

**Application for Certification  
For a MURS Transmitter.**

D. Green Engineering LLC  
P. O. Box 2 0247  
Panama City Beach, FL 32417

Transceiver used in Hunting Dog tracking products

M/N: O

FCC ID: 2AERJ-O-01

REPORT # UT56076C-004

This report was prepared in accordance with the requirements of the FCC Rules and Regulations Part 2, Subpart J, 2.1033, Part 95, 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

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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.

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## 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 95. 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

### 1.3 Test Equipment List

<b>TEST EQUIPMENT LIST - CONDUCTED EMISSIONS</b>				
<b>Description</b>	<b>Manufacturer/MN</b>	<b>Asset #</b>	<b>Serial #</b>	<b>Cal Due</b>
LISN	Fisher LISN-50/32-4-01	U-286	2020	19-Jan-16
LISN	FisherFCCLISN-50/250/25/8	U-062	5003	11-Nov-15
Spectrum Analyzer	Agilent/E7401A	U-257	MY42000103	08-Jan-16
Spectrum Analyzer	R&S/FSV30	U-248	101367	18-Jun-16
CDN 16 amp	Fischer/FCC801M316A	U-169	64	09-Jul-17
TILE Software	ETS Lindgren/ 3.4.11.13	U-317	8112006	13-Oct-15
Current Probe	Solar/ 6741-1	U-267	966727	19-Jan-16

<b>TEST EQUIPMENT LIST - RADIATED EMISSIONS</b>				
<b>Description</b>	<b>Manufacturer/MN</b>	<b>Asset #</b>	<b>Serial #</b>	<b>Cal Due</b>
Amplifier	HP/8447D	U-065	2727A06180	5-Jan-16
Amplifier	HP/8447D	U-066	2727A06181	5-Jan-16
Amplifier	HP/8447D	U-068	2727A06184	5-Jan-16
Bicon Antenna *	SCH/BBA9106	U-186	7	18-May-17
Bicon Antenna	SCH/BBA9106	U-098	12340	10-Feb-16
Log P Antenna	SCH/UHAL09107	U-010	10	10-Oct-15
Log P Antenna *	SCH/UHAL09107	U-011	L11	27 Apr-17
DRG Horn Antenna	AH Systems/SAS-200/571	U-156	222	23-Apr-17
HF Cable	W.L.Grove	U-075	P44597	4-Dec-15
DRG Horn Antenna *	AH Systems/SAS-200/571	U-071	417	9-Jul-17
Spectrum Analyzer	Agilent/E7401A	U-257	MY42000103	8-Jan-16
Spectrum Analyzer	R&S/FSV30	U-248	101367	18-Jun-16
TILE Software	ETS- Lindgren/ 3.4.11.13	U-317	8112006	13-Oct-15

\* Used for substitution method transmit antenna.

<b>TEST EQUIPMENT LIST - ANTENNA CONDUCTED</b>				
<b>Description</b>	<b>Manufacturer/MN</b>	<b>Asset #</b>	<b>Serial #</b>	<b>Cal Due</b>
Spectrum Analyzer	R&S/FSV30	U-248	101367	18-Jun-16

## 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: X D. Green Engineering LLC  
Vendor  
Licensee  
Prospective Licensee  
Other

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

Description: MURS Transmitter used in Hunting Dog tracking products

Part Number: O

Anticipated Production Quantity: Multiple Units

Frequency Band:

Channel Frequency (MHz)	USED	NOT USED
151.820	X	N/A
151.880	X	N/A
151.940	X	N/A
154.570	N/A	X
154.600	N/A	X

Modulation Type: GFSK

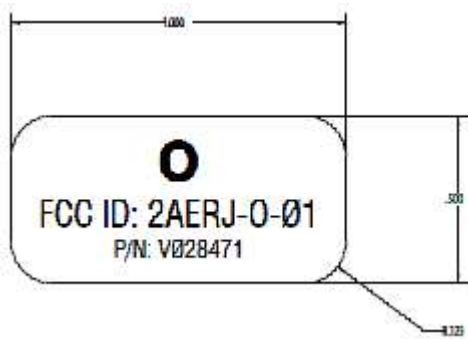
Rated Power: 1.140 W

Emissions Designator 1K20F1D

2.1033 (b) (2) FCC Identifier

FCC ID: 2AERJ-O-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

## 15.209 Radiated Emissions (General Provisions)

Test Procedure: ANSI 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.

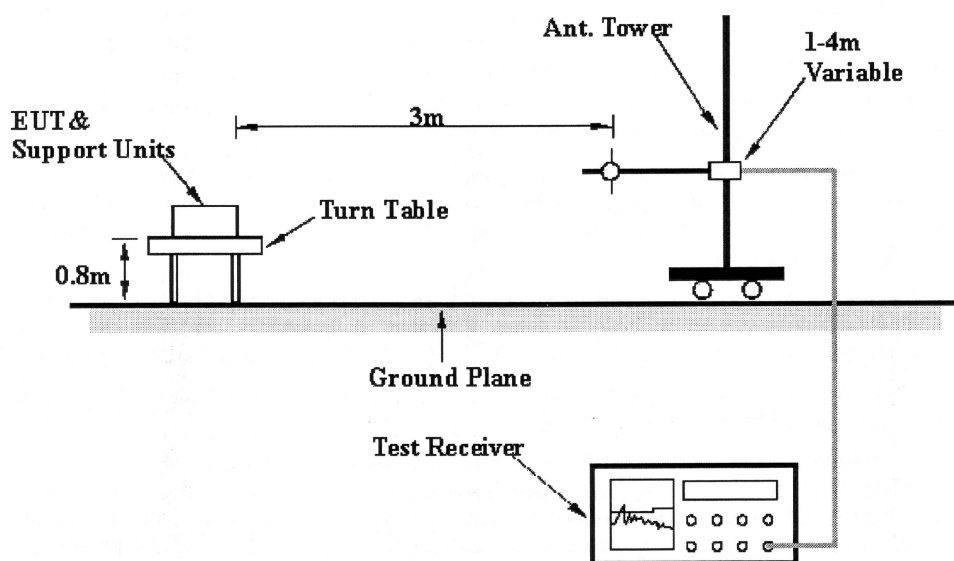
Sufficient precautions shall be taken to ensure that reflections from extraneous objects adjacent to the site do not degrade the measurement results, in particular:


- 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.

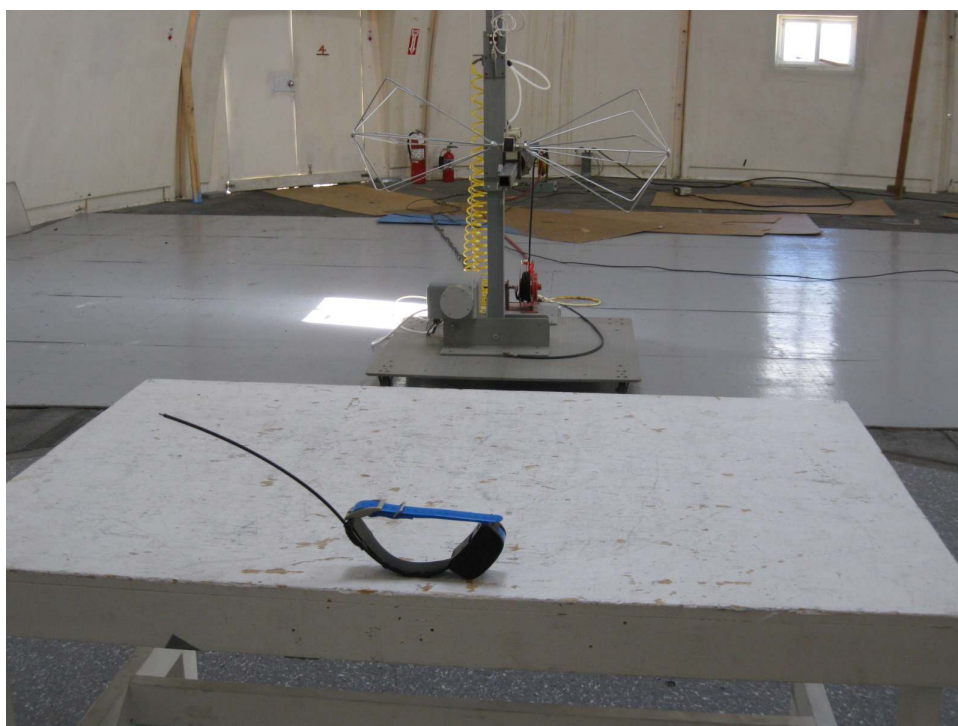
The EUT shall be placed upon a non-conductive table 0.80 meters above the ground plane for frequencies from 30 to 1000MHz and 1.5 meters above the ground plane above 1 GHz and shall be placed in the “worst case” transmitting mode. The EUT shall be rotated 360 degrees to find the azimuth maxima. The receive 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

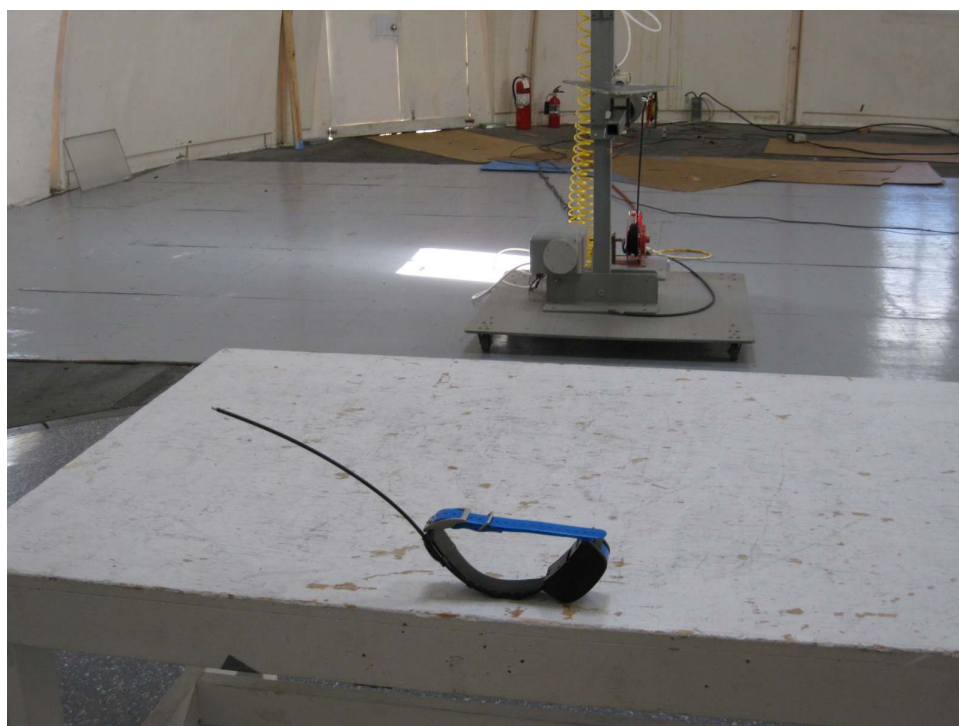
	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436	<b>Radiated Emissions</b> (Spurious)		
DNB Job Number:	56076	Date:	2 Apr 2015	Specification  [X] 15.209 [X] ANSI C63.10-2013
Customer:	D. Green Engineering LLC			
Model Number:	O			
Description:	Transceiver used in Hunting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




