TYPE OF EXHIBIT: TEST REPORT

FCC PART: 2.1033 (c)(14)

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

MODELS: RQX-156, RQX-156-XT

FCC ID: AIERIT18-156

DATE: October 14, 2003

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

TYPE OF EXHIBIT: STATEMENT OF CERTIFYING ENGINEER

FCC PART: 2.947

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

MODELS: RQX-156, RQX-156-XT

FCC ID: AIERIT18-156

DATE: October 14, 2003

I, Kevin G. Matson, have been employed by RITRON, Inc. since May 1980, working in the Engineering Department since November 1980 as a radio frequency Project Engineer.

I received an Associates Degree in Electrical Engineering Technology from Purdue University at Indianapolis in 1980. I received a Bachelor of Science Degree in Electrical Engineering Technology from Purdue University at Indianapolis in 1982.

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: Kevin G. Matson

Kevin G. Matson - Project Engineer

TYPE OF EXHIBIT: TEST EQUIPMENT LIST

FCC PART:	2.947 (d)
MANUFACTURER:	RITRON, INC. 505 West Carmel Drive Carmel, IN 46032
MODELS:	RQX-156, RQX-156-XT
FCC ID:	AIERIT18-156
DATE:	October 14, 2003
IC STANDARDS:	RSS-119, Issue 6, Section 4
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

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.

ITEM	MANUFACTURER	MODEL NO.	SERIAL NO.
Communications Test Set	IFR	COM-120B	485002391
RF Signal Generator	Marconi Instruments	2022	119019/120
Spectrum Analyzer	Hewlett-Packard	8560E	3720A02980
Audio Sweep Generator	B & K Precision	4010	275-00893
Power Supply	VIZ	WP 706A	3429D3
Digital Oscilloscope	Philips	PM-3335	DM648004
Dual Display Multimeter	Fluke	45	6723040
Digital VOM	Fluke	2704A	234-008459
RF Wattmeter	Bird	6154	8652
Dipole Antenna	Electro-Metrics	EM-6924	241
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
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:	RQX-156, RQX-156-XT
FCC ID:	AIERIT18-156
DATE:	October 14, 2003

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: Kevin G. Matson

Kevin G. Matson - Project Engineer

TYPE OF TEST:	RADIO FREQUENCY POWER OUTPUT
FCC PART:	2.1046
MANUFACTURER:	RITRON, INC. 505 West Carmel Drive Carmel, IN 46032
MODELS:	RQX-156, RQX-156-XT
FCC ID:	AIERIT18-156
DATE:	October 14, 2003
IC STANDARDS:	RSS-119, Issue 6, Section 6.2
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

PROCEDURE:

1. The RQX-156 was aligned for transmitter operation on 150.050, 156.050 and 161.950 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 RQX-156 operating frequency band.

2. Power was supplied to the RQX-156 via battery input connector P501 by a VIZ Model WP 706A power supply. The power supply was set for +9.6VDC. The RQX-156 was connected at antenna terminal J201 to the input of a Bird 6154 Thermaline Wattmeter, used to measure RF power of the carrier.

3. A BK Model 2704A Digital Multimeter was connected in series with Z202 to measure the collector current of Q206, the final RF amplifier device. A Micronta Model 22-191 Digital Multimeter was used to measure Q206 collector supply voltage at Z202.

4. Q201, Q202, Q207 and digital pot U305B set the supply voltage to the transmitter. Measurements were taken with the transmitter supply set for low and high power operation at each frequency.

5. Power was also supplied to the RQX-156 via external 12VDC input connectors J501 and J502 by a VIZ Model WP 706A power supply. The power supply was set for +12VDC. The RQX-156 was connected at antenna terminal J201 to the input of a Bird 6154 Thermaline Wattmeter, used to measure RF power of the carrier.

6. A BK Model 2704A Digital Multimeter was connected in series with Z202 to measure the collector current of Q206, the final RF amplifier device. A Micronta Model 22-191 Digital Multimeter was used to measure Q206 collector supply voltage at Z202.

7. Q201, Q202, Q207 and digital pot U305B set the supply voltage to the transmitter. Measurements were taken with the transmitter supply set for low and high power operation at each frequency.

TYPE OF TEST: RADIO FREQUENCY POWER OUTPUT

FCC PART: 2.1046

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

MODELS: RQX-156, RQX-156-XT

FCC ID: AIERIT18-156

DATE: October 14, 2003

IC STANDARDS:	RSS-119, Issue 6, Section 6.2
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

TEST RESULTS:

Battery Input(+9 VDC) : P501

Frequency (MHz)	High/Low Power	Collector Voltage (VDC)	Collector Current (Amps)	Input Power (Watts)	Output Power (Watts)	Efficiency
150.050	Low	6.9	0.22	1.52	1.00	65.8%
	High	8.9	0.31	2.76	2.00	72.4%
156.050	Low	6.5	0.22	1.43	1.00	69.9%
	High	8.9	0.34	3.03	2.00	66.0%
161.950	Low	6.5	0.21	1.37	1.00	73.0%
	High	9.0	0.31	2.79	2.00	71.7%

Certifying Engineer: 

Kevin G. Matson - Project Engineer

TYPE OF TEST: RADIO FREQUENCY POWER OUTPUT

FCC PART: 2.1046

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

MODELS: RQX-156, RQX-156-XT

FCC ID: AIERIT18-156

DATE: October 14, 2003

IC STANDARDS:	RSS-119, Issue 6, Section 6.2
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

TEST RESULTS:

External +12VDC Input : J501/502

Frequency (MHz)	High/Low Power	Collector Voltage (VDC)	Collector Current (Amps)	Input Power (Watts)	Output Power (Watts)	Efficiency
150.050	Low High	6.9 9.4	0.22 0.34	1.52 3.20	1.00 2.00	65.8% 62.5%
156.050	Low High	6.7 9.3	0.22 0.34	1.47 3.16	1.00 2.00	68.0% 63.3%
161.950	Low High	6.5 9.0	0.21 0.30	1.37 2.70	1.00 2.00	73.0% 74.0%

Certifying Engineer: Kevin G. Matson

Kevin G. Matson - Project Engineer

TYPE OF TEST: MODULATOR RESPONSE

FCC PART:	2.1047 (a)
MANUFACTURER:	RITRON, INC. 505 West Carmel Drive Carmel, IN 46032
MODELS:	RQX-156, RQX-156-XT
FCC ID:	AIERIT18-156
DATE:	October 14, 2003
IC STANDARDS:	RSS-119, Issue 6, Section 6.6
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

PROCEDURE:

1. The RQX-156 was aligned for transmitter operation on 156.050 MHz (Fo) at full rated power per the tune-up procedure outlined in the Preliminary Maintenance Manual.

2. The RQX-156 speech amplifier was disconnected from the modulator at R345. The output of a BK Precision Model 4010 Function Generator was connected to R345 through a 100μF capacitor.

3. The RQX-156 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 162mVrms.

5. With the audio generator output level fixed at 162 mVrms, 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 42 mVrms, the level required to produce 450 Hz deviation at 100 Hz. There was no variation in resulting deviation across the sub-audible frequency range.

7. The circuit was restored to normal operation. The audio signal was injected at the microphone input. The audio frequency was adjusted to find the frequency of maximum deviation. The audio level was set to insure that clipping did not occur. The audio generator was set to 1000 Hz and the deviation noted and referenced to 0 dB.

