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ENGINEERING STATEMENT

For Certification of

RANGER ELECTRONIC COMMUNICATIONS, INC.

Model: Galaxy DX-2547

FCC ID: C2R-DX-2547

A. INTRODUCTION

Hyak Laboratories, Inc. has been authorized to conduct measurements on the Model Galaxy DX-2547 receiver to determine if the Commission's radiation interference limits for receivers under Part 15 of the Rules are met by the receiver.

B. DESCRIPTION OF RECEIVER

The Galaxy DX-2547 receiver is a dual conversion superhetrodyne unit for operation within the citizens radio band as a mobile station.

The following information is supplied as requested in FCC Bulletin OCE 42 (July 1973) and OCE 41 (August 1976):

1. Service in which the receiver will be used: citizens radio service (Part 95, Subpart D).

2. Function of the receiver: voice communications reception.

3. Tuning range: 26.965 - 27.405.

4. IFs used: 10.695 MHz and 455 MHz.

5. Fundamental frequency of all oscillators in the receiver:

   a. The receiver uses phase-locked-loop (PLL) technology.
   b. The receiver reference oscillator operates at 10.24 MHz.
   c. Injection frequency to the first mixer from the PLL output is 16.27 - 16.71 MHz.

C. DESCRIPTION OF MEASUREMENT FACILITIES

A description of Hyak Laboratories, Inc.'s RF radiation measurement facility was filed with the Commission September 3, 1976 and approved October 1976. It is currently listed as an accepted site.

D. RECEIVER EMISSIONS AT THE ANTENNA TERMINAL

Emissions available at the receiver antenna terminal were measured with a Tektronix 494P spectrum analyzer.

All emissions from 25 MHz to 500 MHz were less than 0.1 nanowatt (-70 dBm) on all channels, per OCE 41(2).

Rated antenna circuit impedance is 50 ohms, which was terminated by the 50 ohm spectrum analyzer input.

E. RECEIVER CABINET RADIATION

1. **CB RECEIVER**

Radiation measurements were made over the frequency range of 25 to 500 MHz following ANSI C63.4 (1992). For these tests, the receiver was placed on a rotatable test stand, approximately 80 cm in height, with normal power lead and accessory external headset. The power lead was extended vertically down to a 13.6 Vdc supply, external accessory lead 1 meter vertically up.

During the tests, the unit was tuned to the channel having highest emission level measured at the antenna terminals. The test sample was rotated and antenna polarization shifted to obtain worst-case readings with both vertical and horizontal polarization of the test antennas, and with and without accessory connected.

Data on worst-case channel are shown in Table 1a or 1b were taken using the Tektronix 494P spectrum analyzer with Eaton 94455-1 antennas and a Hewlett-Packard 8447D wide-band amplifier.

The CB receiver met the limits of Part 15, Para. 15.109.

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)	Field[1] Intensity uV/m @ 3m	FCC Limit uV/m @ 3m	dB to Limit
26.965	48.814	-100.8	11.1	7*	100	-23
26.965	65.082	-89.6	7.2	17	100	-15
26.965	97.622	-102.4	9.3	5*	150	-30
26.965	113.894	-92.8	9.2	15*	150	-20
26.965	130.164	-98.4	13.1	12*	150	-22
26.965	48.814	-100.8	11.1	7*	100	-23
26.965	65.084	-87.6	7.2	21	100	-13
26.965	97.624	-98.8	9.3	8*	150	-26
26.965	113.894	-90.0	9.2	20	150	-17
26.965	130.164	-97.2	13.1	14*	150	-21
26.965	48.816	-105.2	11.1	4*	100	-27
26.965	65.084	-102.4	7.2	4*	100	-28
26.965	97.632	-105.2	9.3	4*	150	-32
26.965	113.894	-90.0	9.2	20	150	-17
26.965	130.164	-102.0	13.1	8*	150	-26
26.965	48.816	-105.2	11.1	4*	100	-27
26.965	65.084	-100.0	7.2	5*	100	-26
26.965	97.626	-103.2	9.3	5*	150	-31
26.965	113.896	-87.6	9.2	27	150	-15
26.965	130.166	-103.2	13.1	7*	150	-27

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

dBu = dBm + antenna factor + 107

*Reference data, 20 dB or more below FCC limit.

Data Sequence: (Test antenna orientation)

Vertical polarization, with accessory cables.
Horizontal polarization, with accessory cables.
Vertical polarization, without accessory cables.
Horizontal polarization, without accessory cables.

No emissions were detected in the 25 - 30 MHz range.

RADIATED SPURIOUS EMISSIONS
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TABLE 1a

F. RECEIVER POWER-LINE-CONDUCTED EMISSIONS

Measurements of power-line-conducted emissions were made according to the procedures described in IEEE Standard 213 as follows:

1. For the measurements, the unit was tuned to the worst-case channel observed in antenna terminal emissions tests. The receiver was fed an unmodulated signal of 100 microvolts on the test channel via coaxial cable from a Wavetek 3002 signal generator.

Measurements were made over the frequency range of 0.45 to 30 MHz, using the Tektronix 494P spectrum analyzer. All signals were 20 dB or lower than the permissible limit.

G. LABEL

Unit serial number and required identification data will be displayed on a label (See Exhibit 1) riveted to the unit chassis in such a manner that it cannot be removed without probable damage to the equipment.

H. PHOTOGRAPHS

Photographs of the unit are shown in Exhibit 2.

I. STATEMENT

Technical test data herein 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: August 25, 1998