



NVLAP LAB CODE 100396-0

• P.O. Box 489 • 1350 Tolland Road • Rollinsville, CO 80474 • Phone: (303) 258-0100 • FAX: (303) 258-0775 •
• www.criteriontech.com •

**EMC QUALIFICATION
TEST REPORT**

ELECTRONIC SOLUTIONS, INC.

**DRAPERY MOTOR AND CONTROLLER,
M40RF, M40Q, M50RF, M50Q**

FCC ID# P7RM4E1

TESTED TO CONFORM WITH:

☒ **EMISSIONS STANDARDS**

FOR

INDUSTRIAL, SCIENTIFIC AND MEDICAL (ISM)

Test Report Number: 100323-1548FCC
Date of Test Completion: February 25, 2011
Manufacturer's Address: 1355 Horizon Ave
Lafayette, CO 80026
Phone: (303) 469-9322

Approved by:

Laboratory Director

DOCUMENT REVISION HISTORY

REVISION #	REPORT NUMBER	DESCRIPTION OF REVISION	DATE OF REVISION
0	100323-1548FCC	ORIGINAL REPORT	2011-02-17
1	100323-1548FCC	REVISED FCC STANDARD REFERENCE	2011-02-22
2	100323-1548FCC	ADDITIONAL TEST DATA ADDED	2011-04-05

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Criterion Technology reports apply only to the specific Equipment Under Test (EUT) sample(s) tested under the test conditions described in this report. If the manufacturer intends to use this report as a document demonstrating compliance of this model, additional models of this product must have electrical and mechanical characteristics identical to the device tested for this report. Criterion Technology shall have no liability for any deductions, inferences, or generalizations drawn by the client or others from Criterion Technology issued reports.

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Laboratory Director
Criterion Technology Corp.
P.O. Box 489
1350 Tolland Road
Rollinsville, Colorado 80474
Phone: (303) 258-0100
Fax: (303) 258-0775
mailto:laboratory_director@criteriontech.com

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TABLE OF CONTENTS

1.0	EXECUTIVE SUMMARY.....	4
1.1	PURPOSE.....	4
1.2	CONFORMITY.....	4
1.3	EQUIPMENT UNDER TEST (EUT).....	4
2.0	EMISSIONS TEST STANDARDS.....	5
2.1	UNINTENTIONAL RADIATED EMISSIONS – 30 MHZ TO 1000 MHZ – M40RF& M40Q.....	5
2.2	UNINTENTIONAL RADIATED EMISSIONS – 30 MHZ TO 1000 MHZ – M50RF & M50Q.....	6
2.3	UNINTENTIONAL RADIATED EMISSIONS – ABOVE 1 GHZ – M40RF & M40Q.....	7
2.4	UNINTENTIONAL RADIATED EMISSIONS – ABOVE 1 GHZ – M50RF & M50Q.....	8
2.5	INTENTIONAL RADIATOR – RADIATED EMISSIONS – M40RF.....	9
2.6	INTENTIONAL RADIATOR – RADIATED EMISSIONS – M50RF.....	10
2.7	FREQUENCY LIMITS – M40RF.....	11
2.8	FREQUENCY LIMITS – M50RF.....	12
2.9	POWER SPECTRAL DENSITY – M40RF.....	13
2.10	POWER SPECTRAL DENSITY – M50RF.....	14
2.11	CONDUCTED EMISSIONS – M40RF & M40Q.....	15
2.12	CONDUCTED EMISSIONS – M50RF & M50Q.....	16
3.0	APPENDIX A: EUT PHOTOGRAPHS	17
3.1	UNINTENTIONAL RADIATED EMISSIONS	17
3.2	CONDUCTED EMISSIONS.....	18
4.0	APPENDIX B: DATA SHEETS	19
4.1	UNINTENTIONAL RADIATED EMISSIONS PLOT – 30 MHZ TO 1 GHZ – M40RF & M40Q.....	19
4.2	UNINTENTIONAL RADIATED EMISSIONS TABLE – 30 MHZ TO 1 GHZ – M40RF & M40Q.....	20
4.3	UNINTENTIONAL RADIATED EMISSIONS PLOT – 30 MHZ TO 1 GHZ – M50RF & M50Q.....	23
4.4	UNINTENTIONAL RADIATED EMISSIONS TABLE – 30 MHZ TO 1 GHZ – M50RF & M50Q.....	24
4.5	UNINTENTIONAL RADIATED EMISSIONS PLOT – ABOVE 1 GHZ – M40RF & M40Q.....	27
4.6	UNINTENTIONAL RADIATED EMISSIONS TABLE – ABOVE 1 GHZ – M40RF & M40Q.....	28
4.7	UNINTENTIONAL RADIATED EMISSIONS PLOT – ABOVE 1 GHZ – M50RF & M50Q.....	29
4.8	UNINTENTIONAL RADIATED EMISSIONS TABLE – ABOVE 1 GHZ – M50RF & M50Q.....	30
4.9	INTENTIONAL RADIATED EMISSIONS TABLE – M40RF.....	31
4.10	INTENTIONAL RADIATED EMISSIONS TABLE – M50RF.....	32
4.11	FREQUENCY LIMITS – M40RF.....	33
4.12	FREQUENCY LIMITS – M50RF.....	36
4.13	POWER SPECTRAL DENSITY - M40RF.....	39
4.14	POWER SPECTRAL DENSITY – M50RF.....	42
4.15	CONDUCTED EMISSIONS – M40RF & M40Q.....	46
4.16	CONDUCTED EMISSIONS – M50RF & M50Q.....	47
5.0	APPENDIX C: PRODUCT INFORMATION FORM.....	48
6.0	APPENDIX D: TEST EQUIPMENT AND CALIBRATION STATUS	50
7.0	APPENDIX E: TEST DIRECTIVES, STANDARDS AND METHODS	51

EMC QUALIFICATION TEST REPORT

DRAPERY MOTOR AND CONTROLLER, M40RF, M40Q, M50RF, M50Q

1.0 EXECUTIVE SUMMARY

1.1 PURPOSE

The purpose of this report is to present EMC test data and demonstrate conformity to the requirements of the prescribed standards for Emissions and/or Immunity.

1.2 CONFORMITY

The test article was tested to the standards listed in Table I with the indicated conformity status. All test methods were performed in accordance to with the standards listed.

TABLE I. EMISSIONS CONFORMITY SUMMARY

TEST TYPE	COMPLIANCE STANDARD	TESTING TECHNIQUE	TEST DESCRIPTION	PRODUCT CLASSIFICATION	CONFORMITY STATUS
EMISSIONS	<u>FCC Part 15</u>	☒ <u>FCC Part 15</u>	Unintentional Radiated Emissions	Class B	PASSED
			Intentional Radiated Emissions		PASSED
			Conducted Emissions ¹		PASSED

1.3 EQUIPMENT UNDER TEST (EUT)

EUT NAME(S): **DRAPERY MOTOR AND CONTROLLER**

EUT NAME(S): **M40RF, M40Q, M50RF, M50Q**

¹ Measurement of Conducted Emissions do not apply if the EUT is powered by an external DC power source.

2.0 EMISSIONS TEST STANDARDS

FCC Part 15

Class B

2.1 ☒ UNINTENTIONAL RADIATED EMISSIONS – 30 MHZ TO 1000 MHZ – M40RF& M40Q

Measurements for *Radiated Emissions* were performed over the frequency range of 30 MHz to 1000 MHz in the horizontal and vertical antenna polarities to the requirements of:

FCC Part 15.109

Testing Conditions

Date of Test: June 18, 2010
Temperature: 20° C
Relative Humidity: 45%
Test Voltage: 120 VAC 60 Hz
Test Operator: SP

Test Location

Criterion Technology Open Area Test Site

Test Distance

Antenna Distance: 10 meter(s) Final Measurement(s)

Test Equipment

- ☒ Rohde and Schwarz Receiver, ESVS-30
- ☒ Mini Circuits Pre-Amp #2
- ☒ Chase BiLog Antenna, Model 1121

Test Accessories: See Appendix C for support equipment details

Test Results of Radiated Emissions

Test Status: **PASSED**Frequency Range: **30 MHz to 1000 MHz**Minimum Margin to Limit **-2.18** dB at **49.1494** MHz

Uncertainty Horizontal under 200 MHz: **4.56** dB
Uncertainty Horizontal over 200 MHz: **3.92** dB
Uncertainty Vertical under 200 MHz: **4.77** dB
Uncertainty Vertical over 200 MHz: **4.52** dB

Remarks

See: **APPENDIX A** for EUT Photographs
APPENDIX B for Data Sheets
APPENDIX D for Test Equipment Calibration Status

2.2 ☒ UNINTENTIONAL RADIATED EMISSIONS – 30 MHZ TO 1000 MHZ – M50RF & M50Q

Measurements for *Radiated Emissions* were performed over the frequency range of 30 MHz to 1000 MHz in the horizontal and vertical antenna polarities to the requirements of:

FCC Part 15.109Testing Conditions

Date of Test: June 21, 2010
Temperature: 18° C
Relative Humidity: 47 %
Test Voltage: 120 VAC 60 Hz
Test Operator: SP

Test LocationCriterion Technology Open Area Test SiteTest Distance

Antenna Distance: **10 meter(s)** **Final Measurement(s)**

Test Equipment

- ☒ Rohde and Schwarz Receiver, ESVS-30
- ☒ Mini Circuits Pre-Amp #2
- ☒ Chase BiLog Antenna, Model 1121

Test Accessories: See Appendix C for support equipment details

Test Results of Radiated Emissions

Test Status: **PASSED**

Frequency Range: **30 MHz to 1000 MHz**

Minimum Margin to Limit **-3.30** dB at **49.1494** MHz

Uncertainty Horizontal under 200 MHz: **4.56** dB
Uncertainty Horizontal over 200 MHz: **3.92** dB
Uncertainty Vertical under 200 MHz: **4.77** dB
Uncertainty Vertical over 200 MHz: **4.52** dB

Remarks

See: **APPENDIX A** for EUT Photographs
APPENDIX B for Data Sheets
APPENDIX D for Test Equipment Calibration Status

2.3 ☒ UNINTENTIONAL RADIATED EMISSIONS – ABOVE 1 GHZ – M40RF & M40Q

Measurements for *Radiated Emissions* were performed over the frequency range of 1 GHz to 12.5 GHz with horizontal and vertical antenna polarities to the requirements of:

FCC Part 15.109Testing Conditions

Date of Test: June 19, 2010
Temperature: 19° C
Relative Humidity: 45 %
Test Voltage: 120 VAC 60 Hz
Test Operator: SP

Test Location**Criterion Technology Open Area Test Site**Test Distance

Antenna Distance: **3 meter(s)** **Final Measurement(s)**

Test Equipment

☒ Rohde and Schwarz Receiver, ESVS-30
☒ Mini Circuits Pre-Amp #2
☒ Chase BiLog Antenna, Model 1121
☒ Veratech Pre-Amp #3
☒ Antenna Research, Horn Antenna, Model DRG118/A

Test Results of Radiated Emissions

Test Status: **PASSED** Frequency Range: **1 GHz to 12.5 GHz**

Minimum Margin to Limit **-8.15** dB at **10536.7590** MHz

Remarks

See: **APPENDIX A** for EUT Photographs
 APPENDIX B for Data Sheets
 APPENDIX D for Test Equipment Calibration Status

2.4 ☒ UNINTENTIONAL RADIATED EMISSIONS – ABOVE 1 GHz – M50RF & M50Q

Measurements for *Radiated Emissions* were performed over the frequency range of 1 GHz to 12.5 GHz with horizontal and vertical antenna polarities to the requirements of:

FCC Part 15.109Testing Conditions

Date of Test: June 19, 2010
Temperature: 19° C
Relative Humidity: 45 %
Test Voltage: 120 VAC 60 Hz
Test Operator: SP

Test Location**Criterion Technology Open Area Test Site**Test Distance

Antenna Distance: **3 meter(s)** **Final Measurement(s)**

Test Equipment

☒ Rohde and Schwarz Receiver, ESVS-30
☒ Mini Circuits Pre-Amp #2
☒ Chase BiLog Antenna, Model 1121
☒ Veratech Pre-Amp #3
☒ Antenna Research, Horn Antenna, Model DRG118/A

Test Results of Radiated Emissions

Test Status: **PASSED** Frequency Range: **1 GHz to 12.5 GHz**

Minimum Margin to Limit **-8.15** dB at **10536.7590** MHz

Remarks

See: **APPENDIX A** for EUT Photographs
 APPENDIX B for Data Sheets
 APPENDIX D for Test Equipment Calibration Status

2.5 ☒ INTENTIONAL RADIATOR – RADIATED EMISSIONS – M40RF

Measurements for *Radiated Emissions* were performed over the frequency range of 1 GHz to 24 GHz with horizontal and vertical antenna polarities to the requirements of:

FCC Part 15.205

FCC Part 15.209

FCC Part 15.247

Testing Conditions

Date of Test: June 25, 2010
Temperature: 18° C
Relative Humidity: 40 %
Test Voltage: 120 VAC 60 Hz
Test Operator: SP

Test LocationCriterion Technology Open Area Test SiteTest Distance

Antenna Distance: **3 meter(s)** Final Measurement(s)

Test Equipment

☒ Hewlett-Packard Spectrum Analyzer, HP 8566B ☒ Hewlett-Packard Quasi-Peak Adapter, HP 85650A
☒ Veratech Pre-Amp #3 ☒ Antenna Research, Horn Antenna, Model DRG118/A

Test Results of Radiated Emissions

Test Status: **PASSED** Frequency Range: **1 GHz to 24 GHz**

Fundamental Minimum Margin to Limit: **-20.5** dB at **2.4430185** GHz

Spurious & Harmonics Minimum Margin to Limit: **-6.96** dB at **12.215** GHz

Remarks

See: **APPENDIX A** for EUT Photographs
APPENDIX B for Data Sheets
APPENDIX D for Test Equipment Calibration Status

2.6 ☒ INTENTIONAL RADIATOR – RADIATED EMISSIONS – M50RF

Measurements for *Radiated Emissions* were performed over the frequency range of 1 GHz to 24 GHz with horizontal and vertical antenna polarities to the requirements of:

FCC Part 15.205

FCC Part 15.209

FCC Part 15.247

Testing Conditions

Date of Test: June 25, 2010
Temperature: 18° C
Relative Humidity: 40 %
Test Voltage: 120 VAC 60 Hz
Test Operator: SP

Test LocationCriterion Technology Open Area Test SiteTest Distance

Antenna Distance: **3 meter(s)** Final Measurement(s)

Test Equipment

☒ Hewlett-Packard Spectrum Analyzer, HP 8566B ☒ Hewlett-Packard Quasi-Peak Adapter, HP 85650A
☒ Veratech Pre-Amp #3 ☒ Antenna Research, Horn Antenna, Model DRG118/A

Test Results of Radiated Emissions

Test Status: **PASSED** Frequency Range: **1 GHz to 24 GHz**

Fundamental Minimum Margin to Limit: **-20.5** dB at **2.4430185** GHz

Spurious & Harmonics Minimum Margin to Limit: **-14.32** dB at **4.88** GHz

Remarks

See: **APPENDIX A** for EUT Photographs
 APPENDIX B for Data Sheets
 APPENDIX D for Test Equipment Calibration Status

2.7 FREQUENCY LIMITS – M40RF

Measurements for bandwidth, band edges, number of channels were performed in accordance with the Operations to the Requirements of:

FCC Part 15.205

FCC Part 15.209

FCC Part 15.247

Testing Conditions

Date of Test: June 17, 2010
February 25, 2011
Temperature: 18° C
17° C
Relative Humidity: 48 %
30 %
Test Voltage: 120 VAC 60 Hz
Test Operator: SP

Test Location

Criterion Technology Open Area Test Site

Test Equipment

Hewlett-Packard Spectrum Analyzer, HP 8566B

Test Results of Occupied Bandwidth and 20 dB / 6 dB Bandedges

Test Status: **PASSED**

Low Channel:

20 dB lower Bandedge: 2.40368 GHz
20 dB upper Bandedge: 2.40631 GHz
20 dB Occupied Channel Bandwidth: 2.63 MHz

Low Channel:

6 dB lower Bandedge: 2.40419GHz
6 dB upper Bandedge: 2.40580 GHz
6 dB Occupied Channel Bandwidth: 2.61 MHz

Mid Channel:

20 dB lower Bandedge: 2.43867 GHz
20 dB upper Bandedge: 2.44132 GHz
20 dB Occupied Channel Bandwidth: 2.65 MHz

Mid Channel:

6 dB lower Bandedge: 2.43919 GHz
6 dB upper Bandedge: 2.44078 GHz
6 dB Occupied Channel Bandwidth: 1.58 MHz

High Channel:

20 dB lower Bandedge: 2.47868 GHz
20 dB upper Bandedge: 2.4813 GHz
20 dB Occupied Channel Bandwidth: 2.63 MHz

High Channel:

6 dB lower Bandedge: 2.47918 GHz
6 dB upper Bandedge: 2.48078 GHz
6 dB Occupied Channel Bandwidth: 1.60 MHz

Remarks

See: **APPENDIX A** for EUT Photographs
APPENDIX B for Data Sheets
APPENDIX D for Test Equipment Calibration Status

2.8 FREQUENCY LIMITS – M50RF

Measurements for bandwidth, band edges, number of channels were performed in accordance with the Operations to the Requirements of:

