TYPE OF EXHIBIT:	APPLICATION INFORMATION
FCC PART:	2.1033(C)(1), (2)
MANUFACTURER:	RITRON, Inc. 505 West Carmel Drive Carmel, IN 46032
MODEL:	RLR-460
TYPE OF UNIT:	UHF FM Repeater
FCC ID:	AIERIT15-460
DATE:	November 25, 2002
APPLICANT:	RITRON, Inc. 505 West Carmel Dr. Carmel, IN 46032
CONTACT:	Sam L. Dulaney Chief Engineer 317-846-1201 x 185 317-846-4978 sdulaney@ritron.com
FCC ID:	AIERIT15-460
FCC PART:	90
EQUIPMENT CLASS:	TNB-Licensed non-broadcast station transmitter
DESCRIPTION:	UHF FM Repeater Transceiver
FREQUENCY STABILITY:	1.5 PPM

TYPE OF EXHIBIT: OPERATIONAL DESCRIPTION

FCC PART: 2.1033(C)(4), (5), (6), (7), (8), (10)

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

MODEL: RLR-460

TYPE OF UNIT: UHF FM Repeater

FCC ID: AIERIT15-460

DATE: November 25, 2002

DESCRIPTION:

The RLR-460 is a UHF FM repeater which operates at a maximum 5.0 watts RF output. It includes in internal duplexer to allow full duplex operation. By changing setting of the maximum deviation control, the unit may be configured for either 12.5 kHz or 25 kHz channel operation. The unit is designed to be used in fixed operation with an external power supply and antenna.

TYPES OF EMISSIONS:

10K1F3E and 14K8F3E

FREQUENCY RANGE:

450 to 470 MHz

RANGE OF OPERATING POWER:

0.5 to 5.0 watts

OPERATING POWER CONTROL:

The output power is controlled by tuning the capacitors in the matching network of the last RF transmitter power stage and by a potentiometer which controls the gate voltage to the last RF power amplifier device.

MAXIMUM POWER RATING:

5.0 watts

TYPE OF EXHIBIT: OPERATIONAL DESCRIPTION

FCC PART: 2.1033(C)(4), (5), (6), (7), (8)

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

MODEL: RLR-460

TYPE OF UNIT: UHF FM Repeater

FCC ID: AIERIT15-460

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FINAL AMPLIFYING STAGE VOLTAGES AND CURRENTS:

Po (watts)	Vg (V)	Vd (V)	Id (A)
0.5	0.67	11.1	0.28
1.0	1.36	10.9	0.39
1.5	1.83	10.9	0.52
2.0	2.56	10.9	0.65
3.0	3.12	10.8	0.99
4.0	3.68	10.5	1.33
5.0	4.26	10.2	1.77

Where Po is output power, Vg is the gate voltage, Vd is the drain voltage and Id is the drain current.

CIRCUIT DESCRIPTION-STABILIZING FREQUENCY:

The basic frequency stability of the unit is determined by the stability of the transmitter VCTCXO (voltage controlled temperature compensated crystal oscillator), Y101, and the voltage which drives the modulation port of the VCTCXO.

The VCTCXO is a monolithic device purchased by RITRON and specified to have a frequency stability in excess of that required by the Commission. Sampling of units by RITRON has confirmed that the devices do indeed meet the required stability. The voltage to the modulation port of the VCTCXO is maintained by a high stability voltage regulator. The variation in frequency caused by modulation port voltage variations is at least an order of magnitude below that of the basic VCTCXO.

CIRCUIT DESCRIPTION-SPURIOUS RADIATION SUPPRESSION:

Spurious radiation caused by modulation components is limited by the modulation limiter filter. The modulation limiter filter is an active lowpass filter formed around two operational amplifiers, U305-C and U305_D. This active filter has five poles with no transmission zeros.

Harmonics of the transmitter carrier are suppressed by a 5-pole elliptic filter which follows the final transmitter stage matching network. This filter has less than 0.5 dB insertion loss and 40 dB stopband loss.

CIRCUIT DESCRIPTION-MODULATION LIMITING:

The modulation limiter is an operational amplifier, U305-B, which is allowed to clip against its power supply rails. This limits the maximum deviation and thus, the maximum occupied bandwidth.

CIRCUIT DESCRIPTION-POWER LIMITING:

The RF output power is limited by the capability of the final RF power amplifier device. This device will not produce much more than the 5.0 watt maximum specified output of the unit. Internally, the matching network and gate voltage control further limit the output power.