

# HP 8751A NETWORK ANALYZER MAINTENANCE MANUAL

## SERIAL NUMBERS

This manual applies directly to instruments with serial number prefix 3026J.  
For additional important information about serial numbers, read "Instruments  
Covered By Manual" in General Information of this Maintenance Manual.



HP Part No. 08751-90030  
Microfiche Part No. 08751-90080  
Printed in JAPAN November 1990

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## Manual Printing History

The manual printing date and part number indicate its current edition. The printing date changes when a new edition is printed. (Minor corrections and updates which are incorporated at reprint do not cause the date to change.) The manual part number changes when extensive technical changes are incorporated.

November 1990..... 1st. Edition

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## Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific **WARNINGS** given elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument.

*The Hewlett-Packard Company assumes no liability for the customer's failure to comply with these requirements.*

### Ground The Instrument

This is a Safety Class 1 product (provided with a protective earthing terminal). An uninterruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power source to the product input wiring terminals, power cord, or supplied power cord set. Whenever it is likely that the protection has been impaired, the product must be made inoperative and secured against any unintended operation.

### DO NOT Operate In An Explosive Atmosphere

Do not operate the instrument in the presence of flammable gasses or fumes. Operation of any electrical instrument in such an environment constitutes a safety hazard.

### Keep Away From Live Circuits

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

### DO NOT Service Or Adjust Alone

Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

### DO NOT Substitute Parts Or Modify Instrument

Because of the danger of introducing additional hazards, do not substitute parts or perform unauthorized modifications to the instrument. Return the instrument to a Hewlett-Packard Sales and Service Office for service and repair to ensure the safety features are maintained.

### Dangerous Procedure Warnings

**Warnings**, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

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#### Warning



**Dangerous voltages, capable of causing death, are present in this instrument. Use extreme caution when handling, testing, and adjusting this instrument.**

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## **How To Use This Manual**

This is the Maintenance Manual for the HP 8751A Network Analyzer. This manual contains the performance test procedures. For more detailed information, refer to the Chapter 1. General Information.

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## Typeface Conventions

### Bold

Boldface type is used when a term is defined. For example: **icons** are symbols.

### Italics

Italic type is used for emphasis and for titles of manuals and other publications.

Italic type is also used for keyboard entries when a name or a variable must be typed in place of the words in italics. For example: *copy filename* means to type the word *copy*, to type a space, and then to type the name of a file such as *file1*.

### Computer

Computer font is used for on-screen prompts and messages.

### **HARDKEYS**

Labeled keys on the instrument front panel are enclosed in **□**.

### **SOFTKEYS**

Softkeys located to the right of the CRT are enclosed in **▢**.

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## Certification

Hewlett-Packard Company certifies that this product met its published specifications at the time of shipment from the factory. Hewlett-Packard further certifies that its calibration measurements are traceable to the United States National Institute for Standards and Technology, to the extent allowed by the Institution's calibration facility, or to the calibration facilities of other International Standards Organization members.

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## Warranty

This Hewlett-Packard instrument product is warranted against defects in material and workmanship for a period of one year from the date of shipment, except that in the case of certain components listed in *General Information* of this manual, the warranty shall be for the specified period. During the warranty period, Hewlett-Packard Company will, at its option, either repair or replace products which prove to be defective.

For warranty service or repair, this product must be returned to a service facility designated by HP. Buyer shall prepay shipping charges to HP and HP shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to HP from another country.

HP warrants that its software and firmware designated by HP for use with an instrument will execute its programming instruction when properly installed on that instrument. HP does not warrant that the operation of the instrument, or software, or firmware will be uninterrupted or error free.

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## Limitation Of Warranty

The foregoing warranty shall not apply to defects resulting from improper or adequate maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environment specifications for the product, or improper site preparation or maintenance.

*No other warranty is expressed or implied. HP specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.*

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## **Exclusive Remedies**

*The remedies provided herein are buyer's sole and exclusive remedies. HP shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory.*

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## **Assistance**

Product maintenance agreements and other customer assistance agreements are available for Hewlett-Packard products.

For any assistance, contact your nearest Hewlett-Packard Sales and Service Office. Address are provided at the back of this manual.

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## Safety Symbols

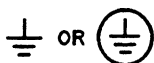
General definitions of safety symbols used on equipment or in manuals.



Instruction manual symbol: the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual in order to protect against damage to the instrument.



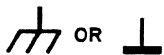
Indicates dangerous voltage (terminals fed from the interior by voltage exceeding 1000 volts must be so marked).



Protective conductor terminal. For protection against electrical shock in case of a fault. Used with wiring terminals to indicate the terminal which must be connected to ground before operating equipment.



Low-noise or noiseless, clean ground (earth) terminal. Used for a signal common, as well as providing protection against electrical shock in case of fault. A terminal marked with this symbol must be connected to ground in the manner described in the installation (Operation) manual, and before operating the equipment.



Frame or chassis terminal. A connection to the frame (chassis) of the equipment which normally includes all exposed metal structures.



Alternating current (power line).



Direct current (power line).



Alternating or direct current (power line).

### Warning



Warning denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in injury or death to personnel.

### Caution



Caution sign denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result damage to or destruction of part or all of the product.

### Note



Note denotes important information. It calls attention to a procedure, practice, condition or the like, which is essential to highlight.

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## Documentation Map

### **Operation Manual Set (HP Part Number 08751-90000)**

#### **User's Guide**

The User's Guide walks you through system setup and initial power-on, shows how to make basic measurements, explains commonly used features, and tells you how to get the most performance from your analyzer. After you receive your HP 8751A, begin with this manual. (P/N 08751-90001)

#### **General Information**

The General Information provides general information, specifications.

#### **Reference Manual**

The Reference Manual provides in-depth reference information.

#### **HP-IB Programming Manual**

The HP-IB Programming Guide provides a summary of all available HP-IB command, and shows how to make basic program to control the HP 8751A by a controller via HP-IB.

### **Maintenance Manual (HP Part Number 08751-90030)**

The Maintenance Manual explains how to verify conformance to published specifications.

### **Service Manual (Option 915), (HP Part Number 08751-90031)**

The Service Manual explains how to adjust, troubleshoot, and repair the instrument.

### **Using HP Instrument BASIC with the HP 8751A (Option 002 only)**

The Using HP Instrument BASIC with the HP 8751A describes how HP Instrument BASIC works with the HP 8751A and any unique features. This manual is furnished option 002.

### **HP Instrument BASIC Manual Set (Option 002 only), (HP Part Number E2083-90000)**

#### **HP Instrument BASIC User's Handbook**

The HP Instrument BASIC User's Handbook provides some helpful hints on getting the most use from HP Instrument BASIC programming language, and provides a general programming reference. This manual is furnished option 002.

#### **HP Instrument BASIC Language Reference**

The HP Instrument BASIC Language Reference provides a summary of all available HP Instrument BASIC Language. This manual is furnished option 002.

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## **General Information**

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### **INTRODUCTION**

This manual contains technical information concerning the maintenance of the HP 8751A Network Analyzer.

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### **MANUAL ORGANIZATION**

This manual contains two chapters. A summary of each section follows.

#### **Chapter 1. General Information**

Chapter 1 describes this maintenance manual, and lists the test equipment required for the preventive maintenance and the performance tests. It also provides the procedures for replacing the line fuse.

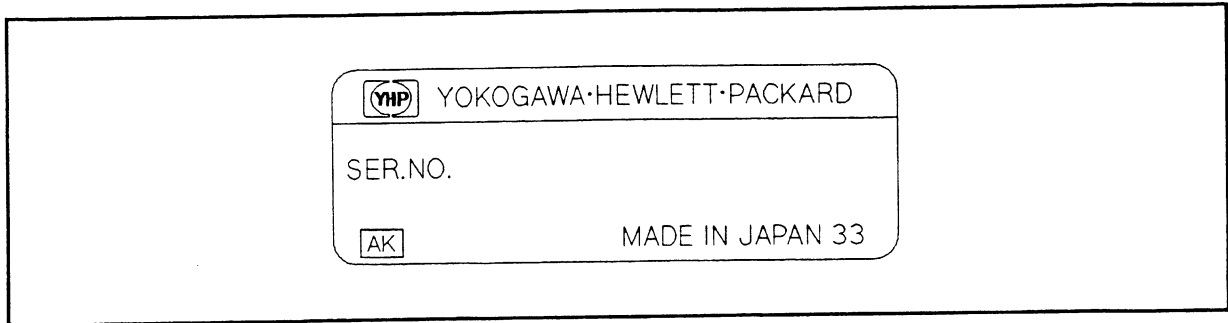
#### **Chapter 2. Performance Tests**

Chapter 2 provides the performance test procedures for the incoming inspection and periodical maintenance.

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### **INSTRUMENTS COVERED BY THIS MANUAL**

Hewlett-Packard uses a two-part, nine character serial number which is stamped on the serial number plate (see Figure 1-1) attached to the rear panel. The first four digits and the letter are the serial prefix and the last five digits are the suffix. The letter placed between the two sections identifies the country where the instrument was manufactured. The prefix is the same for all identical instruments; it changes only when a change is made to the test set. The suffix, however, is assigned sequentially and is unique to each instrument. The contents of this manual apply to instruments with the serial number prefixes listed under Serial Numbers on the title page.



**Figure 1-1. Serial Number Plate**

An instrument manufactured after the printing date of this manual may have a serial number prefix that is not listed on the title page. This unlisted serial number prefix indicates that the instrument is different from those described in this manual. The manual for a new instrument may be accompanied by a yellow *MANUAL CHANGES* supplement or have a different manual part number. The *MANUAL CHANGES* supplement contains “change information” that explains how to adapt the manual to newer instruments.

In additions to change information, the supplement may contain information for correcting errors (Errata) in the manual. To keep this manual as current and accurate as possible, Hewlett-Packard recommends that you periodically request the latest *MANUAL CHANGES* supplement. The supplement for this manual is identified by this manual’s printing data and its supplement are available from Hewlett-Packard. If the serial prefix or number of an instrument is lower than that on the title page of this manual, see APPENDIX A, *MANUAL CHANGES*.

For information concerning serial number prefixes not listed on the title page or in the *MANUAL CHANGE* supplement, contact the nearest Hewlett-Packard office.

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## RECOMMENDED TEST EQUIPMENT

Table 1-1 lists the equipment required for performance testing, adjustments, and troubleshooting the HP 8751A. Other equipment may be substituted if it meets or exceeds the critical specifications given in Table 1-1.

**Table 1-1. Recommended Test Equipment (1/2)**

Equipment	Critical Specifications	Recommended Model	Qty	Use <sup>1</sup>
Series 200/300 Controller	No substitute (BASIC Rev. 5.0 and above)	Model 310	1	A, T
Spectrum Analyzer	Frequency: 100 Hz to 1.5 GHz	HP 8566B or HP 8568B	1	P, A, T
Multimeter	No substitute	HP 3458A	1	P, A, T
Universal Source	DC Output: 0 to $\pm 2$ V, Accuracy: < 0.1%	HP 3245A	1	P, A
Frequency Counter	Frequency: 10 Hz to 500 MHz Accuracy: < 0.25 ppm	HP 5334B Opt. 010, 030	1	P, A
Power Meter	No substitute	HP 436A Opt.022, HP 437B, or HP 438A	1	P, A
Power Sensor	Frequency: 100 kHz to 500 MHz Power: +5 dBm to -20 dBm	HP 8482A	1	P, A
	Frequency: 10 MHz to 500 MHz Power: -20 to -60 dBm	HP 8481D	1	P
80 dB Step Attenuator	No substitute	HP 8496A/G with Opt.001 & H60 <sup>2</sup>	1	P
Attenuator/ Switch Driver	No substitute	HP 11713A	1	P
Type-N Calibration Kit	No substitute	HP 85032B	1	P
Coaxial Loads	Type-N 50 $\Omega$ Termination	HP909C Opt.012	3	P, A, T
	50 $\Omega$ Feedthrough, BNC(m)-BNC(f)	PN 04192-61002 or HP 11048C	1	P, A
Program Attenuator Pad	Adjustments Program (3.5 in) Impedance 50 $\Omega$ , N(m)-N(f)	PN 08751-65002	1	A
	ATT 6 dB	HP 8491A Opt. 006	1	P
	ATT 10 dB	HP 8491A Opt. 010	2	P
	ATT 6 dB, VSWR < 1.015	HP 8491A Opt. 006 & H60 <sup>3</sup>	1	P
	ATT 10 dB, VSWR < 1.015	HP 8491A Opt. 010 & H60 <sup>4</sup>	1	P
	ATT 20 dB	HP 8491A Opt. 020 <sup>5</sup>	1	P, A, T

1 P: Performance Tests, A: Adjustments and Correction Constants, T: Troubleshooting

2 An HP 8496A/B step attenuator with required low VSWR (1.02) can be purchased by specifying option H60, then contact your nearest Hewlett-Packard service center for the required calibration frequency and calibration uncertainty.

3 An HP 8491A Opt. 006 fixed attenuator with required low VSWR (< 1.015) can be purchased by specifying Opt. H60.

4 An HP 8491A Opt. 010 fixed attenuator with required low VSWR (< 1.015) can be purchased by specifying Opt. H60.

5 An HP 8491A Opt. 020 must be calibrated at 1 MHz, 30 MHz, 50 MHz, 100 MHz, 300 MHz, and 500 MHz (Uncertainty:  $\leq 0.06$  dB). When you purchase an HP 8491A Opt. 020, contact your nearest Hewlett-Packard service center for the required calibration frequency and uncertainty.

**Table 1-1. Recommended Test Equipment (1/2) (continued)**

Equipment	Critical Specifications	Recommended Model	Qty	Use <sup>1</sup>
Cables	RF Cable Set	HP 11851B	1	P
	50 $\Omega$ N(m)-N(m), 61cm	HP 11500B	3	P, A, T
	50 $\Omega$ BNC(m)-BNC(m), 61 cm	PN 8120-1839	2	P, A
	50 $\Omega$ BNC(m)-BNC(m), 122 cm	PN 8120-1840	2	P, A
	50 $\Omega$ BNC(m)-SMB(f), 122 cm	PN 85680-60093	1	A, T
	50 $\Omega$ SMC(f)-SMC(f)	PN 08751-65006	1	T
	50 $\Omega$ SMC(m)-SMC(f)	PN 08751-65007	1	T
	HP-IB Cable	HP 10833A/B/C	3	A, T
Adapters	50 $\Omega$ , N(f)-N(f)	PN 1250-0777	2	P, A
	50 $\Omega$ , N(f)-BNC(f)	PN 1250-1474	1	A
	50 $\Omega$ , N(m)-N(m)	PN 1250-0778	1	P, A
	50 $\Omega$ , N(m)-BNC(f)	PN 1250-0780	2	P, A, T
	50 $\Omega$ , N(f)-BNC(m)	PN 1250-0077	1	A
	50 $\Omega$ SMC(m)-BNC(f)	PN 1250-1899	1	A, T
	50 $\Omega$ SMC(m)-N(m)	PN 1250-1023	1	A, T
	BNC (f)-Dual Banana Plug	PN 1251-2277	1	P, A
Power Splitter	Freq.Range: > 500 MHz, Two-way	HP 11667A	1	P, A, T
	Freq.Range: > 500 MHz, Three-way	HP 11850C	1	P, A, T
T/R Test Kit	Frequency: 5 Hz to 500 MHz Directivity: $\geq$ 40 dB	HP 87512A	1	P
Extender Board	HP 8751A Extender Board Set	PN 08751-65005	1	A, T
Tool	Board Extractor	PN 08751-65012	1	T

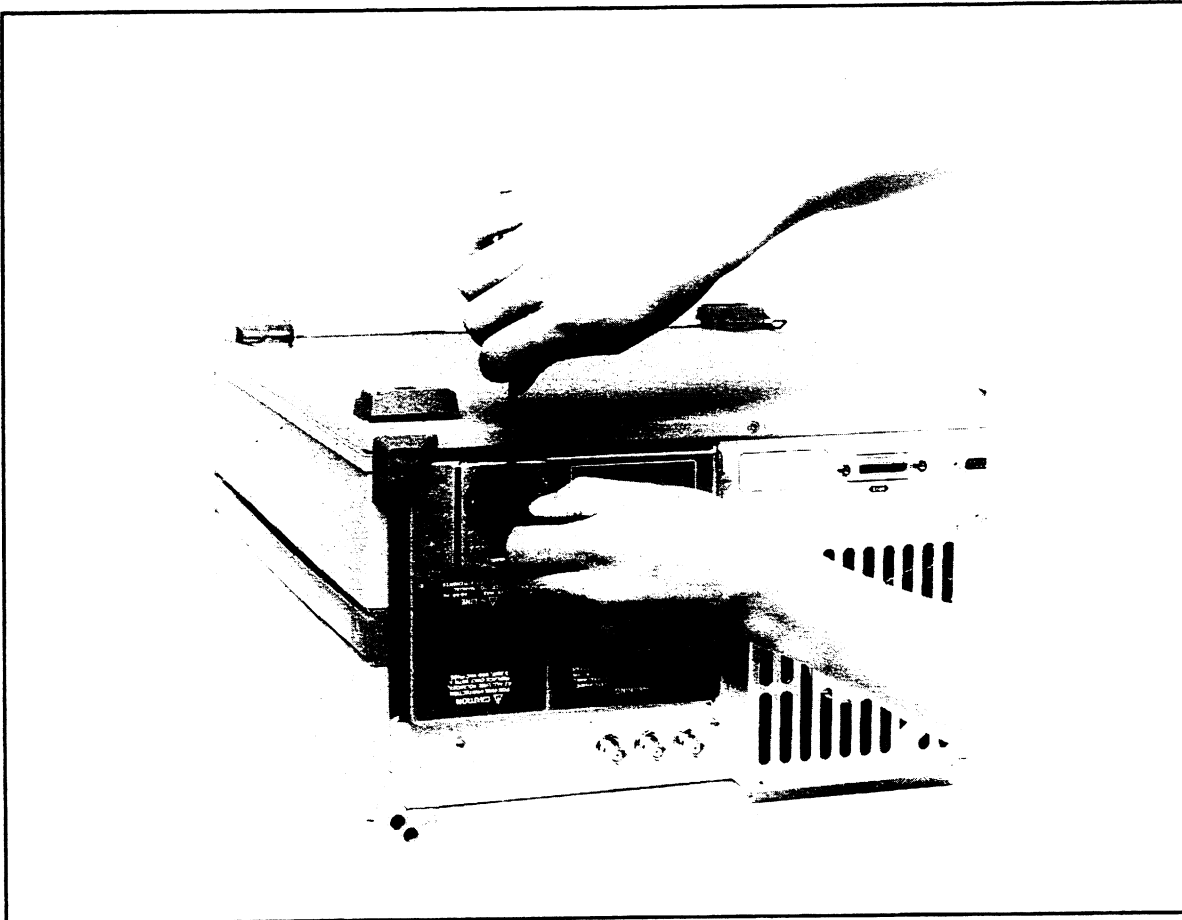


---

## LINE FUSE REPLACEMENT PROCEDURE

If the line fuse of your HP 8751A is blown, perform the following procedures.

1. Turn the instrument up side down.
2. Use a small flat-bladed screwdriver to pry out the fuse holder as shown in Figure 1-2.



**Figure 1-2. Removing the Line Fuse Holder**

3. There is one spare fuse (PN 2110-0780: 3 A, 250 V) in the line fuse holder. Replace the blown fuse with a new fuse.
4. Reinstall the line fuse holder.



## Performance Tests

---

### INTRODUCTION

This chapter provides the test procedures used to verify that the HP 8751A's specifications listed in the HP 8751A Operating Manual are met. All tests can be performed without access to the interior of the instrument. The performance tests can also be used to perform incoming inspection, and to verify that the HP 8751A meets performance specifications after troubleshooting or adjustment. If the performance tests indicate that the HP 8751A is NOT operating within the specified limits, check your test setup, and then proceed to Adjustments or Troubleshooting in the HP 8751A service manual are required.

---

**Note**

Allow the HP 8751A to warm up for at least 30 minutes before you execute any of the performance tests.

---

**Note**

Perform all performance tests in an ambient temperature of  $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ .

---

### PERFORMANCE TEST RECORD

Record the performance test results in the Test Record at the end of this chapter (Photocopy the Test Record and use the photocopy). The Test Record lists all test specifications, their acceptable limits, and measurement uncertainty for the recommended test equipment. Test results recorded during incoming inspection can be used for comparison purposes during periodic maintenance, troubleshooting, and after repair or adjustment.

---

## **CALCULATION SHEET**

The Calculation Sheet is used to as an aid for recording raw measurement data, and calculating the performance test results.

The performance test procedure gives the test sequence for performing a test, the complete set of measurement data are recorded on the calculation sheet, the results are calculated using the equations given on the calculation sheet, and the results are transcribed to the Performance Test Record.

The procedure for using the calculation sheet is:

1. Photo copy the Calculation Sheet.
2. Follow the performance test procedure and record the measurement value, the HP 8751A's reading, etc., into the specified column on the Calculation Sheet.
3. Calculate the test result using the appropriate equation given on the Calculation Sheet.
4. Record the test result into the TEST RESULT column on the Calculation Sheet of the Performance Test Record sheet as appropriate.

---

## **CALIBRATION CYCLE**

The HP 8751A requires periodic performance verification. The frequency of performance verification depends on the operating and environmental conditions under which the HP 8751A is used. Verify the HP 8751A's performance at least once a year, using the performance tests described in this chapter.

## FREQUENCY RANGE AND ACCURACY TEST

This test uses an external frequency counter to test the HP 8751A's Internal Synthesizer Frequency Accuracy over its entire frequency range.

### Specification

Frequency Range:	5 Hz to 500 MHz
Frequency Accuracy:	$\pm (20 \text{ ppm} + 1 \text{ mHz})$ , at $23^\circ\text{C} \pm 5^\circ\text{C}$ (Standard) $\pm (1.0 \text{ ppm} + 1 \text{ mHz})$ , at 0 to $55^\circ\text{C}$ , 20 minutes after power on (With Opt. 001)

### Test Equipment

Frequency Counter	HP 5334B Opt.010, 030
BNC(m)-BNC(m) Cable, 61 cm	PN 8120-1839
N(m)-BNC(f) Adapter	PN 1250-1476

### Procedure

1. Connect the BNC(m)-BNC(m) Cable from HP 8751A RF OUT to the Frequency Counter INPUT A as shown in Figure 2-1.

If the HP 8751A is equipped with Option 001, confirm that a BNC(m)-BNC(m) cable is connected between the EXT REF INPUT (10/N MHz) connector and the REF OVEN (OPTION 001) connector on the rear panel. If Option 001 is NOT installed, connect nothing to the EXT REF INPUT (10/N MHz) connector.

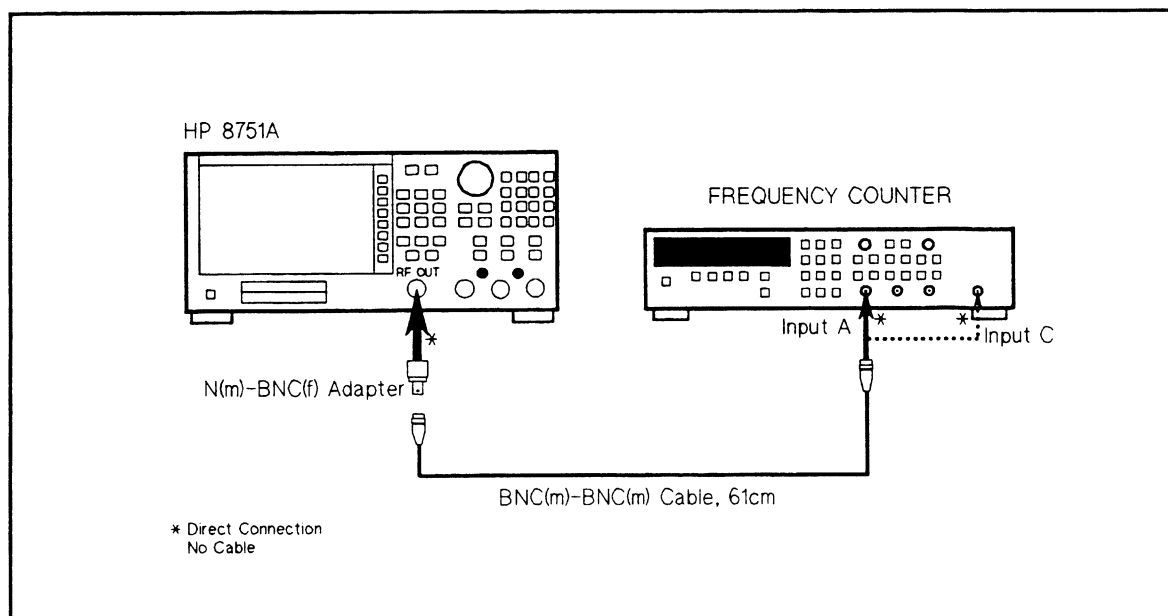


Figure 2-1. Frequency Accuracy Test Setup

- Set up the HP 8751A as follows.

#### Control Settings

#### Key Strokes

PRESET

START Freq. = 6.387499999 Hz

STOP Freq. = 17.387499999 MHz

Number of Points: 2

Trigger: Manual Trigger on Point

PRESET

START, 6, ., 3, 8, 7, 4, 9, 9, 9, 9, 9, M/u

STOP, 1, 7, ., 3, 8, 4, 9, 9, 9, 9, 9, M/u

MENU, NUMBER of POINTS, 2, x1

MENU, TRIGGER MENU, MANUAL TRG ON POINT

- Set the frequency by pressing the MANUAL TRG ON POINT softkey in accordance with the following table. Record the frequency counter reading on the Performance Test Record.

HP 8751A Frequency
6.387499999 MHz
17.387499999 MHz

- Press TRIGGER: TRIG OFF.
- Set the gate time of the frequency counter to 10 s.
- Change the HP 8751A control settings as follows:

#### Control Settings

#### Key Strokes

CENTER Freq. = 5 Hz

SPAN Freq. = 0 Hz

CENTER, 5, x1

SPAN, 0, x1

- Record the frequency counter reading on the Performance Test Record.
- Change the gate time of the frequency counter to 300 ms.
- Press CENTER, 8, 3, ., 0, 6, 9, M/u to set the CENTER FREQUENCY to 83.069 MHz.
- Record the frequency counter reading on the Performance Test Record.
- Remove the cable from the frequency counter INPUT A, and connect the cable to the frequency counter INPUT C.
- Set the HP 8751A CENTER FREQUENCY according to the table listed below. Record the frequency counter reading on the Performance Test Record.

HP 8751A CENTER FREQUENCY
250 MHz
500 MHz

## HARMONICS TEST

This test measures the HP 8751A signal source's second harmonics and third harmonics with a spectrum analyzer.

### Specification

Harmonics: < -30 dBc (at +10 dBm output level)

### Test Equipment

Spectrum Analyzer	HP 8566B
N(m)-BNC(f) Adapter	PN 1250-1476, 2 ea.
BNC(m)-BNC(m) Cable, 122 cm	PN 8120-1840, 2 ea.

### Procedure

1. Set up the test configuration shown in Figure 2-2.

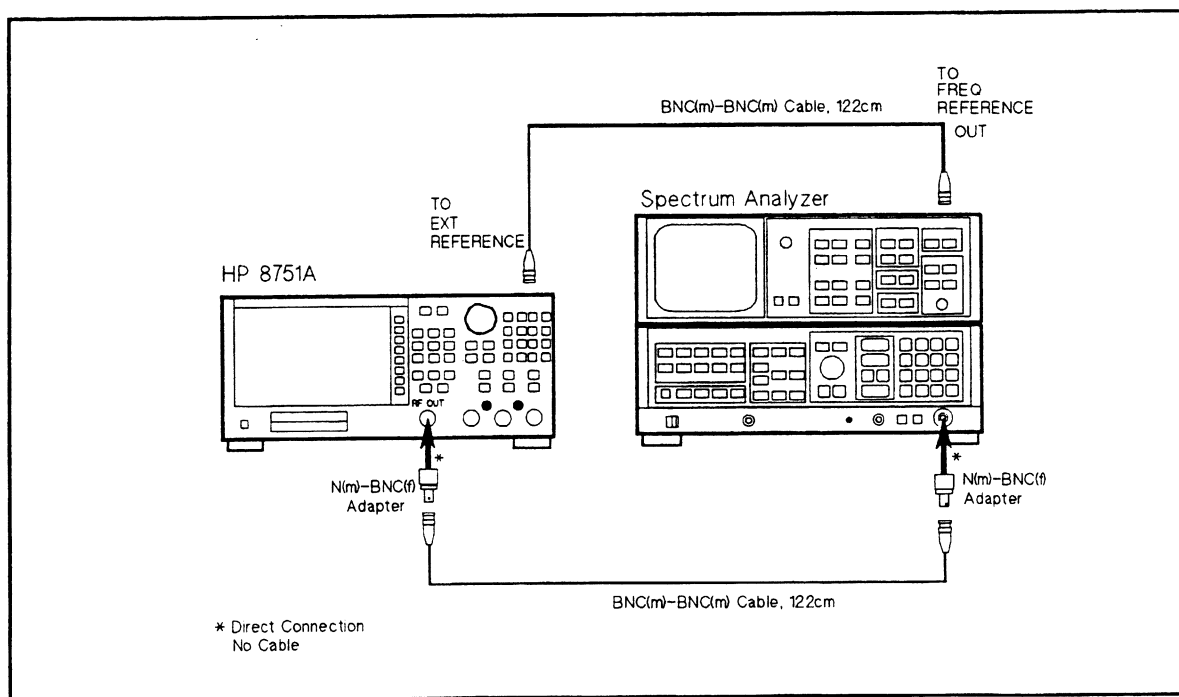


Figure 2-2. Harmonics Test Setup

2. Set up the HP 8751A as follows:

#### Control Settings

PRESET

Source Power = 10 dBm

Span = 0 Hz

#### Key Strokes

PRESET

MENU, POWER, 1, 0, x1

SPAN, 0, x1

3. Set the spectrum analyzer as follows:

Reference Level                      +20 dBm  
Res BW                                  AUTO

4. Set the HP 8751A's center frequency and the spectrum analyzer's center and span frequency according to the table below. Then record the spectrum analyzer readings in the calculation sheet.

HP 8751A Center Freq.	Spectrum Analyzer	
	CENTER	SPAN
100 Hz	100 Hz	100 Hz
	200 Hz	100 Hz
	300 Hz	100 Hz
10 kHz	10 kHz	5 kHz
	20 kHz	5 kHz
	30 kHz	5 kHz
500 kHz	500 kHz	5 kHz
	1.0 MHz	5 kHz
	1.5 MHz	5 kHz
10 MHz	10 MHz	5 kHz
	20 MHz	5 kHz
	30 MHz	5 kHz
100 MHz	100 MHz	5 kHz
	200 MHz	5 kHz
	300 MHz	5 kHz
300 MHz	300 MHz	5 kHz
	600 MHz	5 kHz
	900 MHz	5 kHz
500 MHz	500 MHz	5 kHz
	1 GHz	5 kHz
	1.5 GHz	5 kHz

5. Use the equation given on the calculation sheet to calculate the test results, and transcribe the test results to the Performance Test Record.



## NON-HARMONIC SPURIOUS TEST

This test uses a spectrum analyzer to measure the HP 8751A's signal source Non-Harmonic Spurious signal which appears near the carrier frequency.

### Specification

Non Harmonic Spurious: < -45 dBc (at 0 dBm output level)

### Test Equipment

Spectrum Analyzer	HP 8566B
N(m)-BNC (f) Adapter	PN 1250-1476, 2 ea.
BNC(m)-BNC(m) Cable, 122 cm	PN 8120-1840, 2 ea.

### Procedure

1. Set up the test configuration as shown in Figure 2-3.

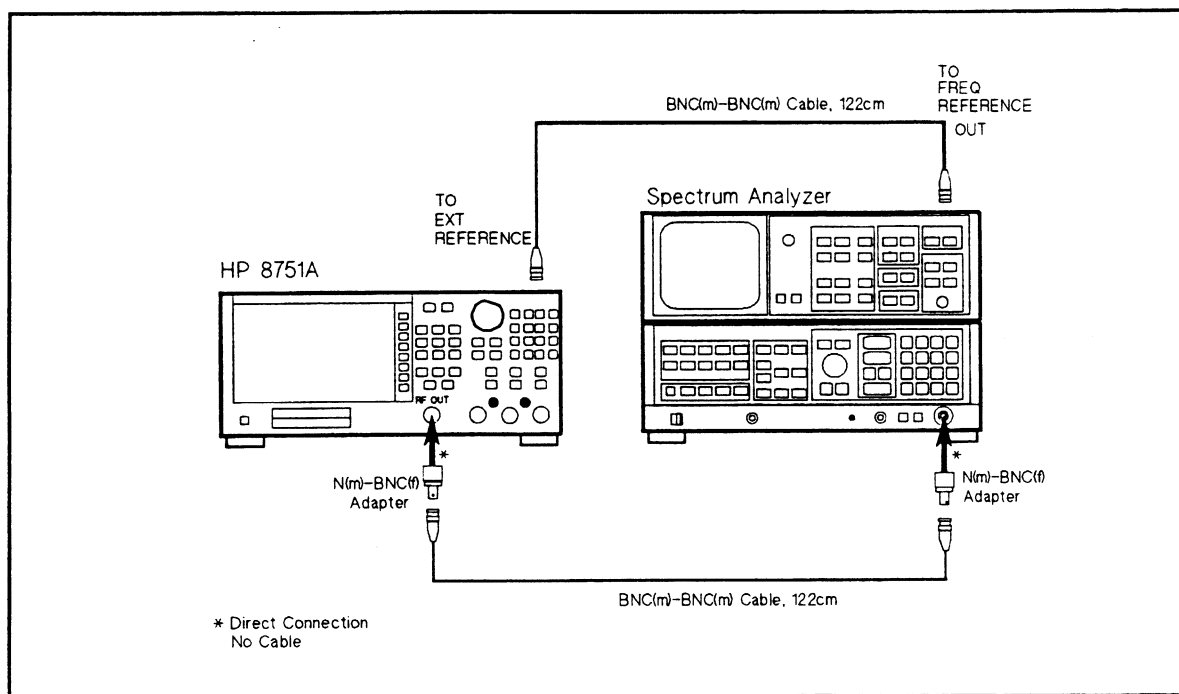


Figure 2-3. Non Harmonics Spurious Test Setup

2. Set up the HP 8751A as follows:

#### Control Settings

PRESET

Span = 0 Hz

#### Key Strokes

PRESET  
SPAN, 0, x1

3. Perform the following sequence.

- a. Set the HP 8751A's CENTER FREQUENCY and the Spectrum Analyzer's CENTER, SPAN, RBW according to the table.
- b. Move the Spectrum Analyzer's marker to the peak value (Fundamental) using the peak search function.
- c. Record the fundamental frequency and amplitude on the calculation sheet.
- d. Calculate the spectrum analyzer CENTER frequency for the spurious measurement according to the calculation sheet, if necessary.
- e. Set the spectrum analyzer CENTER, SPAN, and RBW according to the table.
- f. Move the Spectrum Analyzer's marker to the peak value (Spurious Max.) using the peak search function.
- g. Record the Spectrum Analyzer reading on the Calculation Sheet.
- h. Repeat steps a through g until all frequencies in the table are completed.

HP 8751A Center Freq.	Spectrum Analyzer			
	CENTER	SPAN	RBW	Marker
493.7625 MHz	493.7625 MHz	20 kHz	300 Hz	Fundamental (f1)
	(f1) + 225 Hz	400 Hz	10 Hz	Spurious Max.
493.76274125 MHz	493.76274125 MHz	20 kHz	300 Hz	Fundamental (f2)
	(f2) + 550 Hz	1 kHz	10 Hz	Spurious Max.
493.7649125 MHz	493.7649125 MHz	20 kHz	300 Hz	Fundamental (f3)
	(f3) + 5.5 kHz	10 kHz	100 Hz	Spurious Max.
493.786625 MHz	493.786625 MHz	100 kHz	300 Hz	Fundamental (f4)
	(f4) + 55 kHz	100 kHz	300 Hz	Spurious Max.
426 MHz	426 MHz	20 kHz	300 Hz	Fundamental
	424 MHz	20 kHz	300 Hz	Spurious Max.

4. Use the equation given on the Calculation Sheet to calculate the test results, and record the test results in the Performance Test Record.

## PHASE NOISE TEST

This test measures the HP 8751A's signal source Phase Noise. A spectrum analyzer is used to determine the phase noise which broadens the carrier spectrum.

### Specification

Phase Noise:  $< -75 \text{ dBc/Hz}$  (at 20 kHz offset from 0 dBm fundamental)

### Test Equipment

Spectrum Analyzer	HP 8566B
N(m)-N(f) Adapter	PN 1250-1476, 2 ea.
BNC(m)-BNC(m) Cable, 122 cm	PN 8120-1840, 2 ea.

### Procedure

1. Set up the test configuration as shown in Figure 2-4.

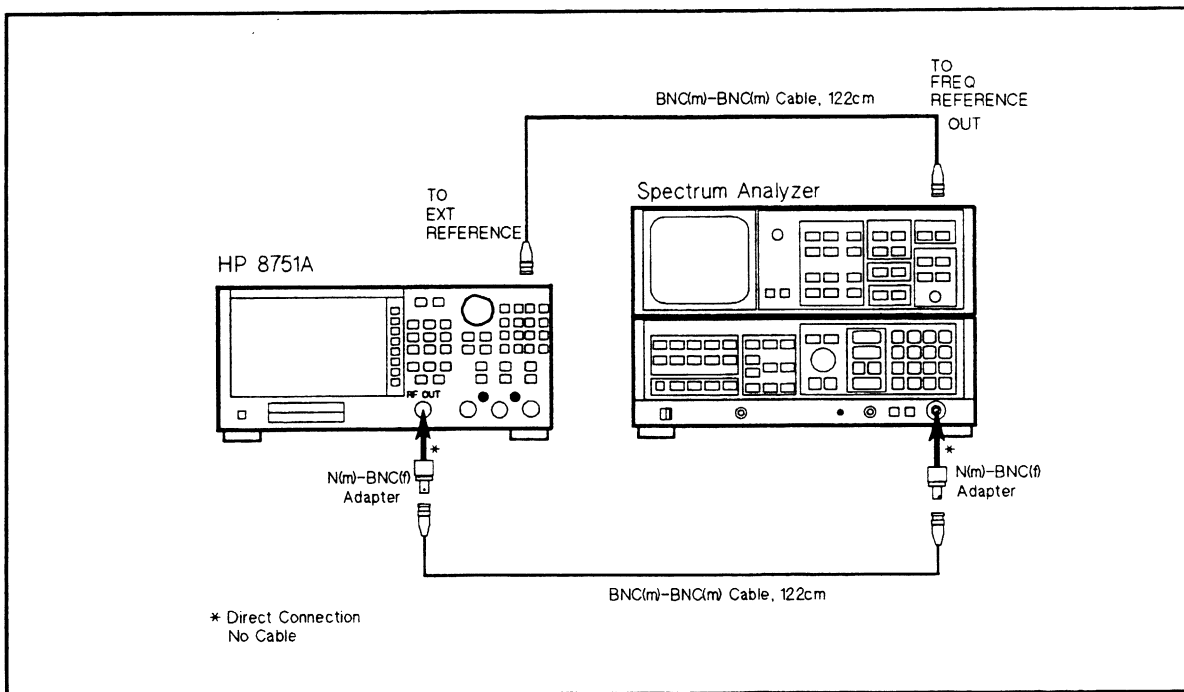


Figure 2-4. Phase Noise Test Setup

2. Set up the HP 8751A as follows:

**Control Settings**

**Key Strokes**

PRESET

PRESET

SPAN Freq. = 0 Hz

SPAN, 0, x1

3. Set the spectrum analyzer as follows:

Frequency Span

50 kHz

RES BW

100 Hz

4. Set the HP 8751A CENTER FREQUENCY, and the spectrum analyzer CENTER FREQUENCY, according to the following table. Then record the spectrum analyzer reading at CENTER FREQUENCY into Calculation Sheet, and record the spectrum analyzer reading at the  $\pm 20$  kHz frequency points of the CENTER FREQUENCY into Calculation Sheet.

CENTER FREQUENCY For HP 8751A and Spectrum Analyzer
4 MHz
249 MHz
498.5875 MHz

5. Use the equation given on the Calculation Sheet to calculate the test results, and record the test results in the Performance Test Record.

---

## SOURCE LEVEL ACCURACY/FLATNESS TEST

This test measures the HP 8751A's signal source output Level Accuracy/Flatness. A digital voltmeter or a power meter is used to measure each output port level at several frequencies. The Flatness test is checked by the tolerance of the level at 50 MHz.

### Specification

Level Accuracy:	$\pm 0.5$ dB (at $23 \pm 5^\circ\text{C}$ , 0 dBm output level, 50 MHz)
Level Flatness:	(at $23 \pm 5^\circ\text{C}$ , Relative to 0 dBm output level at 50 MHz)
5 Hz $\leq$ Freq. $\leq$ 1 MHz	$\pm 2.0$ dB
1 MHz $<$ Freq. $\leq$ 300 MHz	$\pm 1.5$ dB
300 MHz $<$ Freq. $\leq$ 500 MHz	$\pm 2.0$ dB

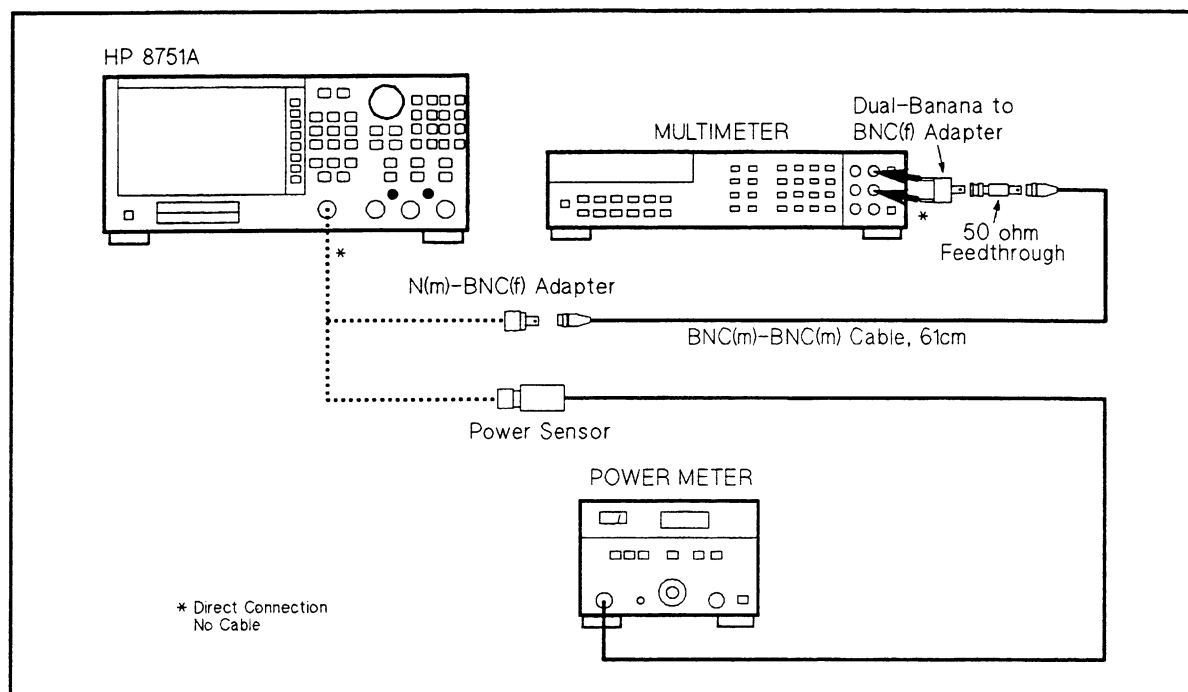
### Test Equipment

Digital Voltmeter	HP 3458A
Power Meter	HP 436A
Power Sensor	HP 8482A
50 $\Omega$ Feedthrough	PN 04192-61002
BNC(m)-BNC(m) Cable, 61 cm	PN 8120-1839
N(m)-BNC(f) Adapter	PN 1250-1476
BNC(f)-Dual Banana Plug Adapter	PN 1251-2277

### Procedure

1. Connect the Power Sensor to the Power Meter, and calibrate the Power Meter for the Power Sensor.

2. Connect the Power Sensor to the HP 8751A RF OUT as shown in Figure 2-5.



**Figure 2-5. Level Accuracy/Flatness Test Setup**

3. Set up the HP 8751A as follows:

**Control Settings**

PRESET

CENTER Freq.= 50 MHz

SPAN = 0 Hz

Source Power = 0 dBm

**Key Strokes**

PRESET

CENTER, 5, 0, M/u

SPAN, 0, x1

MENU, POWER, 0, x1

4. Record the Power Meter reading on the performance test record, and transcribe it into Calculation Sheet.
5. Set the HP 8751A CENTER FREQUENCY as follows, and record the Power Meter reading into Calculation Sheet.

HP 8751A CENTER FREQUENCY
1 MHz
10 MHz
100 MHz
300 MHz
500 MHz

6. Disconnect the power sensor, and connect the Digital Voltmeter INPUT to HP 8751A RF OUT, as shown in Figure 2-5 (use a 50  $\Omega$  Feedthrough on the Digital Voltmeter input).

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7. Set the Multimeter as follows:

Measurement Function: AC Volts mode  
Display Reading Value: dBm reading value  
Measurement Method: Synchronous Sampling Conversion

8. Set the HP 8751A CENTER FREQUENCY as follows, and Record the Digital Voltmeter reading in the Calculation Sheet for each setting.