FCC Part 15.205

FCC Part 15.209

FCC Part 15.247

Testing Conditions

Date of Test: June 17, 2010
February 25, 2011
Temperature: 18° C
17° C
Relative Humidity: 48 %
30 %
Test Voltage: 120 VAC 60 Hz
Test Operator: SP

Test Location

Criterion Technology Open Area Test Site

Test Equipment

Hewlett-Packard Spectrum Analyzer, HP 8566B

Test Results of Occupied Bandwidth and 20 dB / 6dB Bandedges

Test Status: **PASSED**

Low Channel:

20 dB lower Bandedge: 2.40368 GHz
20 dB upper Bandedge: 2.40631 GHz
20 dB Occupied Channel Bandwidth: 2.63 MHz

Low Channel:

6 dB lower Bandedge: 2.40368 GHz
6 dB upper Bandedge: 2.40631 GHz
6 dB Occupied Channel Bandwidth: 2.63 MHz

Mid Channel:

20 dB lower Bandedge: 2.43867 GHz
20 dB upper Bandedge: 2.44132 GHz
20 dB Occupied Channel Bandwidth: 2.65 MHz

Mid Channel:

6 dB lower Bandedge: 2.43867 GHz
6 dB upper Bandedge: 2.44132 GHz
6 dB Occupied Channel Bandwidth: 2.65 MHz

High Channel:

20 dB lower Bandedge: 2.47868 GHz
20 dB upper Bandedge: 2.4813 GHz
20 dB Occupied Channel Bandwidth: 2.63 MHz

High Channel:

6 dB lower Bandedge: 2.47868 GHz
6 dB upper Bandedge: 2.4813 GHz
6 dB Occupied Channel Bandwidth: 2.63 MHz

Remarks

See: **APPENDIX A** for EUT Photographs
APPENDIX B for Data Sheets
APPENDIX D for Test Equipment Calibration Status

2.9 POWER SPECTRAL DENSITY – M40RF

Measurements for Power Spectrum Density were performed in accordance with the Operations to the Requirements of:

FCC Part 15.247Testing Conditions

Date of Test: February 25, 2011
Temperature: 17° C
Relative Humidity: 30 %
Test Voltage: 120 VAC 60 Hz
Test Operator: SP

Test Location**Criterion Technology Open Area Test Site**Test Equipment

Hewlett-Packard Spectrum Analyzer, HP 8566B

Test Results of 3 kHz Power Spectrum Density

Test Status: **PASSED**

Low Channel:

Minimum Margin to Limit: **-17.0** dB at **2.4055** GHz

Mid Channel:

Minimum Margin to Limit: **-17.44** dB at **2.4055** GHz

High Channel: :

Minimum Margin to Limit: **-17.9** dB at **2.4796** GHz

Remarks

See: **APPENDIX A** for EUT Photographs
APPENDIX B for Data Sheets
APPENDIX D for Test Equipment Calibration Status

2.10 POWER SPECTRAL DENSITY – M50RF

Measurements for Power Spectrum Density were performed in accordance with the Operations to the Requirements of:

FCC Part 15.247Testing Conditions

Date of Test: February 25, 2011
Temperature: 17° C
Relative Humidity: 30 %
Test Voltage: 120 VAC 60 Hz
Test Operator: SP

Test Location**Criterion Technology Open Area Test Site**Test Equipment

Hewlett-Packard Spectrum Analyzer, HP 8566B

Test Results of 3 kHz Power Spectrum Density

Test Status: **PASSED**

Low Channel:

Minimum Margin to Limit: **-20.4** dB at **2.4055** GHz

Mid Channel:

Minimum Margin to Limit: **-17.86** dB at **2.4055** GHz

High Channel: :

Minimum Margin to Limit: **-18.2** dB at **2.4796** GHz

Remarks

See: **APPENDIX A** for EUT Photographs
APPENDIX B for Data Sheets
APPENDIX D for Test Equipment Calibration Status

2.11 ☒ CONDUCTED EMISSIONS – M40RF & M40Q

Measurements for *Conducted Emissions* were performed over the frequency range of 150 kHz to 30 MHz to the requirements of:

FCC Part 15.107Testing Conditions

Date of Test: June 17, 2010
Temperature: 20° C
Relative Humidity: 44 %
Test Voltage: 120 VAC 60 Hz
Test Operator: SP

Test Location**Criterion Technology Shield Room**Test Equipment

Hewlett-Packard Spectrum Analyzer, HP 8566B
Rohde and Schwarz Receiver, ESHS-30 Rohde and Schwarz LISN, ESH2-Z5

Test Accessories: See Appendix C for support equipment details

Test Results of Conducted Emissions

Test Status: **PASSED** Frequency Range: **150 kHz TO 30 MHz**

Minimum Margin to Limit: **-50.4** dB at **270** kHz

Uncertainty: **3.66** dB

Remarks

See: **APPENDIX A** for EUT Photographs
APPENDIX B for Data Sheets
APPENDIX D for Test Equipment Calibration Status

2.12 ☒ CONDUCTED EMISSIONS – M50RF & M50Q

Measurements for *Conducted Emissions* were performed over the frequency range of 150 kHz to 30 MHz to the requirements of:

FCC Part 15.107Testing Conditions

Date of Test: June 17, 2010
Temperature: 20° C
Relative Humidity: 44 %
Test Voltage: 120 VAC 60 Hz
Test Operator: SP

Test Location**Criterion Technology Shield Room**Test Equipment

Hewlett-Packard Spectrum Analyzer, HP 8566B
Rohde and Schwarz Receiver, ESHS-30 Rohde and Schwarz LISN, ESH2-Z5

Test Accessories: See Appendix C for support equipment details

Test Results of Conducted Emissions

Test Status: **PASSED** Frequency Range: **150 kHz TO 30 MHz**

Minimum Margin to Limit **-53.0** dB at **270** kHz

Uncertainty: **3.66** dB

Remarks

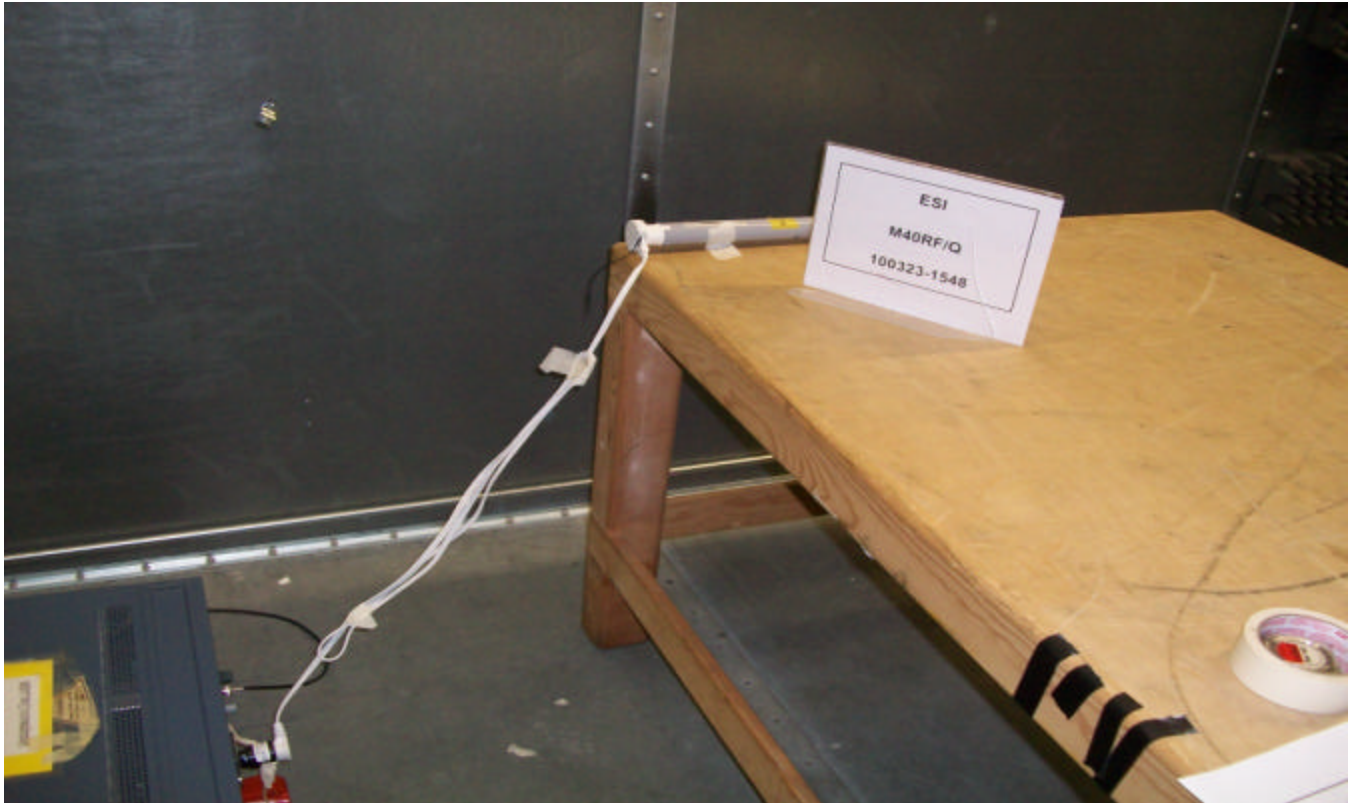
See: **APPENDIX A** for EUT Photographs
 APPENDIX B for Data Sheets
 APPENDIX D for Test Equipment Calibration Status

3.0 APPENDIX A: EUT PHOTOGRAPHS

3.1 UNINTENTIONAL RADIATED EMISSIONS



3.2 CONDUCTED EMISSIONS



4.0 APPENDIX B: DATA SHEETS

4.1 UNINTENTIONAL RADIATED EMISSIONS PLOT – 30 MHZ TO 1 GHZ – M40RF & M40Q

Criterion Technology

Date: June 18, 2010

EUT: Drapery Motor and Controller, M40RF & M40Q

Manufacturer: Electronic Solutions, Inc.

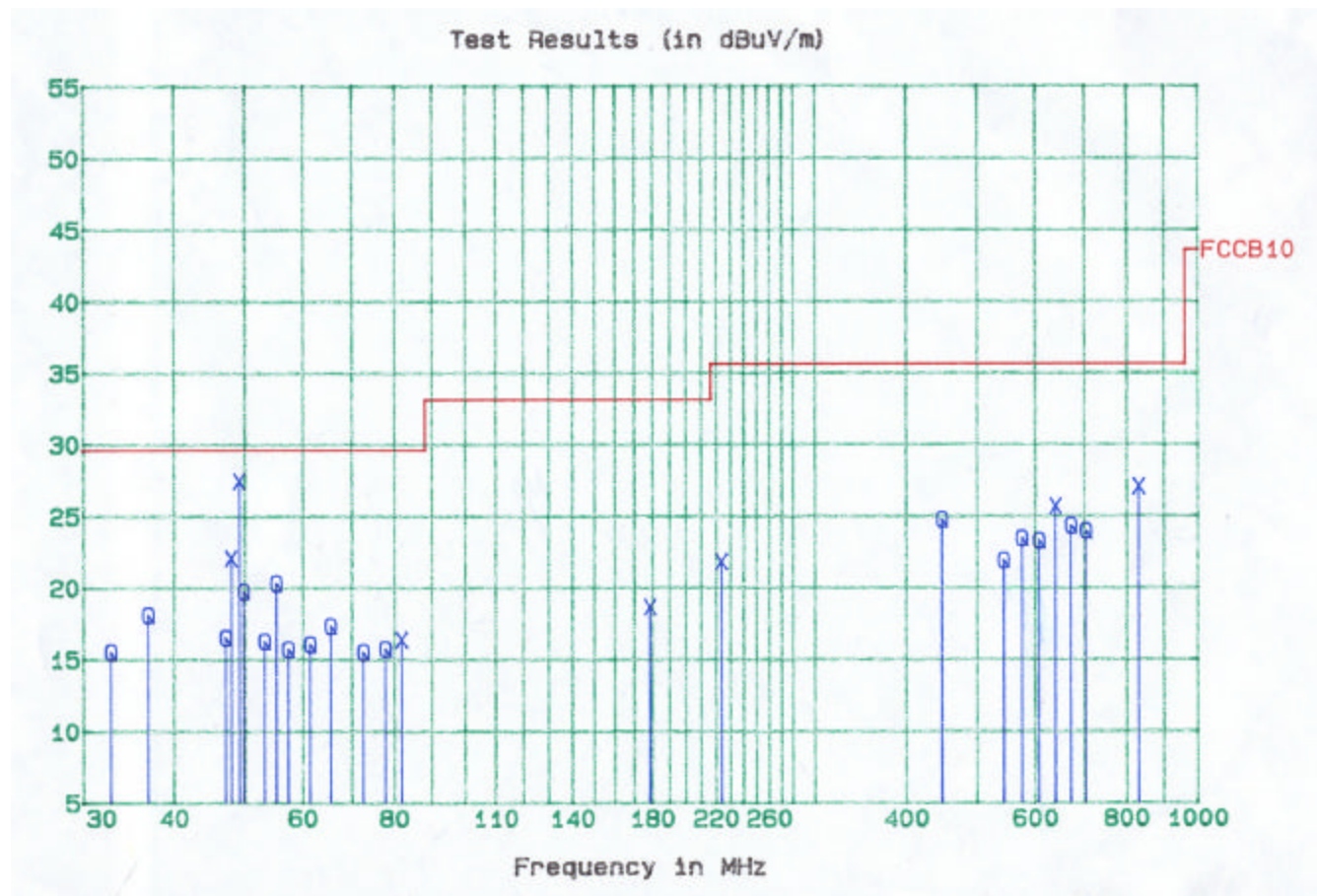
Tester: SP

SpiD: 1003-1548

Test Information: 10 meters, 120 VAC 60 Hz, FCC Part 15 Class B

Test Cond: Temp: 20° C

Humidity: 45 %



4.2 UNINTENTIONAL RADIATED EMISSIONS TABLE – 30 MHZ TO 1 GHZ – M40RF & M40Q**Notes:**

Fval = Ival + AF + Cable + Pads – Amp

Where:

Fval is the final electric field in dbuv/m

Ival is the initial reading from the EMC receiver or spec an in dbuv.

AF is the antenna factor, a + value is loss

Cable is the cable attenuation in db, a + value is loss

Pads is the total attenuator loss in db, a + value is loss

Amp is the preamplifier gain in db, a + value is amplifier gain

A Sample calculation with Ival, AF, Cable, Pads, & Amp values of
50 dbuv, 18, 4, 3, 32 respectively is:

Fval = 50 + 18 + 4 + 3 – 32 = 43 dbuv/m

Minimum Margin to Limit: **-2.18** dB at **49.1494** MHz

Criterion Technology

EUT: Drapery Motor and Controller, M40RF & M40Q

Manufacturer: Electronic Solutions, Inc.

Tester: sp

Special ID: 100323-1548

EUT Level: production Unit

EUT Information: Tabletop unit

Test information: FCC 10 meter Class B 120VAC/60Hz

Table 1: Scan List, sorted by margin to limit FCCB10, -15.0dB filter

<u>Freq. MHz</u>	<u>Value</u>	<u>Sts</u>	<u>FCCB10</u>	<u>TT</u>	<u>Hght</u>	<u>Az</u>	<u>Comment</u>
49.1494	27.36	m	-2.18	322	100	V	.
2438.0155	39.01	m	-4.51	320	101	V	.
47.9290	21.98	m	-7.56	180	351	H	.
832.0049	26.96	m	-8.60	175	327	V	.
55.2571	20.23	q	-9.31	270	100	V	.
49.8600	19.67	q	-9.87	180	351	H	.
640.0081	25.59	m	-9.97	269	380	V	.
448.0041	24.68	q	-10.88	0	151	V	.
672.0061	24.26	q	-11.30	180	251	V	.
36.8650	18.01	q	-11.53	90	100	V	.
704.0021	23.88	q	-11.68	270	100	V	.
2322.1200	31.58	a	-11.94	320	101	H	.
2343.9600	31.57	a	-11.95	320	101	H	.
576.0039	23.37	q	-12.19	270	400	V	.
65.5380	17.25	q	-12.29	270	151	V	.
608.0038	23.21	q	-12.35	270	100	V	.
47.1020	16.42	q	-13.12	0	351	H	.
81.9190	16.28	m	-13.26	175	101	V	.
53.2470	16.18	q	-13.36	0	351	H	.
2333.4000	30.11	a	-13.41	320	101	H	.
61.4405	15.96	q	-13.58	0	351	H	.
544.0061	21.82	q	-13.74	270	100	V	.
224.0001	21.73	m	-13.83	295	100	V	.
77.8221	15.66	q	-13.88	0	351	H	.
57.3440	15.63	q	-13.91	180	151	V	.
32.7686	15.43	q	-14.11	90	100	V	.
72.6012	15.43	q	-14.11	90	100	V	.
2342.0400	29.27	a	-14.25	320	101	H	.
178.8860	18.57	m	-14.49	161	399	V	.

