Admin: Please Type & Expedite.

4/11/36.

Memo: To The Chief Radio Section.

Subject: Tests of Radio Receiver BC 312-T1 Serial No 2.

1. It is requested that the following tests be made of Radio Receiver BC 312 T1 Serial No 2:

a. Complete specification test as per Spec 71-840

b. Humidity test as decribed below under paragraph 3

2 (a) When making the test prescribed under IV 27-a 71-840 the test set up described in the accompanying sketches is suggested. The following type of tabulation of results are suggested.

Radio Receiver BC312 T1 #2 MCW – 14 volts – Heater "ON" – Output 10 mw.

Frequency	Temperature	Humidity	Sensitivity.
17500000	+40° C 104°	20%	2 μV
17500500	+35° C 95°	25%	2.5 μV
17501000	+30° C 86°	30%	3.0 μV
Readings to	+25° C 77°	35%	
nearest ½ KC	+20° C 68° F	40%	
Etc to	−20° C −4° F.	To be kept below	etc.
except that final figure will be as accurate as possible.		50%	

Dry bulb. Wet B. % HUM.

Receiver setting Scale freq.

b. Readings ~~should~~ be made at the following frequencies.

~~17~~ 1800	2000 KC	~~300~~
3600	3000 KC	
5000 – 8000	7500 KC	
9600	14500 KC	
12000		
18000	17500 KC	

⅓ begin. 1st. band
beginning 2nd " "
end of 3rd " "
beginning 5th " "
end of 6th " "

c. One set of readings should be made as above

at 17500 KC and one at 2000 KC with the heater "OFF".

NOTE Due to length of input leads a sensitivity correction may be necessary

3. Humidity test.

a. Receiver BC312-T1 Serial No 2
MCW – MVC
14 Volts
Heater OFF and Heater ON. (one course each)
Output 10 mW.

b. Data FREQUENCY ~~8200 KC~~ 14500 KC

Humidity in %	Frequency Resonant	Sensitivity µV	Selectivity @ 10/1	Temperature
up to but not exceeding 95%				should be kept constant at 35°C

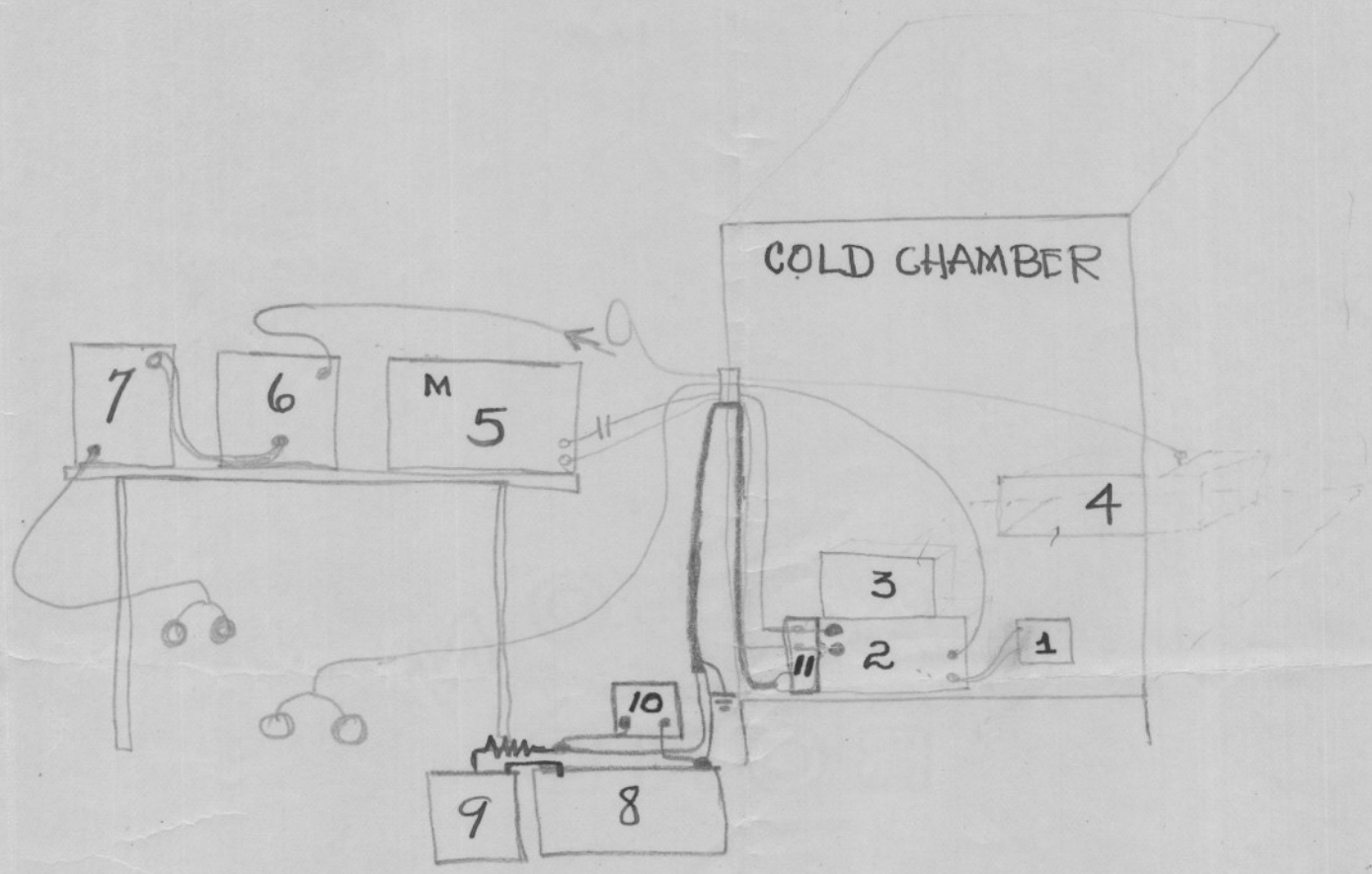
c. Twelve hours should be allowed ~~between~~ at each constant humidity to allow the apparatus to assume the ambient humidity.

