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

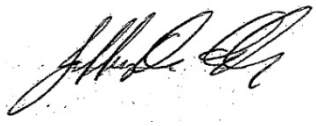
February 24, 2012

Kevin Moses
LDARTools
1320 Highway 3 South
Unit D3
League City, Texas 77573

Dear Kevin:

Enclosed is the Wireless Test Report for the Shepherd Base by LDARTools. This report can be used to demonstrate compliance with FCC requirements for wireless devices in the United States and Canada. If you have any questions, please contact me.

Sincerely,



Jeffrey A. Lenk
President

Enclosure

Project 12345-10

LDARTools
Shepherd Base

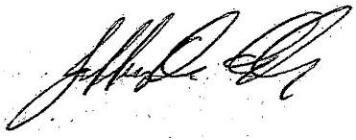
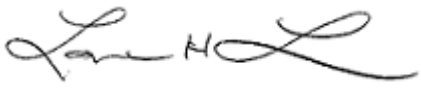
Wireless Certification Report

Prepared for:
LDARTools
1320 Highway 3 South
Unit D3
League City, Texas 77573

By

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

October 24, 2011
Revised November 29, 2011
Revised December 13, 2011
Revised February 24, 2012

Reviewed by	Written by
	
Jeffrey A. Lenk	Layne Lueckemeyer
President	Product Development Engineer

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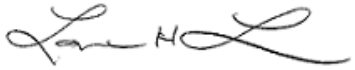
Applicant: LDARTools
Applicant's Address: 1320 Highway 3 South, Unit D3, League City, TX 77573
FCC ID: ZJ2-BASE001
IC Identifier 9851A-BASE001
Project Number: 12345-10
Test Dates: July 20, August 4, 2011

The **LDARTools, Shepherd Base** was tested to and found to be in compliance with FCC 47 CFR, Part 15, RSS-GEN and RSS-210 The highest emissions generated by the above equipment are listed below:

Parameter	Level	Limit	Margin (dB)
Shepherd Base 432.99 MHz Transmitter: Radiated Spurious Emissions	1298.76 MHz: 58.3 dBuV/m @ 3m	60.8 dBuV/m	-2.5
Shepherd Base 432.99 MHz Transmitter: Output Power at 3 meters	77.1 dBuV/m	80.8 dBuV/m	-3.7
Shepherd Base 432.99 MHz Transmitter: Mains Conducted	0.5005 MHz: 40.4 dBuV	46 dBuV	-5.6
Occupied Bandwidth			
20 dB	99%		
86 kHz	91 kHz		

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



Layne Lueckemeyer
Product Development Engineer

This report has been reviewed and accepted by LDARTools The undersigned is responsible for ensuring that this device will continue to comply with the FCC and Industry Canada rules.

_____
Representative of LDARTools

1.0 Introduction

1.1 Scope

This report describes the extent of the equipment under test (EUT) conformance to the intentional radiator requirements of the United States and Canada.

Professional Testing (EMI), Inc. (PTI), follows the guidelines of NIST for all uncertainty calculations, estimates, and expressions thereof for EMC testing. The procedures of ANSI C63.4: 2009 and KDB Publication No. 558074 were utilized for making all emissions measurements.

1.2 EUT Description

The Shepherd Base Station (BS) monitors Personal Monitors worn by field personnel who may be working in areas where hazardous gases might be found. The BS will be alerted if an individual carrying a personal monitor has been introduced to toxic fumes. The Base station will be connected to the internet and will report to the Home Office which individuals have had an alarm event. The Home Office personnel will contact the field personnel who have had an alarm event via their cell phone or landline.

The EUT was tested while in a continuous transmit mode. The EUT was tuned to a fixed channel to perform power, occupied bandwidth, spurious, and harmonic tests. The EUT continuously transmitted at maximum power. The system tested consisted of the following:

EUT	Manufacturer	Model	Serial Number	FCC ID Number	IC Identifier
	LDARTools	BASE001	None	ZJ2-BASE001	9851A-BASE001
Transmit Frequency					
432.99 MHz					

The following rules apply to the operation of the EUT:

Guidelines	FCC Rules, 47 CFR, Part 15	RSS-GEN Issue 3	RSS-210 Issue 8
Transmitter Characteristics for 433 MHz Transmitter	15.231	4.1-4.6, 7	2.2, 2.6-2.7, A2.9, A8, A9
Spurious Radiated Power	15.209	4.2, 4.7, 4.8, 6, 7	2.2, 2.6-2.7, A2.9, A8, A9
Power Line Conducted	15.207	4.2, 4.7, 7.2	
Antenna Requirement	15.203	7.1, 7.1.4	

1.3 Modifications

No modifications were made to the EUT during the performance of the test program.

1.4 Test Site

Measurements were made at the PTI semi-anechoic facility designated Site 45 (FCC 459644) in Austin, Texas. This site is registered with the FCC under Section 2.948, 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 N. A.W. Grimes Blvd., Suite B, Round Rock, Texas, 78665.

1.5 Applicable Documents

Document	Title	Release
ANSI C63.4	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment	2009
ANSI 63.10	American National Standard for Testing Unlicensed Wireless Devices	2009
47 CFR	Part 15 – Radio Frequency Devices Subpart C – Intentional Radiators	
RSS-GEN	General Requirements and Information for the Certification of Radiocommunication Equipment Issue 3	2010
RSS-210	Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment	2010

1.6 Applicable Tests

Test	Rule
Fundamental Field Strength	FCC 15.231(b), RSS-GEN 4.8
Occupied Bandwidth	FCC 15.231(c), RSS-GEN 4.6.1
Out of Band Spurious Emissions	FCC 15.205(a), 15.209(a), 15.231(b) , RSS-GEN 4.9
Powerline Conducted Emissions	FCC 15.207, RSS-GEN 7.2.2
Antenna Requirements	FCC 15.203, RSS-GEN 7.1.4

2.0 Power Line Conducted Emissions

2.1 Test Procedure

The EUT was configured and operated in a manner consistent with typical applications. The EUT power cord in excess of one meter was folded back and forth forming a bundle 30 to 40 cm long in the approximate center of the cable. Power supply cords for the peripheral equipment were powered from an auxiliary LISN. Excess interface cable lengths were separately bundled in a non-inductive arrangement at the approximate center of the cable with the bundle 30 to 40 centimeters in length. The conducted emissions were maximized, by varying the operating states and configuration of the EUT.

The tests were performed in an 8' x 8' RayProof modular shielded room. The EUT was placed on a non-metallic table 0.4 meters from a vertical metal reference plane and 0.8 meters from a horizontal metal reference plane. A drawing showing the test setup is given as Figure 2.1.1.

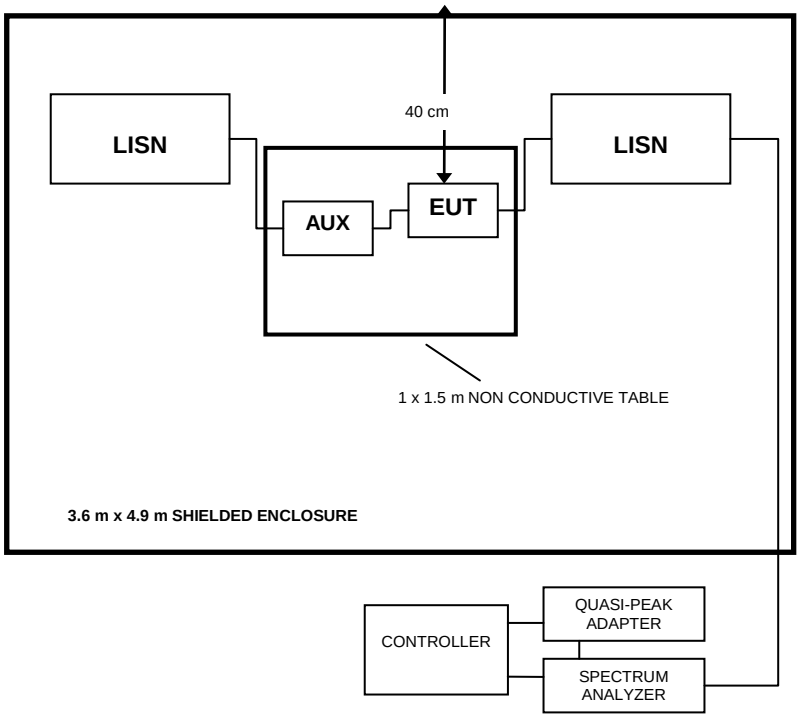


Figure 2.1.1: Conducted Emissions Test Setup

2.2 Test Criteria

The FCC Part 15 Class B conduction limits are given below.

Frequency (MHz)	Conducted Limits (dBuV)	
	Average	Quasi-Peak
0.15 – .50	66-56*	56 – 46*
.50 - 5	56	46
5 – 30	60	50

The tighter limit shall apply at the edge between two frequency bands.
*Decreases with the logarithm of the frequency.

2.3 Test Results

Conducted emission measurements for the EUT were taken on July 20, 2011, and the EUT was found to be in compliance with applicable requirements.

Table 2.3.1: Conducted Emissions Measurements – Test Equipment

Professional Testing, EMI, Inc.			
Test Method:	**ANSI C63.4–2009: 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 15.107 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Conducted Emissions Limits**		
Section:	**15.107**		
Test Date(s):	**7/20/2011**	**EUT Serial #:**	**n/a**
Customer:	**LDAR Tools**	**EUT Part #:**	**n/a**
Project Number:	**12345-10**	**Test Technician:**	**Bob Redoutey**
Purchase Order #:	**791**	**Supervisor:**	**Jason Haley**
Equip. Under Test:	**Shepherd Monitor Base**	**Witness' Name:**	**Bob Yarbrough**

Conducted Emissions Test Equipment List					Page: 1 of 1
Tile! Software Version:	**4.1.A.0, April 14, 2009, 11:01:00PM**				
Test Profile:	**Profile#: CE_2010.til, dated December 16, 2010**				
Asset#	**Manufacturer**	**Model**	**Equipment Nomenclature**	**Serial Number**	**Calibration Due Date**
1129	HP	8568B	Spectrum Analyzer 100Hz-1.5GHz	2140A01754	10/5/2011
1629	HP	85662A	Spec Anal Display for AN1129	3001A18433	N/A
1277	HP	85650A	Quasi Peak Adapter	2811A01117	11/11/2011
0027	EMCO	3825/2	LISN, 10kHz-100MHz	9010-1708	11/16/2011
1173	PTI	100k HPF	Filter, High Pass, 100kHz	none	1/25/2012
1087	PTI	PTI-ALF4	Attenuator Limiter Filter	none	4/18/2012
C109	HP	None	Cable, BNC, 19"	none	6/21/2012
C107	Pomona	RG-58	Cable, BNC, 10.5'	none	6/21/2012
C108	Pomona	RG-223	Cable, BNC, 5.5'	none	6/21/2012
939	EMCO	3825/2	LISN, 10kHz-100MHz	9603-2521	11/8/2011
1185	EMCO	3825/2	LISN, 10kHz-100MHz	1235	8/6/2011

Table 2.3.2: Conducted Emissions Measurements Bandwidth and Measurement Time Used for Testing

Professional Testing, EMI, Inc.			
Test Method:	**ANSI C63.4–2009: 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 15.107 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Conducted Emissions Limits**		
Section:	**15.107**		
Test Date(s):	**7/20/2011**	**EUT Serial #:**	**n/a**
Customer:	**LDAR Tools**	**EUT Part #:**	**n/a**
Project Number:	**12345-10**	**Test Technician:**	**Bob Redoutey**
Purchase Order #:	**791**	**Supervisor:**	**Jason Haley**
Equip. Under Test:	**Shepherd Monitor Base**	**Witness' Name:**	**Bob Yarbrough**

