

SmartLabs, Inc.

TEST REPORT FOR

In-Line Dual-Band Hardwired Light Dimming Module, 2475DA1

Tested To The Following Standards:

FCC Part 15 Subpart C Sections 15.207, 15.209, 15.249
and
RSS 210 Issue 8

Report No.: 92708-4

Date of issue: April 11, 2012



This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

SmartLabs, Inc.
16542 Millikan Ave.
Irvine, CA 92606

Representative: John Lockyer
Customer Reference Number: 12-3JL0117-03

DATE OF EQUIPMENT RECEIPT:

DATE(S) OF TESTING:

REPORT PREPARED BY:

Dianne Dudley
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 92708

April 3, 2012

April 3-9, 2012

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.



Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information



Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
110 Olinda Place
Brea, CA 92823

Site Registration & Accreditation Information

Location	CB #	Taiwan	Canada	FCC	Japan
Brea D	US0060	SL2-IN-E-1146R	3082D-2	100638	R-1256 C-1319 T-1660 G-255

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C Sections 15.207, 15.209, 15.249 and RSS 210 Issue 8

Description	Test Procedure/Method	Results
Voltage Variation	FCC Part 15 Subpart C Section 15.31(e)	Pass
AC Conducted Emissions	FCC Part 15 Subpart C Section 15.207 / ANSI C63.4 (2003)	Pass
RF Power Output	FCC Part 15 Subpart C Section 15.249(a)	Pass
Field Strength of Harmonics	FCC Part 15 Subpart C Section 15.249(b) / ANSI C63.4 (2003)	Pass
-20dBc Occupied Bandwidth	FCC Part 15 Subpart C	Pass
Bandedge	FCC Part 15 Subpart C	Pass
Field Strength of Spurious Emissions	FCC Part 15 Subpart C Section 15.249(d) / 15.209	Pass
99% Bandwidth	RSS 210 Issue 8	Pass

Conditions During Testing

This list is a summary of the conditions noted for or modifications made to the equipment during testing.

Summary of Conditions
None

EQUIPMENT UNDER TEST (EUT)

EQUIPMENT UNDER TEST

In-Line Dual-Band Hardwired Light Dimming Module

Manuf: SmartLabs, Inc.

Model: 2475DA1

Serial: 17.6D.72

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

100W Light Bulb

Manuf: Sylvania

Model: Double Life 64 Soft White

Serial: NA

Light Fixture

Manuf: SmartLabs, Inc.

Model: 738V

Serial: NA

FCC PART 15 SUBPART C

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) 47 CFR 15C requirements for Unlicensed Radio Frequency Devices, Subpart C - Intentional Radiators.

15.31(e) Voltage Variations

Test Conditions / Setup

The AC mains supply voltage was varied between 85% and 115% of the nominal rated supply voltage (120Vac). No change in the fundamental signal amplitude or frequency was observed.

Engineer Name: S. Yamamoto

Test Equipment					
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
02672	Spectrum Analyzer	E4446A	Agilent	080910	080912

Test Setup Photos



15.207 AC Conducted Emissions

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer: **SmartLabs, Inc.**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **92708** Date: 4/5/2012
 Test Type: **Conducted Emissions** Time: 15:44:57
 Equipment: **In-Line Dual-Band Hardwired Light Dimming Module** Sequence#: 7
 Manufacturer: SmartLabs, Inc. Tested By: S. Yamamoto
 Model: 2475DA1 120V 60Hz
 S/N: 17.6D.72

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	2/12/2011	2/12/2013
T1	AN02343	High Pass Filter	HE9615-150K-50-720B	1/4/2011	1/4/2013
T2	ANP01910	Cable	RG-142	2/6/2012	2/6/2014
T3	ANP06085	Attenuator	SA18N10W-09	12/8/2010	12/8/2012
T4	AN02128	50uH LISN-L1 (dB)	3816/2NM	8/1/2011	8/1/2013
	AN02128	50uH LISN-L2 (dB)	3816/2NM	8/1/2011	8/1/2013

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
In-Line Dual-Band Hardwired Light Dimming Module*	SmartLabs, Inc.	2475DA1	17.6D.72

Support Devices:

Function	Manufacturer	Model #	S/N
100W Light bulb	Sylvania	Double Life 64 Soft White	NA
Light fixture	SmartLabs, Inc.	738V	NA

Test Conditions / Notes:

The equipment under test (EUT) is placed on the table top. The support equipment is located adjacent to the EUT. The EUT is ceiling mounted device. The EUT ground wire is connected to earth ground. The EUT is continuously transmitting. RF Output set to -3dB below the maximum setting. Transmit frequency is 915 MHz. Frequency range of measurement: 150kHz to 30MHz, RBW=9kHz=VBW. Temperature: 19°C, Humidity: 39%, Pressure: 100kPa

Ext Attn: 0 dB

Measurement Data:

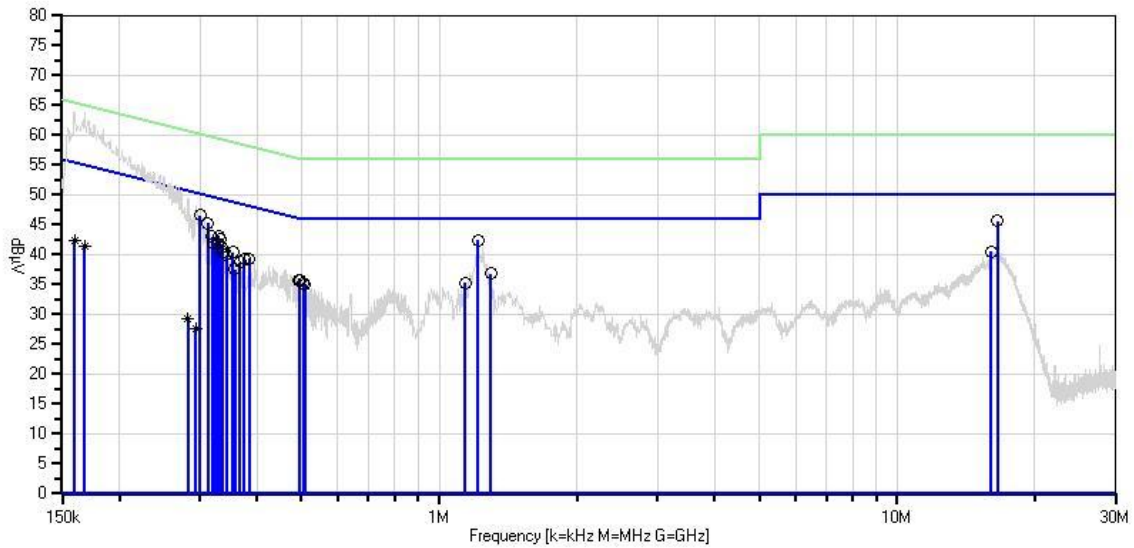
Reading listed by margin.

