Exhibit Type: Test Report

Date: January 4, 1999

The following exhibits are contained in this file. Other exhibits required were electronically filed as separate exhibits. This file makes references to information contained in these separate exhibits. This includes but is not limited to schematics, drawings and photographs.

Description of Exhibit	F.C.C. Rule(s)
Statement of Certifying Engineer	2.947
Manufacturer's Statement	2.983 (a) (b) (c)
List of Test Equipment Used	2.947 (d)
Description of Measurement Facility	2.948
Statement Certifying Spectrum Efficiency	90.203 (j) (3)
Radio Frequency Power Output	2.985
Transmitter Modulator Response	2.987 (a), (b)
Speech Amplifier Low Pass Filter Response	2.987(a)
Percent of Modulation vs. Modulation Input Voltage	2.987(b)
Occupied Bandwidth, Emission Masks	2.989 (c), 90.210 (d), 90.211 (a)
Spurious Emissions at Antenna Terminals	2.991
Field Strength of Spurious Emissions	2.993 (b)
Frequency Stability vs. Temperature	2.995 (a), 90.213 (a) (7)
Frequency Stability vs. Input Voltage	2.995 (d)

EXHIBIT TYPE: Statement of Certifying Engineer

FCC PART: 2.947

DATE: November 10, 1998

I, Steven Paul Henke, am now and have been for the past 20 years the Vice President and Chief Engineer of RITRON, INC..

I hereby certify that all the measurements and data herein were taken by me, or under my direct supervision and that they were obtained using sound and professionally accepted engineering principles, and that they accurately reflect the performance and characteristics of the unit tested.

Further I attest that manufacturing controls exist such that this data is representative of units which will be manufactured by Ritron.

Signed:

Steven Paul Henke
Vice President and Chief Engineer

EXHIBIT TYPE: List of Test Equipment Used to Conduct Measurements

FCC PART: 2.947 (d)

DATE: November 10, 1998

The measurements taken for this application were obtained using one or more of the following pieces of equipment.

ITEM	MANUFACTURER	MODEL NO.	SERIAL NO.
DC Power Supply	Astron	VS-20M	9406023
Multimeter	Beckman Industrial	4410	50710069
Multimeter	BK Precision	2704A	234-008455
RF Power Meter	Hewlett Packard	435B	2441A10170
RF Power Sensor*	Hewlett Packard	8482B	2349A01936
RF Load, Calibrated*	Hewlett Packard	8482B	2349A01936
	* Traceable Calibrated Source of matching serial numbers.		
Wattmeter	Telewave	44	8172
RF Test Set	Hewlett Packard	8920A	R# 01498
Spectrum Analyzer	Hewlett Packard	8559A	2010A 06979
Spectrum Analyzer	Hewlett Packard	HP8560E	01540
Digital Storage Scope	Fluke/Phillips	PM3335	DM630034
Plotter	Hewlett Packard	7585B	2503A05509
Temperature Chamber	Delta Design	3900 CL	0-52-R
Pyrometer	Omega	7035-J-225	7504

EXHIBIT TYPE: Description of Measurement Facility

FCC PART: 2.948

DATE: November 10, 1998

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 on a continuing basis exclusively by RITRON, INC. and is utilized only for 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.

All other measurements were taken at Ritron's Engineering Laboratory in Carmel, Indiana.

EXHIBIT TYPE: Radio Frequency Power Output
FCC PART: 2.985

DATE: December 14, 1998

PROCEDURE:

An RQT-450 was aligned for transmitter operation on 464.600 MHz. (Fo) per the tune-up procedure outlined in the preliminary manual.

The output of a variable DC power supply was applied to the external DC power terminals of the unit.

The RQT-450 antenna connector was connected to the input of the HP Power Meter. This device provides a single 50 Ohm resistively loaded input port for all measurements.

The voltages across the resistor in series with the final RF power transistor were measured and Ohm's Law was used to determine the collector current.

The DC power supply voltage applied to the unit was varied from 6 to 15 Volts DC. The measured transmitter output power remained constant across this range of input voltages. This is attributable to the fact that supply voltages to the transmitter are regulated to a fixed voltage regardless of the applied power supply voltage.

RQT-450, 460.100 MHz, w/ 27 Ohm Collector Resistor

External Voltage (Volts)	Regulated Voltage (Volts)	Collector Voltage (Volts)	Collector Current (Amperes)	Input Power (Watts)	RF Output Power (Watts)	Efficiency (%)
6.0	4.9	3.1	0.067	0.207	0.108	52%
9.0	4.9	3.1	0.067	0.207	0.108	52%
12.0	4.9	3.1	0.067	0.207	0.109	53%
15.0	4.9	3.1	0.067	0.207	0.109	53%

Certifying Engineer: Steve Henke
Date: December 14,1998

EXHIBIT TYPE: Modulator Frequency Response
FCC PART: 2.987 (a), (b)

DATE: November 20, 1998

PROCEDURE: The RQT-450 was aligned for transmitter operation on 464.6 MHz. (Fo) per the tune-up procedure contained in the preliminary manual.

The modulation input to the transmitter was isolated by breaking the TX MOD line between the RQT Control and Transmitter boards. The HP Test Set's Audio Generator output was connected to the Transmitter Board's TX MOD.

The frequency response of the modulator was determined to be flat within +/-1.5 from 10 Hz to 27,000 Hz. The slight variation is response is at a low frequency and is due to the two point synthesizer reference and VCO modulation method.

The following pages show the results in tabular and graphical form.

Certifying Engineer: Steve Henke
Date: November 20, 1998

EXHIBIT TYPE: Modulator Frequency Response
FCC PART: 2.987 (a), (b)

Frequency ~~(Hz)~~	FM Deviation ~~(+/- Hz)~~	Variation ~~(dB)~~
10	3143	-0.4
12	3187	-0.3
15	3189	-0.3
18	3199	-0.2
22	3176	-0.3
27	3133	-0.4
33	3042	-0.7
38	2949	-1.0
47	2776	-1.5
56	2844	-1.3
68	3068	-0.6
82	3202	-0.2
100	3261	-0.1
120	3279	0.0
150	3286	0.0
180	3290	0.0
220	3281	0.0
270	3283	0.0
330	3275	0.0
380	3268	-0.1
470	3266	-0.1
560	3276	0.0
680	3274	0.0
820	3285	0.0
1000	3289	0.0
1200	3291	0.0
1500	3294	0.0
1800	3298	0.0
2200	3306	0.0
2700	3298	0.0
3300	3304	0.0
3800	3298	0.0
4700	3291	0.0
5600	3294	0.0
6800	3292	0.0
8200	3285	0.0
10000	3290	0.0
12000	3287	0.0
15000	3273	0.0
18000	3270	-0.1
22000	3245	-0.1
27000	3226	-0.2

