DATE 20 July 1964 SHEET 1 OF 12	TMC SPECIFICATION NO. S-836	0
RDV COMPILED / Led CHECKED	TITLE: TEST PROCEDURE SMR-1	
APPROVED RDL		

TEST PROCEDURE

SMR-1

OGILVIE PRESS, INC., BROOKLYN 17, N. Y. STOCK NO. 430M

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A. EQUIPMENT REQUIRED

1. VOM Simpson Model 260 or equivalent.
2. Audio Signal Generator - HP 200.
3. 4 ohm Loudspeaker.
4. HP 410 VTVM.
5. HP 606A RF Signal Generator.
6. TMC Model PTE-3 Spectrum Analyzer.
7. A two-tone RF signal source. TMC models TTG, VOX, SBE-2 or SBE-3.
8. Ballantine Model 314 a-c VTVM.
9. Schematic CK- 770
10. Step Attenuator, 50 ohms, TELONIC Mod. TG 950 or equivalent.
11. 600 ohms resistor - 1 watt.
12. Frequency Counter - HP 524C.
13. BNC "T" adapter UG-274A/U.
14. Sonic Analyzer - LP-1A.
15. AX-436 Extension Module.
16. Test Procedure S-808
17. One pair of ear phones (600 ohms).

B. WARNING

This unit is a Solid State device. Any indiscriminate resistance measurement may harm this unit. Make resistance measurements only where and when so indicated.

C. PRELIMINARY

1. All RF modules should be pretested per TMC S-808 before being installed into this unit.

2. Inspect the unit for mechanical imperfections such as loose screws, printed circuit boards, cold solder joints etc.

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3. With the ohmmeter d-c setting in the + position, measure 130 ohms ±10% from Pin #11 on the AF Board to GND. With the ohmmeter d-c setting in the minus (-) position, measure 200 ohms ±10% from Pin #14 on the AF Board to GND.

4. Set oven switch S902 to EXTERNAL.

5. Short pins #10 and #9 on the RF board temporarily, and measure approximately 15Ω across oven input J905.

6. Set oven switch to internal and measure infinite resistance (open) across the oven input J905. Remove the short from Pin #10 and Pin #9.

D. POWER

1. Set the power switch S901 to OFF, function switch S1514 to Simplex, channel switch S1515 to channel #1 and oven switch to internal.

2. Connect the unit to an a-c outlet.

3. Set the power switch to ON. The white light should go on.

4. With the HP-VTVM measure +12 V±5% from Pin #11 on the audio board to GND, and -12 V±5% from Pin #14 on the audio board to GND.

5. Connect the a-c Ballantine between Pin #11 on the AF board and GND. The a-c noise measured should not exceed 1 MV.

6. Repeat Step #5 for Pin #14 on the audio board.

7. Connect the VTVM between Pin #7 on the IF board and GND, and measure +12V±5% . When Pin #1 and Pin #2 on TB1502 are shorted to each other, the +12V should disappear from Pin #7. When the SIMPLEX-DUPLEX switch is set to DUPLEX, the +12V should reappear on Pin #7. Return the switch back to SIMPLEX, and disconnect the short from Pins #1 and #2.

8. R peat Step #7 for Pin #1 on the RF board.

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9. Connect the VTVM between Pin #8 on the IF board and measure -12V±5%. When Pin #1 and Pin #2 on TB1502 are shorted to each other, the -12V should disappear from Pin #8. When the SIMPLEX-DUPLEX switch is set to DUPLEX, the -12V should reappear. Return the switch to SIMPLEX, and disconnect the short from Pins #1 and #2.

10. Repeat Step #9 for Pin #8 on the RF board.

11. Make sure that the removal of the a-c line fuse, the B+ fuse and the B- fuse will make the respective voltages disappear.

12. Set the oven switch to internal and measure 115 VAC with the Simpson between Pin #10 and Pin #9 on the RF board.

13. Set the oven switch to external. The voltage obtained in Step #12 should disappear. Install the customer specified RF modules into the unit.