Table 2: Scan List for FCCB10, sorted by Frequency, -15.0dB filter

<u>Freq, MHz</u>	<u>Value</u>	<u>Sts</u>	<u>FCCB10</u>	<u>TT</u>	<u>Hght</u>	<u>Az</u>	<u>Comment</u>
32.7686	15.43	q	-14.11	90	100	V	.
36.8650	18.01	q	-11.53	90	100	V	.
47.1020	16.42	q	-13.12	0	351	H	.
47.9290	21.98	m	-7.56	180	351	H	.
49.1494	27.36	m	-2.18	322	100	V	.
49.8600	19.67	q	-9.87	180	351	H	.
53.2470	16.18	q	-13.36	0	351	H	.
55.2571	20.23	q	-9.31	270	100	V	.
57.3440	15.63	q	-13.91	180	151	V	.
61.4405	15.96	q	-13.58	0	351	H	.
65.5380	17.25	q	-12.29	270	151	V	.
72.6012	15.43	q	-14.11	90	100	V	.
77.8221	15.66	q	-13.88	0	351	H	.
81.9190	16.28	m	-13.26	175	101	V	.
178.8860	18.57	m	-14.49	161	399	V	.
224.0001	21.73	m	-13.83	295	100	V	.
448.0041	24.68	q	-10.88	0	151	V	.
544.0061	21.82	q	-13.74	270	100	V	.
576.0039	23.37	q	-12.19	270	400	V	.
608.0038	23.21	q	-12.35	270	100	V	.
640.0081	25.59	m	-9.97	269	380	V	.
672.0061	24.26	q	-11.30	180	251	V	.
704.0021	23.88	q	-11.68	270	100	V	.
832.0049	26.96	m	-8.60	175	327	V	.
2322.1200	31.58	a	-11.94	320	101	H	.
2333.4000	30.11	a	-13.41	320	101	H	.
2342.0400	29.27	a	-14.25	320	101	H	.
2343.9600	31.57	a	-11.95	320	101	H	.
2438.0155	39.01	m	-4.51	320	101	V	.

Table 3: Complete Scan List Sorted by Frequency

Freq, MHz	I-val	Final	Sts	TT	Hght	Az	Time	Comment
32.7686	20.99	15.43	q	90	100	V	Fri Jun 18 09:10:47 2010	.
36.0040	21.30	14.29	q	0	151	V	Fri Jun 18 08:24:43 2010	.
36.8650	25.36	18.01	q	90	100	V	Fri Jun 18 09:10:51 2010	.
47.1020	29.13	16.42	q	0	351	H	Fri Jun 18 08:39:06 2010	.
47.9290	35.06	21.98	m	180	351	H	Fri Jun 18 09:40:23 2010	.
49.1494	40.99	27.36	m	322	100	V	Fri Jun 18 10:35:27 2010	.
49.8600	33.66	19.67	q	180	351	H	Fri Jun 18 09:40:27 2010	.
53.2470	31.69	16.18	q	0	351	H	Fri Jun 18 08:39:17 2010	.
55.2571	36.09	20.23	q	270	100	V	Fri Jun 18 10:00:18 2010	.
57.3440	31.58	15.63	q	180	151	V	Fri Jun 18 09:31:38 2010	.
61.4405	32.20	15.96	q	0	351	H	Fri Jun 18 08:39:24 2010	.
65.5380	33.26	17.25	q	270	151	V	Fri Jun 18 09:57:05 2010	.
68.6157	27.99	12.13	q	90	151	V	Fri Jun 18 09:08:49 2010	.
69.6330	28.21	12.40	q	90	151	V	Fri Jun 18 09:08:52 2010	.
72.1401	29.76	14.14	q	180	151	V	Fri Jun 18 09:31:51 2010	.
72.6012	30.99	15.43	q	90	100	V	Fri Jun 18 09:11:23 2010	.
72.7062	29.58	14.03	q	90	100	V	Fri Jun 18 09:11:25 2010	.
73.7311	26.94	11.50	q	90	100	V	Fri Jun 18 09:11:27 2010	.
77.8221	30.81	15.66	q	0	351	H	Fri Jun 18 08:39:43 2010	.
81.9190	30.47	16.28	m	175	101	V	Fri Jun 18 11:18:56 2010	.
83.9682	26.95	13.05	q	90	100	V	Fri Jun 18 09:11:34 2010	.
86.0175	26.02	12.25	q	90	100	V	Fri Jun 18 09:11:36 2010	.
114.6900	21.23	11.12	q	90	351	H	Fri Jun 18 08:48:39 2010	.
115.4022	24.94	14.92	m	347	101	H	Fri Jun 18 11:24:03 2010	.
178.8860	30.63	18.57	m	161	399	V	Fri Jun 18 11:12:09 2010	.
224.0001	32.51	21.73	m	295	100	V	Fri Jun 18 10:49:47 2010	.
320.0051	27.45	20.19	q	270	200	H	Fri Jun 18 09:54:00 2010	.
448.0041	28.14	24.68	q	0	151	V	Fri Jun 18 08:26:15 2010	.
464.0021	22.01	19.00	q	0	151	V	Fri Jun 18 08:26:20 2010	.
496.0043	20.99	18.98	q	270	400	V	Fri Jun 18 09:47:45 2010	.
512.0041	21.18	19.03	q	180	100	V	Fri Jun 18 09:29:51 2010	.
544.0061	23.66	21.82	q	270	100	V	Fri Jun 18 10:01:11 2010	.
576.0039	24.05	23.37	q	270	400	V	Fri Jun 18 09:47:52 2010	.
608.0038	23.52	23.21	q	270	100	V	Fri Jun 18 10:01:16 2010	.
640.0081	25.13	25.59	m	269	380	V	Fri Jun 18 11:06:56 2010	.
672.0061	23.56	24.26	q	180	251	V	Fri Jun 18 09:38:50 2010	.
704.0021	22.23	23.88	q	270	100	V	Fri Jun 18 10:01:22 2010	.
832.0049	23.92	26.96	m	175	327	V	Fri Jun 18 10:59:05 2010	.
2322.1200	38.98	31.58	a	320	101	H	Wed Jun 16 16:35:30 2010	.
2333.4000	37.44	30.11	a	320	101	H	Wed Jun 16 16:36:29 2010	.
2342.0400	36.55	29.27	a	320	101	H	Wed Jun 16 16:37:27 2010	.
2343.9600	38.84	31.57	a	320	101	H	Wed Jun 16 16:38:08 2010	.
2438.0155	44.86	39.01	m	320	101	V	Wed Jun 16 16:24:19 2010	.

4.3 UNINTENTIONAL RADIATED EMISSIONS PLOT – 30 MHZ TO 1 GHZ – M50RF & M50Q

Criterion Technology

Date: June 21, 2010

EUT: Drapery Motor and Controller, M50RF & M50Q

Manufacturer: Electronic Solutions, Inc.

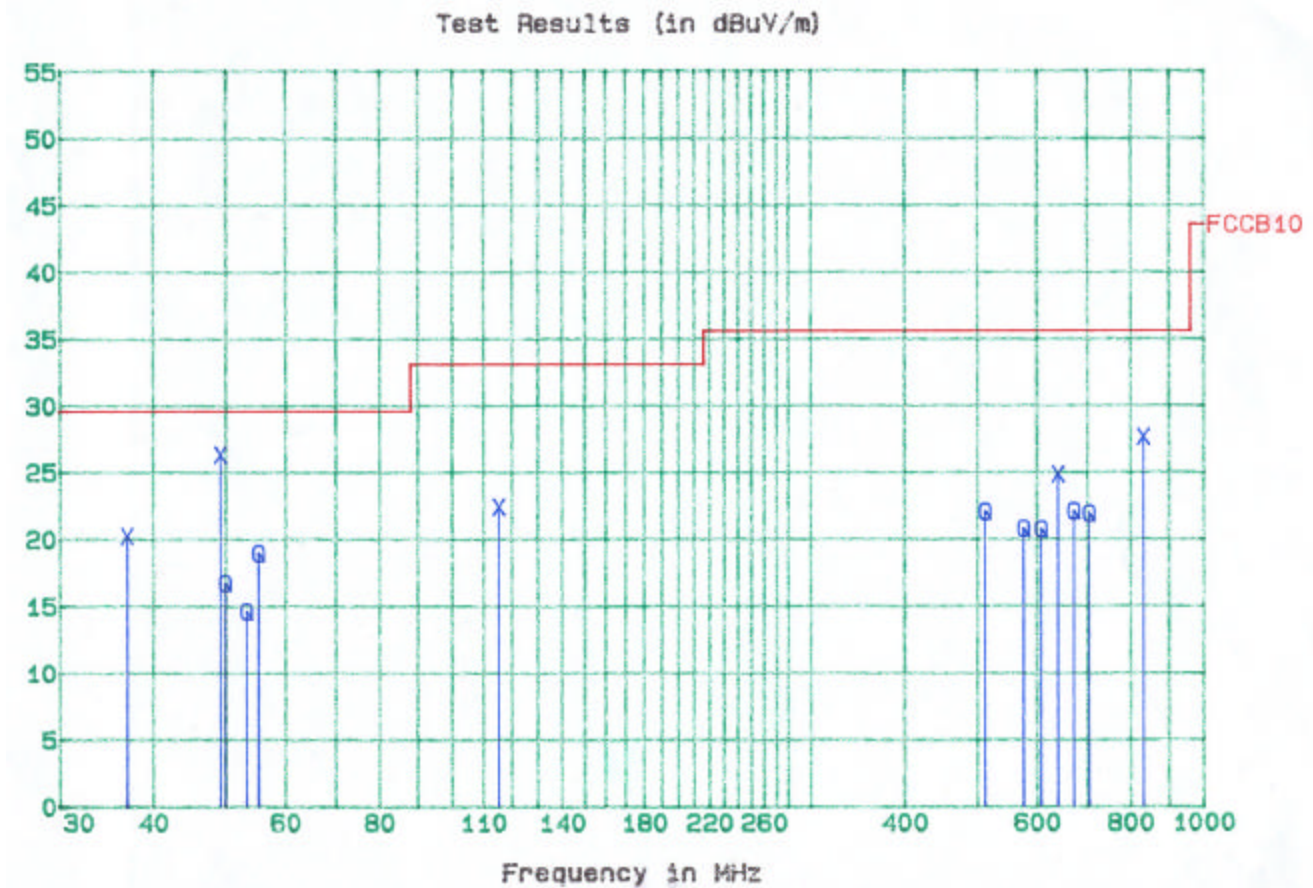
Tester: SP

SpiD: 1003-1548

Test Information: 10 meters, 120 VAC 60 Hz, FCC Part 15 Class B

Test Cond: Temp: 18° C

Humidity: 47 %



4.4 UNINTENTIONAL RADIATED EMISSIONS TABLE – 30 MHZ TO 1 GHZ – M50RF & M50Q**Notes:**

$$F_{val} = I_{val} + AF + Cable + Pads - Amp$$

Where:

Fval is the final electric field in dbuv/m

Ival is the initial reading from the EMC receiver or spec an in dbuv.

AF is the antenna factor, a + value is loss

Cable is the cable attenuation in db, a + value is loss

Pads is the total attenuator loss in db, a + value is loss

Amp is the preamplifier gain in db, a + value is amplifier gain

A Sample calculation with Ival, AF, Cable, Pads, & Amp values of
50 dbuv, 18, 4, 3, 32 respectively is:

$$F_{val} = 50 + 18 + 4 + 3 - 32 = 43 \text{ dbuv/m}$$

Minimum Margin to Limit: **-3.30** dB at **49.1494** MHz

Criterion Technology

EUT: Drapery Motor and Controller, M50RF & M50Q

Manufacturer: Electronic Solutions, Inc.

Tester: sp

Special ID: 100323-1548

EUT Level: production Unit

EUT Information: Tabletop 2 units

Test information: 10 meter FCC Part 15 Class B 120VAC/60Hz

Table 1: Scan List, sorted by margin to limit FCCB10, -15.0dB filter

<u>Freq. MHz</u>	<u>Value</u>	<u>Sts</u>	<u>FCCB10</u>	<u>TT</u>	<u>Hght</u>	<u>Az</u>	<u>Comment</u>
49.1494	26.24	m	-3.30	325	100	V	.
2438.0155	39.01	m	-4.51	320	101	V	.
832.0049	27.56	m	-8.00	206	100	V	.
36.8650	20.17	m	-9.37	89	100	V	.
55.2571	18.88	q	-10.66	89	150	V	.
115.4022	22.33	m	-10.73	141	100	V	.
640.0081	24.76	m	-10.80	223	159	H	.
2322.1200	31.58	a	-11.94	320	101	H	.
2343.9600	31.57	a	-11.95	320	101	H	.
49.8600	16.66	q	-12.88	89	150	V	.
2333.4000	30.11	a	-13.41	320	101	H	.
672.0061	22.03	q	-13.53	89	150	V	.
512.0041	21.99	q	-13.57	181	100	V	.
704.0021	21.84	q	-13.72	-2	250	V	.
2342.0400	29.27	a	-14.25	320	101	H	.
576.0039	20.72	q	-14.84	181	100	V	.
608.0038	20.68	q	-14.88	89	150	H	.
53.2470	14.55	q	-14.99	270	100	V	.

Table 2: Scan List for FCCB10, sorted by Frequency, -15.0dB filter

<u>Freq. MHz</u>	<u>Value</u>	<u>Sts</u>	<u>FCCB10</u>	<u>TT</u>	<u>Hght</u>	<u>Az</u>	<u>Comment</u>
36.8650	20.17	m	-9.37	89	100	V	.
49.1494	26.24	m	-3.30	325	100	V	.
49.8600	16.66	q	-12.88	89	150	V	.
53.2470	14.55	q	-14.99	270	100	V	.
55.2571	18.88	q	-10.66	89	150	V	.
115.4022	22.33	m	-10.73	141	100	V	.
512.0041	21.99	q	-13.57	181	100	V	.
576.0039	20.72	q	-14.84	181	100	V	.
608.0038	20.68	q	-14.88	89	150	H	.
640.0081	24.76	m	-10.80	223	159	H	.
672.0061	22.03	q	-13.53	89	150	V	.
704.0021	21.84	q	-13.72	-2	250	V	.
832.0049	27.56	m	-8.00	206	100	V	.
2322.1200	31.58	a	-11.94	320	101	H	.
2333.4000	30.11	a	-13.41	320	101	H	.
2342.0400	29.27	a	-14.25	320	101	H	.
2343.9600	31.57	a	-11.95	320	101	H	.
2438.0155	39.01	m	-4.51	320	101	V	.

Table 3: Complete Scan List Sorted by Frequency

Freq, MHz	I-val	Final	Sts	TT	Hght	Az	Time	Comment
32.7686	19.89	14.53	q	89	150	V	Sat Jun 19 16:24:43 2010	.
36.0040	20.49	13.59	q	89	100	V	Sat Jun 19 16:26:47 2010	.
36.8650	27.49	20.17	m	89	100	V	Sat Jun 19 16:26:00 2010	.
47.1020	23.00	10.37	q	270	100	V	Sat Jun 19 16:39:42 2010	.
47.9290	22.38	9.30	q	270	100	V	Sat Jun 19 16:39:05 2010	.
49.1494	39.87	26.24	m	325	100	V	Mon Jun 21 09:12:55 2010	.
49.8600	30.71	16.66	q	89	150	V	Sat Jun 19 16:20:08 2010	.
53.2470	29.80	14.55	q	270	100	V	Sat Jun 19 16:39:55 2010	.
55.2571	34.51	18.88	q	89	150	V	Sat Jun 19 16:20:02 2010	.
57.3440	26.08	10.22	q	181	151	V	Sat Jun 19 16:33:21 2010	.
61.4405	24.16	8.10	q	181	100	V	Sat Jun 19 16:31:20 2010	.
65.5380	26.92	10.88	q	181	151	V	Sat Jun 19 16:32:56 2010	.
68.6157	24.06	8.18	q	-2	100	H	Sat Jun 19 16:06:47 2010	.
69.6330	24.84	9.04	q	-2	250	V	Sat Jun 19 16:13:20 2010	.
72.1401	28.50	13.03	q	89	150	V	Sat Jun 19 16:24:54 2010	.
72.6012	22.93	7.56	q	270	100	V	Sat Jun 19 16:40:04 2010	.
72.7062	21.11	5.77	q	-2	100	H	Sat Jun 19 16:06:34 2010	.
73.7311	26.94	11.50	q	90	100	V	Fri Jun 18 09:11:27 2010	.
77.8221	24.48	9.62	q	89	150	V	Sat Jun 19 16:20:50 2010	.
81.9190	22.86	8.82	q	89	150	V	Sat Jun 19 16:24:27 2010	.
83.9682	22.93	9.19	q	181	100	V	Sat Jun 19 16:31:51 2010	.
86.0175	22.10	8.45	q	-2	100	H	Sat Jun 19 16:06:45 2010	.
114.6900	21.23	11.12	m	90	351	H	Fri Jun 18 08:48:39 2010	.
115.4022	32.35	22.33	m	141	100	V	Mon Jun 21 09:53:58 2010	.
178.8860	27.88	15.82	m	358	100	V	Mon Jun 21 09:44:24 2010	.
224.0001	29.85	19.07	m	81	320	H	Mon Jun 21 09:28:52 2010	.
320.0051	23.47	16.30	q	89	150	V	Sat Jun 19 16:24:59 2010	.
448.0041	20.66	17.58	q	-2	100	H	Sat Jun 19 16:05:39 2010	.
464.0021	23.27	20.53	q	270	151	V	Sat Jun 19 16:38:39 2010	.
496.0043	21.47	19.81	q	270	100	V	Sat Jun 19 16:40:41 2010	.
512.0041	23.90	21.99	q	181	100	V	Sat Jun 19 16:32:00 2010	.
544.0061	21.95	20.38	q	270	100	H	Sat Jun 19 16:42:05 2010	.
576.0039	21.23	20.72	q	181	100	V	Sat Jun 19 16:31:09 2010	.
608.0038	20.87	20.68	q	89	150	H	Sat Jun 19 16:22:36 2010	.
640.0081	24.30	24.76	m	223	159	H	Mon Jun 21 09:40:31 2010	.
672.0061	21.24	22.03	q	89	150	V	Sat Jun 19 16:20:24 2010	.
704.0021	20.54	21.84	q	-2	250	V	Sat Jun 19 16:12:31 2010	.
832.0049	24.52	27.56	m	206	100	V	Mon Jun 21 09:22:03 2010	.
2322.1200	38.98	31.58	a	320	101	H	Wed Jun 16 16:35:30 2010	.
2333.4000	37.44	30.11	a	320	101	H	Wed Jun 16 16:36:29 2010	.
2342.0400	36.55	29.27	a	320	101	H	Wed Jun 16 16:37:27 2010	.
2343.9600	38.84	31.57	a	320	101	H	Wed Jun 16 16:38:08 2010	.
2438.0155	44.86	39.01	m	320	101	V	Wed Jun 16 16:24:19 2010	.

