

**FCC PART 15 SUBPART B & C
TEST REPORT***for***TEMPLINC****Model: 2441TH**

Prepared for

SmartLabs, Inc.
16542 MILLIKAN AVENUE
IRVINE, CA 92606 USA

Prepared by: _____

MATT HARRISON

Approved by: _____

JOSH HANSENCOMPATIBLE ELECTRONICS INC.
20621 PASCAL WAY
LAKE FOREST, CALIFORNIA 92630
(949) 589-0700

DATE: November 15, 2011

	REPORT BODY	APPENDICES					TOTAL
		A	B	C	D	E	
PAGES	18	2	2	2	14	25	63

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**Brea Division**
114 Olinda Drive
Brea, CA 92823
(714) 579-0500**Agoura Division**
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600**Silverado Division**
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700**Lake Forest Division**
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

TABLE OF CONTENTS

Section / Title	PAGE
GENERAL REPORT SUMMARY	4
SUMMARY OF TEST RESULTS	5
1. PURPOSE	6
2. ADMINISTRATIVE DATA	7
2.1 Location of Testing	7
2.2 Traceability Statement	7
2.3 Cognizant Personnel	7
2.4 Date Test Sample was Received	7
2.5 Disposition of the Test Sample	7
2.6 Abbreviations and Acronyms	7
3. APPLICABLE DOCUMENTS	8
4. DESCRIPTION OF TEST CONFIGURATION	9
4.1 Description of Test Configuration - EMI	9
4.1.1 Photograph Test Configuration - EMI	9
4.1.2 Cable Construction and Termination	10
5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT	11
5.1 EUT and Accessory List	11
5.2 EMI Test Equipment	12
6. TEST SITE DESCRIPTION	13
6.1 Test Facility Description	13
6.2 EUT Mounting, Bonding and Grounding	13
6.3 Facility Environmental Characteristics	13
7. CHARACTERISTICS OF THE TRANSMITTER	14
7.1 Channel Number and Frequencies	14
7.2 Antenna	14
7.3 Modulation	14
8. TEST PROCEDURES	15
8.1 RF Emissions	15
8.1.1 Conducted Emissions Test	15
8.1.2 Radiated Emissions (Spurious and Harmonics) Test	16
8.1.3 Peak Transmit EMI	17
8.1.4 Band Edge	17
9. TEST PROCEDURE DEVIATIONS	18
10. CONCLUSIONS	18



LIST OF APPENDICES

APPENDIX	TITLE
A	Laboratory Accreditations and Recognitions
B	Modifications to the EUT
C	Additional Models Covered Under This Report
D	Diagrams, Charts, and Photos <ul style="list-style-type: none">• Test Setup Diagrams• Antenna Factors• Radiated and Conducted Emissions Photos
E	Data Sheets

LIST OF FIGURES

FIGURE	TITLE
1	Plot Map And Layout of Test Site
2	Radiated Emissions 3-Meter Semi-Anechoic Test Chamber Above 1 GHz



GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced in any form unless done so in full with the written permission of Compatible Electronics.

This report must not be used to claim product endorsement by NVLAP, NIST, or any other agency of the U.S. Government or other governments.

Device Tested: TempLinc
Model: 2441TH
S/N: 17.6B.A4

Product Description: The EUT is a wall-mounted wireless thermostat.

Modifications: The EUT was not modified in during the testing.

Manufacturer: SmartLabs, Inc.
16542 Millikan Avenue
Irvine, California 92606

Test Date: September 08, 2011

Test Specifications: EMI requirements
CFR Title 47, Part 15 Subpart B and Subpart C Sections 15.205, 15.209 and 15.249

Test Procedure: ANSI C63.10
CFR 47, Part 15.31



SUMMARY OF TEST RESULTS

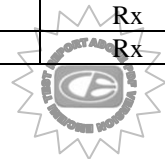
TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz - 30 MHz.	Complies with the Class B limits of CFR Title 47, Part 15, Subpart B; and CFR Title 47, Part 15, Subpart C, section 15.249
2	Spurious Radiated RF Emissions, 9 kHz – 30 MHz, 30 - 1,000 MHz, and 1,000 MHz – 10,000 MHz	Complies with the Class B limits of CFR Title 47, Part 15, Subpart B; and CFR Title 47, Part 15, Subpart C, section 15.249
3	Emissions produced by the intentional radiator, 9 kHz – 10 GHz	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart C, section 15.205, 15.209, 15.249
4	Peak Transmit EMI	Complies with the relevant requirements of FCC Title 47, Part 15, Subpart C, section 15.249
5	Input Power Variation	Complies with the relevant requirements of CFR Title 47, Part 15, Subpart A, section 15.31

SIX HIGHEST RADIATED SPURIOUS EMISSIONS READINGS

	Reading Type (PK / QP / AV)	Polarization (Vert / Horz)	Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Delta (dB)	Test Distance
1	QP	H	855.1	37.79	46.00	-8.21	3-meter
2	QP	H	864.9	37.66	46.00	-8.34	3-meter
3	QP	V	855.1	36.47	46.00	-9.53	3-meter
4	QP	V	121.2	33.48	43.52	-10.04	3-meter
5	QP	V	194.3	32.89	43.52	-10.63	3-meter
6	QP	V	864.9	34.48	46.00	-11.52	3-meter

SIX HIGHEST CONDUCTED EMISSIONS READINGS 120VAC Input, 60Hz

Freq(MHz)	(AVG) Margin AVL (dB)	(QP) Margin QPL (dB)	(AVG) EMI (dBuV)	(QP) EMI (dBuV)	(AVG) Limit (dBuV)	(QP) Limit (dBuV)	LINE/NEU	Rx / Tx
0.18	-43.99	-33.01	10.13	31.1	54.11	64.11	L	Tx
0.15	-43.39	-33.47	12.07	31.99	55.46	65.46	L	Tx
0.19	-39.72	-33.48	13.88	30.12	53.6	63.6	N	Rx
0.19	-39.72	-33.48	13.88	30.12	53.6	63.6	L	Rx
0.16	-41.13	-33.55	13.92	31.5	55.05	65.05	N	Rx
0.16	-41.13	-33.55	13.92	31.5	55.05	65.05	L	Rx



1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on TempLinc Model: 2441TH. The EMI measurements were performed according to the measurement procedure described in ANSI C63.10. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the **Class B** specification limits defined by the Code of Federal Regulations Title 47, Part 15 Subpart B and Subpart C.



2. ADMINISTRATIVE DATA

2.1 Location of Testing

The EMI tests described herein were performed at the test facility of Compatible Electronics, 20621 Pascal Way Lake Forest, California 92630.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

SmartLabs, Inc.

John Lockyer Senior Product Development Manager

Compatible Electronics Inc.

Josh Hansen	Lab Manager
Matt Harrison	Test Technician
Joey Madlangbayan	Test Engineer
Jeff Klinger	Director of Engineering

2.4 Date Test Sample was Received

The test sample was received on September 8, 2011.

2.5 Disposition of the Test Sample

The sample has not yet been returned to SmartLabs, Inc. at the time of this report.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

RF	Radio Frequency		
EMI	Electromagnetic Interference		
EUT	Equipment Under Test		
P/N	Part Number		
S/N	Serial Number		
HP	Hewlett Packard		
ITE	Information Technology Equipment		
LISN	Line Impedance Stabilization Network		
NVLAP	National Voluntary Laboratory Accreditation Program		
CFR	Code of Federal Regulations		
PCB	Printed Circuit Board	ANSI	American National Standard Institute
TX	Transmit	LBE	Lower Band Edge
RX	Receive	UBE	Upper Band Edge



3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this EMI Test Report.

SPEC	TITLE
CFR Title 47, Part 15	FCC Rules – Radio frequency devices (including digital devices)
ANSI C63.10: 2009	Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz



4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration - EMI

The TempLinc Model: 2441TH (EUT) was setup in a tabletop configuration. The EUT was continuously transmitting a data stream throughout all the tests. The EUT was also tested in a mode which the transmit function was disabled; while continuously receiving. The EUT was supplied 24V AC via a power supply connected to AC Mains. The EUT is intended to be mounted on the wall so it was tested in an orientation representative to how it would be installed.

It was determined that the emissions were at their highest level when the EUT was setup in the above configuration. The final emissions data was taken in the above configuration. The EUT was set up as shown in the photographs in Appendix D. Please see Appendix E for the test data.

Alternative Setup:

The TempLinc Model:2441TH (EUT) was setup in a tabletop configuration. The EUT was continuously transmitting a data stream throughout all the tests. The EUT was supplied 24V AC via a power supply connected to AC Mains. The EUT was connected to a box that simulated typical accessories. The EUT is intended to be mounted on the wall so it was tested in an orientation representative to how it would be installed.

4.1.1 Photograph Test Configuration - EMI



4.1.2 Cable Construction and Termination

This is a 1-meter, unshielded, round cable connecting the EUT to the Simulation Box. The cable was hard wired at the EUT and Simulation Box. The cable was not bundled.



