



Retlif Testing Laboratories

101 New Boston Road, Goffstown, NH 03045
603-497-4600 - Fax: 603-497-5281

CORPORATE OFFICE
795 Marconi Avenue
Ronkonkoma, NY 11779
631-737-1500 Fax 631-737-1497
(A NY Corporation)
WASHINGTON
REGULATORY OFFICE
703-533-1614 Fax 703-533-1612

FCC Part 90.217 TEST REPORT

EnerTrac, Inc. PROPANE TANK TRANSMITTER

PART NUMBER: 3822

FCC ID: X94-0003391REVB00

Company Name: EnerTrac, Inc.

Date of Report: March 27, 2013

Test Report No: R-5706N

Test Start Date: February 20, 2013

Test Finish Date: March 23, 2013

Test Technician: T. Hannemann

Laboratory Supervisor: T. Hannemann

Report Prepared By: S. Wentworth

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Scott Wentworth
Branch Manager
NVLAP Approved Signatory



Todd Hannemann
Laboratory Supervisor
iNARTE Certified ATL-0255-T

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TEST PROGRAM SUMMARY

Applicant/Manufacturer:	EnerTrac, Inc. 94 River Road, Suite 101 Hudson, NH 03051
Equipment under Test (EUT):	The EUT is a transmitter operating in the Part 90 Industrial/Business Radio Pool and will be installed on propane tanks to send tank level status information.
Part Number:	3822
FCC ID Number:	X94-0003391REVB00
Applicable Test Standards:	FCC Parts 2 & 90.217
90.217 Exemption from Technical Standards	The EUT will have an output power less than 120 mW and operate at frequencies listed in Part 90, Subpart C. The EUT is thereby subject only to the technical requirements of 90.217.
Measurement Procedure:	ANSI/TIA-603-C-2004
EUT Frequency Range Band:	450 MHz – 470 MHz
EUT Channels:	464.725 MHz, 464.700 MHz, 464.650 MHz, 464.625 MHz, 464.600 MHz
Power Output Rating:	10.59 mW (ERP)
Modulation Type:	AM
Antenna Type:	Integral Omni Directional (No Antenna Port)
Input Power:	3.6 VDC via internal lithium thionyl chloride battery
RF Exposure:	The EUT will operate at a frequency less than 1.5 GHz with an ERP of less than 1.5 W and is therefore exempt from routine evaluation
Temporary Hardware Modification:	In order to enable continuous transmission during testing, a temporary hardware modification was required. A larger capacitor was installed then is typically used in production units.
Support Equipment:	No support equipment was utilized



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TEST PROGRAM SUMMARY (continued)

MEASUREMENTS REQUIRED:

- RF Power Output (2.1046/90.217)
- Occupied Bandwidth (2.1049/90.217 (b))
- Effective Radiated Power of Spurious Radiation (2.1053/90.217)
- Frequency Stability (2.1055/90.217)

RF POWER OUTPUT (ERP)

Measurement Procedure:

In order to be considered exempt from the other technical requirements of Part 90 and subject only to the technical requirements of 90.217 the output power of the EUT must be less than 120 mW. The test sample was placed on an 80cm high wooden test stand which was located 3 meters from the test antenna on an FCC listed test site. The effective radiated power of the fundamental frequency was measured using the substitution method specified in ANSI/TIA-603-C-2004. The maximum ERP of the fundamental frequency was measured to be 10.59 mW. See attached test data.

EFFECTIVE RADIATED POWER OF SPURIOUS RADIATION

Measurement Procedure:

The test sample was placed on an 80cm high wooden test stand which was located 3 meters from the test antenna on an FCC listed test site. The effective radiated power of each spurious emission was measured using the substitution method specified in ANSI/TIA-603-C-2004. The frequency range of the test was 30 MHz – 5 GHz. The limit for out of band spurious emissions is -30 dBc as specified in Part 90.217. No emissions were observed within 20 dB of the specified limit. See attached test data.



