TR-090

| DATE 3/7/67 SH. 1 OF 9 COMPILED BY | TMC SPECIFICATION NO. S 10139 | |
|---|---|---|
| APPROVED | TITLE: TEST PROCEDURE TR090 BROAD BAND IF TRANSFORMER | JOB |

The test shall consist of three parts:

(a) VSWR of 50 ohm output

(b) Insertion loss and frequency response

(c) Balance

LIST OF EQUIPMENT

1. Tektronics scope model no. 545 or 543 with a plug in capable of a 5 mv/cm sensitivity.

2. Model HD 7 Telonic sweep generator with a diode type detector.

3. Telonic Rho-Tector VSWR bridge with two 1.0 to 1.0 loads and one 1.5 to 1.0 load.

4. A TR090 bearing the identification prototype. This should be in the transformer room.

5. Miscellaneous items:

   1) 200 ohm resistor
   2) 600 ohm resistor
   3) 50 ohm resistor
   4) 50 ohm RF cable as required
   5) 3 short clip leads
   6) a 600 ohm test jig
   7) a 200 ohm test jig
   8) RF demodulator probe

   Items 6, 7, and 8 should be in transformer room.

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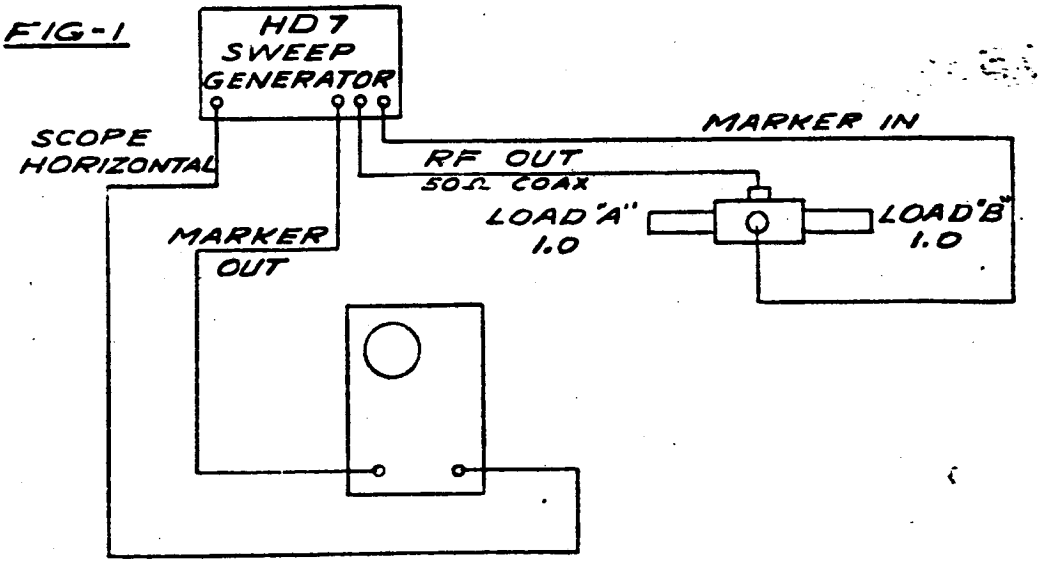
TEST 1. VSWR

FIG-1




(a) Set up the equipment as shown in figure 1, and observe the output on the scope. There should be no deviation from a straight line. The sweep should be continuous to 30 megacycles.

(b) Replace Load B with the 1.5 to 1 load.

(c) Set the scope to give deflection easily readable and note the maximum deflection.

(d) Replace the 1.5 to 1.0 load with a UHF to BNC adaptor. Connect a short length of 50 ohms cable to the adaptor and the 50 ohm output of the TR090. Terminate the 200 ohm input in a 200 ohm resistor and note maximum value of VSWR.

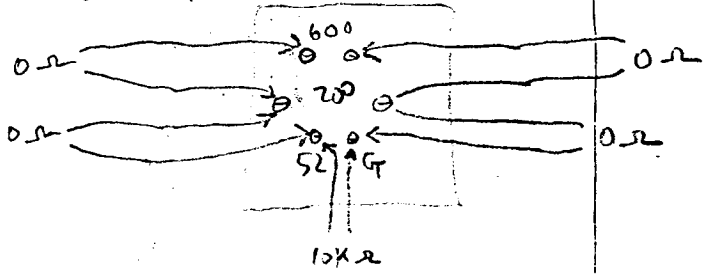
(e) Maximum VSWR shall be 1.5 to 1.0 or less below 30 megacycles.

(f) Repeat part (d), removing the 200 ohm resistor and terminating the 600 ohm output in a 600 ohm resistor.

(g) Maximum VSWR shall be 1.5 to 1.0 or less, below 30 megacycles.

(h) Record results on test data sheets.