E. RECEIVER AUDIO CHECK

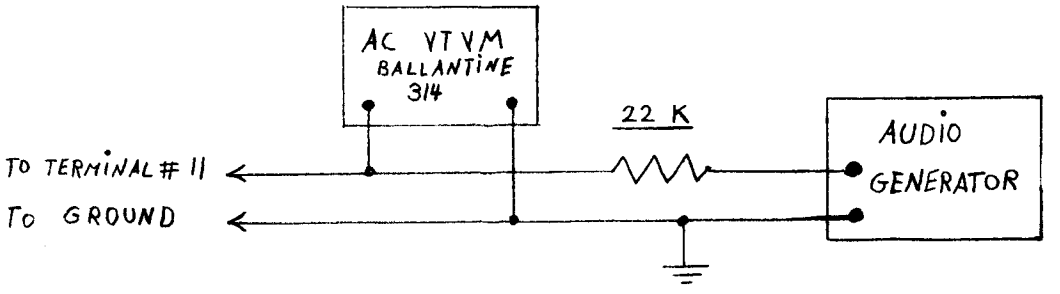
1. Set the VOLUME and LINE control on the front panel maximum clockwise.

2. Set the power switch to the ON position.

3. Set the SQUELCH control maximum clockwise.

4. Connect a 600 ohm 1 watt resistor between terminals 6 and 8 on TB1502, and a 4 ohm loudspeaker between terminals 11 and 12 on TB1502.

5. Set the AUDIO SIGNAL GENERATOR at 1 KC and connect to the RECEIVER IF board as shown below with generator output at zero, and AC VTVM across input to board.



6. Increase the AUDIO GENERATOR output until a 1 kc tone is heard through the speaker. Insert the phones into J1516. The 1 kc tone should disappear from the speaker and should be heard on the phones. Remove phones.

7. Rotate the SQUELCH control maximum counter-clockwise. The tone should abruptly disappear.

8. Set the AUDIO GENERATOR output for a 10 mv reading on the Ballantine A-C VTVM. Remove meter.

9. Connect the Ballantine across terminals 6 and 8 on TB1502. The meter should read approximately 780 mv.

10. Connect the BALLANTINE across terminals 6 and 7 on TB150.2. The meter should read exactly half the voltage obtained in step 10. Remove meter.

11. Connect the BALLANTINE across R1660 on the RCVR AF printed circuit board. The meter should read approximately 1.4 volts. Leave meter connected.

12. Rotate the VOLUME control counter clockwise. The voltage across R1660 should drop proportionately with rotation of the VOLUME control knob. Reset the VOLUME control maximum clockwise and remove the BALLANTINE AC VTVM.

F. RECEIVER IF ALIGNMENT

1. Connect the frequency counter to the arm of potentiometer R1663 on the RCVR IF printed circuit card. The arm of R1663 is accessible through the rear of the printed circuit assembly. The counter should register a frequency of 250KC±50cps. Remove counter.

2. Set the RCVR sideband switch to LSB.

3. Connect the counter to emitter lead of Q1602 and adjust C1629 for a frequency of 1.5±2cps as registered on the counter. Leave counter connected.

4. Set the RCVR sideband switch to USB/REMOTE.

5. Adjust C1631 for a frequency of 2.0MC±2cps as registered on the counter. Remove counter.

6. Connect the BALLANTINE AC VTVM between the collector of Q1610 and ground.

7. Adjust R1663 for a minimum (null) reading on the BALLANTINE. (approx. 110MV) Remove meter.

8. Connect the H-P VTVM between terminal 9 on the RCVR IF printed circuit board and ground. The meter should read approximately 1.8 volts DC. Remove meter.

9. Set the RCVR sideband switch to LSB and remove the 1.5MC crystal Y1603.

10. Connect the BALLANTINE between the base of Q1602 and ground.

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11. Connect the HP606A RF GENERATOR between terminals 1 and 2 on the RCVR IF board with the generator's output control at zero.

