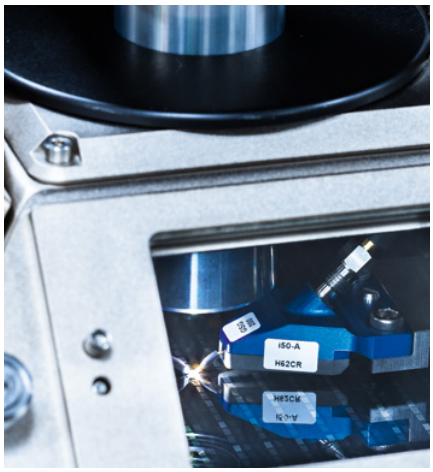
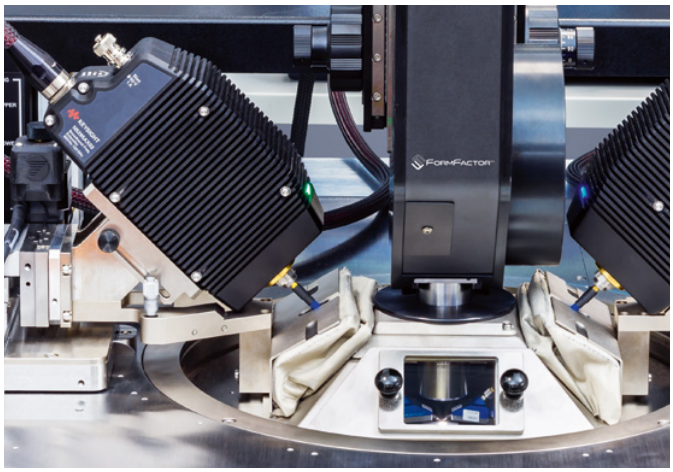
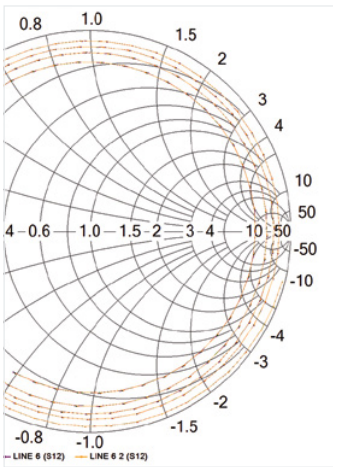






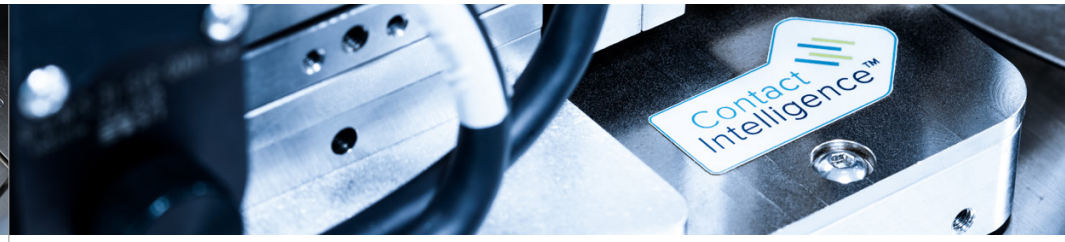
Cascade

Autonomous RF Measurement Assistant

Contact Intelligence™

Improving Accuracy and Accelerating Time to Market

FormFactor™



Fully Autonomous Hands-free Calibrations and Measurements over Multiple Temperatures

FormFactor understands the challenges of testing RF devices over multiple temperatures. Included in the obstacles are calibration drift, expansion or contraction of the test setup, and shrinking device pads to save real-estate space and minimize pad parasitics. Testing over multiple temperatures requires a continuous monitoring and readjustment of the calibration - a time-consuming and highly-demanding task.

To overcome these challenges, we have introduced the Autonomous RF Measurement Assistant* to enable higher accuracy and more productivity – minimizing training needs and accelerating time to market.

