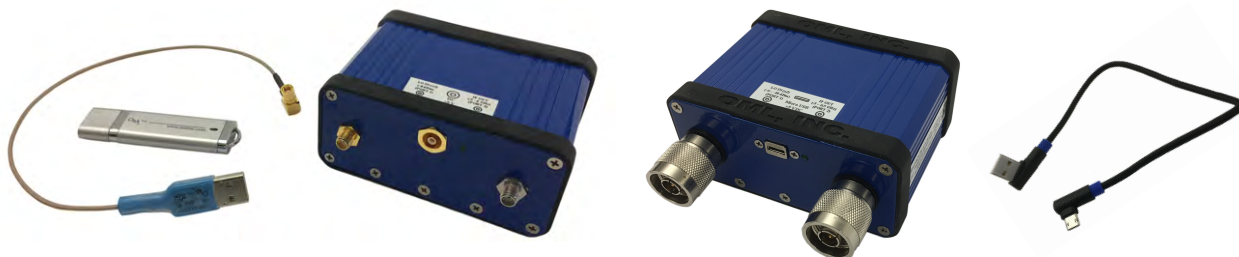


Keysight Technologies

N9910XM28-H2A and N9910XM28-H2N

Product Note



The Keysight N9910XM28-H2A and N9910XM28-H2N are WR28 (24–40 GHz) high performance x2 harmonic mixer modules from Oleson Microwave Labs. The IF bandwidth is sufficiently broad to capture data in any of the 5G bands from 24 to 40 GHz. Both models come with a 2.92 mm (F) input connector. They are designed to be used with the N9917A, N9917B, N9918A, and N9918B FieldFox models.

Model N9910XM28-H2A has SMA connectors for the IF and LO port connections. Adapter kits -AK1, -AK2, and -AK3, described on page 2, provide options for connecting this model to the FieldFox ports. This model comes with a USB to SMB cable to supply power from the FieldFox to the mixer.



Model N9910XM28-H2N has N-Type connectors for the IF and LO ports. It is designed for connecting directly to FieldFox models with N-Type port connectors without the need for adapters. This model comes with a USB to USB mini cable to supply power from the FieldFox to the mixer.

The product shipment includes the harmonic mixer module with a polycarbonate carrying case, DC cable, and USB memory stick with data.¹

OML products are to be returned directly to Oleson Microwave Labs for service, repair, and calibration. Keysight Technologies does not guarantee the performance of the OML products or the system performance when connected to a Keysight X-Series spectrum analyzer. Further information regarding OML harmonic mixers can be found on their website at: <https://www.omlinc.com/images/pdf/MxxHWD/OML-M28H2ADC-K-Datasheet.pdf>

For information concerning the operation and connections, reference the standard X-Series spectrum analyzer documentation with Option EXM.

The N9910XM28 is compliant to the RoHS and WEEE directives.

	<p>This WEEE symbol indicates separate collection for electrical and electronic equipment, mandated under EU law as of August 13, 2005. All electric and electronic equipment are required to be separated from normal waste for disposal.</p>
	<p>China Restricted Product Label. The EPUP (environmental protection use period) number in the center indicates the time period during which no hazardous or toxic substance elements are expected to leak or deteriorate during normal use and generally reflects the expected useful life of the product.</p>

1. The USB correction data provided may not currently be supported in all available SA modes and functionality associated with the Field Fox. The Field Fox firmware is continuously being updated.

Table 1 OML Frequency Extender Module Adapter Kits

Keysight adapter kits -AK1, -AK2, and -AK3 provide options for connecting the mixer model N9910XM28-H2A to FieldFox models with N-Type and 3.5 mm ports. Adapters -AK4 and -AK5 can be used for both mixer models.

When ordering the OML frequency extender as Keysight model number **N9910XM28-H2A**, add the adapter kits shown below as Keysight model numbers N9910XM28-AK1, -AK2, -AK3, -AK4, and -AK5. When ordering the OML frequency extender as Keysight model number **N9910XM28-H2N**, add the adapter kits shown below as Keysight model numbers N9910XM28-AK4, -AK5, and -AK6. (Note: -AK1, -AK2, and AK3 are intended for N9910XM28-H2A only)