12. Set potentiometer R1612 on the RCVR IF board maximum counter-clockwise.

13. Set the generator frequency at 1.75MC using the frequency counter and increase the generator output to approximately 1.0MV. The Ballantine should indicate some voltage present at the base of Q1602.

14. Adjust C1602 for a peak indication on the Ballantine meter. Peak reading should be approximately 20 MV.

15. Reduce generator output to zero and remove meter.

16. Replace the 1.5MC crystal, Y1603.

17. Connect the BALLANTINE across terminals 10 and 11 on the RCVR IF board.

18. Set the HP606A RF GENERATOR to 1.75MC + 1KC as indicated on the frequency counter.

19. Check that the SQUELCH control on the front panel is maximum counter clockwise.

20. Increase the SIGNAL GENERATOR output for an indication on the BALLANTINE. Use the 10MV scale on the meter.

21. Adjust C1655 and C1656 for a peak indication on the meter. Do not allow the meter reading to exceed 10MV.

22. Set the SIGNAL GENERATOR output at 260 microvolts and adjust R1612 for a reading of 10MV on the BALLANTINE. Remove meter.

23. Connect the BALLANTINE across terminals 6 and 8 on TB1502. The meter should read .78V with the LINE control maximum clockwise. Readjust R1612 to obtain this reading if necessary.

23 A. Adjust AF METER ADJUST, R1551, to obtain a 0 dbm reading on the meter. Lock R1551. Remove the Ballantine.

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24. Set the VOLUME control maximum counter-clockwise and the SQUELCH control maximum clockwise.

25. Slowly rotate the VOLUME control clockwise. A 1KC note should be heard through the speaker.

26. Remove the SIGNAL GENERATOR input connections.

G. RECEIVER TESTING - OVERALL

1. Set VOLUME control on front panel maximum clockwise.

2. Set SIMPLEX-DUPLEX switch to DUPLEX.

3. Set sideband selectors to USB/REMOTE.

4. Set SQUELCH control maximum clockwise.

5. Set CHANNEL selector to Channel 1.

6. Set power switch to OFF.

7. Set meter switch to AF.

8. The oven voltages utilized in the converter modules should be specified by the customer and stamped on the ovens within the module. If external oven voltage is specified, this voltage should agree with the voltage stamped on the ovens and should be applied through jack J905 from the source. The OVEN VOLTAGE switch on the rear of the power supply section of the SMR-1 should be set to EXT if the above applies. For oven voltages corresponding to the source voltage of the power supply, the OVEN VOLTAGE switch should be set to INT providing the power supply source voltage agrees with the voltage stamped on the ovens within the converter modules.

9. Connect the HP606A to the ANTENNA jack J1502 on the rear of the SMR -1 set at zero output.

10. Set the power switch S901 to the ON position.

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11. Connect the Ballantine VTVM between terminals 12 and 11 on TB1502.

12. Set the signal generator for an output of 100 mv at the operating frequency noted on the reciever converter freqeucny nameplate for channel 1.

13. Tune the signal generator for a beat note (e.g. 1 kc) on the speaker. Reduce signal generator output until beat note just exceeds noise.

NOTE: Some generator retuning may be required as output is reduced.

14. Adjust VOLUME control for a comfortable listening level and obtain reading on the Ballantine VTVM.

15. Adjust receiver converter tuning capacitors A through E, in that order, for peak indication on the Ballantine. Signal generator output should be reduced to maintain signal level just above noise.

16. Adjust signal generator output to 1 mv.

17. Set the Ballantine to the 1 volt full scale position and adjust VOLUME control for a .78V reading. This is the SIGNAL + NOISE level. Adjust USB ADJUST, R1555, for a peak reading & back off slightly. Set Sideband Selector to LSB. Reset the Signal Gen., and adjust LSB ADJUST, R1554, for a peak reading, & back off slightly. Readjust the VOLUME control for a .78V reading.

18. Set meter switch to RF.

19. Adjust RF METER ADJUSTMENT, R1548, to obtain a reading of 0 dbm on the meter. Remove signal generator input connection to ANTENNA jack and connect the 50 ohm dummy load. Read the output now indicated on the Ballantine using the SIGNAL + NOISE level as db reference. The output on the Ballantine is NOISE level in db.

