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APPLICANT: COBRA ELECTRONICS CORPORATION

FCC ID: BBOMRHH400

TEST REPORT:

EXHIBIT CONTAINING:

GENERAL_INFORMATION_REQUIRED FOR_TYPE_ACCEPTANCE

2.1033(c) COBRA ELECTRONICS CORPORATION will sell the FCC ID: MRHH400 VHF Marine transmitter in quantity, for use under FCC RULES PART 80.

2.1033(c) TECHNICAL_DESCRIPTION

(4) Type of Emission: 16K0G3E/16K0F3E For 20KHz
For 25KHz
Bn = 2M + 2DK
M = 3000
D = 5.0KHz (Peak Deviation)
K = 1
Bn = 2(3.0K) + 2(5.0K)(1) = 6.0K + 10.0K = 16.0K

80.205(A) ALLOWED AUTHORIZED BANDWIDTH = 20.00KHz.

2.1033(c)(5) Frequency Range: 156.025-157.425 MHz

2.1033(c)(6) Power Range and Controls: There is a user Power switch for High/Low Power.

2.1033(c)(8) DC Voltages and Current into Final Amplifier:

POWER INPUT
FINAL AMPLIFIER ONLY

High	Low
Vce = 7.2 Volts	Vce = 7.2 VDC
Ice = 1.5 A.	Ice = .72
Pin = 10.80 Watts	Pin = 5.19 Watts

Function of each electron tube or semiconductor device or other active circuit device: - SEE EXHIBIT# 10

2.1033(c)(10) Complete Circuit Diagrams: The circuit diagram is included as EXHIBIT 6. The block diagram is included as EXHIBIT 5.

2.1033(c)(3) Instruction book. The instruction manual is included as EXHIBIT #7.

2.1033(c) (9) Tune-up procedure. The tune-up procedure is given in EXHIBIT #8

2.1033(c) (13) Digital modulation. This unit does NOT use digital modulation.

The data required by 2.1046 through 2.1055 is submitted below.

80.203(b) External Controls: The transmitter is capable of changing frequency between 156.05-157.425 MHz by external control. The available channels are shown in the user manual. These channels are programmed by the manufacturer and change of frequency is inaccessible to the station operator.

80.203(c) Five Minute continuous transmission test: The antenna was connected to a dummy load and the radio was locked in a transmit PTT mode. An external timer digital clock was used to observe the duration of the unmodulated transmission. The transmitter turned off and the radio went to receive mode at 4 minutes, 58 seconds as displayed by the external digital clock.

80.203(n) Not applicable as this radio does not have DSC capability.

80.211 Not applicable as this radio does not have DSC capability.

2.1046(a)
80.215(e)(1)

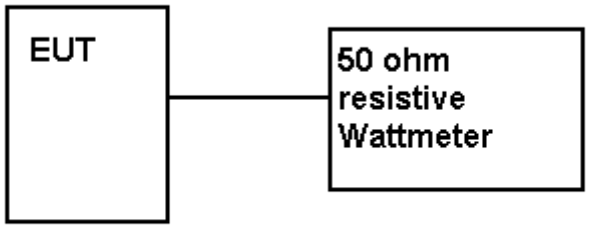
RF_power_output.

RF power is measured by connecting a 50 ohm, resistive wattmeter to the RF output connector. With a nominal battery voltage of 7.2 VDC and the transmitter properly adjusted the RF output measures:

More than 1 channel was checked and both channels Have the same output power.

