

Keysight 11667C/D Power Splitter

Notices

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(product-specific information and support, software and documentation updates)
- www.keysight.com/find/assist
(worldwide contact information for repair and service)

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1 General Information

General Information

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This manual contains operating and service information for the Keysight 11667C/D power splitter.

Specifications

Table 1-1 and **Table 1-2** list the general specifications of Keysight 11667C and 11667D power splitters respectively.

Table 1-1 11667C General Specifications

Description	Value
Frequency range	DC to 50 GHz
Maximum power	+27 dBm
Connectors	2.4 mm female on all ports
Pin depth	0.000 to 0.076 mm (0.000 to 0.003 in) ^[a]
Dimensions	35.1 mm H x 35.5 mm W x 10 mm D (1.38 x 1.39 x 0.39 in)
Weight	0.036 kg (0.079 lb)

[a] Allowable recession of the end of the female center pin behind the outer conductor mating plane.

Table 1-2 11667D General Specifications

Description	Value
Frequency range	67 GHz
Maximum power	+27 dBm
Connectors	1.85 mm female on all ports
Pin depth	0.000 to 0.076 mm (0.000 to 0.003 in) ^[a]
Dimensions	35.1 mm H x 35.5 mm W x 10 mm D (1.38 x 1.39 x 0.39 in)
Weight	0.036 kg (0.079 lb)

[a] Allowable recession of the end of the female center pin behind the outer conductor mating plane.

Overview

Keysight 11667C/D power splitter is a two-resistor power splitter used in network analysis where one output arm is used for leveling or to supply a reference signal for ratio measurements.

In a network analyzer system, the node at the fork of the power splitter is held constant by the leveling action of the network analyzer reference channel (see [Figure 1-1](#)). Because a virtual ground is present at the node, the resistance in each output arm is 50 ohms, giving a 50 ohm matched output impedance.

The ratio between the two power splitter arms is not affected by source power level variation. Variations in power level appear in both arms equally and simultaneously.

