

Overview

Accessories for the Agilent 8712E, 8753ET/ES, 8720E, 8510C, and the PNA Series network analyzers include a variety of calibration kits, verification kits, cables, and adapters from dc to 110 GHz.

Calibration kits

Error-correction procedures require that the systematic errors in the measurement system be characterized by measuring known devices (standards) on the system over the frequency range of interest. Agilent offers two types of calibration kits: mechanical and electronic.

Electronic calibration kits

ECal modules consist of a connector-specific calibration standard. Modules are available with 3.5mm, 7mm, Type-N (50 and 75 ohm), Type-F, and 7-16 connectors. The Type-N, Type-F, 7-16, and 3.5mm modules have one male and one female connector. Options exist for modules with two male or two female connectors. ECal modules are controlled via the 85097A PC interface kit and ECal software that runs on a Windows-based PC (not included) when used with the Agilent 8753, 8719, 8720, 8722, and 8510 series of network analyzers. The PNA Series network analyzers can control RF ECal modules directly via its USB port and does not require the 85097A kit.

Mechanical calibration kits

All network analyzer coaxial mechanical calibration kits contain precision standard devices to characterize the systematic errors of the Agilent 8712, 8753 series, PNA Series, 8720 series or 8510C network analyzer system. Each mechanical calibration kit also contains adapters for test ports and a torque wrench for proper connection.

Verification kits

Measuring known devices, other than the calibration standards, is a straightforward way of verifying that the network analyzer system is operating properly. Agilent offers verification kits that include precision airlines, mismatch airlines, and precision-fixed attenuators. Traceable measurement data is shipped with each kit on disk. Verification kits may be recertified by Agilent Technologies. This recertification includes a new measurement of all standards and new data with uncertainties.

Scalar network analyzer accessories

The basic components of any scalar system include a scalar analyzer, a swept source, a directional bridge or coupler, and detectors. Agilent scalar accessories, when used with the 8757D network analyzer, provide measurement coverage from 10 MHz to 50 GHz.

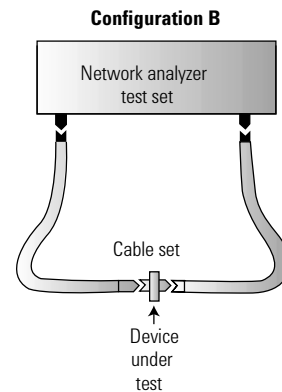
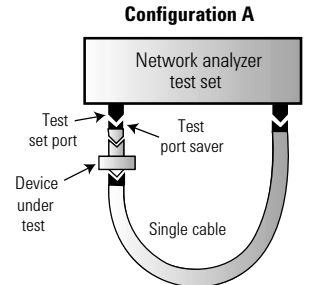
Test port cables and adapters

Test port cables and adapters sets are available for various connector types. The cable/adapter configurations are described below. Cables used with the 8720 series and 8510 series network analyzers are designed with one end that connects directly to the special rugged ports of the network analyzer test set, and one end that connects to the device under test. Special test port adapter sets are also available to convert the rugged ports of the network analyzer test set to the desired connector interface. Each kit contains two adapters, one male and one female.

These cables and special adapters have a 3.5 mm or 2.4 mm ruggedized female connector on one end, which is designed to connect to the 8720 series or 8510 series network analyzer two-port test set. This connector cannot be mated to standard 3.5 mm or 2.4 mm connectors. However, the other end of the cable or adapter has a connector that can be mated to standard 3.5 mm or 2.4 mm connectors.

Test port cables are available for two test configurations as shown below. Configuration A utilizes a single (96.5 cm, [38 inches] long) test port cable for use when the device under test (DUT) is connected directly to the port on the test set. Configuration B utilizes two test port cables, each cable is 62.2 cm [24.5 inches] long. It provides more flexibility since the DUT is connected between the test port cables. See next page for recommended cables/adapters associated with each configuration.

Network Analyzer Accessories and Cal Kits



Configuration A

3.5 mm test set ports

DUT connector	Cables/adapters
3.5 mm	Agilent 85131C semi-rigid cable with a 3.5 mm (f) connector
	Agilent 85131E flexible cable with a 3.5 mm (f) connector
	Agilent 85130D adapter set with 3.5 mm (m,f) connectors
7 mm	Agilent 85132C semi-rigid cable with 7 mm connector
	Agilent 85132E flexible cable with a 7 mm connector
	Agilent 85130B adapter set with 7 mm connectors
Type-N	Use 7 mm cables and the 7 mm to Type-N adapters included in the Agilent 85054B,D calibration kit.

Configuration A

2.4 mm test set ports

DUT Connector	Cables/adapters
2.4 mm	Agilent 85133C semi-rigid cable with a 2.4 mm (f) connector
	Agilent 85133E flexible cable with a 2.4 mm (f) connector
	Agilent 85130G adapter set with 2.4 mm (m,f) connectors
3.5 mm	Agilent 85134C semi-rigid cable with a 3.5 mm (f) connector
	Agilent 85134E flexible cable with a 3.5 mm (f) connector
	Agilent 85130F adapter set with 3.5 mm (m,f) connectors
7 mm	Agilent 85135C semi-rigid cable with a 7 mm connector
	Agilent 85135E flexible cable with a 7 mm connector
	Agilent 85130E adapter set with 7 mm connectors

Cables (for network analyzer)

11857B 75-ohm Type-N test port cables (two)
11857D 50-ohm, APC-7, test-port extension cables
11857F 75-ohm Type-F cables (two)
11851B 50-ohm Type-N cables (four)
N6314A 50-ohm Type-N cable (one)

Configuration B

3.5 mm test set ports

DUT Connector	Cable set
3.5 mm	Agilent 85131D semi-rigid cable set with 3.5 mm (m,f) connectors
	Agilent 85131F flexible cable set with 3.5 mm (m,f) connectors
7 mm	Agilent 85132D semi-rigid cable set with 7 mm connector
	Agilent 85132F flexible cable set with 7 mm connector
Type-N	Use 7 mm cables and the 7 mm to Type-N adapters included in the Agilent 85054B,D calibration kit.

Configuration B

2.4 mm test set ports

DUT Connector	Cable set
2.4 mm	Agilent 85133D semi-rigid cable set with 2.4 mm (m,f) connectors
	Agilent 85133F flexible cable set with 2.4 mm (m,f) connectors
3.5 mm	Agilent 85134D semi-rigid cable set with 3.5 mm (m,f) connectors
	Agilent 85134F flexible cable set with 3.5 mm (m,f) connectors
7 mm	Agilent 85135D semi-rigid cable set with 7 mm connectors
	Agilent 85135F flexible cable set with 7 mm connectors

Accessories

Agilent 11742A blocking capacitor

The Agilent 11742A blocking capacitor blocks dc signals below 45 MHz and passes signals up to 26.5 GHz. Ideal for use with high-frequency oscilloscopes or in biased microwave circuits, the Agilent 11742A will suppress low-frequency signals that can damage expensive measuring equipment or will affect the accuracy of your RF and microwave measurements.

Agilent 85024A high-frequency probe

Makes in-circuit measurements easy. Input capacitance of only 0.7 pF shunted by 1 MΩ resistance permits high-frequency probing without adverse loading of the circuit under test. Excellent frequency response and unity gain guarantee highly accurate swept measurements. High-sensitivity and low-distortion levels allow measurements that take full advantage of the analyzer's dynamic range. Directly compatible with many Agilent RF spectrum network analyzers.

Coaxial mechanical calibration kits

Connector	Frequency range	Type	VNA calibration accuracy	Agilent model	Available options	Page
Type-F(75 ohm)	DC to 3	Economy	5%-1%	85039B	1BP, 1BN, UK6, 00M, 00F	88
Type-N(75 ohm)	DC to 3	Economy	5%-1%	85036E	1BN, 1BP, UK6, 910	89
Type-N(75 ohm)	DC to 3	Standard	5%-1%	85036B	1BN, 1BP, UK6, 910	89
Type-N(50 ohm)	DC to 6	Economy	5%-1%	85032E	1BN, 1BP, UK6, 910	90
Type-N(50 ohm)	DC to 6	Standard	5%-1%	85032B	1BN, 1BP, UK6, 910, 001	90
Type-N(50 ohm)	DC to 9	Standard	5%-1%	85032F	1BN, 1BP, UK6, 100, 200,300,400*	92
Type-N(50 ohm)	0.045 to 18	Economy	5%-1%	85054D	1BN, 1BP, 002	94
Type-N(50 ohm)	0.045 to 18	Standard	2%-0.3%	85054B	1BN, 1BP, 002	93
7-16	DC to 7.5	Standard	2%	85038A	none	95
7-16	DC to 7.5	Standard	2%	85038F	none	95
7-16	DC to 7.5	Standard	2%	85038M	none	95
7 mm	DC to 6	Economy	2%-0.3%	85031B	1BN, 1BP, UK6, 910	96
7 mm	0.045 to 18	Economy	5%-1%	85050D	1BN, 1BP, 910, 002	96
7 mm	0.045 to 18	Standard	2%-0.05%	85050B	1BN, 1BP, 910, 002	97
7 mm	0.045 to 18	Precision	0.3%-0.05%	85050C	1BN, 1BP, 910, 002	98
3.5 mm	DC to 6	Economy	5%-1%	85033D	1BN, 1BP, UK6, 910, 001, 002	99
3.5 mm	DC to 9	Standard	5%-1%	85033E	1BN, 1BP, UK6, 100, 200, 300, 400**,500	100
3.5 mm	0.045 to 26.5	Economy	5%-1%	85052D	1BN, 1BP, 910, 002	101
3.5 mm	0.045 to 26.5	Standard	3%-0.5%	85052B	1BN, 1BP, 910, 002	102
3.5 mm	0.045 to 26.5	Precision	2%-0.5%	85052C	1BN, 1BP, 910, 002	103
2.92 mm	0.045 to 50	Economy	11%-4% (Option 001 65%-3%)	85056K	1BN, 1BP, 001*, 002	104, 105
2.4 mm	0.045 to 50	Economy	5%-1%	85056D	1BN, 1BP, 910, 002	106
2.4 mm	0.045 to 50	Standard	4%-0.5%	85056A	1BN, 1BP, 910, 002	107
1 mm	0.045 to 110	Precision	5%-1%	85059A	none	108, 109

Waveguide mechanical calibrations kits

Connector	Frequency range	Type	VNA calibration accuracy	Agilent model	Available options	Page
WR-90	8.2 to 12.4	Precision	0.3%-0.05%	X11644A	002	110
WR-62	12.4 to 18	Precision	0.3%-0.05%	P11644A	002	111
WR-42	18 to 16.5	Precision	0.3%-0.05%	K11644A	002	112
WR-28	26.5 to 40	Precision	0.3%-0.05%	R11644A	002	113
WR-22	33 to 50	Precision	0.3%-0.05%	Q11644A	002	114
WR-19	40 to 60	Precision	0.3%-0.05%	U11644A	002	115
WR-15	50 to 75	Precision	0.3%-0.05%	V11644A	002	116
WR-10	75 to 110	Precision	0.3%-0.05%	W11644A	002	117

Option description

- 002:** Add calibration/verification data on magnetic tape in addition to 3.5" floppy
- 002*:** Replaces 7 mm to 3.5 mm adapters with Type-N to 3.5 mm adapters
- 1BN:** MIL standard 45662A calibration certification
- 1BP:** MIL standard 45662A calibration certification with test data
- UK6:** Commercial calibration certificate with test data
- 00M:** Includes male standards & male-male adapter
- 00F:** Includes female standards and female-female adapter
- 001:** Deletes 7 mm to 3.5 mm adapters

- 001*:** Adds 2.4 mm sliding load and 2.4 mm gauges
- 001**:** Adds data for Agilent 8702 lightwave component analyzer
- 100:** Includes female-female adapter
- 200:** Includes male-male adapter
- 300:** Includes male-female adapter
- 400*:** Adds four 7 mm to Type-N adapters
- 400**:** Adds four 3.5 mm to Type-N adapters
- 500:** Adds four 7 mm to 3.5 mm adapters
- 910:** Adds extra manual

Coaxial electronic calibration kits (Ecal)

