1601 North A.W. Grimes Blvd., Suite B
Round Rock, TX 78665
e-mail: info@ptitest.com
(512) 244-3371 Fax: (512) 244-1846

September 6, 2013

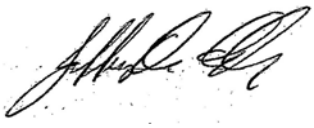
William Martens
WWSBP, LLC
3515 Peachwood Lane
Sugar Land, Texas 77479

Dear William:

Thank you for allowing Professional Testing (EMI), Inc. an opportunity to perform testing for WWSBP, LLC. Enclosed is the Wireless Certification Report for the SafetyBoost Transmitter. This report can be used to demonstrate compliance with FCC requirements for wireless devices in the United States.

If you have any questions, please contact me.

Sincerely,



Jeffrey A. Lenk
President

Attachment

Project 14391-10

SafetyBoost Transmitter

Wireless Certification Report

Prepared for:

WWSBP, LLC

By

Professional Testing (EMI), Inc.
1601 North A.W. Grimes Blvd., Suite B
Round Rock, Texas 78665

September 6, 2013

Reviewed by

Larry Finn
Product Development Engineer

Written by

Eric Lifsey
Test Engineer

Revision History

Revision Number	Description	Date
00	Initial Release	August 23, 2013
01	Revised per ACB Comments	September 6, 2013

Table of Contents

NOTICE:

(1) This Report must not be used to claim product endorsement, by NVLAP, NIST, the FCC or any other Agency. This report also does not warrant certification by NVLAP or NIST.

(2) This report shall not be reproduced except in full, without the written approval of Professional Testing (EMI), Inc.

(3) The significance of this report is dependent on the representative character of the test sample submitted for evaluation and the results apply only in reference to the sample tested. The manufacturer must continuously implement the changes shown herein to attain and maintain the required degree of compliance.

Certificate of Compliance

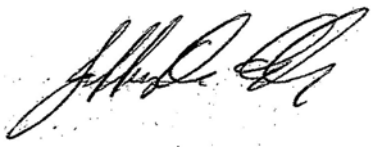
Applicant: WWSBP, LLC
Applicant's Address: 8500 Clinton Rd, Unit 1104A
Brooklyn, OH 44144

FCC ID: RSI-SBZ113
Model: SafetyBoost Transmitter
Project Number: 14391-10

The **SafetyBoost Transmitter** by **WWSBP, LLC**, was tested utilizing the following documents and found to be in compliance with the required criteria on the indicated test date.

47 CFR (USA)		
Section Reference	Parameter	Date
15.231	Fundamental Field Strength	2013-06-18
15.231	Transmit Timing	2013-02-07
15.209	Harmonic & Spurious Emissions	2013-08-07
15.203	Antenna Requirements	2013-06-18
15.231(c)	Bandwidth	2013-09-06
2.1091	Maximum Permissible Exposure	2013-08-21

I, Jeffrey A. Lenk, for Professional Testing (EMI), Inc., being familiar with the FCC rules and test procedures, have reviewed the test setup, measured data, and this report. I believe them to be true and accurate.



Jeffrey A. Lenk
President

This report has been reviewed and accepted by WWSBP, LLC. The undersigned is responsible for ensuring that the SafetyBoost Transmitter by WWSBP, LLC, will continue to comply with the applicable rules.

_____
Representative of WWSBP, LLC

1.0 Introduction

1.1 Scope

This report describes the extent to which the equipment under test (EUT) conformed to the intentional radiator requirements of the United States.

Professional Testing (EMI), Inc., (PTI) follows the guidelines of National Institute of Standards and Technology (NIST) for all uncertainty calculations, estimates, and expressions thereof for electromagnetic compatibility testing. The procedures of ANSI C63.4: 2009 were used for making all radiated enclosure and mains emission measurements.

1.2 EUT Description

The EUT is the **SafetyBoost Transmitter** by **WWSBP, LLC**. This device remotely activates a vehicular backup or boost battery system. On pressing the transmit button, a receiver in the vehicle connects a standby battery to provide an emergency boost of power for starting the engine. It sends a simple FSK modulated signal on the 315 MHz band. The system as tested consisted of the following:

Table 1.2.1: Equipment Under Test

Manufacturer	Model	Serial #	Description
WWSBP, LLC	SafetyBoost Transmitter	none	Boost battery remote control.

The device is composed of a single circuit board, one push-button switch, and two coin-style batteries. It is the size of a key fob. It measures 72 x 35 x 15 mm.

1.3 EUT Operation

The EUT was exercised in a manner consistent with normal operations.

Photograph 1.3.1: EUT

1.4 Modifications to Equipment

No modifications were made to the EUT during the performance of the test program; however, a wire was soldered across the transmitter enable button to allow continuous transmit operation for testing.

1.5 Test Site

Measurements were made at the PTI semi-anechoic facility designated Site 45 (FCC 459644, IC 3036B-1) in Austin, Texas. The site is registered with the FCC under Section 2.948 and Industry Canada per RS-Gen, and is subsequently confirmed by laboratory accreditation (NVLAP). The test site is located at 11400 Burnet Road, Austin, Texas 78758, while the main office is located at 1601 North A.W. Grimes Boulevard, Suite B, Round Rock, Texas, 78665.

2.0 Applicable Documents and Clauses

This device operates on 315 MHz under 47 CFR and relevant part(s) applies as shown below.

Table 2.0.1: Applicable Documents

Document #	Title/Description
47 CFR (USA)	Part 15 – Section 15.231
ANSI C63.4 2009	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment

Table 2.0.2: Applicable Clauses

Clause Subject	Section References	Required?	Result
Radiated Output Power	15.231	Yes	Pass
Occupied Bandwidth, 20 dB	15.231(c)	Yes	Pass
Field Strength of Radiated Spurious/Harmonic Emissions (30 MHz to 3.2 GHz)	15.231, 15.209	Yes	Pass
Antenna Construction	15.203	Yes	Pass
Maximum Permissible Exposure*	2.1091, FCC OET Bulletin 65	Yes	Pass

*Reported in another document.

3.0 Fundamental Field Strength

Radiated peak output power measurements were made on the EUT.

3.1 Test Procedure

EUT is placed on a non-conductive surface 80 cm above a reference plane and measurements of emissions are made to find maximum emission level.

3.2 Test Criteria

Section Reference	Parameter	Date(s)
15.231	Radiated Output Power, Band: 260 to 470 MHz, Limit Range: 3750 to 12500 µV/m At 315 MHz Limit (3 m) Is: **6,041.67 µV/m** Or restated as: **75.62 dB µV/m at 3 m**	2013-06-18

3.3 Test Results

The EUT was found to be in compliance with the applicable criteria. The maximum emission is presented below and compared to the limit.

Field Strength of Fundamental 10 Meter Measurement Distance Extrapolated to 3 meters

Frequency MHz	Orientation	Antenna Polarity	Antenna Height meters	Raw Measured Level dBµV	Amplifier Gain dB	Antenna Factor dB/m	Cable Loss dB	Corrected Level (Measured Peak Level) dBµV/m	Detector Mode
315	Upright	V	3.6	84.66	28.6	13.6	3.8	73.46	Peak
315	Flat	H	2.7	84.40	28.6	13.6	3.8	73.20	Peak
315	Side	H	2.7	82.93	28.6	13.6	3.8	71.73	Peak

Resolution Bandwidth 120 kHz, maximum emission in orientation upright.

