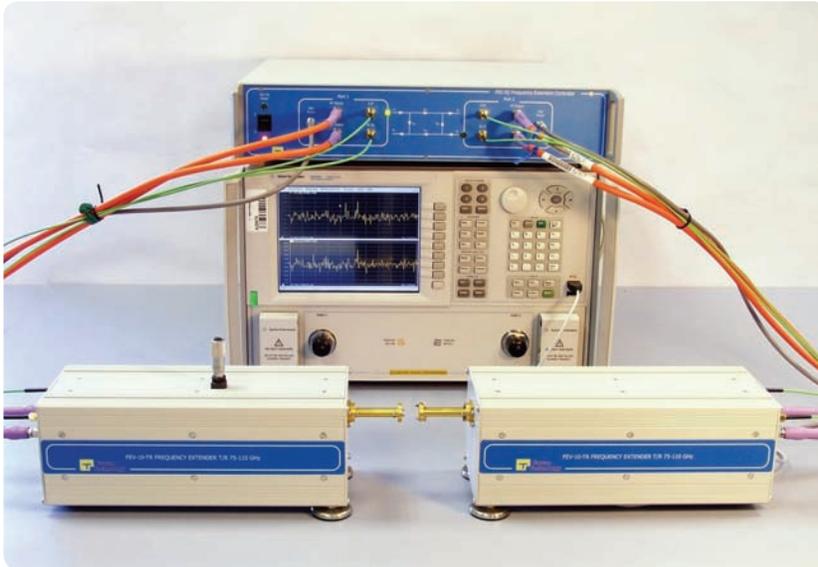


Millimeter-Wave Frequency Extension for Vector Network Analyzers

Agilent Technologies and Farran Technology

Characterize your millimeter-wave devices accurately by extending the frequency range of your vector network analyzer



The ability to extend the frequency range of your vector network analyzer (VNA) into the millimeter-wave bands is critical to ensure the accurate characterization of your 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 your vector 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 Agilent 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

- *Characterize your millimeter-wave devices accurately*
- *Extend the frequency range of your VNA*
- *Use your VNA in the millimeter bands*
- *Solutions for V-, E-, W-, D- and G-bands*
- *Solutions Y-band in development*
- *Fully compatible with Agilent PNA and PNA-X*
- *Excellent directivity and dynamic range*



Agilent Technologies

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coupler, a frequency multiplier for upconversion and two harmonic mixers for reference and test signal probing. The controller ensures full compatibility with the Agilent 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 your Agilent PNA or PNA-X vector network analyzer to allow you to characterize your highest frequency, highest performance millimeter-wave devices.



System Components

Agilent 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 Agilent's solutions partner, Farran Technology.

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Agilent Solutions Partner Program

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Farran Technology Ltd designs and manufactures a wide range of millimeter-wave 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. www.farran.com

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Printed in USA, March 29, 2012
5990-9610EN