Conducted Emissions Bandwidth and Measurement Time Used for Testing

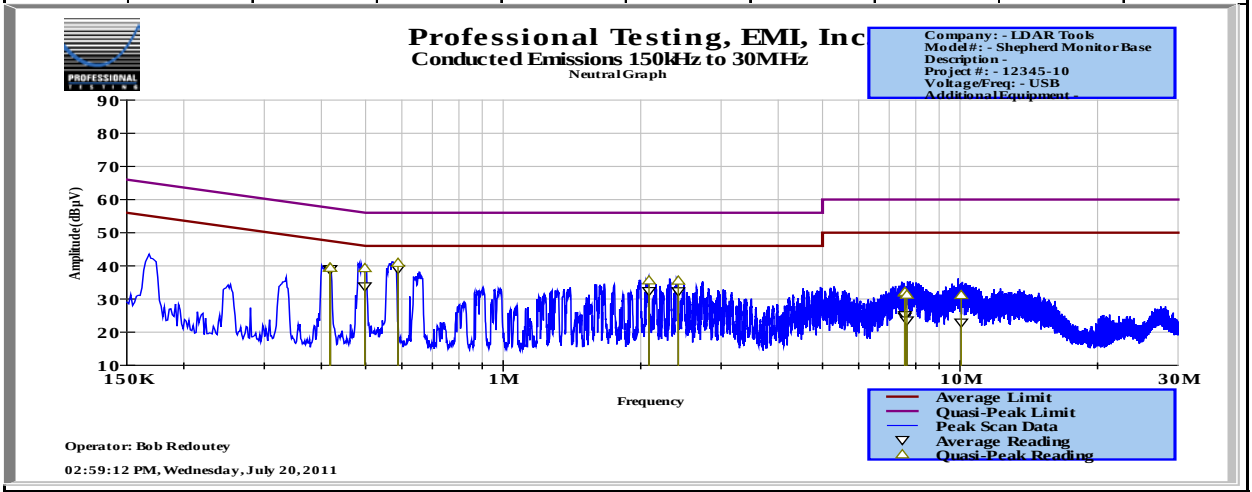
Frequency Band Start (MHz)	Frequency Band Stop (MHz)	6dB Bandwidth (kHz)	Number of ranges used	Measurement Time per Range
0.01	0.15	0.3	7	Five 1 second sweeps
0.15	30	9	20	Five 1 second sweeps

*Notes:
1. The settings above are specifically calculated for the HP856X series of spectrum analyzers, which have 1000 data points per range.
2. The measurement receiver resolution bandwidth setting was 300Hz for Quasi-peak measurements from 10-150kHz.
3. The measurement receiver resolution bandwidth setting was 9kHz for Quasi-peak measurements from 0.15-30MHz.

Table 2.3.3: Conducted Emissions Measurements – 120 VAC – Neutral Lead Test Results

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.4–2009: 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, see §15.38).		
In accordance with:	FCC Part 15.107 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Conducted Emissions Limits		
Section:	15.107		
Test Date(s):	7/20/2011	**EUT Serial #:**	n/a
Customer:	LDAR Tools	**EUT Part #:**	n/a
Project Number:	12345-10	**Test Technician:**	Bob Redoutey
Purchase Order #:	791	**Supervisor:**	Jason Haley
Equip. Under Test:	Shepherd Monitor Base	**Witness' Name:**	Bob Yarbrough

Conducted Emissions Test Results Data Sheet - Neutral Lead								Page:	1 of 2
EUT Line Voltage:			120 VAC		**EUT Line Frequency:**			60 Hz	
Frequency Measured (MHz)	**Peak Detector Reading (dBµV)**	**Quasi-peak Detector Reading (dBµV)**	**Quasi-peak Detector Limit (dBµV)**	**Quasi-peak Detector Margin (dB)**	**Quasi-peak Detector Test Results**	**Average Detector Reading (dBµV)**	**Average Detector Limit (dBµV)**	**Average Detector Margin (dB)**	**Average Detector Test Results**
0.41737	40.9	39.4	57.5	-18.1	PASS	38.9	47.5	-8.6	PASS
0.41862	40.8	39.4	57.5	-18.1	PASS	39	47.5	-8.4	PASS
0.498053	42.8	39.3	56	-16.7	PASS	33.8	46	-12.2	PASS
0.5888	42.4	40.9	56	-15.1	PASS	39.1	46	-6.9	PASS
2.0858	37.8	35.6	56	-20.4	PASS	32.4	46	-13.6	PASS
2.4176	38.4	35.5	56	-20.5	PASS	32.4	46	-13.6	PASS
7.5674	37	31.9	60	-28.1	PASS	24.7	50	-25.3	PASS
7.5735	37.3	32.1	60	-27.9	PASS	25.1	50	-24.9	PASS
7.6516	36.8	31.3	60	-28.7	PASS	23.6	50	-26.4	PASS
10.0631	36.6	31.2	60	-28.8	PASS	22.9	50	-27.1	PASS



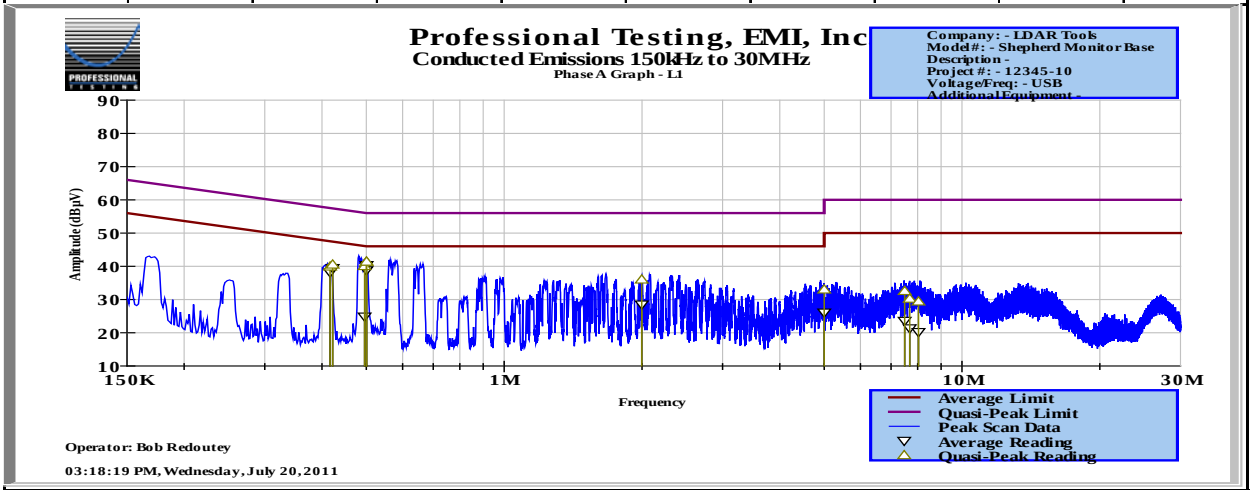
Measured Conducted Emissions - Neutral Lead

Table 2.3.4: Conducted Emissions Measurements – 120 VAC – Phase Lead Test Results

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.4–2009: 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, see §15.38).		
In accordance with:	FCC Part 15.107 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Conducted Emissions Limits		
Section:	15.107		
Test Date(s):	7/20/2011	**EUT Serial #:**	n/a
Customer:	LDAR Tools	**EUT Part #:**	n/a
Project Number:	12345-10	**Test Technician:**	Bob Redoutey
Purchase Order #:	791	**Supervisor:**	Jason Haley
Equip. Under Test:	Shepherd Monitor Base	**Witness' Name:**	Bob Yarbrough

Conducted Emissions Test Results Data Sheet - Phase Lead (Line 1) **Page: 2 of 2**

EUT Line Voltage:			120 VAC		EUT Line Frequency:			60 Hz	
Frequency Measured (MHz)	Peak Detector Reading (dBµV)	Quasi-peak Detector Reading (dBµV)	Quasi-peak Detector Limit (dBµV)	Quasi-peak Detector Margin (dB)	Quasi-peak Detector Test Results	Average Detector Reading (dBµV)	Average Detector Limit (dBµV)	Average Detector Margin (dB)	Average Detector Test Results
0.4166	41.9	39.9	57.5	-17.6	PASS	38.2	47.5	-9.3	PASS
0.42203	41.5	40.5	57.4	-16.9	PASS	39.5	47.4	-7.9	PASS
0.49553	44.4	40	56.1	-16	PASS	24.9	46.1	-21.2	PASS
0.500158	43.7	41.4	56	-14.6	PASS	38.8	46	-7.2	PASS
0.5005	43.2	41.4	56	-14.6	PASS	40.4	46	-5.6	PASS
1.997	38.9	36	56	-20	PASS	28.5	46	-17.5	PASS
5.00106	37	33	60	-27	PASS	26.1	50	-23.9	PASS
7.4941	36.9	32.5	60	-27.5	PASS	23.6	50	-26.4	PASS
7.6868	36.6	30.2	60	-29.8	PASS	21.3	50	-28.7	PASS
8.0361	36.3	29.4	60	-30.6	PASS	20.2	50	-29.8	PASS



Measured Conducted Emissions - Phase Lead (Line 1)

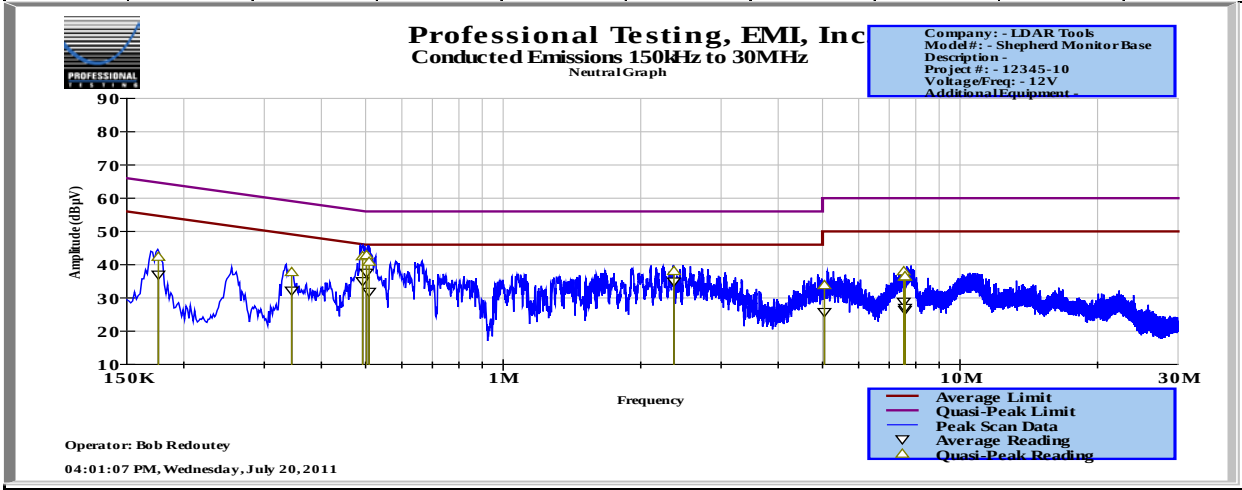
Table 2.3.5: Conducted Emissions Measurements – 12 VDC – Neutral Lead Test Results

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.4–2009: 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, see §15.38).		
In accordance with:	FCC Part 15.107 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Conducted Emissions Limits		
Section:	15.107		
Test Date(s):	7/20/2011	**EUT Serial #:**	n/a
Customer:	LDAR Tools	**EUT Part #:**	n/a
Project Number:	12345-10	**Test Technician:**	Bob Redoutey
Purchase Order #:	791	**Supervisor:**	Jason Haley
Equip. Under Test:	Shepherd Monitor Base	**Witness' Name:**	Bob Yarbrough