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



	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	Specification  [X] 15.209 [X] ANSI C63.10-2013
Customer:	D. Green Engineering LLC			
Model Number:	O			
Description:	Transceiver used in Hunting Dog tracking products			
Test Set Up - Log Periodic - Horizontal				



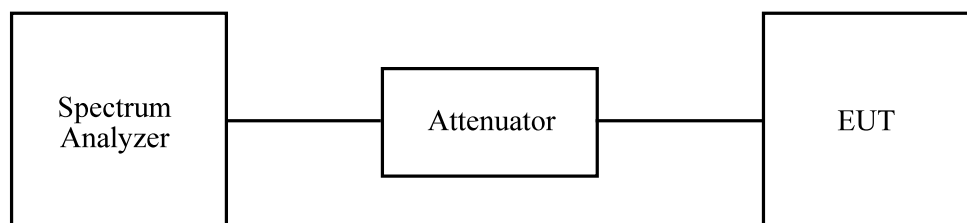
		1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436				<b>Radiated Emissions</b> (General)					
DNB Job Number:		56076				Date:		2 Apr 2015		<b>Specification</b> [X] 15.209 [X] ANSI C63.10-2013	
Customer:		D. Green Engineering LLC									
Model Number:		O									
Description:		Transceiver used in Hunting Dog tracking products									
		Non-transmit mode									
EUT is in conformance with FCC 15.209						X	YES		NO	Signed	<i>Y Staples</i>
FREQ (Mhz)	Meter	Correction Factors (dB)			dBuV/m			Positions			
		Ant	Cbl	Amp	Corr	Lim	Delta	Typ	Tbl	Pl	Hgt
137.481	19.73	14.10	2.80	25.90	10.73	43.50	-32.77	QP	260	H	4.00
189.000	30.66	17.00	3.40	25.50	25.56	43.50	-17.94	QP	2	H	4.00
30.000	22.12	19.10	1.40	26.30	16.32	40.00	-23.68	QP	2	V	1.00
37.433	20.07	16.30	1.50	26.20	11.67	40.00	-28.33	QP	292	V	1.00
54.300	20.24	10.00	1.70	26.20	5.74	40.00	-34.26	QP	2	V	1.00
56.324	20.18	9.30	1.80	26.10	5.18	40.00	-34.82	QP	2	V	1.00
67.800	29.20	6.30	2.00	26.20	11.30	40.00	-28.70	QP	285	V	1.00
137.100	19.00	14.10	2.80	25.90	10.00	43.50	-33.50	QP	2	V	1.00
231.356	21.56	16.50	3.40	25.60	15.86	46.00	-30.14	QP	2	V	1.00
249.301	25.02	16.60	3.40	25.60	19.42	46.00	-26.58	QP	275	V	1.00
260.668	21.60	18.10	3.90	25.40	18.20	46.00	-27.80	QP	2	V	1.00
269.956	19.10	18.70	4.00	25.40	16.40	46.00	-29.60	QP	2	V	1.00
274.100	21.40	18.90	4.00	25.40	18.90	46.00	-27.10	QP	2	V	1.00

**NOTE:** *As this device only uses Channels 1 through 3 only Emissions Mask 1 is applicable:*

- (e) For transmitters designed to operate in the MURS, transmitters shall comply with the following:
- (1) Emission Mask 1—For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:
    - (i) On any frequency from the center of the authorized bandwidth  $f_0$  to 5.625 kHz removed from  $f_0$ : Zero dB.
    - (ii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 5.625 kHz but no more than 12.5 kHz: at least  $7.27(f_d - 2.88 \text{ kHz})$  dB.
    - (iii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$  in kHz) of more than 12.5 kHz: at least  $50 + 10 \log(P)$  dB or 70 dB, whichever is the lesser attenuation.


EUT operating conditions:

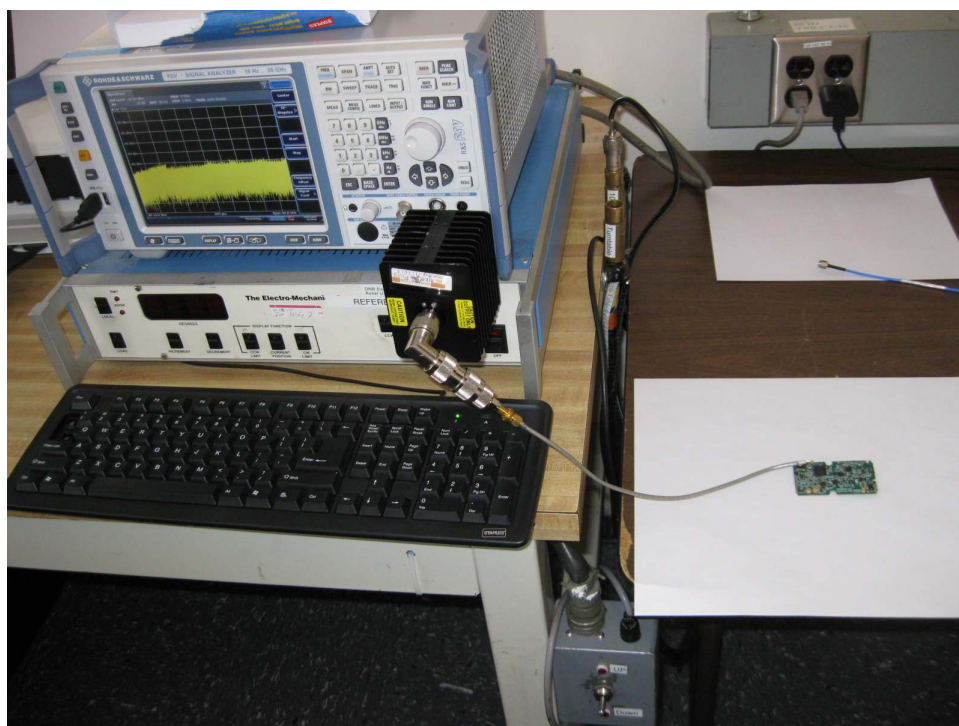
The software provided by the client to enable the EUT to transmit continuously.




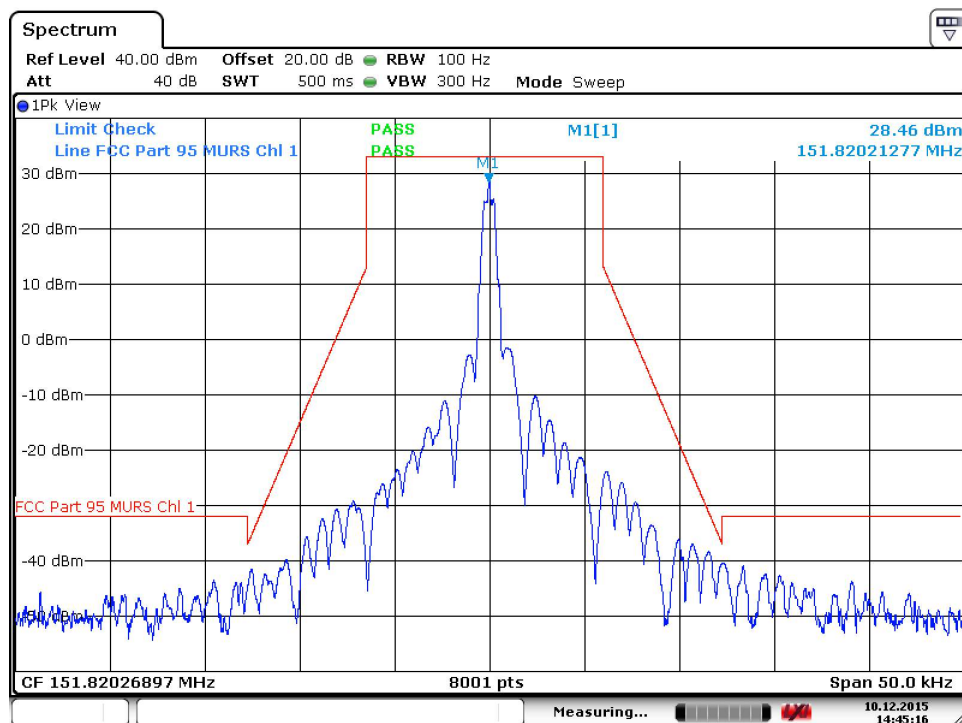
Test Set Up: (Note following set up was used for all antenna conducted measurements)




	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	<b>Conformance Standard</b>  FCC Part 95
Customer:	D. Green Engineering LLC			
Model Number:	O			
Description:	Transceiver used in Hunting Dog tracking products			<b>Clause</b> 95.635
Antenna Conducted Measurement Set Up				

