

# PEAK POWER CALIBRATOR HEWLETT-PACKARD, MODEL 8900B

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## Calibration Instructions

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## SECTION I IDENTIFICATION AND DESCRIPTION

**1. Test Instrument Identification.** This bulletin provides instructions for the calibration of Peak Power Calibrator, Hewlett-Packard, Model 8900B. The manufacturer's manual was used as the prime data source in compiling these instructions. The equipment being calibrated will be referred to as the TI (test instrument) throughout this bulletin.

**a. Model Variations.** None.

**b. Time and Technique.** The time required for this calibration is approximately 2 hours, using the microwave technique.

### 2. Forms, Records, and Reports

**a.** Forms, records, and reports required for calibration personnel at all levels are prescribed by TB 750-25.

**b.** Adjustments to be reported are designated (R) at the end of the sentence in which they appear. When adjustments are in tables, the (R) follows the designated adjustment. Report only those adjustments made and designated with (R).

**3. Calibration Description.** TI parameters and performance specifications which pertain to this calibration are listed in table 1.

Table 1. Calibration Description

Test instrument parameters	Performance specifications
Meter accuracy	$\pm 1.5$ dB
RF power <sup>1</sup>	10 to 200 mW
RF power <sup>2</sup>	50 to 2000 MHz

<sup>1</sup>Procedure limitation of 10 to 100 mW.

<sup>2</sup>Calibrated at 900 MHz only.

## SECTION II EQUIPMENT REQUIREMENTS

**4. Equipment Required.** Table 2 identifies the specific equipment to be used in this calibration procedure. This equipment is issued with Secondary Transfer Calibration Standards Set, AN/GSM-287 or AN/GSM-705. Alternate items may be used by the calibrating activity. The items selected must be verified to perform satisfactorily prior to use and must bear evidence of current calibration. The equipment must meet or exceed the minimum use specifications listed in table 2. The accuracies listed in table 2 provide a four-to-one ratio between the standard and TI. Where the four-to-one ratio cannot be met, the actual accuracy of the equipment selected is shown in parenthesis.

**5. Accessories Required.** The accessories listed in table 3 are issued as indicated in paragraph 4 above and are used in this calibration procedure. When necessary, these items may be substituted by equivalent items, unless specifically prohibited.

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
ATTENUATOR	Frequency range: 0.9 to 1.0 GHz Accuracy: <sup>1</sup>	Weinschel, Model 9918, 9918 10dB (9918 10dB)
DIRECTIONAL COUPLER	Frequency range: 0.9 to 1.0 GHz Coupling factor: 20 dB nominal Input power: 50 W	Hewlett Packard, Model 778D (778D)
OSCILLOSCOPE	Frequency range: Dc to 7 MHz Sensitivity: 0.2 V/cm	Agilent, OS 303/G (OS 303/G)
POWER METER	Frequency range: 0.9 to 1.0 GHz Power range: 1 mW to 10 mW Accuracy: ±3%	Hewlett Packard, Model 437B (13440045) w/power sensor Hewlett Packard, Model 8482A (13440043)
POWER SPLITTER	Frequency range: 0.9 to 1.0 GHz Accuracy <sup>2</sup>	Weinschel, Model 1870A (7916839)
RF POWER AMPLIFIER	Frequency range: 0.9 to 1.0 GHz Output level: 0 to 50 W	Antenna Research Asso Inc., Model 757LC (757LC)

<sup>1</sup>Insertion loss at 900 MHz must be known.

<sup>2</sup>Exact coupling ratio at 900 MHz must be known.

