166 South Carter, Genoa City, WI 53128

Company:	Andersen Corporation
Model Tested:	9017587
Report Number:	18701
Project Number:	5737

Code of Federal Regulations 47 Part 15 – Radio Frequency Devices

Subpart C – Intentional Radiators
Section 15.231
Periodic operation in the band 40.66 - 40.70 MHz
and above 70 MHz

THE FOLLOWING **MEETS** THE ABOVE TEST SPECIFICATION

Formal Name:	Remote Control
Kind of Equipment:	Remote Control
Frequency Range:	868.2 MHz
Test Configuration:	Tabletop
Model Number(s):	9017587
Model(s) Tested:	9017587
Serial Number(s):	none (Test Sample)
Date of Tests:	January 23 to March 3, 2013
Test Conducted For:	Andersen Corporation 100 Fourth Avenue North Bayport, Minnesota 55003-1096, USA

NOTICE: "This test report relates only to the items tested and must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government". Please see the "Description of Test Sample" page listed inside of this report.

DLS ELECTRONIC SYSTEMS, INC.
166 South Carter, Genoa City, WI 53128

Company:	Andersen Corporation
Model Tested:	9017587
Report Number:	18701
Project Number:	5737

SIGNATURE PAGE

Tested By:

Craig Brandt
Test Engineer

Reviewed By:

William Stumpf
OATS Manager

Approved By:

Brian Mattson
General Manager

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166 South Carter, Genoa City, WI 53128

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United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 100276-0

D.L.S. Electronic Systems, Inc.

Wheeling, IL

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2012-10-01 through 2013-09-30

Effective dates

For the National Institute of Standards and Technology

NVLAP-01C (REV. 2009-01-28)

1.0 Summary of Test Report

It was determined that the Andersen Corporation Remote Control, Model 9017587, complies with the requirements of CFR 47 Part 15 Subpart C Section 15.231.

Subpart C Section 15.231 Applicable Technical Requirements Tested:

Section	Description	Procedure	Note	Compliant?
15.231(c)	20 dB Emission Bandwidth	ANSI C63.4-2009 & ANSI C63.10-2009	2	Yes
15.231(a)(1)	Automatic Deactivation	ANSI C63.4-2009 & ANSI C63.10-2009	2	Yes
15.231(b)	Field Strength of Emissions - Fundamental and Spurious -	ANSI C63.4-2009 & ANSI C63.10-2009	1,2	Yes
15.35(c)	Duty Cycle Correction for Pulsed operation	ANSI C63.4-2009 & ANSI C63.10-2009	2	Yes

Note 1: Tested in 3 orthogonal planes.
Note 2: Radiated emission measurement.

2.0 Introduction

On non-consecutive days in January, February and March, 2013 the Remote Control, Model 9017587, as provided from Andersen Corporation was tested to the requirements of CFR 47 Part 15 Subpart C Section 15.231. To meet these requirements, the procedures contained within this report were performed by personnel of D.L.S Electronic Systems, Inc.

3.0 Test Facilities

D.L.S. Electronic Systems, Inc. is a full service EMC/Safety Testing Laboratory accredited to ISO 17025. NVLAP Certificate and Scope can be viewed at http://www.dlsemc.com/certificate. Our facilities are registered with the FCC, Industry Canada, and VCCI.

Wisconsin Test Facility:
D.L.S. Electronic Systems, Inc.
166 S. Carter Street
Genoa City, Wisconsin 53128

Wheeling Test Facility:
D.L.S. Electronic Systems, Inc.
1250 Peterson Drive
Wheeling, IL 60090

4.0 Description of Test Sample

Description:

This is a remote control for awning style power windows. This remote device communicates with the key pad control module that opens and closes the window. It consists of a key pad, circuit board and plastic housing.

Type of Equipment / Frequency Range:

Handheld / 868.2 MHz

Physical Dimensions of Equipment Under Test:

Length: 5 in x Width: 2 in x Height: 1 in

Power Source:

3 VDC

Internal Frequencies:

30 kHz, 4 MHz, 16 MHz

Transmit / Receive Frequencies Used For Test Purpose:

868.2 MHz

Type of Modulation(s) / Antenna Type:

Digital-Gaussian Frequency Shift Keying with a data rate of 100kbps / Integral antenna

Description of Circuit Board(s) / Part Number:

Remote Board	HO21010064-B0 Revision 3

5.0 Test Equipment

A list of the equipment used can be found in the table below. All primary equipment was calibrated against known reference standards with a verified traceable path to NIST.

