

**TD-3 MICROWAVE RADIO
OVERALL SYSTEM
TESTS
RECEIVED CARRIER POWER**

The theoretical received carrier power at the input to the radio receiver of a properly engineered TD-3 radio system, when no fading is present, depends upon the frequency, the transmitted power, the gain of the transmitting and receiving antennas, the filter and waveguide losses, and the length of the path. When the value of each of these variables is known, the theoretical received carrier power may be readily computed. The procedure for determining the theoretical value is outlined in Section 402-421-208. A procedure for measuring the actual value of the received carrier power is given in this section. The test is used primarily to check the loss of the radio hop from the output of the distant transmitter to the input of the radio receiver.

The test should not be made during periods of fading since, when fading occurs, the received carrier power is generally below the normal value.

Caution 1: These tests are performed on an out-of-service basis. Check that the channel is not being used.

Caution 2: When removing and replacing waveguide units, care should be taken to prevent foreign matter from entering the waveguide. Handle waveguide sections with care to prevent damage to flange surfaces. All open waveguide sections should be capped.

| CHART | PAGE |
|--|------|
| 1—Transmitting Radio Station | 1 |
| 2—Receiving Radio Station | 2 |

**CHART 1
TRANSMITTING RADIO STATION**

A valid comparison between the measured and theoretical received carrier powers can be made only after it is determined that the transmitter at the far station has the normal output power. A check of the far transmitter is made in this chart. If personnel are not available at the far station and it is known that the transmitter is sending the proper power, the procedures outlined in this chart can be omitted.

CHART 1 (Cont)

APPARATUS:

None

| STEP | PROCEDURE |
|------|---|
| 1 | <p>Press the TRMTR-OUT pushbutton on the transmitter control panel and read the value indicated on the panel meter.</p> <p>Requirement: The meter should indicate the value which is handwritten in the space to the right of the pushbutton.</p> <p>If the requirement is met, proceed to Chart 2. If the requirement is not met, refer to Section 411-400-501.</p> |

CHART 2

RECEIVING RADIO STATION

The radio receiver is normally adjusted so that with the theoretical received carrier power applied, the panel meter (in the RCVD SIG LEV position) should read a set value. That value is either 56 for a bay equipped with a J68387C receiver modulator-IF preamplifier or 70 for a bay equipped with a J68387P receiver modulator-IF preamplifier. When the radio receiver has been adjusted to 56 or 70, the meter indication will then change by 2 for each dB change in the received power. Therefore, by knowing the theoretical power for which the bay was adjusted and noting any change from the 56- or 70-meter reading, the actual received carrier power can be determined.

If there is any doubt as to the meter calibration, the following procedure can be used to measure the actual received carrier power.

APPARATUS:

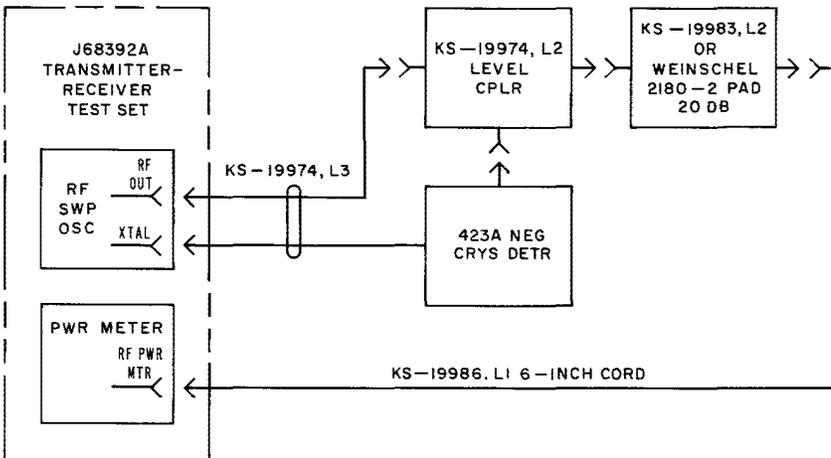
1—J68392A Transmitter-Receiver Test Set

| STEP | PROCEDURE |
|------|--|
| 1 | Press the RCVD SIG LEV pushbutton on the receiver control panel and record the value indicated on the meter. This value is a measure of the actual received carrier power. |
| 2 | Prepare the test set in accordance with Fig. 1. |
| 3 | Set the CW control on the RF sweep oscillator to the center frequency of the desired channel. |

CHART 2 (Cont)

| STEP | PROCEDURE |
|------|--|
| 4 | Adjust the POWER LEVEL control on the RF sweep oscillator for a reading of 0 dBm on the power meter. |
| 5 | Disconnect the 6-inch cord from the power meter. |
| 6 | Replace the 20-dB pad with a KS-19983, L4 or Weinschel 2180-4 40-dB pad. |
| 7 | Connect the 24A transducer to the 40-dB pad through the 6-inch cord. |
| 8 | Determine that the channel has been removed from service. |
| 9 | Remove bandpass filter FL1 located between channel dropping network Z1 and the 8A isolator A1 ahead of the receiver modulator unit. |
| 10 | Terminate the open end of the flexible waveguide with the shorting plate supplied with the test set. |
| 11 | Connect the 24A transducer to the 8A isolator. The power entering the 8A isolator is -20 dBm. |
| 12 | Adjust the POWER LEVEL control on the RF sweep oscillator until the value indicated on the receiver panel meter is the same as in Step 1. |
| | <i>Note:</i> During Steps 13 through 15, do not touch the level control on the RF sweep oscillator. |
| 13 | Disconnect the 40-dB pad and the 6-inch cord from the 24A transducer. |
| 14 | Replace the 40-dB pad with a 20-dB pad and connect it through the 6-inch cord to the RF PWR MTR jack. |
| 15 | Set the power meter POWER RANGE DBM switch to a convenient range and measure and record the power. |
| 16 | <p>The level of the received carrier power at the drop arm of channel network Z1 can now be computed as follows:</p> $\begin{aligned} \text{Received Carrier Power, dBm} &= \text{Power Meter Reading (Step 15)} - 20 + 0.5 \text{ dB} \\ &= \text{Power Meter Reading (Step 15)} - 19.5 \end{aligned}$ <p>where the 20-dB factor takes into account the substitution of the 20-dB pad for the 40-dB pad in Step 14, and the 0.5-dB factor takes into account the loss of filter FL1 which was not included in the circuit during the test.</p> <p><i>Example:</i> If the power meter reads -7.2 dBm, the received carrier power, referred to the output of the drop arm of channel network Z1, is:</p> $\begin{aligned} \text{Received Carrier Power} &= -7.2 - 19.5 \\ &= -26.7 \text{ dBm} \end{aligned}$ |

| CHART 2 (Cont) | |
|----------------|--|
| STEP | PROCEDURE |
| 17 | Remove the shorting plate from the flexible waveguide and the 24A transducer from the 8A isolator. Replace filter FL1. |
| 18 | Restore the channel to service. |



OPERATE THE CONTROLS ON THE TEST SET TO THE FOLLOWING POSITIONS:

| UNIT | CONTROL | POSITION |
|---------------------|-------------------------|----------|
| RF SWEEP OSCILLATOR | LINE | RF |
| | SWEEP SELECTOR FUNCTION | CW |
| | POWER LEVEL | MAX CCW |
| POWER METER | INPUT CHANNEL | RF |
| | POWER RANGE DBM | 0 |

Fig. 1—Transmission Test Setup