Industry-First Features

/ True automatic, hands-free calibration

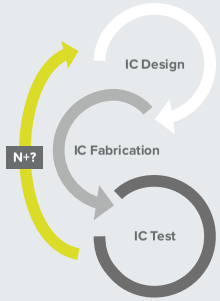
/ Monitors calibration drift, re-calibrates automatically

/ Full management of system expansion

/ Accurate and repeatable probe positioning at all temperatures

Faster Time to Market

/ More modelling data with increased accuracy and reduced uncertainty

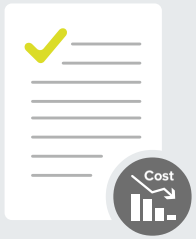


Fewer Design Cycles

Reduced Cost of Test

/ More tool utilisation with unattended test

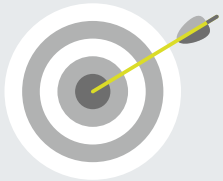
/ Minimized training costs



Lower Cost of Test

Increased Data Accuracy

/ True autonomous calibration monitoring and re-calibration



More Accuracy

** Available for CM300xi, SUMMIT200, Summit 12000 and Elite. Measurements from -40°C to 175°C and up to 500 GHz.*

Autonomous RF Wafer Probing featuring Contact Intelligence™

As part of FormFactor's Contact Intelligence™ Technology, the Autonomous RF Measurement Assistant is designed specifically to automate the whole calibration, measuring and monitoring tasks that are normally performed manually by experienced engineers.

Contact Intelligence – A powerful combination of innovative system design and state-of-the-art image processing provides an operator-independent solution to achieve highly-reliable measurement data at any time.

Ease of use – An inexperienced operator can perform an RF calibration by simply pushing a button. This reduces the need for experienced users full time on each system.

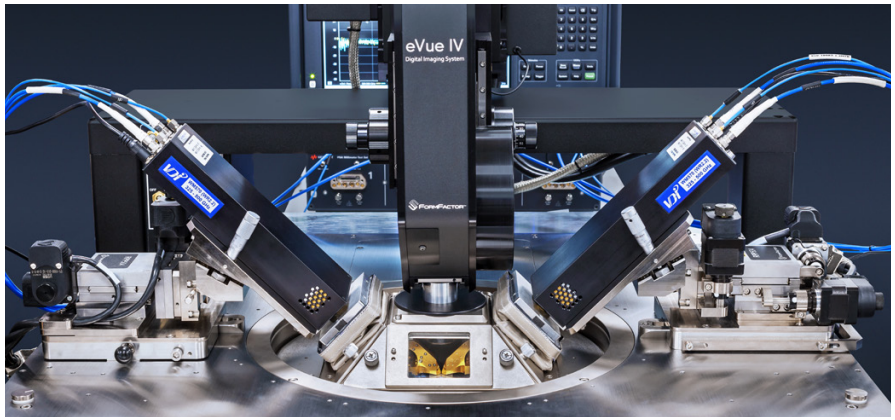
Unattended use – Measurements can be left running overnight, testing all devices on the wafer, and at different temperatures without the need of the operator.

Calibration monitor and re-calibration – The system will continuously monitor calibration drift, and automatically re-calibrate should the drift exceed a pre-defined limit.

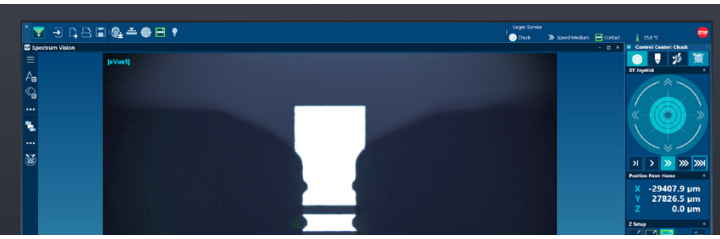
Reduced soak time – The system will re-align the probes to the pads if they drift away from alignment. This reduces the time of test and increases throughput.

