1. Connect the equipment as shown in Figure 1-14.

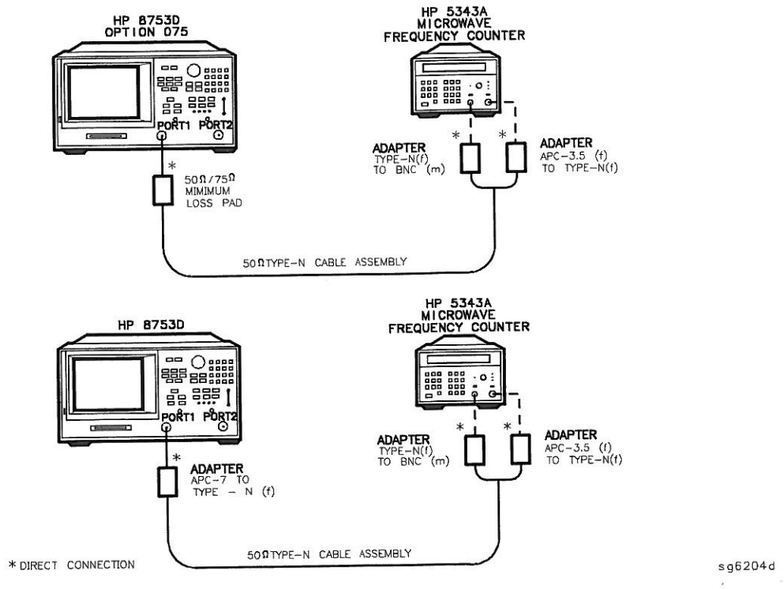


Figure 1-14. Test Port Output Frequency Range and Accuracy Test Setup

2. Press (PRESET) (MENU) CW FREQ .
3. Press (30) (k/m) and write the frequency counter reading on the "Performance Test Record."
4. Repeat step 3 for each instrument frequency listed in the "Performance Test Record."

In Case of Difficulty

1. If any measured frequency is close to the specification limits, check the time base accuracy of the counter used.
2. If the analyzer fails by a significant margin at *all* frequencies (especially if the deviation increases with frequency), the master time base probably needs adjustment. In this case, refer to the "Frequency Accuracy Adjustment" procedure, located in the "Adjustments and Correction Constants" chapter of the *HP 8753D Network Analyzer Service Guide*. The "Fractional-N Frequency Range Adjustment" also affects frequency accuracy.
3. Refer to the "Source Troubleshooting" chapter of the *HP 8753D Network Analyzer Service Guide* for related troubleshooting information.

2. External Source Mode Frequency Range

Specifications

Frequency Range
300 kHz to 3 GHz
30 kHz to 6 GHz[1]

1 Only for analyzers with Option 006.

Equipment Required

External Source ..... HP 83640A
Cable, APC-7, 24-inch ..... HP P/N 8120-4779
Adapter, APC-3.5 (f) to APC-7 ..... HP P/N 1250-1747
Adapter, APC-3.5 (m) to APC-7 ..... HP P/N 1250-1746

Analyzer warm-up time: **30 minutes**

Perform this test to verify that the analyzer's reference channel, input R, is capable of phase locking to an external CW signal.

1. On the external source, press (PRESET) (CW) (10) (MHz/µsec) (POWER LEVEL) (−/←) (20) (GHz/dB(m)).
2. Connect the equipment as shown in Figure 1-15.