Test Lead: L1(L)

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	300.532k	40.6	+0.2	+0.1	+5.7	+0.0	+0.0	46.6	50.2	-3.6	L1(L)
2	1.213M	36.2	+0.3	+0.1	+5.7	+0.1	+0.0	42.4	46.0	-3.6	L1(L)
3	16.589M	38.4	+0.3	+0.4	+5.7	+0.9	+0.0	45.7	50.0	-4.3	L1(L)
4	312.167k	39.3	+0.2	+0.1	+5.7	+0.0	+0.0	45.3	49.9	-4.6	L1(L)
5	329.620k	37.1	+0.2	+0.1	+5.7	+0.0	+0.0	43.1	49.5	-6.4	L1(L)
6	318.712k	37.0	+0.2	+0.1	+5.7	+0.0	+0.0	43.0	49.7	-6.7	L1(L)
7	331.802k	36.6	+0.2	+0.1	+5.7	+0.0	+0.0	42.6	49.4	-6.8	L1(L)
8	327.438k	36.0	+0.2	+0.1	+5.7	+0.0	+0.0	42.0	49.5	-7.5	L1(L)
9	320.893k	36.0	+0.2	+0.1	+5.7	+0.0	+0.0	42.0	49.7	-7.7	L1(L)
10	335.438k	35.2	+0.2	+0.1	+5.7	+0.0	+0.0	41.2	49.3	-8.1	L1(L)
11	354.345k	34.4	+0.2	+0.1	+5.7	+0.0	+0.0	40.4	48.9	-8.5	L1(L)
12	384.160k	33.4	+0.2	+0.1	+5.7	+0.0	+0.0	39.4	48.2	-8.8	L1(L)
13	336.892k	34.4	+0.2	+0.1	+5.7	+0.0	+0.0	40.4	49.3	-8.9	L1(L)
14	375.434k	33.4	+0.2	+0.1	+5.7	+0.0	+0.0	39.4	48.4	-9.0	L1(L)
15	1.294M	30.7	+0.3	+0.1	+5.7	+0.1	+0.0	36.9	46.0	-9.1	L1(L)
16	342.710k	33.9	+0.2	+0.1	+5.7	+0.0	+0.0	39.9	49.1	-9.2	L1(L)
17	16.067M	33.3	+0.3	+0.4	+5.7	+0.8	+0.0	40.5	50.0	-9.5	L1(L)
18	366.707k	32.8	+0.2	+0.1	+5.7	+0.0	+0.0	38.8	48.6	-9.8	L1(L)
19	493.241k	29.6	+0.3	+0.1	+5.7	+0.0	+0.0	35.7	46.1	-10.4	L1(L)
20	495.423k	29.5	+0.3	+0.1	+5.7	+0.0	+0.0	35.6	46.1	-10.5	L1(L)
21	504.877k	29.2	+0.3	+0.1	+5.7	+0.0	+0.0	35.3	46.0	-10.7	L1(L)
22	1.141M	29.1	+0.3	+0.1	+5.7	+0.1	+0.0	35.3	46.0	-10.7	L1(L)
23	507.785k	29.0	+0.3	+0.1	+5.7	+0.0	+0.0	35.1	46.0	-10.9	L1(L)
24	357.981k	31.6	+0.2	+0.1	+5.7	+0.0	+0.0	37.6	48.8	-11.2	L1(L)

25	159.454k	35.9	+0.6	+0.1	+5.7	+0.0	+0.0	42.3	55.5	-13.2	L1(L)
Ave											
^	159.454k	57.5	+0.6	+0.1	+5.7	+0.0	+0.0	63.9	55.5	+8.4	L1(L)
		average data above									
27	168.180k	35.3	+0.4	+0.1	+5.7	+0.0	+0.0	41.5	55.0	-13.5	L1(L)
Ave											
^	168.180k	57.5	+0.4	+0.1	+5.7	+0.0	+0.0	63.7	55.0	+8.7	L1(L)
		average data above									
29	282.351k	23.3	+0.2	+0.1	+5.7	+0.0	+0.0	29.3	50.7	-21.4	L1(L)
Ave											
^	282.351k	43.6	+0.2	+0.1	+5.7	+0.0	+0.0	49.6	50.7	-1.1	L1(L)
		average data above									
^	286.715k	40.8	+0.2	+0.1	+5.7	+0.0	+0.0	46.8	50.6	-3.8	L1(L)
32	293.987k	21.5	+0.2	+0.1	+5.7	+0.0	+0.0	27.5	50.4	-22.9	L1(L)
Ave											
^	293.987k	42.1	+0.2	+0.1	+5.7	+0.0	+0.0	48.1	50.4	-2.3	L1(L)
		average data above									
^	289.624k	40.3	+0.2	+0.1	+5.7	+0.0	+0.0	46.3	50.5	-4.2	L1(L)

CKC Laboratories, Inc. Date: 4/5/2012 Time: 15:44:57 SmartLabs, Inc. WO#: 92708
 15.207 AC Mains - Average Test Lead: L1(L) 120V 60Hz Sequence#: 7 Ext ATTN: 0 dB



— Sweep Data
 ○ Peak Readings
 * Average Readings
 — 1 - 15.207 AC Mains - Average
 — Readings
 × QP Readings
 ▼ Ambient
 — 2 - 15.207 AC Mains - Quasi-peak

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer: **SmartLabs, Inc.**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **92708** Date: 4/5/2012
 Test Type: **Conducted Emissions** Time: 15:51:27
 Equipment: **In-Line Dual-Band Hardwired Light Dimming Module** Sequence#: 8
 Manufacturer: SmartLabs, Inc. Tested By: S. Yamamoto
 Model: 2475DA1 120V 60Hz
 S/N: 17.6D.72

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	2/12/2011	2/12/2013
T1	AN02343	High Pass Filter	HE9615-150K-50-720B	1/4/2011	1/4/2013
T2	ANP01910	Cable	RG-142	2/6/2012	2/6/2014
T3	ANP06085	Attenuator	SA18N10W-09	12/8/2010	12/8/2012
	AN02128	50uH LISN-L1 (dB)	3816/2NM	8/1/2011	8/1/2013
T4	AN02128	50uH LISN-L2 (dB)	3816/2NM	8/1/2011	8/1/2013

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
In-Line Dual-Band Hardwired Light Dimming Module*	SmartLabs, Inc.	2475DA1	17.6D.72

Support Devices:

Function	Manufacturer	Model #	S/N
100W Light bulb	Sylvania	Double Life 64 Soft White	NA
Light fixture	SmartLabs, Inc.	738V	NA

Test Conditions / Notes:

The equipment under test (EUT) is placed on the table top. The support equipment is located adjacent to the EUT. The EUT is ceiling mounted device. The EUT ground wire is connected to earth ground. The EUT is continuously transmitting. RF Output set to -3dB below the maximum setting. Transmit frequency is 915 MHz. Frequency range of measurement: 150kHz to 30MHz, RBW=9kHz=VBW.
 Temperature: 19°C, Humidity: 39%, Pressure: 100kPa

Ext Attn: 0 dB

Measurement Data:

Reading listed by margin.