Connector	Frequency range(GHz)	Type	VNA calibration accuracy	Agilent model	Available options	Page
7 mm	30 kHz to 9 GHz	Standard	1% - 0.1%	85091B	See detailed descriptions	118
Type-N (50 ohm)	30 kHz to 9 GHz	Standard	1% - 0.1%	85092B		118, 119, 120
3.5 mm	30 kHz to 9 GHz	Standard	2% - 0.2%	85093B		118, 119, 121
Type-N (75 ohm)	30 kHz to 3 GHz	Standard	N/A	85096B		119
7-16	30 kHz to 7.5 GHz	Standard	N/A	85098B		119
Type-F	30 kHz to 3 GHz	Standard	N//A	85099B		119
7 mm	1 GHz to 18 GHz	Standard	2% - 0.05%	85060B		118, 119, 120
3.5 mm	1 GHz to 26.5 GHz	Standard	3% - 0.5%	85062B		118, 119, 121
Type-N (50 ohm)	1 GHz to 18 GHz	Standard	2% - 0.1%	85064B		118, 119, 120
PC Interface kit	N/A	N/A	N/A	85097A		118

Mechanical verification kits

Connector	Frequency Range(GHz)	Type	VNA calibration accuracy	Agilent model	Available options	Page
Type-N	0.045 to 18 GHz	Precision	N/A	85055A	1BP,002,910	123
7 mm	DC to 6 GHz	Precision	N/A	85092B	1BP,001**,910	123
7 mm	0.045 to 18 GHz	Precision	N/A	85051B	1BP,002,910	124
3.5 mm	0.045 to 26.5 GHz	Precision	N/A	85053B	1BP,002,910	124
2.4 mm	0.045 to 50 GHz	Precision	N/A	85057B	1BP,002,910	125
WR-28	26.5 to 40	Precision	N/A	R11645A	1BP,002	125
WR-22	33 to 50	Precision	N/A	Q11645A	1BP,002	126
WR-19	40 to 60	Precision	N/A	U11645A	1BP,002	126
WR-15	50 to 75	Precision	N/A	V11645A	1BP,002	127
WR-10	75 to 110	Precision	N/A	W11645A	1BP,002	127

Option description

- 002:** Add calibration/verification data on magnetic tape in addition to 3.5" floppy
- 1BN:** MIL standard 45662A calibration certification
- 1BP:** MIL standard 45662A calibration certification with test data
- UK6:** Commercial calibration certificate with test data
- 00M:** Includes male standards & male-male adapter
- 00F:** Includes female standards and female-female adapter
- 001:** Deletes 7 mm to 3.5 mm adapters
- 001*:** Adds 2.4 mm sliding load and 2.4 mm gauges
- 001**:** Adds data for Agilent 8702 lightwave component analyzer
- 910:** Adds extra manual

Agilent 85039B calibration kit, Type-F

The Agilent 85039B 75 Ω type-F calibration kit is used to calibrate Agilent 8752C, Agilent 8753, and Agilent 8712E network analyzer systems for measurements of components with 75 Ω type-F connectors up to 3 GHz.

Electrical specifications

75 Ω Type-F device	Specifications	Frequency
Male load, female load:	Return loss ≥ 45 dB ($\rho \leq 0.006$)	dc to ≤ 1 GHz
	Return loss ≥ 38 dB ($\rho \leq 0.013$)	> 1 to ≤ 3 GHz
Male short¹, female short:	$\pm 0.60^\circ$ from nominal	dc to ≤ 1 GHz
	$\pm 1.00^\circ$ from nominal	> 1 to ≤ 3 GHz
Male open¹, female open:	$\pm 0.55^\circ$ from nominal	dc to ≤ 1 GHz
	$\pm 1.30^\circ$ from nominal	> 1 to ≤ 3 GHz

Adapters

Type-F to Type-F	Return loss ≥ 40 dB ($\rho \leq 0.013$)	dc to ≤ 1 GHz
	Return loss ≥ 32 dB ($\rho \leq 0.025$)	> 1 to ≤ 3 GHz
Type-N to Type-F	Return loss ≥ 38 dB ($\rho \leq 0.013$)	dc to ≤ 1 GHz

¹ The specifications for the open and short are given as allowed deviation from the nominal model as defined in the standard definitions. See Table A-3



Accessories

Agilent 86211A 75 ohm Type-N to Type-F adapter kit

Adapter kit provides Type-N to Type-F adapters necessary when measuring Type-F devices on a network analyzer with 75 ohm Type-N test ports.

Adapter kits

86211A	75 ohm Type-N to Type-F adapter kit
	Type-F (f) to Type-F (f)
	Type-F (m) to Type-N (f)
	Type-F (m) to Type-N (m)

Part Number	Description	85039B	Opt 00M	Opt 00F
85039-60007	75 ohm Type-F male load	X	X	
85039-60008	75 ohm Type-F male short	X	X	
85039-60009	75 ohm Type-F male open	X	X	
85039-60004	75 ohm Type-F female load	X		X
85039-60003	75 ohm Type-F female load	X		X
85039-60005	75 ohm Type-F female load	X		X
85039-60006	75 ohm Type-F male to male adapter	X	X	
85039-60002	75 ohm Type-F female to female adapter	X		X
85039-60013	75 ohm Type-F female to Type-N male adapter	X		
85039-60011	75 ohm Type-F male to Type-N female adapter	X		
Additional adapters available from Agilent but not included in the cal kit.				
85039-60010	75 ohm Type-F male to Type-N male			
85039-60012	75 ohm Type-F male to Type-F female			
85039-60014	75 ohm Type-F female to Type-N female			



Agilent 85036E economy calibration kit, Type-N, 75 ohm

The Agilent 85036E economy calibration kit contains precision type-N (m) fixed termination and a one piece type-N (m) open/short circuit. The kit is specified from DC to 3 GHz.

Agilent 85036B calibration kit, Type-N, 75 ohm

The Agilent 85036B calibration kit contains precision type-N standards used to calibrate Agilent network analyzers for measurement of devices with 75 ohm type-N connectors. Standards include fixed terminations, open circuits, and short circuits in both sexes. Precision phase-matched adapters are included for accurate measurements of non-insertable devices. This kit is specified from DC to 3 GHz.



Electrical specifications

75 ohm Device	Specification	Frequency (GHz)
Type-N loads	Return loss ≥ 46 dB ($\rho \leq 0.00501$)	DC to ≤ 2
	Return loss ≥ 40 dB ($\rho \leq 0.01000$)	>2 to ≤ 3

Replaceable parts for the Agilent 85036E

Item no.	Description	Qty per kit	Agilent replacement part number
Calibration devices			
1	75Ω Type-N male broadband load	1	00909-60019
2	75Ω Type-N male combined open/short	1	85036-60016

Replaceable parts for the Agilent 85036B

Item no.	Description	Qty per kit	Agilent replacement part number
Calibration devices			
1	75Ω Type-N male broadband load	1	00909-60019
2	75Ω Type-N female broadband load	1	00909-60020
3	75Ω Type-N male short	1	85036-60012
4	75Ω Type-N female short	1	85036-60011
5	75Ω Type-N male open	1	85032-60007
6	75Ω Type-N female open body	1	85032-20001
7	75Ω Type-N female open center conductor extender	1	85036-60010
Adapters			
8	Type-N male to male	1	85036-60013
9	Type-N female to female	1	85036-60014
10	Type-N male to female	1	85036-60015

Agilent 85032E economy calibration kit, Type-N, 50 ohm

The Agilent 85032E economy calibration kit contains a type-N (m) fixed termination and a one piece type-N (m) open/short circuit. The kit is specified from DC to 6 GHz.



Parts list

Agilent 11853A

Part number	Qty	Description
1250-1472	2	Type-N female to Type-N female adapter
1250-1475	2	Type-N male to Type-N male adapter
11511A	1	Type-N female short
11512A	1	Type-N male short

Agilent 11854A

Part number	Qty	Description
1250-0929	2	BNC male short
1250-1473	2	BNC male to Type-N male adapter
1250-1474	2	BNC female to Type-N female adapter
1250-1476	2	BNC female to Type-N male adapter
1250-1477	2	BNC male to Type-N female adapter

Agilent 86211A

Part number	Qty	Description
1250-2350	2	Type-F female to Type-F female
1250-2368	1	75 ohm Type-N female to Type-F male
1250-2369	1	75 ohm Type-N male to Type-F male

Coaxial Mechanical Calibration Kits

Agilent 85032B calibration kit, Type-N, 50 ohm

The Agilent 85032B calibration kit contains precision 50 ohm type-N standards used to calibrate Agilent 8712ES, Agilent 8753, PNA Series and 50 ohm test sets for measurement of devices with 50 ohm type-N connectors. Precision phase-matched 7 mm to 50 ohm type-N adapters are included for accurate measurements of non-insertable devices. Standards include fixed terminations, open circuits, and short circuits in both sexes. This kit is specified from DC to 6 GHz. Option 001 removes the precision phase-matched 7 mm to Type-N adapters.



Adapter kits

11853A	50 ohm Type-N accessory kit
	(m) to (m)
	(f) to (f)
	(m) short
	(m) short
11854A	50 ohm BNC accessory kit
	(m) short
	BNC (m) to N (m)
	BNC (f) to N (f)
	BNC (m) to N (f)
	BNC (f) to N (m)

Electrical specifications

The electrical specifications in table 2-2 apply to the devices in both the Agilent 85032B and Agilent 85032E 50 ohm, type-N calibration kits.

Table 2-2 electrical specifications for 50 Ω Type-N devices

Device	Frequency (GHz)	Parameter	Specifications
Loads	DC to ≤2	Return loss	≥49dB (≤0.00355p)
	> 2 to ≤3	Return loss	≥46 dB (≤0.00501p)
	> 3 to ≤6	Return loss	≥40 dB (≤0.01000p)
Female open ¹	DC to ≤6	Deviation from nominal: phase	±0.50° ±0.484° / GHz
Female short ¹	DC to ≤6	Deviation from nominal: phase	±0.490° ±0.385° / GHz
Male open ¹	DC to ≤6	Deviation from nominal: phase	±0.501° ±0.234° / GHz
Male short ¹	DC to ≤6	Deviation from nominal: phase	±0.441° ±0.444° / GHz
Adapters (7 mm to type-N)	DC to ≤6	Return loss	≥30 dB (≤0.03162p)

Replacement parts for Agilent 85032E

Description	Qty per kit	Agilent replacement part number
Calibration devices		
50Ω Type-N male broadband load	1	00909-60009
50Ω Type-N combination male open/short	1	85032-60011

Replacement parts for Agilent 85032B

Description	Qty per kit	Agilent replacement part number
Calibration devices		
50Ω Type-N male broadband load	1	00909-60009
50Ω Type-N female broadband load	1	00909-60010
50Ω Type-N male short	1	85032-60008
50Ω Type-N female short	1	85032-60009
50Ω Type-N male open	1	85032-60007
50Ω Type-N female open ²	1	85032-60012
Adapters (not included with Option 001)		
50Ω Type-N male to 7 mm	2	85054-60009
50Ω Type-N female to 7 mm	2	85054-60001

¹The specifications for the opens and shorts are given as allowed deviation from the nominal model as defined in the standard definitions.

²Includes center conductor extender

Coaxial Mechanical Calibration Kits



Agilent 85032F mechanical calibration kit, Type-N, 50 ohm

The Agilent 85032F calibration kit contains precision 50 ohm Type-N standards used to calibrate Agilent 8712ES, 8753, PNA Series, and 50 ohm test sets for measurements of devices with 50 ohm Type-N connectors. Standards include fixed terminations, open circuits, and short circuits in both sexes. This kit is specified from DC to 9 GHz. Option 001 adds a Type-N female to female adapter, Option 200 adds a Type-N male to male adapter, and Option 300 adds a Type-N female to male adapter. Precision phase-matched 7 mm to 50 ohm Type-N adapters for accurate measurements of non-insertable devices is added with Option 400.