d. Due to c. above only a few humidity can be taken in a reasonable time. Suggest as follows:–
95% (if it can be obtained).
50%
? as low as can be obtained.

4. Suggestions are invited.

J D Clonnell

TEST SET UP
TEMPERATURE AND HUMIDITY TESTS.



1 Output Power Meter
2. Radio Receiver BC 312-T1 Serial No 2.
3. Humidity Indicator
4. Box with sliding cover containing dehydrant.
5. Ferris Microvolter.
6. Frequency meter SCR 211
7. Audio Frequency Bridge General Radio.
8. Storage Battery 12 volts
9. Storage Battery 4 volts
10. Voltmeter 14 volts
11. Power unit Plug On.

Change Note:- Item 1 should be located outside the box if possible.

4

RADIO SECTION
Signal Corps Laboratories

Saturday - May 30th (Date)

MEMORANDUM FOR: Mr. Marleman

SUBJECT: Temperature - Frequency test of BC-312T2.

1). The results of Fridays ~~tests~~ look exceedingly promising and it is suggested that the week of June 1st be set aside for completion, if possible of one check on each band.

2). The week of June 8th will be allotted to Photographing, alignment, and completion of such ~~tests~~ that remain.

Ralph Hale (Signature)

Approved:

6

4-29-36.

~~[illegible]~~:

Mr Watson: Unit should be repaired before proceeding. Joe

To: Paul Watson:

Re; Humidity chamber, and temperature test of the BC-312-T2.

Inselman

During this afternoons operation of the chamber it was found that the expansion valve for the freezing apparatus is out of commission. This will cripple the test quite a bit since the available change in temperature would be from 85° F. or 29°C approx. minimum to 50°C, or higher. Mr. Graham was notified and Mr. Adams was to have a repair man come around tomorrow and replace the valve.

The blower also went out of commission, but the trouble was found to be a sticking brush and was repaired.

I am going ahead with the available plus temperature range and get as many readings as possible.

H. Inselman

7

4-30-36.

