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FCC ID: BSYWT-130

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TEST EQUIPMENT LIST

1. Spectrum Analyzer: Hewlett Packard 8566B - Opt 462, w/ preselector 85685A, & Quasi-Peak Adapter HP 8565OA, & HP 8449B - OPT H02 Cal. 6/26/98
2. Signal Generator, Hewlett Packard 8640B, cal. 10/1/98
3. Eaton Biconnical Antenna Model 94455-1 20-200 MHz Serial No. 0997 Cal. 5/15/98
4. Electro-Metric Dipole Kit, 20-1000 MHz, Model TDA-30 10/15/98
5. Electro-Metric Horn 1-18 GHz, Model RGA-180, Cal. 8/15/98
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 80oC with a humidity of 76%.

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 80oC with a humidity of 76%.

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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.

CIRCUIT_DESCRIPTION:

In the transmit mode the speaker is switched so that it is connected to the input of the audio amplifiers Q10, Q11 & Q12 and the output of Q12 drives the transformer T6, which modulates the voltage of the crystal controlled oscillator, Q9. The crystal controlled oscillator is the transmitter. Q9 is connected to the antenna via the output filter made up of T5,C37, C60, & L3.

ANTENNA_AND_GROUND_CIRCUITRY

This unit makes use of a external 5" antenna. The antenna is inductively coupled. 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 NO.: 15.235

REQUIREMENTS: CARRIER FREQUENCY WILL NOT EXCEED 80 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 dB	FIELD STRENGTH dBuV/m@3m	MARGIN dB	ANT. POL.
49.86	25.90	0.25	10.99	37.14	42.86	H
99.70	2.50	0.80	8.39	11.69	31.81	V
299.20	2.90	1.40	15.65	19.95	26.05	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: FEBRUARY 4, 1999

APPLICANT: GMT INDUSTRIAL LTD

FCC ID: BSYWT-130

NAME OF TEST: Occupied Bandwidth

RULES PART NO.: 15.235

REQUIREMENTS: The field strength of any emissions appearing between the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 26 dB below the level of the unmodulated carrier or to the general limits of 15.209, whichever permits the higher emission levels.

THE GRAPHS IN EXHIBITS 11-12 REPRESENT THE EMISSIONS TAKEN FOR THE DEVICE.

METHOD OF MEASUREMENT: A small sample of the transmitter output was fed into the spectrum analyzer and the attached plot was taken. The vertical scale is set to -10 dBm per division. The horizontal scale is set to 5 kHz per division.

TEST RESULTS: The unit DOES meet the FCC requirements.

PERFORMED BY: S. S. SANDERS DATE: FEBRUARY 4, 1999