Electrical specifications

Device	Frequency (GHz)	Parameter	Specifications
Loads	DC to ≤ 2	Return loss	≥ 48 dB (≤ 0.0398 p)
	> 2 to ≤ 3	Return loss	≥ 45 dB (≤ 0.00562 p)
	> 3 to ≤ 6	Return loss	
	> 6 to ≤ 9	Return loss	≥ 40 dB (≤ 0.010 p)
Opens	DC to ≤ 3	Deviation from nominal: phase	$\pm 0.65^\circ$
	> 3 to ≤ 9	Deviation from nominal: phase	$\pm 1.00^\circ$
Shorts	DC to ≤ 3	Deviation from nominal: phase	$\pm 0.65^\circ$
	> 3 to ≤ 9	Deviation from nominal: phase	$\pm 1.00^\circ$
Adapters			

Replacement parts for Agilent 85032F

Description	Qty per kit	Agilent replacement part number
Calibration devices		
50Ω Type-N male broadband load	1	85032-60017
50Ω Type-N female broadband load	1	85032-60018
50Ω Type-N male open	1	85032-60013
50Ω Type-N female open	1	85032-60014
50Ω Type-N male short	1	85032-60016
50Ω Type-N female short	1	85032-60015
Adapters		
50Ω Type-N (f) to Type-N (f) adapter (Option 100)	1	85032-60021
50Ω Type-N (m) to Type-N (m) adapter (Option 200)	1	85032-60019
50Ω Type-N (m) to Type-N (f) adapter (Option 300)	1	85032-60020
50Ω Type-N (f) to 7 mm adapter (Option 400)	2	85054-60001
50Ω Type-N (m) to 7 mm adapter (Option 400)	2	85054-60009



Agilent 85054B mechanical calibration kit, Type-N

The Agilent 85054B mechanical calibration kit contains precision standard devices to characterize the systematic errors of the Agilent 8720 series or 8510C network analyzer system in the Type-N interface. This kit also contains adapters to change the sex of the test port, connector gages for verifying and maintaining in the connector interface, and a torque wrench for proper connection. Included are standards definitions on disk for the 8510C.

Electrical specifications

Device	Frequency (GHz)	Parameter	Specifications
Lowband loads	DC to ≤ 2	Return loss	$\geq 48\text{dB}$ ($\leq 0.00398 \rho$)
Sliding loads	> 2 to ≤ 18	Return loss	$\geq 42\text{dB}$ ($\leq 0.00794 \rho$)
Adapters (both types)	DC to ≤ 8	Return loss	$\geq 34\text{dB}$ ($\leq 0.00200 \rho$)
	> 8 to ≤ 18	Return loss	$\geq 28\text{ dB}$ ($\leq 0.00398 \rho$)
Offset opens	at 18	Deviation from nominal: phase	$\pm 1.5^\circ$
Offset shorts	at 18	Deviation from nominal: phase	$\pm 1.0^\circ$

Replaceable parts

Description	Qty per kit	Agilent replacement part number
Type-N (m) sliding load	1	85054-60035
Type-N (f) sliding load	1	85054-60036
Type-N (m) lowband load	1	00909-60011
Type-N (f) lowband load	1	00909-60012
Type-N (m) offset short	1	85054-60025
Type-N (f) offset short	1	85054-60026
Type-N (m) offset open	1	85054-60027
Type-N (f) offset open	1	85054-60028
Type-N (m) to Type-N (m)	1	85054-60038
Type-N (f) to Type-N (f)	1	85054-60037
Type-N (f) to 7 mm	2	85054-60031
Type-N (m) to 7 mm	2	85054-60032
$\frac{3}{4}$ in., 135 N-cm (12 in-lb) torque Spanner	1	8710-1766
Screw-on N gage	1	08513-20014
Type-N gage set (includes items listed below)	1	85054-80011
Type-N gage (f)	1	85054-60050
Type-N gage master (f)	1	85054-60052
Type-N gage (m)	1	85054-60051
Type-N gage master (m)	1	85054-60053
Centering beads	2	85054-80028

Agilent 85054D economy mechanical calibration kit, Type-N

The Agilent 85054D type-N economy calibration kit is used to calibrate network analyzer systems (such as the Agilent 8510 or Agilent 8720 series) for measurements of components with type-N connectors up to 18 GHz.



Electrical specifications

Device	Frequency (GHz)	Parameter	Specifications
Broadband loads	DC to ≤ 2	Return loss	≥ 40 dB ($\leq 0.01000 \rho$)
	> 2 to ≤ 8	Return loss	≥ 36 dB ($\leq 0.01585 \rho$)
	> 8 to ≤ 18	Return loss	≥ 42 dB ($\leq 0.01995 \rho$)
Adapters (both types)	DC to ≤ 8	Return loss	≥ 34 dB ($\leq 0.00200 \rho$)
	> 8 to ≤ 18	Return loss	≥ 28 dB ($\leq 0.00398 \rho$)
Offset opens	at 18	Deviation from nominal: phase	$\pm 1.5^\circ$
Offset shorts	at 18	Deviation from nominal: phase	$\pm 1.0^\circ$

Replaceable parts

Description	Qty per kit	Agilent replacement part number
Type-N broadband load (m)	1	85054-60046
Type-N broadband load (f)	1	85054-60047
Type-N offset short (m)	1	85054-60025
Type-N offset short (f)	1	85054-60026
Type-N offset open (m)	1	85054-60027
Type-N offset open (f)	1	85054-60028
Type-N (m) to Type-N (m)	1	85054-60038
Type-N (f) to Type-N (f)	1	85054-60037
Type-N (f) to 7 mm	2	85054-60031
Type-N (m) to 7 mm	2	85054-60032
3/4 in., 135 N-cm (12 in-lb) torque Spanner	1	8710-1766
	1	08513-20014

Agilent 85038A 7-16 calibration kit

The Agilent 85038A 7-16 calibration kit contains fixed loads and open and short circuits in both sexes. It can be used to calibrate the Agilent 8753, PNA Series, and Agilent 8712E network analyzers for measurement of components with 50 ohm 7-16 connectors up to 7.5 GHz.

The Agilent 85038M and Agilent 85038F are single sex calibration kits and contain male only and female only standards respectively.



Electrical specifications

Frequency range	dc to 7.5 GHz
Reference impedance	50 ohms
Short circuits:	
Reflection coefficient	0.99 minimum
Open circuits:	
Reflection coefficient	0.99 minimum
Reflection phase	+/- 1 degree
Fixed termination:	
VSWR	1.02 maximum

Parts list

Agilent 85038A 7-16 calibration kit

Part number	Description	85038A	85038M	85038F
85038-80002	Open female	X		X
85038-80003	Open male	X	X	
85038-80004	Short female	X		X
85038-80005	Short male	X	X	
85038-80006	Load female	X		X
85038-80007	Load male	X	X	
85038-80015	Male to male adapter		X	
85038-80016	Female to female adapter			X

Agilent also offers the following adapter kits:

Agilent 11906A 7-16 to 7-16

Part number	Qty	Description
11906-80015	1	7-16 male to 7-16 male
11906-80016	1	7-16 female to 7-16 female
11906-80017	1	7-16 female to 7-16 male

Agilent 11906C 7-16 to 7 mm

Part number	Qty	Description
11906-80012	1	7 mm to 7-16 male
11906-80013	1	7 mm to 7-16 female

Agilent 11906B 7-16 to Type-N 50 ohm

Part number	Qty	Description
11906-80007	1	Type-N male to 7-16 male
11906-80008	1	Type-N female to 7-16 female
11906-80009	1	Type-N female to 7-16 male
11906-80010	1	Type-N male to 7-16 female

Agilent 11906D 7-16 to 3.5 mm

Part number	Qty	Description
11906-80002	1	3.5 mm male to 7-16 male
11906-80003	1	3.5 mm female to 7-16 female
11906-80004	1	3.5 mm female to 7-16 male
11906-80005	1	3.5 mm male to 7-16 female

Agilent 85031B calibration kit, 7 mm

The Agilent 85031B calibration kit contains a set of precision 7 mm fixed terminations, and a one-piece open/short circuit used to calibrate the PNA Series, Agilent 8753, and its 50 ohm test sets for measurement of devices with precision 7 mm connectors. This kit is specified 300 kHz to 6 GHz.

Device	Specification	
50 ohm loads	dc to 5 GHz	Return loss ≥ 52 dB
	5 to 6 GHz	Return loss ≥ 46 dB
	6 to 18 GHz	Return loss (typical) ≥ 26.4 dB

Part or model number	Quantity	Description
85031-60001	1	7 mm 50 ohm combination open/short
00909-60008	2	7 mm 50 ohm terminations



12

Agilent 85050D, 7 mm economy mechanical calibration kit

The Agilent 85050D economy mechanical calibration kit contains precision standard devices to characterize the systematic errors of the Agilent 8720 series or 8510C network analyzer system in the 7 mm interface. This kit also contains adapters to change the sex of the test port and a torque wrench for proper connection. Included are standards definitions on disk for the 8510C. Connector gages may be ordered separately.

Electrical specifications

Device	Specifications	Frequency (GHz)
Broadband loads	≥ 38 dB return loss	dc to 18 GHz
	$\pm 0.2^\circ$ from nominal	dc to 2 GHz
	$\pm 0.3^\circ$ from nominal	2 to 8 GHz
Short (collet style)	$\pm 0.5^\circ$ from nominal	8 to 18 GHz
	$\pm 0.3^\circ$ from nominal	dc to 2 GHz
	$\pm 0.4^\circ$ from nominal	2 to 18 GHz
Open with collet pusher	$\pm 0.6^\circ$ from nominal	8 to 18 GHz

Replaceable parts

Description	Qty per kit	Agilent replacement part number
7 mm broadband load	1	85050-60006
7 mm short	1	85050-80007
7 mm open	1	85050-80010

Agilent 85050B mechanical calibration kit, 7 mm

The Agilent 85050B mechanical calibration kit contains precision standard devices to characterize the systematic errors of the Agilent 8720 series or 8510C network analyzer system in the 7 mm interface. This kit also contains adapters to change the sex of the test port, connector gages for verifying and maintaining the connector interface, and a torque wrench for proper connection. Included are standards definitions on disk for the 8510C.



Electrical specifications

Device	Specifications	Frequency (GHz)
Lowband loads	≥52 dB return loss	dc to 2 GHz
Broadband loads	≥38 dB return loss	dc to 18 GHz
Short collet style	±0.2° from nominal	dc to 2 GHz
	±0.3° from nominal	2 to 8 GHz
	±0.5° from nominal	8 to 18 GHz
Open with collet pusher	±0.3° from nominal	dc to 2 GHz
	±0.4° from nominal	2 to 18 GHz
	±0.6° from nominal	8 to 18 GHz

Replaceable parts

Description	Qty per kit	Agilent replacement part number
7 mm lowband load	1	00909-60008
7 mm sliding load	1	85050-60014
7 mm broadband load	1	85050-60006
7 mm short	1	85050-80007
7 mm open	1	85050-80010
7 mm center conductor collets	4	85050-20001
7 mm connector collet extractor tool	1	5060-0370
3/4 in., 135 N-cm (12 in-lb) torque	1	8710-1766

Agilent 85050C, 7 mm precision mechanical calibration kit

The Agilent 85050C precision mechanical calibration kit contains precision standard devices to characterize the systematic errors of the Agilent 8720 series or 8510C network analyzer system in the 7 mm interface. This kit also contains adapters to change the sex of the test port, connector gages for verifying and maintaining the connector interface, and a torque wrench for proper connection. Included are standards definitions on disk for the 8510C.



Electrical specifications

Device	Specifications	Frequency (GHz)
Lowband loads	≥52 dB return loss	dc to 2 GHz
Broadband loads	≥38 dB return loss	dc to 18 GHz
Short (collet style)	±0.2° from nominal	dc to 2 GHz
	±0.3° from nominal	2 to 8 GHz
	±0.5° from nominal	8 to 18 GHz
Open with collet pusher	±0.3° from nominal	dc to 2 GHz
	±0.4° from nominal	2 to 18 GHz
	±0.6° from nominal	8 to 18 GHz
Precision airline	>60 dB return loss	2 to 18 GHz

Replaceable parts

Description	Qty per kit	Agilent replacement part number
7 mm broadband load	1	85050-60006
7 mm lowband load	1	00909-60008
7 mm short (collet style)	1	85050-80009
7 mm short (threaded center conductor style)	1	85050-80008
TRL adapter	1	85050-60005
7 mm open	1	85050-80010
7 mm precision airline	1	85050-80010
3/4 in., 135 N-cm (12 in-lb) torque	1	8710-1766
7 mm connector collet extractor	1	5060-0370

Agilent 85033D calibration kit, 3.5 mm

The Agilent 85033D calibration kit contains fixed loads and open and short circuits in both sexes to calibrate the 50 ohm test sets for measurement of devices with precision 3.5 mm and SMA connectors. Phase-matched 7 mm to 3.5 mm adapters for male and female connectors are included for use with 7 mm test port cables. This kit is specified from dc to 6 GHz. Option 001 removes the precision phase-matched 7 mm to 3.5 mm adapter.