TYPE OF TEST: MODULATOR RESPONSE

FCC PART: 2.1047 (a)

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

MODELS: RQX-156, RQX-156-XT

FCC ID: AIERIT18-156

DATE: October 15, 2003

IC STANDARDS:	RSS-119, Issue 6, Section 6.6
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

TEST RESULTS:

Test Frequency: 156.050 MHz
Input Voltage required for 60% deviation at 1000 Hz: 162 mVrms

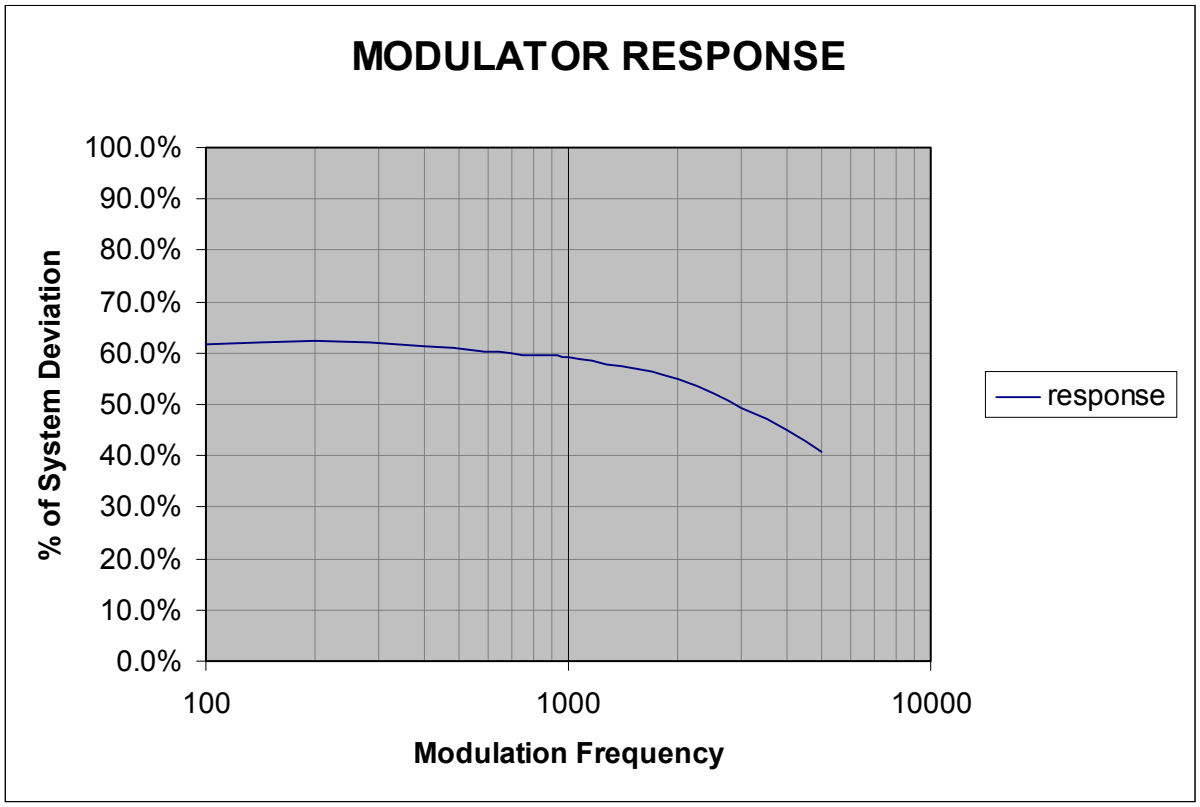
Modulation Frequency (Hz)	Frequency Deviation (+/- kHz)	Percent System Deviation
100	1.54	61.6%
200	1.56	62.4%
400	1.53	61.2%
800	1.49	59.6%
1000	1.48	59.2%
2000	1.37	54.8%
3000	1.23	49.2%
4000	1.13	45.2%
5000	1.02	40.8%

Certifying Engineer: Kevin G. Matson

Kevin G. Matson - Project Engineer

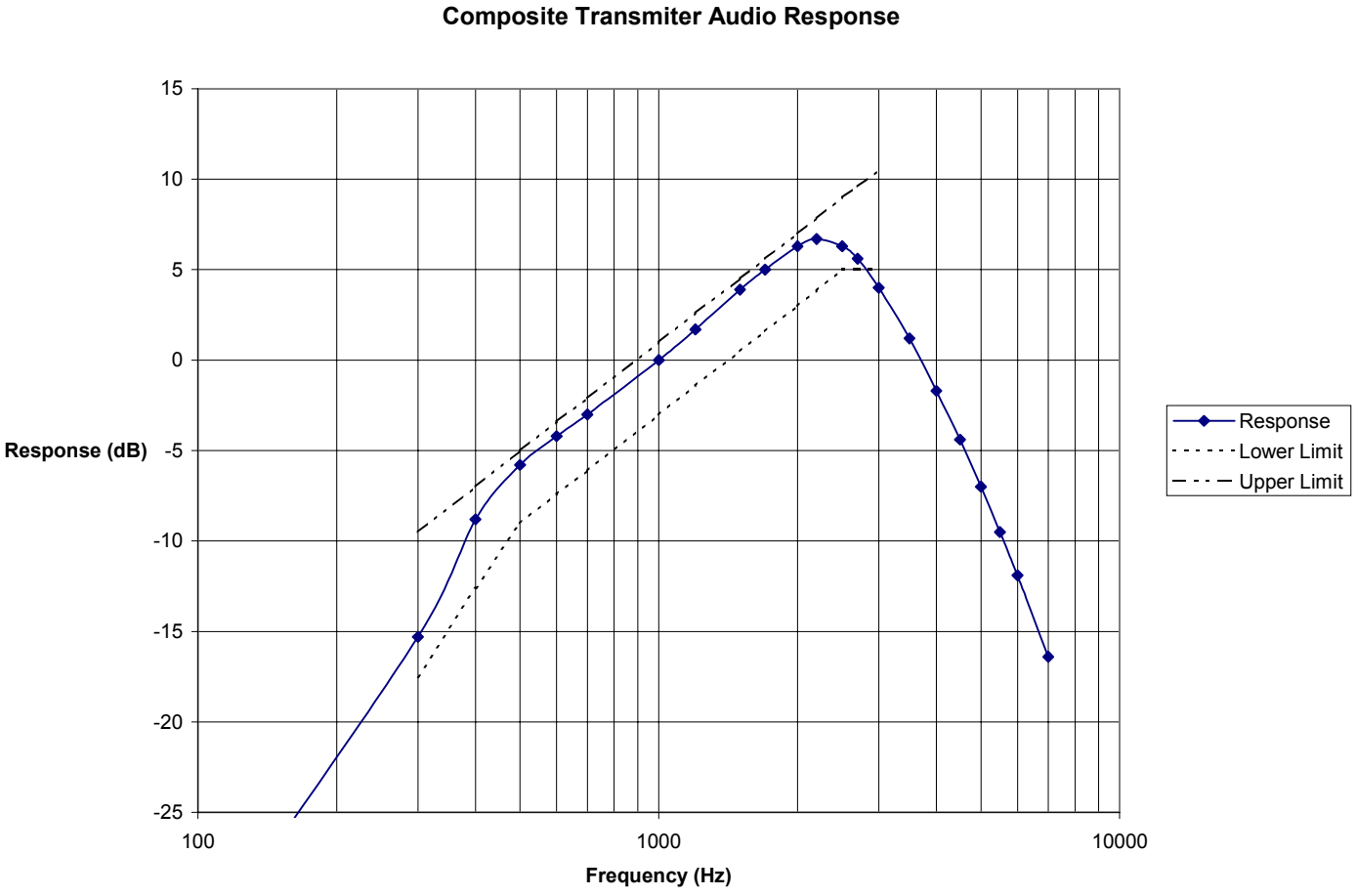
TYPE OF TEST:	MODULATOR RESPONSE
FCC PART:	2.1047 (a)
MANUFACTURER:	RITRON, INC. 505 West Carmel Drive Carmel, IN 46032
MODELS:	RQX-156, RQX-156-XT
FCC ID:	AIERIT18-156
DATE:	October 15, 2003
IC STANDARDS:	RSS-119, Issue 6, Section 6.6
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

CURVE:



TYPE OF TEST:	MODULATOR RESPONSE
FCC PART:	2.1047 (a)
MANUFACTURER:	RITRON, INC. 505 West Carmel Drive Carmel, IN 46032
MODELS:	RQX-156, RQX-156-XT
FCC ID:	AIERIT18-156
DATE:	October 15, 2003
IC STANDARDS:	RSS-119, Issue 6, Section 6.6
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

CURVE:



TYPE OF TEST:	SPEECH AMPLIFIER LOW-PASS FILTER RESPONSE
FCC PART:	2.1047 (a)
MANUFACTURER:	RITRON, INC. 505 West Carmel Drive Carmel, IN 46032
MODELS:	RQX-156, RQX-156-XT
FCC ID:	AIERIT18-156
DATE:	October 15, 2003
IC STANDARDS:	RSS-119, Issue 6, Section 6.6
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

PROCEDURE:

1. The stages of the RQX-156 speech amplifier prior to the low-pass filter were removed by disconnecting R331 from the output of limiting amplifier U302B.

