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FCC Part 15, Subpart C, Section 15.231 Test Report

On

318 MHz Single Channel Transmitter
FCC ID: OYE-MWT120

Customer Name: Miller Edge, Inc.

Customer P.O.: 017600-00

Date of Report: April 25, 2013

Test Report No: R-1957P-1

Test Start Date: March 20, 2013

Test Finish Date: April 15, 2013

Test Technician: B. Mortimer, D. Fiore

EMC Test Engineer: D. Landers

Approved By: R.J. Reitz

Report Prepared By: C. Reitz

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Technical Information

Report Number: R-1957P-1

Customer: Miller Edge, Inc.

Address: 300 North Jennersville Road
West Grove, PA 19390

Manufacturer: Miller Edge
300 North Jennersville Road

Manufacturer Address: West Grove, PA 19390

Test Sample: 318 MHz Single Channel Transmitter

Model Numbers: MWT A12, MWT 12

FCC ID: OYE-MWT120

Type: Part 15 Security / Remote Control Transmitter

Power Requirements: 3 VDC Derived from (2) 1.5 VOC AA Lithium Batteries

Frequency of Operation: 318 MHz

Equipment Class: DSC

Equipment Use: Fixed

Test Specification:

FCC Rules and Regulations Part 15, Subpart C, Section 15.231

Test Procedure:

ANSI C63.4:2003



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Tests Performed

The test methods performed on the 318 MHz Keyfob Transmitter are shown below:

FCC Part 15, Subpart C	Test Method
15.231(b)(2)	Duty Cycle Determination
15.231(b)(3)	Field Strength of Spurious Emissions
15.231(c)	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).
2. All radiated emissions measurements were performed on an Open Area Test Site (OATS), listed with the FCC, in accordance with FCC Section 15.31(d).
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).
4. All measurements were performed at the specified 3 meter test distance as required by FCC Section 15.31(f).
5. The EUT was rotated throughout 360 degrees for all radiated emissions measurements as specified in FCC Section 15.31(f)(5).
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).
7. Appropriate accessories were attached to all EUT ports during the performance of radiated emissions measurements as required by FCC Section 15.31(i).
8. The EUT operated at a discrete frequency of 318 MHz. Testing was performed with the device operating at one frequency in the middle of the range of operation.
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).
10. All measurements were taken with a peak detector function as specified in FCC Section 15.35(a). The duty cycle, calculated in accordance with FCC Section 15.35(c), 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).



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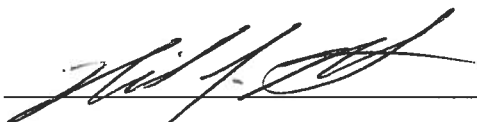
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Certification and Signatures

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.



Dean Landers
EMI 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.



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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.

- Results:
The device was operated at a frequency of 318 MHz and is for the transmission of a safety control signal used door openers.

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:

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.

- Results:
The device is activated by pressure applied to the bottom edge of an overhead door. The device ceases transmission within 5 seconds of deactivation.

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

- 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.

- Results:
The transmitter does not perform periodic transmissions.



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Requirements and Test Results (con't)

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.

- Results:
This device is employed for radio control purposes during emergencies involving 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.

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.

Table 1 - Test Limits, Field Strength of Emissions

Fundamental Frequency (MHz)	Field Strength of Spurious Emissions microvolts/meter @ 3 meters Quasi Peak or Average
260 to 470	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 318 MHz are listed in Table 2.

Table 2 - Fundamental and Harmonic Limits

Frequency of Operation (MHz)	Fundamental (μV/m)	Harmonics (μV/m)
318	6167.0	616.7

- 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.



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Requirements and Test Results (con't)

Table 3 - Fundamental and Harmonics Test Results

Fundamental Frequency (MHz)	Maximum Fundamental ($\mu\text{V/m}$)	Maximum Harmonics ($\mu\text{V/m}$)
318	1210.6	419.7

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.