HP 8751A CENTER FREQUENCY
5 Hz
50 Hz
1 kHz
10 kHz
100 kHz

9. Use the equation given on the Calculation sheet to calculate the test results (Flatness), and transcribe the test results to the FLATNESS column in the Performance Test Record.

---

## NON SWEEP POWER LINEARITY TEST

This tests the HP 8751A's signal source non sweep power linearity. The linearity is measured by the Power Meter.

### Specification

Output Level Linearity	$\pm 0.5$ dB, Output Level $\geq -35$ dBm, $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ , 50 MHz, Relative to 0 dBm
	$\pm 1.5$ dB, Output Level $< -35$ dBm, $23\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$ , 50 MHz, Relative to 0 dBm

### Test Equipment

Power Meter	HP 436A
Power Sensor	HP 8482A
Power Sensor	HP 8481D
10 dB Attenuator Pad	HP 8491A Opt.010

### Procedure

1. Connect the HP 8482A Power Sensor to the Power Meter, and calibrate the Power Meter for the Power Sensor.
2. Connect the Power Meter to the HP 8751A's RF OUT as shown in Figure 2-6.

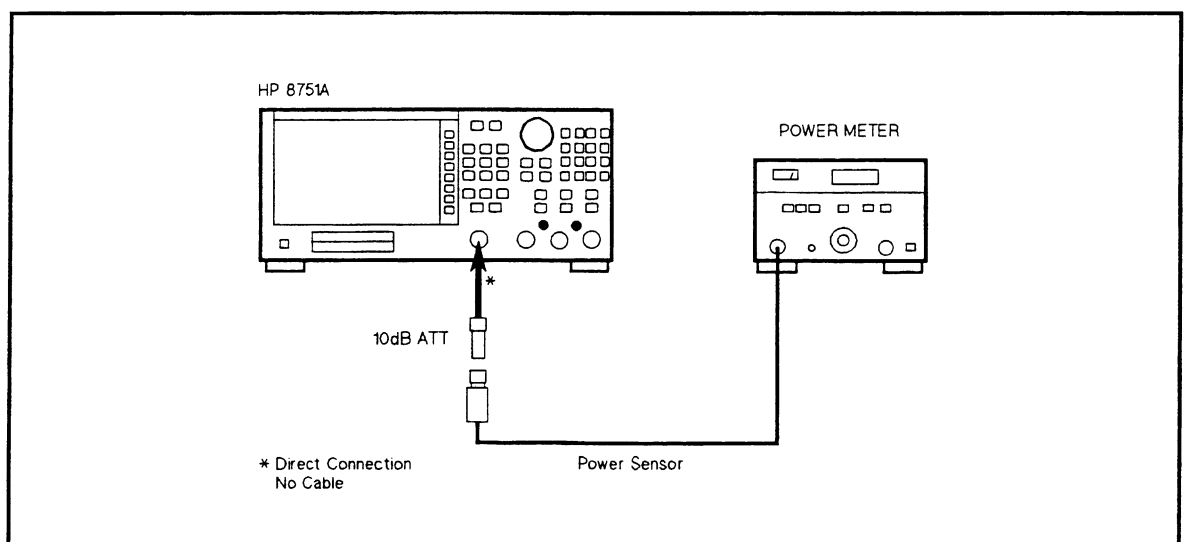


Figure 2-6. Power Linearity Test Setup

3. Set up the HP 8751A as follows.

#### Control Settings

PRESET  
CENTER Freq. = 50 MHz  
SPAN Freq. = 0 Hz

#### Key Strokes

PRESET  
CENTER, 5, 0, M/u  
SPAN, 0, x1



4. Record the Power Meter's reading value on the Calculation Sheet.
5. Set the HP 8751A SOURCE POWER as follows, and record the Power Meter's reading value into Calculation Sheet.

SOURCE POWER
+15 dBm
+10 dBm
+0 dBm
-10 dBm

6. Remove the HP 8482A Power Sensor from the HP 8751A RF OUT connector.
7. Change the Power Sensor from the HP 8482A to the HP 8481D, and calibrate the Power Meter for the Power Sensor.
8. Connect the Power Sensor to the HP 8751A RF OUT.
9. Set the SOURCE POWER according to the following table, and record the Power Meter's reading value into the Calculation Sheet.

SOURCE POWER
-10 dBm
-15 dBm
-20 dBm
-25 dBm
-30 dBm
-35 dBm
-40 dBm
-50 dBm

10. Use the equation given on the Calculation Sheet to calculate the test results, and transcribe the test results to the Performance Test Record.

---

## POWER SWEEP LINEARITY TEST

This test checks the HP 8751A's signal source linearity (Power Sweep).

### Specification

Start Power  $\geq -45$  dBm, relative to the STOP power level

	Span $\leq +20$ dB	Span $> +20$ dB
CW Freq. $\leq 300$ MHz	$\pm(0.3 \text{ dB}/10\text{dB} + 0.2\text{dB})$	$\pm(0.3 \text{ dB}/10\text{dB} + 1.0 \text{ dB})$
CW Freq. $> 300$ MHz	$\pm(1.0 \text{ dB}/10\text{dB} + 0.2 \text{ dB})$	$\pm(1.0 \text{ dB}/10\text{dB} + 1.0 \text{ dB})$

Start Power  $< -45$  dBm, relative to the STOP power level

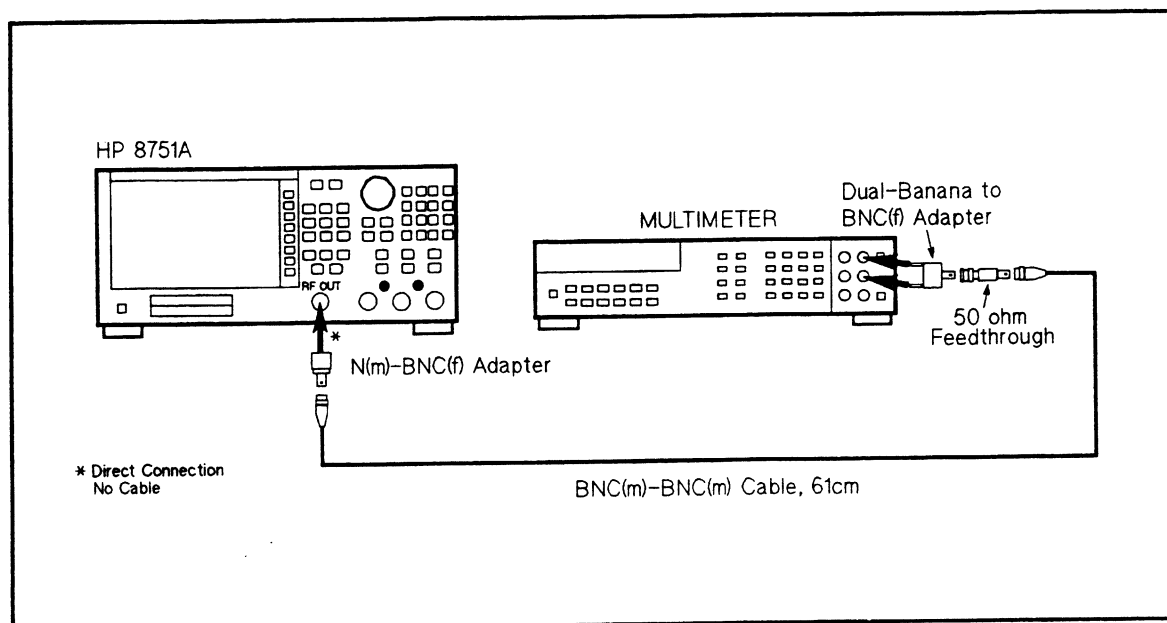
	Span $\leq +20$ dB	Span $> +20$ dB
CW Freq. $\leq 300$ MHz	$\pm(0.3 \text{ dB}/10\text{dB} + 1.2\text{dB})$	$\pm(0.3 \text{ dB}/10\text{dB} + 2.0 \text{ dB})$
CW Freq. $> 300$ MHz	$\pm(1.0 \text{ dB}/10\text{dB} + 1.2 \text{ dB})$	$\pm(1.0 \text{ dB}/10\text{dB} + 2.0 \text{ dB})$

### Test Equipment

Power Meter	HP 436A
Power Sensor	HP 8481D
10 dB Attenuator Pad	HP 8491A Opt.010
Multimeter	HP 3458A
50 $\Omega$ Feedthrough	PN 04192-61002
BNC(m)-BNC(m) Cable, 61 cm	PN 8120-1839
BND(f)-Dual Banana Plug Adapter	PN 1251-2277

## Procedure

1. Connect the Multimeter as shown in Figure 2-7.



**Figure 2-7. Power Sweep Linearity Test Setup**

2. Set up the HP 8751A as follows:

### Control Settings

PRESET

Sweep Type: Power

START Power = -50 dBm

STOP Power = -15 dBm

CW Freq. = 500 kHz

Number of Points: 8

Trigger: Manual Trigger on Point

### Key Strokes

**PRESET**

**MENU, SWEEP TYPE MENU, POWER SWEEP**

**START, -, 5, 0, x1**

**STOP, -, 1, 5, x1**

**MENU, CW FREQ, 5, 0, 0, k/m**

**MENU, NUMBER of POINTS, 8, x1**

**MENU, TRIGGER MENU, MANUAL TRG ON POINT**

3. Set the Multimeter as follows:

Measurement Function:

Display Reading Value:

Measurement Method:

Measurement Range:

AC Volts mode

dBm reading value

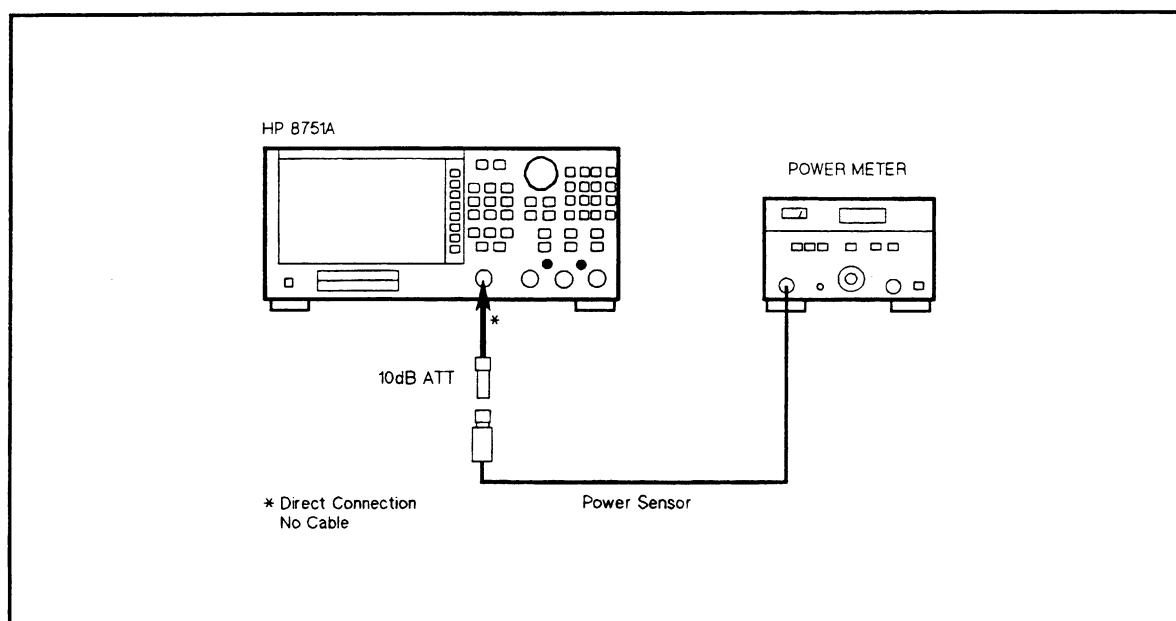
Synchronous Sampling Conversion

100 mV Range

4. Set the power by pressing **MANUAL TRG ON POINT** in accordance with the following table.  
Record the meter reading on the Calculation Sheet.

Power Level (dBm)
-50 dBm
-45 dBm
-40 dBm
-35 dBm
-30 dBm
-25 dBm
-20 dBm
-15 dBm

5. Press **MENU**, **CW FREQ**, **1**, **M/u** to change the CW frequency to 1 MHz.
6. Repeat step 4.
7. Connect the Power Sensor to the Power Meter, and calibrate the Power Meter for the Power Sensor.
8. Connect the equipment as shown in Figure 2-8.



**Figure 2-8. Power Sweep Linearity Test Setup**

9. Set the CW Frequency in accordance with the following table, and repeat step 4 for each CW Frequency.

CW Frequency
10 MHz
100 MHz
300 MHz
500 MHz

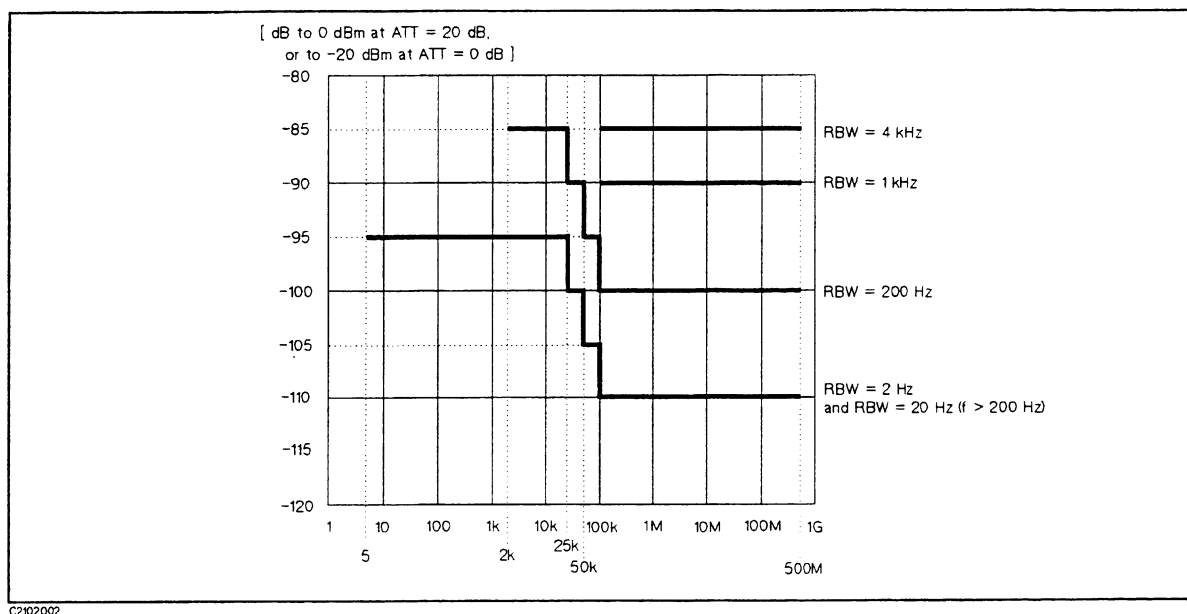
10. Use the equation given on the calculation sheet to calculate the test results, and transcribe the test results to the Performance Test Record.

## RECEIVER NOISE LEVEL TEST

This test measures the HP 8751A's Receiver Noise Level (Noise Floor). Linear format is used to avoid skewing the data with the marker statistics function.

### Specification

At  $23 \pm 5^\circ\text{C}$ ,



### Test Equipment

50  $\Omega$  Termination

HP 909C, 3 ea.

Procedure

1. Connect each 50 Ω Termination to each input as shown in Figure 2-9.

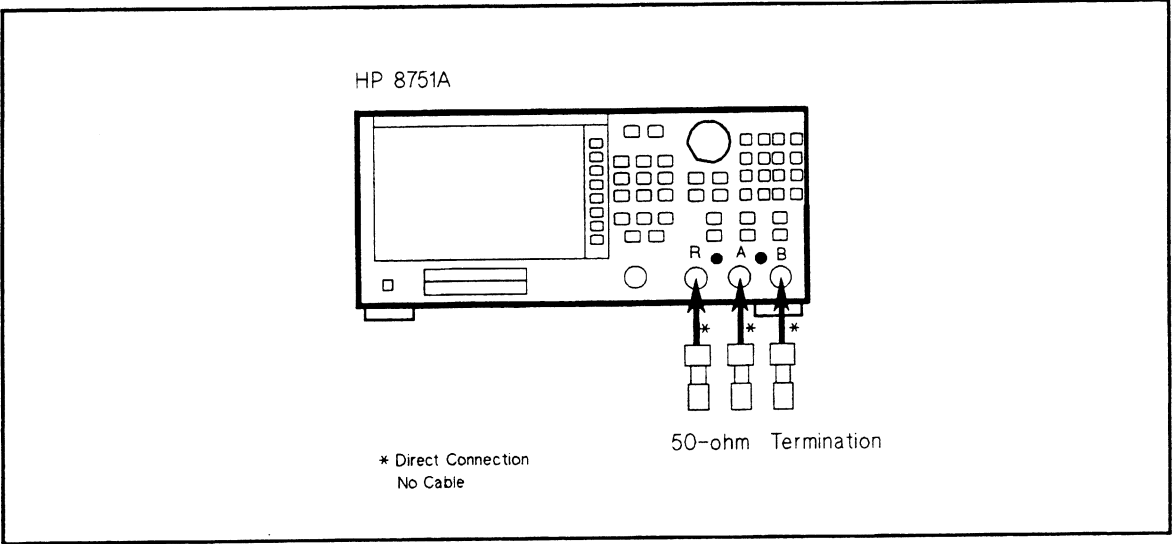


Figure 2-9. Receiver Noise Level Test Setup

2. Set up the HP 8751A as follows:

Control Settings

Key Strokes

PRESET

PRESET

SPAN Freq. = 0 Hz

SPAN, 0, x1

IF BW = 2 Hz

AVG, IF BW, 2, x1

Meas. Config. : R, LIN MAG

MEAS, R, FORMAT, LIN MAG

Number of Points: 40

MENU, NUMBER of POINTS, 4, 0, x1

Marker Function: STATISTICS  
ON

MKR FCTN, STATISTICS on/OFF

3. Set the CENTER frequency in accordance with the following table, and note the trace mean value on the performance test record. (The trace mean value is displayed as a marker statistic (mean) in the upper right-hand corner of the CRT.) The Performance Record shows the specification in dBm. U (units) are related to volts and are defined by the following equation:

Power(dBm) = 20 LOG (Linear Magnitude measured value)

HP 8751A CENTER Frequency	
	5 Hz
	205 Hz

4. Press AVG, IF BW, 2, 0, x1 to change the IF BW to 20 Hz.

5. Set the CENTER frequency in accordance with the following table, and record the input trace mean value on the performance test record. (Refer to step 3.)

HP 8751A CENTER Frequency	
205 Hz	
1 kHz	
10 kHz	
25 kHz	
60 kHz	
100 kHz	
1.1 MHz	
10 MHz	
101 MHz	
401 MHz	
499 MHz	

6. Press **AVG**, **IF BW**, **2**, **0**, **0**, **x1** to change the IF BW to 200 Hz.
7. Set the CENTER frequency in accordance with the following table, and record the input trace mean value on the performance test record. (Refer to Step 3.)

HP 8751A CENTER Frequency	
2 kHz	
10 kHz	
25 kHz	
60 kHz	
100 kHz	
1.1 MHz	
10 MHz	
101 MHz	
401 MHz	
499 MHz	

8. Press **AVG**, **IF BW**, **1**, **k/m** to change the IF BW to 1 kHz.
9. Set the CENTER frequency in accordance with the following table, and record the input trace mean value on the performance test record. (Refer to Step 3.)

HP 8751A CENTER Frequency	
100 kHz	
1.1 MHz	
10 MHz	
101 MHz	
401 MHz	
499 MHz	

10. Press **AVG**, **IF BW**, **4**, **k/m** to change the IF BW to 4 kHz.

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11. Set the CENTER frequency in accordance with the following table, and record the input trace mean value on the performance test record. (Refer to Step 3.)

HP 8751A CENTER Frequency
100 kHz
1.1 MHz
10 MHz
101 MHz
401 MHz
499 MHz

12. Change the HP 8751A control settings as follows:

**Control Settings**

**Key Strokes**

Meas. Config: A, LIN MAG  
IF BW = 2 Hz

**MEAS**, **A**, **FORMAT**, LIN MAG  
**AVG**, IF BW, **2**, **x1**

13. Repeat the steps 3 through 11.

14. Change the HP 8751A control settings as follows:

**Control Settings**

**Key Strokes**

Meas. Config: B, LIN MAG  
IF BW = 2 Hz

**MEAS**, **B**, **FORMAT**, LIN MAG  
**AVG**, IF BW, **2**, **x1**

15. Repeat the steps 3 through 11.

## TRACE NOISE TEST

This test checks the HP 8751A's Trace Noise on a CW signal in ratio mode. This test is done in CW in order to eliminate any effects of frequency response.

### Specification

(At Freq.  $\geq 100$  kHz, 1 kHz bandwidth, input level -10 dBm (ATT = 20 dB) or -30 dBm (ATT = 0dB))

Magnitude: < 10 mdB rms  
Phase: < 50 mdeg rms

### Test Equipment

N(m)-N(m) Cable, 61 cm	HP 11500B, 3ea
Three-way Power Splitter	HP 11850C
N(m)-N(m) Adapter	PN 1250-1475

### Procedure

1. Connect the cables and the adapter as shown in Figure 2-10.

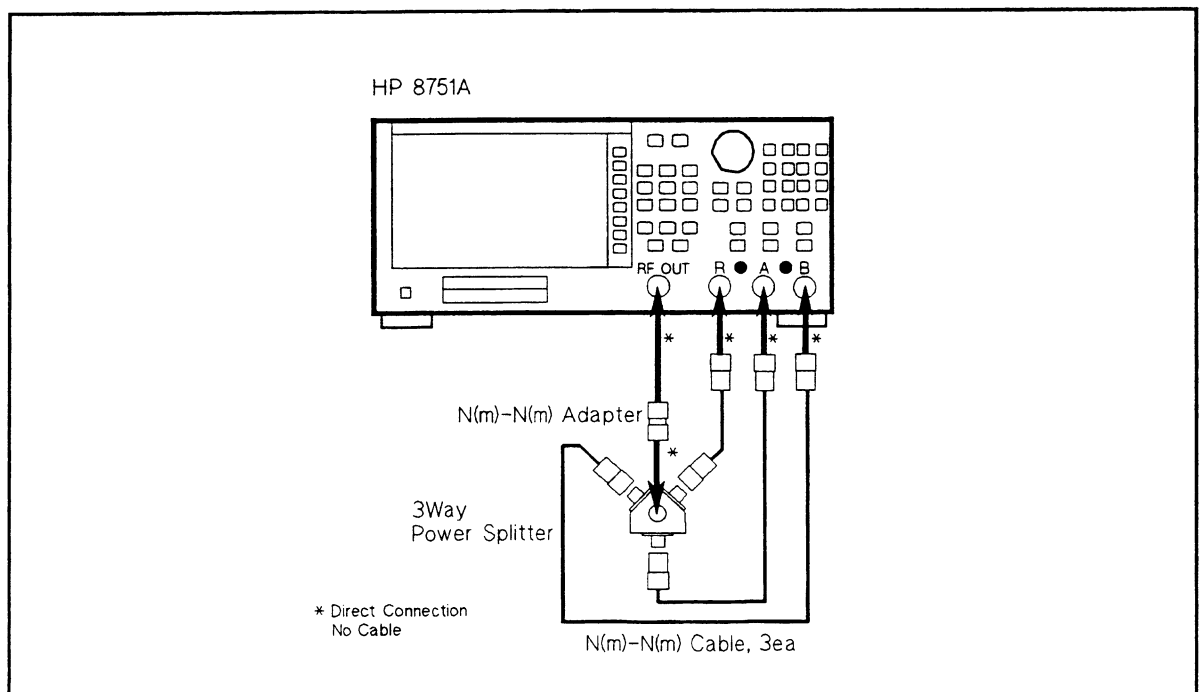


Figure 2-10. Trace Noise Test Setup

2. Set up the HP 8751A as follows:

#### Control Settings

PRESET  
Source Power = -0.5 dBm

#### Key Strokes

PRESET  
MENU, POWER, -, 0, ., 5, x1

SPAN Freq. = 0 Hz

**SPAN**, **0**, **x1**

IF BW = 1 kHz

**AVG**, **IF BW**, **1**, **k/m**

CH 1: A/R, LOG MAG

**CH 1**, **MEAS**, **A/R**, **FORMAT**, LOG MAG

CH 1: Marker Statistics ON

**CH 1**, **MKR FCTN**, **STATISTICS** on/OFF

CH 2: A/R, PHASE

**CH 2**, **MEAS**, **A/R**, **FORMAT**, PHASE

CH 2: Marker Statistics ON

**CH 2**, **MKR FCTN**, **STATISTICS** on/OFF

Dual Channel: ON

**DISPLAY**, **DUAL CHAN** on/OFF

3. Set the HP 8751A CENTER frequency in accordance with the following table.

The standard deviation trace value is displayed as a marker statistic (s.dev) in the upper right-hand corner of the CRT on each channel's display. Record each s.dev value of the magnitude and phase in the Performance Test Record.

HP 8751A CENTER Frequency	
	100 kHz
	1 MHz
	10 MHz
	100 MHz
	500 MHz

4. Change the HP 8751A as follows:

**Control Settings**

**Key Strokes**

CH 1: B/R, LOG MAG

**CH 1**, **MEAS**, **B/R**, **FORMAT**, LOG MAG

CH 2: B/R, PHASE

**CH 2**, **MEAS**, **B/R**, **FORMAT**, PHASE

5. Repeat step 3.

6. Change the HP 8751A as follows:

**Control Settings**

**Key Strokes**

CH 1: A/B, LOG MAG

**CH 1**, **MEAS**, **A/B**, **FORMAT**, LOG MAG

CH 2: A/B, PHASE

**CH 2**, **MEAS**, **A/B**, **FORMAT**, PHASE

7. Repeat step 3.

## RESIDUAL RESPONSE TEST

This tests the HP 8751A's Residual Response. This test measures how effectively the HP 8751A's internal oscillator signal's interference is reduced by measuring the amplitude at some known frequencies with its input terminated.

### Specification

Residual Response: -100 dBm to Input Range (IF BW  $\leq$  1 kHz, excluding line related and CRT scan related components)

### Test Equipment

50  $\Omega$  Termination

HP 909C Opt.012, 2 ea.

### Procedure

1. Connect a 50  $\Omega$  Termination to HP 8751A INPUT R, as shown in Figure 2-11.

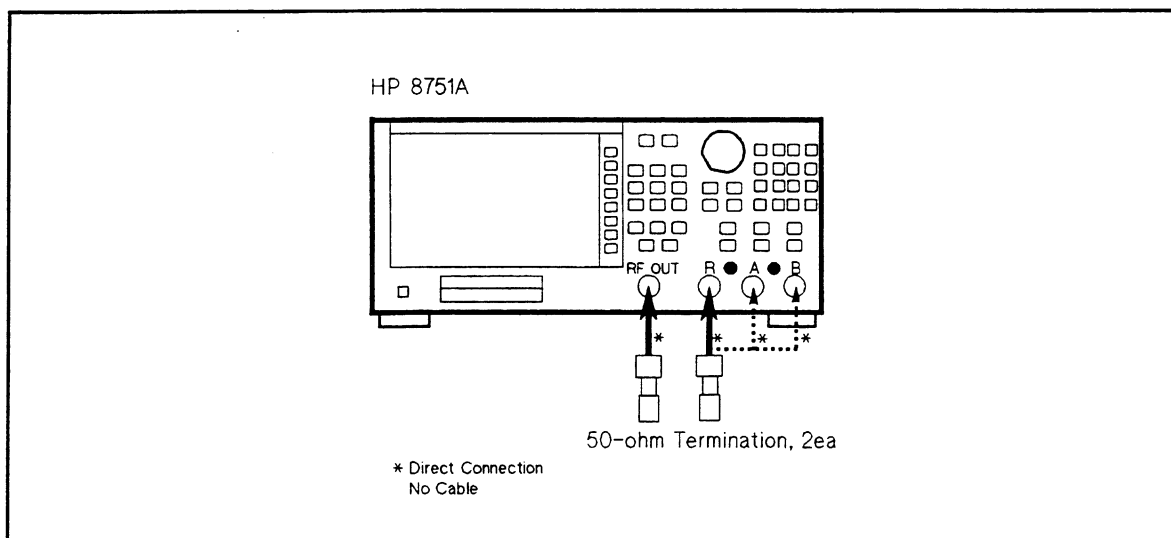


Figure 2-11. Residual Response Test Setup

2. Set up the HP 8751A as follows:

#### Control Settings

PRESET  
CENTER Freq. = 6.25 MHz  
Meas. Config. : R  
SPAN = 0 Hz  
IF BW = 20 Hz  
Number of Points: 21

#### Key Strokes

PRESET  
CENTER, 6, ., 2, 5, M/u  
MEAS, R  
SPAN, 0, x1  
AVG, IF BW, 2, 0, x1  
MENU, NUMBER of POINTS, 2, 1, x1

3. Perform the following key strokes for a single sweep measurement.

MENU, TRIGGER MENU, SINGLE

4. Move the marker to the maximum point of the displayed data using the following key strokes. Record the maximum point in the Performance Test Record.

**MKR FCTN**, **MKR SEARCH**, **MAX**

5. Repeat steps 3 and 4, for the following HP 8751A CENTER FREQUENCY settings.

CENTER FREQUENCY
40.77575 MHz
43.004342105 MHz
45.480555556 MHz
48.248088235 MHz
51.3615625 MHz
54.890166667 MHz
58.922857143 MHz
139.968541667 MHz
152.835454545 MHz
281.4175 MHz
300 MHz
325 MHz
337.96225 MHz
362.270357143 MHz
375.687777778 MHz

6. Remove the 50  $\Omega$  Termination to HP 8751A Input-R, and connect it to HP 8751A Input-A.
7. Change the HP 8751A control settings as follows:

**Control Settings**

**Key Strokes**

CENTER Freq. = 6.25 MHz  
MEAS Config. : A

**CENTER**, **6**, **.**, **2**, **5**, **M/u**  
**MEAS**, **A**

8. Repeat steps 3 through 5.
9. Remove the 50  $\Omega$  Termination to HP 8751A Input-A, and connect it to HP 8751A Input-B.
10. Change the HP 8751A control settings as follows:

**Control Settings**

**Key strokes**

CENTER Freq. = 6.25 MHz  
MEAS Config. : B

**CENTER**, **6**, **.**, **2**, **5**, **M/u**  
**MEAS**, **B**

11. Repeat steps 3 through 5.

---

## INPUT CROSSTALK TEST

This tests the signal leakage interference between the HP 8751A's two inputs when one input is driven and the other is terminated.

### Specification

Input Crosstalk: (Same ATT for both input ports)

5 Hz  $\leq$  Freq.  $<$  10 kHz  $<$  -95 dB  
10 kHz  $\leq$  Freq.  $\leq$  500 MHz  $<$  -100 dB

### Test Equipment

N(m)-N(m) Cable, 61 cm HP 11500B  
50  $\Omega$  Termination HP 909C Opt.012, 2ea

### Procedure

1. —*R into A Crosstalk and R into B Crosstalk*—

a. Set up the HP 8751A as follows:

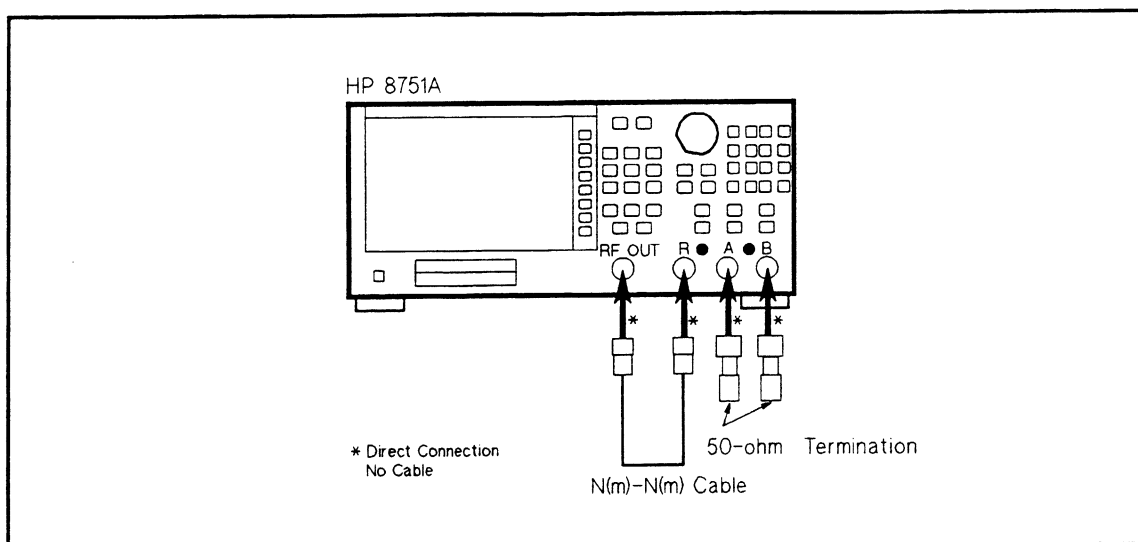
**Control Settings**

PRESET  
Source Power = -26 dBm  
STOP Freq. = 10 kHz  
Sweep Type: LOG FREQ  
IF BW: 2 Hz  
Averaging Factor: 4  
  
CH 1: A/R, LOG MAG  
CH 2: B/R, LOG MAG  
Dual Channel: ON  
ATTEN: Input-R = 0 dB  
ATTEN: Input-A = 0 dB  
ATTEN: Input-B = 0 dB  
Number of Points: 20

**Key Strokes**

[PRESET]  
[MENU], POWER, [−], [2], [6], [x1]  
[STOP], [1], [0], [k/m]  
[MENU], SWEEP TYPE MENU, LOG FREQ  
[AVG], IF BW, [2], [x1]  
[AVG], AVERAGING FACTOR, [4], [x1],  
AVERAGING on OFF  
[CH 1], [MEAS], A/R, [FORMAT], LOG MAG  
[CH 2], [MEAS], B/R, [FORMAT], LOG MAG  
[DISPLAY], DUAL CHAN on/OFF  
[ATTEN], INPUT-R:0dB  
[ATTEN], INPUT-A:0dB  
[ATTEN], INPUT-B:0dB  
[MENU], NUMBER of POINTS, [2], [0], [x1]

b. Connect an N(m)-N(m) Cable between HP 8751A RF OUT and Input-R, and connect a 50  $\Omega$  Termination to Input-A and Input-B as shown in Figure 2-12.



**Figure 2-12. Crosstalk Test Setup 1**

- c. Perform the following key strokes for a single sweep measurement.

**MENU**, **TRIGGER MENU**, **SINGLE**

- d. Move the CH 1 marker to the maximum value (A/R) using the following key strokes.  
Record the maximum value on the Performance Test Record.

**CH 1**, **MKR FCTN**, **MKR SEARCH**, **MAX**

- e. Move the CH 2 marker to the maximum value (B/R) using the following key strokes.  
Record the maximum value on the Performance Test Record.

**CH 2**, **MKR FCTN**, **MKR SEARCH**, **MAX**

- f. Change the HP 8751A as follows:

**Control Settings**

**Key Strokes**

START Freq. = 10 kHz

**START**, **1**, **0**, **k/m**

STOP Freq. = 500 MHz

**STOP**, **5**, **0**, **0**, **M/u**

Source Power = -20 dBm

**MENU**, **POWER**, **-**, **2**, **0**, **x1**

IF BW: 20 Hz

**AVG**, **IF BW**, **2**, **0**, **x1**

Number of Points: 201

**MENU**, **NUMBER of POINTS**, **2**, **0**, **1**, **x1**

- g. Perform the following key strokes for a single sweep measurement.

**MENU**, **TRIGGER MENU**, **SINGLE**

- h. Move the CH 1 marker to the maximum value (A/R) using the following key strokes.  
Record the maximum value on the Performance Test Record.

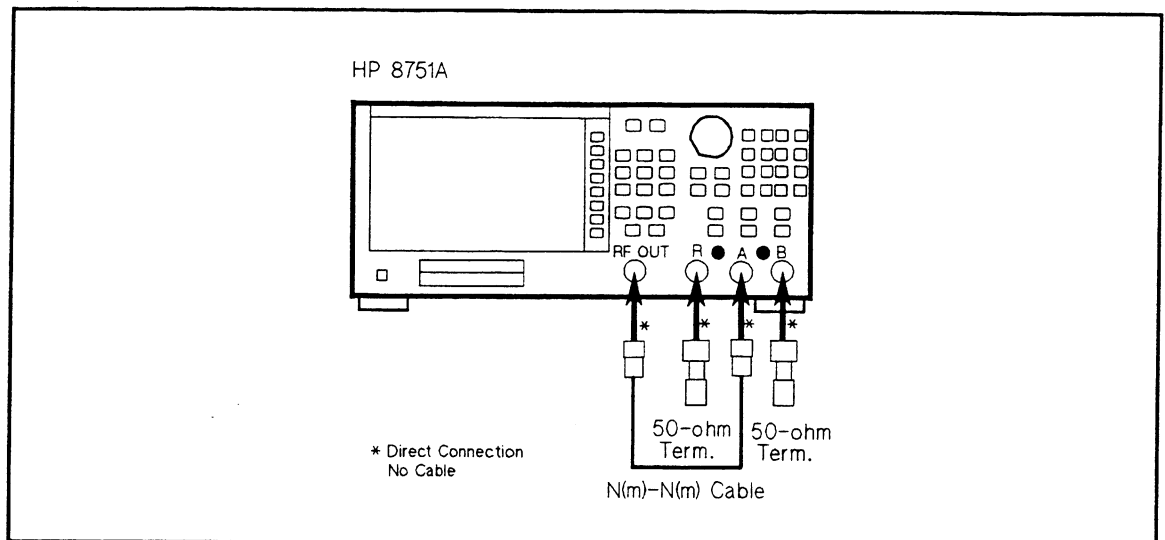
**CH 1**, **MKR FCTN**, **MKR SEARCH**, **MAX**

- i. Move the CH 2 marker to the maximum value (B/R) using the following key strokes.  
Record the maximum value on the Performance Test Record.

**CH 2**, **MKR FCTN**, **MKR SEARCH**, **MAX**

2. —A into R Crosstalk and A into B Crosstalk—

- a. Connect the equipment as shown in Figure 2-13.



**Figure 2-13. Crosstalk Test Setup 2**

- b. Change the HP 8751A as follows:

**Control settings**

Source Power = -26 dBm

START Freq. = 5 Hz

STOP Freq. = 10 kHz

CH 1: A/R, LOG MAG

CH 2: A/B, LOG MAG

IF BW: 2 Hz

Number of Points: 20

**Key Strokes**

**MENU**, **POWER**, **-**, **2**, **6**, **x1**

**START**, **5**, **Hz**

**STOP**, **1**, **0**, **k/m**

**CH 1**, **MEAS**, **A/R**, **FORMAT**, **LOG MAG**

**CH 2**, **MEAS**, **A/B**, **FORMAT**, **LOG MAG**

**AVG**, **IF BW**, **2**, **x1**

**MENU**, **NUMBER of POINTS**, **2**, **0**, **x1**

- c. Perform the following key strokes for a single sweep measurement.

**MENU**, **TRIGGER MENU**, **SINGLE**

- d. Move the CH 1 marker to the minimum value (A/R) using the following key strokes.  
Record the minimum value reverse the sign on the Performance Test Record.

**CH 1**, **MKR FCTN**, **MKR SEARCH**, **MIN**

- e. Move the CH 2 marker to the minimum value (A/B) using the following key strokes.  
Record the minimum value reverse the on the Performance Test Record.

**CH 2**, **MKR FCTN**, **MKR SEARCH**, **MIN**



- f. Change the HP 8751A as follows:

**Control Settings**

START Freq. = 10 kHz  
 STOP Freq. = 500 MHz  
 Source Power = -20 dBm  
 IF BW: 20 Hz  
 Number of Points: 201

**Key Strokes**

(START), (1), (0), (k/m)  
 (STOP), (5), (0), (0), (M/u)  
 (MENU), POWER, (-), (2), (0), (x1)  
 (AVG), IF BW, (2), (0), (x1)  
 (MENU), NUMBER of POINTS, (2), (0), (1), (x1)

- g. Perform the following key strokes for a single sweep measurement.

(MENU), TRIGGER MENU, SINGLE

- h. Move the CH 1 marker to the minimum value (A/R) using the following key strokes.  
 Record the minimum value reverse the sign on the Performance Test Record.

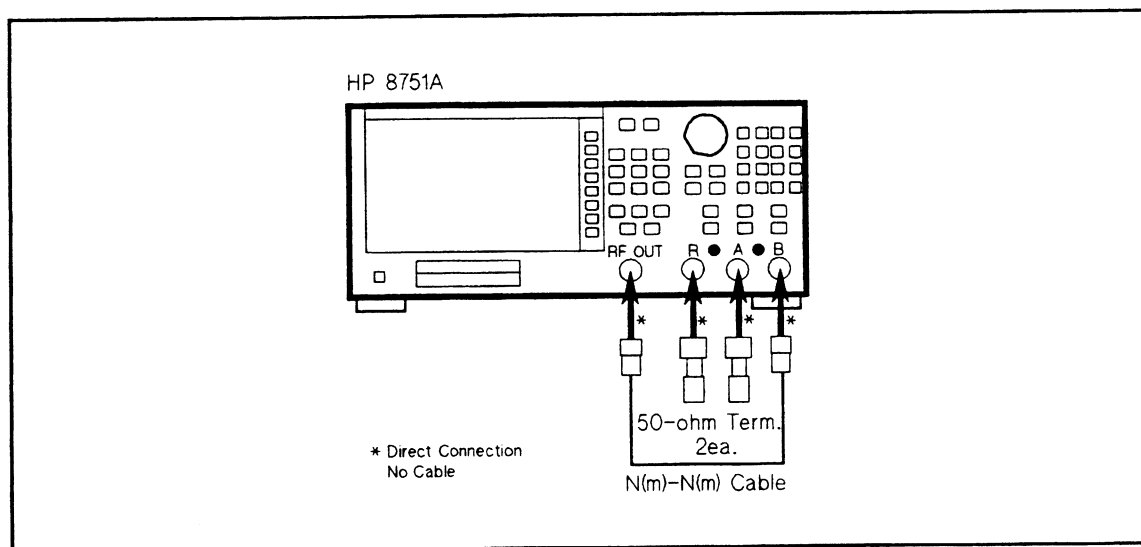
(CH 1), (MKR FCTN), MKR SEARCH, MIN

- i. Move the CH 2 marker to the minimum value (A/B) using the following key strokes.  
 Record the minimum value reverse the sign on the Performance Test Record.

(CH 2), (MKR FCTN), MKR SEARCH, MIN

3. —B into R Crosstalk and B into A Crosstalk—

- a. Connect the equipment as shown in Figure 2-14.



**Figure 2-14. Crosstalk Test Setup 3**

- b. Change the HP 8751A as follows.

**Control settings**

Source Power = -26 dBm  
 START Freq. = 5 Hz  
 STOP Freq. = 10 kHz  
 CH 1: B/R, LOG MAG

**Key strokes**

(MENU), POWER, (-), (2), (6), (x1)  
 (START), (5), (Hz)  
 (STOP), (1), (0), (k/m)  
 (CH 1), (MEAS), B/R, (FORMAT), LOG MAG

CH 2: A/B, LOG MAG

**CH 2**, **MEAS**, **A/B**, **FORMAT**, **LOG MAG**

IF BW: 2 Hz

**AVG**, **IF BW**, **2**, **x1**

Number of Points: 20

**MENU**, **NUMBER of POINTS**, **2**, **0**, **x1**

- c. Perform the following key strokes for a single sweep measurement.

**MENU**, **TRIGGER MENU**, **SINGLE**

- d. Move the CH 1 marker to the minimum value (B/R) using the following key strokes.  
Record the minimum value reverse the sign on the Performance Test Record.

**CH 1**, **MKR FCTN**, **MKR SEARCH**, **MIN**

- e. Move the CH 2 marker to the maximum value (A/B) using the following key strokes.  
Record the maximum value on the Performance Test Record.

**CH 2**, **MKR FCTN**, **MKR SEARCH**, **MAX**

- f. Change the HP 8751A as follows:

**Control Settings**

START Freq. = 10 kHz

STOP Freq. = 500 MHz

Source Power = -20 dBm

IF BW: 20 Hz

Number of Points: 201

**Key strokes**

**START**, **1**, **0**, **k/m**

**STOP**, **5**, **0**, **0**, **M/u**

**MENU**, **POWER**, **-**, **2**, **0**, **x1**

**AVG**, **IF BW**, **2**, **0**, **x1**

**MENU**, **NUMBER of POINTS**, **2**, **0**, **1**, **x1**

- g. Perform the following key strokes for a single sweep measurement.

**MENU**, **TRIGGER MENU**, **SINGLE**

- h. Move the CH 1 marker to the minimum value (B/R) using the following key strokes.  
Record the minimum value reverse the sign on the Performance Test Record.

**CH 1**, **MKR FCTN**, **MKR SEARCH**, **MIN**

- i. Move the CH 2 marker to the maximum value (A/B) using the following key strokes.  
Record the maximum value on the Performance Test Record.

**CH 2**, **MKR FCTN**, **MKR SEARCH**, **MAX**

# INPUT IMPEDANCE TEST

This test checks the HP 8751A's input impedance by measuring the return loss.

