

# Smartlabs, Inc.

TEST REPORT FOR

**INSTEON Door Sensor II**  
**Model: 2845-222**

Tested To The Following Standards:

**FCC Part 15 Subpart C Sections 15.249**  
**and**  
**RSS 210 Issue 8**

Report No.: 94595-10

Date of issue: August 22, 2013



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: 13-3JL0731-01

**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: 94595

August 5, 2013

August 5-8, 2013

### 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.  
1120 Fulton Place  
Fremont, CA 94539

## Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.00.14
Immunity	5.00.07

## Site Registration & Accreditation Information

Location	CB #	TAIWAN	CANADA	FCC	JAPAN
Fremont	US0082	SL2-IN-E-1148R	3082B-1	958979	A-0149

## SUMMARY OF RESULTS

### Standard / Specification: FCC Part 15 Subpart C 15.249 and RSS 210 Issue 8

Description	Test Procedure/Method	Results
Fundamental Field Strength	FCC Part 15 Subpart C Section 15.249(a) / ANSI C63.4 / ANSI C63.10	Pass
Field Strength under Voltage Variation	FCC Part 15 Subpart C Section 15.31(e) / ANSI C63.4 / ANSI C63.10	Pass
Occupied Bandwidth	FCC Part 15 Subpart C Section 15.215(c) / ANSI C63.4 / ANSI C63.10	Pass
99% Occupied Bandwidth	RSS 210 Issue 8 / RSP-100 / RSS-GEN Section 4.6	Pass
Radiated Spurious Emissions	FCC Part 15 Subpart C Section 15.249(a) / ANSI C63.4 / ANSI C63.10	Pass
Band Edge Measurements	FCC Part 15 Subpart C Section 15.249(d) / ANSI C63.4 / ANSI C63.10	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**

#### **INSTEON Door Sensor II**

Manuf: Smartlabs, Inc.

Model: 2845-222

Serial: ENG1

### **PERIPHERAL DEVICES**

The EUT was not tested with peripheral devices.

## 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.

### 15.249(a) Fundamental Field Strength

#### Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170

Customer: **Smartlabs, Inc.**

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

Work Order #: **94595** Date: 8/5/2013

Test Type: **Radiated Scan** Time: 09:30:05

Equipment: **INSTEON Door Sensor II** Sequence#: 1

Manufacturer: Smartlabs, Inc. Tested By: Hieu Song Nguyenpham

Model: 2845-222

S/N: ENG1

#### Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00852	Biconilog Antenna	CBL 6111C	11/28/2012	11/28/2014
T2	ANP00880	Cable	RG214U	7/30/2012	7/30/2014
T3	ANP05300	Cable	RG214/U	3/25/2013	3/25/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015

#### Equipment Under Test (\* = EUT):

Function	Manufacturer	Model #	S/N
INSTEON Door Sensor II*	Smartlabs, Inc.	2845-222	ENG1

#### Support Devices:

Function	Manufacturer	Model #	S/N
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#### Test Conditions / Notes:

Fundamental of the EUT  
 Firmware Used: DSensor 883 915 TxAlways p40.HEX  
 Temperature: 21.4°C  
 Humidity: 40 %  
 Atmospheric Pressure: 101.2 kPa  
 High Clock: 10MHz  
 Transmitting operating frequency= 915MHz  
 RF Output= 0dBm

The EUT is a portable device and operated at 1.5 VDC. It is placed on the 80cm Styrofoam table and at the center of a turning table. The EUT is set in continuously transmit mode.

Ext Attn: 0 dB

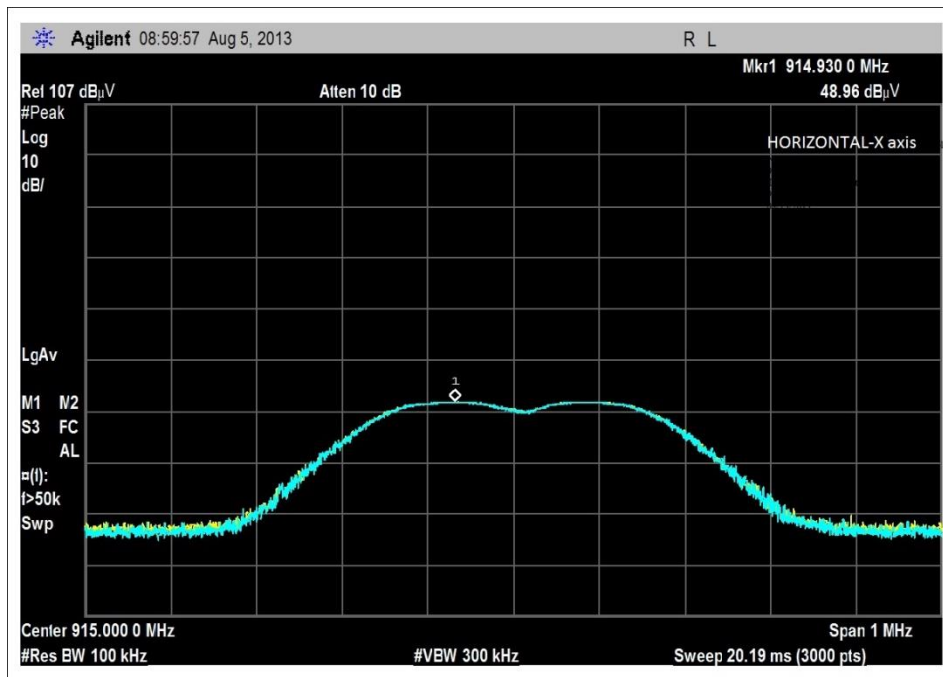
**Measurement Data:**

Reading listed by margin.

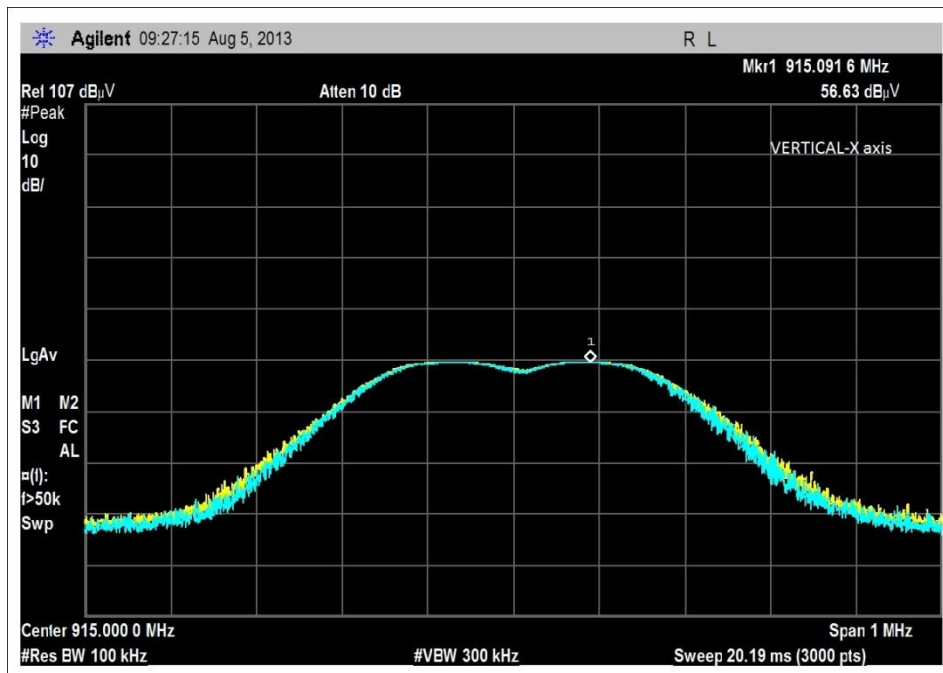
Test Distance: 3 Meters

#	Freq MHz	Rdng dB $\mu$ V	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
1	914.941M	56.5	+22.7	+3.5	+0.9		+0.0	83.6	94.0 X-axis	-10.4	Vert
2	914.941M	54.8	+22.7	+3.5	+0.9		+0.0	81.9	94.0 Z-axis	-12.1	Vert
3	914.941M	49.6	+22.7	+3.5	+0.9		+0.0	76.7	94.0 Y-axis	-17.3	Vert
4	914.941M	49.0	+22.7	+3.5	+0.9		+0.0	76.1	94.0 X-axis	-17.9	Horiz
5	914.941M	47.9	+22.7	+3.5	+0.9		+0.0	75.0	94.0 Y-axis	-19.0	Horiz
6	914.941M	47.4	+22.7	+3.5	+0.9		+0.0	74.5	94.0 Z-axis	-19.5	Horiz