To: Paul Watson:

Re: Humidity Chamber for temperature test of the BC-312-T2

1. A test run of the refrigeration equipment shows the following results. ROOM TEMP. 80°F.

TIME	TEMP.	TIME	TEMP.
10.15 AM	90°F	12.00	10°
10.30	70°	12.30	0
10.45	50°	1.00	-3°
11.00	35°	1.45	-6°
11.30	20°		

2. Inquiry of Mr. Graham and Mr. Palmer discloses that the specification tests call for -10°F in a period of 2½ hrs.

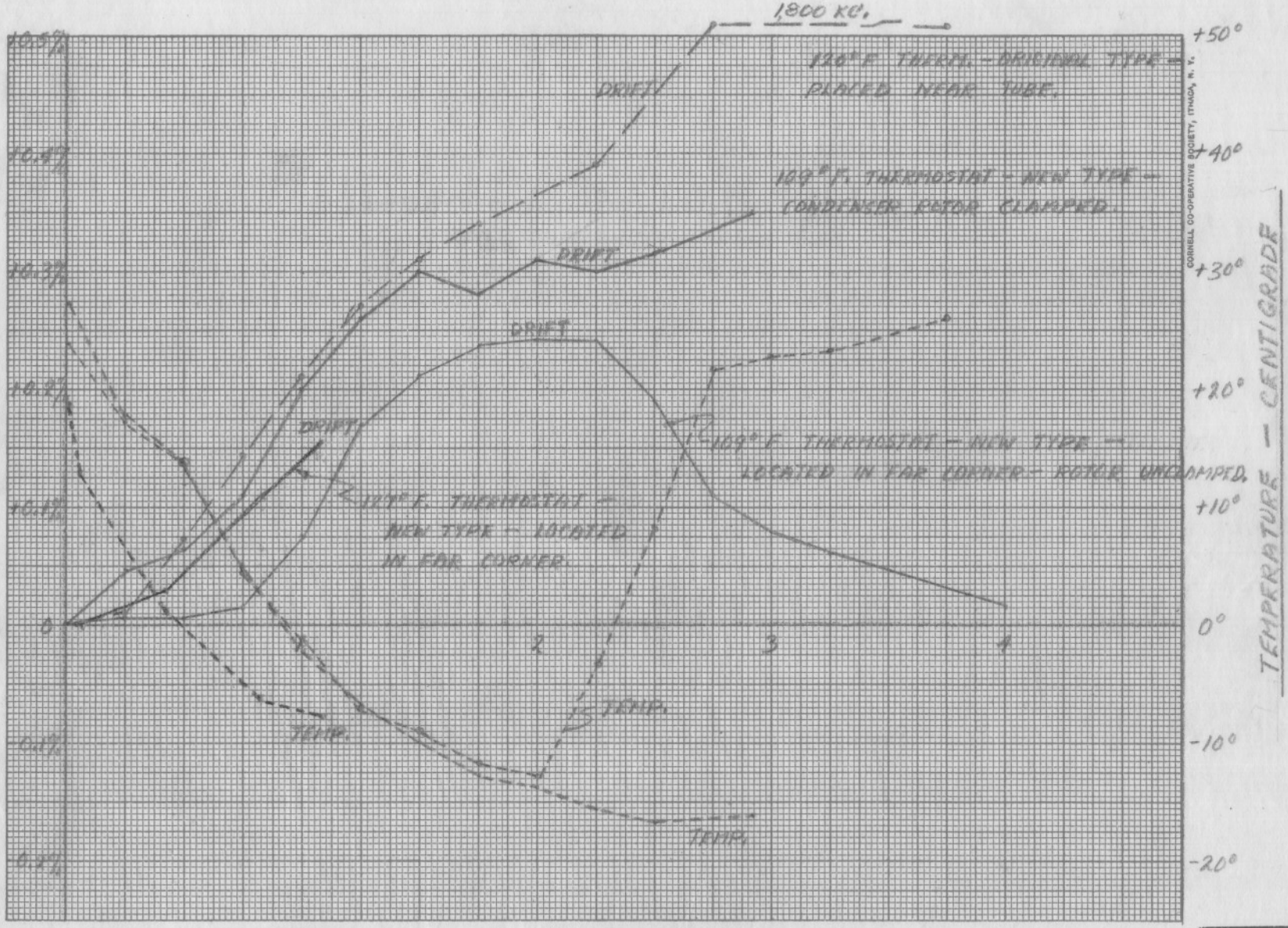
3. Our lowest obtainable temperature would probably be about -5°F in a period of 3½ to 4 hrs. (taking into account heat from the receiver under test) and it would probably take an extended period of time to get down to -10°F.

