**TYPE OF EXHIBIT**: OPERATIONAL DESCRIPTION

**FCC PART**: 2.1033(C)(4), (5), (6), (7), (8), (10)

**MANUFACTURER**: RITRON, Inc.
505 West Carmel Drive
Carmel, IN 46032

**MODEL**: DTX-254

**TYPE OF UNIT**: 220 MHz Transceiver Module

**FCC ID:** AIERIT20-250

**DATE:** December 23, 2004

**DESCRIPTION:**

The DTX-254 is a transceiver module designed to operate in the 220 MHz band. In the portion of this band where 5 kHz channels are the norm, this product is designed to use 3 contiguous channels to effect a 12 kHz occupied bandwidth. Also, this product can support 12.5 kHz channel operation.

**TYPES OF EMISSIONS:**

11K1F3E and 11K0F1D

**FREQUENCY RANGE:**

217-245 MHz

**RANGE OF OPERATING POWER:**

1.0 to 6.0 watts

**CIRCUIT DESCRIPTION-STABILIZING FREQUENCY:**

The basic frequency stability of the unit is determined by the stability of the VCTCXO (voltage controlled temperature compensated crystal oscillator), Y101, and the voltage which drives the modulation port of the VCTCXO.

The VCTCXO is a monolithic device purchased by RITRON and specified to have a frequency stability in excess of that required by the Commission. Sampling of units by RITRON has confirmed that the devices do indeed meet the required stability. The voltage to the modulation port of the VCTCXO is maintained by a high stability voltage regulator. The variation in frequency

caused by modulation port voltage variations is at least an order of magnitude below that of the basic VCTCXO.

**CIRCUIT DESCRIPTION-SPURIOUS RADIATION SUPPRESSION:**

Spurious radiation caused by modulation components is limited by the modulation limiter filter. The modulation limiter filter is an active lowpass filter formed around two operational amplifiers, IC310-B and IC310-D. This active filter has five poles with no transmission zeros.

Harmonics of the transmitter carrier are suppressed by a 5-pole elliptic filter which follows the final transmitter stage matching network. This filter has less than 0.5 dB insertion loss and 40 dB stopband loss.

**CIRCUIT DESCRIPTION-MODULATION LIMITING:**

The modulation limiter is an operational amplifier, IC310-B, which is allowed to clip against its power supply rails. This limits the maximum deviation and thus, the maximum occupied bandwidth.

**CIRCUIT DESCRIPTION-POWER LIMITING:**

The RF output power is limited by the drain voltage and the power control voltage on the final RF power amplifier module. When adjusted per the alignment procedure in the maintenance manual, the maximum licensed power output will not be exceeded.