Limit at 3 meter dBµV/m	Corrected Level (Measured Peak Level) dBµV/m	Margin dB
75.62	73.46	-2.16

4.0 Transmitter Timing

The transmitter must cease transmitting after transmit function is released within defined time period per rules.

4.1 Test Procedure

The EUT transmit output is observed while operating the transmitter.

4.2 Test Criteria

Section Reference	Parameter	Date(s)
15.231(a)(1)	Transmission ends in less than 5 seconds.	2013-02-07

4.3 Test Results

EUT transmit button supplies all power to the transmitter.

This is a manually operated transmitter and has no periodic or pulsed transmit capabilities.

Power is removed from the device instantly when the transmit button is released.

The EUT was found to be in compliance with applicable requirements.

5.0 Occupied Bandwidth

Occupied bandwidth measurement was made on the EUT.

5.1 Test Procedure

The EUT is configured for best signal/power and the bandwidth then is measured. A recording of the results is included.

5.2 Test Criteria

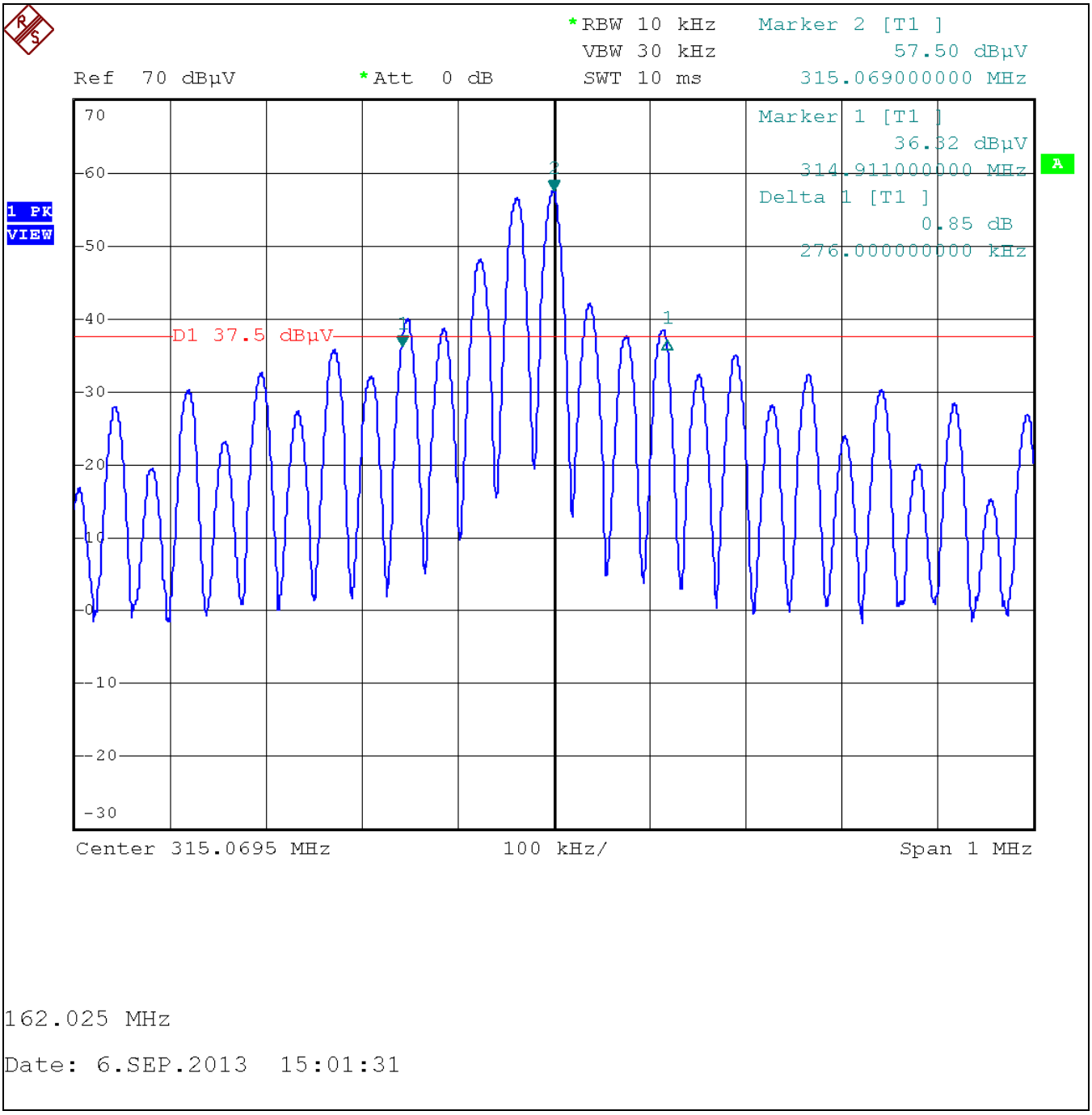
Section Reference	Parameter	Date(s)
15.231(c)	Bandwidth, 20 dB (min) Band: 70 to 900 MHz No wider than 0.25% of center frequency. 0.25% of 315 MHz: **787.5 kHz**	2013-09-06

5.3 Test Results

EUT was found to be in compliance with applicable requirements.

BW Limit (kHz)	BW Measured (kHz)
787.50	276.00

5.3.1 Bandwidth Plot



6.0 Radiated Spurious Emissions Below 1 GHz

Out of band spurious/harmonic emissions measurements were performed on the EUT to determine compliance to 47 CFR, Part 15.

6.1 Test Procedure

The EUT was placed on a non-conductive table 0.8 meters above the ground plane. The table was centered on a rotating turntable at a distance of 10 meters from the measurement antenna.

Spurious/harmonic emissions below 1 GHz were measured with peak detection with a resolution bandwidth of 120 kHz and measured at a distance of 10 meters. A diagram showing the test setup is given as Figure 6.1.1.

