Increase Confidence in Measurements Using **Maury Microwave Type N Calibration, Validation and Interconnect Solutions**

SOLUTIONS BROCHURE / 1E-005

Maury Microwave

// OCTOBER 2021

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Confidence in Measurements

In today's competitive market, many companies are losing customer trust because the product they promise, or the product they ship, does not match customer expectations, or customer's own validation. Equally, many companies are losing market share because they are taking too long to release products due to multiple design cycles or prolonged qualification due to measurement variations or inconsistencies. Finally, many companies face production yield challenges due to built-in buffers to ensure passed parts pass, or due to inconsistent pass/fail data resulting in higher rejection rate. The root cause is often caused by inconsistencies: inconsistencies between measured data and simulations or expectations, inconsistencies related to measurement variability over time, or inconsistencies related to measurements across multiple test benches at one or more sites. These inconsistencies often lead to a lack of trust, or confidence, in measurements.

Our mission is to give our customers confidence in their RF through THz measurements and models. We have developed and offer all aspects of measurement and modeling systems with the primary objective of ensuring our customers have confidence in their measurements and models. We complete your lab with:

Calibration, validation and measurement solutions including

- Coaxial and waveguide VNA calibration kits which empower the highest calibration accuracy
- Calibration verification kits to validate VNA calibrations with an unambiguous go/no-go decision
- Software to drive the VNA calibration, validation and S-parameter measurement process with an emphasis on characterized measurement uncertainties

Interconnect solutions including

- VNA test port, phase-stable and general-purpose cable assemblies designed to reduce measurement uncertainties
- Calibration-grade (metrology), color-coded precision and general purpose in-series and between-series adapters, and color-coded precision attenuators, emphasizing improved VSWR and MIL-spec pin depth and concentricity for improved connection repeatability
- Torque wrenches and gage kits to ensure accurate and repeatable connections each time

Device characterization solutions

- For more information on Maury's device characterization solutions, please visit *www.maurymw.com*

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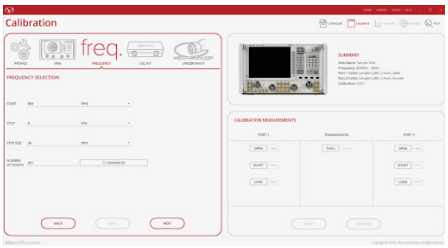
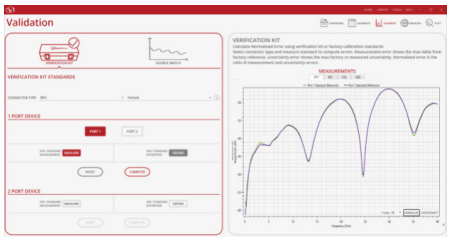
Calibration, Validation and Measurement Solutions

Insight is the industry's first software suite designed to empower VNA users and help them make better decisions. Insight represents a paradigm shift in the way users approach VNA calibration, validation, measurement, visualization and analysis. A single software platform standardizes the interface for all generations of VNA models and adds an intuitive GUI and wizard which walks users through every step. Advanced VNA calibration identifies and quantifies the individual sources of measurement uncertainty and can be used to improve measurement accuracy. Calibration validation uses uncertainty boundaries to definitively identify good and bad calibrations. Real-time measurements with uncertainty boundaries allow users to better understand their devices. Advanced visualization and analysis helps users make better decisions which results in bringing the best products to market faster.





PDF DATA SHEET 4T-023

Maury's new characterized device (CD) VNA calibration kits and verification kits are designed to improve confidence in your S-parameters measurements.

With individually characterized standards, CD cal kits result in calibrations with TRL-like accuracy and SOL ease-of-use, thereby improving your measurements while reducing the opportunity for potential user errors. Cal kits come with factory-characterized uncertainty data and can be used with Maury's Insight software to quantify its contribution on the overall DUT measurement uncertainty.

Maury's new verification kits include multiple standards with similar characteristics to different types of DUTs, thereby increasing the meaningfulness of the validation. Like the cal kits, verification kits come with factory-characterized uncertainty and can be used with Insight to conclusively determine the validity of a VNA calibration.