Conducted Emissions Test Results Data Sheet - Neutral Lead — **Page: 1 of 2**

EUT Line Voltage: 12 VAC — **EUT Line Frequency:** n/a Hz

Frequency Measured (MHz)	Peak Detector Reading (dBµV)	Quasi-peak Detector Reading (dBµV)	Quasi-peak Detector Limit (dBµV)	Quasi-peak Detector Margin (dB)	Quasi-peak Detector Test Results	Average Detector Reading (dBµV)	Average Detector Limit (dBµV)	Average Detector Margin (dB)	Average Detector Test Results
0.17594	45.1	42.3	64.7	-22.3	PASS	37	54.7	-17.7	PASS
0.34446	42.5	37.8	59.1	-21.3	PASS	32.2	49.1	-16.9	PASS
0.49255	46.7	42.5	56.1	-13.6	PASS	35.1	46.1	-11.1	PASS
0.50222	47.1	42.9	56	-13.1	PASS	37.6	46	-8.4	PASS
0.5089	45.5	40.9	56	-15.1	PASS	31.9	46	-14.1	PASS
2.3643	41	38.1	56	-17.9	PASS	34.9	46	-11.1	PASS
5.0487	38	33.8	60	-26.2	PASS	25.8	50	-24.2	PASS
7.531	41.1	38	60	-22	PASS	28.9	50	-21.1	PASS
7.5758	41.5	36.4	60	-23.6	PASS	26.4	50	-23.6	PASS
7.5799	41.3	36.5	60	-23.5	PASS	27	50	-23	PASS



Measured Conducted Emissions - Neutral Lead

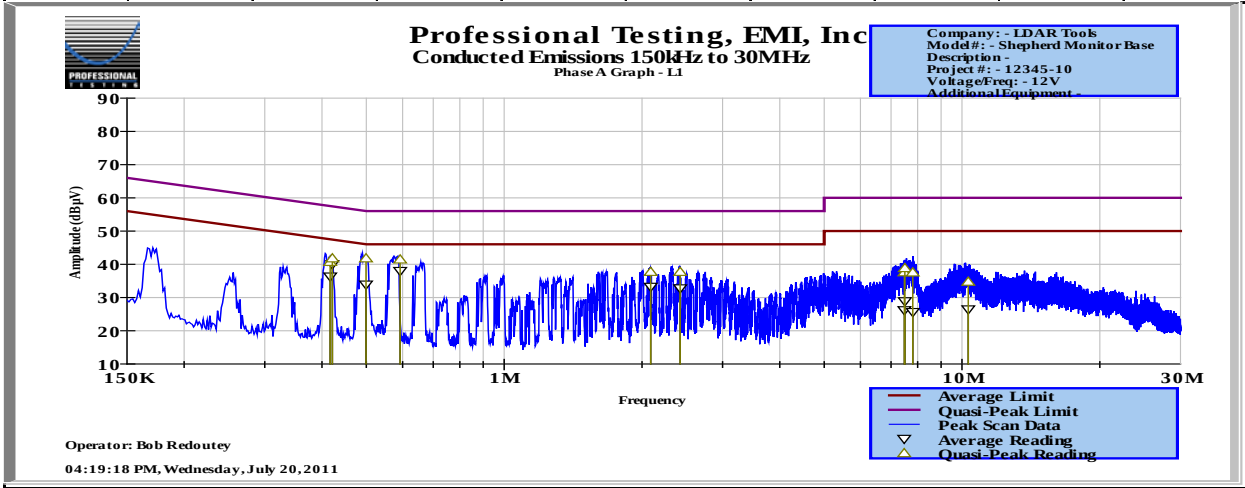
Table 2.3.6: Conducted Emissions Measurements – 12 VDC – Phase Lead Test Results

Professional Testing, EMI, Inc.			
Test Method:	ANSI C63.4–2009: 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, see §15.38).		
In accordance with:	FCC Part 15.107 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Conducted Emissions Limits		
Section:	15.107		
Test Date(s):	7/20/2011	**EUT Serial #:**	n/a
Customer:	LDAR Tools	**EUT Part #:**	n/a
Project Number:	12345-10	**Test Technician:**	Bob Redoutey
Purchase Order #:	791	**Supervisor:**	Jason Haley
Equip. Under Test:	Shepherd Monitor Base	**Witness' Name:**	Bob Yarbrough

Conducted Emissions Test Results Data Sheet - Phase Lead (Line 1) **Page: 2 of 2**

EUT Line Voltage: 12 VAC **EUT Line Frequency:** n/a Hz

Frequency Measured (MHz)	Peak Detector Reading (dBµV)	Quasi-peak Detector Reading (dBµV)	Quasi-peak Detector Limit (dBµV)	Quasi-peak Detector Margin (dB)	Quasi-peak Detector Test Results	Average Detector Reading (dBµV)	Average Detector Limit (dBµV)	Average Detector Margin (dB)	Average Detector Test Results
0.41689	43.7	40.7	57.5	-16.8	PASS	36.3	47.5	-11.2	PASS
0.4215	43.8	41.8	57.4	-15.7	PASS	40	47.4	-7.4	PASS
0.49908	45.5	41.8	56	-14.2	PASS	33.9	46	-12.1	PASS
0.5927	43.9	41.4	56	-14.6	PASS	38	46	-8	PASS
2.0891	40	37.7	56	-18.3	PASS	33.3	46	-12.7	PASS
2.4237	40.2	37.7	56	-18.3	PASS	32.8	46	-13.2	PASS
7.4858	42.4	37.6	60	-22.4	PASS	26.2	50	-23.8	PASS
7.5032	42.2	38.8	60	-21.2	PASS	28.9	50	-21.1	PASS
7.8053	43	37.5	60	-22.5	PASS	25.7	50	-24.3	PASS
10.3194	41.3	34.7	60	-25.3	PASS	26.4	50	-23.6	PASS



Measured Conducted Emissions - Phase Lead (Line 1)

Table 2.3.7: Conducted Emissions Measurements Test Setup Photos

Professional Testing, EMI, Inc.			
Test Method:	**ANSI C63.4–2009: 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 15.107 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Conducted Emissions Limits**		
Section:	**15.107**		
Test Date(s):	**7/20/2011**	**EUT Serial #:**	**n/a**
Customer:	**LDAR Tools**	**EUT Part #:**	**n/a**
Project Number:	**12345-10**	**Test Technician:**	**Bob Redoutey**
Purchase Order #:	**791**	**Supervisor:**	**Jason Haley**
Equip. Under Test:	**Shepherd Monitor Base**	**Witness' Name:**	**Bob Yarbrough**

Conducted Emissions Photographs **Page: 1 of 1**

EUT

EUT with support equipment

3.0 Fundamental Field Strength Measurements

Fundamental field strength measurements were made on the selected fundamental transmit frequency of the EUT. Tests of the fundamental field strength of the EUT also determined the worse case polarization of the device. The emissions of the device were measured with the EUT in three orthogonal axes.

3.1 Test Procedure

Radiated emission measurements were made of the fundamental field strength level for the EUT. The EUT was placed on a non-conductive table 0.8 meters above the ground plane. The table was centered on a motorized turntable that enables 360-degree rotation. For measurements of the fundamental signal, a measurement antenna was positioned at a distance of 3 meters, as measured from the closest point of the EUT. The field strength emissions were maximized by rotating the EUT. A diagram showing the test setup is given as Figure 3.1.1.

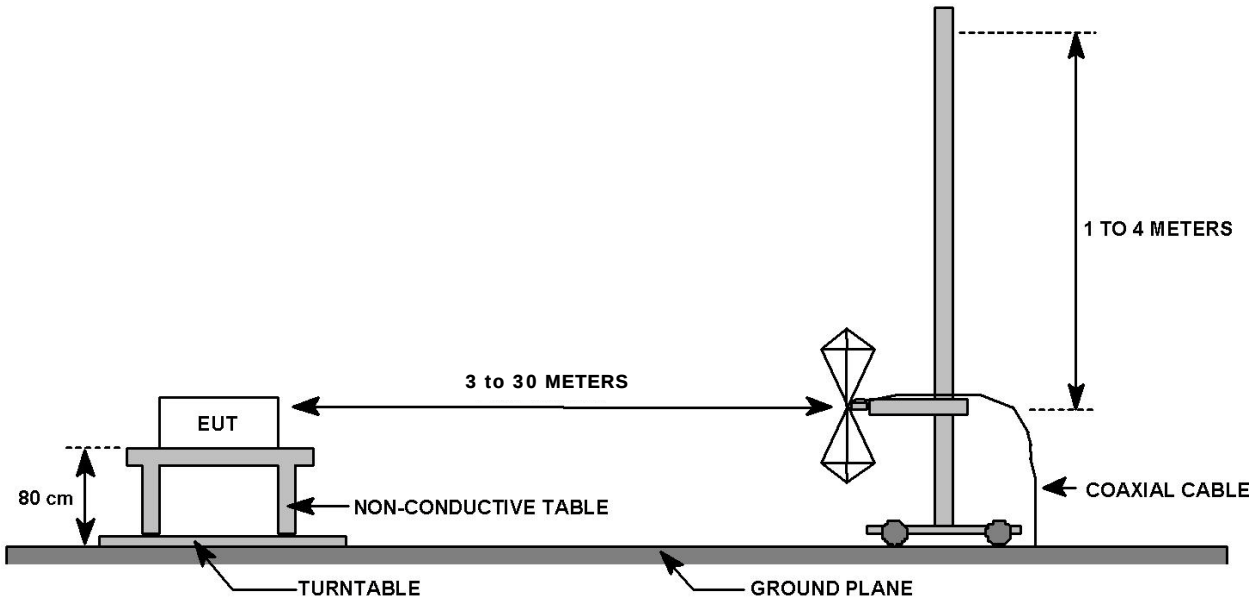


Figure 3.1.1: Radiated Emissions Test Setup

3.2 Test Criteria

According to 47 CFR, 15.231, and RSS-210 the field strength of emissions from intentional radiators operated under this section should not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (Microvolts/Meter)	Field Strength of Spurious Emissions (Microvolts/Meter)
40.66 – 40.70	2,250	255
70 – 130	1,250	125
130 – 174	1,250 to 3,750[1]	125 to 375[1]
174 – 260	3,750	375
260 – 470	3,750 to 12,500[1]	375 to 1,250[1]
Above 470	12,500	1,250

[1]Linear interpolations

3.3 Test Results

Radiated emissions measurements of the fundamental field strength level for the EUT were taken on August 4, 2011, and the EUT was found to be in compliance with applicable requirements.