EXHIBIT TYPE: Modulator Frequency Response
FCC PART: 2.987 (a), (b)

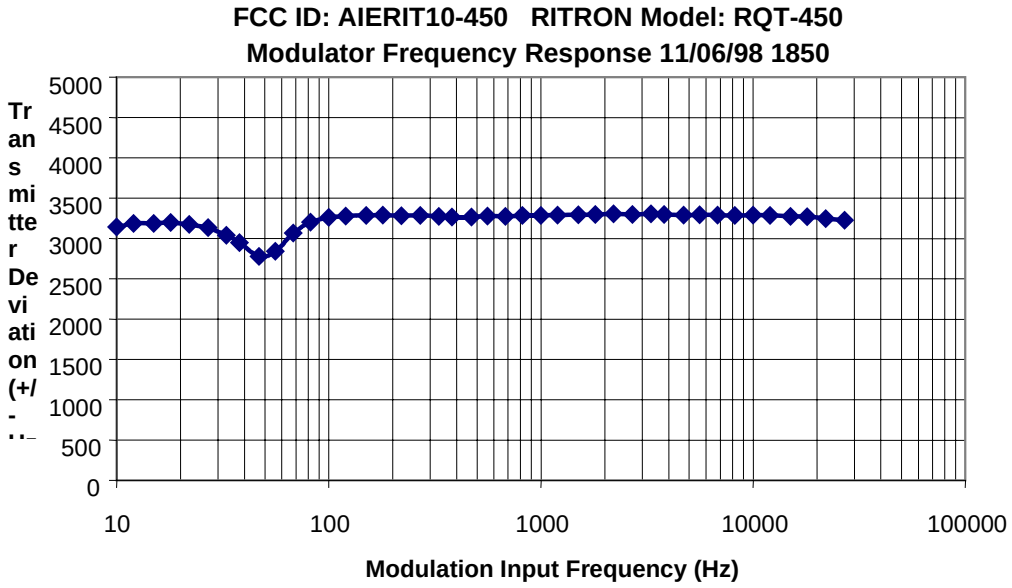


EXHIBIT TYPE: Modulator Low Pass Response
FCC PART: 2.987 (a)

DATE: November 10, 1998

PROCEDURE: The RQT-450 was aligned for transmitter operation on 464.600 MHz. (Fo) per the tune-up procedure outlined in the preliminary manual.

The low pass filter and compressor/limiter for the voice signal is contained in the voice record and playback integrated circuit IC101.

The output of the HP Test Set's Audio Frequency Generator was connected to the telephone input terminals of the RQT-450 through a network equivalent to an F.C.C. Part 68 registered telephone set. The input to the HP Test Set's Audio Frequency Voltage Meter was connected to the output of the RQT Control Board at JXXX, pin YYY which is used to provide transmit modulation to the RQT Transmitter Board.

Each measurement was taken using automated program control where the Audio Generator's sine wave output amplitude was fixed and its audio frequency was varied. The RQT recorded the input signal for 4 seconds and then activated its transmitter and played back the recorded input signal.

Each measurement was stored in a file for import to a spreadsheet program which was used to present the following data in tabular and graphical formats.

Certifying Engineer: Steve Henke

EXHIBIT TYPE: Modulator Low Pass Response
FCC PART: 2.987 (a)

Input Frequency (Hertz)	System Output Amplitude (mV)	Relative Amplitude (dB)
10	4	-43.2
12	3	-45.7
15	3	-45.7
18	3	-45.7
22	3	-45.7
27	4	-43.2
33	4	-43.2
38	4	-43.2
47	4	-43.2
56	4	-43.2
68	5	-41.2
82	8	-37.1
100	13	-32.9
120	22	-28.3
150	39	-23.4
180	60	-19.6
220	91	-16.0
270	127	-13.1
330	171	-10.5
380	207	-8.9
470	270	-6.6
560	325	-5.0
680	389	-3.4
820	449	-2.1
1000	510	-1.0
1200	556	-0.3
1500	575	0.0
1800	531	-0.7
2200	455	-2.0
2700	303	-5.6
3300	79	-17.2
3800	48	-21.6
4700	18	-30.1
5600	7	-38.3
6800	1	-55.2
8200	1	-55.2
10000	1	-55.2
12000	1	-55.2
15000	1	-55.2
18000	1	-55.2
22000	3	-45.7
27000	3	-45.7

