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REPORT ON  
Radio testing of the YAESU VL-2000  
In accordance with ANSI/TIA-603, FCCPart 15, FCCPart 97

Report number TA000981

March 2011

## GENERAL INFORMATION

MODEL NAME:	VL-2000
FCC ID:	K6620321X70
MANUFACTURER:	Vertex Standard Co., Ltd.
TRADE NAME:	YAESU
EUT DESCRIPTION:	HF / 50MHz Liner Amplifier
SERIAL NUMBER:	1D000010
VOLTAGE REQUIREMENTS:	DC+48 V, +12 V, -12V

SPECIFICATION ARE REFERENCED: ANSI/TIA-603, FCCPart 15, FCCPart 97

## TRANSMITTERS

TYPE OF EMISSION:	SSB, CW, AM, FM, RTTY
FREQUENCY RANGE:	1.8 to 54 [MHz]
POWER OUTPUT RATING:	1500, (1000 W @ 50MHz) [W]

MAXIMUM POWER RATING:	3000 [W]
INPUT IMPEDANCE (INPUT):	50 [Ω]
OUTPUT IMPEDANCE (RF):	50 [Ω]
Drain Voltage:	48 [V]
Drain Current:	63 [A]

This report was prepared by Vertex Standard Co., Ltd.

Test performed by

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Shigemitu Takahashi

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Engineering Division T/A Section  
Vertex Standard Co., Ltd.

Date 18 / March /2011

## VL-2000 Test Frequency Settings

TEST BAND No	Glow on BAND LED	Transmit Frequency [MHz]	Receive Frequency [MHz]	Power
1	1.8	1.900	1.900	1500 W
2	3.5	3.750	3.750	1500 W
3	7	7.150	7.150	1500 W
4	10	10.125	10.125	1500 W
5	14	14.150	14.150	1500 W
6	18	18.110	18.110	1500 W
7	21	21.200	21.200	1500 W
8	24.5	24.900	24.900	1500 W
9	28	29.100	29.100	1500 W
10	50	52.000	52.000	1000 W
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

NAME OF TEST: R.F. Power Output (Conducted)  
SPECIFICATION: 47 CFR 2.1046 (a), Part 97,313  
GUIDE: ANSI/TIA/EIA-603, Paragraph 2.2.1  
TEST EQUIPMENT: As per attached page

#### MEASUREMENT PROCEDURE

1. The EUT was connected to a resistive coaxial attenuator of normal load impedance, and the modulated output power was measured by means of an R.F. power meter.

#### MEASUREMENT RESULTS

Frequency [MHz]	Input Power [W]	Output Power [W]	Gain[dB]
1.900	54.0	1496.0	14.4
3.750	56.0	1482.0	14.2
7.150	59.0	1486.0	14.0
10.125	57.0	1489.0	14.2
14.150	57.0	1495.0	14.2
18.110	63.0	1483.0	13.7
21.200	60.5	1489.0	13.9
24.900	64.0	1479.0	13.6
29.100	68.0	1485.0	13.4
52.000	89.0	1008.0	10.5

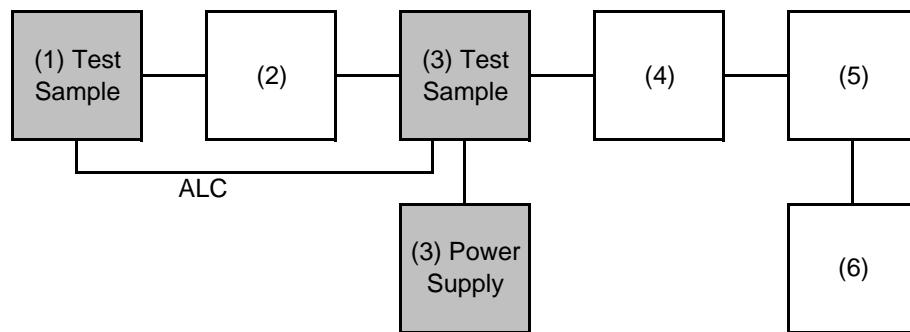
Note 1: Input/Output Ratio: Not to exceed 15 dB

Note 2: Gain [dB]=  $10 \log (\text{output power} / \text{Input power})$

Note 3: The amplifier is NOT capable of operation frequencies between 26-28MHz

TRANSMITTER POWER CONDUCTED MEASUREMENTS

## TEST 1: R.F. POWER OUTPUT &amp; GAIN



Instruments	Description	Calibration Date	Next Calibration
(1) TEST SAMPLE EXCITER	FT-2000(0G610040)	-	-
(2) POWER METER	BIRD Model-43 (ser:196556)	2010.10.9	One year after
(3) TEST SAMPLE	VL-2000 / VP-2000	-	-
(4) POWER METER	ROHDE NRT (ser:102462)	2011.1.10	One year after
(5) RF DUMMY LORD TESTER	TOKYO HI-POWER (ser:1004001)	2010.4.8	One year after
(6) DUMMY LORD	BIRD Model-8890 (ser:2099)	2010.11.18	One year after

