

**TD-3 MICROWAVE RADIO**  
**J68386G AND J68386H TRANSMITTER-RECEIVER BAY**  
**TESTS USING THE ED-50996-10 PORTABLE TEST EQUIPMENT**  
**NOISE FIGURE**

This appendix supplements Section 411-504-505.

It is reissued to:

- Add a caution to be observed when working on systems equipped with Hot Standby/Space Diversity Switching.
- Change RF PAD value in Exhibit 2.

If trouble has been experienced with the receiver modulator and IF preamplifier, necessitating diode changes, modulator, and/or preamplifier replacement, the noise figure should be measured.

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

*Caution 1: This test is 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: When removing and replacing waveguide units, care should be exercised to prevent foreign matter from entering the waveguide. Handle all types of waveguide carefully in order to prevent damage to flange mating surfaces. When connecting waveguide units, flange mating surfaces must be carefully aligned and all screws must be replaced and tightened securely to prevent RF leakage.*

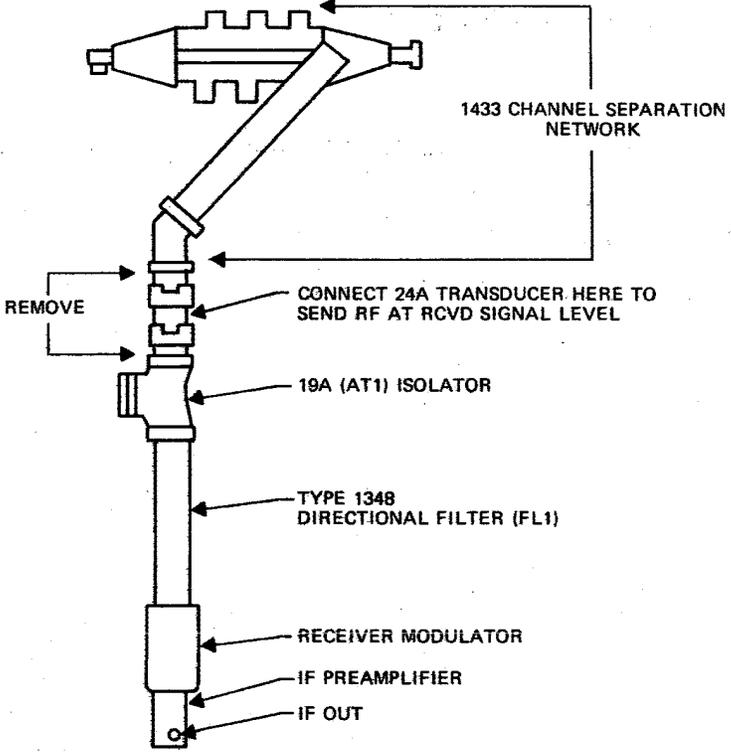
*Caution 3: Before working on Hot Standby/Space Diversity equipped bays, consult Section 411-600-500 for forced switching procedures to be followed to remove service from the desired receiver. Exercise extra caution during tests since the transmitter in this bay may be carrying service.*

**RECEIVER NOISE FIGURE TEST**

The noise figure test provides a measure of the amount of noise added by receiver to the signal received from preceding station during normal in-service operation.

