

**Application for Certification  
For a Transceiver.**

D. Green Engineering LLC  
P. O. Box 20247  
Panama City Beach, FL 32417

Transceiver used in Hunting Dog tracking products

M/N: OR

FCC ID: 2AERJ-OR-01

REPORT # UT56076B-002

This report was prepared in accordance with the requirements of the FCC Rules and Regulations Part 2, Subpart J, 2.1033, Part 15.247, and other applicable sections of the rules as indicated herein.

Prepared By:

DNB Engineering, Inc.  
1100 E Chalk Creek Road  
Coalville, UT 84017

8 July 2015

## TABLE OF CONTENTS

Paragraph numbers in this report follow the application section numbers found in the FEDERAL COMMUNICATIONS COMMISSION Rules and Regulations, Part 2, Subpart J for Certification of electronic equipment.

TABLE OF CONTENTS.....	2
1.0 ADMINISTRATIVE DATA.....	3
1.1 Certifications and Qualifications.....	3
1.2 Measurement Repeatability Information.....	3
2.1033 (b) (1) Application for Certification.....	4
2.1033 (b) (2) FCC Identifier .....	5
2.1033 (b) (3) Installation and Operating Instructions.....	6
2.1033 (b) (4) Brief Description of Circuit Function.....	7
2.1033 (b) (5) Block Diagram.....	8
2.1033 (b) (6) Report of Measurements .....	9
15.207      Conducted Emissions (General Provisions) .....	10
15.209      Radiated Emissions (General Provisions) .....	12
15.247 (c)      Spurious Radiated Emissions.....	17
15.247 (a,2)      6 dB Bandwidth .....	30
15.247 (b)      Maximum Peak Output Power (Conducted).....	36
15.247 (d)      Conducted Band Edge Measurements and Out of Band Emissions. ....	40
15.247 ( c)      Spurious RF Conducted Emissions.....	47
15.247(d):      Power spectral density(PSD).. .....	51
2.1055 Frequency stability.....	55
2.1033 (b) (7) Equipment Photographs .....	58
End of Report UT56076B-002.....	63

## 1.0 ADMINISTRATIVE DATA

### 1.1 Certifications and Qualifications

I certify that DNB Engineering, Inc conducted the tests performed in order to obtain the technical data presented in this application. Also, based on the results of the enclosed data, I have concluded that the equipment tested meets or exceeds the requirements of the Rules and Regulations governing this application.

### 1.2 Measurement Repeatability Information

The test data presented in this report has been acquired using the guidelines set forth in FCC Part 2.1031 through 2.1057, Part 15. The test results presented in this document are valid only for the equipment identified herein under the test conditions described. Repeatability of these test results will only be achieved with identical measurement conditions. These conditions include: The same test distance, EUT Height, Measurement Site Characteristics, and the same EUT System Components. The system must have the same Interconnecting Cables arranged in identical placement to that in the test set-up, with the system and/or EUT functioning in the identical mode of operation (i.e. software and so on) as on the date of the test. Any deviation from the test conditions and the environment on the date of the test may result in measurement repeatability difficulties.

All changes made to the EUT during the course of testing as identified in this test report must be incorporated into the EUT or identical models to ensure compliance with the FCC regulations.



C. L. Payne III (Para. 1.1)  
Facility Manager  
Coalville Facility.  
DNB Engineering, Inc.  
Tel. (435) 336-4433  
FAX (435) 336-4436

2.1033 (b) (1) Application for Certification

Name of Applicant: D. Green Engineering LLC  
P. O. Box 20247  
Panama City Beach, FL 32417

FRN Number: 0024594632

Applicant is:  D. Green Engineering LLC  
Vendor  
Licensee  
Prospective Licensee  
Other

Name of Manufacturer : VPI Engineering  
11814 South Election Road  
Draper, UT 84020

Description: Transceiver used in Hunting Dog tracking products

Part Number: OR

Anticipated Production Quantity: Multiple Units

Frequency Band: 2401.3 - 2480.7 MHz

Rated Power: 1 mW

Type of Signal: Digital Transmission System (DTS)

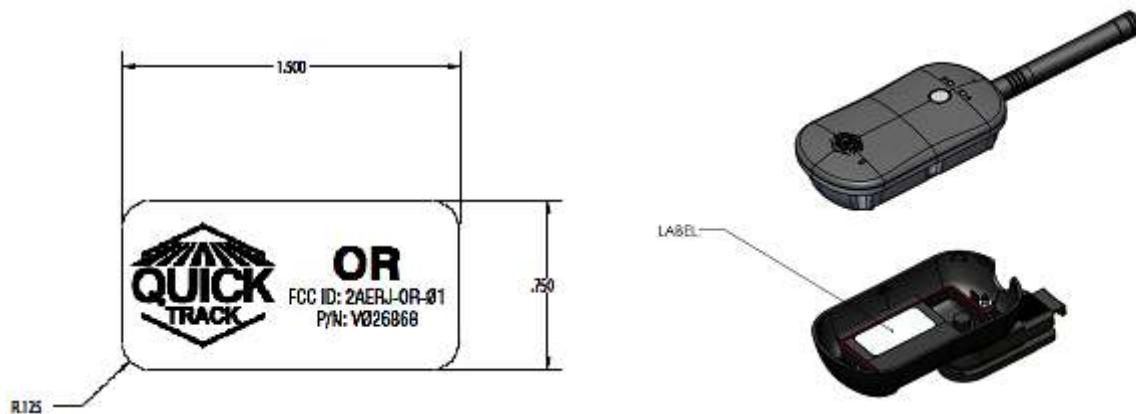
Hopping Channels: 40

Max Data Rate: 1Mpbs (mega-bit) - Data transmission is not continuous, it happens for short intervals for short periods of time.

2.1033 (b) (2) FCC Identifier

FCC ID: 2AERJ-OR-01

Figure 1 - Label and location



Label Material:

The adhesive used in this label material is a permanent type.

2.1033 (b) (3) Installation and Operating Instructions

Supplied separately.

2.1033 (b) (4) Brief Description of Circuit Function

The Quick Track OMNI system allows hunters to track their hunting dogs location wirelessly using a Multi-Use Radio Service (MURS). The O is a collar that the dog wears that transmits the GPS location of the dog back to the hunter over MURS. The OR is a MURS receiver that stays with the hunter and relays the dog location to the hunter's smartphone/tablet through a Bluetooth Low Energy Radio.

2.1033 (b) (5) Block Diagram

Supplied separately for confidentiality.

2.1033 (b) (6) Report of Measurements

15.207      Conducted Emissions (General Provisions)

Test Procedure: As specified in IEEE C63.10-2013

To measure conducted emissions, the EUT was set upon a wooden table in the shielded enclosure. AC power was fed into the EUT from the Artificial Mains Network. With the Artificial Mains Network connected to an Rhode & Schwarz FSV Signal and Spectrum Analyzer, and using Personal Computer with TILES Measurement Software, the spectrum was searched from 0.15 - 30 MHz for emissions emanating from the EUT.

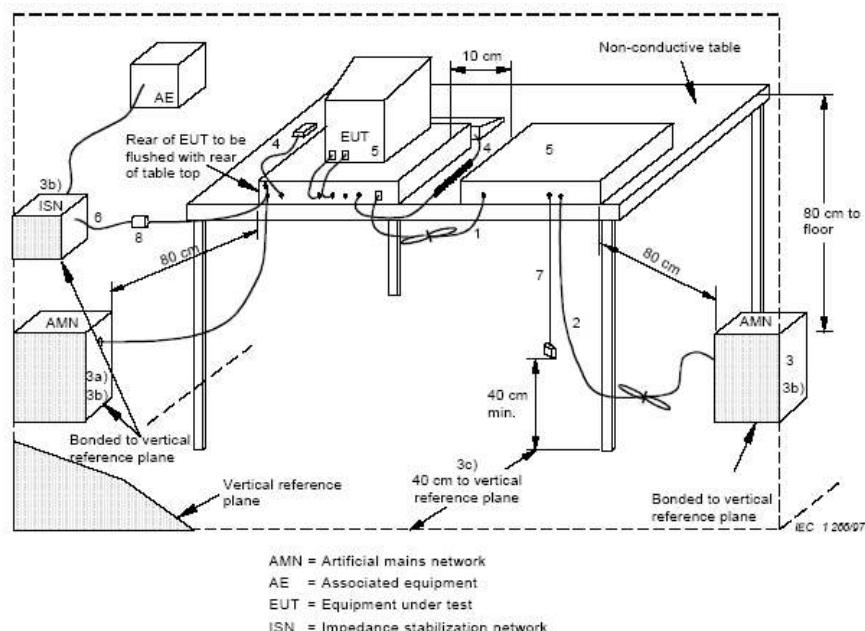
Frequency of emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 - 0.5	66 to 56*	56 to 46*
0.5 - 5	56	46
5 - 30	60	50

\* Decreases with the logarithm of the frequency.

EUT operating conditions:

The software provided by the client to enable the EUT to transmit continuously.

Test Set Up:





1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

## Conducted Emissions

DNB Job Number:	56076	Date:	2 Apr 2015	Specification  [X] 15.207 [X] IEEE C63.10-2013
Customer:	D. Green Engineering LLC			
Model Number:	OR			
Description:	Transceiver used in Hunting Dog tracking products			
TEST SET UP - CONDUCTED EMISSIONS				

Not Applicable - EUT is Battery Operated

15.209 Radiated Emissions (General Provisions)

Test Procedure: IEEE C63.10-2013

The EUT was measured on an open area test site (OATS).

A measuring distance of at least 3 m shall be used for measurements at frequencies up to 1 GHz. For frequencies above 1 GHz, any suitable measuring distance may be used. The equipment size (excluding the antenna) shall be less than 20 % of the measuring distance.

Sufficient precautions shall be taken to ensure that reflections from extraneous objects adjacent to the site do not degrade the measurement results, in particular:

- no extraneous conducting objects having any dimension in excess of a quarter wavelength of the highest frequency tested shall be in the immediate vicinity of the site;
- all cables shall be as short as possible; as much of the cables as possible shall be on the ground plane or preferably below; and the low impedance cables shall be screened.

The EUT shall be placed upon a non-conductive table 0.8 meters above the ground plane and shall be placed in the “worst case” transmitting mode. The EUT shall be rotated 360 degrees to find the azimuth maxima. The receive antenna shall then be raised and lowered between 1 to 4 meters to find the maximum signal emanating from the EUT. This signal strength is then recorded on the data sheets.

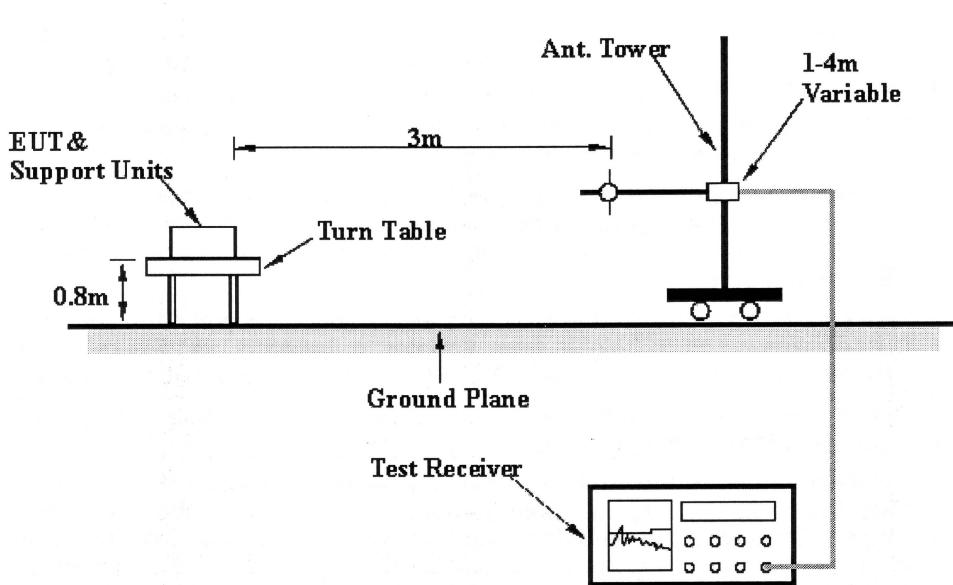
Frequency (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measurement Distance (meters)
.0009 - 0.490	2400/F(kHz)	$20*(\text{Log}_{10}(2400/F(\text{kHz})))$	300
0.490 - 1.705	24000/F(kHz)	$20*(\text{Log}_{10}(24000/F(\text{kHz})))$	30
1.705 - 30.0	30	29.5	30
30 - 88	100	40.0	3
88 - 216	150	43.5	3
216 - 960	200	46.0	3
Above 960	500	54.0	3



1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

## Radiated Emissions (Spurious)

DNB Job Number:	56076	Date:	2 Apr 2015	Specification  [X] 15.209 [X] IEEE C63.10-2013
Customer:	D. Green Engineering LLC			
Model Number:	OR			
Description:	Transceiver used in Hunting Dog tracking products			
	Test Set Up			



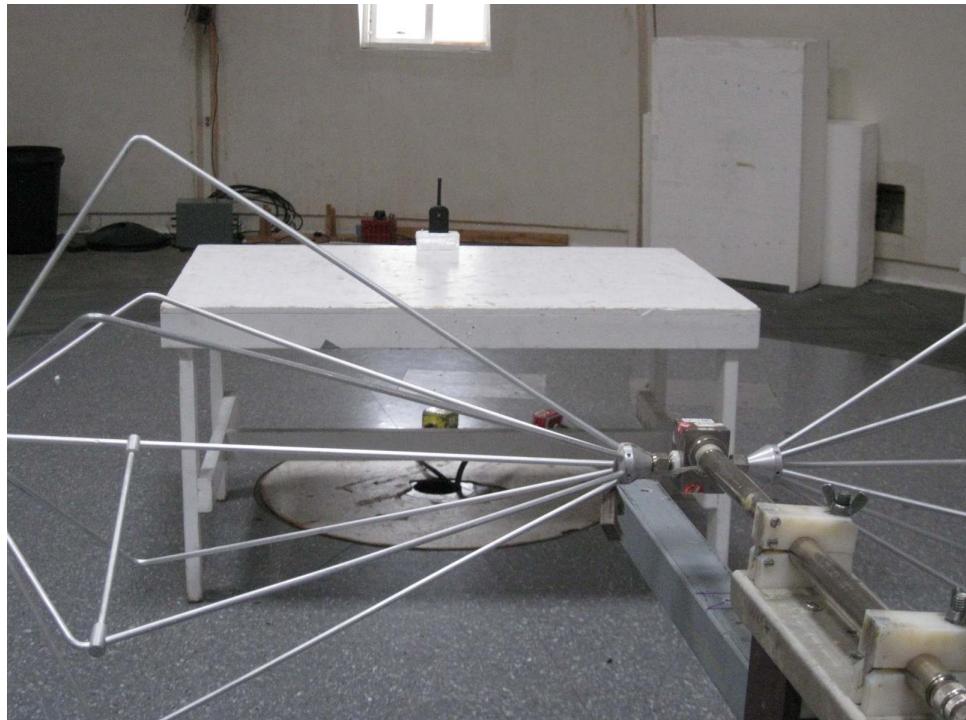


1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

## Radiated Emissions (General)

DNB Job Number:	56076	Date:	2 Apr 2015	Specification  [X] 15.209 [X] IEEE C63.10-2013
Customer:	D. Green Engineering LLC			
Model Number:	OR			
Description:	Transceiver used in Hunting Dog tracking products			

Test Set Up - Bicon - Horizontal - Y Axis



	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436	<b>Radiated Emissions</b> (General)	
DNB Job Number:	56076	Date:	2 Apr 2015
Customer:	D. Green Engineering LLC	Specification	[X] 15.209
Model Number:	OR		[X] IEEE C63.10-2013
Description:	Transceiver used in Hunting Dog tracking products		
Test Set Up - Log Periodic - Horizontal - Z Axis			





1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

## Radiated Emissions (General)

### 15.247 (c) Spurious Radiated Emissions

This test is required for any spurious emission or modulation product that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for  $f \geq 1$  GHz, 100 kHz for  $f < 1$  GHz

VBW = RBW

Sweep = auto

Detector function = peak

Trace = max hold

Follow the guidelines in C63.4.2009 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b). Submit this data.

Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from  $20\log(\text{dwell time}/100 \text{ ms})$ , in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

If the emission on which a radiated measurement must be made is located at the edge of the authorized band of operation, then the alternative “marker-delta” method, listed at the end of this document, may be employed.

	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436	<b>Radiated Emissions</b> (Spurious)	
DNB Job Number:	56076	Date:	5 May 2015
Customer:	D. Green Engineering LLC	Specification	
Model Number:	OR	<input checked="" type="checkbox"/> 15.247 (c) <input checked="" type="checkbox"/> IEEE C63.10-2013	
Description:	Transceiver used in Hunting Dog tracking products		
Test Set Up - Z-Axis (Vertical - DRG)			





1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

## Radiated Emissions (Spurious)

DNB Job Number:	56076	Date:	5 May 2015	Specification  [X] 15.247 (c) [X] IEEE C63.10-2013
Customer:	D. Green Engineering LLC			
Model Number:	OR			
Description:	Transceiver used in Hunting Dog tracking products			

Test Set Up - Y-Axis (Vertical - DRG)



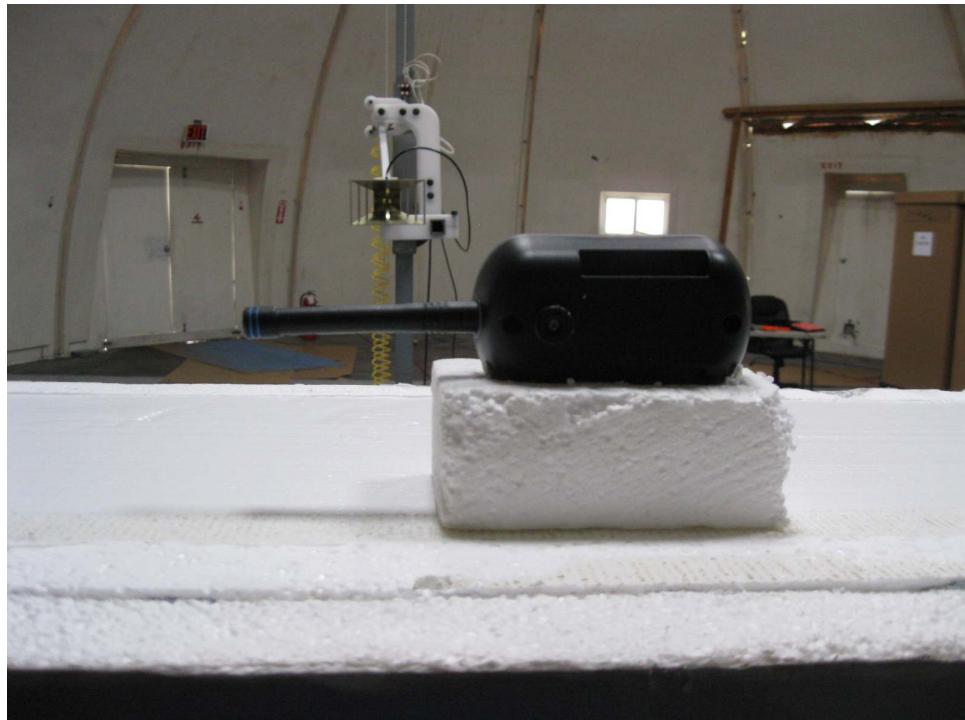


1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

## Radiated Emissions (Spurious)

DNB Job Number:	56076	Date:	5 May 2015	Specification  [X] 15.247 (c) [X] IEEE C63.10-2013
Customer:	D. Green Engineering LLC			
Model Number:	OR			
Description:	Transceiver used in Hunting Dog tracking products			

Test Set Up - X-Axis (Vertical - DRG)



	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436	<b>Radiated Emissions</b> (Spurious)	
DNB Job Number:	56076	Date: 5 May 2015	Specification
Customer:	D. Green Engineering LLC		[X] 15.247 (c) [X] IEEE C63.10-2013
Model Number:	OR		
Description:	Transceiver used in Hunting Dog tracking products Low Channel - X-Axis		

Note 1: GF = Ground Floor = If Y reading was at ground floor, If N reading was identifiable signal.

Note 2: Limit listed is the general limit as specified in 15.209 in order to show compliance with the restricted bands of operation as well as the out of band limit in 15.247. No other identifiable signals were observed in the restricted bands as specified in 15.205.

Note 3: Highest frequency investigated was the tenth harmonic of the fundamental, no emissions were detected above the 2nd harmonic. Only data to the 7<sup>th</sup> harmonic has been provided.

FREQ (Mhz)	Meter	Correction Factors			dBuV/m			Type		Positions			G F
		Ant	Cbl	Amp	Corr	Lim	Delta	Lim	Rdng	Tbl	PI	Hgt	
2402	62.24	29.45	3.36	-	95.05	--	--	Peak	Peak	230	Hor	1.00	N
4804	40.20	32.99	7.80	49.32	31.68	54.00	-22.32	Ave	Peak	145	Hor	1.00	N
7206	31.90	37.18	8.29	48.36	29.01	54.00	-24.99	Ave	Peak	0	Hor	1.00	Y
9608	32.90	37.84	5.42	46.86	29.29	54.00	-24.71	Ave	Peak	0	Hor	1.00	Y
12010	33.54	39.73	11.12	47.20	37.20	54.00	-16.80	Ave	Peak	0	Hor	1.00	Y
14412	33.08	41.51	13.51	46.66	41.43	54.00	-12.57	Ave	Peak	0	Hor	1.00	Y
16814	33.09	41.92	14.38	46.26	43.13	54.00	-10.87	Ave	Peak	0	Hor	1.00	Y
2402	66.20	29.45	3.36	-	99.01	--	--	Peak	Peak	255	Vert	1.05	N
4804	40.54	32.99	7.80	49.32	32.02	54.00	-21.98	Ave	Peak	141	Vert	1.00	N
7206	31.78	37.18	8.29	48.36	28.89	54.00	-25.11	Ave	Peak	0	Vert	1.00	Y
9608	32.04	37.84	5.42	46.86	28.43	54.00	-25.57	Ave	Peak	0	Vert	1.00	Y
12010	33.42	39.73	11.12	47.20	37.08	54.00	-16.92	Ave	Peak	13	Vert	1.00	Y
14412	34.80	41.51	13.51	46.66	43.15	54.00	-10.85	Ave	Peak	0	Vert	1.00	Y
16814	34.20	41.92	14.38	46.26	44.24	54.00	-9.76	Ave	Peak	0	Vert	1.00	Y

	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436	<b>Radiated Emissions</b> (Spurious)	
DNB Job Number:	56076	Date: 5 May 2015	Specification  [X] 15.247 (c) [X] IEEE C63.10-2013
Customer:	D. Green Engineering LLC		
Model Number:	OR		
Description:	Transceiver used in Hunting Dog tracking products Low Channel - Y-Axis		

Note 1: GF = Ground Floor = If Y reading was at ground floor, If N reading was identifiable signal.

Note 2: Limit listed is the general limit as specified in 15.209 in order to show compliance with the restricted bands of operation as well as the out of band limit in 15.247. No other identifiable signals were observed in the restricted bands as specified in 15.205.

Note 3: Highest frequency investigated was the tenth harmonic of the fundamental, no emissions were detected above the 2nd harmonic. Only data to the 7<sup>th</sup> harmonic has been provided.

FREQ (Mhz)	Meter	Correction Factors			dBuV/m			Type		Positions			G F
		Ant	Cbl	Amp	Corr	Lim	Delta	Lim	Rdng	Tbl	PI	Hgt	
2402	59.81	29.45	3.36	-	92.62	--	--	Peak	Peak	254	Hor	1	N
4804	40.39	32.99	7.80	49.32	31.87	54.00	-22.13	Ave	Peak	341	Hor	1	N
7206	31.89	37.18	8.29	48.36	29.00	54.00	-25.00	Ave	Peak	0	Hor	1	Y
9608	30.72	37.84	5.42	46.86	27.11	54.00	-26.89	Ave	Peak	0	Hor	1	Y
12010	32.82	39.73	11.12	47.20	36.48	54.00	-17.52	Ave	Peak	0	Hor	1	Y
14412	33.02	41.51	13.51	46.66	41.37	54.00	-12.63	Ave	Peak	0	Hor	1	Y
16814	33.82	41.92	14.38	46.26	43.86	54.00	-10.14	Ave	Peak	0	Hor	1	Y
2402	55.20	29.45	3.36	-	88.01	--	--	Peak	Peak	255	Vert	1	N
4804	40.94	32.99	7.80	49.32	32.42	54.00	-21.58	Ave	Peak	0	Vert	1	N
7206	31.37	37.18	8.29	48.36	28.48	54.00	-25.52	Ave	Peak	0	Vert	1	Y
9608	31.32	37.84	5.42	46.86	27.71	54.00	-26.29	Ave	Peak	0	Vert	1	Y
12010	32.14	39.73	11.12	47.20	35.80	54.00	-18.20	Ave	Peak	0	Vert	1	Y
14412	33.93	41.51	13.51	46.66	42.28	54.00	-11.72	Ave	Peak	0	Vert	1	Y
16814	32.72	41.92	14.38	46.26	42.76	54.00	-11.24	Ave	Peak	0	Vert	1	Y

	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436	<b>Radiated Emissions</b> (Spurious)	
DNB Job Number:	56076	Date: 5 May 2015	Specification
Customer:	D. Green Engineering LLC		[X] 15.247 (c) [X] IEEE C63.10-2013
Model Number:	OR		
Description:	Transceiver used in Hunting Dog tracking products Low Channel - Z-Axis		

Note 1: GF = Ground Floor = If Y reading was at ground floor, If N reading was identifiable signal.

Note 2: Limit listed is the general limit as specified in 15.209 in order to show compliance with the restricted bands of operation as well as the out of band limit in 15.247. No other identifiable signals were observed in the restricted bands as specified in 15.205.

Note 3: Highest frequency investigated was the tenth harmonic of the fundamental, no emissions were detected above the 2nd harmonic. Only data to the 7<sup>th</sup> harmonic has been provided.

FREQ (Mhz)	Meter	Correction Factors			dBuV/m			Type		Positions			G F
		Ant	Cbl	Amp	Corr	Lim	Delta	Lim	Rdng	Tbl	PI	Hgt	
2402	66.70	29.45	3.36	-	99.51	--	--	Peak	Peak	234	Hor	1.00	N
4804	41.94	32.99	7.80	49.32	33.42	54.00	-20.58	Ave	Peak	0	Hor	1.00	N
7206	32.20	37.18	8.29	48.36	29.31	54.00	-24.69	Ave	Peak	0	Hor	1.00	Y
9608	31.61	37.84	5.42	46.86	28.00	54.00	-26.00	Ave	Peak	0	Hor	1.00	Y
12010	33.61	39.73	11.12	47.20	37.27	54.00	-16.73	Ave	Peak	0	Hor	1.00	Y
14412	34.19	41.51	13.51	46.66	42.54	54.00	-11.46	Ave	Peak	0	Hor	1.00	Y
16814	35.31	41.92	14.38	46.26	45.35	54.00	-8.65	Ave	Peak	0	Hor	1.00	Y
2402	65.37	29.45	3.36	-	98.18	--	--	Peak	Peak	288	Vert	1.10	N
4804	41.89	32.99	7.80	49.32	33.37	54.00	-20.63	Ave	Peak	0	Vert	1.00	N
7206	31.41	37.18	8.29	48.36	28.52	54.00	-25.48	Ave	Peak	0	Vert	1.00	Y
9608	32.65	37.84	5.42	46.86	29.04	54.00	-24.96	Ave	Peak	0	Vert	1.00	Y
12010	32.34	39.73	11.12	47.20	36.00	54.00	-18.00	Ave	Peak	0	Vert	1.00	Y
14412	33.68	41.51	13.51	46.66	42.03	54.00	-11.97	Ave	Peak	0	Vert	1.00	Y
16814	34.58	41.92	14.38	46.26	44.62	54.00	-9.38	Ave	Peak	0	Vert	1.00	Y

	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436	<b>Radiated Emissions</b> (Spurious)	
DNB Job Number:	56076	Date: 5 May 2015	Specification  [X] 15.247 (c) [X] IEEE C63.10-2013
Customer:	D. Green Engineering LLC		
Model Number:	OR		
Description:	Transceiver used in Hunting Dog tracking products Middle Channel - X-Axis		

Note 1: GF = Ground Floor = If Y reading was at ground floor, If N reading was identifiable signal.