5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT**5.1 EUT and Accessory List**

#	EQUIPMENT TYPE	MANU-FACTURER	MODEL	SERIAL NUMBER	FCC ID
1	TEMPLINC (EUT)	SMARTLABS, INC.	2441TH	17.6B.A4	SBP2441T
2	POWER SUPPLY	ELK PRODUCTS, INC	ELK-TRG2440	N/A	N/A
3	SIMULATION BOX	SMART LABS, INC.	N/A	N/A	N/A



5.2 EMI Test Equipment

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
Computer	Compatible Electronics	NONE	NONE	N/A	N/A
EMI Receiver	Rohde & Schwarz	ESIB40	100219	4/19/2010	4/19/2012
Antenna, Loop	Com Power	AL-130	17085	1/26/2011	1/26/2012
Antenna, CombiLog	Com Power	AC-220	003	6/07/2011	6/07/2012
Antenna, CombiLog	Com Power	AC-220	25857	6/07/2011	6/07/2012
Antenna, Horn 1-18GHz	Com Power	AH-118	071250	10/01/2010	10/01/2012
Pre-Amp, 1-18GHz	Com Power	PA-122	25196	6/07/2011	6/07/2012
Pre-Amp, 1-18GHz ¹	Com Power	PA-118	181653	10/01/2010	10/01/2011
Mast, Antenna Positioner	Sunol Science Corporation	TWR 95-4	020808-3	N/A	N/A
Antenna Mast	Sunol Science Corporation	TWR 95-4	020808-3	N/A	N/A
Turntable	Sunol Science Corporation	FM 2001	N/A	N/A	N/A
Mast and Turntable Controller	Sunol Science Corporation	SC104V	020808-1	N/A	N/A
LISN	Com-Power	LI-215	12076	6/20/2011	6/20/2012

Note¹: - Pre-Amp was not used for alternative setup



6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 of this report for EMI test location.

6.2 EUT Mounting, Bonding and Grounding

The EUT was centered on a 1.0 by 1.5 by 0.8 meter high non-conductive table, which was placed on the ground plane.

The EUT was not grounded.

6.3 Facility Environmental Characteristics

When applicable refer to the data sheets in Appendix E for the relative humidity, air temperature, and barometric pressure.



7. CHARACTERISTICS OF THE TRANSMITTER

7.1 Channel Number and Frequencies

There is a total of 1 channel.

1 = 915 MHz

7.2 Antenna

The antenna is an antenna comprised of a wire soldered on the PCB.

7.3 Modulation

The EUT uses FSK modulation. (ie. Frequency Shift Keyed)



8. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

8.1 RF Emissions

8.1.1 Conducted Emissions Test

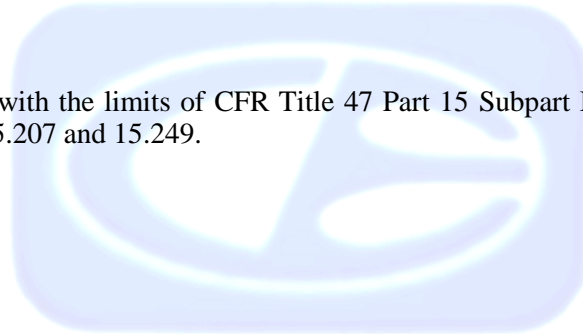
The EMI receiver was used as a measuring meter. A quasi-peak and/or average reading was taken only where indicated in the data sheets. The LISN output was measured using the EMI receiver. The output of the second LISN was terminated by a 50-ohm termination. The effective measurement bandwidth used for this test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding, and grounding of the EUT. The EUT received its power through the LISN, which was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI 63.4. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The conducted emissions from the EUT were maximized for operating mode as well as cable placement. The final data was collected under program control by the computer software. The final qualification data is located in Appendix E.

Test Results:

The EUT complies with the limits of CFR Title 47 Part 15 Subpart B 15.107 (Class B devices) and Subpart C section 15.207 and 15.249.



8.1.2 Radiated Emissions (Spurious and Harmonics) Test

The receiver was used as a measuring meter. The receiver was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the receiver records the highest measured reading over all the sweeps. Amplifiers were used to increase the sensitivity of the instrument. The Com Power Microwave Preamplifier Model: PA-122 was used for frequencies above 1 GHz, Microwave Preamplifier Model: PA-118 was used for frequencies above 1 GHz Microwave Preamplifier Model: PA-840 was used for frequencies above 18 GHz.

The quasi-peak adapter was used only for those readings which are marked accordingly on the data sheets.

The average detector was used for frequencies above 1 GHz.

The measurement bandwidths and transducers used for the radiated emissions test were:

FREQUENCY RANGE (MHz)	TRANSDUCER	EFFECTIVE MEASUREMENT BANDWIDTH
.009 to .150	Active Loop Antenna	200 Hz
.150 to 30	Active Loop Antenna	9 kHz
30 to 1,000	Combilog Antenna	120 kHz
1,000 to 10,000	Horn Antenna	1 MHz

The TDK FAC-3 shielded test chamber of Compatible Electronics, Inc. was used for radiated emissions testing. This test site is in full compliance with ANSI C63.10, EN 50147-2, and CISPR 22. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters in both vertical and horizontal polarizations (for E field radiated field strength).

Test Results:

The EUT complies with the limits of CFR Title 47 Part 15 Subpart B 15.109 (Class B devices) and Subpart C sections 15.205, 15.209 and 15.249.



8.1.3 Peak Transmit EMI

The EUT was tested at a 3-meter test distance to obtain the final test data. The single EUT channel was measured. The final qualification data sheets are located in Appendix E.

Test Results:

The EUT complies with Part 15, Subpart C, Section 15.249

8.1.4 Band Edge

The EUT was tested at a 3-meter test distance to obtain the final test data. The single EUT channel was measured during the low and high band edge tests. The final qualification data sheets are located in Appendix E.

Test Results:

The EUT complies with Part 15, Subpart C, Section 15.249



9. TEST PROCEDURE DEVIATIONS

The test procedures were not deviated from throughout all tests.

10. CONCLUSIONS

The TempLinc Model: 2441TH meets all of the **Class B** specification limits defined in the Code of Federal Regulations Title 47, Part 15 Subpart B 15.107, 15.109 and Subpart C 15.205, 15.207, 15.209, 15.249 of the FCC Rules.



APPENDIX A
***LABORATORY ACCREDITATIONS AND
RECOGNITIONS***

Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

LABORATORY ACCREDITATIONS AND RECOGNITIONS



NVLAP LAB CODES 200063-0,
200528-0, 200527-0

For US, Canada, Australia/New Zealand, Taiwan and the European Union, Compatible Electronics is currently accredited by NVLAP to ISO/IEC 17025 an ISO 9002 equivalent. Please follow the link to the NIST site for each of our facilities NVLAP certificate and scope of accreditation.

NVLAP listing links

Agoura Division - <http://ts.nist.gov/Standards/scopes/2000630.htm>
Brea Division - <http://ts.nist.gov/Standards/scopes/2005280.htm>
Silverado/Lake Forest Division - <http://ts.nist.gov/Standards/scopes/2005270.htm>



ANSI listing

[CETCB](#)

<https://www.ansica.org/wwwversion2/outside/ALLdirectoryDetails.asp?menuID=1&prgID=3&orgID=123&status=4>



Compatible Electronics has been nominated as a Conformity Assessment Body (CAB) for EMC under the US/EU Mutual Recognition Agreement (MRA).



Compatible Electronics has been nominated as a Conformity Assessment Body (CAB) for Taiwan/BSMI under the US/APEC (Asia-Pacific Economic Cooperation) Mutual Recognition Agreement (MRA).

We are also certified/listed for IT products by the following country/agency:



VCCI Listing, from VCCI site

[Enter "Compatible" in search form](http://www.vcci.or.jp/vcci_e/activity/registration/setsubi.html) http://www.vcci.or.jp/vcci_e/activity/registration/setsubi.html



FCC Listing, from FCC OET site

[FCC test lab search](https://fjallfoss.fcc.gov/oetcf/eas/reports/TestFirmSearch.cfm) <https://fjallfoss.fcc.gov/oetcf/eas/reports/TestFirmSearch.cfm>



Compatible Electronics IC listing can be found at:

<http://www.ic.gc.ca/eic/site/ic1.nsf/eng/home>

Lab ID# 2154C



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

APPENDIX B

MODIFICATIONS TO THE EUT



MODIFICATIONS TO THE EUT

There were no modifications made to the EUT during the test.





APPENDIX C

***ADDITIONAL MODELS COVERED
UNDER THIS REPORT***



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

ADDITIONAL MODELS COVERED UNDER THIS REPORT

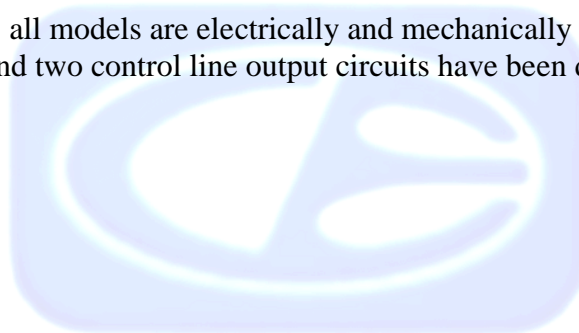
USED FOR THE PRIMARY TEST

TempLinc
Model: 2441TH
S/N: 17.6B.A4

Client provided additional models not tested but covered by similarity are listed below.

TempLinc
Model: 2441T
SN: N/A

According to the manufacturer, all models are electrically and mechanically identical. The only difference is the 2441T humidity sensor and two control line output circuits have been de-populated from the PCB.