2. The output of a BK Precision Model 4010 Function Generator was applied to R331.

3. A Fluke Model 45 Dual Display Multimeter was used to measure the low-pass filter output at Pin 14 of U302D.

4. The audio signal generator was set for a 1000 Hz sine wave at an output level of 3.8 VP to produce 3.41 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 3.41 dB measured at 1000 Hz.

TYPE OF TEST: SPEECH AMPLIFIER LOW-PASS FILTER RESPONSE

FCC PART: 2.1047 (a)

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

MODELS: RQX-156, RQX-156-XT

FCC ID: AIERIT18-156

DATE: October 15, 2003

IC STANDARDS:	RSS-119, Issue 6, Section 6.6
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

TEST RESULTS:

Input Voltage required for 3.41 dB output at 1000 Hz: 4.2 VP

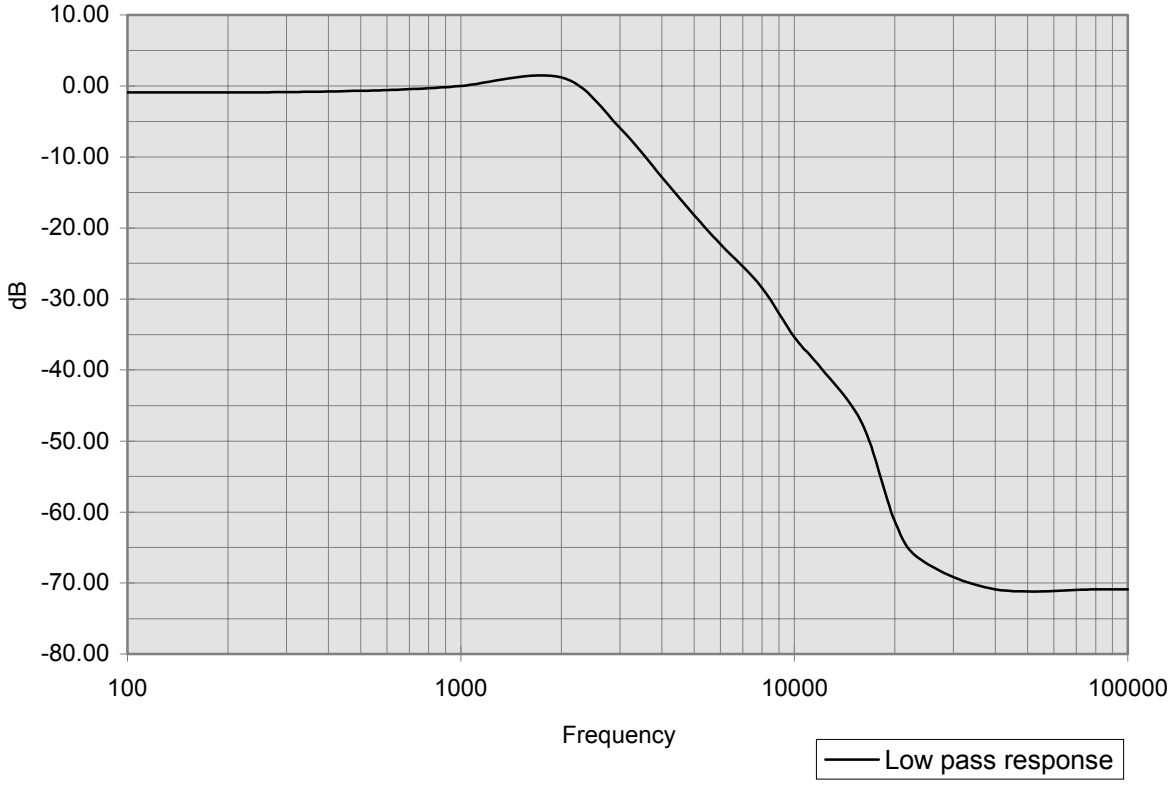
Frequency (Hz)	Measured Amplitude (dB)	Relative Amplitude (dB)
100	2.49	-0.92
200	2.51	-0.90
300	2.56	-0.85
400	2.62	-0.79
500	2.71	-0.70
600	2.81	-0.60
800	3.08	-0.33
1,000	3.41	0.00
2,000	4.62	1.21
3,000	-2.50	-5.91
4,000	-9.43	-12.84
5,000	-14.78	-18.19
6,000	-18.85	-22.26
8,000	-25.02	-28.43
10,000	-31.94	-35.35
12,000	-36.29	-39.70
16,000	-44.20	-47.61
20,000	-57.84	-61.25
24,000	-63.35	-66.76
40,000	-67.47	-70.88
80,000	-67.47	-70.88
100,000	-67.47	-70.88

Certifying Engineer: Kevin G. Matson

Kevin G. Matson - Project 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
MODELS:	RQX-156, RQX-156-XT
FCC ID:	AIERIT18-156
DATE:	October 15, 2003
IC STANDARDS:	RSS-119, Issue 6, Section 6.6
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

CURVE:



TYPE OF TEST: PERCENT MODULATION VS. MODULATION INPUT VOLTAGE

FCC PART: 2.1047 (b)

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

MODELS: RQX-156, RQX-156-XT

FCC ID: AIERIT18-156

DATE: October 21, 2003

IC STANDARDS:	RSS-119, Issue 6, Section 6.6
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

PROCEDURE:

1. The RQX-156 was aligned for transmitter operation on 156.050 MHz (Fo) per the tune-up procedure outlined in the Preliminary Maintenance Manual.

2. The RQX-156 was connected at antenna terminal J201 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 RQX-156 through C303. The output of the audio generator was set to an output level of 1.5 VP, 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 RQX-156 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 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 RQX-156 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.

TYPE OF TEST: PERCENT MODULATION VS. MODULATION INPUT VOLTAGE

FCC PART: 2.1047 (b)

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

MODELS: RQX-156, RQX-156-XT

FCC ID: AIERIT18-156

DATE: October 21, 2003

IC STANDARDS:	RSS-119, Issue 6, Section 6.6
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

TEST RESULTS:

Percent Modulation	Deviation (kHz)	Input level (mVRMS) - **12.5 kHz Bandwidth**					
		300 Hz	500 Hz	750 Hz	1000 Hz	2000 Hz	3000 Hz
10%	0.25	7.9	2.7	1.9	1.4	0.8	1.0
20%	0.50	17.0	5.7	4.0	2.8	1.5	2.3
30%	0.75	26.1	8.8	5.8	4.5	2.3	3.3
40%	1.00	35.2	11.8	7.9	6.2	3.2	4.5
50%	1.25	44.7	14.8	10.0	7.9	4.1	6.6
60%	1.50	52.0	17.0	11.7	9.2	4.9	8.8*
70%	1.75	62.3*	20.4	13.5	10.9	5.8	
80%	2.00		29.1	18.2	13.5	6.6	
90%	2.25		34.7	22.1	17.9	7.9	
100%	2.50		43.5*	27.8*	23.8*	12.2	
Level at 50%	+16 dB	281.6	93.2	63.0	49.8	24.6	41.6
Max Deviation	(kHz)	1.75*	2.30*	2.40*	2.40*	2.50	1.30*