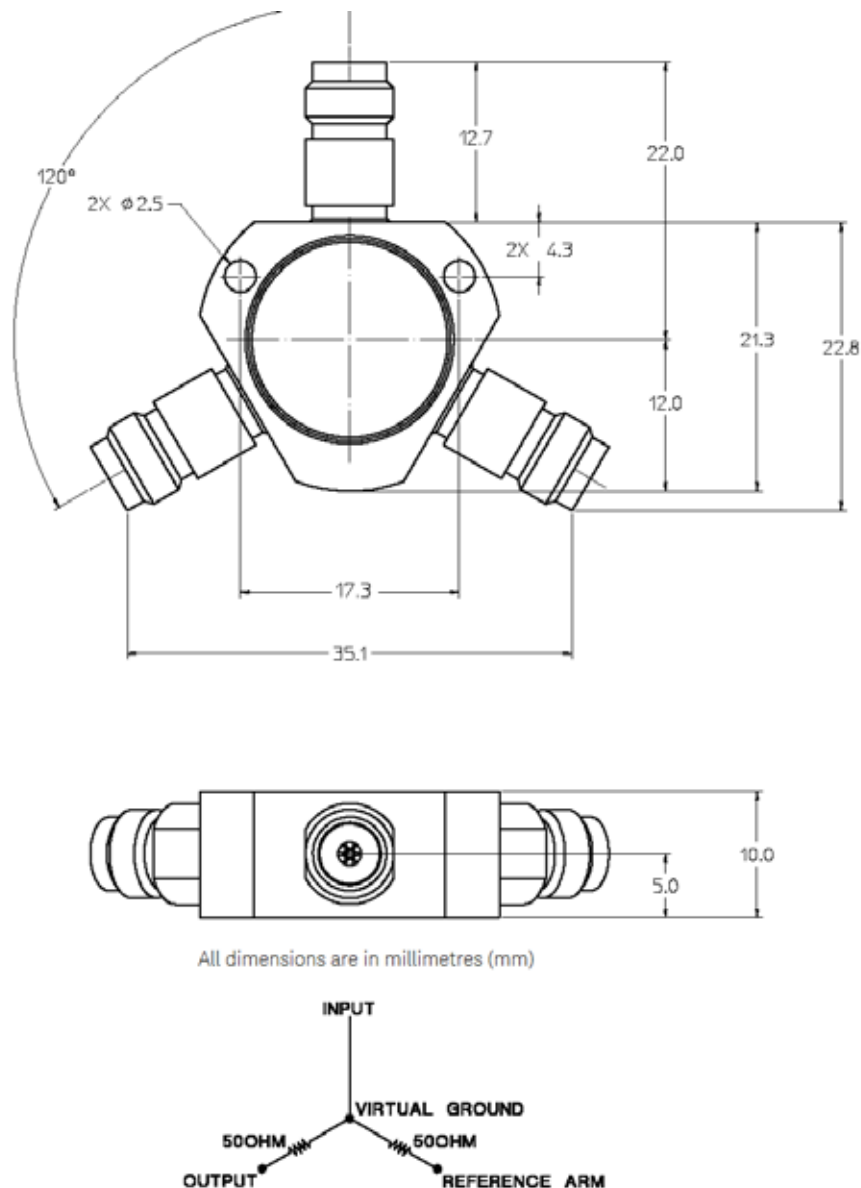


Figure 1-1 Keysight 11667C/D schematic and dimensions

Equipment Available

The power splitter's 1.85 and 2.4 mm connectors are compatible with all other 1.85 mm and 2.4 mm connectors. Keysight also produces adapters from 2.4 mm to other coaxial connector types. Refer to respective adapters and calibration accessories document for a list of these products and their specifications.

2 Installation

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Initial Inspection

- 1** Inspect the shipping container for damage. If the shipping container or cushioning material is damaged, it should be kept until the contents of the shipment have been checked for completeness and the instrument has been checked both mechanically and electrically.
 - Check for mechanical damage such as scratches or dents.
 - Procedures for checking electrical performance are given under “Operator’s Check” on page 20 or Chapter 4, “Performance Tests”.
- 2** If the contents are incomplete, if there is mechanical damage or defect, or if the instrument does not pass the electrical performance test, contact the nearest Keysight Technologies Sales and Service office (refer to “Sales and Technical Support” on page 3). Keysight will arrange for repair or replacement of the damaged or defective equipment. Keep the shipping materials for the carrier’s inspection.
- 3** If you are returning the instrument under warranty or for service, repackaging the instrument requires original shipping containers and materials or their equivalents. Keysight Technologies can provide packaging materials identical to the original materials. Refer to “Sales and Technical Support” on page 3 for the Keysight office nearest to you. Attach a tag indicating the type of service required, return address, model number and serial number. Mark the container **FRAGILE** to insure careful handling. In any correspondence, refer to the instrument by model number and serial number.

Preparation for Use

CAUTION

Maximum input power to the Keysight 11667C/D is +27 dBm. Exceeding this limit will damage the resistor network and void the warranty.

Mating Connectors

The accuracy and repeatability of each measurement depends on the proper care and use of the 2.4/1.85 mm connectors. Visually inspect and clean connectors before every connection. Measure mechanical tolerances (pin depth) with a precision gage prior to the connector's first use, and periodically thereafter. Torque connections to 8 in-lb (90 N-cm). Information concerning the proper maintenance, inspection, and gaging of connectors is provided in the Keysight *Microwave Connector Care manual* (PN: 08510-90064).

Environmental Conditions

Operate the power splitter only in environments within the limits listed in [Table 2-1](#) and [Table 2-2](#). Storage and shipment environments must meet the conditions below.

Table 2-1 11667C Environmental Requirements

Parameter	Required values/ranges
Temperature	
– Operating	0°C to +55°C
– Storage	-40°C to +75°C
Humidity	
– Operating	Up to 95% RH
– Storage	Up to 95% RH
Shock	
– End-user handling	Delta-V: 3m/s $\pm$ 5%, Duration <3ms at 6 faces
– Mechanical Survival	Half Sine: 1000g, 0.5ms at 6 faces
– Transportation	50g, delta-V: 8m/s at 6 faces
Vibration	
– Operating (Random)	0.3 Grms, 5-500 Hz
Altitude	
– Operating	Up to 4,572 metres (15,000 feet)
– Storage and shipment	Up to 7,620 metres (25,000 feet)
ESD immunity	
– Contact Discharge	4 kV (to center conductor)
– Air Discharge	15 kV (to outer conductor)