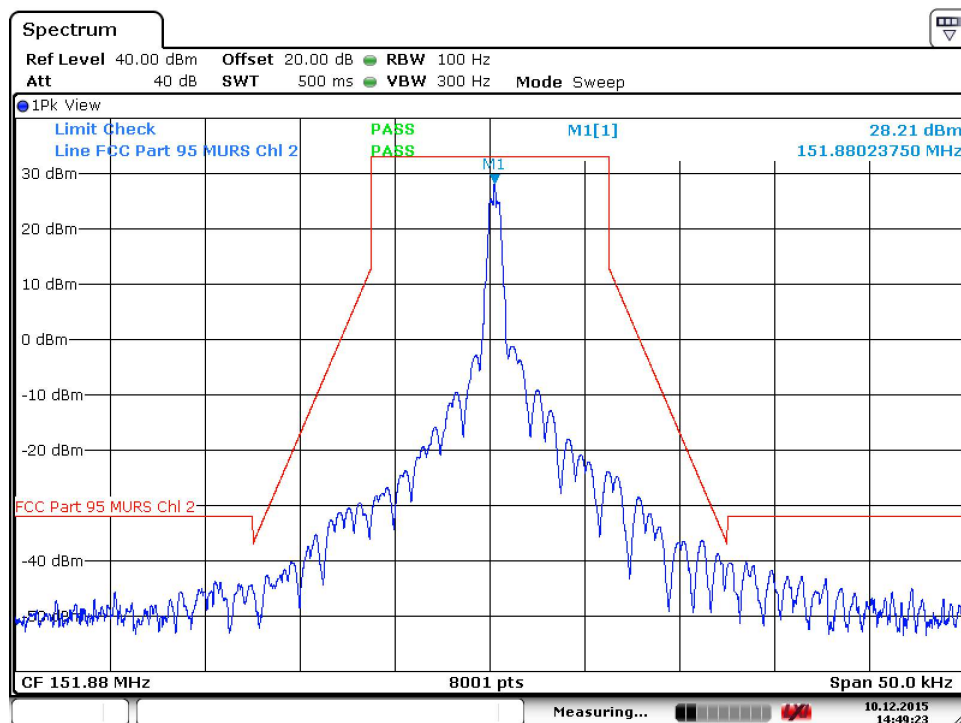


		1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		<b>Unwanted Radiation</b>	
DNB Job Number:	56076	Date:	10 Dec 2015	<b>Conformance Standard</b>  FCC Part 95  <b>Clause 95.635</b>	
Customer:	D. Green Engineering LLC				
Model Number:	O				
Description:	Transceiver used in Hunting Dog tracking products				
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>					
Channel	Chl Freq (MHz)	Mask	Pass/Fail		
1	151.82	1	Pass		




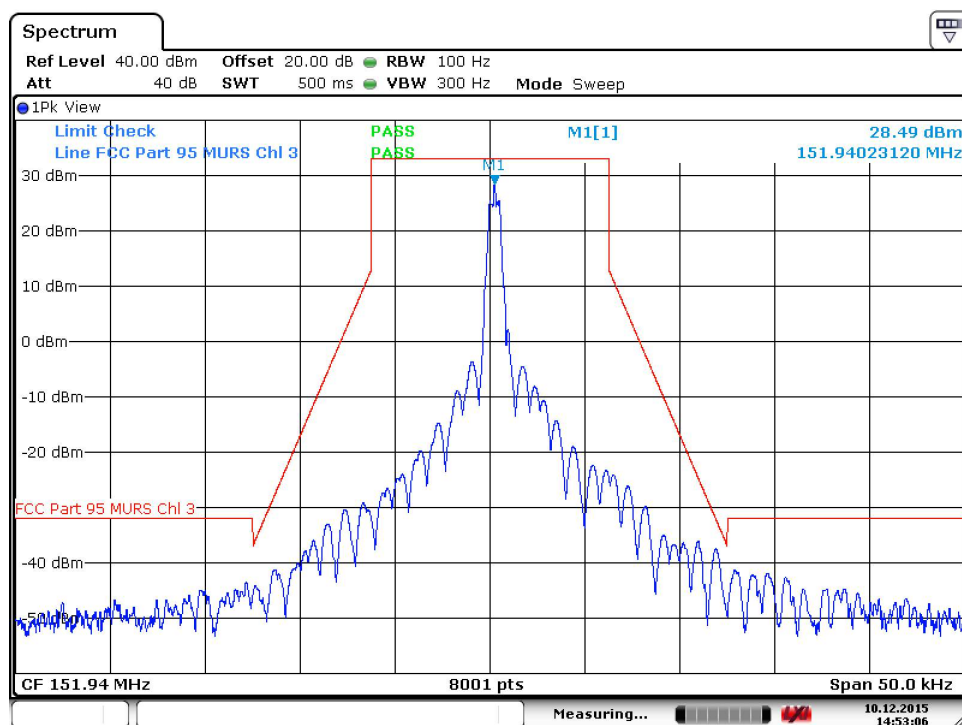
Date: 10.DEC.2015 14:45:15

		1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		<b>Unwanted Radiateion</b>	
DNB Job Number:	56076	Date:	10 Dec 2015	<b>Conformance Standard</b>  FCC Part 95  <b>Clause 95.635</b>	
Customer:	D. Green Engineering LLC				
Model Number:	O				
Description:	Transceiver used in Hunting Dog tracking products				
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>					
Channel	Chl Freq (MHz)	Mask	Pass/Fail		
2	151.88	1	Pass		



Date: 10.DEC.2015 14:49:23

		1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		<b>Unwanted Radiation</b>	
DNB Job Number:	56076	Date:	10 Dec 2015	<b>Conformance Standard</b>  FCC Part 95  <b>Clause 95.635</b>	
Customer:	D. Green Engineering LLC				
Model Number:	O				
Description:	Transceiver used in Hunting Dog tracking products				
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>					
Channel	Chl Freq (MHz)	Mask	Pass/Fail		
3	151.94	1	Pass		



Date: 10.DEC.2015 14:53:06

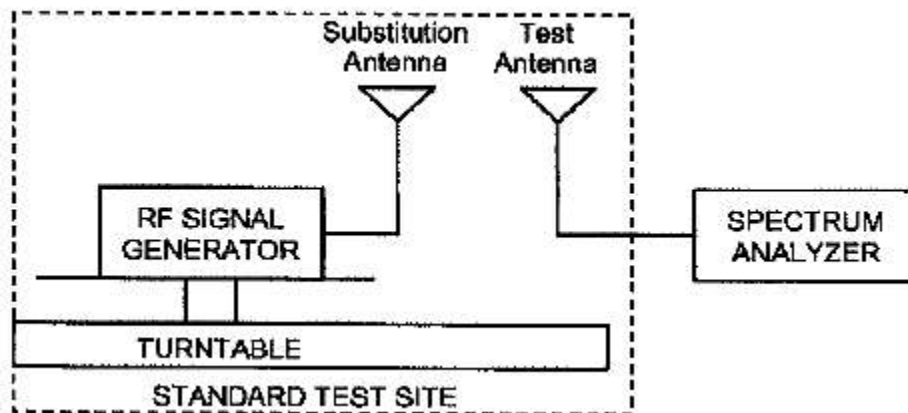
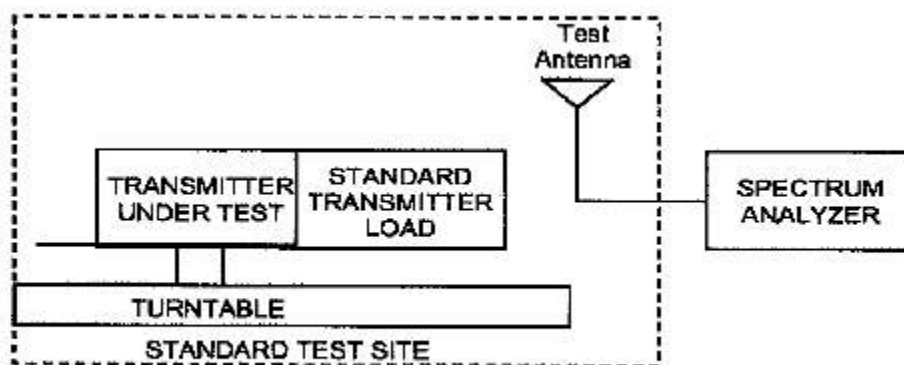
		1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		<b>Radiated Emissions</b> (Spurious)	
DNR Job Number:		56076		Date: 5 May 2015	
Customer:		D. Green Engineering LLC		Specification [X] 95.635 [X] 2.1053 [X] EIA/TIA-603-D	
Model Number:		O			
Description:		Transceiver used in Hunting Dog tracking products			
		Test Procedure			

- A) Connect the equipment as illustrated below.
- B) Adjust the spectrum analyzer to the following settings:
- 1) Resolution Bandwidth 100 kHz (< 1 GHz), 1 MHz (> 1GHz)
  - 2) Video Bandwidth  $\geq 3$  times Resolution Bandwidth, or 30 kHz
  - 3) Sweep Speed  $\leq 2000$  Hz/second
  - 4) Detector Mode = Mean or Average Power
- C) Place the transmitter to be tested on the turntable in the standard test site. The transmitter is transmitting into a non- radiating load that is placed on the turntable. The RF cable to this load should be of minimum length.
- D) For each spurious measurement the test antenna should be adjusted to the correct length for the frequency involved. This length may be determined from a calibration ruler supplied with the equipment. Measurements shall be made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, except for the region close to the carrier equal to  $\pm$  the test bandwidth (see Section 1.3.4.4).
- E) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.
- F) Repeat Step E) for each spurious frequency with the test antenna polarized vertically.
- G) Reconnect the equipment as illustrated.
- H) Keep the spectrum analyzer adjusted as in Step B).
- I) Remove the transmitter and replace it with a substitution antenna (the antenna should be half wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.
- J) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.
- K) Repeat Step J) with both antennas vertically polarized for each spurious frequency.
- L) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in Steps J) and K) by the power loss in the cable between the generator and the antenna and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna.
- M) The levels recorded in Step L) are absolute levels of radiated spurious emissions in dBm. The radiated spurious emissions in dB can be calculated by the following:

$$\text{Radiated spurious emissions dB} = 10\log_{10}(\text{TX power in watts}/0.001) - \text{the levels in Step I})$$

$$\text{Limit in dBm} = -20\text{dBm} = 33 - (50 + 10\log(P \text{ in Watts})) \quad P=2$$

	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] 95.635 [X] 2.1053
Customer:	D. Green Engineering LLC			
Model Number:	O			
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	<b>Radiated Emissions</b> (Spurious)		
DNB Job Number:	56076	Date:	5 May 2015	Specification  [X] 95.635 [X] 2.1053
Customer:	D. Green Engineering LLC			
Model Number:	O			
Description:	Transceiver used in Hunting Dog tracking products Channel 1			