FCC ID: AIERIT10-450 Modulation Low Pass Filter Response

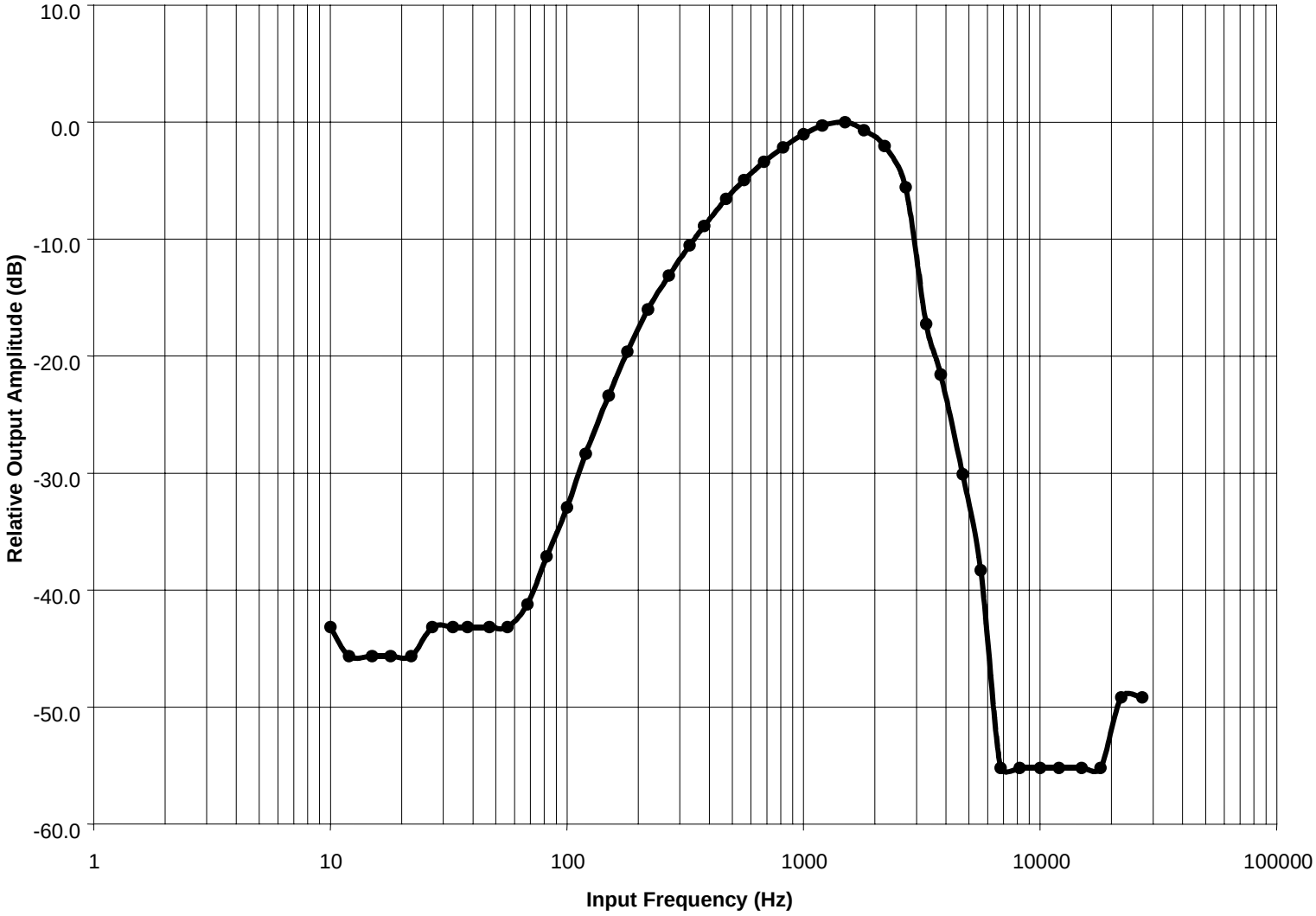


EXHIBIT TYPE: Percent Modulation vs. Modulation Input Voltage
FCC PART: 2.987 (b)

DATE: November 10, 1998

PROCEDURE: The RQT-450 was aligned for transmitter operation on 460.100 MHz. (Fo) per the tune-up procedure outlined in the preliminary manual.

The output of the HP Test Set's Audio Frequency Generator was connected through a network simulating a balanced F.C.C. Part 68 registered telephone set to the RJ-11 telephone jack of the RQT-450.

The input to the HP Test Set's Audio Frequency Analyzer was connected to the output of the RQT-450 Control Board at pin which is connected to the transmitter modulator.

To obtain each measurement, the RQT-450 recorded and played back the input waveform.

Each measurement was taken using automated program control where the Audio Generator's amplitude and frequency were adjusted, the RQT recorded the input signal, activated its transmitter and played back the recorded input signal. Transmitter deviation was measured by the HP Modulation Analyzer. Each measurement was stored in a file for import to a spreadsheet program which was used to present the following data in tabular and graphical formats

EXHIBIT TYPE: Percent Modulation vs. Modulation Input Voltage
FCC PART: 2.987 (b)

RQT-450 Percent Modulation vs. Modulation Input Voltage

Input Frequency >>		250	500	1000	1500	2500	3500
	Input (mVolts)	Output (Hz)	Output (Hz)	Output (Hz)	Output (Hz)	Output (Hz)	Output (Hz)
1000	0.0	162	154	169	180	164	182
1000	1.0	186	183	164	164	168	163
1000	1.2	166	160	160	165	174	161
1000	1.5	183	184	180	168	173	183
1000	1.8	154	188	177	178	177	166
1000	2.2	165	162	187	208	185	182
1000	2.7	167	167	205	192	188	181
1000	3.3	151	183	198	225	188	165
1000	3.8	185	173	200	226	191	162
1000	4.7	166	174	217	225	214	151
1000	5.6	168	206	216	242	225	153
1000	6.8	191	197	241	269	235	180
1000	8.2	160	210	280	312	263	175
1000	10.0	182	215	300	337	309	190
1000	12.0	182	259	321	402	320	196
1000	15.0	210	263	390	431	353	165
1000	18.0	194	279	440	525	395	192
1000	22.0	209	320	521	569	488	183
1000	27.0	244	380	606	672	578	194
1000	33.0	240	402	669	840	612	211
1000	38.0	278	448	779	925	769	211
1000	47.0	276	544	916	1114	777	250
1000	56.0	323	590	1067	1256	895	263
1000	68.0	340	737	1260	1441	999	271
1000	82.0	384	847	1446	1639	1130	279
1000	100.0	468	998	1696	1869	1188	293
1000	120.0	528	1152	1948	2071	1320	304
1000	150.0	621	1378	2275	2335	1429	295
1000	180.0	713	1587	2487	2548	1538	322
1000	220.0	869	1841	2766	2750	1631	331
1000	270.0	1011	2152	3059	2976	1675	329
1000	330.0	1181	2454	3324	3158	1756	329
1000	380.0	1342	2633	3476	3269	1806	330
1000	470.0	1562	2968	3742	3450	1880	333
1000	560.0	1779	3213	3895	3586	1926	346
1000	680.0	2043	3451	4119	3697	1964	379
1000	820.0	2272	3693	4307	3837	2012	377
1000	1000.0	2537	3953	4487	3927	2056	370
1000	1200.0	2774	4171	4629	4048	2099	382
1000	1500.0	2993	4361	4794	4167	2123	388
1000	1800.0	3243	4499	4851	4174	2140	393
1000	2200.0	3879	4633	4475	3889	2029	377
1000	2700.0	4113	4612	4053	3564	1864	333
1000	3300.0	4375	4563	3676	3275	1736	318
1000	3800.0	4493	4445	3486	3121	1679	314
1000	4700.0	4494	4312	3231	2941	1596	328
1000	5600.0	4722	4250	3107	2860	1571	300
1000	6800.0	4674	4171	2973	2788	1522	316

EXHIBIT TYPE: Percent Modulation vs. Modulation Input Voltage
FCC PART: 2.987 (b)