Table 2-2 11667D Environmental Requirements

Parameter	Required values/ranges
Temperature	0°C to +55°C
– Operating	–40°C to +75°C
– Storage	–40°C to +75°C, 10 cycles at 20 °C per minute ramp rate, 20 minutes dwell time per MIL-STD-883F, Method 1010.8, Condition C (modified)
– Cycling	
Humidity	
– Operating	95% RH at 40°C, 24 hours cycling, 5 cycles
– Condensation	95% RH at -10°C to 25°C, Method 2
– Resistance	95% RH at 65°C, 10 Days per JEDEC HAST Standard
Shock	
– End-user handling	Delta-V: 3m/s ±5%, Duration <3ms at 6 faces
– Mechanical Survival	Half Sine: 1000g, 0.5ms at 6 faces
– Transportation	50g, delta-V: 8m/s at 6 faces
Vibration	
– Operating (Random)	0.3 Grms, 5-500 Hz
Altitude	
– Operating	4,600 meters (15,092 feet)
– Non-operating	4,600 meters (15,092 feet)
ESD immunity	
– Contact Discharge	4 kV (to center conductor)
– Air Discharge	15 kV (to outer conductor)

3 Operation

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Operator's Check

The operator's check is a quick evaluation of the power splitter 's operation. Perform this procedure to verify that the power splitter is functioning.

- 1** Visually inspect the input port and both output ports for defect or damage. Mating defective or unclean connectors degrade the measurement and damage the mating connector.
- 2** Perform the *Output Tracking* test (over the frequency range you will be using). Refer to [Chapter 4, "Performance Tests"](#) for this procedure.

If the power splitter fails either check, contact Keysight for repair or replacement.

4 Performance Tests

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Input Return Loss

Input return loss is a measurement of the input port match of the power splitter. The reflected RF signal is measured at the input port with both output ports terminated in 50 ohms.

To ensure that the power splitter meets the input return loss specifications, the measured values must be greater than or equal to the specifications plus the measurement uncertainty.

Procedure

- 1 Set up the network analyzer for 2-port measurement and perform 2-port calibration after the network analyzer has been warmed up for 30 minutes.
- 2 Connect ports 1 and 2 of the power splitter to the ports 1 and 2 of the network analyzer respectively. Terminate port 3 of the power splitter with 50 ohm load (refer to [Figure 4-1](#)).

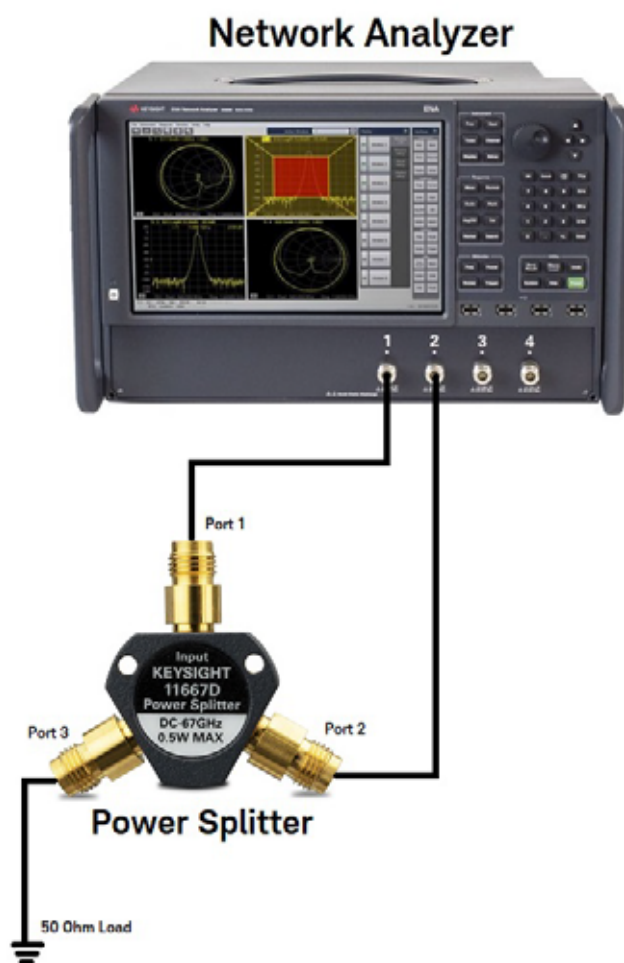


Figure 4-1 Input return loss test setup

- 3 Measure the reflection parameter, S11.

