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APPLICANT: TEKK INC.

FCC ID: GOXNT20

TEST REPORT:

EXHIBITS:

GENERAL_INFORMATION_REQUIRED
FOR_TYPE_ACCEPTANCE

2.983 (a,b,c) TEKK INC. will sell the
MODEL NO. GOXNT20 VHF transmitter in quantity,
for use under FCC RULES PART 22 & 90.

2.983 (d) TECHNICAL_DESCRIPTION

(1) Type of Emission: 10K0F3E For 25KHz
10K0F3E For 12.5KHz

For 25KHz
Bn = 2M + 2DK
M = 3000
D = 2.0KHz (Peak Deviation)
K = 1
Bn = 2(3.0K) + 2(2.0K)(1) = 6.0K + 4.0K = 10.0K
ALLOWED AUTHORIZED BANDWIDTH = 20.00KHz.

For 12.5KHz
Bn = 2M + 2DK
M = 3000
D = 2.0KHz (Peak Deviation)
K = 1
Bn = 2(3.0K) + 2(2.0K)(1) = 6.0K + 4.0K = 10.0K
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:
1.5Watts,
into a 50 ohm resistive load.

(5) DC Voltages and Current into Final Amplifier:

POWER INPUT
FINAL AMPLIFIER ONLY
Vce = 7.50 Volts
Ice = 0.71 A.

Pin = 5.35 Watts

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

SEE EXHIBITS 6A-6B

2.983(d) (7) Complete Circuit Diagrams: The circuit diagram is included as EXHIBIT #7. The block diagram is included as EXHIBIT #5.

(8) Instruction book. The instruction manual is cluded 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 multisection low pass filter made up of L201, L202, L203, L205, C201, C203, C202, C204, C205, C206, C207, C208, C209, C211, & TC201.

Limiting Modulaton:
The transmitter audio limiting circuitry is contained in the loop filter IC402.

Limiting Power: There is no provision for limiting power.

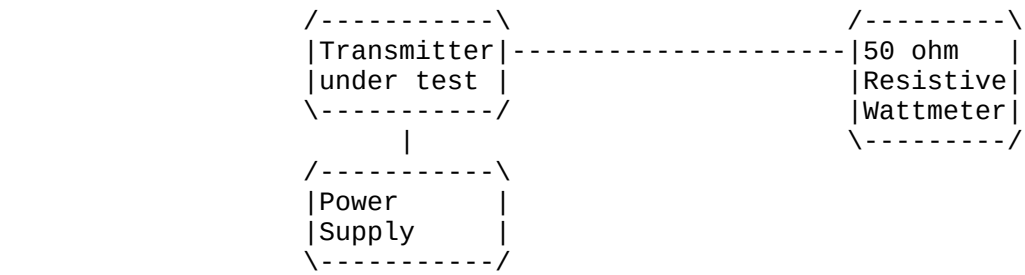
(12) Digital modulation. This unit does NOT use digital modulation.

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 7.2V, and the transmitter properly adjusted the RF output measures:

POWER HIGH
INPUT POWER: (7.2V)(0.71A) = 5.11 Watts
OUTPUT POWER: 1.5 Watts Efficiency: 28%



2.987(a) Voice Modulation_characteristics:

(a) AUDIO_FREQUENCY_RESPONSE See the EXHIBIT #11.

2.987(a) AUDIO_LOW_PASS_FILTER
The audio low pass filter is included and the plot is shown as EXHIBIT #13. Rules 90.210(b,d, & e) for mobile stations with a low pass filter.

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

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 designed 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.

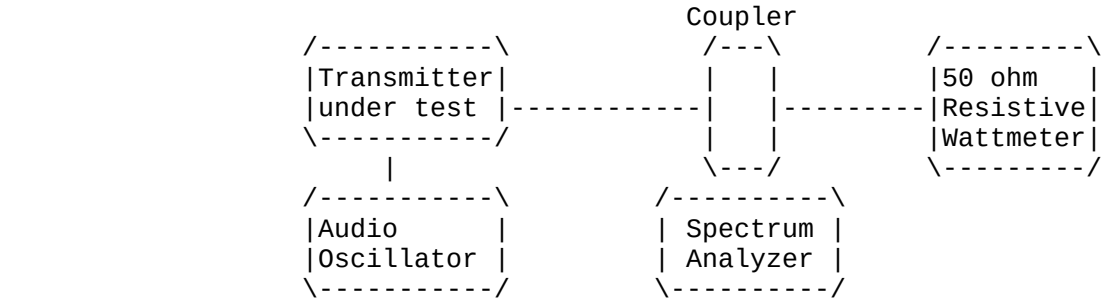
(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency(fd in kHz Log(P) or 70dB, whichever is the lesser attenuation.