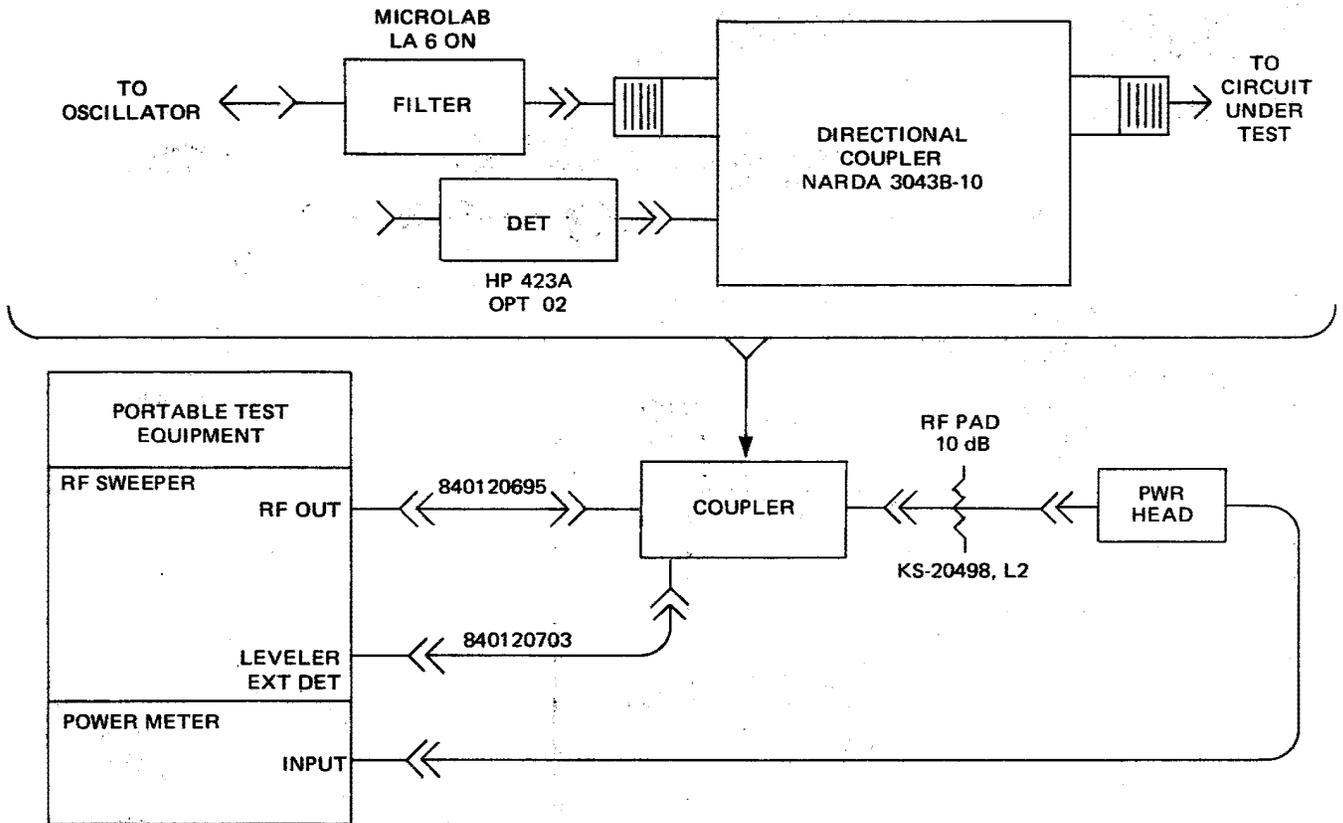
## APPARATUS:

1-ED-50996-10 Portable Test Arrangement.

STEP	PROCEDURE
1	<p>Remove 3-inch waveguide piece between 1433 channel separation network and 19A (AT1) isolator in receiver. Connect a 24A transducer to the AT1 isolator so that test signals can be sent into receiver. (See Fig. 1.)</p>  <p style="text-align: center;">Preparation Of Receiver For Test Fig. 1</p>
2	Prepare test set to send RF in accordance with Exhibit 1.