H. Insherman

5-11-36

TEMPERATURE - FREQUENCY RUNS

BC-312-T2 SERIAL NO. 1 BAND NO. 1 AT 1,800 AND 2,000 KC.



TITLE FREQUENCY DRIFT - PERCENT

SIGNAL CORPS LABORATORIES
U. S. ARMY
FORT MONMOUTH NEW JERSEY

DRAWN BY: _____ SECTION
CHECKED BY: _____ DATE
APPROVED: _____

ES-A-

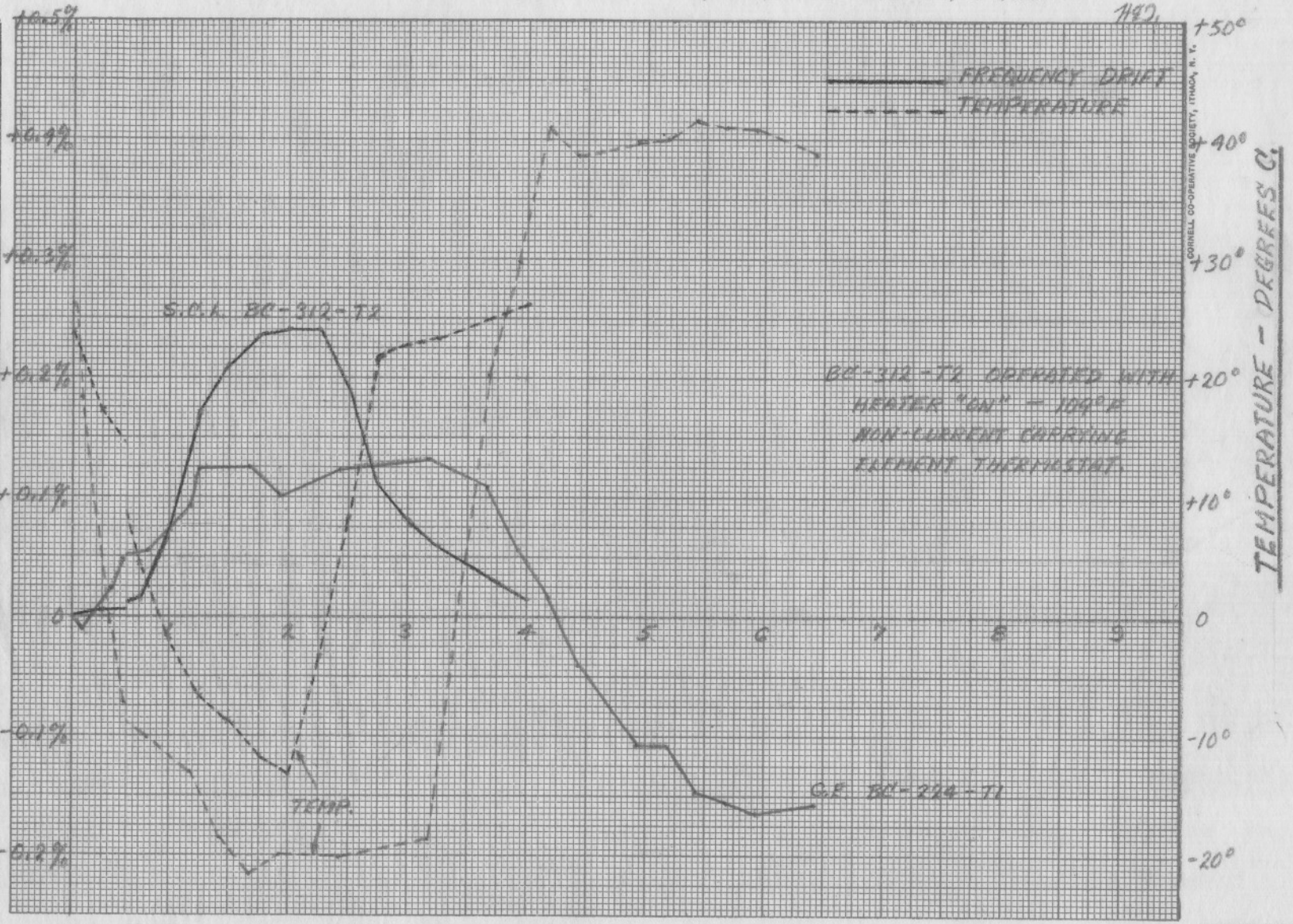
CORNELL CO-OPERATIVE SOCIETY, ITHACA, N. Y.

