

Agilent Technologies E8257DS02 - S15

User's Guide

Millimeter Source Modules

**E8257DS02, E8257DS03, E8257DS05, E8257DS06, E8257DS08,
E8257DS10, E8257DS12 and E8257DS15**



Agilent Technologies

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Safety Notes

The following safety notes are used throughout this document. Familiarize yourself with each of these notes and its meaning before performing any of the procedures in this document.

WARNING	Warning denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a warning note until the indicated conditions are fully understood and met.
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CAUTION	Caution denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in damage to or destruction of the instrument. Do not proceed beyond a caution sign until the indicated conditions are fully understood and met.
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Definitions

- *Specifications* describe the performance of parameters covered by the product warranty (temperature +20 to +30 °C, unless otherwise noted.)
- *Typical* describes additional product performance information that is not covered by the product warranty. It is performance beyond specification that 80% of the units exhibit with a 95% confidence level over the temperature range 20 to 30 °C. Typical performance does not include measurement uncertainty.
- *Nominal* values indicate expected performance or describe product performance that is useful in the application of the product, but is not covered by the product warranty.
- *Characteristic Performance* describes performance parameter that the product is expected to meet before it leaves the factory, but is not verified in the field and is not covered by the product warranty. A characteristic includes the same guard bands as a specification.

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Contents

E8257DS02-S15

Introduction

The E8257DS02, S03, S05, S06, S08, S10, S12, and S15 are Millimeter-wave Source Modules that are manufactured by Oleson Microwave Labs (OML) and is provided as an ordering convenience by Agilent Technologies. This product can be ordered directly from OML. For additional Millimeter-wave Source Modules information go to the Agilent website at <http://www.agilent.com/find>

This product is warranted by OML against defective materials and workmanship. Refer to documentation supplied with this product or go to <http://www.omlinc.com> for more information.

NOTE A periodic calibration is not required for millimeter-wave modules.

Description

The millimeter-wave source modules are designed to work with the E8247C, E8257C, E8257D, E8267C or E8267D Series PSG Synthesized Sources.

The following list of adapters are required to connect the PSG RF Output to the millimeter-wave source module RF Input. The adapter is included with the PSG product, but is not included with the millimeter-wave source module. Refer to the following table for required adapters.

Table 1 Adapters

Instrument Options	Adapter Description	Agilent Part Number
520	3.5 mm (f) to (f)	5061-5311
540, 550 and 567	2.4 mm (f) to 3.5 mm (f)	1250-2187
1ED	3.5 mm (f) to Type-N (m)	1250-1744

Content list

Each source module ordered includes one each of the standard accessories listed below:

- Source Module Interface cable (2 meter)
- RF cable SMA (m) to SMA (m) (1 meter)

System Setup

1. Connect the interface cable (included with this option) from the millimeter-wave source module and to the rear panel on the PSG. Refer to [Figure 1](#).
2. Connect the RF cable (included with this option) from the SMA RF Input connector on the millimeter-wave source module to the RF Output connector on the PSG, using the adapter listed in [Table 1](#). Refer to [Figure 2](#).