Output Tracking

Output tracking compares the frequency response of one output port to the other output port. A swept measurement is stored from the first output port and compared to the measurement of the other output port. Output tracking is measured as the maximum peak-to-peak variation.

Procedure

- 1 Set up the network analyzer for 2-port measurement and perform 2-port calibration after the network analyzer has been warmed up for 30 minutes.
- 2 Connect ports 1 and 2 of the power splitter to the ports 1 and 2 of the network analyzer respectively. Terminate port 3 of the power splitter with 50 ohm load (refer to [Figure 4-2](#)).

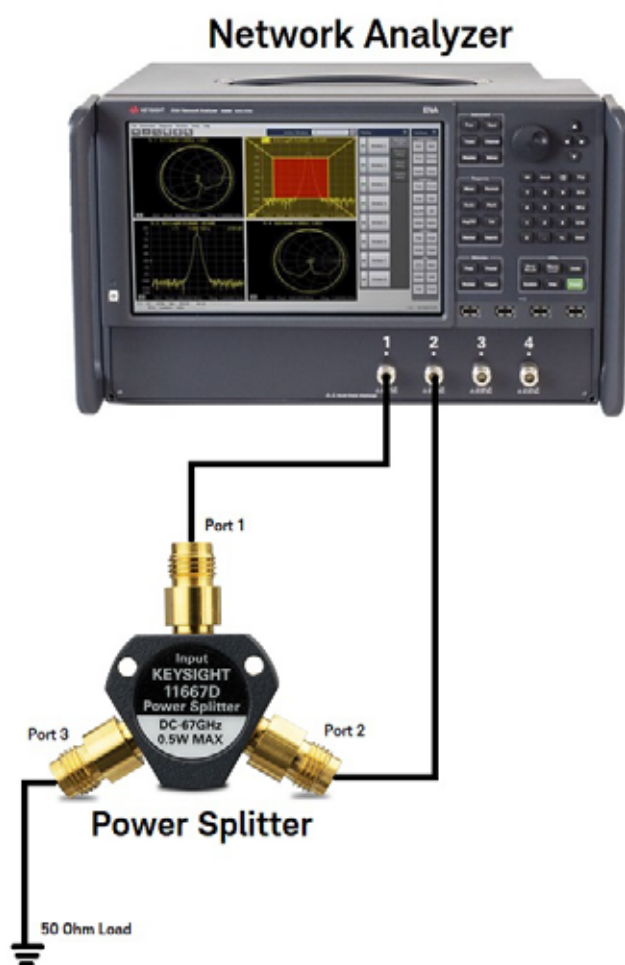


Figure 4-2 Output tracking test setup (Port 3 Terminated)

- 3 Measure the transmission parameter, S_{21} and save the measured value to the memory.
- 4 Now connect ports 1 and 3 of the power splitter to the ports 1 and 2 of the network analyzer respectively. Terminate port 2 of the power splitter with 50 ohm load (refer to [Figure 4-3](#)).



Figure 4-3 Output tracking test setup (Port 2 Terminated)

- 5 Measure the transmission parameter, S_{31} and perform "Data-Memory" math operation. The "Data-Memory" operation result is the output tracking measurement result.

5 Adjustments

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Service Instructions

Keysight 11667C/D power splitter has no electrical or mechanical adjustments.

Adjustment

The 11667C/D power splitter does not have internal adjustments and should not be opened.

Repair

The 11667C/D power splitter is not recommended for repair as most components are not easily removed.

Maintenance

The connectors, particularly the connector faces, must be kept clean.

For instructions on connecting and care of your connectors, refer to Microwave Connector Care Quick Reference Card (PN: 08510- 90360).



This information is subject to change without notice. Always refer to the Keysight website for the latest revision.

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