

# Keysight N9911X Economical Waveguide Calibration Components

Configuration  
Guide



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## N9911X Economical Waveguide Calibration Components

N9911X Economical Waveguide Calibration Components are used to calibrate Keysight FieldFox Handheld Analyzers. These components are purchased separately — it is not necessary to buy a kit. This allows you to purchase only the components you need, saving the expense of non-necessary components and a storage box.

Use the following information to help determine which N9911X Economical Waveguide Calibration Components to purchase.

### Types of Calibration Components

Here is a brief explanation of the types of calibration components that you can purchase. Refer to [“Calibration Component Part Numbers and Photos” on page 3](#) to see images of the components.

#### Adapter, Waveguide-to-Coax

The adapter is intended for adapting the analyzer’s coaxial connectors to waveguide flanges.

#### Termination

A termination is also called a load. It is connected directly to the adapter.

#### $\frac{1}{4}$ Wavelength Offset Shim

A  $\frac{1}{4}$  wavelength offset shim is also called a  $\frac{1}{4}$  wavelength section. The shim is connected between the adapter and the short to create an **offset short**.

#### Short

A short is also called a flush short. It is connected directly to the adapter, or used as an **offset short** when combined with the  $\frac{1}{4}$  wavelength offset shim.

### Coax Cables

To perform a 1-port calibration, one coaxial cable is required. To perform a 2-port calibration, two coaxial cables are required. Each cable is connected between an analyzer test port and a waveguide-to-coax adapter. A list of Keysight cables available for purchase is in the “Accessories” section of the online document *Keysight FieldFox Handheld Analyzers Configuration Guide* (part number 5990-9836EN).

### Coupling Set (Hardware) for Flanges

Hardware items such as screws, nuts, washers, and slip pins are necessary for coupling flanges together. One coupling set (english/imperial or metric) contains all of the flange hardware you need for performing both 1-port and 2-port calibrations. It is not necessary to buy more than one coupling set.

## Purchasing Calibration Components and Hardware

1. Keysight N9911X Economical Waveguide Calibration Components can be purchased with english/imperial or metric threads. If you already own other Keysight waveguide calibration components, be aware that these have metric threads, so you should order N9911X metric components rather than english/imperial components for full compatibility.
2. To perform a 1-port calibration, you need the following calibration components and hardware. Refer to the tables in ["Calibration Component Part Numbers and Photos" on page 3](#) for part number information.
  - Adapter, qty 1
  - Termination, qty 1
  - Flush short, qty 1
  - 1/4 wavelength offset shim, qty 1
  - Coax cable, qty 1 (refer to ["Coax Cables" on page 1](#))
  - Coupling set, qty 1 (refer to ["Coupling Set \(Hardware\) for Flanges" on page 1](#))
3. To perform a 2-port calibration, you need the following calibration components and hardware. Refer to the tables in ["Calibration Component Part Numbers and Photos" on page 3](#) for part number information.
  - Adapter, qty 2
  - Termination, qty 1
  - Flush short, qty 1
  - 1/4 wavelength offset shim, qty 1
  - Coax cable, qty 2 (refer to ["Coax Cables" on page 1](#))
  - Coupling set, qty 1 (refer to ["Coupling Set \(Hardware\) for Flanges" on page 1](#))
4. Purchase the N9911X Economical Waveguide Calibration Components and hardware by contacting Keysight on the Web at: [www.keysight.com/find/assist](http://www.keysight.com/find/assist).