Note 2: Limit listed is the general limit as specified in 15.209 in order to show compliance with the restricted bands of operation as well as the out of band limit in 15.247. No other identifiable signals were observed in the restricted bands as specified in 15.205.

Note 3: Highest frequency investigated was the tenth harmonic of the fundamental, no emissions were detected above the 2nd harmonic. Only data to the 7<sup>th</sup> harmonic has been provided.

FREQ (Mhz)	Meter	Correction Factors			dBuV/m			Type		Positions			G F
		Ant	Cbl	Amp	Corr	Lim	Delta	Lim	Rdng	Tbl	PI	Hgt	
2440	63.97	29.54	3.42	-	96.93	--	--	Peak	Peak	225	Hor	1.00	N
4880	41.38	33.27	7.88	49.27	33.26	54.00	-20.74	Ave	Peak	0	Hor	1.00	N
7320	32.20	37.11	8.45	48.34	29.42	54.00	-24.58	Ave	Peak	0	Hor	1.00	Y
9760	32.29	37.90	5.72	46.96	28.96	54.00	-25.04	Ave	Peak	0	Hor	1.00	Y
12200	34.20	40.26	11.58	47.12	38.92	54.00	-15.08	Ave	Peak	0	Hor	1.00	Y
14640	33.51	41.80	13.53	46.70	42.14	54.00	-11.86	Ave	Peak	0	Hor	1.00	Y
17080	33.76	42.53	15.12	46.02	13.03	54.00	-8.60	Ave	Peak	0	Hor	1.00	Y
2440	64.67	29.54	3.42	-	97.63	--	--	Peak	Peak	235	Vert	1.00	N
4880	40.83	33.27	7.88	49.27	32.71	54.00	-21.29	Ave	Peak	0	Vert	1.00	N
7320	32.14	37.11	8.45	48.34	29.36	54.00	-24.64	Ave	Peak	0	Vert	1.00	Y
9760	32.15	37.90	5.72	46.96	28.82	54.00	-25.18	Ave	Peak	0	Vert	1.00	Y
12200	32.79	40.26	11.58	47.12	37.51	54.00	-16.49	Ave	Peak	0	Vert	1.00	Y
14640	33.43	41.80	13.53	46.70	42.06	54.00	-11.94	Ave	Peak	0	Vert	1.00	Y
17080	33.43	42.53	15.12	46.02	12.70	54.00	-8.93	Ave	Peak	0	Vert	1.00	Y

	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436	<b>Radiated Emissions</b> (Spurious)	
DNB Job Number:	56076	Date: 5 May 2015	Specification
Customer:	D. Green Engineering LLC		[X] 15.247 (c) [X] IEEE C63.10-2013
Model Number:	OR		
Description:	Transceiver used in Hunting Dog tracking products Middle Channel - Y-Axis		

Note 1: GF = Ground Floor = If Y reading was at ground floor, If N reading was identifiable signal.

Note 2: Limit listed is the general limit as specified in 15.209 in order to show compliance with the restricted bands of operation as well as the out of band limit in 15.247. No other identifiable signals were observed in the restricted bands as specified in 15.205.

Note 3: Highest frequency investigated was the tenth harmonic of the fundamental, no emissions were detected above the 2nd harmonic. Only data to the 7<sup>th</sup> harmonic has been provided.

FREQ (Mhz)	Meter	Correction Factors			dBuV/m			Type		Positions			G F
		Ant	Cbl	Amp	Corr	Lim	Delta	Lim	Rdng	Tbl	PI	Hgt	
2440	65.17	29.54	3.42	-	98.13	--	--	Peak	Peak	119	Hor	1.00	N
4880	40.47	33.27	7.88	49.27	32.35	54.00	-21.65	Ave	Peak	0	Hor	1.00	N
7320	32.43	37.11	8.45	48.34	29.65	54.00	-24.35	Ave	Peak	0	Hor	1.00	Y
9760	33.32	37.90	5.72	46.96	29.99	54.00	-24.01	Ave	Peak	0	Hor	1.00	Y
12200	33.61	40.26	11.58	47.12	38.33	54.00	-15.67	Ave	Peak	0	Hor	1.00	Y
14640	34.25	41.80	13.53	46.70	42.88	54.00	-11.12	Ave	Peak	0	Hor	1.00	Y
17080	35.11	42.53	15.12	46.02	46.75	54.00	-7.25	Ave	Peak	0	Hor	1.00	Y
2440	65.33	29.54	3.42	-	98.29	--	--	Peak	Peak	0	Vert	1.00	N
4880	41.07	33.27	7.88	49.27	32.95	54.00	-21.05	Ave	Peak	0	Vert	1.00	N
7320	32.19	37.11	8.45	48.34	29.41	54.00	-24.59	Ave	Peak	0	Vert	1.00	Y
9760	32.73	37.90	5.72	46.96	29.40	54.00	-24.60	Ave	Peak	0	Vert	1.00	Y
12200	34.26	40.26	11.58	47.12	38.98	54.00	-15.02	Ave	Peak	0	Vert	1.00	Y
14640	34.40	41.80	13.53	46.70	43.03	54.00	-10.97	Ave	Peak	0	Vert	1.00	Y
17080	33.45	42.53	15.12	46.02	45.09	54.00	-8.91	Ave	Peak	0	Vert	1.00	Y

	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436	<b>Radiated Emissions</b> (Spurious)	
DNB Job Number:	56076	Date: 5 May 2015	Specification
Customer:	D. Green Engineering LLC		[X] 15.247 (c) [X] IEEE C63.10-2013
Model Number:	OR		
Description:	Transceiver used in Hunting Dog tracking products Middle Channel - Z-Axis		

Note 1: GF = Ground Floor = If Y reading was at ground floor, If N reading was identifiable signal.

Note 2: Limit listed is the general limit as specified in 15.209 in order to show compliance with the restricted bands of operation as well as the out of band limit in 15.247. No other identifiable signals were observed in the restricted bands as specified in 15.205.

Note 3: Highest frequency investigated was the tenth harmonic of the fundamental, no emissions were detected above the 2nd harmonic. Only data to the 7<sup>th</sup> harmonic has been provided.

FREQ (Mhz)	Meter	Correction Factors			dBuV/m			Type		Positions			G F
		Ant	Cbl	Amp	Corr	Lim	Delta	Lim	Rdng	Tbl	PI	Hgt	
2440	67.06	29.54	3.42	-	100.02	--	--	Peak	Peak	333	Hor	1.00	N
4880	40.25	33.27	7.88	49.27	32.13	54.00	-21.87	Ave	Peak	0	Hor	1.00	N
7320	31.90	37.11	8.45	48.34	29.12	54.00	-24.88	Ave	Peak	0	Hor	1.00	Y
9760	31.78	37.90	5.72	46.96	28.45	54.00	-25.55	Ave	Peak	0	Hor	1.00	Y
12200	32.27	40.26	11.58	47.12	36.99	54.00	-17.01	Ave	Peak	0	Hor	1.00	Y
14640	33.62	41.80	13.53	46.70	42.25	54.00	-11.75	Ave	Peak	0	Hor	1.00	Y
17080	33.38	42.53	15.12	46.02	45.02	54.00	-8.98	Ave	Peak	0	Hor	1.00	Y
2440	59.56	29.54	3.42	-	92.52	--	--	Peak	Peak	197	Vert	1.00	N
4880	40.82	33.27	7.88	49.27	32.70	54.00	-21.30	Ave	Peak	0	Vert	1.00	N
7320	32.73	37.11	8.45	48.34	29.95	54.00	-24.05	Ave	Peak	0	Vert	1.00	Y
9760	33.32	37.90	5.72	46.96	29.99	54.00	-24.01	Ave	Peak	0	Vert	1.00	Y
12200	32.46	40.26	11.58	47.12	37.18	54.00	-16.82	Ave	Peak	0	Vert	1.00	Y
14640	33.32	41.80	13.53	46.70	41.95	54.00	-12.05	Ave	Peak	0	Vert	1.00	Y
17080	34.05	42.53	15.12	46.02	45.69	54.00	-8.31	Ave	Peak	0	Vert	1.00	Y

	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436	<b>Radiated Emissions</b> (Spurious)	
DNB Job Number:	56076	Date: 5 May 2015	Specification
Customer:	D. Green Engineering LLC		[X] 15.247 (c) [X] IEEE C63.10-2013
Model Number:	OR		
Description:	Transceiver used in Hunting Dog tracking products High Channel - X-Axis		

Note 1: GF = Ground Floor = If Y reading was at ground floor, If N reading was identifiable signal.

Note 2: Limit listed is the general limit as specified in 15.209 in order to show compliance with the restricted bands of operation as well as the out of band limit in 15.247. No other identifiable signals were observed in the restricted bands as specified in 15.205.

Note 3: Highest frequency investigated was the tenth harmonic of the fundamental, no emissions were detected above the 2nd harmonic. Only data to the 7<sup>th</sup> harmonic has been provided.

FREQ (Mhz)	Meter	Correction Factors			dBuV/m			Type		Positions			G F
		Ant	Cbl	Amp	Corr	Lim	Delta	Lim	Rdng	Tbl	PI	Hgt	
2480	64.57	29.65	3.47	-	97.69	--	--	Peak	Peak	230	Hor	1.00	N
4960	42.04	33.56	7.96	49.22	34.33	54.00	-19.67	Ave	Peak	0	Hor	1.00	N
7440	33.22	37.04	8.62	48.31	30.56	54.00	-23.44	Ave	Peak	0	Hor	1.00	Y
9920	31.64	37.97	6.04	47.05	28.60	54.00	-25.40	Ave	Peak	0	Hor	1.00	Y
12400	32.50	40.82	12.06	47.04	38.34	54.00	-15.66	Ave	Peak	0	Hor	1.00	Y
14880	33.95	42.13	13.24	46.70	42.63	54.00	-11.37	Ave	Peak	0	Hor	1.00	Y
17360	33.65	42.98	15.91	46.07	46.46	54.00	-7.54	Ave	Peak	0	Hor	1.00	Y
2480	62.99	29.65	3.47	-	96.11	--	--	Peak	Peak	254	Vert	1.00	N
4960	42.16	33.56	7.96	49.22	34.45	54.00	-19.55	Ave	Peak	0	Vert	1.00	N
7440	33.20	37.04	8.62	48.31	30.54	54.00	-23.46	Ave	Peak	0	Vert	1.00	Y
9920	32.30	37.97	6.04	47.05	29.26	54.00	-24.74	Ave	Peak	0	Vert	1.00	Y
12400	32.26	40.82	12.06	47.04	38.10	54.00	-15.90	Ave	Peak	0	Vert	1.00	Y
14880	33.38	42.13	13.24	46.70	42.06	54.00	-11.94	Ave	Peak	0	Vert	1.00	Y
17360	33.92	42.98	15.91	46.07	46.73	54.00	-7.27	Ave	Peak	0	Vert	1.00	Y

	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436	<b>Radiated Emissions</b> (Spurious)	
DNB Job Number:	56076	Date:	5 May 2015
Customer:	D. Green Engineering LLC	Specification	
Model Number:	OR	[X] 15.247 (c) [X] IEEE C63.10-2013	
Description:	Transceiver used in Hunting Dog tracking products High Channel - Y-Axis		

Note 1: GF = Ground Floor = If Y reading was at ground floor, If N reading was identifiable signal.

Note 2: Limit listed is the general limit as specified in 15.209 in order to show compliance with the restricted bands of operation as well as the out of band limit in 15.247. No other identifiable signals were observed in the restricted bands as specified in 15.205.

Note 3: Highest frequency investigated was the tenth harmonic of the fundamental, no emissions were detected above the 2nd harmonic. Only data to the 7<sup>th</sup> harmonic has been provided.

FREQ (Mhz)	Meter	Correction Factors			dBuV/m			Type		Positions			G F
		Ant	Cbl	Amp	Corr	Lim	Delta	Lim	Rdng	Tbl	PI	Hgt	
2480	60.09	29.65	3.47	-	93.21	--	--	Peak	Peak	252	Hor	1.00	N
4960	41.76	33.56	7.96	49.22	34.05	54.00	-19.95	Ave	Peak	0	Hor	1.00	N
7440	32.73	37.04	8.62	48.31	30.07	54.00	-23.93	Ave	Peak	0	Hor	1.00	Y
9920	33.13	37.97	6.04	47.05	30.09	54.00	-23.91	Ave	Peak	0	Hor	1.00	Y
12400	33.48	40.82	12.06	47.04	39.32	54.00	-14.68	Ave	Peak	0	Hor	1.00	Y
14880	33.35	42.13	13.24	46.70	42.03	54.00	-11.97	Ave	Peak	0	Hor	1.00	Y
17360	34.34	42.98	15.91	46.07	47.15	54.00	-6.85	Ave	Peak	0	Hor	1.00	Y
2480	57.45	29.65	3.47	-	90.57	--	--	Peak	Peak	23	Vert	1.00	N
4960	41.92	33.56	7.96	49.22	34.21	54.00	-19.79	Ave	Peak	0	Vert	1.00	N
7440	31.84	37.04	8.62	48.31	29.18	54.00	-24.82	Ave	Peak	0	Vert	1.00	Y
9920	31.67	37.97	6.04	47.05	28.63	54.00	-25.37	Ave	Peak	0	Vert	1.00	Y
12400	33.24	40.82	12.06	47.04	39.08	54.00	-14.92	Ave	Peak	0	Vert	1.00	Y
14880	33.70	42.13	13.24	46.70	42.38	54.00	-11.62	Ave	Peak	0	Vert	1.00	Y
17360	34.22	42.98	15.91	46.07	47.03	54.00	-6.97	Ave	Peak	0	Vert	1.00	Y

	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436	<b>Radiated Emissions</b> (Spurious)	
DNB Job Number:	56076	Date: 5 May 2015	Specification
Customer:	D. Green Engineering LLC		[X] 15.247 (c) [X] IEEE C63.10-2013
Model Number:	OR		
Description:	Transceiver used in Hunting Dog tracking products High Channel - Z-Axis		

Note 1: GF = Ground Floor = If Y reading was at ground floor, If N reading was identifiable signal.