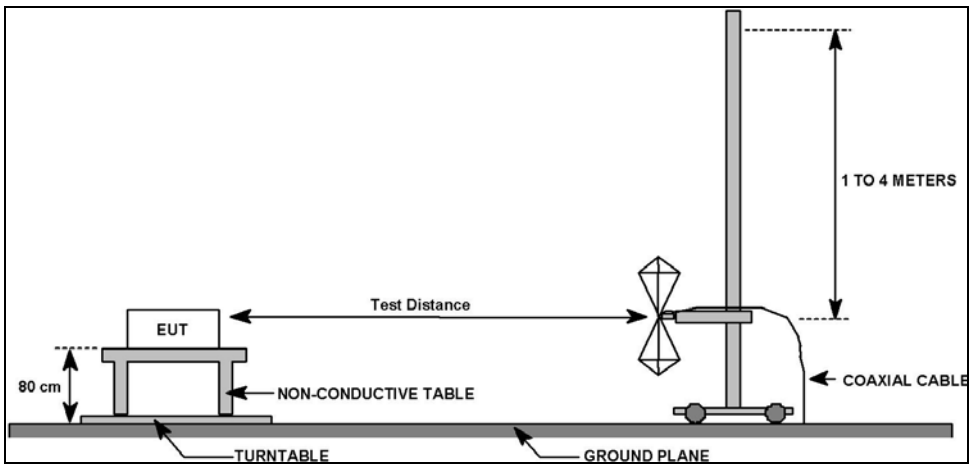


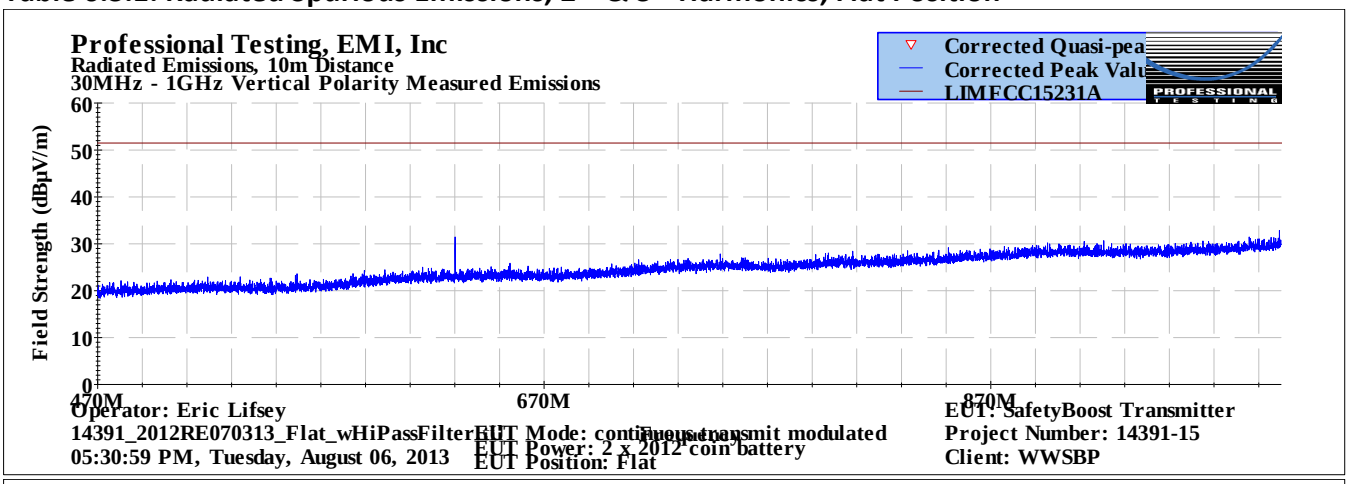
Figure 6.1.1: Field Strength of Spurious Emissions Test Setup

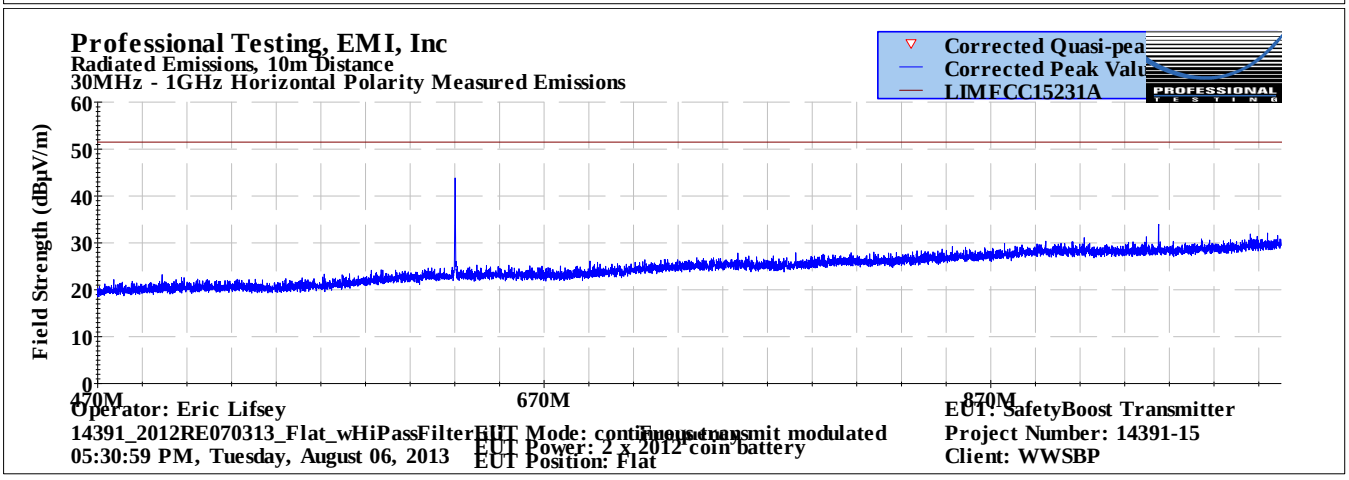
6.2 Test Criteria

Clause Subject	Section Number	Required?
Field Strength of Radiated Spurious/Harmonic Emissions	15.231, 15.209	Yes

6.3 Test Results

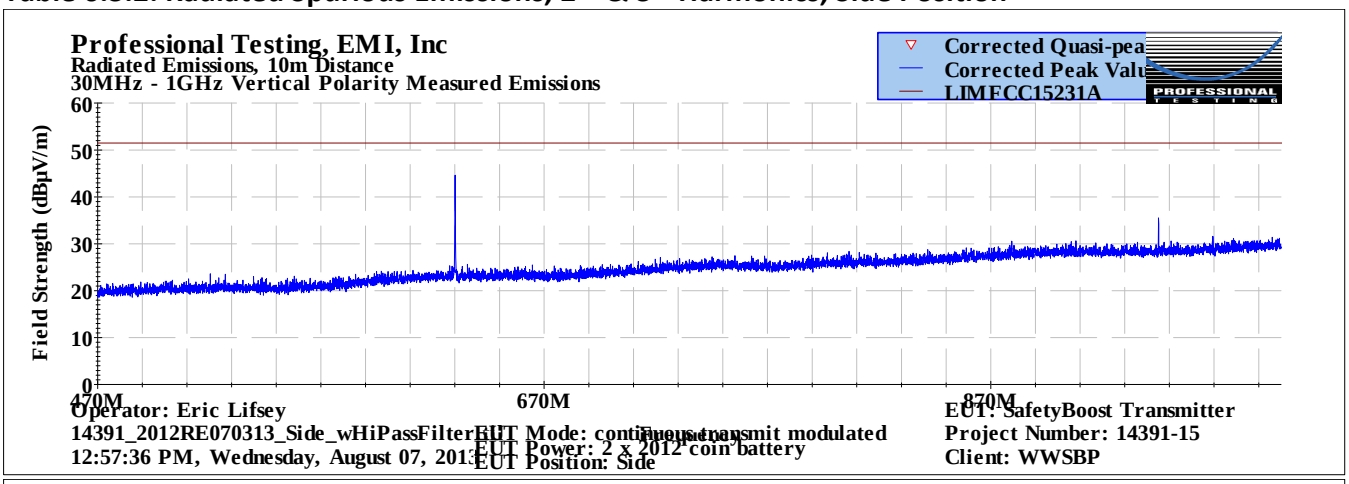
Table 6.3.1: Radiated Spurious Emissions, 2nd & 3rd Harmonics, Flat Position

