

Keysight Wireless Test Set

M1650A mmWave Transceiver for
E7760A Wideband Transceiver

Getting Started
Guide

Notices

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Safety Notices

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Where to Find the Latest Information

Documentation is updated periodically. For the latest information about these products, including instrument software upgrades, application information, and product information, browse to one of the following URLs, according to the name of your product:

<http://www.keysight.com/find/m1650a>

To receive the latest updates by email, subscribe to Keysight Email Updates at the following URL:

<http://www.keysight.com/find/MyKeysight>

Information on preventing instrument damage can be found at:

www.keysight.com/find/PreventingInstrumentRepair

Is your product software up-to-date?

Periodically, Keysight releases software updates to fix known defects and incorporate product enhancements. To search for software updates for your product, go to the Keysight Technical Support website at:

<http://www.keysight.com/find/techsupport>

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1 Safety & Environmental Information

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“Using Accessories” on page 12

“Weight and Dimensions” on page 13

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Warning Statements and Symbols

Caution and Warning notices are used in this document are described below.

CAUTION

A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

WARNING

A WARNING denotes a hazard. It calls attention to an operating procedure, practice or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

See also: [“Front and Rear Panel Symbols” on page 22.](#)

Safety

This product has been designed and tested in accordance with accepted industry standards, and has been supplied in a safe condition. The documentation contains information and warnings that must be followed by the user to ensure safe operation and to maintain the product in a safe condition.

Safety Compliance

This product complies with the essential requirements of the European Low Voltage Directive as well as current editions of the following standards (dates and editions are cited in the Declaration of Conformity):

- IEC/EN 61010-1
- Canada: CSA C22.2 No. 61010-1
- USA: UL std no. 61010-1

Acoustic statement (European Machinery Directive)

Acoustic noise emission
LpA <70 dB
Operator position
Normal operation mode per ISO 7779

General Safety Notices

WARNING

If this product is not used as specified, the protection provided by the equipment could be impaired. This product must be used in a normal condition (in which all means for protection are intact) only.

WARNING

No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electrical shock, do not remove covers.

WARNING

This is a Safety Protection Class I Product (provided with a protective earthing ground incorporated in the power cord). The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. Any interruption of the protective conductor inside or outside of the product is likely to make the product dangerous. Intentional interruption is prohibited.

Environmental Conditions (Operating)

This product is designed for use in the following conditions:

- For indoor use only
- Altitude up to 3000 m
- Temperature 5 to 40°C
- Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C.

CAUTION

This product is designed for use in Installation Category II and Pollution Degree 2 environment.

Environmental Stress Testing

Samples of this product have been type tested in accordance with the Keysight Environmental Test Manual and verified to be robust against the environmental stresses of Storage, Transportation and End-use; those stresses include but are not limited to temperature, humidity, shock, vibration, altitude and power line conditions.

Test Methods are aligned with IEC 60068-2 and levels are similar to MIL-PRF-28800F Class 3.

EMC (Electromagnetic Compatibility)

This product complies with the essential requirements of the European Directive as well as current editions of the following standards (dates and editions are cited in the Declaration of Conformity):

- IEC/EN 61326-1
- CISPR Pub 11 Group 1, class A
- AS/NZS CISPR 11
- ICES/NMB-001

This ISM device complies with Canadian ICES-001.

Cet appareil ISM est conforme a la norme NMB-001 du Canada.

South Korean Class A EMC declaration

This equipment is Class A suitable for professional use and is for use in electromagnetic environments outside of the home.

A 급 기기 (업무용 방송통신기자재)이 기기는 업무용 (A 급) 전자파적합기기로서 판 매자 또는 사용자는 이 점을 주 의하시기 바라 며 , 가정외의 지역에서 사용하는 것을 목적으 로 합니다 .
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Declaration of Conformity

The Declaration of Conformity for any Keysight product can be found on the website:

<http://www.keysight.com/go/conformity>

Ventilation

CAUTION

VENTILATION REQUIREMENTS: When installing the instrument(s) into a cabinet, consideration shall be given to the convection flow into and out of the cabinet. Consideration shall also be given to the individual instruments to avoid having the heated discharge of one instrument, now becoming the cooling intake air for another instrument.

Another area of concern is verification that the maximum ambient operating temperature of the instrument(s) is not exceeded by cabinet installation.

