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FCC ID: MKDAR447

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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 Biconnical 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 prese-
lector. 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 estab-
lished by adding the meter reading of the spectrum analyzer (which is
set to read in units of dBuV) to the antenna correction factor sup-
plied 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 STAN-
DARD C63.4-1992 using a 50uH LISN. Both lines were observed.
The bandwidth of the spectrum analyzer was 10kHz with an appro-
priate sweep speed. The ambient temperature of the UUT was 80oC with a
humidity of 76%.

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

CIRCUIT_DESCRIPTION:

In the receive mode the signal comes in on the receive antenna to the low pass filter and then to the Rx/Tx switch, D#, D4, & D5. From the Antenna switch the signal goes to the RF amplifier Q1 and then to the band pass filter BFP to the 2nd RF amplifier Q5. From Q5 the signal goes to the mixer Q6. The output of Q6 drives the crystal filter XF1.2. The output of XF1.2 goes to the IF amplifier Q8. The output of Q8 drives the integrated circuit A1A1. The output of A1A1 drives the audio amplifier U5 which is connected to the speaker.

ANTENNA_AND_GROUND_CIRCUITRY

This unit makes use of a external 5 inch 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 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 AT 3 METERS dBuV	ANTENNA		FIELD STRENGTH dBuV/m@3m	MARGIN dB	ANT
			COAX LOSS dB	CORRECTION FACTOR dB			
430.00	399.14	22.20	1.40	16.98	40.58	5.42	H
430.00	798.00	3.30	2.00	22.01	27.31	18.69	V
450.00	419.17	22.80	1.60	17.44	41.84	4.16	H
469.99	439.18	23.80	1.60	17.90	43.30	2.70	H

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 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 coherent 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: APRIL 14, 1999

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