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APPLICANT: YAESU MUSEN CO., LTD.

FCC ID: K66VX-800V

TEST REPORT:

EXHIBITS CONTAINING:

GENERAL_INFORMATION_REQUIRED
FOR_TYPE_ACCEPTANCE

2.983 (a,b,c) YAESU MUSEN CO., LTD. will sell the MODEL NO. K66VX-800V VHF transmitter in quantity, for use under FCC RULES PART 22 & 90.

2.983 (d) TECHNICAL_DESCRIPTION

(1) Type of Emission: 16K0F3E For 25KHz
11K0F3E For 12.5KHz

For 25KHz
Bn = 2M + 2DK
M = 3000
D = 4.0kHz (Peak Deviation)
K = 1
Bn = 2(3.0K) + 2(4.0k(1) = 6.0k + 8.0k = 14.0k
ALLOWED AUTHORIZED BANDWIDTH = 20.00KHz.

For 12.5KHz
Bn = 2M + 2DK
M = 3000
D = 2.2KHz (Peak Deviation)
K = 1
Bn = 2(3.0k) + 2(2.5k(1) = 6.0k + 5.0k = 11.0K
ALLOWED AUTHORIZED BANDWIDTH = 11.25KHz.
90.209(b)(5)

(2) Frequency Range: 148-174 MHz

(3) Power Range and Controls:There are NO user Power controls.

(4) Maximum Output Power Rating:
5.0 & 1.0 Watts ,
into a 50 ohm resistive load.

(5) DC Voltages and Current into Final Amplifier:

POWER INPUT
FINAL AMPLIFIER ONLY
Vce = 7.2 Volts
Ice = 2.10A.

Pin = 15.1 Watts

(6) Function of each electron tube or semiconductor device or other active circuit device: - SEE EXHIBIT

2.983(d) (7) Complete Circuit Diagrams: The circuit diagram is included as EXHIBIT 7A-7C. The block diagram is included as EXHIBIT 6.

(8) Instruction book. The instruction manual is included as EXHIBIT #8.

(9) Tune-up procedure. The tune-up procedure is given in EXHIBIT #8.

(10) Description of all circuitry and devices provided for determining and stabilizing frequency is included in the circuit description in the instruction manual.

2.983 (11) Description of any circuits or devices employed for suppression of spurious radiation, for limiting modulation, and for limiting power.

In addition to the interstage filtering the multi-section low pass filter made up of C1004,L1001, C1005, L1002, C1010, C1014 & C1015.

Limiting Modulaton:
The transmitter audio limiting circuitry is contained in the loop filter IC01.

Limiting Power: There is no provision for limiting power.

(12) Digital modulation. This unit does NOT use digital modulation.

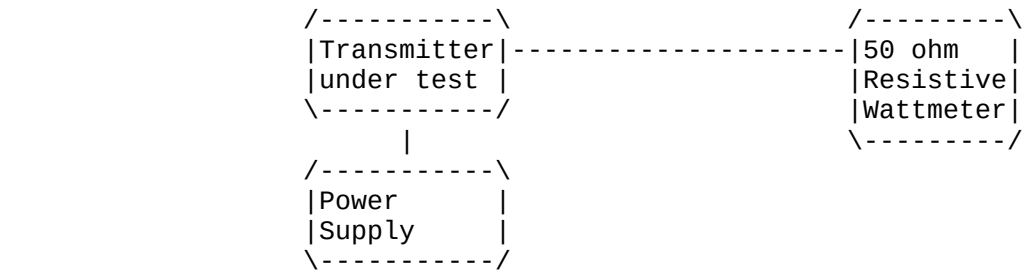
2.983(e) The data required by 2.985 through 2.997 is submitted below.

2.985(a) RF_power_output.

RF power is measured by connecting a 50 ohm, resistive wattmeter to the RF output connector. With a nominal battery voltage of 7.2 VDC, and the transmitter properly adjusted the RF output measures:

POWER HIGH
INPUT POWER: (7.2V)(2.1A) = 15.1 Watts
OUTPUT POWER: 5.4 Watts Efficiency: 36%
POWER LOW
INPUT POWER: (7.2V)(0.8A) = 5.76 Watts
OUTPUT POWER: 1.2 Watts Efficiency: 21.0%

METHOD OF MEASURING RF POWER OUTPUT



2.987(a) Voice Modulation_characteristics:

(a) AUDIO_FREQUENCY_RESPONSE SEE EXHIBIT #13.

