

DATE 1-4-61
SH. 1 OF 12
COMPILED BY

TMC SPECIFICATION NO. S-533

TITLE:

JOB C

APPROVED RR

TEST PROCEDURE FOR MODEL RFD-1, RFD-1A, and RFD-1B

DATE 1-4-61
SH. 2 OF 12
COMPILED BY

TMC SPECIFICATION NO. S -533

TITLE: TEST PROCEDURE FOR MODEL RFD -1A & 1B

JOB C

APPROVED RK

1. INTRODUCTION:

- A. The TMC Model RFD-1A is a conservatively rated multi band general purpose transmitter providing 1000 watts PEP over the frequency range of 2-32 Mc.
- B. The RFD-1A uses a TV-100 (PL8295/PL172) tube as power amplifier. Operated Class AB for linear operation. It is coupled to a pi network providing an unbalanced output of 50 Ω to 600 Ω . This stage is neutralized to provide stable operation throughout complete frequency range.
- C. The TV-100 is preceded by two Class A amplifier stages. A 6146 is used to provide drive for TV-100. This stage is also neutralized for stable operation.
- D. The first amplifier is a 5763 tube, its grid is terminated into a low impedance input jack (J201) 70 Ω .
- E. Feedback is used internally from TV-100 to cathode of 6146 to decrease 3rd order distortion by another -10 db.
- F. An effective ALDC (Automatic Load and Drive Control) system has been included to limit high drive peaks or load changes.
- G. The amplifier stages are divided into five bands:
 - Band I 2-4
 - Band II 4-8
 - Band III 8-16
 - Band IV 16-22
 - Band V 22-32
- H. The pi tank is divided into nine bands:

Band I	2.0-2.5	Band VI	8-12
Band II	2.5-3	Band VII	12-16
Band III	3-4	Band VIII	16-22
Band IV	4-6	Band IX	22-32
Band V	6-8		

DATE 1-26-62
SHEET 3 OF 12

TMC SPECIFICATION NO. S 533

C

COMPILED

CHECKED

TITLE: TEST PROCEDURE FOR MODEL RFD-1A & 1B

APPROVED

TEST EQUIPMENT REQUIRED:

1. Measurements Corp. Model 82 RF Signal Generator.
2. TMC model SBE-2 or SBE-3.
3. Vacuum Tube Voltmeter (Hewlett Packard 410 or equivalent).
4. TMC model PTE-3.
5. 52 ohm dummy load.
6. TMC model VOX-5.
7. TMC Model P.S.-4A.
8. TMC Model P.S.-5.

PRELIMINARY TEST:

1. Inspect entire unit for bad solder connections and loose hardware.
2. Check counters and see that variable capacitors are fully meshed, when counter indicates 000.
3. Check entire unit for mechanical imperfections.
4. Check entire unit for electrical imperfections.
5. Take continuity measurements between ground and various high voltage B+ points to insure there are no shorts to ground. Remove TV-100 from its socket.
6. Turn on A.C. switch and observe direction of blower rotation. Air should blow through TV-100 socket.
7. Measure A.C. filament voltage at TV-100 socket. Voltage should be 6VAC + 5%.
8. Turn internal voltmeter switch to "PA BIAS" position and adjust bias control (R703) in PS-4A for - 100 volt indication. Recheck this voltage at TV-100 socket with VTVM to insure application of bias directly to TV-100 tube.
9. Shut off A.C. power and reinsert TV-100 tube in its socket.
10. Turn A.C. power "on" and set the TRANSMITTER VOLTAGES switch and FINAL VOLTAGES switch on P.S.-4A to "ON".
11. After the required 3 min. time delay, adjust PA plate current for 220MA. By adjusting R703 in the P.S.-4A.
12. Set FINAL VOLTAGE switch on P.S.-4A to OFF.
13. Connect RF signal generator to input jack J201.