Type N VNA calibration kits

PDF DATA SHEET 2Z-076

8850CK40 – fixed load SOLT kit (polynomial definitions)

8850CK41 – fixed load SOLT kit (polynomial definitions) with adapters

8850CK50 – characterized device (CD) fixed load SOLT kit

8850CK51 – characterized device (CD) fixed load SOLT kit with adapters

Type N calibration verification kits

PDF DATA SHEET 2Z-077

8850CK60 – characterized verification kit

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Interconnect Solutions

Measurement uncertainty can be seen as the potential variability between measurements caused by all aspects of a measurement system. Objectively, the two largest contributors to measurement uncertainty are cables and connectors as they impact the repeatability of a measurement.

The signal passing through a cable assembly will change in magnitude and phase as the cable is moved. Measuring a device with the cable in a certain position may yield different results from the same measurement with the cable in a second, third and fourth position. The more the measurement changes with flexure, the higher the cable's measurement uncertainty contribution.

Similarly, signal changes caused by connector mating repeatability will directly impact measurement uncertainty. A connector's ability to offer repeatable connections stems from pin depth and concentricity, and mating force. Recessed or non-concentric center pins lead to reduced measurement accuracy and repeatability and hence an increased uncertainty. Protruding center pins will damage your mating connector. Hand-threading an RF connector often leads to inconsistent mating between connectors and an increased measurement uncertainty.

Maury Microwave's Interconnect Solutions offering consists of cable assemblies, adapters and attenuators developed specifically to reduce measurement uncertainty, and gages and torque wrenches to ensure accurate and repeatable measurements.

Stabilityplus™ Maury Microwave

DATA SHEET
2Z-009

Maury Microwave's StabilityPlus™ series sets the standard for high performance ruggedized cable assemblies. Designed specifically for phase-stable and amplitude-stable applications, StabilityPlus™ offers excellent measurement repeatability even after cable flexure. StabilityPlus'™ light weight, superior flexibility and small form factor make it ideal for daily use with VNA's, test instruments, bench-top testing and ATE systems.

Stabilitybench™ Maury Microwave

DATA SHEET
2Z-007

Maury Microwave's Stability Bench™ series sets the standard for high-end all-purpose test and measurement cable assemblies. Designed for general testing applications, Stability Bench™ offers excellent value with its low cost, low insertion loss, excellent return loss, flexibility, and amplitude and phase stability. Stability Bench™ is the ideal interconnection for reliable and repeatable measurements when mated with test instruments including bench-top testing, on-wafer characterization and ATE systems.

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StabilityVNA, StabilityPlus™ and StabilityPlus™ Low-Profile are available in standard and custom configurations, including custom lengths, input/output connector pairs, phase matched sets, right angle connectors and high-temperature boots.

Standard configurations include:

Series	Frequency Range	Configuration	Length	Model Number	Image
StabilityPlus™	18 GHz	Type N male to Type N male	24”	SP-N-MM-24	
			36”	SP-N-MM-36	
			48”	SP-N-MM-48	
			60”	SP-N-MM-60	
			78”	SP-N-MM-78	

Series	Frequency Range	Configuration	Length	Model Number	Image
StabilityBench™	18 GHz	Type N male to Type N male	24”	SB-N-MM-24	
			36”	SB-N-MM-36	
			48”	SB-N-MM-48	
			60”	SB-N-MM-60	
			78”	SB-N-MM-78	
		SMA male to Type N male	24”	SB-SMAN-MM-24	
			36”	SB-SMAN-MM-36	
			48”	SB-SMAN-MM-48	

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Coaxial In-Series and Between-Series Adapters

Maury Microwave's comprehensive line of calibration-grade (metrology) adapters have been designed as an integral part of its renowned Vector Network Analyzer (VNA) Calibration Kits and are also available separately where calibration-grade precision is demanded.

ColorConnect™ Maury Microwave

ColorConnect™ Precision Adapters have been designed for lab and field use where quality, performance, ease-of-identification and ease-of-use are critical. New manufacturing techniques have given ColorConnect™ Precision Adapters improved VSWR specifications bridging the gap between calibration-grade metrology adapters and daily-use lab adapters. Following the proposed IEEE high-frequency connector/adapter color convention, ColorConnect™ Precision Adapters are the first commercially available products to offer clear indications of compatibility and intermatability. ColorConnect™ makes it a simple matter to avoid and eliminate damaged equipment, degraded equipment reliability, degraded performance and lengthy maintenance times due to improper mating (and attempted mating) of incompatible adapters.

