

OPERATION MANUAL

54000-4WRXX and -5WRXX

Millimeter Wave Source Module

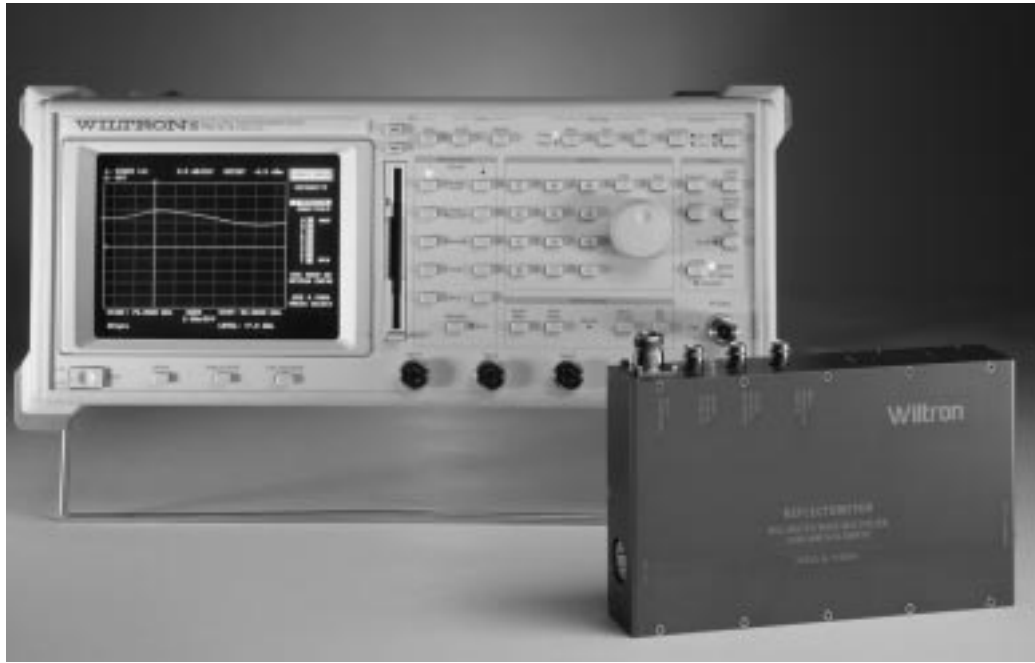


Figure 1. 54000-MM Series Module Shown With Model 54147A Scalar Measurement System

1. INTRODUCTION

The ANRITSU 54000-4WR10 and -4WR15 are compact, integrated, waveguide, millimeter (mm) wave, multiplied sources with an output frequency range of 75 to 110 GHz and 50 to 75 GHz, respectively.

The ANRITSU 54000-5WR10 and -5WR15 are similar in operation and frequency range to the -4WRXX sources, except that they provide a reference coupler and detector for leveled output power.

All of these modules can be used in conjunction with an appropriate RF driver source to extend the source's frequency range into the mm wave region. Or they can be used in a Scalar Measurement System to provide the stimulus for mm wave transmission measurements.

During the remainder of this manual, the 54000-4WR10 and -4WR15 and 54000-5WR10 and -5WR15 will be referred to as Source Module.

2. DESCRIPTION

The RF input (Figure 2) passes through an isolator and is then doubled. The doubled signal is then amplified, passed through a tuner and low-pass filter, and multiplied again (X2 for 54000-4WR15 and X3 for 54000-4WR10). At this point the 75-110 GHz or 50 to 75 GHz signal is passed externally through user-selectable filters and then back into the unit. From there the signal passes through an isolator to the test port. For the 54000-5WRXX modules, a coupler is inserted before the test port. A detector on the coupled arm provides a DC signal for external power leveling.