## Calibration Component Part Numbers and Photos

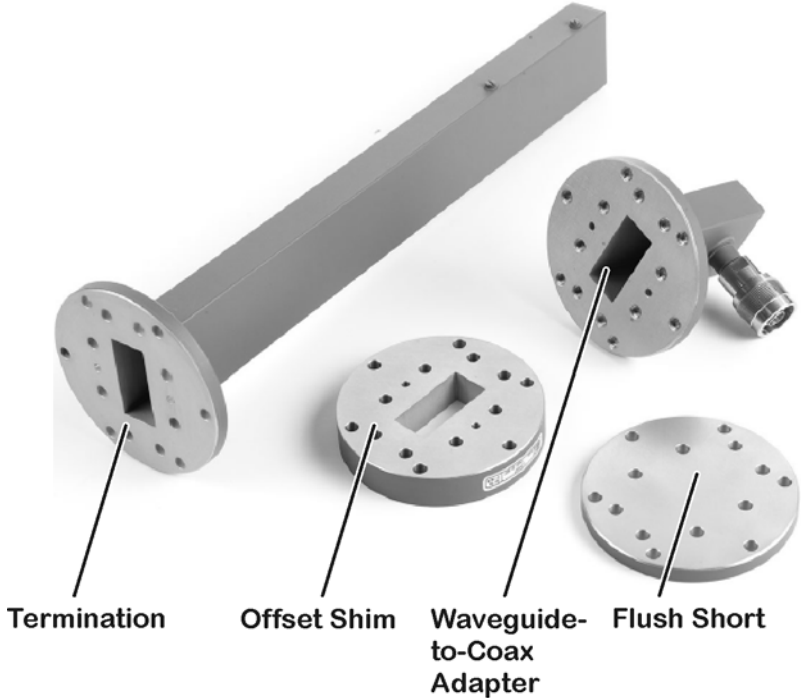
The tables on the following pages list the part numbers and descriptions for the N9911X Economical Waveguide Calibration Components. The figures on the following pages show photos of the components.

**Table 1 Calibration Components with Waveguide Designators C-Band/WR137/WG14, 5.38 – 8.18 GHz**

Description	Keysight Option Number
<b>Calibration Grade Components – Metric</b>	
Adapter, WR137 waveguide to type-N (male) coax	N9911X–110
Termination	N9911X–111
Flush short	N9911X–112
¼ wavelength offset shim	N9911X–113
Coupling set for flange (screw, M5 X 30, qty 16; bolt, M5 X 22 X 12, qty 6; bolt, M5 X 30 X 18.5, qty 8; screw, M5 X 45, qty 8; nut, M5, qty 16; washer, M5, qty 32; slip pin, Ø1/8" X 15 mm, qty 4)	N9911X–114
<b>Calibration Grade Components – English (Imperial)</b>	
Adapter, WR137 waveguide to type-N (male) coax	N9911X–115
Termination	N9911X–116
Flush short	N9911X–117
¼ wavelength offset shim	N9911X–118
Coupling set for flange (screw, #10-32 UNF X 1 1/4", qty 16; screw, #10-32 UNF X 1 3/4", qty 8; screw, #10-32 UNF X 1", qty 8; nut, #10-32 UNF, qty 16; washer, M5, qty 32; slip pin, Ø1/8" X 15 mm, qty 4)	N9911X–119

