TYPE OF EXHIBIT: TEST REPORT

FCC PART: 2.1033 (c)(14)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: July 7, 2000

Following is a list of attached exhibits required by the Federal Communications Commission for the application to and grant of FCC Certification.

Statement of Certifying Engineer	2.947
List of Test Equipment Used	2.947 (d)
Description of Measurement Facility	2.948
Required Measurements	2.1033 (c)(14)
Radio Frequency Power Output	2.1046
Modulator Response	2.1047 (a)
Speech Amplifier Low-Pass Filter Response	2.1047 (a)
Percent of Modulation vs. Modulation Input Voltage	2.1047 (b)
Occupied Bandwidth	2.1049 (c)(1)
Spurious Emissions at Antenna Terminals	2.1051
Field Strength of Spurious Emissions	2.1053 (b)
Frequency Stability vs. Temperature	2.1055 (a)
Frequency Stability vs. Battery Voltage	2.1055 (d)
Transient Frequency Behavior	90.214

TYPE OF EXHIBIT: STATEMENT OF CERTIFYING ENGINEER

FCC PART: 2.947

MANUFACTURER: RITRON, INC.

505 West Carmel Drive

Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: **AIERIT13-450**

DATE: July 7, 2000

I, Michael A. Pickard, have been employed by RITRON, Inc. since November 1979, working in the Engineering Department since June 1981 as a radio frequency Project Engineer.

I hereby certify that all measurements and date herein were taken by me, that they were obtained using sound and accepted engineering principles, and that they accurately reflect the performance and characteristics of the units tested.

Signed:

Michael A. Pickard - Project Engineer

TYPE OF EXHIBIT: TEST EQUIPMENT LIST

FCC PART: 2.947 (d)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: July 7, 2000

The measured data in this report was obtained using one or more of the following pieces of equipment. The particular equipment used in any one test is detailed in the procedure for that test.

<u>ITEM</u>	MANUFACTURER	MODEL NO.	SERIAL NO.
Communications Test Set	IFR	COM-120B	500008863
Spectrum Analyzer	Hewlett-Packard	8554B	1502A 09103
Spectrum Analyzer	Hewlett-Packard	8559A	2010A 06979
Audio Sweep Generator	B & K Precision	4010	275-00893
Power Supply	BK/Precision	1630	146-01091
Power Supply	Astron	VS-20M	9608032
Digital Oscilloscope	Philips	PM-3335	DM648004
Dual Display Multimeter	Fluke	45	6723040
Digital VOM	Micronta	22-191	N/A
RF Wattmeter	Bird	6154	8652
Dipole Antenna	Electro-Metrics	BDA-25	8-101
Log Periodic Antenna	Electro-Metrics	LP-25	8-102
Microwave Test Antenna	Polarad	CA-B	11-3
Temperature Chamber	Associated Laboratories	ELH-0.5-LC	N/A
Thermocouple	Omega	7035-J-225	8504
30dB Power Attenuator	Bird	8306-300-N	N/A
10dB Attenuator	ELCOM	AT-51-10	N/A
20dB Attenuator	Tenuline	8340-200	1544
RF Detector	Microlabs/FXR	XA-1040	N/A

TYPE OF EXHIBIT: DESCRIPTION OF MEASUREMENT FACILITY

FCC PART: 2.948

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: July 7, 2000

The Field Strength measurements filed with this application were made on a site certified by RITRON, Inc. Data pertaining to this site is on file with the FCC and is current.

This site is used exclusively by RITRON, Inc. and is utilized only for the RF Field Strength Measurements of equipment designed and manufactured by RITRON, Inc. It is NOT used for measurements by or for any other party on a contract basis or otherwise.

Signed:

Michael A. Pickard - Project Engineer

TYPE OF TEST: RADIO FREQUENCY POWER OUTPUT

FCC PART: 2.1046

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 5, 2000

PROCEDURE:

- The SST-444 was aligned for transmitter operation on 460.0125, 465.0125 and 470.0125 MHz
 (Fo) at full rated power per the tune-up procedure outlined in the Preliminary Maintenance
 Manual. This represents frequencies at the low, middle and high end of the SST-444 operating
 frequency band.
- 2. Power was supplied to the SST-444 via P302 by a BK Precision Model 1630 power supply.
- 3. The SST-444 was connected at antenna terminal P201 to the input of a Bird 6154 Thermaline Wattmeter, used to measure RF power of the carrier.
- 4. A Fluke Model 45 Digital Multimeter was connected in series with L208 to measure the Drain current of Q203, the final RF amplifier device.
- 5. A Micronta Model 22-191 Digital Multimeter was used to measure Q203 Drain supply voltage at L208, as well as Gate bias voltage at Pin 2 of Q203.
- 6. The SST-444 is equipped with a 6-cell AA NiCd battery pack that has a nominal voltage of 7.2 VDC and a maximum voltage of 8.4 VDC. Measurements were taken with the power supply set to 7.2 and 8.4 VDC.
- 7. The SST-444 transmitter was then set to operate in low power mode, with test measurements made as described above with the power supply set to 7.2 VDC.

TYPE OF TEST: RADIO FREQUENCY POWER OUTPUT

FCC PART: 2.1046

MANUFACTURER: RITRON, INC.

505 West Carmel Drive

Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 5, 2000

TEST RESULTS:

Frequency (MHz)	TX Mode	Program	Drain Voltage (VDC)	Gate Voltage (VDC)	Drain Current (Amps)	Input Power (Watts)	Output Power (Watts)	Efficiency
460.0125	Low	63	7.2	2.30	0.58	4.18	1.09	26.1%
	High	78	7.2	4.00	1.55	11.16	3.99	35.8%
	High	78	8.4	4.00	1.77	14.87	5.32	35.8%
465.0125	Low	63	7.2	2.30	0.56	4.03	1.03	25.5%
	High	78	7.2	4.00	1.51	10.87	4.00	36.8%
	High	78	8.4	4.00	1.70	14.28	5.15	36.1%
470.0125	Low	63	7.2	2.30	0.55	3.96	0.95	24.0%
	High	78	7.2	4.00	1.47	10.58	3.68	34.8%
	High	78	8.4	4.00	1.68	14.11	5.05	35.8%

Certifying Engineer:

Michael A. Pickard - Project Engineer

TYPE OF TEST: MODULATOR RESPONSE

FCC PART: 2.1047 (a)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 6, 2000

PROCEDURE:

1. The SST-444 was aligned for transmitter operation on 465.0125 MHz (Fo) at full rated power per the tune-up procedure outlined in the Preliminary Maintenance Manual.

