

**TD-3 MICROWAVE RADIO**  
**J68386G AND J68386H TRANSMITTER-RECEIVER BAYS**  
**TRANSMITTER TESTS USING ED-50996-10 PORTABLE TEST EQUIPMENT**  
**IF RETURN LOSS MEASUREMENTS**

This appendix describes the procedures for using the ED-50996-10 Portable Test Arrangement to measure the return loss of various IF units in the transmitter portion of the radio bay.

It is reissued to add a caution to be observed when working on a system equipped with Hot Standby/Space Diversity Switching.

The preliminary checks in Section 411-502-500 should be completed before performing the tests in this appendix.

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

*Caution 1: 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.*

*Caution 2: On Hot Standby/Space Diversity equipped bays, consult Section 411-600-500 for forced switching procedures to remove service from the desired transmitter. Exercise extra caution during tests since the receiver in this bay may be carrying service.*

**CHART A**  
**IF LIMITER-CARRIER RESUPPLY**

**APPARATUS:**

- 1—ED-50996-10 Portable Test Arrangement
- 1—KS-20114, L2 Adjusting Tool

STEP	PROCEDURE
1	When performing the main station transmitter tests, disconnect the cable at the IF IN jack of the IF limiter-carrier resupply and terminate the end of the cable with a 188A adapter and a 20 dB, 19A pad. Also perform this step when testing any transmitter equipped for hot standby operations.

## CHART A (Cont)

STEP	PROCEDURE
	<p><i>Note:</i> Terminating the cable is necessary to prevent reflections that might otherwise impair transmission in the signal (service-carrying) path back at the 100A transmitting IF switch bay (frequency diversity systems) or in the service-carrying transmitter (Hot Standby/Space Diversity Systems).</p>
2	Prepare test set in accordance with Exhibit 1.
3	Connect the P-48N309 cable assembly between test points TP1 and TP5 on the IF limiter-carrier resupply. (This disables the carrier resupply.)
4	Remove the normal connection from the IF OUT jack and insert a 442A plug.
5	Perform preparation for test and check of test setup in Exhibit 2.
6	Measure return loss at the IF IN jack as directed in the measurement procedure in Exhibit 2.
	<i>Requirement:</i> Greater than 30 dB between 60 and 80 MHz.
	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-carrier resupply with a spare unit and repeat Steps 3 through 6.
7	Remove the 442A plug from the IF OUT jack and insert it into the IF IN jack.
8	Measure the return loss at the IF OUT jack.
	<i>Requirement:</i> Greater than 28 dB between 60 and 80 MHz.
	If the requirement is not met, adjust the OUT RL1 and OUT RL2 controls.
	If the requirement still is not met, replace the IF limiter-carrier resupply and repeat Steps 3 through 8.
9	Remove the P-48N309 cable assembly from between TP1 and TP5 and restore normal bay connections.

## CHART B

## IF DRIVER AMPLIFIER

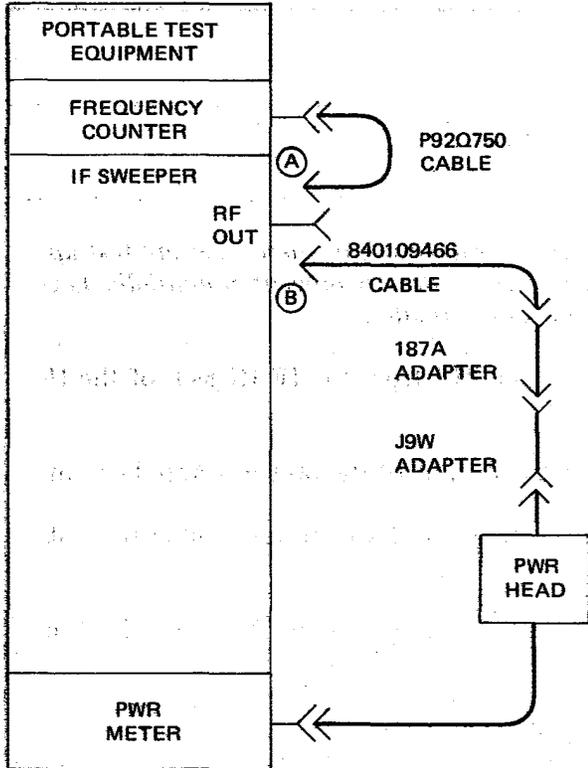
## APPARATUS:

- 1—ED-50996-10 Portable Test Arrangement
- 1—KS-20114, L2 Adjusting Tool

CHART B (Cont)

STEP	PROCEDURE
	<p><i>Caution: Step 1 should always be performed before connecting or disconnecting test apparatus to the output of the 30A integrated circuit in order to prevent potentially hazardous RF power radiating from that port while it is unterminated.</i></p> <ol style="list-style-type: none"> <li>1 Remove drive to the transmitter by disconnecting plug P14 from the IF IN jack of the IF driver amplifier.</li> <li>2 Remove the flexible waveguide section located at the output of the 30A integrated circuit.</li> <li>3 Using a KS-19751, L20 flexible waveguide bend, connect a 522A termination to the output of the 30A integrated circuit.</li> <li>4 Terminate the waveguide going to the 1432 transmitter channel network with a shorting plate.</li> <li>5 Prepare test set in accordance with Exhibit 1.</li> <li>6 Perform preparation for test and check of test setup in Exhibit 2.</li> <li>7 Measure the return loss at the input to the cable normally connected to the IF driver amplifier IF IN jack as directed in the measurement procedure in Exhibit 2.   <i>Requirement: Greater than 30 dB between 60 and 80 MHz.</i>                       If the requirement is not met, adjust RL1 and RL2 for the best return loss.                       If the requirement still is not met, replace the IF driver amplifier with a spare as directed in Section 411-506-503.</li> <li>8 Restore all normal connections. Connect plug P14 to the IF IN jack of the IF driver amplifier only after the flexible waveguide section has been replaced.</li> </ol>

