TIMCO ENGINEERING, Inc.

849 NW State Road 45
Newberry, FL 32669 USA
Phone: 888.472.2424 or 352.472.5500
Fax: 352.472.2030
Email: info@timcoengr.com
Website: www.timcoengr.com

FCC PART 97 AMATEUR RADIO TEST REPORT

Applicant	TOKYO HY-POWER LABS, INC.
Address	1-1 HATANAKA 3 CHOME, NIIZA SAITAMA
	352-0012 JAPAN
FCC ID	UB9HL-450B
Model Number	HL-450B
Product Description	400W LINEAR AMPLIFIER
Date Sample Received	10/17/2007
Date Tested	11/8/2007
Tested By	Richard Block
Approved By	Mario de Aranzeta
Report Number	3379AUT7TestReport.doc
Test Results	☒ PASS ☐ FAIL

ACCREDITED
Testing Certificate # 0955-01

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GENERAL REMARKS

The attached report shall not be reproduced except in full without the written permission of Timco Engineering Inc.

The test results relate only to the items tested.

Summary

The device under test does:
☒ fulfill the general approval requirements as identified in this test report
☐ not fulfill the general approval requirements as identified in this test report

Attestations

This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025 requirements.

Testing Certificate # 0955-01

I attest that the necessary measurements were made, under my supervision, at:

Timco Engineering Inc.
849 NW State Road 45
Newberry, Fl 32669

Authorized Signatory Name: *Mario de Aranzeta*

Mario de Aranzeta C.E.T.
Compliance Engineer/ Lab. Supervisor

Date: 12/3/2007

GENERAL INFORMATION

DUT Specification

DUT Description	400W LINEAR AMPLIFIER
FCC ID	UB9HL-450B
Model Number	HL-450B
Serial Number	N/A
Operating Frequency	3.5 – 29.7 MHz
DUT Power Source	☐ 240 VAC/50– 60Hz; 120 VAC/50-60Hz
	☒ DC Power
	☐ Battery Operated Exclusively
Test Item	☐ Prototype
	☒ Pre-Production
	☐ Production
Type of Equipment	☐ Fixed
	☒ Mobile
	☐ Portable
Antenna Connector	4HF SO-239
Test Facility	Timco Engineering Inc. 849 NW State Road 45 Newberry, FL 32669 USA.
Test Condition	The DUT was tested in the laboratory in an environment with normal temperature and humidity. The temperature was 26°C with a relative humidity of 50%.
Modification to the DUT	None
Test Exercise (e.g software description, test signal, etc.)	The DUT was placed in continuous transmit mode of operation
Applicable Standards	TIA 603 & ANSI C63.4 – 2003, FCC CFR 47 Part 97 FCC CRF 47 Part 15

OTHER INFORMATION

The amplifier is capable of operation in the amateur radio bands below 30 MHz. The amplifier is NOT capable of operation on any frequency or frequencies between 26 MHz and 28 MHz as marketed.

1. The amplifier is incapable of amplification above 30 MHz.

2. The amplifier requires 50 Watts of drive to obtain full output power. Reduction in RF input power reduces the output power.

3. The gain of the amplifier is under 15 dB on all bands and under all conditions.

4. The amplifier in the “off “ or standby state does not amplify and merely passes the exciter energy to the antenna port. The spurious emissions of the transceiver were unaffected.

EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	Listed 3/20/07	3/19/10
3-Meter OATS	TEI	N/A	N/A	Listed 1/11/06	1/10/09
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	Listed 5/11/07	5/10/10
Analyzer Tan Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	CAL 12/7/05	12/7/07
Analyzer Tan Tower RF Preselector	HP	85685A	3221A01400	CAL 12/7/05	12/7/07
Analyzer Tan Tower Quasi-Peak Adapter	HP	85650A	3303A01690	CAL 12/8/05	12/8/07
Analyzer Tan Tower Preamplifier	HP	8449B-H02	3008A00372	CAL 12/8/05	12/8/07
Antenna: Biconnical	Electro-Metrics	BIA-25	1171	CAL 4/29/0	4/29/09
Antenna: Log-Periodic	Electro-Metrics	LPA-25	1122	CAL 8/26/06	8/26/08
Antenna: Double-Ridged Horn	Electro-Metrics	RGA-180	2319	CAL 12/29/06	12/29/08
LISN	Electro-Metrics	ANS-25/2	2604	CAL 8/27/06	8/27/08
Termaline Wattmeter	Bird Electronic Corporation	611	16405	CAL 7/16/06	7/16/08

TEST PROCEDURES:

Radiation Interference: The test procedure used was ANSI/TIA 603-C:2004 using a spectrum analyzer with a pre-selector. In the frequency range 10 kHz to 30 MHz the RBW was 10 kHz and from 30-1000 MHz the RBW of the spectrum analyzer was 100 kHz with an appropriate sweep speed. The analyzer was calibrated in dB above a micro volt at the output of the antenna. The resolution bandwidth was 100 kHz and the video bandwidth was 300 kHz.

