SHEET 1 OF 7

TMC SPECIFICATION NO. S [redacted]

TITLE:

AFC-2A, 3 & AFC-7, 8 TEST PROCEDURE

DATE 5-10-62	TMC SPECIFICATION NO. S 579	
SHEET 2 OF 7		
J. Stein COMPILED / CHECKED	TITLE: AFC-2A, 3 & AFC-7 TEST PROCEDURE AND AFC-8	
APPROVED		

I TEST EQUIPMENT REQUIRED:

A. Standard Signal Generator, Measurements Model 82.
B. VTVM, Hewlett Packard 410B.
C. Frequency Counter, Hewlett Packard Model 524C.
D. Variable bias supply.
E. Regulated power supply Lamda Electronics Model 25 or SBS Power Supply or equivalent.

II PROCEDURE:

NOTE: For AFC-7, all 250KC freq's will be 205KC, all voltage levels and tolerances remain the same.

A. Power Distribution:

1. Disconnect power cable from J5001.
2. Make the following continuity check to ground from the circuit board at the rear of the unit.
   a. L5020 approximately 10K.
   b. L5021 approximately 300K.
   c. L5022 open.
   d. L5023 open.
   e. L5024 ½ ohm.
   f. L5025 ½ ohm.
3. Connect power cable to J5001.
4. Make the following voltage checks from the circuit board.
   a. D.C. voltage - L5020 to ground: +200V.
   b. D.C. voltage - L5021 to ground: -105V.
   c. A.C. voltage - L5022 to L5023: 110V A.C.
   d. A.C. voltage - L5025 to ground: 6.3V A.C.

B. Carrier Amplifier:

1. Controls:
   a. Carrier Selector to "RCC"
   b. Sensitivity to Maximum
   c. Threshold, R5020, fully counter-clockwise
2. Connect signal generator to J5000 & adjust for .3 V at 250KC ±5 CPS
3. Terminate J5002 with 50 ohm load.
4. Connect A.C. VTVM to pin 1 of V5001.
5. Adjust L5030 for maximum indication of VTVM.
6. Connect A.C. VTVM to pin 1 of V5002.
7. Adjust L5031 for maximum indication of VTVM.
8. Adjust signal gen rator to 3000 micro-volts at 250KC ±5 CPS
9. Connect A.C. VTVM to J5002.
10. Adjust thr shold R5020 until VTVM r ads 1.0V.
11. Connect (-) D.C. VTVM to pin 1 of V5001.

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12. VTVM should read -5 volts ±1.5 volt.
13. Check "LEVEL" meter, it should now read in the green scale.
14. Increase signal generator to 30K micro-volts.
15. VTVM should now read between -6V and -9V (record) at pin 1 of V5001.
16. Reduce signal generator until the "FADE" relay and light operates. The LEVEL meter should read in the red scale. The signal level should be 100μv or less (record).
17. Remove VTVM and signal generator.

This completes the alignment of the Carrier Amplifier.

C. Low Frequency Oscillator:

This test is to be done prior to final assembly of 250KC oscillator. Plug oscillator into tested AFC. Carrier selector switch in oscillator position.

1. No signal in.
2. Plug P5006 into J5006. Connect counter to J5002.
3. Connect bias supply to positive side of C5077
4. Turn on B+.
5. Adjust bias until counter reads 250KC ± 1cps. Increase bias by 1 volt. Frequency should decrease by 40±10 cps. Return to 250KC point. Decrease bias by 1 volt. Frequency should increase by 40±10 cps. Return to 250KC point. Record frequencies.
6. Connect AC VTVM to J5002. Meter should read approximat ly 1 volt.
7. Connect DC VTVM to R5115. Meter should read approximat ly 2 volts.
8. This completes pre-testing of the oscillator

D. Low Frequency Amp Test:

1. Controls: Carrier selector in oscillator position. No signal in. Reset switch shorted.
2. Ground AGC at R5115. Turn on B+.
3. Connect AC VTVM to pin 1 of V5004. Tune L5033 for maximum indication.
4. Connect AC VTVM to pin 1 of V5003. Tune L5032 for maximum indication.
5. Remove AGC ground. Tune T5001 for minimum indication.
6. Connect AC VTVM to J5002. VTVM should read between 1 and 1.3 volts. (record)

NOTE: FOR FOLLOWING PROCEDURES THE OVEN MUST CYCLE FOR AT LEAST ONE HOUR.

