Q & A

Turnkey On-Wafer Millimeter-Wave Device Characterization Solution

Innovating Test Technologies®

Why is Cascade Microtech introducing this offering?

The demand for high-frequency ICs is being driven by the growth of complex electronic systems with clock rates of >1 GHz (PCs, PDAs, wireless LANs, Bluetooth chips). The transition to Silicon Germanium (SiGe) processes allows companies to create powerful new micro-communication devices. Due to increased competition, bringing these devices to market faster, cheaper and with higher performance, is now a requirement. To reach this goal, companies must reduce design cycle time and cost. Design cycle times can be reduced by as much as 40% through accurate device models with capability ranges up to and including Millimeter-wave frequencies. Cascade Microtech now offers a turnkey solution that combines the necessary tools to characterize these RF devices.

What is the solution architecture?

This solution consists of:

- Semiautomatic state-of-the-art 300mm wave probe station that allows you to do both RF and parametric characterization on a single station without tearing down and reconfiguring the systems (improved productivity). This is a key requirement for the fast growing SiGe technology. This solution has also been fully integrated to Cascade Microtech's 150 mm and 200 mm probe stations.
- High performance characterization probes to 110 GHz with high performance calibration standards.
- WinCal™ calibration software. WinCal is a high performance on-wafer measurement environment for calibration of Vector Network Analyzers. This new approach to software guides the engineer through the previously error-prone process of VNA calibration. Calibration verification and stability displays help to diagnose measurement system flaws or determine when system drift has occurred and a new calibration is needed. This results in improved measurement accuracy and helps reduce modeling cycle time resulting in cost savings.
- Wavevue™ test software. Combines the necessary tools to fully characterize an RF device. This test software increases the ability and productivity of the test engineer to accelerate data gathering and improve time-to-market. The Enterprise Vision™ gives the test engineer the ability to utilize his desktop PC for both setup and analysis while reserving the test system and system controller for actual measurements. This key feature frees up the test equipment for others to use. By dedicating its use to only the actual test measurement function, asset productivity is greatly enhanced.

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How does this solution assist productivity of the Test Engineering staff?

This offering raises expectations of what a complete RF wafer characterization test solution should be. An integrated test solution can now be expected to include the probing station and its control system, measurement and modeling software, high performance characterization probes plus turnkey installation and training and a single point of responsibility.

In addition, this Cascade test solution expands the technical frontier through:

- **MicroChamber®:** available on 200 mm and 300 mm stations, this capability eliminates the need for re-configuration of the test system between RF and parametric tests on the same wafer, thus improving test engineer and test equipment asset productivity. It also reduces the possibility of damage to expensive 1 mm coaxial cables and MMW modules. In addition, system integrity is ensured and there will be no need for continual re-qualification of the system.
- **Cascade's industry leading thermal test range capability** (-65°C to 200°C) permits modeling of 110 GHz devices over temperature providing a more accurate and comprehensive device model.
- **Thermally isolated auxiliary chuck:** The calibration substrate resides on this chuck. The thermal isolation from the main chuck ensures the accuracy and integrity of the calibration is maintained during over temperature test. The load impedance on the substrate remains 50 Ohms in spite of changes to the main chuck temperature.
- **High performance characterization probes to 110 GHz**
- **Mode-free millimeter-wave calibration standards**
- **WinCal Calibration software:** Patented, advanced LRRM calibration technique demonstrated to be the most accurate method for calibration to 110 GHz.
- **Wavevue Measurement Studio:** A software package developed by Microvue that combines the necessary tools to help RF test engineers fully characterize an RF semiconductor device. It includes S-Parameter measurement and parameter transformations, DC Bias and IV curves.

These advantages result in increased accuracy and measurement repeatability. In addition, they significantly increase the productivity of characterization engineers while at the same time greatly improving the return on the substantial investment RF semiconductor companies must make in wafer-based test systems. This approach also ensures correlation of data between different measurements and measurement systems, subsequently reducing modeling, design cycle time and time-to-market.

How does this solution help RF semiconductor companies meet their strategic objectives?

Turnkey solution provides RF semiconductor companies with:

- significantly improved characterization engineering productivity
- improved asset utilization
- the most advanced test system capability available

All of which are designed to reduce a manufacturer's time-to-market of next generation chips.

How does Agilent Technologies complement Cascade's test systems offerings?

The new Agilent PNA series 50GHz and the 110GHz Agilent 8510 XF network analyzers are the final pieces a semiconductor characterization lab needs to complete a test system solution for on-wafer RF/Microwave and Millimeter-Wave device characterization.

Having a complete test systems solution available nearly eliminates the amount of engineering time needed in the past to design, coordinate, locate, assemble and troubleshoot a test system compiled from various disparate equipment and component sources. Now, an engineering team can look to Cascade to handle those details and assure the solution is integrated and tested beforehand, thus allowing the company to use its RF engineering resources on product characterization and new product introduction – vis-à-vis test equipment system design.

What kinds of companies can benefit from this solution?

This solution is well suited for companies:

- that are looking for new innovative tools to increase productivity and overcome measurement problems
- that prefer a more productive and complete integrated measurement solution to maximize their return on their overall investment
- that are looking to develop their own in-house modeling capability

Who do I contact for more information?

Customers who are interested in this new integrated solution, should contact Cascade Microtech. See the contact information at the end of this document.

Why Cascade Microtech and Agilent Technologies?

Cascade Microtech and Agilent Technologies partnered 6 years ago to introduce to the engineering community the first broadband on-wafer 110 GHz measurement system. Cascade Microtech is the world leader in providing on-wafer device characterization measurement solutions. Agilent Technologies is the world leader for providing advanced test and measurement instrumentation to the semiconductor industry. Cascade Microtech is Agilent Technologies' world's largest Channel Partner. Agilent and Cascade have worked successfully for the past 20 years in providing leading edge technical solutions. Providing this solution brings a strongly differentiated offering that gives high value to the device engineering community.

Who is Cascade Microtech?

Cascade Microtech, Inc. is the worldwide leader in providing high frequency and parametric on-wafer test solutions. Engineers use our solutions to test and characterize integrated circuits (ICs) and photonic devices. These devices are then used in semiconductor applications, such as personal computers, servers, cell phones, consumer and automotive electronics, fiber-optics, PDAs, and other wireless products. Cascade Microtech also produces thin-film probe cards for production-level on-wafer testing of fine pitch, high-speed IC devices for broadband communications and networking, wireless and cell phones as well as other market applications. For more information visit www.cascademicrotech.com.

Who is Agilent Technologies?

Agilent Technologies Inc. (NYSE: A) is a global technology leader in communications, electronics and life sciences. The company's 37,000 employees serve customers in more than 120 countries. Agilent had net revenue of $8.4 billion in fiscal year 2001. Information about Agilent is available on the Web at www.agilent.com.

CASCADE® MICROTECH

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