TYPE OF EXHIBIT: RF WARNING STATEMENT

FCC PART: 1.1310

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

MODEL: PBS-146D

TYPE OF UNIT: VHF-FM Base Transceiver

FCC ID: AIERIT16-146

DATE: April 23, 2003

PLEASE NOTE THE FOLLOWING WITH REGARD TO RF EXPOSURE FOR THIS PRODUCT:

1. The User's Manual contains the following text:

   EXPOSURE TO RADIO FREQUENCY ENERGY:

   JBS/PBS-146D: This product generates radio frequency (RF) energy when the PTT button on the front of the unit is depressed. This product has been evaluated for compliance with the maximum permissible exposure limits for RF energy at the maximum power rating of the unit when using antennas available from RITRON. To comply with the General Population/Uncontrolled limits, all persons must be at least 7.9 inches (20 cm) from the AFB-1545 antenna which is supplied by RITRON to be attached directly to the rear of the unit. For the RITRON RAM-1545 magnet mount antenna which can be located away from the unit, all persons must be at least 10.8 inches (28 cm) from the antenna. Antennas other than the two mentioned above have not been tested for compliance and may or may not meet the exposure limits at the distances given. Higher gain antennas are capable of generating higher fields in the strongest part of their field and would, therefore, require a greater separation from the antenna.

   JBS/PBS-446D: This product generates radio frequency (RF) energy when the PTT button on the front of the unit is depressed. This product has been evaluated for compliance with the maximum permissible exposure limits for RF energy at the maximum power rating of the unit when using antennas available from RITRON. To comply with the Occupational/Controlled limits, all persons must be at least 7.9 inches (20 cm) from the antenna when transmitting. Antennas other than the two mentioned above have not been tested for compliance and may or may not meet the exposure limits at the distances given. Higher gain antennas are capable of generating higher fields in the strongest part of their field and would, therefore, require a greater separation from the antenna. This product is not to be used by the general public in an uncontrolled environment unless compliance with the Uncontrolled/General Population limits for RF exposure can be assured.

   To limit your exposure to levels at, or below, the levels tested, please observe the following:

   - Use only the antenna(s) available from RITRON for this model.
   - Keep talk times as short and infrequent as possible. **DO NOT** depress the PTT button when not actually wishing to transmit. The radio is equipped with an internal timer to limit continuous transmit times.
   - When transmitting, maintain a distance of at least 7.9 inches(20 cm). DO NOT hold the radio in such a manner that the antenna is next to, or touching, exposed parts of the body, especially the face or eyes while transmitting.
   - **DO NOT** allow children to operate the radio.

TYPE OF EXHIBIT: TRANSMITTER EFFECTIVE RADIATED POWER

FCC PART: 1.1310

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

MODEL: PBS-146D

TYPE OF UNIT: VHF-FM Base Transceiver

FCC ID: AIERIT16-146

DATE: April 23, 2003

PROCEDURE:

1. The measurement for effective radiated power was taken at the RITRON, Inc. 3 meter test site, details of which are on file with the FCC.

2. The PBS-146D was aligned for transmitter operation on 156.100 MHz at the 2.0 Watt maximum obtainable from the unit per the tune-up procedure outlined in the Preliminary Maintenance Manual. The unit was then terminated at the antenna port with the antennas sold with this product. (The user can connect other antennas, however.)

3. All ERP measurements were made with a Hewlett-Packard Model 8560E Spectrum Analyzer, an Electro-Metrics BDA-25 Dipole Antenna, and Electro-Metrics Model LPA-25 Log Periodic antenna.

4. The height of the field strength measurement antenna and orientation of the PBS-146D were varied to provide maximum field strength at the receiving antenna.

5. A substitution antenna, a calibrated ½half-wave dipole, was substituted for the PBS-146D at the PBS-146D's location. An RF signal generator was set for the frequency of the PBS-146D with the level at the substitution antenna noted.

6. The height of the substitution antenna was adjusted for maximum signal strength at the field strength measuring antenna. The level at the field strength antenna was noted.

TYPE OF EXHIBIT:	TRANSMITTER EFFECTIVE RADIATED POWER
FCC PART:	1.1310
MANUFACTURER:	RITRON, INC. 505 West Carmel Drive Carmel, IN 46032
MODEL:	PBS-146D
TYPE OF UNIT:	VHF-FM Base Transceiver
FCC ID:	AIERIT16-146D
DATE:	April 23, 2003

EQUATIONS:

The substitution antenna is specified from the manufacturer in terms of antenna factor rather than antenna gain. The conversion is:

Ga(dbd) = 20 log f (MHz) – AF(dB) – 31.9

The effective radiated power (ERP) is then:

ERP(dBm) = Pr(dBm) + Pgen(dBm) – Ps(dBm) – 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 output.

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

Ga is the gain of the substitution antenna.

The ERP is converted to watts from dBm by:

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

TYPE OF EXHIBIT: TRANSMITTER EFFECTIVE RADIATED POWER

FCC PART: 1.1310

MANUFACTURER: RITRON, INC.
505 West Carmel Drive
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MODEL: PBS-146D

TYPE OF UNIT: VHF-FM Base Transceiver

FCC ID: AIERIT16-146D

DATE: April 23, 2003

RESULTS:

Antenna	Pr (dBm)	Pgen (dBm)	Ps (dBm)	Ga (dBd)	ERP (dBm)	ERP (watts)
Nearson AFB-1545	+7.0	0.0	-22.0	-0.5	+29.5	0.89
Nearson RAM-1545	+11.2	0.0	-22.0	-0.5	+33.7	2.34

Certifying Engineer: 

Kevin G. Matson - Project Engineer

TYPE OF EXHIBIT: MAXIMUM PERMISSIBLE EXPOSURE EVALUATION

FCC PART: 2.1091(d)(4)

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

MODEL: PBS-146D

TYPE OF UNIT: VHF-FM Base Transceiver

FCC ID: AIERIT16-146

DATE: April 23, 2003

PROCEDURE AND EQUATIONS:

The ERP values previously calculated will be used to determine the minimum safe distance from the antenna supplied by RITRON in order not to exceed the General Population/Uncontrolled Limits of RF exposure.

The ERP must be converted to EIRP to simulate an isotropic radiator, since the unit is categorized as a mobile device, a 50% duty cycle may be used, therefore:

EIRP = 1.64 (ERP/2). For the PBS-146D w/AFB-1545: EIRP = 0.73 W
For the PBS-146D w/RAM-1545; EIRP= 1.92 W

Power density is related to EIRP:

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

$r = SQRT (EIRP/4\pi S)$.

The MPE limit for a device operating in an General Population/Uncontrolled environment at 156.100 MHz is 0.2 mW/ cm^2

For the equation above, mW/cm^2 must be converted to W/m^2. Since 1 $mW/cm^2 = 10 W/m^2$, the FCC limit is 2.0 W/m^2.

Substituting and solving for distance:

Antenna Model	Distance for MPE (in. / cm)
AFB-1545	6.6 / 17
RAM-1545	10.8 / 28

With the antennas available from RITRON for use with this product, users must remain more than 6.6 inches(17 cm) from the AFB-1545 antenna while the unit is transmitting and when using the RAM-1545 antenna, all persons must be at least 10.8 inches(28 cm) from the antenna when the unit is transmitting. Other antenna may require lesser or greater distances depending upon their gain relative to that available from RITRON.