

TABLE OF CONTENTS LIST

APPLICANT: TEKK INC.

FCC ID: GOXNT20

**TEST REPORT:**

PAGE	1.....	COVER SHEET - GENERAL INFORMATION & TECHNICAL DESCR.
PAGE	2.....	TECHNICAL DESCRIPTION CONTINUED
PAGE	3.....	RF POWER OUTPUT AND MODULATION CHARACTERISTICS
PAGE	4.....	OCCUPIED BANDWIDTH
PAGE	5.....	SPURIOUS EMISSIONS AT ANTENNA TERMINALS
PAGE	6.....	FIELD STRENGTH OF SPURIOUS EMISSIONS
PAGE	7.....	METHOD OF MEASURING RADIATED SPURIOUS EMISSIONS
PAGE	8.....	FREQUENCY STABILITY
PAGE	9-10....	TRANSIENT FREQUENCY STABILITY
PAGE	11.....	CERTIFICATION OF TECHNICAL DATA
PAGE	12.....	LIST OF TEST EQUIPMENT

**EXHIBITS:**

EXHIBIT	1.....	POWER OF ATTORNEY LETTER
EXHIBIT	2.....	FCC ID LABEL SAMPLE
EXHIBIT	3.....	SKETCH OF LOCATION
EXHIBIT	4A.....	EXTERNAL FRONT VIEW PHOTOGRAPH
EXHIBIT	4B.....	EXTERNAL REAR VIEW PHOTOGRAPH
EXHIBIT	4C.....	EXTERNAL SIDE VIEW PHOTOGRAPH
EXHIBIT	4D.....	EXTERNAL SIDE VIEW PHOTOGRAPH
EXHIBIT	4E.....	EXTERNAL TOP VIEW PHOTOGRAPH
EXHIBIT	4F.....	INTERNAL COPPER SIDE PHOTOGRAPH
EXHIBIT	4G.....	INTERNAL COMPONENT SIDE PHOTOGRAPH
EXHIBIT	5.....	BLOCK DIAGRAM
EXHIBIT	6A-6B....	LIST OF ACTIVE DEVICES
EXHIBIT	7A-7B....	SCHEMATICS
EXHIBIT	8A-8D....	USER'S MANUAL
EXHIBIT	9A-9B....	TUNING PROCEDURE
EXHIBIT	10A-10C...	THEORY OF OPERATION
EXHIBIT	11.....	AUDIO FREQUENCY RESPONSE GRAPH
EXHIBIT	12.....	AUDIO INPUT VS DEVIATION GRAPH
EXHIBIT	13.....	AUDIO LOW PASS FILTER GRAPH
EXHIBIT	14.....	OCCUPIED BANDWIDTH CW PLOT
EXHIBIT	15.....	OCCUPIED BANDWIDTH 2.0K DEVIATION PLOT
EXHIBIT	16A-16B...	TRANSIENT FREQUENCY RESPONSE PLOTS

APPLICANT: TEKK INC.

FCC ID: GOXNT20

REPORT #: F:\CUS\T\TEKK\TEK187A8.RPT

PAGE: TABLE OF CONTENTS

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

$$B_n = 2M + 2DK$$

$$M = 3000$$

$$D = 2.0\text{KHz (Peak Deviation)}$$

$$K = 1$$

$$B_n = 2(3.0K) + 2(2.0K)(1) = 6.0K + 4.0K = 10.0K$$

ALLOWED AUTHORIZED BANDWIDTH = 20.00KHz.

For 12.5KHz

$$B_n = 2M + 2DK$$

$$M = 3000$$

$$D = 2.0\text{KHz (Peak Deviation)}$$

$$K = 1$$

$$B_n = 2(3.0K) + 2(2.0K)(1) = 6.0K + 4.0K = 10.0K$$

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

$$V_{ce} = 7.50 \text{ Volts}$$

$$I_{ce} = 0.71 \text{ A.}$$

$$P_{in} = 5.35 \text{ Watts}$$

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

SEE EXHIBITS 6A-6B

APPLICANT: TEKK INC.  
FCC ID: GOXNT20  
REPORT NO.: F:\CUS\T\TEKK\TEK187A8.RPT  
PAGE NO. : 1

- 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 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 L201, L202, L203, L205, C201, C203, C202, C204, C205, C206, C207, C208, C209, C211, & TC201.
- Limiting Modulation:  
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.