ES-A-

5-11-36

TEMPERATURE – FREQUENCY RUN

S.C.L. BC-312-T2 SERIAL NO.1 BAND NO.1 – 2,000 KC. – S.C.L. DATA ———
G.E.Co. Y-224-T1 - - - - - - - - - BAND NO.1 – 2,090.6 KC. – A.R.L. DATA ———
R.C.A. Y-224-T2 - - - - - - - - - BAND NO.1 – 2,090.6 KC. – A.R.L. DATA ———



FORT MONMOUTH NEW JERSEY

CHECKED BY: APPROVED:

ES-A-

CORNELL CO-OPERATIVE SOCIETY, ITHACA, N. Y.

ES-A-

TEMPERATURE CONTROL CURVES - SAMPLE THERMOSTAT

(CALIBRATED FOR 127° F.)

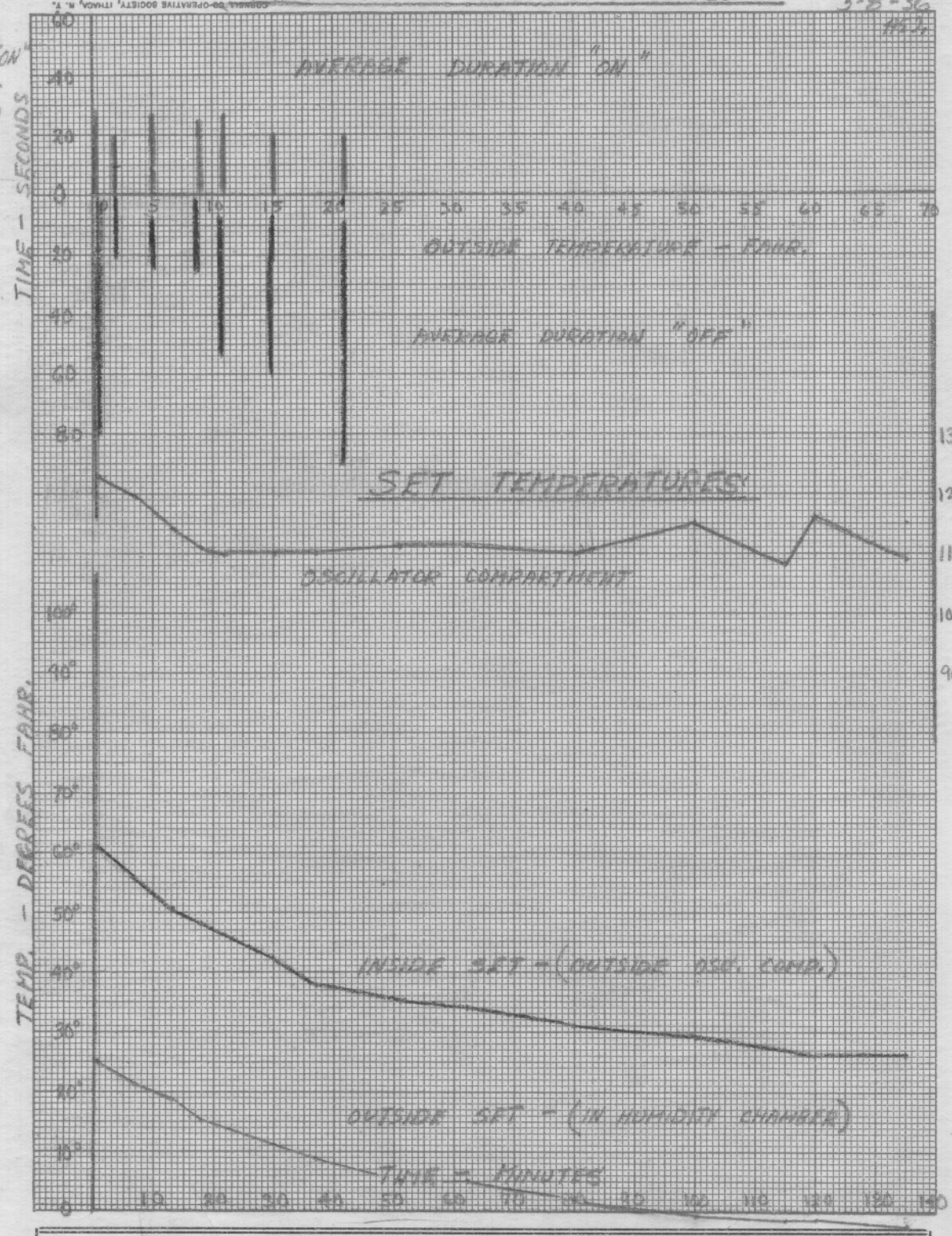
OSCILLATOR COMPARTMENT
RADIO REC. BC-312-T2
SERIAL NO. 1

ES-A-

HEATER "ON" AND "OFF" PERIODS

5-8-36

NOTE:
THERMOSTAT "ON" AND "OFF" PERIODS IRREGULAR BELOW +2° FAHR.



CURVE I

TITLE

SIGNAL CORPS LABORATORIES
U. S. ARMY
FORT MONMOUTH NEW JERSEY

SECTION
DRAWN BY: DATE
CHECKED BY:
APPROVED:
ES-A-

Temperature Run

5-8-36

BC-312-T2 SERIAL No. 1
Band No. 6 — 16,200 KC.

8.8 div = 12 KC
1 div = 1.364 KC.

Time	Temperature Outside F°	Temperature Outside C°	Temperature Inside Set F°	Temperature Inside Set C°	Temperature Oscill. F°	Temperature Oscill. C°	Humidity D.B.	Humidity W.B.	Humidity %	Resonant Freq. Sc. Div.	Resonant Freq. KC.	Drift Cycles	Drift %	Sensitivity Untuned	Sensitivity Retuned	% Change Sensitivity Retuned	Heater Cycle Sec. On	Heater Cycle Sec. Off	Input Volts	NOTES
11.20 AM.	Set on —																			
11.55	80	+26.7	91	32.8	126	52.2	81	68	51%	2016.3	16,200.0	0	0	1.0	1.0	0			14.18	Heater cycle
12.45 PM.	82	+27.8	96	35.6	126	52.2	85	76	64%	2016.3	16,200.0	0	0	1.0	1.0	0	17	75	14.10	rdgs. are
12.55	Refrigeration on																			Averages of
1.05	70	+21.1	90	32.2	125	51.7	72	62	58%	2019.7	16,204.6	4,640	+ .028%	6.5	0.9	+10.0%	15	54	14.1	3 successive
1.20	61	+16.1	83	28.3	124	51.1	65	56	58%	2023.5	16,209.8	9,820	+ .060%	—	0.9	+10.0%	23	53	14.0	rdgs.
1.35	45	+7.2	73	22.8	121	49.4	52	42	40%	2026.2	16,213.5	13,500	+ .083%	—	0.9	+10.0%	24	43	14.05	