Table 3. Accessories Required

Common name	Description (part number)
FILTER, LOW PASS	Telonic, Model TLS 1225 5EFI
TERMINATION	Bird Eng., Model 8085
TERMINATION (DUMMY LOAD)	Narda, Model 374BNM (374BNM)
VARIABLE ATTENUATOR	Weinschel, Model AF117A 69 34 (AF117A 69 34)

### SECTION III CALIBRATION PROCESS

#### 6. Preliminary Instructions

a. The instructions outlined in paragraphs 6 and 7 are preparatory to the calibration process. Personnel should become familiar with the entire bulletin before beginning the calibration.

b. Items of equipment used in this procedure are referenced within the text by common name as listed in tables 2.

c. Unless otherwise specified, verify the result of each test and, whenever the test requirement is not met, take corrective action before continuing with the calibration. Adjustments required to calibrate the TI are included in this procedure. Additional maintenance information is contained in the manufacturer's manual for this TI.

d. Unless otherwise specified, all controls and control settings refer to the TI.

## 7. Equipment Setup

### WARNING

HIGH VOLTAGE is used or exposed during the performance of this calibration. DEATH ON CONTACT may result if personnel fail to observe safety precautions. REDUCE OUTPUT(S) to minimum after each step within the performance check where applicable. Energize equipment and allow approximately 10 minutes for equipment to warm-up and stabilize.

## 8. Meter Calibration

### a. Performance Check

### NOTE

Measurements should be taken in the shortest time possible.

- (1) Connect equipment as shown in figure 1.