4.5 UNINTENTIONAL RADIATED EMISSIONS PLOT – ABOVE 1 GHZ – M40RF & M40Q

Criterion Technology

Date: June 19, 2010

EUT: Drapery Motor and Controller, M40RF & M40Q

Manufacturer: Electronic Solutions, Inc.

Tester: SP

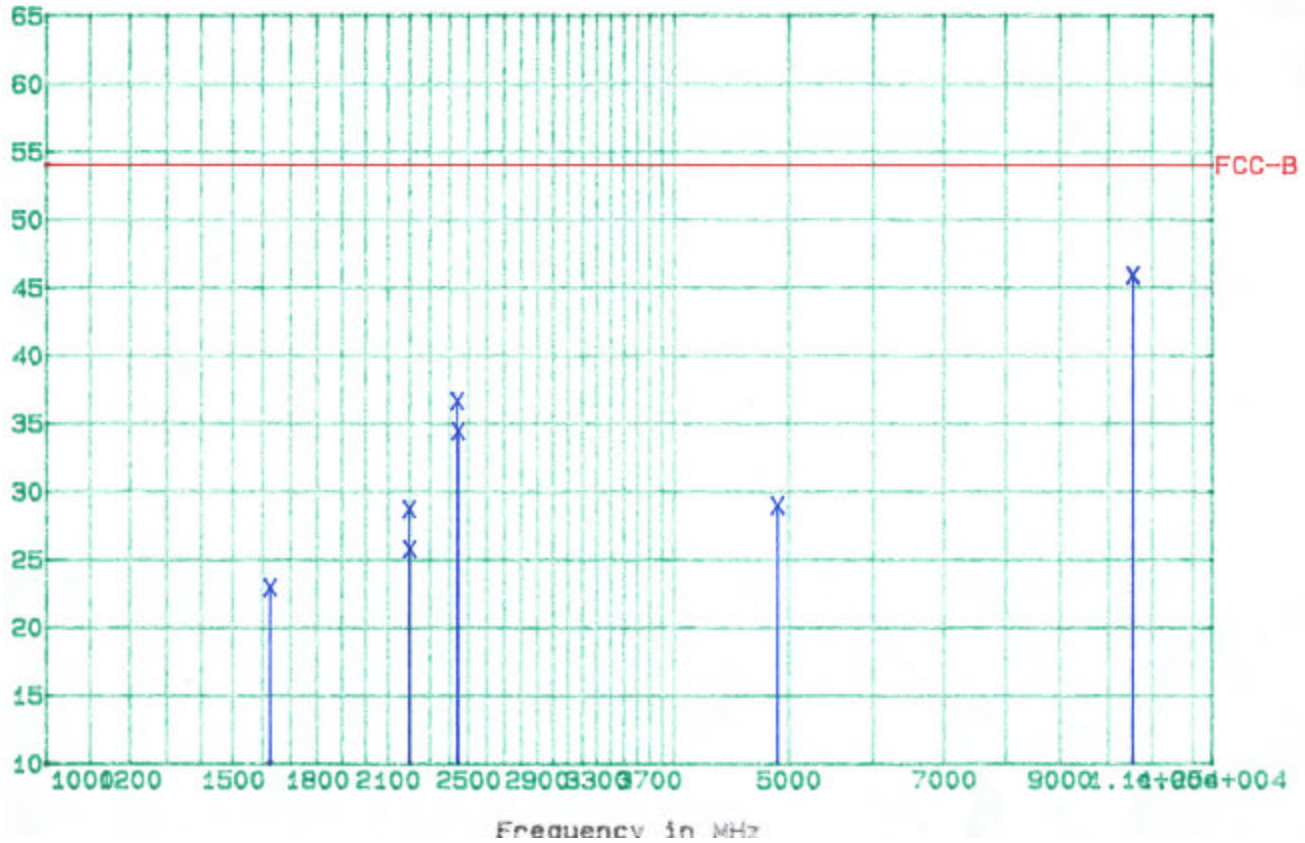
SpiD: 100323-1548FCC

Test Information: 3 meters, 120 VAC 60 Hz, FCC Part 15 Class B

Test Cond: Temp: 19° C

Humidity: 45 %

Test Results (in dBuV/m)



4.6 UNINTENTIONAL RADIATED EMISSIONS TABLE – ABOVE 1 GHZ – M40RF & M40Q**Notes:**

$$F_{val} = I_{val} + AF + Cable + Pads - Amp$$

Where:

Fval is the final electric field in dbuv/m

Ival is the initial reading from the EMC receiver or spec an in dbuv.

AF is the antenna factor, a + value is loss

Cable is the cable attenuation in db, a + value is loss

Pads is the total attenuator loss in db, a + value is loss

Amp is the preamplifier gain in db, a + value is amplifier gain

A Sample calculation with Ival, AF, Cable, Pads, & Amp values of 50 dbuv, 18, 4, 3, 32 respectively is:

$$F_{val} = 50 + 18 + 4 + 3 - 32 = 43 \text{ dbuv/m}$$
Minimum Margin to Limit: **-8.15** dB at **10536.7590** MHz

Criterion Technology

EUT: Drapery Motor and Controller, M40RF & M40Q

Manufacturer: Electronic Solutions, Inc.

Tester: lws

Special ID: 100323-1548

EUT Level: production Unit

EUT Information: Tabletop 2 units

Test information: FCC 3 Meter Class B, Receive Only, 120VAC 60Hz

Table 1: Scan List, sorted by margin to limit FCC-B, -40.0dB filter

<u>Freq, MHz</u>	<u>Value</u>	<u>Sts</u>	<u>FCC-B</u>	<u>TT</u>	<u>Hght</u>	<u>Az</u>	<u>Comment</u>
10536.7590	45.83	m	-8.15	341	100	H	.
10528.8690	45.77	m	-8.21	-2	100	H	.
2438.0139	36.55	m	-17.43	47	100	H	.
2443.0196	34.35	m	-19.63	46	100	H	.
4876.0256	28.90	m	-25.08	351	100	H	.
2197.1778	28.65	m	-25.33	25	100	H	.
2198.7046	25.72	m	-28.26	58	100	H	.
1623.4904	22.86	m	-31.12	62	100	H	.

Table 2: Scan List for FCC-B, sorted by Frequency, -40.0dB filter

<u>Freq, MHz</u>	<u>Value</u>	<u>Sts</u>	<u>FCC-B</u>	<u>TT</u>	<u>Hght</u>	<u>Az</u>	<u>Comment</u>
1623.4904	22.86	m	-31.12	62	100	H	.
2197.1778	28.65	m	-25.33	25	100	H	.
2198.7046	25.72	m	-28.26	58	100	H	.
2438.0139	36.55	m	-17.43	47	100	H	.
2443.0196	34.35	m	-19.63	46	100	H	.
4876.0256	28.90	m	-25.08	351	100	H	.
10528.8690	45.77	m	-8.21	-2	100	H	.
10536.7590	45.83	m	-8.15	341	100	H	.

Table 3: Complete Scan List Sorted by Frequency

<u>Freq, MHz</u>	<u>I-val</u>	<u>Final</u>	<u>Sts</u>	<u>TT</u>	<u>Hght</u>	<u>Az</u>	<u>Time</u>	<u>Comment</u>
1623.4904	34.90	22.86	m	62	100	H	Sat Jun 19 14:40:30 2010	.
2197.1778	35.22	28.65	m	25	100	H	Sat Jun 19 14:35:57 2010	.
2198.7046	32.31	25.72	m	58	100	H	Sat Jun 19 14:41:40 2010	.
2438.0139	42.40	36.55	m	47	100	H	Sat Jun 19 14:43:25 2010	.
2443.0196	40.09	34.35	m	46	100	H	Sat Jun 19 14:44:54 2010	.
4876.0256	30.50	28.90	m	351	100	H	Sat Jun 19 14:47:02 2010	.
10528.8690	33.21	45.77	m	-2	100	H	Sat Jun 19 14:49:09 2010	.
10536.7590	33.29	45.83	m	341	100	H	Sat Jun 19 14:51:15 2010	.

4.7 UNINTENTIONAL RADIATED EMISSIONS PLOT – ABOVE 1 GHZ – M50RF & M50Q

Criterion Technology

Date: June 19, 2010

EUT: Drapery Motor and Controller, M50RF & M50Q

Manufacturer: Electronic Solutions, Inc.

Tester: SP

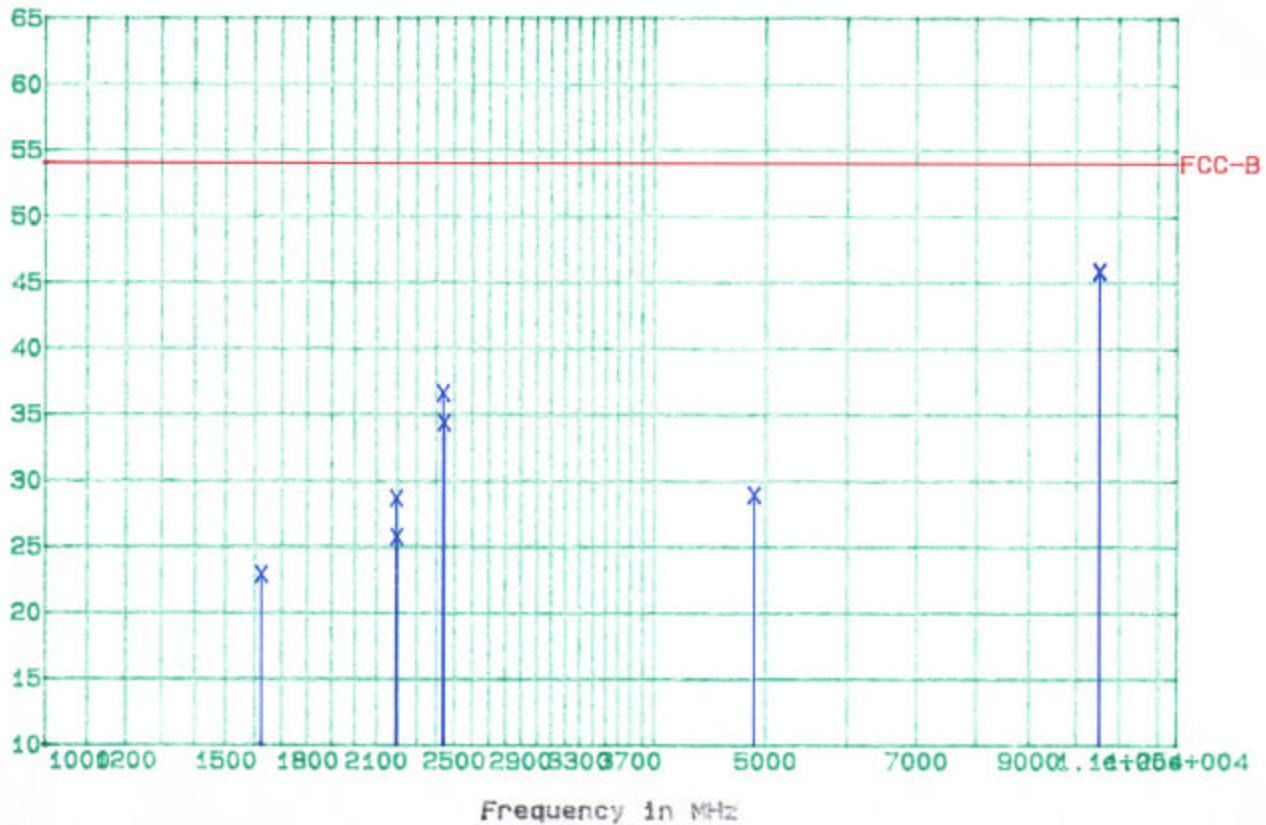
SpiD: 100323-1548FCC

Test Information: 3 meters, 120 VAC 60 Hz, FCC Part 15 Class B

Test Cond: Temp: 19° C

Humidity: 45 %

Test Results (in dBuV/m)



4.8 UNINTENTIONAL RADIATED EMISSIONS TABLE – ABOVE 1 GHZ – M50RF & M50Q**Notes:**

$$F_{val} = I_{val} + AF + Cable + Pads - Amp$$

Where:

Fval is the final electric field in dbuv/m

Ival is the initial reading from the EMC receiver or spec an in dbuv.

AF is the antenna factor, a + value is loss

Cable is the cable attenuation in db, a + value is loss

Pads is the total attenuator loss in db, a + value is loss

Amp is the preamplifier gain in db, a + value is amplifier gain

A Sample calculation with Ival, AF, Cable, Pads, & Amp values of
50 dbuv, 18, 4, 3, 32 respectively is:
$$F_{val} = 50 + 18 + 4 + 3 - 32 = 43 \text{ dbuv/m}$$
Minimum Margin to Limit: **-8.15** dB at **10536.7590** MHz

Criterion Technology

EUT: Drapery Motor Controller, M50RF & M50Q

Manufacturer: Electronic Solutions, Inc.

Tester: lws

Special ID: 100323-1548

EUT Level: production Unit

EUT Information: Tabletop 2 units

Test information: FCC 3 Meter Class B, Receive Only, 120VAC 60Hz

Table 1: Scan List, sorted by margin to limit FCC-B, -40.0dB filter

<u>Freq, MHz</u>	<u>Value</u>	<u>Sts</u>	<u>FCC-B</u>	<u>TT</u>	<u>Hght</u>	<u>Az</u>	<u>Comment</u>
10536.7590	45.83	m	-8.15	341	100	H	.
10528.8690	45.77	m	-8.21	-2	100	H	.
2438.0139	36.55	m	-17.43	47	100	H	.
2443.0196	34.35	m	-19.63	46	100	H	.
4876.0256	28.90	m	-25.08	351	100	H	.
2197.1778	28.65	m	-25.33	25	100	H	.
2198.7046	25.72	m	-28.26	58	100	H	.
1623.4904	22.86	m	-31.12	62	100	H	.

Table 2: Scan List for FCC-B, sorted by Frequency, -40.0dB filter

<u>Freq, MHz</u>	<u>Value</u>	<u>Sts</u>	<u>FCC-B</u>	<u>TT</u>	<u>Hght</u>	<u>Az</u>	<u>Comment</u>
1623.4904	22.86	m	-31.12	62	100	H	.
2197.1778	28.65	m	-25.33	25	100	H	.
2198.7046	25.72	m	-28.26	58	100	H	.
2438.0139	36.55	m	-17.43	47	100	H	.
2443.0196	34.35	m	-19.63	46	100	H	.
4876.0256	28.90	m	-25.08	351	100	H	.
10528.8690	45.77	m	-8.21	-2	100	H	.
10536.7590	45.83	m	-8.15	341	100	H	.

Table 3: Complete Scan List Sorted by Frequency

<u>Freq, MHz</u>	<u>I-val</u>	<u>Final</u>	<u>Sts</u>	<u>TT</u>	<u>Hght</u>	<u>Az</u>	<u>Time</u>	<u>Comment</u>
1623.4904	34.90	22.86	m	62	100	H	Sat Jun 19 14:40:30 2010	.
2197.1778	35.22	28.65	m	25	100	H	Sat Jun 19 14:35:57 2010	.
2198.7046	32.31	25.72	m	58	100	H	Sat Jun 19 14:41:40 2010	.
2438.0139	42.40	36.55	m	47	100	H	Sat Jun 19 14:43:25 2010	.
2443.0196	40.09	34.35	m	46	100	H	Sat Jun 19 14:44:54 2010	.
4876.0256	30.50	28.90	m	351	100	H	Sat Jun 19 14:47:02 2010	.
10528.8690	33.21	45.77	m	-2	100	H	Sat Jun 19 14:49:09 2010	.
10536.7590	33.29	45.83	m	341	100	H	Sat Jun 19 14:51:15 2010	.