## Specification

Input Impedance: 50 Ω Nominal

Frequency	ATT = 0 dB	ATT = 20 dB
5 Hz ≤ Freq. ≤ 100 MHz	> 20 dB	> 25 dB
100 MHz < Freq. ≤ 300 MHz	> 15 dB	> 25 dB
300 MHz < Freq. ≤ 500 MHz	> 10 dB	> 20 dB

## Test Equipment

50 Ω T/R Test Kit	HP 87512A
50 Ω type-N calibration kit	HP 85032B
50 Ω type-N RF cable set	HP 11851B
N(f)-N(f) Adapter	PN 1250-0777, 2 ea.

## Procedure

1. —Input B Impedance Test—
  - a. Connect the equipment as shown in Figure 2-15.

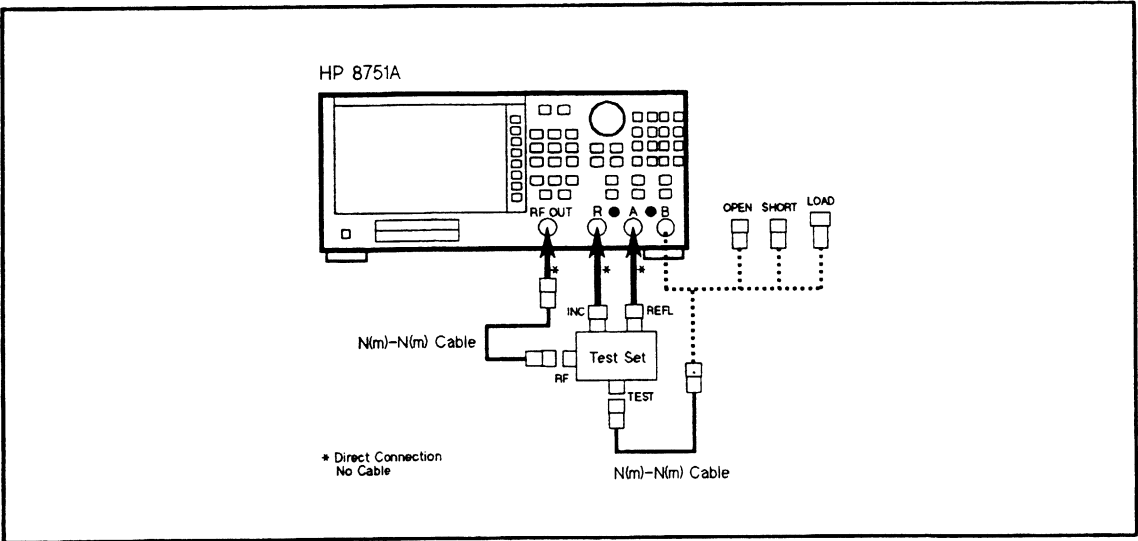


Figure 2-15. Input B Impedance Test Setup

- b. Set up the HP 8751A as follows:

### Control Settings

PRESET

Meas. Config.: A/R

Source Power: -18 dBm

### Key strokes

**PRESET**

**MEAS**, A/R

**MENU**, **POWER**, **-**, **1**, **8**, **x1**

IF BW: AUTO

**AVG**, IF BW, IF BW AUTO

Sweep Type: LOG SWEEP

**MENU**, SWEEP TYPE MENU, LOG FREQ

c. Perform the following sequence to do the one port calibration.

i. Press **CAL**, CAL KIT, N 50  $\Omega$ , RETURN, CALIBRATE MENU, S11 1-PORT

ii. Connect a type-N(f) open to the test port cable and press **OPENS**, **OPEN[M]**, **DONE:OPENS**.

iii. Connect a type-N(f) short to the test port cable and press **SHORTS**, **SHORT[M]**, **DONE:SHORTS**.

iv. Connect a type-N(f) 50  $\Omega$  Termination (LOAD) to the test port cable and press **LOAD**, **DONE 1-PORT CAL**.

d. Remove the 50  $\Omega$  Termination from the test port cable and connect the cable to the open input port of the analyzer.

e. Perform the following key strokes for a single sweep measurement.

**MENU**, TRIGGER MENU, SINGLE

f. Press **SCALE REF**, AUTO SCALE.

g. Perform the following key strokes to set the marker search range from 5 Hz to 100 MHz.

**MKR**, ACTIVE MARKER, MARKER 1, **5**, **x1**, ACTIVE MARKER, MARKER 2, **1**, **0**, **0**, **M/u**, **MKR**,  $\Delta$  MODE MENU,  $\Delta$  REF MARKER,  $\Delta$  REF = 1, **MKR FCTN**, SEARCH RANGE, SEARCH RNG STORE, PART SRCH on/OFF

h. Move the marker to the maximum value using the following key strokes. Record the maximum value with an opposite sign in the Performance Test Record.

**MKR FCTN**, MKR SEARCH, MAX, **MKR**,  $\Delta$  MODE MENU,  $\Delta$  MODE OFF

i. Press  $\Delta$  REF MARKER,  $\Delta$  REF = 1.

j. Perform the following key strokes to set the marker search range from 100 MHz to 300 MHz.

**MKR**, ACTIVE MARKER, MARKER 1, **9**, **9**, **.**, **9**, **9**, **9**, **9**, **9**, **5**, **M/u**, **MKR**, ACTIVE MARKER, MARKER 2, **2**, **0**, **0**, **M/u**, **MKR FCTN**, SEARCH RANGE, SEARCH RNG STORE

k. Move the marker to the maximum value using the following key strokes. Record the maximum value with an opposite sign in the Performance Test Record.

**MKR FCTN**, MKR SEARCH, MAX, **MKR**,  $\Delta$  MODE MENU,  $\Delta$  MODE OFF

l. Press  $\Delta$  REF MARKER,  $\Delta$  REF = 1.

m. Perform the following key strokes to set the marker search range from 300 MHz to 500 MHz.

**MKR**, **ACTIVE MARKER**, **MARKER 1**, **2**, **0**, **0**, **M/u**, **MKR**, **ACTIVE MARKER**, **MARKER 2**, **3**, **0**, **0**, **M/u**, **MKR FCTN**, **SEARCH RANGE**, **SEARCH RNG STORE**

- n. Move the marker to the maximum value using the following key strokes. Record the maximum value with an opposite sign in the Performance Test Record.

**MKR FCTN**, **MKR SEARCH**, **MAX**, **MKR**, **Δ MODE MENU**, **Δ MODE OFF**

- o. Change the HP 8751A Control Settings as follows:

#### Control Settings

#### Key Strokes

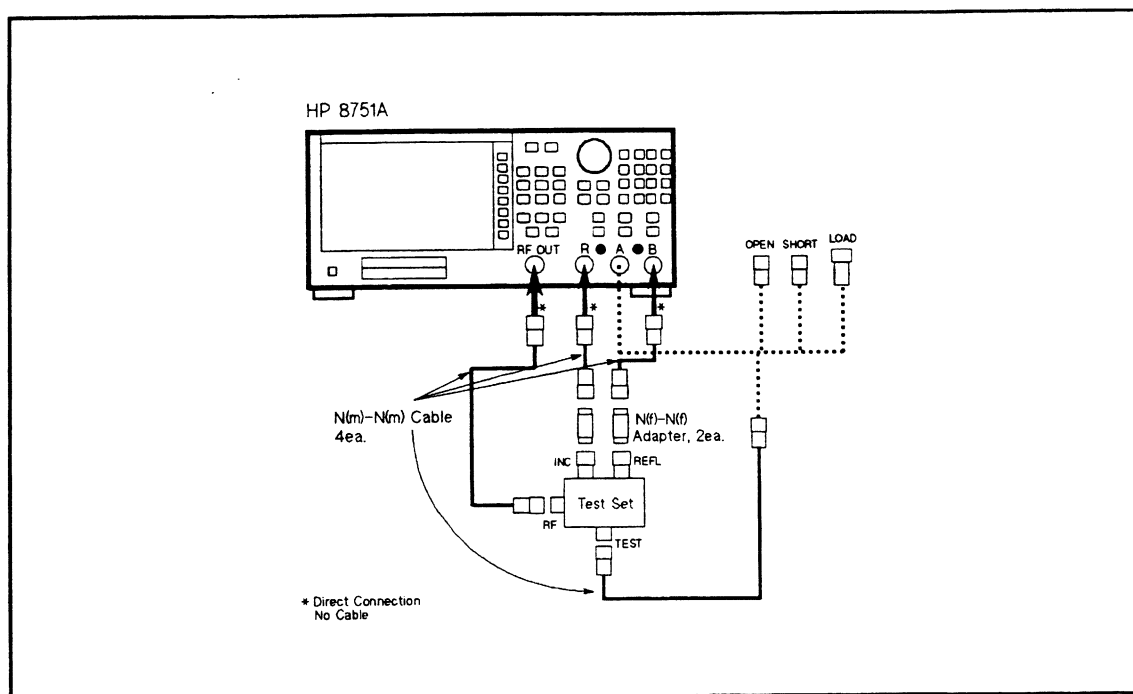
ATTEN: Input-B = 0 dB

**ATTEN**, **INPUT-B: 0 dB**

- p. Repeat steps e through n in Step 1.

## 2. —Input A Impedance Test—

- a. Connect the equipment as shown in Figure 2-16.



**Figure 2-16. Input A Impedance Setup**

- b. Change the HP 8751A control settings as follows:

#### Control Settings

#### Key Strokes

PRESET

**PRESET**

Meas. Config.: B/R

**MEAS**, **B/R**

IF BW: AUTO

**AVG**, **IF BW**, **IF BW AUTO**

Source Power: -18 dBm

**MENU**, **POWER**, **-**, **1**, **8**, **x1**

Sweep Type: LOG SWEEP

**MENU**, **SWEEP TYPE MENU**, **LOG FREQ**

- c. Perform the following sequence to do the one port calibration.
  - i. Press **CAL**, **CAL KIT**, **N 50  $\Omega$** , **RETURN**, **CALIBRATE MENU**, **S11 1-PORT**
  - ii. Connect a type-N(f) open to the test port cable and press **OPENS**, **OPEN[M]**, **DONE:OPENS**.
  - iii. Connect a type-N(f) short to the test port cable and press **SHORTS**, **SHORT[M]**, **DONE:SHORTS**.
  - iv. Connect a type-N(f) 50  $\Omega$  Termination (LOAD) to the test port cable and press **LOAD**, **DONE 1-PORT CAL**.
- d. Remove the 50  $\Omega$  Termination from the test port cable and connect the cable to the open input port of the analyzer.
- e. Perform the following key strokes for a single sweep measurement.  
**MENU**, **TRIGGER MENU**, **SINGLE**
- f. Press **SCALE REF**, **AUTO SCALE**.
- g. Perform the following key strokes to set the marker search range from 5 Hz to 100 MHz.  
**MKR**, **ACTIVE MARKER**, **MARKER 1**, **5**, **x1**, **ACTIVE MARKER**, **MARKER 2**, **1**, **0**, **0**, **M/u**, **MKR**,  **$\Delta$  MODE MENU**,  **$\Delta$  REF MARKER**,  **$\Delta$  REF = 1**, **MKR FCTN**, **SEARCH RANGE**, **SEARCH RNG STORE**
- h. Move the marker to the maximum value using the following key strokes. Record the maximum value with an opposite sign in the Performance Test Record.  
**MKR FCTN**, **MKR SEARCH**, **MAX**, **MKR**,  **$\Delta$  MODE MENU**,  **$\Delta$  MODE OFF**
- i. Press  **$\Delta$  REF MARKER**,  **$\Delta$  REF = 1**.
- j. Perform the following key strokes to set the marker search range from 100 MHz to 300 MHz.  
**MKR**, **ACTIVE MARKER**, **MARKER 1**, **9**, **9**, **.**, **9**, **9**, **9**, **9**, **9**, **5**, **M/u**, **MKR**, **ACTIVE MARKER**, **MARKER 2**, **2**, **0**, **0**, **M/u**, **MKR FCTN**, **SEARCH RANGE**, **SEARCH RNG STORE**
- k. Move the marker to the maximum value using the following key strokes. Record the maximum value with an opposite sign in the Performance Test Record.  
**MKR FCTN**, **MKR SEARCH**, **MAX**, **MKR**,  **$\Delta$  MODE MENU**,  **$\Delta$  MODE OFF**
- l. Press  **$\Delta$  REF MARKER**,  **$\Delta$  REF = 1**.
- m. Perform the following key strokes to set the marker search range from 300 MHz to 500 MHz.  
**MKR**, **ACTIVE MARKER**, **MARKER 1**, **2**, **0**, **0**, **M/u**, **MKR**, **ACTIVE MARKER**, **MARKER 2**, **3**, **0**, **0**, **M/u**, **MKR FCTN**, **SEARCH RANGE**, **SEARCH RNG STORE**

- n. Move the marker to the maximum value using the following key strokes. Record the maximum value with an opposite sign in the Performance Test Record.

**(MKR FCTN)**, **MKR SEARCH**, **MAX**, **(MKR)**, **Δ MODE MENU**, **Δ MODE OFF**

- o. Press **Δ REF MARKER**, **Δ REF = 1**.

- p. Change the HP 8751A Control Settings as follows:

**Control Settings**

**Key Strokes**

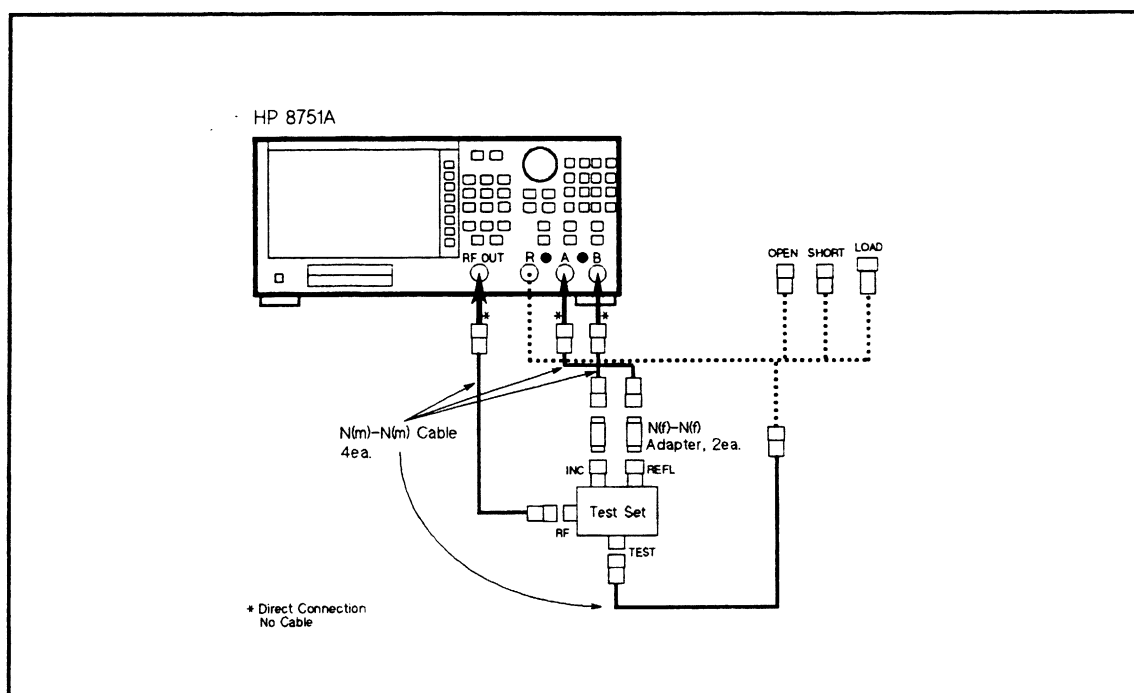
ATTEN: Input-A = 0 dB

**(ATTEN)**, **INPUT-A: 0 dB**

- q. Repeat steps e through n in Step 2.

### 3. —Input R Impedance Test—

- a. Connect the equipment as shown in Figure 2-17.



**Figure 2-17. Input R Impedance Setup**

- b. Set up the HP 8751A as follows:

**Control Settings**

PRESET

Meas. Config.: A/B

IF BW: AUTO

Source Power: -18 dBm

Sweep Type: LOG SWEEP

**Key strokes**

**(PRESET)**

**(MEAS)**, **A/B**

**(AVG)**, **IF BW**, **IF BW AUTO**

**(MENU)**, **POWER**, **(-)**, **(1)**, **(8)**, **(x1)**

**(MENU)**, **SWEEP TYPE MENU**, **LOG FREQ**

- c. Perform the following sequence to do the one port calibration.

- i. Press **(CAL)**, **CAL KIT**, **N 50 Ω**, **RETURN**, **CALIBRATE MENU**, **S11 1-PORT**

- ii. Connect a type-N(f) open to the test port cable and press **OPENS** , **OPEN[M]** , **DONE:OPENS** .
- iii. Connect a type-N(f) short to the test port cable and press **SHORTS** , **SHORT[M]** , **DONE:SHORTS** .
- iv. Connect a type-N(f) 50  $\Omega$  Termination (LOAD) to the test port cable and press **LOAD** , **DONE 1-PORT CAL** .
- d. Remove the 50  $\Omega$  Termination from the test port cable and connect the cable to the open input port of the analyzer.
- e. Perform the following key strokes for a single sweep measurement.  
**[MENU]** , **TRIGGER MENU** , **SINGLE**
- f. Press **[SCALE REF]** , **AUTO SCALE** .
- g. Perform the following key strokes to set the marker search range from 5 Hz to 100 MHz.  
**[MKR]** , **ACTIVE MARKER** , **MARKER 2** , **[1]** , **[0]** , **[0]** , **[M/u]** , **[MKR]** ,  **$\Delta$  MODE MENU** ,  **$\Delta$  REF MARKER** ,  **$\Delta$  REF = 1** , **[MKR FCTN]** , **SEARCH RANGE** , **SEARCH RNG STORE**
- h. Move the marker to the maximum value using the following key strokes. Record the maximum value with an opposite sign in the Performance Test Record.  
**[MKR FCTN]** , **MKR SEARCH** , **MAX** , **[MKR]** ,  **$\Delta$  MODE MENU** ,  **$\Delta$  MODE OFF**
- i. Press  **$\Delta$  REF MARKER** ,  **$\Delta$  REF = 1** .
- j. Perform the following key strokes to set the marker search range from 100 MHz to 300 MHz.  
**[MKR]** , **ACTIVE MARKER** , **MARKER 1** , **[9]** , **[9]** , **[.]** , **[9]** , **[9]** , **[9]** , **[9]** , **[9]** , **[5]** , **[M/u]** , **[MKR]** , **ACTIVE MARKER** , **MARKER 2** , **[2]** , **[0]** , **[0]** , **[M/u]** , **[MKR FCTN]** , **SEARCH RANGE** , **SEARCH RNG STORE**
- k. Move the marker to the maximum value using the following key strokes. Record the maximum value with an opposite sign in the Performance Test Record.  
**[MKR FCTN]** , **MKR SEARCH** , **MAX** , **[MKR]** ,  **$\Delta$  MODE MENU** ,  **$\Delta$  MODE OFF**
- l. Press  **$\Delta$  REF MARKER** ,  **$\Delta$  REF = 1** .
- m. Perform the following key strokes to set the marker search range from 300 MHz to 500 MHz.  
**[MKR]** , **ACTIVE MARKER** , **MARKER 1** , **[2]** , **[0]** , **[0]** , **[M/u]** , **[MKR]** , **ACTIVE MARKER** , **MARKER 2** , **[3]** , **[0]** , **[0]** , **[M/u]** , **[MKR FCTN]** , **SEARCH RANGE** , **SEARCH RNG STORE**
- n. Move the marker to the maximum value using the following key strokes. Record the maximum value with an opposite sign in the Performance Test Record.  
**[MKR FCTN]** , **MKR SEARCH** , **MAX** , **[MKR]** ,  **$\Delta$  MODE MENU** ,  **$\Delta$  MODE OFF**



- o. Change the HP 8751A Control Settings as follows:

**Control Settings**

**Key Strokes**

ATTEN: Input-R = 0 dB

**ATTEN**, **INPUT-R: 0 dB**

- p. Repeat steps e through n in Step 3.

---

## ABSOLUTE AMPLITUDE ACCURACY TEST

This test checks the HP 8751A's absolute amplitude accuracy. A digital voltmeter or a power meter is used to measure each actual output level.

### Specification

(At  $23 \pm 5^\circ\text{C}$ ,  $-30\text{ dBm}$  for  $\text{ATT} = 0\text{ dB}$ , or  $-10\text{ dBm}$  for  $\text{ATT} = 20\text{ dB}$ )

$5\text{ Hz} \leq \text{Freq.} \leq 300\text{ MHz}$ :	$\pm 1.0\text{ dB}$
$300\text{ MHz} < \text{Freq.} \leq 500\text{ MHz}$ :	$\pm 1.5\text{ dB}$

### Test Equipment

Power Meter	HP 436A
Power Sensor	HP 8482A
Digital Multimeter	HP 3458A
Power Splitter	HP 11667A
N(m)-N(m) Cable	HP 11500B
BNC(m)-BNC(m) Cable, 61 cm	PN 8120-1839
N(m)-N(m) Adapter	PN 1250-1475
N(m)-BNC(f) Adapter	PN 1250-1476
BNC(f)-Dual Banana Plug	PN 1251-2277
50 $\Omega$ Feedthrough	PN 04192-61002
20 dB Attenuator Pad	HP 8491A Opt. 020

---

### Note



The HP 8491A Opt. 020 attenuator pad must be calibrated at the following frequencies (Uncertainty:  $\leq 0.06\text{ dB}$ ).

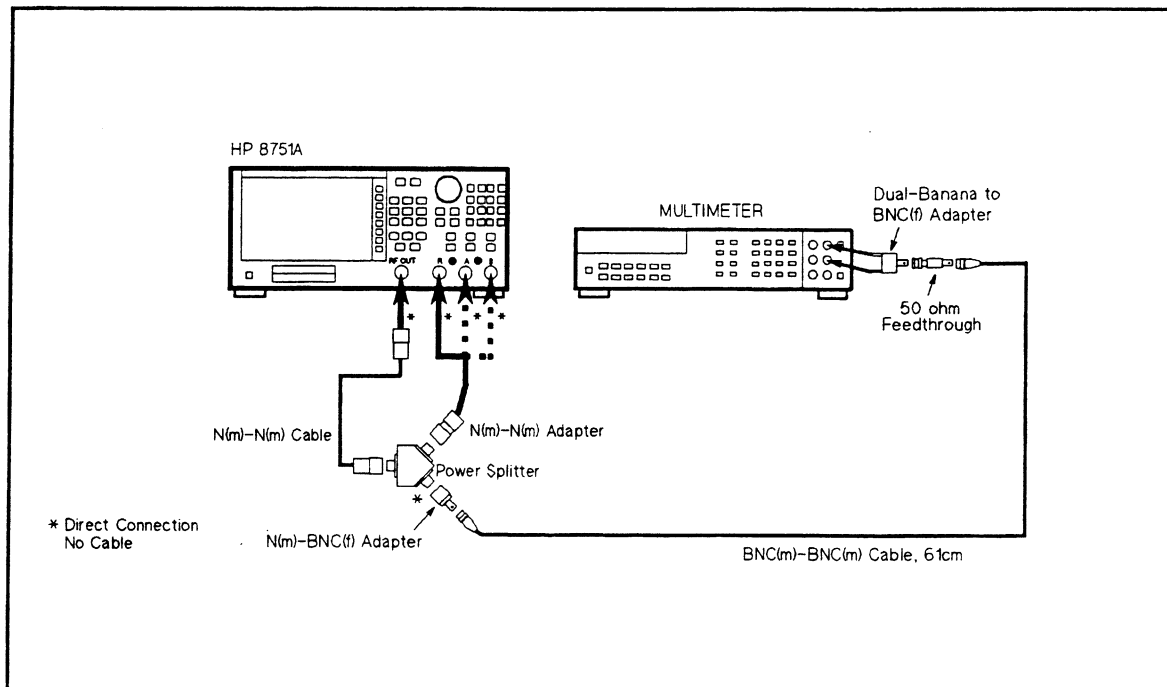
1 MHz	100 MHz
10 MHz	300 MHz
30 MHz	500 MHz
50 MHz	

So when you purchase the HP 8491A Opt. 020, contact your nearest Hewlett-Packard service center for the required calibration frequency and uncertainty.

---

## Procedure

1. Connect the Digital Multimeter as shown in Figure 2-18.



**Figure 2-18. Absolute Amplitude Accuracy Test Setup 1**

2. Set up the HP 8751A as follows:

### Control Settings

PRESET

SPAN = 0 Hz

IF BW = 2 Hz

Source Power = -24 dBm

Number of Points: 2

Meas.Config: R

ATTEN: Input-R, 0 dB

ATTEN: Input-A, 0 dB

ATTEN: Input-B, 0 dB

Marker Function: ON

### Key Strokes

[PRESET]

[SPAN], [0], [x1]

[AVG], [IF BW], [2], [x1]

[MENU], [POWER], [-], [2], [4], [x1]

[MENU], [NUMBER of POINTS], [2], [x1]

[MEAS], [R]

[ATTEN], [INPUT-R: 0dB]

[ATTEN], [INPUT-A: 0dB]

[ATTEN], [INPUT-B: 0dB]

[MKR FCTN]

3. Set the Digital Multimeter as follows:

Measurement Function:

AC Volts mode

Display Reading Value:

dBm reading value

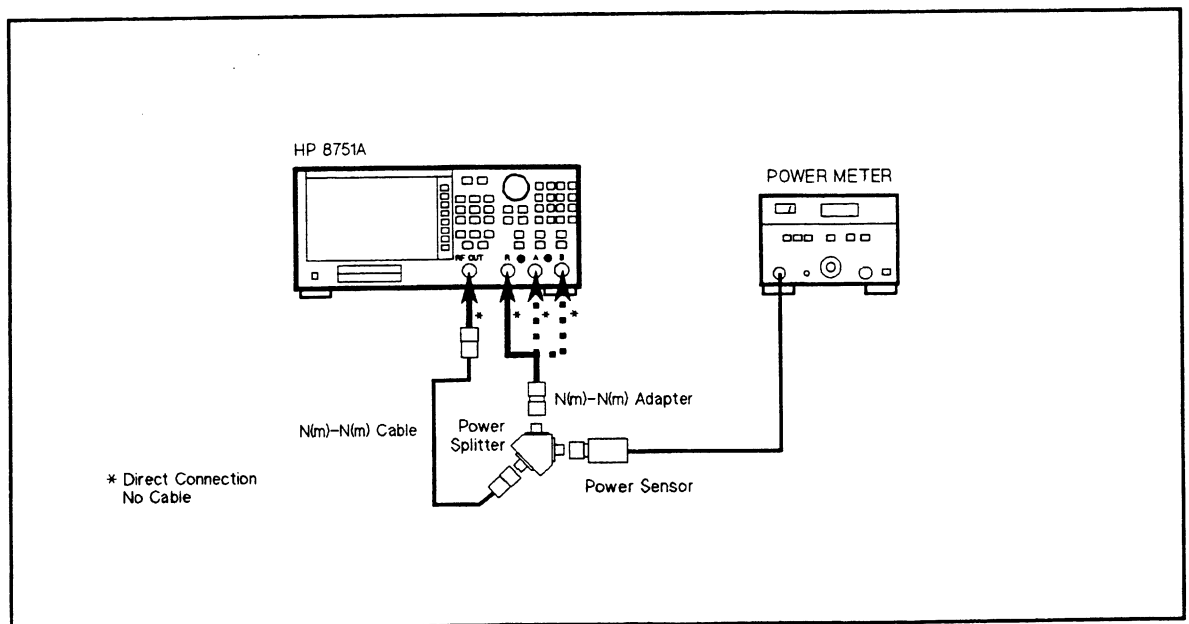
Measurement Method:

Synchronous Sampling Conversion

- Set the HP 8751A CENTER FREQUENCY according to the following table. Then record the readings of the Digital Multimeter, and the HP 8751A's readings in the Calculation Sheet.

Center Frequency
5 Hz
10 Hz
100 Hz
100 kHz
200 kHz
500 kHz

- Connect the Power Sensor to the Power Meter, and calibrate the Power Meter for the Power Sensor.
- Remove the digital multimeter from the power splitter, and connect the power sensor to the power splitter as shown in Figure 2-19.



**Figure 2-19. Absolute Amplitude Accuracy Test Setup 2**

- Set the HP 8751A as follows:

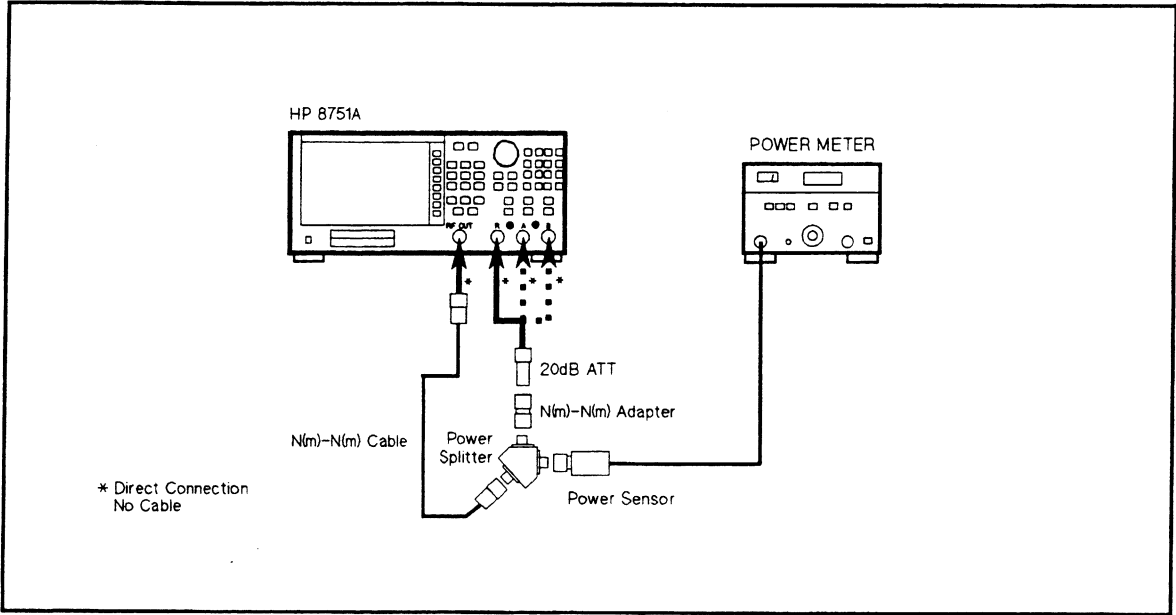
CENTER Freq. = 50 MHz  
IF BW: 20 Hz

Source Power = -4 dBm  
ATTEN: Input-R, 20 dB  
ATTEN: Input-A, 20 dB  
ATTEN: Input-B, 20 dB

CENTER, 5, 0, M/u  
AVG, IF BW, 2, 0, x1  
MENU, POWER, -, 4, x1  
ATTEN, INPUT-R: 20 dB  
ATTEN, INPUT-A: 20 dB  
ATTEN, INPUT-B: 20 dB

- Record the readings of the Power Meter and the HP 8751A in the Calculation Sheet.
- Record the 20 dB Pad Calibration Values on the Calculation Sheet.

10. Remove the Power Splitter from the front panel, and connect the 20 dB Pad as shown in Figure 2-20.



**Figure 2-20. Absolute Amplitude Accuracy Test Setup 3**

11. Set the HP 8751A Control Settings as follows:
- ATTEN: Input-R, 0 dB                    **ATTEN**, INPUT-R: 0 dB
- ATTEN: Input-A, 0 dB                    **ATTEN**, INPUT-A: 0 dB
- ATTEN: Input-B, 0 dB                    **ATTEN**, INPUT-B: 0 dB
12. Set the HP 8751A CENTER FREQUENCY according to the following table. Then record the readings of the power meter and the HP 8751A in the Calculation Sheet.

Center Frequency
1 MHz
10 MHz
30 MHz
50 MHz
100 MHz
300 MHz
500 MHz

13. Remove the 20 dB Pad from the Input-R, and disconnect the N(m)-N(m) Adapter from the 20 dB Pad, and connect it to the input-A.
14. Disconnect the Power Sensor from the Power Splitter, and connect the Digital Multimeter as shown in Figure 2-18.
15. Press **MEAS**, **A**, **MEAS**, **POWER**, **-**, **2**, **4**, **x1**, **AVG**, **IF BW**, **2**, **x1**.
16. Repeat steps 4 through 12.

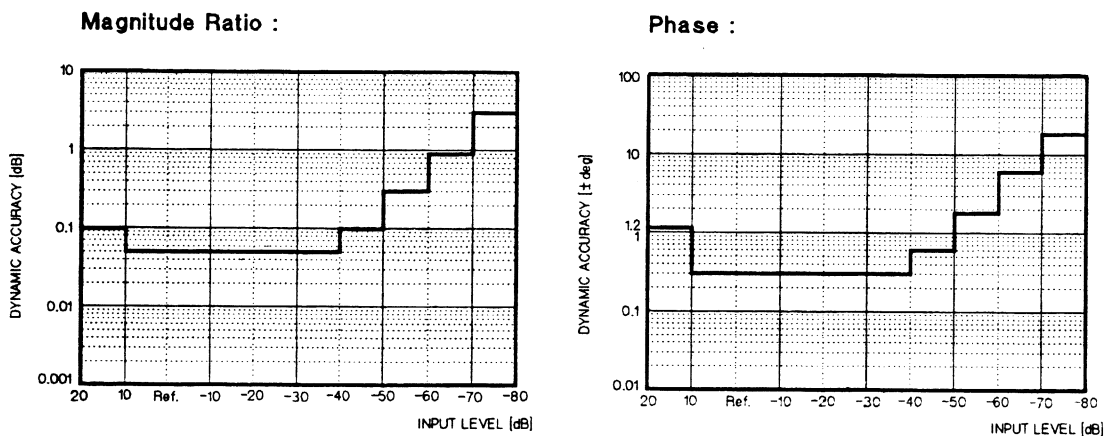
17. Remove the 20 dB Pad from the Input-A, and disconnect the N(m)-N(m) Adapter from the 20 dB Pad, and connect it to the input-B.
18. Disconnect the Power Sensor from the Power Splitter, and connect the Digital Multimeter as shown in Figure 2-18.
19. Press **MEAS**, **B**, **MEAS**, **POWER**, **-**, **2**, **4**, **x1**, **AVG**, **IF BW**, **2**, **x1**.
20. Repeat steps 4 through 12.

## MAGNITUDE RATIO/PHASE DYNAMIC ACCURACY TEST

This test measures the HP 8751A's Dynamic Accuracy. The dynamic accuracy is a measure of how well the receiver measure the magnitude and phase components of a signal as that signal varies in amplitude over the specified dynamic range.

### Specification

(At  $23 \pm 5^\circ\text{C}$ , 20 Hz bandwidth, Freq.  $\geq 1$  kHz)



Input Level : A/R and B/R - Rch. Input Level = -10dBm (@ATT = 20dB) or -30dBm (@ATT = 0dB)

A/B - Bch. Input Level = -10dBm (@ATT = 20dB) or -30dBm (@ATT = 0dB)

Assumption : Ref. Input Level = -20dBm (@ATT = 20dB) or -40dBm (@ATT = 0dB)

### Test Equipment

Power Splitter	HP 11667A
Step Attenuator	HP 8496A/G Opt.001 & H60
Attenuator Pad 6 dB	HP 8491A Opt.006 & H60
Attenuator Pad 6 dB	HP 8491A Opt.006
Attenuator Pad 10 dB	HP 8491A Opt.010 & H60
Attenuator Pad 10 dB	HP 8491A Opt.010, 2 ea
N(m)-N(m) Cable, 61 cm	HP 11500B, 3 ea
N(m)-N(m) Adapter	PN 1250-1475

---

**Note**

- An HP 8496A/G Step attenuator with required low VSWR ( $< 1.02$ ) can be purchased by specifying option H60, then contact your nearest Hewlett-Packard service center for the required calibration frequency and calibration uncertainty. If your attenuator is an HP 8496G (remote control), also provide the segment actuation sequence for every attenuation as listed below.

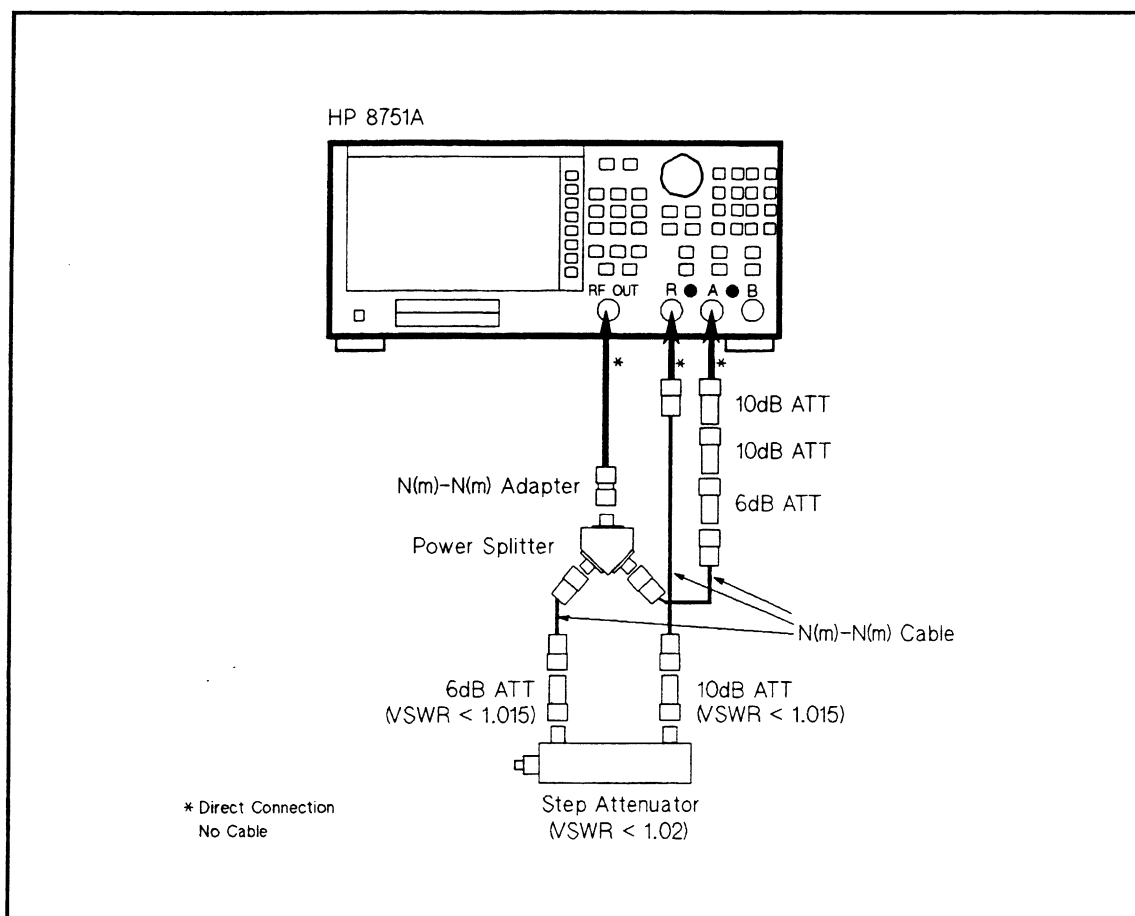
Attenuation	Activated Segment
40 dB	4
50 dB	1 and 4
60 dB	2 and 4
70 dB	1, 2, and 4

- An HP 8491A option 006 or option 010 fixed attenuator with required low VSWR ( $< 1.015$ ) can be purchased by specifying option H60.
- 

**Procedure**

1. Record the Step Attenuator 50 MHz Calibration Value on the Calculation Sheet.
2. —*A/R Dynamic Accuracy Test (Magnitude Ratio (50 MHz) and Phase (3 MHz))*—
  - a. Connect the test equipment as shown in Figure 2-21.





**Figure 2-21. Magnitude Ratio/Phase Dynamic Accuracy Test Setup 1**

b. Set the Step Attenuator to 0 dB.

c. Set the HP 8751A as follows:

#### Control Settings

PRESET

CH1: A/R, LOG MAG

CH2: A/R, PHASE

Dual Channel: ON

START Freq. = 3 MHz

STOP Freq. = 50 MHz

Number of Points = 2

Source Power = -8 dBm

IF BW: 20 Hz

Markers: Discrete, Coupled

ATTEN: Input-R = 0 dB

ATTEN: Input-A = 0 dB

#### Key Strokes

PRESET

CH 1, MEAS, A/R, FORMAT, LOG MAG

CH 2, MEAS, A/R, FORMAT, PHASE

DISPLAY, DUAL CHAN on/OFF

START, 3, M/u

STOP, 5, 0, M/u

MENU, NUMBER of POINTS, 2, x1

MENU, POWER, -, 8, x1

AVG, IF BW, 2, 0, x1

MKR, MARKER MODE MENU, MARKERS:DISCRETE, MARKERS:COUPLED

ATTEN, INPUT-R: 0dB

ATTEN, INPUT-A: 0dB

ATTEN: Input-B = 0 dB

**ATTEN**, INPUT-B: 0dB

- d. Perform the following key strokes to do a pass loss calibration.

**CAL**, CAL KIT, CAL KIT: N 50 $\Omega$ , **CAL**, CALIBRATE MENU, RESPONSE, THRU,  
DONE:RESPONSE

- e. Set the Step Attenuator to 10 dB.

- f. Press **MENU**, POWER, **2**, **x1** to change the source power from -8 dBm to +2 dBm.

- g. Perform the following key strokes for a single sweep measurement.

**MENU**, TRIGGER MENU, SINGLE

- h. Rotate the RPG knob, and read the magnitude ratio value at 50 MHz and the phase at 3 MHz. Then record these values on the Calculation Sheet.

- i. Set the Step Attenuator to 20 dB.

- j. Press **MENU**, POWER, **1**, **2**, **x1** to change the output power from +2 dBm to +12 dBm.

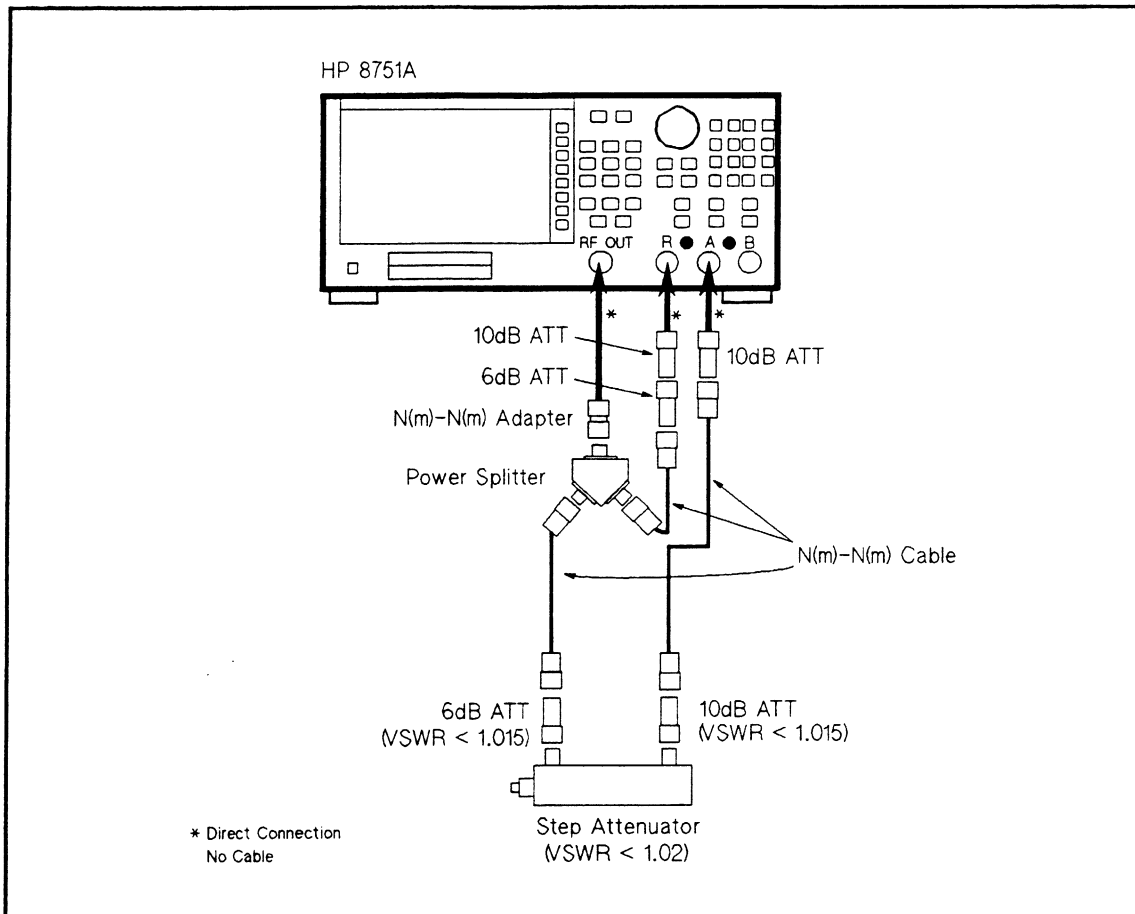
- k. Perform the following key strokes for a single sweep measurement.

**MENU**, TRIGGER MENU, SINGLE

- l. Rotate the RPG knob, and read the phase measurement result at 3 MHz and the magnitude ratio measurement result at 50 MHz. Then record these results on the Calculation Sheet.

- m. Press **MENU**, POWER, **-**, **8**, **x1** to change the output power from +12 dBm to -8 dBm.