Table 3.3.1: Radiated Emissions Measurements of the Fundamental Field Strength Level – Test Equipment

Professional Testing, EMI, Inc.			
Test Method:	**ANSI C63.4–2009: "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**		
In accordance with:	**FCC Part 15.231 - Code of Federal Regulations Part 47**		
Test Date(s):	**8/4/2011**	**EUT Serial #:**	**N/A**
Customer:	**LDARTools**	**EUT Part #:**	**N/A**
Project Number:	**12345-10**	**Test Technician:**	**Layne Lueckemeyer**
Purchase Order #:	**791 / 792**	**Supervisor:**	**Jason Haley**
Equip. Under Test:	**Shepherd Base / Monitor**	**Witness' Name:**	**Jason Anderson**

Radiated Emissions Test Equipment List				Page: 1 of 1	
Tile! Software Version:		**3.4.K.11, June 7, 2006, 07:49:00 PM**			
Test Profile:		**Radiated Emissions_updated_12-16-10.til**			
Asset#	**Manufacturer**	**Model**	**Equipment Nomenclature**	**Serial Number**	**Calibration Due Date**
1509A	Braden	N/A	TDK 10M Chamber, NSA < 1 GHz	DAC-012915-005	8/10/2011
85	HP	85650A	Quasi-Peak Adapter CISPR	3033A01458	7/28/2011
0949	HP	85662A	Spec Anal Dsply for AN	2542A12285	N/A
1525	HP	8566B	Spectrum Analyzer 100Hz-22GHz	2532A02126	6/7/2012
238	HP	85685A	RF Preselector	2887A00841	7/27/2011
1497	EMCO	3108	Antenna, Bi Con, 30-300MHz	2121	8/4/2011
1278	HP	85650A	Quasi Peak Adapter	2811A01147	7/28/2011
1834	HP	85662A	Spec Anal Dsply	2349A06182	N/A
1145	HP	8568B	Spectrum Analyzer 100Hz-1.5GHz	2517A01821	7/28/2011
1035	HP	85685A	RF Preselector	2901A00891	4/13/2012
1486	EMCO	3147	Antenna, Log Periodic, .2-5GHz	9112-1052	8/4/2011
1497	EMCO	3108	Antenna, Bi Con, 30-300MHz	2121	8/4/2011
C026	N/A	RG214	Cable Coax, N-N, 25m	none	8/10/2011
C027	N/A	RG214	Cable Coax, N-N, 25m	none	8/10/2011
1414	HP	8447D	Preamp	1937A03403	7/15/2011
1509B	Braden	N/A	TDK 10M Chamber, VSWR > 1 GHz	DAC-012915-005	4/7/2012
1594	Miteq	AFS4-01001800	Amplifier, 1-26.5GHz, 42dB	none	1/28/2012
1529	Miteq	AFS4-01001800	Amplifier, 1-26.5GHz, 36dB	none	7/16/2011
C030	N/A	0	Cable Coax, N-N, 30m	none	3/21/2012

Table 3.3.2: Radiated Emissions Measurements of the Fundamental Field Strength Level Bandwidth and Measurement Time Used for Testing – Peak Scan

Professional Testing, EMI, Inc.			
Test Method:	**ANSI C63.4–2009: "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**		
In accordance with:	**FCC Part 15.231 - Code of Federal Regulations Part 47**		
Test Date(s):	**8/4/2011**	**EUT Serial #:**	**N/A**
Customer:	**LDARTools**	**EUT Part #:**	**N/A**
Project Number:	**12345-10**	**Test Technician:**	**Layne Lueckemeyer**
Purchase Order #:	**791 / 792**	**Supervisor:**	**Jason Haley**
Equip. Under Test:	**Shepherd Base / Monitor**	**Witness' Name:**	**Jason Anderson**

Radiated Emissions Bandwidth and Measurement Time Used for Testing - Peak Scan

Frequency Band Start (MHz)	Frequency Band Stop (MHz)	6dB Bandwidth (kHz)	Number of ranges used	Measurement Time per Range
0.009	0.15	0.3	2	Multiple Sweeps
0.15	30	9	6	Multiple Sweeps
30	200	120	1	Multiple 800mS Sweeps
200	1000	120	1	Multiple 800mS Sweeps
1000	18000	1000	17	Multiple Sweeps

*Notes:
1. The settings above are specifically calculated for the HP856X series of spectrum analyzers, which have 1000 data points per range.
2. The measurement receiver resolution bandwidth setting was 300Hz for Quasi-peak measurements from 9-150kHz.
3. The measurement receiver resolution bandwidth setting was 9kHz for Quasi-peak measurements from 0.15-30MHz.
4. The measurement receiver resolution bandwidth setting was 120kHz for Quasi-peak measurements from 30-1000MHz.
5. The measurement receiver resolution bandwidth setting was 1MHz for Average measurements from 1-18GHz.

Table 3.3.3: Radiated Emissions Measurements of the Fundamental Field Strength Level Test Results – Horizontal Antenna Polarity ≤ 1 GHz

Professional Testing, EMI, Inc.			
Test Method:	**ANSI C63.4–2009: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"**		
In accordance with:	**FCC Part 15.231 - Code of Federal Regulations Part 47**		
Section:	**0**		
Test Date(s):	**8/4/2011**	**EUT Serial #:**	**N/A**
Customer:	**LDARTools**	**EUT Part #:**	**N/A**
Project Number:	**12345-10**	**Test Technician:**	**Layne Lueckemeyer**
Purchase Order #:	**791 / 792**	**Supervisor:**	**Jason Haley**
Equip. Under Test:	**Shepherd Base / Monitor**	**Witness' Name:**	**Jason Anderson**

Radiated Emissions Test Results Data Sheet - Horizontal Antenna Polarity ≤ 1GHz				Page:	1	of	1
EUT Line Voltage:	**12**	**VDC**	**EUT Line Frequency:**	**N/A**		**Hz**	
EUT Mode of Operation:							

Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
432.99	3	36	1	Peak	65.4	87.5	100.8	-13.3	Pass
432.99	3	36	1	Average	49	71.1	80.8	-9.7	Pass

Table 3.3.4: Radiated Emissions Measurements of the Fundamental Field Strength Level Test Results – Vertical Antenna Polarity ≤ 1 GHz

Professional Testing, EMI, Inc.			
Test Method:	**ANSI C63.4–2009: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"**		
In accordance with:	**FCC Part 15.231 - Code of Federal Regulations Part 47**		
Section:	**0**		
Test Date(s):	**8/4/2011**	**EUT Serial #:**	**N/A**
Customer:	**LDARTools**	**EUT Part #:**	**N/A**
Project Number:	**12345-10**	**Test Technician:**	**Layne Lueckemeyer**
Purchase Order #:	**791 / 792**	**Supervisor:**	**Jason Haley**
Equip. Under Test:	**Shepherd Base / Monitor**	**Witness' Name:**	**Jason Anderson**

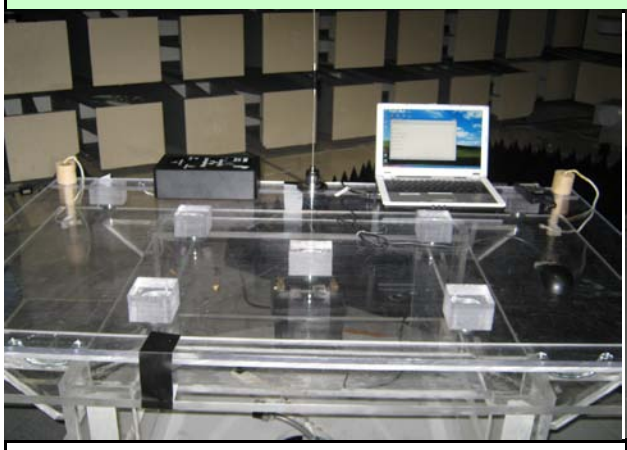
Radiated Emissions Test Results Data Sheet - Vertical Antenna Polarity ≤ 1GHz			**Page:**	**1**	**of**	**1**
EUT Line Voltage:	**12**	**VDC**	**EUT Line Frequency:**	**N/A**		**Hz**
EUT Mode of Operation:			**Transmit Max Power**			

Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
432.99	3	338	1	Peak	71.4	93.5	100.8	-7.3	Pass
432.99	3	338	1	Average	55	77.1	80.8	-3.7	Pass

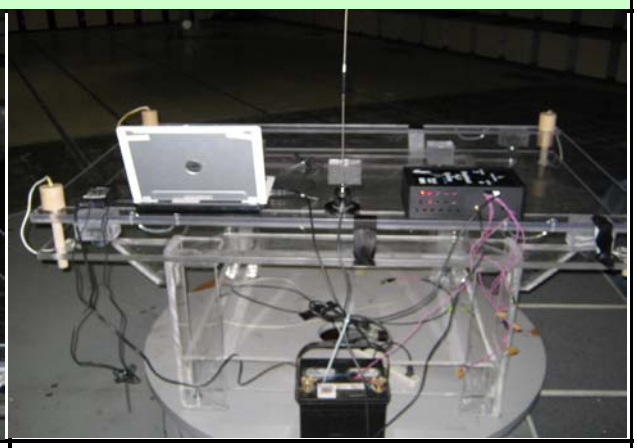
Table 3.3.5: Radiated Emissions Measurements of the Fundamental Field Strength Level Test Setup Photographs

Professional Testing, EMI, Inc.			
Test Method:	**ANSI C63.4–2009: "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**		
In accordance with:	**FCC Part 15.231 - Code of Federal Regulations Part 47**		
Test Date(s):	**8/4/2011**	**EUT Serial #:**	**N/A**
Customer:	**LDARTools**	**EUT Part #:**	**N/A**
Project Number:	**12345-10**	**Test Technician:**	**Layne Lueckemeyer**
Purchase Order #:	**791 / 792**	**Supervisor:**	**Jason Haley**
Equip. Under Test:	**Shepherd Base / Monitor**	**Witness' Name:**	**Jason Anderson**

Radiated Emissions Photographs **Page: 1 of 1**



EUT Front



EUT Rear

4.0 Occupied Bandwidth

Occupied bandwidth measurements were performed on the EUT to determine compliance with 47 CFR, Part 15.231 and RSS-GEN.

4.1 Test Procedure

The occupied bandwidth was measured with a spectrum analyzer connected to a double-ridged guide horn while the EUT was operating in continuous transmit mode at the appropriate center frequency. The analyzer center frequency was set to the EUT carrier frequency. Display line and marker delta functions were used to measure the occupied bandwidth of the EUT. However, the 20 dB bandwidth is referenced to a peak power measurement taken at the entire bandwidth or more for RBW, then using 1% RBW for the 20 dB bandwidth. A diagram showing the test setup is given as Figure 3.1.1.

4.2 Test Criteria

According to 47 CFR, Part 15.231 and RSS-GEN, the bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

4.3 Test Results

Occupied bandwidth measurements were taken on July 20, 2011, and the EUT was found to be in compliance with applicable requirements.

Table 4.3.1: Radiated Emissions Measurements of Occupied Bandwidth – Test Equipment

Professional Testing, EMI, Inc.			
Test Method:	**ANSI C63.4–2009: "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**		
In accordance with:	**FCC Part 15.231 - Code of Federal Regulations Part 47**		
Test Date(s):	**8/4/2011**	**EUT Serial #:**	**N/A**
Customer:	**LDARTools**	**EUT Part #:**	**N/A**
Project Number:	**12345-10**	**Test Technician:**	**Layne Lueckemeyer**
Purchase Order #:	**791 / 792**	**Supervisor:**	**Jason Haley**
Equip. Under Test:	**Shepherd Base / Monitor**	**Witness' Name:**	**Jason Anderson**

Radiated Emissions Test Equipment List				Page:	1 of 1
Tile! Software Version:	**3.4.K.11, June 7, 2006, 07:49:00 PM**				
Test Profile:	**Radiated Emissions_updated_12-16-10.til**				
Asset#	**Manufacturer**	**Model**	**Equipment Nomenclature**	**Serial Number**	**Calibration Due Date**
1509A	Braden	N/A	TDK 10M Chamber, NSA < 1 GHz	DAC-012915-005	8/10/2011
85	HP	85650A	Quasi-Peak Adapter CISPR	3033A01458	7/28/2011
0949	HP	85662A	Spec Anal Dsply for AN	2542A12285	N/A
1525	HP	8566B	Spectrum Analyzer 100Hz-22GHz	2532A02126	6/7/2012
238	HP	85685A	RF Preselector	2887A00841	7/27/2011
1497	EMCO	3108	Antenna, Bi Con, 30-300MHz	2121	8/4/2011
1278	HP	85650A	Quasi Peak Adapter	2811A01147	7/28/2011
1834	HP	85662A	Spec Anal Dsply	2349A06182	N/A
1145	HP	8568B	Spectrum Analyzer 100Hz-1.5GHz	2517A01821	7/28/2011
1035	HP	85685A	RF Preselector	2901A00891	4/13/2012
1486	EMCO	3147	Antenna, Log Periodic, .2-5GHz	9112-1052	8/4/2011
1497	EMCO	3108	Antenna, Bi Con, 30-300MHz	2121	8/4/2011
C026	N/A	RG214	Cable Coax, N-N, 25m	none	8/10/2011
C027	N/A	RG214	Cable Coax, N-N, 25m	none	8/10/2011
1414	HP	8447D	Preamp	1937A03403	7/15/2011
1509B	Braden	N/A	TDK 10M Chamber, VSWR > 1 GHz	DAC-012915-005	4/7/2012
1594	Miteq	AFS4-01001800	Amplifier, 1-26.5GHz, 42dB	none	1/28/2012
1529	Miteq	AFS4-01001800	Amplifier, 1-26.5GHz, 36dB	none	7/16/2011
C030	N/A	0	Cable Coax, N-N, 30m	none	3/21/2012