DATE 1-4-61
SH. 4 OF 12
COMPILED BY

TMC SPECIFICATION NO. S-533

TITLE: TEST PROCEDURE FOR MODEL RED -1A & 1B

JOB C

APPROVED *PK*

ALIGNMENT OF R.F. TUNED CIRCUITS:

2-4 Mc BAND:

1. Set RF signal generator to 2.0 megacycles and adjust output for .5 VRF at J201.
2. Set driver band switch (S201) to position #1 (2-4 Mc Band).
3. Adjust trimmer capacitor (C202) to approximately half capacity.
4. Set 1st amplifier tuning capacitor (C203 and 232) to 0.5 on front panel. Turn meter switch (S204) to position 5 (1st amplifier plate) and tune L201 for maximum meter deflection.
5. Turn meter switch (S204) to position 6 (PA grid). Set PA grid tuning capacitor (C231) to number 1 on front panel and tune L219 for maximum meter deflection. Return meter switch to position 5 (1st Ampl. plate).
6. Set RF signal generator to 4.0 megacycles. Set 1st amplifier tuning capacitor to number 9.5 on front panel. Tune C202 for peak indication. Turn meter switch to position 6 (PA grid) and tune PA grid tuning capacitor for maximum meter deflection. Pointer should be at # 9.5 on front panel.
7. If this is not true, low end of band (2.0 Mc) must be returned after adding or removing capacity from C231 or C203 and C232 by changing initial setting on front panel.

8. Proper meter readings at 2.0 megacycles

1st AMPLIFIER Ep	4V
PA GRID Eg	40V

Proper meter readings at 4.0 megacycles

E INPUT	
1st AMPLIFIER Ep	5V
PA GRID Eg	66V

DATE 1-4-61
SH. 5 OF 12
COMPILED BY

TMC SPECIFICATION NO. S-533

TITLE: TEST PROCEDURE FOR MODEL RFD-1A & 1B

JOB C

APPROVED RK

4-8 Mc BAND:

1. Set 6146 (V202) neutralizing capacitor (C229) to approximately 1/4 capacity.
2. Set driver bandswitch (S201) to position number 2 (4-8 Mc Band).
3. Set 1st Amplifier Tuning Capacitor pointer to 0.5 on front panel. Set PA grid tuning capacitor to 0.5 on front panel. Turn meter switch to position 5 (1st Amplifier plate) and tune L202 for maximum meter deflection.
4. Turn meter switch to position 6 (PA grid) and tune L220 for maximum deflection.
5. Set RF signal generator to 8.0 megacycles. Tune 1st amplifier tuning capacitor to high end of band. Tune to peak and note pointer. Pointer should be at approximately number 9.5 on front panel. Tune PA grid tuning capacitor to peak indication. This pointer should also point to number 9.5 on front panel. If one or both pointers do not point to number 9.5, the low end (4.0 Mc) will have to be RETUNED after either increasing or decreasing the capacity of the 1st amplifier tuning capacitor. Retuning consists of peaking L202 and L220. Check high end of band again.
6. Proper meter readings at 4.0 megacycles

E INPUT	
1st AMPLIFIER Ep	6.2
PA GRID Eg	50V

Proper meter readings at 8.0 megacycles

E INPUT	
1st AMPLIFIER Ep	12.3V
PA GRID Eg	135V

DATE 1-4-61
SH. 6 OF 12
COMPILED BY

TMC SPECIFICATION NO. S-533

TITLE: TEST PROCEDURE FOR MODEL RFD-1A & 1B

JOB C

APPROVED *RK*

8-16 Mc BAND:

1. Set driver band switch (S201) to position number 3 (8-16 Mc Band).
2. Set 1st amplifier tuning capacitor pointer to 0.5 on front panel.
Turn meter switch to position 5 (1st amplifier plate) and tune L209 for maximum meter deflection.
3. Set PA grid tuning capacitor to 0.5 on front panel. Turn meter switch to position 6 (PA grid) and tune L223 for maximum deflection.
4. Set RF signal generator to 16.0 megacycles. Tune 1st amplifier tuning capacitor to peak at high end of band. Pointer should be at approximately 8 on front panel.
5. Tune PA Grid Tuning Capacitor to peak indication. Pointer should be at approximately 8 on front panel. If pointers do not point to 8, the low end (8.0 Mc) of the band will have to be retuned after either increasing or decreasing the capacity of the 1st amplifier tuning capacitor. Retuning consists of peaking L209 and L223. Check high end of band again and if not yet satisfactory repeat compensation process until band is tracking properly.
6. Proper meter readings at 8.0 megacycles