4.9 INTENTIONAL RADIATED EMISSIONS TABLE – M40RF

Intentional Radiator: M40RF 120VAC-60Hz-CW radiator

Fundamental Freq (GHz) (bold=>max config)	Fval before rcvr pads (dBuV/m)	Recv Pads db	Field Strength (dBuV/m)	Elev	AZ	Pol	Orientation	Conducted or Substitution CW Power to duplicate EIRP (dBm)	Substitution antenna, DRG 118A, gain (dBi)	Equivalent CW Power (dBm at 0 dBi)	Limit (dBm)	Margin to Limit (dB)
2.4045183	69.64	30.4	100.04	100.0	248.0	V	X		9.46			
2.4430185	68.47	30.5	98.97	100.0	249.0	V	X		9.46			
2.4805192	67.2	30.4	97.6	100.0	247.0	V	X		9.46			
2.4045183	72.18	30.4	102.58	100.0	248.0	V	Y		9.46			
2.4430185	72.6	30.5	103.1	100.0	249.0	V	Y	0.5	9.46	9.96	30.0	-20.04
2.4805192	72.12	30.4	102.52	100.0	247.0	V	Y		9.46			
2.4045183	69.15	30.4	99.55	100.0	258.0	H	Z		9.46			
2.4430185	67.56	30.5	98.06	100.0	242.0	H	Z		9.46			
2.4805192	65.54	30.4	95.94	103.0	29.0	H	Z		9.46			

Harmonic	Frequency (Bold => restricted band)	F val	FCC part 15 limit	Margin to Limit (db)	Elev	AZ	Pol	Comments	Antennas
2nd	4.886037	39.68	54	-14.32	103	304	H	Y orientation	DRG 118A
3rd	7.3290555	<36.52	54	<-17.48	*	*	*	Y orientation noise floor	DRG 118A
4th	9.6180732	<27.92	83.1	<-55.18	*	*	*	Y orientation noise floor	DRG 118A
5th	12.2150925	<47.04	54	<-6.96	103	362	V	Y orientation	ETS-3160-08-sn1147
6th	14.658111	<41.83	83.1	<-41.27	*	*	*	Y orientation noise floor	ETS-3160-08-sn1147
7th	17.1011295	<71.69	83.1	<-11.41	104	29	v	Y orientation	ETS-3160-08-sn1147
8th	19.544148	<11.5	54	<-42.5	*	*	*	Y orientation noise floor	MIT-12A-18-sn19527JE
9th	21.9871665	<20.3	83.1	<-62.8	*	*	*	Y orientation noise floor	MIT-12A-18-sn19527JE
10th	24.430185	<18.6	83.1	<-64.5	*	*	*	Y orientation noise floor	MIT-12A-18-sn19527JE
* => noise floor measurement. The spec an will retrun the same amplitude regardless of these settings.									

4.10 INTENTIONAL RADIATED EMISSIONS TABLE – M50RF

M50RF, 120VAC/60Hz-CW radiator												
Fundamental Freq (GHz) (bold=>max config)	Fval before rcvr pads (dBuV/m)	Recvp ads db	Field Strength (dBuV/m)	Elev	AZ	Pol	Orientation	Conducted or Substitution CW Power to duplicate EIRP (dBm)	Substitution antenna, DRG 118A, gain (dBi)	Equivalent CW Power (dBm at 0 dBi)	Limit (dBm)	Margin to Limit (dB)
2.4045175	66.05	30.4	96.45	103.0	248.0	V	X		9.462805			
2.4430185	67.72	30.5	98.22	103.0	251.0	V	X		9.462805			
2.4805197	67.48	30.4	97.88	100.0	249.0	V	X		9.462805			
2.4045175	68.8	30.4	99.2	100.0	308.0	V	Y		9.462805			
2.4430185	72.19	30.5	102.69	100.0	308.0	V	Y	0.08	9.462805	9.542805	30.0	-20.5
2.4805197	71.86	30.4	102.26	100.0	306.0	V	Y		9.462805			
2.4045175	64.87	30.4	95.27	100.0	338.0	H	Z		9.462805			
2.4430185	62.88	30.5	93.38	100.0	321.0	V	Z		9.462805			
2.4805197	62.24	30.4	92.64	100.0	319.0	V	Z		9.462805			

Harmonic	Frequency (Bold => restricted band)	F val	FCC part 15 limit	Margin to Limit (db)	Elev	AZ	Pol	Comments	Antennas
2nd	4.886037	39.68	54	-14.32	100	319	V	Y orientation	DRG 118A
3rd	7.3290555	36.52	54	-17.48	100	319	V	Y orientation	DRG 118A
4th	9.772074	27.92	82.69	-54.77	100	319	V	Y orientation	DRG 118A
5th	12.2150925	<5	54	<49	*	*	*	Y orientation noise floor	ETS-3160-08-sn1147
6th	14.658111	<8.5	82.69	<-74.1	*	*	*	Y orientation noise floor	ETS-3160-08-sn1147
7th	17.1011295	<11	82.69	<-71.7	*	*	*	Y orientation noise floor	ETS-3160-08-sn1147
8th	19.544148	<20.6	54	<-33.4	*	*	*	Y orientation noise floor	ETS-3160-08-sn1147
9th	21.9871665	<19.1	82.69	<-63.6	*	*	*	Y orientation noise floor	MIT-12A-18-sn19527JE
10th	24.430185	<21.1	82.69	<-61.6	*	*	*	Y orientation	MIT-12A-18-sn19527JE
* => noise floor measurement. The spec an will retrun the same amplitude regardless of these settings.									

4.11 FREQUENCY LIMITS – M40RF

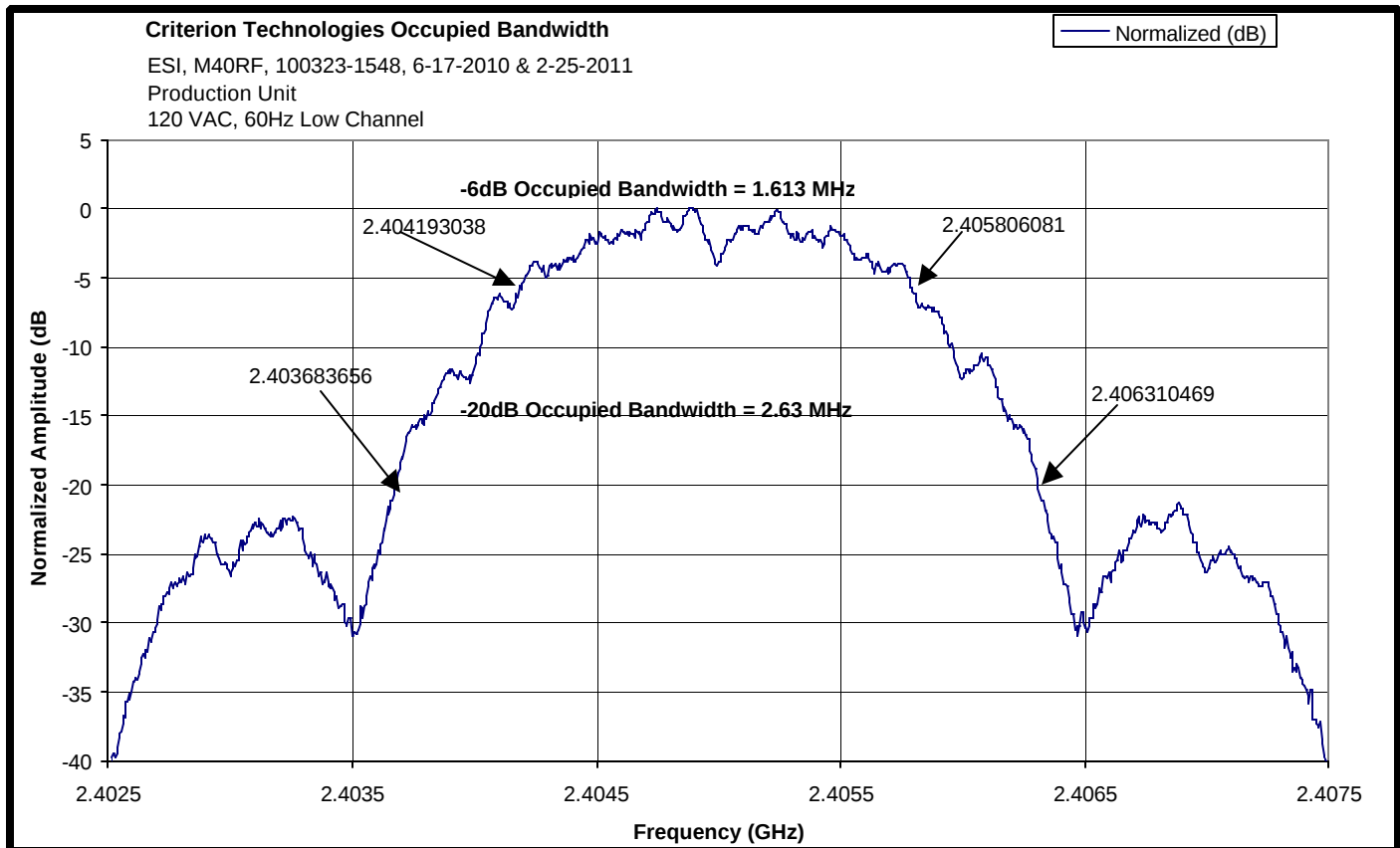
Criterion Technology

EUT: Drapery Motor and Controller, M40RF

Manufacturer: Electronic Solutions, Inc.

Tester: SP

SpiD: 100323-1548FCC



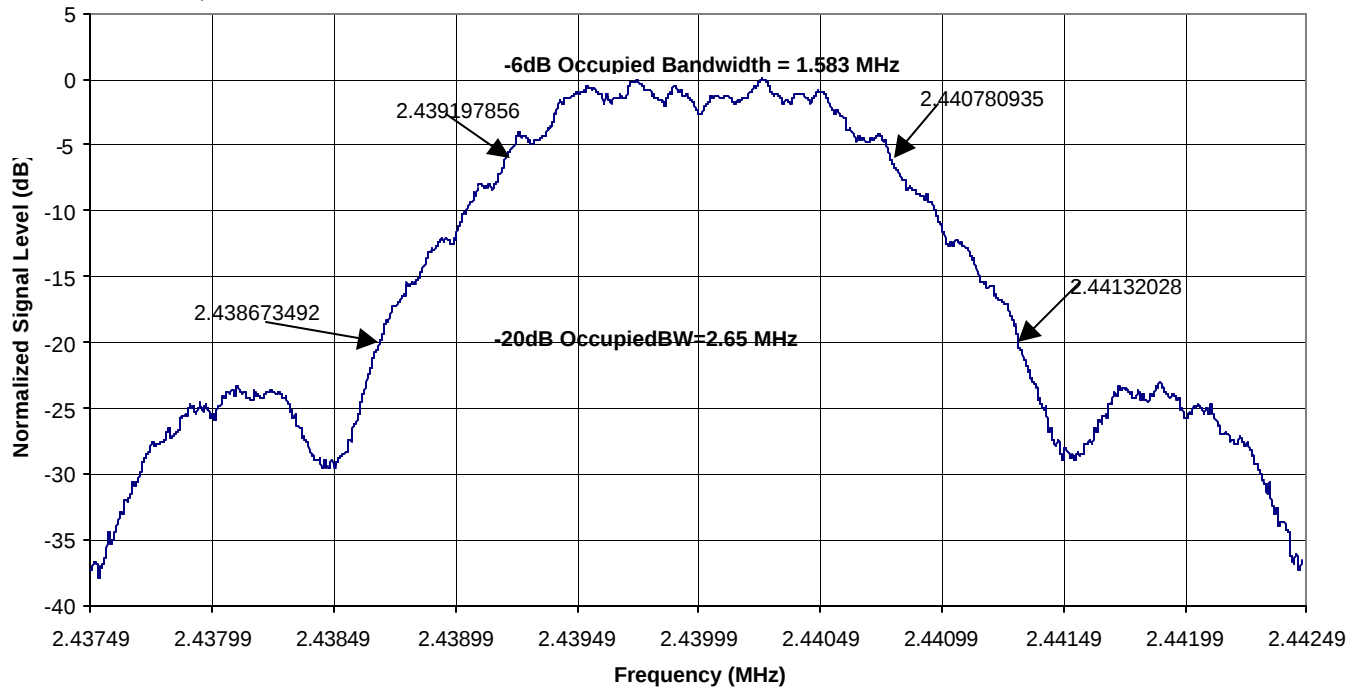
Criterion Technologies Occupied Bandwidth

ESI, M40RF, 100323-1548, 6-17-2010 & 2-25-2011

Production Unit

120 VAC, 60Hz Middle Channel

— Normalized Amplitude (dB)

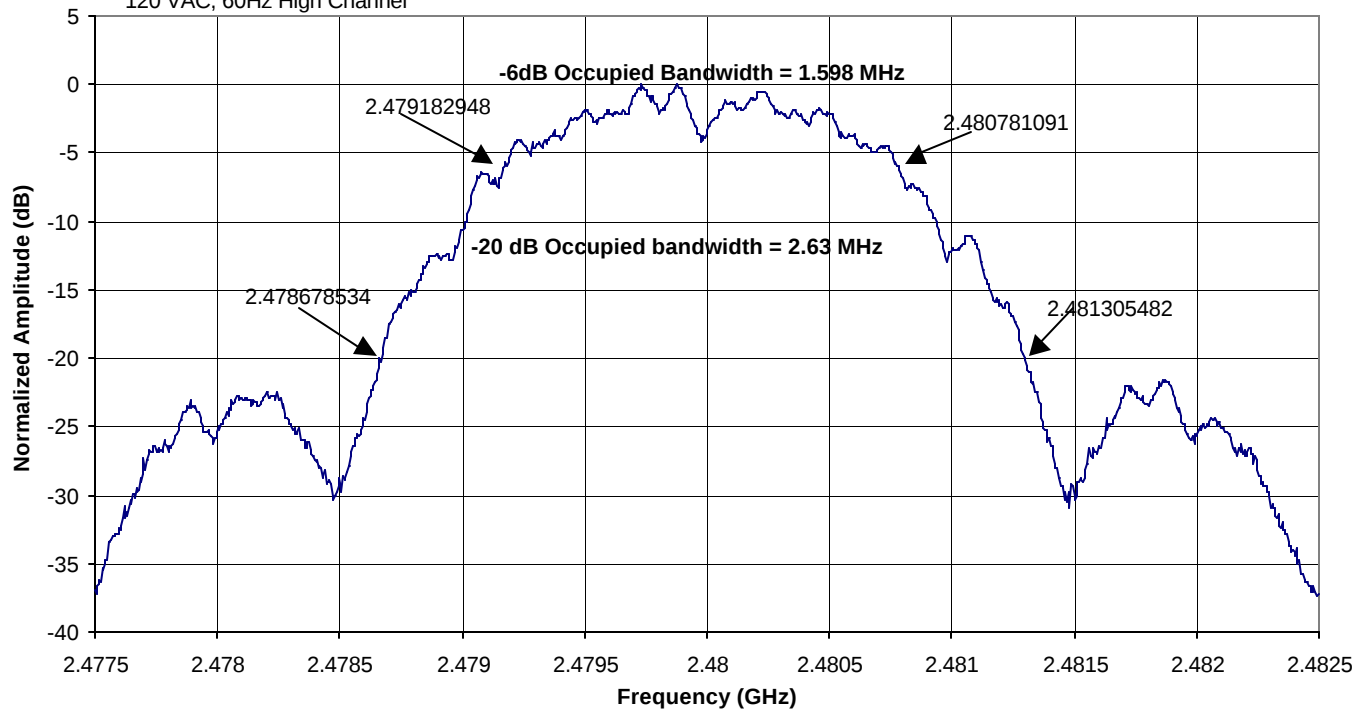


Criterion Technologies Occupied Bandwidth

ESI, M40RF, 100628-1548, 6-17-2010 & 2-25-2011

Production Unit

120 VAC, 60Hz High Channel



4.12 FREQUENCY LIMITS – M50RF

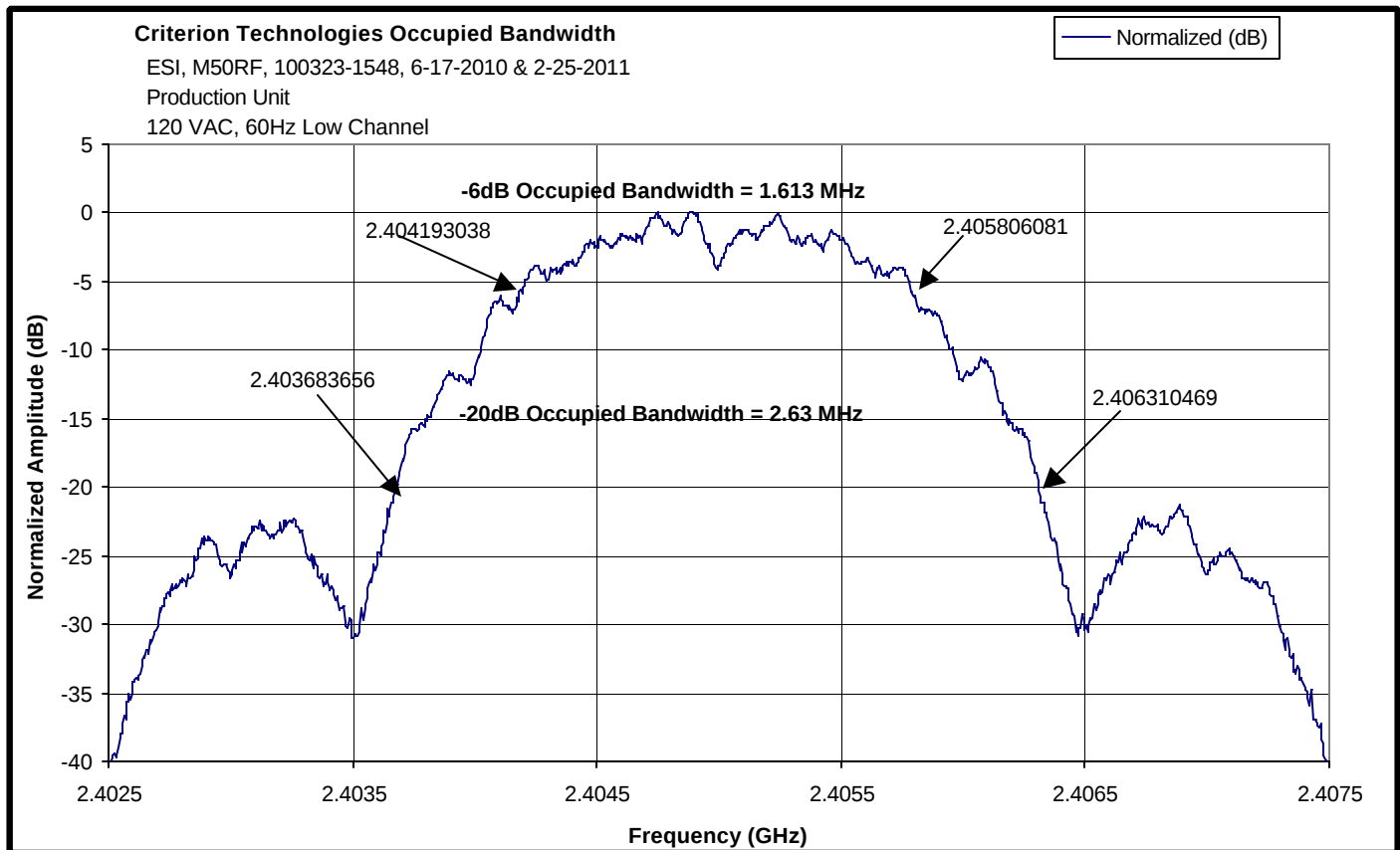
Criterion Technology

EUT: Drapery Motor and Controller, M50RF

Manufacturer: Electronic Solutions, Inc.