- 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 = 15.3 milliseconds (maximum per cycle)

Transmitter Cycle Time = 24.65 milliseconds (100 ms maximum)

Transmitter Duty Cycle = 62.0 %

CALCULATION

1 Large Pulse = 0.85 milliseconds

18 x 0.85 μs (small pulse) = 15.3 milliseconds

Duty Cycle (15.3/100) = 62.0 %

Correction Factor = $20 \log$ (0.62) = -4.14 dB



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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.

- 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 bandwidth was measured and found to be 20 kHz of the center frequency.



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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 850 μs yields a minimum required bandwidth of 784 Hz. FCC specified bandwidths of 100 kHz and 1 MHz were utilized below and above 1GHz, respectively.



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Equipment Lists

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

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
8410B	EMCO	3CM MAGNETIC-FIELD LOOP	1.5GHz	7405-902	No Calibration Required	
8533	RIGOL	SPECTRUM ANALYZER	9 kHz - 1.5GHz	DSA 815-TG	2/15/2013	2/28/2014

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

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
8017	EMCO	DOUBLE RIDGE GUIDE	1 - 18 GHz	3115	2/27/2013	8/31/2014
8071	AGILENT / HP	SPECTRUM ANALYZER	100Hz-2.5 GHz/2-22GH	8566B	6/7/2012	6/30/2013
8072	AGILENT / HP	SPECTRUM ANALYZER DISPLAY		85662A	6/7/2012	6/30/2013
8300C	UNKNOWN	3/10 METER CABLE	3/10 METER	3 METER CABLE	8/15/2012	8/31/2013
8317	AGILENT / HP	PRE-AMPLIFIER	1-26.5 GHz, 30 dB	8449B	6/7/2012	6/30/2013
8411	SONOMA INSTRUMENT	PRE-AMPLIFIER	9 kHz - 1 GHz	310N	8/9/2012	8/31/2013
8433	ETS LINDGREN	BICONILOG	20 - 6000 MHz	3142D	8/2/2012	8/31/2013

FCC Section 15.231(c) - Bandwidth of Emission

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
8410B	EMCO LOOP	3CM MAGNETIC-FIELD	1.5GHz	7405-902	No Calibration Required	
R603	AGILENT / HP	SPECTRUM ANALYZER	100 kHz - 26.5 GHz	E7405A;B	6/18/2012	6/18/2013