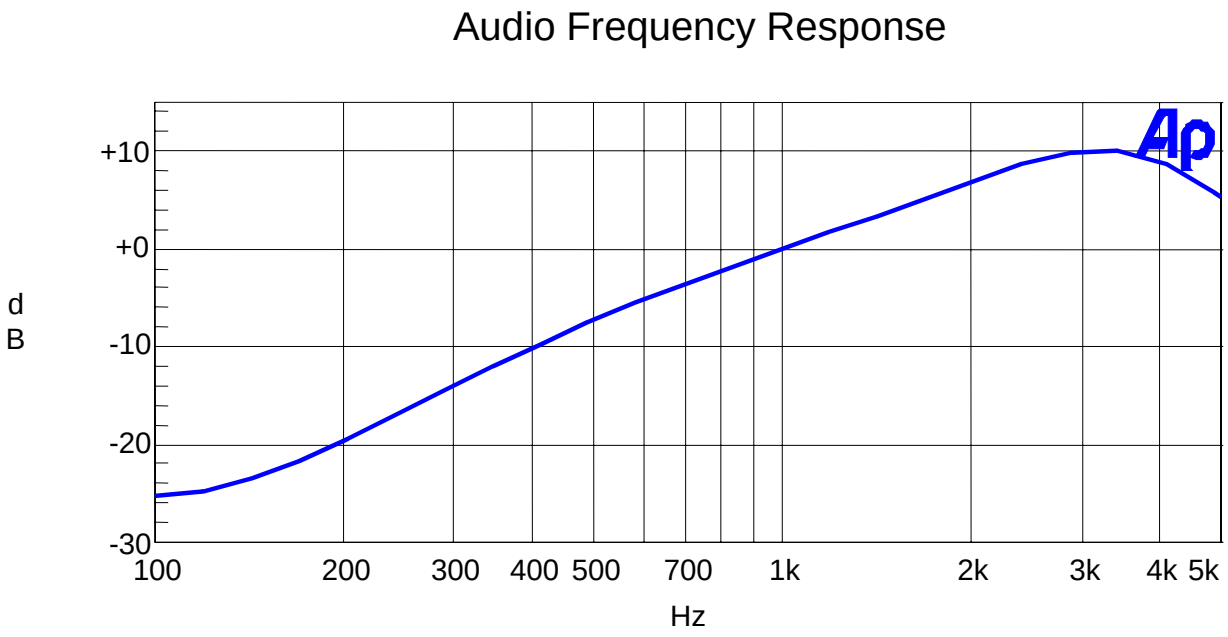
HIGH POWER: 4.88 W CONDUCTED
LOW POWER: 1 W CONDUCTED

METHOD OF MEASURING RF POWER OUTPUT



2.1047(a) Voice Modulation_characteristics:

(b) AUDIO_FREQUENCY_RESPONSE
See the following plot.



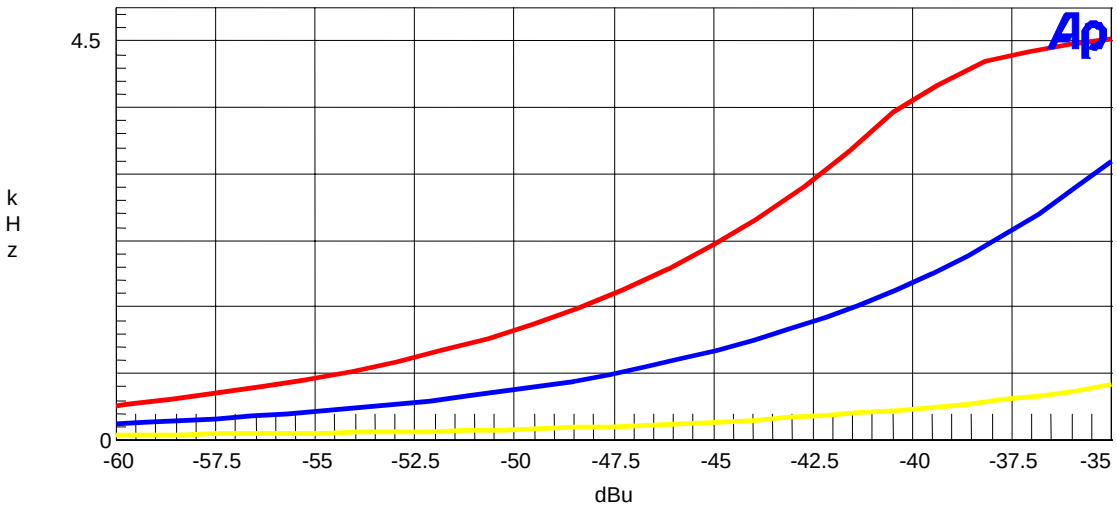
2.1047(a) AUDIO_LOW_PASS_FILTER

The audio low pass filter is included and the plot is shown as below. Rules 80.213(e) for ship stations with a low pass filter.

2.1047(b) AUDIO INPUT VS MODULATION

Plots of the audio input versus deviation are shown below.

