TYPE OF EXHIBIT: TRANSMITTER EFFECTIVE RADIATED POWER

FCC PART: 1.1310

MANUFACTURER: RITRON, INC.
505 West Carmel Drive
Carmel, IN 46032

MODEL: DTX-442

TYPE OF UNIT: UHF-FM Transceiver

FCC ID: AIERIT17-442

DATE: Dec 10, 2003

PROCEDURE:

1. The measurement for effective radiated power was taken at the RITRON, Inc. 3 meter test site. The measurement was via the substitution method.

2. The ERP measurement was made with a Hewlett-Packard Model 8560E Spectrum Analyzer and an Electro-Metrics LPA-25 log periodic antenna.

3. A substitution antenna, an adjustable dipole, was substituted for the DTX-442 on the turntable 3 meters from the pick up antenna. An RF signal generator was set for the frequency of the DTX-442 at 460.050 MHz with a 0 dBm output level.

4. The height of the LPA-25 receiving antenna was varied to pick up maximum signal.

5. The DTX-442 was programmed for transmitter operation on 460.050 MHz at the 5.0 watt maximum obtainable from the unit. The unit was then terminated at the antenna port with a Nearson RAM1545 antenna, the only antenna available for this product from RITRON.

6. The DTX-442 antenna was then positioned on the turntable and the above procedure used to obtain maximum level at the receiving dipole.

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CALCULATIONS:

The effective radiated power can be calculated as:

ERP(dBm) = Pr(dBm) -- Pref(dBm) + Pgen(dBm) – Cable(dB) – Ga(dBd)

Where:

Pr is the power level of the radio's emission at the receiving antenna output.
Pgen is the RF signal generator level at the substitution antenna input.
Pref is the power level of the substitution antenna emission at the receiving antenna output.
Cable is the generator cable loss.
Ga is the gain of the substitution antenna relative to a dipole.

ERP(dBm) = 4.5 – (-29.7) – 0 – 1.9 –0 = 32.3 dBm

ERP(watts) = antilog((ERP(dBm) – 30)/10)

ERP(watts) = 1.7 watts

RESULTS:

Pr(dBm)	Pref(dBm)	Pgen(dBm)	Cable loss(dB)	Ga(dB)	ERP(dBm)	ERP(W)
4.50	-29.7	0	1.9	0	32.3	1.69

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PROCEDURE:

We will determine the minimum safe operating distance for this occupational device. Converting from ERP to EIRP we multiple by 1.64.

EIRP(W) = 1.7 x 1.64 = 2.79 W

Power density as related to EIRP is:

$S(W/m^2) = EIRP/4\pi r^2$ where r is distance from the source in meters. Rearranging for distance:

$r = \sqrt{(EIRP/4\pi S)}$

The MPE for a device operating in the occupational environment is 1 mW/cm^2 Converting to W/m^2 we get 10 W/m^2.

$r = \sqrt{(2.79 /4\pi\ 10)} = .149m$

Thus, at a distance of 15 cm or greater the MPE for occupational use is met.

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STATEMENT:

The following statement appears in the User/Maintenance manual regarding RF safety:

This product has been evaluated for compliance with the maximum permissible exposure limits for RF energy at the maximum power rating of the unit with the whip antenna available from RITRON. To ensure compliance with the Occupational/Controlled Exposure maximum limits, all persons must be at least 20 cm (7.9 inches) from the antenna while the unit is transmitting. Other antennas may require lesser or greater distances to meet the limits depending upon their gains relative to that tested. Higher gain antennas are capable of yielding a higher RF energy density in the strongest part of their field and would, therefore, require a greater separation from the antenna.