Table 4.3.2: Radiated Emissions Measurements of Occupied Bandwidth Test Results

Professional Testing, EMI, Inc.			
Test Method:	**ANSI C63.4–2009: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"**		
In accordance with:	**FCC Part 15.231 - Code of Federal Regulations Part 47**		
Test Date(s):	**8/4/2011**	**EUT Serial #:**	**N/A**
Customer:	**LDARTools**	**EUT Part #:**	**N/A**
Project Number:	**12345-10**	**Test Technician:**	**Layne Lueckemeyer**
Purchase Order #:	**791 / 792**	**Supervisor:**	**Jason Haley**
Equip. Under Test:	**Shepherd Base / Monitor**	**Witness' Name:**	**Jason Anderson**

Radiated Emissions Test Results Data Sheet - Occupied Bandwidth Test Results

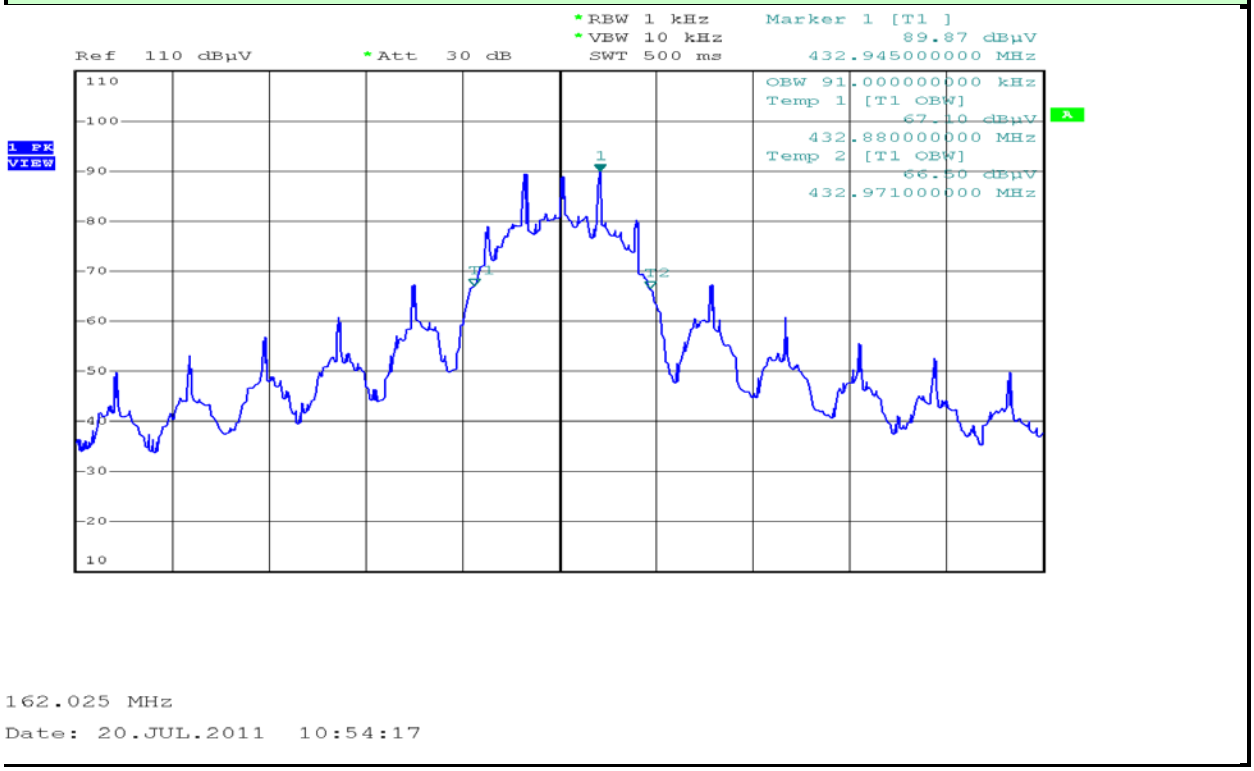


Table 4.3.3: Radiated Emissions Measurements of Occupied Bandwidth Test Results

Professional Testing, EMI, Inc.			
Test Method:	**ANSI C63.4–2009: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"**		
In accordance with:	**FCC Part 15.231 - Code of Federal Regulations Part 47**		
Test Date(s):	**8/4/2011**	**EUT Serial #:**	**N/A**
Customer:	**LDARTools**	**EUT Part #:**	**N/A**
Project Number:	**12345-10**	**Test Technician:**	**Layne Lueckemeyer**
Purchase Order #:	**791 / 792**	**Supervisor:**	**Jason Haley**
Equip. Under Test:	**Shepherd Base / Monitor**	**Witness' Name:**	**Jason Anderson**

Radiated Emissions Test Results Data Sheet - Occupied Bandwidth 20 dB Test Results

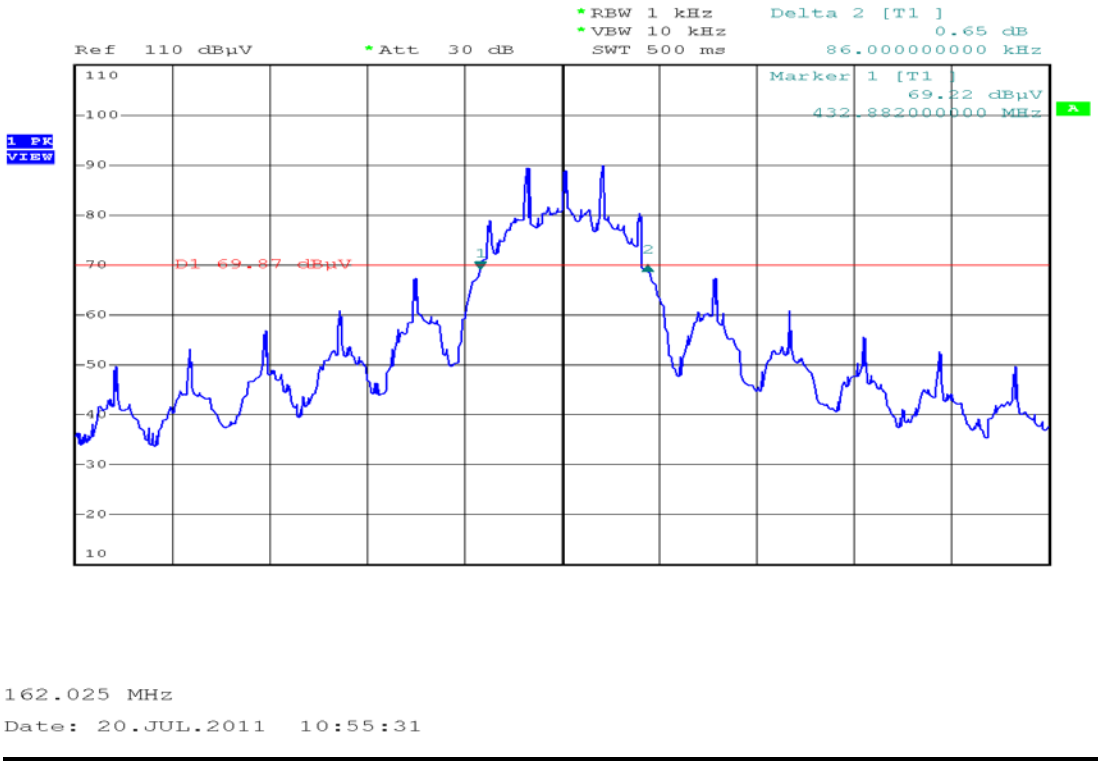
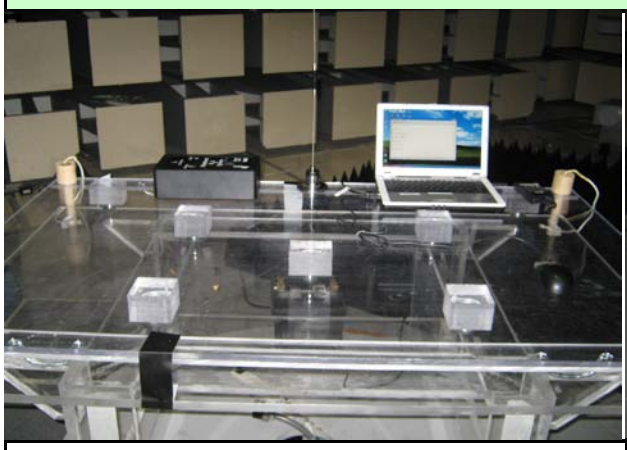


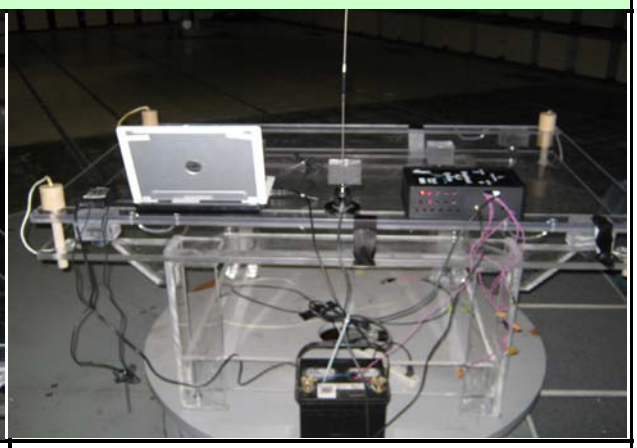
Table 4.3.4: Radiated Emissions Measurements of Occupied Bandwidth Test Setup Photographs

Professional Testing, EMI, Inc.			
Test Method:	**ANSI C63.4–2009: "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**		
In accordance with:	**FCC Part 15.231 - Code of Federal Regulations Part 47**		
Test Date(s):	**8/4/2011**	**EUT Serial #:**	**N/A**
Customer:	**LDARTools**	**EUT Part #:**	**N/A**
Project Number:	**12345-10**	**Test Technician:**	**Layne Lueckemeyer**
Purchase Order #:	**791 / 792**	**Supervisor:**	**Jason Haley**
Equip. Under Test:	**Shepherd Base / Monitor**	**Witness' Name:**	**Jason Anderson**

Radiated Emissions Photographs **Page: 1 of 1**



EUT Front



EUT Rear

5.0 Out of Band Spurious Emissions

Out of band spurious/harmonic emissions measurements were performed on the EUT to determine compliance to 47 CFR, Parts 15.231(c), and 15.209 and RSS-GEN.

5.1 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.

For spurious emissions below 1 GHz, quasi-peak detection was used with a resolution bandwidth of 120 kHz. All measurements below 1 GHz were normalized to 3 meters using a 20 dB/decade distance extrapolation. The emissions were maximized by rotating the EUT and raising and lowering the measurement antenna from 1 to 4 meters.

Spurious/harmonic emissions above 1 GHz peak were measured with average and peak detection with a resolution bandwidth of 1 MHz and measured at a distance of 1 meter. Average detection was used to determine compliance of the EUT if the peak did not meet the average limit. Non-harmonic emissions must satisfy the average limit and the peak limit (20 dB above average). A diagram showing the test setup is given as Figure 3.1.1. Above 1 GHz, testing was completed at the transmit frequency to determine compliance.

5.2 Test Criteria

According to 47 CFR, Part 15.231 and RSS-GEN, field strength of emissions from intentional radiators operated under this section shall not exceed the limits in the table below. The limits specified are at 3 meters.

