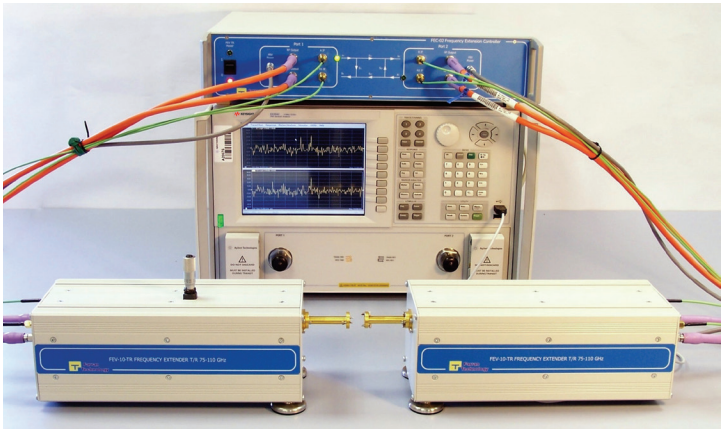
mm-Wave Frequency Extension for Vector Network Analyzers

Keysight Technologies and Farran Technology

Frequency range extension for accurate millimeter-wave measurements



- Characterize millimeter-wave devices accurately
- Extend the frequency range of vector network analyzers
- Use VNAs in the millimeter bands
- Solutions for V-, E-, W-, D- and G-bands
- Solutions for Y-band in development
- Fully compatible with Keysight PNA and PNA-X
- Excellent directivity and dynamic range

The ability to extend the frequency range of a vector network analyzer (VNA) into the millimeter-wave bands is critical to ensure the accurate characterization of high-frequency, high-performance devices. Millimeter band frequencies are increasingly being used in applications in aerospace/defense, communications, research, antenna measurement, foreign object detection and others.

With frequency extension solutions from Farran Technology you can increase the capabilities of your vector network analyzer in order to characterize accurately your millimeter-wave devices.

Millimeter-wave solutions from Farran Technology can increase the frequency range of a network analyzer to 75 GHz (V-band), 90 GHz (E-band), 110 GHz (W-band), 170 GHz (D-band) or 220 GHz (G-band) with solutions for 325 GHz (Y-band) in development. The frequency extenders are fully compatible with the Keysight Technologies PNA and PNA-X family of vector network analyzers.

A complete solution comprises a frequency extension head, a variable attenuator for output power regulation, a controller, cables and a calibration kit. The frequency extension head consists of a dual-directional coupler, a frequency multiplier for upconversion and two harmonic mixers for reference and test signal probing.

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mm-Wave Frequency Extension for Vector Network Analyzers

The controller ensures full compatibility with the Keysight PNA and PNA-X network analyzers. It controls the routing, switching and amplification of RF and IF signals and provides the communications with the vector network analyzer to enable full two-port S-parameter measurements to be made through the heads.

One of the critical parameters when utilizing a coupler, especially when measuring reflection coefficients, is its directivity, which defines how well the coupler isolates the forward and reverse signals. The couplers used in the Farran Technology frequency extension heads offer a minimum directivity of 40 dB (45 dB typical) from 50 to 110 GHz, 35 dB (40 dB typical) from 110 GHz to 170 GHz, and 30 dB (35 dB typical) from 170 GHz to 220 GHz. The extension heads also provide high dynamic range of up to >100 dB (>80 dB for 100 GHz to 170 GHz and >70 dB for 170 GHz to 220 GHz).

With a frequency extension solution from Farran Technology you can extend the performance of Keysight PNA or PNA-X vector network analyzers to allow you to characterize accurately your highest frequency, highest performance millimeter-wave devices.

System Components

Keysight Technologies	
PNA/PNA-X	Vector network analyzer

Farran Technology	
FEC-02/03	Frequency extension controller
FEV-15	V-band (75 GHz) frequency extension module
FEV-12	E-band (90 GHz) frequency extension module
FEV-10	W-band (110 GHz) frequency extension module
FEV-06	D-band (170 GHz) frequency extension module
FEV-05	G-band (220 GHz) frequency extension module
	Cable set, Calibration Kit

Frequency extension modules for Y-band (325 GHz) are in development

To learn how this solution can address your specific needs please contact Keysight's solutions partner, Farran Technology
www.keysight.com/find/farran

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Extending our solutions to meet your needs

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For information on Keysight Technol
Farran Technology Ltd designs and manufactures a wide range of millime terwave components and subsystems serving emerging and mature markets, including radar and imaging, communications, research, test and measurement, and aerospace. Farran is on the leading-edge of millimeter-wave development.
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