Input Frequency >	250	500	1000	1500	2500	3500
Input (mVolts)	(%)	(%)	(%)	(%)	(%)	(%)
0.0	3.2%	3.1%	3.4%	3.6%	3.3%	3.6%
1.0	3.7%	3.7%	3.3%	3.3%	3.4%	3.3%
1.2	3.3%	3.2%	3.2%	3.3%	3.5%	3.2%
1.5	3.7%	3.7%	3.6%	3.4%	3.5%	3.7%
1.8	3.1%	3.8%	3.5%	3.6%	3.5%	3.3%
2.2	3.3%	3.2%	3.7%	4.2%	3.7%	3.6%
2.7	3.3%	3.3%	4.1%	3.8%	3.8%	3.6%
3.3	3.0%	3.7%	4.0%	4.5%	3.8%	3.3%
3.8	3.7%	3.5%	4.0%	4.5%	3.8%	3.2%
4.7	3.3%	3.5%	4.3%	4.5%	4.3%	3.0%
5.6	3.4%	4.1%	4.3%	4.8%	4.5%	3.1%
6.8	3.8%	3.9%	4.8%	5.4%	4.7%	3.6%
8.2	3.2%	4.2%	5.6%	6.2%	5.3%	3.5%
10.0	3.6%	4.3%	6.0%	6.7%	6.2%	3.8%
12.0	3.6%	5.2%	6.4%	8.0%	6.4%	3.9%
15.0	4.2%	5.3%	7.8%	8.6%	7.1%	3.3%
18.0	3.9%	5.6%	8.8%	10.5%	7.9%	3.8%
22.0	4.2%	6.4%	10.4%	11.4%	9.8%	3.7%
27.0	4.9%	7.6%	12.1%	13.4%	11.6%	3.9%
33.0	4.8%	8.0%	13.4%	16.8%	12.2%	4.2%
38.0	5.6%	9.0%	15.6%	18.5%	15.4%	4.2%
47.0	5.5%	10.9%	18.3%	22.3%	15.5%	5.0%
56.0	6.5%	11.8%	21.3%	25.1%	17.9%	5.3%
68.0	6.8%	14.7%	25.2%	28.8%	20.0%	5.4%
82.0	7.7%	16.9%	28.9%	32.8%	22.6%	5.6%
100.0	9.4%	20.0%	33.9%	37.4%	23.8%	5.9%
120.0	10.6%	23.0%	39.0%	41.4%	26.4%	6.1%
150.0	12.4%	27.6%	45.5%	46.7%	28.6%	5.9%
180.0	14.3%	31.7%	49.7%	51.0%	30.8%	6.4%
220.0	17.4%	36.8%	55.3%	55.0%	32.6%	6.6%
270.0	20.2%	43.0%	61.2%	59.5%	33.5%	6.6%
330.0	23.6%	49.1%	66.5%	63.2%	35.1%	6.6%
380.0	26.8%	52.7%	69.5%	65.4%	36.1%	6.6%
470.0	31.2%	59.4%	74.8%	69.0%	37.6%	6.7%
560.0	35.6%	64.3%	77.9%	71.7%	38.5%	6.9%
680.0	40.9%	69.0%	82.4%	73.9%	39.3%	7.6%
820.0	45.4%	73.9%	86.1%	76.7%	40.2%	7.5%
1000.0	50.7%	79.1%	89.7%	78.5%	41.1%	7.4%
1200.0	55.5%	83.4%	92.6%	81.0%	42.0%	7.6%
1500.0	59.9%	87.2%	95.9%	83.3%	42.5%	7.8%
1800.0	64.9%	90.0%	97.0%	83.5%	42.8%	7.9%
2200.0	77.6%	92.7%	89.5%	77.8%	40.6%	7.5%
2700.0	82.3%	92.2%	81.1%	71.3%	37.3%	6.7%
3300.0	87.5%	91.3%	73.5%	65.5%	34.7%	6.4%
3800.0	89.9%	88.9%	69.7%	62.4%	33.6%	6.3%
4700.0	89.9%	86.2%	64.6%	58.8%	31.9%	6.6%
5600.0	94.4%	85.0%	62.1%	57.2%	31.4%	6.0%
6800.0	93.5%	83.4%	59.5%	55.8%	30.4%	6.3%