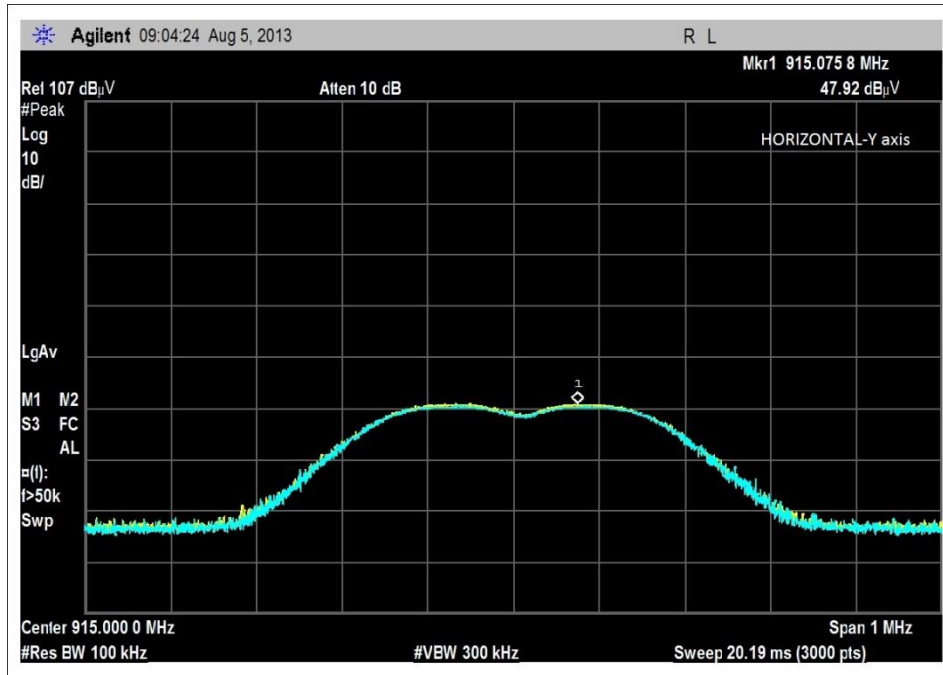




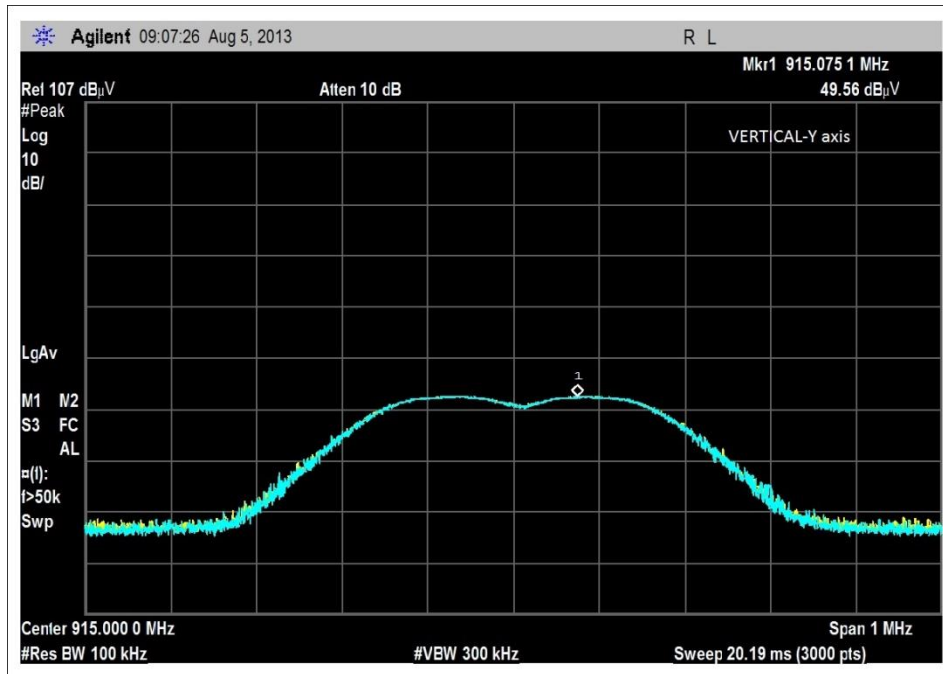
X Axis, Horizontal



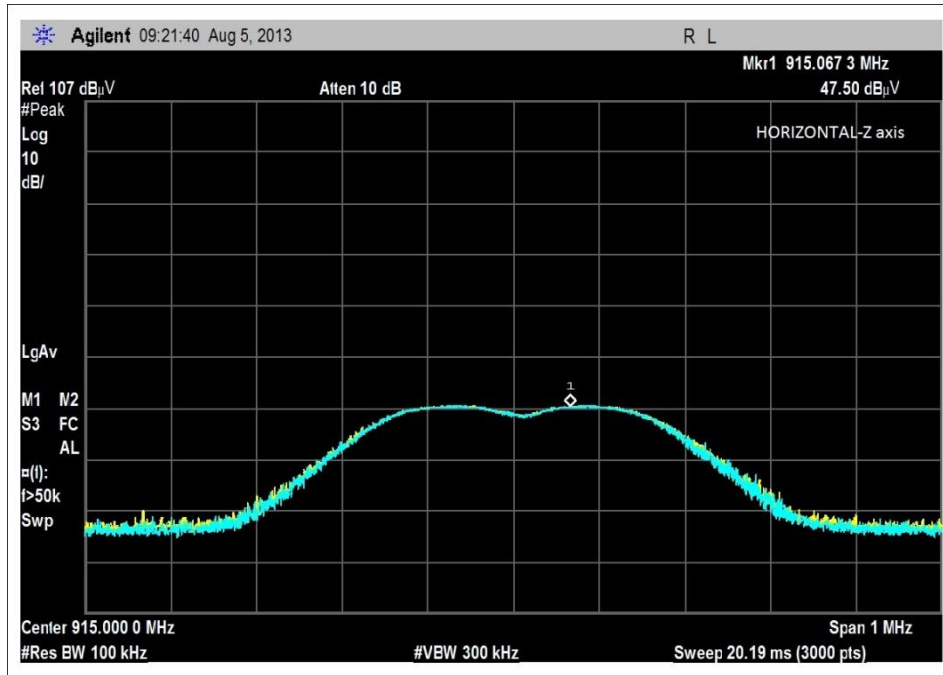
X Axis, Vertical



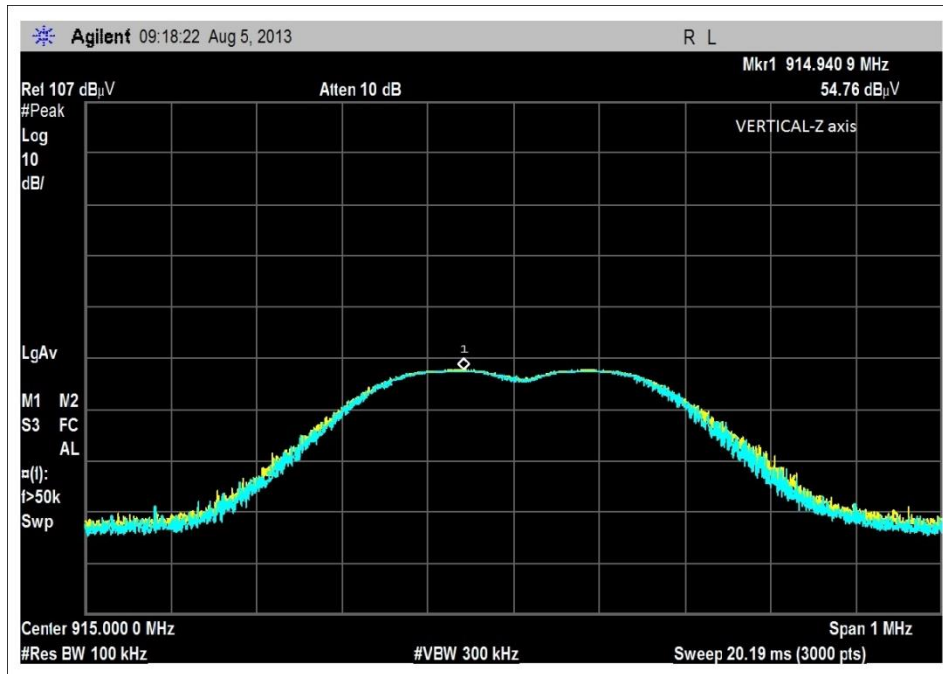
Y Axis, Horizontal



Y Axis, Vertical



Z Axis, Horizontal

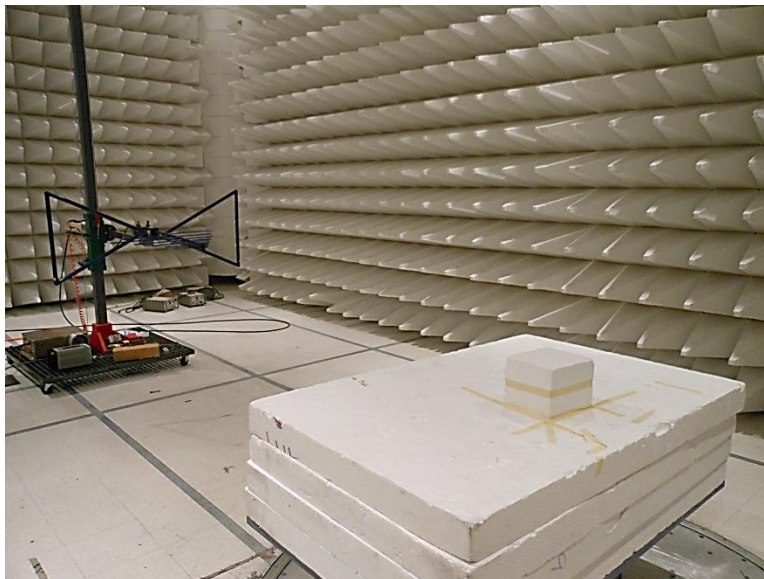


Z Axis, Vertical

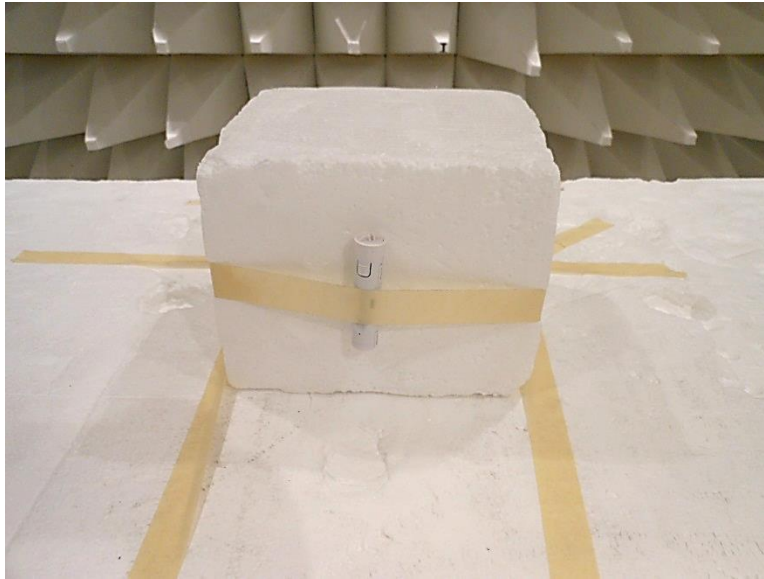
**Test Setup Photos**



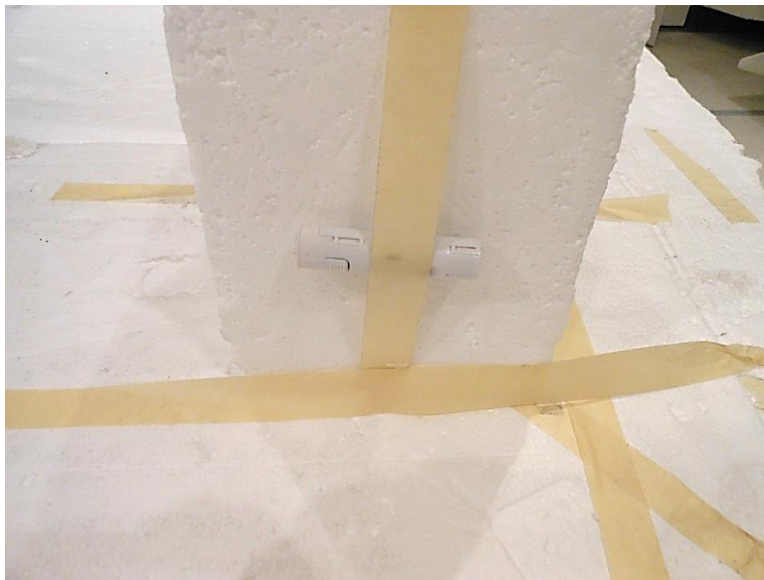
Fundamental



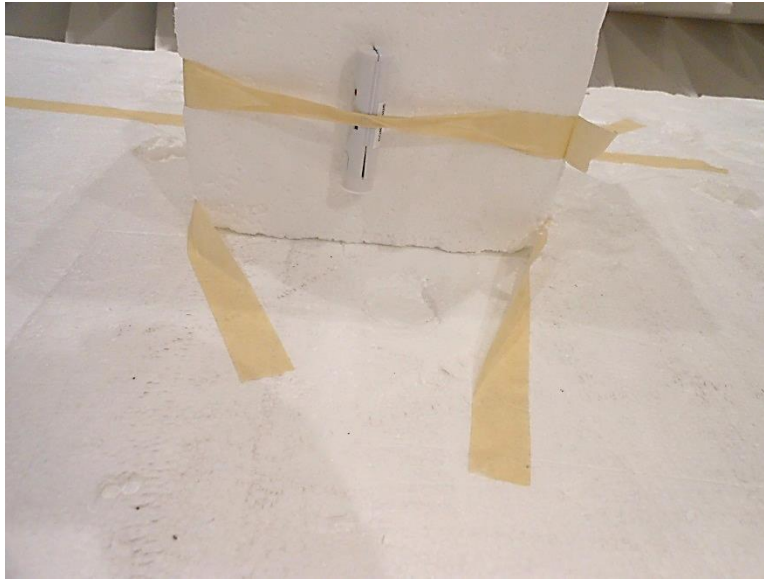
Fundamental



X Axis



Y Axis



Z Axis

## 15.31(e) Field Strength Under Voltage Variations

**Test Conditions / Setup**

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170

Customer: **Smartlabs, Inc.**

Specification: **15.31e**

Work Order #: **94595**

Date: 8/5/2013

Test Type: **Radiated Scan**

Time: 09:30:05

Equipment: **INSTEON Door Sensor II**

Sequence#: 1

Manufacturer: Smartlabs, Inc.

