

TECHNICAL OVERVIEW

Power Splitter

11667L/A/B/C/D: DC to 2/18/26.5/67 GHz

Key Features

- Broad operating frequency up to 67 GHz
- Excellent output VSWR at the auxiliary arm when used for source leveling or ratio measurement applications
- Unmatched tracking between outputs ensures minimum measurement uncertainty

Description

The Keysight Technologies, Inc. 11667x is a 50 ohm two-resistor type power splitter that provides exceptional amplitude and phase tracking for highly accurate power splitting. Offering excellent output power symmetry between the two output ports, the 11667x is recommended for applications that require external source leveling, ratio measurements and for other legacy network/ gain-phase analyzers that do not have built-in power splitters or directional bridges.

KEYSIGHT TECHNOLOGIES

Applications

Network measurement

Milliohm impedance measurements with shunt-thru method (DC-DC converters, large bypass capacitors)

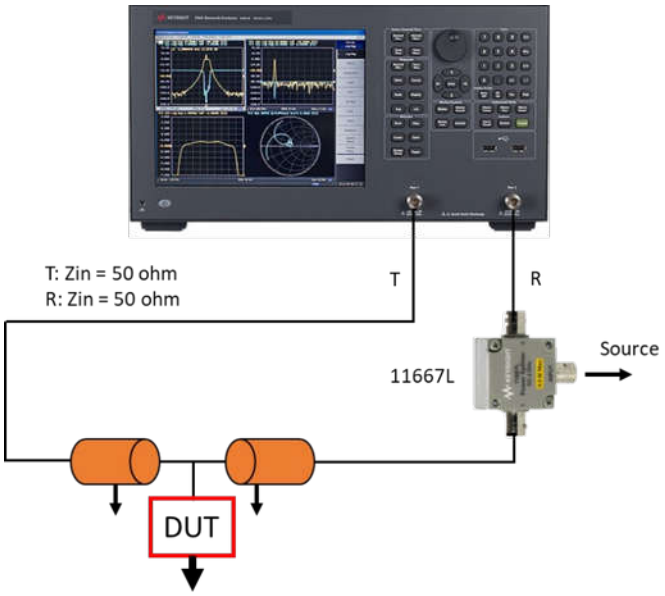


Figure 1. Shunt-thru impedance measurement

Transmission coefficient measurements for 2-port devices

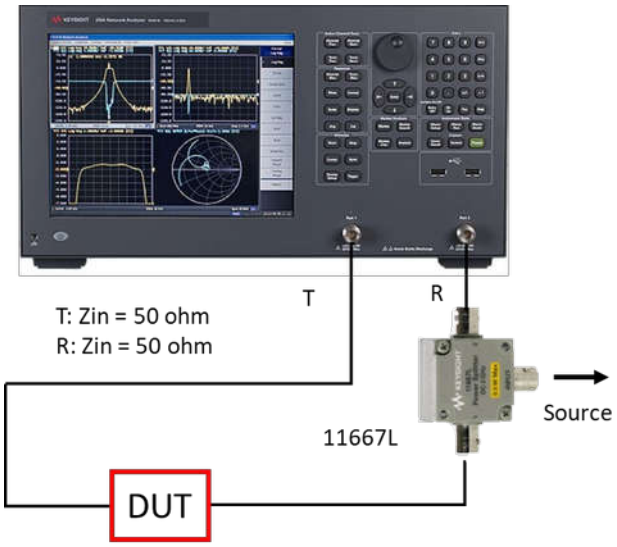


Figure 2. 50-ohm device measurement

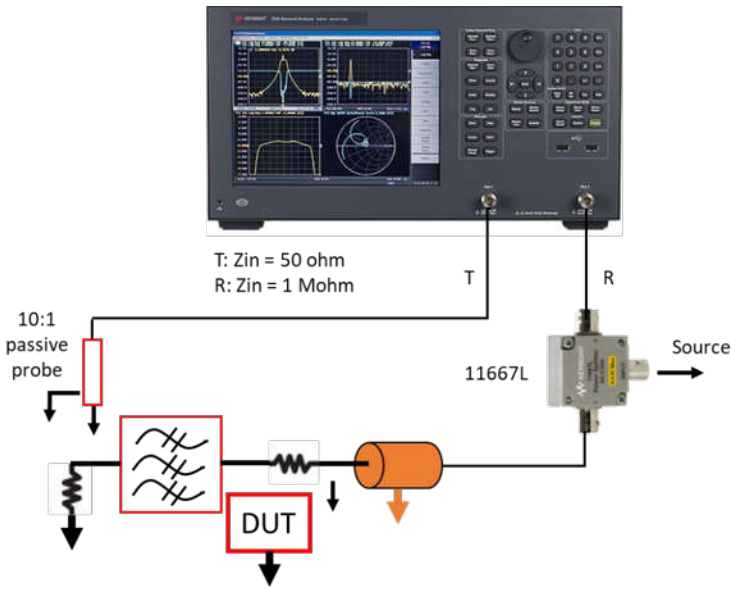


Figure 3. Non- 50-ohm LF filter measurement

Ratioing and Leveling

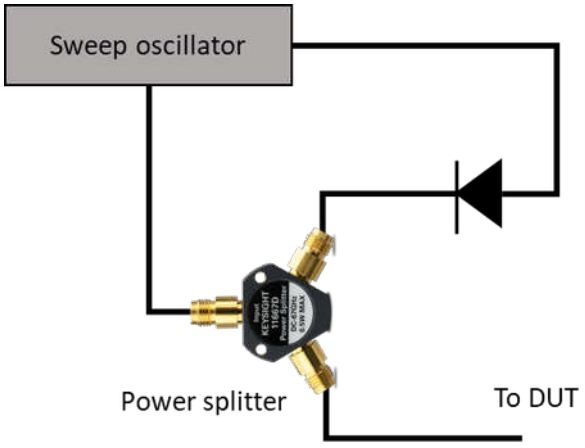


Figure 4. Power splitter test setup for leveling with a crystal detector

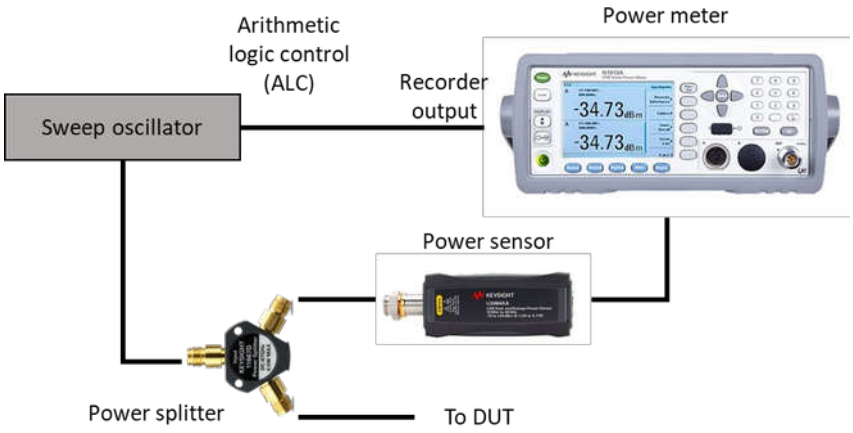


Figure 5. Power splitter test setup for leveling with a power meter

Specifications

Specifications describe the product's warranted performance. Supplemental and typical characteristics are intended to provide typical but non-warranted performance parameters. These are denoted as "typical", "nominal" or "approximate"