Emissions Measurements								
Freq in MHz	Polarity	Measured Level (dBuV/m)	Substitution Sig Gen (dBm)	Substitution Ant Gain (dBd)	Cable Loss (dB)	EIRP Level (dBm)	Limit (dBm)	Margin (dB)
151.820	Vert	86.00	6.44	1.00	0.10	7.34	33.00	-25.66
303.640	Vert	53.90	-49.05	3.45	0.15	-45.75	-20.00	-25.75
455.460	Vert	58.60	-45.35	5.64	0.19	-39.90	-20.00	-19.90
607.280	Vert	66.10	-34.37	5.25	0.23	-29.35	-20.00	-9.35
759.100	Vert	63.00	-34.37	5.40	0.26	-29.23	-20.00	-9.23
910.920	Vert	58.10	-37.65	5.62	0.29	-32.32	-20.00	-12.32
1062.740	Vert	32.30	-44.16	7.24	0.31	-37.23	-20.00	-17.23
1214.560	Vert	27.90	-48.34	7.75	0.33	-40.92	-20.00	-20.92
1366.380	Vert	31.60	-44.51	8.39	0.34	-36.46	-20.00	-16.46
1518.200	Vert	27.40	-48.34	8.74	0.36	-39.96	-20.00	-19.96
151.820	Horz	96.30	16.72	1.00	0.10	17.62	33.00	-15.38
303.640	Horz	66.30	-36.63	3.45	0.15	-33.33	-20.00	-13.33
455.460	Horz	61.10	-42.89	5.64	0.19	-37.44	-20.00	-17.44
607.280	Horz	73.80	-26.51	5.25	0.23	-21.49	-20.00	-1.49
759.100	Horz	59.10	-38.32	5.40	0.26	-33.18	-20.00	-13.18
910.920	Horz	57.10	-38.69	5.62	0.29	-33.36	-20.00	-13.36
1062.740	Horz	31.80	-44.65	7.24	0.31	-37.72	-20.00	-17.72
1214.560	Horz	28.70	-47.49	7.75	0.33	-40.07	-20.00	-20.07
1366.380	Horz	30.20	-45.89	8.39	0.34	-37.84	-20.00	-17.84
1518.200	Horz	23.60	-52.14	8.74	0.36	-43.76	-20.00	-23.76

		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] 95.635 [X] 2.1053
Customer:		D. Green Engineering LLC				
Model Number:		O				
Description:		Transceiver used in Hunting Dog tracking products Channel 2				

Emissions Measurements								
Freq in MHz	Polarity	Measured Level (dBuV/m)	Substitution Sig Gen (dBm)	Substitution Ant Gain (dBd)	Cable Loss (dB)	EIRP Level (dBm)	Limit (dBm)	Margin (dB)
151.880	Vert	85.80	6.24	1.00	0.10	7.14	33.00	-25.86
303.760	Vert	54.00	-48.98	3.45	0.15	-45.68	-20.00	-25.68
455.640	Vert	58.60	-45.41	5.65	0.19	-39.95	-20.00	-19.95
607.520	Vert	70.70	-29.70	5.25	0.23	-24.68	-20.00	-4.68
759.400	Vert	64.80	-32.82	5.40	0.26	-27.68	-20.00	-7.68
911.280	Vert	54.70	-41.04	5.63	0.29	-35.70	-20.00	-15.70
1063.160	Vert	29.00	-47.51	7.24	0.31	-40.58	-20.00	-20.58
1215.040	Vert	25.70	-50.55	7.75	0.33	-43.13	-20.00	-23.13
1366.920	Vert	30.50	-45.67	8.39	0.34	-37.62	-20.00	-17.62
1518.800	Vert	21.30	-54.42	8.74	0.36	-46.04	-20.00	-26.04
151.880	Horz	95.20	15.62	1.00	0.10	16.52	33.00	-16.48
303.760	Horz	67.00	-35.94	3.45	0.15	-32.64	-20.00	-12.64
455.640	Horz	62.70	-41.31	5.65	0.19	-35.85	-20.00	-15.85
607.520	Horz	73.70	-26.64	5.25	0.23	-21.62	-20.00	-1.62
759.400	Horz	63.70	-33.70	5.40	0.26	-28.56	-20.00	-8.56
911.280	Horz	54.60	-41.18	5.63	0.29	-35.84	-20.00	-15.84
1063.160	Horz	33.90	-42.52	7.24	0.31	-35.59	-20.00	-15.59
1215.040	Horz	29.60	-46.61	7.75	0.33	-39.19	-20.00	-19.19
1366.920	Horz	33.10	-43.05	8.39	0.34	-35.00	-20.00	-15.00
1518.800	Horz	29.10	-46.61	8.74	0.36	-38.23	-20.00	-18.23



		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] 95.635 [X] 2.1053
Customer:		D. Green Engineering LLC				
Model Number:		O				
Description:		Transceiver used in Hunting Dog tracking products Channel 3				

Emissions Measurements								
Freq in MHz	Polarity	Measured Level (dBuV/m)	Substitution Sig Gen (dBm)	Substitution Ant Gain (dBd)	Cable Loss (dB)	EIRP Level (dBm)	Limit (dBm)	Margin (dB)
151.940	Vert	85.40	5.90	1.00	0.10	6.80	33.00	-26.20
303.880	Vert	53.30	-49.68	3.46	0.15	-46.37	-20.00	-26.37
455.820	Vert	56.40	-47.65	5.67	0.19	-42.17	-20.00	-22.17
607.760	Vert	68.70	-31.70	5.26	0.23	-26.67	-20.00	-6.67
759.700	Vert	64.60	-32.77	5.40	0.26	-27.63	-20.00	-7.63
911.640	Vert	55.00	-40.75	5.63	0.29	-35.41	-20.00	-15.41
1063.580	Vert	33.90	-42.51	7.24	0.31	-35.58	-20.00	-15.58
1215.520	Vert	29.60	-46.61	7.75	0.33	-39.19	-20.00	-19.19
1367.460	Vert	33.10	-43.06	8.40	0.34	-35.00	-20.00	-15.00
1519.400	Vert	29.10	-46.61	8.74	0.36	-38.23	-20.00	-18.23
151.940	Horz	95.60	15.62	1.00	0.10	16.52	33.00	-16.48
303.880	Horz	67.70	-35.29	3.46	0.15	-31.98	-20.00	-11.98
455.820	Horz	64.00	-40.02	5.67	0.19	-34.54	-20.00	-14.54
607.760	Horz	74.40	-26.96	5.26	0.23	-21.93	-20.00	-1.93
759.700	Horz	65.10	-32.30	5.40	0.26	-27.16	-20.00	-7.16
911.640	Horz	58.10	-37.72	5.63	0.29	-32.38	-20.00	-12.38
1063.580	Horz	31.00	-42.79	7.24	0.31	-35.86	-20.00	-15.86
1215.520	Horz	27.30	-48.89	7.75	0.33	-41.47	-20.00	-21.47
1367.460	Horz	30.20	-45.94	8.40	0.34	-37.88	-20.00	-17.88
1519.400	Horz	23.30	-51.73	8.74	0.36	-43.35	-20.00	-23.35

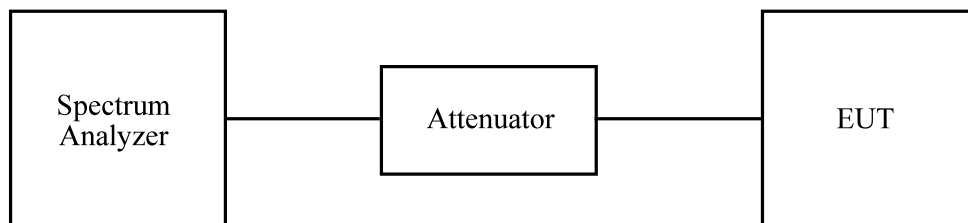
95.639 Maximum Transmitter Power


- (h) No MURS unit, under any condition of modulation, shall exceed 2 Watts transmitter power output.

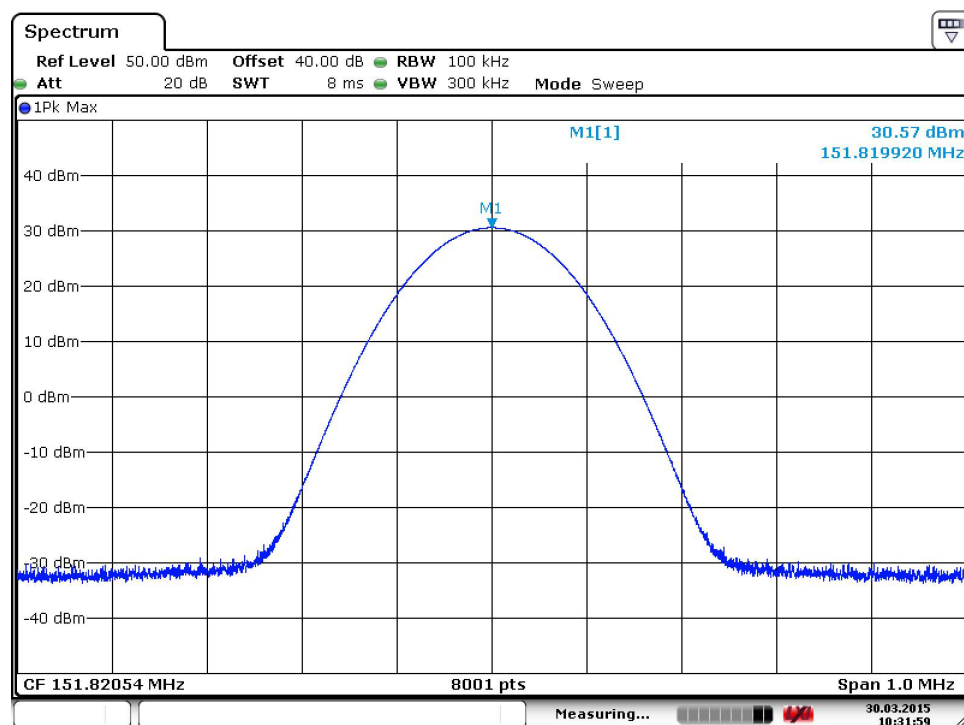
EUT operating conditions:

The software provided by the client to enable the EUT to transmit continuously at the each channel respectively.


