

# TIMCO ENGINEERING INC.

849 NW State Road 45  
Newberry, Florida 32669  
<http://www.timcoengr.com>  
888.472.2424 F 352.472.2030 email: [tei@timcoengr.com](mailto:tei@timcoengr.com)

## Test Report

Product Name: HANDHELD MARINE TRANSCEIVER

FCC ID: PDHTX150M

Applicant:

TTI TECH CO., LTD.  
TTI HOUSE, 163-4, POI-DONG  
KANGNAM-KU, SEOUL, KOREA 135-260

Date Receipt: 9/18/2006

Date Tested: 9/21/2006

APPLICANT: TTI TECH CO., LTD.  
FCC ID: PDHTX150M  
REPORT #:V:\T\TTI\_PDH\2645AUT6\Extra2645AUT6\2645AUT6TestReport.doc

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**FCC ID:** PDHTX150M

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### EXHIBITS INCLUDING:

CONFIDENTIALITY REQUEST LETTER
BLOCK DIAGRAM
SCHEMATIC
PARTS LIST
USERS MANUAL
LABEL SAMPLE
LABEL LOCATION
EXTERNAL PHOTOGRAPHS
INTERNAL PHOTOGRAPHS
OPERATIONAL DESCRIPTION
TUNING PROCEDURE
TEST SET UP PHOTOGRAPHS

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## GENERAL INFORMATION

2.1033(c) TTI TECH CO., LTD. will sell the FCC ID: PDHTX150M VHF Marine transmitter in quantity, for use under FCC RULES PART 80.

## TECHNICAL DESCRIPTION

(4) Type of Emission: 16K0F3E

Bn = 2M + 2DK  
M = 3000  
D = 5.0 (Peak Deviation)  
K = 1  
Bn = 2(3.0K) + 2(5.0K)(1) = 6.0K + 10.0 = 16.0K

80.205 (a) ALLOWED AUTHORIZED BANDWIDTH = 20.00 kHz.

2.1033(c)(6) Frequency Range: 156.025 - 157.425 MHz

2.1033(c)(7) Power Range and Controls: There is a user Power switch for High/Low Power. Maximum Output Power Rating: High 5.5 Watts, Low 1.1 Watt into a 50 ohm resistive load.

2.1033(c)(8) DC Voltages and Current into Final Amplifier:

### POWER INPUT

#### FINAL AMPLIFIER ONLY

High

Vce = 7.4 Volts

Ice = 1.4 A

Low

Vce = 7.4 VDC

Ice = 0.7 A

Pin = 10.4 Watts

Pin = 5.18 Watts

Function of each electron tube or semiconductor device or other active circuit device is included as an exhibit.

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2.1033(c)(9) Complete Circuit Diagrams: The circuit diagrams and block diagrams are included.

2.1033(c)(10) Instruction book. The instruction manual is included.

2.1033(c)(11) Tune-up procedure. The tune-up procedure is included.

Description of all circuitry and devices provided for determining and stabilizing frequency is included in the circuit description

2.1033(c)(11) Digital modulation. This unit does NOT use digital modulation.

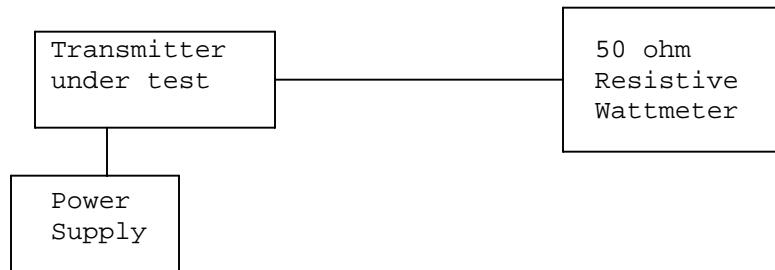
The data required by 2.1046 through 2.1055 is submitted below.

