

OPERATION MANUAL

54000-6WRXX Millimeter Wave Reflectometer

54000-7WRXX Millimeter Wave Detector

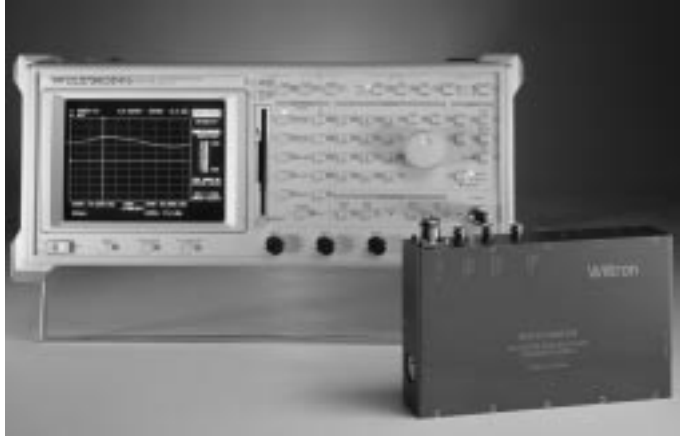


Figure 1. 54000-MM Series Module Shown With Model 54147A Scalar Measurement System

1. INTRODUCTION

The ANRITSU 54000-6WR10 and -6WR15 are compact, integrated, waveguide reflectometers with an output frequency range of 75 to 110 GHz and 50 to 75 GHz, respectively.

These modules combine source multiplication, reference sampling, and reflection measurement in a single compact package. When used with ANRITSU scalar network analyzer systems, they provide complete ratioed or unratioed reflection measurements from 75 to 110 GHz or 50 to 75 GHz.

During the remainder of this manual, the 54000-6WR10 and -6WR15 will be referred to as Reflectometer.

The ANRITSU 54000-7WR10 and -7WR15 are 75 to 110 GHz and 50 to 75 GHz detectors with integrated isolators. When used with ANRITSU scalar network analyzers, they perform transmission measurements. For ratioed transmission measurements, either a second detector or a Reflectometer with an internal reference detector is required.

2. DESCRIPTION

Internal to the Reflectometers, the RF input (Figure 2) passes through an isolator and is then doubled. The doubled signal is then amplified, passed through a tuner and a low-pass filter and multiplied again (X2 for -6WR15 and X3 for -6WR10). At this point the 75 to 110 GHz or 50 to 75 GHz signal is passed through externally mounted, user-selectable filters and then back into the unit. The signal then passes through an output isolator and dual-directional coupler to the Test Port. Detectors on the coupler's coupled arms provide the reference and reflection outputs.

The 54000-7WRXX Detectors are applied to the DUT output, where the signal passes through the detector's isolator to the detector element.

3. POWER CONNECTION

The Reflectometer 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.

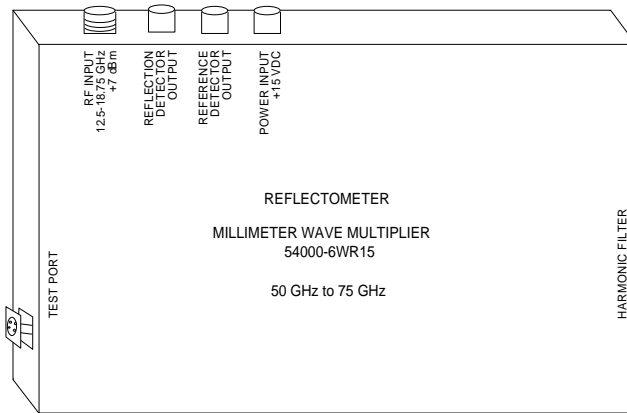


Figure 2. ANRITSU 54000-6WR15 mm Reflectometer

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

An adapter (female twinax to dual banana plug), ANRITSU P/N SM4816, is available on 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.

The 54000-7WRXX Detector does not require external power connection.

4. OPERATION AS A mm WAVE SOURCE

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

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

The level should be +7 dBm ± 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 mm wave signal is available at the TEST PORT.

- Step 4.** If leveling is desired, and the source is capable of external leveling, connect the Reflectometer REFERENCE DETECTOR OUTPUT to the appropriate connector on the source. Refer to the Operation Manual for the source.

5. OPERATION IN SCALAR mm WAVE MEASUREMENTS

The following procedure describes how to operate the mm wave Reflectometer in a scalar measurement system.

- Step 1.** Connect DC power to the Reflectometer POWER INPUT connector as described in paragraph 3 above.
- Step 2.** Connect an RF source, 12.5–18.33 GHz to the Reflectometer RF INPUT connector.

The level should be +7 dBm ± 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.** If leveling is desired, and the source is capable of external leveling, connect the Reflectometer REFERENCE DETECTOR OUTPUT to the appropriate connector on the source. Refer to the Operation Manual for the source.

- Step 4.**

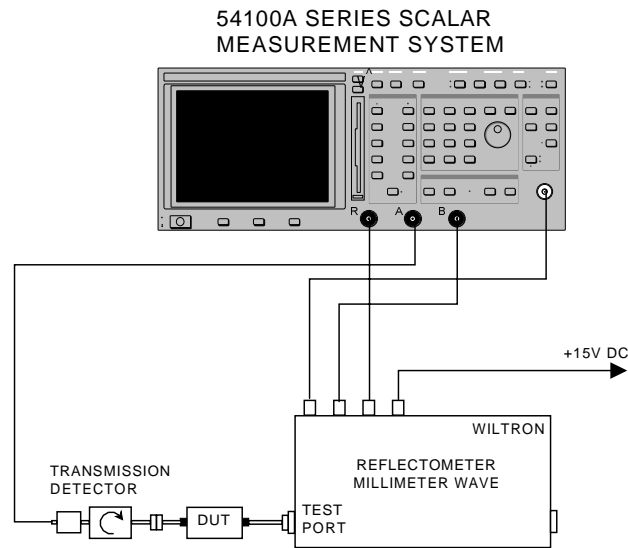


Figure 3. ANRITSU 54000-6WRXX mm Reflectometer

Step 5. If ratioed Transmission measurements are desired, and the Scalar Network Analyzer has an “R” Channel, connect the Reflectometer 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 6. Connect the Reflectometer REFLECTION DETECTOR OUTPUT to the Analyzer Channel B input.

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

Step 8. Remove the detector from the Test Port and insert the device to be tested.

6. SPECIFICATIONS

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

Performance specifications for the 54000-7WRXX Detectors are given below:

General:

Max Input Power, Damage Level: +21 dBm
Return Loss: 17 dB

Model MM5075-7WR15

Frequency Range: 50–75 GHz
Dynamic Range: >56 dB, typical
Input Port Return Loss: 17 dB
Input Port Flange: WR15
Output Connector: BNC (f)

Model MM5075-7WR10

Frequency Range: 75–110 GHz
Dynamic Range: >56 dB, typical
Input Port Return Loss: 17 dB
Input Port Flange: WR10
Output Connector: BNC (f)

7. ACCESSORIES

The following accessories are included with the Reflectometer:

- 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)
- Flush short

Table 1. Performance Specifications, 54000-6WR10 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 F11 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

Directivity: 35 dB min, 40 dB typical

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, 54000-6WR15 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 F11 Installed): 0 dBm Minimum, +5 dBm Typical, ± 3 dB Variation Typical

Harmonics And Spurs:

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

Directivity: 35 dB min, 40 dB typical

Source Match: 1.9:1 VSWR max

Waveguide: WR-15, compatible with MIL-F-3922/67B-008, 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)