DC RESISTANCE CHECK



TEST 2 INSERTION LOSS AND FREQUENCY RESPONSE.

INTRODUCTION

This test is a back to back test. By knowing the characteristics of a prototype transformer and using it to match a 50 ohm generator to a 600 ohm and a 200 ohm transformer, the characteristics of the transformer under test can be determined.

Briefly the output of the generator is fed into the prototype and transformered into 600 or 200 ohms.

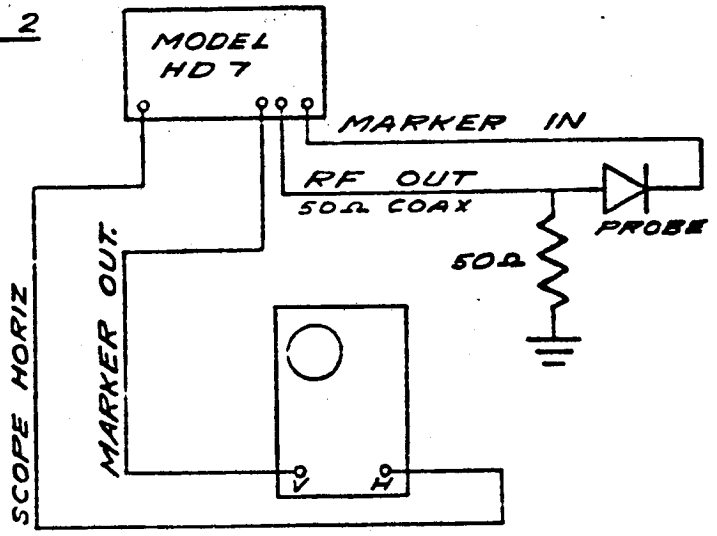
The losses of the prototype transformer have been determined and are recorded on graphs in the appendix.

TEST:

CALIBRATION.

(1) Set up equipment as shown in Figure 2.

FIG. 2




This set up should produce a flat sweep. Any major deviations indicates a defect in method or equipment.

It will make interpretation of results easier if generator is adjusted to give a full scope face deflection (4 cm).

This can be accomplished by setting scope sensitivity to 0.1 volt/cm and setting generator for maximum output. Don't chang these levels before performing tests.

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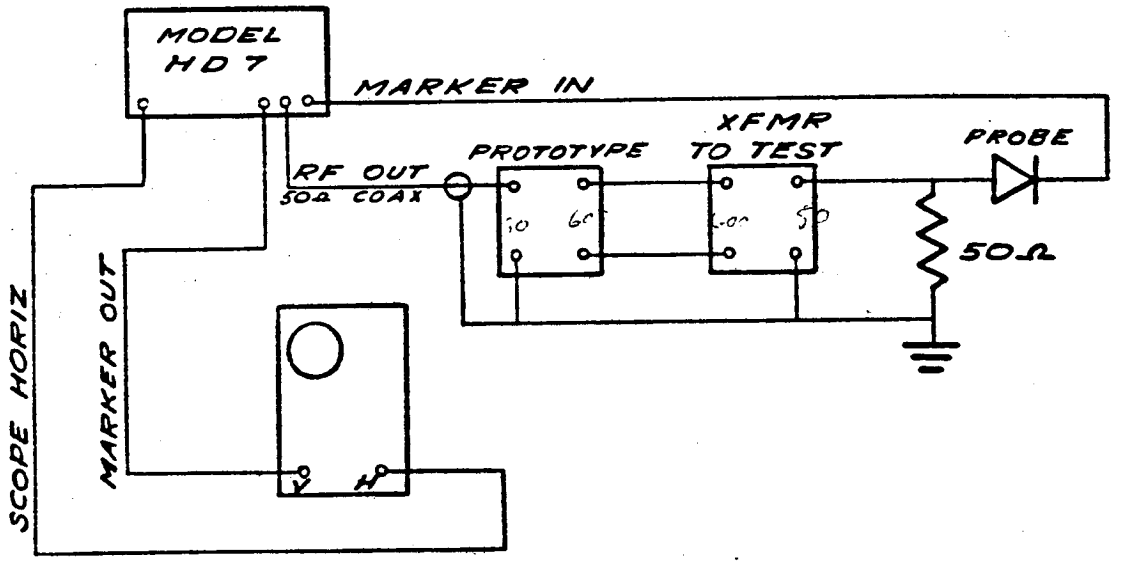
600 OHM TEST

(1) Set the test equipment as shown in figure 3. Leads connecting the two 600 ohm output and the common ground between the two transformers should be as short as practical.

(2) The trace on the scope should be approximately 3 centimeters in height (this is only an approximate). By putting the base line on the bottom horizontal line of the scope graticule the output at different frequencies can be read. Compare this output with the full scope face.