Figure 1 Interface Cable Installation

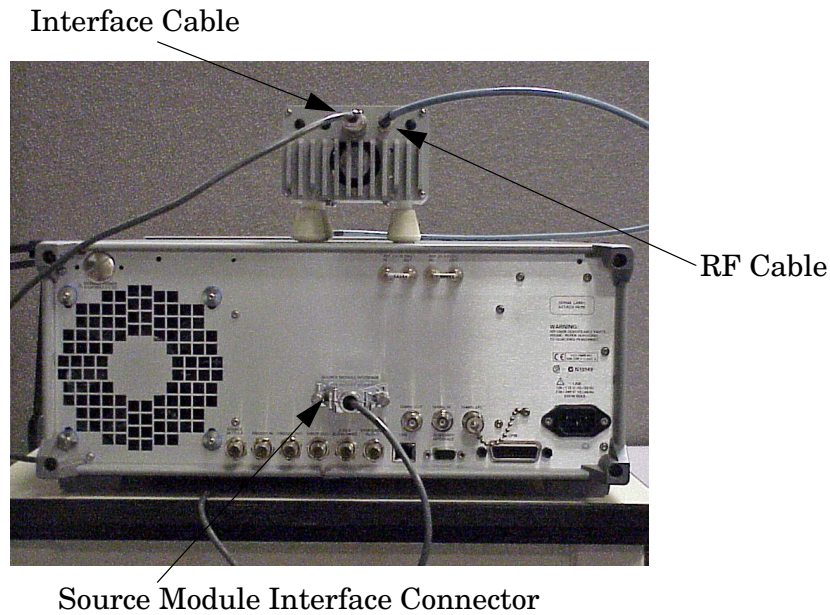
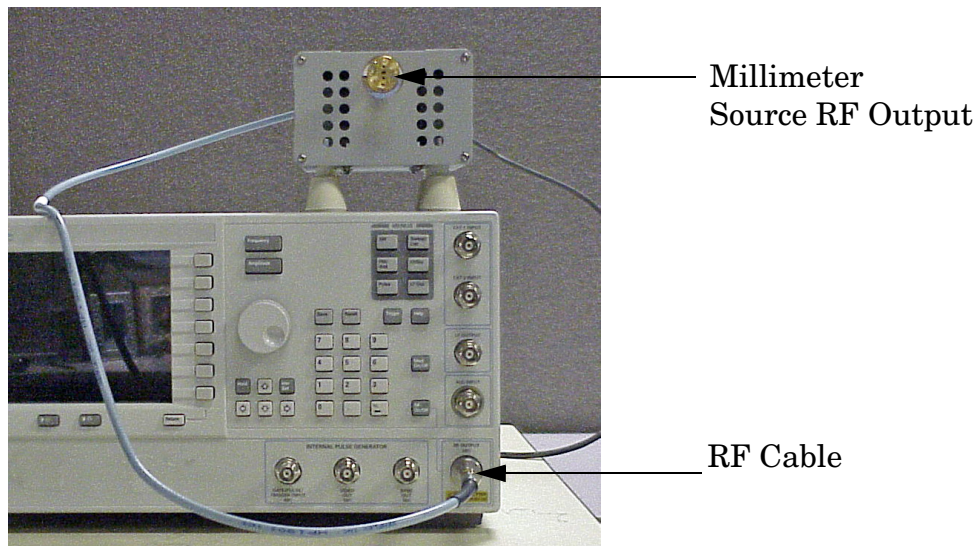


Figure 2 RF Cable Installation



Performance Specifications

The following table provides specifications for each of the millimeter source models. Refer to the millimeter source module used for your application. All specifications apply over a temperature range of +20 to +30 °C.

Table 2 Millimeter Source Model Performance Specifications

Item ¹	S15	S12	S10	S08	S06	S05	S03	S02
Multipliers	x4	x6	x6	x8	x12	x12	x18	x30
FREQ IN (GHz)	12.5 to 18.7	10.0 to 15.0	12.5 to 18.4	11.2 to 17.5	9.1 to 14.1	11.6 to 18.4	12.2 to 18.1	10.83 to 16.67
FREQ OUT (GHz)	50.0 to 75.0	60.0 to 90.0	75.0 to 110.0	90.0 to 140.0	110.0 to 170.0	140.0 to 220.0	220.0 to 325.0	325 to 500
RF IN	+13 dBm							
RF IN Damage Level	+36 dBm							
RF OUT ² (typical)	+8 dBm	+6 dBm	+5 dBm	-5 dBm	-13 dBm	-15 dBm ³	-25 dBm ⁴	-35 dBm ⁴
Harmonics & Sub-Harmonics ⁵ (typical)	≤ -20 dBc							
In-Band Spurious ⁶ (typical)	≤ -20 dBc ≤ -15 dBc (in the lower 10% band)				≤ -20 dBc			
RF IN VSWR (typical)	≤ 2							
RF OUT VSWR (typical)	≤ 1.7	≤ 1.7	≤ 1.7	≤ 1.7	≤ 1.7	≤ 1.7	≤ 3.0	≤ 3.0
RF IN Port	SMA Female							
RF OUT Port ⁷	WR-15	WR-12	WR-10	WR-08	WR-06	WR-05	WR-03	WR-02
Power (typical)	Supplied by E82xx Series PSG (+8 Vdc at 1.2 A max, +15 Vdc at 150 mA max)							

1. Specifications subject to change without notice.
2. Not traceable to NIST above 110 GHz.
3. Up to 200 GHz, rolling off at -25 dBm typ. at 220 GHz as measured by OML's calorimeter.
4. Output power estimated due to sensitivity limitation of OML's calorimeter, measured power data not traceable or provided.
5. As related to the desired output frequencies.
6. In-band mixing products. Typically ≤ -15 dBc in the lower 10% of WR-15, WR12, or WR10 waveguide band.
7. RF Output port flange configuration per MIL-F-3922-67B-xx.

Table 3 Instrument Dimensions

Net Weight	Height ¹	Width	Depth ²
2.5 lb (1.1 kg) <i>nominal</i>	2.8 in (7.11 cm)	4.3 in (10.92 cm)	5.7 in (14.47 cm)

1. Height excludes the adjustable rubber feet length.
2. Depth dimension excludes the output waveguide length.

The following millimeter-wave source module model part numbers corresponding with the Agilent model part numbers.