Keysight Model Number	Description
N9910XM28-AK1	Coaxial straight Male-N to Male-SMA, qty. 2 included, connects the mixer model N9910XM28-H2A, with SMA LO and IF connectors, directly to the FieldFox with N-Type ports, e.g., FieldFox model N9917B (see Figure 1, page 4). The new mixer model N9910XM28-H2N has N-Type LO and IF connections for direct connection to the FieldFox N9917B.
N9910XM28-AK2	Coaxial straight Female-SMA to Female-N, qty. 2 included, used as as spacer with N9910XM28-AK1 for FieldFox units with 3.5 mm ports when the GPS antenna is mounted vertically (see Figure 2, page 5).
N9910XM28-AK3	Coaxial straight Male-SMA to Female-SMA, qty. 2 included, connects mixer directly to FieldFox with 3.5 mm ports. Required to provide space for the GPS antenna when used with right angle adapter N9010AM28-AK4 (see Figure 3, page 6).
N9910XM28-AK4	Female-SMA to Male-SMA, Right Angle, qty. 1 included. For connecting GPS antenna at right angle and used for GPS antenna attachment with N9910XM28-AK1 or N9910XM28-AK3 adapter kits. Can also be used to provide a right angle connection to Ref/Trig input (see Figures 1, 3, 4, and 5).
N9910XM28-AK5 ¹	Waveguide horn antenna and mounting fixture (see Figure 6, page 9).
N9910XM28-AK6	N-Type Male-Female adapter. Acts as a spacer to offset the mixer from the FieldFox to allow access to the Trig/Ref input connector which is blocked by the USB mini connector when the N9910XM28-H2N is connected directly (see Figure 5, page 8).

1. To access the N9910XM28-AK5 Waveguide Horn Antenna Data Sheet, go to the Eravant website at <http://www.eravant.com> and copy/paste the MPN **SAR-2309-28KF-E2** into the search bar. Select the MPN from the drop-down menu. Click on the Data Sheet link to see specifications.

Table 1 OML Frequency Extender Module Adapter Kits (Continued from Page 1)

Keysight adapter kits -AK1, -AK2, and -AK3 provide options for connecting the mixer model N9910XM28-H2A to FieldFox models with N-Type and 3.5 mm ports. Adapters -AK4 and -AK5 can be used for both mixer models.	
When ordering the OML frequency extender adapter kits separately (not added to an order with Keysight model number N9910XM28-H2A or N9910XM28-H2N), order the adapter kits shown on page 1 (N9910XM28-AKx) as the Keysight part numbers shown below.	
Keysight Part Number	Description
1250-1636	Coaxial straight Male-N to Male-SMA, order qty. 2, connects mixer directly to FieldFox with N-Type ports (see Figure 1, page 4).
1250-3968	Coaxial straight Female-SMA to Female-N, order qty. 2, spacer for FieldFox units with 3.5 mm ports and used with part number 1250-1636 adapter kit when GPS antenna is mounted vertically (see Figure 2, page 5).
1250-3851	Coaxial straight Male-SMA to Female-SMA, order qty. 2, connects mixer directly to FieldFox with 3.5 mm ports (see Figure 3, page 6).
N0000-33203	Female-SMA to Male-SMA, Right Angle, qty. 1, for connecting GPS antenna or Trig/Ref input at a right angle (see Figures 1, 3, 4, and 5).
0950-6352	Antenna and mounting fixture, 0.75-inch square flange plastic, qty. 1 included, to be used with 0955-3591 (see Figure 6, page 9).
0955-3591	Waveguide horn antenna, pyramidal Ka-band 26.5 to 40 GHz WR-28, qty. 1 included, also order 0950-6352 (above) for the mounting fixture (see Figure 6, page 9).
85032-60020	N-Type Male-Female adapter. Acts as a spacer to offset the mixer from the FieldFox to allow access to the Trig/Ref input connector which is blocked by the USB mini connector when the N9910XM28-H2N is connected directly (see Figure 5, page 8).

Connecting the N9910XM28 to the Keysight FieldFox Microwave Analyzer

To setup and use the FieldFox with the OML H2A or H2N Mixer, please refer to the Starter Reference Guide provided on the USB drive. Alternatively, you may access the Application Note at https://www.omlinc.com/images/pdf/Library/Application_Notes/42_160504A1B_Mixer-Setup-FieldFox.pdf.

1. Connect power to the mixer using the USB cable provided.
2. The maximum recommended input power is -10 dBm.

Figure 1 Example of Adapter Kit N9910XM28-AK1 for using the N9910XM28-H2A with FieldFox analyzers with N-Type Ports. Adapter Kit N9910XM28-AK4, a single SMA M-F right angle connector, for connecting the GPS Antenna.