Tested By: Hieu Song Nguyenpham

Model: 2845-222

S/N: ENG1

***Test Equipment:***

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00852	Biconilog Antenna	CBL 6111C	11/28/2012	11/28/2014
T2	ANP00880	Cable	RG214U	7/30/2012	7/30/2014
T3	ANP05300	Cable	RG214/U	3/25/2013	3/25/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015

***Equipment Under Test (\* = EUT):***

Function	Manufacturer	Model #	S/N
INSTEON Door Sensor II*	Smartlabs, Inc.	2845-222	ENG1

***Support Devices:***

Function	Manufacturer	Model #	S/N
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***Test Conditions / Notes:***

Firmware Used: DSensor 883 915 TxAlways p40.HEX  
 Temperature: 21.4°C, Humidity: 40 %, Atmospheric Pressure: 101.2 kPa  
 High Clock: 10MHz  
 Transmitting operating frequency= 915MHz  
 RF Output= 0dBm  
 The EUT is a portable device and operated at 1.5 VDC. It is placed on the 80cm Styrofoam table and at the center of a turning table. The EUT is set in continuously transmit mode.  
 15.31e: Using a fresh battery

**15.215(c) Occupied Bandwidth**

**Test Conditions / Setup**

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170

Customer: **Smartlabs, Inc.**

Specification: **OBW**

Work Order #: **94595**

Date: 8/5/2013

Test Type: **Radiated Scan**

Time: 09:30:05

Equipment: **INSTEON Door Sensor II**

Sequence#: 1

Manufacturer: Smartlabs, Inc.

Tested By: Hieu Song Nguyenpham

Model: 2845-222

S/N: ENG1

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00852	Biconilog Antenna	CBL 6111C	11/28/2012	11/28/2014
T2	ANP00880	Cable	RG214U	7/30/2012	7/30/2014
T3	ANP05300	Cable	RG214/U	3/25/2013	3/25/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
INSTEON Door Sensor II*	Smartlabs, Inc.	2845-222	ENG1

**Support Devices:**

Function	Manufacturer	Model #	S/N
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**Test Conditions / Notes:**

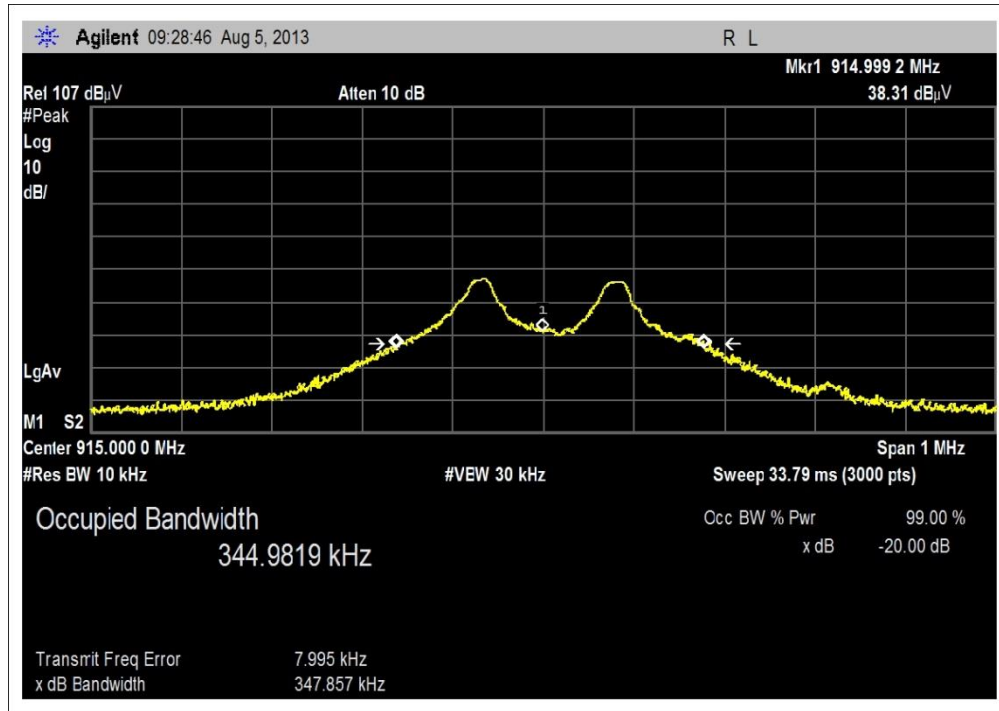
Firmware Used: DSensor 883 915 TxAlways p40.HEX  
 Temperature: 21.4°C  
 Humidity: 40 %  
 Atmospheric Pressure: 101.2 kPa  
 High Clock: 10MHz

Transmitting operating frequency= 915MHz  
 RF Output= 0dBm

The EUT is a portable device and operated at 1.5 VDC. It is placed on the 80cm Styrofoam table and at the center of a turning table. The EUT is set in continue transmit mode.

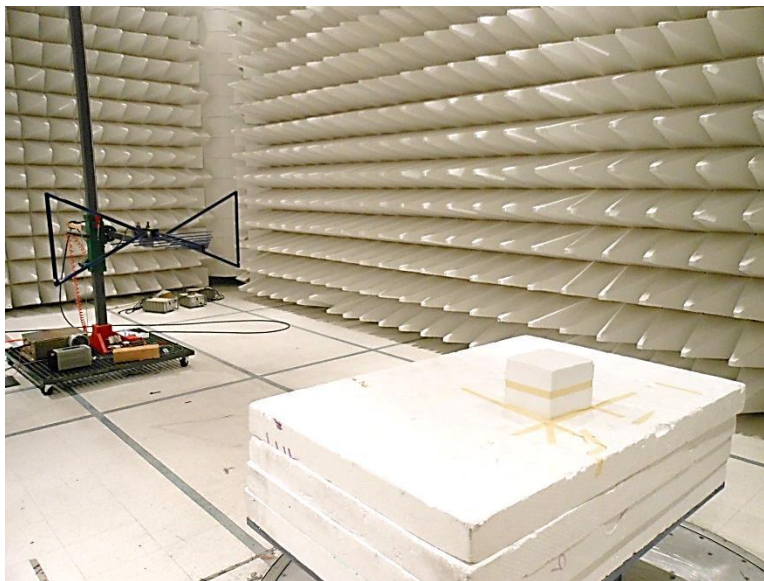


**Test Data**



X Axis

**Test Setup Photos**



**RSS-210 99 % Bandwidth**

**Test Conditions / Setup**

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170

Customer: **Smartlabs, Inc.**

Specification: **OBW**

Work Order #: **94595**

Date: 8/5/2013

Test Type: **Radiated Scan**

Time: 09:30:05

Equipment: **INSTEON Door Sensor II**

Sequence#: 1

Manufacturer: Smartlabs, Inc.

Tested By: Hieu Song Nguyenpham

Model: 2845-222

S/N: ENG1

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00852	Biconilog Antenna	CBL 6111C	11/28/2012	11/28/2014
T2	ANP00880	Cable	RG214U	7/30/2012	7/30/2014
T3	ANP05300	Cable	RG214/U	3/25/2013	3/25/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
INSTEON Door Sensor II*	Smartlabs, Inc.	2845-222	ENG1

**Support Devices:**

Function	Manufacturer	Model #	S/N
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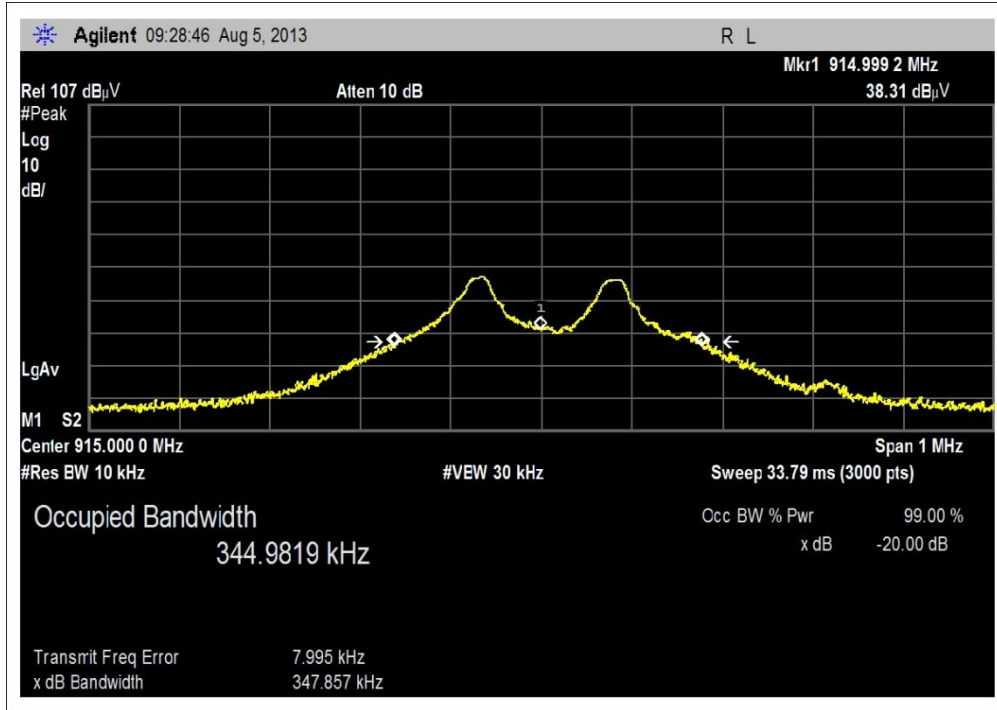
**Test Conditions / Notes:**

Firmware Used: DSensor 883 915 TxAlways p40.HEX  
 Temperature: 21.4°C, Humidity: 40 %, Atmospheric Pressure: 101.2 kPa  
 High Clock: 10MHz

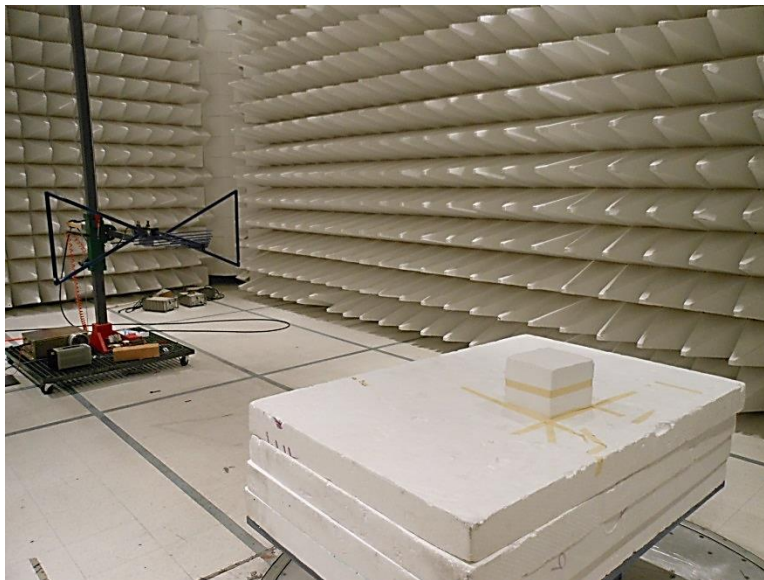
Transmitting operating frequency= 915MHz  
 RF Output= 0dBm

The EUT is a portable device and operated at 1.5 VDC. It is placed on the 80cm Styrofoam table and at the center of a turning table. The EUT is set in continue transmit mode.

**Test Data**



**Test Setup Photos**



**15.249(a) Radiated Spurious Emissions**

**Test Data Sheets**

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170

Customer: **Smartlabs, Inc.**  
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**  
 Work Order #: **94595** Date: 8/5/2013  
 Test Type: **Radiated Scan** Time: 16:06:22  
 Equipment: **INSTEON Door Sensor II** Sequence#: 28  
 Manufacturer: Smartlabs, Inc. Tested By: Hieu Song Nguyenpham  
 Model: 2845-222  
 S/N: ENG1

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP00880	Cable	RG214U	7/30/2012	7/30/2014
T2	ANP05300	Cable	RG214/U	3/25/2013	3/25/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015
T3	AN00432	Loop Antenna	6502	4/2/2013	4/2/2015

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
INSTEON Door Sensor II*	Smartlabs, Inc.	2845-222	ENG1

**Support Devices:**

Function	Manufacturer	Model #	S/N
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**Test Conditions / Notes:**

Radiated Spurious Emission  
 Frequency Range: 9kHz to 30MHz  
 Firmware Used: DSensor 883 915 TxAlways p40.HEX  
 Temperature: 21.4°C, Humidity: 40 %, Atmospheric Pressure: 101.2 kPa  
 High Clock: 10MHz

Transmitting operating frequency= 915MHz  
 RF Output= 0dBm  
 9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz;  
 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz;  
 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz,  
 1000 MHz-10000MHz RBW=1 MHz, VBW=1 MHz.