Specifications	11667L	11667A	11667B	11667C	11667D
Frequency range	DC to 2 GHz	DC to 18 GHz	DC to 26.5 GHz	DC to 50 GHz	DC to 67 GHz
Connector	BNC (f) all ports	Type-N (f) all ports[1]	3.5 mm (f) all ports	2.4 mm (f) all ports	1.85 mm (f) all ports
Insertion loss (dB)	(6 dB nominal): DC to 100 MHz: 0.2 100 MHz to 2 GHz: 0.6	(6 dB nominal): DC to 4 GHz: 0.2, + 0.6 to any output, typical 4 to 8 GHz: 0.2 + 1.0 to any output, typical 8 to 18 GHz: 0.2 + 1.8 to any output, typical	DC to 26.5 GHz: 7 dB typical	DC to 18 GHz: 6 18 to 26.5 GHz: 7 26.5 to 40 GHz: 8 40 to 50 GHz: 8.5	DC to 18 GHz: 7.0 18 to 26.5 GHz: 7.5 26.5 to 40 GHz: 8.0 40 to 50 GHz: 8.5 50 to 67 GHz: 10.5
Return loss, dB (VSWR)	Input: 18 (1.3) typical Output: 11 (1.78) typical	Input: DC to 4 GHz: 23 (1.15) 4 to 8 GHz: 19 (1.25) 8 to 18 GHz: 15 (1.45) Output: DC to 4 GHz: 26 (1.10) 4 to 8 GHz: 21 (1.20) 8 to 18 GHz: 17 (1.33) (8 to 18 GHz: 17 (1.38) for option 002	Input: DC to 18 GHz: 20 (1.22) 18 to 26.5 GHz: 18 (1.29) Output: DC to 26.5 GHz: 20 (1.22)	Input: DC to 18 GHz: 20 (1.22) 18 to 26.5 GHz: 16 (1.38) 26.5 to 40 GHz: 14 (1.50) 40 to 50 GHz: 12 (1.65) Output: DC to 26.5 GHz: 18 (1.29) 26.5 to 40 GHz: 14 (1.50) 40 to 50 GHz: 12 (1.65)	Input: DC to 18 GHz: 18.6 (1.25) 18 to 26.5 GHz: 15.6 (1.43) 26.5 to 40 GHz: 14.0 (1.58) 40 to 50 GHz: 10.3 (1.79) 50 to 67 GHz: 8.5 (2.1) Output: DC to 18 GHz: 17.7 (1.33) 18 to 26.5 GHz: 14 (1.43) 26.5 to 40 GHz: 11.7 (1.58) 40 to 50 GHz: 9.5 (1.79) 50 to 67 GHz: 8.5 (2.1)
Amplitude tracking (dB), typical	DC to 100 MHz: 0.1 100 MHz to 2 GHz: 0.2	DC to 4 GHz: 0.15 4 to 8 GHz: 0.20 8 to 18 GHz: 0.25	DC to 18 GHz: 0.25 18 to 26.5 GHz: 0.40	DC to 18 GHz: 0.30 18 to 26.5 GHz: 0.35 26.5 to 50 GHz: 0.40	DC to 50 GHz: 0.40 50 to 67 GHz: 0.65
Phase tracking (degree) typical	DC to 100 MHz: 1.0 100 MHz to 2 GHz: 3.0	DC to 4 GHz: 0.5 4 to 8 GHz: 1.5 8 to 18 GHz: 3.0	DC to 18 GHz: 1.5 18 to 26.5 GHz: 2.5	DC to 18 GHz: 2.0 18 to 26.5 GHz: 2.5 26.5 to 50 GHz: 3.0	DC to 50 GHz: 4.0 50 to 67 GHz: 7.0
Max input power	+27 dBm	+27 dBm	+27 dBm	+27 dBm	+ 30 dBm

[1]Connectors:

Type-N female on all ports

Option 001: Type-N male on the input and type-N female on the output ports

Option 002: Type-N female on the input and APC-7 on the output ports

Typical Performance

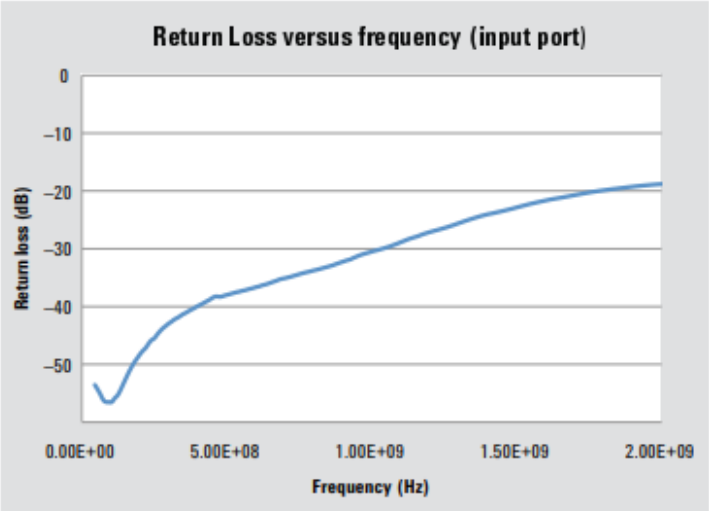


Figure 6. 11667L input port return loss versus frequency (typical)