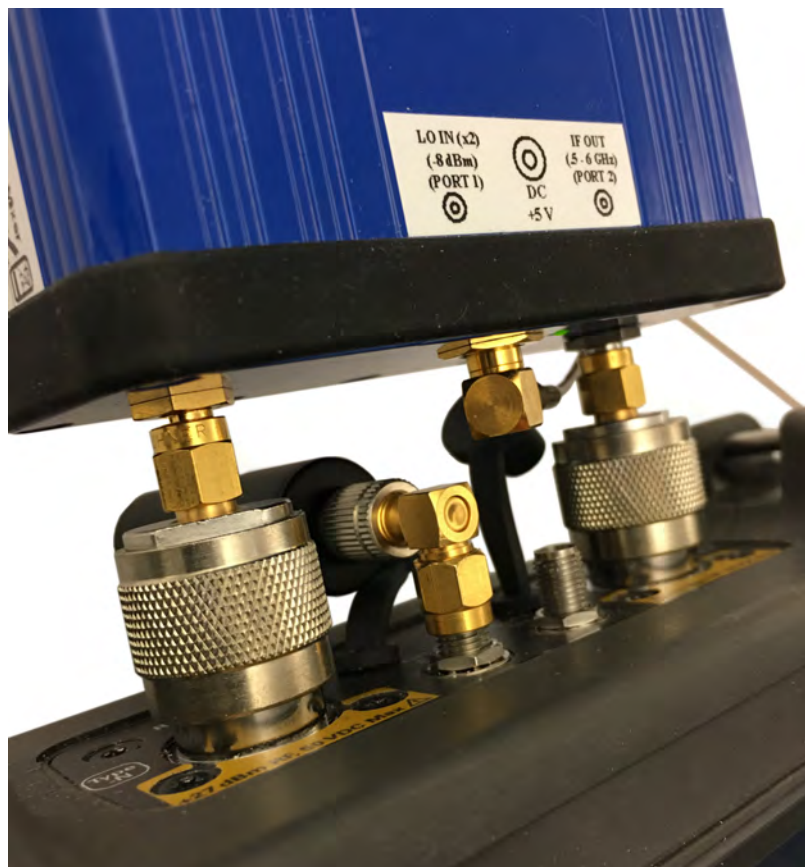


Figure 2 Example of Adapter Kit N9910XM28-AK1 and N9910XM28-AK2 connected together to act as a spacer for the vertically mounted GPS Antenna. This is for FieldFox analyzers with 3.5 mm Port connectors.



Figure 3 Example of Adapter Kit N9910XM28-AK3 for connecting FieldFox analyzers with 3.5mm Port connectors directly to the mixer. N9910XM28-AK4 is used to attach the GPS antenna at a right angle.



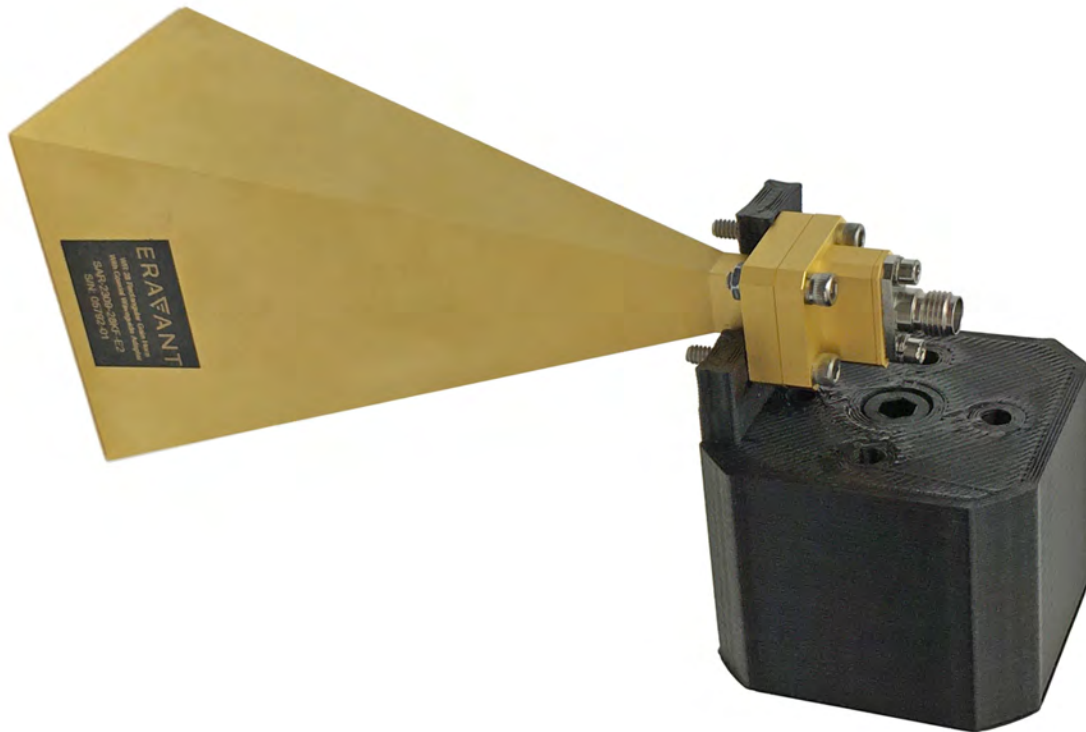
Figure 4 Example of model N9910XM28-H2N connected directly to a N9917B 18 GHz FieldFox. Note that the Ref/Trig input connector is blocked by the mini USB connector.



