Table 1. Specifications

Frequency Range: 478A: 10 MHz to 10 GHz

Mount Calibration: Calibration Factor and Effective Efficiency furnished at six frequencies between 10 MHz and 10 GHz.

Impedance: 50 ohms.

Maximum Reflection Coefficient:
10 to 25 MHz: 0.273 (1.75 SWR, 11.3 dB return loss).

25 MHz to 7 GHz: 0.13 (1.3 SWR, 17.7 dB return loss).

7 to 10 GHz: 0.2 (1.5 SWR, 14 dB return loss).

Operating Resistance: 200 ohms.

Power Range with Model 431 and 432A: 1 μW to 10 mW.

Maximum Peak Power: 200W.

Maximum Average Power: 30 mW.

Maximum Energy per Pulse: 10 W · μs for a PRF ≥1 kHz; 5 W · μs for a PRF <1 kHz.

Elements: Field-replaceable, thermally balanced thermistor assembly. Thermistor assembly field adjustable so that full "zero-set" capability can be restored in the event of inadvertent overload (mount calibration no longer valid).

RF Connector: Type-N male, compatible with female connectors whose dimensions conform to MIL-C-71 or MIL-C-39012. Brass connector.

Output Connector: Mates with 431 and 432 cables.

Weight: Net, 5 oz (140 g). Shipping, 1 lb (450 g).

Uncertainty of Calibration Factor and Effective Efficiency Data for 478A

Sum of Uncertainties (%)			Probable Uncertainties (%)	
Freq. (GHz)	Cal. Factor	Effective Efficiency	Cal. Factor	Effective Efficiency
1.0	2.3	2.3	1.1	1.1
3.0	2.8	3.1	1.6	1.6
5.0	3.6	3.5	2.1	2.1
7.0	3.7	4.1	2.1	2.1
8.2	2.8	3.5	1.3	1.3
9.8	2.8	3.1	1.3	1.3

*Includes uncertainty of reference standard and transfer uncertainty. Directly traceable to NBS. In addition to the listed uncertainties, add the following for the indicated 431 ranges: ±0.3%; 0.1 mW, ±0.7%; 0.03 mW, ±1.5%; 0.01 mW. When using the 432 Power Meter no additional uncertainties are encountered.

measurement of microwave power down to the microwatt region.

4. INCOMING INSPECTION.

5. Inspect the Model 478A upon receipt for mechanical damage. Also check it electrically; if the mount was subjected to severe mechanical shock during shipment, the match between the thermistors may be affected. To check thermistor match, proceed as described in Paragraph 58.

6. If any damage is found, inform the carrier and your nearest HP Sales and Service Office immediately.

OPERATION

7. PRECAUTIONS.

8. MECHANICAL SHOCK.

9. DO NOT DROP OR SUBJECT TO SEVERE MECHANICAL SHOCK. SHOCK MAY DESTROY THE MATCH BETWEEN THERMISTORS AND INCREASE SUSCEPTIBILITY TO DRIFT.

10. BIASING THERMISTORS.

CAUTION

Before connecting the Model 478A to the 431 or 432 Power Meters, set the MOUNT RES switch to 200-ohm position. CONNECTING A 200-OHM MOUNT TO A POWER METER SET FOR A 100-OHM MOUNT CAN RESULT IN THERMISTOR DAMAGE.

11. MAXIMUM INPUT.

12. The Model 478A/431 and 478A/432 combinations respond to the average RF power applied. The maximum signal applied to the thermistor mount should not exceed the limitations for 1) average power, 2) pulse energy and 3) peak pulse power. Excessive input can permanently damage the Model 478A by altering the match between the RF and compensation thermistors (resulting in excessive drift or zero shift) or cause error in indicated power.

13. AVERAGE POWER. The 478A/431 and 478A/432 combinations can measure average power up to 10 mW. To measure power in excess of 10 mW, insert a calibrated directional coupler such as one of the HP Model 770 series or 790 series between the mount and the source. UNDER NO CIRCUMSTANCES APPLY MORE THAN 30 mW AVERAGE POWER TO THE MOUNT.

14. PULSE ENERGY AND PEAK POWER FOR 478A/432 COMBINATION. For pulses shorter than 250 μs, energy per pulse must not exceed 10 W-μs and peak power should never exceed 200 watts. (For example, a 40 mW, 250 μs pulse contains 10 W-μs of energy.) Pulses longer than 250 μs are allowed to contain more energy but peak power must not exceed 200W. Figures 1 and 2 interpret these limits in graphical form. (For lack of space, the mount nameplate lists only a 5 W-μs