D.L.S. Wisconsin – OATS 2

Radiated 30 – 1000 MHz

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Date	Cal Due Dates
Receiver	Rohde & Schwarz	ESI 26	837491/010	20 Hz – 26 GHz	1-3-13	1-3-14
Preamplifier	Rohde & Schwarz	TS-PR10	032001/004	9 kHz – 1 GHz	1-10-13	1-10-14
Antenna	EMCO	3104C	00054892	20 MHz – 200 MHz	9-13-12	9-13-14
Antenna	EMCO	3146	1205	200 MHz – 1 GHz	9-19-12	9-19-14

Radiated above 1 GHz - OATS 2

Description	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Date	Cal Due Dates
High Pass Filter	Q Microwave	100460	2	1GHz-18GHz	5-18-12	5-18-13
Preamp	Miteq	AMF-7D-01001800-22-10P	1777990	1GHz-18GHz	2-15-13	2-15-14
Horn Antenna	EMCO	3115	6204	1-18GHz	6-16-11	6-16-13

6.0 Test Arrangements

Radiated Emissions Measurement Arrangement:

All radiated emission measurements were performed at D.L.S. Electronic Systems, Inc. and set up according to ANSI C63.4-2009 and ANSI C63.10-2009, unless otherwise noted. Description of procedures and measurements can be found in Appendix B – Measurement Data. See Appendix A for additional photos of the test set up.

Unless otherwise noted, the bandwidth of the measuring receiver / analyzer used during testing is shown below.

Frequency Range	Bandwidth (-6 dB)
10 to 150 kHz	200 Hz
150 kHz to 30 MHz	9 kHz
30 MHz to 1 GHz	120 kHz
Above 1 GHz	1 MHz

7.0 Test Conditions

Test Conditions recorded during test:

Temperature and Humidity:

70°F at 20% RH

Battery Voltage:

3 VDC

8.0 Modifications Made To EUT For Compliance

None noted at time of test.

9.0 Additional Descriptions

Tested in continuous transmit mode.

10.0 Results

Measurements were performed in accordance with ANSI C63.4-2009 and ANSI C63.10-2009. Graphical and tabular data can be found in Appendix B at the end of this report.

11.0 Conclusion

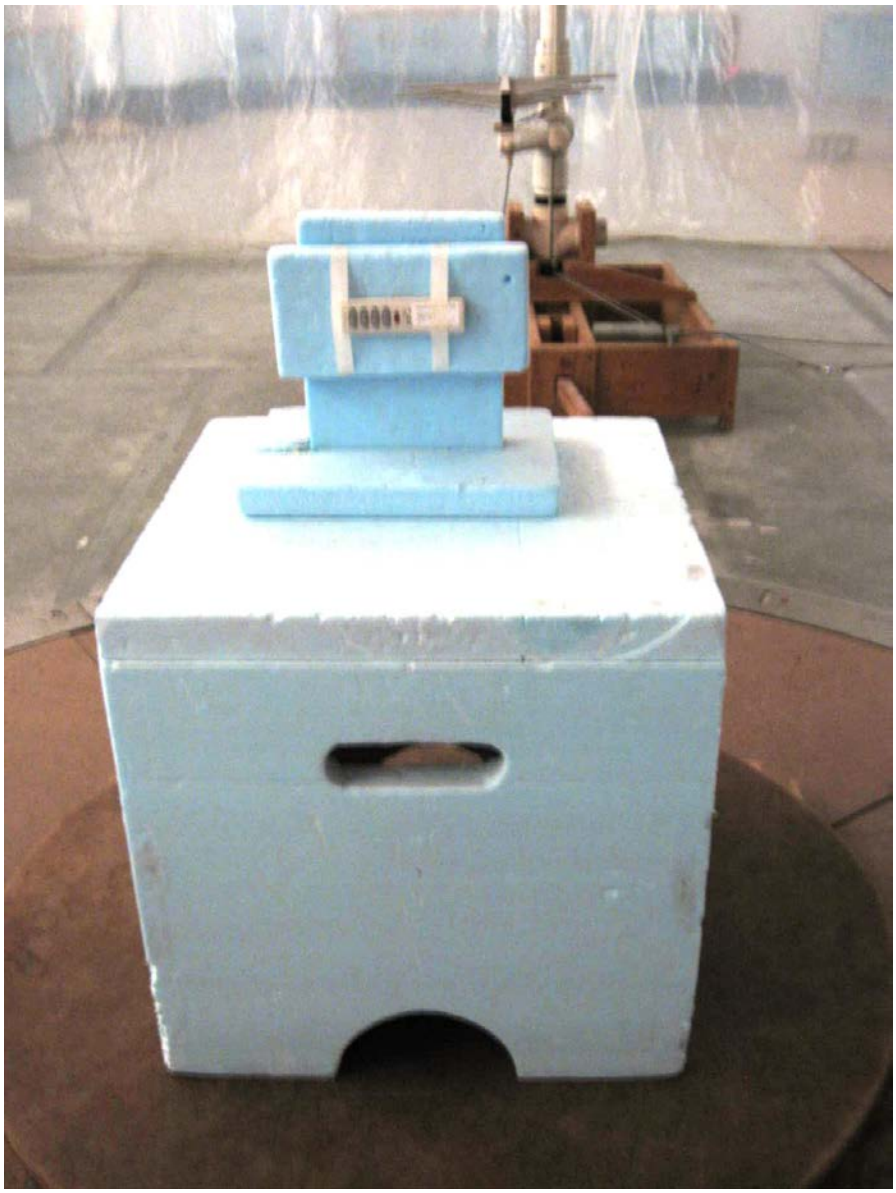
The Remote Control, Model 9017587, as provided from Andersen Corporation tested on non-consecutive days in January, February and March, 2013 **meets** the requirements of CFR 47 Part 15 Subpart C Section 15.231.