Tester: SP

SpiD: 100323-1548FCC



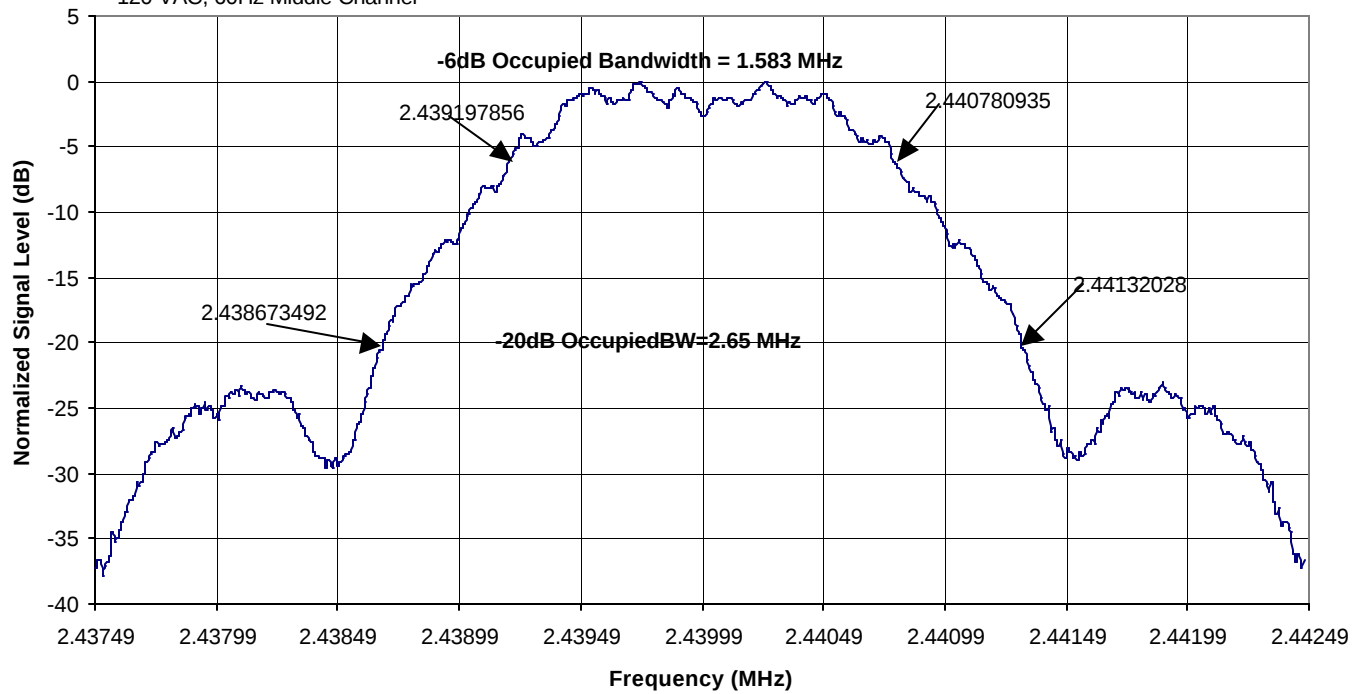
Criterion Technologies Occupied Bandwidth

ESI, M50RF, 100323-1548, 6-17-2010 & 2-25-2011

Production Unit

120 VAC, 60Hz Middle Channel

— Normalized Amplitude (dB)

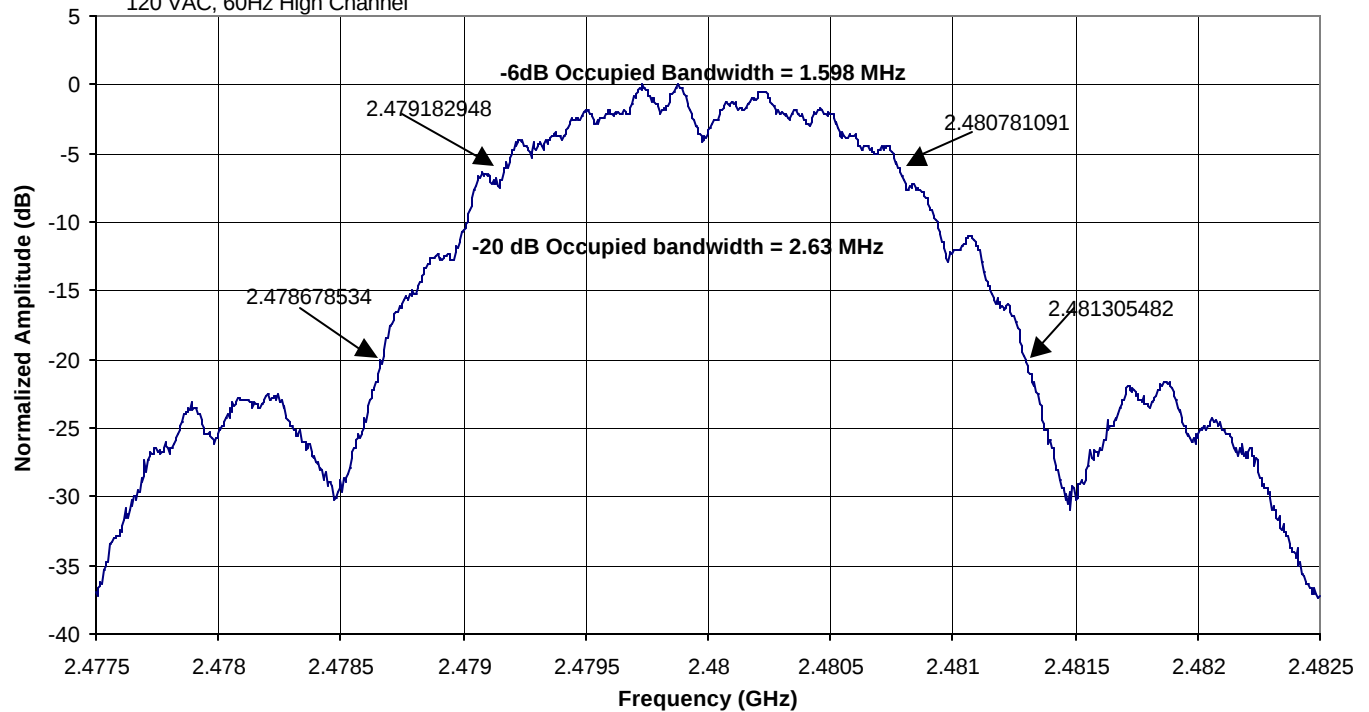


Criterion Technologies Occupied Bandwidth

ESI, M50RF, 100628-1548, 6-17-2010 & 2-25-2011

Production Unit

120 VAC, 60Hz High Channel



4.13 POWER SPECTRAL DENSITY - M40RF

Criterion Technology

EUT: Drapery Motor and Controller, M40RF

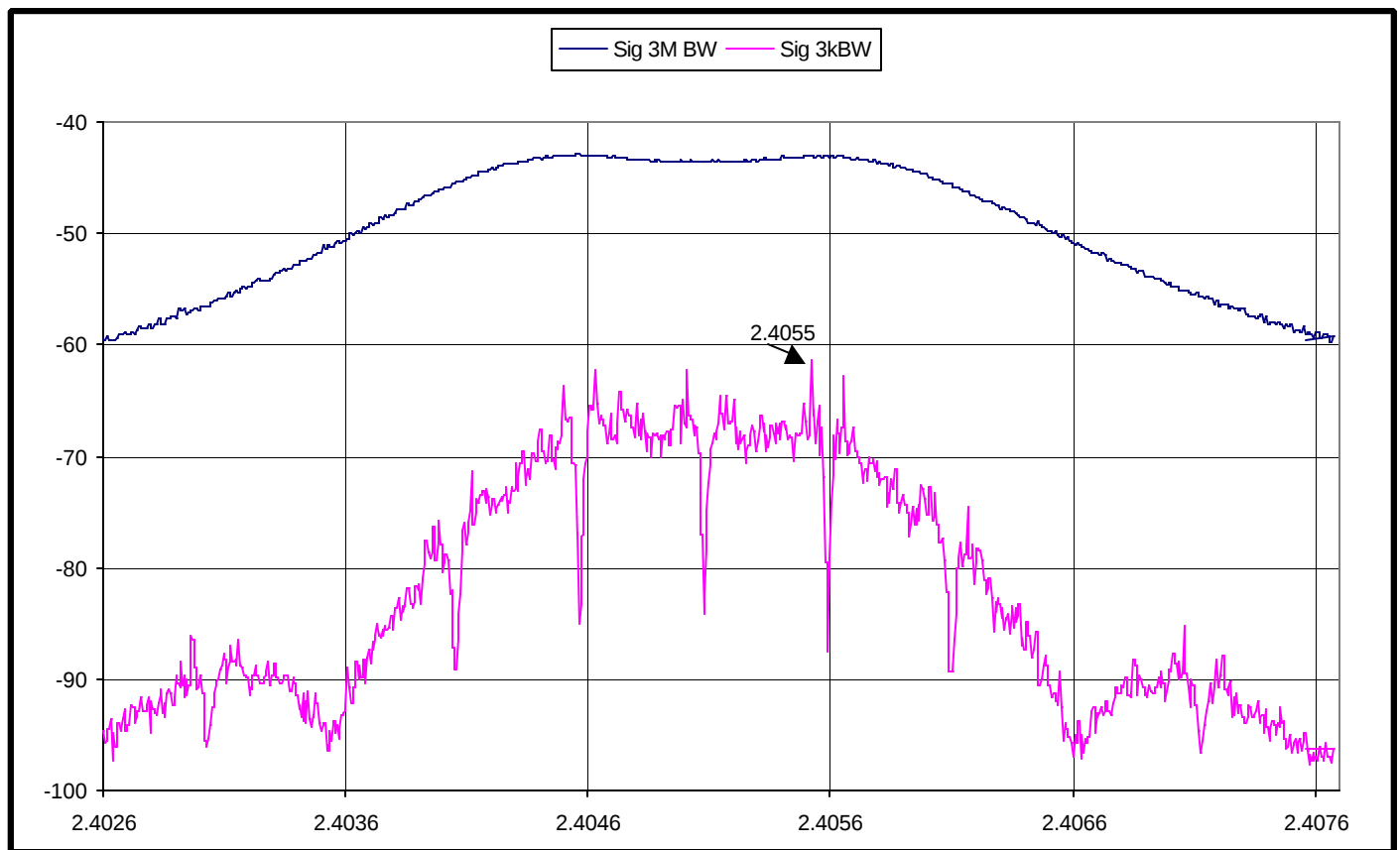
Manufacturer: Electronic Solutions, Inc.

Tester: SP

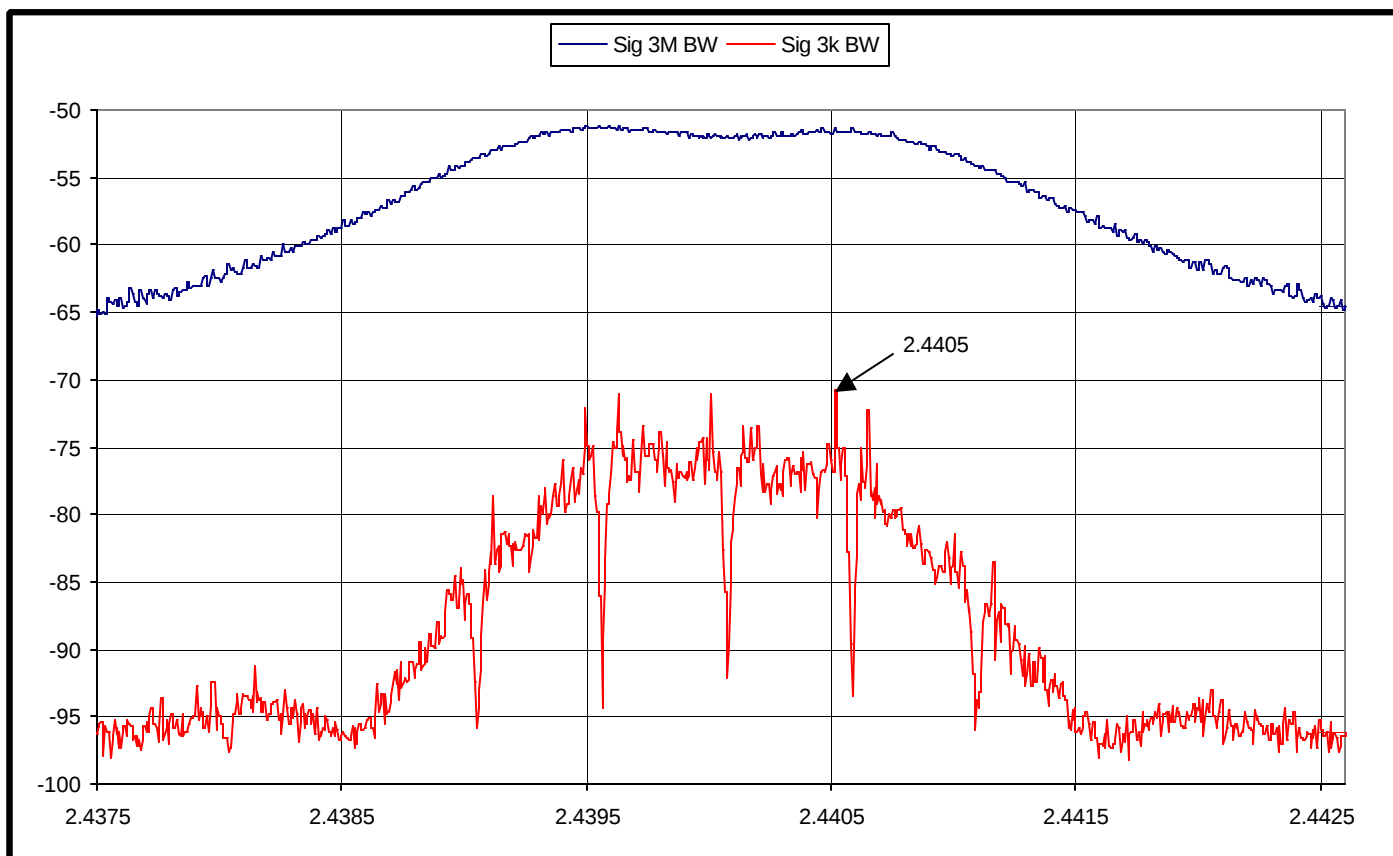
SpiD: 100323-1548FCC

Fundamental Freq (GHz) (bold=>max config)	Fval before rcvr pads (dBuV/m)	Recv. Pads db	Field Strength (dBuV/m)	Orientation	Conducted or Substitution CW Power to duplicate EIRP (dBm)	Substitution antenna, DRG 118A, gain (dBi)	Equivalent CW Power (dBm at 0 dBi)	Limit (dBm)	Margin to Limit (dB)
2.4055	63.28	30.4	93.64	Y	-18.42	9.46	-8.96	8.0	-17.0
2.4405	62.61	30.5	93.11	Y	-18.9	9.46	-9.44	8.0	-17.44
2.4796	62.28	30.4	92.68	Y	-19.38	9.46	-9.92	8.0	-17.9