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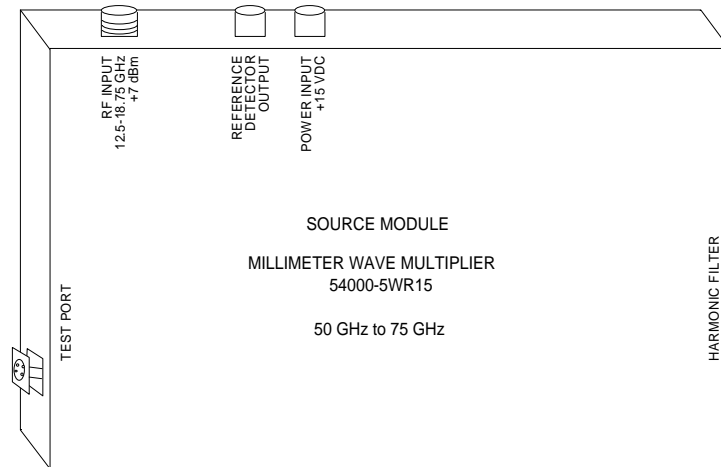


Figure 2. ANRITSU 54000-5WR15 mm Source Module

3. POWER CONNECTION

The Source Module requires DC power of +15V \pm 0.5V at 550 mA. The connector on the unit is a female BNC “twinax” with +15V on the female center pin. an ANRITSU P/N A36599 power cable is included to connect directly to below-listed ANRITSU instruments that provide rear panel auxiliary +15V power.

- 54xxA/SM4356
- 541xxA/Option 16
- 68xxxB (\leq 20 GHz)/SM4957
- 68xxxB ($>$ 20 GHz)/SM4954

An adapter (female twinax to dual banana plug), ANRITSU P/N SM4816, is available via Special order. This adapter, in conjunction with cable A36599, will allow connection to any power supply that has banana terminals on 0.75-inch (19 mm) centers.

4. OPERATION AS A mm WAVE SOURCE

The following procedure describes how to operate the mm Wave Source Module as a stand alone source.

- Step 1.** Connect DC power to the Source Module POWER INPUT connector as described in paragraph 3 above. (See Figure 3.)
- Step 2.** Connect an RF source to the Source Module RF INPUT connector.

The level should be +7 dBm \pm 1 dB at the input connector.

Source frequency is 12.5–18.75 GHz for WR15 modules and 12.5–18.333 GHz for WR10 modules.

- Step 3.** The multiplied mm wave signal is available at the TEST PORT.

- Step 4.** If leveling is desired (5WRXX only), and the source is capable of external leveling, connect the Source Module REFERENCE DETECTOR OUTPUT to the appropriate connector on the source. Refer to the Operation Manual for the source.

5. OPERATION IN SCALAR mm WAVE TRANSMISSION MEASUREMENTS

The following procedure describes how to operate the mm Wave Source Module in a scalar measurement system.

- Step 1.** Connect DC power to the Source Module POWER INPUT connector as described in paragraph 3 above.
- Step 2.** Connect an RF source to the Source Module RF INPUT connector.

The level should be +7 dBm \pm 1 dB at the input connector.

Source frequency is 12.5–18.75 GHz for WR15 modules and 12.5–18.333 GHz for WR10 modules.

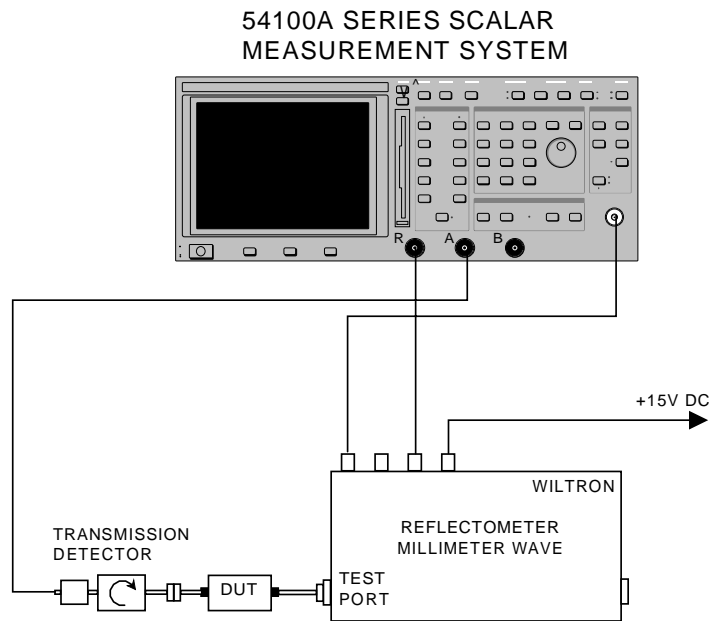


Figure 3. ANRITSU 54000-5WRXX mm Source Module

- Step 3.** If leveling is desired (5WRXX only), and the source is capable of external leveling, connect the Source Module REFERENCE DETECTOR OUTPUT to the appropriate connector on the source. Refer to the Operation Manual for the source.
- Step 4.** If ratioed Transmission measurements are desired, and the Scalar Network Analyzer has an “R” Channel, connect the Source Module REFERENCE DETECTOR OUTPUT connector to the Analyzer R input using the 560-10BX-2 cable provided.