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TEST PROGRAM SUMMARY (continued)

FREQUENCY STABILITY/OCCUPIED BANDWIDTH

Measurement Procedure:

Per 90.217 (b), for equipment designed to operate with a 12.5 kHz channel bandwidth, the sum of the bandwidth occupied by the emitted signal plus the bandwidth required for frequency stability shall be adjusted so that any emission appearing on a frequency 25 kHz or more removed from the assigned frequency is attenuated at least 30 dB below the unmodulated carrier. The test sample was placed into a temperature chamber with a variable DC power source supplying power to the EUT. With the test sample operating at maximum output power the test sample's fundamental output frequency was measured and recorded at 10 degree increments from -30 degrees C to +50 degrees C. At each 10 degree increment, frequency measurements were taken with the DC input voltage set to 3.6 VDC (nominal internal battery voltage) and 1.6 VDC (lowest voltage at which the EUT will transmit).

At each 10 degree increment and DC input voltage referenced above, frequency measurements were also made at the upper and lower -30 dBc points in order to determine the maximum occupied bandwidth of the signal. The maximum occupied bandwidth at -30dBc was determined to be 1.25 kHz. See attached test data.



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EQUIPMENT LISTS

Fundamental & Spurious ERP

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
3258	EMCO	DOUBLE RIDGED GUIDE ANTENNA	1 GHz - 18GHz	3115	2/24/2012	2/28/2013
4029	RETLIF	OPEN AREA TEST SITE	3 / 10 Meters	RNH	7/24/2012	7/24/2015
5049B	FLUKE	DIGITAL MULTIMETER	True RMS Multimeter	111	8/16/2012	8/31/2013
5053	EMCO	BICONILOG ANTENNA	26 MHz - 3 GHz	3142C	11/14/2011	5/30/2013
5070	ROHDE & SCHWARZ	EMI TEST RECEIVER	20 Hz - 40 GHz	ESIB40	11/6/2012	11/30/2013
5107	AGILENT / HP	SIGNAL GENERATOR	100 kHz - 20 GHz	N5183A	4/17/2012	4/30/2013
R444	AGILENT / HP	SPECTRUM ANALYZER	100 Hz - 26.5 GHz	E7405A;A	7/6/2012	7/6/2013

Occupied Bandwidth/Frequency Stability

EN	Manufacturer	Description	Range	Model No.	Cal Date	Due Date
4997	OMEGA	DIGITAL THERMOMETER	-200 DEG C - +1372 DEG C	HH22	8/16/2012	8/31/2013
5049B	FLUKE	DIGITAL MULTIMETER	True RMS Multimeter	111	8/16/2012	8/31/2013
5077	ASSOCIATED ENVIRONME	TEMPERATURE CHAMBER	-50 to 150 DEG C	ZFD-531	8/15/2012	8/31/2013
R444	AGILENT / HP	SPECTRUM ANALYZER	100 Hz - 26.5 GHz	E7405A;A	7/6/2012	7/6/2013



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**SETUP PHOTOGRAPHS
FUNDAMENTAL & SPURIOUS ERP**

Test Setup, Horizontal, 30 to 1000 MHz



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**SETUP PHOTOGRAPHS
FUNDAMENTAL & SPURIOUS ERP**

Test Setup, Vertical, 30 to 1000 MHz



Test Setup, Substitution



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SETUP PHOTOGRAPHS SPURIOUS ERP