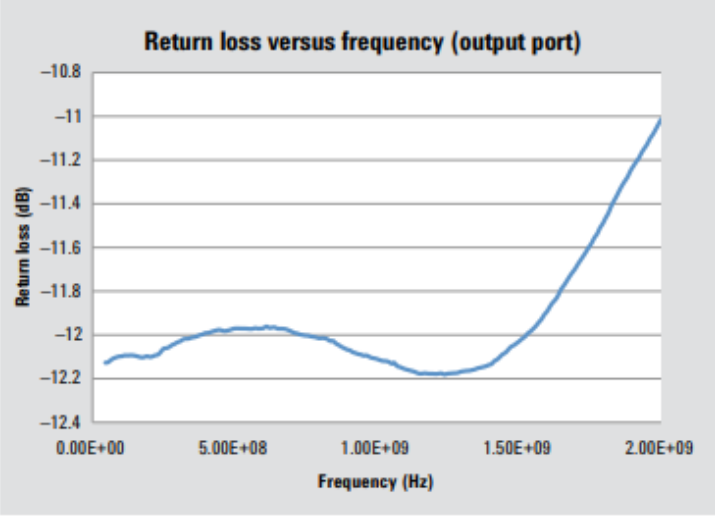


Figure 7. 11667L output port return loss versus frequency (typical)

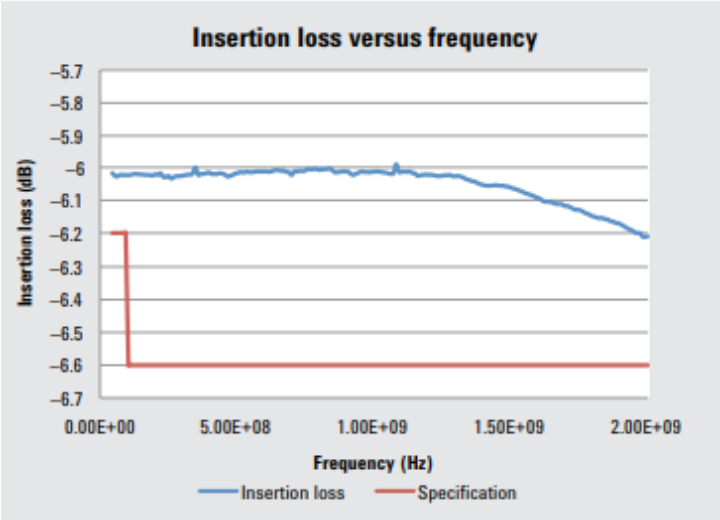


Figure 8. 11667L insertion loss versus frequency (typical)

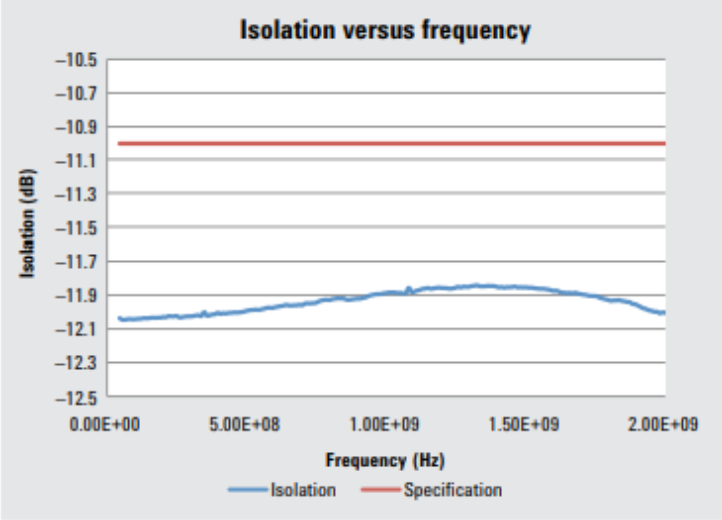


Figure 9. 11667L isolation versus frequency (typical)