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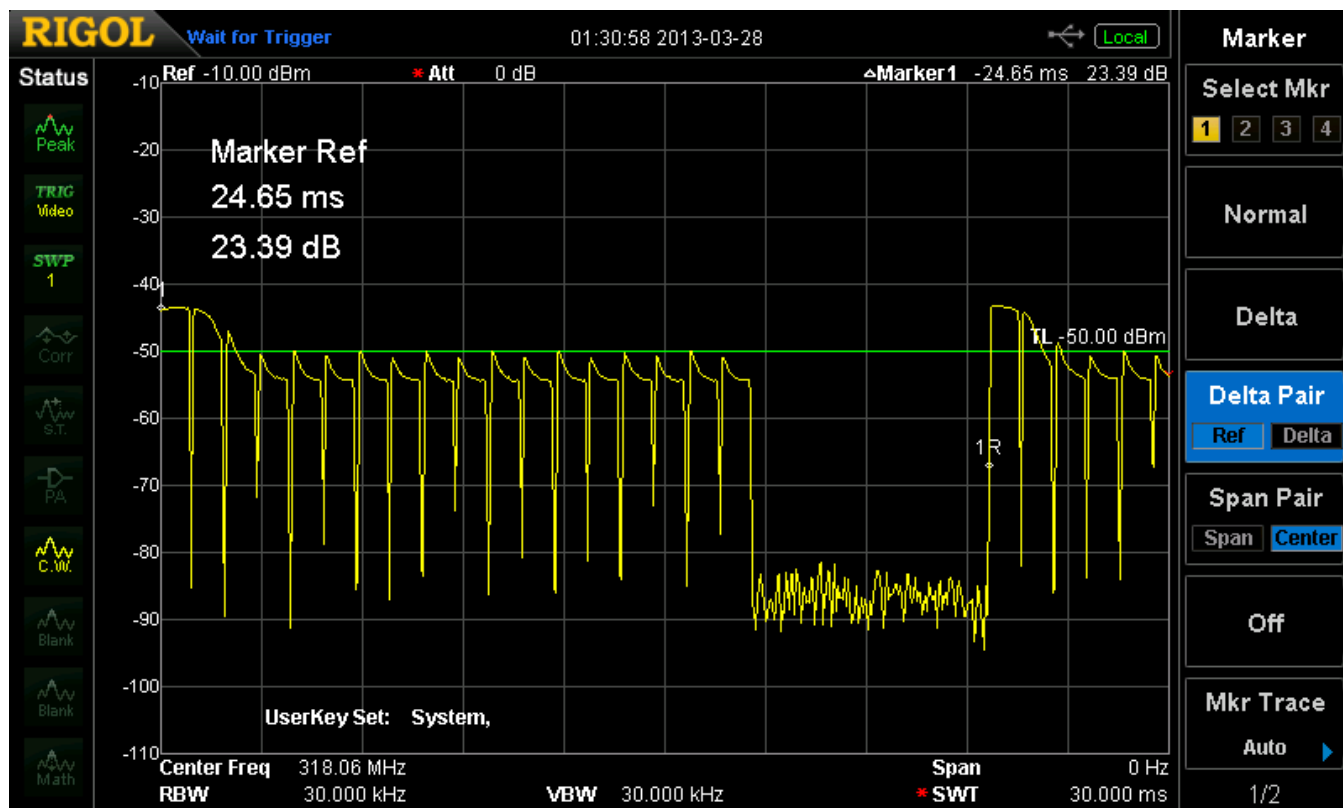
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Duty Cycle Determination
FCC Part 15, Subpart C, Section 15.231(b)
Test Data



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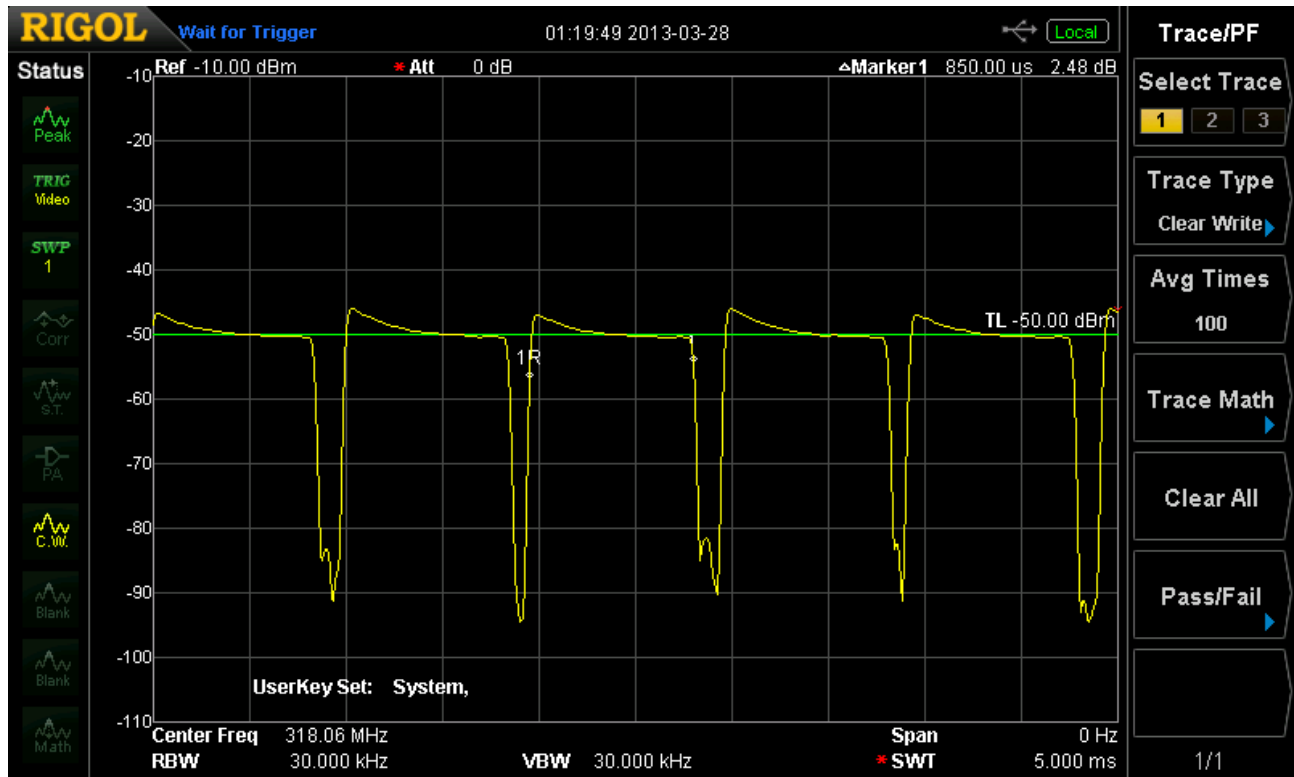
Test Method: FCC Part 15.231(b), Duty Cycle Determination