FIG. 3




(2 cont'd) It may be useful to note that if the marker for the particular frequency being checked is put on the vertical centre line of the graticule then by moving the horizontal position control, easier measurements can be made. Each centimeter will correspond to .25 of the input. Each 2 millimeter mark will correspond to .05 of the input.

Figures in the region of 0.65 to 0.90 should be typical.

(3) The figure obtained is the response of the system at a given frequency. Checking the voltage ratio with a set of dB tables shows the loss of the system in "dBs".

eg. If scope deflection is 3 cm, voltage out is .75 of voltag in. This is a 2.5 dB loss.

(4) This loss must be broken down into 2 parts:

(a) loss in prototype transformer
(b) loss in test transformer

The loss of the prototype transformer has been determined and a graph of the loss is included for both the 200 and 600 ohm outputs.

(5) By subtracting the loss of the system (in dBs) from the known loss of the prototype, the loss of the transformer under test can be determined. Check and record this loss (in dBs) at 2, 10, 20 and 30 megacycles. Also check for any major variations in output. (Trace should be reasonably flat).

(6) Maximum loss in test transformer shall be 3 dB.

200 OHM TEST.

(1) Remove the jumpers from the 600 ohm terminals and connect the 200 ohm windings of both transformers in the same way.

(2) Repeat the transformer loss test and record test transformer results at 2, 10, 20, and 30 megacycles.

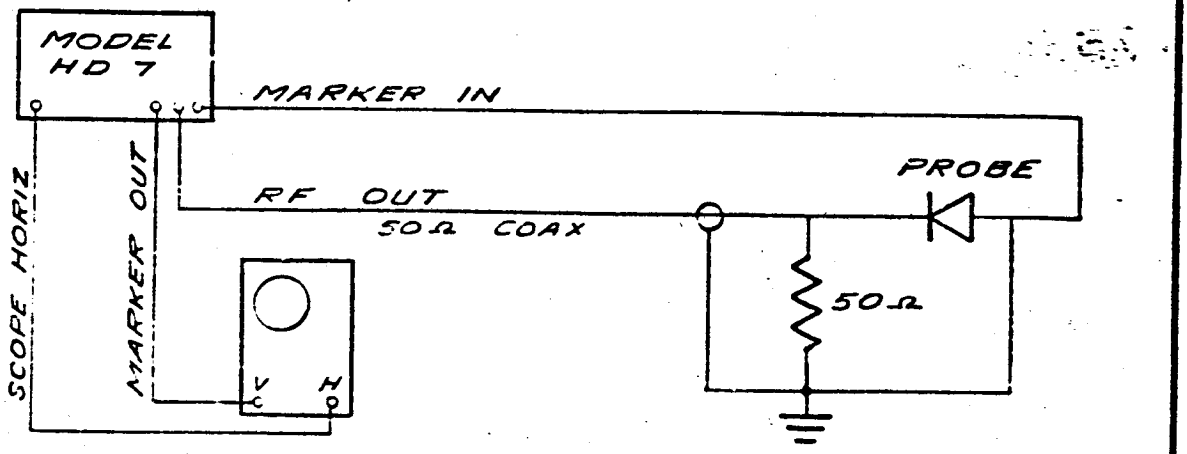
(3) Maximum test transformer loss shall be 3 dB.

MAKE SURE THE RIGHT GRAPH IS USED.

The following are the figures for the loss of the prototype transformer.

| Freq. | 600 ohms | 200 ohms |
|---|---|---|
| 2 | .3 dB | .35 dB |
| 5 | .25 dB | .40 dB |
| 10 | .1 dB | .5 dB |
| 15 | .05 dB | .65 dB |
| 20 | .2 dB | .85 dB |
| 25 | .8 dB | 1.2 dB |
| 30 | 1.4 dB | 1.1 dB |

BALANCE TEST




1. Set up equipment as in Figure 4.

2. Set scope sensitivity to .05 volts/cm and adjust generator output for full scope deflection (4 cm).

3. The trace should be a straight line. Major deviations indicate a defect in method or equipment.

4. Remove the 50 ohm resistor and feed output of signal generator through a short length of 50 ohm coax to the input terminal of the 200 ohm test jig.

5. Using the demodulator probe measure the output level at 2, 10, 20, and 30 megacycles for output 1. Record these figures on the test data sheet.

6. Next measure the output level at 2, 10, 20, and 30 megacycles for output 2. Record these figures on test data sheet.

7. The ratio of output 1 to output 2 shall not be greater than 1.225 or less than .815 when these outputs are measured at the same frequency. This corresponds to a balance of ± 10%.