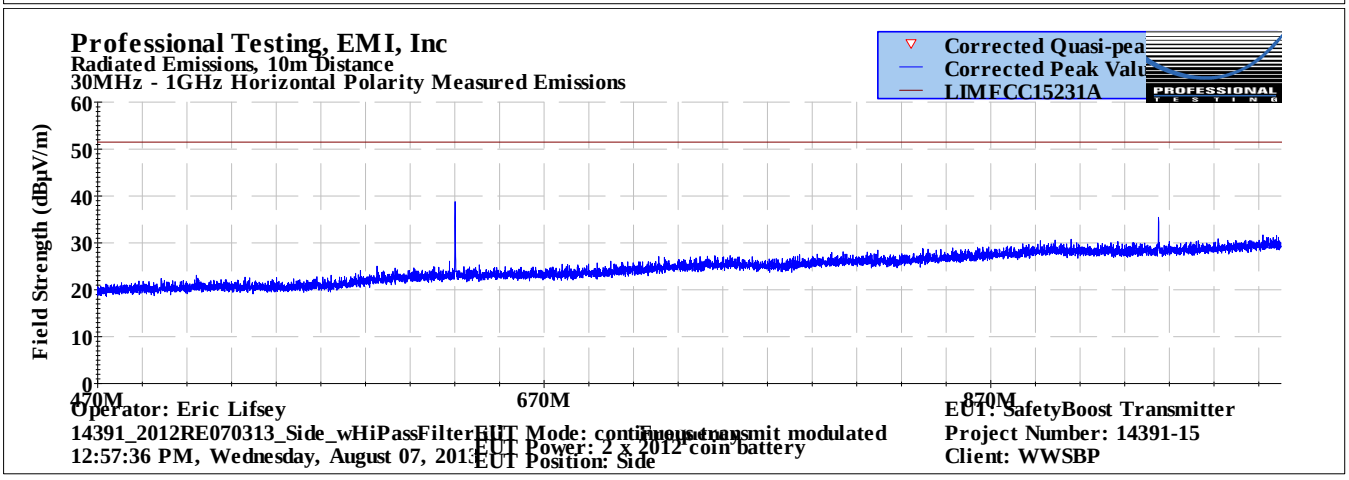




Maximum in flat position: Vertical polarity, 630.06 MHz, 43.8 dBµV/m Corrected Level

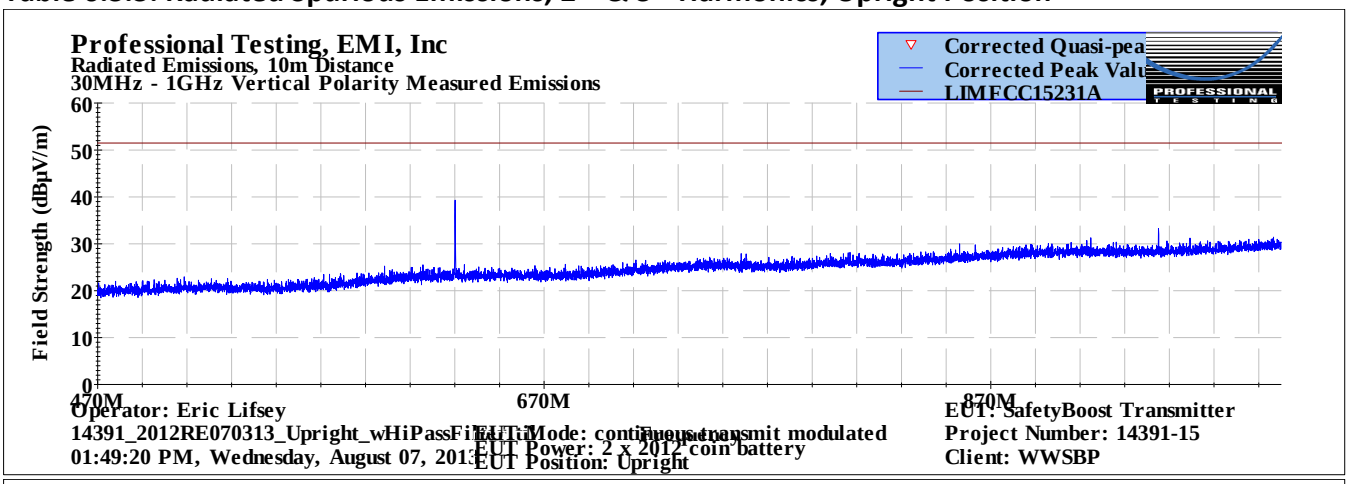
Table 6.3.2: Radiated Spurious Emissions, 2nd & 3rd Harmonics, Side Position

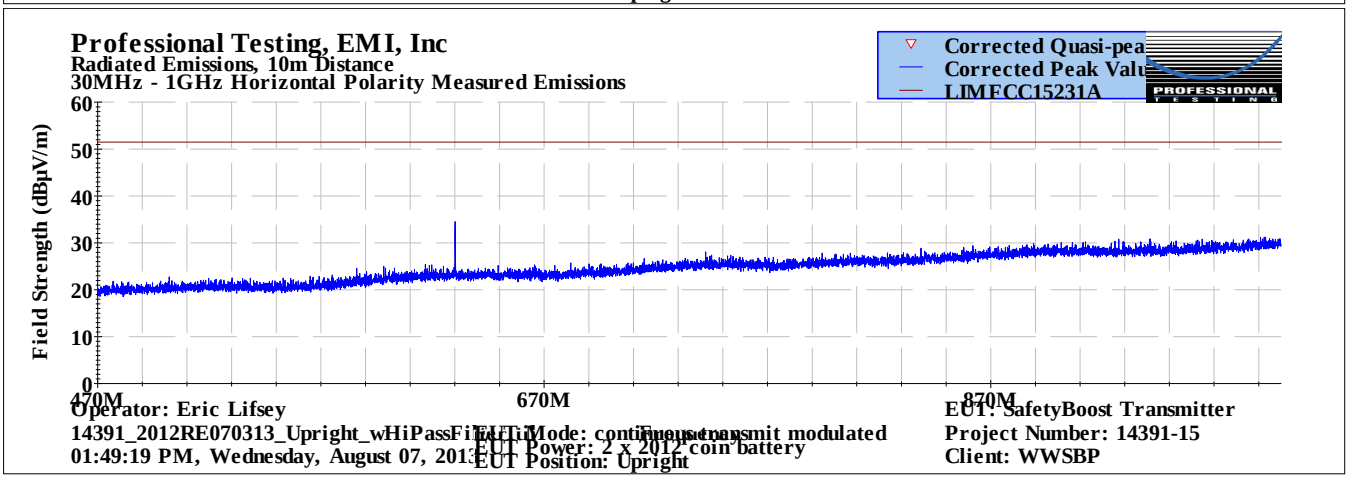




Maximum in side position: Vertical polarity, 630.06 MHz, 44.6 dBµV/m Corrected Level