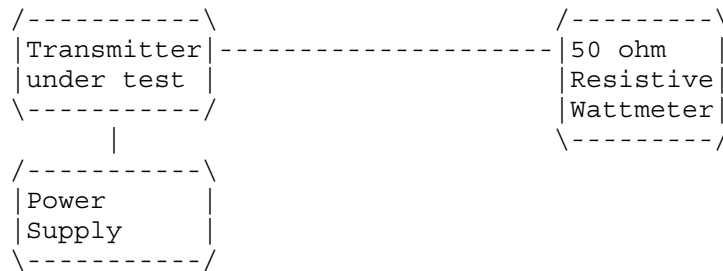
2.985(a) RF\_power\_output.

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.

APPLICANT: TEKK INC.  
FCC ID: GOXNT20  
REPORT NO.: F:\CUS\T\TEKK\TEK187A8.RPT  
PAGE NO.: 3

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  $f_0$  to 5.625kHz removed from  $f_{P0}$ : Zero dB.

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency  $(f_d - 2.88\text{kHz})$  dB.

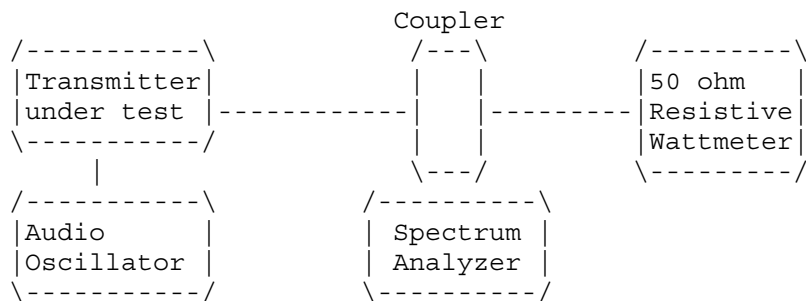
(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency  $(f_d \text{ in kHz } \log(P) \text{ or } 70\text{dB})$ , whichever is the lesser attenuation.

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



APPLICANT: TEKK INC.  
FCC ID: GOXNT20  
REPORT NO.: F:\CUS\T\TEKK\TEK187A8.RPT  
PAGE NO.: 4



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.

$$43 + 10\log(1.5) = 44.8 \text{ dB}$$

METER READING			ANTENNA				
EMISSION FREQUENCY	@ 3 METERS	COAX LOSS	CORRECTION FACTOR	FIELD STRENGTH	ATT.		
MHz	dBuV	dB	dB_dB	dBuV/m	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

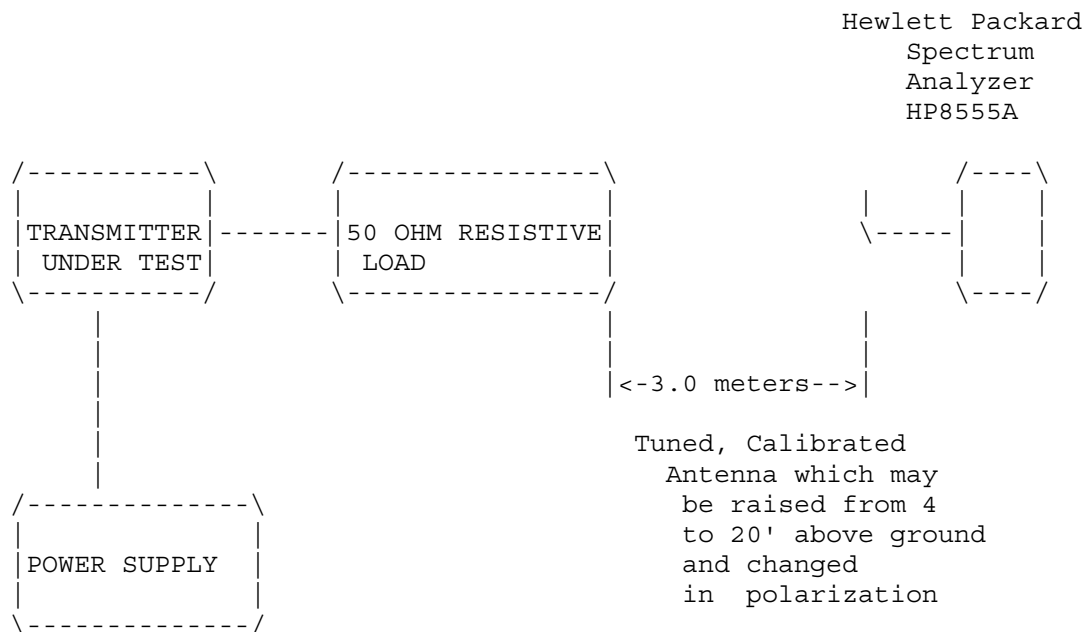
METHOD OF MEASUREMENT: The tabulated Data shows the results of the radiated field strength emissions test. The spectrum was scanned from 30 to at least the tenth harmonic of the fundamental. This test was conducted per ANSI STANDARD C63.4-1992 with the exception of briefly connecting the transmitter 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.