8. Reduce the scope sensitivity to .1 volt/cm. Replace the 200 ohm test jig with the 600 ohm test jig.

9. Measure output at 2, 10, 20, and 30 megacycles at output 1. Record results on test data sheet.

10. Repeat part 9 for output 2. Record results on test data sheet.

11. The ratio of output 1 to output 2 shall not be greater than 1.225 or less than .815 when thes outputs are measured at the sam frequency. This corresponds to a balance of ± 10%.

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## TEST DATA SHEET

MANUFACTURING #_____ TRO90

200 ohm Test 600 ohm Test

| | Before Potting | After Potting | Before Potting | After Potting |
|---|---|---|---|---|
| max VSWR | | | | |
| Loss of Transformer | | | | |
| Freq. 2 | | | | |
| 10 | | | | |
| 20 | | | | |
| 30 | | | | |

| Balance | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 |
|---|---|---|---|---|---|---|---|---|
| 2 | | | | | | | | |
| 10 | | | | | | | | |
| 20 | | | | | | | | |
| 30 | | | | | | | | |

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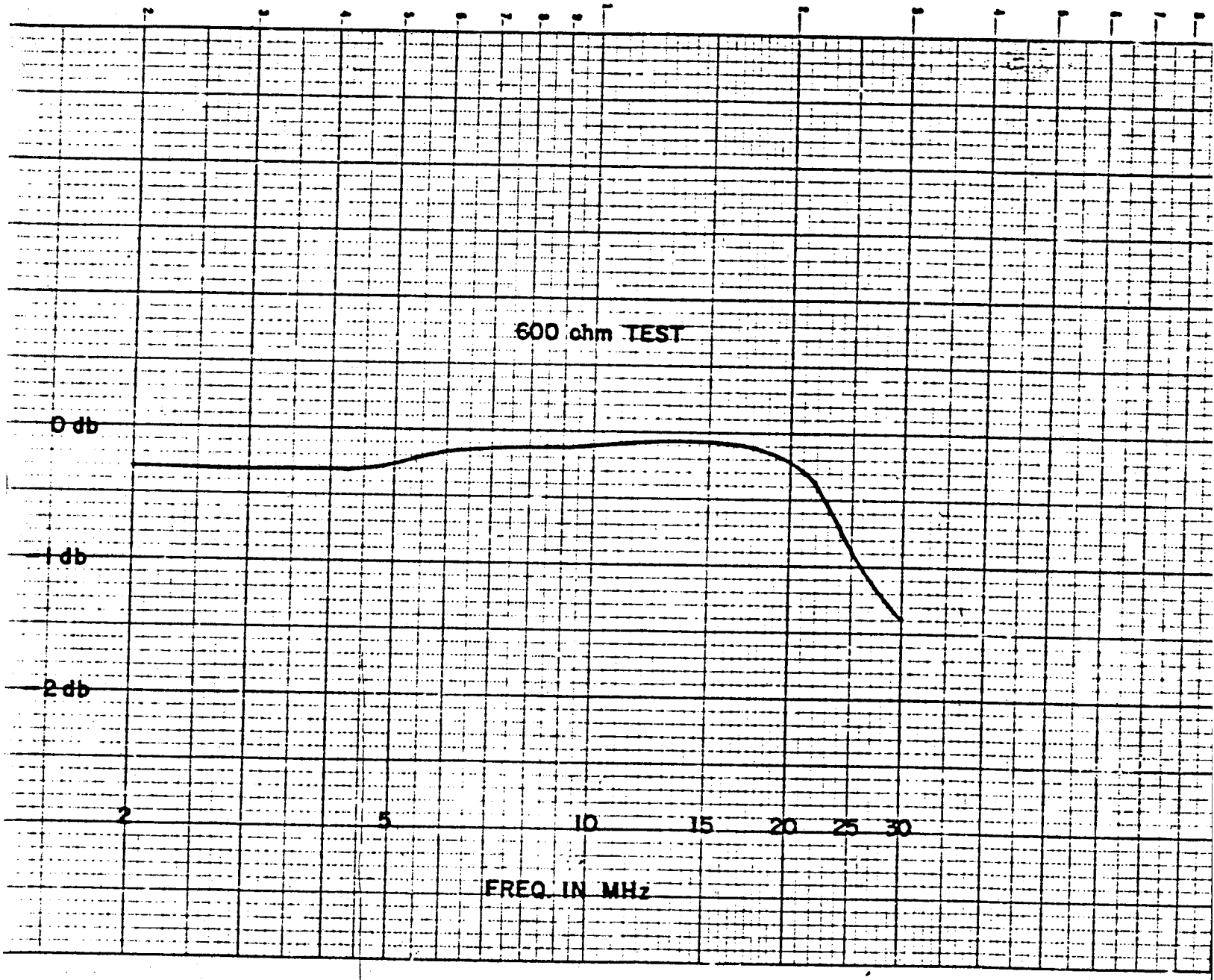

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