NAME OF TEST: Unwanted Emissions (Conducted)  
SPECIFICATION: 47 CFR 2.105, FCC Part97.307  
GUIDE: ANSI/TIA/EIA-603, Paragraph 2.2.13  
TEST EQUIPMENT: As per attached page

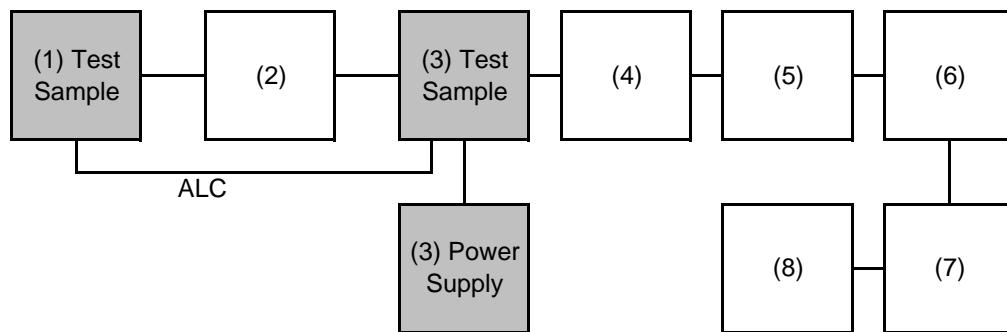
MEASUREMENT PROCEDURE

1. The emissions were measured for the worst case as follows:
  - (a): within a band of frequencies defined by the carrier frequency.
  - (b): from the lowest frequency generated in the EUT and to at least the 10th harmonic of the carrier frequency, or 40GHz, whichever is lower.
2. The magnitude of spurious emissions that are attenuated more than 20dB below the permissible value need not be specified.
3. MEASUREMENT RESULTS:

FREQUENCY OF CARRIER, MHz = 1.8 to 50MHz (all amateur BAND)  
SPECTRUM SEARCHED, GHz = 0 to 10 x Fc  
ALL OTHER EMISSIONS = >= 20dB BELOW LIMIT

TRANSMITTER SPURIOUS EMISSION

## TEST 2: OUT-OF-BAND SPURIOUS



Instruments	Description	Calibration Date	Next Calibration
(1) TEST SAMPLE EXCITER	FT-2000 (0G610040)	-	-
(2) POWER METER	BIRD Model-43 (ser:196556)	2010.10.09	One year after
(3) TEST SAMPLE	VL-2000 / VP-2000	-	-
(4) POWER METER	ROHDE NRT (ser:102462)	2011.1.10	One year after
(5) COAXUAL ATTENUATOR	BIRD 8329-300 (ser:101401432)	2010.10.09	One year after
(6) COAXUAL ATTENUATOR	ROHDE RBU-30 (ser:892)	2010.11.12	One year after
(7) COAXUAL ATTENUATOR	TAMAGAWA CFA-01	2010.10.25	One year after
(8) SPECTRUM ANALYZER	ADVANTEST R3267(ser:95090123)	2010.12.20	One year after

NAME OF TEST: Unwanted Emissions (Conducted)

Carrier Frequency [MHz]		
1.9000		
	Emission Frequency [MHz]	Spurious Attenuation [dB]
2nd	3.800	-72.1
3rd	5.700	-70.8
4th	7.600	-
5th	9.500	-79.8
6th	11.400	-
7th	13.300	-
8th	15.200	-
9th	17.100	-
10th	19.000	-

Carrier Frequency [MHz]		
3.7500		
	Emission Frequency [MHz]	Spurious Attenuation [dB]
2nd	7.500	-78.0
3rd	11.250	-75.5
4th	15.000	-
5th	18.750	-
6th	22.500	-
7th	26.250	-
8th	30.000	-
9th	33.750	-
10th	37.500	-

Carrier Frequency [MHz]		
7.1500		
	Emission Frequency [MHz]	Spurious Attenuation [dB]
2nd	14.300	-80.9
3rd	21.450	-
4th	28.600	-
5th	35.750	-
6th	42.900	-
7th	50.050	-
8th	57.200	-
9th	64.350	-
10th	71.500	-