Table 4 OML and Agilent Model Numbers

OML Model Number	Agilent Model Number
S15MS-AG	E8257DS15
S12MS-AG	E8257DS12
S10MS-AG	E8257DS10
S08MS-AG	E8257DS08
S06MS-AG	E8257DS06
S05MS-AG	E8257DS05
S03MS-AG	E8257DS03
S02MS-AG	E8257DS02

Safety and Regulatory Information

Introduction

Review this product and related documentation to familiarize yourself with safety markings and instructions before you operate the instrument.

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 Earth Ground

WARNING **This is a Safety Class I Product (provided with a protective earthing ground incorporated in the power cord). The mains plug shall be 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.**

CAUTION Always use the three prong AC power cord supplied with this product. Failure to ensure adequate earth grounding by not using this cord may cause product damage and the risk of electrical shock.

Declaration of Conformity

A copy of the Declaration of Conformity is available upon request, or a copy is available on the Agilent Technologies web site at
<http://regulations.corporate.agilent.com/DoC/search.htm>

Statement of Compliance

This instrument has been designed and tested in accordance with CAN/CSA 22.2 No. 61010-1-04, UL Std No. 61010-1 (2nd Edition).

Before Applying Power

Verify that the premises electrical supply is within the range of the instrument. The instrument has an autoranging power supply.

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.

CAUTION The Mains wiring and connectors shall be compatible with the connector used in the premise electrical system. Failure, to ensure adequate earth grounding by not using the correct components may cause product damage, and serious injury.

CAUTION Always use the three prong AC power cord supplied with this product. Failure to ensure adequate earth grounding by not using this cord may cause product damage and the risk of electrical shock.

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

CAUTION Before switching on this instrument, make sure the supply voltage is in the specified range.

CAUTION Verify that the premise electrical voltage supply is within the range specified on the instrument.

CAUTION Ventilation Requirements: When installing the instrument in a cabinet, the convection into and out of the instrument must not be restricted. The ambient temperature (outside the cabinet) must be less than the maximum operating temperature of the instrument by 4 °C for every 100 watts dissipated in the cabinet. If the total power dissipated in the cabinet is greater than 800 watts, forced convection must be used.

Servicing

WARNING These servicing instructions are for use by qualified personnel only. To avoid electrical shock, do not perform any servicing unless you are qualified to do so.

WARNING Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended. Discard used batteries according to manufacturer's instructions.

WARNING For continued protection against fire hazard replace line fuse only with same type and rating. The use of other fuses or material is prohibited.

WARNING These servicing instructions are for use by qualified personnel only. To avoid electrical shock, do not perform any servicing unless you are qualified to do so.

WARNING The opening of covers or removal of parts is likely to expose the user to dangerous voltages. Disconnect the instrument from all voltage sources before opening.

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

WARNING The detachable power cord is the instrument disconnecting device. It disconnects the mains circuits from the mains supply before other parts of the instrument. The front panel switch is only a standby switch and is not a LINE switch (disconnecting device).

Connector Care and Cleaning Precautions

Remove the power cord to the instrument. To clean the connectors use alcohol in a well ventilated area. Allow all residual alcohol moisture to evaporate, and fumes to dissipate prior to energizing the instrument.

WARNING To prevent electrical shock, disconnect the **“Agilent Technologies E8257DS02 - S15”** from mains electrical supply before cleaning. Use a dry cloth or one slightly dampened with water to clean the external case parts. Do not attempt to clean internally.

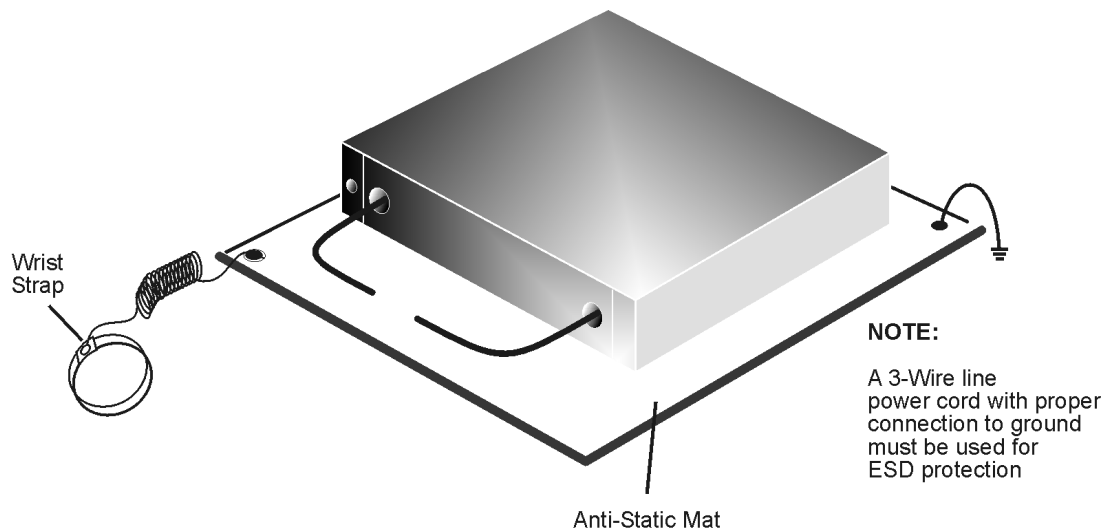
WARNING If flammable cleaning materials are used, the material shall not be stored, or left open in the area of the equipment. Adequate ventilation shall be assured to prevent the combustion of fumes, or vapors.