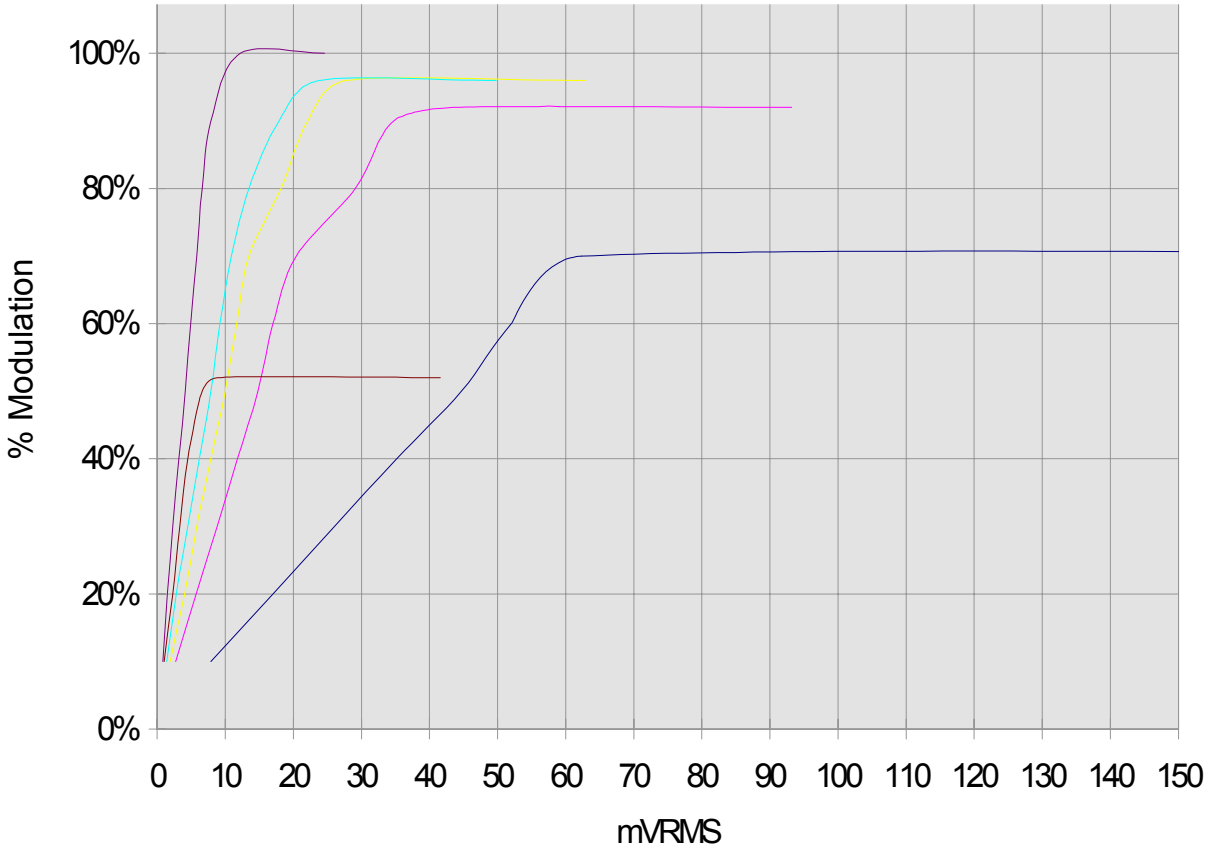
Percent Modulation	Deviation (kHz)	Input level (mVRMS) - **25 kHz Bandwidth**					
		300 Hz	500 Hz	750 Hz	1000 Hz	2000 Hz	3000 Hz
10%	0.50	9.5	3.0	1.9	1.5	1.0	1.0
20%	1.00	18.6	6.3	4.2	3.2	1.8	2.3
30%	1.50	29.0	9.5	6.6	4.9	2.7	3.6
40%	2.00	38.2	12.1	8.7	6.6	3.5	4.9
50%	2.50	47.4	15.9	10.5	8.3	4.4	10.9*
60%	3.00	55.2	18.5	12.6	10.1	5.3	
70%	3.50	68.5*	27.7	16.5	11.8	6.2	
80%	4.00		31.6	20.0	15.3	7.0	
90%	4.50		43.3*	27.3*	29.5*	8.3	
100%	5.00					17.6	
Level at 50%	+ 16 dB	298.6	109.7	66.2	52.3	27.2	68.7
Max Deviation	(kHz)	3.30*	4.30*	4.40*	4.40*	5.00	2.40*

Certifying Engineer: Kevin G. Matson

Kevin G. Matson - Project Engineer

TYPE OF TEST: VOLTAGE	PERCENT MODULATION VS. MODULATION INPUT
FCC PART:	2.1047 (b)
MANUFACTURER:	RITRON, INC. 505 West Carmel Drive Carmel, IN 46032
MODELS:	RQX-156, RQX-156-XT
FCC ID:	AIERIT18-156
DATE:	October 21, 2003
IC STANDARDS:	RSS-119, Issue 6, Section 6.6
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

CURVE:



Channel Bandwidth: 12.5 kHz
100% Modulation: 2.5 kHz

TYPE OF TEST: PERCENT MODULATION VS. MODULATION INPUT VOLTAGE

FCC PART: 2.1047 (b)

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

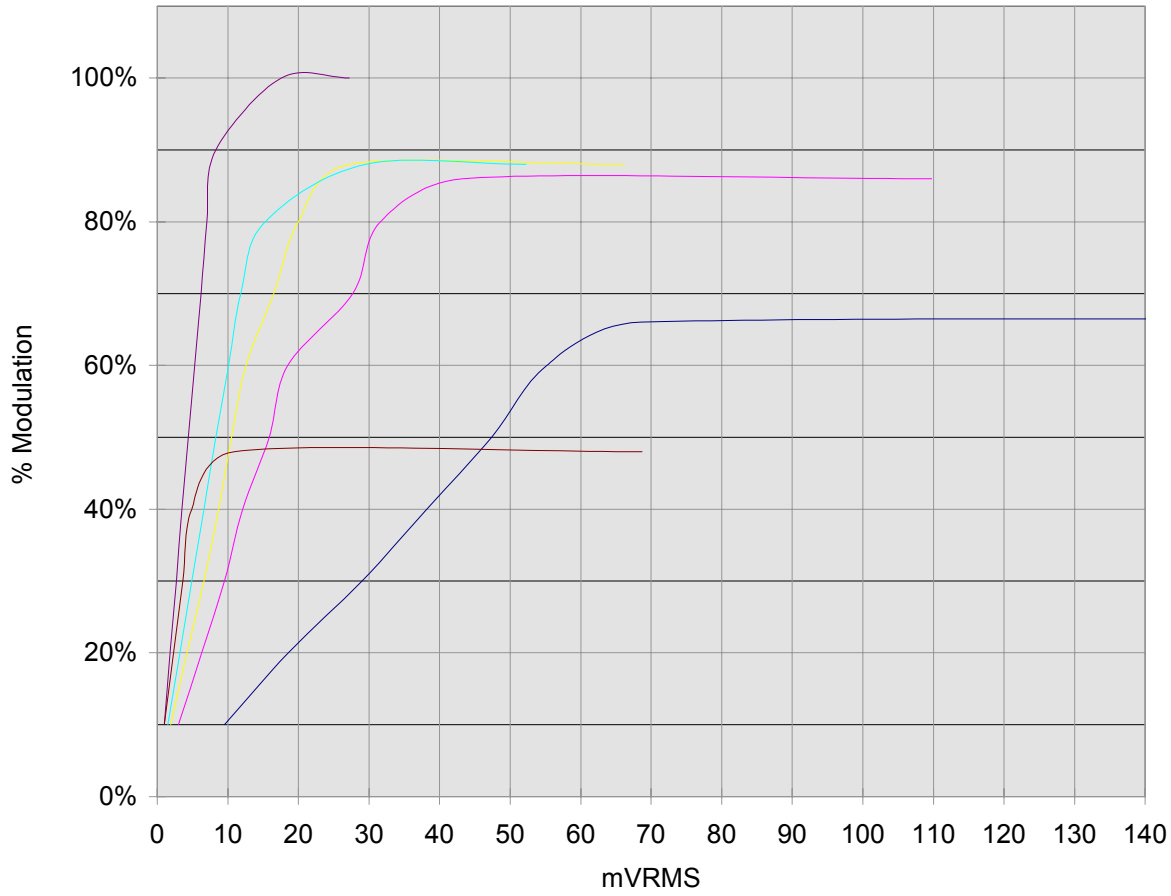
MODELS: RQX-156, RQX-156-XT

FCC ID: AIERIT18-156

DATE: October 21, 2003

IC STANDARDS:	RSS-119, Issue 6, Section 6.6
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

