

TD-3 MICROWAVE RADIO
J68386A AND J68386B TRANSMITTER-RECEIVER BAYS
TRANSMITTER TESTS
IF RETURN LOSS MEASUREMENTS

This section describes the procedures for measuring the return loss of the various IF units in the transmitter portion of the radio bay.

The preliminary checks in Section 411-402-500 must be completed before performing the tests in this section.

The recommended maintenance interval for these tests is given in the Equipment Test List.

This issue affects the Equipment Test List.

Caution: These tests are performed on an out-of-service basis. Obtain a release from the designated control office and remove the channel from service as directed by local practice.

CHART	PAGE
1—IF limiter	1
2—IF Carrier Resupply	2
3—IF Driver Amplifier and Transmitter Modulator	2

CHART 1
IF LIMITER

APPARATUS:

- 1—J68392A Transmitter-Receiver Test Set

STEP	PROCEDURE
1	Prepare for the return loss test in accordance with Fig. 1.

CHART 1 (Cont)

STEP	PROCEDURE
2	Remove the cable from the IF IN jack of the IF limiter and connect it to a 19A 20-dB pad. Remove the cables from the IF OUT and MON OUT jacks and terminate the jacks with 368A plugs.
3	<p>Measure the return loss at the IF IN jack of the IF limiter.</p> <p>Requirement: 34 dB minimum between 60 and 80 MHz</p> <p>If the requirement is not met, adjust the IN RL1 and IN RL2 controls for the best return loss. If the requirement still is not met, replace the IF limiter with a spare and repeat Steps 2 and 3.</p>
4	<p>Measure the return loss at the IF OUT jack with terminations on the IF IN and MON OUT jacks.</p> <p>Requirement: 29 dB minimum between 60 and 80 MHz</p> <p>If the requirement is not met, adjust the OUT RL1 and OUT RL2 controls for the best return loss. If the requirement still is not met, replace the IF limiter with a spare and repeat Steps 2 through 4.</p>
5	Restore the normal connections to the IF IN, IF OUT, and MON OUT jacks on the IF limiter.

CHART 2

IF CARRIER RESUPPLY

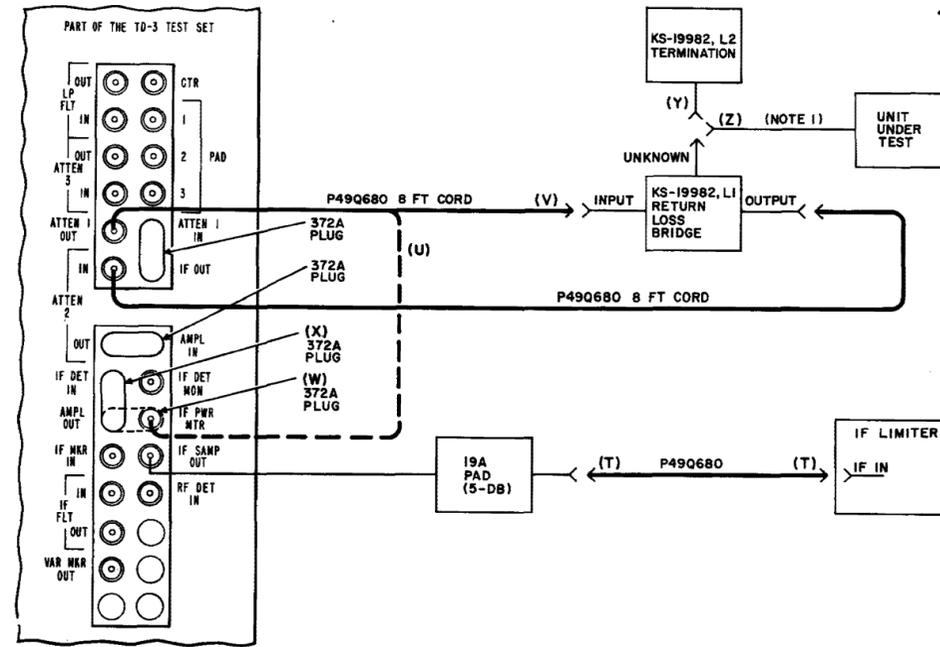
APPARATUS:

1—J68392A Transmitter-Receiver Test Set

STEP	PROCEDURE
1	Remove the normal connection from the IF OUT jack and insert a 368A plug. Connect option (T) in Fig. 1.
2	<p>Measure the return loss at the input of the cable connected to the carrier resupply IF IN jack. (Use the P49Q681 adapter.)</p> <p>Requirement: 34 dB minimum between 60 and 80 MHz</p>

CHART 2 (Cont)	
STEP	PROCEDURE
3	<p>If the requirement is not met, check the return loss at the IF IN jack. If the requirement is now met, replace the connecting cable with a new cable.</p> <p>If the requirement still is not met, remove the IF carrier resupply from the bay and remove the cover on the side nearest the IF jacks. Connect the test set to measure the return loss at the end of the cable which is normally connected to the IF IN jack. Apply power to the IF carrier resupply. Adjust capacitor C42 for the best return loss when the cover is in place.</p> <p>If the requirement still is not met, replace the carrier resupply with a spare unit and repeat Steps 1 and 2.</p> <p>Measure the return loss at the IF OUT jack with the IF IN jack terminated.</p> <p>Requirement: 34 dB minimum between 60 and 80 MHz</p>
4	<p>If the requirement is not met, replace the carrier resupply unit and repeat Steps 1 through 3.</p> <p>Restore the normal connection between the IF IN jack on the carrier resupply and the IF OUT jack on the IF limiter. Remove the option (T) connection from the test set and IF limiter.</p>
CHART 3	
IF DRIVER AMPLIFIER AND TRANSMITTER MODULATOR	
APPARATUS:	
1—J68392A Transmitter-Receiver Test Set	
STEP	PROCEDURE
1	<p>Measure the return loss at the input to the cable normally connected to the IF driver amplifier IF IN jack. (Use the P49Q681 adapter.)</p> <p>Requirement: 34 dB minimum between 60 and 80 MHz</p>

