Waveguide VNA Calibration Kits

7005E Standard Kits

Features

- *1.7 to 50 GHz*
- *WR430 Through WR22*
- *Fixed and Sliding Load Calibration*
- *Agilent and Anritsu VNAs Supported*

K7005E34

Description

The 7005E series standard kits are designed to provide accurate calibration of vector network analyzers (VNAs) for measurements in standard rectangular waveguide from 1.7 to 50 GHz (WR430 through WR22). Each kit includes all the components needed for accurate calibration of most VNAs with a user-specified set of adapters and a high precision sliding termination (in a machined housing) to ensure high effective directivity after calibration. Precision straight sections and a fixed (reference plane) short are also provided as verification standards. All component flanges have precision indexing holes and indexing pins for excellent measurement repeatability.

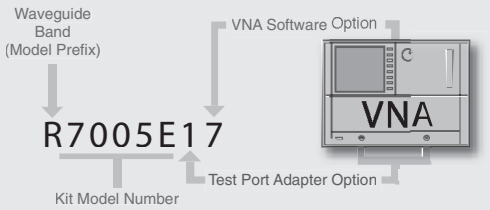
Components Included in7005E Kits

QUANTITY	DESCRIPTION	MODEL
1	Fixed flush (reference plane) short	344 series
1	1/8-λ fixed offset short	340 series
1	3/8-λ fixed offset short	340 series
1	Precision fixed termination	301 series
1	High precision sliding termination	314 series
1	Straight section (rectangular)	101/2 series
1	Flange hardware (including the indexing pin set)	—
1	3.5-inch data disk with VNA software	—
1	Operating Instructions (manual)	—
1	Instrument case	—

Note: Each kit includes a set of adapters that is user specified per the chart below.

Ordering Options

To specify the waveguide band, test port adapter and VNA software options you need, add a letter (designating the desired bandwidth) to the front of the kit model number and add a two digit number to the end of the kit model number (as shown in the diagram at right). The first digit is the test port adapter option number, and the second is the VNA software option number (from the ***Option Finder*** below). The example in the diagram shows the waveguide band prefix, kit model number, adapter option and VNA software option numbers to order an "R" band 7005E kit for use with an Agilent PNA.



Option Finder

WAVEGUIDE BAND (Model Prefix)	FREQUENCY RANGE (GHz)	WAVEGUIDE DESIGNATION EIA WR NO.	TEST PORT ADAPTER SET OPTIONS (See below)	VNA SOFTWARE OPTIONS				
				KITS W/O SOFTWARE OPTION 0	AGILENT 8510C OPTION 4	AGILENT 8719/20/22 OPTION 5	AGILENT PNA SERIES OPTION 7	ANRITSU 37000 OPTION 9
R	1.70 – 2.60	WR430	1 or 2	0	4	5	7	9
S	2.60 – 3.95	WR284	1, 2 or 3	0	4	5	7	9
E	3.30 – 4.90	WR229	1, 2 or 3	0	4	5	7	9
G	3.95 – 5.85	WR187	1, 2 or 3	0	4	5	7	9
F	4.90 – 7.05	WR159	1, 2 or 3	0	4	5	7	9
C	5.85 – 8.20	WR137	1, 2 or 3	0	4	5	7	9
H	7.05 – 10.0	WR112	1, 2 or 3	0	4	5	7	9
X	8.20 – 12.4	WR90	1, 2 or 3	0	4	5	7	9
M	10.0 – 15.0	WR75	1, 2 or 3	0	4	5	7	9
P	12.4 – 18.0	WR62	1, 2 or 3	0	4	5	7	9
N	15.0 – 22.0	WR51	3 or 5	0	4	5	7	9
K	18.0 – 26.5	WR42	3 or 5	0	4	5	7	9
U	26.5 – 40.0	WR28	4 or 5	0	4	5	7	9
J	33.0 – 50.0	WR22	5	0	4	5	7	9

TEST PORT ADAPTER SET OPTIONS* (One of these sets is Included in each kit)	OPTION 1: 2 ea., waveguide (WG) to 7mm right angle launch (RAL); 1 ea., WG to 7mm end launch (EL) adapters OPTION 2: 1 ea., WG to 7mm RAL; 2 ea., WG to 7mm EL adapters OPTION 3: 1 ea., WG to 3.5mm female RAL; 1 ea. WG to 3.5mm male RAL; 1 ea., WG to 3.5mm female EL adapters (NMD F – K bands) OPTION 4: 1 ea. WG to 2.92mm female RAL; 1 ea. WG to 2.92mm male RAL; 1 ea. WG to 2.92mm female EL adapters OPTION 5: 1 ea. WG to 2.4mm female RAL; 1 ea. WG to 2.4mm male RAL; 1 ea. WG to 2.4mm female EL adapters (not included for N band)

* The specifications of the waveguide test port adapters included in these adapter set options are provided on page 136 .