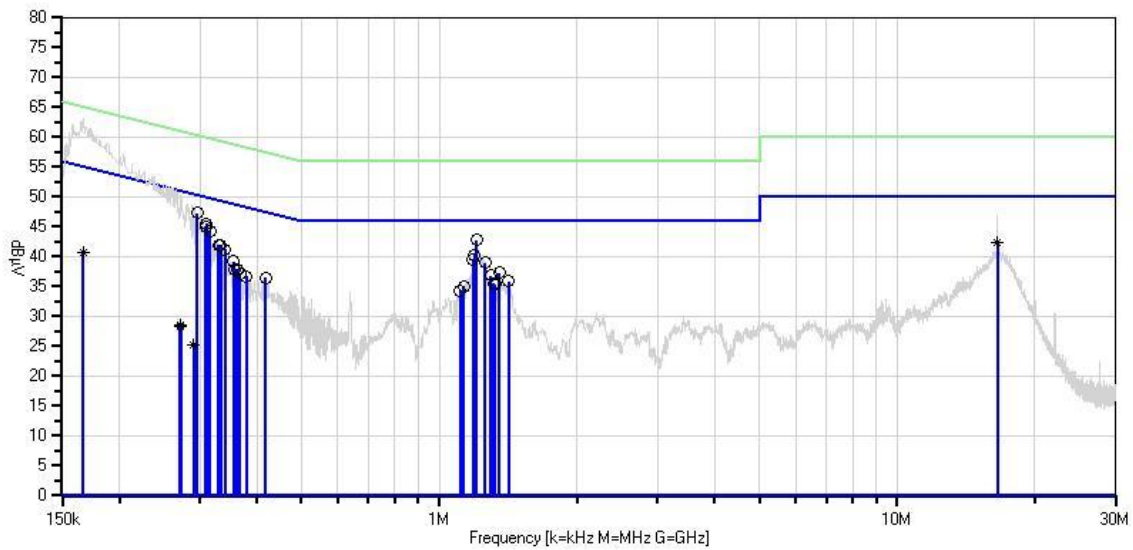
Test Lead: (N) L2

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	295.440k	41.3	+0.2	+0.1	+5.7	+0.0	+0.0	47.3	50.4	-3.1	(N) L
2	1.205M	36.6	+0.3	+0.1	+5.7	+0.1	+0.0	42.8	46.0	-3.2	(N) L
3	309.984k	39.5	+0.2	+0.1	+5.7	+0.0	+0.0	45.5	50.0	-4.5	(N) L
4	308.530k	39.0	+0.2	+0.1	+5.7	+0.0	+0.0	45.0	50.0	-5.0	(N) L
5	315.802k	38.3	+0.2	+0.1	+5.7	+0.0	+0.0	44.3	49.8	-5.5	(N) L
6	1.192M	34.1	+0.3	+0.1	+5.7	+0.1	+0.0	40.3	46.0	-5.7	(N) L

7	1.183M	33.4	+0.3	+0.1	+5.7	+0.1	+0.0	39.6	46.0	-6.4	(N) L
8	1.260M	32.8	+0.3	+0.1	+5.7	+0.1	+0.0	39.0	46.0	-7.0	(N) L
9	329.619k	36.0	+0.2	+0.1	+5.7	+0.0	+0.0	42.0	49.5	-7.5	(N) L
10	16.589M	34.9	+0.3	+0.4	+5.7	+1.1	+0.0	42.4	50.0	-7.6	(N) L
^	16.589M	39.6	+0.3	+0.4	+5.7	+1.1	+0.0	47.1	50.0	-2.9	(N) L
									see average data above		
12	332.528k	35.8	+0.2	+0.1	+5.7	+0.0	+0.0	41.8	49.4	-7.6	(N) L
13	339.800k	35.2	+0.2	+0.1	+5.7	+0.0	+0.0	41.2	49.2	-8.0	(N) L
14	1.354M	31.1	+0.3	+0.1	+5.7	+0.1	+0.0	37.3	46.0	-8.7	(N) L
15	1.294M	30.7	+0.3	+0.1	+5.7	+0.1	+0.0	36.9	46.0	-9.1	(N) L
16	355.798k	33.2	+0.2	+0.1	+5.7	+0.0	+0.0	39.2	48.8	-9.6	(N) L
17	1.417M	29.8	+0.2	+0.1	+5.7	+0.1	+0.0	35.9	46.0	-10.1	(N) L
18	1.315M	29.3	+0.3	+0.1	+5.7	+0.1	+0.0	35.5	46.0	-10.5	(N) L
19	1.324M	29.2	+0.3	+0.1	+5.7	+0.1	+0.0	35.4	46.0	-10.6	(N) L
20	362.343k	31.9	+0.2	+0.1	+5.7	+0.0	+0.0	37.9	48.7	-10.8	(N) L
21	1.132M	28.9	+0.3	+0.1	+5.7	+0.1	+0.0	35.1	46.0	-10.9	(N) L
22	357.980k	31.8	+0.2	+0.1	+5.7	+0.0	+0.0	37.8	48.8	-11.0	(N) L
23	417.611k	30.4	+0.3	+0.1	+5.7	+0.0	+0.0	36.5	47.5	-11.0	(N) L
24	367.434k	31.1	+0.2	+0.1	+5.7	+0.0	+0.0	37.1	48.6	-11.5	(N) L
25	378.342k	30.7	+0.2	+0.1	+5.7	+0.0	+0.0	36.7	48.3	-11.6	(N) L
26	1.111M	28.0	+0.3	+0.1	+5.7	+0.1	+0.0	34.2	46.0	-11.8	(N) L
27	166.725k	34.4	+0.4	+0.1	+5.7	+0.0	+0.0	40.6	55.1	-14.5	(N) L
^	166.725k	56.9	+0.4	+0.1	+5.7	+0.0	+0.0	63.1	55.1	+8.0	(N) L
									see average data above		
29	271.442k	22.6	+0.2	+0.1	+5.7	+0.0	+0.0	28.6	51.1	-22.5	(N) L
30	272.897k	22.3	+0.2	+0.1	+5.7	+0.0	+0.0	28.3	51.0	-22.7	(N) L

^	272.897k	44.4	+0.2	+0.1	+5.7	+0.0	+0.0	50.4	51.0	-0.6	(N) L
									see average data above		
^	271.442k	44.2	+0.2	+0.1	+5.7	+0.0	+0.0	50.2	51.1	-0.9	(N) L
									see average data above		
33	290.350k	19.2	+0.2	+0.1	+5.7	+0.0	+0.0	25.2	50.5	-25.3	(N) L
	Ave										
^	290.350k	42.3	+0.2	+0.1	+5.7	+0.0	+0.0	48.3	50.5	-2.2	(N) L
									see average data above		
^	293.259k	39.9	+0.2	+0.1	+5.7	+0.0	+0.0	45.9	50.4	-4.5	(N) L

CKC Laboratories, Inc. Date: 4/5/2012 Time: 15:51:27 SmartLabs, Inc. WO#: 92708
 15.207 AC Mains - Average Test Lead: (N) L2 120V 60Hz Sequence#: 8 Ext ATTN: 0 dB



- Sweep Data
- Peak Readings
- * Average Readings
- 1 - 15.207 AC Mains - Average
- Readings
- × QP Readings
- ▼ Ambient
- 2 - 15.207 AC Mains - Quasi-peak

Test Setup Photos



15.249(a) RF Power Output

Test Data

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer: **SmartLabs, Inc.**
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
 Work Order #: **92708** Date: 4/5/2012
 Test Type: **Maximized Emissions** Time: 10:25:36
 Equipment: **In-Line Dual-Band Hardwired Light Dimming Module** Sequence#: 1
 Manufacturer: SmartLabs, Inc. Tested By: S. Yamamoto
 Model: 2475DA1
 S/N: 17.6D.72

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP04382	Cable	LDF-50	9/3/2010	9/3/2012
T2	ANP05569	Cable	RG-214/U	8/18/2010	8/18/2012
	AN02869	Spectrum Analyzer	E4440A	2/12/2011	2/12/2013
T3	AN01992	Biconilog Antenna	CBL6111C	12/23/2010	12/23/2012

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
In-Line Dual-Band Hardwired Light Dimming Module*	SmartLabs, Inc.	2475DA1	17.6D.72

Support Devices:

Function	Manufacturer	Model #	S/N
100W Light bulb	Sylvania	Double Life 64 Soft White	NA
Light fixture	SmartLabs, Inc.	738V	NA

Test Conditions / Notes:

The equipment under test (EUT) is placed on the Styrofoam table top. The support equipment is located adjacent to the EUT. The EUT is ceiling mounted device. The light bulb brightness level is set to maximum. The EUT ground wire is connected to earth ground. The EUT is continuously transmitting. Voltage to EUT is 120Vac 60Hz. RF Output set to -3dB below the maximum setting. Transmit frequency is 915 MHz. Frequency range of measurement = 914.8MHz to 915.2MHz. RBW=120 kHz, VBW=120 kHz. Temperature: 18°C, Humidity: 39%, Pressure: 100kPa