Electrical specifications

Device	Specifications	Frequency (GHz)
Broadband loads (male and female)	Return loss ≥ 46 dB ($\rho \leq 0.005$)	dc to ≤ 1.3
	Return loss ≥ 44 dB ($\rho \leq 0.006$)	> 1.3 to ≤ 3
	Return loss ≥ 38 dB ($\rho \leq 0.013$)	> 3 to ≤ 6
Offset opens ¹ (male and female)	$\pm 0.65^\circ$ from nominal	dc to ≤ 1.3
	$\pm 0.65^\circ$ from nominal	> 1.3 to ≤ 3
	$\pm 0.85^\circ$ from nominal	> 3 to ≤ 6
Offset shorts ¹ (male and female)	$\pm 0.48^\circ$ from nominal	dc to ≤ 1.3
	$\pm 0.50^\circ$ from nominal	> 1.3 to ≤ 3
	$\pm 0.55^\circ$ from nominal	> 3 to ≤ 6

¹ The specifications for the open and short are given as allowed deviation from the nominal model as defined in the standard definitions.

Replaceable parts

Item No.	Description	Qty per kit	Agilent replacement part number
Calibration devices			
1	3.5 mm male broadband load	1	85033-60009
2	3.5 mm female broadband load	1	85033-60010
3	3.5 mm male offset open	1	85033-60011
4	3.5 mm female offset open	1	85033-60012
5	3.5 mm male offset short	1	85033-60013
6	3.5 mm female offset short	1	85033-60014
Adapters (not included with option 001)			
7	7 mm to 3.5 mm male	2	85052-60004
8	7 mm to 3.5 mm female	2	85052-60003
Adapters (Option 002)			
9	Type-N male to 3.5 mm male	1	1250-1743
10	Type-N male to 3.5 mm female	1	1250-1744
11	Type-N female to 3.5 mm female	1	1250-1745
12	Type-N female to 3.5 mm male	1	1250-1750

**Agilent 85033E
mechanical calibration kit, 3.5 mm**

The Agilent 85033E calibration kit contains precision 3.5 mm standards used to calibrate Agilent 8712ES, 8753, PNA Series, and 50 ohm test sets for measurements of devices 3.5 mm connectors. Standards include fixed terminations, open circuits, and short circuits in both sexes. This kit is specified from DC to 9 GHz. Option 001 adds a Type-N female to female adapter, Option 200 adds a Type-N male to male adapter, and Option 300 adds a Type-N female to male adapter. Precision phase-matched Type-N to 3.5 mm adapters for accurate measurements of non-insertable devices is added with Option 400 while Option 500 provides phase-matched 7 mm to 3.5 mm adapters.

Electrical specifications

Device	Frequency (GHz)	Parameter	Specifications
Loads	DC to ≤2	Return loss	≥46dB (≤0.005p)
	> 2 to ≤3	Return loss	≥44 dB (≤0.006p)
	> 3 to ≤9	Return loss	≥38 dB (≤0.013p)
Opens	DC to ≤2	Deviation from nominal: phase	±0.55°
	> 2 to ≤3	Deviation from nominal: phase	±0.65°
	> 3 to ≤6	Deviation from nominal: phase	±0.85°
Shorts	> 6 to ≤9	Deviation from nominal: phase	±1.00°
	DC to ≤2	Deviation from nominal: phase	±0.48°
	> 2 to ≤3	Deviation from nominal: phase	±0.50°
	> 3 to ≤6	Deviation from nominal: phase	±0.55°
	> 6 to ≤9	Deviation from nominal: phase	±0.65°

Replaceable parts for Agilent 85033E

Description	Qty per kit	Agilent replacement part number
3.5 mm male broadband load	1	85033-60016
3.5 mm female broadband load	1	85033-60017
3.5 mm male open	1	85033-60018
3.5 mm female open	1	85033-60019
3.5 mm male short	1	85033-60020
3.5 mm female short	1	85033-60021
Adapters		
3.5 mm (f) to (f) adapter (Option 100)	1	85027-60005
3.5 mm (m) to (m) adapter (Option 200)	1	85027-60007
3.5 mm (m) to (f) adapter (Option 300)	1	85027-60006
3.5 mm (f) to Type-N (f) adapter (Option 400)	1	1250-1745
3.5 mm (f) to Type-N (m) adapter (Option 400)	1	1250-1744
3.5 mm (m) to Type-N (f) adapter (Option 400)	1	1250-1750
3.5 mm (m) to Type-N (m) adapter (Option 400)	1	1250-1743
3.5 mm (f) to 7 mm adapter (Option 500)	1	1250-1746
3.5 mm (m) to 7 mm adapter (Option 500)	1	1250-1747

**Agilent 85052D
economy mechanical calibration kit, 3.5 mm**

The Agilent 85052D economy mechanical calibration kit contains precision standard devices to characterize the systematic errors of the Agilent 8720 series or 8510C network analyzer system in the 3.5 mm interface. This kit also contains adapters to change the sex of the test port and a torque wrench for proper connection. Included are standards definitions on disk for the 8510C. Connector gages may be ordered separately.



Electrical specifications

Device	Specifications	Frequency (GHz)
Broadband loads	≥46 dB return loss (≤0.00501p)	dc to ≤2
	≥44 dB return loss (≤0.00631p)	> 2 to ≤3
	≥38 dB return loss (≤0.01259p)	> 3 to ≤8
	≥36 dB return loss (≤0.01585p)	> 8 to ≤20
	≥34 dB return loss (≤0.01995p)	> 20 to ≤26.5
Adapters	30 ≥dB return loss (≤0.03162p)	dc to ≤8
	28 ≥dB return loss (≤0.03981p)	>8 to ≤18
	26 ≥dB return loss (≤0.05012p)	>18 to ≤26.5
Offset opens	±0.65° from nominal	dc to ≤3
	±1.20° from nominal	> 3 to ≤8
	±2.00° from nominal	> 8 to ≤20
	±2.00° from nominal	> 20 to ≤26.5
Offset shorts	±0.50° from nominal	dc to ≤3
	±1.00° from nominal	> 3 to ≤8
	±1.75° from nominal	> 8 to ≤20
	±1.75° from nominal	> 20 to ≤26.5

Replaceable parts

Description	Qty per kit	Agilent replacement part number
3.5 mm broadband load (m)	1	00902-60003
3.5 mm broadband load (f)	1	00902-60004
3.5 mm offset short (m)	1	85052-60006
3.5 mm offset short (f)	1	85052-60007
3.5 mm offset open (m)	1	85052-60008
3.5 mm offset open (f)	1	85052-60009
3.5 mm (m) to 3.5 mm (m)	1	85052-60014
3.5 mm (m) to 3.5 mm (f)	1	85052-60013
3.5 mm (f) to 3.5 mm (f)	1	85052-60012
5/16 in., 90 N-cm (8 in-lb) Torque	1	8710-1765
7 mm open-end	1	8710-1761

**Agilent 85052B
mechanical calibration kit, 3.5 mm**

The Agilent 85052B mechanical calibration kit contains precision standard devices to characterize the systematic errors of the Agilent 8720 series or 8510C network analyzer system in the 3.5 mm interface. This kit also contains adapters to change the sex of the test port, connector gages for verifying and maintaining the connector interface, and a torque wrench for proper connection. Included are standards definitions on disk for the 8510C.



Electrical specifications

Device	Specifications	Frequency (GHz)
Broadband loads	≥46 dB return loss (≤0.00501p)	dc to ≤2
	≥44 dB return loss (≤0.00631p)	> 2 to ≤3
	≥38 dB return loss (≤0.01259p)	> 3 to ≤8
	≥36 dB return loss (≤0.01585p)	> 8 to ≤20
	≥34 dB return loss (≤0.01995p)	> 20 to ≤26.5
Sliding loads	≥44 dB return loss (≤0.00631p)	3 to ≤26.5
Adapters	30 ≥dB return loss (≤0.03162p)	dc to ≤8
	28 ≥dB return loss (≤0.03981p)	>8 to ≤18
	26 ≥dB return loss (≤0.05012p)	>18 to ≤26.5
Offset opens	±0.65° from nominal	dc to ≤3
	±1.20° from nominal	3 to ≤8
	±2.00° from nominal	> 8 to ≤20
	±2.00° from nominal	20 to ≤26.5
Offset shorts	±0.50° from nominal	dc to ≤3
	±1.00° from nominal	> 3 to ≤8
	±1.75° from nominal	> 8 to ≤20
	±1.75° from nominal	> 20 to ≤26.5

12

Replaceable parts

Description	Qty per kit	Agilent replacement part number
3.5 mm sliding load (m)	1	00911-60019
3.5 mm sliding load (f)	1	00911-60020
3.5 mm broadband load (m)	1	00902-60003
3.5 mm broadband load (f)	1	00902-60004
3.5 mm offset short (m)	1	85052-60006
3.5 mm offset short (f)	1	85052-60007
3.5 mm offset open (m)	1	85052-60008
3.5 mm offset open (f)	1	85052-60009
3.5 mm (m) to 3.5 mm (m)	1	85052-60014
3.5 mm (m) to 3.5 mm (f)	1	85052-60013
3.5 mm (f) to 3.5 mm (f)	1	85052-60012
5/16 in., 90 N-cm (8 in-lb) torque	1	8710-1765
7 mm open-end	1	8710-1761

**Agilent 85052C
mechanical calibration kit, 3.5 mm**

The Agilent 85052C is a laboratory-grade 3.5 mm calibration kit. Its purpose is to provide high-quality calibrations up to 26.5 GHz for microwave network analyzers such as the Agilent 8510 and Agilent 8720 and PNA Series using the TRL (thru-reflect-line) calibration method. The calibration devices in this kit have very precise mechanical dimensions and must be handled with care.



Electrical specifications

Device	Specifications	Frequency (GHz)
Broadband loads	≥46 dB return loss (≤0.00501p)	dc to ≤2
	≥44 dB return loss (≤0.00631p)	> 2 to ≤3
	≥38 dB return loss (≤0.01259p)	> 3 to ≤8
	≥36 dB return loss (≤0.01585p)	> 8 to ≤20
	≥34 dB return loss (≤0.01995p)	> 20 to ≤26.5
Long precision airline	≥56 dB return loss (≤0.00158p)	> 2 to ≤7
Short precision airline	≥50 dB return loss (≤0.00316p)	> 7 to ≤26.5
Precision adapters	≥30 dB return loss (≤0.03162p)	dc to ≤20
	≥27 dB return loss (≤0.00447p)	>20 to ≤26.5
Offset opens	±0.65° from nominal	dc to ≤3
	±1.20° from nominal	> 3 to ≤8
	±2.00° from nominal	> 8 to v20
	±2.00° from nominal	> 20 to ≤26.5
Offset shorts	±0.50° from nominal	dc to ≤3
	±1.00° from nominal	> 3 to ≤8
	±1.75° from nominal	> 8 to ≤20
	±1.75° from nominal	> 20 to ≤26.5

Replaceable parts

Description	Qty per kit	Agilent replacement part number
3.5 mm broadband load (m)	1	00902-60003
3.5 mm broadband load (f)	1	00902-60004
3.5 mm offset short (m)	1	85052-60006
3.5 mm offset short (f)	1	85052-60007
3.5 mm offset open (m)	1	85052-60008
3.5 mm offset open (f)	1	85052-60009
3.5 mm (m) to 3.5 mm (m)	1	85052-60033
3.5 mm (m) to 3.5 mm (f)	1	85052-60032
3.5 mm (f) to 3.5 mm (f)	1	85052-60034
Long precision airline, 2-7 GHz (includes insertion tool)	1	85052-60036
Short precision airline, 7-32 GHz (includes insertion tool)	1	85052-60035
Spanner	1	08513-20014
5/16 in., 90 N-cm (8 in-lb) torque	1	8710-1765
Hex balldriver, 4mm	1	8710-1933
Adapter anti-rotation clamp	2	85052-20060

**Agilent 85056K
mechanical calibration kit, 2.4 mm & 2.92 mm**

The Agilent 85056K calibration kit was designed to give network analyzer systems with 2.4 mm test ports, such as the Agilent 8510 or Agilent 8722, the ability to perform measurements on devices with 2.92 mm connectors. The kit can be used to achieve calibrated measurements of 2.92 mm devices up to 40 GHz, and 2.4 mm devices up to 50 GHz.