- 2. The SST-444 speech amplifier was disconnected from the modulator at R349. The output of a BK Precision Model 4010 Function Generator was connected to R349 through a 100µF capacitor.
- 3. The SST-444 was connected at antenna terminal P201 to the 50Ω RF input of the IFR COM-120B, which was used to measure FM deviation.
- 4. The audio signal generator was set to a frequency of 1000 Hz and the output was adjusted to provide +/- 1.5 KHz deviation (60% rated system deviation) as indicated by the IFR COM-120B. This output level was 125 mVAC.
- 5. With the audio generator output level fixed at 125 mVAC, the frequency was varied from 100 5000 Hz. Deviation was measured at various frequencies within this range and recorded on the accompanying chart.
- 6. A separate measurement was made for sub-audible tones. The audio signal generator was set for various sub-audible tones between 67 250 Hz at an output level of 41 mVAC, the level required to produce 500 Hz deviation at 67 Hz. There was no variation in resulting deviation across the sub-audible frequency range.

TYPE OF TEST: MODULATOR RESPONSE

FCC PART: 2.1047 (a)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

Gairrioi, ii v

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 6, 2000

TEST RESULTS:

Test Frequency: 465.0125 MHz Input Voltage required for 60% deviation at 1000 Hz: 125 mVAC

Modulation	Frequency	Percent
Frequency	Deviation	System
(Hz)	(+/- KHz)	Deviation
100	1.49	59.6%
200	1.49	59.6%
400	1.49	59.6%
800	1.50	60.0%
1000	1.50	60.0%
2000	1.54	61.6%
3000	1.56	62.4%
4000	1.53	61.2%
5000	1.34	53.6%

Certifying Engineer:

TYPE OF TEST: SPEECH AMPLIFIER LOW-PASS FILTER RESPONSE

FCC PART: 2.1047 (a)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 2, 2000

PROCEDURE:

1. The stages of the SST-444 speech amplifier prior to the low-pass filter were removed by disconnecting R344 from the output of limiting amplifier IC305B.

- 2. The output of a BK Precision Model 4010 Function Generator was applied to R344.
- 3. A Fluke Model 45 Dual Display Multimeter was used to measure the low-pass filter output at Pin 14 of IC303D.
- 4. The audio signal generator was set for a 1000 Hz sine wave at an output level of 1.56 VAC to produce –2.4 dB at the output of the low-pass filter. This level was selected to prevent limiting or distortion at any frequency. The Fluke Model 45 Dual Display Multimeter was set to make all measurements relative to this reference level.
- 5. The frequency of the audio signal generator was varied from 100 to 100 KHz with the output level constant. Measurements were recorded on the accompanying chart. All measurements were +/-relative to the -2.4 dB measured at 1000 Hz.

TYPE OF TEST: SPEECH AMPLIFER LOW-PASS FILTER RESPONSE

FCC PART: 2.1047 (a)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 2, 2000

TEST RESULTS:

Input Voltage required for –2.4 dB output at 1000 Hz: 1.56 VAC

	Measured	Relative
Frequency	Amplitude	Amplitude
(Hz)	(dB)	(dB)
100	-3.4	-1.0
200	-3.3	-0.9
300	-3.2	-0.8
400	-3.2	-0.8
500	-3.1	-0.7
600	-2.9	-0.5
800	-2.7	-0.3
1,000	-2.4	0.0
2,000	-5.6	-3.2
3,000	-13.5	-11.1
4,000	-20.3	-17.9
5,000	-25.9	-23.5
6,000	-30.7	-28.3
8,000	-38.8	-36.4
10,000	-45.5	-43.1
12,000	-51.2	-48.8
16,000	-60.1	-57.7
20,000	-64.9	-62.5
24,000	-69.2	-66.8
40,000	-70.1	-67.7
80,000	-70.4	-68.0
100,000	-70.4	-68.0

Certifying Engineer:

TYPE OF TEST: SPEECH AMPLIFER LOW-PASS FILTER RESPONSE

FCC PART: 2.1047 (a)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

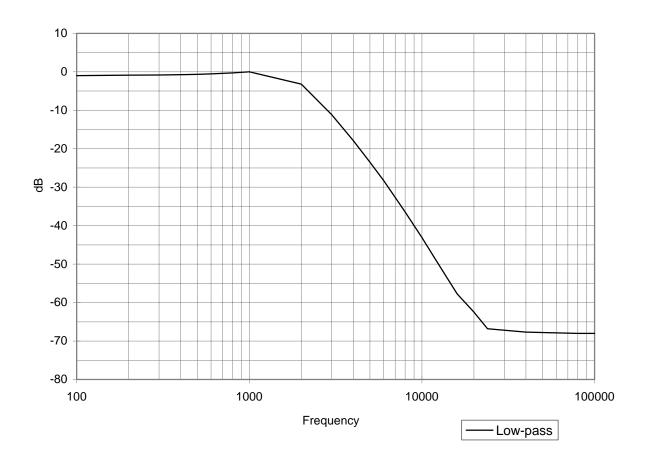
MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 2, 2000

CURVE:



FCC PART: 2.1047 (b)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 5, 2000

PROCEDURE:

1. The SST-444 was aligned for transmitter operation on 465.0125 MHz (Fo) per the tune-up procedure outlined in the Preliminary Maintenance Manual.

- 2. The SST-444 was connected at antenna terminal P201 to the RF input of an IFR COM-120B Communications Test Set used to measure FM deviation.
- 3. The output of a BK Precision Model 4010 Function Generator was applied to the microphone input of the SST-444 through J301. The output of the audio generator was set to an output level of 1.0 VRMS, a level sufficient to drive the audio circuit into limiting at any frequency.
- 4. A Fluke Model 45 Dual Display Multimeter was used to measure the amplitude of the signal applied to the microphone input.
- 5. The frequency of the audio generator was adjusted to find the frequency of maximum response. The SST-444 was set for 12.5 KHz bandwidth operation and the deviation was adjusted for +/- 2.5 KHz as outlined in the Preliminary Maintenance Manual.
- 6. The frequency of the audio signal generator was set to 300 Hz and the output level was adjusted to produce 250 Hz deviation, which is 10% of the rated modulation. The voltage level was then adjusted for 20% of the rated modulation, and repeated for every 10% increment.
- 7. The input voltage was adjusted to a level 16 dB greater than that required to produce 50% modulation. The maximum deviation was noted, along with the level required to achieve it, if 100% modulation was not realized.
- 8. Steps 6 and 7 were repeated for frequencies of 500, 750, 1000, 2000 and 3000 Hz.
- 9. The SST-444 was set for 25 KHz bandwidth operation and the deviation was adjusted for +/- 5 KHz as outlined in the Preliminary Maintenance Manual.
- 10. Steps 6, 7 and 8 were repeated for 25 KHz bandwidth operation.
- 11. Results were plotted on separate graphs for 12.5 KHz and 25 KHz bandwidth operation.