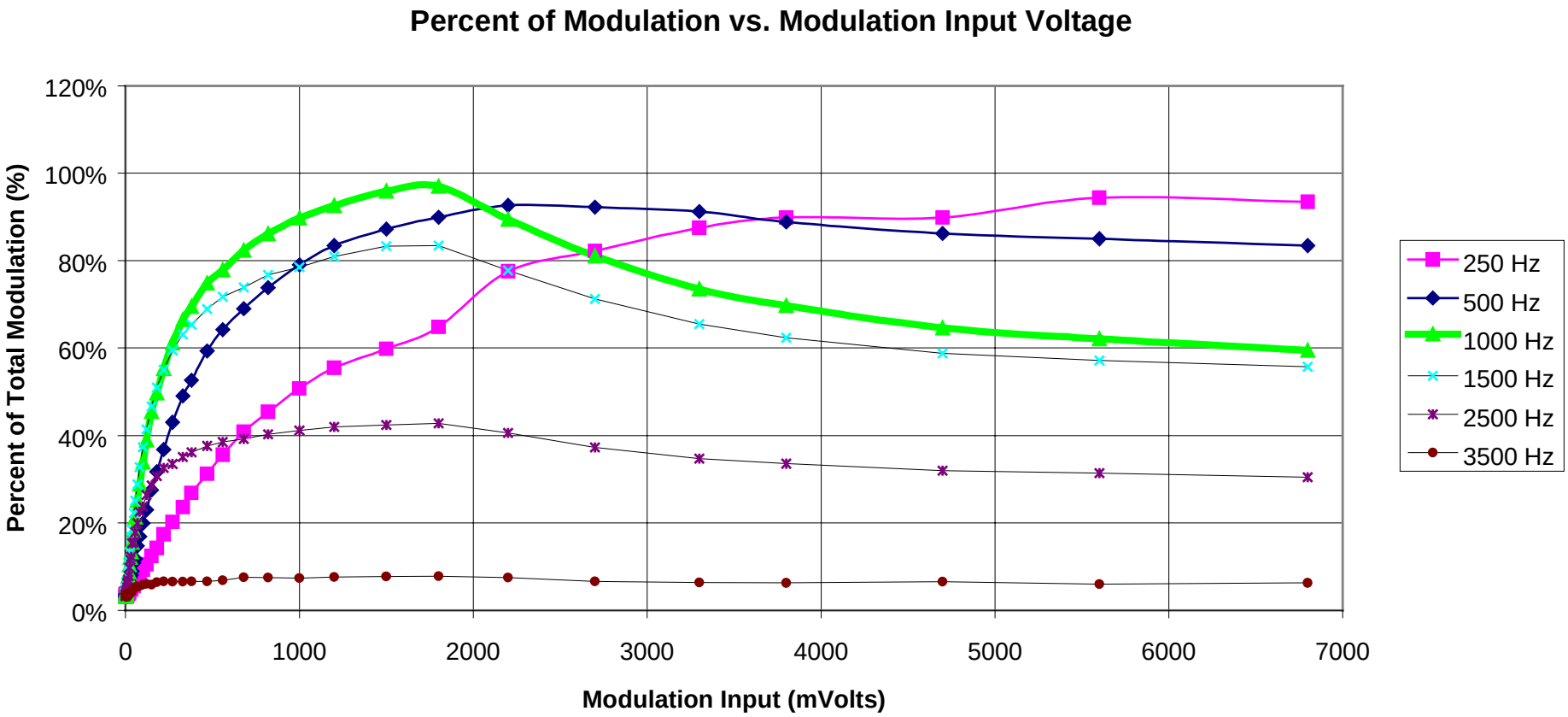

Percent of Modulation vs. Modulation Input Voltage
Percent of Total Modulation (%)
120%
100%
80%
60%
40%
20%
0%
0
1000
2000
3000
4000
5000
6000
7000
Modulation Input (mVolts)
250 Hz
500 Hz
1000 Hz
1500 Hz
2500 Hz
3500 Hz

EXHIBIT TYPE: Occupied Bandwidth
FCC PARTS: 2.989 (c) (1), 90.210 (d)

DATE: December 7, 1998

PROCEDURE:

The RQT-450 was aligned for transmitter operation on 464.600 MHz. (Fo) per the tune-up procedure outlined in the preliminary manual.

Nominal battery voltage was applied to the RQT-450. The antenna jack of the RQT was connected to a 20 dB attenuator and then to the input of the HP 8559A Spectrum Analyzer.

The output of the HP Test Set's Audio Frequency Generator was connected through a network equivalent to a balanced F.C.C. Part 68 registered telephone set to the RJ-11 telephone jack of the RQT-450.

To obtain a reference power level, the RQT's transmitter was activated with no-modulation applied. The result of this measurement was then recorded as 0 dBc. It was noted that the noise floor performance of the HP8559A Spectrum Analyzer permitted the measurement of signals –75 dBc or greater.

To obtain a modulated spectrum plot, the HP RF Test Set's Audio Frequency Generator Output was applied to the telephone instrument jack of the RQT and set to 2500 Hz at 5.000 Vac-rms. This is 16 dB greater than the the amount required to produce 50% modulation. This input signal was recorded and played back by the Voice Storage IC.

This test was conducted with the transmitter bandwidth jumper in both the 12.5 and 25 KHz channel bandwidth settings. The amplitudes of the carrier and sidebands were recorded and are attached in tabular and graphical formats for both settings.

The occupied bandwidth was determined to be equal to or less than 15 KHz for +/-5 KHz deviation setting and equal to or less than 10 KHz for the +/- 2.5 KHz deviation setting.