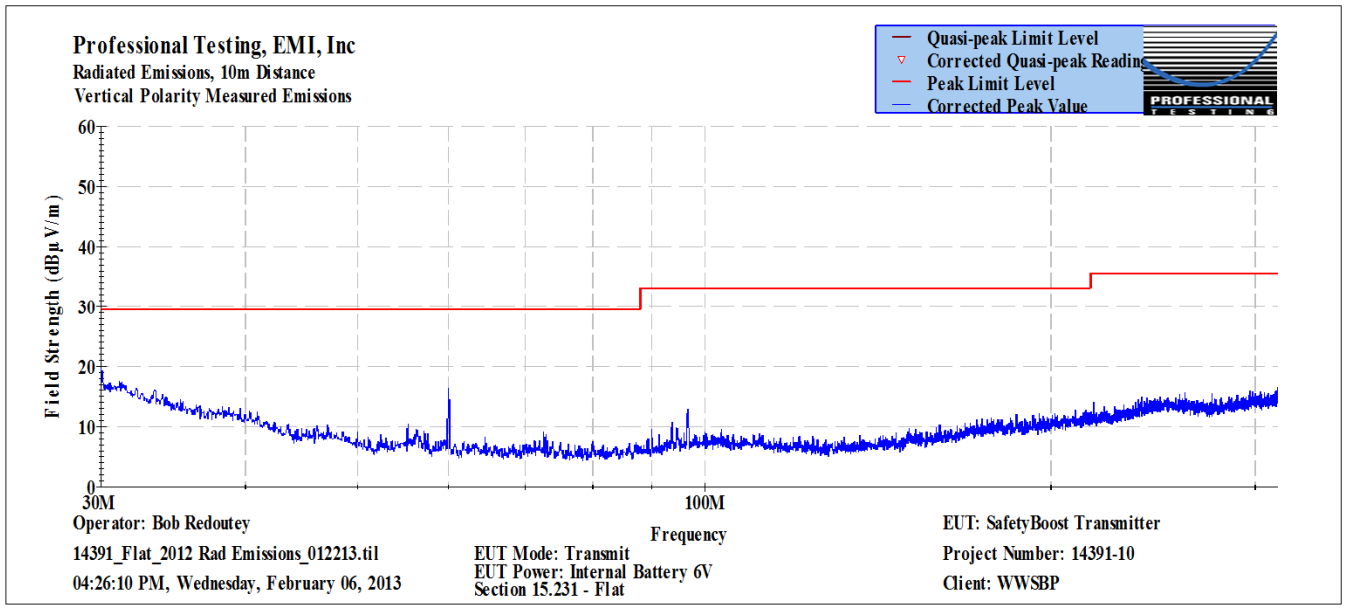
Table 6.3.3: Radiated Spurious Emissions, 2nd & 3rd Harmonics, Upright Position

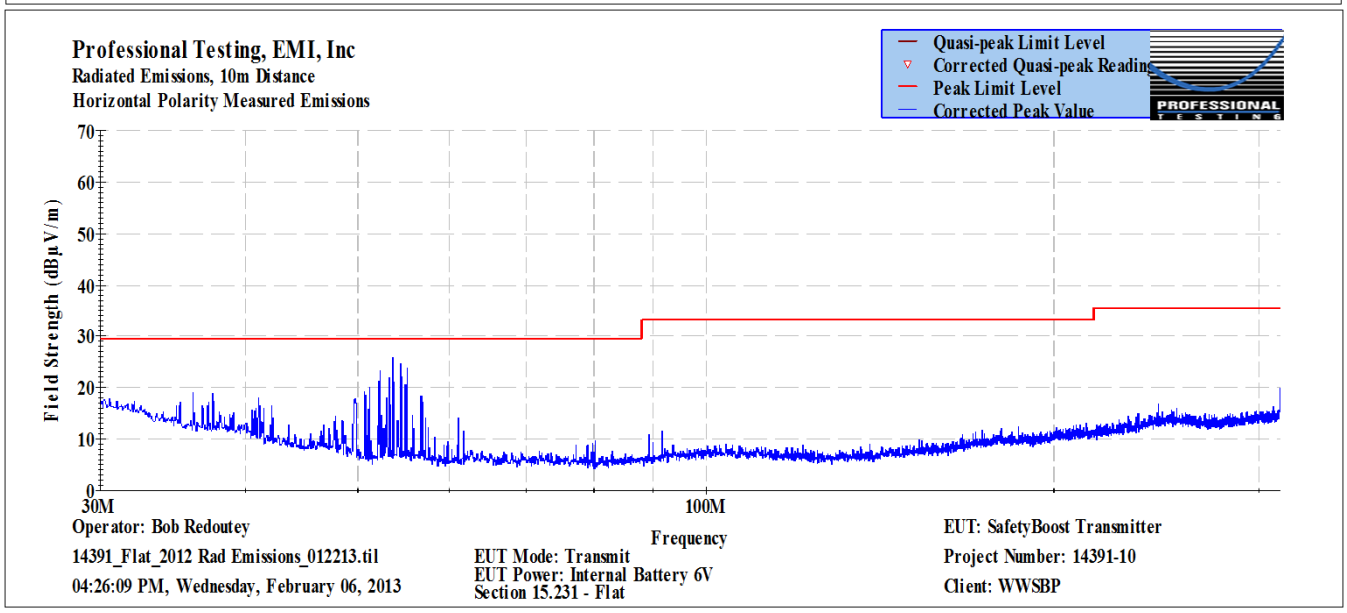




Maximum in upright position: Vertical polarity, 630.06 MHz, 39.3 dBµV/m Corrected Level