The EUT is a portable device and operated at 1.5 VDC. It is placed on the 80cm Styrofoam table and at the center of a turning table. The EUT is set in continuously transmit mode.

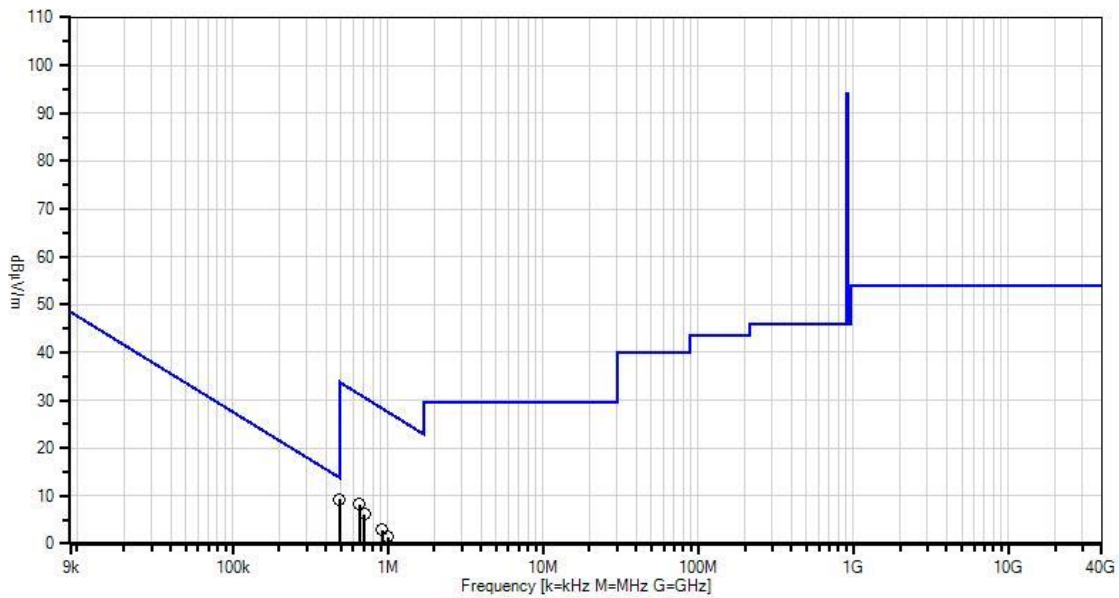
Note: X-axis

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	658.041k	38.2	+0.1	+0.0	+9.9		-40.0	8.2	31.2	-23.0	Perpe
2	708.217k	36.2	+0.1	+0.0	+9.9		-40.0	6.2	30.6	-24.4	Paral
3	490.784k	39.4	+0.1	+0.0	+9.8		-40.0	9.3	33.8	-24.5	Paral
4	925.650k	33.2	+0.1	+0.0	+9.6		-40.0	2.9	28.2	-25.3	Perpe
5	1.007M	31.6	+0.1	+0.0	+9.7		-40.0	1.4	27.5	-26.1	Paral
6	1.655M	26.5	+0.1	+0.0	+9.8		-40.0	-3.6	23.2	-26.8	Perpe

CKC Laboratories, Inc Date: 8/5/2013 Time: 16:06:22 Smartlabs, Inc WO#: 94595  
 Test Distance: 3 Meters Sequence#: 28



— Readings  
 × QP Readings  
 ▼ Ambient  
 ○ Peak Readings  
 \* Average Readings  
 — 1 - 15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170

Customer: **Smartlabs, Inc.**  
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**  
 Work Order #: **94595** Date: 8/5/2013  
 Test Type: **Radiated Scan** Time: 13:42:11  
 Equipment: **INSTEON Door Sensor II** Sequence#: 13  
 Manufacturer: Smartlabs, Inc. Tested By: Hieu Song Nguyenpham  
 Model: 2845-222  
 S/N: ENG1

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00730	Preamp	8447D	1/17/2013	1/17/2015
T2	AN00852	Biconilog Antenna	CBL 6111C	11/28/2012	11/28/2014
T3	ANP00880	Cable	RG214U	7/30/2012	7/30/2014
T4	ANP01183	Cable	CNT-195	10/24/2011	10/24/2013
T5	ANP05300	Cable	RG214/U	3/25/2013	3/25/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
INSTEON Door Sensor II*	Smartlabs, Inc.	2845-222	ENG1

**Support Devices:**

Function	Manufacturer	Model #	S/N
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**Test Conditions / Notes:**

Radiated Spurious Emission  
 Frequency Range: 30MHz to 1000MHz

Firmware Used: DSensor 883 915 TxAlways p40.HEX  
 Temperature: 21.4°C  
 Humidity: 40 %  
 Atmospheric Pressure: 101.2 kPa  
 High Clock: 10MHz

Transmitting operating frequency= 915MHz  
 RF Output= 0dBm

9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz;  
 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz;  
 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz,  
 1000 MHz-10000MHz RBW=1 MHz, VBW=1 MHz.

The EUT is a portable device and operated at 1.5 VDC. It is placed on the 80cm Styrofoam table and at the center of a turning table. The EUT is set in continuously transmit mode.

Note: X-axis

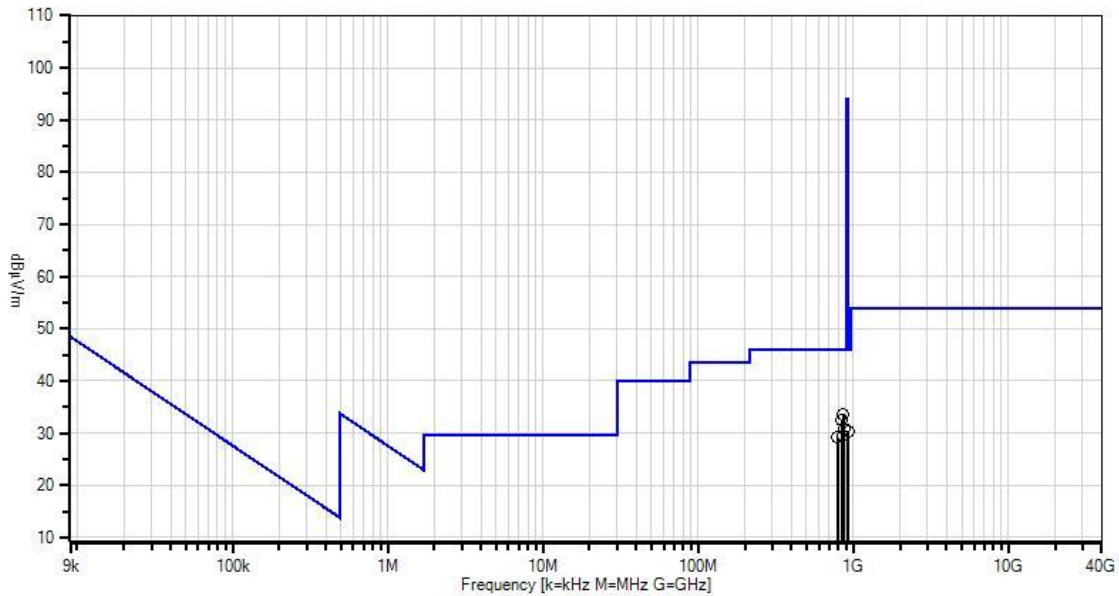


Ext Attn: 0 dB

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

#	Freq MHz	Rdng dB $\mu$ V	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
1	865.077M	32.7	-27.0 +0.9	+22.8	+3.3	+0.9	+0.0	33.6	46.0	-12.4	Vert
2	844.897M	32.1	-26.9 +0.9	+22.1	+3.3	+1.0	+0.0	32.5	46.0	-13.5	Vert
3	872.404M	29.7	-27.0 +0.9	+23.0	+3.4	+0.9	+0.0	30.9	46.0	-15.1	Vert
4	930.062M	29.1	-27.1 +0.9	+22.8	+3.5	+1.0	+0.0	30.2	46.0	-15.8	Horiz
5	860.632M	28.3	-27.0 +0.9	+22.9	+3.3	+1.0	+0.0	29.4	46.0	-16.6	Horiz
6	795.047M	29.3	-26.7 +0.9	+21.6	+3.2	+0.8	+0.0	29.1	46.0	-16.9	Horiz

CKC Laboratories, Inc Date: 8/5/2013 Time: 13:42:11 Smartlabs, Inc WO#: 94595  
Test Distance: 3 Meters Sequence#: 13



— Readings  
x QP Readings  
▼ Ambient

○ Peak Readings  
\* Average Readings  
— 1 - 15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170

Customer: **Smartlabs, Inc.**  
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**  
 Work Order #: **94595** Date: 8/5/2013  
 Test Type: **Radiated Scan** Time: 11:52:18  
 Equipment: **INSTEON Door Sensor II** Sequence#: 4  
 Manufacturer: Smartlabs, Inc. Tested By: Hieu Song Nguyenpham  
 Model: 2845-222  
 S/N: ENG1

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03114	Preamp	AMF-7D-00101800-30-10P	4/11/2013	4/11/2015
T2	AN02157	Horn Antenna-ANSI C63.5	3115	1/23/2013	1/23/2015
T3	AN03015	Cable	32022-2-29094K-24TC	5/6/2013	5/6/2015
T4	AN03302	Cable	32026-29094K-29094K-72TC	3/21/2012	3/21/2014
T5	ANP01210	Cable	FSJ1P-50A-4A	2/19/2013	2/19/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015
T6	AN03172	High Pass Filter	HM1155-11SS	2/9/2012	2/9/2014

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
INSTEON Door Sensor II*	Smartlabs, Inc.	2845-222	ENG1

**Support Devices:**

Function	Manufacturer	Model #	S/N
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**Test Conditions / Notes:**

Radiated Spurious Emission  
 Frequency Range: 1000MHz to 10000MHz

Firmware Used: DSensor 883 915 TxAlways p40.HEX  
 Temperature: 21.4°C  
 Humidity: 40 %  
 Atmospheric Pressure: 101.2 kPa  
 High Clock: 10MHz

Transmitting operating frequency= 915MHz  
 RF Output= 0dBm

9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz;  
 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz;  
 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz,  
 1000 MHz-10000MHz RBW=1 MHz, VBW=1 MHz.

The EUT is a portable device and operated at 1.5 VDC. It is placed on the 80cm Styrofoam table and at the center of a turning table. The EUT is set in continuously transmit mode.