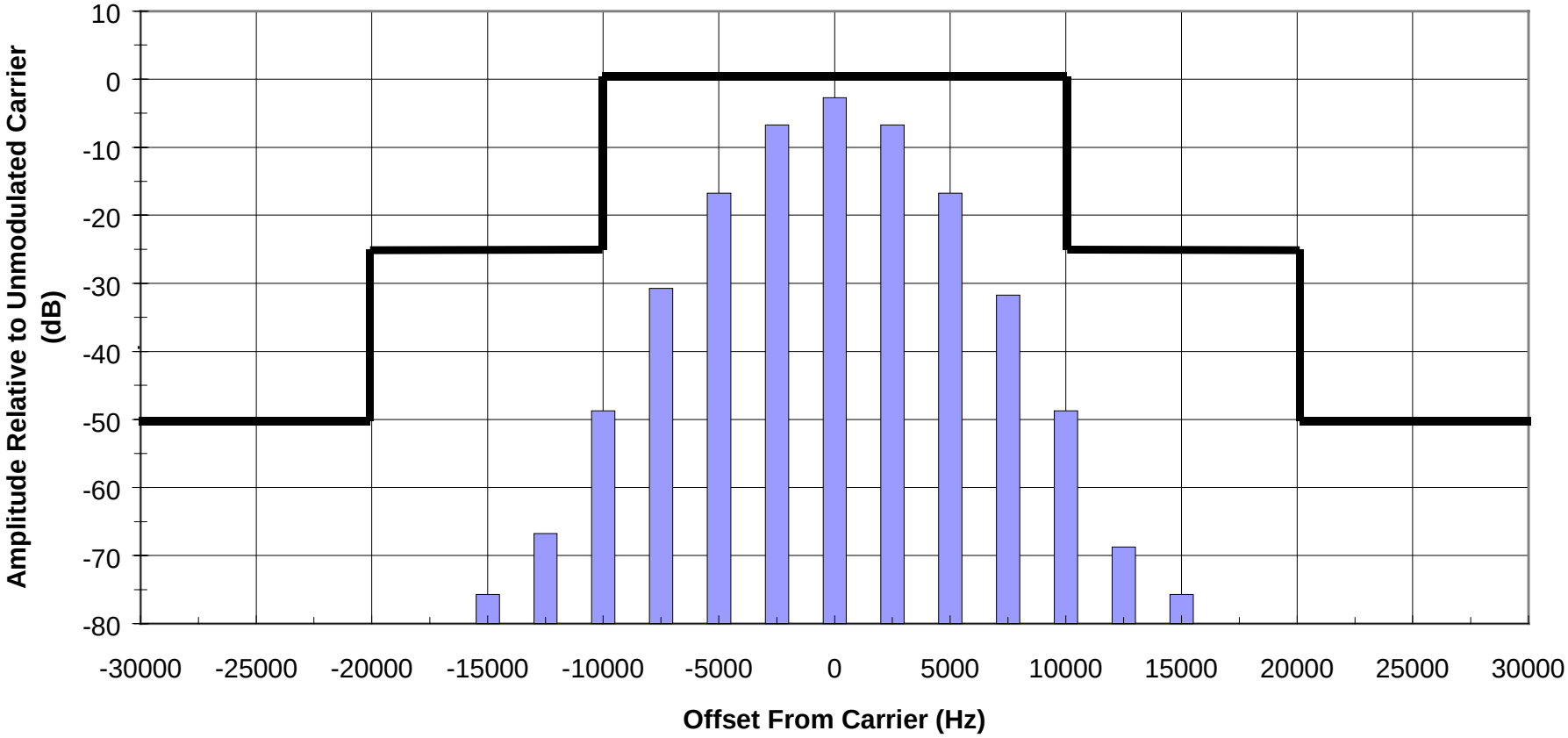
Certifying Engineer: Steve Henke

sph 12/7/98

RITRON RQT-450 OCCUPIED BANDWIDTH MEASUREMENTS WITH +/- 5 KHz Peak Deviation

Carrier Offset (Hz)	Analyzer Amplitude (dBm)	Attenuation (dB)	Net Power (dBm)	Net Power (mW)	Relative Power (dB)						
-30000											
-27500											
-25000											
-22500											
-20000											
-17500											
-15000	-75	20	-55	0.000	-75.7						0.000
-12500	-66	20	-46	0.000	-66.7						0.000
-10000	-48	20	-28	0.002	-48.7					0.002	0.002
-7500	-30	20	-10	0.100	-30.7				0.100	0.100	0.100
-5000	-16	20	4	2.512	-16.7			2.512	2.512	2.512	2.512
-2500	-6	20	14	25.119	-6.7		25.119	25.119	25.119	25.119	25.119
0	-2	20	18	63.096	-2.7	63.096	63.096	63.096	63.096	63.096	63.096
2500	-6	20	14	25.119	-6.7		25.119	25.119	25.119	25.119	25.119
5000	-16	20	4	2.512	-16.7			2.512	2.512	2.512	2.512
7500	-31	20	-11	0.079	-31.7				0.079	0.079	0.079
10000	-48	20	-28	0.002	-48.7					0.002	0.002
12500	-68	20	-48	0.000	-68.7						0.000
15000	-75	20	-55	0.000	-75.7						0.000
17500											
20000											
22500											
25000											
27500											
30000											
Total Power				118.540		63.096	113.333	118.357	118.537	118.540	118.540
Percent of Total						53.2%	95.6%	99.8%	100.0%	100.0%	100.0%
Bandwidth (KHz)						0	5000	10000	15000	20000	25000

FCC ID: AIERIT10-450 Occupied Bandwidth and Emission Mask for 20 KHz Bandwidth Mode



Occupied Bandwidth with +/- 2.5 KHz peak deviation

Carrier Offset (Hz)	Analyzer Amplitude (dBm)	Attenuation (dB)	Net Power (dBm)	Net Power (mW)	Relative Power (dB)						
-30000											
-27500											
-25000											
-22500											
-20000											
-17500											
-15000											
-12500	-82.5	30	-52.5	0.000	-73.3						0.000
-10000	-80.0	30	-50.0	0.000	-70.8					0.000	0.000
-7500	-68.0	30	-38.0	0.000	-58.8				0.000	0.000	0.000
-5000	-45.0	30	-15.0	0.032	-35.8			0.032	0.032	0.032	0.032
-2500	-24.5	30	5.5	3.548	-15.3		3.548	3.548	3.548	3.548	3.548
0	-9.5	30	20.5	112.202	-0.3	112.202	112.202	112.202	112.202	112.202	112.202
2500	-24.5	30	5.5	3.548	-15.3		3.548	3.548	3.548	3.548	3.548
5000	-44.5	30	-14.5	0.035	-35.3			0.035	0.035	0.035	0.035
7500	-69.5	30	-39.5	0.000	-60.3				0.000	0.000	0.000
10000	-80.0	30	-50.0	0.000	-70.8					0.000	0.000
12500	-83.0	30	-53.0	0.000	-73.8						0.000
15000											
17500											
20000											
22500											
25000											
27500											
30000											
Total Power				119.366		112.202	119.298	119.365	119.365	119.366	119.366
Percent of Total						94.0%	99.9%	100.0%	100.0%	100.0%	100.0%
Bandwidth (KHz)						0	5000	10000	15000	20000	25000

FCC ID: AIERIT10-450 Occupied Bandwidth and Emission Mask for 11 KHz Bandwidth Mode