Modulation Limiting: 2.5KHz, 1.0KHz, 300Hz



Red Modulation 2.5KHz

Blue Modulation 1.0KHz

Yellow Modulation 300Hz

2.1049(c) Occupied bandwidth:

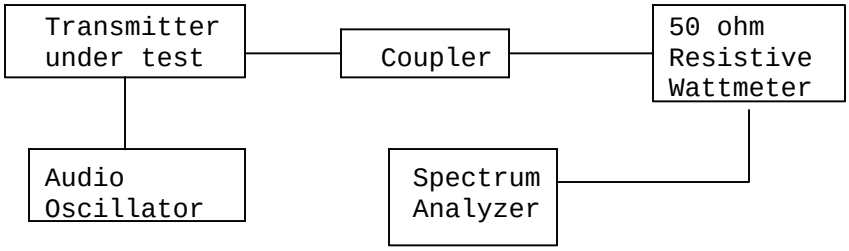
80.213(b)
Data in the plots shows that on any frequency removed from the assigned frequency by more than 50%, but not more than 100%: At least 25dB. On any frequency removed from the assigned frequency by more than 100%, but not more than 250%: At least 35dB. On any frequency removed from the assigned frequency by more than 250%, of the authorized bandwidth: At least 43+log(P)dB.

Radiotelephone transmitter with modulation limiter.

Test procedure: TIA/EIA-603 para 2.2.11 , with the exception that various tones were used.

Test procedure diagram

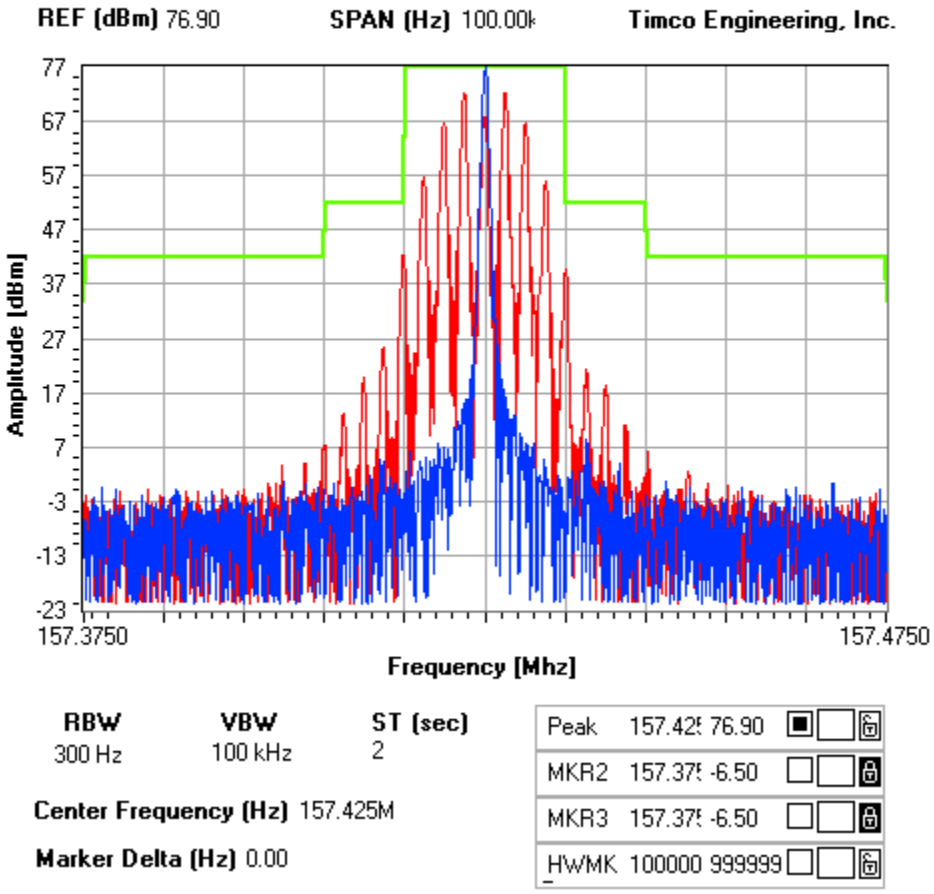
OCCUPIED BANDWIDTH MEASUREMENT



OCCUPIED BANDWIDTH PLOT

NOTES:

FCC 90.210 Mask B



2.1051 Spurious_emissions_at_antenna_terminals(conducted):
80.211 The data on the following page shows the level of conducted spurious responses. The carrier was modulated 100% using a 2500Hz tone. The spectrum was scanned from 0.4 to at least the 10th harmonic of the fundamental. The measurements were made in accordance with standard TIA/EIA-603.