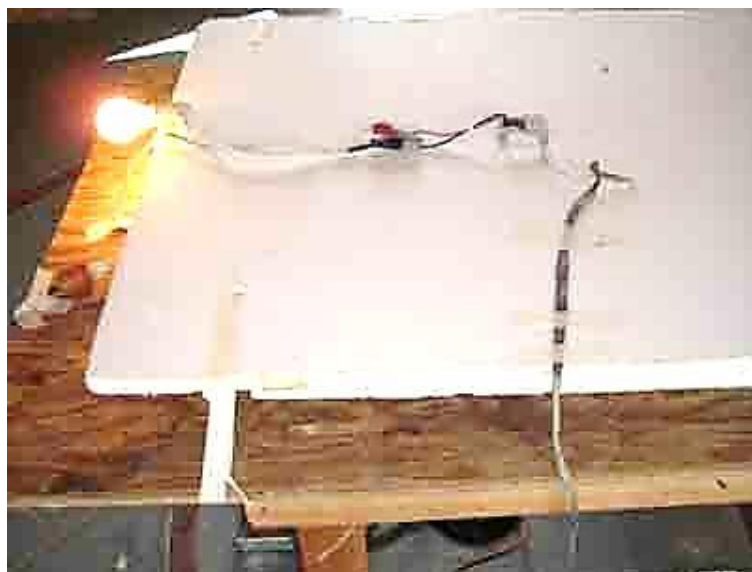
Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	Dist Table dB	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	914.915M	60.5	+3.3	+4.1	+23.6	+0.0	91.5	94.0	-2.5	Horiz
	QP									
^	914.915M	61.0	+3.3	+4.1	+23.6	+0.0	92.0	94.0	-2.0	Horiz
3	915.078M	60.5	+3.3	+4.1	+23.6	+0.0	91.5	94.0	-2.5	Horiz
	QP									
^	915.078M	61.0	+3.3	+4.1	+23.6	+0.0	92.0	94.0	-2.0	Horiz

5	914.926M	60.3	+3.3	+4.1	+23.6	+0.0	91.3	94.0	-2.7	Vert
6	915.112M	60.2	+3.3	+4.1	+23.6	+0.0	91.2	94.0	-2.8	Vert

Test Setup Photos



15.249(b) Field Strength of Harmonics

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer: **SmartLabs, Inc.**

Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**

Work Order #: **92708** Date: 4/5/2012

Test Type: **Maximized Emissions** Time: 13:39:34

Equipment: **In-Line Dual-Band Hardwired Light Dimming Module** Sequence#: 3

Manufacturer: SmartLabs, Inc. Tested By: S. Yamamoto

Model: 2475DA1

S/N: 17.6D.72

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP04382	Cable	LDF-50	9/3/2010	9/3/2012
	ANP05569	Cable	RG-214/U	8/18/2010	8/18/2012
	AN02869	Spectrum Analyzer	E4440A	2/12/2011	2/12/2013
	AN01992	Biconilog Antenna	CBL6111C	12/23/2010	12/23/2012
	AN00010	Preamp	8447D	3/29/2012	3/29/2014
	ANP05555	Cable	RG223/U	8/18/2010	8/18/2012
	AN00314	Loop Antenna	6502	6/30/2010	6/30/2012
T2	AN02947	Cable	32022-29094K-29094K-72TC	8/8/2011	8/8/2013
T3	AN00787	Preamp	83017A	4/8/2011	4/8/2013
	AN02113	Horn Antenna-SAE ARP958	3115	1/17/2011	1/17/2013
T4	AN02113	Horn Antenna-ANSI C63.5	3115	1/17/2011	1/17/2013
T5	ANP05988	Cable	LDF1-50	3/12/2012	3/12/2014

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
In-Line Dual-Band Hardwired Light Dimming Module*	SmartLabs, Inc.	2475DA1	17.6D.72

Support Devices:

Function	Manufacturer	Model #	S/N
100W Light bulb	Sylvania	Double Life 64 Soft White	NA
Light fixture	SmartLabs, Inc.	738V	NA

Test Conditions / Notes:

The equipment under test (EUT) is placed on the Styrofoam table top. The support equipment is located adjacent to the EUT. The EUT is ceiling mounted device. The light bulb brightness level is set to maximum. The EUT ground wire is connected to earth ground.

The EUT is continuously transmitting. Voltage to EUT is 120Vac 60Hz. RF Output set to -3dB below the maximum setting. Transmit frequency is 915 MHz. Frequency range of measurement: 9kHz to 10GHz. 9kHz to 150kHz, RBW=200 Hz=VBW. 150kHz to 30MHz, RBW=9kHz=VBW. 30MHz to 1000MHz, RBW=120kHz=VBW. 1000MHz to 10000MHz, RBW=1MHz=VBW.

Temperature: 18°C, Humidity: 39%, Pressure: 100kPa

Ext Attn: 0 dB

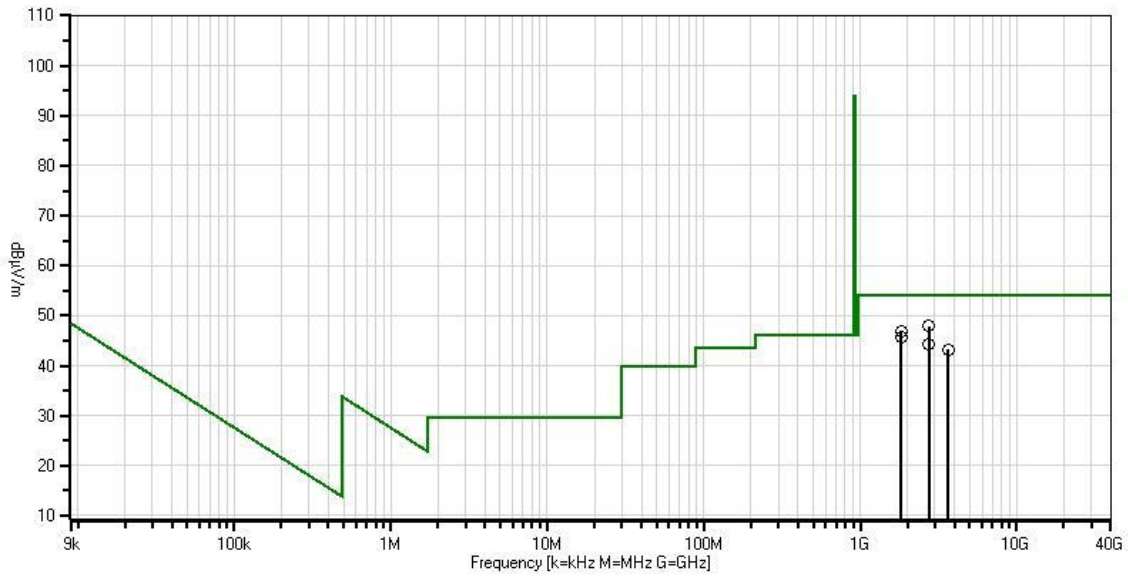
Measurement Data:

Reading listed by margin.

