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FCC ID: NZTSF-140

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TEST EQUIPMENT LIST

1. Spectrum Analyzer: Hewlett Packard 8566B - Opt 462, w/ preselector 85685A, & Quasi-Peak Adapter HP 85650A, & HP 8449B - OPT H02 Cal. 6/26/98
2. Signal Generator, Hewlett Packard 8640B, cal. 10/1/98
3. Eaton Biconical 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. 10/30/98
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

TEST PROCEDURE

GENERAL: This report shall NOT be reproduced except in full without the written approval of TIMCO ENGINEERING, INC.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-1992 using a HEWLETT PACKARD spectrum analyzer with a preselector. The bandwidth of the spectrum analyzer was 100 kHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100KHz and the video bandwidth was 300KHz. The ambient temperature of the UUT was &temp& with a humidity of &humr&.

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. The antenna correction factors are stated in terms of dB. The gain of the Preselector was accounted for in the Spectrum Analyzer Meter Reading.

Example:

Freq (MHz) METER READING + ACF = FS  
33 20 dBuV + 10.36 dB = 30.36 dBuV/m @ 3m

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## TEST PROCEDURES CONTINUED

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ANSI STANDARD C63.4-1992 10.1.7 MEASUREMENT PROCEDURES: The unit under test was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The table used for radiated measurements is capable of continuous rotation.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

The situation was similar for the conducted measurement except that the table did not rotate. The EUT was setup as described in ANSI C63.4-1992 with the EUT 40 cm from the vertical ground wall.

### 2.1033(b)(4) CIRCUIT DESCRIPTION:

This unit is a low power wireless microphone operating in the 88-108 MHz FM broadcast band. Transistor TR2 is an LC oscillator stage. The output of the condenser microphone is fed to the audio amplifier TR2 which frequency modulates the oscillator.

The unit is operated on 3 Volts and is powered by two AA batteries.

### ANTENNA & GROUND:

This unit uses a short wire antenna. The antenna is self contained and there is no provision for connecting an external antenna.

No ground connection is provided. The only ground used is the ground track on the PC board.

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NAME OF TEST: RADIATION INTERFERENCE

RULES PART NO.: 15.239

REQUIREMENTS: CARRIER FREQUENCY WILL NOT EXCEED 48.0 dBuV/m AT 3M.  
OUT-OF-BAND EMISSIONS SHALL NOT EXCEED:

30 - 88 MHz	40.0 dBuV/M	MEASURED AT 3 METERS
88 - 216 MHz	43.5 dBuV/M	
216 - 960 MHz	46.0 dBuV/M	
ABOVE 960 MHz	54.0 dBuV/M	

TEST DATA:

EMISSION FREQUENCY MHz	METER READING AT 3 METERS dBuV	COAX LOSS dB	ANTENNA CORRECTION FACTOR	FIELD STRENGTH dBuV/m@3m	MARGIN dB	ANT. POL.
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TUNING RANGE - 88-108 MHz

89.91	32.20	0.80	12.89	45.89	2.11	H
179.82	27.20	0.90	14.82	42.92	0.58	H
96.66	32.90	0.80	9.80	43.50	4.50	H
193.40	24.00	0.90	13.31	38.21	5.29	H
107.40	34.40	0.80	8.36	43.56	4.44	H
214.80	18.10	1.20	12.35	31.65	11.85	V

SAMPLE CALCULATION:

$$FSdBuV/m = MR(dBuV) + ACFdB.$$

TEST PROCEDURE: The procedure used was ANSI STANDARD C63.4-1992. The spectrum was scanned from 30 MHz to 1000 MHz. When an emission was found, the table was rotated to produce the maximum signal strength. The antenna was placed in both the horizontal and vertical planes and the worse case emissions were reported. The UUT was tested in 3 orthogonal planes.

TEST RESULTS: THE UNIT DOES MEET THE FCC REQUIREMENTS.

PERFORMED BY: S. S. SANDERS DATE: MAY 20, 1999

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NAME OF TEST: Occupied Bandwidth

RULES PART NO.: 15.239

REQUIREMENTS: Emissions from the device shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88-108 MHz.

THE GRAPH IN EXHIBITS 8 AND 9 REPRESENTS THE EMISSIONS TAKEN FOR THIS DEVICE.

METHOD OF MEASUREMENT: The zero level was set without modulation. A small sample of the transmitter output was fed into the spectrum analyzer and the above photo was taken. The vertical scale is set to -10 dBm per division; the horizontal scale is set to 100 kHz per division.

TEST RESULTS: The unit DOES meet the FCC requirements.

PERFORMED BY: S. S. SANDERS \_\_\_\_\_ MAY 20, 1999

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