Notes: Measurement of cycle time = 24.65mSec.



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

Notes: Pulse width 1 = 850us; 18 pulses

Duty Cycle = $(18 * 0.85) / 24.65 = 0.62 = 62 \%$



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**Field Strength of Emissions
FCC Part 15, Subpart C, Section 15.231(b)
Test Data**



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Test Method:	FCC Part 15 Subpart C, Field Strength of Emissions, Paragraph 15.231(b)						
Customer:	Miller Edge				Job No.:	R-1957P-1	
Test Sample:	318 MHz Single Channel Transmitter						
Model No.:	MWT A12						
Operating Mode:	Continuously transmitting a RF signal at 318 MHz						
Technician:	D. Fiore				Date:	04-15-2013	
Notes:	Detector: Peak, Unless otherwise specified				Test Distance: 3 Meters		
Test Freq.	Antenna Pol./Height	EUT Rotation	Meter Reading	Correction Factor	Corrected Reading	Converted Reading	Peak Limit
MHz	(V/H)/Meters	Degrees	dBμV	dB	dBμV/m	uV/m	uV/m
79.51	V / 1.00	200.5	30.20	9.8	40.00	100.00	6167.0
79.51	H / 2.76	155.0	33.60	9.8	43.4	147.91	6167.0
159.03	V / 2.02	143.6	29.9	9.8	39.7	96.60	6167.0
159.03	H / 1.85	230.5	30.5	9.8	40.3	103.51	6167.0
318.00	V /1.00	29.1	60.40	17.4	77.80	7762.47	61670.0
318.00	H /1.19	67.6	65.80	17.4	83.20	14454.40	61670.0
397.53	V /1.2	245.4	19.10	20.0	39.10	90.16	6167.0
397.53	H /3.50	20.3	21.70	20.0	41.70	121.62	6167.0
477.09	V /2.0	217.5	14.5	22.4	36.9	69.98	6167.0
477.09	H /2.1	90.6	27.20	22.4	49.6	302.00	6167.0
636.00	V /3.2	342.6	23.90	26.1	50.00	316.23	6167.0
636.00	H /2.3	106.7	30.1	26.1	56.20	645.65	6167.0
954.00	V /1.00	205.4	13.40	31.0	44.40	165.96	6167.0
954.00	H /2.06	269.7	16.70	31.0	47.70	242.66	6167.0
1272.00	V /2.03	339.2	56.40	-2.6	53.80	489.78	6167.0
1272.00	H /1.1	195.8	56.60	-2.6	54.00	501.19	6167.0
1590.00	V /2.2	196.7	38.30	-1.2	37.10	71.61	5000.0
1590.00	H /1.0	203.6	37.50	-1.2	36.3	65.31	5000.0
1908.00	V /1.5	270.3	52.70	1.9	54.60	537.03	6167.0
1908.00	H /1.3	350.0	52.10	1.9	54.00	501.19	6167.0
2226.00	V / 1.0	103.9	34.63	3.6	38.23	81.56	5000.0
2226.00	H /2.96	284.5	39.20	3.6	42.8	138.04	5000.0