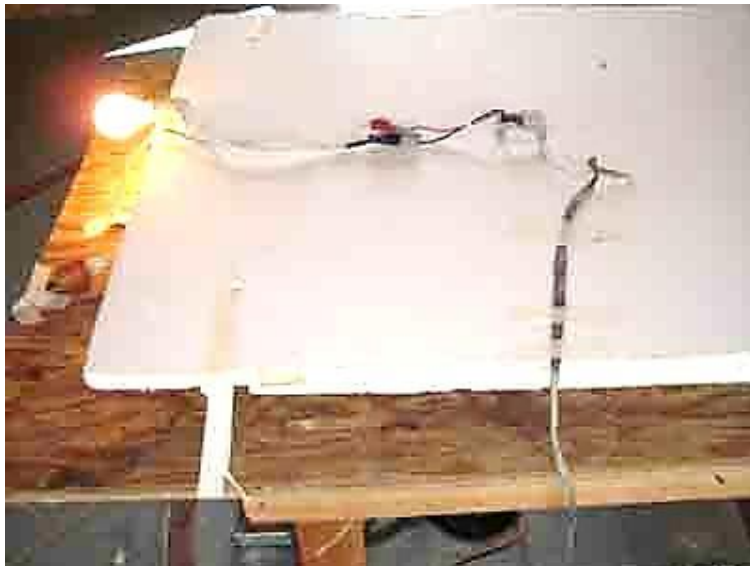
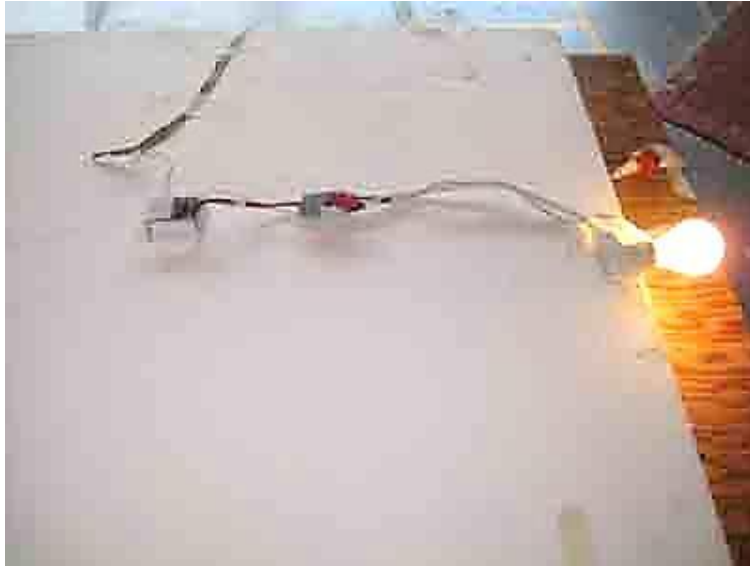
Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	2745.233M	47.4	+6.3 +4.4	+0.5	-39.7	+29.0	+0.0	47.9	54.0	-6.1	Horiz
2	1830.113M	51.6	+4.9 +3.5	+0.4	-39.4	+25.7	+0.0	46.7	54.0	-7.3	Vert
3	1829.703M	50.6	+4.9 +3.5	+0.4	-39.4	+25.7	+0.0	45.7	54.0	-8.3	Horiz
4	2744.962M	43.9	+6.3 +4.4	+0.5	-39.7	+29.0	+0.0	44.4	54.0	-9.6	Vert
5	3660.403M	37.4	+7.0 +5.1	+0.6	-39.7	+32.8	+0.0	43.2	54.0	-10.8	Vert
6	3659.578M	37.4	+7.0 +5.1	+0.6	-39.7	+32.8	+0.0	43.2	54.0	-10.8	Horiz

CKC Laboratories, Inc. Date: 4/5/2012 Time: 13:39:34 SmartLabs, Inc. WO#: 92708
 15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter) Test Distance: 3 Meters Sequence#: 3 Ext
 ATTN: 0 dB



Test Setup Photos



-20dBc Occupied Bandwidth

Test Conditions / Setup

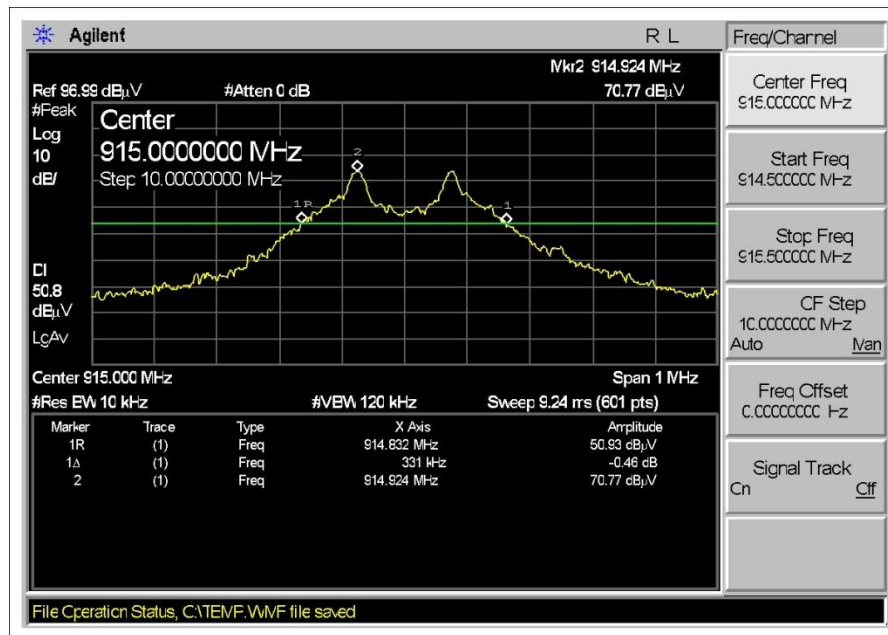
The equipment under test (EUT) is placed on the Styrofoam table top. The support equipment is located adjacent to the EUT. The light bulb brightness level is set to maximum. The EUT ground wire is connected to earth ground. The EUT is continuously transmitting. Voltage to EUT is 120Vac 60Hz. RF Output set to -3dB below the maximum setting. Transmit frequency is 915 MHz. Frequency range of measurement: 914.5MHz to 915.5MHz. RBW=10kHz, 120kHz=VBW.

Temperature: 18°C,
Relative Humidity: 39%,
Pressure: 100kPa

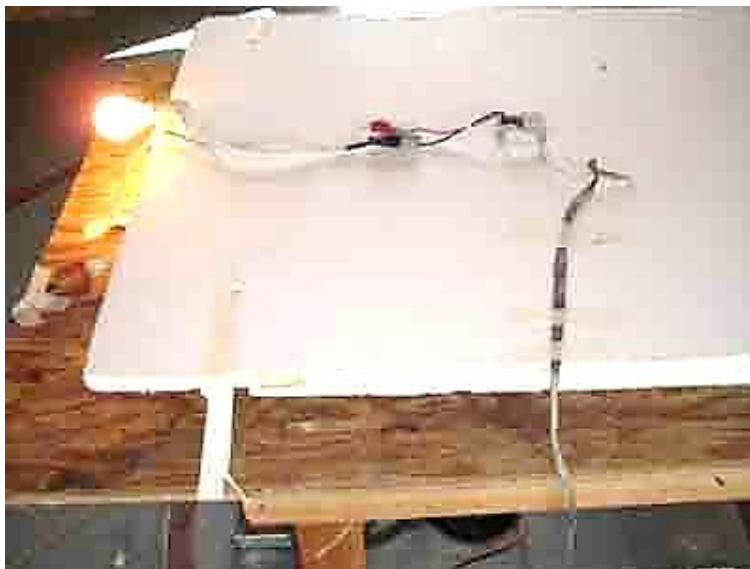
Engineer Name: S. Yamamoto

Test Equipment					
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
ANP04382	Cable	LDF-50	Andrew	9/3/2010	9/3/2012
ANP05569	Cable	RG-214/U	Pasternack	8/18/2010	8/18/2012
AN02869	Spectrum Analyzer	E4440A	Agilent	2/12/2011	2/12/2013
AN01992	Biconilog Antenna	CBL6111C	Chase	12/23/2010	12/23/2012
AN00010	Preamplifier	8447D	HP	3/29/2012	3/29/2014
ANP05555	Cable	RG223/U	Pasternack	8/18/2010	8/18/2012