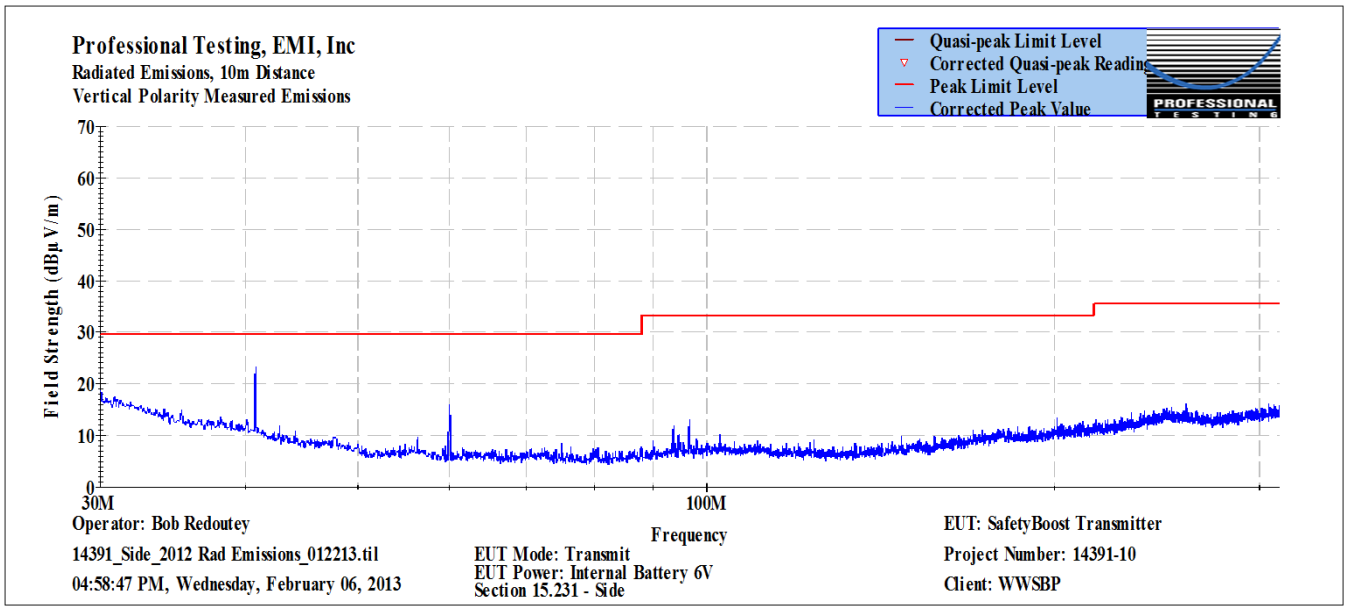
Table 6.3.4: Radiated Spurious Emissions below Fundamental Frequency, Flat Position





Note – in the lower graph a noise burst from 45 MHz to 60 MHz from the chamber metal vapor lighting system which was captured as under the limit and can be disregarded.

Table 6.3.5: Radiated Spurious Emissions below Fundamental Frequency, Side Position



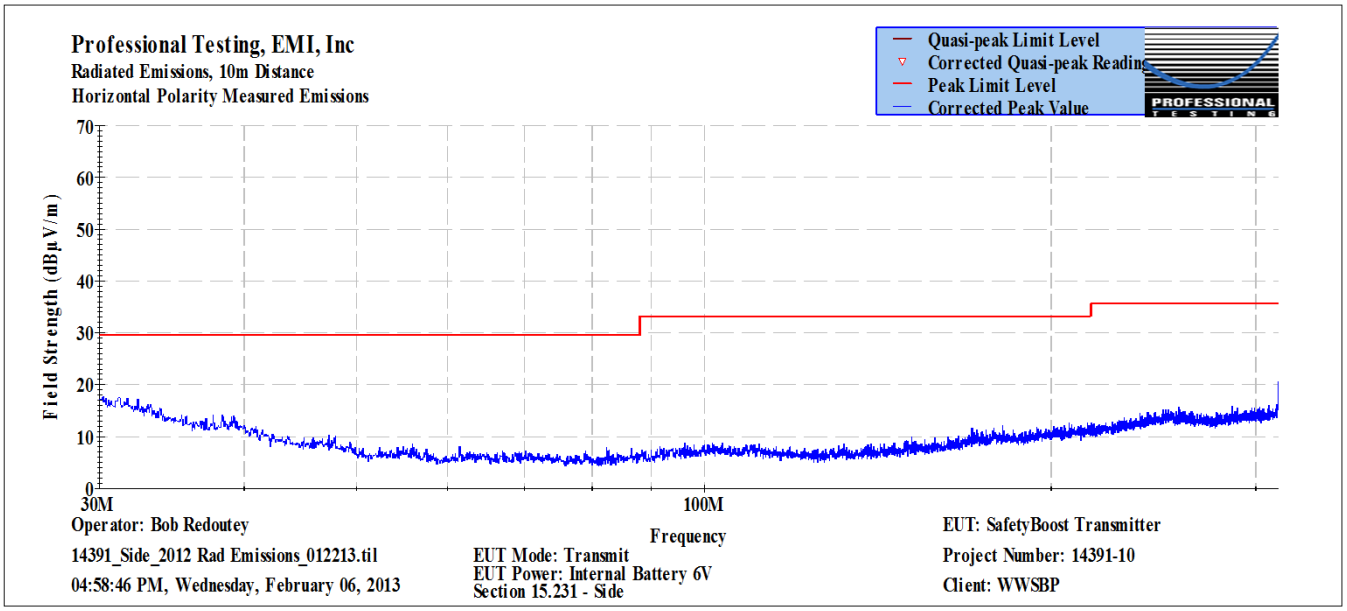
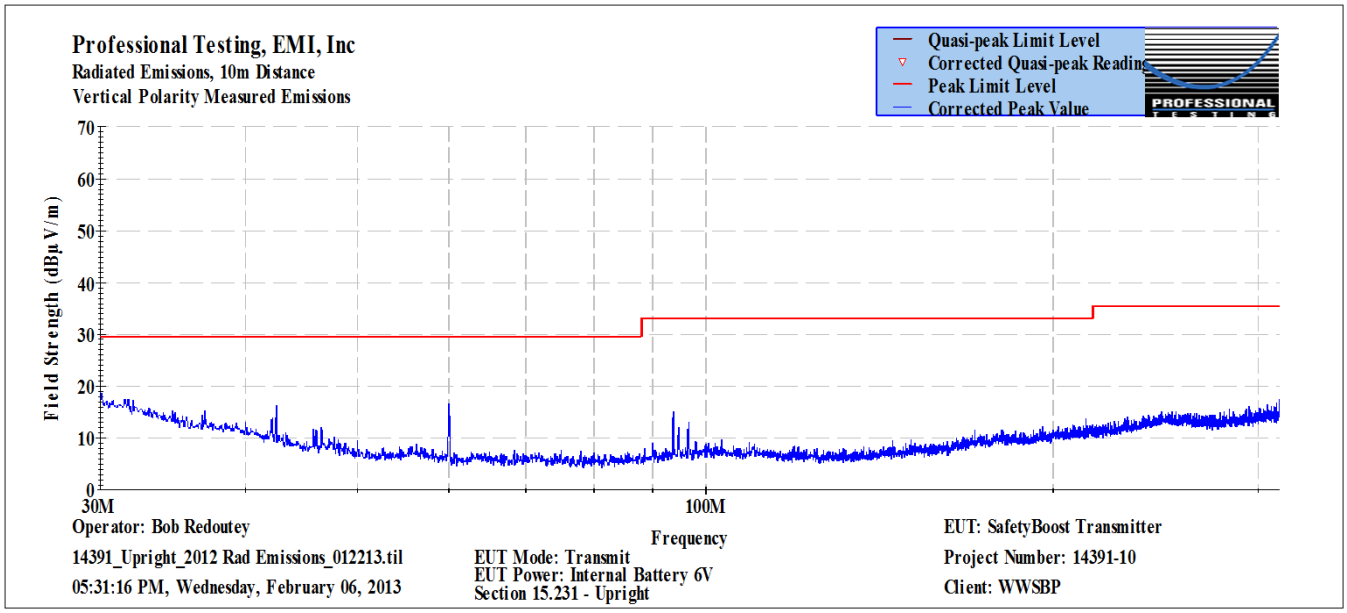
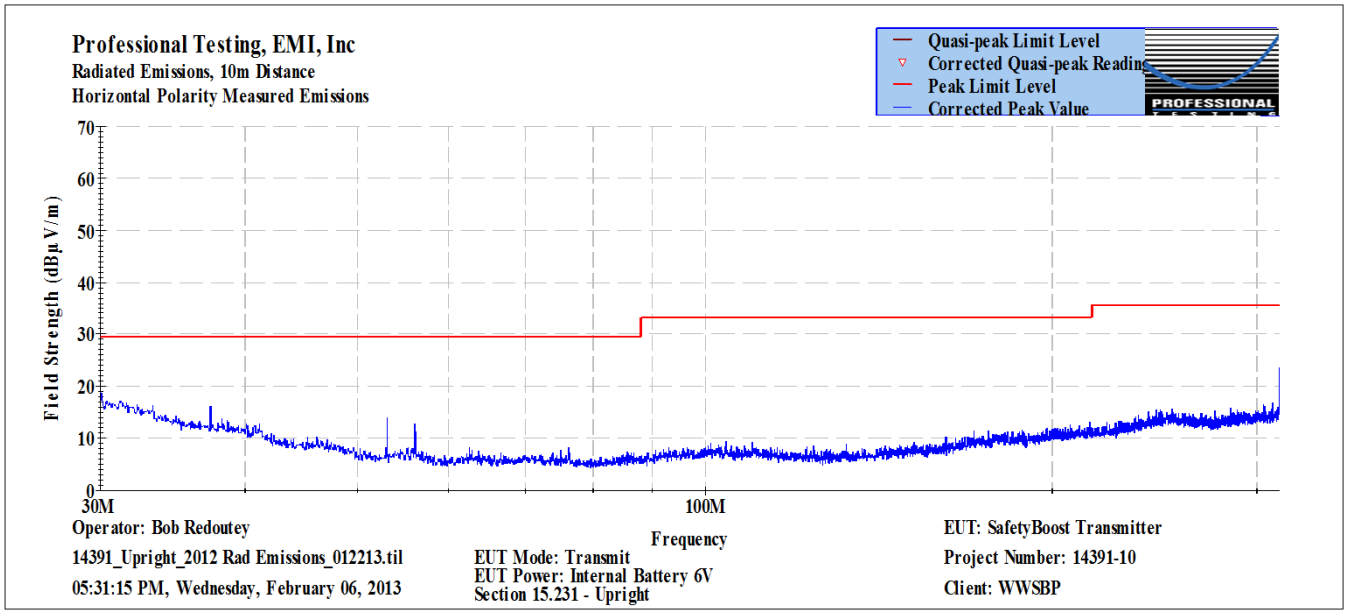