Keysight recommends forced air convection whenever an instrument(s) are installed in a cabinet and further recommends that the maximum operating temperature of the cabinet be reduced 10°C from the lowest, of the maximum operating temperature of a single instrument.

If there are any concerns or special requirements an Keysight Field Engineer should be consulted to assure instrument(s) temperature compliance and performance.

Power requirements

The M1650A does not have an AC power connection. It is powered by a DC voltage from the E7760A Wideband Transceiver, which is supplied over the RF Cable Assembly. The DC supply does not represent a risk of personal injury.

CAUTION

The RF Cable Assembly should not be connected to, or disconnected from, the M1650A while it is supplying DC power from the E7760A. This connection should be made only when the E7760A is powered off, or the cable is not connected to the E7760A. If the LED status indicator on the front of the M1650A is lit, this indicates that it is powered up and the cable should not be disconnected.

Using Accessories

Use only the RF Cable Assembly which has been supplied with the M1650A to connect it with the E7760A, and connect it only to the mmW ports on that instrument.

Weight and Dimensions

The weight and dimensions of the M1650A are as follows.

- Weight: 4 kg (8.8 lbs)
- Height: 185 mm (7.3 in)
- Width: 96 mm (3.8 in)
- Depth: 220 mm (8.7 in)

Protecting against electrostatic discharge

Electrostatic discharge (ESD) can damage or destroy electronic components (the possibility of unseen damage caused by ESD is present whenever components are transported, stored, or used).

Test equipment and ESD

To help reduce ESD damage that can occur while using test equipment:

WARNING

Do not use these first three techniques when working on circuitry with a voltage potential greater than 500 volts.

- Before connecting any coaxial cable to a test set connector for the first time each day, momentarily short the center and outer conductors of the cable together.
- Personnel should be grounded with a 1 M Ω resistor-isolated wrist-strap before touching the center pin of any connector and before removing any assembly from the test set.
- Be sure that all instruments are properly earth-grounded to prevent build-up of static charge.
- Perform work on all components or assemblies at a static-safe workstation.
- Keep static-generating materials at least one meter away from all components.
- Store or transport components in static-shielding containers.
- Always handle printed circuit board assemblies by the edges. This reduces the possibility of ESD damage to components and prevent contamination of exposed plating.

Additional information about ESD

For more information about ESD and how to prevent ESD damage, contact the Electrostatic Discharge Association (<http://www.esda.org>). The ESD standards developed by this agency are sanctioned by the American National Standards Institute (ANSI).

Safety & Environmental Information
Protecting against electrostatic discharge

2 Quick Start

The following topics can be found in this section:

[“Initial Inspection” on page 16](#)

[“Location and Mounting” on page 17](#)

Initial Inspection

Inspect the shipping container and the cushioning material for signs of stress. Retain undamaged shipping materials for future use, as you may wish to ship the test set to another location or to Keysight Technologies for service. Verify the contents of the container against the table below.

Item	Deliverable	Description
Getting Started Guide (this document)		Provides first-time power on instructions, licensing information, operating system information, and general hardware information.
Keysight M1650A mmWave Transceiver		
RF Cable Assembly (E7760-60006)		In addition to test signals, carries DC supply voltage from E7760A.

NOTE

The M1650A is used in conjunction with the E7760A Wideband Transceiver, but that is a separate purchase and is not always shipped with the M1650A.

Shipping Problems?

If the shipping materials are damaged or the contents of the container are incomplete:

- Contact the nearest Keysight Technologies office.
- Keep the shipping materials for the carrier's inspection.
- If you must return a test set to Keysight Technologies, use the undamaged original or comparable shipping materials. See **“Returning Your Test Set for Service” on page 25.**

Location and Mounting

It is recommended to suspend the transceiver above the Device Under Test (DUT), with the mmWave port pointed downwards at the DUT, so that heat given off by the external cooling fins of the transceiver will rise away from the DUT. Leave a minimum clearance of 2.5 inches (7 cm) around the transceiver. Also, ensure there is enough room to attach the RF Cable Assembly, which connects to the M1650A mmWave Transceiver to the E7760A Wideband Transceiver.

Quick Start
Location and Mounting

3 Exterior Rear Panel Functions

The following topics can be found in this section:

[“Exterior Features” on page 20](#)

[“Front and Rear Panel Symbols” on page 22](#)

Exterior Features

Figure 3-1 M1650A Front and Rear Views



Figure 3-2 M1650A side view



The features are described in the following table.

