

ENGINEERING STATEMENT
IN REGARD TO MEASUREMENTS ON
DESIGNTECH INTERNATIONAL, INC.

First Defense Model 20694

FCC ID: ELGKEY2

Super-Regenerative Receiver

A. INTRODUCTION

Hyak Laboratories Inc. has been authorized by Designtech International Inc., to perform measurements on the First Defense receiver to determine compliance with FCC Rules, Part 15 Subpart B, Para. 15.109.

The First Defense 20694 is a super-regenerative receiver for automotive security/RC systems. It operates at a nominal 312 MHz frequency. The receiver, constructed on an etched circuit card, is powered by 13.8 Vdc.

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.

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 receiver under test consisted of a short wire antenna.

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 8596E 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 1 MHz 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

<u>Frequency To Which Tuned (MHz)</u>	<u>Frequency of Emission (MHz)</u>	<u>Meter Reading (dBm)</u>	<u>Antenna Factor (dB)</u>	<u>Field¹ Intensity uV/m @ 3m</u>	<u>FCC Limit uV/m @ 3m</u>	<u>dB to Limit</u>
312.000	306.410	-90.8	14.3	34	200	-16
312.000	315.410	-92.8	14.2	26	200	-18

Note 1: $\text{uV/m} = \text{Log} \frac{-1\text{dBu/m}}{20}$
 $\text{dBu} = \text{dBm} + \text{antenna factor} + 107$

All other emissions were 20 dB or more below FCC limits or, for forbidden band, below ambient or instrumentation noise level.

Cohered, peak-detector

Measured in three planes of orientation.

RADIATED FIELD INTENSITY
FCC ID: ELGKEY2

TABLE 1

E. 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.

F. 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: December 6, 2001