Method of Measuring Conducted Spurious Emissions

2.1051 Continued Spurious_Emissions_at_the_Antenna_Terminals:

REQUIREMENTS: Emissions must be 43 +10log(Po) dB below the mean power output of the transmitter.

HIGH POWER 43 + 10log(4.88) = 49.88 dB
LOW POWER 43 + 10log(1) = 43 dB

156 MHz			157.4 MHz		
	HIGH POWER	LOW POWER		HIGH POWER	LOW POWER
EF	dB below carrier	dB below carrier	EF	dB below carrier	dB below carrier
156.0	0.0	0.0	157.4	0.0	0.0
312.0	67.08	71.4	314.8	68.58	74.0
468.1	74.78	65.4	472.2	74.98	66.0
624.1	74.18	64.4	629.6	70.08	63.6
780.2	73.88	77.2	787.0	80.78	75.0
936.2	95.98	96.7	944.5	103.28	97.8
1092.2	89.68	99.6	1101.9	96.98	99.9
1248.3	102.48	87.5	1259.3	94.78	86.5
1404.4	105.68	98.3	1416.7	95.68	96.7
1560.4	105.68	99.3	1574.2	101.98	95.4

METHOD OF MEASUREMENT: The procedure used was TIA/EIA-603 STANDARD without any exceptions. An audio generator was connected to the UUT through a dummy microphone circuit and the output of the transmitter connected to a standard load and from the standard load through a pre-selector filter of the spectrum analyzer. The spectrum was scanned from 400KHz to at least the tenth harmonic of the fundamental using a HP model 8566B spectrum analyzer. The measurements were made using the shielded room located at TIMCO ENGINEERING INC. 849 STATE ROAD, NEWBERRY FLORIDA 32669.

2.1053(a) Field_strength_of_spurious_emissions:

NAME OF TEST: RADIATED SPURIOUS EMISSIONS

REQUIREMENTS: Emissions must be 43 +10log(Po) dB below the mean power output of the transmitter.
HIGH POWER: 43+10LOG(2) = 46.01 dB
LOW POWER: 43+10LOG(.4) = 41.45 dB

TEST DATA:

HIGH POWER:

Emission Frequency MHz	Ant. Polarity	Corrected EUT Signal Reading	Coax Loss (dB)	Substitution Antenna (dBd)	dB Below Carrier (dBc)
156.00	V	32.60	0	0	0
312.00	H	-45.30	0	-1.22	79.12
468.10	H	-43.10	0	-1.46	77.16
624.10	H	-64.50	0	-1.54	98.64
780.20	V	-59.00	0	-1.31	92.91
936.20	V	-51.10	0	-1.33	85.03
1092.20	V	-55.60	1	-3.54	90.74
1248.20	V	-50.50	1	-4.08	86.18
1404.30	H	-57.70	1	-4.63	93.93
1560.40	V	-56.30	1.1	-5.03	92.83

LOW POWER

Emission Frequency MHz	Ant. Polarity	Corrected EUT Signal Reading	Coax Loss (dB)	Substitution Antenna (dBd)	dB Below Carrier (dBc)
156.00	V	25.7	0	0	0.00
312.00	H	-52.6	0	-1.22	79.52
468.10	H	-45	0	-1.46	72.16
624.10	V	-57	0	-1.54	84.24
780.20	V	-56.2	0	-1.31	83.21
936.20	V	-53.5	0	-1.33	80.53
1092.20	V	-55.7	1	-3.54	83.94
1248.20	V	-52	1	-4.08	80.78
1404.30	H	-59.2	1	-4.63	88.53
1560.40	V	-58.1	1.1	-5.03	87.73

2.1053(a) Field_strength_of_spurious_emissions:

NAME OF TEST: RADIATED SPURIOUS EMISSIONS

REQUIREMENTS: Emissions must be 43 +10log(Po) dB below the mean power output of the transmitter.