FCC PART: 2.1047 (b)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 5, 2000

TEST RESULTS:

Percent	Deviation		Input level (mVRMS) - 12.5 KHz Bandwidth				
Modulation	(KHz)	300 Hz	500 Hz	750 Hz	1000 Hz	2000 Hz	3000 Hz
10%	0.25	16.6	4.2	2.5	1.8	1.5	2.8
20%	0.50	33.1	9.2	5.2	3.8	3.1	6.3
30%	0.75	50.7	14.1	7.9	5.7	4.8	19.3*
40%	1.00	71.7	19.2	10.6	7.8	6.5	
50%	1.25	84.9	24.2	13.4	9.7	8.3	
60%	1.50	102.5	29.2	16.2	11.8	10.2	
70%	1.75	121.6	34.0	18.7	13.8	23.3	
80%	2.00	143.8	48.8	21.8	15.7		
90%	2.25	212.1	70.7	29.7	18.8		
100%	2.50			58.0*	43.3		
Level at 50%	+16 dB	535.7	152.8	84.2	61.5	52.2	121.53
Max Deviation	(KHz)	2.25*	2.25*	2.45*	2.50	1.75*	0.70*

Percent	Deviation		Input level (mVRMS) - 25 KHz Bandwidth				
Modulation	(KHz)	300 Hz	500 Hz	750 Hz	1000 Hz	2000 Hz	3000 Hz
10%	0.50	17.0	4.7	2.6	1.9	1.6	3.3
20%	1.00	35.7	9.6	5.4	4.0	3.2	6.9
30%	1.50	53.8	14.7	8.1	6.0	4.9	22.2*
40%	2.00	72.5	19.6	10.8	7.9	6.6	
50%	2.50	90.7	24.6	13.6	9.9	8.3	
60%	3.00	108.8	29.7	16.3	11.9	10.3	
70%	3.50	127.6	34.9	19.1	13.8	18.8	
80%	4.00	149.7	49.7	23.6	15.9		
90%	4.50	274.1*	67.4*	32.1	19.7		
100%	5.00			45.1*	33.9*		
Level at 50%	+ 16 dB	572.3	155.5	85.7	62.3	52.3	140.0
Max Deviation	(KHz)	4.40*	4.45*	4.65*	4.80*	3.50*	1.40*

Certifying Engineer:

FCC PART: 2.1047 (b)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

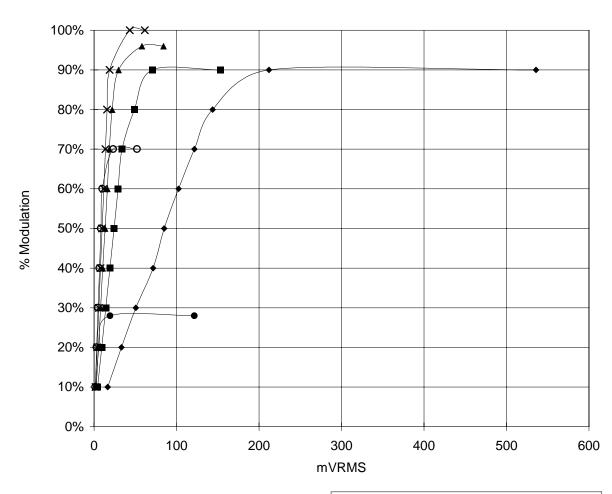
MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 5, 2000

CURVE:



Channel Bandwidth: 12.5 KHz 100% Modulation: 2.5 KHz

→ 300 Hz → 500 Hz → 750 Hz → 1000 Hz → 2000 Hz → 3000 Hz

FCC PART: 2.1047 (b)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

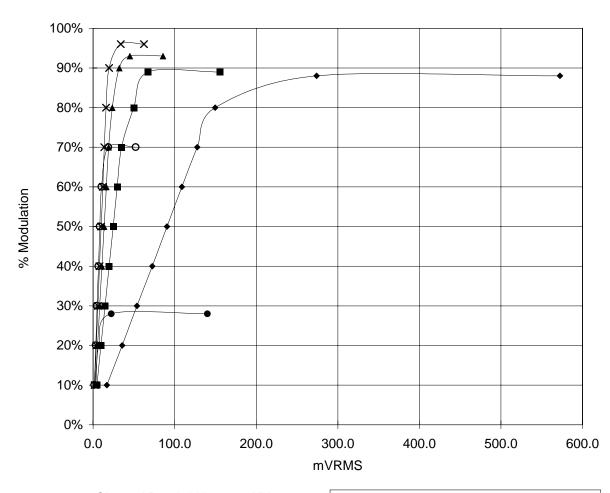
MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 5, 2000

CURVE:



Channel Bandwidth: 25.0 KHz 100% Modulation: 5.0 KHz

→ 300 Hz → 500 Hz → 750 Hz → 1000 Hz → 2000 Hz → 3000 Hz

FCC PART: 2.1049 (c)(1) per 90.210 (b)(d)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 19, 2000

PROCEDURE:

1. The SST-444 was aligned for transmitter operation on 465.0125 MHz (Fo) at full rated power, was set for 12.5 KHz bandwidth operation, and the deviation was adjusted for +/- 2.5 KHz as outlined in the Preliminary Maintenance Manual.