Table 6.3.6: Radiated Spurious Emissions below Fundamental Frequency, Upright Position





7.0 Radiated Spurious Emissions Above 1 GHz

Out of band spurious/harmonic emissions measurements were performed on the EUT to determine compliance to 47 CFR, Part 15.

7.1 Test Procedure

The EUT was placed on a non-conductive table 0.8 meters above the ground plane. The table was centered on a rotating turntable at a distance of 1 meter from the measurement antenna.

Harmonic emissions above 1 GHz peak were measured with peak detection, a resolution bandwidth of 1 MHz, and at a distance of 1 meter. If peak measurements exceeded average limits, the peak limit was applicable and duty cycle factor was then applied for average level calculation. Emissions were investigated up to the 10^{th} harmonic of the transmitter fundamental.

Non-harmonic spurious emissions must satisfy the average limit and the peak limit (20 dB above average). A diagram showing the test setup is given as Figure 5.1.1.

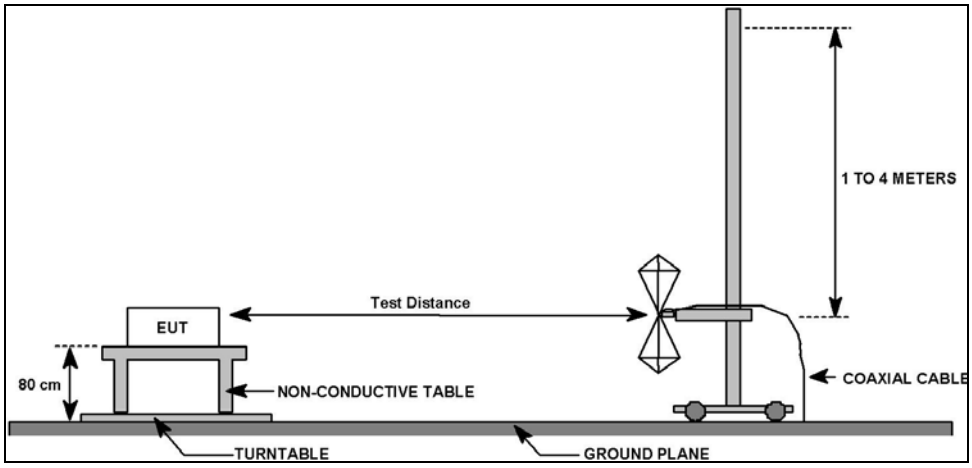


Figure 5.1.1: Field Strength of Spurious Emissions Test Setup

7.2 Test Criteria

Clause Subject	Section Number	Required?	Result
Field Strength of Radiated Spurious/Harmonic Emissions	15.231, 15.209, or Limit Range: 3750 to 12500 µV/m At 315 MHz Limit (3 m) Is: **604.17 µV/m** Or restated as: **55.62 dB µV/m at 3 m***	Yes	Pass

*Limits of 15.209 apply to emissions in restricted bands.

As a hand-held device, emissions in all three orthogonal positions were measured; position of maximum emission is reported.

7.3 Test Results

Table 6.3.1: Radiated Spurious Emissions, 1 to 3.15 GHz, Vertical Polarity

Professional Testing (EMI), Inc.										
Radiated Emissions Measured Indoors, 1 Meters Distance, Antenna Polarized Vertical										
V01.09EL										
Client:	WWSBP - Bill Martens			Preamp:	1					
Test Date:	February 7, 2013			EUT:	SafetyBoost Transmitter					
Voltage:	6V (Batteries CR2016 X 2)			Serial #:	None					
Frequency:	n/a			Project #:	14391					
Technician:	Eric Lifsey			Test Type:	FCC		Class:	B		
Corrected Level = Recorded Level - Amplifier Gain + Antenna Factor + Cable Loss										
Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Function / Position
1.26	40	1	64.3	39.6	24.3	2.4	51.4	65.16	-13.8	Peak / U
1.575	360	1	62.3	39.6	24.7	2.7	50.1	63.54	-13.4	Peak / U
1.89	530	1	58.7	40.2	27.7	2.9	49.1	65.16	-16.1	Peak / S
2.205	550	1	52	40.5	28.1	2.8	42.3	63.54	-21.2	Peak / U

Resolution Bandwidth 1 MHz. U = upright, S = side, F = flat.