Test Essentials™ Maury Microwave

Test Essentials™ Lab Adapters have been designed for daily use in microwave/RF labs and production facilities and offer one of the industry's best price/performance values. Test Essentials™ Lab Adapters feature excellent electrical performance, rugged construction for durability, repeatable mating and high reliability.

PDF DATA SHEET 2B-075

Configuration	Frequency Range	Adapter Series			
		Calibration-Grade / Metrology		ColorConnect™	TestEssentials™
NMD2.4mm female to Type N female	18 GHz	7909D3		N/A	
NMD2.4mm female to Type N male		7909D4			
2.4mm female to Type N female		7923A			
2.4mm female to Type N male		7923B			
2.4mm male to Type N female		7923C			
2.4mm male to Type N male		7923D			
2.92mm female to Type N female		8723A			
2.92mm female to Type N male		8723B			
2.92mm male to Type N female		8723C			
2.92mm male to Type N male		8723D			
NMD3.5mm female to Type N female		8829A1			
NMD3.5mm female to 3 Type N male		8829B1			

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3.5mm female to Type N female	18 GHz	8023A		CC-A-35N-FF		TE-A-35N-FF	
3.5mm female to Type N male		8023B1		CC-A-35N-FM		TE-A-35N-FM	
3.5mm male to Type N female		8023C		CC-A-35N-MF		TE-A-35N-MF	
3.5mm male to Type N male		8023D1		CC-A-35N-MM		TE-A-35N-MM	
SMA female to Type N female		N/A		CC-A-SMAN-FF		TE-A-SMAN-FF	
SMA female to Type N male				CC-A-SMAN-FM		TE-A-SMAN-FM	
SMA male to Type N female				CC-A-SMAN-MF		TE-A-SMAN-MF	
SMA male to Type N male				CC-A-SMAN-MM		TE-A-SMAN-MM	
Type N female to Type N female		8828A2		CC-A-N-FF		TE-A-N-FF	
Type N male to Type N male		8828B2		CC-A-N-MM		TE-A-N-MM	
Type N female to Type N male		8828C2		CC-A-N-MF		TE-A-N-MF	
Type N female to TNC female		8817A		N/A			
Type N female to TNC male		8817B					
Type N male to TNC female		8817C					
Type N male to TNC male		8817D					
Type N female to BNC female		8021A1					
Type N female to BNC male		8021B1					
Type N male to BNC female		8021C1					
Type N male to BNC male		8021D1					

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Connector Gages

Connector gages are an essential tool to ensure connectors pins are flush and concentric. Maury's connector gage kits provide an easy to use, direct reading, self-checking, and accurate way to measure the critical linear interface dimensions of most coaxial connectors. These kits consist of gages with specially adapted dial indicators, plus the correct bushings and pins needed to mate with specified connectors. A master setting gage is used to adjust the dial indicator to zero, before a push-on or thread-on gage is mated with a connector to measure the distance from a given interface (female or male contact location) to the outer conductor mating plane.

DATA SHEET
2Y-051

Type N gages

A020K – Type N digital connector gage kit

A020D – Type N analog thread-on connector gage kit

A020A – Type N analog push-on connector gage kit

A007A – Type N analog push-on connector gage kit

Torque Wrenches

Torque wrenches are a simple and inexpensive tool to ensure repeatable force is applied to the connection each time, thereby ensuring a proper and secure connection and reducing measurement uncertainty. Maury torque wrenches employ a "break" design so it is impossible to over-torque a coupled junction, and torque can be applied in either direction. Each Maury torque wrench is factory preset to the proper in/lbs for tightening its coaxial connector type, and the color-coded handles make it easy to select the correct wrench from your toolbox at a glance.

DATA SHEET
2Y-050A

Type N torque wrench

TW-12 – 0.75 hex torque wrench with 12 in/lb torque

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