7. Connect fr qu ncy count r to J5002. Tun L5008 to 250KC ± 1 cps.

8. Connect DC VTVM between wiper arm of R5031 and terminal 2 of T5003. Adjust R5031 for 0 VDC.
9. Connect DC VTVM to terminal 2 of T5003. Should read approximately 2.7 volts. (Record)
10. Connect AC VTVM to terminal 3 of T5003. Should read 2.5-3 Volts. (Record)
11. Adjust R5064 for equal DC voltage on pin 6 of V5007 and pin 6 of V5008, approximately 130 volts.
12. Adjust R5074 until Drift Meter reads zero at center scale.
13. Remove short from reset button. Inject 250KC at 100 microvolts from signal generator at J5000. Connect counter to J5002.
14. Vary frequency of signal generator by (40 ± 10cps) above and below 250KC. Oscillator should follow at J5002.

E. High Frequency Oscillator:
This test to be performed prior to final assembly of oscillator. Connect oscillator to tested AFC unit. **(Note: Output Frequency of** AFC-2A, 7 is 705.kc. **Output Frequency of AFC-3 is 2 mc. Proper plug in coils must be used.)** Output frequency of AFC-8 is 350KC.

1. No signal in.
2. Turn on B+. Connect counter to J5003.
3. Press reset button and adjust tuning knob for center frequency. Release reset button.
4. Connect bias supply to positive side of C5077.
5. Adjust bias until counter reads center frequency (i.e. 705KC ± 100 CPS for AFC-2A and 2MC ± 100 CPS for AFC-3). Increase bias by 1 volt. Frequency should increase 1000 cycles to 1600 cps. At this point the drift meter should swing to 1/2 the yellow scale. Return to center frequency. Decrease bias by 1 volt. Frequency should decrease 1000 cycles to 1600 cps. At this point the drift meter should swing to 1/2 the yellow scale. The drift alarm should light. Return to center frequency. Record frequencies.
6. Connect AC VTVM to J5003. The meter should read approximately 1 volt.
7. Connect DC VTVM to junction of L5037 and R5096. The meter should indicate approximately 2 volts. Disconnect bias supply.
8. This completes pre-testing of oscillator.

F. High Frequency Amp Test:

1. No signal in. Reset switch shorted.
2. Ground AGC at junction of L5037 and C5091. Turn on B+.
3. Connect AC VTVM to pin 1 of V5010. Tune Z5002 for maximum indication on the VTVM.
4. Connect AC VTVM to pin 1 of V5009. Tune Z5001 for maximum indication on the VTVM.
5. Remove AGC ground. Tune Z5003 for minimum indication on the VTVM.
6. Connect AC VTVM to J5003. VTVM should read 1 Volt, ± 10 %. Record

NOTE: FOR THE FOLLOWING STEPS OVEN SHOULD CYCLE FOR AT LEAST ONE HOUR.

7. Connect frequency counter to J5003. Short reset switch. Adjust tuning cap-

acitor C509 for lowest frequency. (Knob on front panel labeled TUNING.) Loosen coupling of tuning shaft and adjust tuning pointer to +3 on front panel. Retighten shaft coupling.

8. Adjust TUNING to zero. Adjust L5029 for center frequency.
9. Turn tuning to ±3 positions.
   Counter should vary at least ±3 kc.
10. Remove short from Reset Switch. Connect variable battery supply with (+) side to Reset Switch and (-) to chassis.
11. Adjust battery voltage for center frequency.
12. Vary supply by input (+) and (-). Frequency should vary like to 1.6 kc (+) and (-).