2.987(a) AUDIO_LOW_PASS_FILTER
The audio low pass filter is included and the plot is shown as EXHIBIT #11. Rules 90.210(b,d, & e) for mobile stations with a low pass filter.
SEE EXHIBIT # 15.

2.987(b) Audio_input_versus_modulation A plot of the audio input versus deviation is shown in in EXHIBITS #12 AND 14.

2.989(c) Occupied_bandwidth:

90.210(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.

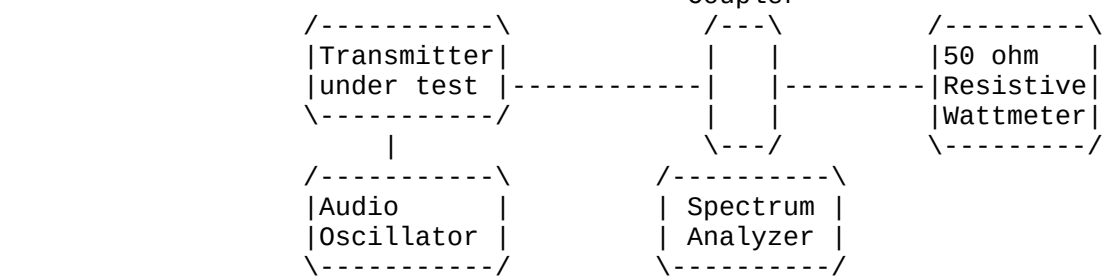
90.210(d) 12.5KHz channel bandwidth equipment. For transmitters de signed to operate with a 12.5KHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows;
(1) On any frequency from the center of the authorized bandwidth f0 to 5.625kHz removed from fP0: Zero dB.
(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency(fd-2.88kHz)dB.
(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency(fd in kHz Log(P) or 70dB, whichever is the lesser attenuation.

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

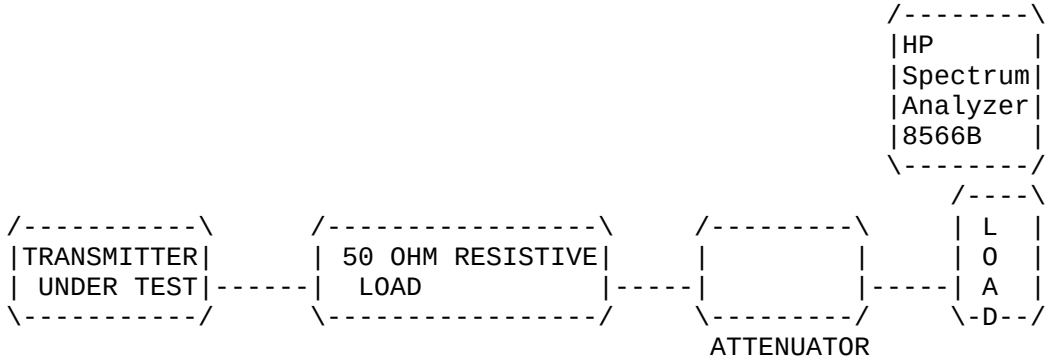


2.991 Spurious_emissions_at_antenna_terminals(conducted): Data on the following page shows the level of conducted spurious responses. The carrier was modulated 100% using a 2500Hz tone. The spectrum was scanned from 0.4 to at least the 10th harmonic of the fundamental. The measurements were made in accordance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

2.991 Continued Spurious_Emissions_at_the_Antenna_Terminals:

90.210(d)(3)

Method of Measuring Conducted Spurious Emissions



REQUIREMENTS: Emissions must be 43 +10log(Po) dB below the mean power output of the transmitter.
For 25KHz 43 + 10log(5.1) = 43+ 7.0 = 50.1dB
For 12.5KHz 50 + 10log(5.0) = 50 + 7.0 = 57.0

	EMISSION FREQUENCY ___MHz___	dB BELOW CARRIER
HIGH POWER	173.975	00.0
	347.95	-71.2
	480.12	-84.5
LOW POWER	173.975	00.0
	347.95	-75.2
	521.93	-95.0
	695.90	-98.0

METHOD OF MEASUREMENT: The procedure used was TIA/EIA-603 STANDARD without any exceptions. An audio generator was connected to the UUT through a dummy microphone circuit and the output of the transmitter connected to a standard load and from the standard load through a pre-selector filter of the spectrum analyzer. The spectrum was scanned from 400KHz to at least the tenth harmonic of the fundamental using a HP model 8566B spectrum analyzer. The measurements were made using the shielded room located at TIMCO ENGINEERING INC. 849 N.W. SR 45 NEWBERRY FLORIDA 32669.