Electrical specifications

Device	Frequency (GHz)	Parameter	Specifications
Broadband loads	DC to ≤4	Return loss	≥42dB (≤0.00794p)
	> 4 to ≤20	Return loss	≥34 dB (≤0.01995p)
	> 20 to ≤26.5	Return loss	≥30 dB (≤0.03163p)
	> 26.5 to ≤50	Return loss	≥30 dB (≤0.05019p)
Sliding loads	4 to ≤20	Return loss	≥42dB (≤0.00794p)
	> 20 to ≤36	Return loss	≥40 dB (≤0.01000p)
	> 36 to ≤40	Return loss	≥38 dB (≤0.01259p)
	> 40 to ≤50	Return loss	≥36 dB (≤0.01585p)
Adapters (2.4 mm to 2.4 mm)	DC to ≤4	Return loss	≥32dB (≤0.02512p)
	> 4 to ≤26.5	Return loss	≥30 dB (≤0.03162p)
	> 26.5 to ≤40	Return loss	≥25 dB (≤0.05623p)
	> 40 to ≤50	Return loss	≥20 dB (≤0.01000p)
Adapters (2.4 mm to 2.92 mm)	DC to ≤40	Return loss	≥24dB (≤0.06310p)
Offset opens	DC to ≤2	Deviation from nominal:	±0.5°
	> 2 to ≤20	Deviation from nominal:	±1.25°
	> 20 to ≤40	Deviation from nominal:	±1.75°
	> 40 to ≤50	Deviation from nominal:	±2.25°
Offset shorts	DC to ≤2	Deviation from nominal:	±0.5°
	> 2 to ≤20	Deviation from nominal:	±1.25°
	> 20 to ≤40	Deviation from nominal:	±1.5°
	> 40 to ≤50	Deviation from nominal:	±2.0°

2.4 mm to 2.92 mm adapter characteristics

Frequency (GHz)	Parameter	Typical Value
DC to ≤2	Return loss	≥38 dB (≤0.01259p)
> 2 to ≤20	Return loss	≥35 dB (≤0.01778p)
> 20 to ≤40	Return loss	≥30 dB (≤0.03162p)
DC to ≤40	Electrical length	39.631 ps ±0.14 ps
DC to ≤40	Insertion loss	< 0.075 dB

Agilent 85056K mechanical calibration kit, 2.4 mm & 2.92 mm (continued)

Replaceable parts

Description	Qty per kit	Agilent replacement part number
2.4 mm broadband load (m)	1	00901-60003
2.4 mm broadband load (f)	1	00901-60004
2.4 mm offset short (m)	1	85056-60020
2.4 mm offset short (f)	1	85056-60021
2.4 mm offset open (m)	1	85056-60022
2.4 mm offset open (f)	1	85056-60023
2.4 mm (m) to 2.4 mm (m)	1	85056-60005
2.4 mm (f) to 2.4 mm (f)	1	85056-60006
2.4 mm (f) to 2.4 mm (m)	1	85056-60007
2.4 mm (m) to 2.92 mm (m)	1	11904-60001
2.4 mm (m) to 2.92 mm (f)	1	11904-60003
2.4 mm (f) to 2.92 mm (m)	1	11904-60004
2.4 mm (f) to 2.92 mm (f)	1	11904-60002
$\frac{5}{16}$ in., 90 N-cm (8 in-lb) torque	1	8710-1765
$\frac{5}{16}$ in., 56 N-cm (5 in-lb) torque	1	8710-1582
7 mm open-end	1	8710-1761
2.4 mm sliding load (m)	1	00915-60003
2.4 mm sliding load (f)	1	00915-60004
2.4 mm (m/f) gage set	1	11752E
Centering bead (for gaging 2.4 mm sliding load)	2	85056-20001
Tube package	1	15040-0803

**Agilent 85056D
economy mechanical calibration kit, 2.4 mm**

The Agilent 85056D economy mechanical calibration kit contains precision standard devices to characterize the systematic errors of the Agilent 8720 series or 8510C network analyzer system in the 2.4 mm interface. This kit also contains adapters to change the sex of the test port and a torque wrench for proper connection. Included are standards definitions on disk for the 8510C. Connector gages may be ordered separately.



Electrical specifications

Device	Frequency (GHz)	Parameter	Specifications
Broadband loads	DC to ≤4	Return loss	≥42dB (≤0.00794ρ)
	> 4 to ≤20	Return loss	≥34 dB (≤0.01995ρ)
	> 20 to ≤26.5	Return loss	≥30 dB (≤0.03163ρ)
	> 26.5 to ≤50	Return loss	≥30 dB (≤0.05019ρ)
Adapters (2.4 mm to 2.4 mm)	DC to ≤4	Return loss	≥32dB (≤0.02512ρ)
	> 4 to ≤26.5	Return loss	≥30 dB (≤0.03162ρ)
	> 26.5 to ≤40	Return loss	≥25 dB (≤0.05623ρ)
	> 40 to ≤50	Return loss	≥20 dB (≤0.01000ρ)
Offset opens	DC to ≤2	Deviation from nominal:	±0.5°
	> 2 to ≤20	Deviation from nominal:	±1.25°
	> 20 to ≤40	Deviation from nominal:	±1.75°
	> 40 to ≤50	Deviation from nominal:	±2.25°
Offset shorts	DC to ≤2	Deviation from nominal:	±0.5°
	> 2 to ≤20	Deviation from nominal:	±1.25°
	> 20 to ≤40	Deviation from nominal:	±1.5°
	> 40 to ≤50	Deviation from nominal:	±2.0°

12

Replaceable parts

Description	Qty per kit	Agilent replacement part number
2.4 mm broadband load (m)	1	00901-60003
2.4 mm broadband load (f)	1	00901-60004
2.4 mm offset short (m)	1	85056-60020
2.4 mm offset short (f)	1	85056-60021
2.4 mm offset open (m)	1	85056-60022
2.4 mm offset open (f)	1	85056-60023
2.4 mm (m) to 2.4 mm (m)	1	85056-60005
2.4 mm (m) to 2.4 mm (f)	1	85056-60006
2.4 mm (f) to 2.4 mm (f)	1	85056-60007
5/16 in., 90 N-cm (8 in-lb) torque	1	8710-1765
7 mm open-end	1	8710-1761

Agilent 85056A calibration kit

The Agilent 85056A 2.4 mm calibration kit is used to calibrate network analyzer systems (such as the Agilent 8510 or Agilent 8722) for measurements of components with 2.4 mm connectors up to 50 GHz.



Electrical specifications

Device	Frequency (GHz)	Parameter	Specifications
Broadband loads	DC to ≤4	Return loss	≥42dB (≤0.00794p)
	> 4 to ≤20	Return loss	≥34 dB (≤0.01995p)
	> 20 to ≤26.5	Return loss	≥30 dB (≤0.03163p)
	> 26.5 to ≤50	Return loss	≥30 dB (≤0.05019p)
Sliding loads	4 to ≤20	Return loss	≥42dB (≤0.00794p)
	> 20 to ≤36	Return loss	≥40 dB (≤0.01000p)
	> 36 to ≤40	Return loss	≥38 dB (≤0.01259p)
	> 40 to ≤50	Return loss	≥36 dB (≤0.01585p)
Adapters (2.4 mm to 2.4 mm)	DC to ≤4	Return loss	≥32dB (≤0.02512p)
	> 4 to ≤26.5	Return loss	≥30 dB (≤0.03162p)
	> 26.5 to ≤40	Return loss	≥25 dB (≤0.05623p)
	> 40 to ≤50	Return loss	≥20 dB (≤0.01000p)
Offset opens	DC to ≤2	Deviation from nominal:	±0.5°
	> 2 to ≤20	Deviation from nominal:	±1.25°
	> 20 to ≤40	Deviation from nominal:	±1.75°
	> 40 to ≤50	Deviation from nominal:	±2.25°
Offset shorts	DC to ≤2	Deviation from nominal:	±0.5°
	> 2 to ≤20	Deviation from nominal:	±1.25°
	> 20 to ≤40	Deviation from nominal:	±1.5°
	> 40 to ≤50	Deviation from nominal:	±2.0°

Replaceable parts

Description	Qty per kit	Agilent replacement part number
2.4 mm sliding load (m)	1	00915-60003
2.4 mm sliding load (f)	1	00915-60004
2.4 mm broadband load (m)	1	00901-60003
2.4 mm broadband load (f)	1	00901-60004
2.4 mm offset short (m)	1	85056-60020
2.4 mm offset short (f)	1	85056-60021
2.4 mm offset open (m)	1	85056-60022
2.4 mm offset open (f)	1	85056-60023
2.4 mm (m) to 2.4 mm (m)	1	85056-60005
2.4 mm (m) to 2.4 mm (f)	1	85056-60006
2.4 mm (f) to 2.4 mm (f)	1	85056-60007
5/16 in., 90 N-cm (8 in-lb) torque	1	8710-1765
7 mm open-end	1	8710-1761

**Agilent 85059A
precision calibration/verification kit, 1.0 mm**

The Agilent 85059A is a 1.0 mm calibration/verification kit designed for vector network analyzer systems operating over the frequency range of 45 MHz to 110 GHz. The opens, shorts and loads in this kit were optimized to provide accurate calibrations over the specified frequency range. For best results, the calibration techniques recommended are the open-short-load-thru (OSLT) calibration from 45 MHz to 50 GHz, and the offset-shorts calibration from 50 GHz to 110 GHz, all in one calibration sequence.



Electrical specifications for 1.0 mm 50 ohm devices

Device	Frequency (GHz)	Parameter	Specifications	
			Male	Female
Loads	DC to 2 GHz	Return loss	30 dB	30 dB
	2 GHz to 18 GHz		30 dB	30 dB
	18 GHz to 40 GHz		26 dB	26 dB
	40 GHz to 50 GHz		24 dB	24 dB
Opens	DC to 2 GHz	Deviation from nominal phase	±1.0°	±1.0°
	2 GHz to 18 GHz		±1.5°	±3.0°
	18 GHz to 50 GHz		±2.5°	±4.0°
Short 3	DC to 2 GHz	Deviation from nominal phase	±0.8°	±1.0°
	2 GHz to 18 GHz		±1.2°	±2.0°
	18 GHz to 50 GHz		±1.5°	±2.5°
	50 GHz to 110 GHz		±3.0°	±5.0°
Short 1	50 GHz to 110 GHz	Deviation from nominal phase	±2.5°	±4.0°
Short 2	75 GHz to 110 GHz	Deviation from nominal phase	±2.5°	±4.0°
Short 4	50 GHz to 75 GHz	Deviation from nominal phase	±2°	±4.5°

12

Device	Frequency (GHz)	Parameter	Specifications
Lossy delay line	DC to 110 GHz	Return loss	18 dB
Adapters	DC to 20 GHz	Return loss	24 dB
	20 GHz to 50 GHz		20 dB
	50 GHz to 75 GHz		18 dB
	75 GHz to 110 GHz		14 dB
Verification match Thru (adapter)	DC to 20 GHz	Return loss	24 dB
	20 GHz to 50 GHz		20 dB
	50 GHz to 75 GHz		18 dB
	75 GHz to 110 GHz		14 dB
Verification mismatch Thru (adapter)	DC to 110 GHz	Return loss	6 dB @ ~22.6 GHz intervals

Agilent 85059A precision calibration/verification kit, 1.0 mm (continued)

Replaceable parts

Description	Qty per kit	Agilent replacement part number
Shorts:		
M short 3	1	85059-60003
F short 3	1	85059-60007
M short 4	1	85059-60004
F short 4	1	85059-60008
M short 2	1	85059-60002
F short 2	1	85059-60006
M short 1	1	85059-60001
F short 1	1	85059-60005
Opens:		
Male open	1	85059-60009
Female open	1	85059-60010
Loads:		
Male load	1	85059-60019
Female load	1	85059-60020
Lossy delay line	2	85059-60021
Adapters:		
Male to male adapter	1	11920-60001
Female to female adapter	1	11920-60002
Male to female adapter	1	11920-60003
Cables:		
Female to female cable (8.8 cm)	1	11500-60001
Verification devices		
Mismatched thru adapter	1	85059-60016
Matched thru adapter	1	85059-60017
Wrenches		
6 mm 4 in-lb torque	1	8710-2079
6 mm open-end	1	8710-2156

Agilent X11644A WR-90 mechanical calibration kit, 8.2 GHz to 12.4 GHz

The Agilent X11644A calibration kit contains the precision mechanical standards required to calibrate the systematic errors of the Agilent 8510C or 8720 series network analyzer systems. This calibration kit has a precision 50 ohm airline for performing the Thru-Reflect-Line (TRL) calibration, the most accurate error-correction technique for coaxial measurements. This kit also contains flush short circuit, a precision shim, and a fixed termination.