Test Setup, Vertical, 1 to 5 GHz



Test Setup, Horizontal, 1 to 5 GHz

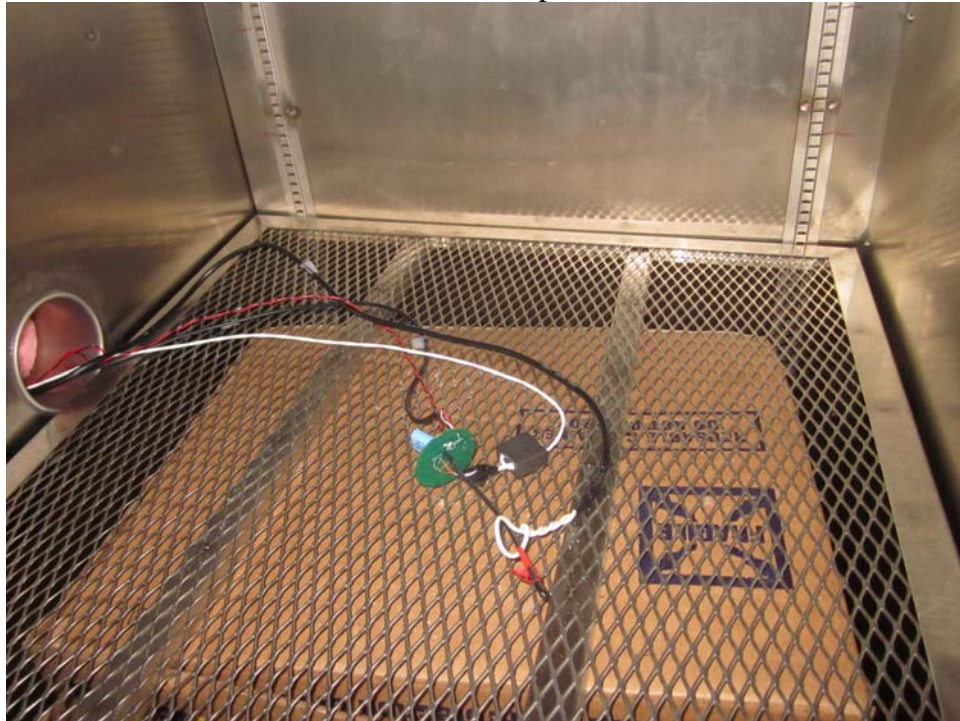


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SETUP PHOTOGRAPHS
OCCUPIED BANDWIDTH/FREQUENCY STABILITY

Test Setup



Test Setup



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TEST DATA



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RETLIF TESTING LABORATORIES

TABULAR DATA SHEET

Test Method:	RF Power Output (ERP)		
Customer:	EnerTrac	Job No:	R-5706N
Test Sample:	Propane Tank Transmitter		
Part No:	3822	Serial No:	N/A
Test Specification:	FCC Part 2 & 90 Paragraph: 2.1046/90.217		
Operating Mode:	Transmitting at 464.64750 MHz		
Technician:	T. Hannemann	Date:	March 23, 2013
Notes:			

[illegible]

RETLIF TESTING LABORATORIES

TABULAR DATA SHEET

Test Method:	Spurious Emissions (ERP)		
Customer:	EnerTrac	Job No:	R-5706N
Test Sample:	Propane Tank Transmitter		
Part No:	3822	Serial No:	N/A
Test Specification:	FCC Part 2 & 90 Paragraph: 2.1053/90.217		
Operating Mode:	Transmitting at 464.64750 MHz		
Technician:	T. Hannemann	Date:	March 23, 2013
Notes:			

[illegible]

RETLIF TESTING LABORATORIES

TABULAR DATA SHEET

Test Method:	Frequency Stability and Occupied Bandwidth		
Customer:	EnerTrac	Job No:	R-5706N
Test Sample:	Propane Tank Transmitter		
Part No:	3822	Serial No:	N/A
Test Specification:	FCC Part 2 & 90 Paragraph: 2.1049 & 2.1055/90.217		
Operating Mode:	Transmitting at 464.64750 MHz		
Technician:	T. Hannemann	Date:	March 23, 2013
Notes:	Fundamental peak frequency and bandwidth (measured at -30 dBc) recorded at extreme temperature and voltage. Frequency Stability: 4.624999999759 kHz Maximum Occupied Bandwidth: 1.25000000002728 kHz		

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