- 2. The RF output of the SST-444 was measured with a Bird Model 6154 Thermaline Wattmeter. This value was recorded as POWER OUTPUT. Power was supplied to the SST-444 via P302 by an Astron Model VS-20M Power Supply set at +8.4 VDC to produce the maximum rated transmitter power output.
- 3. The antenna terminal P201 was connected to the input of a Bird Model 8306-300-N 30 DB power attenuator. The output of the attenuator was connected to the input of a Hewlett Packard Model 8554B Spectrum Analyzer. The spectrum analyzer was set to:

• 100 Hz Resolution • 0 dBm Reference

5 KHz per Horizontal Division
 10 dB per Vertical Division

- 4. The center frequency of the spectrum analyzer was set to the SST-444 carrier frequency and the full scale reference line was set to the level of the unmodulated carrier.
- 5. The output of a BK Precision Model 4010 Function Generator was applied to the microphone input of the SST-444 through J301. The frequency of the audio signal generator was set to 2500 Hz and the output adjusted to a level 16 dB greater than that necessary to produce 50% of the rated system deviation at the frequency of maximum response.
- 6. The spectrum analyzer readings of the sideband levels in dBm were recorded and a graph of the spectrum analyzer output was plotted. All readings were rounded up to the nearest dB.
- 7. Steps 3 6 were repeated with the radio set for low power operation.
- 8. The SST-444 was set for 25 KHz bandwidth operation, and the deviation was adjusted for +/- 5 KHz as outlined in the Preliminary Maintenance Manual. Steps 3 7 were repeated for 25 KHz bandwidth operation.

FCC PART: 2.1049 (c)(1) per 90.210 (b)(d)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 19, 2000

EQUATIONS:

The analyzer readings in dBm were converted to power using the following formula:

Power = .001 (antilog F(dBm, 10))

The power readings were summed to provide a reference power level. The total was converted back to dBm with the following formula and recorded as MEAN REFERENCE POWER OUTPUT:

dBm = 10 (log Fc (Power,.001))

The sideband powers on each side of the carrier were reduced to a percentage of the MEAN REFERENCE POWER OUTPUT. The percentages were added together starting with the carrier and expanding out equally in +/- 2.5 KHz increments until greater than 99.5% of the total MEAN REFERENCE POWER was reached.

The occupied bandwidth is defined as having 99.5% of the total MEAN REFERENCE POWER existing within its limits.

Certifying Engineer:

Michael A. Pickard - Project Engineer

FCC PART: 2.1049 (c)(1) per 90.210 (b)(d)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 19, 2000

DATA: Carrier Frequency: 465.0125 MHz

Power Output: 1.00 Watts
Power Output: 30.00 dBm
Mean Reference Power: 29.47 dBm
Channel Bandwidth: 12.5 KHz
Occupied Bandwidth: 10.0 KHz

Emission Frequency Offset (KHz)	Measured Relative Amplitude (dBm)	Actual Amplitude (dBm)	FCC Limit (dBm)	Power (Watts)	Percent MRP (%)	Occupied Bandwidth (%)
-25.0			-20.00			
-22.5			-20.00			
-20.0			-20.00			
-17.5			-20.00			
-15.0	-71.00	-41.00	-20.00	79.4E-9	0.00%	
-12.5	-70.00	-40.00	-39.94	100.0E-9	0.00%	
-10.0	-66.00	-36.00	-21.76	251.2E-9	0.00%	
-7.5	-51.00	-21.00	-3.59	7.9E-6	0.00%	
-5.0	-32.00	-2.00	30.00	631.0E-6	0.07%	
-2.5	-13.00	17.00	30.00	50.1E-3	5.66%	
0.0	-1.00	29.00	30.00	794.3E-3	89.70%	100.00%
2.5	-14.00	16.00	30.00	39.8E-3	4.50%	
5.0	-32.00	-2.00	30.00	631.0E-6	0.07%	
7.5	-53.00	-23.00	-3.59	5.0E-6	0.00%	
10.0	-65.00	-35.00	-21.76	316.2E-9	0.00%	
12.5	-70.00	-40.00	-39.94	100.0E-9	0.00%	
15.0	-71.00	-41.00	-20.00	79.4E-9	0.00%	
17.5			-20.00			
20.0			-20.00			
22.5			-20.00			
25.0			-20.00			

Certifying Engineer:

FCC PART: 2.1049 (c)(1) per 90.210 (b)(d)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

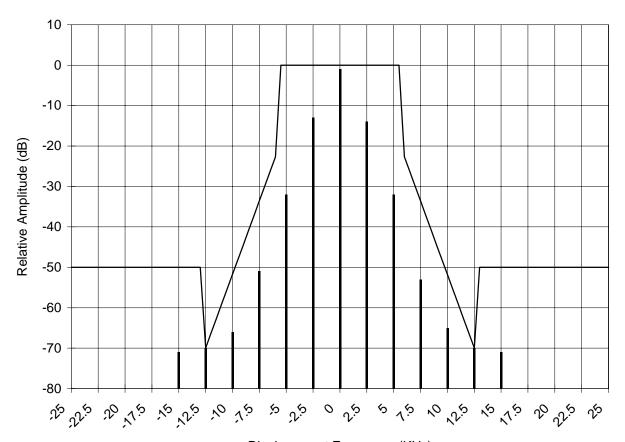
MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 19, 2000

CURVE:



Displacement Frequency (KHz)

Channel Bandwidth: 12.5 KHz Power Output: 1.0 Watts 2500 Hz Sidebands
—— Emission Mask D

FCC PART: 2.1049 (c)(1) per 90.210 (b)(d)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 19, 2000

DATA: Carrier Frequency: 465.0125 MHz

Power Output: 5.00 Watts
Power Output: 36.99 dBm
Mean Reference Power: 36.37 dBm
Channel Bandwidth: 12.5 KHz
Occupied Bandwidth: 10.0 KHz

Emission	Measured					
Frequency	Relative	Actual	FCC	Power	Percent	Occupied
Offset	Amplitude	Amplitude	Limit		MRP	Bandwidth
(KHz)	(dBm)	(dBm)	(dBm)	(Watts)	(%)	(%)
-25.0			-20.00			
-22.5			-20.00			
-20.0			-20.00			
-17.5			-20.00			
-15.0	-72.00	-35.01	-20.00	315.5E-9	0.00%	
-12.5	-71.00	-34.01	-32.95	397.2E-9	0.00%	
-10.0	-67.00	-30.01	-14.77	997.6E-9	0.00%	
-7.5	-51.00	-14.01	3.40	39.7E-6	0.00%	
-5.0	-32.00	4.99	36.99	3.2E-3	0.07%	
-2.5	-14.00	22.99	36.99	199.1E-3	4.59%	
0.0	-1.00	35.99	36.99	4.0E+0	91.64%	100.00%
2.5	-15.00	21.99	36.99	158.1E-3	3.65%	
5.0	-34.00	2.99	36.99	2.0E-3	0.05%	
7.5	-54.00	-17.01	3.40	19.9E-6	0.00%	
10.0	-65.00	-28.01	-14.77	1.6E-6	0.00%	
12.5	-71.00	-34.01	-32.95	397.2E-9	0.00%	
15.0	-72.00	-35.01	-20.00	315.5E-9	0.00%	
17.5			-20.00			
20.0			-20.00			
22.5			-20.00			
25.0			-20.00			