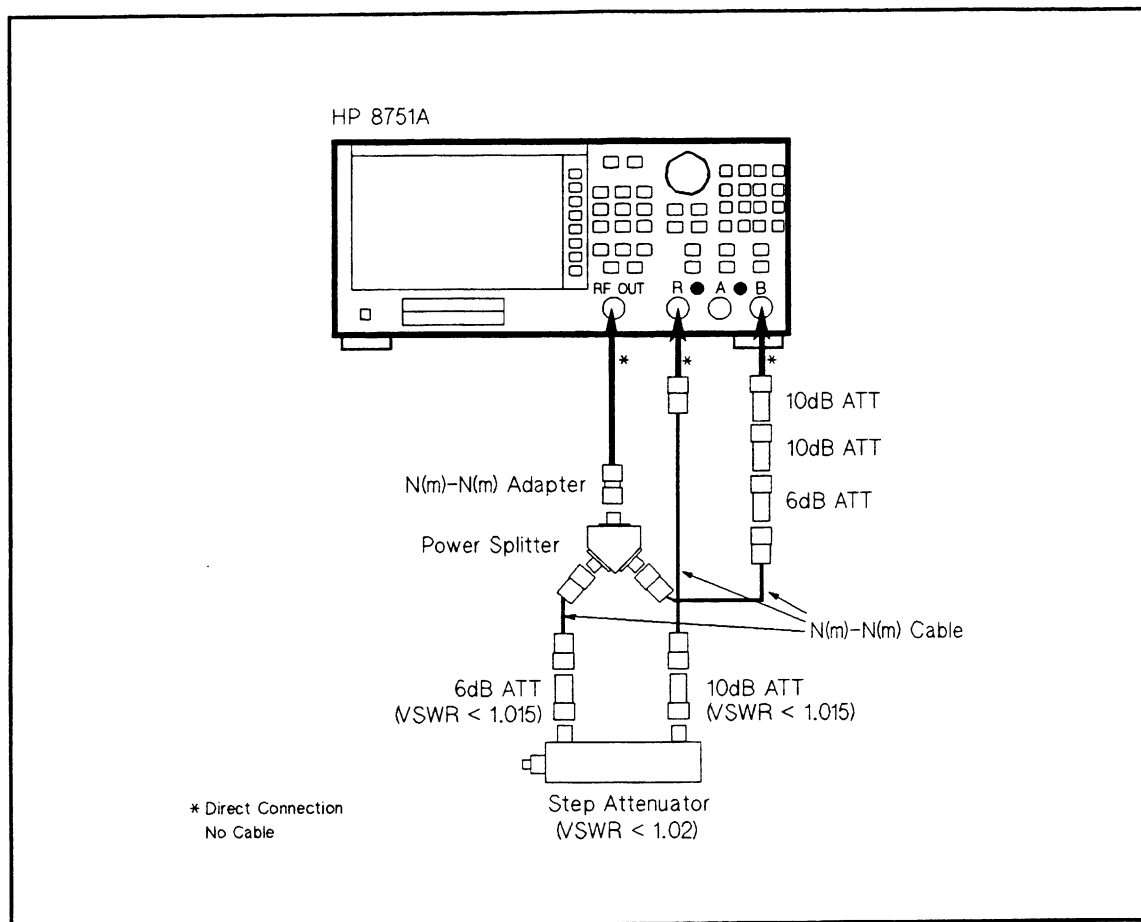
- n. Change the cable connection as shown in Figure 2-22.



**Figure 2-22. Magnitude Ratio/Phase Dynamic Accuracy Test Setup 2**

- o. Change the Step Attenuator to 0 dB.
- p. Perform the following key strokes to do a pass loss calibration.  
**CAL**, **CALIBRATE MENU**, **RESPONSE**, **THRU**, **DONE:RESPONSE**
- q. Set the Step Attenuator to 10 dB.
- r. Perform the following key strokes for a single sweep measurement.  
**MENU**, **TRIGGER MENU**, **SINGLE**
- s. Rotate the RPG knob, and read the phase measurement result at 3 MHz and the magnitude ratio measurement result at 50 MHz. Then record these results on the Calculation Sheet.
- t. Set the Step Attenuator from 20 dB to 80 dB in 10 dB steps, and repeat steps r and s in step 2 for every attenuation setting.

3. —B/R Dynamic Accuracy Test (Magnitude Ratio (50 MHz) and Phase (3 MHz))—
  - a. Connect the test equipment as shown in Figure 2-23.



**Figure 2-23. Magnitude Ratio/Phase Dynamic Accuracy Test Setup 3**

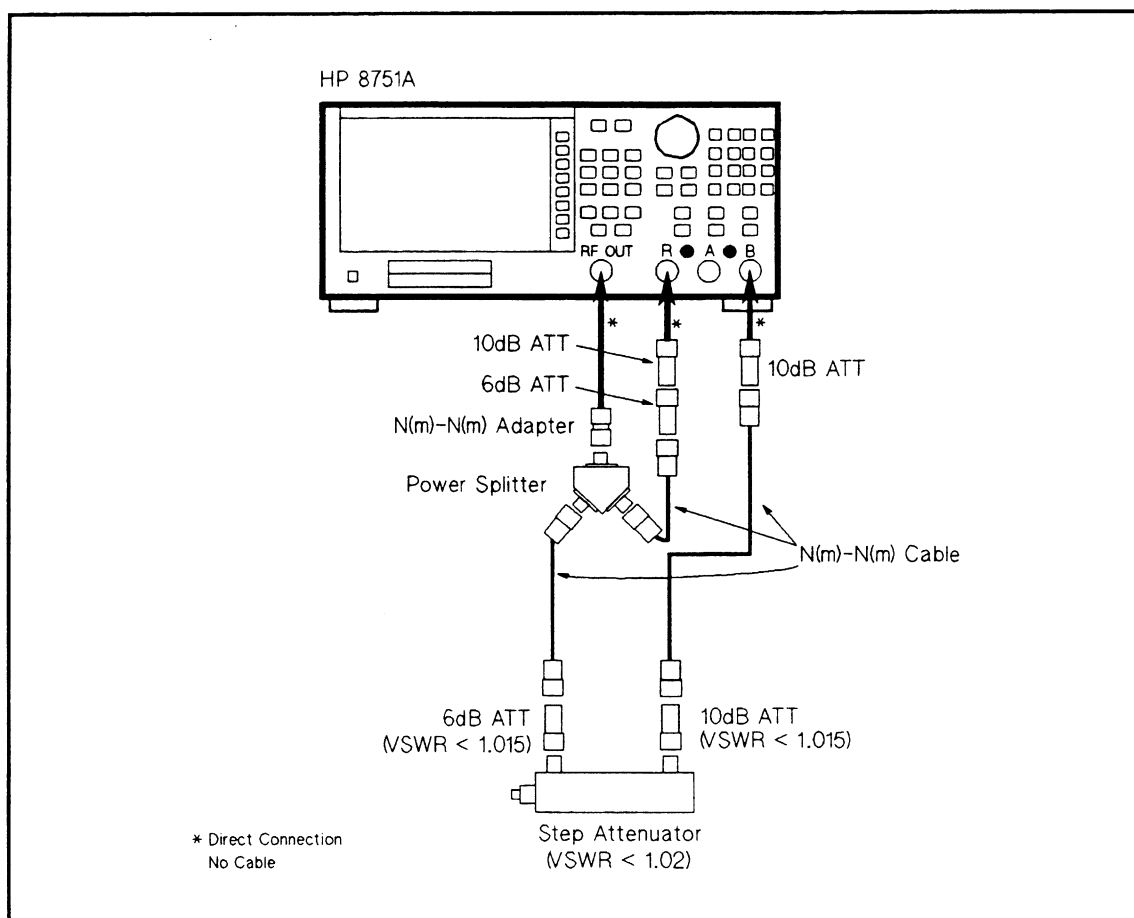
- b. Set the Step Attenuator to 0 dB.
- c. Change the HP 8751A control settings as follows:
 

Control Settings	Key Strokes
CH1: B/R, LOG MAG	[CH 1], [MEAS], B/R, [FORMAT], LOG MAG
CH2: B/R, PHASE	[CH 2], [MEAS], B/R, [FORMAT], PHASE
- d. Perform the following key strokes to do a pass loss calibration.
 

[CAL], CALIBRATE MENU, RESPONSE, THRU, DONE:RESPONSE
- e. Set the Step Attenuator to 10 dB.
- f. Press [MENU], POWER, [2], [x1] to change the output power from -8 dBm to +2 dBm.
- g. Perform the following key strokes for a single sweep measurement.
 

[MENU], TRIGGER MENU, SINGLE

- h. Rotate the RPG knob, and read the phase measurement result at 3 MHz and the magnitude ratio measurement result at 50 MHz. Then record these results on the Calculation Sheet.
- i. Set the Step Attenuator to 20 dB.
- j. Press **MENU**, **POWER**, **1**, **2**, **x1** to change the output power from +2 dBm to +12 dBm.
- k. Perform the following key strokes for a single sweep measurement.  
**MENU**, **TRIGGER MENU**, **SINGLE**
- l. Rotate the RPG knob, and read the phase measurement result at 3 MHz and the magnitude ratio measurement result at 50 MHz. Then record these results on the Calculation Sheet.
- m. Press **MENU**, **POWER**, **-**, **8**, **x1** to change the output power from +12 dBm to -8 dBm.
- n. Change the cable connection as shown in Figure 2-24.



**Figure 2-24. Magnitude Ratio/Phase Dynamic Accuracy Test Setup 4**

- o. Change the Step Attenuator to 0 dB.
- p. Perform the following key strokes to do a pass loss calibration.

**CAL**, **CALIBRATE MENU**, **RESPONSE**, **THRU**, **DONE:RESPONSE**

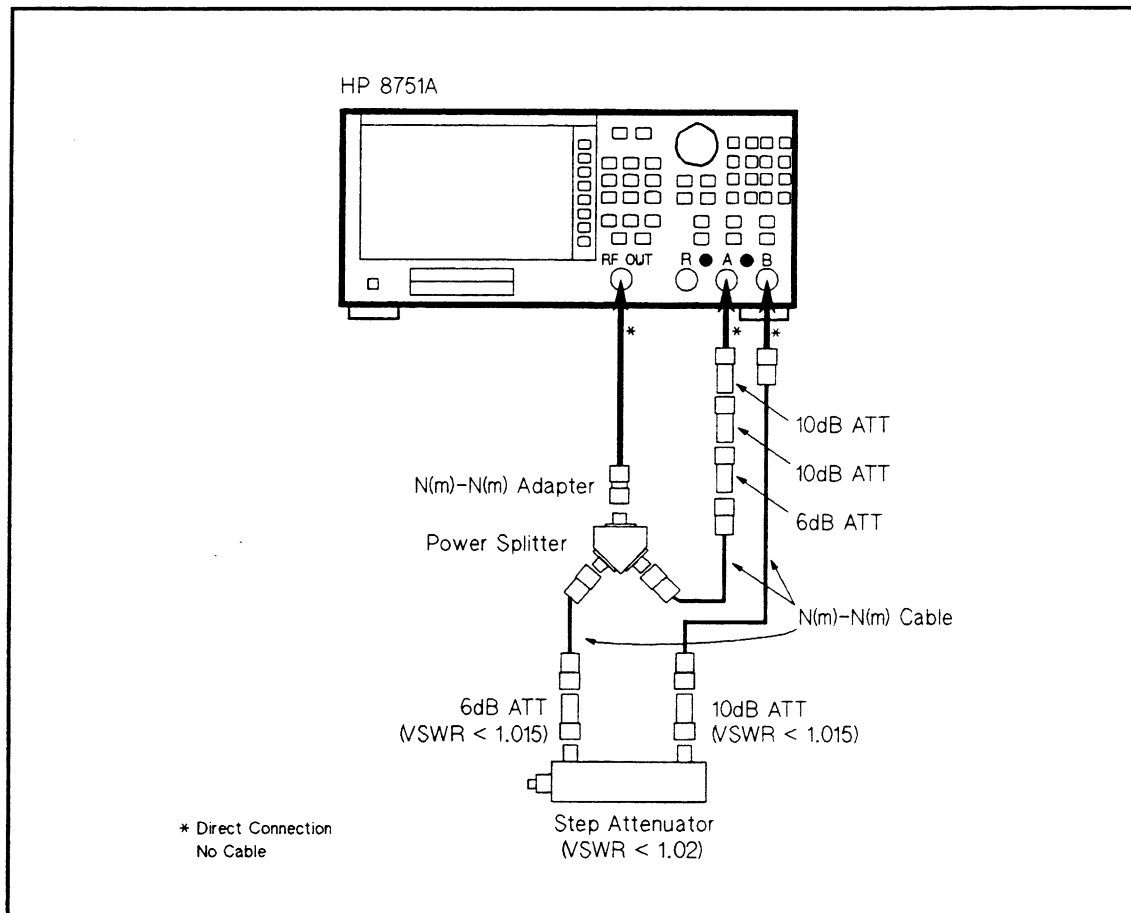
- q. Set the Step Attenuator to 10 dB.
- r. Perform the following key strokes for a single sweep measurement.

**MENU**, **TRIGGER MENU**, **SINGLE**

- s. Rotate the RPG knob, and read the phase measurement result at 3 MHz and the magnitude ratio measurement result at 50 MHz. Then record these results on the Calculation Sheet.
- t. Set the Step Attenuator from 20 dB to 80 dB in 10 dB steps, and repeat steps r and s in step 3 for every attenuation setting.

4. —A/B Dynamic Accuracy Test (Magnitude Ratio (50 MHz) and Phase (3 MHz))—

- a. Connect the test equipment as shown in Figure 2-25.



**Figure 2-25. Magnitude Ratio/Phase Dynamic Accuracy Test Setup 5**

- b. Set the Step Attenuator to 0 dB.
- c. Change the HP 8751A control settings as follows:

**Control Settings**

**Key Strokes**

CH1: A/B, LOG MAG

[CH 1], [MEAS], A/B, [FORMAT], LOG MAG

CH2: A/B, PHASE

[CH 2], [MEAS], A/B, [FORMAT], PHASE

- d. Perform the following key strokes to do a pass loss calibration.

[CH 1], [CAL], CALIBRATE MENU, RESPONSE, THRU, DONE:RESPONSE

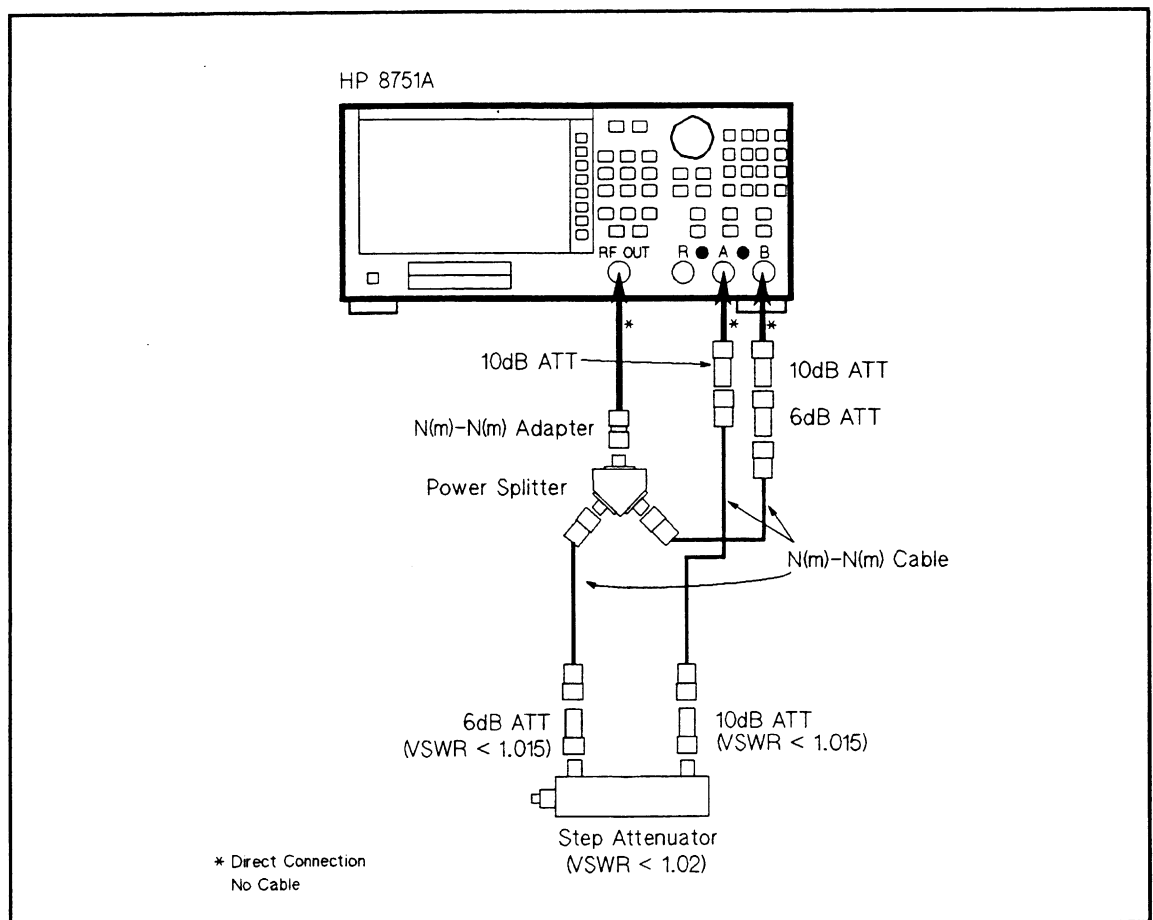
- e. Set the Step Attenuator to 10 dB.

- f. Press [MENU], POWER, [2], [x1] to change the output power from -8 dBm to +2 dBm.

- g. Perform the following key strokes for a single sweep measurement.

[MENU], TRIGGER MENU, SINGLE

- h. Rotate the RPG knob, and read the phase measurement result at 3 MHz and the magnitude ratio measurement result at 50 MHz. Then record these results on the Calculation Sheet.
- i. Set the Step Attenuator to 20 dB.
- j. Press **MENU**, **POWER**, **1**, **2**, **x1** to change the output power from +2 dBm to +12 dBm.
- k. Perform the following key strokes for a single sweep measurement.  
**MENU**, **TRIGGER MENU**, **SINGLE**
- l. Rotate the RPG knob, and read the phase measurement result at 3 MHz and the magnitude ratio measurement result at 50 MHz. Then record these results on the Calculation Sheet.
- m. Press **MENU**, **POWER**, **-**, **8**, **x1** to change the source power from +12 dBm to -8 dBm.
- n. Change the cable connection as shown in Figure 2-26.



**Figure 2-26. Magnitude Ratio/Phase Dynamic Accuracy Test Setup 6**

- o. Change the Step Attenuator to 0 dB.
- p. Perform the following key strokes to do a pass loss calibration.



**CAL**, CALIBRATE MENU , RESPONSE , THRU , DONE:RESPONSE

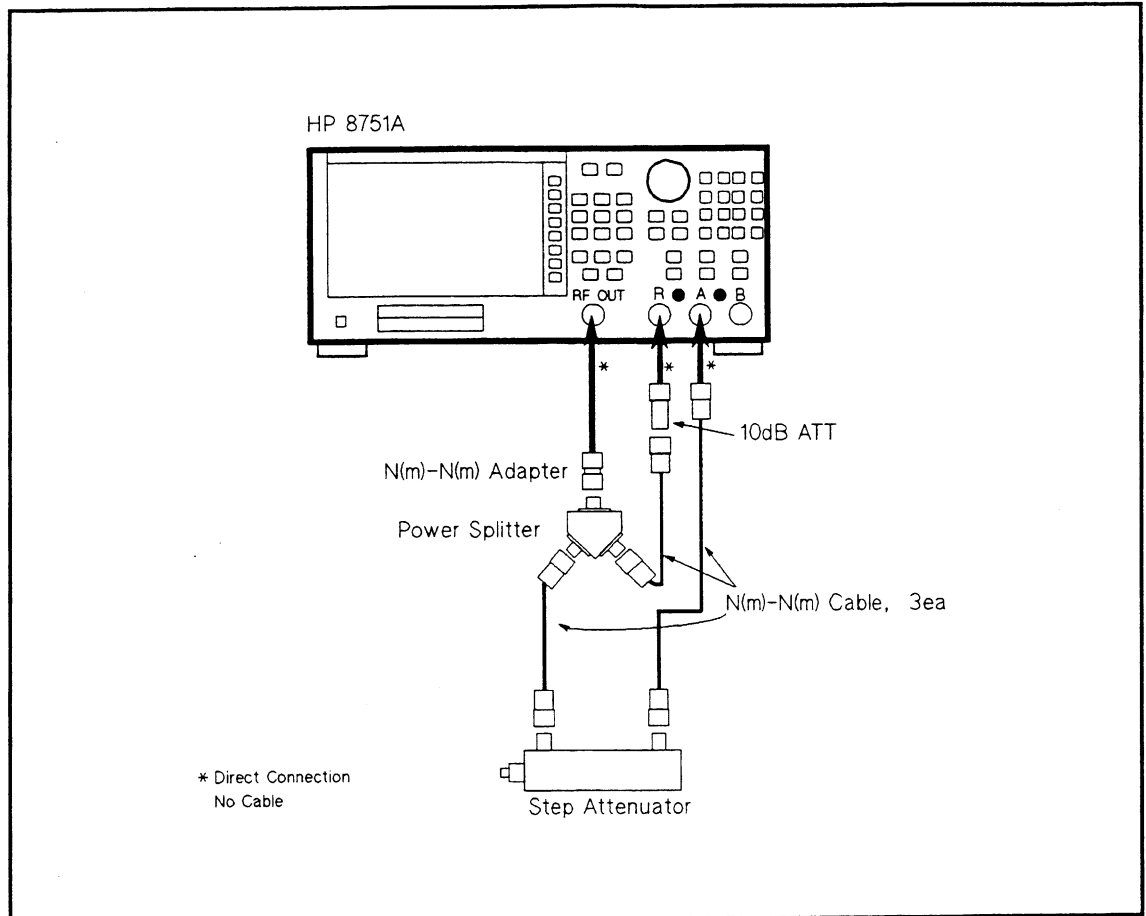
- q. Set the Step Attenuator to 10 dB.
- r. Perform the following key strokes for a single sweep measurement.

**MENU**, TRIGGER MENU , SINGLE

- s. Rotate the RPG knob, and read the phase measurement result at 3 MHz and the magnitude ratio measurement result at 50 MHz. Then record these results on the Calculation Sheet.
- t. Set the Step Attenuator from 20 dB to 80 dB in 10 dB steps, and repeat steps r and s in step 4 for every attenuation setting.

5. —A/R Dynamic Accuracy at the Other Frequencies Test—

- a. Connect the test equipment as shown in Figure 2-27.



**Figure 2-27. Magnitude Ratio/Phase Dynamic Accuracy Test Setup 7**

- b. Set the Step Attenuator to 10 dB.

- c. Set the HP 8751A as follows:

**Control Settings**

PRESET  
CH1: A/R, LOG MAG  
CH2: A/R, PHASE  
Dual Channel: ON  
CENTER Freq. = 1 kHz  
SPAN Freq. = 0 Hz  
Number of Points = 2  
IF BW: 20 Hz  
Source Power = -10 dBm

**Key Strokes**

PRESET  
CH 1, MEAS, A/R, FORMAT, LOG MAG  
CH 2, MEAS, A/R, FORMAT, PHASE  
DISPLAY, DUAL CHAN on/OFF  
CENTER, 1, k/m  
SPAN, 0, x1  
MENU, NUMBER of POINTS, 2, x1  
AVG, IF BW, 2, 0, x1  
MENU, POWER, -, 1, 0, x1

Markers: Discrete, Coupled

**MKR**, **MARKER MODE MENU**, **MARKERS:DISCRETE**,  
**MARKERS:COUPLED**

- d. Perform the following key strokes for a single sweep measurement.

**MENU**, **TRIGGER MENU**, **SINGLE**

- e. Perform the following key stroke.

**CH 1**, **DISPLAY**, **DEFINE TRACE**, **DATA -> MEM**, **DATA/MEM**, **CH 2**, **DATA -> MEM**,  
**DATA/MEM**.

- f. Press **MENU**, **POWER**, **0**, **x1** to change the output power from -10 dBm to 0 dBm.

- g. Perform the following key strokes for a single sweep measurement.

**MENU**, **TRIGGER MENU**, **SINGLE**

- h. Record the Magnitude Ratio/Phase reading values on the Calculation Sheet.

- i. Press **MENU**, **POWER**, **-**, **1**, **0**, **x1** to change the output power from 0 dBm to -10 dBm.

- j. Set the Step Attenuator to 0 dB.

- k. Perform the following key strokes for a single sweep measurement.

**MENU**, **TRIGGER MENU**, **SINGLE**

- l. Perform the following key strokes.

**CH 1**, **DISPLAY**, **DEFINE TRACE**, **DATA -> MEM**, **CH 2**, **DATA -> MEM**

- m. Press **MENU**, **POWER**, **0**, **x1** to change the output power from -10 dBm to 0 dBm.

- n. Perform the following key strokes for a single sweep measurement.

**MENU**, **TRIGGER MENU**, **SINGLE**

- o. Record the Magnitude Ratio/Phase reading values on the Calculation Sheet.

- p. Change the HP 8751A control settings as follows:

**Control Settings**

**Key Strokes**

START Freq. = 1 MHz

**START**, **1**, **M/u**

STOP Freq. = 50 MHz

**STOP**, **5**, **0**, **M/u**

Source Power = -4 dBm

**MENU**, **POWER**, **-**, **4**, **x1**

- q. Change the Step Attenuator to 10 dB.

- r. Perform the following key strokes for a single sweep measurement.

**MENU**, **TRIGGER MENU**, **SINGLE**

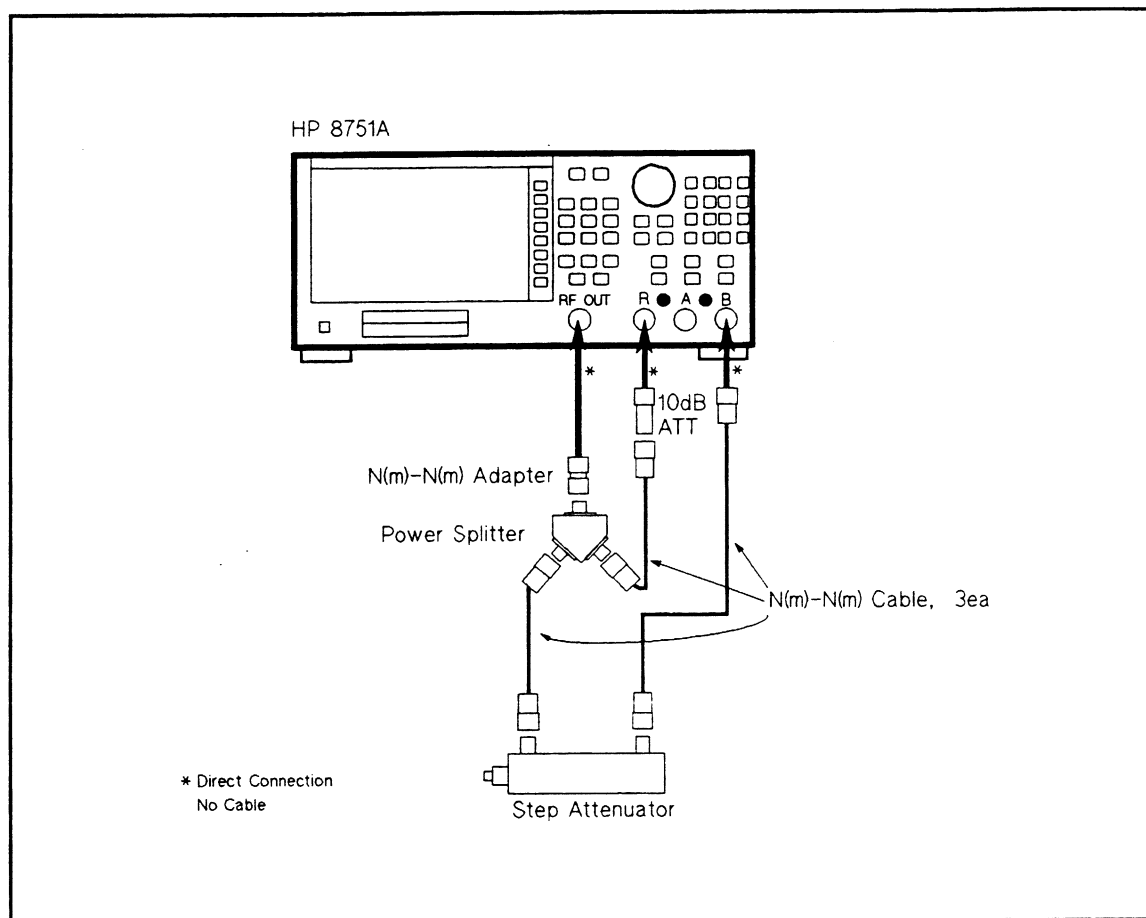
- s. Perform the following key stroke.

**CH 1**, **DISPLAY**, **DEFINE TRACE**, **DATA -> MEM**, **DATA/MEM**, **CH 2**, **DATA -> MEM**,  
**DATA/MEM**.

- t. Press **MENU**, **POWER**, **[6]**, **[x1]** to change the output power from -4 dBm to +6 dBm.
- u. Perform the following key strokes for a single sweep measurement.  
**MENU**, **TRIGGER MENU**, **SINGLE**
- v. Rotate the RPG knob, and record the Magnitude Ratio/Phase reading values for each frequency on the Calculation Sheet.
- w. Press **MENU**, **POWER**, **[-]**, **[4]**, **[x1]** to change the output power from +6 dBm to -4 dBm.
- x. Set the Step Attenuator to 0 dB.
- y. Perform the following key strokes for a single sweep measurement.  
**MENU**, **TRIGGER MENU**, **SINGLE**
- z. Perform the following key strokes.  
**CH 1**, **DISPLAY**, **DEFINE TRACE**, **DATA -> MEM**, **CH 2**, **DATA -> MEM**
- aa. Press **MENU**, **POWER**, **[6]**, **[x1]** to change the output power from -4 dBm to +6 dBm.
- bb. Perform the following key strokes for a single sweep measurement.  
**MENU**, **TRIGGER MENU**, **SINGLE**
- cc. Rotate the RPG knob, and record the Magnitude Ratio/Phase reading values for each frequency on the Calculation Sheet.
- dd. Change the HP 8751A control settings as follows:
- | Control Settings      | Key Stroke   |
|-----------------------|--|
| START Freq. = 100 MHz | <b>START</b> , <b>[1]</b> , <b>[0]</b> , <b>[0]</b> , <b>[M/u]</b> |
| STOP Freq. = 500 MHz  | <b>STOP</b> , <b>[5]</b> , <b>[0]</b> , <b>[0]</b> , <b>[M/u]</b>  |
| Source Power = -4 dBm | <b>MENU</b> , <b>POWER</b> , <b>[-]</b> , <b>[4]</b> , <b>[x1]</b> |
| Number of Points: 5   | <b>MENU</b> , <b>NUMBER of POINTS</b> , <b>[5]</b> , <b>[x1]</b>   |
- ee. Set the Step Attenuator to 10 dB.
- ff. Repeat the steps r through cc in step 5.

6. —*B/R Dynamic Accuracy at the Other Frequencies Test*—

- a. Change the HP 8751A connection as shown in Figure 2-28.



**Figure 2-28. Magnitude Ratio/Phase Dynamic Accuracy Test Setup 8**

- b. Change the HP 8751A control settings as follows:

**Control Settings**

CH1: B/R, LOG MAG

CH2: B/R, PHASE

CENTER Freq. = 1 kHz

SPAN Freq. = 0 Hz

Source Power = -10 dBm

Number of Points: 2

**Key Strokes**

[CH 1], [MEAS], B/R, [FORMAT], LOG MAG

[CH 2], [MEAS], B/R, [FORMAT], PHASE

[CENTER], [1], [k/m]

[SPAN], [0], [x1]

[MENU], POWER, [-], [1], [0], [x1]

[MENU], NUMBER of POINTS, [2], [x1]

- c. Set the Step Attenuator to 10 dB.
- d. Repeat the steps d through ff in step 5.

7. —A/B Dynamic Accuracy at the Other Frequencies Test—

- a. Change the HP 8751A connection as shown in Figure 2-29.

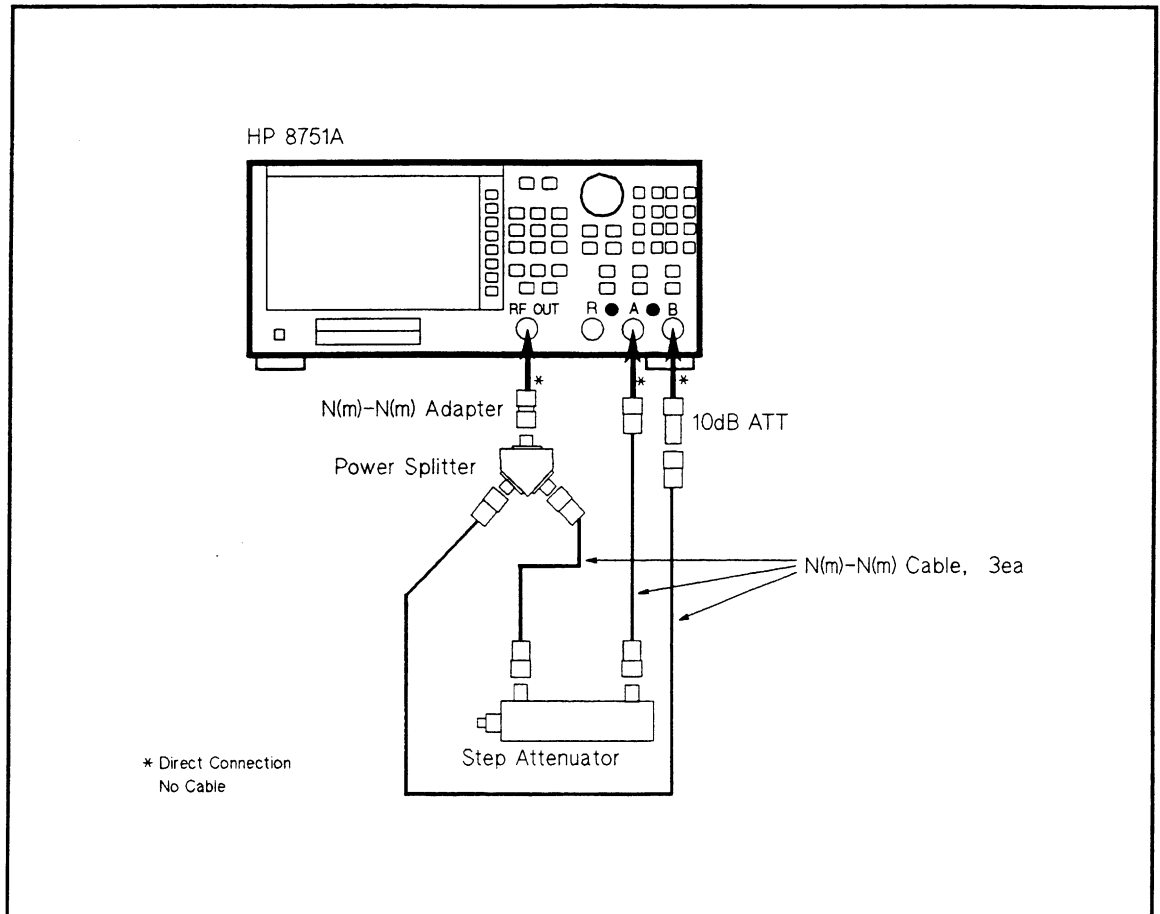


Figure 2-29. Magnitude Ratio/Phase Dynamic Accuracy Test Setup 9

- b. Change the HP 8751A control settings as follows:

**Control Settings**

CH1: A/B, LOG MAG

CH2: A/B, PHASE

CENTER Freq. = 1 kHz

SPAN Freq. = 0 Hz

Source Power = -10 dBm

Number of Points: 2

**Key Stroke**

CH 1, MEAS, A/B, FORMAT, LOG MAG

CH 2, MEAS, A/B, FORMAT, PHASE

CENTER, 1, k/m

SPAN, 0, x1

MENU, POWER, -, 1, 0, x1

MENU, NUMBER of POINTS, 2, x1

- c. Set the Step Attenuator to 10 dB.
- d. Repeat the steps d through ff in step 5.

## MAGNITUDE RATIO FREQUENCY RESPONSE TEST

This test checks the magnitude ratio accuracy for each pair of inputs by measuring the peak-to-peak variation of the ratioed trace.

### Specification

(At  $23 \pm 5^\circ\text{C}$ , same ATT for both input ports, -10 dBm relative to Input Range)

$5 \text{ Hz} \leq \text{Freq.} \leq 100 \text{ MHz}$	$\pm 0.5 \text{ dB}$
$100 \text{ MHz} < \text{Freq.} \leq 300 \text{ MHz}$	$\pm 1.0 \text{ dB}$
$300 \text{ MHz} < \text{Freq.} \leq 500 \text{ MHz}$	$\pm 1.5 \text{ dB}$

### Test Equipment

Three Way Power Splitter	HP 11850C
50 $\Omega$ type-N RF cable set	HP 11851B

### Procedure

1. Connect the equipment as shown in Figure 2-30.

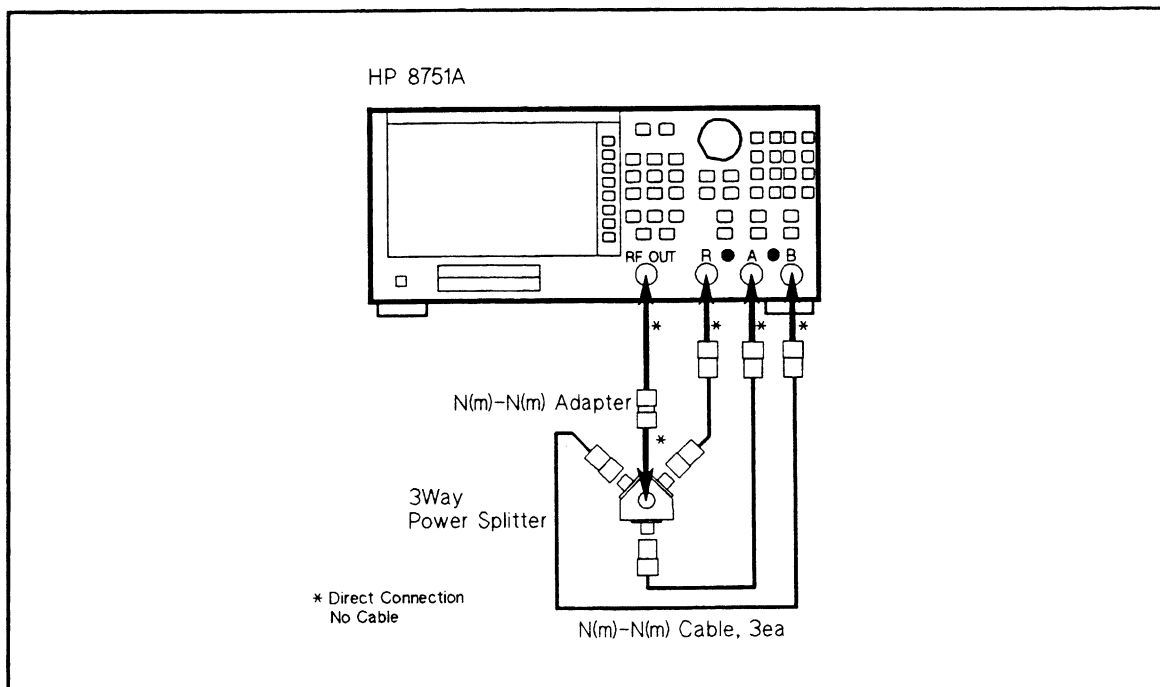


Figure 2-30. Magnitude Ratio Frequency Response Test Setup

- Set up the HP 8751A as follows.

#### Control Settings

#### Key Strokes

PRESET

**PRESET**

Meas. Config.: A/R

**MEAS**, **A/R**

Source Power = -0.5 dBm

**MEAS**, **POWER**, **-**, **.**, **5**, **x1**

IF BW: 2 Hz

**AVG**, **IF BW**, **2**, **x1**

Scale: 0.5 dB/div

**SCALE REF**, **SCALE/DIV**, **.**, **5**, **x1**.

- Store the measurement data using the following key stroke.

**MKR FCTN**, **MARKER -> REFERENCE**, **DISPLAY**, **DEFINE TRACE**, **DATA -> MEM**

- Reverse R and A cable connections on the HP 8751A input ports.
- Press the **DISPLAY**, **DEFINE TRACE**, **DATA** and **MEMORY**. Visually average the two traces: imagine a trace directly between the two traces. (If both traces are not completely visible, change the scales as required.)
  - Rotate the RPG knob, and record the maximum “averaged” power deviation from 5 Hz to 100 MHz on the Performance Test Record.
  - Rotate the RPG knob, and record the maximum “averaged” power deviation from 100 MHz to 300 MHz on the Performance Test Record.
  - Rotate the RPG knob, and record the maximum “averaged” power deviation from 300 MHz to 500 MHz on the Performance Test Record.

- Press **DISPLAY: DATA**.

- Change the HP 8751A control settings as follows:

#### Control Settings

#### Key Strokes

Meas. Config.: B/R

**MEAS**, **B/R**

- Repeat the steps 3 through 6, except reverse the B and R input cable connections after storing the trace.

- Press **DISPLAY: DATA**.

- Change the HP 8751A control settings as follows:

#### Control Settings

#### Key Strokes

Meas. Config.: A/B

**MEAS**, **A/B**

- Repeat the steps 3 through 6, except reverse the B and R input cable connections after storing the trace.



## PHASE FREQUENCY RESPONSE TEST

This test checks the phase tracking frequency response, measured as deviation from linear phase.

### Specification

(At  $23 \pm 5^\circ\text{C}$ , the same ATT setting for both input ports, -10 dBm relative to Input Range)

$5 \text{ Hz} \leq \text{Freq.} \leq 100 \text{ MHz}$ :	$\pm 2.5$ degree
$100 \text{ MHz} < \text{Freq.} \leq 300 \text{ MHz}$ :	$\pm 5.0$ degree
$300 \text{ MHz} < \text{Freq.} \leq 500 \text{ MHz}$ :	$\pm 10.0$ degree

### Test Equipment

Three Way Power Splitter	HP 11850C
N(m)-N(m) Adapter	PN 1250-1475
50 $\Omega$ type-N RF cable set	HP 11851B

### Procedure

1. Connect the equipment as shown in Figure 2-31.

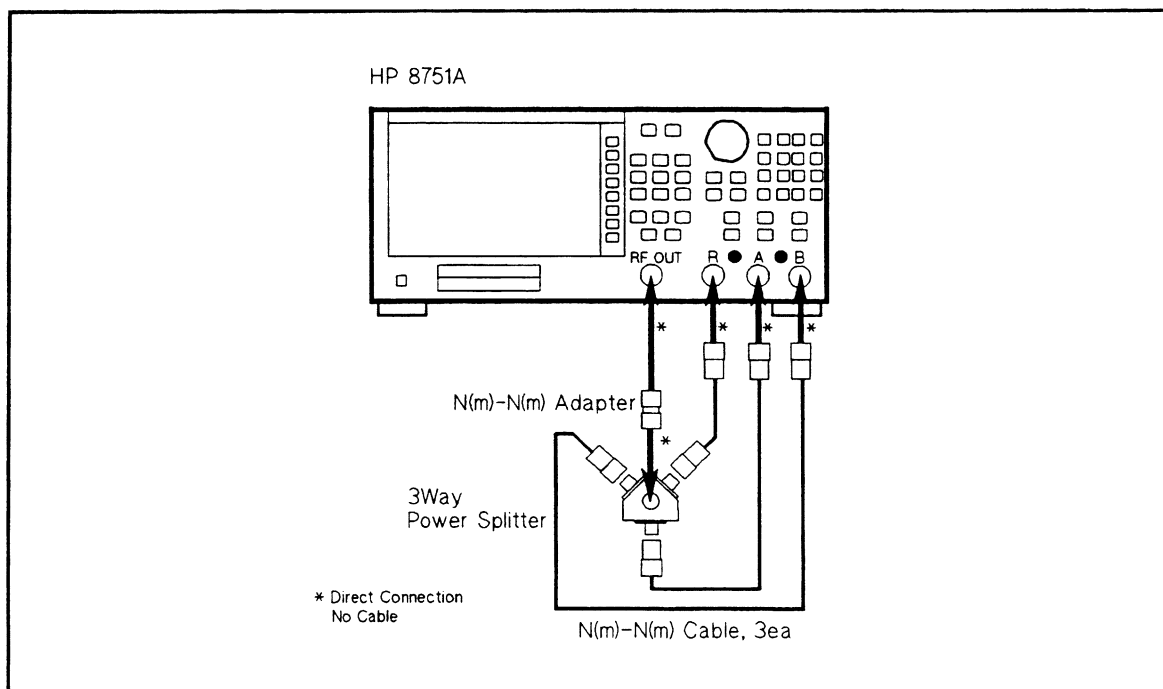


Figure 2-31. Phase Frequency Response Test Setup

- Set up the HP 8751A as follows:

#### Control Settings

#### Key Strokes

PRESET

**PRESET**

Meas. Config. : A/R

**MEAS**, A/R

Display Format: Phase

**FORMAT**, PHASE

Source Power= -0.5 dBm

**MENU**, POWER, -, ., 5, **x1**

IF BW: AUTO

**AVG**, IF BW, 2, **x1**

Marker Statistics ON

**MKR FCTN**, STATISTICS on/OFF

Scale: 2.5°/div

**SCALE REF**, 2, ., 5, **x1**

- Press **SCALE REF**, ELEC DELAY MENU, ELECTRICAL DELAY and turn the RPG knob or press **↑**, **↓** to vary the electrical delay until the standard deviation value as a marker statistic (s.dev) is minimum as possible.
- Press **PHASE OFFSET**, and enter the mean value as a marker statistic (mean).
- Perform the following key strokes for a single sweep measurement.  
**MENU**, TRIGGER MENU, SINGLE
- Perform the following key strokes to set the marker search range from 5 Hz to 100 MHz.  
**MKR**, ACTIVE MARKER, MARKER 1, 5, **x1**, ACTIVE MARKER, MARKER 2, 1, 0, 0,  
**M/u**, Δ MODE MENU, Δ REF MARKER, Δ REF = 1, **MKR FCTN**, SEARCH RANGE,  
SEARCH RNG STORE, PART SRCH on/OFF
- Move the marker to the maximum value and the minimum value using the following key strokes. Compare the two values, and record the larger one in the Performance Test Record.  
**MKR**, Δ MODE MENU, Δ MODE OFF, **MKR FCTN**, MKR SEARCH, MAX, MIN
- Press **MKR**, Δ MODE MENU, Δ RF MARKER, Δ RF = 1.
- Perform the following key strokes to set the marker search range from 100 MHz to 300 MHz.  
**MKR**, ACTIVE MARKER, MARKER 1, 9, 9, ., 9, 9, 9, 9, 9, 5, **M/u**,  
**MKR**, ACTIVE MARKER, MARKER 2, 2, 0, 0, **M/u**, **MKR FCTN**, SEARCH RANGE,  
SEARCH RNG STORE
- Move the marker to the maximum value and the minimum value using the following key strokes. Compare the two values, and record the larger one in the Performance Test Record.  
**MKR**, Δ MODE MENU, Δ MODE OFF, **MKR FCTN**, MKR SEARCH, MAX, MIN
- Press **MKR**, Δ MODE MENU, Δ RF MARKER, Δ RF = 1.
- Perform the following key strokes to set the marker search range from 300 MHz to 500 MHz.