**Figure 1**

**Calibration Components with Waveguide Designators C-Band/WR137/WG14, 5.38 – 8.18 GHz**



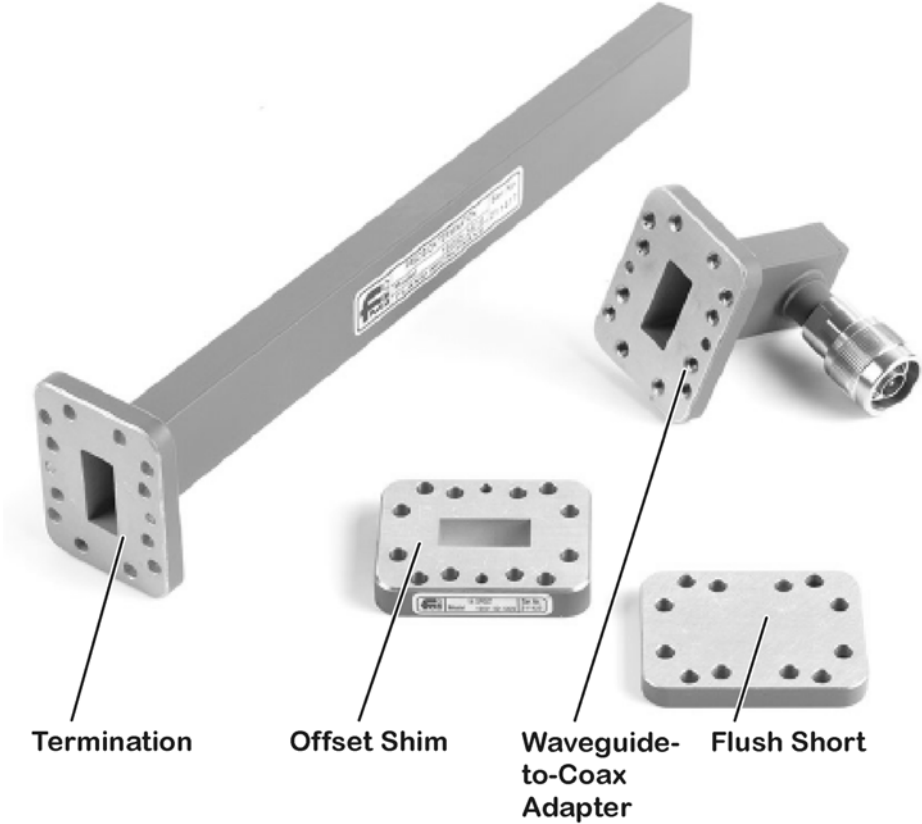
N9911\_002\_001



**Table 2 Calibration Components with Waveguide Designators X-Band/WR90/WG16, 8.2 – 12.5 GHz**

Description	Keysight Option Number
<b>Calibration Grade Components – Metric</b>	
Adapter, WR90 waveguide to type-N (male) coax	N9911X–210
Termination	N9911X–211
Flush short	N9911X–212
¼ wavelength offset shim	N9911X–213
Coupling set for flange (screw, M4 X 25, qty 16; screw, M4 X 30, qty 8; bolt, M4 X 21 X 12 (4.0), qty 8; bolt, M4 X 18 X 9 (4.17), qty 4; nut, M4, qty 16; washer, M4, qty 32; slip pin, Ø1/8" X 15 mm, qty 4)	N9911X–214
<b>Calibration Grade Components – English (Imperial)</b>	
Adapter, WR90 waveguide to type-N (male) coax	N9911X–215
Termination	N9911X–216
Flush short	N9911X–217
¼ wavelength offset shim	N9911X–218
Coupling set for flange (screw, #8-32-UNC X 1", qty 16; screw, #8-32 UNC X 1 1/4", qty 8; screw, #8-32 UNC X 3/4", qty 8; nut, #8-32 UNC, qty 16; washer, #8, qty 32; slip pin, Ø1/8" X 15 mm, qty 4)	N9911X–219