Key Literature: Maury data sheet 3H-056.

Optimized Millimeter Waveguide VNA Calibration Kits

7005G Optimized Kits

Features

- *26.5 to 110 GHz*
- *WR28 Through WR10*
- *Fixed and Sliding Load Calibration*
- *Optimized Directivity & Source Match*

Description

The 7005G kits are high precision kits featuring optimized standards and VNA software, which provide highly accurate calibration (for measurements in rectangular waveguide) of Agilent 8510C, 8719/20/22, and PNA series or Anritsu 37000 vector network analyzers (VNAs) equipped with external millimeter waveguide test heads or modules. Kits are available for these Agilent VNAs (and for the Anritsu 37000) from 26.5 to 110 GHz. Each kit includes all the components needed for accurate calibration of these VNAs. The high precision sliding termination features a machined housing to ensure high effective directivity after calibration. For kits in WR22 and smaller sizes, these sliding terminations are equipped with a micrometer drive so that load positions can be easily and smoothly set. The precision straight section and fixed (reference plane) short in these kits can be used as verification standards. All component flanges have precision indexing holes and removable indexing pins for excellent measurement repeatability. The millimeter waveguide flanges in the WR22 and smaller sizes are of a unique Maury-pioneered design featuring a raised outer rim to prevent the flanges from cocking during connection. These flanges will mate with corresponding UG ***/U flanges.

Optimized Directivity and Source Match

All 7005G kits are configured for the Short-Short-Load-Thru (SSLT) calibration method using offset shorts and a sliding termination. The sliding termination housings are calibrated for return loss and selected for compliance with the directivity specification. The offset shorts are calibrated and the calibration coefficients are optimized for compliance with the source match specification. Each kit comes with a calibration report which includes the unique calibration data for that individual kit.

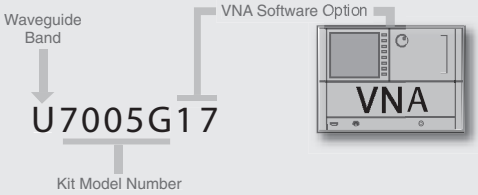
Components Included in 7005G Kits

QUANTITY	DESCRIPTION
2	Test port adapters (see the Option Finder below)
1	Fixed flush (reference plane) short (verification standard)
1	1/8-λ high precision fixed offset short
1	3/8-λ high precision fixed offset short
1	Precision fixed termination
1	High precision sliding termination
1	Precision straight section (verification standard)
1	Flange hardware (including the indexing pin set)
1	Flange tool set
1	3.5-inch data disk with optimized VNA software
1	Operating Instructions (manual)
1	Instrument case

Note: Additional adapters may be ordered separately.

Ordering Options

To specify the waveguide band and VNA software options you need, add a letter (designating the desired bandwidth) to the front of the kit model number and add a two digit number, from the ***Option Finder*** (below), to the end of the kit model number, as shown in the diagram at right. The example in the diagram shows the waveguide band prefix, kit model number, and VNA software option number needed to order a "U" band 7006G kit configured for use with an Agilent PNA.



Option Finder

WAVEGUIDE BAND (Model Prefix)	FREQUENCY RANGE (GHz)	WAVEGUIDE DESIGNATION EIA WR NO.	TEST PORT ADAPTERS PROVIDED [1]	MINIMUM DIRECTIVITY (dB)	MINIMUM SOURCE MATCH (dB)	VNA SOFTWARE OPTIONS			
						AGILENT 8510C OPTION 4	AGILENT 8719/20/22 OPTION 5	AGILENT PNA SERIES OPTION 7	ANRITSU 37000 OPTION 9
U	26.5 – 40.0	WR28	2 U103A1.375	54	48	14	15	17	19
J	33.0 – 50.0	WR22	2 J115B1	54	48	14	15	17	19
T	40.0 – 60.0	WR19	2 T115B	54	44	14	15	17	19
V	50.0 – 75.0	WR15	2 V115C	54	42	14	15	17	19
Y	60.0 – 90.0	WR12	2 Y115B	50	40	14	15	17	19
Z	75.0 – 110.0	WR10	2 Z115A	50	40	14	15	17	19

[1] See page 123 for Overall lengths.

