ENGINEERING STATEMENT

IN REGARD TO MEASUREMENTS ON

AUTO PAGE, INC.

Model AR-55

FCC ID: B23AR55

Super-Regenerative Receiver

A. INTRODUCTION

Hyak Laboratories Inc. has been authorized by Auto Page Inc., to perform measurements on the AR-55 R/C receiver to deter-mine compliance with FCC Rules, Part 15 Subpart B, Para. 15.109.

The AR-55 is a super-regenerative receiver to remotely control various automobile alarm functions. It operates at a nominal 433.9 MHz frequency. The receiver, constructed on an etched circuit card, is powered by 13.8 Vdc from a vehicle power system.

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 accepted site, No. 90660.

C. DESCRIPTION OF MEASUREMENT PROCEDURE: RADIATED MEASUREMENTS

Measurements of receiver radiation field strength were made using ANSI 63.4 (1992) as the test procedure. Measurements were made with 3 meter spacing between the receiver under test and the test equipment antenna. The antenna connected to the equipment under test consisted of a short wire antenna, permanently attached to the receiver.

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

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

Measurement of field strength was made through use of HP 8593B and Advantest R3361A spectrum analyzers in conjunction with a HP 8447D wide band, low noise preamp. Compliance Designs Bi-conical calibrated dipoles were used as the test antennas in the 25-1000 MHz range. Above 1 GHz the Tektronix 494P spectrum analyzer was used with a Avantek 1-2 GHz amplifier. An EMCO 3115 calibrated horn antenna was used between 1 and 2 GHz.

For each spurious emission identified between 30 to 2000 MHz, the test sample 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.

Spurious emissions within the 30 - 1000 MHz band were measured with the receiver cohered and a peak-responding detector employed. Above 1 GHz, the Tektronix 494P spectrum analyzer, a peak-responding instrument, with 100 kHz RBW, and no video filtering was used.

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

The sample was measured in three orientation planes with the wiring harness attached.

The spectrum was checked from 30 to 2000 MHz. All emissions not reported were more than 20 dB below the permitted level or below the applicable limits but obscured by ambient or instrumentation noise. Tabulation of the measurements are shown in Table 1.

The forbidden band frequencies of 15.205 were specifically searched.

D. REPORT OF RADIATED MEASUREMENTS

Table 1 lists the frequency and amplitude of all signals observed from 30 to 2000 MHz that were within 20 dB of the limits of FCC Rules.

TABLE 1

RADIATED SPURIOUS EMISSIONS
Measured at 3 meters
PART 15(B) PARA. 15.109

Frequency To Which Tuned (MHz)	Frequency of Emission (MHz)	Meter Reading (dBm)	Antenna Factor (dB)	Field1 Intensity uV/m @ 3m	FCC Limit uV/m @ 3m	dB to Limit
433.900	416.000	-93.2	16.4	32	200	-16
433.900	432.000	-86.0	17.0	79	200	-8.0
433.900	432.200	-84.4	17.0	96	200	-6.4
433.900	438.500	-91.6	17.1	42	200	-14

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

dBu = dBm + antenna factor + 107

E. POWER LINE CONDUCTED MEASUREMENTS

No AC line-conducted spurious measurements were made since the device is battery operated.

F. EXHIBITS

FCC ID Label, Exhibit 1.
Photographs, Exhibit 2.
Schematic Diagram, Exhibit 3.
User Instructions, Exhibit 4.
Block Diagram, Exhibit 5.
Circuit Description, Exhibit 6.

G. FORBIDDEN BAND MEASUREMENTS

All forbidden bands of 15.205 from 73 MHz to 2 GHz were searched and any signals above ambient noise or interference levels are shown in Table 1.

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.

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Rowland S. Johnson

Dated: December 11, 1998