Note 2: Limit listed is the general limit as specified in 15.209 in order to show compliance with the restricted bands of operation as well as the out of band limit in 15.247. No other identifiable signals were observed in the restricted bands as specified in 15.205.

Note 3: Highest frequency investigated was the tenth harmonic of the fundamental, no emissions were detected above the 2nd harmonic. Only data to the 7<sup>th</sup> harmonic has been provided.

FREQ (Mhz)	Meter	Correction Factors			dBuV/m			Type		Positions			G F
		Ant	Cbl	Amp	Corr	Lim	Delta	Lim	Rdng	Tbl	PI	Hgt	
2480	65.79	29.65	3.47	-	98.91	--	--	Peak	Peak	237	Hor	1.00	N
4960	40.28	33.56	7.96	49.22	32.57	54.00	-21.43	Ave	Peak	0	Hor	1.00	N
7440	31.58	37.04	8.62	48.31	28.92	54.00	-25.08	Ave	Peak	0	Hor	1.00	Y
9920	32.50	37.97	6.04	47.05	29.46	54.00	-24.54	Ave	Peak	0	Hor	1.00	Y
12400	33.93	40.82	12.06	47.04	39.77	54.00	-14.23	Ave	Peak	0	Hor	1.00	Y
14880	33.71	42.13	13.24	46.70	42.39	54.00	-11.61	Ave	Peak	0	Hor	1.00	Y
17360	35.37	42.98	15.91	46.07	48.18	54.00	-5.82	Ave	Peak	0	Hor	1.00	Y
2480	63.17	29.65	3.47	-	96.29	--	--	Peak	Peak	188	Vert	1.00	N
4960	41.82	33.56	7.96	49.22	34.11	54.00	-19.89	Ave	Peak	0	Vert	1.00	N
7440	32.95	37.04	8.62	48.31	30.29	54.00	-23.71	Ave	Peak	0	Vert	1.00	Y
9920	32.95	37.97	6.04	47.05	29.91	54.00	-24.09	Ave	Peak	0	Vert	1.00	Y
12400	32.89	40.82	12.06	47.04	38.73	54.00	-15.27	Ave	Peak	0	Vert	1.00	Y
14880	33.73	42.13	13.24	46.70	42.41	54.00	-11.59	Ave	Peak	0	Vert	1.00	Y
17360	33.94	42.98	15.91	46.07	46.75	54.00	-7.25	Ave	Peak	0	Vert	1.00	Y

## 15.247 (a,2) 6 dB Bandwidth

Test Procedure: IEEE C63.10-2013

### 6 dB Bandwidth

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 6 dB bandwidth, centered on a hopping channel

RBW 1% of the 6 dB bandwidth

VBW RBW

Sweep = auto

Detector function = peak

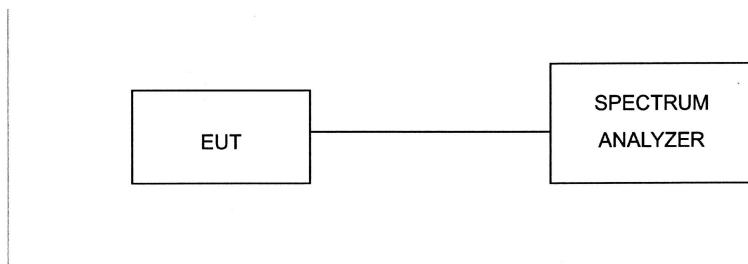
Trace = max hold

The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 6 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 6 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

EUT operating conditions:

The software provided by the client to enable the EUT to transmit continuously.

Test Set Up: (Note following set up was used for all antenna conducted measurements)



	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436	<b>Measurement Test Set Up</b>	
DNB Job Number:	56076	Date:	16 Apr 2015
Customer:	D. Green Engineering LLC		
Model Number:	OR		
Description:	Transceiver used in Hunting Dog tracking products		<b>Clause</b> 15.247
Antenna Conducted Measurement Set Up			



	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436	<b>6 dB Single Channel Bandwidth</b>	
DNB Job Number:	56076	Date:	16 Apr 2015
Customer:	D. Green Engineering LLC		
Model Number:	OR		
Description:	Transceiver used in Hunting Dog tracking products		<b>Clause</b> 15.247(a,2)
	Test Procedure		
Environmental Conditions			
Ambient Temperature	Relative Humidity		Barometric Pressure
21 °C	25 %		101.2 kPa
EUT performed within the requirements of the applicable standard <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <i>Les Payne</i>			

## 6 dB Bandwidth

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 6dB bandwidth, centered on a hopping channel

RBW 1% of the 6dB bandwidth

VBW RBW

Sweep = auto

Detector function = peak

Trace = max hold

The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 6 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 6 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).



1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

### 6 dB Single Channel Bandwidth

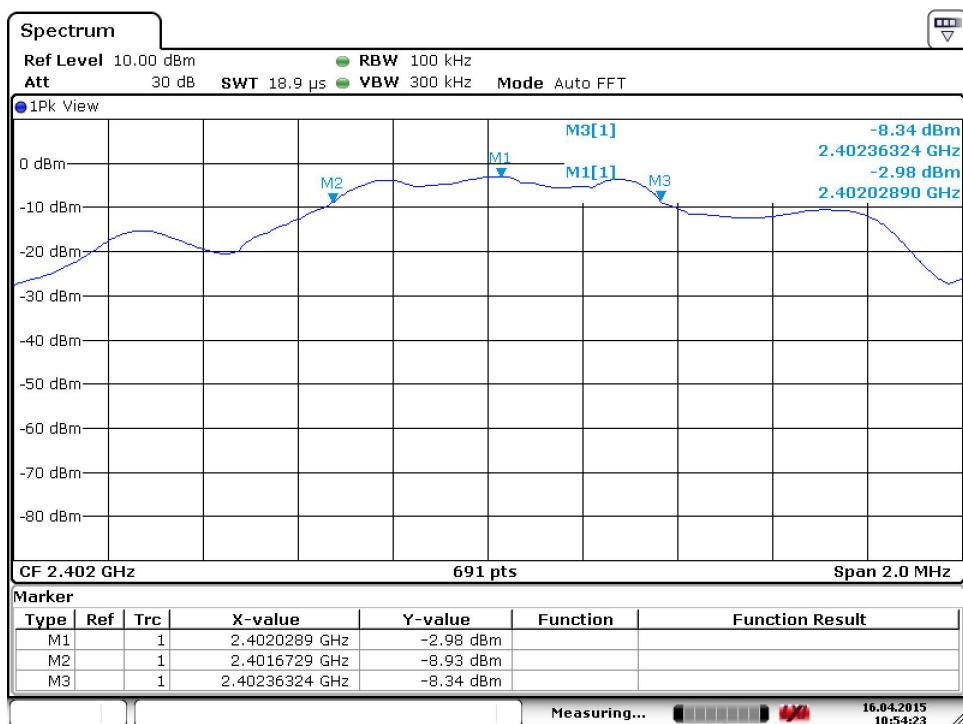
DNB Job Number:	56076	Date:	16 Apr 2015	<b>Conformance Standard</b>
Customer:	D. Green Engineering LLC			
Model Number:	OR			FCC Part 15
Description:	Transceiver used in Hunting Dog tracking products		<b>Clause</b> 15.247(a,2)	
	1Mbps data rate (Basic data rate)			

#### Environmental Conditions

Ambient Temperature	Relative Humidity	Barometric Pressure
21 °C	25 %	101.2 kPa

EUT performed within the requirements of the applicable standard     Yes     No    *Les Payne*

Channel	Chl Freq (MHz)	6dB BW (kHz)	Limit	Pass/Fail
Low	2402	690.340	> 500 kHz	Pass



Date: 16.APR.2015 10:54:22



1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

### 6 dB Single Channel Bandwidth

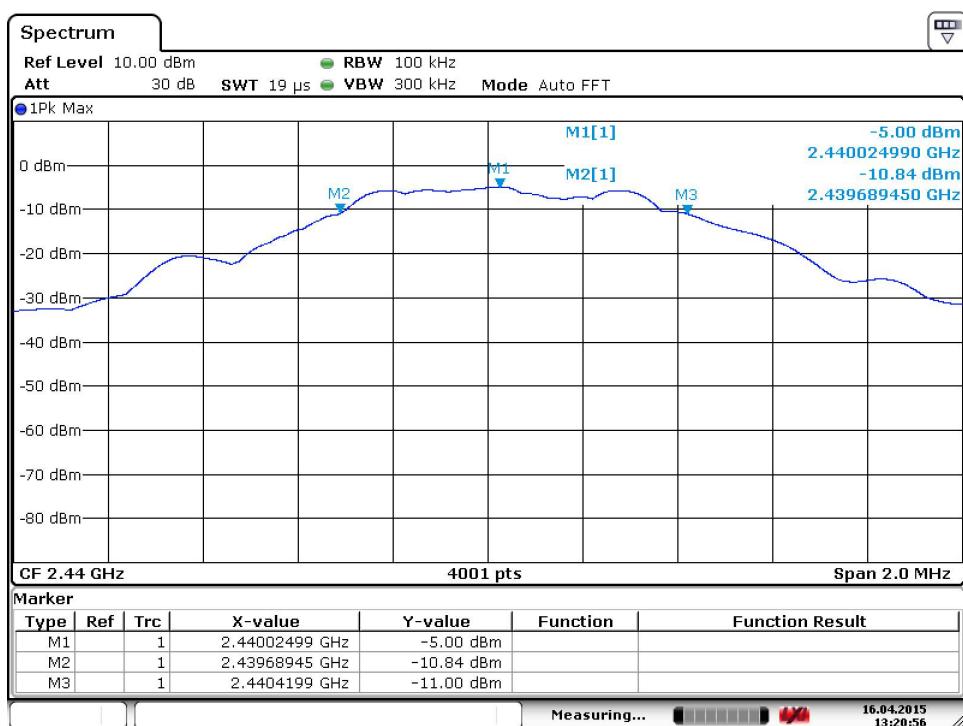
DNB Job Number:	56076	Date:	16 Apr 2015	<b>Conformance Standard</b>
Customer:	D. Green Engineering LLC			
Model Number:	OR			FCC Part 15
Description:	Transceiver used in Hunting Dog tracking products		<b>Clause</b> 15.247(a,2)	
	1Mbps data rate (Basic data rate)			

#### Environmental Conditions

Ambient Temperature	Relative Humidity	Barometric Pressure
21 °C	25 %	101.2 kPa

EUT performed within the requirements of the applicable standard  Yes  No *Les Payne*

Channel	Chl Freq (MHz)	6dB BW (kHz)	Limit	Pass/Fail
Middle	2440	730.450	> 500 kHz	Pass



Date: 16.APR.2015 13:20:56



1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

### 6 dB Single Channel Bandwidth

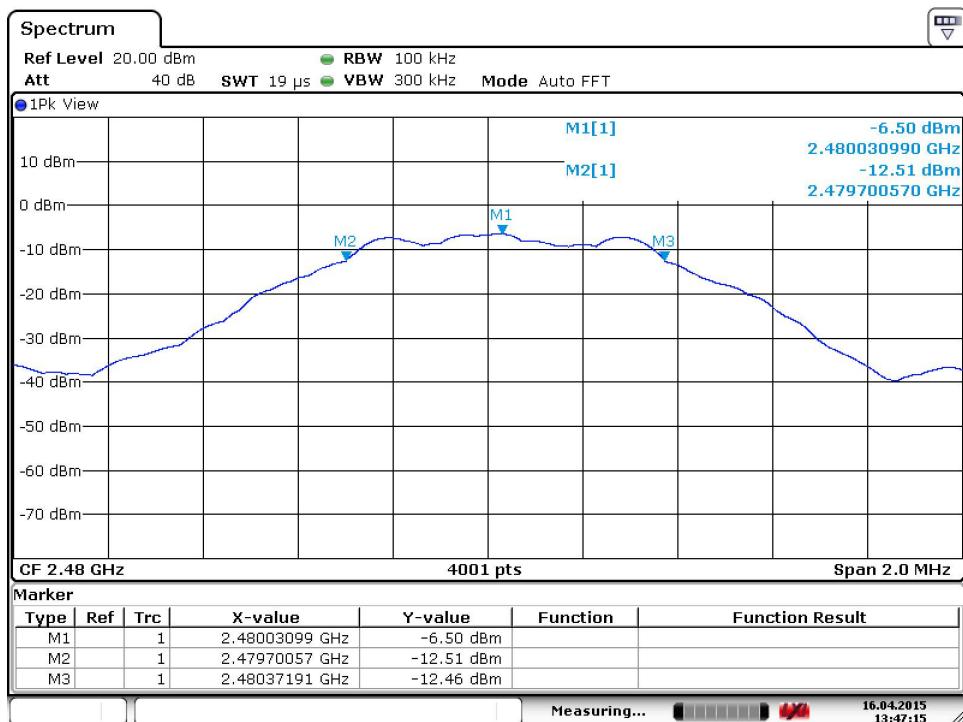
DNB Job Number:	56076	Date:	16 Apr 2015	<b>Conformance Standard</b>
Customer:	D. Green Engineering LLC			
Model Number:	OR			FCC Part 15
Description:	Transceiver used in Hunting Dog tracking products		<b>Clause</b> 15.247(a,2)	
	1Mbps data rate (Basic data rate)			

#### Environmental Conditions

Ambient Temperature	Relative Humidity	Barometric Pressure
21 °C	25 %	101.2 kPa

EUT performed within the requirements of the applicable standard  Yes  No *Les Payne*

Channel	Chl Freq (MHz)	6dB BW (MHz)	Limit	Pass/Fail
High	2480	671.340	> 500 kHz	Pass



Date: 16.APR.2015 13:47:15

15.247 (b) Maximum Peak Output Power (Conducted)

Test Procedure: IEEE C63.10-2013

**Peak Output Power**

Use the following spectrum analyzer settings:

Span = approximately 5 times the 6 B bandwidth, centered on a hopping channel

RBW > the 6 dB bandwidth of the emission being measured

VBW RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power (see the NOTE above regarding external attenuation and cable loss). The limit is specified in one of the subparagraphs of this Section. Submit this plot. A peak responding power meter may be used instead of a spectrum analyzer.