Certifying Engineer:

Michael A. Pickard - Project Engineer

FCC PART: 2.1049 (c)(1) per 90.210 (b)(d)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

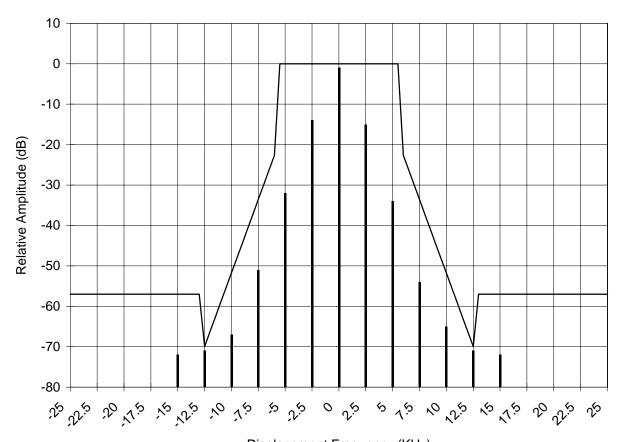
MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 19, 2000

CURVE:



Displacement Frequency (KHz)

Channel Bandwidth: 12.5 KHz Power Output: 5.0 Watts 2500 Hz Sidebands
—— Emission Mask D

FCC PART: 2.1049 (c)(1) per 90.210 (b)(d)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 19, 2000

DATA: Carrier Frequency: 465.0125 MHz

Power Output: 1.00 Watts
Power Output: 30.00 dBm
Mean Reference Power: 30.03 dBm
Channel Bandwidth: 25.0 KHz
Occupied Bandwidth: 20.0 KHz

Emission Frequency Offset (KHz)	Measured Relative Amplitude (dBm)	Actual Amplitude (dBm)	FCC Limit (dBm)	Power (Watts)	Percent MRP (%)	Occupied Bandwidth (%)
-25.0	(ubiii)	(dBiii)	-5.00	(waits)	(/0)	(/0)
-23.0 -22.5			-5.00 -5.00			
-22.5			5.00			
-20.0 -17.5	-72.00	-42.00	5.00	63.1E-9	0.00%	
-17.5	-72.00 -71.00	-42.00 -41.00	5.00	79.4E-9	0.00%	
-12.5	-69.00	-39.00	5.00	125.9E-9	0.00%	
-10.0	-54.00	-24.00	30.00	4.0E-6	0.00%	
-7.5	-36.00	-6.00	30.00	251.2E-6	0.02%	
-5.0	-20.00	10.00	30.00	10.0E-3	0.99%	
-2.5	-7.00	23.00	30.00	199.5E-3	19.81%	
0.0	-2.00	28.00	30.00	631.0E-3	62.63%	100.00%
2.5	-8.00	22.00	30.00	158.5E-3	15.73%	
5.0	-21.00	9.00	30.00	7.9E-3	0.79%	
7.5	-37.00	-7.00	30.00	199.5E-6	0.02%	
10.0	-55.00	-25.00	30.00	3.2E-6	0.00%	
12.5	-69.00	-39.00	5.00	125.9E-9	0.00%	
15.0	-72.00	-42.00	5.00	63.1E-9	0.00%	
17.5	-73.00	-43.00	5.00	50.1E-9	0.00%	
20.0			5.00			
22.5			-5.00			
25.0			-5.00			

Certifying Engineer:

FCC PART: 2.1049 (c)(1) per 90.210 (b)(d)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

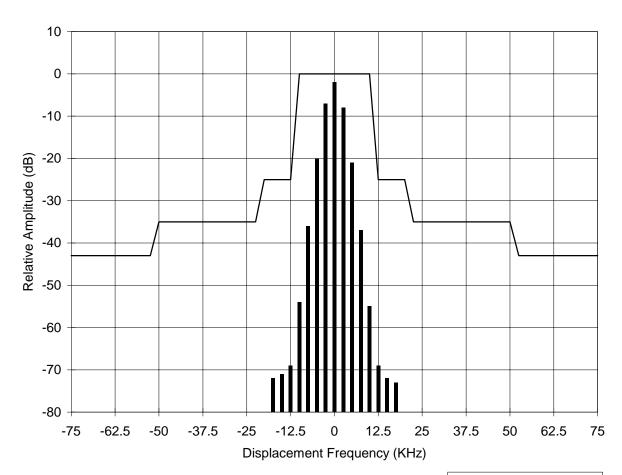
MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 19, 2000

CURVE:



Channel Bandwidth: 25 KHz Power Output: 1.0 Watts 2500 Hz Sidebands
— Emission Mask B

FCC PART: 2.1049 (c)(1) per 90.210 (b)(d)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 19, 2000

DATA: Carrier Frequency: 465.0125 MHz

Power Output: 5.00 Watts
Power Output: 36.99 dBm
Mean Reference Power: 37.02 dBm
Channel Bandwidth: 25.0 KHz
Occupied Bandwidth: 20.0 KHz

Emission Frequency Offset (KHz)	Measured Relative Amplitude (dBm)	Actual Amplitude (dBm)	FCC Limit (dBm)	Power (Watts)	Percent MRP (%)	Occupied Bandwidth (%)
-25.0	(4.2)	(4.2)	1.99	(114.115)	(7-5)	(73)
-22.5			1.99			
-20.0			11.99			
-17.5	-74.00	-37.01	11.99	199.1E-9	0.00%	
-15.0	-73.00	-36.01	11.99	250.6E-9	0.00%	
-12.5	-70.00	-33.01	11.99	500.0E-9	0.00%	
-10.0	-54.00	-17.01	36.99	19.9E-6	0.00%	
-7.5	-36.00	0.99	36.99	1.3E-3	0.02%	
-5.0	-20.00	16.99	36.99	50.0E-3	0.99%	
-2.5	-7.00	29.99	36.99	997.6E-3	19.81%	
0.0	-2.00	34.99	36.99	3.2E+0	62.63%	100.00%
2.5	-8.00	28.99	36.99	792.4E-3	15.73%	
5.0	-21.00	15.99	36.99	39.7E-3	0.79%	
7.5	-37.00	-0.01	36.99	997.6E-6	0.02%	
10.0	-55.00	-18.01	36.99	15.8E-6	0.00%	
12.5	-70.00	-33.01	11.99	500.0E-9	0.00%	
15.0	-70.00	-33.01	11.99	500.0E-9	0.00%	
17.5	-74.00	-37.01	11.99	199.1E-9	0.00%	
20.0			11.99			
22.5			1.99			
25.0			1.99			