Table 6.3.2: Radiated Spurious Emissions, 1 to 3.15 GHz, Horizontal Polarity

Professional Testing (EMI), Inc.										
Radiated Emissions Measured Indoors, 1 Meters Distance, Antenna Polarized Horizontal										
V01.09EL										
Client:	WWSBP - Bill Martens			Preamp:	1					
Test Date:	February 7, 2013			EUT:	SafetyBoost Transmitter					
Voltage:	6V (Batteries CR2016 X 2)			Serial #:	None					
Frequency:	n/a			Project #:	14391					
Technician:	Eric Lifsey			Test Type:	FCC		Class:	B		
Corrected Level = Recorded Level - Amplifier Gain + Antenna Factor + Cable Loss										
Frequency (GHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Function / Orientation
1.26	440	1	57.9	39.6	24.3	2.4	45.0	65.16	-20.2	Peak / F
1.575	490	1	56.5	39.6	24.7	2.7	44.3	63.54	-19.2	Peak / F
1.89	170	1	61.3	40.2	27.7	2.9	51.7	65.16	-13.5	Peak / F
2.205	540	1	48.9	40.5	28.1	2.8	39.2	63.54	-24.3	Peak / S

Resolution Bandwidth 1 MHz, U = upright, S = side, F = flat.

8.0 Antenna Construction Requirements

The design was investigated for meeting the antenna construction requirements of the applicable rules.

8.1 Test Procedure

A direct examination of the antenna construction is performed and compared to rule criteria that prevents wireless device antennas from being modified by end users in ways that would void their authorization to use the device.

8.2 Test Criteria

Clause Subject	Section Number	Required?
Antenna Construction	15.203	Yes

8.3 Test Results

Antenna specifications are referenced here:

Antenna Manufacturer and Model	Specifications
SafetyBoost	Etched on circuit board, no connector.

The antenna is internal only to the device.

The antenna is an etched design on the circuit board.

There is no antenna connector.

The construction meets the requirements of the rules.

9.0 Equipment Lists

9.1 Equipment for Tests Below 1 GHz

Professional Testing, EMI, Inc.			
Test Method:	**ANSI C63.4–2003: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" (incorporated by reference,**		
In accordance with:	**FCC Part 15.109 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Radiated Emissions Limits**		
Section:	**15.109**		
Test Date(s):	**6/18/2013**	**EUT Serial #:**	**None**
Customer:	**WWSBP**	**EUT Part #:**	**None**
Project Number:	**14391-10**	**Test Technician:**	**Bob Redoutey**
Purchase Order #:	**None Listed**	**Supervisor:**	**Rob McCollough**
Equip. Under Test:	**SafetyBoost Wireless Transmitter**	**Witness' Name:**	**None**

Radiated Emissions Test Equipment List	
Tile! Software Version:	**4.2.A, May 23, 2010, 08:38:52 AM**
Test Profile:	**Radiated Emissions_Profile Version October 12, 2011**

Asset #	Manufacturer	Model	Equipment Nomenclature	Serial Number	Calibration Due Date
1509A	Braden	N/A	TDK 10M Chamber, NSA < 1 GHz	DAC-012915-005	7/27/2013
1890	HP	8447F	Preamp/Amp, 9kHz-1300MHz, 28/25dB	3313A05298	4/8/2014
1325	EMCO	1050	Controller, Antenna Mast	9003-1461	N/A
1926	ETS-Lindgren	3142D	Antenna, Biconilog, 26 MHz - 6 GHz	00135454	7/24/2013
C027	N/A	RG214	Cable Coax, N-N, 25m	none	9/7/2013
1327	EMCO	1050	Controller, Antenna Mast	none	N/A
0942	EMCO	11968D	Turntable, 4ft.	9510-1835	N/A
1969	HP	11713A	Attenuator/Switch Driver	3748A04113	N/A
Rental	Agilent	E4440A-239	Spectrum Analyzer, 3 Hz - 26.5 GHz	203523	11/19/2014

9.2 Equipment for Tests Above 1 GHz

The following equipment was used to measure bandwidth and radiated spurious emissions.

Asset #	Manufacturer	Model #	Description	Calibration Due
0582	EMCO	3115	Ridge Guide Antenna	2014-02-14
1594	Agilent	83017A	Microwave Preamplifier (preamp 1)	2014-09-24
1342	Rohde & Schwarz	FSP	Spectrum Analyzer	2015-01-29
C059	Pasternack		Cable	2014-02-06
C249	Pasternack		Cable	2014-02-06
C250	Pasternack		Cable	2014-02-06
1542	AH Systems	SAS-572	Horn Antenna, Standard Gain, 20 dB	Not Required

Appendix: Policy, Rationale, and Evaluation of EMC Measurement Uncertainty

All uncertainty calculations, estimates and expressions thereof shall be in accordance with NIST policy. Since PTI operates in accordance with NIST (NVLAP) Handbook 150-11: 2007, all instrumentation having an effect on the accuracy or validity of tests shall be periodically calibrated or verified traceable to national standards by a competent calibration laboratory. The certificates of calibration or verification on this instrumentation shall include estimates of uncertainty as required by NIST Handbook 150-11.

1. Rationale and Summary of Expanded Uncertainty.

Each piece of instrumentation at PTI that is used in making measurements for determining conformance to a standard (or limit), shall be assessed to evaluate its contribution to the overall uncertainty of the measurement in which it is used. The assessment of each item will be based on either a type A evaluation or a type B evaluation. Most of the evaluations will be type B, since they will be based on the manufacturer's statements or specifications of the calibration tolerances, or uncertainty will be stated along with a brief rationale for the type of evaluation and the resulting stated uncertainties.

The individual uncertainties included in the combined standard uncertainty for a specific test result will depend on the configuration in which the item of instrumentation is used. The combination will always be based on the law of propagation of uncertainty. Any systematic effects will be accommodated by including their uncertainties, in the calculation of the combined standard uncertainty; except that if the direction and amount of the systematic effect cannot be determined and separated from its uncertainty, the whole effect will be treated as uncertainty and combined along with the other elements of the test setup.

Type A evaluations of standard uncertainty will usually be based on calculating the standard deviation of the mean of a series of independent observations, but may be based on a least-squares curve fit or the analysis of variance for unusual situations. Type B evaluations of standard uncertainty will usually be based on manufacturer's specifications, data provided in calibration reports, and experience. The type of probability distribution used (normal, rectangular, a priori, or u-shaped) will be stated for each Type B evaluation.

In the evaluation of the uncertainty of each type of measurement, the uncertainty caused by the operator will be estimated. One notable operator contribution to measurement uncertainty is the manipulation of cables to maximize the measured values of radiated emissions. The operator contribution to measurement uncertainty is evaluated by having several operators independently repeat the same test. This results in a Type A evaluation of operator-contributed measurement uncertainty.

A summary of the expanded uncertainties of PTI measurements is shown as Table 1. These are the worst-case uncertainties considering all operative influence factors.

Table 1: Summary of Measurement Uncertainties for Site 45

Type of Measurement	Frequency Range	Meas. Dist.	Expanded Uncertainty U, dB (k=2)
Mains Conducted Emissions	150 kHz to 30 MHz	N/A	2.9
Telecom Conducted Emissions	150 kHz to 30 MHz	N/A	2.8
Radiated Emissions	30 to 1,000 MHz	10 m	4.8
	1 to 18 GHz	3 m	5.7

End of Report

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