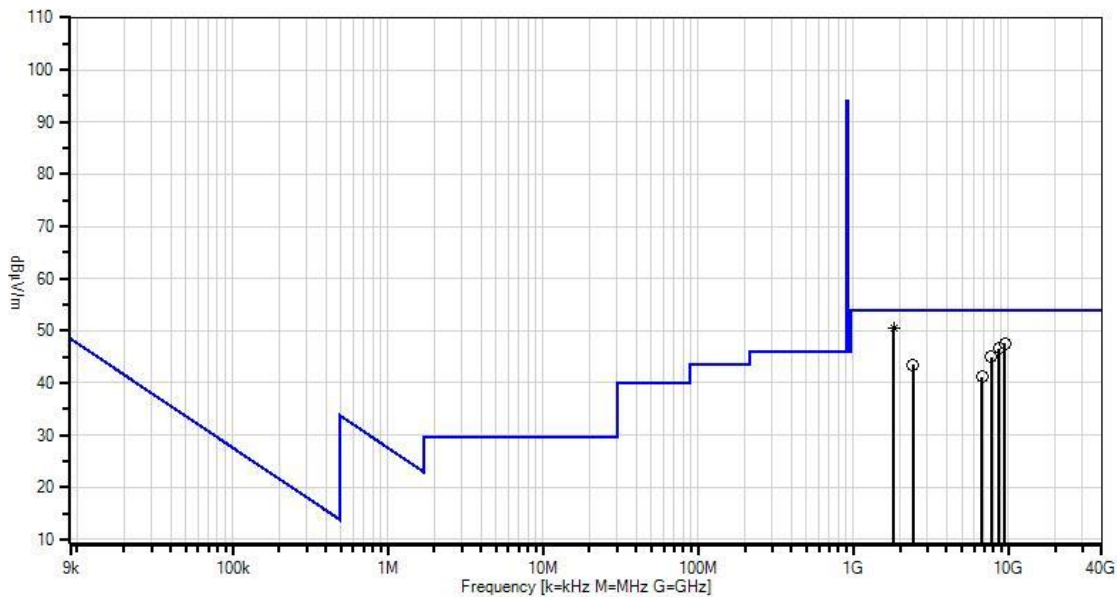
Note: X-axis

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dB $\mu$ V	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
1	1829.829M	78.8	-58.8 +2.1	+27.0 +0.3	+0.3	+0.9	+0.0	50.6	54.0	-3.4	Vert
^	1829.829M	80.7	-58.8 +2.1	+27.0 +0.3	+0.3	+0.9	+0.0	52.5	54.0	-1.5	Vert
3	9477.216M	56.8	-57.6 +6.3	+38.5 +0.2	+1.2	+2.2	+0.0	47.6	54.0	-6.4	Horiz
4	8700.693M	55.7	-56.4 +5.7	+37.8 +0.2	+1.5	+2.1	+0.0	46.6	54.0	-7.4	Horiz
5	7759.753M	58.2	-58.8 +5.5	+36.6 +0.2	+1.2	+2.0	+0.0	44.9	54.0	-9.1	Horiz
6	2434.433M	69.3	-59.0 +2.7	+28.7 +0.2	+0.5	+1.1	+0.0	43.5	54.0	-10.5	Vert
7	6769.764M	57.2	-58.7 +4.9	+35.0 +0.1	+0.8	+1.8	+0.0	41.1	54.0	-12.9	Vert

CKC Laboratories, Inc Date: 8/5/2013 Time: 11:52:18 Smartlabs, Inc WO#: 94595  
Test Distance: 3 Meters Sequence#: 4



Readings  
 x QP Readings  
 ▼ Ambient  
 ○ Peak Readings  
 \* Average Readings  
 — 1 - 15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170

Customer: **Smartlabs, Inc.**  
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**  
 Work Order #: **94595** Date: 8/5/2013  
 Test Type: **Radiated Scan** Time: 15:43:12  
 Equipment: **INSTEON Door Sensor II** Sequence#: 25  
 Manufacturer: Smartlabs, Inc. Tested By: Hieu Song Nguyenpham  
 Model: 2845-222  
 S/N: ENG1

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP00880	Cable	RG214U	7/30/2012	7/30/2014
T2	ANP05300	Cable	RG214/U	3/25/2013	3/25/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015
T3	AN00432	Loop Antenna	6502	4/2/2013	4/2/2015

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
INSTEON Door Sensor II*	Smartlabs, Inc.	2845-222	ENG1

**Support Devices:**

Function	Manufacturer	Model #	S/N
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**Test Conditions / Notes:**

Radiated Spurious Emission  
 Frequency Range: 9kHz to 30MHz

Firmware Used: DSensor 883 915 TxAlways p40.HEX  
 Temperature: 21.4°C  
 Humidity: 40 %  
 Atmospheric Pressure: 101.2 kPa  
 High Clock: 10MHz

Transmitting operating frequency= 915MHz  
 RF Output= 0dBm

9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz;  
 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz;  
 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz,  
 1000 MHz-10000MHz; RBW=1 MHz, VBW=1 MHz.

The EUT is a portable device and operated at 1.5 VDC. It is placed on the 80cm Styrofoam table and at the center of a turning table. The EUT is set in continuously transmit mode.

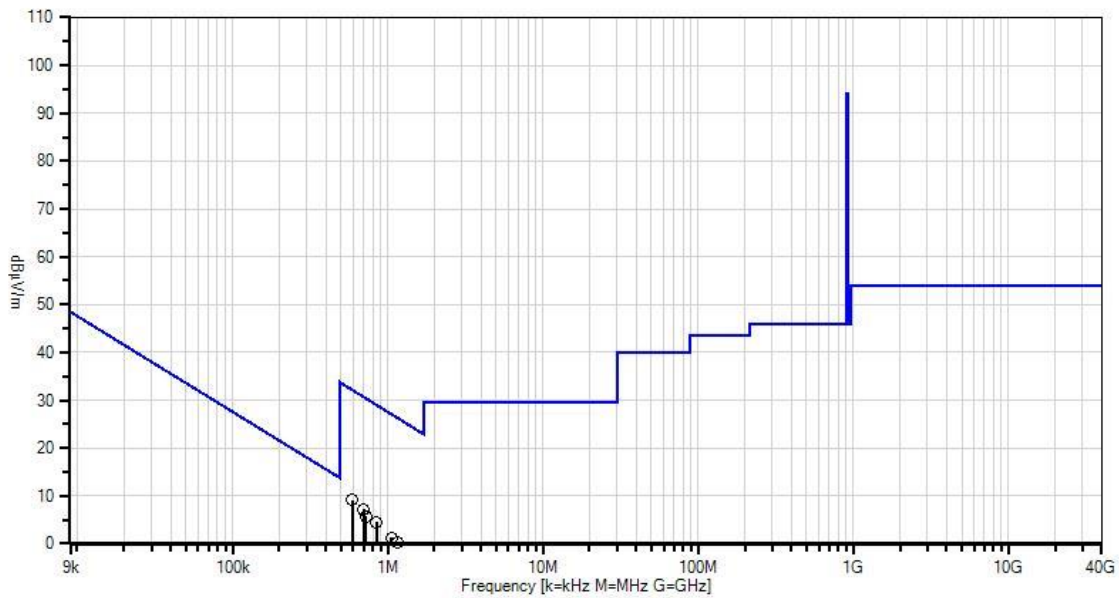
Note: Y-axis

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dB $\mu$ V	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
1	591.138k	39.2	+0.1	+0.0	+9.8		-40.0	9.1	32.2	-23.1	Perpe
2	697.764k	37.2	+0.1	+0.0	+9.9		-40.0	7.2	30.7	-23.5	Paral
3	846.204k	35.0	+0.1	+0.0	+9.4		-40.0	4.5	29.0	-24.5	Perpe
4	724.943k	35.8	+0.1	+0.0	+9.8		-40.0	5.7	30.4	-24.7	Paral
5	1.164M	30.6	+0.1	+0.0	+9.7		-40.0	0.4	26.2	-25.8	Paral
6	1.055M	31.4	+0.1	+0.0	+9.7		-40.0	1.2	27.1	-25.9	Perpe

CKC Laboratories, Inc Date: 8/5/2013 Time: 15:43:12 Smartlabs, Inc WO#: 94595  
Test Distance: 3 Meters Sequence#: 25



— Readings  
 × QP Readings  
 ▼ Ambient  
 ○ Peak Readings  
 \* Average Readings  
 — 1 - 15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170

Customer: **Smartlabs, Inc.**  
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**  
 Work Order #: **94595** Date: 8/5/2013  
 Test Type: **Radiated Scan** Time: 14:12:33  
 Equipment: **INSTEON Door Sensor II** Sequence#: 16  
 Manufacturer: Smartlabs, Inc. Tested By: Hieu Song Nguyenpham  
 Model: 2845-222  
 S/N: ENG1

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00730	Preamp	8447D	1/17/2013	1/17/2015
T2	AN00852	Biconilog Antenna	CBL 6111C	11/28/2012	11/28/2014
T3	ANP00880	Cable	RG214U	7/30/2012	7/30/2014
T4	ANP01183	Cable	CNT-195	10/24/2011	10/24/2013
T5	ANP05300	Cable	RG214/U	3/25/2013	3/25/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
INSTEON Door Sensor II*	Smartlabs, Inc.	2845-222	ENG1

**Support Devices:**

Function	Manufacturer	Model #	S/N
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**Test Conditions / Notes:**

Radiated Spurious Emission  
 Frequency Range: 30MHz to 1000MHz

Firmware Used: DSensor 883 915 TxAlways p40.HEX  
 Temperature: 21.4°C  
 Humidity: 40 %  
 Atmospheric Pressure: 101.2 kPa  
 High Clock: 10MHz

Transmitting operating frequency= 915MHz  
 RF Output= 0dBm

9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz;  
 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz;  
 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz,  
 1000 MHz-10000MHz; RBW=1 MHz, VBW=1 MHz.

The EUT is a portable device and operated at 1.5 VDC. It is placed on the 80cm Styrofoam table and at the center of a turning table. The EUT is set in continuously transmit mode.

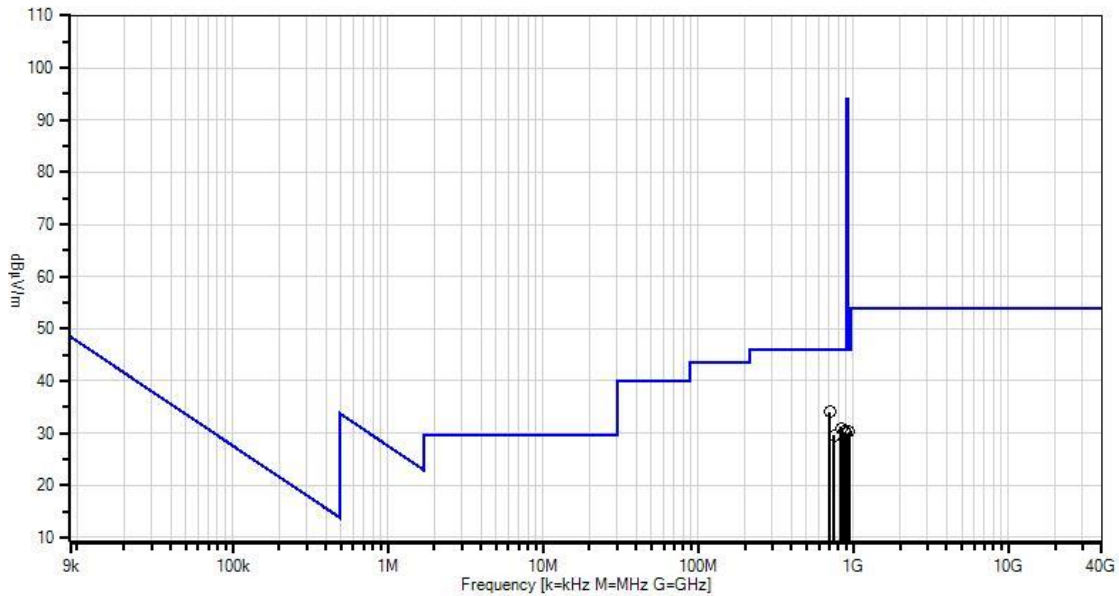
Note: Y-axis

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dB $\mu$ V	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
1	708.680M	35.7	-26.7 +0.8	+20.6	+2.9	+0.8	+0.0	34.1	46.0	-11.9	Horiz
2	835.047M	30.5	-26.9 +0.9	+22.1	+3.3	+1.0	+0.0	30.9	46.0	-15.1	Horiz
3	942.147M	28.5	-27.1 +0.9	+23.4	+3.5	+1.0	+0.0	30.2	46.0	-15.8	Vert
4	871.683M	29.0	-27.0 +0.9	+23.0	+3.4	+0.9	+0.0	30.2	46.0	-15.8	Horiz
5	898.470M	28.8	-27.1 +0.9	+22.9	+3.4	+1.0	+0.0	29.9	46.0	-16.1	Vert
6	750.722M	29.8	-26.9 +0.8	+22.0	+3.0	+0.9	+0.0	29.6	46.0	-16.4	Vert