Appendix A – Test Photos

Photo Information and Test Setup:

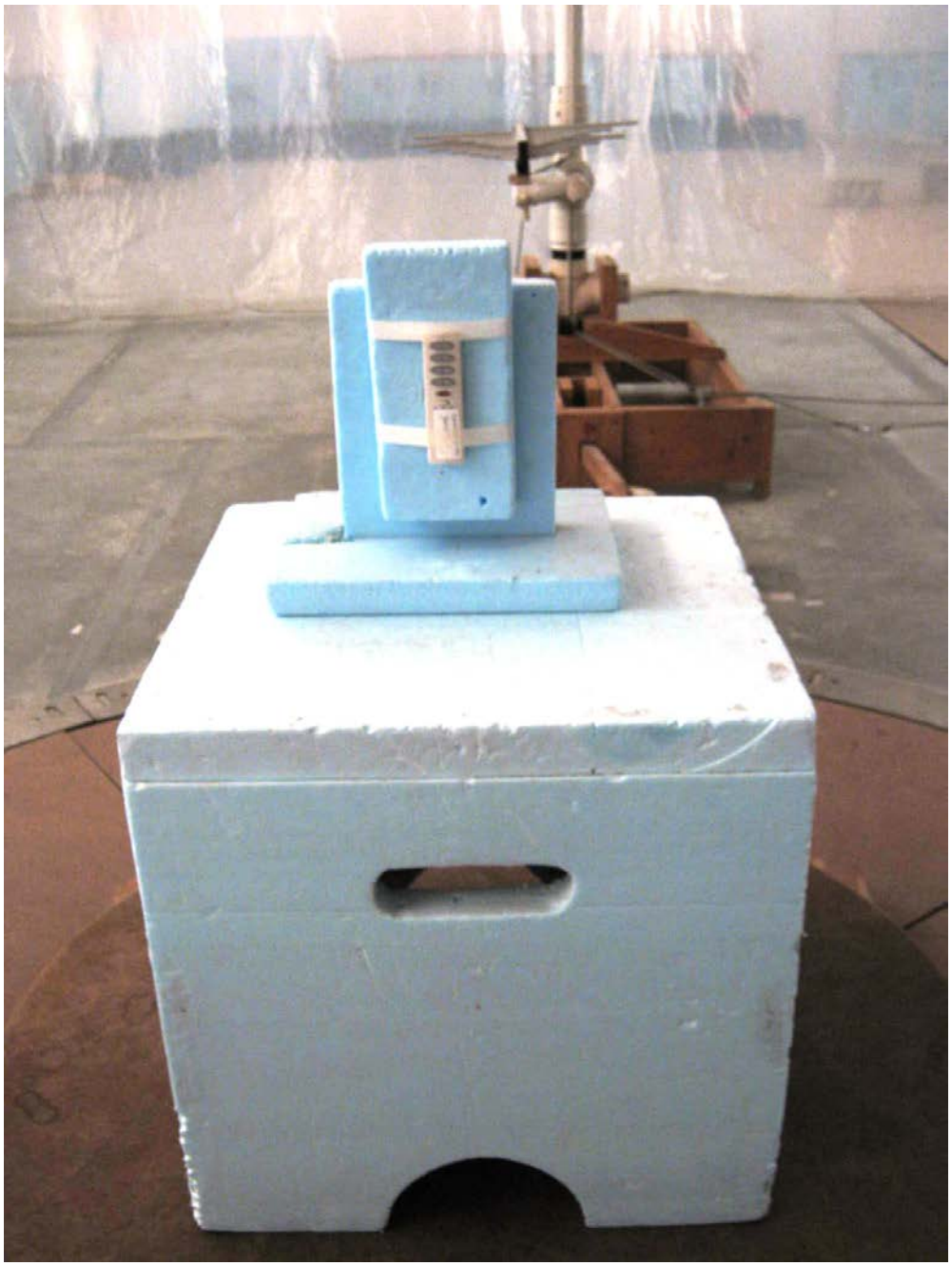
Item: Remote Control, Model 9017587

Radiated Emissions – 'X' Position



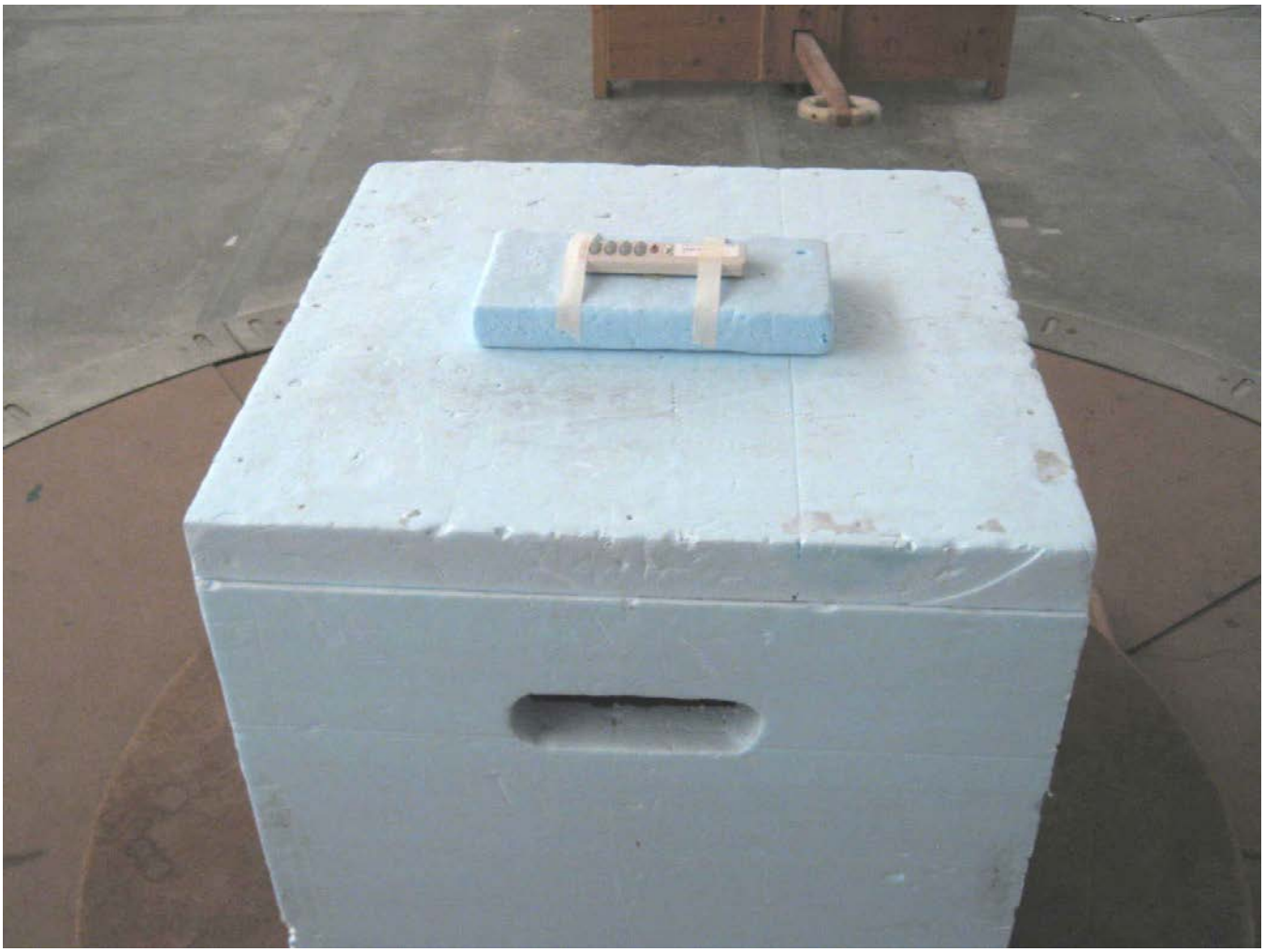
Appendix A

Radiated Emissions – 'Y' Position



Appendix A

Radiated Emissions – 'Z' Position



Appendix A

Radiated Emissions – Above 1 GHz

Appendix B – Measurement Data

1.0 Emission Bandwidth – 20 dB

Rule Part:

Section 15.231 (c)

Test Procedure:

ANSI C63.4-2009 and ANSI C63.10-2009

Limit:

Section 15.231 (c) :

868.2 MHz x 0.25% = 2.17 MHz

Results:

Compliant
20 dB bandwidth: **211.6 kHz**

Sample Equation(s):

None

Notes:

This was a radiated emissions measurement. The bandwidth was measured from the points 20 dB down from the modulated carrier.

ELECTRONIC SYSTEMS, INC.
166 South Carter, Genoa City, WI 53128

Company: Andersen Corporation
Model Tested: 9017587
Report Number: 18701
Project Number: 5737

Appendix B

Test Date: 01-23-2013
Company: Andersen Windows
EUT: Remote Control
Test: 20 dB Bandwidth
Operator: Craig B

Comment: SPAN 2 to 5 times occupied bandwidth
RBW between 1% and 5% of occupied bandwidth

20 dB Bandwidth = 211.6 kHz

Appendix B

2.0 Automatic Deactivation

Rule Part:

15.231 (a) (1) and 15.231 (a) (2)

Test Procedure:

ANSI C63.4-2009 and ANSI C63.10-2009

Limit:

A transmitter activated manually/automatically shall cease transmission within 5 seconds after activation.

Results:

Compliant
Time before deactivation: 6.613 ms

Sample Equation(s):

None

Notes:

None

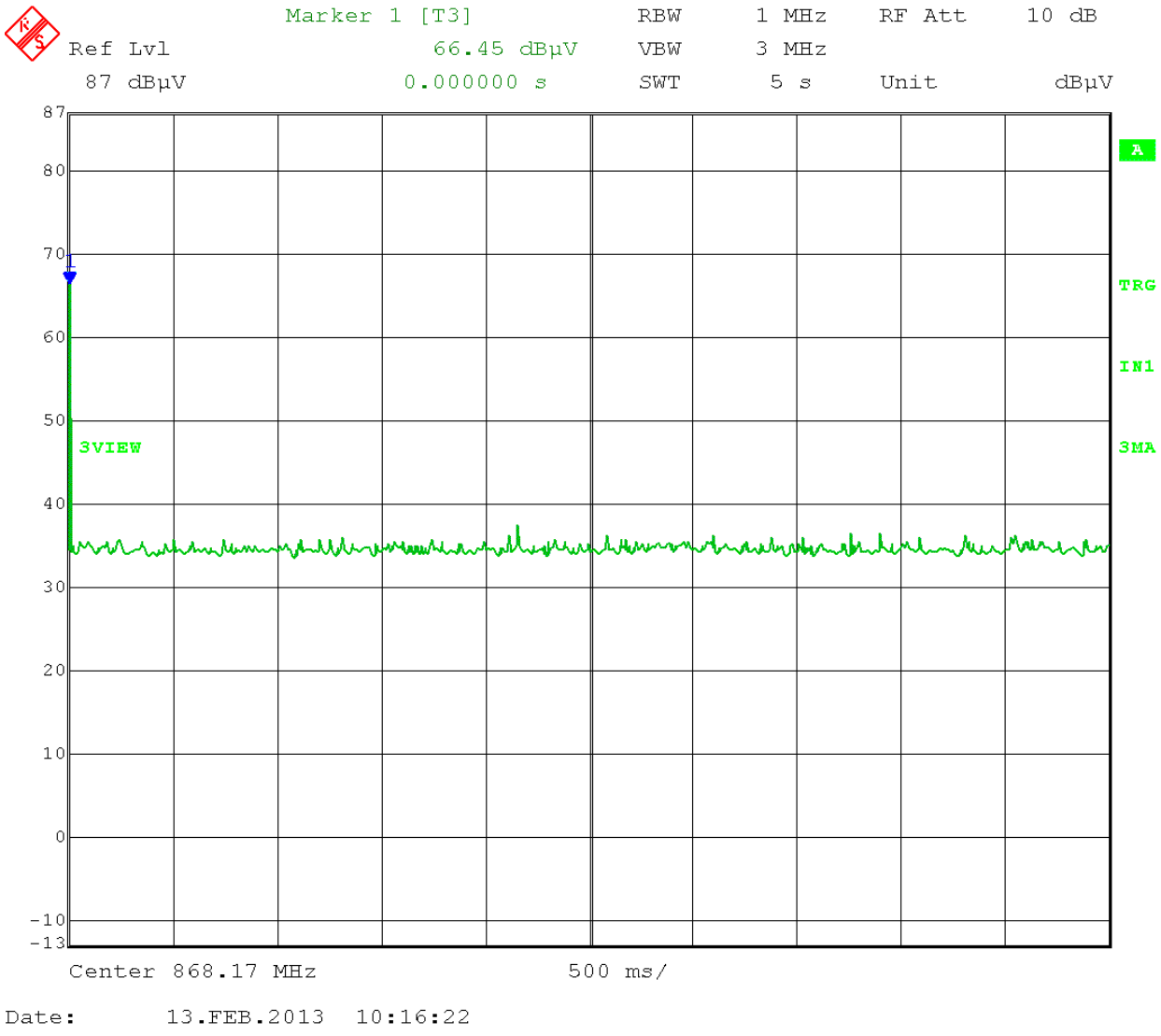
166 South Carter, Genoa City, WI 53128

Company: Andersen Corporation
Model Tested: 9017587
Report Number: 18701
Project Number: 5737

Appendix B

Test Date: 02-13-2013
Company: Andersen Corporation
EUT: Remote
Test: Dwell Time
Operator: Craig B

Comment: A transmitter activated manually/automatically shall cease transmission within 5 seconds after activation.



Appendix B

3.0 Field Strength of Emissions – Fundamental and Spurious

Rule Part:

15.231 (b) including 15.205

Test Procedure:

ANSI C63.4-2009 and ANSI C63.10-2009

Limit:

Fundamental (F) µV/m at 3 meters: 12,500 µV/m at 3 meters
The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

Results:

Compliant

Sample Equation(s):

41.6667(F) – 7083.3333 = 10996.68 µV/m at 3 meters

20*log (12500) = 81.93 dB µV/m at 3 meters

Final Corrected = Total Level - Duty Cycle Correction
Margin = Limit - Final Corrected
Level = Total Level - System Loss - Antenna Factor

Notes:

The emissions were measured of the fundamental and spurious at a distance of three meters between the EUT and the measuring antenna. The EUT was tested in 3 orthogonal planes and the highest emission was recorded. Compliance is determined by comparing peak data, minus duty cycle correction, to the average limit.

Radiated Fundamental and Spurious Emissions – 30 MHz to 10 GHz
Tested at a 3 Meter Distance

EUT: Remote Control
Manufacturer: Andersen Windows
Operating Condition: 70 deg F; 20% R.H.
Test Site: Site 2
Operator: Craig B
Test Specification: FCC Part 15.231(a) and 15.205
Comment: Transmit frequency: 868.2 MHz
Date: 03-03-2013
Notes: All other emissions at least 20 dB under the limit.