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Report No. R-1957P-1

Test Method:	FCC Part 15 Subpart C, Field Strength of Emissions, Paragraph 15.231(b)						
Customer:	Miller Edge			Job No.:	R-1957P-1		
Test Sample:	318 MHz Single Channel Transmitter						
Model No.:	MWT A12						
Operating Mode:	Continuously transmitting a RF signal at 318 MHz						
Technician:	D. Fiore			Date:	04-15-2013		
Notes:	Average values calculated from Peak readings Duty Cycle: 62% Correction: -4.14 dB						
Test Freq.	Antenna Pol./Height	EUT Rotation	Peak Reading	Duty Cycle Correction	Corrected Reading	Converted Reading	Avg. Limit
MHz	(V/H)-Meters	Degrees	dBµV/m	dB	dBµV/m	uV/m	uV/m
79.51	V / 1.00	200.5	30.20	-4.14	26.06	20.09	616.7
79.51	H / 2.76	155.0	33.60	-4.14	29.46	29.72	616.7
159.03	V / 2.02	143.6	29.9	-4.14	25.76	19.40	616.7
159.03	H / 1.85	230.5	30.5	-4.14	26.36	20.80	616.7
318.00	V /1.00	29.1	60.40	-4.14	56.26	650.13	6167.0
318.00	H /1.19	67.6	65.80	-4.14	61.66	1210.60	6167.0
397.53	V /1.2	245.4	19.10	-4.14	14.96	5.60	616.7
397.53	H /3.50	20.3	21.70	-4.14	17.56	7.55	616.7
477.09	V /2.0	217.5	14.5	-4.14	10.36	3.29	616.7
477.09	H /2.1	90.6	27.20	-4.14	23.06	14.22	616.7
636.00	V /3.2	342.6	23.90	-4.14	19.76	9.73	616.7
636.00	H /2.3	106.7	30.1	-4.14	25.96	19.86	616.7
954.00	V /1.00	205.4	13.40	-4.14	9.26	2.90	616.7
954.00	H /2.06	269.7	16.70	-4.14	12.56	4.25	616.7
1272.00	V /2.03	339.2	56.40	-4.14	52.26	410.20	616.7
1272.00	H /1.1	195.8	56.60	-4.14	52.46	419.76	616.7
1590.00	V /2.2	196.7	38.30	-4.14	34.16	51.05	500.0
1590.00	H /1.0	203.6	37.50	-4.14	33.36	46.56	500.0
1908.00	V /1.5	270.3	52.70	-4.14	48.56	267.92	616.7
1908.00	H /1.3	350.0	52.10	-4.14	47.96	250.03	616.7
2226.00	V / 1.0	103.9	34.63	-4.14	30.49	33.46	500.0
2226.00	H /2.96	284.5	39.20	-4.14	35.06	56.62	500.0



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Bandwidth of Emission
FCC Part 15, Subpart C, Section 15.231 (c)
Test Data



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Retlif Testing Laboratories, R-1957P-1
FCC Section 15.231(c) Bandwidth of Emission

Customer: Miller Edge
Test Sample: 318 MHz Single Channel Transmitter
Model Number: MWTA12
Test Specification: FCC Part 15, Subpart C, Section 15.231
Mode of Operation: Continuously transmitting a RF signal at 318 MHz
Technician/Date: B.A. Mortimer / 3-20-13