HIGH POWER: 43+10LOG(2) = 46.01 dB
LOW POWER: 43+10LOG(.7) = 41.45 dB

TEST DATA CONTINUED:

HIGH POWER:

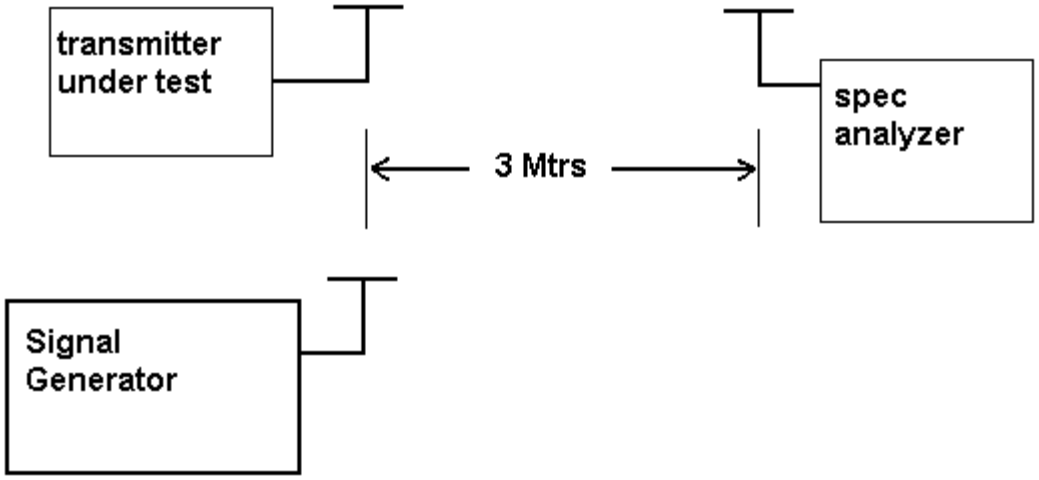
Emission Frequency MHz	Ant. Polarity	Corrected EUT Signal Reading	Coax Loss (dB)	Substitution Antenna (dBd)	dB Below Carrier (dBc)
157.40	V	33.00	0	0	0
314.80	H	-43.70	0	-1.22	77.92
472.20	H	-47.70	0	-1.46	82.16
629.60	V	-52.50	0	-1.54	87.04
787.00	V	-53.20	0	-1.31	87.51
944.50	V	-54.40	0	-1.33	88.73
1101.80	V	-55.10	1	-3.54	90.64
1259.20	V	-50.70	1	-4.08	86.78
1416.60	H	-51.90	1	-4.63	88.53
1574.10	V	-51.80	1.1	-5.03	88.73

LOW POWER

Emission Frequency MHz	Ant. Polarity	Corrected EUT Signal Reading	Coax Loss (dB)	Substitution Antenna (dBd)	dB Below Carrier (dBc)
157.40	V	28.3	0	0	0.00
314.80	H	-64.6	0	-1.22	94.12
472.20	H	-44.9	0	-1.46	74.66
629.60	V	-59.8	0	-1.54	89.64
787.00	V	-57.1	0	-1.31	86.71
944.50	V	-54	0	-1.33	83.63
1101.80	V	-58	1	-3.54	88.84
1259.20	V	-48.6	1	-4.08	79.98
1416.60	H	-56.5	1	-4.63	88.43
1574.10	V	-60.4	1.1	-5.03	92.63

METHOD OF MEASUREMENT: The tabulated data shows the results of the radiated field strength emissions test. The spectrum was scanned from 30 to at least the tenth harmonic of the fundamental. This test was conducted per TIA/EIA STANDARD 603 using the substitution method. Measurements were made at the open field test site of TIMCO ENGINEERING, INC. located at 849 N.W. State Road 45, Newberry, FL 32669.

Method of Measuring Radiated Spurious Emissions



Frequency stability:

2.1055(a)(2)
80.209(a)

Temperature and voltage tests were performed to verify that the frequency remains within the .0010%,10.0 ppm specification limit, for 20kHz spacing. The test was conducted as follows: The transmitter was placed in the temperature chamber at 25 degrees C and allowed to stabilize for one hour. The transmitter was keyed ON for one minute during which four frequency readings were recorded at 15 second intervals. The worse case number was taken for temperature plotting. The assigned channel frequency was considered to be the reference frequency. The temperature was then reduced to -20 degrees C after which the transmitter was again allowed to stabilize for one hour. The transmitter was keyed ON for one minute, and again frequency readings were noted at 15 second intervals. The worst-case number was recorded for temperature plotting. This procedure was repeated in 10 degree increments up to + 50 degrees C.

