

Millimeter-Wave Spectrum Analysis

Keysight Technologies and OML

Millimeter-wave spectrum analysis using frequency extension harmonic mixers

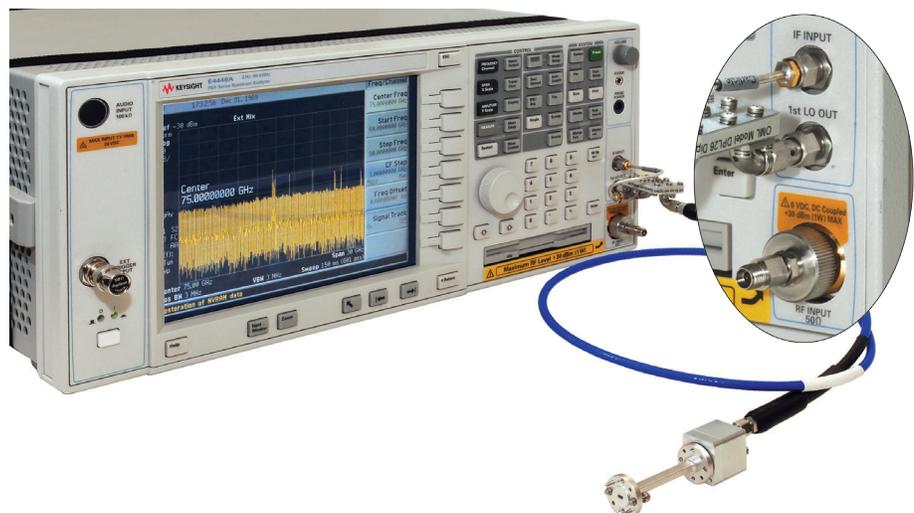
Millimeter-wave (mm-wave) measurements require the same fundamental tools that engineers use for the RF & microwave spectrum. Frequency extension of a microwave spectrum analyzer or signal analyzer is possible up to 0.325 Terahertz (THz). The key enabler for millimeter-wave measurements is harmonic mixer technology. With a harmonic mixer connected to your spectrum analyzer you can overcome the inherent microwave limitations of your instrument allowing you to perform accurate millimeter-wave measurements.

Millimeter-wave measurements are essential for research into next generation technology in areas such as radio astronomy, imaging, communication, semiconductors, space research, biomedical and homeland security. With a spectrum from 30 GHz to 325 GHz, and greater, the complexity of measurements requires specialized solutions, especially as the wavelengths approach sub-millimeter in length.

OML provides harmonic mixers that connect externally to the Keysight PSA spectrum analyzers or PXA and 32 or 44 GHz EXA signal analyzers for mm-wave band measurements. The external mixer extends the frequency range of the analyzers into the mm-wave bands. By using an external module the connections to the device-under-test (DUT) are closer giving improved dynamic range. It can be interfaced to the DUT via over-the-air, on-wafer, or via waveguide connections. The waveguide interface is compatible with MIL-DTL-3922/54 and MIL-DTL-3922/67D.

Once connected, the OML harmonic mixers utilize the predetermined RF, LO and IF to effectively multiply the PSA, PXA, or EXA microwave capabilities to the mm-wave spectrum. The familiar front panel operation for setup, calibration, measurement, and output are the same, except the readouts are in the mm-wave instead of microwave spectrum.

- Perform millimeter-wave spectrum analysis
- Harmonic mixers for spectrum analyzer frequency extension
- Extend the frequency range of your Keysight PSA, PXA and 32 or 44 GHz EXA signal analyzers
- External harmonic mixer simplifies setup and optimizes performance
- Over-the-air, on-wafer, or waveguide connections to your DUT
- Waveguide interface compatible with MIL-DTL-3922/54 and MIL-DTL-3922/67D
- Verify millimeter-wave transmitter characteristics



Millimeter-Wave Spectrum Analysis

The Keysight PXA or EXA (32 or 44 GHz) is plug-and-play compatible with the MxxHWDX series of harmonic mixers from OML. With electronic CSV data, this part number simplifies import of correction factors to the PXA or EXA. Similarly, the Keysight PSA is compatible when configured with an external diplexer (DPL-26). One popular application is FCC Part 15 emissions compliance testing from 40 GHz to 200 GHz, which is conducted when using additional standard gain horn antennas with harmonic mixers.

OML's external harmonic mixers when combined with an Keysight PSA spectrum analyzer, PXA or EXA signal analyzer allow you to extend the frequency range of your instruments to perform accurate measurements on your millimeter wave band circuits and devices.

System Components

Keysight Technologies

N9030A	PXA signal analyzer	N9030A-EXM	External mixing
N9010A (Option 532 or 544)	EXA (32 or 44 GHz) signal analyzer	N9010A-EXM	External mixing
E444xA	PSA spectrum analyzer	E444xA-AYZ	External mixing

OML mixers ordered through Keysight, supported by OML.

N9029AE12	WR-12 (60-90 GHz)	N9029AE05	WR-05 (140-220 GHz)
N9029AE08	WR-08 (90-140 GHz)	N9029AE04	WR-04 (170-260 GHz)
N9029AE06	WR-06 (110-170 GHz)	N9029AE03	WR-03 (220-325 GHz)

Note: The N9029AExx mixers are for X-Series signal analyzers. For PSA order E4440AExx.

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Mixers for X-Series signal analyzers, including CSV data file

M28HWDX	WR-28, 26.5-40 GHz	M08HWDX	WR-08, 90-140 GHz
M22HWDX	WR-22, 33-50 GHz	M06HWDX	WR-06, 110-170 GHz
M19HWDX	WR-19, 40-60 GHz	M05HWDX	WR-05, 140-220 GHz
M15HWDX	WR-15, 50-75 GHz	M04HWDX	WR-04, 170-260 GHz
M12HWDX	WR-12, 60-90 GHz	M03HWDX	WR-03, 220-325 GHz
M10HWDX	WR-10, 75-110 GHz		

Other: DPL-26 External diplexer for Keysight PSA; 2378H231 Part 15 bundle, 40-220 GHz, WR-19, WR-12, WR-08, WR-05; Standard gain horn antennas

To learn how this solution can address your specific needs please contact

Keysight's solutions partner,
OML

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OML, Inc. is a premier supplier of innovative millimeter and sub-millimeter wave frequency extension products for vector network analyzers, scalar network analyzers, spectrum analyzers, converters, and signal generators. Our solutions empower engineers in R&D and manufacturing to pursue opportunities in emerging applications spanning radio astronomy, communication, imaging, space research, and homeland security

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