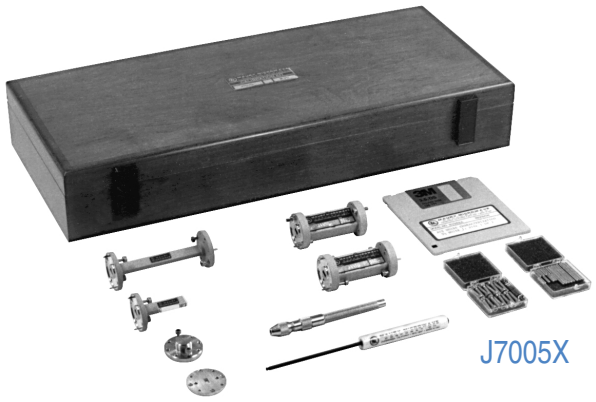
Key Literature: Maury data sheet 3H-068.

Millimeter Waveguide VNA Calibration Kits

7005M Economy Kits

Features

- *26.5 to 110 GHz*
- *WR28 Through WR10*
- *Fixed or Sliding Load Calibration*
- *SSLLT Configured*



Description

The 7005M series kits are economical, cost effective kits designed to provide accurate calibration (for measurements in rectangular waveguide) of Agilent 8510C, 8719/20/22 and PNA series or Anritsu 37000 vector network analyzers (VNAs) equipped with external millimeter waveguide test heads or modules. Kits are available for these Agilent VNAs (and for the Anritsu 37000) from 26.5 to 110 GHz.

Each kit includes all the components needed for accurate calibration of these VNAs as listed at the right. The 7005M kits come with a precision fixed termination. The precision straight section and fixed (reference plane) short in these kits can be used as verification standards.

All component flanges have precision indexing holes and removable indexing pins for excellent measurement repeatability. The Millimeter waveguide flanges in the WR22 and smaller sizes are of a unique Maury-pioneered design featuring a raised outer rim to prevent the flanges from cocking during connection. These flanges will mate with corresponding UG ***/U flanges.

Components Included in 7005M Kits

QTY	DESCRIPTION
1	Fixed flush (reference plane) short (calibration and verification standard)
1	Precision straight section (verification standard)
1	1/4-λ waveguide straight section (shim)
1	Precision fixed termination
1	Flange hardware (including the indexing pin set)
1	Flange tool set
1	3-1/2 inch data disk with optimized VNA software
1	Operating Instructions (manual)
1	Instrument case

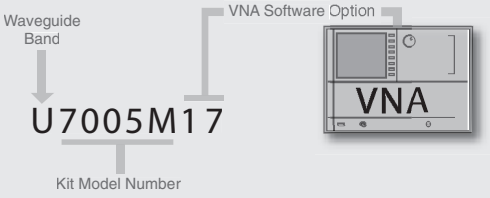
Note: Additional adapters may be ordered separately.

Calibration Method

The 7005M series kits are configured for the Short-Short-Load-Load-Thru (SSLLT) calibration method using a fixed flush short, a fixed precision termination, and a 1/4-λ shim.

Ordering Options

To specify the waveguide band and VNA software options you need, add a letter (designating the desired bandwidth) to the front of the kit model number and add a letter and/or two digit number to the end of the kit model number from the ***Option Finder*** (as shown in the diagram at right). The example in the diagram shows the waveguide band prefix, kit model number, and VNA software option number to order an "U" band 7005 kit configured for use with an Agilent PNA.



Option Finder

WAVEGUIDE BAND (Model Prefix)	FREQUENCY RANGE (GHz)	TEST PORT ADAPTERS PROVIDED[1]	WAVEGUIDE DESIGNATION EIA WR NO.	VNA SOFTWARE OPTIONS		
				AGILENT 8510C OPTION 14	AGILENT PNA SERIES OPTION 17	ANRITSU 37000 OPTION 19
U	26.5 – 40.0	2 U103A1.375	WR28	14	17	—
J	33.0 – 50.0	2 J115B1	WR22	14	17	19
T	40.0 – 60.0	2 T115B	WR19	14	17	19
V	50.0 – 75.0	2 V115C	WR15	14	17	19
Y	60.0 – 90.0	2 Y115B	WR12	14	17	19
Z	75.0 – 110.0	2 Z115A	WR10	14	17	19

[1] See page 123 for Overall lengths.

