

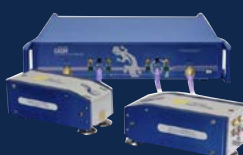
farran



Millimeter
wave
solutions,
made simple

Irish Millimeter Wave
Design, Production &
Test Enterprise

Providing mm-wave
Solutions from
20 - 500 GHz



Frequency Extension Products

(FEV/FEC/FEK/AET&AER)



Frequency Extension Heads for Vector Network Analyzers (FEV)

The Frequency Extension series will expand your existing Vector Network Analyzer (VNA) capabilities so you can conduct industry leading millimeter wave S-parameter measurements between 40-500GHz.

These frequency extension modules connect to your existing test ports and leverage the inherent microwave network analyzer's performance and features to display full port S-parameters: Two measurement architecture available: 1-path/2-port and fully reversing 2 port. Waveguide calibration kits are available as separate accessories..



MM-WAVE S-PARAMETERS MEASUREMENTS

- Full 2-port S-parameters millimeter wave measurements up to 500 GHz.
- Error-corrected measurements – full 2-port TRL/SOLT calibration



Antenna Measurement Frequency Extenders (AET/AER)

Farran offers Antenna Measurement Frequency Extension Modules for extending frequency range of customer systems to 500GHz. Farran's AET and AER frequency extenders are a dedicated Test & Measurement solution for antenna performance verification. The system comprises of the transmitter and receiver units that enable antenna radiation pattern, gain and phase polarisation measurement in the near- and far-field up to 500 GHz. This compact and lightweight system allows you to use your existing baseband vector network analyzer and extend its operational range to the frequency of interest. Farran's Antenna Test & Measurement Frequency Extension Systems are a cost-effective way to expand your test capability into the millimeter wave range.



MEASUREMENTS

- Lightweight and low complexity make it an ideal solution for omni-directional spherical systems and scanners
- Does not require complex and expensive positioners
- Coherent phase and amplitude measurements
- High phase and amplitude stability



Cobalt FX – Millimeter Wave VNA System

Farran & Copper Mountain Technologies, globally recognized innovators, with a combined 50 years' experience in RF test & measurement systems, have partnered to create CobaltFx; your new mm-Wave frequency solution. Cobalt Fx is the first mm-Wave frequency solution that can be built upon either a 9 GHz or a 20 GHz frequency extension compatible VNA. Cobalt Fx's high dynamic range and directivity allow for highly accurate and stable mm-Wave S-parameter measurements in four dedicated waveguide bands 18-54 GHz, 50-75 GHz, 60-90 GHz, and 75-110 GHz. CobaltFx offers an unparalleled combination of price, performance, flexibility and size.



MM-WAVE S-PARAMETERS MEASUREMENTS

- Full 2-port or 4-port S-parameters millimeter wave measurements up to 110 GHz
- Error-corrected measurements - full 2/4-port TRL/SOLT calibration



Frequency Extension Calibration Kits (FEK)

Farran's FEK-xx-0001 calibration kit provides accurate calibration of the Vector Network Analyzer (VNA). It is compatible with TRL and SOLT calibration techniques and allows for a full 12-term port calibration.



CONTENT

- Fixed termination
- Flush short
- 1/4 lambda offset
- Hex ket 5/64"
- Flange screws
- Precision alignment pins
- USB flash memory



Frequency Extension Controller (FEC)

Farran's Frequency Extension Controllers are part of the mm-wave measurement extension solution which ensure that Farran's mmwave products are fully compatible with Keysight PNA-X Vector Network Analyzer's and offers the best S-Parameter accuracy available on the market.



FEATURES

- RF/LO and IF signal routing & amplification
- Fast Switching Speed
- Compatibility with PNA-X
- DC bias source for FEV-XX



Signal Generator Frequency Extenders & Spectrum Analyzers

(FES/SAE)



Signal Generator Frequency Extenders (FES)

The Frequency Extension Source series will expand your existing microwave Signal Generator capabilities to conduct measurements from 40 - 500GHz. These frequency extension modules easily connect to the output of your signal generator so you have high-performance source for your DUT characterization activities. Characterize your DUT with the confidence that the superior performance in terms of output power, spurious and harmonic will provide product accurate results.



FEATURES

- Stable and lightweight
- Support FM/PM and pulse modulation
- Optional manual variable attenuator



Spectrum and Signal Analyzer Frequency Extension Systems (SAE)

Farran's SAE frequency extenders are a dedicated Test & Measurement solution for extending the range of Signal and Spectrum Analyzers. The SAE modules are designed to interface with your existing microwave signal or spectrum analyzer and extend its frequency coverage to 170 GHz.