**MKR**, ACTIVE MARKER, MARKER 1, **2**, **0**, **0**, **M/u**, **MKR**, ACTIVE MARKER, MARKER 2, **3**, **0**, **0**, **M/u**, **MKR FCTN**, SEARCH RANGE, SEARCH RNG STORE

13. Move the marker to the maximum value and the minimum value using the following key strokes. Compare the two values, and record the larger one in the Performance Test Record.

**MKR**, **Δ** MODE MENU, **Δ** MODE OFF, **MKR FCTN**, MKR SEARCH, MAX, MIN

14. Press **MKR**, **Δ** MODE MENU, **Δ** RF MARKER, **Δ** RF = 1.

15. Change the HP 8751A control settings for B/R Phase:

Control Settings	Key Strokes
Meas. Config.: B/R, Phase	<b>MEAS</b> , B/R, <b>FORMAT</b> , PHASE
Trigger Mode: Continuous	<b>MENU</b> , TRIGGER MENU, CONTINUOUS

16. Repeat steps 3 through 14.

17. Change the HP 8751A control settings for A/B Phase:

Control Settings	Key Strokes
Meas. Config. : A/B, Phase	<b>MEAS</b> , A/B, <b>FORMAT</b> , PHASE
Trigger Mode; Continuous	<b>MENU</b> , TRIGGER MENU, CONTINUOUS

18. Repeat steps 3 through 14.

## DC MEASUREMENT RANGE AND ACCURACY TEST

This test checks the HP 8751A DC measurement range and accuracy for input-B.

### Specification

Range:  $\pm 2$  Vdc  
Accuracy:  $\pm(0.5\% + 5\text{mV})$

### Test Equipment

Universal Source	HP 3245A
BNC (m)-BNC(m) Cable, 61 cm	PN 8120-1840
N(m)-BNC(f) Adapter	PN 1250-0780

### Procedure

1. Connect the equipment as shown in Figure 2-32.

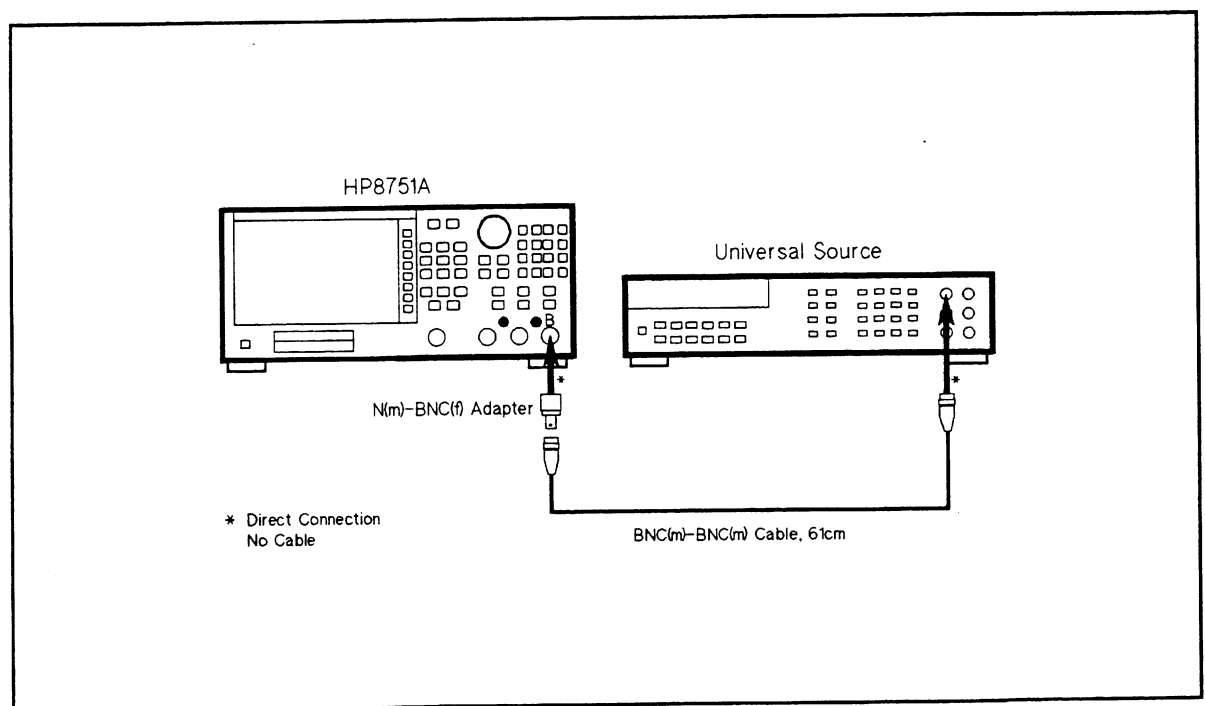


Figure 2-32. DC Measurement Range and Accuracy Test Setup

2. Set up the HP 8751A as follows.

#### Control Settings

PRESET  
Meas. Config.: Bdc  
Display Format: REAL  
Marker Function: ON

#### Key Strokes

PRESET  
MEAS, S-PARAMTERS, Bdc  
FORMAT, MORE, REAL  
MKR FCTN

3. Set the universal source as follows.

Output Channel:	Channel A
Output Impedance:	0 $\Omega$
Output Mode:	DCV
Resolution:	High Resolution Mode
Output Voltage:	0 V

4. Record the HP 8751A reading value on the Performance Test Record.

5. Change the universal source's output voltage to 2 V.

6. Record the HP 8751A reading value on the Performance Test Record.

7. Change the universal source's output voltage to -2 V.

8. Record the HP 8751A reading value on the Performance Test Record.

## CALCULATION SHEET

### Harmonics Test

HP 8751A Center Frequency	Spectrum Analyzer Frequency	Spectrum Analyzer Reading	Test Result [-a+b]
100 Hz	100 Hz	a = _____ dBm	
	200 Hz	b = _____ dBm	_____ dBc
	300 Hz	b = _____ dBm	_____ dBc
10 kHz	10 kHz	a = _____ dBm	
	20 kHz	b = _____ dBm	_____ dBc
	30 kHz	b = _____ dBm	_____ dBc
500 kHz	500 kHz	a = _____ dBm	
	1 MHz	b = _____ dBm	_____ dBc
	1.5 MHz	b = _____ dBm	_____ dBc
10 MHz	10 MHz	a = _____ dBm	
	20 MHz	b = _____ dBm	_____ dBc
	30 MHz	b = _____ dBm	_____ dBc
100 MHz	100 MHz	a = _____ dBm	
	200 MHz	b = _____ dBm	_____ dBc
	300 MHz	b = _____ dBm	_____ dBc
300 MHz	300 MHz	a = _____ dBm	
	600 MHz	b = _____ dBm	_____ dBc
	900 MHz	b = _____ dBm	_____ dBc
500 MHz	500 MHz	a = _____ dBm	
	1000 MHz	b = _____ dBm	_____ dBc
	1500 MHz	b = _____ dBm	_____ dBc

### Non-Harmonic Spurious Test

HP 8751A Center Frequency	Spectrum Analyzer Frequency	Spectrum Analyzer Reading	Test Result [-a+b]
493.7625 MHz	f1 = _____	a = _____ dBm	
	f1 + 205 Hz = _____	b = _____ dBm	_____ dBc
493.76274125 MHz	f2 = _____	a = _____ dBm	
	f2 + 550 Hz = _____	b = _____ dBm	_____ dBc
493.7649125 MHz	f3 = _____	a = _____ dBm	
	f3 + 5.5 kHz = _____	b = _____ dBm	_____ dBc
493.786625 MHz	f4 = _____	a = _____ dBm	
	f4 + 55 kHz = _____	b = _____ dBm	_____ dBc
426 MHz	426 MHz	a = _____ dBm	
	424 MHz	b = _____ dBm	_____ dBc

## Phase Noise Test

HP 8751A Center Frequency	Spectrum Analyzer Frequency	Spectrum Analyzer Reading	Test Result [-a+b]
4 MHz	4 MHz	a = _____ dBm	
	3.98 MHz	b = _____ dBm	
	4.02 MHz	b = _____ dBm	
249 MHz	249 MHz	a = _____ dBm	
	248.98 MHz	b = _____ dBm	
	249.02 MHz	b = _____ dBm	
498.5875 MHz	498.5875 MHz	a = _____ dBm	
	498.5675 MHz	b = _____ dBm	
	498.6075 MHz	b = _____ dBm	

## Source Level Linearity/Flatness Test

HP 8751A Center Frequency	HP 3458A Reading [a]	Test Result [a-d]
5 Hz	_____ dBm	_____ dB
50 Hz	_____ dBm	_____ dB
1 kHz	_____ dBm	_____ dB
10 kHz	_____ dBm	_____ dB
100 kHz	_____ dBm	_____ dB

HP 8751A Center Frequency	HP Power Meter Reading [a]	Test Result [a-d]
1 MHz	_____ dBm	_____ dB
10 MHz	_____ dBm	_____ dB
50 MHz	d = _____ dBm	_____ dB
100 MHz	_____ dBm	_____ dB
200 MHz	_____ dBm	_____ dB
300 MHz	_____ dBm	_____ dB
400 MHz	_____ dBm	_____ dB
500 MHz	_____ dBm	_____ dB

## Non Sweep Power Linearity Test

### HP 8482A Power Sensor

Source Power [a]	Power Meter Reading [b]	Test Result [-a+b-d]
-10 dBm c =	_____ dBm	_____ dB
0 dBm d =	_____ dBm	
+10 dBm	_____ dBm	_____ dB
+15 dBm	_____ dBm	_____ dB

### HP 8481D Power Sensor

Source Power [a]	Power Meter Reading [b]	Test Result [-a+b+c-d-e]
-10 dBm e =	_____ dBm	
-15 dBm	_____ dBm	_____ dB
-20 dBm	_____ dBm	_____ dB
-25 dBm	_____ dBm	_____ dB
-30 dBm	_____ dBm	_____ dB
-35 dBm	_____ dBm	_____ dB
-40 dBm	_____ dBm	_____ dB
-45 dBm	_____ dBm	_____ dB
-50 dBm	_____ dBm	_____ dB



## Power Sweep Linearity Test

CW FREQUENCY = 500 kHz

Output Level	Power Meter Reading
-15 dBm	a = _____ dBm
-20 dBm	b = _____ dBm
-25 dBm	c = _____ dBm
-30 dBm	d = _____ dBm
-35 dBm	e = _____ dBm
-40 dBm	f = _____ dBm
-45 dBm	g = _____ dBm
-50 dBm	h = _____ dBm

STOP Power	Output Level	Test Result
-15 dBm	-20 dBm	- a + b + 5 = _____ dB
	-25 dBm	- a + c + 10 = _____ dB
	-30 dBm	- a + d + 15 = _____ dB
	-35 dBm	- a + e + 20 = _____ dB
	-40 dBm	- a + f + 25 = _____ dB
	-45 dBm	- a + g + 30 = _____ dB
-20 dBm	-50 dBm	- a + h + 35 = _____ dB
	-25 dBm	- b + c + 5 = _____ dB
	-30 dBm	- b + d + 10 = _____ dB
	-35 dBm	- b + e + 15 = _____ dB
	-40 dBm	- b + f + 20 = _____ dB
	-45 dBm	- b + g + 25 = _____ dB
-25 dBm	-50 dBm	- b + h + 30 = _____ dB
	-30 dBm	- c + d + 5 = _____ dB
	-35 dBm	- c + e + 10 = _____ dB
	-40 dBm	- c + f + 15 = _____ dB
	-45 dBm	- c + g + 20 = _____ dB
	-50 dBm	- c + h + 25 = _____ dB
-30 dBm	-35 dBm	- d + e + 5 = _____ dB
	-40 dBm	- d + f + 10 = _____ dB
	-45 dBm	- d + g + 15 = _____ dB
	-50 dBm	- d + h + 20 = _____ dB
-35 dBm	-40 dBm	- e + f + 5 = _____ dB
	-45 dBm	- e + g + 10 = _____ dB
	-50 dBm	- e + h + 15 = _____ dB
-40 dBm	-45 dBm	- f + g + 5 = _____ dB
	-50 dBm	- f + h + 10 = _____ dB
-45 dBm	-50 dBm	- g + h + 5 = _____ dB

**CW FREQUENCY = 1 MHz**

Output Level	Power Meter Reading
-15 dBm	a = _____ dBm
-20 dBm	b = _____ dBm
-25 dBm	c = _____ dBm
-30 dBm	d = _____ dBm
-35 dBm	e = _____ dBm
-40 dBm	f = _____ dBm
-45 dBm	g = _____ dBm
-50 dBm	h = _____ dBm

STOP Power	Output Level	Test Result
-15 dBm	-20 dBm	- a + b + 5 = _____ dB
	-25 dBm	- a + c + 10 = _____ dB
	-30 dBm	- a + d + 15 = _____ dB
	-35 dBm	- a + e + 20 = _____ dB
	-40 dBm	- a + f + 25 = _____ dB
	-45 dBm	- a + g + 30 = _____ dB
-20 dBm	-50 dBm	- a + h + 35 = _____ dB
	-25 dBm	- b + c + 5 = _____ dB
	-30 dBm	- b + d + 10 = _____ dB
	-35 dBm	- b + e + 15 = _____ dB
	-40 dBm	- b + f + 20 = _____ dB
	-45 dBm	- b + g + 25 = _____ dB
-25 dBm	-50 dBm	- b + h + 30 = _____ dB
	-30 dBm	- c + d + 5 = _____ dB
	-35 dBm	- c + e + 10 = _____ dB
	-40 dBm	- c + f + 15 = _____ dB
	-45 dBm	- c + g + 20 = _____ dB
	-50 dBm	- c + h + 25 = _____ dB
-30 dBm	-35 dBm	- d + e + 5 = _____ dB
	-40 dBm	- d + f + 10 = _____ dB
	-45 dBm	- d + g + 15 = _____ dB
	-50 dBm	- d + h + 20 = _____ dB
-35 dBm	-40 dBm	- e + f + 5 = _____ dB
	-45 dBm	- e + g + 10 = _____ dB
	-50 dBm	- e + h + 15 = _____ dB
-40 dBm	-45 dBm	- f + g + 5 = _____ dB
	-50 dBm	- f + h + 10 = _____ dB
-45 dBm	-50 dBm	- g + h + 5 = _____ dB

**CW FREQUENCY = 10 MHz**

Output Level	Power Meter Reading
-15 dBm	a = _____ dBm
-20 dBm	b = _____ dBm
-25 dBm	c = _____ dBm
-30 dBm	d = _____ dBm
-35 dBm	e = _____ dBm
-40 dBm	f = _____ dBm
-45 dBm	g = _____ dBm
-50 dBm	h = _____ dBm

STOP Power	Output Level	Test Result
-15 dBm	-20 dBm	- a + b + 5 = _____ dB
	-25 dBm	- a + c + 10 = _____ dB
	-30 dBm	- a + d + 15 = _____ dB
	-35 dBm	- a + e + 20 = _____ dB
	-40 dBm	- a + f + 25 = _____ dB
	-45 dBm	- a + g + 30 = _____ dB
	-50 dBm	- a + h + 35 = _____ dB
-20 dBm	-25 dBm	- b + c + 5 = _____ dB
	-30 dBm	- b + d + 10 = _____ dB
	-35 dBm	- b + e + 15 = _____ dB
	-40 dBm	- b + f + 20 = _____ dB
	-45 dBm	- b + g + 25 = _____ dB
	-50 dBm	- b + h + 30 = _____ dB
-25 dBm	-30 dBm	- c + d + 5 = _____ dB
	-35 dBm	- c + e + 10 = _____ dB
	-40 dBm	- c + f + 15 = _____ dB
	-45 dBm	- c + g + 20 = _____ dB
	-50 dBm	- c + h + 25 = _____ dB
-30 dBm	-35 dBm	- d + e + 5 = _____ dB
	-40 dBm	- d + f + 10 = _____ dB
	-45 dBm	- d + g + 15 = _____ dB
	-50 dBm	- d + h + 20 = _____ dB
-35 dBm	-40 dBm	- e + f + 5 = _____ dB
	-45 dBm	- e + g + 10 = _____ dB
	-50 dBm	- e + h + 15 = _____ dB
-40 dBm	-45 dBm	- f + g + 5 = _____ dB
	-50 dBm	- f + h + 10 = _____ dB
-45 dBm	-50 dBm	- g + h + 5 = _____ dB

**CW FREQUENCY = 100 MHz**

Output Level	Power Meter Reading
-15 dBm	a = _____ dBm
-20 dBm	b = _____ dBm
-25 dBm	c = _____ dBm
-30 dBm	d = _____ dBm
-35 dBm	e = _____ dBm
-40 dBm	f = _____ dBm
-45 dBm	g = _____ dBm
-50 dBm	h = _____ dBm

STOP Power	Output Level	Test Result
-15 dBm	-20 dBm	- a + b + 5 = _____ dB
	-25 dBm	- a + c + 10 = _____ dB
	-30 dBm	- a + d + 15 = _____ dB
	-35 dBm	- a + e + 20 = _____ dB
	-40 dBm	- a + f + 25 = _____ dB
	-45 dBm	- a + g + 30 = _____ dB
	-50 dBm	- a + h + 35 = _____ dB
-20 dBm	-25 dBm	- b + c + 5 = _____ dB
	-30 dBm	- b + d + 10 = _____ dB
	-35 dBm	- b + e + 15 = _____ dB
	-40 dBm	- b + f + 20 = _____ dB
	-45 dBm	- b + g + 25 = _____ dB
	-50 dBm	- b + h + 30 = _____ dB
-25 dBm	-30 dBm	- c + d + 5 = _____ dB
	-35 dBm	- c + e + 10 = _____ dB
	-40 dBm	- c + f + 15 = _____ dB
	-45 dBm	- c + g + 20 = _____ dB
	-50 dBm	- c + h + 25 = _____ dB
-30 dBm	-35 dBm	- d + e + 5 = _____ dB
	-40 dBm	- d + f + 10 = _____ dB
	-45 dBm	- d + g + 15 = _____ dB
	-50 dBm	- d + h + 20 = _____ dB
-35 dBm	-40 dBm	- e + f + 5 = _____ dB
	-45 dBm	- e + g + 10 = _____ dB
	-50 dBm	- e + h + 15 = _____ dB
-40 dBm	-45 dBm	- f + g + 5 = _____ dB
	-50 dBm	- f + h + 10 = _____ dB
-45 dBm	-50 dBm	- g + h + 5 = _____ dB

**CW FREQUENCY = 300 MHz**

Output Level	Power Meter Reading
-15 dBm	a = _____ dBm
-20 dBm	b = _____ dBm
-25 dBm	c = _____ dBm
-30 dBm	d = _____ dBm
-35 dBm	e = _____ dBm
-40 dBm	f = _____ dBm
-45 dBm	g = _____ dBm
-50 dBm	h = _____ dBm

STOP Power	Output Level	Test Result
-15 dBm	-20 dBm	- a + b + 5 = _____ dB
	-25 dBm	- a + c + 10 = _____ dB
	-30 dBm	- a + d + 15 = _____ dB
	-35 dBm	- a + e + 20 = _____ dB
	-40 dBm	- a + f + 25 = _____ dB
	-45 dBm	- a + g + 30 = _____ dB
	-50 dBm	- a + h + 35 = _____ dB
-20 dBm	-25 dBm	- b + c + 5 = _____ dB
	-30 dBm	- b + d + 10 = _____ dB
	-35 dBm	- b + e + 15 = _____ dB
	-40 dBm	- b + f + 20 = _____ dB
	-45 dBm	- b + g + 25 = _____ dB
	-50 dBm	- b + h + 30 = _____ dB
-25 dBm	-30 dBm	- c + d + 5 = _____ dB
	-35 dBm	- c + e + 10 = _____ dB
	-40 dBm	- c + f + 15 = _____ dB
	-45 dBm	- c + g + 20 = _____ dB
	-50 dBm	- c + h + 25 = _____ dB
-30 dBm	-35 dBm	- d + e + 5 = _____ dB
	-40 dBm	- d + f + 10 = _____ dB
	-45 dBm	- d + g + 15 = _____ dB
	-50 dBm	- d + h + 20 = _____ dB
-35 dBm	-40 dBm	- e + f + 5 = _____ dB
	-45 dBm	- e + g + 10 = _____ dB
	-50 dBm	- e + h + 15 = _____ dB
-40 dBm	-45 dBm	- f + g + 5 = _____ dB
	-50 dBm	- f + h + 10 = _____ dB
-45 dBm	-50 dBm	- g + h + 5 = _____ dB

**CW FREQUENCY = 500 MHz**

Output Level	Power Meter Reading
-15 dBm	a = _____ dBm
-20 dBm	b = _____ dBm
-25 dBm	c = _____ dBm
-30 dBm	d = _____ dBm
-35 dBm	e = _____ dBm
-40 dBm	f = _____ dBm
-45 dBm	g = _____ dBm
-50 dBm	h = _____ dBm

STOP Power	Output Level	Test Result
-15 dBm	-20 dBm	- a + b + 5 = _____ dB
	-25 dBm	- a + c + 10 = _____ dB
	-30 dBm	- a + d + 15 = _____ dB
	-35 dBm	- a + e + 20 = _____ dB
	-40 dBm	- a + f + 25 = _____ dB
	-45 dBm	- a + g + 30 = _____ dB
-20 dBm	-50 dBm	- a + h + 35 = _____ dB
	-25 dBm	- b + c + 5 = _____ dB
	-30 dBm	- b + d + 10 = _____ dB
	-35 dBm	- b + e + 15 = _____ dB
	-40 dBm	- b + f + 20 = _____ dB
	-45 dBm	- b + g + 25 = _____ dB
-25 dBm	-50 dBm	- b + h + 30 = _____ dB
	-30 dBm	- c + d + 5 = _____ dB
	-35 dBm	- c + e + 10 = _____ dB
	-40 dBm	- c + f + 15 = _____ dB
	-45 dBm	- c + g + 20 = _____ dB
	-50 dBm	- c + h + 25 = _____ dB
-30 dBm	-35 dBm	- d + e + 5 = _____ dB
	-40 dBm	- d + f + 10 = _____ dB
	-45 dBm	- d + g + 15 = _____ dB
	-50 dBm	- d + h + 20 = _____ dB
-35 dBm	-40 dBm	- e + f + 5 = _____ dB
	-45 dBm	- e + g + 10 = _____ dB
	-50 dBm	- e + h + 15 = _____ dB
-40 dBm	-45 dBm	- f + g + 5 = _____ dB
	-50 dBm	- f + h + 10 = _____ dB
-45 dBm	-50 dBm	- g + h + 5 = _____ dB

## Absolute Amplitude Accuracy Test

### Input-R

Frequency	3458A Reading [a]	8751A Reading [b]	Test Result [-a+b]
5 Hz	_____ dBm	_____ dBm	_____ dB
10 Hz	_____ dBm	_____ dBm	_____ dB
100 Hz	_____ dBm	_____ dBm	_____ dB
100 kHz	_____ dBm	_____ dBm	_____ dB
200 kHz	_____ dBm	_____ dBm	_____ dB
500 kHz	_____ dBm	_____ dBm	_____ dB

Frequency	Input Level	20 dB Pad Cal. Value [c]	Power Meter Reading [a]	8751A Reading [b]	Test Result [-c-a+b]
1 MHz	-30 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB
10 MHz	-30 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB
30 MHz	-30 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB
50 MHz	-30 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB
50 MHz	-10 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB
100 MHz	-30 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB
300 MHz	-30 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB
500 MHz	-30 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB

### Input-A

Frequency	3458A Reading [a]	8751A Reading [b]	Test Result [-a+b]
5 Hz	_____ dBm	_____ dBm	_____ dB
10 Hz	_____ dBm	_____ dBm	_____ dB
100 Hz	_____ dBm	_____ dBm	_____ dB
100 kHz	_____ dBm	_____ dBm	_____ dB
200 kHz	_____ dBm	_____ dBm	_____ dB
500 kHz	_____ dBm	_____ dBm	_____ dB

Frequency	Input Level	20 dB Cal. Value [c]	Power Meter Reading [a]	8751A Reading [b]	Test Result [-c-a+b]
1 MHz	-30 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB
10 MHz	-30 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB
30 MHz	-30 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB
50 MHz	-30 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB
50 MHz	-10 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB
100 MHz	-30 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB
300 MHz	-30 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB
500 MHz	-30 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB

## Input-B

Frequency	3458A Reading [a]	8751A Reading [b]	Test Result [-a+b]
5 Hz	_____ dBm	_____ dBm	_____ dB
10 Hz	_____ dBm	_____ dBm	_____ dB
100 Hz	_____ dBm	_____ dBm	_____ dB
100 kHz	_____ dBm	_____ dBm	_____ dB
200 kHz	_____ dBm	_____ dBm	_____ dB
500 kHz	_____ dBm	_____ dBm	_____ dB

Frequency	Input Level	20 dB Cal. Value [c]	Power Meter Reading [a]	8751A Reading [b]	Test Result [-c-a+b]
1 MHz	-30 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB
10 MHz	-30 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB
30 MHz	-30 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB
50 MHz	-30 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB
50 MHz	-10 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB
100 MHz	-30 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB
300 MHz	-30 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB
500 MHz	-30 dBm	_____ dBm	_____ dBm	_____ dBm	_____ dB



## Magnitude Ratio/Phase Dynamic Accuracy Test

### Step Attenuator Calibration Value (at 50 MHz)

Nominal Value	Calibration Value
10 dB	a1 = _____ dB
20 dB	a2 = _____ dB
30 dB	a3 = _____ dB
40 dB	a4 = _____ dB
50 dB	a5 = _____ dB
60 dB	a6 = _____ dB
70 dB	a7 = _____ dB
80 dB	a8 = _____ dB

### A/R Dynamic Accuracy (Mag. Ratio (50 MHz), Phase (3 MHz)) Test

Step Attenuator Setting	Phase (3 MHz)	Mag. Ratio (50 MHz)	Test Result	HP 8751A Input Level
		[b]		
R-side 20 dB	_____ deg	_____ dB	-a2+b _____ dB	-20 dBm
10 dB	_____ deg	_____ dB	-a1+b _____ dB	-30 dBm
A-side 10 dB	_____ deg	_____ dB	a1+b _____ dB	-50 dBm
20 dB	_____ deg	_____ dB	a2+b _____ dB	-60 dBm
30 dB	_____ deg	_____ dB	a3+b _____ dB	-70 dBm
40 dB	_____ deg	_____ dB	a4+b _____ dB	-80 dBm
50 dB	_____ deg	_____ dB	a5+b _____ dB	-90 dBm
60 dB	_____ deg	_____ dB	a6+b _____ dB	-100 dBm
70 dB	_____ deg	_____ dB	a7+b _____ dB	-110 dBm
80 dB	_____ deg	_____ dB	a8+b _____ dB	-120 dBm

### B/R Dynamic Accuracy (Mag. Ratio (50 MHz), Phase (3 MHz)) Test

Step Attenuator Setting	Phase (3 MHz)	Mag. Ratio (50 MHz)	Test Result	HP 8751A Input Level
		[b]		
R-side 20 dB	_____ deg	_____ dB	-a2+b _____ dB	-20 dBm
10 dB	_____ deg	_____ dB	-a1+b _____ dB	-30 dBm
B-side 10 dB	_____ deg	_____ dB	a1+b _____ dB	-50 dBm
20 dB	_____ deg	_____ dB	a2+b _____ dB	-60 dBm
30 dB	_____ deg	_____ dB	a3+b _____ dB	-70 dBm
40 dB	_____ deg	_____ dB	a4+b _____ dB	-80 dBm
50 dB	_____ deg	_____ dB	a5+b _____ dB	-90 dBm
60 dB	_____ deg	_____ dB	a6+b _____ dB	-100 dBm
70 dB	_____ deg	_____ dB	a7+b _____ dB	-110 dBm
80 dB	_____ deg	_____ dB	a8+b _____ dB	-120 dBm

### A/B Dynamic Accuracy (Mag. Ratio (50 MHz), Phase (3 MHz)) Test

Step	Attenuator Setting	Phase (3 MHz)	Mag. Ratio (50 MHz)	Test Result	HP 8751A Input Level
			[b]		
B-side	20 dB	_____ deg	_____ dB	-a2+b _____ dB	-20 dBm
	10 dB	_____ deg	_____ dB	-a1+b _____ dB	-30 dBm
A-side	10 dB	_____ deg	_____ dB	a1+b _____ dB	-50 dBm
	20 dB	_____ deg	_____ dB	a2+b _____ dB	-60 dBm
	30 dB	_____ deg	_____ dB	a3+b _____ dB	-70 dBm
	40 dB	_____ deg	_____ dB	a4+b _____ dB	-80 dBm
	50 dB	_____ deg	_____ dB	a5+b _____ dB	-90 dBm
	60 dB	_____ deg	_____ dB	a6+b _____ dB	-100 dBm
	70 dB	_____ deg	_____ dB	a7+b _____ dB	-110 dBm
	80 dB	_____ deg	_____ dB	a8+b _____ dB	-120 dBm

### A/R Dynamic Accuracy at the other frequencies Test

HP 8751A Frequency	Reading Value ATT = 10 dB [a]	Reading Value ATT = 0 dB [b]	Test Result ATT = 0 dB [-a+b]
1 kHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
1 kHz Phase:	_____ deg	_____ deg	_____ deg
1 MHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
1 MHz Phase:	_____ deg	_____ deg	_____ deg
50 MHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
50 MHz Phase:	_____ deg	_____ deg	_____ deg
100 MHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
100 MHz Phase:	_____ deg	_____ deg	_____ deg
200 MHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
200 MHz Phase:	_____ deg	_____ deg	_____ deg
300 MHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
300 MHz Phase:	_____ deg	_____ deg	_____ deg
400 MHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
400 MHz Phase:	_____ deg	_____ deg	_____ deg
500 MHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
500 MHz Phase:	_____ deg	_____ deg	_____ deg

### B/R Dynamic Accuracy at the other frequencies Test

HP 8751A Frequency	Reading Value ATT = 10 dB [a]	Reading Value ATT = 0 dB [b]	Test Result ATT = 0 dB [-a+b]
1 kHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
1 kHz Phase:	_____ deg	_____ deg	_____ deg
1 MHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
1 MHz Phase:	_____ deg	_____ deg	_____ deg
50 MHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
50 MHz Phase:	_____ deg	_____ deg	_____ deg
100 MHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
100 MHz Phase:	_____ deg	_____ deg	_____ deg
200 MHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
200 MHz Phase:	_____ deg	_____ deg	_____ deg
300 MHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
300 MHz Phase:	_____ deg	_____ deg	_____ deg
400 MHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
400 MHz Phase:	_____ deg	_____ deg	_____ deg
500 MHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
500 MHz Phase:	_____ deg	_____ deg	_____ deg

### A/B Dynamic Accuracy at the other frequencies Test

HP 8751A Frequency	Reading Value ATT = 10 dB [a]	Reading Value ATT = 0 dB [b]	Test Result ATT = 0 dB [-a+b]
1 kHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
1 kHz Phase:	_____ deg	_____ deg	_____ deg
1 MHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
1 MHz Phase:	_____ deg	_____ deg	_____ deg
50 MHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
50 MHz Phase:	_____ deg	_____ deg	_____ deg
100 MHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
100 MHz Phase:	_____ deg	_____ deg	_____ deg
200 MHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
200 MHz Phase:	_____ deg	_____ deg	_____ deg
300 MHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
300 MHz Phase:	_____ deg	_____ deg	_____ deg
400 MHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
400 MHz Phase:	_____ deg	_____ deg	_____ deg
500 MHz Mag.Ratio:	_____ dB	_____ dB	_____ dB
500 MHz Phase:	_____ deg	_____ deg	_____ deg

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## PERFORMANCE TEST RECORD

Hewlett-Packard 8751A NETWORK ANALYZER

Date: \_\_\_\_\_  
Temperature: \_\_\_\_\_  
Humidity: \_\_\_\_\_  
Serial No.: \_\_\_\_\_  
Tested by: \_\_\_\_\_

### Frequency Range and Accuracy Test

without OPTION 001

Frequency	Minimum Limit	Test Result	Maximum Limit	Measurement Uncertainty
5 Hz	4.99890 Hz	_____	±5.00110 Hz	0.000177 Hz
6.387499999 MHz	6.3873722 MHz	_____	6.3876277 MHz	±1.33 Hz
17.387499999 MHz	17.387152 MHz	_____	17.387847 MHz	±3.6 Hz
83.069 MHz	83.067338 MHz	_____	83.070661 MHz	±17.2 Hz
250 MHz	249.99499 MHz	_____	250.00500 MHz	±52 Hz
500 MHz	499.98999 MHz	_____	500.01000 MHz	±97 Hz

with OPTION 001

Frequency	Minimum Limit	Test Result	Maximum Limit	Measurement Uncertainty
5 Hz	4.99900 Hz	_____	5.00101 Hz	±0.000177 Hz
6.387499999 MHz	6.3874936 MHz	_____	6.3875064 MHz	±1.33 Hz
17.387499999 MHz	17.387483 MHz	_____	17.387517 MHz	±3.6 Hz
83.069 MHz	83.068916 MHz	_____	83.069083 MHz	±17.2 Hz
250 MHz	249.99974 MHz	_____	250.00025 MHz	±52 Hz
500 MHz	499.99949 MHz	_____	500.00050 MHz	±97 Hz

## Harmonics Test

Frequency	Harmonics Frequency	Test Result	Test Limit	Measurement Uncertainty
100 Hz	200 Hz	_____	< -30 dBc	±1.97 dB
	300 Hz	_____	< -30 dBc	±1.97 dB
10 kHz	20 kHz	_____	< -30 dBc	±1.97 dB
	30 kHz	_____	< -30 dBc	±1.97 dB
500 kHz	1 MHz	_____	< -30 dBc	±1.97 dB
	1.5 MHz	_____	< -30 dBc	±1.97 dB
10 MHz	20 MHz	_____	< -30 dBc	±1.97 dB
	30 MHz	_____	< -30 dBc	±1.97 dB
100 MHz	200 MHz	_____	< -30 dBc	±1.97 dB
	300 MHz	_____	< -30 dBc	±1.97 dB
300 MHz	600 MHz	_____	< -30 dBc	±1.97 dB
	900 MHz	_____	< -30 dBc	±1.97 dB
500 MHz	1 GHz	_____	< -30 dBc	±1.97 dB
	1.5 GHz	_____	< -30 dBc	±1.97 dB

## Non-Harmonic Spurious Test

Frequency	Test Result	Test Limit	Measurement Uncertainty
493.7625 MHz	_____	< -45 dBc	± 2.05 dB
493.76274125 MHz	_____	< -45 dBc	±2.05 dB
493.7649125 MHz	_____	< -45 dBc	±2.05 dB
493.786625 MHz	_____	< -45 dBc	±2.05 dB
426 MHz	_____	< -45 dBc	±2.05 dB

## Phase Noise Test

Reference	Frequency	Test Result	Test Limit	Measurement Uncertainty
4 MHz	3.98 MHz	_____	< -75 dBc/Hz	±2.46 dB
	4.02 MHz	_____	< -75 dBc/Hz	±2.46 dB
249 MHz	248.98 MHz	_____	< -75 dBc/Hz	±2.46 dB
	249.02 MHz	_____	< -75 dBc/Hz	±2.46 dB
498.5875 MHz	498.5675 MHz	_____	< -75 dBc/Hz	±2.46 dB
	498.6075 MHz	_____	< -75 dBc/Hz	±2.46 dB

## Source Level Linearity/Flatness Test

### Level Accuracy (at 50 MHz, 0 dBm)

Minimum Limit	Test Result	Maximum Limit	Measurement Uncertainty
-0.5 dBm	_____	+0.5 dBm	±0.08 dB

### Level Flatness (Relative to 0 dBm at 50 MHz)

Frequency	Minimum Limit	Test Result	Maximum Limit	Measurement Uncertainty
5 Hz	-2.0 dB	_____	+2.0 dB	±0.04 dB
50 Hz	-2.0 dB	_____	+2.0 dB	±0.04 dB
1 kHz	-2.0 dB	_____	+2.0 dB	±0.04 dB
10 kHz	-2.0 dB	_____	+2.0 dB	±0.04 dB
100 kHz	-2.0 dB	_____	+2.0 dB	±0.04 dB
1 MHz	-2.0 dB	_____	+2.0 dB	±0.09 dB
10 MHz	-1.5 dB	_____	+1.5 dB	±0.09 dB
100 MHz	-1.5 dB	_____	+1.5 dB	±0.10 dB
300 MHz	-1.5 dB	_____	+1.5 dB	±0.10 dB
500 MHz	-2.0 dB	_____	+2.0 dB	±0.10 dB

## Non Sweep Power Linearity Test

Output Level	Minimum Limit	Test Result	Maximum Limit	Measurement Uncertainty
+15 dBm	-0.5 dB	_____	+0.5 dB	0.03 dB
+10 dBm	-0.5 dB	_____	+0.5 dB	0.03 dB
-10 dBm	-0.5 dB	_____	+0.5 dB	0.03 dB
-15 dBm	-0.5 dB	_____	+0.5 dB	0.09 dB
-20 dBm	-0.5 dB	_____	+0.5 dB	0.09 dB
-25 dBm	-0.5 dB	_____	+0.5 dB	0.03 dB
-30 dBm	-0.5 dB	_____	+0.5 dB	0.03 dB
-35 dBm	-0.5 dB	_____	+0.5 dB	0.03 dB
-40 dBm	-1.5 dB	_____	+1.5 dB	0.03 dB
-50 dBm	-1.5 dB	_____	+1.5 dB	0.12 dB

## Power Sweep Linearity Test

CW FREQUENCY = 500 kHz

STOP Power	Level	Minimum Limit	Test Result	Maximum Limit	Measurement Uncertainty
-15 dBm	-20 dBm	-0.35 dB	_____	+0.35 dB	±0.086 dB
	-25 dBm	-0.50 dB	_____	+0.50 dB	±0.086 dB
	-30 dBm	-0.65 dB	_____	+0.65 dB	±0.086 dB
	-35 dBm	-0.80 dB	_____	+0.80 dB	±0.086 dB
	-40 dBm	-1.75 dB	_____	+1.75 dB	±0.086 dB
	-45 dBm	-1.90 dB	_____	+1.90 dB	±0.086 dB
	-50 dBm	-3.05 dB	_____	+3.05 dB	±0.086 dB
-20 dBm	-25 dBm	-0.35 dB	_____	+0.35 dB	±0.086 dB
	-30 dBm	-0.50 dB	_____	+0.50 dB	±0.086 dB
	-35 dBm	-0.65 dB	_____	+0.65 dB	±0.086 dB
	-40 dBm	-0.80 dB	_____	+0.80 dB	±0.086 dB
	-45 dBm	-1.75 dB	_____	+1.75 dB	±0.086 dB
	-50 dBm	-2.90 dB	_____	+2.90 dB	±0.086 dB
	-55 dBm	-4.05 dB	_____	+4.05 dB	±0.086 dB
-25 dBm	-30 dBm	-0.35 dB	_____	+0.35 dB	±0.086 dB
	-35 dBm	-0.50 dB	_____	+0.50 dB	±0.086 dB
	-40 dBm	-0.65 dB	_____	+0.65 dB	±0.086 dB
	-45 dBm	-0.80 dB	_____	+0.80 dB	±0.086 dB
	-50 dBm	-1.95 dB	_____	+1.95 dB	±0.086 dB
-30 dBm	-35 dBm	-0.35 dB	_____	+0.35 dB	±0.086 dB
	-40 dBm	-0.50 dB	_____	+0.50 dB	±0.086 dB
	-45 dBm	-0.65 dB	_____	+0.65 dB	±0.086 dB
	-50 dBm	-1.80 dB	_____	+1.80 dB	±0.086 dB
-35 dBm	-40 dBm	-0.35 dB	_____	+0.35 dB	±0.086 dB
	-45 dBm	-0.50 dB	_____	+0.50 dB	±0.086 dB
	-50 dBm	-1.65 dB	_____	+1.65 dB	±0.086 dB
-40 dBm	-45 dBm	-0.35 dB	_____	+0.35 dB	±0.086 dB
	-50 dBm	-1.50 dB	_____	+1.50 dB	±0.086 dB
-45 dBm	-50 dBm	-1.35 dB	_____	+1.35 dB	±0.086 dB

**CW FREQUENCY = 1 MHz**

STOP Power	Level	Minimum Limit	Test Result	Maximum Limit	Measurement Uncertainty
-15 dBm	-20 dBm	-0.35 dB	_____	+0.35 dB	±0.086 dB
	-25 dBm	-0.50 dB	_____	+0.50 dB	±0.086 dB
	-30 dBm	-0.65 dB	_____	+0.65 dB	±0.086 dB
	-35 dBm	-0.80 dB	_____	+0.80 dB	±0.086 dB
	-40 dBm	-1.75 dB	_____	+1.75 dB	±0.086 dB
	-45 dBm	-1.90 dB	_____	+1.90 dB	±0.086 dB
	-50 dBm	-3.05 dB	_____	+3.05 dB	±0.086 dB
-20 dBm	-25 dBm	-0.35 dB	_____	+0.35 dB	±0.086 dB
	-30 dBm	-0.50 dB	_____	+0.50 dB	±0.086 dB
	-35 dBm	-0.65 dB	_____	+0.65 dB	±0.086 dB
	-40 dBm	-0.80 dB	_____	+0.80 dB	±0.086 dB
	-45 dBm	-1.75 dB	_____	+1.75 dB	±0.086 dB
	-50 dBm	-2.90 dB	_____	+2.90 dB	±0.086 dB
-25 dBm	-30 dBm	-0.35 dB	_____	+0.35 dB	±0.086 dB
	-35 dBm	-0.50 dB	_____	+0.50 dB	±0.086 dB
	-40 dBm	-0.65 dB	_____	+0.65 dB	±0.086 dB
	-45 dBm	-0.80 dB	_____	+0.80 dB	±0.086 dB
	-50 dBm	-1.95 dB	_____	+1.95 dB	±0.086 dB
-30 dBm	-35 dBm	-0.35 dB	_____	+0.35 dB	±0.086 dB
	-40 dBm	-0.50 dB	_____	+0.50 dB	±0.086 dB
	-45 dBm	-0.65 dB	_____	+0.65 dB	±0.086 dB
	-50 dBm	-1.80 dB	_____	+1.80 dB	±0.086 dB
-35 dBm	-40 dBm	-0.35 dB	_____	+0.35 dB	±0.086 dB
	-45 dBm	-0.50 dB	_____	+0.50 dB	±0.086 dB
	-50 dBm	-1.65 dB	_____	+1.65 dB	±0.086 dB
-40 dBm	-45 dBm	-0.35 dB	_____	+0.35 dB	±0.086 dB
	-50 dBm	-1.50 dB	_____	+1.50 dB	±0.086 dB
-45 dBm	-50 dBm	-1.35 dB	_____	+1.35 dB	±0.086 dB