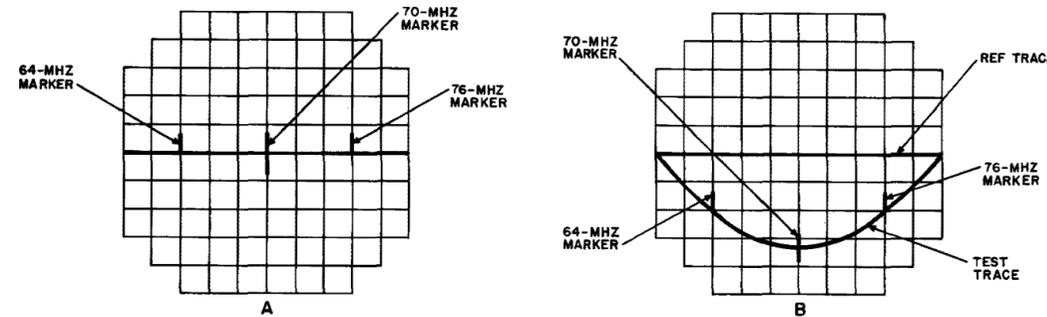
CHART 3 (Cont)	
STEP	PROCEDURE
	If the requirement is not met, adjust RL1 and RL2 for the best return loss. If the requirement still is not met, check the return loss at the IF IN jack. If the requirement is now met, replace the connecting cable with a new one. If the requirement still is not met, replace the IF driver amplifier with a spare (see Section 411-406-503) and repeat Step 1.
2	Restore the normal connections between the IF IN jack on the IF driver amplifier and the IF OUT jack on the carrier resupply.



PREPARATION FOR TEST (FIG. 1)

1. Operate the test set controls to the following positions.

UNIT	CONTROL	POSITION
Control panel	FUNCTION IF MARKER AMPLITUDE AMPL GAIN CTR	IF-IF Midrange Midrange MKR FREQ
Oscilloscope	INTENSITY	Midrange
Time base unit	POSITION MAGNIFIER SWEEP TIME VERNIER SINGLE-NORMAL	Midrange X10 EXT Midrange NORMAL
Differential amplifier unit	POSITION BANDWIDTH AMPLIFIER VERNIER SENSITIVITY AC-DC-OFF (+INPUT) AC-DC-OFF (-INPUT)	Midrange 4 DC Midrange 10 MV/CM DC OFF
Power meter	INPUT CHANNEL POWER RANGE DBM	IF (Note 2) 0



- Set ATTEN 1 to 14 dB and ATTEN 2 to 50 dB.
- Establish test connections using option (U).
- Adjust ATTEN 1 for a power meter indication of -4.0 ± 0.5 dBm.
- Connect options (V) and (W) and set the power meter POWER RANGE DBM switch to -5.
- Adjust the AMPL GAIN control on the control panel to obtain -7 dBm.
- Change option (W) to option (X).
- Adjust the TEST TRACE and REF TRACE controls to center the trace on the oscilloscope.
- Adjust the SWEEP TIME, VERNIER, and POSITION controls on the oscilloscope time base unit for approximately 10 centimeters horizontal deflection.
- Adjust the IF MARKER FREQ control for a 70 ± 0.2 MHz indication on the counter.
- Adjust the IF SWEEP WIDTH and IF CENTER FREQ controls to obtain the oscilloscope display shown in A at left.

Note: An extraneous marker will appear at 89 MHz.

- Adjust the TEST and REF TRACE controls to bring the reference trace into coincidence with the test trace at 70 MHz.
- Increase the attenuation of ATTEN 2 by 1 dB and adjust the SENSITIVITY, VERNIER, and POSITION controls on the oscilloscope differential amplifier for 2 centimeters deflection between traces. Reduce the attenuation of ATTEN 2 by 1 dB. This calibrates the oscilloscope for 0.5 dB per centimeter.

14. Connect option (Y) and set ATTEN 2 to 0.

Requirement: The test trace shall be below the reference trace between 60 and 80 MHz.

Note: It may be necessary to move the traces up on the oscilloscope using the differential amplifier POSITION control to ensure that the test trace is below the reference trace.

15. Disconnect option (Y).

MEASUREMENT PROCEDURE

- Connect option (Z) and adjust ATTEN 2 until the uppermost part of the test trace in B shown at left just touches the reference trace at the desired frequency.
- The magnitude of the return loss is determined by subtracting the ATTEN 2 setting from 50 dB.

Note 1: A back-to-back adapter (P49Q681) is required between the return loss bridge and the unit under test whenever the return loss measurement is made through a connecting cable.

Note 2: With the INPUT CHANNEL switch set to IF, determine that no input is connected; then zero the power meter by setting the POWER RANGE DBM switch to -25 and adjusting the METER ZERO control for an indication of 0 on the meter. Return the POWER RANGE DBM switch to the position shown in Step 1.

Fig. 1—IF Return Loss Measurement