NOTE

Leveling and ratioed measurements cannot be done simultaneously.

- Step 5.** Connect an ANRITSU 54000-7WR10 or -7WR15 detector to the TEST PORT and the Analyzer Channel A or B input as appropriate. Perform a Transmission Calibration on the Analyzer. Refer to the Operation Manual for the Analyzer.

- Step 6.** Remove the detector from the Test Port and insert the device to be tested.

6. SPECIFICATIONS

Performance specifications for the ANRITSU 54000-MM Series Source Modules are given in Tables 1 and 2.

7. ACCESSORIES

The following accessories are included with the source module:

- DC Power Cable P/N A36599
- Detector Cable P/N 560-10BX-2 (2 ea)
- Filter FL1 75–110 GHz or 50–75 GHz
- Filter FL2 75–92 GHz or 50–58 GHz
- Filter FL3 89–110 GHz or 57–75 GHz
- Waveguide section, WR10 or WR15, 1 inch (25 mm)

Table 1. Performance Specifications, 54000-XWR10 Module

DC POWER INPUT

Current: 550 mA max
Voltage: +15 VDC $\pm 0.5V$
Connector: BNC Twinax female connector, +15V on female pin

RF INPUT

Frequency Range: 12.5–18.33 GHz
Level: +7 dBm ± 1 dB
Connector: N Female

NOTE

–60 dBc harmonics and spurs required to make output harmonic and spur specifications with FL2 and FL3

TEST PORT

Frequency Range: 75–110 GHz
Frequency Accuracy: Source Dependent, 6x Source
Frequency Resolution: Source Dependent, 6x Source

Power:(with FI1 Installed): -5 dBm Minimum, +1 dBm Typical, ± 3 dB Variation Typical

Harmonics And Spurs:

FL1 (75–110 GHz): –20 dBc typical
FL2 (75–92 GHz): –55 dBc max
FL3 (89–110 GHz): –55 dBc max

Source Match: 1.9:1 VSWR max

Waveguide: WR-10, compatible with MIL-F-3922/67B-010, UG-387/U flange

Modulation:

AM: Not Recommended
FM: 6x source deviation
Pulse: OK

DIMENSIONS

Length: 7.47 inches (190 mm)
Width: 4.10 inches (104 mm)
Height: 1.56 inches (40 mm)

Table 2. Performance Specifications, 54000-XWR15 Module

DC POWER INPUT

Current: 550 mA max
Voltage: +15 VDC $\pm 0.5V$
Connector: BNC Twinax female connector, +15V on female pin

RF INPUT

Frequency Range: 12.5–18.75 GHz
Level: +7 dBm ± 1 dB
Connector: N Female

NOTE

–60 dBc harmonics and spurs required to make output harmonic and spur specifications with FL2 and FL3

TEST PORT

Frequency Range: 50–75 GHz
Frequency Accuracy: Source Dependent, 4x Source
Frequency Resolution: Source Dependent, 4x Source

Power:(with FI1 Installed): 0 dBm Minimum, +5 dBm Typical, ± 3 dB Variation Typical

Harmonics And Spurs:

FL1 (50–75 GHz): –20 dBc typical (50–75)
FL2 (50–58 GHz): –55 dBc max (50–58)
FL3 (57–75 GHz): –55 dBc max (57–75)

Source Match: 1.9:1 VSWR max

Waveguide: WR-15, compatible with MIL-F-3922/67B-008, or UG-385/U flange

Modulation:

AM: Not Recommended
FM: 4x source deviation
Pulse: OK

DIMENSIONS

Length: 7.47 inches (190 mm)
Width: 4.10 inches (104 mm)
Height: 1.56 inches (40 mm)