Frequency (MHz)	Measurement Type	Antenna Polarization	Level (dBuV)	Antenna Factor (dB/m)	System Loss (dB)	Duty Cycle Correction (dB)	Total Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	EUT Angle (deg)	Comment
868.2	Max Peak	Vert	63.29	23.16	6.8	0	93.3	101.93	8.7	1.10	270	Fundamental
868.2	Average	Vert	63.29	23.16	6.8	-23.59	69.7	81.93	12.3	1.10	270	Fundamental
868.2	Max Peak	Horz	65.04	23.16	6.8	0	95.0	101.93	6.9	1.00	45	Fundamental
868.2	Average	Horz	65.04	23.16	6.8	-23.59	71.4	81.93	10.5	1.00	45	Fundamental
1736.4	Max Peak	Vert	103.28	26.15	-54.1	0	75.3	81.93	6.6	1.10	180	Harmonic
1736.4	Average	Vert	103.28	26.15	-54.1	-23.59	51.7	61.93	10.2	1.10	180	Harmonic
1736.4	Max Peak	Horz	103.51	26.15	-54.1	0	75.6	81.93	6.4	1.00	180	Harmonic
1736.4	Average	Horz	103.51	26.15	-54.1	-23.59	52.0	61.93	10.0	1.00	180	Harmonic
2170.5	Max Peak	Vert	75.75	27.85	-53.8	0	49.8	81.93	32.1	1.20	225	Spurious
2170.5	Average	Vert	75.75	27.85	-53.8	-23.59	26.2	61.93	35.7	1.20	225	Spurious
2170.5	Max Peak	Horz	78.68	27.85	-53.8	0	52.7	81.93	29.2	1.00	160	Spurious
2170.5	Average	Horz	78.68	27.85	-53.8	-23.59	29.1	61.93	32.8	1.00	160	Spurious
2604.6	Max Peak	Vert	84.77	29.08	-53.7	0	60.2	81.93	21.8	225.00	1	Harmonic
2604.6	Average	Vert	84.77	29.08	-53.7	-23.59	36.6	61.93	25.4	225.00	1	Harmonic
2604.6	Max Peak	Horz	87.43	29.08	-53.7	0	62.8	81.93	19.1	1.00	225	Harmonic
2604.6	Average	Horz	87.43	29.08	-53.7	-23.59	39.2	61.93	22.7	1.00	225	Harmonic
3472.8	Max Peak	Vert	93.02	31.15	-53.9	0	70.3	81.93	11.7	1.10	135	Harmonic
3472.8	Average	Vert	93.02	31.15	-53.9	-23.59	46.7	61.93	15.3	1.10	135	Harmonic
3472.8	Max Peak	Horz	94.95	31.15	-53.9	0	72.2	81.93	9.7	1.30	170	Harmonic
3472.8	Average	Horz	94.95	31.15	-53.9	-23.59	48.6	61.93	13.3	1.30	170	Harmonic

