

TYPE OF EXHIBIT: TRANSMITTER EFFECTIVE RADIATED POWER

FCC PART:

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

MODEL: DTX-142

TYPE OF UNIT: VHF-FM Transceiver

FCC ID: AIERIT17-142

DATE: May 12, 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 BDA-25 dipole antenna.
3. A substitution antenna, an adjustable dipole, was substituted for the DTX-142 on the turntable 3 meters from the pick up dipole. An RF signal generator was set for the frequency of the DTX-142 at 159.100 MHz with a 0 dBm output level.
4. The height of the BDA-25 receiving dipole was varied to pick up maximum signal.
5. The DTX-142 was programmed for transmitter operation on 159.100 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-142 antenna was then positioned on the turntable and the above procedure used to obtain maximum level at the receiving dipole.

TYPE OF EXHIBIT: TRANSMITTER EFFECTIVE RADIATED POWER

FCC PART:

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

MODEL: DTX-142

TYPE OF UNIT: VHF-FM Transceiver

FCC ID: AIERIT17-142

DATE: May 12, 2003

CALCULATIONS:

The effective radiated power can be calculated as:

$$\text{ERP(dBm)} = \text{Pr(dBm)} + \text{Pgen(dBm)} - \text{Ps(dBm)} - \text{Ga(dBd)}$$

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.

Ps is the power level of the substitution antenna emission at the receiving antenna output.

Ga is the gain of the substitution antenna relative to a dipole.

$$\text{ERP(watts)} = \text{antilog}((\text{ERP(dBm)} - 30)/10)$$

RESULTS:

Pr(dBm)	Pgen(dBm)	Ps(dBm)	Ga(dB)	ERP(dBm)	ERP(watts)
9.5	0	-25.0	0	34.5	2.82

TYPE OF EXHIBIT: MAXIMUM PERMISSIBLE EXPOSURE EVALUATION

FCC PART: 1.1310

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

MODEL: DTX-142

TYPE OF UNIT: VHF-FM Transceiver

FCC ID: AIERIT17-142

DATE: May 12, 2003

PROCEDURE:

The ERP value measured for this device will be used to determine the minimum safe distance from the antenna supplied by Ritron for use with this product in order not to exceed the Occupational/Controlled Environment RF exposure limits.

The ERP must be converted to EIRP by multiplying by 1.64, the gain of the reference dipole.

$$\text{EIRP(W)} = 2.8 \times 1.64 = 4.62 \text{ W}$$

Power density as related to EIRP is:

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

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

The MPE for a device operating in the General Population/Uncontrolled Exposure Environment is 0.2 mW/cm^2 . Converting to W/m^2 we get 2 W/m^2 . Therefore:

$$r = \sqrt{(4.62 / 4\pi(2))} = 0.43 \text{ m (43 cm)}$$

Thus, at a distance of 43 cm or greater the MPE for Occupational/Controlled Environment use is met.

TYPE OF EXHIBIT: RF WARNING STATEMENT

FCC PART: 1.1310

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

MODEL: DTX-142

TYPE OF UNIT: VHF-FM Transceiver

FCC ID: AIERIT17-142

DATE: May 12, 2003

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 General Population/Uncontrolled Exposure RF exposure maximum limits, all persons must be at least 43 cm (16.9 inches) from the antenna while the unit is transmitting. The installer must site the antenna in such a way that all persons would be at least 43 cm (16.9 inches) or greater away during transmission.

The antenna tested for this product for RF exposure was the RITRON RAM-1545, which has a gain of -2.2 dBd with the included 25 feet of coaxial cable. This is the only antenna available from RITRON for use with this product. 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. If other antennas are used, it is incumbent upon the installer to insure that the RF exposure limits for General Population/Uncontrolled Exposure are met. See 47CFR1.1307(b)(1)-(3) and/ or OET Bulletin 55, Edition 97-01 for more information on RF exposure guidelines.