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-550FX
Model Number	HL-550FX
Product Description	550W HF LINEAR AMPLIFIER
Date Sample Received	4/1/2010
Date Tested	4/15/2010
Tested By	Nam Nguyen
Approved By	Mario R. de Aranzeta
Report Number	759ATU10TestReport.doc
Test Results	☒ PASS ☐ FAIL

ACCREDITED
Certificate # 0955-01

TABLE OF CONTENT

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: 2005 requirements.

ACCREDITED

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:

Date: 05/07/2010

GENERAL INFORMATION

DUT Specification

The test results relate only to the items tested.	
DUT Description	550W HF LINEAR AMPLIFIER
FCC ID	UB9HL-550FX
Model Number	HL-550FX
Serial Number	N/A
Operating Frequency	1.8-54 MHz
Type of Emission	N/A
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

Test Facility: The test sites used by Timco Engineering Inc. for radiated and conducted emission data are located at 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 26ºC with a relative humidity of 50%.

Modification to the DUT: No modification was made to the DUT during testing.

Test Exercise (e.g. software description, test signal, etc.): The DUT was placed in continuous transmit mode of operation.

Applicable Standards: ANSI/TIA 603-C: 2004 & 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 and additionally in the 6 meter amateur band (50-54 MHz). The amplifier is shipped with the frequencies from 26 MHz and 28 MHz bands disabled and inoperative.

1. The amplifier is incapable of amplification above 54 MHz.

2. The amplifier requires 65 to 80 Watts of drive to obtain full output power.

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

5. The amplifier in the off or standby state does not amplify and merely passes through 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-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	Listed 5/11/07	5/10/10
AC Voltmeter	HP	400FL	2213A14499	CAL 3/23/09	3/23/11
Antenna: Dipole Kit	Electro-Metrics	TDA-30/1-4	153	CHAR 6/10/09	6/10/11
Frequency Counter	HP	5385A	3242A07460	CAL 5/26/09	5/26/11
Hygro-Thermometer	Extech	445703	0602	CAL 1/30/09	1/30/11
Modulation Analyzer	HP	8901A	3435A06868	CAL 5/26/09	5/26/11
Digital Multimeter	Fluke	FLUKE-77-3	79510405	CAL 5/18/09	5/18/11
Analyzer Tan Tower Preamplifier	HP	8449B-H02	3008A00372	CAL 11/21/09	11/21/11
Analyzer Tan Tower Quasi-Peak Adapter	HP	85650A	3303A01690	CAL 11/22/09	11/22/11
Analyzer Tan Tower RF Preselector	HP	85685A	3221A01400	CAL 11/21/09	11/21/11
Analyzer Tan Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	CAL 11/24/09	11/24/11
Temperature Chamber	Tenney Engineering	TTRC	11717-7	CHAR 4/25/08	4/25/10

TEST PROCEDURES:

Radiation Interference: The test procedure used was ANSI/TIA 603-C: 2004 using a Agilent spectrum analyzer with a preselector. 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. 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

Part 97.313

Power Output Power shall not exceed 1.5 kW PEP 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 – (42Volts)(30Amps) = 1260 Watts

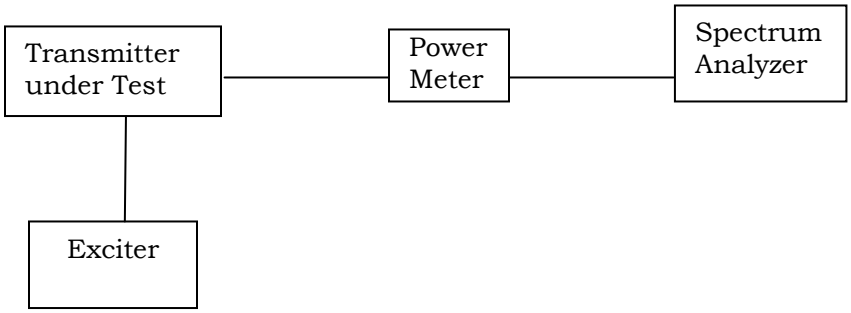
RF POWER OUTPUT

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 240 AC Volts.

Test Setup:



Test Data:

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

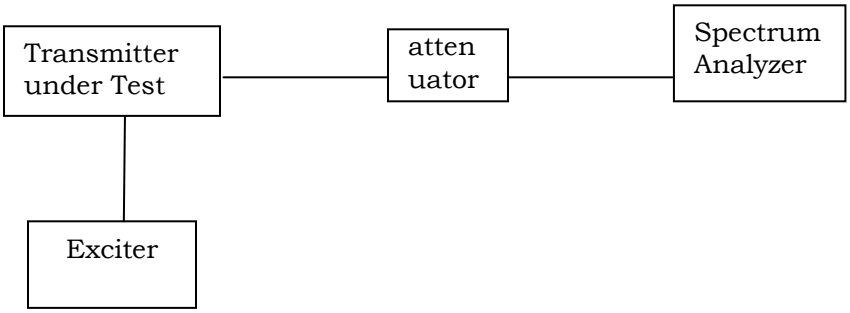
TF	Input	Output	Gain
MHz	dBm	W	dB
1.900	48.5	398.1	7.5
3.750	48.5	467.7	8.2
7.150	48.5	501.2	8.5
10.125	48.5	501.2	8.5
14.150	48.5	524.8	8.7
18.110	48.5	467.7	8.2
21.200	48.5	478.6	8.3
24.900	48.5	436.5	7.9
28.100	48.5	467.7	8.2
29.100	48.5	446.7	8
50.100	48.5	426.6	7.8
53.900	48.5	398.1	7.5

STRENGTH OF CONDUCTED 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. For the transmitter frequency operating at 50 MHz, the RF spurious emissions must be at least 60 dB below the mean power of the fundamental.