1.45	39	+3.9	68	20.0	121	49.4	45	31	10%	2028.3	16,216.4	16,360	+ .101%	—	1.0	0	23	33	14.03	
2.00	28	-2.2	60	15.6	118	47.8	—	—	—	2032.0	16,221.4	21,400	+ .132%	—	1.0	0	—	—	14.0	
2.15	20	-6.7	51	10.6	117	47.2	—	—	—	2035.5	16,226.2	26,200	+ .162%	—	1.0	0	39	39	13.98	
2.30	13	-10.6	43	6.1	115	46.1	—	—	—	2039.8	16,232.1	32,100	+ .198%	—	1.0	0	On 8 min 33 secs.		13.80 H. ON.	Heater on steady
2.45	9	-12.8	39	3.9	122	50.0	—	—	—	2037.8	16,229.3	29,300	+ .181%	—	0.9	+10.0%	Irregular		13.80	
3.00	7	-13.9	36	2.2	120	48.9	—	—	—	2040.2	16,232.6	32,600	+ .201%	—	1.2	-20.0%	—		13.75	
3.15	5	-15.0	35	1.7	129	53.9	—	—	—	2040.7	16,233.3	33,300	+ .205%	—	1.2	-20.0%	—	—	13.9 H. OFF	
3.30	2	-16.7	32	0	127	52.8	—	—	—	2038.5	16,230.3	30,300	+ .187%	—	1.2	-20.0%	On 13 min 50 sec.		13.87	Heater on over
[illegible]	2	-16.7	29	-1.7	117.5	47.5	—	—	—	2044.7	16,238.7	38,700	+ .238%	—	1.3	-30.0%	—	—	13.7	13 min.
[illegible]	-0.5	-18.1	30	-1.1	128	53.3	—	—	—	2040.3	16,232.8	32,800	+ .204%	—	1.3	-30.0%	—	—	13.8 H. OFF.	
4.15	-1	-18.3	27	-2.8	120	48.9	—	—	—	2044.7	16,238.7	38,700	+ .238%	—	1.3	-30.0%	—	—	13.62 H. ON.	
4.30	-2	-18.9	28	-2.2	130	54.4	—	—	—	2043.5	16,237.1	37,100	+ .229%	—	1.1	-10.0%	—	—	13.6 H. ON.	
4.45	-3	-19.4	26	-3.3	127	52.8	—	—	—	2043.7	16,237.4	37,400	+ .231%	—	1.4	-40.0%	—	—	13.55 H. ON.	
5.40	-5	-20.6	23	-5.0	125	51.7	—	—	—	2046.3	16,240.9	40,900	+ .252%	—	1.5	-50.0%	—	—	13.42 H. ON.	Heater on
6.00	-5.5		22		127		—	—	—	2048.2	16,243.5	43,500	+ .268%	—	1.5	-50.0%	Heater went off		13.55 H. OFF	most of time
6.05	Refrigeration off.																			
6.10	23	-5.0	33	+0.6	119	48.3	—	—	—	2050.7	16,246.9	46,900	+ .290%	—	1.3	-30.0%	—	—	13.4 H. ON.	
	34	1.1	46	7.8	132	55.6	—	—	—	2040.2	16,232.6	32,600	+ .201%	—	1.4	-40.0%	—	—	13.5 H. OFF.	
	47	8.3	56	13.3	122	50.0	48	38	36%	2044.0	16,237.8	37,800	+ .233%	—	1.1	-10.0%	—	—	13.35 H. ON.	