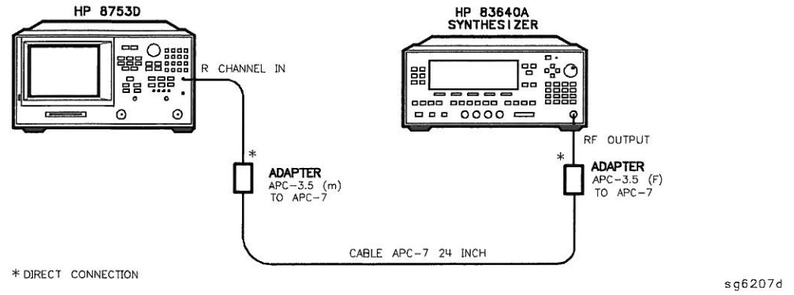


Figure 1-15. External Source Mode Frequency Range Test Setup

3. On the network analyzer, press (PRESET) (MEAS) INPUT PORTS R .
4. Press (SYSTEM) INSTRUMENT MODE EXT SOURCE AUTO (MENU) CW FREQ (10) (M/μ) .
5. Check to see if the analyzer is phase locking to the external CW signal:
   - If the analyzer displays any phase lock error messages, write "unlock" in the "Performance Test Record" for the set CW signal.
   - If the analyzer does not display any phase lock error messages, write "lock" in the "Performance Test Record" for the set CW signal.
6. On the external source, press (CW) (50) (MHz/μ).
7. On the analyzer, press (50) (M/μ).
8. Repeat step 5 through 7 for the other external source CW frequencies listed in the "Performance Test Record." For analyzers with Option 006, change the power sensor to the HP 8481A for frequencies above 4 GHz.

In Case of Difficulty

1. Be sure the external source power is set within 0 to −25 dBm.
2. Make sure the analyzer's "Ext Source Auto" feature is selected. In addition, verify that the analyzer is set to measure its input channel R.
3. Verify that all connections are tight.

3. Test Port Output Power Accuracy

Specifications

Frequency Range	Test Port Output Power Accuracy[1]
300 kHz to 3 GHz	±1.0 dB
3 GHz to 6 GHz[2]	±1.0 dB

1 At 0 dBm and 25° C ±5° C

2 Only for analyzers with Option 006.

Equipment Required for 50Ω Analyzers

Power Meter ..... HP 436A/437B/438A
Power Sensor ..... HP 8482A
Adapter, APC-7 to Type-N (f) ..... HP 11524A

Additional Equipment Required for Analyzers with Option 006

Power Sensor ..... HP 8481A

Equipment Required for 75Ω Analyzers

Power Meter ..... HP 436A/437B/438A
Power Sensor ..... HP 8483A Option H03

Analyzer warm-up time: **30 minutes**

Perform this test to confirm the accuracy of the HP 8753D source output power.

1. Zero and calibrate the power meter. For more information of how to perform this task, refer to the power meter operating manual.
2. Connect the equipment as shown in Figure 1-16.

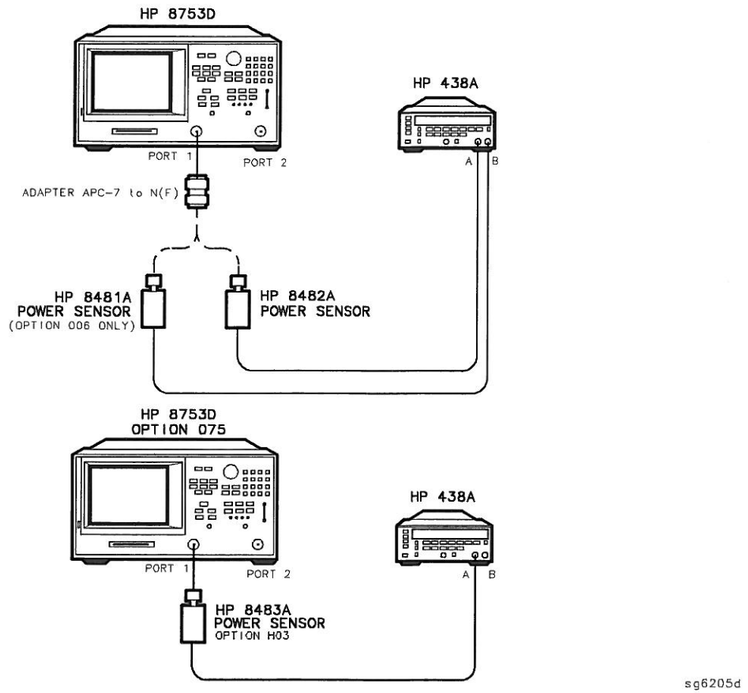


Figure 1-16. Source Output Power Accuracy Test Setup

3. Press (PRESET).

Note The factory preset test port power is 0 dBm.