2.1046(a)  
80.215 (e)(1) **RF power output.**

RF power is measured by connecting a 50 ohm, resistive wattmeter to the RF output connector. With a nominal battery voltage, and the transmitter properly adjusted the RF output measures:

OUTPUT POWER: HIGH: 5.5 W CONDUCTED  
LOW: 1.1 W CONDUCTED

## METHOD OF MEASURING RF POWER OUTPUT



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## TECHNICAL DATA:

80.203 (b)

**External Controls:** The transmitter is capable of changing frequency between 156.025 - 157.425 MHz by external control. The available channels are shown in the User Manual description Channel List. These channels are preprogrammed by the manufacturer and change of frequency is inaccessible to the station operator.

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2.1047(a) Voice Modulation\_characteristics:

REFER TO 2645AUT6 TESTREPORT2

2.1047(a) AUDIO\_LOW\_PASS\_FILTER

REFER TO 2645AUT6 TESTREPORT2

2.1047(b) Audio\_input\_versus\_modulation  
80.213 (d) A plot of the audio input versus deviation is  
shown in the following plot.

REFER TO 2645AUT6 TESTREPORT2

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2.1049(c)

## Occupied bandwidth:

80.213 (b)

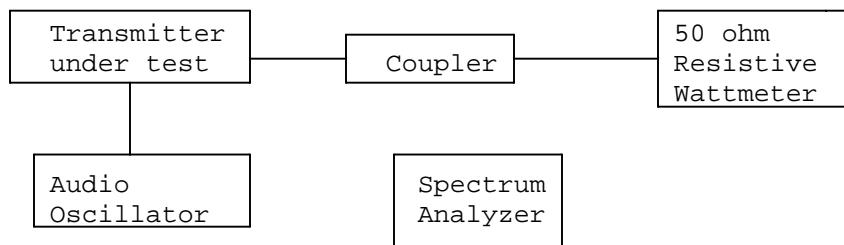
Data in the plots shows that on any frequency removed from the assigned frequency by more than 50%, but not more than 100%: At least 25dB. On any frequency removed from the assigned frequency by more than 100%, but not more than 250%: At least 35dB. On any frequency removed from the assigned frequency by more than 250%, of the authorized bandwidth:  
At least  $43 + \log(P)$ dB.

## **Radiotelephone transmitter with modulation limiter.**

Test procedure: TIA/EIA-603 para 2.2.11, with the exception that various tones were used.

Test procedure diagram

## **OCCUPIED BANDWIDTH MEASUREMENT**



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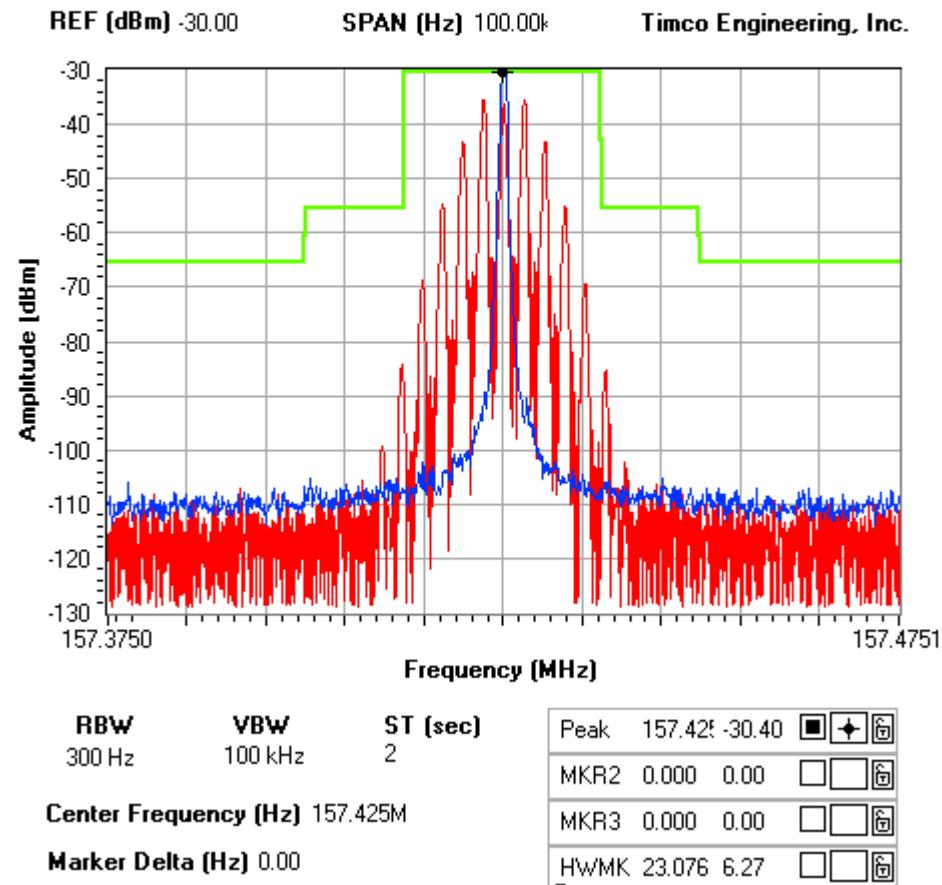
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## OCCUPIED BANDWIDTH PLOT