Continued P. 2.

HEJ.

5-8-36.

Temp. Run - Continued

BC-312-T2 Serial No. 1
Band No. 6 - 16,200 KC.

Time	Temp. Outside F°	Temp. Outside C°	Temp. Inside F.	Temp. Inside C.	Temp. Oscill. F.	Temp. Oscill. C.	Humidity D.B.	Humidity W.B.	Humidity %	Freq. Sc. Div.	Freq. KC.	Drift Cycles	Drift %	Sensit. Untuned	Sensit. Retuned	% Change Sensit. Retuned	Heater Cycle Secs. On	Heater Cycle Secs. Off	Input Volts	NOTES
6.50 PM	56	13.3	63	17.2	118	47.8	57	48	51%	2041.5	16,239.4	34,400	+.212%	—	1.0	0	29	44	13.3	H. ON.
7.00	70	21.1	72	22.2	118	47.8	68	58	55%	2038.8	16,230.7	30,700	+.190%	—	1.0	0	—	—	13.3	" "
7.10	81	27.2	82	27.8	119	48.3	81	67	48%	2035.0	16,225.5	25,500	+.157%	—	1.1	-10.0%	22	60	13.3	H. OFF.
7.30	80	26.7	87.5	30.8	121	49.4	81	68	52%	2030.0	16,218.7	18,700	+.115%	—	1.2	-20.0%	—	—	13.4	H. OFF
7.45	95	35.0	94	34.4	122	50.0	93	74	41%	2027.2	16,214.9	14,870	+.092%	—	1.2	-20.0%	21	66	13.4	H. ON.
8.00	107	41.7	107	41.7	126	52.2	108	88	46%	2022.2	16,208.1	8,050	+.050%	—	1.2	-20.0%	—	—	13.38	
8.30	106	41.1	114	45.6	131	55.0	—	—	—	2016.3	16,000.0	0	0	—	1.2	-20.0%	15	2 MIN. 40 SEC.	13.33	H. OFF.
8.45	106	41.1	114	45.6	131	55.0	106	82	37%	2015.8	15,999.3	-682	-.004%	—	1.2	-20.0%	—	—	13.3	" "
8.53	91	32.8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
9.00	85	29.4	105	40.6	131	55.0	83	67	43%	2017.5	16,201.6	1,637	.010%	—	1.1	-10.0%	—	—	13.28	" "
9.05	80	26.7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
9.15	80	26.7	102	38.9	128	53.3	81	68	52%	2021.5	16,207.1	7,100	.044%	—	1.2	-20.0%	—	—	13.1	H. ON
9.30	83	28.3	99	37.2	127	52.8	83	69	49%	2022.5	16,208.5	8,460	.052%	—	1.2	-20.0%	—	—	13.2	H. OFF