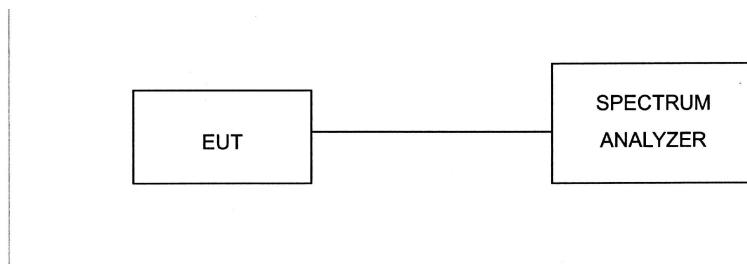
The transmitter output was connected to a spectrum analyzer.

Requirement: The maximum peak output power shall not exceed .125W (21dBm)

EUT operating conditions:

The software provided by the client to enable the EUT to transmit continuously at the low, mid, and upper channels respectively.

Test Set Up:





1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

### Peak Output Power (Cond)

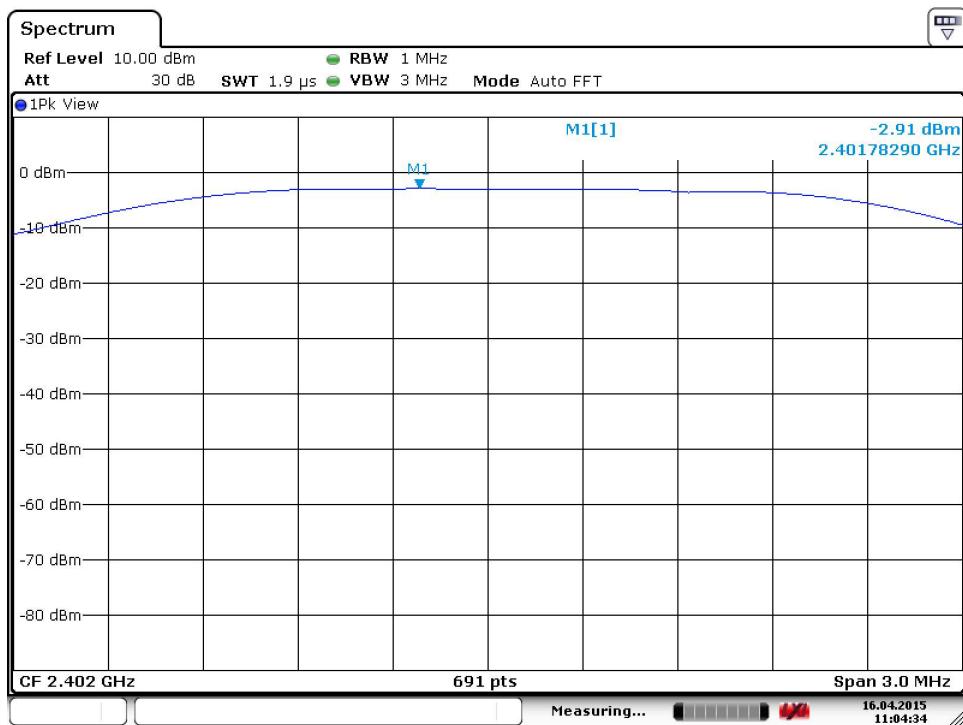
DNB Job Number:	56076	Date:	16 Apr 2015	<b>Conformance Standard</b>
Customer:	D. Green Engineering LLC			
Model Number:	OR			FCC Part 15
Description:	Transceiver used in Hunting Dog tracking products			<b>Clause</b> 15.247(b)
	1Mbps data rate (Basic data rate) - Low Channel			

#### Environmental Conditions

Ambient Temperature	Relative Humidity	Barometric Pressure
21 °C	25 %	101.2 kPa

EUT performed within the requirements of the applicable standard  Yes  No *Les Payne*

Freq MHz	Meas Peak Pwr (dBm)	Limit (dBm)	Delta (dBm)	Meas Peak Pwr (mW)	Limit (mW)	Delta (mW)	Pass/Fail
2402	-2.91	20.97	-23.88	0.512	125	-124.488	Pass



Date: 16.APR.2015 11:04:34



1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

### Peak Output Power (Cond)

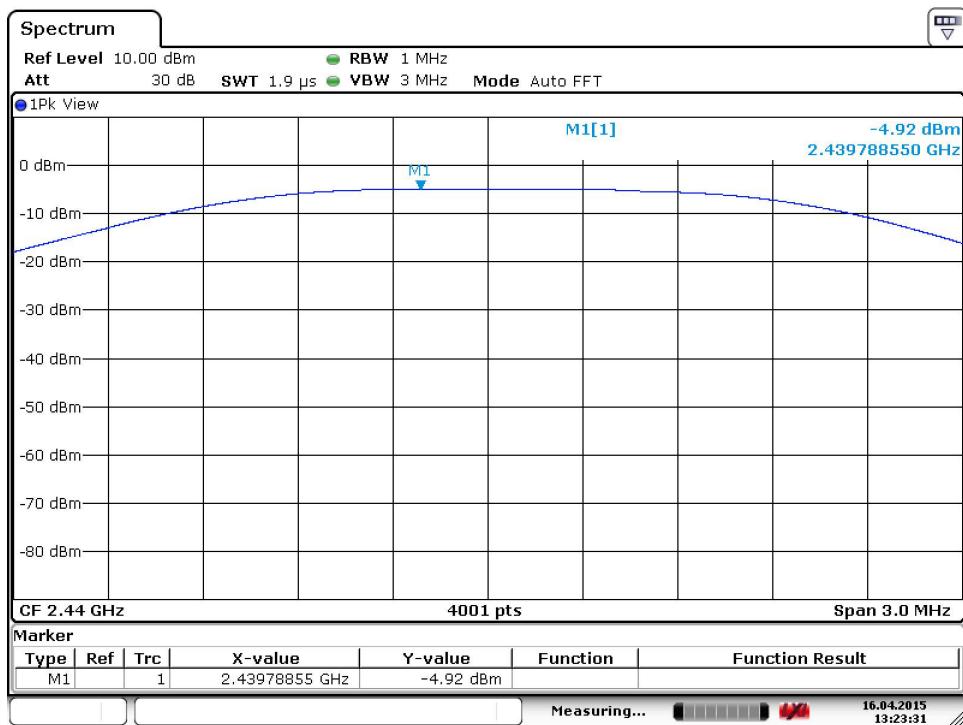
DNB Job Number:	56076	Date:	16 Apr 2015	<b>Conformance Standard</b>
Customer:	D. Green Engineering LLC			
Model Number:	OR			FCC Part 15
Description:	Transceiver used in Hunting Dog tracking products		<b>Clause</b> 15.247(b)	
	1Mbps data rate (Basic data rate) - Mid Channel			

#### Environmental Conditions

Ambient Temperature	Relative Humidity	Barometric Pressure
21 °C	25 %	101.2 kPa

EUT performed within the requirements of the applicable standard  Yes  No *Les Payne*

Freq MHz	Meas Peak Pwr (dBm)	Limit (dBm)	Delta (dBm)	Meas Peak Pwr (mW)	Limit (mW)	Delta (mW)	Pass/Fail
2440	-4.92	20.97	-25.94	0.322	125	-124.678	Pass



Date: 16.APR.2015 13:23:31



1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

### Peak Output Power (Cond)

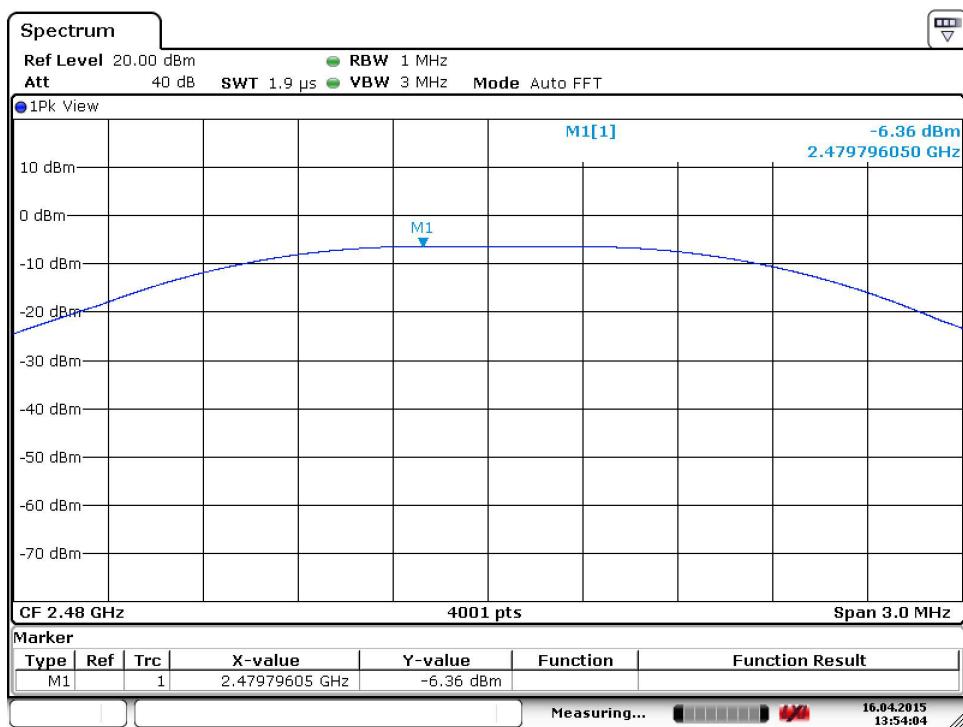
DNB Job Number:	56076	Date:	16 Apr 2015	<b>Conformance Standard</b>
Customer:	D. Green Engineering LLC			
Model Number:	OR			FCC Part 15
Description:	Transceiver used in Hunting Dog tracking products			<b>Clause</b> 15.247(b)
	1Mbps data rate (Basic data rate) - High Channel			

#### Environmental Conditions

Ambient Temperature	Relative Humidity	Barometric Pressure
21 °C	25 %	101.2 kPa

EUT performed within the requirements of the applicable standard  Yes  No *Les Payne*

Freq MHz	Meas Peak Pwr (dBm)	Limit (dBm)	Delta (dBm)	Meas Peak Pwr (mW)	Limit (mW)	Delta (mW)	Pass/Fail
2480	-6.36	20.97	-27.33	0.231	125	-124.769	Pass



Date: 16.APR.2015 13:54:04

15.247 (d)      Conducted Band Edge Measurements and Out of Band Emissions

Test Procedure:      IEEE C63.10-2013

**Band-edge Compliance of RF Conducted Emissions**

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation

RBW 1% of the span

VBW RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. The marker-delta value now displayed must comply with the limit specified in this Section. Submit this plot.

Now, using the same instrument settings, enable the hopping function of the EUT. Allow the trace to stabilize. Follow the same procedure listed above to determine if any spurious emissions caused by the hopping function also comply with the specified limit. Submit this plot.

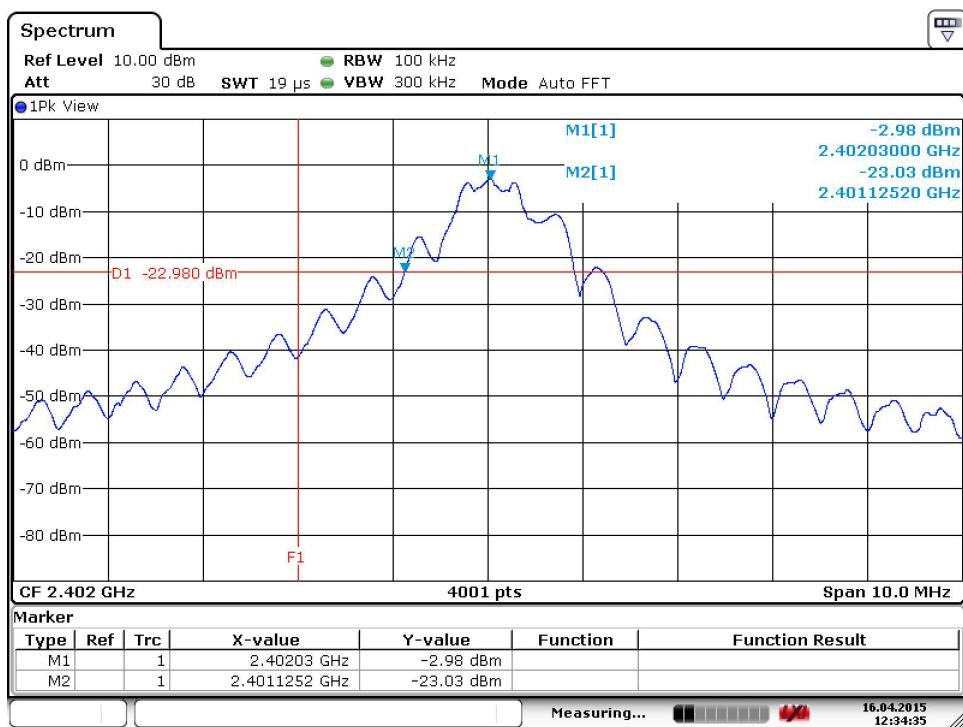
Test Set Up: Same as 15.247 (a,2) 6dB Emission Bandwidth



1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

## Band Edge Measurements

DNB Job Number:	56076	Date:	16 Apr 2015	<b>Conformance Standard</b>
Customer:	D. Green Engineering LLC			
Model Number:	OR			FCC Part 15
Description:	Transceiver used in Hunting Dog tracking products		<b>Clause</b> 15.247(d)	
	1Mbps data rate (Basic data rate)			
Ambient Temperature		Relative Humidity	Barometric Pressure	
19 °C		28 %	101.8 kPa	
EUT performed within the requirements of the applicable standard				[X] Yes [ ] No <i>Les Payne</i>
Conducted Band Edge Measurement - Single Channel				
Limit	Lower (MHz)	Upper (MHz)	Freq Delta (MHz)	Pass/Fail
2400	2401.125		1.125	Pass