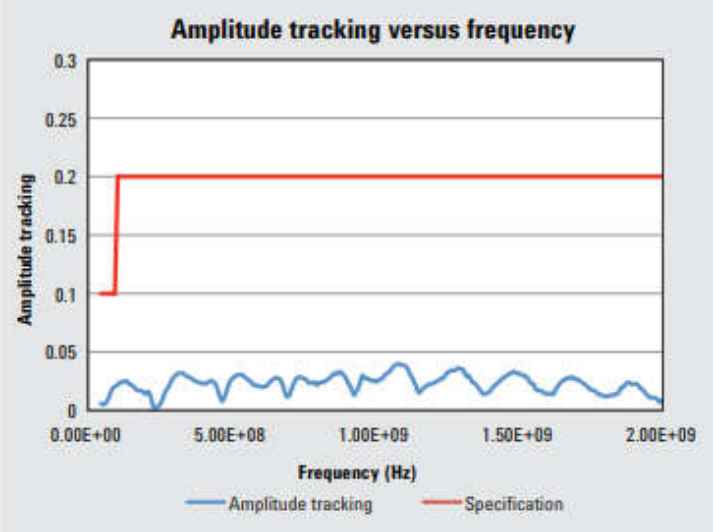


Figure 10. 11667L amplitude tracking (dB) versus frequency (typical)

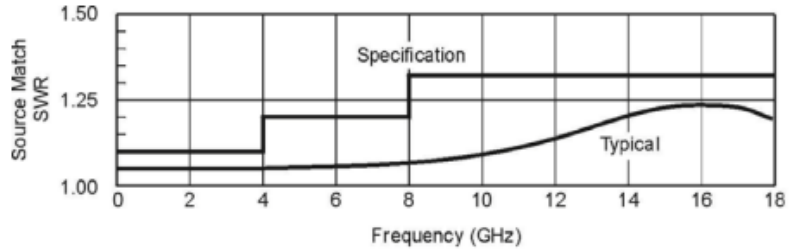


Figure 11. 11667A Leveling or ratio measurement source match (typical)

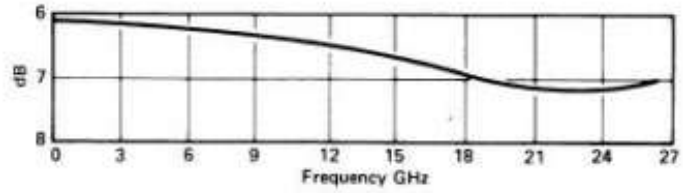


Figure 12. 11667B Insertion loss versus frequency (typical)

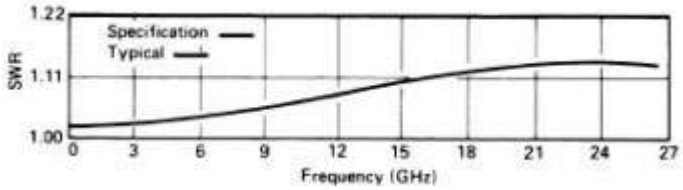


Figure 13. 11667B Leveling or ratio measurement source match (typical)

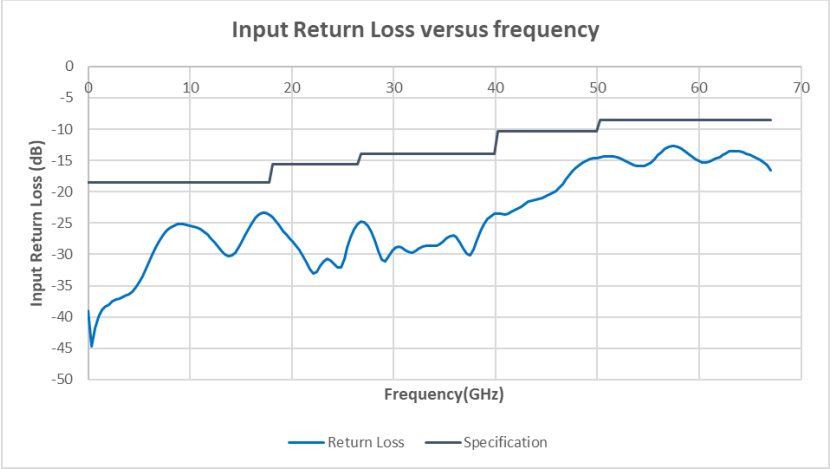


Figure 14. 11667D Input return loss versus frequency (typical)