Test Set Up: Same set up as 95.635e

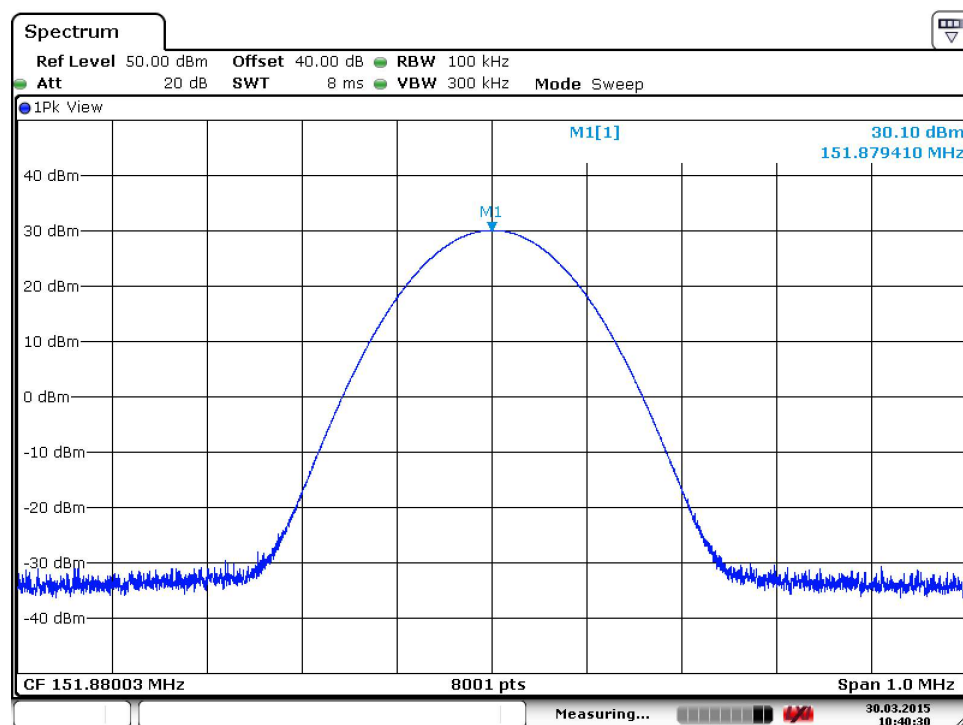


		1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		<b>Maximum Xmtr Power</b>			
DNB Job Number:		56076		Date:		30 Mar 2015	
Customer:		D. Green Engineering LLC				<b>Conformance Standard</b>  FCC Part 95	
Model Number:		O					
Description:		Transceiver used in Hunting Dog tracking products				<b>Clause</b> 95.639	
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>							
Freq MHz	Meas Peak Pwr (dBm)	Limit (dBm)	Delta (dBm)	Meas Peak Pwr (W)	Limit (W)	Delta (W)	Pass/Fail
151.82	30.57	33.00	- 2.43	1.140	2.000	-0.860	Pass




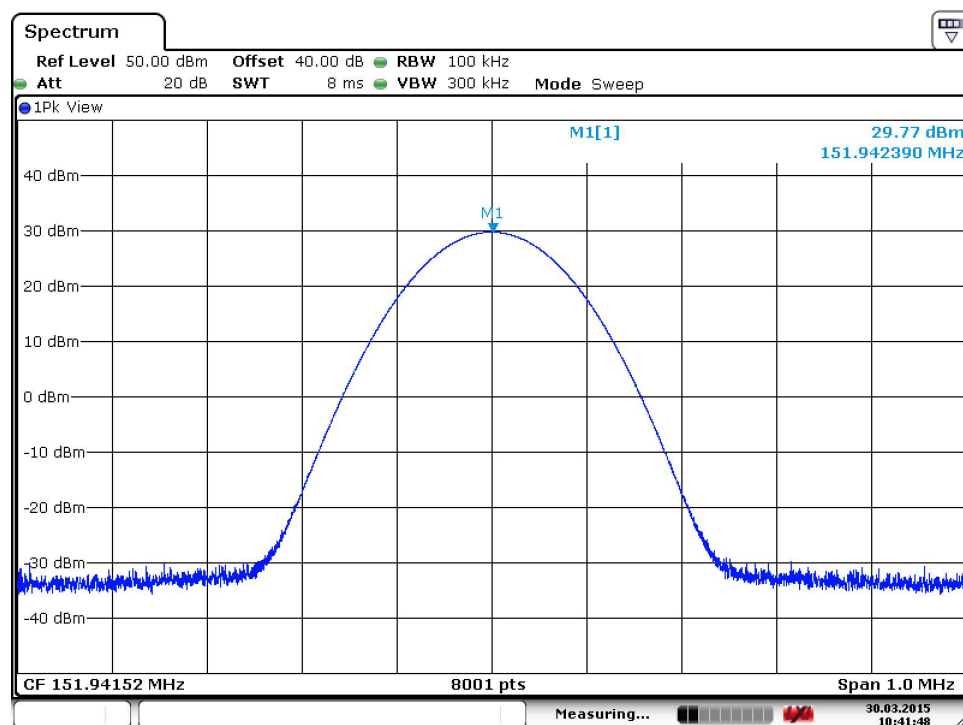
Date: 30.MAR.2015 10:31:59

		1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		<b>Maximum Xmtr Power</b>			
DNB Job Number:		56076		Date:		30 Mar 2015	
Customer:		D. Green Engineering LLC				<b>Conformance Standard</b>  FCC Part 95	
Model Number:		O					
Description:		Transceiver used in Hunting Dog tracking products				<b>Clause</b> 95.639	
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>							
Freq MHz	Meas Peak Pwr (dBm)	Limit (dBm)	Delta (dBm)	Meas Peak Pwr (W)	Limit (W)	Delta (W)	Pass/Fail
151.94	30.10	33.00	-2.90	1.023	2.000	-0.977	Pass



Date: 30.MAR.2015 10:40:31

		1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		<b>Maximum Xmtr Power</b>			
DNB Job Number:		56076		Date:		10 Dec 2015	
Customer:		D. Green Engineering LLC				<b>Conformance Standard</b>  FCC Part 95	
Model Number:		O					
Description:		Transceiver used in Hunting Dog tracking products				<b>Clause</b> 95.639	
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>							
Freq MHz	Meas Peak Pwr (dBm)	Limit (dBm)	Delta (dBm)	Meas Peak Pwr (W)	Limit (W)	Delta (W)	Pass/Fail
151.94	29.77	33.00	-3.23	0.948	2.000	-1.052	Pass

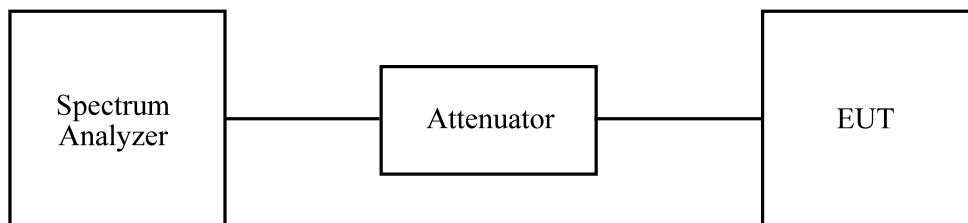


Date: 30.MAR.2015 10:41:48

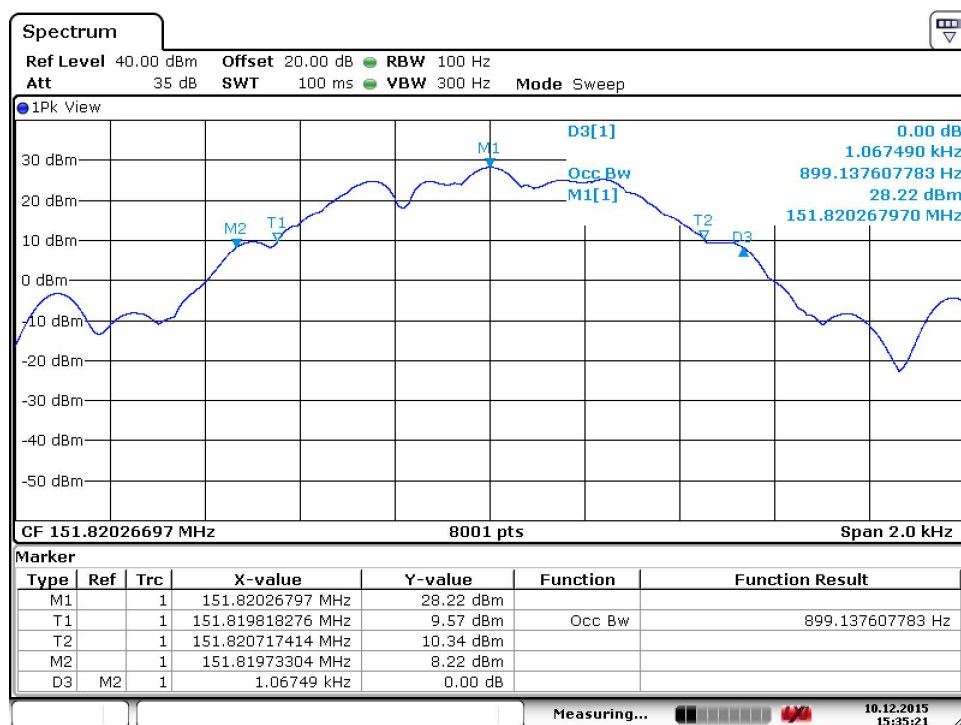
95.633f Emission Bandwidth

- (f) The authorized bandwidth for any emission type transmitted by a MURS transmitter is specified as follows:
- (1) Emissions on frequencies 151.820 MHz, 151.880 MHz, and 151.940 MHz are limited to 11.25 kHz.
  - (2) Emissions on frequencies 154.570 and 154.600 MHz are limited to 20.0 kHz.
  - (3) Provided, however, that all A3E emissions are limited to 8 kHz.


Test Set Up: Same as 95.635e Unwanted Radiation

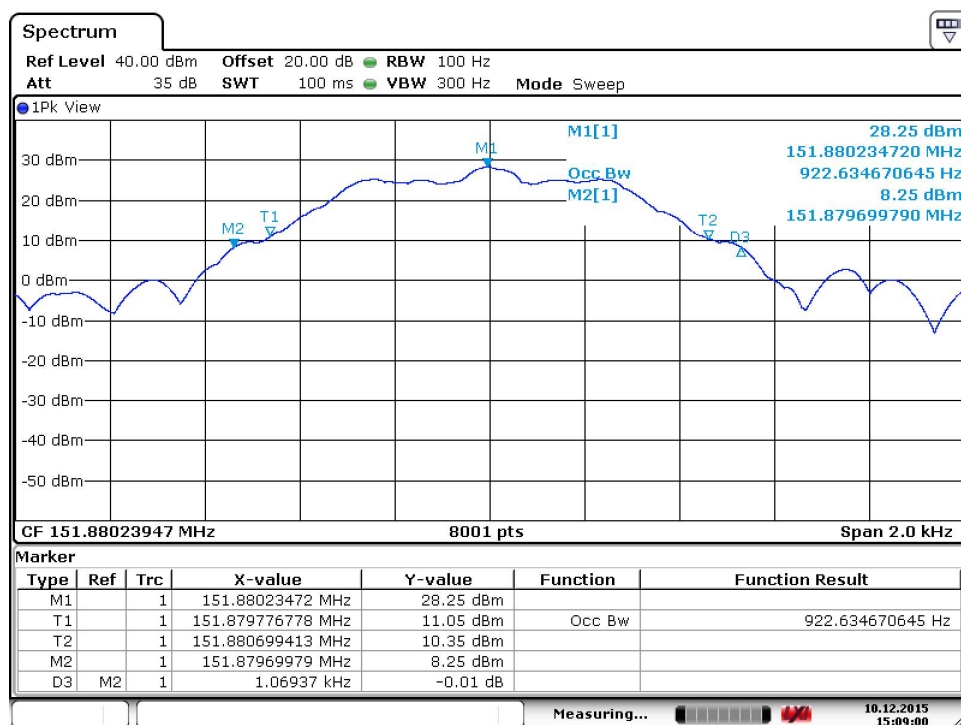


		1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		<b>Emission Bandwidth</b>	
DNB Job Number:		56076		Date: 10 Dec 2015	
Customer:		D. Green Engineering LLC			
Model Number:		O			
Description:		Transceiver used in Hunting Dog tracking products			
		<b>Conformance Standard</b>  FCC Part 95  <b>Clause</b> 95.633f			
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>					