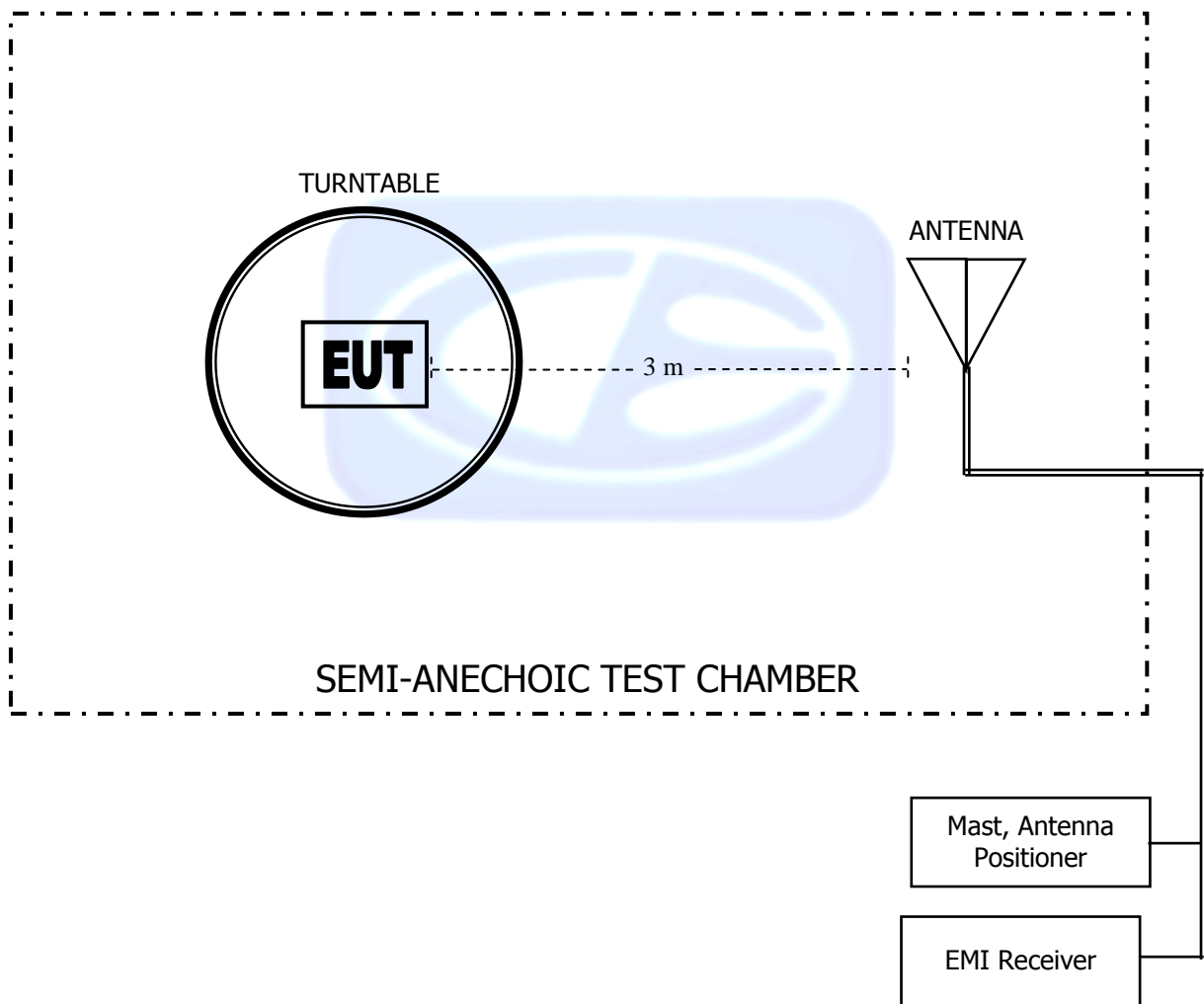


APPENDIX D

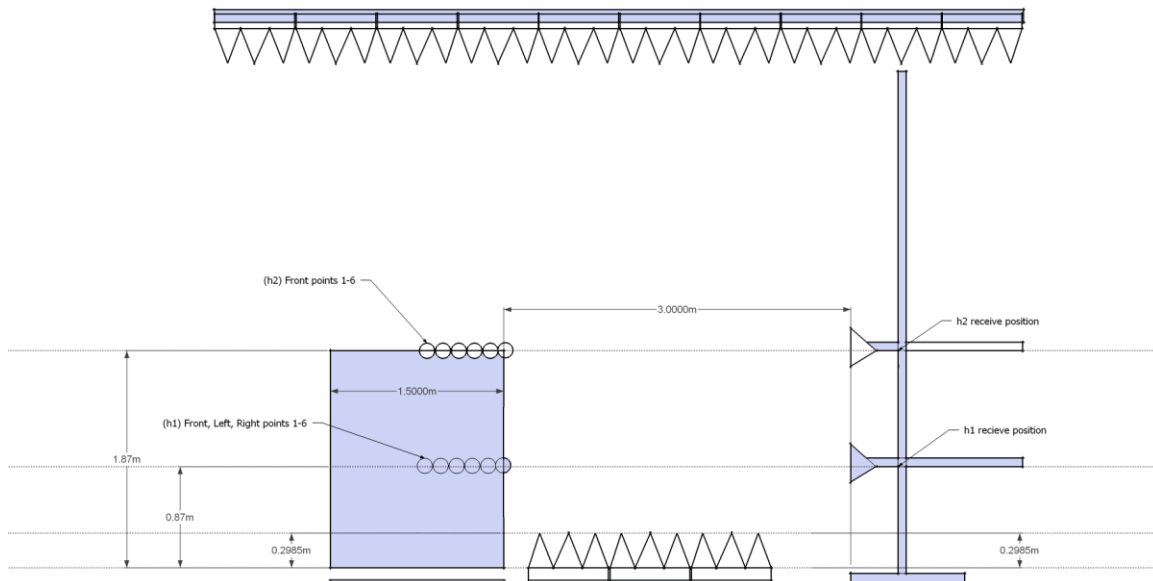
DIAGRAMS, CHARTS, AND PHOTOS



FIGURE 1: RADIATED EMISSIONS 3-METER SEMI-ANECHOIC TEST CHAMBER BELOW 1GHz



**FIGURE 2: RADIATED EMISSIONS 3-METER
SEMI-ANECHOIC TEST CHAMBER ABOVE 1 GHz**



COM-POWER AC-220**LAB P - COMBYLOG ANTENNA**

S/N: 003

CALIBRATION DUE: JUNE 7, 2012

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	18.3	180	9
35	18.3	200	8.9
40	18.9	250	11.5
45	17.9	300	14.2
50	16.6	300	14.2
60	13.1	400	14.8
70	7.5	500	16.1
80	6.3	600	18.3
90	7.9	700	20.4
100	8.5	800	20.8
120	9.9	900	21.1
140	9.3	1000	22.1
160	10.3		



COM-POWER AC-220**LAB R - COMBYLOG ANTENNA**

S/N: 25857

CALIBRATION DUE: JUNE 07, 2012

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	17.20	180	8.50
35	17.60	200	9.00
40	18.30	250	11.70
45	17.10	300	13.40
50	16.10	300	13.40
60	13.10	400	15.00
70	8.60	500	16.00
80	5.50	600	17.90
90	7.20	700	20.20
100	8.20	800	21.10
120	9.40	900	20.50
140	8.60	1000	22.60
160	8.40		



COM-POWER AH-118**HORN ANTENNA**

S/N: 071250

CALIBRATION DUE: OCTOBER 01, 2012

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
1000	24.00	9500	35.90
1500	23.90	10000	40.40
2000	27.90	10500	41.70
2500	29.60	11000	38.90
3000	30.70	11500	40.30
3500	30.30	12000	38.10
4000	28.60	12500	42.80
4500	30.70	13000	38.80
5000	33.00	13500	36.90
5500	32.90	14000	43.70
6000	34.10	14500	42.00
6500	37.20	15000	42.00
7000	37.90	15500	37.90
7500	38.30	16000	38.50
8000	38.50	16500	38.20
8500	36.90	17000	39.20
9000	40.20	17500	42.80
		18000	43.20



COM-POWER PA-122**1-22GHz - PREAMPLIFIER**

S/N: 25196

CALIBRATION DUE: JUNE 07, 2012

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
1000	32.22	11500	27.05
1500	31.53	12000	28.14
2000	30.77	12500	28.65
2500	30.21	13000	28.16
3000	29.85	13500	26.89
3500	29.39	14000	27.37
4000	28.62	14500	28.08
4500	28.13	15000	27.29
5000	28.48	15500	27.81
5500	31.68	16000	27.51
6000	28.17	16500	25.60
6500	28.05	17000	25.04
7000	28.00	17500	24.74
7500	27.74	18000	23.24
8000	27.15	18500	23.56
8500	27.15	19000	25.39
9000	27.59	19500	23.45
9500	27.08	20000	20.60
10000	25.88	20500	20.73
10500	25.99	21000	19.44
11000	26.37	21500	15.06
		22000	11.92



COM-POWER PA-118**1-18GHz - PREAMPLIFIER**

S/N: 181653

CALIBRATION DUE: OCTOBER 1, 2011

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
1000	25.60	9500	25.80
1500	26.80	10000	25.70
2000	26.60	10500	25.10
2500	26.50	11000	24.40
3000	26.30	11500	24.00
3500	26.00	12000	24.00
4000	26.00	12500	24.20
4500	25.50	13000	24.40
5000	25.40	13500	24.40
5500	28.20	14000	24.40
6000	25.30	14500	24.70
6500	25.00	15000	25.30
7000	24.70	15500	25.90
7500	24.50	16000	26.30
8000	24.70	16500	25.90
8500	25.10	17000	25.30
9000	25.50	17500	25.10
		18000	26.10





FRONT VIEW

SMARTLABS, INC.

TEMPLINC

Model: 2441TH

FCC SUBPART B & C - RADIATED EMISSIONS – 9-8-2011

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400



REAR VIEW

SMARTLABS, INC.

TEMPLINC

Model: 2441TH

FCC SUBPART B & C - RADIATED EMISSIONS – 9-8-11

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



Brea Division
114 Olinda Drive
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Silverado Division
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Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400



FRONT VIEW

SMARTLABS, INC.

TEMPLINC

Model: 2441TH

FCC SUBPART B & C - CONDUCTED EMISSIONS – 9-8-11

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

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19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400



REAR VIEW

SMARTLABS, INC.
TEMPLINC
Model: 2441TH

FCC SUBPART B & C - CONDUCTED EMISSIONS – 9-8-11

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



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Lake Forest Division
20621 Pascal Way
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(949) 587-0400



FRONT VIEW

SMARTLABS, INC.

TEMPLINC

Model: 2441TH

FCC SUBPART B & C - RADIATED EMISSIONS – 10-27-2011

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



Brea Division
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(949) 587-0400



REAR VIEW

SMARTLABS, INC.