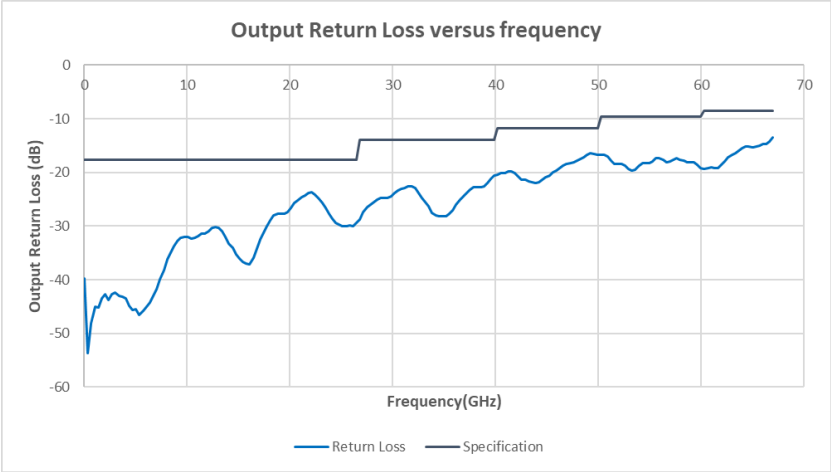


Figure 15. 11667D Output equivalent return loss versus frequency (typical)

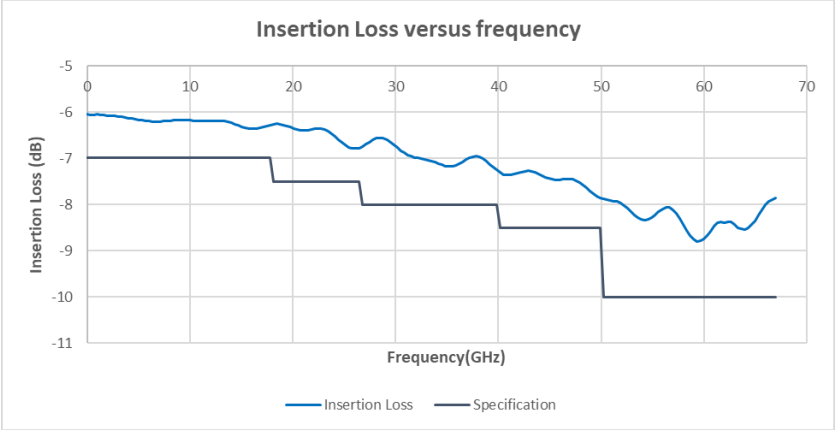


Figure 16. 11667D Insertion loss versus frequency (typical)

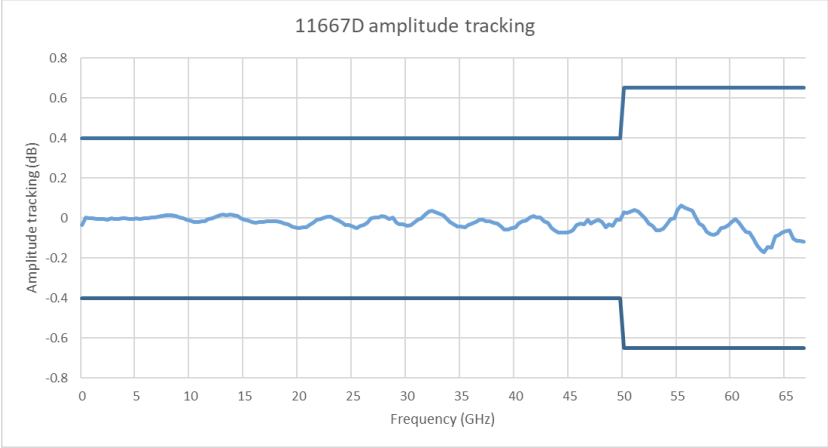


Figure 17. 11667D Amplitude tracking versus frequency (typical)