Radiotelephone transmitter with modulation limiter.

Test procedure: TIA/EIA-603 para 2.2.11 , with the exception that various tones were used.

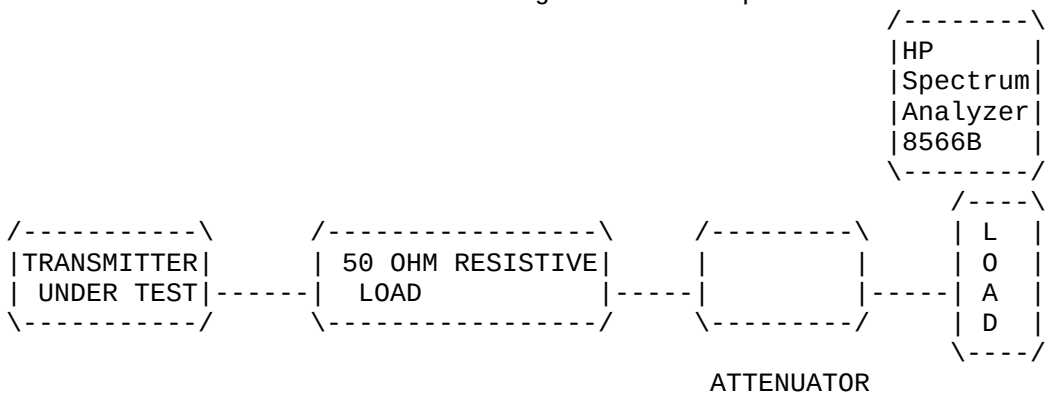
Test procedure diagram

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.

Method of Measuring Conducted Spurious Emissions



2.991 Continued Spurious_Emissions_at_the_Antenna_Terminals:

REQUIREMENTS: Emissions must be 43 +10log(Po) dB below the mean power output of the transmitter.

For 25KHz 43 + 10log(5.5) = 43+ 7.4 = 50.4dB

For 12.5KHz 50 + 10log(Po) = 50 + 3.01 = 53.01

EMISSION FREQUENCY ___MHz___	dB BELOW CARRIER _____
150.18	00.0
300.36	-54.6
450.54	-75.5
750.67	-61.5
900.81	-86.6
1050.92	-64.6
1201.03	-64.0
1351.17	-84.1
1501.31	-85.6

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 preselector 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. 25355 WEST NEWBERRY ROAD, NEWBERRY FLORIDA 32669.

2.993(a)(b) Field_strength_of_spurious_emissions:

NAME OF TEST: RADIATED SPURIOUS EMISSIONS

REQUIREMENTS: Emissions must be 43 +10log(Po) dB below the mean power output of the transmitter.