E INPUT	
1st AMPLIFIER Ep	4.5
PA GRID Eg	24

Proper meter readings at 16.0 megacycles

E INPUT	
1st AMPLIFIER Ep	10V
PA GRID Eg	54V

DATE 1-4-61
SH 7 OF 12
COMPILED BY

TMC SPECIFICATION NO. S-533

TITLE: TEST PROCEDURE FOR MODEL RFD-1A & 1B

JOB C

APPROVED RK

16-22 Mc BAND:

1. Set driver band switch to position 4.
2. Set 1st Amplifier Tuning Capacitor pointer to 4 on front panel.
Turn meter switch to position 5 (1st Amplifier plate) and tune L210 for maximum meter deflection.
3. Set PA grid tuning capacitor to 3 on front panel. Turn meter switch to position 6 (PA grid) and tune L224 for maximum deflection.
4. Set RF signal generator to 22.0 megacycles. Tune 1st amplifier tuning capacitor to peak at high end of band. Pointer should be at approximately 8 on front panel.
5. Tune PA grid tuning capacitor to peak indication. Pointer should be at approximately 8 on front panel. If pointers do not point to 8, the low end of the band (16.0 Mc) will have to be retuned after either increasing or decreasing the capacity of the 1st amplifier tuning capacitor. Retuning consists of peaking L210 and L224. Check high end of band again and if not yet satisfactory repeat compensation process until band is tracking properly.
6. Proper meter readings at 16.0 megacycles

E INPUT	
1st AMPLIFIER Ep	5.6V
PA GRID Eg	21V

Proper meter readings at 22.0 megacycles

E INPUT	
1st AMPLIFIER Ep	7V
PA GRID Eg	40V

DATE 1-4-61
SH. 8 OF 12
COMPILED BY

TMC SPECIFICATION NO. S-533

TITLE: TEST PROCEDURE FOR MODEL RFD-1A & 1B

JOB C

APPROVED *RK*

22-32 Mc BAND:

1. Set driver band switch to position 5.
2. Set 1st Amplifier Tuning Capacitor pointer to $\frac{3}{4}$ on front panel.
Turn meter switch to position 5 (1st Amplifier plate) and tune L211 for maximum deflection.
3. Set PA grid tuning capacitor to 2 on front panel.
Turn meter switch to position 6 (PA grid) and tune L225 for maximum deflection.
4. Set RF signal generator to 32.0 megacycles. Tune 1st amplifier tuning capacitor to peak at high end of band. Pointer should be approximately 8 on front panel.
5. Tune PA grid tuning capacitor to peak indication. Pointer should be approximately 8 on front panel. If pointers do not point to 8, the low end of the band (22.0 Mc) will have to be retuned after either increasing or decreasing the capacity of the 1st amplifier tuning capacitor. Retuning consists of peaking L211 and L225. Check high end of band again and if not yet satisfactory repeat compensation process until band is tracking properly.
6. Proper meter readings at 22.0 megacycles

E INPUT	
1st AMPLIFIER Ep	4V
PA GRID Eg	13V

Proper meter readings at 32.0 megacycles

E INPUT	
1st AMPLIFIER Ep	4V
PA GRID Eg	10V

DATE 1-26-62

SHEET 9 OF 12

TMC SPECIFICATION NO. S 533

C

R.K.
COMPILEDRK
CHECKED

TITLE:

TEST PROCEDURE FOR MODEL RFD-1A & 1B

Ron Koh
APPROVED

PART-3.