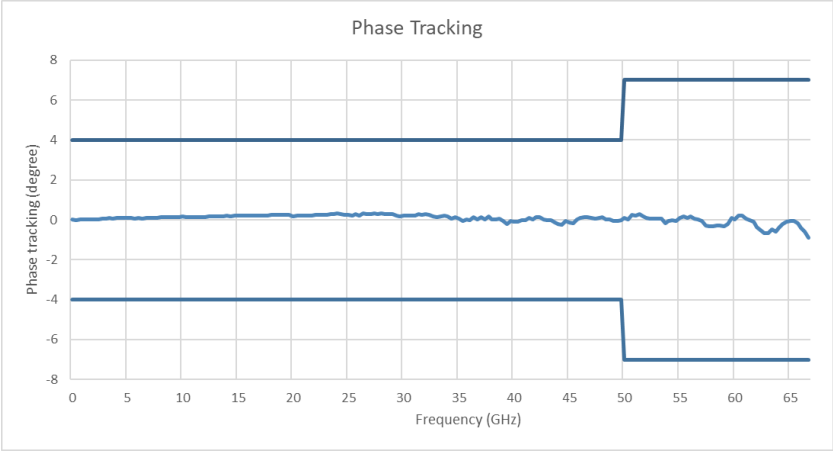


Figure 18. 11667D phase tracking versus frequency (typical)

Environmental Specifications

The 11667x power splitter are designed to fully comply with Keysight Technologies' product operating environment specifications. The following summarizes the environmental specifications for these products.

Environmental condition	11667L
Temperature	
Operating	0 – 55 °C
Non-operating	–40 °C to 70 °C
Humidity	
Non-operating	–10 °C to 25 °C / 50% RH
Operating	40 °C / 95% RH, 5-day cycle
Functional shock	Half-sine, 30 g, 11 ms
Vibration	
Operating random vibration	5 to 500 Hz, 0.21g RMS
Altitude	
Operating/storage	≤ 4600 meters (15,000 feet)
ESD immunity	
Direct discharge	6kV
Air discharge	15kV

Environmental condition	11667C
Temperature	
Operating	0°C to +55°C
Non-operating	-40°C to +75°C
Humidity	
Operating/storage	Up to 95% RH
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	Up to 4,572 metres (15,000 feet)
Storage and shipment	Up to 7,620 metres (25,000 feet)

ESD immunity	
Contac discharge	4 kV (to center conductor)
Air discharge	15 kV (to outer conductor)

Environmental condition	11667D
Temperature	
Operating	0°C to +55°C
Storage	–40°C to +75°C
Cycling	–40°C to +75°C, 10 cycles at 20 °C per minute ramp rate, 20 minutes dwell time per MIL-STD-833F, Method 1010.8, Condition C (modified)
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	
Contac discharge	4 kV (to center conductor)
Air discharge	15 kV (to outer conductor)