TEMPLINC

Model: 2441TH

FCC SUBPART B & C - RADIATED EMISSIONS – 10-27-11

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



Brea Division
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(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

APPENDIX E

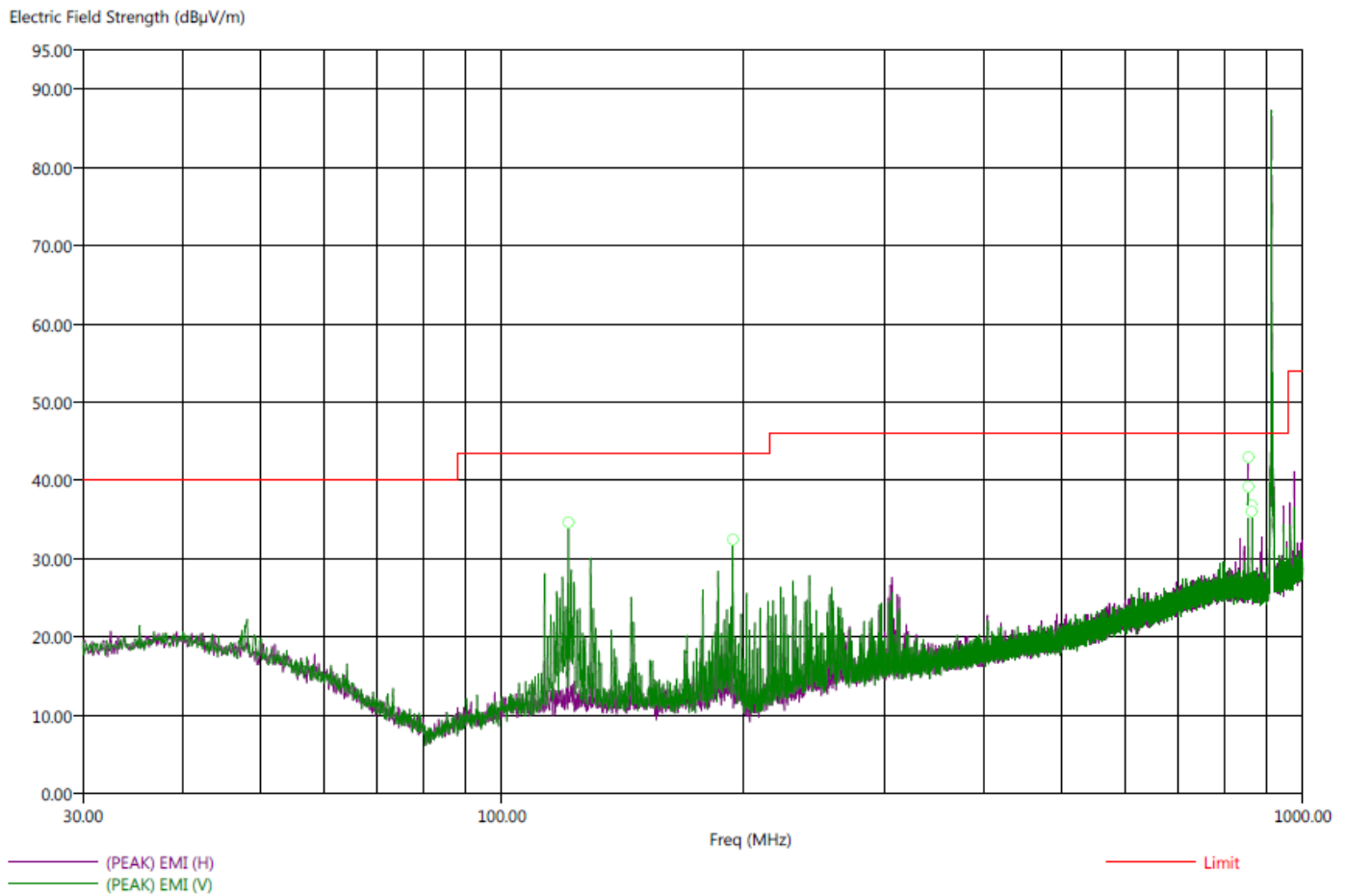
***RADIATED AND CONDUCTED
EMISSIONS DATA SHEETS
TRANSMIT MODE***



Title: FCC 15.209
 File: Radiated Pre-scan 30-1000Mhz.set
 Operator: Matt Harrison
 EUT Type: TempLinc -- Thermostat with Humidity Sensor #2441TH
 EUT Condition: Continuously Transmitting 915MHz
 Comments:
 Temp: 70f
 Hum: 50%
 120V 60Hz

9/8/2011 8:42:48 AM
 Sequence: Preliminary Scan

Compatible Electronics, Inc. FAC- 3 (LAB R)



Note: There were no radiated emissions found below 30 MHz or above 1GHz

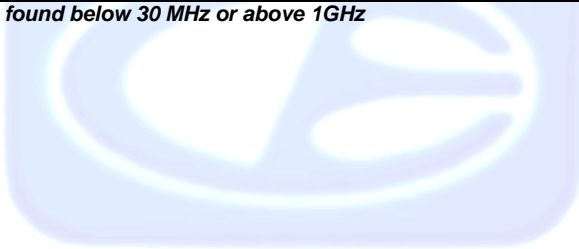


Title: FCC 15.209 9/8/2011 9:06:58 AM
 File: Radiated Final 30-1000Mhz.set Sequence: Final Measurements
 Operator: Matt Harrison
 EUT Type: TempLinc -- Thermostat with Humidity Sensor #2441TH
 EUT Condition: Continuously Transmitting 915MHz
 Comments:
 Temp: 70f
 Hum: 50%
 120V 60Hz

Compatible Electronics, Inc. FAC- 3 (LAB R)

Freq (MHz)	(QP) Margin (dB)	(QP) EMI (dBµV/m)	(PEAK) EMI (dBµV/m)	Limit (dBµV/m)	Pol	Ttbl Agl (deg)	Twr Ht (cm)	Transducer(dB)	Cable(dB)
121.20	-10.04	33.48	35.43	43.52	V	177.50	101.73	9.35	1.16
194.30	-10.63	32.89	34.00	43.52	V	0.00	100.95	8.86	1.49
855.10	-8.21	37.79	41.71	46.00	H	13.50	115.94	20.76	3.44
855.10	-9.53	36.47	39.76	46.00	V	44.25	175.10	20.76	3.44
864.90	-8.34	37.66	39.98	46.00	H	155.25	154.62	20.70	3.48
864.90	-11.52	34.48	37.36	46.00	V	91.00	117.55	20.70	3.48

Note: There were no radiated emissions found below 30 MHz or above 1GHz



Title: FCC 15.207

9/8/2011 10:47:57 AM

File: Conducted Pre-Line_TX.set

Sequence: Preliminary Scan

Operator: Matt Harrison

EUT Type: TempLinc -- Thermostat with Humidity Sensor #2441TH

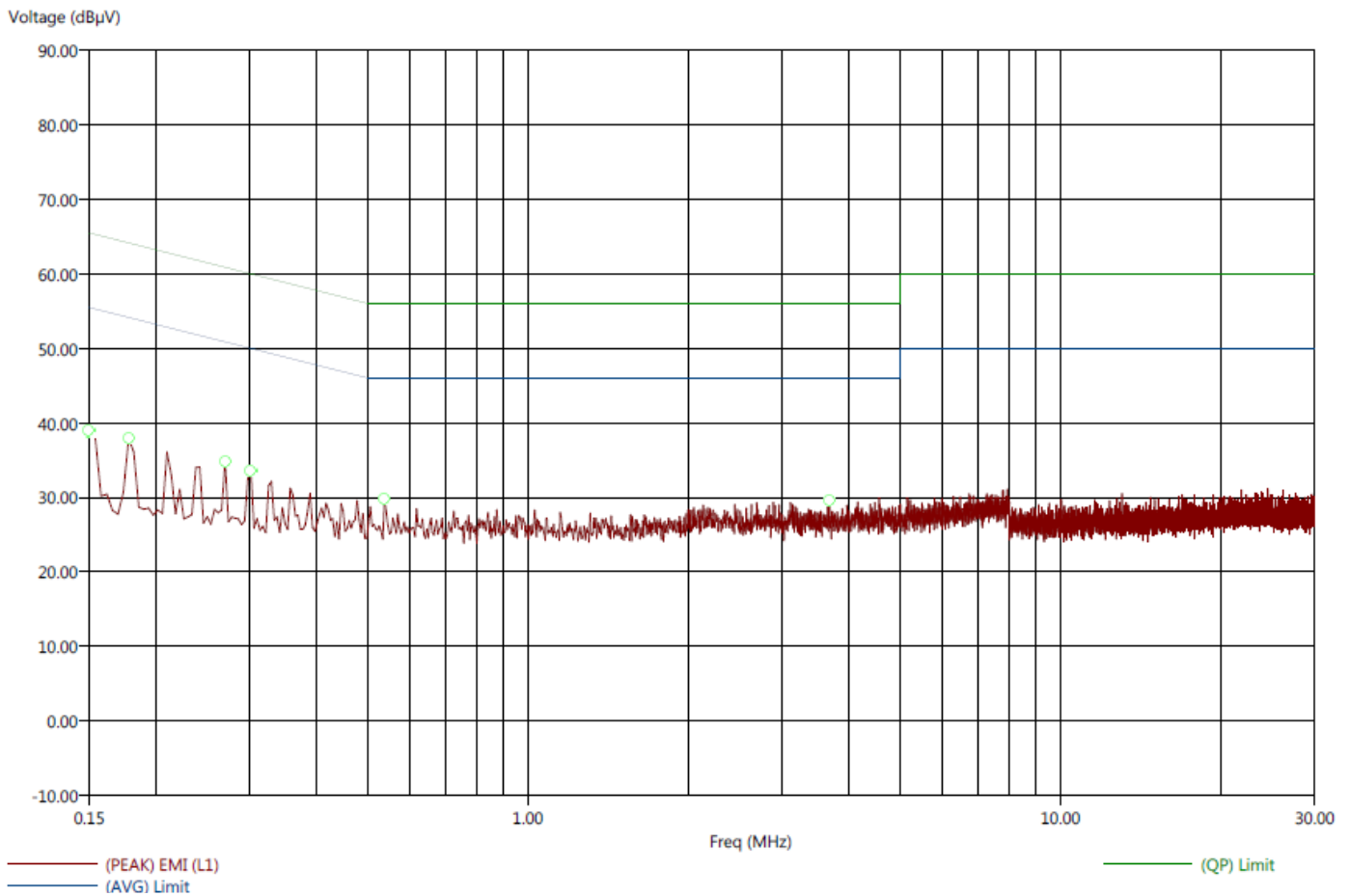
EUT Condition: Continuously Transmitting 915MHz