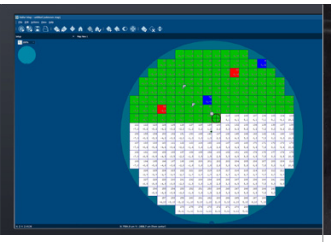
Data volume – Unattended test allows more tool utilisation without additional time and money.

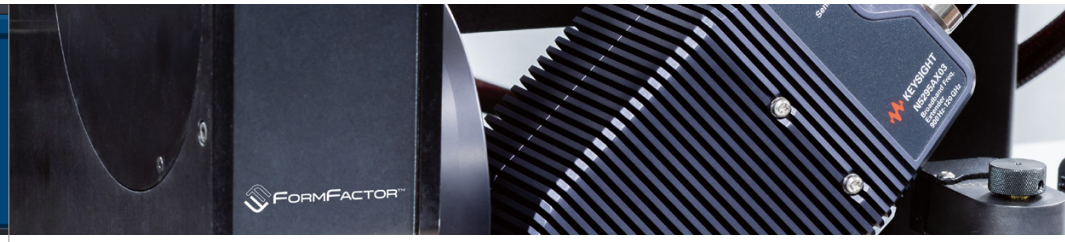
Contact Intelligence™



FormFactor's SUMMIT200 Probe Station: Highly-stable and robust platform for RF probing







Velox™ Auto RF Tool

Simplified Test Management Enables the Ultimate Test Experience

Exclusive Automation

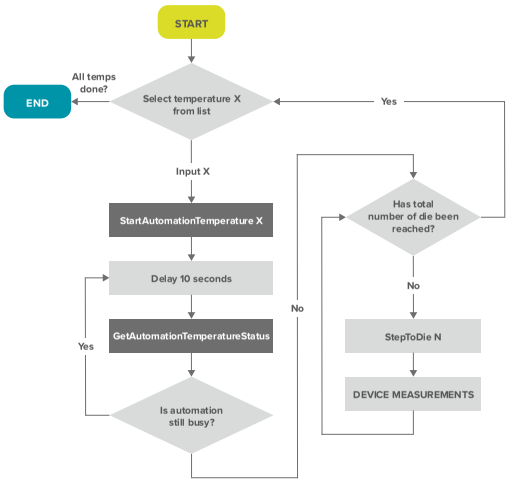
- Simplified test sequences
- Minimized training needs
- Automated calibration, monitoring and soaking
- Higher productivity

Only Available SIMPLIFIED From FormFactor

We have simplified the majority of test sequences so that the test executive never needs to ask the system to calibrate, monitor or soak. It is all automatic. Just send temperature automation, wait until complete and then step to numbered die as normal. Next die commands will check for drift, recalibrate if needed and automate probe on die placement.

The entire operation is embedded into the Velox™ Auto RF Tool and there is no need for any additional customer commands to monitor calibration, re-calibrate or correct for probe positioning errors.

The Velox Auto RF Tool works seamlessly with FormFactor's powerful RF calibration software WinCal XE™.



All Manual Calibration Steps are Automated

- Moves any DC probes out the way
- Moves to ISS calibration substrate
- Aligns ISS and probes with correct separation and over-travel
- Performs full VNA calibration
- Validates the calibration accuracy
- Moves RF and DC probes back to DUT with correct pad layout

WinCal XE™

High-performance RF Calibration Software

Powerful RF Calibration

- Exclusive 1-, 2-, 3-, and 4-port calibration algorithms
- LRRM™, LRM+™, SOLT, SOLR, hybrid LRRM-SOLR and NIST-style multi-line TRL calibrations
- Immediate and live data measurement and viewing
- Error Set Management capability for data comparison and augmentation