CURVE:



Channel Bandwidth: 25.0 kHz
100% Modulation: 5.0 kHz

OCCUPIED B

FCC PART:	2.1049 (c)(1) per 90.210 (b)(d)
MANUFACTURER:	RITRON, INC. 505 West Carmel Drive Carmel, IN 46032
MODELS:	RQX-156, RQX-156-XT
FCC ID:	AIERIT18-156
DATE:	November 5, 2003
IC STANDARDS:	RSS-119, Issue 6, Section 6.4
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

PROCEDURE:

1. The RQX-156 was aligned for transmitter operation on 156.050 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 antenna terminal J201 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 8560E Spectrum Analyzer. The spectrum analyzer was set to:

   - 100 Hz Resolution Bandwidth
   - 100 Hz Video Bandwidth
   - 5 kHz per Horizontal Division
   - 10 dB per Vertical Division

3. The center frequency of the spectrum analyzer was set to the RQX-156 carrier frequency and the full scale reference line was set to the level of the unmodulated carrier.

4. The output of a BK Precision Model 4010 Function Generator was applied to the microphone input of the RQX-156 through C303. 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.

5. The spectrum analyzer output was plotted with emission mask D.

6. The RQX-156 was set for 25 kHz bandwidth operation, and the deviation was adjusted for +/- 5 kHz as outlined in the Preliminary Maintenance Manual. Steps 3 and 4 were repeated for 25 kHz bandwidth operation. The spectrum analyzer output was plotted with emission mask B.

TYPE OF TEST:	OCCUPIED BANDWIDTH
FCC PART:	2.1049 (c)(1) per 90.210 (b)(d)

MANUFACTURER:	RITRON, INC. 505 West Carmel Drive Carmel, IN 46032
MODEL:	RQX-156, RQX-156-XT
FCC ID:	AIERIT18-156
DATE:	November 5, 2003
IC STANDARDS:	RSS-119, Issue 6, Section 6.4
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

RESULTS:

By Carson's rule, occupied bandwidth for an FM signal may be calculated by:

BW = $2(f_\Delta + f_m)$ where f_Δ is the frequency deviation and f_m is the modulating frequency.

For 12.5 kHz operation, f_Δ is 2.50 kHz and f_m is 3 kHz, therefore

BW = 11 kHz

Since this product will be transmitting voice, the emission designator for 12.5 kHz channel operation is: 11K0F3E.

For 25 kHz operation, f_Δ is 5.0 kHz and f_m is 3 kHz, therefore BW = 16 kHz

Since this product will be transmitting voice, the emission designator for 25 kHz channel operation is: 16K0F3E.

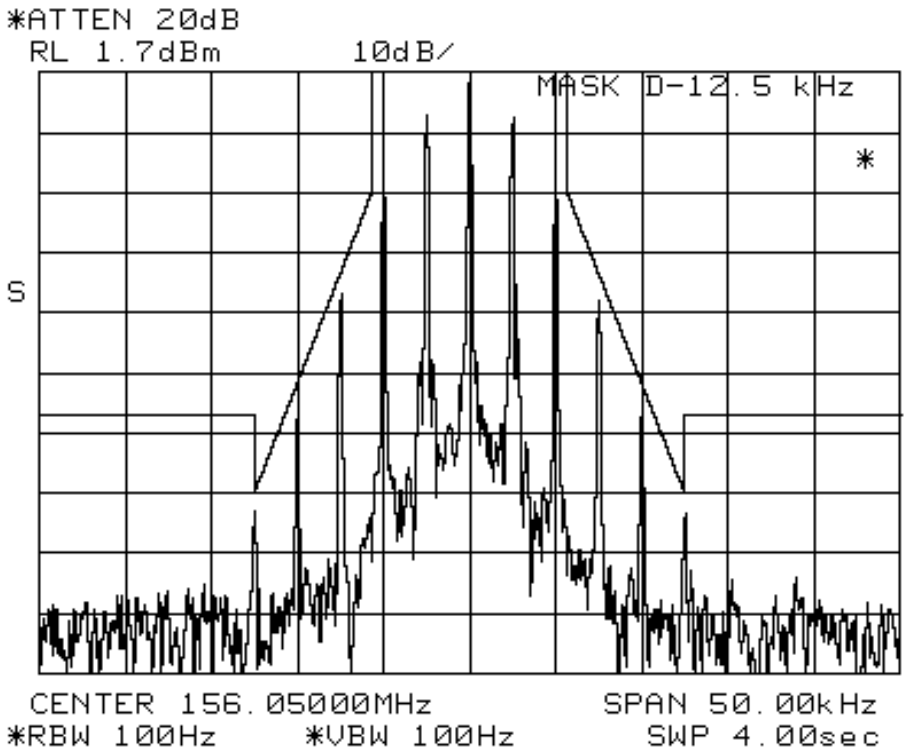
Certifying Engineer: Kevin G. Matson

Kevin G. Matson - Project Engineer

TYPE OF TEST:	OCCUPIED BANDWIDTH
FCC PART:	2.1049 (c)(1) per 90.210 (b)(d)
MANUFACTURER:	RITRON, INC. 505 West Carmel Drive Carmel, IN 46032
MODELS:	RQX-156, RQX-156-XT
FCC ID:	AIERIT18-156
DATE:	November 5, 2003
IC STANDARDS:	RSS-119, Issue 6, Section 6.4
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

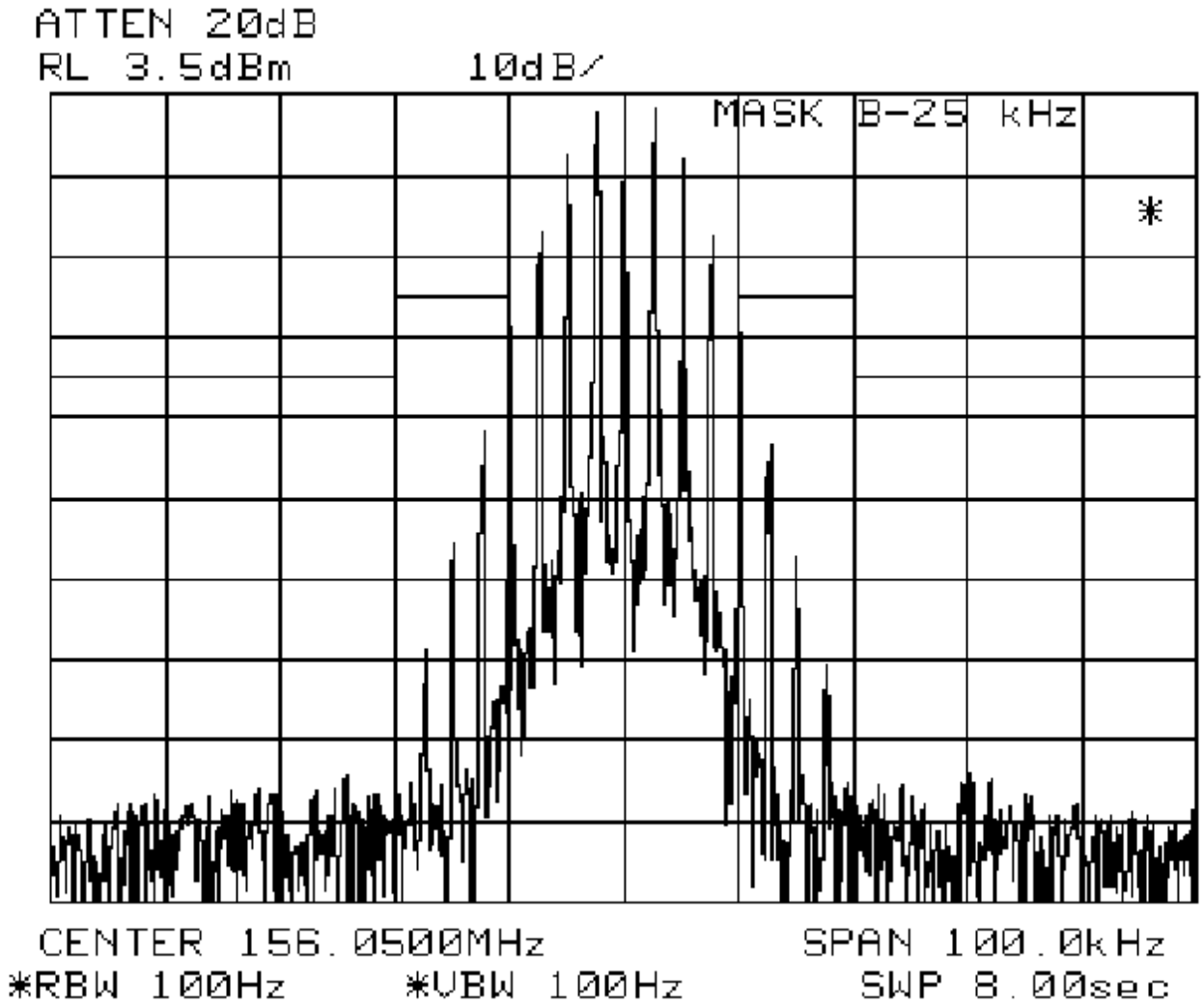
CURVE:

12.5 kHz Bandwidth



TYPE OF TEST:	OCCUPIED BANDWIDTH
FCC PART:	2.1049 (c)(1) per 90.210 (b)(d)
MANUFACTURER:	RITRON, INC. 505 West Carmel Drive Carmel, IN 46032
MODELS:	RQX-156, RQX-156-XT
FCC ID:	AIERIT18-156
DATE:	November 5, 2003
IC STANDARDS:	RSS-119, Issue 6, Section 6.4
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

CURVE: 25kHz Bandwidth



TYPE OF TEST:	SPURIOUS EMISSIONS AT ANTENNA TERMINALS
FCC PART:	2.1051
MANUFACTURER:	RITRON, INC. 505 West Carmel Drive Carmel, IN 46032
MODELS:	RQX-156, RQX-156-XT
FCC ID:	AIERIT18-156
DATE:	October 16, 2003
IC STANDARDS:	RSS-119, Issue 6, Section 6.3
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

PROCEDURE:

1. The RQX-156 was aligned for transmitter operation on 156.050 MHz (Fo) at 2 Watts, the full rated power, and 1 Watt per the tune-up procedure outlined in the Preliminary Maintenance Manual.

2. Power was supplied to the RQX-156 by the VIZ Power Supply and connected to the battery input P501. The supply voltage was set at +9.6 VDC to simulate the internal battery 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 RQX-156 antenna terminal J201 was connected to the input of a Bird Model 8306-300-N, 30 dB power attenuator and a AT-51 10dB attenuator. The output of the attenuator was connected to the input of a Hewlett-Packard Model 8560E Spectrum Analyzer.

5. The spectrum was searched from 8 MHz to the 10th harmonic of the operating frequency. All unreported emissions were more than 20 dB below the FCC limit of 50 + 10 log P, or -20 dBm.

6. The power supply was then connected to the external supply input J501/502. The power supply output was adjusted for +12 VDC. Items 3, 4, and 5 were repeated.

7. The measured insertion loss of the attenuators and cables are listed as the “Correction Factor” on the data sheet.

8. Resultant Amplitude = Measured Amplitude + Correction Factor

TYPE OF TEST: SPURIOUS EMISSIONS AT ANTENNA TERMINALS

FCC PART: 2.1051

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

MODELS: RQX-156, RQX-156-XT

FCC ID: AIERIT18-156

DATE: October 16, 2003

IC STANDARDS:	RSS-119, Issue 6, Section 6.3
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

TEST RESULTS:

Carrier Frequency (Fo):	156.050	MHz
Oscillator Frequency:	14.4	MHz
Output Power:	2.0	Watts
FCC Limit:	-20	dBm

Emmission Frequency (MHz)	Multiple of Carrier(fo)	Measured Amplitude (dBm)	Correction Factor (dB)	Resultant Amplitude (dBm)	FCC LIMIT (dBm)
Battery Input P501:					
141.650	fo-14.4MHz	-69.8	39.1	--30.7	-20
156.050	fo	-6.3	39.2	+32.9	None
170.450	fo+14.4MHz	-72.5	39.4	--33.1	-20
312.100	fo * 2	-62.3	39.5	--22.8	-20
468.150	fo * 3	-67.8	39.7	--28.1	-20
624.200	fo * 4	-72.2	39.8	-32.4	-20
External Input J501/502:					
141.650	fo-14.4MHz	-69.8	39.1	--30.7	-20
156.050	fo	-6.2	39.2	+33.0	None
170.450	fo+14.4MHz	-73.5	39.4	--34.1	-20
312.100	fo * 2	-61.7	39.5	--22.2	-20
468.150	fo * 3	-67.3	39.7	--27.6	-20
624.200	fo * 4	-73.0	39.8	-33.2	-20

Certifying Engineer: 

Kevin G. Matson - Project Engineer

TYPE OF TEST: SPURIOUS EMISSIONS AT ANTENNA TERMINALS

FCC PART: 2.1051

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

MODELS: RQX-156, RQX-156-XT

FCC ID: AIERIT18-156

DATE: October 16, 2003

IC STANDARDS:	RSS-119, Issue 6, Section 6.3
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

TEST RESULTS:

Carrier Frequency (Fo):	156.050	MHz
Oscillator Frequency:	14.4	MHz
Output Power:	1.0	Watts
FCC Limit:	-20	dBm

Emmission Frequency (MHz)	Multiple of Carrier(fo)	Measured Amplitude (dBm)	Correction Factor (dB)	Resultant Amplitude (dBm)	FCC LIMIT (dBm)
Battery Input P501:					
141.650	fo-14.4MHz	-70.3	39.1	--31.2	-20
156.050	fo	-8.8	39.2	+30.4	None
170.450	fo+14.4MHz	-71.5	39.4	--32.1	-20
312.100	fo * 2	-67.7	39.5	--28.2	-20
468.150	fo * 3	-71.5	39.7	--31.8	-20
External Input J501/502:					
141.650	fo-14.4MHz	-71.2	39.1	--32.1	-20
156.050	fo	-8.8	39.2	+30.4	-20
170.450	fo+14.4MHz	-71.7	39.4	--32.3	-20
312.100	fo * 2	-64.2	39.5	--24.7	-20
468.150	fo * 3	-71.1	39.7	--31.4	-20

Certifying Engineer: Kevin G. Matson

Kevin G. Matson - Project Engineer

TYPE OF EXHIBIT: FIELD STRENGTH OF SPURIOUS RADIATION

FCC PART: 2.0153

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

MODELS: RQX-156, RQX-156-XT

FCC ID: AIERIT18-156

DATE: November 5, 2003

PROCEDURE:

1, The measurements for effective radiated power and field strength of spurious radiation were taken at the RITRON, Inc. 3 meter test site using the substitution method. The measurements were made in accordance with FCC Rules & Regulations Part 2.947.

2. The RQX-156 was aligned for transmitter operation on 156.050 MHz at 2.0 Watts per the tune-up procedure outlined in the Preliminary Maintenance Manual. The unit was then terminated at the antenna port with the antenna sold with this product (Nearson AFB-1545). Power was supplied to the RQX-156 by (6) D-cell Alkaline batteries installed in the unit.

3. All field strength measurements were made with the Hewlett-Packard Model 8560E Spectrum Analyzer and the appropriate antenna for the frequency being measured. The antennas used were:

   - Calibrated ½-wave dipole tuned to desired harmonic
   - Electro-Metrics LP-25 Log Periodic Antenna at 200 to 1000 MHz

4. A tuned dipole was substituted at the radio side of the range driven by a known power to produce a known ERP at each harmonic. The receiving antenna was oriented both vertically and horizontally and reference measurements were taken at each harmonic.

5. For each emission, the height and polarization of the field strength measurement antenna and orientation of the RQX-156 were varied to provide maximum field strength.