Figure 5 Example of the N9910XM28-H2N Mixer connected with Adapter Kit N9910XM28-AK6. The -AK6 acts as a spacer to allow access to the Ref/Trig connector.



Figure 6 WR-28 Coaxial Rectangular Horn Antenna with the SAX-750-S1 Standard Antenna Mounting Fixture for mounting to a tripod (the tripod is not provided).



EMC Information

NOTE

When used with the FieldFox Microwave Analyzer, this product may exhibit some performance loss, per the following:

1. Sideband spurs up to -45 dBc may occur when exposed to ambient continuous electromagnetic phenomenon in the range of 80 MHz to 6 GHz when tested per IEC 61000-4-3 (Field strength of 10V/m from 80 MHz to 1 GHz, 3V/m 1 GHz to 6 GHz).
2. Sideband spurs up to -25 dBc may occur when exposed to ambient continuous magnetic phenomenon in the range of 50 to 60 Hz when tested per IEC 61000-4-8. (Field strength of 30A/m)

Electrostatic Discharge Protection

NOTE

The polycarbonate carrying case provided with this product can generate a charge. The N9910XM28-H2A mixer has built-in static protection and is safe to use with the case. However, after using the case, please take the precaution of putting it on an anti-static surface as described below and allow any charge to dissipate so that other static sensitive components in your work area are protected.

Protection against electrostatic discharge (ESD) is essential while removing assemblies from or connecting cables to the system components. Static electricity can build up on your body and can easily damage sensitive internal circuit elements when discharged. Static discharges too small to be felt can cause permanent damage. To prevent damage to the instrument:

- *always* have a grounded, conductive table mat in front of your test equipment.
- *always* wear a grounded wrist strap, connected to a grounded conductive table mat, having a 1 M Ω resistor in series with it, when handling components and assemblies or when making connections.
- *always* wear a heel strap when working in an area with a conductive floor. If you are uncertain about the conductivity of your floor, wear a heel strap.
- *always* ground yourself before you clean, inspect, or make a connection to a static-sensitive device or test port. You can, for example, grasp the grounded outer shell of the test port or cable connector briefly.
- *always* ground the center conductor of a test cable before making a connection to the analyzer test port or other static-sensitive device. This can be done as follows:
 1. Connect a short (from your calibration kit) to one end of the cable to short the center conductor to the outer conductor.
 2. While wearing a grounded wrist strap, grasp the outer shell of the cable connector.
 3. Connect the other end of the cable to the test port and remove the short from the cable.

Keysight Support, Services, and Assistance

To verify the contents shipped with your product, refer to the “Box Content List” included with the shipment.

Inspect the shipping container. If the container or packing material is damaged, it should be kept until the contents of the shipment have been checked mechanically and electrically. If there is any physical damage, refer to “[Contacting Keysight](#)” below. Keep the damaged shipping materials (if any) for inspection by the carrier and a Keysight Technologies representative.

Keysight Technologies provides warranty service if a repair is needed. The product is serviced by OML, which requires that the product be returned to OML or Keysight.

Contacting Keysight

Assistance with test and measurement needs, and information on finding a local Keysight office are available on the Internet at:
<http://www.keysight.com/find/assist>

You can also purchase accessories or documentation items on the Internet at: <http://www.keysight.com/find>

If you do not have access to the Internet, contact your field engineer.

NOTE

In any correspondence or telephone conversation, refer to the Keysight product by its model number and full serial number. With this information, the Keysight representative can determine the warranty status of your unit.

NOTE

The **product serial number** is the OML serial number (example: 200526-2 is yymmdd-second one) assigned by Oleson Microwave Labs. Refer to the label on the product for the serial number.