Electrical specifications

Device	Specifications
Frequency range	8.2 to 12.4 GHz
Termination	≥42 dB return loss

Adapter characteristics

SWR	<1.05
Insertion loss	0.08 dB
Center conductor	0.0076 to 0.038 mm
Pin recession tolerance	(0.0003 to 0.015 in)
Equivalent flange type	UG-135/U



Replaceable parts

Description	Qty per kit	Agilent replacement part number
Termination	2	00910-60003
Short	1	11644-20018
1/4 Wavelength shim	1	11644-20021
7 mm coax-to-waveguide adapter (f)	2	K281C
Standard section	1	00896-60008
Alignment pin	6	11644-20024
Slip pin	6	11644-20025
8-32 pozi dr screw 0.625 inches long	6	2510-0109
8-32 pozi dr screw 1.0 inches long	6	2510-0115
#8 lock washer	12	2190-0009
8-32 hex nut	12	2580-0002
1/4 Wrench	1	8720-0014

Agilent P11644A WR-62 mechanical calibration kit, 12.4 GHz to 18.0 GHz

The Agilent P11644A calibration kit contains the precision mechanical standards required to calibrate the systematic errors of the Agilent 8510C or 8720 series network analyzer systems. This calibration kit has a precision 50 ohm airline for performing the Thru-Reflect-Line (TRL) calibration, the most accurate error-correction technique for coaxial measurements. This kit also contains flush short circuit, a precision shim, and a fixed termination.

Electrical specifications

Device	Specifications
Frequency range	8.2 to 12.4 GHz
Termination	≥42 dB return loss

Adapter characteristics

SWR	<1.06
Insertion loss	0.10 dB
Center conductor	0.0076 to 0.038 mm
Pin recession tolerance	(0.0003 to 0.015 in)
Equivalent flange type	UG-419/U



Replaceable parts

Description	Qty per kit	Agilent replacement part number
Termination	2	00910-60002
Short	1	11644-20017
1/4 Wavelength shim	1	11644-20020
7 mm coax-to-waveguide adapter (f)	2	P281C
Standard section	1	00896-60007
Alignment pin	6	11644-20023
Slip pin	6	11644-20025
6-32 pozi dr screw 0.562 inches long	6	2360-0229
6-32 pozi dr screw 0.875 inches long	6	2360-0207
#8 lock washer	12	2190-0007
6-32 hex nut	12	2420-0003
1/4 Wrench	1	8720-0014

Agilent K11644A WR-42 mechanical calibration kit, 18 GHz to 26.5 GHz

The Agilent K11644A calibration kit contains the precision mechanical standards required to calibrate the systematic errors of the Agilent 8510C or 8720 series network analyzer systems. This calibration kit has a precision 50 ohm airline for performing the Thru-Reflect-Line (TRL) calibration, the most accurate error-correction technique for coaxial measurements. This kit also contains flush short circuit, a precision shim, and a fixed termination.



Electrical specifications

Device	Specifications
Frequency range	18 to 26.5 GHz
Termination	≥42 dB return loss

Adapter characteristics

SWR	<1.07
Insertion loss	0.12 dB
Center conductor	0.0076 to 0.038 mm
Pin recession tolerance	(0.0003 to 0.015 in)
Equivalent flange type	UG-597/U

Replaceable parts

Description	Qty per kit	Agilent replacement part number
Termination	2	00910-60001
Short	1	11644-20016
1/4 Wavelength shim	1	11644-20019
3.5 mm coax-to-waveguide adapter (m)	1	K281C opt 12
3.5 mm coax-to-waveguide adapter (f)	1	K281C
Standard section	1	00896-60006
Alignment pin	6	11644-20022
Slip pin	6	11644-20027
4-40 pozi dr screw 0.750 inches long	12	2200-0151
Lock washer M2.5	12	2190-0643
4-40 hex nut	12	2260-0002
3/16 Wrench	1	8720-0013

Agilent R11644A WR-28 mechanical calibration kit, 26.5 GHz to 40 GHz

The Agilent R11644A calibration kit contains the precision mechanical standards required to calibrate the systematic errors of the Agilent 8510C or Agilent 8720 series network analyzer systems. This calibration kit has a precision 50 ohm airline for performing the Thru-Reflect-Line (TRL) calibration, the most accurate error-correction technique for coaxial measurements. This kit also contains flush short circuit, a precision shim, and a fixed termination.

Electrical specifications

Device	Specifications
Frequency range	26.5 to 40 GHz
Termination	≥46 dB effective return loss



Replaceable parts

Description	Qty per kit	Agilent replacement part number
Standard section (5 cm)	2	11644-60016
Standard section (10 cm)	2	11644-60001
Waveguide load	1	00914-60028
Short	1	11644-20005
R-band shim	1	11644-20003
Alignment pin	6	11644-20009
Slip pin	6	11644-20006
4-40 hex nut .094 inches thick	12	2260-0002
4-40 SKT HD screw .750 inches long	12	3030-0721
Lock washer .115 inches	12	2190-0030
Open-end wrench	1	8720-0013
Hex ball	1	8710-1539

Agilent Q11644A WR-22 mechanical calibration kit, 33 GHz to 50 GHz

The Agilent Q11644A calibration kit contains the precision mechanical standards required to calibrate the systematic errors of the Agilent 8510C network analyzer system. This calibration kit has a precision 50 ohm airline for performing the Thru-Reflect-Line (TRL) calibration, the most accurate error-correction technique for coaxial measurements. This kit also contains flush short circuit, a precision shim, and a fixed termination.



Electrical specifications

Device	Specifications
Frequency range	30 to 50 GHz
Termination	≥46 dB effective return loss

Replaceable parts

Description	Qty per kit	Agilent replacement part number
Q-band standard section (5 cm)	2	11644-60017
Q-band standard section (10 cm)	2	11644-60002
Q-band waveguide load	1	11644-60005
Q-band shim	1	11644-20001
Short (Q-band)	1	11644-20004
Alignment pin	6	11644-20008
Slip pin	6	11644-20006
4-40 SKT HD screw .500 inches long	12	3030-0209
4-40 captive screw .43 inches long	12	1390-0764
4-40 captive screw .31 inches long	24	1390-0671
Hex ball	1	8710-1539

Agilent U11644A WR-19 mechanical calibration kit, 40 GHz to 60 GHz

The Agilent U11644A calibration kit contains the precision mechanical standards required to calibrate the systematic errors of the Agilent 8510C network analyzer system. This calibration kit has a precision 50 ohm airline for performing the Thru-Reflect-Line (TRL) calibration, the most accurate error-correction technique for coaxial measurements. This kit also contains flush short circuit, a precision shim, and a fixed termination.



Electrical specifications

Device	Specifications
Frequency range	40 to 60 GHz
Termination	≥46 dB effective return loss

Replaceable parts

Description	Qty per kit	Agilent replacement part number
U-band standard section (5 cm)	2	11644-60018
U-band standard section (10 cm)	2	11644-60003
U-band waveguide load	1	11644-60006
U-band shim	1	11644-20002
Short (U-band)	1	11644-20004
Alignment pin	6	11644-20008
Slip pin	6	11644-20006
4-40 SKT HD screw .500 inches long	12	3030-0209
4-40 captive screw .43 inches long	12	1390-0764
4-40 captive screw .31 inches long	24	1390-0671
Hex ball	1	8710-1539

Agilent V11644A WR-15 mechanical calibration kit, 50 GHz to 75 GHz

The Agilent V11644A calibration kit contains the precision mechanical standards required to calibrate the systematic errors of the Agilent 8510C network analyzer system. This calibration kit has a precision 50 ohm airline for performing the Thru-Reflect-Line (TRL) calibration, the most accurate error-correction technique for coaxial measurements. This kit also contains flush short circuit, a precision shim, and a fixed termination.



Electrical specifications

Device	Specifications
Frequency range	50 to 75 GHz
Termination	≥38.2 dB return loss
Element SWR	±1.025

Replaceable parts

Description	Qty per kit	Agilent replacement part number
V-band fixed load	1	11643-60025
V-band standard section	3	11644-60012
V-band shim	1	11644-20013
Short (V-band)	1	11644-20015
Slip pin	6	11644-20007
4-40 captive dcrew .41 inches long	12	1390-0765
4-40 captive dcrew .31 inches long	24	1390-0671
Hex ball	1	8710-1539

Agilent W11644A WR-10 mechanical calibration kit, 75 GHz to 110 GHz

The Agilent W11644A calibration kit contains the precision mechanical standards required to calibrate the systematic errors of the Agilent 8510C network analyzer system. This calibration kit has a precision 50 ohm airline for performing the Thru-Reflect-Line (TRL) calibration, the most accurate error-correction technique for coaxial measurements. This kit also contains flush short circuit, a precision shim, and a fixed termination.



Electrical specifications

Device	Specifications
Frequency range	75 to 110 GHz
Termination	≥36.6 dB return loss
Element SWR	±1.03

Replaceable parts

Description	Qty per kit	Agilent replacement part number
W-band fixed load	1	11643-60026
W-band standard section	3	11644-60013
W-band shim	1	11644-20014
Short (W-band)	1	11644-20015
Slip pin	6	11644-20007
4-40 captive screw .41 inches long	12	1390-0765
4-40 captive screw .31 inches long	24	1390-0671
Hex ball	1	8710-1539

Overview

Electronic calibration (ECal) is a precision, single-connection, one or two-port calibration technique for your Agilent vector network analyzer. Agilent ECal modules use fully traceable and verifiable electronic impedance standards. The modules are state-of-the-art, solid-state devices with programmable and highly repeatable impedance states. ECal modules are transfer standards that provide consistent calibrations and eliminate operator errors while bringing convenience and simplicity to your calibration routine. Consistent calibrations provide consistent measurements.

ECal replaces the traditional calibration technique that uses mechanical standards. With mechanical standards, you are required to make numerous connections to the test ports for a single calibration. These traditional calibrations require intensive operator interaction, which are prone to error. With ECal, a full two-port calibration can be accomplished with a single connection to the ECal module and minimal operator interaction. This results in faster and more repeatable calibrations, and less wear on the connectors—and on you. Calibrations for non-insertable devices are equally convenient and straightforward.



ECal modules and available options^{A, B}

Connector type ¹	Frequency range	ECal module model number	Available options
7 mm	30 kHz to 9 GHz ²	Agilent 85091B	1BN, 1BP, 910, UK6
7 mm	1 GHz to 18 GHz	Agilent 85060B	001, 1BN, 1BP, 910, UK6
Type-N (50 ohm)	30 kHz to 9 GHz ²	Agilent 85092B	00F, 00M, 00A, 1BN, 1BP, 910, UK6
Type-N (50 ohm)	1 GHz to 18 GHz	Agilent 85064B	001, 00F, 00M, 00A, 1BN, 1BP, 910, UK6
3.5 mm	30 kHz to 9 GHz ²	Agilent 85093B	00F, 00M, 00A, 1BN, 1BP, 910, UK6
3.5 mm	1 GHz to 26.5 GHz	Agilent 85062B	001, 00F, 00M, 00A, 1BN, 1BP, 910, UK6

12

Option	Description
001	Adds a 30 kHz to 9 GHz RF module ²
00F	Replace f/m connectors on ECal module(s) with f/f connectors
00M	Replace f/m connectors on ECal module(s) with m/m connectors
00A	Adds male-to-male and female-to-female adapters (also adds a 5/16" 90 N-cm [8 in-lb] torque wrench to 3.5 mm modules)
1BN	Mil-STD 45662 calibration certificate
1BP	Mil-STD 45662 calibration certificate with measured data
910	Add an extra operating and service manual
UK6	Commercial calibration certificate with measured data

Ordering information

Select an ECal module based on the connector type required and the frequency range of your Agilent vector network analyzer.