Mechanical Dimensions

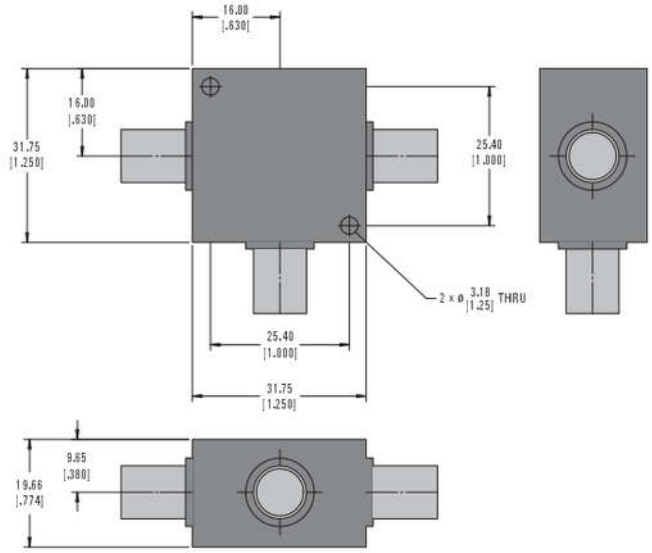


Figure 19. 11667L mechanical dimension

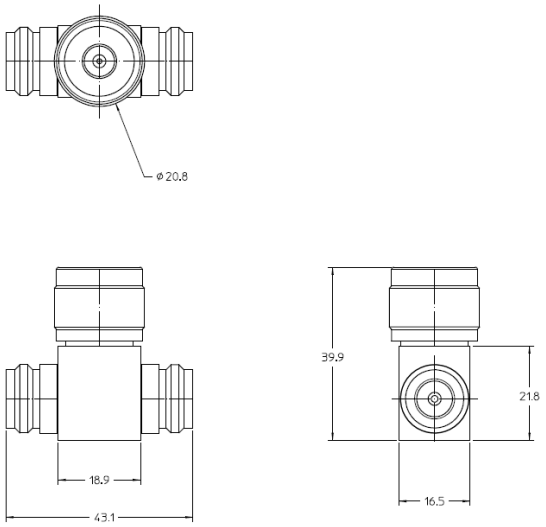


Figure 20. 11667A mechanical dimension

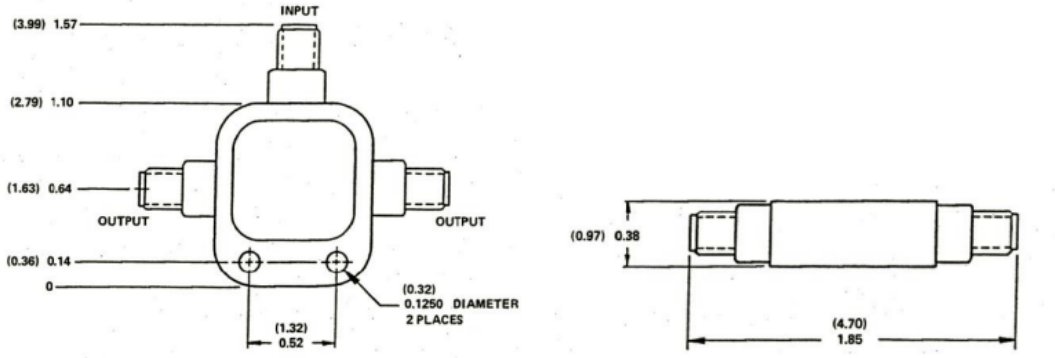


Figure 21. 11667B mechanical dimension

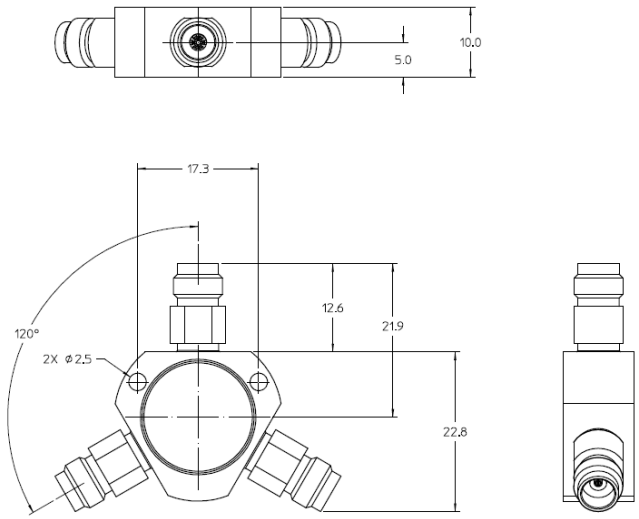


Figure 22. 11667C/D mechanical dimension

Ordering Information

Model	Description
11667L	Power splitter, DC to 2 GHz
11667A	Power splitter, DC to 18 GHz Option 001: Type-N male on the input and type-N female on the output ports Option 002: Type-N female on the input and APC-7 on the output ports
11667B	Power splitter, DC to 26.5 GHz
11667C	Power splitter, DC to 50 GHz
11667D	Power splitter, DC to 67 GHz

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KEYSIGHT TECHNOLOGIES

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