

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](mailto:info@timcoengr.com)  
Website: [www.timcoengr.com](http://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-45B	
Model Number	HL-45B	
Product Description	LINEAR POWER AMPLIFIER	
Date Sample Received	4/9/2008	
Date Tested	10/3/2008	
Tested By	Joe Scoglio	
Approved By	Mario de Aranzeta	
Report Number	1881AUT8TestReport.doc	
Test Results	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL

THE ATTACHED REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL  
WITHOUT THE WRITTEN APPROVAL OF TIMCO ENGINEERING, INC.



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:**

**Date:** 11/17/2008

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## REPORT SUMMARY

Applicable Standard/procedure	TIA 603 & ANSI C63.4 – 2003 FCC CFR 47 Part 97 FCC CRF 47 Part 15
Related Report/Approval	NA

## TEST ENVIRONMENT AND TEST SETUP

Test Facility	All tests were performed by Timco Engineering Inc. which is located at 849 NW State Road 45 Newberry, FL 32669
Lab Conditions	Temperature: 26 °C Relative Humidity: 55%
Test Supporting Equipment	Icom 706 mkIIIG was used to supply drive to the amplifier
Deviation from test procedure	None
Modification to the DUT	None

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## **DUT SPECIFICATION**

DUT Description	LINEAR POWER AMPLIFIER
FCC ID	UB9HL-45B
Model Number	HL-45B
Serial Number	N/A
Power Output	There are no user power controls.
DC Voltages and Current into final amplifier	Per Part 2.1033(c)(8) Input Power = (13.8Volts)(8Amps) = 110 Watts
DUT Power Source	Primary – 13.8 DC Secondary – N/A
Test Item	Pre-Production
Type of Equipment	Mobile

## **OTHER INFORMATION IN REGARDS TO THE PROJECT**

The amplifier is capable of operation in the amateur radio bands below 30 MHz, and from 50 to 54 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 only capable of amplification to 30 MHz and then from 50 to 54 MHz.
2. The gain of the amplifier is under 15 dB on all bands and under all conditions.
3. 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.

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## EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3-Meter OATS	TEI	N/A	N/A	Listed 1/11/06	1/10/09
3/10-Meter OATS	TEI	N/A	N/A	Listed 3/20/07	3/19/10
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 11/30/07	11/30/09
Analyzer Tan Tower RF Preselector	HP	85685A	3221A01400	CAL 11/30/07	11/30/09
Analyzer Tan Tower Quasi-Peak Adapter	HP	85650A	3303A01690	CAL 11/30/07	11/30/09
Analyzer Tan Tower Preamplifier	HP	8449B-H02	3008A00372	CAL 11/30/07	11/30/09
Antenna: Biconical	Electro-Metrics	BIA-25	1171	CAL 4/29/0	4/29/09
Antenna: Log-Periodic	Electro-Metrics	LPA-25	1122	CAL 12/1/06	12/1/08
Antenna: Double-Ridged Horn	Electro-Metrics	RGA-180	2319	CAL 12/29/06	12/29/08
Termaline Wattmeter	Bird Electronic Corporation	611	16405	CAL 3/15/07	3/15/09

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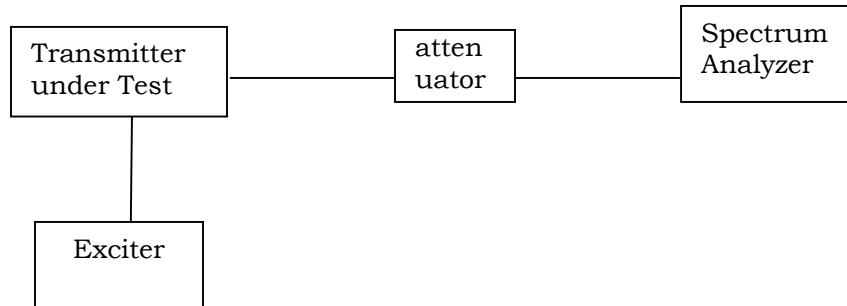
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## TEST PROCEDURES

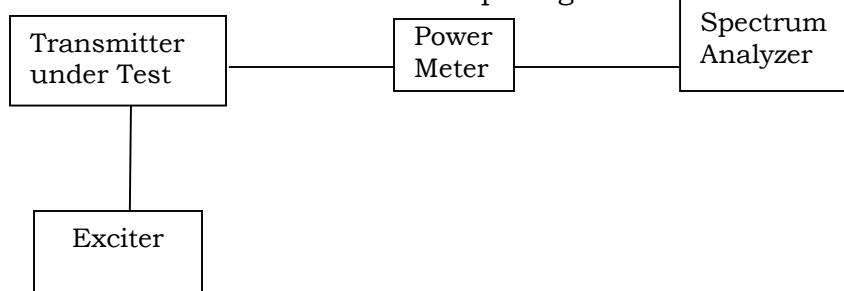
**Radiation Interference:** The test procedure used was ANSI/TIA 603-C: 2004 using an Agilent spectrum analyzer with a pre-selector. In the frequency range 10 kHz to 30 MHz the RBW was 10 kHz and from 30-1000 MHz the RBW of the spectrum analyzer was 100 kHz with an appropriate sweep speed. The analyzer 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.

Test Setup Diagram



**Output Power:** 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 45 Watts.

Test Setup Diagram





**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 Pre-selector 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.

