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ENGINEERING STATEMENT
IN REGARD TO MEASUREMENTS ON
ARISTO-CRAFT

FCC ID: BBG5480

A. INTRODUCTION

Hyak Laboratories Inc. has been authorized by Aristo-Craft, to perform measurements on the model ART-5480 transmitter to determine compliance with FCC Rules, Subpart C, Para. 15.227.

The ART-5480 is a low powered, battery operated transmitter designed to operate model trains. It operates at a nominal 27.05 MHz frequency. The transmitter, constructed on an etched circuit card, is powered from a 9 volt battery. An integral, attached antenna is used.

B. DESCRIPTION OF MEASUREMENT FACILITIES

A description of the Hyak Laboratories Inc. radiation test facility is a matter of record with the FCC. The facility was accepted for radiation measurements on October 1, 1976, and is currently listed as an acceptable site.

C. DESCRIPTION OF MEASUREMENT PROCEDURE: RADIATED MEASUREMENTS

Measurements of transmitter radiation field strength were made using ANSI 63.4 (1992) as the test procedure. Measurements were made with 3 meter spacing between the transmitter under test and the test equipment antenna.

The transmitter under test was placed on a rotatable table approximately one meter in height.

A fresh battery was installed.

Measurement of field strength was made through use of HP 8593B and Tektronix 494P spectrum analyzer in conjunction with a HP 8447D and Avantek wide band, low noise preamplifiers; and an Advantest R3361A spectrum analyzer with quasi-peak detector.

C. DESCRIPTION OF MEASUREMENT PROCEDURE: RADIATED MEASUREMENTS
(Continued)

Singer DM-105A series or compliance design biconical calibrated dipoles were used as the test antennas in the 25-1000 MHz range.

For each spurious emission identified between 30 to 271 MHz, (the tenth harmonic) the test assembly was rotated for maximum pickup, the test antenna varied in elevation and the test antenna polarization shifted between horizontal to vertical in order to maximize observed signals.

The measurement procedure included recording the worst-case field strength for receiving antenna polarization, test antenna height variation from 3 feet to 10 feet, test sample rotation, and placing the test sample on each of its major planes.

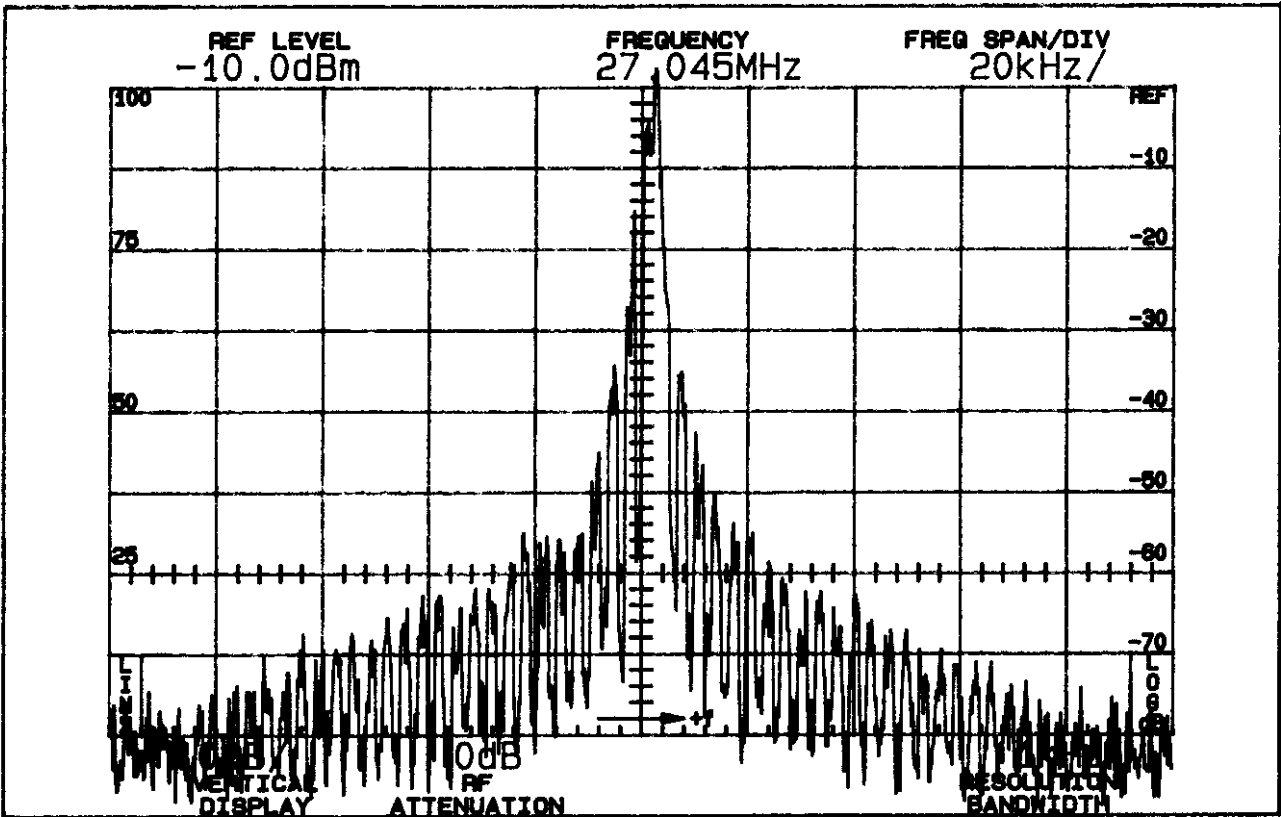
The spectrum was checked from 30 to 271 MHz. All emissions not reported were more than 20 dB below the permitted level or below FCC limits but in the ambient/system noise floor. Tabulation of the measurements are shown in Table 1.

