

TYPE OF EXHIBIT: RF WARNING STATEMENT

FCC PART: 1.1310

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

MODEL: PBS-446D

TYPE OF UNIT: UHF-FM Base Transceiver

FCC ID: AIERIT16-446

DATE: May 6, 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 General Population/Uncontrolled limits, all persons must be at least 8.7 inches (22 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, at the 20 cm (7.9 inches) minimum expected separation distance and greater, the maximum RF exposure is well below the General Population/Uncontrolled limits. 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.

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 at least the minimum distance from the antenna as stated above. **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.
2. The FCC serial label contains a statement referring the user to the User's Manual for information on exposure to RF energy.

RITRON, INC. • 505 West Carmel Drive • Carmel, Indiana 46032
TEL: 317-846-1201 • FAX: 317-846-4978 • <http://www.ritron.com>

Ritron Item: 14200130
Description: LABEL, FCC/SERIAL, PBS-446D
Vendor Part Numbers: Identco# TTL307-700,
Identco# TTRR-D3.54ZJ
Revision Date: November 18, 2002

Description:

The FCC ID, serial label will be made in house by manufacturing. The ELP 310 thermal transfer printer will be used with glossy white polyester labels (RTN# 14290001). Identco# TTL307-700, a three (3) inch by two (2) inch label, is the approved material. The approved ribbon is Identco# TTRR-D3.54ZJ.

Labels will be numbered sequentially, with an initial 5-digit number of B1234. Records are maintained to track the next available serial number. All PBS-446D models share the same serial sequence. Labels will contain an updated Manufacturing Date using the Ritron 4-digit Date Code.

Drawing:

FCC ID: AIERIT16-446 FREQ: 450-470 MHz
Use of this radio device must be monitored to assure FCC RF exposure compliance. See owner's manual for specific operating instructions.
MODEL: PBS-446D SN: B1234 Mfg Date: 0248
For service, contact your radio dealer or return product directly to: RITRON, INC. 505 W. CARMEL DR. CARMEL, IN 46032 OR CALL 1-800-USA-1-USA

Sample:

Chief Eng: _____
Sales: _____

Project Eng: _____
Manufacturing: _____

TYPE OF EXHIBIT: TRANSMITTER EFFECTIVE RADIATED POWER

FCC PART: 1.1310

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

MODEL: PBS-446D

TYPE OF UNIT: UHF-FM Base Transceiver

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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-446D was aligned for transmitter operation on 460.050 MHz at the 2.5 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 and an Electro-Metrics LP-25 Log Periodic Antenna.
4. The height of the field strength measurement antenna and orientation of the PBS-446D were varied to provide maximum field strength at the receiving antenna.
5. A substitution antenna, a calibrated $\frac{1}{2}$ -wave dipole, was substituted for the PBS-446D at the PBS-446D's location. An RF signal generator was set for the frequency of the PBS-446D with the level at the substitution antenna noted.
6. The height of the field strength antenna was adjusted for maximum signal strength at the field strength measuring antenna. The level at the field strength antenna was noted.

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FCC PART: 1.1310

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MODEL: PBS-446D

TYPE OF UNIT: UHF-FM Base Transceiver

FCC ID: AIERIT16-446D

DATE: May 6, 2003

EQUATIONS:

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

$$Ga(\text{dbd}) = 20 \log f (\text{MHz}) - AF(\text{dB}) - 31.9$$

The effective radiated power (ERP) is then:

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

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:

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

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RESULTS:

Antenna	Pr (dBm)	Pgen (dBm)	Ps (dBm)	Ga (dBd)	ERP (dBm)	ERP (watts)
Nearson AFB-1545	+7.0	0.0	-27.0	0.2	+33.8	2.40
Nearson RAM-1545	-2.7	0.0	-27.0	0.2	+24.1	0.26

Certifying Engineer:


 Michael Pickard - Project Engineer

TYPE OF EXHIBIT: MAXIMUM PERMISSIBLE EXPOSURE EVALUATION

FCC PART: 2.1091(d)(4)

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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. This device is a transceiver; it does not and cannot transmit and receive simultaneously. Typical transmit duty cycles are between 5% and 10%. Over the 30 minute averaging period for General Population/Uncontrolled MPE limits, a 50% maximum duty cycle is reasonable, and will be used in the MPE calculations for this device. 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-446D w/AFB-1545: EIRP = 1.97 W
For the PBS-446D w/RAM-1545: EIRP = 0.21 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:

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

The MPE limit for this device operating in a General Population/Uncontrolled environment is F (MHz)/1500 mW/cm², which for this product at the upper band edge is 0.31 mW/cm²

For the equation above, mW/cm² must be converted to W/m². Since 1 mW/cm² = 10 W/m², the FCC limit is 3.1 W/m².

Substituting and solving for distance:

<u>Antenna Model</u>	<u>Distance for MPE (in. / cm)</u>
AFB-1545	8.7 / 22
RAM-1545	2.8 / 7

With the antennas available from RITRON for use with this product, users must remain more than 8.7 inches (22 cm) from the AFB-1545 antenna while the unit is transmitting and when using the RAM-1545 antenna, the minimum expected separation of 20 cm (7.9 inches) results in RF exposure levels well below the General Population/Uncontrolled MPE limits. Other antenna may require lesser or greater distances depending upon their gain relative to that available from RITRON.