MODES OF OPERATION

- Signal and spectrum Analyzer mode
- Block down-converter mode
- Block up-converter mode

Noise Figure Analyzers

(FBC/WGNS)



Frequency Extension Noise Figure Analyzers (FBC)

Farran offer the FBC series of down converters for use as frequency extenders for noise figure measurement test systems. The FBC-XX-FB is a full band system can be built upon a Keysight N8975A Noise Figure Analyzer (NFA) or X Series Signal Analyzer with option N9069A. This system allows the user to extend the frequency range of the NFA to allow for accurate noise figure measurements to be performed on a device covering Ka, U, V, E, W bands (26.5-170 GHz), when used with an Agilent E8247C signal generator (or equivalent).



FEATURES

- Lightweight and low complexity make it an ideal solution for use with existing systems
- Fully compatible with Y-factor based noise figure analyzers
- Accurate millimeter wave noise figure & gain measurements



Noise Sources (WGNS)

Farran's Noise Source is part of the Noise Figure measurement system (FBC-XX-XX) which can be built upon a Keysight N8975A Noise Figure Analyzer (NFA) or X-Series Signal Analyzer with option N9069A. The system allows the user to extend the frequency range of the NFA to allow for accurate noise figure measurements to be performed on a device operating in the 26.5 – 170 GHz range on wafer as well as in benchtop applications. Farran offers the WGNS series of noise sources to be used in conjunction with the FBC down converters for use as frequency extenders for noise figure measurement test system.



FEATURES

- Lightweight and low complexity make it an ideal solution for use with existing systems
- Fully compatible with Y-factor based noise figure analyzers
- Accurate millimeter wave noise figure & gain measurements



FMCW Radar / Imaging Products

(FMCW/PMMW)



Radar Front Ends (FMCW)

Farran's 77 GHz FMCW Radar front end is based on a GaAs MMIC chipset offering wide bandwidth in a small outline package. The transmit signal is derived from an external VCO signal, internally multiplied, which also acts as the LO for the receive mixer. The resulting IF is conditioned for gain and filtering as required. The IF also contains an industry leading IF noise figure, especially in the frequency range below 500MHz. Custom designs available.



FEATURES

- Stable and lightweight
- Supports FMCW modulation schemes
- Customised performance available



Passive Imaging & Radiometers (PMMW)

Passive mm-wave (PMMW) imaging provides the unique capability to create high resolution images in low visibility conditions (e.g., through clothing, clouds and fog) and is therefore useful for such applications as concealed weapon detection and airplane landing. A low attenuation atmospheric window from 80-110 GHz (W Band) makes this band an ideal candidate for PMMW systems. Passive imagers operate by detecting naturally emitted thermal (black body) radiation from an object. Products available up to 345 GHz.



APPLICATIONS

- Airport security screening
- Material composition
- Remote sensing
- Medical
- Metrology
- Metal detection in food

Amplifiers (Low Noise & Power Amplifiers)

(FLNA/FPA)



Low Noise Amplifiers (FLNA) 18-110 GHz

FLNA series low noise amplifiers are constructed with discrete or MMIC pHEMT devices that operate over the frequency range 18 to 110 GHz. These amplifiers are specifically designed for low noise applications. The amplifiers are offered in two categories: standard and custom-built. The custom-built amplifiers are offered in various RF interfaces, including standard waveguide or coaxial connectors, for convenient system integration.



APPLICATIONS

- Communication receivers
- Radar front ends
- Driver amplifiers
- Point to point communication



Power Amplifiers (FPA) 50-110 GHz

FPA series driver amplifiers and power amplifiers are discrete and/or MMIC pHEMT device-based amplifiers that operate over the frequency range 18 to 110 GHz for high output power applications. The amplifiers are offered in two categories, standard and custom built up to 250 GHz. The custom-built amplifiers are offered in various RF interfaces, including standard waveguide or coaxial connectors, for convenient system integration. The optional input and output integrated isolators are available to further improve the port return loss.