Certifying Engineer:

FCC PART: 2.1049 (c)(1) per 90.210 (b)(d)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

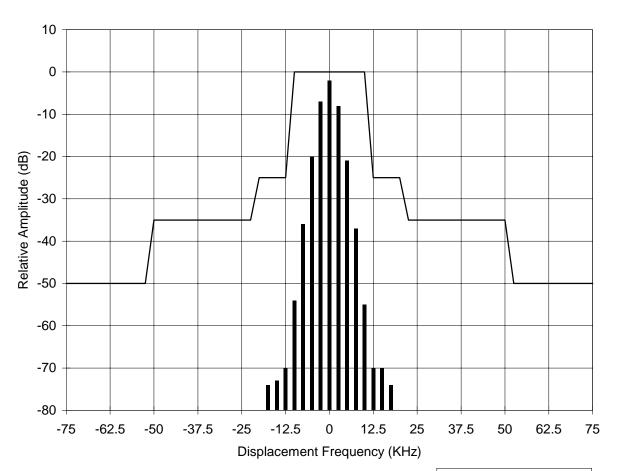
MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 19, 2000

CURVE:



Channel Bandwidth: 25 KHz Power Output: 5.0 Watts 2500 Hz Sidebands
—— Emission Mask B

TYPE OF TEST: SPURIOUS EMISSIONS AT ANTENNA TERMINALS

FCC PART: 2.1051

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 27, 2000

PROCEDURE:

1. The SST-444 was aligned for transmitter operation on 465.0125 MHz (Fo) at full rated power per the tune-up procedure outlined in the Preliminary Maintenance Manual.

- 2. Power was supplied to the SST-444 by a BK Precision Model 1630 Power Supply. The supply voltage was set to +8.4 VDC to represent the highest possible operating voltage.
- 3. The transmitter was modulated by a 2500 Hz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation as specified in FCC Part 2.1049 (c)(1).
- 4. The SST-444 antenna terminal P201 was connected to the input of a Bird Model 8306-300-N, 30 dB power attenuator, in series with a notch filter tuned to the carrier frequency. The output of the notch filter and attenuator was connected to the input of a Hewlett-Packard Model 8559A Spectrum Analyzer.
- 5. The spectrum was searched from 8 MHz to the 10th harmonic of the operating frequency. All unreported emissions were more than 30 dB below the FCC limit of 50 + 10 log P, or -20 dBm.
- 6. The measured insertion loss of the attenuators, notch filter, and cables are listed as the "Correction Factor" on the data sheet.
- 7. A second test was conducted with the SST-444 transmitter set for low power operation. The supply voltage was set to +7.2 VDC to represent the nominal operating voltage. All other conditions remained the same.

TYPE OF TEST: SPURIOUS EMISSIONS AT ANTENNA TERMINALS

FCC PART: 2.1051

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 27, 2000

TEST RESULTS:

Carrier Frequency (Fo): 465.0125 MHz
Oscillator Frequency: 3.6 MHz
Output Power: 5.00 Watts
Supply Voltage: 8.4 VDC
FCC Limit: -20 dBm

Fasianian	Marilton Lo	N 4 = =	0	Describerat
Emission	Mulitple	Measured	Correction	Resultant
Frequency	of	Amplitude	Factor	Amplitude
(MHz)	Carrier	(dBm)	(dB)	(dBm)
460.8000	Fo - (3.66125)	-76	40	-36
461.4125	fo - (3.6)	-76	41	-35
462.0250	Fo - (3.6 + .6125)	-77	42	-35
465.0125	fo	-21	57	36
468.0000	Fo + (3.66125)	-74	38	-36
468.6125	fo - (3.6)	-72	36	-36
469.2250	fo + (3.6 + .6125)	-71	35	-36
	,			
930.0250	fo * 2	-68	34	-34

Certifying Engineer:

TYPE OF TEST: SPURIOUS EMISSIONS AT ANTENNA TERMINALS

FCC PART: 2.1051

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 27, 2000

TEST RESULTS:

Carrier Frequency (Fo): 465.0125 MHz
Oscillator Frequency: 3.6 MHz
Output Power: 1.00 Watts
Supply Voltage: 7.2 VDC
FCC Limit: -20 dBm

Emission	Mulitala	Magazirad	Correction	Decultont
Emission	Mulitple	Measured	Correction	Resultant
Frequency	of	Amplitude	Factor	Amplitude
(MHz)	Carrier	(dBm)	(dB)	(dBm)
460.8000	Fo - (3.66125)	-80	40	-40
461.4125	fo - (3.6)	-81	41	-40
462.0250	Fo - (3.6 + .6125)	-82	42	-40
465.0125	fo	-26	57	31
468.0000	Fo + (3.66125)	-82	38	-44
468.6125	fo - (3.6)	-84	36	-48
469.2250	fo + (3.6 + .6125)	-85	35	-50
930.0250	fo * 2	-74	34	-40

Certifying Engineer:

Michael A. Pickard - Project Engineer

TYPE OF TEST: FIELD STRENGTH OF SPURIOUS RADIATION

FCC PART: 2.1053

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 22, 2000

PROCEDURE:

The following measurements were taken at the RITRON, Inc. 3 meter test site. Measurements were made in accordance with FCC Rules & Regulations Part 2.947, using the procedures of IEC Publication 106.