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APPROVED		

TEST DATA SHEET

III.	B15	AGC voltage at pin 1 of V5002	_____	-6 TO -9v
	B16	Fade threshold indication	_____	100μvor less
	C5	Frequency at J5002	_____	250KC-10 cps
			_____	250KC-13 cps
			_____	
	C5	Frequency at J5002 for increase in bias of 1 volt	_____	250KC-40 ± 10 cps
	C5	Frequency at J5002 for decrease in bias of 1 volt	_____	250KC +40 ± 10 cps
	D6	250KC voltage at J5002 200KC for AFC-7	_____	1 to 1.3 ± 10%
	D9	DC voltage at terminal 2 of T5002	_____	2.7 VOLTS
	D10	AC voltage at terminal 3 of T5003	_____	2.5-3 VOLTS
	E4	Frequency at J5003	_____	CENTER FREQ.
	E4	Frequency at J5003 for increase in bias of 1 volt	_____	CENTER FREQ.+1KC -1.6 kc
	E4	Frequency at J5003 for decrease in bias of 1 volt	_____	CENTER FREQ.-1KC -1.6 kc
	F6	AC voltage at J5003	_____	1 VOLT ± 10%

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J. Ste n COMPILED / CHECKED	TITLE: AFC-2A, 3, & AFC-7 TEST PROCEDURE AND AFC-8	
APPROVED		

	ACCEPT
Tuning Control	
Drift Meter	
Level Meter	
Threshold	
Sensitivity	
Tade Alarm	
Drift Alarm	
Phase Detector Balance	
Sensitivity Control	

MFG. NO. _____

SERIAL NO. _____

DATE OF TEST _____

TESTED BY _____

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MODEL AFC-2A, AFC-3, AFC-7 PROJECT NO. _____

DATE	REV.	PAGE	EMN #	DESCRIPTION	CHK.	APP.
7/23/62	A	1	6980	On Test Equip. Req'd, Sect. on letter E add, SBS Power Supply or.		
				On Carrier Ampl. Sect., delete No's. 2,3,4		
				Renumber whole section		
				On new No. 2, add, and adjust for .3V at 250KC ±5CPS.		
				On new No. 8, add at 250KC ±5CPS.		
		2		On Low Freq. Osc. Sect., add, Plug oscillator into tested AFC		
				On No. 3, Chg. Reset switch to positive side of C5077		
				On No. 5 add, record frequencies		
				Add No. 8, This completes pre-testing of the Osc.		
		3		On Low Freq. Osc. Sect., on No. 8, Chg. Sym. from K5031 to R5031		
				On No. 13, add at J5000		
				On No. 14, add at J5002		
				On High Freq. Osc. Sect. completely revise and renumber		
				On High Freq. Amp Test Sect., on No. 4, Chg. Sym. from V5007 to V5009		
				On No. 6, add, Record		
				On No. 7, insert sectence [illegible], Short Reset Switch		
				On No. 8, Dele. Record		
				On No. 9, Dele. Short Reset Switch & add ± to 3KC		
		5&6		Add sheets 5 & 6, Test Data Sheet		
		all pages		Renumber Spec.		
8/21/62	B	1	7126	**Section B, No. 8 - chgd "100 microvolts" to "300 microvolts"**		
		2		**Section B, No. 14 - chgd "3 K" to "10 K"**		
		3		**Section E - added Note**		
		4		**Items 10, 11 rewritten and added Item 12**		
1/16/63	C	1	8041	On line (B8), Chg. 300 micro-volts to 3000 micro-volts		
		2		On line (B12), Chg. "Approx. 0 volts" to "-5 volts +1.5 volts" & Dele. "(not more negative than 1.0 volt)"		
				On line (B13) Chg. end of sentence from "approximately, etc." to "in the green scale."		
				On line (B14), Chg. "10K" to "30K"		
				On line (B15), Chg. from "-7V" to "-9V"		

REVISION SHEET

THE TECHNICAL MATERIEL CORP.
MAMARONECK NEW YORK

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LIST NO.

DATE	REV.	SHEET	EMN #	DESCRIPTION	APP.
1/16/63	C	2	8041	On line (B16), completely revise.	16
		5		Add B16. fade threshold indication 100 uv or less.	
4/8/63	D	2	8765	On Sect. "C", Item 5, Chg. wording from: "At least 50 cps."	16
				to: "40±10"	
6-28-63	E		9456	Sheet 5. Chgd per EMN	16
11/27/63	F	----	10512	Revised Sheets 3,4,5 per EMN.	16
4/23/64	G	5	11283	Revised SHt. 5 per EMN	16
10/22/65	H	ALL	15049	Revised per EMN	2.9.
12/30/65	J	all	15473	Revised per EMN.	2.8.