2.993(a)(b) Field_strength_of_spurious_emissions:

NAME OF TEST: RADIATED SPURIOUS EMISSIONS

REQUIREMENTS: Emissions must be 50 +10log(Po) dB below the mean power output of the transmitter or 70dB, which ever is the lessor.

50 + 10log(50) = 67.0 dB

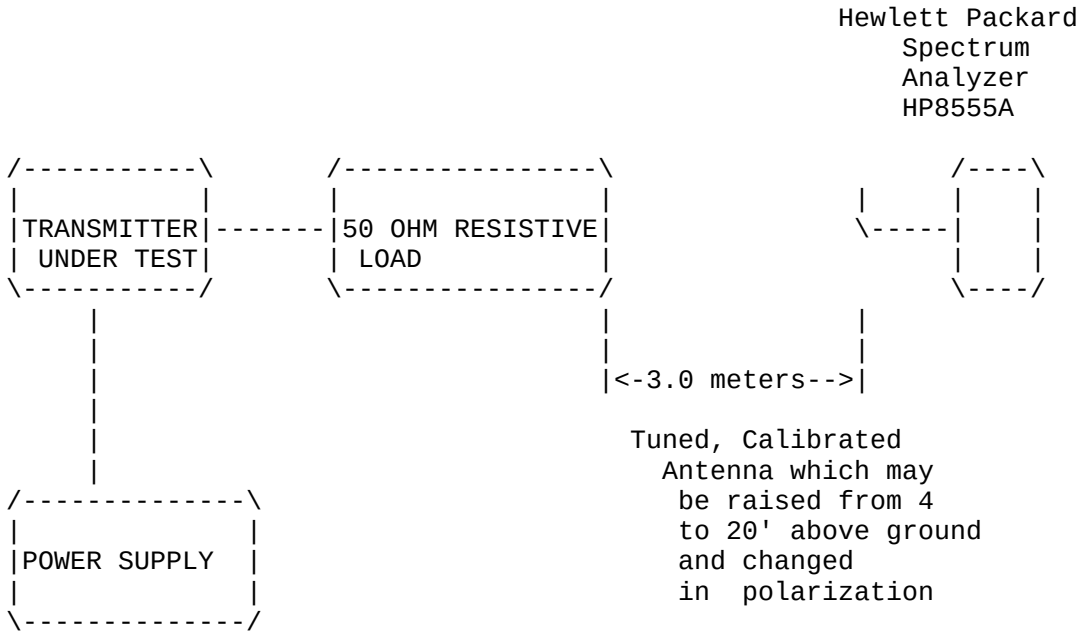
EMISSION FREQUENCY MHz	METER READING @ 3 METERS dBuV	COAX LOSS dB	A.C.F. dB	FIELD STRENGTH dBuV/m	ATT. dB	MARGIN dB	ANT. POL.
HIGH POWER							
148.00	41.40	0.80	16.90	59.10	0.00	0.00	H
296.00	24.40	1.40	15.44	41.24	17.86	17.86	H
444.00	25.20	1.60	18.01	44.81	14.29	14.29	V
592.00	15.90	1.60	20.04	37.54	21.56	21.56	H
740.00	13.80	2.00	21.82	37.62	21.48	21.48	V
888.00	10.60	2.90	24.06	37.56	21.54	21.54	V
1036.00	4.90	1.00	24.14	30.04	29.06	29.06	H
1184.00	5.70	1.00	24.74	31.44	27.66	27.66	V
LOW POWER							
148.02	35.60	0.80	16.90	53.30	0.00	0.00	H
296.00	26.30	1.40	15.44	43.14	10.16	10.16	H
444.00	22.40	1.60	18.01	42.01	11.29	11.29	H
592.00	12.10	1.60	20.04	33.74	19.56	19.56	H
740.00	15.80	2.00	21.82	39.62	13.68	13.68	V
888.00	12.50	2.90	24.06	39.46	13.84	13.84	V
1036.00	4.02	1.00	24.14	29.16	24.14	24.14	V
1036.00	4.00	1.00	24.14	29.14	24.16	24.16	V
1186.00	5.70	1.00	24.74	31.44	21.86	21.86	V

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 ANSI STANDARD C63.4-1992 with the exception of briefly connecting the transmitter to a half wave dipole for the purpose of establishing a reference. Measurements were made at the open field test site of TIMCO ENGINEERING INC. located at 6051 N.W. 19th Lane Gainesville, FL 32605.