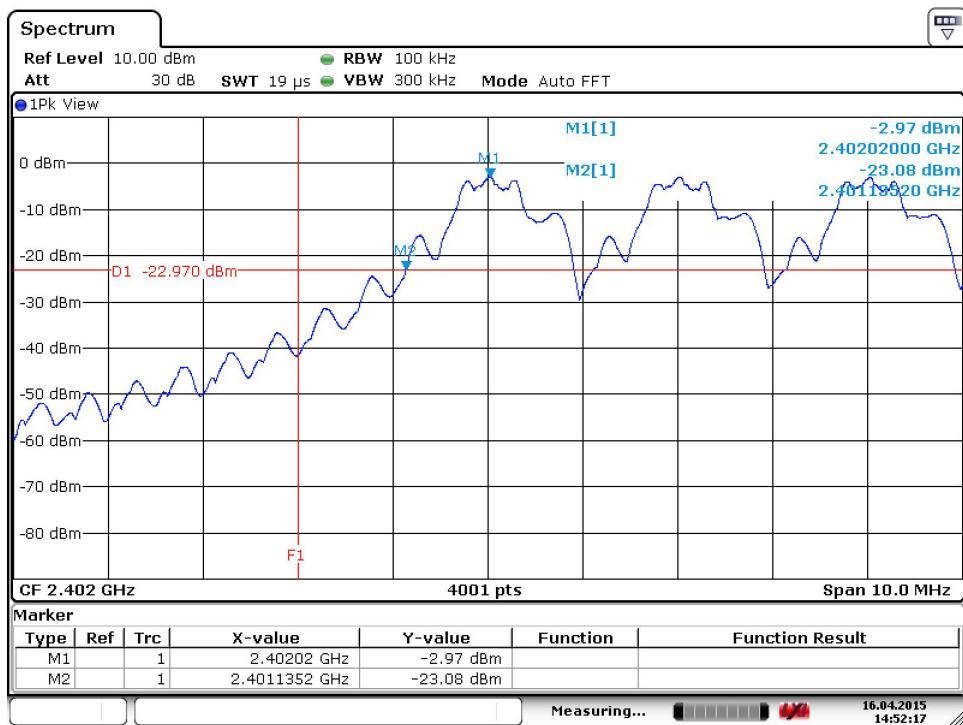
Date: 16.APR.2015 12:34:35



1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

## Band Edge Measurements

DNB Job Number:	56076	Date:	16 Apr 2015	<b>Conformance Standard</b>
Customer:	D. Green Engineering LLC			
Model Number:	OR			FCC Part 15
Description:	Transceiver used in Hunting Dog tracking products		<b>Clause</b> 15.247(d)	
	1Mbps data rate (Basic data rate)			
Ambient Temperature		Relative Humidity	Barometric Pressure	
19 °C		28 %	101.8 kPa	
EUT performed within the requirements of the applicable standard				[X] Yes [ ] No <i>Les Payne</i>
Conducted Band Edge Measurement - All Channels				
Limit	Lower (MHz)	Upper (MHz)	Freq Delta (MHz)	Pass/Fail
2400	2401.1352		1.135	Pass



Date: 16.APR.2015 14:52:16



1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

## Band Edge Measurements

DNB Job Number:	56076	Date: 16 Apr 2015	<b>Conformance Standard</b>
Customer:	D. Green Engineering LLC		
Model Number:	OR		FCC Part 15
Description:	Transceiver used in Hunting Dog tracking products		<b>Clause</b> 15.247(d)
	1Mbps data rate (Basic data rate)		

Ambient Temperature	Relative Humidity	Barometric Pressure
19 °C	28 %	101.8 kPa

EUT performed within the requirements of the applicable standard  Yes  No *Les Payne*

### Radiated Corrected Band Edge Measurement - Lower Edge

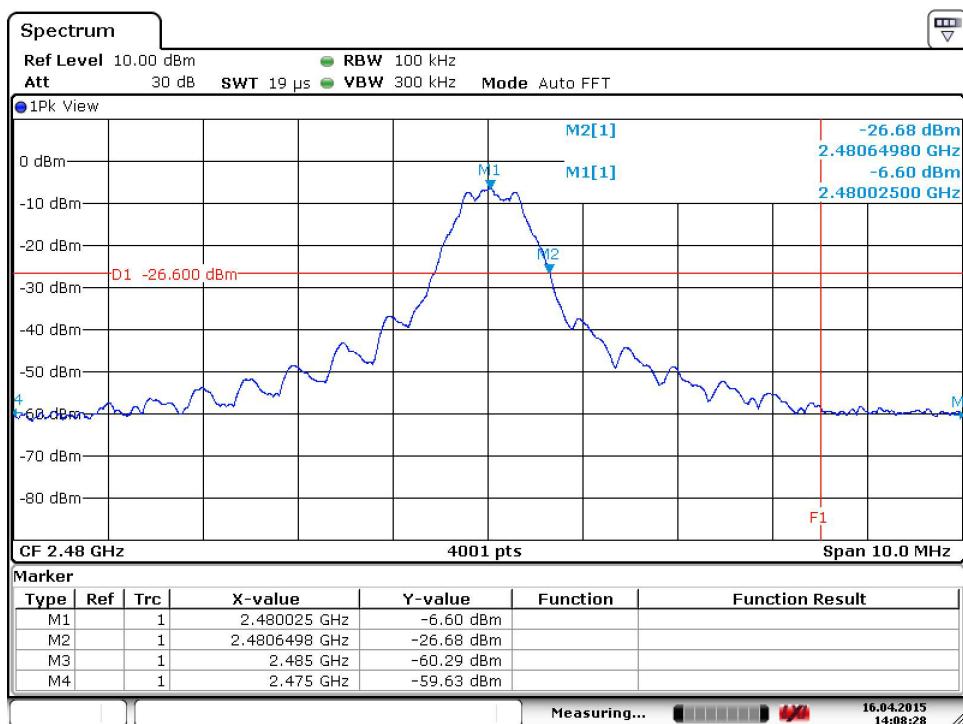
Band Edge	Lower (MHz)	Upper (MHz)	Limit (dBuV/m)	Measured (dBuV/m)	Delta (dBuV)	Chl	Axis	Polar	Freq Delta (MHz)	Result
2400	2400.958		54.00	43.32	-10.68	SC	X	H	0.958	Pass
2400	2400.813		54.00	42.59	-11.41	SC	Y	H	0.813	Pass
2400	2400.900		54.00	42.38	-11.62	SC	Z	H	0.900	Pass
2400	2400.828		54.00	42.89	-11.11	SC	X	V	0.828	Pass
2400	2401.059		54.00	41.59	-12.41	SC	Y	V	1.059	Pass
2400	2400.828		54.00	42.89	-11.11	SC	Z	V	0.828	Pass
2400	2400.944		54.00	41.61	-12.39	All	X	H	0.944	Pass
2400	2400.886		54.00	41.95	-12.05	All	Y	H	0.886	Pass
2400	2401.016		54.00	41.63	-12.37	All	Z	H	1.016	Pass
2400	2400.784		54.00	41.97	-12.03	All	X	V	0.784	Pass
2400	2401.059		54.00	41.01	-12.99	All	Y	V	1.059	Pass
2400	2401.132		54.00	41.33	-12.67	All	Z	V	1.132	Pass



1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

## Band Edge Measurements

DNB Job Number:	56076	Date:	16 Apr 2015	<b>Conformance Standard</b>		
Customer:	D. Green Engineering LLC					
Model Number:	OR			FCC Part 15		
Description:	Transceiver used in Hunting Dog tracking products		<b>Clause</b> 15.247(d)			
	1Mbps data rate (Basic data rate)					
Ambient Temperature	Relative Humidity		Barometric Pressure			
19 °C	28 %		101.8 kPa			
EUT performed within the requirements of the applicable standard <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <i>Les Payne</i>						
Conducted Band Edge Measurement - Single Channel						
Limit	Lower (MHz)	Upper (MHz)	Freq Delta (MHz)	Pass/Fail		
2483.5		2480.6498	2.850	Pass		



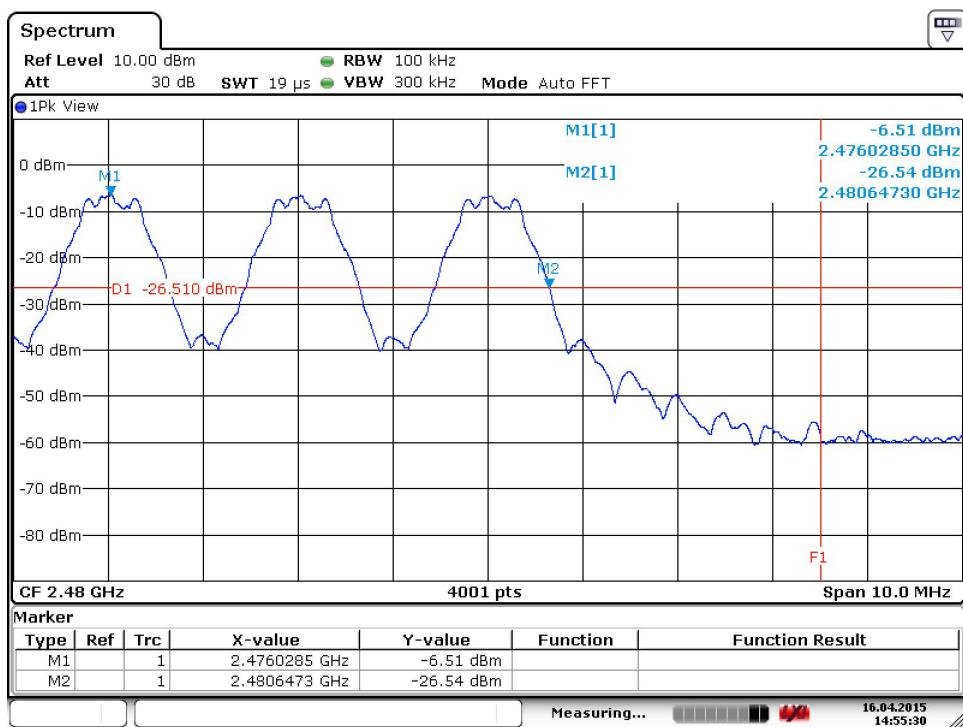
Date: 16.APR.2015 14:08:27



1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

## Band Edge Measurements

DNB Job Number:	56076	Date:	16 Apr 2015	Conformance Standard	
Customer:	D. Green Engineering LLC				
Model Number:	OR			FCC Part 15	
Description:	Transceiver used in Hunting Dog tracking products			Clause 15.247(d)	
	1Mbps data rate (Basic data rate)				
Ambient Temperature	Relative Humidity		Barometric Pressure		
19 °C	28 %		101.8 kPa		
EUT performed within the requirements of the applicable standard		[X] Yes	[ ] No	Les Payne	
Conducted Band Edge Measurement - All Channels			Freq Delta (MHz)	Pass/Fail	
Limit	Lower (MHz)	Upper (MHz)			
2483.5		2480.6473	2.853	Pass	



Date: 16.APR.2015 14:55:30



1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

## Band Edge Measurements

DNB Job Number:	56076	Date:	16 Apr 2015	<b>Conformance Standard</b>
Customer:	D. Green Engineering LLC			
Model Number:	OR			FCC Part 15
Description:	Transceiver used in Hunting Dog tracking products			<b>Clause</b> 15.247(d)
	1Mbps data rate (Basic data rate)			

Ambient Temperature	Relative Humidity	Barometric Pressure
19 °C	28 %	101.8 kPa

EUT performed within the requirements of the applicable standard  Yes  No *Les Payne*

### Radiated Corrected Band Edge Measurement - Lower Edge

Band Edge	Lower (MHz)	Upper (MHz)	Limit (dBuV/m)	Measured (dBuV/m)	Delta (dBuV)	Chl	Axis	Polar	Freq Delta (MHz)	Result
2483.5		2481.368	54.00	41.95	-12.05	SC	X	H	2.132	Pass
2483.5		2481.970	54.00	42.78	-11.22	SC	Y	H	1.530	Pass
2483.5		2480.948	54.00	42.93	-11.07	SC	Z	H	2.552	Pass
2483.5		2481.136	54.00	43.37	-10.63	SC	X	V	2.364	Pass
2483.5		2481.324	54.00	41.50	-12.50	SC	Y	V	2.176	Pass
2483.5		2480.803	54.00	42.48	-11.52	SC	Z	V	2.697	Pass
2483.5		2481.252	54.00	42.24	-11.76	All	X	H	2.248	Pass
2483.5		2481.252	54.00	43.01	-10.99	All	Y	H	2.248	Pass
2483.5		2481.223	54.00	42.08	-11.92	All	Z	H	2.277	Pass
2483.5		2481.107	54.00	41.35	-12.65	All	X	V	2.393	Pass
2483.5		2481.238	54.00	41.83	-12.17	All	Y	V	2.262	Pass
2483.5		2481.252	54.00	41.98	-12.02	All	Z	V	2.248	Pass

	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436	<b>Conducted Spurious</b>	
DNB Job Number:	56076	Date:	16 Apr 2015
Customer:	D. Green Engineering LLC		
Model Number:	OR		
Description:	Transceiver used in Hunting Dog tracking products		
	Test Procedure		
Ambient Temperature	Relative Humidity		Barometric Pressure
21 °C	25 %		101.2 kPa
EUT performed within the requirements of the applicable standard		[X] Yes	[ ] No
		<i>Les Payne</i>	

Test Procedure: IEEE C63.10-2013

15.247 ( c ) Spurious RF Conducted Emissions

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10<sup>th</sup> harmonic. Typically, several plots are required to cover this entire span.