Test Plots



Test Setup Photos



Bandedge

Test Conditions / Setup

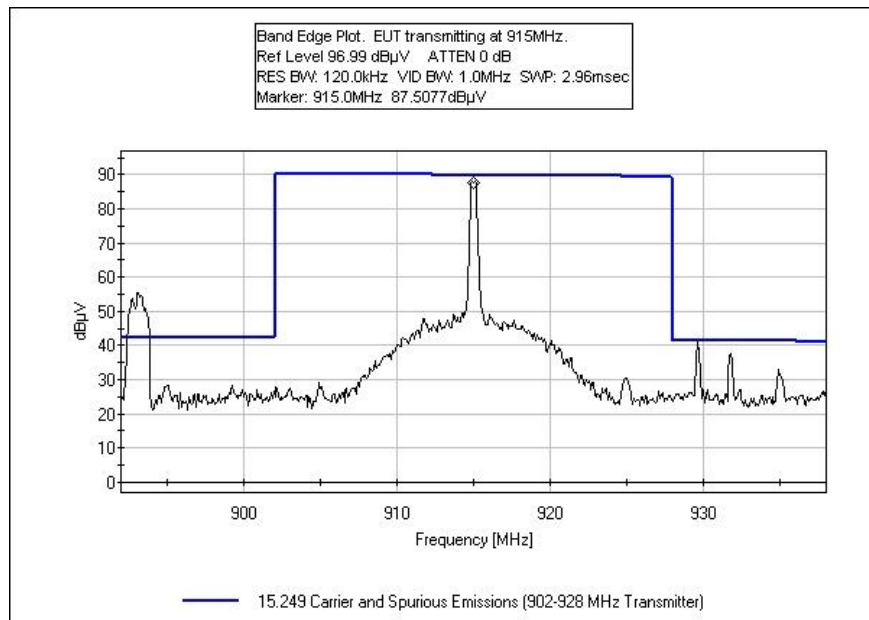
The equipment under test (EUT) is placed on the Styrofoam table top. The support equipment is located adjacent to the EUT. The light bulb brightness level is set to maximum. The EUT ground wire is connected to earth ground. The EUT is continuously transmitting. Voltage to EUT is 120Vac 60Hz. RF Output set to -3dB below the maximum setting. Transmit frequency is 915 MHz. Frequency range of measurement: 892MHz to 938MHz. RBW=120kHz, 1MHz=VBW.

Temperature: 18°C
 Relative Humidity: 39%
 Pressure: 100kPa

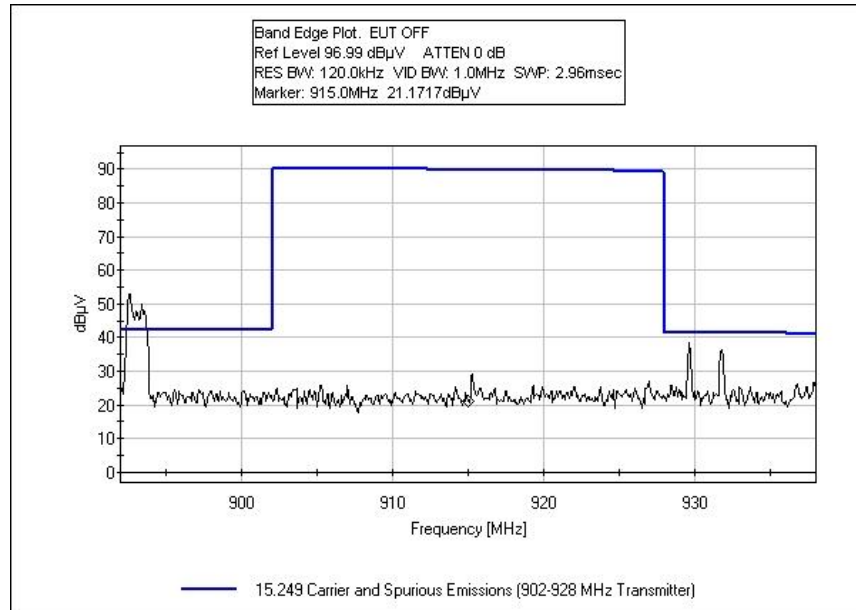
Engineer Name: S. Yamamoto

Test Equipment					
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
ANP04382	Cable	LDF-50	Andrew	9/3/2010	9/3/2012
ANP05569	Cable	RG-214/U	Pasternack	8/18/2010	8/18/2012
AN02869	Spectrum Analyzer	E4440A	Agilent	2/12/2011	2/12/2013
AN01992	Biconilog Antenna	CBL6111C	Chase	12/23/2010	12/23/2012
AN00010	Preamplifier	8447D	HP	3/29/2012	3/29/2014
ANP05555	Cable	RG223/U	Pasternack	8/18/2010	8/18/2012

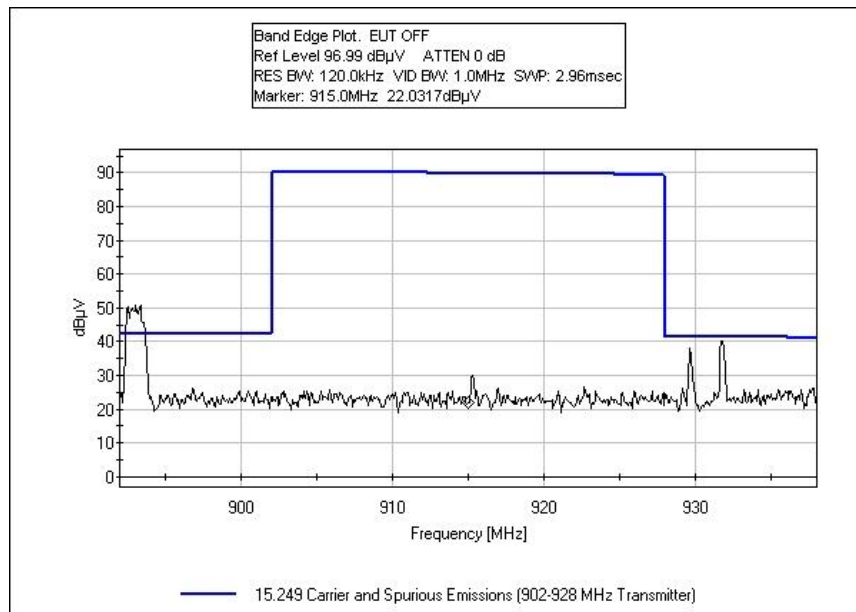
Test Data



EUT ON

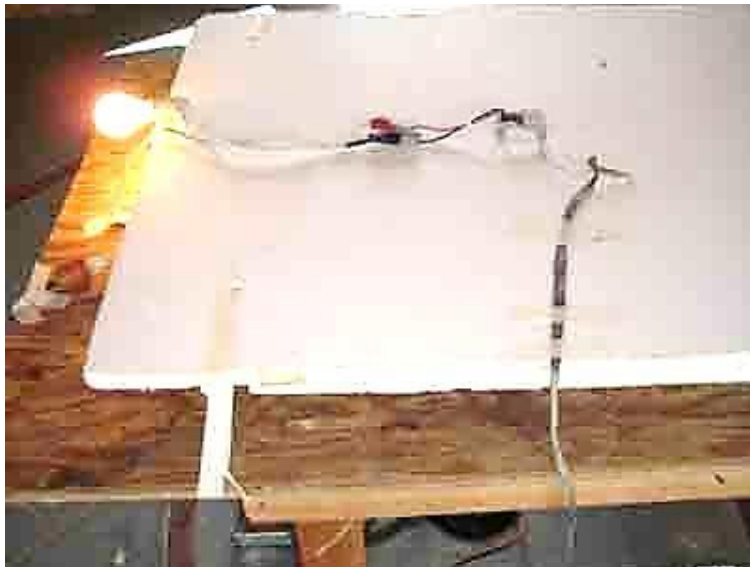


EUT OFF PLOT 1



EUT OFF PLOT 2

Test Setup Photos



15.249(d) / 15.209 Field Strength of Radiated Spurious Emissions

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer: **SmartLabs, Inc.**
 Specification: **15.209 Radiated Emissions**
 Work Order #: **92708** Date: 4/5/2012
 Test Type: **Maximized Emissions** Time: 13:06:28
 Equipment: **In-Line Dual-Band Hardwired Light Dimming Module** Sequence#: 2
 Manufacturer: SmartLabs, Inc. Tested By: S. Yamamoto
 Model: 2475DA1
 S/N: 17.6D.72