---

4. Press (MENU) CW FREQ (300) (k/m). Set the calibration factor on the power meter for this CW frequency.
5. Write the power meter reading on the "Performance Test Record."
6. Repeat steps 4 and 5 for each CW frequency listed in the "Performance Test Record."

In Case of Difficulty

1. Be sure the source power is switched on. Press (MENU) POWER. Check the SOURCE PWR softkey, "on" *should* be highlighted. Otherwise, press SOURCE PWR to switch on the source power.
2. Refer to the "Source Troubleshooting" chapter of the *HP 8753D Network Analyzer Service Guide* for more troubleshooting information.

4. Test Port Output Power Range and Linearity

Specifications

Power Range	Power Level Linearity[1]
−15 to +5 dBm	±0.2 dB
+5 to +10 dBm	±0.5 dB

1 Relative to 0 dBm output level.

Required Equipment

Power Meter ..... HP 437B/438A
Power Sensor ..... HP 8482A
Adapter, APC-7 to Type-N (f) ..... HP 118524A

Additional Required Equipment for Analyzers with Option 006

Power Sensor ..... HP 8481A

Additional Required Equipment for Analyzers with Option 075

Power Sensor ..... HP 8483A Option H03

Analyzer warm-up time: **1 hour**

Perform this test to verify the analyzer's test port output power range and power level linearity at selected CW frequencies.

1. Zero and calibrate the power meter. Refer to the power meter operating and service manual for more information on how to do this task.
2. On the network analyzer, press (PRESET) (MENU) CW FREQ (300) (k/m). Set the power meter calibration factor for this CW frequency.
3. Connect the equipment as shown in Figure 1-17.

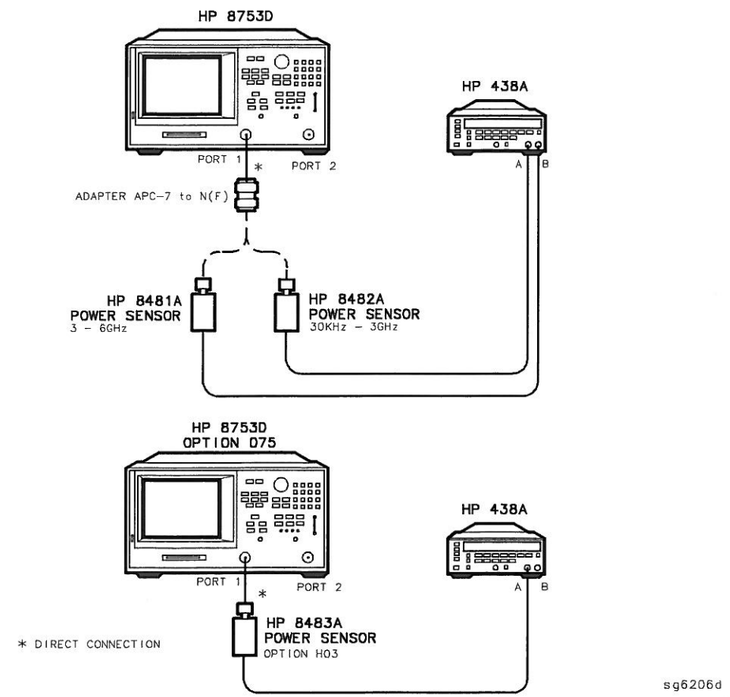


Figure 1-17. Test Port Output Power Range and Accuracy Test Setup

4. On the HP 438A, press (REL). This sets the current power level for relative power measurement.
5. On the network analyzer, press (MENU) POWER PWR RANGE MAN .
6. Write the power meter reading in the "Results Measured" column on the "Performance Test Record."
7. Calculate the difference between the analyzer test port power (which appears on the analyzer's display) and the power meter reading. Write the result in the "Power Level Linearity" column on the "Performance Test Record."
8. Repeat steps 5 through 7 for the other power levels listed in the "Performance Test Record."
9. Press CW FREQ (3) (G/n).
10. Set the power meter calibration factor for this CW frequency and press (REL) to set the reference at this new frequency.
11. Press (MENU) POWER (-15) (x1).
12. Write the power meter reading in the "Results Measured" column on the "Performance Test Record."
13. Calculate the difference between the analyzer test port power and the power meter reading. Write the result in the "Power Level Linearity" column of the "Performance Test Record."
14. Repeat steps 11 through 13 for the other power levels listed in the "Performance Test Record."