STEP	PROCEDURE																																		
3	<p>Note calibrated loss of 20 dB, KS-20498, L-3 RF pad. Using stamped value on unit, adjust RF oscillator RF LEV control for scale reading in Table A.</p> <p style="text-align: center;"><b>TABLE A SCALE READINGS</b></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th data-bbox="548 506 898 562">20 dB PAD LOSS AT 4 GHz (dB)</th> <th data-bbox="898 506 1256 562">SCALE READING (dBm)</th> </tr> </thead> <tbody> <tr><td>19.3</td><td>-3.7</td></tr> <tr><td>19.4</td><td>-3.6</td></tr> <tr><td>19.5</td><td>-3.5</td></tr> <tr><td>19.6</td><td>-3.4</td></tr> <tr><td>19.7</td><td>-3.3</td></tr> <tr><td>19.8</td><td>-3.2</td></tr> <tr><td>19.9</td><td>-3.1</td></tr> <tr><td>20.0</td><td>-3.0</td></tr> <tr><td>20.1</td><td>-2.9</td></tr> <tr><td>20.2</td><td>-2.8</td></tr> <tr><td>20.3</td><td>-2.7</td></tr> <tr><td>20.4</td><td>-2.6</td></tr> <tr><td>20.5</td><td>-2.5</td></tr> <tr><td>20.6</td><td>-2.4</td></tr> <tr><td>20.7</td><td>-2.3</td></tr> <tr><td>20.8</td><td>-2.2</td></tr> </tbody> </table> <p style="text-align: center;"><i>Example: If the pad value is 19.6 dB adjust the output to obtain a meter scale reading of -3.4 dB.</i></p> <p>4 Disconnect power head from 10 dB pad and connect 10 dB and 20 dB pads to directional coupler. Complete test setup in Exhibit 2, option (A). Make sure that all coaxial connections are tight.</p> <p>5 Operate bay AGC-MAN switch on IF main amplifier to MAN.</p> <p>6 Adjust EXT AMPL GAIN control on IF test panel fully clockwise.</p> <p>7 Operate power meter RANGE button to 0 dBm.</p> <p>8 Adjust EXT AMPL GAIN control on IF test panel for a power meter reading of 0 dBm.</p> <p>9 Connect test setup option (B), Exhibit 2.</p> <p>10 Adjust sweeper MARKER 2-FC control to obtain 70 MHz, <math>\pm 0.5</math> MHz reading on counter.</p> <p>11 Connect option (A), Exhibit 2.</p> <p>12 Adjust EXT AMPL GAIN control on IF test panel for a power meter reading of 0 dBm.</p> <p>13 Operate sweeper PUSH ON-OFF switch to OFF.</p> <p>14 Remove 30 dB 63A pad between IF preamplifier and IF filter and make direct connection.</p> <p>15 Remove 30 dB pad between IF OUT of J68387S-1, L1 IF main amplifier and AMPL IN of IF test panel and make direct connection.</p>	20 dB PAD LOSS AT 4 GHz (dB)	SCALE READING (dBm)	19.3	-3.7	19.4	-3.6	19.5	-3.5	19.6	-3.4	19.7	-3.3	19.8	-3.2	19.9	-3.1	20.0	-3.0	20.1	-2.9	20.2	-2.8	20.3	-2.7	20.4	-2.6	20.5	-2.5	20.6	-2.4	20.7	-2.3	20.8	-2.2
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STEP	PROCEDURE
16	<p>Measure power.</p> <p><i>Requirement:</i> Between <math>-7.6</math> dBm and <math>-3.6</math> dBm.</p> <p><i>Note:</i> If measured power is less than <math>-5</math> dBm, press power meter range button to <math>-5</math> dBm. The meter scale reading shall be between <math>-2.6</math> dBm and <math>0</math> dBm.</p> <p>If the requirement is met, proceed with Step 17. If the requirement is not met, perform the following, in the sequence given, until the requirement is met.</p> <ul style="list-style-type: none"><li>(a) Verify that all waveguide units in the receiver are properly aligned and the screws tightened securely.</li><li>(b) Verify that the test apparatus is arranged properly and that the levels are correct.</li><li>(c) Replace receiver modulator diode CR1 and perform the tests in accordance with Section 411-504-503.</li><li>(d) Replace the receiver modulator — IF preamplifier and retune as directed in Section 411-504-503.</li><li>(e) If the completion of (d) above does not result in meeting the requirement, reinstall the original receiver modulator — IF preamplifier and replace the IF main amplifier.</li></ul>
17	Restore all connections to normal.