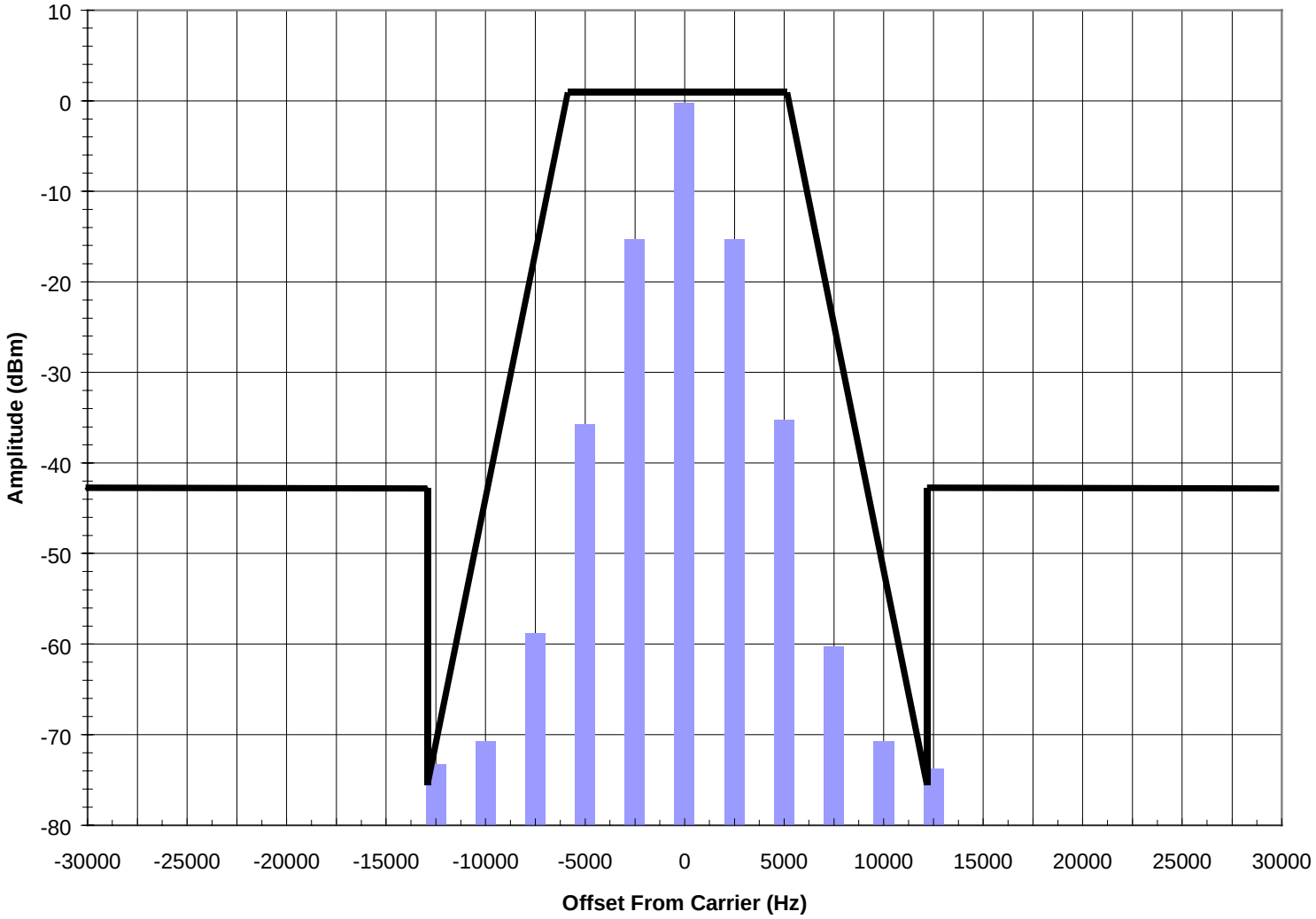


EXHIBIT TYPE: Spurious Emissions at Antenna Terminals
FCC PART: 2.991

DATE: November 10, 1998

PROCEDURE: The RQT-450 was aligned for transmitter operation on 460.000(Fo) per the tune-up procedure outlined in the preliminary manual.

Nominal battery voltage was applied to the RQT-450 through the battery connector. The RQT-450's antenna connector was connected through a fixed 20 dB attenuator and a 10 dB attenuator to the input of the Model 8559A Spectrum Analyzer.

The HP RF Test Set's Audio Frequency Generator Output was applied to the telephone instrument jack of the RQT and set to 2500 Hz at 5.000 Vac-rms. This is 16 dB greater than the amount required to produce 50% modulation. This input signal was recorded and played back by the Voice Storage IC during the measurements.

The spectrum was searched from 4 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(Power).

No measured signal exceeded the F.C.C. emission limits.

Emission Frequency (MHz)	Analyzer Measurement dBm	External Attenuation (dB)	Net Emission Amplitude (dBm)	Relative Emission Amplitude (dBc)	F.C.C. Limit Amplitude (dBc)	
443.988	-70	30.0	-40.0	-40.0	-41.0	
460.000	-9	30.0	21.0	21.0	0.0	(Reference)
476.013	-68	30.0	-38.0	-38.0	-41.0	
0.000	-56	30.0	-26.0	-26.0	-41.0	
0.000	-64	30.0	-34.0	-34.0	-41.0	
0.000	-66	30.0	-36.0	-36.0	-41.0	
0.000	-68	30.0	-38.0	-38.0	-41.0	
0.000	-56	30.0	-26.0	-26.0	-41.0	
0.000	-55	30.0	-25.0	-25.0	-41.0	

EXHIBIT TYPE: Field Strength of Spurious Radiation
FCC PART: 2.993 (b)

DATE: November 10, 1998

PROCEDURE:

The following measurements were taken at Ritron's certified 3 meter test site. Measurements were made in accordance with FCC Rules and Regulations Part 2.947, using the procedures of IEC Publication 106.

The RQT-450 was aligned for transmitter operation on 464.600 MHz. (Fo) per the tune-up procedure outlined in the preliminary manual. This unit was then terminated at the antenna port with a non-radiating 50 Ohm terminating load.

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 LPA-25 Log Periodic Antenna at 200 to 1000 MHz.
Polarad CA-B Microwave Test Antenna at 1000 to 10,000 MHz.

For each emission, the height and polarization of the field strength measuring antenna and the orientation of the RQT-450 were varied to provide maximum field strength. The spectrum was searched from 4 MHz to the 10th harmonic of the transmit frequency. All unreported emissions were more than 20 dB below FCC limits.

EXHIBIT TYPE: Field Strength of Spurious Radiation
FCC PART: 2.993 (b)

DATE: November 10, 1998

EQUATIONS:

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

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

P_{3m} = Power output at 3 meters in dBm.
R = Reading direct from spectrum analyzer in dBm.
K = Antenna factor in dB at 3 meters.
E_{3m} = Field strength at 3 meters in μV/m.

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

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

P = Transmitter power in Watts.
D = Distance (3) in meters.

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

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

E = The amount below reference level in dB.
E_{3m} = Field strength at 3 meters in μV/m.
E_{ref} = Reference field strength at 3 meters in μV/m.

EXHIBIT TYPE: Field Strength of Spurious Radiation
FCC PART: 2.993 (b)

DATE: November 10, 1998

Transmitter Power (Watts):	0.120
Carrier Frequency (MHz):	460.000
Dipole Reference Field Strength of Carrier (uV/m):	809938
Required Attenuation (dB):	41
Maximum Permissible Spurious Emission Field Strength (uV/m):	7394

Emission Frequency (MHz)	Measurement Antenna (Description)	Antenna Factor (dB)	Analyzer Reading (dBm)	Computed Field Strength (uV/m)
920.000	Log-Periodic	28.3	-60	5848
1380.000	Discone	28.8	-78	779
1840.000	Discone	30.8	-78	979
2300.000	Discone	32.6	-77	1351

Certifying Engineer: Steve Henke

EXHIBIT TYPE: Frequency Stability vs. Temperature
FCC PART: 2.995 (a)

PROCEDURE: A complete RQT-450 was aligned for operation on 460.000 MHz. (Fo) per the test and alignment procedure. Power was supplied by installed Alkaline batteries.

The RQT-450 was then placed into a Delta Design Model 3900 Temperature Chamber. An Omega thermocouple was attached directly to the printed circuit board for temperature measurements. In order to reduce temperature stabilization time, the RQT's plastic cover was not sealed. For each measurement, time was allowed for the mass of the RQT reach the chamber temperature.

The RQT-450 was connected by coaxial cable to the input of the HP8920A RF test set. The RF test set was turned on and allowed to warm-up and stabilize. Its frequency accuracy was checked using WWV at the beginning and end of this test and was found to remain within 0.10 ppm of that standard.