Order an Agilent 85097A PC interface module with control software to drive all Agilent ECal modules. If you will be using the Agilent 85097A to control an older Agilent 85060 series module with serial number below 800, the module will require a small modification by an Agilent service center.

The PNA Series network analyzer can control RF ECal modules directly via its USB port and does not require the 85097A.

¹ For ECal modules with sexed (m-f) connectors, the standard modules have one female and one male connector.

² RF ECal modules are specified to operate from 300 kHz to 9 GHz, with typical performance down to 30 kHz.

^A Agilent 85060 series modules cover a frequency range of 1 GHz to either 18 or 26.5 GHz. The upper frequency is limited by the connector cutoff frequency. Each module is supplied with a torque wrench and foam-padded wood storage box.

^B Agilent 85090 series modules cover a frequency range of 30 kHz to 9 GHz. Each module is supplied with a torque wrench and foam-padded wood storage box.

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PC requirements

The Agilent 85097A requires a customer-supplied PC, meeting the following minimum requirements:

- Windows® 95, Windows NT® 4.0 or later operating system
- 486 or later CPU
- 32 MB of RAM
- 10 MB available hard-disk space
- One of the following GPIB interface cards:
Agilent 82340A/B, 82341C/D, National Instruments AT-GPIB/TNT, National Instruments AT-GPIB/TNT (plug-and-play) or National Instruments PCI-GPIB



Agilent 85097A PC interface kit

ECal module specifications and characteristics

Specifications describe product performance covered by the product warranty over a temperature range of 0° C to +55° C.

Characteristics describe performance that is useful in the application of the product, but not warranted. Typical values describe non-warranted performance that most units will exhibit.

Characteristics and typical values are shown in italics.

	Agilent 85091B ¹	Agilent 85092B ¹	Agilent 85093B ¹	Agilent 85060B	Agilent 85062B	Agilent 85064B
Frequency range						
Standard	30 kHz - 9 GHz	30 kHz - 9 GHz	30 kHz - 9 GHz.	1 - 18 GHz.	1 - 26.5 GHz.	1 - 18 GHz.
Option 001^{1,2}	N/A.	N/A.	N/A.	30 kHz - 18 GHz	30 kHz - 26.5 Hz	30 kHz - 18 GHz
Maximum power	+20 dBm	+20 dBm	+20 dBm	+20 dBm	+20 dBm	+20 dBm
Minimum power	-45 dBm	-45 dBm	-45 dBm	-45 dBm	-45 dBm	-45 dBm
Connectors						
Standard	7 mm	Type-N (m-f)	3.5 mm (m-f) ³	7 mm	3.5 mm (m-f) ³	Type-N (m-f)
Option 00F	N/A	Type-N (f-f)	3.5 mm (f-f)	N/A	3.5 mm (f-f)	Type-N (f-f)
Option 00M	N/A	Type-N (m-m)	3.5 mm (m-m)	N/A	3.5 mm (m-m)	Type-N (m-m)

Additional coaxial electronic calibrations kits

Connector	Frequency range	Agilent model	Available options
Type-N (75 ohm)	30 kHz to 3 GHz	85096B	00F, 00M, 00A, 1BN, 1BP, 910, UK6
7-16	30 kHz to 7.5 GHz	85098B	00F, 00M, 00A, 1BN, 1BP, 910, UK6
Type-F	30 kHz to 3 GHz	85099B	00F, 00M, 00A, 1BN, 1BP, 910, UK6

¹ Performance is specified from 300 kHz to 9 GHz and typical from 30 kHz to 300 kHz.

² Option 001 adds an RF ECal module (30 kHz - 9 GHz)

³ 3.5 mm modules have precision slotless connectors that guarantee the best calibration accuracy is transferred to your system.

⁴ Specifications include the effects of the following environmental conditions: sine vibration, random vibration, storage survival, operating temperature stability, shock, and humidity.

Measurement port specifications¹ (Residual e-terms)

7 mm ECal modules

RF ECal module

Agilent 85091B	Frequency range				
	30 kHz to 300 kHz (typical)	300 kHz to 1.3 GHz	1.3 GHz to 3 GHz	3 GHz to 6 GHz	6 GHz to 9 GHz
Directivity (dB)	-52	-52	-56	-55	-47
Source match (dB)	-45	-45	-44	-41	-34
Reflection tracking (±dB)	0.05	0.038	0.038	0.068	0.1
Transmission tracking (±dB)	0.14	.060	0.055	0.13	0.23
Load match (dB)	-41	-47	-47	-46	-39

Microwave ECal module

Agilent 85060B	Frequency range (GHz)		
	1 to 2	2 to 8	8 to 18
Directivity (dB)	-50	-49	-46
Source match (dB)	-46	-45	-40
Reflection tracking (±dB)	.032	.046	.065
Transmission tracking (±dB)	.043	.050	0.14
Load match (dB)	-46	-44	-40
Option 001	Add RF ECal module (30 kHz to 9 GHz)	See Agilent 85091B specifications	

Type-N ECal modules

RF ECal module

Agilent 85092B	Frequency range				
	30 kHz to 300 kHz (typical)	300 kHz to 1.3 GHz	1.3 GHz to 3 GHz	3 GHz to 6 GHz	6 GHz to 9 GHz
Directivity (dB)	-52	-52	-54	-52	-47
Source match (dB)	-45	-45	-45	-41	-34
Reflection tracking (±dB)	0.05	0.038	0.038	0.068	0.1
Transmission tracking (±dB)	0.14	0.060	0.055	0.13	0.23
Load match (dB)	-41	-47	-47	-44	-39

Microwave ECal module

Agilent 85064B	Frequency range (GHz)		
	1 to 2	2 to 8	8 to 18
Directivity (dB)	-50	-49	-46
Source match (dB)	-46	-45	-40
Reflection tracking (±dB)	0.034	0.046	0.065
Transmission tracking (±dB)	0.043	0.050	0.14
Load match (dB)	-46	-44	-40
Option 001	Add RF ECal Module (30 kHz to 9 GHz)	See Agilent 85029B specifications	

¹ Specifications include the effects of the following environmental conditions: sine vibration, random vibration, storage survival, operating temperature stability, and shock. Based on 28% humidity. Higher humidity levels may degrade performance.

3.5 mm ECal modules¹

RF ECal module

Agilent 85093B	Frequency range				
	30 kHz to 300 kHz (typical)	300 kHz to 300 MHz	300 MHz to 3 GHz	3 GHz to 6 GHz	6 GHz to 9 GHz
Directivity (dB)	-50	-50	-52	-50.5	-47
Source match (dB)	-43	-43	-42	-39	-34
Reflection tracking (\pm dB)	0.05	0.043	0.043	0.055	0.1
Transmission tracking (\pm dB)	0.14	0.050	0.045	0.13	0.23
Load match (dB)	-41	-47	-47	-44	-39

Microwave ECal module

Agilent 85062B	Frequency range (GHz)			
	1 to 2	2 to 8	8 to 20	20 to 26.5
Directivity (dB)	-48	-49	-46	-44
Source match (dB)	-45	-43	-40	-37
Reflection tracking (\pm dB)	0.041	0.041	0.064	0.088
Transmission tracking (\pm dB)	0.048	0.068	0.13	0.17
Load match (dB)	-45	-43	-40	-38
Option 001	Add RF ECal Module (30 kHz to 9 GHz)	See Agilent 85093B specifications		

¹3.5 mm modules have precision slotless connectors that guarantee the best calibration accuracy is transferred to your system.

Parts for Type-N 50 ohm ECal modules

Description	Qty	Agilent part number
Agilent 85064B, 1 GHz to 18 GHz microwave ECal modules		
Insertable (standard)	1	85064-60002
Non-insertable male (Option 00M)	1	85064-60004
Non-insertable female (Option 00F)	1	85064-60006
Agilent 85092B, 30 kHz to 9 GHz RF ECal modules		
Insertable (85064B Option 001 or 85092A)	1	85092-60005
Non-insertable male (85064B Option 001 and Option 00M or 85092A Option 00M)	1	85092-60006
Non-insertable female (85064B Option 001 and Option 00F or 85092A Option 00F)	1	85092-60007
Adapters (added with option 00A)		
Type-N female-to-female	1	85054-60037
Type-N male-to-male	1	85054-60038

Parts for 3.5mm ECal modules

Description	Qty	Agilent part number
Agilent 85062B, 1 GHz to 26.5 GHz microwave ECal modules		
Module with male/female connectors (standard)	1	85062-60002
Module with male/male connectors (Option 00M)	1	85062-60004
Module with female/female connectors (Option 00F)	1	85062-60006
Agilent 85093B, 30 kHz to 9 GHz RF ECal modules		
Module with male/female connectors (85062B Option 001 or 85093A)	1	85093-60005
Module with male/male connectors (85062B Option 001 and 00M, or 85093A Option 00M)	1	85093-60006
Module with female/female connectors (85062B Option 001 and 00F, or 85093A Option 00F)	1	85093-60007
Adapters (added with Option 00A)		
3.5 mm female/female	1	85052-60012
3.5 mm male/male	1	85052-60014

Agilent 85055A verification kit, Type-N

The Agilent 85055A Type-N verification kit is used with an Agilent 85054B Type-N calibration kit and network analyzers, such as the Agilent 8510, Agilent 8719, Agilent 8720, or PNA Series. Use the Agilent 85055A verification kit to verify that your network analyzer system is working within its specifications, and that you have performed a valid measurement calibration. This verification kit is traceable to the U.S. National Institute of Standards and Technology (NIST).

Replaceable parts

Description	Qty per Kit	Agilent replacement part number
20 dB attenuator with data	1	85055-60003
50 dB attenuator with data	1	85055-60004
50 ohm airline with data	1	85055-60006
20 ohm mismatch airline with data	1	85055-60007
Open-end 5.5 wrench	1	8710-1770



Agilent 85092B verification kit, 7 mm

Measuring known devices, other than the calibration standards, is a convenient way of verifying that the Agilent 8753 measurement system is operating properly. The Agilent 85029B verification kit contains a set of precision 7 mm devices, with data traceable to NIST, used to verify the calibrated performance of an Agilent 8753 measurement system. The devices have precision 7 mm connectors and include a 20 dB pad, a 50 dB pad, and a mismatch attenuator. The verification process requires only an Agilent 85031B calibration kit and an Agilent 85029B verification kit. Option 001 is intended solely for use with the Agilent 8702B lightwave component analyzer. Option 001 adds verification data that is compatible with the Agilent 8702B.

Replaceable parts

The three attenuators are separately available and should be ordered by the numbers given below. Each of these devices has a serial number and the kit has a serial number. All four serial numbers appear on the verification disc label.

Description	Agilent part number
7 mm mismatch attenuator	85029-60004
7 mm 20 dB attenuator	85029-60005
7 mm 50 dB attenuator	85029-60006



Agilent 85051B verification kit, 7 mm

The Agilent 85051B 7 mm verification kit is used with an Agilent 85050 7 mm calibration kit and network analyzers, such as the Agilent 8510, Agilent 8719, or Agilent 8720 Series. Use the Agilent 85051B verification kit to verify that your network analyzer system is working within its specifications, and that you have performed a valid measurement calibration. This verification kit is traceable to the U.S National Institute of Standards and Technology (NIST).

Replaceable parts

Description	Qty per kit	Agilent replacement part number
20 dB attenuator with data	1	85051-60001
50 dB attenuator with data	1	85051-60002
50 ohm airline with data	1	85051-60010
20 ohm mismatch airline with data	1	85051-60011
Open-end 5.5 wrench	1	8710-1770



Agilent 85053B verification kit, 3.5 mm

The Agilent 85053B 3.5 mm verification kit is used with an Agilent 85052 3.5 mm calibration kit and network analyzers, such as the Agilent 8510, Agilent 8719, Agilent 8720, or PNA Series. Use the Agilent 85053B verification kit to verify that your network analyzer system is working within its specifications, and that you have performed a valid measurement calibration. This verification kit is traceable to the U.S National Institute of Standards and Technology (NIST).

Replaceable parts

Description	Qty per kit	Agilent replacement part number
20 dB attenuator with data	1	85053-60001
40 dB attenuator with data	1	85053-60002
50 ohm airline with data	1	85053-60010
20 ohm mismatch airline with data	1	85053-60011





Agilent 85057B verification kit, 2.4 mm

The Agilent 85057B 2.4 mm verification kit is used with an Agilent 85056A 2.4 mm calibration kit and network analyzers, such as the Agilent 8510 or Agilent 8722. Use the Agilent 85057B verification kit to verify that your network analyzer system is working within its specifications, and that you have performed a valid measurement calibration. This verification kit is traceable to the U.S. National Institute of Standards and Technology (NIST).