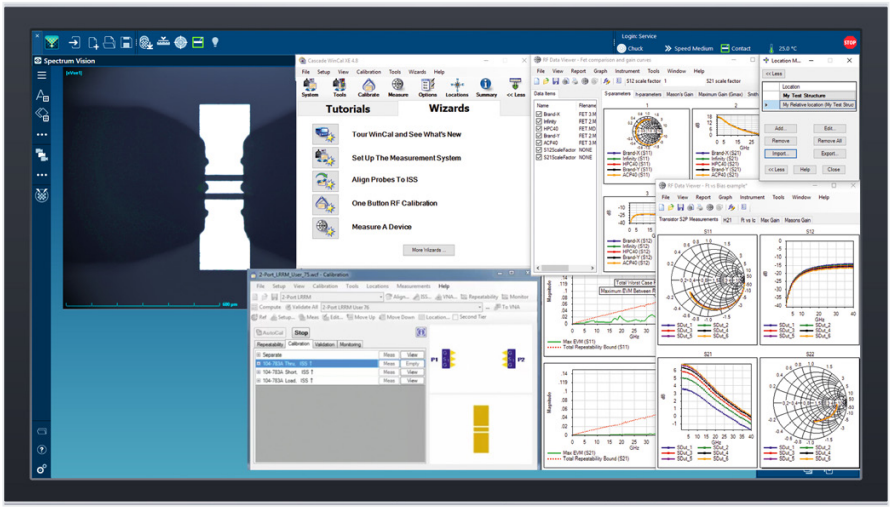
Only Available POWERFUL From FormFactor

WinCal XE from FormFactor is a comprehensive and intuitive on-wafer RF measurement calibration tool to achieve accurate and repeatable S-parameter measurement, which is crucial for precision device modeling/characterization and engineering RFIC test.

WinCal XE is fully-integrated with Velox: A two-way channel of communication synchronizes probing processes with RF measurements and calibrations.

The combination of both software solutions empowers FormFactor's Autonomous RF Measurement Assistant, which enables operator-independent calibrations and RF measurements that lead to faster time to profitability.

The WinCal XE features a guided system setup complete with customizable Wizards to ensure fast and easy access to reliable VNA calibration and repeatable data.



Motorized Positioners

Perfected Probe Positioning with Highest Accuracy and Repeatability

Uniquely Developed Motorized Positioners

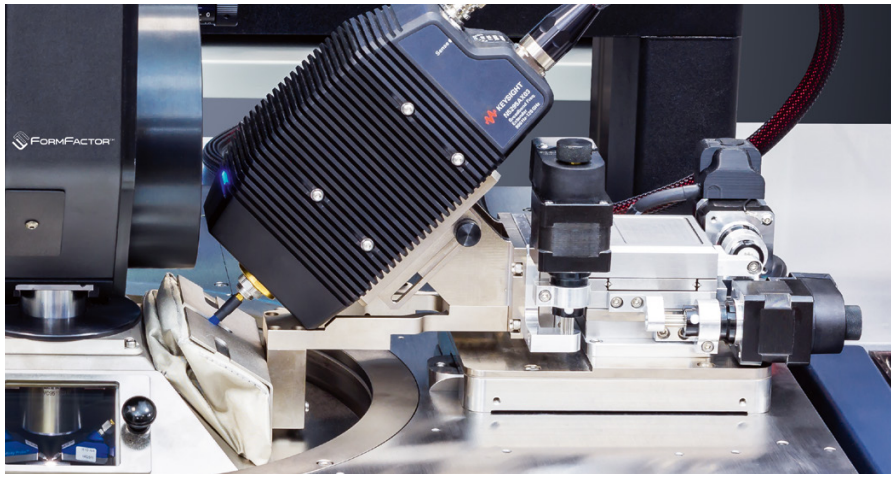
- Submicron positioning accuracy
- Additional manual controls and encoders
- Most accurate and repeatable probe positioning
- Can be located in East, West, North and South

Only Available PRECISE From FormFactor

Newly designed programmable positioners have been developed specifically for this application, to give the highest positioning resolution for the most accurate and repeatable probe positioning and measurement performance. With 0.3 µm resolutions even the smallest errors can be recognized and corrected.