- 1. The SST-444 was aligned for transmitter operation on 465.0125 MHz (Fo) at full rated power per the tune-up procedure outlined in the Preliminary Maintenance Manual.
- 2. The SST-444 was then terminated at the antenna port with a non-radiating 50Ω terminating load.
- 3. All field strength measurements were made with the Hewlett-Packard Model 8559A Spectrum Analyzer and the appropriate antenna for the frequency being measured. The antennas used were:
 - Electro-Metrics BDA-25 Dipole Antenna at 0 to 200 MHz
 - Electro-Metrics LP-25 Log Periodic Antenna at 200 to 1000 MHz
 - Polarad CA-BB Microwave Antenna at 1000 to 10.000 MHz
- 4. For each emission, the height and polarization of the field strength measuring antenna and orientation of the SST-444 were varied to provide maximum field strength.
- 5. The spectrum was searched from 4 MHz to the 10th harmonic of the transmit frequency. All unreported emissions were more than 20 dB below the FCC limits specified in Part 90.210(d)(3).
- 6. The SST-444 was then set for low power transmitter operation and test measurements were repeated as described above.

TYPE OF TEST: FIELD STRENGTH OF SPURIOUS RADIATION

FCC PART: 2.1053

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 22, 2000

EQUATIONS:

Analyzer readings in dBm and the calibrated antenna factor were converted to field strength as follows:

 $P_{3m} = R + 107 + K$ $E_{3m} = Log^{-1} (P_{3m} / 20)$

where: P_{3m} = Power output at 3 meters in dBm.

R = Direct reading from spectrum analyzer in dBm.

K = Antenna factor in dB at 3 meters. $E_{3m} = Field strength at 3 meters in <math>\mu V/m$.

The reference level for a half wave dipole was computed as follows:

 $E_{ref} = 1000000 * \sqrt{(49.2 * P)} / D$

where: P = Transmitter power in Watts.

D = Distance in meters.

The amount, in dB, that the measured field strength is below the reference field strength was computed as follows:

 $E = 20 \text{ Log } (E_{3m} / E_{ref})$

where: E = The amount below reference level in dB.

 E_{3m} = Field strength at 3 meters in μ V/m.

 E_{ref} = Reference field strength at 3 meters in μ V/m.

TYPE OF TEST: FIELD STRENGTH OF SPURIOUS RADIATION

FCC PART: 2.1053

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 22, 2000

TEST RESULTS:

Emission	Multiple		Analyzer	Antenna	Field	dB Below	dB Below
Frequency	of	Antenna	Reading	Factor	Strength	Reference	FCC
(MHz)	Carrier		(dBm)	(dB)	(μV/m)	Level	Limit
930.025	2	Log Periodic	-60	28.46	5929.46	-58.91	-1.92

Emission	Multiple	Antenna	Analyzer	Antenna	Field	dB Below	dB Below
Frequency	of		Reading	Factor	Strength	Reference	FCC
(MHz)	Carrier		(dBm)	(dB)	(µV/m)	Level	Limit
930.025	2	Log Periodic	-66	28.46	2971.77	-57.92	-0.93

Certifying Engineer:

Michael A. Pickard - Project Engineer

TYPE OF TEST: FREQUENCY STABILITY VS. TEMPERATURE

FCC PART: 2.1055 (a)(1)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 21, 2000

PROCEDURE:

1. The SST-444 was aligned for transmitter operation on 465.0125 MHz (Fo) at full rated power per the tune-up procedure outlined in the Preliminary Maintenance Manual.

- 2. Power was supplied to the SST-444 by a BK Precision Model 1630 power supply set to the nominal operating voltage of +7.2 VDC. The SST-444 antenna terminal P201 was connected to the input of an IFR COM-120B RF communications test set, used to measure frequency of the carrier.
- 3. Temperature was measured with an Omega Model 7035-J-225 thermocouple connected directly to the case of Y302, a TCVCXO reference oscillator mounted on the SST-444 printed circuit board.
- 4. The SST-444 was enclosed in a plastic bag and placed into an Associated Laboratories Model ELH-0.5-LC environmental test chamber.
- 5. The temperature was raised to +50°C and allowed to stabilize for 30 minutes. The transmitter was activated and the frequency output recorded. The temperature was lowered in 10°C increments down to -30°C, allowing 30 minutes to stabilize at each temperature.
- 6. All measurements were converted to part-per-million (ppm) deviation and charted on a linear graph.

TYPE OF TEST: FREQUENCY STABILITY VS. TEMPERATURE

FCC PART: 2.1055 (a)(1)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 21, 2000

TEST RESULTS:

Frequency: 465.0125 MHz FCC Limit: +/- 2.5 ppm

Temperature	Frequency	Deviation	Deviation	
(°C)	(MHz)	(Hz)	(ppm)	
50	465.012300	-200	-0.43	
40	465.012420	-80	-0.17	
30	465.012550	50	0.11	
20	465.012720	220	0.47	
10	465.012770	270	0.58	
0	465.012750	250	0.54	
-10	465.012500	0	0.00	
-20	465.012270	-230	-0.49	
-30	465.012390	-110	-0.24	

Certifying Engineer:

TYPE OF TEST: FREQUENCY STABILITY VS. TEMPERATURE

FCC PART: 2.1055 (a)(1)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

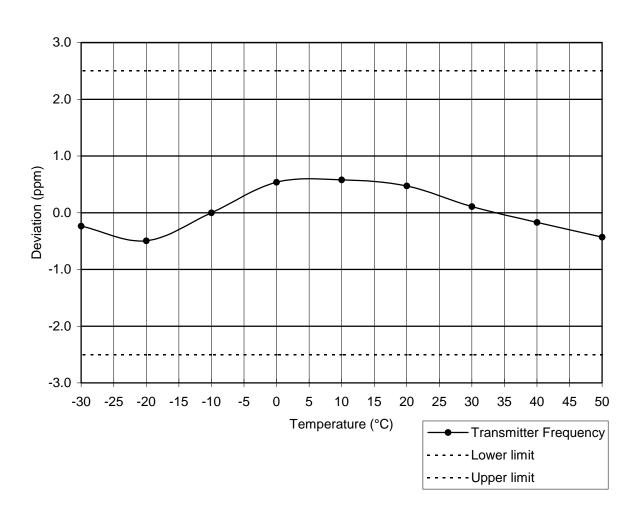
MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 21, 2000

CURVE:



TYPE OF TEST: FREQUENCY STABILITY VS. BATTERY VOLTAGE

FCC PART: 2.1055 (d)(2)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 6, 2000

PROCEDURE:

- 1. The SST-444 was aligned for transmitter operation on 465.0125 MHz (Fo) at full rated power per the tune-up procedure outlined in the Preliminary Maintenance Manual.
- 2. Power was supplied to the SST-444 by a BK Precision Model 1630 power supply, and supply voltage was measured at P302 battery connector with a Micronta Model 22-191 Digital Multimeter.
- 3. The SST-444 antenna terminal P201 was connected to the input of an IFR COM-120B RF communications test set, used to measure frequency of the carrier.
- 4. Frequency measurements were made at +25°C with supply voltage set to 6.0, 7.2 and 8.4 VDC.
- 5. The lowest operating voltage is determined by battery end of life voltage for each cell multiplied by the number of individual cells. The maximum cell voltage multiplied by the number of cells determines the highest operating voltage. For AA NiCd and NiMH cells the lowest operating voltage is 1 VDC and the highest operating voltage is 1.4 VDC.