Radiated Fundamental and Spurious Emissions – 30 MHz to 10 GHz
Tested at a 3 Meter Distance

EUT: Remote Control
Manufacturer: Andersen Windows
Operating Condition: 70 deg F; 36% R.H.
Test Site: Site 2
Operator: Craig B
Test Specification: FCC Part 15.231(a) and 15.205
Comment: Transmit frequency: 868.2 MHz
Date: 03-03-2013
Notes: All other emissions at least 20 dB under the limit.

Frequency (GHz)	Measurement Type	Antenna Polarization	Level (dBuV)	Antenna Factor (dB/m)	System Loss (dB)	Duty Cycle Correction (dB)	Total Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	EUT Angle (deg)	Comment
4341.0	Max Peak	Vert	71.53	32.38	-54.3	0	49.6	74	24.4	1.00	330	Restricted Band
4341.0	Average	Vert	71.53	32.38	-54.3	-23.59	26.0	54	28.0	1.00	330	Restricted Band
4341.0	Max Peak	Horz	71.40	32.38	-54.3	0	49.5	74	24.5	1.00	0	Restricted Band
4341.0	Average	Horz	71.40	32.38	-54.3	-23.59	25.9	54	28.1	1.00	0	Restricted Band
5209.2	Max Peak	Vert	71.83	33.67	-52.6	0	52.9	81.93	29.0	1.00	340	Harmonic
5209.2	Average	Vert	71.83	33.67	-52.6	-23.59	29.3	61.93	32.6	1.00	340	Harmonic
5209.2	Max Peak	Horz	72.80	33.67	-52.6	0	53.9	81.93	28.1	1.00	225	Harmonic
5209.2	Average	Horz	72.80	33.67	-52.6	-23.59	30.3	61.93	31.7	1.00	225	Harmonic
7813.8	Max Peak	Vert	69.08	36.86	-50.6	0	55.3	81.93	26.6	1.10	0	Harmonic
7813.8	Average	Vert	69.08	36.86	-50.6	-23.59	31.8	61.93	30.2	1.10	0	Harmonic
7813.8	Max Peak	Horz	68.94	36.86	-50.6	0	55.2	81.93	26.7	1.00	100	Harmonic
7813.8	Average	Horz	68.94	36.86	-50.6	-23.59	31.6	61.93	30.3	1.00	100	Harmonic
8682.0	Max Peak	Vert	68.56	37.64	-50.3	0	55.9	81.93	26.0	1.00	10	Harmonic
8682.0	Average	Vert	68.56	37.64	-50.3	-23.59	32.3	61.93	29.6	1.00	10	Harmonic
8682.0	Max Peak	Horz	68.12	37.64	-50.3	0	55.5	81.93	26.5	1.40	0	Harmonic
8682.0	Average	Horz	68.12	37.64	-50.3	-23.59	31.9	61.93	30.1	1.40	0	Harmonic

Appendix B

4.0 Duty Cycle Correction

Rule Part:

15.35 (c)

Test Procedure:

ANSI C63.4-2009and ANSI C63.10-2009

Limit:

Informative

Results:

Informative

Sample Equation(s):

See data

Notes:

Compliance is determined by comparing peak data, minus duty cycle correction, to the average limit.