6. 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).

7. ERP (dBm) = analyzer reading of emission (dBm) – 0dB substitution analyzer reading (dBm)

TYPE OF EXHIBIT: FIELD STRENGTH OF SPURIOUS RADIATION

FCC PART: 2.1053

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

MODELS: RQX-156, RQX-156-XT

FCC ID: AIERIT18-156

DATE: November 5, 2003

RESULTS:

Emmission Frequency (MHz)	Mult of Carrier	Reference Antenna	Analyzer Reading (dBm)	0 dBm Substitution Reading (dBm)	ERP (dBm)	FCC Limit (dBm)
156.050	1	Vert Dipole	+3.8	-25.2	+29.0	None
312.100	2	Vert Dipole	-51.2	-27.2	-24.0	-20
156.050	1	Horz Dipole	-2.5	-18.8	+16.3	None
312.100	2	Horz Dipole	-66.0	-27.0	-39.0	-20

All other spurious emissions were at least 20 dB below the limit.

Certifying Engineer: 

Kevin G. Matson - 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
MODELS:	RQX-156, RQX-156-XT
FCC ID:	AIERIT18-156
DATE:	October 16, 2003
IC STANDARDS:	RSS-119, Issue 6, Section 7.0
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

PROCEDURE:

1. The RQX-156 was aligned for transmitter operation on 156.050 MHz (Fo) at full rated power per the tune-up procedure outlined in the Preliminary Maintenance Manual.

2. Power was supplied to the RQX-156 by the VIZ power supply. The RQX-156 antenna terminal J201 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 Y301, a TCVCXO reference oscillator mounted on the RQX-156 printed circuit board.

4. The RQX-156 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 15 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

MODELS: RQX-156, RQX-156-XT

FCC ID: AIERIT18-156

DATE: October 16, 2003

IC STANDARDS:	RSS-119, Issue 6, Section 7.0
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

TEST RESULTS:

Frequency:	156.050078	MHz
Nominal Temp:	+20	°C
FCC Limit:	+/- 2.5	ppm

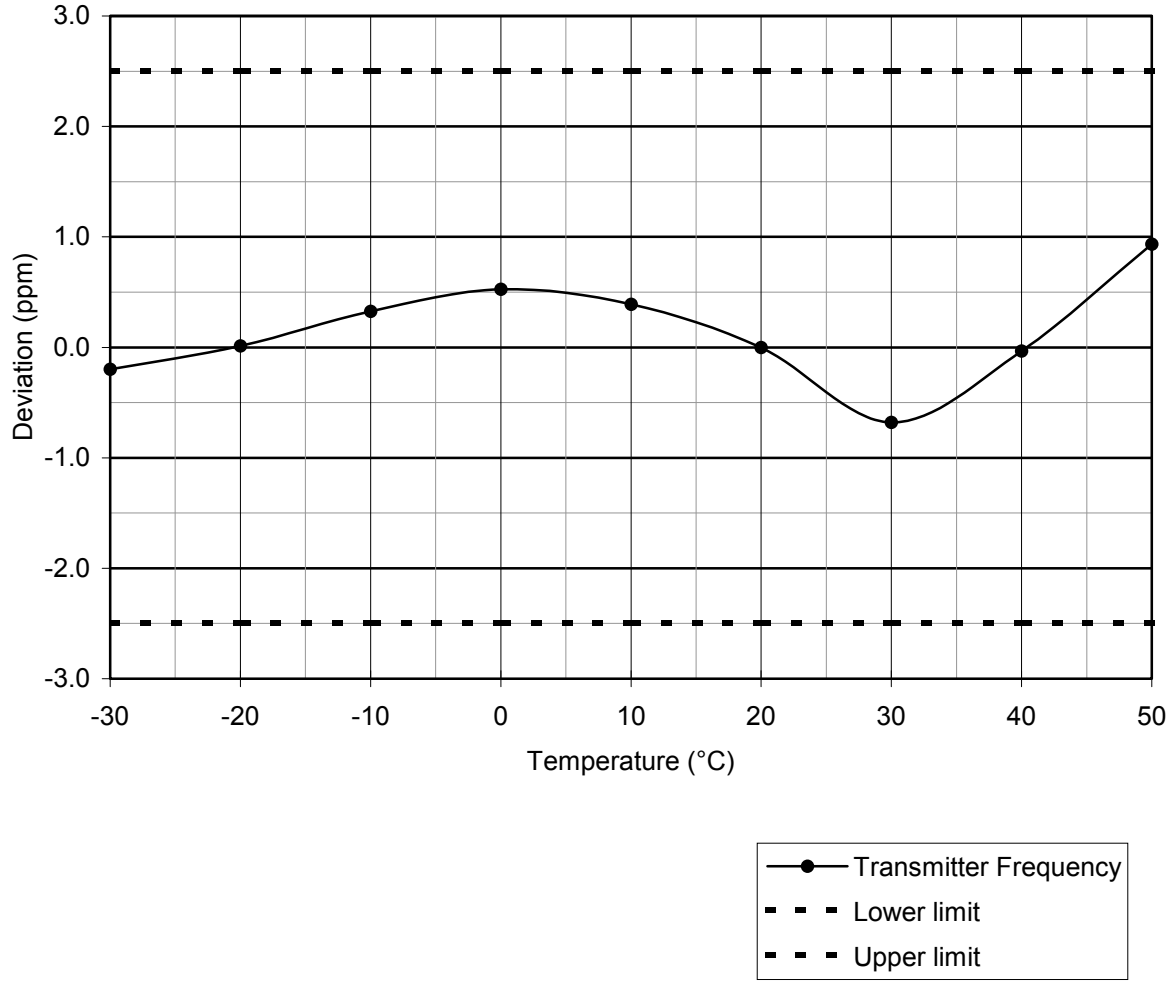
Temperature (°C)	Frequency (MHz)	Deviation (Hz)	Deviation (ppm)
50	156.050224	+146	+0.94
40	156.050073	-5	-0.03
30	156.049972	-6	-0.03
20	156.050078	0	0
10	156.050139	+61	+0.39
0	156.050160	+82	+0.53
-10	156.050129	+51	+0.33
-20	156.050080	+2	+0.01
-30	156.050047	-31	-0.20

Certifying Engineer: Kevin G. Matson

Kevin G. Matson - 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
MODELS:	RQX-156, RQX-156-XT
FCC ID:	AIERIT18-156
DATE:	October 16, 2003
IC STANDARDS:	RSS-119, Issue 6, Section 7.0
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

CURVE:



TYPE OF TEST: FREQUENCY STABILITY VS. BATTERY VOLTAGE

FCC PART: 2.1055 (d)(1)

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

MODELS: RQX-156, RQX-156-XT

FCC ID: AIERIT18-156

DATE: October 17, 2003

IC STANDARDS:	RSS-119, Issue 6, Section 7.0
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

PROCEDURE:

1. The RQX-156 was aligned for transmitter operation on 156.050 MHz (Fo) at full rated power per the tune-up procedure outlined in the Preliminary Maintenance Manual.

2. Power was supplied to the RQX-156 by a VIZ power supply, and supply voltage was measured at P501 battery connector with a BK digital multimeter.

3. The RQX-156 antenna terminal J201 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 as follows for both battery input and external power input:

   Battery Input P501:
   Minimum operating voltage
   Nominal operating voltage
   Maximum operating voltage

   External Power Input J501/502:
   Minimum operating voltage
   85% Nominal operating voltage
   Nominal operating voltage
   115% Nominal operating voltage
   Maximum operating voltage

   NOTE: The RQX-156 is normally powered through P501 by (6) D-Cell batteries with a minimum voltage of 6.0 VDC and a maximum voltage of 9.6 VDC. The RQX-156 may be externally powered through J501/502 with a minimum voltage of 10.0 VDC and a maximum voltage of 14.0 VDC.