Formula Of Conversion Factors: The field strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer plus the coax loss. The antenna correction factors are stated in terms of dB. The gain of the preselector was accounted for in the spectrum analyzer meter reading.

Example:

Freq (MHz)	Meter Reading	+ ACF	+ CL	= FS
33	20 dBuV	+ 10.36 dB/m	+0.4 dB	= 30.76 dBuV/m @ 3m

ANSI/TIA 603-C:2004 Measurement Procedures: The DUT was placed on a non-conducting table 80 cm above the ground plane with the DUT located in the center of the table. With the antenna vertical a preliminary scan was done at 1 meters distance, the DUT was moved to a 3.0-meter distance and the antenna height varied and also placed in a horizontal position. The frequency was scanned from 9.0 kHz to 1.0 GHz. When an emission was found, the table was rotated to produce the maximum signal strength.

Part 97.313

Power Output Power does not exceed 400 Watts into a 50 ohm resistive load. There are no user power controls.

Part 2.1033(c)(8)

DC Voltages and Current into Final Amplifier:

INPUT POWER – (12Volts)(50Amps) = 600 Watts

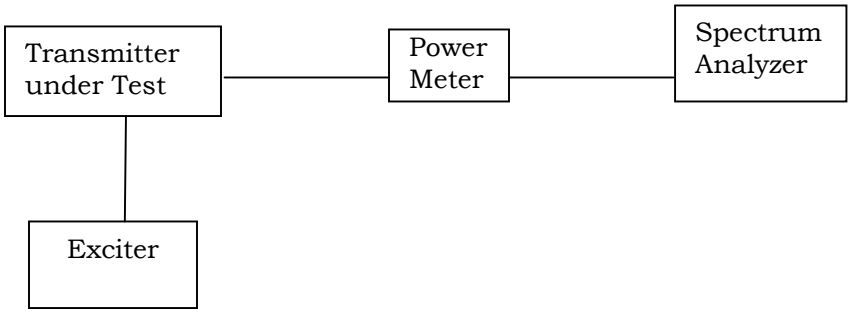
RF POWER OUTPUT

Rule Parts No.: Part 2.1046(a), Part 97.313

Requirements: 97.313

Test Procedure: RF power is measured by connecting a 50-ohm, resistive wattmeter to the RF output connector with a nominal input voltage of 13.8 DC Volts. The transmitter was properly adjusted and the maximum RF output power was measured at 398 Watts.

Test Setup:



Test Data:

Output Power: 400 Watts
(Input/Output: Not to exceed 15 dB Gain)

TF (MHz)	Input (dBm)	Output (dBm)	Gain (dB)
3.750	46.8	56.0	9.2
7.150	46.9	55.0	8.1
10.125	46.9	53.5	6.6
14.150	46.9	54.5	7.6
18.110	45.6	54.2	8.6
21.200	46.7	54.6	7.9
24.440	46.6	54.0	7.4
29.100	46.8	54.0	7.2

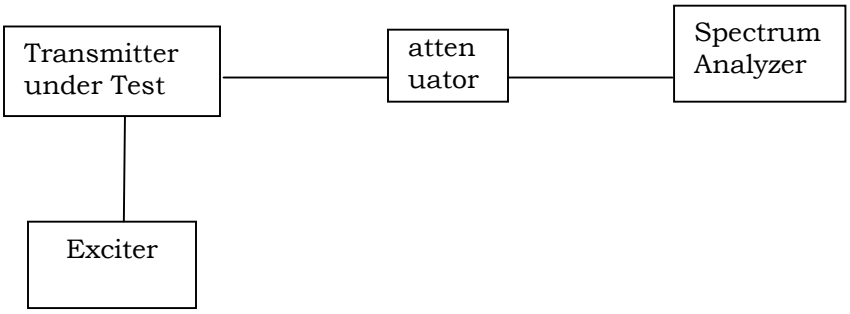
STRENGTH OF SPURIOUS EMISSIONS

Rule Parts No.: Part 2.1053 & Part 97.307 (d) (e)

Requirements: The FCC Limits for spurious emissions of a transmitting operating on a frequency below 30 MHz must be at least 43dB below the mean power.

Method Of Measurements:

Test Setup:



Test Data:

TF (MHz)	EF (MHz)	M Reading (dBm)	dB below carrier	43 dB Below Fundamental
3.750	3.750	55.0	0	N/A
3.750	7.500	-0.5	55.5	PASS
3.750	11.250	-10.3	65.3	PASS
3.750	15.000	-27.8	82.8	PASS
3.750	18.750	-13.8	68.8	PASS
3.750	22.500	-28.3	83.3	PASS
3.750	26.250	-18.0	73.0	PASS
3.750	30.000	-28.1	83.1	PASS
3.750	33.750	-25.0	80.0	PASS
3.750	37.500	-28.3	83.3	PASS

Test Data Contd.:

TF (MHz)	EF (MHz)	M Reading (dBm)	dB below carrier	43 dB Below Fundamental
7.150	7.150	55.0	0	N/A
7.150	14.300	-3.9	58.9	PASS
7.150	21.450	-13.3	68.3	PASS
7.150	28.600	-26.8	81.8	PASS
7.150	35.750	-16.2	71.2	PASS
7.150	42.900	-26.5	81.5	PASS
7.150	50.050	-19.0	74.0	PASS
7.150	57.200	-25.4	80.4	PASS
7.150	64.350	-26.1	81.1	PASS
7.150	71.500	-27.3	82.3	PASS

TF (MHz)	EF (MHz)	M Reading (dBm)	dB below carrier	43 dB Below Fundamental
10.125	10.125	53.5	0	N/A
10.125	20.250	-3.8	57.3	PASS
10.125	30.375	7.4	46.1	PASS
10.125	40.500	-26.6	80.1	PASS
10.125	50.625	-6.5	60.0	PASS
10.125	60.750	-27.2	80.7	PASS
10.125	70.875	-25.3	78.8	PASS
10.125	81.000	-25.4	78.9	PASS
10.125	91.125	-28.1	81.6	PASS
10.125	101.250	-28.5	82.0	PASS

TF (MHz)	EF (MHz)	M Reading (dBm)	dB below carrier	43 dB Below Fundamental
14.150	14.150	54.5	0	N/A
14.150	28.300	-9.5	64.0	PASS
14.150	42.450	-15.2	69.7	PASS
14.150	56.600	-26.5	81.0	PASS
14.150	70.750	-26.7	81.2	PASS
14.150	84.900	-26.1	80.6	PASS
14.150	99.050	-27.5	82.0	PASS
14.150	113.200	-26.6	81.1	PASS
14.150	127.350	-26.0	80.5	PASS
14.150	141.500	-27.4	81.9	PASS

Test Data Contd.:

TF (MHz)	EF (MHz)	M Reading (dBm)	dB below carrier	43 dB Below Fundamental
18.110	18.110	54.2	0	N/A
18.110	36.220	-8.8	63.0	PASS
18.110	54.330	-17.6	71.8	PASS
18.110	72.440	-24.8	79.0	PASS
18.110	90.550	-21.5	75.7	PASS
18.110	108.660	-23.9	78.1	PASS
18.110	126.770	-25.6	79.8	PASS
18.110	144.880	-27.5	81.7	PASS
18.110	162.990	-28.5	82.7	PASS
18.110	181.100	-29.5	83.7	PASS

TF (MHz)	EF (MHz)	M Reading (dBm)	dB below carrier	43 dB Below Fundamental
21.200	21.200	54.6	0	N/A
21.200	42.400	-6.1	60.7	PASS
21.200	63.600	-20.1	74.7	PASS
21.200	84.800	-25.2	79.8	PASS
21.200	106.000	-24.3	78.9	PASS
21.200	127.200	-26.3	80.9	PASS
21.200	148.400	-26.3	80.9	PASS
21.200	169.600	-28.2	82.8	PASS
21.200	190.800	-26.8	81.4	PASS
21.200	212.000	-27.3	81.9	PASS

TF (MHz)	EF (MHz)	M Reading (dBm)	dB below carrier	43 dB Below Fundamental
24.440	24.440	54.0	0	N/A
24.440	48.880	-12.0	66.0	PASS
24.440	73.320	-26.0	80.0	PASS
24.440	97.760	-26.7	80.7	PASS
24.440	122.200	-24.2	78.2	PASS
24.440	146.640	-26.2	80.2	PASS
24.440	171.080	-29.9	83.9	PASS
24.440	195.520	-26.2	80.2	PASS
24.440	219.960	-24.8	78.8	PASS
24.440	244.400	-23.3	77.3	PASS

This device will not transmit in the 26 – 28 MHz range.

Test Data Contd.:

TF (MHz)	EF (MHz)	M Reading (dBm)	dB below carrier	43 dB Below Fundamental
29.100	29.100	54.0	0	N/A
29.100	58.200	-10.7	64.7	PASS
29.100	87.300	-15.7	69.7	PASS
29.100	116.400	-24.2	78.2	PASS
29.100	145.500	-26.2	80.2	PASS
29.100	174.600	-24.9	78.9	PASS
29.100	203.700	-24.8	78.8	PASS
29.100	232.800	-23.8	77.8	PASS
29.100	261.900	-20.2	74.2	PASS
29.100	291.000	-25.1	79.1	PASS

POWER LINE CONDUCTED INTERFERENCE

Rules Part No.: Part 15.207

Requirements:

Frequency (MHz)	Quasi Peak Limits (dBuV)	Average Limits (dBuV)
0.15 – 0.5	66 – 56	56 – 46
0.5 – 5.0	56	46
5.0 – 30	60	50

Test Procedure: ANSI Standard C63.4-2003. The spectrum was scanned from 0.15 to 30 MHz.

Test Data: N/A DC POWER ONLY