In Case of Difficulty

1. Ensure that the power meter and power sensor(s) are operating to specifications. Be sure you set the power meter calibration factor for the CW frequency that you are testing.
2. Verify that there is power coming out of the analyzer's test port 1. Be sure you did not accidently switch off the analyzer's internal source. If you did so, press (MENU) POWER SOURCE PWR ON .
3. Repeat this performance test.

5. Minimum R Channel Level

Specifications

Frequency Range	Minimum R Channel Level
300 kHz to 3 GHz	< −35 dBm
3 GHz to 6 GHz[1]	< −30 dBm

1 Only for analyzers with Option 006.

Required Equipment for 50Ω Analyzers

Adapter, APC-3.5 (m) to APC-7 ..... HP P/N 1250-1746
Cable, APC-7 24-inch ..... HP P/N 8120-4779

Required Equipment for 75Ω Analyzers (Option 075)

Minimum Loss Pad, 50Ω to 75Ω ..... HP 11852B
Cable, 50Ω Type-N, 24-inch ..... HP P/N 8120-4781
Adapter, APC-3.5 (m) to Type-N (f) ..... HP P/N 1250-1750

Analyzer warm-up time: **1 hour**

Perform this test to determine the minimum R channel input power level at which phase lock can be accomplished.

1. Connect the equipment as shown in Figure 1-18.

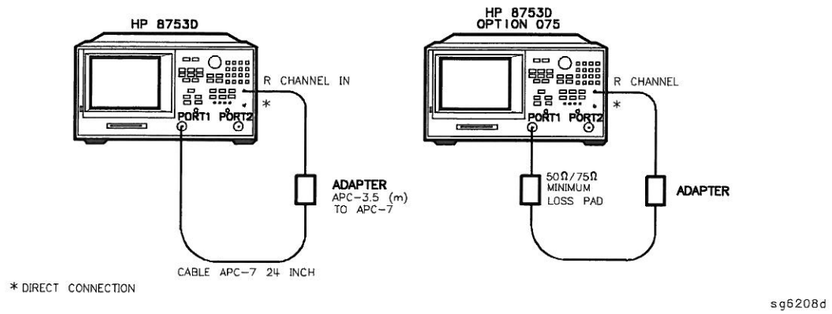


Figure 1-18. Minimum R Channel Level Test Setup

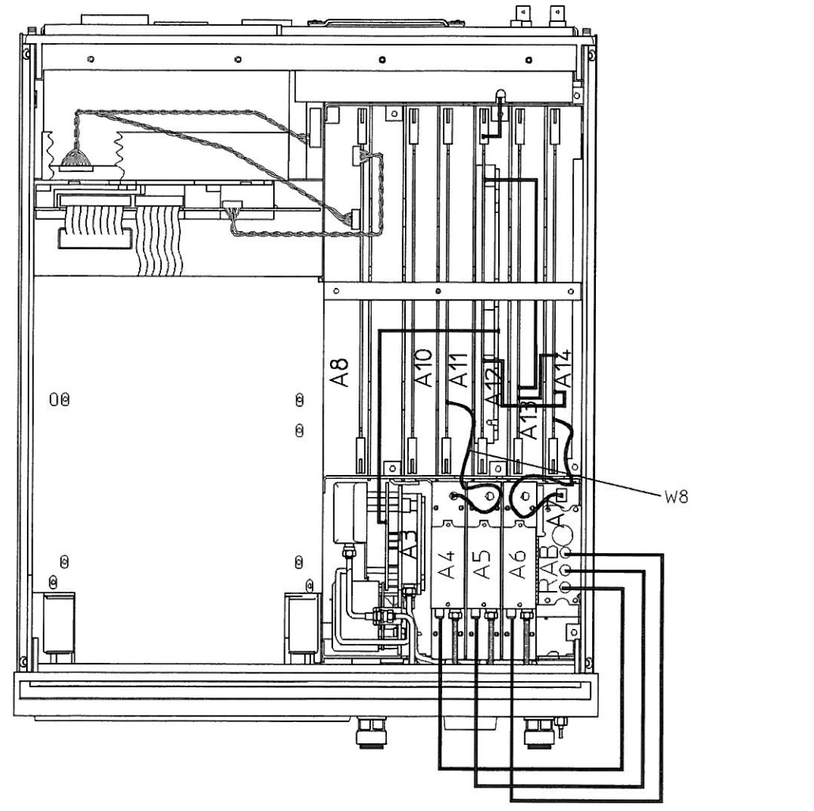
2. Press (PRESET) (MEAS) INPUT PORTS R.
3. Press (MENU) POWER PWR RANGE MAN POWER RANGES RANGE 4 −55 to −30.
4. Press (SCALE/REF) REFERENCE VALUE (-70) (x1).
5. Press (MENU) CW FREQ (300) (k/m).
6. Press (MENU) POWER (-65) (x1).