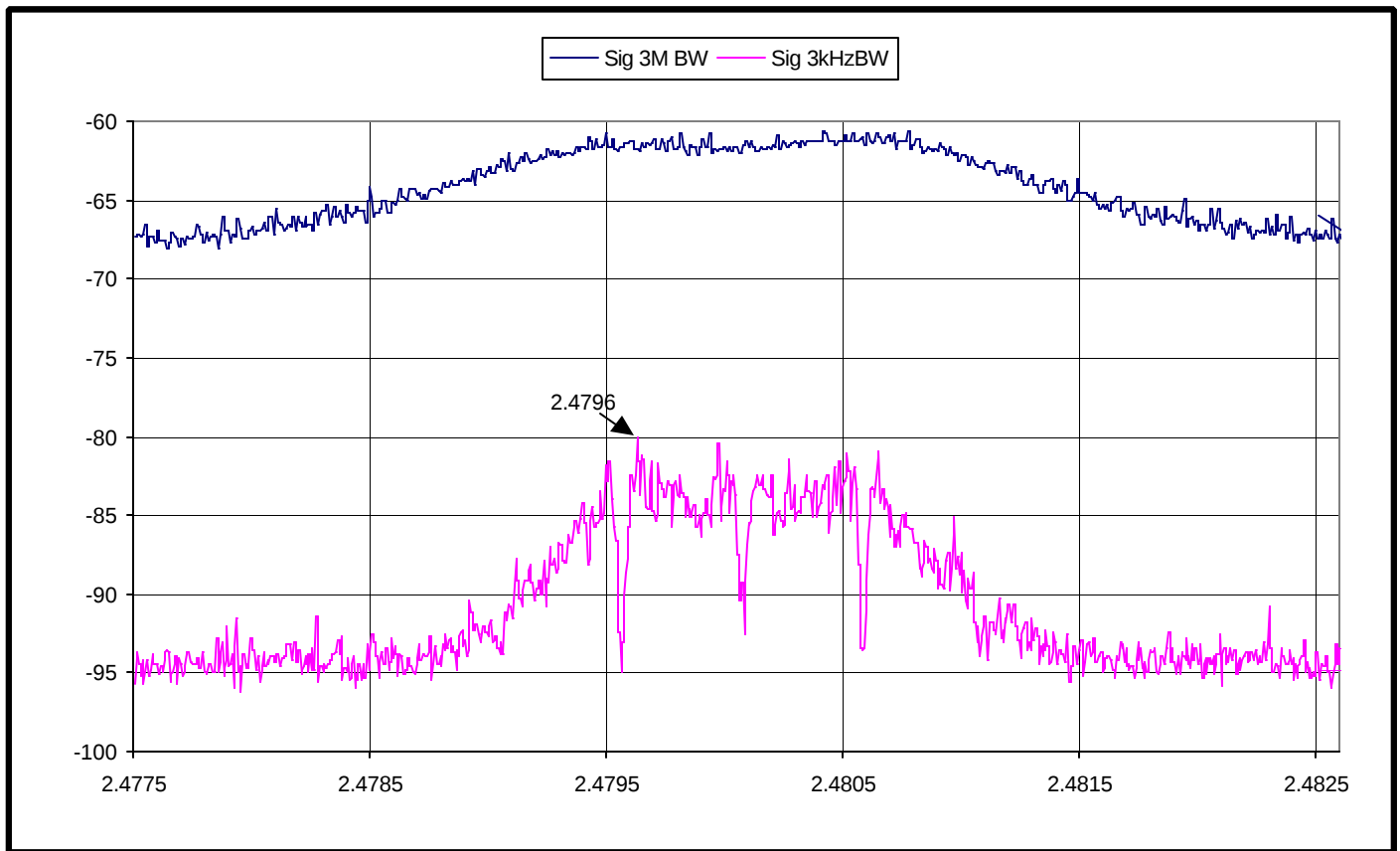
Low Channel – M40RF



Mid Channel – M40RF



High Channel – M40RF



4.14 POWER SPECTRAL DENSITY – M50RF

Criterion Technology

EUT: Drapery Motor and Controller, M40RF

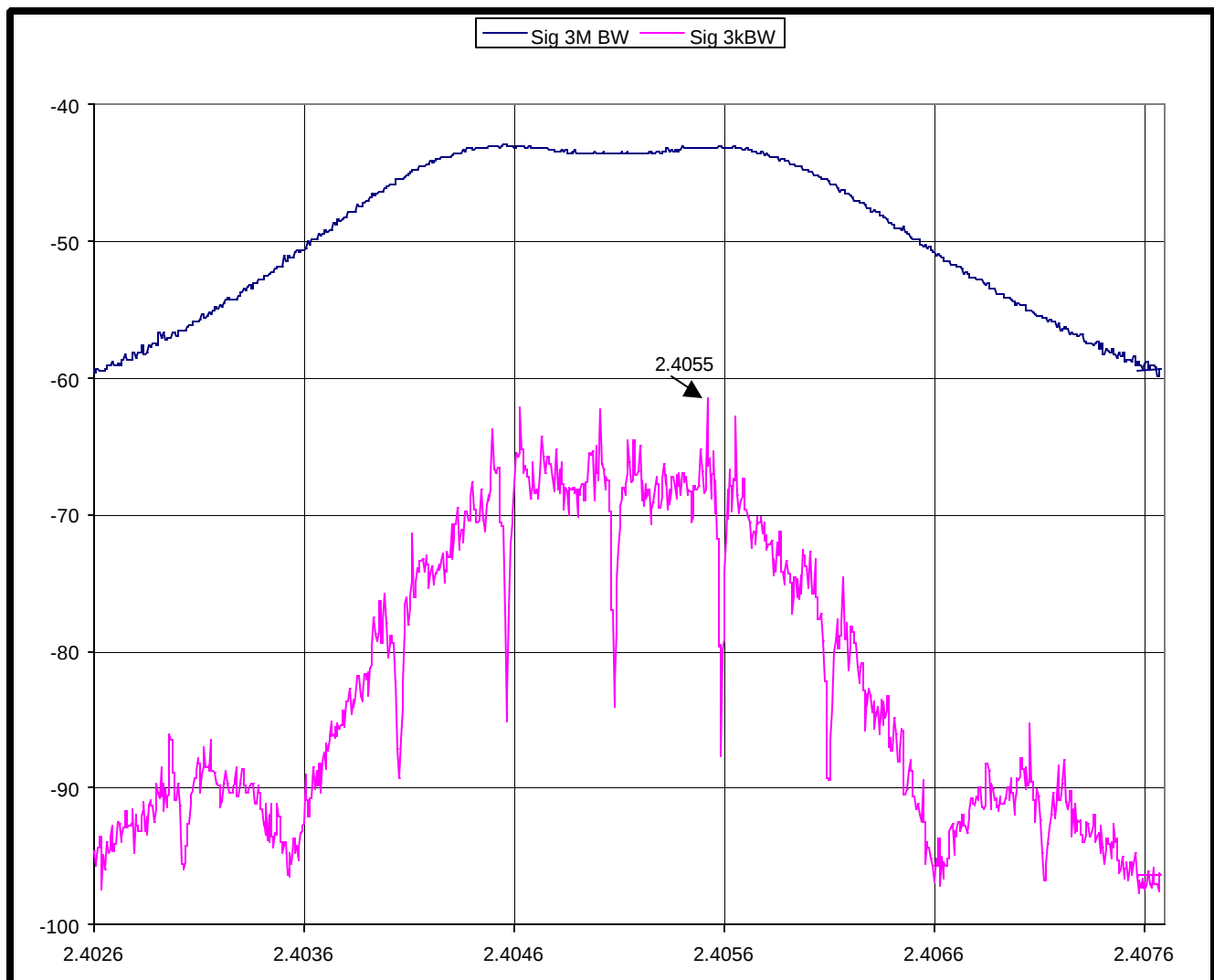
Manufacturer: Electronic Solutions, Inc.

Tester: SP

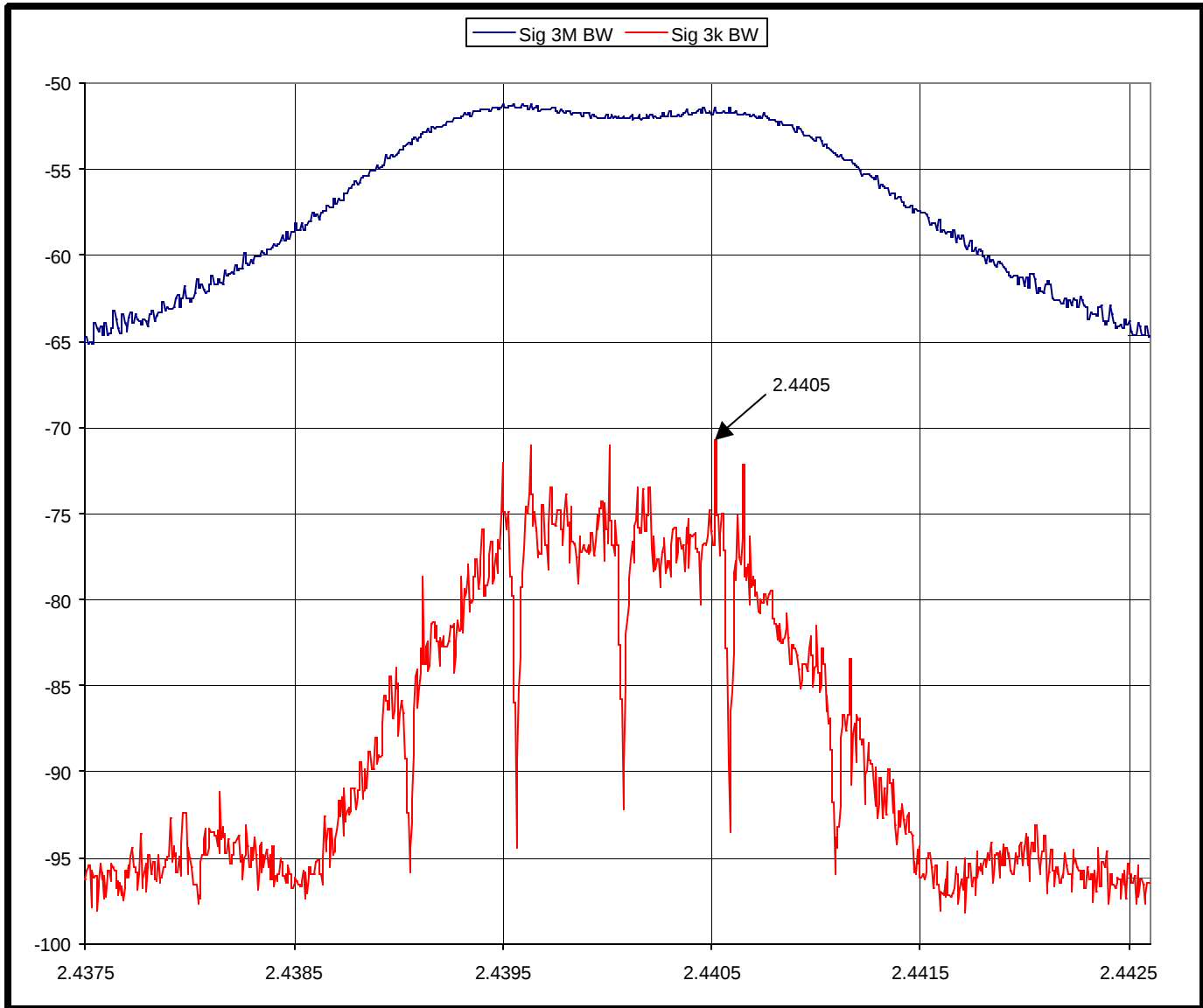
SpiD: 100323-1548FCC

Fundamental Freq (GHz) (bold=>max config)	Fval before rcvr pads (dBuV/m)	Recv. Pads db	Field Strength (dBuV/m)	Orientation	Conducted or Substitution CW Power to duplicate EIRP (dBm)	Substitution antenna, DRG 118A, gain (dB)	Equivalent CW Power (dBm at 0 dBi)	Limit (dBm)	Margin to Limit (dB)
2.4055	59.85	30.4	90.25	Y	-21.81	9.46	-12.35	8.0	-20.4
2.4405	62.24	30.5	92.74	Y	-19.32	9.46	-9.86	8.0	-17.86
2.4796	62.01	30.4	92.41	Y	-19.65	9.46	-10.19	8.0	-18.2

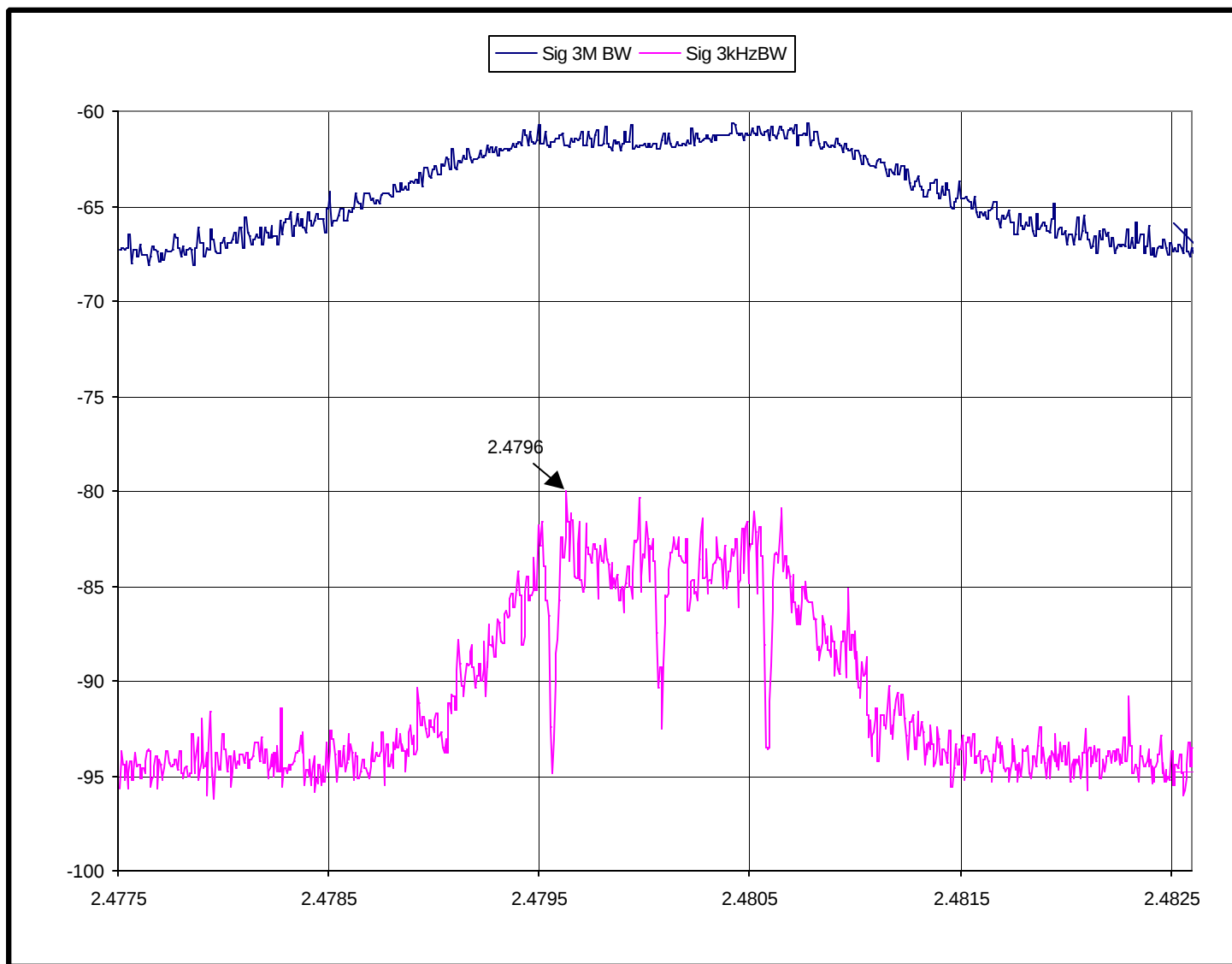
Low Channel – M50RF



Mid Channel – M50RF



High Channel – M50RF



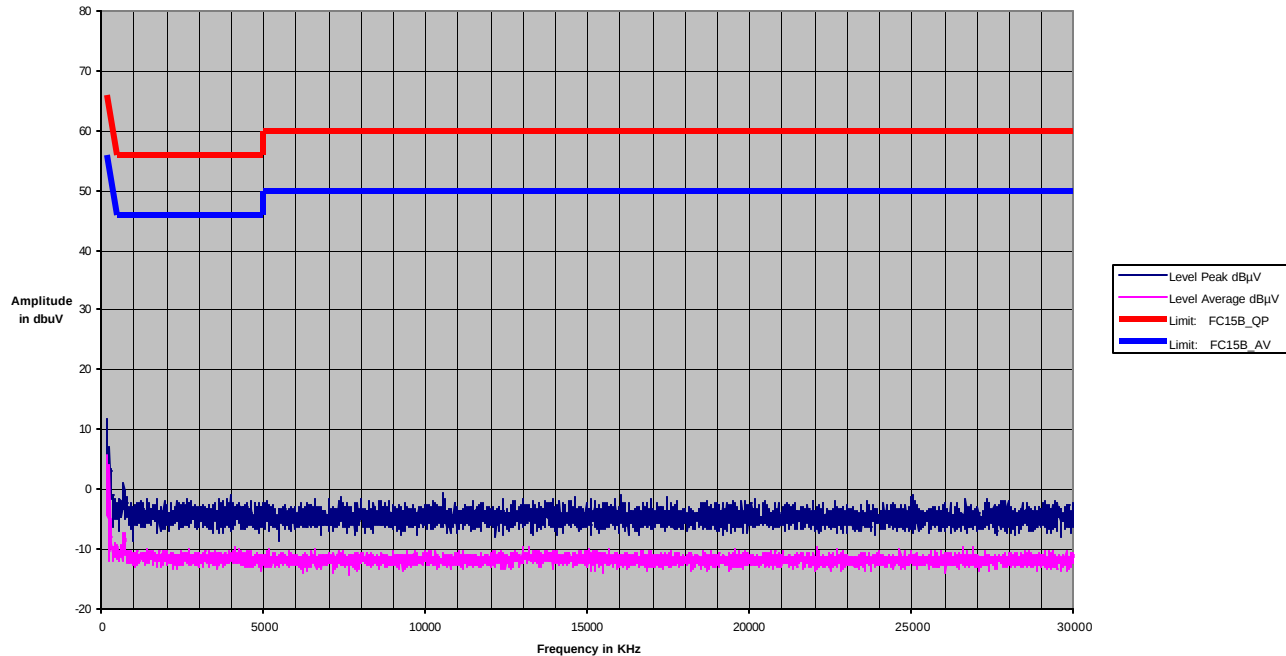
4.15 CONDUCTED EMISSIONS – M40RF & M40Q

EUT: Drapery Motor and Controller, M40RF & M40Q
 Manuf: Electronic Solutions, Inc.
 Op Cond: normal operation
 Test Spec: FCC Part 15 Class B, 120 VAC 60 Hz
 Test Cond: Temp: 20° C