Readings were also taken at minus 15% of the battery voltage of 7.2 V, which we estimate to be the battery endpoint.

MEASUREMENT DATA:

Assigned Frequency (Ref. Frequency): 157.425000

TEMPERATURE_C	FREQUENCY_MHz	PPM
REFERENCE_____	157.425 000	00.0
-20_____	157.424 525	-3.02
-10_____	157.424 768	-1.47
0_____	157.424 912	-0.56
+10_____	157.424 974	-0.17
+20_____	157.424 963	-0.24
+30_____	157.424 951	-0.31
+40_____	157.425 030	0.19
+50_____	157.425 285	1.81
6.1 VDC	157.424 964	-0.23

RESULTS OF MEASUREMENTS: The test results indicates that the EUT meets the requirements.

EMC Equipment List

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	Listed 3/26/01	3/26/04
3-Meter OATS	TEI	N/A	N/A	Listed 1/13/03	1/13/06
Audio Generator	B&K Precision	3010	8739686	CHAR 12/1/02	12/1/04
Audio Oscillator	HP	653A	832-00260	CHAR 12/1/02	12/1/04
Biconnical Antenna	Eaton	94455-1	1057	CAL 3/18/03	3/18/05
Biconnical Antenna	Eaton	94455-1	1096	CAL 10/1/01	10/1/03
Biconnical Antenna	Electro-Metrics	BIA-25	1171	CAL 4/26/01	4/26/03
Blue Tower Quasi-Peak Adapter	HP	85650A	2811A01279	CAL 4/15/03	4/15/05
Blue Tower RF Preselector	HP	85685A	2926A00983	CAL 4/15/03	4/15/05
Blue Tower Spectrum Analyzer	HP	8568B	2928A04729 2848A18049	CAL 4/15/03	4/15/05
Frequency Counter	HP	5352B	2632A00165	CAL 11/28/01	11/28/03
Frequency Counter	HP	5382A	1620A03535	CHAR 3/2/01	3/2/03
Frequency Counter	HP	5385A	2730A03025	CAL 3/7/03	3/7/05
Frequency Counter	HP	5385A	3242A07460	CAL 3/7/03	3/7/05
LISN	Electro-Metrics	ANS-25/2	2604	CAL 10/9/01	10/9/03
LISN	Electro-Metrics	EM-7820	2682	CAL 3/12/03	3/12/05
Log-Periodic Antenna	Eaton	96005	1243	CAL 5/8/03	5/8/05
Log-Periodic Antenna	Electro-Metrics	EM-6950	632	CHAR 10/15/01	10/15/03
Log-Periodic Antenna	Electro-Metrics	LPA-25	1122	CAL 10/2/01	10/2/03
Log-Periodic Antenna	Electro-Metrics	LPA-30	409	CAL 3/4/03	3/4/05
Modulation Analyzer	HP	8901A	3435A06868	CAL 9/5/01	9/5/03
Modulation Meter	Boonton	8220	10901AB	CAL 4/15/03	4/15/05
Peak Power Meter	HP	8900C	2131A00545	CAL 7/2/03	7/2/05
Power Meter And Sensor	Bird	4421-107 & 4022	0166 & 0218	CAL 4/16/03	4/16/05

Signal Generator	**HP**	**8640B**	**2308A21464**	**CAL 2/15/02**	**2/15/04**
Tan Tower Preamplifier	**HP**	**8449B-H02**	**3008A00372**	**CHAR 3/4/01**	**3/4/03**
Tan Tower Quasi-Peak Adapter	**HP**	**85650A**	**3303A01690**	**CAL 8/31/01**	**8/31/03**
Tan Tower RF Preselector	**HP**	**85685A**	**3221A01400**	**CAL 8/31/01**	**8/31/03**
Tan Tower Spectrum Analyzer	**HP**	**8566B Opt 462**	**3138A07786 3144A20661**	**CAL 8/31/01**	**8/31/03**
Temperature Chamber	**Tenney Engineering**	**TTRC**	**11717-7**	**CHAR 1/22/02**	**1/22/04**