   The analyzer displays the message CAUTION: NO IF FOUND: CHECK R INPUT LEVEL.
7. Press (↑) to increase the test port power by 1 dBm.
8. If the analyzer displays a phase lock error message, continue increasing the test port power until phase lock is achieved.
9. Write the test port power, that is displayed on the analyzer, on the "Performance Test Record."
10. Repeat steps 5 through 9 for the other CW frequencies listed in the "Performance Test Record."

In Case of Difficulty

1. Check the flexible RF cable (W8, as shown in Figure 1-19) between the R sampler assembly (A4) and the A11 phase lock assembly. Make sure it is connected between A11J1 (PL IF IN) and 1st IF Out.

Caution Loop the W8 cable around the A5 sampler as shown in Figure 1-19. *Do not* push the cable down next to the A11 phase lock assembly.



sg6209d

Figure 1-19. Flexible RF Cable Location

2. Using an ohmmeter, verify that the RF cable is not open. In addition, examine both the cable connectors - measure the resistance between the cable center pin and the cable connector and make sure it is *not* close to zero.
3. Check the R sampler by substituting it with the B sampler (A6).
   a. Move cable W8 to the B sampler (A6), as shown in Figure 1-20.

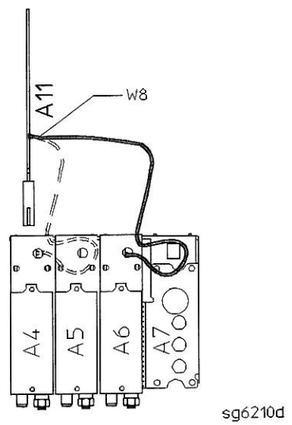


Figure 1-20. Connections for Substituting the R Sampler (A4)

4. Connect the equipment as shown in Figure 1-21.

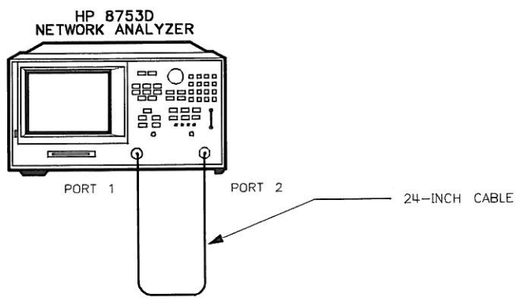


Figure 1-21. Setup for Checking the R Sampler (A4)

5. Repeat the test, but select the B sampler (A6) by pressing (MEAS) INPUT PORTS B in step 2. Use the following specifications:

   300 kHz to 3 GHz <−27 dBm
   3 GHz to 6 GHz <−22 dBm

6. If the analyzer fails the test, replace the A11 assembly.
7. Verify that the high/low band adjustments are still within specifications. For more information on how to perform this task, refer to the "High/Low Band Transition Adjustment" located in the "Adjustments and Correction Constants" chapter of the *HP 8753D Network Analyzer Service Guide.*
8. Refer to the "Source Troubleshooting" chapter of the *HP 8753D Network Analyzer Service Guide* for more troubleshooting information.

