was scanned from 9 kHz to 3.2 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 Section 15.231(c) - Bandwidth of Emission**
**IC RSS-210, A1.1.3 - Bandwidth of Momentary Signals**

**Test Data**

***Retlif Testing Laboratories, R-1932P-5***

***FCC Section 15.231(c) Bandwidth of Emission***
Customer: Dorman Products
Test Sample: 315MHz Remote Keyless Transmitter
Model Number: 13735
Test Specification: FCC Part 15, Subpart C, Section 15.231
Mode of Operation: Continuously transmitting a RF signal at 315 MHz
Technician/Date: M. Seamans / 4-23-13