DATE: June 17, 2010
 Operator: SP

Humidity: 44 %

Criterion Technology Inc. Conducted Emissions
 M40RF & M40Q 120VAC 60Hz



Limit: FC15B_QP

Limit: FC15B_AV

Frequency kHz:	Level dB:	Frequency kHz:	Level dB:
150	66	150	56
500	56	500	46
5000	56	5000	46
5000.1	60	5000.1	50
30000	60	30000	50

Final Measurement Results:

Indicated Phase/PE shows Configuration of max. Emission

Frequency:	AV Level:	AV Limit:	Phase:	PE:
kHz	dBμV/m	dBμV/m	-	-
270	5.6	56	L1	gnd
360	4.1	56	N	gnd
365	3.3	56	N	gnd
700	-7.4	46	L1	gnd
725	-7.4	46	L1	gnd
720	-7.6	46	N	gnd
26910	-9.7	50	N	gnd
13035	-9.8	50	N	gnd
13200	-9.8	50	L1	gnd

Minimum Margin to Limit: **-50.4** dB at **270** kHz

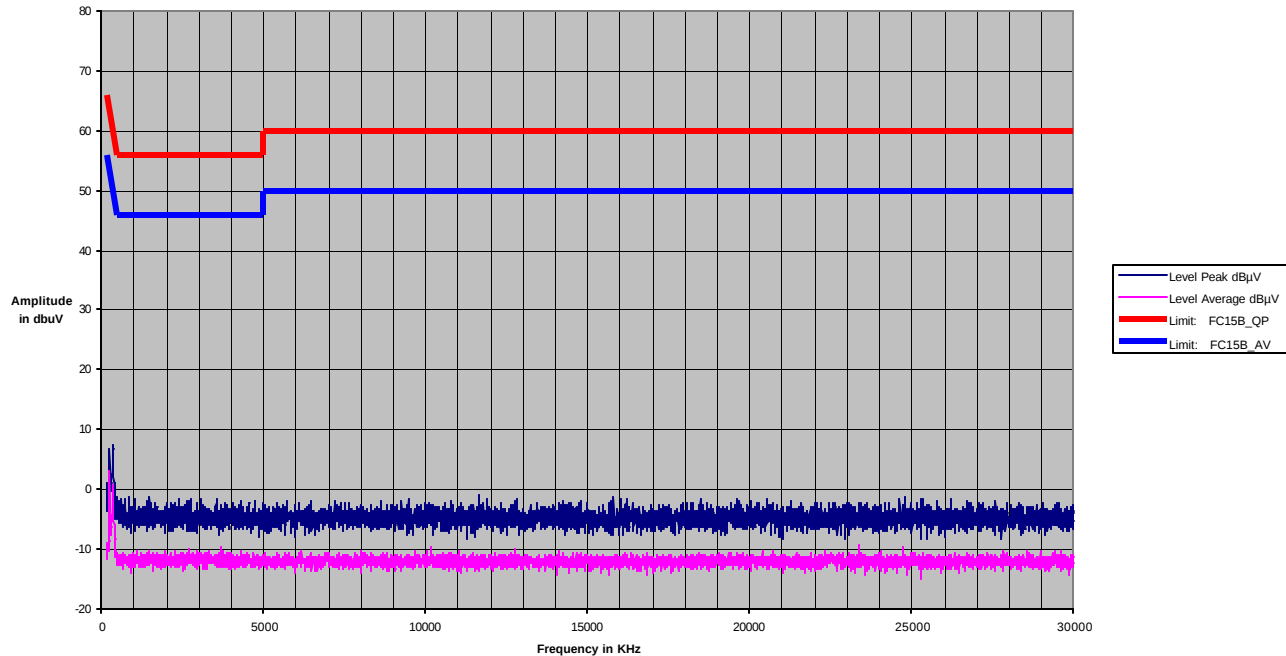
4.16 CONDUCTED EMISSIONS – M50RF & M50Q

EUT: Drapery Motor and Controller, M50RF & M50Q
 Manuf: Electronic Solutions, Inc.
 Op Cond: normal operation
 Test Spec: FCC Part 15 Class B, 120VAC 60 Hz
 Test Cond: Temp: 19° C

DATE: June 17, 2010
 Operator: SP

Humidity: 35 %

Criterion Technology Inc. Conducted Emissions
 M50RF & M50Q 120VAC 60Hz



Limit: FC15B_QP

Limit: FC15B_AV

Frequency kHz:	Level dB:	Frequency kHz:	Level dB:
150	66	150	56
500	56	500	46
5000	56	5000	46
5000.1	60	5000.1	50
30000	60	30000	50

Final Measurement Results:

Indicated Phase/PE shows Configuration of max. Emission

Frequency:	AV Level:	AV Limit:	Phase:	PE:
kHz	dBμV/m	dBμV/m	-	-
270	3	56	N	gnd
360	0.8	56	N	gnd
365	0.2	56	L1	gnd
3700	-9.7	46	N	gnd
700	-9.9	46	L1	gnd
725	-10.2	46	L1	gnd
23360	-9.4	50	L1	gnd
24755	-9.7	50	N	gnd
10190	-9.8	50	N	gnd

Minimum Margin to Limit: **-53.0** dB at **270** kHz

5.0 APPENDIX C: PRODUCT INFORMATION FORM**CRITERION TECHNOLOGY PRODUCT INFORMATION FORM****General Information****Date:** 12-23-09

Company Name: Electronic Solutions Inc
Company Address: 1355 Horizon Ave
Lafayette, CO 80026

Contacts:Compliance Engineer: Douglas Barnes Phone: 303 663 3396 Email: _____**Test Description**De-Bug _____ Formal (Initial) X Formal (Re-Verification) _____**Market Information (Check all that Apply)**

USA X Canada _____ Euro. Union _____ Taiwan _____ Japan _____ New Zealand _____ Australia _____
Other FCC 15.107, 15.109, 15.205, 15.209, 15.247

Product Information

Name: Draper Motor and Controller
Model Number: M40RF, M40Q, M50RF, M50Q
Product Dimensions: 2" x 2" x 1"

Product Power Source:**Battery**

Type _____
Redundant Power Supplies _____

AC Supply

Input Voltage Range(s) 24VDC
Phases 1 Delta _____ Wye _____
Current _____
Frequency 60 Hz
Manufacturer N/A
Model Number _____

TopologyLinear _____ Switching Mode X Switching Frequency _____**Support Equipment (if used):****Power Supply:**

Manufacturer: Yubright
Model Number: ADS-060DU024

I/O Cables – Manufacturer, P/N, Length :

Serial Port _____
Parallel Port _____
SCSI Port _____
Other 1 – 6 inch cable

Operation Software:Name none Version Number _____**Operating Modes: (Please Include Cycle Time)**One 0 secondsTime necessary for EUT to be exercised and able to fully respond: 0 seconds.**Operation Pass/Fail Criteria:**Motors (represented by lamps) will malfunction

Test Type – Emissions (Please check all that apply):**Information Technology Equipment**Class A ☐Class B ☐

Oscillator/Clock Frequencies (MHz) _____

Industrial, Scientific, Medical EquipmentClass A ☐Class B ☒

Oscillator/Clock Frequencies (MHz) _____

Unintentional RadiatorClass A ☐Class B ☒Oscillator/Clock Frequencies (MHz) 16 and 32 MHz

Receiver

Type (Regen., Superhet., Direct Conv., Homodyne) _____

Local Oscillator Frequencies _____

Frequency Range _____

Intentional RadiatorClass A ☐Class B ☒Fundamental Frequency Range Z-wave 908 MHz

Local Oscillator Frequencies _____

Power Output (to antenna) _____

Integral Antenna (Yes/No) yes

Modulation Type (AM, CM, Pulse, Spread Spectrum) _____

Control Circuits (Microprocessor/Micro-controller) _____

Oscillator/Clock Frequencies (MHz) 908 MHz

6.0 APPENDIX D: TEST EQUIPMENT AND CALIBRATION STATUS

Manufacturer	Name/Description	Model Number	Serial Number	Cal. Due Date	Intervals
Veratech	Preamp (AMP2)	unknown	N/A	9/6/2010	24 months
FCC	EM Clamp	F2031	309	10/2/2010	24 months
FCC	CDN	FCC-801-M3-25	9714	10/2/2010	24 months
Rohde/ Schwarz	VHF/UHF Receiver	ESVS-30	863342014	10/8/2010	24 months
Rohde/ Schwarz	LISN	ESH2-Z5	828739-001	10/8/2010	24 months
Rohde/ Schwarz	HF Receiver	ESHS-30	826003/011	10/8/2010	24 months
Solar Electronics	LISN	8012-50-R-24-BNC	892310	10/15/2010	24 months
Haefely Trench	Test Mag	Mag 100	80162	10/15/2010	24 months
Gigatronics	Power Sensor	80301A-410	1831996	10/15/2010	24 months
Gigatronics	Power Meter	8541C	1830945	10/15/2010	24 months
Hewlett Packard	Tracking Generator	HP85645A	3210A00124	10/22/2010	24 months
FCC	LISN	FCC-TLISN-T4-02	20252	11/24/2010	24 months
Calorina Instruments	AC Power Source Pacs-1	5001iX-CTS-411	55637/ 72242	3/24/2011	24 months
Haefely Trench	Surge Generator	PSURGE 6.1	083-906-07	5/26/2011	24 months
Haefely Trench	EFT Tester	PEFT Junior	583-333-51	5/26/2011	24 months
Haefely Trench	Surge Coupler	FP-Surge 32.1	083-925-05	5/26/2011	24 months
EMCO	Active Loop	6502	2626	5/28/2011	24 months
Amplifier Research	E-Field Probe	FP2080	20236	10/16/2011	24 months
Amplifier Research	E-Field Probe	FP2000	19682	10/19/2011	24 months
EMCO	Horn	3160-08	1147	1/19/2012	24 months
Hewlett Packard	Signal Generator	HP 8648D	3642000145	3/9/2012	24 months
Hewlett Packard	Quasi Peak Adapter	85650A	3014A18942	5/3/2012	24 months
Hewlett Packard	Spectrum Analyzer	HP 8566B	2240A0195	5/21/2012	24 months
Hewlett Packard	Spectrum Analyzer Display	HP 85662A	3014A18942	5/21/2012	24 months
Haefely Trench	ESD Gun	PESD 1600	H605100	6/2/2012	24 months

7.0 APPENDIX E: TEST DIRECTIVES, STANDARDS AND METHODS

7.1.1 EUROPEAN DIRECTIVES, STANDARDS AND METHODS

89/336/EEC: Council Directive of 03 May 1989 on the Approximation of the Laws of the Member States Relating to Electromagnetic Compatibility, OJEC No. L 139/19-26, Aug 1993.

BS DD ENV 50204 (CENELEC): Testing and Measurement Techniques; Radiated Electromagnetic Field from Digital Radio Telephones - Immunity Test, 1996.

EN 55011 (CENELEC): ISM Radio-Frequency Equipment Radio Disturbance Characteristics - Limits and Methods of Measurement, 2007.

EN 55014-1 (CENELEC): Part 1. Electromagnetic Compatibility Requirements for Household Appliances, Electric Tools and Similar Apparatus - Part 1. Emission - Product Family Standard, 2007.

EN 55022 (CENELEC): ITE - Radio-Frequency Equipment Radio Disturbance Characteristics - Limits and Methods of Measurement, 2008.

CISPR 22: Information Technology Equipment – Radio Disturbance Characteristics - Limits and Methods of Measurement, 2009.

EN 55024 (CENELEC): ITE - Immunity Characteristics - Limits and Methods of Measurement, 2008.

EN 55103-1: Product Family standard for audio, video, audio - visual and entertainment lighting control apparatus for professional use. Part 1: Emissions, April 1997.

EN 55103-2: Product Family standard for audio, video, audio - visual and entertainment lighting control apparatus for professional use. Part 2: Immunity, April 1997.

EN 60601-1-2 (CENELEC): Medical Electrical Equipment. Part 1. General Requirements for Safety - Section 1.2. Collateral Standard: Electromagnetic Compatibility - Requirements and Tests, Third Edition 2007.

EN 61000-6-1: EMC- Part 6-1. Generic Standard-Immunity for residential, commercial and light-industrial Environments 2007.

EN 61000-6-2: EMC- Part 6-2. Generic Standard-Immunity for Industrial Environments, 2005.

EN 61000-6-3: EMC- Part 6-3. Generic Standard-Emissions for residential, commercial and light-industrial Environments 2007.

EN61000-6-4 (CENELEC): EMC - Generic Emission Standard, Part 6-4: Industrial Environment, 2007.

EN 61000-3-2 (CENELEC): EMC - Part 2. Limits for Harmonic Current Emissions (Equipment Input Current ≤ 16 A per phase), with Amendment 14, 2006.

EN 61000-3-3 (CENELEC): EMC - Part 3. Limitation of Voltage Fluctuation and Flicker in Low-Voltage Supply Systems for Equipment with Rated Current ≤ 16 A, 2008.

EN 61000-4-2 (CENELEC): EMC - Part 4. Testing and Measurement Techniques; Section 2. Electrostatic Discharge Immunity Test, 2009.

EN 61000-4-3 (CENELEC): EMC - Part 4. Testing and Measurement Techniques; Section 3. Radiated, Radio-Frequency, Electromagnetic Field Immunity, 2008.

EN 61000-4-4 (CENELEC): EMC - Part 4. Testing and Measurement Techniques; Section 4. Electrical Fast Transient/Burst Immunity Test, 2008.

EN 61000-4-5 (CENELEC): EMC - Part 4. Testing and Measurement Techniques; Section 5. Surge Immunity Test, 2006.

EN 61000-4-6 (CENELEC): EMC - Part 4. Testing and Measurement Techniques; Section 6. Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields, 2009.

EN 61000-4-8 (CENELEC): EMC - Part 4. Testing and Measurement Techniques; Section 8. Power Frequency Magnetic Field Immunity Test, 1993 with the incorporation of amendment A1:2001.

EN 61000-4-11 (CENELEC): EMC - Part 4. Testing and Measurement Techniques; Section 11. Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests, 2004

ETSI EN 300 220-1 V2.1.1 – Electromagnetic Compatibility and Radio spectrum Matters (ERM); Short range devices (SRD); radio equipment to be used in the 25MHz to 1000 MHz frequency range with power levels ranging up to 500 mW; Part 1: Technical characteristics and test methods; 2006.

ETSI EN 300 220-2 V2.1.1 – Electromagnetic Compatibility and Radio spectrum Matters (ERM); Short range devices (SRD); radio equipment to be used in the 25MHz to 1000 MHz frequency range with power levels ranging up to 500 mW; Part 2: Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive, 2006

ETSI EN 300 220-3 V1.1.1 – Electromagnetic Compatibility and Radio spectrum Matters (ERM); Short range devices (SRD); radio equipment to be used in the 25MHz to 1000 MHz frequency range with power levels ranging up to 500 mW; Part 3: Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive

ETSI EN 300 683 –Radio Equipment and Systems (RES); ElectroMagnetic Compatibility (EMC) Standard for Short Range Devices (SRD) Operating on Frequencies between 9 kHz and 25kHz, 1997

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Subpart A General.

Subpart B Unintentional Radiators.

Subpart C Intentional Radiators.

Subpart D Unlicensed Personal Communications Service Devices.

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7.1.4 47 CFR FCC PART 24 PERSONAL COMMUNICATIONS SERVICES: OCT 2009

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