Key Literature: Maury data sheet 3H-071.

Waveguide VNA Calibration Kits

7006A Economy Kits

P7006A

Features

- *2.6 to 40 GHz*
- *WR284 Through WR28*
- *Sliding Load Calibration*
- *Agilent and Anritsu VNAs Supported*

Description

The 7006A kits are economical, cost effective kits designed to provide accurate calibration of vector network analyzers (VNAs) that are equipped with 3.5mm or 2.4mm connectors. They are used for making measurements in standard rectangular waveguide from 2.6 to 40 GHz (WR284 through WR28). Each kit includes all the components needed for accurate calibration of most VNAs with a user-specified set of adapters and a precision sliding termination. In addition to these components, kits for Anritsu 37000 VNAs also include two (2) fixed shorts. All component flanges have precision indexing holes and indexing pins for excellent measurement repeatability.

Components Included in 7006A Kits

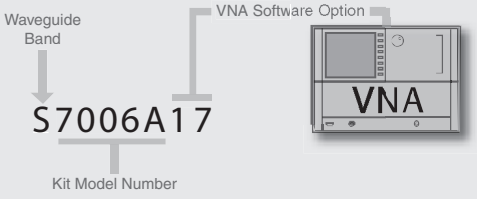
QUANTITY	DESCRIPTION	MODEL
1	Fixed (reference plane) short**	344 series
1	1/4-λ straight section (shim)	322A series
1	Precision sliding termination	313/4 series
1	WG to NMD 3.5mm female end launch adapter*	230/3 series
1	WG to 3.5mm male right angle launch adapter*	200/10 series
1	Flange hardware (including the indexing pin set)	—
1	3.5-inch data disk with VNA software	—
1	Operating Instructions (manual)	—
1	Instrument case	—

Note: Additional adapters may be ordered separately.

*WR34 and WR28 kits replace these adapters with two 2.4mm female right angle launch adapters.

Ordering Options

To specify the waveguide band and VNA software options you need, add a letter (designating the desired bandwidth) to the front of the kit model number and add a two digit number to the end of the kit model number (as shown in the diagram at right) from the ***Option Finder*** (below). The example in the diagram shows the waveguide band prefix, kit model number, and VNA software option number to order an "S" band 7006A kit configured for use with an Agilent PNA.



Option Finder

WAVEGUIDE BAND (Model Prefix)	FREQUENCY RANGE (GHz)	WAVEGUIDE DESIGNATION EIA WR NO.	TEST PORT ADAPTERS PROVIDED IN THESE KITS	VNA SOFTWARE OPTIONS			
				AGILENT 8510C OPTION 4	AGILENT 8719/20/22 OPTION 5	AGILENT PNA SERIES OPTION 7	ANRITSU 37000** OPTION 9
S	2.60 – 3.95	WR284	1 S230K1 and 1 S200B1	14	15	17	19
E	3.30 – 4.90	WR229	1 E230K1 and 1 E200B1	14	15	17	19
G	3.95 – 5.85	WR187	1 G230K1 and 1 G200B1	14	15	17	19
F	4.90 – 7.05	WR159	1 F230K1 and 1 F200B1	14	15	17	19
C	5.85 – 8.20	WR137	1 C230K1 and 1 C200B1	14	15	17	19
H	7.05 – 10.0	WR112	1 H230K1 and 1 H200B1	14	15	17	19
X	8.20 – 12.4	WR90	1 X230K1 and 1 X200B2	14	15	17	19
M	10.0 – 15.0	WR75	1 M230K1 and 1 M200B2	14	15	17	19
P	12.4 – 18.0	WR62	1 P230K1 and 1 P200B2	14	15	17	19
N	15.0 – 22.0	WR51	1 N230K3 and 1 N200B2	14	15	17	19
K	18.0 – 26.5	WR42	1 K230K6 and 1 K200B8	14	15	17	19
Q	22.0 – 33.0	WR34	2 Q236A1	14	15	17	19
U	26.5 – 40.0	WR28	2 U236A6	14	15	17	19

** All kits for Anritsu 37000 VNAs include two fixed shorts.

Key Literature: Maury data sheet 3H-057.

Waveguide TRL VNA Calibration Kits

7007H Kits

Features

- *1.7 to 50 GHz*
- *WR430 Through WR10*
- *Fixed Load Calibration*
- *TRL and SSLT Configured*

Description

Maury 7007H series calibration kits are designed to provide accurate Thru-Reflect-Line (TRL) calibrations of vector network analyzers (VNAs), for measurements in rectangular waveguide from 1.7 to 110.0 GHz (WR430 through WR10).