Fundamental Frequency (MHz)	Field Strength of Fundamental (Microvolts/Meter)	Field Strength of Spurious Emissions (Microvolts/Meter)
40.66 – 40.70	2,250	255
70 – 130	1,250	125
130 – 174	1,250 to 3,750[1]	125 to 375[1]
174 – 260	3,750	375
260 – 470	3,750 to 12,500[1]	375 to 1,250[1]
Above 470	12,500	1,250

[1]Linear interpolations

The radiated limits of 47 CFR, Part 15.209 and RSS-GEN, are shown below. The limits specified are at 3 meters. The limits are quasi-peak for emissions below 1 GHz and average for emissions above 1 GHz. Also above 1 GHz, the peak limit is 20 dB above the average limit.

Frequency MHz	Specification Distance (Meters)	Field Strength (dBuV/m)	Test Distance (Meters)	Field Strength (dBuV/m)
30 to 88	3	40.0	10	29.5
88 to 216	3	43.5	10	33
216 to 960	3	46.0	10	35.5
Above 960	3	54.0	1	63.5

Note: Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Restricted bands of operation per 15.205(a) are shown below.

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
[1]0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	([2])
13.36–13.41			

5.3 Test Results

Out of band spurious emissions measurements were taken on July 20, 2011, and the EUT was found to be in compliance with applicable requirements.

Table 5.3.1: Out of Band Spurious Emissions Measurements – Test Equipment

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**		
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):	**7/20/2011**	**EUT Serial #:**	**1**
Customer:	**LDAR Tools**	**EUT Part #:**	**N/A**
Project Number:	**12345-10**	**Test Technician:**	**Layne Lueckemeyer**
Purchase Order #:	**791**	**Supervisor:**	**Jason Haley**
Equip. Under Test:	**Shepherd Base**	**Witness' Name:**	**Jason Anderson**

Radiated Emissions Test Equipment List	**Page: 1 of 1**
Tile! Software Version:	**3.4.K.11, June 7, 2006, 07:49:00 PM**
Test Profile:	**Radiated Emissions_updated_12-16-10.til**

Asset#	Manufacturer	Model	Equipment Nomenclature	Serial Number	Calibration Due Date
1509A	Braden	N/A	TDK 10M Chamber, NSA < 1 GHz	DAC-012915-005	8/10/2011
85	HP	85650A	Quasi-Peak Adapter CISPR	3033A01458	7/28/2011
0949	HP	85662A	Spec Anal Dsply for AN	2542A12285	N/A
1525	HP	8566B	Spectrum Analyzer 100Hz-22GHz	2532A02126	6/7/2012
238	HP	85685A	RF Preselector	2887A00841	7/27/2011
1497	EMCO	3108	Antenna, Bi Con, 30-300MHz	2121	8/4/2011
1278	HP	85650A	Quasi Peak Adapter	2811A01147	7/28/2011
1834	HP	85662A	Spec Anal Dsply	2349A06182	N/A
1145	HP	8568B	Spectrum Analyzer 100Hz-1.5GHz	2517A01821	7/28/2011
1035	HP	85685A	RF Preselector	2901A00891	4/13/2012
1486	EMCO	3147	Antenna, Log Periodic, .2-5GHz	9112-1052	8/4/2011
1497	EMCO	3108	Antenna, Bi Con, 30-300MHz	2121	8/4/2011
C026	N/A	RG214	Cable Coax, N-N, 25m	none	8/10/2011
C027	N/A	RG214	Cable Coax, N-N, 25m	none	8/10/2011
1414	HP	8447D	Preamp	1937A03403	7/15/2011
1509B	Braden	N/A	TDK 10M Chamber, VSWR > 1 GHz	DAC-012915-005	4/7/2012
1594	Miteq	AFS4-01001800	Amplifier, 1-26.5GHz, 42dB	none	1/28/2012
1529	Miteq	AFS4-01001800	Amplifier, 1-26.5GHz, 36dB	none	7/16/2011
C030	N/A	0	Cable Coax, N-N, 30m	none	3/21/2012
1780	ETS-Lindgren	3117	Antenna, DRG Horn, 1 - 18 GHz	1110313	1/14/2012
948	EMCO	3301B	Antenna, Rod, Active, 30Hz-50MHz	29784	9/15/2011

Table 5.3.2: Bandwidth and Measurement Time Used for Out of Band Spurious Emissions Testing – Peak Scan

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**		
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):	**7/20/2011**	**EUT Serial #:**	**1**
Customer:	**LDAR Tools**	**EUT Part #:**	**N/A**
Project Number:	**12345-10**	**Test Technician:**	**Layne Lueckemeyer**
Purchase Order #:	**791**	**Supervisor:**	**Jason Haley**
Equip. Under Test:	**Shepherd Base**	**Witness' Name:**	**Jason Anderson**

Radiated Emissions Bandwidth and Measurement Time Used for Testing - Peak Scan

Frequency Band Start (MHz)	Frequency Band Stop (MHz)	6dB Bandwidth (kHz)	Number of ranges used	Measurement Time per Range
0.009	0.15	0.3	2	Multiple Sweeps
0.15	30	9	6	Multiple Sweeps
30	200	120	1	Multiple 800mS Sweeps
200	1000	120	1	Multiple 800mS Sweeps
1000	18000	1000	17	Multiple Sweeps

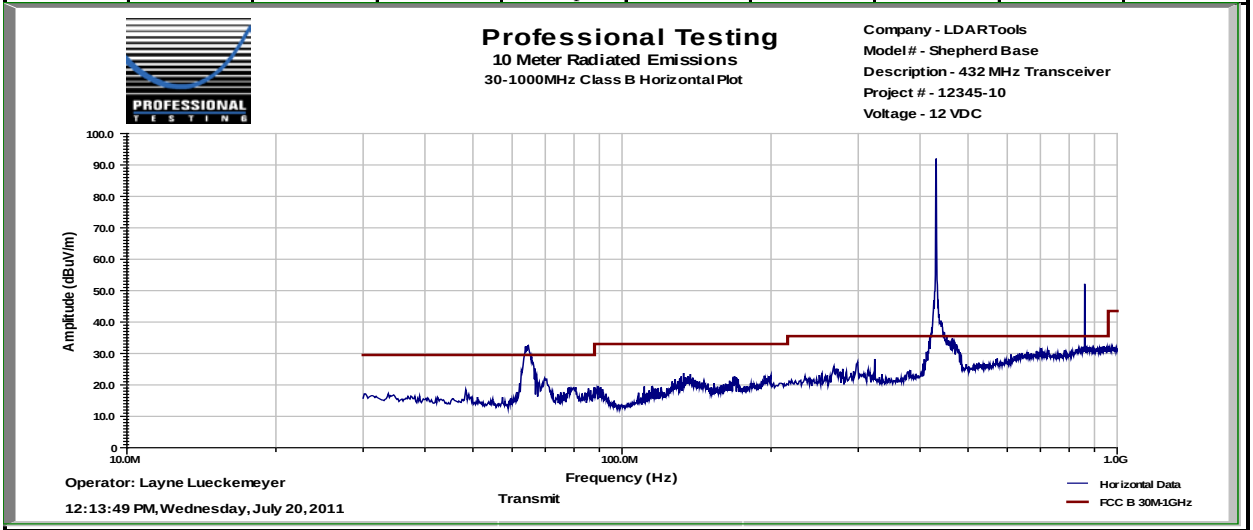
*Notes:
1. The settings above are specifically calculated for the HP856X series of spectrum analyzers, which have 1000 data points per range.
2. The measurement receiver resolution bandwidth setting was 300Hz for Quasi-peak measurements from 9-150kHz.
3. The measurement receiver resolution bandwidth setting was 9kHz for Quasi-peak measurements from 0.15-30MHz.
4. The measurement receiver resolution bandwidth setting was 120kHz for Quasi-peak measurements from 30-1000MHz.
5. The measurement receiver resolution bandwidth setting was 1MHz for Average measurements from 1-18GHz.

Table 5.3.3: Out of Band Spurious Emissions Measurements Test Results – Horizontal Antenna Polarity ≤ 1GHz

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"**		
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):	**7/20/2011**	**EUT Serial #:**	**1**
Customer:	**LDAR Tools**	**EUT Part #:**	**N/A**
Project Number:	**12345-10**	**Test Technician:**	**Layne Lueckemeyer**
Purchase Order #:	**791**	**Supervisor:**	**Jason Haley**
Equip. Under Test:	**Shepherd Base**	**Witness' Name:**	**Jason Anderson**

Radiated Emissions Test Results Data Sheet - Horizontal Antenna Polarity ≤ 1GHz			**Page:**	**1**	**of**	**1**
EUT Line Voltage:	**12**	**VDC**	**EUT Line Frequency:**	**N/A**		**Hz**
EUT Mode of Operation:			**Transmit**			

Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
64.5	10	89	4	Quasi-peak	32.5	17.0	29.5	-12.5	Pass
133.19	10	48	4	Quasi-peak	23.8	12.1	33.1	-21.0	Pass
193.88	10	183	4	Quasi-peak	22.9	13.3	33.1	-19.8	Pass
299.268	10	99	4	Quasi-peak	27.3	13.9	35.6	-21.7	Pass
324.961	10	106	4	Quasi-peak	28.2	15.5	35.6	-20.1	Pass



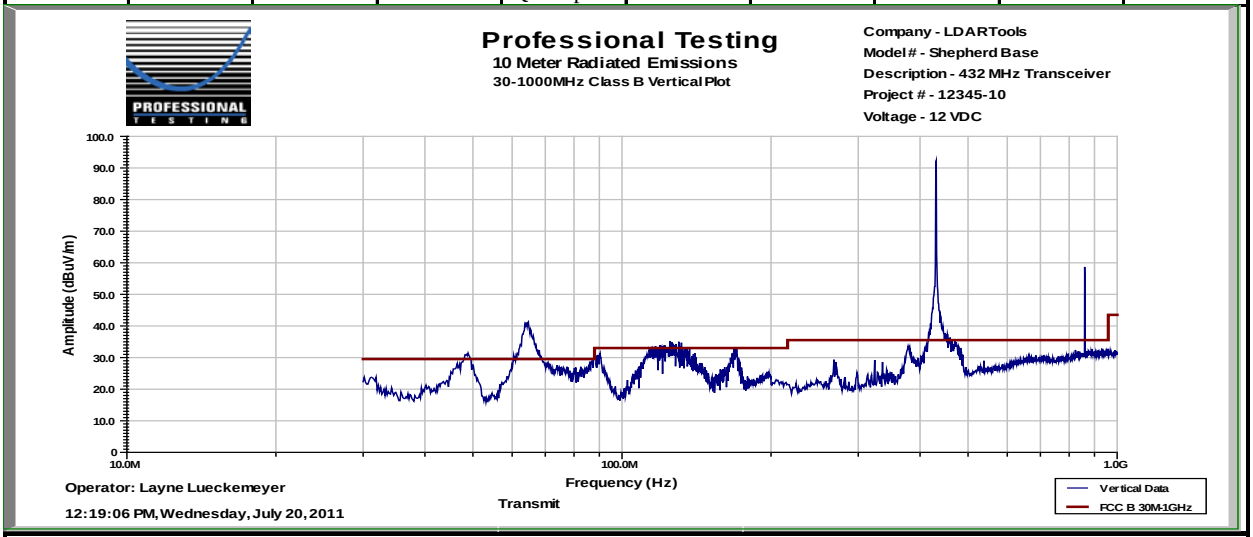
30MHz to 1GHz, Horizontal Polarity

Table 5.3.4: Out of Band Spurious Emissions Measurements Test Results – Vertical Antenna Polarity ≤ 1GHz