5. All frequencies were referenced to the measurement made at the nominal supply voltage.

TYPE OF TEST: FREQUENCY STABILITY VS. BATTERY VOLTAGE

FCC PART: 2.1055 (d)(2)

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

MODELS: RQX-156,RQX-156-XT

FCC ID: AIERIT18-156

DATE: October 17, 2003

IC STANDARDS:	RSS-119, Issue 6, Section 7.0
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

TEST RESULTS:

Carrier Frequency: 156.050 MHz

Supply Voltage (VDC)	Supply Condition	Transmitter Frequency (MHz)	Deviation (Hz)	Deviation (ppm)
Battery Input P501				
6.0	Minimum	156.050024	-9	-0.06
9.0	Nominal	156.050033	0	0.00
9.6	Maximum	156.050042	+9	+0.06
External Input J501/502				
10.0	Minimum	156.050016	-17	-0.11
10.2	85% Nominal	156.050017	-16	-0.10
12.0	Nominal	156.050033	0	0.00
13.8	115% Nominal	156.050039	+6	+0.04
14.0	Maximum	156.050041	+8	+0.05

Certifying Engineer: Kevin G. Matson

Kevin G. Matson - Project Engineer

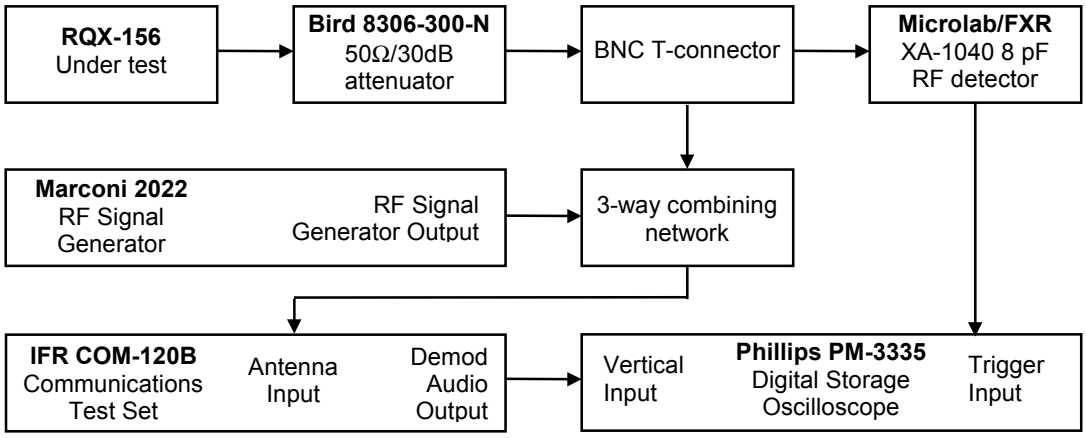
TYPE OF TEST: TRANSIENT FREQUENCY BEHAVIOR

FCC PART:	90.214
MANUFACTURER:	RITRON, INC. 505 West Carmel Drive Carmel, IN 46032
MODELS:	RQX-156, RQX-156-XT
FCC ID:	AIERIT18-156
DATE:	November 5, 2003
IC STANDARDS:	RSS-119, Issue 6, Section 6.5
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

PROCEDURE:

The RQX-156 was aligned for transmitter operation on 156.050 MHz 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 156.100 MHz.

3. The RQX-156 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 RQX-156 transmitter was turned off.

5. The Marconi Model 2022 RF signal generator was set to 156.050 MHz at an RF level 20 dB below that measured in step 3, modulated with a 1 kHz tone at ± 12.5 kHz deviation.

6. The Phillips PM-3335 digital oscilloscope's 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 ± 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 RQX-156 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 RQX-156 transmitter is turned on.

9. The RQX-156 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 RQX-156 transmitter.

11. The RQX-156 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: Kevin G. Matson

Kevin G. Matson - Project Engineer

TYPE OF TEST: TRANSIENT FREQUENCY BEHAVIOR

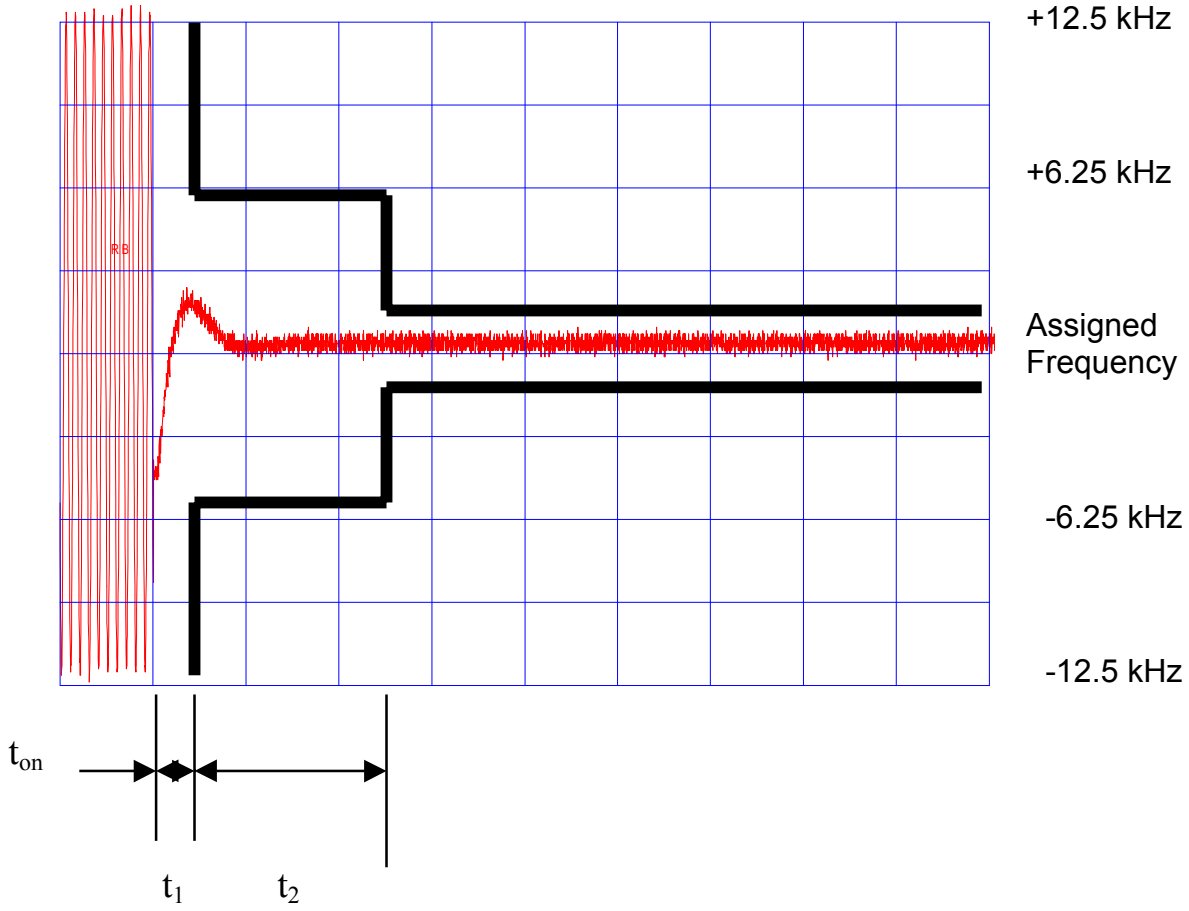
FCC PART: 90.214

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

MODELS: RQX-156, RQX-156-XT

FCC ID:	AIERIT18-156
DATE:	November 6, 2003
IC STANDARDS:	RSS-119, Issue 6, Section 6.5
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

SWITCH ON CONDITION t_{on}, t_1, and t_2



TYPE OF TEST:	TRANSIENT FREQUENCY BEHAVIOR
FCC PART:	90.214
MANUFACTURER:	RITRON, INC. 505 West Carmel Drive Carmel, IN 46032
MODELS:	RQX-156, RQX-156-XT

FCC ID:	AIERIT18-156
DATE:	November 5, 2003
IC STANDARDS:	RSS-119, Issue 6, Section 6.5
INDUSTRY CANADA:	1084A-RIT18156
MODELS:	RQX-156-CANADA, RQX-156-XT-CANADA, RQX-156-BC, RQX-156-XT-BC

SWITCH OFF CONDITION t_3 and t_{OFF}