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## RF POWER OUTPUT

**Rule Parts No.:** Part 2.1046(a), Part 97.317

**Requirements:** Power Output Power shall not exceed 1.5 kW PEP Watts into a 50 ohm resistive load.

### Test Data:

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

TF (MHz)	Input (dBm)	Output (W)	Gain (dB)
1.900	37.0	42.66	9.3
3.750	37.0	43.65	9.4
7.150	37.0	45.71	9.6
10.12	37.0	44.67	9.5
14.20	37.0	48.98	9.9
18.1	37.0	38.91	8.9
21.200	37.0	39.81	9.0
24.85	37.0	47.86	9.8
28.100	37.0	50.12	10
29.6	37.0	50.12	10
50.1	37.0	39.81	9.0
53.9	37.0	38.02	8.8

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## 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.

### Test Data:

TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
1.900	1.900	0	N/A
1.900	3.800	65.3	PASS
1.900	5.700	54.2	PASS
1.900	7.600	81.2	PASS
1.900	9.500	58.2	PASS
1.900	11.400	80.5	PASS
1.900	13.300	65.9	PASS
1.900	15.200	81.7	PASS
1.900	17.100	68.7	PASS
1.900	19.000	83.2	PASS

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TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
3.750	3.750		N/A
3.750	7.500	69.4	PASS
3.750	11.250	64.6	PASS
3.750	15.000	78.1	PASS
3.750	18.750	63.7	PASS
3.750	22.500	81.5	PASS
3.750	26.250	69.2	PASS
3.750	30.000	79.2	PASS
3.750	33.750	74.6	PASS
3.750	37.500	79	PASS

TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
7.150	7.150		N/A
7.150	14.300	69.9	PASS
7.150	21.450	57.7	PASS
7.150	28.600	75.1	PASS
7.150	35.750	63.5	PASS
7.150	42.900	68.7	PASS
7.150	50.050	62.6	PASS
7.150	57.200	74.7	PASS
7.150	64.350	72.3	PASS
7.150	71.500	69.8	PASS

TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
10.125	10.125		N/A
10.125	20.250	61.6	PASS
10.125	30.375	56.1	PASS
10.125	40.500	68.8	PASS
10.125	50.625	53.7	PASS
10.125	60.750	67.8	PASS
10.125	70.875	70.3	PASS
10.125	81.000	73	PASS
10.125	91.125	72.8	PASS
10.125	101.250	76.2	PASS

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TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
14.200	14.200		N/A
14.200	28.400	80.3	PASS
14.200	42.600	51.4	PASS
14.200	56.800	60.3	PASS
14.200	71.000	66.1	PASS
14.200	85.200	65.7	PASS
14.200	99.400	62.5	PASS
14.200	113.600	69.5	PASS
14.200	127.800	80	PASS
14.200	142.000	72.9	PASS

TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
18.110	18.110		N/A
18.110	36.220	70.8	PASS
18.110	54.330	74.2	PASS
18.110	72.440	64.8	PASS
18.110	90.550	50.8	PASS
18.110	108.660	67.6	PASS
18.110	126.770	59.7	PASS
18.110	144.880	68.5	PASS
18.110	162.990	57.1	PASS
18.110	181.100	71.6	PASS

TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
21.200	21.200		N/A
21.200	42.400	71	PASS
21.200	63.600	57.8	PASS
21.200	84.800	69	PASS
21.200	106.000	53.1	PASS
21.200	127.200	61.6	PASS
21.200	148.400	53.3	PASS
21.200	169.600	64	PASS
21.200	190.800	75.6	PASS
21.200	212.000	75.4	PASS

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TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
24.900	24.900		N/A
24.900	49.800	64.3	PASS
24.900	74.700	49.4	PASS
24.900	99.600	63.6	PASS
24.900	124.500	49.2	PASS
24.900	149.400	50.6	PASS
24.900	174.300	56.9	PASS
24.900	199.200	63.1	PASS
24.900	224.100	64.2	PASS
24.900	249.000	64.6	PASS

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

TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
28.100	28.100		N/A
28.100	56.200	69.3	PASS
28.100	84.300	57	PASS
28.100	112.400	65.2	PASS
28.100	140.500	53.3	PASS
28.100	168.600	55.3	PASS
28.100	196.700	77.6	PASS
28.100	224.800	62.1	PASS
28.100	252.900	74.3	PASS
28.100	281.000	61.7	PASS

TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
29.600	29.600		N/A
29.600	59.200	68.5	PASS
29.600	88.800	56.7	PASS
29.600	118.400	69.8	PASS
29.600	148.000	53.3	PASS
29.600	177.600	57.6	PASS
29.600	207.200	76.2	PASS
29.600	236.800	66.2	PASS
29.600	266.400	72.3	PASS
29.600	296.000	65	PASS

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TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
50.100	50.100		N/A
50.100	100.200	65.7	PASS
50.100	150.300	56.9	PASS
50.100	200.400	66.1	PASS
50.100	250.500	65.7	PASS
50.100	300.600	65	PASS
50.100	350.700	61.8	PASS
50.100	400.800	52	PASS
50.100	450.900	66	PASS
50.100	501.000	68	PASS

TF (MHz)	EF (MHz)	dB below carrier	43 dB Below Fundamental
53.900	53.900		N/A
53.900	107.800	54.1	PASS
53.900	161.700	51.2	PASS
53.900	215.600	54	PASS
53.900	269.500	67.6	PASS
53.900	323.400	62.4	PASS
53.900	377.300	69	PASS
53.900	431.200	52.9	PASS
53.900	485.100	65.4	PASS
53.900	539.000	77.6	PASS

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