6. Test Port Input Noise Floor Level

Specifications

Frequency Range	Test Port	IF Bandwidth	Average Noise Level
50 kHz to 3.0 GHz	Port 1	3 kHz	−82 dBm
50 kHz to 3.0 GHz	Port 1	10 Hz	−102 dBm
50 kHz to 3.0 GHz	Port 2	3 kHz	−82 dBm
50 kHz to 3.0 GHz	Port 2	10 Hz	−102 dBm
3.0 GHz to 6.0 GHz[1]	Port 1	3 kHz	−77 dBm
3.0 GHz to 6.0 GHz[1]	Port 1	10 Hz	−97 dBm
3.0 GHz to 6.0 GHz[1]	Port 2	3 kHz	−77 dBm
3.0 GHz to 6.0 GHz[1]	Port 2	10 Hz	−97 dBm

1 Only for analyzer with Option 006.

Equipment Required for 50Ω Analyzers

Calibration Kit, 7 mm ..... HP 85031B

Equipment Required for 75Ω Analyzers

Calibration Kit, Type-N ..... HP 85036B

Analyzer warm-up time: **1 hour**

Perform this test to determine the HP 8753D port 1 and port 2 noise floor levels at the input test ports.

Port 1 Noise Floor Level from 50 kHz to 3 GHz (IF BW = 3 kHz)

1. Connect the equipment as shown in Figure 1-22.

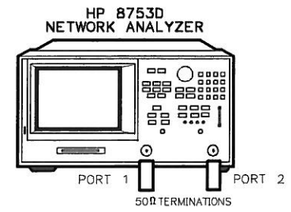


Figure 1-22. Source Input Noise Floor Test Setup

2. Press (PRESET) (MENU) POWER (-85) (x1) (STOP) (3) (G/n).
3. Press (MEAS) INPUT PORTS A TESTPORT 2 (FORMAT) LIN MAG (SCALE/REF) AUTO SCALE.
4. Press (MARKER FCTN) STATS ON (MENU) TRIGGER MENU SINGLE.
5. When the analyzer finishes the sweep, notice the mean value (which appears on the analyzer display).
6. Convert the measured linear magnitude mean value to log magnitude, using this equation.

$$Power\ (dBm) = 20 * [\log_{10}(linear\ magnitude\ mean\ value)]$$

Note Notice that the mean value that is displayed on the analyzer is in μUnits. So, for example, if the displayed value is 62 μU, the value that you would put in the equation is (62×10^{-6}).

7. Write this calculated value on the "Performance Test Record."

Port 1 Noise Floor Level from 50 kHz to 3 GHz (IF BW = 10 Hz)

8. Press (AVG) IF BW (10) (x1) to change the IF bandwidth to 10 Hz.
9. Press (MENU) TRIGGER MENU SINGLE.
10. When the analyzer finishes the sweep, notice the mean value.
11. Convert the measured linear magnitude mean value to log magnitude, using this equation.

$$Power\ (dBm) = 20 * [\log_{10}(linear\ magnitude\ mean\ value)]$$

12. Write this calculated value on the "Performance Test Record."

Port 2 Noise Floor Level from 50 kHz to 3 GHz (IF BW = 10 Hz)

13. Press (MEAS) INPUT PORTS B TESTPORT 1 (FORMAT) LIN MAG.
14. Press (MENU) TRIGGER MENU SINGLE.
15. When the analyzer finishes the sweep, notice the mean value.
16. Convert the measured linear magnitude mean value to log magnitude, using this equation.

$$Power\ (dBm) = 20 * [\log_{10}(linear\ magnitude\ mean\ value)]$$

17. Write this calculated value on the "Performance Test Record."

Port 2 Noise Floor Level from 50 kHz to 3 GHz (IF BW = 3 kHz)

18. Press (AVG) IF BW (3) (k/m) to change the IF bandwidth to 3 kHz.
19. Press (MENU) TRIGGER MENU SINGLE.
20. When the analyzer finishes the sweep, notice the mean value.
21. Convert the measured linear magnitude mean value to log magnitude, using this equation.

$$Power\ (dBm) = 20 * [\log_{10}(linear\ magnitude\ mean\ value)]$$

22. Write this calculated value on the "Performance Test Record."
23. This completes the "Test Port Input Noise Floor Level" procedure if your analyzer does not have Option 006. Otherwise continue with the next section.