### NOTES:

TTI TECH CO., LTD. - FCC ID: PDHTX-150M  
OCCUPIED BANDWIDTH PLOT



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2.1051  
80.211

## Spurious emissions at antenna terminals (conducted):

The data on below shows the level of conducted spurious responses. The carrier was modulated 100% using a 2500Hz tone. The spectrum was scanned from 0.4 to at least the 10th harmonic of the fundamental. The measurements were made in accordance with standard TIA/EIA-603.

REQUIREMENTS: Emissions must be  $43 + 10\log(Po)$  dB below the mean power output of the transmitter.

$$43 + 10\log(5.5) = 50.4$$

$$43 + 10\log(1.1) = 43.4$$

TF HIGH POWER	EF	dB below carrier	TF LOW POWER	EF	dB below carrier
<b>156.8</b>	<b>156.80</b>		<b>157.45</b>	<b>157.45</b>	
	<b>313.60</b>	75.2		<b>314.90</b>	81.6
	<b>470.40</b>	99		<b>472.35</b>	100.1
	<b>627.20</b>	96.8		<b>629.80</b>	100.3
	<b>784.00</b>	87		<b>787.25</b>	92.5
	<b>940.80</b>	84		<b>944.70</b>	91.3
	<b>1097.60</b>	80.1		<b>1102.15</b>	84.8
	<b>1254.40</b>	82.9		<b>1259.60</b>	89.2
	<b>1411.20</b>	92.6		<b>1417.05</b>	90.5
	<b>1568.00</b>	91.1		<b>1574.50</b>	89.6

TF LOW POWER	EF	dB below carrier
<b>156.42</b>	<b>156.42</b>	
	<b>312.84</b>	81.1
	<b>469.26</b>	99.7
	<b>625.68</b>	100.5
	<b>782.10</b>	92.8
	<b>938.52</b>	92.1
	<b>1094.94</b>	84.9
	<b>1251.36</b>	88.9
	<b>1407.78</b>	90.9
	<b>1564.20</b>	119.4

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## Method of Measuring Conducted Spurious Emissions



METHOD OF MEASUREMENT: The procedure used was TIA/EIA-603 STANDARD without any exceptions. The measurements were made using the shielded room located at TIMCO ENGINEERING INC. 849 STATE ROAD 45, NEWBERRY FLORIDA 32669.

