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APPLICANT: GMT INDUSTRIAL LTD.

FCC ID: BSYWT-111

TEST EQUIPMENT LIST

1. Spectrum Analyzer: Hewlett Packard 8566B, with preselector HP 85685A, & Quasi-Peak Adapter HP 8565OA, & HP 8449B OPT H02 Cal. 9/30/97
2. Eaton Biconnical Antenna Model 94455-1 20-200 MHz Serial No. 0997 Cal. 9/17/97
3. Electro-Metric Dipole Kit, 20-1000 MHz, Model TDA 25 cal. 5/15/97
4. Electro-Metric Horn 1-18 GHz, Model RGA-180, Cal. 9/24/97
5. Electro-Metric Antennas Model TDS-25-1, TDS-25-2, 9/3/97
6. Electro-Metric Line Impedance Stabilization Network Model No. EM-7821, Serial No. 101; 100KHz-30MHz 50uH. 9/30/97
7. Electro-Metric Line Impedance Stabilization Network Model No. EM-7820, Serial No. 2682; 10KHz-30MHz 50uH. 9/30/97

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 80.2oC with a humidity of 56%.

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

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-1992 using a 50uH LISN. Both lines were observed. The bandwidth of the spectrum analyzer was 10kHz with an appropriate sweep speed. The ambient temperature of the UUT was 80.2oC with a humidity of 56%.

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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 ANSIC63.4-1992 with the EUT 40 cm from the vertical ground wall.

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CIRCUIT DESCRIPTION:

In the receive mode the signal comes in on the receive antenna to the double tuned circuit to the super-regenerative detector Q-1, where the audio is detected. From Q-1 the audio goes to the volume resistor R13 to the input to the three(3) stage audio amplification, Q2, Q3 & Q4. Q4 drives the audio output transformer T1 which is connected to the speaker.

In the transmit mode the speaker is switched so that it is connected to the input to the audio amplifiers Q2, Q3 & Q4 and the output of Q4 drives the transformer T1, which modulates the voltage of the crystal controlled oscillator. Q1, the crystal controlled oscillator is the transmitter. Q1 is connected to the antenna via the output filter made up of L2, C1, C2, L1, & C1A.

ANTENNA AND GROUND CIRCUITRY

This unit makes use of a short, antenna. The antenna is inductively coupled. The antenna is self contained, no provision is made for an external antenna. This unit is powered from a 9.0V battery.

No ground connection is provided. The unit relies on the ground tract of the printed circuit board.

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NAME OF TEST: RADIATION INTERFERENCE

RULES PART NUMBER: 15.109

REQUIREMENTS:
30 to 80 MHz: 40.0 dBuV/M @ 3 METERS
88 to 216 MHz: 43.5 dBuV/M
216 to 960 MHz: 46.0 dBuV/M
ABOVE 960 MHz: 54.0 dBuV/M

TEST RESULTS: A search was made of the spectrum from 30 to 1000 MHz and the measurements indicate that the unit DOES meet the FCC requirements.

TEST DATA:

TUNED FREQ. MHz	EMISSION FREQUENCY MHz	METER READING @ 3m dBuV	COAX LOSS dB	A.C.F. dB	FIELD STRENGTH dBuV/m@3m	MARGIN dB	ANT.
49.89	47.72	12.80	0.25	10.91	23.96	16.04	V
49.89	47.88	13.10	0.25	10.92	24.27	15.73	V
49.89	48.02	12.90	0.25	10.93	24.08	15.92	V
49.89	48.15	12.40	0.25	10.93	23.58	16.42	V
49.89	48.29	11.60	0.25	10.94	22.79	17.21	V
49.89	48.44	12.30	0.25	10.94	23.49	16.51	V
49.89	48.56	12.20	0.25	10.95	23.40	16.60	V
49.89	48.71	12.50	0.25	10.95	23.70	16.30	V
49.89	48.85	13.40	0.25	10.96	24.61	15.39	V
49.89	49.01	13.60	0.25	10.96	24.81	15.19	V
49.89	49.14	14.00	0.25	10.97	25.22	14.78	H
49.89	49.31	14.10	0.25	10.97	25.32	14.68	V
49.89	49.44	11.00	0.25	10.98	22.23	17.77	V
49.89	49.56	11.80	0.25	10.98	23.03	16.97	V

SAMPLE CALCULATION: FSdBuV/m = MR(dBuV) + ACFdB.

TEST PROCEDURE: ANSI STANDARD C63.4-1992 using a Hewlett Packard Model 8566B spectrum analyzer, a Hewlett Packard Model 85685A Preselector, a Hewlett Packard Model 85650A Quasi-Peak adapter, an Electro-Metric Dipole Kit, and an Eaton Model 94455-1 Biconical Antenna. The bandwidth of spectrum analyzer was 100

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TEST PROCEDURE CONTINUED:

kHz with an appropriate sweep speed. 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 receiver was put into the coherant mode by placing an antenna driven by a signal generator off site. The UUT was tested in 3 orthogonal planes.

PERFORMED BY: S. S. SANDERS DATE: MAY 15, 1998