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"**		
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):	**7/20/2011**	**EUT Serial #:**	**1**
Customer:	**LDAR Tools**	**EUT Part #:**	**N/A**
Project Number:	**12345-10**	**Test Technician:**	**Layne Lueckemeyer**
Purchase Order #:	**791**	**Supervisor:**	**Jason Haley**
Equip. Under Test:	**Shepherd Base**	**Witness' Name:**	**Jason Anderson**

Radiated Emissions Test Results Data Sheet - Vertical Antenna Polarity ≤ 1GHz			**Page:**	**1**	**of**	**1**
EUT Line Voltage:	**12**	**VDC**	**EUT Line Frequency:**	**N/A**		**Hz**
EUT Mode of Operation:			**Transmit**			

Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
48.63	10	107	1	Quasi-peak	36.4	22.4	29.5	-7.1	Pass
64.5	10	119	1	Quasi-peak	40.7	25.2	29.5	-4.3	Pass
115.82	10	19	1	Quasi-peak	30.2	17.1	33.1	-16.0	Pass
168.77	10	162	1	Quasi-peak	29.2	18.6	33.1	-14.5	Pass
270.4	10	102	1	Quasi-peak	40.3	26.0	35.6	-9.6	Pass



30MHz to 1GHz, Vertical Polarity

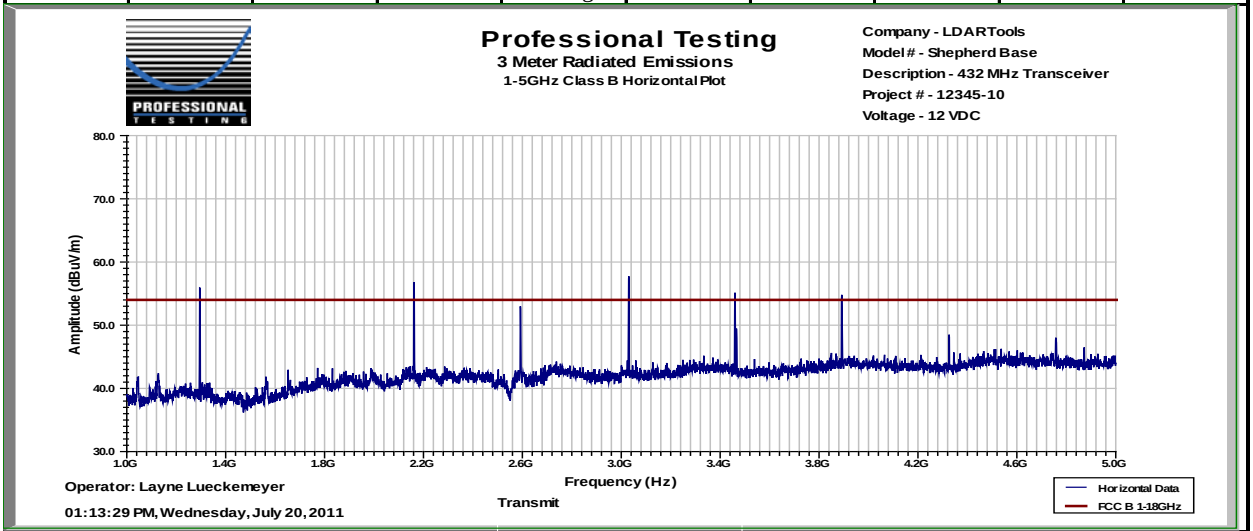
Table 5.3.5: Out of Band Spurious Emissions Measurements Test Results – Horizontal Antenna Polarity ≥ 1GHz

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"**		
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):	**7/20/2011**	**EUT Serial #:**	**1**
Customer:	**LDAR Tools**	**EUT Part #:**	**N/A**
Project Number:	**12345-10**	**Test Technician:**	**Layne Lueckemeyer**
Purchase Order #:	**791**	**Supervisor:**	**Jason Haley**
Equip. Under Test:	**Shepherd Base**	**Witness' Name:**	**Jason Anderson**

Radiated Emissions Test Results Data Sheet - Horizontal Antenna Polarity > 1GHz **Page: 1 of 1**

EUT Line Voltage:	**12**	**VDC**	**EUT Line Frequency:**	**N/A**	**Hz**
EUT Mode of Operation:			**Transmit**		

Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
1298.76	3	180	1	Peak	92.3	55.9	60.8	-4.9	Pass
1731.68	3	180	1	Peak	78.1	43.2	60.8	-17.6	Pass
2164.6	3	180	1	Peak	89.5	56.8	60.8	-4.0	Pass
2597.52	3	180	1	Peak	84.7	52.9	60.8	-7.9	Pass
3030.44	3	180	1	Peak	88.4	57.7	60.8	-3.1	Pass
3463.36	3	180	1	Peak	85.2	55.1	60.8	-5.7	Pass
3896.28	3	180	1	Peak	83.7	54.8	74.0	-19.2	Pass
3896.28	3	180	1	Average	63.7	34.8	54.0	-19.2	Pass
4329.2	3	180	1	Peak	76.5	48.1	74.0	-25.9	Pass
4329.2	3	180	1	Average	56.5	28.1	54.0	-25.9	Pass



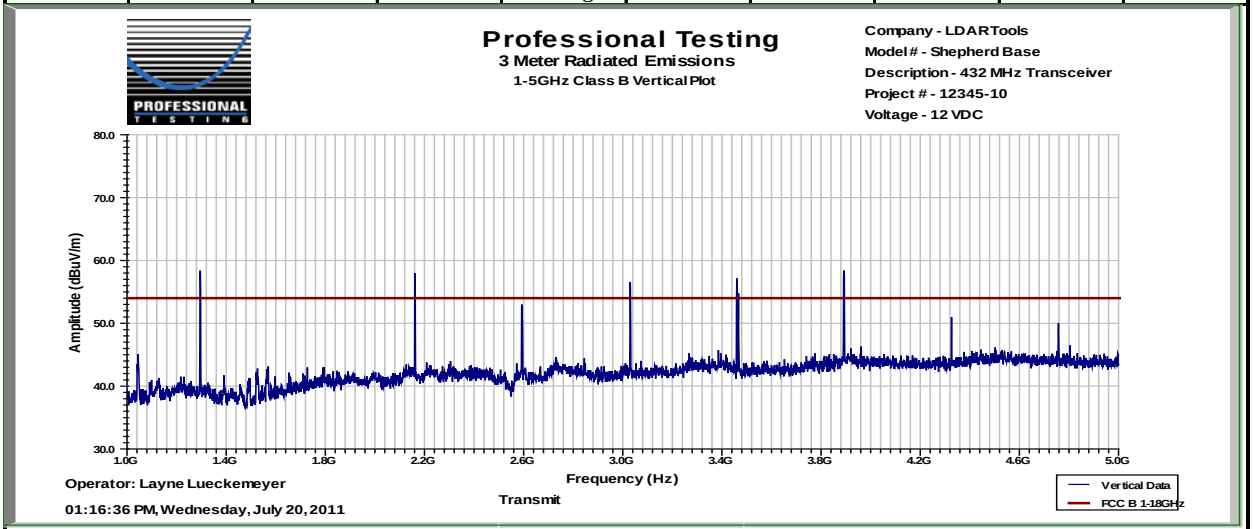
1GHz to 5GHz, Horizontal Polarity

Table 5.3.6: Out of Band Spurious Emissions Measurements Test Results – Vertical Antenna Polarity ≥ 1GHz

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"**		
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):	**7/20/2011**	**EUT Serial #:**	**1**
Customer:	**LDAR Tools**	**EUT Part #:**	**N/A**
Project Number:	**12345-10**	**Test Technician:**	**Layne Lueckemeyer**
Purchase Order #:	**791**	**Supervisor:**	**Jason Haley**
Equip. Under Test:	**Shepherd Base**	**Witness' Name:**	**Jason Anderson**

Radiated Emissions Test Results Data Sheet - Vertical Antenna Polarity > 1GHz			**Page:**	**1**	**of**	**1**
EUT Line Voltage:	**12**	**VDC**	**EUT Line Frequency:**	**N/A**		**Hz**
EUT Mode of Operation:			**Transmit**			

Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
1298.76	3	180	1	Peak	94.7	58.3	60.8	-2.5	Pass
1731.68	3	180	1	Peak	77.8	42.9	60.8	-17.9	Pass
2164.6	3	180	1	Peak	90.6	57.9	60.8	-2.9	Pass
2597.52	3	180	1	Peak	84.7	52.9	60.8	-7.9	Pass
3030.44	3	180	1	Peak	87.2	56.5	60.8	-4.3	Pass
3463.36	3	180	1	Peak	87.2	57.1	60.8	-3.7	Pass
3896.28	3	180	1	Peak	87.3	58.4	74.0	-15.6	Pass
3896.28	3	180	1	Average	67.3	38.4	54.0	-15.6	Pass
4329.2	3	180	1	Peak	79.3	50.9	74.0	-23.1	Pass
4329.2	3	180	1	Average	59.3	30.9	54.0	-23.1	Pass



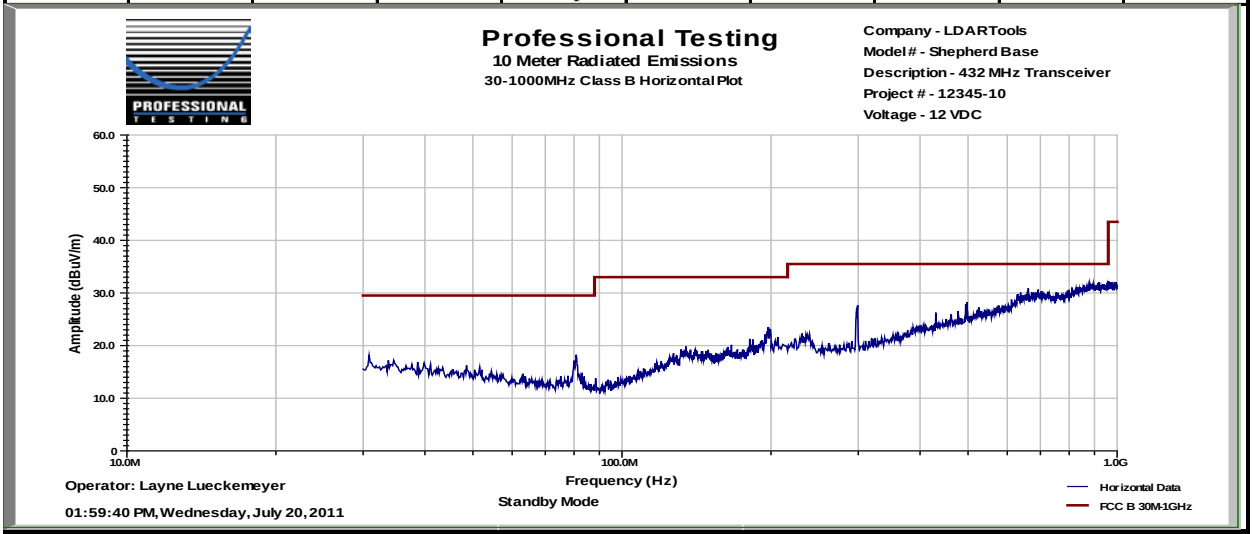
1GHz to 5GHz, Vertical Polarity

Table 5.3.7: Out of Band Spurious Emissions Measurements Receive Test Results – Horizontal Antenna Polarity ≤ 1GHz

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"**		
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):	**7/20/2011**	**EUT Serial #:**	**1**
Customer:	**LDAR Tools**	**EUT Part #:**	**N/A**
Project Number:	**12345-10**	**Test Technician:**	**Layne Lueckemeyer**
Purchase Order #:	**791**	**Supervisor:**	**Jason Haley**
Equip. Under Test:	**Shepherd Base**	**Witness' Name:**	**Jason Anderson**

Radiated Emissions Test Results Data Sheet - Horizontal Antenna Polarity ≤ 1GHz			**Page:**	**1**	**of**	**1**
EUT Line Voltage:	**12**	**VDC**	**EUT Line Frequency:**	**N/A**		**Hz**
EUT Mode of Operation:			**Standby**			

Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
80.83	10	89	4	Quasi-peak	34.5	18.3	29.5	-11.2	Pass
197.45	10	48	4	Quasi-peak	33	23.5	33.1	-9.6	Pass
299.2	10	183	4	Quasi-peak	40.1	26.7	35.6	-8.9	Pass
430.4	10	99	4	Quasi-peak	35.6	26.3	35.6	-9.3	Pass
497.6	10	106	4	Quasi-peak	35.9	28.2	35.6	-7.4	Pass
661.6	10	18	4	Quasi-peak	35.4	30.9	35.6	-4.7	Pass



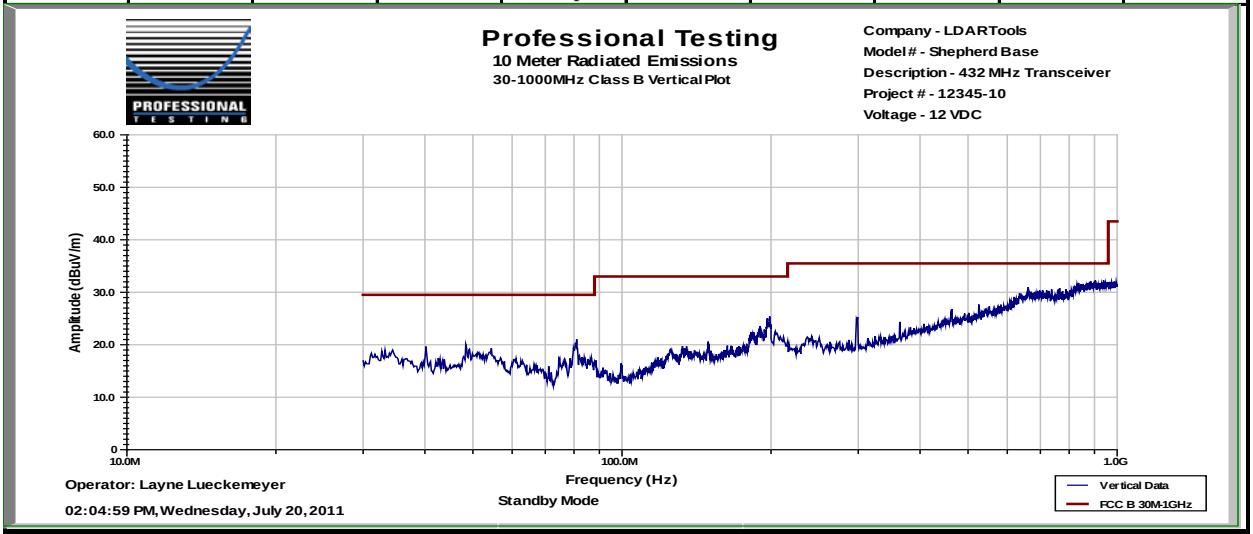
30MHz to 1GHz, Horizontal Polarity

Table 5.3.8: Out of Band Spurious Emissions Measurements Receive Test Results – Vertical Antenna Polarity ≤ 1GHz

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"**		
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):	**7/20/2011**	**EUT Serial #:**	**1**
Customer:	**LDAR Tools**	**EUT Part #:**	**N/A**
Project Number:	**12345-10**	**Test Technician:**	**Layne Lueckemeyer**
Purchase Order #:	**791**	**Supervisor:**	**Jason Haley**
Equip. Under Test:	**Shepherd Base**	**Witness' Name:**	**Jason Anderson**

Radiated Emissions Test Results Data Sheet - Vertical Antenna Polarity ≤ 1GHz			Page:	1	of	1
EUT Line Voltage:	**12**	**VDC**	**EUT Line Frequency:**	**N/A**		**Hz**
EUT Mode of Operation:			**Standby**			

Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Level (dBµV/m)	Margin (dB)	Test Results
48.63	10	107	1	Quasi-peak	34.1	20.1	29.5	-9.4	Pass
81.38	10	119	1	Quasi-peak	37.3	21.1	29.5	-8.4	Pass
198.81	10	19	1	Quasi-peak	34.8	25.4	33.1	-7.7	Pass
299.2	10	162	1	Quasi-peak	38.7	25.3	35.6	-10.3	Pass
464.598	10	102	1	Quasi-peak	35	26.8	35.6	-8.8	Pass
661.8	10	18	1	Quasi-peak	34.3	29.8	35.6	-5.8	Pass

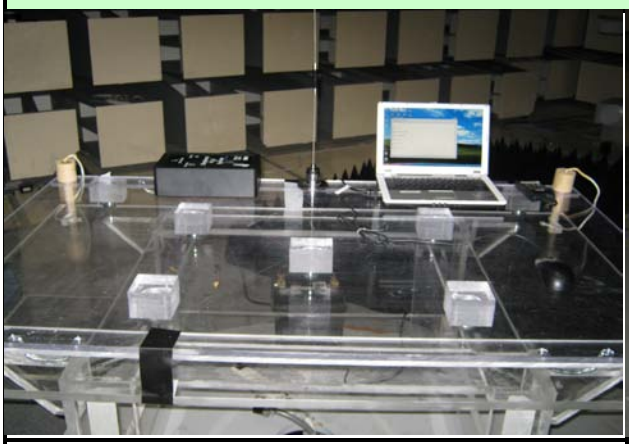


30MHz to 1GHz, Vertical Polarity

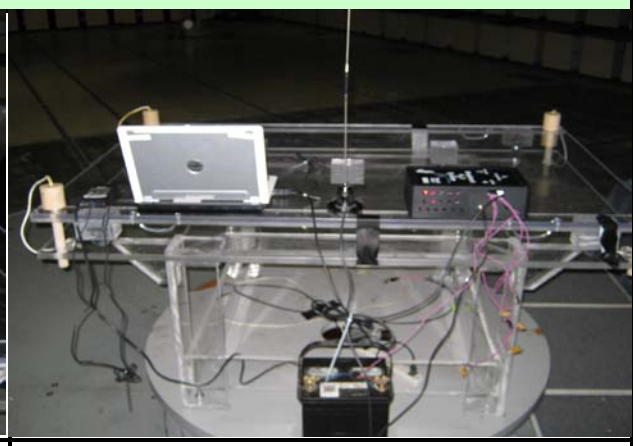
Table 5.3.9: Out of Band Spurious Emissions Measurements Test Setup Photographs

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**		
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):	**7/20/2011**	**EUT Serial #:**	**1**
Customer:	**LDAR Tools**	**EUT Part #:**	**N/A**
Project Number:	**12345-10**	**Test Technician:**	**Layne Lueckemeyer**
Purchase Order #:	**791**	**Supervisor:**	**Jason Haley**
Equip. Under Test:	**Shepherd Base**	**Witness' Name:**	**Jason Anderson**

Radiated Emissions Photographs **Page: 1 of 1**



EUT Front



EUT Rear

6.0 Antenna Requirements

An antenna evaluation was performed on the EUT to determine compliance with 47 CFR, Part 15.203 and RSS-210.

6.1 Evaluation Procedure

The design of the EUT antenna was evaluated for conformance to engineering requirements for gain and to prevent substitution of unapproved antennae. Gain of the antenna was assessed by reviewing the antenna manufacturer's data sheet.

6.2 Evaluation Criteria

The antenna design must meet at least one of the following criteria:

a) Antenna is permanently attached to the unit.
b) Antenna must use a unique type of connector to attach to the EUT.
c) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

6.3 Evaluation Results

The Shepherd Base met the criteria of this rule by virtue of having an internal antenna inaccessible to the user. Therefore, the EUT is compliant.

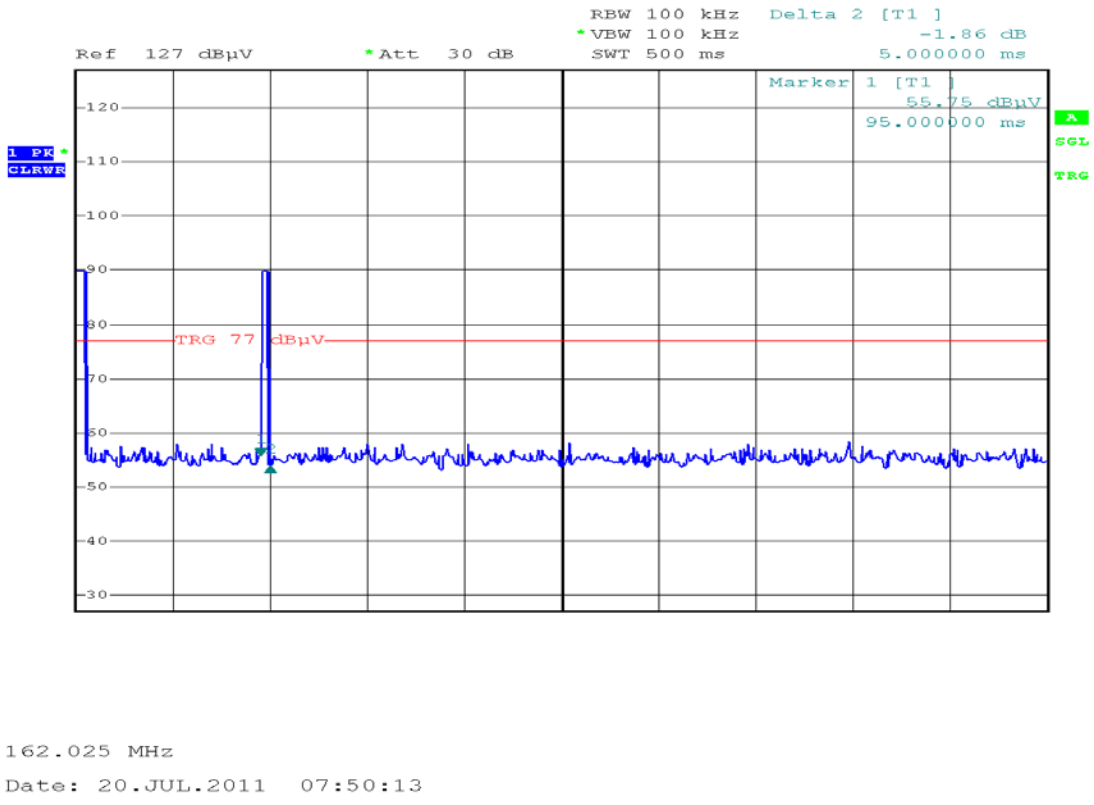
7.0 Compliance with FCC 15.231(a)(2)

The Shepherd Base was tested to evaluate compliance to FCC 15.231(a)(2). The event was triggered by a software command to transmit under normal circumstances. The plot demonstrates compliance to FCC 15.231(a)(2) as the unit ceases transmission within 5 seconds after activation.

The EUT was observed beyond 5 seconds to ensure compliance to FCC 15.231(a)(2). Professional Testing attests to the compliance of the Shepherd Base.

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"**		
In accordance with:	**FCC Part 15.231 - Code of Federal Regulations Part 47**		
Test Date(s):	**7/20/2011**	**EUT Serial #:**	**1**
Customer:	**LDAR Tools**	**EUT Part #:**	**N/A**
Project Number:	**12345-10**	**Test Technician:**	**Layne Lueckemeyer**
Purchase Order #:	**791**	**Supervisor:**	**Jason Haley**
Equip. Under Test:	**Shepherd Base**	**Witness' Name:**	**Jason Anderson**

15.231 (a)(2)



8.0 Duty Cycle Calculation

Period = 100 ms
Total on time over 100 ms = 6 ms + 3.3 ms = 9.3 ms
Duty Cycle Correction Factor = 20 log (9.3ms /100 ms)

Duty cycle Correction Factor = -20.0 dB
Duty cycle = 9.3%

End of Report

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