Exterior Rear Panel Functions
Exterior Features

Number	Name	Description
1	Waveguide	WR-15 connector
2	"Connect to E776X mm Wave Port only"	<p>This Type N connector is cabled to one of the E7760A mmWave ports. (Use only the supplied RF Cable Assembly.) In addition to test signals, the E7760A supplies DC power and control signals to this port.</p> <p>CAUTION</p> <p>Do not connect or disconnect the RF cable, at this port or at the E7760A mmWave port, while the E7760A is powered on.</p>
3	LED Status Indicator	This LED will be lit and blue when the M1650A is being used as an output port (providing a stimulus to the DUT) or green if it is being used as an input port (measuring a signal received from the DUT).

Front and Rear Panel Symbols

Symbols used on the exterior of the M1650A are described below.

Symbol	Description
	The instruction documentation symbol. The product is marked with this symbol when it is necessary for the user to refer to instructions in the documentation.
	The CE mark is a registered trademark of the European Community.
	The RCM mark is a registered trademark of the Australian Communications and Media Authority.
	South Korean Certification (KC) mark; includes the marking's identifier code which follows this format: MSIP-REM-YYY- <u>ZZZZZZZZZZZZZZ</u>
	ICES / NMB-001 Cet appareil ISM est conforme a la norme NMB du Canada. This is a marking to indicate product compliance with the Industry Canadian Interference-Causing Equipment Standard (ICES-001). This is also a symbol of an Industrial Scientific and Medical Group 1 Class A product (CISPR 11, Clause 4).
	The CSA mark is a registered trademark of the CSA International.
	This 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 (Reference WEEE Directive 2002/96/EC).
	Indicates the time period during which no hazardous or toxic substance elements are expected to leak or deteriorate during normal use. Forty years is the expected useful life of the product.

4 Troubleshooting

The following topics can be found in this section:

[“Identifying Problems” on page 24](#)

[“Returning Your Test Set for Service” on page 25](#)

Where to get technical help

For online assistance: <http://www.keysight.com/find/assist>

To contact Keysight Technologies: <http://www.keysight.com/find/contactus>

Also, see **“Locations for Keysight Technologies” on page 26.**

Identifying Problems

WARNING

No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electrical shock do not remove covers.

If the status indicator on the M1650A is not lit, or if it appears that mmWave signals are not being exchanged with the Device Under Test check the following:

- 1. Is the RF Cable Assembly connected between the M1650A and the appropriate mm Wave Port of the E7760A?**
- 2. Is the E7760A powered on?**
- 3. Is the E7760A properly configured (for example, are the input and output ports selected appropriately for your test setup?).**

If no obvious problem in the test setup can be found, contact Keysight Technologies to ask for technical support.

Returning Your Test Set for Service

Calling Keysight Technologies

Keysight Technologies has offices around the world to provide you with complete support for your wireless test set. To obtain servicing information, or to order replacement parts, contact the nearest Keysight Technologies office listed under **“Locations for Keysight Technologies” on page 26**. In any correspondence or telephone conversations, refer to your test set by its product number and full serial number.

Locations for Keysight Technologies

For online assistance: <http://www.keysight.com/find/assist>

To contact Keysight Technologies: <http://www.keysight.com/find/contactus>

Alternately, contact the nearest Keysight sales office:

Americas		
Canada (877) 894 4414	Brazil 55 11 3351 7010	Mexico 001 800 254 2440
United States (800) 829 4444		
Asia & Pacific		
Australia 1 800 629 485	China 800 810 0189	Hong Kong 800 938 693
India 1 800 112 929	Japan 0120 (421) 345	Korea 080 769 0800
Malaysia 1 800 888 848	Singapore 1 800 375 8100	Taiwan 0800 047 866
Other Asia-Pacific countries: (65) 6375 8100		
Europe & Middle East		
Austria 0800 001122	Belgium 0800 58580	Finland 0800 523252
France 0805 980333	Germany 0800 6270999	Ireland 1800 832700
Israel 1 809 343051	Italy 800 599100	Luxembourg +32 800 58580
Netherlands 0800 0233200	Russia 8800 5009286	Spain 0800 000154
Sweden 0200 882255	Switzerland 0800 805353 Opt. 1 (DE), Opt. 2 (FR), Opt. 3 (IT)	United Kingdom 0800 0260637



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