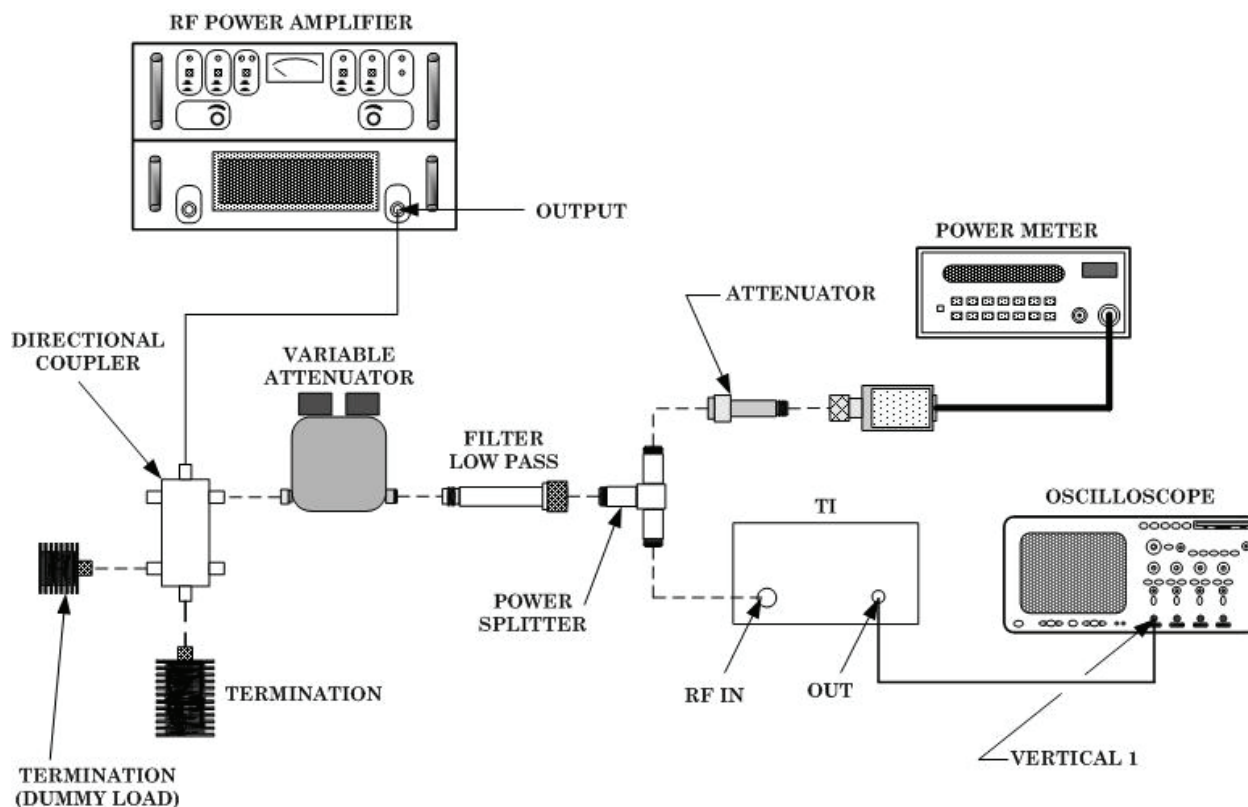


Figure 1. Meter calibration equipment setup.

- (2) Set variable attenuator to 0 dB.
- (3) Set **OFF MON/CAL MEAS** switch to **MON/CAL**.

(4) Adjust **VIDEO NULL** control until the two horizontal lines displayed on oscilloscope coincide.

**NOTE**

Use highest oscilloscope vertical sensitivity practical for most precise adjustment.

(5) Observe TI meter. If meter does not indicate within **CAL** marking on meter scale, perform **b** (1) below.

(6) Set **OFF MON/CAL MEAS** switch to **MEAS**.

(7) Set RF power amplifier output on, adjust frequency dial to 900 MHz, and adjust output level for a corrected indication of 10 mW on power meter. Record power meter indication.

**NOTE**

The value of attenuator and coupling ratio of power splitter must be computed and applied to power meter indication in (7) above.

(8) Adjust **COARSE** and **FINE** controls until the two horizontal lines displayed on oscilloscope coincide. If the TI meter does not indicate 100 mW  $\pm 1.5$  dB, perform **b** (2) through (5) below.

(9) Using variable attenuator and RF power amplifier output level control, reduce the power meter indication exactly 8 dB from the indication recorded in (7) above.

(10) Adjust **COARSE** and **FINE** controls until the two horizontal lines displayed on oscilloscope coincide. If the TI meter does not indicate decrease between -6.5 and -9.5 dB, perform **b** (2) through (5) below.

**NOTE**

Before performing **b** (2) through (5) below turn RF power amplifier output off and repeat **a** (2) through (7) above.

**b. Adjustments**

(1) Adjust R12 (fig. 2) until TI meter indicates within **CAL** marking (R).

(2) Adjust **COARSE** and **FINE** controls until TI meter indicates 100 mW. Adjust R20 (fig. 2) until the two horizontal lines displayed on oscilloscope coincide (R).

**NOTE**

If balance cannot be attained, adjust R20 for minimum separation of horizontal lines. Then adjust **COARSE** and **FINE** controls until horizontal lines coincide. Adjust R18 (fig. 2) until TI meter reads exactly 100 mW (0 dB).

(3) Using variable attenuator and RF power amplifier output level control, reduce the power meter indication exactly 8 dB from indication recorded in **a** (7) above.

(4) Adjust **COARSE** and **FINE** controls until the two horizontal lines displayed on oscilloscope coincide. Adjust R18 (fig. 2) until TI meter indicates - 8 dB below 100 mW (R).

(5) Repeat (2) through (4) above while adjusting R20 and R18 for best in tolerance condition.

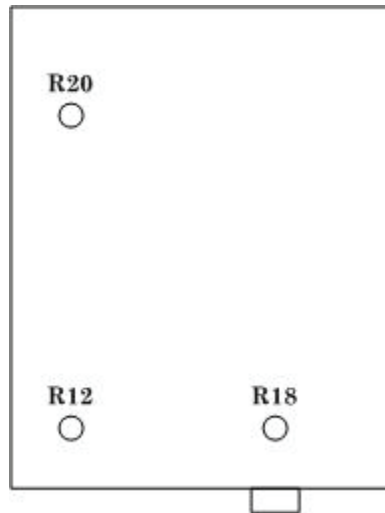


Figure 2. Test instrument top view.

## 9. Final Procedure

Deenergize and disconnect all equipment.