Carrier Frequency [MHz]		
10.1250		
	Emission Frequency [MHz]	Spurious Attenuation [dB]
2nd	20.250	-76.8
3rd	30.375	-81.7
4th	40.500	-
5th	50.625	-
6th	60.750	-
7th	70.875	-
8th	81.000	-
9th	91.125	-
10th	101.250	-

Carrier Frequency [MHz]		
14.1250		
	Emission Frequency [MHz]	Spurious Attenuation [dB]
2nd	28.300	-65.8
3rd	42.450	-74.4
4th	56.600	-
5th	70.750	-
6th	84.900	-
7th	99.050	-
8th	113.200	-
9th	127.350	-
10th	141.500	-

Carrier Frequency [MHz]		
18.1100		
	Emission Frequency [MHz]	Spurious Attenuation [dB]
2nd	36.220	-76.1
3rd	54.330	-75.7
4th	72.440	-
5th	90.550	-
6th	108.660	-
7th	126.770	-
8th	144.880	-
9th	162.990	-
10th	181.100	-

LIMIT's, dBc: Below 30 MHz:  $-(13+10x\text{LOG}(P)) = -44.8 \text{ dBc}$  (P=1500 Watts)  
 Above 30 MHz:  $= -60 \text{ dBc}$  (50 MHz P=1000 Watts)

note: - under -85dB

Carrier Frequency [MHz]		
21.2000		
	Emission Frequency [MHz]	Spurious Attenuation [dB]
2nd	42.400	-77.7
3rd	63.600	-83.7
4th	84.800	-
5th	106.000	-
6th	127.200	-
7th	148.400	-
8th	169.600	-
9th	190.800	-
10th	212.000	-

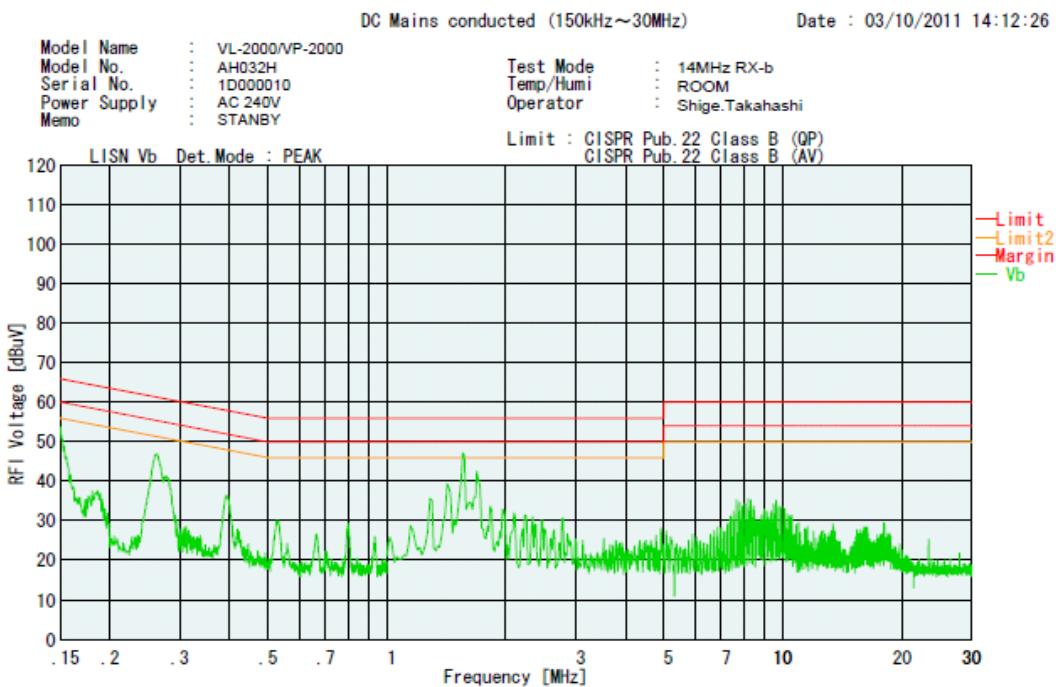
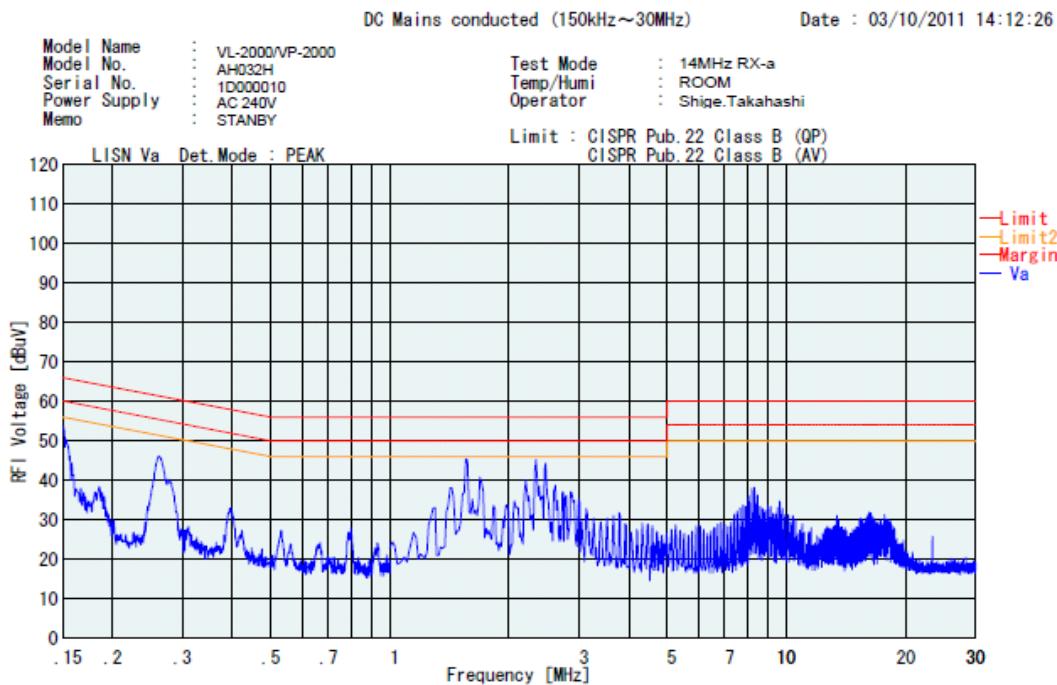
Carrier Frequency [MHz]		
24.9000		
	Emission Frequency [MHz]	Spurious Attenuation [dB]
2nd	49.800	-74.3
3rd	74.700	-74.8
4th	99.600	-
5th	124.500	-
6th	149.400	-
7th	174.300	-
8th	199.200	-
9th	224.100	-
10th	249.000	-