Comments:

Temp: 70f

Hum: 50%

120V 60Hz

Compatible Electronics, Inc. FAC- 3 (LAB R)

Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

Title: FCC 15.207 9/8/2011 10:50:56 AM
 File: Conducted Final-Line_TX.set Sequence: Final Measurements
 Operator: Matt Harrison
 EUT Type: TempLinc -- Thermostat with Humidity Sensor #2441TH
 EUT Condition: Continuously Transmitting 915MHz
 Comments:
 Temp: 70f
 Hum: 50%
 120V 60Hz

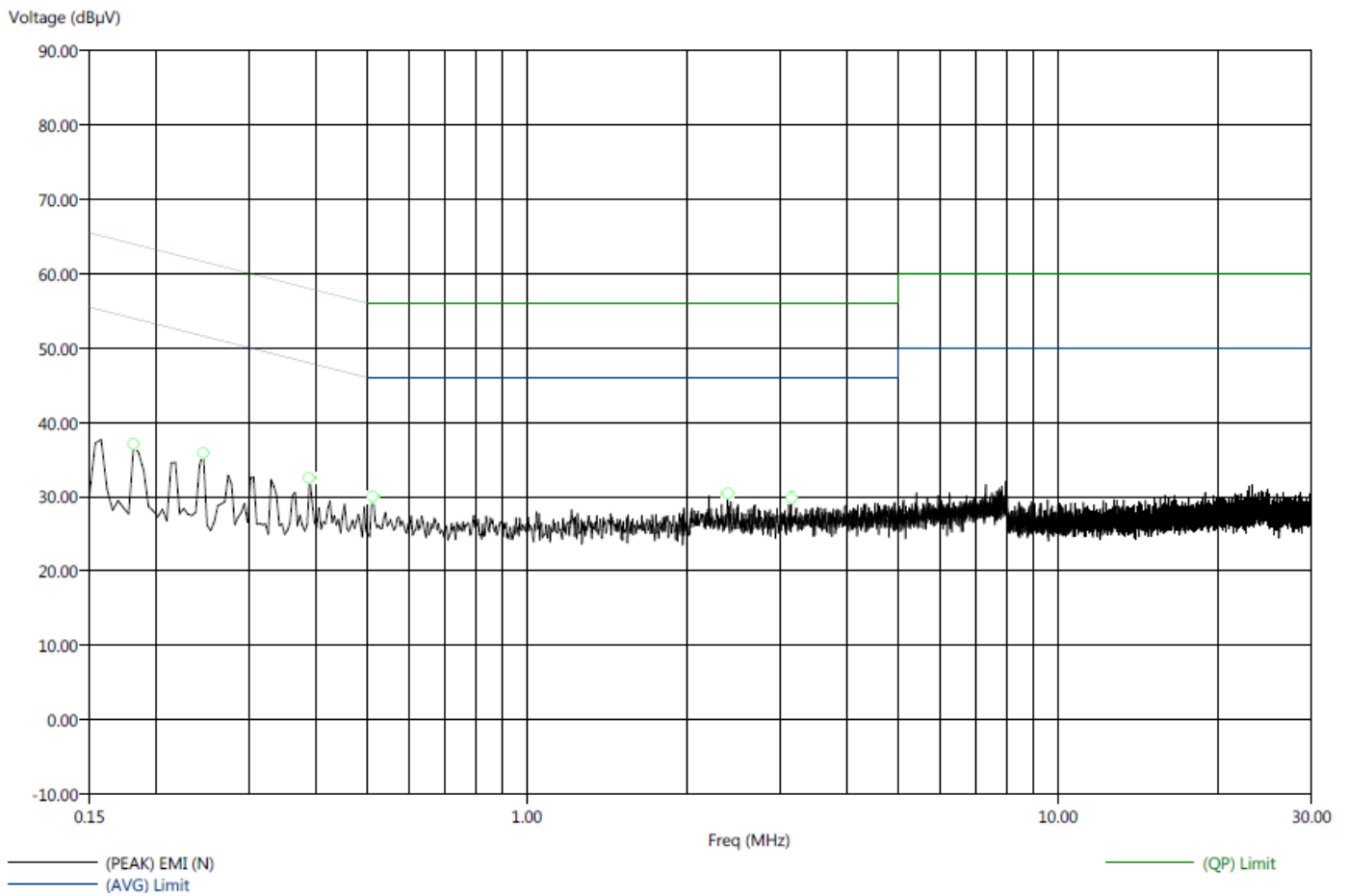
Compatible Electronics, Inc. FAC- 3 (LAB R)

Freq (MHz)	(AVG) Margin AVL (dB)	(QP) Margin QPL (dB)	(AVG) EMI (dBuV)	(QP) EMI (dBuV)	(PEAK) EMI (dBuV)	(AVG) Limit (dBuV)	(QP) Limit (dBuV)	Transducer (dB)	Cable (dB)
0.15	-43.39	-33.47	12.07	31.99	39.82	55.46	65.46	0.11	-0.01
0.18	-43.99	-33.01	10.13	31.10	37.47	54.11	64.11	0.09	0.00
0.27	-42.85	-33.68	7.99	27.16	32.59	50.84	60.84	0.07	0.02
0.30	-43.63	-34.01	6.33	25.96	31.11	49.96	59.96	0.07	0.02
0.54	-47.38	-39.62	-1.38	16.38	21.78	46.00	56.00	0.05	0.03
3.68	-52.63	-58.46	-6.63	-2.46	4.94	46.00	56.00	0.04	0.14



Title: FCC 15.207 9/8/2011 10:55:34 AM
 File: Conducted Pre-Neutral_TX.set Sequence: Preliminary Scan
 Operator: Matt Harrison
 EUT Type: TempLinc -- Thermostat with Humidity Sensor #2441TH
 EUT Condition: Continuously Transmitting 915MHz
 Comments:
 Temp: 70f
 Hum: 50%
 120V 60Hz

Compatible Electronics, Inc. FAC- 3 (LAB R)



Brea Division
 114 Olinda Drive
 Brea, CA 92823
 (714) 579-0500

Agoura Division
 2337 Troutdale Drive
 Agoura, CA 91301
 (818) 597-0600

Silverado Division
 19121 El Toro Road
 Silverado, CA 92676
 (949) 589-0700

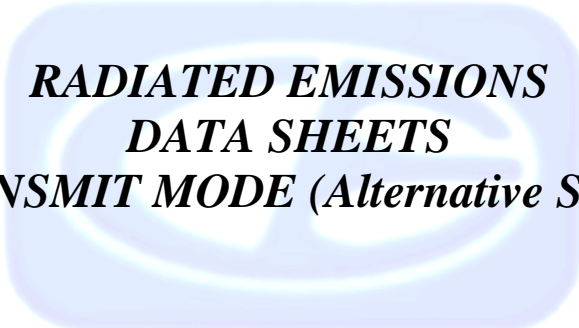
Lake Forest Division
 20621 Pascal Way
 Lake Forest, CA 92630
 (949) 587-0400

Title: FCC 15.207 9/8/2011 11:00:02 AM
 File: Conducted Final-Neutral_TX.set Sequence: Final Measurements
 Operator: Matt Harrison
 EUT Type: TempLinc -- Thermostat with Humidity Sensor #2441TH
 EUT Condition: Continuously Transmitting 915MHz
 Comments:
 Temp: 70f
 Hum: 50%
 120V 60Hz

Compatible Electronics, Inc. FAC- 3 (LAB R)

Freq (MHz)	(AVG) Margin AVL (dB)	(QP) Margin QPL (dB)	(AVG) EMI (dBuV)	(QP) EMI (dBuV)	(PEAK) EMI (dBuV)	(AVG) Limit (dBuV)	(QP) Limit (dBuV)	Transducer (dB)	Cable (dB)
0.18	-39.76	-33.81	14.17	30.13	37.84	53.94	63.94	0.03	0.01
0.25	-37.82	-33.75	13.75	27.82	34.08	51.57	61.57	0.03	0.01
0.39	-40.58	-36.09	7.38	21.86	27.81	47.95	57.95	0.02	0.02
0.51	-40.86	-39.25	5.14	16.75	23.31	46.00	56.00	0.03	0.03
2.39	-43.18	-49.83	2.82	6.17	14.91	46.00	56.00	0.03	0.12
3.15	-42.89	-49.12	3.11	6.88	16.07	46.00	56.00	0.04	0.14