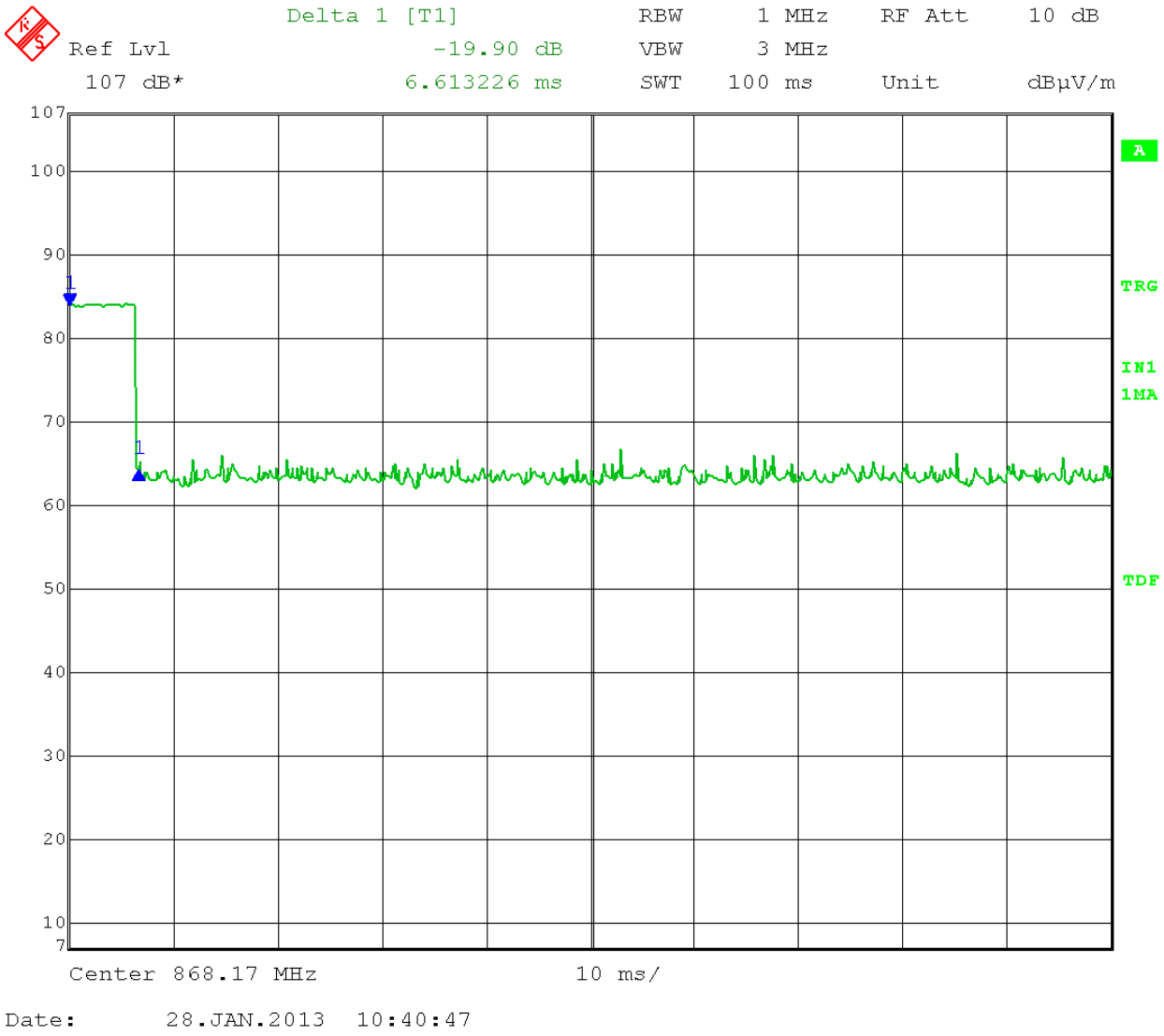
166 South Carter, Genoa City, WI 53128

Company: Andersen Corporation
Model Tested: 9017587
Report Number: 18701
Project Number: 5737

Appendix B

Test Date: 01-24-2013
Company: Andersen Corporation
EUT: Remote Control
Test: Duty Cycle
Operator: Craig B

Comment: One pulses: 6.613 ms
Total ON time in 100 ms = 6.613 ms
Duty Cycle Correction Factor = 20 log (6.613/100) = **-23.59 dB**



166 South Carter, Genoa City, WI 53128

Company: Andersen Corporation
Model Tested: 9017587
Report Number: 18701
Project Number: 5737

END OF REPORT

Revision #	Date	Comments	By
1.0	3-4-2013	Preliminary Release	JS
1.1	3-7-2013	Removed incorrect notation on page 21	JS