TYPE OF EXHIBIT:	TRANSMITTER EFFECTIVE RADIATED POWER
FCC PART:	1.1310
MANUFACTURER:	RITRON, INC.
MODELS:	RQX-456, RQX-456-XT
TYPE OF UNIT:	UHF-FM Callbox 2-Way Radio
FCC ID:	AIERIT38-456
DATE:	July 16, 2014

PROCEDURE:

1. The measurements for effective radiated power were taken at the RITRON, Inc. 3-meter test site, details of which are on file with the FCC. These measurements were via the substitution method.
2. The RQX-456 was aligned for transmitter operation on 3 frequencies represent the low, middle, and upper range of the desired operating band at the rated transmitter output power.
3. The RQX-456 was tested in each of the three configurations:
    - Installed in the basic enclosure, powered by 3 D-cell batteries for 700mW TX power, operating with the internal antenna etched on the PCB.
    - Installed in the basic enclosure, powered by 6 AA-cell batteries for 2W TX power, operating with the internal antenna etched on the PCB.
    - Installed in an XT enclosure, powered by 6 D-cell batteries for 1.5W TX power, terminated at the antenna port with the Ritron AFB-1545 antenna include with the product. (The user can connect other antennas, however.)
4. The ERP measurements were made with an Advantest R3265A Spectrum Analyzer and an Electro-Metrics LPA-25 log periodic antenna.
5. The height of the LPA-25 receiving antenna and orientation of the RQX-456 were varied to provide maximum field strength at the receiving antenna.
6. A calibrated ½-wave dipole antenna was substituted for the RQX-456 on the turntable 3 meters from the pick up antenna. An Agilent N5181A RF signal generator was set at the 3 frequencies representing the low, middle and upper range of the desired operating band with a 0 dBm output level.
7. The height of the LPA-25 receiving antenna was adjusted for maximum signal strength at the receiving antenna. The level at the field strength antenna was noted.

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FCC PART:	1.1310
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TYPE OF UNIT:	UHF-FM Callbox 2-Way Radio
FCC ID:	AIERIT38-456
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CALCULATIONS:

The substitution antenna is specified by 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 can be calculated as:

ERP(dBm) = Pr(dBm) - Pref(dBm) + Pgen(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 input.
- Pref 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) = antilog((ERP(dBm) – 30)/10)

Basic Enclosure, 3 D-cell batteries, Internal Etched Antenna, 700 mW

Frequency (MHz)	Pr (dBm)	Pref (dBm)	Pgen (dBm)	Ga (dBd)	ERP (dBm)	ERP (watts)
451.025	2.56	-25.41	-1.59	0.56	25.82	0.38
460.025	-0.09	-25.78	-2.00	0.41	23.28	0.21
469.975	1.06	-25.88	-1.78	0.26	24.90	0.31

Basic Enclosure, 6 AA-cell batteries, Internal Etched Antenna, 2 W

Frequency (MHz)	Pr (dBm)	Pref (dBm)	Pgen (dBm)	Ga (dBd)	ERP (dBm)	ERP (watts)
451.025	6.09	-25.41	-1.59	0.56	29.35	0.86
460.025	8.00	-25.78	-2.00	0.41	31.37	1.37
469.975	8.03	-25.88	-1.78	0.26	31.87	1.54

XT Enclosure, 6 D-cell batteries, AFB-1545 Antenna, 1.5 W

Frequency (MHz)	Pr (dBm)	Pref (dBm)	Pgen (dBm)	Ga (dBd)	ERP (dBm)	ERP (watts)
451.025	7.31	-25.41	-1.59	0.56	30.57	1.14
460.025	8.69	-25.78	-2.00	0.41	32.06	1.61
469.975	8.63	-25.88	-1.78	0.26	32.47	1.77

Signed: Michael A. Pickard

Michael A. Pickard - Project Engineer

TYPE OF EXHIBIT:	MAXIMUM PERMISSABLE EXPOSURE EVALUATION
FCC PART:	2.1091(d)(4)
MANUFACTURER:	RITRON, INC.
MODELS:	RQX-456, RQX-456-XT
TYPE OF UNIT:	UHF-FM Callbox 2-Way Radio
FCC ID:	AIERIT38-456
DATE:	July 16, 2014

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. 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.

EIRP = 1.64 (ERP/2) For the RQX-456 w/AFB-1545: EIRP = 1.45 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 this device operating in a General Population/Uncontrolled environment is f(MHz)/1500 mW/ cm^2. For this equation, mW/cm^2 must be converted to W/m^2. Converting to W/m^2, the FCC limit is f(MHz)/150 W/m^2. Substituting and solving for distance:

Basic Enclosure, 3 D-cell batteries, Internal Etched Antenna, 700 mW

Frequency (MHz)	EIRP (Watts)	Duty Cycle (%)	S limit (W/m^2)	Distance (cm)	Distance (in)
451.025	0.31	50	3.01	9.1	3.58
460.025	0.17	50	3.07	6.7	2.65
469.975	0.25	50	3.13	8.0	3.16

Basic Enclosure, 6 AA-cell batteries, Internal Etched Antenna, 2 W

Frequency (MHz)	EIRP (Watts)	Duty Cycle (%)	S limit (W/m^2)	Distance (cm)	Distance (in)
451.025	0.71	50	3.01	13.6	5.38
460.025	1.12	50	3.07	17.1	6.72
469.975	1.26	50	3.13	17.9	7.04

XT Enclosure, 6 D-cell batteries, AFB-1545 Antenna, 1.5 W

Frequency (MHz)	EIRP (Watts)	Duty Cycle (%)	S limit (W/m^2)	Distance (cm)	Distance (in)
451.025	0.93	50	3.01	15.7	6.19
460.025	1.32	50	3.07	18.5	7.28
469.975	1.45	50	3.13	19.2	7.55

Model /Antenna	Distance for MPE (in. / cm)
RQX-456/AFB-1545	7.55 / 19.2

With the antenna available from RITRON for use with this product, users must remain more than 7.55 inches (19.2 cm) from the AFB-1545 antenna while the unit is transmitting.

For the AFB-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.

TYPE OF EXHIBIT:	RF WARNING STATEMENT
FCC PART:	1.1310
MANUFACTURER:	RITRON, INC.
MODELS:	RQX-456, RQX-456-XT
TYPE OF UNIT:	UHF-FM Callbox 2-Way Radio
FCC ID:	AIERIT38-456
DATE:	July 16, 2014

WARNING STATEMENT:

The following statement appears in the User Manual:

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

EXPOSURE TO RADIO FREQUENCY ENERGY:

RQX-456, RQX-456-XT: 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.

For antennas available from RITRON 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 those available from RITRON 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 exposure to RF energy to levels below the limit, please observe the following:

- Use only the antenna(s) available from RITRON for these models. **DO NOT** operate the radio without an antenna.
- **DO NOT** activate the transmitter when not actually wishing to transmit. These radios transmit recorded messages of a pre-determined length to prevent continuous transmit times.
- When transmitting, make certain that the distance limits for the particular model in use are observed.
- **DO NOT** allow children to operate the radio.

When used as directed, this series of radios is designed to comply with the FCC's RF exposure limits for "Uncontrolled/General Population". In addition, they are designed to comply with the following Standards and Guidelines:

- United States Federal Communications Commission, Code of Federal Regulations; 47 CFR §§ 2 sub-part J.
- American National Standards Institute (ANSI) / Institute of Electrical and Electronic Engineers (IEEE) C95. 1-1992.
- Institute of Electrical and Electronic Engineers (IEEE) C95.1-1999 Edition.