

**TYPE OF EXHIBIT:** RF EXPOSURE

**FCC PART:** 1.1307

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

**MODEL:** SST-442

**TYPE OF UNIT:** UHF-FM Transceiver

**FCC ID:** AIERIT13-442

**DATE:** May 11, 2001

**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:**

The JMX/SST Series handheld radios consist of a transmitter and a receiver. The transmitter is active when the Push-to-Talk button is depressed and emits radio frequency (RF) energy at a power level of up to 3 watts. Analog modulation techniques are used.

In 1991, the Institute of Electrical and Electronics Engineers (IEEE), and in 1992 the American National Standards Institute (ANSI) updated the 1982 ANSI standard for safety levels with respect to human exposure to RF energy. Over 120 scientists, engineers, and physicians from universities, government health agencies, and industry, after reviewing the available body of research, developed this updated Standard. In March 1993 the Federal Communications Commission (FCC) proposed the adoption of this updated Standard.

The JMX/SST "Four Series" handheld radios are designed to comply with this Standard. To limit your exposure to levels at, or below, the levels in the Standard, please observe the following:

- Use only the antenna(s) available from RITRON for these models. **DO NOT** attempt to substitute any other antenna.
- 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, hold the radio in front of the mouth at a distance of at least 4 inches. **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.
- In belt mounted applications, when transmitting, remove the radio from the belt and hold away from the body at least 4 inches.
- When using external headset accessories, hold the unit away from the body at least 4 inches while transmitting.
- **DO NOT** allow children to operate the radio.

2. Antennas:

Two antennas are available for this product, the AF-450 and AF-450-S. Both attach to the top of the radio and are shortened quarterwave whips. The connector is a 1/4-20 stud attached to the antenna. It would be difficult to connect any other connector or antenna other than that supplied by the manufacturer.

### 3. Device Limitations on Transmission:

The unit only emits significant RF power while the PTT button is actually depressed. This occurs only when the user makes a conscious effort to do so and would normally only occur when the user wishes to speak. The unit is a simplex unit; it does not transmit and receive simultaneously.

The RF power amplifier is thermally limited to continuous operation for a period of time measured in minutes. An internal timeout timer exists which limits continuous transmit to one minute or less. For short term conversations, the expected duty cycle is 50% maximum. For long term, the duty cycle is 10% or less. Experience has shown that battery life calculations based upon a 5% transmit duty cycle tend to reflect real world operation.

**TYPE OF EXHIBIT:** TRANSMITTER EFFECTIVE RADIATED POWER

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**PROCEDURE:**

1. The measurement for effective radiated power was taken at the RITRON, Inc. 3 meter test site. The measurement was made in accordance with FCC Rules & Regulations Part 2.947 using the procedures of IEC Publication 106.
2. The SST-442 was aligned for transmitter operation on 465.0125 MHz at the 2.2 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 two antennas sold with this product.
3. All ERP measurements were made with a Hewlett-Packard Model 8559A Spectrum Analyzer and an Electro-Metrics LP-25 Log Periodic Antenna.
4. The height and polarization of the field strength measurement antenna and orientation of the SST-442 were varied to provide maximum field strength.
5. A substitution antenna, an Electro-Metrics EM-6924 adjustable dipole, was substituted for the SST-442 at the SST-442's location. A RF signal generator was set for the frequency of the SST-442 with the level at the substitution antenna noted.
6. The polarization 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.

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**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<br>(dBm) | Pgen<br>(dBm) | Ps<br>(dBm) | Ga<br>(dBd) | ERP<br>(dBm) | ERP<br>(watts) |
|-----------|-------------|---------------|-------------|-------------|--------------|----------------|
| AFS-450   | +6.0        | 0.0           | -27.0       | 0.2         | +32.8        | 1.90           |
| AFS-450-S | +4.0        | 0.0           | -27.0       | 0.2         | +30.8        | 1.20           |

Certifying Engineer:

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