RBW = 100 kHz

VBW RBW

Sweep = auto

Detector function = peak

Trace = max hold

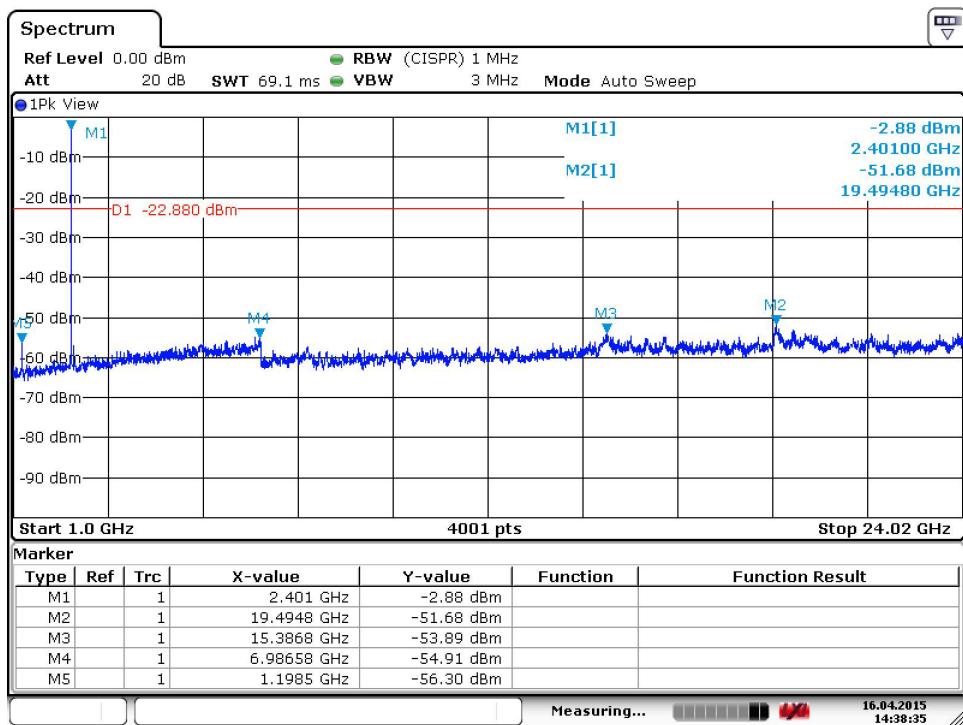
Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this Section. Submit these plots.



1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

## Conducted Spurious

DNB Job Number:	56076	Date:	16 Apr 2015	<b>Conformance Standard</b>
Customer:	D. Green Engineering LLC			
Model Number:	OR			FCC Part 15
Description:	Transceiver used in Hunting Dog tracking products		<b>Clause</b> 15.247(c)	
	1Mbps data rate (Basic data rate) - Low Channel			
Ambient Temperature	Relative Humidity		Barometric Pressure	
21 °C	25 %		101.2 kPa	
EUT performed within the requirements of the applicable standard [X] Yes [ ] No <i>Les Payne</i>				
Peak Output Power	Reading	-20dBc	Pass/Fail	
-2.91 dBm	-2.88 dBm	-22.88 dBm	Pass	



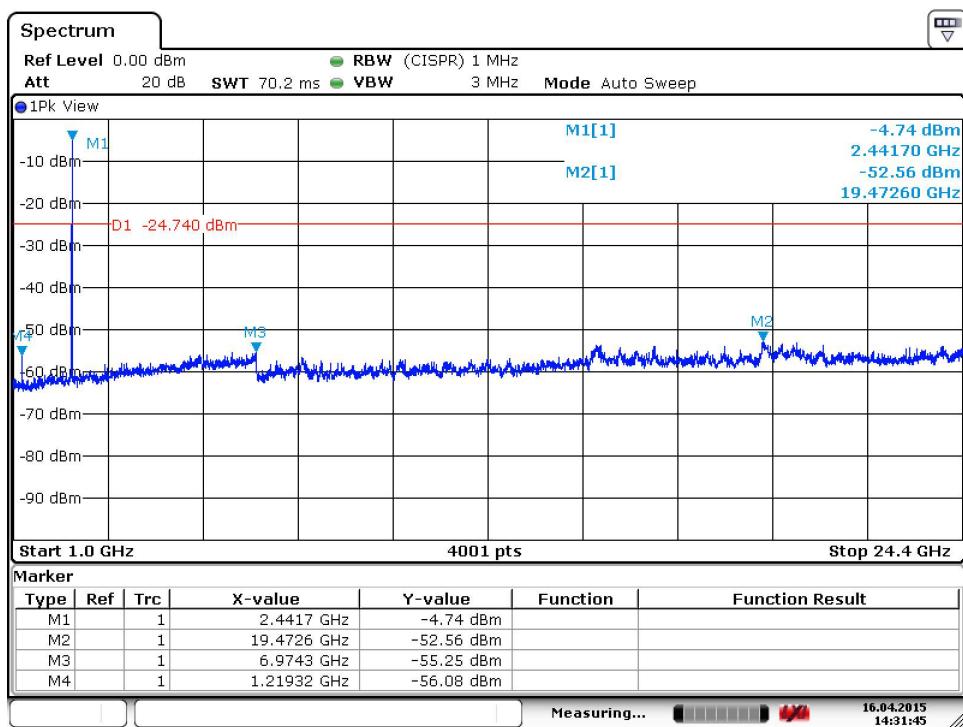
Date: 16.APR.2015 14:38:34



1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

## Conducted Spurious

DNB Job Number:	56076	Date:	16 Apr 2015	<b>Conformance Standard</b>	
Customer:	D. Green Engineering LLC				
Model Number:	OR			FCC Part 15	
Description:	Transceiver used in Hunting Dog tracking products			<b>Clause</b> 15.247(c)	
	1Mbps data rate (Basic data rate) - Mid Channel				
Ambient Temperature		Relative Humidity	Barometric Pressure		
21 °C		25 %	101.2 kPa		
EUT performed within the requirements of the applicable standard [X] Yes [ ] No <i>Les Payne</i>					
Peak Output Power	Reading	-20dBc	Pass/Fail		
-4.92 dBm	-4.74 dBm	-24.74 dBm	Pass		



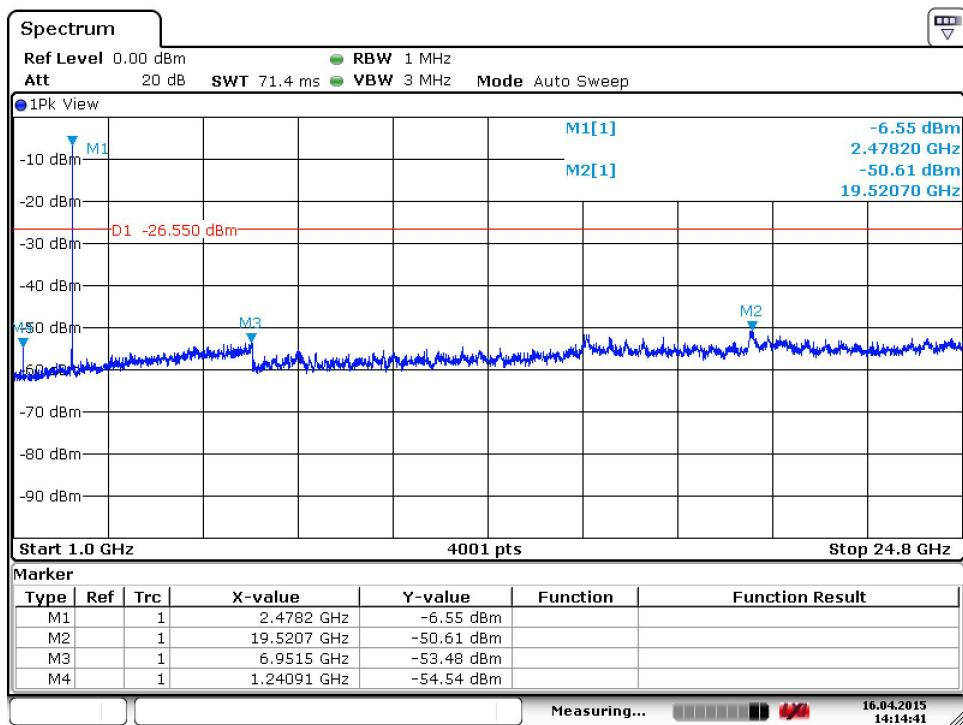
Date: 16.APR.2015 14:31:44



1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

## Conducted Spurious

DNB Job Number:	56076	Date:	16 Apr 2015	<b>Conformance Standard</b>
Customer:	D. Green Engineering LLC			
Model Number:	OR			FCC Part 15
Description:	Transceiver used in Hunting Dog tracking products		<b>Clause</b> 15.247(c)	
	1Mbps data rate (Basic data rate) - High Channel			
Ambient Temperature		Relative Humidity	Barometric Pressure	
21 °C		25 %	101.2 kPa	
EUT performed within the requirements of the applicable standard [X] Yes [ ] No <i>Les Payne</i>				
Peak Output Power	Reading	-20dBc	Pass/Fail	
-6.36 dBm	-6.55 dBm	-26.55 dBm	Pass	



Date: 16.APR.2015 14:14:41

15.247(d): Power spectral density(PSD).

Test Procedure: IEEE C63.10-2013

The same method of determining the conducted output power shall be used to determine the power spectral density.

If a peak output power is measured, then a peak power spectral density measurement is required. If an average output power is measured, then an average power spectral density measurement should be used.

#### **Method PKPSD (peak PSD)**

The following procedure shall be used if maximum peak conducted output power was used to determine compliance, and it is optional if the maximum conducted (average) output power was used to determine compliance:

- a) Set analyzer center frequency to DTS channel center frequency.
- b) Set the span to 1.5 times the DTS bandwidth.
- c) Set the RBW to  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- d) Set the VBW  $\geq [3 \text{ RBW}]$ .
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum amplitude level within the RBW.
- j) If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

The peak level measured must be no greater than + 8 dBm. If external attenuation is used, don't forget to add this value to the reading. Use the following guidelines for modifying the power spectral density measurement procedure when necessary.

For devices with spectrum line spacing greater than 3 kHz no change is required.

For devices with spectrum line spacing equal to or less than 3 kHz, the resolution bandwidth must be reduced below 3kHz until the individual lines in the spectrum are resolved. The measurement data must then be normalized to 3 kHz by summing the power of all the individual spectral lines within a 3kHz band (in linear power units) to determine compliance.

If the spectrum line spacing cannot be resolved on the available spectrum analyzer, the noise density function on most modern conventional spectrum analyzers will directly measure the noise power density normalized to a 1 Hz noise power bandwidth. Add 35dB for correction to 3 kHz.

Should all the above fail or any controversy develop regarding accuracy of measurement, the Laboratory will use the HP 89440A Vector Signal Analyzer for final measurement unless a clear showing can be made for a further alternate.



1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

## Power Spectral Density

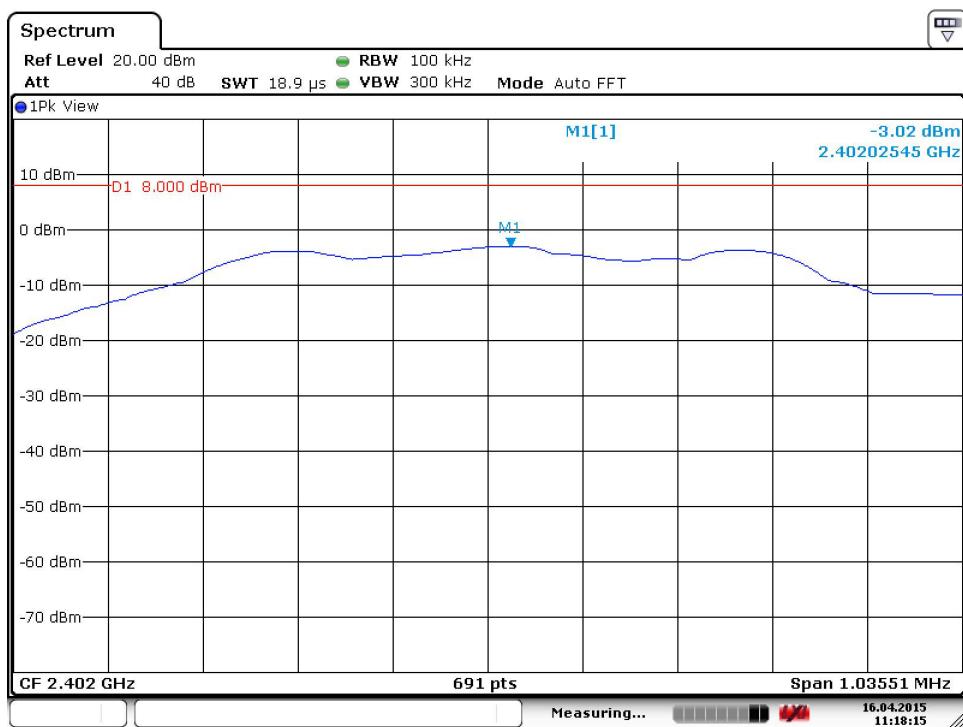
DNB Job Number:	56076	Date:	16 Apr 2015	<b>Conformance Standard</b>
Customer:	D. Green Engineering LLC			
Model Number:	OR			FCC Part 15
Description:	Transceiver used in Hunting Dog tracking products		<b>Clause</b> 15.247(d)	
	1Mbps data rate (Basic data rate)			

### Environmental Conditions

Ambient Temperature	Relative Humidity	Barometric Pressure
19 °C	28 %	101.8 kPa

EUT performed within the requirements of the applicable standard  Yes  No *Les Payne*

Channel	Freq MHz	Meas PSD (dBm)	Limit (dBm)	Delta (dBm)	Pass/Fail
Low	2402	-3.02	8.0	-11.02	Pass