**PREPARATION FOR TEST**

1. Insert 5013-3 RF plug-in unit and associated scale into sweeper.
2. Set controls on sweeper and power meter.

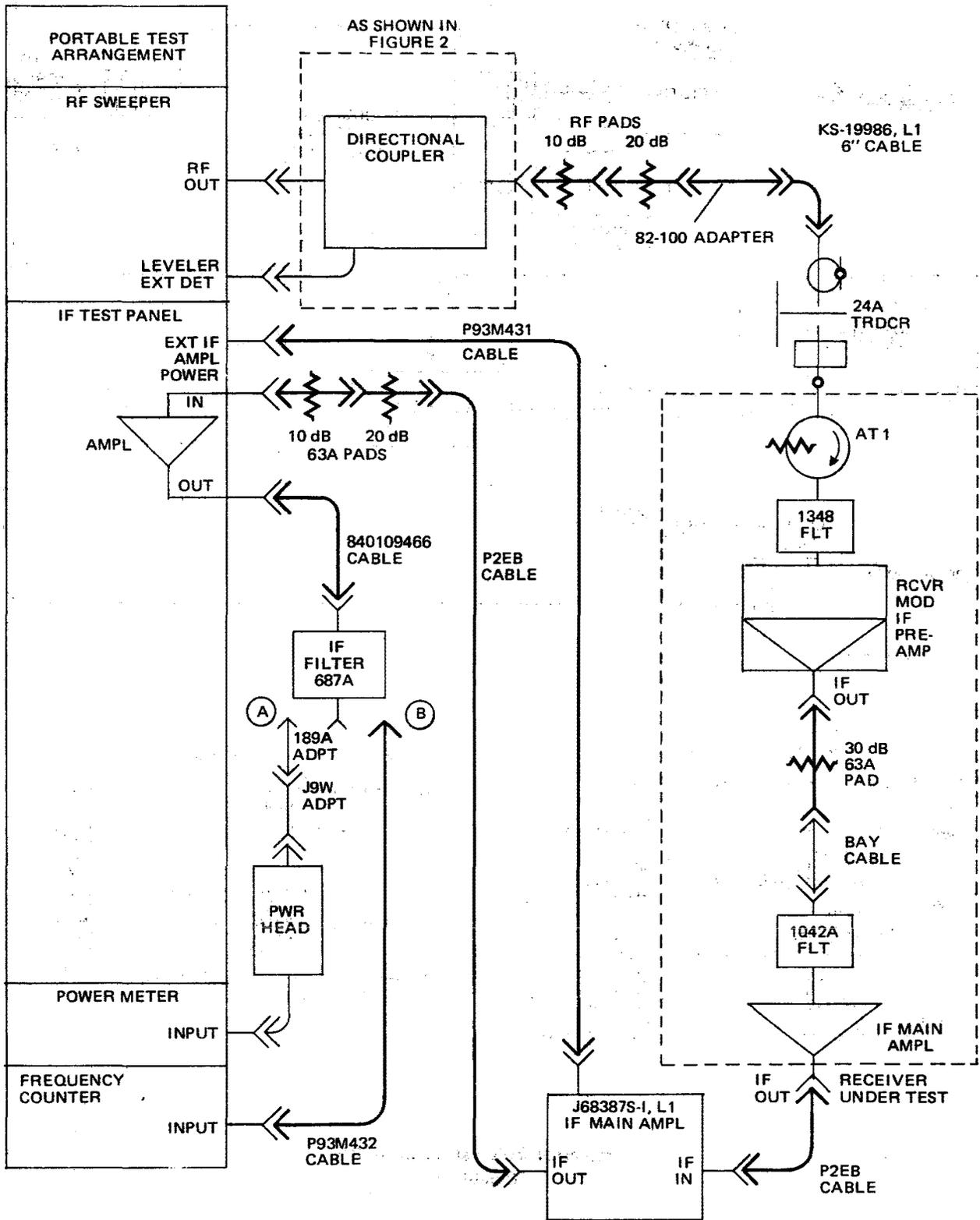
UNIT	CONTROL	POSITION
SWEEPER	PUSH ON-OFF	ON
	SWEEP SECONDS	.01
	SWEEP SECONDS VERNIER	CLOCKWISE
	RECUR TRIG LINE	RECUR
	VERNIER	0
	MODE	CW
	MODE VERNIER	CALIB
EXT'L/INT'L SWEEP (REAR)	INT'L	
RF PLUG-IN	MARKERS	OFF
	RETRACE	RETRACE
	LEVELER	LEVELER
	1 KHz	OFF
	RF LEVEL	FULLY COUNTER CLOCKWISE

UNIT	CONTROL	POSITION
POWER METER	LINE	ON
	SCALE ILLUM	MIDRANGE
	RANGE	-5 dBm
POWER HEAD	% EFF	FOR 4 GHz (REFER TO CHART ON THE POWER LEAD)
COUNTER	FREQUENCY A (KHz)	10 ms
	DISPLAY TIME	MINIMUM
	INPUT B INT OSC	INT OSC
	GAIN	MAX
	NOR-TEST	NDR.

3. Set sweeper center frequency control MARKER 2-FC to center frequency of receiver under test.

**Preparing Test Set to Send RF  
Exhibit 1**

SECTION 411-504-505PT  
APPENDIX 1



Noise Figure Reference Level Test Set-up  
Exhibit 2