PA NEUTRALIZATION

1. Connect the 52ohm dummy load to J203 on the RFD-1A.
2. Set the ALDC switch S209, located on the rear plate of the RFD-1A, to the EXT position.
3. Connect the HP410 VTVM across the PA tank circuit.
4. With the FINAL VOLTAGES switch in the OFF position, tune the first and second amplifiers at 8MC.
5. Adjust PA NEUTRALIZING capacitor C255 for a minimum reading on the VTVM. Remove the VTVM.
6. Reduce drive signal to zero.
7. Set FINAL VOLTAGES switch on the P.S.-4A to the ON position.
8. Tune the RFD-1A at 8MC, maintaining about 350MA PA plate current at resonance. Reduce drive to zero.
9. Set the FINAL VOLTAGES switch to OFF.
10. Re-connect the VTVM across the PA tank circuit.
11. Increase drive and readjust C255 for a minimum reading on the VTVM.
12. Repeat steps 3 through 11 at 30MC. If the settings of C255 differ, a compromise setting must be used to maintain low VTVM readings at both 8MC and 30MC. If take-off is experienced at any of the frequencies covered in PART 4, the PA should be neutralized at that frequency.

PART-4

RFD-1A POWER OUTPUT AND DISTORTION

1. Place the VTVM across the dummy load.
2. Tune the RFD-1A for 1KW, CW, at the alignment frequencies noted in PART-2. 1KW, CW, is 225V RMS as read on the HP410 VTVM across the 52 ohm load.
3. Shut the transmitter down and remove the signal generator.
4. Connect the output of the SBE to the RFD-1A input.
5. Connect the PTE signal input jack to the MONITOR jack on the dummy load. See Fig. 1 for test set-up.
6. Using the VOX-5 as the VFO for the SBE, tune the RFD-1A for 1KW, PEP, at the alignment frequencies noted in PART-2. 1KW, PEP, is 225V RMS as read on the HP410 meter. Using the spectrum analyzer on the PTE-3, check for third and fifth order distortion. Distortion should be less than -40db at frequencies below 22 MC and less than -35DB from 22 MC to 32MC. Spurious outputs can be checked by varying the PTE oscillator frequency.
7. Set ALDC switch S209 on the RFD-1A to the INT. position.

DATE <u>1-26-62</u>		TMC SPECIFICATION NO. S 533	C
SHEET <u>10</u> OF <u>12</u>			
R.K. COMPILED	<i>RK</i> CHECKED	TITLE: TEST PROCEDURE FOR MODEL RFD-1A & 1B	
<i>Ron Koh</i> APPROVED			

8. Rotate ALDC knob on the front panel of the RFD-1A. The output of the unit should decrease above ~~some~~ setting of this knob and an increase in drive should cause little increase in output beyond this point. Reduce drive to zero.
9. Set the FINAL VOLTAGES switch on the P.S.-4A to OFF.
10. With the VTVM set to measure + D.C. voltage, place the VTVM between the arm of R201 on the RFD-1A and ground. Adjust the ALDC knob on the front panel for a maximum positive reading.
11. Shut down the transmitter and remove all test equipment and power supplies. This completes testing of TMC model RFD-1A.