Date: 16.APR.2015 11:18:15



1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

## Power Spectral Density

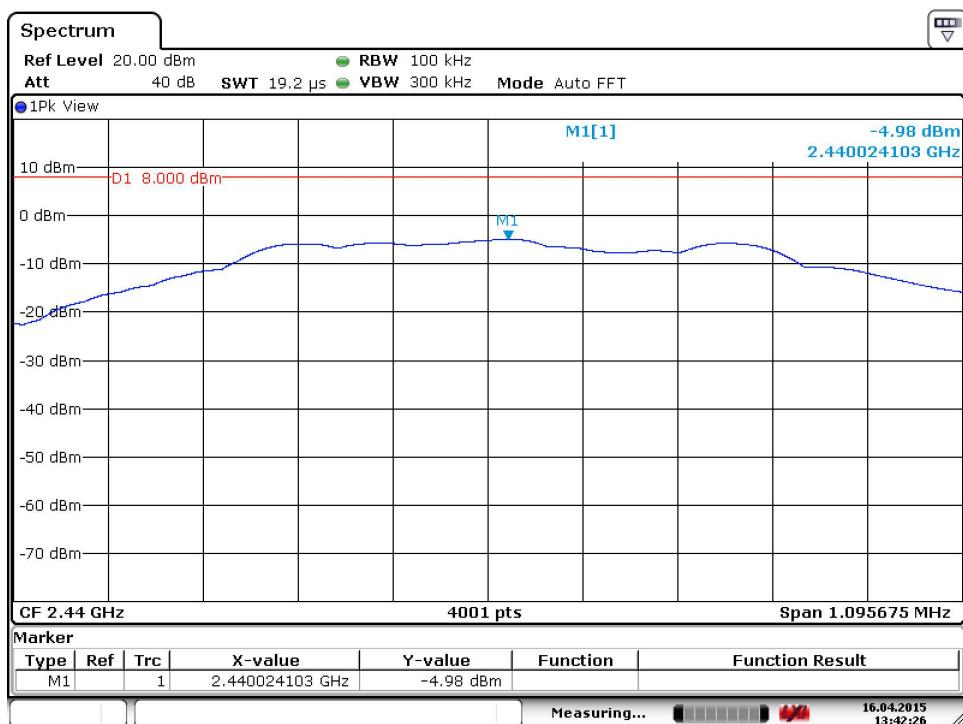
DNB Job Number:	56076	Date:	16 Apr 2015	<b>Conformance Standard</b>
Customer:	D. Green Engineering LLC			
Model Number:	OR			FCC Part 15
Description:	Transceiver used in Hunting Dog tracking products		<b>Clause</b> 15.247(d)	
	1Mbps data rate (Basic data rate)			

### Environmental Conditions

Ambient Temperature	Relative Humidity	Barometric Pressure
19 °C	28 %	101.8 kPa

EUT performed within the requirements of the applicable standard  Yes  No *Les Payne*

Channel	Freq MHz	Meas PSD (dBm)	Limit (dBm)	Delta (dBm)	Pass/Fail
Middle	2440	-4.98	8.0	-12.98	Pass



Date: 16.APR.2015 13:42:26



1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

## Power Spectral Density

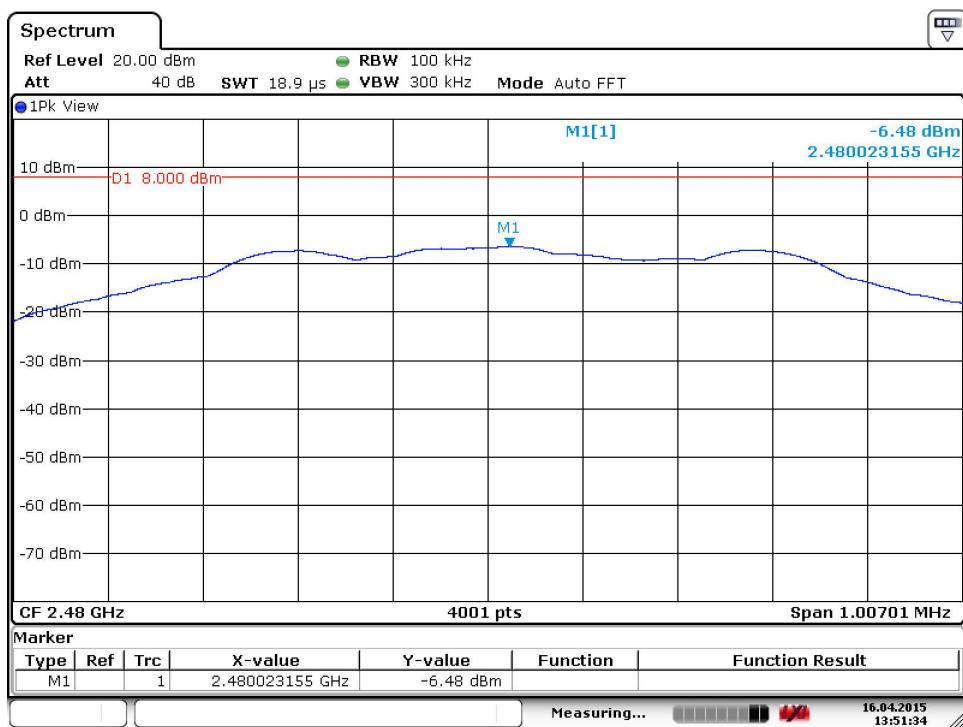
DNB Job Number:	56076	Date:	16 Apr 2015	<b>Conformance Standard</b>
Customer:	D. Green Engineering LLC			
Model Number:	OR			FCC Part 15
Description:	Transceiver used in Hunting Dog tracking products		<b>Clause</b> 15.247(d)	
	1Mbps data rate (Basic data rate)			

### Environmental Conditions

Ambient Temperature	Relative Humidity	Barometric Pressure
19 °C	28 %	101.8 kPa

EUT performed within the requirements of the applicable standard  Yes  No *Les Payne*

Channel	Freq MHz	Meas PSD (dBm)	Limit (dBm)	Delta (dBm)	Pass/Fail
High	2480	-6.48	8.0	-14.48	Pass



Date: 16.APR.2015 13:51:33

## 2.1055 Frequency stability.

Test Procedure: IEEE C63.10-2013

The frequency stability shall be measured with variation of ambient temperature from -30 to +50 degrees centigrade and the voltage shall be measured at 85% and 115% of the nominal voltage.

Use the following spectrum analyzer settings:

Span = 5MHz

RBW = 100 kHz

VBW RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Set marker M1 On the peak of the channel, set marker M2 on the -30dB down point of the leading edge of the channel, set marker M3 on the -30dB down point of the trailing edge of the channel. Record this data in the appropriate table.

Verify that the lower channel does not exceed below the lower band edge and the upper channel does not exceed the upper band edge.

Temperature Stability:

Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10 centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. Temperature range data shall be recorded in the table.

Voltage Stability:

Vary primary supply voltage from 85 to 115 percent of the nominal value or values in the case of a nominal voltage range.

	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436	<b>Measurement Test Set Up</b>	
DNB Job Number:	56076	Date:	8 May 2015
Customer:	D. Green Engineering LLC	FCC Part 15	<b>Conformance Standard</b>
Model Number:	OR		<b>Clause</b> 15.247
<b>Frequency Stability Measurement Set Up</b>			





1100 E Chalk Creek Road  
Coalville, UT 84017  
(435) 336-4433  
FAX (435) 336-4436

### XMTR Frequency Range

DNB Job Number:	56076	Date: 8 May 2015	<b>Conformance Standard</b> FCC Part 15	
Customer:	D. Green Engineering LLC			
Model Number:	OR			
Description:	Transceiver used in Hunting Dog tracking products			
	1Mbps data rate (Basic data rate)			

#### Environmental Conditions

Ambient Temperature	Relative Humidity	Barometric Pressure
21 °C	25 %	101.2 kPa

EUT performed within the requirements of the applicable standard  Yes  No *Les Payne*

TEST CONDITIONS		Measured Frequency Bandwidth					
		Lo Channel		Mid Channel		Hi Channel	
Temperature	Voltage	F <sub>l</sub>	F <sub>h</sub>	F <sub>l</sub>	F <sub>h</sub>	F <sub>l</sub>	F <sub>h</sub>
-30.00 °C	3.00 Vdc	2.401774690	2.402295670	2.439800200	2.440251770	2.479785800	2.480253960
-20.00 °C	3.00 Vdc	2.401803200	2.402260500	2.439811900	2.440243100	2.479806100	2.480253460
-10.00 °C	3.00 Vdc	2.401791600	2.402263400	2.439797400	2.440272100	2.479811900	2.480259250
0.00 °C	3.00 Vdc	2.401782900	2.402280800	2.439823400	2.440248900	2.479823400	2.480238990
10.00 °C	3.00 Vdc	2.401809000	2.402246000	2.439817700	2.440246000	2.479835000	2.480236090
20.00 °C	3.00 Vdc	2.401806100	2.402246000	2.439820500	2.440251800	2.479840800	2.480215830
<b>25.00 °C</b>	<b>2.55 Vdc</b>	<b>2.401792050</b>	<b>2.402252250</b>	<b>2.439817700</b>	<b>2.440220000</b>	<b>2.479808900</b>	<b>2.480246000</b>
<b>25.00 °C</b>	<b>3.00 Vdc</b>	<b>2.401783370</b>	<b>2.402266730</b>	<b>2.439806100</b>	<b>2.440237300</b>	<b>2.479840800</b>	<b>2.480210040</b>
<b>25.00 °C</b>	<b>3.45 Vdc</b>	<b>2.401806520</b>	<b>2.402240680</b>	<b>2.439820500</b>	<b>2.440217100</b>	<b>2.479800200</b>	<b>2.480251800</b>
30.00 °C	3.00 Vdc	2.401806100	2.402228700	2.439814800	2.440228700	2.479843700	2.480204250
40.00 °C	3.00 Vdc	2.401803200	2.402220000	2.439800300	2.440237300	2.479846600	2.480201360
50.00 °C	3.00 Vdc	2.401809000	2.402222900	2.439794500	2.440228700	2.479855300	2.480181100
55.00 °C	3.00 Vdc	2.401809000	2.402225800	2.439788700	2.440234400	2.479852400	2.480186890

Note 1 : Shaded area represents nominal voltage and temperature range.

Note 2 : F<sub>l</sub> = Lower channel frequency edge (-30dB down)

F<sub>h</sub> = Upper channel frequency edge (-30dB down)

2.1033 (b) (7) Equipment Photographs

Photo 1	External	Top of EUT
Photo 2	External	Bottom of EUT
Photo 3	Internal	Top of PCB
Photo 4	Internal	Bottom of PCB

Photo 1      External      Top of EUT



Photo 2

External

Bottom of EUT



Photo 3

Internal

Top of PCB

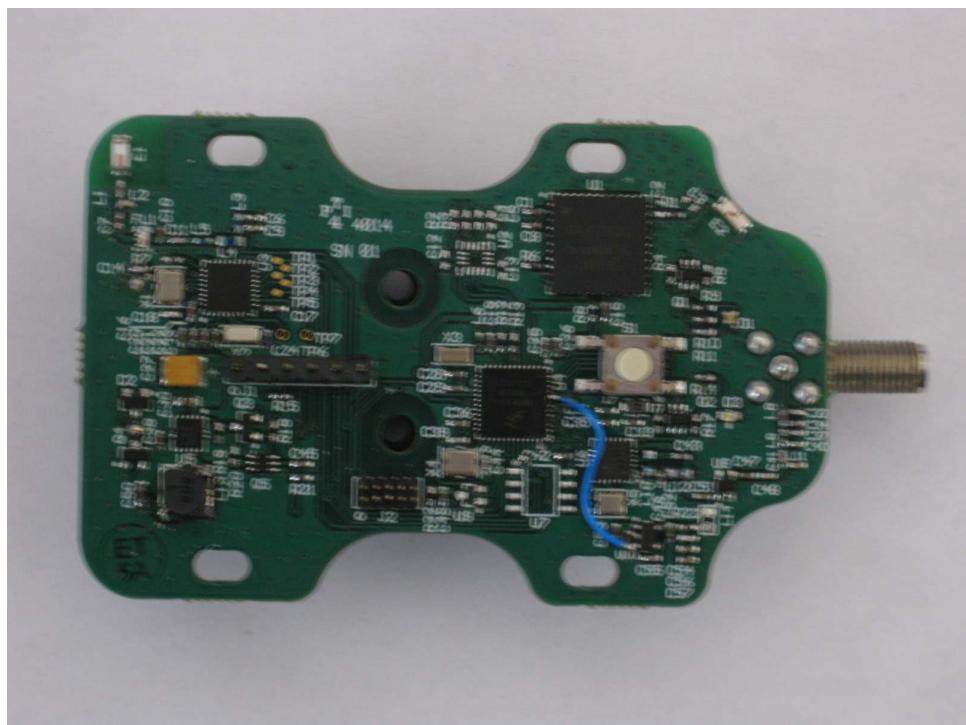
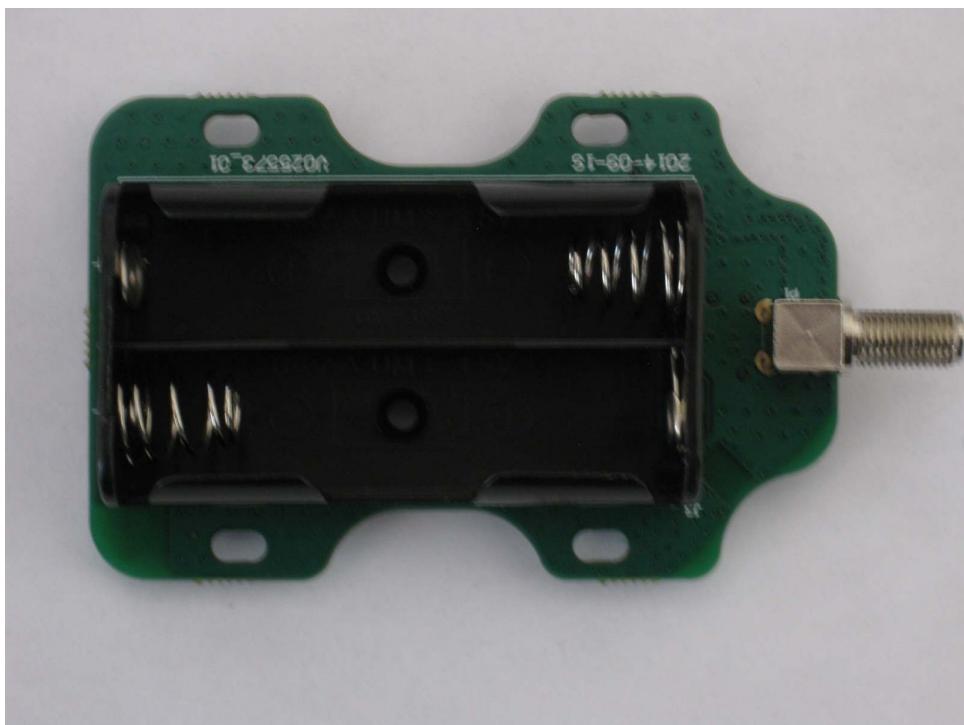


Photo 4

Internal

Bottom of PCB



End of Report UT56076B-002