**CW FREQUENCY = 10 MHz**

<b>STOP Power</b>	<b>Level</b>	<b>Minimum Limit</b>	<b>Test Result</b>	<b>Maximum Limit</b>	<b>Measurement Uncertainty</b>
<b>-15 dBm</b>	<b>-20 dBm</b>	<b>-0.35 dB</b>	_____	<b>+0.35 dB</b>	<b>±0.090 dB</b>
	<b>-25 dBm</b>	<b>-0.50 dB</b>	_____	<b>+0.50 dB</b>	<b>±0.090 dB</b>
	<b>-30 dBm</b>	<b>-0.65 dB</b>	_____	<b>+0.65 dB</b>	<b>±0.090 dB</b>
	<b>-35 dBm</b>	<b>-0.80 dB</b>	_____	<b>+0.80 dB</b>	<b>±0.090 dB</b>
	<b>-40 dBm</b>	<b>-1.75 dB</b>	_____	<b>+1.75 dB</b>	<b>±0.090 dB</b>
	<b>-45 dBm</b>	<b>-1.90 dB</b>	_____	<b>+1.90 dB</b>	<b>±0.100 dB</b>
<b>-20 dBm</b>	<b>-50 dBm</b>	<b>-3.05 dB</b>	_____	<b>+3.05 dB</b>	<b>±0.151 dB</b>
	<b>-25 dBm</b>	<b>-0.35 dB</b>	_____	<b>+0.35 dB</b>	<b>±0.090 dB</b>
	<b>-30 dBm</b>	<b>-0.50 dB</b>	_____	<b>+0.50 dB</b>	<b>±0.090 dB</b>
	<b>-35 dBm</b>	<b>-0.65 dB</b>	_____	<b>+0.65 dB</b>	<b>±0.090 dB</b>
	<b>-40 dBm</b>	<b>-0.80 dB</b>	_____	<b>+0.80 dB</b>	<b>±0.090 dB</b>
	<b>-45 dBm</b>	<b>-1.75 dB</b>	_____	<b>+1.75 dB</b>	<b>±0.100 dB</b>
<b>-25 dBm</b>	<b>-50 dBm</b>	<b>-2.90 dB</b>	_____	<b>+2.90 dB</b>	<b>±0.151 dB</b>
	<b>-30 dBm</b>	<b>-0.35 dB</b>	_____	<b>+0.35 dB</b>	<b>±0.026 dB</b>
	<b>-35 dBm</b>	<b>-0.50 dB</b>	_____	<b>+0.50 dB</b>	<b>±0.026 dB</b>
	<b>-40 dBm</b>	<b>-0.65 dB</b>	_____	<b>+0.65 dB</b>	<b>±0.028 dB</b>
	<b>-45 dBm</b>	<b>-0.80 dB</b>	_____	<b>+0.80 dB</b>	<b>±0.052 dB</b>
	<b>-50 dBm</b>	<b>-1.95 dB</b>	_____	<b>+1.95 dB</b>	<b>±0.125 dB</b>
<b>-30 dBm</b>	<b>-35 dBm</b>	<b>-0.35 dB</b>	_____	<b>+0.35 dB</b>	<b>±0.026 dB</b>
	<b>-40 dBm</b>	<b>-0.50 dB</b>	_____	<b>+0.50 dB</b>	<b>±0.028 dB</b>
	<b>-45 dBm</b>	<b>-0.65 dB</b>	_____	<b>+0.65 dB</b>	<b>±0.053 dB</b>
	<b>-50 dBm</b>	<b>-1.80 dB</b>	_____	<b>+1.80 dB</b>	<b>±0.125 dB</b>
<b>-35 dBm</b>	<b>-40 dBm</b>	<b>-0.35 dB</b>	_____	<b>+0.35 dB</b>	<b>±0.029 dB</b>
	<b>-45 dBm</b>	<b>-0.50 dB</b>	_____	<b>+0.50 dB</b>	<b>±0.053 dB</b>
	<b>-50 dBm</b>	<b>-1.65 dB</b>	_____	<b>+1.65 dB</b>	<b>±0.126 dB</b>
<b>-40 dBm</b>	<b>-45 dBm</b>	<b>-0.35 dB</b>	_____	<b>+0.35 dB</b>	<b>±0.054 dB</b>
	<b>-50 dBm</b>	<b>-1.50 dB</b>	_____	<b>+1.50 dB</b>	<b>±0.126 dB</b>
<b>-45 dBm</b>	<b>-50 dBm</b>	<b>-1.35 dB</b>	_____	<b>+1.35 dB</b>	<b>±0.133 dB</b>

**CW FREQUENCY = 100 MHz**

<b>STOP Power</b>	<b>Level</b>	<b>Minimum Limit</b>	<b>Test Result</b>	<b>Maximum Limit</b>	<b>Measurement Uncertainty</b>
-15 dBm	-20 dBm	-0.35 dB	_____	+0.35 dB	±0.090 dB
	-25 dBm	-0.50 dB	_____	+0.50 dB	±0.090 dB
	-30 dBm	-0.65 dB	_____	+0.65 dB	±0.090 dB
	-35 dBm	-0.80 dB	_____	+0.80 dB	±0.090 dB
	-40 dBm	-1.75 dB	_____	+1.75 dB	±0.090 dB
	-45 dBm	-1.90 dB	_____	+1.90 dB	±0.100 dB
	-50 dBm	-3.05 dB	_____	+3.05 dB	±0.151 dB
-20 dBm	-25 dBm	-0.35 dB	_____	+0.35 dB	±0.090 dB
	-30 dBm	-0.50 dB	_____	+0.50 dB	±0.090 dB
	-35 dBm	-0.65 dB	_____	+0.65 dB	±0.090 dB
	-40 dBm	-0.80 dB	_____	+0.80 dB	±0.090 dB
	-45 dBm	-1.75 dB	_____	+1.75 dB	±0.100 dB
	-50 dBm	-2.90 dB	_____	+2.90 dB	±0.151 dB
-25 dBm	-30 dBm	-0.35 dB	_____	+0.35 dB	±0.026 dB
	-35 dBm	-0.50 dB	_____	+0.50 dB	±0.026 dB
	-40 dBm	-0.65 dB	_____	+0.65 dB	±0.028 dB
	-45 dBm	-0.80 dB	_____	+0.80 dB	±0.052 dB
	-50 dBm	-1.95 dB	_____	+1.95 dB	±0.125 dB
-30 dBm	-35 dBm	-0.35 dB	_____	+0.35 dB	±0.026 dB
	-40 dBm	-0.50 dB	_____	+0.50 dB	±0.028 dB
	-45 dBm	-0.65 dB	_____	+0.65 dB	±0.053 dB
	-50 dBm	-1.80 dB	_____	+1.80 dB	±0.125 dB
-35 dBm	-40 dBm	-0.35 dB	_____	+0.35 dB	±0.029 dB
	-45 dBm	-0.50 dB	_____	+0.50 dB	±0.053 dB
	-50 dBm	-1.65 dB	_____	+1.65 dB	±0.126 dB
-40 dBm	-45 dBm	-0.35 dB	_____	+0.35 dB	±0.054 dB
	-50 dBm	-1.50 dB	_____	+1.50 dB	±0.126 dB
-45 dBm	-50 dBm	-1.35 dB	_____	+1.35 dB	±0.133 dB

**CW FREQUENCY = 300 MHz**

STOP Power	Level	Minimum Limit	Test Result	Maximum Limit	Measurement Uncertainty
-15 dBm	-20 dBm	-0.70 dB	_____	+0.70 dB	±0.050 dB
	-25 dBm	-1.20 dB	_____	+1.20 dB	±0.050 dB
	-30 dBm	-1.70 dB	_____	+1.70 dB	±0.050 dB
	-35 dBm	-2.20 dB	_____	+2.20 dB	±0.050 dB
	-40 dBm	-3.50 dB	_____	+3.5 dB	±0.052 dB
	-45 dBm	-4.00 dB	_____	+4.00 dB	±0.068 dB
-20 dBm	-50 dBm	-5.50 dB	_____	+5.50 dB	±0.132 dB
	-25 dBm	-0.70 dB	_____	+0.70 dB	±0.050 dB
	-30 dBm	-1.20 dB	_____	+1.20 dB	±0.050 dB
	-35 dBm	-1.70 dB	_____	+1.70 dB	±0.050 dB
	-40 dBm	-2.20 dB	_____	+2.20 dB	±0.052 dB
	-45 dBm	-3.50 dB	_____	+3.50 dB	±0.068 dB
-25 dBm	-50 dBm	-5.00 dB	_____	+5.00 dB	±0.132 dB
	-30 dBm	-0.70 dB	_____	+0.70 dB	±0.026 dB
	-35 dBm	-1.20 dB	_____	+1.20 dB	±0.026 dB
	-40 dBm	-1.70 dB	_____	+1.70 dB	±0.028 dB
	-45 dBm	-2.20 dB	_____	+2.20 dB	±0.052 dB
	-50 dBm	-3.70 dB	_____	+3.70 dB	±0.125 dB
-30 dBm	-35 dBm	-0.70 dB	_____	+0.70 dB	±0.026 dB
	-40 dBm	-1.20 dB	_____	+1.20 dB	±0.028 dB
	-45 dBm	-1.70 dB	_____	+1.70 dB	±0.053 dB
	-50 dBm	-3.20 dB	_____	+3.20 dB	±0.125 dB
-35 dBm	-40 dBm	-0.70 dB	_____	+0.70 dB	±0.029 dB
	-45 dBm	-1.20 dB	_____	+1.20 dB	±0.053 dB
	-50 dBm	-2.70 dB	_____	+2.70 dB	±0.126 dB
-40 dBm	-45 dBm	-0.70 dB	_____	+0.70 dB	±0.054 dB
	-50 dBm	-2.20 dB	_____	+2.20 dB	±0.126 dB
-45 dBm	-50 dBm	-1.70 dB	_____	+1.70 dB	±0.133 dB

**CW FREQUENCY = 500 MHz**

STOP Power	Level	Minimum Limit	Test Result	Maximum Limit	Measurement Uncertainty
-15 dBm	-20 dBm	-0.70 dB	_____	+0.70 dB	±0.050 dB
	-25 dBm	-1.20 dB	_____	+1.20 dB	±0.050 dB
	-30 dBm	-1.70 dB	_____	+1.70 dB	±0.050 dB
	-35 dBm	-2.20 dB	_____	+2.20 dB	±0.050 dB
	-40 dBm	-3.50 dB	_____	+3.5 dB	±0.052 dB
	-45 dBm	-4.00 dB	_____	+4.00 dB	±0.068 dB
	-50 dBm	-5.50 dB	_____	+5.50 dB	±0.132 dB
-20 dBm	-25 dBm	-0.70 dB	_____	+0.70 dB	±0.050 dB
	-30 dBm	-1.20 dB	_____	+1.20 dB	±0.050 dB
	-35 dBm	-1.70 dB	_____	+1.70 dB	±0.050 dB
	-40 dBm	-2.20 dB	_____	+2.20 dB	±0.052 dB
	-45 dBm	-3.50 dB	_____	+3.50 dB	±0.068 dB
	-50 dBm	-5.00 dB	_____	+5.00 dB	±0.132 dB
-25 dBm	-30 dBm	-0.70 dB	_____	+0.70 dB	±0.026 dB
	-35 dBm	-1.20 dB	_____	+1.20 dB	±0.026 dB
	-40 dBm	-1.70 dB	_____	+1.70 dB	±0.028 dB
	-45 dBm	-2.20 dB	_____	+2.20 dB	±0.052 dB
	-50 dBm	-3.70 dB	_____	+3.70 dB	±0.125 dB
-30 dBm	-35 dBm	-0.70 dB	_____	+0.70 dB	±0.026 dB
	-40 dBm	-1.20 dB	_____	+1.20 dB	±0.028 dB
	-45 dBm	-1.70 dB	_____	+1.70 dB	±0.053 dB
	-50 dBm	-3.20 dB	_____	+3.20 dB	±0.125 dB
-35 dBm	-40 dBm	-0.70 dB	_____	+0.70 dB	±0.029 dB
	-45 dBm	-1.20 dB	_____	+1.20 dB	±0.053 dB
	-50 dBm	-2.70 dB	_____	+2.70 dB	±0.126 dB
-40 dBm	-45 dBm	-0.70 dB	_____	+0.70 dB	±0.054 dB
	-50 dBm	-2.20 dB	_____	+2.20 dB	±0.126 dB
-45 dBm	-50 dBm	-1.70 dB	_____	+1.70 dB	±0.133 dB

## Receiver Noise Level Test

IF BW = 2 Hz

Frequency	R	A	B	Test Limit
5 Hz	_____	_____	_____	< -95 dB
205 Hz	_____	_____	_____	< -95 dB

IF BW = 20 Hz

Frequency	R	A	B	Test Limit
205 Hz	_____	_____	_____	< -95 dB
1 kHz	_____	_____	_____	< -95 dB
10 kHz	_____	_____	_____	< -95 dB
25 kHz	_____	_____	_____	< -100 dB
60 kHz	_____	_____	_____	< -105 dB
100 kHz	_____	_____	_____	< -110 dB
1.1 MHz	_____	_____	_____	< -110 dB
10 MHz	_____	_____	_____	< -110 dB
101 MHz	_____	_____	_____	< -110 dB
401 MHz	_____	_____	_____	< -110 dB
499 MHz	_____	_____	_____	< -110 dB

IF BW = 200 Hz

Frequency	R	A	B	Test Limit
2 kHz	_____	_____	_____	< -85 dB
10 kHz	_____	_____	_____	< -85 dB
25 kHz	_____	_____	_____	< -90 dB
60 kHz	_____	_____	_____	< -95 dB
100 kHz	_____	_____	_____	< -100 dB
1.1 MHz	_____	_____	_____	< -100 dB
10 MHz	_____	_____	_____	< -100 dB
101 MHz	_____	_____	_____	< -100 dB
401 MHz	_____	_____	_____	< -100 dB
499 MHz	_____	_____	_____	< -100 dB

**IF BW = 1 kHz**

Frequency	R	A	B	Test Limit
100 kHz	_____	_____	_____	< -90 dB
1.1 MHz	_____	_____	_____	< -90 dB
10 MHz	_____	_____	_____	< -90 dB
101 MHz	_____	_____	_____	< -90 dB
401 MHz	_____	_____	_____	< -90 dB
499 MHz	_____	_____	_____	< -90 dB

**IF BW = 4 kHz**

Frequency	R	A	B	Test Limit
100 kHz	_____	_____	_____	< -85 dB
1.1 MHz	_____	_____	_____	< -85 dB
10 MHz	_____	_____	_____	< -85 dB
101 MHz	_____	_____	_____	< -85 dB
401 MHz	_____	_____	_____	< -85 dB
499 MHz	_____	_____	_____	< -85 dB

## Trace Noise Test

Measurement	Frequency		Test Result	Test Limit
A/R	100 kHz	Magnitude	_____	< 0.01 dB
		Phase	_____	< 0.05°
	1 MHz	Magnitude	_____	< 0.01 dB
		Phase	_____	< 0.05°
	10 MHz	Magnitude	_____	< 0.01 dB
		Phase	_____	< 0.05°
	100 MHz	Magnitude	_____	< 0.01 dB
		Phase	_____	< 0.05°
B/R	100 kHz	Magnitude	_____	< 0.01 dB
		Phase	_____	< 0.05°
	1 MHz	Magnitude	_____	< 0.01 dB
		Phase	_____	< 0.05°
	10 MHz	Magnitude	_____	< 0.01 dB
		Phase	_____	< 0.05°
	100 MHz	Magnitude	_____	< 0.01 dB
		Phase	_____	< 0.05°
A/B	100 kHz	Magnitude	_____	< 0.01 dB
		Phase	_____	< 0.05°
	1 MHz	Magnitude	_____	< 0.01 dB
		Phase	_____	< 0.05°
	10 MHz	Magnitude	_____	< 0.01 dB
		Phase	_____	< 0.05°
	100 MHz	Magnitude	_____	< 0.01 dB
		Phase	_____	< 0.05°
	500 MHz	Magnitude	_____	< 0.01 dB
		Phase	_____	< 0.05°

## Residual Response Test

### Input-R

Frequency	Test Result	Test Limit
6.25 MHz	_____	< -100 dBm
40.77575 MHz	_____	< -100 dBm
43.004342105 MHz	_____	< -100 dBm
45.480555556 MHz	_____	< -100 dBm
48.248088235 MHz	_____	< -100 dBm
51.3615625 MHz	_____	< -100 dBm
54.890166667 MHz	_____	< -100 dBm
58.922857143 MHz	_____	< -100 dBm
139.968541667 MHz	_____	< -100 dBm
152.835454545 MHz	_____	< -100 dBm
281.4175 MHz	_____	< -100 dBm
300 MHz	_____	< -100 dBm
325 MHz	_____	< -100 dBm
337.96225 MHz	_____	< -100 dBm
362.270357143 MHz	_____	< -100 dBm
375.687777778 MHz	_____	< -100 dBm



**Input-A**

Frequency	Test Result	Test Limit
6.25 MHz	_____	< -100 dBm
40.77575 MHz	_____	< -100 dBm
43.004342105 MHz	_____	< -100 dBm
45.480555556 MHz	_____	< -100 dBm
48.248088235 MHz	_____	< -100 dBm
51.3615625 MHz	_____	< -100 dBm
54.890166667 MHz	_____	< -100 dBm
58.922857143 MHz	_____	< -100 dBm
139.968541667 MHz	_____	< -100 dBm
152.835454545 MHz	_____	< -100 dBm
281.4175 MHz	_____	< -100 dBm
300 MHz	_____	< -100 dBm
325 MHz	_____	< -100 dBm
337.96225 MHz	_____	< -100 dBm
362.270357143 MHz	_____	< -100 dBm
375.687777778 MHz	_____	< -100 dBm

**Input-B**

Frequency	Test Result	Test Limit
6.25 MHz	_____	< -100 dBm
40.77575 MHz	_____	< -100 dBm
43.004342105 MHz	_____	< -100 dBm
45.480555556 MHz	_____	< -100 dBm
48.248088235 MHz	_____	< -100 dBm
51.3615625 MHz	_____	< -100 dBm
54.890166667 MHz	_____	< -100 dBm
58.922857143 MHz	_____	< -100 dBm
139.968541667 MHz	_____	< -100 dBm
152.835454545 MHz	_____	< -100 dBm
281.4175 MHz	_____	< -100 dBm
300 MHz	_____	< -100 dBm
325 MHz	_____	< -100 dBm
337.96225 MHz	_____	< -100 dBm
362.270357143 MHz	_____	< -100 dBm
375.687777778 MHz	_____	< -100 dBm

## Input Crosstalk Test

Measurement	Frequency	Test Result	Test Limit
R into A Crosstalk	5 Hz to 10 kHz	_____	< -95 dB
R into B Crosstalk	5 Hz to 10 kHz	_____	< -95 dB
R into A Crosstalk	10 kHz to 500 MHz	_____	< -100 dB
R into B Crosstalk	10 kHz to 500 MHz	_____	< -100 dB
A into R Crosstalk	5 Hz to 10 kHz	_____	< -95 dB
A into B Crosstalk	5 Hz to 10 kHz	_____	< -95 dB
A into R Crosstalk	10 kHz to 500 MHz	_____	< -100 dB
A into B Crosstalk	10 kHz to 500 MHz	_____	< -100 dB
B into R Crosstalk	5 Hz to 10 kHz	_____	< -95 dB
B into A Crosstalk	5 Hz to 10 kHz	_____	< -95 dB
B into R Crosstalk	10 kHz to 500 MHz	_____	< -100 dB
B into A Crosstalk	10 kHz to 500 MHz	_____	< -100 dB

## Input Impedance Test

Measurement	ATT	Frequency	Test Result	Test Limit	Measurement Uncertainty
B Return Loss	20 dB	5 Hz to 100 MHz	_____	> 25 dB	±1.7 dB
	20 dB	100 MHz to 300 MHz	_____	> 25 dB	±1.7 dB
	20 dB	300 MHz to 500 MHz	_____	> 20 dB	±1.0 dB
	0 dB	5 Hz to 100 MHz	_____	> 20 dB	±1.0 dB
	0 dB	100 MHz to 300 MHz	_____	> 15 dB	±0.7 dB
	0 dB	300 MHz to 500 MHz	_____	> 10 dB	±0.5 dB
A Return Loss	20 dB	5 Hz to 100 MHz	_____	> 25 dB	±1.7 dB
	20 dB	100 MHz to 300 MHz	_____	> 25 dB	±1.7 dB
	20 dB	300 MHz to 500 MHz	_____	> 20 dB	±1.0 dB
	0 dB	5 Hz to 100 MHz	_____	> 20 dB	±1.0 dB
	0 dB	100 MHz to 300 MHz	_____	> 15 dB	±0.7 dB
	0 dB	300 MHz to 500 MHz	_____	> 10 dB	±0.5 dB
R Return Loss	20 dB	5 Hz to 100 MHz	_____	> 25 dB	±1.7 dB
	20 dB	100 MHz to 300 MHz	_____	> 25 dB	±1.7 dB
	20 dB	300 MHz to 500 MHz	_____	> 20 dB	±1.0 dB
	0 dB	5 Hz to 100 MHz	_____	> 20 dB	±1.0 dB
	0 dB	100 MHz to 300 MHz	_____	> 15 dB	±0.7 dB
	0 dB	300 MHz to 500 MHz	_____	> 10 dB	±0.5 dB

## Absolute Amplitude Accuracy Test

### Input-R

ATT	Frequency	Minimum Limit	Test Result	Maximum Limit	Measurement Uncertainty
0 dB	5 Hz	-1.0 dB	_____	+1.0 dB	±0.15 dB
0 dB	10 Hz	-1.0 dB	_____	+1.0 dB	±0.15 dB
0 dB	100 Hz	-1.0 dB	_____	+1.0 dB	±0.15 dB
0 dB	100 kHz	-1.0 dB	_____	+1.0 dB	±0.15 dB
0 dB	200 kHz	-1.0 dB	_____	+1.0 dB	±0.18 dB
0 dB	500 kHz	-1.0 dB	_____	+1.0 dB	±0.18 dB
0 dB	1 MHz	-1.0 dB	_____	+1.0 dB	±0.18 dB
0 dB	10 MHz	-1.0 dB	_____	+1.0 dB	±0.18 dB
0 dB	30 MHz	-1.0 dB	_____	+1.0 dB	±0.18 dB
0 dB	50 MHz	-1.0 dB	_____	+1.0 dB	±0.16 dB
20 dB	50 MHz	-1.0 dB	_____	+1.0 dB	±0.17 dB
0 dB	100 MHz	-1.0 dB	_____	+1.0 dB	±0.19 dB
0 dB	300 MHz	-1.0 dB	_____	+1.0 dB	±0.19 dB
0 dB	500 MHz	-1.5 dB	_____	+1.5 dB	±0.19 dB

### Input-A

ATT	Frequency	Minimum Limit	Test Result	Maximum Limit	Measurement Uncertainty
0 dB	5 Hz	-1.0 dB	_____	+1.0 dB	±0.15 dB
0 dB	10 Hz	-1.0 dB	_____	+1.0 dB	±0.15 dB
0 dB	100 Hz	-1.0 dB	_____	+1.0 dB	±0.15 dB
0 dB	100 kHz	-1.0 dB	_____	+1.0 dB	±0.15 dB
0 dB	200 kHz	-1.0 dB	_____	+1.0 dB	±0.18 dB
0 dB	500 kHz	-1.0 dB	_____	+1.0 dB	±0.18 dB
0 dB	1 MHz	-1.0 dB	_____	+1.0 dB	±0.18 dB
0 dB	10 MHz	-1.0 dB	_____	+1.0 dB	±0.18 dB
0 dB	30 MHz	-1.0 dB	_____	+1.0 dB	±0.18 dB
0 dB	50 MHz	-1.0 dB	_____	+1.0 dB	±0.16 dB
20 dB	50 MHz	-1.0 dB	_____	+1.0 dB	±0.17 dB
0 dB	100 MHz	-1.0 dB	_____	+1.0 dB	±0.19 dB
0 dB	300 MHz	-1.0 dB	_____	+1.0 dB	±0.19 dB
0 dB	500 MHz	-1.5 dB	_____	+1.5 dB	±0.19 dB

**Input-B**

ATT	Frequency	Minimum Limit	Test Result	Maximum Limit	Measurement Uncertainty
0 dB	5 Hz	-1.0 dB	_____	+1.0 dB	±0.15 dB
0 dB	10 Hz	-1.0 dB	_____	+1.0 dB	±0.15 dB
0 dB	100 Hz	-1.0 dB	_____	+1.0 dB	±0.15 dB
0 dB	100 kHz	-1.0 dB	_____	+1.0 dB	±0.15 dB
0 dB	200 kHz	-1.0 dB	_____	+1.0 dB	±0.18 dB
0 dB	500 kHz	-1.0 dB	_____	+1.0 dB	±0.18 dB
0 dB	1 MHz	-1.0 dB	_____	+1.0 dB	±0.18 dB
0 dB	10 MHz	-1.0 dB	_____	+1.0 dB	±0.18 dB
0 dB	30 MHz	-1.0 dB	_____	+1.0 dB	±0.18 dB
0 dB	50 MHz	-1.0 dB	_____	+1.0 dB	±0.16 dB
20 dB	50 MHz	-1.0 dB	_____	+1.0 dB	±0.17 dB
0 dB	100 MHz	-1.0 dB	_____	+1.0 dB	±0.19 dB
0 dB	300 MHz	-1.0 dB	_____	+1.0 dB	±0.19 dB
0 dB	500 MHz	-1.5 dB	_____	+1.5 dB	±0.19 dB

## Magnitude Ratio/Phase Dynamic Accuracy Test

### A/R Dynamic Accuracy (Magnitude Ratio (50 MHz) and Phase (3 MHz)) Test

#### Magnitude Ratio (50 MHz).

A Input Level	Minimum Limit	Test Result	Maximum Limit	Measurement Uncertainty
-20 dBm	-0.1 dB	_____	+0.1 dB	±0.010 dB
-30 dBm	-0.05 dB	_____	+0.05 dB	±0.010 dB
-50 dBm	-0.05 dB	_____	+0.05 dB	±0.010 dB
-60 dBm	-0.05 dB	_____	+0.05 dB	±0.010 dB
-70 dBm	-0.05 dB	_____	+0.05 dB	±0.010 dB
-80 dBm	-0.05 dB	_____	+0.05 dB	±0.012 dB
-90 dBm	-0.1 dB	_____	+0.1 dB	±0.018 dB
-100 dBm	-0.3 dB	_____	+0.3 dB	±0.021 dB
-110 dBm	-0.9 dB	_____	+0.9 dB	±0.028 dB
-120 dBm	-3.0 dB	_____	+3.0 dB	±0.052 dB

#### Phase (3 MHz).

A Input Level	Minimum Limit	Test Result	Maximum Limit
-20 dBm	-1.2 °	_____	+1.2 °
-30 dBm	-0.3 °	_____	+0.3 °
-50 dBm	-0.3 °	_____	+0.3 °
-60 dBm	-0.3 °	_____	+0.3 °
-70 dBm	-0.3 °	_____	+0.3 °
-80 dBm	-0.3 °	_____	+0.3 °
-90 dBm	-0.6 °	_____	+0.6 °
-100 dBm	-1.8 °	_____	+1.8 °
-110 dBm	-6.0 °	_____	+6.0 °
-120 dBm	-18.0 °	_____	+18.0 °

## B/R Dynamic Accuracy (Magnitude Ratio (50 MHz) and Phase (3 MHz)) Test

### Magnitude Ratio (50 MHz).

B Input Level	Minimum Limit	Test Result	Maximum Limit	Measurement Uncertainty
-20 dBm	-0.1 dB	_____	+0.1 dB	±0.010 dB
-30 dBm	-0.05 dB	_____	+0.05 dB	±0.010 dB
-50 dBm	-0.05 dB	_____	+0.05 dB	±0.010 dB
-60 dBm	-0.05 dB	_____	+0.05 dB	±0.010 dB
-70 dBm	-0.05 dB	_____	+0.05 dB	±0.010 dB
-80 dBm	-0.05 dB	_____	+0.05 dB	±0.012 dB
-90 dBm	-0.1 dB	_____	+0.1 dB	±0.018 dB
-100 dBm	-0.3 dB	_____	+0.3 dB	±0.021 dB
-110 dBm	-0.9 dB	_____	+0.9 dB	±0.028 dB
-120 dBm	-3.0 dB	_____	+3.0 dB	±0.052 dB

### Phase (3 MHz).

B Input Level	Minimum Limit	Test Result	Maximum Limit
-20 dBm	-1.2 °	_____	+1.2 °
-30 dBm	-0.3 °	_____	+0.3 °
-50 dBm	-0.3 °	_____	+0.3 °
-60 dBm	-0.3 °	_____	+0.3 °
-70 dBm	-0.3 °	_____	+0.3 °
-80 dBm	-0.3 °	_____	+0.3 °
-90 dBm	-0.6 °	_____	+0.6 °
-100 dBm	-1.8 °	_____	+1.8 °
-110 dBm	-6.0 °	_____	+6.0 °
-120 dBm	-18.0 °	_____	+18.0 °

## A/B Dynamic Accuracy (Magnitude Ratio (50 MHz) and Phase (3 MHz)) Test

### Magnitude Ratio (50 MHz).

A Input Level	Minimum Limit	Test Result	Maximum Limit	Measurement Uncertainty
-20 dBm	-0.1 dB	_____	+0.1 dB	±0.010 dB
-30 dBm	-0.05 dB	_____	+0.05 dB	±0.010 dB
-50 dBm	-0.05 dB	_____	+0.05 dB	±0.010 dB
-60 dBm	-0.05 dB	_____	+0.05 dB	±0.010 dB
-70 dBm	-0.05 dB	_____	+0.05 dB	±0.010 dB
-80 dBm	-0.05 dB	_____	+0.05 dB	±0.012 dB
-90 dBm	-0.1 dB	_____	+0.1 dB	±0.018 dB
-100 dBm	-0.3 dB	_____	+0.3 dB	±0.021 dB
-110 dBm	-0.9 dB	_____	+0.9 dB	±0.028 dB
-120 dBm	-3.0 dB	_____	+3.0 dB	±0.052 dB

### Phase (3 MHz).

A Input Level	Minimum Limit	Test Result	Maximum Limit
-20 dBm	-1.2 °	_____	+1.2 °
-30 dBm	-0.3 °	_____	+0.3 °
-50 dBm	-0.3 °	_____	+0.3 °
-60 dBm	-0.3 °	_____	+0.3 °
-70 dBm	-0.3 °	_____	+0.3 °
-80 dBm	-0.3 °	_____	+0.3 °
-90 dBm	-0.6 °	_____	+0.6 °
-100 dBm	-1.8 °	_____	+1.8 °
-110 dBm	-6.0 °	_____	+6.0 °
-120 dBm	-18.0 °	_____	+18.0 °

### A/R Dynamic Accuracy at the Other Frequencies Test

Frequency	Measurement	Minimum Limit	Test Result	Maximum Limit
1 kHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°
1 MHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°
50 MHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°
100 MHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°
200 MHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°
300 MHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°
400 MHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°
500 MHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°

### B/R Dynamic Accuracy at the Other Frequencies Test

Frequency	Measurement	Minimum Limit	Test Result	Maximum Limit
1 kHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°
1 MHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°
50 MHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°
100 MHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°
200 MHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°
300 MHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°
400 MHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°
500 MHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°



### A/B Dynamic Accuracy at the Other Frequencies Test

Frequency	Measurement	Minimum Limit	Test Result	Maximum Limit
1 kHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°
1 MHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°
50 MHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°
100 MHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°
200 MHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°
300 MHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°
400 MHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°
500 MHz	Magnitude Ratio	-0.1 dB	_____	+0.1 dB
	Phase	-1.2°	_____	+1.2°

### Magnitude Ratio Frequency Response Test

Measurement	Frequency	Minimum Limit	Test Result	Maximum Limit
A/R	5 Hz to 100 MHz	-0.5 dB	_____	+0.5 dB
	100 MHz to 300 MHz	-1.0 dB	_____	+1.0 dB
	300 MHz to 500 MHz	-1.5 dB	_____	+1.5 dB
B/R	5 Hz to 100 MHz	-0.5 dB	_____	+0.5 dB
	100 MHz to 300 MHz	-1.0 dB	_____	+1.0 dB
	300 MHz to 500 MHz	-1.5 dB	_____	+1.5 dB
A/B	5 Hz to 100 MHz	-0.5 dB	_____	+0.5 dB
	100 MHz to 300 MHz	-1.0 dB	_____	+1.0 dB
	300 MHz to 500 MHz	-1.5 dB	_____	+1.5 dB

## Phase Frequency Response Test

Measurement	Frequency	Minimum Limit	Test Result	Maximum Limit
A/R	5 Hz to 100 MHz	-2.5°	_____	+2.5°
	100 MHz to 300 MHz	-5.0°	_____	+5.0°
	300 MHz to 500 MHz	-10.0°	_____	+10.0°
B/R	5 Hz to 100 MHz	-2.5°	_____	+2.5°
	100 MHz to 300 MHz	-5.0°	_____	+5.0°
	300 MHz to 500 MHz	-10.0°	_____	+10.0°
A/B	5 Hz to 100 MHz	-2.5°	_____	+2.5°
	100 MHz to 300 MHz	-5.0°	_____	+5.0°
	300 MHz to 500 MHz	-10.0°	_____	+10.0°

## DC Measurement Range and Accuracy Test

Input Voltage	Minimum Limit	Test Result	Maximum Limit	Measurement Uncertainty
0 V	-0.005 V	_____	+0.005 V	±0.00032 V
2 V	1.985 V	_____	+2.015 V	±0.00004 V
-2 V	-1.985 V	_____	-2.015 V	±0.00032 V

## Manual Changes

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### INTRODUCTION

This appendix usually contains information required to adapt this manual to earlier versions or configurations of the HP 8751A than the current printing date of this manual. The information is this manual directly to HP 8751A Network Analyzer whose serial number prefix is listed on the title page of this manual.

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### MANUAL CHANGES

To adapt this manual to your HP 8751A, refer to Table A-1, and make all of the manual changes listed opposite your instrument's serial number.

Instruments manufactured after the printing of this manual may be different than those documented in this manual. Later instrument versions will be documented in a manual change supplement that will accompany the manual shipped with that instrument. If your manual or in Table A-1, it may be documented in a yellow *MANUAL CHANGES* supplements.

For additional information on serial number coverage, refer to "INSTRUMENTS COVERED BY MANUAL" in Chapter 1.

**Table A-1. Manual Changes by Serial Number**

Serial Prefix or Number	Make Manual Changes
	There are no earlier configurations than the printing date of this manual.



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May, 1990



## MANUAL CHANGES

### HP 8751A Network Analyzer

#### Maintenance Manual

#### MANUAL IDENTIFICATION

Model Number: HP 8751A  
Date Printed: Nov. 1990  
Part Number: 08751-90030

This supplement contains information for correcting manual errors and for adapting the manual to newer instruments that contains improvements or modifications not documented in the existing manual.

To use this supplement

1. Make all ERRATA corrections
2. Make all appropriate serial-number-related changes listed below

SERIAL PREFIX OR NUMBER      MAKE MANUAL CHANGES


SERIAL PREFIX OR NUMBER      MAKE MANUAL CHANGES


► New Item

## ERRATA

### Page vii, Certification

Change as follows:

Hewlett-Packard Company certifies that this product met its published specifications at the time of shipment from the factory. Hewlett-Packard further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology, to the extent allowed by the Institution's calibration facility, or to the calibration facilities of other International Standards Organization members.

### Page vii, Limitation Of Warranty

Change as follows:

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

*No other warranty is expressed or implied. HP specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.*

#### NOTE

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# MANUAL CHANGES

**HP 8751A**

**Network Analyzer**

## MANUAL IDENTIFICATION

**Model Number: 8751A**  
**Date Printed: November, 1990**  
**Part Number: 08751-90030**

This supplement contains information for correcting manual errors and for adapting the manual to newer instruments that contain improvements or modifications not documented in the existing manual.

To use this supplement

1. Make all ERRATA corrections
2. Make all appropriate serial-number-related changes listed below

SERIAL PREFIX OR NUMBER      MAKE MANUAL CHANGES


SERIAL PREFIX OR NUMBER      MAKE MANUAL CHANGES


► New Item

## ► ERRATA

### Page 2-8, Non-Harmonic Spurious Test

Change the table in Step h in Step 3 as follows:

HP 8751A Center Freq.	Spectrum Analyzer			
	CENTER	SPAN	RBW	Marker
493.7625 MHz	493.7625 MHz	20 kHz	300 Hz	Fundamental (f1)
	(f1) + 225 Hz	400 Hz	10 Hz	Spurious Max.
493.76274125 MHz	493.76274125 MHz	20 kHz	300 Hz	Fundamental (f2)
	(f2) + 550 Hz	1 kHz	10 Hz	Spurious Max.
493.7649125 MHz	493.7649125 MHz	20 kHz	300 Hz	Fundamental (f3)
	(f3) + 5.5 kHz	10 kHz	100 Hz	Spurious Max.
493.786625 MHz	493.786625 MHz	100 kHz	300 Hz	Fundamental (f4)
	(f4) + 55 kHz	100 kHz	100 Hz	Spurious Max.
426 MHz	426 MHz	20 kHz	300 Hz	Fundamental
	424 MHz	20 kHz	300 Hz	Spurious Max.

## NOTE

Manual change supplements are revised as often as necessary to keep manuals as current and accurate as possible. Hewlett-Packard recommends that you periodically request the latest edition of this supplement. Free copies are available from all HP offices. When requesting copies, quote the manual identification information from your supplement, or the model number and print date from the title page of the manual.

Date/Div: March, 1991

Page: 1 of 19



#### **Page 2-21, Receiver Noise Level Test**

Add the following HP 8751A control setting to Step 2:

Source Power = -50 dBm      **MENU**, **POWER**, **-**, **5**, **0**, **x1**

#### **Page 2-26, Residual Response Test**

Add the following HP 8751A control setting to Step 2:

Source Power = -50 dBm      **MENU**, **POWER**, **-**, **5**, **0**, **x1**

#### **Page 2-28, Input Crosstalk Test**

Replace the test procedure with the procedure on pages 3 through 8 of this manual change sheet.

#### **Page 2-33, Input Impedance Test**

Replace the test procedure with the procedure on pages 9 through 17 of this manual change sheet.

#### **Page 2-68, Non-Harmonic Spurious Test on Calculation Sheet**

Change the formula from  $f1 + 205 \text{ Hz} =$  to  $f1 + 225 \text{ Hz} =$  for CENTER frequency = 493.7625 MHz.

#### **Page 2-69, Phase Noise Test on Calculation Sheet**

Change the formula (Test Result) from  $[-a+b]$  to  $[-a+b-20]$ .

#### **Page 2-77, Absolute Amplitude Accuracy Test in Calculation Sheet**

Change the Test Result's formula from  $[-c-a+b]$  to  $[+c-a+b]$  for each input port.

#### **Page 2-89 and 2-90, CW = 300 MHz and CW = 500 MHz, Power Sweep Linearity Test in Performance Test Record**

Change the test record according to the pages 18 and 19 of this manual change sheet.

## INPUT CROSSTALK TEST

Tests the signal leakage interference between the HP 8751A's two inputs when one input is driven and the other is terminated.

### Specification

Input Crosstalk: (Same ATT for both input ports)

5 Hz  $\leq$  Freq.  $<$  10 kHz  $<$  -95 dB  
10 kHz  $\leq$  Freq.  $\leq$  500 MHz  $<$  -100 dB

### Test Equipment

N(m)-N(m) Cable, 61 cm HP 11500B  
50  $\Omega$  Termination HP 909C Opt. 012, 2 ea.

### Procedure

1. —R into A Crosstalk and R into B Crosstalk—

a. Set up the HP 8751A as follows:

#### Control Settings

PRESET

Source Power = -26 dBm

STOP Freq. = 10 kHz

Sweep Type: LOG FREQ

Number of Points: 20

IF BW: 2 Hz

Marker: Uncoupled

CH 1: A/R, LOG MAG, AVG: 4,  
Marker Tracking: MAX

CH 2: B/R, LOG MAG, AVG: 4,  
Marker Tracking: Max

Dual Channel: ON

ATTEN: Input-A = 0 dB

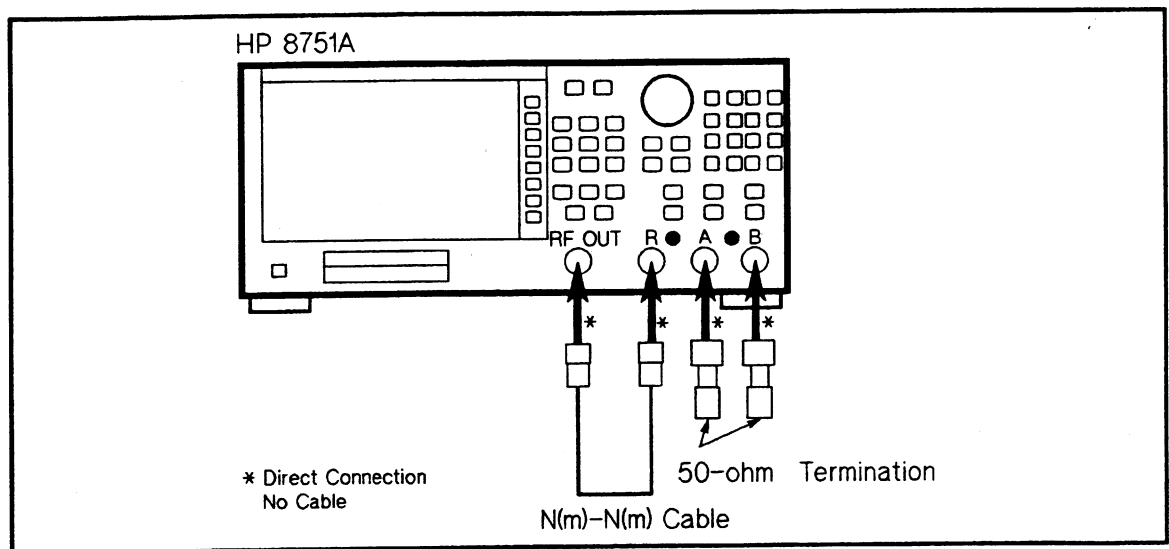
ATTEN: Input-B = 0 dB

ATTEN: Input-R = 0 dB

#### Key Strokes

PRESET  
MENU, POWER, -, 2, 6, x1  
STOP, 1, 0, k/m  
MENU, SWEEP TYPE MENU, LOG FREQ  
MENU, NUMBER of POINTS, 2, 0, x1  
AVG, IF BW, 2, x1  
MKR, MARKER MODE MENU, MARKER: UNCOUPLED  
CH 1, MEAS, A/R, FORMAT, LOG MAG, AVG,  
AVERAGING FACTOR, 4, x1, AVERAGING on OFF,  
MKR FCTN, MKR SEARCH, TRACKING on OFF,  
SEARCH: MAX  
CH 2, MEAS, B/R, FORMAT, LOG MAG, AVG,  
AVERAGING FACTOR, 4, x1, AVERAGING on OFF,  
MKR FCTN, MKR SEARCH, TRACKING on OFF,  
SEARCH: MAX  
DISPLAY, DUAL CHAN on OFF  
ATTEN, INPUT-A:0dB  
ATTEN, INPUT-B:0dB  
ATTEN, INPUT-R:0dB

b. Connect an N(m)-N(m) Cable between HP 8751A RF OUT and Input-R, and connect a 50  $\Omega$  Termination to Input-A and Input-B as shown in Figure 1-1.



**Figure 1-1. Crosstalk Test Setup 1**

- c. Perform the following key strokes, then wait until the sweeps are completed.

**MENU**, **TRIGGER MENU**, **NUMBER of GROUPS**, **4**, **X1**

- d. Record the CH 1 marker value into the *R into A Crosstalk (5 Hz to 10 kHz)* column of the Performance Test Record.
- e. Record the CH 2 marker value into the *R into B Crosstalk (5 Hz to 10 kHz)* column of the Performance Test Record.
- f. Change the HP 8751A's settings as follows:

**Control Settings**

**Key Strokes**

START Freq. = 10 kHz

**START**, **1**, **0**, **k/m**

STOP Freq. = 500 MHz

**STOP**, **5**, **0**, **0**, **M/u**

Source Power = -20 dBm

**MENU**, **POWER**, **-**, **2**, **0**, **x1**

IF BW: 20 Hz

**AVG**, **IF BW**, **2**, **0**, **x1**

Number of Points: 201

**MENU**, **NUMBER of POINTS**, **2**, **0**, **1**, **x1**

- g. Perform the following key strokes, then wait until the sweeps are completed.

**MENU**, **TRIGGER MENU**, **NUMBER of GROUPS**, **4**, **X1**

- h. Record the CH 1 marker value into the *R into A Crosstalk (10 kHz to 500 MHz)* column of the Performance Test Record.
- i. Record the CH 2 marker value into the *R into B Crosstalk (10 kHz to 500 MHz)* column of the Performance Test Record.