Room temperature —

HEJ.

Frequency Drift on Band No. 1

6-19-36. W

Drift measured at signal frequency

PART I.

% Drift	Freq.	Date	Band	Outside Temp.	Coil temp variat. (to this point)			Time for temp. to come to -15°C HRS.-MIN.
+0.362	1,800	4-30-36	1	-15.0°C.	—	Old type thermostat mounted back of tube; 42 W. heaters mounted on condenser and along tube.	A	2-0'
+0.155%	2,000	5-11-36	1	-7.8°C.	6.7°C	127° F. new type thermostat; 42 watts of heater. Thermostat moved away from heaters to back of chamber.	B	1-15'
+0.240%	2,000	5-12-36	1	-12.8°C.	10°C.	109° F. new type thermostat; 42 watts of heater	C	2-0'
+0.300%	2,003	5-12-36	1	-15.6°	11.7°C	109° F thermo. Condenser gear clamped at R-F section	D	2-10'
+0.280%	2,005	5-13-36	1	-5.6°C	8.0°C.	109° F. thermo. heaters moved away from condenser and placed in front of metal reflecting plate.	E	1-25'
+0.124%	2,008	5-13-36	1	-15.0°C.	6.7°C.	109° F. thermo. Condenser coupling loosened; condenser loosened from four supports.	F	2-0'

PART II.

Drift measured at oscillator frequency

+.186%	2,474	5-15-36	1	-15.0°C	10.0°C.	Same as above except condenser fastened to base.	H	2-10'
+.165%	2,468	5-18-36	1	-15.0°C	5.0°C.	127° F. thermo. Oscillator coupling removed.	I	2-15'
+.130%	2,520	5-19-36	1	-15.0°C	9.4°C.	127° F. thermo. Mixer lead disconnected at oscillator	J	1-30'
+.090%	2,524	5-19-36	1	-15.0°C.	1.7°C.	Oscillator temperature manually controlled within ± 2°F.	K	2-0'
+.037%	2,526	5-20-36	1	-13.0°C.	1.1°C.	Temp. manually controlled, but set mounted on back.	L	1-55'
+.102%	2,460	5-25-36	1	-4.4°C.	2.2°C.	Set Rewired - double thermostatic control; 42 watts heat. 2-12 ohms on 127°F. 1-12 ohms on 136°	M	1-5'
+.130%	2,461	5-26-36	1	-13.3°C.	6.1°C.	Air condenser and ½ W. leak substituted for grid-leak & condenser.	N	2-0'
+.123%	2,460	5-26-36	1	-14.4°C.	4.4°C.	3rd. heater moved from condenser to side wall	O	1-50'
+.110%	2,401	5-29-36	1	-11.7°C.	6.1°C.	Double thermo. control on 109° F. - 2 heaters; 111° F. - 2 heaters; 56 watts of heater (heat elements up)	P	1-45'
+.074%	2,400	5-29-36	1	-15.0°C.	1.7°C.	Position of thermo. facing down (heat elements down)	Q	1-50'
+.177%	2,400	6-2-36	1	-15.0°C.	4.4°C.	Set in final operating condition (EVERYTHING CONNECTED) controls and heaters as above.	R	2-15'
+.199%	2,400	6-4-36	1	-15.0°C.	4.4°C.	Spencer Disk thermostat; 42 watts of heater.	S	2-0'