DATE 11/4/63

SHEET 11 OF 12

TMC SPECIFICATION NO. S

Q

RK
COMPILED

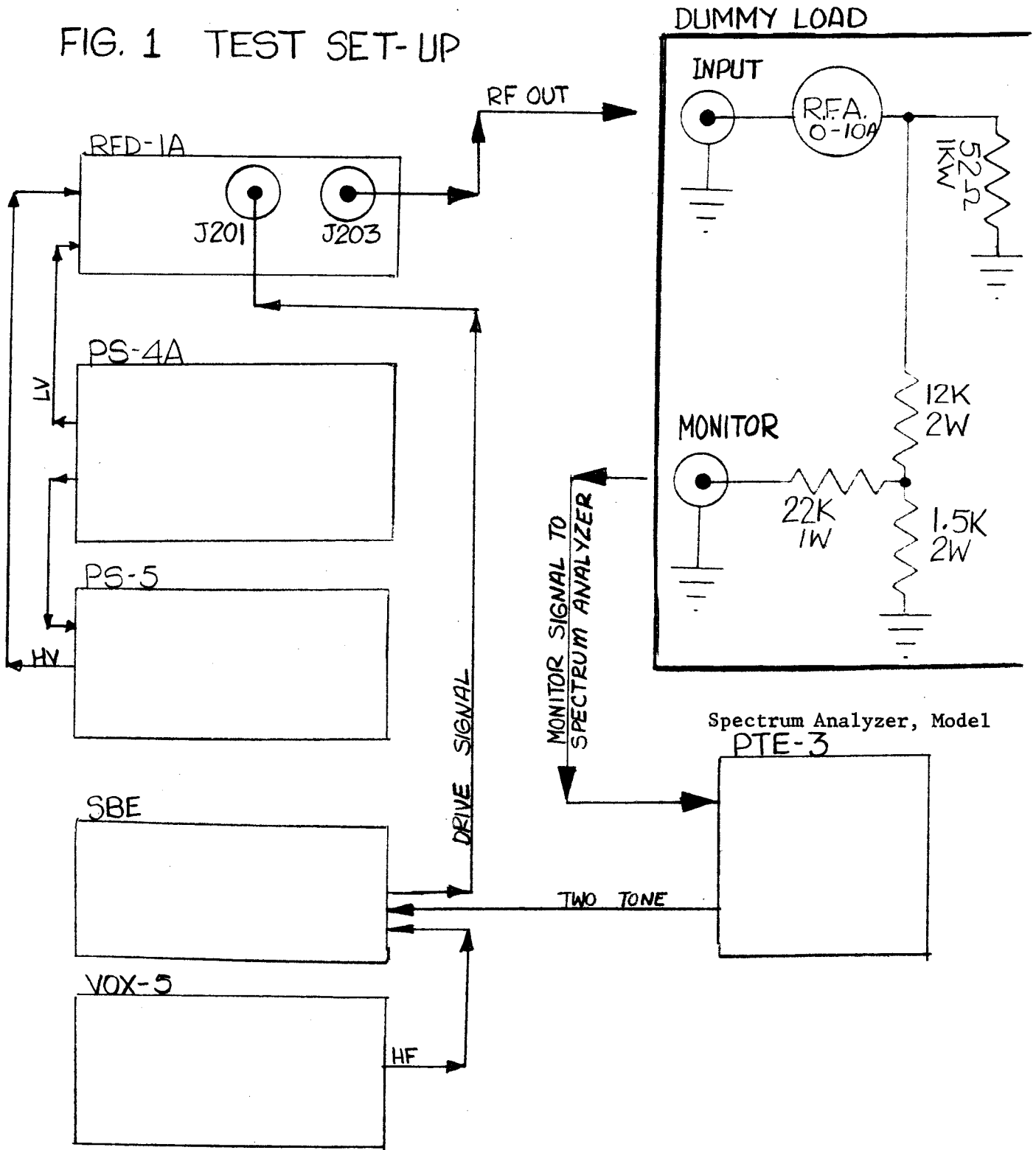
RK
CHECKED

TITLE:

TEST PROCEDURE FOR MODEL RFD-1A & 1B

Ron Kohn
APPROVED

FIG. 1 TEST SET-UP



DATE 1-4-61
SH. 12 OF 12
COMPILED BY

TMC SPECIFICATION NO. S-533

TITLE: TEST PROCEDURE FOR MODEL RFD-1A & 1B

JOB C

APPROVED *PK*

TEST REPORT SHEET

PART 1 POWER AMPLIFIER WIRING

ACCEPT

TEST A: General Inspection
TEST B: Continuity Test
TEST C: Safety Switch
TEST D: Filaments & Blower

PART 2 RFD-1A ALIGNMENT

TEST A: General Inspection
TEST B: Alignment of Knobs
TEST C: Alignment of 1st & Second Amplifier

PART 3 RFD-1A NEUTRALIZATION

TEST A: Neutralizing P.A.

PART 4 RFD-1A OUTPUT

TEST A: **IKW, CW**, All Test Frequencies
TEST B: **IKW, PEP**, All Test Frequencies
TEST C: Distortion (2 tone 40 db or better
2 to 22 MC; 35db 22 to 32 MC)
TEST D: ALDC Operation

Serial Number _____

Date _____

Accepted _____

Tested By _____