Lowest operating voltage 1.0 VDC X 6 cells 6.0 VDC Nominal operating voltage 1.2 VDC X 6 cells 7.2 VDC Lowest operating voltage 1.4 VDC X 6 cells 8.4 VDC

6. All frequencies were referenced to the measurement made at +7.2 VDC, the nominal supply voltage for a 6-cell AA NiCd battery pack.

TYPE OF TEST: FREQUENCY STABILITY VS. BATTERY VOLTAGE

FCC PART: 2.1055 (d)(2)

MANUFACTURER: RITRON, INC.

505 West Carmel Drive

Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 6, 2000

TEST RESULTS:

Carrier Frequency: 465.0125 MHz

Battery Voltage (VDC)	Battery Condition	Transmitter Frequency (MHz)	Deviation (Hz)	Deviation (ppm)
6.0	end of life	465.012480	-10	-0.02
7.2	nominal	465.012490	0	0.00
8.4	high charge	465.012490	0	0.00

Certifying Engineer:

TYPE OF TEST: TRANSIENT FREQUENCY BEHAVIOR

FCC PART: 90.214

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

MODEL: SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

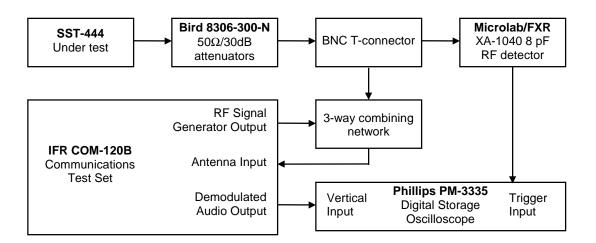
FCC ID: AIERIT13-450

DATE: June 7, 2000

PROCEDURE:

The SST-444 was aligned for transmitter operation on 465.0125 at full rated power per the tune-up procedure outlined in the Preliminary Maintenance Manual. The tests were conducted per EIA-603 Part 2.2.19 as follows:

1. The test equipment was connected per the following diagram:



- 2. The IFR COM-120B receiver was set to measure FM deviation with the audio bandwidth set at ≤ 20 Hz to 15 KHz and the RF frequency set to 465.0125 MHz.
- 3. The SST-444 transmitter under test was turned on and the IFR COM-120B Spectrum Analyzer was used to measure the RF power level through the test network.
- 4. The SST-444 transmitter was turned off.
- 5. The IFR COM-120B RF signal generator was set to 465.0125 MHz at an RF level 20 dB below that measured in step 3, modulated with a 1 KHz tone at \pm 25 KHz deviation.
- 6. The Phillips PM-3335 digital oscilloscope horizontal sweep rate was set to 10 mS per division. The vertical amplitude control was adjusted to display the 1000 Hz demodulated audio from the signal generator at \pm 4 divisions, vertically centered on the screen.

- 7. The Phillips PM-3335 digital oscilloscope was set to trigger at 1 division from the left side of the display when the RF detector senses RF power from the SST-444 transmitter.
- 8. The attenuation of the RF attenuator was reduced so the input of the RF detector and the RF combiner is increased by 30 dB when the SST-444 transmitter is turned on.
- The SST-444 transmitter is turned on and the resulting waveform on the oscilloscope display was stored and plotted. The FCC limits per Part 90.214 were added to the plot in the same manner illustrated in EIA-603 Part 3.2.19.2 The resulting plot is labeled "switch on condition" and shows compliance with FCC Part 90.214.
- 10. The Phillips PM-3335 digital oscilloscope was set to trigger at 1 division from the right side of the display when the RF detector senses loss of RF power from the SST-444 transmitter.
- 11. The SST-444 transmitter is turned off and the resulting waveform on the oscilloscope display was stored and plotted. The FCC limits per Part 90.214 were added to the plot in the same manner illustrated in EIA-603 Part 3.2.19.2 The resulting plot is labeled "switch off condition" and shows compliance with FCC Part 90.214.

Certifying Engineer:

Michael A. Pickard - Project Engineer

TYPE OF TEST: TRANSIENT FREQUENCY BEHAVIOR

FCC PART: 90.214

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

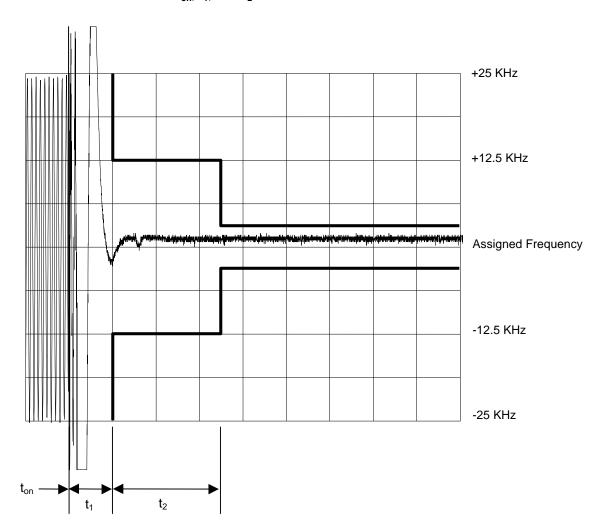
SST-444 MODEL:

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: **AIERIT13-450**

DATE: June 7, 2000

SWITCH ON CONDITION t_{on} , t_{1} , and t_{2}



TYPE OF TEST: TRANSIENT FREQUENCY BEHAVIOR

FCC PART: 90.214

MODEL:

MANUFACTURER: RITRON, INC.

505 West Carmel Drive Carmel, IN 46032

SST-444

TYPE OF UNIT: UHF-FM Handheld Transceiver

FCC ID: AIERIT13-450

DATE: June 7, 2000

SWITCH OFF CONDITION t₃ and t_{OFF}