They include all the components needed for accurate TRL calibration of supported VNA (listed at right). They can also be used for Short-Short-Load-Thru (SSLT) and offset load calibrations.

All component flanges have precision indexing holes for excellent measurement repeatability (indexing pins are provided).

Test Port and Cable Connectors

These kits are configured for use with VNA test sets or test cables utilizing 7mm, 3.5mm and 2.4mm connectors. Other adapter or test port configurations are available upon request.

Components Included in 7007H Kits

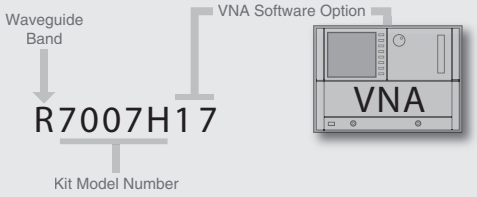
QTY	DESCRIPTION
2	Test port adapters (see the Option Finder below)
1	Fixed (reference plane) short (calibration and verification standard)*
2	Precision fixed terminations
1	1/4-λ high precision straight section (shim)
1	Flange hardware (including the indexing pin set)
1	3-1/2 inch data disk with optimized VNA software
1	Operating Instructions (manual)
1	Instrument case

Note: Additional adapters may be ordered separately.

*Kits for the Anritsu 37000 include two (2) fixed (reference plane) shorts.

Ordering Options

To specify the waveguide band and VNA software options you need, add a letter from the ***Option Finder*** (designating the desired bandwidth) to the front of the kit model number, and add a two digit number to the end of the kit model number (designating the VNA software needed) as shown in the diagram at right. The example in the diagram shows the waveguide band prefix, kit model number, and VNA software option number to order an "R" band 7007H kit for use with an Agilent PNA.



Option Finder

WAVEGUIDE BAND (Model Prefix)	FREQUENCY RANGE (GHz)	WAVEGUIDE DESIGNATION EIA WR NO.	TEST PORT ADAPTERS PROVIDED IN THESE KITS*	VNA SOFTWARE OPTIONS				
				AGILENT ENA SERIES OPTION 2	AGILENT 8510C OPTION 4	AGILENT 8719/20/22 OPTION 5	AGILENT PNA SERIES OPTION 7	ANRITSU 37000 OPTION 9
R	1.70 – 2.60	WR430	2 R209A2 (W/G to 7mm)	12	14	15	17	19
S	2.60 – 3.95	WR284	2 S209D2 (W/G to 7mm)	12	14	15	17	19
E	3.30 – 4.90	WR229	2 E209A2 (W/G to 7mm)	12	14	15	17	19
G	3.95 – 5.85	WR187	2 G209D2 (W/G to 7mm)	12	14	15	17	19
F	4.90 – 7.05	WR159	2 F209A2 (W/G to 7mm)	12	14	15	17	19
C	5.85 – 8.20	WR137	2 C209D2 (W/G to 7mm)	12	14	15	17	19
H	7.05 – 10.0	WR112	2 H209D2 (W/G to 7mm)	12	14	15	17	19
X	8.20 – 12.4	WR90	2 X209D2 (W/G to 7mm)	—	14	15	17	19
M	10.0 – 15.0	WR75	2 M209D2 (W/G to 7mm)	—	14	15	17	19
P	12.4 – 18.0	WR62	2 P209D2 (W/G to 7mm)	—	14	15	17	19
N	15.0 – 22.0	WR51	1 N200A2 and 1 N200B2	—	14	15	17	19
K	18.0 – 26.5	WR42	1 K200A1 and 1 K200B1	—	14	15	17	19
Q	22.0 – 33.0	WR34	1 Q236A1 and 1 Q236B1	—	14	15	17	19
U	26.5 – 40.0	WR28	1 U236A6 and 1 U236B6	—	14	15	17	19
T	40.0 – 60.0	WR19	2 T115B (Test Port Adapt.)	—	14	15	17	19
V	33.0 – 50.0	WR15	2 V115C (Test Port Adapt.)	—	14	15	17	19
Y	33.0 – 50.0	WR12	2 Y115B (Test Port Adapt.)	—	14	15	17	19
Z	33.0 – 50.0	WR10	2 Z115A (Test Port Adapt.)	—	14	15	17	19

Key Literature: Maury data sheet 3H-058. *To order kits without adapters substitute zero (0) for the numberal "1" in the VNA software option numbers.