Date: 10.DEC.2015 15:35:21

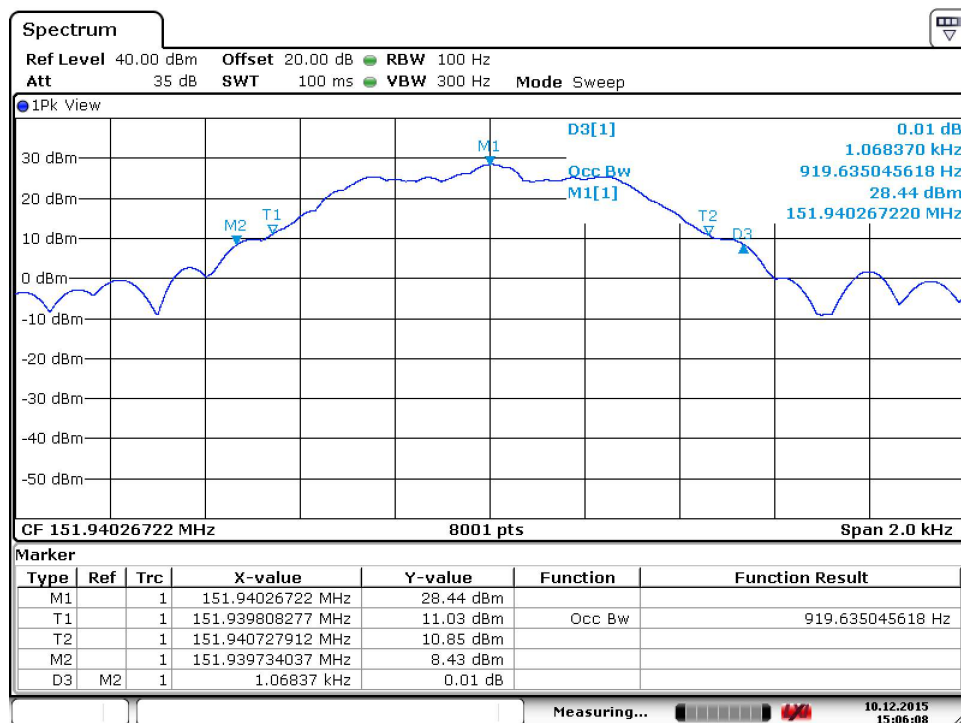
		1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		<b>Emission Bandwidth</b>	
DNB Job Number:		56076		Date: 10 Dec 2015	
Customer:		D. Green Engineering LLC			
Model Number:		O			
Description:		Transceiver used in Hunting Dog tracking products			
		<b>Conformance Standard</b>  FCC Part 95  <b>Clause</b> 95.633f			
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>					



Date: 10.DEC.2015 15:08:59



		1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		<b>Emission Bandwidth</b>	
DNB Job Number:		56076		Date: 10 Dec 2015	
Customer:		D. Green Engineering LLC			
Model Number:		O			
Description:		Transceiver used in Hunting Dog tracking products			
		<b>Conformance Standard</b>  FCC Part 95  <b>Clause</b> 95.633f			
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>					



Date: 10.DEC.2015 15:06:08

Test Procedure: ANSI C63.10-2013

## Part 2.1051 Spurious RF Conducted Emissions

Spurious emissions at antenna terminals.

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in §2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

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

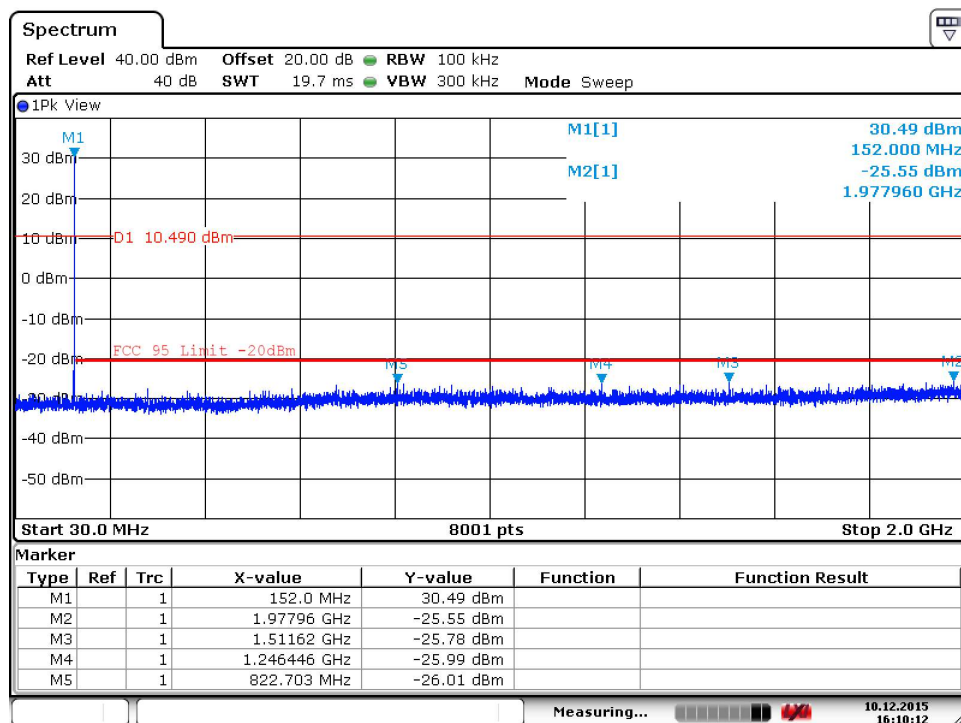
Sweep = auto

Detector function = peak


Trace = max hold

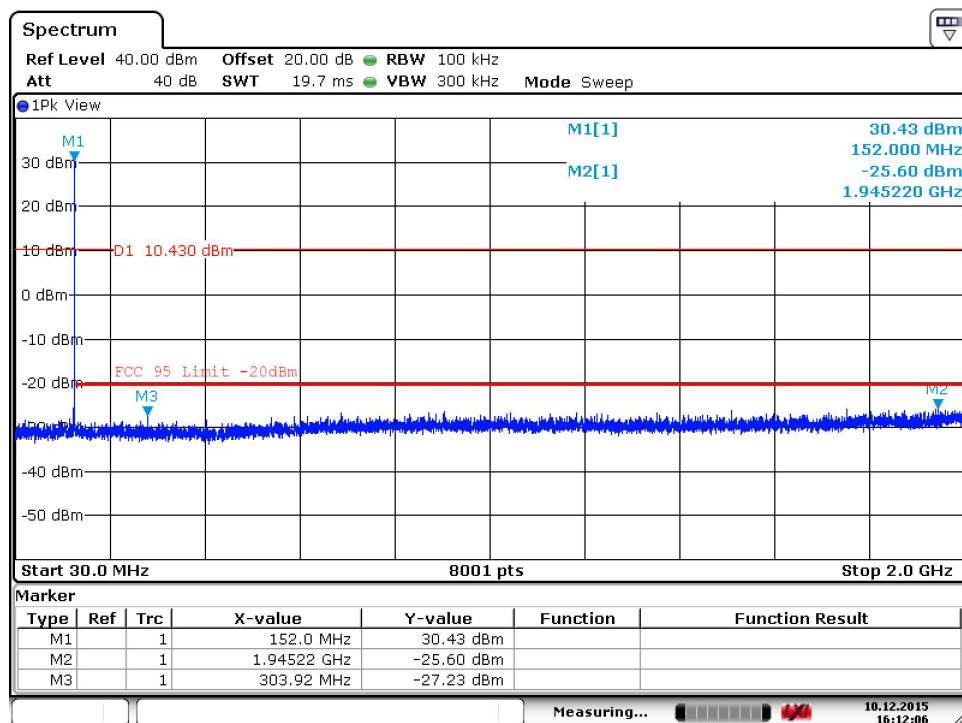
Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this Section. Submit these plots.

		1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		<b>Conducted Spurious</b>	
DNB Job Number:	56076	Date:	10 Dec 2015	<b>Conformance Standard</b>  FCC Part 15  <b>Clause 2.1051</b>	
Customer:	D. Green Engineering LLC				
Model Number:	O				
Description:	Transceiver used in Hunting Dog tracking products				
	Channel 1				
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>					
Peak Output Power	Reading	Limit	Pass/Fail		
30.12 dBm	30.49 dBm	-20dBm	Pass		




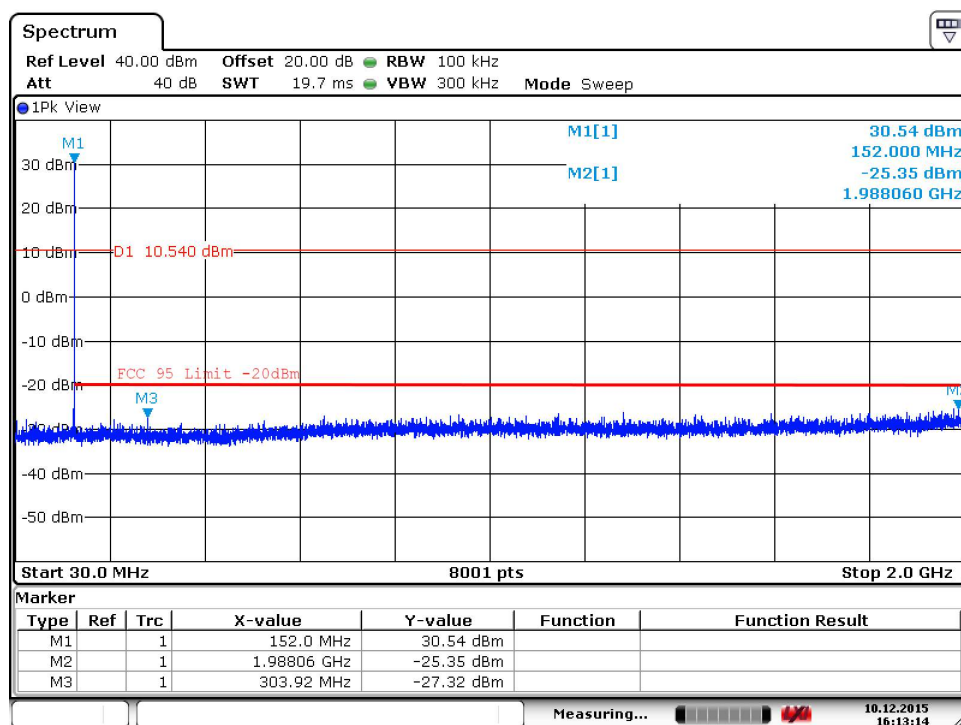
Date: 10.DEC.2015 16:10:11

		1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		<b>Conducted Spurious</b>	
DNB Job Number:	56076	Date:	10 Dec 2015	<b>Conformance Standard</b>  FCC Part 15  <b>Clause 2.1051</b>	
Customer:	D. Green Engineering LLC				
Model Number:	O				
Description:	Transceiver used in Hunting Dog tracking products				
	Channel 2				
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>					
Peak Output Power	Reading	Limit	Pass/Fail		
30.03 dBm	30.43 dBm	-20dBm	Pass		