Port 2 Noise Floor Level from 3 GHz to 6 GHz (IF BW = 3 kHz)

24. Press (START) (3) (G/n) (STOP) (6) (G/n).
25. Press (MENU) TRIGGER MENU SINGLE.
26. When the analyzer finishes the sweep, notice the mean value.
27. Convert the measured linear magnitude mean value to log magnitude, using this equation.

$$Power\ (dBm) = 20 * [\log_{10}(linear\ magnitude\ mean\ value)]$$

28. Write this calculated value on the "Performance Test Record."

Port 2 Noise Floor Level from 3 GHz to 6 GHz (IF BW = 10 Hz)

29. Press (AVG) IF BW (10) (x1) to change the IF bandwidth to 10 Hz.
30. Press (MENU) TRIGGER MENU SINGLE.
31. When the analyzer finishes the sweep, notice the mean value.
32. Convert the measured linear magnitude mean value to log magnitude, using this equation.

$$Power\ (dBm) = 20 * [\log_{10}(linear\ magnitude\ mean\ value)]$$

33. Write this calculated value on the "Performance Test Record."

Port 1 Noise Floor Level for 3 GHz to 6 GHz (IF BW = 10 Hz)

34. Press (MEAS) INPUT PORTS A TESTPORT 2.
35. Press (MENU) TRIGGER MENU SINGLE.
36. When the analyzer finishes the sweep, notice the mean value.
37. Convert the measured linear magnitude mean value to log magnitude, using this equation.

$$Power\ (dBm) = 20 * [\log_{10}(linear\ magnitude\ mean\ value)]$$

38. Write this calculated value on the "Performance Test Record."

Port 1 Noise Floor Level from 3 GHz to 6 GHz (IF BW = 3 kHz)

39. Press (AVG) IF BW (3) (k/m).
40. Press (MENU) TRIGGER MENU SINGLE.
41. When the analyzer finishes the sweep, notice the mean value.
42. Convert the measured linear magnitude mean value to log magnitude, using this equation.

$$Power\ (dBm) = 20 * [\log_{10}(linear\ magnitude\ mean\ value)]$$

43. Write this calculated value on the "Performance Test Record."

In Case of Difficulty

1. Perform the "ADC Linearity Correction Constants (Test 52)," located in the "Adjustments and Correction Constants" chapter of the *HP 8753D Network Analyzer Service Guide.*
2. Repeat the "Test Port Input Noise Floor Level" procedure.
3. Suspect the A10 Digital IF assembly if the analyzer fails both test port input noise floor tests.
4. Refer to the "Receiver Troubleshooting" chapter of the *HP 8753D Network Analyzer Service Guide* for more troubleshooting information.

7. Test Port Input Frequency Response

Specifications

Frequency Range	Test Port	Input Frequency Response
300 kHz to 3 GHz	Port 1	±1 dB
300 kHz to 3 GHz	Port 2	±1 dB
3 GHz to 6 GHz[1]	Port 1	±2 dB
3 GHz to 6 GHz[1]	Port 2	±2 dB

1 Only for analyzers with Option 006.

Equipment Required for 50Ω Analyzers

Power Meter ..... HP 436A/437B/438A
Power Sensor ..... HP 8482A
Cable, APC-7 24-inch ..... HP P/N 8120-4779
Adapter, APC-7 to Type-N (f) ..... HP 118524A

Additional Equipment Required for Analyzers with Option 006

Power Sensor ..... HP 8481A

Equipment Required for 75Ω Analyzers

Power Meter ..... HP 436A/437B/438A
Power Sensor ..... HP 8483A Option H03
Cable, Type-N ..... HP P/N 8120-2408

Analyzer warm-up time: **1 hour**

Perform this test to examine the vector sum of all test setup error vectors in both magnitude and phase change as a function of frequency.