Method of Measurements:
Test Setup:



Test Data:

TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
1.900	1.90	0	N/A
1.900	3.80	62.3	PASS
1.900	5.70	70.5	PASS
1.900	7.60	62.1	PASS
1.900	9.50	65.2	PASS
1.900	11.40	79.1	PASS
1.900	13.30	71	PASS
1.900	15.20	77.7	PASS
1.900	17.10	77.3	PASS
1.900	19.00	78.4	PASS

TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
3.750	3.75	0	N/A
3.750	7.50	62.9	PASS
3.750	11.25	74.5	PASS
3.750	15.00	78.3	PASS
3.750	18.75	70.9	PASS
3.750	22.50	74.2	PASS
3.750	26.25	71	PASS
3.750	30.00	78	PASS
3.750	33.75	69.7	PASS
3.750	37.50	77.9	PASS

TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
7.150	7.15	0	N/A
7.150	14.30	62.7	PASS
7.150	21.45	55.9	PASS
7.150	28.60	69.1	PASS
7.150	35.75	62.2	PASS
7.150	42.90	82.9	PASS
7.150	50.05	67.6	PASS
7.150	57.20	80.6	PASS
7.150	64.35	69.4	PASS
7.150	71.50	81.1	PASS

TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
10.125	10.13	0	N/A
10.125	20.25	56.1	PASS
10.125	30.38	52.5	PASS
10.125	40.50	82.1	PASS
10.125	50.63	71.6	PASS
10.125	60.75	81	PASS
10.125	70.88	80.9	PASS
10.125	81.00	82.4	PASS
10.125	91.13	81.3	PASS
10.125	101.25	80.5	PASS

TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
14.150	14.15	0	N/A
14.150	28.30	55.9	PASS
14.150	42.45	70.7	PASS
14.150	56.60	76.6	PASS
14.150	70.75	75.3	PASS
14.150	84.90	81.7	PASS
14.150	99.05	78.2	PASS
14.150	113.20	79.6	PASS
14.150	127.35	82.4	PASS
14.150	141.50	80.9	PASS

TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
18.110	18.11	0	N/A
18.110	36.22	59.4	PASS
18.110	54.33	62.1	PASS
18.110	72.44	93.9	PASS
18.110	90.55	83.3	PASS
18.110	108.66	99.5	PASS
18.110	126.77	100.4	PASS
18.110	144.88	98.7	PASS
18.110	162.99	98.5	PASS
18.110	181.10	97.9	PASS

TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
21.200	21.20	0	N/A
21.200	42.40	85.1	PASS
21.200	63.60	65.7	PASS
21.200	84.80	90.5	PASS
21.200	106.00	90.2	PASS
21.200	127.20	98.2	PASS
21.200	148.40	97.3	PASS
21.200	169.60	97.4	PASS
21.200	190.80	87.6	PASS
21.200	212.00	99.3	PASS

TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
24.900	24.900	0	N/A
24.900	49.800	71.1	PASS
24.900	74.700	71.7	PASS
24.900	99.600	95.6	PASS
24.900	124.500	96.8	PASS
24.900	149.400	94.6	PASS
24.900	174.300	99.1	PASS
24.900	199.200	97.8	PASS
24.900	224.100	98.5	PASS
24.900	249.000	99.1	PASS

TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
28.100	28.10	0	N/A
28.100	56.20	70.2	PASS
28.100	84.30	76.8	PASS
28.100	112.40	101.1	PASS
28.100	140.50	99.4	PASS
28.100	168.60	99.7	PASS
28.100	196.70	99.6	PASS
28.100	224.80	96.4	PASS
28.100	252.90	98.6	PASS
28.100	281.00	88.8	PASS

TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
29.100	29.10	0	N/A
29.100	58.20	72.5	PASS
29.100	87.30	77.6	PASS
29.100	116.40	93.1	PASS
29.100	145.50	101.6	PASS
29.100	174.60	99.7	PASS
29.100	203.70	95.9	PASS
29.100	232.80	97.1	PASS
29.100	261.90	96.3	PASS
29.100	291.00	90.7	PASS

TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
50.100	50.10	0	N/A
50.100	100.20	62.1	PASS
50.100	150.30	91.4	PASS
50.100	200.40	95.4	PASS
50.100	250.50	100.1	PASS
50.100	300.60	91.6	PASS
50.100	350.70	98.1	PASS
50.100	400.80	95.3	PASS
50.100	450.90	98.3	PASS
50.100	501.00	94.8	PASS

TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
53.900	53.900	0	N/A
53.900	107.800	62.7	PASS
53.900	161.700	86.9	PASS
53.900	215.600	95.1	PASS
53.900	269.500	95.5	PASS
53.900	323.400	90	PASS
53.900	377.300	92.6	PASS
53.900	431.200	88.9	PASS
53.900	485.100	93.2	PASS
53.900	539.000	96.6	PASS