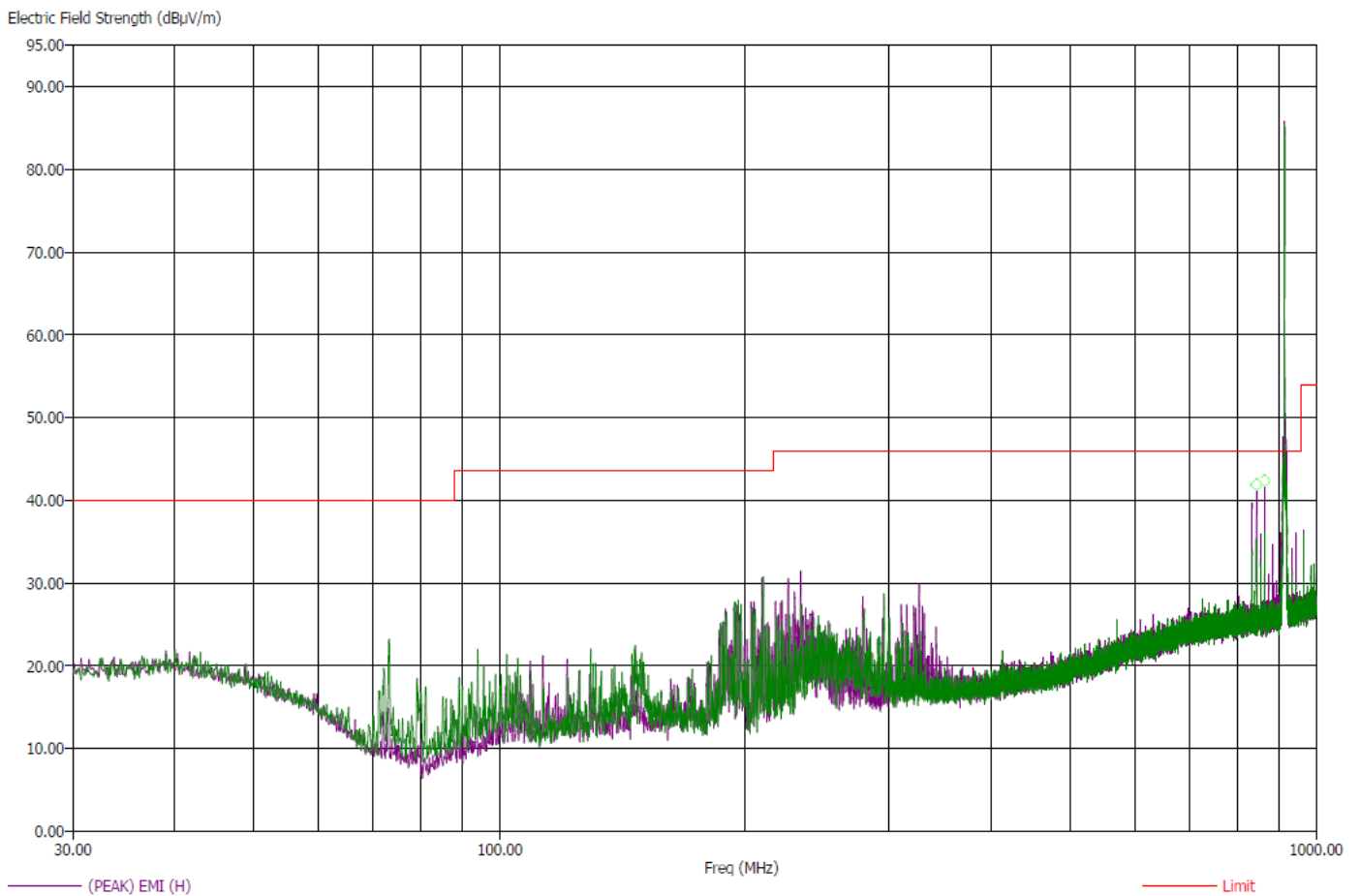
***RADIATED EMISSIONS
DATA SHEETS
TRANSMIT MODE (Alternative Setup)***



Title: FCC 15.209
File: Radiated Pre-scan 30-1000Mhz.set
Operator: Matt Harrison
EUT Type: TempLinc -- Thermostat with Humidity Sensor #2441TH
EUT Condition: Continuously Transmitting 915MHz (Alternative Setup)
Comments:
Temp: 70f
Hum: 50%
120V 60Hz

10/27/2011 3:05:25 PM
Sequence: Preliminary Scan

Compatible Electronics, Inc. FAC- 3 (LAB P)



Note: There were no radiated emissions found below 30 MHz or above 1GHz



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

Title: FCC 15.209 10/27/2011 3:29:35 PM
 File: Radiated Final 30-1000Mhz.set Sequence: Final Measurements
 Operator: Matt Harrison
 EUT Type: TempLinc -- Thermostat with Humidity Sensor #2441TH
 EUT Condition: Continuously Transmitting 915MHz (Alternative Setup)
 Comments:
 Temp: 70f
 Hum: 50%
 120V 60Hz

Compatible Electronics, Inc. FAC- 3 (LAB P)

Freq (MHz)	(QP) Margin (dB)	(QP) EMI (dBµV/m)	(PEAK) EMI (dBµV/m)	Limit (dBµV/m)	Pol	Ttbl Agl (deg)	Twr Ht (cm)	Transducer (dB)	Cable(dB)
845.20	-9.44	36.56	40.92	46.00	H	180	105	20.94	2.61
865.00	-8.87	37.13	41.21	46.00	H	180	105	21.00	2.66

Note: There were no radiated emissions found below 30 MHz or above 1GHz





***PEAK TRANSMIT EMI
&
HARMONICS
DATA SHEETS***



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

PEAK TRANSMIT EMI

FCC 15.249

SmartLabs
 Periodic Operation Device
 TempLinc
 Model: 2441TH

Date: 09/08/11
 Tested By: Matt Harrison
 Test Distance
 3 meter

915Mhz Transmitter

Compatible Electronics, Inc. FAC- 3 (LAB R)

Freq. (MHz)	Level (dBUV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
915	93.14	H	93.979	-0.839	Peak	1.06	10	
915	90.53	V	93.979	-3.449	Peak	1.06	95	

Note: All measurements are corrected.



VERTICAL HARMONIC EMISSIONS

FCC 15.249

SmartLabs
 Periodic Operation Device
 TempLinc
 Model: 2441TH

Date: 09/08/11
 Tested By: Matt Harrison
 Test distance:
 3 meter

915Mhz Transmitter

Compatible Electronics, Inc. FAC- 3 (LAB R)

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830		V	--	--	Peak			No Emission Found
1830		V	--	--	Avg			No Emission Found
2745		V	--	--	Peak			No Emission Found
2745		V	--	--	Avg			No Emission Found
3660		V	--	--	Peak			No Emission Found
3660		V	--	--	Avg			No Emission Found
4575		V	--	--	Peak			No Emission Found
4575		V	--	--	Avg			No Emission Found
5490		V	--	--	Peak			No Emission Found
5490		V	--	--	Avg			No Emission Found
6405		V	--	--	Peak			No Emission Found
6405		V	--	--	Avg			No Emission Found
7320		V	--	--	Peak			No Emission Found
7320		V	--	--	Avg			No Emission Found
8235		V	--	--	Peak			No Emission Found
8235		V	--	--	Avg			No Emission Found
9150		V	--	--	Peak			No Emission Found
9150		V	--	--	Avg			No Emission Found

Note: No emissions found = >20db delta.



HORIZONTAL HARMONIC EMISSIONS

FCC 15.249

SmartLabs
 Periodic Operation Device
 TempLinc
 Model: 2441TH

Date: 09/08/11
 Tested By: Matt Harrison
 Test distance:
 3 meter

915Mhz Transmitter

Compatible Electronics, Inc. FAC- 3 (LAB R)

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830		H	--	--	Peak			No Emission Found
1830		H	--	--	Avg			No Emission Found
2745		H	--	--	Peak			No Emission Found
2745		H	--	--	Avg			No Emission Found
3660		H	--	--	Peak			No Emission Found
3660		H	--	--	Avg			No Emission Found
4575		H	--	--	Peak			No Emission Found
4575		H	--	--	Avg			No Emission Found
5490		H	--	--	Peak			No Emission Found
5490		H	--	--	Avg			No Emission Found
6405		H	--	--	Peak			No Emission Found
6405		H	--	--	Avg			No Emission Found
7320		H	--	--	Peak			No Emission Found
7320		H	--	--	Avg			No Emission Found
8235		H	--	--	Peak			No Emission Found
8235		H	--	--	Avg			No Emission Found
9150		H	--	--	Peak			No Emission Found
9150		H	--	--	Avg			No Emission Found

Note: No emissions found = >20db delta.



VERTICAL HARMONIC EMISSIONS (ALTERNATIVE SETUP)

FCC 15.249

SmartLabs
 Periodic Operation Device
 TempLinc
 Model: 2441TH

Date: 10/28/11
 Tested By: Matt Harrison
 Test distance:
 3 meter

915Mhz Transmitter

Compatible Electronics, Inc. FAC- 3 (LAB R)

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830		V	--	--	Peak			No Emission Found
1830		V	--	--	Avg			No Emission Found
2745		V	--	--	Peak			No Emission Found
2745		V	--	--	Avg			No Emission Found
3660		V	--	--	Peak			No Emission Found
3660		V	--	--	Avg			No Emission Found
4575		V	--	--	Peak			No Emission Found
4575		V	--	--	Avg			No Emission Found
5490		V	--	--	Peak			No Emission Found
5490		V	--	--	Avg			No Emission Found
6405		V	--	--	Peak			No Emission Found
6405		V	--	--	Avg			No Emission Found
7320		V	--	--	Peak			No Emission Found
7320		V	--	--	Avg			No Emission Found
8235		V	--	--	Peak			No Emission Found
8235		V	--	--	Avg			No Emission Found
9150		V	--	--	Peak			No Emission Found
9150		V	--	--	Avg			No Emission Found

Note: No emissions found = >20db delta.