2.993(a)(b)

2.993(a)(b) Continued Field_strength_of_spurious_emissions:

Method of Measuring Radiated Spurious Emissions



Equipment placed 4' above ground
on a rotatable platform.

2.995(a)(b)(d) Frequency_stability:
90.213(a)

Temperature and voltage tests were performed to verify that the frequency remains within the .0005%, 5.0 ppm specification limit, for 25KHz spacing & 0.00025% for 12.5KHz spacing and 0.0001% for 6.25KHz spacing. The test was conducted as follows: The transmitter was placed in the temperature chamber at 25 degrees C and allowed to stabilize for one hour. The transmitter was keyed ON for one minute during which four frequency readings were recorded at 15 second intervals. The worse case number was taken for temperature plotting. The assigned channel frequency was considered to be the reference frequency. The temperature was then reduced to -30 degrees C after which the transmitter was again allowed to stabilize for one hour. The transmitter was keyed ON for one minute, and again frequency readings were noted at 15 second intervals. The worst case number was recorded for temperature plotting. This procedure was repeated in 10 degree increments up to + 50 degrees C.

Readings were also taken at minus 25% of the battery voltage of 5.4VDC, which we estimate to be the battery endpoint.

MEASUREMENT DATA:

Assigned Frequency (Ref. Frequency): 160.025 000MHz

TEMPERATURE_C	FREQUENCY_MHz	PPM
REFERENCE_____	160.025 000	00.0
-30_____	160.025 110	+ 0.69
-20_____	160.025 350	2.18
-10_____	160.025 360	2.24
0_____	160.025 330	2.06
+10_____	160.025 300	1.87
+20_____	160.025 310	1.93
+30_____	160.024 930	-0.44
+40_____	160.024 640	2.25
+50_____	160.024 720	1.74
20oC Battery End-Point 5.6VDC	160.025 220	1.37

RESULTS OF MEASUREMENTS: The maximum frequency variation over the temperature range was -2.25 to 2.24 ppm. The maximum frequency variation over the voltage range was +1.37ppm.

2.995(a)(b)(d) Frequency_stability:
90.214 Transient Frequency Behavior

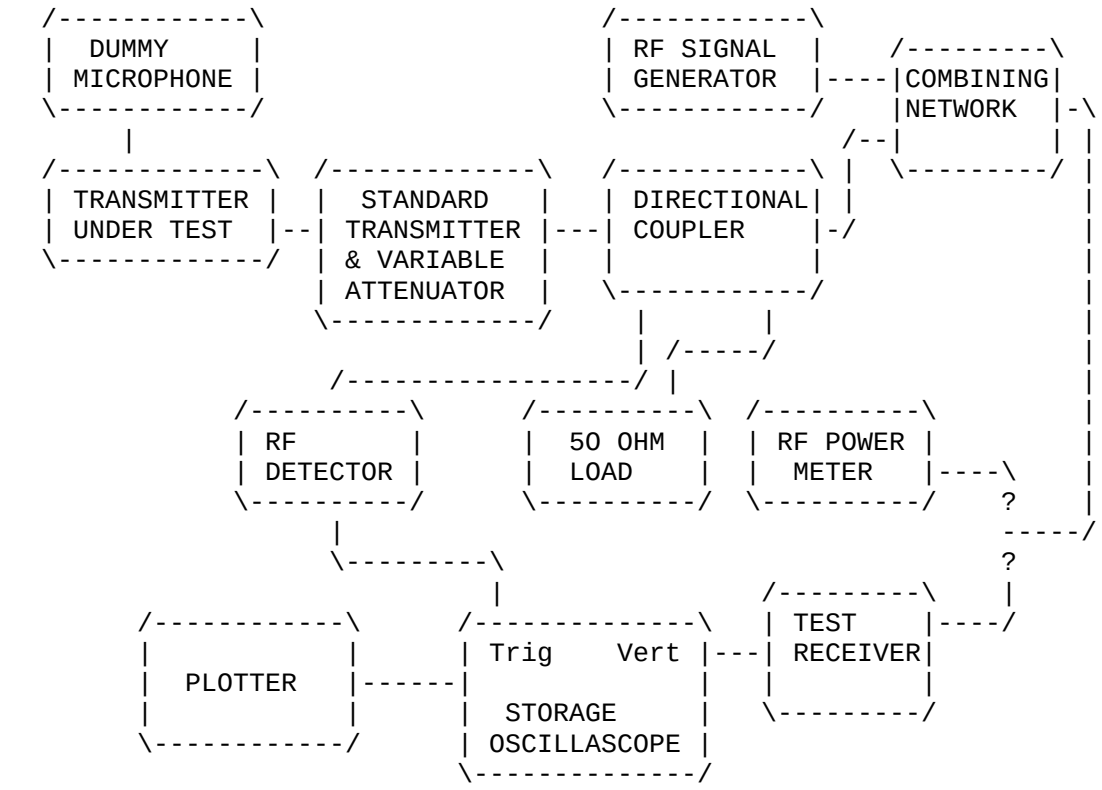
REQUIREMENTS: In the 150-174MHz frequency band, transient frequencies must be within the maximum frequency difference limits during the time interval indicated below for 12.5kHz Channels:

Time Interval	Maximum Frequency	Portable Radios 150-174Mhz
t1	+12.5kHz	5.0ms
t2	+6.25kHz	20.0ms
t3,t4	+12.5kHz	5.0ms

TEST PROCEEDURE: TIA/EIA TS603 PARA 2.2.19, the levels were set as follows;

1. Using the varible attenuator the transmitter level was set to 40dB below the test recievers maximum input level, then the transmitter was turned off.
2. With the Transmitter off the signal generator was set 20dB below the level of the transmitter in the above step, this level will be maintained with the signal generator through-out the test.
3. Reduce the attenuation between the transmitter and the RF detector by 30dB.
4. With the levels set as above the transient frequency behavior was observed & recorded.

2.995(a)(b)(d) Frequency_stability:
90.214 Transient Frequency Behavior
(Continued)



2.983(f) Photo_or_Drawing_of_Label:
See Page 3.

2.983(g) Photos_of_Equipment:
See Pages 5A-5G.

2.999 Measurement_Procedures_for_Type_Acceptance:

Measurement techniques have been in accordance with EIA specifications and the FCC requirements.

2.909 Certification_of_Technical_Data_by_Engineers

We, the undersigned, certify that the enclosed measurements and enclosed data are true and correct.

_____
S.S. Sanders
Engineer

LIST OF TEST EQUIPMENT

1. Spectrum Analyzer: Hewlett Packard 8566B - Opt 462, w/ preselector 85685A, & Quasi-Peak Adapter HP 8565OA, & HP 8449B - OPT H02 Cal. 7/6/99
2. Signal Generator, Hewlett Packard 8640B, cal. 9/23/99
3. Signal Generator, HP 8614A Serial No.2015A07428 cal. 5/27/99
3. Eaton Biconnical Antenna Model 94455-1 20-200 MHz Serial No. 0997 Cal. 10/30/98
4. Electro-Metric Dipole Kit, 20-1000 MHz, Model TDA-30 10/31/98
5. Electro-Metric Horn 1-18 GHz, Model RGA-180, Cal. 4/27/99
6. Electro-Metric Antennas Model TDA-30/1-4,Cal. 10/15/98
7. Electro-Metric Line Impedance Stabilization Network Model No. EM-7821, Serial No. 101; 100KHz-30MHz 50uH. Cal.11/19/98
8. Electro-Metric Line Impedance Stabilization Network Model No. EM-7820, Serial No. 2682; 10KHz-30MHz 50uH. Cal. 11/19/98
9. Special low loss cable was used above 1 GHz
10. Tenney Temperature Chamber
11. AC Voltmeter, HP 400FL, Serial No 2213A14499. Cal. 9/21/99
12. Digital Multimeter, Fluke 8010A/12A, Serial No. 4810047. Cal 9/21/99
13. Digital Multimeter, Fluke 77, Serial No. 43850817. Cal 9/21/99
14. Oscilloscope, Tektronix 2230, Serial No. 300572. Cal 9/23/99