CKC Laboratories, Inc Date: 8/5/2013 Time: 14:12:33 Smartlabs, Inc WO#: 94595  
Test Distance: 3 Meters Sequence#: 16



— Readings  
× QP Readings  
▼ Ambient

○ Peak Readings  
\* Average Readings  
— 1 - 15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170

Customer: **Smartlabs, Inc.**  
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**  
 Work Order #: **94595** Date: 8/5/2013  
 Test Type: **Radiated Scan** Time: 11:25:01  
 Equipment: **INSTEON Door Sensor II** Sequence#: 7  
 Manufacturer: Smartlabs, Inc. Tested By: Hieu Song Nguyenpham  
 Model: 2845-222  
 S/N: ENG1

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03114	Preamp	AMF-7D-00101800-30-10P	4/11/2013	4/11/2015
T2	AN02157	Horn Antenna-ANSI C63.5	3115	1/23/2013	1/23/2015
T3	AN03015	Cable	32022-2-29094K-24TC	5/6/2013	5/6/2015
T4	AN03302	Cable	32026-29094K-29094K-72TC	3/21/2012	3/21/2014
T5	ANP01210	Cable	FSJ1P-50A-4A	2/19/2013	2/19/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015
T6	AN03172	High Pass Filter	HM1155-11SS	2/9/2012	2/9/2014

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
INSTEON Door Sensor II*	Smartlabs, Inc.	2845-222	ENG1

**Support Devices:**

Function	Manufacturer	Model #	S/N
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**Test Conditions / Notes:**

Radiated Spurious Emission  
 Frequency Range: 1000MHz to 10000MHz

Firmware Used: DSensor 883 915 TxAlways p40.HEX  
 Temperature: 21.4°C  
 Humidity: 40 %  
 Atmospheric Pressure: 101.2 kPa  
 High Clock: 10MHz

Transmitting operating frequency= 915MHz  
 RF Output= 0dBm

9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz;  
 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz;  
 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz,  
 1000 MHz-10000MHz; RBW=1 MHz, VBW=1 MHz.

The EUT is a portable device and operated at 1.5 VDC. It is placed on the 80 cm Styrofoam table and at the center of a turning table. The EUT is set in continuously transmit mode.

Note: Y-axis

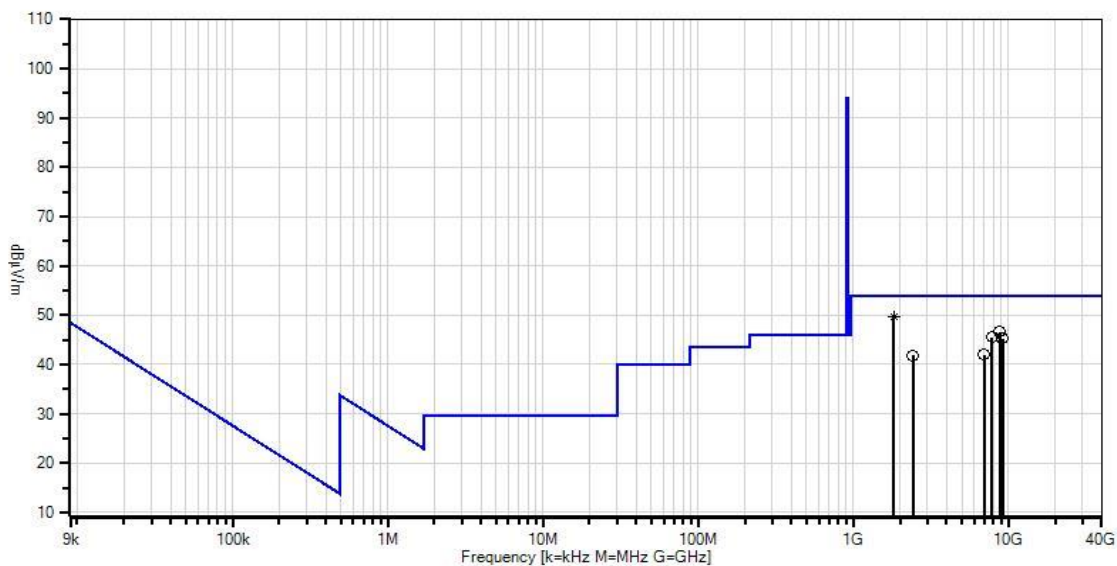


Ext Attn: 0 dB

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

#	Freq MHz	Rdng dB $\mu$ V	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
1	1829.829M	78.0	-58.8 +2.1	+27.0 +0.3	+0.3	+0.9	+0.0	49.8	54.0	-4.2	Horiz
	Ave										
^	1829.829M	80.3	-58.8 +2.1	+27.0 +0.3	+0.3	+0.9	+0.0	52.1	54.0	-1.9	Horiz
^	1829.829M	80.2	-58.8 +2.1	+27.0 +0.3	+0.3	+0.9	+0.0	52.0	54.0	-2.0	Horiz
4	8794.787M	55.3	-56.3 +5.9	+38.0 +0.2	+1.4	+2.1	+0.0	46.6	54.0	-7.4	Vert
5	7792.786M	58.6	-58.6 +5.5	+36.6 +0.2	+1.2	+2.0	+0.0	45.5	54.0	-8.5	Vert
6	9127.040M	54.3	-56.8 +6.0	+38.2 +0.2	+1.3	+2.1	+0.0	45.3	54.0	-8.7	Horiz
7	6951.946M	58.1	-59.4 +5.1	+35.2 +0.1	+0.9	+1.9	+0.0	41.9	54.0	-12.1	Horiz
8	2433.432M	67.6	-59.0 +2.7	+28.7 +0.2	+0.5	+1.1	+0.0	41.8	54.0	-12.2	Vert

CKC Laboratories, Inc Date: 8/5/2013 Time: 11:25:01 Smartlabs, Inc WO#: 94595  
Test Distance: 3 Meters Sequence#: 7



— Readings  
 × QP Readings  
 ▼ Ambient  
 ○ Peak Readings  
 \* Average Readings  
 — 1 - 15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170

Customer: **Smartlabs, Inc.**  
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**  
 Work Order #: **94595** Date: 8/5/2013  
 Test Type: **Radiated Scan** Time: 15:11:35  
 Equipment: **INSTEON Door Sensor II** Sequence#: 22  
 Manufacturer: Smartlabs, Inc. Tested By: Hieu Song Nguyenpham  
 Model: 2845-222  
 S/N: ENG1

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP00880	Cable	RG214U	7/30/2012	7/30/2014
T2	ANP05300	Cable	RG214/U	3/25/2013	3/25/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015
T3	AN00432	Loop Antenna	6502	4/2/2013	4/2/2015

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
INSTEON Door Sensor II*	Smartlabs, Inc.	2845-222	ENG1

**Support Devices:**

Function	Manufacturer	Model #	S/N
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**Test Conditions / Notes:**

Radiated Spurious Emission  
 Frequency Range: 9kHz to 30MHz

Firmware Used: DSensor 883 915 TxAlways p40.HEX  
 Temperature: 21.4°C  
 Humidity: 40 %  
 Atmospheric Pressure: 101.2 kPa  
 High Clock: 10MHz

Transmitting operating frequency= 915MHz  
 RF Output= 0dBm

9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz;  
 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz;  
 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz,  
 1000 MHz-10000MHz RBW=1 MHz, VBW=1 MHz.

The EUT is a portable device and operated at 1.5 VDC. It is placed on the 80cm Styrofoam table and at the center of a turning table. The EUT is set in continuously transmit mode.

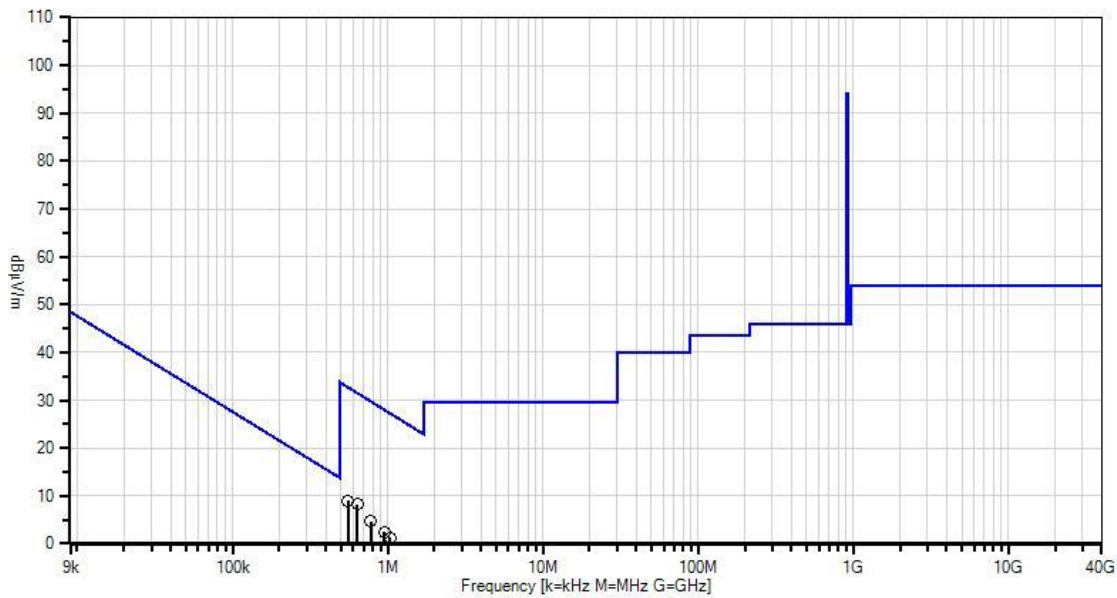
Note: Z-axis

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dB $\mu$ V	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
1	635.043k	38.3	+0.1	+0.0	+9.8		-40.0	8.2	31.5	-23.3	Paral
2	557.687k	39.1	+0.1	+0.0	+9.8		-40.0	9.0	32.7	-23.7	Perpe
3	777.211k	35.1	+0.1	+0.0	+9.5		-40.0	4.7	29.8	-25.1	Perpe
4	946.557k	32.8	+0.1	+0.0	+9.6		-40.0	2.5	28.0	-25.5	Paral
5	1.032M	31.4	+0.1	+0.0	+9.7		-40.0	1.2	27.3	-26.1	Perpe
6	1.239M	29.0	+0.1	+0.0	+9.8		-40.0	-1.1	25.7	-26.8	Paral

CKC Laboratories, Inc Date: 8/5/2013 Time: 15:11:35 Smartlabs, Inc WO#: 94595  
Test Distance: 3 Meters Sequence#: 22



— Readings  
 × QP Readings  
 ▼ Ambient  
 ○ Peak Readings  
 \* Average Readings  
 — 1 - 15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170

Customer: **Smartlabs, Inc.**  
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**  
 Work Order #: **94595** Date: 8/5/2013  
 Test Type: **Radiated Scan** Time: 14:40:11  
 Equipment: **INSTEON Door Sensor II** Sequence#: 19  
 Manufacturer: Smartlabs, Inc. Tested By: Hieu Song Nguyenpham  
 Model: 2845-222  
 S/N: ENG1

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00730	Preamp	8447D	1/17/2013	1/17/2015
T2	AN00852	Biconilog Antenna	CBL 6111C	11/28/2012	11/28/2014
T3	ANP00880	Cable	RG214U	7/30/2012	7/30/2014
T4	ANP01183	Cable	CNT-195	10/24/2011	10/24/2013
T5	ANP05300	Cable	RG214/U	3/25/2013	3/25/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
INSTEON Door Sensor II*	Smartlabs, Inc.	2845-222	ENG1

**Support Devices:**

Function	Manufacturer	Model #	S/N
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**Test Conditions / Notes:**

Radiated Spurious Emission  
 Frequency Range: 30MHz to 1000MHz

Firmware Used: DSensor 883 915 TxAlways p40.HEX  
 Temperature: 21.4°C  
 Humidity: 40 %  
 Atmospheric Pressure: 101.2 kPa  
 High Clock: 10MHz

Transmitting operating frequency= 915MHz  
 RF Output= 0dBm

9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz;  
 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz;  
 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz,  
 1000 MHz-10000MHz; RBW=1 MHz, VBW=1 MHz

The EUT is a portable device and operated at 1.5 VDC. It is placed on the 80cm Styrofoam table and at the center of a turning table. The EUT is set in continuously transmit mode.