HORIZONTAL HARMONIC EMISSIONS (ALTERNATIVE SETUP)

FCC 15.249

SmartLabs
 Periodic Operation Device
 TempLinc
 Model: 2441TH

Date: 10/28/11
 Tested By: Matt Harrison
 Test distance:
 3 meter

915Mhz Transmitter

Compatible Electronics, Inc. FAC- 3 (LAB R)

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
1830		H	--	--	Peak			No Emission Found
1830		H	--	--	Avg			No Emission Found
2745		H	--	--	Peak			No Emission Found
2745		H	--	--	Avg			No Emission Found
3660		H	--	--	Peak			No Emission Found
3660		H	--	--	Avg			No Emission Found
4575		H	--	--	Peak			No Emission Found
4575		H	--	--	Avg			No Emission Found
5490		H	--	--	Peak			No Emission Found
5490		H	--	--	Avg			No Emission Found
6405		H	--	--	Peak			No Emission Found
6405		H	--	--	Avg			No Emission Found
7320		H	--	--	Peak			No Emission Found
7320		H	--	--	Avg			No Emission Found
8235		H	--	--	Peak			No Emission Found
8235		H	--	--	Avg			No Emission Found
9150		H	--	--	Peak			No Emission Found
9150		H	--	--	Avg			No Emission Found

Note: No emissions found = >20db delta.





***LOWER & UPPER
BAND EDGE***

DATA SHEETS



Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

LOWER & UPPER BAND EDGE EMISSIONS

FCC 15.249

SmartLabs
 Periodic Operation Device
 TempLinc
 Model: 2441TH

Date: 09/08/11
 Tested By: Matt Harrison
 Test distance:
 3 meter

915Mhz Transmitter

Compatible Electronics, Inc. FAC- 3 (LAB R)

Freq. (MHz)	Level (dBuV)	Pol (V/H)	Limit (dBuV)	Margin (dBuV)	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
899.72	42.68	V	46.00	-3.32	Peak			
939.45	44.01	V	46.00	-1.99	Peak			





***RADIATED AND CONDUCTED
EMISSIONS DATA SHEETS
RECIEVE ONLY MODE***



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Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

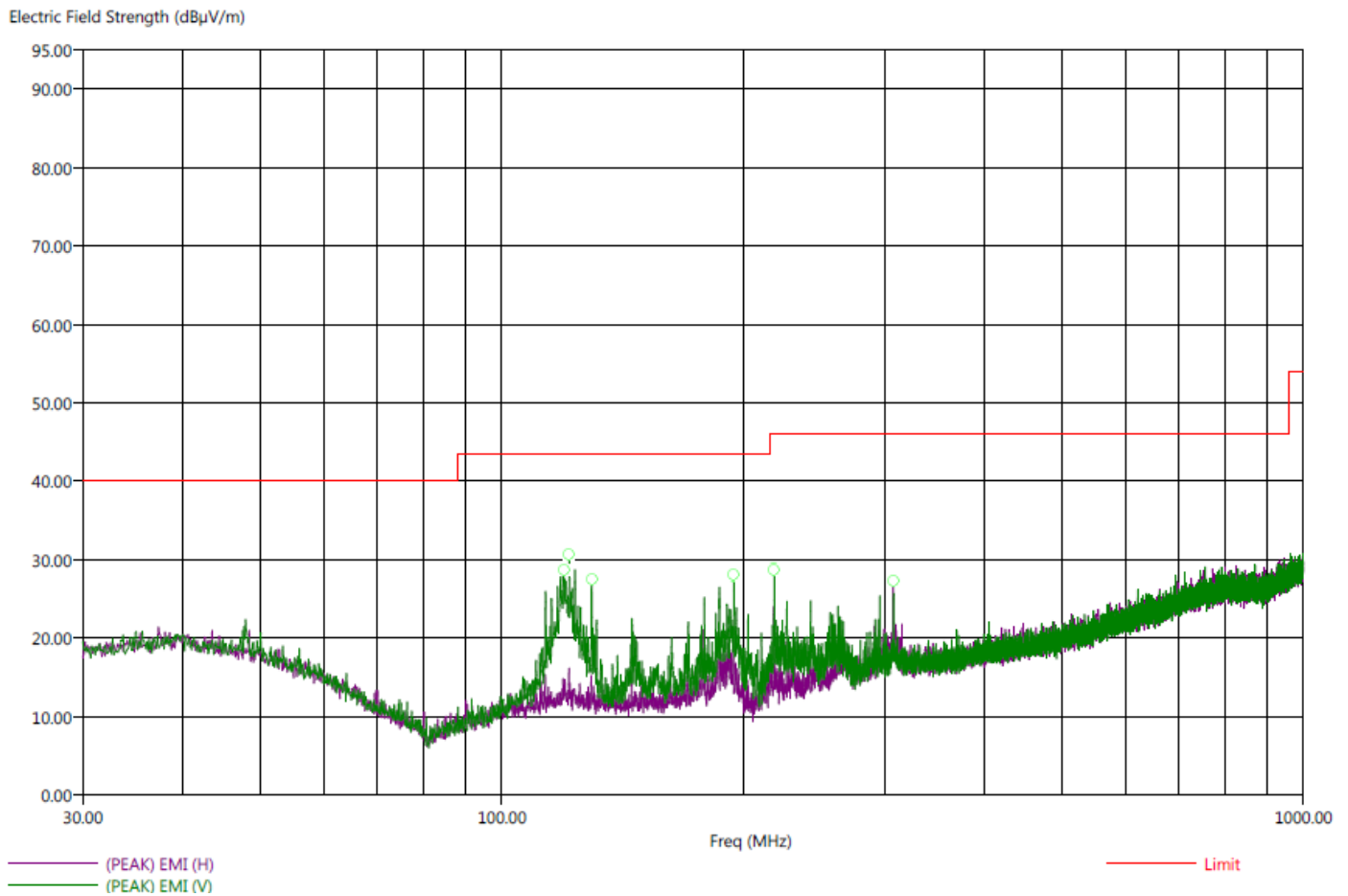
Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

Title: FCC 15.209
File: Radiated Pre-scan 30-1000Mhz_RX.set
Operator: Matt Harrison
EUT Type: TempLinc -- Thermostat with Humidity Sensor #2441TH
EUT Condition: RX Only
Comments:
Temp: 70f
Hum: 50%
120V 60Hz

9/8/2011 9:24:08 AM
Sequence: Preliminary Scan

Compatible Electronics, Inc. FAC- 3 (LAB R)



Note: There were no radiated emissions found below 30 MHz or above 1GHz



Title: FCC 15.209 9/8/2011 9:46:09 AM
 File: Radiated Final 30-1000Mhz_RX.set Sequence: Final Measurements
 Operator: Matt Harrison
 EUT Type: TempLinc -- Thermostat with Humidity Sensor #2441TH
 EUT Condition: RX Only
 Comments:
 Temp: 70f
 Hum: 50%
 120V 60Hz

Compatible Electronics, Inc. FAC- 3 (LAB R)

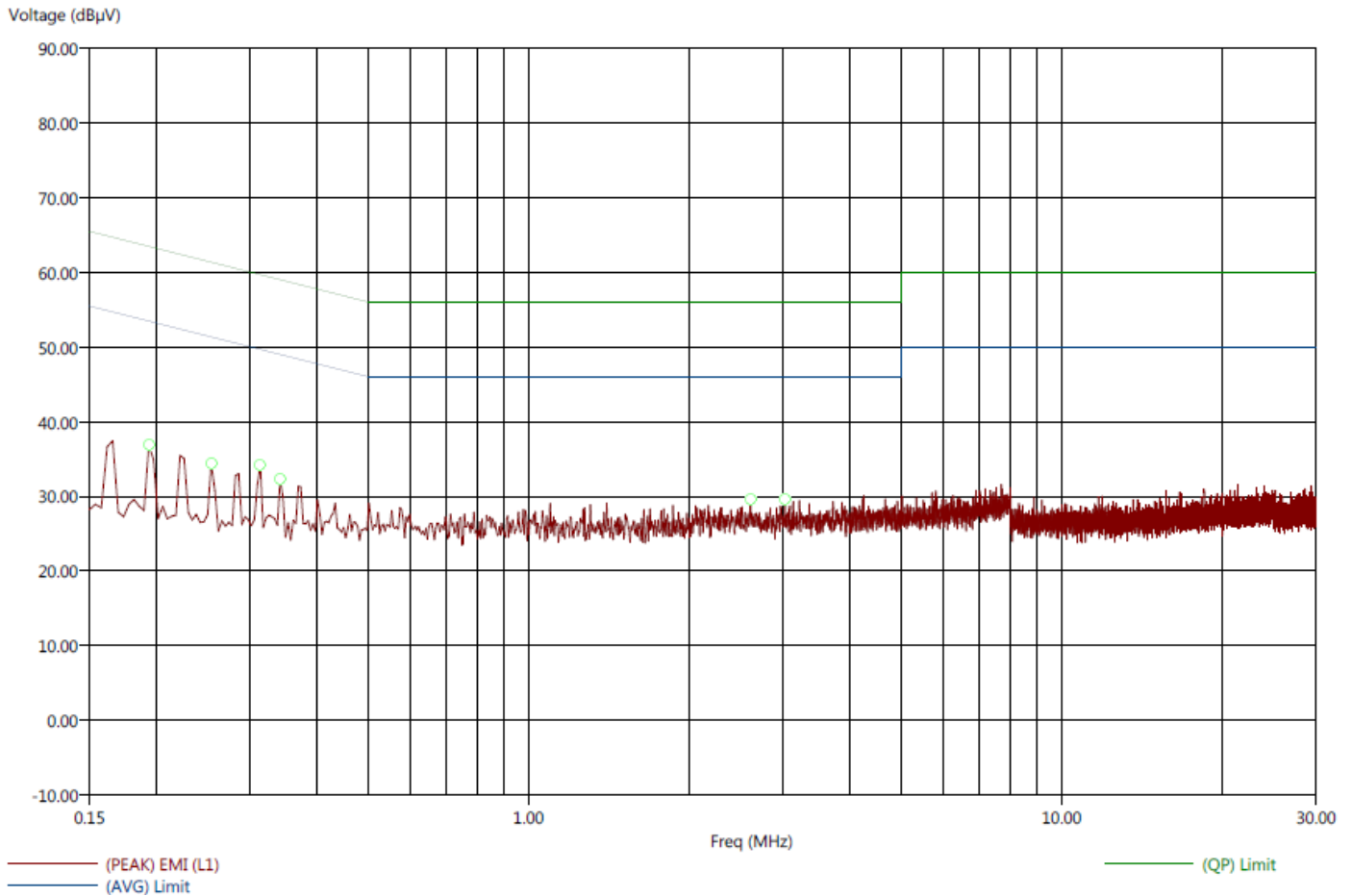
Freq (MHz)	(QP) Margin (dB)	(QP) EMI (dBµV/m)	(PEAK) EMI (dBµV/m)	Limit (dBµV/m)	Pol	Ttbl Agl (deg)	Twr Ht (cm)	Transducer(dB)	Cable(dB)
119.40	-12.68	30.84	32.88	43.52	V	190.25	101.85	9.37	1.15
121.40	-12.42	31.10	33.63	43.52	V	175.25	100.83	9.34	1.17
129.40	-16.94	26.58	28.80	43.52	V	188.00	110.80	9.00	1.21
194.90	-23.49	20.03	28.70	43.52	V	31.00	122.86	8.88	1.49
218.80	-19.73	26.27	30.11	46.00	V	24.75	104.77	10.10	1.62
307.70	-27.46	18.54	23.30	46.00	H	131.25	121.43	13.54	1.94