43 + 10log(1.5) = 44.8 dB

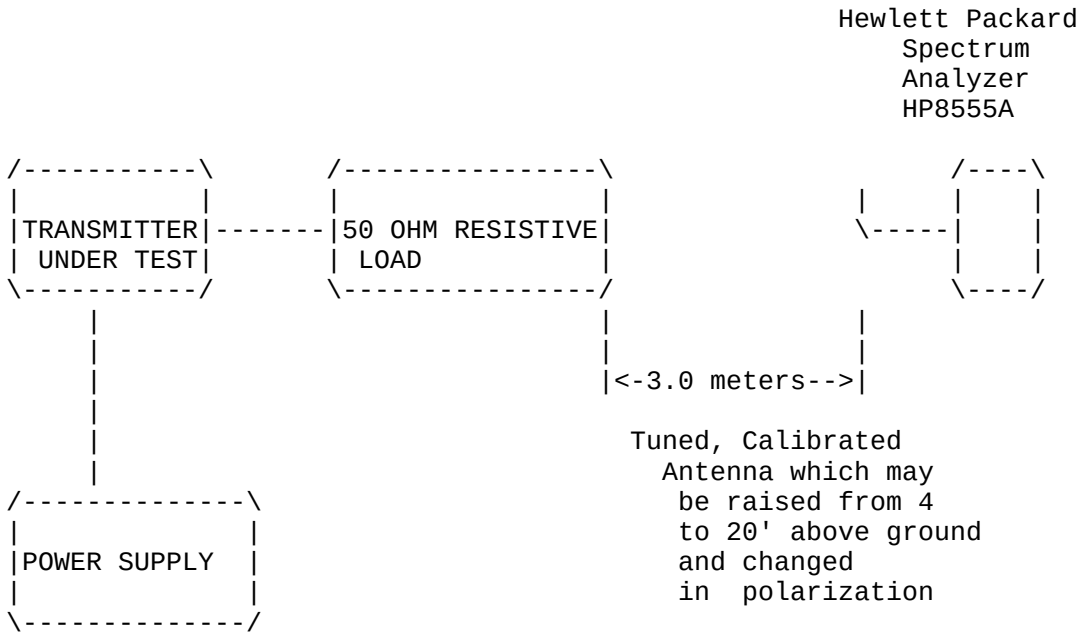
EMISSION FREQUENCY __MHz	METER READING @ 3 METERS _____dBuV____	COAX LOSS dB	ANTENNA CORRECTION FACTOR dB_dB_	FIELD STRENGTH dBuV/m	ATT. _dB_	dB__	
150.18	104.40	0.90	16.89	122.19	0.00	0.00	H
300.36	39.20	1.40	15.69	56.29	65.91	21.10	V
450.54	28.50	1.60	18.16	48.26	73.93	29.13	H
600.72	22.40	1.60	20.12	44.12	78.08	33.28	H
750.67	24.20	2.00	21.91	48.11	74.09	29.29	H
900.81	23.10	2.90	24.20	50.20	72.00	27.20	H
1050.92	28.60	1.00	24.20	53.80	68.39	23.59	H
1201.03	29.10	1.00	24.80	54.90	67.29	22.39	H
1351.17	12.80	1.00	25.40	39.20	82.99	38.19	V
1501.31	16.70	1.00	26.01	43.71	78.49	33.69	H

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): 150.125 000MHz

TEMPERATURE_C	FREQUENCY_MHz	PPM
REFERENCE_____	150.125 000	00.0
-30_____	150.124 500	-3.33
-20_____	150.124 680	-2.13
-10_____	150.125 160	+1.06
0_____	150.125 040	+0.27
+10_____	150.125 050	0.33
+20_____	150.124 940	-0.40
+30_____	150.124 860	-0.93
+40_____	150.124 810	-1.27
+50_____	150.124 800	-1.33

20oC Battery End-Point 5.6VDC 150.125 340 +2.26

RESULTS OF MEASUREMENTS: The maximum frequency variation over the temperature range was -3.33 to 1.06 ppm. The maximum frequency variation over the voltage range was +2.26 ppm.