**Figure 2 Calibration Components with Waveguide Designators X-Band/WR90/WG16, 8.2 – 12.5 GHz**



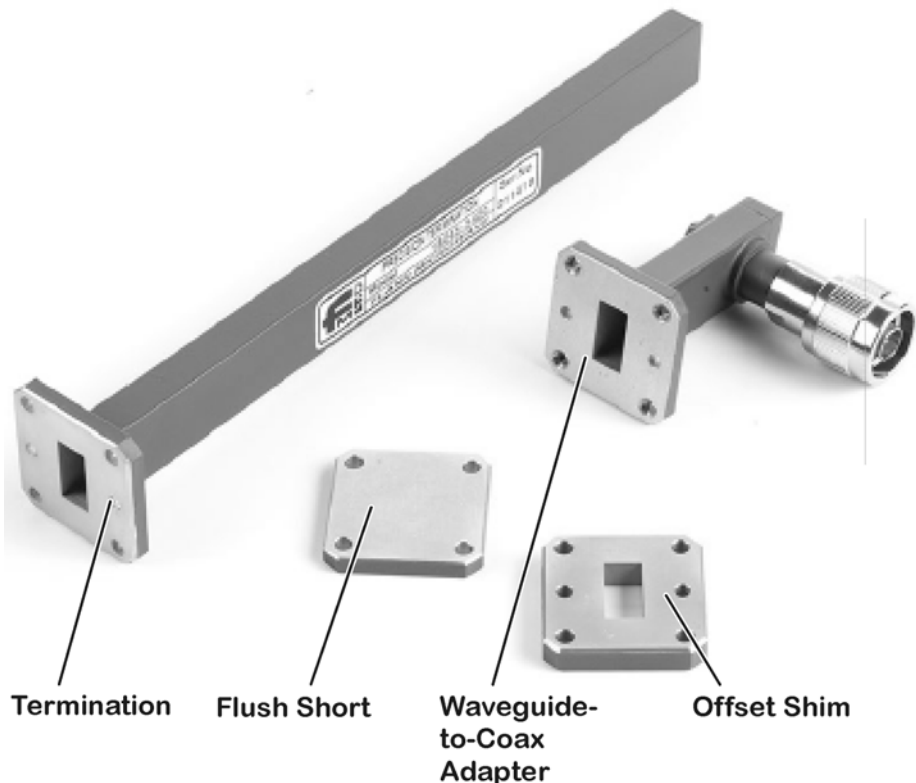
N9911\_002\_002

**Table 3 Calibration Components with Waveguide Designators Ku-Band/WR62/WG18, 11.9 – 18 GHz**

Description	Keysight Part Number
<b>Calibration Grade Components – Metric</b>	
Adapter, WR62 waveguide to Type-N (male) coax	N9911X–310
Termination	N9911X–311
Flush short	N9911X–312
¼ wavelength offset shim	N9911X–313
Coupling set for flange (screw, M4 X 25, qty 12; screw, M4 X 30, qty 6; bolt, M4 X 21 X 12 (4.0), qty 6; bolt, M4 x 18 x 9 (4.0), qty 4; nut, M4, qty 12; washer, M4, qty 24; slip pin, Ø1/8" X 15 mm, qty 4)	N9911X–314
<b>Calibration Grade Components – English (Imperial)</b>	
Adapter, WR62 waveguide to Type-N (male) coax	N9911X–315
Termination	N9911X–316
Flush short	N9911X–317
¼ wavelength offset shim	N9911X–318
Coupling set for flange (screw, #6-32-UNC X 1", qty 8; screw, #6-32-UNC X 1 1/4", qty 4; screw, #6-32 UNC X 5/8", qty 4; nut, #6-32 UNC, qty 8; washer, #6, qty 16; slip pin, Ø1/8" X 15 mm, qty 4)	N9911X–319

**Figure 3**

**Calibration Components with Waveguide Designators Ku-Band/WR62/WG18, 11.9 – 18 GHz**



N9911\_002\_003

**Table 4 Calibration Components with Waveguide Designators K-Band/WR42/WG20, 17.6 – 26.7 GHz**

Description	Keysight Part Number
<b>Calibration Grade Components – Metric</b>	
Adapter, WR42 waveguide to 3.5 mm (male) coax	N9911X–410
Termination	N9911X–411
Flush short	N9911X–412
¼ wavelength offset shim	N9911X–413
Coupling set for flange (screw, M3 X 20, qty 12; screw, M3 X 25, qty 6; bolt, M3 X 19 X 12.5, qty 6; bolt, M3 X 16 X 10, qty 4; nut, M3, qty 12; washer, M3, qty 24; slip pin, Ø3/32" X 12 mm, qty 4)	N9911X–414
<b>Calibration Grade Components – English (Imperial)</b>	
Adapter, WR 42 waveguide to 3.5 mm (male) coax	N9911X–415
Termination	N9911X–416
Flush short	N9911X–417
¼ wavelength offset shim	N9911X–418
Coupling set for flange (screw, #4-40-UNC X 3/4", qty 8; screw, #4-40 UNX X 1", qty 4; screw, #4-40 UNX X 5/8", qty 4; nut, #4-40 UNC, qty 8; washer, #4, qty 16; slip pin, Ø3/32" X 12 mm, qty 4)	N9911X–419



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