**SECTION 411-506-502PT**  
**APPENDIX 1**

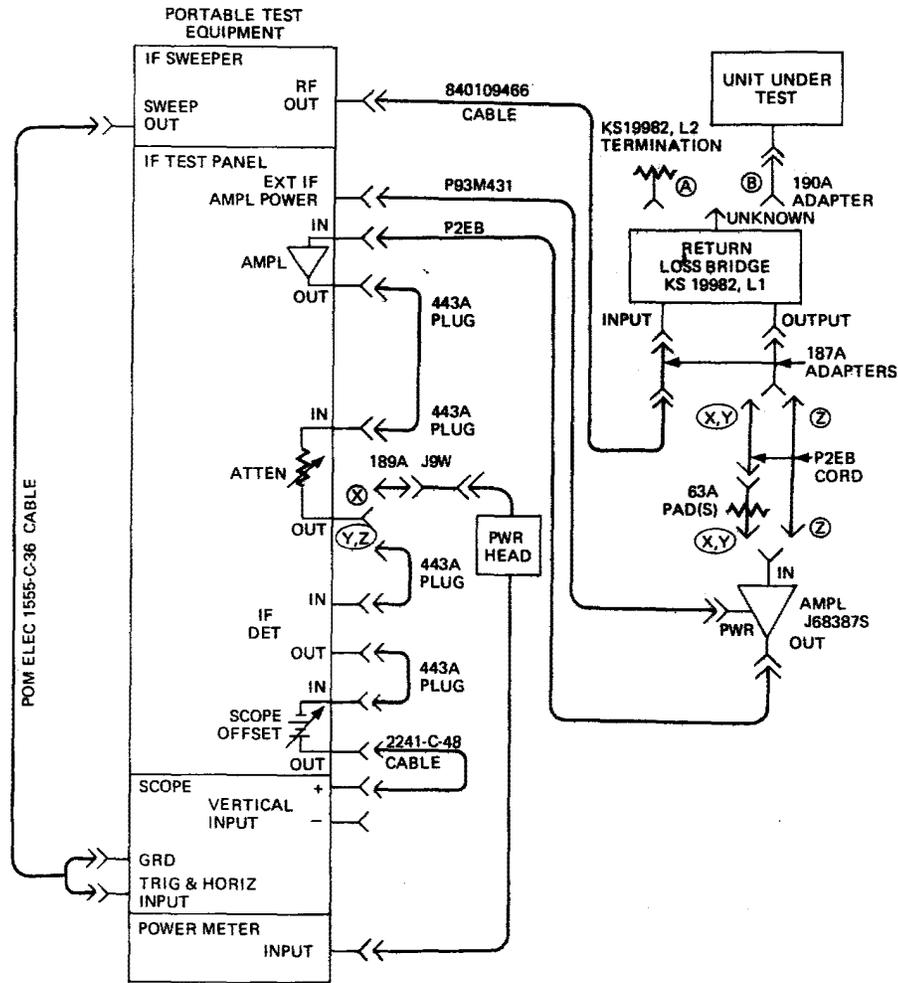


UNIT	CONTROL	POSITION
SWEEPER	PUSH ON-OFF	ON
	SWEEP SECONDS	.01
	SWEEP SECONDS VERNIER	CLOCKWISE
	RECUR-TRIG-LINE	RECUR
	VERNIER	0
	MODE	CW
	MODE VERNIER	CALIB
	EXT'L/INT'L SWEEP (REAR)	INT'L
	F1-START	60 MHz
	F2-STOP	80 MHz
IF PLUG-IN	MARKER 1	60 MHz
	MARKER 2-FC	70 MHz
	MARKER 3	80 MHz
PWR METER	MARKERS ADJ	MIDRANGE
	MARKERS	MARKERS
	RETRACE	RETRACE
	LEVELER	LEVELER
PWR HEAD	1 kHz	OFF
	RF LEVEL	1 mw
COUNTER	LINE	ON
	SCALE ILLUM	MIDRANGE
	RANGE	0 dBm
COUNTER	% EFF	100
	FREQ A (kHz)	10 ms
	DISPLAY TIME	MINIMUM
	INPUT B/INT OSC	INT OSC
	GAIN	MAX
	NORM-TEST (AC TEST DC)	NORM (AC)

**PREPARATION FOR TEST**

1. Insert Kruse 5007-1 IF plug-in and associated scale into 5000A sweeper.
2. Connect test setup option (A) for measuring sweeper frequency.
3. Position test equipment controls. (See above table.)
4. Adjust sweeper MARKER 2-FC control until counter reads  $70 \pm 0.1$  MHz.
5. Connect option (B).
6. Adjust sweeper RF LEVEL control for a power meter measurement of 0 dBm,  $\pm 0.2$  dBm.

**Preparation of Test Equipment to Send IF**  
**Exhibit 1**



**PREPARATION FOR TEST**

1. Set IF test panel ATTEN to 8 dB and power meter RANGE control to -5 dBm.
2. Connect option (X). Use 20 dB and 30 dB 63A pads in series between return loss bridge and test panel amplifier.
3. Adjust EXT AMPL GAIN control on IF test panel for a power meter reading of -7.0 dBm, ±0.1 dBm. (Meter scale reading of -2.0 dBm, ±0.1 dBm.)
4. Set sweeper MODE control to WIDE F1-F2.
5. Set scope controls.

CONTROL	POSITION
VERTICAL POSITION	MIDRANGE
SENSITIVITY	2MV/DIV
+ INPUT	DC
INPUT	OFF
BW LIMIT	IN
HORIZONTAL POSITION	MIDRANGE
EXT HORIZ. V/DIV	0.5
COUPLING	DC
OFFSET	
INPUT SELECT	OFF

6. Connect option (Y).
7. On IF test panel, adjust SCOPE OFFSET control until trace appears on scope center horizontal line.
8. Adjust scope HORIZONTAL POSITION and EXT HORIZ controls so that the two end markers coincide with full horizontal deflection.

9. While switching IF test panel ATTEN control to 9 dB and back to 8 dB, adjust scope VERTICAL POSITION and SENSITIVITY controls for one division deflection. This calibrates scope for 1 dB/DIV.
10. Set ATTEN control for 8 dB.

**CHECK OF TEST SETUP**

1. Connect options (A) and (Z).
2. The trace shall be below scope center horizontal line. If this requirement is not met, recheck test setup and preparation for test.
3. Remove option (A).

**MEASUREMENT PROCEDURE**

1. Connect option (B) and (Y).
2. Option (Y) pad combinations.  
 IF LIM CARR RESUPPLY - TESTING FROM IF IN JACK - 10 dB AND 5 dB PADS  
 TESTING FROM IF OUT JACK - 20 dB PAD  
 IF DRIVE AMPLIFIER - 10 dB AND 5 dB PADS
3. To meet requirements, the trace shall be entirely below scope horizontal center line with 70 MHz point at lowest point on trace. (See example.)

Example:



**IF Return Loss Measurement Exhibit 2**