20. The difference between the levels obtained in Steps 11 and 12 is the $\frac{\text{SIGNAL + NOISE}}{\text{NOISE}}$ ratio. This ratio should be not less than 20 db. Record this ratio on the check sheet.

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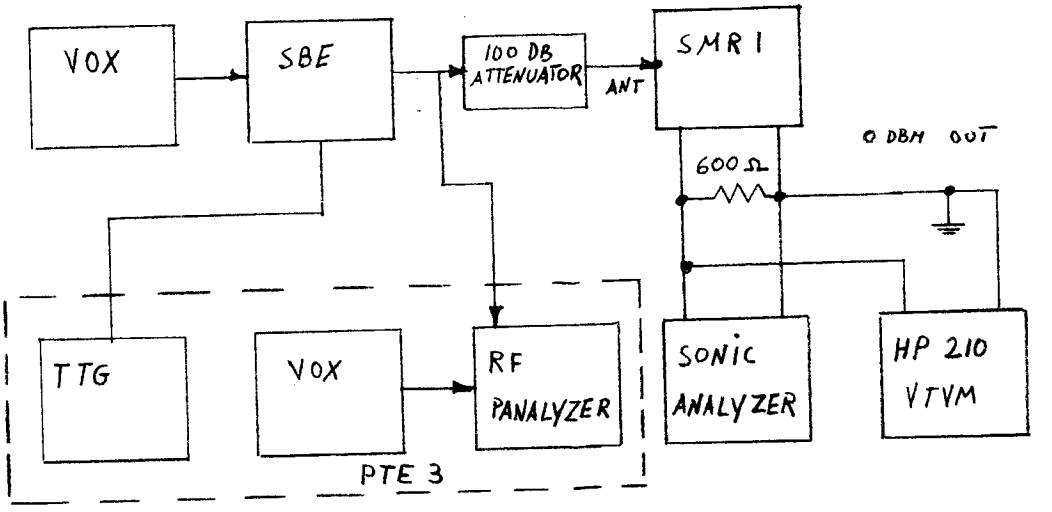
21. Remove the dummy load and reconnect the signal generator and retune if necessary to obtain a beat note. Set output at 1 microvolt.

22. Adjust the VOLUME control to obtain a 0db reading with the Ballantine set on the 1 volt full-scale range.

23. Using the step output attenuator on the signal generator, increase the output 100 db to .1 volts. The Ballantine should show an increase in output not greater than +10 db.

24. Disconnect the signal generator and install additional equipment as shown below:



25. The input 3rd order distortion to the attenuator as part of the SBE output should not be less than 40 db below each tone at .1 volt RMS output. The attenuator setting of 100 db should produce a reading of .78V across terminals 6 and 8 of TB1501. Readjust R1612 on the RCVR IF printed circuit board to obtain .78V if required. Do not readjust R1612 when testing channels that tune to a frequency higher than 4 MC.

26. The distortion shown on the sonic analyzer should be a minimum of 29 db below tone 1.

27. Repeat Steps 1 through 19 for all remaining channels.

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THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, N.Y.

SERIAL NO.:_____

MFG. NO.:_____

Mechanical_____OK

Wiring_____OK

D-C Power_____OK

RECEIVER OVERALL

1 μv into antenna results in _____ mv audio output.

LSB and USB adjust _____OK

$\frac{\text{SIGNAL + NOISE}}{\text{NOISE}}$ _____ - ____DB

AF RF METER adjustment_____OK

Dynamic Range (100 DB) results in DB change in audio output.

3rd Order Distortion - DB

DATE:_____

TESTER:_____

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REVISION SHEET

THE TECHNICAL MATERIEL CORP.
MAMARONECK NEW YORK

S-836
LIST NO.

DATE	REV.	SHEET	EMN #	DESCRIPTION	APP.
3/9/65		1 of 12		O=ORIGINAL RELEASE FOR PRODUCTION.	