Replaceable parts

Description	Qty per kit	Agilent replacement part number
20 dB attenuator with data	1	85057-60010
40 dB attenuator with data	1	85057-60011
50 ohm airline with data	1	85057-60008
20 ohm mismatch airline with data	1	85057-60009



Agilent R11645A W-28 verification kit

The Agilent R band millimeter-waveguide verification kit is used with the R11644A calibration kit and network analyzer systems, such as the Agilent 8510 and Agilent 85106. Use the R11645A series verification kit to verify that your network analyzer system is working within its specifications, and that you have performed a valid measurement calibration. This verification kit is traceable to the U.S. National Institute of Standards and Technology (NIST).

Replaceable parts

Description	Qty per kit	Agilent replacement part number
20 dB attenuator with data	1	11645-60021
50 dB attenuator with data	1	11645-60022
50 ohm airline with data	1	11645-60016
25 ohm mismatch airline with data	1	11645-60011
Lock washer	6	2190-0030
Hex nut	6	2260-0002
Waveguide alignment pin (short)	6	11644-20009
Waveguide alignment pin (long)	6	11644-20006
4-40 hex ball screw 0.75 inches long	6	3030-0721
3/32-inch hex ball driver	1	8710-1539

Agilent Q11645A W-22 verification kit

The Agilent Q band millimeter-waveguide verification kit is used with the Q11644A calibration kit and network analyzer systems, such as the Agilent 8510 and Agilent 85106. Use the Q11645A series verification kit to verify that your network analyzer system is working within its specifications, and that you have performed a valid measurement calibration. This verification kit is traceable to the U.S. National Institute of Standards and Technology (NIST).

Replaceable parts

Description	Qty per kit	Agilent replacement part number
20 dB attenuator with data	1	11645-60023
50 dB attenuator with data	1	11645-60024
50 ohm airline with data	1	11645-60017
25 ohm mismatch airline with data	1	11645-60012
4-40 captive screw 0.31 inch	6	1390-0671
4-40 captive screw 0.43 inch	6	1390-0764
Waveguide alignment pin (short)	6	11644-20008
Waveguide alignment pin (long)	6	11644-20006
3/32-inch hex ball driver	1	8710-1539

Agilent U11645A W-19 verification kit

The Agilent U band millimeter-waveguide verification kit is used with the U11644A calibration kit and network analyzer systems, such as the Agilent 8510 and Agilent 85106. Use the U11645A series verification kit to verify that your network analyzer system is working within its specifications, and that you have performed a valid measurement calibration. This verification kit is traceable to the U.S. National Institute of Standards and Technology (NIST).



Replaceable parts

Description	Qty per kit	Agilent replacement part number
20 dB attenuator with data	1	11645-60025
50 dB attenuator with data	1	11645-60006
50 ohm airline with data	1	11645-60018
25 ohm mismatch airline with data	1	11645-60013
4-40 captive screw 0.31 inch	6	1390-0671
4-40 captive screw 0.43 inch	6	1390-0764
Waveguide alignment pin (short)	6	11644-20008
Waveguide alignment pin (long)	6	11644-20006
3/32-inch hex ball driver	1	8710-1539

Agilent V11645A W-15 verification kit

The Agilent V band millimeter-waveguide verification kit is used with the V11644A calibration kit and network analyzer systems, such as the Agilent 8510 and Agilent 85106. Use the V11645A series verification kit to verify that your network analyzer system is working within its specifications, and that you have performed a valid measurement calibration. This verification kit is traceable to the U.S National Institute of Standards and Technology (NIST).



Description	Qty per kit	Agilent replacement part number
20 dB attenuator with data	1	11645-60007
50 dB attenuator with data	1	11645-60008
50 ohm airline with data	1	11645-60019
25 ohm mismatch airline with data	1	11645-60014
4-40 captive screw 0.31 inch	6	1390-0671
4-40 captive screw 0.41 inch	6	1390-0765
Waveguide alignment pin V/W	6	11644-20007
3/32-inch hex ball driver	1	8710-1539

Agilent W11645A W-10 verification kit

The Agilent W band millimeter-waveguide verification kit is used with the W11644A calibration kit and network analyzer systems, such as the Agilent 8510 and Agilent 85106. Use the W11645A series verification kit to verify that your network analyzer system is working within its specifications, and that you have performed a valid measurement calibration. This verification kit is traceable to the U.S National Institute of Standards and Technology (NIST).



Description	Qty per kit	Agilent replacement part number
20 dB attenuator with data	1	11645-60009
50 dB attenuator with data	1	11645-60010
50 ohm airline with data	1	11645-60020
25 ohm mismatch airline with data	1	11645-60015
4-40 captive screw 0.31 inch	6	1390-0671
4-40 captive screw 0.41 inch	6	1390-0765
Waveguide alignment pin V/W	6	11644-20007
3/32-inch hex ball driver	1	8710-1539

Agilent 85025 and 85026 series detectors (ac/dc)

The Agilent 85025 and 85026 series detectors are designed specifically for operation with the Agilent 8757 scalar network analyzer. The Agilent 85025/26 detectors detect either a modulated (ac) or an unmodulated (dc) microwave signal.

Agilent 85025C detector adapters

The Agilent 85025C adapters matches the scalar analyzer display to most standard crystal, silicon and gallium arsenide detectors. This enables the user to operate up to 110 GHz with the Agilent 8757. The Agilent 8502C detector adapter is designed for use with the Agilent 8757 only, and can operate in either ac or dc detection modes.

Scalar network analyzer accessories

Coaxial detector summary

Agilent model	Frequency range	Connector type	Dynamic range	Frequency	Return loss	Frequency response	Power (at 50 MHz)	Dynamic accuracy ⁴	Absolute accuracy ⁵
85025A ³	10 MHz to 18 GHz	Type-N (m)	ac mode	0.01 to 0.04 GHz	10 dB	±0.8 dB	16 dBm	±0.8 dB	±0.8 dB
		7 mm2	+16 to -55 dBm	0.04 to 4 GHz	20 dB	±0.5 dB	6 dBm	±0.4 dB	±0.4 dB
			dc mode	4 to 18 GHz	17 dB	±0.5 dB	-35 dBm	±0.4 dB	±0.4 dB
			+16 to 50 dBm	18 to 26.5	12 dB	±2.0 dB	-50 dBm	±1.3 dB	±1.3 dB
85025B ³	10 MHz to 26.5 GHz	3.5 mm (m)	ac mode	0.01 to 0.04 GHz	10 dB	±0.8 dB	16 dBm	±0.8 dB	±0.8 dB
			+16 to -55 dBm	0.04 to 4 GHz	20 dB	±0.5 dB	6 dBm	±0.4 dB	±0.4 dB
			dc mode	4 to 18 GHz	17 dB	±0.5 dB	-35 dBm	±0.4 dB	±0.4 dB
			+16 to 50 dBm	18 to 26.5	12 dB	±2.0 dB	-50 dBm	±1.3 dB	±1.3 dB
85025D ³	10 MHz to 50 GHz	2.4 mm (m)	ac mode	0.01 to 0.1 GHz	10 dB	±0.8 dB	16 dBm	±1.0 dB	±0.8 dB
			+16 to -55 dBm	0.1 to 20 GHz	20 dB	±0.5 dB	6 dBm	±0.4 dB	±0.4 dB
			dc mode	20 to 26.5 GHz	20 dB	±1.0 dB	-35 dBm	±0.4 dB	±0.4 dB
			+16 to 50 dBm	26.5 to 40 GHz	15 dB	±2.5 dB	-50 dBm	±1.3 dB	±1.3 dB
85025E ³	10 MHz to 26.5 GHz	3.5 mm (m)	ac mode	0.01 to 0.1 GHz	10 dB	±0.8 dB	16 dBm	±1.0 dB	±1.0 dB
			+16 to -55 dBm	0.1 to 18 GHz	25 dB	±0.5 dB	6 dBm	±0.4 dB	±0.4 dB
			dc mode	18 to 25 GHz	25 dB	±0.5 dB	-35 dBm	±0.4 dB	±0.4 dB
			+16 to 50 dBm	25 to 26.5 GHz	23 dB	±1.4 dB	-50 dBm	±1.3 dB	±1.3 dB
85037A ¹	10 MHz to 18 GHz	Type-N (m)	ac mode	0.01 to 0.04 GHz	10 dB	±0.35 dB	20 dBm	±0.25 dB	±0.25 dB
		7 mm2	+20 to -55 dBm	0.04 to 18 GHz	20 dB	±0.18 dB	10 dBm	±0.11 dB	±0.11 dB
			dc mode	+20 to 50 dBm			-30 dBm	±0.11 dB	±0.11 dB
			+20 to 50 dBm				-50 dBm	±0.85dB	±0.85dB
85037B ¹	10 MHz to 26.5 GHz	3.5 mm (m)	ac mode	0.01 to 0.04 GHz	10 dB	±0.35 dB	20 dBm	±0.25 dB	±0.25 dB
			+20 to -55 dBm	0.04 to 18 GHz	20 dB	±0.18 dB	10 dBm	±0.11 dB	±0.11 dB
			dc mode	+20 to 50 dBm			-30 dBm	±0.11 dB	±0.11 dB
			+20 to 50 dBm	18 to 26.5 GHz	18 dB	±0.22 dB	-50 dBm	±0.85dB	±0.85dB

¹The Agilent 85037A/B specifications are applicable when used with the Agilent 8757D scalar network analyzer. The absolute power accuracy and dynamic power accuracy specifications apply after a calibration via the Agilent 8757D Option 002's internal power calibrator.

²Option 001 changes to a 7 mm connector.

³The Agilent 85025 and 85026 series detectors and the Agilent 85025C detector adapter require Agilent 8757Q ri4m2q43 43vision 2.0 or higher. To upgrade previous revisions, order the Agilent 11614A firmware enhancement.

⁴Dynamic accuracy refers to measurement accuracy as power varies (in dB) from a 0 dBm reference. 25° ±5°C, 50 MHz.

⁵DC mode, 25° ±5°C.

Agilent 85027 series directional bridges (ac/dc)

The Agilent 85027 series directional bridges are designed to operate with either the HP 8757 in ac or dc detection modes. These bridges offer high directivity, excellent test port matching and a measurement range of up to 50 GHz in coax.

Directional bridge summary

Agilent model	Frequency range	Nominal impedance	Connector–input	Connector–input	Frequency	Directivity (dB)	Frequency	Test port match (SWR)
85027A	10 MHz to 18 GHz	50 Ω	Type-N (f)	7 mm	0.01 to 18 GHz	40 dB	0.01 to 8.4 GHz 8.4 to 12.4 GHz 12.4 to 18 GHz	<1.15 <1.25 <1.43
85027A	10 MHz to 26.5 GHz	50 Ω	3.5 mm (f)	3.5 mm (f)	0.01 to 20 GHz 20 to 26.5 GHz	40 dB 36 dB	0.01 to 8.4 GHz 8.4 to 20 GHz 20 to 26.5 GHz	<1.15 <1.43 <1.78
85027A	10 MHz to 18 GHz	50 Ω	Type-N (f)	Type-N (f)	0.01 to 12.4 GHz 12.4 to 18 GHz	36 dB 34 dB	0.01 to 8.4 GHz 8.4 to 12.4 GHz 12.4 to 18 GHz	<1.15 <1.25 <1.43
85027A	10 MHz to 50 GHz	50 Ω	2.4 mm (f)	2.4 mm (m)	0.01 to 20 GHz 20 to 26.5 GHz 26.5 to 40 GHz 40 to 50 GHz	36 dB 32 dB 30 dB 25 dB	0.01 to 16 GHz 16 to 30 GHz 30 to 40 GHz 40 to 50 GHz	<1.18 <1.27 <1.57 typically <2.00
85027A	10 MHz to 26.5 GHz	50 Ω	3.5 mm (f)	3.5 mm (m)	0.01 to 20 GHz 20 to 26.5 GHz	40 dB 36 dB	0.01 to 8.4 GHz 8.4 to 20 GHz 20 to 26.5 GHz	<1.15 <1.43 <1.78