

Millimeter-Wave: Details Matter for Successful Measurements

Measurements at millimeter-wave frequencies require extra care. Decisions that may not impact measurement at lower frequencies can lead to connection loss or compromises in accuracy and repeatability at higher frequencies. Device specifications, power requirements, and test conditions will influence the optimal setup. Pay close attention to the details for successful millimeter-wave measurements.

Start: Connect Device



Choose Your Conduit

Coaxial Cable

- Versatile, flexible and can carry multiple signals
- Best for devices that cover a wide frequency range



Coax can be delicate, and has limited power handling.

4x MORE cable loss above 110 GHz

Waveguide

- Durable, accurate and sensitive
- Ideal for high power devices
- Large surface area reduces loss



Waveguide is expensive and has a narrow frequency range.

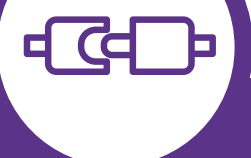
Over The Air

- Allows measurement when a wire can't be connected to the device
- More realistic for simulating real-world conditions



OTA requires additional specialized equipment and may be less accurate than other methods.

10x MORE atmospheric absorption above 110 GHz



Use a Connector Adapter

1.0 mm PREFERRED

- Best accuracy and minimum strain
- Inexpensive and easy to replace



Use of a connector adapter is an industry best practice.



Adjust Torque

4 in-lb TORQUE VALUE

- Maintain consistent mechanical alignment
- Ensure accuracy and repeatability



Excessive tightening or loose connections can affect calibration. Torque values can vary. Consult your manufacturer for exact torque.



Choose Your Test Equipment

Signal Analyzer with Continuous Frequency Coverage



Keysight N9041B UXA Signal Analyzer

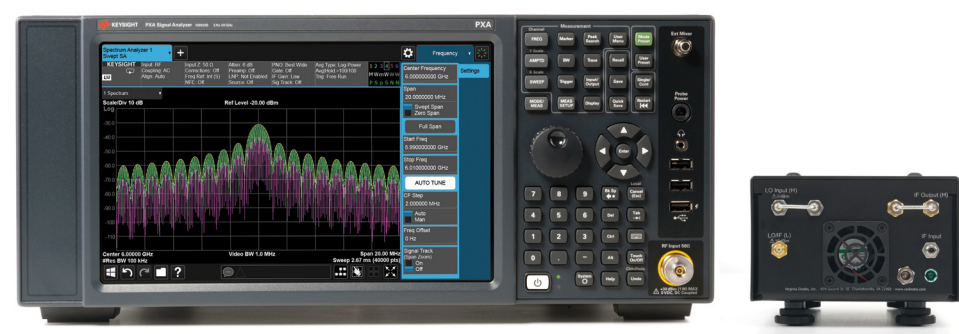
- Provides direct, continuous coverage across the instrument's entire frequency range
- Offers calibrated results
- Optimized for sensitivity or dynamic range



Very high-performance analyzers are more expensive.

UP TO **110 GHz**

Signal Analyzer with Frequency Extender



Keysight N9030B PXA Signal Analyzer

Keysight N9029AV12 Frequency Extender

- Extends the range of existing equipment
- Allows measurements of the highest millimeter-wave frequencies



This setup can only make banded measurements and is impractical for very wideband measurements. It also lacks filters, attenuators or preamps.

UP TO **1.1 THz**

End: Successful Millimeter-Wave Measurement