Specific forbidden band scans were made per Paragraph 15.205 and 15.209.

D. REPORT OF RADIATED MEASUREMENTS

Table 1 lists the frequency and amplitude of all signals observed from 30 to 271 MHz that were within 20 dB of the limits of FCC Rules.

FIGURE 1



OCCUPIED BANDWIDTH
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FIGURE 1

TABLE 1

RADIATED FIELD INTENSITY
Measured at 3 meters
15.227

<u>Frequency</u> <u>(MHz)</u>	<u>Meter¹</u> <u>Reading</u> <u>(dBm)</u>	<u>Antenna</u> <u>Factor</u> <u>(dB)</u>	<u>Field²</u> <u>Intensity</u> <u>uV/m @ 3m(P)³</u>	<u>FCC Limit</u> <u>uV/m @ 3m</u>	<u>dB to</u> <u>Limit</u>
27.046	-27.2	- 0.2	9549.9V	10000	- 0.4
54.092	-76.9	9.7	97.7V	100	- 0.2
81.138	-80.8	12.1	82.2V	100	- 1.5
108.186	-96.4	8.8	9.3H	150	-24.2
135.240	-104.0	15.0	7.9H	150	-25.6
162.278	-100.8	17.0	14.5H	150	-20.3
189.324	-98.8	14.0	12.9V	150	-21.3
216.372	-103.2	11.8	6.0V	200	-30.5
243.420	-101.2	11.8	7.6V	200	-28.4
270.462	-98.8	14.4	13.5H	200	-23.4

Note 1: Peak detector reading without averaging.

Note 2: $uV/m = \text{Log}^{-1} \frac{dBu/m}{20}$

$$dBu = dBm + \text{antenna factor} + 107$$

Note 3: Worst-case test antenna polarization.

All other emissions to the tenth harmonic were below FCC limits.

(Unit was measured on 3 major planes)

RBW: 100 kHz, VBW 1 MHz, peak-responding detector calibrated in RMS.

RADIATED FIELD INTENSITY
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TABLE 1

D. FORBIDDEN BAND MEASUREMENTS

Any spurious signals from the transmitter that fell in a forbidden band are identified in Table 1. All forbidden bands, per Paragraph 15.205, from 73 MHz to 271 MHz were searched and any applicable emissions above noise or interference levels are shown in Table 1.

E. OCCUPIED BANDWIDTH

A plot of occupied bandwidth is shown in Figure 1.

F. POWER LINE CONDUCTED MEASUREMENTS

AC line conducted spurious measurements were not made since the device does not use the public power supply system.

G. EXHIBITS

Label; Exhibit 1.
Photographs; Exhibit 2.
Schematic Diagrams; Exhibit 3.
User Instructions; Exhibit 4.
Block Diagram; Exhibit 5.
Circuit Description; Exhibit 6.

H. STATEMENT

Technical test data are from tests performed by me or under my supervision. My qualifications are a matter of record with the Federal Communications Commission. I personally attest to the accuracy of the test data submitted as a part of this engineering statement.



Rowland S. Johnson

Dated: April 1, 1998