At each temperature the RQT was remotely activated and its transmit frequency was recorded. Error is referenced to Room Temperature Tune Up at 23 C. This data follows.

RF Test Set Center Frequency = 460.000 MHz
Error is referenced to Room Temperature Tune Up at 23 C.

Temperature (C.)	Error (KHz)	Error (ppm)
-35	-1.665	-3.7
-30	-0.140	-0.4
-25	0.985	2.0
-20	1.630	3.4
-15	1.730	3.6
-10	1.345	2.8
-5	0.550	1.1
0	0.625	1.2
5	0.820	1.7
10	0.740	1.5
15	0.500	1.0
20	0.330	0.6
23	0.055	0.0
25	0.032	-0.1
30	-0.094	-0.3
35	-0.500	-1.2
40	-0.726	-1.7
45	-0.785	-1.8
50	-0.725	-1.7
55	-0.365	-0.9
60	0.200	0.3
65	1.230	2.6

Certifying Engineer: Steve Henke
Date: December 17, 1998

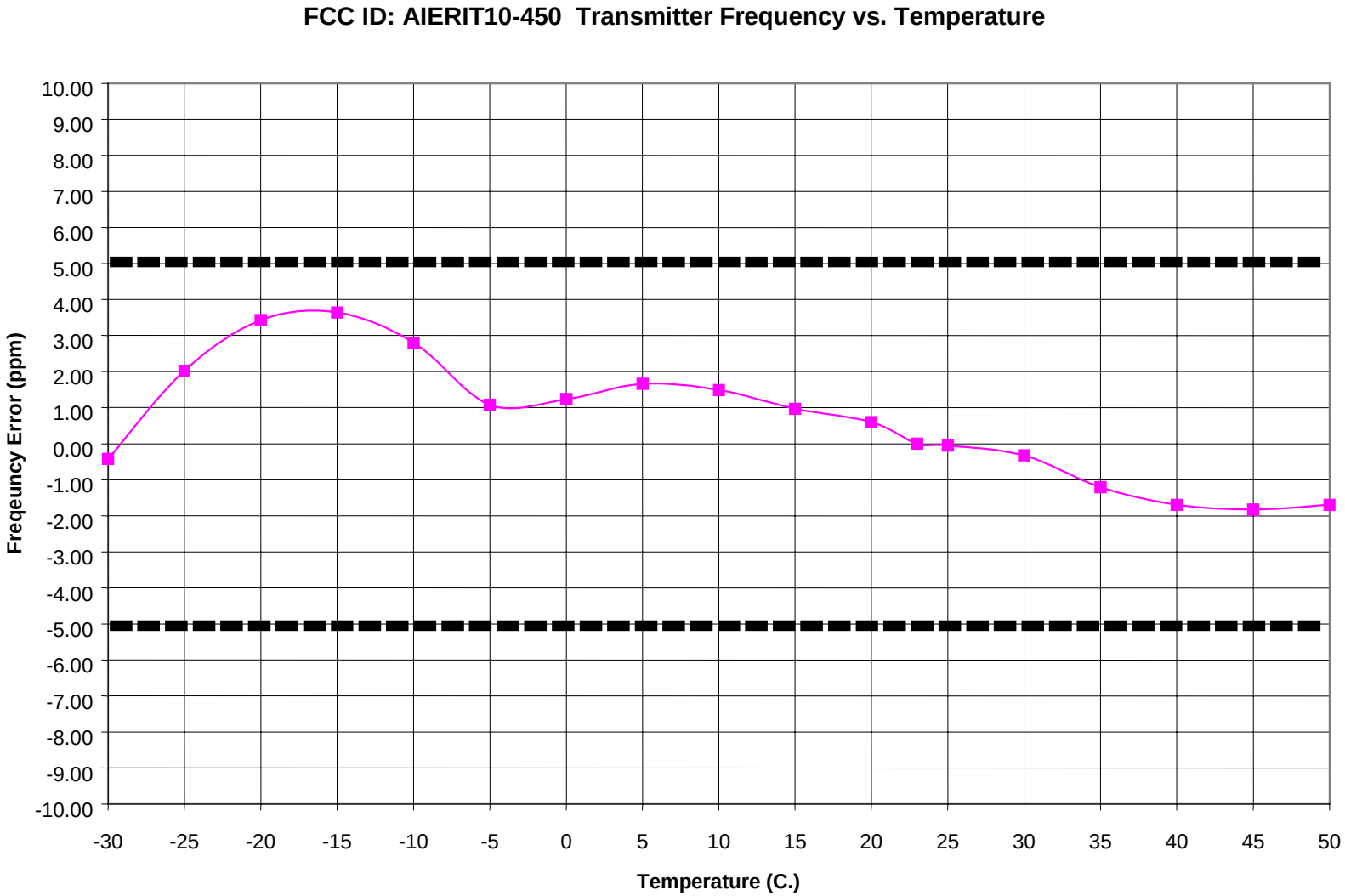

FCC ID: AIERIT10-450 Transmitter Frequency vs. Temperature
Freqeuncy Error (ppm)
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
-1.00
-2.00
-3.00
-4.00
-5.00
-6.00
-7.00
-8.00
-9.00
-10.00
-30
-25
-20
-15
-10
-5
0
5
10
15
20
25
30
35
40
45
50
Temperature (C.)

EXHIBIT TYPE: Frequency Stability vs. Input Voltage
FCC PART: 2.995 (d)

DATE: November 10, 1998

PROCEDURE:

The RQT-450 was aligned for transmitter operation on 464.6 MHz. (Fo) per the tune-up procedure outlined in the preliminary manual.

A variable DC power supply was connected to the battery terminals of the RQT-450. The RQT-450's antenna terminal was connected to the input of the HP RF Test Set with frequency counter and error meter.

The DC supply voltage of the RQT-450 was monitored and adjusted, using a Beckman Industrial 4.5 digit DMM. Frequency measurements were taken, using the frequency error meter of the HP8920A RF Test Set.

Because the supply voltage to the frequency determining circuits are regulated over the range of nominal battery voltages there was no measurable change in the operating frequency as the applied supply voltage was varied.

Certifying Engineer: Steve Henke

EXHIBIT TYPE: Statement of Spectrum Efficiency
FCC PART: 90.203 (j) (3)

DATE: November 10, 1998

I certify that when set for +/- 2.5 KHz deviation or 11K0F3E modulation, the RQT-450 carries a single voice channel within a 12.5 KHz spacing channel.

Certifying Engineer: Steve Henke

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