Carrier Frequency [MHz]		
29.1000		
	Emission Frequency [MHz]	Spurious Attenuation [dB]
2nd	58.200	-74.7
3rd	87.300	-83.3
4th	116.400	-
5th	145.500	-
6th	174.600	-
7th	203.700	-
8th	232.800	-
9th	261.900	-
10th	291.000	-

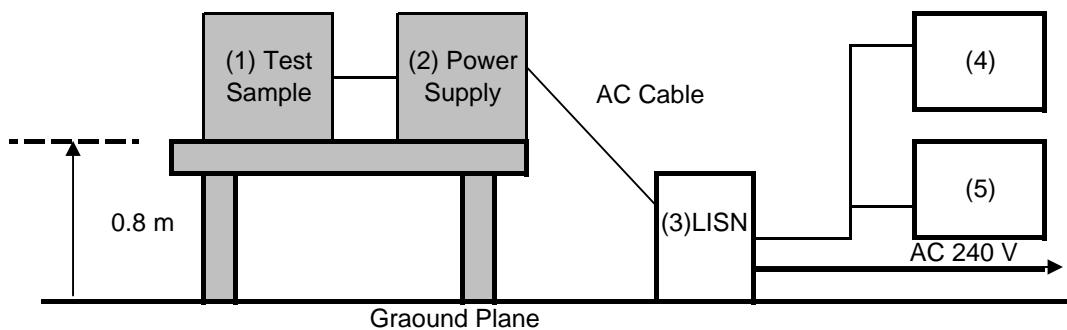
Carrier Frequency [MHz]		
52.0000		
	Emission Frequency [MHz]	Spurious Attenuation[dB]
2nd	104.000	-76.0
3rd	156.000	-
4th	208.000	-
5th	260.000	-
6th	312.000	-
7th	364.000	-
8th	416.000	-
9th	468.000	-
10th	520.000	-

NAME OF TEST: POWER LINE CONDUCTED INTERFERENCE  
SPECIFICATION: Part 15.207

TEST EQUIPMENT: As per attached page



## TEST 3: AC POWER LINE CONDUCTED INTERFERENCE



Instruments	Description	Calibration Date	Next Calibration
(1) TEST SAMPLE	VL-2000	-	-
(2) TEST SAMPLE	VP-2000	-	-
(3) LISN	ROLF HEINE NNB-2/169Z	2010.11.05	One year after
(4) EMC Receiver	ROHDE ESPC (0.15-1000MHz)	2010.12.15	One year after
(5) SPECTRUM ANALYZER	HEWLETT PACKARD 8561B	2010.10.21	One year after