Note: There were no radiated emissions found below 30 MHz or above 1GHz



Title: FCC 15.207
File: Conducted Pre-Line_RX.set
Operator: Matt Harrison
EUT Type: TempLinc -- Thermostat with Humidity Sensor #2441TH
EUT Condition: RX Only
Comments:
Temp: 70f
Hum: 50%
120V 60Hz

9/8/2011 10:34:40 AM
Sequence: Preliminary Scan

Compatible Electronics, Inc. FAC- 3 (LAB R)

Brea Division
114 Olinda Drive
Brea, CA 92823
(714) 579-0500

Agoura Division
2337 Troutdale Drive
Agoura, CA 91301
(818) 597-0600

Silverado Division
19121 El Toro Road
Silverado, CA 92676
(949) 589-0700

Lake Forest Division
20621 Pascal Way
Lake Forest, CA 92630
(949) 587-0400

Title: FCC 15.207 9/8/2011 10:37:21 AM
 File: Conducted Final-Line_RX.set Sequence: Final Measurements
 Operator: Matt Harrison
 EUT Type: TempLinc -- Thermostat with Humidity Sensor #2441TH
 EUT Condition: RX Only
 Comments:
 Temp: 70f
 Hum: 50%
 120V 60Hz

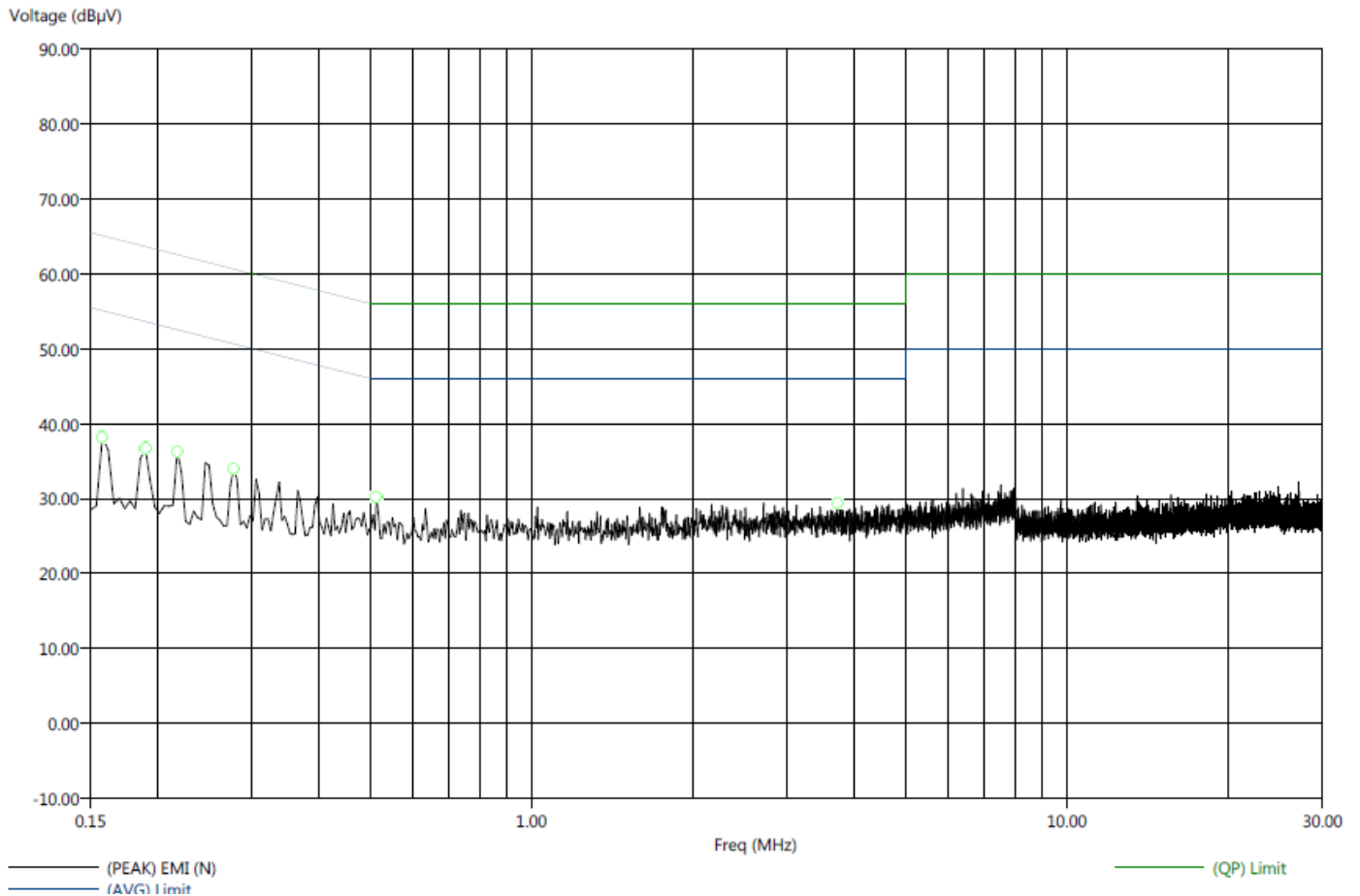
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Freq (MHz)	(AVG) Margin AVL (dB)	(QP) Margin QPL (dB)	(AVG) EMI (dBuV)	(QP) EMI (dBuV)	(PEAK) EMI (dBuV)	(AVG) Limit (dBuV)	(QP) Limit (dBuV)	Transducer (dB)	Cable (dB)
0.19	-45.41	-33.18	8.03	30.26	36.89	53.44	63.44	0.08	0.01
0.25	-45.31	-33.57	6.01	27.75	33.90	51.32	61.32	0.06	0.01
0.31	-45.97	-34.20	3.68	25.45	30.62	49.65	59.65	0.07	0.02
0.34	-46.74	-34.67	2.24	24.31	29.40	48.98	58.98	0.06	0.02
2.61	-52.96	-59.12	-6.96	-3.12	4.64	46.00	56.00	0.04	0.13
3.03	-52.66	-59.11	-6.66	-3.11	4.51	46.00	56.00	0.04	0.13



Title: FCC 15.207	9/8/2011 10:40:23 AM
File: Conducted Pre-Neutral_RX.set	Sequence: Preliminary Scan
Operator: Matt Harrison	
EUT Type: TempLinc -- Thermostat with Humidity Sensor #2441TH	
EUT Condition: RX Only	
Comments:	
Temp: 70f	
Hum: 50%	
120V 60Hz	

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 Brea, CA 92823
 (714) 579-0500

Agoura Division
 2337 Troutdale Drive
 Agoura, CA 91301
 (818) 597-0600

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 19121 El Toro Road
 Silverado, CA 92676
 (949) 589-0700

Lake Forest Division
 20621 Pascal Way
 Lake Forest, CA 92630
 (949) 587-0400

Title: FCC 15.207 9/8/2011 10:44:05 AM
 File: Conducted Final-Neutral_RX.set Sequence: Final Measurements
 Operator: Matt Harrison
 EUT Type: TempLinc -- Thermostat with Humidity Sensor #2441TH
 EUT Condition: RX Only
 Comments:
 Temp: 70f
 Hum: 50%
 120V 60Hz

Compatible Electronics, Inc. FAC- 3 (LAB R)

Freq (MHz)	(AVG) Margin AVL (dB)	(QP) Margin QPL (dB)	(AVG) EMI (dBuV)	(QP) EMI (dBuV)	(PEAK) EMI (dBuV)	(AVG) Limit (dBuV)	(QP) Limit (dBuV)	Transducer (dB)	Cable (dB)
0.16	-41.13	-33.55	13.92	31.50	38.85	55.05	65.05	0.06	-0.00
0.19	-39.72	-33.48	13.88	30.12	37.28	53.60	63.60	0.01	0.01
0.22	-39.06	-33.66	13.46	28.86	35.39	52.52	62.52	0.01	0.01
0.28	-38.96	-34.06	11.65	26.55	32.77	50.61	60.61	0.02	0.02
0.51	-41.39	-39.04	4.61	16.96	23.78	46.00	56.00	0.03	0.03
3.73	-42.69	-49.10	3.31	6.90	15.47	46.00	56.00	0.04	0.14