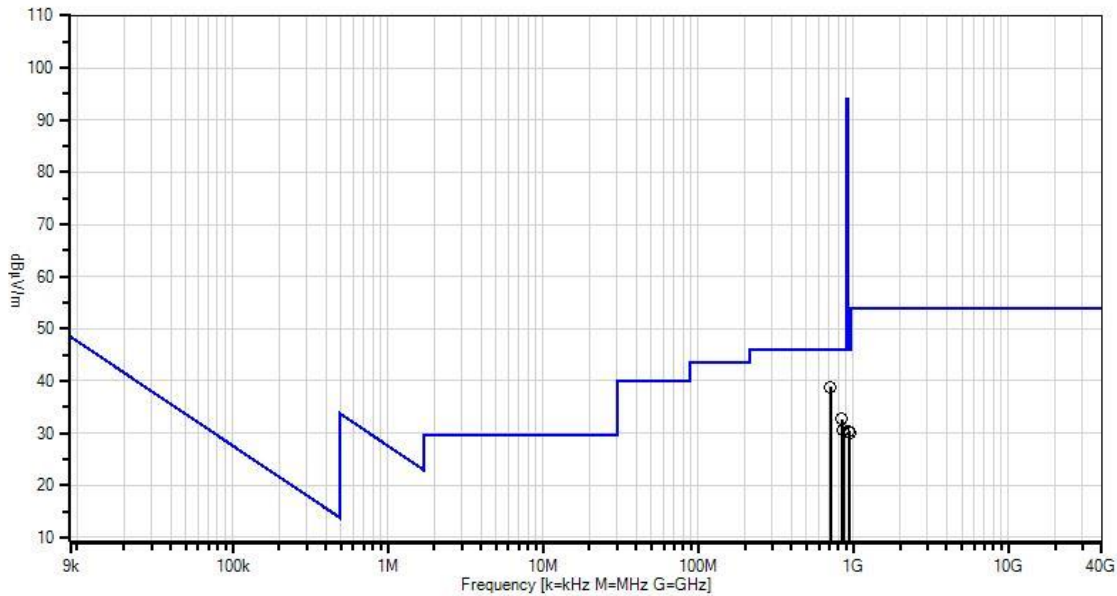
Note: Z-axis

Ext Attn: 0 dB

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

#	Freq MHz	Rdng dB $\mu$ V	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
1	712.885M	40.3	-26.7 +0.8	+20.7	+2.9	+0.8	+0.0	38.8	46.0	-7.2	Vert
2	844.897M	32.3	-26.9 +0.9	+22.1	+3.3	+1.0	+0.0	32.7	46.0	-13.3	Vert
3	864.957M	29.7	-27.0 +0.9	+22.8	+3.3	+1.0	+0.0	30.7	46.0	-15.3	Horiz
4	938.829M	28.8	-27.1 +0.9	+23.2	+3.5	+1.0	+0.0	30.3	46.0	-15.7	Vert
5	952.353M	28.3	-27.1 +0.9	+23.5	+3.5	+1.0	+0.0	30.1	46.0	-15.9	Horiz
6	947.219M	28.1	-27.1 +0.9	+23.5	+3.5	+1.0	+0.0	29.9	46.0	-16.1	Horiz

CKC Laboratories, Inc Date: 8/5/2013 Time: 14:40:11 Smartlabs, Inc WO#: 94595  
Test Distance: 3 Meters Sequence#: 19



— Readings  
 × QP Readings  
 ▼ Ambient  
 ○ Peak Readings  
 \* Average Readings  
 — 1 - 15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170

Customer: **Smartlabs, Inc.**  
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**  
 Work Order #: **94595** Date: 8/5/2013  
 Test Type: **Radiated Scan** Time: 11:47:02  
 Equipment: **INSTEON Door Sensor II** Sequence#: 10  
 Manufacturer: Smartlabs, Inc. Tested By: Hieu Song Nguyenpham  
 Model: 2845-222  
 S/N: ENG1

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03114	Preamp	AMF-7D-00101800-30-10P	4/11/2013	4/11/2015
T2	AN02157	Horn Antenna-ANSI C63.5	3115	1/23/2013	1/23/2015
T3	AN03015	Cable	32022-2-29094K-24TC	5/6/2013	5/6/2015
T4	AN03302	Cable	32026-29094K-29094K-72TC	3/21/2012	3/21/2014
T5	ANP01210	Cable	FSJ1P-50A-4A	2/19/2013	2/19/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015
T6	AN03172	High Pass Filter	HM1155-11SS	2/9/2012	2/9/2014

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
INSTEON Door Sensor II*	Smartlabs, Inc.	2845-222	ENG1

**Support Devices:**

Function	Manufacturer	Model #	S/N
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**Test Conditions / Notes:**

Radiated Spurious Emission  
 Frequency Range: 1000MHz to 10000MHz

Firmware Used: DSensor 883 915 TxAlways p40.HEX  
 Temperature: 21.4°C  
 Humidity: 40 %  
 Atmospheric Pressure: 101.2 kPa  
 High Clock: 10MHz

Transmitting operating frequency= 915MHz  
 RF Output= 0dBm

9 kHz -150 kHz; =200 Hz, VBW=200 Hz;  
 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz;  
 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz,  
 1000 MHz-10000MHz; RBW=1 MHz, VBW=1 MHz.

The EUT is a portable device and operated at 1.5 VDC. It is placed on the 80cm Styrofoam table and at the center of a turning table. The EUT is set in continuously transmit mode.

Note: Z-axis

Ext Attn: 0 dB

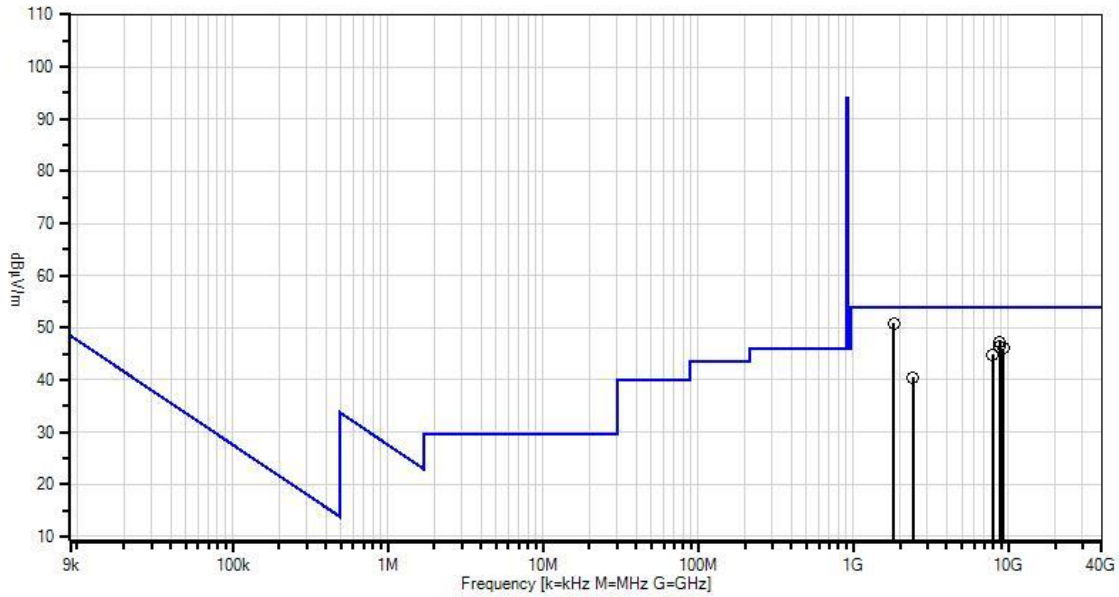
**Measurement Data:**

Reading listed by margin.

Test Distance: 3 Meters

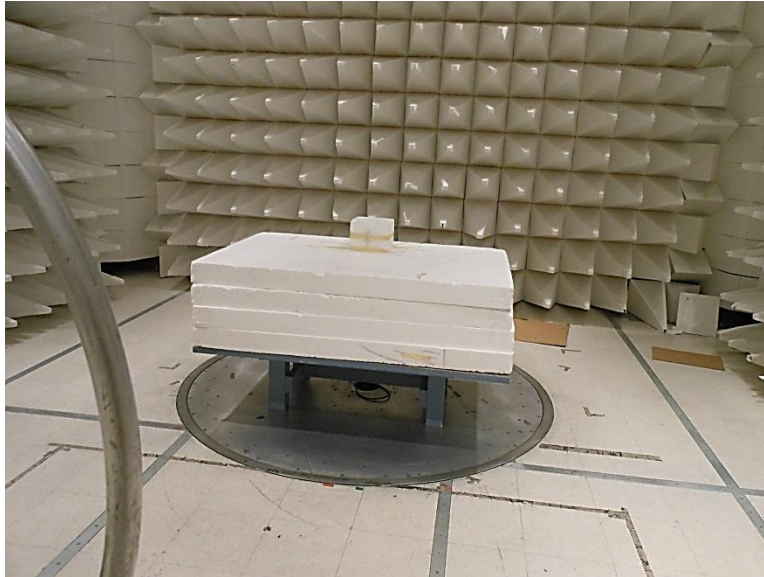
#	Freq MHz	Rdng dB $\mu$ V	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
1	1829.829M	79.1	-58.8 +2.1	+27.0 +0.3	+0.3	+0.9	+0.0	50.9	54.0	-3.1	Vert
2	8806.799M	56.0	-56.3 +5.9	+38.0 +0.2	+1.4	+2.1	+0.0	47.3	54.0	-6.7	Vert
3	8820.813M	55.1	-56.3 +5.9	+38.1 +0.2	+1.4	+2.1	+0.0	46.5	54.0	-7.5	Horiz
4	9264.928M	55.2	-57.3 +6.1	+38.3 +0.2	+1.3	+2.2	+0.0	46.0	54.0	-8.0	Horiz
5	7944.938M	57.0	-57.9 +5.4	+36.8 +0.2	+1.3	+2.0	+0.0	44.8	54.0	-9.2	Horiz
6	2434.433M	66.3	-59.0 +2.7	+28.7 +0.2	+0.5	+1.1	+0.0	40.5	54.0	-13.5	Vert

CKC Laboratories, Inc Date: 8/5/2013 Time: 11:47:02 Smartlabs, Inc WO#: 94595  
Test Distance: 3 Meters Sequence#: 10

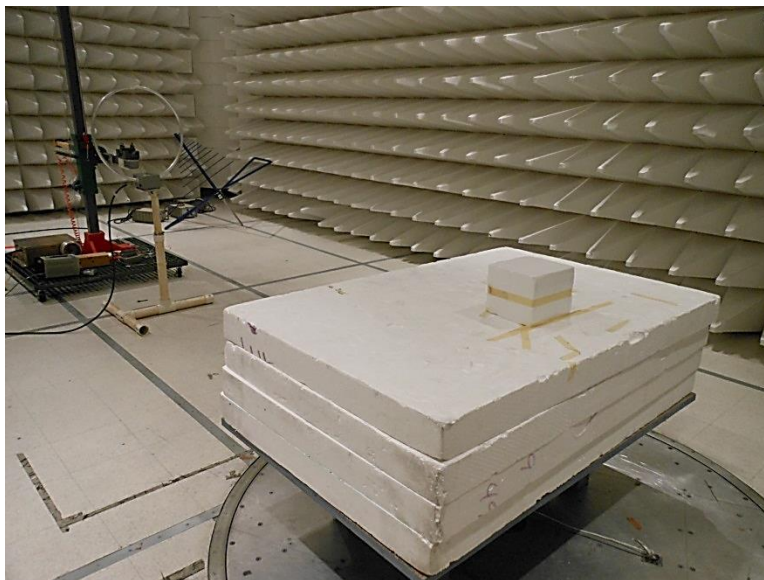


— Readings  
 × QP Readings  
 ▼ Ambient  
 ○ Peak Readings  
 \* Average Readings  
 — 1 - 15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)