2. —A into R Crosstalk and A into B Crosstalk—

- a. Change the HP 8751A's settings as follows:

**Control settings**

Source Power = -26 dBm

START Freq. = 5 Hz

STOP Freq. = 10 kHz

CH 1: A, LOG MAG

CH 2: A, LOG MAG

IF BW: 2 Hz

Number of Points: 20

**Key Strokes**

**MENU**, **POWER**, **-**, **2**, **6**, **x1**

**START**, **5**, **Hz**

**STOP**, **1**, **0**, **k/m**

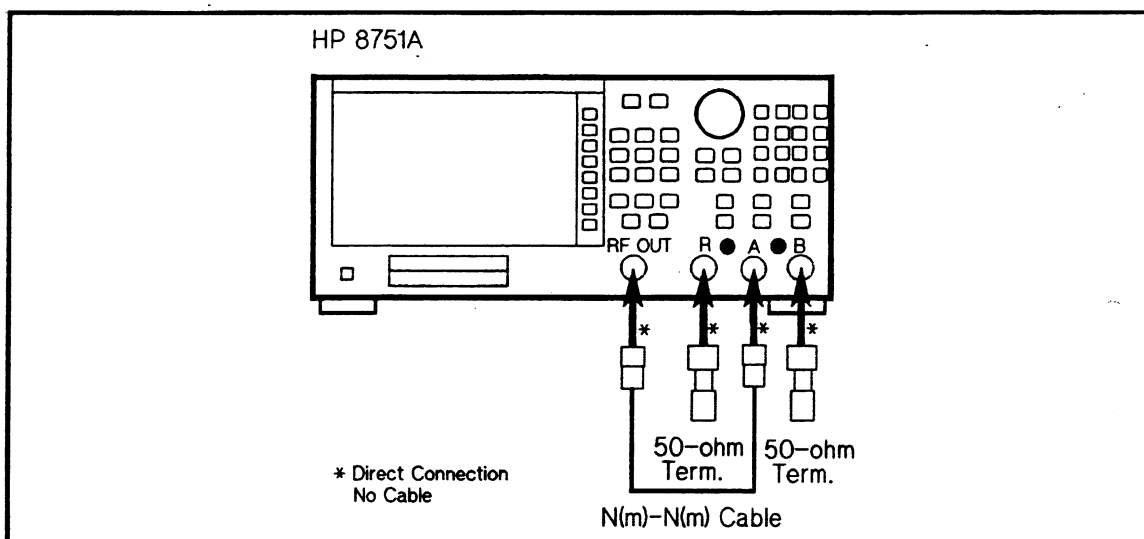
**CH 1**, **MEAS**, **A**, **FORMAT**, **LOG MAG**

**CH 2**, **MEAS**, **A**, **FORMAT**, **LOG MAG**

**AVG**, **IF BW**, **2**, **x1**

**MENU**, **NUMBER of POINTS**, **2**, **0**, **x1**

- b. Connect the equipment as shown in Figure 1-2.



**Figure 1-2. Crosstalk Test Setup 2**

- c. Perform the following key strokes, then wait until the sweeps are completed.

**MENU**, **TRIGGER MENU**, **NUMBER of GROUPS**, **4**, **x1**

- d. Perform the following key strokes:

**CH 1**, **DISPLAY**, **DEFINE TRACE**, **DATA → MEM**, **DATA/MEM**, **CH 2**, **DATA → MEM**, **DATA/MEM**

- e. Change the HP 8751A's settings as follows:

**Control settings**

CH 1: R

CH 2: B

**Key Strokes**

**CH 1**, **MEAS**, **R**

**CH 2**, **MEAS**, **B**

- f. Perform the following key strokes, then wait until the sweeps are completed.

**MENU**, **TRIGGER MENU**, **NUMBER of GROUPS**, **4**, **X1**

- g. Record the CH 1 marker value into the *A into R Crosstalk (5 Hz to 10 kHz)* column of the Performance Test Record.
- h. Record the CH 2 marker value into the *A into B Crosstalk (5 Hz to 10 kHz)* column of the Performance Test Record.
- i. Change the HP 8751A's settings as follows:

Control Settings	Key Strokes
CH 1: A	<b>CH 1</b> , <b>MEAS</b> , <b>▲</b>
CH 2: A	<b>CH 2</b> , <b>MEAS</b> , <b>▲</b>
START Freq. = 10 kHz	<b>START</b> , <b>1</b> , <b>0</b> , <b>k/m</b>
STOP Freq. = 500 MHz	<b>STOP</b> , <b>5</b> , <b>0</b> , <b>0</b> , <b>M/u</b>
Source Power = -20 dBm	<b>MENU</b> , <b>POWER</b> , <b>-</b> , <b>2</b> , <b>0</b> , <b>x1</b>
IF BW: 20 Hz	<b>AVG</b> , <b>IF BW</b> , <b>2</b> , <b>0</b> , <b>x1</b>
Number of Points: 201	<b>MENU</b> , <b>NUMBER of POINTS</b> , <b>2</b> , <b>0</b> , <b>1</b> , <b>x1</b>

- j. Perform the following key strokes, then wait until the sweeps are completed.

**MENU**, **TRIGGER MENU**, **NUMBER of GROUPS**, **4**, **X1**

- k. Perform the following key strokes:

**CH 1**, **DISPLAY**, **DEFINE TRACE**, **DATA → MEM**, **CH 2**, **DATA → MEM**

- l. Change the HP 8751A's settings as follows:

Control Settings	Key Strokes
CH 1: R	<b>CH 1</b> , <b>MEAS</b> , <b>R</b>
CH 2: B	<b>CH 2</b> , <b>MEAS</b> , <b>B</b>

- m. Perform the following key strokes, then wait until the sweeps are completed.

**MENU**, **TRIGGER MENU**, **NUMBER of GROUPS**, **4**, **x1**

- n. Record the CH 1 marker value into the *A into R Crosstalk (10 kHz to 500 MHz)* column of the Performance Test Record.
- o. Record the CH 2 marker value into the *A into B Crosstalk (10 kHz to 500 MHz)* column of the Performance Test Record.

### 3. —B into R Crosstalk and B into A Crosstalk—

- a. Change the HP 8751A's settings as follows:

Control settings	Key strokes
Source Power = -26 dBm	<b>MENU</b> , <b>POWER</b> , <b>-</b> , <b>2</b> , <b>6</b> , <b>x1</b>
START Freq. = 5 Hz	<b>START</b> , <b>5</b> , <b>Hz</b>
STOP Freq. = 10 kHz	<b>STOP</b> , <b>1</b> , <b>0</b> , <b>k/m</b>
CH 1: B, LOG MAG	<b>CH 1</b> , <b>MEAS</b> , <b>B</b> , <b>FORMAT</b> , <b>LOG MAG</b>
CH 2: A/B, LOG MAG	<b>CH 2</b> , <b>MEAS</b> , <b>A/B</b> , <b>FORMAT</b> , <b>LOG MAG</b>

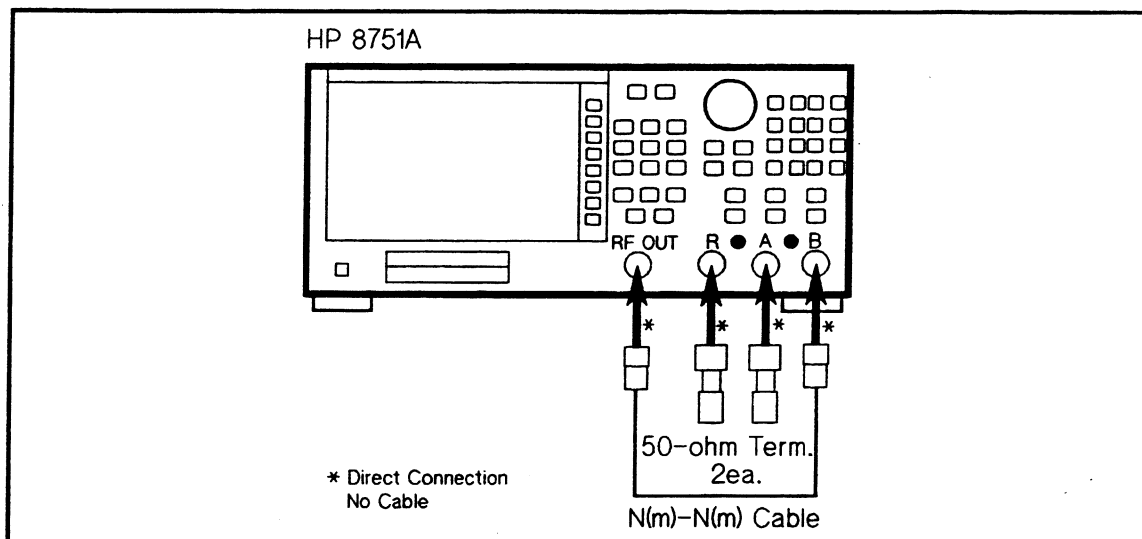
IF BW: 2 Hz

**[AVG], [IF BW], [2], [x1]**

Number of Points: 20

**[MENU], [NUMBER of POINTS], [2], [0], [x1]**

- b. Connect the equipment as shown in Figure 1-3.



**Figure 1-3. Crosstalk Test Setup 3**

- c. Perform the following key strokes, then wait until the sweeps are completed.

**[MENU], [TRIGGER MENU], [NUMBER of GROUPS], [4], [x1]**

- d. Perform the following key strokes:

**[CH 1], [DISPLAY], [DEFINE TRACE], [DATA → MEM], [CH 2], [DISPLAY: DATA]**

- e. Record the CH 2 marker value into the *B into A Crosstalk (5 Hz to 10 kHz)* column of the Performance Test Record.

- f. Change the HP 8751A's settings as follows:

**Control settings**

**Key Strokes**

CH 1: R

**[CH 1], [MEAS], [R]**

- g. Perform the following key strokes, then wait until the sweeps are completed.

**[MENU], [TRIGGER MENU], [NUMBER of GROUPS], [4], [x1]**

- h. Record the CH 1 marker value into the *B into R Crosstalk (5 Hz to 10 kHz)* column of the Performance Test Record.

- i. Change the HP 8751A as follows:

**Control Settings**

**Key strokes**

CH 1: B

**[CH 1], [MEAS], [B]**

START Freq. = 10 kHz

**[START], [1], [0], [k/m]**

STOP Freq. = 500 MHz

**[STOP], [5], [0], [0], [M/u]**

Source Power = -20 dBm

**MENU**, **POWER**, **-**, **2**, **0**, **x1**

IF BW: 20 Hz

**AVG**, **IF BW**, **2**, **0**, **x1**

Number of Points: 201

**MENU**, **NUMBER of POINTS**, **2**, **0**, **1**, **x1**

- j. Perform the following key strokes, then wait until the sweeps are completed.

**MENU**, **TRIGGER MENU**, **NUMBER of GROUPS**, **4**, **x1**

- k. Perform the following key strokes:

**CH 1**, **DISPLAY**, **DEFINE TRACE**, **DATA → MEM**

- l. Record the CH 2 marker value into the *B into A Crosstalk (10 kHz to 500 MHz)* column of the Performance Test Record.
- m. Change the HP 8751A's setting as follows:

**Control settings**

**Key Strokes**

CH 1: R

**CH 1**, **MEAS**, **R**

- n. Perform the following key strokes, then wait until the sweeps are completed.

**MENU**, **TRIGGER MENU**, **NUMBER of GROUPS**, **4**, **x1**

- o. Record the CH 1 marker value into the *B into R Crosstalk (10 kHz to 500 MHz)* column of the Performance Test Record.



## INPUT IMPEDANCE TEST

Measures the return loss to check the HP 8751A's input impedance.

### Specification

Input Impedance: 50  $\Omega$  Nominal

Frequency	ATT = 0 dB	ATT = 20 dB
5 Hz $\leq$ Freq. $\leq$ 100 MHz	> 20 dB	> 25 dB
100 MHz < Freq. $\leq$ 300 MHz	> 15 dB	> 25 dB
300 MHz < Freq. $\leq$ 500 MHz	> 10 dB	> 20 dB

### Test Equipment

50 $\Omega$ T/R Test Kit	HP 87512A
50 $\Omega$ type-N calibration kit	HP 85032B
50 $\Omega$ type-N RF cable set	HP 11851B
N(f)-N(f) Adapter	PN 1250-0777, 2 ea.

### Procedure

1. —*Input B Impedance Test*—
  - a. Connect the equipment as shown in Figure 1-4.

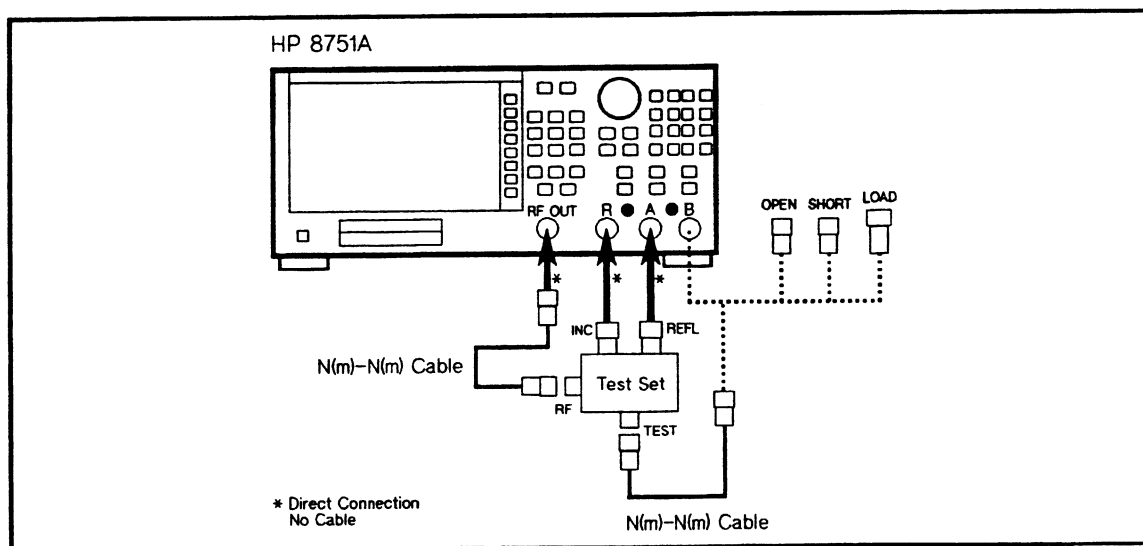


Figure 1-4. Input B Impedance Test Setup

- b. Set up the HP 8751A as follows:

#### Control Settings

PRESET

Meas. Config. : A/R

#### Key strokes

PRESET

MEAS, A/R

STOP Freq. = 100 MHz	<b>STOP</b> , <b>1</b> , <b>0</b> , <b>0</b> , <b>M/u</b>
Source Power: -18 dBm	<b>MENU</b> , <b>POWER</b> , <b>-</b> , <b>1</b> , <b>8</b> , <b>x1</b>
NUMBER of POINTS: 26	<b>MENU</b> , <b>NUMBER of POINTS</b> , <b>2</b> , <b>6</b> , <b>x1</b>
IF BW: AUTO	<b>AVG</b> , <b>IF BW</b> , <b>IF BW AUTO</b>
Sweep Type: LOG SWEEP	<b>MENU</b> , <b>SWEEP TYPE MENU</b> , <b>LOG FREQ</b>
Marker: MKR SEARCH:	<b>MKR FCTN</b> , <b>MKR SEARCH</b> , <b>TRACKING on OFF</b> , <b>MAX</b>
Tracking ON [MAX]	

c. Perform the following one port calibration sequence.

- i. Press **CAL**, **CAL KIT**, **N 50  $\Omega$** , **RETURN**, **CALIBRATE MENU**, **S11 1-PORT**
  - ii. Connect a type-N(f) open to the test port cable and press **OPENS**, **OPEN[M]**, **DONE:OPENS**.
  - iii. Connect a type-N(f) short to the test port cable and press **SHORTS**, **SHORT[M]**, **DONE:SHORTS**.
  - iv. Connect a type-N(f) 50  $\Omega$  Termination (LOAD) to the test port cable and press **LOAD**, **DONE 1-PORT CAL**.
- d. Remove the 50  $\Omega$  Termination from the test port cable and connect the cable to the open input port of the analyzer.
- e. Perform the following single sweep measurement key strokes.
- MENU**, **TRIGGER MENU**, **SINGLE**
- f. Press **SCALE REF**, **AUTO SCALE**.
  - g. Change the sign of and record the marker reading value into the *B return Loss (20 dB, 5 Hz to 100 MHz)* test result column into the Performance Test Record.
  - h. Press **ATTEN** and **INPUT-B: 0 dB**.
  - i. Perform the following single sweep measurement key strokes.
- MENU**, **TRIGGER MENU**, **SINGLE**
- j. Press **SCALE REF**, **AUTO SCALE**.
  - k. Change the sign of and record the marker reading value into the *B return Loss (0 dB, 5 Hz to 100 MHz)* test result column into the Performance Test Record.
  - l. Remove the cable from the INPUT-B Connector on the HP 8751A front panel.
- m. Change the HP 8751A Control Settings as follows:

#### Control Settings

#### Key Strokes

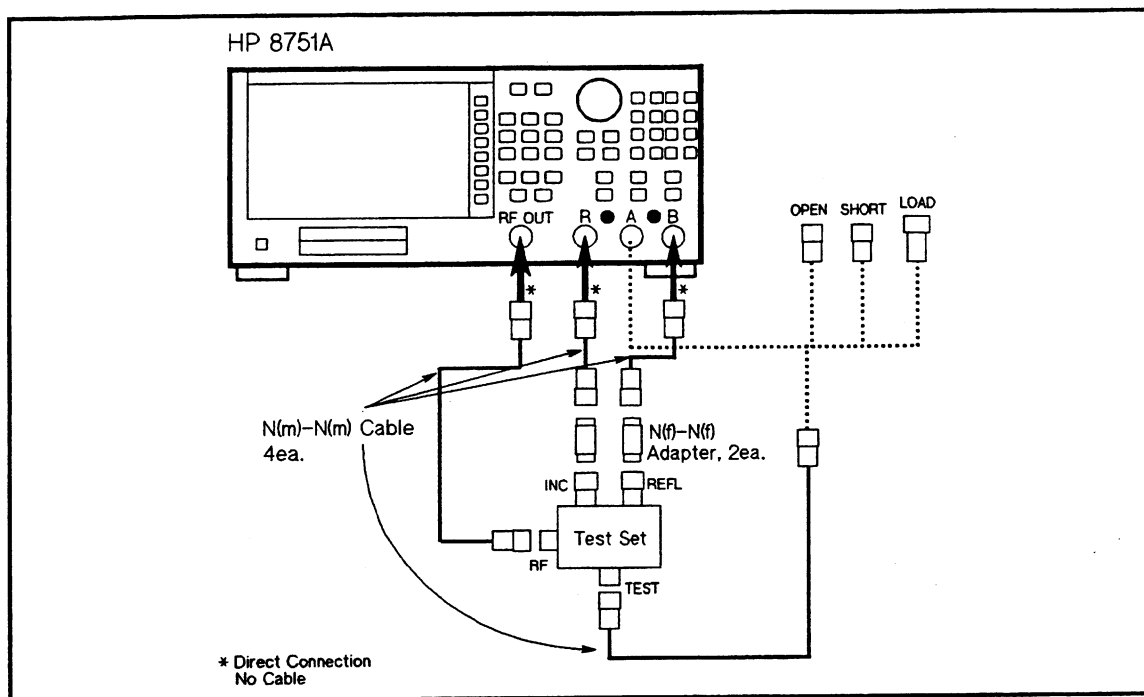
START Freq. = 100 MHz	<b>START</b> , <b>1</b> , <b>0</b> , <b>0</b> , <b>M/u</b>
STOP Freq. = 500 MHz	<b>STOP</b> , <b>5</b> , <b>0</b> , <b>0</b> , <b>M/u</b>
IF BW: 200 Hz	<b>AVG</b> , <b>IF BW</b> , <b>2</b> , <b>0</b> , <b>0</b> , <b>x1</b>

- n. Perform the following one port calibration sequence.

- i. Press **CAL**, **CALIBRATE MENU**, **S11 1-PORT**
- ii. Connect a type-N(f) open to the test port cable and press **OPENS**, **OPEN[M]**, **DONE:OPENS**.
- iii. Connect a type-N(f) short to the test port cable and press **SHORTS**, **SHORT[M]**, **DONE:SHORTS**.
- iv. Connect a type-N(f) 50  $\Omega$  Termination (LOAD) to the test port cable and press **LOAD**, **DONE 1-PORT CAL**.
- o. Remove the 50  $\Omega$  Termination from the test port cable and connect the cable to the open input port of the analyzer.
- p. Perform the following single sweep measurement key strokes.  
**MENU**, **TRIGGER MENU**, **SINGLE**
- q. Press **SCALE REF**, **AUTO SCALE**.
- r. Set the marker search range from 100 MHz to 300 MHz using the following key strokes.  
**MKR**, **ACTIVATE MARKER**, **MARKER 1**, **1**, **0**, **0**, **M/u**, **ACTIVATE MARKER**, **MARKER 2**, **3**, **0**, **0**, **M/u**, **MKR**,  **$\Delta$  MODE MENU**,  **$\Delta$  REF MARKER**,  **$\Delta$  REF = 1**, **MKR FCTN**, **SEARCH RANGE**, **SEARCH RNG STORE**, **PART SRCH on/OFF**
- s. Move the marker to the maximum value using the following key strokes. Change the sign of, and record the maximum value into the *B Return Loss (0 dB, 100 MHz to 300 MHz)* test result column in the Performance Test Record.  
**MKR FCTN**, **MKR SEARCH**, **MAX**, **MKR**,  **$\Delta$  MODE MENU**,  **$\Delta$  MODE OFF**
- t. Press  **$\Delta$  REF MARKER**,  **$\Delta$  REF = 1**.
- u. Set the marker search range from 300 MHz to 500 MHz using the following key strokes.  
**MKR**, **ACTIVATE MARKER**, **MARKER 1**, **2**, **0**, **0**, **M/u**, **MKR**, **ACTIVATE MARKER**, **MARKER 2**, **2**, **0**, **0**, **M/u**, **MKR FCTN**, **SEARCH RANGE**, **SEARCH RNG STORE**
- v. Move the marker to the maximum value using the following key strokes. Change the sign of, and record the maximum value with an opposite sign into the *B Return Loss (0 dB, 300 MHz to 500 MHz)* test result column in the Performance Test Record.  
**MKR FCTN**, **MKR SEARCH**, **MAX**, **MKR**,  **$\Delta$  MODE MENU**,  **$\Delta$  MODE OFF**
- w. Press **ATTEN**, **INPUT-B: 20 dB**.
- x. Repeat steps p through v in Step 1.

## 2. —Input A Impedance Test—

- a. Connect the equipment as shown in Figure 1-5.



**Figure 1-5. Input A Impedance Setup**

- b. Change the HP 8751A control settings as follows:

### Control Settings

START Freq. = 5 Hz  
 STOP Freq. = 100 MHz  
 Meas. Config.: B/R  
 IF BW: AUTO

### Key Strokes

**START**, **5**, **x1**  
**STOP**, **1**, **0**, **0**, **M/u**  
**MEAS**, **B/R**  
**AVG**, **IF BW**, **IF BW AUTO**

- c. Perform the following one port calibration sequence to do the one port calibration.
  - i. Press **CAL**, **CAL KIT**, **N 50 Ω**, **RETURN**, **CALIBRATE MENU**, **S11 1-PORT**
  - ii. Connect a type-N(f) open to the test port cable and press **OPENS**, **OPEN [M]**, **DONE:OPENS**.
  - iii. Connect a type-N(f) short to the test port cable and press **SHORTS**, **SHORT [M]**, **DONE:SHORTS**.
  - iv. Connect a type-N(f) 50 Ω Termination (LOAD) to the test port cable and press **LOAD**, **DONE 1-PORT CAL**.
- d. Remove the 50 Ω Termination from the test port cable and connect the cable to the open input port of the analyzer.
- e. Perform the following single sweep measurement key strokes.

**MENU**, **TRIGGER MENU**, **SINGLE**

- f. Press **SCALE REF**, **AUTO SCALE**.
- g. Change the sign of, and record the marker reading value into the *A return Loss (20 dB, 5 Hz to 100 MHz)* test result column into the Performance Test Record.
- h. Press **ATTEN** and **INPUT-A: 0 dB**.
- i. Perform the following single sweep measurement key strokes.
- MENU**, **TRIGGER MENU**, **SINGLE**
- j. Press **SCALE REF**, **AUTO SCALE**.
- k. Change the sign of, and record the marker reading value into the *A return Loss (0 dB, 5 Hz to 100 MHz)* test result column into the Performance Test Record.
- l. Remove the cable from the INPUT-A Connector on the HP 8751A front panel.
- m. Change the HP 8751A Control Settings as follows:

**Control Settings**

**Key Strokes**

START Freq. = 100 MHz

**START**, **1**, **0**, **0**, **M/u**

STOP Freq. = 500 MHz

**STOP**, **5**, **0**, **0**, **M/u**

IF BW: 200 Hz

**AVG**, **IF BW**, **2**, **0**, **0**, **x1**

- n. Perform the following one port calibration sequence.
- i. Press **CAL**, **CALIBRATE MENU**, **S11 1-PORT**
- ii. Connect a type-N(f) open to the test port cable and press **OPENS**, **OPEN[M]**, **DONE:OPENS**.
- iii. Connect a type-N(f) short to the test port cable and press **SHORTS**, **SHORT[M]**, **DONE:SHORTS**.
- iv. Connect a type-N(f) 50  $\Omega$  Termination (LOAD) to the test port cable and press **LOAD**, **DONE 1-PORT CAL**.
- o. Remove the 50  $\Omega$  Termination from the test port cable and connect the cable to the open input port of the analyzer.
- p. Perform the following single sweep measurement key strokes.
- MENU**, **TRIGGER MENU**, **SINGLE**
- q. Press **SCALE REF**, **AUTO SCALE**.
- r. Set the marker search range from 100 MHz to 300 MHz using the following key strokes.
- MKR**, **ACTIVATE MARKER**, **MARKER 1**, **1**, **0**, **0**, **M/u**, **ACTIVATE MARKER**, **MARKER 2**, **3**, **0**, **0**, **M/u**, **MKR**,  **$\Delta$  MODE MENU**,  **$\Delta$  REF MARKER**,  **$\Delta$  REF = 1**, **MKR FCTN**, **SEARCH RANGE**, **SEARCH RNG STORE**, **PART SRCH on/OFF**

- s. Move the marker to the maximum value using the following key strokes. Change the sign of, and record the maximum value into the *A Return Loss (0 dB, 100 MHz to 300 MHz)* test result column in the Performance Test Record.

**MKR FCTN**, **MKR SEARCH**, **MAX**, **MKR**, **Δ MODE MENU**, **Δ MODE OFF**

- t. Press **Δ REF MARKER**, **Δ REF = 1**.

- u. Set the marker search range from 300 MHz to 500 MHz using the following key strokes.

**MKR**, **ACTIVATE MARKER**, **MARKER 1**, **2**, **0**, **0**, **M/U**, **MKR**, **ACTIVATE MARKER**, **MARKER 2**, **2**, **0**, **0**, **M/U**, **MKR FCTN**, **SEARCH RANGE**, **SEARCH RNG STORE**

- v. Move the marker to the maximum value using the following key strokes. Change the sign of, and record the maximum value into the *A Return Loss (0 dB, 300 MHz to 500 MHz)* test result column in the Performance Test Record.

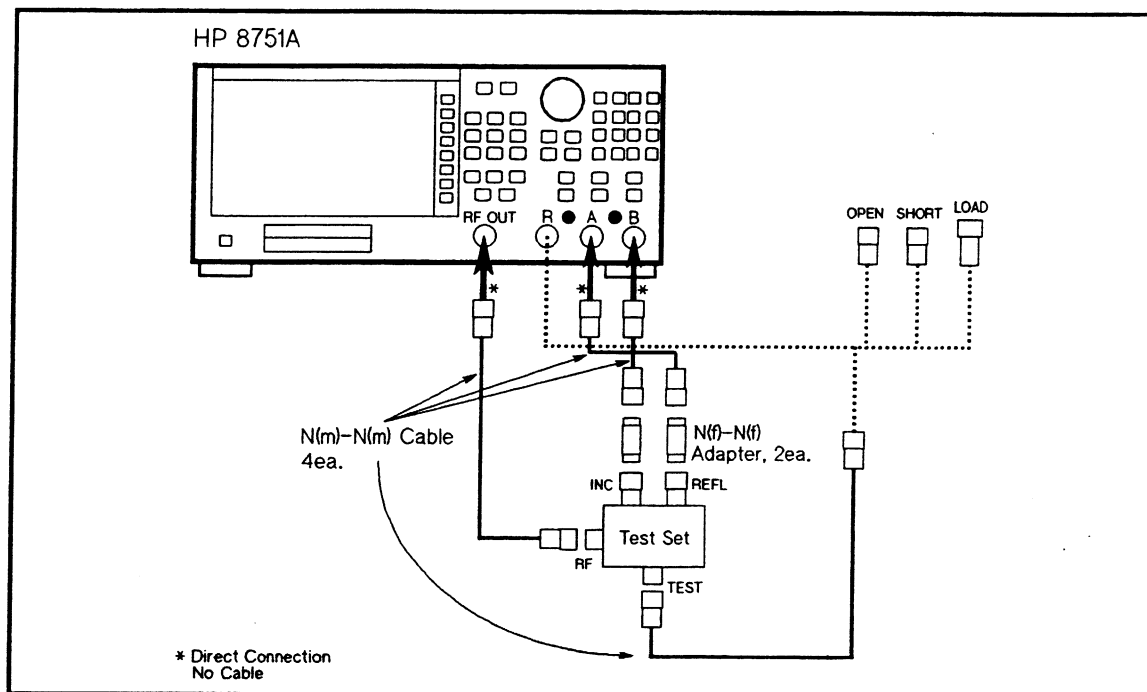
**MKR FCTN**, **MKR SEARCH**, **MAX**, **MKR**, **Δ MODE MENU**, **Δ MODE OFF**

- w. Press **ATTEN**, **INPUT-A: 20 dB**.

- x. Repeat steps p through v in Step 2 for A Return Loss at INPUT ATT: 20 dB.

### 3. —Input R Impedance Test—

- a. Connect the equipment as shown in Figure 1-6.



**Figure 1-6. Input R Impedance Setup**

- b. Change the HP 8751A's settings as follows:

#### Control Settings

START Freq. = 5 Hz  
 STOP Freq. = 100 MHz  
 Meas. Config.: A/B  
 IF BW: AUTO

#### Key strokes

**START**, **5**, **x1**  
**STOP**, **1**, **0**, **0**, **M/u**  
**MEAS**, **A/B**  
**AVG**, **IF BW**, **IF BW AUTO**

- c. Perform the following one port calibration sequence.

- i. Press **CAL**, **CAL KIT**, **N 50 Ω**, **RETURN**, **CALIBRATE MENU**, **S11 1-PORT**
- ii. Connect a type-N(f) open to the test port cable and press **OPENS**, **OPEN[M]**, **DONE:OPENS**.
- iii. Connect a type-N(f) short to the test port cable and press **SHORTS**, **SHORT[M]**, **DONE:SHORTS**.
- iv. Connect a type-N(f) 50 Ω Termination (LOAD) to the test port cable and press **LOAD**, **DONE 1-PORT CAL**.

- d. Remove the 50 Ω Termination from the test port cable and connect the cable to the open input port of the analyzer.

- e. Perform the following single sweep measurement key strokes.

**MENU**, **TRIGGER MENU**, **SINGLE**

- f. Press **SCALE REF**, **AUTO SCALE**.
- g. Change the sign of, and record the marker reading value into the *R return Loss (20 dB, 5 Hz to 100 MHz)* test result column into the Performance Test Record.
- h. Press **ATTEN** and **INPUT-R: 0 dB**.
- i. Perform the following single sweep measurement key strokes.

**MENU**, **TRIGGER MENU**, **SINGLE**

- j. Press **SCALE REF**, **AUTO SCALE**.
- k. Change the sign of, and record the marker reading value into the *R return Loss (0 dB, 5 Hz to 100 MHz)* test result column into the Performance Test Record.
- l. Remove the cable from the INPUT-R Connector on the HP 8751A front panel.
- m. Change the HP 8751A Control Settings as follows:

**Control Settings**

**Key Strokes**

START Freq. = 100 MHz

**START**, **1**, **0**, **0**, **M/u**

STOP Freq. = 500 MHz

**STOP**, **5**, **0**, **0**, **M/u**

IF BW: 200 Hz

**AVG**, **IF BW**, **2**, **0**, **0**, **x1**

- n. Perform the following one port calibration sequence.
- i. Press **CAL**, **CALIBRATE MENU**, **S11 1-PORT**
- ii. Connect a type-N(f) open to the test port cable and press **OPENS**, **OPEN[M]**, **DONE:OPENS**.
- iii. Connect a type-N(f) short to the test port cable and press **SHORTS**, **SHORT[M]**, **DONE:SHORTS**.
- iv. Connect a type-N(f) 50  $\Omega$  Termination (LOAD) to the test port cable and press **LOAD**, **DONE 1-PORT CAL**.
- o. Remove the 50  $\Omega$  Termination from the test port cable and connect the cable to the open input port of the analyzer.
- p. Perform the following key strokes for a single sweep measurement.

**MENU**, **TRIGGER MENU**, **SINGLE**

- q. Press **SCALE REF**, **AUTO SCALE**.
- r. Set the marker search range from 100 MHz to 300 MHz using the following key strokes.
- MKR**, **ACTIVATE MARKER**, **MARKER 1**, **1**, **0**, **0**, **M/u**, **ACTIVATE MARKER**, **MARKER 2**, **3**, **0**, **0**, **M/u**, **MKR**,  **$\Delta$  MODE MENU**,  **$\Delta$  REF MARKER**,  **$\Delta$  REF = 1**, **MKR FCTN**, **SEARCH RANGE**, **SEARCH RNG STORE**, **PART SRCH on/OFF**



- s. Move the marker to the maximum value using the following key strokes. Change the sign of, and record the maximum value into the *R Return Loss (0 dB, 100 MHz to 300 MHz)* test result column in the Performance Test Record.

**MKR FCTN**, **MKR SEARCH**, **MAX**, **MKR**, **Δ MODE MENU**, **Δ MODE OFF**

- t. Press **Δ REF MARKER**, **Δ REF = 1**.

- u. Set the marker search range from 300 MHz to 500 MHz using the following key strokes.

**MKR**, **ACTIVATE MARKER**, **MARKER 1**, **2**, **0**, **0**, **M/u**, **MKR**, **ACTIVATE MARKER**, **MARKER 2**, **2**, **0**, **0**, **M/u**, **MKR FCTN**, **SEARCH RANGE**, **SEARCH RNG STORE**

- v. Move the marker to the maximum value using the following key strokes. Change the sign of, and record the maximum value into the *R Return Loss (0 dB, 300 MHz to 500 MHz)* test result column in the Performance Test Record.

**MKR FCTN**, **MKR SEARCH**, **MAX**, **MKR**, **Δ MODE MENU**, **Δ MODE OFF**

- w. Press **ATTEN**, **INPUT-R: 20 dB**.

- x. Repeat steps p through v in Step 3 for R Return Loss at INPUT ATT: 20 dB.

**CW FREQUENCY = 300 MHz**

<b>STOP Power</b>	<b>Level</b>	<b>Minimum Limit</b>	<b>Test Result</b>	<b>Maximum Limit</b>	<b>Measurement Uncertainty</b>
-15 dBm	-20 dBm	-0.35 dB	_____	+0.35 dB	±0.090 dB
	-25 dBm	-0.50 dB	_____	+0.50 dB	±0.090 dB
	-30 dBm	-0.65 dB	_____	+0.65 dB	±0.090 dB
	-35 dBm	-0.80 dB	_____	+0.80 dB	±0.090 dB
	-40 dBm	-1.75 dB	_____	+1.75 dB	±0.090 dB
	-45 dBm	-1.90 dB	_____	+1.90 dB	±0.100 dB
	-50 dBm	-3.05 dB	_____	+3.05 dB	±0.151 dB
-20 dBm	-25 dBm	-0.35 dB	_____	+0.35 dB	±0.090 dB
	-30 dBm	-0.50 dB	_____	+0.50 dB	±0.090 dB
	-35 dBm	-0.65 dB	_____	+0.65 dB	±0.090 dB
	-40 dBm	-0.80 dB	_____	+0.80 dB	±0.090 dB
	-45 dBm	-1.75 dB	_____	+1.75 dB	±0.100 dB
	-50 dBm	-2.90 dB	_____	+2.90 dB	±0.151 dB
-25 dBm	-30 dBm	-0.35 dB	_____	+0.35 dB	±0.026 dB
	-35 dBm	-0.50 dB	_____	+0.50 dB	±0.026 dB
	-40 dBm	-0.65 dB	_____	+0.65 dB	±0.028 dB
	-45 dBm	-0.80 dB	_____	+0.80 dB	±0.052 dB
	-50 dBm	-1.95 dB	_____	+1.95 dB	±0.125 dB
-30 dBm	-35 dBm	-0.35 dB	_____	+0.35 dB	±0.026 dB
	-40 dBm	-0.50 dB	_____	+0.50 dB	±0.028 dB
	-45 dBm	-0.65 dB	_____	+0.65 dB	±0.053 dB
	-50 dBm	-1.80 dB	_____	+1.80 dB	±0.125 dB
-35 dBm	-40 dBm	-0.35 dB	_____	+0.35 dB	±0.029 dB
	-45 dBm	-0.50 dB	_____	+0.50 dB	±0.053 dB
	-50 dBm	-1.65 dB	_____	+1.65 dB	±0.126 dB
-40 dBm	-45 dBm	-0.35 dB	_____	+0.35 dB	±0.054 dB
	-50 dBm	-1.50 dB	_____	+1.50 dB	±0.126 dB
-45 dBm	-50 dBm	-1.35 dB	_____	+1.35 dB	±0.133 dB

**CW FREQUENCY = 500 MHz**

<b>STOP Power</b>	<b>Level</b>	<b>Minimum Limit</b>	<b>Test Result</b>	<b>Maximum Limit</b>	<b>Measurement Uncertainty</b>
<b>-15 dBm</b>	<b>-20 dBm</b>	<b>-0.70 dB</b>	_____	<b>+0.70 dB</b>	<b>±0.090 dB</b>
	<b>-25 dBm</b>	<b>-1.20 dB</b>	_____	<b>+1.20 dB</b>	<b>±0.090 dB</b>
	<b>-30 dBm</b>	<b>-1.70 dB</b>	_____	<b>+1.70 dB</b>	<b>±0.090 dB</b>
	<b>-35 dBm</b>	<b>-2.20 dB</b>	_____	<b>+2.20 dB</b>	<b>±0.090 dB</b>
	<b>-40 dBm</b>	<b>-3.50 dB</b>	_____	<b>+3.50 dB</b>	<b>±0.090 dB</b>
	<b>-45 dBm</b>	<b>-4.00 dB</b>	_____	<b>+4.00 dB</b>	<b>±0.100 dB</b>
<b>-20 dBm</b>	<b>-50 dBm</b>	<b>-5.50 dB</b>	_____	<b>+5.50 dB</b>	<b>±0.151 dB</b>
	<b>-25 dBm</b>	<b>-0.70 dB</b>	_____	<b>+0.70 dB</b>	<b>±0.090 dB</b>
	<b>-30 dBm</b>	<b>-1.20 dB</b>	_____	<b>+1.20 dB</b>	<b>±0.090 dB</b>
	<b>-35 dBm</b>	<b>-1.70 dB</b>	_____	<b>+1.70 dB</b>	<b>±0.090 dB</b>
	<b>-40 dBm</b>	<b>-2.20 dB</b>	_____	<b>+2.20 dB</b>	<b>±0.090 dB</b>
	<b>-45 dBm</b>	<b>-3.50 dB</b>	_____	<b>+3.50 dB</b>	<b>±0.100 dB</b>
<b>-25 dBm</b>	<b>-50 dBm</b>	<b>-5.00 dB</b>	_____	<b>+5.00 dB</b>	<b>±0.151 dB</b>
	<b>-30 dBm</b>	<b>-0.70 dB</b>	_____	<b>+0.70 dB</b>	<b>±0.026 dB</b>
	<b>-35 dBm</b>	<b>-1.20 dB</b>	_____	<b>+1.20 dB</b>	<b>±0.026 dB</b>
	<b>-40 dBm</b>	<b>-1.70 dB</b>	_____	<b>+1.70 dB</b>	<b>±0.028 dB</b>
	<b>-45 dBm</b>	<b>-2.20 dB</b>	_____	<b>+2.20 dB</b>	<b>±0.052 dB</b>
	<b>-50 dBm</b>	<b>-3.70 dB</b>	_____	<b>+3.70 dB</b>	<b>±0.125 dB</b>
<b>-30 dBm</b>	<b>-35 dBm</b>	<b>-0.70 dB</b>	_____	<b>+0.70 dB</b>	<b>±0.026 dB</b>
	<b>-40 dBm</b>	<b>-1.20 dB</b>	_____	<b>+1.20 dB</b>	<b>±0.028 dB</b>
	<b>-45 dBm</b>	<b>-1.70 dB</b>	_____	<b>+1.70 dB</b>	<b>±0.053 dB</b>
	<b>-50 dBm</b>	<b>-3.20 dB</b>	_____	<b>+3.20 dB</b>	<b>±0.125 dB</b>
<b>-35 dBm</b>	<b>-40 dBm</b>	<b>-0.70 dB</b>	_____	<b>+0.70 dB</b>	<b>±0.029 dB</b>
	<b>-45 dBm</b>	<b>-1.20 dB</b>	_____	<b>+1.20 dB</b>	<b>±0.053 dB</b>
	<b>-50 dBm</b>	<b>-2.70 dB</b>	_____	<b>+2.70 dB</b>	<b>±0.126 dB</b>
<b>-40 dBm</b>	<b>-45 dBm</b>	<b>-0.70 dB</b>	_____	<b>+0.70 dB</b>	<b>±0.054 dB</b>
	<b>-50 dBm</b>	<b>-2.20 dB</b>	_____	<b>+2.20 dB</b>	<b>±0.126 dB</b>
<b>-45 dBm</b>	<b>-50 dBm</b>	<b>-1.70 dB</b>	_____	<b>+1.70 dB</b>	<b>±0.133 dB</b>



## MANUAL CHANGES

### HP 8751A Network Analyzer

#### Maintenance Manual

#### MANUAL IDENTIFICATION

Model Number: HP 8751A  
Date Printed: Nov. 1990  
Part Number: 08751-90030

This supplement contains information for correcting manual errors and for adapting the manual to newer instruments that contains improvements or modifications not documented in the existing manual.

To use this supplement

1. Make all ERRATA corrections
2. Make all appropriate serial-number-related changes listed below

SERIAL PREFIX OR NUMBER	MAKE MANUAL CHANGES
-------------------------	---------------------

3315J	1
3315A	1

FIRMWARE REVISION	MAKE MANUAL CHANGES
-------------------	---------------------

5.00	1

New Item

## CHANGE 1

### Page 1-3 and 1-4, Recommended Test Equipment

Change Table 1-1, Recommended Test Equipment, as follows:

#### NOTE

Manual change supplement are revised as often as necessary to keep manuals as current and accurate as possible. Hewlett-Packard recommends that you periodically request the latest edition of this supplement. Free copies are available from all HP offices. When requesting copies, quote the manual identification information from your supplement, or the model number and print date from the title page of the manual.

**Table 1-1. Recommended Test Equipment**

<b>Equipment</b>	<b>Critical Specifications</b>	<b>Recommended Model</b>	<b>Qty</b>	<b>Use<sup>1</sup></b>
Series 200/300 Controller	No substitute (BASIC Rev. 5.0 and above)	Model 310	1	A, T
Spectrum Analyzer	Frequency: 100 Hz to 1.5 GHz	HP 8566B or HP 8568B	1	P, A, T
Multimeter	No substitute	HP 3458A	1	P, A, T
Universal Source	DC Output: 0 to $\pm 2$ V, Accuracy: < 0.1%	HP 3245A	1	P, A
Frequency Counter	Frequency: 10 Hz to 500 MHz Accuracy: < 0.25 ppm	HP 5334B Opt. 010, 030	1	P, A
Power Meter	No substitute	HP 436A Opt.022, HP 437B, or HP 438A	1	P, A
Power Sensor	Frequency: 100 kHz to 500 MHz Power: +5 dBm to -20 dBm	HP 8482A	1	P, A
	Frequency: 10 MHz to 500 MHz Power: -20 to -60 dBm	HP 8481D	1	P
Ratio Transformer	No substitute	ESI 73 or ESI DT72A	1	P
Buffer Amplifier Set	No substitute	PN 08751-65003	1	P
Type-N Calibration Kit	No substitute	HP 85032B	1	P
Coaxial Loads	Type-N 50 $\Omega$ Termination	HP909C Opt.012	3	P, A, T
	50 $\Omega$ Feedthrough, BNC(m)-BNC(f)	PN 04192-61002 or HP 11048C	1	P, A
Program Attenuator Pad	Adjustments Program (3.5 in)	PN 08751-65002	1	A
	Impedance 50 $\Omega$ , N(m)-N(f)			
	ATT 10 dB	HP 8491A Opt. 010	2	P
	ATT 20 dB	HP 8491A Opt. 020 <sup>2</sup>	1	P, A, T

<sup>1</sup> P: Performance Tests, A: Adjustments and Correction Constants, T: Troubleshooting

<sup>2</sup> An HP 8491A Opt. 020 must be calibrated at 1 MHz, 30 MHz, 50 MHz, 100 MHz, 300 MHz, and 500 MHz (Uncertainty:  $\leq 0.06$  dB). When you purchase an HP 8491A Opt. 020, contact your nearest Hewlett-Packard service center for the required calibration frequency and uncertainty.