Date: 10.DEC.2015 16:12:06

		1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		<b>Conducted Spurious</b>	
DNB Job Number:	56076	Date:	10 Dec 2015	<b>Conformance Standard</b>  FCC Part 15  <b>Clause 2.1051</b>	
Customer:	D. Green Engineering LLC				
Model Number:	O				
Description:	Transceiver used in Hunting Dog tracking products				
	Channel 3				
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>					
Peak Output Power	Reading	Limit	Pass/Fail		
30.37 dBm	30.54 dBm	-20dBm	Pass		



Date: 10.DEC.2015 16:13:14

## 2.1055 Frequency stability.

Test Procedure: ANSI C63.10-2013


### **Frequency stability with respect to ambient temperature**

- a) Supply the EUT with a nominal ac voltage or install a new or fully charged battery in the EUT. If possible, a dummy load shall be connected to the EUT because an antenna near the metallic walls of an environmental test chamber could affect the output frequency of the EUT. If the EUT is equipped with a permanently attached, adjustable-length antenna, then the EUT shall be placed in the center of the chamber with the antenna adjusted to the shortest length possible. Turn ON the EUT and tune it to one of the number of frequencies shown in ANSI 63.10-2013 clause 5.6.
- b) Couple the unlicensed wireless device output to the measuring instrument by connecting an antenna to the measuring instrument with a suitable length of coaxial cable and placing the measuring antenna near the EUT (e.g., 15 cm away), or by connecting a dummy load to the measuring instrument, through an attenuator if necessary.
- c) Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument but is strong enough to allow measurement of the operating or fundamental frequency of the EUT).
- d) Turn the EUT OFF and place it inside the environmental temperature chamber. For devices that have oscillator heaters, energize only the heater circuit.
- e) Set the temperature control on the chamber to the highest specified in the regulatory requirements for the type of device and allow the oscillator heater and the chamber temperature to stabilize.
- f) While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.
- g) Measure the frequency at each of frequencies specified in ANSI 63.10-2013 clause 5.6.
- h) Switch OFF the EUT but do not switch OFF the oscillator heater.
- i) Lower the chamber temperature by not more than 10 °C, and allow the temperature inside the chamber to stabilize.
- j) Repeat step f) through step i) down to the lowest specified temperature.

### **Frequency stability when varying supply voltage**

Unless otherwise specified, these tests shall be made at ambient room temperature (+15 °C to +25 °C). An antenna shall be connected to the antenna output terminals of the EUT if possible. If the EUT is equipped with or uses an adjustable-length antenna, then it shall be fully extended.


- a) Supply the EUT with nominal voltage or install a new or fully charged battery in the EUT. Turn ON the EUT and couple its output to a frequency counter or other frequency-measuring instrument.
- b) Tune the EUT to one of the number of frequencies required in ANSI 63.10-2013 clause 5.6. Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument but is strong enough to allow measurement of the operating or fundamental frequency of the EUT).
- c) Measure the frequency at each of the frequencies specified in ANSI 63.10-2013 clause 5.6.
- d) Repeat the above procedure at 85% and 115% of the nominal supply voltage as described in ANSI 63.10-2013 clause 5.13.

	1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436	Measurement Test Set Up		
DNB Job Number:	56076	Date:	14 May 2015	Conformance Standard  FCC Part 95
Customer:	D. Green Engineering LLC			
Model Number:	O			
Description:	Transceiver used in Hunting Dog tracking products			Clause
Frequency Stability Measurement Set Up				





			1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436			XMTR Frequency Range						
DNB Job Number:			56076			Date: 14 May 2015			Conformance Standard  FCC Part 95			
Customer:			D. Green Engineering LLC									
Model Number:			O									
Description:			Transceiver used in Hunting Dog tracking products						Clause 2.1055			
			Channel 1									
Environmental Conditions												
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>												
Frequency Stability - Temperature												
Channel 1		151820000.000 Hz			Reference at 25 °C			151820060.000 Hz			Limit	5 ppm
°C	At Start Up			After 2 Minutes			After 5 Minutes			After 10 Minutes		
	Freq in Hz	Deviation	PPM	Freq in Hz	Deviation	PPM	Freq in Hz	Deviation	PPM	Freq in Hz	Deviation	PPM
-30	151819785.030	274.970	1.811	151819814.169	245.831	1.619	151819837.345	222.655	1.467	151819846.720	213.280	1.405
-20	151819824.900	235.100	1.549	151819848.563	211.437	1.393	151819867.736	192.264	1.266	151819868.719	191.281	1.260
-10	151819865.000	195.000	1.284	151819872.909	187.091	1.232	151819892.174	167.826	1.105	151819895.383	164.617	1.084
0	151819845.000	215.000	1.416	151819881.942	178.058	1.173	151819883.663	176.337	1.161	151819886.541	173.459	1.143
10	151819785.000	275.000	1.811	151819791.731	268.269	1.767	151819803.604	256.396	1.689	151819807.440	252.560	1.664
20	151819785.000	275.000	1.811	151819827.190	232.810	1.533	151819829.736	230.264	1.517	151819837.878	222.122	1.463
30	151819790.100	269.900	1.778	151819790.853	269.147	1.773	151819811.268	248.732	1.638	151819816.510	243.490	1.604
40	151820040.000	20.000	0.132	151820050.343	9.657	0.064	151820057.176	2.824	0.019	151820061.656	-1.656	-0.011
50	151820157.500	-97.500	-0.642	151820171.597	-111.597	-0.735	151820196.470	-136.470	-0.899	151820198.109	-138.109	-0.910
Frequency Stability - Voltage												
Channel 1		151820000.000 Hz			Reference at 3.700 Vdc			151820060.000 Hz			Limit	5 ppm
Vdc	At Start Up			After 2 Minutes			After 5 Minutes			After 10 Minutes		
	Freq in Hz	Deviation	PPM	Freq in Hz	Deviation	PPM	Freq in Hz	Deviation	PPM	Freq in Hz	Deviation	PPM
3.145	151820060.000	0.000	0.000	151820099.116	-39.116	-0.258	151820110.914	-50.914	-0.335	151820115.731	-55.731	-0.367
4.255	151820042.500	17.500	0.115	151820068.705	-8.705	-0.057	151820092.240	-32.240	-0.212	151820093.862	-33.862	-0.223

		1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436		<b>XMTR Frequency Range</b>								
DNR Job Number:		56076		Date: 14 May 2015		<b>Conformance Standard</b>  FCC Part 95						
Customer:		D. Green Engineering LLC										
Model Number:		O										
Description:		Transceiver used in Hunting Dog tracking products				<b>Clause</b> 2.1055						
		Channel 2										
<b>Environmental Conditions</b>												
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>												
<b>Frequency Stability - Temperature</b>												
Channel 2		151820000.000 Hz		Reference at 25°C		151820060.000 Hz		Limit	5 ppm			
°C	At Start Up			After 2 Minutes			After 5 Minutes			After 10 Minutes		
	Freq in Hz	Deviation	PPM	Freq in Hz	Deviation	PPM	Freq in Hz	Deviation	PPM	Freq in Hz	Deviation	PPM
-30.000	151880155.000	-182.500	-1.202	151880169.307	-196.807	-1.296	151880180.485	-207.985	-1.369	151880181.810	-209.310	-1.378
-20.000	151879845.000	127.500	0.839	151879849.906	122.594	0.807	151879855.416	117.084	0.771	151879864.462	108.038	0.711
-10.000	151880212.500	-240.000	-1.580	151880227.092	-254.592	-1.676	151880240.776	-268.276	-1.766	151880245.151	-272.651	-1.795
0.000	151880225.000	-252.500	-1.662	151880232.751	-260.251	-1.714	151880250.193	-277.693	-1.828	151880251.037	-278.537	-1.834
10.000	151879785.000	187.500	1.235	151879822.867	149.633	0.985	151879839.028	133.472	0.879	151879842.569	129.931	0.855
20.000	151879982.500	-10.000	-0.066	151880022.853	-50.353	-0.332	151880040.801	-68.301	-0.450	151880050.348	-77.848	-0.513
30.000	151879690.100	282.400	1.859	151879737.373	235.127	1.548	151879742.256	230.244	1.516	151879743.496	229.004	1.508
40.000	151880042.500	-70.000	-0.461	151880054.680	-82.180	-0.541	151880062.890	-90.390	-0.595	151880068.365	-95.865	-0.631
50.000	151879707.500	265.000	1.745	151879727.413	245.087	1.614	151879732.056	240.444	1.583	151879737.695	234.805	1.546
<b>Frequency Stability - Voltage</b>												
Channel 2		151820000.000 Hz		Reference at 3.700 Vdc		151820060.000 Hz		Limit	5 ppm			
Vdc	At Start Up			After 2 Minutes			After 5 Minutes			After 10 Minutes		
	Freq in Hz	Deviation	PPM	Freq in Hz	Deviation	PPM	Freq in Hz	Deviation	PPM	Freq in Hz	Deviation	PPM
3.145	151880040.000	-67.500	-0.444	151880084.725	-112.225	-0.739	151880096.384	-123.884	-0.816	151880102.675	-130.175	-0.857
4.255	151880060.000	-87.500	-0.576	151880102.378	-129.878	-0.855	151880105.544	-133.044	-0.876	151880106.009	-133.509	-0.879