APPLICANT:    TEKK INC.  
FCC ID:       GOXNT20  
REPORT NO.:   F:\CUS\T\TEKK\TEK187A8.RPT  
PAGE NO.:     6

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.

APPLICANT: TEKK INC.  
FCC ID: GOXNT20  
REPORT NO.: F:\CUS\T\TEKK\TEK187A8.RPT  
PAGE NO.: 7



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.

APPLICANT: TEKK INC.  
 FCC ID: GOXNT20  
 REPORT NO.: F:\CUS\T\TEKK\TEK187A8.RPT  
 PAGE NO.: 8

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:

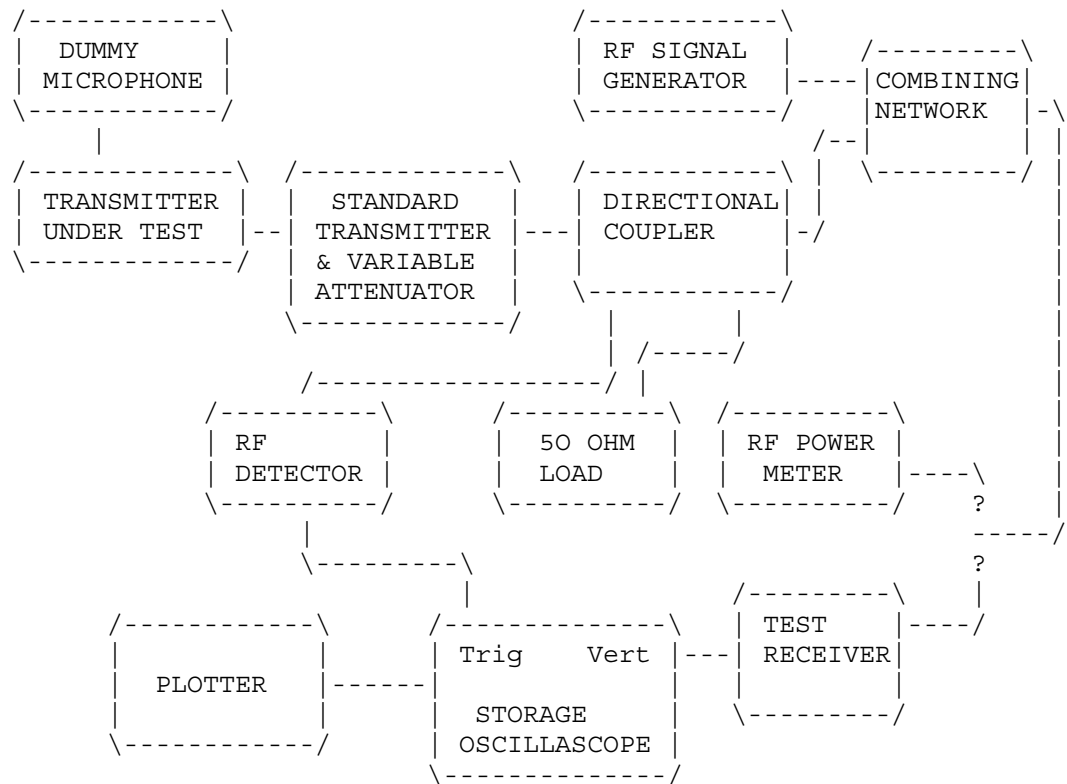
Time Interval	Maximum Frequency	Portable Radios 150-174Mhz
t1	+12.5kHz	5.0ms
t2	+6.25kHz	20.0ms
t3,t4	+12.5kHz	5.0ms

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

1. Using the variable attenuator the transmitter level was set to 40dB below the test receivers 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.

APPLICANT: TEKK INC.  
FCC ID: GOXNT20  
REPORT NO.: F:\CUS\T\TEKK\TEK187A8.RPT  
PAGE NO.: 9

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



APPLICANT: TEKK INC.  
 FCC ID: GOXNT20  
 REPORT NO.: F:\CUS\T\TEKK\TEK187A8.RPT  
 PAGE NO.: 10

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

APPLICANT:   TEKK INC.  
          FCC ID:   GOXNT20  
REPORT NO.:   F:\CUS\T\TEKK\TEK187A8.RPT  
PAGE NO.:   11

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.

APPLICANT: TEKK INC.  
FCC ID: GOXNT20  
REPORT NO.: F:\CUS\T\TEKK\TEK187A8.RPT  
PAGE NO.: 12