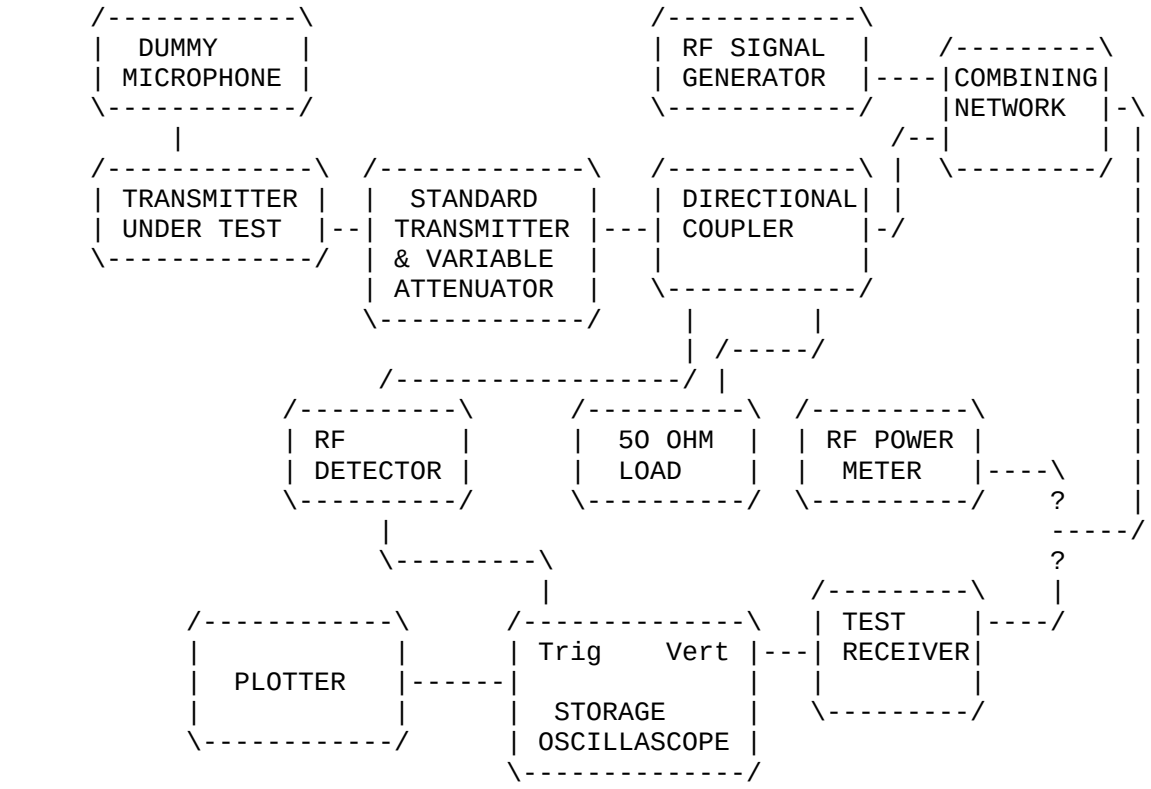
2.995(a)(b)(d) Frequency_stability:
90.214 Transient Frequency Behavior

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.


DUMMY MICROPHONE
RF SIGNAL GENERATOR
COMBINING NETWORK
TRANSMITTER UNDER TEST
STANDARD TRANSMITTER & VARIABLE ATTENUATOR
DIRECTIONAL COUPLER
RF DETECTOR
50 OHM LOAD
RF POWER METER
?
?
PLOTTER
Trig Vert
STORAGE OSCILLASCOPE
TEST RECEIVER

2.983(f) Photo_or_Drawing_of_Label: See Page 2.

2.983(g) Photos_of_Equipment:
See Pages 4A-4G.

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
S.S. Sanders
Engineer

LIST_OF_TEST_EQUIPMENT

1. Frequency Counter - Hewlett Packard Model 5383A
   S/N 2338A06071

2. SPECTRUM ANALYZER - HP Model 8568B

3. RF PRE-SELECTOR - HP Model 85685A

4. QUASI-PEAK ADAPTER - HP 85650A

5. RF Power Meter - Bird Model 43 Serial 81398

6. RF Attenuators - Narda MOD 766-20

7. Audio Oscillator - Hewlett Packard Model 201C
   Serial 351-06107

8. Modulation meter - IFR MODEL AM/FM 500A.

9. Voltmeter - Hewlett Packard Model 427A
   Serial Number 731-0751

10. HP Distortion Analyzer Model No. 334A
    Serial Number 822-01817

11. Tenney Jr. Temperature Chamber

11. Eaton Biconical antenna Model 94455-1 antenna kit 20-200 MHz

12. Electro-Metric Dipole Kit 20-1000MHz, Model TDA 25

13. Electro-Metrics RGA-180 antenna kit 1- 18 GHz

14. HP broadband preamplifier model 8447D, serial no.
    1644A00978, 30 - 1000 MHz.

15. Avaatek AFT-2032 broadband preamplifier, serial no.
    8606SN01, 1 - 2 GHz.