**Table 1-1. Recommended Test Equipment (continued)**

Equipment	Critical Specifications	Recommended Model	Qty	Use <sup>1</sup>
Cables	RF Cable Set	HP 11851B	1	P
	50 $\Omega$ N(m)-N(m), 61 cm	HP 11500B	3	P, A, T
	50 $\Omega$ BNC(m)-BNC(m), 61 cm	PN 8120-1839	2	P, A
	50 $\Omega$ BNC(m)-BNC(m), 122 cm	PN 8120-1840	2	P, A
	50 $\Omega$ BNC(m)-SMB(f), 122 cm	PN 85680-60093	1	A, T
	50 $\Omega$ SMC(f)-SMC(f)	PN 08751-65006	1	T
	50 $\Omega$ SMC(m)-SMC(f)	PN 08751-65007	1	T
	HP-IB Cable	HP 10833A/B/C	3	A, T
Adapters	50 $\Omega$ , N(f)-N(f)	PN 1250-0777	2	P, A
	50 $\Omega$ , N(f)-BNC(f)	PN 1250-1474	1	A
	50 $\Omega$ , N(m)-N(m)	PN 1250-0778	1	P, A
	50 $\Omega$ , N(m)-BNC(f)	PN 1250-0780	2	P, A, T
	50 $\Omega$ , N(f)-BNC(m)	PN 1250-0077	1	A
	50 $\Omega$ SMC(m)-BNC(f)	PN 1250-1899	1	A, T
	50 $\Omega$ SMC(m)-N(m)	PN 1250-1023	1	A, T
	BNC(f)-Dual Banana Plug	PN 1251-2277	1	P, A
Power Splitter	Dual Banana Plug to Alligator Clip Lead	HP 11002A	1	A
	50 $\Omega$ , BNC(f)-BNC(f)	PN 1250-0080	1	P
	Freq. Range: > 500 MHz, Two-way	HP 11667A	1	P, A, T
T/R Test Kit	Freq. Range: > 500 MHz, Three-way	HP 11850C	1	P, A, T
	Frequency: 5 Hz to 500 MHz Directivity: $\geq 40$ dB	HP 87512A	1	P
Extender Board	HP 8751A Extender Board Set	PN 08751-65005	1	A, T
Tool	Board Extractor	PN 08751-65012	1	T
Signal Generator	Frequency: 50 MHz Accuracy: < 1 ppm	HP 8656B Opt. 001	1	A

**Page 2-8, Non-Harmonic Spurious Test**

Change the table in step h of this test as follows:

HP 8751A Center Freq.	Spectrum Analyzer			
	CENTER	SPAN	RBW	Marker
450 MHz	450 MHz	20 kHz	300 Hz	Fundamental (f1)
	(f1) + 225 Hz	400 Hz	10 Hz	Spurious Max.
450.001 MHz	450.001 MHz	5 kHz	300 Hz	Fundamental (f2)
	(f2) + 5.5 kHz	10 kHz	100 Hz	Spurious Max.
450.01 MHz	450.01 MHz	5 kHz	300 Hz	Fundamental (f3)
	(f3) + 55 kHz	100 kHz	300 Hz	Spurious Max.
450.1 MHz	450.1 MHz	5 kHz	300 Hz	Fundamental (f4)
	(f4) + 550 kHz	1 MHz	300 Hz	Spurious Max.
426 MHz	426 MHz	5 kHz	300 Hz	Fundamental
	424 MHz	5 kHz	300 Hz	Spurious Max.

**Page 2-45, Magnitude Ratio/Phase Dynamic Accuracy Test**

Replace the test procedure with the procedure on pages 6 through 19 of this manual change sheet.

**Page 2-68, Non-Harmonic Spurious Test Calculation Sheet**

Change the calculation sheet in the Non-Harmonic Spurious Test as follows:

HP 8751A Center Frequency	Spectrum Analyzer Frequency	Spectrum Analyzer Reading	Test Result [-a+b]
450 MHz	f1 = _____	a = _____ dBm	
	f1 + 225 Hz = _____	b = _____ dBm	_____ dBc
450.001 MHz	f2 = _____	a = _____ dBm	
	f2 + 5.5 kHz = _____	b = _____ dBm	_____ dBc
450.01 MHz	f3 = _____	a = _____ dBm	
	f3 + 55 kHz = _____	b = _____ dBm	_____ dBc
450.1 MHz	f4 = _____	a = _____ dBm	
	f4 + 550 kHz = _____	b = _____ dBm	_____ dBc
426 MHz	426 MHz	a = _____ dBm	
	424 MHz	b = _____ dBm	_____ dBc

**Page 2-79, Magnitude/Phase Dynamic Accuracy Test Calculation Sheet**

Change the calculation sheet according to page 20 of this manual change sheet.

**Page 2-83, Non-Harmonic Spurious Test in the Performance Test Record**

Change the test record sheet as follows:



**Non-Harmonic Spurious Test**

Frequency	Test Result	Test Limit	Measurement Uncertainty
450 MHz	_____	< -45 dBc	±2.05 dB
450.001 MHz	_____	< -45 dBc	±2.05 dB
450.01 MHz	_____	< -45 dBc	±2.05 dB
450.1 MHz	_____	< -45 dBc	±2.05 dB
426 MHz	_____	< -45 dBc	±2.05 dB

**Page 2-99, Magnitude Ratio/Phase Dynamic Accuracy Test in the Performance Test Record**

Change the test record sheet according to pages 21 through 23 of this manual change sheet.

This test measures the HP 8751A's Dynamic Accuracy. The dynamic accuracy is a measure of how well the receiver measures the magnitude and phase components of a signal as that signal varies in amplitude over the specified dynamic range.

Figure 1-1 shows the specification (at constant temperature within  $23 \pm 5^{\circ}\text{C}$ , 20 Hz bandwidth, Freq.  $\geq 500$  Hz).



## 1-6 Manual Changes

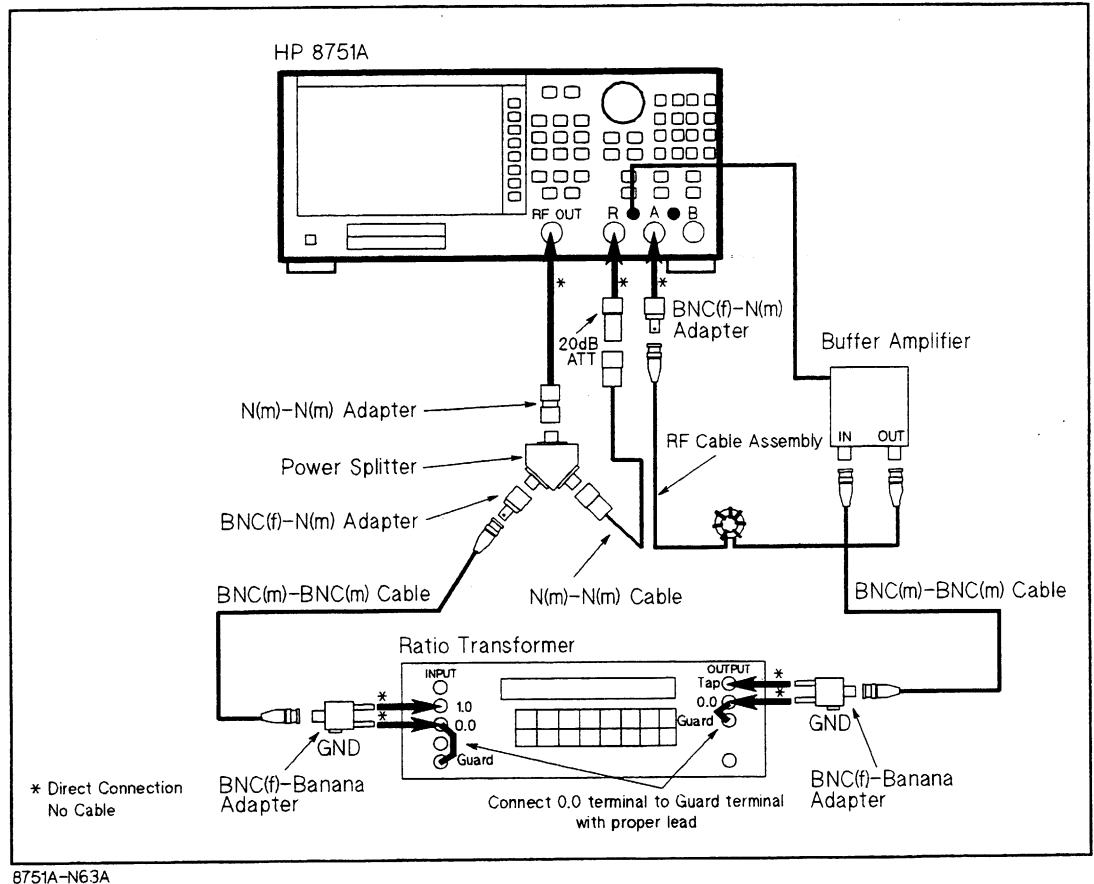
## Test Equipment

Ratio Transformer	ESI 73 or ESI DT72A
Buffer Amplifier Set	PN 08751-65003 (incl. RF Cable Assembly)
Power Splitter	HP 11667A
Attenuator Pad 20 dB	HP8491A Opt.020
BNC(m)-BNC(m) Cable, 61 cm	PN 8120-1839, 2 ea
BNC(f)-BNC(f) Adapter	PN 1251-0080, 1 ea
BNC(f)-N(m) Adapter	PN 1250-0780, 2 ea
BNC(f)-Banana Adapter	PN 1251-2277, 2 ea
N(m)-N(m) Cable, 61 cm	HP11500B, 1 ea
N(m)-N(m) Adapter	PN 1250-1475, 1 ea

## Procedure

### 1. —A/R Dynamic Accuracy Test—

- a. Connect the test equipment as shown in Figure 1-2.



**Figure 1-2. Magnitude Ratio/Phase Dynamic Accuracy Test Setup 1**

- b. Set the ratio setting of the Ratio Transformer to 1.

- c. Set the HP 8751A as follows:

#### Control Settings

PRESET  
 CH1: A/R, LOG MAG  
 CH2: A/R, PHASE  
 Dual Channel: ON  
 CENTER Freq. = 500 Hz  
 SPAN Freq. = 0 Hz  
 Number of Points = 2  
 Source Power = -16.5 dBm  
 IF BW: 20 Hz

#### Key Strokes

PRESET  
 CH 1, MEAS, A/R, FORMAT, LOG MAG  
 CH 2, MEAS, A/R, FORMAT, PHASE  
 DISPLAY, DUAL CHAN on/OFF  
 CENTER, 5, 0, 0, x1  
 SPAN, 0, x1  
 MENU, NUMBER of POINTS, 2, x1  
 MENU, POWER, -, 1, 6, ., 5, x1  
 AVG, IF BW, 2, 0, x1

CH1: AVG Factor: 1, AVG: ON    **CH 1**, **AVG**, **AVERAGING FACTOR**, **1**, **x1**,  
**AVERAGING on/OFF**

CH2: AVG Factor: 1, AVG: ON    **CH 2**, **AVG**, **AVERAGING FACTOR**, **1**, **x1**,  
**AVERAGING on/OFF**

Markers: Discrete, Coupled    **MKR**, **MARKER MODE MENU**, **MARKERS:DISCRETE**,  
**MARKERS:COUPLED**

ATTEN: Input-A = 20 dB    **ATTEN**, **INPUT-A: 20dB**

ATTEN: Input-R = 0 dB    **ATTEN**, **INPUT-R: 0dB**

- d. Perform the following key strokes to do a pass loss calibration:

**CAL**, **CAL KIT**, **CAL KIT: N 50Ω**, **CAL**, **CALIBRATE MENU**, **RESPONSE**, **THRU**,  
**DONE:RESPONSE**

- e. Set the ratio setting of the Ratio Transformer to 0.3162278.

- f. Perform the following key strokes for a single sweep measurement:

**MENU**, **TRIGGER MENU**, **SINGLE**

- g. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.

- h. Set the ratio setting of the Ratio Transformer to 0.1.

- i. Perform the following key strokes for a single sweep measurement:

**MENU**, **TRIGGER MENU**, **SINGLE**

- j. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.

- k. Press **CH 1**, **AVG**, **AVERAGING FACTOR**, **4**, **x1**, **CH 2**, **4**, **x1** to change the averaging factor from 1 to 4.

- l. Set the ratio setting of the Ratio Transformer to 0.0316228.

- m. Perform the following key strokes for a measurement:

**MENU**, **TRIGGER MENU**, **NUMBER OF GROUPS**, **4**, **x1**

- n. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.

- o. Set the ratio setting of the Ratio Transformer to 0.01.

- p. Perform the following key strokes for a measurement:

**MENU**, **TRIGGER MENU**, **NUMBER OF GROUPS**, **4**, **x1**

- q. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.

- r. Press **CH 1**, **AVG**, **AVERAGING FACTOR**, **8**, **x1**, **CH 2**, **8**, **x1** to change the averaging factor from 4 to 8.

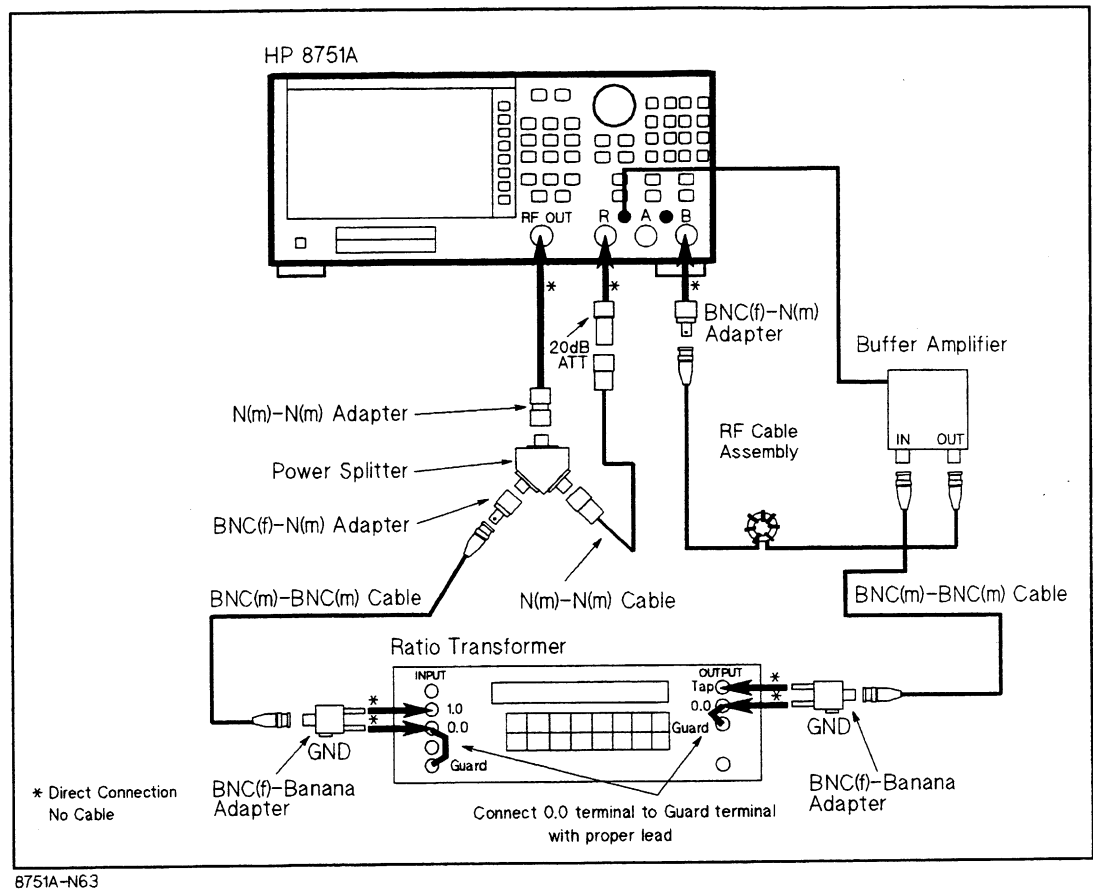
- s. Set the ratio setting of the Ratio Transformer to 0.0031623.

- t. Perform the following key strokes for a measurement:  
**MENU**, **TRIGGER MENU**, **NUMBER OF GROUPS**, **8**, **x1**
- u. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.
- v. Press **CH 1**, **AVG**, **AVERAGING FACTOR**, **3**, **2**, **x1**, **CH 2**, **3**, **2**, **x1** to change the averaging factor from 8 to 32.
- w. Set the ratio setting of the Ratio Transformer to 0.001.
- x. Perform the following key strokes for a measurement:  
**MENU**, **TRIGGER MENU**, **NUMBER OF GROUPS**, **3**, **2**, **x1**
- y. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.
- z. Press **CH 1**, **AVG**, **AVERAGING FACTOR**, **1**, **2**, **8**, **x1**, **CH 2**, **1**, **2**, **8**, **x1** to change the averaging factor from 32 to 128.
- aa. Set the ratio setting of the Ratio Transformer to 0.0003162.
- bb. Perform the following key strokes for a measurement:  
**MENU**, **TRIGGER MENU**, **NUMBER OF GROUPS**, **1**, **2**, **8**, **x1**
- cc. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.
- dd. Press **CH 1**, **AVG**, **AVERAGING FACTOR**, **2**, **5**, **6**, **x1**, **CH 2**, **2**, **5**, **6**, **x1** to change the averaging factor from 128 to 256.
- ee. Set the ratio setting of the Ratio Transformer to 0.0001.
- ff. Perform the following key strokes for a measurement:  
**MENU**, **TRIGGER MENU**, **NUMBER OF GROUPS**, **2**, **5**, **6**, **x1**
- gg. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.
- hh. Press **MENU**, **POWER**, **3**, **.**, **5**, **x1** to change the output power from -16.5 dBm to +3.5 dBm.
- ii. Press **CH 1**, **AVG**, **AVERAGING FACTOR**, **1**, **x1**, **CH 2**, **1**, **x1** to change the averaging factor from 256 to 1.
- jj. Press **ATTEN**, **INPUT-R: 20dB** to set the R-ch input attenuator to 20 dB.
- kk. Set the ratio setting of the Ratio Transformer to 0.1.
- ll. Perform the following key strokes to do a pass loss calibration:  
**CAL**, **CALIBRATE MENU**, **RESPONSE**, **THRU**, **DONE: RESPONSE**
- mm. Set the ratio setting of the Ratio Transformer to 0.5011872.
- nn. Perform the following key strokes for a single sweep measurement:  
**MENU**, **TRIGGER MENU**, **SINGLE**

- oo. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.
- pp. Set the ratio setting of the Ratio Transformer to 0.3162278.
- qq. Perform the following key strokes for a single sweep measurement:  
**MENU**, **TRIGGER MENU**, **SINGLE**
- rr. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.

## 2. —B/R Dynamic Accuracy Test—

- a. Connect the test equipment as shown in Figure 1-3.



**Figure 1-3. Magnitude Ratio/Phase Dynamic Accuracy Test Setup 1**

- b. Set the ratio setting of the Ratio Transformer to 1.
- c. Change the HP 8751A control settings as follows:

### Control Settings

CH1: B/R, LOG MAG

CH2: B/R, PHASE

Source Power = -16.5 dBm

ATTEN: Input-B = 20 dB

ATTEN: Input-R = 0 dB

### Key Strokes

[CH 1], [MEAS], [B/R], [FORMAT], [LOG MAG]

[CH 2], [MEAS], [B/R], [FORMAT], [PHASE]

[MENU], [POWER], [—], [1], [6], [—], [5], [x1]

[ATTEN], [INPUT-B: 20dB]

[ATTEN], [INPUT-R: 0dB]

- d. Perform the following key strokes to do a pass loss calibration:

[CAL], [CALIBRATE MENU], [RESPONSE], [THRU], [DONE:RESPONSE]

- e. Set the ratio setting of the Ratio Transformer to 0.3162278.

- f. Perform the following key strokes for a single sweep measurement:



**MENU**, **TRIGGER MENU**, **SINGLE**

- g. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.
- h. Set the ratio setting of the Ratio Transformer to 0.1.
- i. Perform the following key strokes for a single sweep measurement:

**MENU**, **TRIGGER MENU**, **SINGLE**

- j. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.
- k. Press **CH 1**, **AVG**, **AVERAGING FACTOR**, **4**, **x1**, **CH 2**, **4**, **x1** to change the averaging factor from 1 to 4.
- l. Set the ratio setting of the Ratio Transformer to 0.0316228.
- m. Perform the following key strokes for a measurement:  
**MENU**, **TRIGGER MENU**, **NUMBER OF GROUPS**, **4**, **x1**
- n. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.
- o. Set the ratio setting of the Ratio Transformer to 0.01.
- p. Perform the following key strokes for a measurement:  
**MENU**, **TRIGGER MENU**, **NUMBER OF GROUPS**, **4**, **x1**
- q. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.
- r. Press **CH 1**, **AVG**, **AVERAGING FACTOR**, **8**, **x1**, **CH 2**, **8**, **x1** to change the averaging factor from 4 to 8.
- s. Set the ratio setting of the Ratio Transformer to 0.0031623.
- t. Perform the following key strokes for a measurement:  
**MENU**, **TRIGGER MENU**, **NUMBER OF GROUPS**, **8**, **x1**
- u. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.
- v. Press **CH 1**, **AVG**, **AVERAGING FACTOR**, **3**, **2**, **x1**, **CH 2**, **3**, **2**, **x1** to change the averaging factor from 8 to 32.
- w. Set the ratio setting of the Ratio Transformer to 0.001.
- x. Perform the following key strokes for a measurement:  
**MENU**, **TRIGGER MENU**, **NUMBER OF GROUPS**, **3**, **2**, **x1**
- y. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.
- z. Press **CH 1**, **AVG**, **AVERAGING FACTOR**, **1**, **2**, **8**, **x1**, **CH 2**, **1**, **2**, **8**, **x1** to change the averaging factor from 32 to 128.
- aa. Set the ratio setting of the Ratio Transformer to 0.0003162.

bb. Perform the following key strokes for a measurement:

**MENU**, **TRIGGER MENU**, **NUMBER OF GROUPS**, **1**, **2**, **8**, **x1**

cc. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.

dd. Press **CH 1**, **AVG**, **AVERAGING FACTOR**, **2**, **5**, **6**, **x1**, **CH 2**, **2**, **5**, **6**, **x1** to change the averaging factor from 128 to 256.

ee. Set the ratio setting of the Ratio Transformer to 0.0001.

ff. Perform the following key strokes for a measurement:

**MENU**, **TRIGGER MENU**, **NUMBER OF GROUPS**, **2**, **5**, **6**, **x1**

gg. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.

hh. Press **MENU**, **POWER**, **3**, **.**, **5**, **x1** to change the output power from -16.5 dBm to +3.5 dBm.

ii. Press **CH 1**, **AVG**, **AVERAGING FACTOR**, **1**, **x1**, **CH 2**, **1**, **x1** to change the averaging factor from 256 to 1.

jj. Press **ATTEN**, **INPUT-R: 20dB** to set the R-ch input attenuator to 20 dB.

kk. Set the ratio setting of the Ratio Transformer to 0.1.

ll. Perform the following key strokes to do a pass loss calibration:

**CAL**, **CALIBRATE MENU**, **RESPONSE**, **THRU**, **DONE:RESPONSE**

mm. Set the ratio setting of the Ratio Transformer to 0.5011872.

nn. Perform the following key strokes for a single sweep measurement:

**MENU**, **TRIGGER MENU**, **SINGLE**

oo. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.

pp. Set the ratio setting of the Ratio Transformer to 0.3162278.

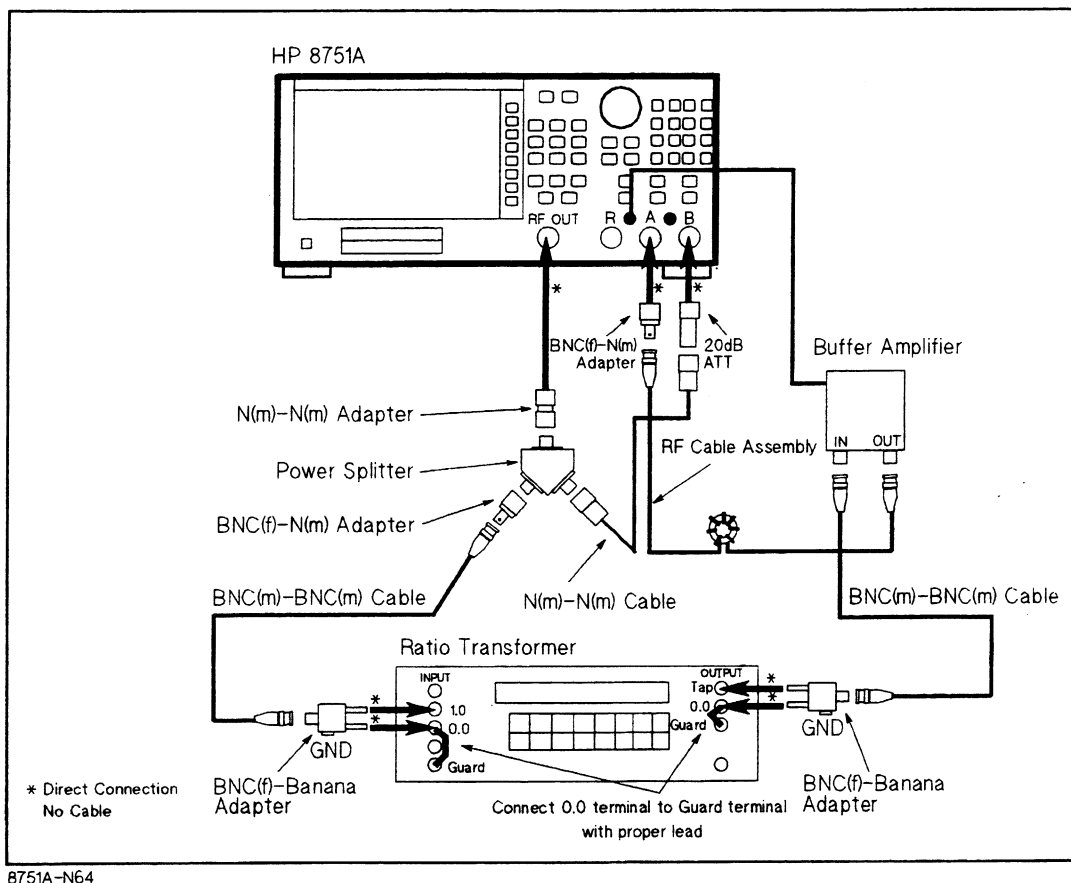
qq. Perform the following key strokes for a single sweep measurement:

**MENU**, **TRIGGER MENU**, **SINGLE**

rr. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.

### 3. —A/B Dynamic Accuracy Test—

- a. Connect the test equipment as shown in Figure 1-4.



**Figure 1-4. Magnitude Ratio/Phase Dynamic Accuracy Test Setup 1**

- b. Set the ratio setting of the Ratio Transformer to 1.
- c. Change the HP 8751A control settings as follows:

#### Control Settings

CH1: A/B, LOG MAG

CH2: A/B, PHASE

Number of Points = 2

Source Power = -16.5 dBm

ATTEN: Input-A = 20 dB

ATTEN: Input-B = 0 dB

#### Key Strokes

**CH 1**, **MEAS**, **A/B**, **FORMAT**, **LOG MAG**

**CH 2**, **MEAS**, **A/B**, **FORMAT**, **PHASE**

**MENU**, **NUMBER of POINTS**, **2**, **x1**

**MENU**, **POWER**, **-**, **1**, **6**, **.**, **5**, **x1**

**ATTEN**, **INPUT-A: 20dB**

**ATTEN**, **INPUT-B: 0dB**

- d. Perform the following key strokes to do a pass loss calibration:

**CAL**, **CALIBRATE MENU**, **RESPONSE**, **THRU**, **DONE:RESPONSE**

- e. Set the ratio setting of the Ratio Transformer to 0.3162278.

f. Perform the following key strokes for a single sweep measurement:

**MENU**, **TRIGGER MENU**, **SINGLE**

g. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.

h. Set the ratio setting of the Ratio Transformer to 0.1.

i. Perform the following key strokes for a single sweep measurement:

**MENU**, **TRIGGER MENU**, **SINGLE**

j. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.

k. Press **CH 1**, **AVG**, **AVERAGING FACTOR**, **4**, **x1**, **CH 2**, **4**, **x1** to change the averaging factor from 1 to 4.

l. Set the ratio setting of the Ratio Transformer to 0.0316228.

m. Perform the following key strokes for a measurement:

**MENU**, **TRIGGER MENU**, **NUMBER OF GROUPS**, **4**, **x1**

n. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.

o. Set the ratio setting of the Ratio Transformer to 0.01.

p. Perform the following key strokes for a measurement:

**MENU**, **TRIGGER MENU**, **NUMBER OF GROUPS**, **4**, **x1**

q. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.

r. Press **CH 1**, **AVG**, **AVERAGING FACTOR**, **8**, **x1**, **CH 2**, **8**, **x1** to change the averaging factor from 4 to 8.

s. Set the ratio setting of the Ratio Transformer to 0.0031623.

t. Perform the following key strokes for a measurement:

**MENU**, **TRIGGER MENU**, **NUMBER OF GROUPS**, **8**, **x1**

u. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.

v. Press **CH 1**, **AVG**, **AVERAGING FACTOR**, **3**, **2**, **x1**, **CH 2**, **3**, **2**, **x1** to change the averaging factor from 8 to 32.

w. Set the ratio setting of the Ratio Transformer to 0.001.

x. Perform the following key strokes for a measurement:

**MENU**, **TRIGGER MENU**, **NUMBER OF GROUPS**, **3**, **2**, **x1**

y. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.

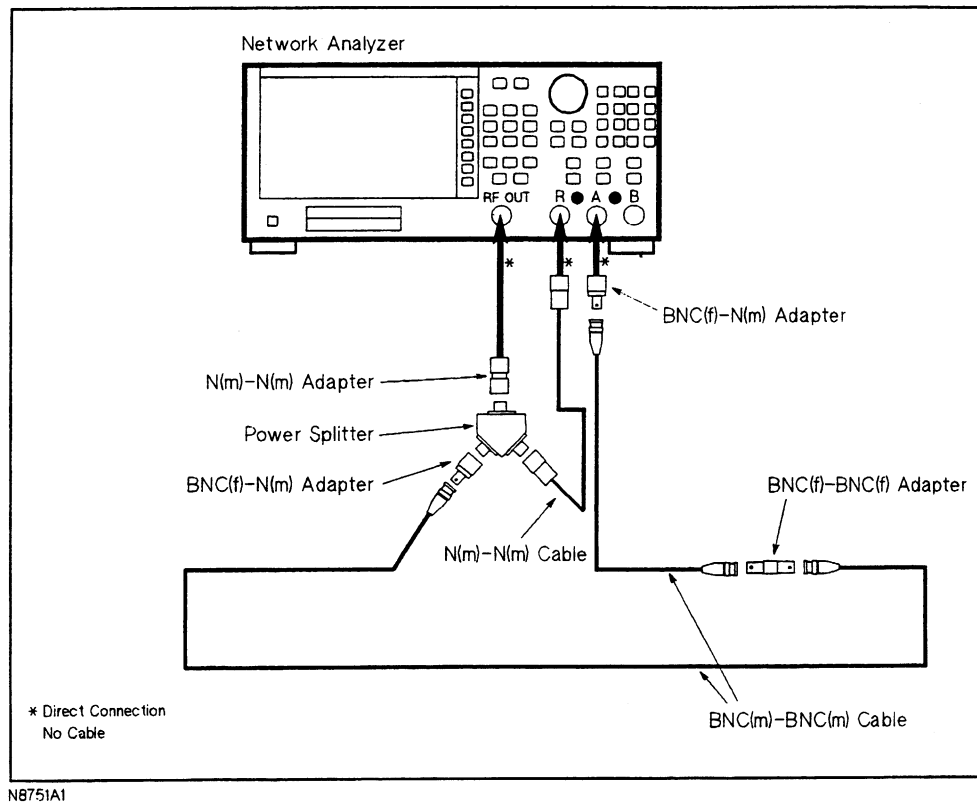
z. Press **CH 1**, **AVG**, **AVERAGING FACTOR**, **1**, **2**, **8**, **x1**, **CH 2**, **1**, **2**, **8**, **x1** to change the averaging factor from 32 to 128.

- aa. Set the ratio setting of the Ratio Transformer to 0.0003162.
- bb. Perform the following key strokes for a measurement:  
 (MENU), TRIGGER MENU, NUMBER OF GROUPS, (1), (2), (8), (x1)
- cc. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.
- dd. Press (CH 1), (AVG), AVERAGING FACTOR, (2), (5), (6), (x1), (CH 2), (2), (5), (6), (x1) to change the averaging factor from 128 to 256.
- ee. Set the ratio setting of the Ratio Transformer to 0.0001.
- ff. Perform the following key strokes for a measurement:  
 (MENU), TRIGGER MENU, NUMBER OF GROUPS, (2), (5), (6), (x1)
- gg. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.
- hh. Press (MENU), POWER, (3), (.), (5), (x1) to change the output power from -16.5 dBm to +3.5 dBm.
- ii. Press (CH 1), (AVG), AVERAGING FACTOR, (1), (x1), (CH 2), (1), (x1) to change the averaging factor from 256 to 1.
- jj. Press (ATTEN), INPUT-B: 20dB to set the B-ch input attenuator to 20 dB.
- kk. Set the ratio setting of the Ratio Transformer to 0.1.
- ll. Perform the following key strokes to do a pass loss calibration:  
 (CAL), CALIBRATE MENU, RESPONSE, THRU, DONE RESPONSE
- mm. Set the ratio setting of the Ratio Transformer to 0.5011872.
- nn. Perform the following key strokes for a single sweep measurement:  
 (MENU), TRIGGER MENU, SINGLE
- oo. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.
- pp. Set the ratio setting of the Ratio Transformer to 0.3162278.
- qq. Perform the following key strokes for a single sweep measurement:  
 (MENU), TRIGGER MENU, SINGLE
- rr. Read the magnitude ratio value and phase at 500 Hz. Record these values on the Calculation Sheet.

## Buffer Amplifier Operation Check

The following description shows an operation check procedure for the Buffer Amplifier.

1. Connect the test equipment as shown in Figure 1-5.

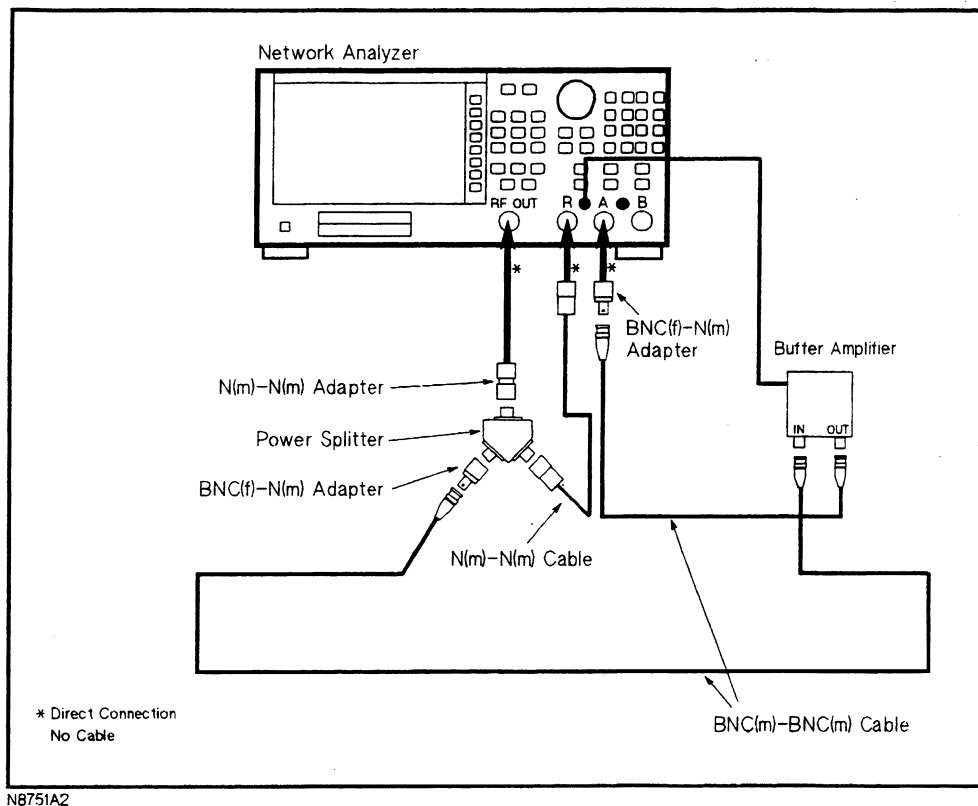


**Figure 1-5. Buffer Amplifier Performance Check Setup 1**

2. Set the Network Analyzer as follows:

Source Power	-3.5 dBm
START Freq.	100 Hz
STOP Freq.	1 MHz
Sweep Type	LOG FREQ
CH1	A/R, LOG MAG
CH2	A/R, PHASE
IF BW	20 Hz

3. Perform the pass loss calibration.
4. Replace the BNC(f)-BNC(f) Adapter with the Buffer Amplifier as shown in Figure 1-6.



**Figure 1-6. Buffer Amplifier Performance Check Setup 2**

5. Perform a single sweep measurement.
6. Read the magnitude ratio difference and phase difference value at 3 kHz from the reference value at 100 Hz with Markers.
7. When the difference value is within the following limits, the Buffer Amplifier operation is adequate to do the magnitude ratio/phase dynamic accuracy test of the HP 8751A:

Difference Value	Test Limit
Gain	$\pm 0.1$ dB
Phase	$\pm 20^\circ$

## Magnitude Ratio/Phase Dynamic Accuracy Test

### A/R Dynamic Accuracy (Mag. Ratio, Phase) Test

Source Power	Ratio Trans. Setting	Phase	Mag. Ratio [a]	Test Result	A Input Level
+3.5 dBm	0.5011872	deg	dB	a-14	-6 dBm
+3.5 dBm	0.3162278	deg	dB	a-10	-10 dBm
-16.5 dBm	0.3162278	deg	dB	a+10	-30 dBm
-16.5 dBm	0.1	deg	dB	a+20	-40 dBm
-16.5 dBm	0.0316228	deg	dB	a+30	-50 dBm
-16.5 dBm	0.01	deg	dB	a+40	-60 dBm
-16.5 dBm	0.0031623	deg	dB	a+50	-70 dBm
-16.5 dBm	0.001	deg	dB	a+60	-80 dBm
-16.5 dBm	0.0003162	deg	dB	a+70	-90 dBm
-16.5 dBm	0.0001	deg	dB	a+80	-100 dBm

### B/R Dynamic Accuracy (Mag. Ratio, Phase) Test

Source Power	Ratio Trans. Setting	Phase	Mag. Ratio [a]	Test Result	B Input Level
+3.5 dBm	0.5011872	deg	dB	a-14	-6 dBm
+3.5 dBm	0.3162278	deg	dB	a-10	-10 dBm
-16.5 dBm	0.3162278	deg	dB	a+10	-30 dBm
-16.5 dBm	0.1	deg	dB	a+20	-40 dBm
-16.5 dBm	0.0316228	deg	dB	a+30	-50 dBm
-16.5 dBm	0.01	deg	dB	a+40	-60 dBm
-16.5 dBm	0.0031623	deg	dB	a+50	-70 dBm
-16.5 dBm	0.001	deg	dB	a+60	-80 dBm
-16.5 dBm	0.0003162	deg	dB	a+70	-90 dBm
-16.5 dBm	0.0001	deg	dB	a+80	-100 dBm

### A/B Dynamic Accuracy (Mag. Ratio, Phase) Test

Source Power	Ratio Trans. Setting	Phase	Mag. Ratio [a]	Test Result	A Input Level
+3.5 dBm	0.5011872	deg	dB	a-14	-6 dBm
+3.5 dBm	0.3162278	deg	dB	a-10	-10 dBm
-16.5 dBm	0.3162278	deg	dB	a+10	-30 dBm
-16.5 dBm	0.1	deg	dB	a+20	-40 dBm
-16.5 dBm	0.0316228	deg	dB	a+30	-50 dBm
-16.5 dBm	0.01	deg	dB	a+40	-60 dBm
-16.5 dBm	0.0031623	deg	dB	a+50	-70 dBm
-16.5 dBm	0.001	deg	dB	a+60	-80 dBm
-16.5 dBm	0.0003162	deg	dB	a+70	-90 dBm
-16.5 dBm	0.0001	deg	dB	a+80	-100 dBm



## Magnitude Ratio/Phase Dynamic Accuracy Test

### A/R Dynamic Accuracy (Magnitude Ratio and Phase) Test

#### Magnitude Ratio.

A Input Level	Minimum Limit	Test Result	Maximum Limit	Measurement Uncertainty
-6 dBm	-0.04 dB	_____	+0.04 dB	±0.001 dB
-10 dBm	-0.02 dB	_____	+0.02 dB	±0.001 dB
-30 dBm	-0.02 dB	_____	+0.02 dB	±0.004 dB
-40 dBm	-0.02 dB	_____	+0.02 dB	±0.004 dB
-50 dBm	-0.02 dB	_____	+0.02 dB	±0.004 dB
-60 dBm	-0.05 dB	_____	+0.05 dB	±0.004 dB
-70 dBm	-0.1 dB	_____	+0.1 dB	±0.014 dB
-80 dBm	-0.3 dB	_____	+0.3 dB	±0.030 dB
-90 dBm	-1.0 dB	_____	+1.0 dB	±0.096 dB
-100 dBm	-3.0 dB	_____	+3.0 dB	±0.288 dB

#### Phase.

A Input Level	Minimum Limit	Test Result	Maximum Limit	Measurement Uncertainty
-6 dBm	-0.8 °	_____	+0.8 °	±0.029 °
-10 dBm	-0.12 °	_____	+0.12 °	±0.029 °
-30 dBm	-0.12 °	_____	+0.12 °	±0.007 °
-40 dBm	-0.12 °	_____	+0.12 °	±0.008 °
-50 dBm	-0.12 °	_____	+0.12 °	±0.014 °
-60 dBm	-0.3 °	_____	+0.3 °	±0.041 °
-70 dBm	-0.6 °	_____	+0.6 °	±0.143 °
-80 dBm	-1.8 °	_____	+1.8 °	±0.402 °
-90 dBm	-6.0 °	_____	+6.0 °	±1.262 °
-100 dBm	-18.0 °	_____	+18.0 °	±4.065 °

**B/R Dynamic Accuracy (Magnitude Ratio and Phase) Test****Magnitude Ratio.**

B Input Level	Minimum Limit	Test Result	Maximum Limit	Measurement Uncertainty
-6 dBm	-0.04 dB	_____	+0.04 dB	±0.001 dB
-10 dBm	-0.02 dB	_____	+0.02 dB	±0.001 dB
-30 dBm	-0.02 dB	_____	+0.02 dB	±0.004 dB
-40 dBm	-0.02 dB	_____	+0.02 dB	±0.004 dB
-50 dBm	-0.02 dB	_____	+0.02 dB	±0.004 dB
-60 dBm	-0.05 dB	_____	+0.05 dB	±0.004 dB
-70 dBm	-0.1 dB	_____	+0.1 dB	±0.014 dB
-80 dBm	-0.3 dB	_____	+0.3 dB	±0.030 dB
-90 dBm	-1.0 dB	_____	+1.0 dB	±0.096 dB
-100 dBm	-3.0 dB	_____	+3.0 dB	±0.288 dB

**Phase.**

B Input Level	Minimum Limit	Test Result	Maximum Limit	Measurement Uncertainty
-6 dBm	-0.8 °	_____	+0.8 °	±0.029 °
-10 dBm	-0.12 °	_____	+0.12 °	±0.029 °
-30 dBm	-0.12 °	_____	+0.12 °	±0.007 °
-40 dBm	-0.12 °	_____	+0.12 °	±0.008 °
-50 dBm	-0.12 °	_____	+0.12 °	±0.014 °
-60 dBm	-0.3 °	_____	+0.3 °	±0.041 °
-70 dBm	-0.6 °	_____	+0.6 °	±0.143 °
-80 dBm	-1.8 °	_____	+1.8 °	±0.402 °
-90 dBm	-6.0 °	_____	+6.0 °	±1.262 °
-100 dBm	-18.0 °	_____	+18.0 °	±4.065 °

## A/B Dynamic Accuracy (Magnitude Ratio and Phase) Test

### Magnitude Ratio.

A Input Level	Minimum Limit	Test Result	Maximum Limit	Measurement Uncertainty
-6 dBm	-0.04 dB	_____	+0.04 dB	±0.001 dB
-10 dBm	-0.02 dB	_____	+0.02 dB	±0.001 dB
-30 dBm	-0.02 dB	_____	+0.02 dB	±0.004 dB
-40 dBm	-0.02 dB	_____	+0.02 dB	±0.004 dB
-50 dBm	-0.02 dB	_____	+0.02 dB	±0.004 dB
-60 dBm	-0.05 dB	_____	+0.05 dB	±0.004 dB
-70 dBm	-0.1 dB	_____	+0.1 dB	±0.014 dB
-80 dBm	-0.3 dB	_____	+0.3 dB	±0.030 dB
-90 dBm	-1.0 dB	_____	+1.0 dB	±0.096 dB
-100 dBm	-3.0 dB	_____	+3.0 dB	±0.288 dB

### Phase.

A Input Level	Minimum Limit	Test Result	Maximum Limit	Measurement Uncertainty
-6 dBm	-0.8 °	_____	+0.8 °	±0.029 °
-10 dBm	-0.12 °	_____	+0.12 °	±0.029 °
-30 dBm	-0.12 °	_____	+0.12 °	±0.007 °
-40 dBm	-0.12 °	_____	+0.12 °	±0.008 °
-50 dBm	-0.12 °	_____	+0.12 °	±0.014 °
-60 dBm	-0.3 °	_____	+0.3 °	±0.041 °
-70 dBm	-0.6 °	_____	+0.6 °	±0.143 °
-80 dBm	-1.8 °	_____	+1.8 °	±0.402 °
-90 dBm	-6.0 °	_____	+6.0 °	±1.262 °
-100 dBm	-18.0 °	_____	+18.0 °	±4.065 °