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP04382	Cable	LDF-50	9/3/2010	9/3/2012
T2	ANP05569	Cable	RG-214/U	8/18/2010	8/18/2012
	AN02869	Spectrum Analyzer	E4440A	2/12/2011	2/12/2013
T3	AN01992	Biconilog Antenna	CBL6111C	12/23/2010	12/23/2012
T4	AN00010	Preamp	8447D	3/29/2012	3/29/2014
T5	ANP05555	Cable	RG223/U	8/18/2010	8/18/2012
	AN00314	Loop Antenna	6502	6/30/2010	6/30/2012
	AN02947	Cable	32022-29094K-29094K-72TC	8/8/2011	8/8/2013
	AN00787	Preamp	83017A	4/8/2011	4/8/2013
	AN02113	Horn Antenna-SAE ARP958	3115	1/17/2011	1/17/2013
	AN02113	Horn Antenna-ANSI C63.5	3115	1/17/2011	1/17/2013
	ANP05988	Cable	LDF1-50	3/12/2012	3/12/2014

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
In-Line Dual-Band Hardwired Light Dimming Module*	SmartLabs, Inc.	2475DA1	17.6D.72

Support Devices:

Function	Manufacturer	Model #	S/N
100W Light bulb	Sylvania	Double Life 64 Soft White	NA
Light fixture	SmartLabs, Inc.	738V	NA

Test Conditions / Notes:

The equipment under test (EUT) is placed on the Styrofoam table top. The support equipment is located adjacent to the EUT. The EUT is ceiling mounted device. The light bulb brightness level is set to maximum. The EUT ground wire is connected to earth ground. The EUT is continuously transmitting. Voltage to EUT is 120Vac 60Hz. RF Output set to -3dB below the maximum setting. Transmit frequency is 915 MHz. Frequency range of measurement: 9kHz to 10GHz. 9kHz to 150kHz, RBW=200 Hz=VBW. 150kHz to 30MHz, RBW=9kHz=VBW. 30MHz to 1000MHz, RBW=120kHz=VBW. 1000MHz to 10000MHz, RBW=1MHz=VBW. Temperature: 18°C, Humidity: 39%, Pressure: 100kPa

Ext Attn: 0 dB

Measurement Data:

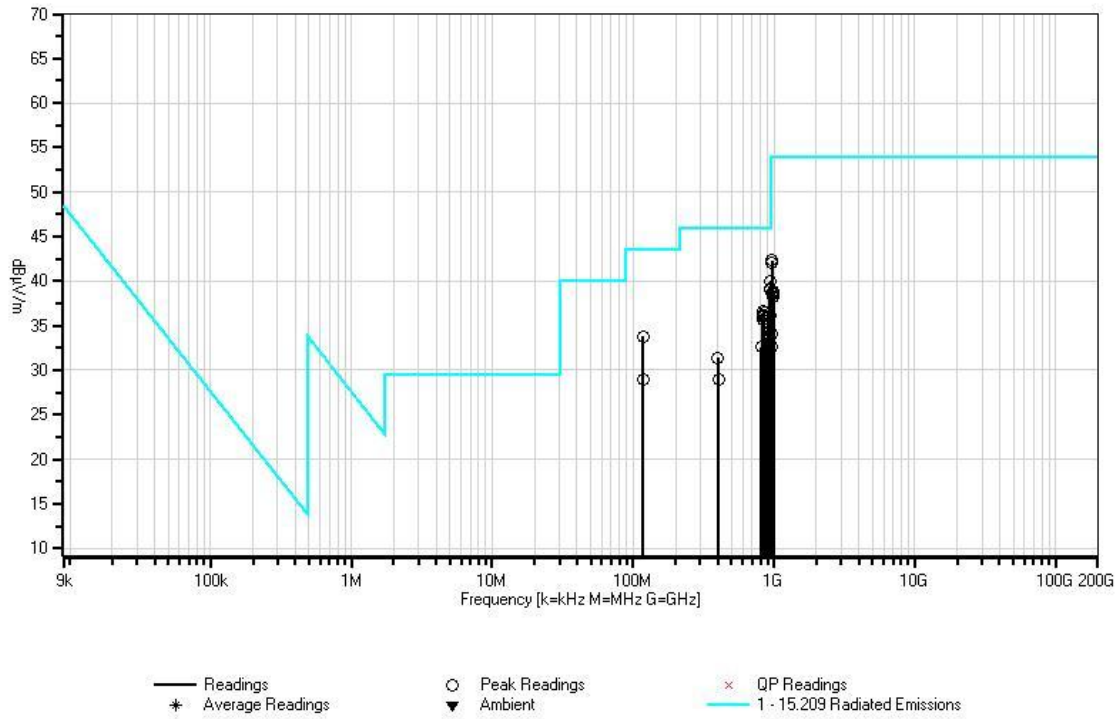
Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	945.073M	35.0	+3.4 +0.6	+4.2	+24.1	-27.3	+0.0	40.0	46.0	-6.0	Horiz
2	944.933M	34.2	+3.4 +0.6	+4.2	+24.1	-27.3	+0.0	39.2	46.0	-6.8	Vert
3	935.034M	34.3	+3.4 +0.6	+4.1	+23.9	-27.3	+0.0	39.0	46.0	-7.0	Horiz
4	845.098M	33.8	+3.1 +0.7	+3.8	+22.9	-27.6	+0.0	36.7	46.0	-9.3	Vert
5	854.928M	33.5	+3.1 +0.7	+3.8	+22.9	-27.6	+0.0	36.4	46.0	-9.6	Vert
6	117.355M	46.5	+1.3 +0.2	+1.4	+11.3	-26.9	+0.0	33.8	43.5	-9.7	Horiz
7	934.944M	31.5	+3.4 +0.6	+4.1	+23.9	-27.3	+0.0	36.2	46.0	-9.8	Vert
8	854.916M	33.3	+3.1 +0.7	+3.8	+22.9	-27.6	+0.0	36.2	46.0	-9.8	Horiz
9	835.113M	33.5	+3.1 +0.7	+3.7	+22.8	-27.6	+0.0	36.2	46.0	-9.8	Vert
10	845.057M	33.1	+3.1 +0.7	+3.8	+22.9	-27.6	+0.0	36.0	46.0	-10.0	Horiz
11	834.934M	33.0	+3.1 +0.7	+3.7	+22.8	-27.6	+0.0	35.7	46.0	-10.3	Horiz
12	924.937M	30.6	+3.4 +0.6	+4.1	+23.8	-27.3	+0.0	35.2	46.0	-10.8	Vert
13	904.970M	31.2	+3.3 +0.6	+4.0	+23.4	-27.4	+0.0	35.1	46.0	-10.9	Horiz
14	924.997M	29.8	+3.4 +0.6	+4.1	+23.8	-27.3	+0.0	34.4	46.0	-11.6	Horiz
15	965.071M	36.8	+3.4 +0.6	+4.3	+24.5	-27.3	+0.0	42.3	54.0	-11.7	Horiz
16	954.929M	28.9	+3.4 +0.6	+4.2	+24.3	-27.3	+0.0	34.1	46.0	-11.9	Horiz
17	964.939M	36.5	+3.4 +0.6	+4.3	+24.5	-27.3	+0.0	42.0	54.0	-12.0	Vert
18	894.922M	29.8	+3.3 +0.6	+4.0	+23.3	-27.4	+0.0	33.6	46.0	-12.4	Horiz
19	904.904M	29.4	+3.3 +0.6	+4.0	+23.4	-27.4	+0.0	33.3	46.0	-12.7	Vert