**Test Setup Photos**

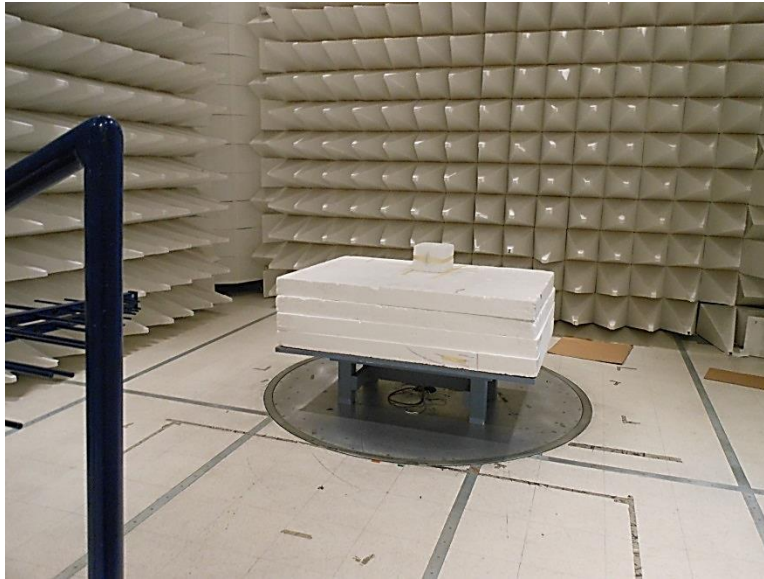


9kHz-30MHz

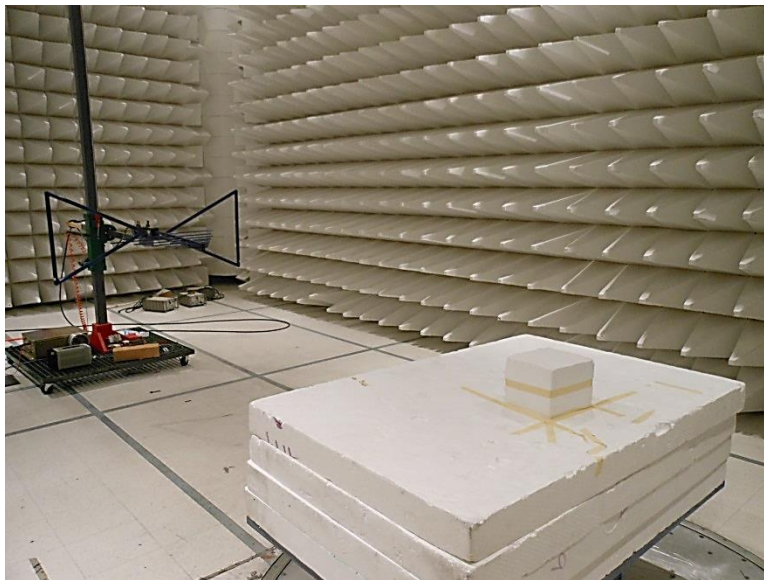


9kHz-30MHz

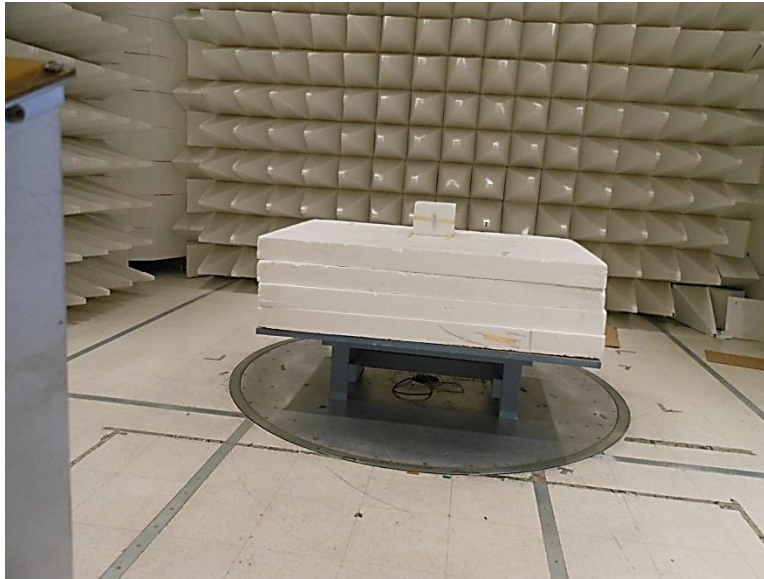




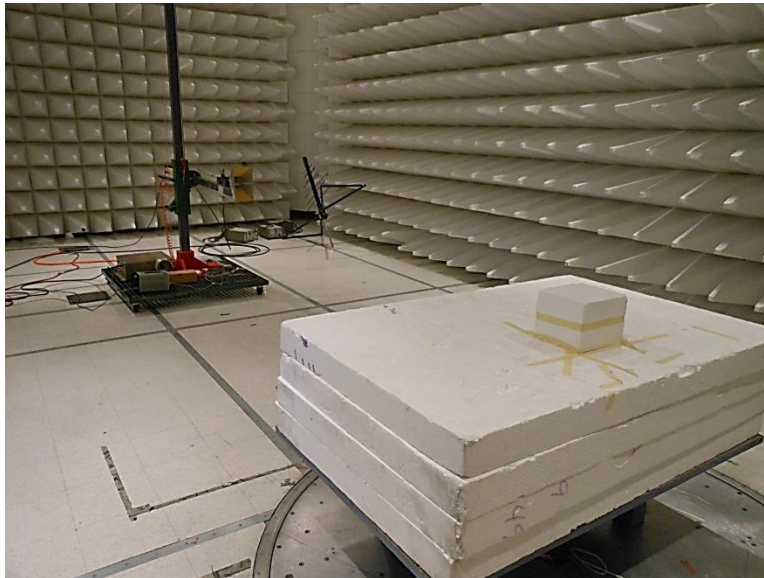
30MHz-1GHz



30MHz-1GHz



1-10GHz



1-10GHz

**15.249(d) Band Edge Measurements**

**Test Conditions / Setup**

Test Location: CKC Laboratories, Inc. • 1120 Fulton Place • Fremont, CA 94539 • (510) 249-1170

Customer: **Smartlabs, Inc.**

Specification: **Band Edge**

Work Order #: **94595**

Date: 8/5/2013

Test Type: **Radiated Scan**

Time: 09:30:05

Equipment: **INSTEON Door Sensor II**

Sequence#: 1

Manufacturer: Smartlabs, Inc.

Tested By: Hieu Song Nguyenpham

Model: 2845-222

S/N: ENG1

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00852	Biconilog Antenna	CBL 6111C	11/28/2012	11/28/2014
T2	ANP00880	Cable	RG214U	7/30/2012	7/30/2014
T3	ANP05300	Cable	RG214/U	3/25/2013	3/25/2015
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
INSTEON Door Sensor II*	Smartlabs, Inc.	2845-222	ENG1

**Support Devices:**

Function	Manufacturer	Model #	S/N
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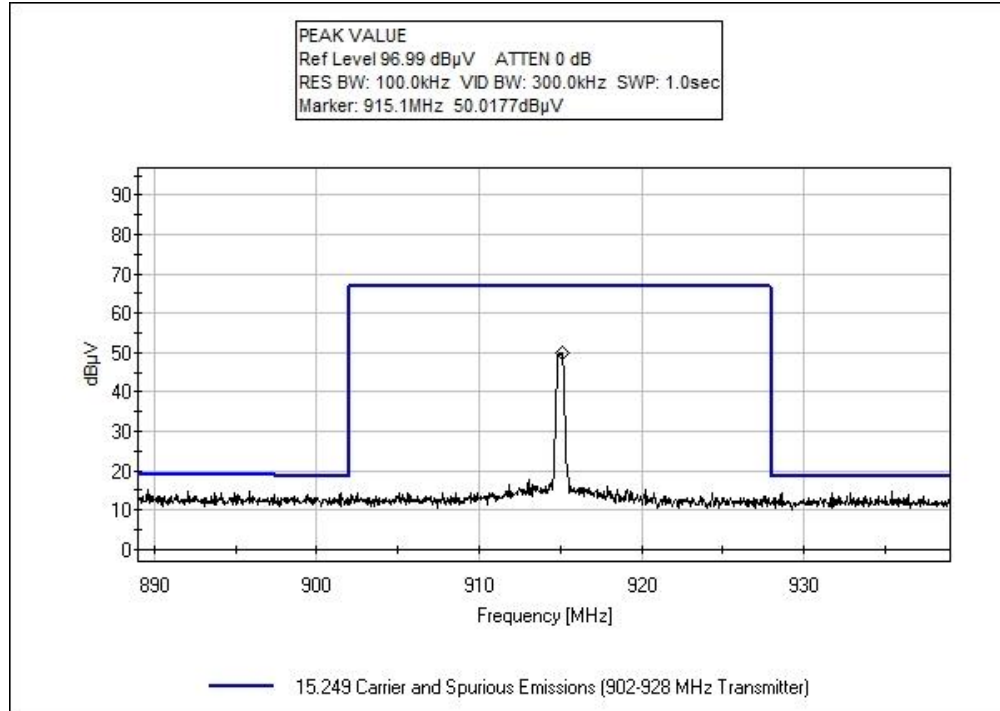
**Test Conditions / Notes:**

Firmware Used: DSensor 883 915 TxAlways p40.HEX  
 Temperature: 21.4°C  
 Humidity: 40 %  
 Atmospheric Pressure: 101.2 kPa  
 High Clock: 10MHz

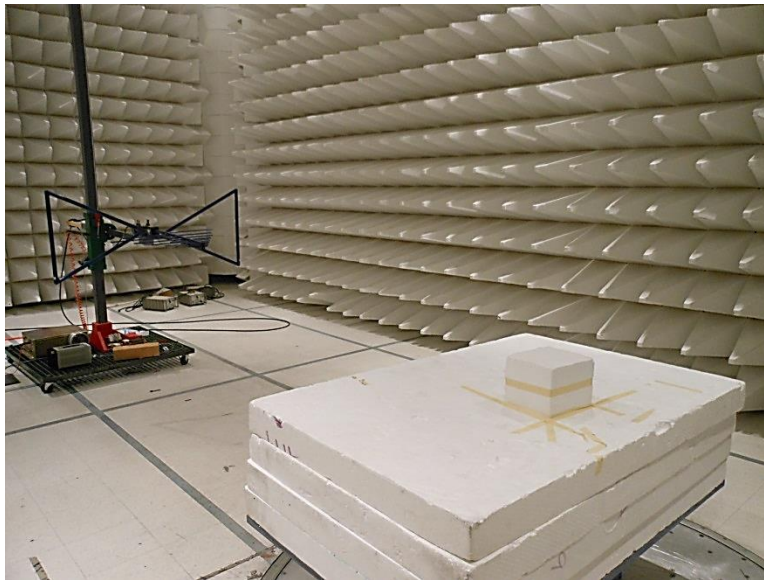
Transmitting operating frequency= 915MHz  
 RF Output= 0dBm

The EUT is a portable device and operated at 1.5 VDC. It is placed on the 80cm Styrofoam table and at the center of a turning table. The EUT is set in continuously transmit mode.

**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 $\mu$ V)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dB $\mu$ 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	9 kHz	150 kHz	200 Hz
RADIATED 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.