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2.1053(a)

## Field strength of spurious emissions:

**NAME OF TEST:** RADIATED SPURIOUS EMISSIONS

**REQUIREMENTS:** Emissions must be  $43 + 10\log(P_o)$  dB below the mean power output of the transmitter.

### TEST DATA:

$$43 + 10\log(5.5) = 50.4$$

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
156.80		0
313.60	V	85.55
470.40	H	79.54
627.20	V	84.63
784.00	V	89.64
940.80	V	84.88
1097.60	V	87.16
1254.40	H	84.66
1411.20	H	89.26
1568.00	H	86.02

$$43 + 10\log(1.1) = 43.4$$

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
156.40		0
312.80	H	85.55
469.20	H	76.92
625.60	H	93.36
782.00	H	90.23
938.40	H	86.19
1094.80	H	75.5
1251.20	V	85.01
1407.60	V	76.71
1564.00	V	79.32

$$43 + 10\log(1.1) = 43.4$$

Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
157.43		0
314.85	V	86.05
472.28	H	74.64
629.70	H	93.03
787.13	V	89.94
944.55	V	82.78
1101.98	H	78.56
1259.40	H	79.06
1416.83	H	83.36
1574.25	H	79.42

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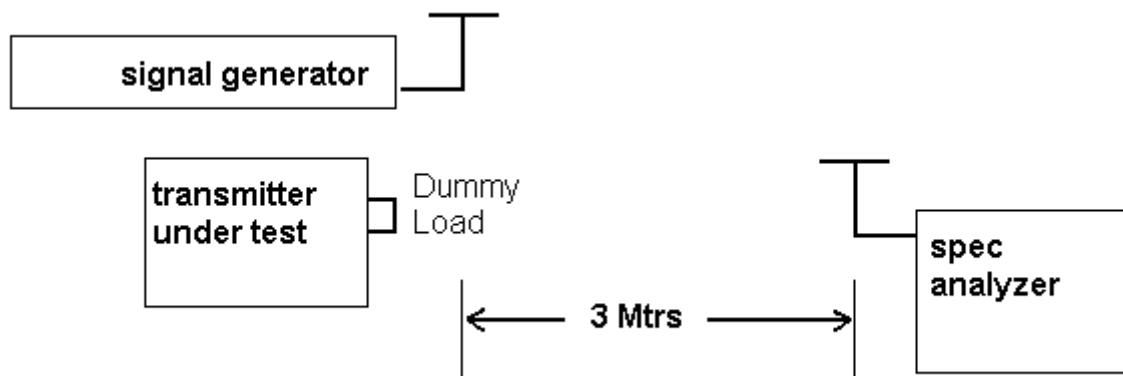
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2.1053(a)      Continued    Field\_strength\_of\_spurious\_emissions:

Method of Measuring Radiated Spurious Emissions



**METHOD OF MEASUREMENT:** The tabulated data shows the results of the radiated field strength emissions test. The spectrum was scanned from 30 to at least the tenth harmonic of the fundamental. This test was conducted per TIA/EIA standard 603 using the substitution method. Measurements were made at the open field test site of TIMCO ENGINEERING, INC. located at 849 N.W. State Road 45, Newberry, FL 32669.

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## Frequency stability:

REFER TO 2645AUT6 TESTREPORT2

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## EMC Equipment List

Device 3/10-Meter OATS	Manufacturer TEI	Model N/A	Serial Number N/A	Cal/Char Date Listed 3/27/04	Due Date 3/26/07
3-Meter OATS	TEI	N/A	N/A	Listed 1/11/06	1/10/09
Antenna: Biconnical	Eaton	94455-1	1057	CAL 12/12/05	12/12/07
Antenna: Biconnical	Electro-Metrics	BIA-25	1171	CAL 4/29/05	4/29/07
Analyzer Blue Tower Quasi- Peak Adapter	HP	85650A	2811A01279	CAL 4/13/05	4/13/07
Analyzer Blue Tower RF Preselector	HP	85685A	2926A00983	CAL 9/5/05	9/5/07
Analyzer Blue Tower Spectrum Analyzer	HP	8568B	2928A04729 2848A18049	CAL 4/13/05	4/13/07
LISN	Electro-Metrics	ANS-25/2	2604	CAL10/5/06	10/5/08
LISN	Electro-Metrics	EM-7820	2682	CAL 4/28/05	4/28/07
Antenna: Log- Periodic	Eaton	96005	1243	CAL 12/14/05	12/14/07

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