20	894.990M	28.9	+3.3 +0.6	+4.0	+23.3	-27.4	+0.0	32.7	46.0	-13.3	Vert
21	814.900M	30.1	+3.1 +0.7	+3.7	+22.6	-27.6	+0.0	32.6	46.0	-13.4	Vert
22	954.949M	27.4	+3.4 +0.6	+4.2	+24.3	-27.3	+0.0	32.6	46.0	-13.4	Vert
23	117.421M	41.7	+1.3 +0.2	+1.4	+11.3	-26.9	+0.0	29.0	43.5	-14.5	Vert
24	398.124M	37.1	+2.4 +0.4	+2.5	+16.2	-27.2	+0.0	31.4	46.0	-14.6	Horiz
25	984.907M	33.1	+3.4 +0.6	+4.3	+24.8	-27.4	+0.0	38.8	54.0	-15.2	Horiz
26	995.125M	32.6	+3.4 +0.6	+4.4	+25.0	-27.3	+0.0	38.7	54.0	-15.3	Horiz
27	975.069M	33.1	+3.4 +0.6	+4.3	+24.6	-27.4	+0.0	38.6	54.0	-15.4	Horiz
28	984.945M	32.5	+3.4 +0.6	+4.3	+24.8	-27.4	+0.0	38.2	54.0	-15.8	Vert
29	974.881M	32.7	+3.4 +0.6	+4.3	+24.6	-27.4	+0.0	38.2	54.0	-15.8	Vert
30	994.916M	32.2	+3.4 +0.6	+4.4	+25.0	-27.4	+0.0	38.2	54.0	-15.8	Vert
31	403.670M	34.6	+2.4 +0.4	+2.5	+16.3	-27.2	+0.0	29.0	46.0	-17.0	Horiz

CKC Laboratories, Inc. Date: 4/5/2012 Time: 13:06:28 SmartLabs, Inc. WO#: 92708
15.209 Radiated Emissions Test Distance: 3 Meters Sequence#: 2 Ext ATTN: 0 dB



Test Setup Photos



RSS-210

99 % Bandwidth

Test Conditions / Setup

The equipment under test (EUT) is placed on the Styrofoam table top. The support equipment is located adjacent to the EUT. The light bulb brightness level is set to maximum. The EUT ground wire is connected to earth ground. The EUT is continuously transmitting. Voltage to EUT is 120Vac 60Hz. RF Output set to -3dB below the maximum setting. Transmit frequency is 915 MHz. Frequency range of measurement: 914.5MHz to 915.5MHz. RBW=10kHz, 120kHz=VBW.

Temperature: 18°C

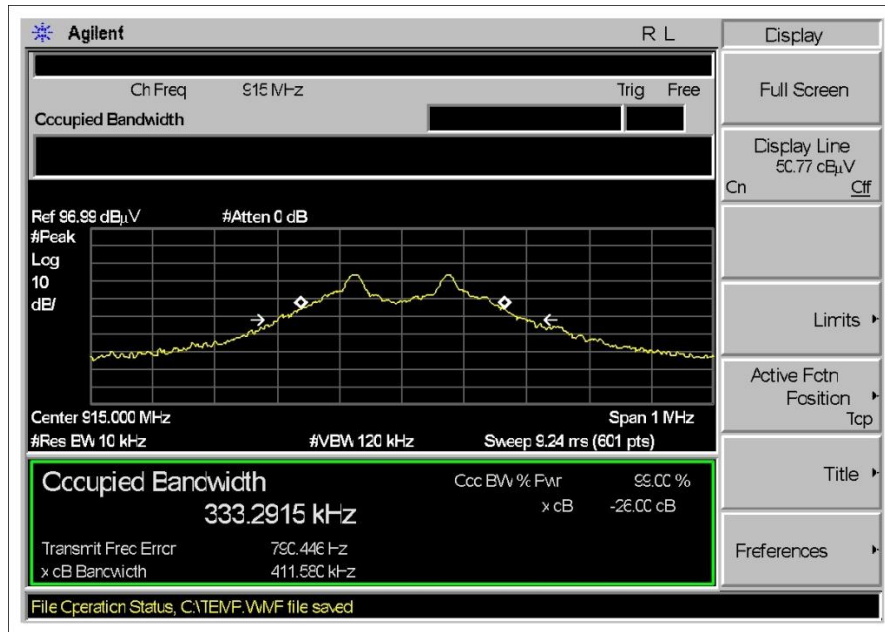
Relative Humidity: 39%

Pressure: 100kPa

Engineer Name: S. Yamamoto

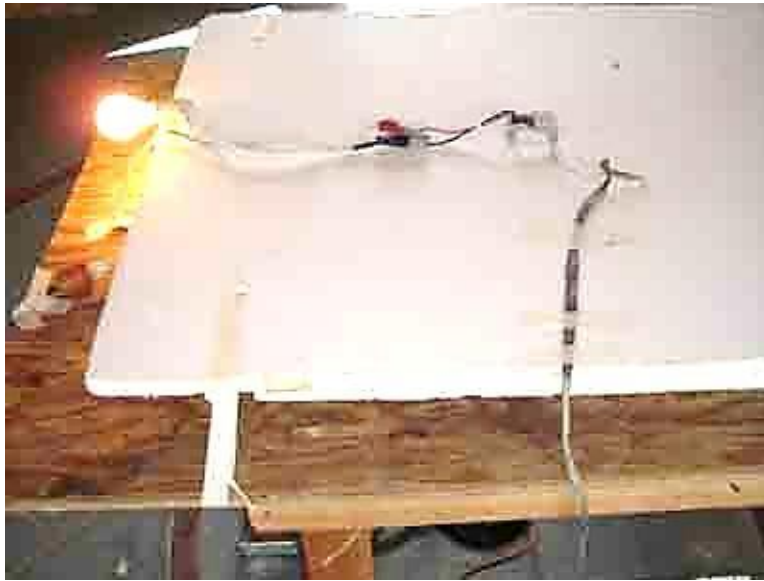
Test Equipment					
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
ANP04382	Cable	LDF-50	Andrew	9/3/2010	9/3/2012
ANP05569	Cable	RG-214/U	Pasternack	8/18/2010	8/18/2012
AN02869	Spectrum Analyzer	E4440A	Agilent	2/12/2011	2/12/2013
AN01992	Biconilog Antenna	CBL6111C	Chase	12/23/2010	12/23/2012
AN00010	Preamp	8447D	HP	3/29/2012	3/29/2014
ANP05555	Cable	RG223/U	Pasternack	8/18/2010	8/18/2012

Test Data



Test Setup Photos





SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

The reported measurement uncertainties are calculated based on the worst case of all laboratory environments from CKC Laboratories, Inc. test sites. Only those parameters which require estimation of measurement uncertainty are reported. The reported worst case measurement uncertainty is less than the maximum values derived in CISPR 16-4-2. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBμV/m, the spectrum analyzer reading in dBμV was corrected by using the following formula. This reading was then compared to the applicable specification limit.

SAMPLE CALCULATIONS		
	Meter reading	(dB μ V)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dB μ V/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or carrot ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.