Electrostatic Discharge Protection

Protection against electrostatic discharge (ESD) is essential while removing assemblies from or connecting cables to the instrument. 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 with grounding cord, 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 (9300-1126) 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 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.

Figure 3 ESD Protection Setup



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Regulatory Information

This section contains information that is required by various government regulatory agencies.

Instrument Markings



The instruction documentation symbol. The product is marked with this symbol when it is necessary for the user to refer to the instructions in the documentation.



This symbol indicates that the instrument requires alternating current (ac) input.



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).



This symbol indicates that the power line switch is ON.



This symbol indicates that the power line switch is in the STANDBY position.



This symbol indicates that the power line switch is in the OFF position.



This symbol is used to identify a terminal which is internally connected to the product frame or chassis.



The CE mark is a registered trademark of the European Community. (If accompanied by a year, it is when the design was proven.)



The CSA mark is a registered trademark of the CSA International. This instrument complies with Canada: CSA 22.2 No. 61010-1-04.



This is a symbol of an Industrial Scientific and Medical Group 1 Class A product (CISPR 11, Clause 54)



This is a marking to indicate product compliance with the Canadian Interference-Causing Equipment Standard (ICES-001).



Direct Current.



The instrument has been designed to meet the requirements of IP 20 for ingress and operational environment.



This is a required mark signifying compliance with an EMC requirement. The C-Tick mark is a registered trademark of the Australian Spectrum Management Agency.



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.



This symbol on all primary and secondary packaging indicates compliance to China standard GB 18455-2001.

Battery Collection

Do not throw batteries away but collect as small chemical waste, or in accordance with your country's requirements. You may return the battery to Agilent Technologies for disposal. Refer to [“Contacting Agilent” on page 12](#) for assistance.

Compliance with German Noise Requirements

This is to declare that this instrument is in conformance with the German Regulation on Noise Declaration for Machines (Laermangabe nach der Maschinenlaermverordnung-3. GSGV Deutschland).

Acoustic Noise Emission/Geraeuschemission	
LpA<70 dB	Lpa<70 dB
Operator Position	am Arbeitsplatz
Normal Operation	normaler Betrieb
per ISO 7779	nach DIN 45635 t .19

EMC Information

Complies with European EMC Directive 2004/108/EC

- IEC/EN 61326-1
- CISPR Pub 11 Group 1, class A
- AS/NZS CISPR 11
- This ISM device complies with Canadian ICES-001.
Cet appareil ISM est conforme a la norme NMB du Canada.

Agilent Support, Services, and Assistance

Service and Support Options

The standard product warranty is a *one-year return to Agilent Technologies* service warranty.

NOTE There are many other repair and calibration options available from the Agilent Technologies support organization. These options cover a range of service agreements with varying response times. Contact Agilent for additional information on available service agreements for this product.

Contacting Agilent

Assistance with test and measurements needs and information or finding a local Agilent office are available on the Web at:

<http://www.agilent.com/find/assist>

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

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

Shipping Your Product to Agilent for Service or Repair

IMPORTANT Agilent Technologies reserves the right to reformat or replace the internal hard disk drive in your analyzer as part of its repair. This will erase all user information stored on the hard disk. It is imperative, therefore, that you make a backup copy of your critical test data located on the analyzer's hard disk before shipping it to Agilent for repair.

If you wish to send your instrument to Agilent Technologies for service or repair:

- Include a complete description of the service requested or of the failure and a description of any failed test and any error message.
- Remove and retain the front handles and all rack mount hardware. The analyzer should be sent to Agilent in the same configuration as it was originally shipped.
- Ship the analyzer using the original or comparable antistatic packaging materials.
- Contact Agilent for instructions on where to ship your analyzer.