And with manual controls and encoders the user can set the system up like a manual RF positioner and the system never loses track of the probe location.

Multiple positioners can be located not only in the East and West, but also the North and South locations.



RF TopHat with Probe Window

Reduced Path Length and Improved Accuracy

Exclusive TopHat

- Dark, shielded and frost-free
- Shortest cable length
- Minimized system drift
- Unique window for easy set up
- Improved dynamic range
- Advanced accuracy

Only Available EXCLUSIVE From FormFactor

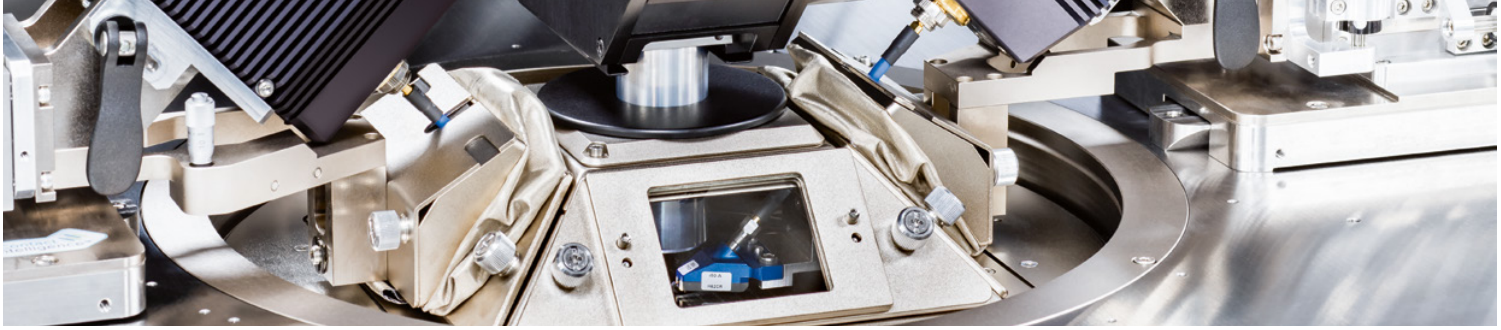
The Autonomous RF Measurement Assistant was designed to minimise cable lengths, prevent stiction which impacts motorised positioner accuracy, and maintains a dark, shielded and frost-free measurement environment.

Reducing cable length to only 10 cm helps to improve system drift and dynamic range.

The new TopHat Window allows easy set up of probes without having to open the MicroChamber.

Full Automation with Optional Wafer Handling Unit

With the optional loader that is available for the SUMMIT200 and CM300xi, the system combines fully-automated wafer test with highest accuracy and flexibilty. The loader can handle up to fifty wafers provided in SEMI-standard wafer cassettes.



*"Only the **Autonomous RF Measurement Assistant**, a combination of programmable positioners, a precise digital microscopy system and advanced pattern recognition algorithms, enables fully autonomous, hands-free calibrations and measurements of RF devices over multiple temperatures."*

Autonomous RF Capabilities

Autonomous calibrations and measurements to mm-wave frequencies
/ Up to 67 GHz using any standard Network Analyser
/ Up to 110 GHz using Keysight N5251A Network Analyser
/ Up to 110 GHz using Keysight N5290A Network Analyser
/ Up to 130 GHz using Keysight N5291A Network Analyser
/ Up to 500 GHz using Virginia Diodes Inc 'Mini' Extenders

Autonomous calibrations and measurements supports
/ Infinity Coax Probes to 130 GHz
/ Infinity XT Coax Probes to 120 GHz
/ Infinity Waveguide Probes from 50 GHz to 330 GHz
/ T-Wave Waveguide Probes to 500 GHz
/ GSG probe pitches from 50 µm to 250 µm
/ GSGSG probe pitches 100 µm

Autonomous calibrations and measurements over wide temperature ranges
/ -40°C to 125°C using Infinity Probes
/ -40°C to 175°C using Infinity XT Probes
/ -40°C to 125°C using T-Wave Waveguide Probes

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