			1100 E Chalk Creek Road Coalville, UT 84017 (435) 336-4433 FAX (435) 336-4436			XMTR Frequency Range						
DNRB Job Number:			56076			Date: 14 May 2015			Conformance Standard  FCC Part 95			
Customer:			D. Green Engineering LLC									
Model Number:			O									
Description:			Transceiver used in Hunting Dog tracking products						Clause 2.1055			
			Channel 3									
Environmental Conditions												
Ambient Temperature			Relative Humidity				Barometric Pressure					
21 °C			25 %				101.2 kPa					
EUT performed within the requirements of the applicable standard    [X] Yes    [ ] No    Les Payne												
Frequency Stability - Temperature												
Channel 3		151820000.000 Hz			Reference at 25 °C			151820060.000 Hz			Limit	5 ppm
°C	At Start Up			After 2 Minutes			After 5 Minutes			After 10 Minutes		
	Freq in Hz	Deviation	PPM	Freq in Hz	Deviation	PPM	Freq in Hz	Deviation	PPM	Freq in Hz	Deviation	PPM
-30.000	151940175.000	-282.400	-1.859	151940201.316	-308.716	-2.032	151940224.490	-331.890	-2.184	151940227.143	-334.543	-2.202
-20.000	151939982.500	-89.900	-0.592	151939998.699	-106.099	-0.698	151940017.740	-125.140	-0.824	151940020.479	-127.879	-0.842
-10.000	151939885.000	7.600	0.050	151939919.715	-27.115	-0.178	151939928.206	-35.606	-0.234	151939930.064	-37.464	-0.247
0.000	151940155.000	-262.400	-1.727	151940161.167	-268.567	-1.768	151940171.775	-279.175	-1.837	151940172.810	-280.210	-1.844
10.000	151939865.000	27.600	0.182	151939878.275	14.325	0.094	151939885.917	6.683	0.044	151939888.031	4.569	0.030
20.000	151939630.000	262.600	1.728	151939676.383	216.217	1.423	151939684.297	208.303	1.371	151939685.767	206.833	1.361
30.000	151939630.000	262.600	1.728	151939664.057	228.543	1.504	151939673.330	219.270	1.443	151939681.098	211.502	1.392
40.000	151940060.000	-167.400	-1.102	151940062.620	-170.020	-1.119	151940063.260	-170.660	-1.123	151940064.544	-171.944	-1.132
50.000	151939707.500	185.100	1.218	151939742.593	150.007	0.987	151939760.796	131.804	0.867	151939765.385	127.215	0.837
Frequency Stability - Voltage												
Channel 3		151820000.000 Hz			Reference at 3.700 Vdc			151820060.000 Hz			Limit	5 ppm
Vdc	At Start Up			After 2 Minutes			After 5 Minutes			After 10 Minutes		
	Freq in Hz	Deviation	PPM	Freq in Hz	Deviation	PPM	Freq in Hz	Deviation	PPM	Freq in Hz	Deviation	PPM
40.000	151939680.100	212.500	1.399	151939705.928	186.672	1.229	151939721.228	171.372	1.128	151939723.858	168.742	1.111
50.000	151939590.100	302.500	1.991	151939621.352	271.248	1.785	151939642.778	249.822	1.644	151939647.946	244.654	1.610

## 2.1033 (b) (7) Equipment Photographs

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

Photo 1      Internal      Top of PCB

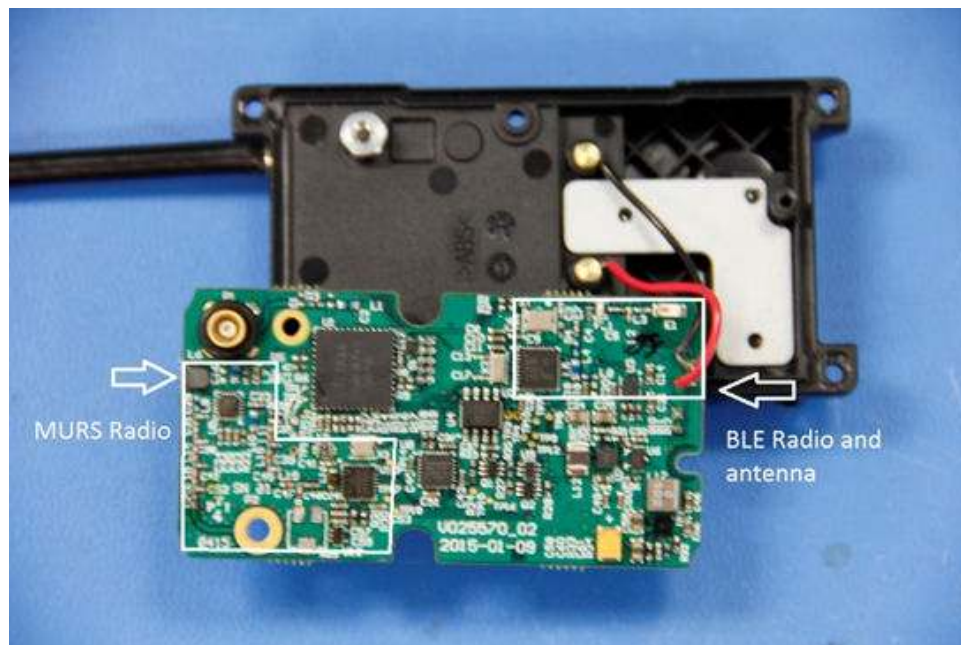


Photo 2      Internal      Bottom of PCB



Photo 3      External

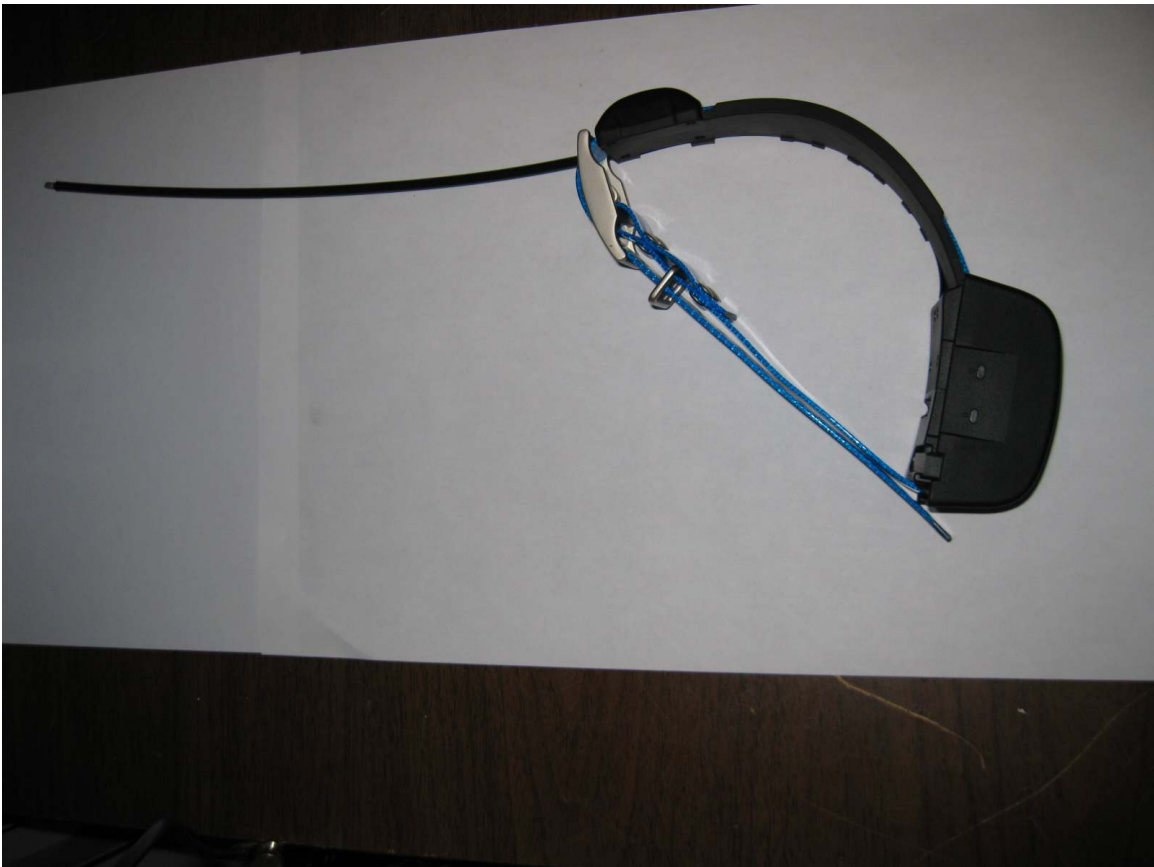


Photo 4      External





## 1.1310 Radio frequency radiation exposure limits

This is a portable device such that it is a hand held transmitter with the Low Duty Cycle SAR exclusion from KDB 447498 Appendix A being used as a reference before applying the formula from section 4.3.1.

Three frequencies were evaluated:

Exclusion Ratio:

Formula 1 from Section 4.3.1 of KDB 447498 D01

$$\frac{((\text{Conducted max power of channel in mW} \times \text{duty cycle}) / (\text{test separation in mm})) \times \sqrt{f(\text{GHz})}}{1}$$

Where the duty cycle is derived from the following 350mSec on / 10 sec off = 3.5%

Minimum test separation distance = 5mm

(Minimum test separation distance is less than 5mm, default value of 5mm is used per Formula 1)

1) Calculation for 151.82 MHz

Exclusion Ratio =  $(1140 \times 0.035 / 5) \times (\sqrt{.15182})$

Exclusion Ratio =  $7.980 \times 0.3896$

Exclusion Ratio = 3.109

Exclusion Threshold = 7.5 for 10-g extremity SAR

Final ratio of 3.109 is below the exclusion threshold of 7.5 therefore SAR testing is excluded.

2) Calculation for 151.88 MHz

Exclusion Ratio =  $(1140 \times 0.035 / 5) \times (\sqrt{.15188})$

Exclusion Ratio =  $7.980 \times 0.3897$

Exclusion Ratio = 3.110

Exclusion Threshold = 7.5 for 10-g extremity SAR

Final ratio of 3.110 is below the exclusion threshold of 7.5 therefore SAR testing is excluded.

3) Calculation for 151.94 MHz

Exclusion Ratio =  $(1140 \times 0.035 / 5) \times (\sqrt{.15194})$

Exclusion Ratio =  $7.980 \times 0.3898$

Exclusion Ratio = 3.111

Exclusion Threshold = 7.5 for 10-g extremity SAR

Final ratio of 3.111 is below the exclusion threshold of 7.5 therefore SAR testing is excluded.

## Summary of Radio Frequency Radiation Exposure Limits

SAR Measurement Necessity Conclusions				
Tuned Frequency (MHz)	Conducted Output Power in dBm (mW)	Exemption Ratio "ER"	Exclusion Threshold "ET"	SAR Required ER > ET
151.820	30.57 (1140)	3.109	7.5	NO
151.880	30.57 (1140)	3.110	7.5	NO
151.940	30.57 (1140)	3.111	7.5	NO

Conclusion: SAR measurements are not required per the exclusion requirement of KDB 447498

End of Report UT56076C-004