Power Meter Calibration for Test Port 1 from 300 kHz to 3 GHz

1. Zero and calibrate the power meter.
2. Connect the equipment as shown in Figure 1-23.

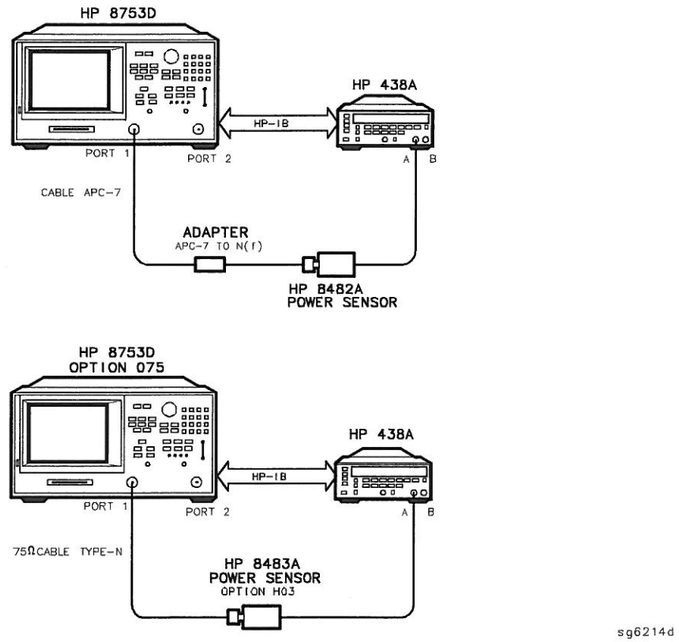


Figure 1-23. Setup for Power Meter Calibration on Test Port 1

3. Press [PRESET] [START] [300] [k/m].
4. **Only for Analyzers with Option 006:** Press [STOP] [3] [G/n].

5. Press (LOCAL) SYSTEM CONTROLLER.
6. Press SET ADDRESSES and POWER MTR until the analyzer shows the correct power meter model.
7. Press ADDRESS: P MTR/HPIB. The default power meter HP-IB address is 13. Make sure it is the same as your power meter HP-IB address. Otherwise, use the analyzer front panel keypad to enter the correct HP-IB address for your power meter.
8. Press (MENU) NUMBER of POINTS (51) (x1).
9. Press POWER PWR RANGE to turn the auto power range off.

Note The analyzer displays the PRm annotation, indicating that the analyzer power range is set to MANUAL.

---

10. Press PORT POWER to uncouple the test port output power.
11. Press (CAL) PWRMTR CAL.
12. Press LOSS/SENSR LISTS CAL FACTOR SENSOR A. Refer to the back of the power sensor to locate the different calibration factor values along with their corresponding frequencies.

Note The analyzer's calibration factor sensor table can hold a MAXIMUM of 12 calibration factor data points.

The following softkeys are included in the sensor calibration factor entries menu:

SEGMENT	press to select a point where you can use the front panel knob or entry keys to enter a value
EDIT	press to edit or change a previously entered value
DELETE	press to delete a point from the sensor calibration factor table
ADD	select this key to add a point into the sensor calibration factor table
CLEAR LIST	select this key to erase the entire sensor calibration factor table
DONE	select this key when done entering points to the sensor calibration factor table

As an example, the following are the keystrokes for entering the first two calibration factor data points for the HP 8482A power sensor (assuming CF% = 96.4 at 100 kHz and CF% = 98.4 at 300 kHz):

a. From the sensor calibration factor entries menu, press ADD.
b. Press FREQUENCY (100) (k/m). If you make an entry error, press (←) and re-enter the correct value again.
c. Press CAL FACTOR (96.4) (x1).
d. Press DONE to terminate the first calibration factor data point entry.
e. To enter the second cal factor data point, press ADD.
f. Press FREQUENCY (300) (k/m).
g. Press CAL FACTOR (98.4) (x1).
h. To terminate the second calibration factor data point entry, press DONE.
i. Press SEGMENT and use the front panel knob to scroll through the sensor calibration factors table. Check to be sure all values are entered correctly. If you spot an error, use the front panel knob to point to the data point you want to modify and press EDIT.

13. Press the appropriate softkeys to create a power sensor calibration factors table.
14. Press DONE to exit the sensor calibration factor entries menu.
15. Press RETURN ONE SWEEP TAKE CAL SWEEP to start the power meter calibration.

    Wait until the analyzer finishes the sweep, then continue with this procedure.

Note The analyzer displays the PC annotation, indicating the power meter calibration is done and the error correction is active.