APPLICATIONS

- Communication transmitters
- Radar front ends
- Driver amplifiers
- Test & Measurement
- Point to point communication



Multipliers (Active & Passive Multipliers)

(FDA/FT)



Active Multipliers (FDA) 18 - 110 GHz & Passive Multipliers (FT) 30 - 500 GHz



Farran's Frequency Multipliers are a high-performance instrumentation grade component designed to multiply microwave signals to millimeter wave range of 18 – 500 GHz. The multipliers are based on commercially available MMIC and

Schottky diode devices and are designed for full waveguide bands coverage with best-in-class spectral purity. These modules use Farran's proprietary multiplier technology to achieve high conversion efficiency and very high output power levels available in extremely wide bandwidths. Farran's multipliers are the most cost-effective way to multiply microwave frequencies to millimeter wave range.



APPLICATIONS

- Communication receivers
- Radar front ends
- Driver amplifiers
- Point to point communication

Mixers (Harmonic & Sub Harmonic Mixers)

(WHMB/SPM)



Harmonic Mixers (WHMB) 26.5 - 500 GHz

Farran offers fundamental (RF - LO), sub-harmonic (RF - 2xLO) and harmonic mixers (RF - NxLO, where N=2, 4, 6) for a wide variety of applications from 26.5 GHz to 500 GHz. All mixers use planar Schottky diodes and provide state of the art performance in a small and lightweight package. Farran's WHMB harmonic mixers are a dedicated Test & Measurement solution for extending the range of Signal and Spectrum Analyzers. The WHMB harmonic mixers are designed to interface with your existing microwave signal or spectrum analyzer and extend its frequency coverage to 500 GHz.



APPLICATIONS

- Spectrum analysis
- mm-Wave instrumentation
- Signal processing
- Phased locked loops



Sub Harmonic Mixers (SPM) 50 - 300 GHz

Farran offers fundamental (RF - LO), sub-harmonic (RF - 2xLO) and harmonic mixers (RF - NxLO, where N=2, 4, 6) for a wide variety of applications from 26.5 GHz to 500 GHz. All mixers use planar Schottky diodes and provide state of the art performance in a small and lightweight package. A high-performance sub harmonically pumped mixers available in frequencies from 50 to 350 GHz and beyond.



APPLICATIONS

- Hetrodyne Receivers
- Instrumentation
- Imaging Front end
- Laboratory Test systems

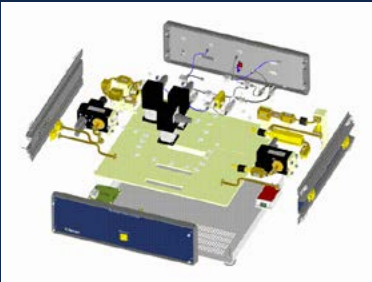


10-Step Custom Design Process

Farran provides the unique creative service of custom products and solutions that perfectly meet your needs. We employ agile development processes and proof-of-concept prototypes throughout testing, iteration, integration and low- to mid-volume production.

Over the past 10+ years, we have designed and delivered over 120 custom solutions which required our specialized design capabilities to convert the vision into an exceptional solution. This included the following steps: from proof-of-concept prototypes through to testing, iteration, integration and low- to mid-volume production in over 70 projects.

Farran is a trusted innovation partner to billion-dollar companies, system integrators, and research organizations worldwide. We are committed to the highest standards of quality management from initial quotation through to final testing, packaging, and delivery. We thrive on solving complex challenges with leading edge solutions that work the first time, every time. To ensure we meet your standards, we use a 10-Step Custom Design Process.



5G Chip Design Project

When developing their 5G chipsets, our customers trust Farran's wealth of mm-wave knowledge and expertise to enable high fidelity prototype testing in their development labs. Farran's know-how enables customers to develop, test, and modify their chipset designs, with full confidence in the accuracy of the results to ensure they bring 'Best in Class' products early to the 5G market.



R&D work with European Space Agency

Over the last two decades, Farran has been involved in several research and development projects sponsored by European Space Agency. The objectives of these initiatives were to develop novel design techniques, manufacturing technologies, and processes for millimeter wave and sub-terahertz receivers along with atmospheric sensing front-ends. Farran has partnered with academic institutions (Tyndall National Institute, Cork)

as well as commercial entities (United Monolithic Semiconductors) to develop mixer and multiplier gallium arsenide (GaAs) membrane circuits operating in the 170 – 380 GHz range. This work involved designing demonstrators with optimised and novel diode topologies, and manufacturing devices using hot embossing techniques. It also included various wafer post processing techniques such as beam lead incorporation, wafer thinning and window etching. A variety of doublers and sub-harmonic mixer circuits has been successfully developed and tested.